무료 전자 책

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iOS

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1: iOS

1- iOS Apple . Apple ID . Apple ID . App Store Apple Developer Program 99 USD ( ). TestFlight .

2- Apple ID . https://appleid.apple.com/ .

- iOS ()
- Xcode ( )
- (AppStore Xcode)

- iOS macOS xcode Apple IDE ( )
- swift-language iOS .
- objective-c-language iOS .
- cocoa iOS macOS Apple API.
- sprite-kit 2D .
- core-data .

iPhone OS 2	2008-07-11
iPhone OS 3	2009-06-17
iOS 4	2010-06-08
iOS 5	2011-10-12
iOS 6	2012-09-19
IOS 7	2013-09-18
iOS 8	2014-09-17
iOS 8.1	2014-10-20
iOS 8.2	2015-03-09
iOS 8.3	2015-04-08
iOS 8.4	2015-06-30
iOS 9	2015-09-16
iOS 9.1	2015-10-22
iOS 9.2	2015-12-08

iOS 9.3	2016-03-21
iOS 10.0.1	2016-09-13
iOS 10.1	2016-10-24
iOS 10.2	2016-12-12
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iOS 10.3	2017-03-27
iOS 10.3.3	2017-07-19

Examples

iOS Xcode . Xcode Apple . , macOS . Xcode 9 ( ) Xcode 8.3.3 .

1. Mac Xcode App Store .

   (App Store Apple Developer Xcode .)

2. Xcode . .

Welcome to Xc

Version 8.0 (8A218a)

Get started with a playground
Explore new ideas quickly and easily.

Create a new Xcode project
Create an app for iPhone, iPad, Mac, Ap

Check out an existing project
Start working on something from an SC

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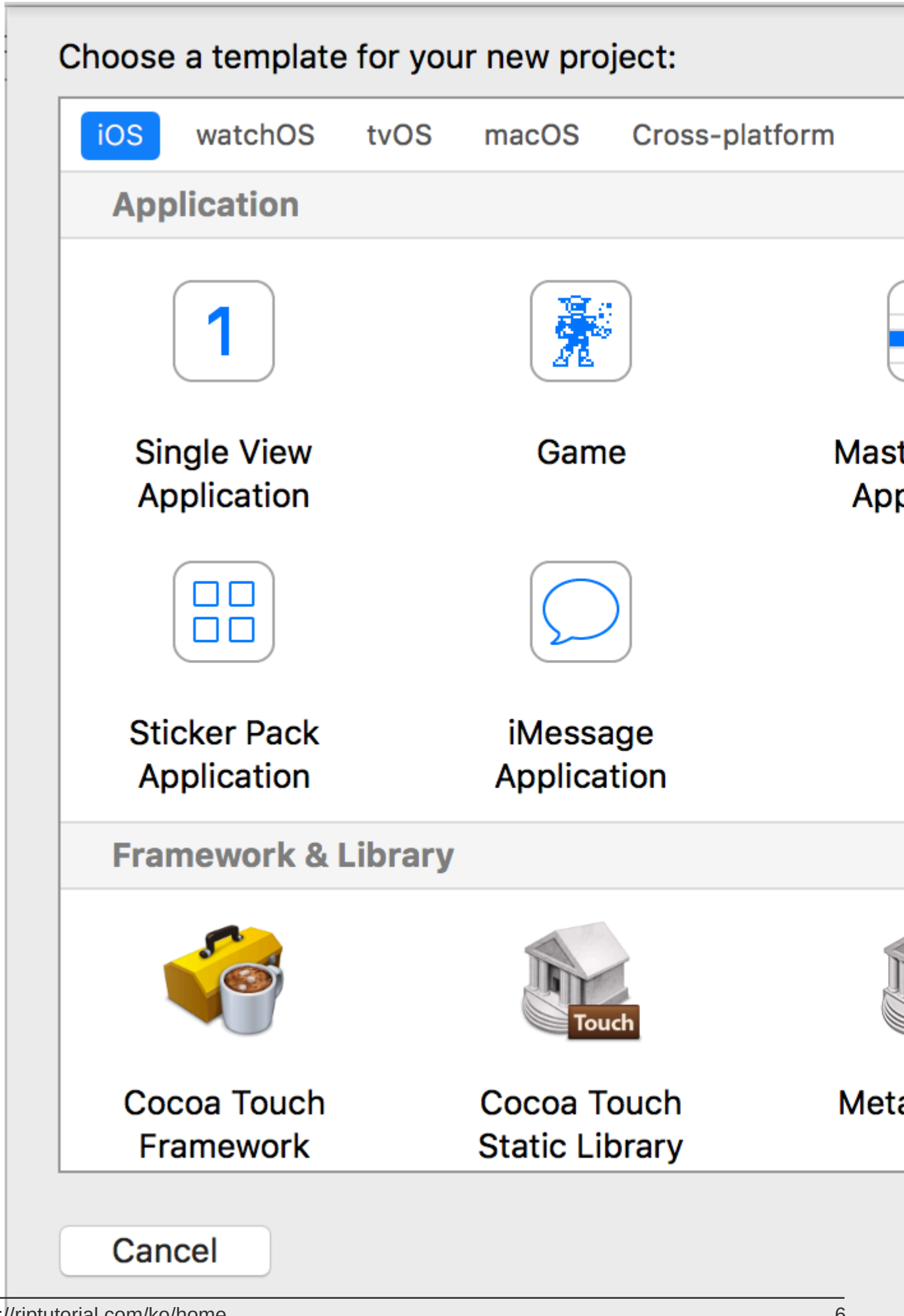
- **:** Swift Xcode 6 . . .
- **Xcode :** .
- **:** , SVN .

3. **Xcode** Xcode .


Choose a template for your new project:
iOS
watchOS
tvOS
macOS
Cross-platform
Application
1
Single View Application
Game
Sticker Pack Application
iMessage Application
Framework & Library
Touch
Cocoa Touch Framework
Cocoa Touch Static Library
Cancel

. 5 .

- **iOS :** iOS , **.**
- **watchOS :** watchOS , **.**
- **tvOS :** tvOS , **.**
- **macOS :** macOS , , , , AppleScripts .
- **:** , **.**

. . UI .

iOS .

1. - :

   . . . UI iPad , .

2. :

   . .

3. :

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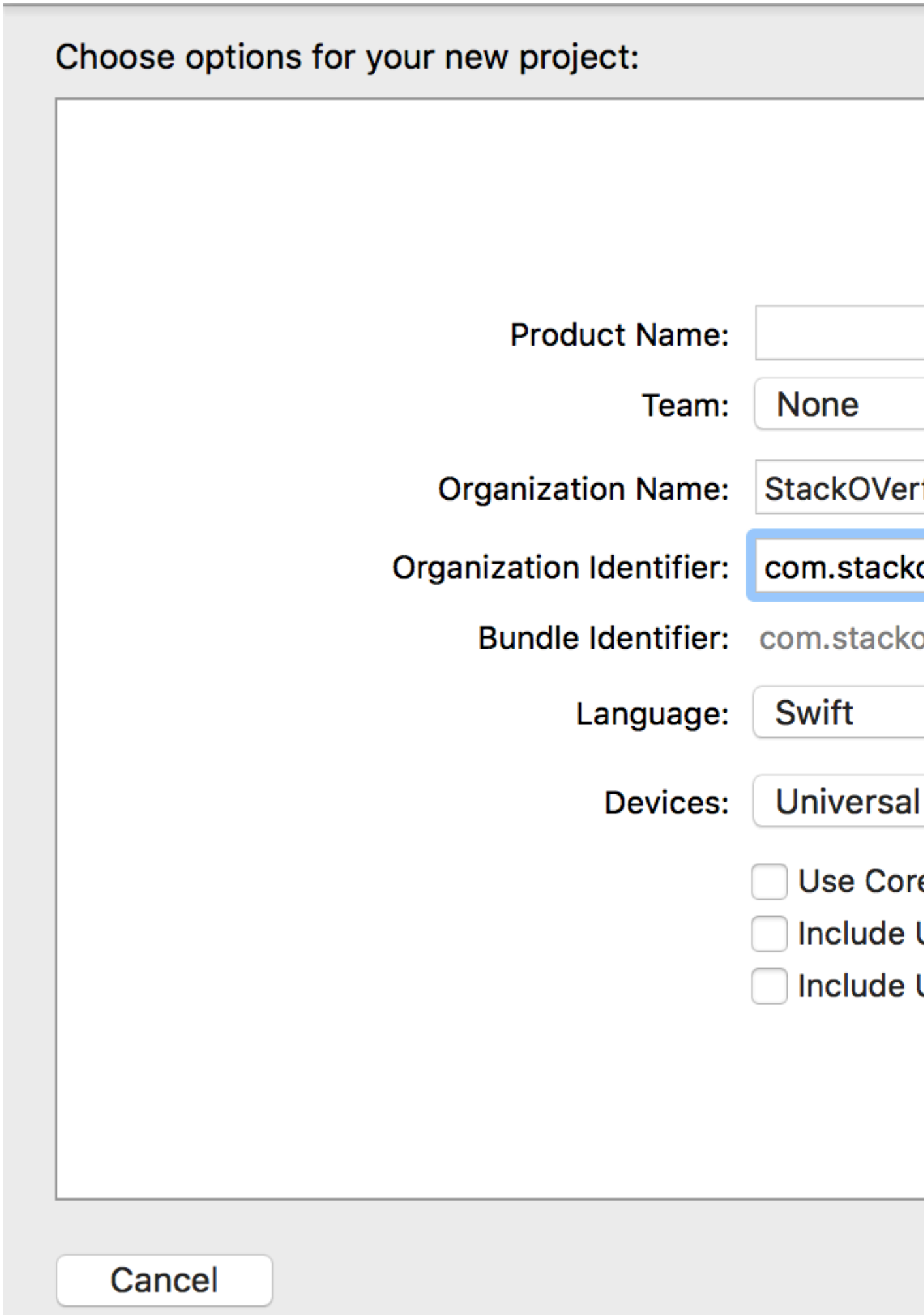
4. :

   . UI . , iTunes Store, iBooks App Store .

5. :

   . SceneKit, SpriteKit, OpenGL ES Metal .

4. **Single View Application** .


Choose options for your new project:
Product Name:
Team:
None
Organization Name:
StackOVer
Organization Identifier:
com.stacko
Bundle Identifier:
com.stacko
Language:
Swift
Devices:
Universal
Use Core
Include U
Include U
Cancel

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- **:** /
- **:**
- **:** . .
- **:** . . iTunes Connect ( ) . .
- **:** . Objective-C Swift .
- **:** . iPhone, iPad Universal . iPhone iPad .
- **:** `.xcdatamodel` `.xcdatamodel` . .
- **:** .
- **UI :** UI UI .

.
Create Xcode UI . .

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(: "iPhone 6") RUN .

5. ( ). . . . , , , , , , , , , .

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Apple ' Jump Right In ' . .

Xcode IOS .
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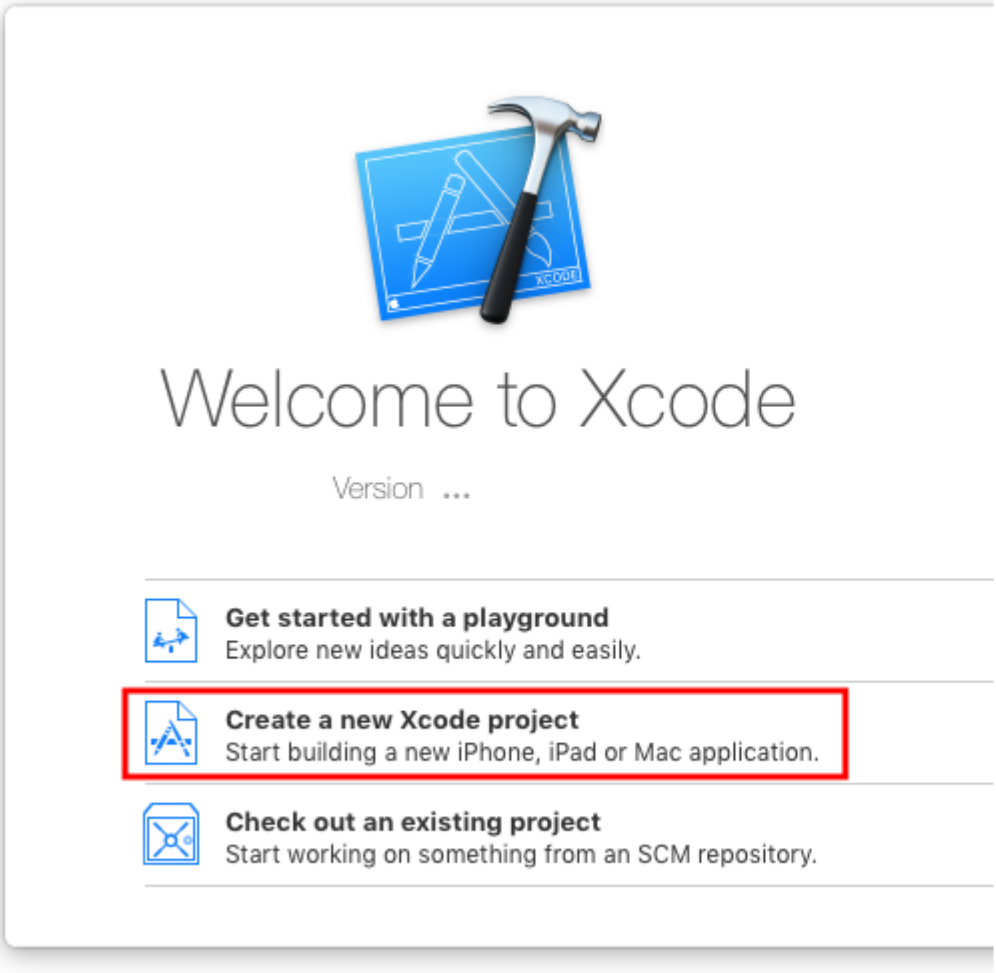
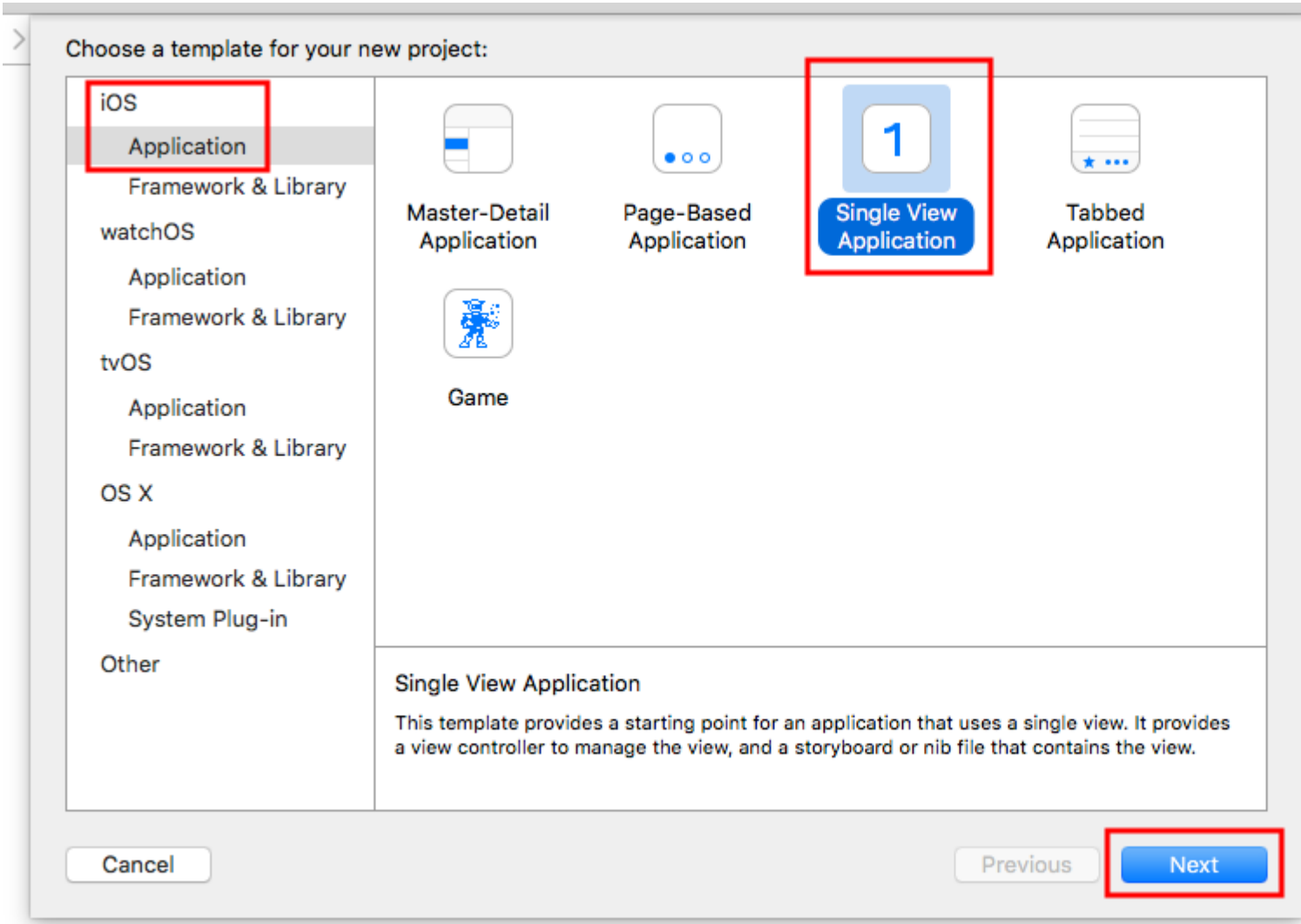
Xcode **Create a new Xcode project** . Xcode **> > ...** .

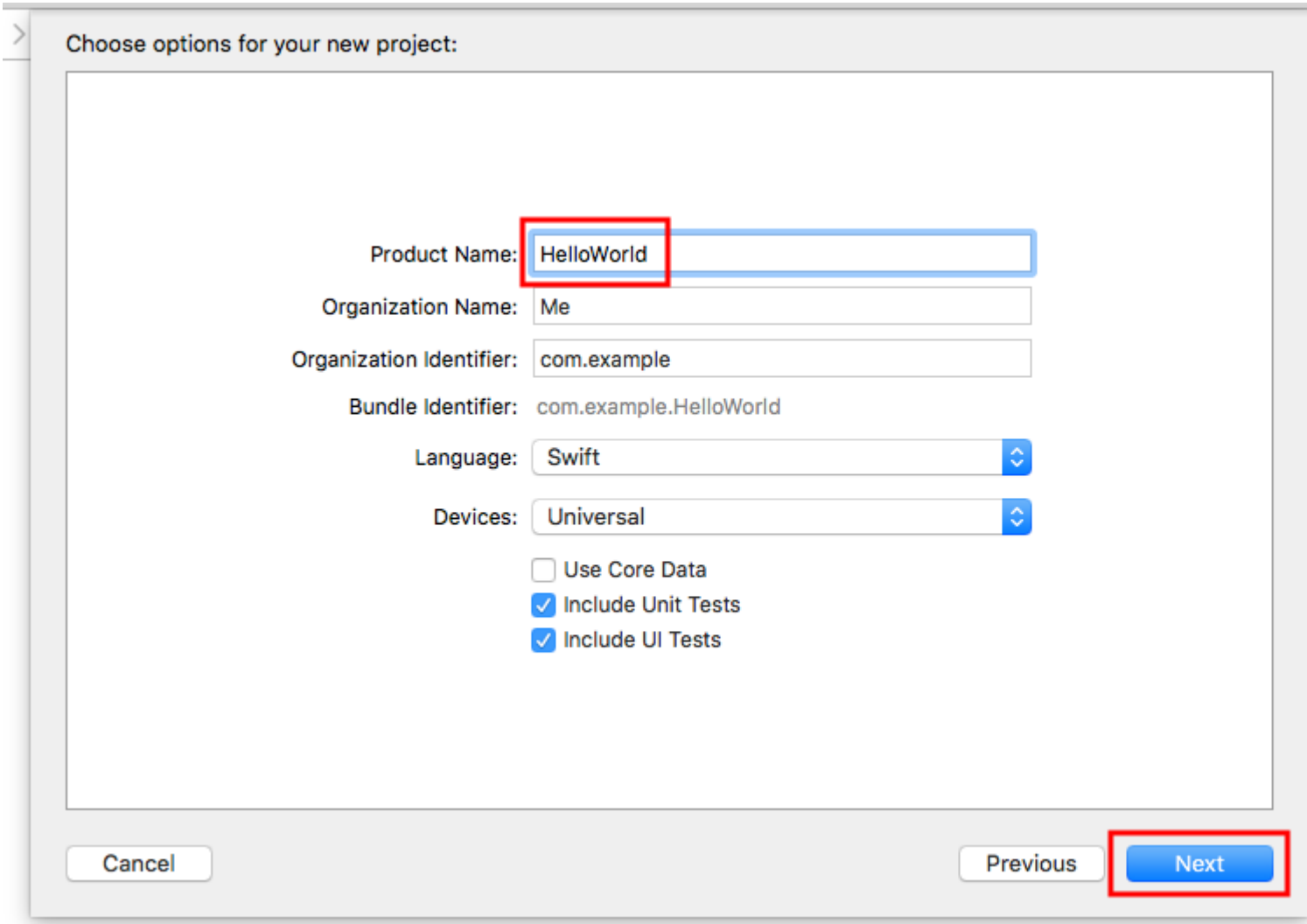

Welcome to Xcode
Version ...
Get started with a playground
Explore new ideas quickly and easily.
Create a new Xcode project
Start building a new iPhone, iPad or Mac application.
Check out an existing project
Start working on something from an SCM repository.

.

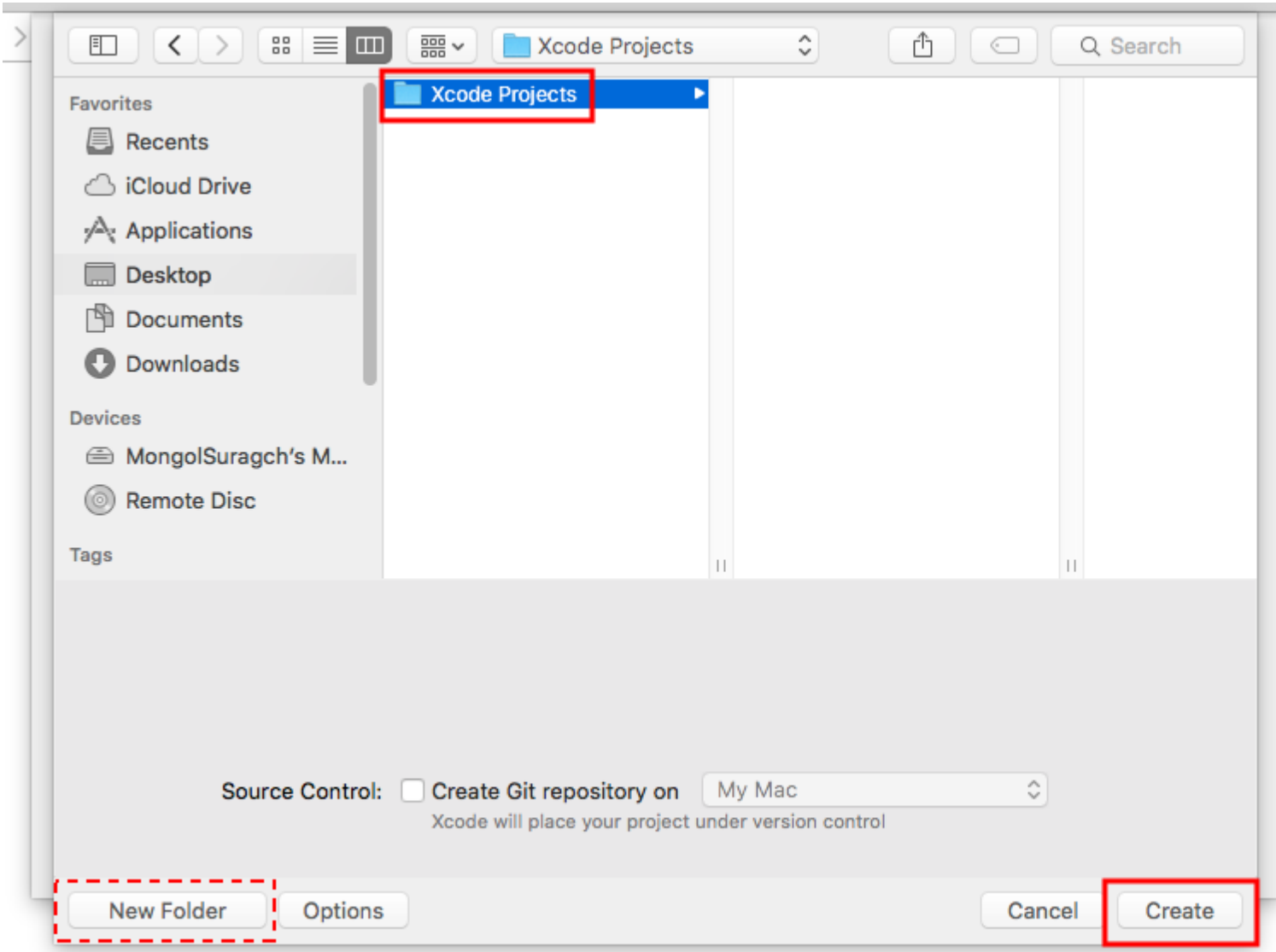


( ) "HelloWorld" .

- iPhone iPad .
- **Use Core Data** Hello World .
- **UI** .

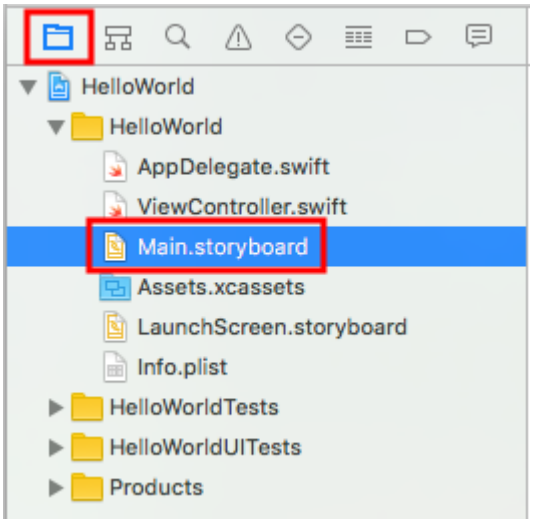


Xcode . . "Xcode Projects" . . (GitHub) .

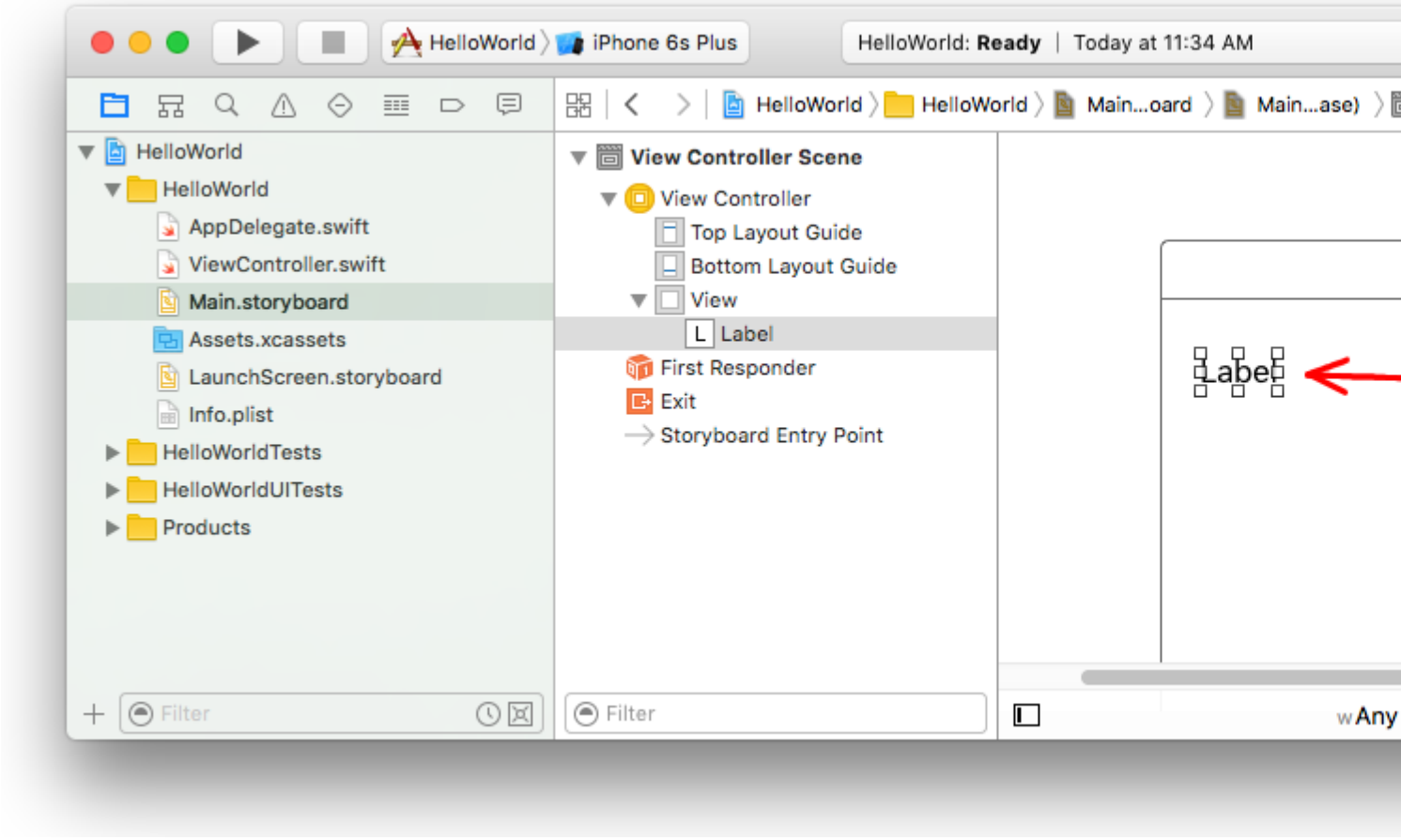


Xcode .

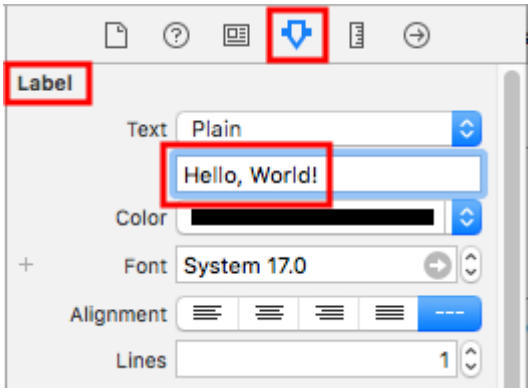
Project Navigator *Main.storyboard* .



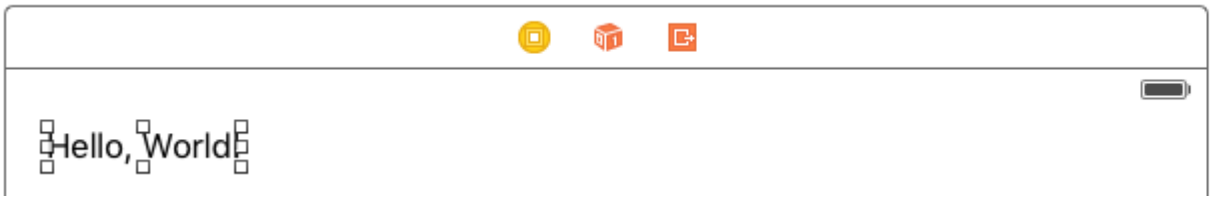
Xcode "label" . `UILabel` . .



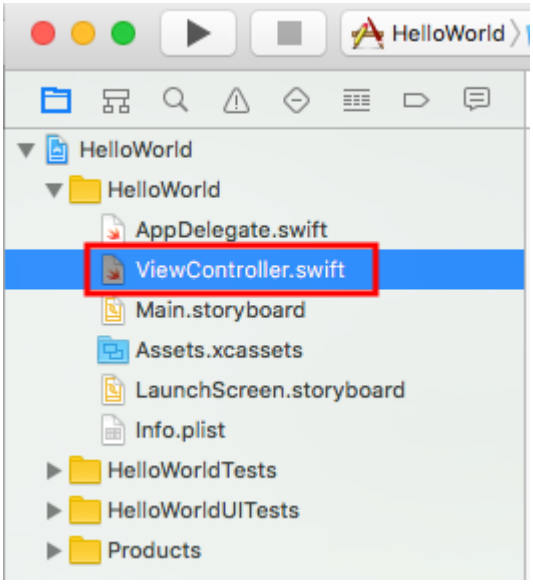
'Hello, World!' . .



"Hello, World!" . :



Project Navigator *ViewController.swift* .



`viewDidLoad() print("Successfully created my first iOS application.") . .`

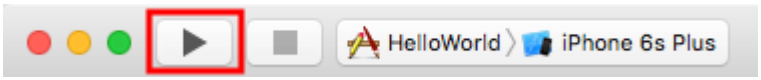
```
import UIKit

class ViewController: UIViewController {

    override func viewDidLoad() {
        super.viewDidLoad()

        // print to the console when app is run
        print("Successfully created my first iOS application.")
    }

    override func didReceiveMemoryWarning() {
        super.didReceiveMemoryWarning()
        // Dispose of any resources that can be recreated.
    }
}
```



. ("") iPhone 6s Plus . Xcode . . .

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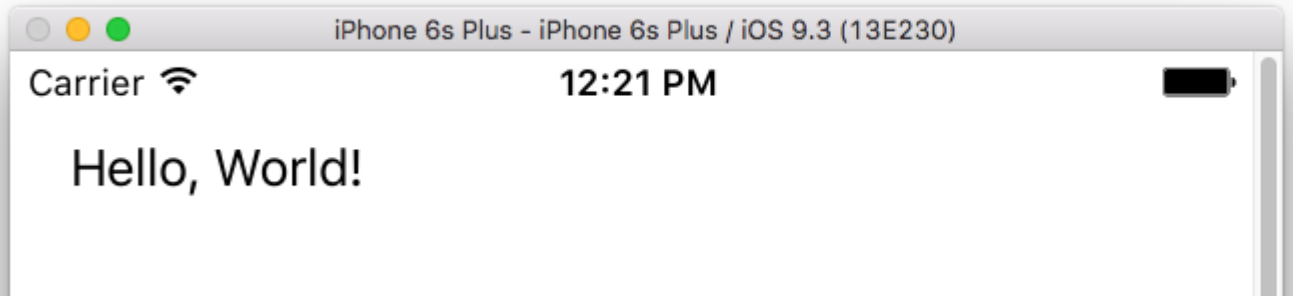
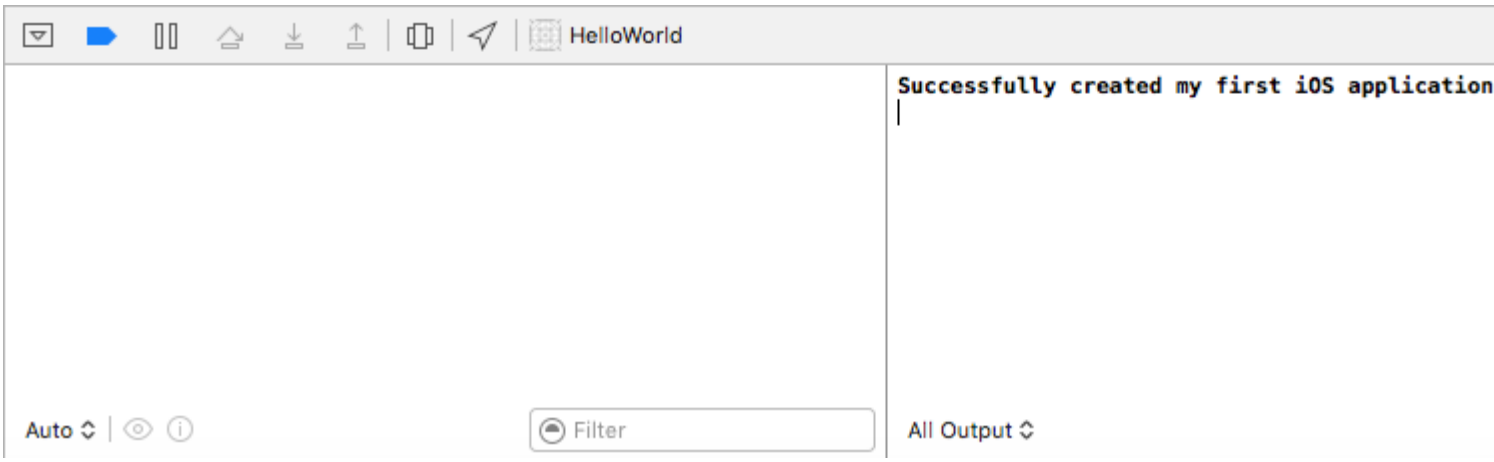


> cmd + 1/2/3/4/5 100 % / 75 % / 50 % / 33 % / 25 % .

Xcode () " iOS ." . . " iOS ." message .



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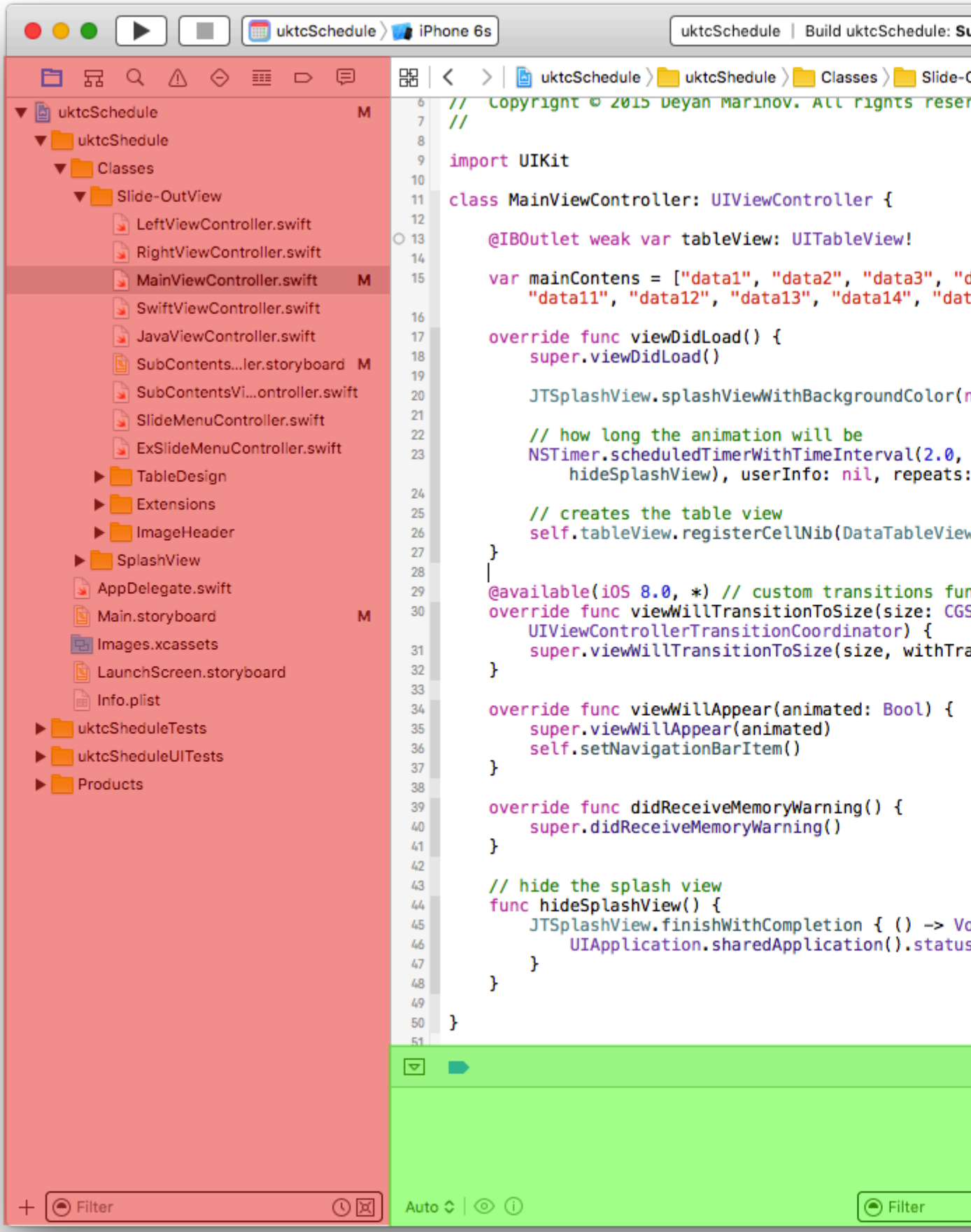
Xcode

Xcode (), () () .


uktcSchedule
iPhone 6s
uktcSchedule | Build uktcSchedule: Su
uktcSchedule
uktcShedule
Classes
Slide-OutView
LeftViewController.swift
RightViewController.swift
MainViewController.swift M
SwiftViewController.swift
JavaViewController.swift
SubContents...ler.storyboard M
SubContentsVi...ontroller.swift
SlideMenuController.swift
ExSlideMenuController.swift
TableDesign
Extensions
ImageHeader
SplashView
AppDelegate.swift
Main.storyboard M
Images.xcassets
LaunchScreen.storyboard
Info.plist
uktcSheduleTests
uktcSheduleUITests
Products
Filter
// Copyright © 2015 Deyan Marinov. All rights reser
//
import UIKit
class MainViewController: UIViewController {
@IBOutlet weak var tableView: UITableView!
var mainContens = ["data1", "data2", "data3", "d
"data11", "data12", "data13", "data14", "dat
override func viewDidLoad() {
super.viewDidLoad()
JTSplashView.splashViewWithBackgroundColor(
// how long the animation will be
NSTimer.scheduledTimerWithTimeInterval(2.0,
hideSplashView), userInfo: nil, repeats:
// creates the table view
self.tableView.registerCellNib(DataTableView
}
@available(iOS 8.0, *) // custom transitions fun
override func viewWillTransitionToSize(size: CGS
UIViewControllerTransitionCoordinator) {
super.viewWillTransitionToSize(size, withTra
}
override func viewWillAppear(animated: Bool) {
super.viewWillAppear(animated)
self.setNavigationBarItem()
}
override func didReceiveMemoryWarning() {
super.didReceiveMemoryWarning()
}
// hide the splash view
func hideSplashView() {
JTSplashView.finishWithCompletion { () -> Vo
UIApplication.sharedApplication().status
}
}
}
Auto
Filter

. , Xcode . MainViewController.swift .

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Xcode . . .

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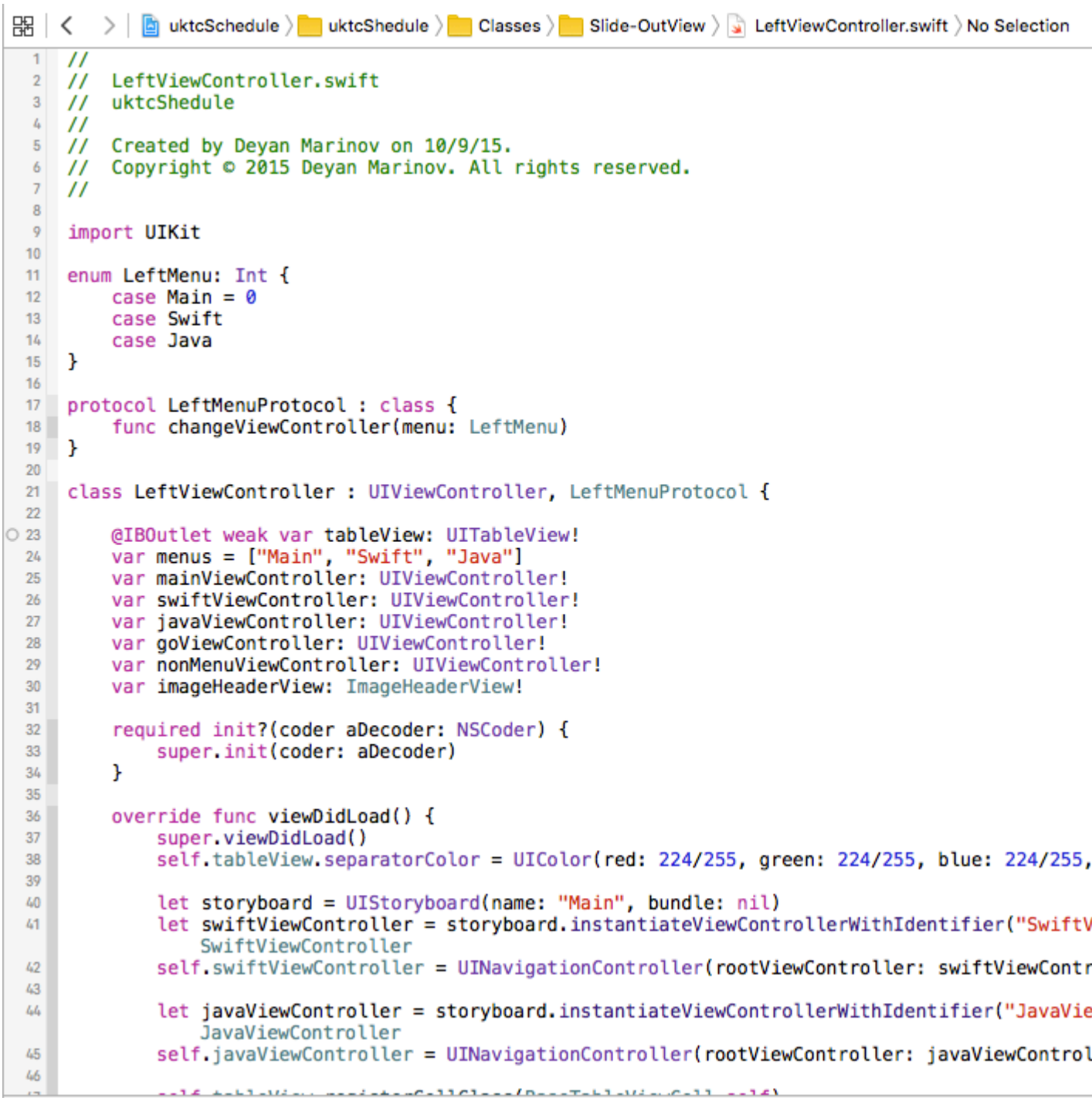
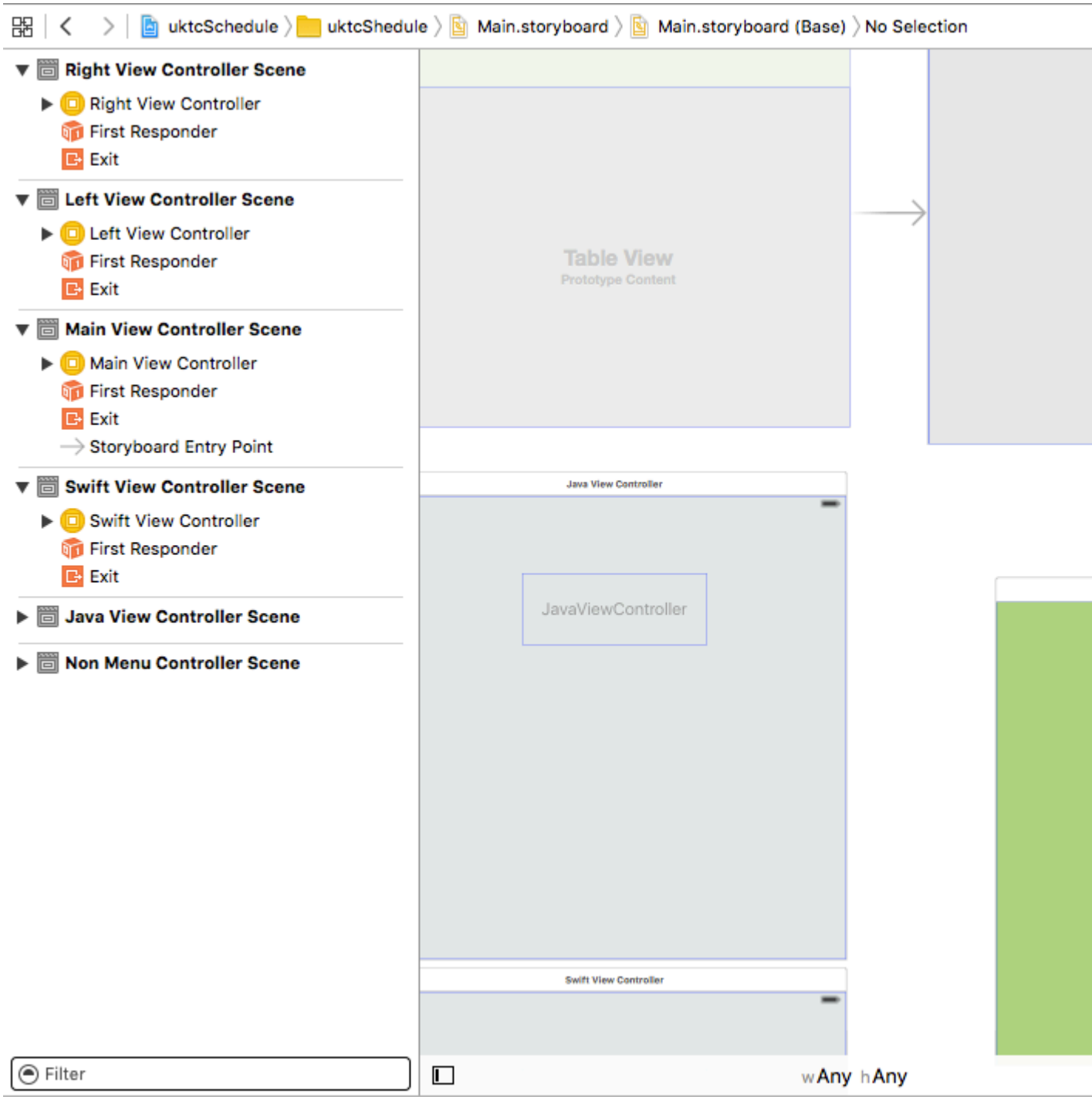



```swift
//
//  LeftViewController.swift
//  uktcShedule
//
//  Created by Deyan Marinov on 10/9/15.
//  Copyright © 2015 Deyan Marinov. All rights reserved.
//

import UIKit

enum LeftMenu: Int {
    case Main = 0
    case Swift
    case Java
}

protocol LeftMenuProtocol : class {
    func changeViewController(menu: LeftMenu)
}

class LeftViewController : UIViewController, LeftMenuProtocol {

    @IBOutlet weak var tableView: UITableView!
    var menus = ["Main", "Swift", "Java"]
    var mainViewController: UIViewController!
    var swiftViewController: UIViewController!
    var javaViewController: UIViewController!
    var goViewController: UIViewController!
    var nonMenuViewController: UIViewController!
    var imageHeaderView: ImageHeaderView!

    required init?(coder aDecoder: NSCoder) {
        super.init(coder: aDecoder)
    }

    override func viewDidLoad() {
        super.viewDidLoad()
        self.tableView.separatorColor = UIColor(red: 224/255, green: 224/255, blue: 224/255,

        let storyboard = UIStoryboard(name: "Main", bundle: nil)
        let swiftViewController = storyboard.instantiateViewControllerWithIdentifier("SwiftV
            SwiftViewController
        self.swiftViewController = UINavigationController(rootViewController: swiftViewContr

        let javaViewController = storyboard.instantiateViewControllerWithIdentifier("JavaVie
            JavaViewController
        self.javaViewController = UINavigationController(rootViewController: javaViewControl
```

- .


uktcSchedule
uktcShedule
Main.storyboard
Main.storyboard (Base)
No Selection
Right View Controller Scene
Right View Controller
First Responder
Exit
Left View Controller Scene
Left View Controller
First Responder
Exit
Main View Controller Scene
Main View Controller
First Responder
Exit
Storyboard Entry Point
Swift View Controller Scene
Swift View Controller
First Responder
Exit
Java View Controller Scene
Non Menu Controller Scene
Table View
Prototype Content
Java View Controller
JavaViewController
Swift View Controller
Filter
wAny hAny

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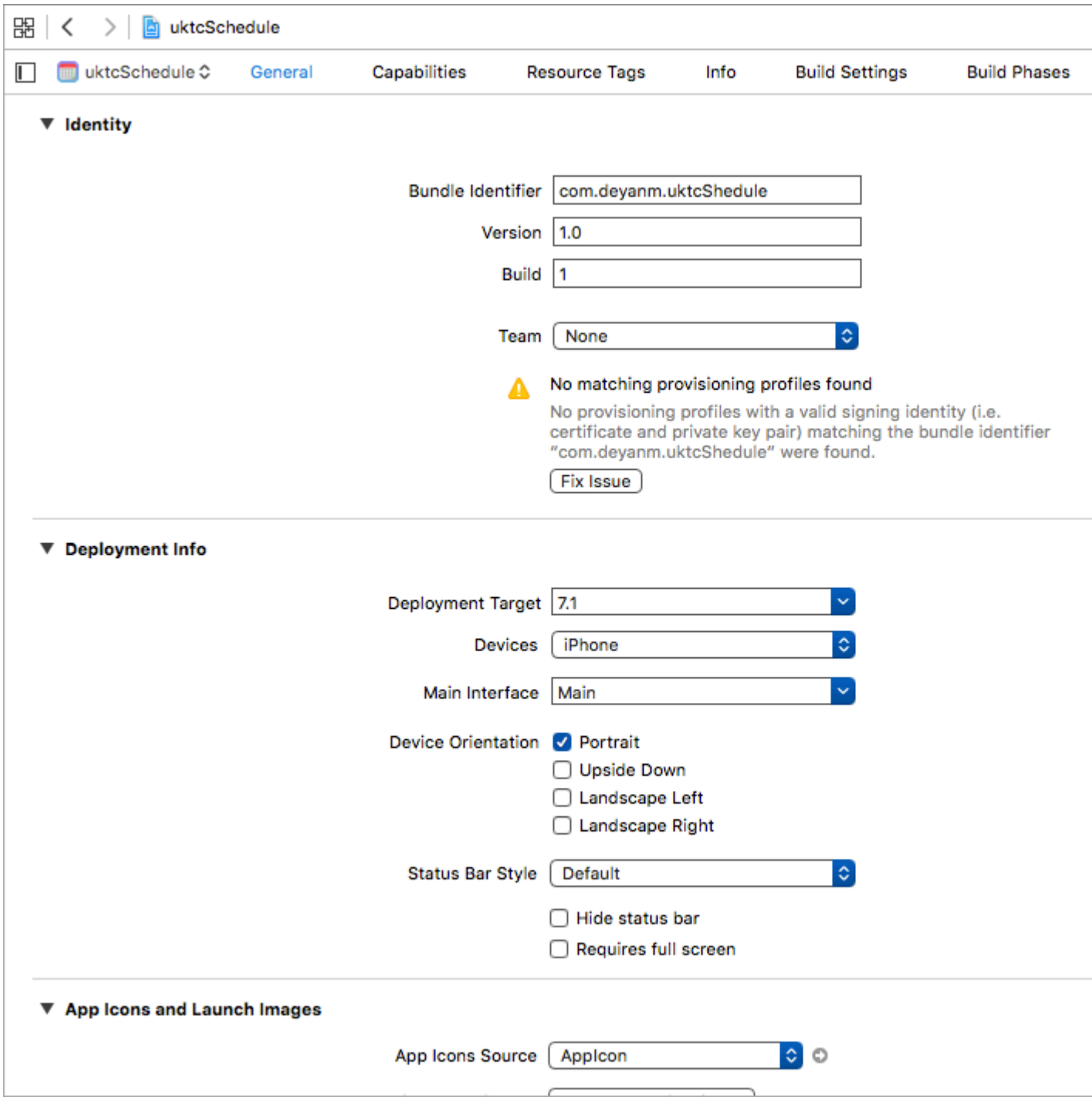
uktcSchedule
uktcSchedule
General
Capabilities
Resource Tags
Info
Build Settings
Build Phases
Identity
Bundle Identifier
com.deyanm.uktcShedule
Version
1.0
Build
1
Team
None
No matching provisioning profiles found
No provisioning profiles with a valid signing identity (i.e. certificate and private key pair) matching the bundle identifier "com.deyanm.uktcShedule" were found.
Fix Issue
Deployment Info
Deployment Target
7.1
Devices
iPhone
Main Interface
Main
Device Orientation
Portrait
Upside Down
Landscape Left
Landscape Right
Status Bar Style
Default
Hide status bar
Requires full screen
App Icons and Launch Images
App Icons Source
AppIcon

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. (Inspectors) - .

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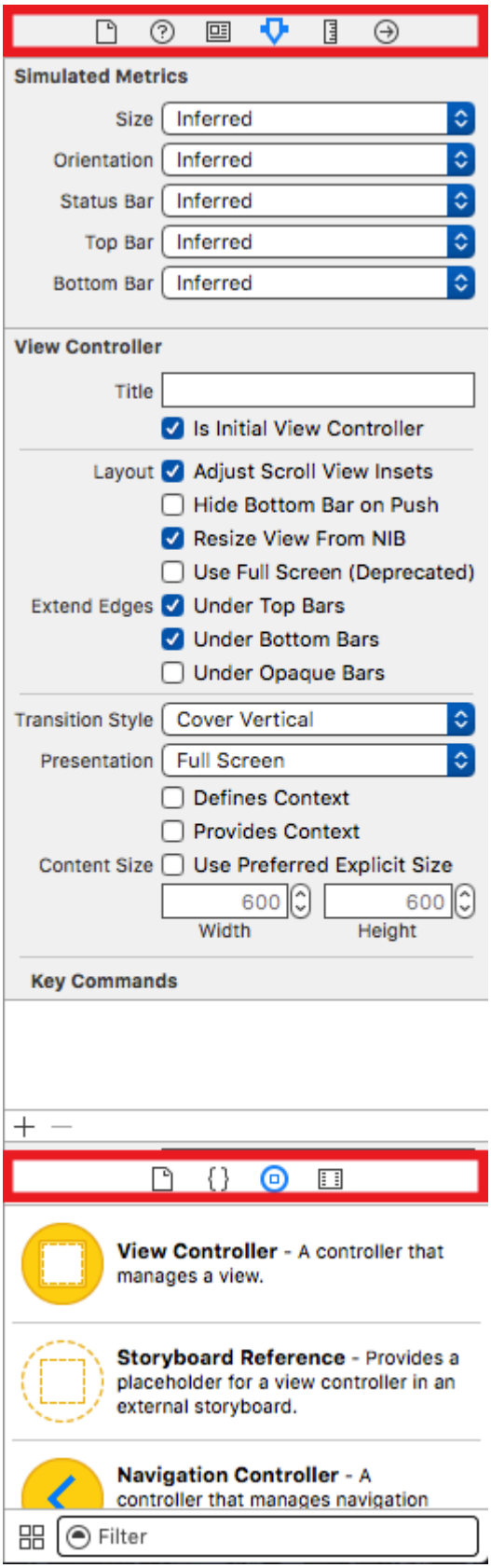

( ) **Inspector** **Inspector** . 2 ( ).

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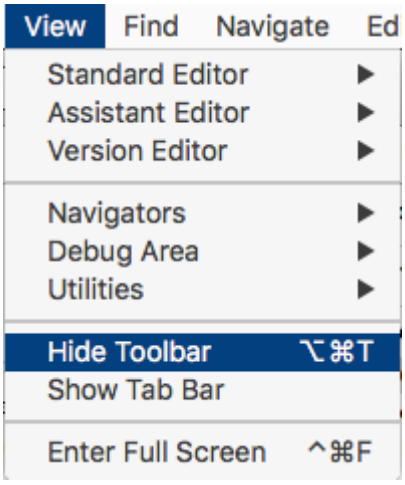

Swift 3

Swift 3 . .

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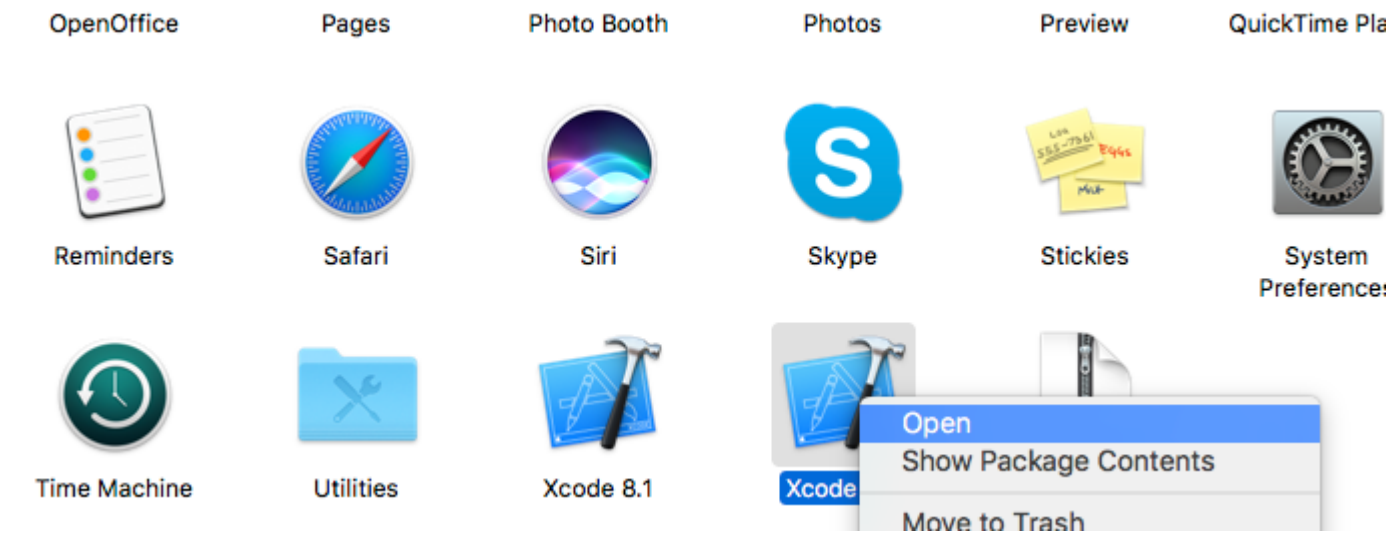
1. MAC OS - Xcode 8.2 10.11.6
2. Xcode - 8.2 Apple Document for Xcode .

Xcode 8.2 iOS 10 APi Swift 3 .

Application Xcode 8.2.



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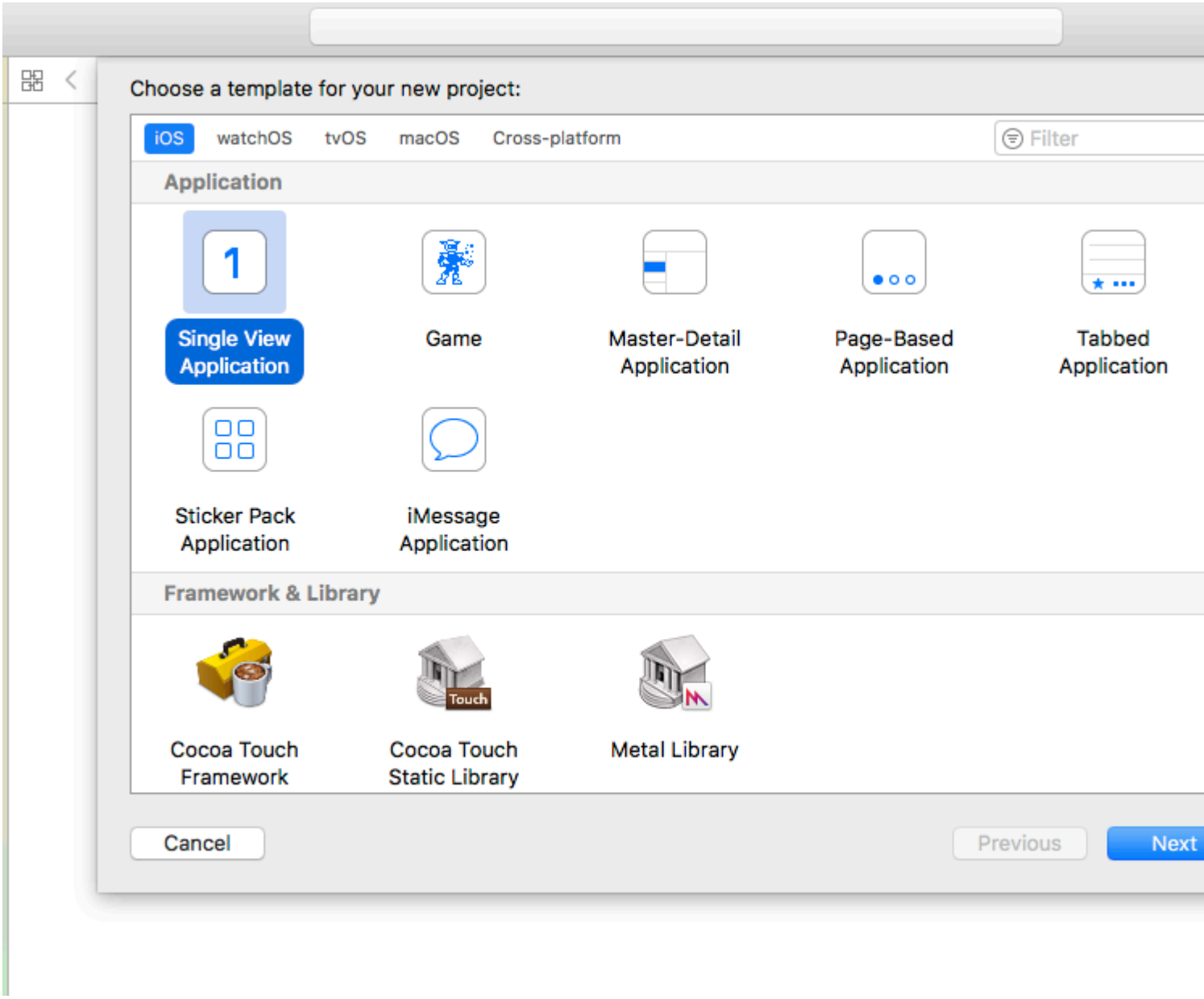
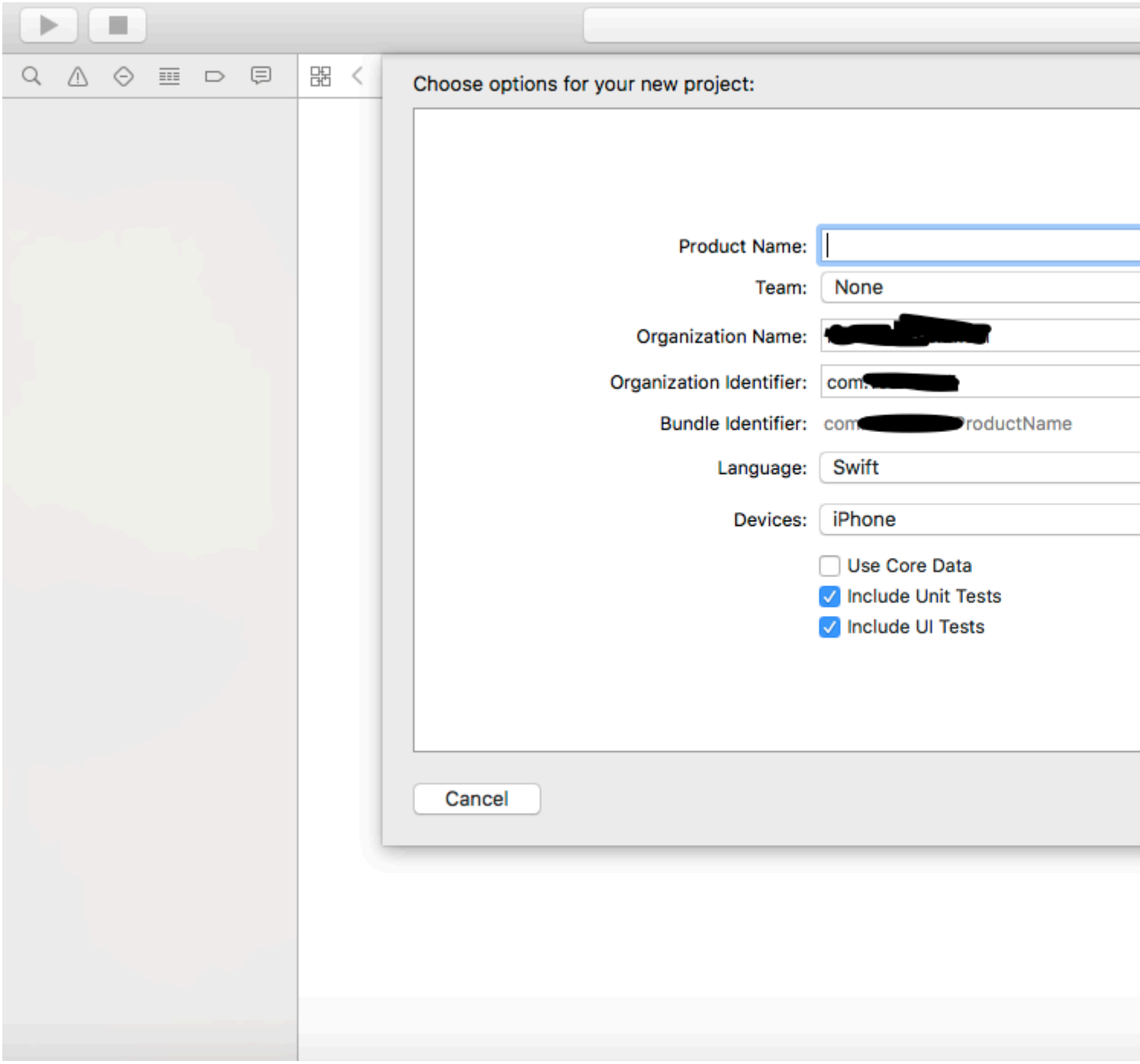
Create new Project .



Xcode . OS . 5 .

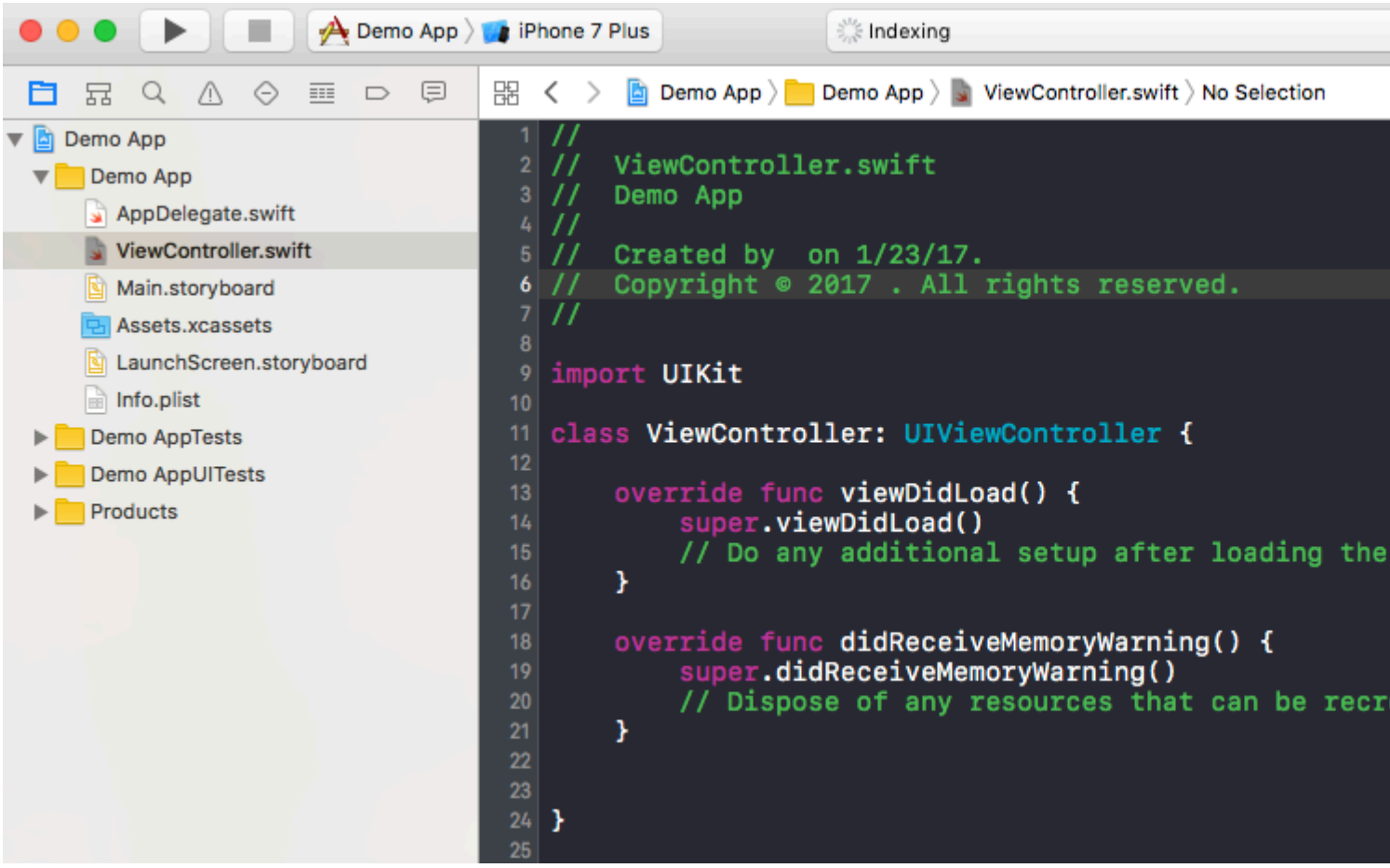
1. iOS
2. OS
3. OS
4.

iOS .



Product Name .

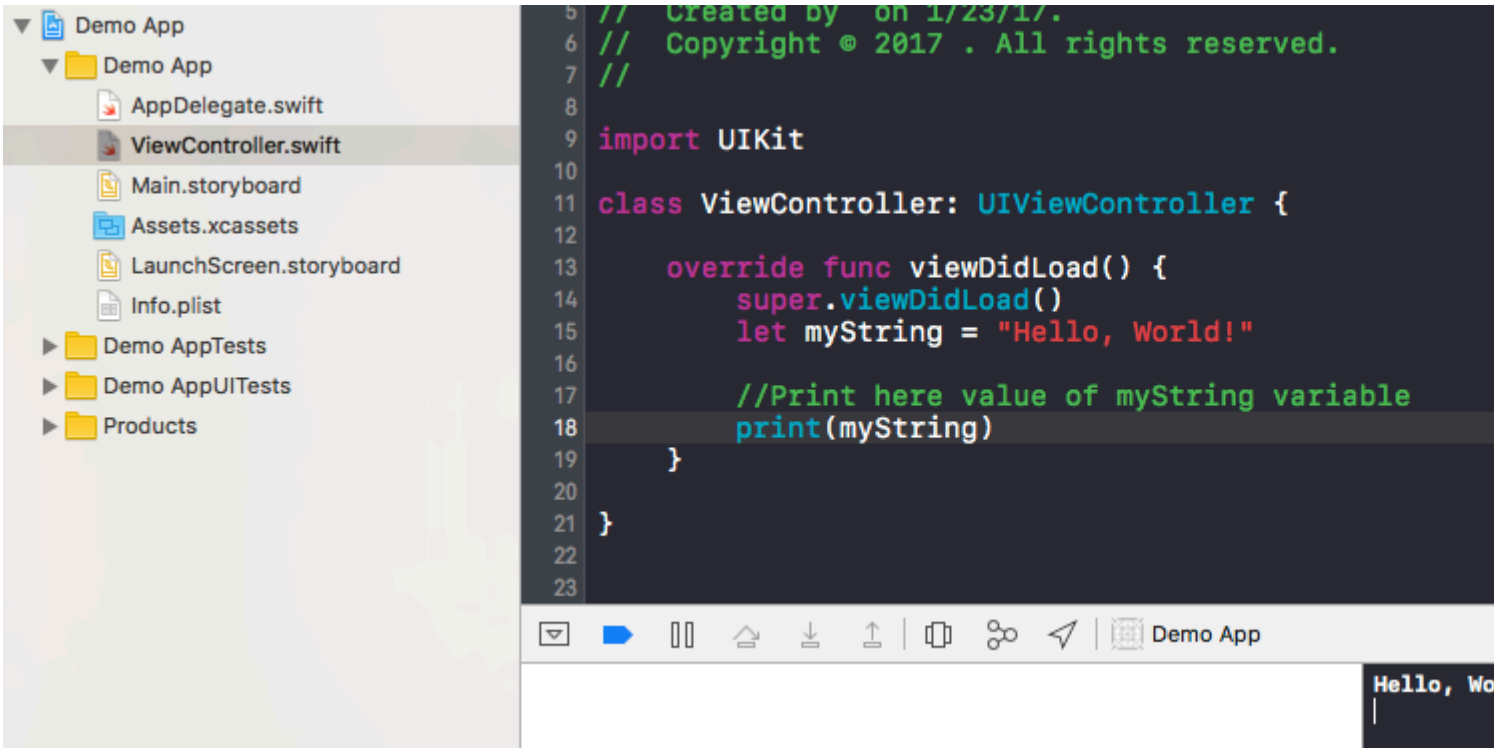
. " .



ViewController.swift UIViewController ViewController 'String' **myString** . 'super.viewDidLoad ()' .

```
let myString = "Hello, World!"
```

. "" .



. . Xcode Hello World .

iOS : https://riptutorial.com/ko/ios/topic/191/ios-

2: 3D

Examples

3D

6 3D . Peek Pop .

Peek and Pop

-

- .

3D

3D . *UITraitCollection forceTouchCapability* . UITraitCollection iOS .

```
if (traitCollection.forceTouchCapability == .Available) {
    registerForPreviewingWithDelegate(self, sourceView: view)
}
```

UIViewControllerPreviewingDelegate . *peek* .

peek *previewingContext* .

```
func previewingContext(previewingContext: UIViewControllerPreviewing,
viewControllerForLocation location: CGPoint) -> UIViewController? {

    guard let indexPath = self.tableView.indexPathForRowAtPoint(location), cell =
self.tableView.cellForRowAtIndexPath(indexPath) as? <YourTableViewCell> else {
        return nil
    }

    guard let datailVC =
storyboard?.instantiateViewControllerWithIdentifier("<YourViewControllerIdentifier>") as?
<YourViewController> else {
        return nil
    }

    datailVC.peekActive = true
    previewingContext.sourceRect = cell.frame

    // Do the stuff

    return datailVC

}
```

previewingContext. :)

```
func previewingContext(previewingContext: UIViewControllerPreviewing, commitViewController
```

```
viewControllerToCommit: UIViewController) {

    let balanceViewController = viewControllerToCommit as! <YourViewController>

    // Do the stuff

    navigationController?.pushViewController(balanceViewController, animated: true)

}
```

. 3D .

-C

```
//Checking for 3-D Touch availability
if ([self.traitCollection respondsToSelector:@selector(forceTouchCapability)] &&
        (self.traitCollection.forceTouchCapability == UIForceTouchCapabilityAvailable))
    {
        [self registerForPreviewingWithDelegate:self sourceView:self.view];
    }
//Peek
- (UIViewController *)previewingContext:(id<UIViewControllerPreviewing>)previewingContext
             viewControllerForLocation:(CGPoint)location {

    NSIndexPath *indexPath = [self.tableView indexPathForRowAtPoint:location];
    Country *country = [self countryForIndexPath:indexPath];
    if (country) {
        CountryCell *cell = [self.tableView cellForRowAtIndexPath:indexPath];
        if (cell) {
            previewingContext.sourceRect = cell.frame;
            UINavigationController *navController = [self.storyboard
instantiateViewControllerWithIdentifier:@"UYLCountryNavController"];
            [self configureNavigationController:navController withCountry:country];
            return navController;
        }
    }
    return nil;
}
//Pop
- (void)previewingContext:(id<UIViewControllerPreviewing>)previewingContext
commitViewController:(UIViewController *)viewControllerToCommit {

    [self showDetailViewController:viewControllerToCommit sender:self];
}
```

3 -C

-C

```
//Checking for 3-D Touch availability
if ([self.traitCollection respondsToSelector:@selector(forceTouchCapability)] &&
        (self.traitCollection.forceTouchCapability == UIForceTouchCapabilityAvailable))
    {
        [self registerForPreviewingWithDelegate:self sourceView:self.view];
    }
//Peek
- (UIViewController *)previewingContext:(id<UIViewControllerPreviewing>)previewingContext
```

```
              viewControllerForLocation:(CGPoint)location {

    NSIndexPath *indexPath = [self.tableView indexPathForRowAtPoint:location];
    Country *country = [self countryForIndexPath:indexPath];
    if (country) {
        CountryCell *cell = [self.tableView cellForRowAtIndexPath:indexPath];
        if (cell) {
            previewingContext.sourceRect = cell.frame;
            UINavigationController *navController = [self.storyboard
instantiateViewControllerWithIdentifier:@"UYLCountryNavController"];
            [self configureNavigationController:navController withCountry:country];
            return navController;
        }
    }
    return nil;
}
//Pop
- (void)previewingContext:(id<UIViewControllerPreviewing>)previewingContext
commitViewController:(UIViewController *)viewControllerToCommit {

    [self showDetailViewController:viewControllerToCommit sender:self];
}
```

3D : https://riptutorial.com/ko/ios/topic/6705/3d-

3: AFNetworking

Examples

AFNetworking AFNetworking . .

.

AFNetworking 2.xx :

```
// Create dispatch_queue_t with your name and DISPATCH_QUEUE_SERIAL as for the flag
dispatch_queue_t myQueue = dispatch_queue_create("com.CompanyName.AppName.methodTest",
                  DISPATCH_QUEUE_SERIAL);

// init AFHTTPRequestOperation of AFNetworking
operation = [[AFHTTPRequestOperation alloc] initWithRequest:request];

// Set the FMDB property to run off the main thread
[operation setCompletionQueue:myQueue];
```

AFNetworking 3.xx :

```
AFHTTPSessionManager *manager = [[AFHTTPSessionManager alloc] init];
[self setCompletionQueue:myQueue];
```

AFNetworking : https://riptutorial.com/ko/ios/topic/3002/afnetworking

4: AppDelegate

AppDelegate UIApplication .

(, analitycs (: Mixpanel / GoogleAnalytics / Crashlitics), DB) (: DB), URL . .

Examples

AppDelegate

.

AppDidFinishLaunching

```
- (BOOL)application:(UIApplication *)application didFinishLaunchingWithOptions:(NSDictionary
*)launchOptions {
    // Write your code before app launch
    return YES;
}
```

:

```
- (void)applicationWillEnterForeground:(UIApplication *)application {
    // Called as part of the transition from the background to the active state; here you can
undo many of the changes made on entering the background.
}
```

:

```
- (void)applicationDidBecomeActive:(UIApplication *)application {
    // Restart any tasks that were paused (or not yet started) while the application was
inactive. If the application was previously in the background, optionally refresh the user
interface.
}
```

:

```
- (void)applicationDidEnterBackground:(UIApplication *)application {
    // Use this method to release shared resources, save user data, invalidate timers, and
store enough application state information to restore your application to its current state in
case it is terminated later.
    // If your application supports background execution, this method is called instead of
applicationWillTerminate: when the user quits.
}
```

```
- (void)applicationWillResignActive:(UIApplication *)application {
    // Sent when the application is about to move from active to inactive state. This can
occur for certain types of temporary interruptions (such as an incoming phone call or SMS
message) or when the user quits the application and it begins the transition to the background
state.
```

```
    // Use this method to pause ongoing tasks, disable timers, and invalidate graphics
rendering callbacks. Games should use this method to pause the game.
}
```

:

```
- (void)applicationWillTerminate:(UIApplication *)application {
    // Called when the application is about to terminate. Save data if appropriate. See also
applicationDidEnterBackground:.
}
```

AppDelegate :

- AppDelegate startup code .
- state key changes ., .
- ( ), , responds to notifications .
- state preservation restoration determines .
- responds to events . .

URL

URL .

:

```
func application(_ app: UIApplication, open url: URL, options: [UIApplicationOpenURLOptionsKey
: Any] = [:]) -> Bool {
        return SomeManager.shared.handle(
            url,
            sourceApplication: options[.sourceApplication] as? String,
            annotation: options[.annotation]
        )
    }
```

:

```
/* Instance of your custom APNs/local notification manager */
private var pushManager: AppleNotificationManager!
```

:

```
func application(application: UIApplication, didRegisterUserNotificationSettings
notificationSettings: UIUserNotificationSettings) {
    // Called to tell the delegate the types of notifications that can be used to get the
user's attention
    pushManager.didRegisterSettings(notificationSettings)
}

func application(application: UIApplication, didRegisterForRemoteNotificationsWithDeviceToken
deviceToken: NSData) {
    // Tells the delegate that the app successfully registered with Apple Push Notification
service (APNs)
```

```
    pushManager.didRegisterDeviceToken(deviceToken)
}

func application(application: UIApplication, didFailToRegisterForRemoteNotificationsWithError
error: NSError) {
    // Sent to the delegate when Apple Push Notification service cannot successfully complete
the registration process.
    pushManager.didFailToRegisterDeviceToken(error)
}
```

:

```
func application(application: UIApplication, didReceiveRemoteNotification userInfo: [NSObject
: AnyObject]) {
    // Remote notification arrived, there is data to be fetched
    // Handling it
    pushManager.handleNotification(userInfo,
                                   background: application.applicationState == .Background
    )
}
```

:

```
func application(application: UIApplication, didReceiveLocalNotification notification:
UILocalNotification) {
    pushManager.handleLocalNotification(notification, background: false)
}
```

( ) :

```
func application(application: UIApplication, handleActionWithIdentifier identifier: String?,
forRemoteNotification userInfo: [NSObject : AnyObject],
                     completionHandler: () -> Void) {
    pushManager.handleInteractiveRemoteNotification(userInfo, actionIdentifier: identifier,
completion: completionHandler)
}
```

AppDelegate : https://riptutorial.com/ko/ios/topic/8740/appdelegate

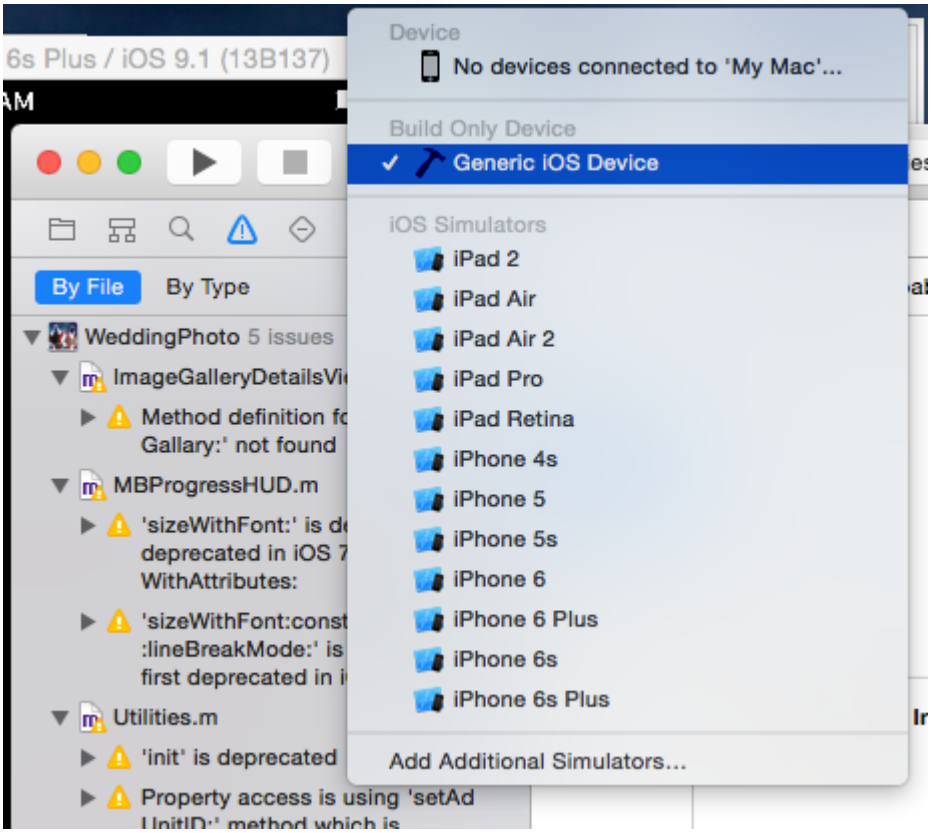
5: Applicationloader appstore .ipa

Examples

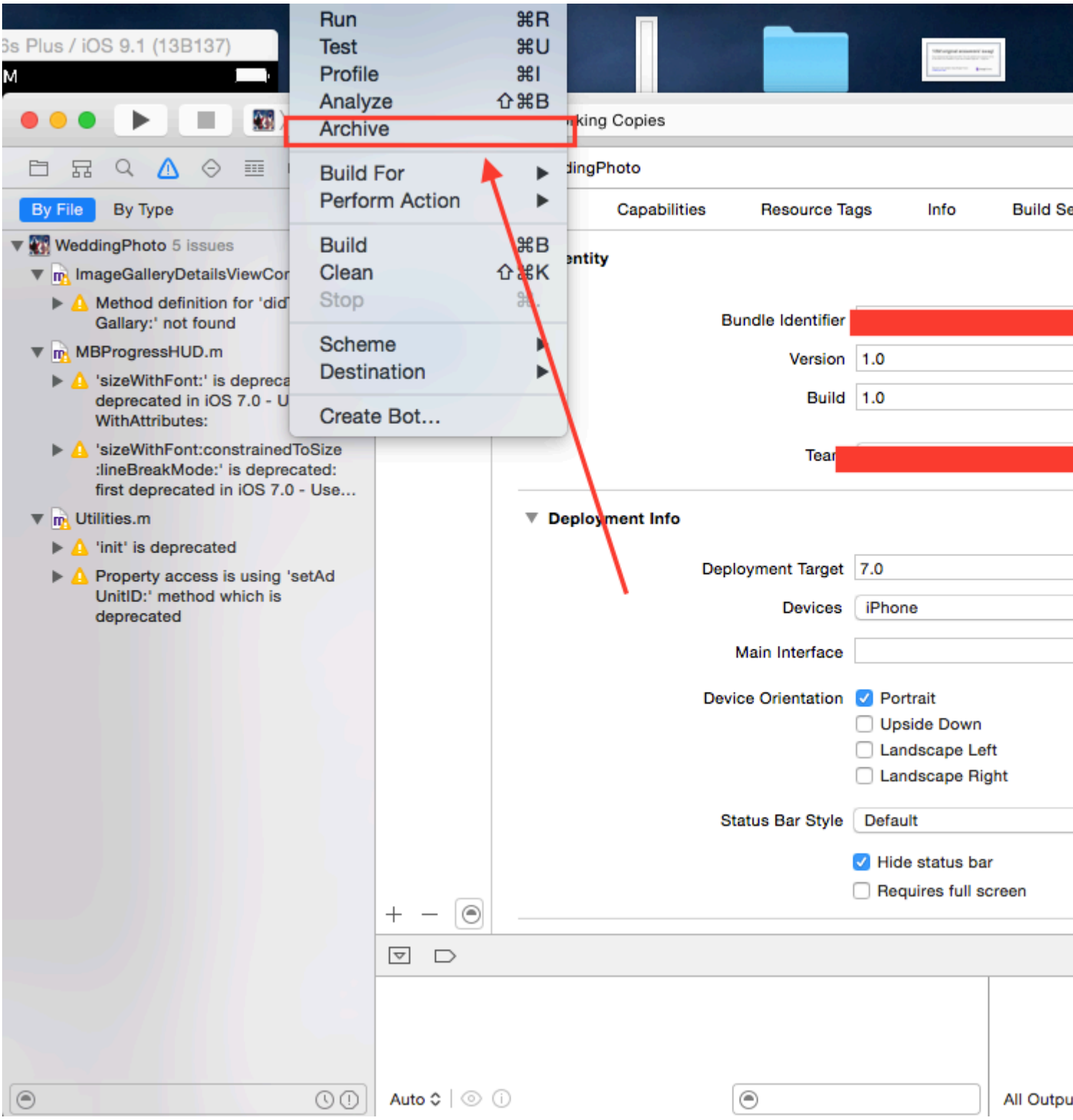
Application Loader appstore .ipa

.ipa **Xcode** itunesconnect . **iTunes .ipa** .

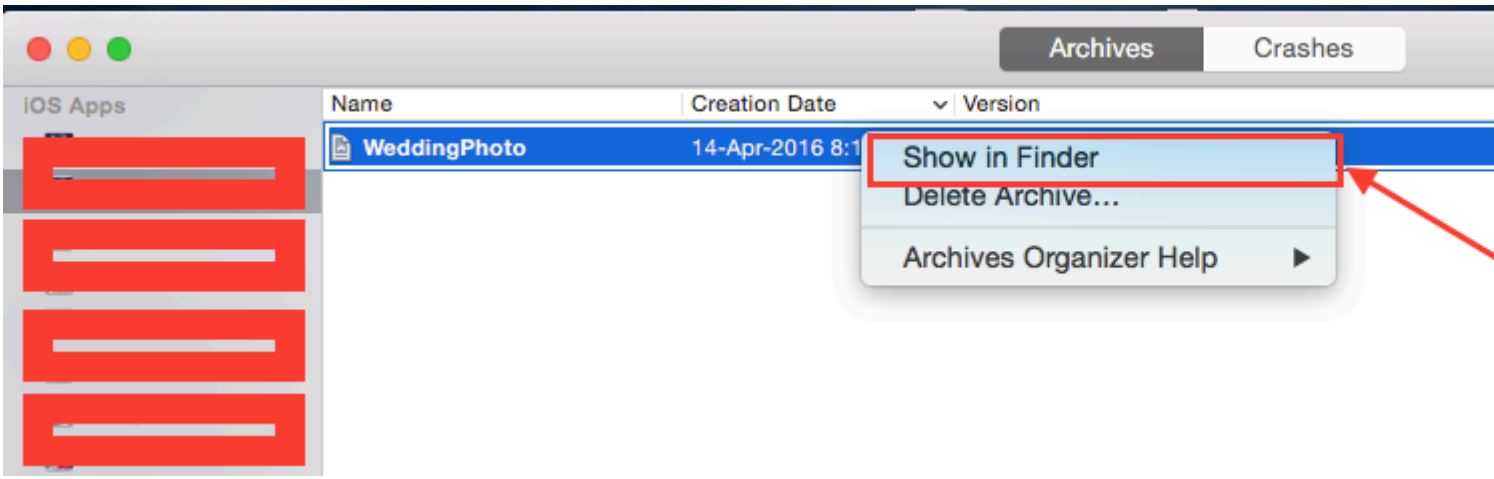
1 : - .



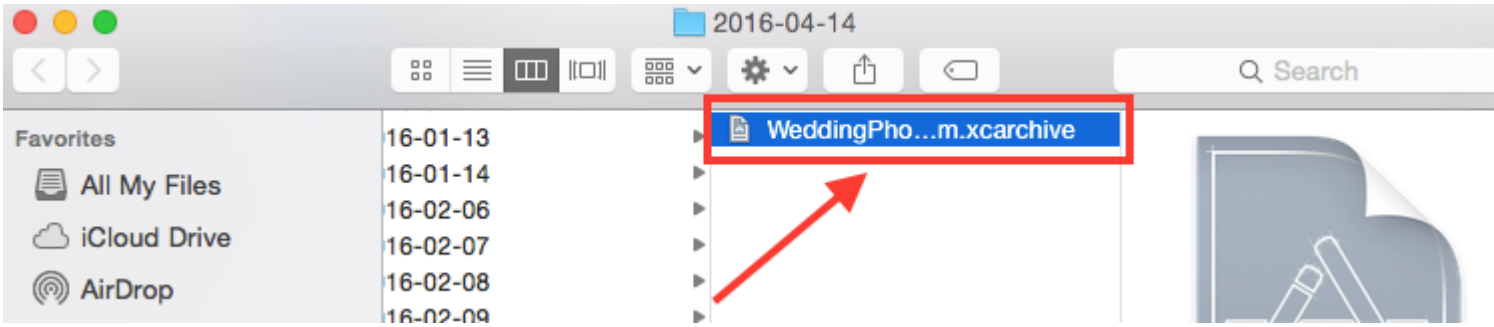
2 : - ->


Run ⌘R
Test ⌘U
Profile ⌘I
Analyze ⇧⌘B
Archive
Build For
Perform Action
Build ⌘B
Clean ⇧⌘K
Stop ⌘.
Scheme
Destination
Create Bot...
By File
By Type
WeddingPhoto 5 issues
ImageGalleryDetailsViewCor
Method definition for 'did
Gallary:' not found
MBProgressHUD.m
'sizeWithFont:' is deprec
deprecated in iOS 7.0 - U
WithAttributes:
'sizeWithFont:constrainedToSize
:lineBreakMode:' is deprecated:
first deprecated in iOS 7.0 - Use...
Utilities.m
'init' is deprecated
Property access is using 'setAd
UnitID:' method which is
deprecated
Capabilities
Resource Tags
Info
Bundle Identifier
Version 1.0
Build 1.0
Deployment Info
Deployment Target 7.0
Devices iPhone
Main Interface
Device Orientation
Portrait
Upside Down
Landscape Left
Landscape Right
Status Bar Style Default
Hide status bar
Requires full screen
Auto

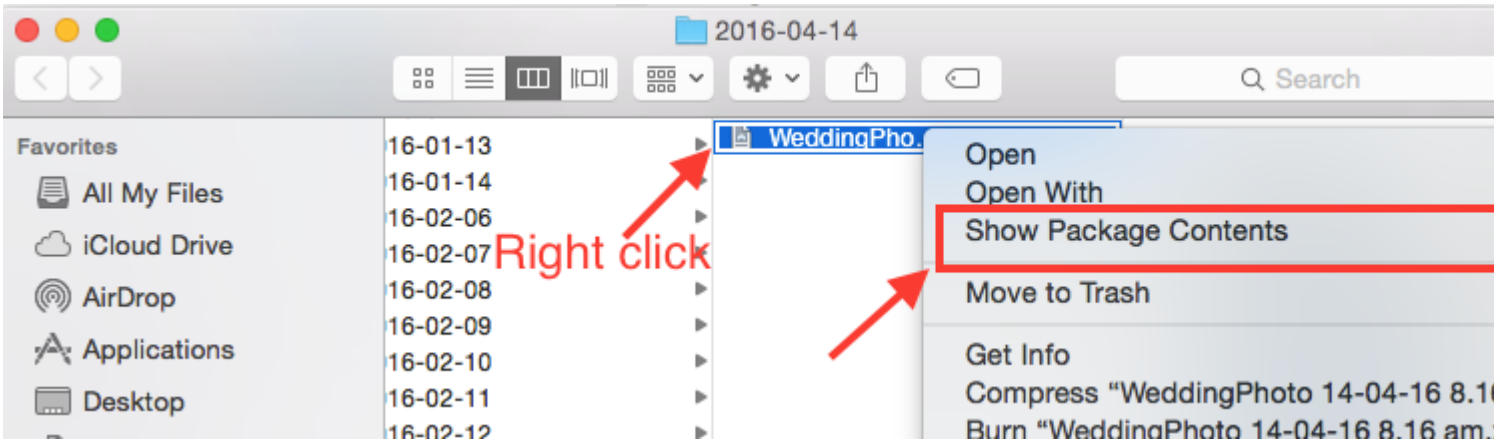
3 : - Finder .



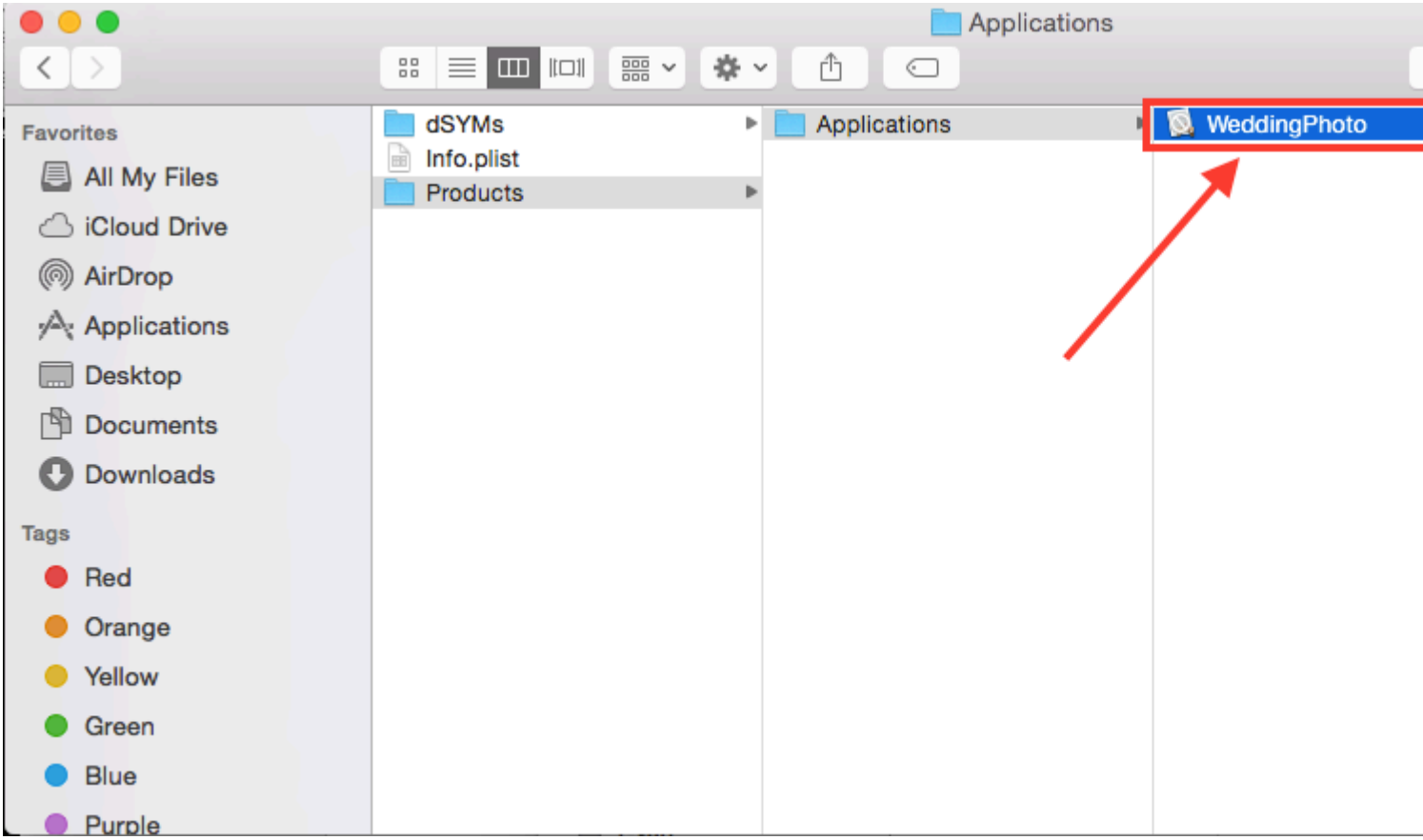
4 : - Finder .



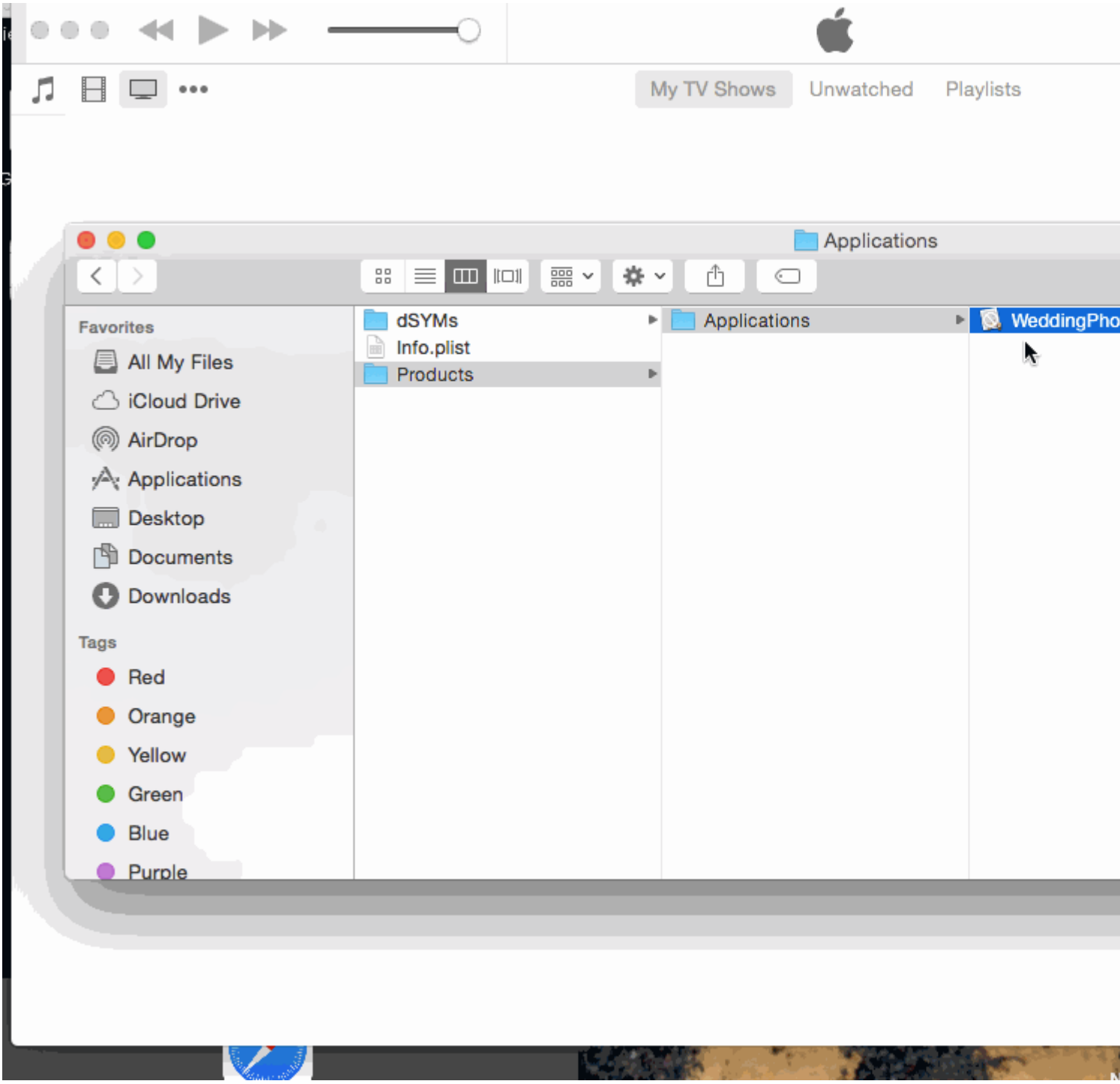
5 : - .xarchive Finder .



6 : - -> -> yourprojectname.app .



7 : - . app .ipa iTunes . ,



8 : .ipa .

: - .

:-

: - .apa .aap .zip, .zip .ipa .

compress.app .zip .ipa . . .

IPA .

Applicationloader appstore .ipa : https://riptutorial.com/ko/ios/topic/6119/applicationloader-

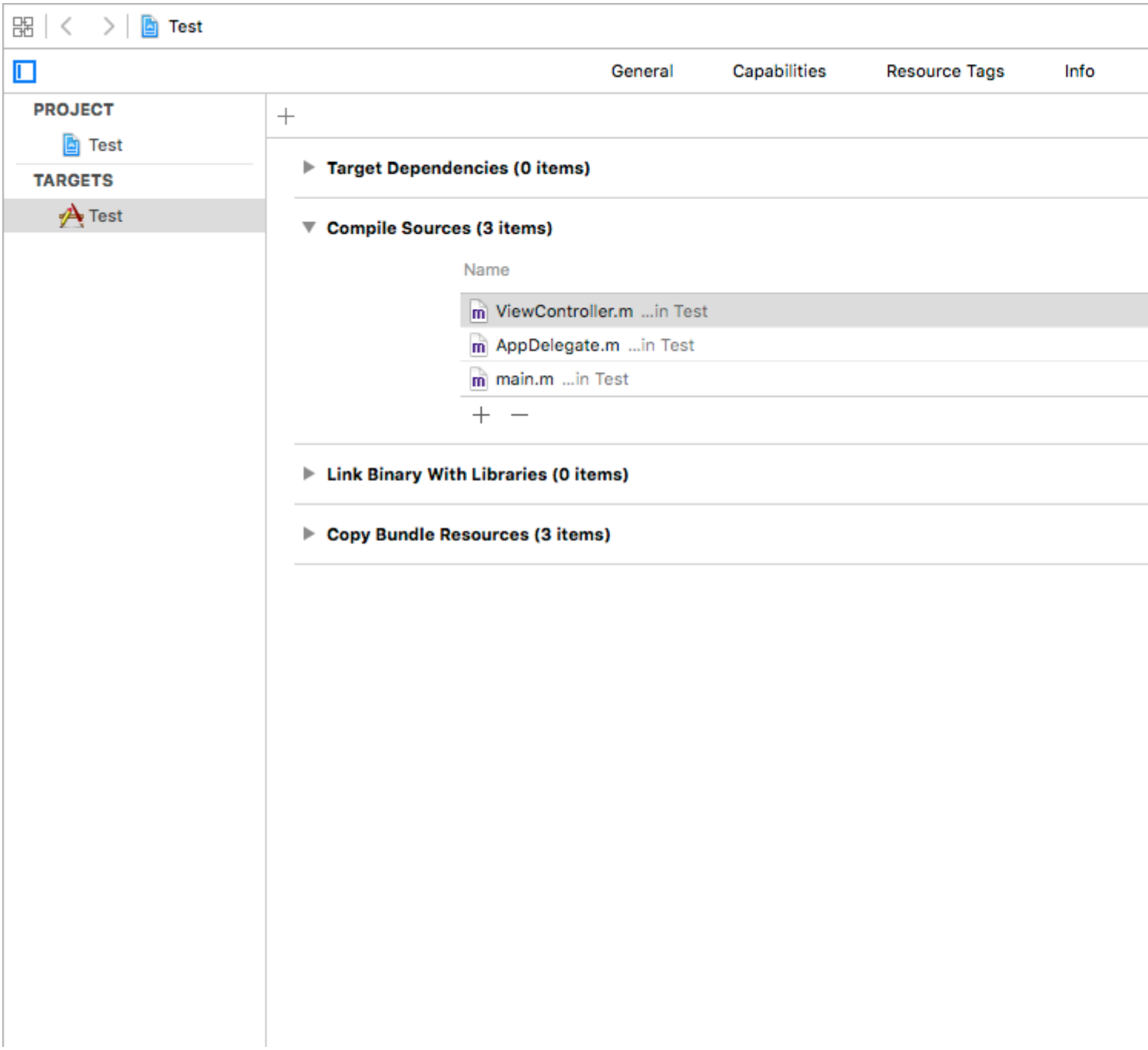
appstore----ipa--

6: ARC (Automatic Reference Counting)

Examples

ARC /

`-fno-objc-arc` ARC . ▸ ▸



ARC (Automatic Reference Counting) : https://riptutorial.com/ko/ios/topic/4150/arc--automatic-reference-counting-

7: Autolayout /

. .

. "" " " . "". .

Examples

:

Interface Builder . .

. , .

, . .

. (Auto Layout) .

`intrinsic content size` . Width Height .

UIImageView . .

: https://www.raywenderlich.com/115444/auto-layout-tutorial-in-ios-9-part-2-constraints

Autolayout / : https://riptutorial.com/ko/ios/topic/6899/autolayout------

8: AVPlayer AVPlayerViewController

AVKit , AVFoundation

Examples

AVPlayerViewController

-C

```
NSURL *url = [[NSURL alloc] initWithString:@"YOUR URL"]; // url can be remote or local

AVPlayer *player = [AVPlayer playerWithURL:url];
// create a player view controller

AVPlayerViewController *controller = [[AVPlayerViewController alloc] init];
[self presentViewController:controller animated:YES completion:nil];
controller.player = player;
[player play];
```

```
let player = AVPlayer(URL: url) // url can be remote or local

let playerViewController = AVPlayerViewController()
// creating a player view controller
playerViewController.player = player
self.presentViewController(playerViewController, animated: true) {

    playerViewController.player!.play()
}
```

AVPlayer AVPlayerLayer

C

```
NSURL *url = [NSURL URLWithString:@"YOUR URL"];
AVPlayer *player = [AVPlayer playerWithURL:videoURL];
AVPlayerLayer *playerLayer = [AVPlayerLayer playerLayerWithPlayer:player];
playerLayer.frame = self.view.bounds;
[self.view.layer addSublayer:playerLayer];
[player play];
```

```
let url = NSURL(string: "YOUR URL")
let player = AVPlayer(URL: videoURL!)
let playerLayer = AVPlayerLayer(player: player)
playerLayer.frame = self.view.bounds
self.view.layer.addSublayer(playerLayer)
player.play()
```

AVPlayer

AVPlayer * avPlayer = [AVPlayer playerWithURL : [NSURL URLWithString : @ "YOUR URL"]];

```
    AVPlayerViewController *avPlayerCtrl = [[AVPlayerViewController alloc] init];
    avPlayerCtrl.view.frame = self.view.frame;
    avPlayerCtrl.player = avPlayer;
    avPlayerCtrl.delegate = self;
    [avPlayer play];
    [self presentViewController:avPlayerCtrl animated:YES completion:nil
```

AVPlayer AVPlayerViewController : https://riptutorial.com/ko/ios/topic/5092/avplayer--avplayerviewcontroller

9: AVSpeechSynthesizer

- AVSpeechSynthesizer () // .
- speaker.speakUtterance (speech) // .

	AVSpeechSynthesizer
	AVSpeechUtterance

Examples

`speakUtterance: AVSpeechSynthesizer  .AVSpeechUtterance  .  .`

C

```
AVSpeechSynthesizer *speaker = [[AVSpeechSynthesizer alloc] init];
AVSpeechUtterance *speech    = [AVSpeechUtterance speechUtteranceWithString:@"Hello World"];
[speaker speakUtterance:speech];
```

```
let speaker = AVSpeechSynthesizer()
let speech = AVSpeechUtterance(string: "Hello World")
speaker.speakUtterance(speech)
```

AVSpeechSynthesizer : https://riptutorial.com/ko/ios/topic/1526/avspeechsynthesizer

10: AWS SDK

Examples

AWS SDK S3

Singleton . .

S3 .

```
enum S3Configuration : String
{
    case IDENTITY_POOL_ID   = "YourIdentityPoolId"
    case BUCKET_NAME        = "YourBucketName"
    case CALLBACK_KEY       = "YourCustomStringForCallBackWhenUploadingInTheBackground"
    case CONTENT_TYPE_IMAGE = "image/png"
    case CONTENT_TYPE_VIDEO = "video/mp4"
}
```

`didFinishLaunchingWithOptions` `AppDelegate` (`regionType`).

```
func application(application: UIApplication, didFinishLaunchingWithOptions launchOptions:
[NSObject: AnyObject]?) -> Bool
{
  let credentialProvider = AWSCognitoCredentialsProvider(regionType: .EUWest1, identityPoolId:
S3Configuration.IDENTITY_POOL_ID.rawValue)
  let configuration = AWSServiceConfiguration(region: .EUWest1, credentialsProvider:
credentialProvider)
  AWSS3TransferUtility.registerS3TransferUtilityWithConfiguration(configuration, forKey:
S3Configuration.CALLBACK_KEY.rawValue)
}
```

AppDelegate AWS SDK .

```
func application(application: UIApplication, handleEventsForBackgroundURLSession identifier:
String, completionHandler: () -> Void)
{
    //  Will print the identifer you have set at the enum: .CALLBACK_KEY
    print("Identifier: " + identifier)
    //  Stores the completion handler.
    AWSS3TransferUtility.interceptApplication(application,
                                              handleEventsForBackgroundURLSession: identifier,
                                              completionHandler: completionHandler)
}
```

.

AWS SDK SDK . UIImage ( ) . .

```
// Some image....
let image = UIImage()
let fileURL = NSURL(fileURLWithPath:
```

```
NSTemporaryDirectory()).URLByAppendingPathComponent(fileName)
let filePath = fileURL.path!
let imageData = UIImageJPEGRepresentation(image, 1.0)
imageData!.writeToFile(filePath, atomically: true)
```

FileURL fileName .

AWS SDK .

1. `AWSS3TransferUtilityUploadCompletionHandlerBlock` - .
2. `AWSS3TransferUtilityUploadProgressBlock` -

(Singleton) . .

```
var completionHandler : AWSS3TransferUtilityUploadCompletionHandlerBlock? =
    { (task, error) -> Void in

        if ((error) != nil)
        {
          print("Upload failed")
        }
        else
        {
          print("File uploaded successfully")
        }
    }

var progressBlock : AWSS3TransferUtilityUploadProgressBlock? =
    { [unowned self] (task, bytesSent:Int64, totalBytesSent:Int64,
totalBytesExpectedToSend:Int64) -> Void in

     let progressInPercentage = Float(Double(totalBytesSent) /
Double(totalBytesExpectedToSend)) * 100
     print(progressInPercentage)
    }
```

: Singleton . :

```
    static func uploadImageToS3(fileURL : NSURL,
                                fileName : String,
                progressFunctionUpdater : Float -> Void,
                             resultBlock : (NSError?) -> Void)
{
 //    Actual implementation .....
 //    ...
 //    ...
}
```

1. `progressFunctionUpdater` - `progressFunctionUpdater` .
2. `resultBlock` - nil `resultBlock` .

, :

```
        let fileData = NSData(contentsOfFile: fileURL.relativePath!)
```

```
        let expression = AWSS3TransferUtilityUploadExpression()
        expression.uploadProgress = progressBlock

        let transferUtility =
AWSS3TransferUtility.S3TransferUtilityForKey(S3Configuration.CALLBACK_KEY.rawValue)

        transferUtility?.uploadData(fileData!,
            bucket: S3Configuration.BUCKET_NAME.rawValue,
            key: fileName,
            contentType: S3Configuration.CONTENT_TYPE_IMAGE.rawData,
            expression: expression,
            completionHander: completionHandler).continueWithBlock
            { (task : AWSTask) -> AnyObject? in

                if let error = task.error
                {
                    print(error)
                }
                if let exception = task.exception
                {
                    print("Exception: " + exception.description)
                }
                if let uploadTask = task.result as? AWSS3TransferUtilityUploadTask
                {
                    print("Upload started...")
                }

                return nil
        }
```

S3 :)

AWS SDK : https://riptutorial.com/ko/ios/topic/4734/aws-sdk

11: CAAnimation

CAAnimation . **CAMediaTiming** **CAAction** . Core Animation Scene Kit **CABasicAnimation** , **CAKeyframeAnimation** , **CAAnimationGroup** **CATransition** .

Examples

.

-C

```
CABasicAnimation *animation = [CABasicAnimation animationWithKeyPath:@"position.x"];
animation.fromValue = @0;
animation.toValue = @320;
animation.duration = 1;

[_label.layer addAnimation:animation forKey:@"basic"];
```

```
let animation = CABasicAnimation(keyPath: "position.x")
animation.fromValue = NSNumber(value: 0.0)
animation.toValue = NSNumber(value: 320.0)

_label.layer.addAnimation(animation, forKey: "basic")
```

0 320 . keypath .

```
"position.y"
```

-

-C

```
CATransition* transition = [CATransition animation];
transition.startProgress = 0;
transition.endProgress = 1.0;
transition.type = @"flip";
transition.subtype = @"fromLeft";
transition.duration = 0.8;
transition.repeatCount = 5;
[_label.layer addAnimation:transition forKey:@"transition"];
```

```
var transition = CATransition()
transition.startProgress = 0
transition.endProgress = 1.0
transition.type = "flip"
```

```
transition.subtype = "fromLeft"
transition.duration = 0.8
transition.repeatCount = 5
label.layer.addAnimation(transition, forKey: "transition")
```

```
 CGRect boundingRect = CGRectMake(-150, -150, 300, 300);

CAKeyframeAnimation *orbit = [CAKeyframeAnimation animation];
orbit.keyPath = @"position";
orbit.path = CFAutorelease(CGPathCreateWithEllipseInRect(boundingRect, NULL));
orbit.duration = 4;
orbit.additive = YES;
orbit.repeatCount = HUGE_VALF;
orbit.calculationMode = kCAAnimationPaced;
orbit.rotationMode = kCAAnimationRotateAuto;

[_label.layer addAnimation:orbit forKey:@"orbit"];
```

-C

```
CAKeyframeAnimation *animation = [CAKeyframeAnimation animationWithKeyPath:@"position.x"];
animation.values = @[ @0, @10, @-10, @10, @0 ];
animation.keyTimes = @[ @0, @(1 / 6.0), @(3 / 6.0), @(5 / 6.0), @1 ];
animation.duration = 0.4;
animation.additive = YES;
[_label.layer addAnimation:animation forKey:@"shake"];
```

3

```
let animation = CAKeyframeAnimation(keyPath: "position.x")
animation.values = [ 0, 10, -10, 10, 0 ]
animation.keyTimes = [ 0, NSNumber(value: (1 / 6.0)), NSNumber(value: (3 / 6.0)),
NSNumber(value: (5 / 6.0)), 1 ]
animation.duration = 0.4
animation.isAdditive = true
label.layer.add(animation, forKey: "shake")
```

C

```
CATransition *animation = [CATransition animation];
[animation setSubtype:kCATransitionFromRight];//kCATransitionFromLeft
[animation setDuration:0.5];
[animation setType:kCATransitionPush];
[animation setTimingFunction:[CAMediaTimingFunction
functionWithName:kCAMediaTimingFunctionEaseInEaseOut]];
[[yourView layer] addAnimation:animation forKey:@"SwitchToView1"];
```

```
let animation = CATransition()
animation.subtype = kCATransitionFromRight//kCATransitionFromLeft
animation.duration = 0.5
animation.type = kCATransitionPush
animation.timingFunction = CAMediaTimingFunction(name: kCAMediaTimingFunctionEaseInEaseOut)
yourView.layer.addAnimation(animation, forKey: "SwitchToView1")
```

CAAnimation : https://riptutorial.com/ko/ios/topic/981/caanimation

12: CAGradientLayer

- CAGradientLayer () // CALayer .
- CAGradientLayer (layer : layer) // .

`CGColorRef` . Animatable.	
`NSNumber` . Animatable.	
. Animatable.	
. Animatable.	
. `kCAGradientLayerAxial` .	

- `startPoint` `endPoint` `CAGradientLayer` .
- `locations` / .

Examples

CAGradientLayer

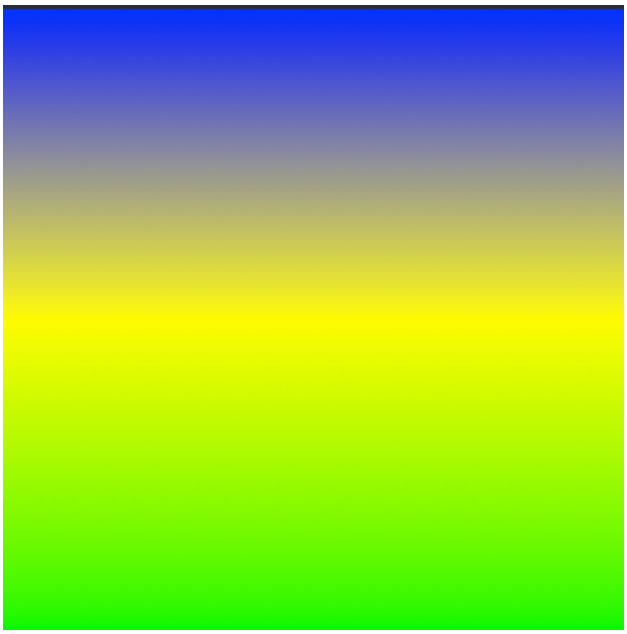
```
// View to hold the CAGradientLayer.
let view: UIView = UIView(frame: CGRect(x: 0, y: 0, width: 320, height: 320))

// Initialize gradient layer.
let gradientLayer: CAGradientLayer = CAGradientLayer()

// Set frame of gradient layer.
gradientLayer.frame = view.bounds

// Color at the top of the gradient.
let topColor: CGColor = UIColor.red.cgColor

// Color at the bottom of the gradient.
let bottomColor: CGColor = UIColor.yellow.cgColor

// Set colors.
gradientLayer.colors = [topColor, bottomColor]

// Set locations of the colors.
gradientLayer.locations = [0.0, 1.0]

// Insert gradient layer into view's layer heirarchy.
view.layer.insertSublayer(gradientLayer, at: 0)
```

:

CGGradientLayer .

```
// View to hold the CAGradientLayer.
let view: UIView = UIView(frame: CGRect(x: 0, y: 0, width: 320, height: 320))

// Initialize gradient layer.
let gradientLayer: CAGradientLayer = CAGradientLayer()

// Set frame of gradient layer.
gradientLayer.frame = view.bounds

// Color at the top of the gradient.
let topColor: CGColor = UIColor.blue.cgColor

// Color at the middle of the gradient.
let middleColor: CGColor = UIColor.yellow.cgColor

// Color at the bottom of the gradient.
let bottomColor: CGColor = UIColor.green.cgColor

// Set colors.
gradientLayer.colors = [topColor, middleColor, bottomColor]

// Set locations of the colors.
gradientLayer.locations = [0.0, 0.5, 1.0]

// Insert gradient layer into view's layer heirarchy.
view.layer.insertSublayer(gradientLayer, at: 0)
```

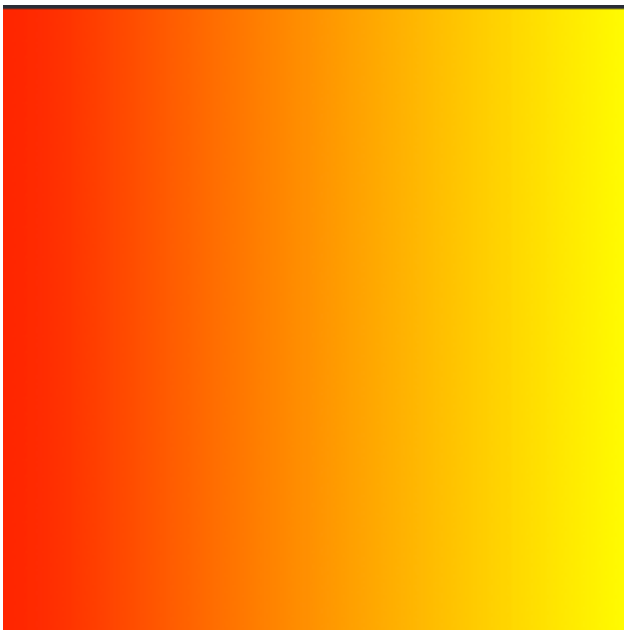
:



CAGradientLayer .

```
// View to hold the CAGradientLayer.
let view: UIView = UIView(frame: CGRect(x: 0, y: 0, width: 320, height: 320))

// Initialize gradient layer.
let gradientLayer: CAGradientLayer = CAGradientLayer()

// Set frame of gradient layer.
gradientLayer.frame = view.bounds

// Color at the top of the gradient.
let topColor: CGColor = UIColor.redColor().CGColor

// Color at the bottom of the gradient.
let bottomColor: CGColor = UIColor.yellowColor().CGColor

// Set colors.
gradientLayer.colors = [topColor, bottomColor]

// Set start point.
gradientLayer.startPoint = CGPoint(x: 0.0, y: 0.5)

// Set end point.
gradientLayer.endPoint = CGPoint(x: 1.0, y: 0.5)

// Insert gradient layer into view's layer heirarchy.
view.layer.insertSublayer(gradientLayer, atIndex: 0)
```

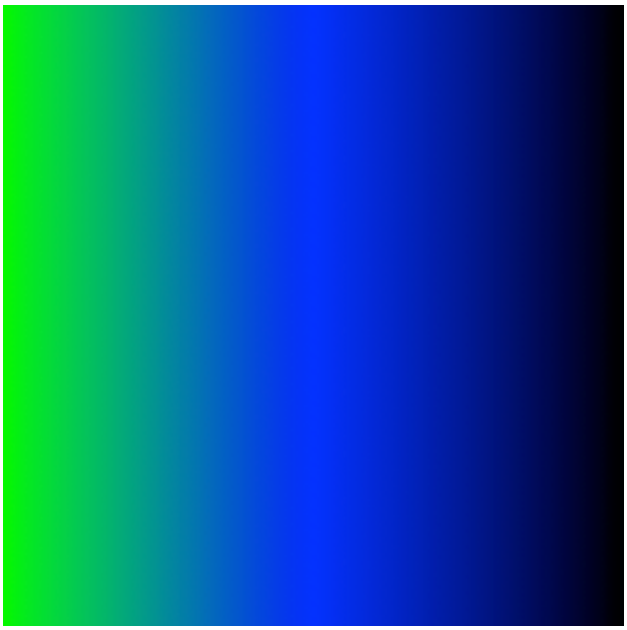
:



CAGradientLayer .

```
// View to hold the CAGradientLayer.
let view: UIView = UIView(frame: CGRect(x: 0, y: 0, width: 320, height: 320))

// Initialize gradient layer.
let gradientLayer: CAGradientLayer = CAGradientLayer()

// Set frame of gradient layer.
gradientLayer.frame = view.bounds

// Color at the top of the gradient.
let topColor: CGColor = UIColor.greenColor().CGColor

// Color at the middle of the gradient.
let middleColor: CGColor = UIColor.blueColor().CGColor

// Color at the bottom of the gradient.
let bottomColor: CGColor = UIColor.blackColor().CGColor

// Set colors.
gradientLayer.colors = [topColor, middleColor, bottomColor]

// Set start point.
gradientLayer.startPoint = CGPoint(x: 0.0, y: 0.5)

// Set end point.
gradientLayer.endPoint = CGPoint(x: 1.0, y: 0.5)

// Insert gradient layer into view's layer heirarchy.
view.layer.insertSublayer(gradientLayer, atIndex: 0)
```

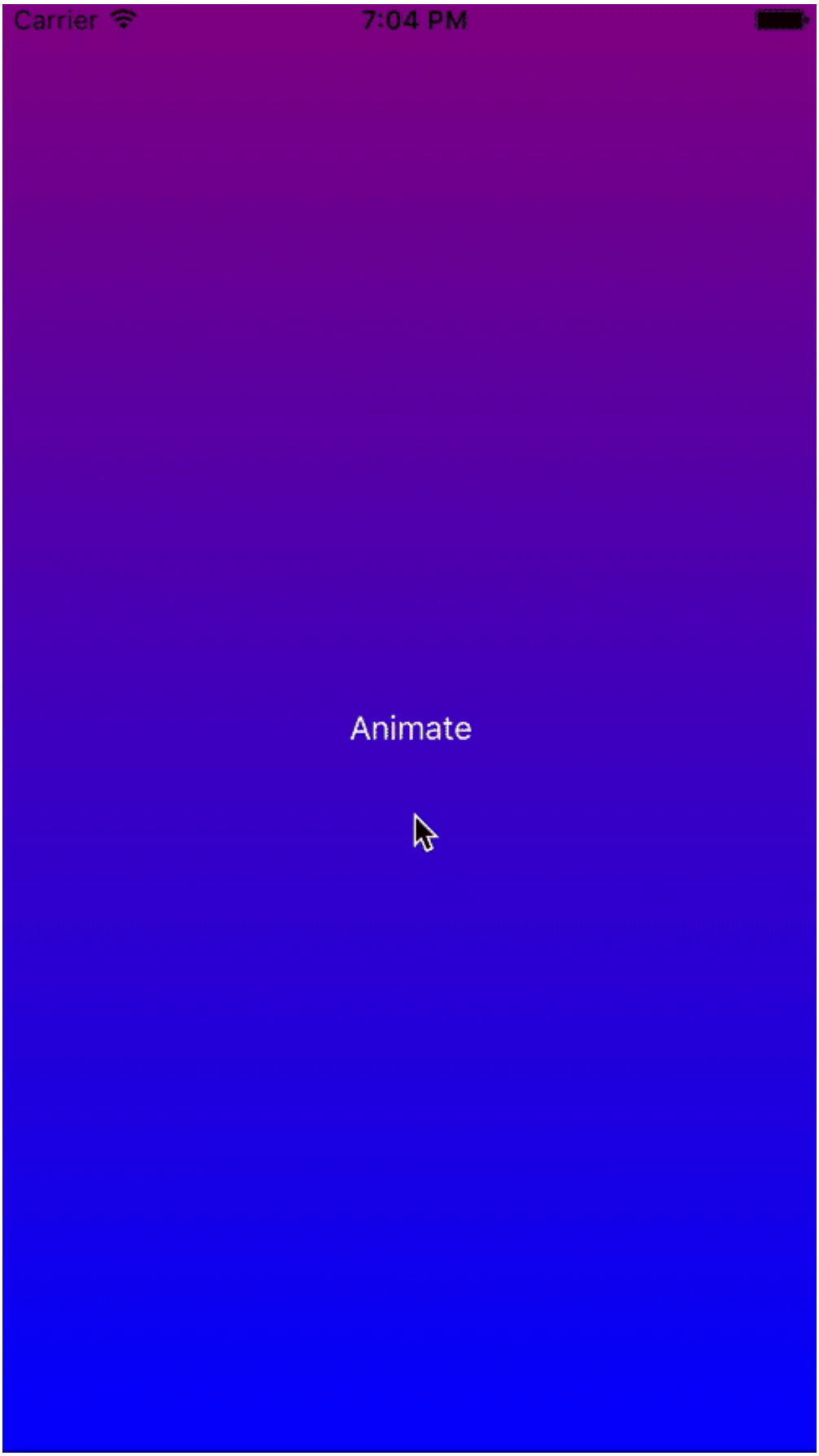
:



CAGradientLayer .

```
// Get the current colors of the gradient.
let oldColors = self.gradientLayer.colors

// Define the new colors for the gradient.
let newColors = [UIColor.red.cgColor, UIColor.yellow.cgColor]

// Set the new colors of the gradient.
self.gradientLayer.colors = newColors

// Initialize new animation for changing the colors of the gradient.
let animation: CABasicAnimation = CABasicAnimation(keyPath: "colors")

// Set current color value.
animation.fromValue = oldColors

// Set new color value.
animation.toValue = newColors

// Set duration of animation.
animation.duration = 0.3

// Set animation to remove once its completed.
animation.isRemovedOnCompletion = true

// Set receiver to remain visible in its final state when the animation is completed.
animation.fillMode = kCAFillModeForwards

// Set linear pacing, which causes an animation to occur evenly over its duration.
animation.timingFunction = CAMediaTimingFunction(name: kCAMediaTimingFunctionLinear)

// Set delegate of animation.
animation.delegate = self

// Add the animation.
self.gradientLayer.addAnimation(animation, forKey: "animateGradientColorChange")
```

:



CAGradientLayer : https://riptutorial.com/ko/ios/topic/1190/cagradientlayer

13: CALayer

Examples

CALayer

CALayer :

:

```
let layer = CALayer()
layer.frame = CGRect(x: 0, y: 0, width: 60, height: 80)
```

-C :

```
CALayer *layer = [[CALayer alloc] init];
layer.frame = CGRectMake(0, 0, 60, 80);
```

CALayer .

:

```
existingLayer.addSublayer(layer)
```

-C :

```
[existingLayer addSublayer:layer];
```

:

QuartzCore .

:

```
 @import QuartzCore
```

-C

```
#import <QuartzCore/QuartzCore.h>
```

CAEmitterLayer

CAEmitterLayer Core Animation . **CAEmitterCell** .

.

```
        var emitter = CAEmitterLayer()

        emitter.emitterPosition = CGPoint(x: frame.size.width / 2.0, y: -20)
        emitter.emitterShape = kCAEmitterLayerLine
        emitter.emitterSize = CGSize(width: frame.size.width, height: 1)

        emitter.emitterCells = cells
        layer.addSublayer(emitter)
```

.

```
import QuartzCore

class ConfettiView: UIView {
    // main emitter layer
    var emitter: CAEmitterLayer!

    // array of color to emit
    var colors: [UIColor]!

    // intensity of appearance
    var intensity: Float!

    private var active :Bool!

    required init?(coder aDecoder: NSCoder) {
        super.init(coder: aDecoder)
        setup()
    }

    override init(frame: CGRect) {
        super.init(frame: frame)
        setup()
    }

    func setup() {
        // initialization
        colors = [UIColor.redColor(),
                  UIColor.greenColor(),
                  UIColor.blueColor()
                  ]
        intensity = 0.2

        active = false
    }

    func startConfetti() {
        emitter = CAEmitterLayer()

        emitter.emitterPosition = CGPoint(x: frame.size.width / 2.0, y: -20)
        emitter.emitterShape = kCAEmitterLayerLine
        emitter.emitterSize = CGSize(width: frame.size.width, height: 1)

        var cells = [CAEmitterCell]()
        for color in colors {
            cells.append(confettiWithColor(color))
        }

        emitter.emitterCells = cells
        layer.addSublayer(emitter)
```

```
        active = true
    }

    func stopConfetti() {
        emitter?.birthRate = 0
        active = false
    }

    func confettiWithColor(color: UIColor) -> CAEmitterCell {
        let confetti = CAEmitterCell()

        confetti.birthRate = 10.0 * intensity
        confetti.lifetime = 180.0 * intensity
        confetti.lifetimeRange = 0
        confetti.color = color.CGColor
        confetti.velocity = CGFloat(350.0 * intensity)
        confetti.velocityRange = CGFloat(40.0 * intensity)
        confetti.emissionLongitude = CGFloat(M_PI)
        confetti.emissionRange = CGFloat(M_PI_4)
        confetti.spin = CGFloat(3.5 * intensity)
        confetti.spinRange = CGFloat(4.0 * intensity)

        // WARNING: A layer can set this property to a CGImageRef to display the image as its
contents.
        confetti.contents = UIImage(named: "confetti")?.CGImage
        return confetti
    }

    internal func isActive() -> Bool {
        return self.active
    }
}
```

"confetti" **confetti.contentsRect** rect .

CALayer UIImage

`contents` `layer` .

```
myView.layer.contents = UIImage(named: "star")?.CGImage
```

- `UIImage` `CGImage` .

.

```
let myLayer = CALayer()
let myImage = UIImage(named: "star")?.CGImage
myLayer.frame = myView.bounds
myLayer.contents = myImage
myView.layer.addSublayer(myLayer)
```

. `UIView` `UIImage` .

, pixelated . `UIImage` `UIView` . .

`contentsGravity` . .

```
myView.layer.contents = UIImage(named: "star")?.CGImage
myView.layer.contentsGravity = kCAGravityTop
myView.layer.geometryFlipped = true
```

iOS `geometryFlipped` `true` `geometryFlipped` . . Stack Overflow .

`UIView` `contentsGravity` `UIImage` . .

kCAGravityResize

.

kCAGravityResizeAspect

kCAGravityResizeAspectFill

kCAGravityCenter

kCAGravityTop

kCAGravityBottom

kCAGravityLeft

kCAGravityRight

kCAGravityTopLeft

kCAGravityTopRight

kCAGravityBottomLeft

kCAGravityBottomRight

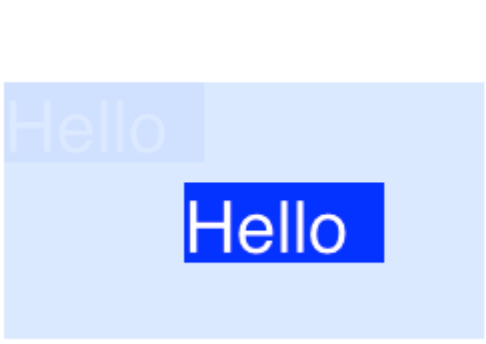
-
- `CGContextDrawImage` `drawRect` `UIImage`
- CALayer :

- .

CALayer (, ,)

.

- ()
-
-



CALayer transform CATransform3D . , .

```
myLayer.transform = CATransform3DMakeTranslation(20, 30, 0)
```

Make . CATransform3D . Make . .

```
let rotation = CATransform3DMakeRotation(CGFloat(30.0 * M_PI / 180.0), 20, 20, 0)
myLayer.transform = CATransform3DTranslate(rotation, 20, 30, 0)
```

., .

UIView . .

```
import UIKit

class ViewController: UIViewController {

    var myLayer = CATextLayer()
    @IBOutlet weak var myView: UIView!

    override func viewDidLoad() {
        super.viewDidLoad()

        // setup the sublayer
        addSubLayer()

        // do the transform
        transformExample()
    }

    func addSubLayer() {
        myLayer.frame = CGRect(x: 0, y: 0, width: 100, height: 40)
        myLayer.backgroundColor = UIColor.blueColor().CGColor
        myLayer.string = "Hello"
        myView.layer.addSublayer(myLayer)
    }

    //******** Replace this function with the examples below ********

    func transformExample() {

        // add transform code here ...


    }

}
```

CALayer CATextLayer .

. .

```
CATransform3DMakeTranslation(tx: CGFloat, ty: CGFloat, tz: CGFloat)
```

`tx` x , `ty` y , `tz` z .

iOS 90 , 50 .

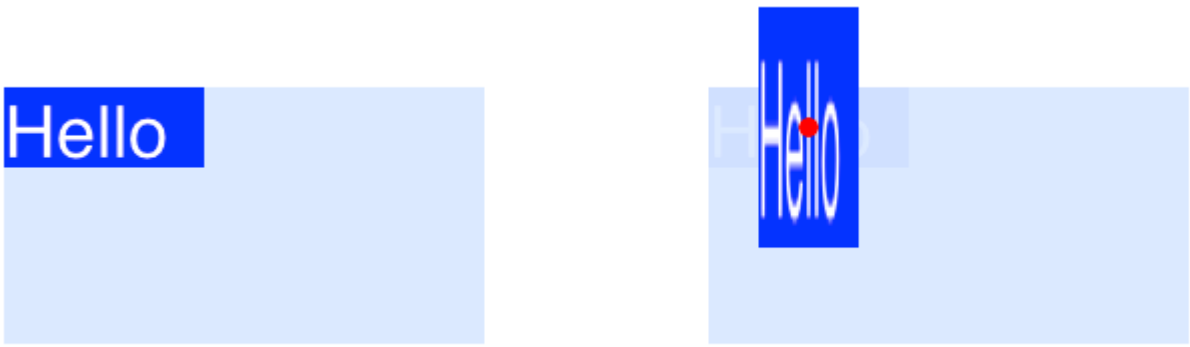
```
myLayer.transform = CATransform3DMakeTranslation(90, 50, 0)
```

- `transformExample()` .
- 2 , `tz` 0 .
- . .

. .

```
CATransform3DMakeScale(sx: CGFloat, sy: CGFloat, sz: CGFloat)
```

, `sx` , `sy` `sz` x, y z () .



3 .

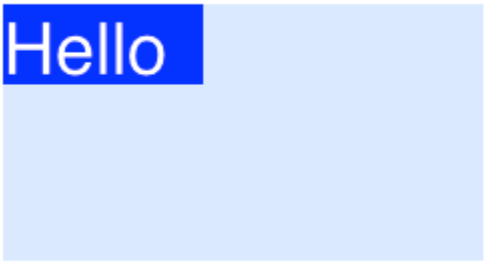
```
myLayer.transform = CATransform3DMakeScale(0.5, 3.0, 1.0)
```

- 2 z 1.0 .
- . . , .

( ) . .

```
CATransform3DMakeRotation(angle: CGFloat, x: CGFloat, y: CGFloat, z: CGFloat)
```

`angle` () `x` , `y` `z` . 0 .



30 .

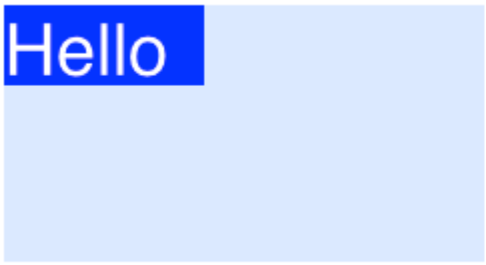
```
let degrees = 30.0
let radians = CGFloat(degrees * M_PI / 180)
myLayer.transform = CATransform3DMakeRotation(radians, 0.0, 0.0, 1.0)
```

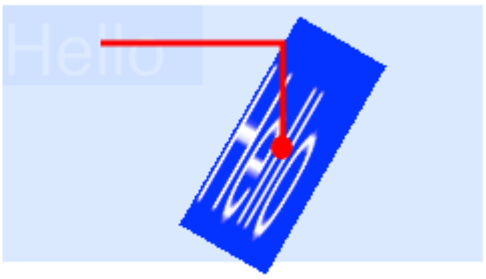
- , xy z . `x` `y` `0.0` `z` `1.0` .
- . `z` `-1.0` .
- . .

.

```
CATransform3DConcat(a: CATransform3D, b: CATransform3D)
```

. `Make` . `Make` .





.

```
let degrees = 30.0
let radians = CGFloat(degrees * M_PI / 180)

// translate
```

```
var transform = CATransform3DMakeTranslation(90, 50, 0)

// rotate
transform = CATransform3DRotate(transform, radians, 0.0, 0.0, 1.0)

// scale
transform = CATransform3DScale(transform, 0.5, 3.0, 1.0)

// apply the transforms
myLayer.transform = transform
```

- .
- ( ) .

. . .

. (0.5, 0.5) .

```
myLayer.anchorPoint = CGPoint(x: 0.0, y: 1.0)
myLayer.position = CGPoint(x: 50, y: 50)
```

. . . 2 .

- anchorPoint
- ?

- CALayer ,
-

.

CALayer . .

```
CATransaction.begin()
CATransaction.setDisableActions(true)

// change layer properties that you don't want to animate

CATransaction.commit()
```

-C

```
[CATransaction begin];
[CATransaction setDisableActions:YES];

// change layer properties that you don't want to animate

[CATransaction commit];
```

```
layer.masksToBounds = true;
```

```
layer.cornerRadius = 8;
```

5 .

- `shadowOffset` - / / .

```
self.layer.shadowOffset = CGSizeMake(-1, -1); // 1px left and up

self.layer.shadowOffset = CGSizeMake(1, 1); // 1px down and right
```

- `shadowColor` - .

```
self.layer.shadowColor = [UIColor blackColor].CGColor;
```

- `shadowOpacity` - 0 1 .

```
self.layer.shadowOpacity = 0.2;
```

- `shadowRadius` - (Sketch Photoshop blur).

```
self.layer.shadowRadius = 6;
```

- `shadowPath` - iOS . PNG . .

-C

```
self.layer.shadowPath = [UIBezierPath bezierPathWithOvalInRect:CGRectMake(0,0,100,100)];
//this does a circular shadow
```

3

```
self.layer.shadowPath = UIBezierPath(ovalIn: CGRect(x: 0, y: 0, width: 100, height:
100)).cgPath
```

CALayer : https://riptutorial.com/ko/ios/topic/1462/calayer

14: CAShapeLayer

1. shapeLayer.fillColor
2. shapeLayer.fillRule
3. shapeLayer.lineCap
4. shapeLayer.lineDashPattern
5. shapeLayer.lineDashPhase
6. shapeLayer.lineJoin

CAShapeLayer 3 . .

Examples

CAShapeLayer

UIBezierPath ShapeLayer

```
CAShapeLayer *circleLayer = [CAShapeLayer layer];
[circleLayer setPath:[[UIBezierPath bezierPathWithOvalInRect:
CGRectMake(50, 50, 100, 100)] CGPath]];
circleLayer.lineWidth = 2.0;
[circleLayer setStrokeColor:[[UIColor redColor] CGColor]];
[circleLayer setFillColor:[[UIColor clearColor] CGColor]];
circleLayer.lineJoin = kCALineJoinRound;  //4 types are available to create a line style
circleLayer.lineDashPattern = [NSArray arrayWithObjects:
[NSNumber numberWithInt:2],[NSNumber numberWithInt:3 ], nil];
// self.origImage is parentView
[[self.view layer] addSublayer:circleLayer];
self.currentShapeLayer = circleLayer;  // public value using to keep that reference of the
shape Layer
self.view.layer.borderWidth = 1.0f;
self.view.layer.borderColor = [[UIColor blueColor]CGColor];  // that will plotted in the
mainview
```

ShapeLayer

. currentShapeLayer . .

1 :

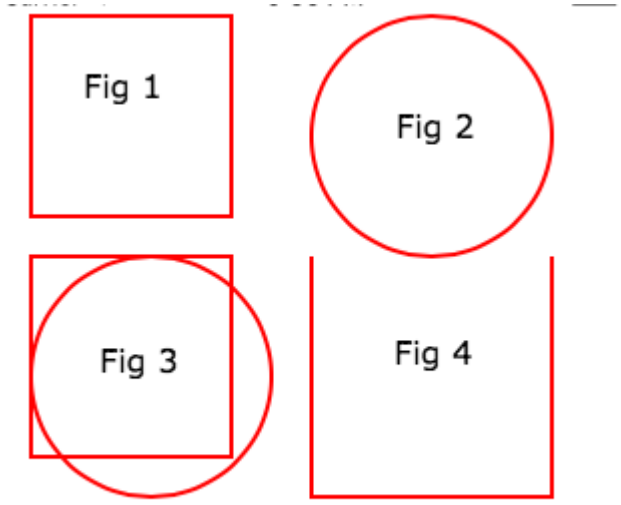
```
 [self.currentShapeLayer removeFromSuperlayer];
```

2 :

```
 self.view.layer.sublayers = nil ;                //removed all earlier shapes
```

```
 //Draw Square Shape

CAShapeLayer *squareLayer = [CAShapeLayer layer];
```

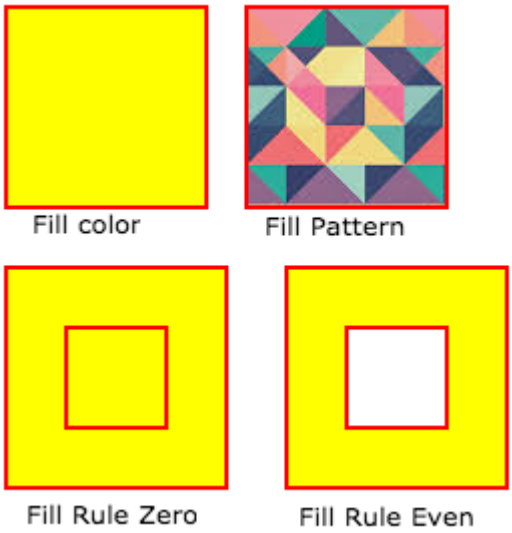
```
squareLayer.frame = CGRectMake(20, 20, 100, 100);
squareLayer.lineWidth = 2.0;
squareLayer.fillColor = nil;
squareLayer.strokeColor = [[UIColor redColor] CGColor];
squareLayer.path = [UIBezierPath bezierPathWithRect:squareLayer.bounds].CGPath;
[[self.view layer] addSublayer:squareLayer];


//Draw Circle Shape

CAShapeLayer *circleShape = [CAShapeLayer layer];
circleShape.frame = CGRectMake(160, 20, 120, 120);
circleShape.lineWidth = 2.0;
circleShape.fillColor = nil;
circleShape.strokeColor = [[UIColor redColor] CGColor];
circleShape.path = [UIBezierPath bezierPathWithOvalInRect:circleShape.bounds].CGPath;
[[self.view layer] addSublayer:circleShape];


//Subpaths
//UIBezierPath can have any number of “path segments” (or subpaths) so you can effectively
draw as many shapes or lines as you want in a single path object

CAShapeLayer *shapeLayer = [CAShapeLayer layer];
shapeLayer.frame = CGRectMake(20, 140, 200, 200);
shapeLayer.lineWidth = 2.0;
shapeLayer.fillColor = nil;
shapeLayer.strokeColor = [[UIColor redColor] CGColor];

CGMutablePathRef combinedPath= CGPathCreateMutableCopy(circleShape.path);
CGPathAddPath(combinedPath, NULL, squareLayer.path);

shapeLayer.path = combinedPath;
[[self.view layer] addSublayer:shapeLayer];

//Open Path
// Paths do not need to connect their end points back to their starting points. A path that
connects back to its starting point is called a closed path, and one that does not is called
an open path.

shapeLayer = [CAShapeLayer layer];
shapeLayer.frame = CGRectMake(160, 140, 300, 300);
shapeLayer.lineWidth = 2.0;
shapeLayer.fillColor = nil;
shapeLayer.strokeColor = [[UIColor redColor] CGColor];

UIBezierPath *linePath=[UIBezierPath bezierPath];
[linePath moveToPoint:CGPointZero];
[linePath addLineToPoint:CGPointMake(0 , 120)];
[linePath addLineToPoint:CGPointMake(120 , 120)];
[linePath addLineToPoint:CGPointMake(120 , 0)];
shapeLayer.path = linePath.CGPath;
[[self.view layer] addSublayer:shapeLayer];
```



//

```
CAShapeLayer *squareLayer = [CAShapeLayer layer];
squareLayer.frame = CGRectMake(20, 30, 100, 100);
squareLayer.lineWidth = 2.0;
squareLayer.fillColor = [[UIColor yellowColor]CGColor];
squareLayer.strokeColor = [[UIColor redColor] CGColor];
squareLayer.path = [UIBezierPath bezierPathWithRect:squareLayer.bounds].CGPath;
[[self.view layer] addSublayer:squareLayer];

//Fill Pattern Color
//images.jpeg

squareLayer = [CAShapeLayer layer];
squareLayer.frame = CGRectMake(140, 30, 100, 100);
squareLayer.lineWidth = 2.0;
squareLayer.fillColor = [[UIColor colorWithPatternImage:[UIImage
imageNamed:@"images.jpeg"]]CGColor];
squareLayer.strokeColor = [[UIColor redColor] CGColor];
squareLayer.path = [UIBezierPath bezierPathWithRect:squareLayer.bounds].CGPath;
[[self.view layer] addSublayer:squareLayer];


//Fill Rule

//Type 1: kCAFillRuleNonZero
squareLayer = [CAShapeLayer layer];
squareLayer.frame = CGRectMake(0, 140, 150, 150);
squareLayer.lineWidth = 2.0;
squareLayer.fillColor = [[UIColor yellowColor]CGColor];
squareLayer.fillRule = kCAFillRuleNonZero;   // indicate the rule type
squareLayer.strokeColor = [[UIColor redColor] CGColor];
UIBezierPath *outerPath = [UIBezierPath bezierPathWithRect:CGRectInset(squareLayer.bounds,
20.0, 20.0)];
UIBezierPath *innerPath = [UIBezierPath bezierPathWithRect:CGRectInset(squareLayer.bounds,
50.0, 50.0)];
CGMutablePathRef combinedPath= CGPathCreateMutableCopy(outerPath.CGPath);
CGPathAddPath(combinedPath, NULL, innerPath.CGPath);
squareLayer.path = combinedPath;
[[self.view layer] addSublayer:squareLayer];
```

```
//Type 2: kCAFillRuleEvenOdd
squareLayer = [CAShapeLayer layer];
squareLayer.frame = CGRectMake(140, 140, 150, 150);
squareLayer.lineWidth = 2.0;
squareLayer.fillColor = [[UIColor yellowColor]CGColor];
squareLayer.fillRule = kCAFillRuleEvenOdd;   // indicate the rule type
squareLayer.strokeColor = [[UIColor redColor] CGColor];
outerPath = [UIBezierPath bezierPathWithRect:CGRectInset(squareLayer.bounds, 20.0, 20.0)];
innerPath = [UIBezierPath bezierPathWithRect:CGRectInset(squareLayer.bounds, 50.0, 50.0)];
combinedPath= CGPathCreateMutableCopy(outerPath.CGPath);
CGPathAddPath(combinedPath, NULL, innerPath.CGPath);
squareLayer.path = combinedPath;
[[self.view layer] addSublayer:squareLayer];
```

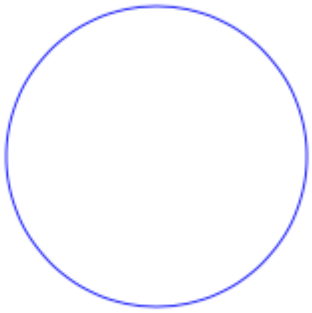



```
fillColor
     Fill the color based on the drawed shape.

fillRule
     Fill Rule the there are two rule is applied to draw the shape.
     1.  kCAFillRuleNonZero
     2.  kCAFillRuleEvenOdd

lineCap
     Below type used to change the style of the line.
     1.  kCALineCapButt
     2.  kCALineCapRound
     3.  kCALineCapSquare

lineDashPattern
     The dash pattern applied to the shape’s path when stroked.
     Create DashStyle while you will stroke the line.

lineDashPhase
     The dash phase applied to the shape’s path when stroked. Animatable.
lineJoin
     Line join style for the shape path.Below style use to draw the line join style.
     1.  kCALineJoinMiter
     2.  kCALineJoinRound
     3.  kCALineJoinBevel

lineWidth
```

```
        Which using to set the line width.

   miterLimit
        The miter limit used when stroking the shape's path. Animatable.

   strokeColor
        Set the stroke color based on the path of the line.

   strokeStart
        When the stroke will start.

   strokeEnd
       When the stroke will end.
```

```
 CAShapeLayer *mask = [[CAShapeLayer alloc] init];

mask.frame = CGRectMake(50, 50, 100, 100);

CGFloat width = 100;

CGFloat height = 100;

CGMutablePathRef path = CGPathCreateMutable();

CGPathMoveToPoint(path, nil, 30, 30);

CGPathAddLineToPoint(path, nil, width, 30);

CGPathAddLineToPoint(path, nil, width, height);

CGPathAddLineToPoint(path, nil,30, height);

CGPathAddLineToPoint(path, nil, 30, 30);

CGPathCloseSubpath(path);


mask.path = path;

CGPathRelease(path);

self.view.layer.mask = mask;
```

```
 CAShapeLayer *circle = [CAShapeLayer layer];

    [circle setPath:[[UIBezierPath bezierPathWithOvalInRect:CGRectMake(100, 100, 150, 150)]
CGPath]];

    [circle setStrokeColor:[[UIColor blueColor] CGColor]];

    [circle setFillColor:[[UIColor clearColor] CGColor]];

    [[self.view layer] addSublayer:circle];
```



CAShapeLayer

```
CAShapeLayer *circle = [CAShapeLayer layer];

[circle setPath:[[UIBezierPath bezierPathWithOvalInRect:CGRectMake(100, 100, 150, 150)]
CGPath]];

[circle setStrokeColor:[[UIColor blueColor] CGColor]];

[circle setFillColor:[[UIColor clearColor] CGColor]];

[[self.view layer] addSublayer:circle];


CABasicAnimation *pathAnimation = [CABasicAnimation animationWithKeyPath:@"strokeEnd"];

pathAnimation.duration = 1.5f;

pathAnimation.fromValue = [NSNumber numberWithFloat:0.0f];

pathAnimation.toValue = [NSNumber numberWithFloat:1.0f];

pathAnimation.repeatCount = 10;

pathAnimation.autoreverses = YES;

[circle addAnimation:pathAnimation
              forKey:@"strokeEnd"];
```

CAShapeLayer : https://riptutorial.com/ko/ios/topic/3575/cashapelayer

15: CGContext

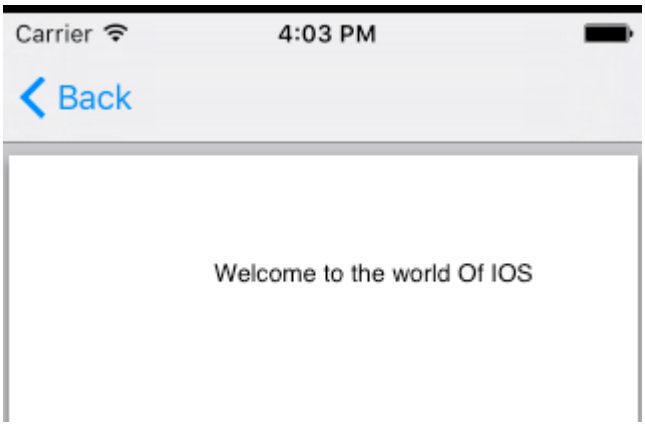
CGContextRef Quartz 2D . , , , PDF .

Examples

```
CGContextRef context = UIGraphicsGetCurrentContext();

CGContextSetLineWidth(context, 5.0);
CGColorSpaceRef colorspace = CGColorSpaceCreateDeviceRGB();
CGContextMoveToPoint(context, 200, 400);
CGContextAddLineToPoint(context, 100, 100);
CGContextStrokePath(context);
CGColorSpaceRelease(colorspace);
```

Draw To **Core Text** .

```
[NSString* textToDraw = @"Welcome to the world Of IOS";

    CFStringRef stringRef = (__bridge CFStringRef)textToDraw;

    CFAttributedStringRef currentText = CFAttributedStringCreate(NULL, stringRef, NULL);
    CTFramesetterRef framesetter = CTFramesetterCreateWithAttributedString(currentText);
    CGRect frameRect = CGRectMake(0, 0, 300, 100);
    CGMutablePathRef framePath = CGPathCreateMutable();
    CGPathAddRect(framePath, NULL, frameRect);

    CFRange currentRange = CFRangeMake(0, 0);
    CTFrameRef frameRef = CTFramesetterCreateFrame(framesetter, currentRange, framePath,
NULL);
    CGPathRelease(framePath);
    CGContextRef currentContext = UIGraphicsGetCurrentContext();

    CGContextSetTextMatrix(currentContext, CGAffineTransformIdentity);
    CGContextTranslateCTM(currentContext, 200, 300);
    CGContextScaleCTM(currentContext, 2, -2);
    CTFrameDraw(frameRef, currentContext);

    CFRelease(frameRef);
    CFRelease(stringRef);
    CFRelease(framesetter);
```



CGContext : https://riptutorial.com/ko/ios/topic/2664/cgcontext-

16: CLLocation

Examples

:

```
   CLLocationManager *locationManager = [[CLLocationManager alloc] init];
   locationManager.delegate = self;
   locationManager.desiredAccuracy = kCLLocationAccuracyBest;
   locationManager.distanceFilter = 5;
```

5m .

CLLocationManager

1 - CoreLocation.framework . .

```
root directory -> build phases -> Link Binary With Libraries
```

(+) CoreLocation.framework .

2 info.plist . . value :

```
<key>NSLocationWhenInUseUsageDescription</key>
<string>message to display when asking for permission</string>
```

3 CoreLocation ViewController .

```
import CoreLocation
```

4- ViewController CLLocationManagerDelagate .

```
class ViewController: UIViewController,CLLocationManagerDelegate {}
```

CLLocationManager ViewController .

```
var manager:CLLocationManager!
```

, " .

```
//initialize the manager
manager = CLLocationManager()

//specify delegate
manager.delegate = self

//set the minimum distance the phone needs to move before an update event is triggered (for
example:  100 meters)
```

```
manager.distanceFilter = 100

//set Accuracy to any of the following depending on your use case

//let kCLLocationAccuracyBestForNavigation: CLLocationAccuracy
//let kCLLocationAccuracyBest: CLLocationAccuracy
//let kCLLocationAccuracyNearestTenMeters: CLLocationAccuracy
//let kCLLocationAccuracyHundredMeters: CLLocationAccuracy
//let kCLLocationAccuracyKilometer: CLLocationAccuracy
//let kCLLocationAccuracyThreeKilometers: CLLocationAccuracy

manager.desiredAccuracy = kCLLocationAccuracyBest

//ask the user for permission
manager.requestWhenInUseAuthorization()

//Start collecting location information
if #available(iOS 9.0, *) {

   manager.requestLocation()

 } else {

   manager.startUpdatingLocation()

  }
```

distanceFilter .

```
func locationManager(manager: CLLocationManager, didUpdateLocations locations: [CLLocation])
{}
```

CLLocation . `coordinate,altitude, floor, horizontalAccuracy, verticalAccuracy, timestamp, description, course, speed , coordinate,altitude, floor, horizontalAccuracy, verticalAccuracy, timestamp, description, course, speed coordinate,altitude, floor, horizontalAccuracy, verticalAccuracy, timestamp, description, course, speed` . `distance(from:)` .

: .

' ' .

" .

Plist .

CLLocation : https://riptutorial.com/ko/ios/topic/2002/cllocation

17: CloudKit

- NSData
- NSDate ()
- NSNumber (/)
- NSString ()
- NSArray ()
- CLLocation
- CKReference
- CKAsset

CloudKit

Examples

CloudKit

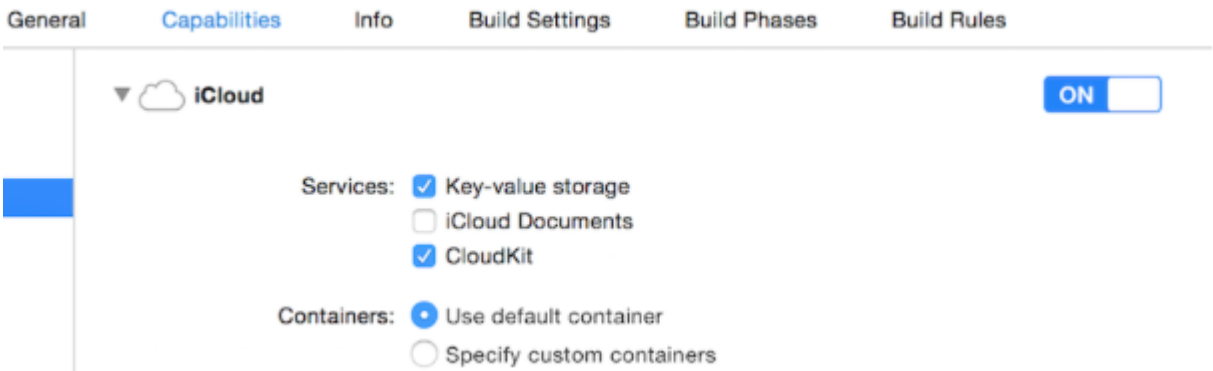
iCloud CloudKit .

iCloud .

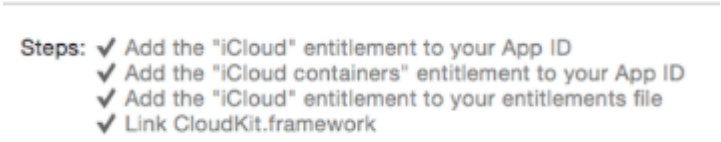
1- Project Navigator General .

2 - ID Apple ID . (Xcode -> -> .

3- Capabilities iCloud . " - " "CloudKit" .



4- .



CloudKit .

CloudKit

CloudKit CloudKit . CloudKit .

.

- ( )
- ( )
- (App Apple Push Notification (APN))

. CloudKit Dashboard Users . .

. iOS SDK . . .

CloudKit

CloudKit .

- `CKRecordID` ( )
- `CKRecord` ( )

ID . `NSDate timeIntervalSinceReferenceDate()` . ### . ### (# .) . .

```
let timestamp = String(format: "%f", NSDate.timeIntervalSinceReferenceDate())
let timestampParts = timestamp.componentsSeparatedByString(".")
let recordID = CKRecordID(recordName: timestampParts[0])
```

(CloudKit) . ID . , .

```
let record = CKRecord(recordType: "Users", recordID: recordID)
record.setObject("Some Text", forKey: "text")
record.setObject(CKAsset(fileURL: someValidImageURL), forKey: "image")
record.setObject(NSDate(), forKey: "date")
```

-C

```
CKRecord *record = [[CKRecord alloc] initWithRecordType: "Users" recordID: recordID];
[record setObject: "Some Text" forKey: "text"];
[record setObject: [CKAsset assetWithFileURL: someValidImageURL] forKey: "image"];
[record setObject: [[NSDate alloc] init] forKey: "date"];
```

CloudKit `UIImage CKAsset UIImage` .

```
let container = CKContainer.defaultContainer()
let database = container.privateCloudDatabase // or container.publicCloudDatabase
```

CloudKit

```
database.saveRecord(record, completionHandler: { (_, error) -> Void in
    print(error ?? "")
})
```

CloudKit : https://riptutorial.com/ko/ios/topic/4946/cloudkit

18: CoreBluetooth

.

- .
- Little Endian iPhone Little Endian . :
  - CPU .
  - ARM 3 .
- .

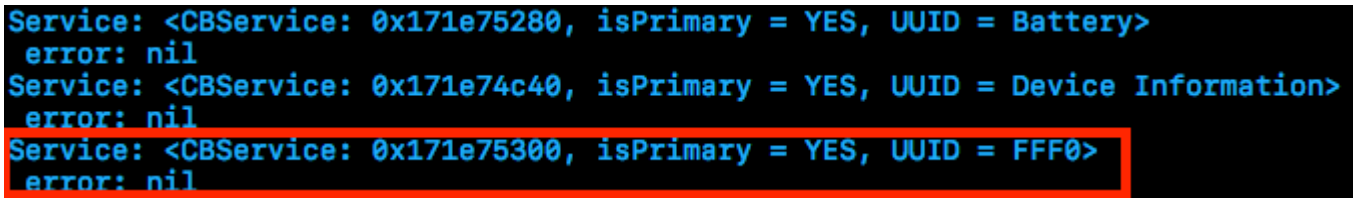
SERVICE UUID .

```
func SearchBLE(){
    cb_manager.scanForPeripherals(withServices:[service_uuid], options: nil)
    StopSearchBLE()
}
```

SERVICE UUID

```
func centralManager(_ central: CBCentralManager, didConnect peripheral:
CBPeripheral) {
        peripheral.delegate = self
        peripheral.discoverServices(nil)
}

func peripheral(_ peripheral: CBPeripheral, didDiscoverServices error: Error?) {
    for service in peripheral.services! {
        print("Service: \(service)\n error: \(error)")
    }
}
```

- discoverServices (nil) - NIL (READ 3)
- SERVICE UUID



- , () FFF0 .
- uuid , .
- FFF0 SERVICE UUID.

UInt16

.

```
protocol DataConvertible {
    init?(data: Data)
    var data: Data { get }
}

extension DataConvertible {

    init?(data: Data) {
        guard data.count == MemoryLayout<Self>.size else { return nil }
        self = data.withUnsafeBytes { $0.pointee }
    }

    var data: Data {
        var value = self
        return Data(buffer: UnsafeBufferPointer(start: &value, count: 1))
    }
}
extension UInt16 : DataConvertible {
    init?(data: Data) {
        guard data.count == MemoryLayout<UInt16>.size else { return nil }
        self = data.withUnsafeBytes { $0.pointee }
    }
    var data: Data {
        var value = CFSwapInt16HostToBig(self)
        return Data(buffer: UnsafeBufferPointer(start: &value, count: 1))
    }
}
```

Examples

Bluetooth Low Energy (BLE)

- BLE .
- CBCentralManagerDelegate .
- : centralManagerDidUpdateState (_ central : CBCentralManager).
- .
- CBCentralManager centralManagerDidUpdateState .

```
class BLEController: CBCentralManagerDelegate{

var cb_manager: CBCentralManager!
var bles : [CBPeripheral] = []

    override func viewDidLoad() {
        super.viewDidLoad()
        cb_manager = CBCentralManager(delegate: self, queue: DispatchQueue.global())
    }

    func centralManagerDidUpdateState(_ central: CBCentralManager) {
        print("UPDATE STATE - \(central)")
    }
}
```

centralManagerDidUpdateState CoreBluetooth BLE . BLE centralManagerDidUpdateState .

```
func centralManagerDidUpdateState(_ central: CBCentralManager) {
    print("UPDATE STATE - \(central)")
    SearchBLE()
}

func SearchBLE(){
    cb_manager.scanForPeripherals(withServices: nil, options: nil)
    StopSearchBLE()
}

func StopSearchBLE() {
    let when = DispatchTime.now() + 5 // change 5 to desired number of seconds
    DispatchQueue.main.asyncAfter(deadline: when) {
        self.cb_manager.stopScan()
    }
}
```

- BLE SearchBLE () 5
- cb_manager.scanForPeripherals (withServices : nil, options : nil) BLE .
- StopSearchBLE () 5 .
- BLE callback func centralManager (_ : CBCentralManager, : CBPeripheral, advertisingData : [:], rssi RSSI : NSNumber)

```
func centralManager(_ central: CBCentralManager, didDiscover peripheral:

    CBPeripheral, advertisementData: [String : Any], rssi RSSI: NSNumber) {
    guard let name = peripheral.name else {
        return
    }
    print(name)
    bles.append(peripheral)
}
```

- IBEACON .
- BLEController CBPeripheralDelegate .
- BLE .
- StopSearchBLE ()

```
class BLEController: CBCentralManagerDelegate, CBPeripheralDelegate{
//...
    func StopSearchMiniewBeacon() {
        let when = DispatchTime.now() + 5 // change 2 to desired number of seconds
        DispatchQueue.main.asyncAfter(deadline: when) {
            self.cb_manager.stopScan()
            self.cb_manager.connect(bles.first)
        }
    }
/...
}
```

- BLE SERVICE UUID MAUOR UUID CHARACTERISTIC

```
var service_uuid =  CBUUID(string: "0000fff0-0000-1000-8000-00805f9b34fb")
var major_uuid =  CBUUID(string: "0000fff2-0000-1000-8000-00805f9b34fb")
func centralManager(_ central: CBCentralManager, didConnect peripheral:
CBPeripheral) {
    peripheral.delegate = self
    peripheral.discoverServices([service_uuid])
}

func peripheral(_ peripheral: CBPeripheral, didDiscoverServices error: Error?) {
    print("Service: \(service)\n error: \(error)")
    peripheral.discoverCharacteristics([major_uuid], for: (peripheral.services?[0])!)
}
```

- 'service_uuid' 'major_uuid' . '-0000-1000-8000-00805f9b34fb' . 'fff0' SERVICE UUID, 'fff2' UUID '0000' 4 uuid 1º .
- discoverCharacteristics ([major_uuid], for : (peripheral.services?[0])!) NIL .
- (peripheral.services?[0])! - peripheral_discoverServices ([service_uuid]) 0 beacuse .

```
func peripheral(_ peripheral: CBPeripheral, didDiscoverCharacteristicsFor service: CBService,
error: Error?) {
    for characteristic in service.characteristics! {
        print("Characteristic: \(characteristic)\n error: \(error)")
        if(characteristic.uuid.uuidString == "FFF2"){
            peripheral.readValue(for: characteristic)
        }
    }
}

func peripheral(_ peripheral: CBPeripheral, didUpdateValueFor characteristic:
CBCharacteristic, error: Error?) {
    print("Characteristic read: \(characteristic)\n error: \(error)")
    let major = UInt16.init(bigEndian: UInt16(data: characteristic.value!)!)
    print("major: \(major)")
}
```

- . peripheral.readValue (for : characteristic)
- readValue func (_ : CBPeripheral, didUpdateValue : CBCharacteristic, : ?) .

- .
- .
- . func (_ : CBPeripheral, didUpdateValue : CBCharacteristic, : ?)
- new_major reset_characteristic .

```
var reset_characteristic : CBCharacteristic!
func peripheral(_ peripheral: CBPeripheral, didDiscoverCharacteristicsFor service: CBService,
error: Error?) {
    for characteristic in service.characteristics! {
        print("Characteristic: \(characteristic)\n error: \(error)")
        if(characteristic.uuid.uuidString == "FFF2"){
            peripheral.readValue(for: characteristic)
        }
        if(characteristic.uuid.uuidString == "FFFF"){
            reset_characteristic = characteristic
        }
    }
}
```

```
let new_major : UInt16 = 100
func peripheral(_ peripheral: CBPeripheral, didUpdateValueFor characteristic:
CBCharacteristic, error: Error?) {
    print("Characteristic read: \(characteristic)\n error: \(error)")
    let major = UInt16.init(bigEndian: UInt16(data: characteristic.value!)!)
    print("major: \(major)")
    peripheral.writeValue(new_major.data, for: characteristic, type:
CBCharacteristicWriteType.withResponse)
}
```

- deafult iPhone Little Endian MINEW NRF51822 ARM Big Endian .
- BLE , (CBCharacteristicWriteType.withResponse) .

```
func peripheral(_ peripheral: CBPeripheral, didWriteValueFor characteristic: CBCharacteristic,
error: Error?) {
    print("Characteristic write: \(characteristic)\n error: \(error)")
    if(characteristic.uuid.uuidString == "FFF2"){
            print("Resetting")
            peripheral.writeValue("minew123".data(using: String.Encoding.utf8)!, for:
reset_characteristic, type: CBCharacteristicWriteType.withResponse)
        }
    if(characteristic.uuid.uuidString == "FFFF"){
        print("Reboot finish")
        cb_manager.cancelPeripheralConnection(peripheral)
    }
}
```

- .
- FFFF .
- 'minew123' .
- .

```
func peripheral(_ peripheral: CBPeripheral, didUpdateValueFor characteristic:
CBCharacteristic, error: Error?) {
    print("Characteristic read: \(characteristic)\n error: \(error)")
    let major = UInt16.init(bigEndian: UInt16(data: characteristic.value!)!)
    print("major: \(major)")
    //peripheral.writeValue(new_major.data, for: characteristic, type:
CBCharacteristicWriteType.withResponse)
```

}

- didUpdateValueFor . .

CoreBluetooth : https://riptutorial.com/ko/ios/topic/9488/corebluetooth--

19: CoreImage / OpenCV

Examples

-C

ViewController .

```
#import <CoreImage/CoreImage.h>
#import <CoreImage/CoreImage.h>
#import <QuartzCore/QuartzCore.h>
```

```
[self faceDetector];
```

:

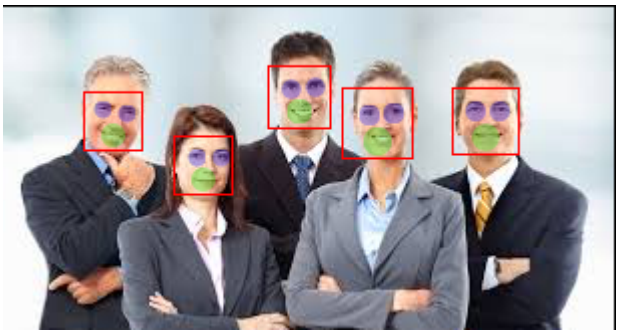
```
-(void)faceDetector
{
    // Load the picture for face detection
    UIImageView* image = [[UIImageView alloc] initWithImage:[UIImage
imageNamed:@"download.jpeg"]];

    // Draw the face detection image
    [self.view addSubview:image];

    // Execute the method used to markFaces in background
    [self performSelectorInBackground:@selector(markFaces:) withObject:image];

    // flip image on y-axis to match coordinate system used by core image
    [image setTransform:CGAffineTransformMakeScale(1, -1)];

    // flip the entire window to make everything right side up
    [self.view setTransform:CGAffineTransformMakeScale(1, -1)];


}
```

```
//Adds face squares and color masks to eyes and mouth
-(void)markFaces:(UIImageView *)facePicture
{
    // draw a CI image with the previously loaded face detection picture
    CIImage* image = [CIImage imageWithCGImage:facePicture.image.CGImage];

    // create a face detector - since speed is not an issue we'll use a high accuracy
    // detector
    CIDetector* detector = [CIDetector detectorOfType:CIDetectorTypeFace
                                              context:nil options:[NSDictionary
dictionaryWithObject:CIDetectorAccuracyHigh forKey:CIDetectorAccuracy]];

    // create an array containing all the detected faces from the detector
    NSArray* features = [detector featuresInImage:image];
    NSLog(@"Number of faces %d",[features count]);
```

```
    // we'll iterate through every detected face.  CIFaceFeature provides us
    // with the width for the entire face, and the coordinates of each eye
    // and the mouth if detected.  Also provided are BOOL's for the eye's and
    // mouth so we can check if they already exist.
    //    for (features in image)
    //    {
    for(CIFaceFeature* faceFeature in features)
    {
        // get the width of the face
        CGFloat faceWidth = faceFeature.bounds.size.width;

        // create a UIView using the bounds of the face
        UIView* faceView = [[UIView alloc] initWithFrame:faceFeature.bounds];

        // add a border around the newly created UIView
        faceView.layer.borderWidth = 1;
        faceView.layer.borderColor = [[UIColor redColor] CGColor];

        // add the new view to create a box around the face
        [self.view addSubview:faceView];

        if(faceFeature.hasLeftEyePosition)
        {
            // create a UIView with a size based on the width of the face
            UIView* leftEyeView = [[UIView alloc]
initWithFrame:CGRectMake(faceFeature.leftEyePosition.x-faceWidth*0.15,
faceFeature.leftEyePosition.y-faceWidth*0.15, faceWidth*0.3, faceWidth*0.3)];
            // change the background color of the eye view
            [leftEyeView setBackgroundColor:[[UIColor blueColor]
colorWithAlphaComponent:0.3]];
            // set the position of the leftEyeView based on the face
            [leftEyeView setCenter:faceFeature.leftEyePosition];
            // round the corners
            leftEyeView.layer.cornerRadius = faceWidth*0.15;
            // add the view to the window
            [self.view addSubview:leftEyeView];
        }

        if(faceFeature.hasRightEyePosition)
        {
            // create a UIView with a size based on the width of the face
            UIView* leftEye = [[UIView alloc]
initWithFrame:CGRectMake(faceFeature.rightEyePosition.x-faceWidth*0.15,
faceFeature.rightEyePosition.y-faceWidth*0.15, faceWidth*0.3, faceWidth*0.3)];
            // change the background color of the eye view
            [leftEye setBackgroundColor:[[UIColor blueColor] colorWithAlphaComponent:0.3]];
            // set the position of the rightEyeView based on the face
            [leftEye setCenter:faceFeature.rightEyePosition];
            // round the corners
            leftEye.layer.cornerRadius = faceWidth*0.15;
            // add the new view to the window
            [self.view addSubview:leftEye];
        }

        if(faceFeature.hasMouthPosition)
        {
            // create a UIView with a size based on the width of the face
            UIView* mouth = [[UIView alloc]
initWithFrame:CGRectMake(faceFeature.mouthPosition.x-faceWidth*0.2,
faceFeature.mouthPosition.y-faceWidth*0.2, faceWidth*0.4, faceWidth*0.4)];
            // change the background color for the mouth to green
```

```
            [mouth setBackgroundColor:[[UIColor greenColor] colorWithAlphaComponent:0.3]];
            // set the position of the mouthView based on the face
            [mouth setCenter:faceFeature.mouthPosition];
            // round the corners
            mouth.layer.cornerRadius = faceWidth*0.2;
            // add the new view to the window
            [self.view addSubview:mouth];
        }
    }

    // }
}
```

ScreenShot



CoreImage / OpenCV : https://riptutorial.com/ko/ios/topic/7298/coreimage---opencv---

20: CoreImage

Examples

-C

.

```
 NSArray *properties = [CIFilter filterNamesInCategory:kCICategoryBuiltIn];

 for (NSString *filterName in properties)
 {
 CIFilter *fltr = [CIFilter filterWithName:filterName];
 NSLog(@"%@", [fltr attributes]);
 }
```

CISepiaTone .

```
CIAttributeFilterDisplayName = "Sepia Tone";
CIAttributeFilterName = CISepiaTone;
    CIAttributeReferenceDocumentation = "http://developer.apple.com/cgi-
bin/apple_ref.cgi?apple_ref=//apple_ref/doc/filter/ci/CISepiaTone";
    inputImage =     {
        CIAttributeClass = CIImage;
        CIAttributeDescription = "The image to use as an input image. For filters that also
use a background image, this is the foreground image.";
        CIAttributeDisplayName = Image;
        CIAttributeType = CIAttributeTypeImage;
    };
    inputIntensity =     {
        CIAttributeClass = NSNumber;
        CIAttributeDefault = 1;
        CIAttributeDescription = "The intensity of the sepia effect. A value of 1.0 creates a
monochrome sepia image. A value of 0.0 has no effect on the image.";
        CIAttributeDisplayName = Intensity;
        CIAttributeIdentity = 0;
        CIAttributeMin = 0;
        CIAttributeSliderMax = 1;
        CIAttributeSliderMin = 0;
        CIAttributeType = CIAttributeTypeScalar;
    };
}
```

.

```
    CIImage *beginImage = [CIImage imageWithCGImage:[myImageView.image CGImage]];
    CIContext *context = [CIContext contextWithOptions:nil];
    //select Filter Name and Intensity
    CIFilter *filter = [CIFilter filterWithName:@"CISepiaTone" keysAndValues:
kCIInputImageKey, beginImage, @"inputIntensity", [NSNumber numberWithFloat:0.8], nil];
    CIImage *outputImage = [filter outputImage];

    CGImageRef cgimg = [context createCGImage:outputImage fromRect:[outputImage extent]];
    UIImage *newImg = [UIImage imageWithCGImage:cgimg];
```

```
    [myImageView1 setImage:newImg];

    CGImageRelease(cgimg);
```


```
UIImageView *imageView1=[[UIImageView alloc]initWithFrame:CGRectMake(0, 0,
self.view.frame.size.width, self.view.frame.size.height/2)];
UIImageView *imageView2=[[UIImageView alloc]initWithFrame:CGRectMake(0,
self.view.frame.size.height/2, self.view.frame.size.width, self.view.frame.size.height/2)];
imageView1.image=[UIImage imageNamed:@"image.png"];

CIImage *beginImage = [CIImage imageWithCGImage:[imageView1.image CGImage]];
CIContext *context = [CIContext contextWithOptions:nil];
//select Filter Name and Intensity

CIFilter *filter = [CIFilter filterWithName:@"CIColorPosterize"];
[filter setValue:beginImage forKey:kCIInputImageKey];
[filter setValue:[NSNumber numberWithFloat:8.0] forKey:@"inputLevels"];
CIImage *outputImage = [filter outputImage];

CGImageRef cgimg = [context createCGImage:outputImage fromRect:[outputImage extent]];
UIImage *newImg = [UIImage imageWithCGImage:cgimg];

[imageView2 setImage:newImg];
```

```
CGImageRelease(cgimg);
[self.view addSubview:imageView1];
[self.view addSubview:imageView2];
```

.

```
/* CIAccordionFoldTransition,
    CIAdditionCompositing,
    CIAffineClamp,
    CIAffineTile,
    CIAffineTransform,
    CIAreaAverage,
    CIAreaHistogram,
    CIAreaMaximum,
    CIAreaMaximumAlpha,
    CIAreaMinimum,
    CIAreaMinimumAlpha,
    CIAztecCodeGenerator,
    CIBarsSwipeTransition,
    CIBlendWithAlphaMask,
    CIBlendWithMask,
    CIBloom,
    CIBoxBlur,
    CIBumpDistortion,
    CIBumpDistortionLinear,
    CICheckerboardGenerator,
    CICircleSplashDistortion,
    CICircularScreen,
```

```
    CICircularWrap,
    CICMYKHalftone,
    CICode128BarcodeGenerator,
    CIColorBlendMode,
    CIColorBurnBlendMode,
    CIColorClamp,
    CIColorControls,
    CIColorCrossPolynomial,
    CIColorCube,
    CIColorCubeWithColorSpace,
    CIColorDodgeBlendMode,
    CIColorInvert,
    CIColorMap,
    CIColorMatrix,
    CIColorMonochrome,
    CIColorPolynomial,
    CIColorPosterize,
    CIColumnAverage,
    CIComicEffect,
    CIConstantColorGenerator,
    CIConvolution3X3,
    CIConvolution5X5,
    CIConvolution7X7,
    CIConvolution9Horizontal,
    CIConvolution9Vertical,
    CICopyMachineTransition,
    CICrop,
    CICrystallize,
    CIDarkenBlendMode,
    CIDepthOfField,
    CIDifferenceBlendMode,
    CIDiscBlur,
    CIDisintegrateWithMaskTransition,
    CIDisplacementDistortion,
    CIDissolveTransition,
    CIDivideBlendMode,
    CIDotScreen,
    CIDroste,
    CIEdges,
    CIEdgeWork,
    CIEightfoldReflectedTile,
    CIExclusionBlendMode,
    CIExposureAdjust,
    CIFalseColor,
    CIFlashTransition,
    CIFourfoldReflectedTile,
    CIFourfoldRotatedTile,
    CIFourfoldTranslatedTile,
    CIGammaAdjust,
    CIGaussianBlur,
    CIGaussianGradient,
    CIGlassDistortion,
    CIGlassLozenge,
    CIGlideReflectedTile,
    CIGloom,
    CIHardLightBlendMode,
    CIHatchedScreen,
    CIHeightFieldFromMask,
    CIHexagonalPixellate,
    CIHighlightShadowAdjust,
    CIHistogramDisplayFilter,
```

```
    CIHoleDistortion,
    CIHueAdjust,
    CIHueBlendMode,
    CIKaleidoscope,
    CILanczosScaleTransform,
    CILenticularHaloGenerator,
    CILightenBlendMode,
    CILightTunnel,
    CILinearBurnBlendMode,
    CILinearDodgeBlendMode,
    CILinearGradient,
    CILinearToSRGBToneCurve,
    CILineOverlay,
    CILineScreen,
    CILuminosityBlendMode,
    CIMaskedVariableBlur,
    CIMaskToAlpha,
    CIMaximumComponent,
    CIMaximumCompositing,
    CIMedianFilter,
    CIMinimumComponent,
    CIMinimumCompositing,
    CIModTransition,
    CIMotionBlur,
    CIMultiplyBlendMode,
    CIMultiplyCompositing,
    CINoiseReduction,
    CIOpTile,
    CIOverlayBlendMode,
    CIPageCurlTransition,
    CIPageCurlWithShadowTransition,
    CIParallelogramTile,
    CIPDF417BarcodeGenerator,
    CIPerspectiveCorrection,
    CIPerspectiveTile,
    CIPerspectiveTransform,
    CIPerspectiveTransformWithExtent,
    CIPhotoEffectChrome,
    CIPhotoEffectFade,
    CIPhotoEffectInstant,
    CIPhotoEffectMono,
    CIPhotoEffectNoir,
    CIPhotoEffectProcess,
    CIPhotoEffectTonal,
    CIPhotoEffectTransfer,
    CIPinchDistortion,
    CIPinLightBlendMode,
    CIPixellate,
    CIPointillize,
    CIQRCodeGenerator,
    CIRadialGradient,
    CIRandomGenerator,
    CIRippleTransition,
    CIRowAverage,
    CISaturationBlendMode,
    CIScreenBlendMode,
    CISepiaTone,
    CIShadedMaterial,
    CISharpenLuminance,
    CISixfoldReflectedTile,
    CISixfoldRotatedTile,
```

```
    CISmoothLinearGradient,
    CISoftLightBlendMode,
    CISourceAtopCompositing,
    CISourceInCompositing,
    CISourceOutCompositing,
    CISourceOverCompositing,
    CISpotColor,
    CISpotLight,
    CISRGBToneCurveToLinear,
    CIStarShineGenerator,
    CIStraightenFilter,
    CIStretchCrop,
    CIStripesGenerator,
    CISubtractBlendMode,
    CISunbeamsGenerator,
    CISwipeTransition,
    CITemperatureAndTint,
    CIToneCurve,
    CITorusLensDistortion,
    CITriangleKaleidoscope,
    CITriangleTile,
    CITwelvefoldReflectedTile,
    CITwirlDistortion,
    CIUnsharpMask,
    CIVibrance,
    CIVignette,
    CIVignetteEffect,
    CIVortexDistortion,
    CIWhitePointAdjust,
    CIZoomBlur*/
```

CoreImage : https://riptutorial.com/ko/ios/topic/7278/coreimage-

21: CTCallCenter

Examples

Apple

CTCallCenter . .

CTCallCenter .

-C :

, .

```
@property (atomic, strong) CTCallCenter *callCenter;
```

init () :

```
[self setCallCenter:[CTCallCenter new]];
```

, .

```
- (void)registerPhoneCallListener
{
[[self callCenter] setCallEventHandler:^(CTCall * _Nonnull call) {
    NSLog(@"CallEventHandler called - interception in progress");

     if ([call.callState isEqualToString: CTCallStateConnected])
     {
         NSLog(@"Connected");
     }
     else if ([call.callState isEqualToString: CTCallStateDialing])
     {
         NSLog(@"Dialing");
     }
     else if ([call.callState isEqualToString: CTCallStateDisconnected])
     {
         NSLog(@"Disconnected");

     } else if ([call.callState isEqualToString: CTCallStateIncoming])
     {
         NSLog(@"Incomming");
     }
 }];
}
```

.

4 .

```
CTCallStateDialing
```

```
CTCallStateIncoming
CTCallStateConnected
CTCallStateDisconnected
```

:

.

```
    self.callCenter = CTCallCenter()
    self.callCenter.callEventHandler = { call in
        //  Handle your interception
        if call.callState == CTCallStateConnected
        {
        }
    }
```

?

2 (VoIP) .

-> -> -> Voice over IP

CallKit - ios 10

```
//Header File

<CallKit/CXCallObserver.h>

CXCallObserver *callObserver = [[CXCallObserver alloc] init];

// If queue is nil, then callbacks will be performed on main queue

[callObserver setDelegate:self queue:nil];

// Don't forget to store reference to callObserver, to prevent it from being released

self.callObserver = callObserver;

// get call status
- (void)callObserver:(CXCallObserver *)callObserver callChanged:(CXCall *)call {
    if (call.hasConnected) {
        // perform necessary actions
    }
}
```

CTCallCenter : https://riptutorial.com/ko/ios/topic/3007/ctcallcenter

22: Cydia

jailbroken iPhone cydia .

.

(Theos)

https://github.com/theos/theos/wiki/Installation

Examples

nic

.

```
$THEOS/bin/nic.pl
```

```
NIC 2.0 - New Instance Creator
------------------------------
  [1.] iphone/activator_event
  [2.] iphone/application_modern
  [3.] iphone/cydget
  [4.] iphone/flipswitch_switch
  [5.] iphone/framework
  [6.] iphone/ios7_notification_center_widget
  [7.] iphone/library
  [8.] iphone/notification_center_widget
  [9.] iphone/preference_bundle_modern
  [10.] iphone/tool
  [11.] iphone/tweak
  [12.] iphone/xpc_service
Choose a Template (required):
```

```
[11.] iphone/tweak
```

.

```
-rw-r--r--@  1 gkpln3  staff   214B Jun 12 15:09 Makefile
-rw-r--r--@  1 gkpln3  staff    89B Jun 11 22:58 TorchonFocus.plist
-rw-r--r--   1 gkpln3  staff   2.7K Jun 12 16:10 Tweak.xm
-rw-r--r--   1 gkpln3  staff   224B Jun 11 16:17 control
drwxr-xr-x   3 gkpln3  staff   102B Jun 11 16:18 obj
drwxr-xr-x  16 gkpln3  staff   544B Jun 12 16:12 packages
```

iOS

Tweak.xm .

.

```
%hook SBScreenShotter
- (void)saveScreenshot:(BOOL)screenshot
{
    %orig;
    NSLog(@"saveScreenshot: is called");
}
%end
```

(:

```
%hook SBScreenShotter
- (void)saveScreenshot:(BOOL)screenshot
{
    NSLog(@"saveScreenshot: is called");
}
%end
```

.

Cydia : https://riptutorial.com/ko/ios/topic/10533/cydia--

23: DispatchGroup

:

Examples

. . mainThread .

DispatchGroup .

DispatchGroup enter leave .

notify ().

:

```
import UIKit

class ViewController: UIViewController {

    override func viewDidLoad() {
        super.viewDidLoad()


        let dispatchGroup = DispatchGroup() //Create a group for the tasks.
        let session: URLSession = URLSession.shared

        dispatchGroup.enter() //Enter the group for the first task.

        let firstTask = session.dataTask(with: URLRequest(url: URL(string:
"https://stackoverflow.com")!)) { (data, response, error) in

            //Process Response..

            dispatchGroup.leave() //Leave the group for the first task.
        }


        dispatchGroup.enter()  //Enter the group for the second task.

        let secondTask = session.dataTask(with: URLRequest(url: URL(string:
"https://google.ca")!)) { (data, response, error) in

            //Process Response..

            dispatchGroup.leave()  //Leave the group for the second task.
        }


        //Get notified on the main thread/queue.. when ALL of the tasks above has been
completed.
        dispatchGroup.notify(queue: DispatchQueue.main) {

            print("Every task is complete")
```

```
        }


        //Start the tasks.
        firstTask.resume()
        secondTask.resume()
    }

    override func didReceiveMemoryWarning() {
        super.didReceiveMemoryWarning()
    }
}
```

wait wait . . .

ordered . :

```
import UIKit

//Locking mechanism..
func synchronized(_ lock: AnyObject, closure: () -> Void) {
    objc_sync_enter(lock)
    closure()
    objc_sync_exit(lock)
}

class ViewController: UIViewController {

    let lock = NSObject() //Object to lock on.
    var responseArray = Array<Data?>() //Array of responses.

    override func viewDidLoad() {
        super.viewDidLoad()

        let dispatchGroup = DispatchGroup()
        let session: URLSession = URLSession.shared

        dispatchGroup.enter() //Enter the group for the first task.

        let firstTask = session.dataTask(with: URLRequest(url: URL(string:
"https://stackoverflow.com")!)) { (data, response, error) in

            //Process Response..

            synchronized(self.lock, closure: { () -> Void in
                self.responseArray[0] = data ?? nil
            })

            dispatchGroup.leave() //Leave the group for the first task.
        }


        dispatchGroup.enter()  //Enter the group for the second task.

        let secondTask = session.dataTask(with: URLRequest(url: URL(string:
"https://google.ca")!)) { (data, response, error) in

            //Process Response..
```

```
            synchronized(self.lock, closure: { () -> Void in
                self.responseArray[1] = data ?? nil
            })

            dispatchGroup.leave()  //Leave the group for the second task.
        }


        //Get notified on the main thread.. when ALL of the requests above has been completed.
        dispatchGroup.notify(queue: DispatchQueue.main) {

            print("Every task is complete..")

            for i in 0..<self.responseArray.count {

                if self.responseArray[i] == nil {
                    print("Request #\(i) Failed.\n")
                }
                else {
                    print("Request #\(i) Succeeded.\n")
                }
            }
        }

        //Two tasks added to the array. Responses are assumed nil until they complete.
        self.responseArray.append(nil)
        self.responseArray.append(nil)

        //Start the tasks.
        firstTask.resume()
        secondTask.resume()
    }

    override func didReceiveMemoryWarning() {
        super.didReceiveMemoryWarning()
    }
}
```

DispatchGroup .entering leave leave   .   .

enter   leave .

DispatchGroup : https://riptutorial.com/ko/ios/topic/4624/dispatchgroup

24: EventKit

Examples

. .

EventKit .

```
import EventKit
```

-C

```
#import <EventKit/EventKit.h>
```

EKEventStore

EKEventStore . .

```
let eventStore = EKEventStore()
```

-C

```
EKEventStore *eventStore = [[EKEventStore alloc] init];
```

EKEventStore . .

, . .

EKEventStore authorizationStatusForEntityType() .

```
switch EKEventStore.authorizationStatusForEntityType(EKEntityTypeEvent){
    case .Authorized: //...
    case .Denied: //...
    case .NotDetermined: //...
    default: break
}
```

-C

```
switch ([EKEventStore authorizationStatusForEntityType:EKEntityTypeEvent]){
    case EKAuthorizationStatus.Authorized:
        //...
        break;
    case EKAuthorizationStatus.Denied:
        //...
        break;
    case EKAuthorizationStatus.NotDetermined:
        //...
        break;
    default:
        break;
}
```

NotDetermined .

```
eventStore.requestAccessToEntityType(EKEntityTypeEvent, completion: { [weak self]
(userGrantedAccess, _) -> Void in
    if userGrantedAccess{
        //access calendar
    }
}
```

EKCalendar , calendarsForEntityType .

```
let calendarsArray = eventStore.calendarsForEntityType(EKEntityType.Event) as! [EKCalendar]
```

---

for .

```
for calendar in calendarsArray{
    //...
}
```

```
let calendarColor = UIColor(CGColor: calendar.CGColor)
let calendarTitle = calendar.title
```

-C

```
UIColor *calendarColor = [UIColor initWithCGColor: calendar.CGColor];
NSString *calendarTitle = calendar.title;
```

```
var event = EKEvent(eventStore: eventStore)
```

-C

```
EKEvent *event = [EKEvent initWithEventStore:eventStore];
```

,

```
event.calendar = calendar
event.title = "Event Title"
event.startDate = startDate //assuming startDate is a valid NSDate object
event.endDate = endDate //assuming endDate is a valid NSDate object
```

```
try {
    do eventStore.saveEvent(event, span: EKSpan.ThisEvent)
} catch let error as NSError {
    //error
}
```

-C

```
NSError *error;
BOOL *result = [eventStore saveEvent:event span:EKSpanThisEvent error:&error];
if (result == NO){
    //error
}
```

EventKit : https://riptutorial.com/ko/ios/topic/5854/eventkit

25: FacebookSDK

Examples

FacebookSDK

1 : SDK

`CocoaPods` SDK . .

`Podfile` .

```
target 'MyApp' do
  use_frameworks!

  pod 'FBSDKCoreKit'
  pod 'FBSDKLoginKit'
  pod 'FBSDKShareKit'
end
```

`pod install` `.xcworkspace` `.xcodeproj` .

`FBSDKLoginKit` `FBSDKShareKit` . .

2 : Facebook

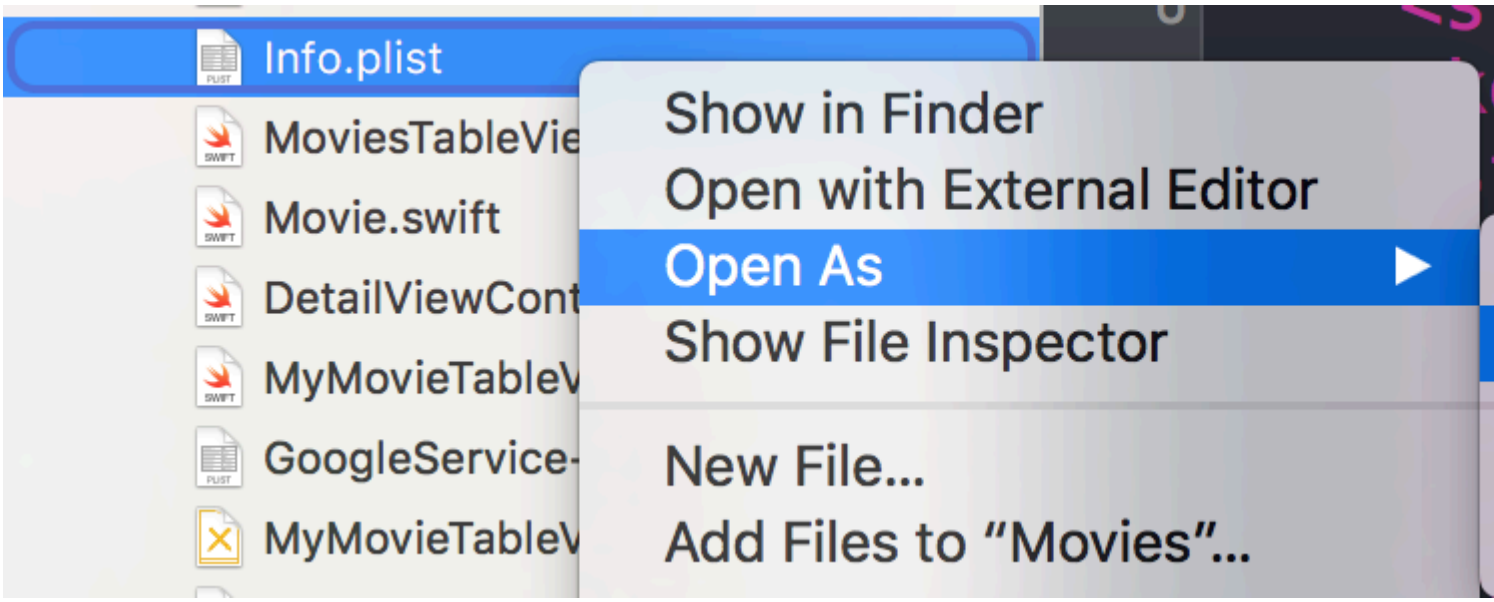
- Facebook .

Facebook SDK . CocoaPod SDK .

3 : `.plist`

. Facebook "" `.plist` . .

`.plist` .



. .! <dict> . .

```
<plist version="1.0">
<dict>
    // ...
    //some default settings
    // ...
    <key>CFBundleURLTypes</key>
    <array>
        <dict>
            <key>CFBundleURLSchemes</key>
            <array>
                <string>fb{FBAppId}</string>
            </array>
        </dict>
    </array>
    <key>FacebookAppID</key>
    <string>{FBAppId}</string>
    <key>FacebookDisplayName</key>
    <string>{FBAppName}</string>
    <key>LSApplicationQueriesSchemes</key>
    <array>
        <string>fbapi</string>
        <string>fb-messenger-api</string>
        <string>fbauth2</string>
        <string>fbshareextension</string>
    </array>
<key>NSAppTransportSecurity</key>
<dict>
    <key>NSExceptionDomains</key>
    <dict>
        <key>facebook.com</key>
        <dict>
            <key>NSIncludesSubdomains</key>
            <true/>
            <key>NSExceptionRequiresForwardSecrecy</key>
            <false/>
        </dict>
        <key>fbcdn.net</key>
        <dict>
            <key>NSIncludesSubdomains</key>
```

```
            <true/>
            <key>NSExceptionRequiresForwardSecrecy</key>
            <false/>
        </dict>
        <key>akamaihd.net</key>
        <dict>
            <key>NSIncludesSubdomains</key>
            <true/>
            <key>NSExceptionRequiresForwardSecrecy</key>
            <false/>
        </dict>
    </dict>
</dict>
</plist>
```

.

4 : Facebook .

=>

5 : `AppDelegate.swift`

.

```
import FBSDKCoreKit
```

.

```
func application(application: UIApplication, didFinishLaunchingWithOptions launchOptions:
[NSObject: AnyObject]?) -> Bool {
    FBSDKApplicationDelegate.sharedInstance().application(application,
didFinishLaunchingWithOptions: launchOptions)
    return true
}

func application(application: UIApplication, openURL url: NSURL, sourceApplication: String?,
annotation: AnyObject) -> Bool {
    return FBSDKApplicationDelegate.sharedInstance().application(application, openURL: url,
sourceApplication: sourceApplication, annotation: annotation)
}
```

" "

FacebookSDK "Facebook " UI .

1. UIButton .
2. Ctrl + IBAction .
3. IBAction Facebook .

:

```
    let loginButton = FBSDKLoginButton()
    loginButton.delegate = self
```

```
    // Your Custom Permissions Array
    loginButton.readPermissions =
    [
                              "public_profile",
                              "email",
                              "user_about_me",
                              "user_photos"
    ]
    // Hiding the button
    loginButton.hidden = true
    self.view.addSubview(loginButton)
    // Simulating a tap for the actual Facebook SDK button
    loginButton.sendActionsForControlEvents(UIControlEvents.TouchUpInside)
```

-C :

```
FBSDKLoginButton *FBButton = [FBSDKLoginButton new];

// Your Custom Permissions Array
FBButton.readPermissions = @[@"public_profile",
                              @"email",
                              @"user_about_me",
                              @"user_photos"
                              ];
FBButton.loginBehavior = FBSDKLoginBehaviorNative;
[FBButton setDelegate:self];
[FBButton setHidden:true];
[loginButton addSubview:FBButton];

[FBButton sendActionsForControlEvents:UIControlEventTouchUpInside];
```

.

Facebook `FBButton.readPermissions` .

:

```
enum FacebookParametesField : String
{
    case FIELDS_KEY = "fields"
    case FIELDS_VALUE = "id, email, picture, first_name, last_name"
}


if FBSDKAccessToken.currentAccessToken() != nil
{
//  Getting user facebook data
FBSDKGraphRequest(graphPath: "me",
                  parameters: [FacebookParametesField.FIELDS_KEY.rawValue :
FacebookParametesField.FIELDS_VALUE.rawValue])
.startWithCompletionHandler({ (graphConnection : FBSDKGraphRequestConnection!, result :
AnyObject!, error : NSError!) -> Void in

        if error == nil
        {
            print("Facebook Graph phaze")

            let email = result["email"]
```

```
            let facebookToken = FBSDKAccessToken.currentAccessToken().tokenString
            let userFacebookId = result["id"]
            let firstName = result["first_name"]
            let lastName = result["last_name"]

            if let result = result as? Dictionary<String, AnyObject>
            {
                if let picture = result["picture"] as? Dictionary<String,AnyObject>
                {
                    if let data = picture["data"] as? Dictionary <String,AnyObject>
                    {
                        if let url = data["url"] as? String
                        {
                            //  Profile picture URL
                            let profilePictureURL = url
                        }
                    }
                }
            }
        }
    })
}
```

FacebookSDK : https://riptutorial.com/ko/ios/topic/2972/facebooksdk

26: FileHandle

Examples

.

1024 `NSMutableData` () .

```
// MARK: - Get file data as chunks Methode.
func getFileDataInChunks() {

    let doumentDirectoryPath = NSSearchPathForDirectoriesInDomains(.documentDirectory,
.userDomainMask, true)[0] as NSString
    let filePath = doumentDirectoryPath.appendingPathComponent("video.mp4")


    //Check file exits at path or not.
    if FileManager.default.fileExists(atPath: filePath) {

        let chunkSize = 1024 // divide data into 1 kb

        //Create NSMutableData object to save read data.
        let ReadData = NSMutableData()

        do {

            //open file for reading.
            outputFileHandle = try FileHandle(forReadingFrom: URL(fileURLWithPath: filePath))

            // get the first chunk
            var datas = outputFileHandle?.readData(ofLength: chunkSize)

            //check next chunk is empty or not.
            while !(datas?.isEmpty)! {

                //here I write chunk data to ReadData or you can directly write to socket.
                ReadData.append(datas!)

                // get the next chunk
                datas = outputFileHandle?.readData(ofLength: chunkSize)

                print("Running: \(ReadData.length)")
            }

            //close outputFileHandle after reading data complete.
            outputFileHandle?.closeFile()

            print("File reading complete")

        }catch let error as NSError {
            print("Error : \(error.localizedDescription)")
        }
    }
}
```

`ReadData` outputFileHandle `FileHandle`

```
var outputFileHandle:FileHandle?
```

FileHandle : https://riptutorial.com/ko/ios/topic/10665/filehandle

27: GameCenter

Examples

GameCenter

:

1. Apple
2. iTunesConnect GameCenter

GameCenter :

1. *iTunesConnect* .
2. *Apps* . .
3. *Game Center* .
4. .
5. .
6. .
7. *ID* .
8. .
9. .
10. .

`LeaderboardID` Xcode .

Xcode

4 .

1.
2. GameCenter
3. GameCenter
4.
5. `GKGameCenterControllerDelegate` `import GameKit GKGameCenterControllerDelegate`
6. GameCenter .

```
func authenticateLocalPlayer() {

        let localPlayer = GKLocalPlayer.localPlayer()
        localPlayer.authenticateHandler = { (viewController, error) -> Void in

            if viewController != nil {
                //If the user is not signed in to GameCenter, we make them sign in
```

```
                let vc:UIViewController = self.view!.window!.rootViewController!
                vc.presentViewController(viewController!, animated: true, completion: nil)

            } else {

                //Do something here if you want
            }
        }
    }
```

3. .

2 .

`Identifier` iTunesConnect leaderboardID .

`score` int iTunesConnect

```
func saveHighScore(identifier:String, score:Int) {

        if GKLocalPlayer.localPlayer().authenticated {

            let scoreReporter = GKScore(leaderboardIdentifier: identifier)

            scoreReporter.value = Int64(score)

            let scoreArray:[GKScore] = [scoreReporter]

            GKScore.reportScores(scoreArray, withCompletionHandler: {
                error -> Void in

                if error != nil {
                    print("Error")
                } else {


                }
            })
        }
    }
```

4. .

```
//This function will show GameCenter leaderboards and Achievements if you call this function.
    func showGameCenter() {

        let gameCenterViewController = GKGameCenterViewController()
        gameCenterViewController.gameCenterDelegate = self

        let vc:UIViewController = self.view!.window!.rootViewController!
        vc.presentViewController(gameCenterViewController, animated: true, completion:nil)

    }

    //This function closes gameCenter after showing.
    func gameCenterViewControllerDidFinish(gameCenterViewController:
GKGameCenterViewController) {
```

```
        gameCenterViewController.dismissViewControllerAnimated(true, completion: nil)
        self.gameCenterAchievements.removeAll()

    }
```

GameCenter : https://riptutorial.com/ko/ios/topic/6720/gamecenter--

28: GameplayKit

Examples

`GameplayKit` (iOS 9 SDK) , . .

`GKRandomSource.sharedRandom` `GKRandomSource` '.

- **GKARC4RandomSource** ARC4 .
- **GKLinearCongruentialRandomSource** **GKRandomSource** `GKRandomSource`
- **GKMersenneTwisterRandomSource** MersenneTwister . .

`GKRandomSource` `nextInt()` . `nextBool() -> Bool` `nextUniform() -> Float`

, Import `GameplayKit` :

```
import GameplayKit
```

-C

```
#import <GameplayKit/GameplayKit.h>
```

.

```
let randomNumber = GKRandomSource.sharedRandom().nextInt()
```

-C

```
int randomNumber = [[GKRandomSource sharedRandom] nextInt];
```

---

nextInt () -2,147,483,648 2,147,483,647 0 .

0 n

`nextIntWithUpperBound()` n .

```
let randomNumber = GKRandomSource.sharedRandom().nextInt(upperBound: 10)
```

-C

```
int randomNumber = [[GKRandomSource sharedRandom] nextIntWithUpperBound: 10];
```

0 10 .

m n

GKRandomDistribution A GKRandomSource . GKRandomDistribution GKGaussianDistribution GKShuffledDistribution .

GKRandom GKRandomSource .

```
let randomizer = GKRandomDistribution(randomSource: GKRandomSource(), lowestValue: 0,
highestValue: 6)
let randomNumberInBounds = randomizer.nextInt()
```

-C .

```
int randomNumber = [[GKRandomSource sharedRandom] nextIntWithUpperBound: n - m] + m;
```

3 10 .

```
let randomNumber = GKRandomSource.sharedRandom().nextInt(upperBound: 7) + 3
```

-C .

```
int randomNumber = [[GKRandomSource sharedRandom] nextIntWithUpperBound: 7] + 3;
```

GKEntity GKComponent

. . apple GKEntity GKComponent .

:

```
class Player: GKEntity{}
class PlayerSpriteComponent: GKComponent {}
```

GKEntity

, .

GKEntity .

. GKEntity .

```
let otherComponent = PlayerSpriteComponent()
var player = Player()
player.addComponent(PlayerSpriteComponent())
player.addComponent(otherComponent)
print(player.components.count) //will print 1
print(player.components[0] === otherComponent) // will print true
```

. component `component(for: T.Type)` .

```
let component = player.component(ofType: PlayerSpriteComponent.self)
```

`update` .

```
var player = Player()
player.addComponent(PlayerSpriteComponent())
player.update(deltaTime: 1.0) // will call the update method of the PlayerSpriteComponent
added to it
```

GKComponent

.

, . (override), Entity .

```
class PlayerSpriteComponent: GKComponent {
    override func update(deltaTime seconds: TimeInterval) {
        //move the sprite depending on the update time
    }
}
```

`didAddToEntity` `willRemoveFromEntity` .

GKEntity .

```
override func update(deltaTime seconds: TimeInterval) {
    let controller = self.entity?.component(ofType: PlayerControlComponent.self)
    //call methods on the controller
}
```

.

GKComponentSystem

`GKEntity` `GKComponents` `GKComponents` `GKComponentSystem` .

.

`GKComponentSystem` .

```
let system = GKComponentSystem(componentClass: PlayerSpriteComponent.self)
```

add .

```
system.addComponent(PlayerSpriteComponent())
```

GKComponentSystem . .

```
system.addComponent(foundIn: player)
```

.

```
system.update(deltaTime: delta)
```

GKComponentSystem GKComponentSystem .

GameplayKit : https://riptutorial.com/ko/ios/topic/4966/gameplaykit

29: GCD ( )

Grand Central Dispatch (GCD) . CPU .

:

Examples

dispatch_queue_create .

-C

```
dispatch_queue_t queue = dispatch_queue_create("com.example.myqueue",  DISPATCH_QUEUE_SERIAL);
```

```
// Before Swift 3
let queue = dispatch_queue_create("com.example.myqueue", DISPATCH_QUEUE_SERIAL)
// Swift 3
let queue = DispatchQueue(label: "com.example.myqueue") //default is serial queue, unless
.concurrent is specified as an attribute otherwise
```

UI UI .

NSURLSession UI .

synchronous asynchronous . synchronously . Asynchronous .

- C

Synchronous

```
dispatch_queue_t queue = dispatch_get_global_queue(DISPATCH_QUEUE_PRIORITY_DEFAULT, 0);
```

Asynchronous

```
dispatch_async(dispatch_get_main_queue(), ^{
   // do work here to Usually to update the User Interface
});
```

SWIFT 3

Asynchronous

```
DispatchQueue.main.async {

}
```

Synchronous

```
DispatchQueue.main.sync {

}
```

DispatchGroup . . .

. , . .

3

```
func doLongTasksAndWait () {
    print("starting long running tasks")
    let group = DispatchGroup()          //create a group for a bunch of tasks we are about to
do
    for i in 0...3 {                     //launch a bunch of tasks (eg a bunch of webservice
calls that all need to be finished before proceeding to the next ViewController)
        group.enter()                    //let the group know that something is being added
        DispatchQueue.global().async {   //run tasks on a background thread
            sleep(arc4random() % 4)      //do some long task eg webservice or database lookup
(here we are just sleeping for a random amount of time for demonstration purposes)
            print("long task \(i) done!")
            group.leave()                //let group know that the task is finished
        }
    }
    group.wait()                         //will block whatever thread we are on here until all
the above tasks have finished (so maybe dont use this function on your main thread)
    print("all tasks done!")
}
```

`group.wait()` notify .

```
group.notify(queue: DispatchQueue.main) { //the queue: parameter is which queue this block
will run on, if you need to do UI updates, use the main queue
    print("all tasks done!")              //this will execute when all tasks have left the
group
}
```

:

```
starting long running tasks
long task 0 done!
long task 3 done!
long task 1 done!
long task 2 done!
all tasks done!
```

Apple Docs .

DispatchSemaphore .

/ , . I / O .

3

```
func do2TasksAtATime () {
    print("starting long running tasks (2 at a time)")
    let sem = DispatchSemaphore(value: 2)            //this semaphore only allows 2 tasks to
run at the same time (the resource count)
    for i in 0...7 {                                 //launch a bunch of tasks
        DispatchQueue.global().async {               //run tasks on a background thread
            sem.wait()                               //wait here if no resources available
            sleep(2)                                 //do some long task eg file access (here
we are just sleeping for a 2 seconds for demonstration purposes)
            print("long task \(i) done! \(Date())")
            sem.signal()                             //let the semaphore know this resource is
now available
        }
    }
}
```

: ( )

```
starting long running tasks (2 at a time)
long task 0 done! 2017-02-16 07:11:53 +0000
long task 1 done! 2017-02-16 07:11:53 +0000
long task 2 done! 2017-02-16 07:11:55 +0000
long task 3 done! 2017-02-16 07:11:55 +0000
long task 5 done! 2017-02-16 07:11:57 +0000
long task 4 done! 2017-02-16 07:11:57 +0000
long task 6 done! 2017-02-16 07:11:59 +0000
long task 7 done! 2017-02-16 07:11:59 +0000
```

Apple Docs .

3

```
func serialQueues () {
    let serialQueue = DispatchQueue(label: "com.example.serial") //default queue type is a
serial queue
    let start = Date ()
    for i in 0...3 {                                             //launch a bunch of tasks
        serialQueue.async {                                      //run tasks on a background
thread, using our serial queue
            sleep(2)                                             //do some long task eg
webservice or database lookup
            let timeTaken = Date().timeIntervalSince(start)
            print("serial long task \(i) done! total time taken: \(timeTaken)")
        }
    }
}
```

:

```
serial long task 0 done! total time taken: 2.07241100072861
serial long task 1 done! total time taken: 4.16347700357437
serial long task 2 done! total time taken: 6.23209798336029
serial long task 3 done! total time taken: 8.30682599544525
```

```
func concurrentQueues () {
    let concurrentQueue = DispatchQueue(label: "com.example.concurrent", attributes:
```

```
.concurrent) //explicitly specify the queue to be a concurrent queue
    let start = Date ()
    for i in 0...3 {            //launch a bunch of tasks
        concurrentQueue.async { //run tasks on a background thread, using our concurrent queue
            sleep(2)            //do some long task eg webservice or database lookup
            let timeTaken = Date().timeIntervalSince(start)
            print("concurrent long task \(i) done! total time taken: \(timeTaken)")
        }
    }
}
```

:

```
concurrent long task 3 done! total time taken: 2.07092100381851
concurrent long task 0 done! total time taken: 2.07087397575378
concurrent long task 2 done! total time taken: 2.07086700201035
concurrent long task 1 done! total time taken: 2.07089096307755
```

. . . .

.

GCD ( ) : https://riptutorial.com/ko/ios/topic/4626/gcd-----

30: GPX iOS

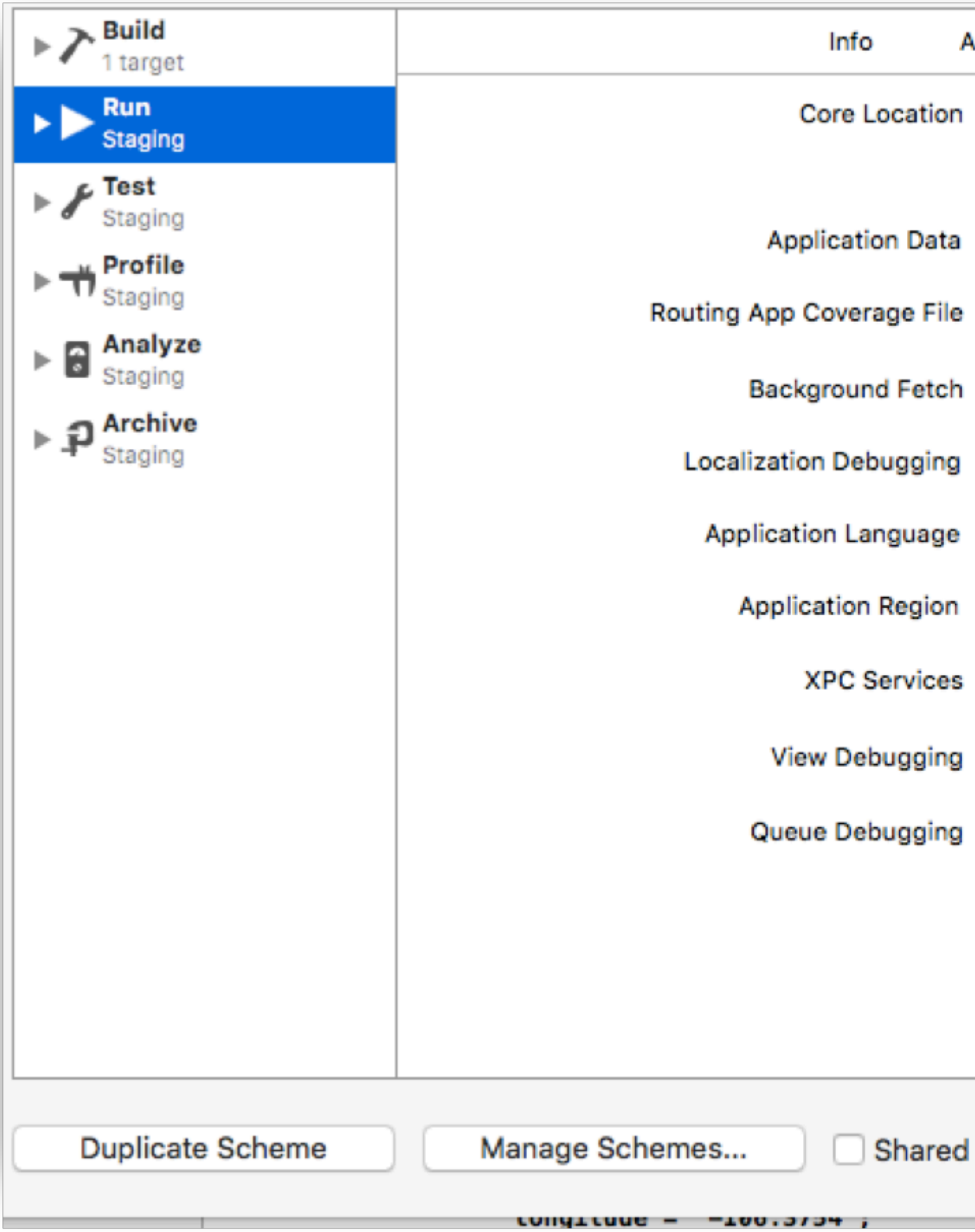
Examples

.gpx : MPS_HQ.gpx

```
<gpx xmlns="http://www.topografix.com/GPX/1/1"
 xmlns:gpxx = "http://www.garmin.com/xmlschemas/GpxExtensions/v3"
 xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance"
 xsi:schemaLocation="http://www.topografix.com/GPX/1/1
 http://www.topografix.com/GPX/1/1/gpx.xsd
 http://www.garmin.com/xmlschemas/GpxExtensions/v3
 http://www8.garmin.com/xmlschemas/GpxExtensions/v3/GpxExtensionsv3.xsd"
 version="1.1"
 creator="gpx-poi.com">
 <wpt lat="38.9072" lon="77.0369">38.9072/-77.0369
 <time>2015-04-16T22:20:29Z</time>
  <name>Washington, DC</name>
  <extensions>
     <gpxx:WaypointExtension>
        <gpxx:Proximity>10</gpxx:Proximity>
        <gpxx:Address>
           <gpxx:StreetAddress>Washington DC</gpxx:StreetAddress>
           <gpxx:City>Washington</gpxx:City>
           <gpxx:State>DC</gpxx:State>
           <gpxx:Country>United States</gpxx:Country>
           <gpxx:PostalCode> 20005 </gpxx:PostalCode>
        </gpxx:Address>
     </gpxx:WaypointExtension>
  </extensions>
```

.

1. .
2. -> .
3. " " .
4. " " * .GPX .



GPX iOS : https://riptutorial.com/ko/ios/topic/9883/gpx--ios---

31: HTML NSAttributed .

Examples

HTML NSAttributedString Vice Versa C

HTML to NSAttributedString conversion : -

```
 //HTML String
 NSString *htmlString=[[NSString alloc]initWithFormat:@"<!DOCTYPE html><html><body><h1>My
First Heading</h1><p>My first paragraph.</p></body></html>"];
//Converting HTML string with UTF-8 encoding to NSAttributedString
 NSAttributedString *attributedString = [[NSAttributedString alloc]
                                         initWithData: [htmlString
dataUsingEncoding:NSUnicodeStringEncoding]
                                         options: @{ NSDocumentTypeDocumentAttribute:
NSHTMLTextDocumentType }
                                         documentAttributes: nil
                                         error: nil ];
```

NSAttributedString -> HTML : -

```
 //Dictionary to hold all the attributes of NSAttributed String
 NSDictionary *documentAttributes = @{NSDocumentTypeDocumentAttribute:
NSHTMLTextDocumentType};
 //Saving the NSAttributedString with all its attributes as a NSData Entity
 NSData *htmlData = [attributedString dataFromRange:NSMakeRange(0, attributedString.length)
documentAttributes:documentAttributes error:NULL];
 //Convert the NSData into HTML String with UTF-8 Encoding
 NSString *htmlString = [[NSString alloc] initWithData:htmlData
encoding:NSUTF8StringEncoding];
```

HTML NSAttributed . : https://riptutorial.com/ko/ios/topic/7225/html-nsattributed----

32: IBOutlets

IBOutlet Interface Builder . Objective-C .

nil .

<UIKit/UINibDeclarations.h> .

```
#ifndef IBOutlet
#define IBOutlet
#endif
```

Examples

UI IBOutlet

IBOutlets (UIViewController) . . .h Control- IBOutlet "" . Label outlet UIViewController .

```
//ViewController.h
#import <UIKit/UIKit.h>

@interface ViewController : UIViewController

//This is the declaration of the outlet
@property (nonatomic, weak) IBOutlet UILabel *myLabel;

@end

//ViewController.m
#import "ViewController.h"

@implementation ViewController

@synthesize myLabel;

-(void) viewDidLoad {

    [super viewDidLoad];
    //Editing the properties of the outlet
    myLabel.text = @"TextHere";

}

@end
```

:

```
import UIKit
class ViewController: UIViewController {
    //This is the declaration of the outlet
    @IBOutlet weak var myLabel: UILabel!
```

```
    override func viewDidLoad() {
        super.viewDidLoad()
        //Editing the properties of the outlet
        myLabel.text = "TextHere"
    }
}
```

.h . .

IBOutlets : https://riptutorial.com/ko/ios/topic/4713/iboutlets

33: iOS - Robbie Hanson XMPP

Examples

Openfire iOS XMPP Robbie Hanson

SRXMPPDemo

- https://github.com/SahebRoy92/SRXMPPDemo

Objective C XMPP . XMPP " " xmpp . .

SRXMPP - Singleton .

-
- , ( ) .
- Robbie Hanson XML Core Data vCard (,) .
- (/ /)

.

1. **Openfire** - openfire .

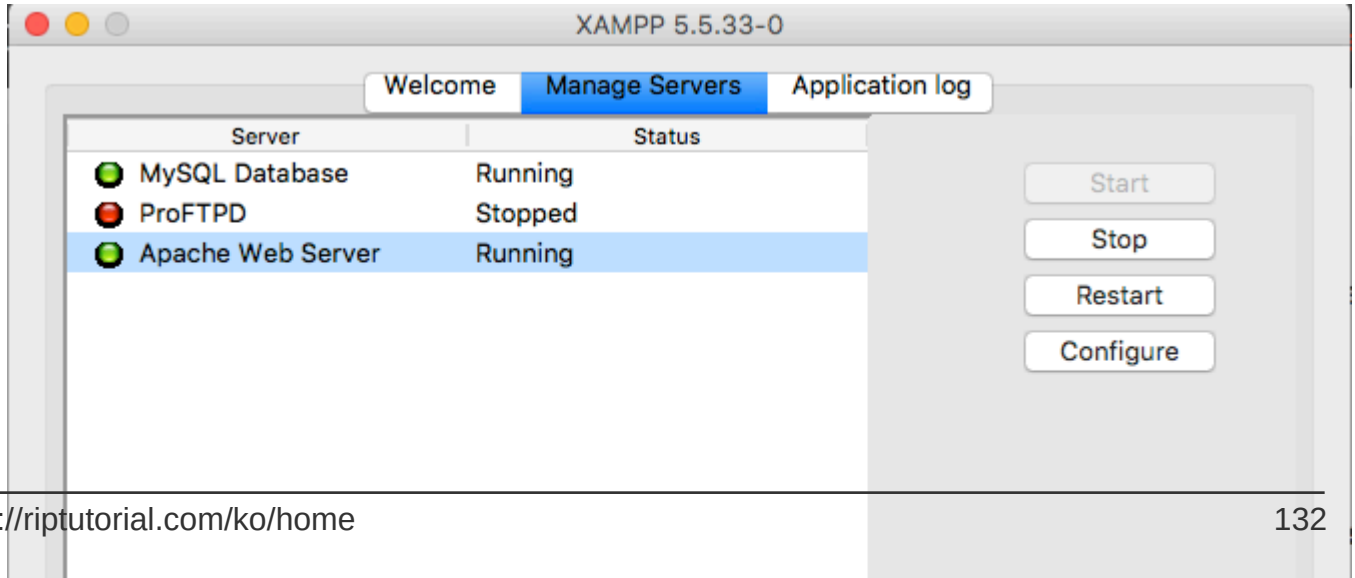
2. - 3 , .

. -

- Mac Java .

. XAMPP -

- XAMPP .
- XAMPP **(SQL) Apache Server** .

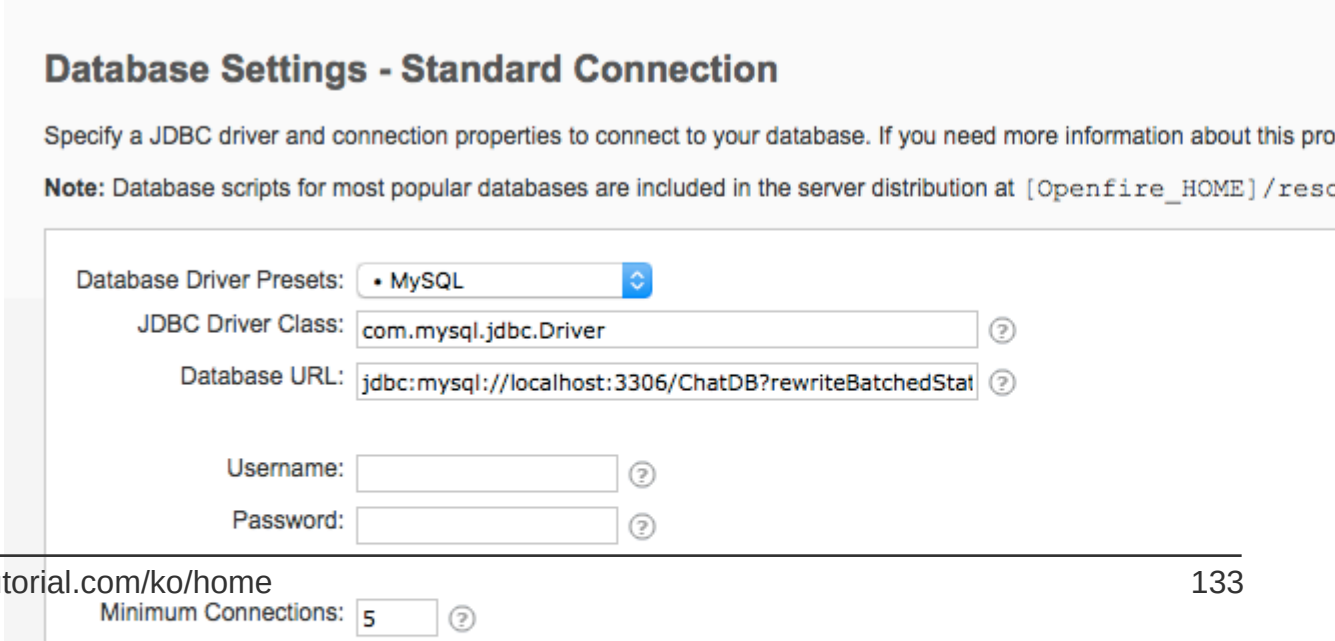


- URL *[http : // localhost / phpmyadmin /]* .
- . DB .
- **DB . ChatDB .**

. Openfire -

- Openfire "Openfire "

- URL - [http : // localhost : 9090 / setup / index.jsp] (http : // localhost : 9090 / setup / index.jsp)
- .
  - >
  - , , >
  - , " "
  - - " DB **ChatDB** .
  - * " *MySQL*" . JDBC . URL . XAMPP **"localhost"** **"ChatDB"** DB . .
    .



.

- . Openfire .

.

SRXMPP.m NSString extern **SRXMPP_Hostname** ( )

- OpenFire IP
- **"localhost"** .

.

XMPP XMPP .

XMPP - https://xmpp.org/rfcs/rfc3920.html

.

1.
2.

.

iOS - Robbie Hanson XMPP : https://riptutorial.com/ko/ios/topic/1475/ios---robbie-hanson---xmpp-

34: iOS 10 API

Examples

:

```
//import Speech
//import AVFoundation

// create a text field to show speech output
@IBOutlet weak var transcriptionTextField: UITextView!
// we need this audio player to play audio
var audioPlayer: AVAudioPlayer!

override func viewDidLoad()
{
    super.viewDidLoad()
}

// this function is required to stop audio on audio completion otherwise it will play same
audio again and again
func audioPlayerDidFinishPlaying(_ player: AVAudioPlayer, successfully flag: Bool)
{
    player.stop()
}

// this function is required to get a speech recognizer and after that make and request to
speech recognizer
func requestSpeechAuth()
{
    SFSpeechRecognizer.requestAuthorization { authStatus in
        if authStatus == SFSpeechRecognizerAuthorizationStatus.authorized {
            if let path = Bundle.main.url(forResource: "mpthreetest", withExtension: "m4a") {
                do {
                    let sound = try AVAudioPlayer(contentsOf: path)
                    self.audioPlayer = sound
                    self.audioPlayer.delegate = self
                    sound.play()
                }   catch {
                    print("error")
                }

                let recognizer = SFSpeechRecognizer()
                let request = SFSpeechURLRecognitionRequest(url:path)
                recognizer?.recognitionTask(with: request) { (result, error) in
                    if let error = error {
                    print("there is a error\(error)")
                    } else {
// here you are printing out the audio output basically showing it on uitext field
                        self.transcriptionTextField.text =
result?.bestTranscription.formattedString
                    }
                }
            }
        }
    }
}
```

```
// here you are calling requestSpeechAuth function on UIButton press
@IBAction func playButtonPress(_ sender: AnyObject)
{
    requestSpeechAuth()
}
```

iOS 10 API : https://riptutorial.com/ko/ios/topic/5986/ios-10---api

35: iOS Google Places API

Examples

1. .
2. GooglePlaces SDK
3.

.

1. GooglePlaces GooglePlacePicker

```
import GooglePlaces
import GooglePlacePicker
```

2. `CLLOcationManagerDelegate`

```
class ViewController: UIViewController, CLLocationManagerDelegate {

}
```

3. CLLocationManager ()

```
var currentLocation = CLLocationManager()
```

4.

```
currentLocation = CLLocationManager()
currentLocation.requetAlwayAuthorization()
```

5. GooglePlacePicker

@IBAction func placePickerAction (: AnyObject) {

```
if CLLOcationManager.authorizationStatues() == .AuthorizedAlways {

        let center =
CLLocationCoordinate2DMake((currentLocation.location?.coordinate.latitude)!,
(currentLocation.location?.coordinate.longitude)!)
        let northEast = CLLocationCoordinate2DMake(center.latitude + 0.001, center.longitude +
0.001)
        let southWest = CLLocationCoordinate2DMake(center.latitude - 0.001, center.longitude -
0.001)
        let viewport = GMSCoordinateBounds(coordinate: northEast, coordinate: southWest)
        let config = GMSPlacePickerConfig(viewport: viewport)
        placePicker = GMSPlacePicker(config: config)

        placePicker?.pickPlaceWithCallback({ (place: GMSPlace?, error: NSError?) -> Void in
            if let error = error {
                print("Pick Place error: \(error.localizedDescription)")
                return
```

```
            }

            if let place = place {
               print("Place name: \(place.name)")
                print("Address: \(place.formattedAddress)")

            } else {
               print("Place name: nil")
                print("Address: nil")
            }
        })
    }
}
```

iOS Google Places API : https://riptutorial.com/ko/ios/topic/6908/ios-google-places-api

36: iOS TTS

iOS

Examples

C

```
AVSpeechSynthesizer *synthesizer = [[AVSpeechSynthesizer alloc]init];
AVSpeechUtterance *utterance = [AVSpeechUtterance speechUtteranceWithString:@"Some text"];
[utterance setRate:0.2f];
[synthesizer speakUtterance:utterance];
```

```
let synthesizer = AVSpeechSynthesizer()
let utterance = AVSpeechUtterance(string: "Some text")
utterance.rate = 0.2
```

.

```
utterance.voice = AVSpeechSynthesisVoice(language: "fr-FR")
```

speek

- 2 : `synthesizer.speakUtterance(utterance)`
- 3 : `synthesizer.speak(utterance)`

AVFoundation .

.

```
- (BOOL)pauseSpeakingAtBoundary:(AVSpeechBoundary)boundary;
- (BOOL)stopSpeakingAtBoundary:(AVSpeechBoundary)boundary;
```

AVSpeechBoundary (`AVSpeechBoundaryImmediate`) (`AVSpeechBoundaryWord`) .

iOS TTS : https://riptutorial.com/ko/ios/topic/8909/ios-tts

37: iOS

Examples

iOS 8

3 :

```
let minimumVersion = OperatingSystemVersion(majorVersion: 8, minorVersion: 1, patchVersion: 2)
if ProcessInfo().isOperatingSystemAtLeast(minimumVersion) {
    //current version is >= (8.1.2)
} else {
    //current version is < (8.1.2)
}
```

```
let minimumVersionString = "3.1.3"
let versionComparison = UIDevice.current.systemVersion.compare(minimumVersionString, options:
.numeric)
switch versionComparison {
    case .orderedSame, .orderedDescending:
        //current version is >= (3.1.3)
        break
    case .orderedAscending:
        //current version is < (3.1.3)
        fallthrough
    default:
        break;
}
```

-C

```
NSString *version = @"3.1.3";
NSString *currentVersion = @"3.1.1";
NSComparisonResult result = [currentVersion compare:version options:NSNumericSearch];
switch(result){
  case: NSOrderedAscending:
        //less than the current version
  break;
  case: NSOrderedDescending:
  case: NSOrderedSame:
       // equal or greater than the current version
  break;
}
```

Swift 2.0

```
if #available(iOS 9, *) {
  // iOS 9
} else {
  // iOS 8 or earlier
```

```
}
```

iOS

.

-C

```
NSString *version = [[UIDevice currentDevice] systemVersion]
```

```
let version = UIDevice.currentDevice().systemVersion
```

3

```
let version = UIDevice.current.systemVersion
```

iOS : https://riptutorial.com/ko/ios/topic/2194/ios---

38: iOS

Apple .

Examples

URL

URL `todolist://` :

-C

```
NSURL *myURL = [NSURL URLWithString:@"todolist://there/is/something/to/do"];
[[UIApplication sharedApplication] openURL:myURL];
```

```
let stringURL = "todolist://there/is/something/to/do"
if let url = NSURL(string: stringURL) {
    UIApplication.shared().openURL(url)
}
```

HTML

```
<a href="todolist://there/is/something/to/do">New SMS Message</a>
```

: . `canOpenURL:` .

URL

`MyTasks` URL . URL .

```
mytasks://create?title=hello&body=world
```

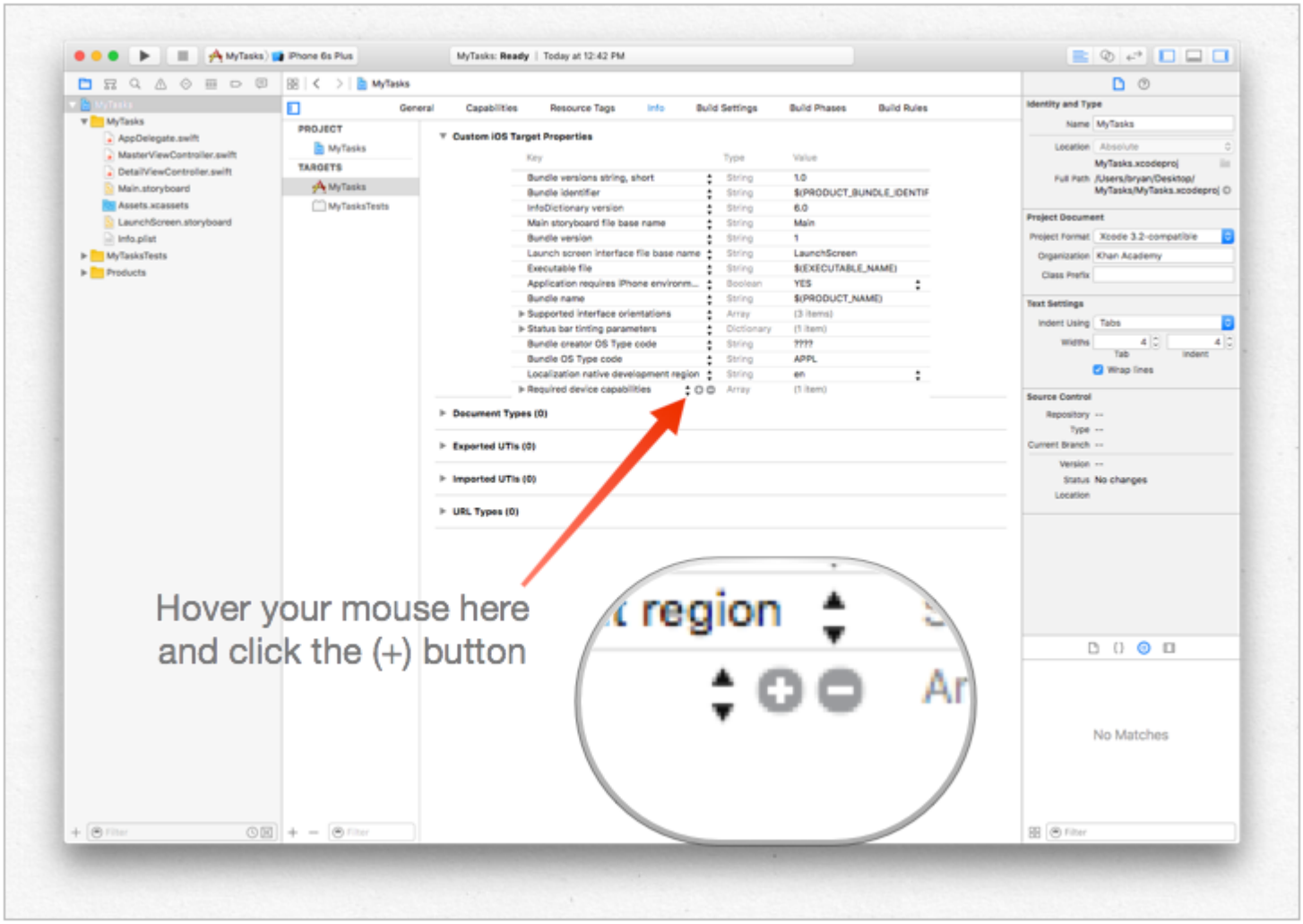
`text body` .

URL .

1. `Info.plist` URL URL `Info.plist` .
2. URL `UIApplicationDelegate` .
3. URL .

1 : Info.plist URL :

Info.plist "URL Types" . (+) :



URL types	Array	(5 items)
Item 0	Dictionary	(2 items)
URL identifier	String	com.mycompany
URL Schemes	Array	(1 item)
Item 0	String	mytasks
Item 1	Dictionary	(1 item)

... URL . ! URL . !

2 : UIApplicationDelegate URL

`application:openURL:options:` UIApplicationDelegate . URL .

.

```
func application(app: UIApplication, openURL url: NSURL, options: [String : AnyObject]) ->
Bool {
    if url.scheme == "mytasks" && url.host == "create" {
        let title = // get the title out of the URL's query using a method of your choice
        let body = // get the title out of the URL's query using a method of your choice
        self.rootViewController.createTaskWithTitle(title, body: body)
        return true
    }

    return false
}
```

3 : URL .

URL . . . !

`self.rootViewController.createTaskWithTitle(:body:)` . AppDelegate .

. URL .

.

1. DeepLinkPOC .
2. .
3. " .
4. **URL** .
5. '+' .
6. **URL** . **URL** " **DeepLinking** " .

"DeepLinking : //" . .

```
[scheme]://[host]/[path]  --> DeepLinking://path/Page1
```

, Scheme : "DeepLinking" : "path" : "Page1"

: . .

7. appdelegate .

:

```
 func application(application: UIApplication, openURL url: NSURL, sourceApplication: String?,
annotation: AnyObject) -> Bool
```

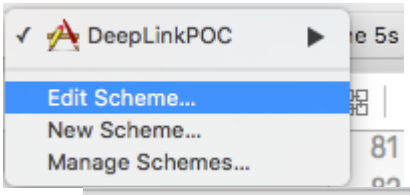
-C :

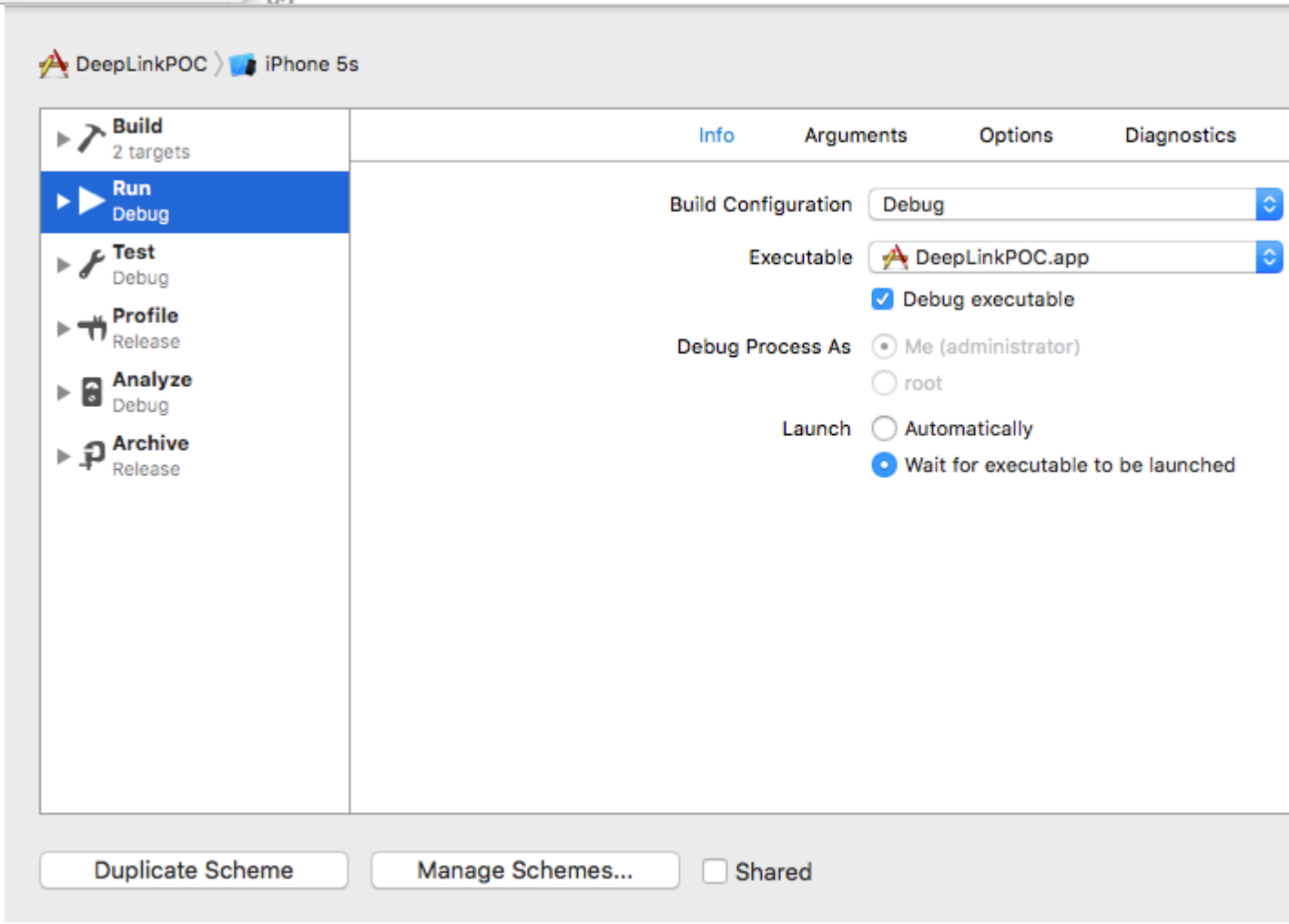
```
-(BOOL)application:(UIApplication *)application
          openURL:(NSURL *)url
          sourceApplication:(NSString *)sourceApplication
          annotation:(id)annotation
```

.

8. . .

- .



- 

9. (didFinishLaunchingWithOptions openURL)
10. "DeepLinkPOC ( ) " .
11. " **DeepLinking : //** " " **DeepLinkPOC** " . .

. :)

iOS : https://riptutorial.com/ko/ios/topic/5173/ios--

39: iOS

Examples

Swift

Swift-IOS Custom Framework .

1. . Xcode
2. iOS / / Cocoa Touch Framework .
3. productName .
4. .
5.

.

" " " " :

1.
2. "* .framework" "Embedded Binaries" .
3. ViewController .

iOS : https://riptutorial.com/ko/ios/topic/7331/ios----

40: iOS PDF

Examples

PDF

```
UIGraphicsBeginPDFContextToFile(fileName, CGRectZero, nil);

UIGraphicsBeginPDFPageWithInfo(CGRectMake(0, 0, 612, 792), nil);

[self drawText];

UIGraphicsEndPDFContext();
```

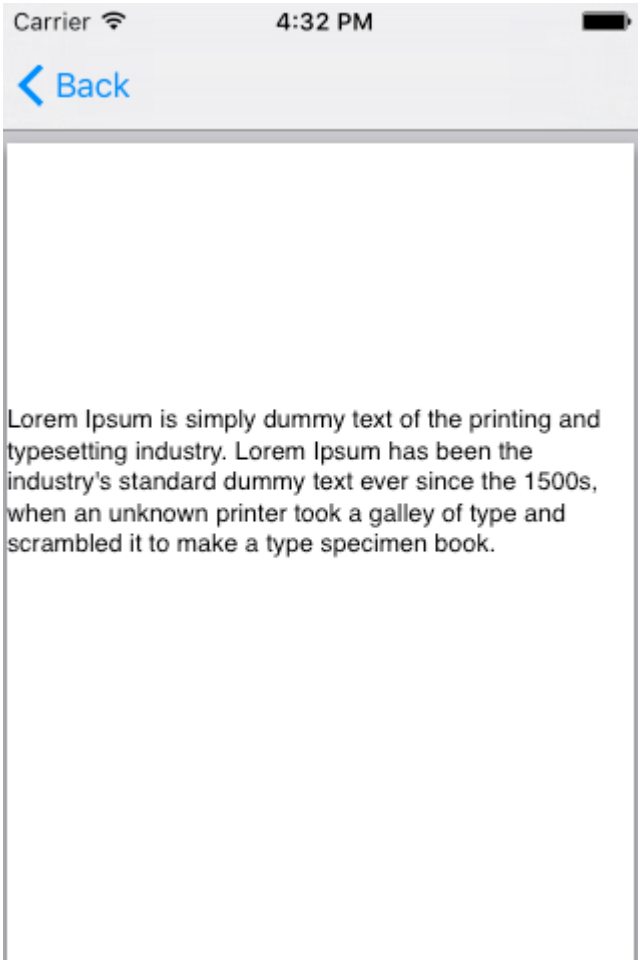
fileName .

```
 NSString* temporaryFile = @"firstIOS.PDF";
    NSArray *arrayPaths =
    NSSearchPathForDirectoriesInDomains(
                                        NSDocumentDirectory,
                                        NSUserDomainMask,
                                        YES);

    NSString *path = [arrayPaths objectAtIndex:0];

    NSString* fileName = [path stringByAppendingPathComponent:fileName];
```

drawText

```
   (void)drawText
{
    NSString* textToDraw = @"Lorem Ipsum is simply dummy text of the printing and typesetting
industry. Lorem Ipsum has been the industry's standard dummy text ever since the 1500s, when
an unknown printer took a galley of type and scrambled it to make a type specimen book.";

    CFStringRef stringRef = (__bridge CFStringRef)textToDraw;

    CFAttributedStringRef currentText = CFAttributedStringCreate(NULL, stringRef, NULL);

    CTFramesetterRef framesetter = CTFramesetterCreateWithAttributedString(currentText);

    CGRect frameRect = CGRectMake(0, 0, 300, 100);

    CGMutablePathRef framePath = CGPathCreateMutable();

    CGPathAddRect(framePath, NULL, frameRect);

    CFRange currentRange = CFRangeMake(0, 0);

    CTFrameRef frameRef = CTFramesetterCreateFrame(framesetter, currentRange, framePath,
NULL);
    CGPathRelease(framePath);

    CGContextRef currentContext = UIGraphicsGetCurrentContext();
```

```
    CGContextSetTextMatrix(currentContext, CGAffineTransformIdentity);


    CGContextTranslateCTM(currentContext, 0, 450);

    CGContextScaleCTM(currentContext, 2, -2);

    CTFrameDraw(frameRef, currentContext);

    CFRelease(frameRef);

    CFRelease(stringRef);

    CFRelease(framesetter);
}
```



PDF

```
  NSString* fileName = @"firstIOS.PDF";


NSArray *arrayPaths =
NSSearchPathForDirectoriesInDomains(
                                    NSDocumentDirectory,
                                    NSUserDomainMask,
                                    YES);
```

```
NSString *path = [arrayPaths objectAtIndex:0];

NSString* pdfFileName = [path stringByAppendingPathComponent:fileName];

UIWebView* webView = [[UIWebView alloc] initWithFrame:CGRectMake(0, 0, 320, 480)];

NSURL *url = [NSURL fileURLWithPath:pdfFileName];

NSURLRequest *request = [NSURLRequest requestWithURL:url];


[webView setScalesPageToFit:YES];

[webView loadRequest:request];

[self.view addSubview:webView];
```

PDF

```
 UIGraphicsBeginPDFContextToFile(fileName, CGRectZero, nil);

    UIGraphicsBeginPDFPageWithInfo(CGRectMake(0, 0, 600, 792), nil);

    UIGraphicsBeginPDFPageWithInfo(CGRectMake(0, 0, 600, 792), nil);

    UIGraphicsBeginPDFPageWithInfo(CGRectMake(0, 0, 600, 792), nil);

    UIGraphicsEndPDFContext();
```

UIWebview Microsoft PDF

```
#define kPaperSizeA4 CGSizeMake(595.2,841.8)
```

UIPrintPageRenderer .

```
@interface UIPrintPageRenderer (PDF)

- (NSData*) printToPDF;

@end

@implementation UIPrintPageRenderer (PDF)

- (NSData*) printToPDF
{
    NSMutableData *pdfData = [NSMutableData data];
    UIGraphicsBeginPDFContextToData( pdfData, self.paperRect, nil );
    [self prepareForDrawingPages: NSMakeRange(0, self.numberOfPages)];
    CGRect bounds = UIGraphicsGetPDFContextBounds();
    for ( int i = 0 ; i < self.numberOfPages ; i++ )
    {
        UIGraphicsBeginPDFPage();
        [self drawPageAtIndex: i inRect: bounds];
    }
    UIGraphicsEndPDFContext();
    return pdfData;
```

```
}
@end
```

UIWebView .

```
-(void)createPDF:(UIWebView *)webView {

UIPrintPageRenderer *render = [[UIPrintPageRenderer alloc] init];
[render addPrintFormatter:webView.viewPrintFormatter startingAtPageAtIndex:0];

float padding = 10.0f;
CGRect paperRect = CGRectMake(0, 0, kPaperSizeA4.width, kPaperSizeA4.height);
CGRect printableRect = CGRectMake(padding, padding, kPaperSizeA4.width-(padding * 2),
kPaperSizeA4.height-(padding * 2));

[render setValue:[NSValue valueWithCGRect:paperRect] forKey:@"paperRect"];
[render setValue:[NSValue valueWithCGRect:printableRect] forKey:@"printableRect"];

NSData *pdfData = [render printToPDF];

dispatch_async(dispatch_get_global_queue(DISPATCH_QUEUE_PRIORITY_DEFAULT, 0), ^{

    if (pdfData) {
        [pdfData writeToFile:directoryPath atomically: YES];
    }
    else
    {
        NSLog(@"PDF couldnot be created");
    }
});}
```

iOS PDF : https://riptutorial.com/ko/ios/topic/2416/ios-pdf-

41: iOS AirPrint

Examples

AirPrint

-C

ViewController.h .

```
@interface ViewController : UIViewController <UIPrintInteractionControllerDelegate> {
    UISimpleTextPrintFormatter *_textFormatter;
}
```

ViewController.m .

```
#define DefaultFontSize 48
#define PaddingFactor 0.1f
```

: -

```
-(IBAction)print:(id)sender;
{
    /* Get the UIPrintInteractionController, which is a shared object */
    UIPrintInteractionController *controller = [UIPrintInteractionController
sharedPrintController];
    if(!controller){
        NSLog(@"Couldn't get shared UIPrintInteractionController!");
        return;
    }

    /* Set this object as delegate so you can  use the
printInteractionController:cutLengthForPaper: delegate */
    controller.delegate = self;

    UIPrintInfo *printInfo = [UIPrintInfo printInfo];
    printInfo.outputType = UIPrintInfoOutputGeneral;

    /* Use landscape orientation for a banner so the text  print along the long side of the
paper. */
    printInfo.orientation = UIPrintInfoOrientationLandscape;

    printInfo.jobName = self.textField.text;
    controller.printInfo = printInfo;

    /* Create the UISimpleTextPrintFormatter with the text supplied by the user in the text
field */
    _textFormatter = [[UISimpleTextPrintFormatter alloc] initWithText:self.textField.text];

    /* Set the text formatter's color and font properties based on what the user chose */
    _textFormatter.color = [self chosenColor];
    _textFormatter.font = [self chosenFontWithSize:DefaultFontSize];
```

```
    /* Set this UISimpleTextPrintFormatter on the controller */
    controller.printFormatter = _textFormatter;

    /* Set up a completion handler block.  If the print job has an error before spooling, this
is where it's handled. */
    void (^completionHandler)(UIPrintInteractionController *, BOOL, NSError *) =
^(UIPrintInteractionController *printController, BOOL completed, NSError *error) {
        if(completed && error)
            NSLog( @"Printing failed due to error in domain %@ with error code %lu. Localized
description: %@, and failure reason: %@", error.domain, (long)error.code,
error.localizedDescription, error.localizedFailureReason );
    };

    if (UI_USER_INTERFACE_IDIOM() == UIUserInterfaceIdiomPad)
        [controller presentFromRect:self.printButton.frame inView:self.view animated:YES
completionHandler:completionHandler];
    else
        [controller presentAnimated:YES completionHandler:completionHandler];  // iPhone
}
```

: -

```
- (CGFloat)printInteractionController:(UIPrintInteractionController
*)printInteractionController cutLengthForPaper:(UIPrintPaper *)paper {

    /* Create a font with arbitrary size so that you can calculate the approximate
        font points per screen point for the height of the text. */
    UIFont *font = _textFormatter.font;
    CGSize size = [self.textField.text sizeWithAttributes:@{NSFontAttributeName: font}];

    float approximateFontPointPerScreenPoint = font.pointSize / size.height;

    /* Create a new font using a size  that will fill the width of the paper */
    font = [self chosenFontWithSize: paper.printableRect.size.width *
approximateFontPointPerScreenPoint];

    /* Calculate the height and width of the text with the final font size */
    CGSize finalTextSize = [self.textField.text sizeWithAttributes:@{NSFontAttributeName:
font}];

    /* Set the UISimpleTextFormatter font to the font with the size calculated */
    _textFormatter.font = font;

    /* Calculate the margins of the roll. Roll printers may have unprintable areas
        before and after the cut.  We must add this to our cut length to ensure the
        printable area has enough room for our text. */
    CGFloat lengthOfMargins = paper.paperSize.height - paper.printableRect.size.height;

    /* The cut length is the width of the text, plus margins, plus some padding */
    return finalTextSize.width + lengthOfMargins + paper.printableRect.size.width *
PaddingFactor;
}
```

iOS AirPrint : https://riptutorial.com/ko/ios/topic/7395/ios-airprint-

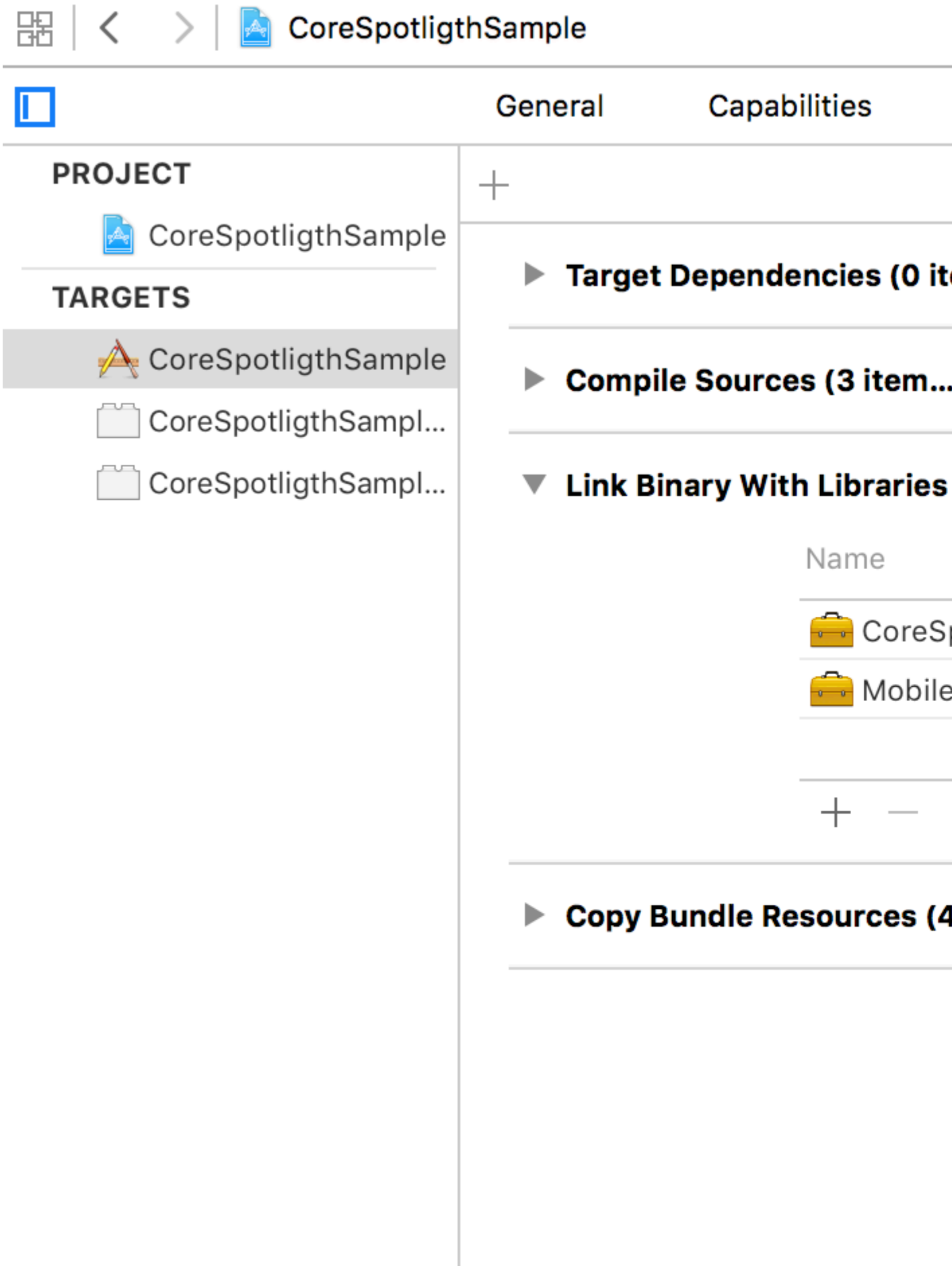
42: iOS Core SpotLight

Examples

Core-Spotlight

-C

1. iOS *CoreSpotlight* *MobileCoreServices* .


CoreSpotligthSample
General
Capabilities
PROJECT
CoreSpotligthSample
TARGETS
CoreSpotligthSample
CoreSpotligthSampl...
CoreSpotligthSampl...
Target Dependencies (0 it
Compile Sources (3 item...
Link Binary With Libraries
Name
CoreSp
Mobile
Copy Bundle Resources (4

2. CSSearchableItem uniqueIdentifier, domainIdentifier attributeSet . [[CSSearchableIndex defaultSearchableIndex] ...] CSSearchableItem .

[[CSSearchableIndex defaultSearchableIndex] ...] CSSearchableItem .

3. !

43: MKDistanceFormatter

Examples

CLLocationDistance (Double .

```
let distance = CLLocationDistance(42)
let formatter = MKDistanceFormatter()
let answer = formatter.stringFromDistance(distance)
// answer = "150 feet"
```

-C

```
CLLocationDistance distance=42;
MKDistanceFormatter *formatter=[[MKDistanceFormatter alloc]init];
NSString *answer=[formatter stringFromDistance:distance];
// answer = "150 feet"
```

.

import Mapkit units .Default, .Metric, .Imperial, .ImperialWithYards .

```
formatter.units = .Metric
var answer = formatter.stringFromDistance(distance)
// "40 m"

formatter.units = .ImperialWithYards
answer = formatter.stringFromDistance(distance)
// "50 yards"
```

-C

```
MKDistanceFormatter *formatter=[[MKDistanceFormatter alloc]init];
formatter.units=MKDistanceFormatterUnitsMetric;
NSString *answer=[formatter stringFromDistance:distance];
//40 m

formatter.units=MKDistanceFormatterUnitsImperialWithYards;
NSString *answer=[formatter stringFromDistance:distance];
//50 yards
```

unitStyle .Default, .Abbreviated, .Full .

```
formatter.unitStyle = .Full
var answer = formatter.stringFromDistance(distance)
// "150 feet"

formatter.unitStyle = .Abbreviated
answer = formatter.stringFromDistance(distance)
// "150 ft"
```

-C

```
formatter.unitStyle=MKDistanceFormatterUnitStyleFull;
NSString *answer=[formatter stringFromDistance:distance];
// "150 feet"

 formatter.unitStyle=MKDistanceFormatterUnitStyleAbbreviated;
 NSString *answer=[formatter stringFromDistance:distance];
// "150 ft"
```

MKDistanceFormatter : https://riptutorial.com/ko/ios/topic/6677/mkdistanceformatter

44: MKMapView

Examples

MKMapView

```
let mapView = MKMapView(frame: CGRect(x: 0, y: 0, width: 320, height: 500))
```

`ViewController` mapView .

C

```
self.map = [[MKMapView alloc]initWithFrame:CGRectMake(0, 0, self.view.frame.size.width,
self.view.frame.size.height)];
[self.view addSubview:self.map];
```

5 (`MKMapType`) , `MKMapView` .

iPhone OS 3

-

.

2

```
mapView.mapType = .Standard
```

3

```
mapView.mapType = .standard
```

-C

```
_mapView.mapType = MKMapTypeStandard;
```

iPhone OS 3

.

2

```
mapView.mapType = .Satellite
```

3

```
mapView.mapType = .satellite
```

-C

```
_mapView.mapType = MKMapTypeSatellite;
```

iOS 9

.

2

```
mapView.mapType = .SatelliteFlyover
```

3

```
mapView.mapType = .satelliteFlyover
```

-C

```
_mapView.mapType = MKMapTypeSatelliteFlyover;
```

iPhone OS 3

.

2

```
mapView.mapType = .Hybrid
```

3

```
mapView.mapType = .hybrid
```

-C

```
_mapView.mapType = MKMapTypeHybrid;
```

iOS 9

.hybridFlyover

.

2

```
mapView.mapType = .HybridFlyover
```

3

```
mapView.mapType = .hybridFlyover
```

-C

```
_mapView.mapType = MKMapTypeHybridFlyover;
```

/

, 2km . .

```
MKUserLocation *userLocation = _mapView.userLocation;
MKCoordinateRegion region = MKCoordinateRegionMakeWithDistance
(userLocation.location.coordinate, 2000, 2000);
[_mapView setRegion:region animated:NO];
```

MKLocalSearch

MKLocalSearch "gym" . .

MKLocalSearchResponse MKMapItem .

.

```
MKLocalSearchRequest *request =
    [[MKLocalSearchRequest alloc] init];//initialising search request
request.naturalLanguageQuery = @”Gym”; // adding query
request.region = _mapView.region; //setting region
MKLocalSearch *search =
     [[MKLocalSearch alloc]initWithRequest:request];//initiate search

[search startWithCompletionHandler:^(MKLocalSearchResponse
     *response, NSError *error)
{
   if (response.mapItems.count == 0)
       NSLog(@"No Matches");
   else
       for (MKMapItem *item in response.mapItems)
       {
           NSLog(@"name = %@", item.name);
           NSLog(@"Phone = %@", item.phoneNumber);
        }
}];
```

OpenStreetMap

Apple .

OpenStreetMap `mapView` .

, `self.mapView` `ViewController` `MKMapView` .

`ViewController`

MKMapViewDelegate .

```
class MyViewController: UIViewController, MKMapViewDelegate
```

mapView ViewController .

```
mapView.delegate = self
```

. URL . URL . http://tile.openstreetmap.org/{z}/{x}/{y}.png

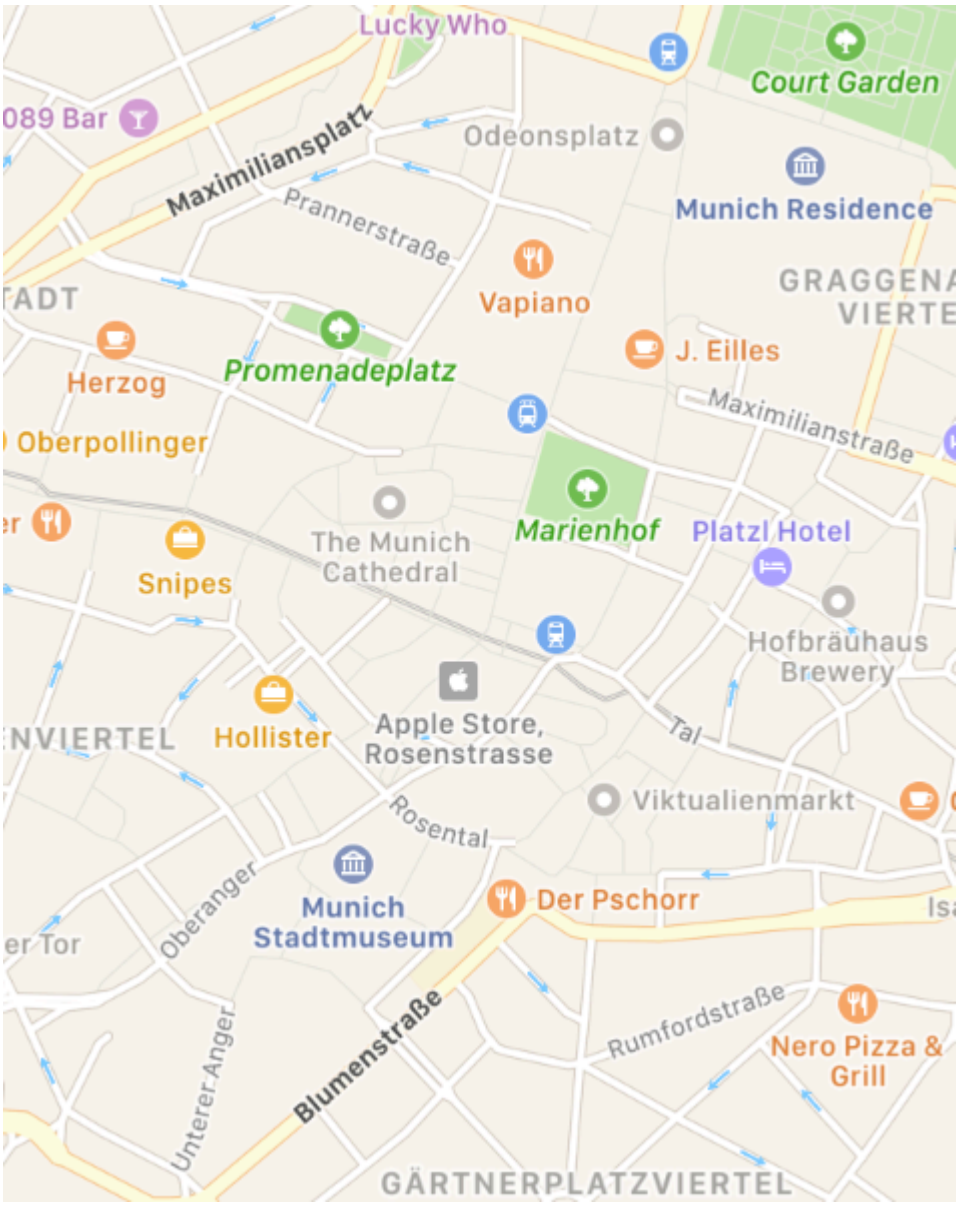
```
let urlTeplate = "http://tile.openstreetmap.org/{z}/{x}/{y}.png"
let overlay = MKTileOverlay(urlTemplate: urlTeplate)
overlay.canReplaceMapContent = true
```

mapView .

```
mapView.add(overlay, level: .aboveLabels)
```

level .aboveLabels . . .aboveRoads .

.



mapView mapView . . func mapView(_ mapView: MKMapView, rendererFor overlay: MKOverlay) -> MKOverlayRenderer func mapView(_ mapView: MKMapView, rendererFor overlay: MKOverlay) -> MKOverlayRenderer .

```
func mapView(_ mapView: MKMapView, rendererFor overlay: MKOverlay) -> MKOverlayRenderer {
    if overlay is MKTileOverlay {
        let renderer = MKTileOverlayRenderer(overlay: overlay)
        return renderer
    } else {
        return MKTileOverlayRenderer()
    }
}
```

MKOverlayRenderer mapView . .

URL . OSM Wiki .

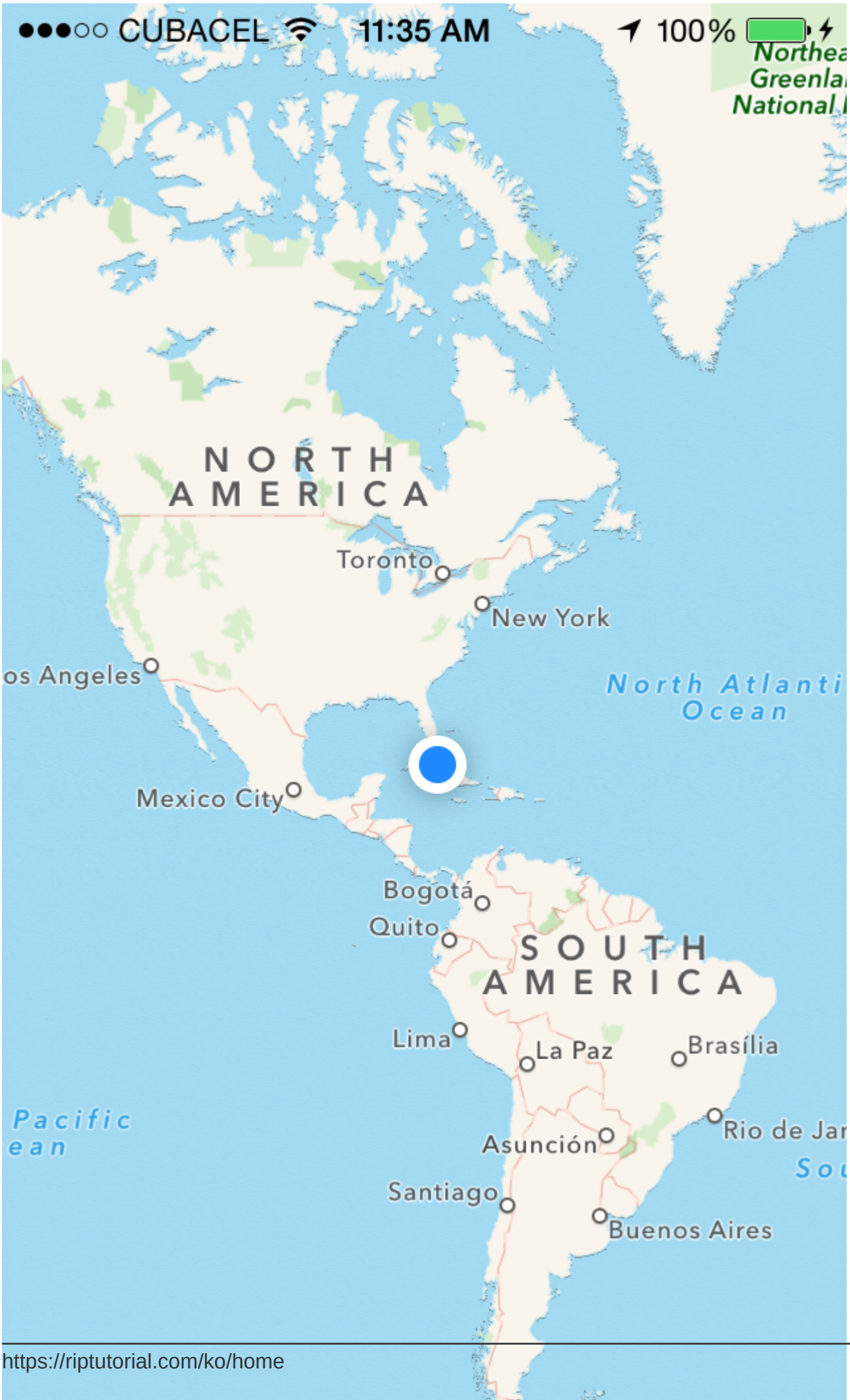
Show UserLocation UserTracking

.

-C

```
[self.map setShowsUserLocation:YES];
```

```
self.map?.showsUserLocation = true
```


●●●○○ CUBACEL
11:35 AM
100%
NORTH AMERICA
Toronto
New York
os Angeles
North Atlanti
Ocean
Mexico City
Bogotá
Quito
SOUTH AMERICA
Lima
La Paz
Brasília
Pacific
ean
Asunción
Rio de Jar
Santiago
Buenos Aires

45: ModelPresentationStyles

. . Interface Builder (segues) . `modalPresentationStyle` `UIModalPresentationStyle` enum . `modalPresentationStyle` `UIViewController` `ViewController` .

Apple .

. .

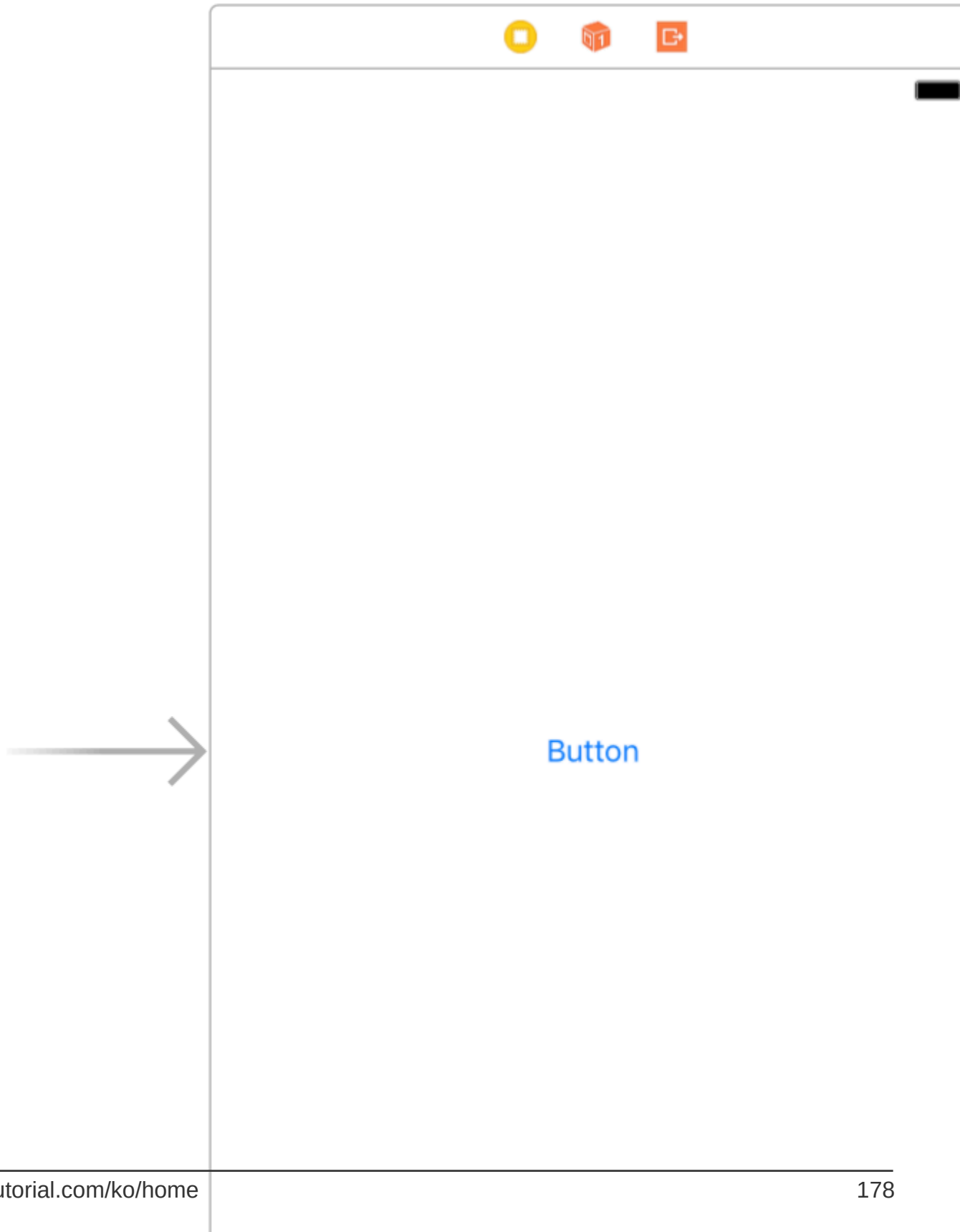
Examples

Interface Builder ModalPresentationStyle

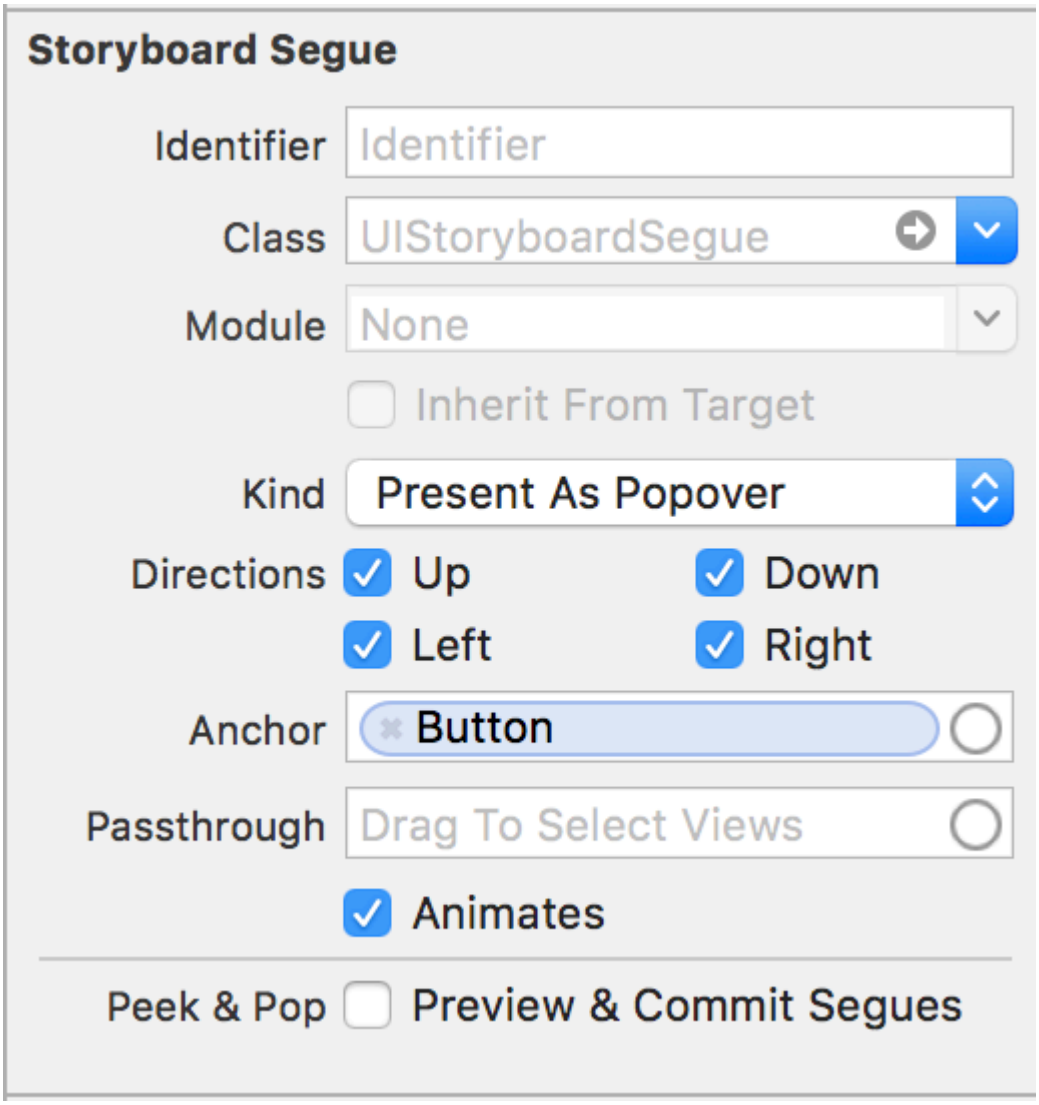
iOS `ModalpresentationStyle` . `UIModalPresentationStyle` 9 .

1. `fullScreen`
2. `pageSheet`
3. `formSheet`
4. `currentContext`
5. `custom`
6. `overFullScreen`
7. `overCurrentContext`
8. `popover`
9. `none`

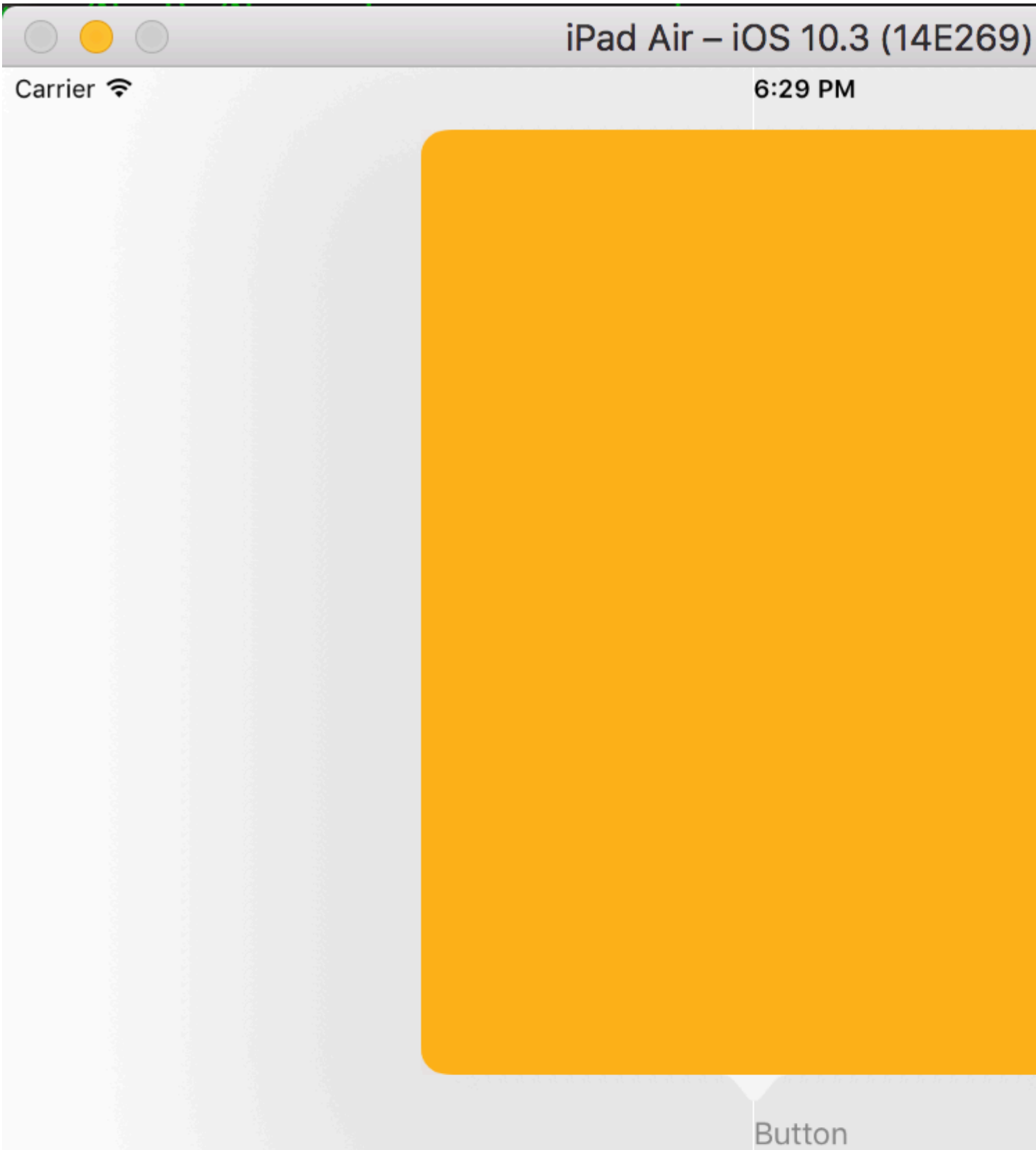
iOS 2 `ViewControllers` . `ViewController` `UIButton` `Target -> Action` `ViewController` . `ViewControllers` , `UIView` `ViewController` . , Interface Builder .


Button

Attributes Inspector .



Anchor Popover UI . Directions Anchor Anchor .


iPad Air – iOS 10.3 (14E269)
Carrier
6:29 PM
Button

46: MPMediaPickerDelegate

.

iPhone . .

Examples

MPMediaPickerControllerDelegate AVAudioPlayer .

.

- Info.plist 'NSAppleMusicUsageDescription' .
- iPhone . .

iOS 10.0.1

```
import UIKit
import AVFoundation
import MediaPlayer

class ViewController: UIViewController, MPMediaPickerControllerDelegate {

    var avMusicPlayer: AVAudioPlayer!
    var mpMediapicker: MPMediaPickerController!
    var mediaItems = [MPMediaItem]()
    let currentIndex = 0

    override func viewDidLoad() {
        super.viewDidLoad()
    }

    func audioPlayerDidFinishPlaying(_ player: AVAudioPlayer, successfully flag: Bool){
        //What to do?
    }

    func mediaPicker(_ mediaPicker: MPMediaPickerController, didPickMediaItems
mediaItemCollection: MPMediaItemCollection) {
        mediaItems = mediaItemCollection.items
        updatePlayer()
        self.dismiss(animated: true, completion: nil)
    }

    func updatePlayer(){
        let item = mediaItems[currentIndex]
        // DO-TRY-CATCH try to setup AVAudioPlayer with the path, if successful, sets up the
AVMusicPlayer, and song values.
        if let path: NSURL = item.assetURL as NSURL? {
            do
            {
                avMusicPlayer = try AVAudioPlayer(contentsOf: path as URL)
                avMusicPlayer.enableRate = true
                avMusicPlayer.rate = 1.0
                avMusicPlayer.numberOfLoops = 0
                avMusicPlayer.currentTime = 0
```

```
            }
            catch
            {
                avMusicPlayer = nil
            }
        }
    }

    @IBAction func Play(_ sender: AnyObject) {
        //AVMusicPlayer.deviceCurrentTime
        avMusicPlayer.play()
    }

    @IBAction func Stop(_ sender: AnyObject) {
        avMusicPlayer.stop()
    }

    @IBAction func picker(_ sender: AnyObject) {
        mpMediapicker = MPMediaPickerController.self(mediaTypes:MPMediaType.music)
        mpMediapicker.allowsPickingMultipleItems = false
        mpMediapicker.delegate = self
        self.present(mpMediapicker, animated: true, completion: nil)
    }

}
```

MPMediaPickerDelegate : https://riptutorial.com/ko/ios/topic/7299/mpmediapickerdelegate

47: MPVolumeView

MPVolumeView .

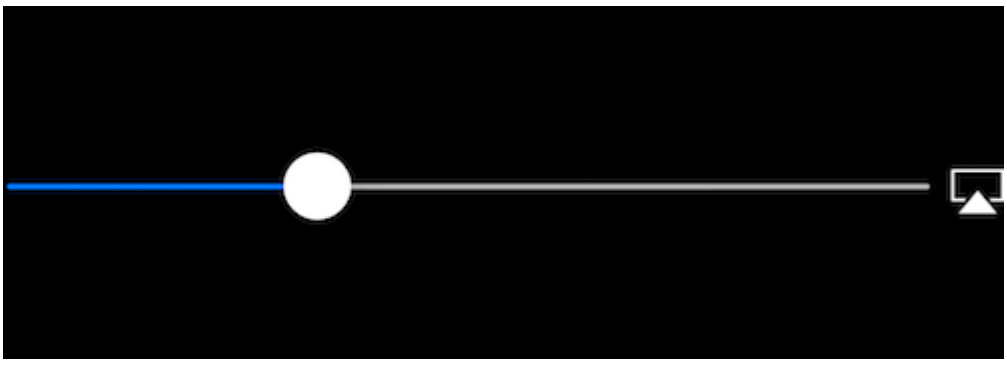
MPVolumeView iOS .

Examples

MPVolumeView

```
// Add MPVolumeView in a holder view
let mpVolumeHolderView = UIView(frame: CGRect(x: 0, y: view.bounds.midY, width:
view.bounds.width, height: view.bounds.height))
// Set the holder view's background color to transparent
mpVolumeHolderView.backgroundColor = .clear
let mpVolume = MPVolumeView(frame: mpVolumeHolderView.bounds)
mpVolume.showsRouteButton = true
mpVolumeHolderView.addSubview(mpVolume)
view.addSubview(mpVolumeHolderView)
// the volume view is white, set the parent background to black to show it better in this
example
view.backgroundColor = .black
```

!!! MPVolumeView .



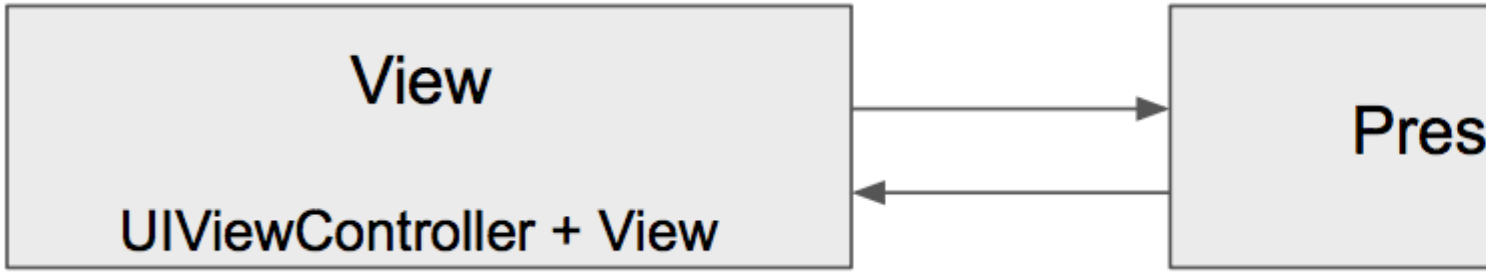
MPVolumeView : https://riptutorial.com/ko/ios/topic/9038/mpvolumeview

48: MVP

MVP Model-View-Controller . , . .

MVP .

:



- (GUI)
- **View** (GUI) .
- **Presenter** Model View " ". .

:

DB	.	.
		.

MVC MVP :

- MVC MVP UIView UIViewController .
- MVP View (MVVM) . MVC View .
- MVP View Presenter . MVC . Model
- MVP . MVC .
- MVC UIKit . MVP Presenter .

:

- MVP ViewView UIViewController .]
- . . .
- , .

- .
-

Examples

Dog.swift

```
import Foundation

enum Breed: String {
    case bulldog  = "Bulldog"
    case doberman = "Doberman"
    case labrador = "Labrador"
}

struct Dog {
    let name:  String
    let breed: String
    let age:   Int
}
```

DoggyView.swift

```
import Foundation

protocol DoggyView: NSObjectProtocol {
    func startLoading()
    func finishLoading()
    func setDoggies(_ doggies: [DoggyViewData])
    func setEmpty()
}
```

DoggyService.swift

```
import Foundation

typealias Result = ([Dog]) -> Void

class DoggyService {

    func deliverDoggies(_ result: @escaping Result) {

        let firstDoggy  = Dog(name: "Alfred", breed: Breed.labrador.rawValue, age: 1)
        let secondDoggy = Dog(name: "Vinny",  breed: Breed.doberman.rawValue, age: 5)
        let thirdDoggy  = Dog(name: "Lucky",  breed: Breed.labrador.rawValue, age: 3)

        let delay = DispatchTime.now() + Double(Int64(Double(NSEC_PER_SEC)*2)) /
Double(NSEC_PER_SEC)

        DispatchQueue.main.asyncAfter(deadline: delay) {
            result([firstDoggy,
                    secondDoggy,
                    thirdDoggy])
        }
    }
}
```

DoggyPresenter.swift

```
import Foundation

class DoggyPresenter {

    // MARK: - Private
    fileprivate let dogService: DoggyService
    weak fileprivate var dogView: DoggyView?

    init(dogService: DoggyService){
        self.dogService = dogService
    }

    func attachView(_ attach: Bool, view: DoggyView?) {
        if attach {
            dogView = nil
        } else {
            if let view = view { dogView = view }
        }
    }

    func getDogs(){
        self.dogView?.startLoading()

        dogService.deliverDoggies { [weak self] doggies in
            self?.dogView?.finishLoading()

        if doggies.count == 0 {
            self?.dogView?.setEmpty()
        } else {
            self?.dogView?.setDoggies(doggies.map {
                return DoggyViewData(name: "\($0.name) \($0.breed)",
                                     age: "\($0.age)")
                })
            }
        }
    }
}

struct DoggyViewData {
    let name: String
    let age:  String
}
```

DoggyListViewController.swift

```
import UIKit

class DoggyListViewController: UIViewController, UITableViewDataSource {

    @IBOutlet weak var emptyView: UIView?
    @IBOutlet weak var tableView: UITableView?
    @IBOutlet weak var spinner:   UIActivityIndicatorView?

    fileprivate let dogPresenter = DoggyPresenter(dogService: DoggyService())
    fileprivate var dogsToDisplay = [DoggyViewData]()
```

```
    override func viewDidLoad() {
        super.viewDidLoad()

        tableView?.dataSource = self
        spinner?.hidesWhenStopped = true
        dogPresenter.attachView(true, view: self)
        dogPresenter.getDogs()
    }

    // MARK: DataSource
    func tableView(_ tableView: UITableView, numberOfRowsInSection section: Int) -> Int {
        return dogsToDisplay.count
    }

    func tableView(_ tableView: UITableView, cellForRowAt indexPath: IndexPath) ->
UITableViewCell {
        let cell = UITableViewCell(style: .subtitle, reuseIdentifier: "Cell")
        let userViewData = dogsToDisplay[indexPath.row]
        cell.textLabel?.text = userViewData.name
        cell.detailTextLabel?.text = userViewData.age
        return cell
    }
}

extension DoggyListViewController: DoggyView {

    func startLoading() {
        spinner?.startAnimating()
    }

    func finishLoading() {
        spinner?.stopAnimating()
    }

    func setDoggies(_ doggies: [DoggyViewData]) {
        dogsToDisplay = doggies
        tableView?.isHidden = false
        emptyView?.isHidden = true;
        tableView?.reloadData()
    }

    func setEmpty() {
        tableView?.isHidden = true
        emptyView?.isHidden = false;
    }
}
```

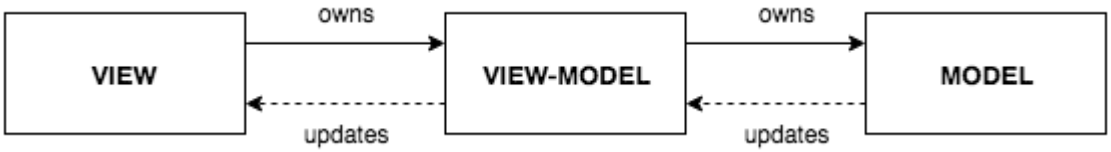
MVP : https://riptutorial.com/ko/ios/topic/9467/mvp-

49: MVVM

Examples

MVVM

iOS Model-View-ViewModel (MVVM) . iOS , Apple MVC (Model-View-Controller) . . MVC (Massive View Controller) . ViewController . MVC iOS (Model-View-ViewModel) .



MVVM . MVVM View ViewController + View (, XIB) (MVVM View). ViewModel . ViewModel View . ViewModel .
MVVM . .

MVVM ViewModel View ViewModel View .

(ReactiveCocoa, ReactiveSwift RxSwif) MVVM (ViewModel View) . : MVVM . MVVM .

MVVM .

`MVVMExampleViewController` ViewController. 'Hello' . ViewModel . MVVM .

```
class MVVMExampleViewController: UIViewController {

    @IBOutlet weak var helloLabel: UILabel!

    var viewModel: MVVMExampleViewModel?

    override func viewDidLoad() {
        super.viewDidLoad()
    }

    @IBAction func sayHelloButtonPressed(_ sender: UIButton) {
        viewModel?.userTriggeredSayHelloButton()
    }
}
```

`MVVMExampleViewModel` ViewModel.

```
class MVVMExampleViewModel {

    func userTriggeredSayHelloButton() {
        // How to update View's label when there is no reference to the View??
    }
```

```
}
```

ViewModel . ViewController . `AppDelegate` .

```
func application(_ application: UIApplication, didFinishLaunchingWithOptions launchOptions:
[UIApplicationLaunchOptionsKey: Any]?) -> Bool {
        if let rootVC = window?.rootViewController as? MVVMExampleViewController {
            let viewModel = MVVMExampleViewModel()
            rootVC.viewModel = viewModel
        }

        return true
```

ViewModel ViewModel View . (Reactive Programming iOS)

KVO . . . MVVM .

MVVM `Dynamic` .

```
class Dynamic<T> {
    typealias Listener = (T) -> Void
    var listener: Listener?

    func bind(_ listener: Listener?) {
        self.listener = listener
    }

    func bindAndFire(_ listener: Listener?) {
        self.listener = listener
        listener?(value)
    }

    var value: T {
        didSet {
            listener?(value)
        }
    }

    init(_ v: T) {
        value = v
    }
}
```

`Dynamic` Generics Closure ViewModel . . . `MVVMExampleViewController` `MVVMExampleViewModel` `MVVMExampleViewModel` .

`MVVMExampleViewController`

```
class MVVMExampleViewController: UIViewController {

    @IBOutlet weak var helloLabel: UILabel!

    var viewModel: MVVMExampleViewModel?

    override func viewDidLoad() {
        super.viewDidLoad()
```

```
        bindViewModel()
    }

    func bindViewModel() {
        if let viewModel = viewModel {
            viewModel.helloText.bind({ (helloText) in
                DispatchQueue.main.async {
                    // When value of the helloText Dynamic variable
                    // is set or changed in the ViewModel, this code will
                    // be executed
                    self.helloLabel.text = helloText
                }
            })
        }
    }

    @IBAction func sayHelloButtonPressed(_ sender: UIButton) {
        viewModel?.userTriggeredSayHelloButton()
    }
}
```

`MVVMExampleViewModel` :

```
    class MVVMExampleViewModel {

    // we have to initialize the Dynamic var with the
    // data type we want
    var helloText = Dynamic("")

    func userTriggeredSayHelloButton() {
        // Setting the value of the Dynamic variable
        // will trigger the closure we defined in the View
        helloText.value = "Hello"
    }
}
```

. `ViewModel` `View` `View` .

. MVVM MVC MVVM . .

MVVM : https://riptutorial.com/ko/ios/topic/8775/mvvm

50: MyLayout

MyLayout iOS objective-c . MyLayout . iOS Autolayout SizeClass, Android , float flex-box HTML / CSS . :

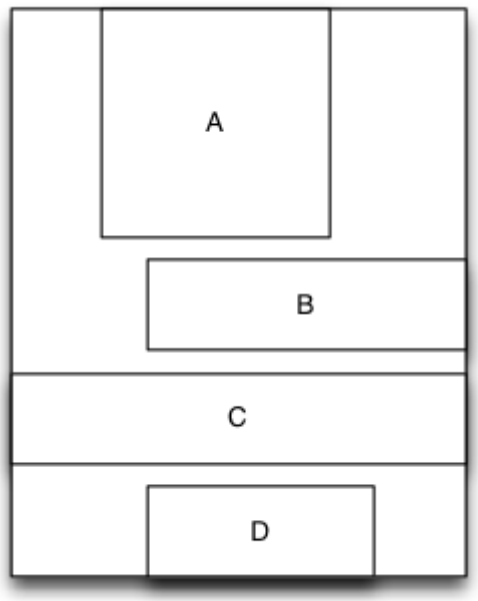
-C : https://github.com/youngsoft/MyLinearLayout : https://github.com/youngsoft/TangramKit

Examples

MyLayout

1. S 100 . 4 A, B, C, D .
2. A S 20 % S 30 % A .
3. B 40 S 40. C S 40.
4. Subview D 20 S 50 % 40.

.




```
    MyLinearLayout *S = [MyLinearLayout
linearLayoutWithOrientation:MyLayoutViewOrientation_Vert];
    S.subviewSpace = 10;
    S.widthSize.equalTo(@100);

    UIView *A = UIView.new;
    A.leftPos.equalTo(@0.2);
    A.rightPos.equalTo(@0.3);
    A.heightSize.equalTo(A.widthSize);
    [S addSubview:A];

    UIView *B = UIView.new;
    B.leftPos.equalTo(@40);
```

```
    B.widthSize.equalTo(@60);
    B.heightSize.equalTo(@40);
    [S addSubview:B];

    UIView *C = UIView.new;
    C.leftPos.equalTo(@0);
    C.rightPos.equalTo(@0);
    C.heightSize.equalTo(@40);
    [S addSubview:C];

    UIView *D = UIView.new;
    D.rightPos.equalTo(@20);
    D.widthSize.equalTo(S.widthSize).multiply(0.5);
    D.heightSize.equalTo(@40);
    [S addSubview:D];
```

MyLayout : https://riptutorial.com/ko/ios/topic/9692/mylayout

51: NSArray

Array / .

. .

Examples

json

'any' . . Json Swift .

// ----------

```
let array = [["one" : 1], ["two" : 2], ["three" : 3], ["four" : 4]]

let jsonString = convertIntoJSONString(arrayObject: array)
print("jsonString - \(jsonString)")
```

// ----------

```
func convertIntoJSONString(arrayObject: [Any]) -> String? {

        do {
            let jsonData: Data = try JSONSerialization.data(withJSONObject: arrayObject,
options: [])
            if  let jsonString = NSString(data: jsonData, encoding:
String.Encoding.utf8.rawValue) {
                return jsonString as String
            }

        } catch let error as NSError {
            print("Array convertIntoJSON - \(error.description)")
        }
        return nil
    }
```

NSArray : https://riptutorial.com/ko/ios/topic/9248/nsarray

52: NSAttributedString

NSAttributedString

Examples

( )

`NSAttributedString` (mutable `NSMutableAttributedString`) .

/ .

(label `UILabel`). "kerning" .

```
var attributedString = NSMutableAttributedString("Apply kerning")
attributedString.addAttribute(attribute: NSKernAttributeName, value: 5, range: NSMakeRange(6,
7))
label.attributedText = attributedString
```

-C

```
NSMutableAttributedString *attributedString;
attributedString = [[NSMutableAttributedString alloc] initWithString:@"Apply kerning"];
[attributedString addAttribute:NSKernAttributeName value:@5 range:NSMakeRange(6, 7)];
[label setAttributedText:attributedString];
```

-C

```
NSMutableAttributedString *attributeString = [[NSMutableAttributedString alloc]
initWithString:@"Your String here"];
[attributeString addAttribute:NSStrikethroughStyleAttributeName
                    value:@2
                    range:NSMakeRange(0, [attributeString length])];
```

```
let attributeString: NSMutableAttributedString =  NSMutableAttributedString(string: "Your
String here")
attributeString.addAttribute(NSStrikethroughStyleAttributeName, value: 2, range:
NSMakeRange(0, attributeString.length))
```

UILabel .

```
yourLabel.attributedText = attributeString;
```

Swift

```
let someValue : String = "Something the user entered"
let text = NSMutableAttributedString(string: "The value is: ")
text.appendAttributedString(NSAttributedString(string: someValue, attributes:
```

```
[NSFontAttributeName:UIFont.boldSystemFontOfSize(UIFont.systemFontSize())]))
```

.

.

-C

```
UIColor *color = [UIColor redColor];
NSString *textToFind = @"redword";

NSMutableAttributedString *attrsString =  [[NSMutableAttributedString alloc]
initWithAttributedString:yourLabel.attributedText];

// search for word occurrence
NSRange range = [yourLabel.text rangeOfString:textToFind];
if (range.location != NSNotFound) {
    [attrsString addAttribute:NSForegroundColorAttributeName value:color range:range];
}

// set attributed text
yourLabel.attributedText = attrsString;
```

```
let color = UIColor.red;
let textToFind = "redword"

let attrsString =  NSMutableAttributedString(string:yourlabel.text!);

// search for word occurrence
let range = (yourlabel.text! as NSString).range(of: textToFind)
if (range.length > 0) {
     attrsString.addAttribute(NSForegroundColorAttributeName,value:color,range:range)
}

// set attributed text
yourlabel.attributedText = attrsString
```

:

`NSMutableAttributedString` selector `NSForegroundColorAttributeName` selector `addAttribute:value:range` .

```
NSMutableAttributedString *attrsString =  [[NSMutableAttributedString alloc]
initWithAttributedString:label.attributedText];
[attrsString addAttribute:NSForegroundColorAttributeName value:color range:range];
```

(: NSRegularExpression).

-C

```
NSMutableAttributedString *mutAttString = @"string goes here";
NSRange range = NSMakeRange(0, mutAttString.length);
[mutAttString setAttributes:@{} range:originalRange];
```

Apple Documentation `addAttribute setAttributes .`

```
mutAttString.setAttributes([:], range: NSRange(0..<string.length))
```

NSAttributedString : https://riptutorial.com/ko/ios/topic/979/nsattributedstring

53: NSAttributedString UIImage .

Examples

NSAttributedString UIImage

-C

```
 NSMutableAttributedString *str = [[NSMutableAttributedString alloc] initWithString:@"Hello.
That is a test attributed string."];
 [str addAttribute:NSBackgroundColorAttributeName value:[UIColor yellowColor]
range:NSMakeRange(3,5)];
 [str addAttribute:NSForegroundColorAttributeName value:[UIColor greenColor]
range:NSMakeRange(10,7)];
 [str addAttribute:NSFontAttributeName value:[UIFont fontWithName:@"HelveticaNeue-Bold"
size:20.0] range:NSMakeRange(20, 10)];
 UIImage *customImage = [self imageFromAttributedString:str];
```

imageFromAttributedString .

```
- (UIImage *)imageFromAttributedString:(NSAttributedString *)text
{
    UIGraphicsBeginImageContextWithOptions(text.size, NO, 0.0);

    // draw in context
    [text drawAtPoint:CGPointMake(0.0, 0.0)];

    // transfer image
    UIImage *image = [UIGraphicsGetImageFromCurrentImageContext()
imageWithRenderingMode:UIImageRenderingModeAlwaysOriginal];
    UIGraphicsEndImageContext();

    return image;
}
```

NSAttributedString UIImage . : https://riptutorial.com/ko/ios/topic/7242/nsattributedstring-uiimage--

54: NSBundle

Examples

1. Cocoa .

   Cocoa **NSBundle *mainBundle*** .

```
   NSBundle *mainBundle;
   // Get the main bundle for the app;
   mainBundle = [NSBundle mainBundle];
```

2. Core Foundation .

   CFBundleGetMainBundle C .

```
   CFBundleRef mainBundle;
   // Get the main bundle for the app
   mainBundle = CFBundleGetMainBundle();
```

1.

   Cocoa **NSBundle *bundleWithPath :*** class **.**

```
   NSBundle *myBundle;
   // obtain a reference to a loadable bundle
   myBundle = [NSBundle bundleWithPath:@"/Library/MyBundle.bundle";
```

2. Cocoa Foundation

   Core Foundation ***CFBundleCreate*** **CFURLRef** .

```
   CFURLRef bundleURL;
   CFBundleRef myBundle;
   // Make a CFURLRef from the CFString representation of the bundle's path.
   bundleURL = CFURLCreateWithFileSystemPath(kCFAllocatorDefault,
CFSTR("/Library/MyBundle.bundle"), kCFURLPOSIXPathStyle, true);
   // Make a bundle instance using the URLRef.
   myBundle = CFBundleCreate(kCFAllocatorDefault, bundeURL);
   // You can release the URL now.
   CFRelease(bundleURL);
   // Use the bundle ...
   // Release the bundle when done.
   CFRelease(myBundle);
```

NSBundle : https://riptutorial.com/ko/ios/topic/5862/nsbundle

55: NSData

Apple (NSData)

NSData.dataWithContentsOfFile ()

NSData.bytes

Examples

NSData

```
let data = NSData(contentsOfFile: filePath) //assuming filePath is a valid path
```

-C

```
NSData *data = [NSData dataWithContentsOfFile:filePath]; //assuming filePath is a valid path
```

String

```
let data = (string as NSString).dataUsingEncoding(NSUTF8StringEncoding) //assuming string is a
String object
```

-C

```
NSData *data = [string dataUsingEncoding:NSUTF8StringEncoding]; //assuming string is a String
object
```

NSData

To

```
let string = String(NSString(data: data, encoding: NSUTF8StringEncoding)) //assuming data is a
valid NSData object
```

-C

```
NSString *string = [[NSString alloc] initWithData:data encoding:NSUTF8StringEncoding];
```

```
//assuming data is a valid NSData object
[string release];
```

To

```
let array = data.bytes as! NSMutableArray //assuming data is a valid NSData object
```

-C

```
NSMutableArray *array = (NSMutableArray *)[data bytes]; //assuming data is a valid NSData
object
```

To

```
let bytesArray = data.bytes as! UInt8 //assuming data is a valid NSData object
```

-C

```
UInt8 *bytesArray = (UInt8 *)data.bytes; //assuming data is a valid NSData object
```

NSData 16

`NSData` 16 , `description` .

```
extension NSData {

    func hexString() -> String {
        return UnsafeBufferPointer<UInt8>(start: UnsafePointer<UInt8>(bytes), count: length)
            .reduce("") { $0 + String(format: "%02x", $1) }
    }

}
```

-C

```
@implementation NSData (HexRepresentation)

- (NSString *)hexString {
    const unsigned char *bytes = (const unsigned char *)self.bytes;
    NSMutableString *hex = [NSMutableString new];
    for (NSInteger i = 0; i < self.length; i++) {
        [hex appendFormat:@"%02x", bytes[i]];
    }
    return [hex copy];
}
```

```
@end
```

NSData : https://riptutorial.com/ko/ios/topic/5084/nsdata

56: NSDate

- NSDate () // NSDate init .
- NSDate (). timeIntervalSince1970 // 1970 1 1 00:00:00 UTC ( ).
- NSDate (). compare (other : NSDate) // . `NSComparisonResult` `NSComparisonResult`

. .

	/	1	2
	1 .	175 → "175"	2016 → "2016"
	2 .	5 → "05"	2016 → "16"
yyy	3 .	5 AD → "005"	2016 → "2016"
yyyy	4	5 AD → "0005"	2016 → "2016"
	.	7 → "7"	"11 "→ "11"
MM	2 .	7 → "07"	"11 "→ "11"
MMM	.	7 → "7 "	"11 "→ "11 "
MMMM	.	7 → "7 "	"11 "→ "11 "
MMMMM	(1 , 6 , 7 'J').	7 → "J"	"11 "→ "N"
	.	8 → "8"	29 → "29"
DD	.	8 → "08"	29 → "29"
"E", "EE" "EEE"	3 .	→ ""	→ ""
EEEE	.	→ ""	→ ""
EEEEE	1 . (Thu Tue 'T'.)	→ "M"	→ "T"
EEEEEE	2 .	→ ""	→ "Th"
	(AM / PM).	10 → "PM"	2 AM → "AM"
h	1 1-12 .	10 → "10"	2 → "2"
hh	2 1-12 .	10 → "10"	2 AM → "02"
H	0-23 1	10 → "14"	2 → "2"

	/	1	2
HH	0-23 2 .	10 → "14"	2 AM → "02"
	1 .	7 → "7"	29 → "29"
mm	2 .	7 → "07"	29 → "29"
	1 .	7 → "7"	29 → "29"
SS	2 .	7 → "07"	29 → "29"

(z) (S) .

Examples

. NSDate :

```
var date = NSDate()
```

3

```
var date = Date()
```

-C

```
NSDate *date = [NSDate date];
```

NSDate N

(). .

`dateWithTimerIntervalSinceNow(seconds: NSTimeInterval) -> NSDate` (Swift) `+ (NSDate*)dateWithTimeIntervalSinceNow:(NSTimeInterval)seconds` (Objective-C) .

, , .

```
let totalSecondsInWeek:NSTimeInterval = 7 * 24 * 60 * 60;
//Using negative value for previous date from today
let nextWeek = NSDate().dateWithTimerIntervalSinceNow(totalSecondsInWeek)

//Using positive value for future date from today
let lastWeek = NSDate().dateWithTimerIntervalSinceNow(-totalSecondsInWeek)
```

3

```
let totalSecondsInWeek:TimeInterval = 7 * 24 * 60 * 60;

//Using positive value to add to the current date
let nextWeek = Date(timeIntervalSinceNow: totalSecondsInWeek)

//Using negative value to get date one week from current date
let lastWeek = Date(timeIntervalSinceNow: -totalSecondsInWeek)
```

-C

```
NSTimeInterval totalSecondsInWeek = 7 * 24 * 60 * 60;
//Using negative value for previous date from today
NSDate *lastWeek = [NSDate dateWithTimeIntervalSinceNow:-totalSecondsInWeek];

//Using positive value for future date from today
NSDate *nextWeek = [NSDate dateWithTimeIntervalSinceNow:totalSecondsInWeek];

NSLog(@"Last Week: %@", lastWeek);
NSLog(@"Right Now: %@", now);
NSLog(@"Next Week: %@", nextWeek);
```

4 .

- `isEqualToDate(anotherDate: NSDate) -> Bool`
- `earlierDate(anotherDate: NSDate) -> NSDate`
- `laterDate(anotherDate: NSDate) -> NSDate`
- `compare(anotherDate: NSDate) -> NSComparisonResult`

-C

- `- (BOOL)isEqualToDate:(NSDate *)anotherDate`
- `- (NSDate *)earlierDate:(NSDate *)anotherDate`
- `- (NSDate *)laterDate:(NSDate *)anotherDate`
- `- (NSComparisonResult)compare:(NSDate *)anotherDate`

2 .

```
let date1: NSDate = ... // initialized as  July 7, 2016 00:00:00
let date2: NSDate = ... // initialized as  July 2, 2016 00:00:00
```

-C

```
NSDate *date1 = ... // initialized as  July 7, 2016 00:00:00
NSDate *date2 = ... // initialized as  July 2, 2016 00:00:00
```

.

```
if date1.isEqualToDate(date2) {
    // returns false, as both dates aren't equal
}
```

```
earlierDate: NSDate = date1.earlierDate(date2) // returns the earlier date of the two (date 2)
laterDate: NSDate = date1.laterDate(date2) // returns the later date of the two (date1)

result: NSComparisonResult = date1.compare(date2)

if result == .OrderedAscending {
    // true if date1 is earlier than date2
} else if result == .OrderedSame {
    // true if the dates are the same
} else if result == .OrderedDescending {
    // true if date1 is later than date1
}
```

-C

```
if ([date1 isEqualToDate:date2]) {
    // returns false, as both date are not equal
}

NSDate *earlierDate = [date1 earlierDate:date2]; // returns date which comes earlier from both
date, here it will return date2
NSDate *laterDate = [date1 laterDate:date2]; // returns date which comes later from both date,
here it will return date1

NSComparisonResult result = [date1 compare:date2];
if (result == NSOrderedAscending) {
    // fails
    // comes here if date1 is earlier then date2, in our case it will not come here
} else if (result == NSOrderedSame){
    // fails
    // comes here if date1 is same as date2, in our case it will not come here
} else{ // NSOrderedDescending
    // succeeds
    // comes here if date1 is later than date2, in our case it will come here
}
```

,, :

3

```
let dateStringUTC = "2016-10-22 12:37:48 +0000"
let dateFormatter = DateFormatter()
dateFormatter.locale = Locale(identifier: "en_US_POSIX")
dateFormatter.dateFormat = "yyyy-MM-dd HH:mm:ss X"
let date = dateFormatter.date(from: dateStringUTC)!

let now = Date()

let formatter = DateComponentsFormatter()
formatter.unitsStyle = .full
formatter.maximumUnitCount = 2
let string = formatter.string(from: date, to: Date())! + " " + NSLocalizedString("ago",
comment: "added after elapsed time to say how long before")
```

.

```
// get the current date and time
let currentDateTime = Date()

// get the user's calendar
let userCalendar = Calendar.current

// choose which date and time components are needed
let requestedComponents: Set<Calendar.Component> = [
    .year,
    .month,
    .day,
    .hour,
    .minute,
    .second
]

// get the components
let dateTimeComponents = userCalendar.dateComponents(requestedComponents, from:
currentDateTime)

// now the components are available
dateTimeComponents.year
dateTimeComponents.month
dateTimeComponents.day
dateTimeComponents.hour
dateTimeComponents.minute
dateTimeComponents.second
```

Unix Epoch

Unix Epoch Time `timeIntervalSince1970` .

```
let date = NSDate() // current date
let unixtime = date.timeIntervalSince1970
```

-C

```
NSDate *date = [NSDate date]; // current date
int unixtime = [date timeIntervalSince1970];
```

NSDateFormatter

`NSDate` 3 .

1. `NSDateFormatter` ▪

```
let dateFormatter = NSDateFormatter()
```

3

```
let dateFormatter = DateFormatter()
```

-C

```
NSDateFormatter *dateFormatter = [[NSDateFormatter alloc] init];
```

2.

```
dateFormatter.dateFormat = "yyyy-MM-dd 'at' HH:mm"
```

-C

```
dateFormatter.dateFormat = @"yyyy-MM-dd 'at' HH:mm";
```

3.

```
let date = NSDate() // your NSDate object
let dateString = dateFormatter.stringFromDate(date)
```

3

```
let date = Date() // your NSDate object
let dateString = dateFormatter.stringFromDate(date)
```

-C

```
NSDate *date = [NSDate date]; // your NSDate object
NSString *dateString = [dateFormatter stringFromDate:date];
```

```
2001-01-02 at 13:00 . 2001-01-02 at 13:00
```

```
    NSDateFormatter          .
```

.

```
extension Date {
```

```
        func toString() -> String {
            let dateFormatter = DateFormatter()
            dateFormatter.dateFormat = "MMMM dd yyyy"
            return dateFormatter.string(from: self)
        }
}
```

nsdateformatter .

.

() NSDate NSDate .

String NSDate (: 08:12) 1 1 NSDate .

NSDate "", NSDate , , , .

, hourAndMinute NSDate .

-C

```
NSDateComponents *hourAndMinuteComponents = [calendar components:NSCalendarUnitHour |
NSCalendarUnitMinute
                                                                fromDate:hourAndMinute];
NSDateComponents *componentsOfDate = [[NSCalendar currentCalendar]
components:NSCalendarUnitDay | NSCalendarUnitMonth | NSCalendarUnitYear
                                                                    fromDate:[NSDate date]];

NSDateComponents *components = [[NSDateComponents alloc] init];
[components setDay: componentsOfDate.day];
[components setMonth: componentsOfDate.month];
[components setYear: componentsOfDate.year];
[components setHour: [hourAndMinuteComponents hour]];
[components setMinute: [hourAndMinuteComponents minute]];
[components setSecond: 0];
[calendar setTimeZone: [NSTimeZone defaultTimeZone]];

NSDate *yourFullNSDateObject = [calendar dateFromComponents:components];
```

"" .

UTC TimeZone NSDate

UTC .

```
+(NSTimeInterval)getUTCOffSetIntervalWithCurrentTimeZone:(NSTimeZone *)current forDate:(NSDate
*)date  {
    NSTimeZone *utcTimeZone = [NSTimeZone timeZoneWithAbbreviation:@"UTC"];
    NSInteger currentGMTOffset = [current secondsFromGMTForDate:date];
    NSInteger gmtOffset = [utcTimeZone secondsFromGMTForDate:date];
    NSTimeInterval gmtInterval = currentGMTOffset - gmtOffset;
    return gmtInterval;
}
```

(12 24)

AM PM

-C

```
NSDateFormatter *formatter = [[NSDateFormatter alloc] init];
[formatter setLocale:[NSLocale currentLocale]];
[formatter setDateStyle:NSDateFormatterNoStyle];
[formatter setTimeStyle:NSDateFormatterShortStyle];
NSString *dateString = [formatter stringFromDate:[NSDate date]];
NSRange amRange = [dateString rangeOfString:[formatter AMSymbol]];
NSRange pmRange = [dateString rangeOfString:[formatter PMSymbol]];
BOOL is24h = (amRange.location == NSNotFound && pmRange.location == NSNotFound);
```

NSDateFormatter

-C

```
NSString *formatStringForHours = [NSDateFormatter dateFormatFromTemplate:@"j" options:0
locale:[NSLocale currentLocale]];
NSRange containsA = [formatStringForHours rangeOfString:@"a"];
BOOL is24h = containsA.location == NSNotFound;
```

ICU "j" ...

[...] (h, H, K k) . [...] API 'j' (12 24) .

. . `NSDateFormatter` `NSCalendar` ICU .

.

JSON NSDate "/ Date (1268123281843) /"

Json.NET 4.5 "/ Date (1198908717056) /"Microsoft . NSDate .

-C

```
(NSDate*) getDateFromJSON:(NSString *)dateString
{
    // Expect date in this format "/Date(1268123281843)/"
    int startPos = [dateString rangeOfString:@"("].location+1;
    int endPos = [dateString rangeOfString:@")"].location;
    NSRange range = NSMakeRange(startPos,endPos-startPos);
```

```
    unsigned long long milliseconds = [[dateString substringWithRange:range] longLongValue];
    NSLog(@"%llu",milliseconds);
    NSTimeInterval interval = milliseconds/1000;
    NSDate *date = [NSDate dateWithTimeIntervalSince1970:interval];
    // add code for date formatter if need NSDate in specific format.
    return date;
}
```

NSDate (: 5 , 2 , 3)

, RSS .

-C

```
- (NSString *)getHistoricTimeText:(NSDate *)since
{
    NSString *str;
    NSTimeInterval interval = [[NSDate date] timeIntervalSinceDate:since];
    if(interval < 60)
        str = [NSString stringWithFormat:@"%is ago",(int)interval];
    else if(interval < 3600)
    {
        int minutes = interval/60;
        str = [NSString stringWithFormat:@"%im ago",minutes];
    }
    else if(interval < 86400)
    {
        int hours =  interval/3600;

        str = [NSString stringWithFormat:@"%ih ago",hours];
    }
    else
    {
        NSDateFormatter *dateFormater=[[NSDateFormatter alloc]init];
        [dateFormater setLocale:[NSLocale currentLocale]];
        NSString *dateFormat = [NSDateFormatter dateFormatFromTemplate:@"MMM d, YYYY"
options:0 locale:[NSLocale currentLocale]];
        [dateFormater setDateFormat:dateFormat];
        str = [dateFormater stringFromDate:since];

    }
    return str;
}
```

NSDate : https://riptutorial.com/ko/ios/topic/1502/nsdate

57: NSHTTPCookieStorage

Examples

NSUserDefault

```
import Foundation


class CookiesSingleton {

static let instance : CookiesSingleton = CookiesSingleton()
static var enableDebug = true

func loadCookies() {
    if let cookiesDetails =
NSUserDefaults.standardUserDefaults().objectForKey("customeWebsite")  {
        for (keys,_) in cookiesDetails as! NSDictionary{
                if let  cookieDict = NSUserDefaults.standardUserDefaults().objectForKey(keys
as! String){
                    if let cookie = NSHTTPCookie(properties:cookieDict as! [String:AnyObject])
{
                        NSHTTPCookieStorage.sharedHTTPCookieStorage().setCookie(cookie)
                        if(CookiesSingleton.enableDebug){
                            print("Each Cookies",cookieDict)
                        }
                    }
                }
        }
    }
}

func  removeCookies(){
    NSURLCache.sharedURLCache().removeAllCachedResponses()
    NSURLCache.sharedURLCache().diskCapacity = 0
    NSURLCache.sharedURLCache().memoryCapacity = 0

    let storage : NSHTTPCookieStorage = NSHTTPCookieStorage.sharedHTTPCookieStorage()
    for cookie in storage.cookies! {
        storage.deleteCookie(cookie as NSHTTPCookie)
    }

    NSUserDefaults.standardUserDefaults().setValue("", forKey: "customeWebsite")
    NSUserDefaults.standardUserDefaults().synchronize()

    if(CookiesSingleton.enableDebug){
        print("Cookies Removed")
    }
}

func saveCookies() {

    let cookieArray = NSMutableArray()
    let savedC = NSHTTPCookieStorage.sharedHTTPCookieStorage().cookies

    let allCookiesDic:NSMutableDictionary = NSMutableDictionary()
```

```
    for c : NSHTTPCookie in savedC! {

        let cookieProps = NSMutableDictionary()
        cookieArray.addObject(c.name)
        cookieProps.setValue(c.name, forKey: NSHTTPCookieName)
        cookieProps.setValue(c.value, forKey: NSHTTPCookieValue)
        cookieProps.setValue(c.domain, forKey: NSHTTPCookieDomain)
        cookieProps.setValue(c.path, forKey: NSHTTPCookiePath)
        cookieProps.setValue(c.version, forKey: NSHTTPCookieVersion)
        cookieProps.setValue(NSDate().dateByAddingTimeInterval(2629743), forKey:
NSHTTPCookieExpires)

        allCookiesDic.setValue(cookieProps, forKey: c.name)

    }
    NSUserDefaults.standardUserDefaults().setValue(allCookiesDic, forKey: "customeWebsite")
    NSUserDefaults.standardUserDefaults().synchronize()

    if(CookiesSingleton.enableDebug){
        print("Cookies Saved")
    }
}

}
```

NSHTTPCookieStorage : https://riptutorial.com/ko/ios/topic/7312/nshttpcookiestorage

58: NSInvocation

Examples

NSInvocation -C

e.James

Apple NSInvocation

NSInvocation Objective-C . , .

.

. .NSInvocation .NSInvocation ( ).

. addObject: .

```
[myArray addObject:myString];
```

NSInvocation NSInvocation .

NSMutableArray addObject: selector NSInvocation .

```
NSMethodSignature * mySignature = [NSMutableArray
    instanceMethodSignatureForSelector:@selector(addObject:)];
NSInvocation * myInvocation = [NSInvocation
    invocationWithMethodSignature:mySignature];
```

.

```
[myInvocation setTarget:myArray];
```

.

```
[myInvocation setSelector:@selector(addObject:)];
```

:

```
[myInvocation setArgument:&myString atIndex:2];
```

. Ryan McCuaig Apple .

myInvocation . .

```
[myInvocation invoke];
```

. [myArray addObject:myString]; .

. (NSInvocation) () (selector) "" . (invoke).

NSInvocation .

NSUndoManager NSInvocation ., NSInvocation ." , , ". NSInvocation NSUndoManager , . " " NSUndoManager NSInvocation .

.

NSInvocation : https://riptutorial.com/ko/ios/topic/8276/nsinvocation

59: NSNotificationCenter

iOS . , . . .

: - Swift

	. , . nil .
obj	. , . nil .
	. nil .
	. () .

NSNotificationCenter ( ) . NSNotificationCenter .

Apple Documentation .

NSNotification & NSNotificationCenter

Examples

NSString .

```
Name of associated class + Did | Will + UniquePartOfName + Notification
```

:

- NSApplicationDidBecomeActiveNotification
- NSWindowDidMiniaturizeNotification
- NSTextViewDidChangeSelectionNotification
- NSColorPanelColorDidChangeNotification

2.3

```
NSNotificationCenter.defaultCenter().addObserver(self,
                                                 selector:
#selector(self.testNotification(_:)),
                                                 name: "TestNotification",
                                                 object: nil)
```

3

```
NSNotificationCenter.default.addObserver(self,
                                         selector: #selector(self.testNotification(_:)),
                                         name: NSNotification.Name(rawValue:
"TestNotification"),
                                         object: nil)
```

-C

```
[[NSNotificationCenter defaultCenter] addObserver:self
                                      selector:@selector(testNotification:)
                                      name:@"TestNotification"
                                      object:nil];
```

: . UIViewController `viewWillAppear:` `viewDidUnload:` .

2.3

```
//Remove observer for single notification
NSNotificationCenter.defaultCenter().removeObserver(self, name: "TestNotification", object:
nil)

//Remove observer for all notifications
NotificationCenter.defaultCenter().removeObserver(self)
```

3

```
//Remove observer for single notification
NotificationCenter.default.removeObserver(self, name: NSNotification.Name(rawValue:
"TestNotification"), object: nil)

//Remove observer for all notifications
NotificationCenter.default.removeObserver(self)
```

-C

```
//Remove observer for single notification
[[NSNotificationCenter defaultCenter] removeObserver:self name:@"TestNotification"
object:nil];

//Remove observer for all notifications
[[NSNotificationCenter defaultCenter] removeObserver:self];
```

```
NSNotificationCenter.defaultCenter().postNotificationName("TestNotification", object: self)
```

-C

```
[[NSNotificationCenter defaultCenter] postNotificationName:@"TestNotification" object:nil];
```

```
let userInfo: [String: AnyObject] = ["someKey": myObject]
NSNotificationCenter.defaultCenter().postNotificationName("TestNotification", object: self,
userInfo: userInfo)
```

-C

```
NSDictionary *userInfo = [NSDictionary dictionaryWithObject:myObject forKey:@"someKey"];
[[NSNotificationCenter defaultCenter] postNotificationName: @"TestNotification" object:nil
userInfo:userInfo];
```

```
func testNotification(notification: NSNotification) {
    let userInfo = notification.userInfo
    let myObject: MyObject = userInfo["someKey"]
}
```

-C

```
- (void)testNotification:(NSNotification *)notification {
    NSDictionary *userInfo = notification.userInfo;
    MyObject *myObject = [userInfo objectForKey:@"someKey"];
}
```

/

.

```
id testObserver = [[NSNotificationCenter defaultCenter] addObserverForName:@"TestNotification"
                                                                    object:nil
                                                                     queue:nil
                                                                usingBlock:^(NSNotification*
notification) {
    NSDictionary *userInfo = notification.userInfo;
    MyObject *myObject = [userInfo objectForKey:@"someKey"];
}];
```

.

```
[[NSNotificationCenter defaultCenter] removeObserver:testObserver
                                                name:@"TestNotification"
```

```
                                                object:nil];
```

.

```
// Add observer
let observer =
NSNotificationCenter.defaultCenter().addObserverForName("nameOfTheNotification", object: nil,
queue: nil) { (notification) in
    // Do operations with the notification in this block
}

// Remove observer
NSNotificationCenter.defaultCenter().removeObserver(observer)
```

NSNotificationCenter : https://riptutorial.com/ko/ios/topic/1601/nsnotificationcenter

60: NSPredicate

- ◦ C : % d, % s, % f
  ◦ : % @
  ◦ : % K
- ◦ =, == : .
  ◦ > =, => :
  ◦ <=, = <: .
  ◦ > : .
  ◦ <: .
  ◦ ! =, <> : .
  ◦ BETWEEN : . : BETWEEN {0, 5}
- ◦ AND, && : AND
  ◦ OR, || : OR
  ◦ NOT,! : NOT
- ◦ BEGINSWITH : .
  ◦ ENDSWITH : .
  ◦ CONTAINS : .
  ◦ LIKE : .
    ◦ * : 0
    ◦ ? :

Examples

predicateWithBlock NSPredicate

-C

```
NSPredicate *predicate = [NSPredicate predicateWithBlock:^BOOL(id item,
                                                               NSDictionary *bindings) {
    return [item isKindOfClass:[UILabel class]];
}];
```

```
let predicate = NSPredicate { (item, bindings) -> Bool in
    return item.isKindOfClass(UILabel.self)
}
```

UILabel .

predicateWithFormat NSPredicate

-C

```
NSPredicate *predicate = [NSPredicate predicateWithFormat: @"self[SIZE] = %d", 5)];
```

```
let predicate = NSPredicate(format: "self[SIZE] >= %d", 5)
```

, 5 !.

NSPredicate

NSPredicate .

-C

```
NSPredicate *template = [NSPredicate predicateWithFormat: @"self BEGINSWITH $letter"];
NSDictionary *variables = @{ @"letter": @"r" };
NSPredicate *beginsWithR = [template predicateWithSubstitutionVariables: variables];
```

```
let template = NSPredicate(format: "self BEGINSWITH $letter")
let variables = ["letter": "r"]
let beginsWithR = template.predicateWithSubstitutionVariables(variables)
```

predicateWithSubstitutionVariables . .

NSPredicate

-C

```
NSArray *heroes = @[@"tracer", @"bastion", @"reaper", @"junkrat", @"roadhog"];

NSPredicate *template = [NSPredicate predicateWithFormat:@"self BEGINSWITH $letter"];

NSDictionary *beginsWithRVariables = @{ @"letter": @"r"};
NSPredicate *beginsWithR = [template predicateWithSubstitutionVariables:
beginsWithRVariables];

NSArray *beginsWithRHeroes = [heroes filteredArrayUsingPredicate: beginsWithR];
// ["reaper", "roadhog"]

NSDictionary *beginsWithTVariables = @{ @"letter": @"t"};
NSPredicate *beginsWithT = [template predicateWithSubstitutionVarables: beginsWithTVariables];

NSArray *beginsWithTHeroes = [heroes filteredArrayUsingPredicate: beginsWithT];
// ["tracer"]
```

```
let heroes = ["tracer", "bastion", "reaper", "junkrat", "roadhog"]

let template = NSPredicate(format: "self BEGINSWITH $letter")

let beginsWithRVariables = ["letter": "r"]
let beginsWithR = template.predicateWithSubstitutionVariables(beginsWithRVariables)

let beginsWithRHeroes = heroes.filter { beginsWithR.evaluateWithObject($0) }
```

```
// ["reaper", "roadhog"]

let beginsWithTVariables = ["letter": "t"]
let beginsWithT = template.predicateWithSubstitutionVariables(beginsWithTVariables)

let beginsWithTHeroes = heroes.filter { beginsWithT.evaluateWithObject($0) }
// ["tracer"]
```

NSPredicate

```
NSString *emailRegex = @"[A-Z0-9a-z]([A-Z0-9a-z._-]{0,64})+[A-Z0-9a-z]+@[A-Z0-9a-z]+([A-Za-z0-
9.-]{0,64})+([A-Z0-9a-z])+\\.[A-Za-z]{2,4}";    NSString *firstNameRegex = @"[0-9A-Za-z\"'-
]{2,32}$";
NSString *firstNameRegex = @"[ 0-9A-Za-z]{2,32}$";
NSString *lastNameRegex = @"[0-9A-Za-z\"'-]{2,32}$";
NSString *mobileNumberRegEx = @"^[0-9]{10}$";
NSString *zipcodeRegEx = @"^[0-9]{5}$";
NSString *SSNRegEx = @"^\\d{3}-?\\d{2}-?\\d{4}$";
NSString *addressRegEx = @"^[ A-Za-z0-9]{2,32}$";
NSString *cityRegEx = @"^[ A-Za-z0-9]{2,25}$";
NSString *PINRegEx = @"^[0-9]{4}$";
NSString *driversLiscRegEx = @"^[0-9a-zA-Z]{5,20}$";

-(BOOL)validateEmail {
    //Email address field should give an error when the email address begins with ".","-","_"
.
    NSPredicate *emailPredicate = [NSPredicate predicateWithFormat:@"SELF MATCHES %@",
emailRegex];
    return ([emailPredicate evaluateWithObject:self.text] && self.text.length <= 64 &&
([self.text rangeOfString:@".."].location == NSNotFound));
}

- (BOOL)validateFirstName {
    NSPredicate *firstNamePredicate = [NSPredicate predicateWithFormat:@"SELF MATCHES %@",
firstNameRegex];
    return [firstNamePredicate evaluateWithObject:self.text];
}

- (BOOL)validateLastName {
    NSPredicate *lastNamePredicate = [NSPredicate predicateWithFormat:@"SELF MATCHES %@",
lastNameRegex];
    return [lastNamePredicate evaluateWithObject:self.text];
}

- (BOOL)validateAlphaNumericMin2Max32 {
    NSPredicate *firstNamePredicate = [NSPredicate predicateWithFormat:@"SELF MATCHES %@",
firstNameRegex];
    return [firstNamePredicate evaluateWithObject:self.text];
}

- (BOOL)validateMobileNumber {
    NSString *strippedMobileNumber =  [[[[self.text stringByReplacingOccurrencesOfString:@"("
withString:@""]
                                       stringByReplacingOccurrencesOfString:@")"
withString:@""]
                                       stringByReplacingOccurrencesOfString:@"-"
withString:@""]
                                       stringByReplacingOccurrencesOfString:@" "
withString:@""];
```

```
    NSPredicate *mobileNumberPredicate = [NSPredicate predicateWithFormat:@"SELF MATCHES %@",
mobileNumberRegEx];

    return [mobileNumberPredicate evaluateWithObject:strippedMobileNumber];
}

- (BOOL)validateZipcode {
    NSPredicate *zipcodePredicate = [NSPredicate predicateWithFormat:@"SELF MATCHES %@",
zipcodeRegEx];

    return [zipcodePredicate evaluateWithObject:self.text];
}

- (BOOL)validateSSN {
NSPredicate *predicate = [NSPredicate predicateWithFormat:@"SELF MATCHES %@", SSNRegEx];

return [predicate evaluateWithObject:self.text];
}

- (BOOL)validateAddress {
    NSPredicate *predicate = [NSPredicate predicateWithFormat:@"SELF MATCHES %@",
addressRegEx];

    return [predicate evaluateWithObject:self.text];
}

- (BOOL)validateCity {
    NSPredicate *predicate = [NSPredicate predicateWithFormat:@"SELF MATCHES %@", cityRegEx];
    return [predicate evaluateWithObject:self.text];
}

- (BOOL)validatePIN {
    NSPredicate *predicate = [NSPredicate predicateWithFormat:@"SELF MATCHES %@", PINRegEx];

    return [predicate evaluateWithObject:self.text];
}
   - (BOOL)validateDriversLiscNumber {
    if([self.text length] > 20) {
        return NO;
    }
    NSPredicate *driversLiscPredicate = [NSPredicate predicateWithFormat:@"SELF MATCHES %@",
driversLiscRegEx];

    return [driversLiscPredicate evaluateWithObject:self.text];
}
```

`AND`,`OR` `NOT` NSPredicate

NSCompoundPredicate NSCompoundPredicate .

-C

AND -

```
  NSPredicate *predicate = [NSPredicate predicateWithFormat:@"samplePredicate"];
  NSPredicate *anotherPredicate = [NSPredicate predicateWithFormat:@"anotherPredicate"];
  NSPredicate *combinedPredicate = [NSCompoundPredicate andPredicateWithSubpredicates:
@[predicate,anotherPredicate]];
```

-

```
 NSPredicate *predicate = [NSPredicate predicateWithFormat:@"samplePredicate"];
 NSPredicate *anotherPredicate = [NSPredicate predicateWithFormat:@"anotherPredicate"];
 NSPredicate *combinedPredicate = [NSCompoundPredicate orPredicateWithSubpredicates:
@[predicate,anotherPredicate]];
```

NOT -

```
 NSPredicate *predicate = [NSPredicate predicateWithFormat:@"samplePredicate"];
 NSPredicate *anotherPredicate = [NSPredicate predicateWithFormat:@"anotherPredicate"];
 NSPredicate *combinedPredicate = [NSCompoundPredicate notPredicateWithSubpredicate:
@[predicate,anotherPredicate]];
```

NSPredicate : https://riptutorial.com/ko/ios/topic/5796/nspredicate

61: NSTimer

interval	(). .
target	selector
selector	Swift, target Selector
repeats	false . true , interval .

NSTimer .

Examples

5 self doSomething .

```
let timer = NSTimer.scheduledTimerWithTimeInterval(5,
                                target: self,
                              selector: Selector(doSomething()),
                              userInfo: nil,
                               repeats: false)
```

3

```
 let timer = Timer.scheduledTimer(timeInterval: 1,
                                        target: self,
                                      selector: #selector(doSomething()),
                                      userInfo: nil,
                                       repeats: true)
```

-C

```
NSTimer *timer = [NSTimer scheduledTimerWithTimeInterval:5.0 target:self
selector:@selector(doSomething) userInfo:nil repeats:NO];
```

false/NO . true/YES 5 .

```
timer.fire()
```

-C

```
[timer fire];
```

fire NSTimer .

. fire .

.

```
timer.invalidate()
```

-C

```
[timer invalidate];
```

. . Apple .

. .

: , . .

```
class ViewController: UIViewController {

    var timer = NSTimer()

    override func viewDidLoad() {
        NSTimer.scheduledTimerWithTimeInterval(1.0, target: self, selector:
Selector(self.timerMethod()), userInfo: nil, repeats: true)
    }

    func timerMethod() {
        print("Timer method called")
    }

    func endTimer() {
        timer.invalidate()
    }
}
```

3

```
class ViewController: UIViewController {

        var timer = Timer()

        override func viewDidLoad() {
            Timer.scheduledTimer(timeInterval: 1.0, target: self, selector:
#selector(self.timerMethod()), userInfo: nil, repeats: true)
        }

        func timerMethod() {
            print("Timer method called")
        }

        func endTimer() {
            timer.invalidate()
        }
    }
```

.

```
NSTimer.scheduledTimerWithTimeInterval(3.0, target: self, selector:
Selector(self.timerMethod()), userInfo: nil, repeats: false)
```

3

```
 Timer.scheduledTimer(timeInterval: 3.0, target: self, selector:
#selector(self.timerMethod()), userInfo: nil, repeats: false)
```

3 . .

`userInfo` .

Timer .

[*3*]

```
Timer.scheduledTimer(timeInterval: 1.0, target: self, selector:#selector(iGotCall(sender:)),
userInfo: ["Name": "i am iOS guy"], repeats:true)
```

[*-C*]

```
NSTimer* timer = [NSTimer scheduledTimerWithTimeInterval:1.0
                                                  target:self
                                                selector:@selector(iGotCall:)
                                                userInfo:@"i am iOS guy" repeats:YES];
```

`["Name": "i am iOS guy"]` `userInfo` . `iGotCall` .

[*3*]

```
func iGotCall(sender: Timer) {
        print((sender.userInfo)!)
    }
```

[*-C*]

```
- (void)iGotCall:(NSTimer*)theTimer {
    NSLog (@"%@", (NSString*)[theTimer userInfo]);
}
```

NSTimer : https://riptutorial.com/ko/ios/topic/2624/nstimer

62: NSURL

Examples

NSURL String .

```
NSURL *url = [NSURL URLWithString:@"http://www.example.com/images/apple-tree.jpg"];
NSString *fileName = [url lastPathComponent];
// fileName = "apple-tree.jpg"
```

Swift URL (NSURL)

2.3

```
let url = NSURL(string: "http://google.com/lastPath")
let lastPath = url?.lastPathComponent
```

3.0

```
  let url = URL(string: "http://google.com/lastPath")
  let lastPath = url?.lastPathComponent
```

NSURL : https://riptutorial.com/ko/ios/topic/4610/nsurl

63: NSURL

NSURLSession API . API iOS .

NSURLSession . URL (URL) . .

, NSURLConnection . .

. . (:) .

NSURLSession . () , , (iOS) , . , TLS .

.

- NSURLConnection .
- .
- .

(OS) . . . . .

. .

- **NSData** . .
- . .
- NSData . POST . / NSURLRequest / ( ).

.

NSURLSession , TLS ( ) , .

Examples

GET

```
    // define url
    let url = NSURL(string: "https://urlToGet.com")

    //create a task to get data from a url
    let task = NSURLSession.sharedSession().dataTaskWithURL(url!)
    {

       /*inside this block, we have access to NSData *data, NSURLResponse *response, and
NSError *error returned by the dataTaskWithURL() function*/
      (data, response, error) in

      if error == nil
      {
          // Data from the request can be manipulated here
      }
      else
      {
```

```
          // An error occurred
      }
    }

    //make the request
    task.resume()
```

-C

```
NSURL *url = [NSURL URLWithString:@"http://www.example.com/"];
NSURLSessionConfiguration *configuration = [NSURLSessionConfiguration
defaultSessionConfiguration];

// Configure the session here.

NSURLSession *session = [NSURLSession sessionWithConfiguration:configuration];

[[session dataTaskWithURL:url
        completionHandler:^(NSData *data, NSURLResponse *response, NSError *error)
{
    // The response object contains the metadata (HTTP headers, status code)

    // The data object contains the response body

    // The error object contains any client-side errors (e.g. connection
    // failures) and, in some cases, may report server-side errors.
    // In general, however, you should detect server-side errors by
    // checking the HTTP status code in the response object.
}] resume];
```

```
 // Swift:
 let mySessionID = "com.example.bgSession"
 let bgSessionConfig =
NSURLSessionConfiguration.backgroundSessionConfigurationWithIdentifier(mySessionID)

 let session = NSURLSession(configuration: bgSessionConfig)

 // add tasks here


 // Objective-C:
 NSString *mySessionID = @"com.example.bgSession";
 NSURLSessionConfiguration *configuration =
     [NSURLSessionConfiguration backgroundSessionConfigurationWithIdentifier: mySessionID];
 NSURLSession *session = [NSURLSession sessionWithConfiguration:configuration
                                                       delegate:self]
```

iOS . `application:handleEventsForBackgroundURLSession:completionHandler:` `application:handleEventsForBackgroundURLSession:completionHandler:` method (Objective-C) `application(_:handleEventsForBackgroundURLSession:completionHandler:)` .

. .

`URLSessionDidFinishEventsForBackgroundURLSession:` (Obj-C) / `URLSessionDidFinishEventsForBackgroundURLSession` (Swift) . . .

`application:application:didFinishLaunchingWithOptions:` call ( ), . .

, .

- (nsurlsessiond)
- NSXPC

ID . . . `handleEventsForBackgroundURLSession` , .

Objective-C NSURLSession POST

POST URL (application / x-www-form-urlencoded) (multipart / form-data) . .

URL

iOS .

. .

name = & = abcde

.

. NSURLSession POST .

```
// Create the configuration, which is necessary so we can cancel cacheing amongst other
things.
NSURLSessionConfiguration * defaultConfigObject = [NSURLSessionConfiguration
defaultSessionConfiguration];
// Disables cacheing
defaultConfigObject.requestCachePolicy = NSURLRequestReloadIgnoringLocalCacheData;
NSURLSession * defaultSession = [NSURLSession sessionWithConfiguration:defaultConfigObject
delegate:self delegateQueue:[NSOperationQueue mainQueue]];

NSString * scriptURL = [NSString stringWithFormat:@"https://server.io/api/script.php"];
//Converts the URL string to a URL usable by NSURLSession
NSMutableURLRequest * urlRequest = [NSMutableURLRequest requestWithURL:[NSURL
URLWithString:scriptURL]];
NSString * postDataString = [NSString stringWithFormat:@"name=%@&password=%@", [self
nameString], [self URLEncode:passwordString]];
[urlRequest setHTTPMethod:@"POST"];
[urlRequest setHTTPBody:[postDataString dataUsingEncoding:NSUTF8StringEncoding]];

NSURLSessionDataTask * dataTask = [defaultSession dataTaskWithRequest:urlRequest];
// Fire the data task.
[dataTask resume];
```

POST . URL POST . , .

URL .

```
- (NSString *)URLEncode:(NSString *)originalString encoding:(NSStringEncoding)encoding
{
    return (__bridge_transfer NSString *)CFURLCreateStringByAddingPercentEscapes(
```

```
        kCFAllocatorDefault,
        (__bridge CFStringRef)originalString,
        NULL,
        CFSTR(":/?#[]@!$&'()*+,;="),
        CFStringConvertNSStringEncodingToEncoding(encoding));
}
```

iOS . ?

NSURLSession . , . 5 ENTIRE .

```
- (void)URLSession:(NSURLSession *)session dataTask:(NSURLSessionDataTask *)dataTask
didReceiveResponse:(NSURLResponse *)response
 completionHandler:(void (^)(NSURLSessionResponseDisposition disposition))completionHandler;

- (void)URLSession:(NSURLSession *)session dataTask:(NSURLSessionDataTask *)dataTask
didReceiveData:(NSData *)data;

- (void)URLSession:(NSURLSession *)session task:(NSURLSessionTask *)task
didCompleteWithError:(NSError *)error;

- (void)URLSession:(NSURLSession *)session didReceiveChallenge:(NSURLAuthenticationChallenge
*)challenge completionHandler:(void (^)(NSURLSessionAuthChallengeDisposition, NSURLCredential
*))completionHandler;

- (void)URLSession:(NSURLSession *)session task:(NSURLSessionTask *)task
didReceiveChallenge:(NSURLAuthenticationChallenge *)challenge completionHandler:(void
(^)(NSURLSessionAuthChallengeDisposition, NSURLCredential * _Nullable))completionHandler;
```

. . .

```
// Response handling delegates
- (void)URLSession:(NSURLSession *)session dataTask:(NSURLSessionDataTask *)dataTask
didReceiveResponse:(NSURLResponse *)response
 completionHandler:(void (^)(NSURLSessionResponseDisposition disposition))completionHandler{
    // Handler allows us to receive and parse responses from the server
    completionHandler(NSURLSessionResponseAllow);
}

- (void)URLSession:(NSURLSession *)session dataTask:(NSURLSessionDataTask *)dataTask
didReceiveData:(NSData *)data{

    // Parse the JSON that came in into an NSDictionary
    NSError * err = nil;
    NSDictionary * jsonDict = [NSJSONSerialization JSONObjectWithData:data
options:NSJSONReadingAllowFragments error:&err];

    if (!err){ // if no error occurred, parse the array of objects as normal
        // Parse the JSON dictionary 'jsonDict' here
    }else{ // an error occurred so we need to let the user know
        // Handle your error here
    }
}

// Error handling delegate
- (void)URLSession:(NSURLSession *)session task:(NSURLSessionTask *)task
didCompleteWithError:(NSError *)error{
    if(error == nil){
```

```
        // Download from API was successful
        NSLog(@"Data Network Request Did Complete Successfully.");
    }else{
        // Describes and logs the error preventing us from receiving a response
        NSLog(@"Error: %@", [error userInfo]);

        // Handle network error, letting the user know what happened.
    }
}

// When the session receives a challenge (because of iOS 9 App Transport Security blocking
non-valid SSL certificates) we use the following methods to tell NSURLSession "Chill out, I
can trust me".
// The following is not necessary unless your server is using HTTP, not HTTPS

- (void)URLSession:(NSURLSession *)session didReceiveChallenge:(NSURLAuthenticationChallenge
*)challenge completionHandler:(void (^)(NSURLSessionAuthChallengeDisposition, NSURLCredential
*))completionHandler{
    if([challenge.protectionSpace.authenticationMethod
isEqualToString:NSURLAuthenticationMethodServerTrust]){
        if([challenge.protectionSpace.host isEqualToString:@"DomainNameOfServer.io"]){
            NSURLCredential * credential = [NSURLCredential
credentialForTrust:challenge.protectionSpace.serverTrust];
            completionHandler(NSURLSessionAuthChallengeUseCredential,credential);
        }
    }
}

- (void)URLSession:(NSURLSession *)session task:(NSURLSessionTask *)task
didReceiveChallenge:(NSURLAuthenticationChallenge *)challenge completionHandler:(void
(^)(NSURLSessionAuthChallengeDisposition, NSURLCredential * _Nullable))completionHandler{
    if([challenge.protectionSpace.authenticationMethod
isEqualToString:NSURLAuthenticationMethodServerTrust]){
        if([challenge.protectionSpace.host isEqualToString:@"DomainNameOfServer.io"]){
            NSURLCredential * credential = [NSURLCredential
credentialForTrust:challenge.protectionSpace.serverTrust];
            completionHandler(NSURLSessionAuthChallengeUseCredential,credential);
        }
    }
}
```

! iOS 9 API . ... . ! .

URL . ASCII 3 (:) . .

. . NSURLSession .

```
UIImage * imgToSend;

// 2nd parameter of UIImageJPEGRepresentation represents compression quality. 0 being most
compressed, 1 being the least
// Using 0.4 likely stops us hitting the servers upload limit and costs us less server space
NSData * imageData = UIImageJPEGRepresentation(imgToSend, 0.4f);

// Alternatively, if the photo is on disk, you can retrieve it with
// [NSData dataWithContentsOfURL:...]

// Set up the body of the POST request.
```

```
// This boundary serves as a separator between one form field and the next.
// It must not appear anywhere within the actual data that you intend to
// upload.
NSString * boundary = @"---------------------------14737809831466499882746641449";

// Body of the POST method
NSMutableData * body = [NSMutableData data];

// The body must start with the boundary preceded by two hyphens, followed
// by a carriage return and newline pair.
//
// Notice that we prepend two additional hyphens to the boundary when
// we actually use it as part of the body data.
//
[body appendData:[[NSString stringWithFormat:@"\r\n--%@\r\n",boundary]
dataUsingEncoding:NSUTF8StringEncoding]];

// This is followed by a series of headers for the first field and then
// TWO CR-LF pairs.
[body appendData:[[NSString stringWithFormat:@"Content-Disposition: form-data;
name=\"tag_name\"\r\n\r\n"] dataUsingEncoding:NSUTF8StringEncoding]];

// Next is the actual data for that field (called "tag_name") followed by
// a CR-LF pair, a boundary, and another CR-LF pair.
[body appendData:[strippedCompanyName dataUsingEncoding:NSUTF8StringEncoding]];
[body appendData:[[NSString stringWithFormat:@"\r\n--%@\r\n", boundary]
dataUsingEncoding:NSUTF8StringEncoding]];

// Encode the filename and image data as the "userfile" CGI parameter.
// This is similar to the previous field, except that it is being sent
// as an actual file attachment rather than a blob of data, which means
// it has both a filename and the actual file contents.
//
// IMPORTANT: The filename MUST be plain ASCII (and if encoded like this,
//            must not include quotation marks in the filename).
//
NSString * picFileName = [NSString stringWithFormat:@"photoName"];
NSString * appendDataString = [NSString stringWithFormat:@"Content-Disposition: form-data;
name=\"userfile\"; filename=\"%@.jpg\"\r\n", picFileName];
[body appendData:[appendDataString dataUsingEncoding:NSUTF8StringEncoding]];
[body appendData:[@"Content-Type: application/octet-stream\r\n\r\n"
dataUsingEncoding:NSUTF8StringEncoding]];
[body appendData:[NSData dataWithData:imageData]];

// Close the request body with one last boundary with two
// additional hyphens prepended **and** two additional hyphens appended.
[body appendData:[[NSString stringWithFormat:@"\r\n--%@--\r\n", boundary]
dataUsingEncoding:NSUTF8StringEncoding]];

// Create the session
// We can use the delegate to track upload progress and disable cacheing
NSURLSessionConfiguration * defaultConfigObject = [NSURLSessionConfiguration
defaultSessionConfiguration];
defaultConfigObject.requestCachePolicy = NSURLRequestReloadIgnoringLocalCacheData;
NSURLSession * defaultSession = [NSURLSession sessionWithConfiguration: defaultConfigObject
delegate: self delegateQueue: [NSOperationQueue mainQueue]];

// Data uploading task.
NSURL * url = [NSURL URLWithString:@"https://server.io/api/script.php"];
NSMutableURLRequest * request = [NSMutableURLRequest requestWithURL:url];
NSString * contentType = [NSString stringWithFormat:@"multipart/form-data;
```

```
boundary=%@",boundary];
[request addValue:contentType forHTTPHeaderField:@"Content-Type"];
request.HTTPMethod = @"POST";
request.HTTPBody = body;
NSURLSessionDataTask * uploadTask = [defaultSession dataTaskWithRequest:request];
[uploadTask resume];
```

NSURLSession , . (`url`) .

NSURL : https://riptutorial.com/ko/ios/topic/2009/nsurl-

64: NSURLConnection

Examples

// NSURLConnectionDelegate .

```
@interface ViewController : UIViewController<NSURLConnectionDelegate>
{
    NSMutableData *_responseData;
}
```

// NSURLConnection .

```
#pragma mark NSURLConnection Delegate Methods

- (void)connection:(NSURLConnection *)connection didReceiveResponse:(NSURLResponse *)response
{
    // A response has been received, this is where we initialize the instance var you created
    // so that we can append data to it in the didReceiveData method
    // Furthermore, this method is called each time there is a redirect so reinitializing it
    // also serves to clear it
    _responseData = [[NSMutableData alloc] init];
}

- (void)connection:(NSURLConnection *)connection didReceiveData:(NSData *)data {
    // Append the new data to the instance variable you declared
    [_responseData appendData:data];
}

- (NSCachedURLResponse *)connection:(NSURLConnection *)connection
                  willCacheResponse:(NSCachedURLResponse*)cachedResponse {
    // Return nil to indicate not necessary to store a cached response for this connection
    return nil;
}

- (void)connectionDidFinishLoading:(NSURLConnection *)connection {
    // The request is complete and data has been received
    // You can parse the stuff in your instance variable now

}

- (void)connection:(NSURLConnection *)connection didFailWithError:(NSError *)error {
    // The request has failed for some reason!
    // Check the error var
}
```

```
NSURLRequest * urlRequest = [NSURLRequest requestWithURL:[NSURL
URLWithString:@"http://google.com"]];
NSURLResponse * response = nil;
NSError * error = nil;
NSData * data = [NSURLConnection sendSynchronousRequest:urlRequest
                                      returningResponse:&response
                                                  error:&error];

if (error == nil)
```

```
{
    // Parse data here
}
```

```
// Create the request instance.
NSURLRequest *request = [NSURLRequest requestWithURL:[NSURL
URLWithString:@"http://google.com"]];

// Create url connection and fire request
NSURLConnection *conn = [[NSURLConnection alloc] initWithRequest:request delegate:self];
```

NSURLConnection : https://riptutorial.com/ko/ios/topic/6004/nsurlconnection

65: NSUserActivity

NSUserActivity . iOS macOS . . iOS 10 SiriKit Siri .

`Info.plist NSUserActivityTypes` . ID . ID (: 'Safari' 'Chrome').

/

`becomeCurrent` . . `resignCurrent` .

+ `invalidate` .

SiriKit .

. . CoreSpotlight .

Examples

NSUserActivity

`NSUserActivity Info.plist` . . (: "com.companyName.productName.activityName") . Info.plist .

NSUserActivityTypes	[]
- item0	com.companyName.productName.activityName01
- item1	com.companyName.productName.activityName02

.

`NSUserActivity` .

```
// Initialize the activity object and set its type from one of the ones specified in your
app's plist
NSUserActivity *currentActivity = [[NSUserActivity alloc]
initWithActivityType:@"com.companyName.productName.activityName01"];

// Set the title of the activity.
// This title may be displayed to the user, so make sure it is localized and human-readable
currentActivity.title = @"Current Activity";

// Configure additional properties like userInfo which will be included in the activity
currentActivity.userInfo = @{@"informationKey" : @"value"};
```

```
// Configure the activity so the system knows what may be done with it
// It is important that you only set YES to tasks that your application supports
// In this example, we will only enable the activity for use with Handoff
[currentActivity setEligibleForHandoff:YES];
[currentActivity setEligibleForSearch:NO]; // Defaults to NO
[currentActivity setEligibleForPublicIndexing:NO]; // Defaults to NO

// Set this activity as the current user activity
// Only one activity may be current at a time on a device. Calling this method invalidates any
other current activities.
[currentActivity becomeCurrent];
```

, (" ").

NSUserActivity : https://riptutorial.com/ko/ios/topic/10716/nsuseractivity

66: NSUserDefaults

- `UserDefaults.standard.set(dic, forKey: "LoginSession") //Save value inside userdefaults`
    - `UserDefaults.standard.object(forKey: "LoginSession") as? [String:AnyObject] ?? [:] //Get value from UserDefaults`

NSUserDefault DataType . **NSUserDefault**

Examples

`NSUserDefaults` .

<3

```
setBool(_:forKey:)
setFloat(_:forKey:)
setInteger(_:forKey:)
setObject(_:forKey:)
setDouble(_:forKey:)
setURL(_:forKey:)
```

3

3 `set` insted `set` folloed.

```
set(_:forKey:)
```

-C

```
-(void)setBool:(BOOL)value forKey:(nonnull NSString *)defaultName;
-(void)setFloat:(float)value forKey:(nonnull NSString *)defaultName;
-(void)setInteger:(NSInteger)value forKey:(nonnull NSString *)defaultName;
-(void)setObject:(nullable id)value forKey:(nonnull NSString *)defaultName;
-(void)setDouble:(double)value forKey:(nonnull NSString *)defaultName;
-(void)setURL:(nullable NSURL *)value forKey:(nonnull NSString *)defaultName;
```

.

<3

```
NSUserDefaults.standardUserDefaults.setObject("Netherlands", forKey: "HomeCountry")
```

3

```
UserDefaults.standard.set("Netherlands", forKey: "HomeCountry")
```

-C

```
[[NSUserDefaults standardUserDefaults] setObject:@"Netherlands" forKey:@"HomeCountry"];
```

`NSUserDefaults` CustomClass`NSCoding` . .

```
public func encodeWithCoder(aCoder: NSCoder) {
    aCoder.encodeObject(name, forKey:"name")
    aCoder.encodeObject(unitId, forKey: "unitId")
}

required public init(coder aDecoder: NSCoder) {
    super.init()
    name = aDecoder.decodeObjectForKey("name") as? String
    unitId = aDecoder.decodeIntegerForKey("unitId") as? NSInteger
}
```

-C

```
- (id)initWithCoder:(NSCoder *)coder {
    self = [super init];
    if (self) {
        name = [coder decodeObjectForKey:@"name"];
        unitId = [coder decodeIntegerForKey:@"unitId"];
    }
    return self;
}

- (void)encodeWithCoder:(NSCoder*)coder {
    [coder encodeObject:name forKey:@"name"];
    [coder encodeInteger:unitId forKey:@"unitId"];
}
```

NSUserDefaults .

```
arrayForKey(_:)
boolForKey(_:)
dataForKey(_:)
dictionaryForKey(_:)
floatForKey(_:)
integerForKey(_:)
objectForKey(_:)
stringArrayForKey(_:)
stringForKey(_:)
doubleForKey(_:)
URLForKey(_:)
```

-C

```
-(nullable NSArray *)arrayForKey:(nonnull NSString *)defaultName;
-(BOOL)boolForKey:(nonnull NSString *)defaultName;
-(nullable NSData *)dataForKey:(nonnull NSString *)defaultName;
-(nullable NSDictionary<NSString *, id> *)dictionaryForKey:(nonnull NSString *)defaultName;
-(float)floatForKey:(nonnull NSString *)defaultName;
-(NSInteger)integerForKey:(nonnull NSString *)defaultName;
-(nullable id)objectForKey:(nonnull NSString *)key;
-(nullable NSArray<NSString *> *)stringArrayForKey:(nonnull NSString *)defaultName;
-(nullable NSString *)stringForKey:(nonnull NSString *)defaultName;
-(double)doubleForKey:(nonnull NSString *)defaultName;
-(nullable NSURL *)URLForKey:(nonnull NSString *)defaultName;
```

.

```
let homeCountry = NSUserDefaults.standardUserDefaults().stringForKey("HomeCountry")
```

-C

```
NSString *homeCountry = [[NSUserDefaults standardUserDefaults] stringForKey:@"HomeCountry"];
```

NSUserDefaults , . synchronize synchronize .

```
NSUserDefaults.standardUserDefaults().synchronize()
```

-C

```
[[NSUserDefaults standardUserDefaults] synchronize];
```

NSUserDefaults , NSUserDefaults .

NSUserDefaults .: setHighScore highScore . .

```
public class ScoreManager: NSObject {

    let highScoreDefaultKey = "HighScoreDefaultKey"

    var highScore = {
        set {
            // This method includes your implementation for saving the high score
            // You can use NSUserDefaults or any other data store like CoreData or
            // SQLite etc.

            NSUserDefaults.standardUserDefaults().setInteger(newValue, forKey:
highScoreDefaultKey)
            NSUserDefaults.standardUserDefaults().synchronize()
        }
        get {
```

```
        //This method includes your implementation for reading the high score

            let score =
NSUserDefaults.standardUserDefaults().objectForKey(highScoreDefaultKey)

            if (score != nil) {
                return score.integerValue;
            } else {
                //No high score available, so return -1
                return -1;
            }
        }
    }
}
```

-C

```
#import "ScoreManager.h"

#define HIGHSCRORE_KEY @"highScore"

@implementation ScoreManager

- (void)setHighScore:(NSUInteger) highScore {
    // This method includes your implementation for saving the high score
    // You can use NSUserDefaults or any other data store like CoreData or
    // SQLite etc.

    [[NSUserDefaults standardUserDefaults] setInteger:highScore forKey:HIGHSCRORE_KEY];
    [[NSUserDefaults standardUserDefaults] synchronize];
}

- (NSInteger)highScore
{

    //This method includes your implementation for reading the high score

    NSNumber *highScore = [[NSUserDefaults standardUserDefaults] objectForKey:HIGHSCRORE_KEY];
    if (highScore) {
        return highScore.integerValue;
    }else
    {
        //No high score available, so return -1

        return -1;
    }

}

@end
```

.

1. (: `NSUserDefaults` Core Data). .
2. .
3.

.

.

NSUserDefaults

```
let bundleIdentifier = NSBundle.mainBundle().bundleIdentifier()

NSUserDefaults.standardUserDefaults().removePersistentDomainForName(bundleIdentifier)
```

-C

```
NSString *bundleIdentifier = [[NSBundle mainBundle] bundleIdentifier];

[[NSUserDefaults standardUserDefaults] removePersistentDomainForName: bundleIdentifier];
```

Swift 3 UserDefaults

UserDefaults . UserDefaults .

3

```
import Foundation

public struct Session {

    fileprivate static let defaults = UserDefaults.standard

    enum userValues: String {
        case auth_token
        case email
        case fname
        case mobile
        case title
        case userId
        case userType
        case OTP
        case isApproved
    }


    //MARK: - Getting here User Details
    static func getUserSessionDetails()->[String:AnyObject]? {
        let dictionary = defaults.object(forKey: "LoginSession") as? [String:AnyObject]
        return  dictionary
    }

    //MARK: - Saving Device Token
    static func saveDeviceToken(_ token:String){
        guard (gettingDeviceToken() ?? "").isEmpty else {
            return
        }
        defaults.removeObject(forKey: "deviceToken")
```

```
        defaults.set(token, forKey: "deviceToken")
        defaults.synchronize()
    }

    //MARK: - Getting Token here
    static func gettingDeviceToken()->String?{
        let token = defaults.object(forKey: "deviceToken") as? String
        if token == nil{
            return ""
        }else{ return token}
    }

    //MARK: - Setting here User Details
    static func setUserSessionDetails(_ dic :[String : AnyObject]){
        defaults.removeObject(forKey: "LoginSession")
        defaults.set(dic, forKey: "LoginSession")
        defaults.synchronize()
    }

    //MARK:- Removing here all Default Values
    static func userSessionLogout(){
        //Set Activity
        defaults.removeObject(forKey: "LoginSession")
        defaults.synchronize()
    }

    //MARK: - Get value from session here
    static func getUserValues(value: userValues) -> String? {
        let dic = getUserSessionDetails() ?? [:]
        guard let value = dic[value.rawValue] else{
            return ""
        }
        return value as? String
    }

}
```

UserDefaults

```
//Saving user Details
Session.setUserSessionDetails(json ?? [:])

//Retriving user Details
let userId = Session.getUserValues(value: .userId) ?? ""
```

NSUserDefaults : https://riptutorial.com/ko/ios/topic/3150/nsuserdefaults

67: Objective-C

iOS 3.1 Objective-C ( ).

, .

- void objc_setAssociatedObject (id , void * , id , objc_AssociationPolicy)
- id objc_getAssociatedObject (id , void * key)
- void objc_removeAssociatedObjects (id)

Param	
	(getter) .
	`value` / .

:

NSHipster

@kostiakoval

Examples

`SomeClass` NSString ( ).

```
#import <objc/runtime.h>

@interface SomeClass (MyCategory)
// This is the property wrapping the associated object. below we implement the setter and
getter which actually utilize the object association
@property (nonatomic, retain) NSString *associated;
@end

@implementation SomeClass (MyCategory)

- (void)setAssociated:(NSString *)object {
    objc_setAssociatedObject(self, @selector(associated), object,
                             OBJC_ASSOCIATION_RETAIN_NONATOMIC);
}

- (NSString *)associated {
    return objc_getAssociatedObject(self, @selector(associated));
}
```

.

```
SomeClass *instance = [SomeClass alloc] init];
instance.associated = @"this property is an associated object under the hood";
```

Objective-C : https://riptutorial.com/ko/ios/topic/9102/objective-c--

68: Objective-C

Examples

.

, UIView :

-C

```
#import <objc/runtime.h>

static char ActivityIndicatorKey;

@implementation UIView (ActivityIndicator)

- (UIActivityIndicatorView *)activityIndicator {
    return (UIActivityIndicatorView *)objc_getAssociatedObject(self, &ActivityIndicatorKey);
}

- (void)setActivityIndicator: (UIActivityIndicatorView *)activityIndicator {
    objc_setAssociatedObject(self, &ActivityIndicatorKey, activityIndicator,
OBJC_ASSOCIATION_RETAIN_NONATOMIC);
}

- (void)showActivityIndicator {
    UIActivityIndicatorView *activityIndicator = [[UIActivityIndicatorView alloc]
initWithActivityIndicatorStyle: UIActivityIndicatorViewStyleGray];

    [self setActivityIndicator:activityIndicator];

    activityIndicator.center = self.center;
    activityIndicator.autoresizingMask = UIViewAutoresizingFlexibleTopMargin |
UIViewAutoresizingFlexibleLeftMargin | UIViewAutoresizingFlexibleRightMargin |
UIViewAutoresizingFlexibleBottomMargin;

    [activityIndicator startAnimating];

    [self addSubview: activityIndicator];
}

- (void)hideActivityIndicator {
    UIActivityIndicatorView * activityIndicator = [self activityIndicator];

    if (activityIndicator != nil) {
        [[self activityIndicator] removeFromSuperview];
    }
}

@end
```

Swift Objective-C .

```
extension UIView {
    private struct AssociatedKeys {
```

```
        static var activityIndicator = "UIView.ActivityIndicatorView"
    }

    private var activityIndicatorView: UIActivityIndicatorView? {
        get {
            return objc_getAssociatedObject(self, &AssociatedKeys.activityIndicator) as?
UIActivityIndicatorView
        }
        set (activityIndicatorView) {
            objc_setAssociatedObject(self, &AssociatedKeys.activityIndicator,
activityIndicatorView, .OBJC_ASSOCIATION_RETAIN_NONATOMIC)
        }
    }

     func showActivityIndicator() {
        activityIndicatorView = UIActivityIndicatorView(activityIndicatorStyle: .gray)
        activityIndicatorView.center = center
        activityIndicatorView.autoresizingMask = [.flexibleLeftMargin, .flexibleRightMargin,
.flexibleTopMargin, .flexibleBottomMargin]

        activityIndicatorView.startAnimating()

        addSubview(activityIndicatorView)
    }

    func hideActivityIndicator() {
        activityIndicatorView.removeFromSuperview()
    }
}
```

Objective-C : https://riptutorial.com/ko/ios/topic/10120/objective-c-

69: OpenGL

OpenGL ES iOS 3D .

Examples

3D (Git repo) . OpenGL . , Xcode .

OpenGL : https://riptutorial.com/ko/ios/topic/9324/opengl

70: plist iOS

Plist iOS . Plist . plist : 1. . 2. .

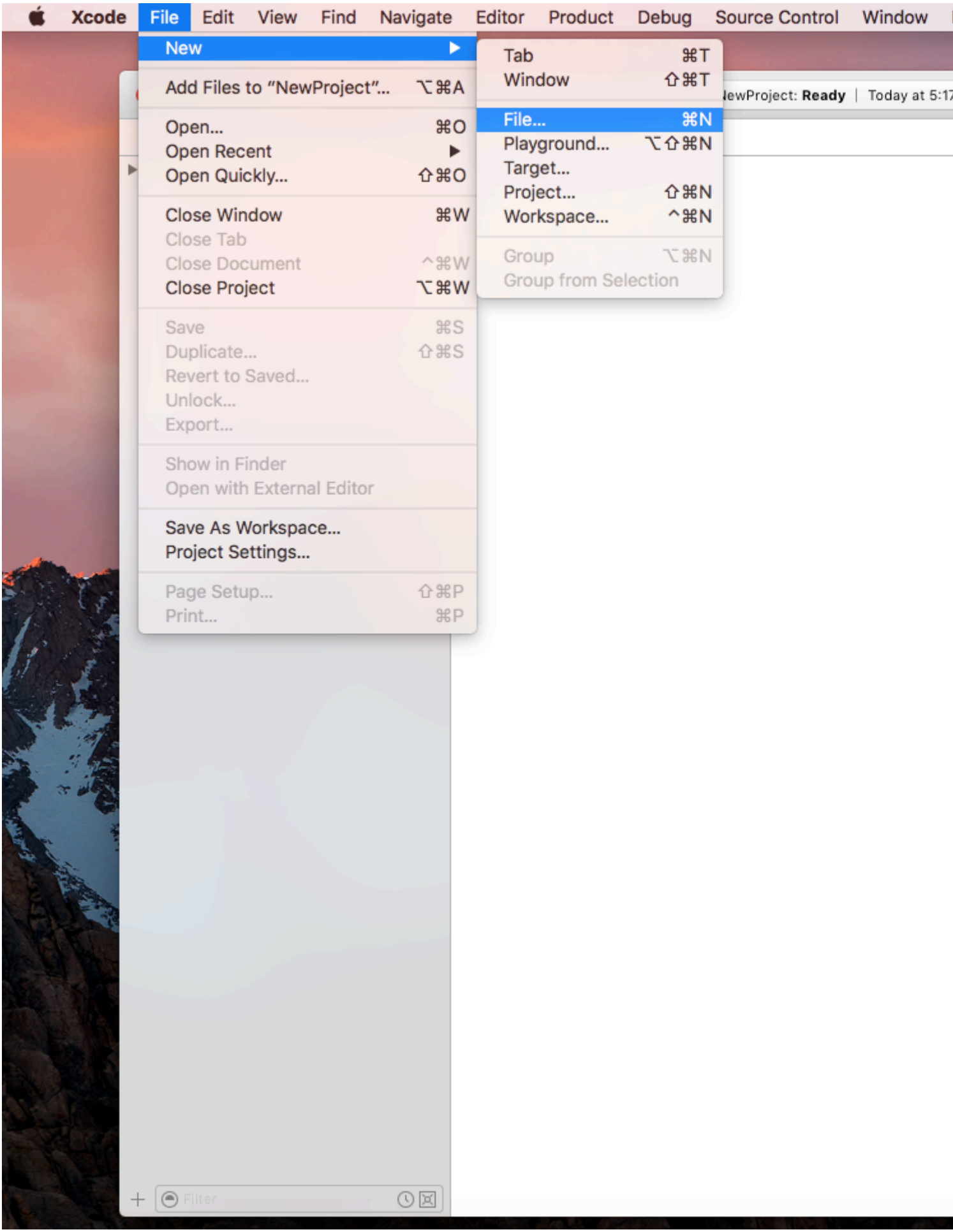
Examples

:

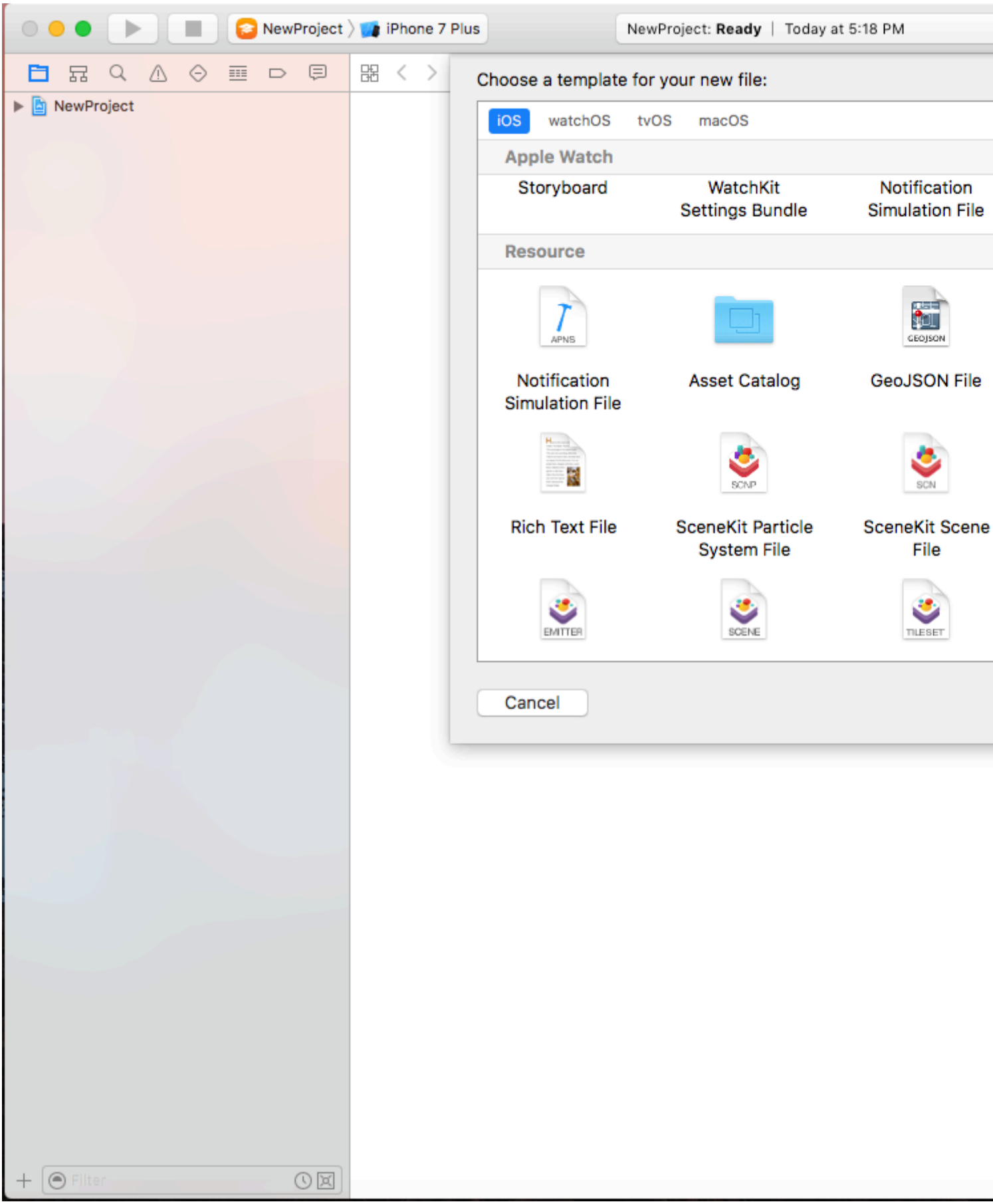
1. .

plist .

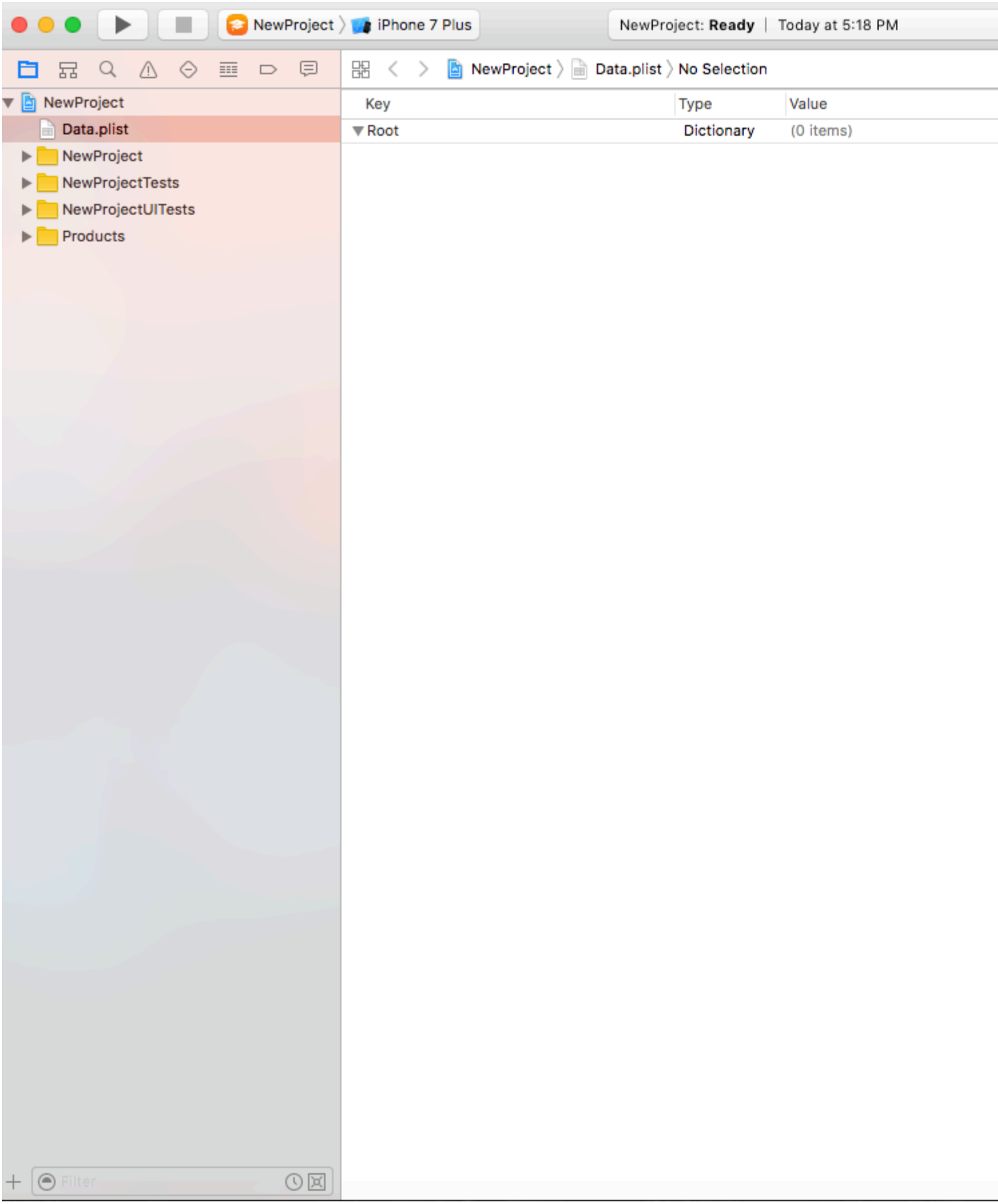
a)


Xcode
File
Edit
View
Find
Navigate
Editor
Product
Debug
Source Control
Window
New
Add Files to "NewProject"... ⌥⌘A
Open... ⌘O
Open Recent
Open Quickly... ⇧⌘O
Close Window ⌘W
Close Tab
Close Document ^⌘W
Close Project ⌥⌘W
Save ⌘S
Duplicate... ⇧⌘S
Revert to Saved...
Unlock...
Export...
Show in Finder
Open with External Editor
Save As Workspace...
Project Settings...
Page Setup... ⇧⌘P
Print... ⌘P
Tab ⌘T
Window ⇧⌘T
File... ⌘N
Playground... ⌥⇧⌘N
Target...
Project... ⇧⌘N
Workspace... ^⌘N
Group ⌥⌘N
Group from Selection
Filter

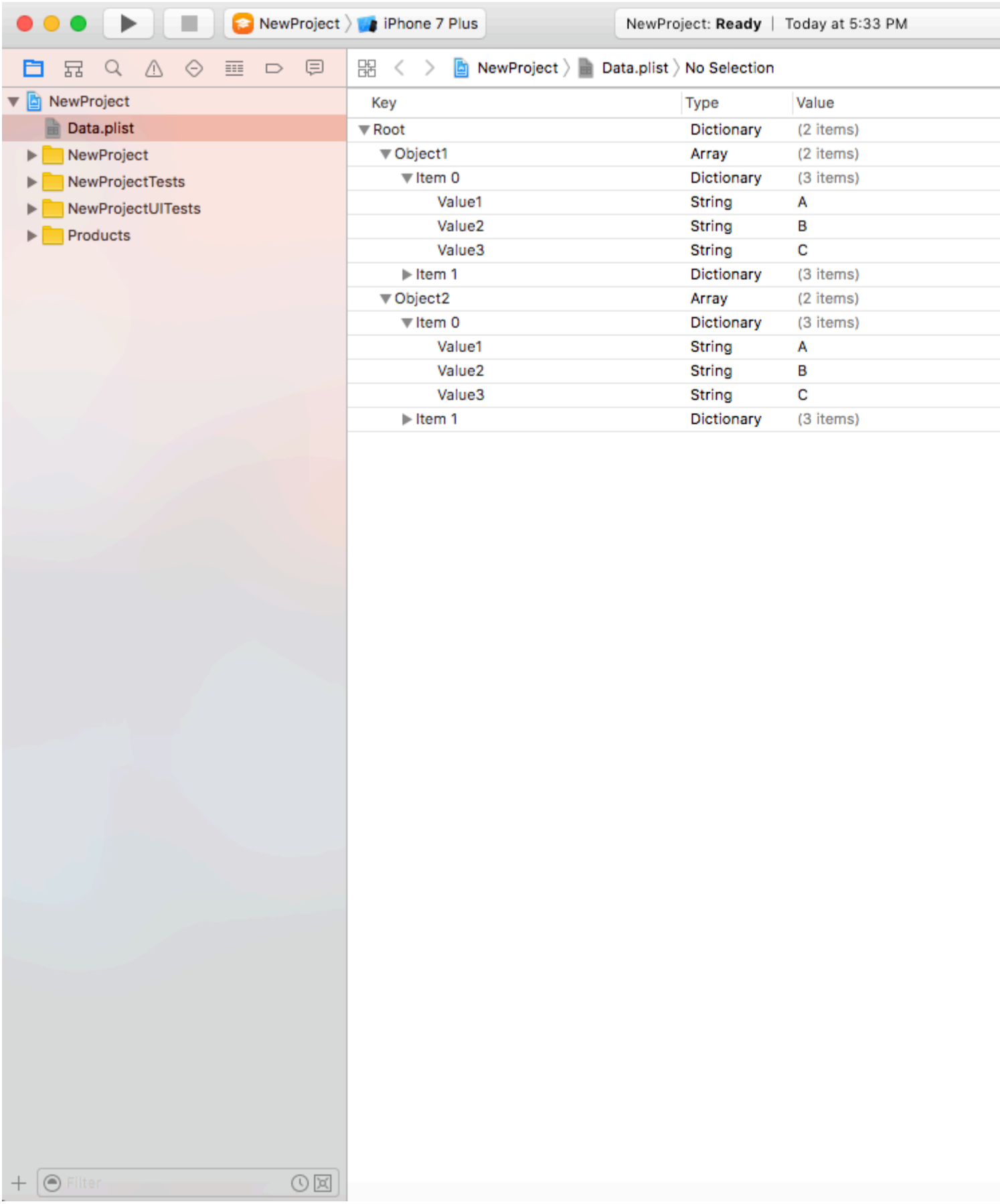
b) Property .



c) propertylist (data.plist .)


NewProject
iPhone 7 Plus
NewProject: Ready | Today at 5:18 PM
NewProject
Data.plist
No Selection
NewProject
Data.plist
NewProjectTests
NewProjectUITests
Products
Key
Type
Value
Root
Dictionary
(0 items)
Filter

d) .



// plist .

```
NSDictionary *dictRoot = [NSDictionary dictionaryWithContentsOfFile:[[NSBundle mainBundle]
pathForResource:@"Data" ofType:@"plist"]];
```

// . // .

```
NSArray *arrayList = [NSArray arrayWithArray:[dictRoot objectForKey:@"Object1"]];

for(int i=0; i< [arrayList count]; i++)
{
    NSMutableDictionary *details=[arrayList objectAtIndex:i];
}
```

Plist /

plist . plist . plist plist plist .

plist . plist .

plist .

```
NSString *filePath = [[NSBundle mainBundle] pathForResource:@"Data" ofType:@"plist"];

NSDictionary *dict = [[NSDictionary alloc] initWithContentsOfFile:filePath];

NSDictionary *plistDict = dict;

NSFileManager *fileManager = [NSFileManager defaultManager];

NSString *error = nil;

NSData *plistData = [NSPropertyListSerialization dataFromPropertyList:plistDict
format:NSPropertyListXMLFormat_v1_0 errorDescription:&error];

if (![fileManager fileExistsAtPath: plistPath]) {

    if(plistData)
    {
        [plistData writeToFile:plistPath atomically:YES];
    }
}
else
{

}
```

Plist :

```
    NSArray *paths = NSSearchPathForDirectoriesInDomains (NSDocumentDirectory,
NSUserDomainMask, YES);
    NSString *documentsPath = [paths objectAtIndex:0];
    NSString *plistPath = [documentsPath stringByAppendingPathComponent:@"Data.plist"];
    NSDictionary *dict = [[NSDictionary alloc] initWithContentsOfFile:plistPath];

    NSArray *usersArray = [dict objectForKey:@"Object1"];
```

plist Document Directory .

plist iOS : https://riptutorial.com/ko/ios/topic/8141/plist-ios

71: QR

QR ( ) 2 . iOS iOS 7 `AVFoundation` QR . / QR API .

Examples

QR UIViewController

```
import AVFoundation
class QRScannerViewController: UIViewController,
     AVCaptureMetadataOutputObjectsDelegate {

    func viewDidLoad() {
        self.initCaptureSession()
    }

    private func initCaptureSession() {
        let captureDevice = AVCaptureDevice
            .defaultDevice(withMediaType: AVMediaTypeVideo)
        do {
            let input = try AVCaptureDeviceInput(device: captureDevice)
            let captureMetadataOutput = AVCaptureMetadataOutput()
            self.captureSession?.addOutput(captureMetadataOutput)
            captureMetadataOutput.setMetadataObjectsDelegate(self,
                 queue: DispatchQueue.main)
            captureMetadataOutput
                .metadataObjectTypes = [AVMetadataObjectTypeQRCode]

            self.videoPreviewLayer =
                AVCaptureVideoPreviewLayer(session: self.captureSession)
            self.videoPreviewLayer?
                .videoGravity = AVLayerVideoGravityResizeAspectFill
            self.videoPreviewLayer?.frame =
                self.view.layer.bounds

            self._viewController?.view.layer
                .addSublayer(videoPreviewLayer!)
            self.captureSession?.startRunning()
        } catch {
            //TODO: handle input open error
        }
    }
    private func dismissCaptureSession() {
        if let running = self.captureSession?.isRunning, running {
            self.captureSession?.stopRunning()
        }
        self.captureSession = nil
        self.videoPreviewLayer?.removeFromSuperLayer()
        self.videoPreviewLayer = nil
    }

    func captureOutput(_ captureOutput: AVCaptureOutput,
        didOutputMetadataObjects metadataObjects: [Any]!,
        from connection: AVCaptureConnection) {
        guard metadataObjects != nil && metadataObjects.count != 0 else {
            //Nothing captured
```

```
            return
        }

        if let metadataObj =
            metadataObjects[0] as? AVMetadataMachineReadableCodeObject {
            guard metadataObj.type == AVMetadataObjectTypeQRCode else {
                return
            }

            let barCodeObject = videoPreviewLayer?
                .transformedMetadataObject(for:
                    metadataObj as AVMetadataMachineReadableCodeObject)
                 as! AVMetadataMachineReadableCodeObject

            if let qrValue = metadataObj.stringValue {
                self.handleQRRead(value: qrValue)
            }
        }
    }

    private handleQRRead(value: String) {
        //TODO: Handle the read qr
    }
    private captureSession: AVCaptureSession?
    private videoPreviewLayer: AVCaptureVideo
}
```

`handleQRRead` - `initCaptureSession` - QR `dismissCaptureSession` -

AVFoudation QR

iOS 7 QR zBar zXing . Apple iOS 7 `AVCaptureMetaDataOutput` `AVCaptureMetaDataOutput` .

`AVFoundation` QR `AVCaptureSession` / `captureOutput:didOutputMetadataObjects:fromConnection:` delegate `captureOutput:didOutputMetadataObjects:fromConnection:` .

1

`AVFoundation` `AVCaptureMetadataOutputObjectsDelegate`

```
import AVFoundation
class ViewController: UIViewController, AVCaptureMetadataOutputObjectsDelegate
```

2

QR . `AVCaptureSession` . `viewDidLoad` .

```
// Create an instance of the AVCaptureDevice and provide the video as the media type
parameter.
let captureDevice = AVCaptureDevice.defaultDevice(withMediaType: AVMediaTypeVideo)

do {
```

```
    // Create an instance of the AVCaptureDeviceInput class using the device object and
intialise capture session
    let input = try AVCaptureDeviceInput(device: captureDevice)
    captureSession = AVCaptureSession()
    captureSession?.addInput(input)

    // Create a instance of AVCaptureMetadataOutput object and set it as the output device the
capture session.
    let captureMetadataOutput = AVCaptureMetadataOutput()
    captureSession?.addOutput(captureMetadataOutput)
    // Set delegate with a default dispatch queue
    captureMetadataOutput.setMetadataObjectsDelegate(self, queue: DispatchQueue.main)
    //set meta data object type as QR code, here we can add more then one type as well
    captureMetadataOutput.metadataObjectTypes = [AVMetadataObjectTypeQRCode]


    // Initialize the video preview layer and add it as a sublayer to the viewcontroller
view's layer.
    videoPreviewLayer = AVCaptureVideoPreviewLayer(session: captureSession)
    videoPreviewLayer?.videoGravity = AVLayerVideoGravityResizeAspectFill
    videoPreviewLayer?.frame = view.layer.bounds
    view.layer.addSublayer(videoPreviewLayer!)

    // Start capture session.
    captureSession?.startRunning()
} catch {
    // If any error occurs, let the user know. For the example purpose just print out the
error
    print(error)
    return
}
```

3

QR `AVCaptureMetadataOutputObjectsDelegate`

```
func captureOutput(_ captureOutput: AVCaptureOutput!, didOutputMetadataObjects
metadataObjects: [Any]!, from connection: AVCaptureConnection!) {

    // Check if the metadataObjects array contains at least one object. If not no QR code is
in our video capture
    if metadataObjects == nil || metadataObjects.count == 0 {
        // NO QR code is being detected.
        return
    }

    // Get the metadata object and cast it to `AVMetadataMachineReadableCodeObject`
    let metadataObj = metadataObjects[0] as! AVMetadataMachineReadableCodeObject

    if metadataObj.type == AVMetadataObjectTypeQRCode {
        // If the found metadata is equal to the QR code metadata then get the string value
from meta data
        let barCodeObject = videoPreviewLayer?.transformedMetadataObject(for: metadataObj)

        if metadataObj.stringValue != nil {
           // metadataObj.stringValue is our QR code
        }
    }
```

```
}
```

QR . `videoPreviewLayer` `transformedMetadataObject` .

```
let barCodeObject = videoPreviewLayer?.transformedMetadataObject(for: metadataObj)
        qrCodeFrameView?.frame = barCodeObject!.bounds
```

QR : https://riptutorial.com/ko/ios/topic/7963/qr--

72: SLComposeViewController

Examples

, , SinaWelbo TencentWelbo SLComposeViewController

-C

`Social Framework` XCode .

`#import "Social/Social.h"` ViewController .

, Twitter

```
//- - To Share text on twitter - -
if([SLComposeViewController isAvailableForServiceType:SLServiceTypeTwitter])
{
        //Tweet
        SLComposeViewController *twitterVC=[SLComposeViewController
composeViewControllerForServiceType:SLServiceTypeTwitter];
        //To send link together with text
        [twitterVC addURL:[NSURL URLWithString:@"https://twitter.com/IbrahimH_ss_n"]];
        //To add a photo to a link
        [twitterVC addImage:[UIImage imageNamed:@"image"]];
        //Sending link and Image with the tweet
        [twitterVC setInitialText:text];
        /* While adding link and images in a tweet the effective length of a tweet i.e.
        the number of characters which can be entered by the user decreases.
        The default maximum length of a tweet is 140 characters*/
        [self presentViewController:twitterVC animated:YES completion:nil];
}
else
{//Shows alert if twitter is not signed in
       UIAlertController *alertCont=[UIAlertController alertControllerWithTitle:@"SocialShare"
message:@"You are not signed in to twitter."preferredStyle:UIAlertControllerStyleAlert];
        [self presentViewController:alertCont animated:YES completion:nil];
        UIAlertAction *okay=[UIAlertAction actionWithTitle:@"Okay"
style:UIAlertActionStyleDefault handler:nil];
        [alertCont addAction:okay];
}
}
```

, Facebook

```
if([SLComposeViewController isAvailableForServiceType:SLServiceTypeFacebook])
{
    SLComposeViewController *fbVC=[SLComposeViewController
composeViewControllerForServiceType:SLServiceTypeFacebook];
    [fbVC setInitialText:text];
    //To send link together with text
    [fbVC addURL:[NSURL URLWithString:@"https://twitter.com/IbrahimH_ss_n"]];
    //To add a photo to a link
    [fbVC addImage:[UIImage imageNamed:@"image"]];
    [self presentViewController:fbVC animated:YES completion:nil];
```

```
}
else
{//Shows alert if twitter is not signed in
       UIAlertController *alertCont=[UIAlertController alertControllerWithTitle:@"SocialShare"
message:@"You are not signed in to twitter."preferredStyle:UIAlertControllerStyleAlert];
        [self presentViewController:alertCont animated:YES completion:nil];
        UIAlertAction *okay=[UIAlertAction actionWithTitle:@"Okay"
style:UIAlertActionStyleDefault handler:nil];
        [alertCont addAction:okay];
}
```

```
//- - SinaWeibo - -
if([SLComposeViewController isAvailableForServiceType:SLServiceTypeSinaWeibo]){

    SLComposeViewController *SinaWeiboVC=[SLComposeViewController
composeViewControllerForServiceType:SLServiceTypeSinaWeibo];
    [SinaWeiboVC setInitialText:text];

    [self presentViewController:SinaWeiboVC animated:YES completion:nil];
}
else
{
    UIAlertController *alertCont=[UIAlertController alertControllerWithTitle:@"SocialShare"
message:@"You are not signed in to SinaWeibo."preferredStyle:UIAlertControllerStyleAlert];
    [self presentViewController:alertCont animated:YES completion:nil];
    UIAlertAction *okay=[UIAlertAction actionWithTitle:@"Okay" style:UIAlertActionStyleDefault
handler:nil];
    [alertCont addAction:okay];
}
```

TencentWeibo

```
//- -TencentWeibo text share
if([SLComposeViewController isAvailableForServiceType:SLServiceTypeTencentWeibo])
{
    SLComposeViewController *tencentWeiboVC=[SLComposeViewController
composeViewControllerForServiceType:SLServiceTypeTencentWeibo];
    [tencentWeibo setInitialText:text];
    [self presentViewController:tencentWeibo animated:YES completion:nil];
}
else
{
    UIAlertController *alertCont=[UIAlertController alertControllerWithTitle:@"SocialShare"
message:@"You are not signed in to SinaWeibo."preferredStyle:UIAlertControllerStyleAlert];
    [self presentViewController:alertCont animated:YES completion:nil];
    UIAlertAction *okay=[UIAlertAction actionWithTitle:@"Okay" style:UIAlertActionStyleDefault
handler:nil];
    [alertCont addAction:okay];
}
```

SLComposeViewController : https://riptutorial.com/ko/ios/topic/7366/slcomposeviewcontroller

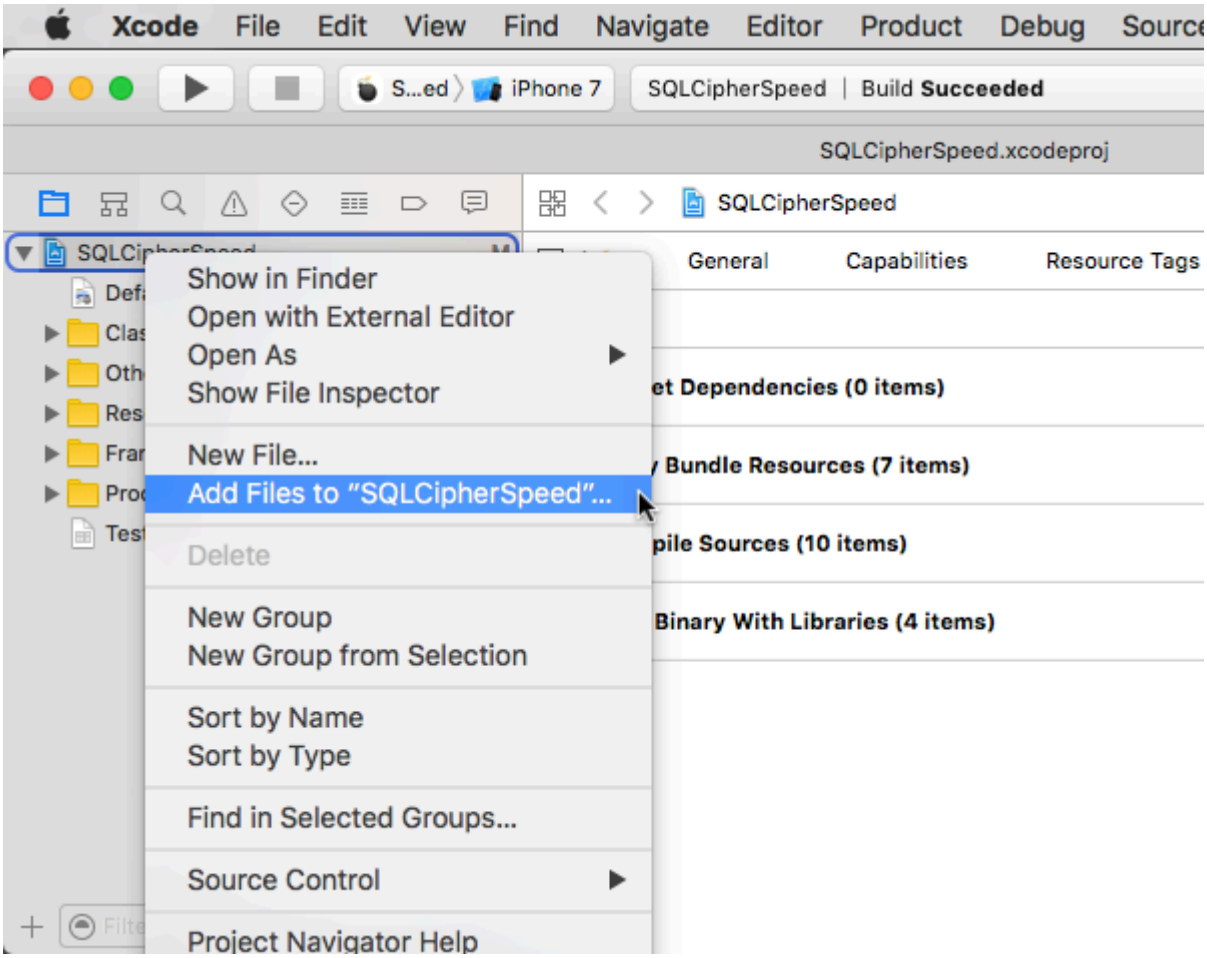
73: SqlCipher

SQLite iOS API . FMDB Objective-C API . .

1. Git SQLCipher .

```
$ git clone https://github.com/sqlcipher/sqlcipher.git
```

2. " " ( ). SQLCipher iOS sqlcipher . **sqlcipher.xcodeproj .**

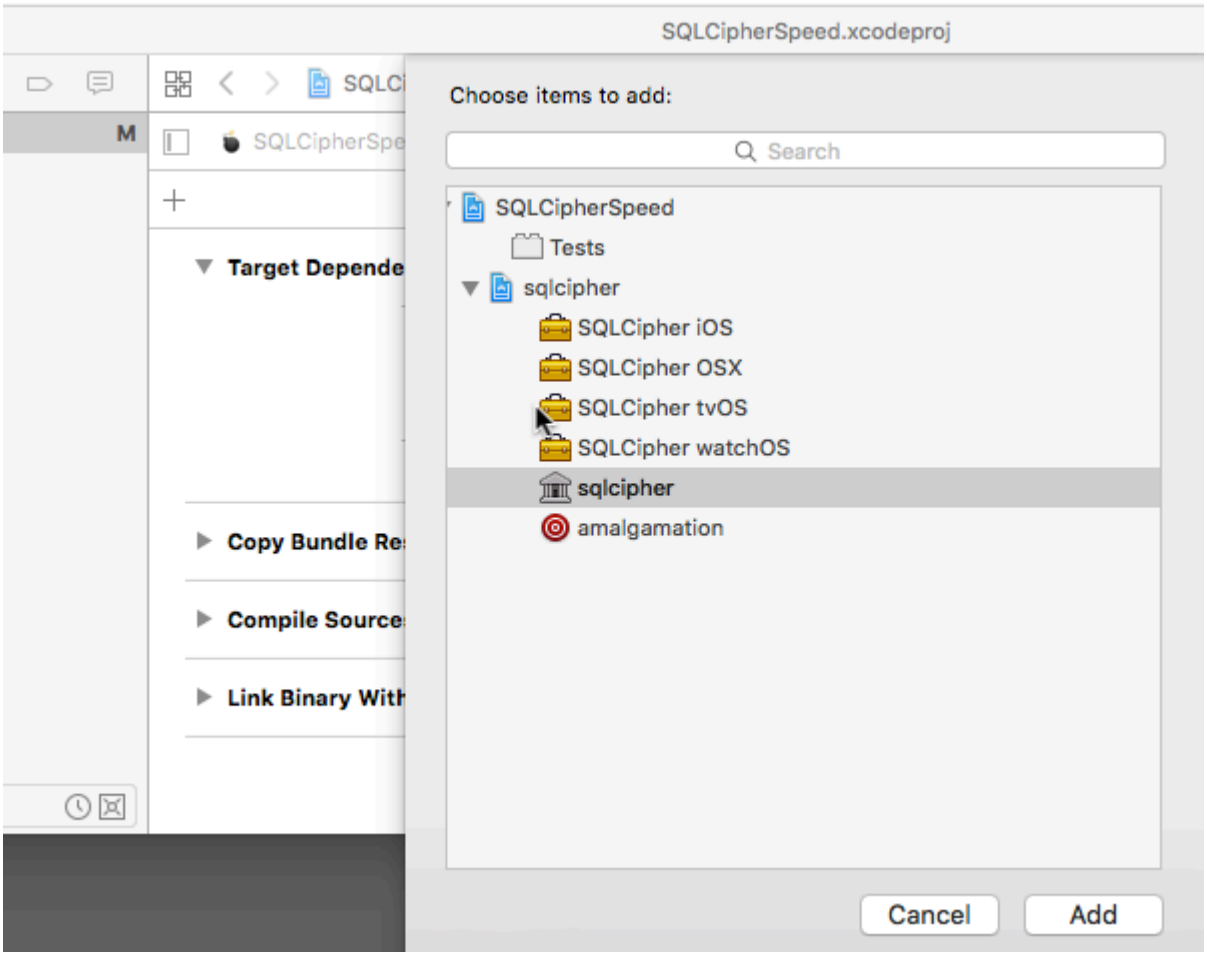


3. . " " . . **$ (PROJECT_DIR) / sqlcipher / src**

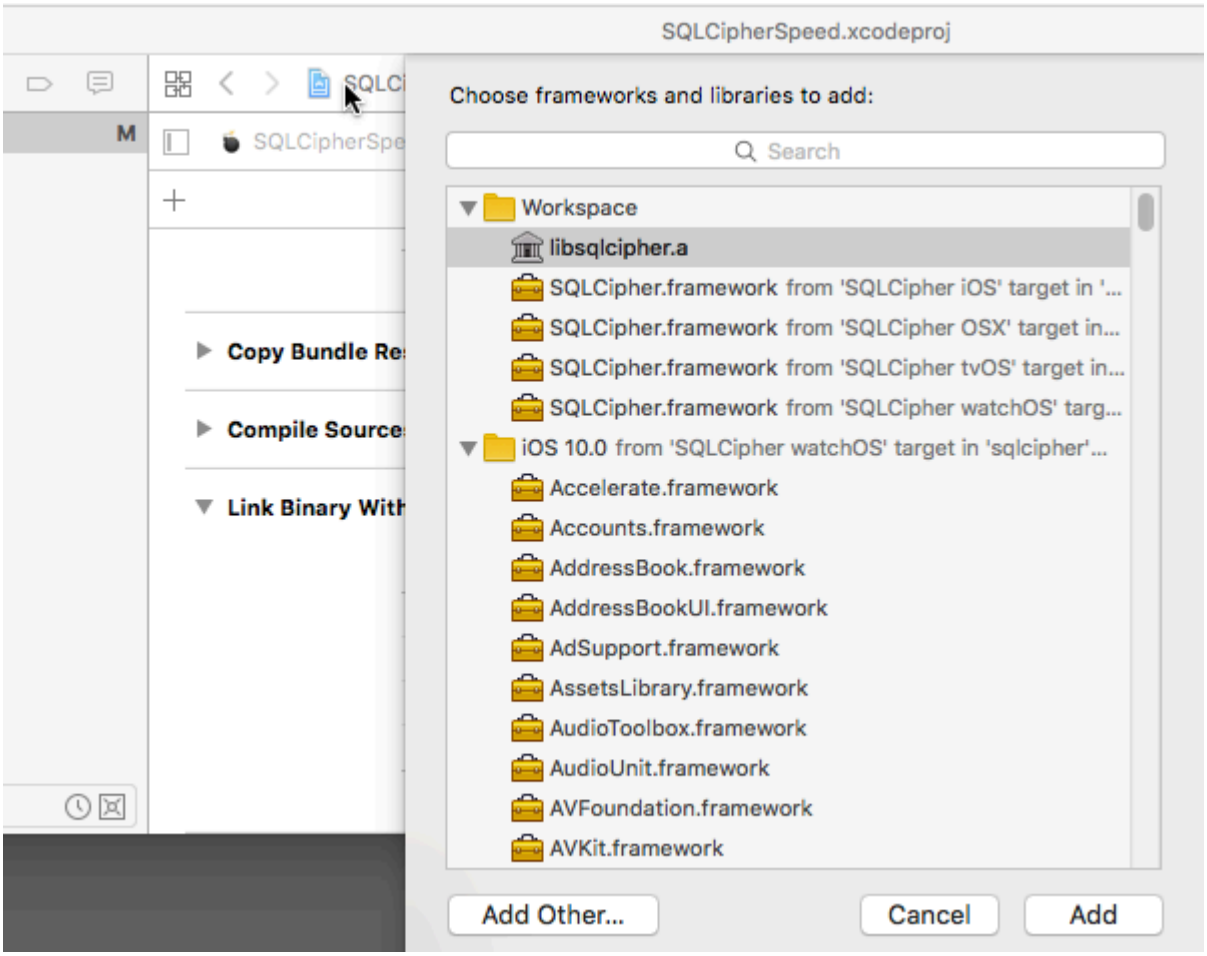
4. " " . **$ (BUILT_PRODUCTS_DIR) /libsqlcipher.a**

5. " C " : **-DSQLITE_HAS_CODEC**

6. + . **sqlcipher** .



7. + **libsqlcipher.a** .



8. **Security.framework** .

Examples

:

.

```
-(void)checkAndOpenDB{
    sqlite3 *db;
    NSString *strPassword = @"password";

        if (sqlite3_open_v2([[databaseURL path] UTF8String], &db, SQLITE_OPEN_READWRITE |
SQLITE_OPEN_CREATE, NULL) == SQLITE_OK) {
            const char* key = [strPassword UTF8String];
            sqlite3_key(db, key, (int)strlen(key));
            if (sqlite3_exec(db1, (const char*) "SELECT count(*) FROM sqlite_master;", NULL,
NULL, NULL) == SQLITE_OK) {
                NSLog(@"Password is correct, or a new database has been initialized");
            } else {
                NSLog(@"Incorrect password!");
            }
            sqlite3_close(db);
        }
}

- (NSURL *)databaseURL
{
```

```
    NSArray *URLs = [[NSFileManager defaultManager] URLsForDirectory:NSDocumentDirectory
inDomains:NSUserDomainMask];
    NSURL *directoryURL = [URLs firstObject];
    NSURL *databaseURL = [directoryURL URLByAppendingPathComponent:@"database.sqlite"];
    return  databaseURL;
}
```

SqlCipher : https://riptutorial.com/ko/ios/topic/9969/sqlcipher-

74: StackView UIScrollView

Examples

Scrollview StackView

StackView . .

Scrollviews StackViews / heigh . .

1. UIScrollView UIView (contentScrollView) .
2. contentScrollView , , 0 .
3. .

StackView

ScrollView StackView .

MinY StackView **`Textfield.frame.minY`** **0** . **/** .

.

1 - ScrollView

```
extension UIScrollView {

    func scrollToShowView(view: UIView){
        var offset = view.frame.minY
        var superview = view.superview
        while((superview  != nil)){
            offset += (superview?.frame.minY)!
            superview = superview?.superview
        }

        offset -= 100 //optional margin added on offset

        self.contentOffset = CGPoint.init(x: 0, y: offset)
    }

}
```

scrollview (,)

:

```
func textViewDidBeginEditing(_ textView: UITextView) {
    self.contentScrollView.scrollToShowView(view: textView)
}
```

StackView UIScrollView : https://riptutorial.com/ko/ios/topic/9404/stackview--uiscrollview

75: StoreKit

Examples

App Store

`SKProductsRequest` `SKProductsRequest` :

```
import StoreKit

let productIdentifierSet = Set(["yellowSubmarine", "pennyLane"])
let productsRequest = SKProductsRequest(productIdentifiers: productIdentifierSet)
```

productsRequest `productsRequest` . `SKProductsRequestDelegate` ., `NSObject` (, `Foundation`)
`productsRequest` `productsRequest` .

```
class PaymentManager: NSObject, SKProductsRequestDelegate {

    var products: [SKProduct] = []

    func productsRequest(request: SKProductsRequest,
                         didReceiveResponse response: SKProductsResponse) {

        products = response.products

    }

}
```

`productsRequest` `PaymentManager` `start()` .

```
let paymentManager = PaymentManager()
productsRequest.delegate = paymentManager
productsRequest.start()
```

`paymentManager.products` .

StoreKit : https://riptutorial.com/ko/ios/topic/6025/storekit

76: Swift : AppDelegate rootViewController /

. ( ), , (Notes,). iOS11).

, Storyboard . `Main.storyboard` . / (: `Onboarding.storyboard`

.

- .
- ()
-

. AppDelegate .

```
func application(_ application: UIApplication, didFinishLaunchingWithOptions launchOptions:
[UIApplicationLaunchOptionsKey: Any]?) -> Bool {
    let isFirstRun = true // logic to determine goes here
    if isFirstRun {
        showOnboarding()
    }
    return true
}
```

.

:

.

1.
2. .

AppDelegate .

Examples

1 : ()

`UIViewAnimationOptions` . .

`UIApplication.shared.keyWindow.rootViewController` .

`UIView.transition(with:)` `UIViewAnimationOptions` ,. ( ).

.

```
// MARK: - Onboarding
```

```
extension AppDelegate {

    func showOnboarding() {
        if let window = UIApplication.shared.keyWindow, let onboardingViewController =
UIStoryboard(name: "Onboarding", bundle: nil).instantiateInitialViewController() as?
OnboardingViewController {
            onboardingViewController.delegate = self
            window.rootViewController = onboardingViewController
        }
    }

    func hideOnboarding() {
        if let window = UIApplication.shared.keyWindow, let mainViewController =
UIStoryboard(name: "Main", bundle: nil).instantiateInitialViewController() {
            mainViewController.view.frame = window.bounds
            UIView.transition(with: window, duration: 0.5, options: .transitionCrossDissolve,
animations: {
                window.rootViewController = mainViewController
            }, completion: nil)
        }
    }
}
```

2 : ( )

Onboarding .

[Apple Human Interface Guidelines - Modality] [1] :

, .

.

`ViewController.present()` API .

```
// MARK: - Onboarding

extension AppDelegate {

    func showOnboarding() {
        if let window = window, let onboardingViewController = UIStoryboard(name:
"Onboarding", bundle: nil).instantiateInitialViewController() as? OnboardingViewController {
            onboardingViewController.delegate = self
            window.makeKeyAndVisible()
            window.rootViewController?.present(onboardingViewController, animated: false,
completion: nil)
        }
    }

    func hideOnboarding() {
        if let window = UIApplication.shared.keyWindow {
            window.rootViewController?.dismiss(animated: true, completion: nil)
        }
    }
}
```

Swift : AppDelegate rootViewController / : https://riptutorial.com/ko/ios/topic/10880/swift---

appdelegate-rootviewcontroller---------

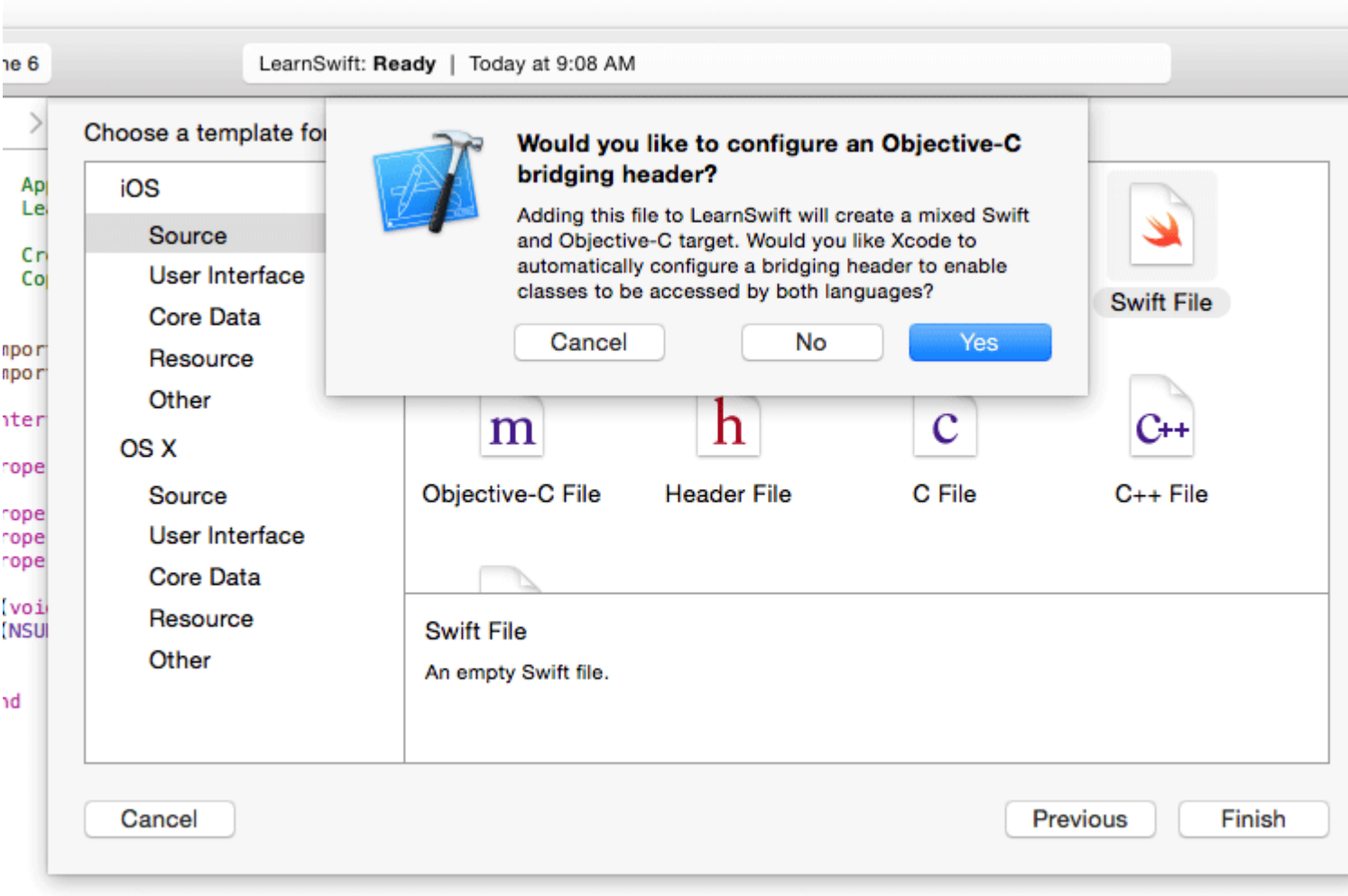
77: SWIFT BRIDGING HEADER

Examples

- Xcode (File> New> File), "Source" "Header File" .
- "YourProjectName-Bridging-Header.h" . : App Station "Station-Bridging-Header".
- .
- "Swift Compiler - Code Generation" . "Swift Compiler" . : "Swift Compiler - Code Generation" , Swift . .
- "Objective-C " / . . : "ProjectName / ProjectName-Bridging-Header.h" "ProjectName-Bridging-Header.h".
- #import Objective-C . .

Xcode

Swift Xcode . . : ( )



SWIFT BRIDGING HEADER : https://riptutorial.com/ko/ios/topic/10851/swift-bridging-header-

78: SWRevealViewController

SWRevealViewController . 5 (5) .

/ . / .

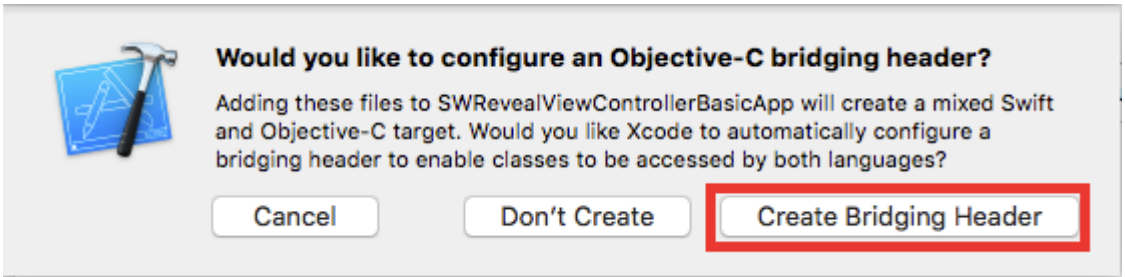
Apple iOS .

Examples

SWRevealViewController

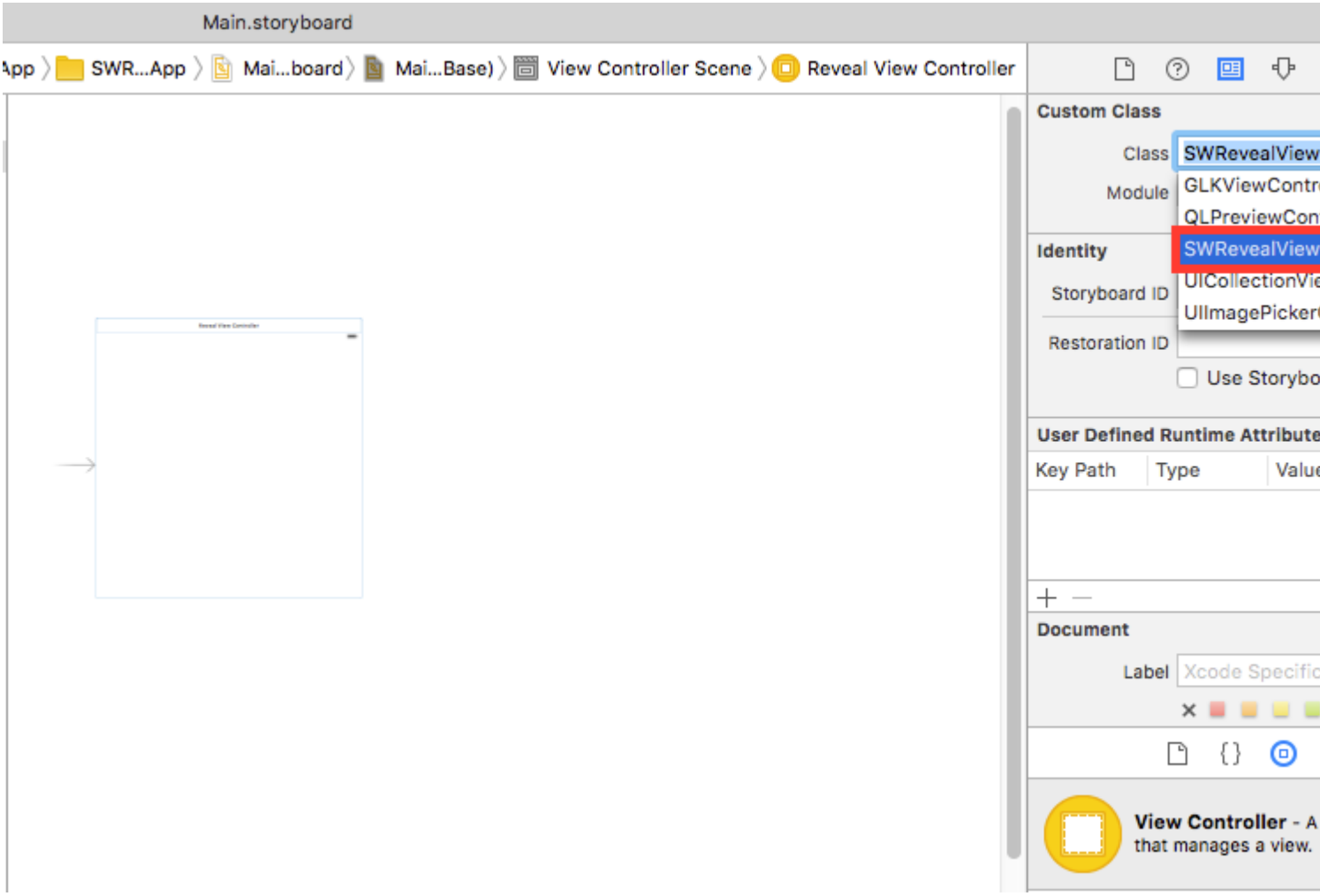
`SWRevealViewController.h` `SWRevealViewController.m` .

Create Bridging Header

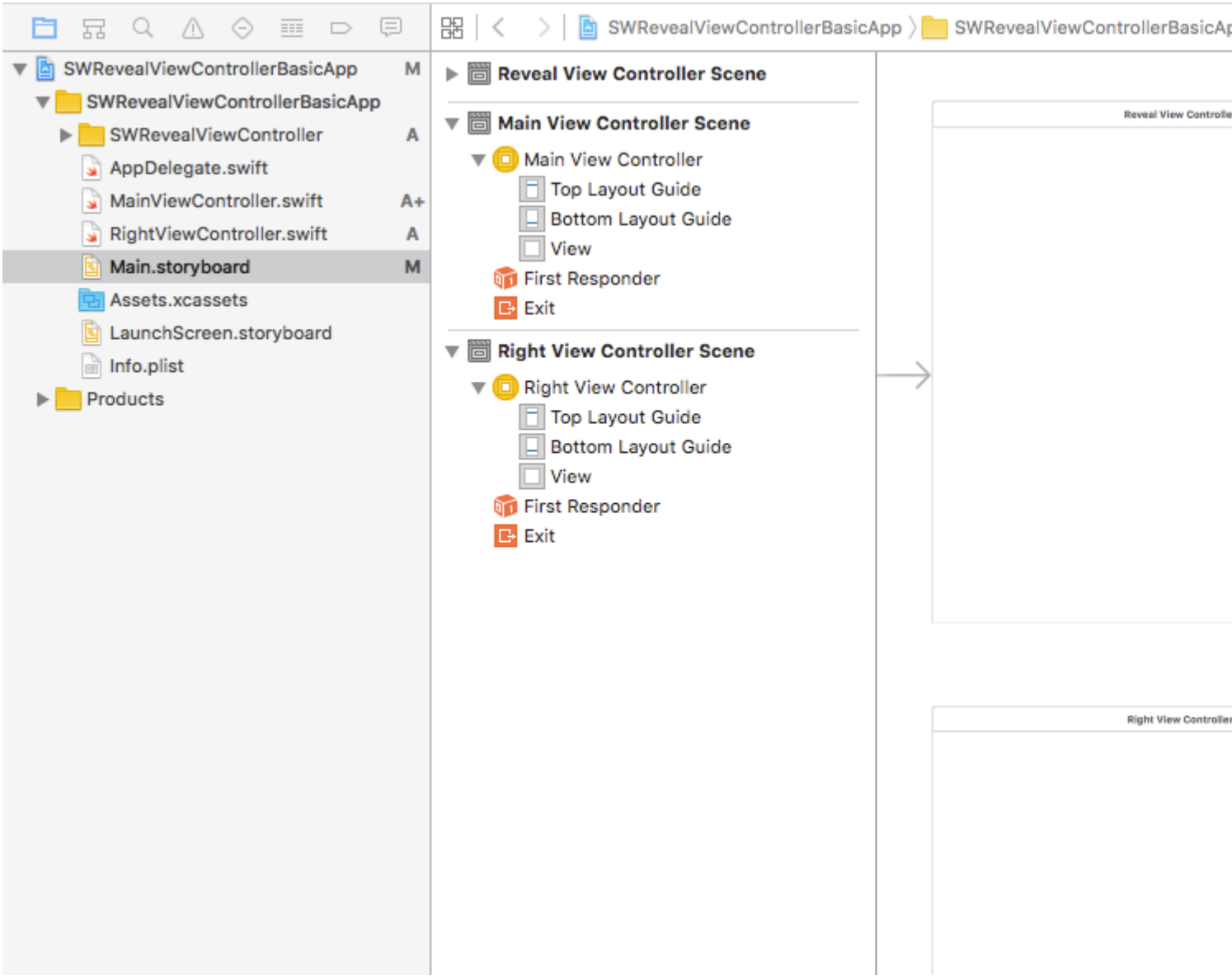



```
#import "SWRevealViewController.h"
```

viewController `SWRevealViewController` `SWRevealViewController`

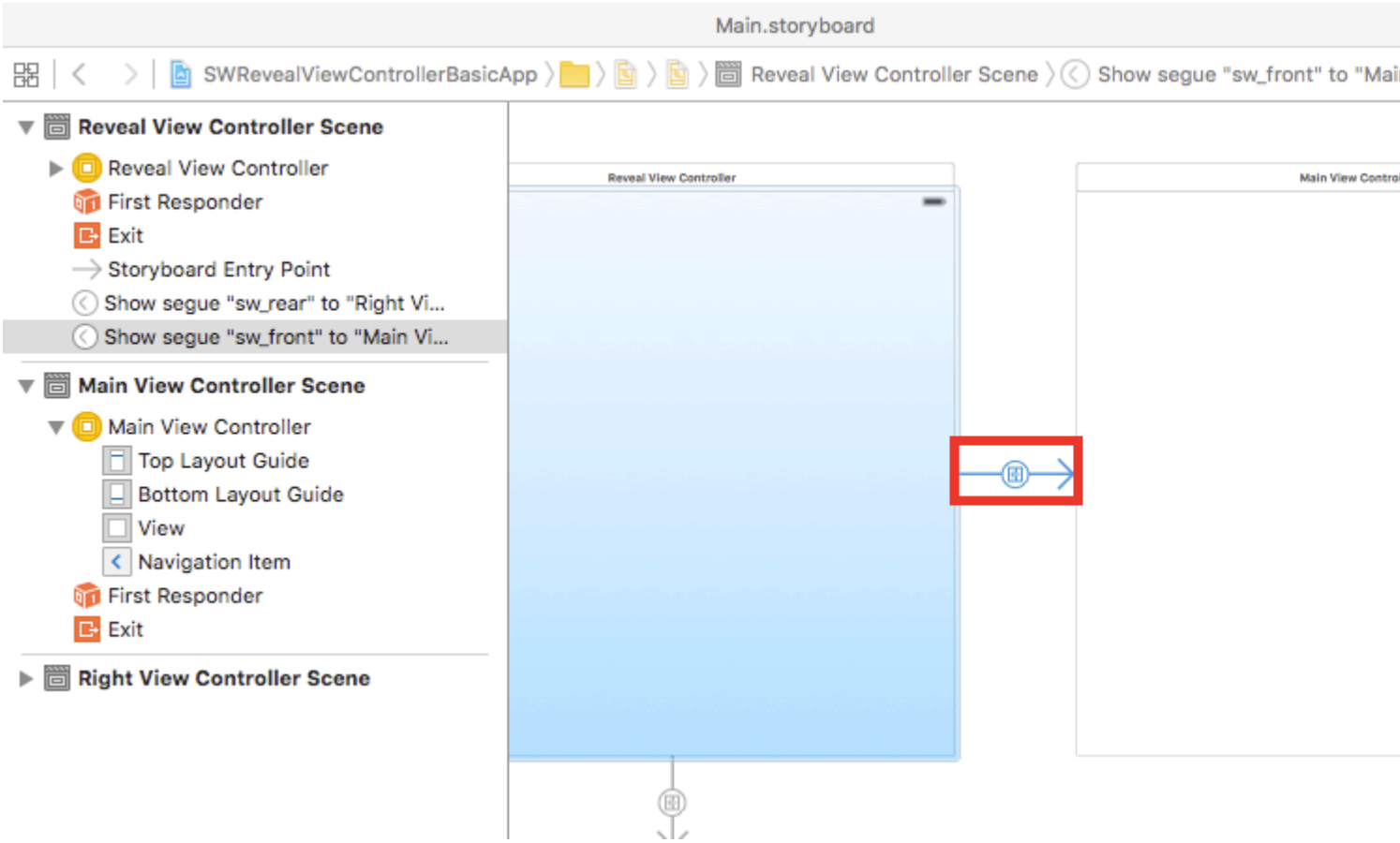


viewController MainViewController RightViewController ViewController .



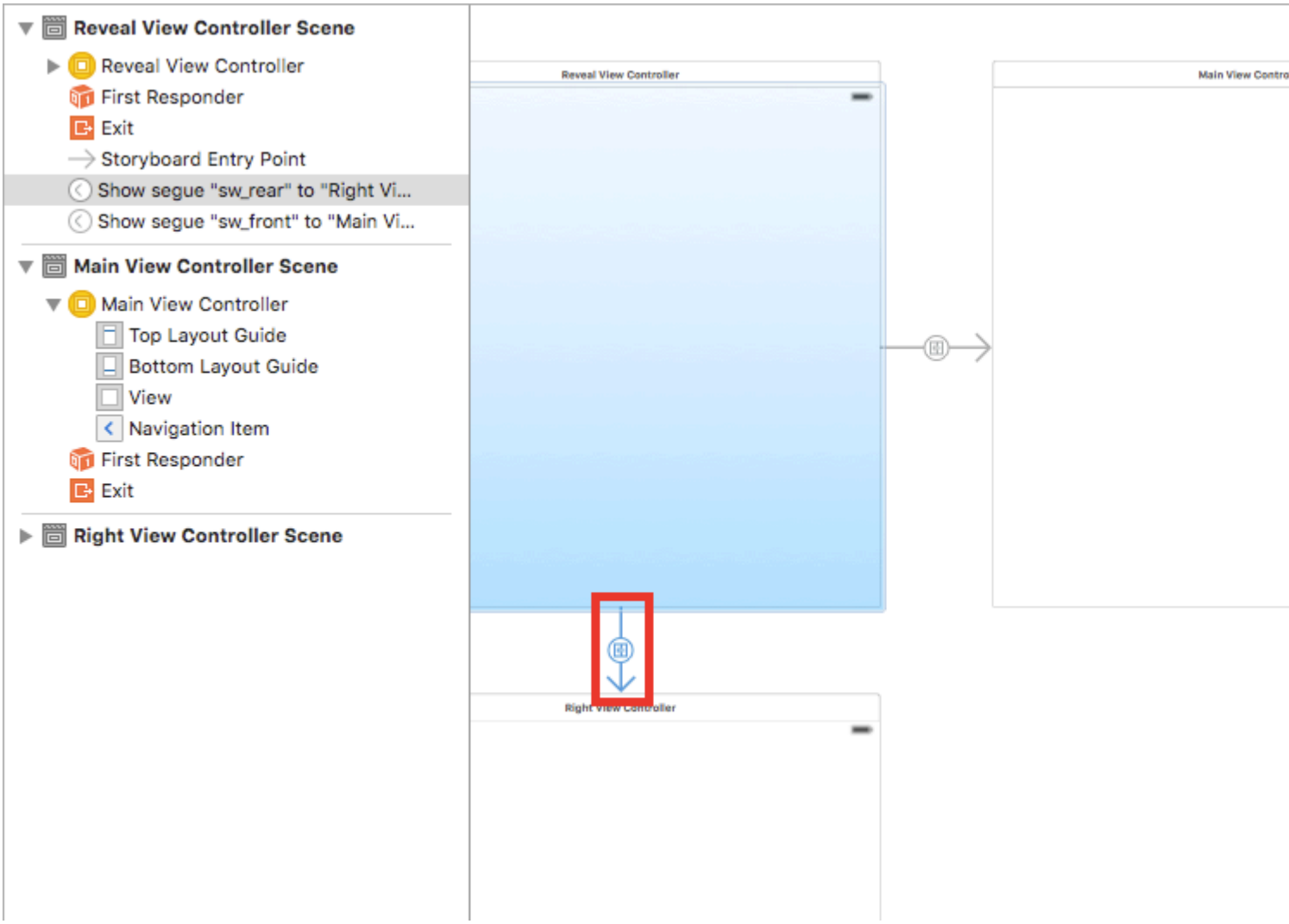
SWRevealViewController MainViewController, SWRevealViewController RightViewController segues SWRevealViewController MainViewController

on `sw_front` `SWRevealViewControllerSegueSetController`



segue (SWRevealViewController RightViewController) .

```
sw_rear  SWRevealViewControllerSegueSetController
```



MainViewController `viewDidLoad` .

```
self.view.addGestureRecognizer(self.revealViewController().panGestureRecognizer());
```

. SWRevealViewController . `RightViewController` .

SWRevealViewController : https://riptutorial.com/ko/ios/topic/4614/swrevealviewcontroller

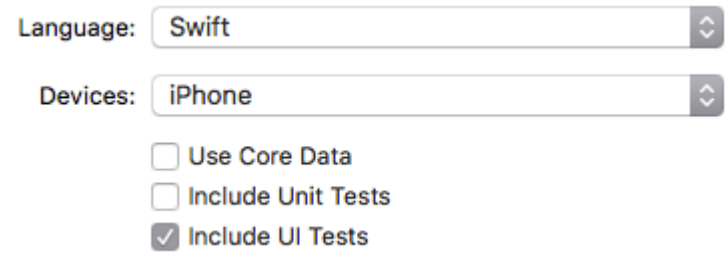
79: UI

- XCUIApplication () // . Xcode " " .
- XCUIElement () // .

Examples

Xcode

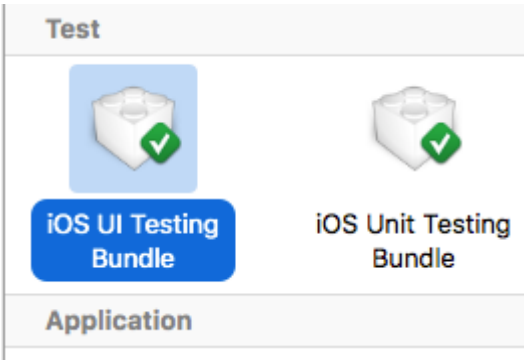
"UI " .



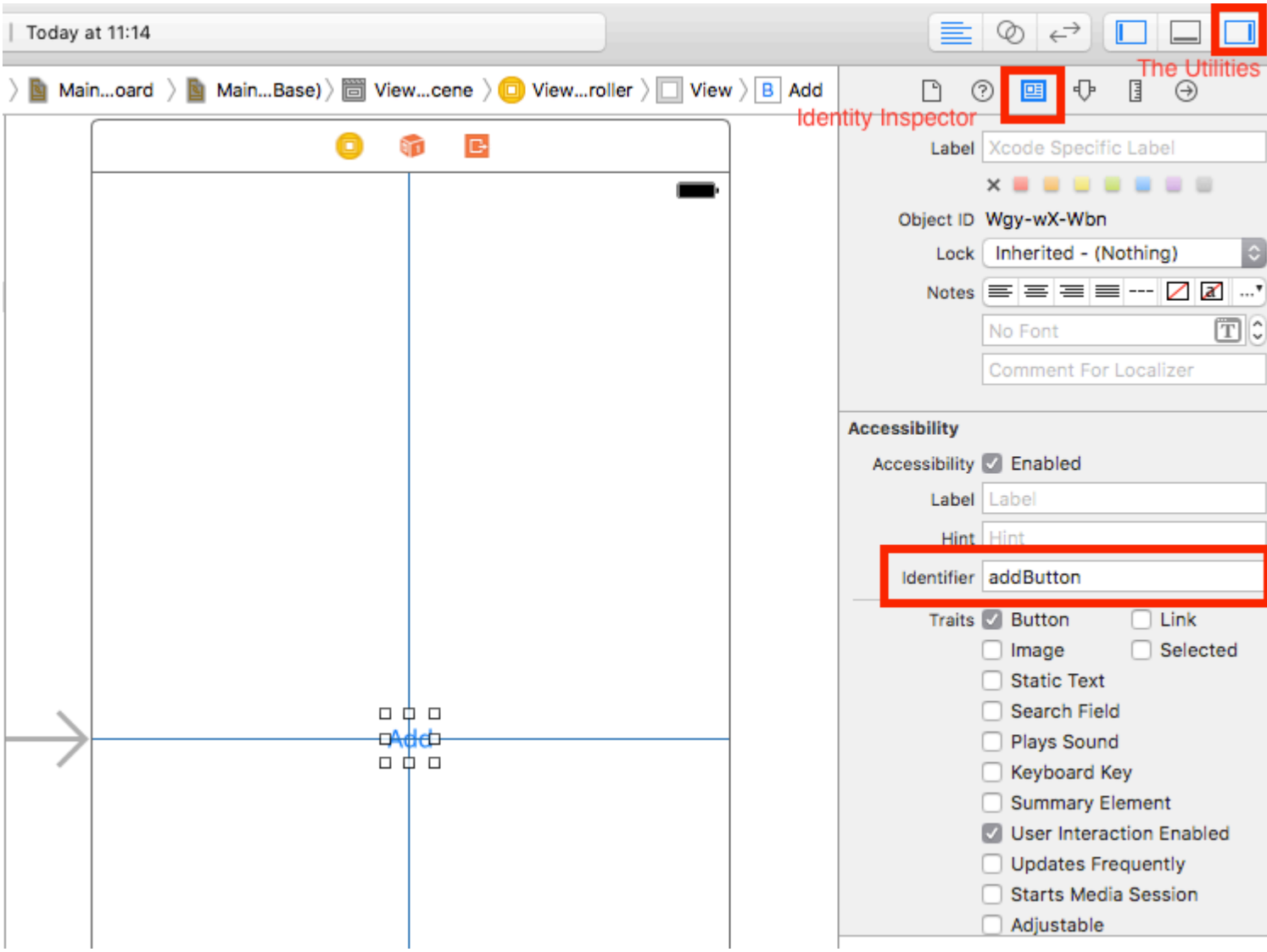
`UI target` .

Setps :

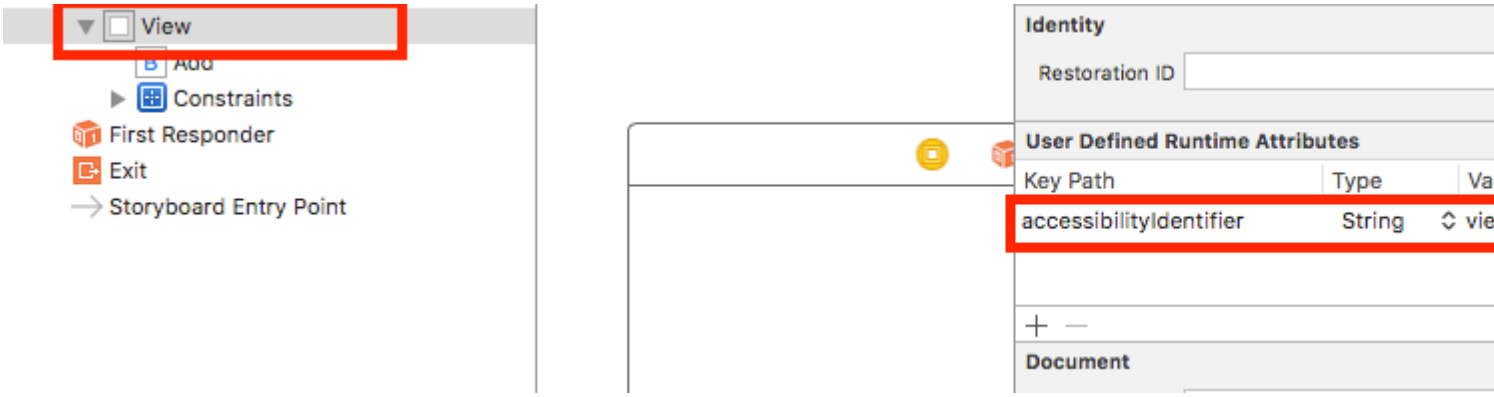
- `File` -> `New` -> `Target`
- `iOS UI Testing Bundle`



- `storyboard` .
- `the Utilities`
- `Identity Inspector`
-
- (: `addButton`)



- `storyboard` .
- `the Utilities`
- `Identity Inspector`
-
- `User Defined Runtime Attributes`
- `Key Path` - `accessibilityIdentifier`
- `Type` -`
- `Value` - (`view`)



UITest

```
import XCTest

class StackOverFlowUITests: XCTestCase {

    private let app = XCUIApplication()

    //Views

    private var view: XCUIElement!

    //Buttons

    private var addButton: XCUIElement!


    override func setUp() {
        super.setUp()

        app.launch()

        //Views

        view = app.otherElements["view"]

        //Buttons

        addButton = app.buttons["addButton"]
    }

    func testMyApp() {

        addButton.tap()
        view.tap()
    }
}
```

[ ] .

UIView, UIImageView, UIScrollView

```
let imageView = app.images["imageView"]
let scrollView = app.scrollViews["scrollView"]
let view = app.otherElements["view"]
```

UILabel

```
let label = app.staticTexts["label"]
```

UIStackView

```
let stackView = app.otherElements["stackView"]
```

UITableView

```
let tableView = app.tables["tableView"]
```

UITableViewCell

```
let tableViewCell = tableView.cells["tableViewCell"]
```

UITableViewCell

```
let tableViewCellButton = tableView.cells.element(boundBy: 0).buttons["button"]
```

UICollectionView

```
let collectionView = app.collectionViews["collectionView"]
```

UIButton, UIBarButtonItem

```
let button = app.buttons["button"]
let barButtonItem = app.buttons["barButtonItem"]
```

UITextField

- UITextField

```
let textField = app.textFields["textField"]
```

- UITextField

```
let passwordTextField = app.secureTextFields["passwordTextField"]
```

UITextView

```
let textView = app.textViews["textView"]
```

UISwitch

```
let switch = app.switches["switch"]
```

```
let alert = app.alerts["About yourself"] // Title of presented alert
```

UI

setUp .

```
    app.launchEnvironment = ["animations": "0"]
```

app XCUIApplication .

```
override func setUp() {
    super.setUp()

    let app = XCUIApplication()

    app.launch()
}
```

```
func testStacOverFlowApp() {

    app.terminate()
}
```

XCUIDevice.shared().orientation orientation .

```
XCUIDevice.shared().orientation = .landscapeLeft
XCUIDevice.shared().orientation = .portrait
```

UI : https://riptutorial.com/ko/ios/topic/7526/ui-

80: UIActivityViewController

activityItems	. nil .
applicationActivities	UIActivity . nil .

Examples

-C

```
NSString *textToShare = @"StackOverflow Documentation!! Together, we can do for Documentation
what we did for Q&A.";
NSURL *documentationURL = [NSURL
URLWithString:@"http://stackoverflow.com/tour/documentation"];

NSArray *objectsToShare = @[textToShare, documentationURL];

UIActivityViewController *activityVC = [[UIActivityViewController alloc]
initWithActivityItems:objectsToShare applicationActivities:nil];

[self presentViewController:activityVC animated:YES completion:nil];
```

```
let textToShare = "StackOverflow Documentation!! Together, we can do for Documentation what we
did for Q&A."
let documentationURL = NSURL(string:"http://stackoverflow.com/tour/documentation")

let objToShare : [AnyObject] = [textToShare, documentationURL!]

let activityVC = UIActivityViewController(activityItems: objToShare, applicationActivities:
nil)
self.presentViewController(activityVC, animated: true, completion: nil)
```

UIActivityViewController : https://riptutorial.com/ko/ios/topic/2889/uiactivityviewcontroller

81: UIAlertController

UIAlertController . UIActionSheet UIAlertView .
presentViewController:animated:completion: .

Apple

Swift UIAlertController

Examples

UIAlertController AlertViews

UIAlertView UIActionSheet iOS 8 . AlertView ActionSheet UIAlertController , preferredStyle , AlertView ActionSheet . .

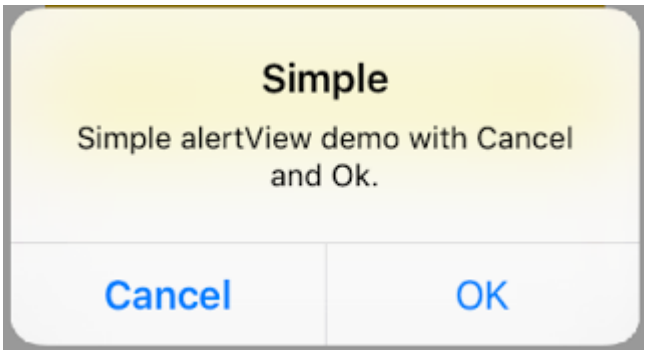
AlertView

:

```
let alert = UIAlertController(title: "Simple", message: "Simple alertView demo with Cancel and OK.", preferredStyle: .alert)

alert.addAction(UIAlertAction(title: "Cancel", style: .cancel) { _ in
        print("Cancel")
})
alert.addAction(UIAlertAction(title: "OK", style: .default) { _ in
        print("OK")
})

present(alert, animated: true)
```

-C :

```
 UIAlertController *alertController = [UIAlertController alertControllerWithTitle:@"Simple"
message:@"Simple alertView demo with Cancel and OK."
preferredStyle:UIAlertControllerStyleAlert];
    UIAlertAction *cancelAction = [UIAlertAction actionWithTitle:@"Cancel"
style:UIAlertActionStyleCancel handler:^(UIAlertAction * action) {
        NSLog(@"Cancel");
    }];
    UIAlertAction *okAction = [UIAlertAction actionWithTitle:@"OK"
style:UIAlertActionStyleDefault handler:^(UIAlertAction * action) {
        NSLog(@"OK");
    }];

    [alertController addAction:cancelAction];
    [alertController addAction:okAction];
    [self presentViewController:alertController animated: YES completion: nil];
```



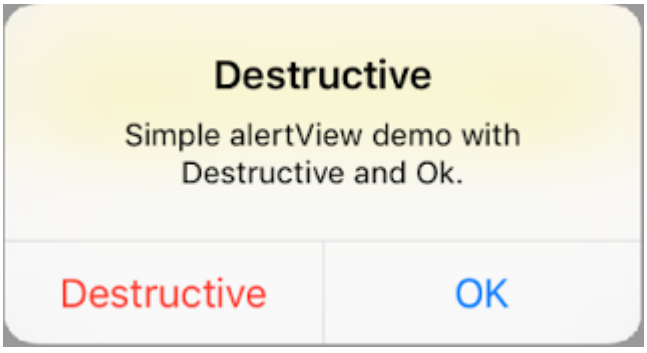
AlertView

:

```
let alert = UIAlertController(title: "Simple", message: "Simple alertView demo with Cancel and
OK.", preferredStyle: .alert)

alert.addAction(UIAlertAction(title: "Destructive", style: .destructive) { _ in
        print("Destructive")
})
alert.addAction(UIAlertAction(title: "OK", style: .default) { _ in
        print("OK")
})

present(alert, animated: true)
```

-C :

```
UIAlertController *alertController = [UIAlertController
alertControllerWithTitle:@"Destructive" message:@"Simple alertView demo with Destructive and
OK." preferredStyle:UIAlertControllerStyleAlert];
    UIAlertAction *destructiveAction = [UIAlertAction actionWithTitle:@"Cancel"
style:UIAlertActionStyleDestructive handler:^(UIAlertAction * action) {
        NSLog(@"Destructive");
    }];
    UIAlertAction *okAction = [UIAlertAction actionWithTitle:@"OK"
style:UIAlertActionStyleDefault handler:^(UIAlertAction * action) {
        NSLog(@"OK");
    }];

    [alertController addAction:destructiveAction];
    [alertController addAction:okAction];
    [self presentViewController:alertController animated: YES completion: nil];
```



.

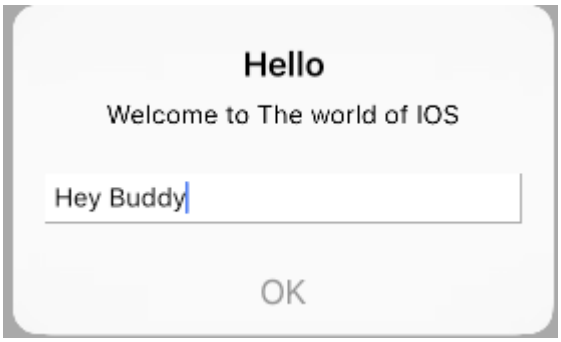
```
let alert = UIAlertController(title: "Toast", message: "Hello World", preferredStyle: .Alert)

presentViewController(alert, animated: true) {
     let delay_s:Double = 2
     let delayTime = dispatch_time(DISPATCH_TIME_NOW, Int64(delay_s * Double(NSEC_PER_SEC)))
     dispatch_after(delayTime, dispatch_get_main_queue()) {
          alert.dismissViewControllerAnimated(true, completion: nil)
     }
}
```

UIAlertController

```
let alert = UIAlertController(title: "Hello",
                              message: "Welcome to the world of iOS",
                              preferredStyle: UIAlertControllerStyle.alert)
let defaultAction = UIAlertAction(title: "OK", style: UIAlertActionStyle.default) { (action)
in

}
defaultAction.isEnabled = false
alert.addAction(defaultAction)

alert.addTextFieldWithConfigurationHandler { (textField) in
     textField.delegate = self
}

present(alert, animated: true, completion: nil)
```

-C

```
UIAlertController* alert = [UIAlertController alertControllerWithTitle:@"Hello"
                                                                message:@"Welcome to the world
of iOS"

preferredStyle:UIAlertControllerStyleAlert];

UIAlertAction* defaultAction = [UIAlertAction actionWithTitle:@"OK"
                                                        style:UIAlertActionStyleDefault
                                                      handler:^(UIAlertAction * action) {}];

defaultAction.enabled = NO;
[alert addAction:defaultAction];

[alert addTextFieldWithConfigurationHandler:^(UITextField *textField) {
     textField.delegate = self;
}];

[self presentViewController:alert animated:YES completion:nil];
```



UIAlertController

`UIAlertController` `UIActionSheet` AlertView API .

2

```
let alertController = UIAlertController(title: "Demo", message: "A demo with two buttons",
preferredStyle: UIAlertControllerStyle.actionSheet)
```

-C

```
UIAlertController *alertController = [UIAlertController alertControllerWithTitle:@"Demo"
message:@"A demo with two buttons" preferredStyle:UIAlertControllerStyleActionSheet];
```

"" "" .

```
let cancelAction = UIAlertAction(title: "Cancel", style: .cancel) { (result : UIAlertAction) -
> Void in
    //action when pressed button
}
let okAction = UIAlertAction(title: "Okay", style: .default) { (result : UIAlertAction) ->
Void in
    //action when pressed button
}
```

-C

```
UIAlertAction *cancelAction = [UIAlertAction actionWithTitle:@"Cancel"
style:UIAlertActionStyleCancel handler:^(UIAlertAction * action) {
        //action when pressed button
    }];

UIAlertAction * okAction = [UIAlertAction actionWithTitle:@"Okay"
style:UIAlertActionStyleDefault handler:^(UIAlertAction * action) {
        //action when pressed button
    }];
```

.

```
alertController.addAction(cancelAction)
alertController.addAction(okAction)
```

-C

```
[alertController addAction:cancelAction];
[alertController addAction:okAction];
```

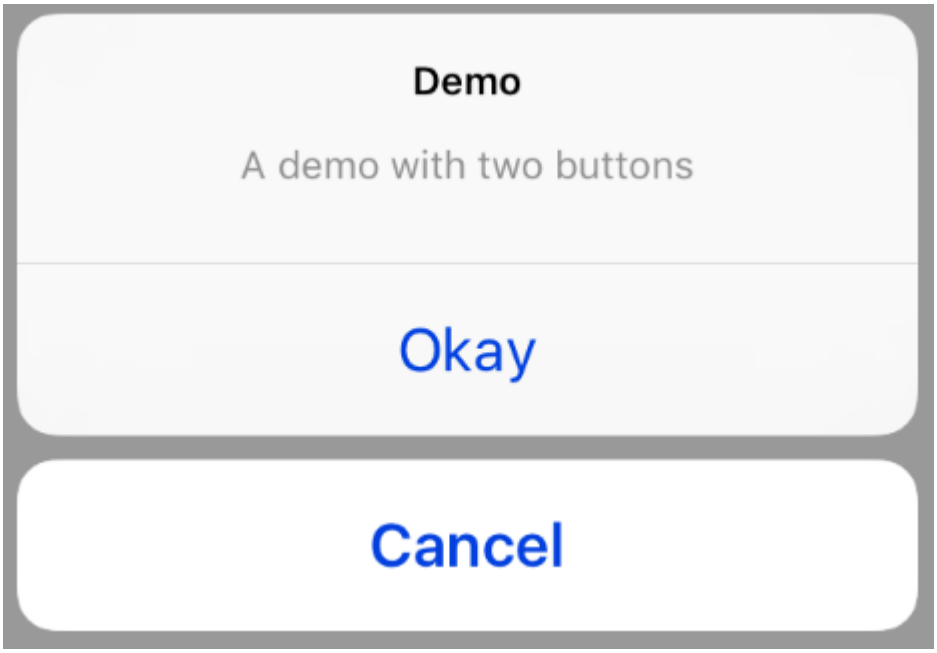
`UIAlertController` .

```
self.present(alertController, animated: true, completion: nil)
```

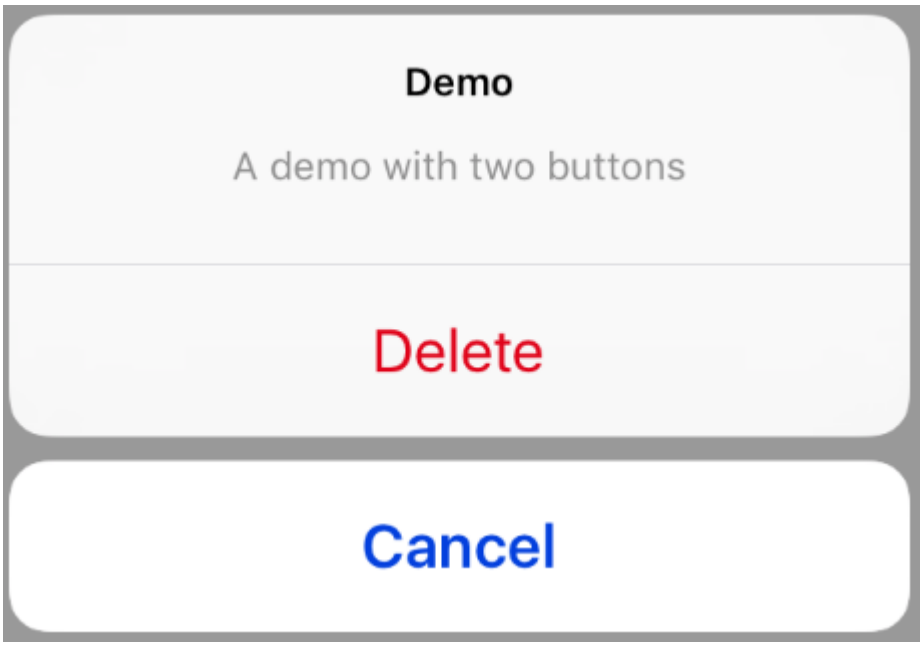
-C

```
[self presentViewController:alertController animated: YES completion: nil];
```

.



Using `UIAlertActionStyle .destructive` `UIAlertAction` .

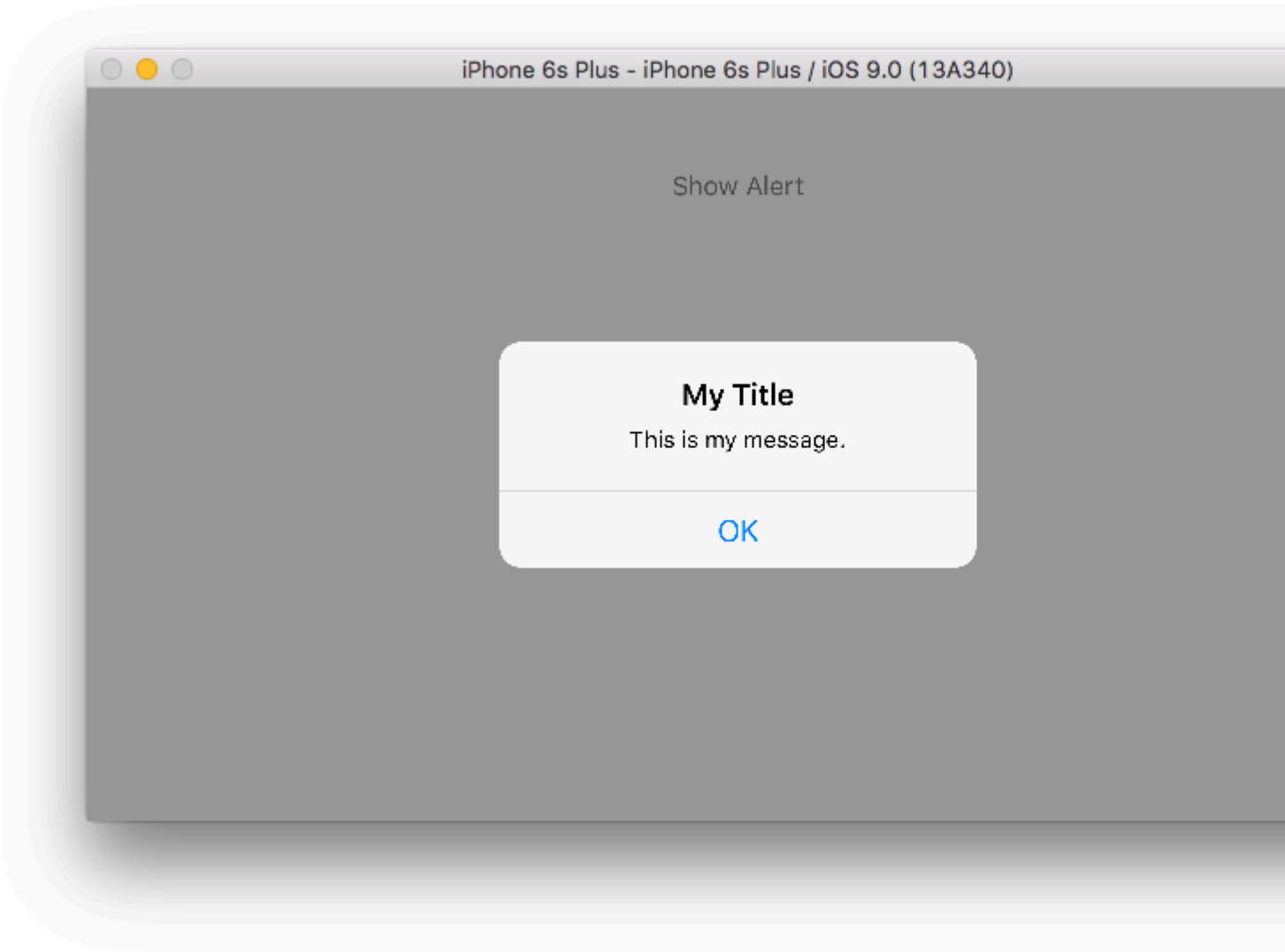


okAction UIAlertAction :

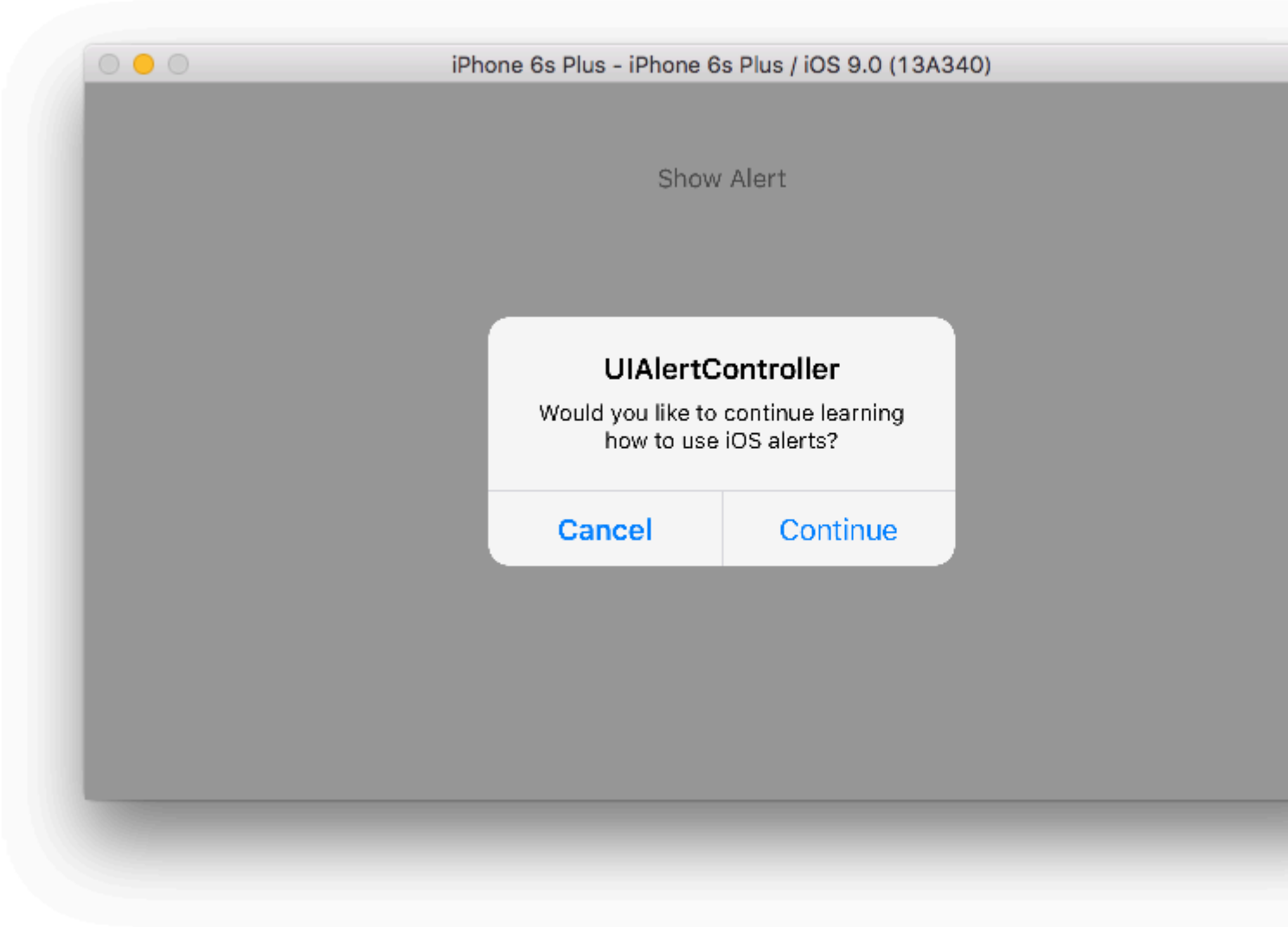
```
let destructiveAction = UIAlertAction(title: "Delete", style: .destructive) { (result :
UIAlertAction) -> Void in
    //action when pressed button
}
```

-C

```
UIAlertAction * destructiveAction = [UIAlertAction actionWithTitle:@"Delete"
style:UIAlertActionStyleDestructive handler:^(UIAlertAction * action) {
            //action when pressed button
        }];
```

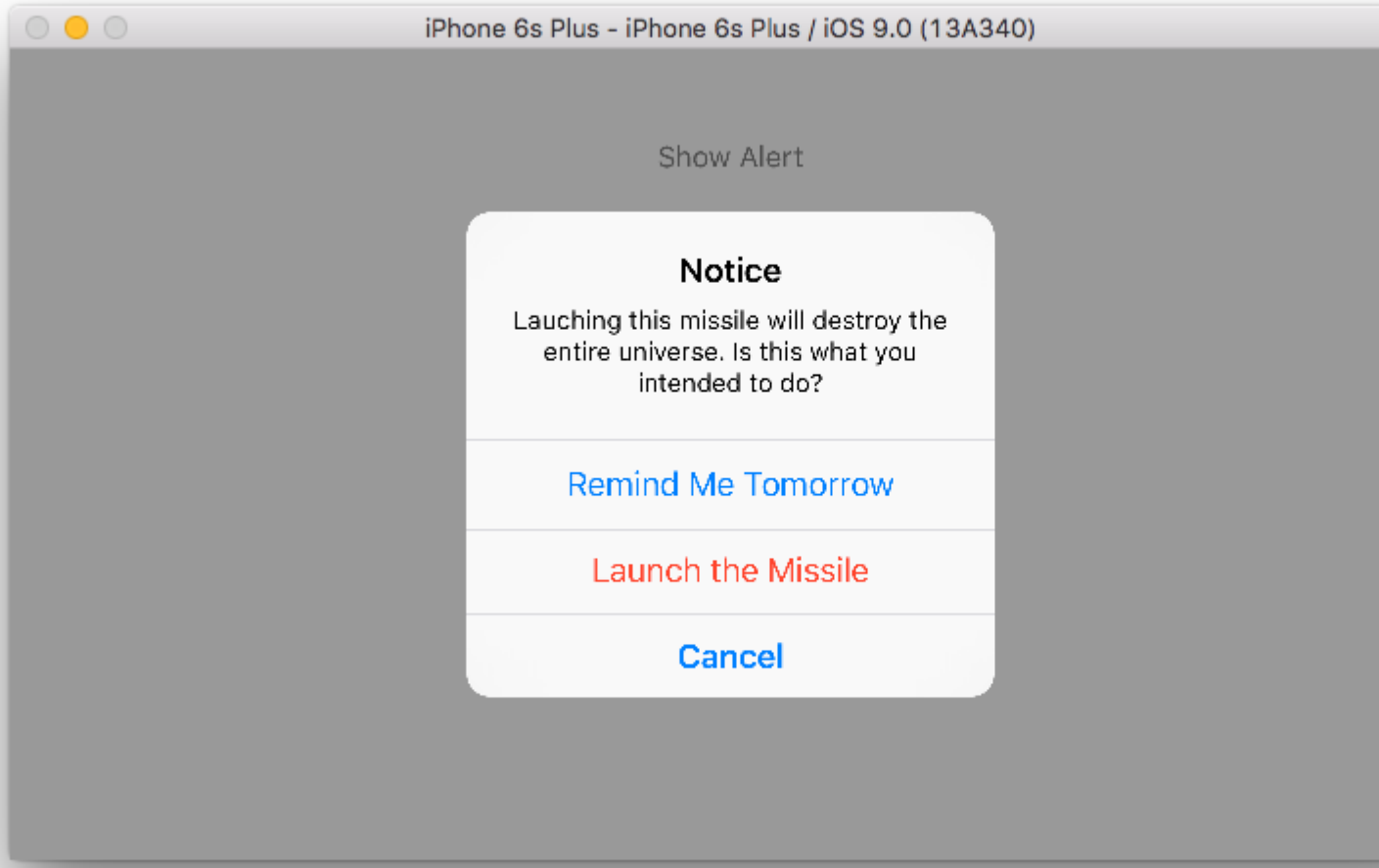



```
class ViewController: UIViewController {

    @IBAction func showAlertButtonTapped(sender: UIButton) {

        // create the alert
        let alert = UIAlertController(title: "My Title", message: "This is my message.",
preferredStyle: UIAlertControllerStyle.Alert)

        // add an action (button)
        alert.addAction(UIAlertAction(title: "OK", style: UIAlertActionStyle.Default, handler:
nil))

        // show the alert
        self.presentViewController(alert, animated: true, completion: nil)
    }
}
```




```
class ViewController: UIViewController {

    @IBAction func showAlertButtonTapped(sender: UIButton) {

        // create the alert
        let alert = UIAlertController(title: "UIAlertController", message: "Would you like to
continue learning how to use iOS alerts?", preferredStyle: UIAlertControllerStyle.Alert)

        // add the actions (buttons)
        alert.addAction(UIAlertAction(title: "Continue", style: UIAlertActionStyle.Default,
handler: nil))
        alert.addAction(UIAlertAction(title: "Cancel", style: UIAlertActionStyle.Cancel,
handler: nil))

        // show the alert
        self.presentViewController(alert, animated: true, completion: nil)
    }
}
```

3




```
class ViewController: UIViewController {

    @IBAction func showAlertButtonTapped(sender: UIButton) {

        // create the alert
        let alert = UIAlertController(title: "Notice", message: "Lauching this missile will
destroy the entire universe. Is this what you intended to do?", preferredStyle:
UIAlertControllerStyle.Alert)

        // add the actions (buttons)
        alert.addAction(UIAlertAction(title: "Remind Me Tomorrow", style:
UIAlertActionStyle.Default, handler: nil))
        alert.addAction(UIAlertAction(title: "Cancel", style: UIAlertActionStyle.Cancel,
handler: nil))
        alert.addAction(UIAlertAction(title: "Launch the Missile", style:
UIAlertActionStyle.Destructive, handler: nil))

        // show the alert
        self.presentViewController(alert, animated: true, completion: nil)
    }
}
```

---

handler nil . nil .

```
alert.addAction(UIAlertAction(title: "Launch the Missile", style:
UIAlertActionStyle.Destructive, handler: { action in

    // do something like...
    self.launchMissile()

}))
```

- `UIAlertActionStyle` . `.Default` .
- 3 Action Sheet . . .

. .

```
@property(nonatomic, strong) UIAlertAction *preferredAction
```

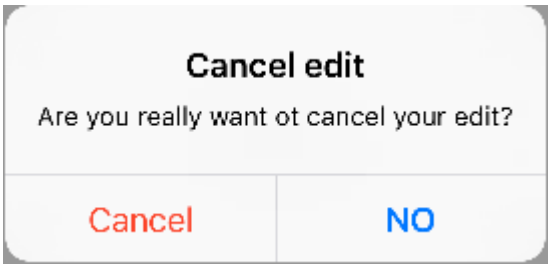
. .

UIAlertControllerStyleAlert .

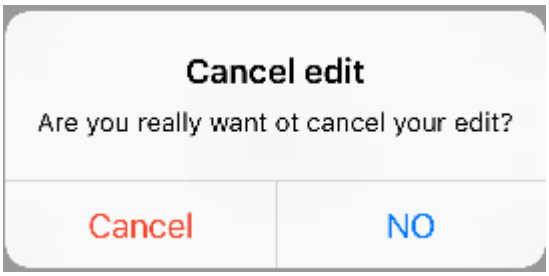
.

```
UIAlertController *alertController = [UIAlertController alertControllerWithTitle:@"Cancel
edit" message:@"Are you really want to cancel your edit?"
preferredStyle:UIAlertControllerStyleAlert];

UIAlertAction *cancel = [UIAlertAction actionWithTitle:@"Cancel"
style:UIAlertActionStyleCancel handler:^(UIAlertAction * action) {
    NSLog(@"Cancel");
}];

UIAlertAction *no = [UIAlertAction actionWithTitle:@"NO" style:UIAlertActionStyleDefault
handler:^(UIAlertAction * action) {
    NSLog(@"Highlighted button is pressed.");
}];

[alertController addAction:cancel];
[alertController addAction:no];

//add no action to preffered action.
//Note
//the action should already be added to alert controller
alertController.preferredAction = no;

[self presentViewController:alertController animated: YES completion: nil];
```

. .



. .



UIAlertController : https://riptutorial.com/ko/ios/topic/874/uialertcontroller

82: UIAppearance

Examples

. :

UIButton

:

```
UIButton.appearance().tintColor = UIColor.greenColor()
```

-C :

```
[UIButton appearance].tintColor = [UIColor greenColor];
```

UIButton

:

```
UIButton.appearance().backgroundColor = UIColor.blueColor()
```

-C :

```
[UIButton appearance].backgroundColor = [UIColor blueColor];
```

UILabel

:

```
UILabel.appearance().textColor = UIColor.redColor()
```

-C :

```
[UILabel appearance].textColor = [UIColor redColor];
```

UILabel

:

```
UILabel.appearance().backgroundColor = UIColor.greenColor()
```

-C :

```
[UILabel appearance].backgroundColor = [UIColor greenColor];
```

UINavigationBar

:

```
UINavigationBar.appearance().tintColor = UIColor.cyanColor()
```

-C :

```
[UINavigationBar appearance].tintColor = [UIColor cyanColor];
```

UINavigationBar

:

```
UINavigationBar.appearance().backgroundColor = UIColor.redColor()
```

-C :

```
[UINavigationBar appearance].backgroundColor = [UIColor redColor];
```

appearanceWhenContainedInInstancesOfClasses: appearanceWhenContainedInInstancesOfClasses:
. , ViewController UILabel textColor backgroundColor textColor :

UILabel

:

```
UILabel.appearanceWhenContainedInInstancesOfClasses([ViewController.self]).textColor =
UIColor.whiteColor()
```

-C :

```
[UILabel appearanceWhenContainedInInstancesOfClasses:@[[ViewController class]]].textColor =
[UIColor whiteColor];
```

UILabel

:

```
UILabel.appearanceWhenContainedInInstancesOfClasses([ViewController.self]).backgroundColor =
UIColor.blueColor()
```

-C :

```
[UILabel appearanceWhenContainedInInstancesOfClasses:@[[ViewController
class]]].backgroundColor = [UIColor blueColor];
```

UIAppearance : https://riptutorial.com/ko/ios/topic/3422/uiappearance

83: UIBarButtonItem

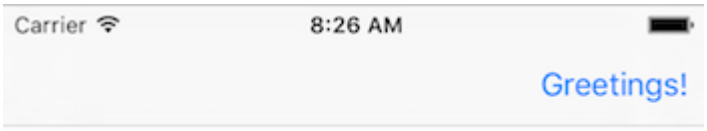
	UIBarButtonItem
	UIBarButtonItem
	UIBarButtonItem
	UIBarButtonItem ().

`self.navigationItem` UIViewController UINavigationController .

Examples

UIBarButtonItem

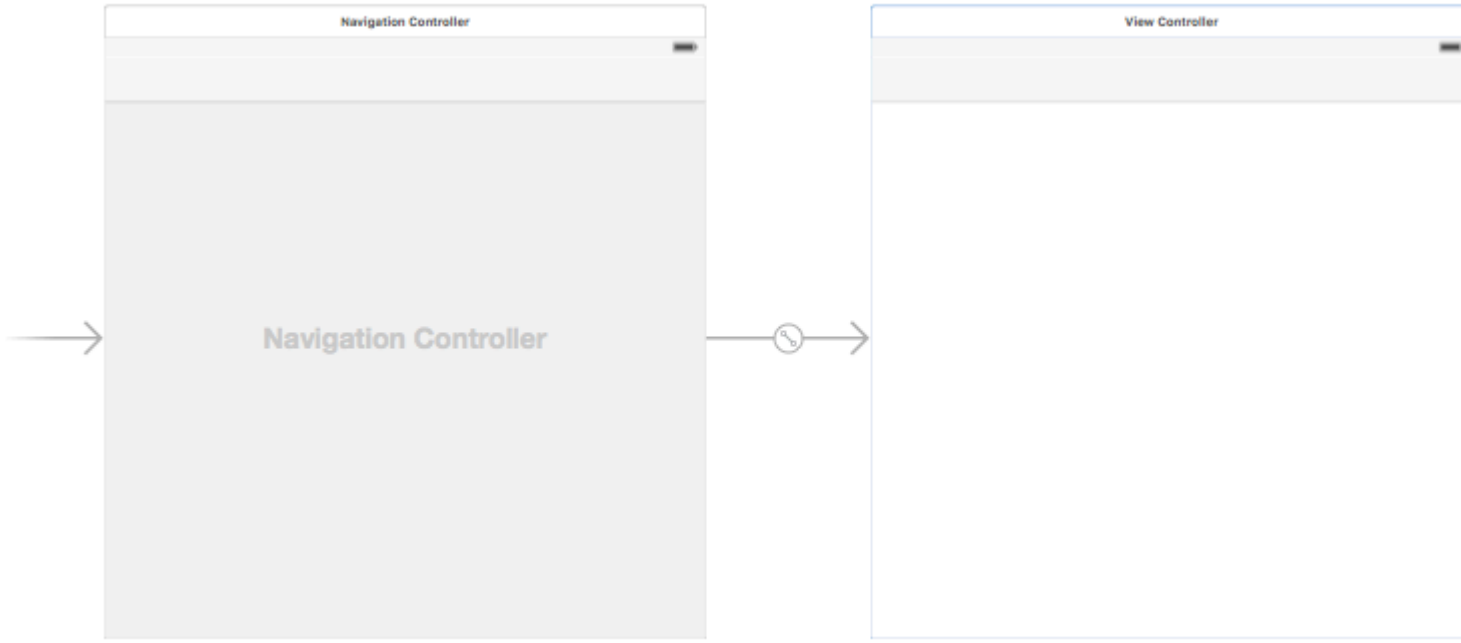
```
//Swift
let barButtonItem = UIBarButtonItem(title: "Greetings!", style: .Plain, target: self, action:
#selector(barButtonTapped))
self.navigationItem.rightBarButtonItem = barButtonItem

//Objective-C
UIBarButtonItem *barButtonItem = [[UIBarButtonItem alloc] initWithTitle:@"Greetings!"
style:UIBarButtonItemStylePlain target:self action:@selector(barButtonTaped)];
self.navigationItem.rightBarButtonItem = barButtonItem;
```



UIBarButtonItem

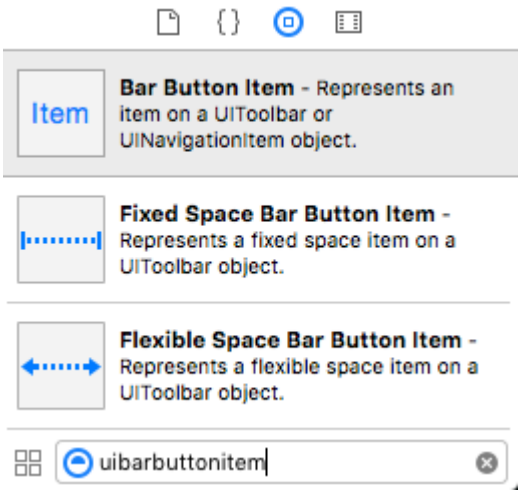
(`UIBarButtonItem`) .

View Controller Xcode **Editor> Embed In> Navigation Controller** .



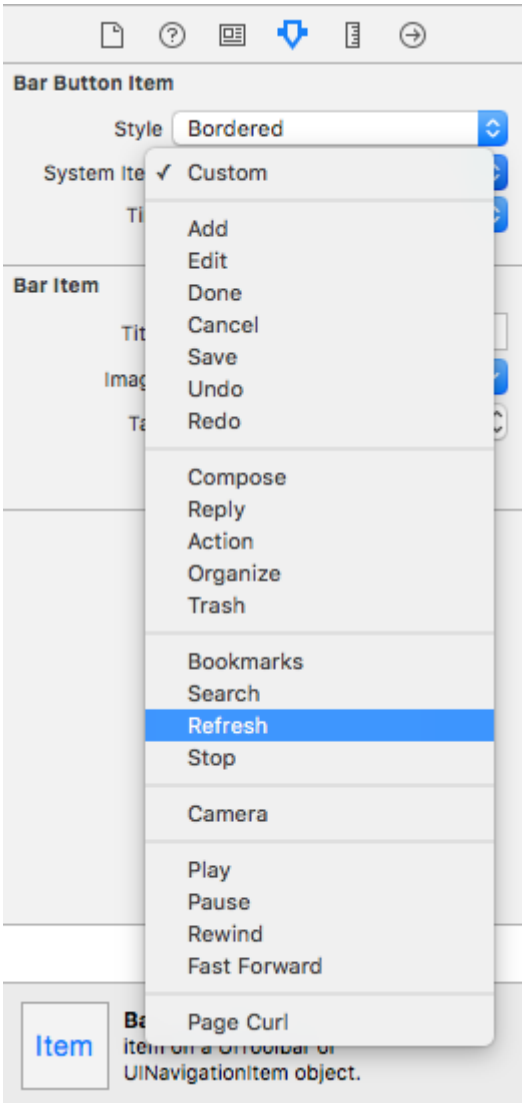
`UINavigationBar` .

`UIBarButtonItem` .



.

"" " " . `UIBarButtonItem` .



.

IB

`@IBAction` `UIBarButtonItem` View Controller `@IBAction` .

```
class ViewController: UIViewController {

    @IBAction func refreshBarButtonItemTap(sender: UIBarButtonItem) {

        print("How refreshing!")
    }

}
```

.

- .

`barButtonItem` null (: Interface Builder)

-C

```
   barButtonItem.image = [barButtonItem.image
imageWithRenderingMode:UIImageRenderingModeAlwaysOriginal];
```

UIBarButtonItem : https://riptutorial.com/ko/ios/topic/1543/uibarbuttonitem

84: UIBezierPath

Examples

UIBezierPath

:

```
 UIBezierPath* rectanglePath = [UIBezierPath bezierPathWithRoundedRect:
CGRectMake(x,y,width,height) cornerRadius: 11];
[UIColor.grayColor setFill];
[rectanglePath fill];
```

:

```
 UIBezierPath* rectanglePath = [UIBezierPath bezierPathWithRoundedRect:
CGRectMake(x,y,width,height) byRoundingCorners: UIRectCornerTopLeft cornerRadii:
CGSizeMake(11, 11)];
[rectanglePath closePath];
[UIColor.grayColor setFill];
[rectanglePath fill];
```

:

```
UIBezierPath* rectanglePath = [UIBezierPath bezierPathWithRoundedRect:
CGRectMake(x,y,width,height) byRoundingCorners: UIRectCornerTopRight cornerRadii:
```

```
CGSizeMake(11, 11)];
[rectanglePath closePath];
[UIColor.grayColor setFill];
[rectanglePath fill];
```

:

```
UIBezierPath* rectanglePath = [UIBezierPath bezierPathWithRoundedRect:
CGRectMake(x,y,width,height) byRoundingCorners: UIRectCornerBottomLeft cornerRadii:
CGSizeMake(11, 11)];
[rectanglePath closePath];
[UIColor.grayColor setFill];
[rectanglePath fill];
```

:

```
 UIBezierPath* rectanglePath = [UIBezierPath bezierPathWithRoundedRect:
CGRectMake(x,y,width,height) byRoundingCorners: UIRectCornerBottomRight cornerRadii:
CGSizeMake(11, 11)];
[rectanglePath closePath];
[UIColor.grayColor setFill];
[rectanglePath fill];
```

:

```
UIBezierPath* rectanglePath = [UIBezierPath bezierPathWithRoundedRect:
CGRectMake(x,y,width,height) byRoundingCorners: UIRectCornerBottomLeft |
UIRectCornerBottomRight cornerRadii: CGSizeMake(11, 11)];
[rectanglePath closePath];
[UIColor.grayColor setFill];
```

```
[rectanglePath fill];
```

:

```
UIBezierPath* rectanglePath = [UIBezierPath bezierPathWithRoundedRect:
CGRectMake(x,y,width,height) byRoundingCorners: UIRectCornerTopLeft | UIRectCornerTopRight
cornerRadii: CGSizeMake(11, 11)];
[rectanglePath closePath];
[UIColor.grayColor setFill];
[rectanglePath fill];
```

UIBezierPath

:

```
UIBezierPath* ovalPath = [UIBezierPath bezierPathWithOvalInRect: CGRectMake(0,0,50,50)];
[UIColor.grayColor setFill];
[ovalPath fill];
```

:

```
let ovalPath = UIBezierPath(ovalInRect: CGRect(x: 0, y: 0, width: 50, height: 50))
UIColor.grayColor().setFill()
ovalPath.fill()
```

:

```
UIBezierPath* rectanglePath = [UIBezierPath bezierPathWithRect: CGRectMake(0,0,50,50)];
[UIColor.grayColor setFill];
[rectanglePath fill];
```

:

```
let rectanglePath = UIBezierPath(rect: CGRect(x: 0, y: 0, width: 50, height: 50))
UIColor.grayColor().setFill()
rectanglePath.fill()
```

:

```
UIBezierPath* bezierPath = [UIBezierPath bezierPath];
[bezierPath moveToPoint: CGPointMake(x1,y1)];
[bezierPath addLineToPoint: CGPointMake(x2,y2)];
[UIColor.blackColor setStroke];
bezierPath.lineWidth = 1;
[bezierPath stroke];
```

:

```
let bezierPath = UIBezierPath()
bezierPath.moveToPoint(CGPoint(x: x1, y: y1))
bezierPath.addLineToPoint(CGPoint(x: x2, y: y2))
UIColor.blackColor().setStroke()
bezierPath.lineWidth = 1
bezierPath.stroke()
```

:

```
 CGRect ovalRect = CGRectMake(x,y,width,height);
UIBezierPath* ovalPath = [UIBezierPath bezierPath];
[ovalPath addArcWithCenter: CGPointMake(0, 0) radius: CGRectGetWidth(ovalRect) / 2 startAngle:
180 * M_PI/180 endAngle: 0 * M_PI/180 clockwise: YES];
[ovalPath addLineToPoint: CGPointMake(0, 0)];
[ovalPath closePath];

CGAffineTransform ovalTransform = CGAffineTransformMakeTranslation(CGRectGetMidX(ovalRect),
CGRectGetMidY(ovalRect));
ovalTransform = CGAffineTransformScale(ovalTransform, 1, CGRectGetHeight(ovalRect) /
CGRectGetWidth(ovalRect));
[ovalPath applyTransform: ovalTransform];

[UIColor.grayColor setFill];
[ovalPath fill];
```

:

```
let ovalRect = CGRect(x: 0, y: 0, width: 50, height: 50)
let ovalPath = UIBezierPath()
ovalPath.addArcWithCenter(CGPoint.zero, radius: ovalRect.width / 2, startAngle: 180 *
CGFloat(M_PI)/180, endAngle: 0 * CGFloat(M_PI)/180, clockwise: true)
ovalPath.addLineToPoint(CGPoint.zero)
ovalPath.closePath()

var ovalTransform = CGAffineTransformMakeTranslation(CGRectGetMidX(ovalRect),
CGRectGetMidY(ovalRect))
ovalTransform = CGAffineTransformScale(ovalTransform, 1, ovalRect.height / ovalRect.width)
ovalPath.applyTransform(ovalTransform)

UIColor.grayColor().setFill()
ovalPath.fill()
```

:

```
UIBezierPath* polygonPath = [UIBezierPath bezierPath];
[polygonPath moveToPoint: CGPointMake(x1, y1)];
[polygonPath addLineToPoint: CGPointMake(x2, y2)];
[polygonPath addLineToPoint: CGPointMake(x3, y2)];
[polygonPath closePath];
[UIColor.grayColor setFill];
[polygonPath fill];
```

:

```
let polygonPath = UIBezierPath()
polygonPath.moveToPoint(CGPoint(x: x1, y: y1))
polygonPath.addLineToPoint(CGPoint(x: x2, y: y2))
polygonPath.addLineToPoint(CGPoint(x: x3, y: y3))
polygonPath.closePath()
UIColor.grayColor().setFill()
polygonPath.fill()
```

UIBezierPath + AutoLayout

viewRect .

```
- (void)drawRect:(CGRect)frame
{
    UIBezierPath* rectanglePath = [UIBezierPath bezierPathWithRect:
CGRectMake(CGRectGetMinX(frame), CGRectGetMinY(frame), CGRectGetWidth(frame),
CGRectGetHeight(frame))];
    [UIColor.grayColor setFill];
    [rectanglePath fill];
}
```

UIBezierPath

.

```
 UIBezierPath* rectanglePath = [UIBezierPath bezierPathWithRect:
CGRectMake(x,y,width,height)];
 [UIColor.grayColor setFill];
 [rectanglePath fill];
```

:

```
CGContextRef context = UIGraphicsGetCurrentContext();

NSShadow* shadow = [[NSShadow alloc] init];
[shadow setShadowColor: UIColor.blackColor];
[shadow setShadowOffset: CGSizeMake(7.1, 5.1)];
[shadow setShadowBlurRadius: 5];

UIBezierPath* rectanglePath = [UIBezierPath bezierPathWithRect: CGRectMake(x,y,width,height)];
CGContextSaveGState(context);
CGContextSetShadowWithColor(context, shadow.shadowOffset, shadow.shadowBlurRadius,
[shadow.shadowColor CGColor]);
[UIColor.grayColor setFill];
[rectanglePath fill];
CGContextRestoreGState(context);
```

:

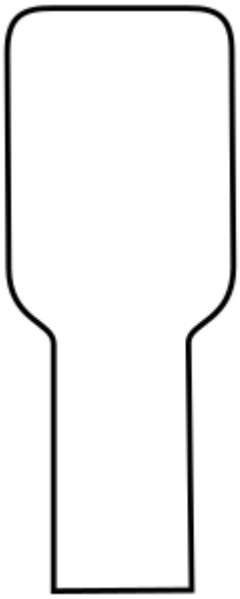
```
CGContextRef context = UIGraphicsGetCurrentContext();

NSShadow* shadow = [[NSShadow alloc] init];
[shadow setShadowColor: UIColor.blackColor];
[shadow setShadowOffset: CGSizeMake(9.1, -7.1)];
[shadow setShadowBlurRadius: 6];

UIBezierPath* rectanglePath = [UIBezierPath bezierPathWithRect: CGRectMake(x,y,width,height)];
[UIColor.grayColor setFill];
[rectanglePath fill];

CGContextSaveGState(context);
UIRectClip(rectanglePath.bounds);
CGContextSetShadowWithColor(context, CGSizeZero, 0, NULL);

CGContextSetAlpha(context, CGColorGetAlpha([shadow.shadowColor CGColor]));
CGContextBeginTransparencyLayer(context, NULL);
{
    UIColor* opaqueShadow = [shadow.shadowColor colorWithAlphaComponent: 1];
    CGContextSetShadowWithColor(context, shadow.shadowOffset, shadow.shadowBlurRadius,
[opaqueShadow CGColor]);
    CGContextSetBlendMode(context, kCGBlendModeSourceOut);
    CGContextBeginTransparencyLayer(context, NULL);

    [opaqueShadow setFill];
    [rectanglePath fill];

    CGContextEndTransparencyLayer(context);
}
CGContextEndTransparencyLayer(context);
CGContextRestoreGState(context);
```

. .

.

1. .
2. , .
3. .
4. drawRect CAShapeLayer CAShapeLayer .

, . .



( ), ( ) ( ) .

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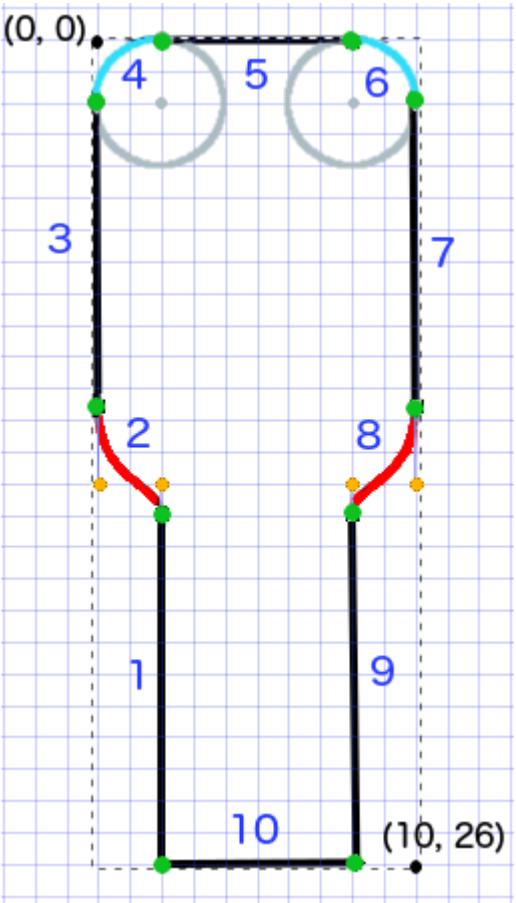

(0, 0)
4
5
6
3
7
2
8
1
9
10
(10, 26)

- .
- .
-

.

- .
- .
- .
- .

. x y . .

.

1. `UIBezierPath`
2. `moveToPoint`
3.

- line : `addLineToPoint`
- : `addArcWithCenter`
- curve : `addCurveToPoint`

4. `closePath`

.

```
func createBezierPath() -> UIBezierPath {

    // create a new path
    let path = UIBezierPath()

    // starting point for the path (bottom left)
    path.moveToPoint(CGPoint(x: 2, y: 26))

    // **********************
    // ***** Left side *****
    // **********************

    // segment 1: line
    path.addLineToPoint(CGPoint(x: 2, y: 15))

    // segment 2: curve
    path.addCurveToPoint(CGPoint(x: 0, y: 12), // ending point
        controlPoint1: CGPoint(x: 2, y: 14),
        controlPoint2: CGPoint(x: 0, y: 14))

    // segment 3: line
    path.addLineToPoint(CGPoint(x: 0, y: 2))

    // **********************
    // ****** Top side *****
    // **********************

    // segment 4: arc
    path.addArcWithCenter(CGPoint(x: 2, y: 2), // center point of circle
        radius: 2, // this will make it meet our path line
        startAngle: CGFloat(M_PI), // π radians = 180 degrees = straight left
        endAngle: CGFloat(3*M_PI_2), // 3π/2 radians = 270 degrees = straight up
```

```
        clockwise: true) // startAngle to endAngle goes in a clockwise direction

    // segment 5: line
    path.addLineToPoint(CGPoint(x: 8, y: 0))

    // segment 6: arc
    path.addArcWithCenter(CGPoint(x: 8, y: 2),
        radius: 2,
        startAngle: CGFloat(3*M_PI_2), // straight up
        endAngle: CGFloat(0), // 0 radians = straight right
        clockwise: true)

    // *********************
    // ***** Right side ****
    // *********************

    // segment 7: line
    path.addLineToPoint(CGPoint(x: 10, y: 12))

    // segment 8: curve
    path.addCurveToPoint(CGPoint(x: 8, y: 15), // ending point
        controlPoint1: CGPoint(x: 10, y: 14),
        controlPoint2: CGPoint(x: 8, y: 14))

    // segment 9: line
    path.addLineToPoint(CGPoint(x: 8, y: 26))

    // *********************
    // **** Bottom side ****
    // *********************

    // segment 10: line
    path.closePath() // draws the final line to close the path

    return path
}
```

: ( ). .

---

drawRect .

1 :

. CAShapeLayer .

```
import UIKit
class MyCustomView: UIView {

    override init(frame: CGRect) {
        super.init(frame: frame)
        setup()
    }

    required init?(coder aDecoder: NSCoder) {
        super.init(coder: aDecoder)
        setup()
    }
```

```
    func setup() {

        // Create a CAShapeLayer
        let shapeLayer = CAShapeLayer()

        // The Bezier path that we made needs to be converted to
        // a CGPath before it can be used on a layer.
        shapeLayer.path = createBezierPath().CGPath

        // apply other properties related to the path
        shapeLayer.strokeColor = UIColor.blueColor().CGColor
        shapeLayer.fillColor = UIColor.whiteColor().CGColor
        shapeLayer.lineWidth = 1.0
        shapeLayer.position = CGPoint(x: 10, y: 10)

        // add the new layer to our custom view
        self.layer.addSublayer(shapeLayer)
    }

    func createBezierPath() -> UIBezierPath {

        // see previous code for creating the Bezier path
    }
}
```

View Controller .

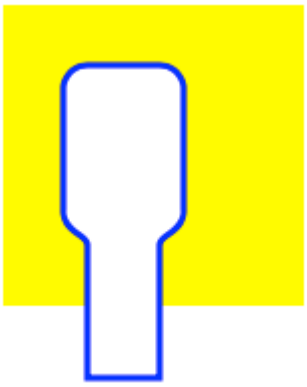
```
override func viewDidLoad() {
    super.viewDidLoad()

    // create a new UIView and add it to the view controller
    let myView = MyCustomView()
    myView.frame = CGRect(x: 100, y: 100, width: 50, height: 50)
    myView.backgroundColor = UIColor.yellowColor()
    view.addSubview(myView)

}
```

...

, . .

```
let path = createBezierPath()
let scale = CGAffineTransformMakeScale(2, 2)
```

```
path.applyTransform(scale)
shapeLayer.path = path.CGPath
```



2 : drawRect

drawRect .

.

```
import UIKit
class MyCustomView: UIView {

    override func drawRect(rect: CGRect) {

        // create path (see previous code)
        let path = createBezierPath()

        // fill
        let fillColor = UIColor.whiteColor()
        fillColor.setFill()

        // stroke
        path.lineWidth = 1.0
        let strokeColor = UIColor.blueColor()
        strokeColor.setStroke()

        // Move the path to a new location
        path.applyTransform(CGAffineTransformMakeTranslation(10, 10))

        // fill and stroke the path (always do these last)
        path.fill()
        path.stroke()

    }

    func createBezierPath() -> UIBezierPath {

        // see previous code for creating the Bezier path
    }
}
```

...

.

- (Bézier) (.)
- : 19 - ( )
- ( )
- (Bezier Curves) ( )

- .
- .

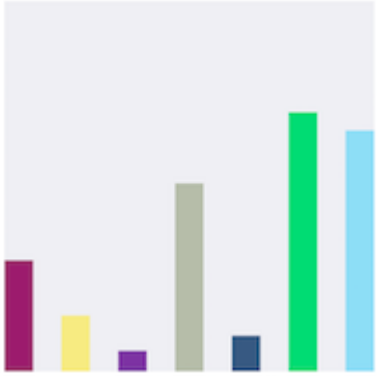
UIBezierPath

```
- (void)drawRect:(CGRect)rect {

    NSArray *data = @[@30, @15, @5, @17, @3, @10, @20];

    // 1. context
    CGContextRef cxtRef = UIGraphicsGetCurrentContext();

    CGPoint center = CGPointMake(150, 150);
    CGFloat radius = 150;
    __block CGFloat startAngle = 0;
    [data enumerateObjectsUsingBlock:^(NSNumber * _Nonnull obj, NSUInteger idx, BOOL *
_Nonnull stop) {

        // 2. create path
        CGFloat endAngle = obj.floatValue / 100 * M_PI * 2 + startAngle;
        UIBezierPath *circlePath = [UIBezierPath bezierPathWithArcCenter:center radius:radius
startAngle:startAngle endAngle:endAngle clockwise:YES];
        [circlePath addLineToPoint:center];
```

```
        // 3. add path
        CGContextAddPath(cxtRef, circlePath.CGPath);

        // set color
        [[UIColor colorWithRed:((float)arc4random_uniform(256) / 255.0)
green:((float)arc4random_uniform(256) / 255.0) blue:((float)arc4random_uniform(256) / 255.0)
alpha:1.0] setFill];

        // 4. render
        CGContextDrawPath(cxtRef, kCGPathFill);

        // reset angle
        startAngle = endAngle;
    }];
}
```

```
override func draw(_ rect: CGRect) {
    // define data to create pie chart
    let data: [Int] = [30, 15, 5, 17, 3, 10, 20]

    // 1. find center of draw rect
    let center: CGPoint = CGPoint(x: rect.midX, y: rect.midY)

    // 2. calculate radius of pie
    let radius = min(rect.width, rect.height) / 2.0

    var startAngle: CGFloat = 0.0
    for value in data {

      // 3. calculate end angle for slice
      let endAngle = CGFloat(value) / 100.0 * CGFloat.pi * 2.0 + startAngle

      // 4. create UIBezierPath for slide
      let circlePath = UIBezierPath(arcCenter: center, radius: radius, startAngle: startAngle,
endAngle: endAngle, clockwise: true)

      // 5. add line to center to close path
      circlePath.addLine(to: center)

      // 6. set fill color for current slice
      UIColor(red: (CGFloat(arc4random_uniform(256)) / 255.0), green:
(CGFloat(arc4random_uniform(256)) / 255.0), blue: (CGFloat(arc4random_uniform(256)) / 255.0),
alpha: 1.0).setFill()

      // 7. fill slice path
      circlePath.fill()

      // 8. set end angle as start angle for next slice
      startAngle = endAngle
    }
  }
```

-



```
- (void)drawRect:(CGRect)rect {

    NSArray *data = @[@300, @150.65, @55.3, @507.7, @95.8, @700, @650.65];

    // 1.
    CGContextRef cxtRef = UIGraphicsGetCurrentContext();

    NSInteger columnCount = 7;
    CGFloat width = self.bounds.size.width / (columnCount + columnCount - 1);
    for (NSInteger i = 0; i < columnCount; i++) {

        // 2.
        CGFloat height = [data[i] floatValue] / 1000 * self.bounds.size.height;  // floatValue
        CGFloat x = 0 + width * (2 * i);
        CGFloat y = self.bounds.size.height - height;
        UIBezierPath *rectPath = [UIBezierPath bezierPathWithRect:CGRectMake(x, y, width,
height)];
        CGContextAddPath(cxtRef, rectPath.CGPath);

        // 3.
        [[UIColor colorWithRed:((float)arc4random_uniform(256) / 255.0)
green:((float)arc4random_uniform(256) / 255.0) blue:((float)arc4random_uniform(256) / 255.0)
alpha:1.0] setFill];
        CGContextDrawPath(cxtRef, kCGPathFill);
    }
}
```

```
override func draw(_ rect: CGRect) {
    // define data for chart
    let data: [CGFloat] = [300, 150.65, 55.3, 507.7, 95.8, 700, 650.65]

    // 1. calculate number of columns
    let columnCount = data.count

    // 2. calculate column width
    let columnWidth = rect.width / CGFloat(columnCount + columnCount - 1)

    for (columnIndex, value) in data.enumerated() {
      // 3. calculate column height
      let columnHeight = value / 1000.0 * rect.height

      // 4. calculate column origin
      let columnOrigin = CGPoint(x: (columnWidth * 2.0 * CGFloat(columnIndex)), y:
(rect.height - columnHeight))

      // 5. create path for column
```

```
      let columnPath = UIBezierPath(rect: CGRect(origin: columnOrigin, size: CGSize(width:
columnWidth, height: columnHeight)))

      // 6. set fill color for current column
      UIColor(red: (CGFloat(arc4random_uniform(256)) / 255.0), green:
(CGFloat(arc4random_uniform(256)) / 255.0), blue: (CGFloat(arc4random_uniform(256)) / 255.0),
alpha: 1.0).setFill()

      // 7. fill column path
      columnPath.fill()
    }
  }
```

UIBezierPath : https://riptutorial.com/ko/ios/topic/3186/uibezierpath

85: UIButton

UIButton : UIControl . , . .

. .

- UIButtonTypeCustom

```
No button style.
```

- UIButtonTypeSystem

```
A system style button, such as those shown in navigation bars and toolbars.
```

- UIButtonTypeDetailDisclosure

```
A detail disclosure button.
```

- UIButtonTypeInfoLight

```
An information button that has a light background.
```

- UIButtonTypeInfoDark

```
An information button that has a dark background.
```

- UIButtonTypeContactAdd

```
A contact add button.
```

(,) (0, 0, 0, 0) . .

Examples

UIButton

UIButton .

```
let button = UIButton(frame: CGRect(x: x, y: y, width: width, height: height)
```

C

```
UIButton *button = [[UIButton alloc] initWithFrame:CGRectMake(x, y, width, height)];
```

UIButton .

```
let button = UIButton(type: .Custom)
```

C

```
UIButton *button = [UIButton buttonWithType:UIButtonTypeCustom];
```

type UIButtonType .

```
enum UIButtonType : Int {
    case Custom
    case System
    case DetailDisclosure
    case InfoLight
    case InfoDark
    case ContactAdd
    static var RoundedRect: UIButtonType { get }
}
```

```
button.setTitle(titleString, forState: controlState)
```

C

```
[button setTitle:(NSString *) forState:(UIControlState)];
```

"Hello, World!"

```
button.setTitle("Hello, World!", forState: .normal)
```

C

```
[button setTitle:@"Hello, World!" forControlState:UIControlStateNormal];
```

```
//Swift
button.setTitleColor(color, forControlState: controlState)

//Objective-C
[button setTitleColor:(nullable UIColor *) forState:(UIControlState)];
```

```
//Swift
button.setTitleColor(.blue, for: .normal)

//Objective-C
[button setTitleColor:[UIColor blueColor] forState:UIControlStateNormal]
```

```
//Align contents to the left of the frame
button.contentHorizontalAlignment = .left

//Align contents to the right of the frame
```

```
button.contentHorizontalAlignment = .right

//Align contents to the center of the frame
button.contentHorizontalAlignment = .center

//Make contents fill the frame
button.contentHorizontalAlignment = .fill
```

C

```
//Align contents to the left
button.contentHorizontalAlignment = UIControlContentHorizontalAlignmentLeft;

//Align contents to the right
button.contentHorizontalAlignment = UIControlContentHorizontalAlignmentRight;

//Align contents to the center
button.contentHorizontalAlignment = UIControlContentHorizontalAlignmentCenter;

//Align contents to fill the frame
button.contentHorizontalAlignment = UIControlContentHorizontalAlignmentFill;
```

.

```
var label: UILabel? = button.titleLabel
```

C

```
UILabel *label = button.titleLabel;
```

```
button.titleLabel?.font = UIFont.boldSystemFontOfSize(12)
```

C

```
button.titleLabel.font = [UIFont boldSystemFontOfSize:12];
```

UIButton

.

```
myButton.isEnabled = false
```

-C :

```
myButton.enabled = NO;
```

.

Button

`adjustsImageWhenDisabled` `false` / `NO`

UIButton ( )

.

-C

```
-(void)someButtonAction:(id)sender {
  // sender is the object that was tapped, in this case its the button.
    NSLog(@"Button is tapped");
}
```

```
func someButtonAction() {
    print("Button is tapped")
}
```

.

C

```
[yourButtonInstance addTarget:self action:@selector(someButtonAction)
forControlEvents:UIControlEventTouchUpInside];
```

```
yourButtonInstance.addTarget(self, action: #selector(someButtonAction), forControlEvents:
.TouchUpInside)
```

ControlEvents `ENUM` UIControlEvents .

```
myButton.titleLabel?.font =  UIFont(name: "YourFontName", size: 20)
```

C

```
myButton.titleLabel.font = [UIFont fontWithName:@"YourFontName" size:20];
```

.

-C

```
-(void) someButtonAction{
    NSLog(@"Button is tapped");

}
```

```
func someButtonAction() {
        print("Button is tapped")
    }
```

.

C

```
[yourButtonInstance addTarget:self action:@selector(someButtonAction)
forControlEvents:UIControlEventTouchUpInside];
```

```
yourButtonInstance.addTarget(self, action: #selector(someButtonAction), forControlEvents:
.touchUpInside)
```

ControlEvents , ENUM UIControlEvents .

UIButton .

UIButton intrinsicContentSize .

```
button.intrinsicContentSize.width
```

-C

```
button.intrinsicContentSize.width;
```

```
button.setImage(UIImage(named:"test-image"), forState: .normal)
```

C

```
[self.button setImage:[UIImage imageNamed:@"test-image"] forState:UIControlStateNormal];
```

UIControlStates (: Selected Highlighted).

```
button.setImage(UIImage(named:"test-image"), forState:[.selected, .highlighted])
```

C

```
[self.button setImage:[UIImage imageNamed:@"test-image"]
forState:UIControlStateSelected|UIControlStateHighlighted];
```

UIButton : https://riptutorial.com/ko/ios/topic/516/uibutton

86: UICollectionView

Examples

```
func createCollectionView() {
    let layout: UICollectionViewFlowLayout = UICollectionViewFlowLayout()
    let collectionView = UICollectionView(frame: CGRect(x: 0, y: 0, width: view.frame.width,
height: view.frame.height), collectionViewLayout: layout)
    collectionView.dataSource = self
    collectionView.delegate = self
    view.addSubview(collectionView)
}
```

-C

```
- (void)createCollectionView {
    UICollectionViewFlowLayout *layout = [[UICollectionViewFlowLayout alloc] init];
    UICollectionView *collectionView = [[UICollectionView alloc] initWithFrame:CGRectMake(0,
0, self.view.frame.size.width, self.view.frame.size.height) collectionViewLayout:layout];
    [collectionView setDataSource:self];
    [collectionView setDelegate:self];
    [self.view addSubview:collectionView];
}
```

Swift - UICollectionViewDelegateFlowLayout

```
// MARK: - UICollectionViewDelegateFlowLayout
extension ViewController: UICollectionViewDelegateFlowLayout {
    func collectionView(collectionView: UICollectionView, layout collectionViewLayout:
UICollectionViewLayout, sizeForItemAtIndexPath indexPath: NSIndexPath) -> CGSize {
        return CGSize(width: 50, height: 50)
    }
    func collectionView(collectionView: UICollectionView, layout collectionViewLayout:
UICollectionViewLayout, insetForSectionAtIndex section: Int) -> UIEdgeInsets {
        return UIEdgeInsets(top: 5, left: 5, bottom: 5, right: 5)
    }
    func collectionView(collectionView: UICollectionView, layout collectionViewLayout:
UICollectionViewLayout, minimumLineSpacingForSectionAtIndex section: Int) -> CGFloat {
        return 5.0
    }
    func collectionView(collectionView: UICollectionView, layout collectionViewLayout:
UICollectionViewLayout, minimumInteritemSpacingForSectionAtIndex section: Int) -> CGFloat {
        return 5.0
    }
}
```

UICollectionView

`CGRect  UICollectionView .`

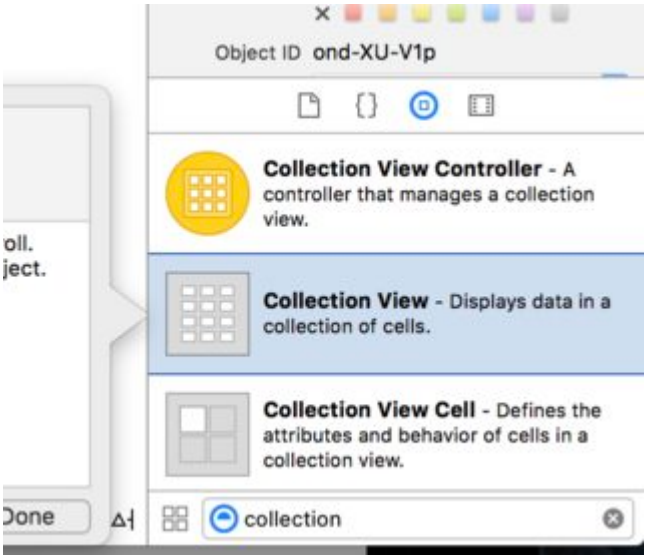
:

```
let collection = UICollectionView(frame: CGRect(x: 0, y: 0, width: 200, height: 21))
```

C :

```
UICollectionView *collection = [[UICollectionView alloc] initWithFrame:CGRectMake(0, 0, 200, 21)];
```

Interface Builder `UICollectionView`



UICollectionView -

`Datasource` . `Datasource` `UICollectionView` . `Datasource` `collectionView:numberOfItemsInSection:` `collectionView:cellForItemAtIndexPath:` .

```
func collectionView(collectionView: UICollectionView, numberOfItemsInSection section: Int) -> Int {
    // Return how many items in section
    let sectionArray = _data[section]
    return sectionArray.count
}

func collectionView(collectionView: UICollectionView, cellForItemAtIndexPath indexPath: NSIndexPath) -> UICollectionViewCell {

   let cell = collectionView.dequeueReusableCellWithReuseIdentifier(MyCellID)
   // If you use a custom cell class then cast the cell returned, like:
   // as! MyCollectionViewCellClass
   // or you will have errors when you try to use features of that class.

   //Customize your cell here, default UICollectionViewCells do not contain any inherent
   //text or image views (like UITableView), but some could be added,
   //or a custom UICollectionViewCell sub-class could be used
   return cell
}
```

C

```
- (NSInteger)collectionView:(UICollectionView*)collectionView
```

```
numberOfItemsInSection:(NSInteger)section {
    // Return how many items in section
    NSArray *sectionArray = [_data objectAtIndex:section];
    return [sectionArray count];
}

- (UICollectionViewCell *)collectionView:(UICollectionView *)collectionView
                 cellForItemAtIndexPath:(NSIndexPath *)indexPath {
   // Return a cell
   UICollectionViewCell *newCell = [self.collectionView
                                    dequeueReusableCellWithReuseIdentifier:MyCellID

                                                                forIndexPath:indexPath];
   //Customize your cell here, default UICollectionViewCells do not contain any inherent
   //text or image views (like UITableView), but some could be added,
   //or a custom UICollectionViewCell sub-class could be used
   return newCell;
}
```

.

(> > ...> iOS>). `MyCollectionViewCell` . .

```
import UIKit
class MyCollectionViewCell: UICollectionViewCell {

    @IBOutlet weak var myLabel: UILabel!
}
```

.

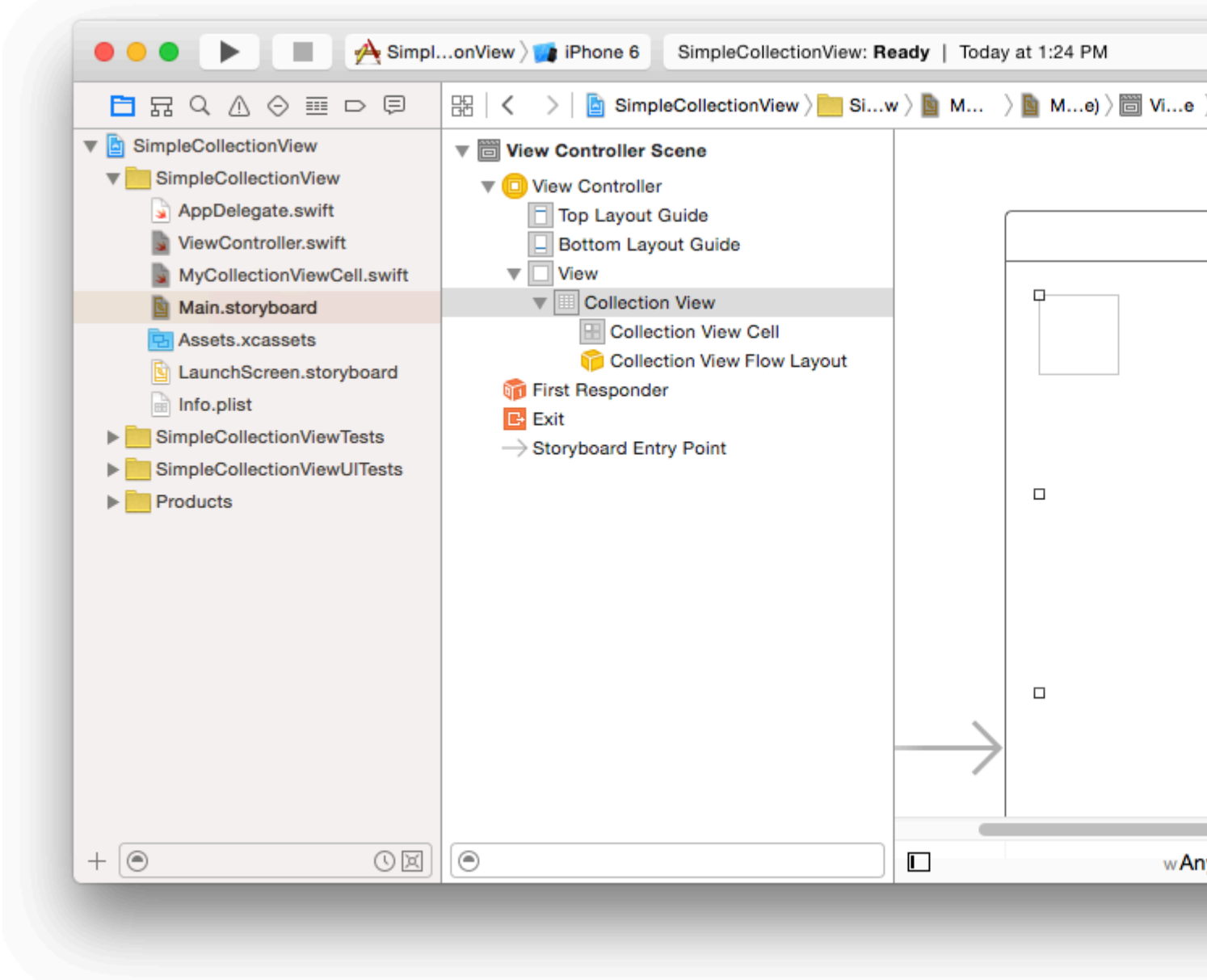
ViewController.swift .

```
import UIKit
class ViewController: UIViewController, UICollectionViewDataSource, UICollectionViewDelegate {

    let reuseIdentifier = "cell" // also enter this string as the cell identifier in the
storyboard
    var items = ["1", "2", "3", "4", "5", "6", "7", "8", "9", "10", "11", "12", "13", "14",
"15", "16", "17", "18", "19", "20", "21", "22", "23", "24", "25", "26", "27", "28", "29",
"30", "31", "32", "33", "34", "35", "36", "37", "38", "39", "40", "41", "42", "43", "44",
"45", "46", "47", "48"]


    // MARK: - UICollectionViewDataSource protocol

    // tell the collection view how many cells to make
    func collectionView(collectionView: UICollectionView, numberOfItemsInSection section: Int)
-> Int {
        return self.items.count
    }

    // make a cell for each cell index path
    func collectionView(collectionView: UICollectionView, cellForItemAtIndexPath indexPath:
```

```
NSIndexPath) -> UICollectionViewCell {

        // get a reference to our storyboard cell
        let cell = collectionView.dequeueReusableCellWithReuseIdentifier(reuseIdentifier,
forIndexPath: indexPath) as! MyCollectionViewCell

        // Use the outlet in our custom class to get a reference to the UILabel in the cell
        cell.myLabel.text = self.items[indexPath.item]
        cell.backgroundColor = UIColor.yellowColor() // make cell more visible in our example
project

        return cell
    }

    // MARK: - UICollectionViewDelegate protocol

    func collectionView(collectionView: UICollectionView, didSelectItemAtIndexPath indexPath:
NSIndexPath) {
        // handle tap events
        print("You selected cell #\(indexPath.item)!")
    }
}
```

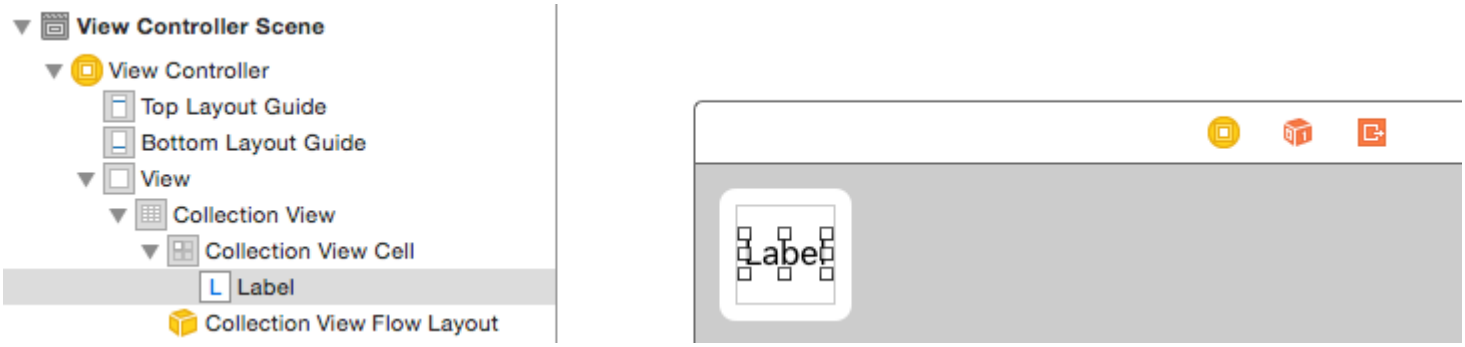
- `UICollectionViewDataSource` `UICollectionViewDelegate` . `UICollectionViewDelegateFlowLayout` .
- . .

View Controller . .



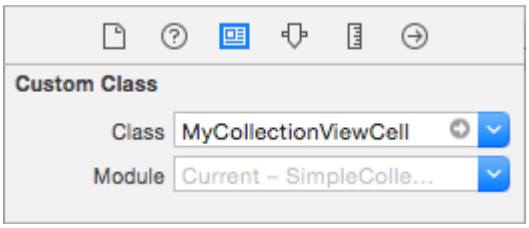
- : 1
- :

. . . .

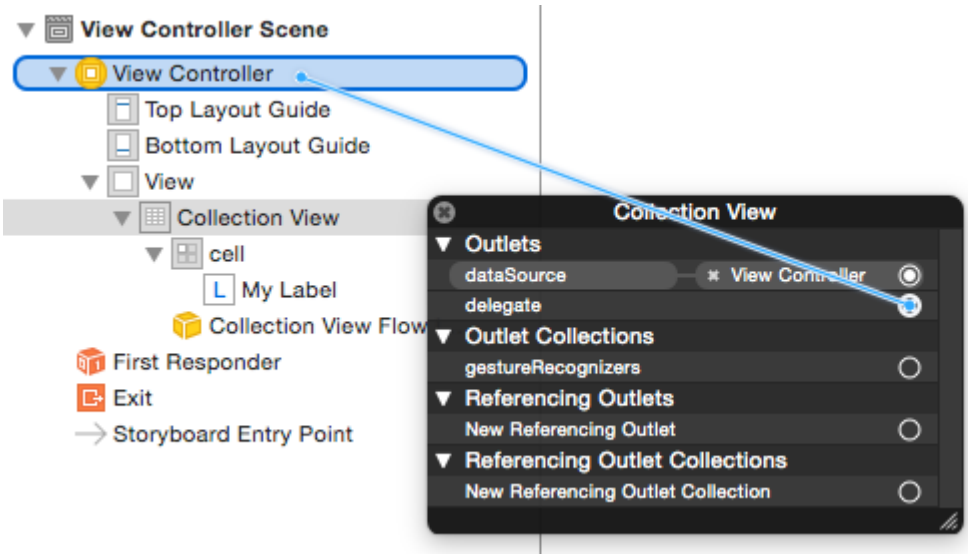


""( ) . ViewController.swift `let reuseIdentifier = "cell"` .

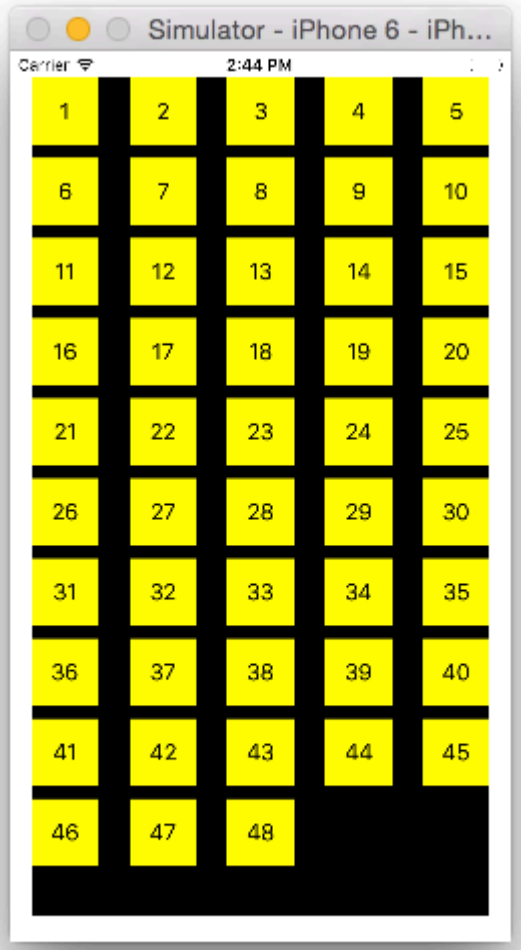
Identity Inspector `MyCollectionViewCell` .



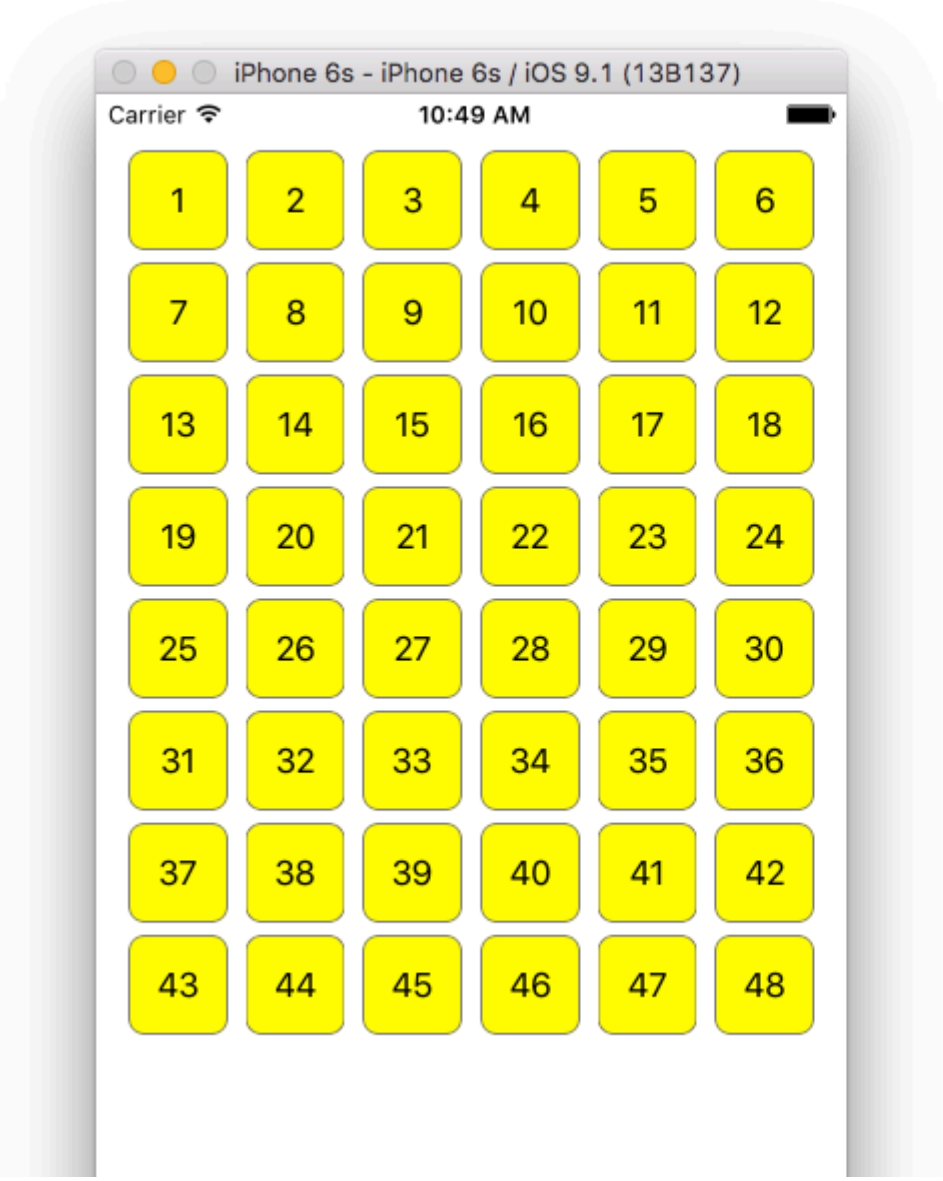
- Label `MyCollectionViewCell myLabel` . (Control .)
- `delegate` `dataSource` View Controller . (Collection View View Controller .)



Label Collection View .


Simulator - iPhone 6 - iPh...
Carrier
2:44 PM
1 2 3 4 5
6 7 8 9 10
11 12 13 14 15
16 17 18 19 20
21 22 23 24 25
26 27 28 29 30
31 32 33 34 35
36 37 38 39 40
41 42 43 44 45
46 47 48

.



- UICollectionView
- UICollectionView 1 :
- UICollectionView 2 :

`performBatchUpdates` . .

```
collecitonView.performBatchUpdates({
    // Perform updates
}, nil)
```

, , . indexPath .

	NSIndexPath
from : , to :	

	NSIndexPath
	( )

. .

deletion , move-from reload indexPath insertion , move-to reload move-to indexPath .

.

```
let from = [1, 2, 3, 4, 5]
let to = [1, 3, 6, 4, 5]

collecitonView.performBatchUpdates({
    collectionView.insertItemsAtIndexPaths([NSIndexPath(forItem: 2, inSection: 0)])
    collectionView.deleteItemsAtIndexPaths([NSIndexPath(forItem: 1, inSection: 0)])
    collectionView.moveItemAtIndexPath(NSIndexPath(forItem: 2, inSection: 0),
                                       toIndexPath: NSIndexPath(forItem: 1, inSection:0))
}, nil)
```

UICollectionViewDelegate

UICollectionViewDelegate UICollectionViewDelegate .

UIViewController MyViewController .

-C

MyViewController.h UICollectionViewDelegate .

```
@interface MyViewController : UIViewController <UICollectionViewDelegate, .../* previous
existing delegate, as UICollectionDataSource *>
```

MyViewController.swift .

```
class MyViewController : UICollectionViewDelegate {
}
```

.

-C

```
-(void)collectionView:(UICollectionView *)collectionView didSelectItemAtIndexPath:(NSIndexPath
*)indexPath
{
}
```

```
func collectionView(collectionView: UICollectionView, didSelectItemAtIndexPath indexPath:
NSIndexPath)
{
```

```
}
```

.

-C

```
-(void)collectionView:(UICollectionView *)collectionView didSelectItemAtIndexPath:(NSIndexPath
*)indexPath
{
    UICollectionViewCell* cell = [collectionView cellForItemAtIndexPath:indexPath];
    cell.backgroundColor = [UIColor greenColor];
}
```

```
class MyViewController : UICollectionViewDelegate {
    func collectionView(collectionView: UICollectionView, didSelectItemAtIndexPath indexPath:
NSIndexPath)
    {
        var cell : UICollectionViewCell = collectionView.cellForItemAtIndexPath(indexPath)!
        cell.backgroundColor = UIColor.greenColor()
    }
}
```

DataSource Flowlayout

didselect .

```
extension ProductsVC: UICollectionViewDelegate, UICollectionViewDataSource{

        // MARK: - UICollectionViewDataSource
        func collectionView(_ collectionView: UICollectionView, numberOfItemsInSection
section: Int) -> Int {
            guard collectionView == collectionCategory else {
                return arrOfProducts.count
            }
            return arrOfCategory.count
        }

        func collectionView(_ collectionView: UICollectionView, cellForItemAt indexPath:
IndexPath) -> UICollectionViewCell {

            guard collectionView == collectionProduct else {
                  let cell = collectionView.dequeueReusableCell(withReuseIdentifier:
"ProductCategoryCell", for: indexPath) as! ProductCategoryCell
                  cell.viewBackground.layer.borderWidth = 0.5
                  //Do some thing as per use
                  return cell
            }

            let cell = collectionView.dequeueReusableCell(withReuseIdentifier: cellIdentifier,
for: indexPath) as! ProductCell
            cell.contentView.layer.borderWidth = 0.5
            cell.contentView.layer.borderColor = UIColor.black.cgColor
            let json = arrOfProducts[indexPath.row]
            //Do something as per use
```

```
            return cell
        }

        func collectionView(_ collectionView: UICollectionView, didSelectItemAt indexPath:
IndexPath) {
            guard collectionView == collectionCategory else {
                let json = arrOfProducts[indexPath.row]
                // Do something for  collectionProduct here
                return
            }
            let json = arrOfCategory[indexPath.row] as [String: AnyObject]
            let id = json["cId"] as? String ?? ""
            // Do something
        }
    }

    extension ProductsVC: UICollectionViewDelegateFlowLayout{

        // MARK: - UICollectionViewDelegateFlowLayout
        func collectionView(_ collectionView: UICollectionView, layout collectionViewLayout:
UICollectionViewLayout, sizeForItemAt indexPath: IndexPath) -> CGSize {

            let collectionWidth = collectionView.bounds.width
            guard collectionView == collectionProduct else {
                var itemWidth = collectionWidth / 4 - 1;

                if(UI_USER_INTERFACE_IDIOM() == .pad) {
                    itemWidth = collectionWidth / 4 - 1;
                }
                return CGSize(width: itemWidth, height: 50)
            }

            var itemWidth = collectionWidth / 2 - 1;
            if(UI_USER_INTERFACE_IDIOM() == .pad) {
                itemWidth = collectionWidth / 4 - 1;
            }
            return CGSize(width: itemWidth, height: 250);
        }

        func collectionView(_ collectionView: UICollectionView, layout collectionViewLayout:
UICollectionViewLayout, minimumInteritemSpacingForSectionAt section: Int) -> CGFloat {
            return 1
        }

        func collectionView(_ collectionView: UICollectionView, layout collectionViewLayout:
UICollectionViewLayout, minimumLineSpacingForSectionAt section: Int) -> CGFloat {
            return 1
        }

    }
```

UICollectionView : https://riptutorial.com/ko/ios/topic/2399/uicollectionview

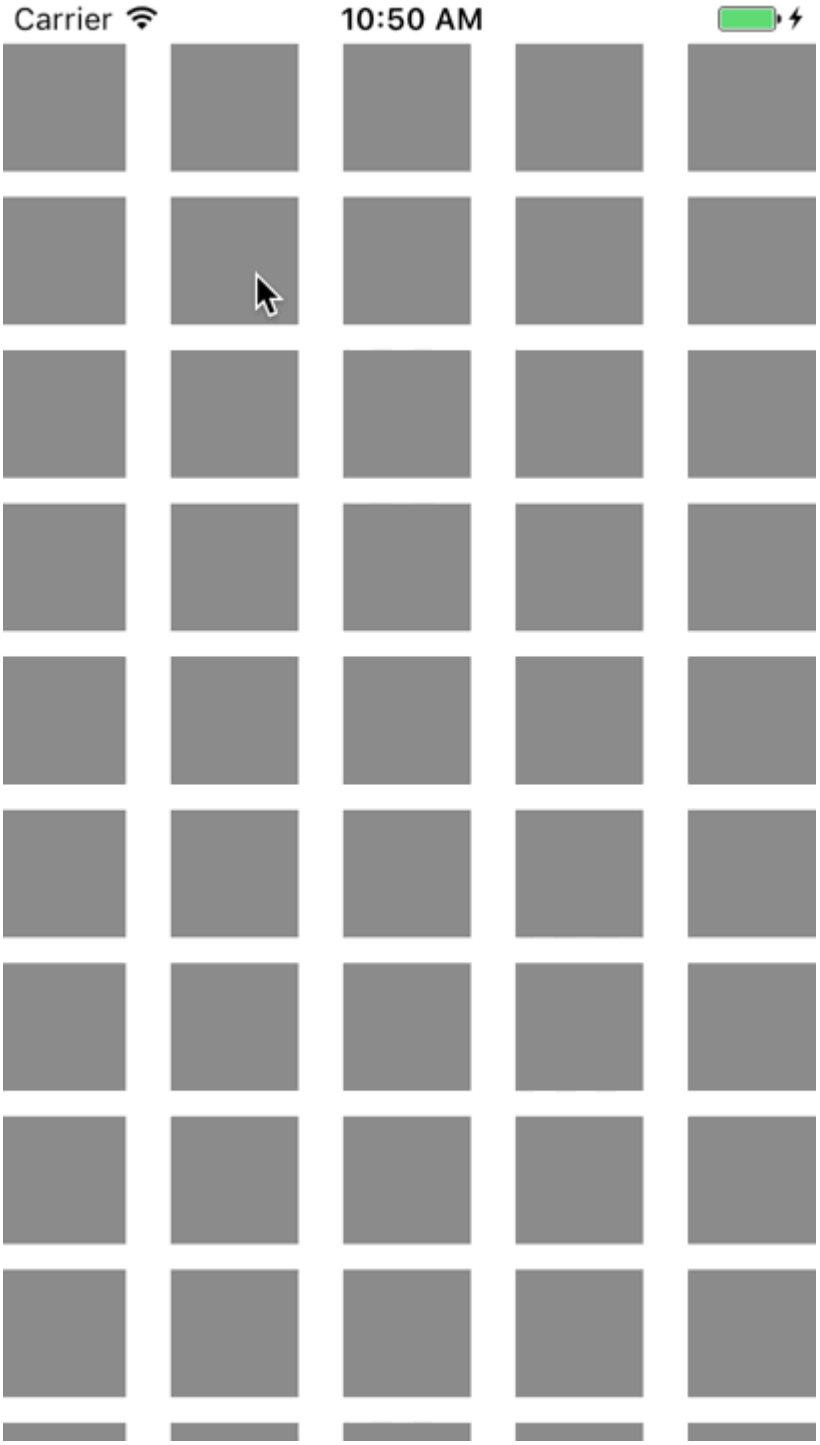
87: UICollectionView UIKit

UIKit Dynamics UIKit . UIKit Dynamics `UICollectionView` `UICollectionViewLayout` API .

Examples

UIDynamicAnimator

`UIDynamicBehavior` `UICollectionViewFlowLayout` . `UICollectionView` . `UIDynamicAnimator`
" " .



UIAttachmentBehavior UIDynamicItem UIDynamicItems .

. RectangleAttachmentBehavior

```
final class RectangleAttachmentBehavior: UIDynamicBehavior
{
    init(item: UIDynamicItem, point: CGPoint)
    {
        // Higher frequency more "ridged" formation
        let frequency: CGFloat = 8.0

        // Lower damping longer animation takes to come to rest
        let damping: CGFloat = 0.6

        super.init()

        // Attachment points are four corners of item
        let points = self.attachmentPoints(for: point)

        let attachmentBehaviors: [UIAttachmentBehavior] = points.map
        {
            let attachmentBehavior = UIAttachmentBehavior(item: item, attachedToAnchor: $0)
            attachmentBehavior.frequency = frequency
            attachmentBehavior.damping = damping
            return attachmentBehavior
        }

        attachmentBehaviors.forEach
        {
            addChildBehavior($0)
        }
    }

    func updateAttachmentLocation(with point: CGPoint)
    {
        // Update anchor points to new attachment points
        let points = self.attachmentPoints(for: point)
        let attachments = self.childBehaviors.flatMap { $0 as? UIAttachmentBehavior }
        let pairs = zip(points, attachments)
        pairs.forEach { $0.1.anchorPoint = $0.0 }
    }

    func attachmentPoints(for point: CGPoint) -> [CGPoint]
    {
        // Width and height should be close to the width and height of the item
        let width: CGFloat = 40.0
        let height: CGFloat = 40.0

        let topLeft = CGPoint(x: point.x - width * 0.5, y: point.y - height * 0.5)
        let topRight = CGPoint(x: point.x + width * 0.5, y: point.y - height * 0.5)
        let bottomLeft = CGPoint(x: point.x - width * 0.5, y: point.y + height * 0.5)
        let bottomRight = CGPoint(x: point.x + width * 0.5, y: point.y + height * 0.5)
        let points = [topLeft, topRight, bottomLeft, bottomRight]
        return points
    }
}
```

-C

```
@implementation RectangleAttachmentBehavior

- (instancetype)initWithItem:(id<UIDynamicItem>)item point:(CGPoint)point
{
    CGFloat frequency = 8.0f;
    CGFloat damping = 0.6f;
    self = [super init];
    if (self)
    {
        NSArray <NSValue *> *pointValues = [self attachmentPointValuesForPoint:point];
        for (NSValue *value in pointValues)
        {
            UIAttachmentBehavior *attachment = [[UIAttachmentBehavior alloc]initWithItem:item
attachedToAnchor:[value CGPointValue]];
            attachment.frequency = frequency;
            attachment.damping = damping;
            [self addChildBehavior:attachment];
        }
    }
    return self;
}

- (void)updateAttachmentLocationWithPoint:(CGPoint)point
{
    NSArray <NSValue *> *pointValues = [self attachmentPointValuesForPoint:point];
    for (NSInteger i = 0; i < pointValues.count; i++)
    {
        NSValue *pointValue = pointValues[i];
        UIAttachmentBehavior *attachment = self.childBehaviors[i];
        attachment.anchorPoint = [pointValue CGPointValue];
    }
}

- (NSArray <NSValue *> *)attachmentPointValuesForPoint:(CGPoint)point
{
    CGFloat width = 40.0f;
    CGFloat height = 40.0f;

    CGPoint topLeft = CGPointMake(point.x - width * 0.5, point.y - height * 0.5);
    CGPoint topRight = CGPointMake(point.x + width * 0.5, point.y - height * 0.5);
    CGPoint bottomLeft = CGPointMake(point.x - width * 0.5, point.y + height * 0.5);
    CGPoint bottomRight = CGPointMake(point.x + width * 0.5, point.y + height * 0.5);

    NSArray <NSValue *> *pointValues = @[[NSValue valueWithCGPoint:topLeft], [NSValue
valueWithCGPoint:topRight], [NSValue valueWithCGPoint:bottomLeft], [NSValue
valueWithCGPoint:bottomRight]];
    return pointValues;
}

@end
```

RectangleAttachmentBehavior .

```
final class DragBehavior: UIDynamicBehavior
{
    init(items: [UIDynamicItem], point: CGPoint)
    {
        super.init()
        items.forEach
        {
```

```
            let rectAttachment = RectangleAttachmentBehavior(item: $0, point: point)
            self.addChildBehavior(rectAttachment)
        }
    }

    func updateDragLocation(with point: CGPoint)
    {
        // Tell low-level behaviors location has changed
        self.childBehaviors.flatMap { $0 as? RectangleAttachmentBehavior }.forEach {
$0.updateAttachmentLocation(with: point) }
    }
}
```

-C

```
@implementation DragBehavior

- (instancetype)initWithItems:(NSArray <id<UIDynamicItem>> *)items point: (CGPoint)point
{
    self = [super init];
    if (self)
    {
        for (id<UIDynamicItem> item in items)
        {
            RectangleAttachmentBehavior *rectAttachment = [[RectangleAttachmentBehavior
alloc]initWithItem:item point:point];
            [self addChildBehavior:rectAttachment];
        }
    }
    return self;
}

- (void)updateDragLocationWithPoint:(CGPoint)point
{
    for (RectangleAttachmentBehavior *rectAttachment in self.childBehaviors)
    {
        [rectAttachment updateAttachmentLocationWithPoint:point];
    }
}

@end
```

. UICollectionViewFlowLayout UICollectionViewFlowLayout . layoutAttributesForElementsInRect UIDynamicAnimator's itemsInRect layoutAttributesForElementsInRect .

```
final class DraggableLayout: UICollectionViewFlowLayout
{
    // Array that holds dragged index paths
    var indexPathsForDraggingElements: [IndexPath]?

    // The dynamic animator that will animate drag behavior
    var animator: UIDynamicAnimator?

    // Custom high-level behavior that dictates drag animation
    var dragBehavior: DragBehavior?
```

```
    // Where dragging starts so can return there once dragging ends
    var startDragPoint = CGPoint.zero

    // Bool to keep track if dragging has ended
    var isFinishedDragging = false


    // Method to inform layout that dragging has started
    func startDragging(indexPaths selectedIndexPaths: [IndexPath], from point: CGPoint)
    {
        indexPathsForDraggingElements = selectedIndexPaths
        animator = UIDynamicAnimator(collectionViewLayout: self)
        animator?.delegate = self

        // Get all of the draggable attributes but change zIndex so above other cells
        let draggableAttributes: [UICollectionViewLayoutAttributes] =
selectedIndexPaths.flatMap {
            let attribute = super.layoutAttributesForItem(at: $0)
            attribute?.zIndex = 1
            return attribute
        }

        startDragPoint = point

        // Add them to high-level behavior
        dragBehavior = DragBehavior(items: draggableAttributes, point: point)

        // Add high-level behavior to animator
        animator?.addBehavior(dragBehavior!)
    }

    func updateDragLocation(_ point: CGPoint)
    {
        // Tell high-level behavior that point has updated
        dragBehavior?.updateDragLocation(with: point)
    }

    func endDragging()
    {
        isFinishedDragging = true

        // Return high-level behavior to starting point
        dragBehavior?.updateDragLocation(with: startDragPoint)
    }

    func clearDraggedIndexPaths()
    {
        // Reset state for next drag event
        animator = nil
        indexPathsForDraggingElements = nil
        isFinishedDragging = false
    }

    override func layoutAttributesForElements(in rect: CGRect) ->
[UICollectionViewLayoutAttributes]?
    {
        let existingAttributes: [UICollectionViewLayoutAttributes] =
super.layoutAttributesForElements(in: rect) ?? []
        var allAttributes = [UICollectionViewLayoutAttributes]()

        // Get normal flow layout attributes for non-drag items
```

```
        for attributes in existingAttributes
        {
            if (indexPathsForDraggingElements?.contains(attributes.indexPath) ?? false) ==
false
            {
                allAttributes.append(attributes)
            }
        }

        // Add dragged item attributes by asking animator for them
        if let animator = self.animator
        {
            let animatorAttributes: [UICollectionViewLayoutAttributes] = animator.items(in:
rect).flatMap { $0 as? UICollectionViewLayoutAttributes }
            allAttributes.append(contentsOf: animatorAttributes)
        }
        return allAttributes
    }
}
extension DraggableLayout: UIDynamicAnimatorDelegate
{
    func dynamicAnimatorDidPause(_ animator: UIDynamicAnimator)
    {
        // Animator has paused and done dragging; reset state
        guard isFinishedDragging else { return }
        clearDraggedIndexPaths()
    }
}
```

-C

```
@interface DraggableLayout () <UIDynamicAnimatorDelegate>
@property (nonatomic, strong) NSArray <NSIndexPath *> *indexPathsForDraggingElements;
@property (nonatomic, strong) UIDynamicAnimator *animator;
@property (nonatomic, assign) CGPoint startDragPoint;
@property (nonatomic, assign) BOOL finishedDragging;
@property (nonatomic, strong) DragBehavior *dragBehavior;
@end

@implementation DraggableLayout

- (void)startDraggingWithIndexPaths:(NSArray <NSIndexPath *> *)selectedIndexPaths
fromPoint:(CGPoint)point
{
    self.indexPathsForDraggingElements = selectedIndexPaths;
    self.animator = [[UIDynamicAnimator alloc]initWithCollectionViewLayout:self];
    self.animator.delegate = self;
    NSMutableArray *draggableAttributes = [[NSMutableArray
alloc]initWithCapacity:selectedIndexPaths.count];
    for (NSIndexPath *indexPath in selectedIndexPaths)
    {
        UICollectionViewLayoutAttributes *attributes = [super
layoutAttributesForItemAtIndexPath:indexPath];
        attributes.zIndex = 1;
        [draggableAttributes addObject:attributes];
    }
    self.startDragPoint = point;
    self.dragBehavior = [[DragBehavior alloc]initWithItems:draggableAttributes point:point];
    [self.animator addBehavior:self.dragBehavior];
```

```
}

- (void)updateDragLoactionWithPoint:(CGPoint)point
{
    [self.dragBehavior updateDragLocationWithPoint:point];
}

- (void)endDragging
{
    self.finishedDragging = YES;
    [self.dragBehavior updateDragLocationWithPoint:self.startDragPoint];
}

- (void)clearDraggedIndexPath
{
    self.animator = nil;
    self.indexPathsForDraggingElements = nil;
    self.finishedDragging = NO;
}

- (void)dynamicAnimatorDidPause:(UIDynamicAnimator *)animator
{
    if (self.finishedDragging)
    {
        [self clearDraggedIndexPath];
    }
}

- (NSArray<UICollectionViewLayoutAttributes *>
*)layoutAttributesForElementsInRect:(CGRect)rect
{
    NSArray *existingAttributes = [super layoutAttributesForElementsInRect:rect];
    NSMutableArray *allAttributes = [[NSMutableArray
alloc]initWithCapacity:existingAttributes.count];
    for (UICollectionViewLayoutAttributes *attributes in existingAttributes)
    {
        if (![self.indexPathsForDraggingElements containsObject:attributes.indexPath])
        {
            [allAttributes addObject:attributes];
        }
    }
    [allAttributes addObjectsFromArray:[self.animator itemsInRect:rect]];
    return allAttributes;
}

@end
```

UICollectionView .

```
final class ViewController: UIViewController
{
    // Collection view that displays cells
    lazy var collectionView: UICollectionView =
    {
        let collectionView = UICollectionView(frame: .zero, collectionViewLayout:
DraggableLayout())
        collectionView.backgroundColor = .white
        collectionView.translatesAutoresizingMaskIntoConstraints = false
        self.view.addSubview(collectionView)
        collectionView.topAnchor.constraint(equalTo:
```

```
self.topLayoutGuide.bottomAnchor).isActive = true
        collectionView.leadingAnchor.constraint(equalTo: self.view.leadingAnchor).isActive =
true
        collectionView.trailingAnchor.constraint(equalTo: self.view.trailingAnchor).isActive =
true
        collectionView.bottomAnchor.constraint(equalTo:
self.bottomLayoutGuide.topAnchor).isActive = true

        return collectionView
    }()

    // Gesture that drives dragging
    lazy var longPress: UILongPressGestureRecognizer =
    {
        let longPress = UILongPressGestureRecognizer(target: self, action:
#selector(self.handleLongPress(sender:)))
        return longPress
    }()

    // Array that holds selected index paths
    var selectedIndexPaths = [IndexPath]()

    override func viewDidLoad()
    {
        super.viewDidLoad()
        collectionView.delegate = self
        collectionView.dataSource = self
        collectionView.register(UICollectionViewCell.self, forCellWithReuseIdentifier: "Cell")
        collectionView.addGestureRecognizer(longPress)
    }

    func handleLongPress(sender: UILongPressGestureRecognizer)
    {
        guard let draggableLayout = collectionView.collectionViewLayout as? DraggableLayout
else { return }
        let location = sender.location(in: collectionView)
        switch sender.state
        {
        case .began:
            draggableLayout.startDragging(indexPaths: selectedIndexPaths, from: location)
        case .changed:
            draggableLayout.updateDragLocation(location)
        case .ended, .failed, .cancelled:
            draggableLayout.endDragging()
        case .possible:
            break
        }
    }
}
extension ViewController: UICollectionViewDelegate, UICollectionViewDataSource
{
    func collectionView(_ collectionView: UICollectionView, numberOfItemsInSection section:
Int) -> Int
    {
        return 1000
    }

    func collectionView(_ collectionView: UICollectionView, cellForItemAt indexPath:
IndexPath) -> UICollectionViewCell
    {
        let cell = collectionView.dequeueReusableCell(withReuseIdentifier: "Cell", for:
```

```
indexPath)
        cell.backgroundColor = .gray
        if selectedIndexPaths.contains(indexPath) == true
        {
            cell.backgroundColor = .red
        }
        return cell
    }

    func collectionView(_ collectionView: UICollectionView, didSelectItemAt indexPath:
IndexPath)
    {
        // Bool that determines if cell is being selected or unselected
        let isSelected = !selectedIndexPaths.contains(indexPath)
        let cell = collectionView.cellForItem(at: indexPath)
        cell?.backgroundColor = isSelected ? .red : .gray
        if isSelected
        {
            selectedIndexPaths.append(indexPath)
        }
        else
        {
            selectedIndexPaths.remove(at: selectedIndexPaths.index(of: indexPath)!)
        }
    }
}
```

-C

```
@interface ViewController () <UICollectionViewDelegate, UICollectionViewDataSource>
@property (nonatomic, strong) UICollectionView *collectionView;
@property (nonatomic, strong) UILongPressGestureRecognizer *longPress;
@property (nonatomic, strong) NSMutableArray <NSIndexPath *> *selectedIndexPaths;
@end

@implementation ViewController

- (void)viewDidLoad
{
    [super viewDidLoad];
    self.collectionView.delegate = self;
    self.collectionView.dataSource = self;
    [self.collectionView registerClass:[UICollectionViewCell class]
forCellWithReuseIdentifier:@"Cell"];
    [self.collectionView addGestureRecognizer:self.longPress];
    self.selectedIndexPaths = [[NSMutableArray alloc]init];
}

- (UICollectionView *)collectionView
{
    if (!_collectionView)
    {
        _collectionView = [[UICollectionView alloc]initWithFrame:CGRectZero
collectionViewLayout:[[DraggableLayout alloc]init]];
        _collectionView.backgroundColor = [UIColor whiteColor];
        _collectionView.translatesAutoresizingMaskIntoConstraints = NO;
        [self.view addSubview:_collectionView];
        [_collectionView.topAnchor
constraintEqualToAnchor:self.topLayoutGuide.bottomAnchor].active = YES;
```

```
        [_collectionView.leadingAnchor constraintEqualToAnchor:self.view.leadingAnchor].active
= YES;
        [_collectionView.trailingAnchor
constraintEqualToAnchor:self.view.trailingAnchor].active = YES;
        [_collectionView.bottomAnchor
constraintEqualToAnchor:self.bottomLayoutGuide.topAnchor].active = YES;
    }
    return _collectionView;
}

- (UILongPressGestureRecognizer *)longPress
{
    if (!_longPress)
    {
        _longPress = [[UILongPressGestureRecognizer alloc]initWithTarget:self
action:@selector(handleLongPress:)];
    }
    return _longPress;
}

- (void)handleLongPress:(UILongPressGestureRecognizer *)sender
{
    DraggableLayout *draggableLayout = (DraggableLayout
*)self.collectionView.collectionViewLayout;
    CGPoint location = [sender locationInView:self.collectionView];
    if (sender.state == UIGestureRecognizerStateBegan)
    {
        [draggableLayout startDraggingWithIndexPaths:self.selectedIndexPaths
fromPoint:location];
    }
    else if(sender.state == UIGestureRecognizerStateChanged)
    {
        [draggableLayout updateDragLoactionWithPoint:location];
    }
    else if(sender.state == UIGestureRecognizerStateEnded ||  sender.state ==
UIGestureRecognizerStateCancelled || sender.state == UIGestureRecognizerStateFailed)
    {
        [draggableLayout endDragging];
    }
}

- (NSInteger)collectionView:(UICollectionView *)collectionView
numberOfItemsInSection:(NSInteger)section
{
    return 1000;
}

- (UICollectionViewCell *)collectionView:(UICollectionView *)collectionView
cellForItemAtIndexPath:(NSIndexPath *)indexPath
{
    UICollectionViewCell *cell = [collectionView
dequeueReusableCellWithReuseIdentifier:@"Cell" forIndexPath:indexPath];
    cell.backgroundColor = [UIColor grayColor];
    if ([self.selectedIndexPaths containsObject:indexPath])
    {
        cell.backgroundColor = [UIColor redColor];
    }
    return cell;
}

- (void)collectionView:(UICollectionView *)collectionView
```

```
didSelectItemAtIndexPath:(NSIndexPath *)indexPath
{
    BOOL isSelected = ![self.selectedIndexPaths containsObject:indexPath];
    UICollectionViewCell *cell = [collectionView cellForItemAtIndexPath:indexPath];
    if (isSelected)
    {
        cell.backgroundColor = [UIColor redColor];
        [self.selectedIndexPaths addObject:indexPath];
    }
    else
    {
        cell.backgroundColor = [UIColor grayColor];
        [self.selectedIndexPaths removeObject:indexPath];
    }
}

@end
```

2013 WWDC "UIKit Dynamics "

UICollectionView UIKit : https://riptutorial.com/ko/ios/topic/10079/uicollectionview--uikit-

88: UIColor

Examples

UIColor

UIColor .

- :

```
let redColor = UIColor.redColor()
let blueColor: UIColor = .blueColor()

// In Swift 3, the "Color()" suffix is removed:
let redColor = UIColor.red
let blueColor: UIColor = .blue
```

UIColor .

```
let view = UIView()
view.backgroundColor = .yellowColor()
```

- :

```
let grayscaleColor = UIColor(white: 0.5, alpha: 1.0)
```

- , , :

```
let hsbColor = UIColor(
    hue: 0.4,
    saturation: 0.3,
    brightness: 0.7,
    alpha: 1.0
)
```

- RGBA :

```
let rgbColor = UIColor(
    red: 30.0 / 255,
    green: 70.0 / 255,
    blue: 200.0 / 255,
    alpha: 1.0
)
```

- :

```
let patternColor = UIColor(patternImage: UIImage(named: "myImage")!)
```

-C

- :

```
UIColor *redColor = [UIColor redColor];
```

- :

```
UIColor *grayscaleColor = [UIColor colorWithWhite: 0.5 alpha: 1.0];
```

- , , :

```
UIColor *hsbColor = [UIColor
    colorWithHue: 0.4
    saturation: 0.3
    brightness: 0.7
    alpha: 1.0
];
```

- RGBA :

```
UIColor *rgbColor = [UIColor
    colorWithRed: 30.0 / 255.0
    green: 70.0 / 255.0
    blue: 200.0 / 255.0
    alpha: 1.0
];
```

- :

```
UIColor *pattenColor = [UIColor colorWithPatternImage:[UIImage
imageNamed:@"myImage.png"]];
```

`UIColor` . `UIColor` . `styleString()` `_systemDestructiveTintColor()` `styleString()` private .

styleString

iOS 2.0 `UIColor` `styleString` private . RGB `whiteColor` RGB RGB RGBA .

-C :

```
@interface UIColor (Private)

- (NSString *)styleString;

@end

// ...

[[UIColor whiteColor] styleString]; // rgb(255,255,255)
[[UIColor redColor] styleString]; // rgb(255,0,0)
[[UIColor lightTextColor] styleString]; // rgba(255,255,255,0.600000)
```

Swift . Swift private `@objc` `unsafeBitCast` `UIColor` .

```
@objc protocol  UIColorPrivate {
    func styleString() -> String
}

let white = UIColor.whiteColor()
let red = UIColor.redColor()
let lightTextColor = UIColor.lightTextColor()

let whitePrivate = unsafeBitCast(white, UIColorPrivate.self)
let redPrivate = unsafeBitCast(red, UIColorPrivate.self)
let lightTextColorPrivate = unsafeBitCast(lightTextColor, UIColorPrivate.self)

whitePrivate.styleString() // rgb(255,255,255)
redPrivate.styleString() // rgb(255,0,0)
lightTextColorPrivate.styleString() // rgba(255,255,255,0.600000)
```

_systemDestructiveTintColor()

_systemDestructiveTintColor UIColor :

```
let red = UIColor.performSelector("_systemDestructiveTintColor").takeUnretainedValue()
```

. .takeUnretainedValue() .

API .

```
if UIColor.respondsToSelector("_systemDestructiveTintColor") {
    if let red = UIColor.performSelector("_systemDestructiveTintColor").takeUnretainedValue()
as? UIColor {
        // use the color
    }
}
```

:

```
@objc protocol UIColorPrivateStatic {
    func _systemDestructiveTintColor() -> UIColor
}

let privateClass = UIColor.self as! UIColorPrivateStatic
privateClass._systemDestructiveTintColor() // UIDeviceRGBColorSpace 1 0.231373 0.188235 1
```

init(red:_,green:_,blue:_,alpha:_) UIColor UIColor .

```
let colorWithAlpha = UIColor.redColor().colorWithAlphaComponent(0.1)
```

3

```
//In Swift Latest Version
_ colorWithAlpha = UIColor.red.withAlphaComponent(0.1)
```

-C

```
UIColor * colorWithAlpha = [[UIColor redColor] colorWithAlphaComponent:0.1];
```

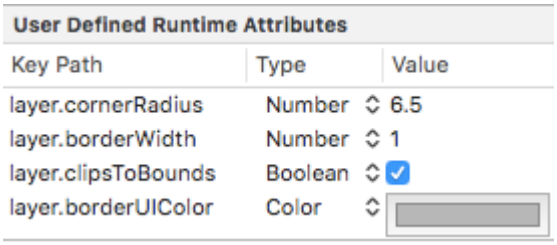
CGColor .

Interface Builder `CGColor` `CGColor` . .

:

```
extension CALayer {
    func borderUIColor() -> UIColor? {
        return borderColor != nil ? UIColor(CGColor: borderColor!) : nil
    }

    func setBorderUIColor(color: UIColor) {
        borderColor = color.CGColor
    }
}
```

(borderUIColor) .



16 UIColor

0xff00cc, "#FFFFFF" 16 `UIColor` .

Int

```
extension UIColor {
    convenience init(hex: Int, alpha: CGFloat = 1.0) {
        let r = CGFloat((hex >> 16) & 0xff) / 255
        let g = CGFloat((hex >> 08) & 0xff) / 255
        let b = CGFloat((hex >> 00) & 0xff) / 255
        self.init(red: r, green: g, blue: b, alpha: alpha)
    }
}
```

:

```
let color = UIColor(hex: 0xff00cc, alpha: 1.0)
```

`alpha` , `1.0` .

```
let color = UIColor(hex: 0xff00cc)
```

```
extension UIColor {
    convenience init(hexCode: String) {
        let hex =
hexCode.stringByTrimmingCharactersInSet(NSCharacterSet.alphanumericCharacterSet().invertedSet)
        var int = UInt32()
        NSScanner(string: hex).scanHexInt(&int)
        let a, r, g, b: UInt32

        switch hex.characters.count {
        case 3:
            (a, r, g, b) = (255, (int >> 8) * 17, (int >> 4 & 0xF) * 17, (int & 0xF) * 17)
        case 6:
            (a, r, g, b) = (255, int >> 16, int >> 8 & 0xFF, int & 0xFF)
        case 8:
            (a, r, g, b) = (int >> 24, int >> 16 & 0xFF, int >> 8 & 0xFF, int & 0xFF)
        default:
            (a, r, g, b) = (1, 1, 1, 0)
        }

        self.init(red: CGFloat(r) / 255, green: CGFloat(g) / 255, blue: CGFloat(b) / 255,
alpha: CGFloat(a) / 255)
    }
}
```

:

16

```
let color = UIColor("#80FFFFFF")
```

16 (`color` 1.0)

```
let color = UIColor("#FFFFFF")
let color = UIColor("#FFF")
```

-C

Int

```
@interface UIColor (Hex)
+ (UIColor *)colorWithHex:(NSUInteger)hex alpha:(CGFloat)alpha;
@end

@implementation UIColor (Hex)
+ (UIColor *)colorWithHex:(NSUInteger)hex alpha:(CGFloat)alpha {
    return [UIColor colorWithRed:((CGFloat)((hex & 0xFF0000) >> 16))/255.0
                           green:((CGFloat)((hex & 0xFF00) >> 8))/255.0
                            blue:((CGFloat)(hex & 0xFF))/255.0
                           alpha:alpha];
}
@end
```

:

```
UIColor *color = [UIColor colorWithHex:0xff00cc alpha:1.0];
```

```
- (UIColor*) hex:(NSString*)hexCode {

    NSString *noHashString = [hexCode stringByReplacingOccurrencesOfString:@"#"
withString:@""];
    NSScanner *scanner = [NSScanner scannerWithString:noHashString];
    [scanner setCharactersToBeSkipped:[NSCharacterSet symbolCharacterSet]];

    unsigned hex;
    if (![scanner scanHexInt:&hex]) return nil;
    int a;
    int r;
    int g;
    int b;

    switch (noHashString.length) {
        case 3:
            a = 255;
            r = (hex >> 8) * 17;
            g = ((hex >> 4) & 0xF) * 17;
            b = ((hex >> 0) & 0xF) * 17;
            break;
        case 6:
            a = 255;
            r = (hex >> 16);
            g = (hex >> 8) & 0xFF;
            b = (hex) & 0xFF;
            break;
        case 8:
            a = (hex >> 24);
            r = (hex >> 16) & 0xFF;
            g = (hex >> 8) & 0xFF;
            b = (hex) & 0xFF;
            break;

        default:
            a = 255.0;
            r = 255.0;
            b = 255.0;
            g = 255.0;
            break;
    }

    return [UIColor colorWithRed:r / 255.0f green:g / 255.0f blue:b / 255.0f alpha:a / 255];
}
```

:

16

```
UIColor* color = [self hex:@"#80FFFFFF"];
```

16 (`color` 1)

```
UIColor* color = [self hex:@"#FFFFFF"];
UIColor* color = [self hex:@"#FFF"];
```

UIColor

.

-C

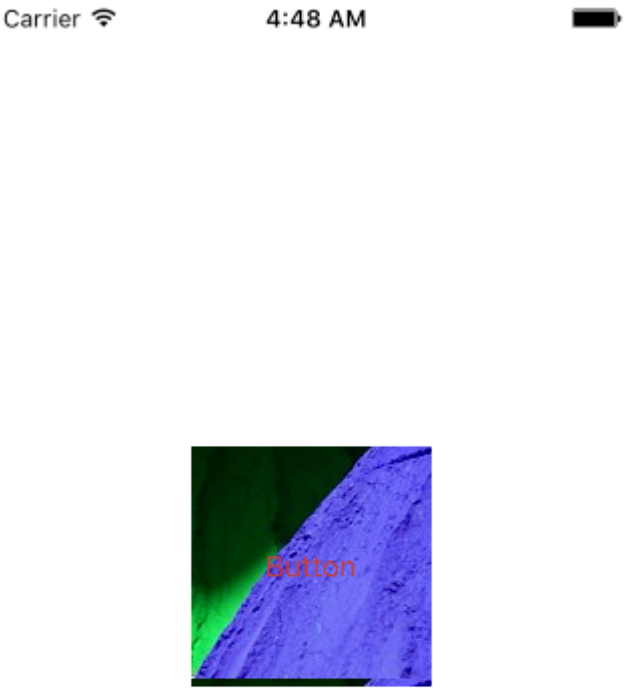
```
+ (UIColor *)adjustedColorForColor:(UIColor *)c : (double)percent
{
    if (percent < 0) percent = 0;

    CGFloat r, g, b, a;
    if ([c getRed:&r green:&g blue:&b alpha:&a])
        return [UIColor colorWithRed:MAX(r * percent, 0.0)
                               green:MAX(g * percent, 0.0)
                                blue:MAX(b * percent, 0.0)
                               alpha:a];
    return nil;
}
```

```
func adjustedColorForColor( c: UIColor, var percent: CGFloat) -> UIColor {
    if percent < 0 {
        percent = 0
    }

    var r,g,b,a: CGFloat
    r = 0.0
    g = 0.0
    b = 0.0
    a = 0.0

    if c.getRed(&r, green: &g, blue: &b, alpha: &a) {
        return UIColor(red: max(r * percent, 0.0), green: max(g * percent, 0.0), blue: max(b *
percent, 0.0), alpha: a)
    }

    return UIColor()
}
```

UIColor

`UIColor(patternImage:_)` `UIColor` .

```
btn.backgroundColor = UIColor(patternImage: UIImage(named: "image")!)
```



UIColor

.

```
+ (UIColor *)darkerColorForColor:(UIColor *)c
{
    CGFloat r, g, b, a;
    if ([c getRed:&r green:&g blue:&b alpha:&a])
        return [UIColor colorWithRed:MAX(r - 0.2, 0.0)
                               green:MAX(g - 0.2, 0.0)
                                blue:MAX(b - 0.2, 0.0)
                               alpha:a];
    return nil;
}
```

```
+ (UIColor *)lighterColorForColor:(UIColor *)c
{
    CGFloat r, g, b, a;
    if ([c getRed:&r green:&g blue:&b alpha:&a])
        return [UIColor colorWithRed:MIN(r + 0.2, 1.0)
                               green:MIN(g + 0.2, 1.0)
                                blue:MIN(b + 0.2, 1.0)
```

```
                                alpha:a];
    return nil;
}
```

```
[UIColor orangeColor]
```

UIColor : https://riptutorial.com/ko/ios/topic/956/uicolor

89: UIControl -

Examples

UIControl UIButton selector .

.

```
import UIKit

class ViewController: UIViewController {
    @IBOutlet weak var button: UIButton!

    override func viewDidLoad() {
        super.viewDidLoad()

        let button = UIButton(frame: CGRect(x: 0, y: 0, width: 100, height: 44))
        button.addTarget(self, action: #selector(self.onButtonPress(_:)), for: .touchUpInside)
        self.view.addSubview(button)
    }

    override func didReceiveMemoryWarning() {
        super.didReceiveMemoryWarning()
    }

    func onButtonPress(_ button: UIButton!) {
        print("PRESSED")
    }
}
```

selector , . protocol .

.

```
import UIKit

@objc
protocol ButtonEvent {
    @objc optional func onButtonPress(_ button: UIButton)
}

class ViewController: UIViewController, ButtonEvent {
    @IBOutlet weak var button: UIButton!

    override func viewDidLoad() {
        super.viewDidLoad()

        let button = UIButton(frame: CGRect(x: 0, y: 0, width: 100, height: 44))
        button.addTarget(self, action: #selector(ButtonEvent.onButtonPress(_:)), for:
.touchUpInside)
        self.view.addSubview(button)
    }

    override func didReceiveMemoryWarning() {
        super.didReceiveMemoryWarning()
```

```
    }
}
```

onButtonPress .

? ? ?

```
import Foundation
import UIKit

protocol RemovableTarget {
    func enable();
    func disable();
}

extension UIControl {
    func addEventHandler(event: UIControlEvents, runnable: (control: UIControl) -> Void) ->
RemovableTarget {

        class Target : RemovableTarget {
            private var event: UIControlEvents
            private weak var control: UIControl?
            private var runnable: (control: UIControl) -> Void

            private init(event: UIControlEvents, control: UIControl, runnable: (control:
UIControl) -> Void) {
                self.event = event
                self.control = control
                self.runnable = runnable
            }

            @objc
            private func run(_ control: UIControl) {
                runnable(control: control)
            }

            private func enable() {
                control?.addTarget(self, action: #selector(Target.run(_:)), for: event)
                objc_setAssociatedObject(self, unsafeAddress(of: self), self,
.OBJC_ASSOCIATION_RETAIN)
            }

            private func disable() {
                control?.removeTarget(self, action: #selector(Target.run(_:)), for:
self.event)
                objc_setAssociatedObject(self, unsafeAddress(of: self), nil,
.OBJC_ASSOCIATION_ASSIGN)
            }
        }

        let target = Target(event: event, control: self, runnable: runnable)
        target.enable()
        return target
    }
}
```

UIControl . func run(_ control: UIControl) .

UIControl object association .

Target enable disable Protocol .

:

```
import Foundation
import UIKit

class ViewController: UIViewController {

    override func viewDidLoad() {
        super.viewDidLoad()


        //Create a button.
        let button = UIButton(frame: CGRect(x: 0, y: 0, width: 100, height: 44))

        //Add an event action block/listener -- Handles Button Press.
        let target = button.addEventHandler(event: .touchUpInside) { (control) in
            print("Pressed")
        }


        self.view.addSubview(button)

        //Example of enabling/disabling the listener/event-action-block.
        DispatchQueue.main.after(when: DispatchTime.now() + 5) {
            target.disable() //Disable the listener.

            DispatchQueue.main.after(when: DispatchTime.now() + 5) {
                target.enable() //Enable the listener.
            }
        }
    }

    override func didReceiveMemoryWarning() {
        super.didReceiveMemoryWarning()
    }
}
```

UIControl - : https://riptutorial.com/ko/ios/topic/3180/uicontrol------

90: UIDatePicker

`UIDatePicker` `UIPickerView` .

Examples

```
let datePicker = UIDatePicker(frame: CGRect(x: 0, y: 0, width: 320, height: 200)
```

-C

```
UIDatePicker *datePicker = [[UIDatePicker alloc] initWithFrame:CGRectMake(x: 0, y: 0, width:
320, height: 200)];
```

-

UIDatePicker .

```
[datePicker setMinimumDate:[NSDate date]];
```

```
[datePicker setMaximumDate:[NSDate date]];
```

UIDatePicker .

```
enum UIDatePickerMode : Int {
    case Time
    case Date
    case DateAndTime
    case CountDownTimer
}
```

- `Time` - , AM / PM ( ).
- `Date` - , .
- `DateAndTime` - (,) , AM / PM ( ).
- `CountDownTimer` - (: [1 | 53]. .

datePickerMode

```
let datePicker = UIDatePicker(frame: CGRect(x: 0, y: 0, width: 320, height: 200)
datePicker.datePickerMode = .Date
```

`minuteInterval` . 1 30.

```
let datePicker = UIDatePicker(frame: CGRect(x: 0, y: 0, width: 320, height: 200)
datePicker.minuteInterval = 15
```

NSTimeInterval . CountDownTimer . 86,399 (23:59).

```
let datePicker = UIDatePicker(frame: CGRect(x: 0, y: 0, width: 320, height: 200)
datePicker.countDownDuration = 60 * 60
```

UIDatePicker : https://riptutorial.com/ko/ios/topic/5643/uidatepicker

91: UIDevice

	.
systemName : String	.
model :	.
systemVersion : String	..

UIDevice Singleton . , , .

Examples

iOS

2

```
import UIKit

extension UIDevice {

    var modelName: String {
        var systemInfo = utsname()
        uname(&systemInfo)
        let machineMirror = Mirror(reflecting: systemInfo.machine)
        let identifier = machineMirror.children.reduce("") { identifier, element in
            guard let value = element.value as? Int8 where value != 0 else { return identifier
}
            return identifier + String(UnicodeScalar(UInt8(value)))
        }

        switch identifier {
        case "iPod5,1":                                 return "iPod Touch 5"
        case "iPod7,1":                                 return "iPod Touch 6"
        case "iPhone3,1", "iPhone3,2", "iPhone3,3":     return "iPhone 4"
        case "iPhone4,1":                               return "iPhone 4s"
        case "iPhone5,1", "iPhone5,2":                  return "iPhone 5"
        case "iPhone5,3", "iPhone5,4":                  return "iPhone 5c"
        case "iPhone6,1", "iPhone6,2":                  return "iPhone 5s"
        case "iPhone7,2":                               return "iPhone 6"
        case "iPhone7,1":                               return "iPhone 6 Plus"
        case "iPhone8,1":                               return "iPhone 6s"
        case "iPhone8,2":                               return "iPhone 6s Plus"
        case "iPhone9,1", "iPhone9,3":                  return "iPhone 7"
        case "iPhone9,2", "iPhone9,4":                  return "iPhone 7 Plus"
        case "iPhone8,4":                               return "iPhone SE"
        case "iPad2,1", "iPad2,2", "iPad2,3", "iPad2,4":return "iPad 2"
        case "iPad3,1", "iPad3,2", "iPad3,3":           return "iPad 3"
        case "iPad3,4", "iPad3,5", "iPad3,6":           return "iPad 4"
        case "iPad4,1", "iPad4,2", "iPad4,3":           return "iPad Air"
        case "iPad5,3", "iPad5,4":                      return "iPad Air 2"
```

```
        case "iPad2,5", "iPad2,6", "iPad2,7":           return "iPad Mini"
        case "iPad4,4", "iPad4,5", "iPad4,6":           return "iPad Mini 2"
        case "iPad4,7", "iPad4,8", "iPad4,9":           return "iPad Mini 3"
        case "iPad5,1", "iPad5,2":                      return "iPad Mini 4"
        case "iPad6,3", "iPad6,4", "iPad6,7", "iPad6,8":return "iPad Pro"
        case "AppleTV5,3":                              return "Apple TV"
        case "i386", "x86_64":                          return "Simulator"
        default:                                        return identifier
        }
    }
}

if UIDevice.currentDevice().modelName == "iPhone 6 Plus" {
    // is an iPhone 6 Plus
}
```

3

```
import UIKit

public extension UIDevice {

    var modelName: String {
        var systemInfo = utsname()
        uname(&systemInfo)
        let machineMirror = Mirror(reflecting: systemInfo.machine)
        let identifier = machineMirror.children.reduce("") { identifier, element in
            guard let value = element.value as? Int8 , value != 0 else { return identifier
}
            return identifier + String(UnicodeScalar(UInt8(value)))
        }

        switch identifier {
        case "iPod5,1":                                 return "iPod Touch 5"
        case "iPod7,1":                                 return "iPod Touch 6"
        case "iPhone3,1", "iPhone3,2", "iPhone3,3":     return "iPhone 4"
        case "iPhone4,1":                               return "iPhone 4s"
        case "iPhone5,1", "iPhone5,2":                  return "iPhone 5"
        case "iPhone5,3", "iPhone5,4":                  return "iPhone 5c"
        case "iPhone6,1", "iPhone6,2":                  return "iPhone 5s"
        case "iPhone7,2":                               return "iPhone 6"
        case "iPhone7,1":                               return "iPhone 6 Plus"
        case "iPhone8,1":                               return "iPhone 6s"
        case "iPhone8,2":                               return "iPhone 6s Plus"
        case "iPhone9,1", "iPhone9,3":                  return "iPhone 7"
        case "iPhone9,2", "iPhone9,4":                  return "iPhone 7 Plus"
        case "iPhone8,4":                               return "iPhone SE"
        case "iPad2,1", "iPad2,2", "iPad2,3", "iPad2,4":return "iPad 2"
        case "iPad3,1", "iPad3,2", "iPad3,3":           return "iPad 3"
        case "iPad3,4", "iPad3,5", "iPad3,6":           return "iPad 4"
        case "iPad4,1", "iPad4,2", "iPad4,3":           return "iPad Air"
        case "iPad5,3", "iPad5,4":                      return "iPad Air 2"
        case "iPad2,5", "iPad2,6", "iPad2,7":           return "iPad Mini"
        case "iPad4,4", "iPad4,5", "iPad4,6":           return "iPad Mini 2"
        case "iPad4,7", "iPad4,8", "iPad4,9":           return "iPad Mini 3"
        case "iPad5,1", "iPad5,2":                      return "iPad Mini 4"
        case "iPad6,3", "iPad6,4", "iPad6,7", "iPad6,8":return "iPad Pro"
        case "AppleTV5,3":                              return "Apple TV"
        case "i386", "x86_64":                          return "Simulator"
        default:                                        return identifier
```

```
        }
    }
}

if UIDevice.current.modelName == "iPhone 7" {
    // is an iPhone 7
}
```

```
override func viewDidLoad() {
    super.viewDidLoad()
    NotificationCenter.default.addObserver(self, selector:
Selector(("batteryStateDidChange:")), name: NSNotification.Name.UIDeviceBatteryStateDidChange,
object: nil)
    NotificationCenter.default.addObserver(self, selector:
Selector(("batteryLevelDidChange:")), name: NSNotification.Name.UIDeviceBatteryLevelDidChange,
object: nil)

    // Stuff...
}

func batteryStateDidChange(notification: NSNotification){
    // The stage did change: plugged, unplugged, full charge...
}

func batteryLevelDidChange(notification: NSNotification){

    let batteryLevel = UIDevice.current.batteryLevel
    if batteryLevel < 0.0 {
        print(" -1.0 means battery state is UIDeviceBatteryStateUnknown")
        return
    }

    print("Battery Level : \(batteryLevel * 100)%")
    // The battery's level did change (98%, 99%, ...)
}
```

```
 UIDevice *deviceInfo = [UIDevice currentDevice];
 NSLog(@"Device Name %@", deviceInfo.name);
 //Ex: myIphone6s
 NSLog(@"System Name %@", deviceInfo.systemName);
 //Device Name iPhone OS
 NSLog(@"System Version %@", deviceInfo.systemVersion);
 //System Version 9.3
 NSLog(@"Model %@", deviceInfo.model);
 //Model iPhone
 NSLog(@"Localized Model %@", deviceInfo.localizedModel);
 //Localized Model iPhone
 int device=deviceInfo.userInterfaceIdiom;
 //UIUserInterfaceIdiomPhone=0
 //UIUserInterfaceIdiomPad=1
 //UIUserInterfaceIdiomTV=2
 //UIUserInterfaceIdiomCarPlay=3
 //UIUserInterfaceIdiomUnspecified=-1
 NSLog(@"identifierForVendor %@", deviceInfo.identifierForVendor);
 //identifierForVendor <__NSConcreteUUID 0x7a10ae20> 556395DC-0EB4-4FD5-BC7E-B16F612ECC6D
```

```
UIDevice *deviceInfo = [UIDevice currentDevice];
int d = deviceInfo.orientation;
```

`deviceInfo.orientation` UIDeviceOrientation .

```
UIDeviceOrientationUnknown 0
UIDeviceOrientationPortrait 1
UIDeviceOrientationPortraitUpsideDown 2
UIDeviceOrientationLandscapeLeft 3
UIDeviceOrientationLandscapeRight 4
UIDeviceOrientationFaceUp 5
UIDeviceOrientationFaceDown 6
```

View Controller :

```
- (void)viewWillAppear:(BOOL)animated
{
    [super viewWillAppear:animated];
    [[UIDevice currentDevice] beginGeneratingDeviceOrientationNotifications];
    [[NSNotificationCenter defaultCenter] addObserver:self
                                             selector:@selector(deviceOrientationDidChange)
                                                 name:UIDeviceOrientationDidChangeNotification
                                               object:nil];
}

-(void)deviceOrientationDidChange
{
    UIDeviceOrientation orientation = [[UIDevice currentDevice] orientation];
    if (orientation == UIDeviceOrientationPortrait || orientation ==
UIDeviceOrientationPortraitUpsideDown) {
        [self changedToPortrait];
    } else if (orientation == UIDeviceOrientationLandscapeLeft || orientation ==
UIDeviceOrientationLandscapeRight) {
        [self changedToLandscape];
    }

-(void)changedToPortrait
{
    // Function Body
}

-(void)changedToLandscape
{
    // Function Body
}
```

.

```
- (void)viewWillDisappear:(BOOL)animated {
    [super viewWillDisappear:animated];
    [[UIDevice currentDevice] endGeneratingDeviceOrientationNotifications];
}
```

```
//Get permission for Battery Monitoring
[[UIDevice currentDevice] setBatteryMonitoringEnabled:YES];
UIDevice *myDevice = [UIDevice currentDevice];

[myDevice setBatteryMonitoringEnabled:YES];
double batLeft = (float)[myDevice batteryLevel] * 100;
NSLog(@"%.f",batLeft);
```

```
int d = myDevice.batteryState;
//Returns an Integer Value
//UIDeviceBatteryStateUnknown 0
//UIDeviceBatteryStateUnplugged 1
//UIDeviceBatteryStateCharging 2
//UIDeviceBatteryStateFull 3

//Using notifications for Battery Monitoring
-(void)startMonitoringForBatteryChanges
{
// Enable monitoring of battery status
[[UIDevice currentDevice] setBatteryMonitoringEnabled:YES];
// Request to be notified when battery charge or state changes
[[NSNotificationCenter defaultCenter] addObserver:self selector:@selector(checkBatteryStatus)
name:UIDeviceBatteryLevelDidChangeNotification object:nil];
[[NSNotificationCenter defaultCenter] addObserver:self selector:@selector(checkBatteryStatus)
name:UIDeviceBatteryStateDidChangeNotification object:nil];
}
-(void) checkBatteryStatus
{
NSLog (@"Battery Level is %.f",[[UIDevice currentDevice] batteryLevel]*100);
 int d=[[UIDevice currentDevice] batteryState];
    if (d==0)
    {
        NSLog(@"Unknown");
    }
    else if (d==1)
    {
        NSLog(@"Unplugged");
    }
    else if (d==2)
    {
        NSLog(@"Charging");
    }
    else if (d==3)
    {
        NSLog(@"Battery Full");
    }
}
```

```
//Enabling the proximity Sensor
- (void)viewWillAppear:(BOOL)animated {

    [super viewWillAppear:animated];
    [[UIDevice currentDevice] setProximityMonitoringEnabled:YES];
    [[NSNotificationCenter defaultCenter] addObserver:self
selector:@selector(sensorStateMonitor:) name:@"UIDeviceProximityStateDidChangeNotification"
object:nil];
}

- (void)sensorStateMonitor:(NSNotificationCenter *)notification
{
    if ([[UIDevice currentDevice] proximityState] == YES)
    {
        NSLog(@"Device is close to user.");
    }

    else
    {
```

```
        NSLog(@"Device is not closer to user.");
    }
}
```

UIDevice : https://riptutorial.com/ko/ios/topic/4878/uidevice

92: UIFeedbackGenerator

`UIFeedbackGenerator` iPhone 7 iOS Taptic Engine® . Haptics Taptics .

`UIFeedbackGenerator` . `UIFeedbackGenerator` . .

Examples

`UIImpactFeedbackGenerator` .

```
class ViewController: UIViewController
{
    lazy var button: UIButton =
    {
        let button = UIButton()
        button.translatesAutoresizingMaskIntoConstraints = false
        self.view.addSubview(button)
        button.centerXAnchor.constraint(equalTo: self.view.centerXAnchor).isActive = true
        button.centerYAnchor.constraint(equalTo: self.view.centerYAnchor).isActive = true
        button.setTitle("Impact", for: .normal)
        button.setTitleColor(UIColor.gray, for: .normal)
        return button
    }()

    // Choose between heavy, medium, and light for style
    let impactFeedbackGenerator = UIImpactFeedbackGenerator(style: .heavy)

    override func viewDidLoad()
    {
        super.viewDidLoad()
        button.addTarget(self, action: #selector(self.didPressButton(sender:)), for:
.touchUpInside)

        // Primes feedback generator for upcoming events and reduces latency
        impactFeedbackGenerator.prepare()
    }

    func didPressButton(sender: UIButton)
    {
        // Triggers haptic
        impactFeedbackGenerator.impactOccurred()
    }
}
```

-C

```
@interface ViewController ()
@property (nonatomic, strong) UIImpactFeedbackGenerator *impactFeedbackGenerator;
@property (nonatomic, strong) UIButton *button;
@end

@implementation ViewController

- (void)viewDidLoad
{
```

```
    [super viewDidLoad];
    [self.button addTarget:self action:@selector(didPressButton:)
forControlEvents:UIControlEventTouchUpInside];

    // Choose between heavy, medium, and light for style
    self.impactFeedbackGenerator = [[UIImpactFeedbackGenerator alloc]
initWithStyle:UIImpactFeedbackStyleHeavy];

    // Primes feedback generator for upcoming events and reduces latency
    [self.impactFeedbackGenerator prepare];
}

- (void)didPressButton:(UIButton *)sender
{
    // Triggers haptic
    [self.impactFeedbackGenerator impactOccurred];
}

#pragma mark - Lazy Init
- (UIButton *)button
{
    if (!_button)
    {
        _button = [[UIButton alloc]init];
        _button.translatesAutoresizingMaskIntoConstraints = NO;
        [self.view addSubview:_button];
        [_button.centerXAnchor constraintEqualToAnchor:self.view.centerXAnchor].active = YES;
        [_button.centerYAnchor constraintEqualToAnchor:self.view.centerYAnchor].active = YES;
        [_button setTitle:@"Impact" forState:UIControlStateNormal];
        [_button setTitleColor:[UIColor grayColor] forState:UIControlStateNormal];
    }
    return _button;
}

@end
```

UIFeedbackGenerator : https://riptutorial.com/ko/ios/topic/10048/uifeedbackgenerator

93: UIFont

UIFont . NSObject Hashable , Equatable , CVarArg NSCopying .

Examples

UIFont

UIFont .

```
var font: UIFont!
```

UIFont init() :

- UIFont.init(descriptor: UIFontDescriptor, size: CGFloat)
- UIFont.init(name: String, size: CGFloat)

UIFont .

```
let font = UIFont(name: "Helvetica Neue", size: 15)
```

System , 17 .

font .

```
label.font = UIFont(name:"Helvetica Neue", size: 15)
```

Helvetica Neue , 15 . Optional . nil .

nil .

UIFont : https://riptutorial.com/ko/ios/topic/9792/uifont

94: UIGestureRecognizer

Examples

UITapGestureRecognizer

`UITapGestureRecognizer` `self` , `action` A : `UITapGestureRecognizer` .

.

```
override func viewDidLoad() {
    super.viewDidLoad()
    let recognizer = UITapGestureRecognizer(target: self,
                                            action: #selector(handleTap(_:)))
    view.addGestureRecognizer(recognizer)
}

func handleTap(recognizer: UITapGestureRecognizer) {

}
```

-C

```
- (void)viewDidLoad {
    [super viewDidLoad];
    UITapGestureRecognizer *recognizer =
        [[UITapGestureRecognizer alloc] initWithTarget:self
                                                action:@selector(handleTap:)];
    [self.view addGestureRecognizer:recognizer];
}

- (void)handleTap:(UITapGestureRecognizer *)recognizer {

}
```

UITapGestureRecognizer :

.

```
func dismissKeyboard() {
        view.endEditing(true)
    }
```

```
let tap: UITapGestureRecognizer = UITapGestureRecognizer(target: self, action:
"dismissKeyboard")
        view.addGestureRecognizer(tap)
```

UITapGestureRecognizer (Swift 3) :

```
func handleTap(gestureRecognizer: UITapGestureRecognizer) {
print("tap working")
if gestureRecognizer.state == UIGestureRecognizerState.recognized
   {
     print(gestureRecognizer.location(in: gestureRecognizer.view))
   }
}
```

UIPanGestureRecognizer

. .

-C

```
- (void)viewDidLoad {
    [super viewDidLoad];

    UIImageView *imageView = [[UIImageView alloc] initWithImage:[UIImage
imageNamed:@"imageToDrag"]];
    [imageView sizeToFit];
    imageView.userInteractionEnabled = YES;
    [self.view addSubview:imageView];

    UIPanGestureRecognizer *pan = [[UIPanGestureRecognizer alloc] initWithTarget:self
action:@selector(handlePan:)];
    [imageView addGestureRecognizer:pan];
}

- (void)handlePan:(UIPanGestureRecognizer *)recognizer {
    CGPoint translation = [recognizer translationInView:self.view];
    recognizer.view.center = CGPointMake(recognizer.view.center.x + translation.x,
                                         recognizer.view.center.y + translation.y);
    [recognizer setTranslation:CGPointZero inView:self.view];
}
```

```
override func viewDidLoad() {
    super.viewDidLoad()

    let imageView = UIImageView.init(image: UIImage.init(named: "imageToDrag"))
    imageView.sizeToFit()
    imageView.isUserInteractionEnabled = true
    self.view.addSubview(imageView)

    let pan = UIPanGestureRecognizer.init(target: self, action:
#selector(handlePan(recognizer:)))
    imageView.addGestureRecognizer(pan)
}

func handlePan(recognizer: UIPanGestureRecognizer) {
    let translation = recognizer.translation(in: self.view)
    if let view = recognizer.view {
        view.center = CGPoint(x: view.center.x + translation.x, y: view.center.y +
translation.y)
    }
    recognizer.setTranslation(CGPoint.zero, in: self.view)
}
```

: UIPanGestureRecognizer / / UISwipeGestureRecognizer
UISwipeGestureRecognizer . UIPanGestureRecognizer translationInView: velocityInView:
.

UITapGestureRecognizer ( )

UITapGestureRecognizer . numberOfTapsRequired 2 .

```
override func viewDidLoad() {
    super.viewDidLoad()

    // Double Tap
    let doubleTapGesture = UITapGestureRecognizer(target: self, action:
#selector(handleDoubleTap))
    doubleTapGesture.numberOfTapsRequired = 2
    doubleTapView.addGestureRecognizer(doubleTapGesture)
}

// Double tap action
func handleDoubleTap() {
    label.text = "Double tap recognized"
}
```

- .
- numberOfTapsRequired 3 .

UILongPressGestureRecognizer

UILongPressGestureRecognizer . .

```
override func viewDidLoad() {
    super.viewDidLoad()

    // Long Press
    let longPressGesture = UILongPressGestureRecognizer(target: self, action:
#selector(handleLongPress(_:)))
    longPressView.addGestureRecognizer(longPressGesture)
}

// Long press action
func handleLongPress(gesture: UILongPressGestureRecognizer) {
    if gesture.state == UIGestureRecognizerState.Began {
        label.text = "Long press recognized"
    }
}
```

- .

- minimumPressDuration .

UISwipeGestureRecognizer

.

```
override func viewDidLoad() {
    super.viewDidLoad()

    // Swipe (right and left)
    let swipeRightGesture = UISwipeGestureRecognizer(target: self, action:
#selector(handleSwipe(_:)))
    let swipeLeftGesture = UISwipeGestureRecognizer(target: self, action:
#selector(handleSwipe(_:)))
    swipeRightGesture.direction = UISwipeGestureRecognizerDirection.Right
    swipeLeftGesture.direction = UISwipeGestureRecognizerDirection.Left
    swipeView.addGestureRecognizer(swipeRightGesture)
    swipeView.addGestureRecognizer(swipeLeftGesture)
}

// Swipe action
func handleSwipe(gesture: UISwipeGestureRecognizer) {
    label.text = "Swipe recognized"

    // example task: animate view off screen
    let originalLocation = swipeView.center
    if gesture.direction == UISwipeGestureRecognizerDirection.Right {
        label.text = "Swipe right"
    } else if gesture.direction == UISwipeGestureRecognizerDirection.Left {
        label.text = "Swipe left"
    }
}
```

-C

```
- (void)viewDidLoad
{
[super viewDidLoad];
UISwipeGestureRecognizer *swipeLeft = [[UISwipeGestureRecognizer alloc] initWithTarget:self
action:@selector(handleSwipe:)];
UISwipeGestureRecognizer *swipeRight = [[UISwipeGestureRecognizer alloc] initWithTarget:self
action:@selector(handleSwipe:)];

// Setting the swipe direction.
[swipeLeft setDirection:UISwipeGestureRecognizerDirectionLeft];
[swipeRight setDirection:UISwipeGestureRecognizerDirectionRight];

// Adding the swipe gesture on image view
[self.view addGestureRecognizer:swipeLeft];
[self.view addGestureRecognizer:swipeRight];

}
//Handling Swipe Gesture Events

- (void)handleSwipe:(UISwipeGestureRecognizer *)swipe {

    if (swipe.direction == UISwipeGestureRecognizerDirectionLeft) {
        NSLog(@"Left Swipe");
    }

    if (swipe.direction == UISwipeGestureRecognizerDirectionRight) {
        NSLog(@"Right Swipe");
    }
```

```
}
```

- .

UIPinchGestureRecognizer

. .

```
override func viewDidLoad() {
    super.viewDidLoad()

    // Pinch
    let pinchGesture = UIPinchGestureRecognizer(target: self, action:
#selector(handlePinch(_:)))
    pinchView.addGestureRecognizer(pinchGesture)
}

// Pinch action
func handlePinch(gesture: UIPinchGestureRecognizer) {
    label.text = "Pinch recognized"

    if gesture.state == UIGestureRecognizerState.Changed {
        let transform = CGAffineTransformMakeScale(gesture.scale, gesture.scale)
        pinchView.transform = transform
    }
}
```

- .

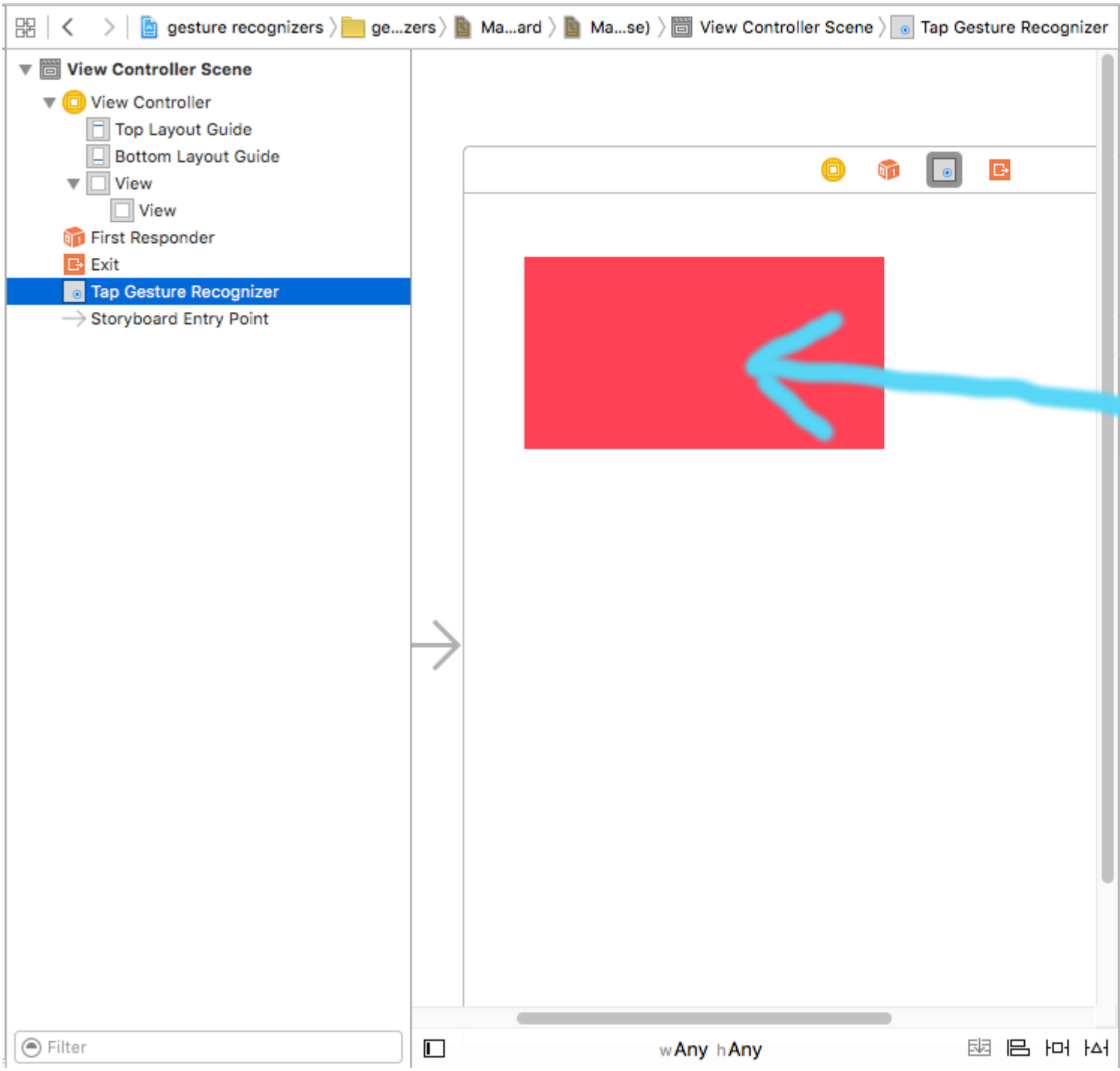
UIRotationGestureRecognizer

UIRotationGestureRecognizer . .

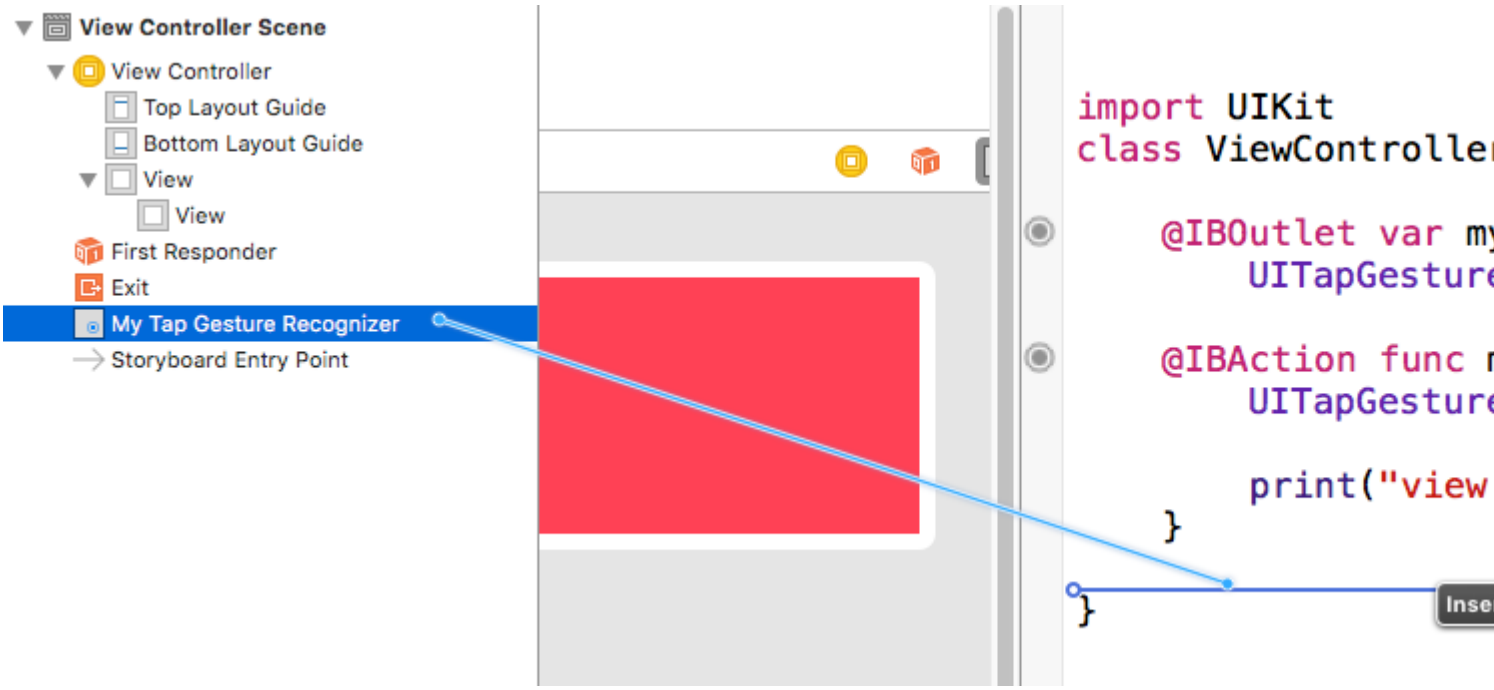
```
override func viewDidLoad() {
    super.viewDidLoad()

    // Rotate
    let rotateGesture = UIRotationGestureRecognizer(target: self, action:
#selector(handleRotate(_:)))
    rotateView.addGestureRecognizer(rotateGesture)
}

// Rotate action
func handleRotate(gesture: UIRotationGestureRecognizer) {
    label.text = "Rotate recognized"

    if gesture.state == UIGestureRecognizerState.Changed {
        let transform = CGAffineTransformMakeRotation(gesture.rotation)
        rotateView.transform = transform
    }
}
```

- .

.



Outlet Action Document Outline View Controller .



- .

UIGestureRecognizer : https://riptutorial.com/ko/ios/topic/1289/uigesturerecognizer

95: UIImage

UIImage

Examples

UIImage

```
let image = UIImage(named: "imageFromBundleOrAsset")
```

-C

```
UIImage *image = [UIImage imageNamed:@"imageFromBundleOrAsset"];
```

imageNamed . . UIImage imageWithContentsOfFile imageWithContentsOfFile .

NSData

```
let imageData = Data(base64Encoded: imageString, options:
Data.Base64DecodingOptions.ignoreUnknownCharacters)

let image = UIImage(data: imageData!)
```

UIColor

```
let color = UIColor.red
let size = CGSize(width: 200, height: 200)

UIGraphicsBeginImageContextWithOptions(size, false, 0.0)
UIGraphicsGetCurrentContext()!.setFillColor(color.cgColor)
UIGraphicsGetCurrentContext()!.fill(CGRect(origin: .zero, size: size))
let colorImage = UIGraphicsGetImageFromCurrentImageContext()
UIGraphicsEndImageContext()
```

-C

```
UIColor *color=[UIColor redColor];
CGRect frame = CGRectMake(0, 0, 80, 100);
UIGraphicsBeginImageContext(frame.size);
CGContextRef context = UIGraphicsGetCurrentContext();
CGContextSetFillColorWithColor(context, [color CGColor]);
```

```
CGContextFillRect(context, frame);
UIImage *image = UIGraphicsGetImageFromCurrentImageContext();
UIGraphicsEndImageContext();
```

-C

:

```
UIImage *image = [UIImage imageWithContentsOfFile:[[NSBundle mainBundle]
pathForResource:[cellCountry objectForKey:@"Country_Flag"] ofType:nil]];
```

:

:

```
NSMutableArray *imageArray = [[NSMutableArray alloc] init];

for (int imageNumber = 1; self.myPhoto != nil; imageNumber++) {
    NSString *fileName = [NSString stringWithFormat:@"%@.jpg", self.myPhoto];

    // check if a file exists
    if ([UIImage imageNamed:fileName]) {
        // if it exists, add it to the array
        [imageArray addObject:[UIImage imageWithContentsOfFile:[[NSBundle
mainBundle]pathForResource:[NSString stringWithFormat:@"%@", fileName] ofType:@""]]];
    } else {
        break;
    }
}
```

// :

```
self.myImageView.animationImages = imageArray;
```

:

```
 UIImage *image = [UIImage imageWithContentsOfFile:[[NSBundle mainBundle]
pathForResource:[cellCountry objectForKey:@"Country_Flag"] ofType:nil]];
```

:

```
 NSMutableArray *imageArray = [[NSMutableArray alloc] init];

for (int imageNumber = 1; self.myPhoto != nil; imageNumber++) {
    NSString *fileName = [NSString stringWithFormat:@"%@.jpg", self.myPhoto];

    // check if a file exists
    if ([UIImage imageNamed:fileName]) {
        // if it exists, add it to the array
        [imageArray addObject:[UIImage imageWithContentsOfFile:[[NSBundle
```

```
mainBundle]pathForResource:[NSString stringWithFormat:@"%@", fileName] ofType:@""]]];
    } else {
        break;
    }
}

//Using image array for animations here
self.myImageView.animationImages = imageArray;
```

UIEdgeInsets .

```
 let insets = UIEdgeInsetsMake(12.0, 20.0, 22.0, 12.0)
 let image = UIImage(named: "test")
 image?.resizableImageWithCapInsets(insets, resizingMode: .Stretch)
```

isEqual: . . isEqual: . Listing 1 .

: Apple

```
// Load the same image twice.
let image1 = UIImage(named: "MyImage")
let image2 = UIImage(named: "MyImage")

// The image objects may be different, but the contents are still equal
if let image1 = image1, image1.isEqual(image2) {
    // Correct. This technique compares the image data correctly.
}

if image1 == image2 {
    // Incorrect! Direct object comparisons may not work.
}
```

-C

```
// Load the same image twice.
UIImage* image1 = [UIImage imageNamed:@"MyImage"];
UIImage* image2 = [UIImage imageNamed:@"MyImage"];

// The image objects may be different, but the contents are still equal
if ([image1 isEqual:image2]) {
   // Correct. This technique compares the image data correctly.
}
```

```
if (image1 == image2) {
   // Incorrect! Direct object comparisons may not work.
}
```

UIColor UIImage

```
let color = UIColor.redColor()
let size = CGSize(width: 200, height: 200)

UIGraphicsBeginImageContextWithOptions(size, false, 0.0)
CGContextSetFillColorWithColor(UIGraphicsGetCurrentContext(), color.CGColor)
CGContextFillRect(UIGraphicsGetCurrentContext(), CGRect(origin: .zero, size: size))
let colorImage = UIGraphicsGetImageFromCurrentImageContext()
UIGraphicsEndImageContext()
```

3

```
let color = UIColor.red()
let size = CGSize(width: 200, height: 200)

UIGraphicsBeginImageContextWithOptions(size, false, 0.0)
if let context = UIGraphicsGetCurrentContext() {
    context.setFillColor(color.cgColor)
    context.fill(CGRect(origin: .zero, size: size))
    let colorImage = UIGraphicsGetImageFromCurrentImageContext()
}
UIGraphicsEndImageContext()
```

-C :

UIImage .

```
+ (UIImage *)createImageWithColor: (UIColor *)color {
    CGRect rect=CGRectMake(0.0f, 0.0f, 1.0f, 1.0f);
    UIGraphicsBeginImageContext(rect.size);
    CGContextRef context = UIGraphicsGetCurrentContext();
    CGContextSetFillColorWithColor(context, [color CGColor]);
    CGContextFillRect(context, rect);

    UIImage *theImage = UIGraphicsGetImageFromCurrentImageContext();
    UIGraphicsEndImageContext();
    return theImage;
}
```

CGRect UIImage

:

```
extension UIImage {
```

```
    static func gradientImageWithBounds(bounds: CGRect, colors: [CGColor]) -> UIImage {
        let gradientLayer = CAGradientLayer()
        gradientLayer.frame = bounds
        gradientLayer.colors = colors

        UIGraphicsBeginImageContext(gradientLayer.bounds.size)
        gradientLayer.render(in: UIGraphicsGetCurrentContext()!)
        let image = UIGraphicsGetImageFromCurrentImageContext()
        UIGraphicsEndImageContext()
        return image!
    }
}
```

:

```
let image = UIImage.gradientImageWithBounds(CGRect(x: 0, y: 0, width: 200, height: 200),
colors: [UIColor.yellowColor().CGColor, UIColor.blueColor().CGColor])
```

-C :

```
+ (UIImage *)gradientImageWithBounds:(CGRect)bounds colors:(NSArray *)colors {
    CAGradientLayer *gradientLayer = [CAGradientLayer layer];
    gradientLayer.frame = bounds;
    gradientLayer.colors = colors;

    UIGraphicsBeginImageContext(gradientLayer.bounds.size);
    [gradientLayer renderInContext:UIGraphicsGetCurrentContext()];
    UIImage *image = UIGraphicsGetImageFromCurrentImageContext();
    UIGraphicsEndImageContext();
    return image;
}
```

```
+ (CALayer *)gradientBGLayerForBounds:(CGRect)bounds colors:(NSArray *)colors
{
    CAGradientLayer * gradientBG = [CAGradientLayer layer];
    gradientBG.frame = bounds;
    gradientBG.colors = colors;
    return gradientBG;
}
```

UIImage base64 /

```
//convert the image to NSData first
let imageData:NSData = UIImagePNGRepresentation(image)!
// convert the NSData to base64 encoding
let strBase64:String =
imageData.base64EncodedStringWithOptions(.Encoding64CharacterLineLength)
```

```
let dataDecoded:NSData = NSData(base64EncodedString: strBase64, options:
NSDataBase64DecodingOptions(rawValue: 0))!
let decodedimage:UIImage = UIImage(data: dataDecoded)!
```

UIView

```
//Here self.webView is the view whose screenshot I need to take
//The screenshot is saved in jpg format in the application directory to avoid any loss of
quality in retina display devices i.e. all current devices running iOS 10
UIGraphicsBeginImageContextWithOptions(self.webView.bounds.size, NO, [UIScreen
mainScreen].scale);
[self.webView.layer renderInContext:UIGraphicsGetCurrentContext()];
UIImage *image = UIGraphicsGetImageFromCurrentImageContext();
UIGraphicsEndImageContext();
NSString  *jpgPath = [NSHomeDirectory() stringByAppendingPathComponent:@"Documents/Test.jpg"];
[UIImageJPEGRepresentation(image, 1.0) writeToFile:jpgPath atomically:YES];
UIImage *pop=[[UIImage alloc]initWithContentsOfFile:jpgPath];
//pop is the final image in jpg format and high quality with the exact resolution of the view
you selected in pixels and not just points
```

UIColor UIImage .

UIImage UIColor UIImage .

```
// *** Create an UIImage instance with RenderingMode AlwaysTemplate ***
UIImage *imgMenu = [[UIImage imageNamed:@"iconMenu"]
imageWithRenderingMode:UIImageRenderingModeAlwaysTemplate];

// *** Now Apply `tintColor` to `UIImageView` of UIImageView or UIButton and convert image in
given color ***
[btn setImage:imgMenu forState:UIControlStateNormal]; // Set UIImage in UIButton.

[button.imageView setTintColor:[UIColor blueColor]]; // It changes image color of UIButton to
blue color
```

UIImageView .

```
[imageView setImage:imgMenu]; // Assign UIImage to UIImageView
[imageView setTintColor:[UIColor greenColor]]; // Change imageview image color to green.
[imageView setTintColor:[UIColor redColor]]; // Change imageview image color to red.
```

UIImage

Swift UIImage .

```
extension UIImage {
    func maskWithColor(color: UIColor) -> UIImage? {

        let maskImage = self.CGImage
        let width = self.size.width
        let height = self.size.height
        let bounds = CGRectMake(0, 0, width, height)

        let colorSpace = CGColorSpaceCreateDeviceRGB()
        let bitmapInfo = CGBitmapInfo(rawValue: CGImageAlphaInfo.PremultipliedLast.rawValue)
        let bitmapContext = CGBitmapContextCreate(nil, Int(width), Int(height), 8, 0,
colorSpace, bitmapInfo.rawValue) //needs rawValue of bitmapInfo

        CGContextClipToMask(bitmapContext, bounds, maskImage)
        CGContextSetFillColorWithColor(bitmapContext, color.CGColor)
        CGContextFillRect(bitmapContext, bounds)
```

```
        //is it nil?
        if let cImage = CGBitmapContextCreateImage(bitmapContext) {
            let coloredImage = UIImage(CGImage: cImage)

            return coloredImage

        } else {
            return nil
        }
    }
}
```

UIImage

```
my_image.maskWithColor(UIColor.blueColor())
```

.

UIImage : https://riptutorial.com/ko/ios/topic/1409/uiimage

96: UIImage

CGInterpolationQuality	.
.	typedef CGInterpolationQuality CGInterpolationQuality;

Examples

```
- (UIImage *)drawImageBySize:(CGSize)size quality:(CGInterpolationQuality)quality
{
    UIGraphicsBeginImageContextWithOptions(size, NO, 0.0);
    CGContextRef context = UIGraphicsGetCurrentContext();
    CGContextSetInterpolationQuality(context, quality);
    [self drawInRect: CGRectMake (0, 0, size.width, size.height)];
    UIImage *resizedImage = UIGraphicsGetImageFromCurrentImageContext();
    UIGraphicsEndImageContext();
    return resizedImage;
}
```

UIImage : https://riptutorial.com/ko/ios/topic/6422/uiimage--

97: UIImagePickerController

UIImagePickerController . UIImagePickerControllerDelegate
didFinishPickingMediaWithInfo (imagePickerControllerDidCancel).

Examples

UIImagePickerController

1 : ,

```
//Swift
class ImageUploadViewController: UIViewController, UIImagePickerControllerDelegate,
UINavigationControllerDelegate {

    let imagePickerController = UIImagePickerController()

    override func viewDidLoad() {
        super.viewDidLoad()
        imagePickerController.delegate = self
    }
}

//Objective-C
@interface ImageUploadViewController : UIViewController
<UIImagePickerControllerDelegate,UINavigationControllerDelegate> {

    UIImagePickerController *imagePickerController;

}

@end

@implementation ImageUploadViewController

- (void)viewDidLoad {

    [super viewDidLoad];

    imagePickerController.delegate = self;

}

@end
```

`UINavigationControllerDelegate` , `UIImagePickerController` `UINavigationController`
`UINavigationController` . `UINavigationControllerDelegate` .

2 : `UIImagePickerController` :

```
//Swift
self.imagePickerController.sourceType = .Camera // options: .Camera , .PhotoLibrary ,
.SavedPhotosAlbum
```

```
self.presentViewController(self.imagePickerController, animated: true, completion: nil)

//Objective-C
imagePickerController.sourceType = UIImagePickerControllerSourceTypeCamera; // options:
UIImagePickerControllerSourceTypeCamera, UIImagePickerControllerSourceTypePhotoLibrary,
UIImagePickerControllerSourceTypeSavedPhotosAlbum
[self presentViewController:imagePickerController animated:YES completion:nil];
```

3 : :

```
//Swift
func imagePickerController(picker: UIImagePickerController, didFinishPickingMediaWithInfo
info: [String : AnyObject]) {
    if let pickedImage = info[UIImagePickerControllerOriginalImage] as? UIImage {
        // Your have pickedImage now, do your logic here
    }
    self.dismissViewControllerAnimated(true, completion: nil)
}

func imagePickerControllerDidCancel(picker: UIImagePickerController) {
    self.dismissViewControllerAnimated(true, completion: nil)
}

//Objective-C
- (void)imagePickerController:(UIImagePickerController *)picker
didFinishPickingMediaWithInfo:(NSDictionary *)info {

   UIImage *pickedImage = info[UIImagePickerControllerOriginalImage];

    if (pickedImage) {

        //You have pickedImage now, do your logic here

    }

    [self dismissViewControllerAnimated:YES completion:nil];

}

- (void)imagePickerControllerDidCancel:(UIImagePickerController *)picker {

    [self dismissViewControllerAnimated:YES completion:nil];

}
```

UIImagePickerController : https://riptutorial.com/ko/ios/topic/3023/uiimagepickercontroller

98: UIImageView

Examples

UIImageView

UIImageView UIImageView UIImageView .

```
//Swift
let imageView = UIImageView()

//Objective-C
UIImageView *imageView = [[UIImageView alloc] init];
```

UIImageView CGRect .

```
//Swift
imageView.frame = CGRect(x: 0, y: 0, width: 200, height: 200)

//Objective-C
imageView.frame = CGRectMake(0,0,200,200);
```

.

```
//Swift
UIImageView(frame: CGRect(x: 0, y: 0, width: 200, height: 200))

//Objective-C
UIImageView *imageView = [[UIImageView alloc] initWithFrame:CGRectMake(0,0,200,200);

//Alternative way of defining frame for UIImageView
UIImageView *imageView = [[UIImageView alloc] init];
CGRect imageViewFrame = imageView.frame;
imageViewFrame.size.width = 200;
imageViewFrame.size.height = 200;
imageViewFrame.origin.x = 0;
imageViewFrame.origin.y = 0;
imageView.frame = imageViewFrame;
```

: UIImageView UIKit .

UIImageView

image image UIImageView .

```
//Swift
UIImageView(image: UIImage(named: "image1"))

UIImageView(image: UIImage(named: "image1"), highlightedImage: UIImage(named: "image2"))

imageView.image = UIImage(named: "image1")
```

```
//Objective-C
[[UIImageView alloc] initWithImage:[UIImage imageNamed:@"image1"];

[[UIImageView alloc] initWithImage:[UIImage imageNamed:@"image1"] highlightedImage:[UIImage
imageNamed:@"image2"]];

imageView.image = [UIImage imageNamed:@"image1"];
```

UIImageView

UIImageView UIImageView :

```
imageView.animationImages = [UIImage(named: "image1")!,
                             UIImage(named: "image2")!,
                             UIImage(named: "image3")!,
                             UIImage(named: "image4")!,
                             UIImage(named: "image5")!,
                             UIImage(named: "image6")!,
                             UIImage(named: "image7")!,
                             UIImage(named: "image8")!]
imageView.animationDuration = 0.3
imageView.animationRepeatCount = 1
```

animationImages UIImages Array .

animationDuration Double .

animationRepeatCount Int .

.

```
imageView.startAnimating()
imageView.stopAnimating()
```

isAnimating() Boolean .

. .

UIView UIImageView .

-C

```
someImageView.layer.cornerRadius = CGRectGetHeight(someImageView.frame) / 2;
someImageView.clipsToBounds = YES;
```

```
someImageView.layer.cornerRadius = someImageView.frame.height/2
// this should alleviate the performance hit that adding transparency may cause - see
http://stackoverflow.com/a/6254531/189804
// Be sure to check scrolling performance with Instruments if you take this approach.
someImageView.layer.shouldRasterize = true
someImageView.clipsToBounds = true // All parts of the image that are outside its bounds (the
frame) are cut out (makes the rounded corners visible)
```

autolayout `someImageView.layer.cornerRadius` `viewDidLayoutSubviews`

`someImageView.layer.cornerRadius` . `cornerRadius` .

```
override func viewDidLayoutSubviews() {
    super.viewDidLayoutSubviews()
    someImageView.layer.cornerRadius = someImageView.frame.size.width/2
    someImageView.layer.masksToBounds = true
}
```

UIImage

.

-C

```
self.maskImage.layer.mask = self.maskLabel.layer;
self.maskImage.layer.masksToBounds = YES;
```

3

```
maskImageView.mask = maskLabel
maskImageView.masksToBounds = true
```

.


```
//Swift
imageView.tintColor = UIColor.redColor()
imageView.image = imageView.image?.imageWithRenderingMode(.AlwaysTemplate)

//Swift 3
imageView.tintColor = UIColor.red
imageView.image = imageView.image?.withRenderingMode(.alwaysTemplate)

//Objective-C
imageView.tintColor = [UIColor redColor];
imageView.image = [imageView.image imageWithRenderingMode:UIImageRenderingModeAlwaysTemplate]
```

Mode

. Interface Builder Attributes Inspector .

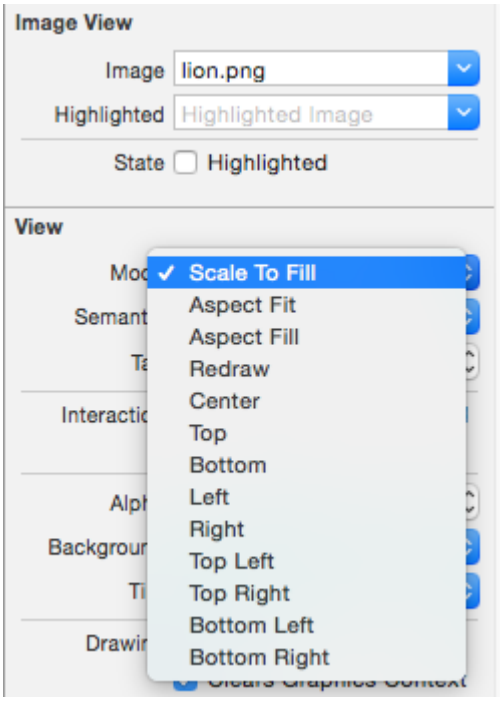


Image View
Image
lion.png
Highlighted
Highlighted Image
State
Highlighted
View
Scale To Fill
Aspect Fit
Aspect Fill
Redraw
Center
Top
Bottom
Left
Right
Top Left
Top Right
Bottom Left
Bottom Right

.

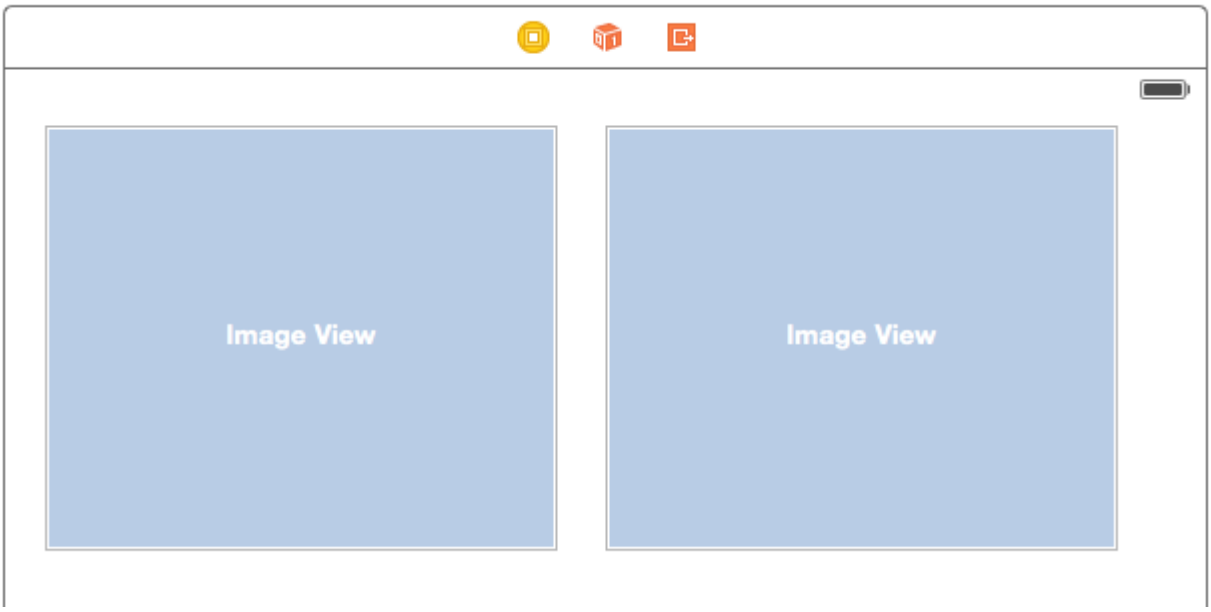
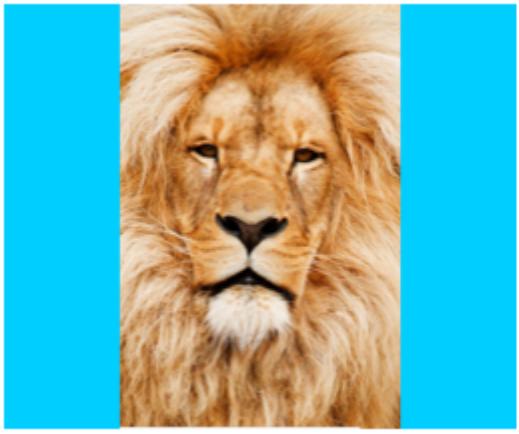
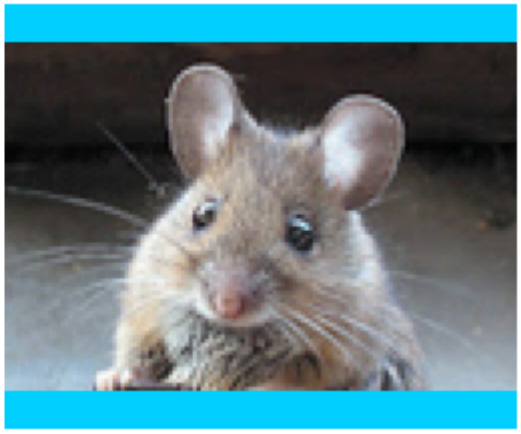


Image View
Image View


`UIImageView` .

( ) . . (`UIImageView` .)


( ) . "Aspect Fit" .


. Redraw . `UIImageView` Scale to Fill , .

Redraw Apple :

`UIViewContentModeRedraw` . `drawRect:` . .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. .

. .

. .

- .
- ( ) (`UIImageView`) .
- `UIImageView` .
- Swift .

```
imageView.contentMode = UIViewContentMode.scaleToFill
imageView.contentMode = UIViewContentMode.scaleAspectFit
imageView.contentMode = UIViewContentMode.scaleAspectFill
imageView.contentMode = UIViewContentMode.redraw
imageView.contentMode = UIViewContentMode.center
imageView.contentMode = UIViewContentMode.top
imageView.contentMode = UIViewContentMode.bottom
imageView.contentMode = UIViewContentMode.left
imageView.contentMode = UIViewContentMode.right
imageView.contentMode = UIViewContentMode.topLeft
imageView.contentMode = UIViewContentMode.topRight
imageView.contentMode = UIViewContentMode.bottomLeft
imageView.contentMode = UIViewContentMode.bottomRight
```

UIImageView : https://riptutorial.com/ko/ios/topic/695/uiimageview

99: UIImage .

Examples

- C

import `#include <math.h>`

viewDidLoad loadView .

```
- (void)loadView
{
[super loadView];
UIImageView *imageView=[[UIImageView alloc]initWithFrame:CGRectMake(0, 50, 320, 320)];
[self.view addSubview:imageView];
UIImage *image=[UIImage imageNamed:@"Dubai-Photos-Images-Travel-Tourist-Images-Pictures-
800x600.jpg"];
imageView.image=[self circularScaleAndCropImage:[UIImage imageNamed:@"Dubai-Photos-Images-
Travel-Tourist-Images-Pictures-800x600.jpg"] frame:CGRectMake(0, 0, 320, 320)];
}
```

heavyrawting `circularScaleAndCropImage` .

```
- (UIImage*)circularScaleAndCropImage:(UIImage*)image frame:(CGRect)frame {
    // This function returns a newImage, based on image, that has been:
    // - scaled to fit in (CGRect) rect
    // - and cropped within a circle of radius: rectWidth/2

    //Create the bitmap graphics context
    UIGraphicsBeginImageContextWithOptions(CGSizeMake(frame.size.width, frame.size.height),
NO, 0.0);
    CGContextRef context = UIGraphicsGetCurrentContext();

    //Get the width and heights
    CGFloat imageWidth = image.size.width;
    CGFloat imageHeight = image.size.height;
    CGFloat rectWidth = frame.size.width;
    CGFloat rectHeight = frame.size.height;

    //Calculate the scale factor
    CGFloat scaleFactorX = rectWidth/imageWidth;
    CGFloat scaleFactorY = rectHeight/imageHeight;

    //Calculate the centre of the circle
    CGFloat imageCentreX = rectWidth/2;
    CGFloat imageCentreY = rectHeight/2;

    // Create and CLIP to a CIRCULAR Path
    // (This could be replaced with any closed path if you want a different shaped clip)
    CGFloat radius = rectWidth/2;
    CGContextBeginPath (context);
    CGContextAddArc (context, imageCentreX, imageCentreY, radius, 0, 2*M_PI, 0);
    CGContextClosePath (context);
    CGContextClip (context);
```

```
    //Set the SCALE factor for the graphics context
    //All future draw calls will be scaled by this factor
    CGContextScaleCTM (context, scaleFactorX, scaleFactorY);

    // Draw the IMAGE
    CGRect myRect = CGRectMake(0, 0, imageWidth, imageHeight);
    [image drawInRect:myRect];

    UIImage *newImage = UIGraphicsGetImageFromCurrentImageContext();
    UIGraphicsEndImageContext();

    return newImage;
}
```

SWIFT 3

```
 override func viewDidLoad() {
        super.viewDidLoad()
        // Do any additional setup after loading the view, typically from a nib.
        let imageView = UIImageView(frame: CGRect(x: CGFloat(0), y: CGFloat(50), width:
CGFloat(320), height: CGFloat(320)))
        view.addSubview(imageView)
        let image = UIImage(named: "Dubai-Photos-Images-Travel-Tourist-Images-Pictures-
800x600.jpg")
        imageView.image = circularScaleAndCropImage(UIImage(named: "Dubai-Photos-Images-
Travel-Tourist-Images-Pictures-800x600.jpg")!, frame: CGRect(x: CGFloat(0), y: CGFloat(0),
width: CGFloat(100), height: CGFloat(100)))
    }
```

heavyrawting circularScaleAndCropImage .

```
func circularScaleAndCropImage(_ image: UIImage, frame: CGRect) -> UIImage{
        // This function returns a newImage, based on image, that has been:
        // - scaled to fit in (CGRect) rect
        // - and cropped within a circle of radius: rectWidth/2
        //Create the bitmap graphics context
        UIGraphicsBeginImageContextWithOptions(CGSize(width: CGFloat(frame.size.width),
height: CGFloat(frame.size.height)), false, 0.0)
        let context: CGContext? = UIGraphicsGetCurrentContext()
        //Get the width and heights
        let imageWidth: CGFloat = image.size.width
        let imageHeight: CGFloat = image.size.height
        let rectWidth: CGFloat = frame.size.width
        let rectHeight: CGFloat = frame.size.height
        //Calculate the scale factor
        let scaleFactorX: CGFloat = rectWidth / imageWidth
        let scaleFactorY: CGFloat = rectHeight / imageHeight
        //Calculate the centre of the circle
        let imageCentreX: CGFloat = rectWidth / 2
        let imageCentreY: CGFloat = rectHeight / 2
        // Create and CLIP to a CIRCULAR Path
        // (This could be replaced with any closed path if you want a different shaped clip)
        let radius: CGFloat = rectWidth / 2
        context?.beginPath()
        context?.addArc(center: CGPoint(x: imageCentreX, y: imageCentreY), radius: radius,
startAngle: CGFloat(0), endAngle: CGFloat(2 * Float.pi), clockwise: false)
        context?.closePath()
        context?.clip()
```

```
        //Set the SCALE factor for the graphics context
        //All future draw calls will be scaled by this factor
        context?.scaleBy(x: scaleFactorX, y: scaleFactorY)
        // Draw the IMAGE
        let myRect = CGRect(x: CGFloat(0), y: CGFloat(0), width: imageWidth, height:
imageHeight)
        image.draw(in: myRect)
        let newImage: UIImage? = UIGraphicsGetImageFromCurrentImageContext()
        UIGraphicsEndImageContext()
        return newImage!
    }
```

UIImage . : https://riptutorial.com/ko/ios/topic/7222/uiimage---

100: UIKit

UIKit Dynamics UIKit . , , . .

UIKit Dynamics iOS .

UIKit . `UIDynamicBehavior` `UIDynamicBehavior` `UIDynamicBehavior` . .
`UIDynamicBehavior` .

. , `UIGravityBehavior` `UILabel label` .

```
label.frame = CGRect(x: 0.0, y: 0.0, width: label.intrinsicContentSize.width, height:
label.intrinsicContentSize.height)
dynamicAnimator.updateItem(usingCurrentState: label)
```

-C

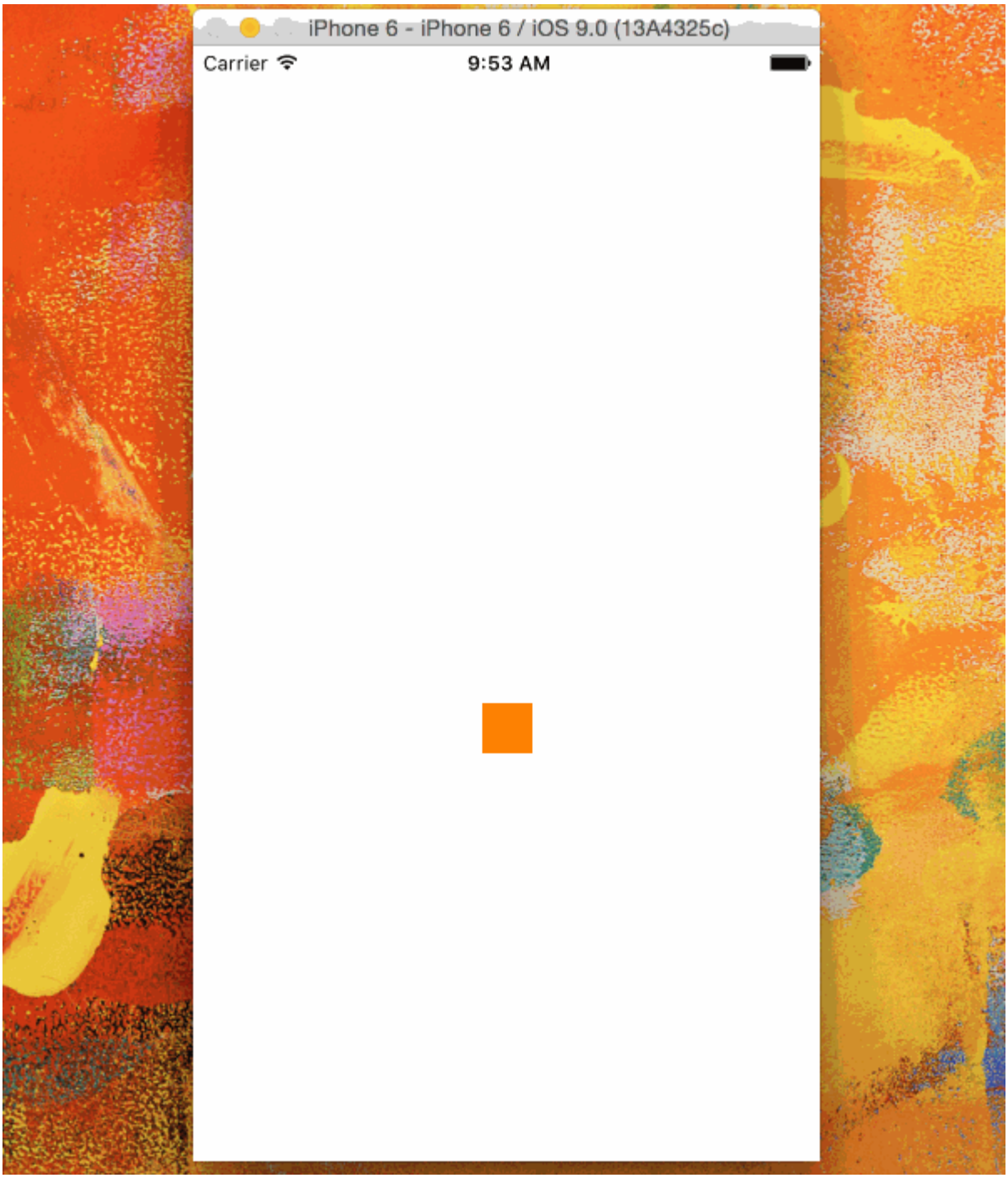
```
self.label.frame = CGRectMake(0.0, 0.0, self.label.intrinsicContentSize.width,
self.label.intrinsicContentSize.height);
[self.dynamicAnimator updateItemUsingCurrentState: self.label];
```

.

`UIDynamicBehaviors` . `UIAttachmentBehavior` `anchorPoint` `touchesMoved` `UIGestureRecognizer`
.

Examples

.




```
@IBOutlet var animationView: UIView!
var squareView:UIView!
var collision: UICollisionBehavior!
var animator: UIDynamicAnimator!
var gravity: UIGravityBehavior!

override func viewDidLoad() {
    super.viewDidLoad()
    let squareSize = CGSize(width: 30.0, height: 30.0)
    let centerPoint = CGPoint(x: self.animationView.bounds.midX - (squareSize.width/2), y:
self.animationView.bounds.midY - (squareSize.height/2))
    let frame = CGRect(origin: centerPoint, size: squareSize)
    squareView = UIView(frame: frame)
    squareView.backgroundColor = UIColor.orangeColor()
    animationView.addSubview(squareView)
    animator = UIDynamicAnimator(referenceView: view)
```

```
    gravity = UIGravityBehavior(items: [squareView])
    animator.addBehavior(gravity)
    collision = UICollisionBehavior(items: [square])
    collision.translatesReferenceBoundsIntoBoundary = true
    animator.addBehavior(collision)
}
```

.


```
class ViewController: UIViewController
{
    // Adjust to change speed of view from flick
    let magnitudeMultiplier: CGFloat = 0.0008

    lazy var dynamicAnimator: UIDynamicAnimator =
    {
        let dynamicAnimator = UIDynamicAnimator(referenceView: self.view)
        return dynamicAnimator
    }()

    lazy var gravity: UIGravityBehavior =
    {
        let gravity = UIGravityBehavior(items: [self.orangeView])
        return gravity
    }()

    lazy var collision: UICollisionBehavior =
    {
        let collision = UICollisionBehavior(items: [self.orangeView])
        collision.translatesReferenceBoundsIntoBoundary = true
        return collision
    }()

    lazy var orangeView: UIView =
    {
        let widthHeight: CGFloat = 40.0
        let orangeView = UIView(frame: CGRect(x: 0.0, y: 0.0, width: widthHeight, height:
widthHeight))
        orangeView.backgroundColor = UIColor.orange
        self.view.addSubview(orangeView)
        return orangeView
```

```
    }()

    lazy var panGesture: UIPanGestureRecognizer =
    {
        let panGesture = UIPanGestureRecognizer(target: self, action:
#selector(self.handlePan(sender:)))
        return panGesture
    }()

    lazy var attachment: UIAttachmentBehavior =
    {
        let attachment = UIAttachmentBehavior(item: self.orangeView, attachedToAnchor: .zero)
        return attachment
    }()

    override func viewDidLoad()
    {
        super.viewDidLoad()
        dynamicAnimator.addBehavior(gravity)
        dynamicAnimator.addBehavior(collision)
        orangeView.addGestureRecognizer(panGesture)
    }

    override func viewDidLayoutSubviews()
    {
        super.viewDidLayoutSubviews()
        orangeView.center = view.center
        dynamicAnimator.updateItem(usingCurrentState: orangeView)
    }

    func handlePan(sender: UIPanGestureRecognizer)
    {
        let location = sender.location(in: view)
        let velocity = sender.velocity(in: view)
        let magnitude = sqrt((velocity.x * velocity.x) + (velocity.y * velocity.y))
        switch sender.state
        {
        case .began:
            attachment.anchorPoint = location
            dynamicAnimator.addBehavior(attachment)
        case .changed:
            attachment.anchorPoint = location
        case .cancelled, .ended, .failed, .possible:
            let push = UIPushBehavior(items: [self.orangeView], mode: .instantaneous)
            push.pushDirection = CGVector(dx: velocity.x, dy: velocity.y)
            push.magnitude = magnitude * magnitudeMultiplier
            dynamicAnimator.removeBehavior(attachment)
            dynamicAnimator.addBehavior(push)
        }
    }
}
```

-C

```
@interface ViewController ()

@property (nonatomic, assign) CGFloat magnitudeMultiplier;
@property (nonatomic, strong) UIDynamicAnimator *dynamicAnimator;
@property (nonatomic, strong) UIGravityBehavior *gravity;
```

```
@property (nonatomic, strong) UICollisionBehavior *collision;
@property (nonatomic, strong) UIView *orangeView;
@property (nonatomic, strong) UIPanGestureRecognizer *panGesture;
@property (nonatomic, strong) UIAttachmentBehavior *attachment;

@end

@implementation ViewController

- (void)viewDidLoad
{
    [super viewDidLoad];
    [self.dynamicAnimator addBehavior:self.gravity];
    [self.dynamicAnimator addBehavior:self.collision];
    [self.orangeView addGestureRecognizer:self.panGesture];
    // Adjust to change speed of view from flick
    self.magnitudeMultiplier = 0.0008f;
}

- (void)viewDidLayoutSubviews
{
    [super viewDidLayoutSubviews];
    self.orangeView.center = self.view.center;
    [self.dynamicAnimator updateItemUsingCurrentState:self.orangeView];
}

- (void)handlePan:(UIPanGestureRecognizer *)sender
{
    CGPoint location = [sender locationInView:self.view];
    CGPoint velocity = [sender velocityInView:self.view];
    CGFloat magnitude = sqrt((velocity.x * velocity.x) + (velocity.y * velocity.y));
    if (sender.state == UIGestureRecognizerStateBegan)
    {
        self.attachment.anchorPoint = location;
        [self.dynamicAnimator addBehavior:self.attachment];
    }
    else if (sender.state == UIGestureRecognizerStateChanged)
    {
        self.attachment.anchorPoint = location;
    }
    else if (sender.state == UIGestureRecognizerStateCancelled ||
             sender.state == UIGestureRecognizerStateEnded ||
             sender.state == UIGestureRecognizerStateFailed ||
             sender.state == UIGestureRecognizerStatePossible)
    {
        UIPushBehavior *push = [[UIPushBehavior alloc] initWithItems:@[self.orangeView]
mode:UIPushBehaviorModeInstantaneous];
        push.pushDirection = CGVectorMake(velocity.x, velocity.y);
        push.magnitude = magnitude * self.magnitudeMultiplier;
        [self.dynamicAnimator removeBehavior:self.attachment];
        [self.dynamicAnimator addBehavior:push];
    }
}

#pragma mark - Lazy Init
- (UIDynamicAnimator *)dynamicAnimator
{
    if (!_dynamicAnimator)
    {
        _dynamicAnimator = [[UIDynamicAnimator alloc]initWithReferenceView:self.view];
    }
```

```
    return _dynamicAnimator;
}

- (UIGravityBehavior *)gravity
{
    if (!_gravity)
    {
        _gravity = [[UIGravityBehavior alloc]initWithItems:@[self.orangeView]];
    }
    return _gravity;
}

- (UICollisionBehavior *)collision
{
    if (!_collision)
    {
        _collision = [[UICollisionBehavior alloc]initWithItems:@[self.orangeView]];
        _collision.translatesReferenceBoundsIntoBoundary = YES;
    }
    return _collision;
}

- (UIView *)orangeView
{
    if (!_orangeView)
    {
        CGFloat widthHeight = 40.0f;
        _orangeView = [[UIView alloc]initWithFrame:CGRectMake(0.0, 0.0, widthHeight,
widthHeight)];
        _orangeView.backgroundColor = [UIColor orangeColor];
        [self.view addSubview:_orangeView];
    }
    return _orangeView;
}

- (UIPanGestureRecognizer *)panGesture
{
    if (!_panGesture)
    {
        _panGesture = [[UIPanGestureRecognizer alloc]initWithTarget:self
action:@selector(handlePan:)];
    }
    return _panGesture;
}

- (UIAttachmentBehavior *)attachment
{
    if (!_attachment)
    {
        _attachment = [[UIAttachmentBehavior alloc]initWithItem:self.orangeView
attachedToAnchor:CGPointZero];
    }
    return _attachment;
}

@end
```

UIFieldBehaviors " "

(2) FaceTime .

```
class ViewController: UIViewController
{
    lazy var dynamicAnimator: UIDynamicAnimator =
    {
        let dynamicAnimator = UIDynamicAnimator(referenceView: self.view)
        return dynamicAnimator
    }()

    lazy var collision: UICollisionBehavior =
    {
        let collision = UICollisionBehavior(items: [self.orangeView])
        collision.translatesReferenceBoundsIntoBoundary = true
        return collision
    }()

    lazy var fieldBehaviors: [UIFieldBehavior] =
    {
        var fieldBehaviors = [UIFieldBehavior]()
        for _ in 0 ..< 2
        {
            let field = UIFieldBehavior.springField()
            field.addItem(self.orangeView)
            fieldBehaviors.append(field)
        }
        return fieldBehaviors
    }()

    lazy var itemBehavior: UIDynamicItemBehavior =
    {
        let itemBehavior = UIDynamicItemBehavior(items: [self.orangeView])
        // Adjust these values to change the "stickiness" of the view
        itemBehavior.density = 0.01
        itemBehavior.resistance = 10
        itemBehavior.friction = 0.0
        itemBehavior.allowsRotation = false
        return itemBehavior
    }()

    lazy var orangeView: UIView =
    {
        let widthHeight: CGFloat = 40.0
        let orangeView = UIView(frame: CGRect(x: 0.0, y: 0.0, width: widthHeight, height:
```

```
widthHeight))
        orangeView.backgroundColor = UIColor.orange
        self.view.addSubview(orangeView)
        return orangeView
    }()

    lazy var panGesture: UIPanGestureRecognizer =
    {
        let panGesture = UIPanGestureRecognizer(target: self, action:
#selector(self.handlePan(sender:)))
        return panGesture
    }()

    lazy var attachment: UIAttachmentBehavior =
    {
        let attachment = UIAttachmentBehavior(item: self.orangeView, attachedToAnchor: .zero)
        return attachment
    }()

    override func viewDidLoad()
    {
        super.viewDidLoad()
        dynamicAnimator.addBehavior(collision)
        dynamicAnimator.addBehavior(itemBehavior)
        for field in fieldBehaviors
        {
            dynamicAnimator.addBehavior(field)
        }

        orangeView.addGestureRecognizer(panGesture)
    }

    override func viewDidLayoutSubviews()
    {
        super.viewDidLayoutSubviews()

        orangeView.center = view.center
        dynamicAnimator.updateItem(usingCurrentState: orangeView)

        for (index, field) in fieldBehaviors.enumerated()
        {
            field.position = CGPoint(x: view.bounds
                .midX, y:  view.bounds.height * (0.25 + 0.5 * CGFloat(index)))
            field.region = UIRegion(size: CGSize(width: view.bounds.width, height:
view.bounds.height * 0.5))
        }
    }

    func handlePan(sender: UIPanGestureRecognizer)
    {
        let location = sender.location(in: view)
        let velocity = sender.velocity(in: view)
        switch sender.state
        {
        case .began:
            attachment.anchorPoint = location
            dynamicAnimator.addBehavior(attachment)
        case .changed:
            attachment.anchorPoint = location
        case .cancelled, .ended, .failed, .possible:
            itemBehavior.addLinearVelocity(velocity, for: self.orangeView)
```

```
            dynamicAnimator.removeBehavior(attachment)
        }
    }
}
```

-C

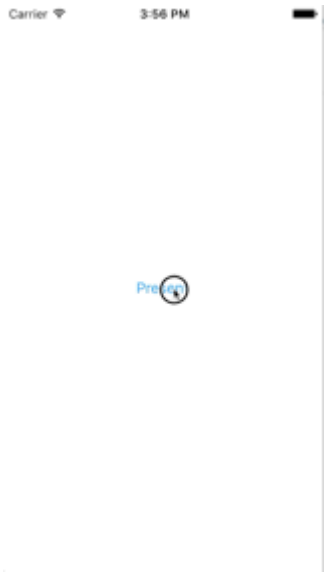
```
@interface ViewController ()

@property (nonatomic, strong) UIDynamicAnimator *dynamicAnimator;
@property (nonatomic, strong) UICollisionBehavior *collision;
@property (nonatomic, strong) UIAttachmentBehavior *attachment;
@property (nonatomic, strong) UIDynamicItemBehavior *itemBehavior;
@property (nonatomic, strong) NSArray <UIFieldBehavior *> *fieldBehaviors;
@property (nonatomic, strong) UIView *orangeView;
@property (nonatomic, strong) UIPanGestureRecognizer *panGesture;

@end

@implementation ViewController

- (void)viewDidLoad
{
    [super viewDidLoad];
    [self.dynamicAnimator addBehavior:self.collision];
    [self.dynamicAnimator addBehavior:self.itemBehavior];
    for (UIFieldBehavior *field in self.fieldBehaviors)
    {
        [self.dynamicAnimator addBehavior:field];
    }

    [self.orangeView addGestureRecognizer:self.panGesture];
}

- (void)viewDidLayoutSubviews
{
    [super viewDidLayoutSubviews];
    self.orangeView.center = self.view.center;
    [self.dynamicAnimator updateItemUsingCurrentState:self.orangeView];

    for (NSInteger i = 0; i < self.fieldBehaviors.count; i++)
    {
        UIFieldBehavior *field = self.fieldBehaviors[i];
        field.position = CGPointMake(CGRectGetMidX(self.view.bounds),
CGRectGetHeight(self.view.bounds) * (0.25f + 0.5f * i));
        field.region = [[UIRegion
alloc]initWithSize:CGSizeMake(CGRectGetWidth(self.view.bounds),
CGRectGetHeight(self.view.bounds) * 0.5)];
    }
}

- (void)handlePan:(UIPanGestureRecognizer *)sender
{
    CGPoint location = [sender locationInView:self.view];
    CGPoint velocity = [sender velocityInView:self.view];
    if (sender.state == UIGestureRecognizerStateBegan)
    {
        self.attachment.anchorPoint = location;
        [self.dynamicAnimator addBehavior:self.attachment];
```

```
    }
    else if (sender.state == UIGestureRecognizerStateChanged)
    {
        self.attachment.anchorPoint = location;
    }
    else if (sender.state == UIGestureRecognizerStateCancelled ||
             sender.state == UIGestureRecognizerStateEnded ||
             sender.state == UIGestureRecognizerStateFailed ||
             sender.state == UIGestureRecognizerStatePossible)
    {
        [self.itemBehavior addLinearVelocity:velocity forItem:self.orangeView];
        [self.dynamicAnimator removeBehavior:self.attachment];
    }
}

#pragma mark - Lazy Init
- (UIDynamicAnimator *)dynamicAnimator
{
    if (!_dynamicAnimator)
    {
        _dynamicAnimator = [[UIDynamicAnimator alloc]initWithReferenceView:self.view];
    }
    return _dynamicAnimator;
}

- (UICollisionBehavior *)collision
{
    if (!_collision)
    {
        _collision = [[UICollisionBehavior alloc]initWithItems:@[self.orangeView]];
        _collision.translatesReferenceBoundsIntoBoundary = YES;
    }
    return _collision;
}

- (NSArray <UIFieldBehavior *> *)fieldBehaviors
{
    if (!_fieldBehaviors)
    {
        NSMutableArray *fields = [[NSMutableArray alloc]init];
        for (NSInteger i =  0; i < 2; i++)
        {
            UIFieldBehavior *field = [UIFieldBehavior springField];
            [field addItem:self.orangeView];
            [fields addObject:field];
        }
        _fieldBehaviors = fields;
    }
    return _fieldBehaviors;
}

- (UIDynamicItemBehavior *)itemBehavior
{
    if (!_itemBehavior)
    {
        _itemBehavior = [[UIDynamicItemBehavior alloc]initWithItems:@[self.orangeView]];
        // Adjust these values to change the "stickiness" of the view
        _itemBehavior.density = 0.01;
        _itemBehavior.resistance = 10;
        _itemBehavior.friction = 0.0;
        _itemBehavior.allowsRotation = NO;
```

```
    }
    return _itemBehavior;
}

- (UIView *)orangeView
{
    if (!_orangeView)
    {
        CGFloat widthHeight = 40.0f;
        _orangeView = [[UIView alloc]initWithFrame:CGRectMake(0.0, 0.0, widthHeight,
widthHeight)];
        _orangeView.backgroundColor = [UIColor orangeColor];
        [self.view addSubview:_orangeView];
    }
    return _orangeView;
}

- (UIPanGestureRecognizer *)panGesture
{
    if (!_panGesture)
    {
        _panGesture = [[UIPanGestureRecognizer alloc]initWithTarget:self
action:@selector(handlePan:)];
    }
    return _panGesture;
}

- (UIAttachmentBehavior *)attachment
{
    if (!_attachment)
    {
        _attachment = [[UIAttachmentBehavior alloc]initWithItem:self.orangeView
attachedToAnchor:CGPointZero];
    }
    return _attachment;
}

@end
```

`UIFieldBehaviors` 2015 WWDC "UIKit Dynamics Visual Effects " .

UIDynamicBehavior



UIDynamicBehavior . .

```
class PresentingViewController: UIViewController
{
    lazy var button: UIButton =
    {
        let button = UIButton()
        button.translatesAutoresizingMaskIntoConstraints = false
        self.view.addSubview(button)
        button.centerXAnchor.constraint(equalTo: self.view.centerXAnchor).isActive
            = true
        button.centerYAnchor.constraint(equalTo: self.view.centerYAnchor).isActive = true
        button.setTitle("Present", for: .normal)
        button.setTextColor(UIColor.blue, for: .normal)

        return button
    }()

    override func viewDidLoad()
    {
        super.viewDidLoad()
        button.addTarget(self, action: #selector(self.didPressPresent), for: .touchUpInside)
    }

    func didPressPresent()
    {
        let modal = ModalViewController()
        modal.view.frame = CGRect(x: 0.0, y: 0.0, width: 200.0, height: 200.0)
        modal.modalPresentationStyle = .custom
        modal.transitioningDelegate = modal
        self.present(modal, animated: true)
    }
}
```

-C

```
@interface PresentingViewController ()
@property (nonatomic, strong) UIButton *button;
@end
```

```
@implementation PresentingViewController

- (void)viewDidLoad
{
    [super viewDidLoad];
    [self.button addTarget:self action:@selector(didPressPresent)
forControlEvents:UIControlEventTouchUpInside];
}

- (void)didPressPresent
{
    ModalViewController *modal = [[ModalViewController alloc] init];
    modal.view.frame = CGRectMake(0.0, 0.0, 200.0, 200.0);
    modal.modalPresentationStyle = UIModalPresentationCustom;
    modal.transitioningDelegate = modal;
    [self presentViewController:modal animated:YES completion:nil];
}

- (UIButton *)button
{
    if (!_button)
    {
        _button = [[UIButton alloc] init];
        _button.translatesAutoresizingMaskIntoConstraints = NO;
        [self.view addSubview:_button];
        [_button.centerXAnchor constraintEqualToAnchor:self.view.centerXAnchor].active = YES;
        [_button.centerYAnchor constraintEqualToAnchor:self.view.centerYAnchor].active = YES;
        [_button setTitle:@"Present" forState:UIControlStateNormal];
        [_button setTitleColor:[UIColor blueColor] forState:UIControlStateNormal];
    }
    return _button;
}

@end
```

ModalViewController .custom transitionDelegate . . modal .

ModalViewController ModalViewController .

```
class ModalViewController: UIViewController
{
    lazy var button: UIButton =
    {
        let button = UIButton()
        button.translatesAutoresizingMaskIntoConstraints = false
        self.view.addSubview(button)
        button.centerXAnchor.constraint(equalTo: self.view.centerXAnchor).isActive
         = true
        button.centerYAnchor.constraint(equalTo: self.view.centerYAnchor).isActive = true
        button.setTitle("Dismiss", for: .normal)
        button.setTitleColor(.white, for: .normal)

        return button
    }()

    override func viewDidLoad()
    {
        super.viewDidLoad()
```

```
        button.addTarget(self, action: #selector(self.didPressDismiss), for: .touchUpInside)
        view.backgroundColor = .red
        view.layer.cornerRadius = 15.0
    }

    func didPressDismiss()
    {
        dismiss(animated: true)
    }
}

extension ModalViewController: UIViewControllerTransitioningDelegate
{
    func animationController(forPresented presented: UIViewController, presenting:
UIViewController, source: UIViewController) -> UIViewControllerAnimatedTransitioning?
    {
        return DropOutAnimator(duration: 1.5, isAppearing: true)
    }

    func animationController(forDismissed dismissed: UIViewController) ->
UIViewControllerAnimatedTransitioning?
    {
        return DropOutAnimator(duration: 4.0, isAppearing: false)
    }
}
```

-C

```
@interface ModalViewController () <UIViewControllerTransitioningDelegate>
@property (nonatomic, strong) UIButton *button;
@end

@implementation ModalViewController

- (void)viewDidLoad
{
    [super viewDidLoad];
    [self.button addTarget:self action:@selector(didPressPresent)
forControlEvents:UIControlEventTouchUpInside];
    self.view.backgroundColor = [UIColor redColor];
    self.view.layer.cornerRadius = 15.0f;
}

- (void)didPressPresent
{
    [self dismissViewControllerAnimated:YES completion:nil];
}

- (UIButton *)button
{
    if (!_button)
    {
        _button = [[UIButton alloc] init];
        _button.translatesAutoresizingMaskIntoConstraints = NO;
        [self.view addSubview:_button];
        [_button.centerXAnchor constraintEqualToAnchor:self.view.centerXAnchor].active = YES;
        [_button.centerYAnchor constraintEqualToAnchor:self.view.centerYAnchor].active = YES;
        [_button setTitle:@"Dismiss" forState:UIControlStateNormal];
        [_button setTitleColor:[UIColor blueColor] forState:UIControlStateNormal];
```

```
    }
    return _button;
}

-
(id<UIViewControllerAnimatedTransitioning>)animationControllerForPresentedController:(UIViewController
*)presented presentingController:(UIViewController *)presenting
sourceController:(UIViewController *)source
{
    return [[DropOutAnimator alloc]initWithDuration: 1.5 appearing:YES];
}

-
(id<UIViewControllerAnimatedTransitioning>)animationControllerForDismissedController:(UIViewController
*)dismissed
{
    return [[DropOutAnimator alloc] initWithDuration:4.0 appearing:NO];
}

@end
```

. ModalViewController transitioningDelegate . UIDynamicBehavior .

, . . , . DropOutAnimator UIViewControllerAnimatedTransitioning DropOutAnimator
func animateTransition(using transitionContext: UIViewControllerContextTransitioning) .

```
class DropOutAnimator: UIDynamicBehavior
{
    let duration: TimeInterval
    let isAppearing: Bool

    var transitionContext: UIViewControllerContextTransitioning?
    var hasElapsedTimeExceededDuration = false
    var finishTime: TimeInterval = 0.0
    var collisionBehavior: UICollisionBehavior?
    var attachmentBehavior: UIAttachmentBehavior?
    var animator: UIDynamicAnimator?

    init(duration: TimeInterval = 1.0,  isAppearing: Bool)
    {
        self.duration = duration
        self.isAppearing = isAppearing
        super.init()
    }
}

extension DropOutAnimator: UIViewControllerAnimatedTransitioning
{
    func animateTransition(using transitionContext: UIViewControllerContextTransitioning)
    {
        // Get relevant views and view controllers from transitionContext
        guard let fromVC = transitionContext.viewController(forKey: .from),
              let toVC = transitionContext.viewController(forKey: .to),
              let fromView = fromVC.view,
              let toView = toVC.view else { return }

        let containerView = transitionContext.containerView
        let duration = self.transitionDuration(using: transitionContext)
```

```
        // Hold refrence to transitionContext to notify it of completion
        self.transitionContext = transitionContext

        // Create dynamic animator
        let animator = UIDynamicAnimator(referenceView: containerView)
        animator.delegate = self
        self.animator = animator

        // Presenting Animation
        if self.isAppearing
        {
            fromView.isUserInteractionEnabled = false

            // Position toView  just off-screen
            let fromViewInitialFrame = transitionContext.initialFrame(for: fromVC)
            var toViewInitialFrame = toView.frame
            toViewInitialFrame.origin.y -= toViewInitialFrame.height
            toViewInitialFrame.origin.x = fromViewInitialFrame.width * 0.5 -
toViewInitialFrame.width * 0.5
            toView.frame = toViewInitialFrame

            containerView.addSubview(toView)

            // Prevent rotation and adjust bounce
            let bodyBehavior = UIDynamicItemBehavior(items: [toView])
            bodyBehavior.elasticity = 0.7
            bodyBehavior.allowsRotation = false

            // Add gravity at exaggerated magnitude so animation doesn't seem slow
            let gravityBehavior = UIGravityBehavior(items: [toView])
            gravityBehavior.magnitude = 10.0

            // Set collision bounds to include off-screen view and have collision in center
            // where our final view should come to rest
            let collisionBehavior = UICollisionBehavior(items: [toView])
            let insets = UIEdgeInsets(top: toViewInitialFrame.minY, left: 0.0, bottom:
fromViewInitialFrame.height * 0.5 - toViewInitialFrame.height * 0.5, right: 0.0)
            collisionBehavior.setTranslatesReferenceBoundsIntoBoundary(with: insets)
            self.collisionBehavior = collisionBehavior

            // Keep track of finish time in case we need to end the animator befor the
animator pauses
            self.finishTime = duration + (self.animator?.elapsedTime ?? 0.0)

            // Closure that is called after every "tick" of the animator
            // Check if we exceed duration
            self.action =
            { [weak self] in
                guard let strongSelf = self,
                  (strongSelf.animator?.elapsedTime ?? 0.0) >= strongSelf.finishTime else {
return }
                strongSelf.hasElapsedTimeExceededDuration = true
                strongSelf.animator?.removeBehavior(strongSelf)
            }

            // `DropOutAnimator` is a composit behavior, so add child behaviors to self
            self.addChildBehavior(collisionBehavior)
            self.addChildBehavior(bodyBehavior)
            self.addChildBehavior(gravityBehavior)

            // Add self to dynamic animator
```

```
            self.animator?.addBehavior(self)
        }
        // Dismissing Animation
        else
        {
            // Create allow rotation and have a elastic item
            let bodyBehavior = UIDynamicItemBehavior(items: [fromView])
            bodyBehavior.elasticity = 0.8
            bodyBehavior.angularResistance = 5.0
            bodyBehavior.allowsRotation = true

            // Create gravity with exaggerated magnitude
            let gravityBehavior = UIGravityBehavior(items: [fromView])
            gravityBehavior.magnitude = 10.0

            // Collision boundary is set to have a floor just below the bottom of the screen
            let collisionBehavior = UICollisionBehavior(items: [fromView])
            let insets = UIEdgeInsets(top: 0.0, left: -1000, bottom: -225, right: -1000)
            collisionBehavior.setTranslatesReferenceBoundsIntoBoundary(with: insets)
            self.collisionBehavior = collisionBehavior

            // Attachment behavior so view will have effect of hanging from a rope
            let offset = UIOffset(horizontal: 70.0, vertical: fromView.bounds.height * 0.5)
            var anchorPoint = CGPoint(x: fromView.bounds.maxX - 40.0, y: fromView.bounds.minY)
            anchorPoint = containerView.convert(anchorPoint, from: fromView)
            let attachmentBehavior = UIAttachmentBehavior(item: fromView, offsetFromCenter:
offset, attachedToAnchor: anchorPoint)
            attachmentBehavior.frequency = 3.0
            attachmentBehavior.damping = 3.0
            self.attachmentBehavior = attachmentBehavior

            // `DropOutAnimator` is a composit behavior, so add child behaviors to self
            self.addChildBehavior(collisionBehavior)
            self.addChildBehavior(bodyBehavior)
            self.addChildBehavior(gravityBehavior)
            self.addChildBehavior(attachmentBehavior)

            // Add self to dynamic animator
            self.animator?.addBehavior(self)

            // Animation has two parts part one is hanging from rope.
            // Part two is bouncying off-screen
            // Divide duration in two
            self.finishTime = (2.0 / 3.0) * duration + (self.animator?.elapsedTime ?? 0.0)

             // After every "tick" of animator check if past time limit
            self.action =
            { [weak self] in
                guard let strongSelf = self,
                  (strongSelf.animator?.elapsedTime ?? 0.0) >= strongSelf.finishTime else {
return }
                strongSelf.hasElapsedTimeExceededDuration = true
                strongSelf.animator?.removeBehavior(strongSelf)
            }
        }

    }

    func transitionDuration(using transitionContext: UIViewControllerContextTransitioning?) ->
TimeInterval
    {
```

```
        // Return the duration of the animation
        return self.duration
    }
}

extension DropOutAnimator: UIDynamicAnimatorDelegate
{
    func dynamicAnimatorDidPause(_ animator: UIDynamicAnimator)
    {
      // Animator has reached stasis
      if self.isAppearing
      {
            // Check if we are out of time
            if self.hasElapsedTimeExceededDuration
            {
                // Move to final positions
                let toView = self.transitionContext?.viewController(forKey: .to)?.view
                let containerView = self.transitionContext?.containerView
                toView?.center = containerView?.center ?? .zero
                self.hasElapsedTimeExceededDuration = false
            }

            // Clean up and call completion

self.transitionContext?.completeTransition(!(self.transitionContext?.transitionWasCancelled ??
false))
            self.childBehaviors.forEach { self.removeChildBehavior($0) }
            animator.removeAllBehaviors()
            self.transitionContext = nil
    }
    else
    {
        if let attachmentBehavior = self.attachmentBehavior
        {
            // If we have an attachment, we are at the end of part one and start part two.
            self.removeChildBehavior(attachmentBehavior)
            self.attachmentBehavior = nil
            animator.addBehavior(self)
            let duration = self.transitionDuration(using: self.transitionContext)
            self.finishTime = 1.0 / 3.0 * duration + animator.elapsedTime
        }
        else
        {
            // Clean up and call completion
            let fromView = self.transitionContext?.viewController(forKey: .from)?.view
            let toView = self.transitionContext?.viewController(forKey: .to)?.view
            fromView?.removeFromSuperview()
            toView?.isUserInteractionEnabled = true

self.transitionContext?.completeTransition(!(self.transitionContext?.transitionWasCancelled ??
false))
            self.childBehaviors.forEach { self.removeChildBehavior($0) }
            animator.removeAllBehaviors()
            self.transitionContext = nil
        }
    }
}
}
```

-C

```
@interface ObjcDropOutAnimator() <UIDynamicAnimatorDelegate,
UIViewControllerAnimatedTransitioning>
@property (nonatomic, strong) id<UIViewControllerContextTransitioning> transitionContext;
@property (nonatomic, strong) UIDynamicAnimator *animator;
@property (nonatomic, assign) NSTimeInterval finishTime;
@property (nonatomic, assign) BOOL elapsedTimeExceededDuration;
@property (nonatomic, assign, getter=isAppearing) BOOL appearing;
@property (nonatomic, assign) NSTimeInterval duration;
@property (nonatomic, strong) UIAttachmentBehavior *attachBehavior;
@property (nonatomic, strong) UICollisionBehavior * collisionBehavior;

@end

@implementation ObjcDropOutAnimator

- (instancetype)initWithDuration:(NSTimeInterval)duration appearing:(BOOL)appearing
{
    self = [super init];
    if (self)
    {
        _duration = duration;
        _appearing = appearing;
    }
    return self;
}

- (void) animateTransition:(id<UIViewControllerContextTransitioning>)transitionContext
{
    // Get relevant views and view controllers from transitionContext
    UIViewController *fromVC = [transitionContext
viewControllerForKey:UITransitionContextFromViewControllerKey];
    UIViewController *toVC = [transitionContext
viewControllerForKey:UITransitionContextToViewControllerKey];
    UIView *fromView = fromVC.view;
    UIView *toView = toVC.view;

    UIView *containerView = transitionContext.containerView;
    NSTimeInterval duration = [self transitionDuration:transitionContext];

    // Hold refrence to transitionContext to notify it of completion
    self.transitionContext = transitionContext;

    // Create dynamic animator
    UIDynamicAnimator *animator = [[UIDynamicAnimator
alloc]initWithReferenceView:containerView];
    animator.delegate = self;
    self.animator = animator;

    // Presenting Animation
    if (self.isAppearing)
    {
        fromView.userInteractionEnabled = NO;

        // Position toView  just above screen
        CGRect fromViewInitialFrame = [transitionContext
initialFrameForViewController:fromVC];
        CGRect toViewInitialFrame = toView.frame;
        toViewInitialFrame.origin.y -= CGRectGetHeight(toViewInitialFrame);
        toViewInitialFrame.origin.x = CGRectGetWidth(fromViewInitialFrame) * 0.5 -
CGRectGetWidth(toViewInitialFrame) * 0.5;
        toView.frame = toViewInitialFrame;
```

```
        [containerView addSubview:toView];

        // Prevent rotation and adjust bounce
        UIDynamicItemBehavior *bodyBehavior = [[UIDynamicItemBehavior
alloc]initWithItems:@[toView]];
        bodyBehavior.elasticity = 0.7;
        bodyBehavior.allowsRotation = NO;

        // Add gravity at exaggerated magnitude so animation doesn't seem slow
        UIGravityBehavior *gravityBehavior = [[UIGravityBehavior
alloc]initWithItems:@[toView]];
        gravityBehavior.magnitude = 10.0f;

        // Set collision bounds to include off-screen view and have collision floor in center
        // where our final view should come to rest
        UICollisionBehavior *collisionBehavior = [[UICollisionBehavior
alloc]initWithItems:@[toView]];
        UIEdgeInsets insets = UIEdgeInsetsMake(CGRectGetMinY(toViewInitialFrame), 0.0,
CGRectGetHeight(fromViewInitialFrame) * 0.5 - CGRectGetHeight(toViewInitialFrame) * 0.5, 0.0);
        [collisionBehavior setTranslatesReferenceBoundsIntoBoundaryWithInsets:insets];
        self.collisionBehavior = collisionBehavior;

        // Keep track of finish time in case we need to end the animator befor the animator
pauses
        self.finishTime = duration + self.animator.elapsedTime;

        // Closure that is called after every "tick" of the animator
        // Check if we exceed duration
        __weak ObjcDropOutAnimator *weakSelf = self;
        self.action = ^{
            __strong ObjcDropOutAnimator *strongSelf = weakSelf;
            if (strongSelf)
            {
                if (strongSelf.animator.elapsedTime >= strongSelf.finishTime)
                {
                    strongSelf.elapsedTimeExceededDuration = YES;
                    [strongSelf.animator removeBehavior:strongSelf];
                }
            }
        };

        // `DropOutAnimator` is a composit behavior, so add child behaviors to self
        [self addChildBehavior:collisionBehavior];
        [self addChildBehavior:bodyBehavior];
        [self addChildBehavior:gravityBehavior];

        // Add self to dynamic animator
        [self.animator addBehavior:self];
    }
    // Dismissing Animation
    else
    {
        // Allow rotation and have a elastic item
        UIDynamicItemBehavior *bodyBehavior = [[UIDynamicItemBehavior alloc]
initWithItems:@[fromView]];
        bodyBehavior.elasticity = 0.8;
        bodyBehavior.angularResistance = 5.0;
        bodyBehavior.allowsRotation = YES;

        // Create gravity with exaggerated magnitude
```

```
        UIGravityBehavior *gravityBehavior = [[UIGravityBehavior alloc]
initWithItems:@[fromView]];
        gravityBehavior.magnitude = 10.0f;

        // Collision boundary is set to have a floor just below the bottom of the screen
        UICollisionBehavior *collisionBehavior = [[UICollisionBehavior alloc]
initWithItems:@[fromView]];
        UIEdgeInsets insets = UIEdgeInsetsMake(0, -1000, -225, -1000);
        [collisionBehavior setTranslatesReferenceBoundsIntoBoundaryWithInsets:insets];
        self.collisionBehavior = collisionBehavior;

        // Attachment behavior so view will have effect of hanging from a rope
        UIOffset offset = UIOffsetMake(70, -(CGRectGetHeight(fromView.bounds) / 2.0));

        CGPoint anchorPoint = CGPointMake(CGRectGetMaxX(fromView.bounds) - 40,
                                          CGRectGetMinY(fromView.bounds));
        anchorPoint = [containerView convertPoint:anchorPoint fromView:fromView];
        UIAttachmentBehavior *attachBehavior = [[UIAttachmentBehavior alloc]
initWithItem:fromView offsetFromCenter:offset attachedToAnchor:anchorPoint];
        attachBehavior.frequency = 3.0;
        attachBehavior.damping = 0.3;
        attachBehavior.length = 40;
        self.attachBehavior = attachBehavior;

        // `DropOutAnimator` is a composit behavior, so add child behaviors to self
        [self addChildBehavior:collisionBehavior];
        [self addChildBehavior:bodyBehavior];
        [self addChildBehavior:gravityBehavior];
        [self addChildBehavior:attachBehavior];

        // Add self to dynamic animator
        [self.animator addBehavior:self];

        // Animation has two parts part one is hanging from rope.
        // Part two is bouncying off-screen
        // Divide duration in two
        self.finishTime = (2./3.) * duration + [self.animator elapsedTime];

        // After every "tick" of animator check if past time limit
        __weak ObjcDropOutAnimator *weakSelf = self;
        self.action = ^{
            __strong ObjcDropOutAnimator *strongSelf = weakSelf;
            if (strongSelf)
            {
                if ([strongSelf.animator elapsedTime] >= strongSelf.finishTime)
                {
                    strongSelf.elapsedTimeExceededDuration = YES;
                    [strongSelf.animator removeBehavior:strongSelf];
                }
            }
        };
    }
}

-
(NSTimeInterval)transitionDuration:(id<UIViewControllerContextTransitioning>)transitionContext
{
    return self.duration;
}

- (void)dynamicAnimatorDidPause:(UIDynamicAnimator *)animator
```

```
{
    // Animator has reached stasis
    if (self.isAppearing)
    {
        // Check if we are out of time
        if (self.elapsedTimeExceededDuration)
        {
            // Move to final positions
            UIView *toView = [self.transitionContext
viewControllerForKey:UITransitionContextToViewControllerKey].view;
            UIView *containerView = [self.transitionContext containerView];
            toView.center = containerView.center;
            self.elapsedTimeExceededDuration = NO;
        }

        // Clean up and call completion
        [self.transitionContext completeTransition:![self.transitionContext
transitionWasCancelled]];
        for (UIDynamicBehavior *behavior in self.childBehaviors)
        {
            [self removeChildBehavior:behavior];
        }
        [animator removeAllBehaviors];
        self.transitionContext = nil;
    }
    // Dismissing
    else
    {
        if (self.attachBehavior)
        {
            // If we have an attachment, we are at the end of part one and start part two.
            [self removeChildBehavior:self.attachBehavior];
            self.attachBehavior = nil;
            [animator addBehavior:self];
            NSTimeInterval duration = [self transitionDuration:self.transitionContext];
            self.finishTime = 1./3. * duration + [animator elapsedTime];
        }
        else
        {
            // Clean up and call completion
            UIView *fromView = [self.transitionContext
viewControllerForKey:UITransitionContextFromViewControllerKey].view;
            UIView *toView = [self.transitionContext
viewControllerForKey:UITransitionContextToViewControllerKey].view;
            [fromView removeFromSuperview];
            toView.userInteractionEnabled = YES;

            [self.transitionContext completeTransition:![self.transitionContext
transitionWasCancelled]];
            for (UIDynamicBehavior *behavior in self.childBehaviors)
            {
                [self removeChildBehavior:behavior];
            }
            [animator removeAllBehaviors];
            self.transitionContext = nil;
        }
    }
}
```

DropOutAnimator . DropOutAnimator action .

2013 WWDC "UIKit Dynamics " SOLPresentingFun

UIDynamicBehaviors

iOS "" .

, . UIViewControllerTransitioningDelegate . ( ). . . .

```
class ViewController: UIViewController
{
    var presentingAnimator: ShadeAnimator!
    var dismissingAnimator: ShadeAnimator!
    let shadeVC = ShadeViewController()

    lazy var label: UILabel =
    {
        let label = UILabel()
        label.textColor = .blue
        label.translatesAutoresizingMaskIntoConstraints = false
        self.view.addSubview(label)
        label.centerXAnchor.constraint(equalTo: self.view.centerXAnchor).isActive = true
        label.centerYAnchor.constraint(equalTo: self.view.centerYAnchor).isActive = true
        return label
    }()

    override func viewDidLoad()
    {
        super.viewDidLoad()
        label.text = "Swipe Down From Top"
        presentingAnimator = ShadeAnimator(isAppearing: true, presentingVC: self, presentedVC:
shadeVC, transitionDelegate: self)
        dismissingAnimator = ShadeAnimator(isAppearing: false, presentingVC: self,
presentedVC: shadeVC, transitionDelegate: self)
    }
}
```

```
extension ViewController: UIViewControllerTransitioningDelegate
{
    func animationController(forPresented presented: UIViewController, presenting:
UIViewController, source: UIViewController) -> UIViewControllerAnimatedTransitioning?
    {
        return EmptyAnimator()
    }

    func animationController(forDismissed dismissed: UIViewController) ->
UIViewControllerAnimatedTransitioning?
    {
        return EmptyAnimator()
    }

    func interactionControllerForPresentation(using animator:
UIViewControllerAnimatedTransitioning) -> UIViewControllerInteractiveTransitioning?
    {
        return presentingAnimator
    }

    func interactionControllerForDismissal(using animator:
UIViewControllerAnimatedTransitioning) -> UIViewControllerInteractiveTransitioning?
    {
        return dismissingAnimator
    }
}
```

-C

```
@interface ObjCViewController () <UIViewControllerTransitioningDelegate>
@property (nonatomic, strong) ShadeAnimator *presentingAnimator;
@property (nonatomic, strong) ShadeAnimator *dismissingAnimator;
@property (nonatomic, strong) UILabel *label;
@property (nonatomic, strong) ShadeViewController *shadeVC;
@end

@implementation ObjCViewController

- (void)viewDidLoad
{
    [super viewDidLoad];
    self.label.text = @"Swipe Down From Top";
    self.shadeVC = [[ShadeViewController alloc] init];
    self.presentingAnimator = [[ShadeAnimator alloc] initWithIsAppearing:YES presentingVC:self
presentedVC:self.shadeVC transitionDelegate:self];
    self.dismissingAnimator = [[ShadeAnimator alloc] initWithIsAppearing:NO presentingVC:self
presentedVC:self.shadeVC transitionDelegate:self];
}

- (UILabel *)label
{
    if (!_label)
    {
        _label = [[UILabel alloc] init];
        _label.textColor = [UIColor blueColor];
        _label.translatesAutoresizingMaskIntoConstraints = NO;
        [self.view addSubview:_label];
        [_label.centerXAnchor constraintEqualToAnchor:self.view.centerXAnchor].active = YES;
        [_label.centerYAnchor constraintEqualToAnchor:self.view.centerYAnchor].active = YES;
```

```
    }
    return _label;
}

#pragma mark - UIViewControllerTransitioningDelegate

-
(id<UIViewControllerAnimatedTransitioning>)animationControllerForPresentedController:(UIViewController
*)presented presentingController:(UIViewController *)presenting
sourceController:(UIViewController *)source
{
    return [[EmptyAnimator alloc] init];
}

-
(id<UIViewControllerAnimatedTransitioning>)animationControllerForDismissedController:(UIViewController
*)dismissed
{
    return [[EmptyAnimator alloc] init];
}

-
(id<UIViewControllerInteractiveTransitioning>)interactionControllerForPresentation:(id<UIViewControlle

{
    return self.presentingAnimator;
}

-
(id<UIViewControllerInteractiveTransitioning>)interactionControllerForDismissal:(id<UIViewControllerAni

{
    return self.dismissingAnimator;
}

@end
```

, UIViewControllerTransitioningDelegate . UIViewControllerAnimatedTransitioning EmptyAnimator .

```
class EmptyAnimator: NSObject
{

}

extension EmptyAnimator: UIViewControllerAnimatedTransitioning
{
    func animateTransition(using transitionContext: UIViewControllerContextTransitioning)
    {

    }

    func transitionDuration(using transitionContext: UIViewControllerContextTransitioning?) ->
TimeInterval
    {
        return 0.0
    }
}
```

-C

```
@implementation EmptyAnimator

- (void)animateTransition:(id<UIViewControllerContextTransitioning>)transitionContext
{

}

-
(NSTimeInterval)transitionDuration:(id<UIViewControllerContextTransitioning>)transitionContext
{
    return 0.0;
}

@end
```

UIViewControllerInteractiveTransitioning UIDynamicBehavior   ShadeAnimator .

```
class ShadeAnimator: UIDynamicBehavior
{
    // Whether we are presenting or dismissing
    let isAppearing: Bool

    // The view controller that is not the shade
    weak var presentingVC: UIViewController?

    // The view controller that is the shade
    weak var presentedVC: UIViewController?

    // The delegate will vend the animator
    weak var transitionDelegate: UIViewControllerTransitioningDelegate?

    // Feedback generator for haptics on collisions
    let impactFeedbackGenerator = UIImpactFeedbackGenerator(style: .light)

    // The context given to the animator at the start of the transition
    var transitionContext: UIViewControllerContextTransitioning?

    // Time limit of the dynamic part of the animation
    var finishTime: TimeInterval = 4.0

    // The Pan Gesture that drives the transition. Not using EdgePan because triggers
Notifications screen
    lazy var pan: UIPanGestureRecognizer =
    {
        let pan = UIPanGestureRecognizer(target: self, action:
#selector(self.handlePan(sender:)))
        return pan
    }()

    // The dynamic animator that we add `ShadeAnimator` to
    lazy var animator: UIDynamicAnimator! =
    {
        let animator = UIDynamicAnimator(referenceView: self.transitionContext!.containerView)
        return animator
    }()
```

```
    // init with all of our dependencies
    init(isAppearing: Bool, presentingVC: UIViewController, presentedVC: UIViewController,
transitionDelegate: UIViewControllerTransitioningDelegate)
    {
        self.isAppearing = isAppearing
        self.presentingVC = presentingVC
        self.presentedVC = presentedVC
        self.transitionDelegate = transitionDelegate
        super.init()
        self.impactFeedbackGenerator.prepare()

        if isAppearing
        {
            self.presentingVC?.view.addGestureRecognizer(pan)
        }
        else
        {
            self.presentedVC?.view.addGestureRecognizer(pan)
        }

    }

    // Setup and moves shade view controller to just above screen if appearing
    func setupViewsForTransition(with transitionContext: UIViewControllerContextTransitioning)
    {
        // Get relevant views and view controllers from transitionContext
        guard let fromVC = transitionContext.viewController(forKey: .from),
            let toVC = transitionContext.viewController(forKey: .to),
            let toView = toVC.view else { return }

        let containerView = transitionContext.containerView

        // Hold refrence to transitionContext to notify it of completion
        self.transitionContext = transitionContext
        if isAppearing
        {
            // Position toView  just off-screen
            let fromViewInitialFrame = transitionContext.initialFrame(for: fromVC)
            var toViewInitialFrame = toView.frame
            toViewInitialFrame.origin.y -= toViewInitialFrame.height
            toViewInitialFrame.origin.x = fromViewInitialFrame.width * 0.5 -
toViewInitialFrame.width * 0.5
            toView.frame = toViewInitialFrame

            containerView.addSubview(toView)
        }
        else
        {
            fromVC.view.addGestureRecognizer(pan)
        }
    }

    // Handles the entire interaction from presenting/dismissing to completion
    func handlePan(sender: UIPanGestureRecognizer)
    {
        let location = sender.location(in: transitionContext?.containerView)
        let velocity = sender.velocity(in: transitionContext?.containerView)
        let fromVC = transitionContext?.viewController(forKey: .from)
        let toVC = transitionContext?.viewController(forKey: .to)

        let touchStartHeight: CGFloat = 90.0
```

```
        let touchLocationFromBottom: CGFloat = 20.0

        switch sender.state
        {
        case .began:
            let beginLocation = sender.location(in: sender.view)
            if isAppearing
            {
                guard beginLocation.y <= touchStartHeight,
                      let presentedVC = self.presentedVC else { break }
                presentedVC.modalPresentationStyle = .custom
                presentedVC.transitioningDelegate = transitionDelegate
                presentingVC?.present(presentedVC, animated: true)
            }
            else
            {
                guard beginLocation.y >= (sender.view?.frame.height ?? 0.0) - touchStartHeight
else { break }
                presentedVC?.dismiss(animated: true)
            }
        case .changed:
            guard let view = isAppearing ? toVC?.view : fromVC?.view else { return }
            UIView.animate(withDuration: 0.2)
            {
                view.frame.origin.y = location.y - view.bounds.height +
touchLocationFromBottom
            }

            transitionContext?.updateInteractiveTransition(view.frame.maxY / view.frame.height
            )
        case .ended, .cancelled:
            guard let view = isAppearing ? toVC?.view : fromVC?.view else { return }
            let isCancelled = isAppearing ? (velocity.y < 0.5 || view.center.y < 0.0) :
(velocity.y > 0.5 || view.center.y > 0.0)
            addAttachmentBehavior(with: view, isCancelled: isCancelled)
            addCollisionBehavior(with: view)
            addItemBehavior(with: view)

            animator.addBehavior(self)
            animator.delegate = self

            self.action =
            { [weak self] in
                guard let strongSelf = self else { return }
                if strongSelf.animator.elapsedTime > strongSelf.finishTime
                {
                    strongSelf.animator.removeAllBehaviors()
                }
                else
                {
                    strongSelf.transitionContext?.updateInteractiveTransition(view.frame.maxY
/ view.frame.height
                    )
                }
            }
        default:
            break
        }
    }

    // Add collision behavior that causes bounce when finished
```

```
    func addCollisionBehavior(with view: UIView)
    {
        let collisionBehavior = UICollisionBehavior(items: [view])
        let insets = UIEdgeInsets(top: -view.bounds.height, left: 0.0, bottom: 0.0, right:
0.0)
        collisionBehavior.setTranslatesReferenceBoundsIntoBoundary(with: insets)
        collisionBehavior.collisionDelegate = self
        self.addChildBehavior(collisionBehavior)
    }

    // Add attachment behavior that pulls shade either to top or bottom
    func addAttachmentBehavior(with view: UIView, isCancelled: Bool)
    {
        let anchor: CGPoint
        switch (isAppearing, isCancelled)
        {
        case (true, true), (false, false):
            anchor = CGPoint(x: view.center.x, y: -view.frame.height)
        case (true, false), (false, true):
            anchor = CGPoint(x: view.center.x, y: view.frame.height)
        }
        let attachmentBehavior = UIAttachmentBehavior(item: view, attachedToAnchor: anchor)
        attachmentBehavior.damping = 0.1
        attachmentBehavior.frequency = 3.0
        attachmentBehavior.length = 0.5 * view.frame.height
        self.addChildBehavior(attachmentBehavior)
    }

    // Makes view more bouncy
    func addItemBehavior(with view: UIView)
    {
        let itemBehavior = UIDynamicItemBehavior(items: [view])
        itemBehavior.allowsRotation = false
        itemBehavior.elasticity = 0.6
        self.addChildBehavior(itemBehavior)
    }

}
extension ShadeAnimator: UIDynamicAnimatorDelegate
{
    // Determines transition has ended
    func dynamicAnimatorDidPause(_ animator: UIDynamicAnimator)
    {
        guard let transitionContext = self.transitionContext else { return }
        let fromVC = transitionContext.viewController(forKey: .from)
        let toVC = transitionContext.viewController(forKey: .to)
        guard let view = isAppearing ? toVC?.view : fromVC?.view else { return }
        switch (view.center.y < 0.0, isAppearing)
        {
        case (true, true), (true, false):
            view.removeFromSuperview()
            transitionContext.finishInteractiveTransition()
            transitionContext.completeTransition(!isAppearing)
        case (false, true):
            toVC?.view.frame = transitionContext.finalFrame(for: toVC!)
            transitionContext.finishInteractiveTransition()
            transitionContext.completeTransition(true)
        case (false, false):
            fromVC?.view.frame = transitionContext.initialFrame(for: fromVC!)
            transitionContext.cancelInteractiveTransition()
            transitionContext.completeTransition(false)
```

```
        }
        childBehaviors.forEach { removeChildBehavior($0) }
        animator.removeAllBehaviors()
        self.animator = nil
        self.transitionContext = nil
    }
}
extension ShadeAnimator: UICollisionBehaviorDelegate
{
    // Triggers haptics
    func collisionBehavior(_ behavior: UICollisionBehavior, beganContactFor item:
UIDynamicItem, withBoundaryIdentifier identifier: NSCopying?, at p: CGPoint)
    {
        guard p.y > 0.0 else { return }
        impactFeedbackGenerator.impactOccurred()
    }
}
extension ShadeAnimator: UIViewControllerInteractiveTransitioning
{
    // Starts transition
    func startInteractiveTransition(_ transitionContext: UIViewControllerContextTransitioning)
    {
        setupViewsForTransition(with: transitionContext)
    }
}
```

-C

```
@interface ShadeAnimator() <UIDynamicAnimatorDelegate, UICollisionBehaviorDelegate>
@property (nonatomic, assign) BOOL isAppearing;
@property (nonatomic, weak) UIViewController *presentingVC;
@property (nonatomic, weak) UIViewController *presentedVC;
@property (nonatomic, weak) NSObject<UIViewControllerTransitioningDelegate>
*transitionDelegate;
@property (nonatomic, strong) UIImpactFeedbackGenerator *impactFeedbackGenerator;
@property (nonatomic, strong) id<UIViewControllerContextTransitioning> transitionContext;
@property (nonatomic, assign) NSTimeInterval finishTime;
@property (nonatomic, strong) UIPanGestureRecognizer *pan;
@property (nonatomic, strong) UIDynamicAnimator *animator;
@end

@implementation ShadeAnimator

- (instancetype)initWithIsAppearing:(BOOL)isAppearing presentingVC:(UIViewController
*)presentingVC presentedVC:(UIViewController *)presentedVC
transitionDelegate:(id<UIViewControllerTransitioningDelegate>)transitionDelegate
{
    self = [super init];
    if (self)
    {
        _isAppearing = isAppearing;
        _presentingVC = presentingVC;
        _presentedVC = presentedVC;
        _transitionDelegate = transitionDelegate;
        _impactFeedbackGenerator = [[UIImpactFeedbackGenerator
alloc]initWithStyle:UIImpactFeedbackStyleLight];
        [_impactFeedbackGenerator prepare];
        if (_isAppearing)
        {
```

```
            [_presentingVC.view addGestureRecognizer:self.pan];
        }
        else
        {
            [_presentedVC.view addGestureRecognizer:self.pan];
        }
    }
    return self;
}

#pragma mark - Lazy Init
- (UIPanGestureRecognizer *)pan
{
    if (!_pan)
    {
        _pan = [[UIPanGestureRecognizer alloc]initWithTarget:self
action:@selector(handlePan:)];
    }
    return _pan;
}

- (UIDynamicAnimator *)animator
{
    if (!_animator)
    {
        _animator = [[UIDynamicAnimator
alloc]initWithReferenceView:self.transitionContext.containerView];
    }
    return _animator;
}

#pragma mark - Setup
-
(void)setupViewForTransitionWithContext:(id<UIViewControllerContextTransitioning>)transitionContext

{
    UIViewController *fromVC = [transitionContext
viewControllerForKey:UITransitionContextFromViewControllerKey];
    UIViewController *toVC = [transitionContext
viewControllerForKey:UITransitionContextToViewControllerKey];
    UIView *toView = toVC.view;
    UIView *containerView = transitionContext.containerView;
    self.transitionContext = transitionContext;
    if (self.isAppearing)
    {
        CGRect fromViewInitialFrame = [transitionContext
initialFrameForViewController:fromVC];
        CGRect toViewInitialFrame = toView.frame;
        toViewInitialFrame.origin.y -= CGRectGetHeight(toViewInitialFrame);
        toViewInitialFrame.origin.x = CGRectGetWidth(fromViewInitialFrame) * 0.5 -
CGRectGetWidth(toViewInitialFrame) * 0.5;

        [containerView addSubview:toView];
    }
    else
    {
        [fromVC.view addGestureRecognizer:self.pan];
    }
}

#pragma mark - Gesture
```

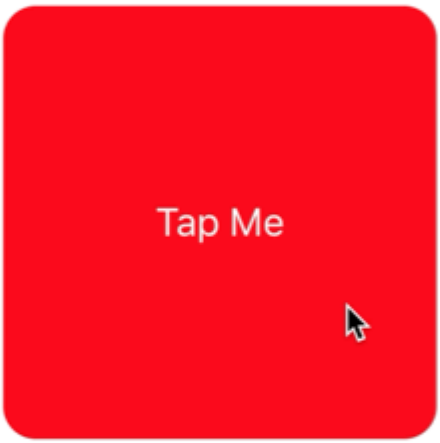
```
- (void)handlePan:(UIPanGestureRecognizer *)sender
{
    CGPoint location = [sender locationInView:self.transitionContext.containerView];
    CGPoint velocity = [sender velocityInView:self.transitionContext.containerView];
    UIViewController *fromVC = [self.transitionContext
viewControllerForKey:UITransitionContextFromViewControllerKey];
    UIViewController *toVC = [self.transitionContext
viewControllerForKey:UITransitionContextToViewControllerKey];

    CGFloat touchStartHeight = 90.0;
    CGFloat touchLocationFromBottom = 20.0;

    if (sender.state == UIGestureRecognizerStateBegan)
    {
        CGPoint beginLocation = [sender locationInView:sender.view];
        if (self.isAppearing)
        {
            if (beginLocation.y <= touchStartHeight)
            {
                self.presentedVC.modalPresentationStyle = UIModalPresentationCustom;
                self.presentedVC.transitioningDelegate = self.transitionDelegate;
                [self.presentingVC presentViewController:self.presentedVC animated:YES
completion:nil];
            }
        }
        else
        {
            if (beginLocation.y >= [sender locationInView:sender.view].y - touchStartHeight)
            {
                [self.presentedVC dismissViewControllerAnimated:true completion:nil];
            }
        }
    }
    else if (sender.state == UIGestureRecognizerStateChanged)
    {
        UIView *view = self.isAppearing ? toVC.view : fromVC.view;
        [UIView animateWithDuration:0.2 animations:^{
            CGRect frame = view.frame;
            frame.origin.y = location.y - CGRectGetHeight(view.bounds) +
touchLocationFromBottom;
            view.frame = frame;
        }];
        [self.transitionContext updateInteractiveTransition:CGRectGetMaxY(view.frame) /
CGRectGetHeight(view.frame)];
    }
    else if (sender.state == UIGestureRecognizerStateEnded || sender.state ==
UIGestureRecognizerStateCancelled)
    {
        UIView *view = self.isAppearing ? toVC.view : fromVC.view;
        BOOL isCancelled = self.isAppearing ? (velocity.y < 0.5 || view.center.y < 0.0) :
(velocity.y > 0.5 || view.center.y > 0.0);
        [self addAttachmentBehaviorWithView:view isCancelled:isCancelled];
        [self addCollisionBehaviorWithView:view];
        [self addItemBehaviorWithView:view];

        [self.animator addBehavior:self];
        self.animator.delegate = self;

        __weak ShadeAnimator *weakSelf = self;
        self.action =
        ^{
```

```
            if (weakSelf.animator.elapsedTime > weakSelf.finishTime)
            {
                [weakSelf.animator removeAllBehaviors];
            }
            else
            {
                [weakSelf.transitionContext
updateInteractiveTransition:CGRectGetMaxY(view.frame) / CGRectGetHeight(view.frame)];
            }
        };
    }
}

#pragma mark - UIViewControllerInteractiveTransitioning
- (void)startInteractiveTransition:(id<UIViewControllerContextTransitioning>)transitionContext
{
    [self setupViewForTransitionWithContext:transitionContext];
}

#pragma mark - Behaviors
- (void)addCollisionBehaviorWithView:(UIView *)view
{
    UICollisionBehavior *collisionBehavior = [[UICollisionBehavior
alloc]initWithItems:@[view]];
    UIEdgeInsets insets = UIEdgeInsetsMake(-CGRectGetHeight(view.bounds), 0.0, 0.0, 0.0);
    [collisionBehavior setTranslatesReferenceBoundsIntoBoundaryWithInsets:insets];
    collisionBehavior.collisionDelegate = self;
    [self addChildBehavior:collisionBehavior];
}

- (void)addItemBehaviorWithView:(UIView *)view
{
    UIDynamicItemBehavior *itemBehavior = [[UIDynamicItemBehavior
alloc]initWithItems:@[view]];
    itemBehavior.allowsRotation = NO;
    itemBehavior.elasticity = 0.6;
    [self addChildBehavior:itemBehavior];
}

- (void)addAttachmentBehaviorWithView:(UIView *)view isCancelled:(BOOL)isCancelled
{
    CGPoint anchor;
    if ((self.isAppearing && isCancelled) || (!self.isAppearing && isCancelled))
    {
        anchor = CGPointMake(view.center.x, -CGRectGetHeight(view.frame));
    }
    else
    {
        anchor = CGPointMake(view.center.x, -CGRectGetHeight(view.frame));
    }
    UIAttachmentBehavior *attachmentBehavior = [[UIAttachmentBehavior alloc]initWithItem:view
attachedToAnchor:anchor];
    attachmentBehavior.damping = 0.1;
    attachmentBehavior.frequency = 3.0;
    attachmentBehavior.length = 0.5 * CGRectGetHeight(view.frame);
    [self addChildBehavior:attachmentBehavior];
}

#pragma mark - UICollisionBehaviorDelegate
- (void)collisionBehavior:(UICollisionBehavior *)behavior
beganContactForItem:(id<UIDynamicItem>)item withBoundaryIdentifier:(id<NSCopying>)identifier
```

```
atPoint:(CGPoint)p
{
    if (p.y > 0.0)
    {
        [self.impactFeedbackGenerator impactOccurred];
    }
}

#pragma mark - UIDynamicAnimatorDelegate
- (void)dynamicAnimatorDidPause:(UIDynamicAnimator *)animator
{
    UIViewController *fromVC = [self.transitionContext
viewControllerForKey:UITransitionContextFromViewControllerKey];
    UIViewController *toVC = [self.transitionContext
viewControllerForKey:UITransitionContextToViewControllerKey];
    UIView *view = self.isAppearing ? toVC.view : fromVC.view;
    if (view.center.y < 0.0 && (self.isAppearing ||  !self.isAppearing))
    {
        [view removeFromSuperview];
        [self.transitionContext finishInteractiveTransition];
        [self.transitionContext completeTransition:!self.isAppearing];
    }
    else if (view.center.y >= 0.0 && self.isAppearing)
    {
        toVC.view.frame = [self.transitionContext finalFrameForViewController:toVC];
        [self.transitionContext finishInteractiveTransition];
        [self.transitionContext completeTransition:YES];
    }
    else
    {
        fromVC.view.frame = [self.transitionContext initialFrameForViewController:fromVC];
        [self.transitionContext cancelInteractiveTransition];
        [self.transitionContext completeTransition:NO];
    }
    for (UIDynamicBehavior *behavior in self.childBehaviors)
    {
        [self removeChildBehavior:behavior];
    }
    [animator removeAllBehaviors];
    self.animator = nil;
    self.transitionContext = nil;
}

@end
```

. . UIDynamicBehaviors . . 2013 WWDC "UIKit Dynamics " .

UIDynamicItem UIButton .



`UIDynamicItem` settable gettable `bounds` .

```
protocol ResizableDynamicItem: UIDynamicItem
{
    var bounds: CGRect { set get }
}
extension UIView: ResizableDynamicItem {}
```

-C

```
@protocol ResizableDynamicItem <UIDynamicItem>
@property (nonatomic, readwrite) CGRect bounds;
```

```
@end
```

UIDynamicItem . bounds transform . x y .

```
final class PositionToBoundsMapping: NSObject, UIDynamicItem
{
    var target: ResizableDynamicItem

    init(target: ResizableDynamicItem)
    {
        self.target = target
        super.init()
    }

    var bounds: CGRect
    {
        get
        {
            return self.target.bounds
        }
    }

    var center: CGPoint
    {
        get
        {
            return CGPoint(x: self.target.bounds.width, y: self.target.bounds.height)
        }

        set
        {
            self.target.bounds = CGRect(x: 0.0, y: 0.0, width: newValue.x, height: newValue.y)
        }
    }

    var transform: CGAffineTransform
    {
        get
        {
            return self.target.transform
        }

        set
        {
            self.target.transform = newValue
        }
    }
}
```

-C

```
@interface PositionToBoundsMapping ()
@property (nonatomic, strong) id<ResizableDynamicItem> target;
@end

@implementation PositionToBoundsMapping
```

```
- (instancetype)initWithTarget:(id<ResizableDynamicItem>)target
{
    self = [super init];
    if (self)
    {
        _target = target;
    }
    return self;
}

- (CGRect)bounds
{
    return self.target.bounds;
}

- (CGPoint)center
{
    return CGPointMake(self.target.bounds.size.width, self.target.bounds.size.height);
}

- (void)setCenter:(CGPoint)center
{
    self.target.bounds = CGRectMake(0, 0, center.x, center.y);
}

- (CGAffineTransform)transform
{
    return self.target.transform;
}

- (void)setTransform:(CGAffineTransform)transform
{
    self.target.transform = transform;
}

@end
```

UIViewController . PositionToBoundsMapping PositionToBoundsMapping . UIAttachmentBehavior UIPushBehavior UIPushBehavior . .

```
final class ViewController: UIViewController
{
    lazy var button: UIButton =
    {
        let button = UIButton(frame: CGRect(x: 0.0, y: 0.0, width: 300.0, height: 200.0))
        button.backgroundColor = .red
        button.layer.cornerRadius = 15.0
        button.setTitle("Tap Me", for: .normal)
        self.view.addSubview(button)
        return button
    }()

    var buttonBounds = CGRect.zero
    var animator: UIDynamicAnimator?

    override func viewDidLoad()
    {
        super.viewDidLoad()
        view.backgroundColor = .white
```

```
        button.addTarget(self, action: #selector(self.didPressButton(sender:)), for:
.touchUpInside)
        buttonBounds = button.bounds
    }

    override func viewDidLayoutSubviews()
    {
        super.viewDidLayoutSubviews()
        button.center = view.center
    }

    func didPressButton(sender: UIButton)
    {
        // Reset bounds so if button is press twice in a row, previous changes don't propogate
        button.bounds = buttonBounds
        let animator = UIDynamicAnimator(referenceView: view)

        // Create mapping
        let buttonBoundsDynamicItem = PositionToBoundsMapping(target: button)

        // Add Attachment behavior
        let attachmentBehavior = UIAttachmentBehavior(item: buttonBoundsDynamicItem,
attachedToAnchor: buttonBoundsDynamicItem.center)

        // Higher frequency faster oscillation
        attachmentBehavior.frequency = 2.0

        // Lower damping longer oscillation lasts
        attachmentBehavior.damping = 0.1
        animator.addBehavior(attachmentBehavior)

        let pushBehavior = UIPushBehavior(items: [buttonBoundsDynamicItem], mode:
.instantaneous)

        // Change angle to determine how much height/ width should change 45° means
heigh:width is 1:1
        pushBehavior.angle = .pi / 4.0

        // Larger magnitude means bigger change
        pushBehavior.magnitude = 30.0
        animator.addBehavior(pushBehavior)
        pushBehavior.active = true

        // Hold refrence so animator is not released
        self.animator = animator
    }
}
```

-C

```
@interface ViewController ()
@property (nonatomic, strong) UIButton *button;
@property (nonatomic, assign) CGRect buttonBounds;
@property (nonatomic, strong) UIDynamicAnimator *animator;
@end

@implementation ViewController

- (void)viewDidLoad
```

```
{
    [super viewDidLoad];
    self.view.backgroundColor = [UIColor whiteColor];
    [self.button addTarget:self action:@selector(didTapButton:)
forControlEvents:UIControlEventTouchUpInside];
    self.buttonBounds = self.button.bounds;
}

- (void)viewDidLayoutSubviews
{
    [super viewDidLayoutSubviews];
    self.button.center = self.view.center;
}

- (UIButton *)button
{
    if (!_button)
    {
        _button = [[UIButton alloc]initWithFrame:CGRectMake(0.0, 0.0, 200.0, 200.0)];
        _button.backgroundColor = [UIColor redColor];
        _button.layer.cornerRadius = 15.0;
        [_button setTitle:@"Tap Me" forState:UIControlStateNormal];
        [self.view addSubview:_button];
    }
    return _button;
}

- (void)didTapButton:(id)sender
{
    self.button.bounds = self.buttonBounds;
    UIDynamicAnimator *animator = [[UIDynamicAnimator alloc] initWithReferenceView:self.view];
    PositionToBoundsMapping *buttonBoundsDynamicItem = [[PositionToBoundsMapping
alloc]initWithTarget:sender];
    UIAttachmentBehavior *attachmentBehavior = [[UIAttachmentBehavior
alloc]initWithItem:buttonBoundsDynamicItem attachedToAnchor:buttonBoundsDynamicItem.center];
    [attachmentBehavior setFrequency:2.0];
    [attachmentBehavior setDamping:0.3];
    [animator addBehavior:attachmentBehavior];

    UIPushBehavior *pushBehavior = [[UIPushBehavior alloc]
initWithItems:@[buttonBoundsDynamicItem] mode:UIPushBehaviorModeInstantaneous];
    pushBehavior.angle = M_PI_4;
    pushBehavior.magnitude = 2.0;
    [animator addBehavior:pushBehavior];

    [pushBehavior setActive:TRUE];

    self.animator = animator;
}

@end
```

UIKit .

UIKit : https://riptutorial.com/ko/ios/topic/9479/uikit-

101: UILabel

UILabel . . UILabel . . .

- UILabel.numberOfLines : Int // . 0 .
- UILabel.text : ? // .
- UILabel.textColor : UIColor! // .
- UILabel.tintColor : UIColor! // .
- UILabel.attributedText : NSAttributedString? // .
- UILabel.font : UIFont! // .
- UILabel.textAlignment : NSTextAlignment // .

UILabels . , .

UILabels + Attributed Strings .

UILabel UIAppearance UIAppearance UILabels . .

Apple

Examples

`UILabel UILabel text . String .`

String

```
label.text = "the new text"
```

-C

```
// Dot Notation
label.text = @"the new text";

// Message Pattern
[label setText:@"the new text"];
```

```
let stringVar = "basic String var"
label.text = stringVar
```

-C

```
NSString * stringVar = @"basic String var";

// Dot Notation
label.text = stringVar;
```

```
// Message Pattern
[label setText: stringVar];
```

textColor .

```
label.textColor = UIColor.redColor()
label.textColor = UIColor(red: 64.0/255.0, green: 88.0/255.0, blue: 41.0/225.0, alpha: 1)
```

3

```
label.textColor = UIColor.red
label.textColor = UIColor(red: 64.0/255.0, green: 88.0/255.0, blue: 41.0/225.0, alpha: 1)
```

-C

```
label.textColor = [UIColor redColor];
label.textColor = [UIColor colorWithRed:64.0f/255.0f green:88.0f/255.0f blue:41.0f/255.0f
alpha:1.0f];
```

NSAttributedString ( ) .

-C

```
attributedString = [[NSMutableAttributedString alloc] initWithString:@"The grass is green; the
sky is blue."];
[attributedString addAttribute: NSForegroundColorAttributeName value:[UIColor greenColor]
range:NSMakeRange(13, 5)];
[attributedString addAttribute: NSForegroundColorAttributeName value:[UIColor blueColor]
range:NSMakeRange(31, 4)];
label.attributedText = attributesString;
```

```
let attributedString = NSMutableAttributedString(string: "The grass is green; the sky is
blue.")
attributedString.addAttribute(NSForegroundColorAttributeName, value: UIColor.green(), range:
NSRange(location: 13, length: 5))
attributedString.addAttribute(NSForegroundColorAttributeName, value: UIColor.blue(), range:
NSRange(location: 31, length: 4))
label.attributedText = attributedString
```

```
label.textAlignment = NSTextAlignment.left
//or the shorter
label.textAlignment = .left
```

NSTextAlignment : .left , .center , .right , .justified , .natural

-C

```
label.textAlignment = NSTextAlignmentLeft;
```

NSTextAlignment . NSTextAlignmentLeft , NSTextAlignmentCenter , NSTextAlignmentRight , NSTextAlignmentJustified , NSTextAlignmentNatural

UILabel . UILabel .

UILabel

CGRect UILabel .

```
let frame = CGRect(x: 0, y: 0, width: 200, height: 21)
let label = UILabel(frame: frame)
view.addSubview(label)
```

-C

```
CGRect frame = CGRectMake(0, 0, 200, 21);
UILabel *label = [[UILabel alloc] initWithFrame:frame];
[view addSubview:label];
```

---

iOS UILabel .

```
let label = UILabel()
label.backgroundColor = .red
label.translatesAutoresizingMaskIntoConstraints = false
view.addSubview(label)

NSLayoutConstraint.activate([
    //stick the top of the label to the top of its superview:
    label.topAnchor.constraint(equalTo: view.topAnchor)

    //stick the left of the label to the left of its superview
    //if the alphabet is left-to-right, or to the right of its
    //superview if the alphabet is right-to-left:
    label.leadingAnchor.constraint(equalTo: view.leadingAnchor)

    //stick the label's bottom to the bottom of its superview:
    label.bottomAnchor.constraint(equalTo: view.bottomAnchor)

    //the label's width should be equal to 100 points:
    label.widthAnchor.constraint(equalToConstant: 100)
])
```

-C

```
UILabel *label = [[UILabel alloc] init];
```

Objective-c + VFL (Visual Format Language)

```
  UILabel *label = [UILabel new];
  label.translatesAutoresizingMaskIntoConstraints = NO;
  [self.view addSubview label];
  // add horizontal constraints with 5 left and right padding from the leading and trailing

  [self.view addConstraints:[NSLayoutConstraint constraintsWithVisualFormat:@"V:|-5-
[labelName]-5-|"
                                                                    options:0
                                                                    metrics:nil

views:@{@"labelName":label}]];
  // vertical constraints that will use the height of the superView with no padding on top and
bottom
  [self.view addConstraints:[NSLayoutConstraint constraintsWithVisualFormat:@"H:|[labelName]|"
                                                                    options:0
                                                                    metrics:nil

views:@{@"labelName":label}]]
```

VFL .

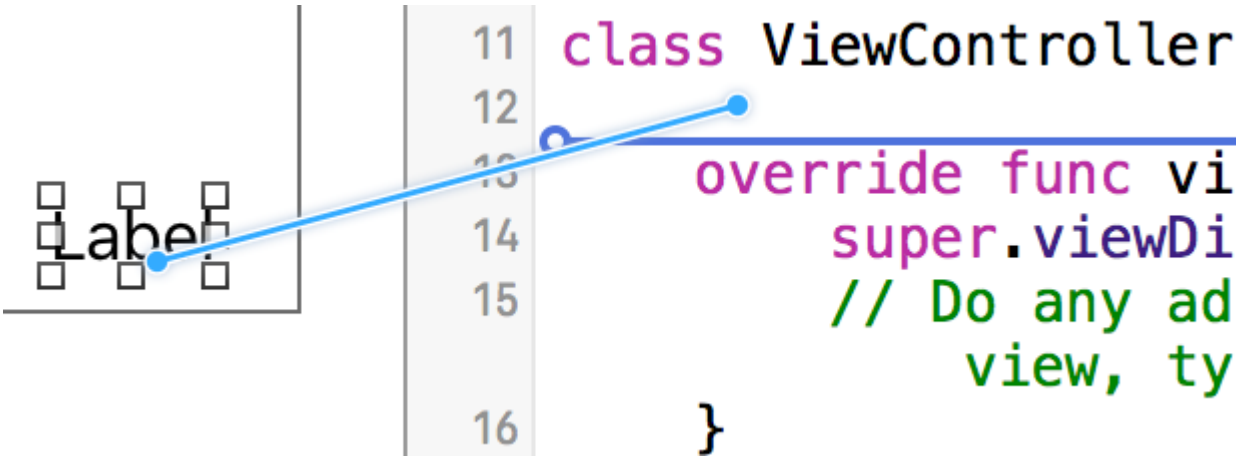
. Xcode .

Interface Builder `Storyboard .xib UILabel` Object Library `Label` .

`Storyboard .xib UILabel` ( ) .

`storyboard xib` IBOutlet .

`Storyboard UILabel .xib Control ^ UILabel ViewController` . .



UILabel strong weak . strong weak .

.

```
@IBOutlet weak var nameLabel : UILabel!
```

-C

```
@property (nonatomic, weak) IBOutlet UILabel *nameLabel;
```

```
let label = UILabel()
```

-C

```
UILabel *label = [[UILabel alloc] init];
or
UILabel *label = [UILabel new]; // convenience method for calling alloc-init
```

```
label.font = UIFont.systemFontOfSize(17)
```

3

```
label.font = UIFont.systemFont(ofSize: 17)
```

-C

```
label.font = [UIFont systemFontOfSize:17];
```

---

iOS 8.2

```
label.font = UIFont.systemFontOfSize(17, weight: UIFontWeightBold)
```

3

```
label.font = UIFont.systemFont(ofSize: 17, weight: UIFontWeightBold)
```

-C

```
label.font = [UIFont systemFontOfSize:17 weight:UIFontWeightBold];
```

iOS 8.2

```
label.font = UIFont.boldSystemFontOfSize(17)
```

3

```
label.font = UIFont.boldSystemFont(ofSize: 17)
```

-C

```
label.font = [UIFont boldSystemFontOfSize:17];
```

.

```
label.font = UIFont.preferredFontForTextStyle(UIFontTextStyleBody)
```

3

```
label.font = UIFont.preferredFont(forTextStyle: .body)
```

-C

```
label.font = [UIFont preferredFontForTextStyle:UIFontTextStyleBody];
```

-

```
label.font = UIFont(name: "Avenir", size: 15)
```

-C

```
label.font = [UIFont fontWithName:@"Avenir" size:15];
```

`UILabel` **font** .

```
label.font = label.font.fontWithSize(15)
```

3

```
label.font = label.font.withSize(15)
```

-C

```
label.font = [label.font fontWithSize:15];
```

---

3 (...) . `numberOfLines` 1 . `UILabel` , . `UILabel` . . 5 1, 2, 3, 4 5 .

.

```
label.numberOfLines = 2
```

-C

```
label.numberOfLines = 2;
```

---

0 . ("").

```
label.numberOfLines = 0
```

-C

```
label.numberOfLines = 0;
```

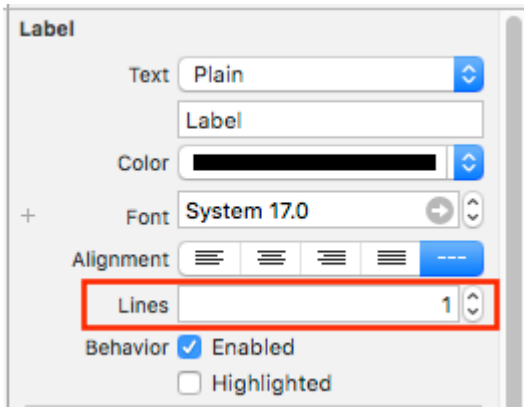
. label.numberOfLines = 0 .

UITextView .*

---

numberOfLines Storyboard .xib numberOfLines . .

:



storyboard UILabel ViewController.swift / ViewController.m IBOutlet labelOne labelOne .

viewDidLoad textColor backgroundColor textColor .

sizeToFit .

```
labelOne.backgroundColor = UIColor.blueColor()
labelOne.textColor = UIColor.whiteColor()
labelOne.text = "Hello, World!"
labelOne.sizeToFit()
```

3

```
labelOne.backgroundColor = UIColor.blue
labelOne.textColor = UIColor.white
labelOne.text = "Hello, World!"
labelOne.sizeToFit()
```

-C

```
labelOne.backgroundColor = [UIColor blueColor];
labelOne.textColor = [UIColor whiteColor];
labelOne.text = @"Hello, World!";
[labelOne sizeToFit];
```

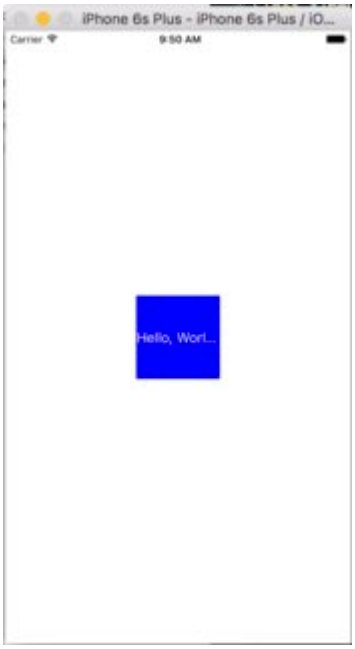
.

labelOne . sizeToFit .

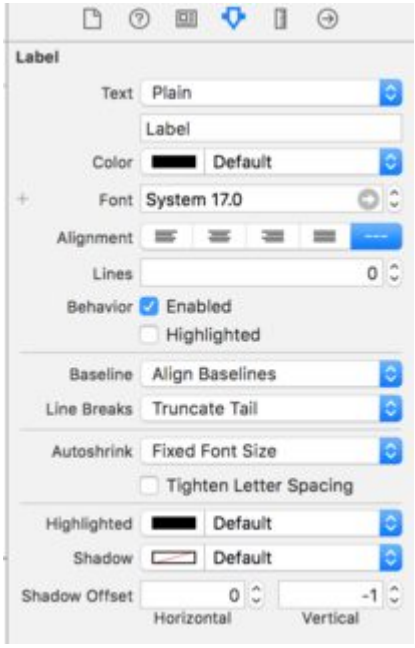
.

```
labelOne.text = "Hello, World! I’m glad to be alive!"
```

labelOne .



`sizeToFit` . UILabel numberOfLines 1 . 0 .



labelOne .

`numberOfLines` ViewController .

```
// Objective-C
labelOne.numberOfLines = 0;

// Swift
labelOne.numberOfLines = 0
```

```
label.backgroundColor = UIColor.redColor()

label.backgroundColor = .redColor()
```

3

```
label.backgroundColor = UIColor.red
```

-C

```
label.backgroundColor = [UIColor redColor];
```

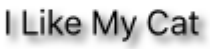
```
label1.layer.shadowOffset = CGSize(width: 3, height: 3)
label1.layer.shadowOpacity = 0.7
label1.layer.shadowRadius = 2
```

3

```
label1.layer.shadowOffset = CGSize(width: 3, height: 3)
label1.layer.shadowOpacity = 0.7
label1.layer.shadowRadius = 2
```

-C

```
label1.layer.shadowOffset = CGSizeMake(3, 3);
label1.layer.shadowOpacity = 0.7;
label1.layer.shadowRadius = 2;
```



`UILabel` .

`numberOfLines` (0), `.GreaterThanOrEqual` `.Height`

iOS 6

```
label.numberOfLines = 0

let heightConstraint = NSLayoutConstraint(
    item: label,
    attribute: .Height,
    relatedBy: .GreaterThanOrEqual,
    toItem: nil,
    attribute: .NotAnAttribute,
    multiplier: 0,
    constant: 20
)

label.addConstraint(heightConstraint)
```

iOS 9

```
label.numberOfLines = 0
```

```
label.translatesAutoresizingMaskIntoConstraints = false
label.heightAnchor.constraintGreaterThanOrEqualToConstant(20).active = true
```

LineBreakMode

```
UILabel.lineBreakMode: NSLineBreakMode
```

```
label.lineBreakMode = .ByTruncatingTail
```

- .ByWordWrapping
- .ByCharWrapping
- .ByClipping
- .ByTruncatingHead
- .ByTruncatingTail
- .ByTruncatingMiddle

3

```
label.lineBreakMode = .byTruncatingTail
```

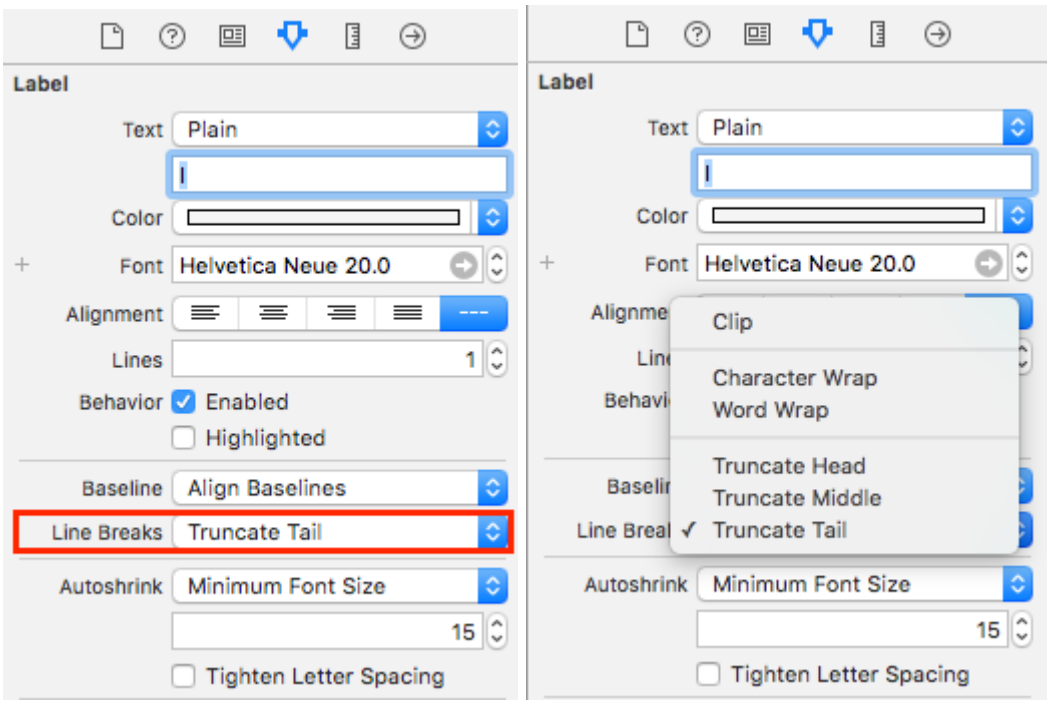
- .byWordWrapping
- .byCharWrapping
- .byClipping
- .byTruncatingHead
- .byTruncatingTail
- .byTruncatingMiddle

-C

```
[label setLineBreakMode:NSLineBreakByTruncatingTail];
```

- NSLineBreakByWordWrapping
- NSLineBreakByCharWrapping
- NSLineBreakByClipping
- NSLineBreakByTruncatingHead
- NSLineBreakByTruncatingTail
- NSLineBreakByTruncatingMiddle

UILabel .



- - .
- Char Wrapping - .
- - .
- - .
- Truncating Tail - .
- - .

( )

. `NSString boundingRectWithSize:options:attributes:context:` .

`options` .

- `NSStringDrawingUsesLineFragmentOrigin` .
- `NSStringDrawingTruncatesLastVisibleLine` |

`attributes attributes` (: Apple Docs) `NSDictionary` .

- **NSFontAttributeName** : , .
- **NSParagraphStyleAttributeName** : . , , . IB .

`NSStringDrawingContext` rect `context nil` . .

C

```
- (CGFloat)tableView:(UITableView *)tableView heightForRowAtIndexPath:(NSIndexPath *)indexPath
{

    UITableViewCell *cell = [tableView cellForRowAtIndexPath:indexPath];
```

```
    NSString *labelContent = cell.theLabel.text;
    // you may choose to get the content directly from the data source if you have done
minimal customizations to the font or are comfortable with hardcoding a few values
//    NSString *labelContent = [self.dataSource objectAtIndexPath:indexPath];

    // value may be hardcoded if retrieved from data source
    NSFont *labelFont = [cell.theLabel font];

    // The NSParagraphStyle, even if you did not code any changes these values may have been
altered in IB
    NSMutableParagraphStyle *paragraphStyle = [NSMutableParagraphStyle new];
    paragraphStyle.lineBreakMode = NSLineBreakByWordWrapping;
    paragraphStyle.alignment = NSTextAlignmentCenter;

    NSDictionary *attributes = @{NSFontAttributeName: labelFont,
                                 NSParagraphStyleAttributeName: paragraphStyle};

    // The width is also important to the height
    CGFloat labelWidth = CGRectGetWidth(cell.theLabel.frame);
    // If you have been hardcoding up to this point you will be able to get this value by
subtracting the padding on left and right from tableView.bounds.size.width
//    CGFloat labelWidth = CGRectGetWidth(tableView.frame) - 20.0f - 20.0f;

    CGRect bodyBounds = [labelContent boundingRectWithSize:CGSizeMake(width, CGFLOAT_MAX)
options:NSStringDrawingUsesLineFragmentOrigin attributes:attributes context:nil];

    return CGRectGetHeight(bodyBounds) + heightOfObjectsOnTopOfLabel +
heightOfObjectBelowLabel;
}
```

Swfit 3

```
override func tableView(_ tableView: UITableView, heightForRowAt indexPath: IndexPath) ->
CGFloat {
    var cell = tableView.cellForRow(atIndexPath: indexPath)!
    var labelContent = cell.theLabel.text
    var labelFont = cell.theLabel.font
    var paragraphStyle = NSMutableParagraphStyle()

    paragraphStyle.lineBreakMode = .byWordWrapping
    paragraphStyle.alignment = .center

    var attributes = [NSFontAttributeName: labelFont, NSParagraphStyleAttributeName:
paragraphStyle]

    var labelWidth: CGFloat = cell.theLabel.frame.width

    var bodyBounds = labelContent.boundingRect(withSize: CGSize(width: width, height:
CGFLOAT_MAX), options: .usesLineFragmentOrigin, attributes: attributes, context: nil)

    return bodyBounds.height + heightOfObjectsOnTopOfLabel + heightOfObjectBelowLabel
}
```

.

```
    // We calculate the height of a line by omitting the NSStringDrawingUsesLineFragmentOrigin
option, which will assume an infinitely wide label
    CGRect singleLineRect = [labelContent boundingRectWithSize:CGSizeMake(CGFLOAT_MAX,
```

```
CGFLOAT_MAX)

options:NSStringDrawingTruncatesLastVisibleLine
                                                context:nil];
    CGFloat lineHeight = CGRectGetHeight(singleLineRect);
    CGFloat maxHeight = lineHeight * cell.theLabel.numberOfLines;

    // Now you can call the method appropriately
    CGRect bodyBounds = [labelContent boundingRectWithSize:CGSizeMake(width, maxHeight)
options:(NSStringDrawingUsesLineFragmentOrigin|NSStringDrawingTruncatesLastVisibleLine)
attributes:attributes context:nil];

    return CGRectGetHeight(bodyBounds) + heightOfObjectsOnTopOfLabel +
heightOfObjectBelowLabel;
```

: UILabel UIButton . , UIButton .

1.
2.
3. UITapGestureRecognizer

UILabel .

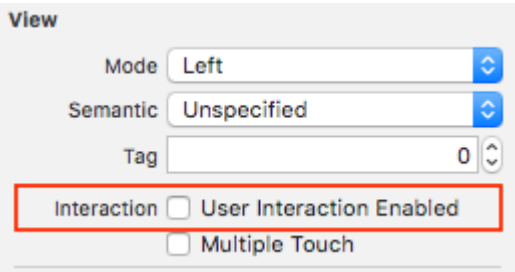
```
let label = UILabel()
label.userInteractionEnabled = true

let gesture = UITapGestureRecognizer(target: self, action: #selector(labelClicked(_:)))
label.addGestureRecognizer(gesture)
```

-C

```
UILabel *label = [[UILabel alloc] init];
[label setUserInteractionEnabled:YES];

UITapGestureRecognizer* gesture = [[UITapGestureRecognizer alloc] initWithTarget:self
action:@selector(labelClicked:)];
[label addGestureRecognizer:gesture];
```

"userInteractionEnabled"

UILabel .



UILabel . UILabel 280 . 9999 . maximumLabelSize .

-C

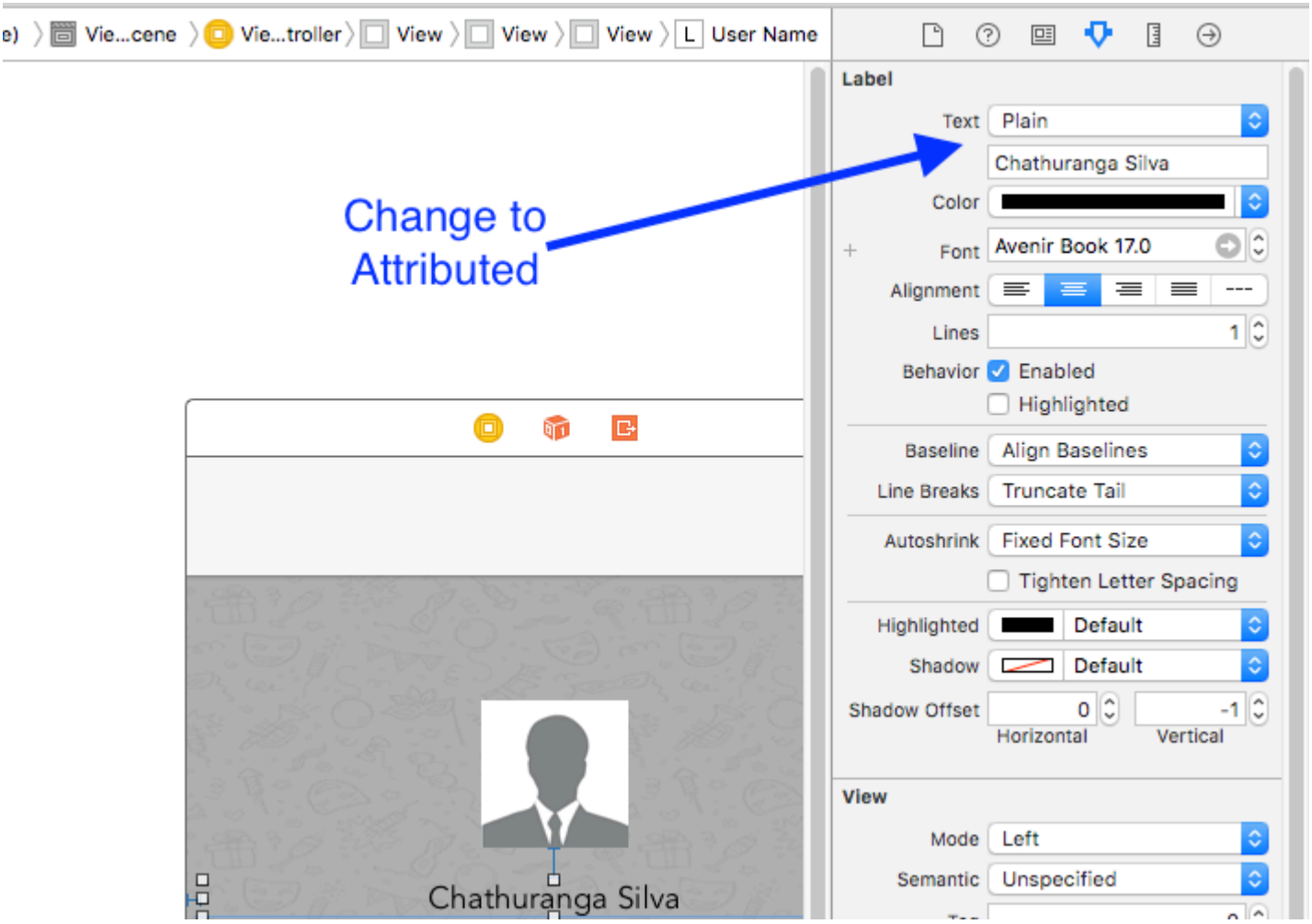
```
UILabel * label = [[UILabel alloc] init];

NSString *message = @"Some dynamic text for label";

//set the text and style if any.
label.text = message;

label.numberOfLines = 0;

CGSize maximumLabelSize = CGSizeMake(280, 9999); //280:max width of label and 9999-max height
of label.

// use font information from the UILabel to calculate the size
CGSize expectedLabelSize = [label sizeThatFits:maximumLabelSize];

//Deprecated in iOS 7.0
//CGSize expectedLabelSize = [message sizeWithFont:label.font
constrainedToSize:maximumLabelSize lineBreakMode:NSLineBreakByWordWrapping];

// create a frame that is filled with the UILabel frame data
CGRect newFrame = label.frame;

// resizing the frame to calculated size
newFrame.size.height = expectedLabelSize.height;

// put calculated frame into UILabel frame
label.frame = newFrame;
```

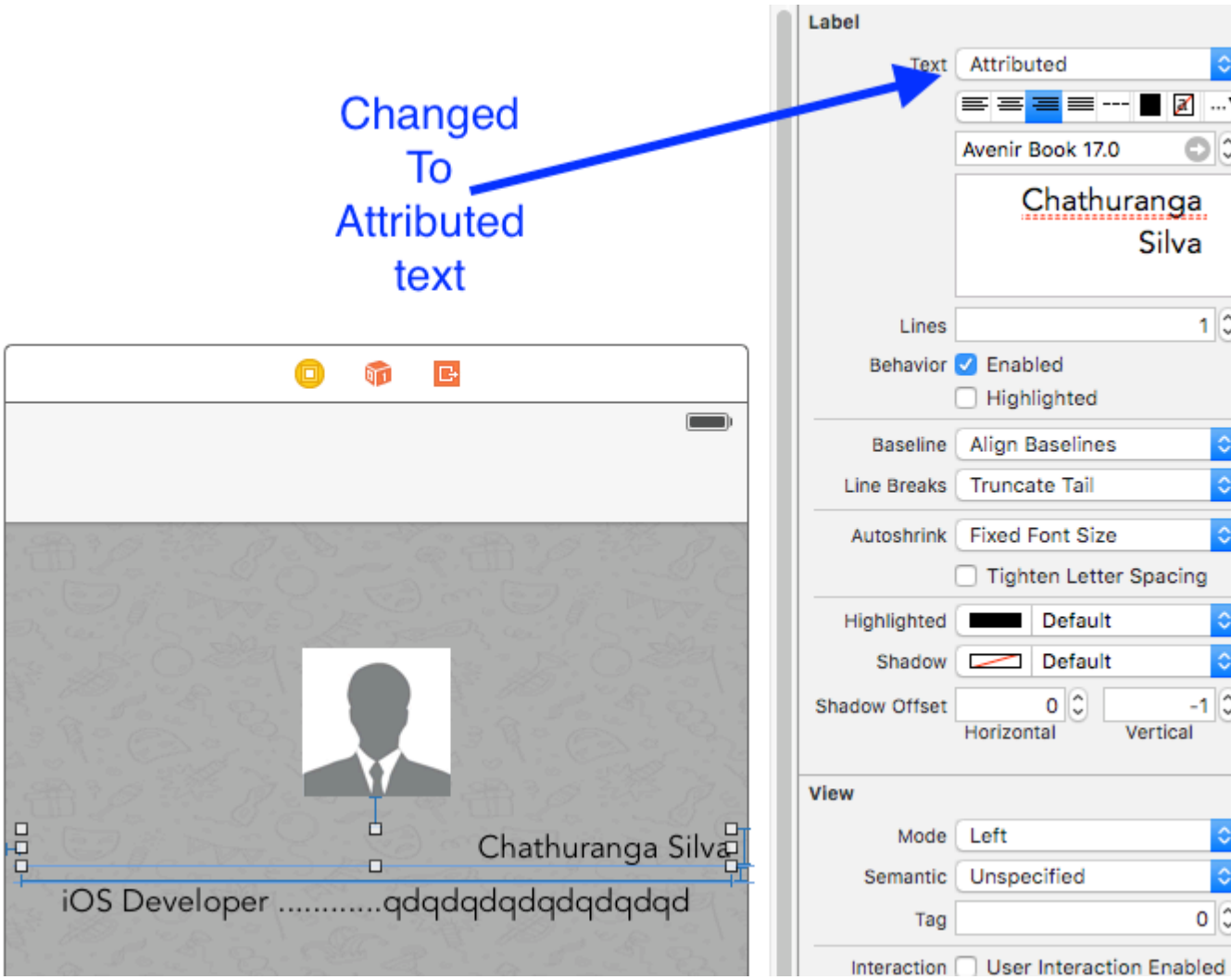
```
var message: String = "Some dynamic text for label"
//set the text and style if any.
label.text = message
label.numberOfLines = 0
var maximumLabelSize: CGSize = CGSize(width: 280, height: 9999)
var expectedLabelSize: CGSize = label.sizeThatFits(maximumLabelSize)
// create a frame that is filled with the UILabel frame data
var newFrame: CGRect = label.frame
// resizing the frame to calculated size
newFrame.size.height = expectedLabelSize.height
// put calculated frame into UILabel frame
label.frame = newFrame
```

01. : - / , : - /

1

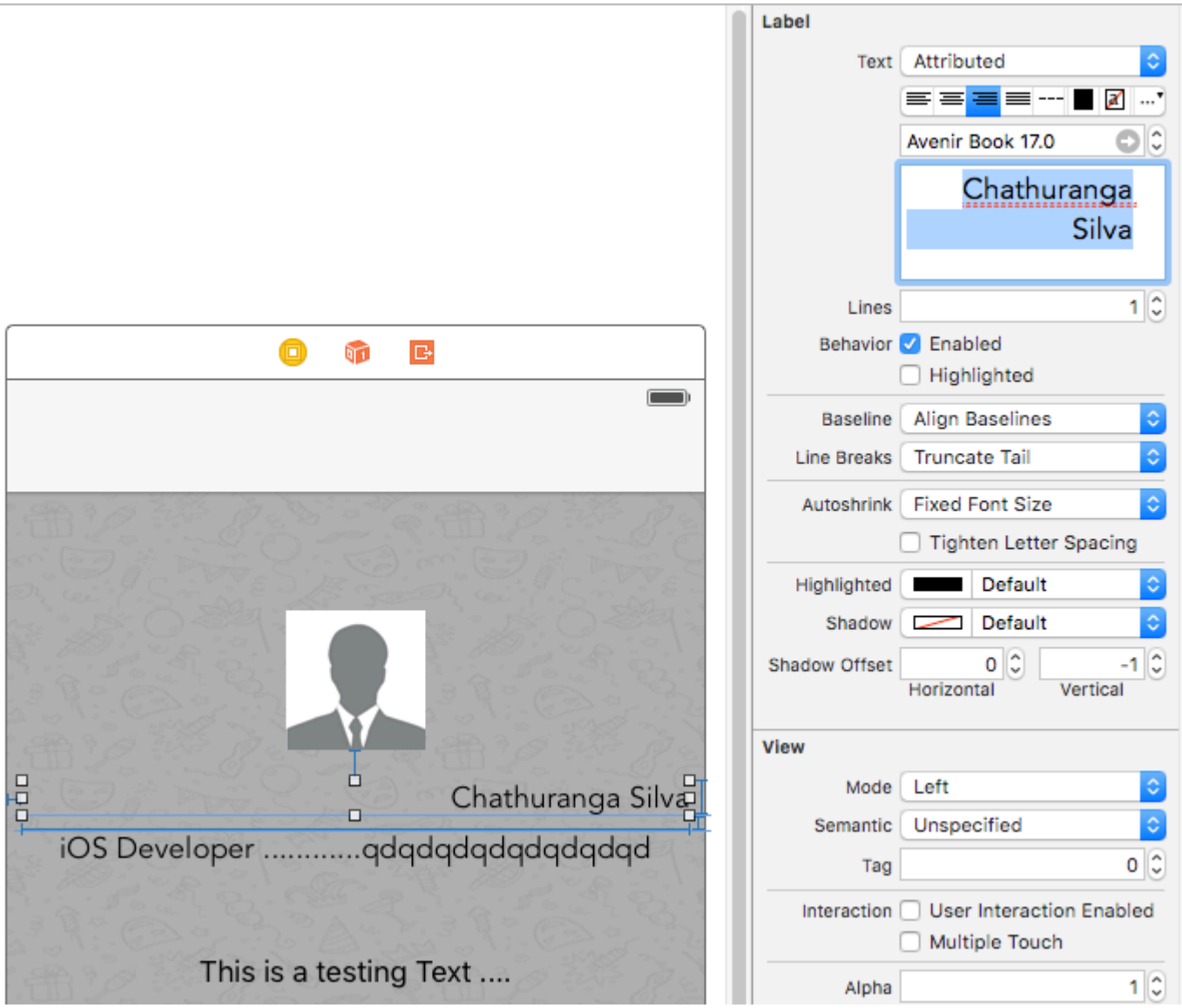
.


Vie...cene
Vie...troller
View
View
View
User Name
Change to
Attributed
Chathuranga Silva
Label
Text
Plain
Chathuranga Silva
Color
Font
Avenir Book 17.0
Alignment
Lines
1
Behavior
Enabled
Highlighted
Baseline
Align Baselines
Line Breaks
Truncate Tail
Autoshrink
Fixed Font Size
Tighten Letter Spacing
Highlighted
Default
Shadow
Default
Shadow Offset
0
-1
Horizontal
Vertical
View
Mode
Left
Semantic
Unspecified


Changed
To
Attributed
text
Chathuranga Silva
iOS Developer .....qdqdqdqdqdqdqdqd
Label
Text
Attributed
Avenir Book 17.0
Chathuranga
Silva
Lines
1
Behavior
Enabled
Highlighted
Baseline
Align Baselines
Line Breaks
Truncate Tail
Autoshrink
Fixed Font Size
Tighten Letter Spacing
Highlighted
Default
Shadow
Default
Shadow Offset
0
-1
Horizontal
Vertical
View
Mode
Left
Semantic
Unspecified
Tag
0
Interaction
User Interaction Enabled

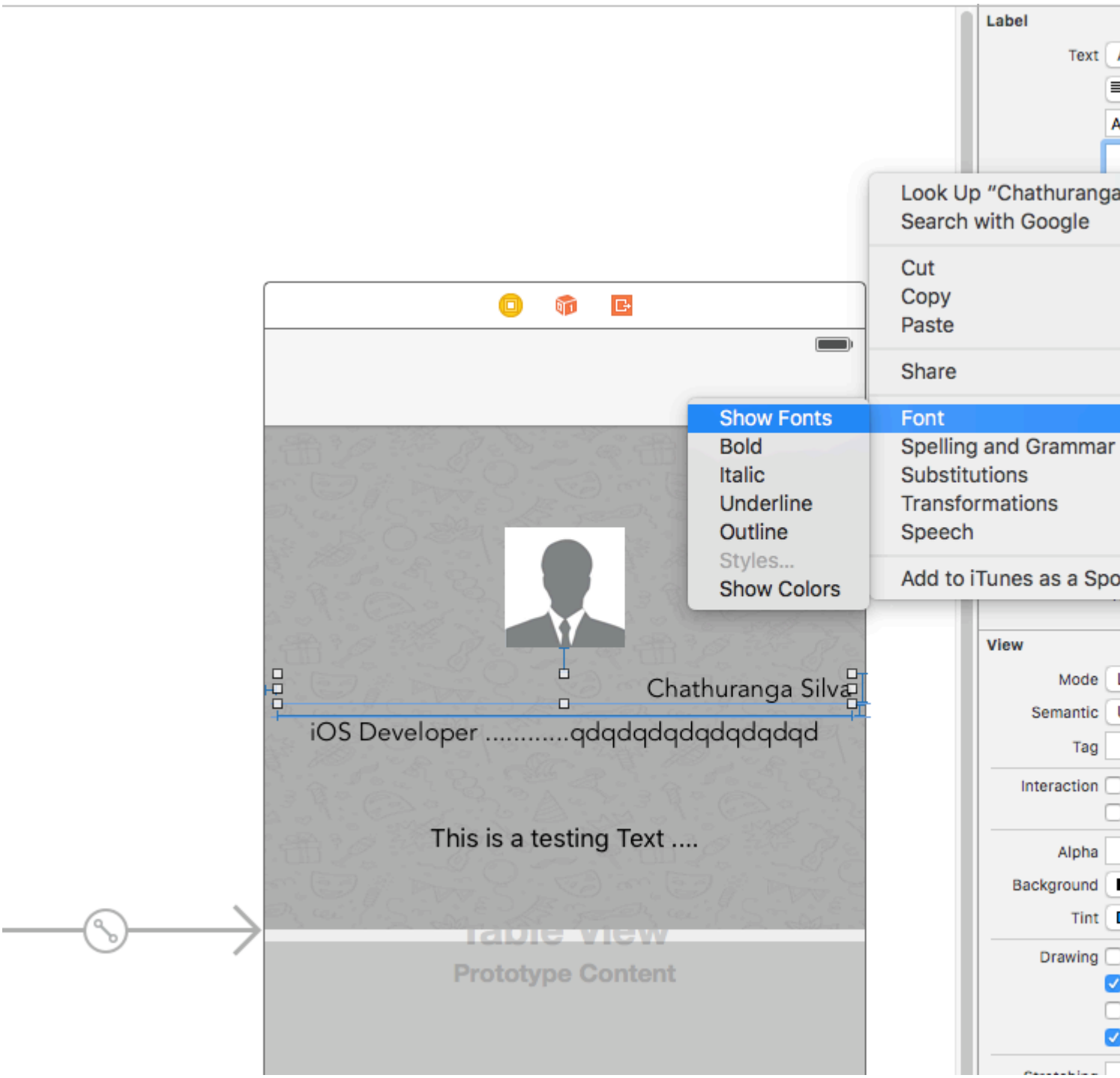
2

.


Label
Text
Attributed
Avenir Book 17.0
Chathuranga
Silva
Lines
1
Behavior
Enabled
Highlighted
Baseline
Align Baselines
Line Breaks
Truncate Tail
Autoshrink
Fixed Font Size
Tighten Letter Spacing
Highlighted
Default
Shadow
Default
Shadow Offset
0
-1
Horizontal
Vertical
View
Mode
Left
Semantic
Unspecified
Tag
0
Interaction
User Interaction Enabled
Multiple Touch
Alpha
1
Chathuranga Silva
iOS Developer .....qdqdqdqdqdqdqdqd
This is a testing Text ....

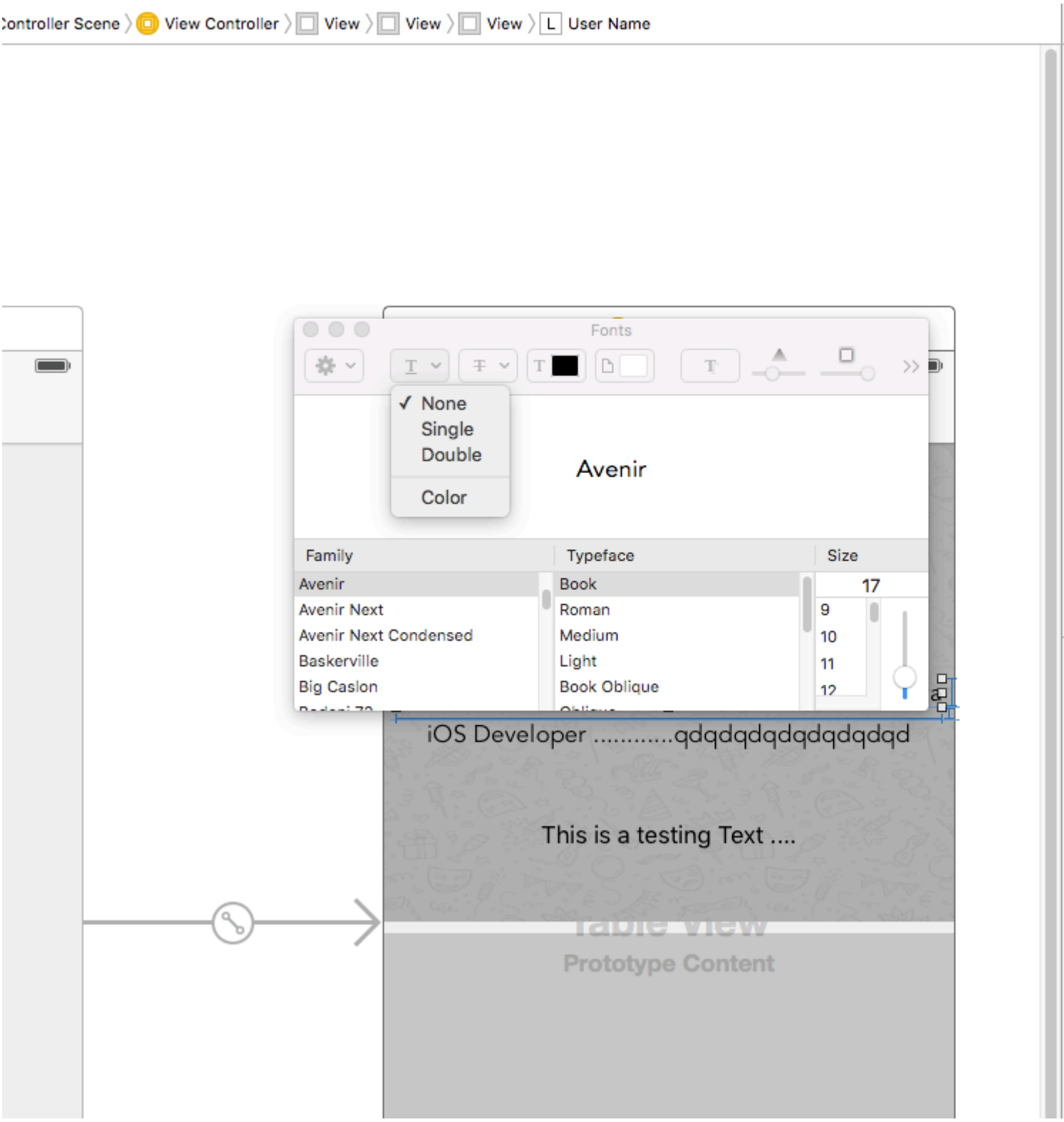
3

-> .

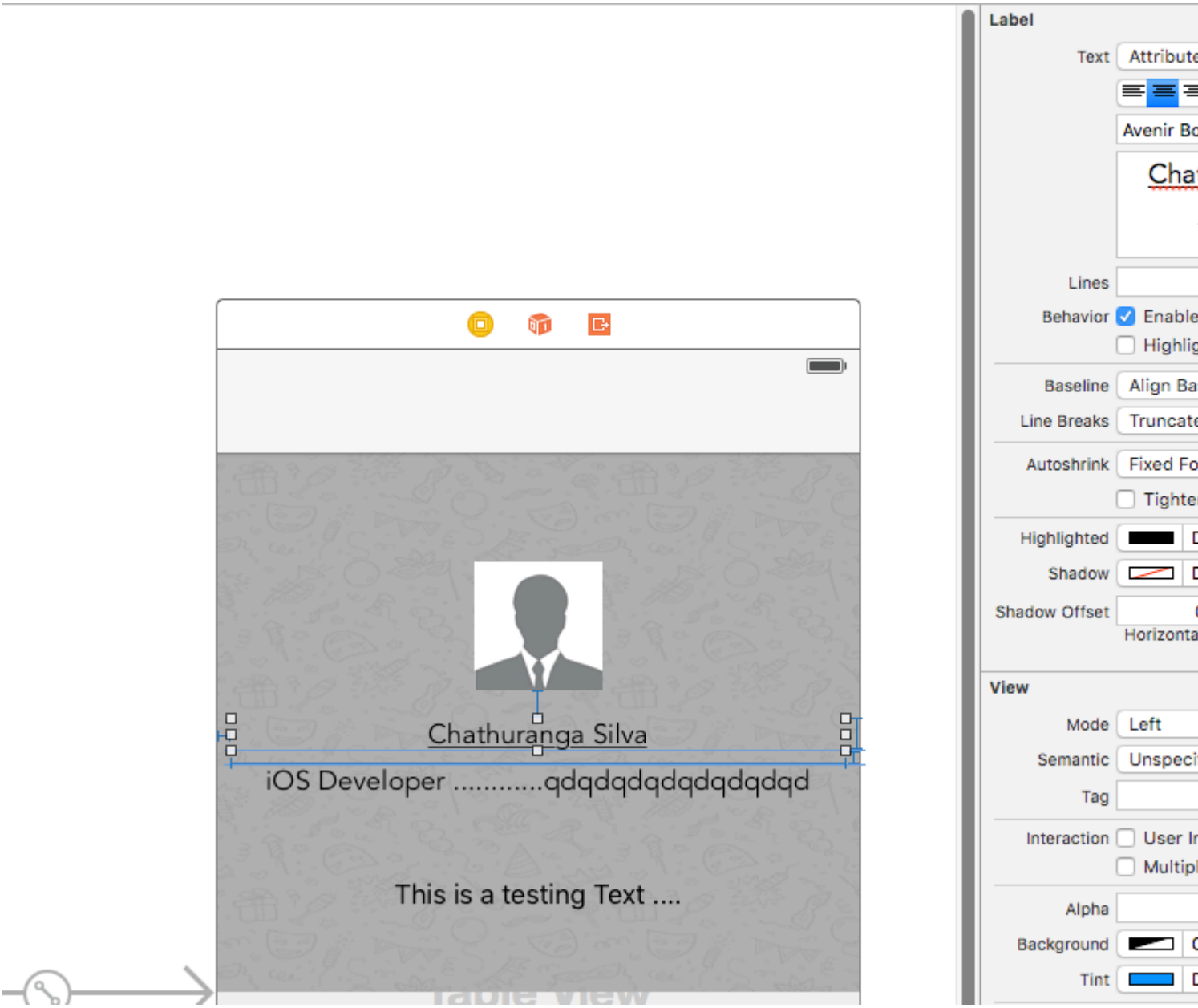

Label
Text
Look Up "Chathuranga
Search with Google
Cut
Copy
Paste
Share
Show Fonts
Bold
Italic
Underline
Outline
Styles...
Show Colors
Font
Spelling and Grammar
Substitutions
Transformations
Speech
Add to iTunes as a Spo
Chathuranga Silva
iOS Developer .....qdqdqdqdqdqdqdqd
This is a testing Text ....
Prototype Content
View
Mode
Semantic
Tag
Interaction
Alpha
Background
Tint
Drawing

4

. .

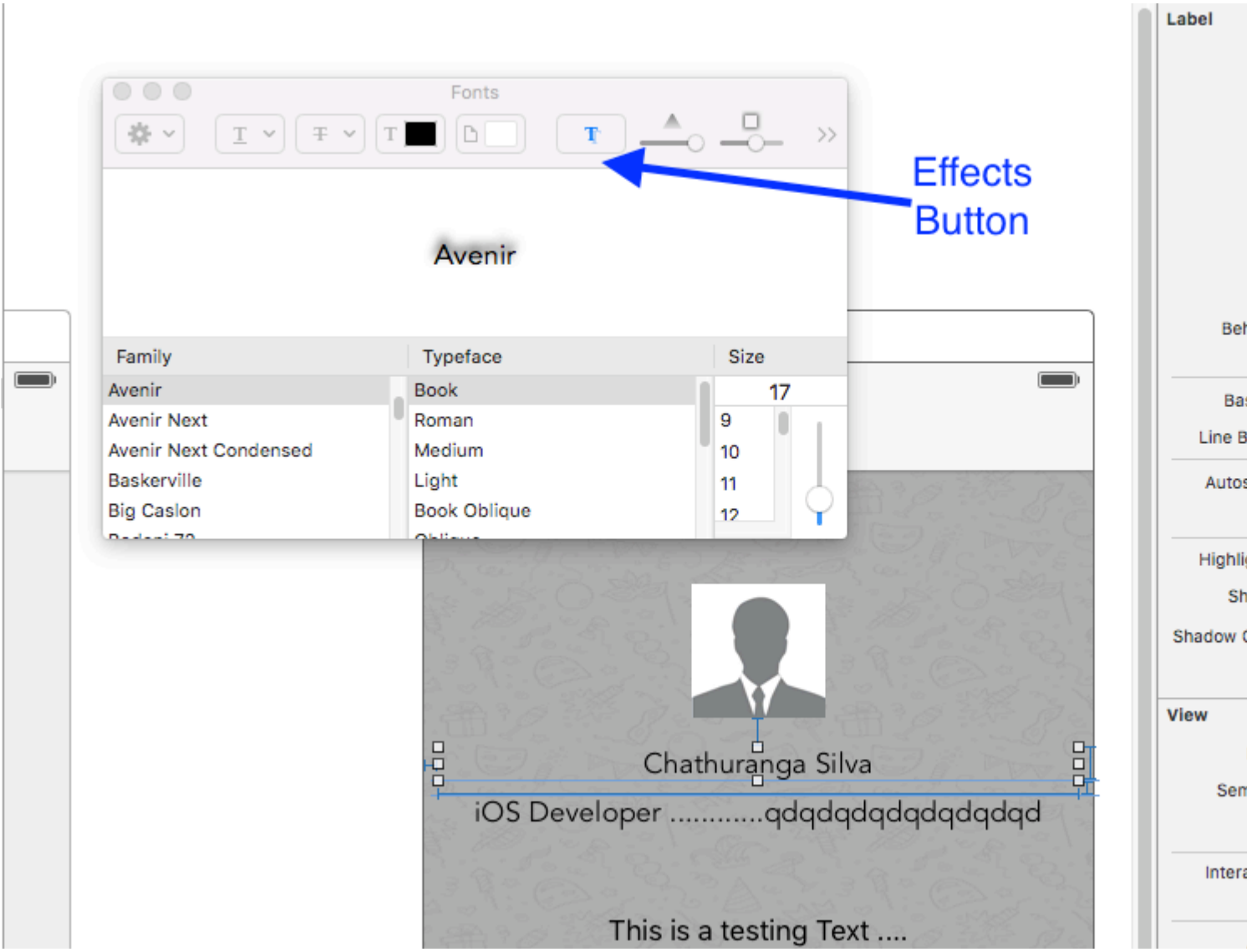

Controller Scene
View Controller
View
View
View
User Name
Fonts
None
Single
Double
Color
Avenir
Family
Typeface
Size
Avenir
Avenir Next
Avenir Next Condensed
Baskerville
Big Caslon
Book
Roman
Medium
Light
Book Oblique
17
9
10
11
12
iOS Developer .....qdqdqdqdqdqdqdqd
This is a testing Text ....
Prototype Content

enter .

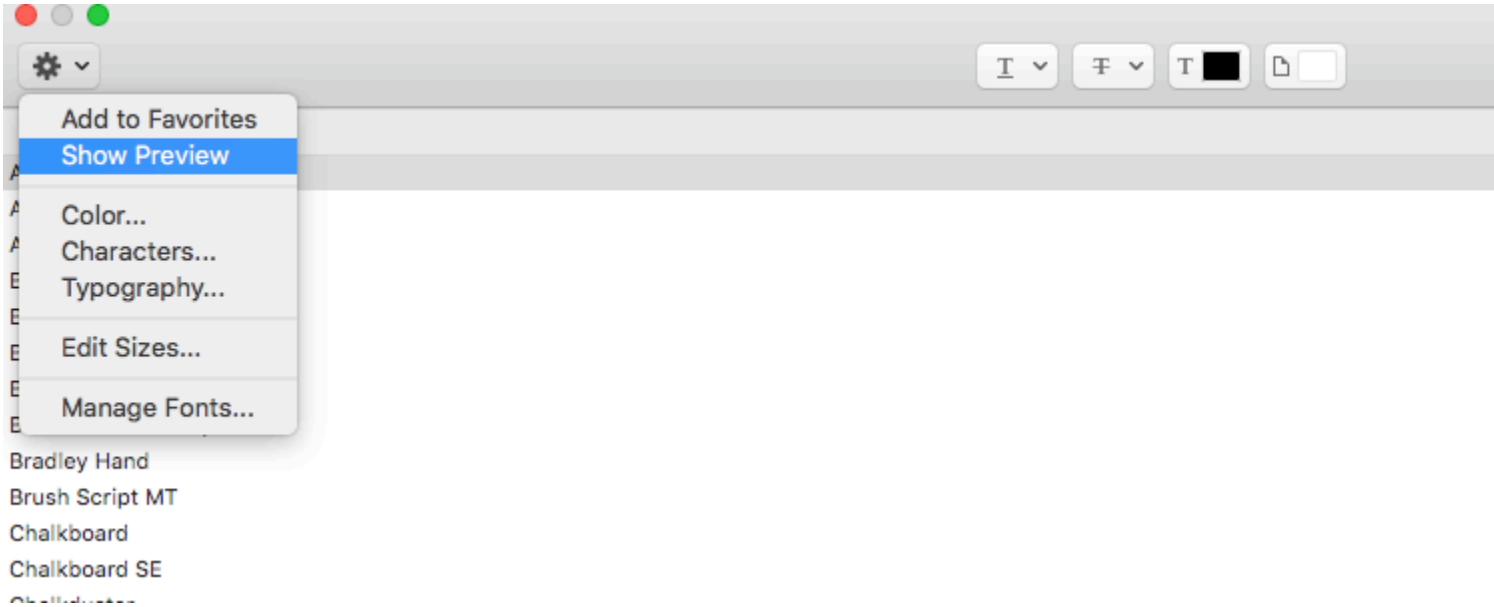

Label
Text
Lines
Behavior
Baseline
Line Breaks
Autoshrink
Highlighted
Shadow
Shadow Offset
View
Mode
Left
Semantic
Tag
Interaction
Alpha
Background
Tint
Chathuranga Silva
iOS Developer .....qdqdqdqdqdqdqdqd
This is a testing Text ....

02. ***/***

.



.



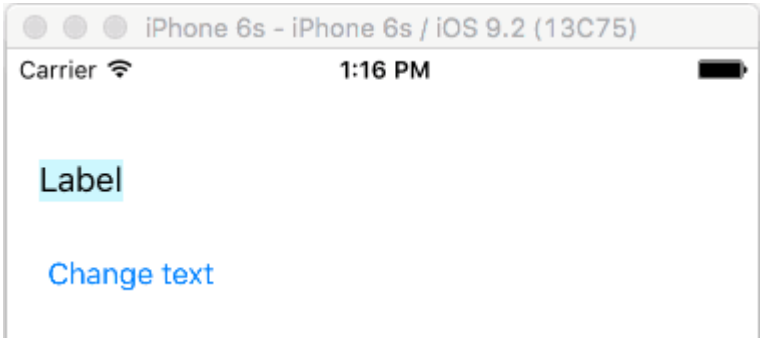
shaddow offset .


```
let sampleText = "Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod
tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud
exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in
reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint
occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est
laborum."

// Create label
let label = UILabel(frame: CGRectMake(0, 0, view.frame.size.width, 400))
label.numberOfLines = 0
label.lineBreakMode = NSLineBreakMode.ByWordWrapping

// Justify text through paragraph style
let paragraphStyle = NSMutableParagraphStyle()
paragraphStyle.alignment = NSTextAlignment.Justified
let attributes = [NSParagraphStyleAttributeName: paragraphStyle,
NSBaselineOffsetAttributeName: NSNumber(float: 0)]
let attributedString = NSAttributedString(string: sampleText, attributes: attributes)
label.attributedText = attributedString
view.addSubview(label)
```

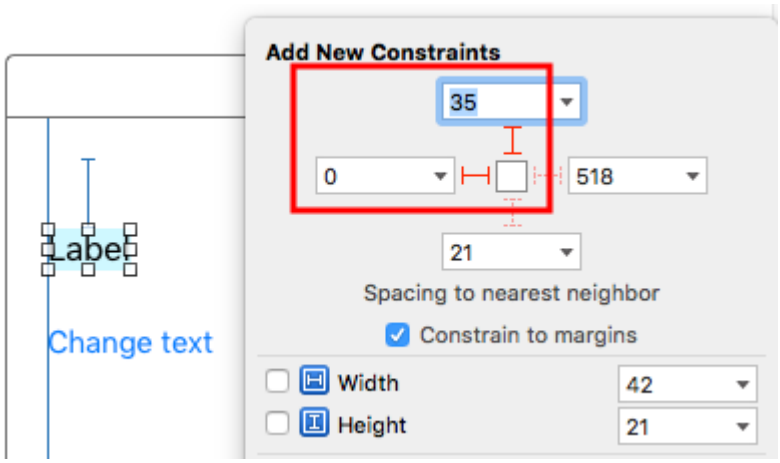
-C

```
  NSString *sampleText = @"Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do
eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis
nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure
dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur.
Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim
id est laborum.";

    // Create label
    UILabel *label = [[UILabel alloc] initWithFrame:CGRectMake(0, 0,
self.view.frame.size.width, 400)];
    label.numberOfLines = 0;
    label.lineBreakMode = NSLineBreakByWordWrapping;


    // Justify text through paragraph style
    NSMutableParagraphStyle *paragraphStyle = [[NSMutableParagraphStyle alloc] init];
    paragraphStyle.alignment = NSTextAlignmentJustified;
    NSAttributedString *attributedString = [[NSAttributedString alloc]
initWithString:sampleText attributes:@{
                       NSParagraphStyleAttributeName : paragraphStyle,
                       NSBaselineOffsetAttributeName : [NSNumber numberWithFloat:0]
                       }];
    label.attributedText = attributedString;
    [self.view addSubview:label];
```

.



.



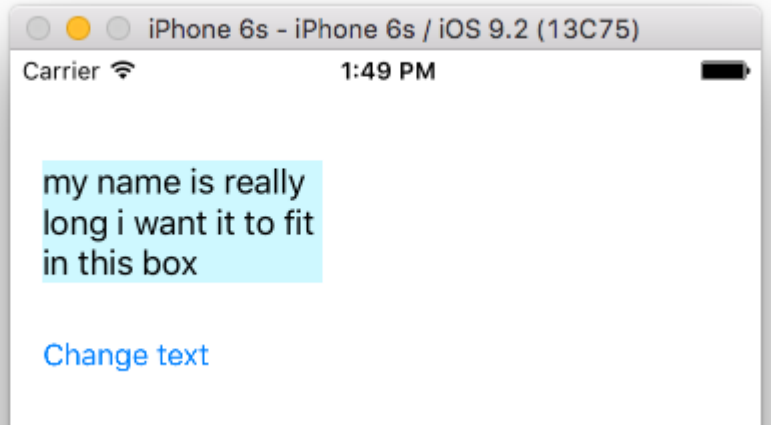
.

- (Stack Overflow) .
- . .
- `sizeToFit` `sizeToFit` . .

```
import UIKit
class ViewController: UIViewController {

    @IBOutlet weak var myLabel: UILabel!

    @IBAction func changeTextButtonTapped(sender: UIButton) {
        myLabel.text = "my name is really long i want it to fit in this box"
    }
}
```

- .

- `myLabel.preferredMaxLayoutWidth = 150 // or whatever` IB 0 `myLabel.preferredMaxLayoutWidth = 150 // or whatever` . (.)



UILabel .

`NSString boundingRectWithSize` (A) CGSize `UILabel` `UILabel`

-C

```
[[text boundingRectWithSize:maxSize options:(NSStringDrawingTruncatesLastVisibleLine |
NSStringDrawingUsesLineFragmentOrigin) attributes:@{NSFontAttributeName: fontName}
context:nil] size];
```

```
let nsText = text as NSString?
nsText?.boundingRectWithSize(maxSize, options: [.TruncatesLastVisibleLine,
.UsesLineFragmentOrigin], attributes: [NSFontAttributeName: fontName], context: nil).size
```

. .

```
@IBOutlet var lblDescriptionHeightConstration: NSLayoutConstraint!
@IBOutlet weak var lblDescription: UILabel!

let maxWidth = UIScreen.mainScreen().bounds.size.width - 40
let sizeOfLabel = self.lblDesc.sizeThatFits(CGSize(width: maxWidth, height: CGFloat.max))
self.lblDescriptionHeightConstration.constant = sizeOfLabel.height
```

: "40" .

-C

```
UILabel *label = [[UILabel alloc] init];
label.highlighted = YES;
label.highlightedTextColor = [UIColor redColor];
```

```
let label = UILabel()
label.highlighted = true
label.highlightedTextColor = UIColor.redColor()
```

3

```
let label = UILabel()
label.isHighlighted = true
label.highlightedTextColor = UIColor.red
```

UILabel : https://riptutorial.com/ko/ios/topic/246/uilabel

102: UILabel

Examples

Objective C UILabel

```
UILabel *label=[[UILabel alloc]initWithFrame:CGRectMake(0, 0, 320, 480)];
label.backgroundColor=[UIColor lightGrayColor];
NSMutableAttributedString *attributedString;
attributedString = [[NSMutableAttributedString alloc] initWithString:@"Apply Underlining"];
[attributedString addAttribute:NSUnderlineStyleAttributeName value:@1 range:NSMakeRange(0,
[attributedString length])];
[label setAttributedText:attributedString];
```

Swift UILabel

```
 let label = UILabel.init(frame: CGRect(x: 0, y:0, width: 100, height: 40))
 label.backgroundColor = .lightGray
 let attributedString = NSMutableAttributedString.init(string: "Apply UnderLining")
 attributedString.addAttribute(NSUnderlineStyleAttributeName, value: 1, range:
NSRange.init(location: 0, length: attributedString.length))
 label.attributedText = attributedString
```

UILabel : https://riptutorial.com/ko/ios/topic/7219/uilabel--

103: UILabel attributedText

.

attributedText `UILabel` `UILabel` `HTML` .

Examples

UILabel HTML

```
NSString * htmlString = @"<html><body> <b> Example bold text in HTML </b> </body></html>";
NSAttributedString * attrStr = [[NSAttributedString alloc] initWithData:[htmlString
dataUsingEncoding:NSUnicodeStringEncoding] options:@{ NSDocumentTypeDocumentAttribute:
NSHTMLTextDocumentType } documentAttributes:nil error:nil];

UILabel * yourLabel = [[UILabel alloc] init];
yourLabel.attributedText = attrStr;
```

UILabel

`NSMutableAttributedString` . `NSAttributedString` `NSMutableAttributedString` .

```
NSString *fullStr = @"Hello World!";
NSMutableAttributedString *attString =[[NSMutableAttributedString
alloc]initWithString:fullStr];

// Finding the range of text.
NSRange rangeHello = [fullStr rangeOfString:@"Hello"];
NSRange rangeWorld = [fullStr rangeOfString:@"World!"];

// Add font style for Hello
[attString addAttribute: NSFontAttributeName
                  value: [UIFont fontWithName:@"Copperplate" size:14]
                  range: rangeHello];
// Add text color for Hello
[attString addAttribute: NSForegroundColorAttributeName
                  value: [UIColor blueColor]
                  range: rangeHello];

// Add font style for World!
[attString addAttribute: NSFontAttributeName
                  value: [UIFont fontWithName:@"Chalkduster" size:20]
                  range: rangeWorld];
// Add text color for World!
[attString addAttribute: NSForegroundColorAttributeName
                  value: [UIColor colorWithRed:(66.0/255.0) green:(244.0/255.0)
blue:(197.0/255.0) alpha:1]
                  range: rangeWorld];

// Set it to UILabel as attributedText
UILabel * yourLabel = [[UILabel alloc] initWithFrame:CGRectMake(10, 150, 200, 100)];
yourLabel.attributedText = attString;
[self.view addSubview:yourLabel];
```

:

UILabel attributedText : https://riptutorial.com/ko/ios/topic/10927/uilabel-attributedtext

104: UILocalNotification

.

. .

UILocalNotification iOS 10 . UserNotifications .

UILocalNotification . UILocalNotification .

:

- UILocalNotification
- UILocalNotification

Examples

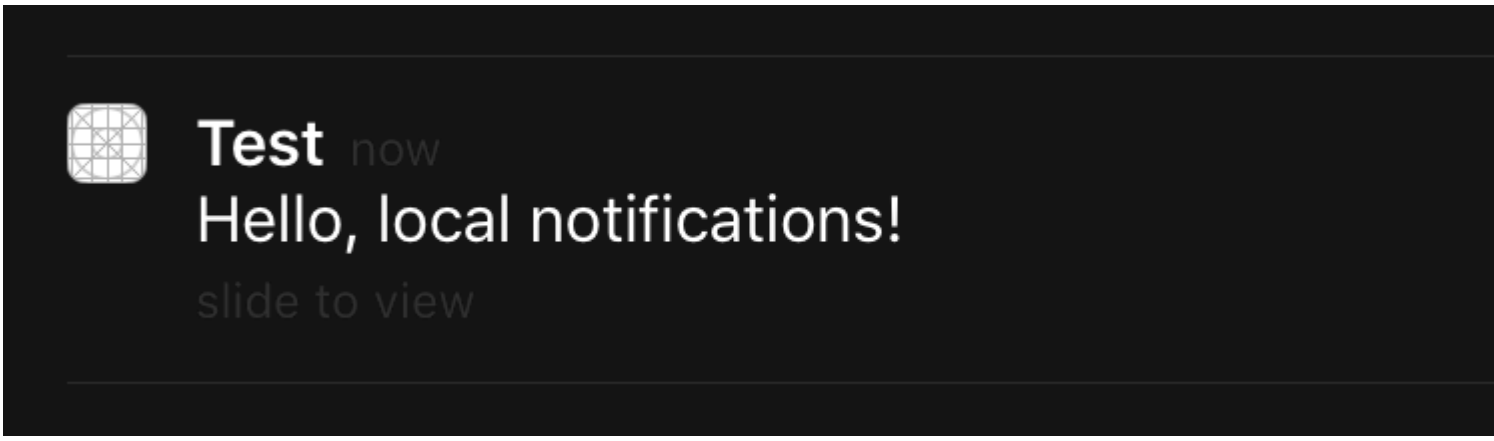
.

```
let notification = UILocalNotification()
notification.alertBody = "Hello, local notifications!"
notification.fireDate = NSDate().dateByAddingTimeInterval(10) // 10 seconds after now
UIApplication.sharedApplication().scheduleLocalNotification(notification)
```

-C

```
UILocalNotification *notification = [[UILocalNotification alloc] init];
notification.alertBody = @"Hello, local notifications!";
notification.fireDate = [NSDate dateWithTimeIntervalSinceNow:10]; // 10 seconds after now
[[UIApplication sharedApplication] scheduleLocalNotification:notification];
```

iOS ^□H (control-command-H) □L □L (command-L) . (" ").



(viewDidLoad , viewWillAppear , viewDidAppear viewDidAppear).

iOS 8

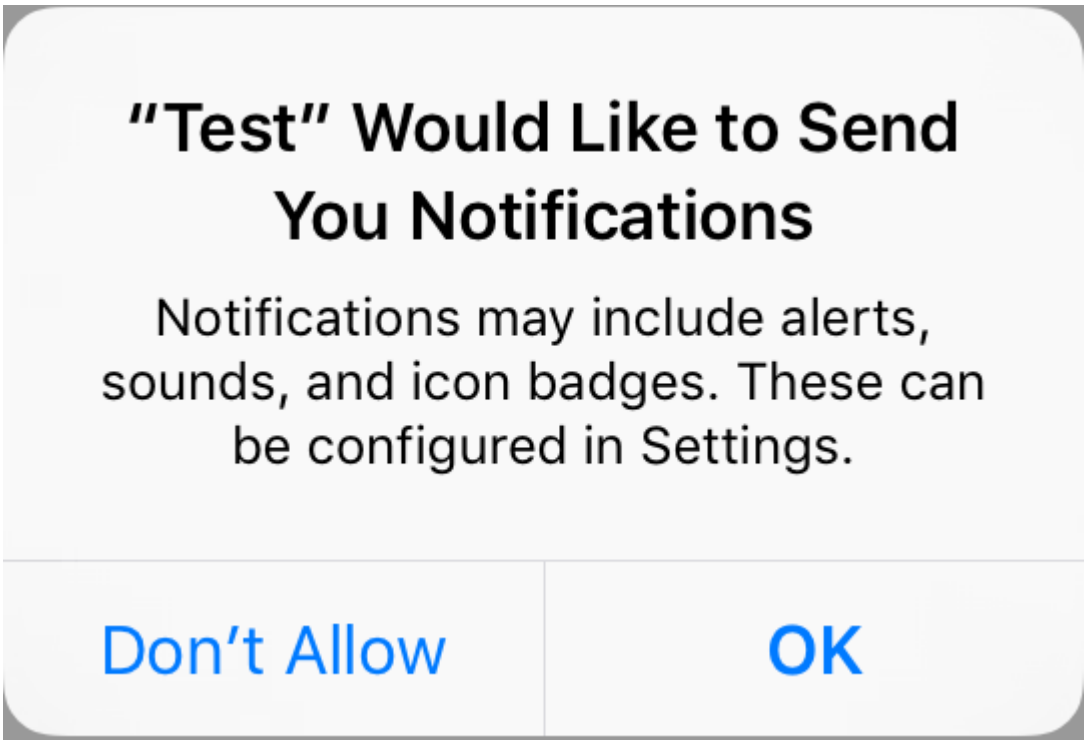
.

```
let settings = UIUserNotificationSettings(forTypes: [.Badge, .Sound, .Alert], categories: nil)
UIApplication.sharedApplication().registerUserNotificationSettings(settings)
```

-C

```
UIUserNotificationSettings *settings = [UIUserNotificationSettings
settingsForTypes:(UIUserNotificationTypeBadge | UIUserNotificationTypeSound |
UIUserNotificationTypeAlert) categories:nil];
[[UIApplication sharedApplication] registerUserNotificationSettings:settings];
```

.



.

: .

```
func application(application: UIApplication, didReceiveLocalNotification notification:
UILocalNotification) {

}
```

-C

```
- (void)application:(UIApplication *)application
didReceiveLocalNotification:(UILocalNotification *)notification {

}
```

UIApplicationDelegate AppDelegate .

UUID

.

UUID (Universally Unique Identifier) .

```
let notification = UILocalNotification()
let uuid = NSUUID().uuidString
notification.userInfo = ["UUID": uuid]
UIApplication.shared.scheduleLocalNotification(notification)
```

-C

```
UILocalNotification *notification = [[UILocalNotification alloc] init];
NSString *uuid = [[NSUUID UUID] UUIDString];
notification.userInfo = @{ @"UUID": uuid };
[[UIApplication sharedApplication] scheduleLocalNotification:notification];
```

UUID . .

```
let scheduledNotifications = UIApplication.shared.scheduledLocalNotifications

guard let scheduledNotifications = scheduledNotifications else {
    return
}

for notification in scheduledNotifications where "\(notification.userInfo!["UUID"]!)" ==
UUID_TO_CANCEL {
    UIApplication.sharedApplication().cancelLocalNotification(notification)
}
```

-C

```
NSArray *scheduledNotifications = [[UIApplication sharedApplication]
scheduledLocalNotifications];

for (UILocalNotification *notification in scheduledNotifications) {
    if ([[notification.userInfo objectForKey:"UUID"] compare: UUID_TO_CANCEL]) {
        [[UIApplication sharedApplication] cancelLocalNotification:notification];
        break;
    }
}
```

UUID Core Data Realm .

.

3

```
UIApplication.shared.presentLocalNotificationNow(notification)
```

2

```
UIApplication.sharedApplication().presentLocalNotificationNow(notification)
```

-C

```
[[UIApplication sharedApplication] presentLocalNotificationNow:notification];
```

`UILocalNotification fireDate timeZone .`

. .

nil.

`.caf` , `.wav` `.aiff` . 30 . (`UILocalNotificationDefaultSoundName`).

-C

```
UILocalNotification *notification = [UILocalNotification new];
notification.soundName = @"nameOfSoundInBundle.wav"; // Use
UILocalNotificationDefaultSoundName for the default alert sound
```

```
let notification = UILocalNotification()
notification.soundName = "nameOfSoundInBundle.wav"
```

Swift 3.0 (iOS 10)

AppDelegate

```
import UserNotifications
```

didFinishLaunchingWithOptions ,

```
UNUserNotificationCenter.current().requestAuthorization(options: [.alert,.sound,.badge]) {
(granted, error) in

// Here you can check Request is Granted or not.

}
```

.

```
    let content = UNMutableNotificationContent()
    content.title = "10 Second Notification Demo"
    content.subtitle = "From Wolverine"
    content.body = "Notification after 10 seconds - Your pizza is Ready!!"
    content.categoryIdentifier = "myNotificationCategory"

    let trigger = UNTimeIntervalNotificationTrigger(
        timeInterval: 10.0,
        repeats: false)

    let request = UNNotificationRequest(
```

```
        identifier: "10.second.message",
        content: content,
        trigger: trigger
    )
    UNUserNotificationCenter.current().add(request, withCompletionHandler: nil)
```

.

.

iOS10 UILocalNotification

`UILocalNotification` . API `UILocalNotification` API . iOS10 .

. .

:

1. iOS 10 , .
2. ( ) .
3. 3D .
4. .
5. UI .

`UILocalNotification` API iOS10 User Notifications API . .

API API . **iOS10AdaptationTips** .

,

:

1.

```
    ///    Notification become independent from UIKit
    import UserNotifications
```

2. localNotification

```
    let center = UNUserNotificationCenter.current()
    center.requestAuthorization(options: [.alert, .sound]) { (granted, error) in
        // Enable or disable features based on authorization.
    }
```

3. schedule localNotification

4.
```
@IBAction  func triggerNotification(){
    let content = UNMutableNotificationContent()
    content.title = NSString.localizedUserNotificationString(forKey: "Elon said:",
arguments: nil)
    content.body = NSString.localizedUserNotificationString(forKey: "Hello Tom Get up,
let's play with Jerry!", arguments: nil)
```

```
    content.sound = UNNotificationSound.default()
    content.badge = UIApplication.shared().applicationIconBadgeNumber + 1;
    content.categoryIdentifier = "com.elonchan.localNotification"
    // Deliver the notification in five seconds.
    let trigger = UNTimeIntervalNotificationTrigger.init(timeInterval: 60.0, repeats:
true)
    let request = UNNotificationRequest.init(identifier: "FiveSecond", content: content,
trigger: trigger)

    // Schedule the notification.
    let center = UNUserNotificationCenter.current()
    center.add(request)
}

@IBAction func stopNotification(_ sender: AnyObject) {
    let center = UNUserNotificationCenter.current()
    center.removeAllPendingNotificationRequests()
    // or you can remove specifical notification:
    // center.removePendingNotificationRequests(withIdentifiers: ["FiveSecond"])
}
```

-C :

1.

```
// Notifications are independent from UIKit
#import <UserNotifications/UserNotifications.h>
```

2. localNotification

```
UNUserNotificationCenter *center = [UNUserNotificationCenter currentNotificationCenter];
[center requestAuthorizationWithOptions:(UNAuthorizationOptionBadge |
UNAuthorizationOptionSound | UNAuthorizationOptionAlert)
                      completionHandler:^(BOOL granted, NSError * _Nullable error) {
                          if (!error) {
                              NSLog(@"request authorization succeeded!");
                              [self showAlert];
                          }
                      }];
```

3. schedule localNotification

4.
```
UNMutableNotificationContent *content = [[UNMutableNotificationContent alloc] init];
content.title = [NSString localizedUserNotificationStringForKey:@"Elon said:"
                                                      arguments:nil];
content.body = [NSString localizedUserNotificationStringForKey:@"Hello Tom Get up, let's
play with Jerry!"
                                                    arguments:nil];
content.sound = [UNNotificationSound defaultSound];

// 4. update application icon badge number
content.badge = [NSNumber numberWithInteger:([UIApplication
sharedApplication].applicationIconBadgeNumber + 1)];
// Deliver the notification in five seconds.
UNTimeIntervalNotificationTrigger *trigger = [UNTimeIntervalNotificationTrigger
                                             triggerWithTimeInterval:5.f
                                             repeats:NO];
```

```
UNNotificationRequest *request = [UNNotificationRequest
requestWithIdentifier:@"FiveSecond"
                                                                content:content
                                                                trigger:trigger];
/// 3. schedule localNotification
UNUserNotificationCenter *center = [UNUserNotificationCenter currentNotificationCenter];
[center addNotificationRequest:request withCompletionHandler:^(NSError * _Nullable error)
{
    if (!error) {
        NSLog(@"add NotificationRequest succeeded!");
    }
}];
```

: **iOS10AdaptationTips** .

#updated

'NSInternalInconsistencyException' , : ' 60 .'

```
let trigger = UNTimeIntervalNotificationTrigger.init(timeInterval: 60, repeats: true)
```

UILocalNotification : https://riptutorial.com/ko/ios/topic/635/uilocalnotification

105: UINavigationController

:

UINavigationController . . .

Examples

.

```
navigationController?.popViewControllerAnimated(true)
```

-C

```
[self.navigationController popViewControllerAnimated:YES];
```

.

```
navigationController?.popToRootViewControllerAnimated(true)
```

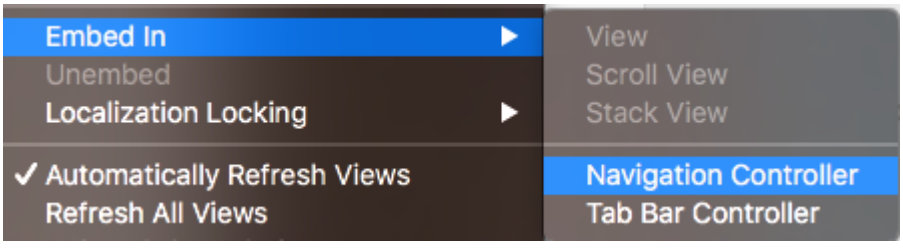
C

```
[self.navigationController popToRootViewControllerAnimated:YES];
```

NavigationController

ViewController .

> > .



.


```
//Swift
let viewController = UIViewController()
let navigationController = UINavigationController(rootViewController: viewController)

//Objective-C
UIViewController *viewController = [[UIViewController alloc] init];
UINavigationController *navigationController = [[UINavigationController alloc]
initWithRootViewController:viewController];
```

```
//Swift
let fooViewController = UIViewController()
navigationController?.pushViewController(fooViewController, animated: true)

//Objective-C
UIViewController *fooViewController = [[UIViewController alloc] init];
[navigationController pushViewController:fooViewController animated:YES];
```

`UINavigationController navigation stack .`

:

UI . `UINavigationController` . `UINavigationController navigation stack` .

:

`UINavigationController` ( ) ( ) .

UINavigationController : https://riptutorial.com/ko/ios/topic/1079/uinavigationcontroller

106: UIPageViewController

UIPageViewController . UIPageViewController UIPageViewControllerDataSource .
UIPageViewController UIPageViewController presentationCount presentationIndex .

1. UIPageViewControllerTransitionStyle
2. UIPageViewControllerNavigationOrientation
3. UIPageViewControllerSpineLocation
4. UIPageViewControllerNavigationDirection

Apple

Examples

UIPageViewController

1. UIPageViewController . UIPageViewController `identifier` . .

```
UIViewController *firstVC = [[UIViewController alloc] init];
firstVC.identifier = 0
UIViewController *secondVC = [[UIViewController alloc] init];
secondVC.identifier = 1
NSArray *viewControllers = [[NSArray alloc] initWithObjects: firstVC, secondVC, nil];
```

2. UIPageViewController .

```
UIPageViewController *pageViewController = [[UIPageViewController alloc]
initWithTransitionStyle:UIPageViewControllerTransitionStyleScroll

navigationOrientation:UIPageViewControllerNavigationOrientationHorizontal

options:nil];
```

3. `UIPageViewControllerDataSource` `UIPageViewControllerDataSource` .

```
pageViewController.dataSource = self;
```

4. `setViewControllers` .

```
if (viewControllers.count) {
    [pageViewController setViewControllers:@[[viewControllers objectAtIndex:0]]
                                 direction:UIPageViewControllerNavigationDirectionForward
                                  animated:NO
                                completion:nil];
}
```

5. UIPageViewController `appearance` `rotation` .

```
 [self addChildViewController:pageViewController];
 pageViewController.view.frame = self.view.frame;
 [self.view addSubview:pageViewController.view];
 [pageViewController didMoveToParentViewController:self];
```

6. UIPageViewControllerDataSource

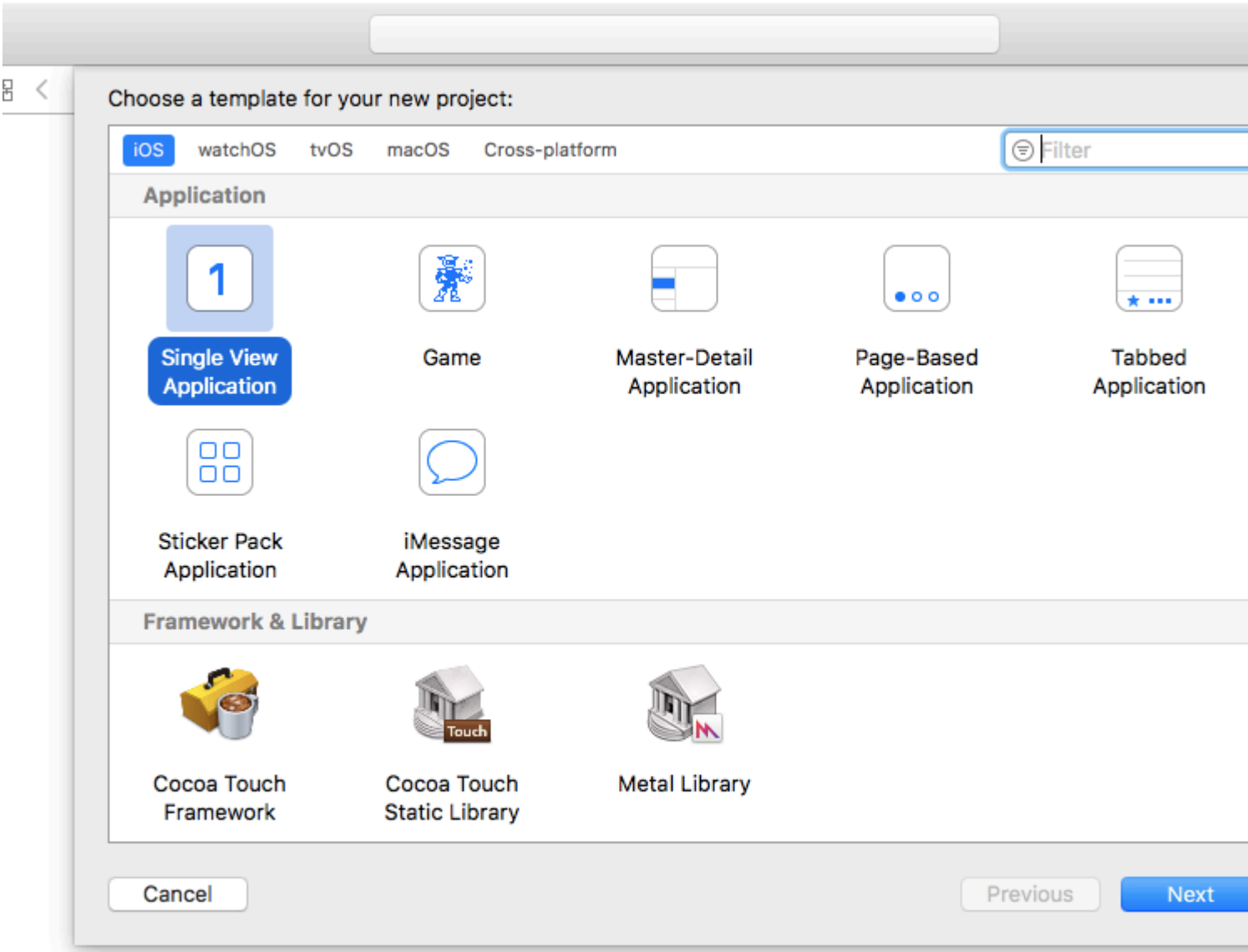
```
- (UIViewController *)pageViewController:(UIPageViewController *)pageViewController
      viewControllerBeforeViewController:(UIViewController *)viewController
{
    index = [(Your View Controler Base Class *)viewController identifier];
    index--;
    return [self childViewControllerAtIndex:index];
}

- (UIViewController *)pageViewController:(UIPageViewController *)pageViewController
       viewControllerAfterViewController:(UIViewController *)viewController
{
    index = [(Your View Controler Base Class *)viewController identifier];
    index++;
    return [self childViewControllerAtIndex:index];
}

- (NSInteger)presentationCountForPageViewController:(UIPageViewController *)pageViewController
{
    return [viewControllers count];
}

- (NSInteger)presentationIndexForPageViewController:(UIPageViewController *)pageViewController
{
    return index;
}
```

7. . nil .

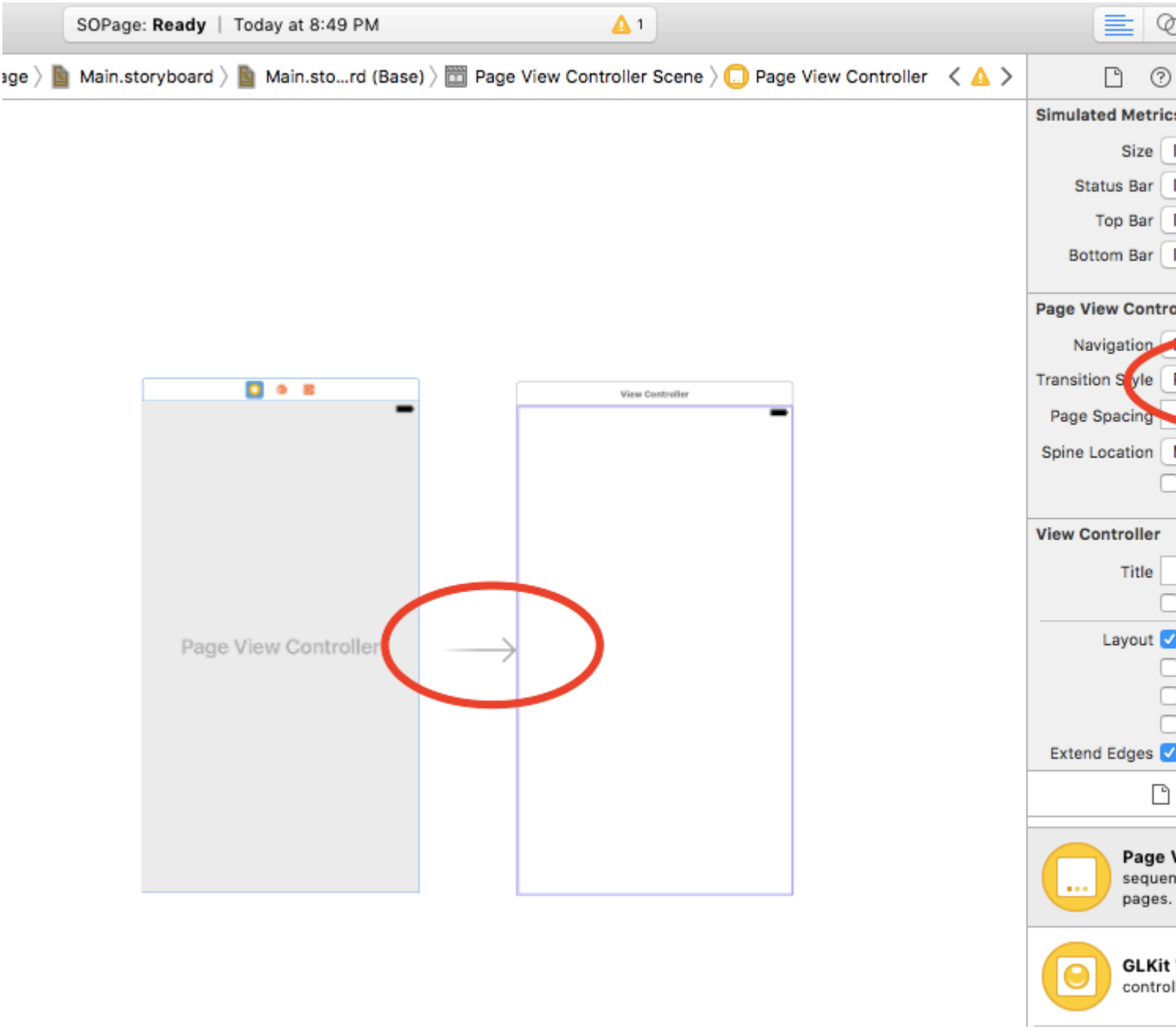
```
- (UIViewController *)childViewControllerAtIndex:(NSInteger)index
{
    if (index <= ([viewControllers count] - 1)) {
        return [viewControllers objectAtIndex:index];
    } else {
        return nil;
    }
}
```

( )

1. . Single View Application .


Choose a template for your new project:
iOS
watchOS
tvOS
macOS
Cross-platform
Filter
Application
Single View Application
Game
Master-Detail Application
Page-Based Application
Tabbed Application
Sticker Pack Application
iMessage Application
Framework & Library
Cocoa Touch Framework
Cocoa Touch Static Library
Metal Library
Cancel
Previous
Next

2. .
    1.
    2.



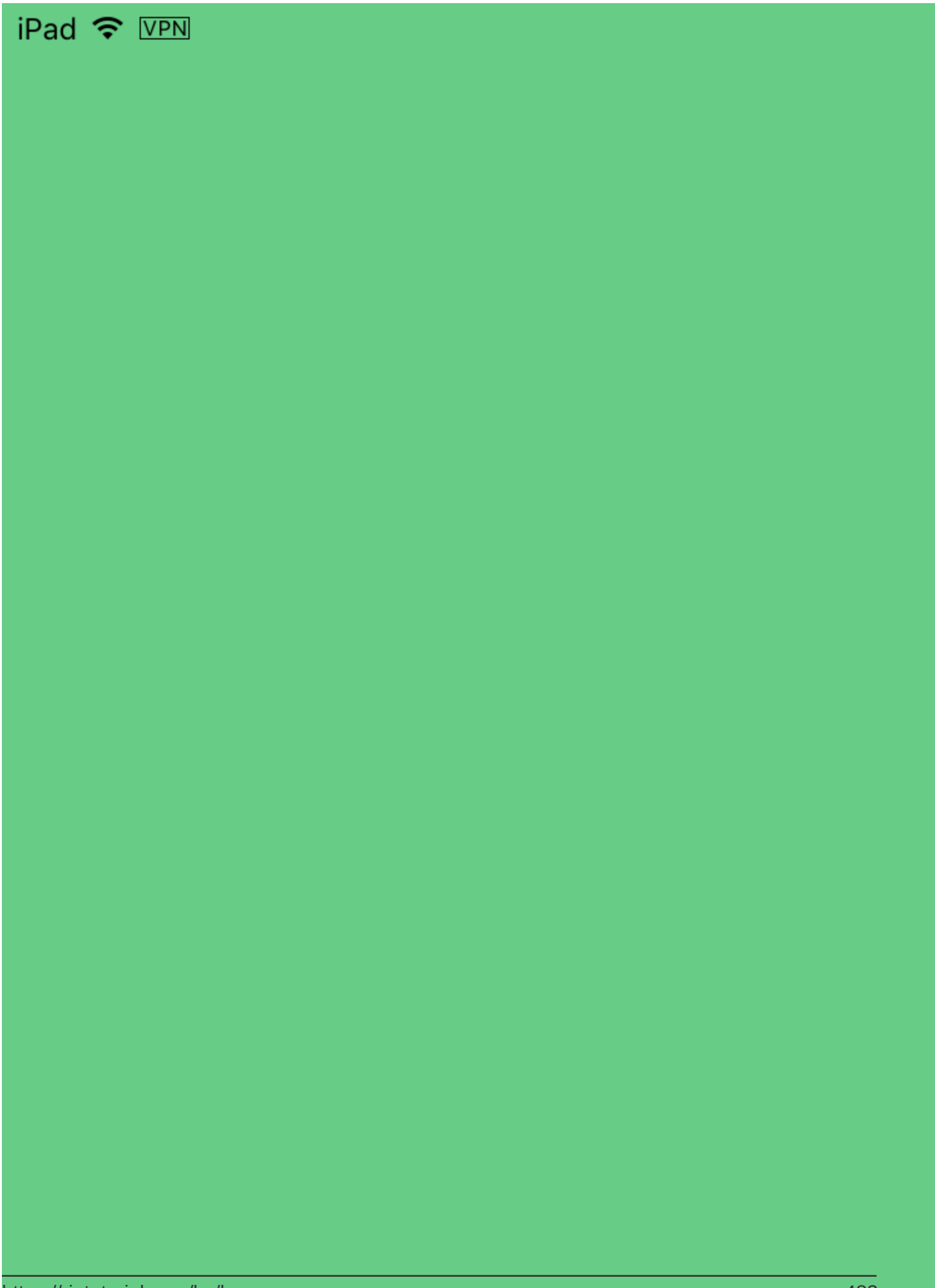
3. UIPageViewController .

4. UIPageViewController . :)

```
class PageViewController: UIPageViewController, UIPageViewControllerDataSource {

    override func viewDidLoad() {
        self.dataSource = self
        let controller = createViewController()
        self.setViewControllers([controller], direction: .forward, animated: false,
completion: nil)
    }

    func pageViewController(_ pageViewController: UIPageViewController,
viewControllerBefore viewController: UIViewController) -> UIViewController? {
        let controller = createViewController()
        return controller
    }
```

```
    func pageViewController(_ pageViewController: UIPageViewController,
viewControllerAfter viewController: UIViewController) -> UIViewController? {
        let controller = createViewController()
        return controller
    }

    func createViewController() -> UIViewController {
        var randomColor: UIColor {
            return UIColor(hue: CGFloat(arc4random_uniform(360))/360, saturation: 0.5,
brightness: 0.8, alpha: 1)
        }
        let storyboard = UIStoryboard(name: "Main", bundle: nil)
        let controller = storyboard.instantiateViewController(withIdentifier: "View
Controller")
        controller.view.backgroundColor = randomColor
        return controller
    }
}
```

. .


iPad
VPN

107: UIPheonix - UI

. UIPheonix macOS, iOS tvOS / UI + . API ! , .

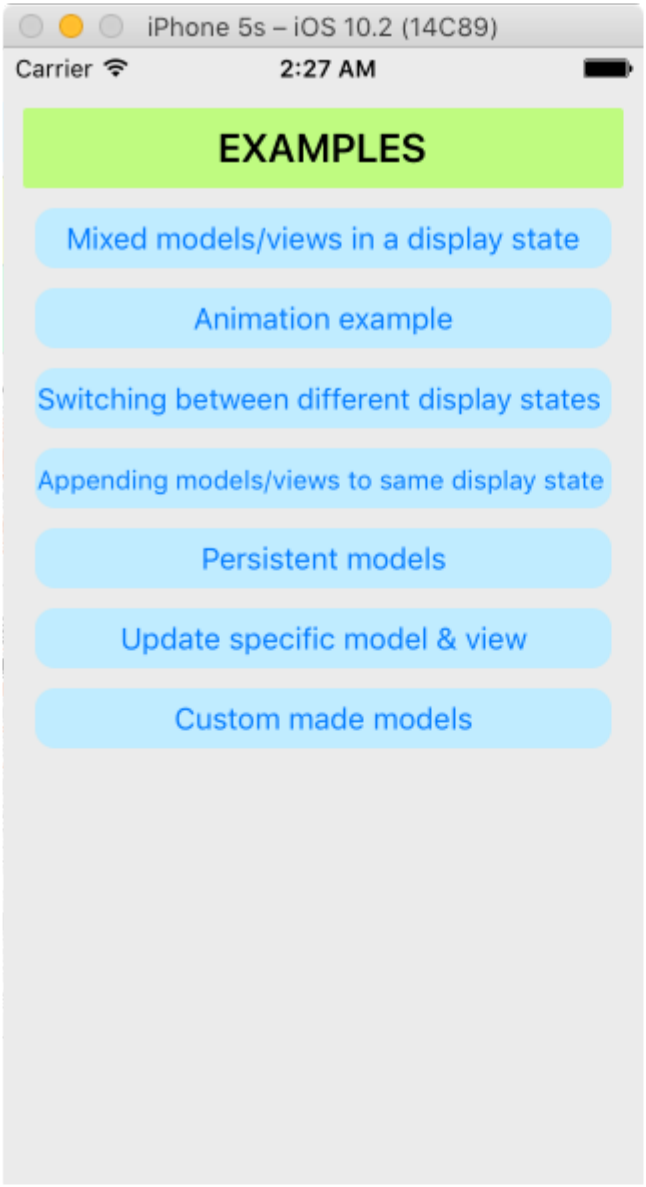
https://github.com/MKGitHub/UIPheonix

- , .
- , .
- UI .
- UI .
- .
- , , , , !
- .
- Apple .
- macOS, iOS tvOS (Kung Fu!)

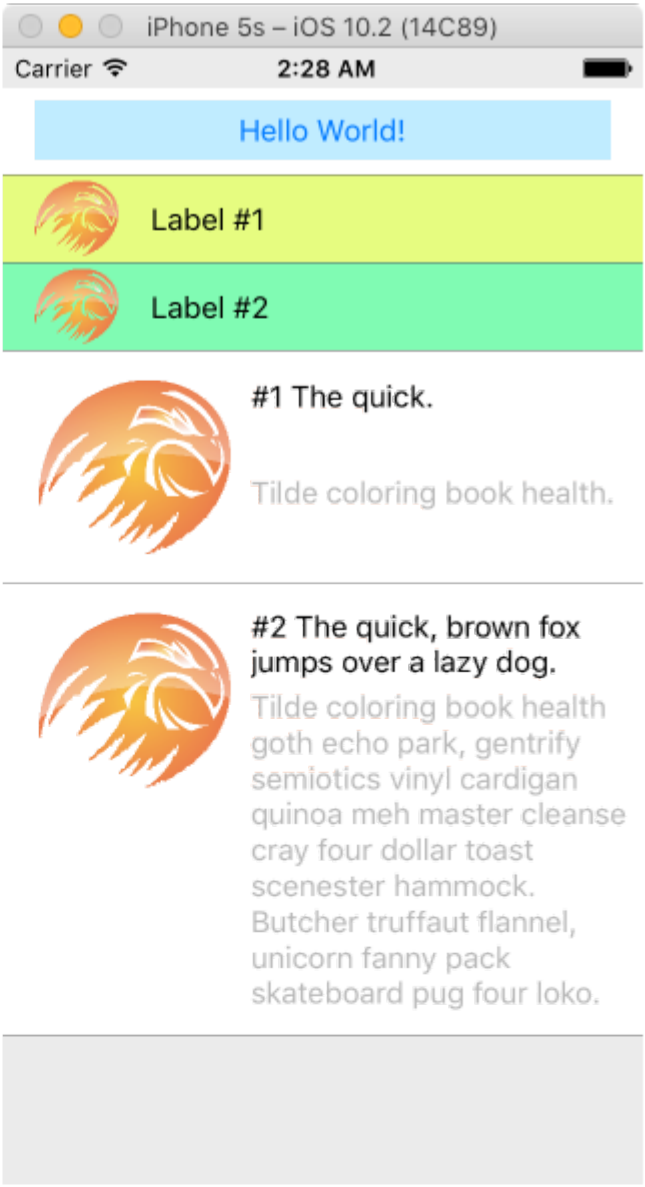
Examples

UI

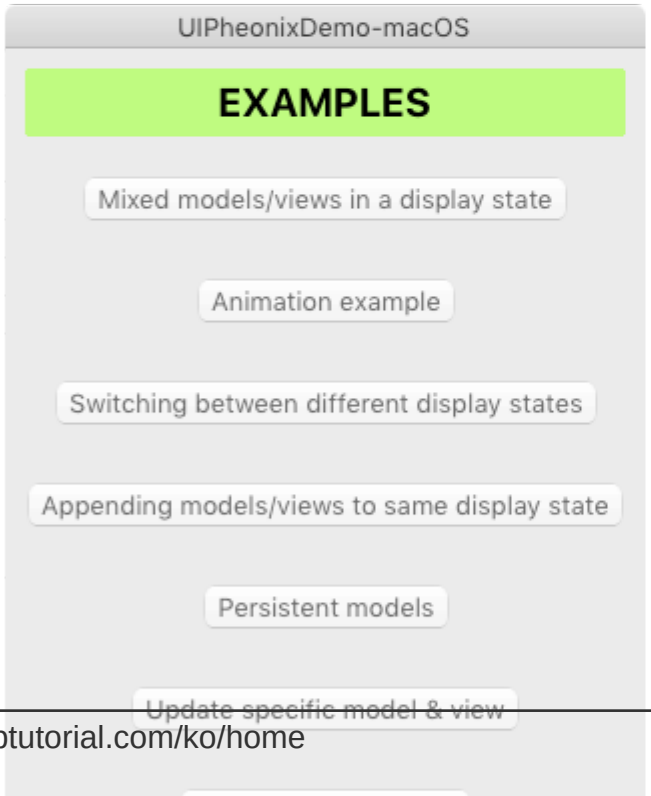
iOS - Collection View



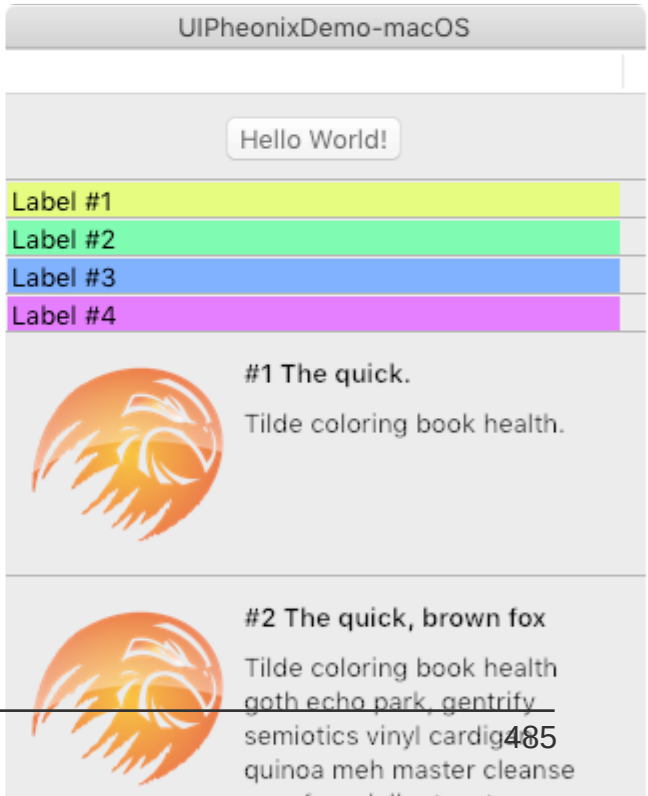
iOS - Table View



macOS - Collection View



macOS - Table View



108: UIPickerView

Examples

```
class PickerViewExampleViewController : UIViewController, UIPickerViewDelegate,
UIPickerViewDataSource {
    @IBOutlet weak var btnFolder: UIButton!
    let pickerView = UIPickerView()
    let pickerViewRows = ["First row,", "Secound row,","Third row,","Fourth row"]

    override func viewDidLoad() {
        super.viewDidLoad()
        self.btnFolder.addTarget(self, action: #selector(CreateListVC.btnFolderPress),
forControlEvents: UIControlEvents.TouchUpInside)
    }

    @objc private func btnFolderPress() {
        self.pickerView.delegate = self
        self.pickerView.dataSource = self
        self.view.addSubview(self.pickerView)
    }

    //MARK: UIPickerViewDelegate

    func pickerView(pickerView: UIPickerView, titleForRow row: Int, forComponent component:
Int) -> String? {
        return self.pickerViewRows[row]
    }

    //MARK: UIPickerViewDataSource

    func numberOfComponentsInPickerView(pickerView: UIPickerView) -> Int {
        return 1
    }

    func pickerView(pickerView: UIPickerView, numberOfRowsInComponent component: Int) -> Int {
        return self.pickerViewRows.count
    }

}
```

-C

```
@property (nonatomic,strong) UIPickerView *countryPicker;
@property (nonatomic,strong) NSArray *countryNames;

- (void)viewDidLoad {
    [super viewDidLoad];
    _countryNames = @[@"Australia (AUD)", @"China (CNY)",
                      @"France (EUR)", @"Great Britain (GBP)", @"Japan (JPY)",@"INDIA
(IN)",@"AUSTRALIA (AUS)",@"NEW YORK (NW)"];
```

```
   [self pickcountry];
 }

-(void)pickcountry {
    _countryPicker = [[UIPickerView alloc]init];

    _countryPicker.delegate = self;
    _countryPicker.dataSource = self;

    [[UIPickerView appearance] setBackgroundColor:[UIColor colorWithRed:21/255.0
green:17/255.0 blue:50/255.0 alpha:1.0]];
}

#pragma mark-  pickerView Delegates And datasource

- (NSInteger)numberOfComponentsInPickerView:(UIPickerView *)pickerView {
    return 1;
}

- (NSInteger)pickerView:(UIPickerView *)pickerView
numberOfRowsInComponent:(NSInteger)component {
    return _countryNames.count;
}

- (NSString *)pickerView:(UIPickerView *)pickerView
             titleForRow:(NSInteger)row
            forComponent:(NSInteger)component {
    return _countryNames[row];
}

- (void)pickerView:(UIPickerView *)pickerView didSelectRow:(NSInteger)row
inComponent:(NSInteger)component {
      NSString *pickedCountryName = _countryNames[row];
}
```

-C

```
//Displays the country pickerView with black background and white text
[self. countryPicker setValue:[UIColor whiteColor] forKey:@"textColor"];
[self. countryPicker setValue:[UIColor blackColor] forKey:@"backgroundColor"];
```

```
let color1 = UIColor(colorLiteralRed: 1, green: 1, blue: 1, alpha: 1)
let color2 = UIColor(colorLiteralRed: 0, green: 0, blue: 0, alpha: 1)
pickerView2.setValue(color1, forKey: "textColor")
pickerView2.setValue(color2, forKey: "backgroundColor")
```

UIPickerView : https://riptutorial.com/ko/ios/topic/4242/uipickerview

109: UIRefreshControl TableView

UIRefreshControl . . .

Examples

-C

ViewController .

```
@property (nonatomic) UIRefreshControl *refreshControl;
```

`viewDidLoad()` refreshControl .

```
self.refreshControl = [[UIRefreshControl alloc]init];
[self.tableView addSubview:self.refreshControl];
[self.refreshControl addTarget:self action:@selector(refreshTable)
forControlEvents:UIControlEventValueChanged];
//Setting the tint Color of the Activity Animation
self.refreshControl.tintColor = [UIColor redColor];
//Setting the attributed String to the text
NSMutableAttributedString * string = [[NSMutableAttributedString alloc]
initWithString:@"firstsecondthird"];
[string addAttribute:NSForegroundColorAttributeName value:[UIColor redColor]
range:NSMakeRange(0,5)];
[string addAttribute:NSForegroundColorAttributeName value:[UIColor greenColor]
range:NSMakeRange(5,6)];
[string addAttribute:NSForegroundColorAttributeName value:[UIColor blueColor]
range:NSMakeRange(11,5)];
self.refreshControl.attributedTitle = string;
```

Now `refreshTable` .

```
- (void)refreshTable {
    //TODO: refresh your data
    [self.refreshControl endRefreshing];
    [self.refreshControl beginRefreshing];
    [self.tableView reloadData];
    [self.refreshControl endRefreshing];
}
```

tableView refreshControl .

```
UIRefreshControl *refreshControl = [[UIRefreshControl alloc] init];
```

```
[refreshControl addTarget:self action:@selector(pullToRefresh:)
forControlEvents:UIControlEventValueChanged];
self.scrollView.alwaysBounceVertical = YES;
[self.scrollView addSubview:refreshControl];

- (void)pullToRefresh:(UIRefreshControl*) sender{
//Do work off the main thread
dispatch_async(dispatch_get_global_queue(DISPATCH_QUEUE_PRIORITY_DEFAULT, 0), ^{
    // Simulate network traffic (sleep for 2 seconds)
    [NSThread sleepForTimeInterval:2];
    //Update data
    //Call complete on the main thread
    dispatch_sync(dispatch_get_main_queue(), ^{
        //Update network activity UI
        NSLog(@"COMPLETE");
        [sender endRefreshing];
    });
});
```

}

UIRefreshControl TableView : https://riptutorial.com/ko/ios/topic/8278/uirefreshcontrol-tableview

110: UIScrollView

Examples

UIScrollView

CGRect UIScrollView .

```
let scrollview = UIScrollView.init(frame: CGRect(x: 0, y: 0, width: 320, height: 400))
```

-C

```
UIScrollView *scrollview = [[UIScrollView alloc] initWithFrame:CGRectMake(0, 0, 320, 400)];
```

contentSize . . , contentSize UIScrollView .

:

autolayout 4 . contentSize .

:

```
scrollview.contentSize = CGSize(width: 640, height: 800)
```

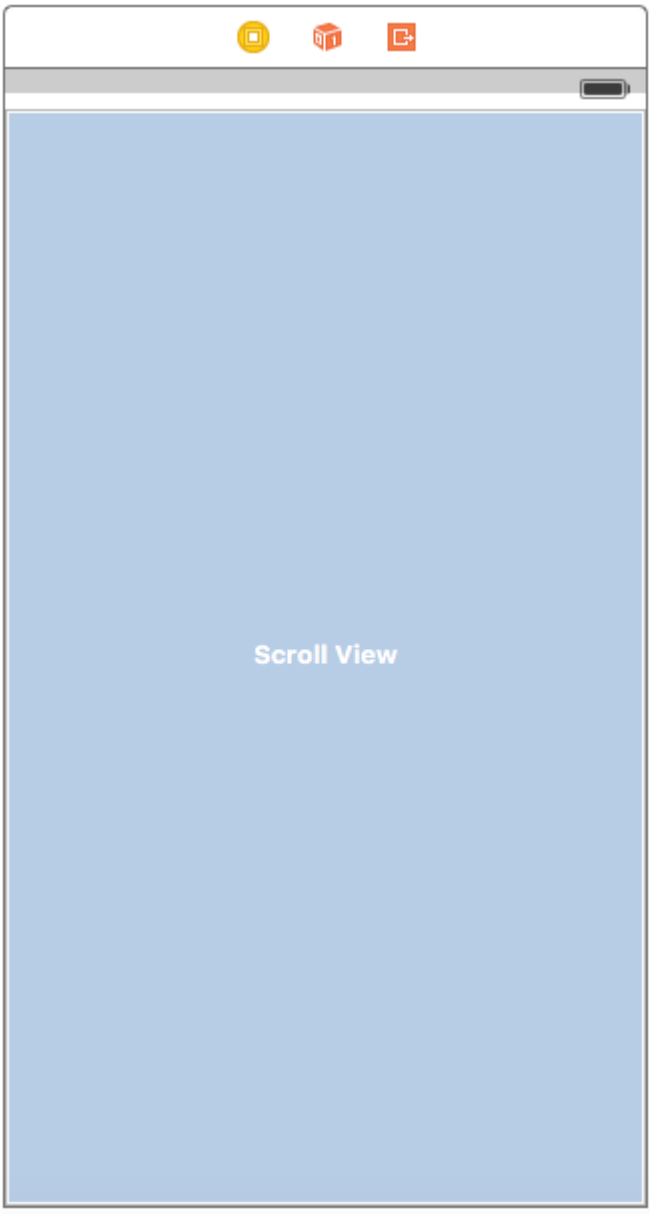
-C

```
scrollview.contentSize = CGSizeMake(640, 800);
```

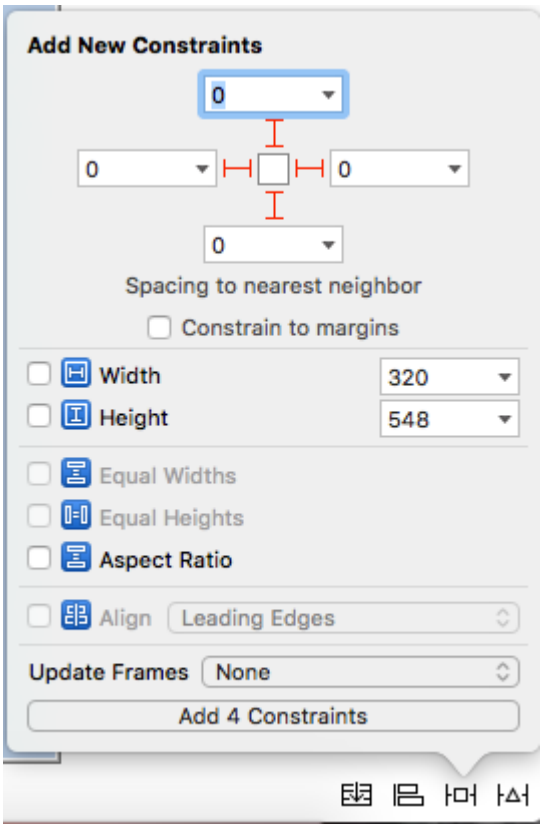
AutoLayout ScrollView

scrollview .

-
- viewcontroller iPhone-4inch .
-


Scroll View

- .



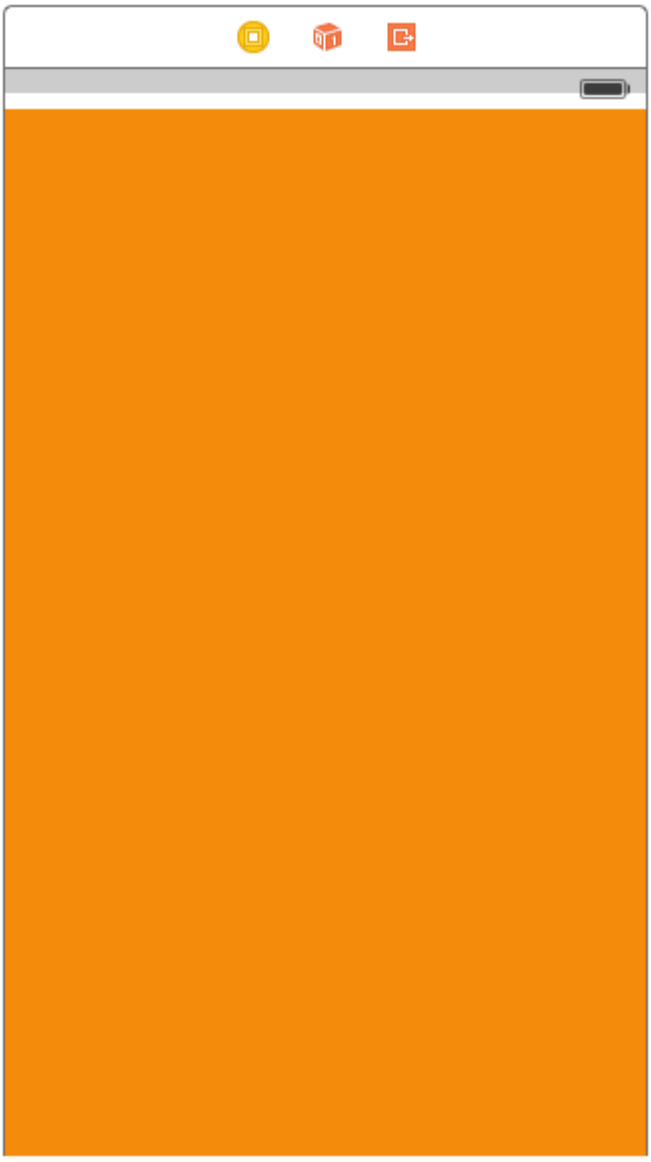
scrollview viewcontroller .

1 :

.

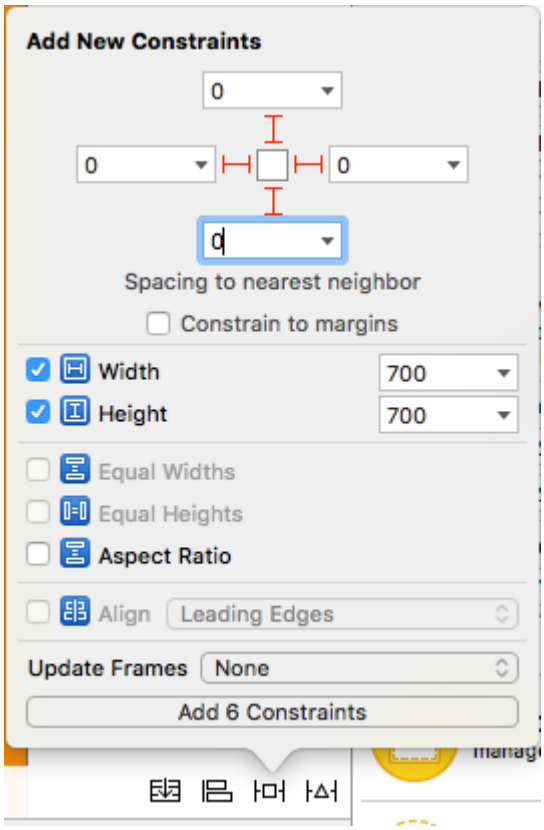
,

- (0,0,700,700) scrollview UIView . .



. .

-



.

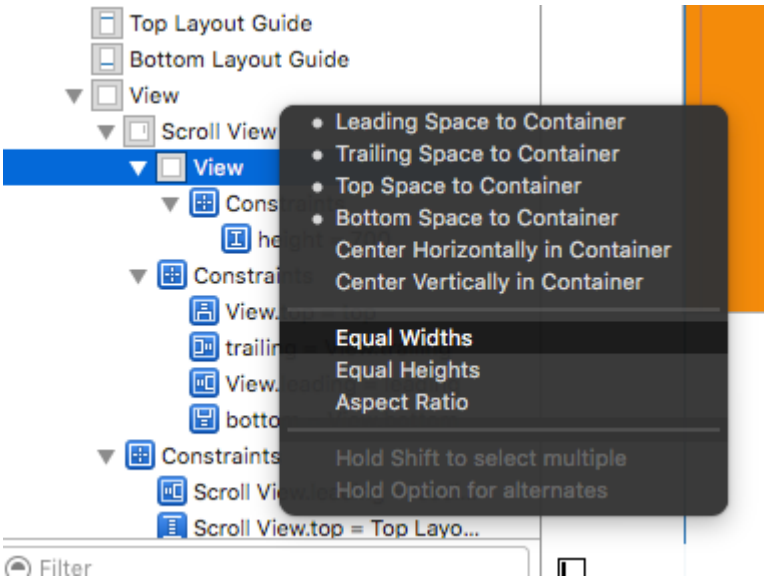
- 700 .
- scrollview = 0 .
- scrollview = 0 .

.

2 : *scrollview* .

.

- .
- .
- Ctrl .


Top Layout Guide
Bottom Layout Guide
View
Scroll View
View
Leading Space to Container
Trailing Space to Container
Top Space to Container
Bottom Space to Container
Center Horizontally in Container
Center Vertically in Container
Equal Widths
Equal Heights
Aspect Ratio
Hold Shift to select multiple
Hold Option for alternates
Constraints
Scroll View.top = Top Layo...
Filter

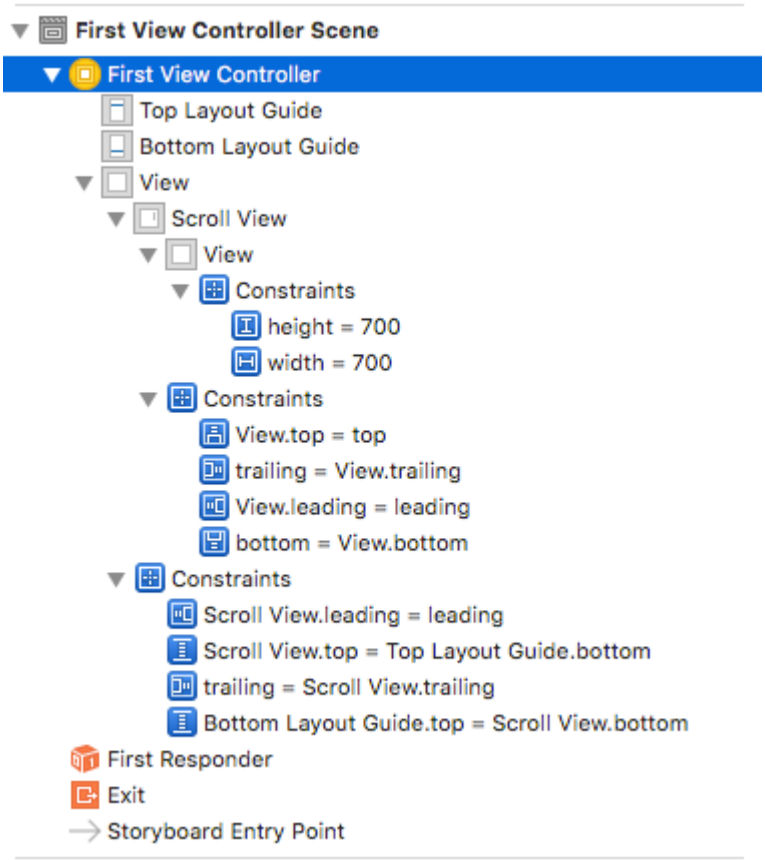
- ! .

3 :

.

.

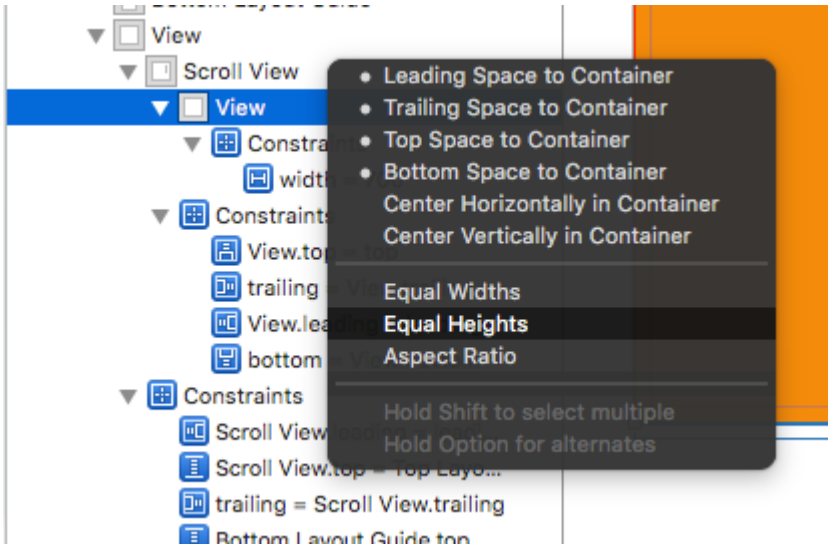
- (,)


First View Controller Scene
First View Controller
Top Layout Guide
Bottom Layout Guide
View
Scroll View
View
Constraints
height = 700
width = 700
Constraints
View.top = top
trailing = View.trailing
View.leading = leading
bottom = View.bottom
Constraints
Scroll View.leading = leading
Scroll View.top = Top Layout Guide.bottom
trailing = Scroll View.trailing
Bottom Layout Guide.top = Scroll View.bottom
First Responder
Exit
Storyboard Entry Point

- (0,0,700,700).
- .
-

.

- Ctrl .



- ! .

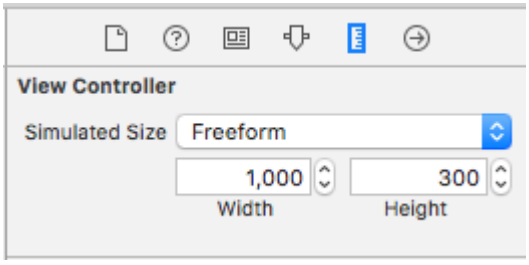
. 10 . .

`UIView` , . . .

- `UIScrollView` `UIScrollView`. 'UIView'.
- (). ( )
- .

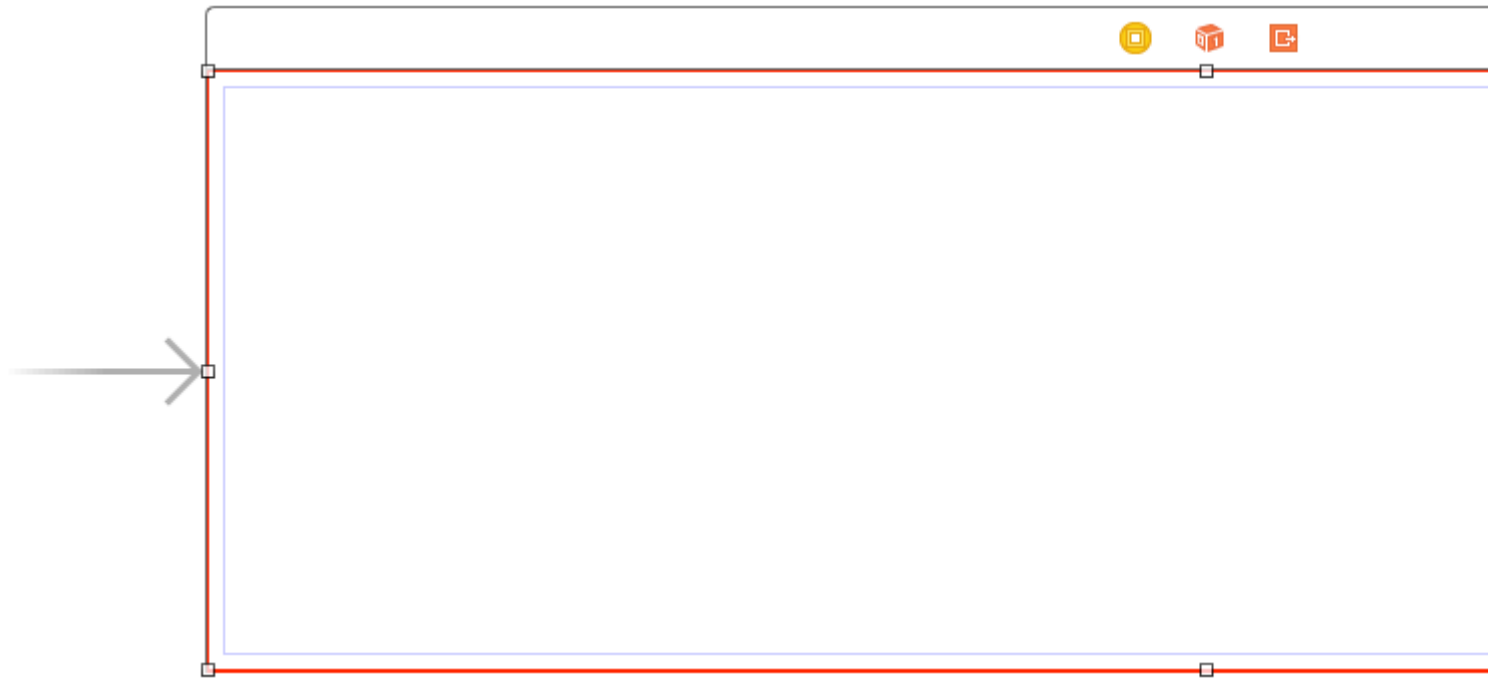
.

. View Controller Size Inspector Freeform . `1,000` , `300` . .

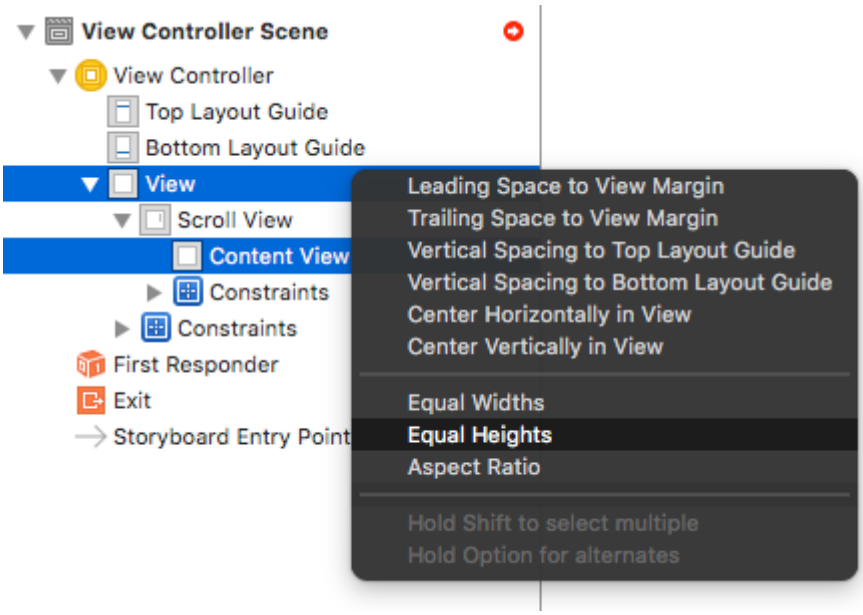


`UIScrollView` .

`UIView` . . . `UIView` . . .



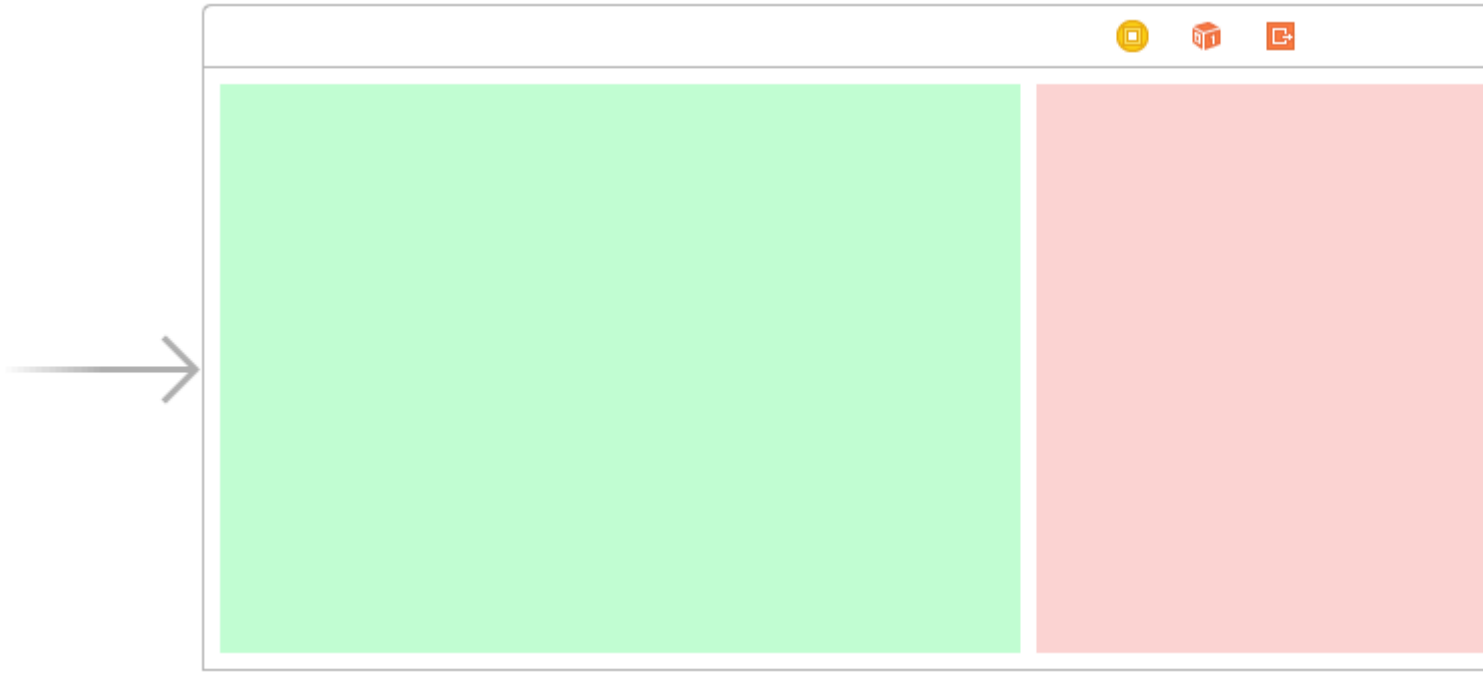
Document Outline `Command` Content View Scroll View . (Control </ kbd). . , .



:

- .

3 `UIView` . 8 .



:

- : , . 400 .
- : , . 300 .
- : . (268).

.

. . .

- iOS : AutoLayout ScrollView
- UIScrollView
- YouTube : UIScrollView -

/

`scrollEnabled` `Boolean` .
true / yes , `true` `true`

```
scrollview.isScrollEnabled = true
```

-C

```
scrollview.scrollEnabled = YES;
```

/ UIImageView

UIScrollView

```
let scrollview = UIScrollView.init(frame: self.view.bounds)
```

.

```
scrollView.minimumZoomScale = 0.1
scrollView.maximumZoomScale = 4.0
scrollView.zoomScale = 1.0
scrollview.delegate = self as? UIScrollViewDelegate
```

. `minimumZoomScale` `maximumZoomScale` `minimumZoomScale` `maximumZoomScale` . 1.0 .

/ `zoomScale` 1.0 .

/ . `UIScrollViewDelegate` . `viewForZoomingInScrollView()` .

ViewController .

```
class ViewController: UIViewController, UIScrollViewDelegate
```

.

```
func viewForZoomingInScrollView(scrollView: UIScrollView) -> UIView? {
    return imageView
}
```

UIImageView .

.

```
var imageView:UIImageView = UIImageView.init(image: UIImage.init(named: "someImage.jpg"))
```

scrollview .

```
scrollView?.addSubview(imageView)
```

- iOS
- UIScrollView

UIScrollView

scrollViewDidEndDecelerating : .

C :

```
- (void)scrollViewDidEndDecelerating:(UIScrollView *)scrollView {
    [self stoppedScrolling];
}

- (void)scrollViewDidEndDragging:(UIScrollView *)scrollView willDecelerate:(BOOL)decelerate {
    if (!decelerate) {
        [self stoppedScrolling];
    }
}

- (void)stoppedScrolling {
    // done, do whatever
}
```

:

```
func scrollViewDidEndDragging(scrollView: UIScrollView, willDecelerate decelerate: Bool) {
    if !decelerate {
        stoppedScrolling()
    }
}

func scrollViewDidEndDecelerating(scrollView: UIScrollView) {
    stoppedScrolling()
}

func stoppedScrolling() {
    // done, do whatever
}
```

.

```
func scrollViewDidScroll(_ scrollView: UIScrollView) {
    if scrollView.contentOffset.x != 0 {
        scrollView.contentOffset.x = 0
    }
}
```

x scrollView 0 .
x S y S .

scrollViewDidScroll(_ scrollView: UIScrollView) . .

UIScrollViewDelegate .

```
class ViewController: UIViewController, UIScrollViewDelegate
```

... viewDidLoad(_:) self scrollView .

```
scrollView.delegate = self
```

UIScrollView : https://riptutorial.com/ko/ios/topic/1575/uiscrollview

111: UIScrollView AutoLayout

Examples

ScrollableController

Autolayout `UIScrollView` .

`UIScrollView` `ContentView` `UIScrollView` .

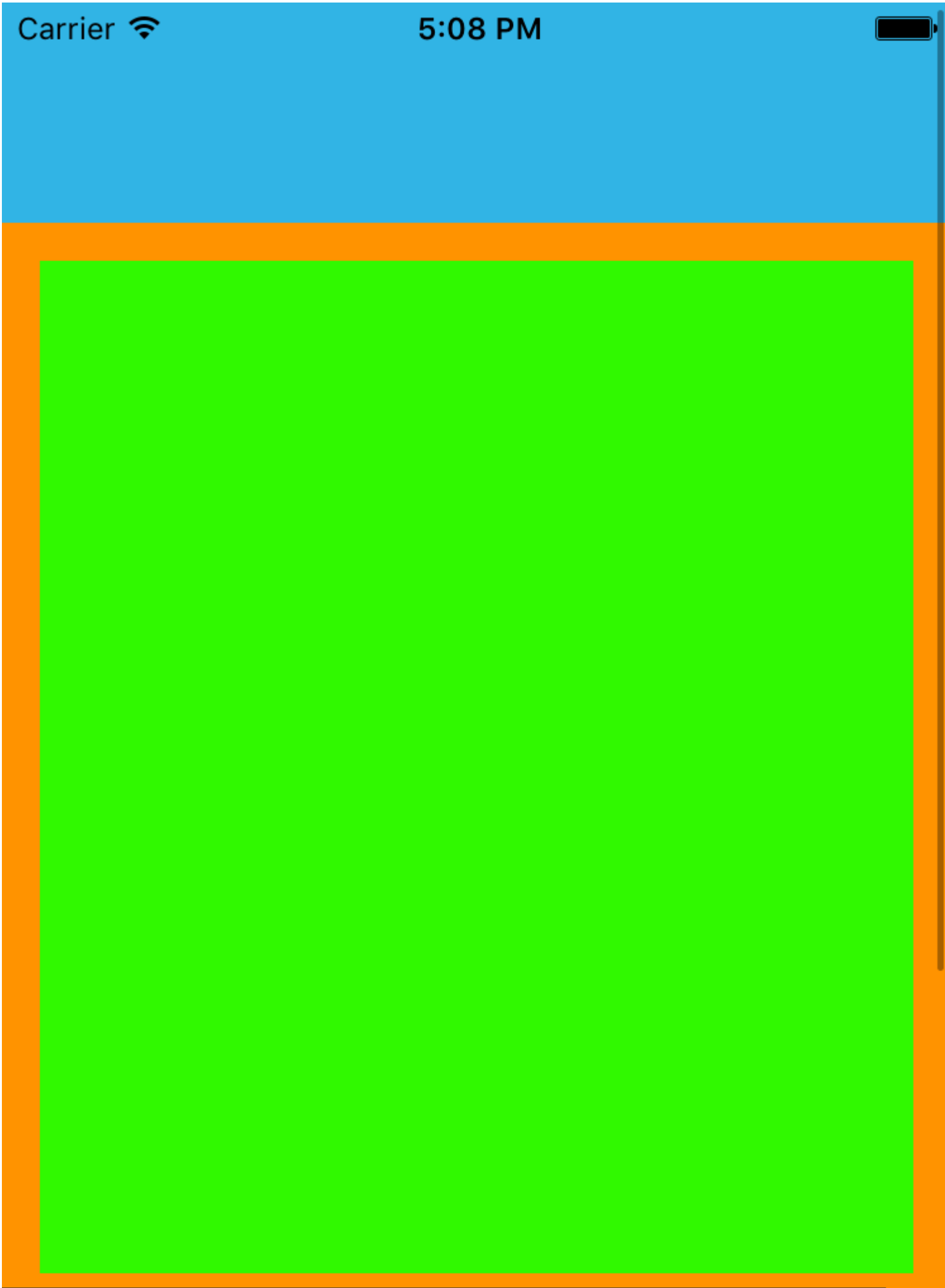
```
import Foundation
import UIKit

class ScrollableController : UIViewController {

    private var scrollView: UIScrollView!
    private var contentView: UIView!

    override func viewDidLoad() {
        super.viewDidLoad()

        //Setup
        self.initControls()
        self.setTheme()
        self.layoutScrollView()
        self.layoutContentView()

        //Add child views
        self.addChildViews()
    }

    func initControls() {
        self.scrollView = UIScrollView()
        self.contentView = UIView()
    }

    func setTheme() {
        self.scrollView.backgroundColor = UIColor.blue()
        self.contentView.backgroundColor = UIColor.orange()
    }

    func layoutScrollView() {
        self.view.addSubview(self.scrollView)

        let views: NSDictionary = ["scrollView": self.scrollView]
        var constraints = Array<String>()

        //Constrain the scrollView to our controller's self.view.
        constraints.append("H:|-0-[scrollView]-0-|")
        constraints.append("V:|-0-[scrollView]-0-|")

        for constraint in constraints {
            self.view.addConstraints(NSLayoutConstraint.constraints(withVisualFormat:
constraint, options: NSLayoutFormatOptions(rawValue: 0), metrics: nil, views: views as!
[String : AnyObject]))
        }
```

```
        self.scrollView.translatesAutoresizingMaskIntoConstraints = false
    }

    func layoutContentView() {
        self.scrollView.addSubview(self.contentView)

        let views: NSDictionary = ["contentView": self.contentView, "view": self.view]
        var constraints = Array<String>()

        //Constrain the contentView to the scrollView.
        constraints.append("H:|-0-[contentView]-0-|")
        constraints.append("V:|-0-[contentView]-0-|")

        for constraint in constraints {
            self.scrollView.addConstraints(NSLayoutConstraint.constraints(withVisualFormat:
constraint, options: NSLayoutFormatOptions(rawValue: 0), metrics: nil, views: views as!
[String : AnyObject]))
        }

        //Disable Horizontal Scrolling by making the contentView EqualWidth with our
controller's self.view (ScrollView's parentView).
        self.view.addConstraints(NSLayoutConstraint.constraints(withVisualFormat:
"H:[contentView(==view)]", options: NSLayoutFormatOptions(rawValue: 0), metrics: nil, views:
views as! [String : AnyObject]))

        self.contentView.translatesAutoresizingMaskIntoConstraints = false
    }

    func addChildViews() {
        //Init
        let greenView = UIView()
        let whiteView = UIView()

        //Theme
        greenView.backgroundColor = UIColor.green()
        whiteView.backgroundColor = UIColor.orange()

        //Layout -- Child views are added to the 'ContentView'
        self.contentView.addSubview(greenView)
        self.contentView.addSubview(whiteView)

        let views: NSDictionary = ["greenView": greenView, "whiteView": whiteView];
        var constraints = Array<String>()

        //Constrain the greenView to the contentView with a height of 400 and 15 spacing all
around.
        constraints.append("H:|-15-[greenView]-15-|")
        constraints.append("V:|-15-[greenView(400)]")

        //Constrain the whiteView below the greenView with 15 spacing all around and a height
of 500.
        constraints.append("H:|-15-[whiteView]-15-|")
        constraints.append("V:[greenView]-15-[whiteView(500)]-15-|")

        for constraint in constraints {
            self.contentView.addConstraints(NSLayoutConstraint.constraints(withVisualFormat:
constraint, options: NSLayoutFormatOptions(rawValue: 0), metrics: nil, views: views as!
[String : AnyObject]))
        }
```

```
        greenView.translatesAutoresizingMaskIntoConstraints = false
        whiteView.translatesAutoresizingMaskIntoConstraints = false
    }
}
```

greenView (400) + whiteView (500) . ScrollView contentSize .

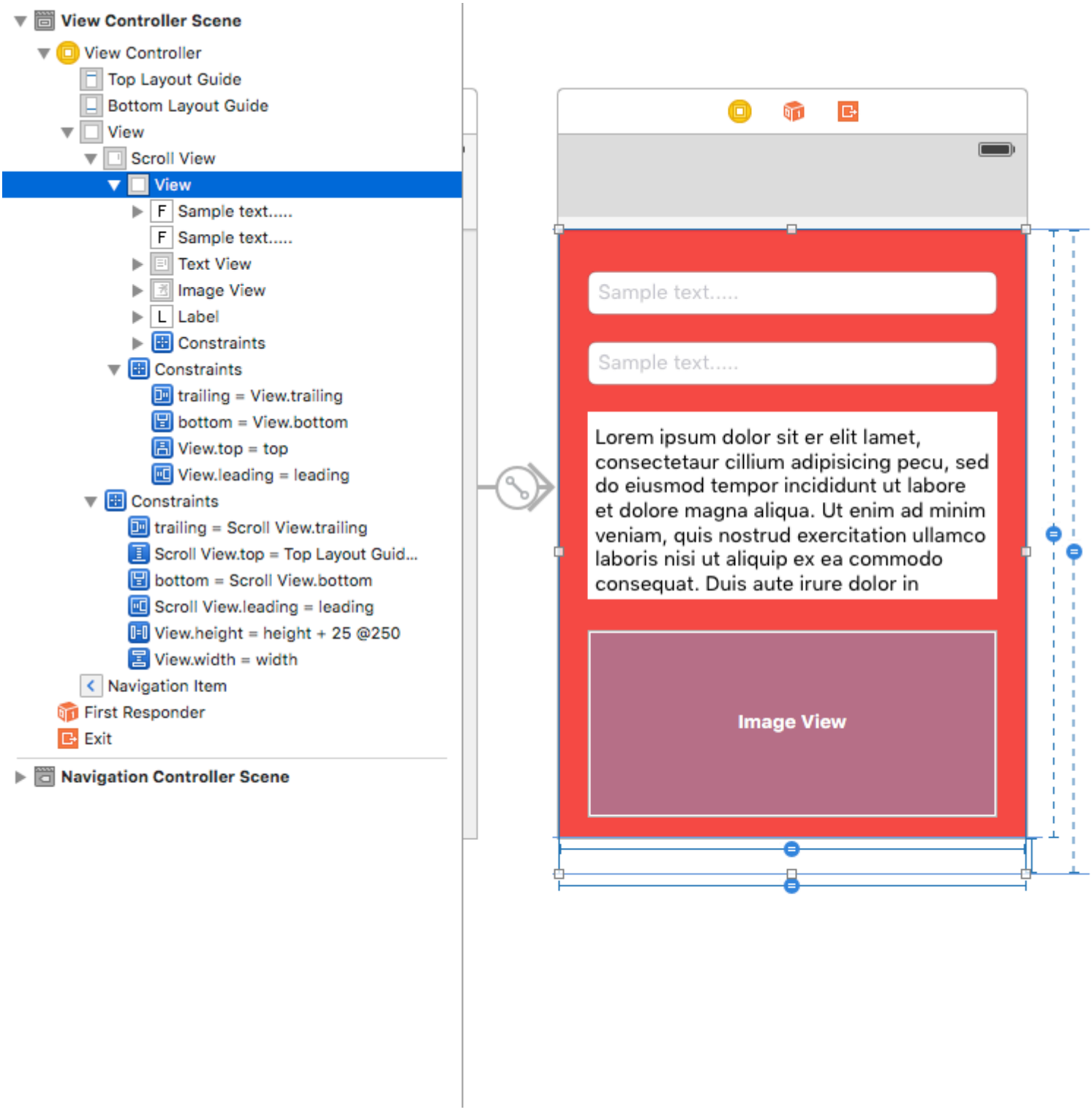
`contentView self.view EqualWidth` .

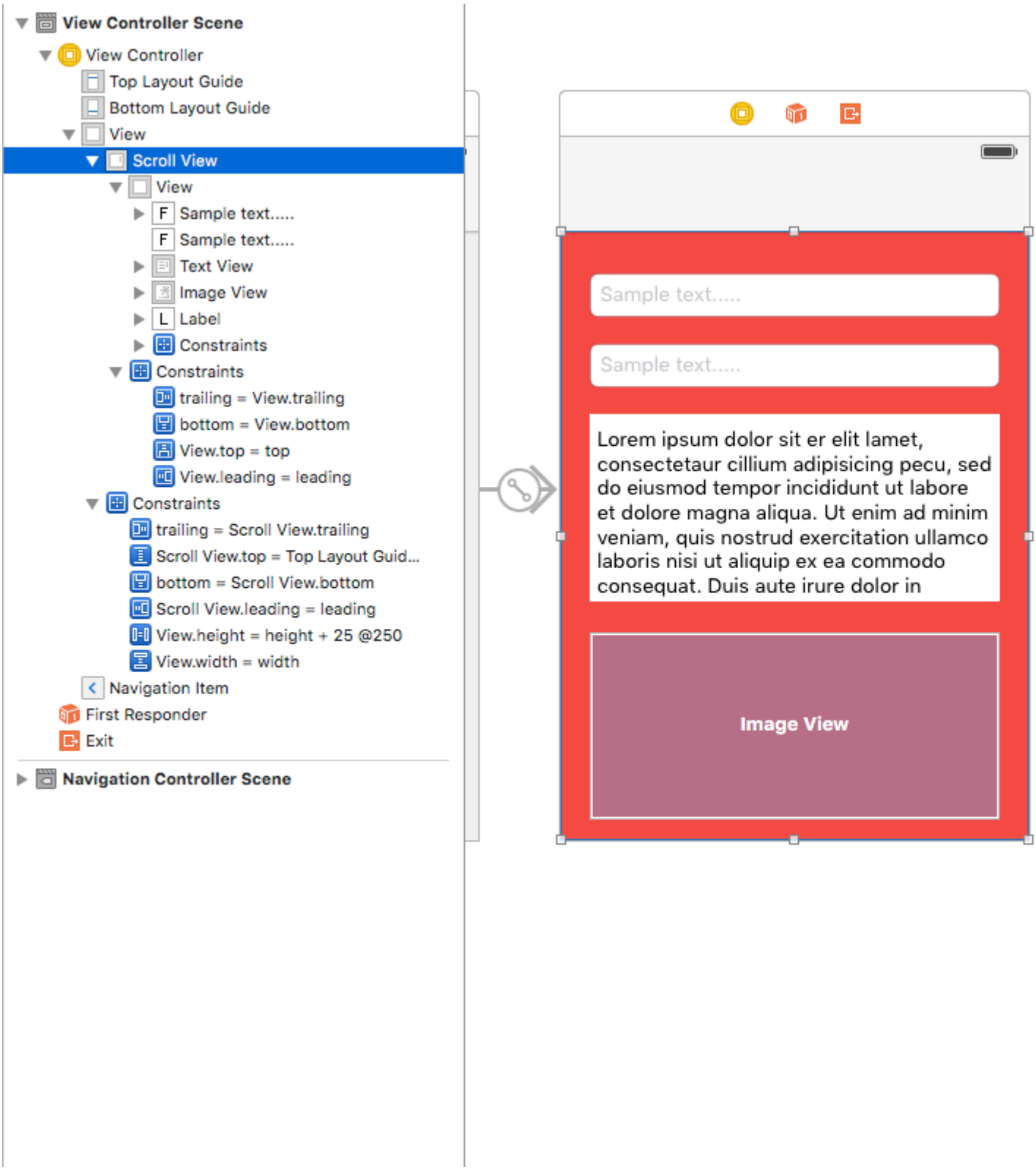

Carrier
5:08 PM

2. , (, scrollview) . . ( ).

3. . Y 420 20 440.

3 : .





UIScrollView AutoLayout : https://riptutorial.com/ko/ios/topic/4671/uiscrollview-autolayout

112: UISearchController

- UISearchController (searchResultsController : UIViewController?) // nil .
- func updateSearchResults (searchController : UISearchController) // UISearchResultsUpdating

`UISearchController.searchBar`	. *( )*
`UISearchController.searchResultsUpdater`	.
`UISearchController.isActive`	.
`UISearchController.obscuresBackgroundDuringPresentation`	.
`UISearchController.dimsBackgroundDuringPresentation`	.
`UISearchController.hidesNavigationBarDuringPresentation`	.
`UIViewController.definesPresentationContext`	View Controller View Controller View Controller View Controller .
`UIViewController.navigationItem.titleView`	.
`UITableViewController.tableView.tableHeaderView`	.

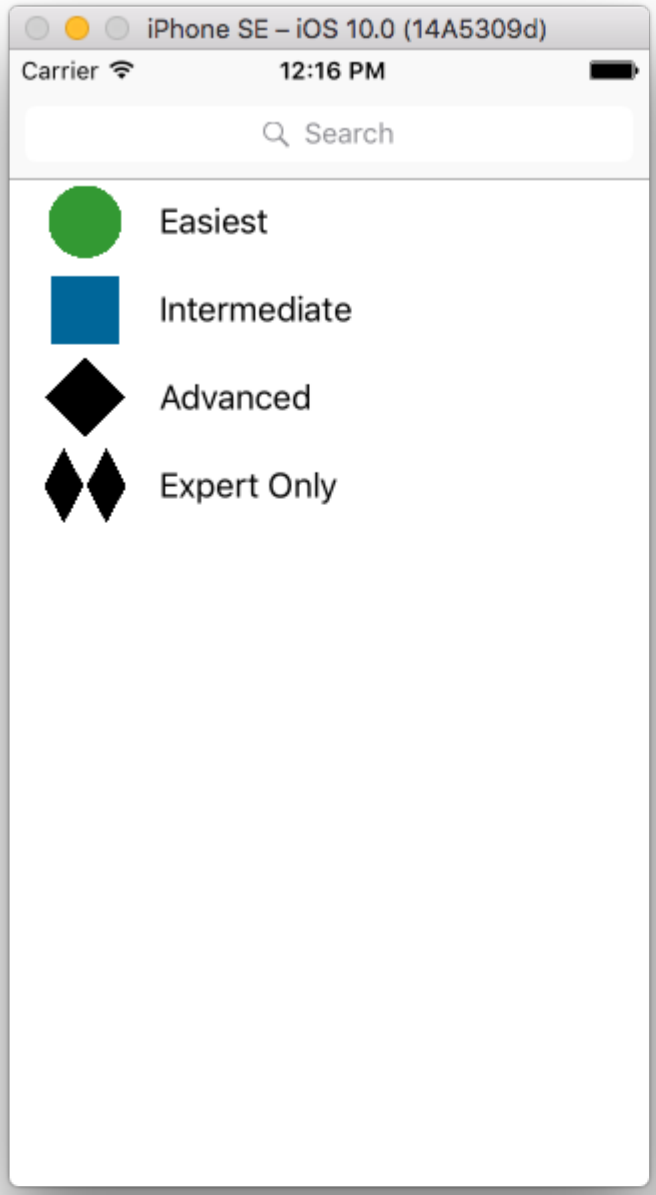
UIKit :

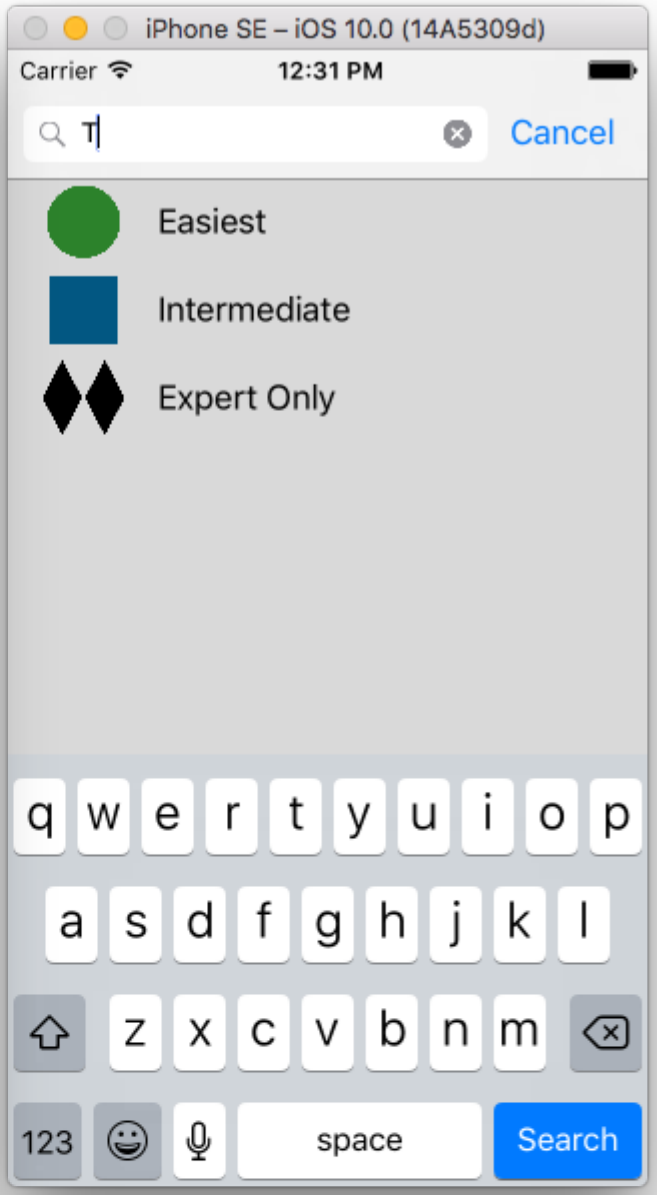
UISearchController

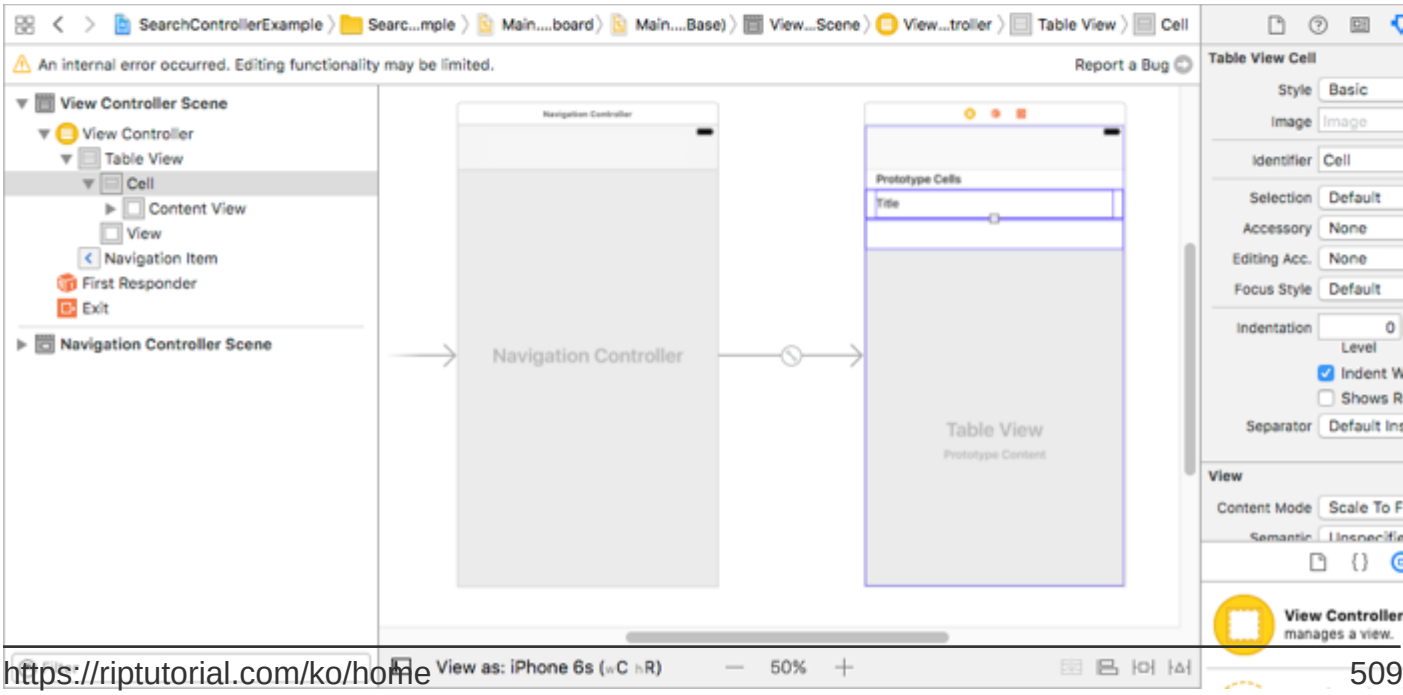
UISearchResultsUpdating

Examples

. .


iPhone SE – iOS 10.0 (14A5309d)
Carrier
12:16 PM
Search
Easiest
Intermediate
Advanced
Expert Only


iPhone SE – iOS 10.0 (14A5309d)
Carrier
12:31 PM
T
Cancel
Easiest
Intermediate
Expert Only
q w e r t y u i o p
a s d f g h j k l
z x c v b n m
123
space
Search

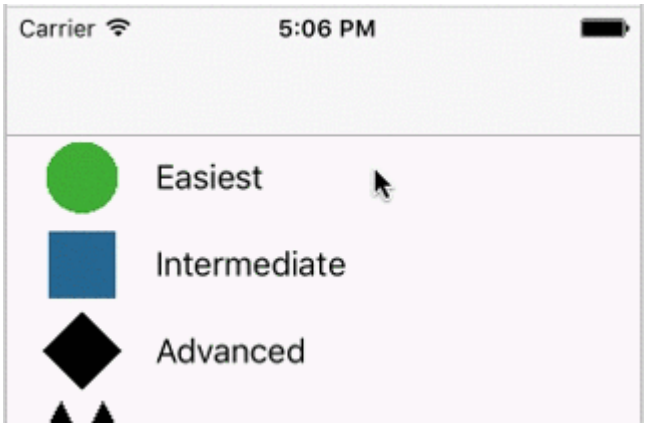

SearchControllerExample
An internal error occurred. Editing functionality may be limited.
Report a Bug
View Controller Scene
View Controller
Table View
Cell
Content View
View
Navigation Item
First Responder
Exit
Navigation Controller Scene
Navigation Controller
Prototype Cells
Title
Table View
Table View Cell
Style
Basic
Identifier
Cell
Selection
Default
Accessory
None
Editing Acc.
None
Focus Style
Default
Indentation
Indent While Editing
Separator
Default Insets
View
Content Mode
Scale To Fill
View Controller
manages a view.
View as: iPhone 6s
50%

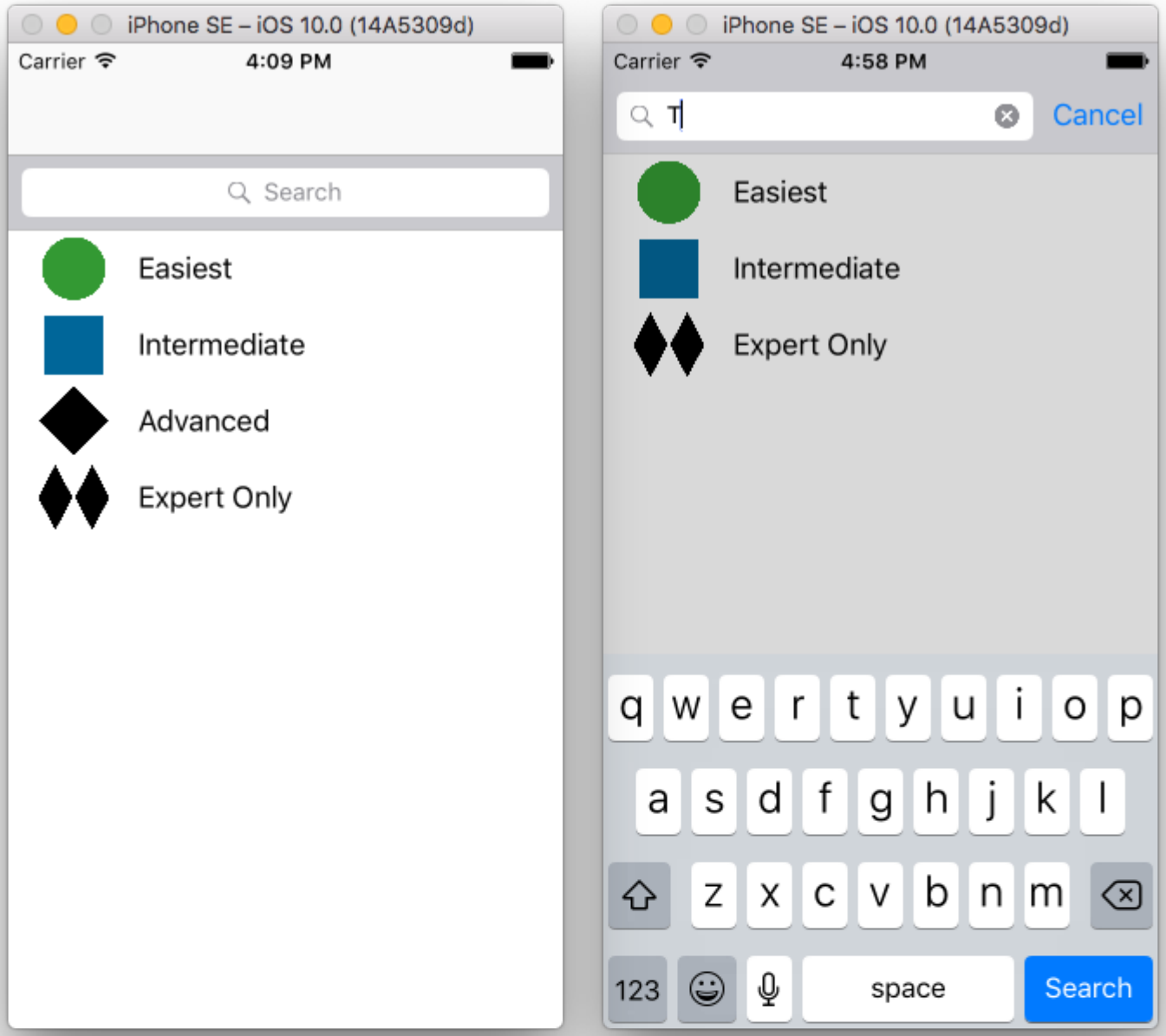
UITableViewController UISearchResultsUpdating .

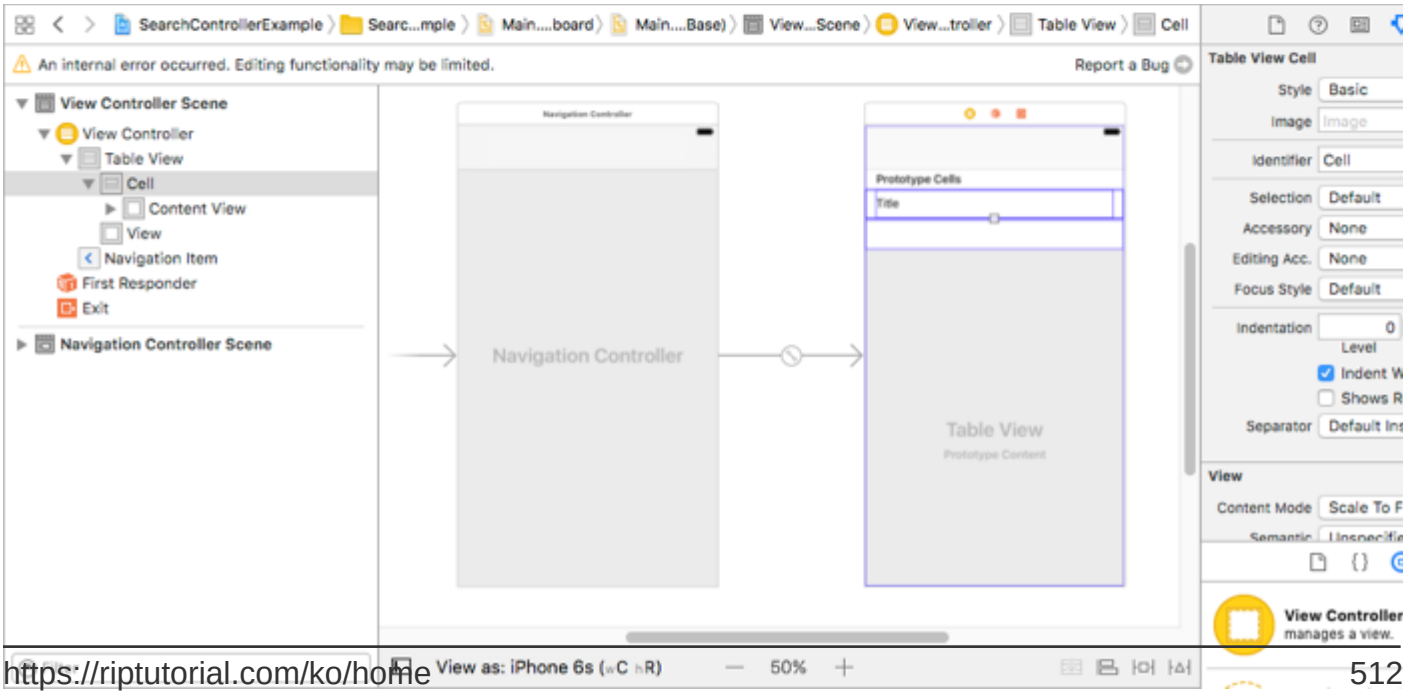
```
class ViewController: UITableViewController, UISearchResultsUpdating {

    let entries = [(title: "Easiest", image: "green_circle"),
                   (title: "Intermediate", image: "blue_square"),
                   (title: "Advanced", image: "black_diamond"),
                   (title: "Expert Only", image: "double_black_diamond")]

    // An empty tuple that will be updated with search results.
    var searchResults : [(title: String, image: String)] = []

    let searchController = UISearchController(searchResultsController: nil)

    override func viewDidLoad() {
        super.viewDidLoad()

        searchController.searchResultsUpdater = self
        self.definesPresentationContext = true

        // Place the search bar in the navigation item's title view.
        self.navigationItem.titleView = searchController.searchBar

        // Don't hide the navigation bar because the search bar is in it.
        searchController.hidesNavigationBarDuringPresentation = false
    }

    func filterContent(for searchText: String) {
        // Update the searchResults array with matches
        // in our entries based on the title value.
        searchResults = entries.filter({ (title: String, image: String) -> Bool in
            let match = title.range(of: searchText, options: .caseInsensitive)
            // Return the tuple if the range contains a match.
            return match != nil
        })
    }

    // MARK: - UISearchResultsUpdating method

    func updateSearchResults(for searchController: UISearchController) {
        // If the search bar contains text, filter our data with the string
        if let searchText = searchController.searchBar.text {
            filterContent(for: searchText)
            // Reload the table view with the search result data.
            tableView.reloadData()
        }
    }

    // MARK: - UITableViewController methods

    override func numberOfSections(in tableView: UITableView) -> Int { return 1 }

    override func tableView(_ tableView: UITableView, numberOfRowsInSection section: Int) ->
Int {
        // If the search bar is active, use the searchResults data.
        return searchController.isActive ? searchResults.count : entries.count
    }

    override func tableView(_ tableView: UITableView, cellForRowAt indexPath: IndexPath) ->
UITableViewCell {
        // If the search bar is active, use the searchResults data.
```

```
        let entry = searchController.isActive ?
                    searchResults[indexPath.row] : entries[indexPath.row]

        let cell = tableView.dequeueReusableCell(withIdentifier: "Cell", for: indexPath)
        cell.textLabel?.text = entry.title
        cell.imageView?.image = UIImage(named: entry.image)
        return cell
    }
}
```

. . . . .







UINavigationController UITableViewController UINavigationItem (...) ViewController

UITableViewController UISearchResultsUpdating .

```
class ViewController: UITableViewController, UISearchResultsUpdating {

    let entries = [(title: "Easiest", image: "green_circle"),
                   (title: "Intermediate", image: "blue_square"),
                   (title: "Advanced", image: "black_diamond"),
                   (title: "Expert Only", image: "double_black_diamond")]

    // An empty tuple that will be updated with search results.
    var searchResults : [(title: String, image: String)] = []

    let searchController = UISearchController(searchResultsController: nil)

    override func viewDidLoad() {
        super.viewDidLoad()

        searchController.searchResultsUpdater = self
        self.definesPresentationContext = true

        // Place the search bar in the table view's header.
        self.tableView.tableHeaderView = searchController.searchBar

        // Set the content offset to the height of the search bar's height
        // to hide it when the view is first presented.
        self.tableView.contentOffset = CGPoint(x: 0, y:
searchController.searchBar.frame.height)
    }

    func filterContent(for searchText: String) {
        // Update the searchResults array with matches
        // in our entries based on the title value.
        searchResults = entries.filter({ (title: String, image: String) -> Bool in
            let match = title.range(of: searchText, options: .caseInsensitive)
            // Return the tuple if the range contains a match.
            return match != nil
        })
    }

    // MARK: - UISearchResultsUpdating method

    func updateSearchResults(for searchController: UISearchController) {
        // If the search bar contains text, filter our data with the string
        if let searchText = searchController.searchBar.text {
            filterContent(for: searchText)
            // Reload the table view with the search result data.
            tableView.reloadData()
        }
    }

    // MARK: - UITableViewController methods

    override func numberOfSections(in tableView: UITableView) -> Int { return 1 }

    override func tableView(_ tableView: UITableView, numberOfRowsInSection section: Int) ->
Int {
        // If the search bar is active, use the searchResults data.
        return searchController.isActive ? searchResults.count : entries.count
    }

    override func tableView(_ tableView: UITableView, cellForRowAt indexPath: IndexPath) ->
```

```
UITableViewCell {
        // If the search bar is active, use the searchResults data.
        let entry = searchController.isActive ?
                    searchResults[indexPath.row] : entries[indexPath.row]

        let cell = tableView.dequeueReusableCell(withIdentifier: "Cell", for: indexPath)
        cell.textLabel?.text = entry.title
        cell.imageView?.image = UIImage(named: entry.image)
        return cell
    }
}
```

UISearchResultsUpdating .

```
class MyTableViewController: UITableViewController, UISearchResultsUpdating {}
```

.

```
class MyTableViewController: UTableViewController, UISearchResultsUpdating {
    let searchController = UISearchController(searchResultsController: nil)
}
```

:

```
override func viewDidLoad() {
    super.viewDidLoad()

    searchController.searchResultsUpdater = self
    searchController.hidesNavigationBarDuringPresentation = false
    searchController.dimsBackgroundDuringPresentation = false
    searchController.searchBar.sizeToFit()
    self.tableView.tableHeaderView = searchController.searchBar
}
```

UISearchResultsUpdating updateSearchResultsForSearchController .

```
func updateSearchResultsForSearchController(searchController: UISearchController) {

}
```

Objective-C UISerachController

```
Delegate: UISearchBarDelegate, UISearchControllerDelegate, UISearchBarDelegate

@property (strong, nonatomic)  UISearchController *searchController;

- (void)searchBarConfiguration
{
    self.searchController = [[UISearchController alloc] initWithSearchResultsController:nil];
    self.searchController.searchBar.delegate = self;
    self.searchController.hidesNavigationBarDuringPresentation = NO;

    // Hides search bar initially.  When the user pulls down on the list, the search bar is
revealed.
```

```
    [self.tableView setContentOffset:CGPointMake(0,
self.searchController.searchBar.frame.size.height)];

    self.searchController.searchBar.backgroundColor = [UIColor DarkBlue];
    self.searchController.searchBar.tintColor = [UIColor DarkBlue];

    self.tableView.contentOffset = CGPointMake(0,
CGRectGetHeight(_searchController.searchBar.frame));
    self.tableView.tableHeaderView = _searchController.searchBar;
    _searchController.searchBar.delegate = self;
    _searchController.searchBar.showsCancelButton = YES;
    self.tapGestureRecognizer = [[UITapGestureRecognizer alloc] initWithTarget:self
action:@selector(resetSearchbarAndTableView)];
    [self.view addGestureRecognizer:self.tapGestureRecognizer];

}

- (void)resetSearchbarAndTableView{
// Reload your tableview and resign keyboard.
}


- (void)searchBarCancelButtonClicked:(UISearchBar *)searchBar{
// Search cancelled
}
- (void)searchBarSearchButtonClicked:(UISearchBar *)searchBar{
// Implement filtration of your data as per your need using NSPredicate or else.
// then reload your data control like Tableview.
}
```

UISearchController : https://riptutorial.com/ko/ios/topic/2813/uisearchcontroller

113: UISegmentedControl

UISegmentedControl , . .

Examples

UISegmentedControl

1. UISegmentedControl 3 () .

```
let mySegmentedControl = UISegmentedControl (items: ["One", "Two", "Three"])
```

2. ;

```
mySegmentedControl.frame = CGRect(x: 0.0, y: 0.0, width: 300, height: 50)
```

3. (0).

```
mySegmentedControl.selectedSegmentIndex = 0
```

4. :

```
mySegmentedControl.addTarget(self, action: #selector(segmentedValueChanged(_:)), for:
.valueChanged)
```

5 :

```
func segmentedValueChanged(_ sender:UISegmentedControl!) {
    print("Selected Segment Index is : \(sender.selectedSegmentIndex)")
}
```

6. UISegmentedControl .

```
yourView.addSubview(mySegmentedControl)
```

UISegmentedControl : https://riptutorial.com/ko/ios/topic/9963/uisegmentedcontrol

114: UISplitViewController

`UISplitViewController` `UITabViewController`, `UINavigationController` . masterViewController (PrimaryViewController) detailViewController (SecondaryViewController) . . Apple rootview `UISplitViewController` `UISplitViewController` . `NSNotificationCenter` .

Examples

C

`UISplitViewController` rootViewController .

AppDelegate.m

```
- (BOOL)application:(UIApplication *)application didFinishLaunchingWithOptions:(NSDictionary
*)launchOptions
{
// Override point for customization after application launch.
self.window = [[UIWindow alloc] initWithFrame:[[UIScreen mainScreen] bounds]]
self.window.backgroundColor = [UIColor blackColor];
[self.window makeKeyAndVisible];
self.window.clipsToBounds = YES;
SplitViewController *spView = [[SplitViewController alloc]init];
self.window.rootViewController = spView;
[self.window makeKeyAndVisible];
return YES;
}
```

`UISplitViewController` viewcontroller rootviewcontroller .

SplitViewController.h

```
#import <UIKit/UIKit.h>
#import "MasterViewController.h"
#import "DetailViewController.h"
@interface ViewController : UISplitViewController
{
DetailViewController *detailVC;
MasterViewController *masterVC;
NSMutableArray *array;
}
@end
```

`MasterViewController` `UISplitViewCOntroller` `DetailViewController` .

SplitViewController.m

```
#import "ViewController.h"
#define ANIMATION_LENGTH 0.3
@interface ViewController ()
@end
```

```
@implementation ViewController
- (void)viewDidLoad
{
[super viewDidLoad];
masterVC = [[MasterViewController alloc]init];
detailVC = [[DetailViewController alloc]init];
[masterVC setDetailDelegate:(id)detailVC];
NSArray *vcArray = [NSArray arrayWithObjects:masterVC, detailVC, nil];
self.preferredDisplayMode = UISplitViewControllerDisplayModeAutomatic;
self.viewControllers = vcArray;
self.delegate = (id)self;
self.presentsWithGesture = YES;
}
```

ViewController `UISplitViewController` `self.viewControllers` . `self.preferredDisplayMode` DisplayMode `DetailViewController` Apple Documentation . `self.presentsWithGesture` `self.presentsWithGesture` `MasterViewcontroller`

MasterViewController.h

```
#import <UIKit/UIKit.h>

@protocol DetailViewDelegate <NSObject>
@required
- (void)sendSelectedNavController:(UIViewController *)viewController;
@end

@interface MasterViewController : UIViewController
{
    UITableView *mainTableView;
    NSMutableArray *viewControllerArray;
}
@property (nonatomic, retain) id<DetailViewDelegate> detailDelegate;
@end
```

`DetailViewDelegate` `sendSelectedNavController:(UIViewController *)viewController` `UIViewController` `DetailViewcontroller` . `MasterViewController` mainTableView tableview. viewControllerArray `DetailViewController` `UIViewControllers` .

MasterViewController.m

```
#import "MasterViewController.h"

@implementation MasterViewController
@synthesize detailDelegate;

-(void)viewDidLoad
{
[super viewDidLoad];

UIViewController *dashBoardVC = [[UIViewController alloc]init];
[dashBoardVC.view setBackgroundColor:[UIColor redColor]];
UIViewController *inventVC = [[UIViewController alloc]init];
[inventVC.view setBackgroundColor:[UIColor whiteColor]];
UIViewController *alarmVC = [[UIViewController alloc]init];
[alarmVC.view setBackgroundColor: [UIColor purpleColor]];
```

```
UIViewController *scanDeviceVC = [[UIViewController alloc]init];
[scanDeviceVC.view setBackgroundColor:[UIColor cyanColor]];
UIViewController *serverDetailVC = [[UIViewController alloc]init];
[serverDetailVC.view setBackgroundColor: [UIColor whiteColor]];
viewControllerArray = [[NSMutableArray
alloc]initWithObjects:dashBoardVC,inventVC,alarmVC,scanDeviceVC,serverDetailVC,nil];
mainTableView = [[UITableView alloc]initWithFrame:CGRectMake(0, 50,self.view.frame.size.width,
self.view.frame.size.height-50) style:UITableViewStylePlain];
[mainTableView setDelegate:(id)self];
[mainTableView setDataSource:(id)self];
[mainTableView setSeparatorStyle:UITableViewCellSeparatorStyleNone];
[mainTableView setScrollsToTop:NO];
[self.view addSubview:mainTableView];
}

- (CGFloat)tableView:(UITableView *)tableView
heightForRowAtIndexPath:(NSIndexPath *)indexPath
{
    return 100;
}
- (NSInteger)tableView:(UITableView *)tableView numberOfRowsInSection:    (NSInteger)section
{
    return [viewControllerArray count];
}

- (NSInteger)numberOfSectionsInTableView:(UITableView *)tableView
{
    return 1;    //count of section
}

- (UITableViewCell *)tableView:(UITableView *)tableView
     cellForRowAtIndexPath:(NSIndexPath *)indexPath
{
    NSString *cellId = [NSString
stringWithFormat:@"Cell%li%ld",(long)indexPath.section,(long)indexPath.row];
UITableViewCell *cell =[tableView   dequeueReusableCellWithIdentifier:cellId];

if (cell == nil)
{
   cell = [[UITableViewCell alloc]initWithStyle:UITableViewCellStyleDefault
reuseIdentifier:cellId];
}
[cell.contentView setBackgroundColor:[UIColor redColor]];
cell.textLabel.text =[NSString stringWithFormat:@"My VC at index %ld",(long)indexPath.row];
return cell;
}

- (void)tableView:(UITableView *)tableView
didSelectRowAtIndexPath:(NSIndexPath *)indexPath
{
    [detailDelegate sendSelectedNavController:[viewControllerArray
objectAtIndex:indexPath.row]];
}

@end
```

UIViewControllers . didSelectRowAtIndexPath UIViewController DetailViewController detailDelegate UIViewController

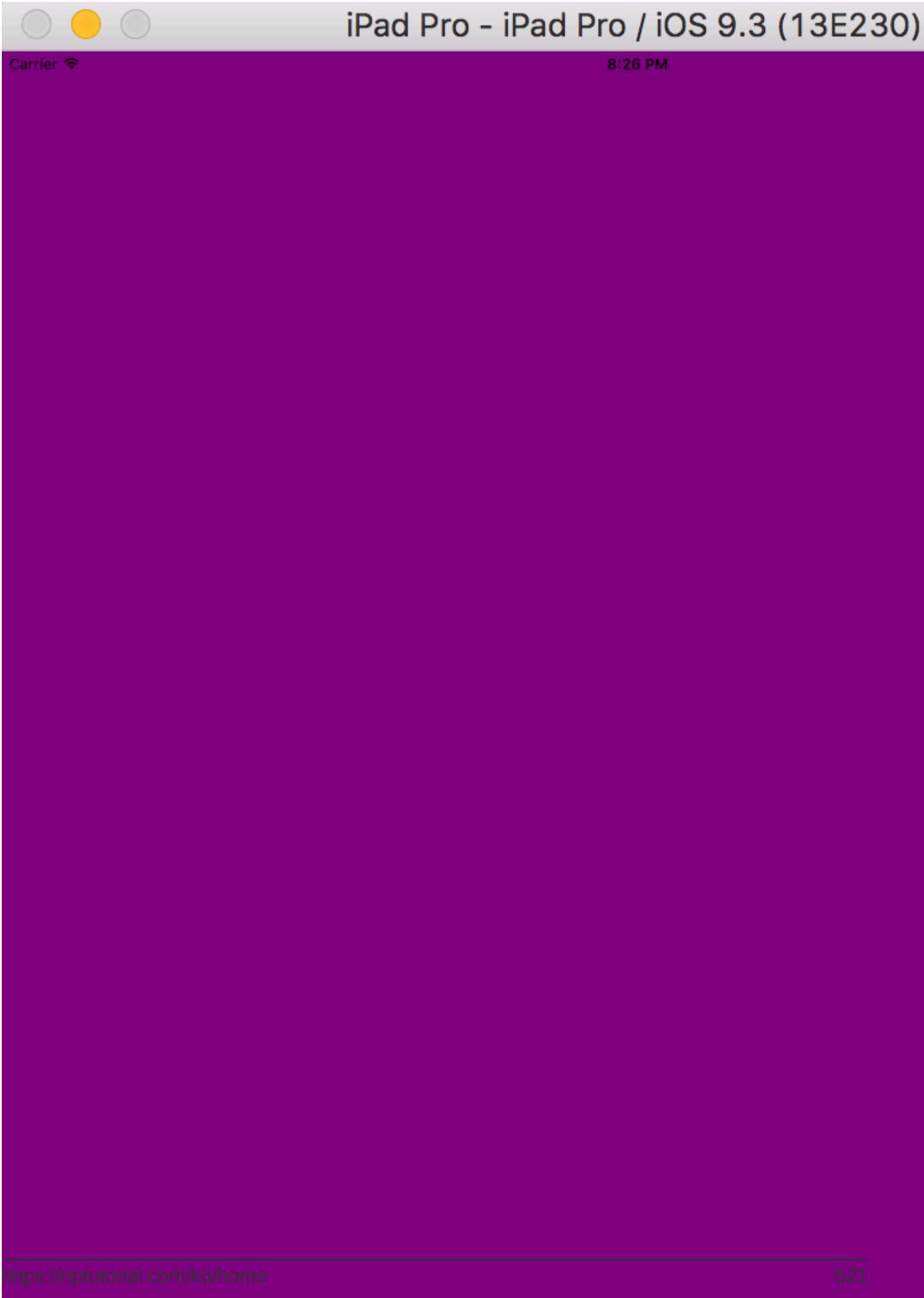
DetailViewController.h

```
#import <UIKit/UIKit.h>

@interface DetailViewController : UIViewController<UICollectionViewDelegate>
{
    UIViewController *tempNav;
}
@end
```

DetailViewController.m

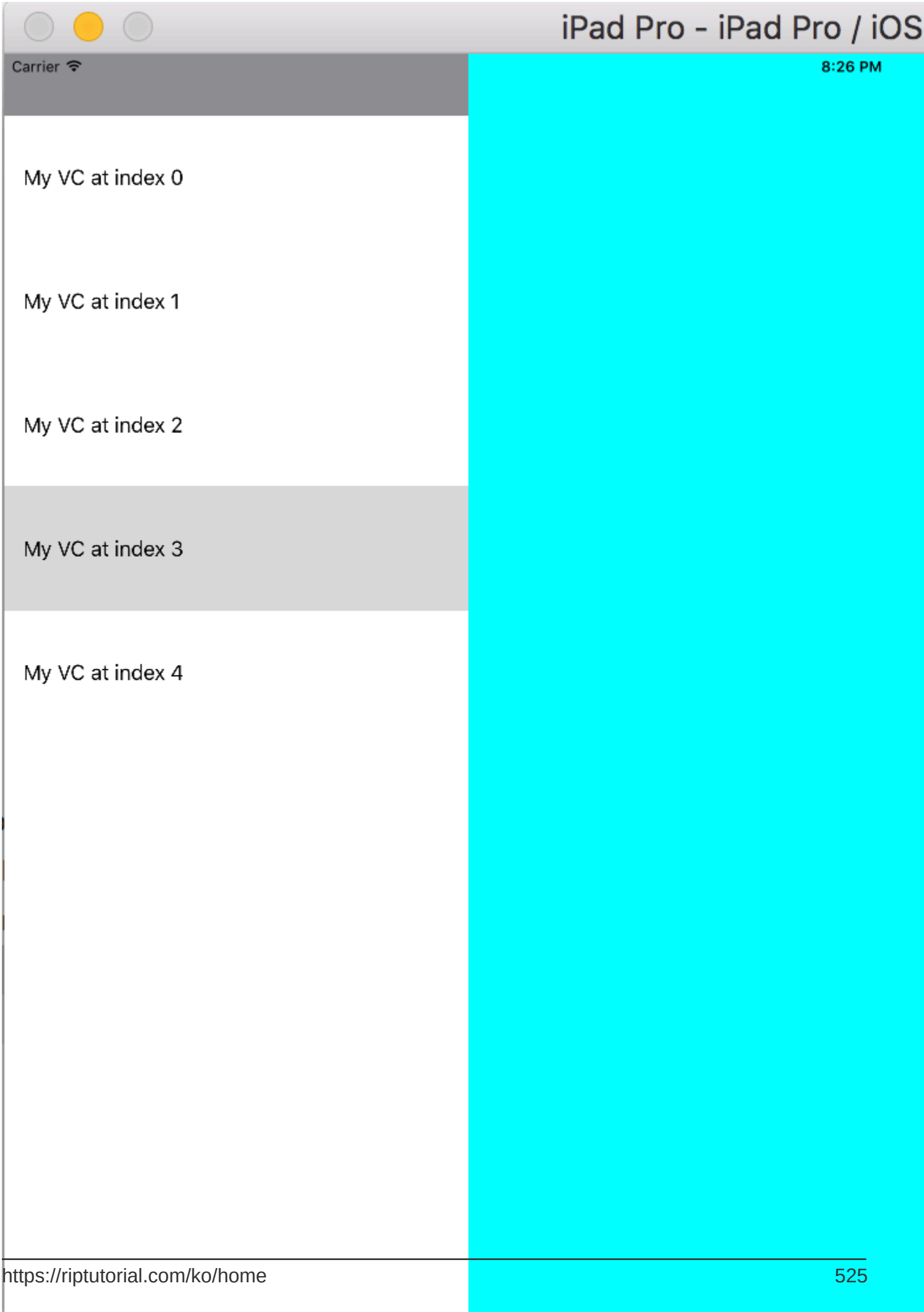
```
#import "DetailViewController.h"

@implementation DetailViewController
-(void)viewDidLoad
{
    [super viewDidLoad];
    [self.view setBackgroundColor:[UIColor whiteColor]];
}
-(void)sendSelectedNavController:(UIViewController *)navController
{
    NSArray *viewsToRemove = [self.view subviews];
    for (UIView *v in viewsToRemove) {
        [v removeFromSuperview];
    }
    tempNav = navController;
    [self.view addSubview:tempNav.view];
}
@end
```

sendSelectedNavController DetailViewController UIViewController MasterViewController


iPad Pro - iPad Pro / iOS 9.3 (13E230)
Carrier
8:26 PM

Landscape `MasterViewController` `DetailViewController` `DetailViewController`


iPad Pro - iPad Pro / iOS 9.3 (13E230)
Carrier
8:26 PM
My VC at index 0
My VC at index 1
My VC at index 2
My VC at index 3
My VC at index 4


iPad Pro - iPad Pro / iOS
Carrier
8:26 PM
My VC at index 0
My VC at index 1
My VC at index 2
My VC at index 3
My VC at index 4

115: UISplitViewController

iOS 8 iOS `UISplitViewController` . iOS iPad . `UISplitViewController` `UITabViewController` , `UINavigationController` . `UIViewControllers` `masterViewController` (PrimaryViewController) `detailViewController` (SecondaryViewController)) . `UIViewControllers` `NSArray` Apple `UISplitViewController` rootviewcontroller . `UIViewControllers` `NSNotificationCenter` .

Examples

C

`UISplitViewController` .

AppDelegate.m

```
- (BOOL)application:(UIApplication *)application didFinishLaunchingWithOptions:(NSDictionary
*)launchOptions
{
self.window = [[UIWindow alloc] initWithFrame:[[UIScreen mainScreen] bounds]]
self.window.backgroundColor = [UIColor blackColor];
[self.window makeKeyAndVisible];
self.window.clipsToBounds = YES;
SplitViewController *spView = [[SplitViewController alloc]init];
self.window.rootViewController = spView;
[self.window makeKeyAndVisible];
return YES;
}
```

`UISplitVIewController` rootViewController .

SplitViewController.h

```
#import <UIKit/UIKit.h>
#import "MasterViewController.h"
#import "DetailViewController.h"
@interface ViewController : UISplitViewController
{
DetailViewController *detailVC;
MasterViewController *masterVC;
NSMutableArray *array;
}
@end
```

`MasterViewController` `UIViewController` `maximumPrimaryColumnWidth` `UISplitViewController` `DetailViewController` .

SplitViewController.m

```
#import "ViewController.h"
#define ANIMATION_LENGTH 0.3
@interface ViewController ()
```

```
@end

@implementation ViewController
- (void)viewDidLoad
{
[super viewDidLoad];
masterVC = [[MasterViewController alloc]init];
detailVC = [[DetailViewController alloc]init];
[masterVC setDetailDelegate:(id)detailVC];
NSArray *vcArray = [NSArray arrayWithObjects:masterVC, detailVC, nil];
self.preferredDisplayMode = UISplitViewControllerDisplayModeAutomatic;
self.viewControllers = vcArray;
self.delegate = (id)self;
self.presentsWithGesture = YES;
}
```

UIViewController self.viewControllers NSArray . self.preferredDisplayMode MasterViewController DetailViewController . self.presentsWithGesture self.presentsWithGesture MasterViewController

MasterViewController.h

```
#import <UIKit/UIKit.h>

@protocol DetailViewDelegate <NSObject>
@required
- (void)sendSelectedNavController:(UIViewController *)viewController;
@end

@interface MasterViewController : UIViewController
{
    UITableView *mainTableView;
    NSMutableArray *viewControllerArray;
}
@property (nonatomic, retain) id<DetailViewDelegate> detailDelegate;
@end
```

DetailViewDelegate sendSelectedNavController UIViewControllers DetailViewController . MasterViewController UITableView . ViewControllerArray DetailViewController UIViewControllers .

MasterViewController.m

```
#import "MasterViewController.h"

@implementation MasterViewController
@synthesize detailDelegate;

-(void)viewDidLoad
{
[super viewDidLoad];

UIViewController *dashBoardVC = [[UIViewController alloc]init];
[dashBoardVC.view setBackgroundColor:[UIColor redColor]];
UIViewController *inventVC = [[UIViewController alloc]init];
[inventVC.view setBackgroundColor:[UIColor whiteColor]];
UIViewController *alarmVC = [[UIViewController alloc]init];
[alarmVC.view setBackgroundColor: [UIColor purpleColor]];
```

```
UIViewController *scanDeviceVC = [[UIViewController alloc]init];
[scanDeviceVC.view setBackgroundColor:[UIColor cyanColor]];
UIViewController *serverDetailVC = [[UIViewController alloc]init];
[serverDetailVC.view setBackgroundColor: [UIColor whiteColor]];
viewControllerArray = [[NSMutableArray
alloc]initWithObjects:dashBoardVC,inventVC,alarmVC,scanDeviceVC,serverDetailVC,nil];
mainTableView = [[UITableView alloc]initWithFrame:CGRectMake(0, 50,self.view.frame.size.width,
self.view.frame.size.height-50) style:UITableViewStylePlain];
[mainTableView setDelegate:(id)self];
[mainTableView setDataSource:(id)self];
[mainTableView setSeparatorStyle:UITableViewCellSeparatorStyleNone];
[mainTableView setScrollsToTop:NO];
[self.view addSubview:mainTableView];
}

- (CGFloat)tableView:(UITableView *)tableView
heightForRowAtIndexPath:(NSIndexPath *)indexPath
{
    return 100;
}
- (NSInteger)tableView:(UITableView *)tableView numberOfRowsInSection:    (NSInteger)section
{
    return [viewControllerArray count];
}

- (NSInteger)numberOfSectionsInTableView:(UITableView *)tableView
{
    return 1;    //count of section
}

- (UITableViewCell *)tableView:(UITableView *)tableView
     cellForRowAtIndexPath:(NSIndexPath *)indexPath
{
    NSString *cellId = [NSString
stringWithFormat:@"Cell%li%ld",(long)indexPath.section,(long)indexPath.row];
UITableViewCell *cell =[tableView   dequeueReusableCellWithIdentifier:cellId];

if (cell == nil)
{
   cell = [[UITableViewCell alloc]initWithStyle:UITableViewCellStyleDefault
reuseIdentifier:cellId];
}
[cell.contentView setBackgroundColor:[UIColor redColor]];
cell.textLabel.text =[NSString stringWithFormat:@"My VC at index %ld",(long)indexPath.row];
return cell;
}

- (void)tableView:(UITableView *)tableView
didSelectRowAtIndexPath:(NSIndexPath *)indexPath
{
    [detailDelegate sendSelectedNavController:[viewControllerArray
objectAtIndex:indexPath.row]];
}

@end
```

UIViewController NSMutableArray . UITableView didselectrowatindexpath | UIViewController DetailViewController detailDelegate UIViewController NSMutableArray

DetailViewController.h

```
#import <UIKit/UIKit.h>

@interface DetailViewController : UIViewController<UICollectionViewDelegate>
{
    UIViewController *tempNav;
}
@end
```

DetailViewController.m

```
#import "DetailViewController.h"

@implementation DetailViewController
-(void)viewDidLoad
{
    [super viewDidLoad];
    [self.view setBackgroundColor:[UIColor whiteColor]];
}
-(void)sendSelectedNavController:(UIViewController *)navController
{
    NSArray *viewsToRemove = [self.view subviews];
    for (UIView *v in viewsToRemove) {
        [v removeFromSuperview];
    }
    tempNav = navController;
    [self.view addSubview:tempNav.view];
}
@end
```

`sendSelectedNavController` `UIView` 'S `DetailViewController` `UIViewController` `MasterViewController` .

UISplitViewController : https://riptutorial.com/ko/ios/topic/4844/uisplitviewcontroller

116: UIStackView

Examples

3

```
let stackView = UIStackView()
stackView.axis = .horizontal
stackView.alignment = .fill // .leading .firstBaseline .center .trailing .lastBaseline
stackView.distribution = .fill // .fillEqually .fillProportionally .equalSpacing
.equalCentering

let label = UILabel()
label.text = "Text"
stackView.addArrangedSubview(label)
// for horizontal stack view, you might want to add width constraint to label or whatever view
you're adding.
```

```
let stackView = UIStackView()
stackView.axis = .Horizontal
stackView.alignment = .Fill // .Leading .FirstBaseline .Center .Trailing .LastBaseline
stackView.distribution = .Fill // .FillEqually .FillProportionally .EqualSpacing
.EqualCentering

let label = UILabel(frame: CGRectZero)
label.text = "Label"
stackView.addArrangedSubview(label)
// for horizontal stack view, you might want to add width constraint to label or whatever view
you're adding.
```

-C

```
UIStackView *stackView = [[UIStackView alloc] init];
stackView.axis = UILayoutConstraintAxisHorizontal;
stackView.alignment = UIStackViewAlignmentFill; //UIStackViewAlignmentLeading,
UIStackViewAlignmentFirstBaseline, UIStackViewAlignmentCenter, UIStackViewAlignmentTrailing,
UIStackViewAlignmentLastBaseline
stackView.distribution = UIStackViewDistributionFill; //UIStackViewDistributionFillEqually,
UIStackViewDistributionFillProportionally, UIStackViewDistributionEqualSpacing,
UIStackViewDistributionEqualCentering

UILabel *label = [[UILabel alloc] initWithFrame:CGRectZero];
label.text = @"Label";
[stackView addArrangedSubview:label];
//For horizontal stack view, you might want to add a width constraint to your label or
whatever view you are adding.
```

```
let stackView = UIStackView()
stackView.axis = .Vertical
stackView.alignment = .Fill // .Leading .FirstBaseline .Center .Trailing .LastBaseline
stackView.distribution = .Fill // .FillEqually .FillProportionally .EqualSpacing
.EqualCentering

let label = UILabel(frame: CGRectZero)
```

```
label.text = "Label"
stackView.addArrangedSubview(label)
// for vertical stack view, you might want to add height constraint to label or whatever view
you're adding.
```

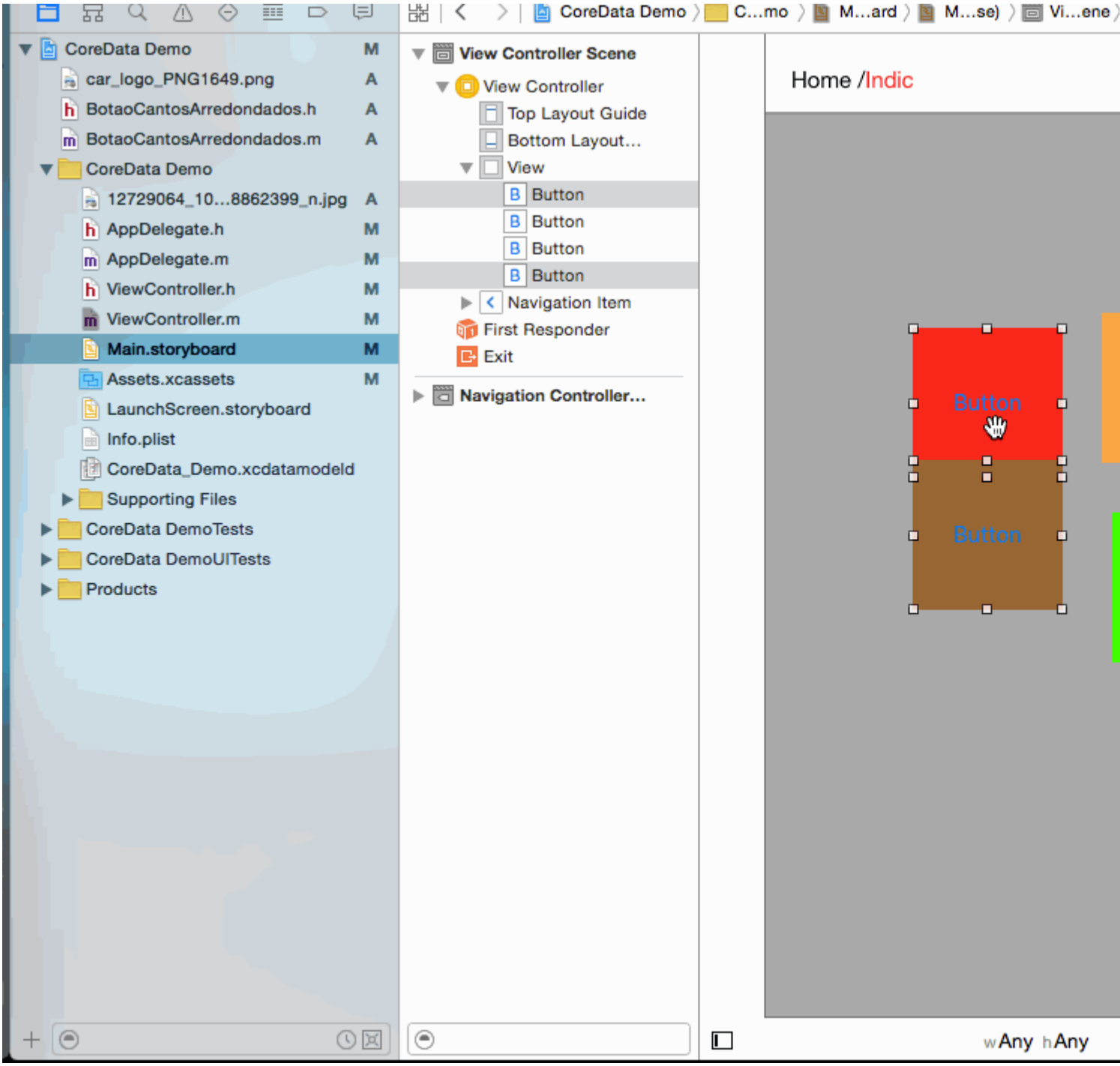
-C

```
UIStackView *stackView = [[UIStackView alloc] init];
stackView.axis = UILayoutConstraintAxisVertical;
stackView.alignment = UIStackViewAlignmentFill; //UIStackViewAlignmentLeading,
UIStackViewAlignmentFirstBaseline, UIStackViewAlignmentCenter, UIStackViewAlignmentTrailing,
UIStackViewAlignmentLastBaseline
stackView.distribution = UIStackViewDistributionFill; //UIStackViewDistributionFillEqually,
UIStackViewDistributionFillProportionally, UIStackViewDistributionEqualSpacing,
UIStackViewDistributionEqualCentering

UILabel *label = [[UILabel alloc] initWithFrame:CGRectZero];
label.text = @"Label";
[stackView addArrangedSubview:label];
//For vertical stack view, you might want to add a height constraint to your label or whatever
view you are adding.
```

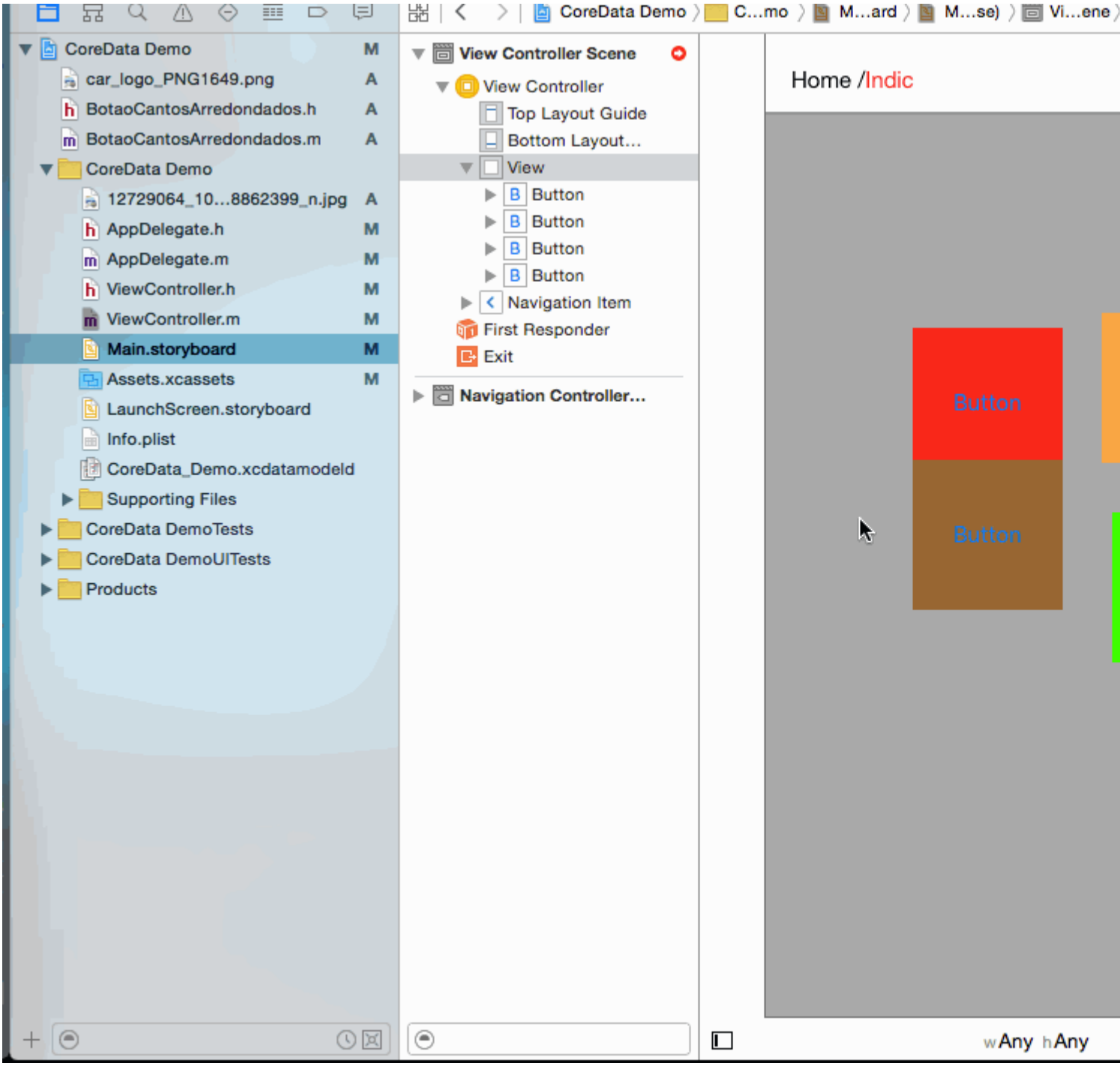
UIStackview

1 : - 4 . 1, 2, 3, 4

2 : - .

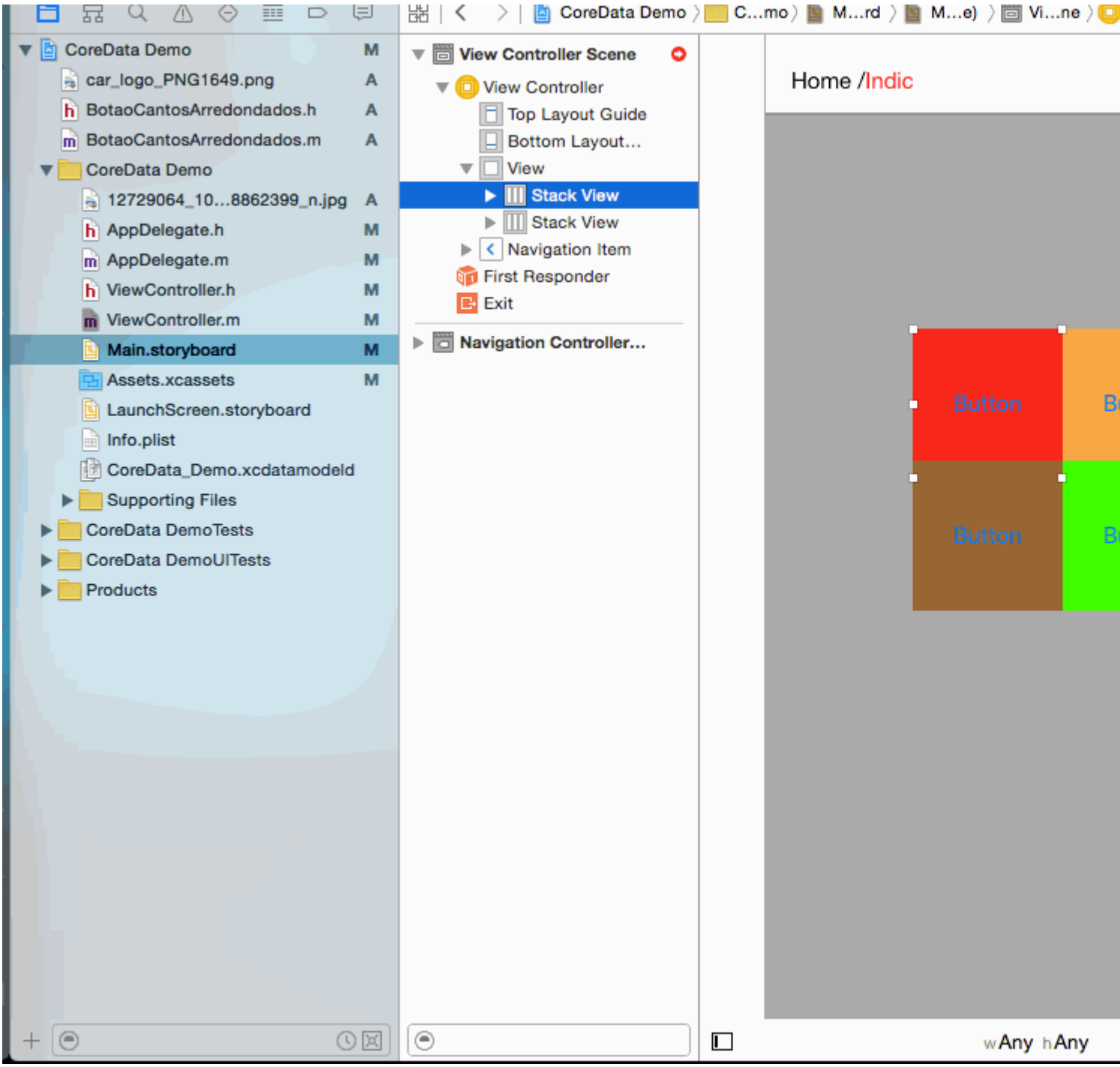

CoreData Demo
car_logo_PNG1649.png
BotaoCantosArredondados.h
BotaoCantosArredondados.m
CoreData Demo
12729064_10...8862399_n.jpg
AppDelegate.h
AppDelegate.m
ViewController.h
ViewController.m
Main.storyboard
Assets.xcassets
LaunchScreen.storyboard
Info.plist
CoreData_Demo.xcdatamodeld
Supporting Files
CoreData DemoTests
CoreData DemoUITests
Products
View Controller Scene
View Controller
Top Layout Guide
Bottom Layout...
View
Button
Button
Button
Button
Navigation Item
First Responder
Exit
Navigation Controller...
Home /Indic
Button
Button
wAny hAny

3 : 2 2 - 2 .

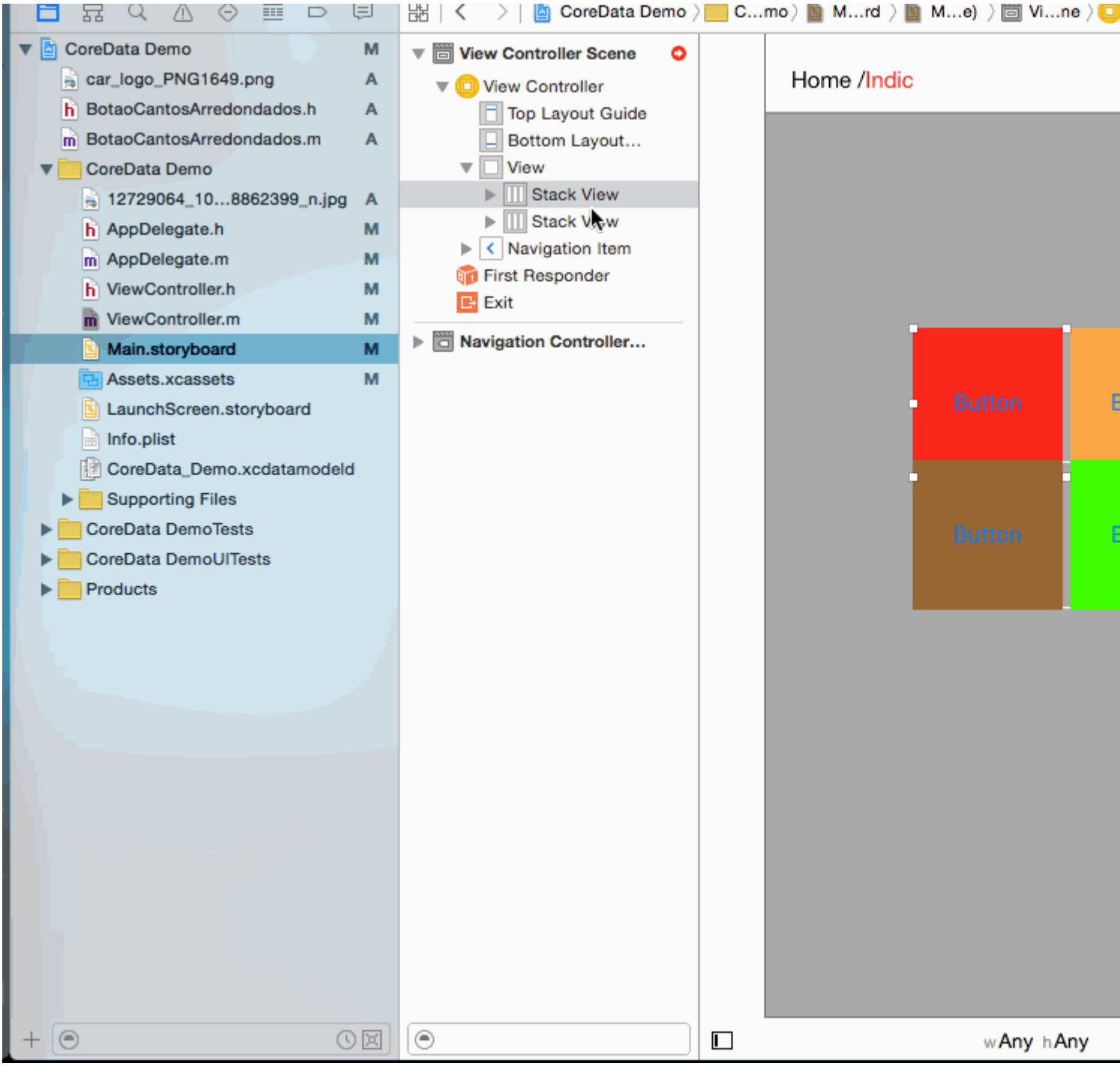


4 : - UIStackview .

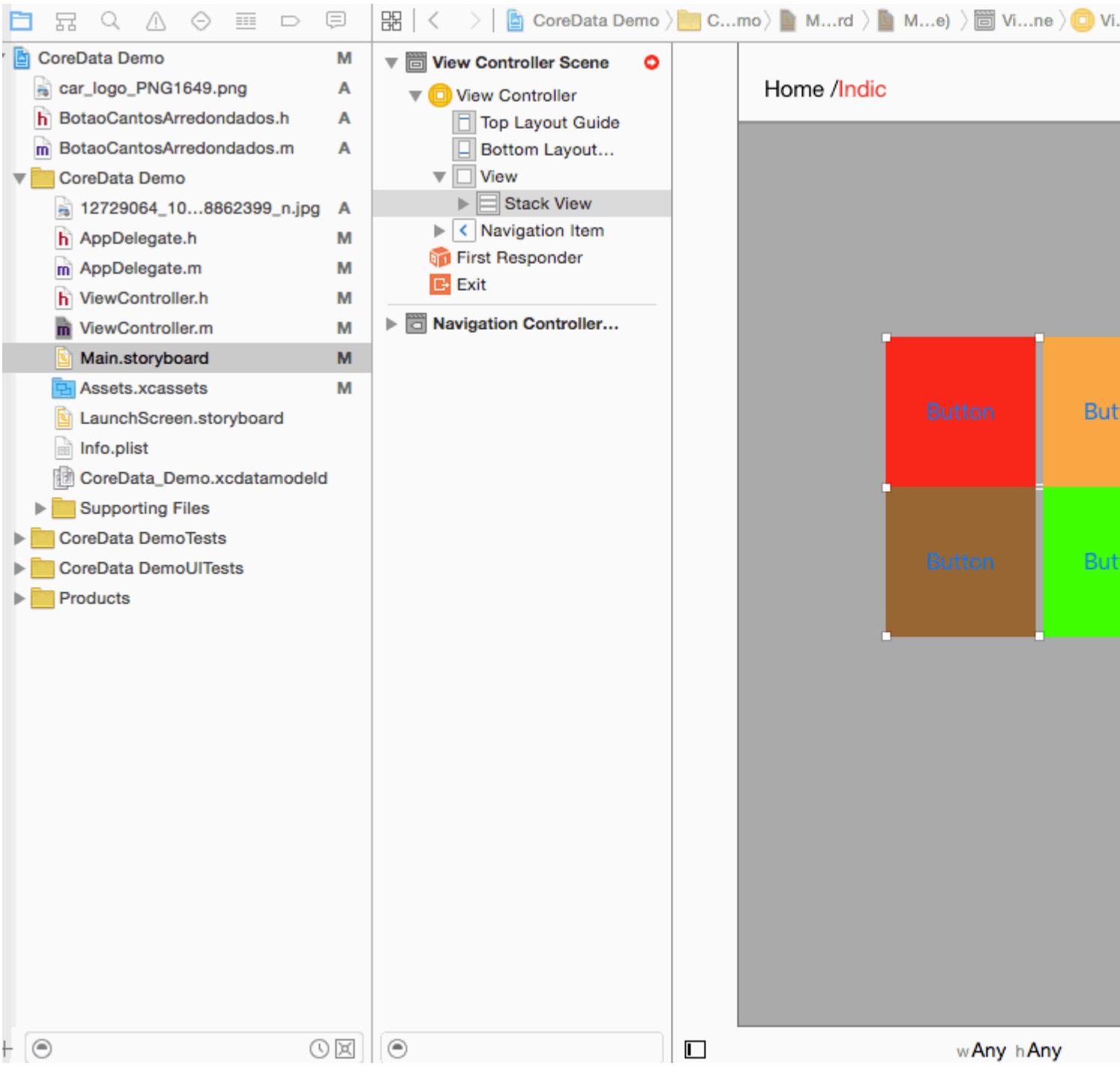
```
    Distribution -> Fill Equally
         Spacing -> 5 (as per your requirement)
```



5 : - Stackview Stackview

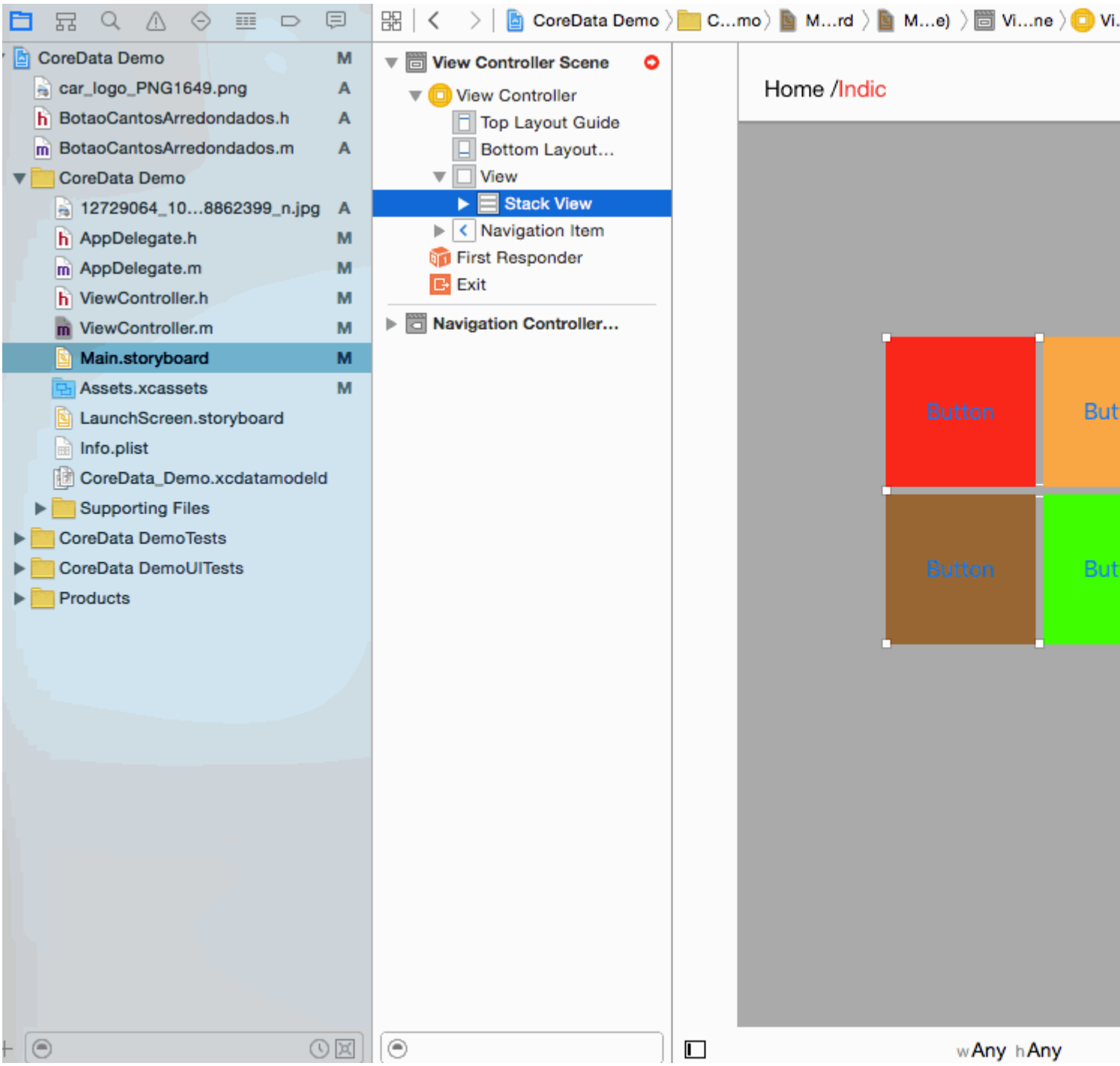


6 : - `Distribution = Fill equally Spacing =5 Distribution = Fill equally Spacing =5 Distribution = Fill equally Spacing =5` **( )**

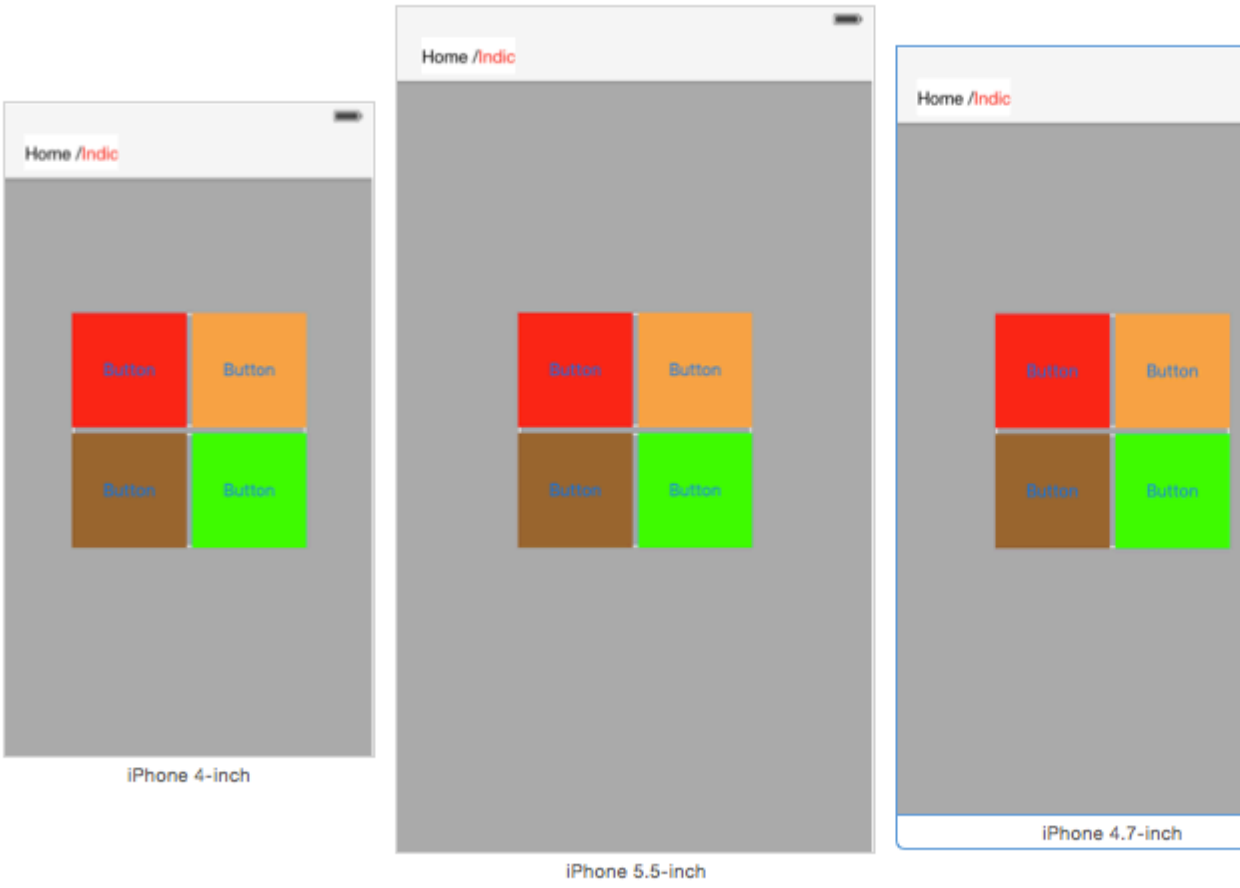


7 : Constrain main stackview .

```
    center Horizontally in container

    center vertically in container

      and select Update Frame.
```


CoreData Demo
CoreData Demo M
car_logo_PNG1649.png A
BotaoCantosArredondados.h A
BotaoCantosArredondados.m A
CoreData Demo
12729064_10...8862399_n.jpg A
AppDelegate.h M
AppDelegate.m M
ViewController.h M
ViewController.m M
Main.storyboard M
Assets.xcassets M
LaunchScreen.storyboard
Info.plist
CoreData_Demo.xcdatamodeld
Supporting Files
CoreData DemoTests
CoreData DemoUITests
Products
View Controller Scene
View Controller
Top Layout Guide
Bottom Layout...
View
Stack View
Navigation Item
First Responder
Exit
Navigation Controller...
Home /Indic
Button
Button
wAny hAny

8 : - .



UIStackView : https://riptutorial.com/ko/ios/topic/1390/uistackview

117: UIStackView

Examples

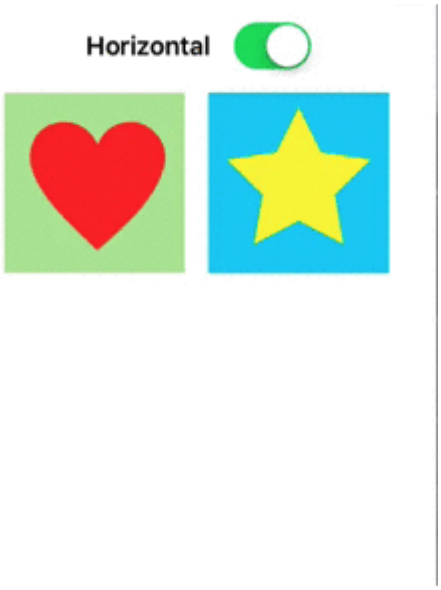
UISwitch .

```
@IBAction func axisChange(sender: UISwitch) {
    UIView.animateWithDuration(1.0) {
        self.updateConstraintsForAxis()
    }
}
```

updateConstraintForAxis .

```
private func updateConstraintsForAxis() {
    if (axisSwitch.on) {
        stackView.axis = .Horizontal
    } else {
        stackView.axis = .Vertical
    }
}
```

GIF .



UIStackView : https://riptutorial.com/ko/ios/topic/5884/uistackview--

118: UIStoryboard

UIStoryboard Interface Builder . .

Examples

UIStoryboard

:

UIStoryboard .

```
    let storyboard = UIStoryboard(name: "Main", bundle: nil)
```

:

- **name** =>
- **bundle** => . nil .

UIViewController .

```
   let viewController = storyboard.instantiateViewController(withIdentifier: "yourIdentifier")
```

-C :

Objective-C **UIStoryboard** .

```
 UIStoryboard *storyboard = [UIStoryboard storyboardWithName:@"MainStoryboard" bundle:nil];
```

UIViewController :

```
MyViewController *myViewController = [storyboard
instantiateViewControllerWithIdentifier:@"MyViewControllerIdentifier"];
```

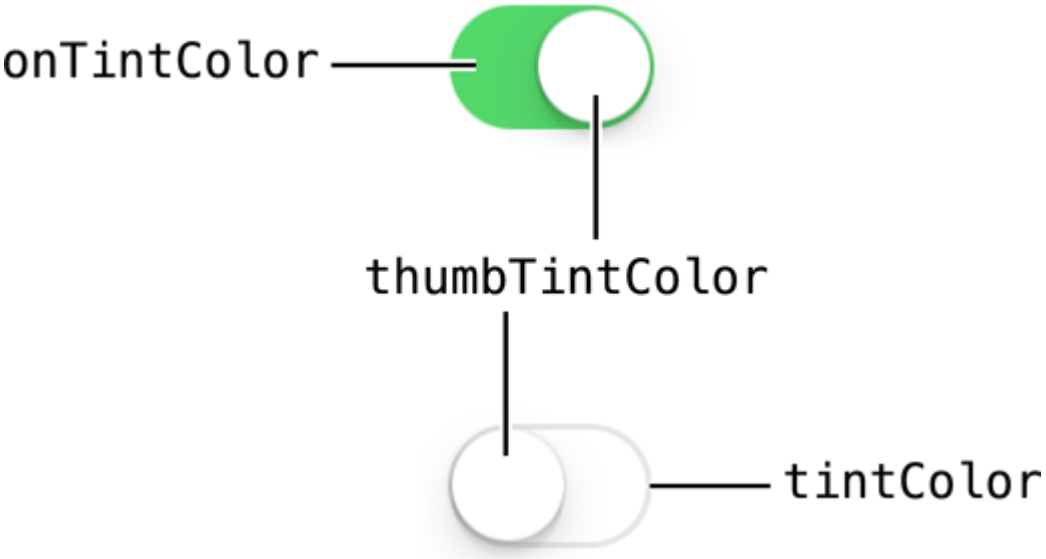
```
let storyboard = UIStoryboard(name: "StoryboardName", bundle: nil)
let vc = storyboard.instantiateViewController(withIdentifier: "ViewControllerID") as
YourViewController
self.present(vc, animated: true, completion: nil)
```

UIStoryboard : https://riptutorial.com/ko/ios/topic/8795/uistoryboard

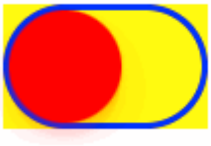
119: UISwitch

- (instancetype) initWithFrame : (CGRect) ;
- (void) setOn : (BOOL) on animated : (BOOL) animated;
- (nullable instancetype) initWithCoder : (NSCoder *) aDecoder;

1. UISwitch : Apple



2. : Enoch Huang



Examples

/

-C

```
[mySwitch setOn:YES];
//or
[mySwitch setOn:YES animated:YES];
```

```
mySwitch.setOn(false)
//or
mySwitch.setOn(false, animated: false)
```

-C

```
mySwitch.backgroundColor = [UIColor yellowColor];
[mySwitch setBackgroundColor: [UIColor yellowColor]];
mySwitch.backgroundColor =[UIColor colorWithRed:255/255.0 green:0/255.0 blue:0/255.0
alpha:1.0];
mySwitch.backgroundColor= [UIColor colorWithWhite: 0.5 alpha: 1.0];
mySwitch.backgroundColor=[UIColor colorWithHue: 0.4 saturation: 0.3 brightness:0.7 alpha:
1.0];
```

```
mySwitch.backgroundColor = UIColor.yellow
mySwitch.backgroundColor = UIColor(red: 255.0/255, green: 0.0/255, blue: 0.0/255, alpha: 1.0)
mySwitch.backgroundColor = UIColor(white: 0.5, alpha: 1.0)
mySwitch.backgroundColor = UIColor(hue: 0.4,saturation: 0.3,brightness: 0.7,alpha: 1.0)
```

-C

```
//for off-state
mySwitch.tintColor = [UIColor blueColor];
[mySwitch setTintColor: [UIColor blueColor]];

//for on-state
mySwitch.onTintColor = [UIColor cyanColor];
[mySwitch setOnTintColor: [UIColor cyanColor]];
```

```
//for off-state
mySwitch.tintColor = UIColor.blueColor()

//for on-state
mySwitch.onTintColor = UIColor.cyanColor()
```

/

-C

```
//set off-image
mySwitch.offImage = [UIImage imageNamed:@"off_image"];
[mySwitch setOffImage:[UIImage imageNamed:@"off_image"]];

//set on-image
mySwitch.onImage = [UIImage imageNamed:@"on_image"];
[mySwitch setOnImage:[UIImage imageNamed:@"on_image"]];
```

```
//set off-image
mySwitch.offImage = UIImage(named: "off_image")

//set on-image
mySwitch.onImage = UIImage(named: "on_image")
```

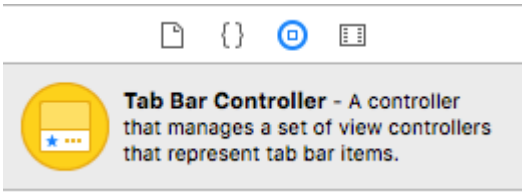
UISwitch : https://riptutorial.com/ko/ios/topic/2182/uiswitch

120: UITabBarController

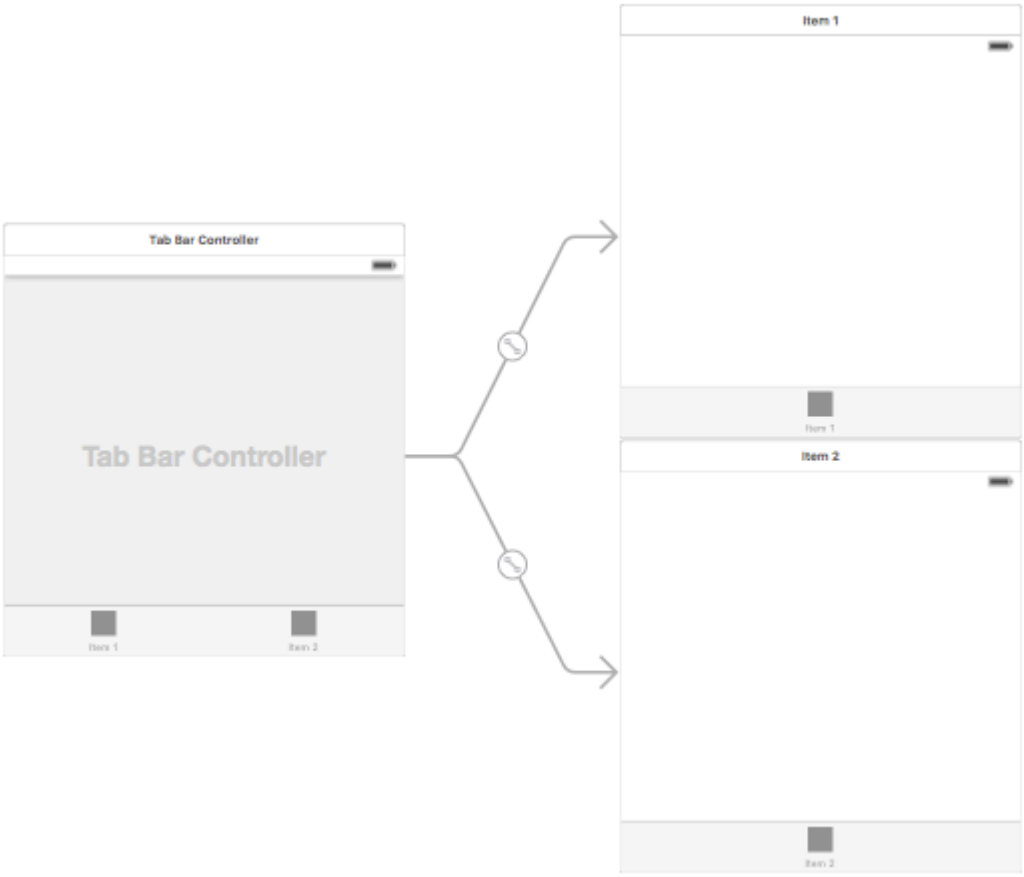
Examples

' ' iOS .

.



. ' ' .



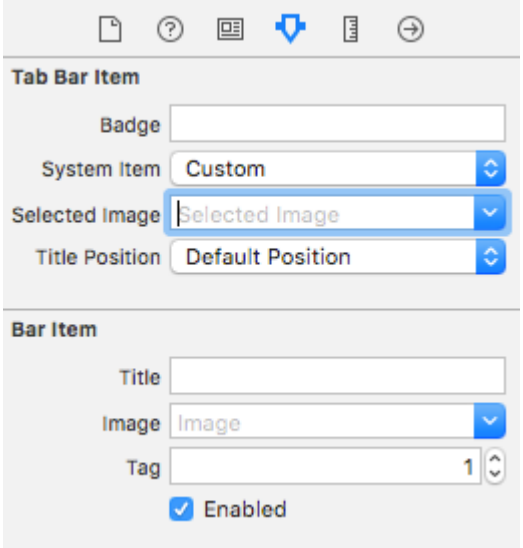
:

.

'System Item' .

' ' ' '.

'selected image' 'image' . 'title' .



:

View Controller `viewDidLoad()` .

-C :

```
self.title = @"item";

self.tabBarItem.image = [UIImage imageNamed:@"item"];
self.tabBarItem.selectedImage = [UIImage imageNamed:@"item_selected"];
```

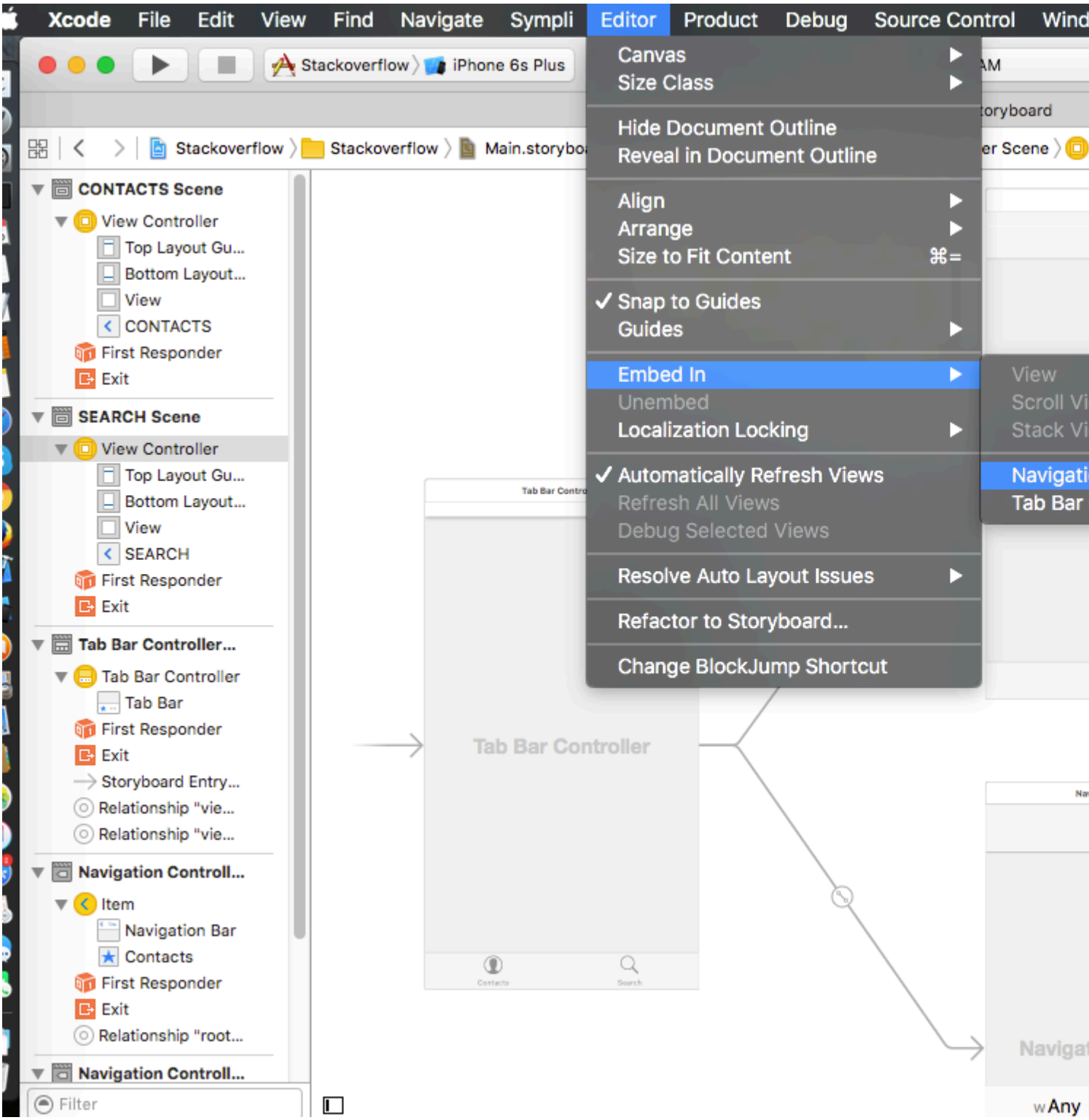
:

```
self.title = "item"
self.tabBarItem.image = UIImage(named: "item")
self.tabBarItem.selectedImage = UIImage(named: "item_selected")
```

TabBar

. .

- . .
- Xcode **Editor Embed In -> Navigation Controller** .

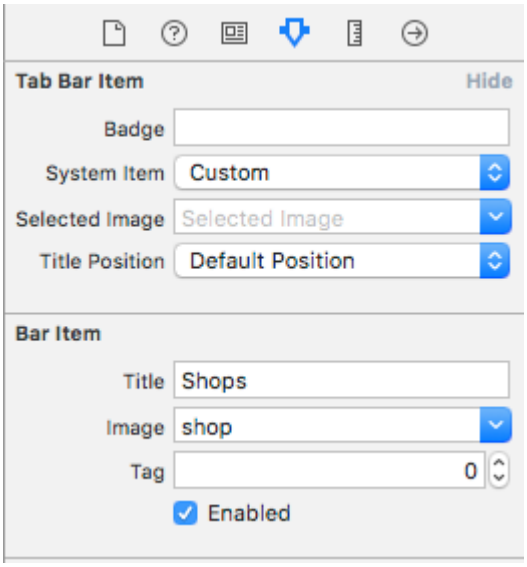



```
[[UITabBar appearance] setTintColor:[UIColor whiteColor]];
[[UITabBar appearance] setBarTintColor:[UIColor tabBarBackgroundColor]];
[[UITabBar appearance] setBackgroundColor:[UIColor tabBarInactiveColor]];
[[UINavigationBar appearance] setBarTintColor:[UIColor appBlueColor]];
[[UINavigationBar appearance] setTintColor:[UIColor whiteColor]];
[[UINavigationBar appearance] setBarStyle:UIBarStyleBlack];
```

UITabBarController

`Swift 3` UITabBarController .

```
import UIKit

class TabbarController: UITabBarController {

    override func viewDidLoad() {
        super.viewDidLoad()

        self.navigationController?.isNavigationBarHidden = true

        UITabBar.appearance().tintColor = UIColor.purple

        // set red as selected background color
        let numberOfItems = CGFloat(tabBar.items!.count)
        let tabBarItemSize = CGSize(width: tabBar.frame.width / numberOfItems, height:
tabBar.frame.height)
        tabBar.selectionIndicatorImage =
UIImage.imageWithColor(UIColor.lightText.withAlphaComponent(0.5), size:
tabBarItemSize).resizableImage(withCapInsets: UIEdgeInsets.zero)

        // remove default border
        tabBar.frame.size.width = self.view.frame.width + 4
        tabBar.frame.origin.x = -2

    }

    override func viewWillAppear(_ animated: Bool) {
        // For Images
        let firstViewController:UIViewController = NotificationVC()
        // The following statement is what you need
        let customTabBarItem:UITabBarItem = UITabBarItem(title: nil, image: UIImage(named:
"notification@2x")?.withRenderingMode(UIImageRenderingMode.alwaysOriginal), selectedImage:
UIImage(named: "notification_sel@2x"))
        firstViewController.tabBarItem = customTabBarItem

        for item in self.tabBar.items! {
            let unselectedItem = [NSForegroundColorAttributeName: UIColor.white]
            let selectedItem = [NSForegroundColorAttributeName: UIColor.purple]

            item.setTitleTextAttributes(unselectedItem, for: .normal)
            item.setTitleTextAttributes(selectedItem, for: .selected)
        }
    }

}


extension UIImage {
    class func imageWithColor(_ color: UIColor, size: CGSize) -> UIImage {
        let rect: CGRect = CGRect(origin: CGPoint(x: 0,y :0), size: CGSize(width: size.width,
height: size.height))
        UIGraphicsBeginImageContextWithOptions(size, false, 0)
        color.setFill()
        UIRectFill(rect)
        let image: UIImage = UIGraphicsGetImageFromCurrentImageContext()!
        UIGraphicsEndImageContext()
        return image
    }

}
```


Tab Bar Item
Hide
Badge
System Item
Custom
Selected Image
Selected Image
Title Position
Default Position
Bar Item
Title
Shops
Image
shop
Tag
0
Enabled


Notifications
Shops
Favorites
My Account

Storyboard Tab Bar

```
class AppDelegate: UIResponder, UIApplicationDelegate {

    var window: UIWindow?

    var firstTabNavigationController : UINavigationController!
    var secondTabNavigationControoller : UINavigationController!
    var thirdTabNavigationController : UINavigationController!
    var fourthTabNavigationControoller : UINavigationController!
    var fifthTabNavigationController : UINavigationController!



    func application(_ application: UIApplication, didFinishLaunchingWithOptions
launchOptions: [UIApplicationLaunchOptionsKey: Any]?) -> Bool {
        // Override point for customization after application launch.
        Fabric.with([Crashlytics.self])

       window = UIWindow(frame: UIScreen.main.bounds)


        window?.backgroundColor = UIColor.black


        let tabBarController = UITabBarController()

        firstTabNavigationController = UINavigationController.init(rootViewController:
FirstViewController())
        secondTabNavigationControoller = UINavigationController.init(rootViewController:
SecondViewController())
        thirdTabNavigationController = UINavigationController.init(rootViewController:
ThirdViewController())
        fourthTabNavigationControoller = UINavigationController.init(rootViewController:
FourthViewController())
        fifthTabNavigationController = UINavigationController.init(rootViewController:
FifthViewController())

        tabBarController.viewControllers = [firstTabNavigationController,
```

```
secondTabNavigationControoller, thirdTabNavigationController, fourthTabNavigationControoller,
fifthTabNavigationController]


        let item1 = UITabBarItem(title: "Home", image: UIImage(named: "ico-home"), tag: 0)
        let item2 = UITabBarItem(title: "Contest", image:  UIImage(named: "ico-contest"), tag:
1)
        let item3 = UITabBarItem(title: "Post a Picture", image:  UIImage(named: "ico-photo"),
tag: 2)
        let item4 = UITabBarItem(title: "Prizes", image:  UIImage(named: "ico-prizes"), tag:
3)
        let item5 = UITabBarItem(title: "Profile", image:  UIImage(named: "ico-profile"), tag:
4)

        firstTabNavigationController.tabBarItem = item1
        secondTabNavigationControoller.tabBarItem = item2
        thirdTabNavigationController.tabBarItem = item3
        fourthTabNavigationControoller.tabBarItem = item4
        fifthTabNavigationController.tabBarItem = item5

        UITabBar.appearance().tintColor = UIColor(red: 0/255.0, green: 146/255.0, blue:
248/255.0, alpha: 1.0)

        self.window?.rootViewController = tabBarController

        window?.makeKeyAndVisible()

        return true
    }
```

UITabBarController : https://riptutorial.com/ko/ios/topic/2763/uitabbarcontroller

121: UITableView

. .

- - (CGFloat) tableView : (UITableView *) tableView heightForRowAtIndexPath : (NSIndexPath *) indexPath;
- - (CGFloat) tableView : (UITableView *) tableView heightForHeaderInSection : (NSInteger) ;
- - (CGFloat) tableView : (UITableView *) tableView heightForFooterInSection : (NSInteger) ;
- - (UIView *) tableView : (UITableView *) tableView viewForHeaderInSection : (NSInteger) ;
- - (UIView *) tableView : (UITableView *) tableView viewForFooterInSection : (NSInteger) ;
- - (UITableViewCellAccessoryType) tableView : (UITableView *) tableView accessoryTypeForRowWithIndexPath : (NSIndexPath *) indexPath
- - (void) tableView : (UITableView *) tableView accessoryButtonTappedForRowWithIndexPath : (NSIndexPath *) indexPath;
- - (NSIndexPath *) tableView : (UITableView *) tableView willSelectRowAtIndexPath : (NSIndexPath *) indexPath;
- - (NSIndexPath *) tableView : (UITableView *) tableView willDeselectRowAtIndexPath : (NSIndexPath *) indexPath
- - (void) tableView : (UITableView *) tableView didSelectRowAtIndexPath : (NSIndexPath *) indexPath;
- - (void) tableView : (UITableView *) tableView didDeselectRowAtIndexPath : (NSIndexPath *) indexPath
- - (UITableViewCellEditingStyle) tableView : (UITableView *) tableView editingStyleForRowAtIndexPath : (NSIndexPath *) indexPath;
- - (NSString *) tableView : (UITableView *) tableView titleForDeleteConfirmationButtonForRowAtIndexPath : (NSIndexPath *) indexPath
- - (BOOL) tableView : (UITableView *) tableView shouldIndentWhileEditingRowAtIndexPath : (NSIndexPath *) indexPath;
- - (void) tableView : (UITableView *) tableView willBeginEditingRowAtIndexPath : (NSIndexPath *) indexPath;
- - (void) tableView : (UITableView *) tableView didEndEditingRowAtIndexPath : (NSIndexPath *) indexPath;
- - (NSIndexPath *) tableView : (UITableView *) tableView

targetIndexPathForMoveFromRowAtIndexPath : (NSIndexPath *) sourceIndexPath toProposedIndexPath : (NSIndexPath *) proposedDestinationIndexPath;

- - (NSInteger) tableView : (UITableView *) tableView indentationLevelForRowAtIndexPath : (NSIndexPath *) indexPath;
- - (NSInteger) tableView : (UITableView *) tableView numberOfRowsInSection : (NSInteger) ;
- - (UITableViewCell *) tableView : (UITableView *) tableView cellForRowAtIndexPath : (NSIndexPath *) indexPath;
- - (NSInteger) numberOfSectionsInTableView : (UITableView *) tableView;
- - (NSString *) tableView : (UITableView *) tableView titleForHeaderInSection : (NSInteger) ; // . (UILabel) .
- - (NSString *) tableView : (UITableView *) tableView titleForFooterInSection : (NSInteger) ;
- - (BOOL) tableView : (UITableView *) tableView canEditRowAtIndexPath : (NSIndexPath *) indexPath;
- - (BOOL) tableView : (UITableView *) tableView canMoveRowAtIndexPath : (NSIndexPath *) indexPath;
- - (NSArray *) sectionIndexTitlesForTableView : (UITableView *) tableView;
- - (NSInteger) tableView : (UITableView *) tableView sectionForSectionIndexTitle : (NSString *) title atIndex : (NSInteger) index;
- - (void) tableView : (UITableView *) tableView commitEditingStyle : (UITableViewCellEditingStyle) editingStyle forRowAtIndexPath : (NSIndexPath *) indexPath;
- - (void) tableView : (UITableView *) tableView moveRowAtIndexPath : (NSIndexPath *) sourceIndexPath toIndexPath : (NSIndexPath *) destinationIndexPath;

`UITableView` `UIScrollView` . `UITableViewDelegate` `UIScrollViewDelegate` . `UITableView` `UIScrollView` .

Examples

iOS 8 Apple . UITableViewCell Autolayout UITableView . . `rowHeight` UITableViewAutomaticDimension.

UITableView `estimatedRowHeight` .

.

- Apple, UITableView

```
self.tableView.estimatedRowHeight = 44.0
```

tableView delegate `heightForRowAtIndexPath` . . .

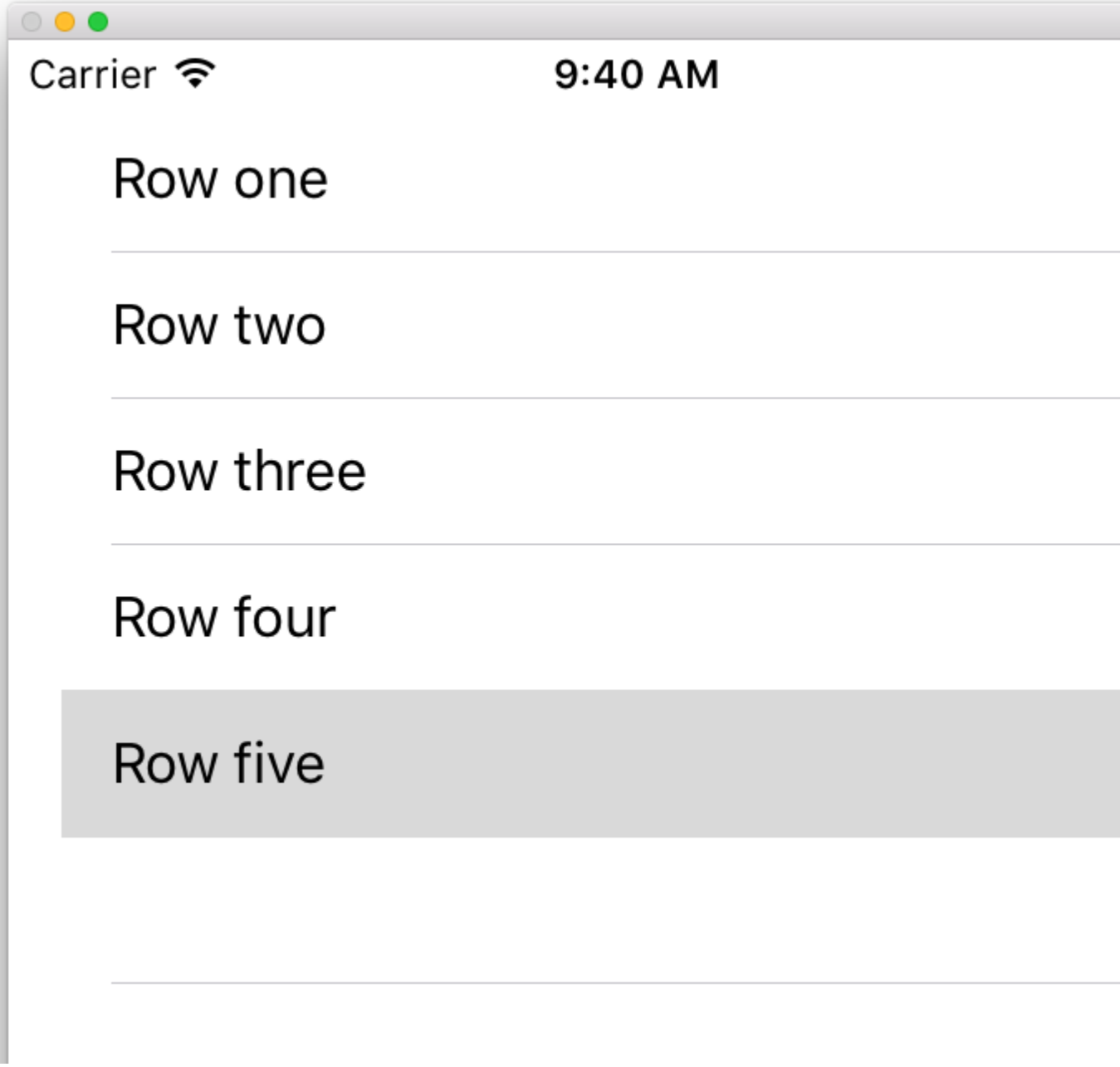
```
override func tableView(tableView: UITableView, heightForRowAtIndexPath indexPath:
NSIndexPath) -> CGFloat {
    switch indexPath.section {
    case 1:
        return 60
    default:
        return UITableViewAutomaticDimension
    }
}
```

-C

```
- (CGFloat)tableView:(UITableView *)tableView heightForRowAtIndexPath:(NSIndexPath *)indexPath
{
  switch (indexPath.section) {
      case 1:
        return 60;
      default:
        return UITableViewAutomaticDimension;
    }
}
```

UITableView

. . .



UITableView

`UITableView` . `UITableView` `UIViewController` . (4).

(: , ,) .

. . .

() .

```
let myDataArray: [String] = ["Row one", "Row two", "Row three", "Row four", "Row five"]
```

-C

```
// You'll need to define this variable as a global variable (like an @property) so that you
can access it later when needed.
NSArray *myDataArray = @[@"Row one", @"Row two", @"Row three", @"Row four", @"Row five"];
```

View Controller

`UITableViewDataSource` .

```
class ViewController: UIViewController, UITableViewDataSource {
```

-C

```
@interface ViewController : UIViewController <UITableViewDataSource>
```

`UITableViewDataSource` ( ) .

- `tableView:numberOfRowsInSection` , .

  ```
  // Swift

  func tableView(tableView: UITableView, numberOfRowsInSection section: Int) -> Int {
       return self.myDataArray.count
  }
  ```

- `tableView:cellForRowAtIndexPath` , `tableView:numberOfRowsInSection` . 10 10 .

  ```
  // Swift

  func tableView(tableView: UITableView, cellForRowAtIndexPath indexPath: NSIndexPath) ->
  UITableViewCell {
       // Create a new cell here. The cellReuseIdentifier needs to match the reuse
  identifier from the cell in your Storyboard
       let cell: UITableViewCell =
  tableView.dequeueReusableCellWithIdentifier(cellReuseIdentifier) as UITableViewCell!

       // Set the label on your cell to the text from your data array
       cell.textLabel?.text = self.myDataArray[indexPath.row]

       return cell
   }
  ```

  : `cellForRowAtIndexPath:` nil . .

  ```
  Uncaught exception 'NSInternalInconsistencyException', reason: 'UITableView
  dataSource must return a cell from tableView:cellForRowAtIndexPath:'
  ```

`dataSource` `self` . "", , `dataSource` (: UIViewController UIView UIViewController).

. . . .

orer `UITableViewDelegate` . . `UITableViewDataSource` . :

```
class ViewController: UIViewController, UITableViewDataSource, UITableViewDelegate {
```

-c

```
@interface ViewController : UIViewController <UITableViewDataSource, UITableViewDelegate>
```

. .

- `tableView:didSelectRowAtIndexPath` , , . Xcode .

```
// Swift

func tableView(tableView: UITableView, didSelectRowAtIndexPath indexPath: NSIndexPath) {
     print("You tapped cell number \(indexPath.row).")
 }

// Objective-C

- (void)tableView:(UITableView *)tableView didSelectRowAtIndexPath:(NSIndexPath
*)indexPath {
     NSLog(@"You tapped cell number %ld.", (long)indexPath.row);
}
```

. .

```
import UIKit
class ViewController: UIViewController, UITableViewDelegate, UITableViewDataSource {

    // Data model: These strings will be the data for the table view cells
    let myDataArray: [String] = ["Row one", "Row two", "Row three", "Row four", "Row five"]

    // cell reuse id (cells that scroll out of view can be reused)
    let cellReuseIdentifier = "cell"

    // don't forget to hook this up from the storyboard
    @IBOutlet var myTableView: UITableView!

    override func viewDidLoad() {
        super.viewDidLoad()

        // Register the table view cell class and its reuse id
        myTableView.registerClass(UITableViewCell.self, forCellReuseIdentifier:
cellReuseIdentifier)

        // This view controller itself will provide the delegate methods and row data for the
table view.
        myTableView.delegate = self
        myTableView.dataSource = self
    }
```

```
    // number of rows in table view
    func tableView(tableView: UITableView, numberOfRowsInSection section: Int) -> Int {
        return self.myDataArray.count
    }

    // create a cell for each table view row
    func tableView(tableView: UITableView, cellForRowAtIndexPath indexPath: NSIndexPath) ->
UITableViewCell {

        // create a new cell if needed or reuse an old one
        let cell:UITableViewCell =
tableView.dequeueReusableCellWithIdentifier(cellReuseIdentifier) as UITableViewCell!

        // set the text from the data model
        cell.textLabel?.text = self.myDataArray[indexPath.row]

        return cell
    }

    // method to run when table view cell is tapped
    func tableView(tableView: UITableView, didSelectRowAtIndexPath indexPath: NSIndexPath) {
        print("You tapped cell number \(indexPath.row).")
    }
}
```

-C

ViewController.h

```
#import <UIKit/UIKit.h>

@interface ViewController: UIViewController <UITableViewDelegate, UITableViewDataSource> {
    IBOutlet UITableView *myTableView;
    NSArray *myDataArray;
}

@end
```

ViewController.m

```
#import "ViewController.h"

// cell reuse id (cells that scroll out of view can be reused)
NSString * _Nonnull cellReuseIdentifier = @"cell";

@implementation ViewController

- (void)viewDidLoad {
    [super viewDidLoad];

    // Data model: These strings will be the data for the table view cells
    myDataArray = @[@"Row one", @"Row two", @"Row three", @"Row four", @"Row five"];

    // Register the table view cell class and its reuse id
    [myTableView registerClass:[UITableViewCell class]
forCellReuseIdentifier:cellReuseIdentifier];

    // This view controller itself will provide the delegate methods and row data for the
```

```
table view.
    myTableView.delegate = self;
    myTableView.dataSource = self;
}

// number of rows in table view
- (NSInteger)tableView:(UITableView *)tableView numberOfRowsInSection:(NSInteger)section {
    return myDataArray.count;
}

// create a cell for each table view row
- (UITableViewCell *)tableView:(UITableView *)tableView cellForRowAtIndexPath:(NSIndexPath
*)indexPath {
    // create a new cell if needed or reuse an old one
    UITableViewCell *cell = [tableView dequeueReusableCellWithIdentifier:cellReuseIdentifier];

    // set the text from the data model
    cell.textLabel.text = myDataArray[indexPath.row];

    return cell;
}

// method to run when table view cell is tapped
- (void)tableView:(UITableView *)tableView didSelectRowAtIndexPath:(NSIndexPath *)indexPath{
    NSLog(@"You tapped cell number %ld.", (long)indexPath.row);
}

@end
```

UITableViewDelegate UITableViewDataSource UITableView .UITableView ,, .

UITableViewDataSource

numberOfRowsInSection: .

-C

```
- (NSInteger)tableView:(UITableView *)tableView numberOfRowsInSection:(NSInteger)section {
    // Return the number of rows for the table view. Usually populated from an array,
    // or can be statically defined.
    return self.myArray.count;
}
```

3

```
func tableView(_ tableView: UITableView, numberOfRowsInSection section: Int) -> Int {
    // Return the number of rows for the table view. Usually populated from an array,
    // or can be statically defined.
    return self.myArray.count
}
```

cellForRowAtIndexPath: UITableView .UITableViewCell .

: dequeueReusableCellWithIdentifier:forIndexPath: UITableView
registerClass:forCellReuseIdentifier:

registerNib:forCellReuseIdentifier: . UIViewController viewDidLoad .

-C

```
- (UITableViewCell *)tableView:(UITableView *)tableView cellForRowAtIndexPath:(NSIndexPath
*)indexPath {
    MyCustomCell *cell = [tableView dequeueReusableCellWithIdentifier:@"MyCustomCell"
                                                              forIndexPath:indexPath];

    // All additional customization goes here
    cell.titleLabel.text = [NSString stringWithFormat:@"Title Row %lu", indexPath.row];

    return cell;
}
```

3

```
func tableView(_ tableView: UITableView, cellForRowAtIndexPath indexPath: NSIndexPath) ->
UITableViewCell {
    let cell = tableView.dequeueReusableCellWithIdentifier("MyCustomCell",
forIndexPath:indexPath)

    // All additional customization goes here
    cell.titleLabel.text = String(format:"Title Row %lu", indexPath.row)

    return cell
}
```

 titleForHeaderInSection: . .

-C

```
- (NSString *)tableView:(UITableView *)tableView titleForHeaderInSection:(NSInteger)section {
    switch(section) {
        case 0:
            return @"Title 1";
            break;

        case 1:
            return @"Title 2";
            break;

        default:
            return nil;
            break;
    }
}
```

3

```
func tableView(_ tableView: UITableView, titleForHeaderInSection section: Int) -> String? {
    switch section {
        case 0:
            return "Title 1"
        case 1:
            return "Title 2"
```

```
        default:
            return nil
    }
}
```

`titleForFooterInSection:` .

-C

```
- (NSString *)tableView:(UITableView *)tableView titleForFooterInSection:(NSInteger)section {
    return @"Footer text";
}
```

3

```
func tableView(_ tableView: UITableView, titleForFooterInSection section: Int) -> String? {
    return "Footer text"
}
```

`canEditRowAtIndexPath:` UI . `YES` .

-C

```
- (BOOL)tableView:(UITableView *)tableView canEditRowAtIndexPath:(NSIndexPath *)indexPath {
    return YES;
}
```

3

```
func tableView(_ tableView: UITableView, canEditRowAtIndexPath indexPath: NSIndexPath) -> Bool
{
    return true
}
```

`commitEditingStyle:forRowAtIndexPath` . `UITableView` .

-C

```
- (void)tableView:(UITableView *)tableView
commitEditingStyle:(UITableViewCellEditingStyle)editingStyle forRowAtIndexPath:(NSIndexPath
*)indexPath {
    switch (editingStyle) {
        case UITableViewCellEditingStyleInsert:
            // Insert new data into the backing data model here
            [self insertNewDataIntoDataModel];
            [tableView insertRowsAtIndexPaths:@[indexPath]
withRowAnimation:UITableViewRowAnimationAutomatic];
            break;
        case UITableViewCellEditingStyleDelete:
            [self removeDataFromDataModelAtIndex:indexPath.row];
            [tableView deleteRowsAtIndexPaths:@[indexPath]
withRowAnimation:UITableViewRowAnimationAutomatic];
            break;
        default:
```

```
            // Nothing to perform if the editingStyle was neither Insert or Delete
            break;

    }
}
```

3

```
func tableView(_ tableView: UITableView, commitEditingStyle editingStyle:
UITableViewCellEditingStyle, forRowAtIndexPath indexPath: NSIndexPath) {
    switch editingStyle {
        case .Insert:
            self.insertNewDataIntoDataModel()
            tableView.insertRowsAtIndexPaths([indexPath], withRowAnimation:.Automatic)
        case .Delete:
            self.removeDataFromDataModelAtIndex(indexPath.row)
            tableView.deleteRowsAtIndexPaths([indexPath], withRowAnimation:.Automatic)
        default:
            // Nothing to perform if the editingStyle was neither Insert or Delete
    }
}
```

editActions:forRowAt UITableview . , , .

3

```
override func tableView(_ tableView: UITableView, editActionsForRowAt indexPath: IndexPath) ->
[UITableViewRowAction]? {
    // In the handler you will get passed the action as well as the indexPath for
    // the row that is being edited
    let editAction = UITableViewRowAction(style: .normal, title: "Edit", handler: { [unowned
self] action, indexPath in
        // Do something when edit is tapped
    })

    // Change the color of the edit action
    editAction.backgroundColor = UIColor.blue

    let deleteAction = UITableViewRowAction(style: .destructive, title: "Delete", handler: {
[unowned self] action, indexPath in
        // Handel the delete event
    })


    return [deleteAction, editAction]
}
```

UITableViewDelegate

UITableViewDelegate UITableView .

numberOfSectionsInTableView: 1 .

-C

```
- (NSInteger)numberOfSectionsInTableView:(UITableView *)tableView {
    return self.numSections;
}
```

3

```
func numberOfSectionsInTableView(_ tableView: UITableView) -> Int {
    return self.numSections
}
```

viewForHeaderInSection .

-C

```
- (UIView *)tableView:(UITableView *)tableView viewForHeaderInSection:(NSInteger)section {

    UIView *view = [[UIView alloc] initWithFrame:CGRectMake(0, 0,
CGRectGetWidth(tableView.frame), 22)];
    view.backgroundColor = [UIColor groupTableViewBackgroundColor];

    UILabel *label = [[UILabel alloc] init];
    label.font = [UIFont systemFontOfSize:12];
    label.textColor = [UIColor darkGrayColor];

    switch (section) {
        case 1: {
            label.text = @"Title";
            label.frame = labelFrame;

            UIButton *more = [[UIButton alloc] initWithFrame:btnFrame];
            [more setTitle:@"See more" forState:UIControlStateNormal];
            [more.titleLabel setFont:[UIFont systemFontOfSize:12]];
            [view addSubview:more];
        }   break;

        default:
            label.frame = CGRectMake(0, 0, 0, 0);
            break;
    }

    [view addSubview:label];
    return view;
}
```

3

```
func tableView(_ tableView: UITableView,  viewForHeaderInSection section: Int) -> UIView? {
    let view = UIView(frame: CGRect(x: 0, y: 0, width: tableView.frame.size.width, height:
22))
    view.backgroundColor = UIColor.groupTableViewBackgroundColor()

    let label = UILabel()
    label.font = UIFont.systemFontOfSize(12)
    label.textColor = UIColor.darkGrayColor()

    switch section {
        case 1:
```

```
            label.text = "Title"
            label.frame = labelFrame

            let more = UIButton(frame: btnFrame)
            more.setTitle("See more", forState:.Normal)
            view.addSubview(more)

        default:
            label.frame = CGRect.zero
    }

    view.addSubview(label)
    return view;
}
```

heightForRowAtIndexPath: .

-C

```
- (CGFloat)tableView:(UITableView *)tableView heightForRowAtIndexPath:(NSIndexPath *)indexPath
{
    return 44;
}
```

3

```
func tableView(_ tableView: UITableView, heightForRowAtIndexPath indexPath: NSIndexPath) ->
CGFloat {
    return 44
}
```

heightForHeaderInSection: heightForFooterInSection

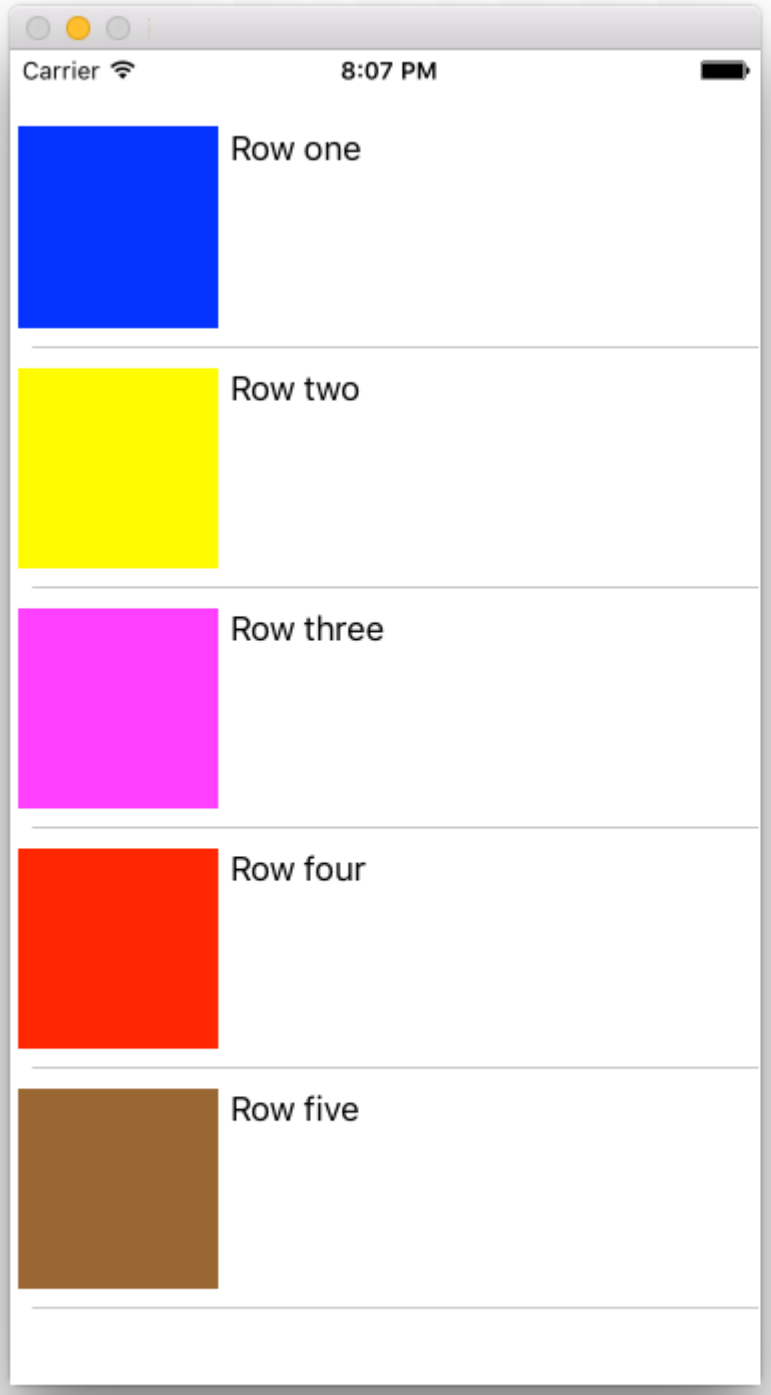
-C

```
- (CGFloat)tableView:(UITableView *)tableView heightForHeaderInSection:(NSInteger)section {
    return 33;
}
```

3

```
func tableView(_ tableView: UITableView, heightForHeaderInSection section: Int) -> CGFloat {
    return 33
}
```

UITableViewCell . . , , . . .



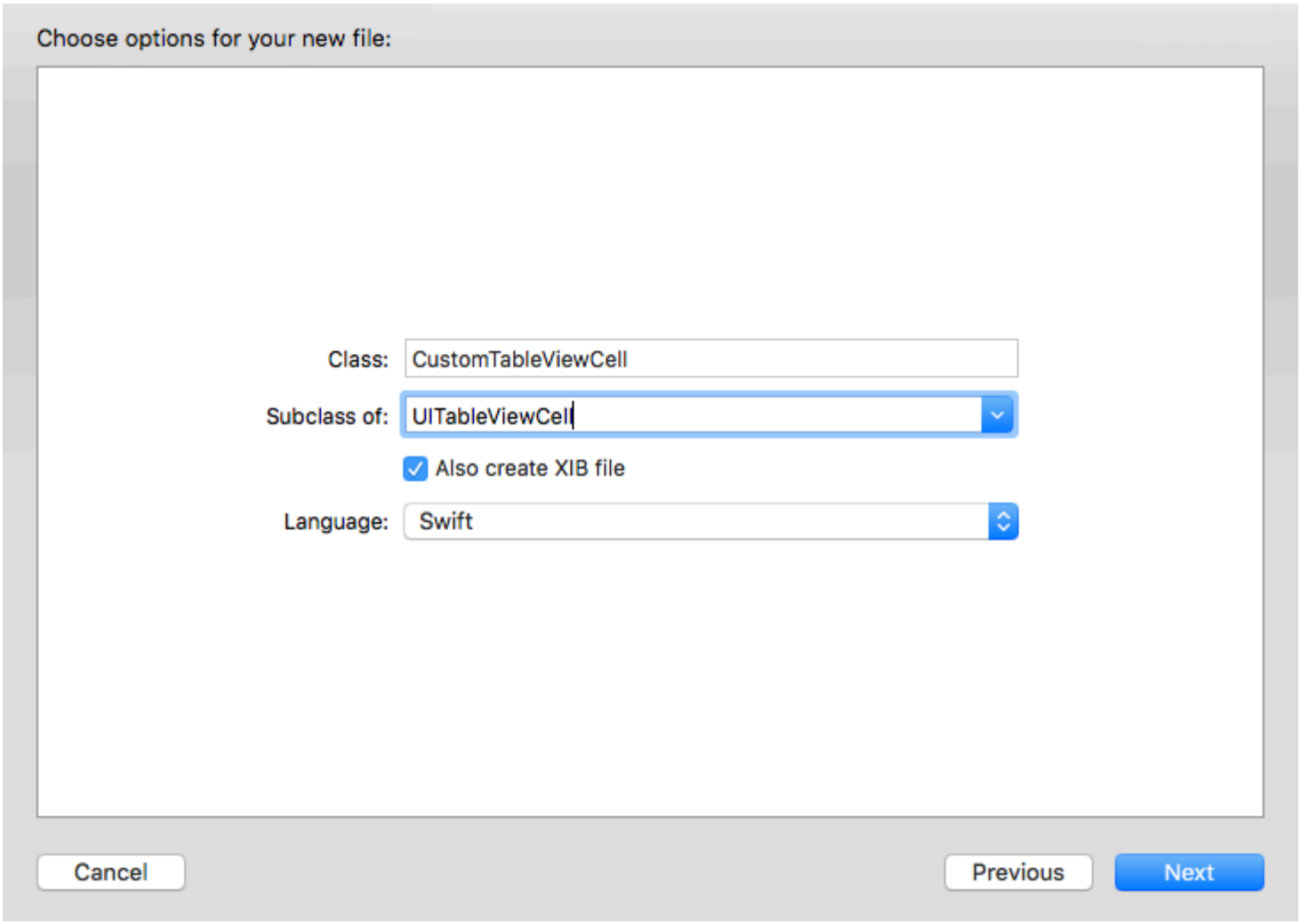
.

`UITableViewCell` (Xcode Cocoa Touch `UITableViewCell`). .

```
class CustomTableViewCell: UITableViewCell {
    static var identifier: String {
        return NSStringFromClass(self)
    }

    var customLabel: UILabel!
```

```
    override func awakeFromNib() {
        super.awakeFromNib()
        // Initialization code
        customLabel = UILabel(frame: CGRect(x: 0, y: 0, width: contentView.frame.width,
height: contentView.frame.height))
        customLabel.textAlignment = .center
        contentView.addSubview(customLabel)
    }
}
```

Interface Builder ' XIB '. `customLabel` `@IBOutlet` `@IBOutlet`



`tableView` `UIViewController` ( ). .

```
override func viewDidLoad() {
    super.viewDidLoad()

    // Register Cell Class
    tableView.register(CustomTableViewCell.self, forCellReuseIdentifier:
CustomTableViewCell.identifier)
}
```

XIB `registerNib` .

```
// Register Nib
tableView.register(UINib(nibName: CustomTableViewCell.identifier, bundle: nil),
forCellReuseIdentifier: CustomTableViewCell.identifier)
```

`tableView` , `cellForRowAtIndexPath` dequeue :

```
func tableView(tableView: UITableView, cellForRowAtIndexPath indexPath: NSIndexPath) ->
UITableViewCell {
    // Load the CustomTableViewCell. Make sure the identifier supplied here matches the one
from your cell
    let cell: CustomTableViewCell =
tableView.dequeueReusableCellWithIdentifier(CustomTableViewCell.identifier) as!
CustomTableViewCell

    // This is where the magic happens - setting a custom property on your very own cell
    cell.customLabel.text = "My Custom Cell"

    return cell
}
```

UITableViewCells

UIViewController UITableView . `UITableviewDataSource` `UITableviewDelegate` .

-c

`.h`

```
NSMutableArray *arrayForBool;
NSMutableArray *sectionTitleArray;
```

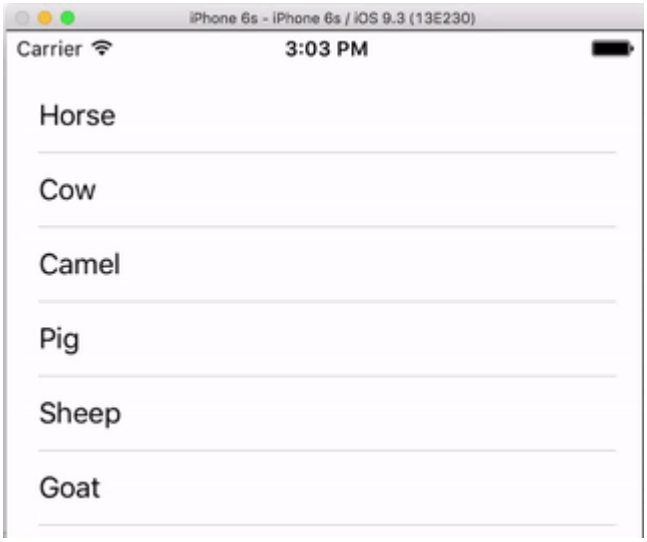
`.m`

```
- (void)viewDidLoad  {
    [super viewDidLoad];

    arrayForBool = [[NSMutableArray alloc] init];
    sectionTitleArray = @[@"Sam",@"Sanju",@"John",@"Staffy"];

    for (int i=0; i<[sectionTitleArray count]; i++) {
        [arrayForBool addObject:[NSNumber numberWithBool:NO]];
    }

    _tableView.dataSource = self;
    _tableView.delegate = self;
}

 // Declare number of rows in section
- (NSInteger)tableView:(UITableView *)tableView numberOfRowsInSection:(NSInteger)section {
     if ([[arrayForBool objectAtIndex:section] boolValue]) {
         return section+2;
    } else {
         return 0;
    }
}
```

```
- (UITableViewCell *)tableView:(UITableView *)tableView cellForRowAtIndexPath:(NSIndexPath
*)indexPath {

static NSString *cellid=@"hello";
UITableViewCell *cell=[tableView dequeueReusableCellWithIdentifier:cellid];
if (cell==nil) {
    cell=[[UITableViewCell alloc]initWithStyle:UITableViewCellStyleSubtitle
reuseIdentifier:cellid];
}
   BOOL manyCells  = [[arrayForBool objectAtIndex:indexPath.section] boolValue];

         /** If the section supposed to be closed******/
    if(!manyCells){
        cell.backgroundColor=[UIColor clearColor];
        cell.textLabel.text=@"";
    }
      /** If the section supposed to be Opened******/
    else{
        cell.textLabel.text=[NSString stringWithFormat:@"%@ %d",[sectionTitleArray
objectAtIndex:indexPath.section],indexPath.row+1];
        cell.backgroundColor=[UIColor whiteColor];
        cell.selectionStyle=UITableViewCellSelectionStyleNone ;
    }
cell.textLabel.textColor=[UIColor blackColor];

 /** Add a custom Separator with cell*/
  UIView* separatorLineView = [[UIView alloc]initWithFrame:CGRectMake(15, 40,
_expandableTableView.frame.size.width-15, 1)];
separatorLineView.backgroundColor = [UIColor blackColor];
[cell.contentView addSubview:separatorLineView];
return cell;
}

- (NSInteger)numberOfSectionsInTableView:(UITableView *)tableView
{
return [sectionTitleArray count];
}


- (void)tableView:(UITableView *)tableView didSelectRowAtIndexPath:(NSIndexPath  *)indexPath
{

/*************** Close the section, once the data is selected
*********************************/
[arrayForBool replaceObjectAtIndex:indexPath.section withObject:[NSNumber numberWithBool:NO]];

 [_expandableTableView reloadSections:[NSIndexSet indexSetWithIndex:indexPath.section]
withRowAnimation:UITableViewRowAnimationAutomatic];

 }

 - (CGFloat)tableView:(UITableView *)tableView heightForRowAtIndexPath:(NSIndexPath
*)indexPath
{
if ([[arrayForBool objectAtIndex:indexPath.section] boolValue]) {
    return 40;
}
return 0;

   }
```

```
- (UIView *)tableView:(UITableView *)tableView viewForHeaderInSection:(NSInteger)section
{

UIView *sectionView=[[UIView alloc]initWithFrame:CGRectMake(0, 0, 280,40)];
sectionView.tag=section;
UILabel *viewLabel=[[UILabel alloc]initWithFrame:CGRectMake(10, 0,
_expandableTableView.frame.size.width-10, 40)];
viewLabel.backgroundColor=[UIColor clearColor];
viewLabel.textColor=[UIColor blackColor];
viewLabel.font=[UIFont systemFontOfSize:15];
viewLabel.text=[NSString stringWithFormat:@"List of %@",[sectionTitleArray
objectAtIndex:section]];
[sectionView addSubview:viewLabel];
         /********** Add a custom Separator with Section view ******************/
UIView* separatorLineView = [[UIView alloc] initWithFrame:CGRectMake(15, 40,
_expandableTableView.frame.size.width-15, 1)];
separatorLineView.backgroundColor = [UIColor blackColor];
[sectionView addSubview:separatorLineView];

/********** Add UITapGestureRecognizer to SectionView   **************/

UITapGestureRecognizer  *headerTapped   = [[UITapGestureRecognizer alloc] initWithTarget:self
action:@selector(sectionHeaderTapped:)];
[sectionView addGestureRecognizer:headerTapped];

return  sectionView;


}

- (void)sectionHeaderTapped:(UITapGestureRecognizer *)gestureRecognizer{

NSIndexPath *indexPath = [NSIndexPath indexPathForRow:0 inSection:gestureRecognizer.view.tag];
if (indexPath.row == 0) {
    BOOL collapsed  = [[arrayForBool objectAtIndex:indexPath.section] boolValue];
    for (int i=0; i<[sectionTitleArray count]; i++) {
        if (indexPath.section==i) {
            [arrayForBool replaceObjectAtIndex:i withObject:[NSNumber
numberWithBool:!collapsed]];
        }
    }
    [_expandableTableView reloadSections:[NSIndexSet
indexSetWithIndex:gestureRecognizer.view.tag]
withRowAnimation:UITableViewRowAnimationAutomatic];

   }
 }
```

. UITableView . .



Swift UITableView .

ViewController.swift .

```
import UIKit
class ViewController: UIViewController, UITableViewDelegate, UITableViewDataSource {

    // These strings will be the data for the table view cells
    var animals: [String] = ["Horse", "Cow", "Camel", "Pig", "Sheep", "Goat"]

    let cellReuseIdentifier = "cell"

    @IBOutlet var tableView: UITableView!

    override func viewDidLoad() {
        super.viewDidLoad()

        // It is possible to do the following three things in the Interface Builder
        // rather than in code if you prefer.
        self.tableView.registerClass(UITableViewCell.self, forCellReuseIdentifier:
cellReuseIdentifier)
        tableView.delegate = self
        tableView.dataSource = self
    }

    // number of rows in table view
    func tableView(tableView: UITableView, numberOfRowsInSection section: Int) -> Int {
        return self.animals.count
    }

    // create a cell for each table view row
    func tableView(tableView: UITableView, cellForRowAtIndexPath indexPath: NSIndexPath) ->
UITableViewCell {

        let cell:UITableViewCell =
self.tableView.dequeueReusableCellWithIdentifier(cellReuseIdentifier) as UITableViewCell!

        cell.textLabel?.text = self.animals[indexPath.row]

        return cell
    }
```

```
    // method to run when table view cell is tapped
    func tableView(tableView: UITableView, didSelectRowAtIndexPath indexPath: NSIndexPath) {
        print("You tapped cell number \(indexPath.row).")
    }

    // this method handles row deletion
    func tableView(tableView: UITableView, commitEditingStyle editingStyle:
UITableViewCellEditingStyle, forRowAtIndexPath indexPath: NSIndexPath) {

        if editingStyle == .Delete {

            // remove the item from the data model
            animals.removeAtIndex(indexPath.row)

            // delete the table view row
            tableView.deleteRowsAtIndexPaths([indexPath], withRowAnimation: .Fade)

        } else if editingStyle == .Insert {
            // Not used in our example, but if you were adding a new row, this is where you
would do it.
        }
    }

}
```

. .

```
func tableView(tableView: UITableView, commitEditingStyle editingStyle:
UITableViewCellEditingStyle, forRowAtIndexPath indexPath: NSIndexPath) {

    if editingStyle == .Delete {

        // remove the item from the data model
        animals.removeAtIndex(indexPath.row)

        // delete the table view row
        tableView.deleteRowsAtIndexPaths([indexPath], withRowAnimation: .Fade)
    }
}
```

`UITableView` . View Controller . `@IBOutlet var tableView: UITableView!` .

. " .

- iOS 8 . .
- .

-
- Apple

---

layoutMargins: . .

cellForRowAtIndexPath: willDisplayCell: layoutMargins: UIEdgeInsetsZero ( ) .

-C

```
[cell setLayoutMargins:UIEdgeInsetsZero];

// May also use separatorInset
[cell setSeparatorInset:UIEdgeInsetsZero];
```

```
func tableView(tableView: UITableView, willDisplayCell cell: UITableViewCell,
forRowAtIndexPath indexPath: NSIndexPath) {
    cell.separatorInset = UIEdgeInsetsZero
    cell.layoutMargins = UIEdgeInsetsZero
}

func tableView(tableView: UITableView, cellForRowAtIndexPath indexPath: NSIndexPath) ->
UITableViewCell
{
    cell.separatorInset = UIEdgeInsetsZero
    cell.layoutMargins = UIEdgeInsetsZero
}
```

. .

UIViewController viewDidLoad: . (viewDidLoad:).

:

```
 tableView.separatorStyle = .None
```

-C :

```
tableView.separatorStyle = UITableViewCellSeparatorStyleNone;
```

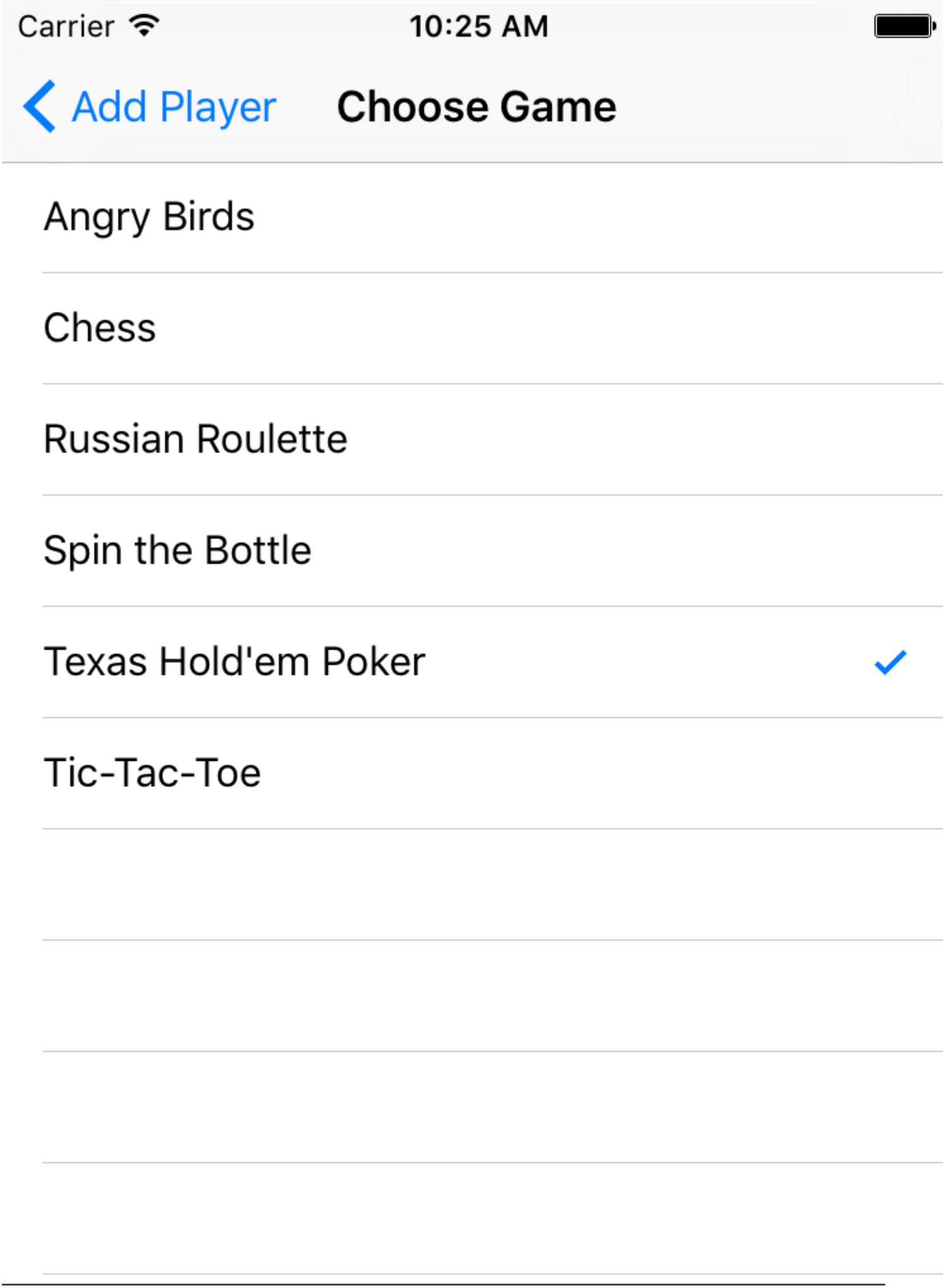
separator None XIB .

UITableViewCell UITableViewCell .

```
tableView.tableFooterView = UIView()
```

-C

```
tableView.tableFooterView = [[UIView alloc] initWithFrame:CGRectZero];
```


Carrier
10:25 AM
Add Player
Choose Game
Angry Birds
Chess
Russian Roulette
Spin the Bottle
Texas Hold'em Poker
Tic-Tac-Toe

122: UITableViewCell

xib nib .

Examples

UITableViewCell Xib

UITableView .

UITableViewCell + RRCell.h

```
#import <UIKit/UIKit.h>

@interface UITableViewCell (RRCell)

-(id)initWithOwner:(id)owner;

@end
```

UITableViewCell + RRCell.m

```
#import "UITableViewCell+RRCell.h"

@implementation UITableViewCell (RRCell)

#pragma clang diagnostic push
#pragma clang diagnostic ignored "-Wobjc-designated-initializers"

-(id)initWithOwner:(id)owner {

    if (self = [super init]) {

        NSArray *nib = [[NSBundle mainBundle]loadNibNamed:NSStringFromClass([self class])
owner:self options:nil];
        self = [nib objectAtIndex:0];
    }
    return self;
}

#pragma clang diagnostic pop



@end
```

cellForRowAtIndexPath

```
- (UITableViewCell *)tableView:(UITableView *)tableView cellForRowAtIndexPath:(NSIndexPath
*)indexPath
{
    //Creted custom cell xib file to load by cell category class
    CustomCell *cell = [[CustomCell alloc]initWithOwner:self];
```

```
    return cell;
}
```

UITableViewCell : https://riptutorial.com/ko/ios/topic/10101/uitableviewcell

123: UITableViewCells

UITableViewCell . `didSelect...` form `UITableViewDelegate` .

Examples

.

UITableViewCell .

```
override func viewDidLoad() {
    viewDidLoad()

    let doubleTapGestureRecognizer = UITapGestureRecognizer(target: self, action:
#selector(handleDoubleTap(sender:)))
    doubleTapGestureRecognizer.numberOfTapsRequired = 2
    tableView.addGestureRecognizer(doubleTapGestureRecognizer)

    let tapGestureRecognizer = UITapGestureRecognizer(target: self, action:
#selector(handleTapGesture(sender:)))
    tapGestureRecognizer.numberOfTapsRequired = 1
    tapGestureRecognizer.require(toFail: doubleTapGestureRecognizer)
    tableView.addGestureRecognizer(tapGestureRecognizer)
}

func handleTapGesture(sender: UITapGestureRecognizer) {
    let touchPoint = sender.location(in: tableView)
    if let indexPath = tableView.indexPathForRow(at: touchPoint) {
        print(indexPath)
    }
}

func handleDoubleTap(sender: UITapGestureRecognizer) {
    let touchPoint = sender.location(in: tableView)
    if let indexPath = tableView.indexPathForRow(at: touchPoint) {
        print(indexPath)
    }
}
```

UITableViewCells : https://riptutorial.com/ko/ios/topic/9961/uitableviewcells----

124: UITableViewCells

Examples

.

.

```
override func viewDidLoad() {
    viewDidLoad()

    let doubleTapGestureRecognizer = UITapGestureRecognizer(target: self, action:
#selector(handleDoubleTap(sender:)))
    doubleTapGestureRecognizer.numberOfTapsRequired = 2
    tableView.addGestureRecognizer(doubleTapGestureRecognizer)

    let tapGestureRecognizer = UITapGestureRecognizer(target: self, action:
#selector(handleTapGesture(sender:)))
    tapGestureRecognizer.numberOfTapsRequired = 1
    tapGestureRecognizer.require(toFail: doubleTapGestureRecognizer)
    tableView.addGestureRecognizer(tapGestureRecognizer)
}

func handleTapGesture(sender: UITapGestureRecognizer) {
    let touchPoint = sender.location(in: tableView)
    if let indexPath = tableView.indexPathForRow(at: touchPoint) {
        print(indexPath)
    }
}

func handleDoubleTap(sender: UITapGestureRecognizer) {
    let touchPoint = sender.location(in: tableView)
    if let indexPath = tableView.indexPathForRow(at: touchPoint) {
        print(indexPath)
    }
}
```

UITableViewCells : https://riptutorial.com/ko/ios/topic/9962/uitableviewcells----

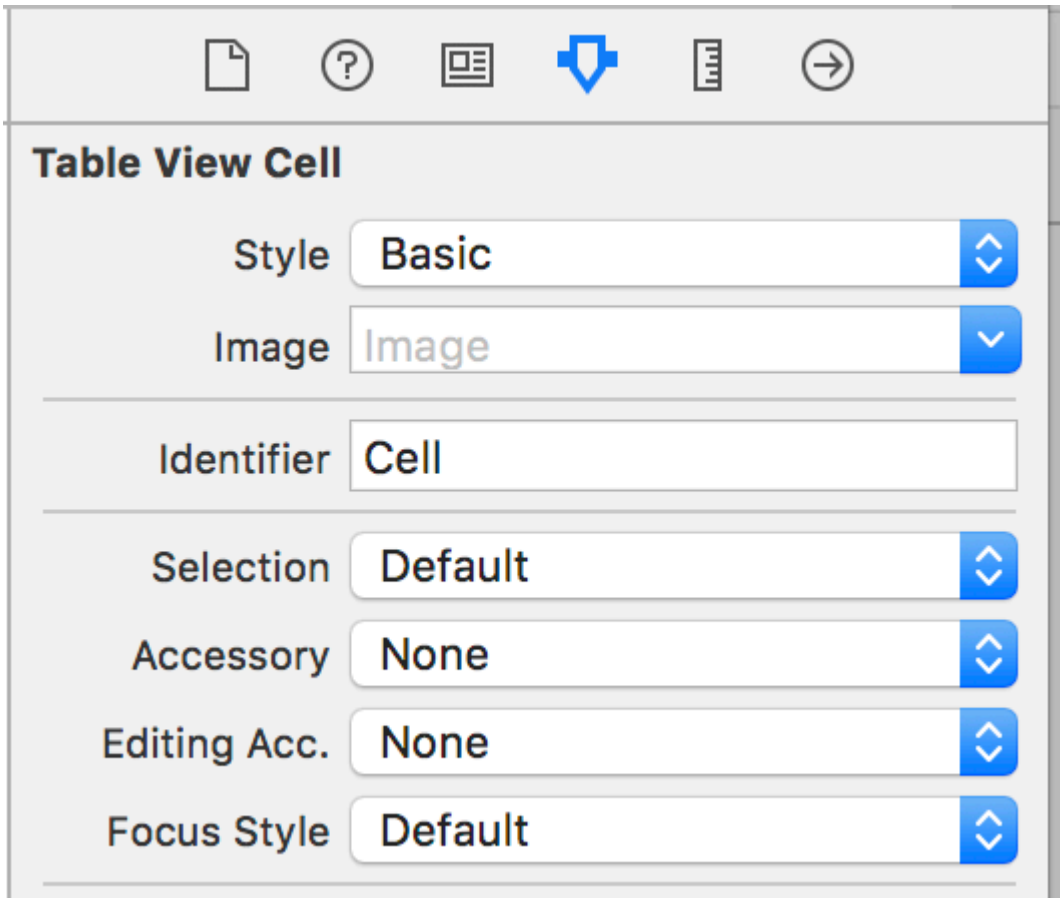
125: UITableViewController

UITableViewController . UITableViewController (: UITextfield).

Examples

tableviewCellStyle TableView.

```
override func numberOfSections(in tableView: UITableView) -> Int {
    // You need to return minimum one to show the cell inside the tableview
    return 1
}

override func tableView(_ tableView: UITableView, numberOfRowsInSection section: Int) -> Int {
    // return the number of rows inside the tableview.
    return 3
}


override func tableView(_ tableView: UITableView, cellForRowAt indexPath: IndexPath) ->
UITableViewCell {

    let cell = tableView.dequeueReusableCell(withIdentifier: "Cell", for: indexPath)
// identifier string should be same as what you have entered in the cell Attribute inspector -
> identifier (see the image).

    // Configure the cell...
    cell.textLabel?.text = "Cell \(indexPath.row) :" + "Hello"
//cell have different style Custom, basic, right detail, left detail, subtitle.
//For custom you can use your own objects and constrains, for other styles all
//is ready just select according to your design. (see the image for changing the style)

    return cell
}

override func tableView(_ tableView: UITableView, didSelectRowAt indexPath: IndexPath) {
        // this delegate method will trigger when you click a cell
}
```



TableView

tableview `UITableViewCell` . .

```
class TableViewCell: UITableViewCell {

@IBOutlet weak var lblTitle: UILabel!

override func awakeFromNib() {
    super.awakeFromNib()
    // Initialization code
}

override func setSelected(_ selected: Bool, animated: Bool) {
    super.setSelected(selected, animated: animated)

    // Configure the view for the selected state
}

}
```

tableview

```
override func numberOfSections(in tableView: UITableView) -> Int {
        // You need to return minimum one to show the cell inside the tableview
        return 1
    }

override func tableView(_ tableView: UITableView, numberOfRowsInSection section: Int) -> Int {
    // return the number of rows inside the tableview.
```

```
    return 3
}


override func tableView(_ tableView: UITableView, cellForRowAt indexPath: IndexPath) ->
UITableViewCell {

    let cell = tableView.dequeueReusableCell(withIdentifier: "Cell", for: indexPath) as!
TableViewCell
    // identifier string should be same as what you have entered in the cell Attribute
inspector -> identifier.

    // Configure the cell...
    cell.lblTitle.text = "Cell \(indexPath.row) :" + "Hello"


    return cell
}

override func tableView(_ tableView: UITableView, didSelectRowAt indexPath: IndexPath) {
    // this delegate method will trigger when you click a cell
}
```

UITableViewController : https://riptutorial.com/ko/ios/topic/10953/uitableviewcontroller

126: UITextField

UITextField UIKit

- UITextField.text : String // .
- UITextField.attributedText : NSAttributedString // .
- UITextField.textColor : UIColor // .
- UITextField.font : UIFont // .
- UITextField.textAlignment : NSTextAlignment // NSLeftTextAlignment.
- UITextField.borderStyle : UITextBorderStyle // UITextBorderStyleNone. UITextBorderStyleRoundedRect .
- UITextField.placeholder : String // default nil. 70 % .
- UITextField.attributedPlaceholder : NSAttributedString //
- UITextField.clearsOnBeginEditing : Bool // NO. . .
- UITextField.adjustsFontSizeToFitWidth : Bool // NO. minFontSize .
- UITextField.minimumFontSize : CGFloat // 0.0. . adjustsFontSizeToFitWidth YES .
- UITextField.delegate : UITextFieldDelegate? // nil.
- UITextField.clearButtonMode : UITextFieldViewMode // clear . UITextFieldViewModeNever .
- UITextField.leftView : UIView? // :
- UITextField.leftViewMode : UITextFieldViewMode // . UITextFieldViewModeNever.
- UITextField.rightView : UIView? // :
- UITextField.rightViewMode : UITextFieldViewMode // . UITextFieldViewModeNever.
- UITextField.inputView : UIView? // . nil . reloadInputViews .
- UITextField.inputAccessoryView : UIView?
- UITextField.isSecureTextEntry : Bool // :

Examples

```
let frame = CGRect(x: 0, y: 0, width: 100, height: 100)
let textField = UITextField(frame: frame)
```

-C

```
CGRect *frame = CGRectMake(0, 0, 100, 100);
UITextField *textField = [[UITextField alloc] initWithFrame:frame];
```

UITextField .

()

. / / (/ /) .

```
let textField = UITextField() // initialized however

let toolbar = UIToolbar(frame: CGRect(x: 0, y: 0, width: view.frame.size.width, height: 0)

let flexibleSpace = UIBarButtonItem(barButtonSystemItem: .FlexibleSpace, target: nil, action:
nil)

let doneButton = UIBarButtonItem(barButtonSystemItem: .Done, target: self, action:
Selector("done"))

let items = [flexibleSpace, doneButton]  // pushes done button to right side

toolbar.setItems(items, animated: false) // or toolbar.items = ...
toolbar.sizeToFit()

textField.inputAccessoryView = toolbar
```

-C

```
UITextField *textField = [[UITextField alloc] init];

UIToolbar *toolbar = [[UIToolbar alloc] initWithFrame:CGRectMake(0, 0,
self.view.frame.size.width, 0)];

UIBarButtonItem *flexibleSpace = [[UIBarButtonItem alloc]
initWithBarButtonSystemItem:UIBarButtonSystemItemFlexibleSpace target:nil action:nil];
UIBarButtonItem *doneButton = [[UIBarButtonItem alloc]
initWithBarButtonSystemItem:UIBarButtonSystemItemDone target:self action:@selector(done)];
NSArray *items = @[
                   flexibleSpace,
                   doneButton
                   ];

[toolbar setItems:items];
[toolbar sizeToFit];

textField.inputAccessoryView = toolbar;
```

```
textField.autocapitalizationType = .None
```

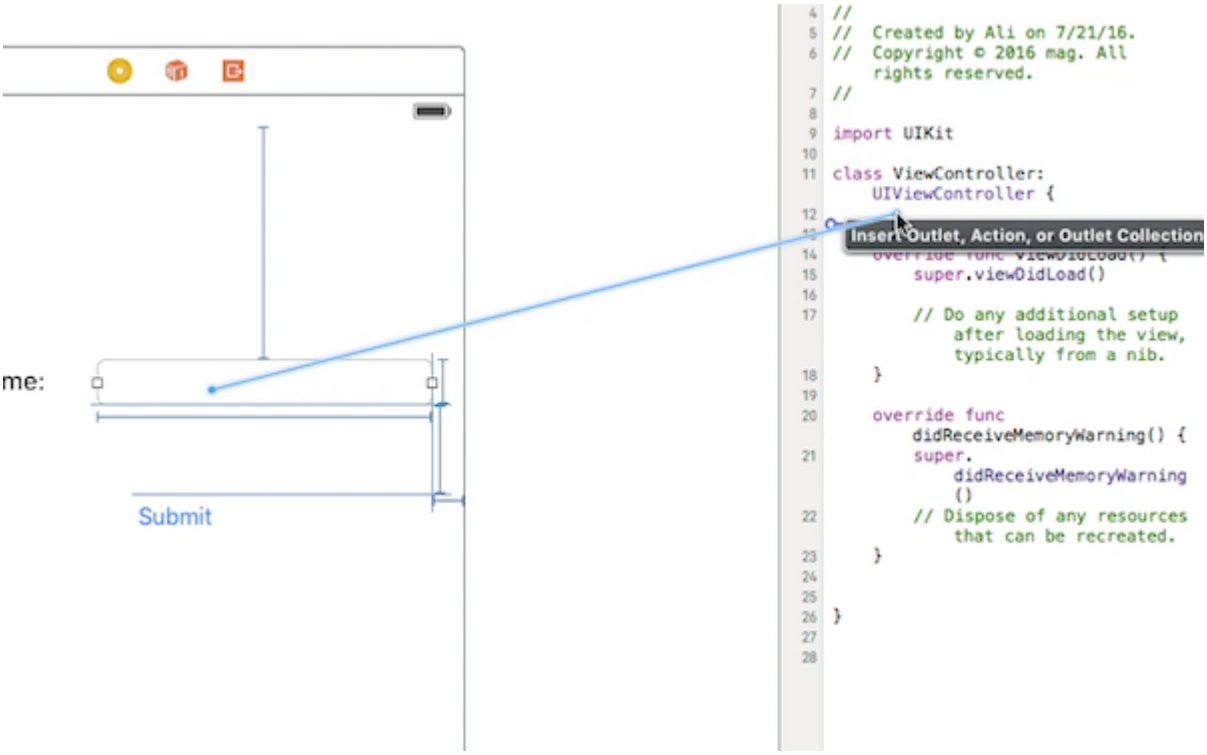
-C

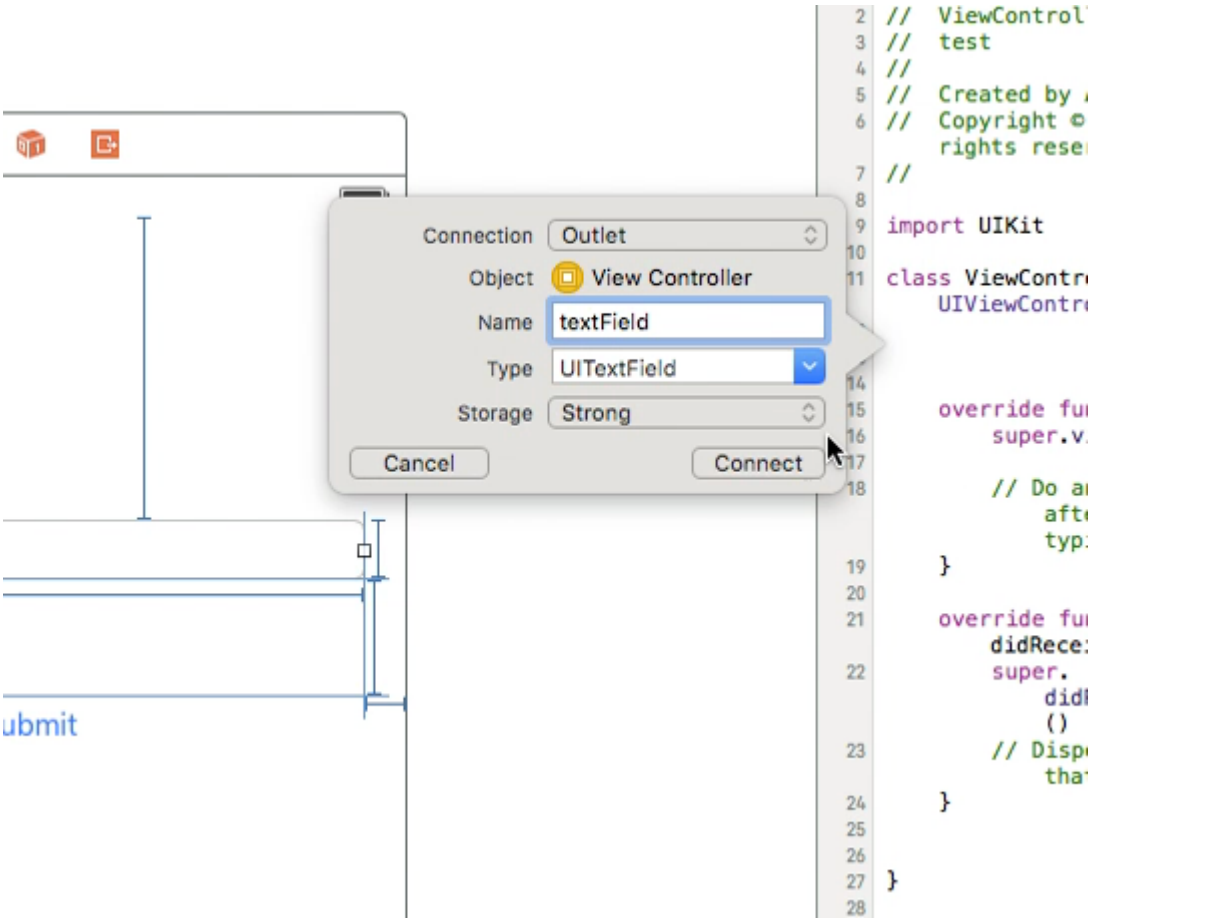
```
textField.autocapitalizationType = UITextAutocapitalizationTypeNone;
```

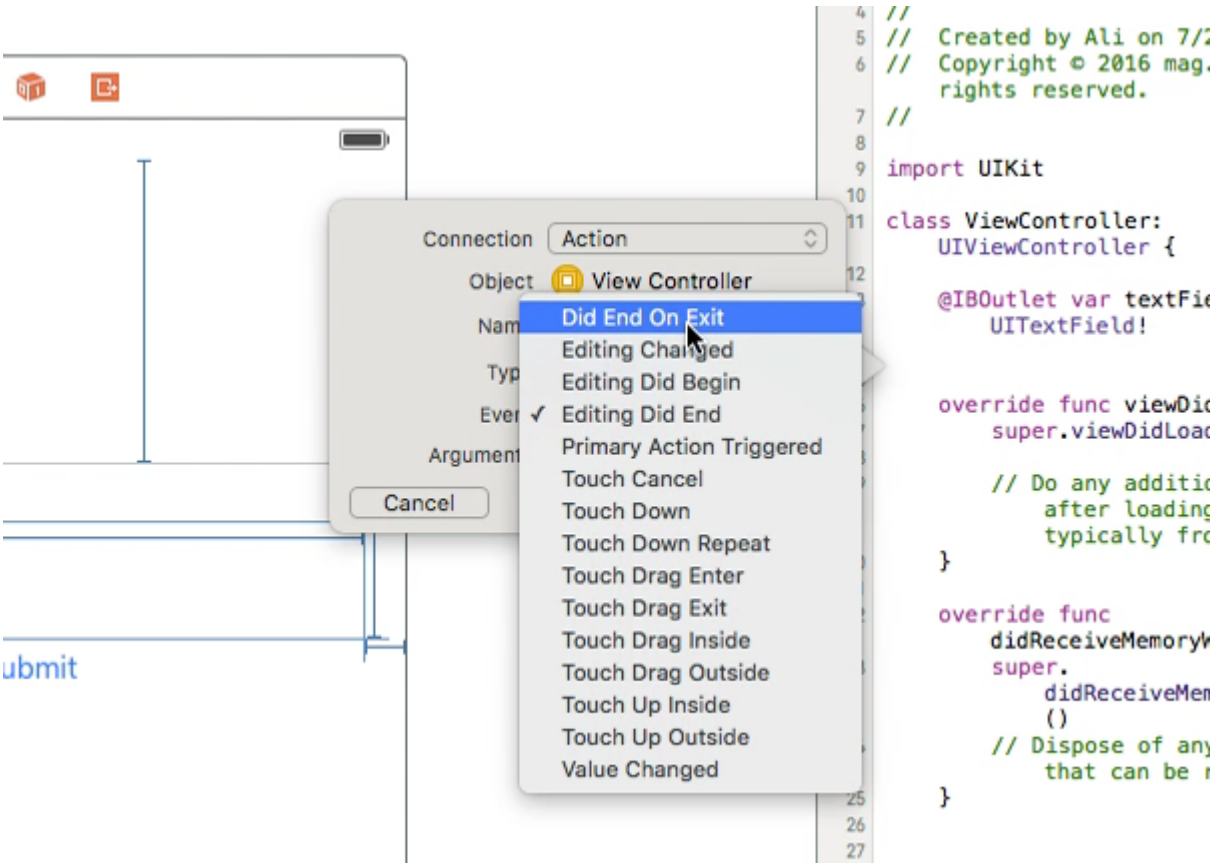
:

- `.None` \ `UITextAutocapitalizationTypeNone` : autocapitalize
- `.Words` \ `UITextAutocapitalizationTypeWords` :
- `.Sentences` \ `UITextAutocapitalizationTypeSentences` :
- `.AllCharacters` \ `UITextAutocapitalizationTypeAllCharacters` : (,)

Ctrl + MainStoryboard UItext ViewController UITextField .







UItextField ViewController Ctrl . **Did End Exit** .

UItextField `.resignFirstResponder()` .

```
   @IBAction func textFieldResign(sender: AnyObject) {
        yourTextFieldName.resignFirstResponder()
    }
```

.

Return .

`UIViewController UITextFieldDelegate .`

vieDidLoad `self.yourTextFieldName.delegate = self .`

```
func textFieldShouldReturn(textField: UITextField) -> Bool {
                yourTextFieldName.resignFirstResponder()
                return true
            }
```

.

```
class ViewController: UIViewController, UITextFieldDelegate  {

@IBOutlet var textField: UITextField!

    func textFieldShouldReturn(textField: UITextField) -> Bool {
        textField.resignFirstResponder()
        return true
    }

override func touchesBegan(touches: Set<UITouch>, withEvent event: UIEvent?){
    view.endEditing(true)
    super.touchesBegan(touches, withEvent: event)
}


override func viewDidLoad() {
    super.viewDidLoad()
    self.textField.delegate = self
        }
```

}

-C

```
[textField resignFirstResponder];
```

```
textField.textAlignment = .Center
```

-C

```
[textField setTextAlignment: NSTextAlignmentCenter];
```

NSTextAlignment center . .Left , .Right , .Justified .Natural .

.Natural . (:) . .Left . .Right .

KeyboardType

UITextFields . keyboardType

```
typedef NS_ENUM(NSInteger, UIKeyboardType) {
    UIKeyboardTypeDefault,                // Default type for the current input method.
    UIKeyboardTypeASCIICapable,           // Displays a keyboard which can enter ASCII
characters, non-ASCII keyboards remain active
    UIKeyboardTypeNumbersAndPunctuation,  // Numbers and assorted punctuation.
    UIKeyboardTypeURL,                    // A type optimized for URL entry (shows . / .com
prominently).
    UIKeyboardTypeNumberPad,              // A number pad (0-9). Suitable for PIN entry.
    UIKeyboardTypePhonePad,               // A phone pad (1-9, *, 0, #, with letters under the
numbers).
    UIKeyboardTypeNamePhonePad,           // A type optimized for entering a person's name or
phone number.
    UIKeyboardTypeEmailAddress,           // A type optimized for multiple email address entry
(shows space @ . prominently).
    UIKeyboardTypeDecimalPad NS_ENUM_AVAILABLE_IOS(4_1),   // A number pad with a decimal
point.
    UIKeyboardTypeTwitter NS_ENUM_AVAILABLE_IOS(5_0),      // A type optimized for twitter
text entry (easy access to @ #)
    UIKeyboardTypeWebSearch NS_ENUM_AVAILABLE_IOS(7_0),    // A default keyboard type with
URL-oriented addition (shows space . prominently).

    UIKeyboardTypeAlphabet = UIKeyboardTypeASCIICapable, // Deprecated
};
```

UITextView

UIKeyboardWillShowNotification UIKeyboardWillHideNotification scrollView
UIKeyboardWillHideNotification .

```
- (void)viewDidLoad
{
    [super viewDidLoad];

    // register for keyboard notifications
    [[NSNotificationCenter defaultCenter] addObserver:self
                                             selector:@selector(keyboardWillShow:)
                                                 name:UIKeyboardWillShowNotification
                                               object:self.view.window];
    // register for keyboard notifications
    [[NSNotificationCenter defaultCenter] addObserver:self
                                             selector:@selector(keyboardWillHide:)
                                                 name:UIKeyboardWillHideNotification
                                               object:self.view.window];
}

// Called when UIKeyboardWillShowNotification is sent
- (void)keyboardWillShow:(NSNotification*)notification
{
    // if we have no view or are not visible in any window, we don't care
```

```
    if (!self.isViewLoaded || !self.view.window) {
        return;
    }

    NSDictionary *userInfo = [notification userInfo];

    CGRect keyboardFrameInWindow;
    [[userInfo objectForKey:UIKeyboardFrameEndUserInfoKey] getValue:&keyboardFrameInWindow];

    // the keyboard frame is specified in window-level coordinates. this calculates the frame
as if it were a subview of our view, making it a sibling of the scroll view
    CGRect keyboardFrameInView = [self.view convertRect:keyboardFrameInWindow fromView:nil];

    CGRect scrollViewKeyboardIntersection = CGRectIntersection(_scrollView.frame,
keyboardFrameInView);
    UIEdgeInsets newContentInsets = UIEdgeInsetsMake(0, 0,
scrollViewKeyboardIntersection.size.height, 0);

    // this is an old animation method, but the only one that retains compaitiblity between
parameters (duration, curve) and the values contained in the userInfo-Dictionary.
    [UIView beginAnimations:nil context:NULL];
    [UIView setAnimationDuration:[[userInfo
objectForKey:UIKeyboardAnimationDurationUserInfoKey] doubleValue]];
    [UIView setAnimationCurve:[[userInfo objectForKey:UIKeyboardAnimationCurveUserInfoKey]
intValue]];

    _scrollView.contentInset = newContentInsets;
    _scrollView.scrollIndicatorInsets = newContentInsets;

    /*
     * Depending on visual layout, _focusedControl should either be the input field
(UITextField,..) or another element
     * that should be visible, e.g. a purchase button below an amount text field
     * it makes sense to set _focusedControl in delegates like -textFieldShouldBeginEditing:
if you have multiple input fields
     */
    if (_focusedControl) {
        CGRect controlFrameInScrollView = [_scrollView convertRect:_focusedControl.bounds
fromView:_focusedControl]; // if the control is a deep in the hierarchy below the scroll view,
this will calculate the frame as if it were a direct subview
        controlFrameInScrollView = CGRectInset(controlFrameInScrollView, 0, -10); // replace
10 with any nice visual offset between control and keyboard or control and top of the scroll
view.

        CGFloat controlVisualOffsetToTopOfScrollview = controlFrameInScrollView.origin.y -
_scrollView.contentOffset.y;
        CGFloat controlVisualBottom = controlVisualOffsetToTopOfScrollview +
controlFrameInScrollView.size.height;

        // this is the visible part of the scroll view that is not hidden by the keyboard
        CGFloat scrollViewVisibleHeight = _scrollView.frame.size.height -
scrollViewKeyboardIntersection.size.height;

        if (controlVisualBottom > scrollViewVisibleHeight) { // check if the keyboard will
hide the control in question
            // scroll up until the control is in place
            CGPoint newContentOffset = _scrollView.contentOffset;
            newContentOffset.y += (controlVisualBottom - scrollViewVisibleHeight);

            // make sure we don't set an impossible offset caused by the "nice visual offset"
            // if a control is at the bottom of the scroll view, it will end up just above the
```

```
keyboard to eliminate scrolling inconsistencies
            newContentOffset.y = MIN(newContentOffset.y, _scrollView.contentSize.height -
scrollViewVisibleHeight);

            [_scrollView setContentOffset:newContentOffset animated:NO]; // animated:NO
because we have created our own animation context around this code
        } else if (controlFrameInScrollView.origin.y < _scrollView.contentOffset.y) {
            // if the control is not fully visible, make it so (useful if the user taps on a
partially visible input field
            CGPoint newContentOffset = _scrollView.contentOffset;
            newContentOffset.y = controlFrameInScrollView.origin.y;

            [_scrollView setContentOffset:newContentOffset animated:NO]; // animated:NO
because we have created our own animation context around this code
        }
    }

    [UIView commitAnimations];
}


// Called when the UIKeyboardWillHideNotification is sent
- (void)keyboardWillHide:(NSNotification*)notification
{
    // if we have no view or are not visible in any window, we don't care
    if (!self.isViewLoaded || !self.view.window) {
        return;
    }

    NSDictionary *userInfo = notification.userInfo;

    [UIView beginAnimations:nil context:NULL];
    [UIView setAnimationDuration:[[userInfo
valueForKey:UIKeyboardAnimationDurationUserInfoKey] doubleValue]];
    [UIView setAnimationCurve:[[userInfo valueForKey:UIKeyboardAnimationCurveUserInfoKey]
intValue]];

    // undo all that keyboardWillShow-magic
    // the scroll view will adjust its contentOffset apropriately
    _scrollView.contentInset = UIEdgeInsetsZero;
    _scrollView.scrollIndicatorInsets = UIEdgeInsetsZero;

    [UIView commitAnimations];
}
```

```
textField.becomeFirstResponder()
```

-C

```
[textField becomeFirstResponder];
```

```
textField.resignFirstResponder()
```

-C

```
[textField resignFirstResponder];
```

UIPickerView .

UITextField UIPickerView .

UIPickerView

UIPickerViewDataSource UIPickerViewDelegate UIPickerView .

```
class MyPickerView: UIPickerView, UIPickerViewDataSource, UIPickerViewDelegate
```

DataSource Delegate .

```
public func pickerView(_ pickerView: UIPickerView, numberOfRowsInComponent component: Int) ->
Int {
    if data != nil {
        return data!.count
    } else {
        return 0
    }
}

public func numberOfComponents(in pickerView: UIPickerView) -> Int {
    return 1
}

public func pickerView(_ pickerView: UIPickerView, titleForRow row: Int, forComponent
component: Int) -> String? {
    if data != nil {
        return data![row]
    } else {
        return ""
    }
}
```

MyPickerView selectedValue textFieldBeingEdited data .

```
/**
 The data for the `UIPickerViewDelegate`

 Always needs to be an array of `String`! The `UIPickerView` can ONLY display Strings
 */
public var data: [String]? {
    didSet {
        super.delegate = self
        super.dataSource = self
        self.reloadAllComponents()
    }
}

/**
 Stores the UITextField that is being edited at the moment
 */
public var textFieldBeingEdited: UITextField?
```

```
/**
 Get the selected Value of the picker
 */
public var selectedValue: String {
    get {
        if data != nil {
            return data![selectedRow(inComponent: 0)]
        } else {
            return ""
        }
    }
}
```

ViewController

textField `ViewController` `UIPickerView` .(textField `@IBOutlet`)

```
/**
 The picker view to present as keyboard
 */
var picker: MyPickerView?
```

`viewDidLoad()` `picker` .

```
picker = MyPickerView()
picker?.autoresizingMask = [.flexibleHeight, .flexibleWidth]
picker?.backgroundColor = UIColor.white()

picker?.data = ["One", "Two", "Three", "Four", "Five"] //The data shown in the picker
```

`inputView` `UITextField` `MyPicker` .

```
textField.inputView = picker
```

, `UIPickerView` `UIPickerView` . `.inputAccessoryView` .

ViewController pickerAccessory .

```
/**
 A toolbar to add to the keyboard when the `picker` is presented.
 */
var pickerAccessory: UIToolbar?
```

`viewDidLoad()` `inputAccessoryView` `UIToolbar` .

```
pickerAccessory = UIToolbar()
pickerAccessory?.autoresizingMask = .flexibleHeight

//this customization is optional
pickerAccessory?.barStyle = .default
pickerAccessory?.barTintColor = UIColor.red()
pickerAccessory?.backgroundColor = UIColor.red()
pickerAccessory?.isTranslucent = false
```

. iOS 44.0 .

```
var frame = pickerAccessory?.frame
frame?.size.height = 44.0
pickerAccessory?.frame = frame!
```

("" "") .

```
let cancelButton = UIBarButtonItem(barButtonSystemItem: .cancel, target: self, action:
#selector(ViewController.cancelBtnClicked(_:)))
cancelButton.tintColor = UIColor.white()
let flexSpace = UIBarButtonItem(barButtonSystemItem: .flexibleSpace, target: nil, action: nil)
//a flexible space between the two buttons
let doneButton = UIBarButtonItem(barButtonSystemItem: .done, target: self, action:
#selector(ViewController.doneBtnClicked(_:)))
doneButton.tintColor = UIColor.white()

//Add the items to the toolbar
pickerAccessory?.items = [cancelButton, flexSpace, doneButton]
```

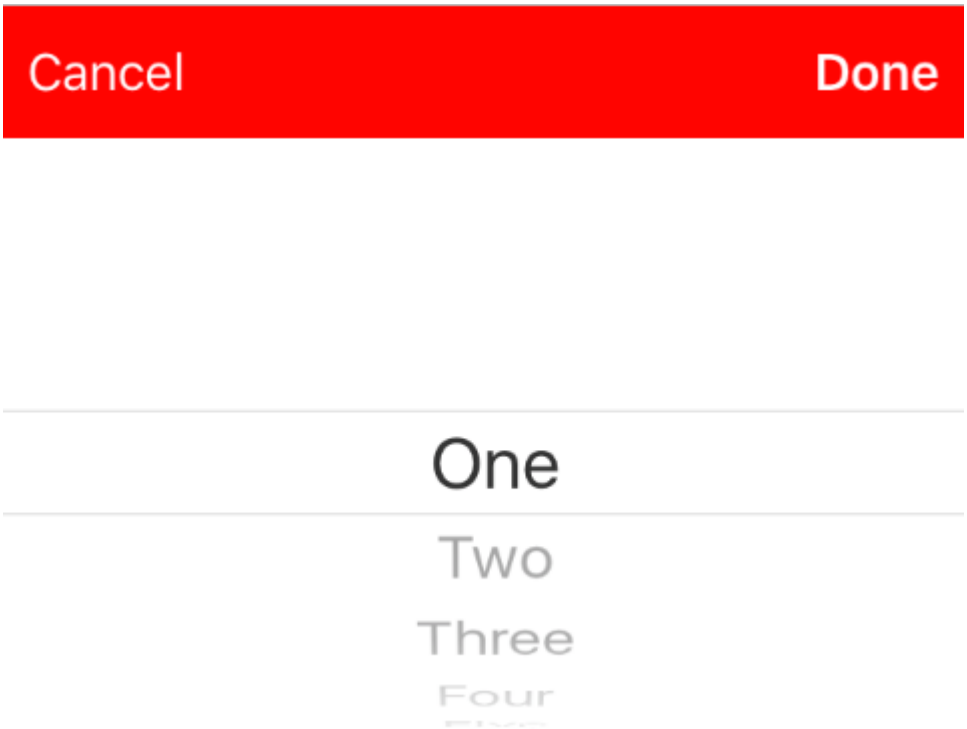
inputAccessoryView .

```
textField.inputAccessoryView = pickerAccessory
```

.

```
/**
 Called when the cancel button of the `pickerAccessory` was clicked. Dismsses the picker
 */
func cancelBtnClicked(_ button: UIBarButtonItem?) {
    textField?.resignFirstResponder()
}

/**
 Called when the done button of the `pickerAccessory` was clicked. Dismisses the picker and
puts the selected value into the textField
 */
func doneBtnClicked(_ button: UIBarButtonItem?) {
    textField?.resignFirstResponder()
    textField.text = picker?.selectedValue
}
```

textField .



( )

UIPickerView .

```
picker?.selectRow(3, inComponent: 0, animated: false) //Will select the row at index 3
```

.

.

```
class MyViewController: UITextFieldDelegate {

    override viewDidLoad() {
        super.viewDidLoad()

        textField.delegate = self
    }

}
```

textFieldShouldReturn .

:

```
func textFieldShouldReturn(textField: UITextField) -> Bool {
    textField.resignFirstResponder()
    return true;
}
```

-C :

```
- (BOOL)textFieldShouldReturn:(UITextField *)textField {
   [textField resignFirstResponder];
   return true;
}
```

:

```
let startPosition: UITextPosition = textField.beginningOfDocument
```

:

```
let endPosition: UITextPosition = textField.endOfDocument
```

:

```
let selectedRange: UITextRange? = textField.selectedTextRange
```

```
if let selectedRange = textField.selectedTextRange {

    let cursorPosition = textField.offsetFromPosition(textField.beginningOfDocument,
toPosition: selectedRange.start)

    print("\(cursorPosition)")
}
```

.

```
let newPosition = textField.beginningOfDocument
textField.selectedTextRange = textField.textRangeFromPosition(newPosition, toPosition:
newPosition)
```

```
let newPosition = textField.endOfDocument
textField.selectedTextRange = textField.textRangeFromPosition(newPosition, toPosition:
newPosition)
```

```
// only if there is a currently selected range
if let selectedRange = textField.selectedTextRange {

    // and only if the new position is valid
    if let newPosition = textField.positionFromPosition(selectedRange.start, inDirection:
UITextLayoutDirection.Left, offset: 1) {

        // set the new position
        textField.selectedTextRange = textField.textRangeFromPosition(newPosition, toPosition:
newPosition)
    }
}
```

5 .

```
let arbitraryValue: Int = 5
if let newPosition = textField.positionFromPosition(textField.beginningOfDocument,
inDirection: UITextLayoutDirection.Right, offset: arbitraryValue) {

    textField.selectedTextRange = textField.textRangeFromPosition(newPosition, toPosition:
newPosition)
}
```

```
textField.selectedTextRange = textField.textRangeFromPosition(textField.beginningOfDocument,
toPosition: textField.endOfDocument)
```

```
// Range: 3 to 7
let startPosition = textField.positionFromPosition(textField.beginningOfDocument, inDirection:
UITextLayoutDirection.Right, offset: 3)
let endPosition = textField.positionFromPosition(textField.beginningOfDocument, inDirection:
UITextLayoutDirection.Right, offset: 7)

if startPosition != nil && endPosition != nil {
    textField.selectedTextRange = textField.textRangeFromPosition(startPosition!, toPosition:
endPosition!)
}
```

```
textField.insertText("Hello")
```

- .
- `UITextView` .
- `textField.becomeFirstResponder()` .
- .

- (`selectedTextRange` `selectedRange`)

UITextField caretRectForPosition CGRectZero .

2.3 <

```
public override func caretRectForPosition(position: UITextPosition) -> CGRect {
    return CGRectZero
}
```

3

```
override func caretRect(for position: UITextPosition) -> CGRect {
    return CGRect.zero
}
```

-C

```
- (CGRect) caretRectForPosition:(UITextPosition*) position{
return CGRectZero;
}
```

`attributedPlaceholder` (`NSAttributedString`) .

```
var placeholderAttributes = [String: AnyObject]()
placeholderAttributes[NSForegroundColorAttributeName] = color
placeholderAttributes[NSFontAttributeName] = font

if let placeholder = textField.placeholder {
    let newAttributedPlaceholder = NSAttributedString(string: placeholder, attributes:
placeholderAttributes)
    textField.attributedPlaceholder = newAttributedPlaceholder
}
```

`color` `font` . . `NSAttributedString` .

UITextField

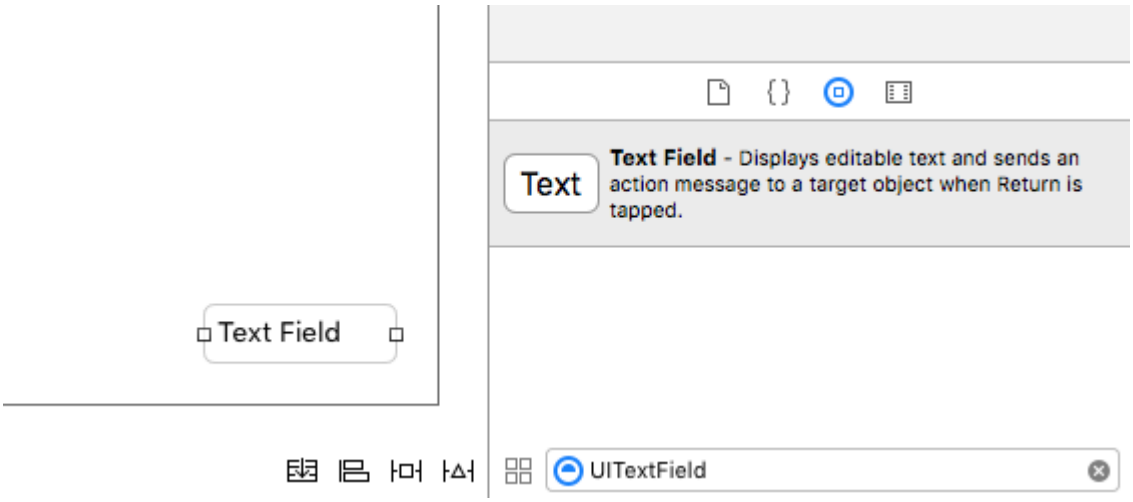
CGRect `UITextField` .

```
let textfield = UITextField(frame: CGRect(x: 0, y: 0, width: 200, height: 21))
```

-C

```
UITextField *textField = [[UITextField alloc] initWithFrame:CGRectMake(0, 0, 200, 21)];
```

Interface Builder `UITextField` .



UITextField : https://riptutorial.com/ko/ios/topic/1630/uitextfield

127: UITextField

Examples

UITextField - .

.

```
// MARK: - UITextFieldDelegate

let allowedCharacters =
CharacterSet(charactersIn:"0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvxyz").inverted


func textField(_ textField: UITextField, shouldChangeCharactersIn range: NSRange,
replacementString string: String) -> Bool {

    let components = string.components(separatedBy: allowedCharacters)
    let filtered = components.joined(separator: "")

    if string == filtered {

        return true

    } else {

        return false
    }
}
```

-C

```
#define ACCEPTABLE_CHARACTERS @"0123456789
ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz"

- (BOOL)textField:(UITextField *)textField shouldChangeCharactersInRange:(NSRange)range
replacementString:(NSString *)string
{
      NSCharacterSet *cs = [[NSCharacterSet
characterSetWithCharactersInString:ACCEPTABLE_CHARACTERS] invertedSet];

      NSString *filtered = [[string componentsSeparatedByCharactersInSet:cs]
componentsJoinedByString:@""];

      return [string isEqualToString:filtered];
}
```

apple .

https://developer.apple.com/reference/foundation/nscharacterset .

```
let allowedCharacters = CharacterSet.alphanumerics.inverted
let allowedCharacters = CharacterSet.capitalizedLetters.inverted
```

( ). textfield * **- (BOOL) textFieldShouldReturn : (UITextField *) *textField***

return . .

,

. 20 , 50,70,90 .

.

```
 - (BOOL)textFieldShouldReturn:(UITextField *)textField {

                NSInteger nextTag = textField.tag+20;
                // Try to find next responder
                UIResponder *nextResponder = [textField.superview viewWithTag:nextTag];
                if (nextResponder)
                {
                    // Found next responder, so set it.
                    [nextResponder becomeFirstResponder];
                }
                else
                {
                    // Not found, so remove keyboard.
                    [textField resignFirstResponder];
                }
                return YES;
            }
```

3.1 :

. UITextFieldDelegate TextField .

UITextFieldDelegate .

```
class SomeClass: UITextFieldDelegate {

    @IBOutlet var textField: UITextField!

    override func viewDidLoad() {
        super.viewDidLoad()
        textField.delegate = self
    }

}
```

UITextFieldDelegate .

textFieldDidBeginEditing (_ :) .

```
func textFieldDidBeginEditing(_ textField: UITextField) {
    // now you can perform some action
    // if you have multiple textfields in a class,
    // you can compare them here to handle each one separately
    if textField == emailTextField {
        // e.g. validate email
```

```
    }
    else if textField == passwordTextField {
        // e.g. validate password
    }
}
```

textFieldDidEndEditing (_ :) .

```
func textFieldDidEndEditing(_ textField: UITextField) {
    // now you can perform some action
    // if you have multiple textfields in a class,
    // you can compare them here to handle each one separately
    if textField == emailTextField {
        // e.g. validate email
    }
    else if textField == passwordTextField {
        // e.g. validate password
    }
}
```

TextField / textFieldShouldBeginEditing (_ :) textFieldShouldEndEditing (_ :) true / false .

UITextField : https://riptutorial.com/ko/ios/topic/7185/uitextfield-

128: UITextView

Examples

```
textView.text = "Hello, world!"
```

-C :

```
textView.text = @"Hello, world!";
```

```
// Modify some of the attributes of the attributed string.
let attributedText = NSMutableAttributedString(attributedString: textView.attributedText!)

// Use NSString so the result of rangeOfString is an NSRange.
let text = textView.text! as NSString

// Find the range of each element to modify.
let tintedRange = text.range(of: NSLocalizedString("tinted", comment: ""))
let highlightedRange = text.range(of: NSLocalizedString("highlighted", comment: ""))

// Add tint.
attributedText.addAttribute(NSForegroundColorAttributeName, value: UIColor.blue, range:
tintedRange)

// Add highlight.
attributedText.addAttribute(NSBackgroundColorAttributeName, value: UIColor.yellow, range:
highlightedRange)

textView.attributedText = attributedText
```

```
textView.textAlignment = .left
```

-C

```
textView.textAlignment = NSTextAlignmentLeft;
```

UITextViewDelegate

- `textViewShouldBeginEditing(_:)`
- `textViewDidBeginEditing(_:)`
- `textViewShouldEndEditing(_:)`
- `textViewDidEndEditing(_:)`

- `textView(_:shouldChangeTextIn:replacementText:)`
- `textViewDidChange(_:)`

URL

- `textView(_: UITextView, shouldInteractWithURL: NSURL, inRange: NSRange) -> Bool`

```
//System Font
textView.font = UIFont.systemFont(ofSize: 12)

//Font of your choosing
textView.font = UIFont(name: "Font Name", size: 12)
```

-C

```
//System Font
textView.font = [UIFont systemFontOfSize:12];

//Font of your choosing
textView.font = [UIFont fontWithName:@"Font Name" size:12];
```

```
textView.textColor = UIColor.red
```

-C

```
textView.textColor = [UIColor redColor];
```

HTML UITextView

```
NSString *htmlString = @"<p> This is an <b>HTML</b> text</p>";
NSAttributedString *attributedString = [[NSMutableAttributedString alloc]
                                                        initWithData: [htmlString
dataUsingEncoding:NSUnicodeStringEncoding]
                                                        options: @{
NSDocumentTypeDocumentAttribute: NSHTMLTextDocumentType }
                                                        documentAttributes: nil
                                                        error: nil
                                                        ];
                _yourTextView.attributedText = attributedString;
                // If you want to modify the font
                field.font = [UIFont fontWithName:@"Raleway-Regular" size:15];
```

,, .

UITextView . .

```
enum {
   UIDataDetectorTypePhoneNumber   = 1 << 0,
   UIDataDetectorTypeLink          = 1 << 1,
   UIDataDetectorTypeAddress       = 1 << 2,
   UIDataDetectorTypeCalendarEvent = 1 << 3,
   UIDataDetectorTypeNone          = 0,
   UIDataDetectorTypeAll           = NSUIntegerMax
};
```

```
// you may add as many as you like by using the `|` operator between options
textView.dataDetectorTypes = (UIDataDetectorTypeLink | UIDataDetectorTypePhoneNumber);
```

UITextView .

( ) UITextView

```
textView.editable = NO;
textView.selectable = YES;
textView.userInteractionEnabled = YES; // YES by default
```

.

```
if let text = self.textView.text where !text.isEmpty {
    // Do stuff for text
} else {
    // Do stuff for nil text or empty string
}
```

-C

```
if (self.textView.text.length > 0){
    // Do stuff for text
}   else {
    // Do stuff for nil text or empty string
}
```

:

```
let startPosition: UITextPosition = textView.beginningOfDocument
```

:

```
let endPosition: UITextPosition = textView.endOfDocument
```

:

```
let selectedRange: UITextRange? = textView.selectedTextRange
```

```
if let selectedRange = textView.selectedTextRange {

    let cursorPosition = textView.offsetFromPosition(textView.beginningOfDocument, toPosition:
selectedRange.start)

    print("\(cursorPosition)")
}
```

.

```
let newPosition = textView.beginningOfDocument
textView.selectedTextRange = textView.textRangeFromPosition(newPosition, toPosition:
newPosition)
```

```
let newPosition = textView.endOfDocument
textView.selectedTextRange = textView.textRangeFromPosition(newPosition, toPosition:
newPosition)
```

```
// only if there is a currently selected range
if let selectedRange = textView.selectedTextRange {

    // and only if the new position is valid
    if let newPosition = textView.positionFromPosition(selectedRange.start, inDirection:
UITextLayoutDirection.Left, offset: 1) {

        // set the new position
        textView.selectedTextRange = textView.textRangeFromPosition(newPosition, toPosition:
newPosition)
    }
}
```

5 .

```
let arbitraryValue: Int = 5
if let newPosition = textView.positionFromPosition(textView.beginningOfDocument, inDirection:
UITextLayoutDirection.Right, offset: arbitraryValue) {

    textView.selectedTextRange = textView.textRangeFromPosition(newPosition, toPosition:
newPosition)
}
```

```
textView.selectedTextRange = textView.textRangeFromPosition(textView.beginningOfDocument,
toPosition: textView.endOfDocument)
```

```
// Range: 3 to 7
let startPosition = textView.positionFromPosition(textView.beginningOfDocument, inDirection:
UITextLayoutDirection.Right, offset: 3)
let endPosition = textView.positionFromPosition(textView.beginningOfDocument, inDirection:
UITextLayoutDirection.Right, offset: 7)

if startPosition != nil && endPosition != nil {
    textView.selectedTextRange = textView.textRangeFromPosition(startPosition!, toPosition:
endPosition!)
}
```

```
textView.insertText("Hello")
```

- (Stack Overflow) .
- `UITextView` .

- `textView.becomeFirstResponder()` .
- .

- (`selectedTextRange` `selectedRange`)

.

`UITextView` . .

.

```
messageTextView.textContainerInset = UIEdgeInsetsZero
messageTextView.textContainer.lineFragmentPadding = 0
```

`NSAttributedString.boundingRectWithSize(...)` `UITextView` .

```
let budget = getSomeCGSizeBudget()
let text = getSomeAttributedString()
let textSize = text.boundingRectWithSize(budget, options: [.UsesLineFragmentOrigin,
.UsesFontLeading], context: nil).size
messageTextView.frame.size = textSize // Just fits.
```

UITextView : https://riptutorial.com/ko/ios/topic/1043/uitextview

129: UIView

1. // Objective-C
2. [UIView new] // .
3. [[UIView alloc] initWithFrame : (CGRect)] //
4. [[UIView alloc] init] // .
5. //
6. UIView () // CGRect.zero UIView .
7. UIView (frame : CGRect) // UIView .
8. UIView.addSubview (UIView) // UIView .
9. UIView.hidden // .
10. UIView.alpha //
11. UIView.setNeedsLayout () // .

UIView . .

Examples

UIView

-C

```
CGRect myFrame = CGRectMake(0, 0, 320, 35)
UIView *view = [[UIView alloc] initWithFrame:myFrame];

//Alternative way of defining the frame
UIView *view = [[UIView alloc] init];
CGRect myFrame = view.frame;
myFrame.size.width = 320;
myFrame.size.height = 35;
myFrame.origin.x = 0;
myFrame.origin.y = 0;
view.frame = myFrame;
```

```
let myFrame = CGRect(x: 0, y: 0, width: 320, height: 35)
let view = UIView(frame: myFrame)
```

UIView layer cornerRadius .

UIImageView UIView .

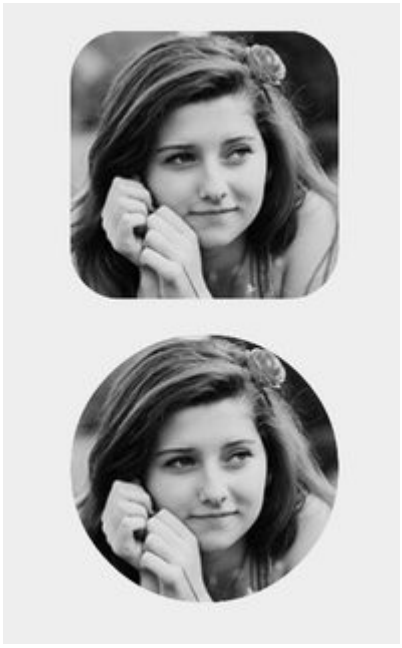
```
someImageView.layoutIfNeeded()
someImageView.clipsToBounds = true
someImageView.layer.cornerRadius = 10
```

-C

```
[someImageView layoutIfNeeded];
someImageView.clipsToBounds = YES;
someImageView.layer.cornerRadius = 10;
```

```
//Swift code
topImageView.layoutIfNeeded()
bottomImageView.layoutIfNeeded()
topImageView.clipsToBounds = true
topImageView.layer.cornerRadius = 10
bottomImageView.clipsToBounds = true
bottomImageView.layer.cornerRadius = bottomImageView.frame.width / 2

//Objective-C code
[topImageView layoutIfNeeded]
[bottomImageView layoutIfNeeded];
topImageView.clipsToBounds = YES;
topImageView.layer.cornerRadius = 10;
bottomImageView.clipsToBounds = YES;
bottomImageView.cornerRadius = CGRectGetWidth(bottomImageView.frame) / 2;
```

.

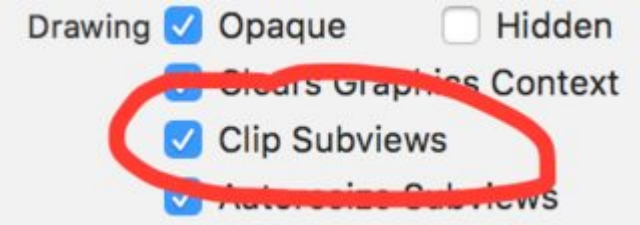


QuartzCore .

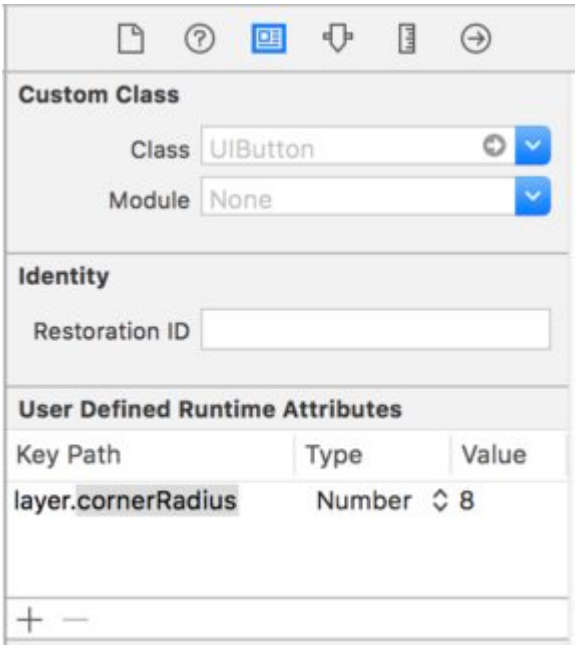
```
 #import <QuartzCore/QuartzCore.h>
```

---

non-programmatically non-programmatically .



layer *cornerRadius* .



.

```
extension UIView {
    @discardableResult
    public func setAsCircle() -> Self {
        self.clipsToBounds = true
        let frameSize = self.frame.size
        self.layer.cornerRadius = min(frameSize.width, frameSize.height) / 2.0
        return self
    }
}
```

:

```
yourView.setAsCircle()
```

UIView .

```
let snapshot = view.snapshotView(afterScreenUpdates: true)
```

-C

```
UIView *snapshot = [view snapshotViewAfterScreenUpdates: YES];
```

IBInspectable IBDesignable

Xcode ( ) IBInspectable IBDesignable UIView . Xcode . iOS . UIView CustomView . . . .

```
var textColor: UIColor = UIColor.blackColor()
var text: String?
var showText: Bool = true
```

drawRect .

```
if showText {
    if let text = text {
        let s = NSString(string: text)
        s.drawInRect(rect,
            withAttributes: [
                NSForegroundColorAttributeName: textColor,
                NSFontAttributeName: UIFont(name: "Helvetica Neue", size: 18)!
            ])
    }
}
```

text . . IBInspectable IBDesignable . IBInspectable Xcode . IBDesignable . :

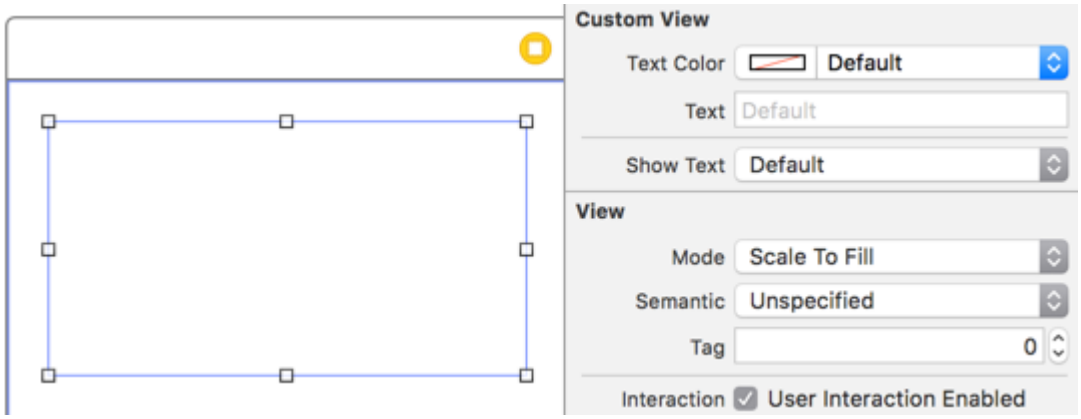
```
@IBDesignable
class CustomView: UIView {
    @IBInspectable var textColor: UIColor = UIColor.blackColor()
    @IBInspectable var text: String?
    @IBInspectable var showText: Bool = true

    override func drawRect(rect: CGRect) {
        // ...
    }
}
```

C :

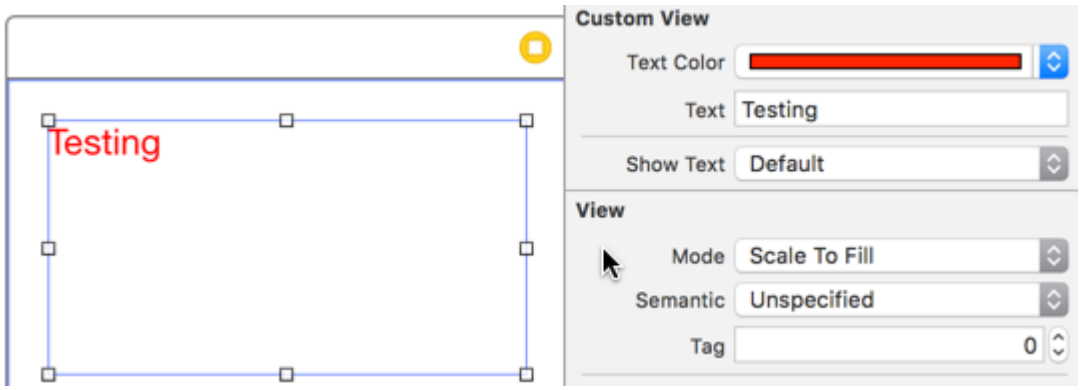
```
IB_DESIGNABLE
@interface CustomView: UIView

@property (nonatomic, strong) IBInspectable UIColor* textColor;
@property (nonatomic, strong) IBInspectable NSString* text;
@property (nonatomic, assign) IBInspectable BOOL showText;

@end

@implementation CustomView

- (instancetype)init {
    if(self = [super init]) {
        self.textColor = [UIColor blackColor];
        self.showText = YES;
    }
    return self;
```

```
}

- (void)drawRect:(CGRect)rect {
    //...
}

@end
```

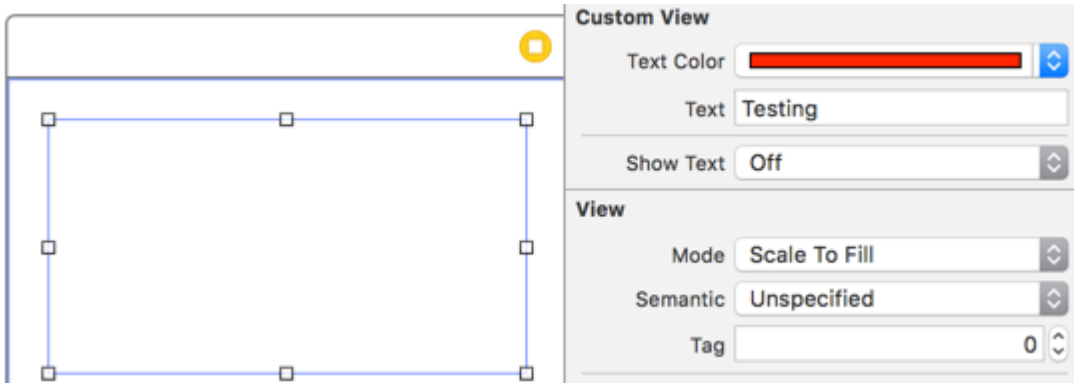
Xcode . . UI . , `false` `true` `Off` `On` `true` .



. `drawRect` . Interface Builder .



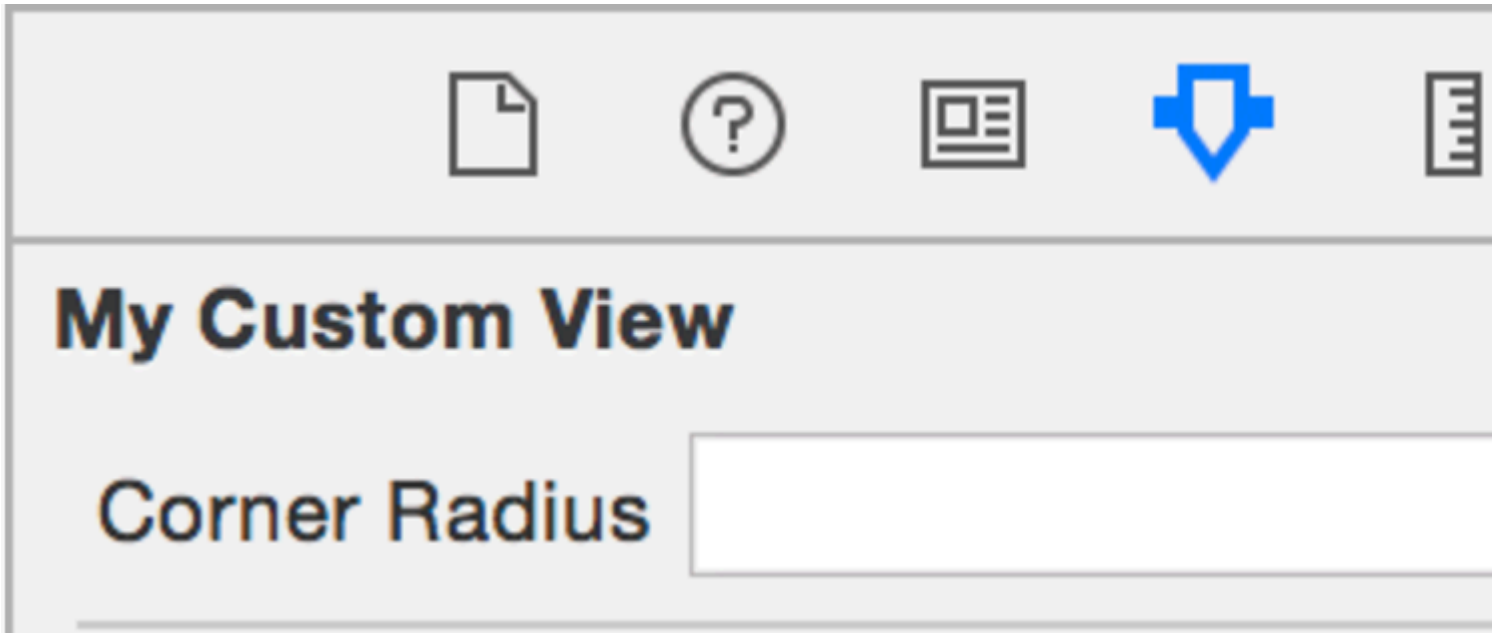
`Off` .



, `UIView` `Storyboard` .Instead `IBDesignable` `Storyboard` , `Extension` `UIView` `UIView` . UIView .

```
extension UIView {
```

```
    @IBInspectable var cornerRadius:CGFloat {
        set {
            layer.cornerRadius = newValue
            clipsToBounds = newValue > 0
        }
        get {
            return layer.cornerRadius
        }
    }

}
```



UIView

```
let view = UIView(frame: CGRect(x: 0, y: 0, width: 100, height: 100))
view.backgroundColor = UIColor.orange
self.view.addSubview(view)
UIView.animate(withDuration: 0.75, delay: 0.5, options: .curveEaseIn, animations: {
    //This will cause view to go from (0,0) to
    // (self.view.frame.origin.x,self.view.frame.origin.y)
    view.frame.origin.x = self.view.frame.origin.x
    view.frame.origin.y = self.view.frame.origin.y
}) { (finished) in
    view.backgroundColor = UIColor.blueColor()
}
```

UIView

x .

```
view.frame.origin.x
```

.

```
view.frame.size.width
```

UIView .

```
view.x
view.y
view.width
view.height
```

.

```
view.x = 10
view.y = 10
view.width = 100
view.height = 200
```

.

```
extension UIView {

    var x: CGFloat {
        get {
            return self.frame.origin.x
        }
        set {
            self.frame = CGRect(x: newValue, y: self.frame.origin.y, width:
self.frame.size.width, height: self.frame.size.height)
        }
    }

    var y: CGFloat {
        get {
            return self.frame.origin.y
        }
        set {
            self.frame = CGRect(x: self.frame.origin.x, y: newValue, width:
self.frame.size.width, height: self.frame.size.height)
        }
    }

    var width: CGFloat {
        get {
            return self.frame.size.width
        }
        set {
            self.frame = CGRect(x: self.frame.origin.x, y: self.frame.origin.y, width:
newValue, height: self.frame.size.height)
        }
    }

    var height: CGFloat {
        get {
            return self.frame.height
        }
        set {
            self.frame = CGRect(x: self.frame.origin.x, y: self.frame.origin.y, width:
self.frame.size.width, height: newValue)
        }
    }
}
```

.

UIView UIView

parentView subView (: UIViewController UIImageView). .

-C

```
[parentView addSubview:subView];
```

```
parentView.addSubview(subView)
```

subView2 subView2 .

-C

```
[parentView insertSubview:subView belowSubview:subView2];
```

```
parentView.insertSubview(subView, belowSubview: subView2)
```

subView2 .

-C

```
[parentView insertSubview:subView aboveSubview:subView2];
```

```
parentView.insertSubview(subView, aboveSubview: subView2)
```

subView , parentView , :

-C

```
[parentView bringSubviewToFront:subView];
```

```
parentView.bringSubviewToFront(subView)
```

, subView parentView , :

-C

```
[subView removeFromSuperview];
```

```
subView.removeFromSuperview()
```

Autolayout UIView

```
UIView *view = [[UIView alloc] init];

[self.view addSubview:view];

//Use the function if you want to use height as constraint
[self addView:view onParentView:self.view withHeight:200.f];


//Use this function if you want to add view with respect to parent and should resize with it
[self addFullResizeConstraintForSubview:view addedOnParentView:self.view];
```

```
-(void)addView:(UIView*)subView onParentView:(UIView*)parentView withHeight:(CGFloat)height{

subView.translatesAutoresizingMaskIntoConstraints = NO;

NSLayoutConstraint *trailing =[NSLayoutConstraint
                                    constraintWithItem:subView
                                    attribute:NSLayoutAttributeTrailing
                                    relatedBy:NSLayoutRelationEqual
                                    toItem:parent
                                    attribute:NSLayoutAttributeTrailing
                                    multiplier:1.0
                                    constant:10.f];


NSLayoutConstraint *top = [NSLayoutConstraint
                                constraintWithItem:subView
                                attribute:NSLayoutAttributeTop
                                relatedBy:NSLayoutRelationEqual
                                toItem:parent
                                attribute:NSLayoutAttributeTop
                                multiplier:1.0
                                constant:10.f];

NSLayoutConstraint *leading = [NSLayoutConstraint
                                    constraintWithItem:subView
                                    attribute:NSLayoutAttributeLeading
                                    relatedBy:NSLayoutRelationEqual
                                    toItem:parent
                                    attribute:NSLayoutAttributeLeading
                                    multiplier:1.0
                                    constant:10.f];
[parent addConstraint:trailing];
[parent addConstraint:top];
[parent addConstraint:leading];

NSLayoutConstraint *heightConstraint =[NSLayoutConstraint
                                           constraintWithItem:subView
                                           attribute:NSLayoutAttributeHeight
                                           relatedBy:NSLayoutRelationEqual
                                           toItem:nil
                                           attribute:0
                                           multiplier:0.0
                                           constant:height];

[subView addConstraint:heightConstraint];

}
```

UIView .

```
-(void)addFullResizeConstraintForSubview:(UIView*)subView
addedOnParentView:(UIView*)parentView{

subView.translatesAutoresizingMaskIntoConstraints = NO;

NSLayoutConstraint *trailing =[NSLayoutConstraint
                                    constraintWithItem:subView
                                    attribute:NSLayoutAttributeTrailing
                                    relatedBy:NSLayoutRelationEqual
                                    toItem:parent
                                    attribute:NSLayoutAttributeTrailing
                                    multiplier:1.0
                                    constant:10.f];


NSLayoutConstraint *top = [NSLayoutConstraint
                                constraintWithItem:subView
                                attribute:NSLayoutAttributeTop
                                relatedBy:NSLayoutRelationEqual
                                toItem:parent
                                attribute:NSLayoutAttributeTop
                                multiplier:1.0
                                constant:10.f];

NSLayoutConstraint *leading = [NSLayoutConstraint
                                    constraintWithItem:subView
                                    attribute:NSLayoutAttributeLeading
                                    relatedBy:NSLayoutRelationEqual
                                    toItem:parent
                                    attribute:NSLayoutAttributeLeading
                                    multiplier:1.0
                                    constant:10.f];

NSLayoutConstraint *bottom =[NSLayoutConstraint
                                  constraintWithItem:subView
                                  attribute:NSLayoutAttributeBottom
                                  relatedBy:NSLayoutRelationEqual
                                  toItem:parent
                                  attribute:NSLayoutAttributeBottom
                                  multiplier:1.0
                                  constant:0.f];
[parent addConstraint:trailing];
[parent addConstraint:top];
[parent addConstraint:leading];
[parent addConstraint:bottom];
}
```

UIView .

```
class ImageView: UIView {
    var image: UIImage {
        didSet {
            invalidateIntrinsicContentSize()
        }
    }
    // omitting initializers
    // convenience init(image: UIImage)

    override func intrinsicContentSize() -> CGSize {
        return CGSize(width: image.size.width, height: image.size.height)
```

```
    }
}
```

UIViewNoIntrinsicMetric .

```
override func intrinsicContentSize() -> CGSize {
    return CGSize(width: UIViewNoIntrinsicMetric, height: image.size.width)
}
```

AutoLayout Interface Builder

ImageView (UIImageView) superview center X superview center Y .

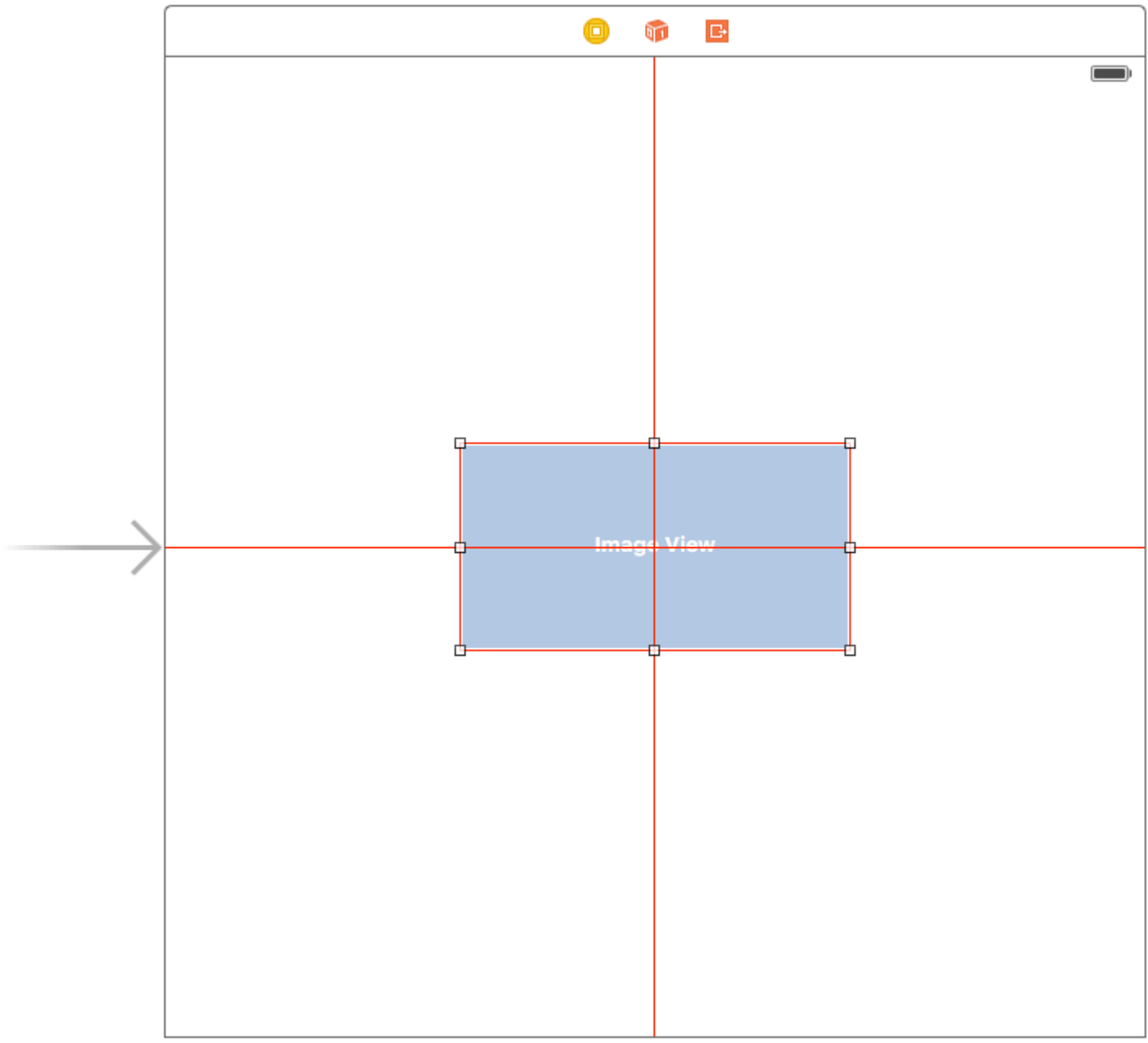
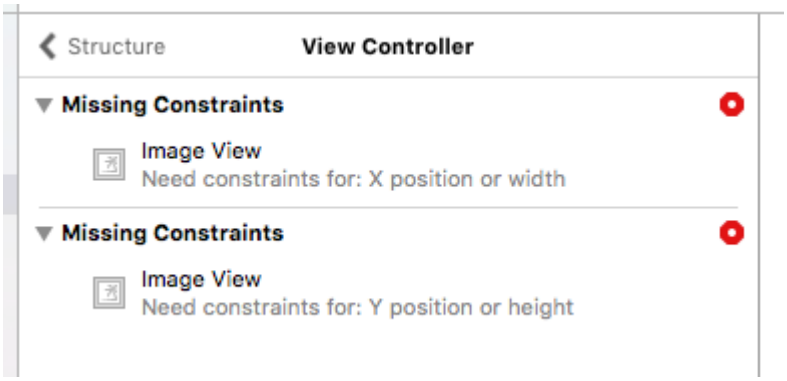


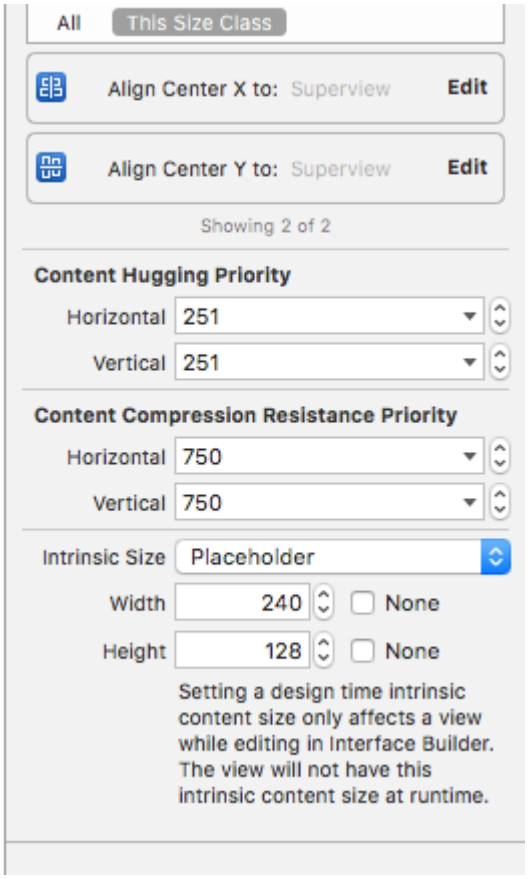
Image View

:



`Placeholder Intrinsic Size` .

Size inspector Intrinsic Size Default Placeholder .



.

```
extension UIView {
    func shake() {
        let animation = CAKeyframeAnimation(keyPath: "transform.translation.x")
        animation.timingFunction = CAMediaTimingFunction(name: kCAMediaTimingFunctionLinear)
        animation.duration = 0.6
        animation.values = [-10.0, 10.0, -7.0, 7.0, -5.0, 5.0, 0.0 ]
        layer.add(animation, forKey: "shake")
    }
}
```

.

UIView : https://riptutorial.com/ko/ios/topic/858/uiview

130: UIViewController

Examples

UIControl .

- beginTrackingWithTouch .
- continueTrackingWithTouch .
- endTrackingWithTouch .

MyCustomControl.swift

```
import UIKit

// These are out self-defined rules for how we will communicate with other classes
protocol ViewControllerCommunicationDelegate: class {
    func myTrackingBegan()
    func myTrackingContinuing(location: CGPoint)
    func myTrackingEnded()
}

class MyCustomControl: UIControl {

    // whichever class wants to be notified of the touch events must set the delegate to
itself
    weak var delegate: ViewControllerCommunicationDelegate?

    override func beginTrackingWithTouch(touch: UITouch, withEvent event: UIEvent?) -> Bool {

        // notify the delegate (i.e. the view controller)
        delegate?.myTrackingBegan()

        // returning true means that future events (like continueTrackingWithTouch and
endTrackingWithTouch) will continue to be fired
        return true
    }

    override func continueTrackingWithTouch(touch: UITouch, withEvent event: UIEvent?) -> Bool
{

        // get the touch location in our custom control's own coordinate system
        let point = touch.locationInView(self)

        // Update the delegate (i.e. the view controller) with the new coordinate point
        delegate?.myTrackingContinuing(point)

        // returning true means that future events will continue to be fired
        return true
    }

    override func endTrackingWithTouch(touch: UITouch?, withEvent event: UIEvent?) {

        // notify the delegate (i.e. the view controller)
        delegate?.myTrackingEnded()
    }
}
```

ViewController.swift

.

```
import UIKit
class ViewController: UIViewController, ViewControllerCommunicationDelegate {

    @IBOutlet weak var myCustomControl: MyCustomControl!
    @IBOutlet weak var trackingBeganLabel: UILabel!
    @IBOutlet weak var trackingEndedLabel: UILabel!
    @IBOutlet weak var xLabel: UILabel!
    @IBOutlet weak var yLabel: UILabel!

    override func viewDidLoad() {
        super.viewDidLoad()
        myCustomControl.delegate = self
    }

    func myTrackingBegan() {
        trackingBeganLabel.text = "Tracking began"
    }

    func myTrackingContinuing(location: CGPoint) {
        xLabel.text = "x: \(location.x)"
        yLabel.text = "y: \(location.y)"
    }

    func myTrackingEnded() {
        trackingEndedLabel.text = "Tracking ended"
    }
}
```

- .
- . print . .

```
  import UIKit
  class MyCustomControl: UIControl {

      override func beginTrackingWithTouch(touch: UITouch, withEvent event: UIEvent?) ->
Bool {
          print("Began tracking")
          return true
      }

      override func continueTrackingWithTouch(touch: UITouch, withEvent event: UIEvent?)
-> Bool {
          let point = touch.locationInView(self)
          print("x: \(point.x), y: \(point.y)")
          return true
      }

      override func endTrackingWithTouch(touch: UITouch?, withEvent event: UIEvent?) {
          print("Ended tracking")
      }
  }
```

```
let viewController = UIViewController()
```

-C

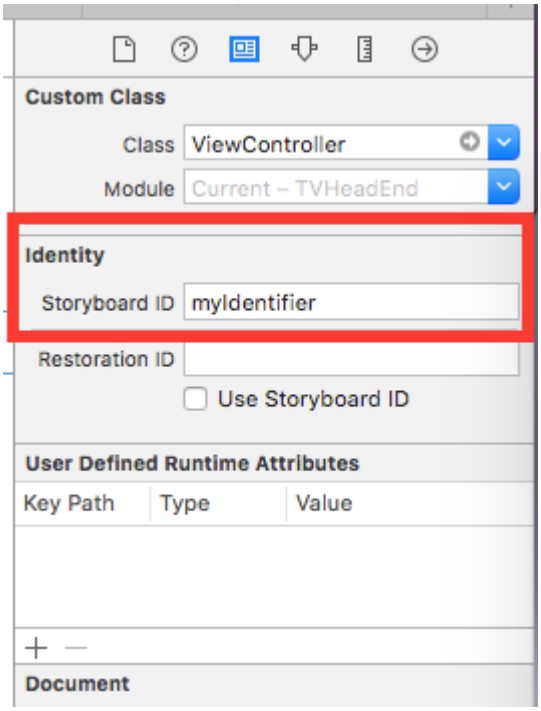
```
UIViewController *viewController = [UIViewController new];
```

```
class FooViewController: UIViewController {

  override func loadView() {
    view = FooView()
  }

}
```

```
UIStoryboard *storyboard = [UIStoryboard storyboardWithName:@"Main" bundle:nil];
```

:

ID ID .

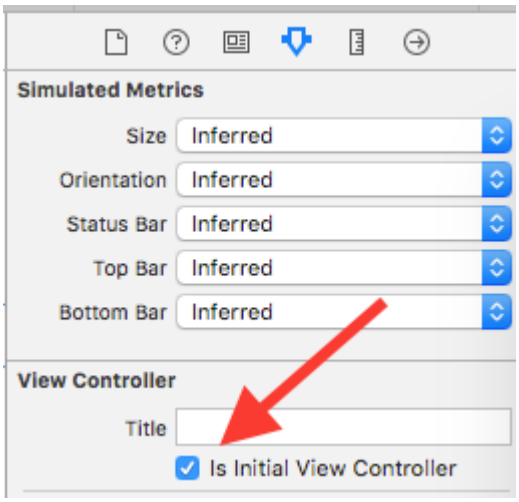


:

```
UIViewController *controller = [storyboard
instantiateViewControllerWithIdentifier:@"myIdentifier"];
```

viewcontroller :

" " .




```
UIStoryboard *storyboard = [UIStoryboard storyboardWithName:@"Main" bundle:nil];
UIViewController *controller = [storyboard instantiateInitialViewController];
```

.

```
let tabBarController = viewController.tabBarController
```

-C

```
UITabBarController *tabBarController = self.tabBarController;
```

.

```
let navigationController = viewController.navigationController
```

-C

```
UINavigationController *navigationController = self.navigationController;
```

/

:

```
- (void)displayContentController:(UIViewController *)vc {
    [self addChildViewController:vc];
    vc.view.frame = self.view.frame;
    [self.view addSubview:vc.view];
    [vc didMoveToParentViewController:self];
}
```

:

```
- (void)hideContentController:(UIViewController *)vc {
    [vc willMoveToParentViewController:nil];
    [vc.view removeFromSuperview];
    [vc removeFromParentViewController];
```

```
}
```

UIViewController : https://riptutorial.com/ko/ios/topic/1956/uiviewcontroller

131: UIView

Examples

```
- (UIImage *)getSnapshot
{
UIScreen *screen = [UIScreen mainScreen];
CGRect bounds = [self.view bounds];
UIGraphicsBeginImageContextWithOptions(bounds.size, false, screen.scale);
CGContextRef context = UIGraphicsGetCurrentContext();
CGContextSetInterpolationQuality(context, kCGInterpolationHigh);
[self.view drawViewHierarchyInRect:bounds afterScreenUpdates:YES];
UIImage *image = UIGraphicsGetImageFromCurrentImageContext();
UIGraphicsEndImageContext();
return image;
}
```

```
var screenshot: UIImage
{
UIGraphicsBeginImageContext(self.bounds.size);
let context = UIGraphicsGetCurrentContext();
self.layer.render(in: context)
let screenShot = UIGraphicsGetImageFromCurrentImageContext();
UIGraphicsEndImageContext();
return screenShot
}
```

-
- . .

```
{
    CGSize fullSize = getImageForEdit.size;
    CGSize sizeInView = AVMakeRectWithAspectRatioInsideRect(imgViewFake.image.size,
imgViewFake.bounds).size;
    CGFloat orgScale = orgScale = fullSize.width/sizeInView.width;
    CGSize newSize = CGSizeMake(orgScale * img.image.size.width, orgScale *
img.image.size.height);
    if(newSize.width <= fullSize.width && newSize.height <= fullSize.height){
        newSize = fullSize;
    }
    CGRect offsetRect;
    if (getImageForEdit.size.height > getImageForEdit.size.width){
        CGFloat scale = newSize.height/fullSize.height;
        CGFloat offset = (newSize.width - fullSize.width*scale)/2;
        offsetRect = CGRectMake(offset, 0, newSize.width-offset*2, newSize.height);
    }
    else{
        CGFloat scale = newSize.width/fullSize.width;
        CGFloat offset = (newSize.height - fullSize.height*scale)/2;
        offsetRect = CGRectMake(0, offset, newSize.width, newSize.height-offset*2);
    }
    UIGraphicsBeginImageContextWithOptions(newSize, NO, getImageForEdit.scale);
    [getImageForEdit drawAtPoint:offsetRect.origin];
    //        [img.image drawInRect:CGRectMake(0,0,newSize.width,newSize.height)];
    CGFloat oldScale = img.contentScaleFactor;
```

```
    img.contentScaleFactor = getImageForEdit.scale;
    [img drawViewHierarchyInRect:CGRectMake(0, 0, newSize.width, newSize.height)
afterScreenUpdates:YES];
    img.contentScaleFactor = oldScale;
    UIImage *combImage = UIGraphicsGetImageFromCurrentImageContext();
    UIGraphicsEndImageContext();
    imageData = UIImageJPEGRepresentation(combImage, 1);
}
```

UIView : https://riptutorial.com/ko/ios/topic/4622/uiview--

132: UIWebView

UIWebView : -

-C

```
- (BOOL)webView:(UIWebView *)webView
shouldStartLoadWithRequest:(NSURLRequest *)request
 navigationType:(UIWebViewNavigationType)navigationType;

- (void)webView:(UIWebView *)webView
didFailLoadWithError:(NSError *)error;

- (void)webViewDidFinishLoad:(UIWebView *)webView;

- (void)webViewDidStartLoad:(UIWebView *)webView;
```

Examples

UIWebView

```
let webview = UIWebView(frame: CGRect(x: 0, y: 0, width: 320, height: 480))
```

-C

```
UIWebView *webview = [[UIWebView alloc] initWithFrame:CGRectMake(0, 0, 320, 480)];

//Alternative way of defining frame for UIWebView
UIWebView *webview = [[UIWebView alloc] init];
CGRect webviewFrame = webview.frame;
webviewFrame.size.width = 320;
webviewFrame.size.height = 480;
webviewFrame.origin.x = 0;
webviewFrame.origin.y = 0;
webview.frame = webviewFrame;
```

URL

`url` webview

```
webview.loadRequest(NSURLRequest(URL: NSURL(string: "http://www.google.com")!))
```

-C

```
[webview loadRequest:[NSURLRequest requestWithURL:[NSURL
URLWithString:@"http://www.google.com"]]];
```

`stopLoading()` webview .

```
webview.stopLoading()
```

-C

```
[webview stopLoading];
```

```
webview.reload()
```

-C

```
[webview reload];
```

, HTML . `UIWebViewDelegate` .

```
- (void) webViewDidFinishLoad:(UIWebView *) aWebView {
    CGRect frame = aWebView.frame;
    frame.size.height = 1;
    aWebView.frame = frame;
    CGSize fittingSize = [aWebView sizeThatFits:CGSizeZero];
    frame.size = fittingSize;
    aWebView.frame = frame;

    NSLog(@"size: %f, %f", fittingSize.width, fittingSize.height);
}
```

1 . . .

HTML

HTML .

```
NSString *html = @"<!DOCTYPE html><html><body>Hello World</body></html>";
[webView loadHTMLString:html baseURL:nil];
```

```
  let htmlString = "<h1>My First Heading</h1><p>My first paragraph.</p>"
  webView.loadHTMLString(htmlString, baseURL: nil)
```

URL . , .

```
NSString *html = @"<!DOCTYPE html><html><head><link href='style.css' rel='stylesheet'
type='text/css'></head><body>Hello World</body></html>";
[self loadHTMLString:html baseURL:[NSURL fileURLWithPath:[[NSBundle mainBundle]
resourcePath]]];
```

`style.css` . URL .

JavaScript

`stringByEvaluatingJavaScriptFromString()` `UIWebView` JavaScript . script JavaScript nil .

```
webview.stringByEvaluatingJavaScriptFromString("alert('This is JavaScript!');")
```

```
//Suppose you have javascript file named "JavaScript.js" in project.
let filePath = NSBundle.mainBundle().pathForResource("JavaScript", ofType: "js")
        do {
            let jsContent = try String.init(contentsOfFile: filePath!, encoding:
NSUTF8StringEncoding)
            webview.stringByEvaluatingJavaScriptFromString(jsContent)
        }
        catch let error as NSError{
            print(error.debugDescription)
        }
```

-C

```
[webview stringByEvaluatingJavaScriptFromString:@"alert('This is JavaScript!');"];
```

```
//Suppose you have javascript file named "JavaScript.js" in project.
NSString *filePath = [[NSBundle mainBundle] pathForResource:@"JavaScript" ofType:@"js"];
NSString *jsContent = [NSString stringWithContentsOfFile:filePath
encoding:NSUTF8StringEncoding error:nil];
[webview stringByEvaluatingJavaScriptFromString:jsContent];
```

`stringByEvaluatingJavaScriptFromString:` JavaScript . . `WKWebView` `evaluateJavaScript:completionHandler:` . `WKWebView` iOS 8.0 .

.pdf, .txt, .doc

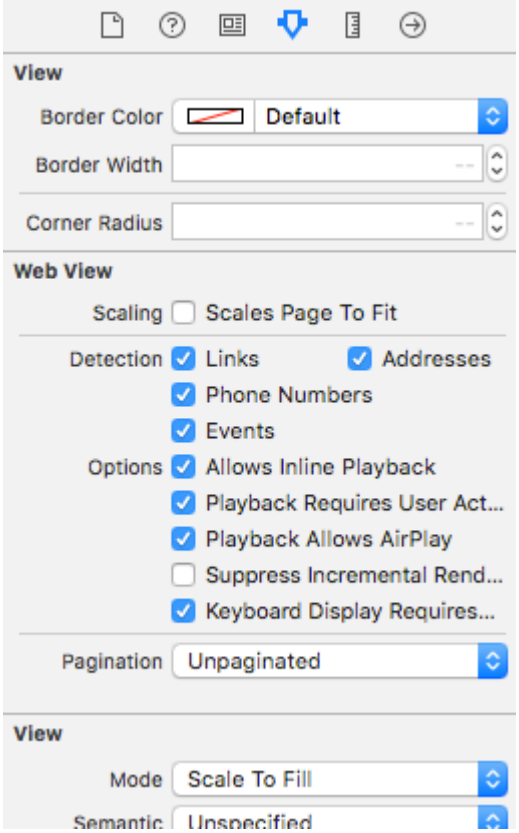
.pdf, .txt, .doc iOS WebView . `loadData` `NSData` webview .

```
//Assuming there is a text file in the project named "home.txt".
let localFilePath = NSBundle.mainBundle().pathForResource("home", ofType:"txt");
let data = NSFileManager.defaultManager().contentsAtPath(localFilePath!);
webview.loadData(data!, MIMEType: "application/txt", textEncodingName:"UTF-8" , baseURL:
NSURL())
```

-C

```
//Assuming there is a text file in the project named "home.txt".
NSString *localFilePath = [[NSBundle mainBundle] pathForResource:@"home" ofType:@"txt"];
NSData *data = [[NSFileManager defaultManager] contentsAtPath:localFilePath];
[webview loadData:data MIMEType:@"application/txt" textEncodingName:@"UTF-8" baseURL:[NSURL
new]];
```

UIWebview



vc.h

```
@interface vc : UIViewController<UIWebViewDelegate>
```

vc.m

```
- (BOOL)webView:(UIWebView *)webView shouldStartLoadWithRequest:(NSURLRequest *)request
navigationType:(UIWebViewNavigationType)navigationType{


    if (navigationType == UIWebViewNavigationTypeLinkClicked){
        //open it on browser if you want to open it in same web view remove return NO;
        NSURL *url = request.URL;
        if ([[UIApplication sharedApplication] canOpenURL:url]) {
            [[UIApplication sharedApplication] openURL:url];
        }
        return NO;

    }

    return YES;

}
```

WebView HTML

, HTML ( )

HTML WebView.

```
webView.loadRequest(NSURLRequest(URL: NSURL(fileURLWithPath:
NSBundle.mainBundle().pathForResource("YOUR HTML FILE", ofType: "html")!})
```

- HTML index.html **HTML index .**
- *viewDidLoad () viewDidAppear ()* .

UIWebView : https://riptutorial.com/ko/ios/topic/1452/uiwebview

133: URL

1. // **canOpenURL** URL .
2. //

   UIApplication.sharedApplication (). canOpenURL (_ aUrl : NSURL)
3. // Objective-C

   [[UIApplication sharedApplication] canOpenURL : (NSURL *) aUrl];
4. // **openURL** URL . YES / true, false.
5. //

   UIApplication.sharedApplication (). openURL (_ aUrl : NSURL)
6. // Objective-C

   [[UIApplication sharedApplication] openURL : (NSURL *) aUrl];

aUrl	NSURL

iOS9 URL . `LSApplicationQueriesSchemes` Info.plist `LSApplicationQueriesSchemes`

---

iOS `tel` , `http` / `https` , `sms` , `mailto` , `facetime` . `Youtube` , `Maps` `iTunes` http URL .

URL :

tel : `tel://123456890` `tel:123456890`

http : `http://www.google.com`

facetime : `facetime://azimov@demo.com`

mailto : `mailto://azimov@demo.com`

sms : `sms://123456890` `sms:123456890`

YouTube : `https://www.youtube.com/watch?v=-eCaif2QKfA`

:

- : `http://maps.apple.com/?address=1,Infinite+Loop,Cupertino,California`
- : `http://maps.apple.com/?ll=46.683155557,6.683155557`

iTunes : `https://itunes.apple.com/us/artist/randy-newman/id200900`

: `tel` (: `*` `#`). . `Phone` .

Examples

URL Mail

:

```
if let url = URL(string: "mailto://azimov@demo.com") {
    if UIApplication.shared.canOpenURL(url) {
        UIApplication.shared.openURL(url)
    } else {
        print("Cannot open URL")
    }
}
```

-C :

```
NSURL *url = [NSURL URLWithString:@"mailto://azimov@demo.com"];
if ([[UIApplication sharedApplication] canOpenURL:url]) {
    [[UIApplication sharedApplication] openURL:url];
} else {
    NSLog(@"Cannot open URL");
}
```

Apple URL

iOS, OS X watchOS 2 URL .

Safari :

-C

```
NSString *stringURL = @"http://stackoverflow.com/";
NSURL *url = [NSURL URLWithString:stringURL];
[[UIApplication sharedApplication] openURL:url];
```

:

```
let stringURL = "http://stackoverflow.com/"
if let url = URL(string: stringURL) {
    UIApplication.shared.openURL(url)
}
```

-C

```
NSString *stringURL = @"tel:1-408-555-5555";
NSURL *url = [NSURL URLWithString:stringURL];
[[UIApplication sharedApplication] openURL:url];
```

:

```
let stringURL = "tel:1-408-555-5555"
if let url = URL(string: stringURL) {
    UIApplication.shared.openURL(url)
}
```

HTML

```
<a href="tel:1-408-555-5555">1-408-555-5555</a>
```

FaceTime

-C

```
NSString *stringURL = @"facetime:14085551234";
NSURL *url = [NSURL URLWithString:stringURL];
[[UIApplication sharedApplication] openURL:url];
```

:

```
let stringURL = "facetime:14085551234"
if let url = URL(string: stringURL) {
    UIApplication.shared.openURL(url)
}
```

HTML

```
<a href="facetime:14085551234">Connect using FaceTime</a>
<a href="facetime:user@example.com">Connect using FaceTime</a>
```

SMS :

-C

```
NSString *stringURL = @"sms:1-408-555-1212";
NSURL *url = [NSURL URLWithString:stringURL];
[[UIApplication sharedApplication] openURL:url];
```

:

```
let stringURL = "sms:1-408-555-1212"
if let url = URL(string: stringURL) {
    UIApplication.shared.openURL(url)
}
```

HTML

```
<a href="sms:">Launch Messages App</a>
<a href="sms:1-408-555-1212">New SMS Message</a>
```

Mail .

-C

```
NSString *stringURL = @"mailto:foo@example.com";
NSURL *url = [NSURL URLWithString:stringURL];
[[UIApplication sharedApplication] openURL:url];
```

:

```
let stringURL = "mailto:foo@example.com"
if let url = URL(string: stringURL) {
    UIApplication.shared.openURL(url)
}
```

HTML

```
<a href="mailto:frank@wwdcdemo.example.com">John Frank</a>
```

, , . (iOS from .) mailto URL .

```
mailto:foo@example.com?cc=bar@example.com&subject=Greetings%20from%20Cupertino!&body=Wish%20you%20were
```

: `MFMailComposeViewController` .

URL : https://riptutorial.com/ko/ios/topic/3646/url--

134: UUID (Universally Unique Identifier)

UUID SSKeychainUtility . Github .

Examples

UUID

UUID

```
func randomUUID() -> NSString{
    return NSUUID.UUID().UUIDString()
}
```

-C

```
+ (NSString *)randomUUID {
    if(NSClassFromString(@"NSUUID")) { // only available in iOS >= 6.0
        return [[NSUUID UUID] UUIDString];
    }
    CFUUIDRef uuidRef = CFUUIDCreate(kCFAllocatorDefault);
    CFStringRef cfuuid = CFUUIDCreateString(kCFAllocatorDefault, uuidRef);
    CFRelease(uuidRef);
    NSString *uuid = [((__bridge NSString *) cfuuid) copy];
    CFRelease(cfuuid);
    return uuid;
}
```

iOS 6

UUID .

```
let UDIDString = UIDevice.currentDevice().identifierForVendor?.UUIDString
```

-C

```
NSString *UDIDString = [[[UIDevice currentDevice] identifierForVendor] UUIDString];
```

`identifierForVendor` . `UUID` Apple .

Apple IFA vs. IFV (Apple)

- IFA IFV .
- IFA . IFV .

- ASIdentifierManager .
    - **advertisingIdentifier : UUID** : .
    - **isAdvertisingTrackingEnabled** : .

IFV

- ASIdentifierManager .
    - **identifierForVendor : UUID** : .

IFA IFV .

iOS UUID

`UUID String` .

, UUID .

3.0

```
print(UUID().uuidString)
```

ID .

UUID (Universally Unique Identifier) : https://riptutorial.com/ko/ios/topic/3629/uuid--universally-unique-identifier-

135: WCSessionDelegate

`WCSessionDelegate` `WCSessionDelegate` OS2 + . var watchSession : WCSession? : - `didReceiveApplicationContext` () : func startWatchSession () {if (WCSession.isSupported ()) {watchSession = WCSession.default () watchSession.delegate = self watchSession.activate ()}}

Examples

(WKInterfaceController)

```
import WatchConnectivity

var watchSession : WCSession?

    override func awake(withContext context: Any?) {
        super.awake(withContext: context)
        // Configure interface objects here.
        startWatchSession()
    }

func startWatchSession(){

        if(WCSession.isSupported()){
            watchSession = WCSession.default()
            watchSession!.delegate = self
            watchSession!.activate()
        }
    }

//Callback in below delegate method when iOS app triggers event
func session(_ session: WCSession, didReceiveApplicationContext applicationContext: [String :
Any]) {
        print("did ReceiveApplicationContext at watch")
    }
```

WCSessionDelegate : https://riptutorial.com/ko/ios/topic/8289/wcsessiondelegate

136: WKWebView

WKWebView iOS 8 OS X Yosemite WebKit API . UIKit UIWebView AppKit WebView API .

60fps , , , Safari JavaScript WKWebView WWDC 2014 .

Examples

```
import UIKit
import WebKit


class ViewController: UIViewController, UISearchBarDelegate, WKNavigationDelegate,
WKUIDelegate {

    var searchbar: UISearchBar! //All web-browsers have a search-bar.
    var webView: WKWebView! //The WKWebView we'll use.
    var toolbar: UIToolbar! //Toolbar at the bottom just like in Safari.
    var activityIndicator: UIActivityIndicatorView! //Activity indicator to let the user know
the page is loading.

    override func viewDidLoad() {
        super.viewDidLoad()

        self.initControls()
        self.setTheme()
        self.doLayout()
    }

    override func didReceiveMemoryWarning() {
        super.didReceiveMemoryWarning()
    }


    func initControls() {
        self.searchbar = UISearchBar()

        //WKUserContentController allows us to add Javascript scripts to our webView that will
run either at the beginning of a page load OR at the end of a page load.

        let configuration = WKWebViewConfiguration()
        let contentController = WKUserContentController()
        configuration.userContentController = contentController

        //create the webView with the custom configuration.
        self.webView = WKWebView(frame: .zero, configuration: configuration)

        self.toolbar = UIToolbar()
        self.layoutToolbar()

        self.activityIndicator = UIActivityIndicatorView(activityIndicatorStyle: .gray)
        self.activityIndicator.hidesWhenStopped = true
    }

    func setTheme() {
        self.edgesForExtendedLayout = UIRectEdge(rawValue: 0)
        self.navigationController?.navigationBar.barTintColor = UIColor.white()
```

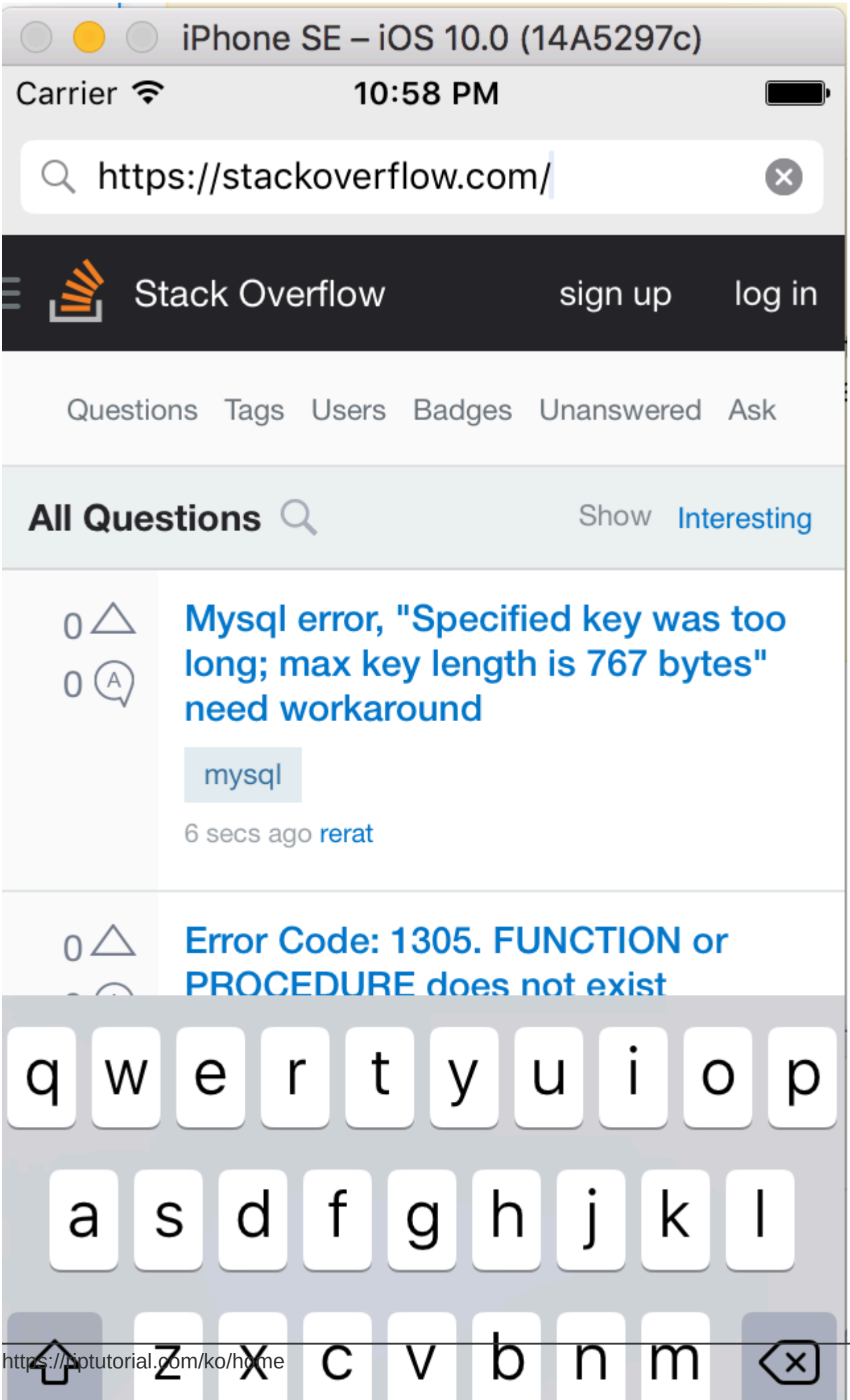
```
        //Theme the keyboard and searchBar. Setup delegates.
        self.searchbar.delegate = self
        self.searchbar.returnKeyType = .go
        self.searchbar.searchBarStyle = .prominent
        self.searchbar.placeholder = "Search or enter website name"
        self.searchbar.autocapitalizationType = .none
        self.searchbar.autocorrectionType = .no

        //Set the WebView's delegate.
        self.webView.navigationDelegate = self //Delegate that handles page navigation
        self.webView.uiDelegate = self //Delegate that handles new tabs, windows, popups,
layout, etc..

        self.activityIndicator.transform = CGAffineTransform(scaleX: 1.5, y: 1.5)
    }

    func layoutToolbar() {
        //Browsers typically have a back button, forward button, refresh button, and
newTab/newWindow button.

        var items = Array<UIBarButtonItem>()

        let space = UIBarButtonItem(barButtonSystemItem: .flexibleSpace, target: nil, action:
nil)

        items.append(UIBarButtonItem(title: "<", style: .plain, target: self, action:
#selector(onBackButtonPressed)))
        items.append(space)
        items.append(UIBarButtonItem(title: ">", style: .plain, target: self, action:
#selector(onForwardButtonPressed)))
        items.append(space)
        items.append(UIBarButtonItem(barButtonSystemItem: .refresh, target: self, action:
#selector(onRefreshPressed)))
        items.append(space)
        items.append(UIBarButtonItem(barButtonSystemItem: .organize, target: self, action:
#selector(onTabPressed)))

        self.toolbar.items = items
    }

    func doLayout() {
        //Add the searchBar to the navigationBar.
        self.navigationItem.titleView = self.searchbar

        //Add all other subViews to self.view.
        self.view.addSubview(self.webView)
        self.view.addSubview(self.toolbar)
        self.view.addSubview(self.activityIndicator)

        //Setup which views will be constrained.

        let views: [String: AnyObject] = ["webView": self.webView, "toolbar": self.toolbar,
"activityIndicator": self.activityIndicator];
        var constraints = Array<String>();

        constraints.append("H:|-0-[webView]-0-|")
        constraints.append("H:|-0-[toolbar]-0-|")
        constraints.append("V:|-0-[webView]-0-[toolbar(50)]-0-|")
```

```
        //constrain the subviews using the above visual constraints.

        for constraint in constraints {
            self.view.addConstraints(NSLayoutConstraint.constraints(withVisualFormat:
constraint, options: NSLayoutFormatOptions(rawValue: 0), metrics: nil, views: views))
        }

        for view in self.view.subviews {
            view.translatesAutoresizingMaskIntoConstraints = false
        }


        //constraint the activity indicator to the center of the view.
        self.view.addConstraint(NSLayoutConstraint(item: self.activityIndicator, attribute:
.centerX, relatedBy: .equal, toItem: self.view, attribute: .centerX, multiplier: 1.0,
constant: 0.0))
        self.view.addConstraint(NSLayoutConstraint(item: self.activityIndicator, attribute:
.centerY, relatedBy: .equal, toItem: self.view, attribute: .centerY, multiplier: 1.0,
constant: 0.0))
    }

    //Searchbar Delegates

    func searchBarSearchButtonClicked(_ searchBar: UISearchBar) {
        self.searchbar.resignFirstResponder()

        if let searchText = self.searchbar.text, url = URL(string: searchText) {
            //Get the URL from the search bar. Create a new NSURLRequest with it and tell the
webView to navigate to that URL/Page. Also specify a timeout for if the page takes too long.
Also handles cookie/caching policy.

            let request = URLRequest(url: url, cachePolicy: .useProtocolCachePolicy,
timeoutInterval: 30)
            self.webView.load(request)
        }
    }


    //Toolbar Delegates

    func onBackButtonPressed(button: UIBarButtonItem) {
        if (self.webView.canGoBack) { //allow the user to go back to the previous page.
            self.webView.goBack()
        }
    }

    func onForwardButtonPressed(button: UIBarButtonItem) {
        if (self.webView.canGoForward) { //allow the user to go forward to the next page.
            self.webView.goForward()
        }
    }

    func onRefreshPressed(button: UIBarButtonItem) {
        self.webView.reload()  //reload the current page.
    }

    func onTabPressed(button: UIBarButtonItem) {
        //TODO: Open a new tab or web-page.
    }
```

```
    //WebView Delegates

    func webView(_ webView: WKWebView, decidePolicyFor navigationAction: WKNavigationAction,
decisionHandler: (WKNavigationActionPolicy) -> Void) {

        decisionHandler(.allow) //allow the user to navigate to the requested page.
    }

    func webView(_ webView: WKWebView, decidePolicyFor navigationResponse:
WKNavigationResponse, decisionHandler: (WKNavigationResponsePolicy) -> Void) {

        decisionHandler(.allow) //allow the webView to process the response.
    }

    func webView(_ webView: WKWebView, didStartProvisionalNavigation navigation:
WKNavigation!) {
        self.activityIndicator.startAnimating()
    }

    func webView(_ webView: WKWebView, didFailProvisionalNavigation navigation: WKNavigation!,
withError error: NSError) {
        self.activityIndicator.stopAnimating()

        //Handle the error. Display an alert to the user telling them what happened.

        let alert = UIAlertController(title: "Error", message: error.localizedDescription,
preferredStyle: .alert)
        let action = UIAlertAction(title: "OK", style: .default) { (action) in
            alert.dismiss(animated: true, completion: nil)
        }
        alert.addAction(action)
        self.present(alert, animated: true, completion: nil)
    }

    func webView(_ webView: WKWebView, didFinish navigation: WKNavigation!) {
        self.activityIndicator.stopAnimating()

        //Update our search bar with the webPage's final endpoint-URL.
        if let url = self.webView.url {
            self.searchbar.text = url.absoluteString ?? self.searchbar.text
        }
    }

    func webView(_ webView: WKWebView, didReceiveServerRedirectForProvisionalNavigation
navigation: WKNavigation!) {
        //When the webview receives a "Redirect" to a different page or endpoint, this is
called.
    }

    func webView(_ webView: WKWebView, didCommit navigation: WKNavigation!) {
        //When the content for the webpage starts arriving, this is called.
    }

    func webView(_ webView: WKWebView, didFail navigation: WKNavigation!, withError error:
NSError) {

    }

    func webView(_ webView: WKWebView, didReceive challenge: URLAuthenticationChallenge,
completionHandler: (URLSession.AuthChallengeDisposition, URLCredential?) -> Void) {
```

```
        completionHandler(.performDefaultHandling, .none) //Handle SSL connections by default.
We aren't doing SSL pinning or custom certificate handling.

    }


    //WebView's UINavigation Delegates

    //This is called when a webView or existing loaded page wants to open a new window/tab.
    func webView(_ webView: WKWebView, createWebViewWith configuration:
WKWebViewConfiguration, for navigationAction: WKNavigationAction, windowFeatures:
WKWindowFeatures) -> WKWebView? {

        //The view that represents the new tab/window. This view will have an X button at the
top left corner + a webView.
        let container = UIView()

        //New tabs need an exit button.
        let XButton = UIButton()
        XButton.addTarget(self, action: #selector(onWebViewExit), for: .touchUpInside)
        XButton.layer.cornerRadius = 22.0

        //Create the new webView window.
        let webView = WKWebView(frame: .zero, configuration: configuration)
        webView.navigationDelegate = self
        webView.uiDelegate = self

        //Layout the tab.
        container.addSubview(XButton)
        container.addSubview(webView)

        let views: [String: AnyObject] = ["XButton": XButton, "webView": webView];
        var constraints = Array<String>()

        constraints.append("H:|-(-22)-[XButton(44)]")
        constraints.append("H:|-0-[webView]-0-|")
        constraints.append("V:|-(-22)-[XButton(44)]-0-[webView]-0-|")


        //constrain the subviews.
        for constraint in constraints {
            container.addConstraints(NSLayoutConstraint.constraints(withVisualFormat:
constraint, options: NSLayoutFormatOptions(rawValue: 0), metrics: nil, views: views))
        }

        for view in container.subviews {
            view.translatesAutoresizingMaskIntoConstraints = false
        }

        //TODO: Add the containerView to self.view or present it with a new controller. Keep
track of tabs..

        return webView
    }

    func onWebViewExit(button: UIButton) {
        //TODO: Destroy the tab. Remove the new tab from the current window or controller.
    }
}
```

GO :

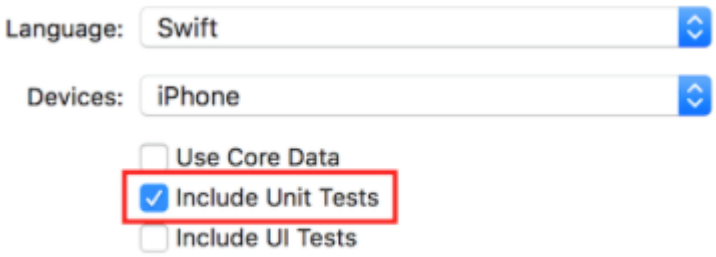

iPhone SE – iOS 10.0 (14A5297c)
Carrier
10:58 PM
https://stackoverflow.com/
Stack Overflow
sign up
log in
Questions
Tags
Users
Badges
Unanswered
Ask
All Questions
Show
Interesting
0
0
Mysql error, "Specified key was too long; max key length is 767 bytes" need workaround
mysql
6 secs ago rerat
0
Error Code: 1305. FUNCTION or PROCEDURE does not exist
q w e r t y u i o p
a s d f g h j k l
z x c v b n m

137: XCTest -

Examples

Xcode

"Include Unit Tests" .



. :

1- Xcode .

2 - "" .

3 - " " .

4- "Other" "Cocoa Touch Unit Test Testing Bundle" .

`[Your app name]Tests.swift` . Objective-C `[Your app name]Tests.h` `[Your app name]Tests.m` .

`[Your app name]Tests.swift or .m` .

- `XCTest`
- A `[Your app name]Tests` `XCTestCase` `[Your app name]Tests`
- `setUp` , `tearDown` , `testExample` , `testPerformanceExample`

```
import XCTest

class MyProjectTests: XCTestCase {

override func setUp() {
    super.setUp()
    // Put setup code here. This method is called before the invocation of each test method in
the class.
}

override func tearDown() {
    // Put teardown code here. This method is called after the invocation of each test method
in the class.
```

```
    super.tearDown()
}

func testExample() {
    // This is an example of a functional test case.
    // Use XCTAssert and related functions to verify your tests produce the correct results.

}

func testPerformanceExample() {
    // This is an example of a performance test case.
    self.measure {
        // Put the code you want to measure the time of here.
    }
}

}
```

-C

```
#import <XCTest/XCTest.h>

@interface MyProjectTests : XCTestCase

@end

@implementation MyProjectTests

- (void)setUp {
    [super setUp];
// Put setup code here. This method is called before the invocation of each test method in the
class.
}

- (void)tearDown {
// Put teardown code here. This method is called after the invocation of each test method in
the class.
    [super tearDown];
}

- (void)testExample {
// This is an example of a functional test case.
// Use XCTAssert and related functions to verify your tests produce the correct results.
}

- (void)testPerformanceExample {
// This is an example of a performance test case.
    [self measureBlock:^{
    // Put the code you want to measure the time of here.
    }];
}

@end
```

View Controller Storyboard .

```
var viewController : ViewController!
```

View Controller

`setUp()` .

```
let storyboard = UIStoryboard(name: "Main", bundle: nil)
viewController = storyboard.instantiateInitialViewController() as! ViewController
```

-C

```
UIStoryboard *storyboard = [UIStoryboard storyboardWithName:"Main" bundle:nil];
viewController = (ViewController *) [storyboard instantiateInitialViewController];
```

. View Controller Storyboard .

:

---

void (: (void) testColorIsRed () . API . throw .

"test" :

```
func testSomething() {

}
```

-C

```
- (void)testSomething {

}
```

`XCTAssert()` true .

`sum()` View Controller . .

```
func testSum(){
    let result = viewController.sum(4, and: 5)
    XCTAssertEqual(result, 9)
}
```

-C

```
- (void)testSum {
    int result = [viewController sum:4 and:5];
    XCTAssertEqual(result, 9);
}
```

Storyboard View Controller , UI . View Controller `loadView()` . `loadView()` `viewController view` . UI .

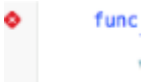
```
XCTAssertNotNil(viewController.view)
```

.

.

.

.



```
Product -> Test OR Cmd + U
```

!

, , `internal` . , . . , . `@testable` `@testable` .

`ToDo` . :

```
@testable import ToDo
```

import `internal` , , `ToDo` `internal` .

.

`loadView()` `viewDidLoad()` . . `sut` (system under test) .

```
XCTAssertNotNil(sut.view)
```

---

viewWillAppear(_:) viewDidAppear(_:) .

```
sut.beginAppearanceTransition(true, animated: true)
sut.endAppearanceTransition()
```

```
import XCTest
@testable import PersonApp

class PersonTests: XCTestCase {
    func test_completeName() {
        let person = Person(firstName: "Josh", lastName: "Brown")
        XCTAssertEqual(person.completeName(), "Josh Brown")
    }
}
```

. import XCTest XCTestCase XCTAssertEqual ( ). XCTestCase test **(U >)** . @testable import PersonApp PersonApp PersonApp Person . , XCTAssertEqual person.completeName() "Josh Brown" .

XCTest - : https://riptutorial.com/ko/ios/topic/5075/xctest------

138: XIB UIView

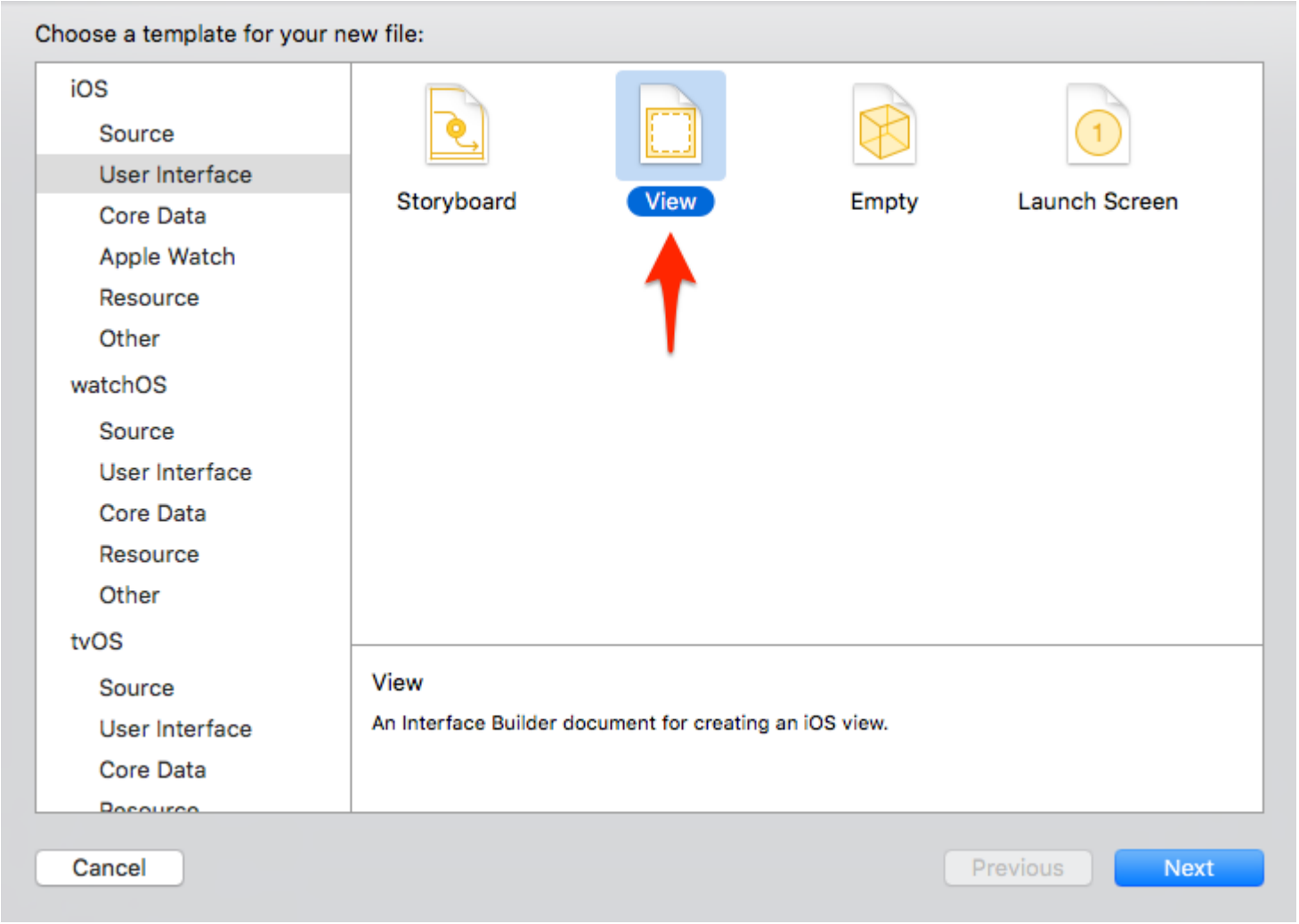
Apple : Interface Builder

- : XIB (: UILabel, UITextField) ' ' XIB .

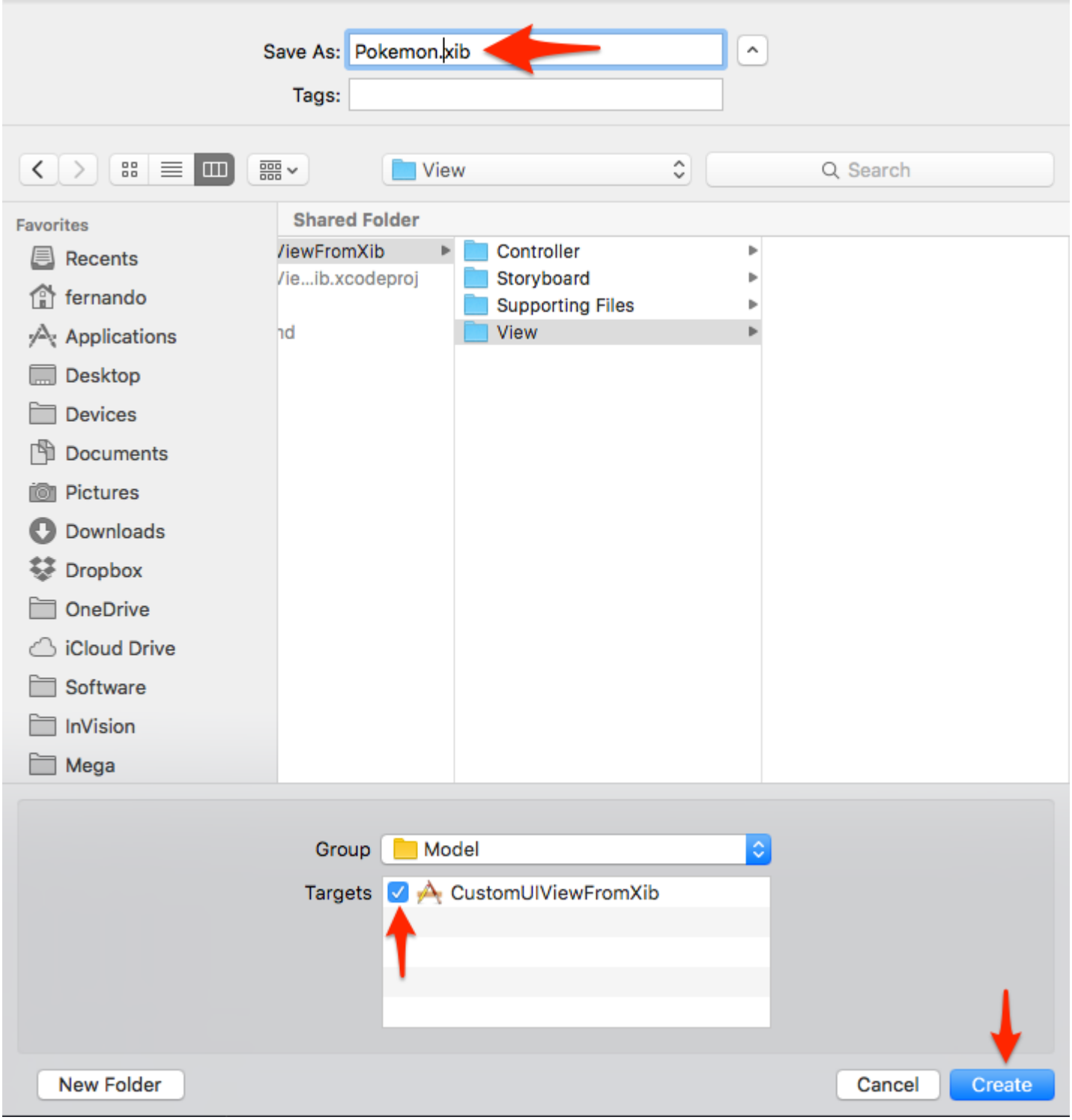
Examples

XIB

Xcode > > > .
iOS, "" .

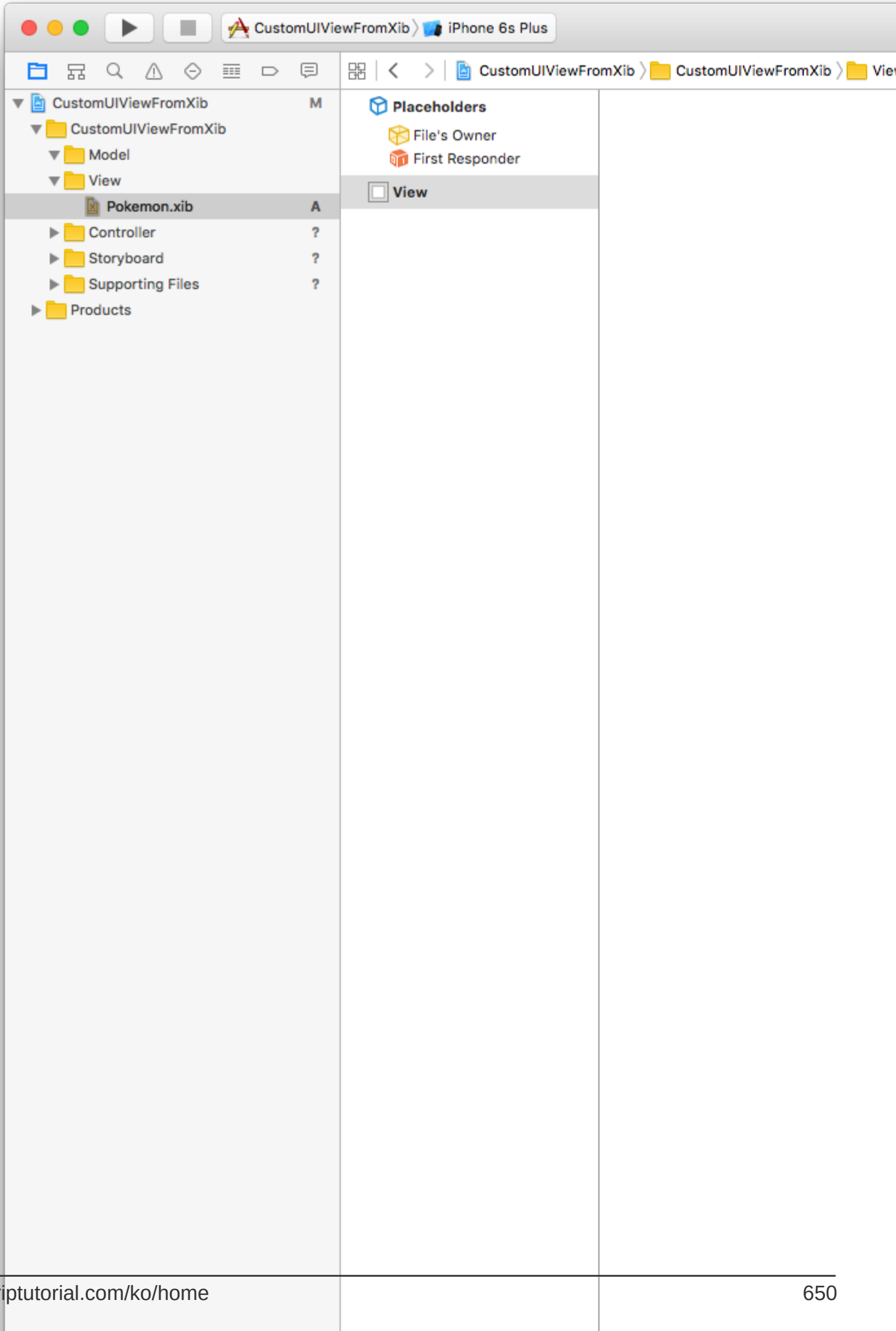


XIB (, doing).
"" .

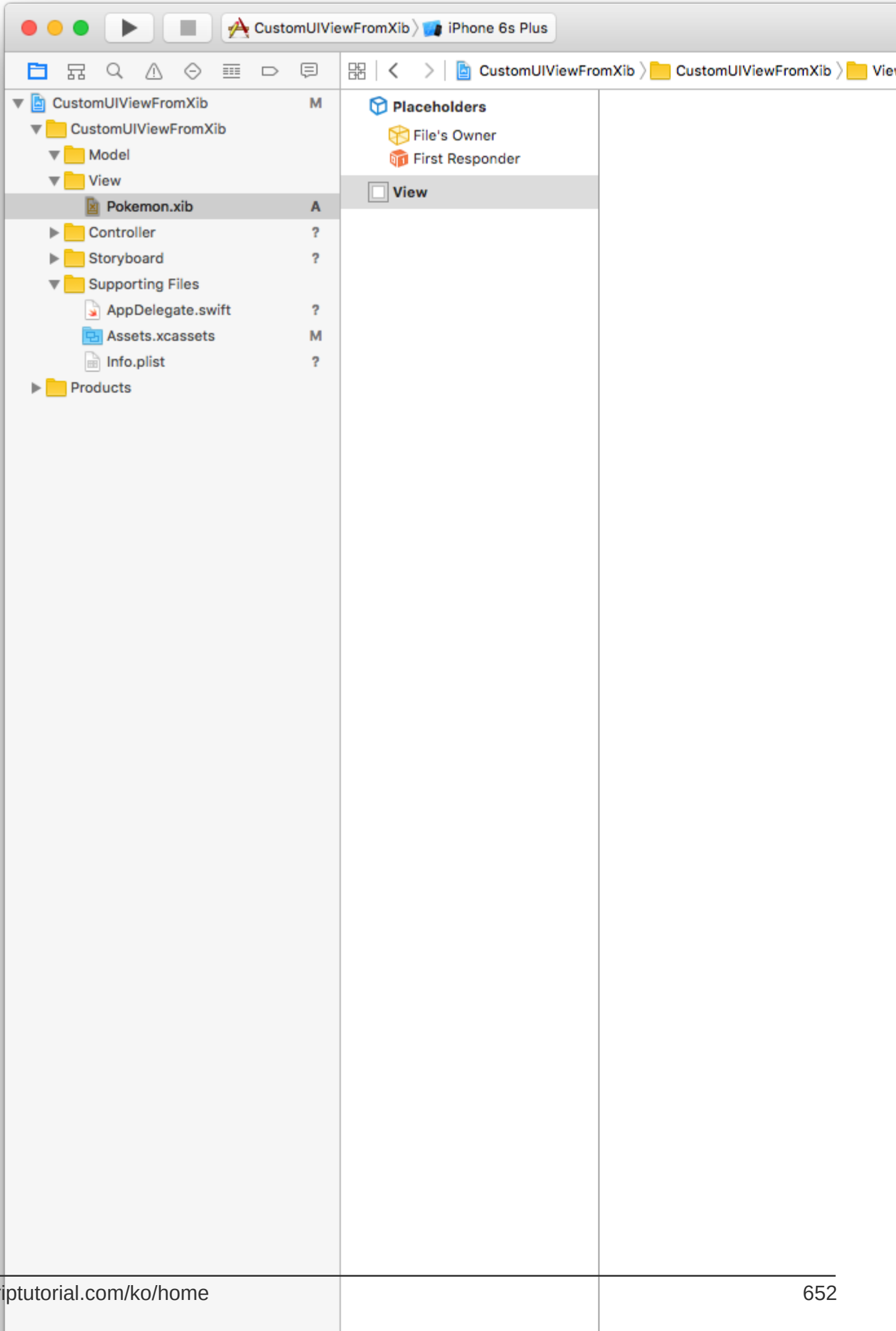

Save As: Pokemon.xib
Tags:
View
Search
Favorites
Recents
fernando
Applications
Desktop
Devices
Documents
Pictures
Downloads
Dropbox
OneDrive
iCloud Drive
Software
InVision
Mega
Shared Folder
/iewFromXib
/ie...ib.xcodeproj
nd
Controller
Storyboard
Supporting Files
View
Group
Model
Targets
CustomUIViewFromXib
New Folder
Cancel
Create

.

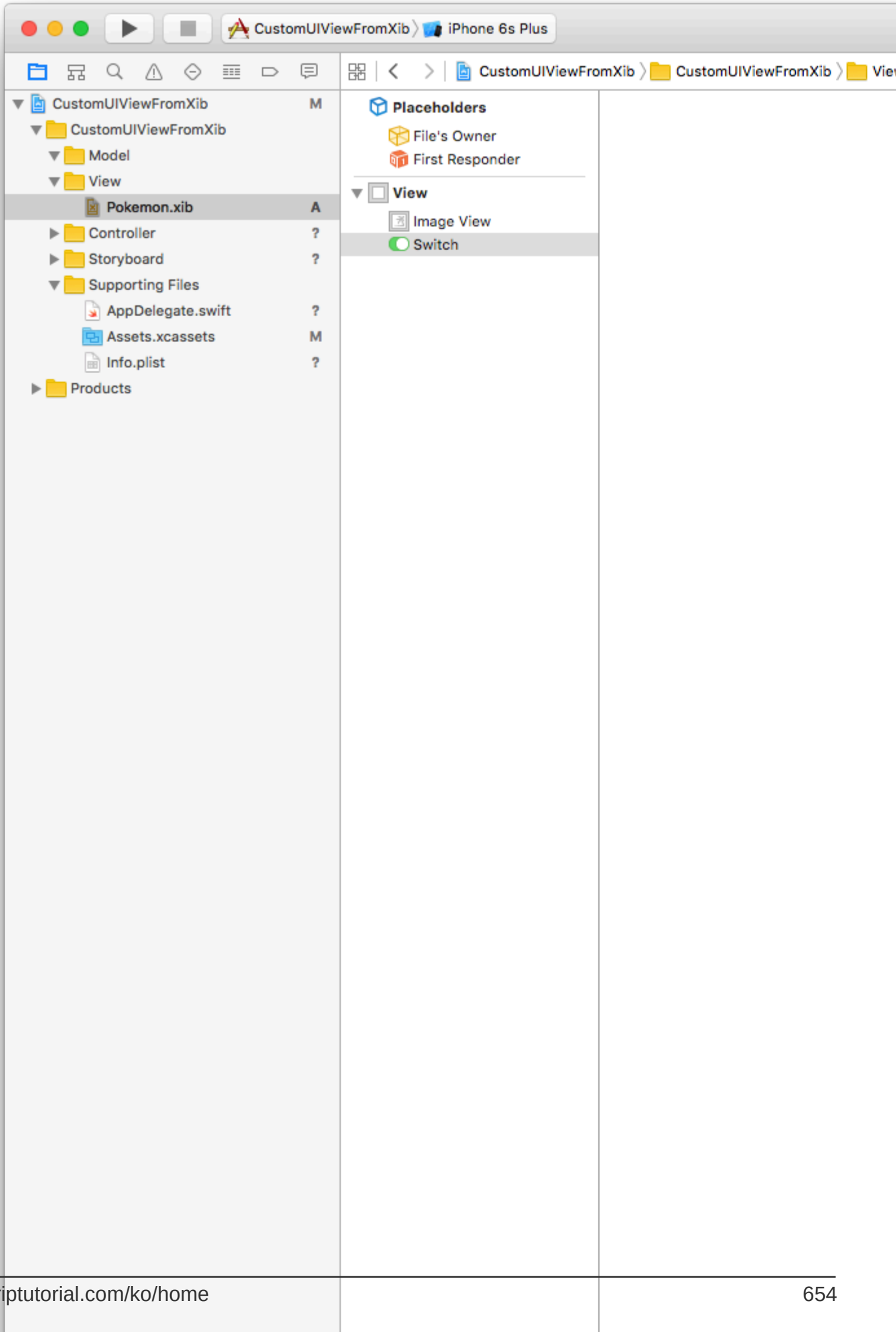
- :
- :
- :
- :


CustomUIViewFromXib
iPhone 6s Plus
CustomUIViewFromXib
CustomUIViewFromXib
CustomUIViewFromXib
M
CustomUIViewFromXib
Model
View
Pokemon.xib
A
Controller
?
Storyboard
?
Supporting Files
?
Products
Placeholders
File's Owner
First Responder
View

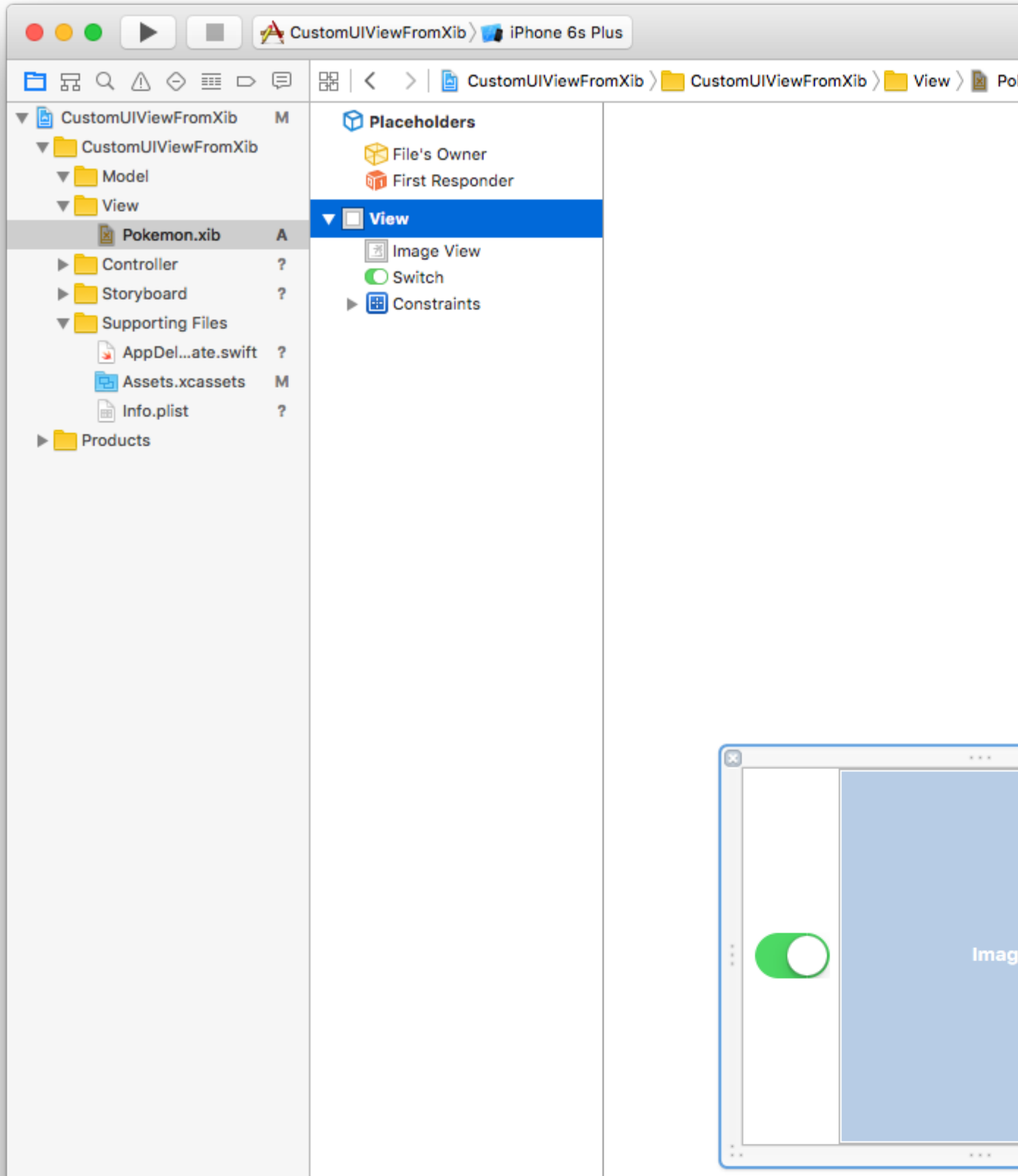
321 256.


CustomUIViewFromXib
iPhone 6s Plus
CustomUIViewFromXib
CustomUIViewFromXib
CustomUIViewFromXib M
CustomUIViewFromXib
Model
View
Pokemon.xib A
Controller ?
Storyboard ?
Supporting Files
AppDelegate.swift ?
Assets.xcassets M
Info.plist ?
Products
Placeholders
File's Owner
First Responder
View

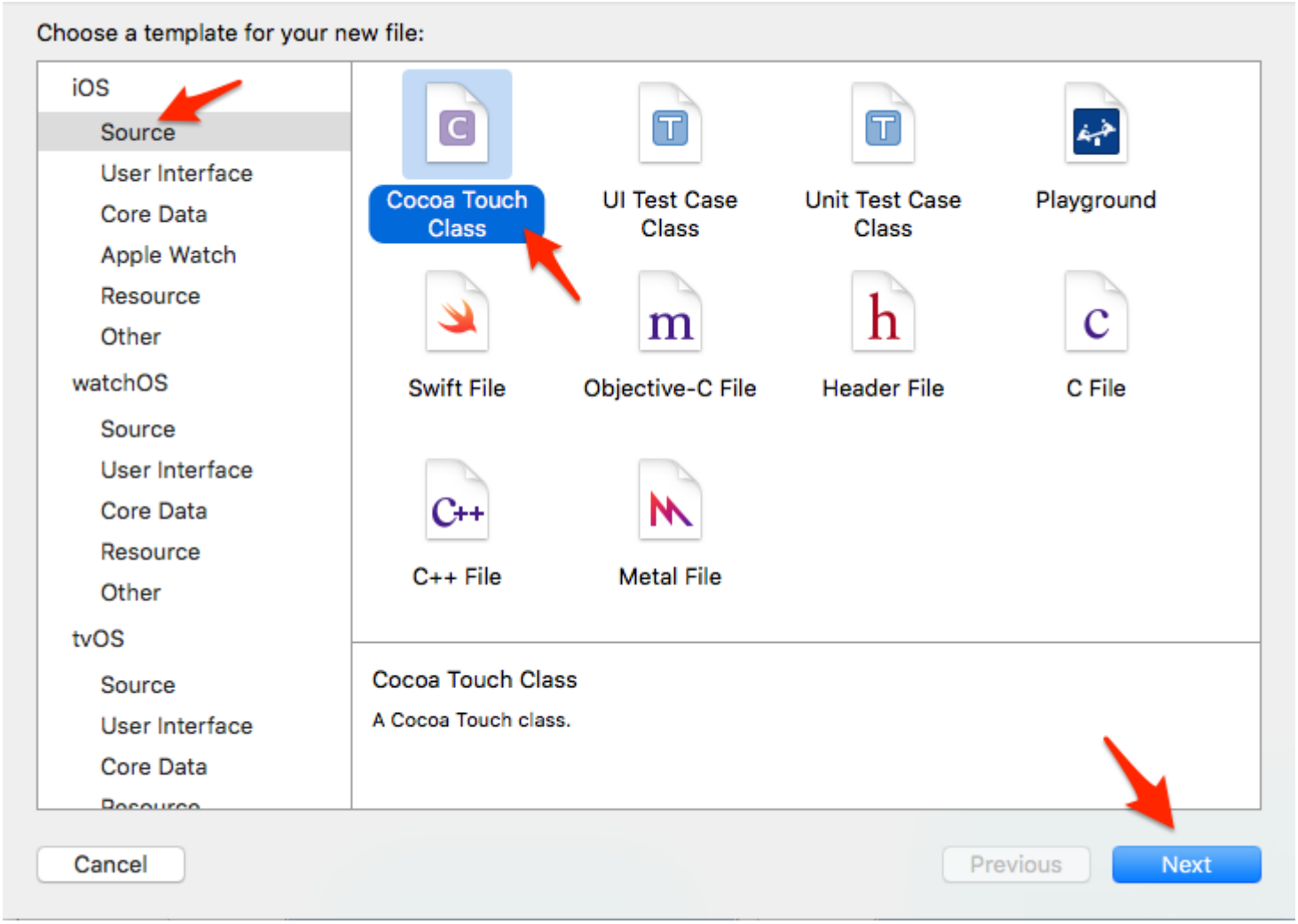
(256x256) .


CustomUIViewFromXib
iPhone 6s Plus
CustomUIViewFromXib
CustomUIViewFromXib
CustomUIViewFromXib M
CustomUIViewFromXib
Model
View
Pokemon.xib A
Controller ?
Storyboard ?
Supporting Files
AppDelegate.swift ?
Assets.xcassets M
Info.plist ?
Products
Placeholders
File's Owner
First Responder
View
Image View
Switch

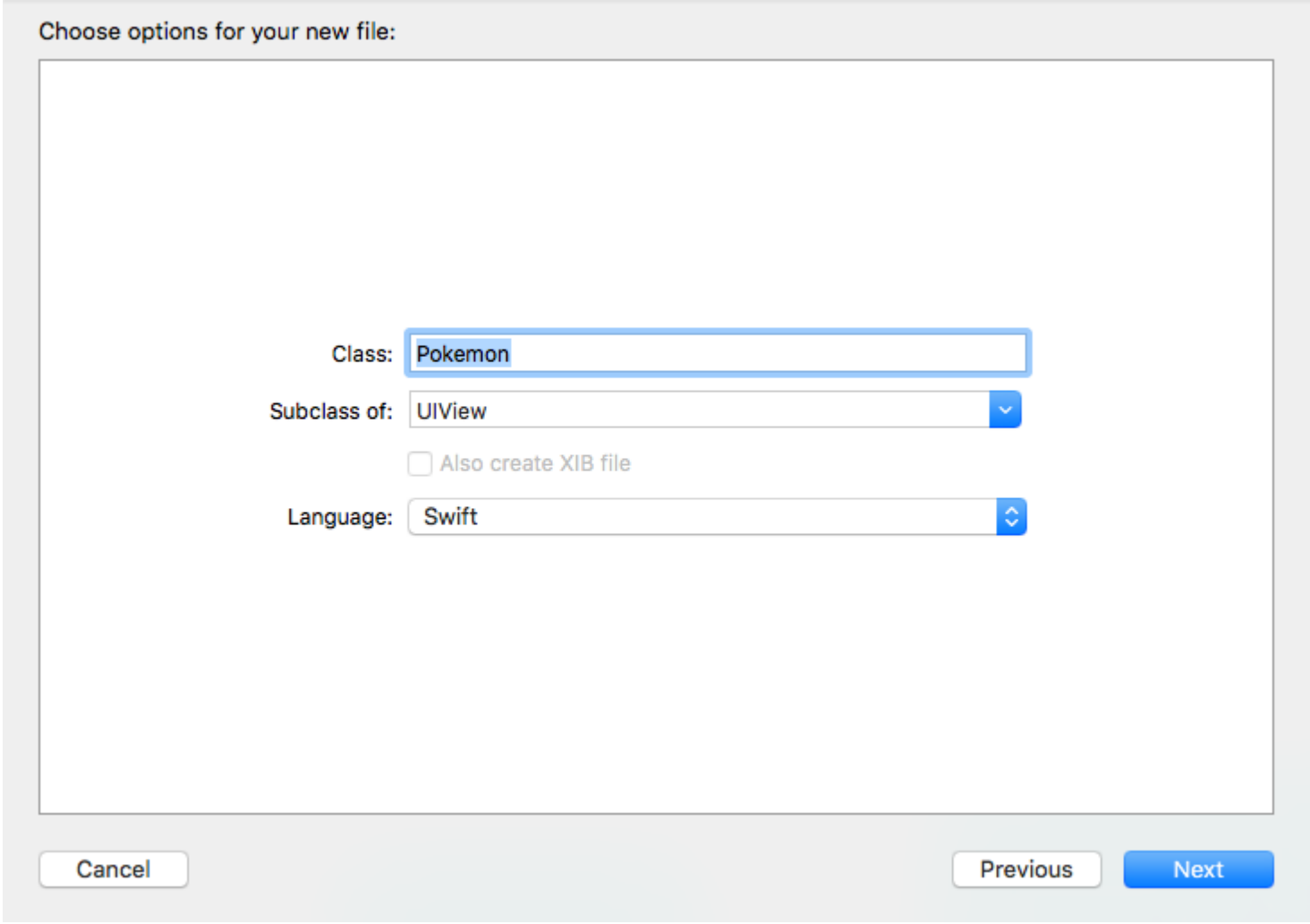
"" iPhone .
.


CustomUIViewFromXib
iPhone 6s Plus
CustomUIViewFromXib
CustomUIViewFromXib
View
CustomUIViewFromXib M
CustomUIViewFromXib
Model
View
Pokemon.xib A
Controller ?
Storyboard ?
Supporting Files
AppDel...ate.swift ?
Assets.xcassets M
Info.plist ?
Products
Placeholders
File's Owner
First Responder
View
Image View
Switch
Constraints

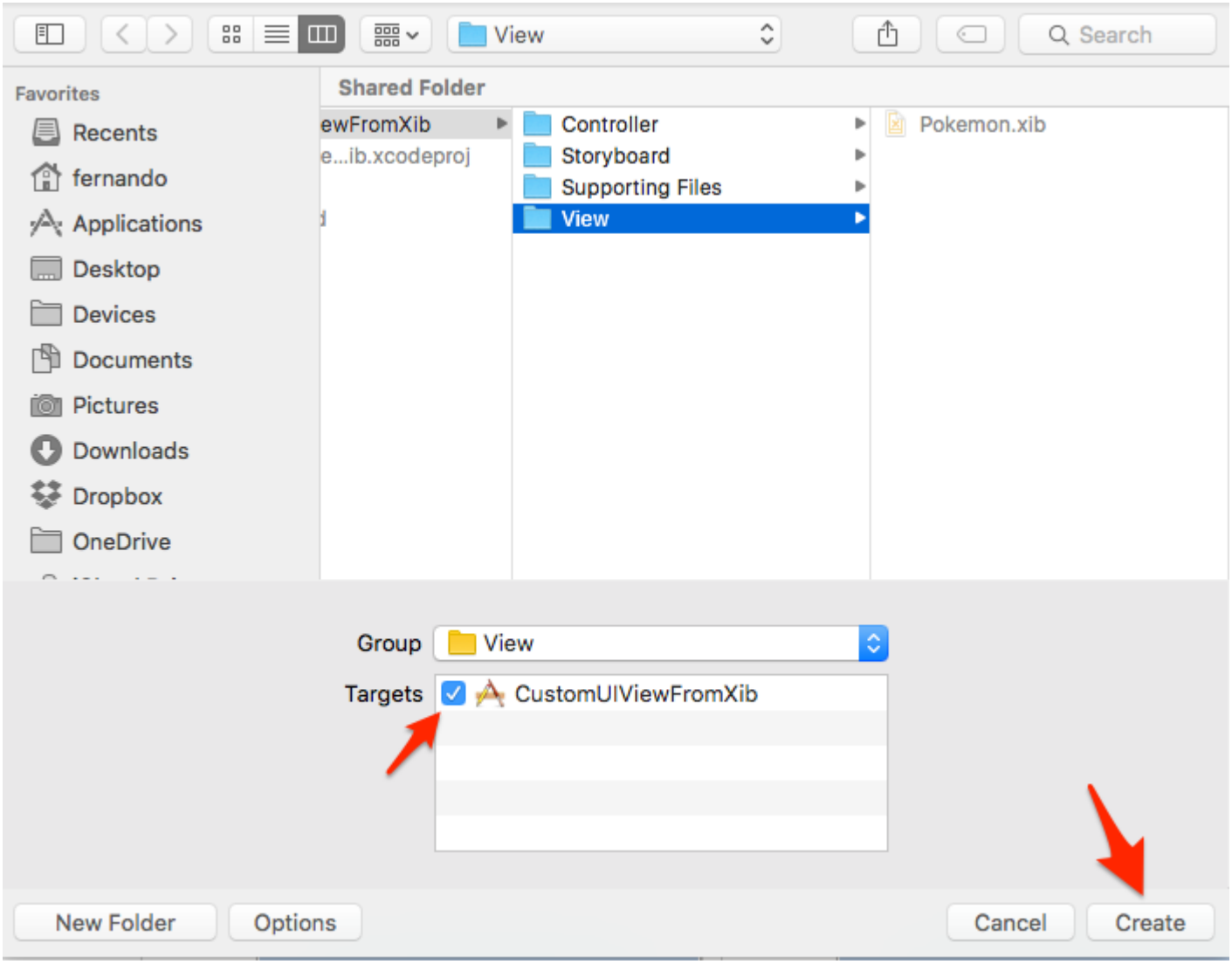
Xcode > > > .
iOS / Source / Cocoa Touch Class . "" .



XIB (Pokemon) .
UIView "" .

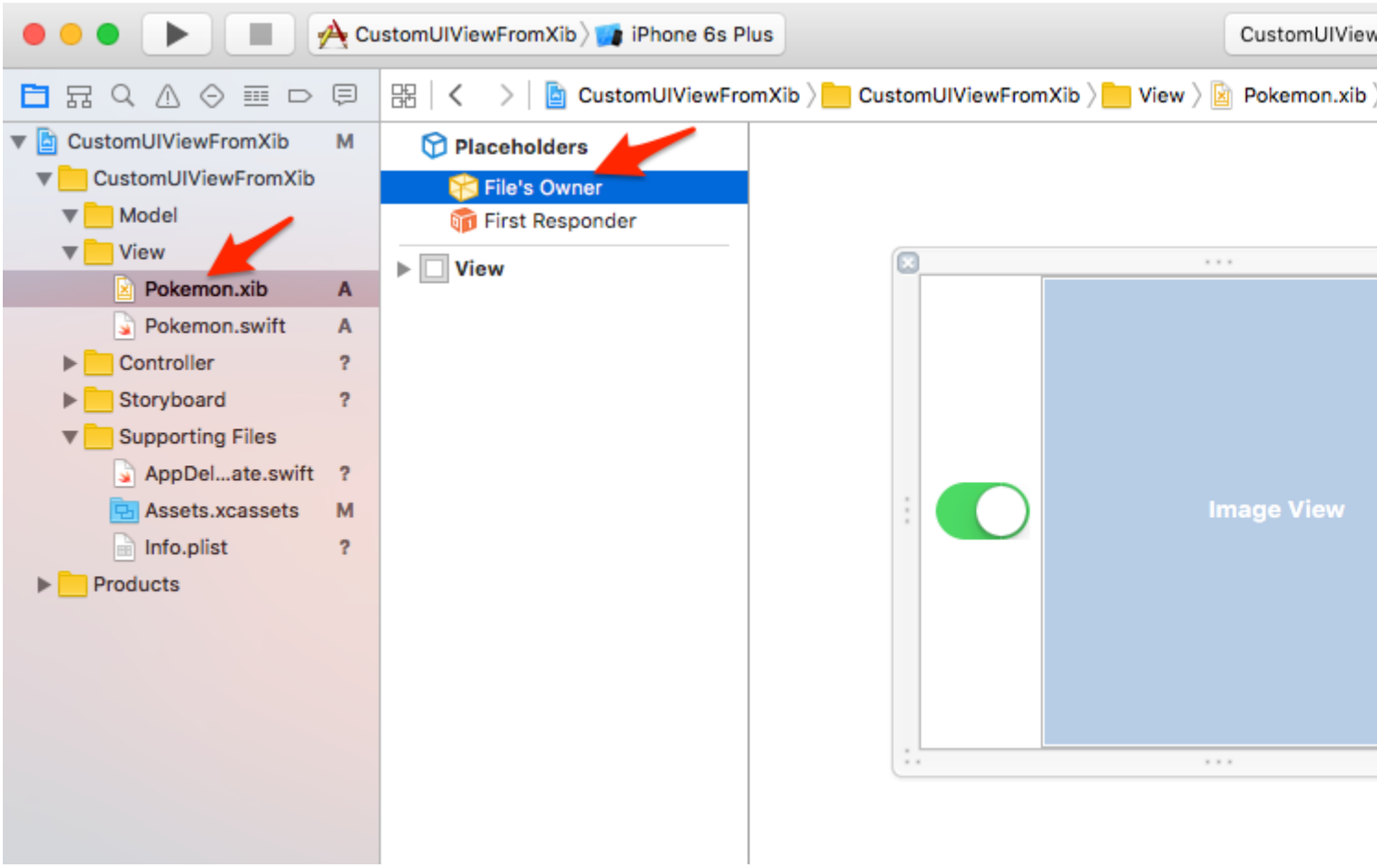

Choose options for your new file:
Class:
Pokemon
Subclass of:
UIView
Also create XIB file
Language:
Swift
Cancel
Previous
Next

"" .



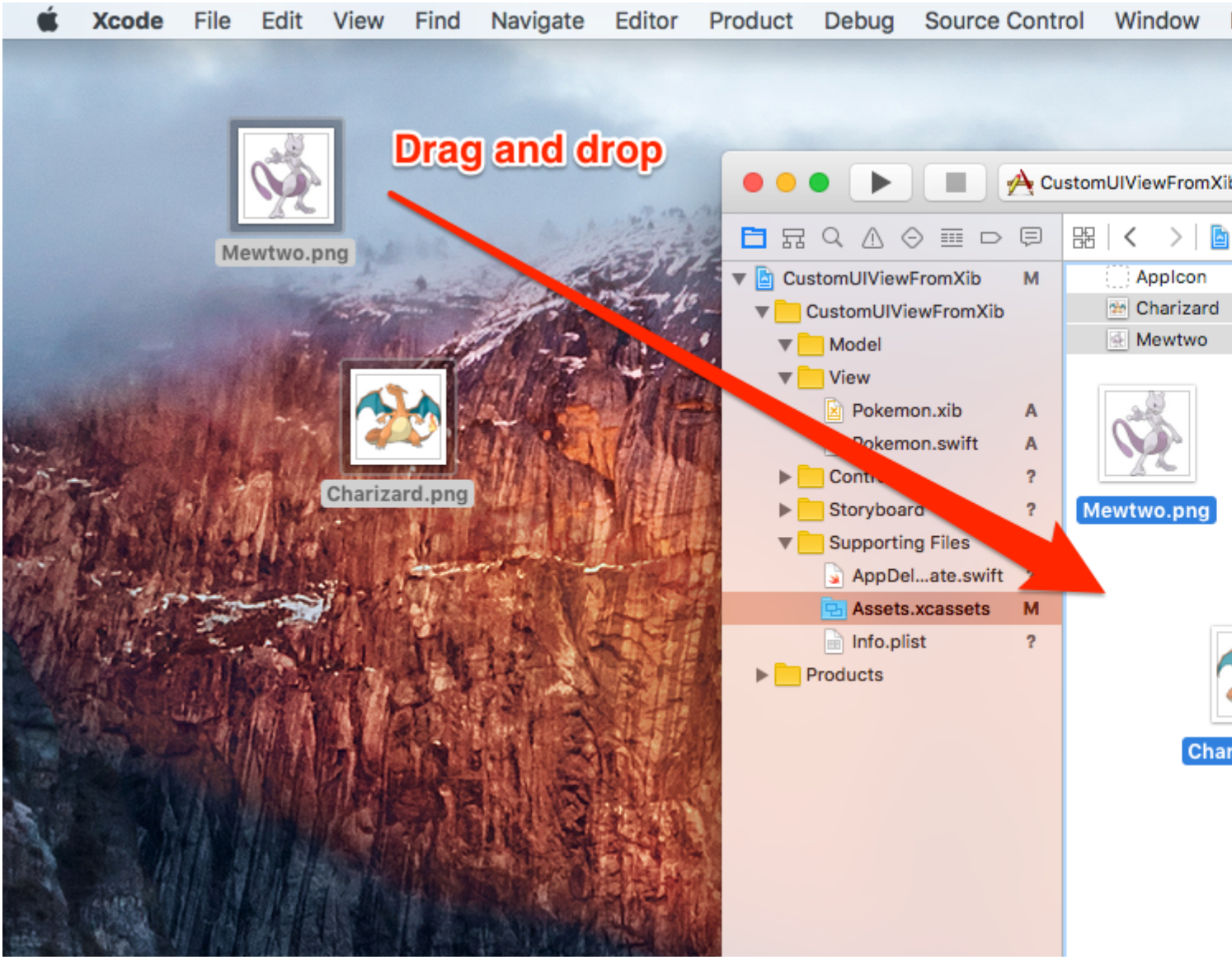
"File 's Owner" Pokemon.xib Pokemon.swift .

Xcode Pokemon.xib .
" " .
"Identity inspector"( ) Pokemon.swift .



POKEMONS !!!

! Pokemons "" .
PGN 256x256 .



.

, .
Pokemon.swift .

.

1.
2. XIB
3. XIB
4.

Pokemon.swift .

```
import UIKit

class Pokemon: UIView {

    // MARK: - Initializers

    override init(frame: CGRect) {
```

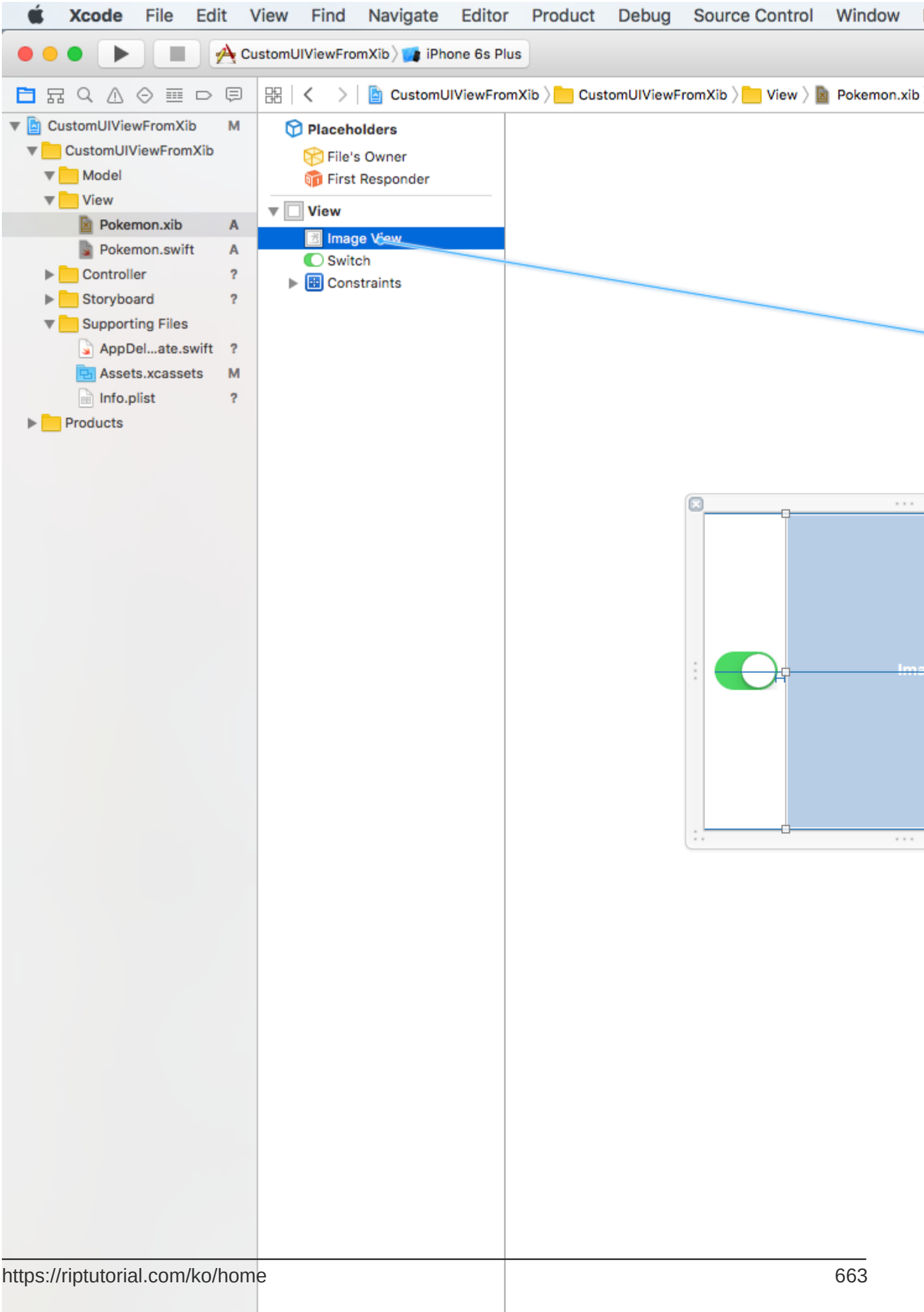
```
        super.init(frame: frame)
        setupView()
    }

    required init?(coder aDecoder: NSCoder) {
        super.init(coder: aDecoder)
        setupView()
    }

    // MARK: - Private Helper Methods

    // Performs the initial setup.
    private func setupView() {
        let view = viewFromNibForClass()
        view.frame = bounds

        // Auto-layout stuff.
        view.autoresizingMask = [
            UIViewAutoresizing.flexibleWidth,
            UIViewAutoresizing.flexibleHeight
        ]

        // Show the view.
        addSubview(view)
    }

    // Loads a XIB file into a view and returns this view.
    private func viewFromNibForClass() -> UIView {

        let bundle = Bundle(for: type(of: self))
        let nib = UINib(nibName: String(describing: type(of: self)), bundle: bundle)
        let view = nib.instantiate(withOwner: self, options: nil).first as! UIView

        /* Usage for swift < 3.x
        let bundle = NSBundle(forClass: self.dynamicType)
        let nib = UINib(nibName: String(self.dynamicType), bundle: bundle)
        let view = nib.instantiateWithOwner(self, options: nil)[0] as! UIView
        */

        return view
    }
}
```

@IBDesignable @IBInspectable

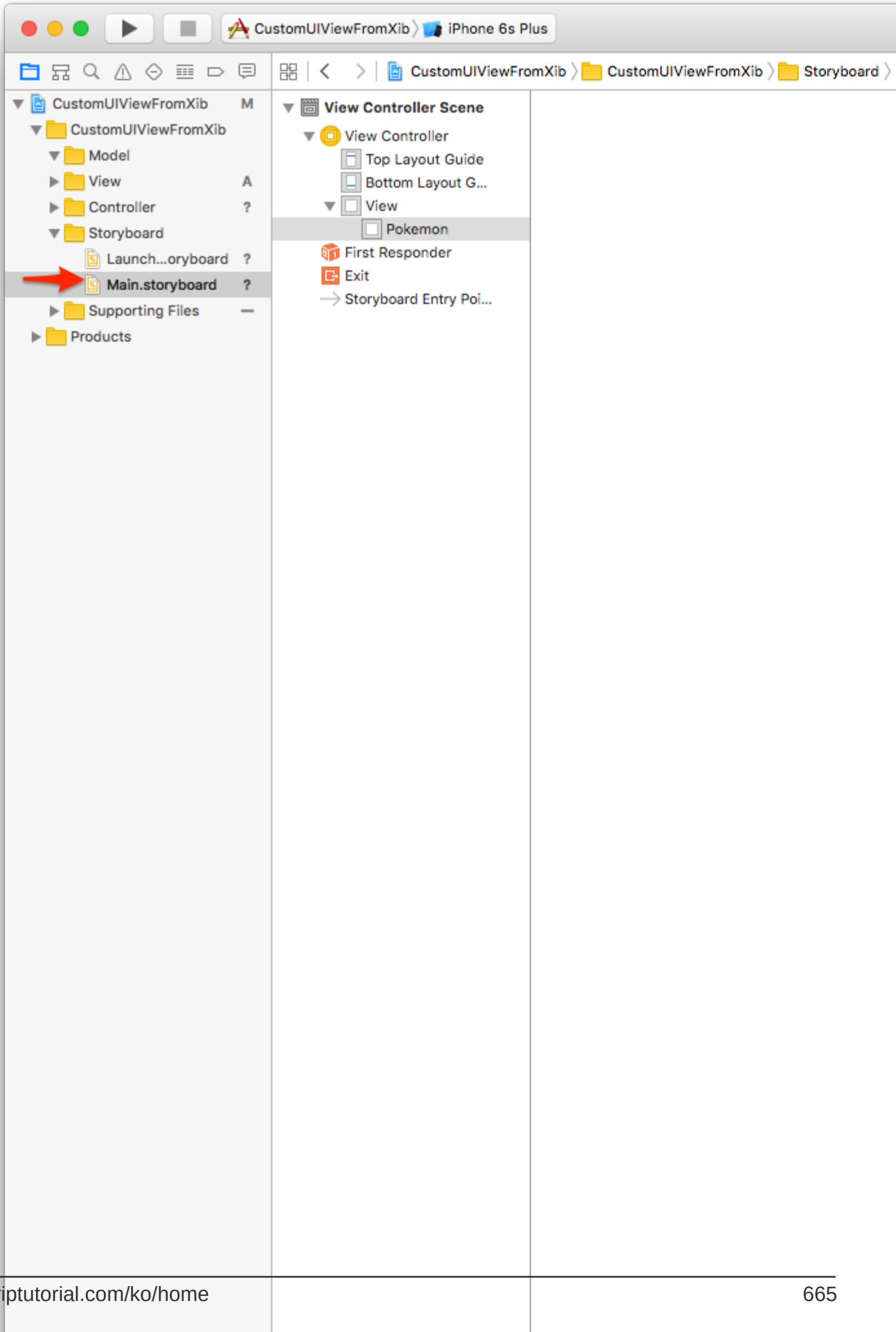
`@IBDesignable` `@IBDesignable` .
`@IBInspectable` Interface Builder .

`Image View` "Inspectable" .

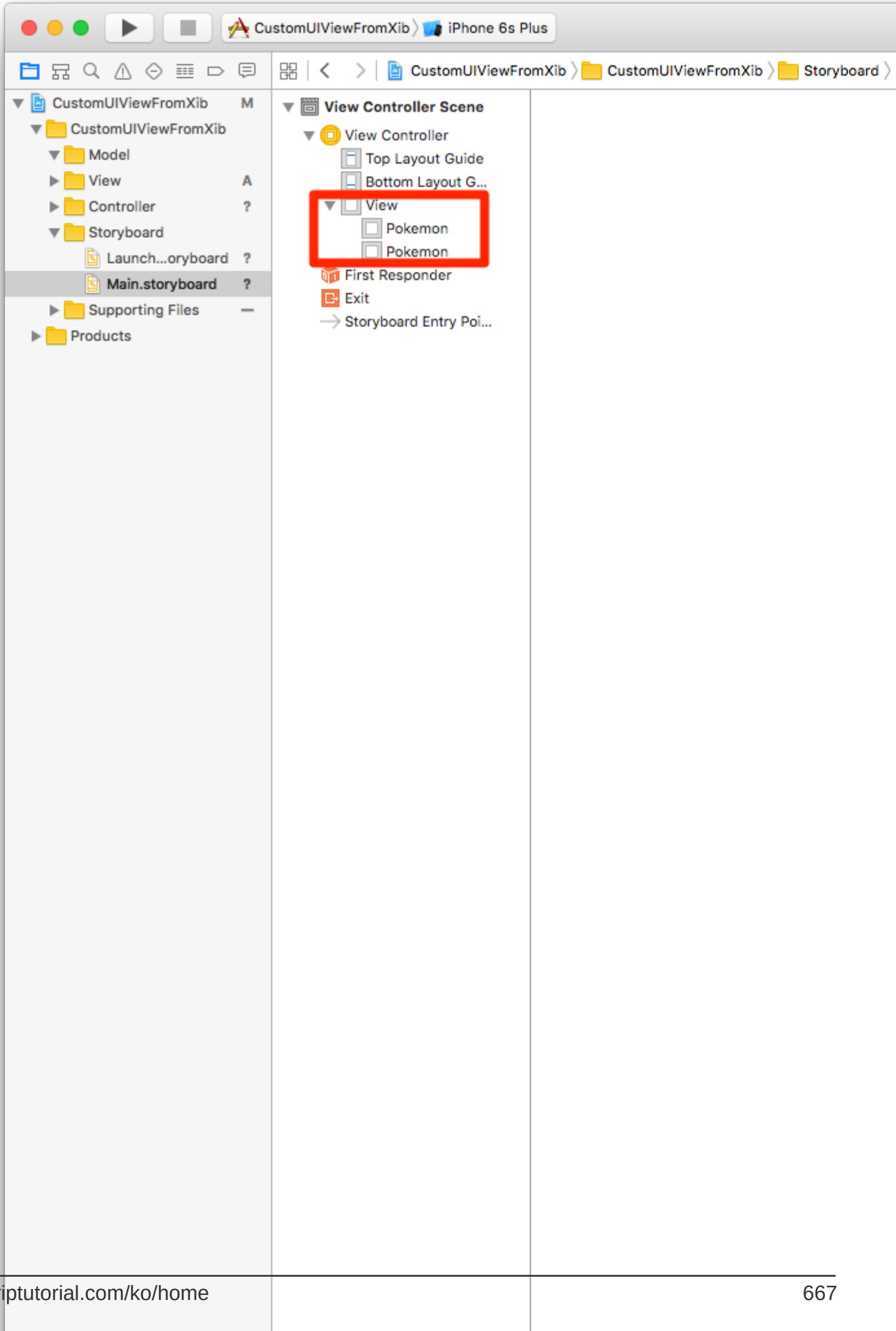
Pokemon.xib `Image View` Pokemon.swift .


Xcode File Edit View Find Navigate Editor Product Debug Source Control Window
CustomUIViewFromXib iPhone 6s Plus
CustomUIViewFromXib CustomUIViewFromXib View Pokemon.xib
CustomUIViewFromXib M
CustomUIViewFromXib
Model
View
Pokemon.xib A
Pokemon.swift A
Controller ?
Storyboard ?
Supporting Files
AppDel...ate.swift ?
Assets.xcassets M
Info.plist ?
Products
Placeholders
File's Owner
First Responder
View
Image View
Switch
Constraints

200x200 . .
Identity inspector ( ) Class to Pokemon .


CustomUIViewFromXib
iPhone 6s Plus
CustomUIViewFromXib
CustomUIViewFromXib
Storyboard
CustomUIViewFromXib
M
CustomUIViewFromXib
Model
View
A
Controller
?
Storyboard
Launch...oryboard
?
Main.storyboard
?
Supporting Files
Products
View Controller Scene
View Controller
Top Layout Guide
Bottom Layout G...
View
Pokemon
First Responder
Exit
Storyboard Entry Poi...

150x150 .
.


CustomUIViewFromXib
iPhone 6s Plus
CustomUIViewFromXib
CustomUIViewFromXib
Storyboard
CustomUIViewFromXib
M
CustomUIViewFromXib
Model
View
A
Controller
?
Storyboard
Launch...oryboard
?
Main.storyboard
?
Supporting Files
Products
View Controller Scene
View Controller
Top Layout Guide
Bottom Layout G...
View
Pokemon
Pokemon
First Responder
Exit
Storyboard Entry Poi...

/ .

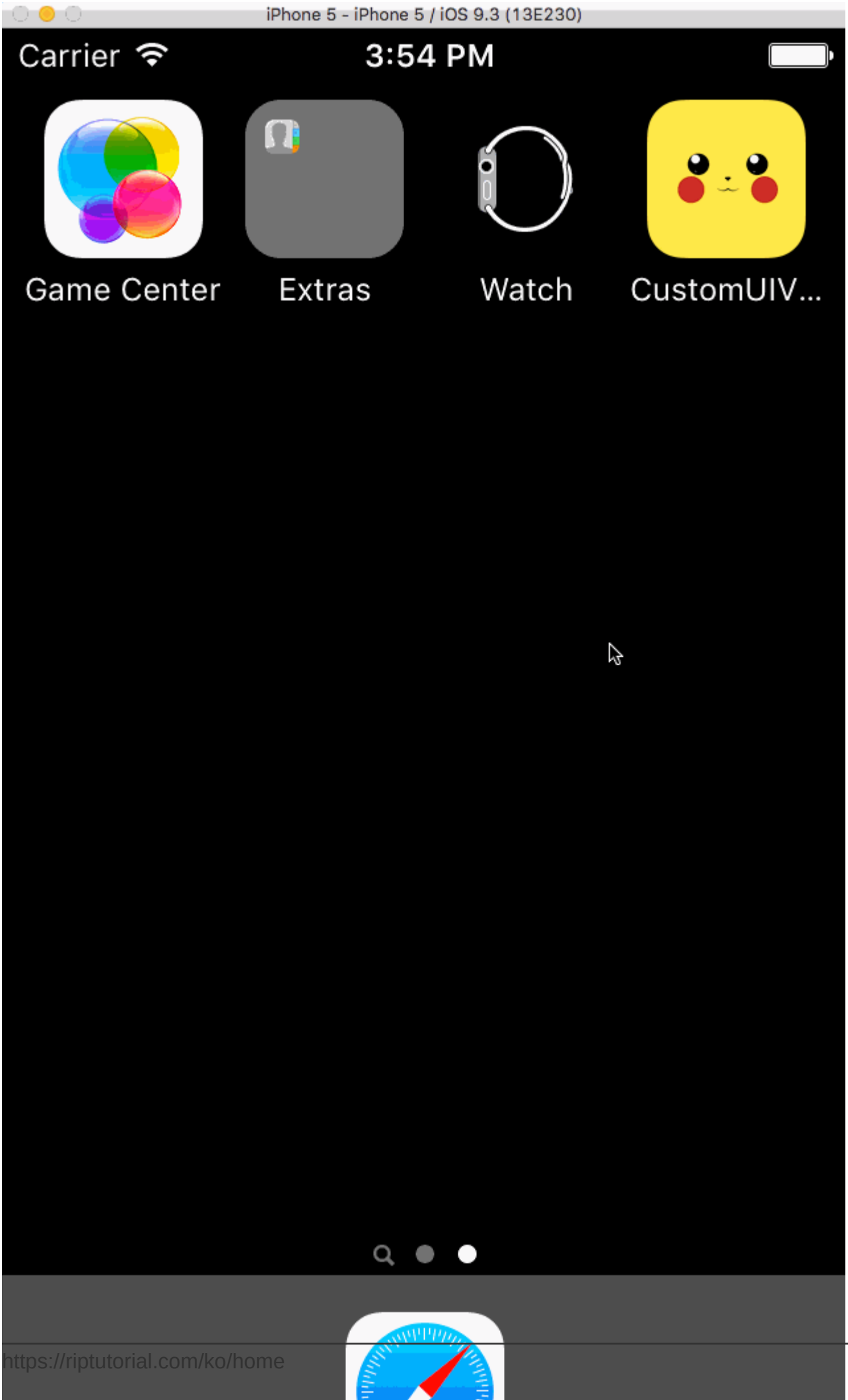
[] Pokemon.swift `IBAction` .

`switchTapped` .

.

```
// MARK: - Actions

@IBAction func switchTapped(sender: UISwitch) {
    imageView.alpha = sender.on ? 1.0 : 0.2
}

// MARK: - Initializers
...
```

:


iPhone 5 - iPhone 5 / iOS 9.3 (13E230)
Carrier
3:54 PM
Game Center
Extras
Watch
CustomUIV...

.
UI .

Github .
(**Swift 3.1**)

XIB UIView

XIB .

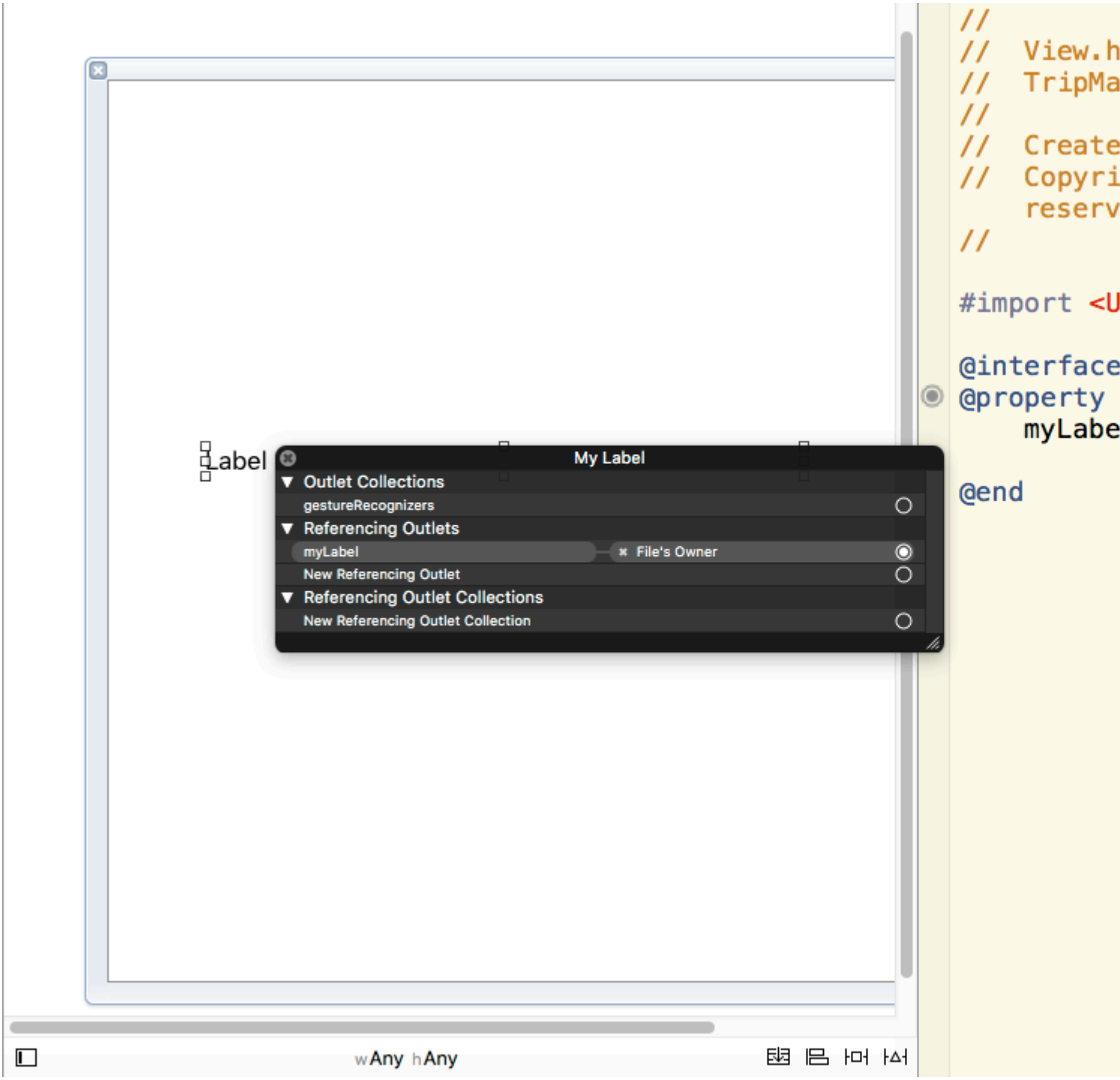
.

loadNibNamed ?

.

1. XIB
2. .h .m .
3. .h
4. .h XIB

:



5. .m initWithCoder loadNibNamed . UIView / UIView XIB . / XIB . XCode Objective C .

XIB UIView : https://riptutorial.com/ko/ios/topic/1362/xib----uiview

139:

Examples

-C

`Target->Capabilities  HealthKit  HealthKit` . info.plist .

`NSObject  CocoaClass    GSHealthKitManager    .`

GSHealthKitManager.h

```
#import <Foundation/Foundation.h>
#import <HealthKit/HealthKit.h>
@interface GSHealthKitManager : NSObject

+ (GSHealthKitManager *)sharedManager;

- (void)requestAuthorization;

- (NSDate *)readBirthDate;
- (void)writeWeightSample:(double)weight;
- (NSString *)readGender;

@end
```

GSHealthKitManager.m

```
#import "GSHealthKitManager.h"
#import <HealthKit/HealthKit.h>


@interface GSHealthKitManager ()

@property (nonatomic, retain) HKHealthStore *healthStore;

@end


@implementation GSHealthKitManager

+ (GSHealthKitManager *)sharedManager {
    static dispatch_once_t pred = 0;
    static GSHealthKitManager *instance = nil;
    dispatch_once(&pred, ^{
        instance = [[GSHealthKitManager alloc] init];
        instance.healthStore = [[HKHealthStore alloc] init];
    });
    return instance;
}

- (void)requestAuthorization {

    if ([HKHealthStore isHealthDataAvailable] == NO) {
        // If our device doesn't support HealthKit -> return.
```

```
        return;
    }

    NSArray *readTypes = @[[HKObjectType
characteristicTypeForIdentifier:HKCharacteristicTypeIdentifierDateOfBirth],[HKObjectType
characteristicTypeForIdentifier:HKCharacteristicTypeIdentifierBiologicalSex]];


    [self.healthStore requestAuthorizationToShareTypes:nil readTypes:[NSSet
setWithArray:readTypes] completion:nil];
}

- (NSDate *)readBirthDate {
    NSError *error;
    NSDate *dateOfBirth = [self.healthStore dateOfBirthWithError:&error];   // Convenience
method of HKHealthStore to get date of birth directly.

    if (!dateOfBirth) {
        NSLog(@"Either an error occured fetching the user's age information or none has been
stored yet. In your app, try to handle this gracefully.");
    }

    return dateOfBirth;
}

- (NSString *)readGender
{
    NSError *error;
    HKBiologicalSexObject *gen=[self.healthStore biologicalSexWithError:&error];
    if (gen.biologicalSex==HKBiologicalSexMale)
    {
        return(@"Male");
    }
    else if (gen.biologicalSex==HKBiologicalSexFemale)
    {
        return (@"Female");
    }
    else if (gen.biologicalSex==HKBiologicalSexOther)
    {
        return (@"Other");
    }
    else{
        return (@"Not Set");
    }
}



@end
```

ViewController

```
- (IBAction)pressed:(id)sender {

    [[GSHealthKitManager sharedManager] requestAuthorization];
    NSDate *birthDate = [[GSHealthKitManager sharedManager] readBirthDate];
        NSLog(@"birthdate %@", birthDate);
        NSLog(@"gender 2131321 %@", [[GSHealthKitManager sharedManager] readGender]);
```

```
}
```

```
2016-10-13 14:41:39.568 random[778:26371] birthdate 1992-11-29 18:30:00 +0000
2016-10-13 14:41:39.570 random[778:26371] gender 2131321 Male
```

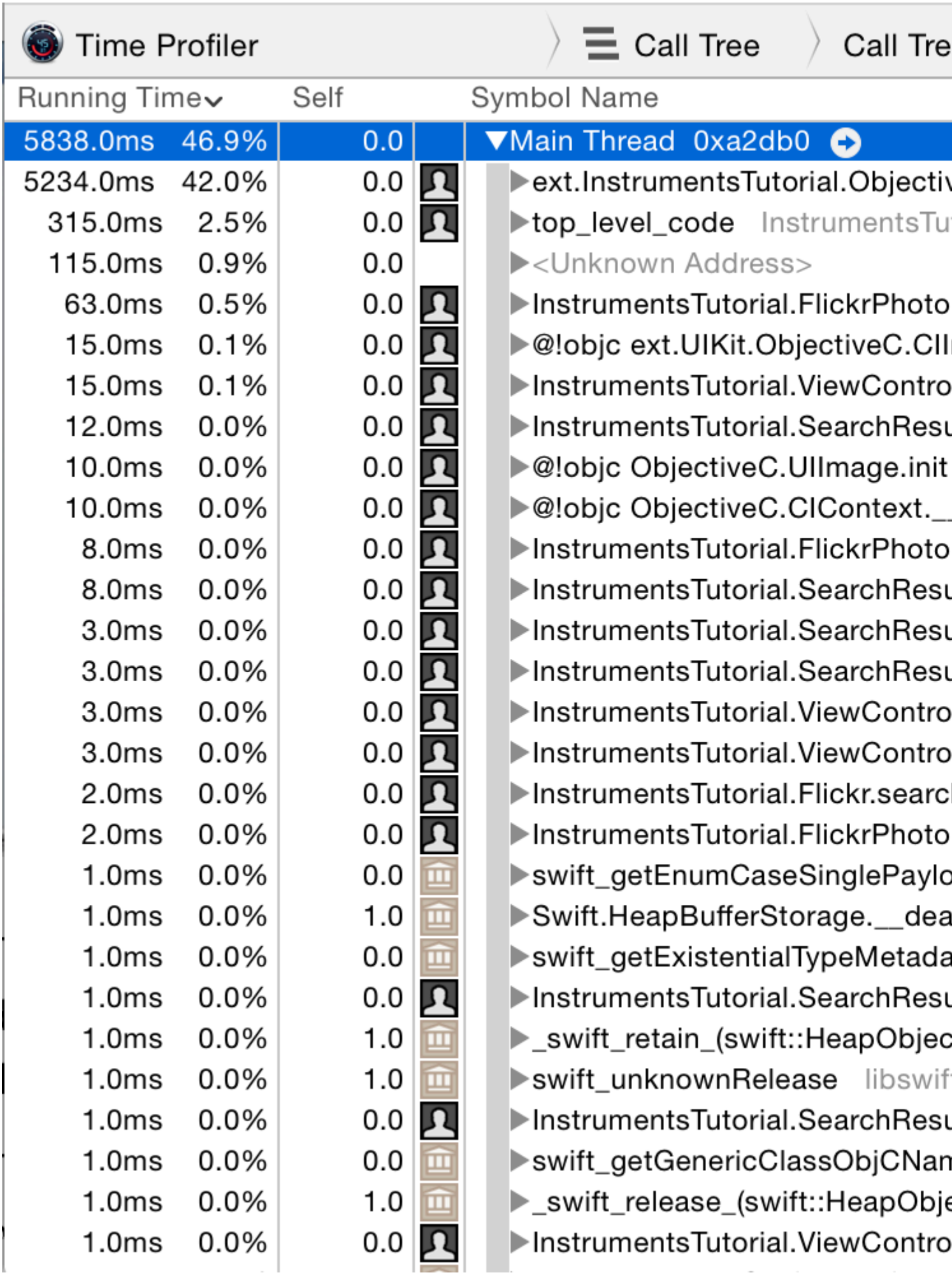
: https://riptutorial.com/ko/ios/topic/7412/-

140:

Xcode Instruments . CPU , , , / . Xcode . . .

Examples

`Time Profiler` . . Xcode . : -



Call Tree . Call Tree . . . . **100** **1** 10 **(10) 10 %** . !

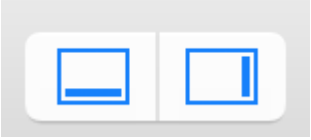
Xcode's Product\Profile press ⌘I . Instruments . .

Instruments .

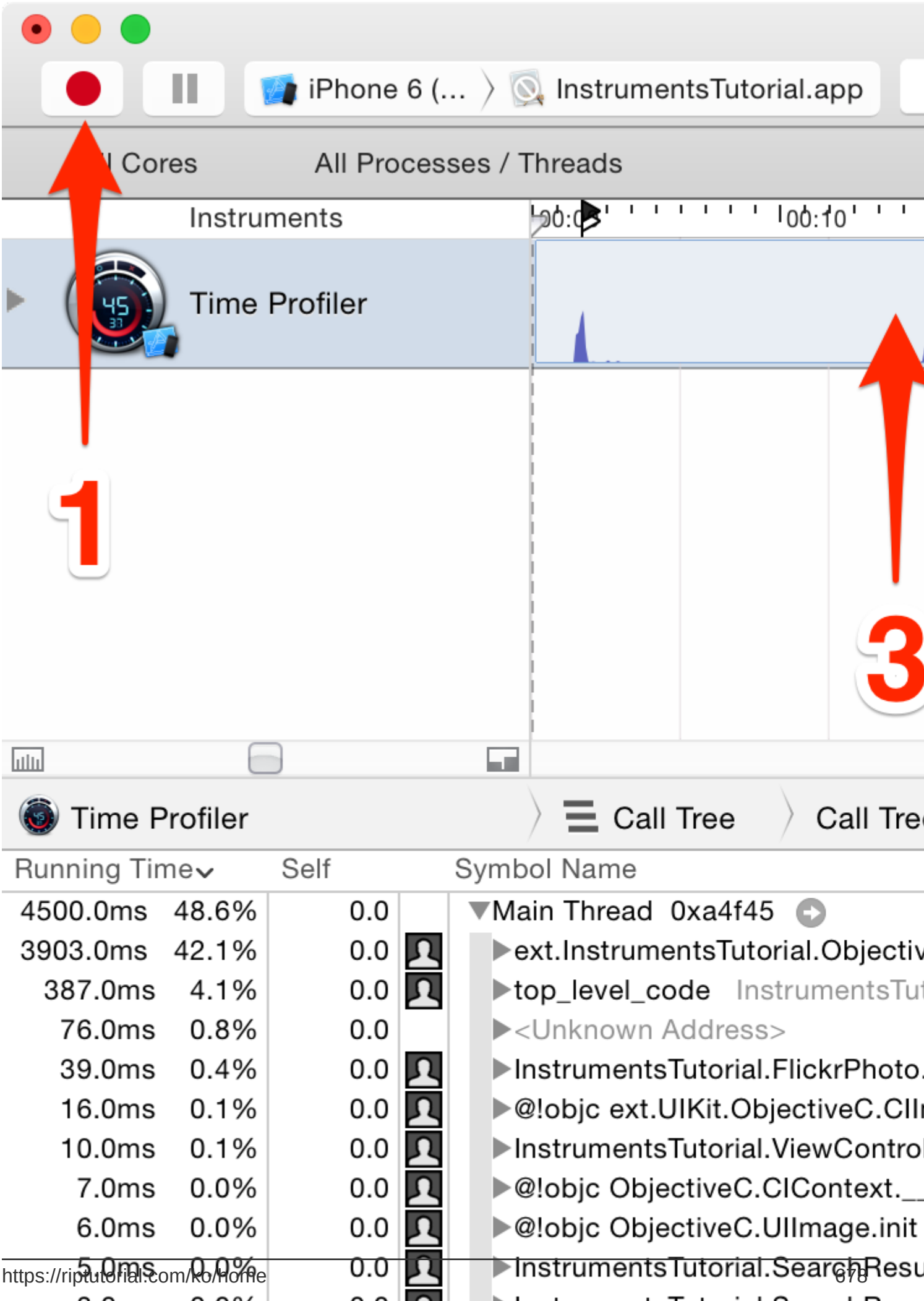
`Time Profiler` Choose () . Instruments . . - , ! , . .

. . . !

, , ! , . .



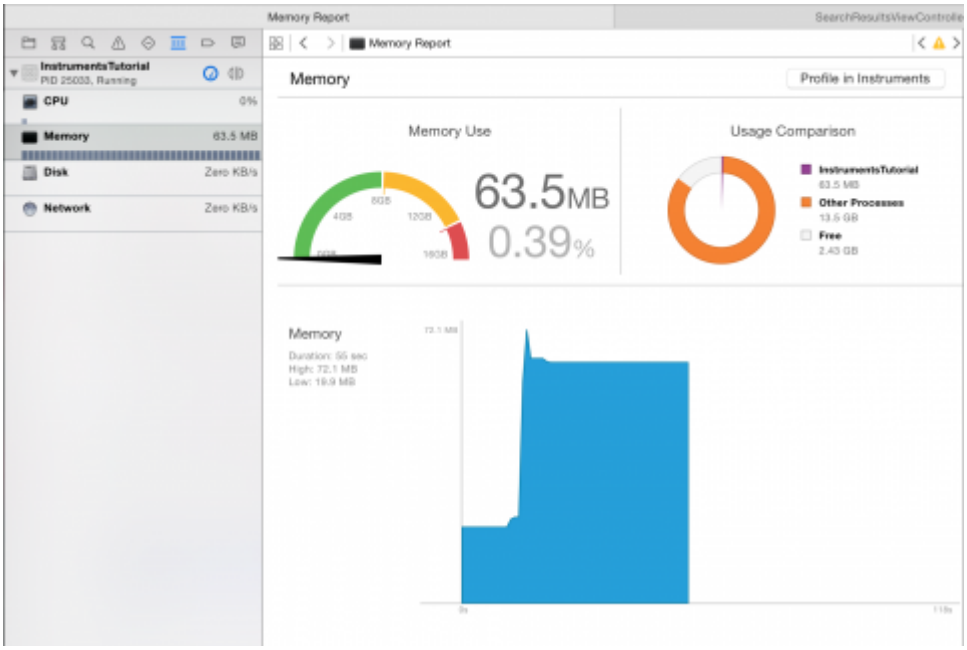
. .


iPhone 6 (...
InstrumentsTutorial.app
All Processes / Threads
Instruments
00:10
Time Profiler
1
3
Time Profiler
Call Tree
Running Time
Self
Symbol Name
4500.0ms 48.6% 0.0 Main Thread 0xa4f45
3903.0ms 42.1% 0.0 ext.InstrumentsTutorial.Objectiv
387.0ms 4.1% 0.0 top_level_code InstrumentsTut
76.0ms 0.8% 0.0 <Unknown Address>
39.0ms 0.4% 0.0 InstrumentsTutorial.FlickrPhoto.
16.0ms 0.1% 0.0 @!objc ext.UIKit.ObjectiveC.CIIr
10.0ms 0.1% 0.0 InstrumentsTutorial.ViewControl
7.0ms 0.0% 0.0 @!objc ObjectiveC.CIContext.__
6.0ms 0.0% 0.0 @!objc ObjectiveC.UIImage.init
5.0ms 0.0% 0.0 InstrumentsTutorial.SearchResu
3.0ms 0.0% 0.0 InstrumentsTutorial.SearchResu

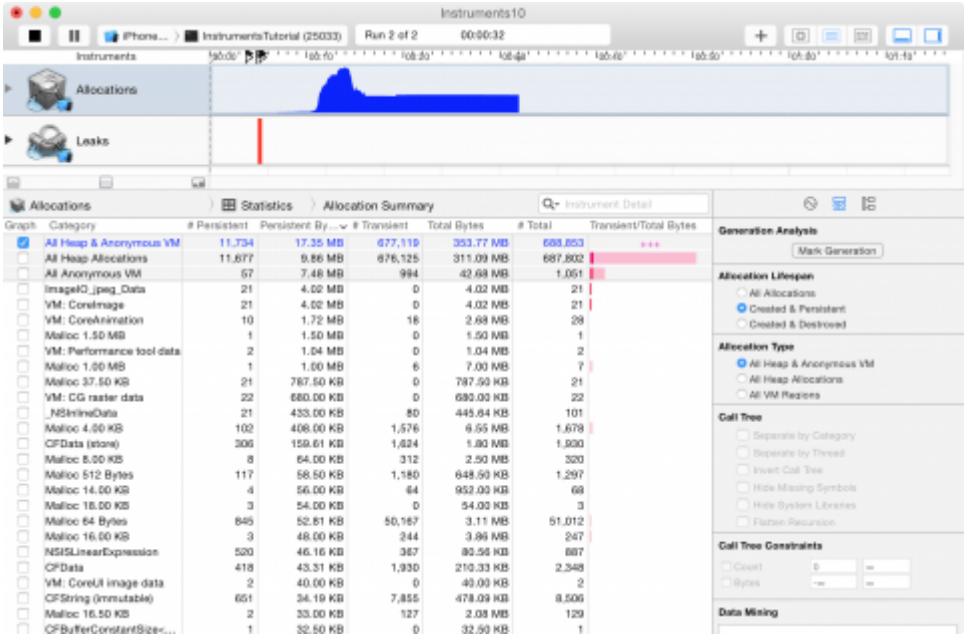
.

. cellForItemAtIndexPath . `main thread` (UI) .

. `retain counts` `retain counts` . `instruments profile` . . .



. . `Profile in Instruments` `Profile in Instruments` . **Allocations** .



. . Allocations . Leaks Objective-C . ? . . .

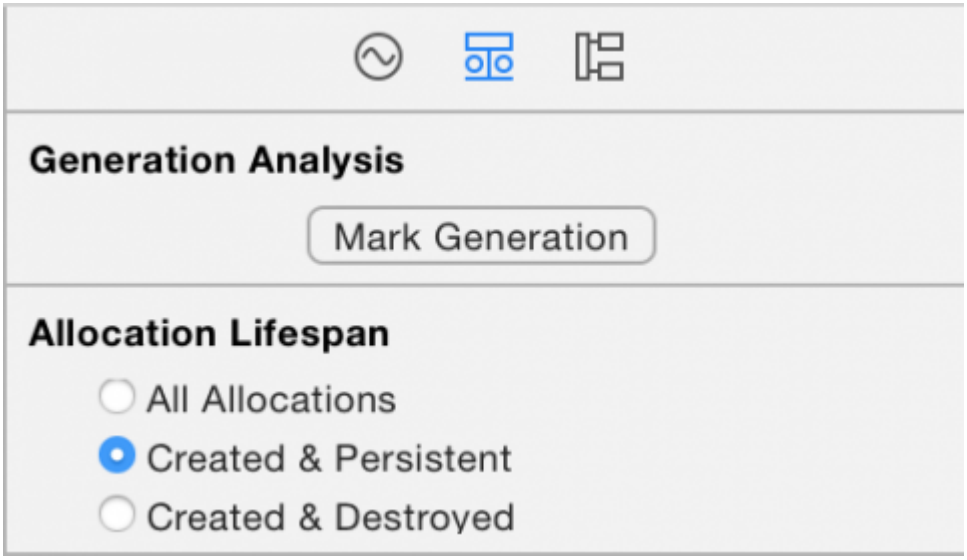
. , . Swift `ARC` `retain cycle or strong reference cycle` . . !

. `system's memory` . iOS .

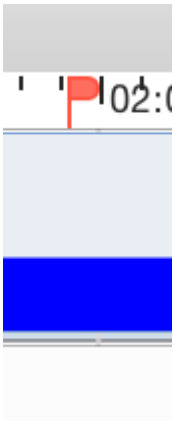
Allocations 5 . ! .

Allocations . . `unbounded memory growth` .

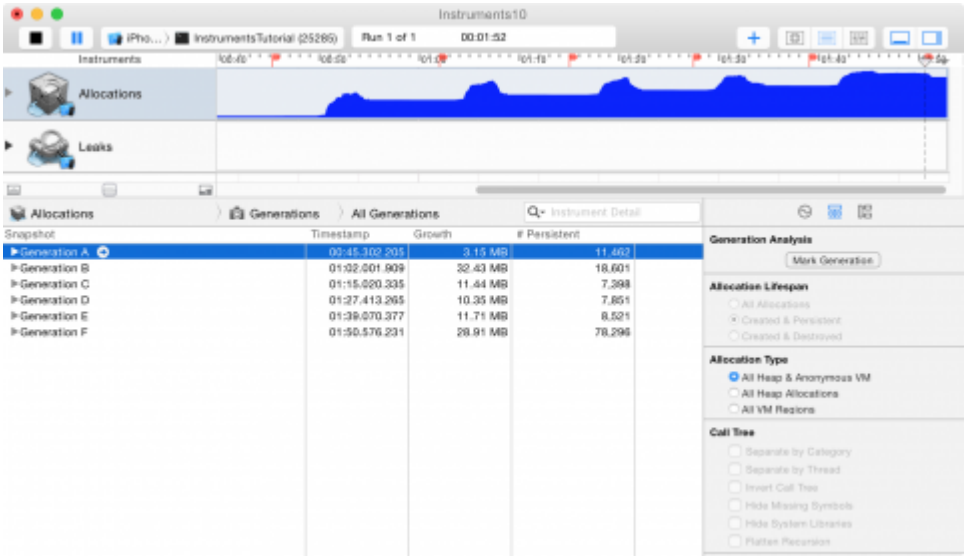
generation analysis . . .



.



generation analysis unbounded fashion ., . . .• ,



. ., . ,memory warnings? ? Memory warnings iOS .

. UIKit . .

`memory warning` `Instrument\Simulate Memory Warning` Instruments , `Hardware\Simulate Memory Warning` `simulator's` . . . .

. .

: https://riptutorial.com/ko/ios/topic/9629/-

141:

Examples

-C

Airdrop `UIActivityViewController` . `UIActivityViewController` , , , AirDrop .

`UIActivityViewController` .

```
UIImage *hatImage = [UIImage imageNamed:@"logo.png"];
if (hatImage)//checks if the image file is not nil
{
//Initialise a UIActivityViewController
UIActivityViewController *controller = [[UIActivityViewController alloc]
initWithActivityItems:@[hatImage] applicationActivities:nil];
//Excludes following options from the UIActivityViewController menu
NSArray *excludeActivities = @[UIActivityTypePostToWeibo,UIActivityTypePrint,
UIActivityTypeMail,UIActivityTypeMessage,UIActivityTypePostToTwitter,UIActivityTypePostToFacebook,


UIActivityTypeCopyToPasteboard,UIActivityTypeAssignToContact,

UIActivityTypeSaveToCameraRoll,UIActivityTypeAddToReadingList,

UIActivityTypePostToFlickr,UIActivityTypePostToVimeo,

UIActivityTypePostToTencentWeibo];
controller.excludedActivityTypes = excludeActivities;
[self presentViewController:controller animated:YES completion:nil];
}
```

```
if ((newImage) != nil)
        {
            let activityVC = UIActivityViewController(activityItems: [newImage],
applicationActivities: nil)
            activityVC.excludedActivityTypes =[UIActivityTypeAddToReadingList]
            self.presentViewController(activityVC, animated: true, completion: nil)

        }
```

: https://riptutorial.com/ko/ios/topic/7360/-

142: (Coreplot)

Examples

CorePlot

Core Plot podspec cocoapod . .

`pod init` Podfile

Podfile 'CorePlot', '~> 1.6'

pod install .

Cocoapods xcworkspace (.xcodeproj pod)

CocoaPods .xcworkspace .

ViewController.h

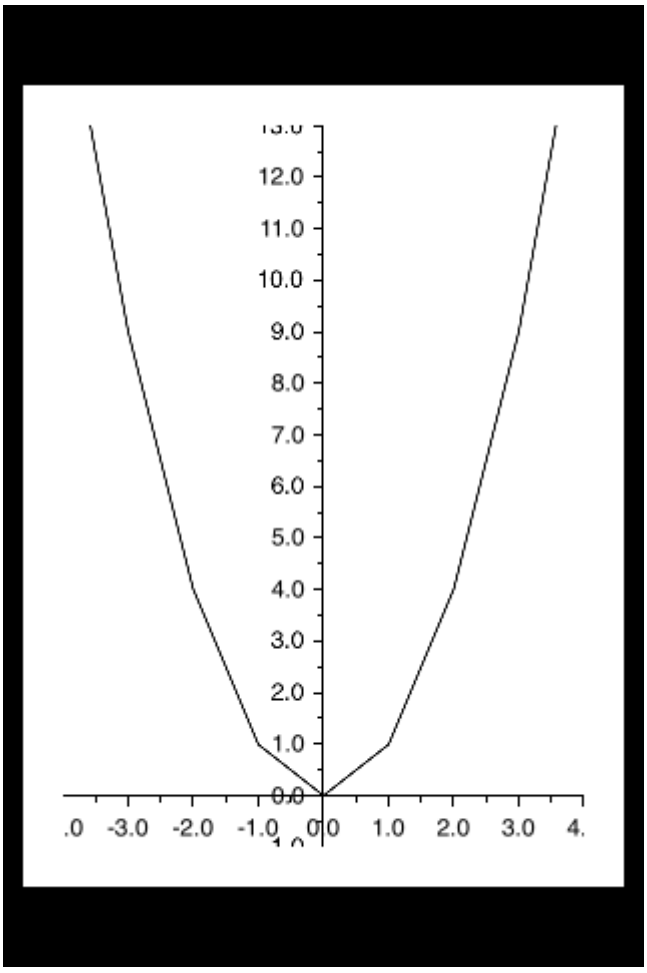
```
#import <CorePlot/ios/CorePlot.h>
//#import "CorePlot-CocoaTouch.h" or the above import statement
@interface ViewController : UIViewController<CPTPlotDataSource>
```

ViewController.m

```
-(void)loadView
{
    [super loadView];
    // We need a hostview, you can create one in IB (and create an outlet) or just do this:
    CPTGraphHostingView* hostView = [[CPTGraphHostingView alloc] initWithFrame:CGRectMake(10,
40, 300, 400)];
    hostView.backgroundColor=[UIColor whiteColor];
    self.view.backgroundColor=[UIColor blackColor];
    [self.view addSubview: hostView];
    // Create a CPTGraph object and add to hostView
    CPTGraph* graph = [[CPTXYGraph alloc] initWithFrame:CGRectMake(10, 40, 300, 400)];
    hostView.hostedGraph = graph;
    // Get the (default) plotspace from the graph so we can set its x/y ranges
    CPTXYPlotSpace *plotSpace = (CPTXYPlotSpace *) graph.defaultPlotSpace;
    // Note that these CPTPlotRange are defined by START and LENGTH (not START and END) !!
    [plotSpace setYRange: [CPTPlotRange plotRangeWithLocation:CPTDecimalFromFloat( 0 )
length:CPTDecimalFromFloat( 20 )]];
    [plotSpace setXRange: [CPTPlotRange plotRangeWithLocation:CPTDecimalFromFloat( -4 )
length:CPTDecimalFromFloat( 8 )]];
    // Create the plot (we do not define actual x/y values yet, these will be supplied by the
datasource...)
    CPTScatterPlot* plot = [[CPTScatterPlot alloc] initWithFrame:CGRectZero];
    // Let's keep it simple and let this class act as datasource (therefore we implemtn
<CPTPlotDataSource>)
    plot.dataSource = self;
    // Finally, add the created plot to the default plot space of the CPTGraph object we
created before
```

```
    [graph addPlot:plot toPlotSpace:graph.defaultPlotSpace];
}
// This method is here because this class also functions as datasource for our graph
// Therefore this class implements the CPTPlotDataSource protocol
-(NSUInteger)numberOfRecordsForPlot:(CPTPlot *)plotnumberOfRecords
{
        return 9; // Our sample graph contains 9 'points'
}
// This method is here because this class also functions as datasource for our graph
// Therefore this class implements the CPTPlotDataSource protocol
-(NSNumber *)numberForPlot:(CPTPlot *)plot field:(NSUInteger)fieldEnum
recordIndex:(NSUInteger)index
{
    // We need to provide an X or Y (this method will be called for each) value for every
index
    int x = index - 4;
    // This method is actually called twice per point in the plot, one for the X and one for
the Y value
    if(fieldEnum == CPTScatterPlotFieldX)
    {
    // Return x value, which will, depending on index, be between -4 to 4
    return [NSNumber numberWithInt: x];
    } else
    {
    // Return y value, for this example we'll be plotting y = x * x
        return [NSNumber numberWithInt: x * x];
    }
}
```

.



(Coreplot) : https://riptutorial.com/ko/ios/topic/7302/--coreplot-

143: I / O

Examples

3

```
import UIKit

// Save String to file
let fileName = "TextFile"
let documentDirectory = try FileManager.default.urlForDirectory(.documentDirectory, in:
.userDomainMask, appropriateFor: nil, create: true)

var fileURL = try
documentDirectory.appendingPathComponent(fileName).appendingPathExtension("txt")

print("FilePath: \(fileURL.path)")

var toFileString = "Text to write"
do {
  // Write to file
  try toFileString.writeToURL(fileURL, atomically: true, encoding: NSUTF8StringEncoding)
} catch let error as NSError {
  print("Failed writing to URL: \(fileURL), Error:\(error.localizedDescription)")
}

// Reading
var fromFileString = ""
do {
  fromFileString = try String(contentsOfURL: fileURL)
} catch let error as NSError {
  print("Failed reading from URL: \(fileURL), Error: " + error.localizedDescription)
}
print("Text input from file: \(fromFileString)")
```

2

```
import UIKit

// Save String to file
let fileName = "TextFile"
let DocumentDirectoryURL = try!
NSFileManager.defaultManager().URLForDirectory(.DocumentDirectory, inDomain: .UserDomainMask,
appropriateForURL: nil, create: true)

let fileURL =
DocumentDirectoryURL.URLByAppendingPathComponent(fileName).URLByAppendingPathExtension("txt")
print("FilePath: \(fileURL.path)")

var toFileString = "Text to write"
do {
  // Write to file
  try toFileString.writeToURL(fileURL, atomically: true, encoding: NSUTF8StringEncoding)
} catch let error as NSError {
  print("Failed writing to URL: \(fileURL), Error:\(error.localizedDescription)")
}
```

```
// Reading
var fromFileString = ""
do {
  fromFileString = try String(contentsOfURL: fileURL)
} catch let error as NSError {
  print("Failed reading from URL: \(fileURL), Error: " + error.localizedDescription)
}
print("Text input from file: \(fromFileString)")
```

I / O : https://riptutorial.com/ko/ios/topic/8892/---i---o

144:

`Reachability.h` `Reachability.m` Apple .

, Apple iOS API . .

Github / Cocoapod .

Apple Reachability / SCNetworkReachability .

Examples

Apple Reachability .

```
Reachability *internetReachability = [Reachability reachabilityForInternetConnection];
[internetReachability startNotifier];
```

`Reachability` `NSNotification` . .

```
[[NSNotificationCenter defaultCenter] addObserver:self
selector:@selector(reachabilityChanged:) name:kReachabilityChangedNotification object:nil];
```

```
- (void) reachabilityChanged:(NSNotification *)note {
    //code which reacts to network changes
}
```

```
- (void)reachabilityChanged:(NSNotification *)note {
    Reachability* reachability = [note object];
    NetworkStatus netStatus = [reachability currentReachabilityStatus];

    if (netStatus == NotReachable) {
        NSLog(@"Network unavailable");
    }
}
```

WIFI

```
- (void)reachabilityChanged:(NSNotification *)note {
    Reachability* reachability = [note object];
    NetworkStatus netStatus = [reachability currentReachabilityStatus];

    switch (netStatus) {
        case NotReachable:
            NSLog(@"Network unavailable");
            break;
        case ReachableViaWWAN:
            NSLog(@"Network is cellular");
            break;
        case ReachableViaWiFi:
            NSLog(@"Network is WIFI");
```

```
            break;
    }
}
```

```
import SystemConfiguration

/// Class helps to code reuse in handling internet network connections.
class NetworkHelper {

    /**
     Verify if the device is connected to internet network.
     - returns:          true if is connected to any internet network, false if is not
     connected to any internet network.
     */
   class func isConnectedToNetwork() -> Bool {
       var zeroAddress = sockaddr_in()

       zeroAddress.sin_len = UInt8(sizeofValue(zeroAddress))
       zeroAddress.sin_family = sa_family_t(AF_INET)

       let defaultRouteReachability = withUnsafePointer(&zeroAddress) {
           SCNetworkReachabilityCreateWithAddress(nil, UnsafePointer($0))
       }

       var flags = SCNetworkReachabilityFlags()

       if !SCNetworkReachabilityGetFlags(defaultRouteReachability!, &flags) {
           return false
       }

       let isReachable = (flags.rawValue & UInt32(kSCNetworkFlagsReachable)) != 0
       let needsConnection = (flags.rawValue & UInt32(kSCNetworkFlagsConnectionRequired)) != 0

      return (isReachable && !needsConnection)
   }
}



if NetworkHelper.isConnectedToNetwork() {
    // Is connected to network
}
```

-C :

.

```
-(BOOL)isConntectedToNetwork
{
    Reachability *networkReachability = [Reachability reachabilityForInternetConnection];
    NetworkStatus networkStatus = [networkReachability currentReachabilityStatus];
    if (networkStatus == NotReachable)
    {
        NSLog(@"There IS NO internet connection");
        return false;
    } else
    {
        NSLog(@"There IS internet connection");
        return true;
```

```
    }
}
```

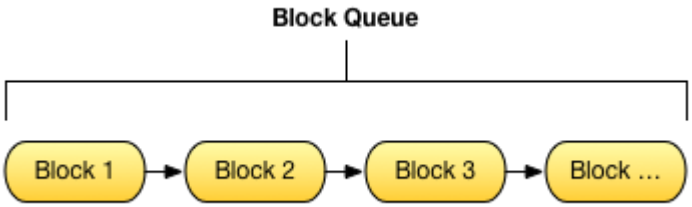
: https://riptutorial.com/ko/ios/topic/704/--

145: (MKBlockQueue)

MKBlockQueue . NSOperation , MKBlockQueue . .

https://github.com/MKGitHub/MKBlockQueue

Examples




```
// create the dictionary that will be sent to the blocks
var myDictionary:Dictionary<String, Any> = Dictionary<String, Any>()
myDictionary["InitialKey"] = "InitialValue"

// create block queue
let myBlockQueue:MKBlockQueue = MKBlockQueue()

// block 1
let b1:MKBlockQueueBlockType =
{
    (blockQueueObserver:MKBlockQueueObserver, dictionary:inout Dictionary<String, Any>) in

    print("Block 1 started with dictionary: \(dictionary)")
    dictionary["Block1Key"] = "Block1Value"

    // tell this block is now completed
    blockQueueObserver.blockCompleted(with:&dictionary)

}

// block 2
let b2:MKBlockQueueBlockType =
{
    (blockQueueObserver:MKBlockQueueObserver, dictionary:inout Dictionary<String, Any>) in

    var copyOfDictionary:Dictionary<String, Any> = dictionary

    // test calling on main thread, async, with delay
    DispatchQueue.main.asyncAfter(deadline:(.now() + .seconds(1)), execute:
    {
        print("Block 2 started with dictionary: \(copyOfDictionary)")

        copyOfDictionary["Block2Key"] = "Block2Value"

        // tell this block is now completed
        blockQueueObserver.blockCompleted(with:&copyOfDictionary)
    })
}

// block 3
```

```
let b3:MKBlockQueueBlockType =
{
    (blockQueueObserver:MKBlockQueueObserver, dictionary:inout Dictionary<String, Any>) in

    var copyOfDictionary:Dictionary<String, Any> = dictionary

    // test calling on global background queue, async, with delay
    DispatchQueue.global(qos:.background).asyncAfter(deadline:(.now() + .seconds(1)), execute:
    {
        print("Block 3 started with dictionary: \(copyOfDictionary)")

        copyOfDictionary["Block3Key"] = "Block3Value"

        // tell this block is now completed
        blockQueueObserver.blockCompleted(with:&copyOfDictionary)
    })
}

// add blocks to the queue
myBlockQueue.addBlock(b1)
myBlockQueue.addBlock(b2)
myBlockQueue.addBlock(b3)

// add queue completion block for the queue
myBlockQueue.queueCompletedBlock(
{
    (dictionary:Dictionary<String, Any>) in
    print("Queue completed with dictionary: \(dictionary)")
})

// run queue
print("Queue starting with dictionary: \(myDictionary)")
myBlockQueue.run(with:&myDictionary)
```

(MKBlockQueue) : https://riptutorial.com/ko/ios/topic/9122/----mkblockqueue--

146:

:

- dispatch_async - . dispatch_async dispatch_async .
- dispatch_sync - , . dispatch_async

```
. . .dispatch_get_main_queue . dispatch_queue_create("QUEUE_NAME",
DISPATCH_QUEUE_CONCURRENT) . . . dispatch_async dispatch_sync . .
DISPATCH_QUEUE_CONCURRENT DISPATCH_QUEUE_SERIAL
```

`queue` `queue` . . : Xcode , Xcode ( )

. , `UIView` . (,) .

Examples

-

("Bar") ("Foo") . . .

```
dispatch_async(dispatch_queue_create("Foo", DISPATCH_QUEUE_CONCURRENT), ^{
    for (int i = 0; i < 100; i++) {
        NSLog(@"Foo");
        usleep(100000);
    }
});

for (int i = 0; i < 100; i++) {
    NSLog(@"Bar");
    usleep(50000);
}
```

"Foo" 100 , 100ms . . `Foo` "Bar" 50ms . "Foo" "Bars" .

. REST API UILabel . UILabel .

```
dispatch_async(dispatch_get_global_queue(DISPATCH_QUEUE_PRIORITY_DEFAULT, 0), ^{
    //Perform expensive tasks
    //...

    //Now before updating the UI, ensure we are back on the main thread
    dispatch_async(dispatch_get_main_queue(), ^{
        label.text = //....
    });
}
```

. .

- .

```
dispatch_group_t preapreWaitingGroup = dispatch_group_create();

dispatch_group_enter(preapreWaitingGroup);
[self doAsynchronousTaskWithComplete:^(id someResults, NSError *error) {
    // Notify that this task has been completed.
    dispatch_group_leave(preapreWaitingGroup);
}]

dispatch_group_enter(preapreWaitingGroup);
[self doOtherAsynchronousTaskWithComplete:^(id someResults, NSError *error) {
    dispatch_group_leave(preapreWaitingGroup);
}]

dispatch_group_notify(preapreWaitingGroup, dispatch_get_main_queue(), ^{
    // This block will be executed once all above threads completed and call
dispatch_group_leave
    NSLog(@"Prepare completed. I'm readyyyy");
});
```

1. Swift 3 .

```
let prepareGroup = DispatchGroup()
prepareGroup.enter()
doAsynchronousTaskWithComplete() { (someResults, error) in
    // Notify that this task has been completed.
    prepareGroup.leave()
}

prepareGroup.enter()
doOtherAsynchronousTaskWithComplete() { (someResults, error) in
    // Notify that this task has been completed.
    prepareGroup.leave()
}

prepareGroup.notify(queue: DispatchQueue.main) {
    // This block will be executed once all above threads completed and call
dispatch_group_leave
    print("Prepare completed. I'm readyyyy")
}
```

: https://riptutorial.com/ko/ios/topic/1090/

147:

```
// Content size category constants
UIContentSizeCategoryExtraSmall
UIContentSizeCategorySmall
UIContentSizeCategoryMedium
UIContentSizeCategoryLarge
UIContentSizeCategoryExtraLarge
UIContentSizeCategoryExtraExtraLarge
UIContentSizeCategoryExtraExtraExtraLarge

// Accessibility sizes
UIContentSizeCategoryAccessibilityMedium
UIContentSizeCategoryAccessibilityLarge
UIContentSizeCategoryAccessibilityExtraLarge
UIContentSizeCategoryAccessibilityExtraExtraLarge
UIContentSizeCategoryAccessibilityExtraExtraExtraLarge
```

Examples

```
UIApplication.sharedApplication().preferredContentSizeCategory
```

-C

```
[UIApplication sharedApplication].preferredContentSizeCategory;
```

.

.

```
NSNotificationCenter.defaultCenter().addObserver(self, selector: #selector(updateFont), name:
name:UIContentSizeCategoryDidChangeNotification, object: nil)
```

-C

```
[[NSNotificationCenter defaultCenter] addObserver:self selector:@selector(updateFont)
name:UIContentSizeCategoryDidChangeNotification object:nil];
```

`userInfo UIContentSizeCategoryNewValueKey  UIContentSizeCategoryNewValueKey .`

WKWebView

WKWebView . .

```
// build HTML header for dynamic type and responsive design
func buildHTMLHeader() -> String {

    // Get preferred dynamic type font sizes for html styles
    let bodySize = UIFont.preferredFont(forTextStyle: UIFontTextStyle.body).pointSize
    let h1Size = UIFont.preferredFont(forTextStyle: UIFontTextStyle.title1).pointSize
    let h2Size = UIFont.preferredFont(forTextStyle: UIFontTextStyle.title2).pointSize
    let h3Size = UIFont.preferredFont(forTextStyle: UIFontTextStyle.title3).pointSize

    // On iPad, landscape text is larger than preferred font size
    var portraitMultiplier = CGFloat(1.0)
    var landscapeMultiplier = CGFloat(0.5)

    // iPhone text is shrunken
    if UIDevice.current.model.range(of: "iPhone") != nil {
        portraitMultiplier = CGFloat(3.0)
        landscapeMultiplier = CGFloat(1.5)
    }

    // Start HTML header text
    let patternText = "<html> <head> <style> "

    // Match Dynamic Type for this page.
    + "body { background-color: \(backgroundColor);} "
    + "@media all and (orientation:portrait) {img {max-width: 90%; height: auto;} "
    + "p, li { font: -apple-system-body; font-family: Georgia, serif; font-
size:calc(\(bodySize * portraitMultiplier)px + 1.0vw); font-weight: normal; color:
\(fontColor) } "
    + "h1 { font: -apple-system-headine; font-family: Verdana, sans-serif; font-
size:calc(\(h1Size * portraitMultiplier)px + 1.0vw); font-weight: bold; color:
\(headFontColor) } "
    + "h2 { font: -apple-system-headine; font-family: Verdana, sans-serif; font-
size:calc(\(h2Size * portraitMultiplier)px + 1.0vw); font-weight: bold; color:
\(headFontColor) } "
    + "h3, h4 { font: -apple-system-headine; font-family: Verdana, sans-serif; font-
size:calc(\(h3Size * portraitMultiplier)px + 1.0vw); font-weight: bold; color:
\(headFontColor) } } "
    + "@media all and (orientation:landscape) {img {max-width: 65%; height: auto;}"
    + "p, li { font: -apple-system-body; font-family: Georgia, serif; font-
size:calc(\(bodySize * landscapeMultiplier)px + 1.0vw); font-weight: normal; color:
\(fontColor) }"
    + "h1 { font: -apple-system-headine; font-family: Verdana, sans-serif; font-
size:calc(\(h1Size * landscapeMultiplier)px + 1.0vw); font-weight: bold; color:
\(headFontColor) } "
    + "h2 { font: -apple-system-headine; font-family: Verdana, sans-serif; font-
size:calc(\(h2Size * landscapeMultiplier)px + 1.0vw); font-weight: bold; color:
\(headFontColor) } "
    + "h3, h4 { font: -apple-system-headine; font-family: Verdana, sans-serif; font-
size:calc(\(h3Size * landscapeMultiplier)px + 1.0vw); font-weight: bold; color:
\(headFontColor) } } </style>"
    + "</head><body>"
    + "<meta name=\"viewport\" content=\"width: device-width\">"

    return patternText
}
```

iOS 10

`UILabel` , `UITextField` `UITextView` `adjustsFontForContentSizeCategory` iOS 10 `adjustsFontForContentSizeCategory` .

```
@IBOutlet var label:UILabel!

if #available(iOS 10.0, *) {
    label.adjustsFontForContentSizeCategory = true
} else {
    // Observe for UIContentSizeCategoryDidChangeNotification and handle it manually
    // since the adjustsFontForContentSizeCategory property isn't available.
}
```

: https://riptutorial.com/ko/ios/topic/4466/-

148:

Examples

Apple :

UIStoryboardSegue . segue . **Segue** . segue prepareForSegue : sender : .

```
sourceViewController: UIViewController {get}
destinationViewController: UIViewController {get}
identifier: String? {get}
```

:

- UIViewController
- UIStoryBoardSegue

Segue

PrepareForSegue :

```
 func prepareForSegue(_ segue:UIStoryboardSegue, sender sender:AnyObject?)
```

segue .

segue : segue .

sender : segue .

Swift

segue "SomeSpecificIdentifier" .

```
override func prepareForSegue(segue: UIStoryboardSegue, sender: AnyObject?) {
    if segue.identifier == "SomeSpecificIdentifier" {
        //- Do specific task
    }
}
```

Segue .

ShouldPerformSegueWithIdentifier :

```
func shouldPerformSegueWithIdentifier(_ identifier:String, sender sender:AnyObject?) -> Bool
```

segue .

Identifier : segue

Sender : Segue .

Swift

"SomeSpecificIdentifier" segue .

```
override func shouldPerformSegueWithIdentifier(identifier:String, sender:AnyObject?) -> Bool {
    if identifier == "SomeSpecificIdentifier" {
        return true
    }
    return false
}
```

Segues

Unwind Segues "" . Interface Builder . **IBAction UIStoryboardSegue** . . . UIViewController Unwind Segue . [] [1]

C :

```
-(IBAction)prepareForUnwind:(UIStoryboardSegue *)segue {
}
```

:

```
@IBAction func prepareForUnwind(segue: UIStoryboardSegue) {
}
```

Segue

PerformSegueWithIdentifier :

```
func performSegueWithIdentifier(_ identifier:String, sender sender:AnyObject?)
```

.

Identifier : segue

Sender : Segue .

Swift

"SomeSpecificIdentifier" segue :

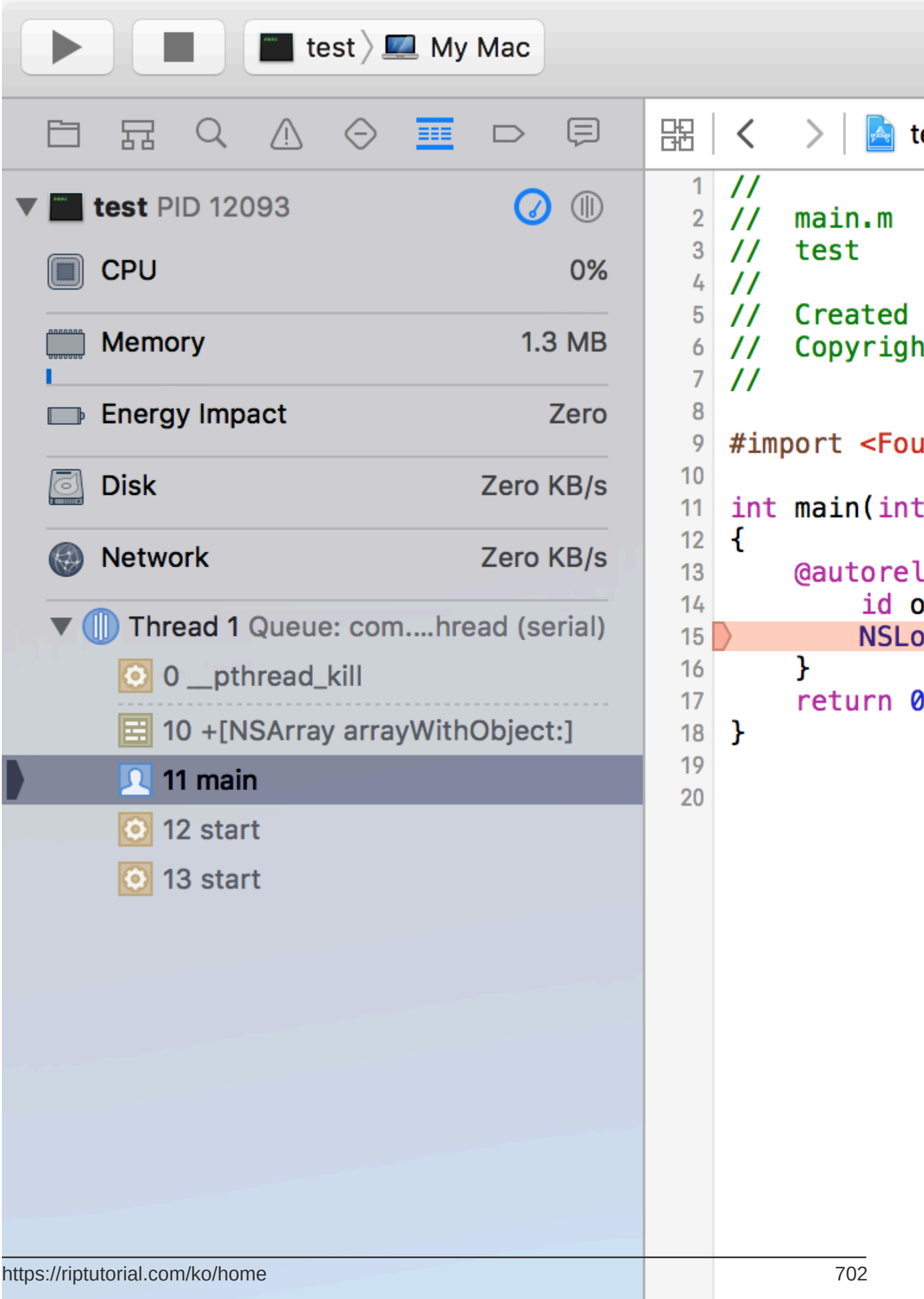
```
func tableView(tableView: UITableView, didSelectRowAtIndexPath indexPath: NSIndexPath) {
    performSegueWithIdentifier("SomeSpecificIdentifier", sender: indexPath.item)
}
```

: https://riptutorial.com/ko/ios/topic/5575/

149:

Examples

Xcode .


test
My Mac
test PID 12093
CPU
0%
Memory
1.3 MB
Energy Impact
Zero
Disk
Zero KB/s
Network
Zero KB/s
Thread 1 Queue: com....hread (serial)
0 __pthread_kill
10 +[NSArray arrayWithObject:]
11 main
12 start
13 start
1 //
2 // main.m
3 // test
4 //
5 // Created
6 // Copyrigh
7 //
8
9 #import <Fou
10
11 int main(int
12 {
13 @autorel
14 id o
15 NSLo
16 }
17 return 0
18 }
19
20

- `NSRangeException`, `NSArray` `NSString` `NSRangeException`.
- `NSInternalInconsistencyException` .
- `NSUnknownKeyException` XIB . .

EXC_BAD_ACCESS

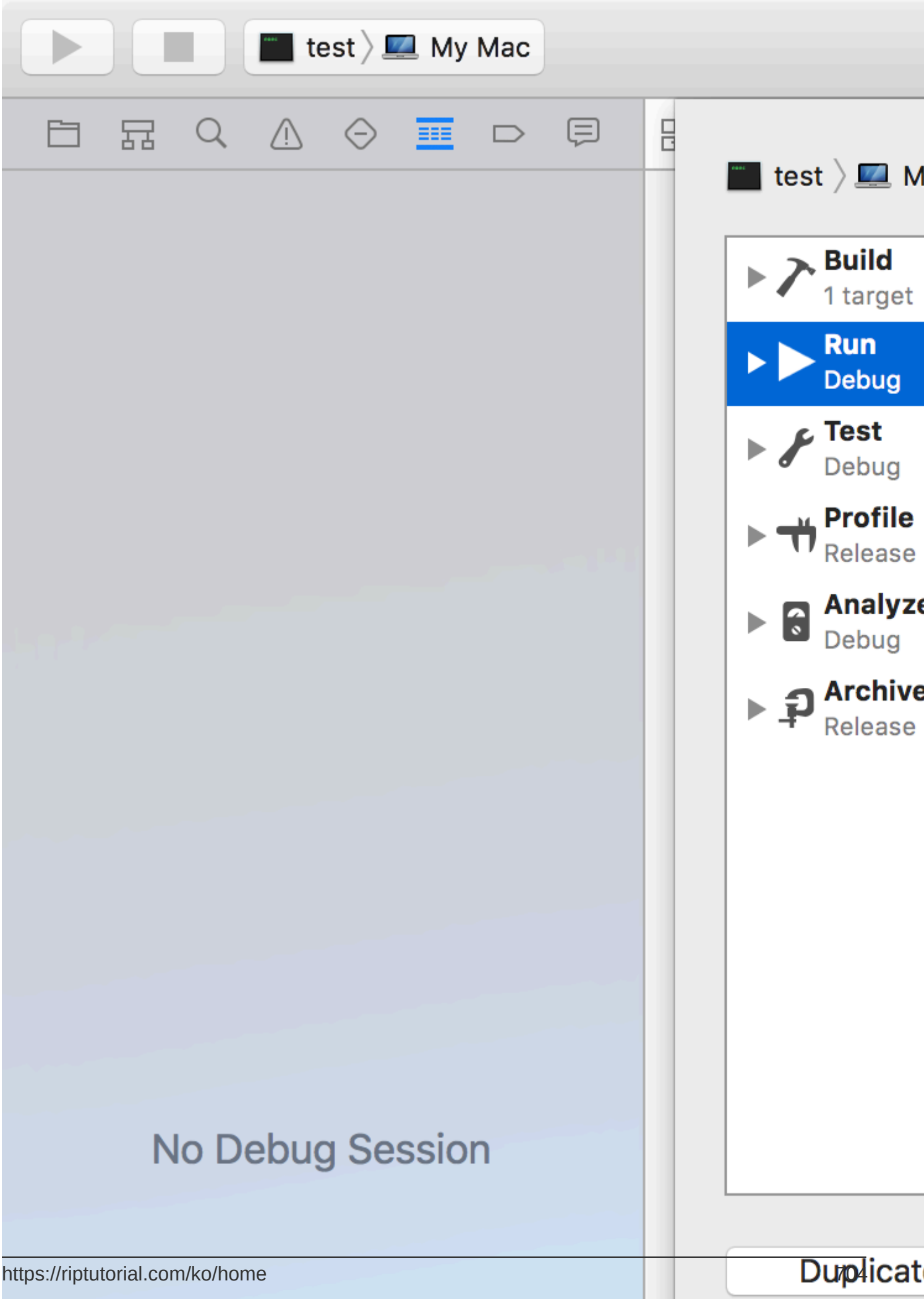
`EXC_BAD_ACCESS` `NULL` `EXC_BAD_ACCESS`. , / , . Swift .

`EXC_BAD_ACCESS` `NULL` . (`0x0` 16. `printf` / `NSLog` `NULL` .

`EXC_BAD_ACCESS` `EXC_BAD_ACCESS` . .

-
- C .
-

Scheme Editor Diagnostics Xcode .

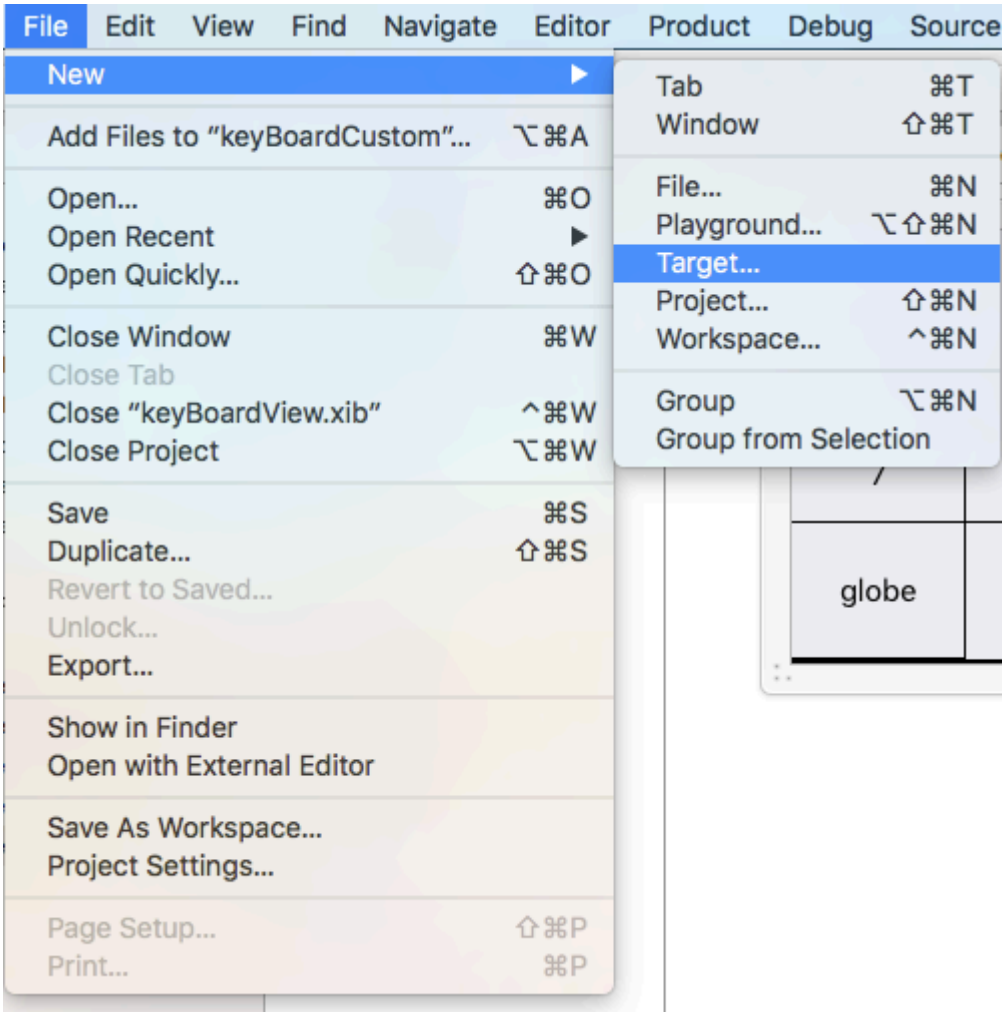

test
My Mac
test
Build
1 target
Run
Debug
Test
Debug
Profile
Release
Analyze
Debug
Archive
Release
No Debug Session
Duplicat

150:

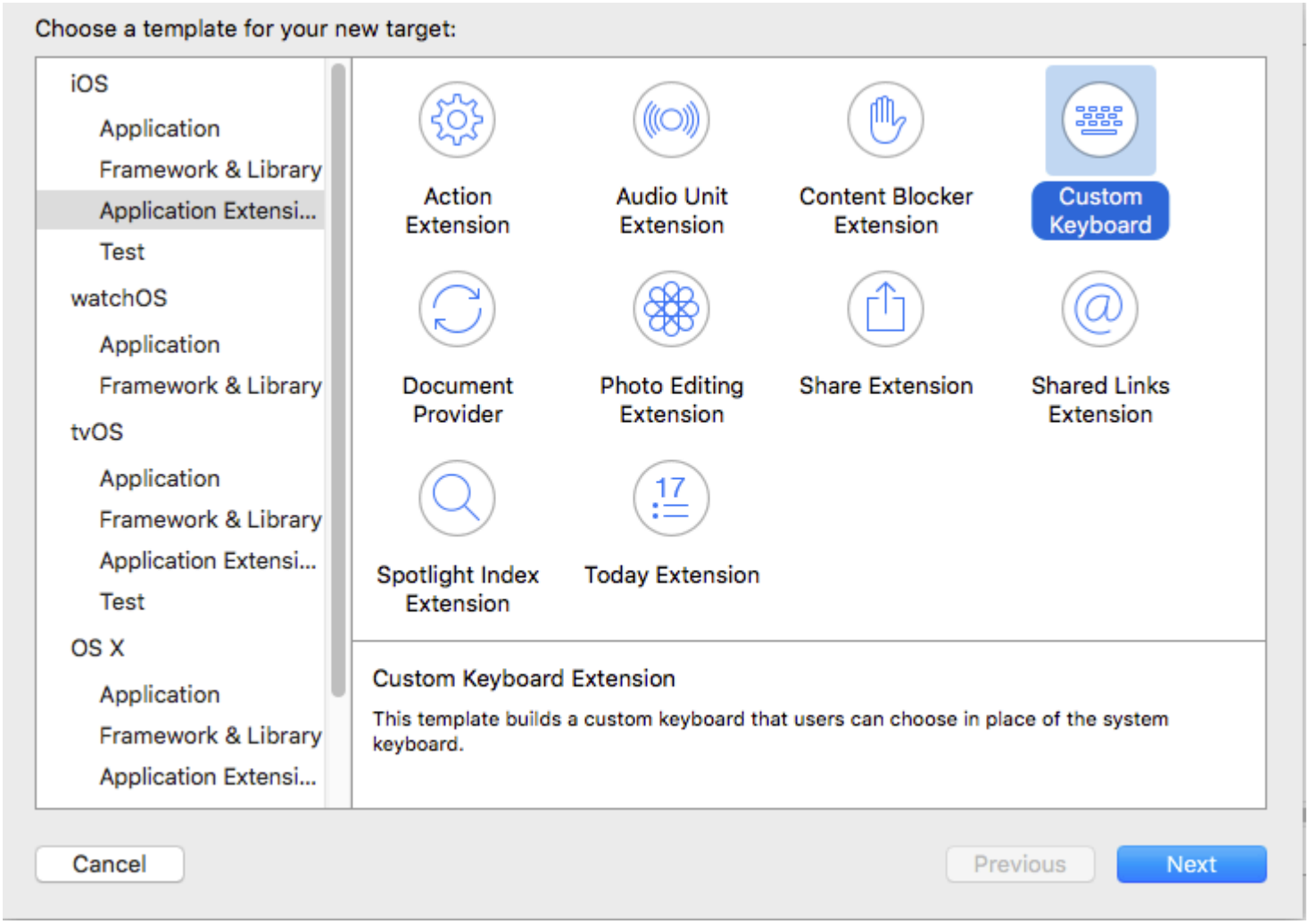
Examples

-C XIB

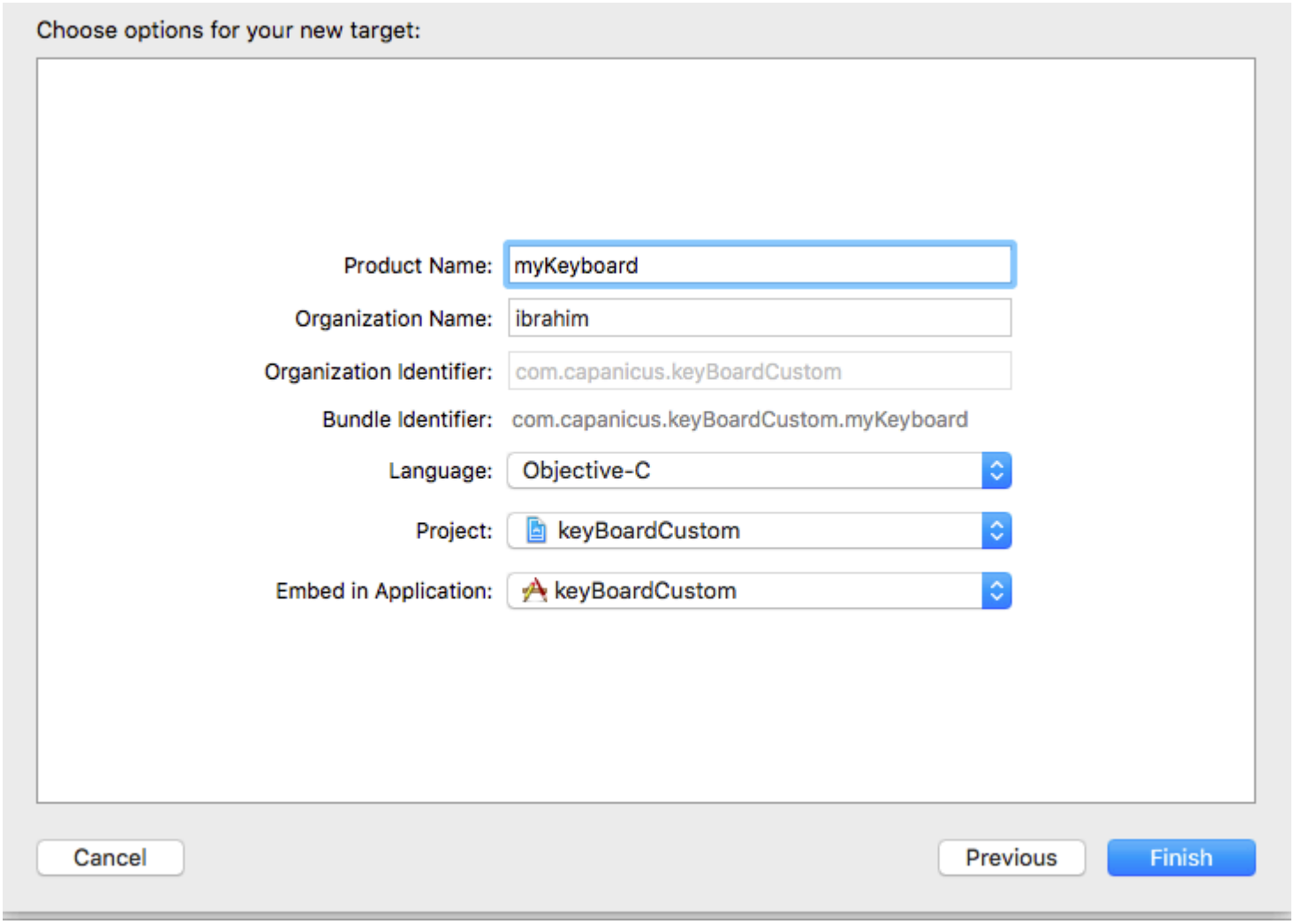
XCode



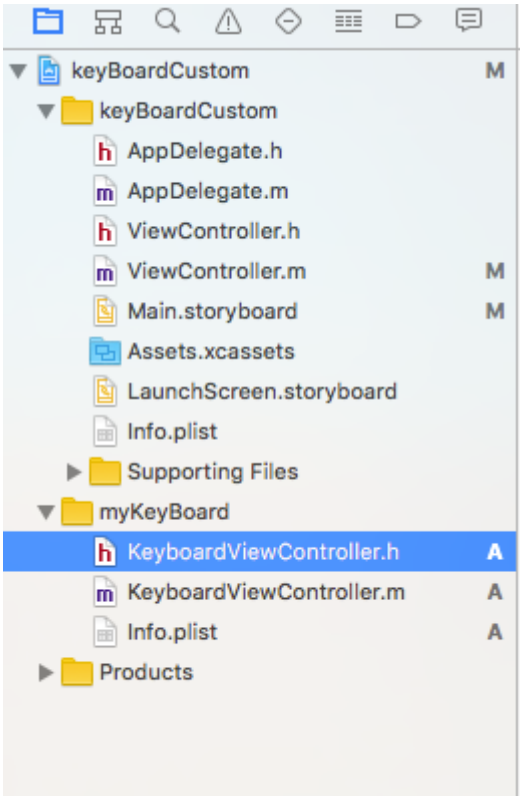
Add Target Custom KeyBoard .


Choose a template for your new target:
iOS
Application
Framework & Library
Application Extensi...
Test
watchOS
Application
Framework & Library
tvOS
Application
Framework & Library
Application Extensi...
Test
OS X
Application
Framework & Library
Application Extensi...
Action Extension
Audio Unit Extension
Content Blocker Extension
Custom Keyboard
Document Provider
Photo Editing Extension
Share Extension
Shared Links Extension
Spotlight Index Extension
Today Extension
Custom Keyboard Extension
This template builds a custom keyboard that users can choose in place of the system keyboard.
Cancel
Previous
Next

.

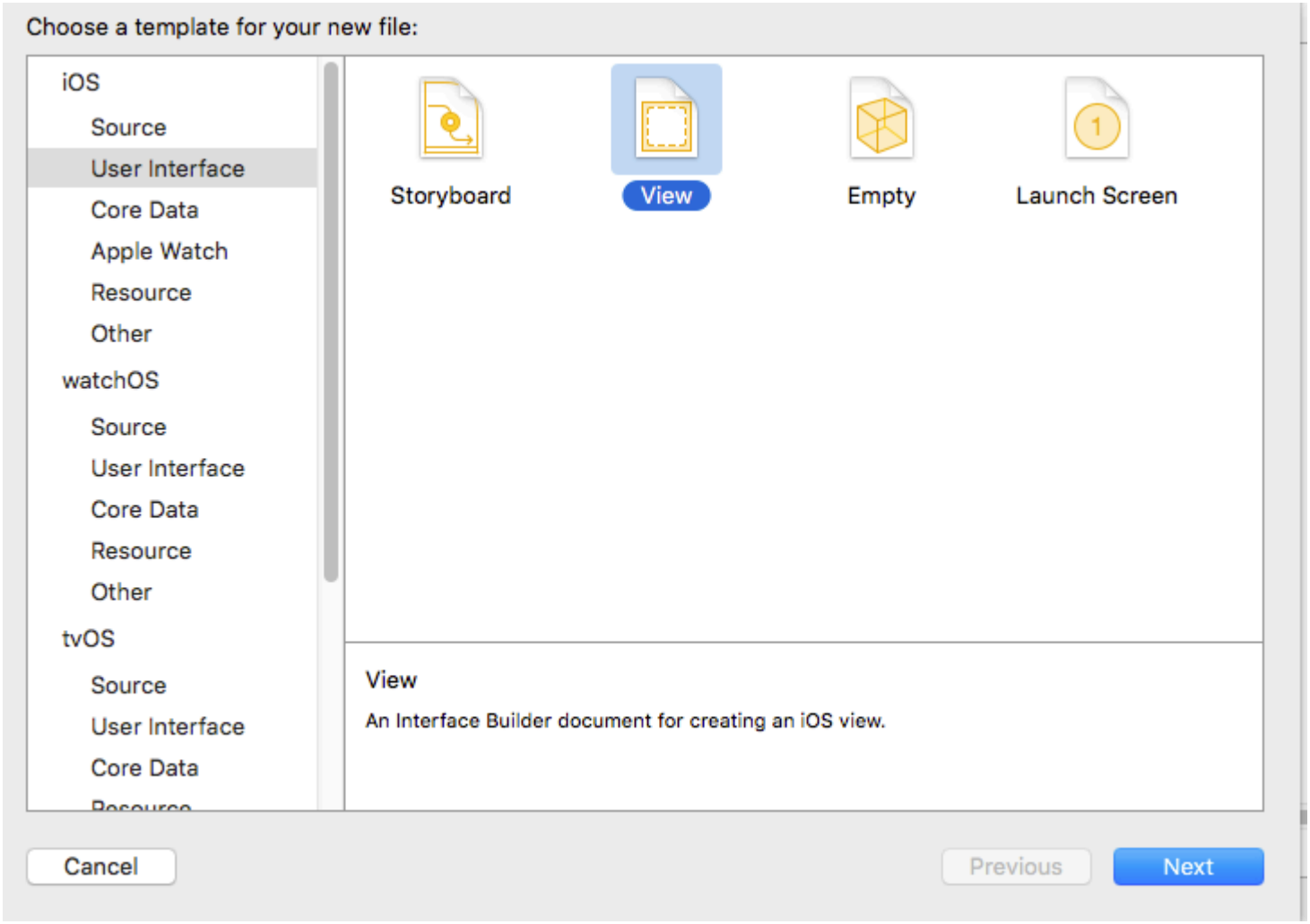

Choose options for your new target:
Product Name: myKeyboard
Organization Name: ibrahim
Organization Identifier: com.capanicus.keyBoardCustom
Bundle Identifier: com.capanicus.keyBoardCustom.myKeyboard
Language: Objective-C
Project: keyBoardCustom
Embed in Application: keyBoardCustom
Cancel
Previous
Finish

.

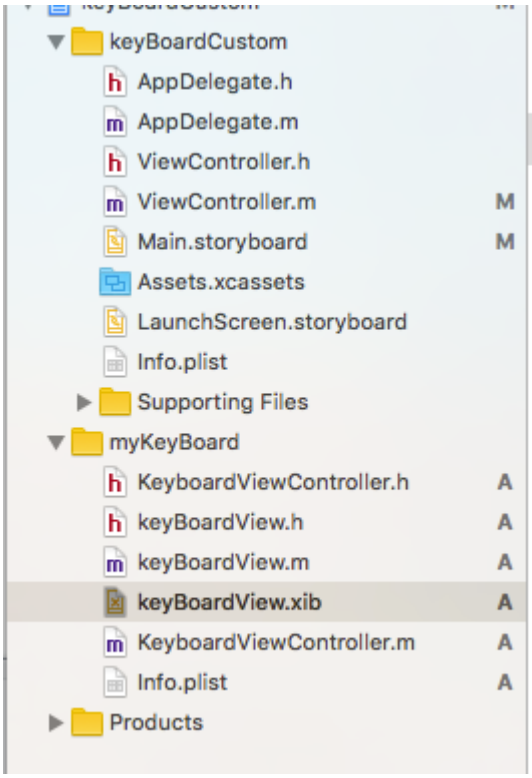

keyBoardCustom M
keyBoardCustom
AppDelegate.h
AppDelegate.m
ViewController.h
ViewController.m M
Main.storyboard M
Assets.xcassets
LaunchScreen.storyboard
Info.plist
Supporting Files
myKeyBoard
KeyboardViewController.h A
KeyboardViewController.m A
Info.plist A
Products

myKeyBoard .

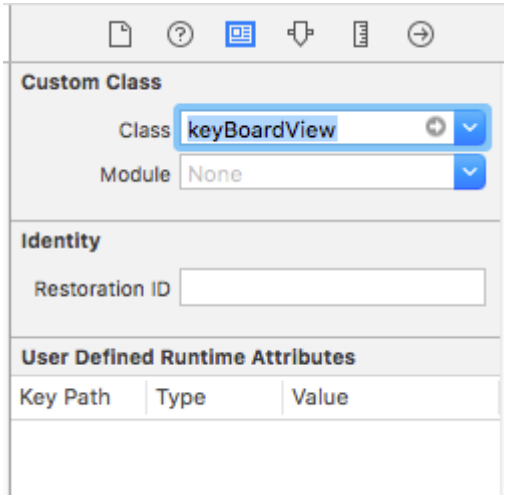
UIView Cocoatouch .



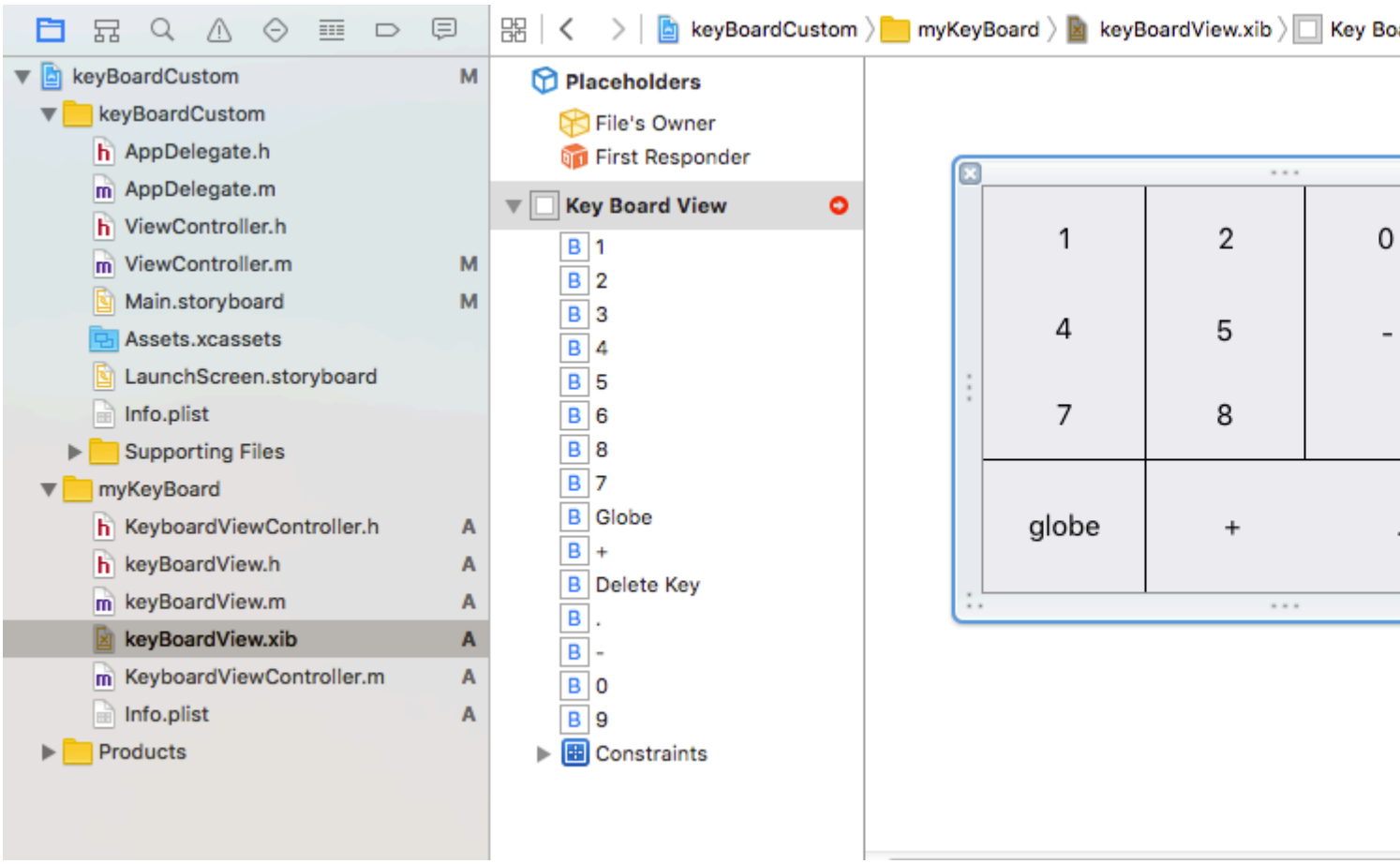
.



`keyBoardView.xib` `keyBoardView`



`keyBoardView.xib`



`keyBoardView.xib` `keyBoardView.h` .

`keyBoardView.h` `keyBoardView.h` .

```
#import <UIKit/UIKit.h>

@interface keyBoardView : UIView

@property (weak, nonatomic) IBOutlet UIButton *deleteKey;
//IBOutlet for the delete Key
@property (weak, nonatomic) IBOutlet UIButton *globe;
//Outlet for the key with title globe which changes the keyboard type
@property (strong, nonatomic) IBOutletCollection(UIButton) NSArray *keys;
//Contains a colloection of all the keys '0 to 9' '+' '-' and '.'

@end
```

`keyBoardViewController.h` import `#import "keyBoardView.h"`

`@property (strong, nonatomic)keyBoardView *keyboard;` `@property (strong, nonatomic)keyBoardView *keyboard;`

```
@property (nonatomic, strong) UIButton *nextKeyboardButton and all the code associated with it
```

KeyboardViewController.m viewDidLoad () .

```
- (void)viewDidLoad {
    [super viewDidLoad];
```

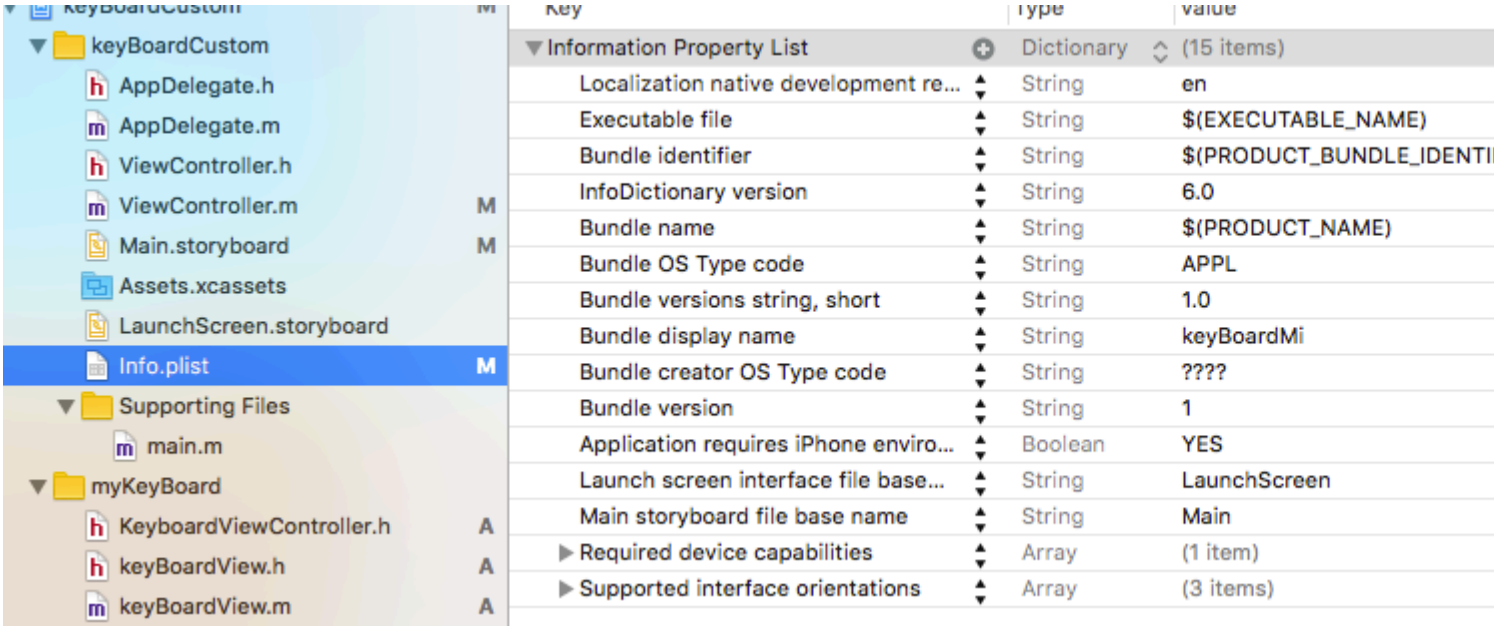
```
    self.keyboard=[[[NSBundle mainBundle]loadNibNamed:@"keyBoardView" owner:nil
options:nil]objectAtIndex:0];
      self.inputView=self.keyboard;
    [self addGestureToKeyboard];

    // Perform custom UI setup here
//    self.nextKeyboardButton = [UIButton buttonWithType:UIButtonTypeSystem];
//
//    [self.nextKeyboardButton setTitle:NSLocalizedString(@"Next Keyboard", @"Title for 'Next
Keyboard' button") forState:UIControlStateNormal];
//    [self.nextKeyboardButton sizeToFit];
//    self.nextKeyboardButton.translatesAutoresizingMaskIntoConstraints = NO;
//
//    [self.nextKeyboardButton addTarget:self action:@selector(advanceToNextInputMode)
forControlEvents:UIControlEventTouchUpInside];
//
//    [self.view addSubview:self.nextKeyboardButton];
//
//    [self.nextKeyboardButton.leftAnchor constraintEqualToAnchor:self.view.leftAnchor].active
= YES;
//    [self.nextKeyboardButton.bottomAnchor
constraintEqualToAnchor:self.view.bottomAnchor].active = YES;
}
```

addGestureToKeyboard , pressDeleteKey , keyPressed .

```
-(void) addGestureToKeyboard
{
    [self.keyboard.deleteKey addTarget:self action:@selector(pressDeleteKey)
forControlEvents:UIControlEventTouchUpInside];
    [self.keyboard.globe addTarget:self action:@selector(advanceToNextInputMode)
forControlEvents:UIControlEventTouchUpInside];

    for (UIButton *key in self.keyboard.keys)
    {
        [key addTarget:self action:@selector(keyPressed:)
forControlEvents:UIControlEventTouchUpInside];
    }


}
-(void) pressDeleteKey
{
    [self.textDocumentProxy deleteBackward];
}

-(void)keyPressed:(UIButton *)key
{
    [self.textDocumentProxy insertText:[key currentTitle]];
}
```

-> -> -> -> (keyboardName keyBoardCustom)

Bundle display name .



youtube

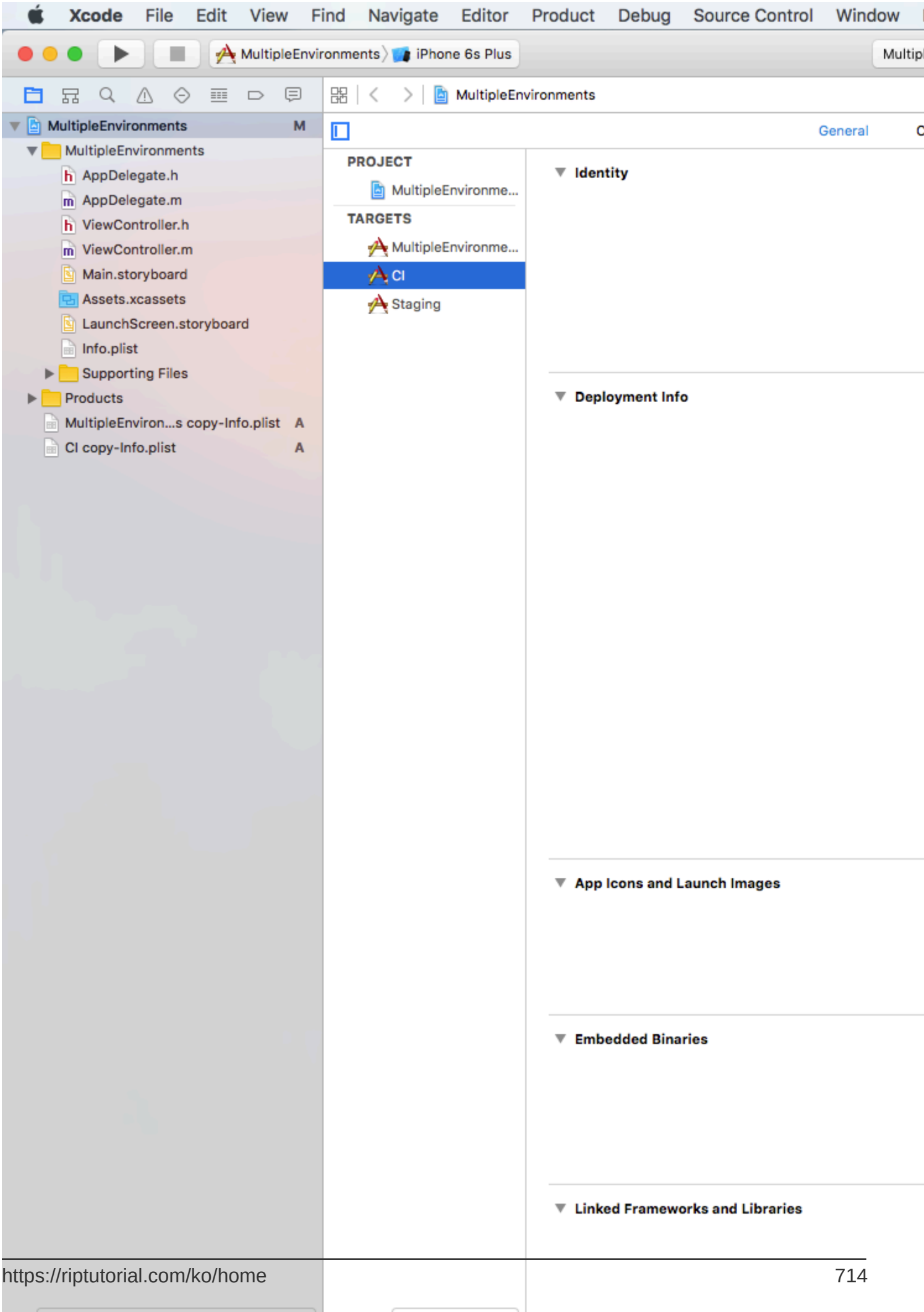
: https://riptutorial.com/ko/ios/topic/7358/-

151:

Examples

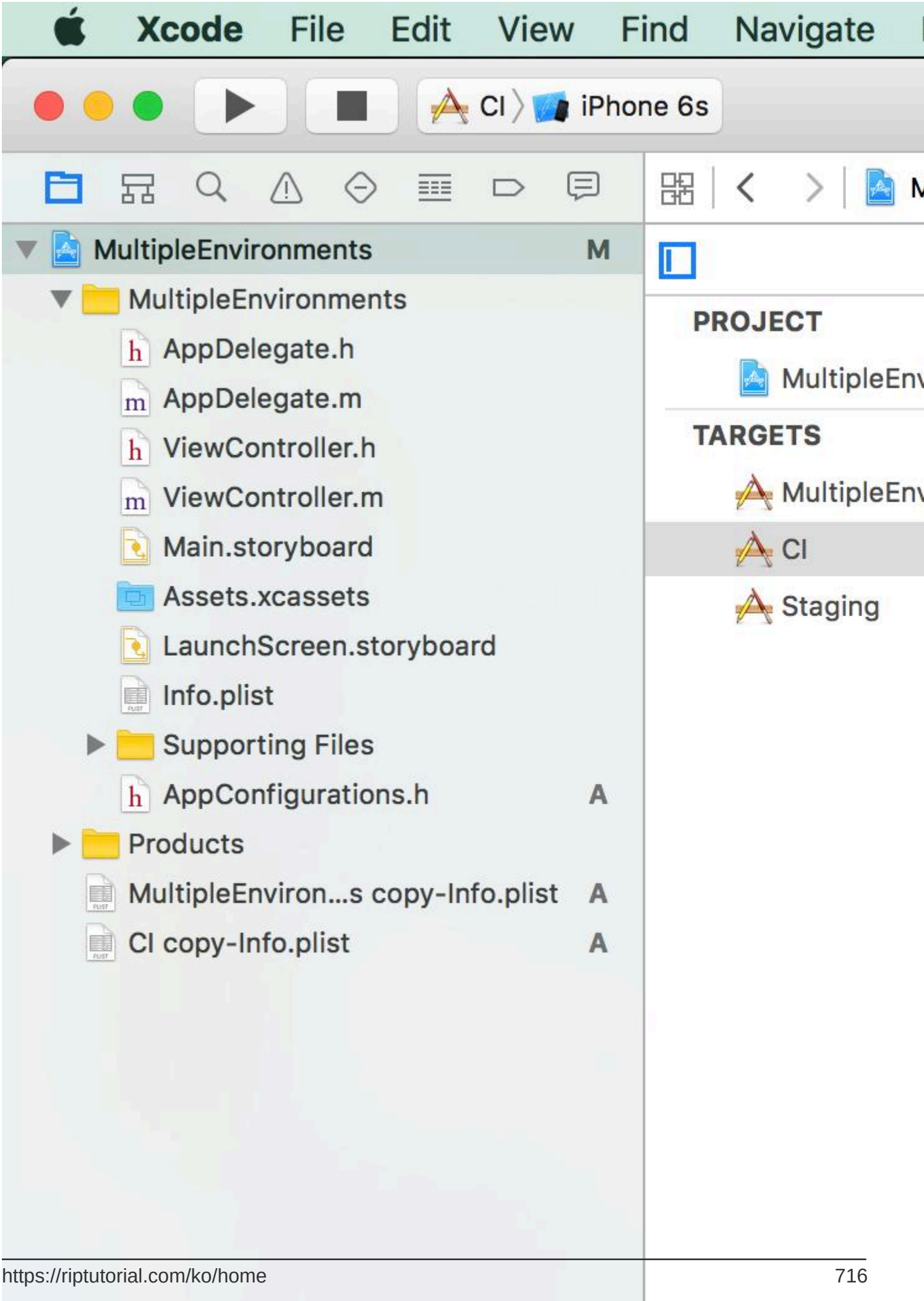
. CI - . URL, .

, 2 .

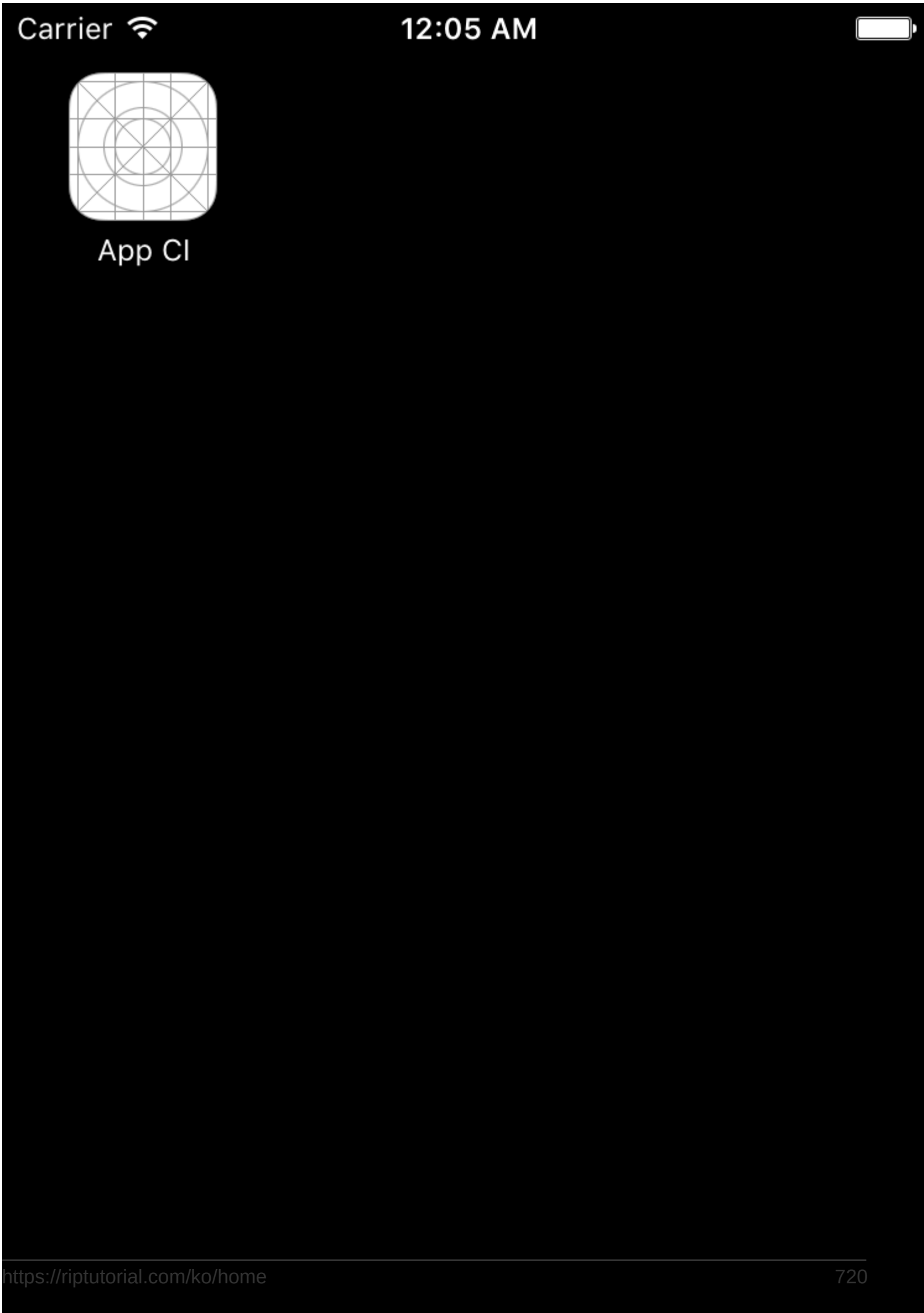

Xcode File Edit View Find Navigate Editor Product Debug Source Control Window
MultipleEnvironments iPhone 6s Plus
MultipleEnvironments
MultipleEnvironments M
MultipleEnvironments
AppDelegate.h
AppDelegate.m
ViewController.h
ViewController.m
Main.storyboard
Assets.xcassets
LaunchScreen.storyboard
Info.plist
Supporting Files
Products
MultipleEnviron...s copy-Info.plist A
CI copy-Info.plist A
General
PROJECT
MultipleEnvironme...
TARGETS
MultipleEnvironme...
CI
Staging
Identity
Deployment Info
App Icons and Launch Images
Embedded Binaries
Linked Frameworks and Libraries

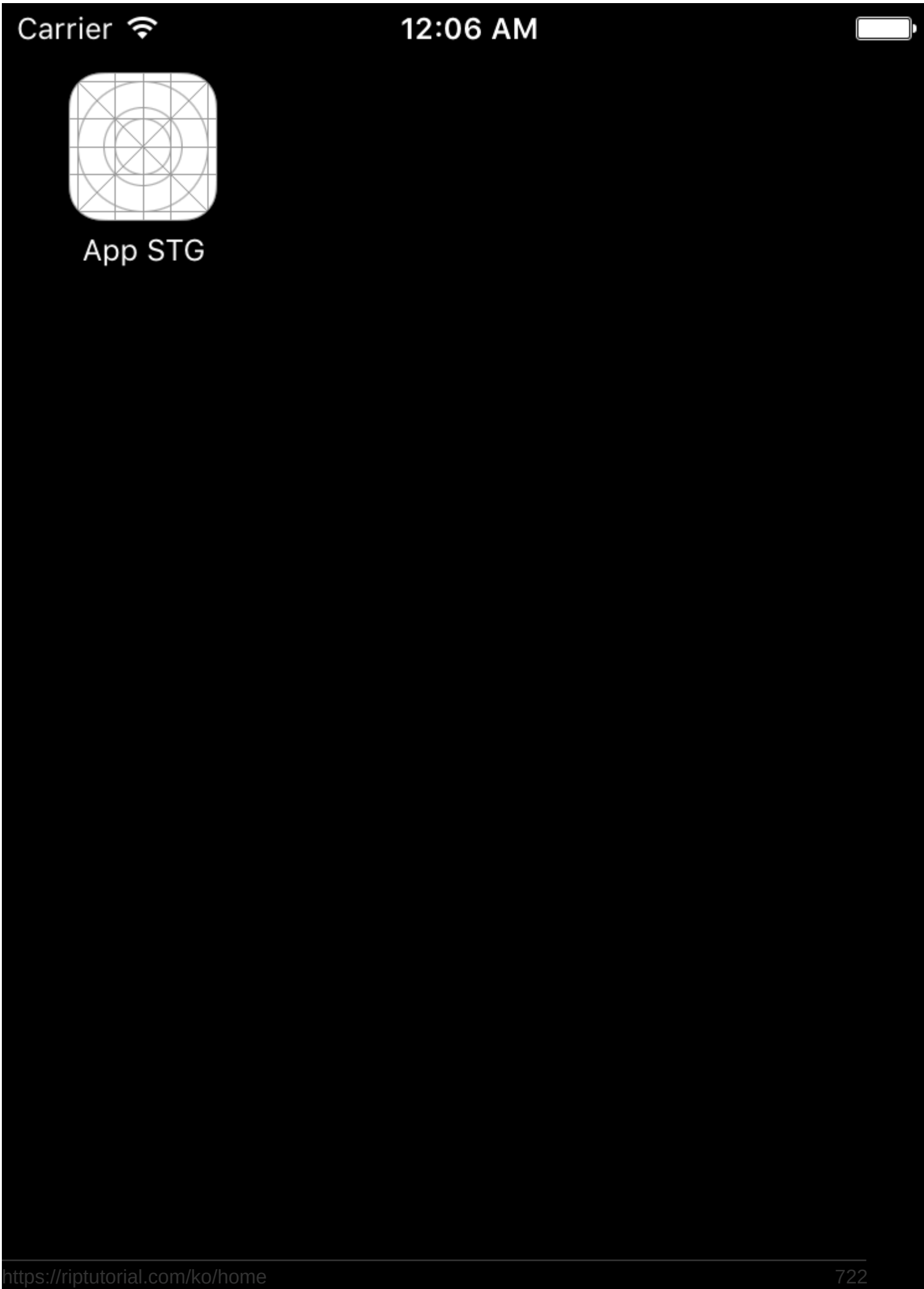
- CI / archive SERVER_URL http://ci.api.example.com/ .
- STAGING / archive SERVER_URL http://stg.api.example.com/ .

(:)


Xcode File Edit View Find Navigate
CI iPhone 6s
MultipleEnvironments M
MultipleEnvironments
AppDelegate.h
AppDelegate.m
ViewController.h
ViewController.m
Main.storyboard
Assets.xcassets
LaunchScreen.storyboard
Info.plist
Supporting Files
AppConfigurations.h A
Products
MultipleEnviron...s copy-Info.plist A
CI copy-Info.plist A
PROJECT
MultipleEnv
TARGETS
MultipleEnv
CI
Staging


Carrier
12:03 AM
MultipleEn...


Carrier
12:05 AM
App CI


Carrier
12:06 AM
App STG

152:

iOS . .

Examples

.

1 : - `RRMulticastDelegate NSObject`

2 : `RRMulticastDelegate.h`

```
#import <Foundation/Foundation.h>

@interface RRMulticastDelegate : NSObject

{
    //Handle multiple observers of delegate
    NSMutableArray* _delegates;
}

// Delegate method implementation to the list of observers
- (void)addDelegate:(id)delegate;
- (void)removeDelegate:(id)delegate;

// Get multiple delegates
-(NSArray *)delegatesObjects;

@end
```

3 : - `RRMulticastDelegate.m`

```
#import "RRMulticastDelegate.h"

@implementation RRMulticastDelegate

- (id)init
{
    if (self = [super init])
    {
        _delegates = [NSMutableArray array];
    }
    return self;
}

-(NSArray *)delegatesObjects
{
    return _delegates;
}

- (void)removeDelegate:(id)delegate
{
    if ([_delegates containsObject:delegate])
        [_delegates removeObject:delegate];
}
```

```
- (void)addDelegate:(id)delegate
{
    if (![_delegates containsObject:delegate])
        [_delegates addObject:delegate];
}

- (BOOL)respondsToSelector:(SEL)aSelector
{
    if ([super respondsToSelector:aSelector])
        return YES;

    // if any of the delegates respond to this selector, return YES
    for(id delegate in _delegates)
    {
        if (!delegate)
            continue;

        if ([delegate respondsToSelector:aSelector])
        {
            return YES;
        }
    }
    return NO;
}

- (NSMethodSignature *)methodSignatureForSelector:(SEL)aSelector
{
    // can this class create the sinature?
    NSMethodSignature* signature = [super methodSignatureForSelector:aSelector];

    // if not, try our delegates
    if (!signature)
    {
        for(id delegate in _delegates)
        {
            if (!delegate)
                continue;

            if ([delegate respondsToSelector:aSelector])
            {
                return [delegate methodSignatureForSelector:aSelector];
            }
        }
    }
    return signature;
}

- (void)forwardInvocation:(NSInvocation *)anInvocation
{
    // forward the invocation to every delegate
    for(id delegate in _delegates)
    {
        if (!delegate)
            continue;

        if ([delegate respondsToSelector:[anInvocation selector]])
        {
            [anInvocation invokeWithTarget:delegate];
        }
    }
```

```
}

@end
```

4 : - RRProperty NSObject

5 : - NSObject+RRProperty.h

```
#import <Foundation/Foundation.h>

#import "RRMulticastDelegate.h"

@interface NSObject (RRProperty)<UITextFieldDelegate,UITableViewDataSource>

-(void)setObject:(id)block forKey:(NSString *)key;
-(id)objectForKey:(NSString *)key;

#pragma mark - Multicast Delegate

- (RRMulticastDelegate *)multicastDelegate;
- (RRMulticastDelegate *)multicastDatasource;

-(void)addDelegate:(id)delegate;
-(void)addDataSource:(id)datasource;

@end
```

6 : NSObject+RRProperty.m

```
#import "NSObject+RRProperty.h"

#import <objc/message.h>
#import <objc/runtime.h>

#pragma GCC diagnostic ignored "-Wprotocol"

static NSString *const MULTICASTDELEGATE = @"MULTICASTDELEGATE";
static NSString *const MULTICASTDATASOURCE = @"MULTICASTDATASOURCE";

@implementation NSObject (RRProperty)

-(void)setObject:(id)block forKey:(NSString *)key
{
    objc_setAssociatedObject(self, (__bridge const void *)(key), block,
OBJC_ASSOCIATION_RETAIN);
}

-(id)objectForKey:(NSString *)key
{
    return objc_getAssociatedObject(self, (__bridge const void *)(key));
}

#pragma mark - Multicast Delegate

- (RRMulticastDelegate *)multicastDelegate
{
    id multicastDelegate = [self objectForKey:MULTICASTDELEGATE];
    if (multicastDelegate == nil) {
```

```
        multicastDelegate = [[RRMulticastDelegate alloc] init];

        [self setObject:multicastDelegate forKey:MULTICASTDELEGATE];
    }

    return multicastDelegate;
}

- (RRMulticastDelegate *)multicastDatasource
{
    id multicastDatasource = [self objectForKey:MULTICASTDATASOURCE];
    if (multicastDatasource == nil) {
        multicastDatasource = [[RRMulticastDelegate alloc] init];

        [self setObject:multicastDatasource forKey:MULTICASTDATASOURCE];
    }

    return multicastDatasource;
}

-(void)addDelegate:(id)delegate
{
    [self.multicastDelegate addDelegate:delegate];

    UITextField *text = (UITextField *) self;
    text.delegate = self.multicastDelegate;
}

-(void)addDataSource:(id)datasource
{
    [self.multicastDatasource addDelegate:datasource];
    UITableView *text = (UITableView *) self;
    text.dataSource = self.multicastDatasource;
}

@end
```

dalegate ...

...

`NSObject+RRProperty.h` viewcontroller `NSObject+RRProperty.h` ***/*** .

```
UITextView *txtView = [[UITextView alloc]initWithFrame:txtframe];
[txtView addDelegate:self];

UITableView *tblView = [[UITableView alloc]initWithFrame:tblframe];
[tblView addDelegate:self];
[tblView addDataSource:self];
```

: https://riptutorial.com/ko/ios/topic/10081/--

153: Xcode

- `xcodebuild [-project name.xcodeproj] -scheme schemename [[-destination destinationspecifier] ...] [-destination-timeout value] [-configuration configurationname] [-sdk [sdkfullpath | sdkname]] [action ...] [buildsetting=value ...] [-userdefault=value ...]`

-	name.xcodeproj .
-	.
-	
-sdk	SDK

`xcodebuild` Xcode . Xcode **-workspace** **-scheme** . xcodebuild .

Examples

:

```
xcodebuild -exportArchive -exportFormat ipa \
    -archivePath "/Users/username/Desktop/MyiOSApp.xcarchive" \
    -exportPath "/Users/username/Desktop/MyiOSApp.ipa" \
    -exportProvisioningProfile "MyCompany Distribution Profile"
```

:

```
xcodebuild -project <ProjectName.xcodeproj>
    -scheme <ProjectName>
    -sdk iphonesimulator
    -configuration Debug
    -destination "platform=iOS Simulator,name=<Device>,OS=9.3"
    clean build
```

Xcode : https://riptutorial.com/ko/ios/topic/5027/--xcode---

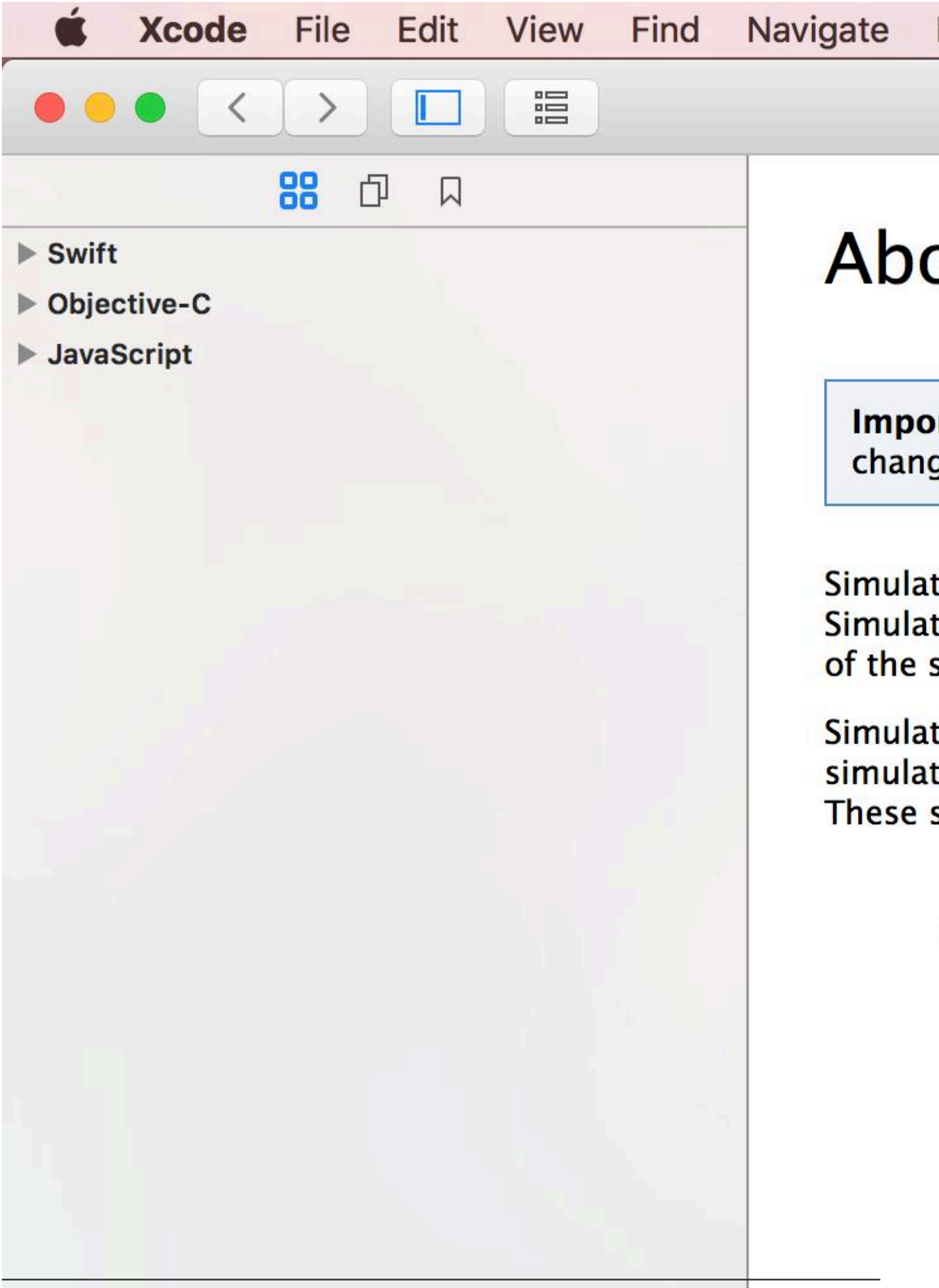
154:

iOS, watchOS tvOS . .

- iOS
- watchOS
- tvOS
-

  Xcode macOS .

-> .


Xcode File Edit View Find Navigate
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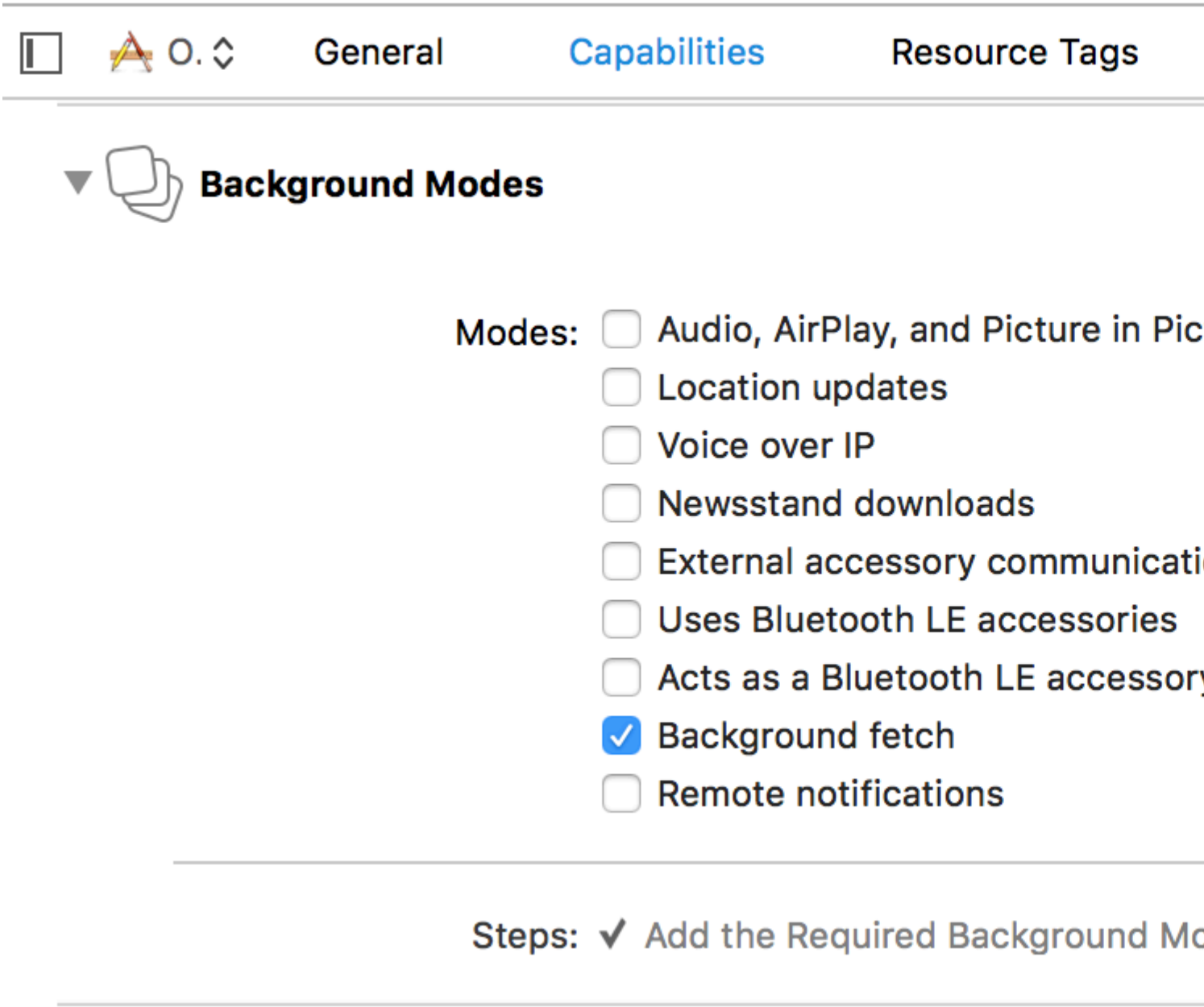
155:

. .

Examples

1. Xcode .
2. .
3. .



. .

:

1- Xcode Background Fetch .

2- `AppDelegate application(_:didFinishLaunchingWithOptions:)` .

```
UIApplication.shared.setMinimumBackgroundFetchInterval(UIApplicationBackgroundFetchIntervalMinimum)
```

-C

```
[[UIApplication shared]
setMinimumBackgroundFetchInterval:UIApplicationBackgroundFetchIntervalMinimum]
```

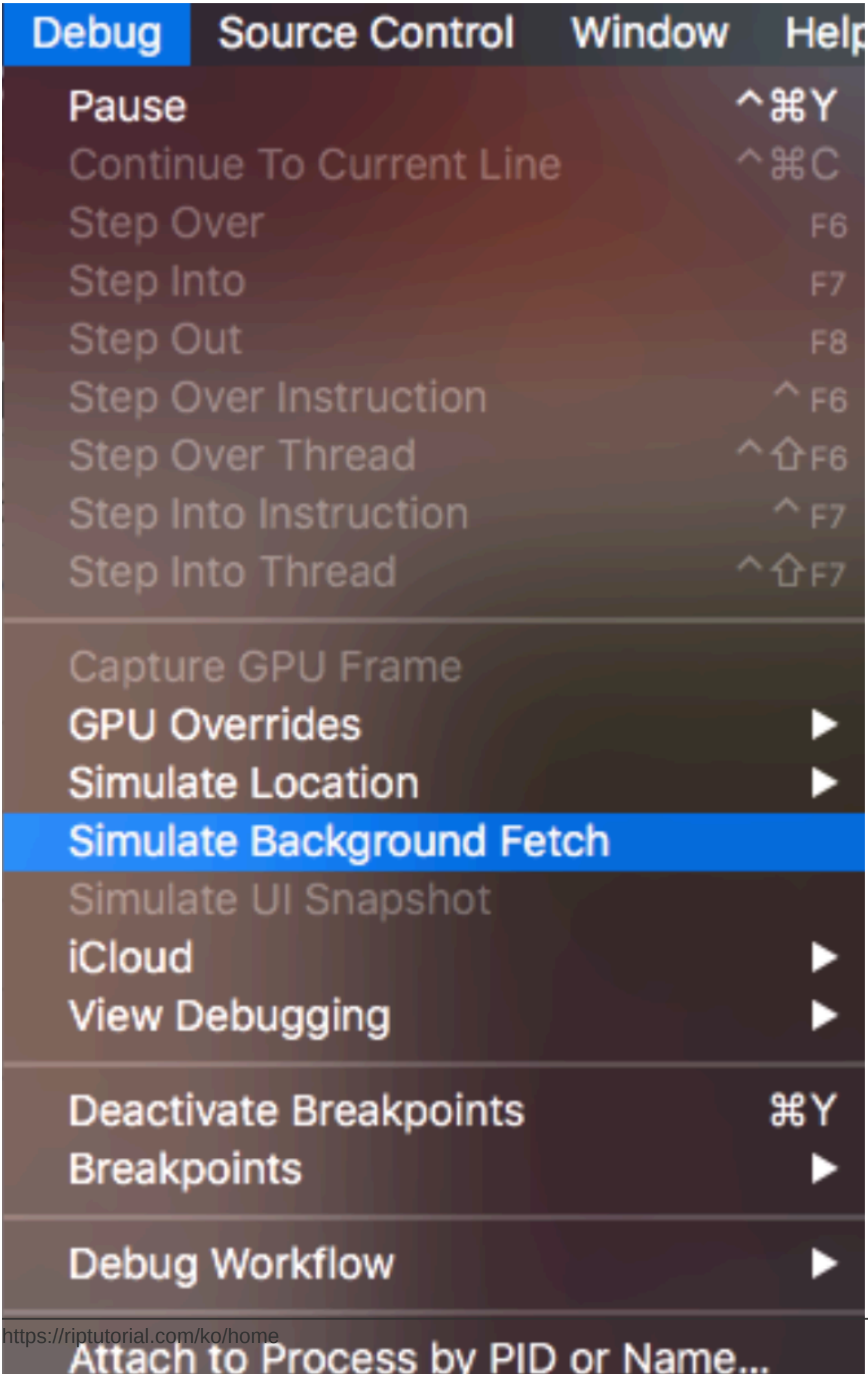
`UIApplicationBackgroundFetchIntervalMinimum` `CGFloat` .

3 - `application(_:performFetchWithCompletionHandler:)` . `AppDelegate` :

```
func application(_ application: UIApplication, performFetchWithCompletionHandler
completionHandler: @escaping (UIBackgroundFetchResult) -> Void) {
    // your code here
}
```

1 - Xcode .

2 - :

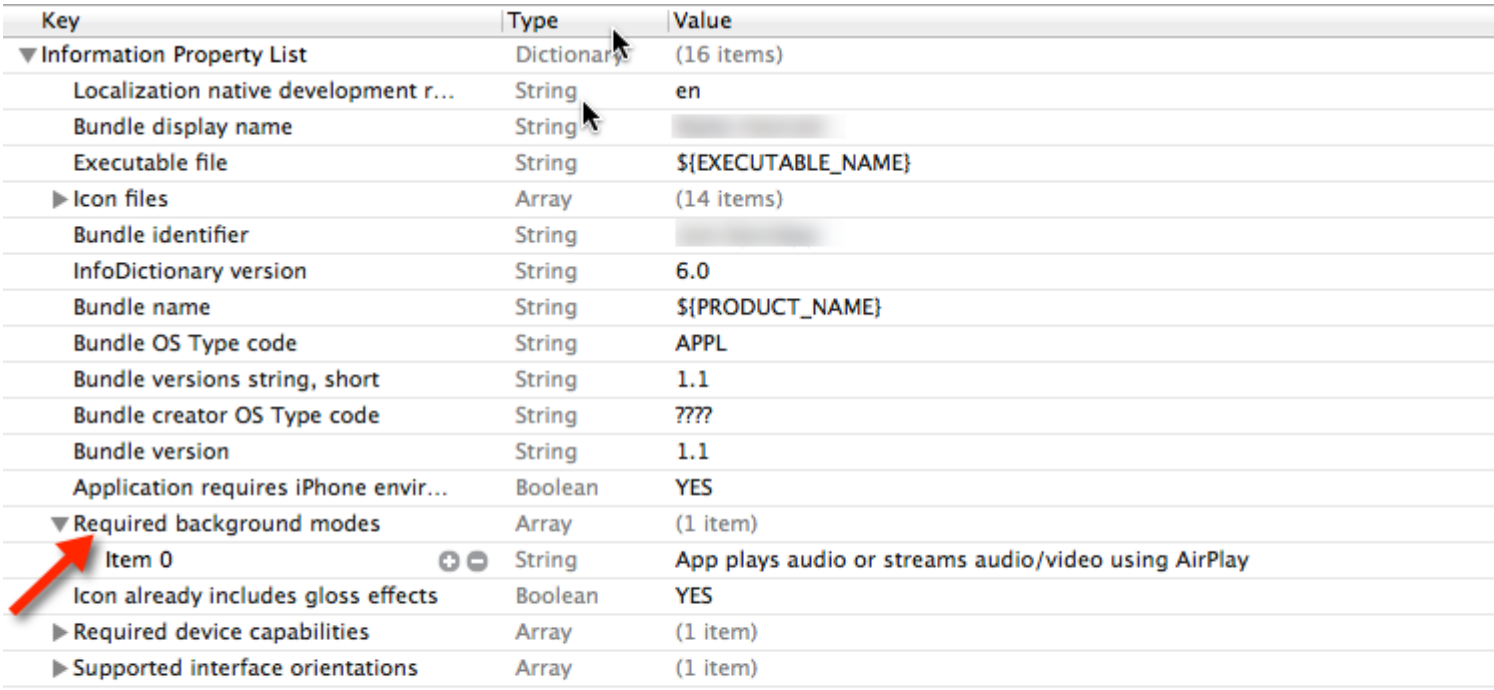

Debug
Source Control
Window
Help
Pause ^⌘Y
Continue To Current Line ^⌘C
Step Over F6
Step Into F7
Step Out F8
Step Over Instruction ^F6
Step Over Thread ^⇧F6
Step Into Instruction ^F7
Step Into Thread ^⇧F7
Capture GPU Frame
GPU Overrides
Simulate Location
Simulate Background Fetch
Simulate UI Snapshot
iCloud
View Debugging
Deactivate Breakpoints ⌘Y
Breakpoints
Debug Workflow
Attach to Process by PID or Name...

156:

Examples

(.plist) .

..



AppDelegate.h

```
#import <AVFoundation/AVFoundation.h>
#import <AudioToolbox/AudioToolbox.h>
```

AppDelegate.m

in application didFinishLaunchingWithOptions

```
[[AVAudioSession sharedInstance] setDelegate:self];
[[AVAudioSession sharedInstance] setCategory:AVAudioSessionCategoryPlayback error:nil];
[[AVAudioSession sharedInstance] setActive:YES error:nil];
[[UIApplication sharedApplication] beginReceivingRemoteControlEvents];

UInt32 size = sizeof(CFStringRef);
CFStringRef route;
AudioSessionGetProperty(kAudioSessionProperty_AudioRoute, &size, &route);
NSLog(@"route = %@", route);
```

AppDelegate.m .

```
- (void)remoteControlReceivedWithEvent:(UIEvent *)theEvent {

    if (theEvent.type == UIEventTypeRemoteControl)    {
        switch(theEvent.subtype)        {
            case UIEventSubtypeRemoteControlPlay:
                [[NSNotificationCenter defaultCenter] postNotificationName:@"TogglePlayPause"
object:nil];
                break;
            case UIEventSubtypeRemoteControlPause:
                [[NSNotificationCenter defaultCenter] postNotificationName:@"TogglePlayPause"
object:nil];
                break;
            case UIEventSubtypeRemoteControlStop:
                break;
            case UIEventSubtypeRemoteControlTogglePlayPause:
                [[NSNotificationCenter defaultCenter] postNotificationName:@"TogglePlayPause"
object:nil];
                break;
            default:
                return;
        }
    }
}
```

..

: https://riptutorial.com/ko/ios/topic/3515/---

157:

1. iOS 9 Safari . Safari .
2. Safari `UIWebView` / `WKWebView` .
3. iOS 9.2 . iOS 9.3 .
4. iOS Universal Links . Safari Safari . .

Examples

. iOS Apple `apple-app-site-association` . `JSON` .

`apple-app-site-association` *https : // {domain} / apple-app-site-association* `HTTPS` .

.

```
{
"applinks": {
    "apps": [ ],
    "details": [
        {
            "appID": "{app_prefix}.{app_identifier}",
            "paths": [ "/path/to/content", "/path/to/other/*", "NOT /path/to/exclude" ]
        },
        {
            "appID": "TeamID.BundleID2",
            "paths": [ "*" ]
        }
    ]
}
}
```

- *apple-app-site-association .json .*

.
`apps` : , . Apple .
`details` : iOS . , ID .

3 .
`Static` : (: / static / terms) .
`Wildcards` : A * . : / books / * . ? (: books / 1) ? ID 1 .
`Exclusions` : NOT .

. . . .

#

https://github.com/vineetchoudhary/iOS-Universal-Links/tree/gh-pages gh-pages .

apple-app-site-association . . .

App-Site-Association

: `HTTPS` *Application Setup* .

iOS 9 `HTTPS` . (: iOS 8) `SSL` .

: App Store Apple . `HTTPS` .

.txt . .

```
cat <unsigned_file>.txt | openssl smime -sign -inkey example.com.key -signer example.com.pem -
certfile intermediate.pem -noattr -nodetach -outform DER > apple-app-site-association
```

. `example.com.key` , `example.com.pem` `intermediate.pem` .

: , `Content-Type` `application/json` . `application/pkcs7-mime` .

Apple App
iOS 9 API . URL Applebot . https://search.developer.apple.com/appsearch-validation-tool/

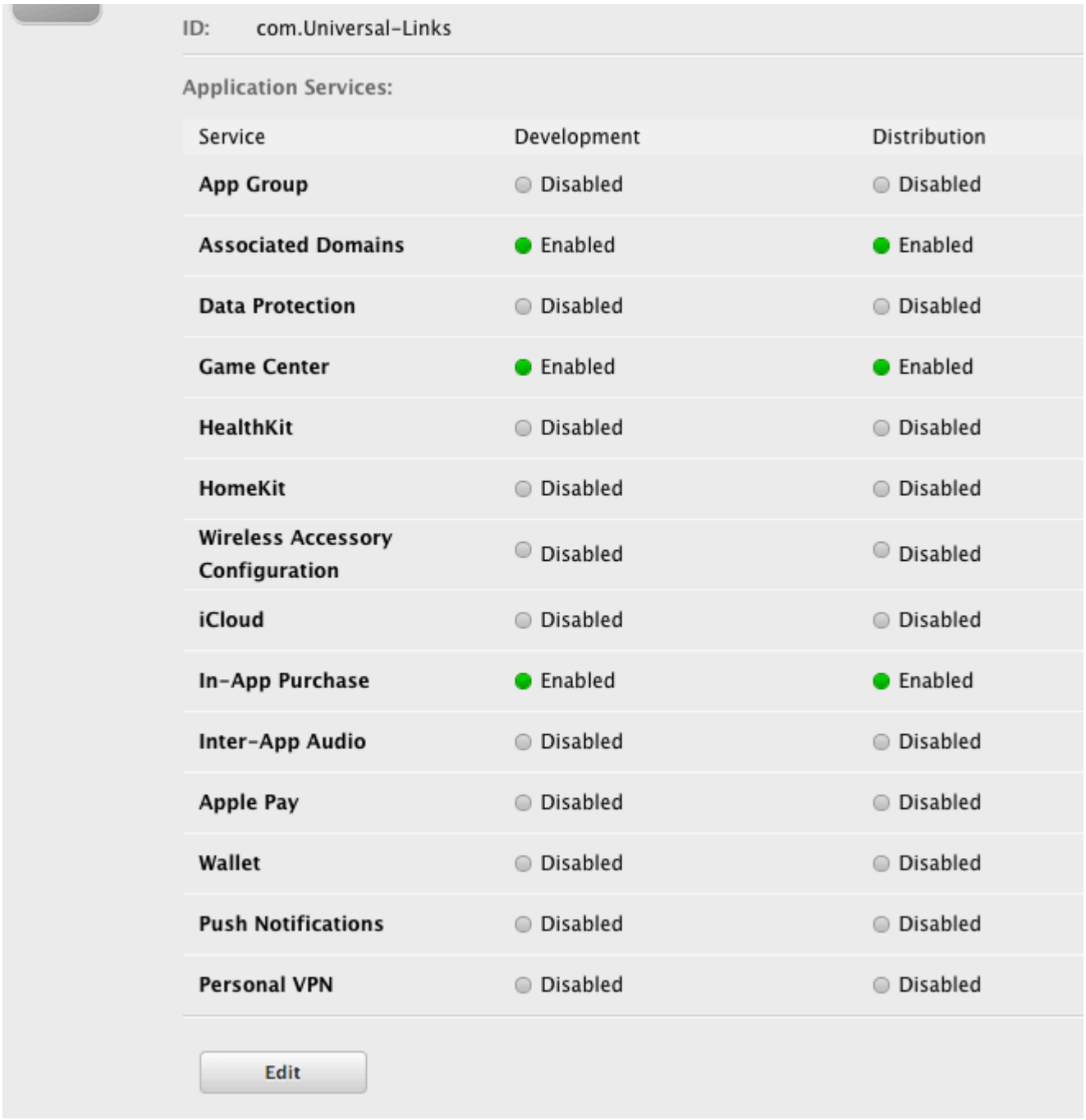
iOS (Universal Links)

.

1. Associated Domains .
2. `AppDelegate` .

1. **.**

ID . Apple Developer Member Center . , . ID ( ) Edit () Associated Domains .



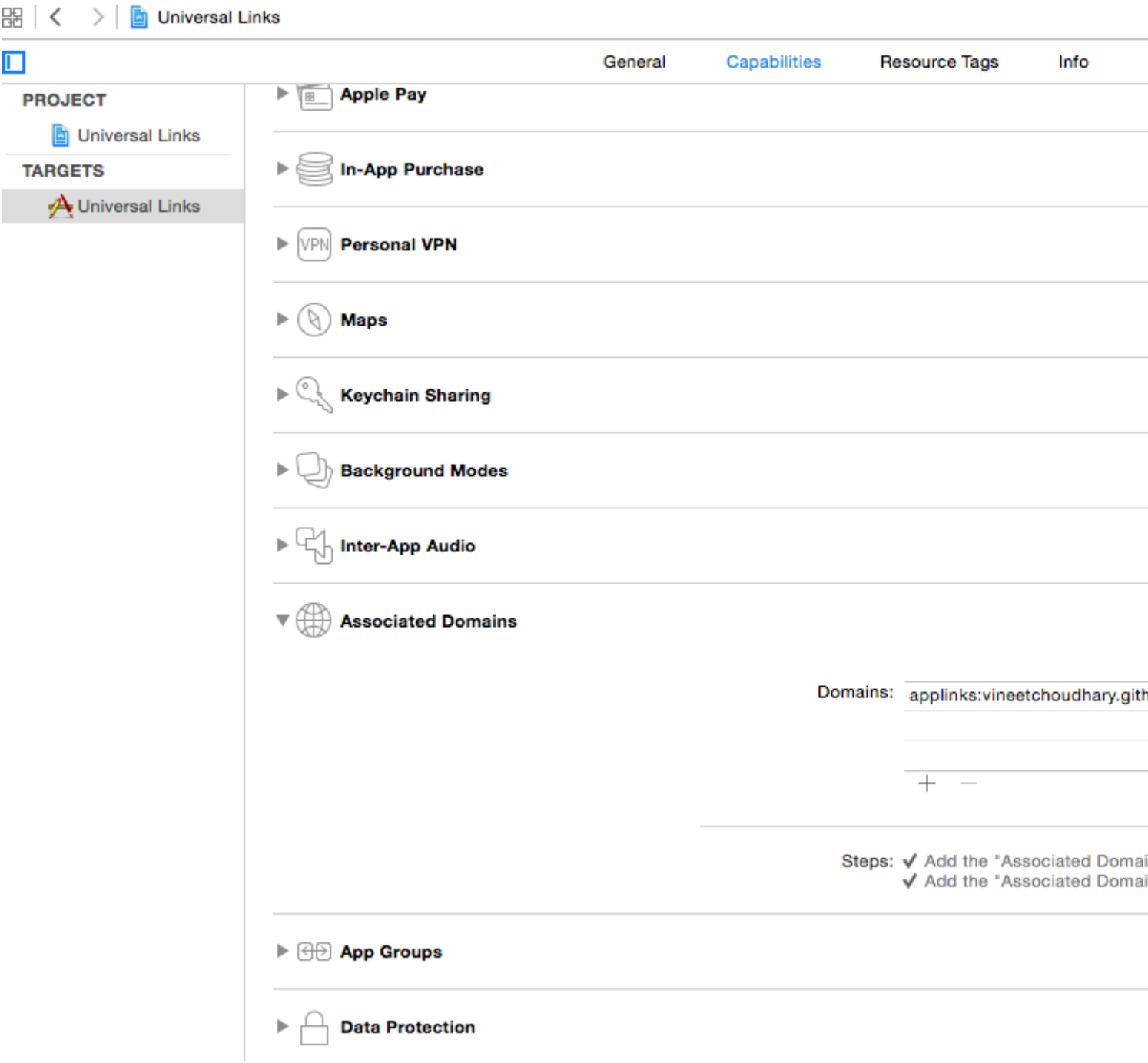
ID ID .

ID apple-app-site-association .

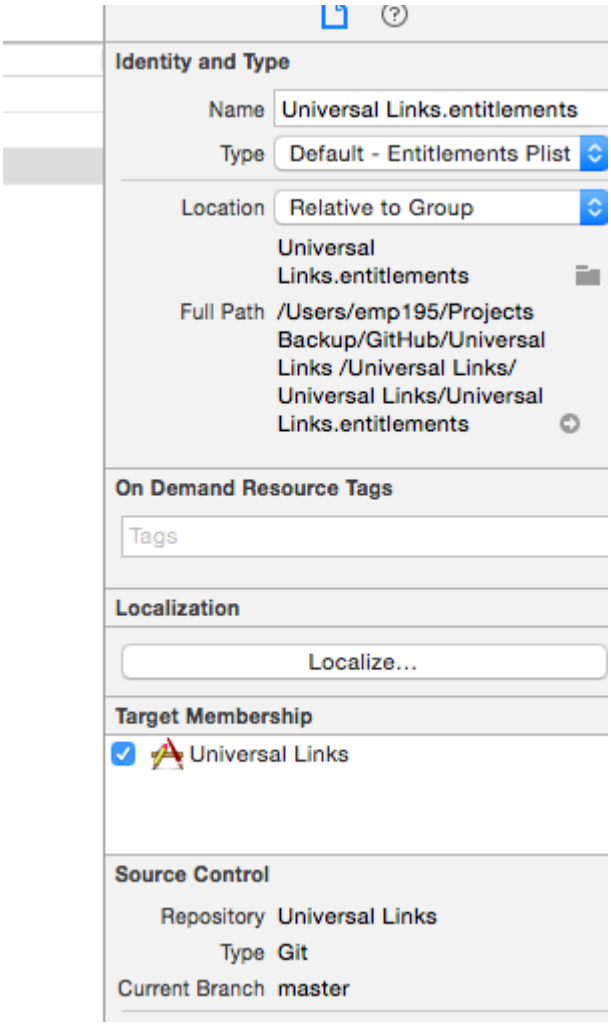
Xcode . .

: **applinks : YourCustomDomainName.com**

.


Universal Links
General
Capabilities
Resource Tags
Info
PROJECT
Universal Links
TARGETS
Universal Links
Apple Pay
In-App Purchase
Personal VPN
Maps
Keychain Sharing
Background Modes
Inter-App Audio
Associated Domains
Domains:
applinks:vineetchoudhary.gith
Steps:
Add the "Associated Domai
Add the "Associated Domai
App Groups
Data Protection

: ID ID . Xcode .



---

2. AppDelegate

Safari AppDelegate . URL .

```
[UIApplicationDelegate application: continueUserActivity: restorationHandler:]
```

-C

```
-(BOOL)application:(UIApplication *)application continueUserActivity:(NSUserActivity
*)userActivity restorationHandler:(void (^)(NSArray * _Nullable))restorationHandler{
    ///Checking whether the activity was from a web page redirect to the app.
    if ([userActivity.activityType isEqualToString: NSUserActivityTypeBrowsingWeb]) {
        ///Getting the URL from the UserActivty Object.
        NSURL *url = userActivity.webpageURL;
        UIStoryboard *storyBoard = [UIStoryboard storyboardWithName:@"Main" bundle:nil];
        UINavigationController *navigationController = (UINavigationController
*)_window.rootViewController;
        if ([url.pathComponents containsObject:@"home"]) {
            [navigationController pushViewController:[storyBoard
instantiateViewControllerWithIdentifier:@"HomeScreenId"] animated:YES];
        }else if ([url.pathComponents containsObject:@"about"]){
            [navigationController pushViewController:[storyBoard
instantiateViewControllerWithIdentifier:@"AboutScreenId"] animated:YES];
        }
    }
```

```
    return YES;
}
```

:

```
func application(application: UIApplication, continueUserActivity userActivity:
NSUserActivity, restorationHandler: ([AnyObject]?) -> Void) -> Bool {
      if userActivity.activityType == NSUserActivityTypeBrowsingWeb {
          let url = userActivity.webpageURL!
          //handle url
      }
      return true
  }
```

---

iOS

master branch .

: https://riptutorial.com/ko/ios/topic/2362/-

158:

Examples

C :

```
view.backgroundColor = [UIColor redColor];
```

:

```
view.backgroundColor! = UIColor.redColor()
```

3

```
view.backgroundColor = UIColor.redColor
```

UIView

-C

```
 UIGraphicsBeginImageContext(self.view.frame.size);
 [[UIImage imageNamed:@"image.png"] drawInRect:self.view.bounds];
 UIImage *image = UIGraphicsGetImageFromCurrentImageContext();
 UIGraphicsEndImageContext();
 self.view.backgroundColor = [UIColor colorWithPatternImage:image];
```

```
self.view.backgroundColor = [UIColor colorWithPatternImage:[UIImage
imageNamed:@"Background.png"]];
```

CAGradientLayer .

3.1 :

```
func createGradient() {
    let caLayer = CAGradientLayer()
    caLayer.colors = [UIColor.white, UIColor.green, UIColor.blue]
    caLayer.locations = [0, 0.5, 1]
    caLayer.bounds = self.bounds
    self.layer.addSublayer(caLayer)
}
```

viewDidLoad () .

```
override func viewDidLoad() {
    super.viewDidLoad()
    createGradient()
}
```

CAGradientLayer . :

.

: https://riptutorial.com/ko/ios/topic/6854/--

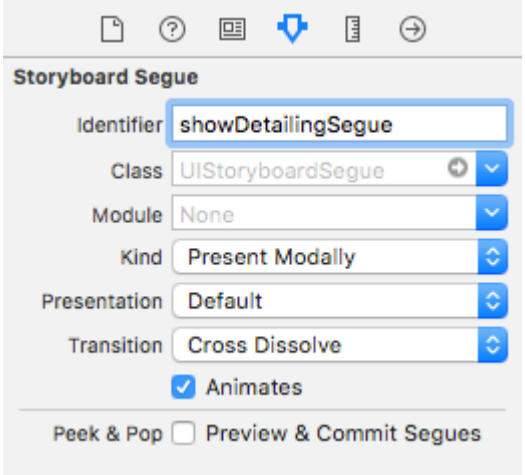
159:

Examples

Segues ( )

segues ( ) . `prepareForSegue` . segue . downcast .

segue :



Segues Ctrl + . segue segue .

-C

```
- (void)showDetail {
    [self performSegueWithIdentifier:@"showDetailingSegue" sender:self];
}
```

```
func showDetail() {
    self.performSegue(withIdentifier: "showDetailingSegue", sender: self)
}
```

`prepareForSegue` segue . .

-C

```
- (void)prepareForSegue:(UIStoryboardSegue *)segue sender:(id)sender {
    if([segue.identifier isEqualToString:@"showDetailingSegue"]){
        DetailViewController *controller = (DetailViewController
*)segue.destinationViewController;
        controller.isDetailingEnabled = YES;
    }
}
```

```
override func prepare(for segue: UIStoryboardSegue, sender: Any?) {
    if segue.identifier == "showDetailingSegue" {
```

```
        let controller = segue.destinationViewController as! DetailViewController
        controller.isDetailingEnabled = true
    }
}
```

DetailViewController isDetailingEnabled .

DetailViewController . DetailViewController . .

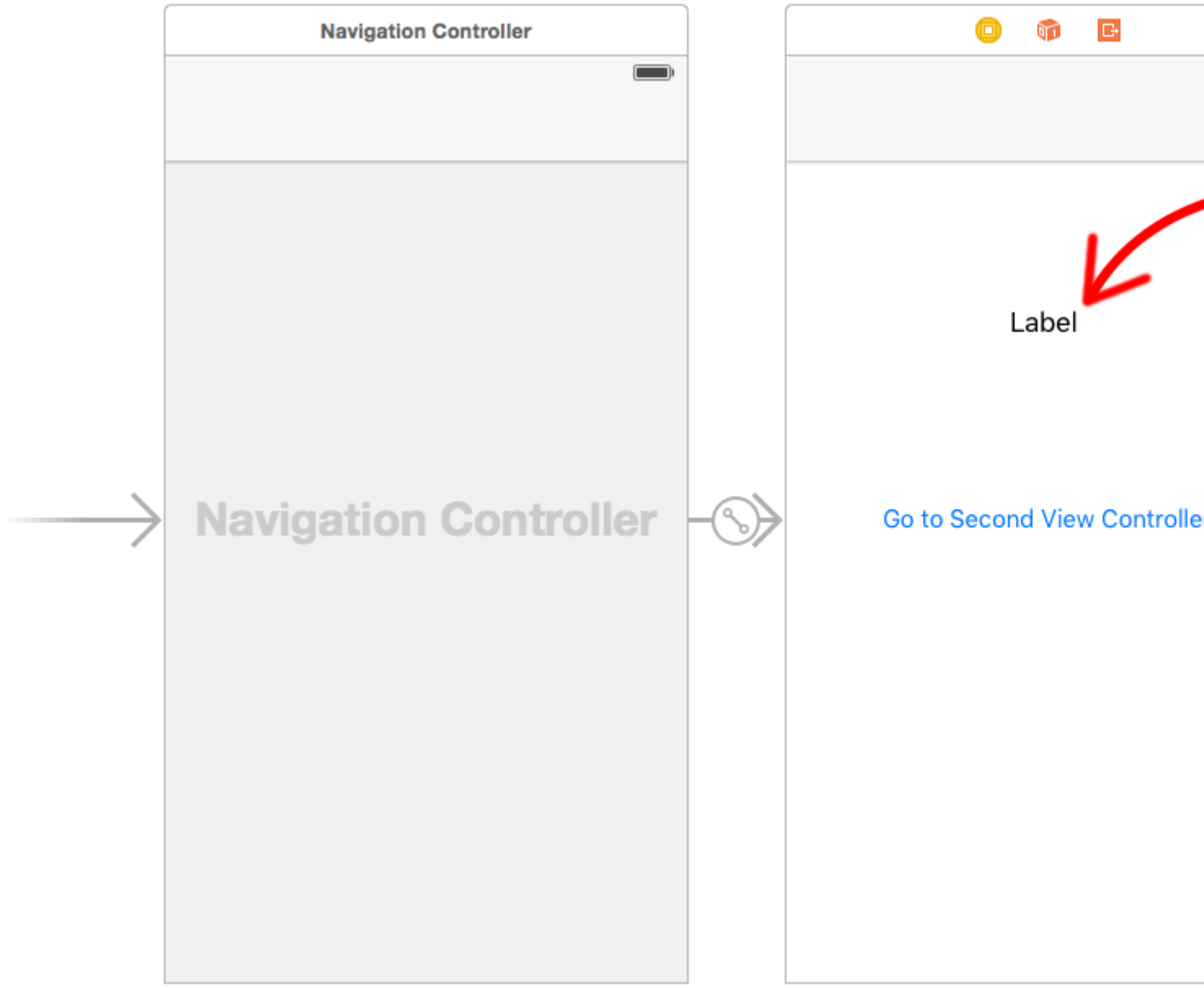
-C

```
- (void)initVC:(BOOL *)isDetailingEnabled {
    self.isDetailingEnabled = isDetailingEnabled
}
```

```
func initVC(isDetailingEnabled: Bool) {
    self.isDetailingEnabled = isDetailingEnabled
}
```

( )

.



Interface Builder segue `showSecondViewController` segue `showSecondViewController` `showSecondViewController` . .

.

```
class FirstViewController: UIViewController, DataEnteredDelegate {

    @IBOutlet weak var label: UILabel!

    override func prepare(for segue: UIStoryboardSegue, sender: Any?) {
        if segue.identifier == "showSecondViewController", let secondViewController =
segue.destinationViewController as? SecondViewController  {
            secondViewController.delegate = self
        }
    }

    // required method of our custom DataEnteredDelegate protocol
    func userDidEnterInformation(info: String) {
        label.text = info
        navigationController?.popViewControllerAnimated(true)
```

```
    }
}
```

-C

```
@interface FirstViewController : UIViewController <DataEnteredDelegate>
@property (weak, nonatomic) IBOutlet UILabel *label;
@end

@implementation FirstViewController
- (void)viewDidLoad {
    [super viewDidLoad];
}
- (void)prepareForSegue:(UIStoryboardSegue *)segue sender:(id)sender {
    SecondViewController *secondViewController = segue.destinationViewController;
    secondViewController.delegate = self;

}
-(void)userDidEnterInformation:(NSString *)info {
    _label.text = info
    [self.navigationController popViewControllerAnimated:YES];
}
@end
```

`DataEnteredDelegate` .

.

```
// protocol used for sending data back
protocol DataEnteredDelegate: class {
    func userDidEnterInformation(info: String)
}

class SecondViewController: UIViewController {

    // making this a weak variable so that it won't create a strong reference cycle
    weak var delegate: DataEnteredDelegate?

    @IBOutlet weak var textField: UITextField!

    @IBAction func sendTextBackButton(sender: AnyObject) {

        // call this method on whichever class implements our delegate protocol (the first
view controller)
        delegate?.userDidEnterInformation(textField.text ?? "")
    }
}
```

-C

```
@protocol DataEnteredDelegate <NSObject>
-(void)userDidEnterInformation:(NSString *)info;
@end
```

```
@interface SecondViewController : UIViewController
@property (nonatomic) id <DataEnteredDelegate> delegate;
@property (weak, nonatomic) IBOutlet UITextField *textField;
@end

@implementation SecondViewController
- (void)viewDidLoad {
    [super viewDidLoad];
}

- (IBAction) sendTextBackButton:(id)sender{
    [_delegate userDidEnterInformation:textField.text];
}
@end
```

`protocol` View Controller .

segue unwind

"" segue :

(VC1) **->** *(VC2)*

"unwind" .

(VC1) **<-** *(VC2)*

: unwind (VC2) .

.

(VC1) .

```
@IBAction func unwindToPresentingViewController(segue:UIStoryboardSegue)
```

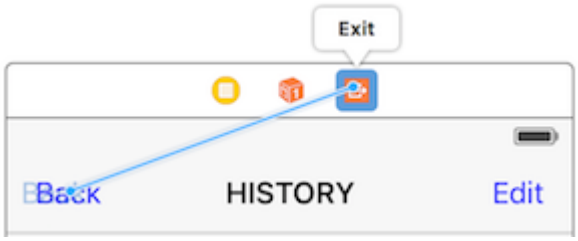
`unwind` . Xcode unwind .

, .

```
@IBAction func unwindToPresentingViewController(segue:UIStoryboardSegue)
{
    if segue.identifier == "YourCustomIdentifer"
    {
        if let VC2 = segue.sourceViewController as? VC2
        {
            //    Your custom code in here to access VC2 class member
        }
```

unwind .

1. : " " `self.performSegueWithIdentifier("YourCustomIdentifier", sender: self)` `performSegueWithIdentifier` .
2. `storyboard` "" unwind . unwind ctrl + "Exit" .



unwind .

( )

UIViewController closures . UIStoryboardSegue prepareForSegue

```
final class DestinationViewController: UIViewController {
    var onCompletion: ((success: Bool) -> ())?

    @IBAction func someButtonTapped(sender: AnyObject?) {
        onCompletion?(success: true)
    }
}

final class MyViewController: UIViewController {
    override func prepareForSegue(segue: UIStoryboardSegue, sender: AnyObject?) {

        guard let destinationController = segue.destinationViewController as?
DestinationViewController else { return }

        destinationController.onCompletion = { success in
            // this will be executed when `someButtonTapped(_:)` will be called
            print(success)
        }
    }
}
```

Swift . Objective-C .

()

iOS . : delegate pattern closure closure !

delegate pattern (delegate example, prepareForSegue , userDidEnterInformation) (prepareForSegue)

. . . ViewController . . ( ) .

: `String` . .

delegate

```
class SecondViewController: UIViewController {

    //weak var delegate: DataEnteredDelegate? = nil
    var callback: ((String?)->())?

    @IBOutlet weak var textField: UITextField!

    @IBAction func sendTextBackButton(sender: AnyObject) {

        //delegate?.userDidEnterInformation(textField.text!)
        callback?(input.text)

        self.navigationController?.popViewControllerAnimated(true)
    }
}
```

. . .

delegate pattern .

```
//no more DataEnteredDelegate
class FirstViewController: UIViewController {

    @IBOutlet weak var label: UILabel!

    override func prepareForSegue(segue: UIStoryboardSegue, sender: AnyObject?) {
        if segue.identifier == "showSecondViewController" {
            let secondViewController = segue.destinationViewController as!
SecondViewController
            //secondViewController.delegate = self
            secondViewController.callback = { text in self.label.text = text }
        }
    }

    // required method of our custom DataEnteredDelegate protocol
    //func userDidEnterInformation(info: String) {
    //    label.text = info
    //}
}
```

, ( ) . ? , , !

( )

.

```
class FirstViewController: UIViewController {

    func openSecondViewController() {

        // Here we initialize SecondViewController and set the id property to 492
        let secondViewController = SecondViewController()
```

```
        secondViewController.id = 492

        // Once it was assign we now push or present the view controller
        present(secondViewController, animated: true, completion: nil)
    }

}

class SecondViewController: UIViewController {

    var id: Int?

    override func viewDidLoad() {
        super.viewDidLoad()

        // Here we unwrapped the id and will get the data from the previous view controller.
        if let id = id {
            print("Id was set: \(id)")
        }
    }
}
```

: https://riptutorial.com/ko/ios/topic/434/---

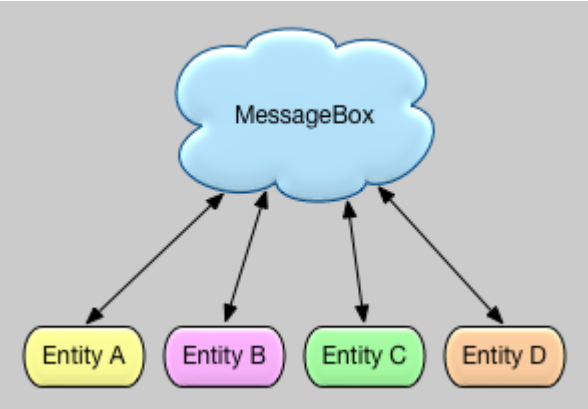
160: (MessageBox)

MessageBox .

A B .

.

Examples




```
let messageBox:MessageBox = MessageBox()

// set
messageBox.setObject("TestObject1", forKey:"TestKey1")

// get
// but don't remove it, keep it stored, so that it can still be retrieved later
let someObject:String = messageBox.getObject(forKey:"TestKey1", removeIfFound:false)

// get
// and remove it
let someObject:String = messageBox.getObject(forKey:"TestKey1", removeIfFound:true)
```

(MessageBox) : https://riptutorial.com/ko/ios/topic/9118/-----messagebox---

161:

iOS , , .

Examples

SSL

iOS .
SSL .

HTTP SSL, HTTPS .

`http://server.com/part` **`https://server.com/part`** .
SSL `server.com` .

.

`URLSessionDelegate` `URLSessionDelegate` .

```
func urlSession(_ session: URLSession, didReceive challenge: URLAuthenticationChallenge,
completionHandler: @escaping (URLSession.AuthChallengeDisposition, URLCredential?) -> Void) {

    if challenge.protectionSpace.authenticationMethod == NSURLAuthenticationMethodServerTrust
{
        let serverTrust:SecTrust = challenge.protectionSpace.serverTrust!

        func acceptServerTrust() {
            let credential:URLCredential = URLCredential(trust: serverTrust)
            challenge.sender?.use(credential, for: challenge)
            completionHandler(.useCredential, URLCredential(trust:
challenge.protectionSpace.serverTrust!))
        }

        let success = SSLTrustManager.shouldTrustServerTrust(serverTrust, forCert:
"Server_Public_SSL_Cert")
        if success {
            acceptServerTrust()
            return
        }
    }
    else if challenge.protectionSpace.authenticationMethod ==
NSURLAuthenticationMethodClientCertificate {
        completionHandler(.rejectProtectionSpace, nil);
        return
    }
    completionHandler(.cancelAuthenticationChallenge, nil)
}
```

: ( )

```
@implementation SSLTrustManager
+ (BOOL)shouldTrustServerTrust:(SecTrustRef)serverTrust forCert:(NSString*)certName {
```

```
// Load up the bundled certificate.
NSString *certPath = [[NSBundle mainBundle] pathForResource:certName ofType:@"der"];
NSData *certData = [[NSData alloc] initWithContentsOfFile:certPath];
CFDataRef certDataRef = (__bridge_retained CFDataRef)certData;
SecCertificateRef cert = SecCertificateCreateWithData(NULL, certDataRef);

// Establish a chain of trust anchored on our bundled certificate.
CFArrayRef certArrayRef = CFArrayCreate(NULL, (void *)&cert, 1, NULL);
SecTrustSetAnchorCertificates(serverTrust, certArrayRef);

// Verify that trust.
SecTrustResultType trustResult;
SecTrustEvaluate(serverTrust, &trustResult);

// Clean up.
CFRelease(certArrayRef);
CFRelease(cert);
CFRelease(certDataRef);

// Did our custom trust chain evaluate successfully?
return trustResult == kSecTrustResultUnspecified;
}
@end
```

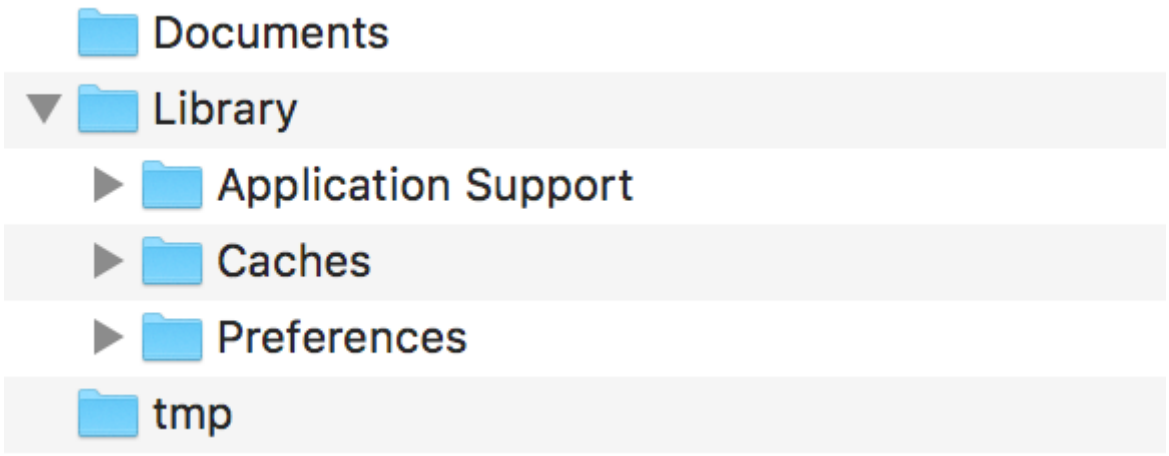
Server_Public_SSL_Cert.der SSL .

- .

iTunes

iTunes iTunes .
Mac OS iTunes iOS .

`URLResourceKey.isExcludedFromBackupKey` `URLResourceKey.isExcludedFromBackupKey` .



.

: 'Application Support' .

, **Application Support** .

```
    let urls = FileManager.default.urls(for: .applicationSupportDirectory, in:
.userDomainMask)
    let baseURL = urls[urls.count-1];
```

```
    let bundleIdentifier = Bundle.main.object(forInfoDictionaryKey: "CFBundleIdentifier") as!
String
    let pathURL = baseURL.appendingPathComponent(bundleIdentifier)
    let persistentStoreDirectoryPath = pathURL.path
    if !FileManager.default.fileExists(atPath: persistentStoreDirectoryPath) {
        do {
            try FileManager.default.createDirectory(atPath: path, withIntermediateDirectories:
true, attributes: nil)
        }catch {
            //handle error
        }
    }
    let dirURL = URL.init(fileURLWithPath: persistentStoreDirectoryPath, isDirectory: true)
    do {
        try (dirURL as NSURL).setResourceValue((true), forKey: .isExcludedFromBackupKey)
    } catch {
        //handle error
    }
```

iTunes .
iExplorer iTunes .

: https://riptutorial.com/ko/ios/topic/9999/

162:

- :

  returnType (^ blockName) (parameterTypes) = ^ returnType (parameters) {...};

- :

  @property (,) returnType (^ blockName) (parameterTypes);

- :

  - (void) methodWithBlock : (returnType (^) (parameterTypes)) blockName;

- typedef :

  typedef returnType (^ TypeName) (parameterTypes);

  TypeName blockName = ^ returnType ( ) {...};

Examples

UIView

```
[UIView animateWithDuration:1.0
    animations:^{
        someView.alpha = 0;
        otherView.alpha = 1;
    }
    completion:^(BOOL finished) {
    [someView removeFromSuperview];
}];
```

"^" . , ^{ … } . , "void" . "- (void) something;" .

. . ^ *(BOOL someArg, NSString someStr) {...}* *. API NSURLConnection .

1 -

```
typedef void(^myCustomCompletion)(BOOL);
```

2 .

```
-(void) customMethodName:(myCustomCompletion) compblock{
    //do stuff
    // check if completion block exist; if we do not check it will throw an exception
    if(complblock)
       compblock(YES);
  }
```

3-

```
[self customMethodName:^(BOOL finished) {
if(finished){
    NSLog(@"success");
}
}];
```

. "const" .

```
int val = 10;
void (^blk)(void) = ^{
    val = 20; // Error! val is a constant value and cannot be modified!
};
```

__block .

```
__block int val = 10;
void (^blk)(void) = ^{
    val = 20; // Correct! val now can be modified as an ordinary variable.
};
```

: https://riptutorial.com/ko/ios/topic/6888/

163:

Examples

fastlane Android iOS . . Ruby Ruby . Mac Ruby .

fastlane

1. .
2. `sudo gem install fastlane --verbose` `sudo gem install fastlane --verbose`
3. Xcode `xcode-select --install` `xcode-select --install`
4. , `cd` (`cd` [ ])
5. `fastlane init` fastlane .
6. .

iOS

- : , App Store .
- : iOS .
- frameit : .
- pem : .
- :
- : iTunes Connect Dev Portal iOS
- cert : iOS .
- : iOS .
- match : Git .
- : iOS Mac
- : Apple Dev Center iTunes Connect

iOS TestFlight

- pilot : TestFlight
- : TestFlight

Android

- : Android Google Play .
- screengrab : Android .

: https://riptutorial.com/ko/ios/topic/3574/-

164: UITextField

UITextField !

Examples

UITextField

`UITextField .`

: iPhone iPad .

```
class NumberTextField: UITextField {

required init(coder aDecoder: NSCoder) {
    super.init(coder: aDecoder)
    registerForTextFieldNotifications()
}

override init(frame: CGRect) {
    super.init(frame: frame)
}

override func awakeFromNib() {
    super.awakeFromNib()
    keyboardType = .numberPad//useful for iPhone only
}

private func registerForTextFieldNotifications() {
    NotificationCenter.default.addObserver(self, selector:
#selector(NumberTextField.textDidChange), name: NSNotification.Name(rawValue:
"UITextFieldTextDidChangeNotification"), object: self)
}

deinit {
    NotificationCenter.default.removeObserver(self)
}

func textDidChange() {
    text = filteredText()
}
private func filteredText() -> String {
    let inverseSet = CharacterSet(charactersIn:"0123456789").inverted
    let components = text!.components(separatedBy: inverseSet)
    return components.joined(separator: "")
}
}
```

UITextField .

, UITextField

`UITextField , , ,  .`

```
class CustomTextField: UITextField {

var enableLongPressActions = false

required init(coder aDecoder: NSCoder) {
    super.init(coder: aDecoder)!
}

override init(frame: CGRect) {
    super.init(frame: frame)
}

override func canPerformAction(_ action: Selector, withSender sender: Any?) -> Bool {
    return enableLongPressActions
}
}
```

enableLongPressActions .

UITextField : https://riptutorial.com/ko/ios/topic/9997/--uitextfield

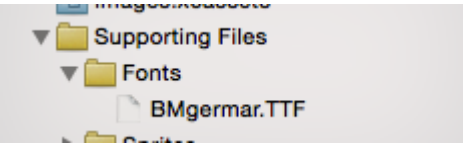
165:

Examples

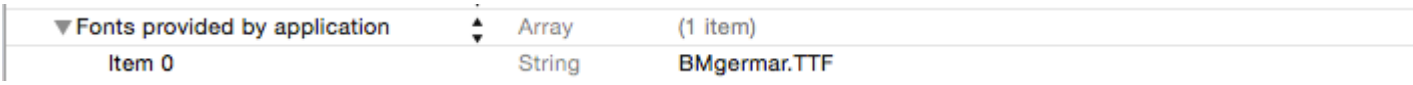
Info.plist UIAppFonts . . .

`Info.plist` IB .

1. Xcode Supporting Files . ' ' . IB .



2. `Info.plist` `Fonts provided by application key` (UIAppFonts) `Fonts provided by application key` . 0 . : .



3. .

[*3*]

```
for family in UIFont.familyNames {
            print("\(family)")

            for name in UIFont.fontNames(forFamilyName: family) {
                print("   \(name)")
            }
        }
```

[*-C*]

```
for (NSString *familyName in [UIFont familyNames]){
        NSLog(@"Family name: %@", familyName);
        for (NSString *fontName in [UIFont fontNamesForFamilyName:familyName]) {
            NSLog(@"--Font name: %@", fontName);
        }
    }
```

UI .

.

-
- .

1. : (.ttf) Info.plist .

2.

: ***UIKit + IBExtensions*** UILabel, UIButton UI . **fontName** . (4).

UIKit + IBExtensions.h

```
#import <UIKit/UIKit.h>

//Category extension for UILabel
@interface UILabel (IBExtensions)

@property (nonatomic, copy) NSString *fontName;
@end

// Category extension for UITextField
@interface UITextField (IBExtensions)

@property (nonatomic, copy) NSString *fontName;
@end

// Category extension for UIButton
@interface UIButton (IBExtensions)

@property (nonatomic, copy) NSString *fontName;
@end
```

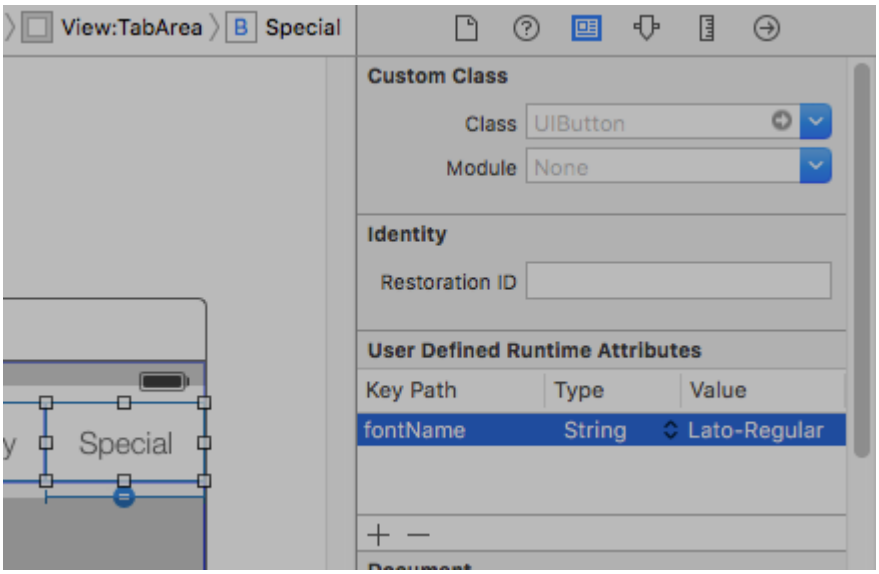
3. **Getters and Setters :** fontName getter setter .

UIKit + IBExtensions.m

```
#import "UIKit+IBExtensions.h"

@implementation UILabel (IBExtensions)

- (NSString *)fontName {
    return self.font.fontName;
}

- (void)setFontName:(NSString *)fontName {
    self.font = [UIFont fontWithName:fontName size:self.font.pointSize];
}
@end

@implementation UITextField (IBExtensions)

- (NSString *)fontName {
    return self.font.fontName;
}

- (void)setFontName:(NSString *)fontName {
    self.font = [UIFont fontWithName:fontName size:self.font.pointSize];
}
@end

@implementation UIButton (IBExtensions)
```

```
- (NSString *)fontName {
    return self.titleLabel.font.fontName;
}

- (void)setFontName:(NSString *)fontName{
    self.titleLabel.font = [UIFont fontWithName:fontName size:self.titleLabel.font.pointSize];
}
@end
```

4. : ***fontName*** keyPath .



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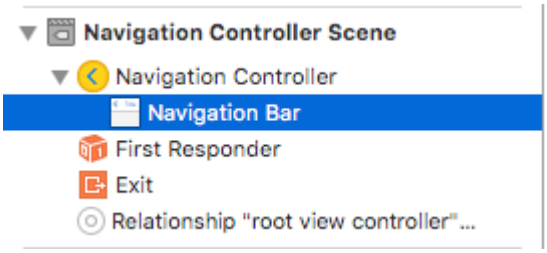
:

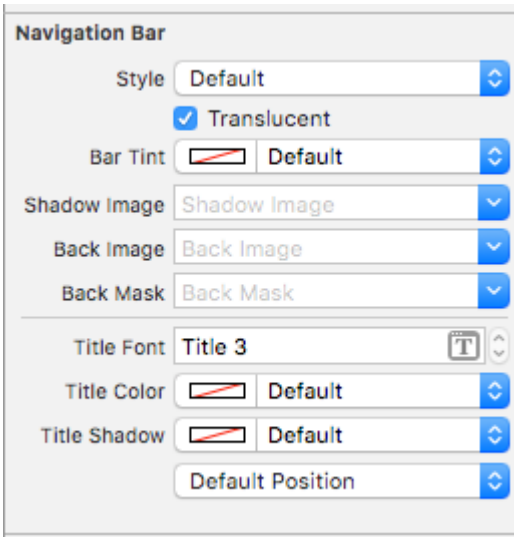
- Lato-Regular .
- ***.ttf*** .
- UI .

Xcode . **UILabels** , **UIButtons** **UIControl** . .

1.



2. Attributes Inspector

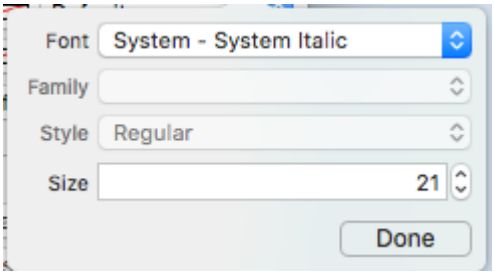


Xcode Bar Tint .

( )

Xcode 7.1.1 . ( )

1. (Xcode)
2. ~ 0.0 ( )



3. NavBar . NavBars . (navBar navBar).

(deux)

.

1. xml . (...)
2. navigationItem xml . .
3. NavBar .
4. .
5. . .

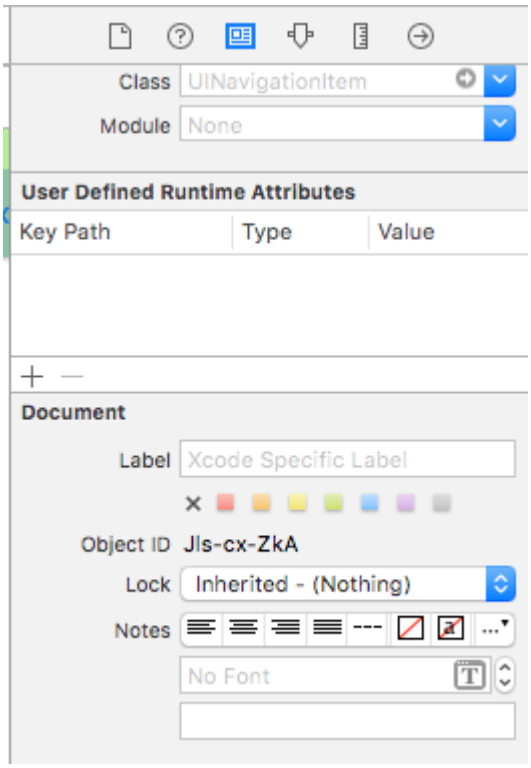
-
-
- ~ NavBar
-

~ *Code With Code* .

SO . .

1. (.ttf, .ttc)
2. Xcode
3. app-info.plist application.It Fonts (:).
4. NavigationBar Attribute Inspector Font select . Custom to Font .

Xcode UINavigationItem ( ).



.

. View Controller ( ) UIView (UIButton, UILabel UIView) . Xcode .). View Controller . UINavigationItem.titleView . . (23600285).

```
@IBOutlet var customFontTitleView: UIButton!

//Sometime later...
self.navigationItem.titleView = customFontTitleView
```

- .

: https://riptutorial.com/ko/ios/topic/1504/--

166:

Examples

SFSafariViewControllerDelegate

`SFSafariViewControllerDelegate` Done `SFSafariViewControllerDelegate` `SFSafariViewControllerDelegate` .

.

```
class MyClass: SFSafariViewControllerDelegate {

}
```

.

```
func safariViewControllerDidFinish(controller: SFSafariViewController) {
    // Dismiss the SafariViewController when done
    controller.dismissViewControllerAnimated(true, completion: nil)
}
```

SafariViewController .

```
let safariVC = SFSafariViewController(URL: yourURL)
safariVC.delegate = self
```

.

```
// Called when the initial URL load is complete.
safariViewController(_ controller: SFSafariViewController, didCompleteInitialLoad
didLoadSuccessfully: Bool) { }

// Called when the user taps an Action button.
safariViewController(_ controller: SFSafariViewController, activityItemsFor URL: URL, title:
String?) -> [UIActivity] { }
```

Safari

`SSReadingList` `addItem` .

```
let readingList = SSReadingList.default()
readingList?.addItem(with: yourURL, title: "optional title", previewText: "optional preview
text")
```

`nil` .

URL `supportsURL` .

```
SSReadingList.default().supportsURL(URL(string: "https://example.com")!)
```

URL Safari Reading List `true` `false` . , URL .

SafariViewController URL

.

```
import SafariServices
//Objective-C
@import SafariServices;
```

`SafariViewController` .

```
let safariVC = SFSafariViewController(URL: URL(string: "your_url")!)
//Objective-C
@import SafariServices;
NSURL *URL = [NSURL URLWithString:[NSString stringWithFormat:@"http://www.google.com"]];
SFSafariViewController *sfvc = [[SFSafariViewController alloc] initWithURL:URL];
```

SafariViewController .

```
let safariVC = SFSafariViewController(URL: URL(string: "your_url")!, entersReaderIfAvailable:
true)
//Objective-C
NSURL *URL = [NSURL URLWithString:[NSString stringWithFormat:@"http://www.google.com"]];
SFSafariViewController *sfvc = [[SFSafariViewController alloc] initWithURL:URL
entersReaderIfAvailable:YES];
```

.

```
present(safariVC, animated: true, completion: nil)
//Objective-C
[self presentViewController:sfvc animated:YES completion:nil];
```

: https://riptutorial.com/ko/ios/topic/1371/-

167:

Examples

UINavigationBar

1. info.plist `View controller-based status bar appearance YES`
2. `UINavigationController` .

-C :

```
- (UIStatusBarStyle)preferredStatusBarStyle
{
    return UIStatusBarStyleLightContent;
}
```

:

```
override func preferredStatusBarStyle() -> UIStatusBarStyle {
    return UIStatusBarStyle.LightContent
}
```

UINavigationBar

UINavigationController , (override).

-C :

```
- (UIStatusBarStyle)preferredStatusBarStyle
{
    return UIStatusBarStyleLightContent;
}
```

:

```
override func preferredStatusBarStyle() -> UIStatusBarStyle {
    return .lightContent
}
```

`UINavigationBar barStyle` .

C :

```
// e.g. in your view controller's viewDidLoad method:
self.navigationController.navigationBar.barStyle = UIBarStyleBlack;  // this will give you a
white status bar
```

```
// e.g. in your view controller's viewDidLoad method:
```

```
navigationController?.navigationBar.barStyle = .black // this will give you a white status bar
```

`UIBarStyle` `default` , `black` , `blackOpaque` , `blackTranslucent` . 3 .

: .

ViewController

( ) AwesomeViewController .

```
  let awesomeViewController = AwesomeViewController()
  awesomeViewController.navigationBar.barStyle = .blackTranslucent // or other style
```

ViewController

`UIViewControllerContainment` .

viewController (,

```
class RootViewController: UIViewController {

    private let messageBarViewController = MessageBarViewController()

    override func childViewControllerForStatusBarStyle() -> UIViewController? {
        return messageBarViewController
    }

    override func viewDidLoad() {
        super.viewDidLoad()

        //add child vc code here...

        setNeedsStatusBarAppearanceUpdate()
    }
}

class MessageBarViewController: UIViewController {

    override func preferredStatusBarStyle() -> UIStatusBarStyle {
        return .Default
    }
}
```

:

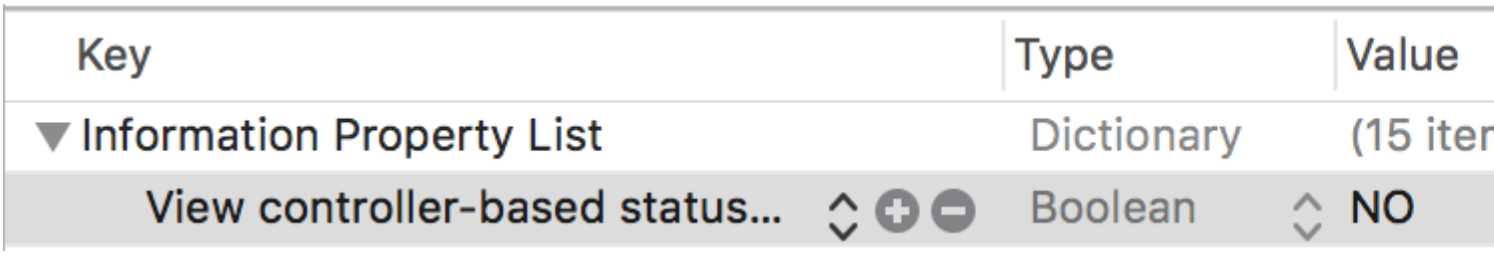
1 :

Info.plist :

```
View controller-based status bar appearance
```

```
NO
```

:



2 :

AppDelegate.swift `didFinishLaunchingWithOptions` .

```
UIApplication.shared.statusBarStyle = .lightContent
```

```
UIApplication.shared.statusBarStyle = .default
```

- **.lightContent** **statusBar** .
- **.default** **statusBar** .

-C :

SWIFT . **AppDelegate.m** .

```
[[UIApplication sharedApplication] setStatusBarStyle:UIStatusBarStyleLightContent];
```

```
[[UIApplication sharedApplication] setStatusBarStyle:UIStatusBarStyleDefault];
```

: https://riptutorial.com/ko/ios/topic/378/---

168: UIView

Examples

UiView C

`#import <QuartzCore/QuartzCore.h>` ViewController . .

```
UIView *view1=[[UIView alloc]init];
view1.backgroundColor=[UIColor colorWithRed:255/255.0 green:193/255.0 blue:72/255.0
alpha:1.0];
CGRect view1Frame = view1.frame;
view1Frame.size.width = SCREEN_WIDTH*0.97;
view1Frame.size.height = SCREEN_HEIGHT*0.2158;
view1Frame.origin.x = 0;
view1Frame.origin.y = 0.1422*SCREEN_HEIGHT-10;
view1.frame = view1Frame;
[self setMaskTo:view1 byRoundingCorners:UIRectCornerBottomRight|UIRectCornerTopRight];
[self.view addSubview:view1];
```

Bottom Right Right Right edge .

```
- (void)setMaskTo:(UIView*)view byRoundingCorners:(UIRectCorner)corners
{
    UIBezierPath *rounded = [UIBezierPath bezierPathWithRoundedRect:view.bounds
                                                  byRoundingCorners:corners
                                                        cornerRadii:CGSizeMake(20.0, 20.0)];
    CAShapeLayer *shape = [[CAShapeLayer alloc] init];
    [shape setPath:rounded.CGPath];
    view.layer.mask = shape;
}
```

UIView : https://riptutorial.com/ko/ios/topic/7224/-uiview---

169: FCM

FCM : https://firebase.google.com/docs/cloud-messaging/ios/client

Examples

Swift FCM

FCM .

1- Xcode . Podfile :

```
$ cd
$ pod init
```

2 . Pod Pod :

```
pod 'Firebase / Core'
pod 'Firebase / Messaging'
```

3- .xcworkspace Xcode .

```
$ pod install
$ your-project.xcworkspace.
```

4- plist GoogleService-Info.plist .

5 APN Firebase . APN Cert

6- appDelegate "Firebase " .

7 - "application : didFinishLaunchingWithOptions" "FIRApp.configure ()" .

8-

```
  if #available(iOS 10.0, *) {
  let authOptions : UNAuthorizationOptions = [.Alert, .Badge, .Sound]
  UNUserNotificationCenter.currentNotificationCenter().requestAuthorizationWithOptions(
    authOptions,
    completionHandler: {_,_ in })

  // For iOS 10 display notification (sent via APNS)
  UNUserNotificationCenter.currentNotificationCenter().delegate = self
  // For iOS 10 data message (sent via FCM)
  FIRMessaging.messaging().remoteMessageDelegate = self

} else {
  let settings: UIUserNotificationSettings =
  UIUserNotificationSettings(forTypes: [.Alert, .Badge, .Sound], categories: nil)
  application.registerUserNotificationSettings(settings)
}
```

```
application.registerForRemoteNotifications()
```

9 -

```
let token = FIRInstanceID.instanceID().token()!
```

10 - appDelegate

```
func tokenRefreshNotification(notification: NSNotification) {
if let refreshedToken = FIRInstanceID.instanceID().token() {
    print("InstanceID token: \(refreshedToken)")
  }

  // Connect to FCM since connection may have failed when attempted before having a token.
  connectToFcm()
}
```

11 - fcm appDelegate

```
func connectToFcm() {
  FIRMessaging.messaging().connectWithCompletion { (error) in
    if (error != nil) {
      print("Unable to connect with FCM. \(error)")
    } else {
      print("Connected to FCM.")
    }
  }
}
```

12

```
func applicationDidEnterBackground(application: UIApplication) {
  FIRMessaging.messaging().disconnect()
  print("Disconnected from FCM.")
}
```

appDelegate.

fcm 3 .

FCM : https://riptutorial.com/ko/ios/topic/7326/-fcm-

170:

. . .

Examples

```
//Swift
let storyboard = UIStoryboard(name: "Main", bundle: NSBundle.mainBundle())

//Objective-c
UIStoryboard *storyboard = [UIStoryboard storyboardWithName:@"Main" bundle:[NSBundle
mainBundle]];
```

ViewController

```
//Swift
let initialScreen = storyboard.instantiateInitialViewController()

//Objective-c
UIViewController *initailScreen = [storyboard instantiateInitialViewController];
```

ViewController

```
//Swift
let viewController = storyboard.instantiateViewControllerWithIdentifier("identifier")

//Objective-c
UIViewController *viewController = [storyboard
instantiateViewControllerWithIdentifier:@"identifier"];
```

: https://riptutorial.com/ko/ios/topic/3514/-

171:

Siri

- (: MyApp)
- (: MyApp John)
- (: MyApp)
- (: MyApp John 20)
- VoIP (: MyApp Mike)
- (: MyApp)
- (CarPlay , : 72)

Examples

Siri

Siri iOS 10 (Today View Extension) .

---

1 - iOS .

2 - Siri

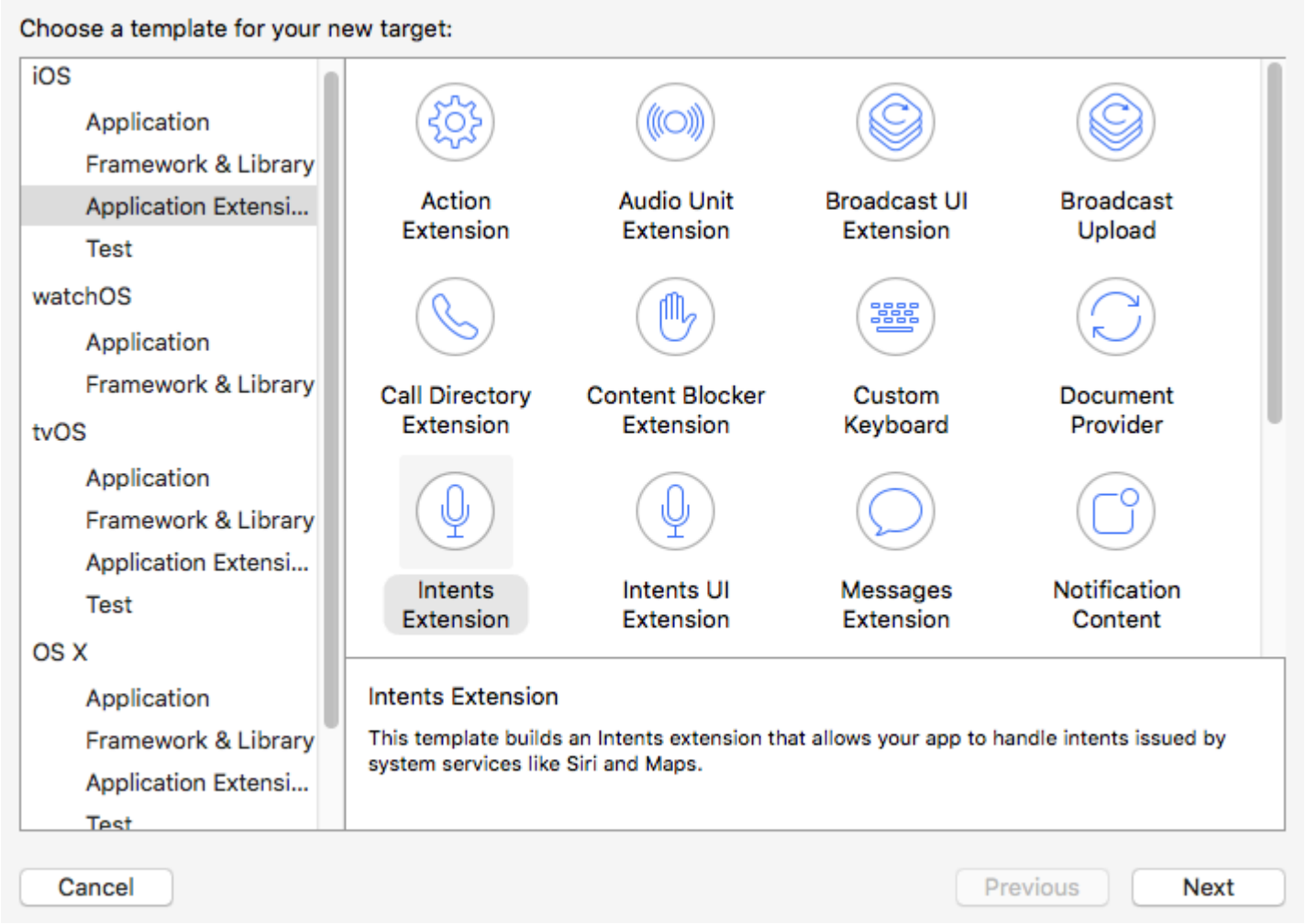
1- -> -> ... .

2 - iOS -> Application Extension .

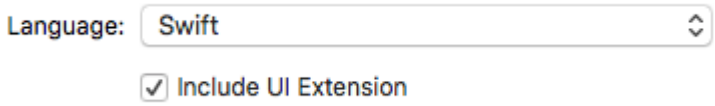
3- Intents Extension .

:

Intents Extension Siri Maps Intents .



4- "Include UI Extension" .



(Intents Extension UI Extension) Workout Intent . Siri .

.

Simulator SiriKit . .

: https://riptutorial.com/ko/ios/topic/5869/-

172:

?

~ / Library / Developer / CoreSimulator / Devices / .

.

/ / / /

.

.

:

iOS .

iPhone i386 iPad x8

Examples

```
xcrun simctl install booted *.app
```

: https://riptutorial.com/ko/ios/topic/9813/-

173: C

Examples

Swift Objective-C

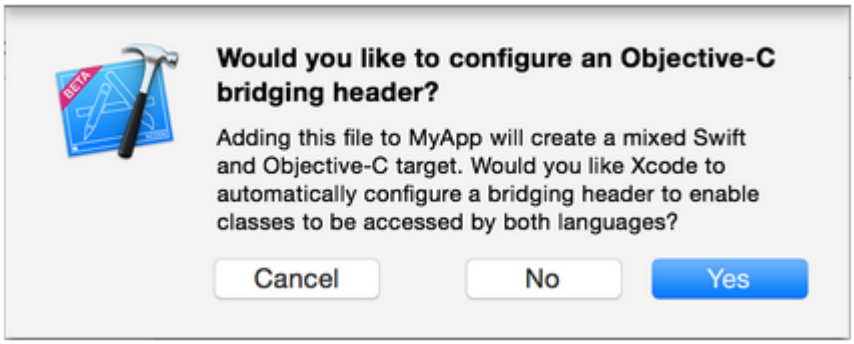
2 **5** . (`#import <Foundation/Foundation.h` ObjC .)

1 : Objective-C - .m

`.m` `CustomObject.m` `CustomObject.m`

2 :

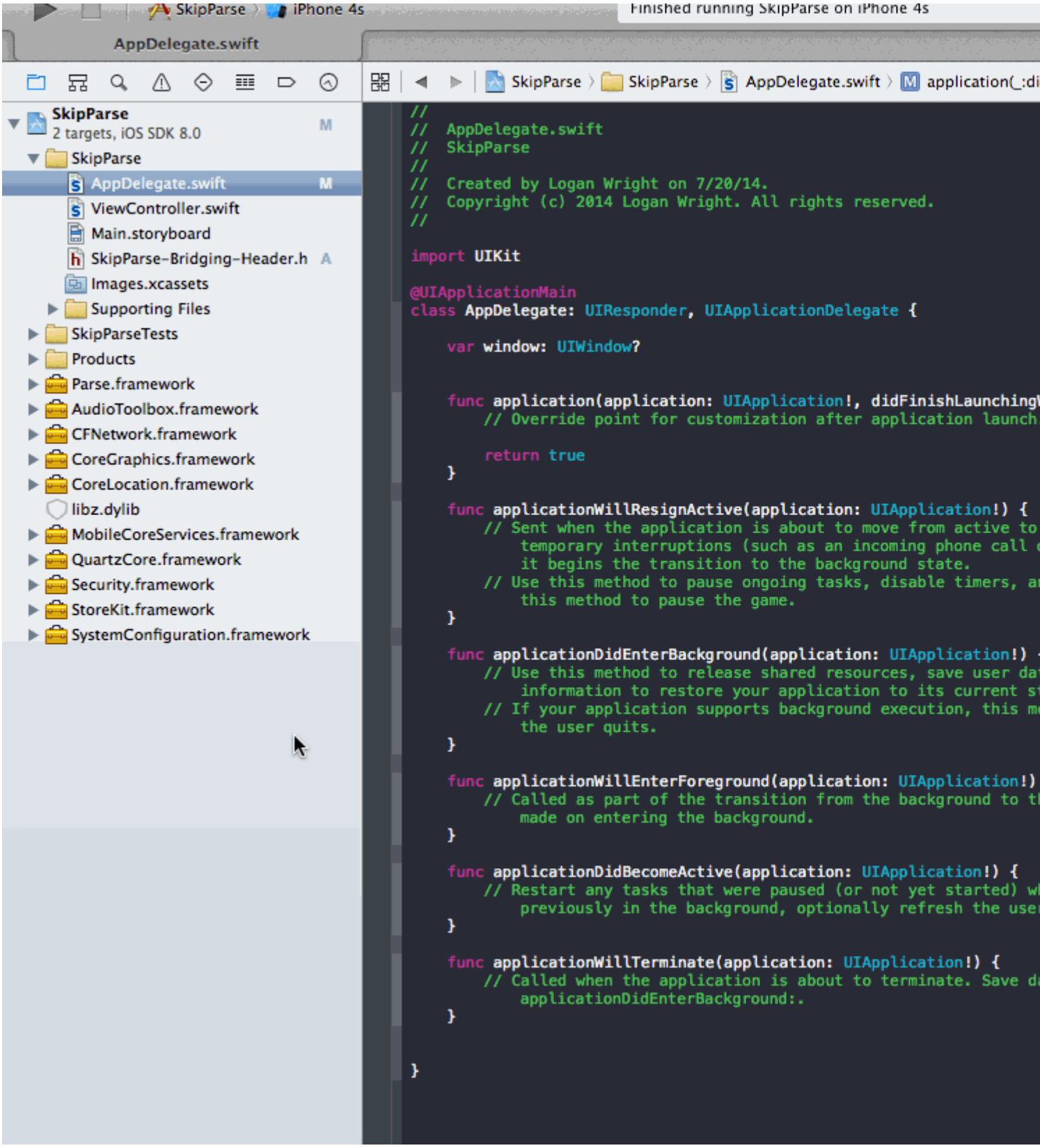
`.m` .



!

`.h` `<#YourProjectName#>-Bridging-Header.h`

ObjC Objective-C Xcode . `.h` .



`$(SRCROOT)` `.$(SRCROOT)` .xcodeproj . .

`$(SRCROOT)/Folder/Folder/<#YourProjectName#>-Bridging-Header.h`

3 : Objective-C - .h

`.h` `CustomObject.h` `CustomObject.h`

4 : Objective-C

CustomObject.h

```
#import <Foundation/Foundation.h>

@interface CustomObject : NSObject

@property (strong, nonatomic) id someProperty;

- (void) someMethod;

@end
```

CustomObject.m

```
#import "CustomObject.h"

@implementation CustomObject

- (void) someMethod {
    NSLog(@"SomeMethod Ran");
}

@end
```

5 :

YourProject-Bridging-Header.h :

```
#import "CustomObject.h"
```

6 :

SomeSwiftFile.swift :

```
var instanceOfCustomObject: CustomObject = CustomObject()
instanceOfCustomObject.someProperty = "Hello World"
println(instanceOfCustomObject.someProperty)
instanceOfCustomObject.someMethod()
```

. .

Objective-C Swift

1 :

.swift MySwiftObject.swift MySwiftObject.swift

MySwiftObject.swift :

```
import Foundation

class MySwiftObject : NSObject {

    var someProperty: AnyObject = "Some Initializer Val"

    init() {}

    func someFunction(someArg:AnyObject) -> String {
        var returnVal = "You sent me \(someArg)"
        return returnVal
    }

}
```

2 : ObjC

`SomeRandomClass.m` :

```
#import "<#YourProjectName#>-Swift.h"
```

: `<#YourProjectName#>-Swift.h` `<#YourProjectName#>-Swift.h` .

3 :

```
MySwiftObject * myOb = [MySwiftObject new];
NSLog(@"MyOb.someProperty: %@", myOb.someProperty);
myOb.someProperty = @"Hello World";
NSLog(@"MyOb.someProperty: %@", myOb.someProperty);
NSString * retString = [myOb someFunction:@"Arg"];
NSLog(@"RetString: %@", retString);
```

:

1. CodeCompletion . w / "cmd + r" Swift Objc .

2. `.swift` : `dyld: Library not loaded: @rpath/libswift_stdlib_core.dylib` , Xcode .

3. Swift 2.0 `@objc` Objective-C Swift . . Swift .

C : https://riptutorial.com/ko/ios/topic/1497/--c--

174: /

iOS 10.3 / . Apple storekit SKStoreReviewController . SKStoreReviewController requestReview () .

App Store .

Examples

iOS /

/ .

SKStoreReviewController.requestReview ()

/ : https://riptutorial.com/ko/ios/topic/9678/-----

175:

	CLLocationManager
	CLRegion ( )
	CLBeacon .

IOT . Apple iBeacon . 3 .

1. UUID
2.
3.

UUID CLLocation iBeacons . UUID .

CLLocation .

Examples

iBeacon

1.

```
func initiateRegion(ref:BeaconHandler){
    let uuid: NSUUID = NSUUID(UUIDString: "<UUID>")
    let beacon = CLBeaconRegion(proximityUUID: uuid, identifier: "")
    locationManager?.requestAlwaysAuthorization()    //cllocation manager obj.
    beacon?.notifyOnEntry = true
    beacon?.notifyOnExit = true
    beacon?.notifyEntryStateOnDisplay = true
    locationManager?.startMonitoringForRegion(beacon!)
    locationManager?.delegate = self;
    // Check if beacon monitoring is available for this device
    if (!CLLocationManager.isMonitoringAvailableForClass(CLBeaconRegion)) {
        print("error")
    }
    locationManager!.startRangingBeaconsInRegion(self.beacon!)
}
```

2.

```
func locationManager(manager: CLLocationManager, didEnterRegion region: CLRegion) {
    if(region.isKindOfClass(CLBeaconRegion)) {
        locationManager!.startRangingBeaconsInRegion(self.beacon!)
    }
}

func locationManager(manager: CLLocationManager, didExitRegion region: CLRegion) {
    if(region.isKindOfClass(CLBeaconRegion)) {
```

```
        locationManager!.stopRangingBeaconsInRegion(self.beacon!)
    }
}
```

3.

```
func locationManager(manager: CLLocationManager, didRangeBeacons beacons: [CLBeacon], inRegion
region: CLBeaconRegion) {
    print(beacons.first.major)
}
```

```
 beacon = CLBeaconRegion(proximityUUID: <#NSUUID#>, major: <#CLBeaconMajorValue#>, identifier:
<#String#>) // listening to all beacons with given UUID and major value
 beacon =    CLBeaconRegion(proximityUUID: <##NSUUID#>, major: <##CLBeaconMajorValue#>, minor:
<##CLBeaconMinorValue#>, identifier: <##String#>) // listening to all beacons with given UUID
and major and minor value
```

.

```
let locationManager = CLLocationManager()
locationManager.delegate = self
locationManager.requestWhenInUseAuthorization()
// OR locationManager.requestAlwaysAuthorization()
```

iBeacons `didRangeBeacons` `didRangeBeacons`

```
func locationManager(manager: CLLocationManager, didRangeBeacons beacons: [CLBeacon], inRegion
region: CLBeaconRegion) {
    for beacon in beacons {
        print(beacon.major)
        print(beacon.minor)
    }
}
```

: https://riptutorial.com/ko/ios/topic/1958/

176:

- ()
- responseData ()
- responseString (: NSStringEncoding)
- responseJSON (: NSJSONReadingOptions)
- responsePropertyList (: NSPropertyListReadOptions)

	.OPTIONS, .GET, .HEAD, .POST, .PUT, .PATCH, .DELETE, .TRACE, .CONNECT
URLString	URLStringConvertible
	[String: AnyObject]?
	ParameterEncoding
	[String: String]?

Examples

```
import Alamofire

Alamofire.request(.GET, "https://httpbin.org/get")
```

```
Alamofire.request("https://httpbin.org/get").validate().responseJSON { response in
switch response.result {
case .success:
    print("Validation Successful")
case .failure(let error):
    print(error)
 }
}
```

```
Alamofire.request(.GET, "https://httpbin.org/get", parameters: ["foo": "bar"])
     .responseJSON { response in
         print(response.request)  // original URL request
         print(response.response) // URL response
         print(response.data)     // server data
         print(response.result)   // result of response serialization

         if let JSON = response.result.value {
             print("JSON: \(JSON)")
         }
     }
```

```
Alamofire.request(.GET, "https://httpbin.org/get", parameters: ["foo": "bar"])
     .validate(statusCode: 200..<300)
     .validate(contentType: ["application/json"])
     .response { response in
```

```
        print(response)
    }
```

```
Alamofire.request(.GET, "https://httpbin.org/get", parameters: ["foo": "bar"])
     .validate()
     .response { request, response, data, error in
         print(request)
         print(response)
         print(data)
         print(error)
      }
```

```
Alamofire.request(.GET, "https://httpbin.org/get")
     .validate()
     .responseString { response in
         print("Response String: \(response.result.value)")
     }
     .responseJSON { response in
         print("Response JSON: \(response.result.value)")
     }
```

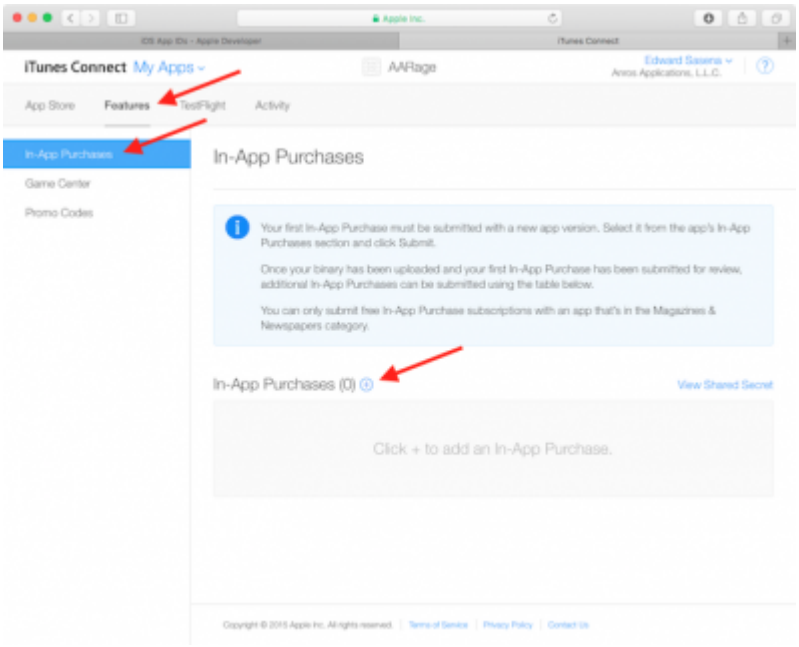
: https://riptutorial.com/ko/ios/topic/1823/-

177: ID

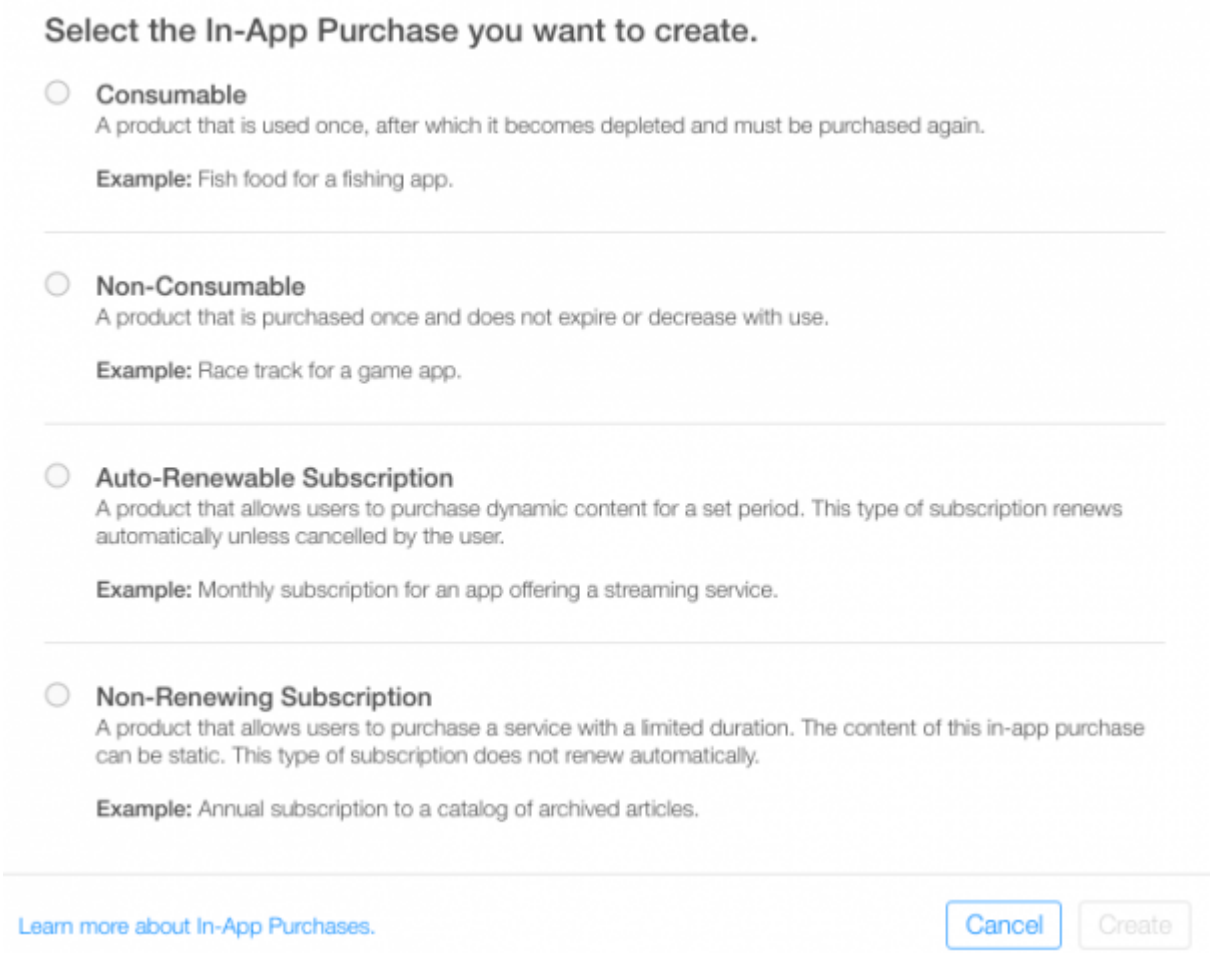
Examples

- IAP iTunes Connect . . App Store iTunes . IAP .
  - : . , , .
  - : .
  - : .
  - : raywenderlich.com .

. App-in-App Purchase Products Apple . iTunes Connect . + .



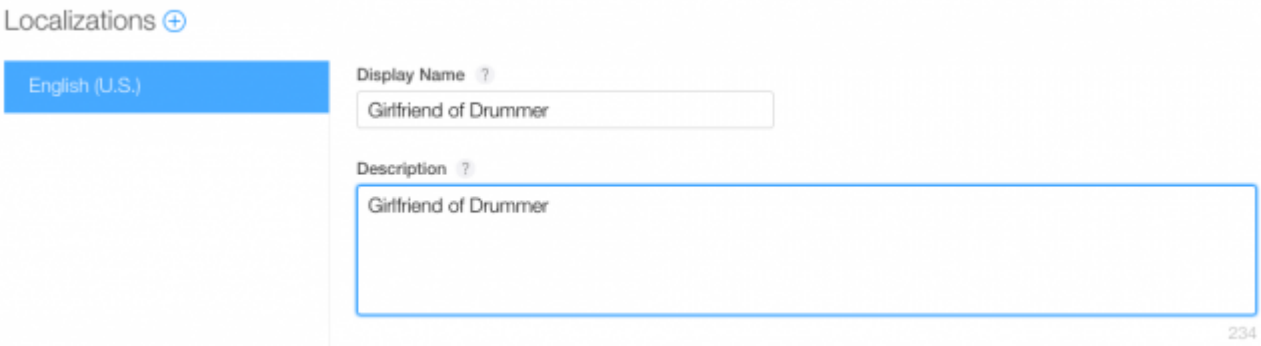
.



. IAP .

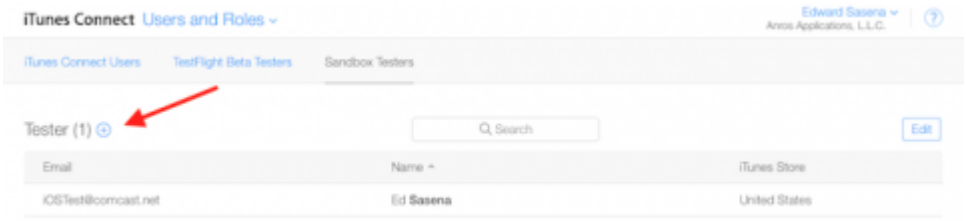
- : iTunes Connect IAP . . " " .
- **Product ID (ID)** : IAP . ID . "GirlfriendOfDrummerRage" . . . com.theNameYouPickedEarlier.Rage.GirlFriendOfDrummerRage.
- : IAP . !
- **Price Tier** : IAP . Tier 1 .

() . " " . . ! IAP .



. Apple IAP " .

iTunes Connect iTunes Connect . . " + .



. , Apple . . Apple ID . : Gmail .

ID : https://riptutorial.com/ko/ios/topic/10854/-id-

178: (ATS)

NSAppTransportSecurity	ATS
NSAllowsArbitraryLoads	ATS YES . iOS 10 macOS 10.12 Info.plist . NSAllowsArbitraryLoadsInMedia, NSAllowsArbitraryLoadsInWebContent, NSAllowsLocalNetworking
NSAllowsArbitraryLoadsInMedia	AV Foundation API ATS YES . ***(iOS 10 , macOS 10.12)***
NSAllowsArbitraryLoadsInWebContent	YES NSURLSession (WKWebView , UIWebView , WebView) ATS . ***(iOS 10 , macOS 10.12)***
NSAllowsLocalNetworking	.local YES . ***(iOS 10 , macOS 10.12)***
NSExceptionDomains	
NSIncludesSubdomains	YES .
NSRequiresCertificateTransparency	CT (CT) (X.509) YES . ***(iOS 10 , macOS 10.12)***
NSExceptionAllowsInsecureHTTPLoads	HTTP YES .
NSExceptionRequiresForwardSecrecy	YES . Forward Secrecy NO .
NSExceptionMinimumTLSVersion	TLSv1.2 . TLSv1.0 , TLSv1.1 , TLSv1.2
NSThirdPartyExceptionAllowsInsecureHTTPLoads	NSExceptionAllowsInsecureHTTPLoads
NSThirdPartyExceptionRequiresForwardSecrecy	NSExceptionRequiresForwardSecrecy
NSThirdPartyExceptionMinimumTLSVersion	NSExceptionMinimumTLSVersion

App Transport Security iOS macOS . . HTTPS .

HTTP Info.plist . ( )

: 2017 Apple ATS . , Info.plist ATS . HTTP Apple . (: WWDC 2016 - 706)

App Transport Security CocoaKeys Documentation .

Examples

HTTP

Apple iOS 9 ATS . ATS HTTPS . .

ATS `NSAppTransportSecurity` (Xcode Info.plist `App Transport Security Settings` `Info.plist` .
HTTP `Allow Arbitrary Loads` (`NSAllowsArbitraryLoads`) `YES` . HTTP .

HTTP

HTTP `App Transport Security Settings` . `Exception Domains` (`NSExceptionDomains`) ATS .

Exception Domains . . HTTPS `NSExceptionAllowsInsecureHTTPLoads YES` .

SSL .

iOS 9 HTTPS .
SSL . .

Info.plist :

1. (testdomain.com) :

```
<key>NSAppTransportSecurity</key>
<dict>
<key>NSExceptionDomains</key>
<dict>
    <key>testdomain.com</key>
    <dict>
        <key>NSIncludesSubdomains</key>
        <true/>
        <key>NSExceptionAllowsInsecureHTTPLoads</key>
        <true/>
    </dict>
</dict>
```

`NSExceptionAllowsInsecureHTTPLoads` . (testdomain.com) HTTP HTTP .

`NSIncludesSubdomains` (testdomain.com) .

2. :

```
<key>NSAppTransportSecurity</key>
<dict>
    <key>NSAllowsArbitraryLoads</key>
    <true/>
</dict>
```

HTTP . 2017 1 1 . .

- .
- .
- .

(ATS) : https://riptutorial.com/ko/ios/topic/5435/----ats-

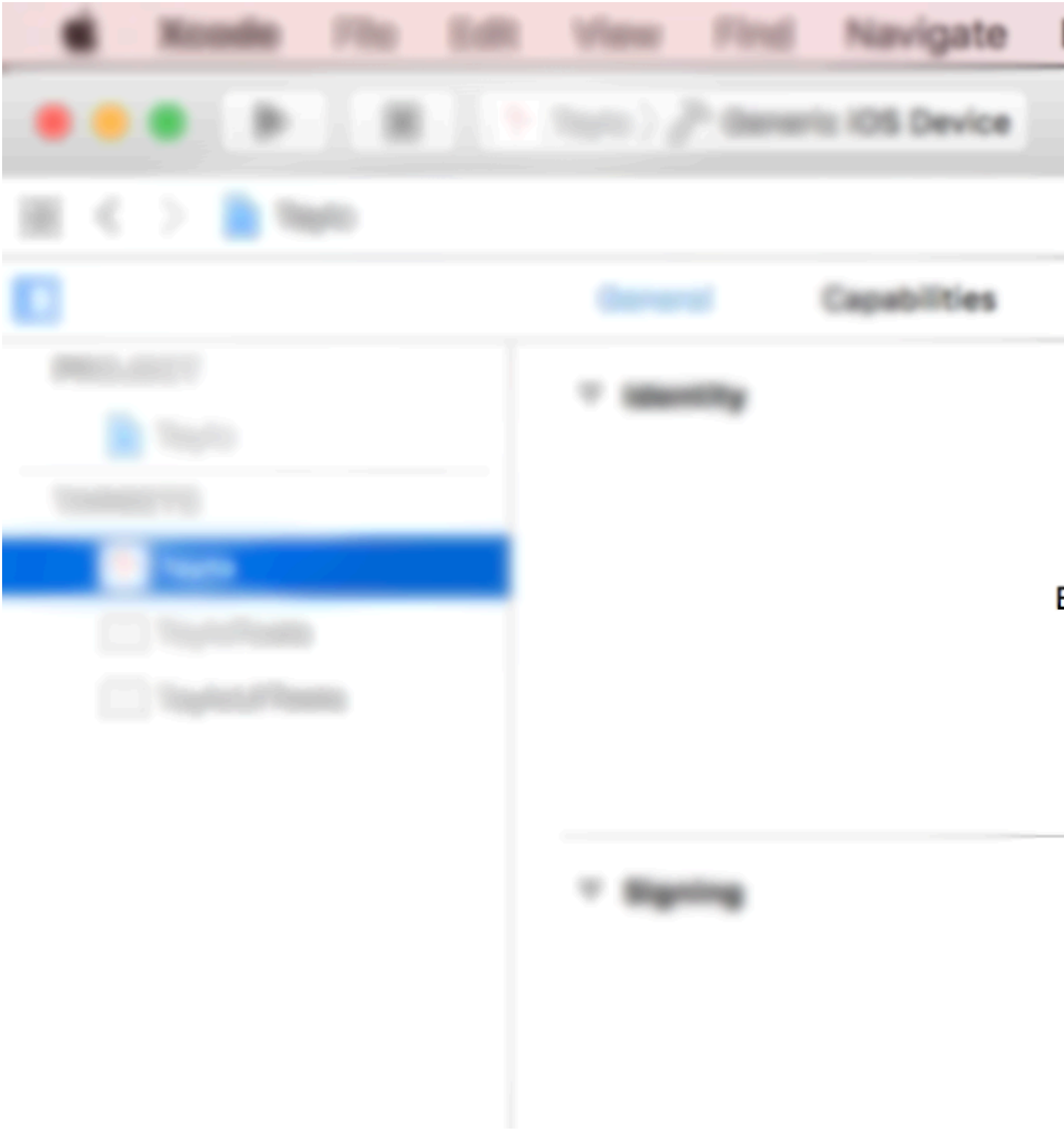
179:

iOS App Store .

Examples

. . . Xcode 8 . -> " " .

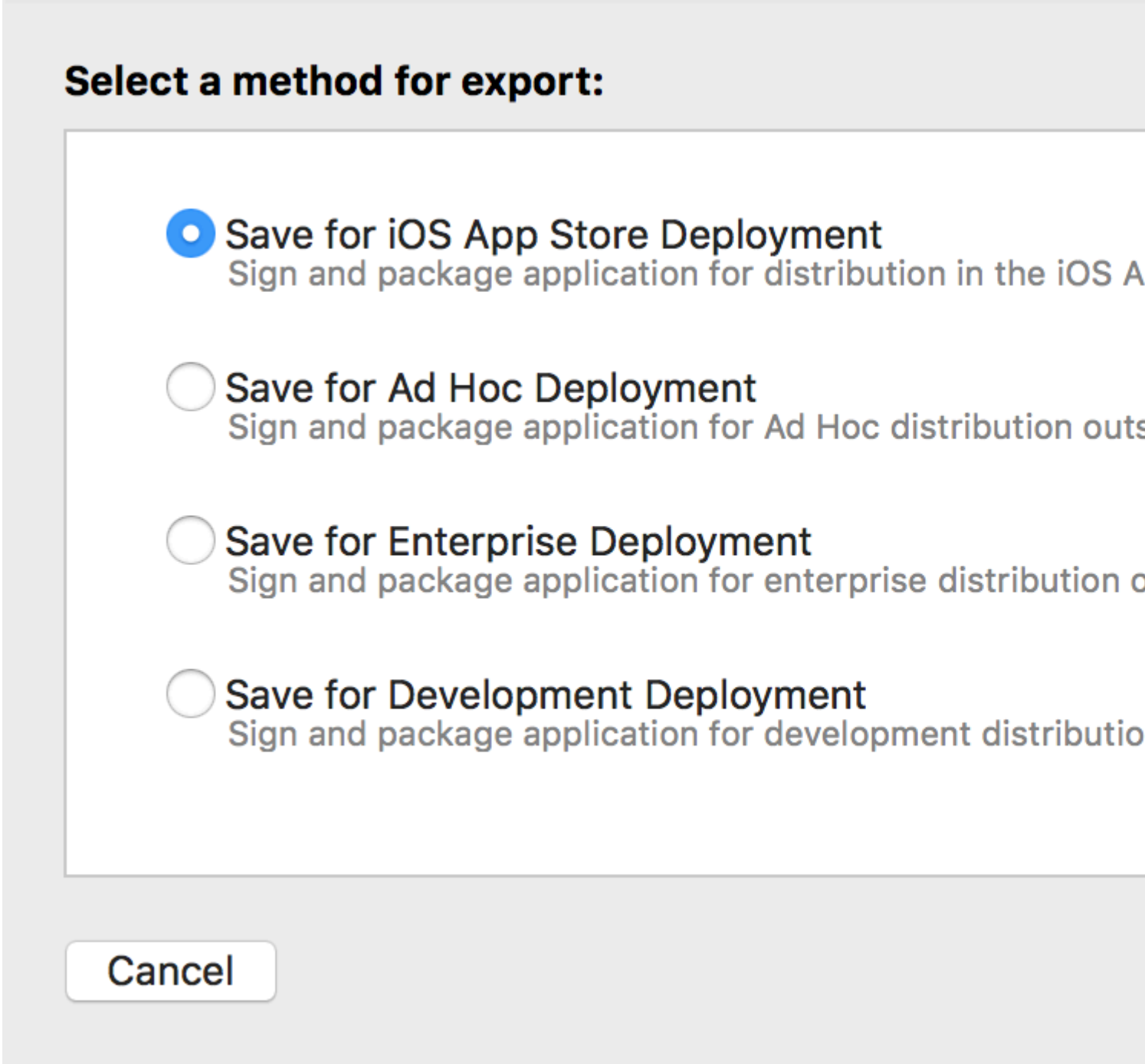
. 'Generic iOS device' . "" "" .



. , 30 1.0. 31 1.0.1 . .

IPA

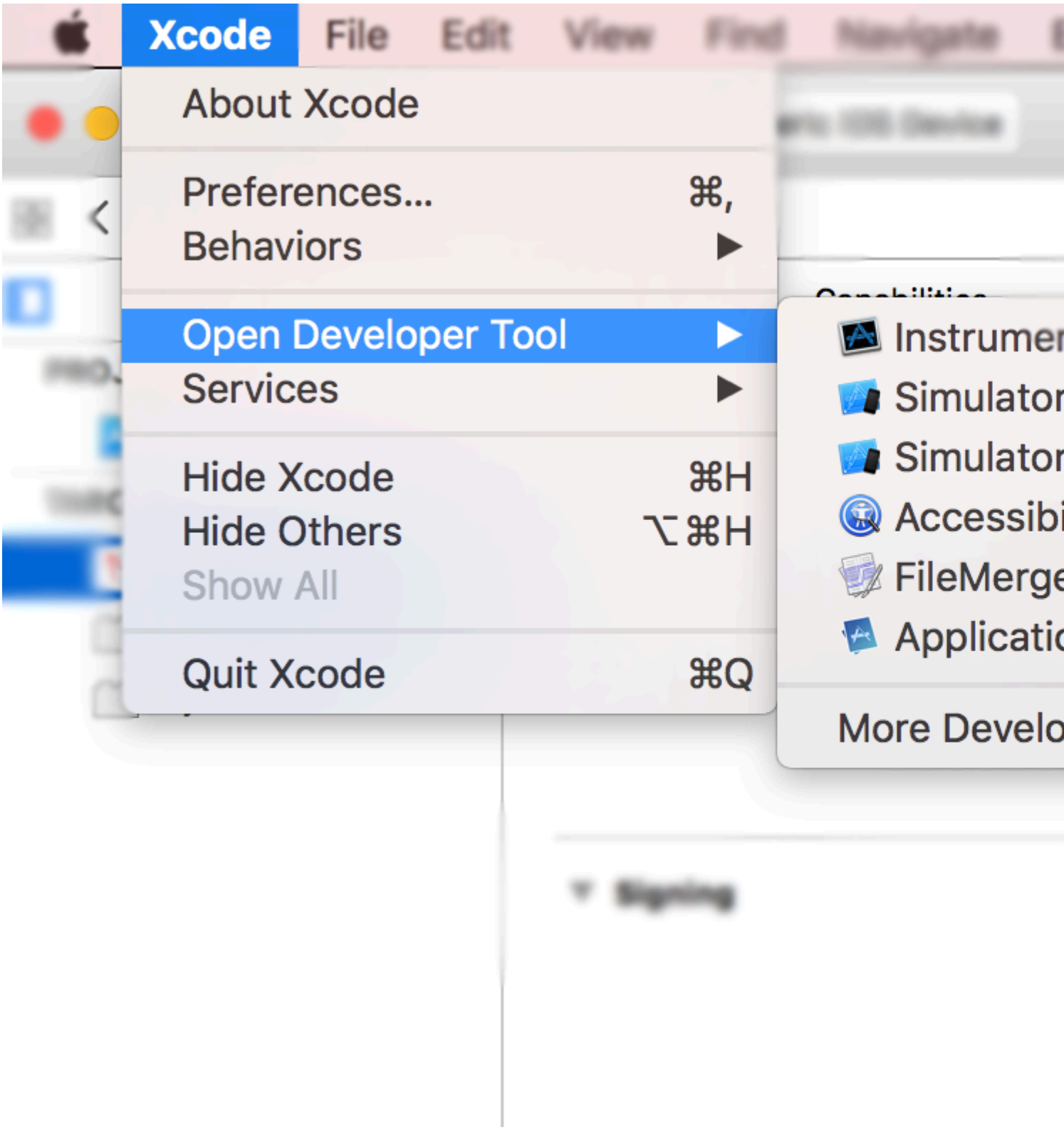
Xcode . . "App Store ..." . 9/10 (Xcode). Application Loader Xcode . Application Loader IPA App Store . 30 . "" .



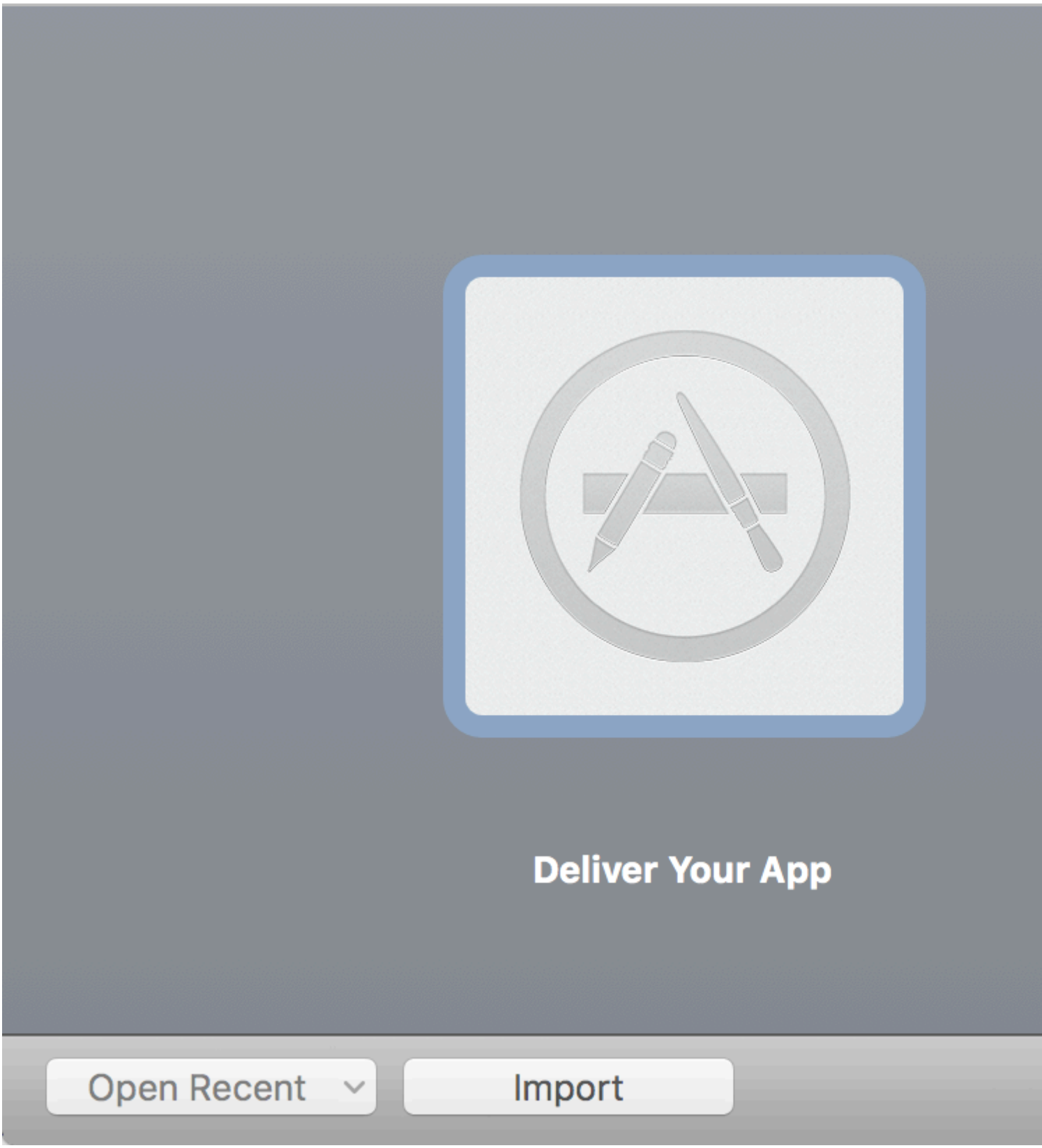
App Store . . IPA . .

Application Loader IPA

IPA Xcode Application Loader .



Xcode . . ' ' . iTunes Connect 1 .



: https://riptutorial.com/ko/ios/topic/8765/--

180:

Examples

2 IAP

iTunesConnect IAP :

```
import StoreKit
```

.

```
class ViewController: UIViewController, SKProductsRequestDelegate,
SKPaymentTransactionObserver {
```

ID iTunesConnect .

```
var product_id: NSString?

override func viewDidLoad() {


    product_id = "YOUR_PRODUCT_ID"
    super.viewDidLoad()
    SKPaymentQueue.defaultQueue().addTransactionObserver(self)

   //Check if product is purchased
   if (NSUserDefaults.standardUserDefaults().boolForKey("purchased")){

       // Hide ads
       adView.hidden = true

   } else {
       print("Should show ads...")

   }

}
```

IAP .

```
@IBAction func unlockAction(sender: AnyObject) {

   print("About to fetch the product...")

// Can make payments
if (SKPaymentQueue.canMakePayments())
    {
        let productID:NSSet = NSSet(object: self.product_id!);
        let productsRequest:SKProductsRequest = SKProductsRequest(productIdentifiers:
productID as! Set<NSString>);
        productsRequest.delegate = self;
```

```
        productsRequest.start();
        println("Fetching Products");
    }else{
        print("Can't make purchases");
    }

}
```

.

```
func buyProduct(product: SKProduct){
    println("Sending the Payment Request to Apple");
    let payment = SKPayment(product: product)
    SKPaymentQueue.defaultQueue().addPayment(payment);

 }
```

```
func productsRequest (request: SKProductsRequest, didReceiveResponse response:
SKProductsResponse) {

    let count : Int = response.products.count
    if (count>0) {
        var validProduct: SKProduct = response.products[0] as SKProduct
        if (validProduct.productIdentifier == self.product_id) {
            print(validProduct.localizedTitle)
            print(validProduct.localizedDescription)
            print(validProduct.price)
            buyProduct(validProduct);
        } else {
            print(validProduct.productIdentifier)
        }
    } else {
        print("nothing")
    }
}


func request(request: SKRequest!, didFailWithError error: NSError!) {
    print("Error Fetching product information");
}

    func paymentQueue(_ queue: SKPaymentQueue,
updatedTransactions transactions: [SKPaymentTransaction])

{
    print("Received Payment Transaction Response from Apple");

    for transaction:AnyObject in transactions {
        if let trans:SKPaymentTransaction = transaction as? SKPaymentTransaction{
            switch trans.transactionState {
            case .Purchased:
                print("Product Purchased");
                SKPaymentQueue.defaultQueue().finishTransaction(transaction as!
SKPaymentTransaction)
                // Handle the purchase
                NSUserDefaults.standardUserDefaults().setBool(true , forKey: "purchased")
                adView.hidden = true
                break;
            case .Failed:
```

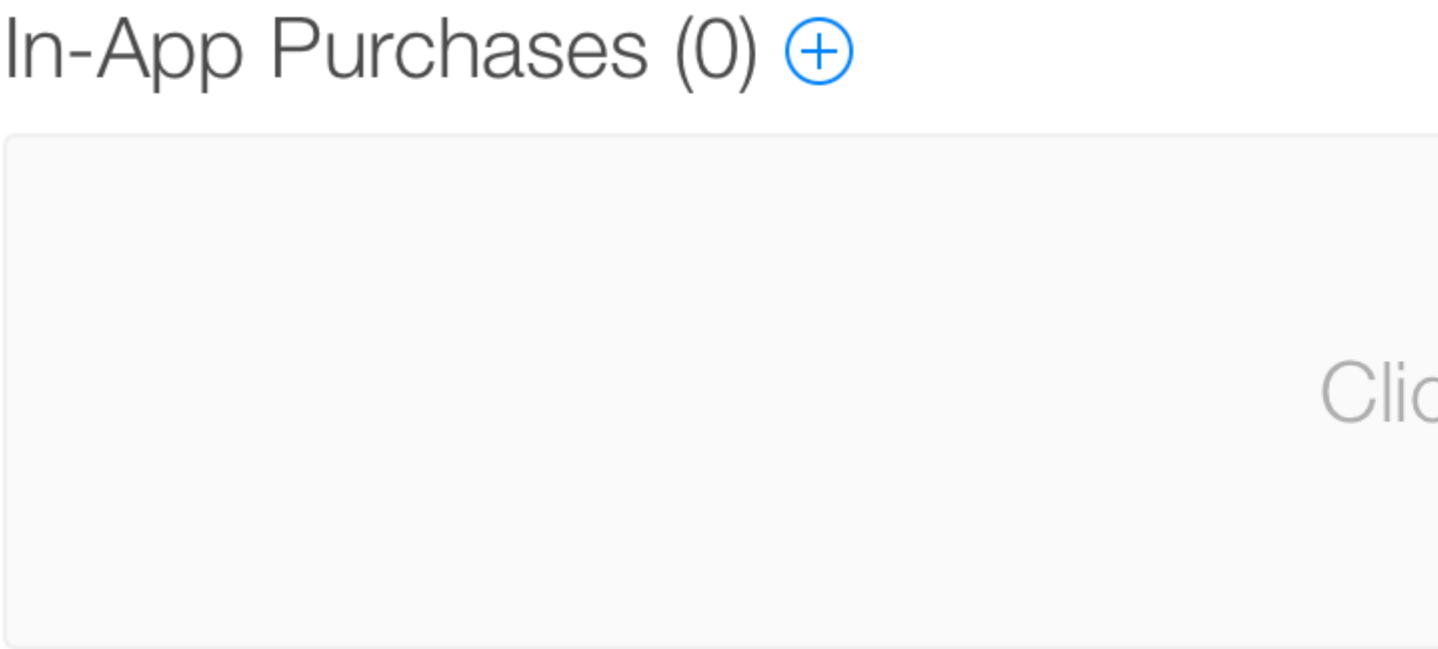
```
                print("Purchased Failed");
                SKPaymentQueue.defaultQueue().finishTransaction(transaction as!
SKPaymentTransaction)
                break;



            case .Restored:
                print("Already Purchased");
               SKPaymentQueue.defaultQueue().restoreCompletedTransactions()


                 // Handle the purchase
                    NSUserDefaults.standardUserDefaults().setBool(true , forKey: "purchased")
                    adView.hidden = true
                    break;
            default:
                break;
            }
        }
    }

}
```

```
if (SKPaymentQueue.canMakePayments()) {
  SKPaymentQueue.defaultQueue().restoreCompletedTransactions()
}
```

iTunesConnect

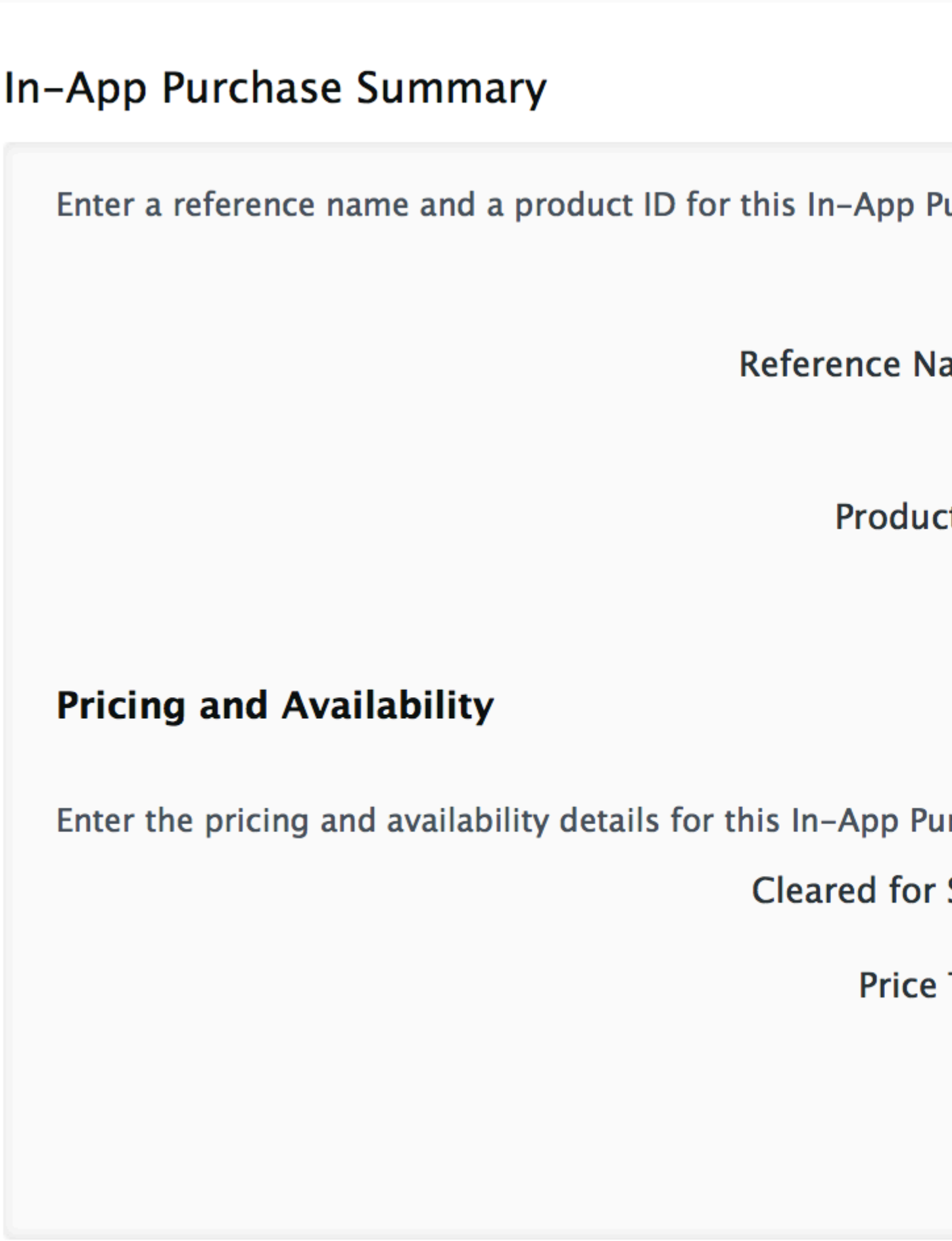
iTunesConnect IAP .

.



. IAP .

IAP .


In-App Purchase Summary
Enter a reference name and a product ID for this In-App Pu
Reference Na
Product
Pricing and Availability
Enter the pricing and availability details for this In-App Pur
Cleared for
Price

181:

Examples

UIViewController

`UIViewController` `UIWindow` RootViewController . :

```
extension UIApplication {

func topViewController(_ base: UIViewController? =
UIApplication.shared.keyWindow?.rootViewController) -> UIViewController {

    if let nav = base as? UINavigationController {
        return topViewController(nav.visibleViewController)
    }

    if let tab = base as? UITabBarController {
        if let selected = tab.selectedViewController {
            return topViewController(selected)
        }
    }

    if let presented = base?.presentedViewController {
        return topViewController(presented)
    }

    return base!
}
```

iOS NotificationCenter .

```
NotificationCenter.default.addObserver(
        self,
        selector: #selector(ViewController.do(_:)),
        name: NSNotification.Name.UIApplicationDidBecomeActive,
        object: nil)
```

. https://developer.apple.com/reference/foundation/nsnotification.name .

: https://riptutorial.com/ko/ios/topic/7188/--

182:

- Apple
- Q & A
- WWDC15

Examples

```
import Contacts
```

-C

```
#import <Contacts/Contacts.h>
```

```
switch CNContactStore.authorizationStatusForEntityType(CNEntityType.Contacts){
case .Authorized: //access contacts
case .Denied, .NotDetermined: //request permission
default: break
}
```

-C

```
switch ([CNContactStore authorizationStatusForEntityType:CNEntityType.Contacts]){
case CNAuthorizationStatus.Authorized:
    //access contacts
    break;
case CNAuthorizationStatus.Denied:
    //request permission
    break;
case CNAuthorizationStatus.NotDetermined:
    //request permission
    break;
}
```

```
var contactStore = CKContactStore()
contactStore.requestAccessForEntityType(CKEntityType.Contacts, completionHandler: { (ok, _) ->
Void in
    if access{
        //access contacts
    }
}
```

Contact Access contactStore `NSPredicate` . , .

```
let predicate = CNContact.predicateForContactsMatchingName("Some Name")
```

-C

```
NSPredicate *predicate = [CNContact predicateForContactsMatchingName:@"Some Name"];
```

, .

```
let keys = [CNContactGivenNameKey, CNContactFamilyNameKey, CNContactImageDataKey]
```

```
do {
    let contacts = try contactStore.unifiedContactsMatchingPredicate(predicate, keysToFetch:
keys)
} catch let error as NSError {
    //...
}
```

```
print(contacts[0].givenName)
print(contacts[1].familyName)
let image = contacts[2].imageData
```

```
import Contacts

// Creating a mutable object to add to the contact
let contact = CNMutableContact()

contact.imageData = NSData() // The profile picture as a NSData object

contact.givenName = "John"
contact.familyName = "Appleseed"

let homeEmail = CNLabeledValue(label:CNLabelHome, value:"john@example.com")
let workEmail = CNLabeledValue(label:CNLabelWork, value:"j.appleseed@icloud.com")
contact.emailAddresses = [homeEmail, workEmail]

contact.phoneNumbers = [CNLabeledValue(
    label:CNLabelPhoneNumberiPhone,
    value:CNPhoneNumber(stringValue:"(408) 555-0126"))]

let homeAddress = CNMutablePostalAddress()
homeAddress.street = "1 Infinite Loop"
homeAddress.city = "Cupertino"
homeAddress.state = "CA"
```

```
homeAddress.postalCode = "95014"
contact.postalAddresses = [CNLabeledValue(label:CNLabelHome, value:homeAddress)]

let birthday = NSDateComponents()
birthday.day = 1
birthday.month = 4
birthday.year = 1988  // You can omit the year value for a yearless birthday
contact.birthday = birthday

// Saving the newly created contact
let store = CNContactStore()
let saveRequest = CNSaveRequest()
saveRequest.addContact(contact, toContainerWithIdentifier:nil)
try! store.executeSaveRequest(saveRequest)
```

: https://riptutorial.com/ko/ios/topic/5872/--

183:

Examples

AlamofireImage

`AlamofireImage` Swift `Alamofire` . `AlamofireImage` `cocoapods`

```
pod 'AlamofireImage', '~> 3.1'
```

:

1. `AlamofireImage` `Alamofire`
2. : `let imageCache = AutoPurgingImageCache( memoryCapacity: 111_111_111, preferredMemoryUsageAfterPurge: 90_000_000)`
3. :

```
Alamofire.request(self.nameUrl[i]).responseImage { response in
                    if response.result.value != nil {
                        let image = UIImage(data: response.data!, scale: 1.0)!
                        imageCache.add(image, withIdentifier: self.nameUrl[i])
                    }
    }
```

4. :

```
if let image = imageCache.image(withIdentifier: self.nameUrl[self.a])
        {
            self.localImageView.image = image
        }
```

: https://riptutorial.com/ko/ios/topic/9450/--

184:

RLMObject -

. .

Examples

RLMObject - -C

RLMObject . .

```
@interface BaseModel : RLMObject

@property NSString *uuid;
@property NSString *metadata;

@end

@implementation BaseModel

+ (NSString *)primaryKey
{
    return @"uuid";
}

+ (NSDictionary *)defaultPropertyValues
{
    NSMutableDictionary *defaultPropertyValues = [NSMutableDictionary
dictionaryWithDictionary:[super defaultPropertyValues]];
    NSString *uuid = [[NSUUID UUID] UUIDString];
    [defaultPropertyValues setValue:@"" forKey:@"metadata"];
    [defaultPropertyValues setValue:uuid forKey:@"uuid"];
    return defaultPropertyValues;
}

+ (NSArray *)ignoredProperties
{
    return @[];
}

@end
```

: https://riptutorial.com/ko/ios/topic/4084/

185:

Examples

-C

`ViewController.h  ViewController.m`

```
@property (strong, nonatomic)UISlider *slider;

//Define frame of slider and add to view
CGRect frame = CGRectMake(0.0, 100.0, 320.0, 10.0);
UISlider *slider = [[UISlider alloc] initWithFrame:frame];
[slider addTarget:self action:@selector(sliderAction:)
forControlEvents:UIControlEventValueChanged];
[self.slider setBackgroundColor:[UIColor clearColor]];
self.slider.minimumValue = 0.0;
self.slider.maximumValue = 50.0;
//sending a NO/False would update the value of slider only when the user is no longer touching
the screen. Hence sending only the final value
self.slider.continuous = YES;
self.slider.value = 25.0;
[self.view addSubview slider];
```

```
- (IBAction)sliderAction:(id)sender {
    NSLog(@"Slider Value %f", sender.value);
}
```

SWIFT

```
 let frame = CGRect(x: 0, y: 100, width: 320, height: 10)
 let slider = UISlider(frame: frame)
 slider.addTarget(self, action:  #selector(sliderAction), for: .valueChanged)
 slider.backgroundColor = .clear
 slider.minimumValue = 0.0
 slider.maximumValue = 50.0
 //sending a NO/False would update the value of slider only when the user is no longer
touching the screen. Hence sending only the final value
 slider.isContinuous = true
 slider.value = 25.0
 view.addSubview(slider)
```

```
 func sliderAction(sender:UISlider!)
 {
    print("value--\(sender.value)")
 }
```

setThumbImage .

3.1 :

```
let slider = UISlider()
let thumbImage = UIImage
slider.setThumbImage(thumbImage, for: .normal)
```

: https://riptutorial.com/ko/ios/topic/7402/-

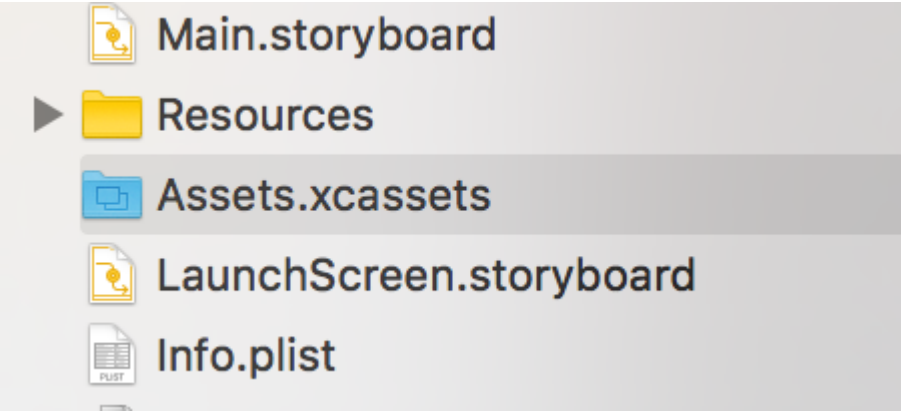
186: Aseets

Xcode iOS .

, , , , .

Examples

Xcode , , , plist . `Assets.xcassets` . . .



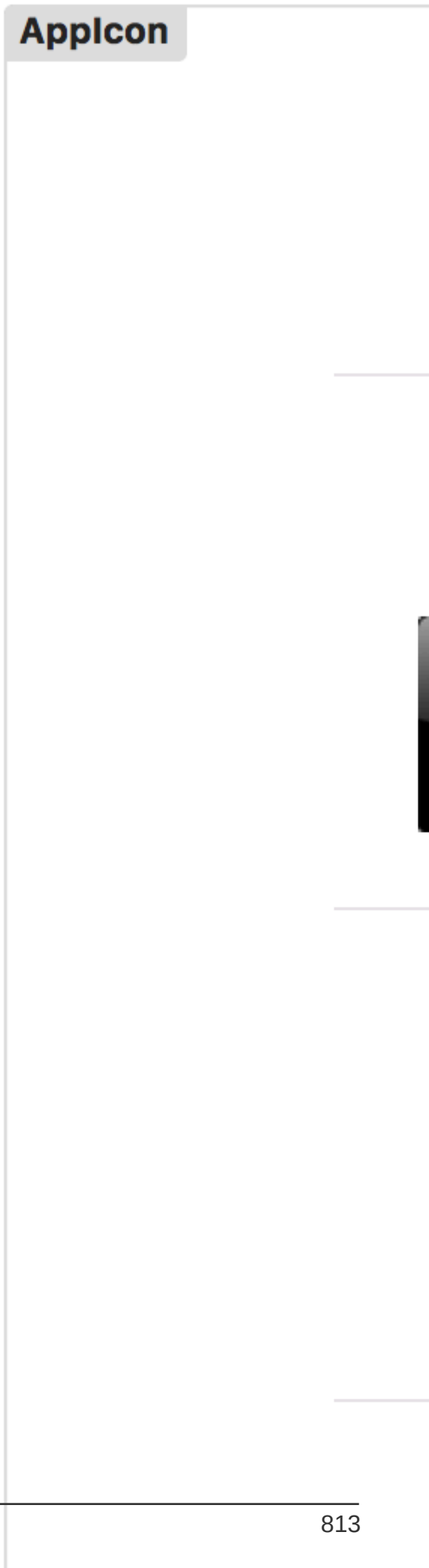
.


AppIcon


AppIcon

. , .
.

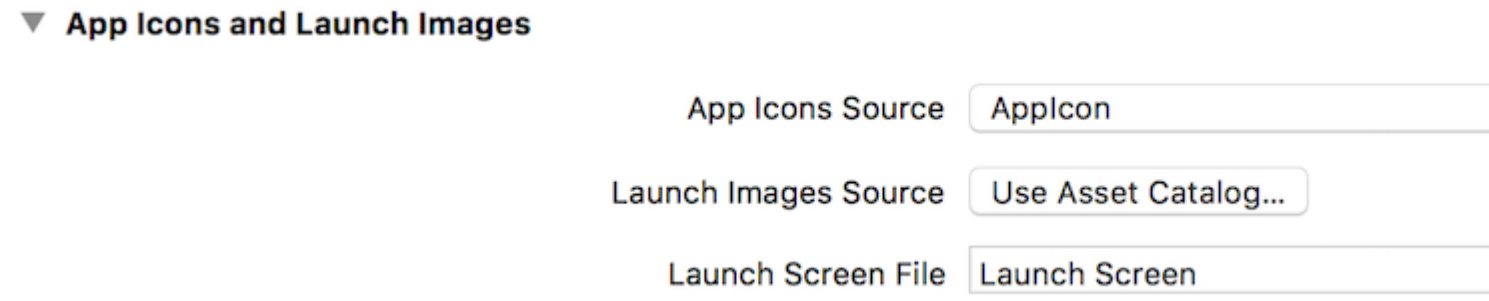

AppIcon


AppIcon

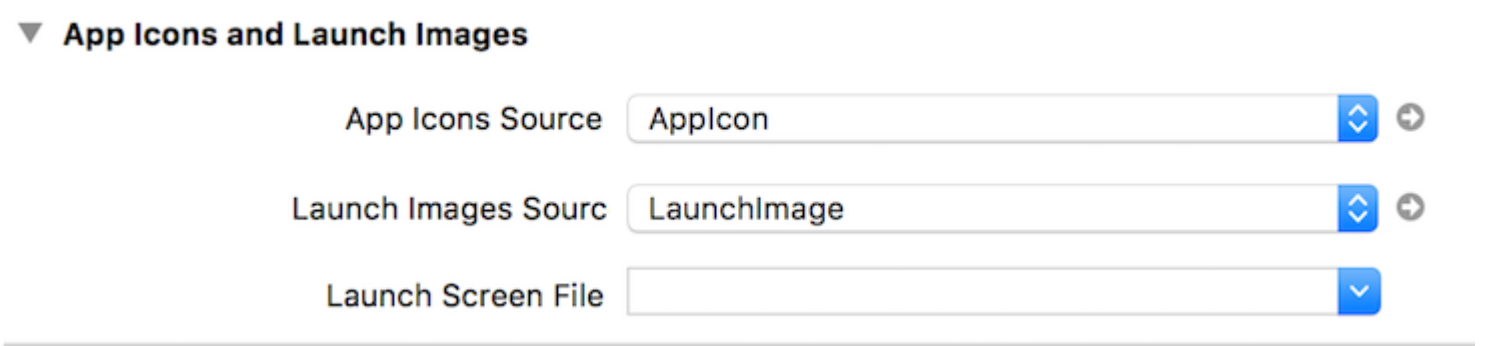
.

AppIcons .

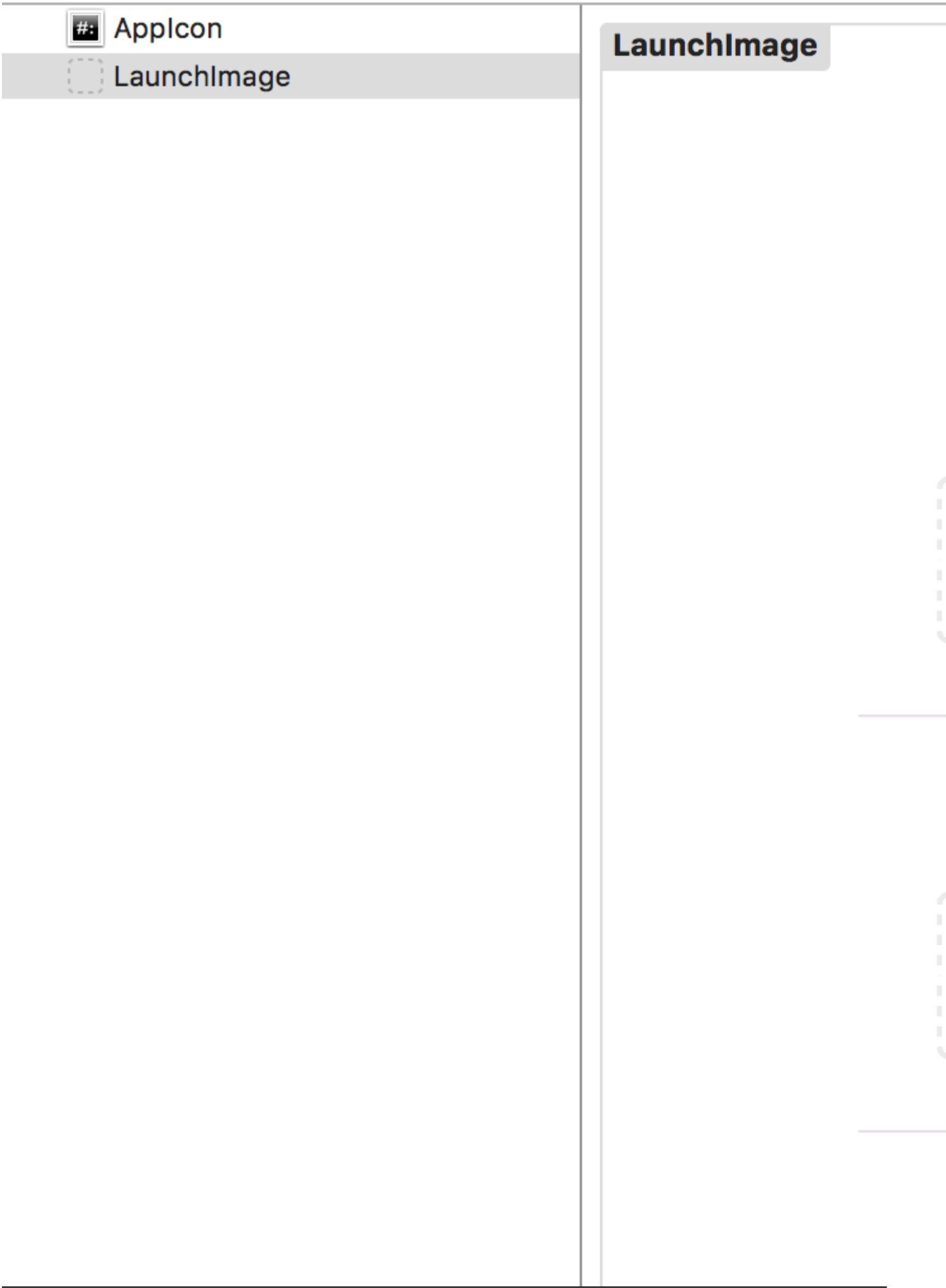
.



.



Xcode LaunchImage .


AppIcon
LaunchImage
LaunchImage

`SplitView` .

5 : . .

Aseets : https://riptutorial.com/ko/ios/topic/10087/-aseets-

187:

Examples

Alamofire UIImageViewExtension . imageView tableview `imageView` .

tableForView cellForRowAt : .

```
let url = URL(string: "https://httpbin.org/image/png")!
let placeholderImage = UIImage(named: "placeholder")!

imageView.af_setImage(withURL: url, placeholderImage: placeholderImage)
```

url placeHolder . url `imageView af_setImage` . .

.

. . UIImageView Extension .

Alamofire .

imageView tableView . cellForRowAt : .

```
let placeholderImage = UIImage(named: "placeholder")!
imageView.image = placeholderImage

let url = URL(string: "https://httpbin.org/image/png")!

Alamofire.request(url!, method: .get).responseImage { response in
    guard let image = response.result.value else { return }

    if let updateCell = tableView.cellForRow(at: indexPath) {
        updateCell.imageView.image = image
    }
}
```

. Alamofire `request` . URL `.get` HTTP . `.responseImage` .

. cellForRow (at : indexPath) nil . , .

if updateCell nil if nil . .

: https://riptutorial.com/ko/ios/topic/10793/-

188:

AVFoundation

Examples

UIImages

AVAssetWriter AVAssetWriter

```
NSError *error = nil;
NSURL *outputURL = <#NSURL object representing the URL where you want to save the video#>;
AVAssetWriter *assetWriter = [AVAssetWriter assetWriterWithURL:outputURL
fileType:AVFileTypeQuickTimeMovie error:&error];
if (!assetWriter) {
    // handle error
}
```

AVAssetWriter AVAssetWriter .

```
 NSDictionary *writerInputParams = [NSDictionary dictionaryWithObjectsAndKeys:
                                                AVVideoCodecH264, AVVideoCodecKey,
                                                [NSNumber numberWithInt:renderSize.width],
AVVideoWidthKey,
                                                [NSNumber numberWithInt:renderSize.height],
AVVideoHeightKey,
                                                AVVideoScalingModeResizeAspectFill,
AVVideoScalingModeKey,
                                                nil];

 AVAssetWriterInput *assetWriterInput = [AVAssetWriterInput
assetWriterInputWithMediaType:AVMediaTypeVideo outputSettings:writerInputParams];
 if ([assetWriter canAddInput:assetWriterInput]) {
     [assetWriter addInput:assetWriterInput];
 } else {
     // show error message
 }
```

CVPixelBufferRef AVAssetWriterInput AVAssetWriterInputPixelBufferAdaptor

```
NSDictionary *attributes = [NSDictionary dictionaryWithObjectsAndKeys:
                            [NSNumber numberWithUnsignedInt:kCVPixelFormatType_32ARGB],
(NSString*)kCVPixelBufferPixelFormatTypeKey,
                            [NSNumber numberWithBool:YES], (NSString
*)kCVPixelBufferCGImageCompatibilityKey,
                            [NSNumber numberWithBool:YES], (NSString
*)kCVPixelBufferCGBitmapContextCompatibilityKey,
                           nil];
AVAssetWriterInputPixelBufferAdaptor *writerAdaptor = [AVAssetWriterInputPixelBufferAdaptor
assetWriterInputPixelBufferAdaptorWithAssetWriterInput:assetWriterInput
sourcePixelBufferAttributes:attributes];
```

.

```
[assetWriter startWriting];
[assetWriter startSessionAtSourceTime:kCMTimeZero];
[assetWriterInput requestMediaDataWhenReadyOnQueue:exportingQueue usingBlock:^{
    for (int i = 0; i < images.count; ++i) {
        while (![assetWriterInput isReadyForMoreMediaData]) {
            [NSThread sleepForTimeInterval:0.01];
            // can check for attempts not to create an infinite loop
        }

        UIImage *uIImage = images[i];

        CVPixelBufferRef buffer = NULL;
        CVReturn err = PixelBufferCreateFromImage(uIImage.CGImage, &buffer);
        if (err) {
            // handle error
        }

        // frame duration is duration of single image in seconds
        CMTime presentationTime = CMTimeMakeWithSeconds(i * frameDuration, 1000000);

        [writerAdaptor appendPixelBuffer:buffer withPresentationTime:presentationTime];

        CVPixelBufferRelease(buffer);
    }

    [assetWriterInput markAsFinished];
    [assetWriter finishWritingWithCompletionHandler:^{
        if (assetWriter.error) {
            // show error message
        } else {
            // outputURL
        }
    }];
}];
```

CGImageRef CVPixelBufferRef CVPixelBufferRef .

```
CVReturn PixelBufferCreateFromImage(CGImageRef imageRef, CVPixelBufferRef *outBuffer) {
    CIContext *context = [CIContext context];
    CIImage *ciImage = [CIImage imageWithCGImage:imageRef];

    NSDictionary *attributes = [NSDictionary dictionaryWithObjectsAndKeys:
                                [NSNumber numberWithBool:YES], (NSString
*)kCVPixelBufferCGBitmapContextCompatibilityKey,
                                [NSNumber numberWithBool:YES], (NSString
*)kCVPixelBufferCGImageCompatibilityKey
                                ,nil];

    CVReturn err = CVPixelBufferCreate(kCFAllocatorDefault, CGImageGetWidth(imageRef),
CGImageGetHeight(imageRef), kCVPixelFormatType_32ARGB, (__bridge CFDictionaryRef
_Nullable)(attributes), outBuffer);
    if (err) {
        return err;
    }

    if (outBuffer) {
        [context render:ciImage toCVPixelBuffer:*outBuffer];
    }

    return kCVReturnSuccess;
```

```
}
```

: https://riptutorial.com/ko/ios/topic/10607/--

189:

.

- NSLayoutConstraint (item : Any, attribute : NSLayoutAttribute, relatedBy : NSLayoutRelation, toItem : Any ?, NSLayoutAttribute, multiplier : CGFloat, CGFloat) //

Examples

```
override func viewDidLoad() {
    super.viewDidLoad()

    let myView = UIView()
    myView.backgroundColor = UIColor.blueColor()
    myView.translatesAutoresizingMaskIntoConstraints = false
    view.addSubview(myView)

    // Add constraints code here
    // ...
}
```

`NSLayoutConstraint` iOS 9 iOS 8 `NSLayoutConstraint` Style .

```
let margins = view.layoutMarginsGuide
myView.leadingAnchor.constraintEqualToAnchor(margins.leadingAnchor, constant: 20).active =
true
```

- `leadingAnchor` , `trailingAnchor` , `topAnchor` `bottomAnchor` .

NSLayoutConstraint

```
NSLayoutConstraint(item: myView, attribute: NSLayoutAttribute.Leading, relatedBy:
NSLayoutRelation.Equal, toItem: view, attribute: NSLayoutAttribute.LeadingMargin, multiplier:
1.0, constant: 20.0).active = true
```

- `.Leading` `.Trailing` , `.Top` `.Bottom` .
- `.LeadingMargin` `.TrailingMargin` , `.TopMargin` `.BottomMargin` .

```
NSLayoutConstraint.constraintsWithVisualFormat("H:|-20-[myViewKey]", options: [], metrics:
nil, views: ["myViewKey": myView])
```

```
myView.widthAnchor.constraintEqualToAnchor(nil, constant: 200).active = true
myView.heightAnchor.constraintEqualToAnchor(nil, constant: 100).active = true
```

NSLayoutConstraint

```
NSLayoutConstraint(item: myView, attribute: NSLayoutAttribute.Width, relatedBy:
NSLayoutRelation.Equal, toItem: nil, attribute: NSLayoutAttribute.NotAnAttribute, multiplier:
1, constant: 200).active = true
NSLayoutConstraint(item: myView, attribute: NSLayoutAttribute.Height, relatedBy:
NSLayoutRelation.Equal, toItem: nil, attribute: NSLayoutAttribute.NotAnAttribute, multiplier:
1, constant: 100).active = true
```

```
NSLayoutConstraint.constraintsWithVisualFormat("H:[myViewKey(200)]", options: [], metrics:
nil, views: ["myViewKey": myView])
NSLayoutConstraint.constraintsWithVisualFormat("V:[myViewKey(100)]", options: [], metrics:
nil, views: ["myViewKey": myView])
```

```
myView.centerXAnchor.constraintEqualToAnchor(view.centerXAnchor).active = true
myView.centerYAnchor.constraintEqualToAnchor(view.centerYAnchor).active = true
```

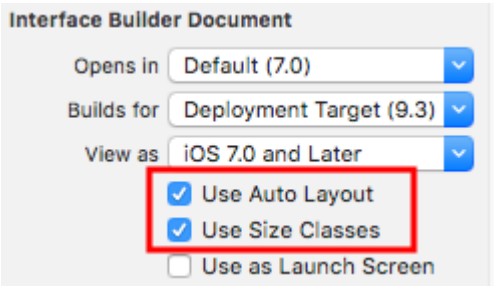
NSLayoutConstraint

```
NSLayoutConstraint(item: myView, attribute: NSLayoutAttribute.CenterX, relatedBy:
NSLayoutRelation.Equal, toItem: view, attribute: NSLayoutAttribute.CenterX, multiplier: 1,
constant: 0).active = true
NSLayoutConstraint(item: myView, attribute: NSLayoutAttribute.CenterY, relatedBy:
NSLayoutRelation.Equal, toItem: view, attribute: NSLayoutAttribute.CenterY, multiplier: 1,
constant: 0).active = true
```

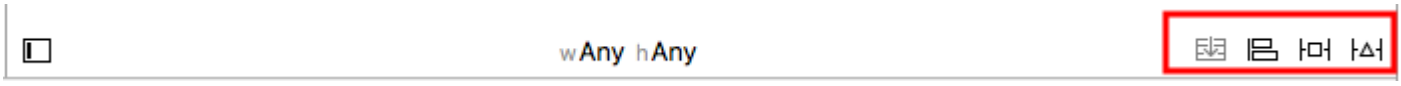
```
NSLayoutConstraint.constraintsWithVisualFormat("V:[viewKey]-(<=0)-[myViewKey]", options:
NSLayoutFormatOptions.AlignAllCenterX, metrics: nil, views: ["myViewKey": myView, "viewKey":
view])
NSLayoutConstraint.constraintsWithVisualFormat("H:[viewKey]-(<=0)-[myViewKey]", options:
NSLayoutFormatOptions.AlignAllCenterY, metrics: nil, views: ["myViewKey": myView, "viewKey":
view])
```

. . , .

. Project Navigator *Main.storyboard* . .

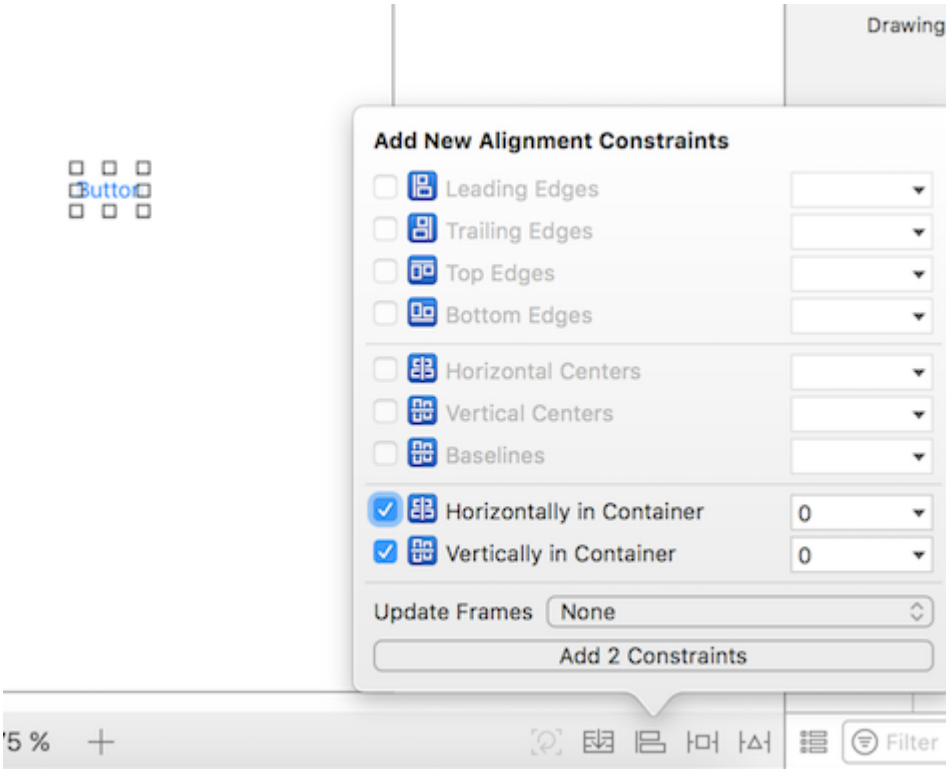


Interface Builder . . .

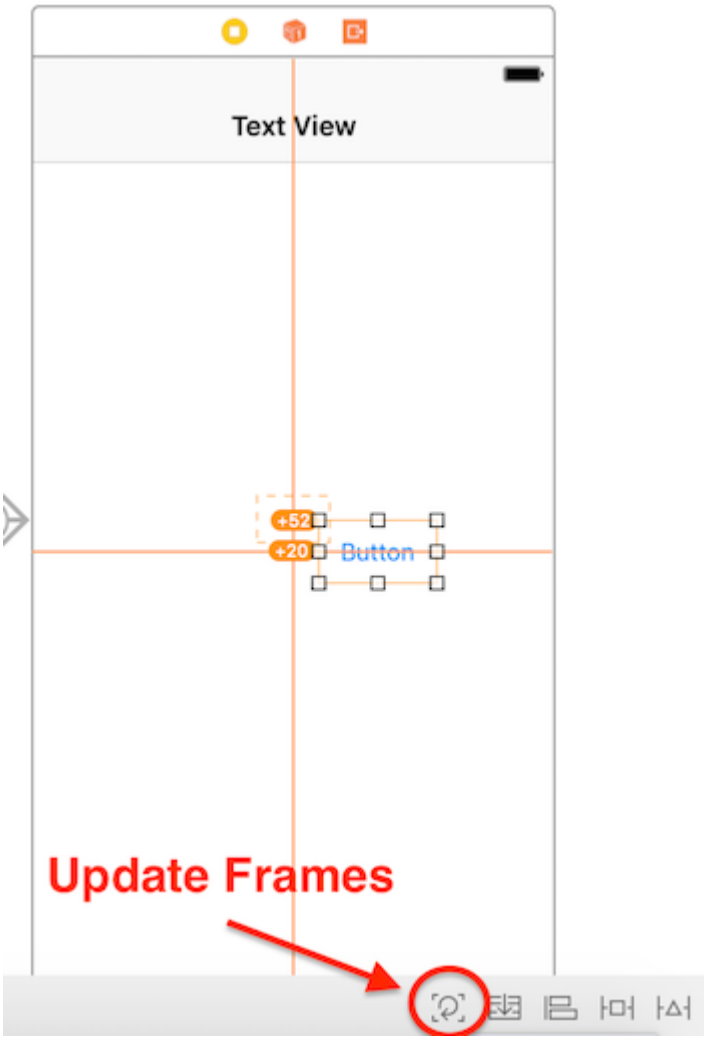


.

( ) . . `Horizontally in Container` `Vertically in Container` . "Add 2 Constraints" .



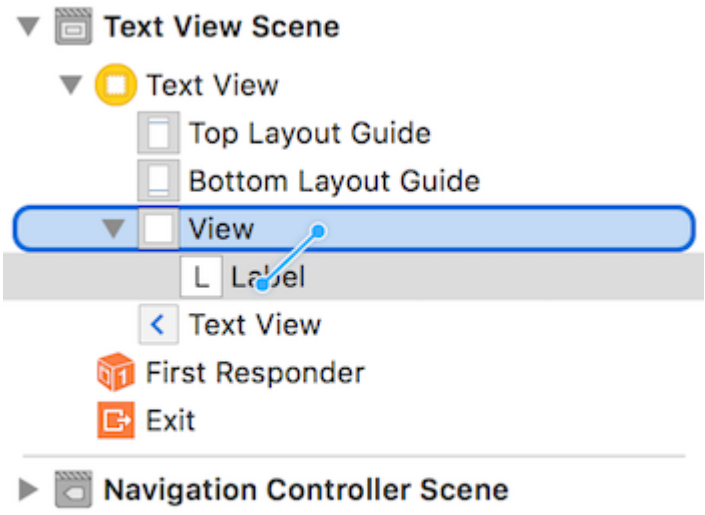
, . "Embed In Stack" "Update Frames" .



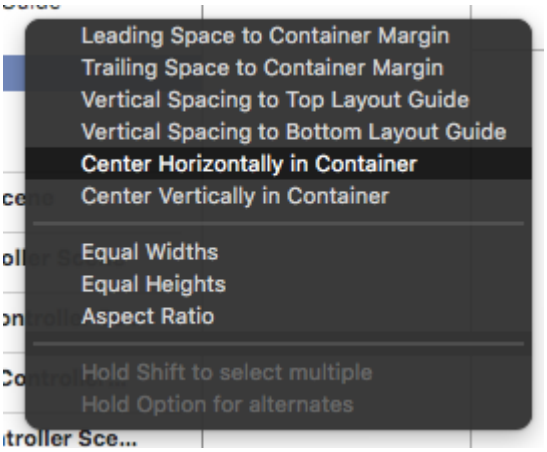
□ + □ + = (Command + Option) " " . .

.

Interface Builder Ctrl . `UILabel` `UILabel` . `Document Outline` . `ctrl` (control) □ .



:



" " " ". ! .

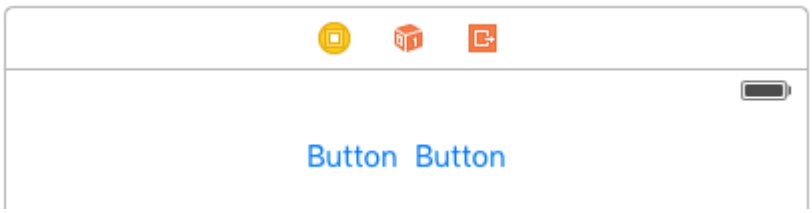
. UI .

-C

```
- (void)viewDidLoad
{
    [super viewDidLoad];
    UIButton *yourButton = [[UIButton alloc] initWithFrame:CGRectMake(0, 0, 100, 18)];
    [yourButton setTitle:@"Button" forState:UIControlStateNormal];


    [self.view addConstraint:[NSLayoutConstraint constraintWithItem:yourButton
attribute:NSLayoutAttributeCenterY relatedBy:NSLayoutRelationEqual toItem:self.view
attribute:NSLayoutAttributeCenterY multiplier:1 constant:0]]; //Align veritcally center to
superView

    [self.view addConstraint:[NSLayoutConstraint constraintWithItem:yourButton
attribute:NSLayoutAttributeCenterX relatedBy:NSLayoutRelationEqual toItem:self.view
attribute:NSLayoutAttributeCenterX multiplier:1 constant:0]]; //Align horizontally center to
superView

    [self.view addSubview:yourButton]; //Add button to superView
}
```

```
override func viewDidLoad()
{
    super.viewDidLoad()
    let yourButton: UIButton = UIButton(frame: CGRect(x: 0, y: 0, width: 100, height: 18))
    yourButton.setTitle("Button", forState: .Normal)

    let centerVertically = NSLayoutConstraint(item: yourButton,
                                    attribute: .CenterX,
                                    relatedBy: .Equal,
                                       toItem: view,
                                    attribute: .CenterX,
                                   multiplier: 1.0,
                                     constant: 0.0)
    let centerHorizontally = NSLayoutConstraint(item: yourButton,
                                    attribute: .CenterY,
                                    relatedBy: .Equal,
                                       toItem: view,
                                    attribute: .CenterY,
```

```
                                    multiplier: 1.0,
                                      constant: 0.0)
    NSLayoutConstraint.activateConstraints([centerVertically, centerHorizontally])
}
```



Superview . UIView UIView . . UILayoutGuide :

. , . , . ,

UIView UILayoutGuide UILayoutGuide . UILayoutGuide . UILayoutGuide . . .

```
view.addSubview(button1)
view.addSubview(button2)

let leftSpace = UILayoutGuide()
view.addLayoutGuide(leftSpace)

let rightSpace = UILayoutGuide()
view.addLayoutGuide(rightSpace)

let views = [
    "leftSpace" : leftSpace,
    "button1" : button1,
    "button2" : button2,
    "rightSpace" : rightSpace
]

// Lay the buttons and layout guides out horizontally in a line.
// Put the layout guides on each end.
NSLayoutConstraint.activateConstraints(NSLayoutConstraint.constraintsWithVisualFormat("H:|[leftSpace][b
[button2][rightSpace]|", options: [], metrics: nil, views: views))

// Now set the layout guides widths equal, so that the space on the
// left and the right of the buttons will be equal
leftSpace.widthAnchor.constraintEqualToAnchor(rightSpace.widthAnchor).active = true
```

```
let leadingSpace = UILayoutGuide()
let trailingSpace = UILayoutGuide()
view.addLayoutGuide(leadingSpace)
view.addLayoutGuide(trailingSpace)

leadingSpace.widthAnchor.constraintEqualToAnchor(trailingSpace.widthAnchor).active = true

leadingSpace.leadingAnchor.constraintEqualToAnchor(view.leadingAnchor).active = true
leadingSpace.trailingAnchor.constraintEqualToAnchor(button1.leadingAnchor).active = true

trailingSpace.leadingAnchor.constraintEqualToAnchor(button2.trailingAnchor).active = true
trailingSpace.trailingAnchor.constraintEqualToAnchor(view.trailingAnchor).active = true
```

, "" ! "" CPU . .

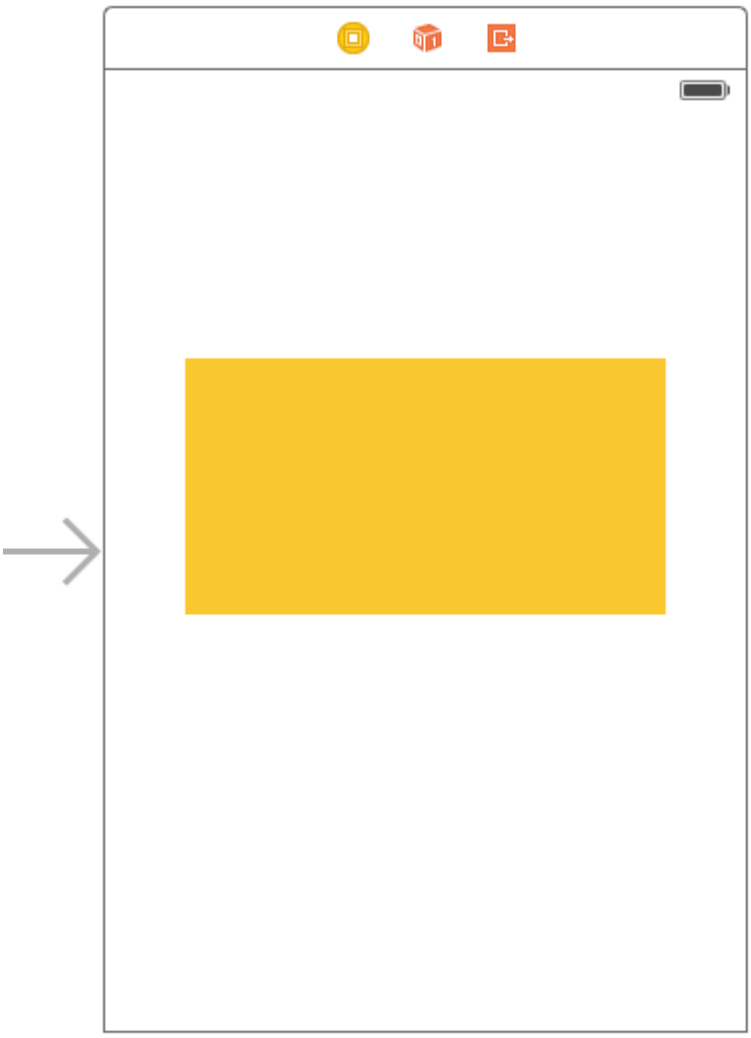
iOS 8 . iOS 9 .

: Interface Builder (Xcode 7.2.1). . .

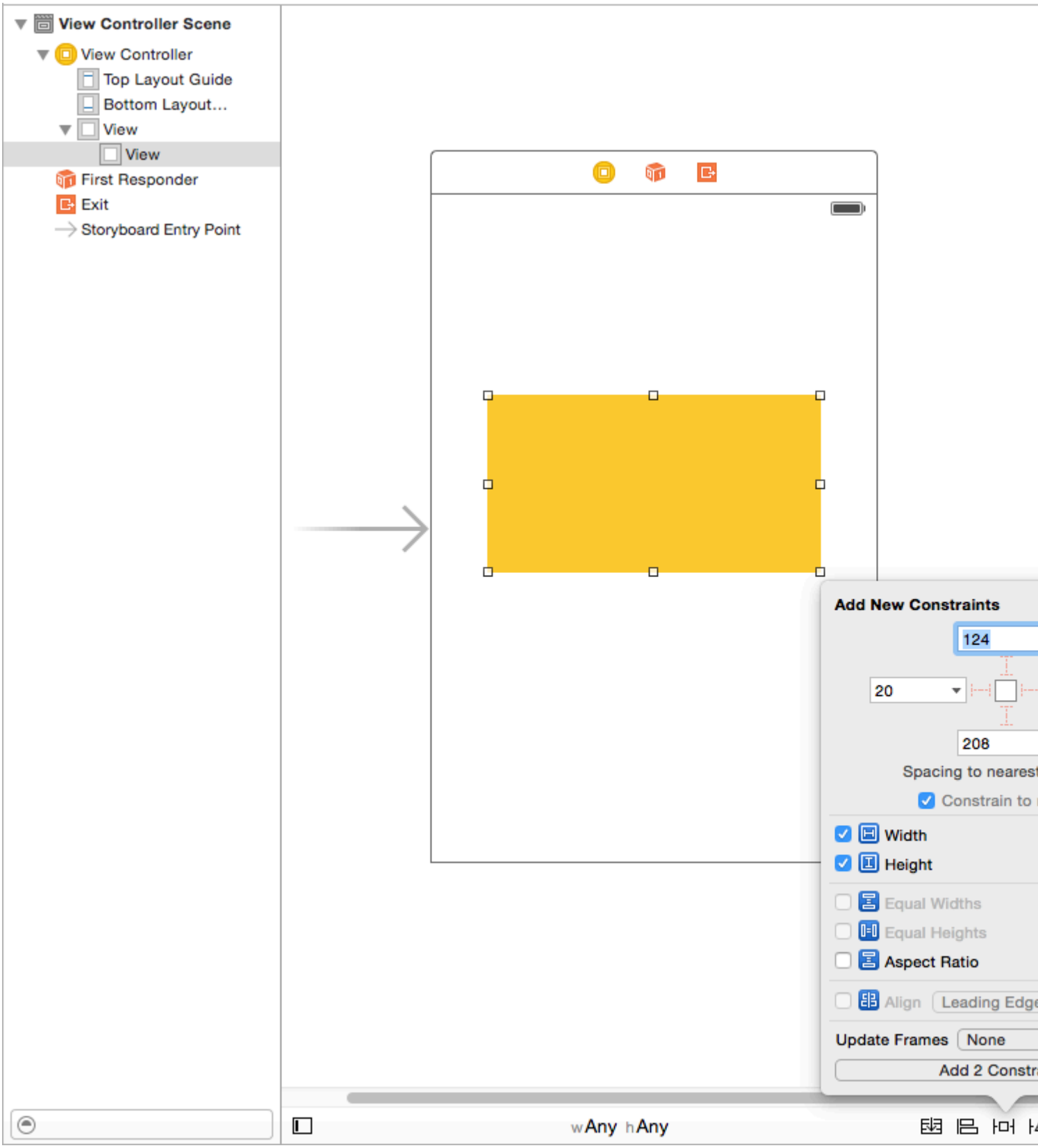
UILabel

. . Image + .

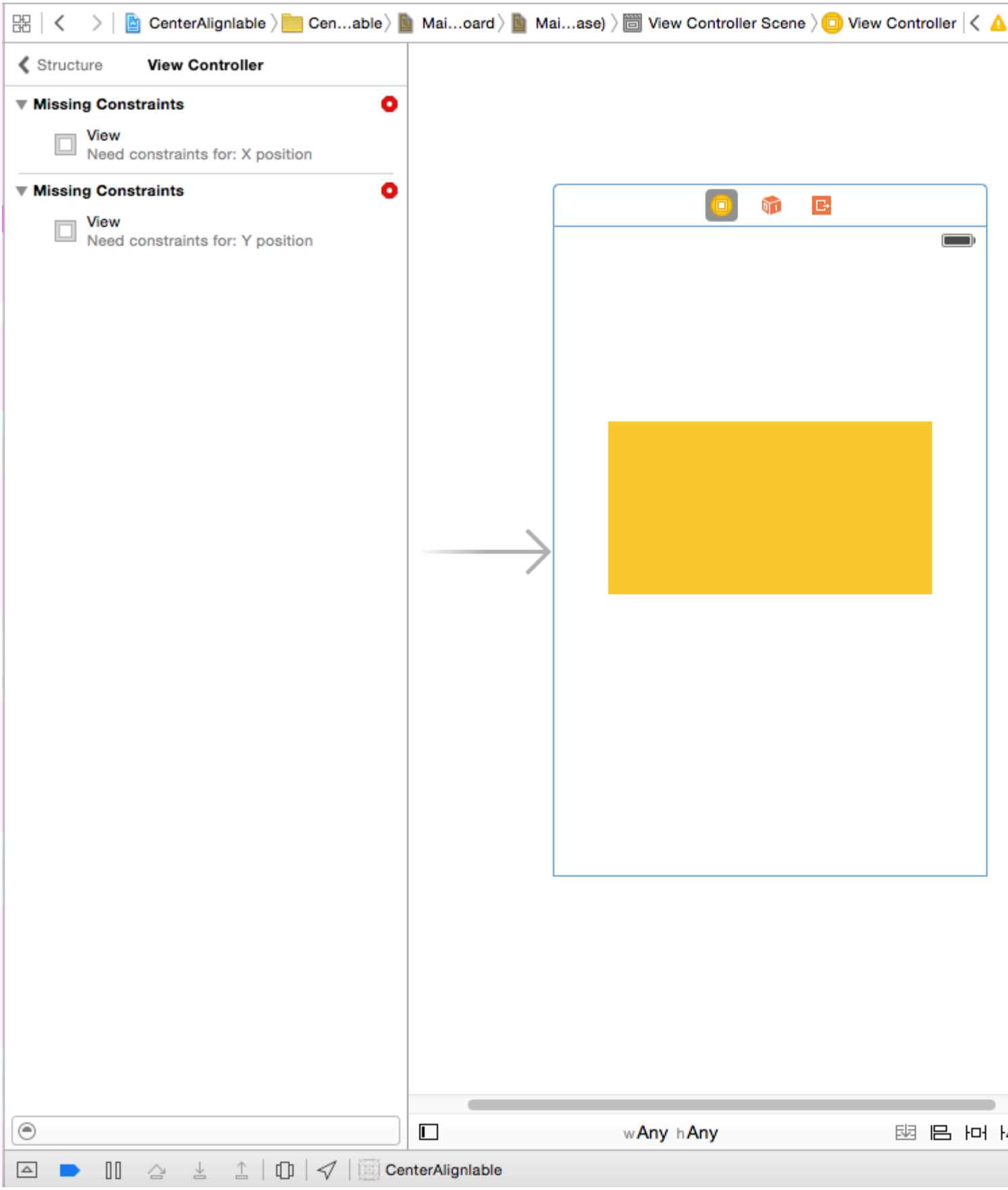
1 : . . 3.5 viewcontroller . .



2 : . (.). . .


View Controller Scene
View Controller
Top Layout Guide
Bottom Layout...
View
View
First Responder
Exit
Storyboard Entry Point
Add New Constraints
124
20
208
Spacing to nearest
Constrain to
Width
Height
Equal Widths
Equal Heights
Aspect Ratio
Align
Leading Edge
Update Frames
None
Add 2 Constr
wAny hAny

Xcode .

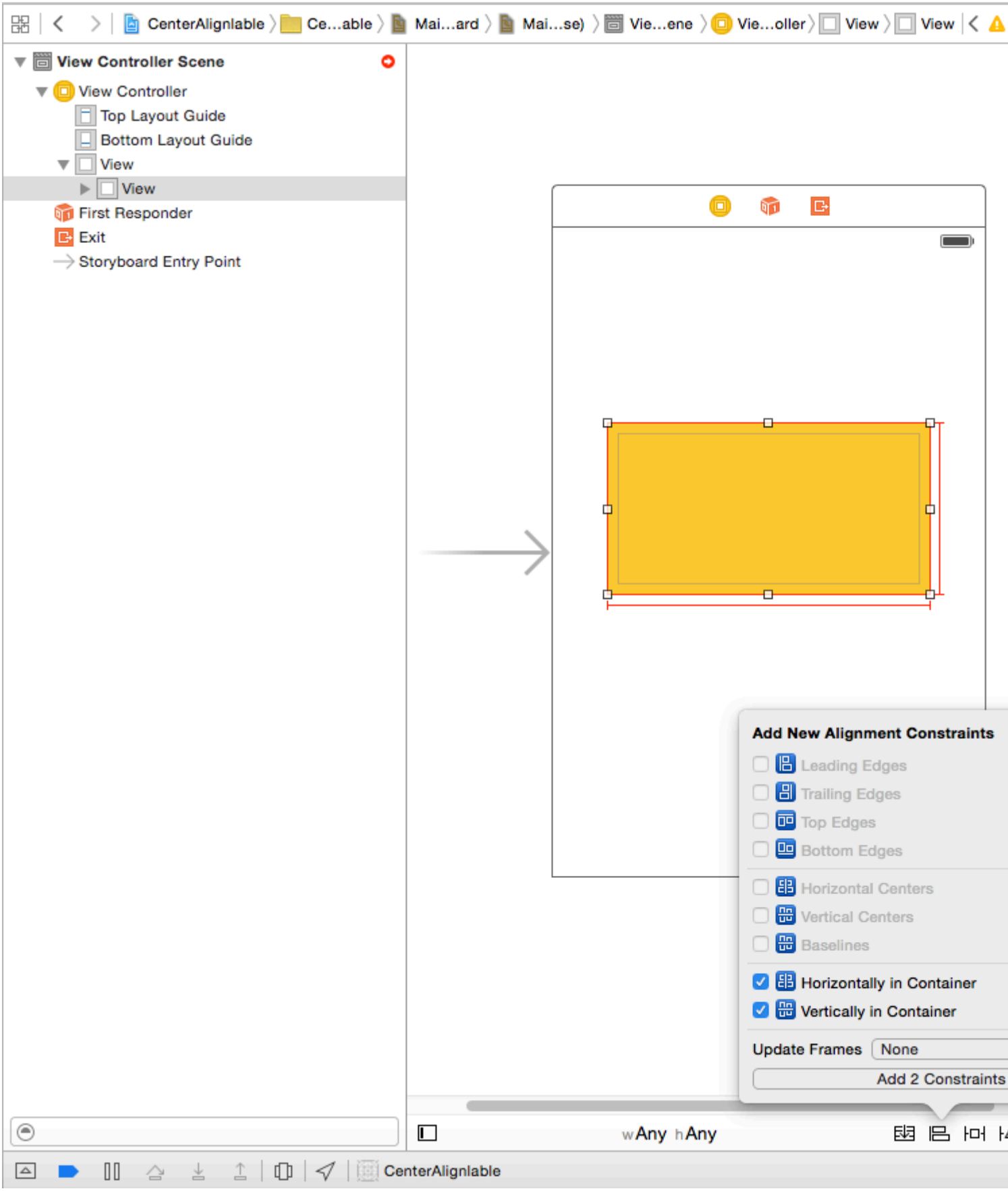


( ) .

: . X : "" "FRAME" . Autolayout X .

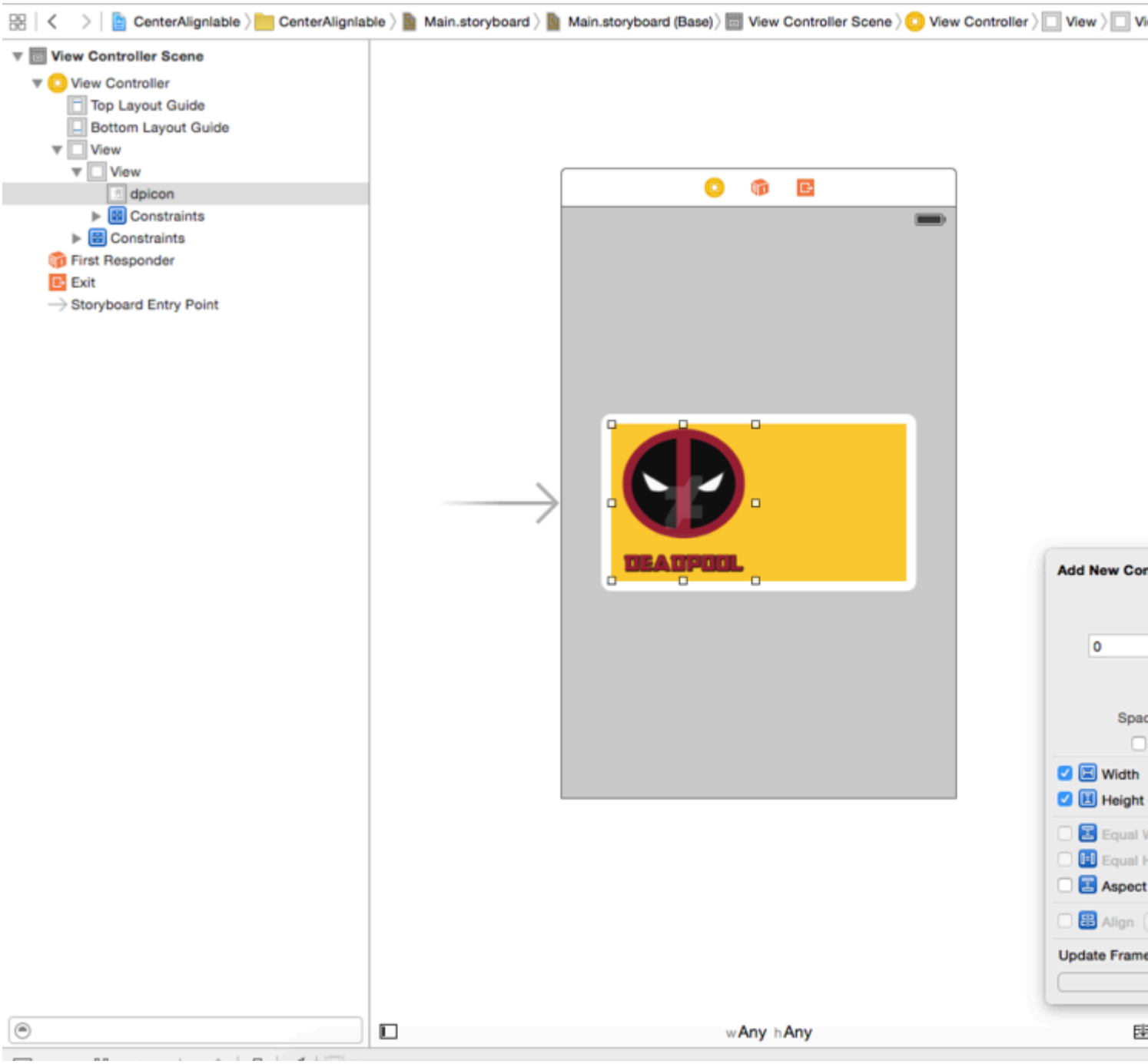
: Y . - "" "FRAME" . Autolayout Y . X Y resol autolayout . autolayout way .

.



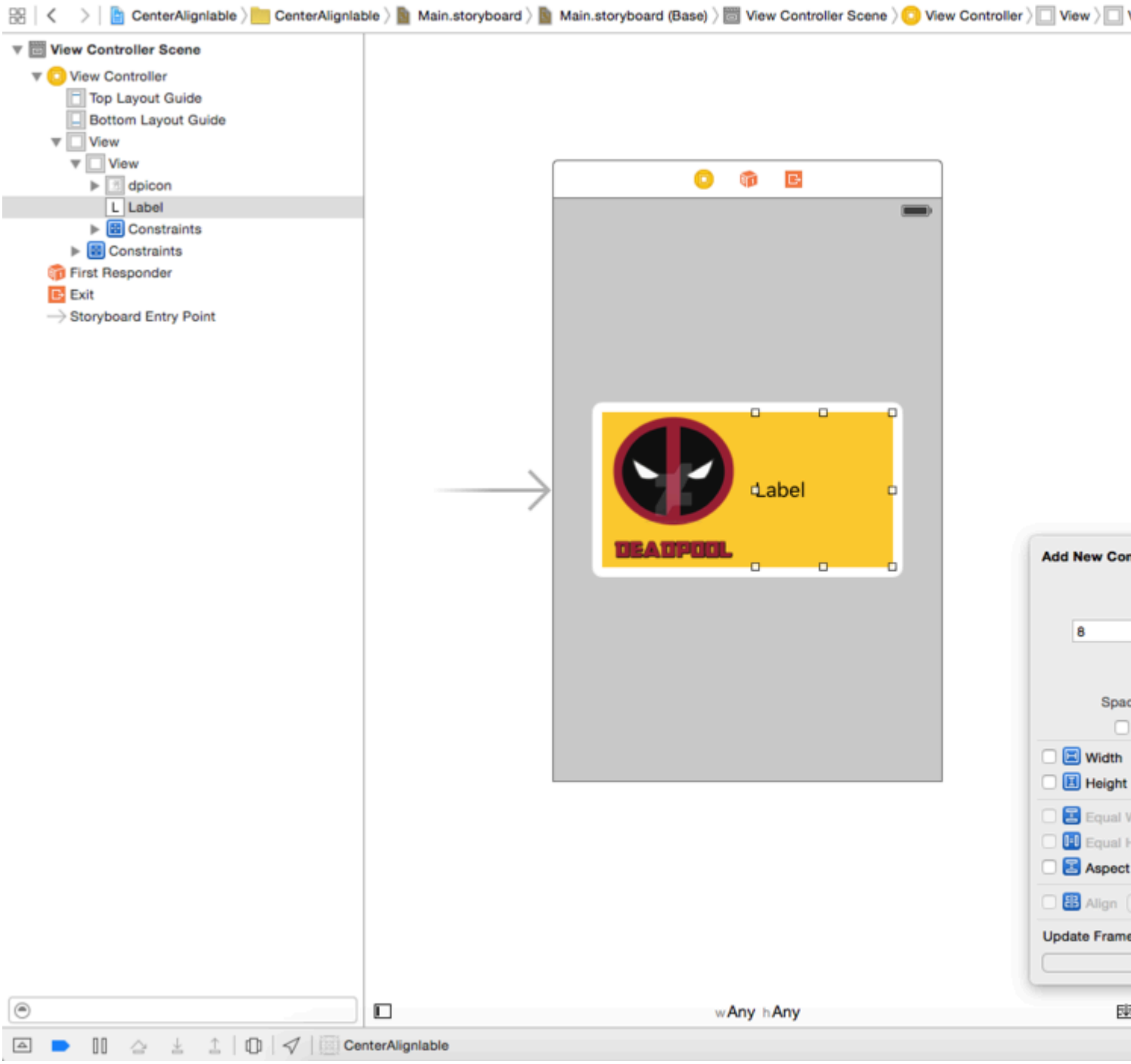
"Vertical Center" "Horizontal Center" . autolayout . : X Y .).

3 : . . .


CenterAlignlable
CenterAlignlable
Main.storyboard
Main.storyboard (Base)
View Controller Scene
View Controller
View
View Controller Scene
View Controller
Top Layout Guide
Bottom Layout Guide
View
View
dpicon
Constraints
Constraints
First Responder
Exit
Storyboard Entry Point
DEADPOOL
Add New Con
0
Width
Height
Aspect
Update Frame
wAny hAny

. .

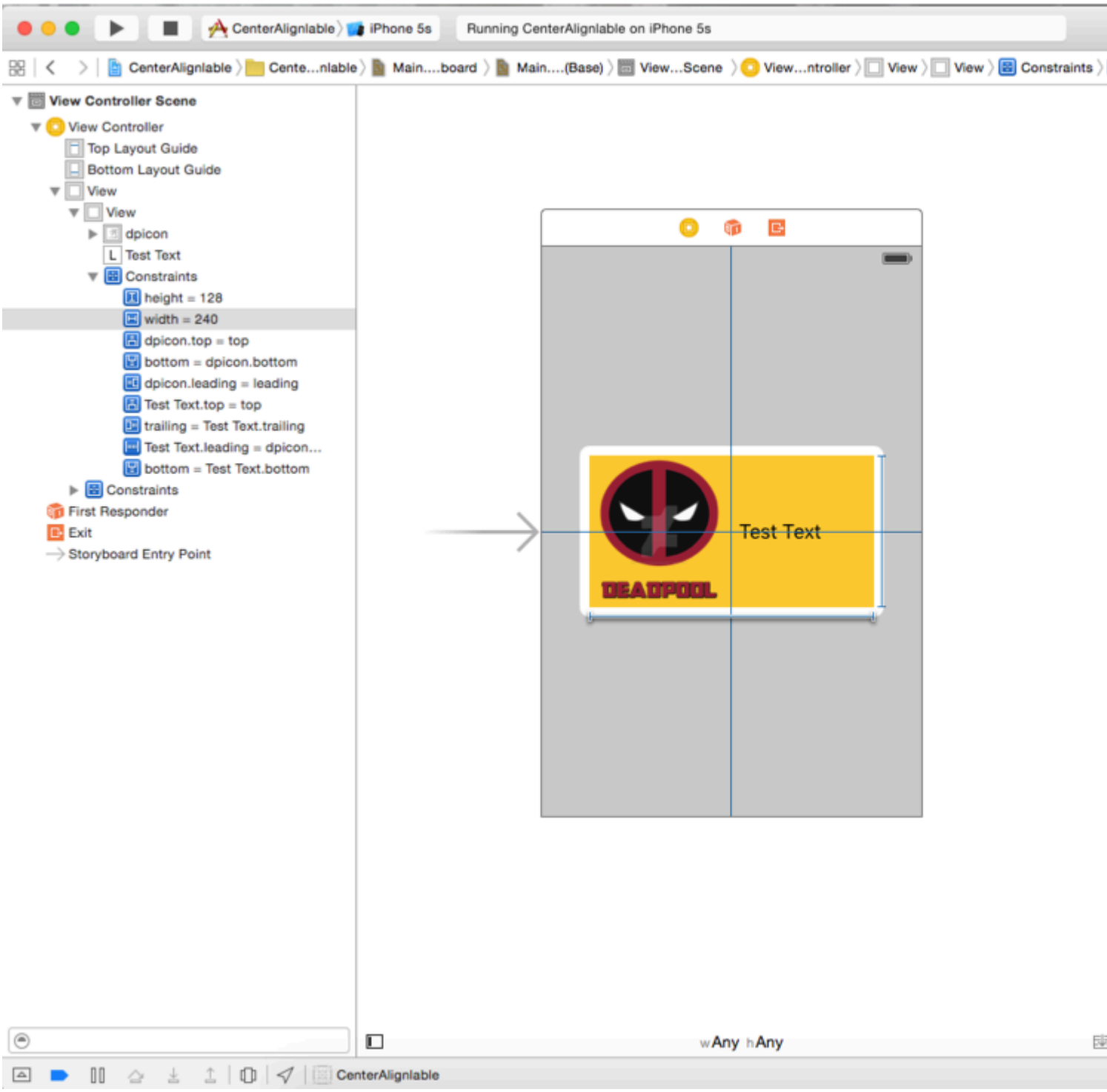
4 : UILabel .



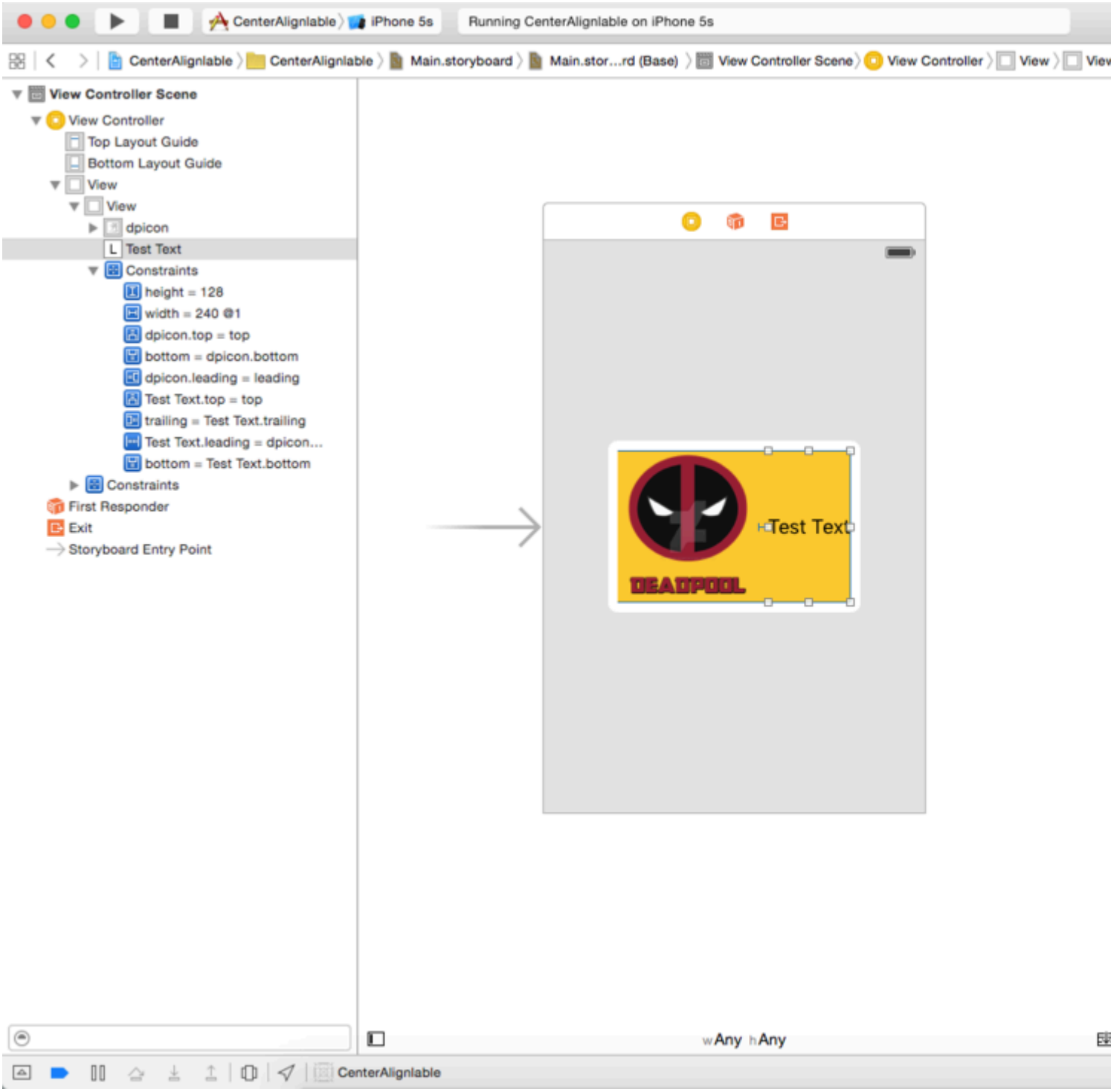
UILabel . 8 , 0,0,0. . .

Q : ? Ans : - . . autolayout .

5 : . Width Constraint . UILabel . 1 . .

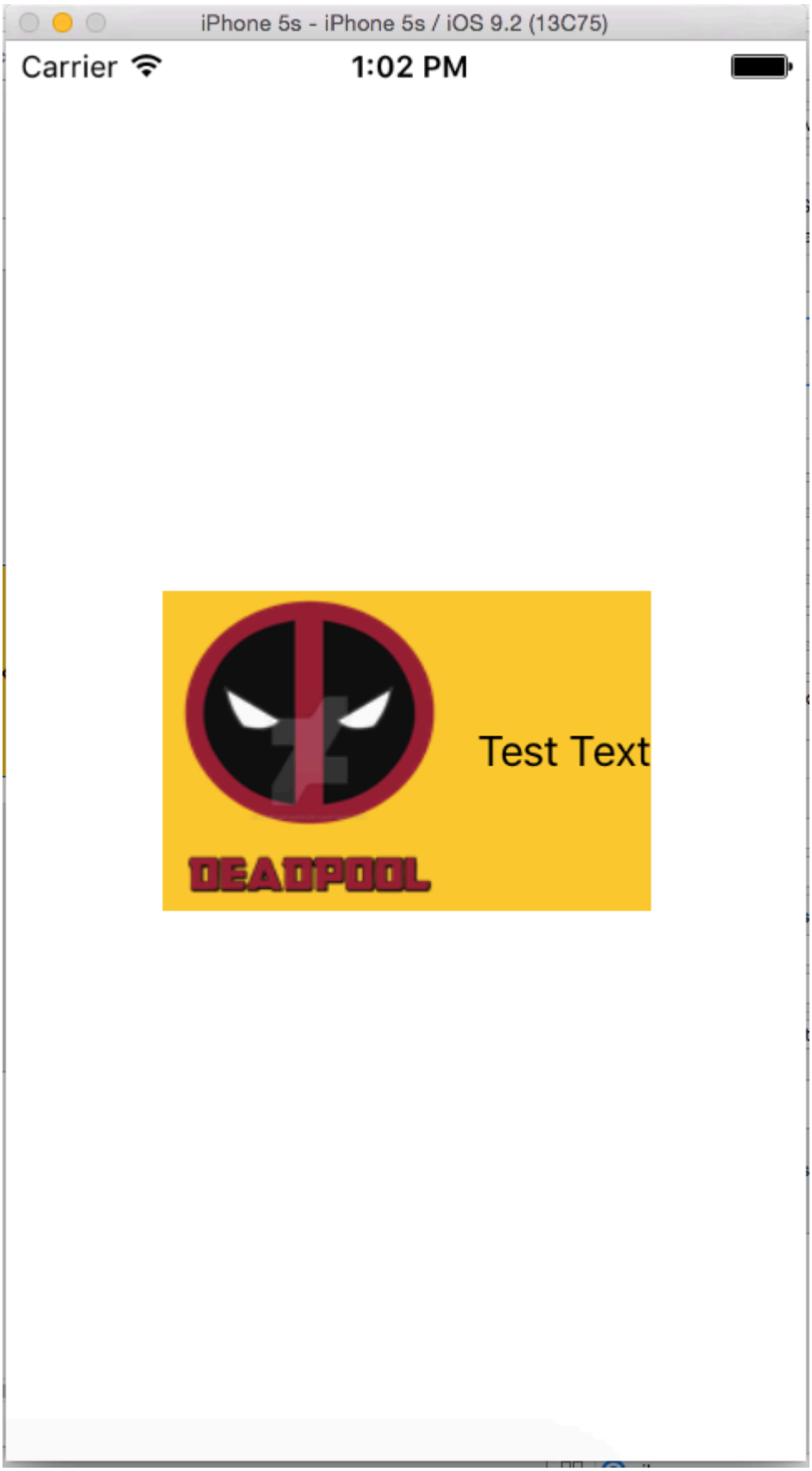


6 : UILabel . . UILabel . UILabel . .


CenterAlignlable
iPhone 5s
Running CenterAlignlable on iPhone 5s
CenterAlignlable
CenterAlignlable
Main.storyboard
Main.stor...rd (Base)
View Controller Scene
View Controller
View
View Controller Scene
View Controller
Top Layout Guide
Bottom Layout Guide
View
View
dpicon
Test Text
Constraints
height = 128
width = 240 @1
dpicon.top = top
bottom = dpicon.bottom
dpicon.leading = leading
Test Text.top = top
trailing = Test Text.trailing
Test Text.leading = dpicon...
bottom = Test Text.bottom
Constraints
First Responder
Exit
Storyboard Entry Point
Test Text
DEADPOOL
wAny hAny
CenterAlignlable

, 500, 751 .

.



. . .

.

1. (`CADisplayLink` , `dispatch_source_t` , `dispatch_after` , `NSTimer`) . `layoutIfNeeded` . :

-C :

```
self.someConstraint.constant = 10.0;
[UIView animateWithDuration:0.25 animations:^{
    [self.view layoutIfNeeded];
}];
```

:

```
self.someConstraint.constant = 10.0
UIView.animate(withDuration: 0.25, animations: self.view.layoutIfNeeded)
```

2. `[view layoutIfNeeded]` . .

```
[UIView animateWithDuration:0.5 animations:^{
    [view layoutIfNeeded];
}]
```

3. . CPU .

4. . , `view.translatesAutoresizingMaskIntoConstraints = YES` .

5. .

6. . . (:). .

7. . .

```
CABasicAnimation* ba = [CABasicAnimation animationWithKeyPath:@"transform"];
ba.autoreverses = YES;
ba.duration = 0.3;
ba.toValue = [NSValue valueWithCATransform3D:CATransform3DMakeScale(1.1, 1.1, 1)];
[v.layer addAnimation:ba forKey:nil];
```

8. **layoutSubviews** . `[super layoutSubviews]` .

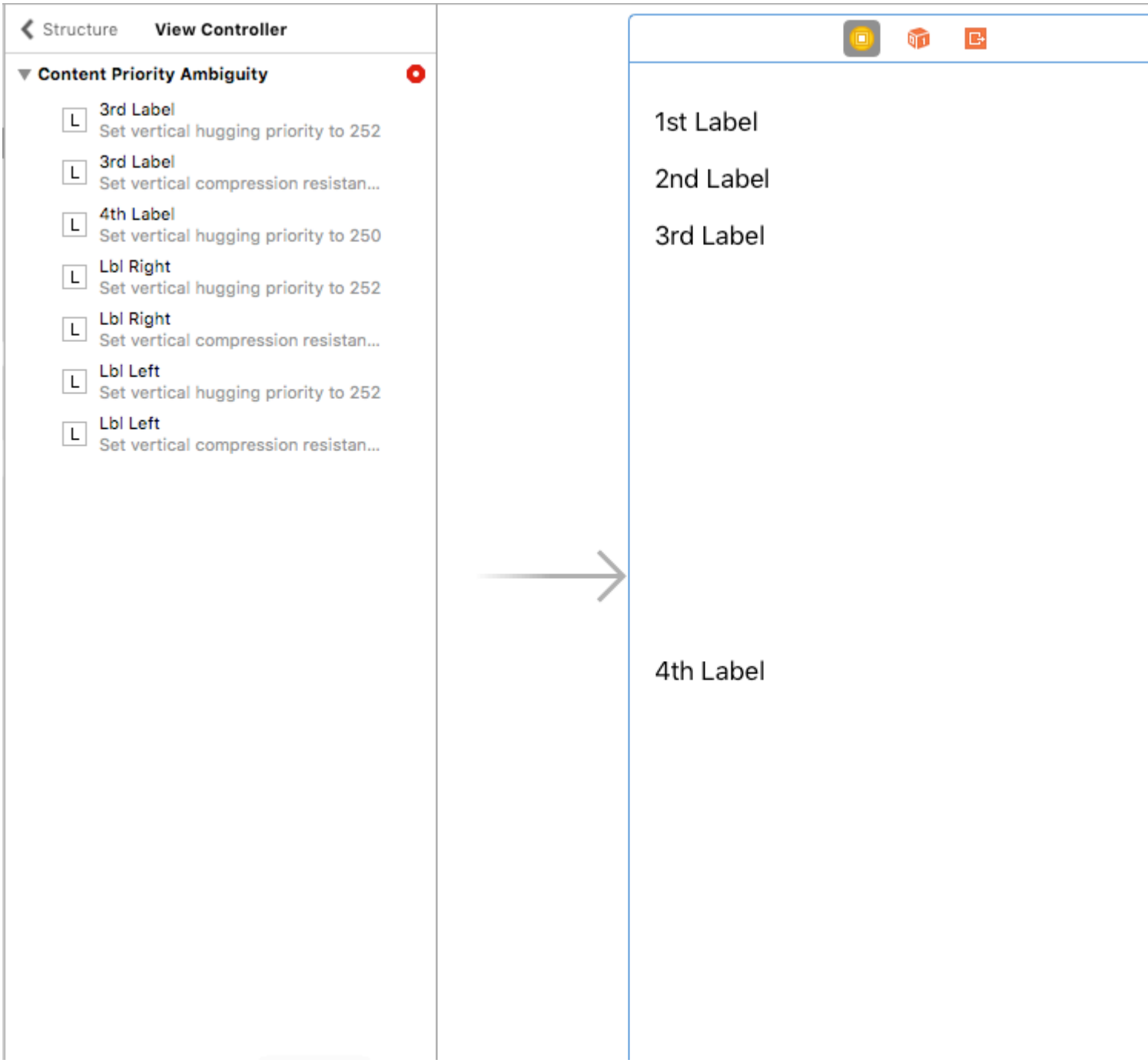
9. **viewDidLayoutSubviews** . `layoutSubviews` `viewDidLayoutSubviews` .

10. . `layoutSubviews` / `layout` .

: (,), `layoutIfNeeded()` `layoutIfNeeded()` ,). .

UILabel

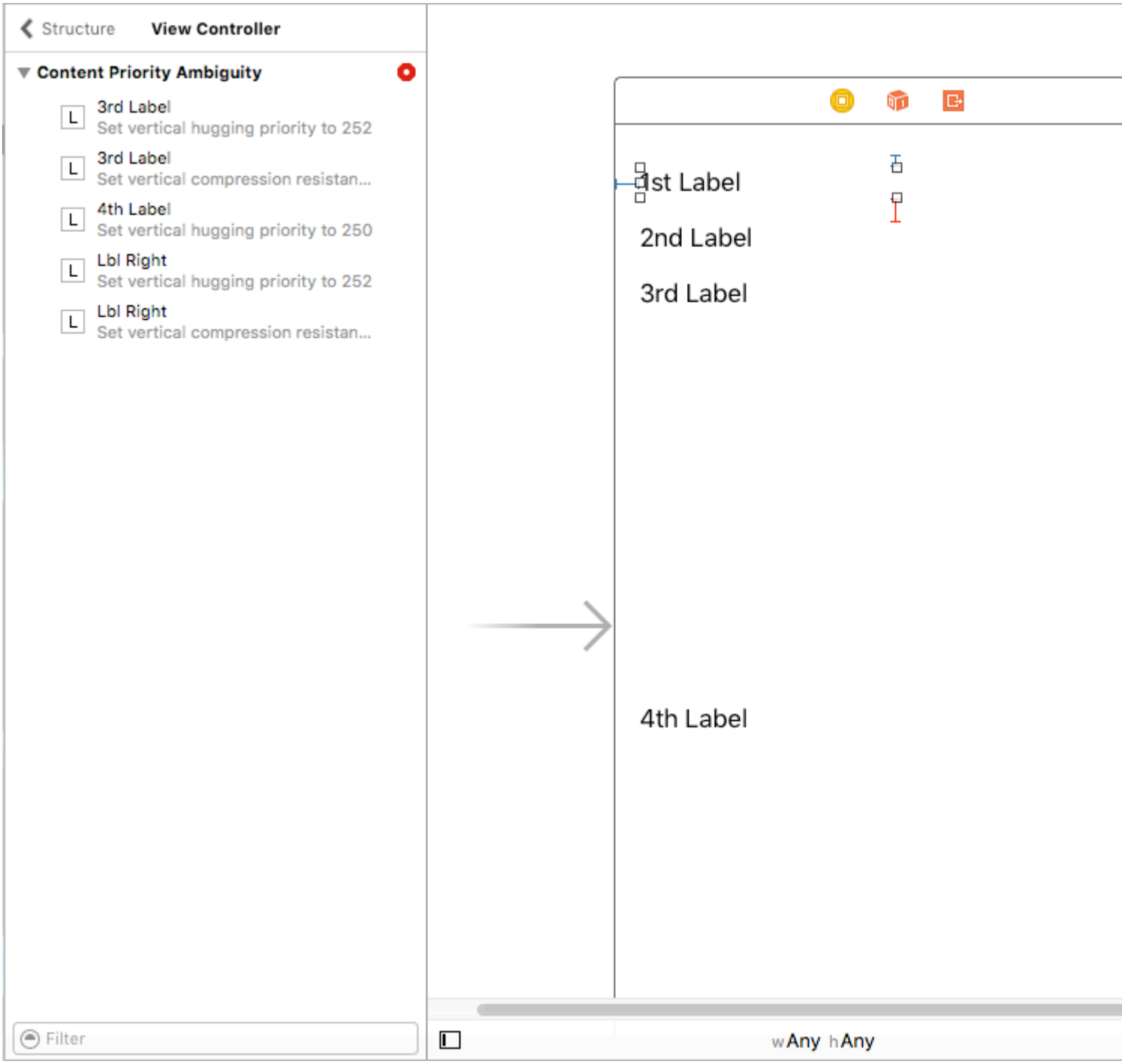
: .

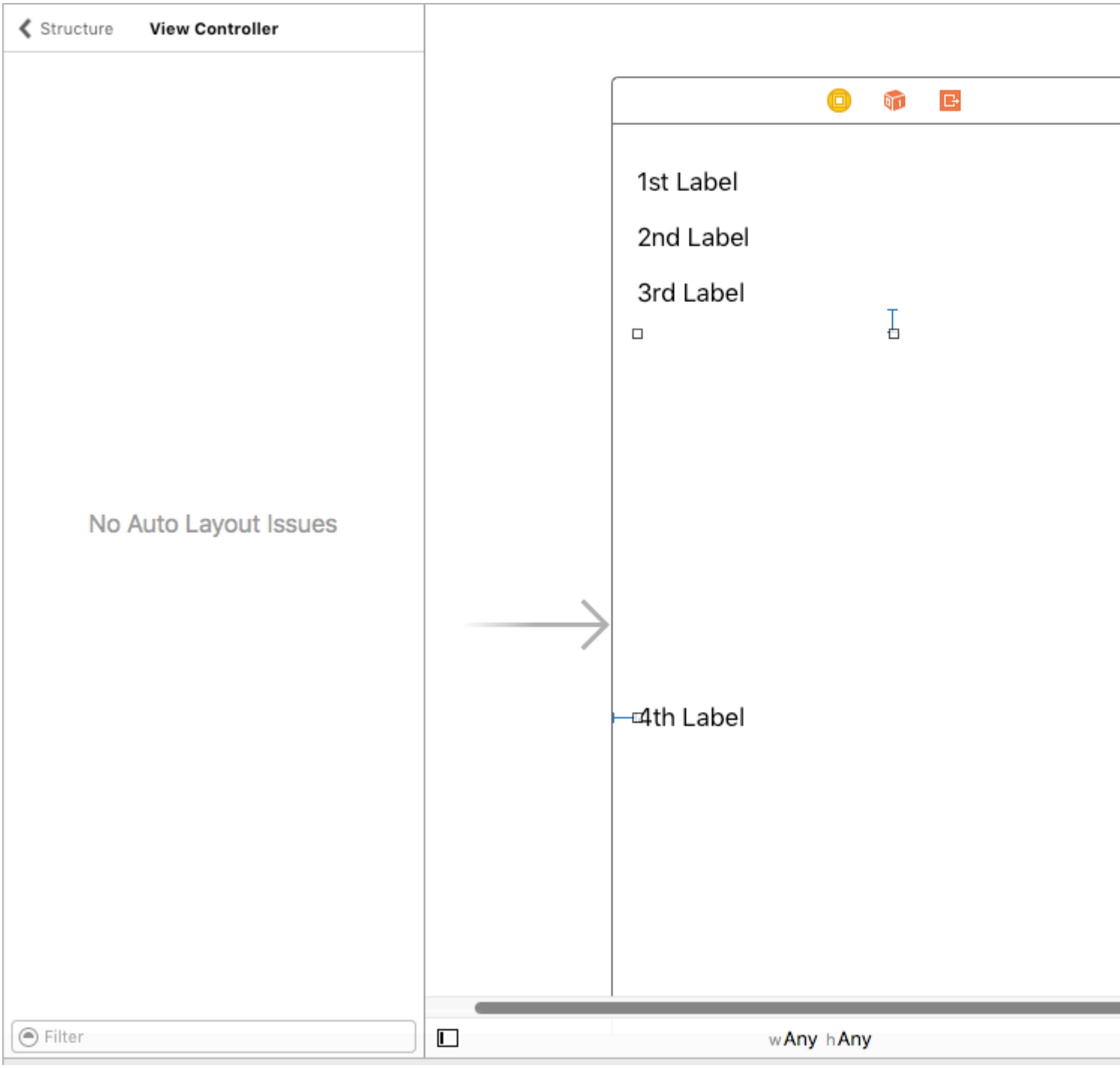

Structure
View Controller
Content Priority Ambiguity
3rd Label
Set vertical hugging priority to 252
3rd Label
Set vertical compression resistan...
4th Label
Set vertical hugging priority to 250
Lbl Right
Set vertical hugging priority to 252
Lbl Right
Set vertical compression resistan...
Lbl Left
Set vertical hugging priority to 252
Lbl Left
Set vertical compression resistan...
1st Label
2nd Label
3rd Label
4th Label

?

: . . . .

, .


Structure
View Controller
Content Priority Ambiguity
3rd Label
Set vertical hugging priority to 252
3rd Label
Set vertical compression resistan...
4th Label
Set vertical hugging priority to 250
Lbl Right
Set vertical hugging priority to 252
Lbl Right
Set vertical compression resistan...
Filter
1st Label
2nd Label
3rd Label
4th Label
wAny hAny



ViewController . UITableViewCell + .

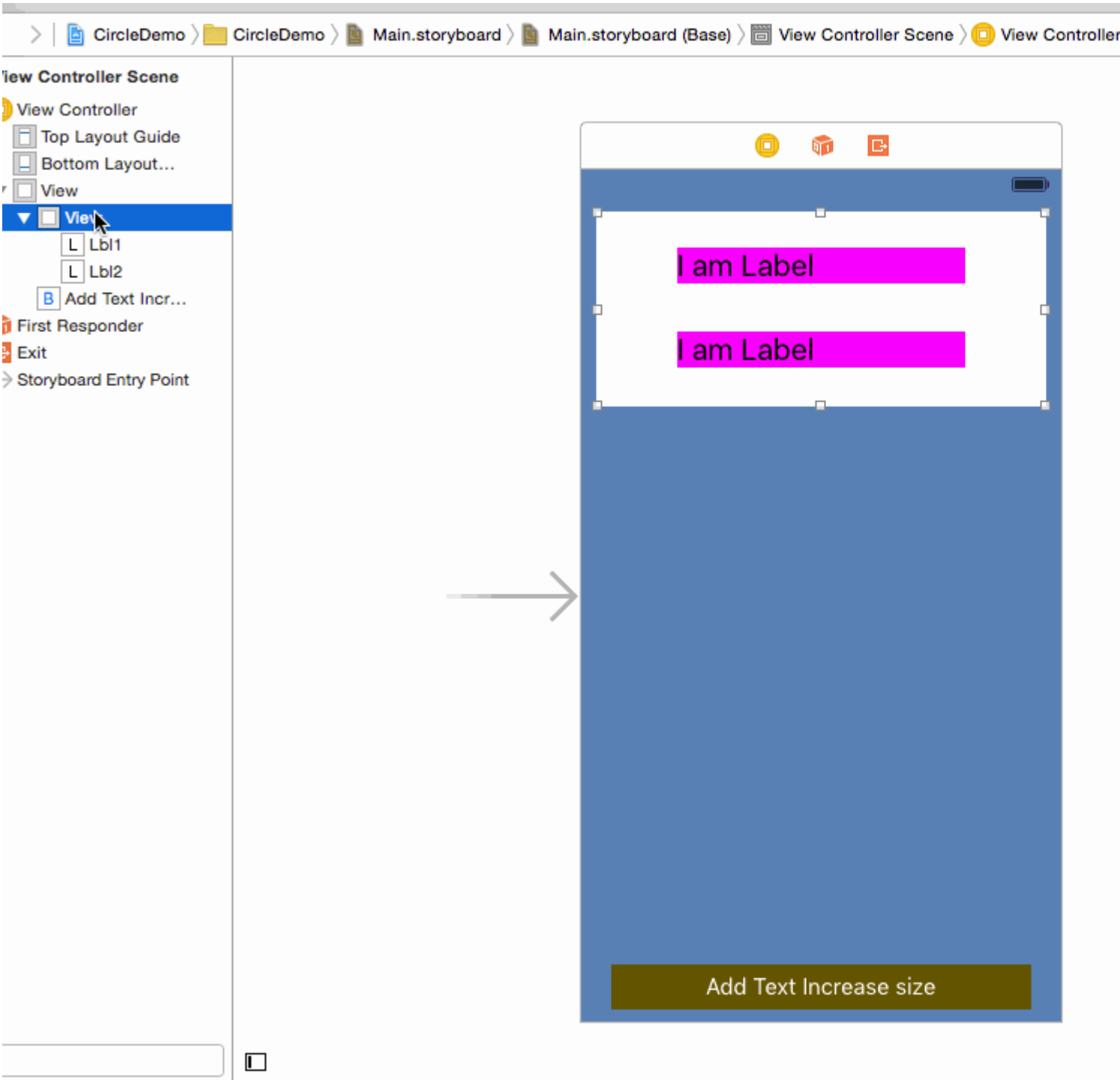
.

UILabel UILabel

: -

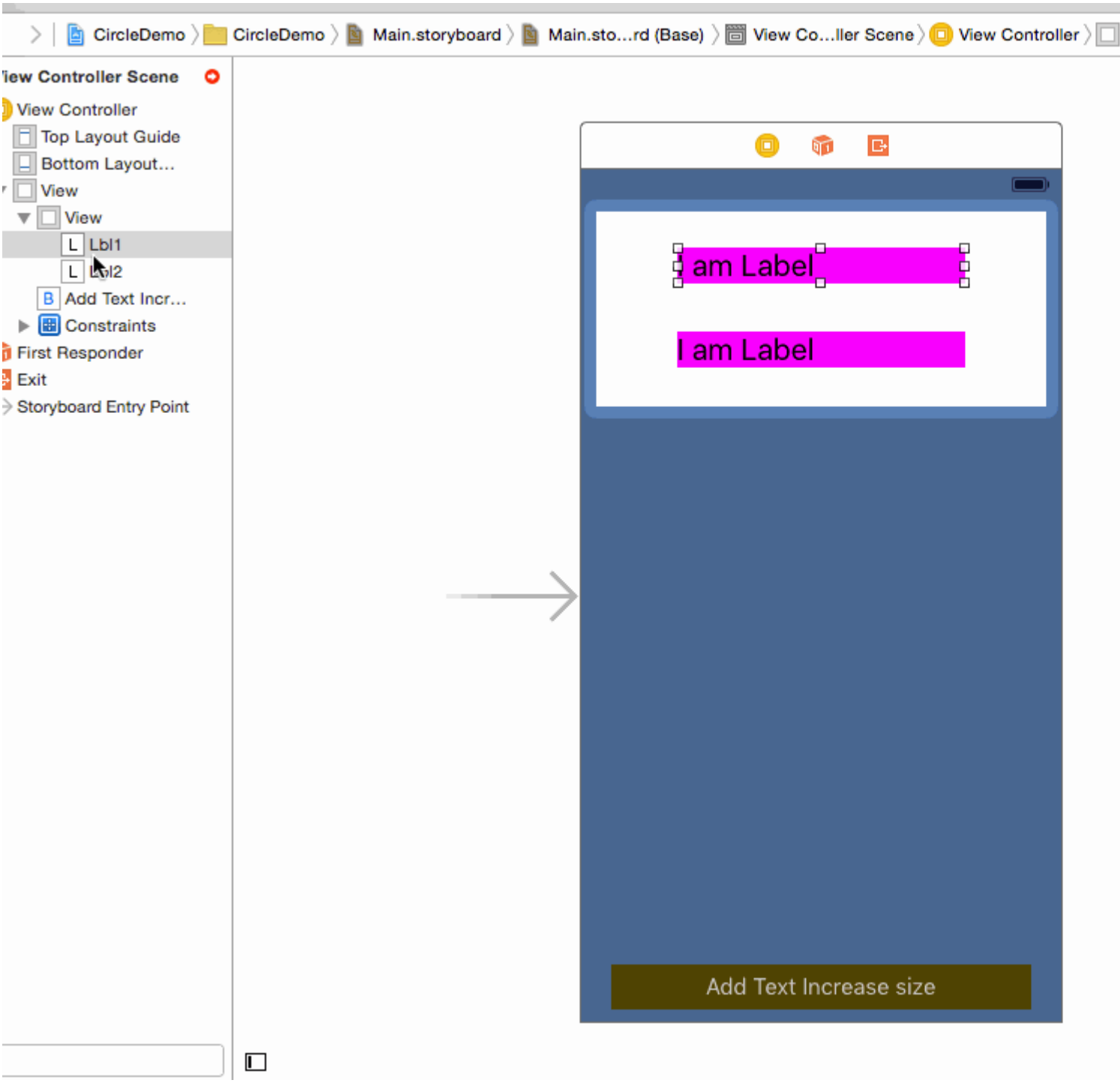
1 : - UIView

1. . 2) . 3) . ( )



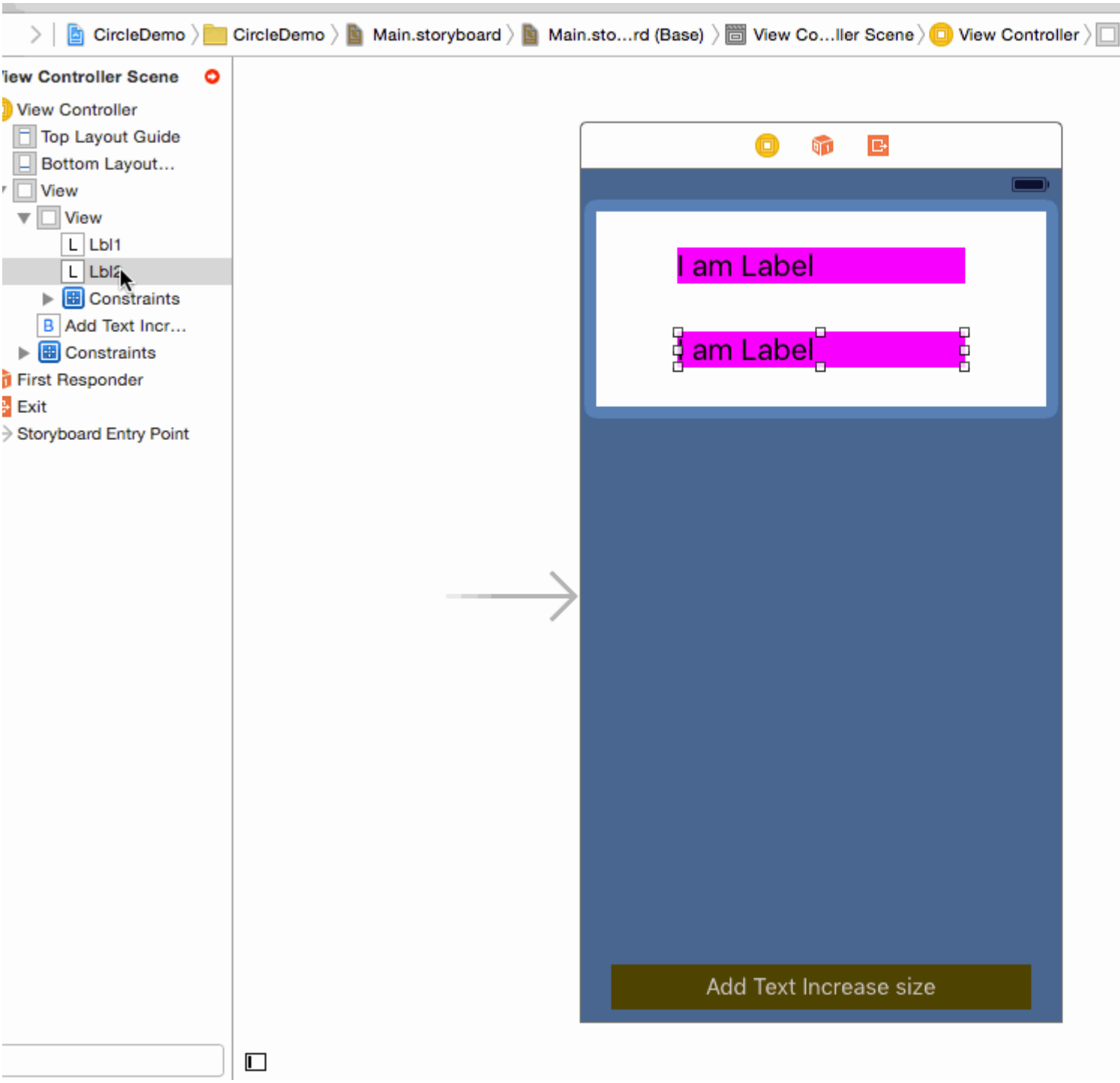
2 : - 1 .

1. Leading 2) Top 3) Trailing ( )

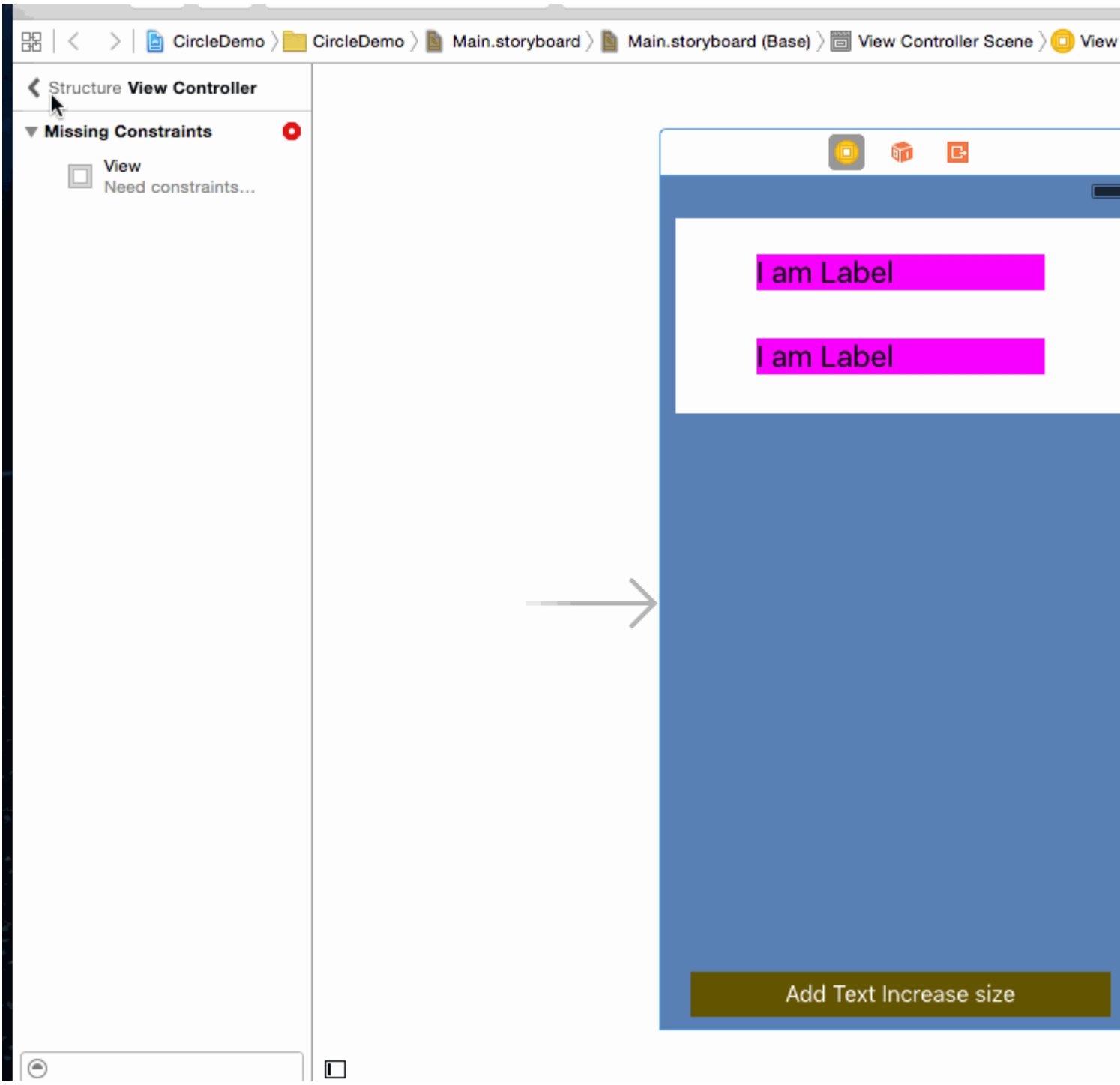


3 : - 2

1. Leading 2) Top 3) Trailing ( )

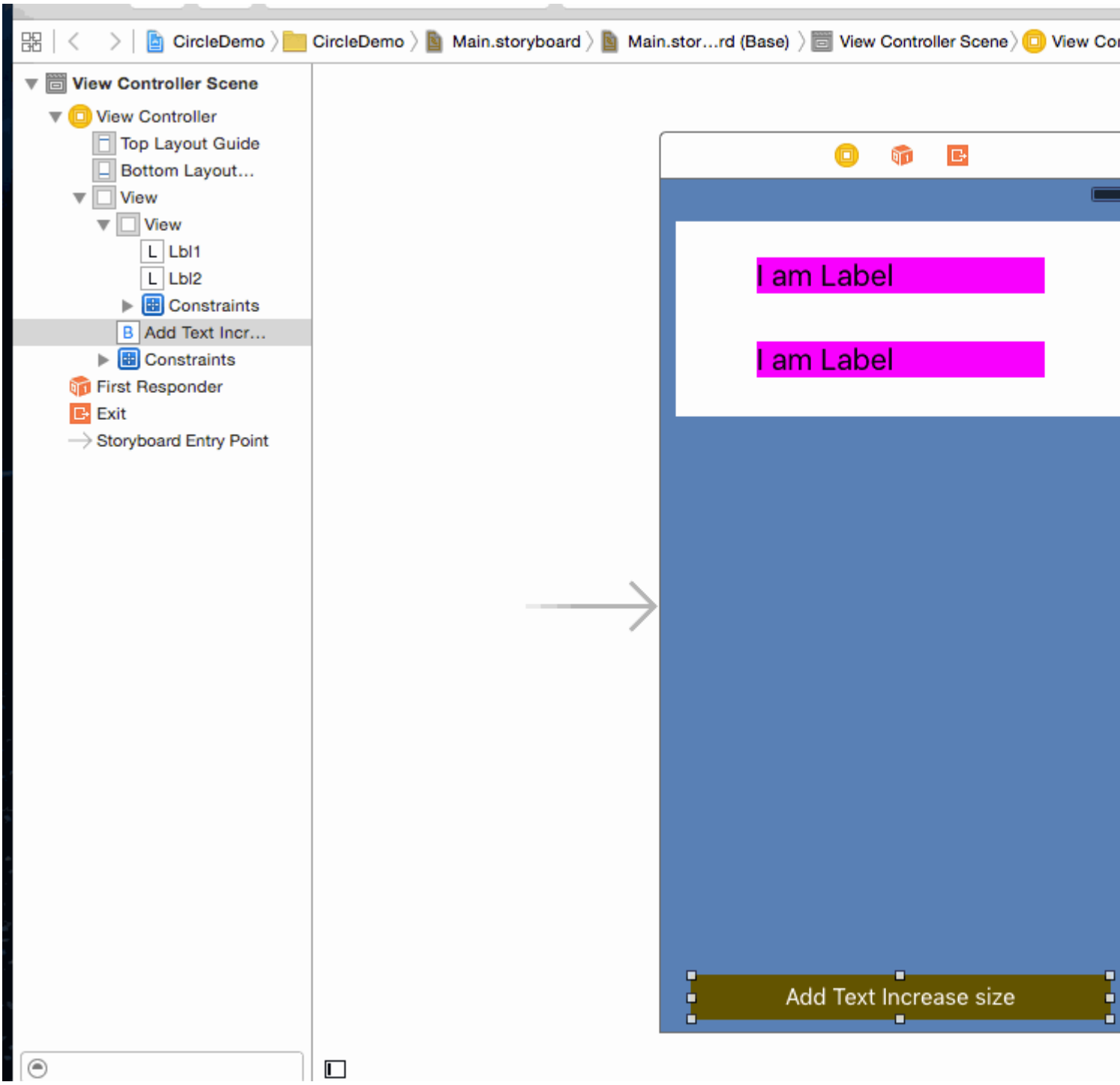


4 : - UIView UILabel .



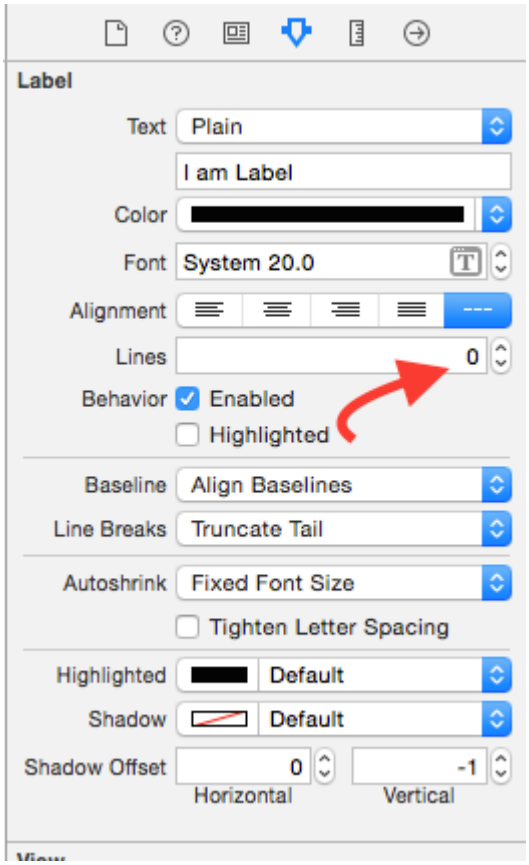
5 : - ( ) UIButton .

1. 2) 3) 4) ( )


CircleDemo
CircleDemo
Main.storyboard
Main.stor...rd (Base)
View Controller Scene
View Controller Scene
View Controller
Top Layout Guide
Bottom Layout...
View
View
Lbl1
Lbl2
Constraints
Add Text Incr...
Constraints
First Responder
Exit
Storyboard Entry Point
I am Label
I am Label
Add Text Increase size

: -

: - Label Number of lines = 0 .



UILabel Autoresize UIView UILabel Autoresize .

: !

HVFL UI . VFL Interface Builder UI .

`superView.width` , `superView.width` `aGradeView` VFL

```
"H:|[bgView][aGradeView(40)][bGradeView(40)]|"
```

UI Objects .

VFL `H: V:` . `H:`

, `.|` . VFL .

, outerleft outerright .

`bgView` . `bgView` . UI . UI . ?

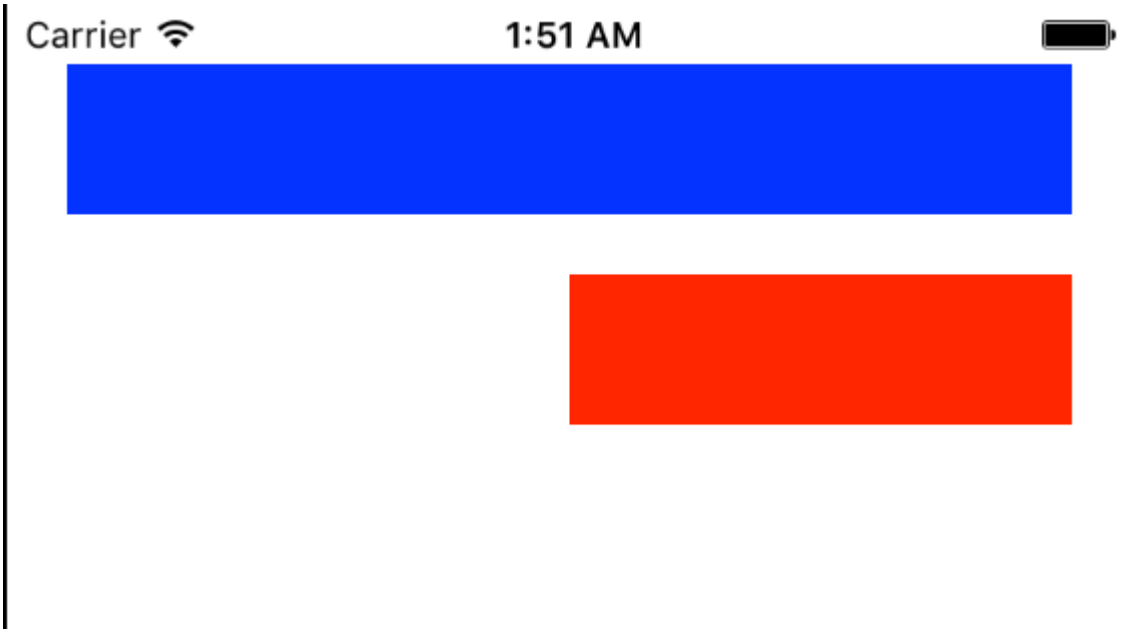
.

`[aGradeView(50)]` . / (50). .

`[bgView]` .

, . .

:




```
    // 1. create views
    UIView *blueView = [[UIView alloc] init];
    blueView.backgroundColor = [UIColor blueColor];
    [self.view addSubview:blueView];

    UIView *redView = [[UIView alloc] init];
    redView.backgroundColor = [UIColor redColor];
    [self.view addSubview:redView];

    // 2. forbid Autoresizing
    blueView.translatesAutoresizingMaskIntoConstraints = NO;
    redView.translatesAutoresizingMaskIntoConstraints = NO;

    // 3. make contraints
    // horizontal
    NSArray *blueH = [NSLayoutConstraint constraintsWithVisualFormat:@"H:|-20-[blueView]-20-|"
options:NSLayoutFormatAlignAllLeft metrics:nil views:@{@"blueView" : blueView}];
    [self.view addConstraints:blueH];

    // vertical
    NSArray *blueVandRedV = [NSLayoutConstraint constraintsWithVisualFormat:@"V:|-20-
[blueView(50)]-20-[redView(==blueView)]" options:NSLayoutFormatAlignAllTrailing metrics:nil
views:@{@"blueView" : blueView, @"redView" : redView}];
    [self.view addConstraints:blueVandRedV];

    NSLayoutConstraint *redW = [NSLayoutConstraint constraintWithItem:redView
attribute:NSLayoutAttributeWidth relatedBy:NSLayoutRelationEqual toItem:blueView
attribute:NSLayoutAttributeWidth multiplier:0.5 constant:0];
    [self.view addConstraint:redW];
```

UIKit .

: maskLayer UIView UIView frame maskLayer .

```
// CustomView.m
- (void)layoutSubviews {
    [super layoutSubviews];
```

```
    // now you can assume Auto Layout did its job
    // you can use view's frame in your calculations
    CALayer maskLayer = self.maskLayer;
    maskLayer.bounds = self.bounds;
    ...
}
```

ViewController

```
- (void)viewDidLayoutSubviews {
    [super viewDidLayoutSubviews];
    // now you can assume all your subviews are positioned/resized correctly
    self.customView.frame = self.containerView.frame;
}
```

.

```
NSLayoutConstraint(item: myView, attribute: NSLayoutAttribute.Leading, relatedBy:
NSLayoutRelation.Equal, toItem: view, attribute: NSLayoutAttribute.LeadingMargin, multiplier:
1.0, constant: 20.0)
```

:

```
view.attribute * multiplier + constant          (1)
```

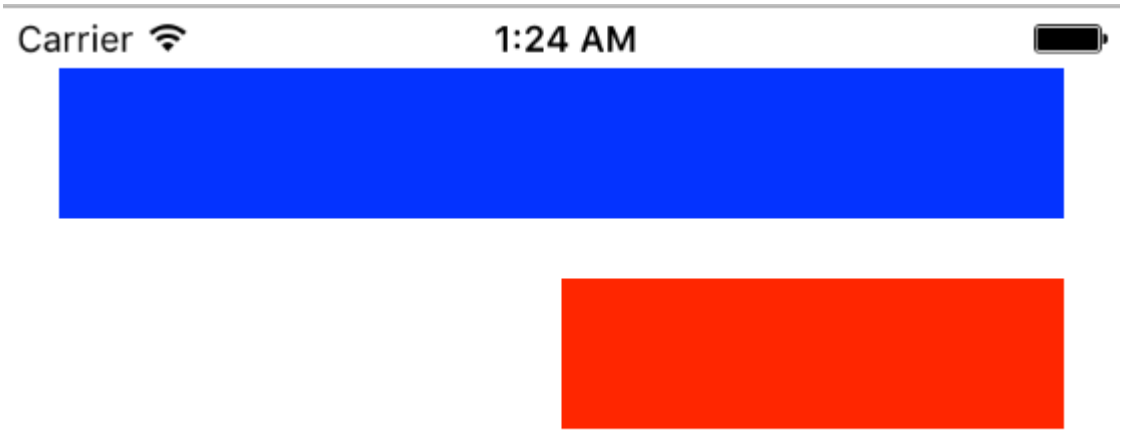
.

:

(V1) 1 : 1.1 .

Gary square (V2) V1 . = 60, = 1.125 = 0

, .



- -C

```
    // 1. create views
    UIView *blueView = [[UIView alloc] init];
    blueView.backgroundColor = [UIColor blueColor];
    [self.view addSubview:blueView];

    UIView *redView = [[UIView alloc] init];
    redView.backgroundColor = [UIColor redColor];
    [self.view addSubview:redView];

    // 2. forbid Autoresizing
    blueView.translatesAutoresizingMaskIntoConstraints = NO;
    redView.translatesAutoresizingMaskIntoConstraints = NO;

    // 3. make contraints
    // 3.1 blueView
    NSLayoutConstraint *blueLeft = [NSLayoutConstraint constraintWithItem:blueView
attribute:NSLayoutAttributeLeft relatedBy:NSLayoutRelationEqual toItem:self.view
attribute:NSLayoutAttributeLeft multiplier:1 constant:20];
    [self.view addConstraint:blueLeft];

    NSLayoutConstraint *blueTop = [NSLayoutConstraint constraintWithItem:blueView
attribute:NSLayoutAttributeTop relatedBy:NSLayoutRelationEqual toItem:self.view
attribute:NSLayoutAttributeTop multiplier:1 constant:20];
    [self.view addConstraint:blueTop];

    NSLayoutConstraint *blueRight = [NSLayoutConstraint constraintWithItem:blueView
attribute:NSLayoutAttributeRight relatedBy:NSLayoutRelationEqual toItem:self.view
attribute:NSLayoutAttributeRight multiplier:1 constant:-20];
    [self.view addConstraint:blueRight];

    NSLayoutConstraint *blueHeight = [NSLayoutConstraint constraintWithItem:blueView
attribute:NSLayoutAttributeHeight relatedBy:NSLayoutRelationEqual toItem:nil
attribute:NSLayoutAttributeNotAnAttribute multiplier:1 constant:50];
    [self.view addConstraint:blueHeight];

    // 3.2 redView
    NSLayoutConstraint *redTop = [NSLayoutConstraint constraintWithItem:redView
attribute:NSLayoutAttributeTop relatedBy:NSLayoutRelationEqual toItem:blueView
attribute:NSLayoutAttributeBottom multiplier:1 constant:20];
    [self.view addConstraint:redTop];
```

```
    NSLayoutConstraint *redRight = [NSLayoutConstraint constraintWithItem:redView
attribute:NSLayoutAttributeRight relatedBy:NSLayoutRelationEqual toItem:self.view
attribute:NSLayoutAttributeRight multiplier:1 constant:-20];
    [self.view addConstraint:redRight];

    NSLayoutConstraint *redHeight = [NSLayoutConstraint constraintWithItem:redView
attribute:NSLayoutAttributeHeight relatedBy:NSLayoutRelationEqual toItem:blueView
attribute:NSLayoutAttributeHeight multiplier:1 constant:0];
    [self.view addConstraint:redHeight];

    NSLayoutConstraint *redWidth = [NSLayoutConstraint constraintWithItem:redView
attribute:NSLayoutAttributeWidth relatedBy:NSLayoutRelationEqual toItem:blueView
attribute:NSLayoutAttributeWidth multiplier:0.5 constant:0];
    [self.view addConstraint:redWidth];
```

: https://riptutorial.com/ko/ios/topic/792/-

190:

iOS VoiceOver, Voice Control, Black on White, Mono Audio, Speech to Text iOS . iOS .

Examples

`UIView` `UIView` .

```
myView.isAccessibilityElement = YES;
```

, . Apple .

VoiceOver , VoiceOver , . !

```
myElement.accessibilityFrame = frameInScreenCoordinates;
```

- `accessibilityFrame` rect . . iOS 10 `accessibilityFrameInContainerSpace` API .

VoiceOver . , . VoiceOver . VoiceOver . VoiceOver .

```
UIAccessibilityPostNotification(UIAccessibilityScreenChangedNotification, firstElement);
```

. . VoiceOver . VoiceOver . .

. , . " " . .

```
UIAccessibilityPostNotification(UIAccessibilityLayoutChangedNotification, firstElement);
```

" " "" . .

```
UIAccessibilityPostNotification(UIAccessibilityAnnouncementNotification, @"The thing
happened!");
```

VoiceOver . "F " . VoiceOver . . (:) "" . , .

VoiceOver VoiceOver . `shouldGroupAccessibiltyChildren` `shouldGroupAccessibiltyChildren` .

```
myView.shouldGroupAccessibilityChildren = YES;
```

UIKit .

VoiceOver `UIKit` `UIAccessibilityProtocol` iOS . Core Graphics Metal `UIView` . iOS 8.0 `UIView` `UIView` .

```
myInaccessibleContainerView.accessibilityElements = @[elements, that, should, be, accessible];
```

UIAccessibilityElement UIAccessibilityProtocol . . VoiceOver . UIView UIAccessibilityProtocol UIAccessibilityElement UIView . VoiceOver .

. iOS . VoiceOver accessibilityViewIsModal . .

```
myModalView.accessibilityViewIsModal = YES;
```

VoiceOver . VoiceOver .

UIKit (UIView) UIAccessibilityProtocol . hidden UIView VoiceOver . . , . VoiceOver UIKit . VoiceOver . UIKit .

```
myViewFullofButtons.hidden = YES;
```

.

```
myViewFullofButtons.accessibilityElementsHidden = YES;
```

. , . VoiceOver . . accessibilityElementsHidden .

: https://riptutorial.com/ko/ios/topic/773/

191: -

KVC : -

KVC . (: "age") .

```
For example, you have employee class with "age" property. Normally we access like this.
emp.age = @”20”;
NSString age = emp.age;

But KVC works like this:
[emp valueForKey:@"age"];
[emp setValue:@"25" forKey:@"age"];
```

KVO : -

KVO. :

, person BankAccount accountBalance . Person addObserver : forKeyPath : options : context : BankAccount accountBalance .

Examples

KVO

```
-(void)observeValueForKeyPath:(NSString *)keyPath ofObject:(id)object
change:(NSDictionary<NSString *,id> *)change context:(void *)context
```

. .

, .

.

.

NSObject

KVO KVC `NSObject` .

`personObject` `firstName` .

```
[personObject addObserver:self
               forKeyPath:@"firstName"
                  options:NSKeyValueObservingOptionNew
                  context:nil];
```

`self` `observeValueForKeyPath:ofObject:change:context:` .

```
- (void)observeValueForKeyPath:(NSString *)keyPath
                      ofObject:(id)object
                        change:(NSDictionary<NSString *,id> *)change
                       context:(void *)context
{
    NSLog(@"new value of %@ is: %@", keyPath, change[NSKeyValueChangeNewKey]);
}
```

" " KVC . `NSObject` KVC .

`_firstName` `@"firstName"` .

`firstName` `@"firstName"` `_firstName` `setFirstName` .

- : https://riptutorial.com/ko/ios/topic/3493/-------

192:

Examples

.

```
class Contact: UIView
{
    private var message: UILabel
    private var phone: UITextView

    required init?(coder aDecoder: NSCoder) {
        (message, phone) = self.dynamicType.setUp()
        super.init(coder: aDecoder)
    }

    override func awakeFromNib() {
        (message, phone) = self.dynamicType.setUp()
        super.awakeFromNib()
    }

    override init(frame: CGRect) {
        (message, phone) = self.dynamicType.setUp()
        super.init(frame: frame)
    }

    private static func setUp(){
        let message = UILabel()  // ...
        let phone = UITextView() // ...
        return (message, phone)
    }
}
```

```
let mySwitch: UISwitch = {
    view.addSubview($0)
    $0.addTarget(self, action: "action", forControlEvents: .TouchUpInside)
    return $0
}(UISwitch())
```

didSet

```
@IBOutlet weak var title: UILabel! {
  didSet {
    label.textColor = UIColor.redColor()
    label.font = UIFont.systemFontOfSize(20)
    label.backgroundColor = UIColor.blueColor()
  }
}
```

.

```
private var loginButton = UIButton() {
    didSet(oldValue) {
```

```
        loginButton.addTarget(self, action: #selector(LoginController.didClickLogin),
forControlEvents: .TouchUpInside)
    }
}
```

NSObject

NSObject . .

```
class ContactFormStyle: NSObject
{
    @IBOutlet private weak var message: UILabel! {
      didSet {
        message.font = UIFont.systemFontOfSize(12)
        message.textColor = UIColor.blackColor()
      }
    }
}

class ContactFormVC: UIViewController
{
    @IBOutlet private var style: ContactFormStyle!
}
```

.

https://github.com/devxoul/Then ( ) `Then` .

```
let label = UILabel().then {
    $0.textAlignment = .Center
    $0.textColor = UIColor.blackColor(
    $0.text = "Hello, World!"
}
```

`Then` :

```
import Foundation

public protocol Then {}

extension Then
{
    public func then(@noescape block: inout Self -> Void) -> Self {
        var copy = self
        block(&copy)
        return copy
    }
}

extension NSObject: Then {}
```

```
internal func Init<Type>(value : Type, block: @noescape (object: Type) -> Void) -> Type
{
    block(object: value)
```

```
    return value
}
```

:

```
Init(UILabel(frame: CGRect.zero)) {
    $0.backgroundColor = UIColor.blackColor()
}
```

: https://riptutorial.com/ko/ios/topic/3513/-

193: iOS

MVC, MVP, MVVM VIPER .

Examples

MVC

```
import UIKit

struct Person { // Model
    let firstName: String
    let lastName: String
}

class GreetingViewController : UIViewController { // View + Controller
    var person: Person!
    let showGreetingButton = UIButton()
    let greetingLabel = UILabel()

    override func viewDidLoad() {
        super.viewDidLoad()
        self.showGreetingButton.addTarget(self, action: "didTapButton:", forControlEvents:
.TouchUpInside)
    }

    func didTapButton(button: UIButton) {
        let greeting = "Hello" + " " + self.person.firstName + " " + self.person.lastName
        self.greetingLabel.text = greeting

    }
    // layout code goes here
}
// Assembling of MVC
let model = Person(firstName: "David", lastName: "Blaine")
let view = GreetingViewController()
view.person = model
```

MVP

```
import UIKit

struct Person { // Model
    let firstName: String
    let lastName: String
}

protocol GreetingView: class {
    func setGreeting(greeting: String)
}

protocol GreetingViewPresenter {
    init(view: GreetingView, person: Person)
    func showGreeting()
```

```
}

class GreetingPresenter : GreetingViewPresenter {
    unowned let view: GreetingView
    let person: Person
    required init(view: GreetingView, person: Person) {
        self.view = view
        self.person = person
    }
    func showGreeting() {
        let greeting = "Hello" + " " + self.person.firstName + " " + self.person.lastName
        self.view.setGreeting(greeting)
    }
}

class GreetingViewController : UIViewController, GreetingView {
    var presenter: GreetingViewPresenter!
    let showGreetingButton = UIButton()
    let greetingLabel = UILabel()

    override func viewDidLoad() {
        super.viewDidLoad()
        self.showGreetingButton.addTarget(self, action: "didTapButton:", forControlEvents:
.TouchUpInside)
    }

    func didTapButton(button: UIButton) {
        self.presenter.showGreeting()
    }

    func setGreeting(greeting: String) {
        self.greetingLabel.text = greeting
    }

    // layout code goes here
}
// Assembling of MVP
let model = Person(firstName: "David", lastName: "Blaine")
let view = GreetingViewController()
let presenter = GreetingPresenter(view: view, person: model)
view.presenter = presenter
```

MVVM

```
import UIKit

struct Person { // Model
    let firstName: String
    let lastName: String
}

protocol GreetingViewModelProtocol: class {
    var greeting: String? { get }
    var greetingDidChange: ((GreetingViewModelProtocol) -> ())? { get set } // function to
call when greeting did change
    init(person: Person)
    func showGreeting()
}
```

```
class GreetingViewModel : GreetingViewModelProtocol {
    let person: Person
    var greeting: String? {
        didSet {
            self.greetingDidChange?(self)
        }
    }
    var greetingDidChange: ((GreetingViewModelProtocol) -> ())?
    required init(person: Person) {
        self.person = person
    }
    func showGreeting() {
        self.greeting = "Hello" + " " + self.person.firstName + " " + self.person.lastName
    }
}

class GreetingViewController : UIViewController {
    var viewModel: GreetingViewModelProtocol! {
        didSet {
            self.viewModel.greetingDidChange = { [unowned self] viewModel in
                self.greetingLabel.text = viewModel.greeting
            }
        }
    }
    let showGreetingButton = UIButton()
    let greetingLabel = UILabel()

    override func viewDidLoad() {
        super.viewDidLoad()
        self.showGreetingButton.addTarget(self.viewModel, action: "showGreeting",
forControlEvents: .TouchUpInside)
    }
    // layout code goes here
}
// Assembling of MVVM
let model = Person(firstName: "David", lastName: "Blaine")
let viewModel = GreetingViewModel(person: model)
let view = GreetingViewController()
view.viewModel = viewModel
```

VIPER

```
import UIKit

struct Person { // Entity (usually more complex e.g. NSManagedObject)
    let firstName: String
    let lastName: String
}

struct GreetingData { // Transport data structure (not Entity)
    let greeting: String
    let subject: String
}

protocol GreetingProvider {
    func provideGreetingData()
}

protocol GreetingOutput: class {
```

```
    func receiveGreetingData(greetingData: GreetingData)
}

class GreetingInteractor : GreetingProvider {
    weak var output: GreetingOutput!

    func provideGreetingData() {
        let person = Person(firstName: "David", lastName: "Blaine") // usually comes from data
access layer
        let subject = person.firstName + " " + person.lastName
        let greeting = GreetingData(greeting: "Hello", subject: subject)
        self.output.receiveGreetingData(greeting)
    }
}

protocol GreetingViewEventHandler {
    func didTapShowGreetingButton()
}

protocol GreetingView: class {
    func setGreeting(greeting: String)
}

class GreetingPresenter : GreetingOutput, GreetingViewEventHandler {
    weak var view: GreetingView!
    var greetingProvider: GreetingProvider!

    func didTapShowGreetingButton() {
        self.greetingProvider.provideGreetingData()
    }

    func receiveGreetingData(greetingData: GreetingData) {
        let greeting = greetingData.greeting + " " + greetingData.subject
        self.view.setGreeting(greeting)
    }
}

class GreetingViewController : UIViewController, GreetingView {
    var eventHandler: GreetingViewEventHandler!
    let showGreetingButton = UIButton()
    let greetingLabel = UILabel()

    override func viewDidLoad() {
        super.viewDidLoad()
        self.showGreetingButton.addTarget(self, action: "didTapButton:", forControlEvents:
.TouchUpInside)
    }

    func didTapButton(button: UIButton) {
        self.eventHandler.didTapShowGreetingButton()
    }

    func setGreeting(greeting: String) {
        self.greetingLabel.text = greeting
    }

    // layout code goes here
}
// Assembling of VIPER module, without Router
let view = GreetingViewController()
let presenter = GreetingPresenter()
```

```
let interactor = GreetingInteractor()
view.eventHandler = presenter
presenter.view = view
presenter.greetingProvider = interactor
interactor.output = presenter
```

iOS : https://riptutorial.com/ko/ios/topic/10029/-ios----

194: iOS

Examples

Carthage.pkg .

pkg .

carthage . `0.18-19-g743fa0f`

iOS : https://riptutorial.com/ko/ios/topic/7404/-ios-

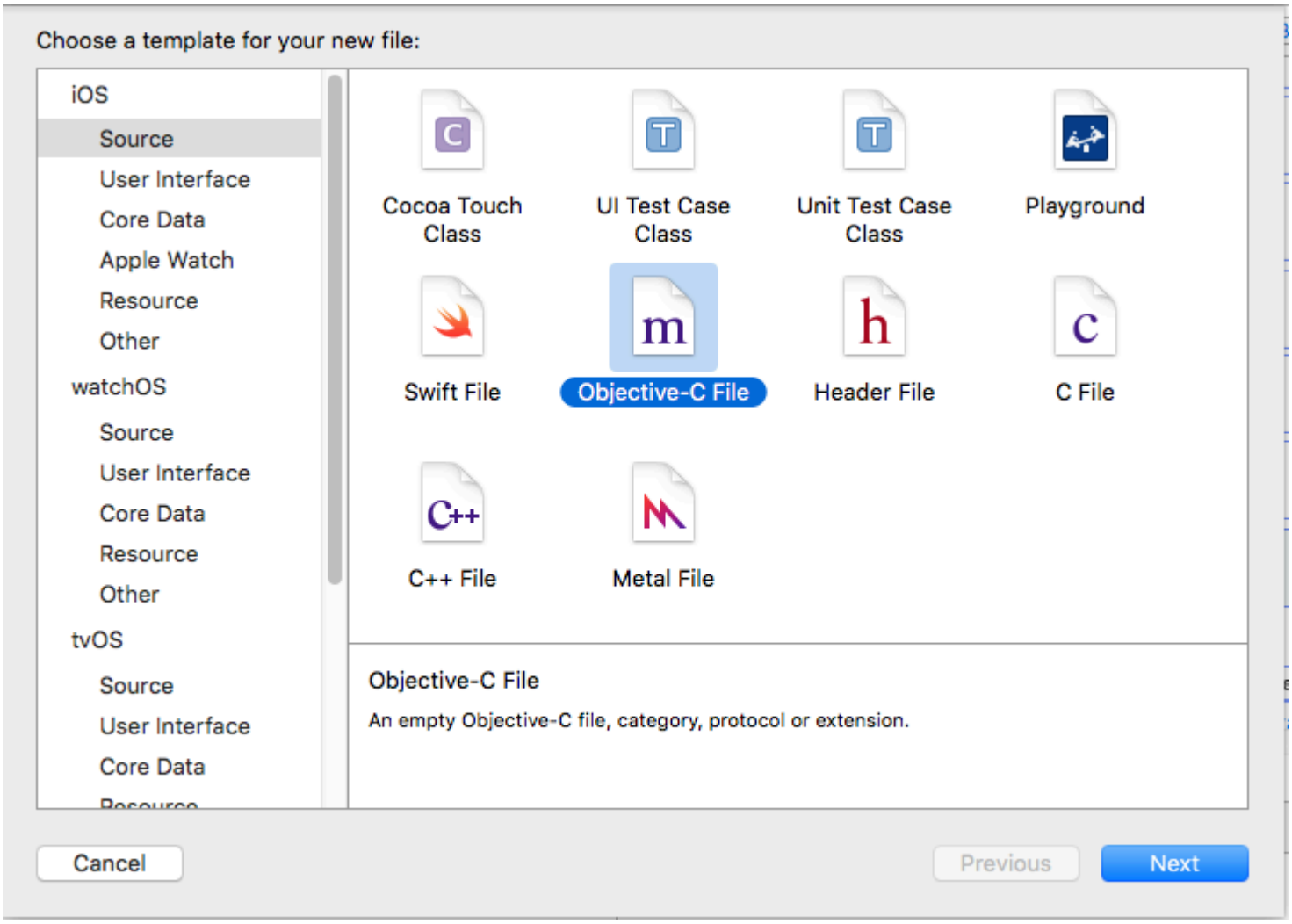
195:

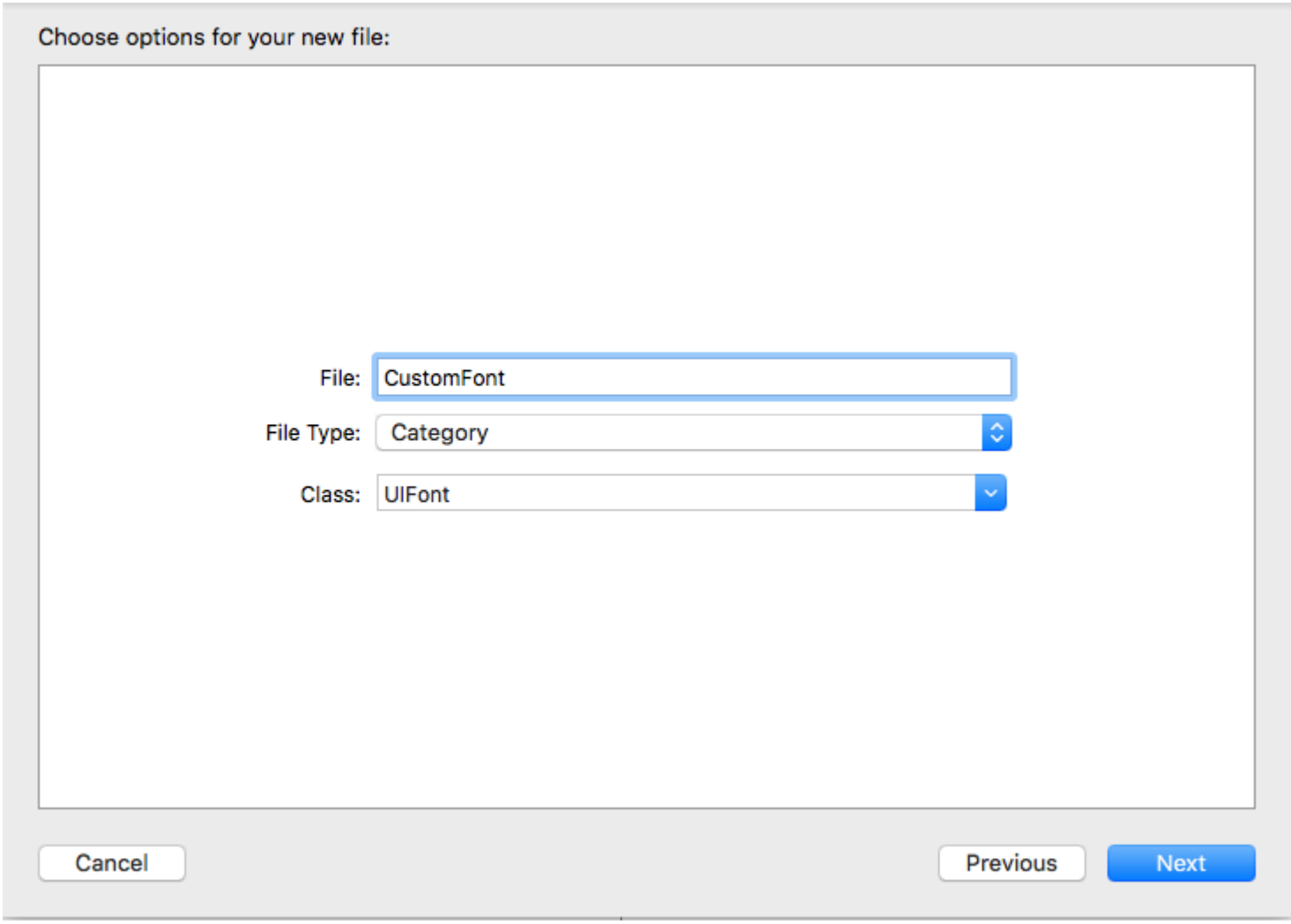
. private . . .

Examples

.

. `UIFont` . Xcode -> -> Objective-C . . "CustomFont" UIFont "" "" . "





: -

"UIFont + CustomFonts.h" . .

```
@interface UIFont (CustomFonts)

+(UIFont *)productSansRegularFontWithSize:(CGFloat)size;

@end
```

: -

"UIFont + CustomFonts.m" . ProductSansRegular Font .

```
+(UIFont *)productSansRegularFontWithSize:(CGFloat)size{

    return [UIFont fontWithName:@"ProductSans-Regular" size:size];

}
```

```
#import "UIFont+CustomFonts.h"
```

.

```
[self.label setFont:[UIFont productSansRegularFontWithSize:16.0]];
```

: https://riptutorial.com/ko/ios/topic/3633/

196:

Codable Xcode 9, iOS 11 Swift 4 . Codable JSON .

Codable . .

Examples

Swift 4 JSONncoder JSONDecoder Codable

Movie . Codable . .

```
struct Movie: Codable {
    enum MovieGenere: String, Codable {
        case horror, skifi, comedy, adventure, animation
    }

    var name : String
    var moviesGenere : [MovieGenere]
    var rating : Int
}
```

.

```
let upMovie = Movie(name: "Up", moviesGenere: [.comedy , .adventure, .animation], rating : 4)
```

upMovie "Up" movieGenere 5 4 .

JSONEncoder JSON . JSONEncoder Codable .

```
// Encode data
let jsonEncoder = JSONEncoder()
do {
    let jsonData = try jsonEncoder.encode(upMovie)
    let jsonString = String(data: jsonData, encoding: .utf8)
    print("JSON String : " + jsonString!)
}
catch {
}
```

JSONncoder JSON JSON .

.

```
{
  "name": "Up",
  "moviesGenere": [
    "comedy",
    "adventure",
    "animation"
  ],
```

```
  "rating": 4
}
```

JSONDecoder JSON . JSON .

```
do {
    // Decode data to object

    let jsonDecoder = JSONDecoder()
    let upMovie = try jsonDecoder.decode(Movie.self, from: jsonData)
    print("Rating : \(upMovie.name)")
    print("Rating : \(upMovie.rating)")
}
catch {
}
```

JSONData Movie . .

.

```
Name : Up
Rating : 4
```

: https://riptutorial.com/ko/ios/topic/10639/-

197:

Examples

XCode IPA . https://developer.apple.com/account/ios/profile/create .

.

- iOS / tvOS -
- App Store / tvOS App Store - .
- In House - .
- Ad Hoc / tvOS Ad Hoc - (: UDID).

: https://riptutorial.com/ko/ios/topic/6055/-

198:

Examples

Core Graphics .

`UIGraphicsBeginImageContextWithOptions()` C . `UIGraphicsEndImageContext()` .

```
let size = CGSize(width: 256, height: 256)

UIGraphicsBeginImageContextWithOptions(size, false, 0)

let context = UIGraphicsGetCurrentContext()

// drawing code here

UIGraphicsEndImageContext()
```

-C

```
CGSize size = [CGSize width:256 height:256];

UIGraphicsBeginImageContextWithOptions(size, NO, 0);

CGContext *context = UIGraphicsGetCurrentContext();

// drawing code here

UIGraphicsEndImageContext();
```

`UIGraphicsBeginImageContextWithOptions()` 3 .

1. () `CGSize`
2. boolean true , .
3. (1, 1, HD 3). 0 .

```
let image = UIGraphicsGetImageFromCurrentImageContext()
imageView.image = image //assuming imageView is a valid UIImageView object
```

-C

```
UIImage *image = UIGraphicsGetImageFromCurrentImageContext();
imageView.image = image; //assuming imageView is a valid UIImageView object
```

: https://riptutorial.com/ko/ios/topic/5530/-

199:

Examples

Core Motion :

```
import CoreMotion
```

, CMAltimeter viewDidLoad() . . viewDidLoad() CMAltimeter .

```
let altimeter = CMAltimeter()
```

:

1. relativeAltitude CMAltimeter.isRelativeAltitudeAvailable .
2. true startRelativeAltitudeUpdatesToQueue
3. relativeAltitude pressure .

.

```
@IBAction func start(sender: AnyObject){
if CMAltimeter.isRelativeAltitudeAvailable() {
    // 2
    altimeter.startRelativeAltitudeUpdatesToQueue(NSOperationQueue.mainQueue(), withHandler: {
data, error in
        // 3
        if (error == nil) {
            println("Relative Altitude: \(data.relativeAltitude)")
            println("Pressure: \(data.pressure)")
        }
    })
}
```

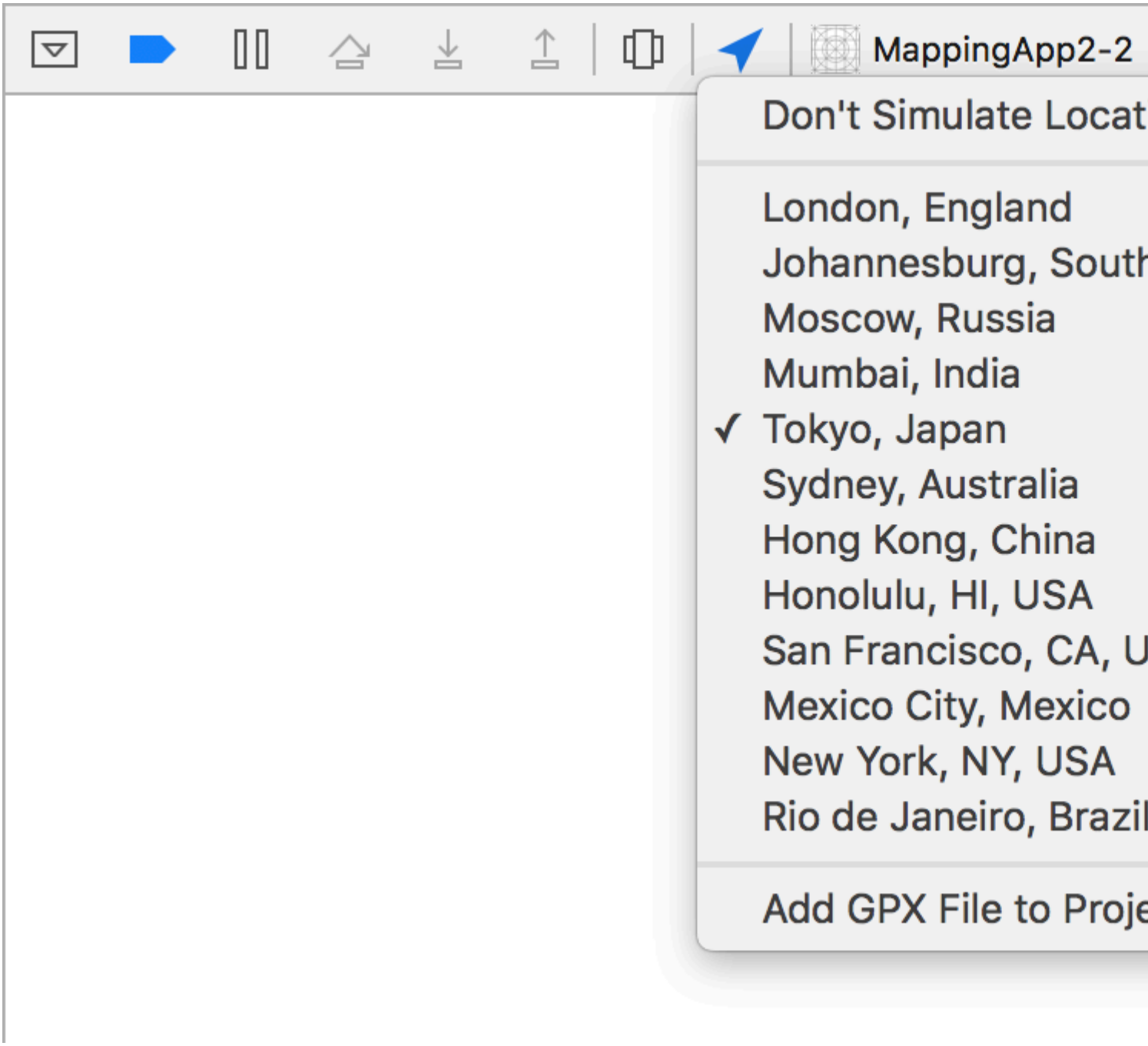
: https://riptutorial.com/ko/ios/topic/7636/-

200:

1. desiredAccuracy
2. distanceFilter
3. requestLocation ()
4. startUpdatingLocation ()
5. allowDeferredLocationUpdates (untilTraveled : timeout :)
6. startMonitoringSignificantLocationChanges ()
7. allowDeferredLocationUpdates (untilTraveled : timeout :)
8. authorizedAlways
9. authorizedWhenInUse
10. locationManager (_ : didChangeAuthorization :)

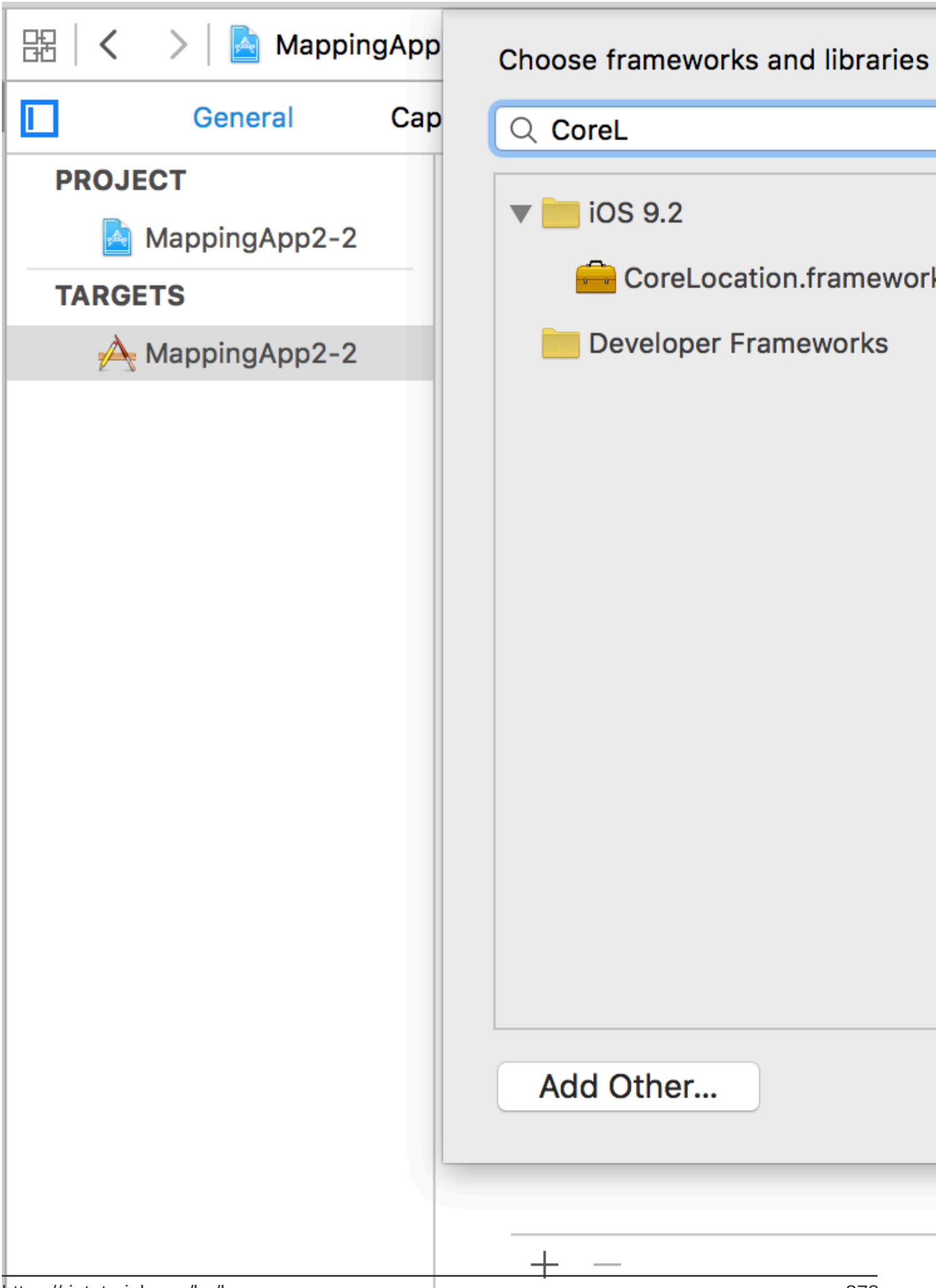
---

1. Xcode .
2. " " .
3. .



Examples

Link CoreLocation


MappingApp
General
Cap
PROJECT
MappingApp2-2
TARGETS
MappingApp2-2
Choose frameworks and libraries
CoreL
iOS 9.2
CoreLocation.framework
Developer Frameworks
Add Other...

- GPX

```
<?xml version="1.0"?>
<gpx version="1.1" creator="Xcode">
<!--
        Provide one or more waypoints containing a latitude/longitude pair. If you provide one
        waypoint, Xcode will simulate that specific location. If you provide multiple
waypoints,
        Xcode will simulate a route visitng each waypoint.
 -->
<wpt lat="52.599878" lon="4.702029">
     <name>location name (eg. Florida)</name>
</wpt>
```

- -> -> RUN GPX .

```
Background Modes  Location updates  Location updates .
```

Info.plist .

```
<key>NSLocationAlwaysUsageDescription</key>
<string>I want to get your location Information in background</string>

<key>UIBackgroundModes</key>
<array>
    <string>location</string>
</array>
```

CLLocationManager .

C

```
//The Location Manager must have a strong reference to it.
_locationManager = [[CLLocationManager alloc] init];
_locationManager.delegate = self;

//Request Always authorization (iOS8+)
if ([_locationManager respondsToSelector:@selector(requestAlwaysAuthorization)]) {
    [_locationManager requestAlwaysAuthorization];
}

//Allow location updates in the background (iOS9+)
if ([_locationManager respondsToSelector:@selector(allowsBackgroundLocationUpdates)]) {
    _locationManager.allowsBackgroundLocationUpdates = YES;
}

[_locationManager startUpdatingLocation];
```

```
self.locationManager.delegate = self

if #available (iOS 8.0,*) {
    self.locationManager.requestAlwaysAuthorization()
}

if #available (iOS 9.0,*) {
    self.locationManager.allowsBackgroundLocationUpdates = true
```

```
}

self.locationManager.startUpdatingLocation()
```

: https://riptutorial.com/ko/ios/topic/2937/-

201:

. . .

. (UIViewController `viewWillTransition(to:with:)` . .)

Examples

iOS . .

Apple : . ( ) . . , . "Compact / Regular" .

UITraitEnvironment .

```
class MyViewController: UIViewController {
    override func viewDidAppear(_ animated: Bool) {
        super.viewDidAppear(animated)
        print("Horizontal size class: \(traitCollection.horizontalSizeClass)")
        print("Vertical size class: \(traitCollection.verticalSizeClass)")
    }

    override func traitCollectionDidChange(_ previousTraitCollection: UITraitCollection?) {
        super.traitCollectionDidChange(previousTraitCollection)
        print("Trait collection changed; size classes may be different.")
    }
}
```

UIView UIViewController UITraitEnvironment .

. .

, UIStackView UILabel . .

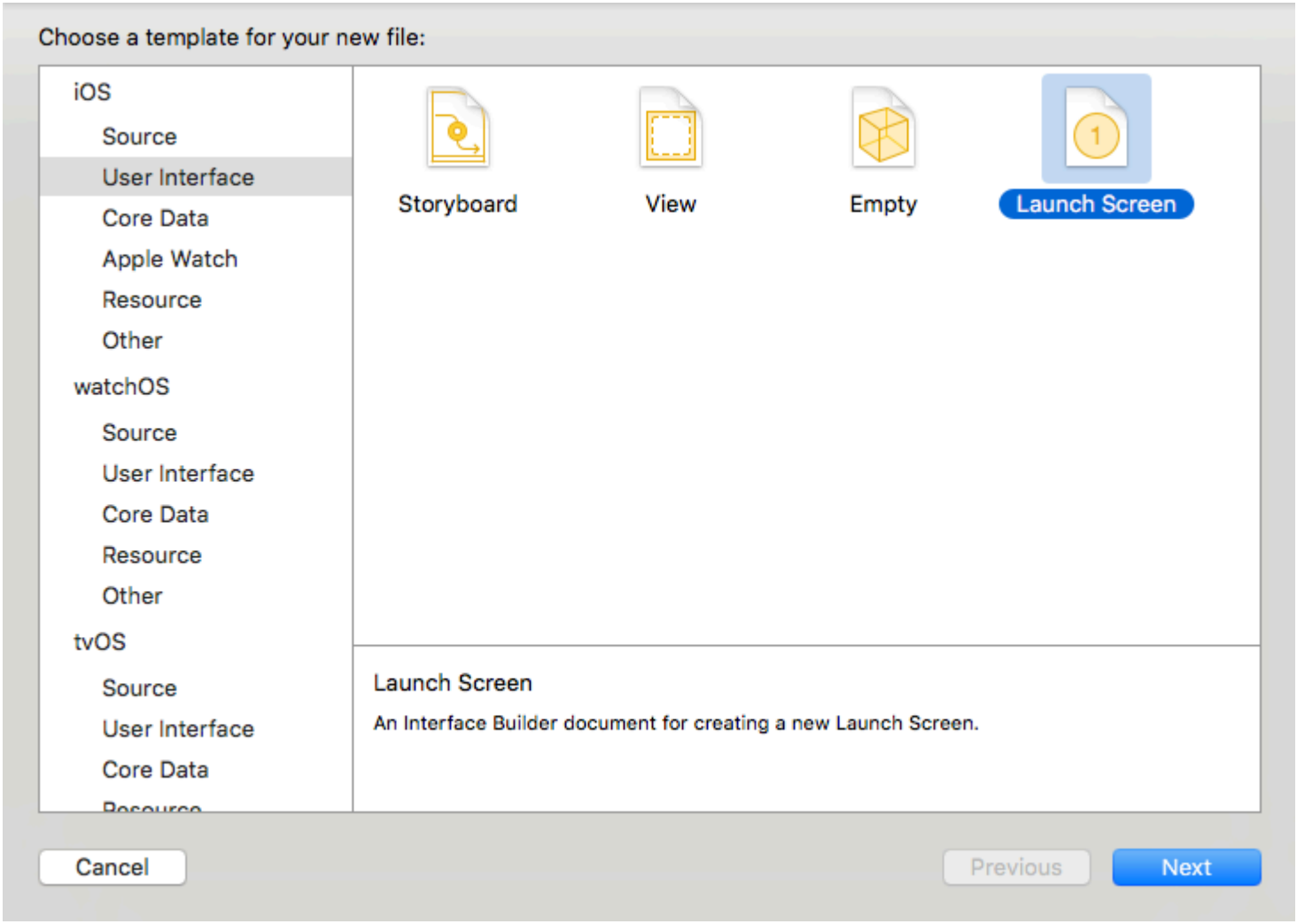
```
class ViewController: UIViewController {
    var stackView: UIStackView!

    override func viewDidLoad() {
        super.viewDidLoad()

        stackView = UIStackView()
        for text in ["foo", "bar"] {
            let label = UILabel()
            label.translatesAutoresizingMaskIntoConstraints = false
            label.text = text
            stackView.addArrangedSubview(label)
        }

        view.addSubview(stackView)
        stackView.translatesAutoresizingMaskIntoConstraints = false
        stackView.centerXAnchor.constraint(equalTo: view.centerXAnchor).isActive = true
        stackView.centerYAnchor.constraint(equalTo: view.centerYAnchor).isActive = true
    }
```

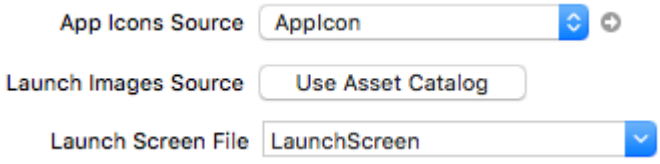
```
    override func viewDidAppear(_ animated: Bool) {
        super.viewDidAppear(animated)
        updateAxis(forTraitCollection: traitCollection)
    }

    override func traitCollectionDidChange(_ previousTraitCollection: UITraitCollection?) {
        super.traitCollectionDidChange(previousTraitCollection)
        updateAxis(forTraitCollection: traitCollection)
    }

    private func updateAxis(forTraitCollection traitCollection: UITraitCollection) {
        switch traitCollection.horizontalSizeClass {
        case .regular:
            stackView.axis = .horizontal
        case .compact:
            stackView.axis = .vertical
        case .unspecified:
            print("Unspecified size class!")
            stackView.axis = .horizontal
        }
    }
}
```

iPad iOS

iOS iPad . Xcode 7 . LaunchScreen.storyboard .

.





iPad .

: https://riptutorial.com/ko/ios/topic/4628/---

202:

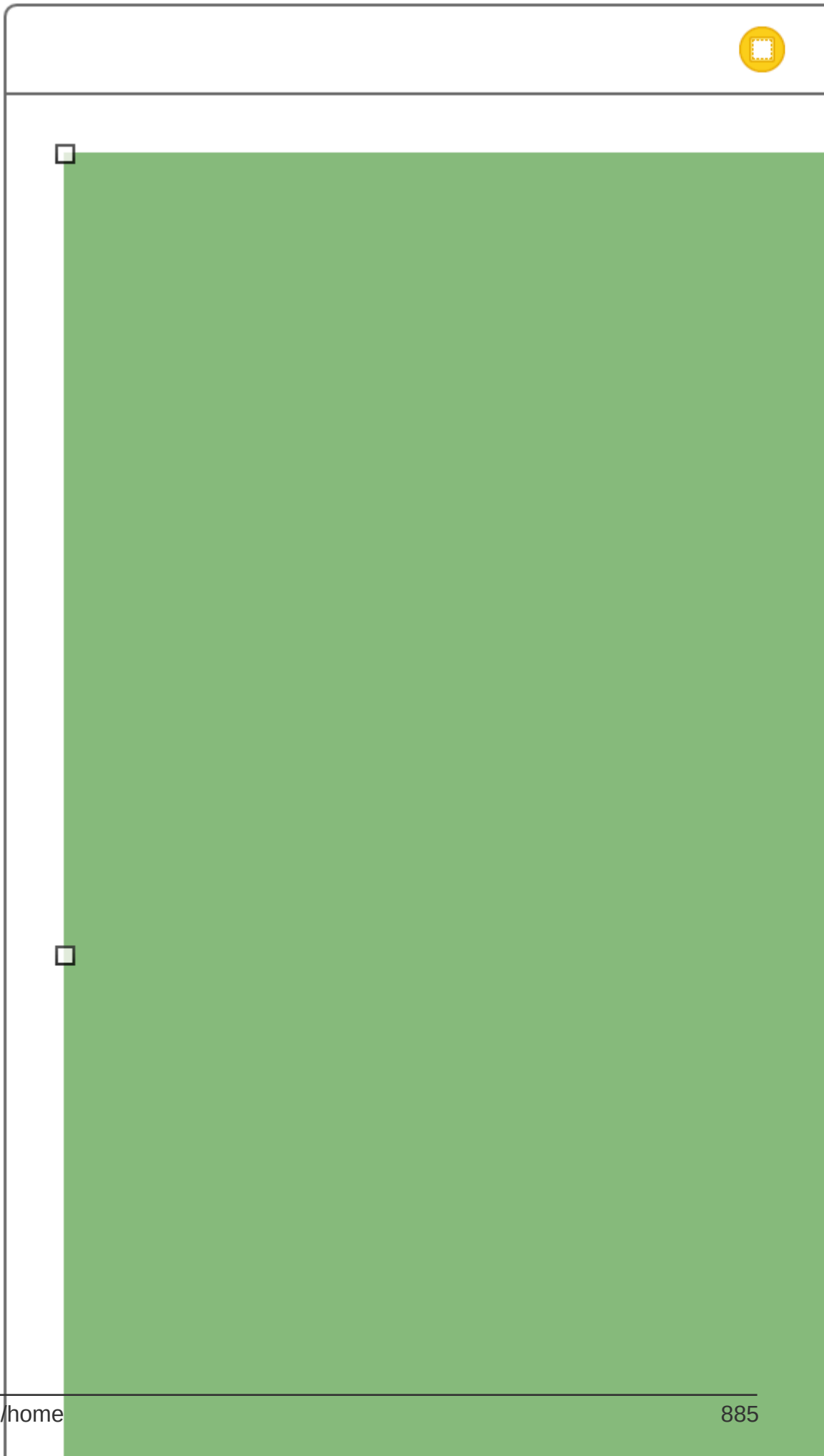
iOS ( ) Apple .

, .

Examples

nib `UIView` .
.

1. .



203:

- kSecClassGenericPassword //
- kSecClassInternetPassword //
- kSecClassCertificate //
- kSecClassCertificate //
- kSecClassIdentity // (+)

iOS , , ID . (Enclave) . iOS .

Xcode .

ac . Apple .

Keychain Services `Foundation` `CoreFoundation` ., `CFString`, `CoreFoundation` `CFDictionary` .

`Security` `Foundation` .

Apple Keychain Services Generic Keychain Swift .

Examples

`CFDictionary` . Objective-C `NSDictionary` Swift `Dictionary` `CFDictionary` .

.

```
var dict = [String : AnyObject]()
```

/ . dict `String` Swift 3 `CFString` `String` . CFString Hashable Swift Dictionary .

```
dict[kSecClass as String] = kSecClassGenericPassword
```

, . .

```
// The password will only be accessible when the device is unlocked
dict[kSecAttrAccessible as String] = kSecAttrAccessibleWhenUnlocked
// Label may help you find it later
dict[kSecAttrLabel as String] = "com.me.myapp.myaccountpassword" as CFString
// Username
dict[kSecAttrAccount as String] = "My Name" as CFString
// Service name
dict[kSecAttrService as String] = "MyService" as CFString
```

. . `CFData` .

```
dict[kSecValueData as String] = "my_password!!".data(using: .utf8) as! CFData
```

Keychain Services add . .

```
dict[kSecReturnAttributes as String] = kCFBooleanTrue
```

. :

```
var result: AnyObject?
let status = withUnsafeMutablePointer(to: &result) {
    SecItemAdd(dict as CFDictionary, UnsafeMutablePointer($0))
}
let newAttributes = result as! Dictionary<String, AnyObject>
```

result . SecItemAdd . OSStatus . .

CFDictionary . Objective-C NSDictionary Swift Dictionary CFDictionary .

.

```
var dict = [String : AnyObject]()
dict[kSecClass as String] = kSecClassGenericPassword
```

.

```
// Label
dict[kSecAttrLabel as String] = "com.me.myapp.myaccountpassword" as CFString
// Username
dict[kSecAttrAccount as String] = "My Name" as CFString
// Service name
dict[kSecAttrService as String] = "MyService" as CFString
```

.

, . CFData .

```
dict[kSecReturnData as String] = kCFBooleanTrue
```

.

```
var queryResult: AnyObject?
let status = withUnsafeMutablePointer(to: &queryResult) {
    SecItemCopyMatching(dict as CFDictionary, UnsafeMutablePointer($0))
}
// Don't keep this in memory for long!!
let password = String(data: queryResult as! Data, encoding: .utf8)!
```

SecItemCopyMatching . OSStatus . .

CFDictionary . . CFDictionary .

. .

```
var dict = [String : AnyObject]()
dict[kSecClass as String] = kSecClassGenericPassword
// Label
dict[kSecAttrLabel as String] = "com.me.myapp.myaccountpassword" as CFString
// Username
dict[kSecAttrAccount as String] = "My Name" as CFString
```

.

```
dict[kSecValueData as String] = "my_password!!".data(using: .utf8) as! CFData
```

.

```
var newDict = [String : AnyObject]()
newDict[kSecClass as String] = kSecClassGenericPassword
// Label
newDict[kSecAttrLabel as String] = "com.me.myapp.myaccountpassword" as CFString
// Username
newDict[kSecAttrAccount as String] = "My Name" as CFString
// New password
newDict[kSecValueData as String] = "new_password!!".data(using: .utf8) as! CFData
```

Keychain Services .

```
let status = SecItemUpdate(dict as CFDictionary, newDict as CFDictionary)
```

SecItemUpdate . .

Keychain . CFDictionary . . Objective-C NSDictionary Swift Dictionary CFDictionary .

. kSecMatchCaseInsensitive .

```
var dict = [String : AnyObject]()
dict[kSecClass as String] = kSecClassGenericPassword
// Label
dict[kSecAttrLabel as String] = "com.me.myapp.myaccountpassword" as CFString
// Username
dict[kSecAttrAccount as String] = "My Name" as CFString
```

.

```
let status = SecItemDelete(dict as CFDictionary)
```

SecItemDelete OSStatus . .

,, .

Keychain.h

```
#import <Foundation/Foundation.h>
typedef void (^KeychainOperationBlock)(BOOL successfulOperation, NSData *data, OSStatus
status);

@interface Keychain : NSObject

-(id) initWithService:(NSString *) service_ withGroup:(NSString*)group_;

-(void)insertKey:(NSString *)key withData:(NSData *)data
withCompletion:(KeychainOperationBlock)completionBlock;
-(void)updateKey:(NSString*)key withData:(NSData*) data
withCompletion:(KeychainOperationBlock)completionBlock;
-(void)removeDataForKey:(NSString*)key
withCompletionBlock:(KeychainOperationBlock)completionBlock;
-(void)findDataForKey:(NSString*)key
withCompletionBlock:(KeychainOperationBlock)completionBlock;

@end
```

.

```
#import "Keychain.h"
#import <Security/Security.h>

@implementation Keychain

{
    NSString * keychainService;
    NSString * keychainGroup;
}

-(id) initWithService:(NSString *)service withGroup:(NSString*)group
{
    self =[super init];
    if(self) {
        keychainService = [NSString stringWithString:service];
        if(group) {
```

```
            keychainGroup = [NSString stringWithString:group];
        }
    }

    return  self;
}

-(void)insertKey:(NSString *)key
        withData:(NSData *)data
  withCompletion:(KeychainOperationBlock)completionBlock
{
    NSMutableDictionary * dict =[self prepareDict:key];
    [dict setObject:data forKey:(__bridge id)kSecValueData];
    [dict setObject:keychainService forKey:(id)kSecAttrService];

    OSStatus status = SecItemAdd((__bridge CFDictionaryRef)dict, NULL);
    if(errSecSuccess != status) {
        DLog(@"Unable add item with key =%@ error:%d",key,(int)status);
        if (completionBlock) {
            completionBlock(errSecSuccess == status, nil, status);
        }
    }
    if (status == errSecDuplicateItem) {
        [self updateKey:key withData:data withCompletion:^(BOOL successfulOperation, NSData
*updateData, OSStatus updateStatus) {
            if (completionBlock) {
                completionBlock(successfulOperation, updateData, updateStatus);
            }
            DLog(@"Found duplication item -- updating key with data");
        }];
    }
}

-(void)findDataForKey:(NSString *)key
  withCompletionBlock:(KeychainOperationBlock)completionBlock
{
    NSMutableDictionary *dict = [self prepareDict:key];
    [dict setObject:(__bridge id)kSecMatchLimitOne forKey:(__bridge id)kSecMatchLimit];
    [dict setObject:keychainService forKey:(id)kSecAttrService];
    [dict setObject:(id)kCFBooleanTrue forKey:(__bridge id)kSecReturnData];
    CFTypeRef result = NULL;
    OSStatus status = SecItemCopyMatching((__bridge CFDictionaryRef)dict,&result);

    if( status != errSecSuccess) {
        DLog(@"Unable to fetch item for key %@ with error:%d",key,(int)status);
        if (completionBlock) {
            completionBlock(errSecSuccess == status, nil, status);
        }
    } else {
        if (completionBlock) {
            completionBlock(errSecSuccess == status, (__bridge NSData *)result, status);
        }
    }
}

-(void)updateKey:(NSString *)key
        withData:(NSData *)data
  withCompletion:(KeychainOperationBlock)completionBlock
{
    NSMutableDictionary * dictKey =[self prepareDict:key];
```

```
    NSMutableDictionary * dictUpdate =[[NSMutableDictionary alloc] init];
    [dictUpdate setObject:data forKey:(__bridge id)kSecValueData];
    [dictUpdate setObject:keychainService forKey:(id)kSecAttrService];
    OSStatus status = SecItemUpdate((__bridge CFDictionaryRef)dictKey, (__bridge
CFDictionaryRef)dictUpdate);
    if( status != errSecSuccess) {
        DLog(@"Unable to remove item for key %@ with error:%d",key,(int)status);
    }
    if (completionBlock) {
        completionBlock(errSecSuccess == status, nil, status);
    }
}

-(void)removeDataForKey:(NSString *)key
    withCompletionBlock:(KeychainOperationBlock)completionBlock {
    NSMutableDictionary *dict = [self prepareDict:key];
    OSStatus status = SecItemDelete((__bridge CFDictionaryRef)dict);
    if( status != errSecSuccess) {
        DLog(@"Unable to remove item for key %@ with error:%d",key,(int)status);
    }
    if (completionBlock) {
        completionBlock(errSecSuccess == status, nil, status);
    }
}

#pragma mark Internal methods

-(NSMutableDictionary*) prepareDict:(NSString *) key {

    NSMutableDictionary *dict = [[NSMutableDictionary alloc] init];
    [dict setObject:(__bridge id)kSecClassGenericPassword forKey:(__bridge id)kSecClass];

    NSData *encodedKey = [key dataUsingEncoding:NSUTF8StringEncoding];
    [dict setObject:encodedKey forKey:(__bridge id)kSecAttrGeneric];
    [dict setObject:encodedKey forKey:(__bridge id)kSecAttrAccount];
    [dict setObject:keychainService forKey:(__bridge id)kSecAttrService];
    [dict setObject:(__bridge id)kSecAttrAccessibleAlwaysThisDeviceOnly forKey:(__bridge
id)kSecAttrAccessible];

    //This is for sharing data across apps
    if(keychainGroup != nil) {
        [dict setObject:keychainGroup forKey:(__bridge id)kSecAttrAccessGroup];
    }

    return  dict;
}

@end
```

(TouchID)

Keychain SecAccessControl . Touch ID ( ) . UI iOS .

SecAccessControl .

```
let error: Unmanaged<CFError>?
```

```
guard let accessControl = SecAccessControlCreateWithFlags(kCFAllocatorDefault,
kSecAttrAccessibleWhenPasscodeSetThisDeviceOnly, .userPresence, &error) else {
    fatalError("Something went wrong")
}
```

kSecAttrAccessControl (kSecAttrAccessible) .

```
var dictionary = [String : Any]()

dictionary[kSecClass as String] = kSecClassGenericPassword
dictionary[kSecAttrLabel as String] = "com.me.myapp.myaccountpassword" as CFString
dictionary[kSecAttrAccount as String] = "My Name" as CFString
dictionary[kSecValueData as String] = "new_password!!".data(using: .utf8) as! CFData
dictionary[kSecAttrAccessControl as String] = accessControl
```

.

```
let lastResultCode = SecItemAdd(query as CFDictionary, nil)
```

Keychain . .

.

```
var query = [String: Any]()

query[kSecClass as String] = kSecClassGenericPassword
query[kSecReturnData as String] = kCFBooleanTrue
query[kSecAttrAccount as String] = "My Name" as CFString
query[kSecAttrLabel as String] = "com.me.myapp.myaccountpassword" as CFString
query[kSecUseOperationPrompt as String] = "Please put your fingers on that button" as CFString

var queryResult: AnyObject?
let status = withUnsafeMutablePointer(to: &queryResult) {
    SecItemCopyMatching(query as CFDictionary, UnsafeMutablePointer($0))
}
```

status err .

```
if status == noErr {
    let password = String(data: queryResult as! Data, encoding: .utf8)!
    print("Password: \(password)")
} else {
    print("Authorization not passed")
}
```

: https://riptutorial.com/ko/ios/topic/6839/-

204:

Examples

UIScrollView / UITableView

:

1. .

```
//Swift 2.0+
override func viewDidLoad() {
    super.viewDidLoad()

    NSNotificationCenter.defaultCenter().addObserver(self, selector:
#selector(YourVCClassName.keyboardWillShow(_:)), name: UIKeyboardWillShowNotification, object:
nil)
    NSNotificationCenter.defaultCenter().addObserver(self, selector:
#selector(YourVCClassName.keyboardWillHide(_:)), name: UIKeyboardWillHideNotification, object:
nil)
}

func keyboardWillShow(notification: NSNotification) {
    if let userInfo = notification.userInfo {
        if let keyboardHeight =
userInfo[UIKeyboardFrameEndUserInfoKey]?.CGRectValue.size.height {
            tableView.contentInset = UIEdgeInsetsMake(0, 0, keyboardHeight, 0)
        }
    }
}

func keyboardWillHide(notification: NSNotification) {
    tableView.contentInset = UIEdgeInsetsMake(0, 0, 0, 0)
}

//Objective-C
- (void)viewDidLoad {

   [super viewDidLoad];


    [[NSNotificationCenter defaultCenter] addObserver:self
selector:@selector(keyboardWillShow:) name:UIKeyboardWillShowNotification object:nil];
    [[NSNotificationCenter defaultCenter] addObserver:self
selector:@selector(keyboardWillHide:) name:UIKeyboardWillHideNotification object:nil];

}

- (void)keyboardWillShow:(NSNotification *)notification {

    NSDictionary *userInfo = [notification userInfo];

    if (userInfo) {

        CGRect keyboardEndFrame;
        [[userInfo objectForKey:UIKeyboardFrameEndUserInfoKey] getValue:&keyboardEndFrame];
```

```
        tableView.contentInset = UIEdgeInsetsMake(0, 0, keyboardEndFrame.size.height, 0);

    }

}

- (void)keyboardWillHide:(NSNotification *)notification {

    tableView.contentInset = UIEdgeInsetsMake(0, 0, 0, 0);

}
```

2. TPKeyboardAvoidingTableView TPKeyboardAvoidingScrollView .
   https://github.com/michaeltyson/TPKeyboardAvoiding

(Objective-C).

```
- (void)viewDidLoad {
    [super viewDidLoad];

    // dismiss keyboard when tap outside a text field
    UITapGestureRecognizer *tapGestureRecognizer = [[UITapGestureRecognizer alloc]
initWithTarget:self.view action:@selector(endEditing:)];
    [tapGestureRecognizer setCancelsTouchesInView:NO];
    [self.view addGestureRecognizer:tapGestureRecognizer];
}
```

Swift .

```
override func viewDidLoad() {
    super.viewDidLoad()

    // dismiss keyboard when tap outside a text field
    let tapGestureRecognizer: UITapGestureRecognizer = UITapGestureRecognizer(target: self,
action: #selector(YourVCName.dismissKeyboard))
    view.addGestureRecognizer(tapGestureRecognizer)
}

//Calls this function when the tap is recognized.
func dismissKeyboard() {
    //Causes the view (or one of its embedded text fields) to resign the first responder
status.
    view.endEditing(true)
}
```

Swift 3 / iOS 10

```
class vc: UIViewController {
    override func viewDidLoad() {
        super.viewDidLoad()
        // Do any additional setup after loading the view, typically from a nib.

        txtSomeField.delegate = self
    }
}
```

```
extension vc: UITextFieldDelegate {
    //Hide the keyboard for any text field when the UI is touched outside of the keyboard.
    override func touchesBegan(_ touches: Set<UITouch>, with event: UIEvent?)
    {
        self.view.endEditing(true) //Hide the keyboard
    }
}
```

. . .

- `UIView` Swift Objective-C .xib .
- `UITextField` .
- .

.xib .

- Xcode **> > ...> iOS> >** .xib .
- Keyboard.xib .
- .
- .
- File 's Owner ( ) `Keyboard` . . . .

.swift UIView

- Xcode **File> New> File ...> iOS> Source> Cocoa Touch Class** Swift Objective-C . `UIView`
- `Keyboard.swift` (Objective-C `Keyboard`)
- Swift .

```
  import UIKit

  // The view controller will adopt this protocol (delegate)
  // and thus must contain the keyWasTapped method
  protocol KeyboardDelegate: class {
      func keyWasTapped(character: String)
  }

  class Keyboard: UIView {

      // This variable will be set as the view controller so that
      // the keyboard can send messages to the view controller.
      weak var delegate: KeyboardDelegate?

      // MARK:- keyboard initialization

      required init?(coder aDecoder: NSCoder) {
          super.init(coder: aDecoder)
          initializeSubviews()
      }

      override init(frame: CGRect) {
          super.init(frame: frame)
          initializeSubviews()
      }

      func initializeSubviews() {
          let xibFileName = "Keyboard" // xib extention not included
          let view = NSBundle.mainBundle().loadNibNamed(xibFileName, owner: self,
options: nil)[0] as! UIView
          self.addSubview(view)
          view.frame = self.bounds
      }

      // MARK:- Button actions from .xib file

      @IBAction func keyTapped(sender: UIButton) {
          // When a button is tapped, send that information to the
          // delegate (ie, the view controller)
          self.delegate?.keyWasTapped(sender.titleLabel!.text!) // could alternatively
send a tag value
      }

  }
```

- Objective-C .

Keyboard.h

```
#import <UIKit/UIKit.h>
```

```
// The view controller will adopt this protocol (delegate)
// and thus must contain the keyWasTapped method
@protocol KeyboardDelegate<NSObject>
- (void)keyWasTapped:(NSString *)character;
@end

@interface Keyboard : UIView
@property (nonatomic, weak) id<KeyboardDelegate> delegate;
@end
```

Keyboard.m

```
#import "Keyboard.h"

@implementation Keyboard

- (id)initWithCoder:(NSCoder *)aDecoder {
    self = [super initWithCoder:aDecoder];
    [self initializeSubviews];
    return self;
}

- (id)initWithFrame:(CGRect)frame {
    self = [super initWithFrame:frame];
    [self initializeSubviews];
    return self;
}

- (void)initializeSubviews {
    NSString *xibFileName = @"Keyboard"; // xib extention not included
    UIView *view = [[[NSBundle mainBundle] loadNibNamed:xibFileName owner:self
options:nil] firstObject];
    [self addSubview:view];
    view.frame = self.bounds;
}

// MARK:- Button actions from .xib file

-(IBAction)keyTapped:(UIButton *)sender {
    // When a button is tapped, send that information to the
    // delegate (ie, the view controller)
    [self.delegate keyWasTapped:sender.titleLabel.text]; // could alternatively send a
tag value
}

@end
```

- .xib Swift Objective-C `@IBAction` .
- . .

- `UITextField IBOutlet . textField .`
- Swift View Controller .

```
  import UIKit
```

```
  class ViewController: UIViewController, KeyboardDelegate {

      @IBOutlet weak var textField: UITextField!

      override func viewDidLoad() {
          super.viewDidLoad()

          // initialize custom keyboard
          let keyboardView = Keyboard(frame: CGRect(x: 0, y: 0, width: 0, height: 300))
          keyboardView.delegate = self // the view controller will be notified by the
keyboard whenever a key is tapped

          // replace system keyboard with custom keyboard
          textField.inputView = keyboardView
      }

      // required method for keyboard delegate protocol
      func keyWasTapped(character: String) {
          textField.insertText(character)
      }
  }
```

- Objective-C .

.h

```
#import <UIKit/UIKit.h>

@interface ViewController : UIViewController

@end
```

.m

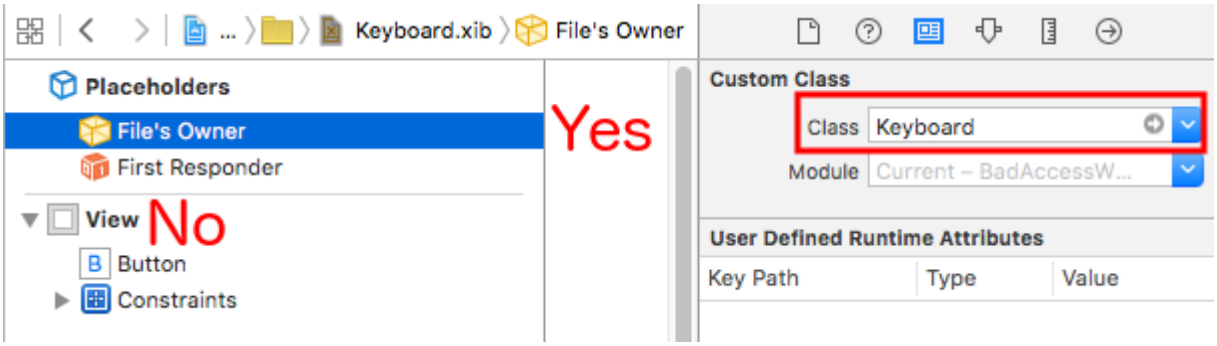
```
#import "ViewController.h"
#import "Keyboard.h"

@interface ViewController ()<KeyboardDelegate>

@property (nonatomic, weak) IBOutlet UITextField *textField;

@end

@implementation ViewController

- (void)viewDidLoad {
    [super viewDidLoad];
    // Do any additional setup after loading the view, typically from a nib.

    // initialize custom keyboard
    Keyboard *keyboardView = [[Keyboard alloc] initWithFrame:CGRectMake(0, 0, 0, 300)];
    keyboardView.delegate = self; // the view controller will be notified by the keyboard
whenever a key is tapped

    // replace system keyboard with custom keyboard
    self.textField.inputView = keyboardView;
}
```

```
- (void)keyWasTapped:(NSString *)character {
    [self.textField insertText:character];
}

@end
```

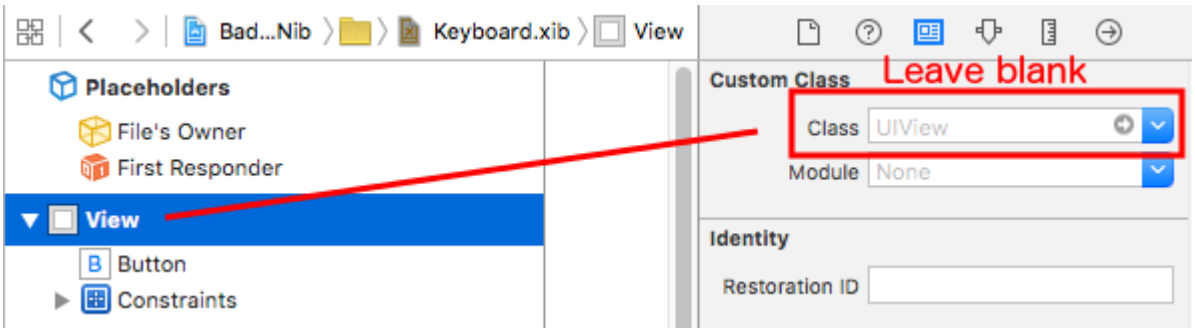
- View Controller `KeyboardDelegate` .

`EXC_BAD_ACCESS` nib File 's Owner `Keyboard` .

`Keyboard.nib` .



.



.

+

ViewController .

(NSNotification) :

```
class ViewController: UIViewController {
    override func viewDidLoad() {
        super.viewDidLoad()
        NSNotificationCenter.defaultCenter().addObserver(self, selector:
#selector(ViewController.keyboardNotification(_:)), name:
UIKeyboardWillChangeFrameNotification, object: nil)
    }
```

```
    func keyboardNotification(notification: NSNotification) {
        guard let userInfo = notification.userInfo else { return }

        let endFrame = (userInfo[UIKeyboardFrameEndUserInfoKey] as? NSValue)?.CGRectValue()
        let duration: NSTimeInterval = (userInfo[UIKeyboardAnimationDurationUserInfoKey] as?
NSNumber)?.doubleValue ?? 0
        let animationCurveRawNSN = userInfo[UIKeyboardAnimationCurveUserInfoKey] as? NSNumber
        let animationCurveRaw = animationCurveRawNSN?.unsignedLongValue ??
UIViewAnimationOptions.CurveEaseOut.rawValue
        let animationCurve: UIViewAnimationOptions = UIViewAnimationOptions(rawValue:
animationCurveRaw)

        if endFrame?.origin.y >= UIScreen.mainScreen().bounds.size.height {
            lowerViewBottomConstraint.constant = 0
        } else {
            lowerViewBottomConstraint.constant = endFrame?.size.height ?? 0.0
        }
        view.animateConstraintWithDuration(duration, delay: NSTimeInterval(0), options:
animationCurve, completion: nil)
    }
}
```

ViewController . Singleton + Delegate !

+ :

```
protocol KeyboardManagerDelegate: class {
    func keyboardWillChangeFrame(endFrame: CGRect?, duration: NSTimeInterval, animationCurve:
UIViewAnimationOptions)
}

class KeyboardManager {

    weak var delegate: KeyboardManagerDelegate?

    class var sharedInstance: KeyboardManager {
        struct Singleton {
            static let instance = KeyboardManager()
        }
        return Singleton.instance
    }

    init() {
        NSNotificationCenter.defaultCenter().addObserver(self, selector:
#selector(KeyboardManager.keyboardWillChangeFrameNotification(_:)), name:
UIKeyboardWillChangeFrameNotification, object: nil)
    }

    @objc func keyboardWillChangeFrameNotification(notification: NSNotification) {
        guard let userInfo = notification.userInfo else { return }

        let endFrame = (userInfo[UIKeyboardFrameEndUserInfoKey] as? NSValue)?.CGRectValue()
        let duration: NSTimeInterval = (userInfo[UIKeyboardAnimationDurationUserInfoKey] as?
NSNumber)?.doubleValue ?? 0
        let animationCurveRawNSN = userInfo[UIKeyboardAnimationCurveUserInfoKey] as? NSNumber
        let animationCurveRaw = animationCurveRawNSN?.unsignedLongValue ??
UIViewAnimationOptions.CurveEaseOut.rawValue
        let animationCurve: UIViewAnimationOptions = UIViewAnimationOptions(rawValue:
animationCurveRaw)
```

```
        delegate?.keyboardWillChangeFrame(endFrame, duration: duration, animationCurve:
animationCurve)
    }
}
```

ViewController ViewController .

```
class ViewController: UIViewController {
    override func viewWillAppear(animated: Bool) {
        super.viewWillAppear(animated)
        KeyboardManager.sharedInstance.delegate = self
    }
}

// MARK: - Keyboard Manager

extension ViewController: KeyboardManagerDelegate {
    func keyboardWillChangeFrame(endFrame: CGRect?, duration: NSTimeInterval, animationCurve:
UIViewAnimationOptions) {
        if endFrame?.origin.y >= UIScreen.mainScreen().bounds.size.height {
           lowerViewBottomConstraint.constant = 0
        } else {
            lowerViewBottomConstraint.constant = (endFrame?.size.height ?? 0.0)
        }
        view.animateConstraintWithDuration(duration, delay: NSTimeInterval(0), options:
animationCurve, completion: nil)
    }
}
```

! `UIKeyboardWillHideNotification` `UIKeyboardWillHideNotification` . `KeyboardManagerDelegate` .

`KeyboardManagerDelegate` `UIKeyboardWillHideNotification` :

```
protocol KeyboardManagerDelegate: class {
    func keyboardWillChangeFrame(endFrame: CGRect?, duration: NSTimeInterval, animationCurve:
UIViewAnimationOptions)
    func keyboardWillHide(notificationUserInfo: [NSObject: AnyObject])
}

class KeyboardManager {
    init() {
        NSNotificationCenter.defaultCenter().addObserver(self, selector:
#selector(KeyboardManager.keyboardWillChangeFrameNotification(_:)), name:
UIKeyboardWillChangeFrameNotification, object: nil)
        NSNotificationCenter.defaultCenter().addObserver(self, selector:
#selector(KeyboardManager.keyboardWillHide(_:)), name: UIKeyboardWillHideNotification, object:
nil)
    }

    func keyboardWillHide(notification: NSNotification) {
        guard let userInfo = notification.userInfo else { return }
        delegate?.keyboardWillHide(userInfo)
    }
}
```

ViewController `func keyboardWillHide(notificationUserInfo: [NSObject: AnyObject])` `func keyboardWillHide(notificationUserInfo: [NSObject: AnyObject])` . .

```
typealias KeyboardManagerDelegate = protocol<KeyboardManagerModel,
KeyboardManagerConfigureable>

protocol KeyboardManagerModel: class {
    func keyboardWillChangeFrame(endFrame: CGRect?, duration: NSTimeInterval, animationCurve:
UIViewAnimationOptions)
}

@objc protocol KeyboardManagerConfigureable {
    optional func keyboardWillHide(userInfo: [NSObject: AnyObject])
}
```

* `@objc` . http://www.jessesquires.com/avoiding-objc-in-swift/ !

, Singleton + Delegate .

: iOS .

:

UIViewController .

```
func keyboardWillShow(notification: NSNotification) {

    if let keyboardSize = (notification.userInfo?[UIKeyboardFrameBeginUserInfoKey] as?
NSValue)?.cgRectValue {
        if self.view.frame.origin.y == 0{
            self.view.frame.origin.y -= keyboardSize.height
        }
    }

}

func keyboardWillHide(notification: NSNotification) {
    if let keyboardSize = (notification.userInfo?[UIKeyboardFrameBeginUserInfoKey] as?
NSValue)?.cgRectValue {
        if self.view.frame.origin.y != 0{
            self.view.frame.origin.y += keyboardSize.height
        }
    }
}
```

`viewDidLoad()` .

```
NotificationCenter.default.addObserver(self, selector: #selector(Login.keyboardWillShow),
name: NSNotification.Name.UIKeyboardWillShow, object: nil)
NotificationCenter.default.addObserver(self, selector: #selector(Login.keyboardWillHide),
name: NSNotification.Name.UIKeyboardWillHide, object: nil)
```

height .

-C :

Objective-C .

```
- (void)viewWillAppear:(BOOL)animated {
    [super viewWillAppear:animated];
    [[NSNotificationCenter defaultCenter] addObserver:self
selector:@selector(keyboardWillShow:) name:UIKeyboardWillShowNotification object:nil];
    [[NSNotificationCenter defaultCenter] addObserver:self
selector:@selector(keyboardWillHide:) name:UIKeyboardWillHideNotification object:nil];
}

- (void)viewWillDisappear:(BOOL)animated {
    [super viewWillDisappear:animated];
    [[NSNotificationCenter defaultCenter] removeObserver:self
name:UIKeyboardWillShowNotification object:nil];
    [[NSNotificationCenter defaultCenter] removeObserver:self
name:UIKeyboardWillHideNotification object:nil];
}

- (void)keyboardWillShow:(NSNotification *)notification
{
    CGSize keyboardSize = [[[notification userInfo]
objectForKey:UIKeyboardFrameBeginUserInfoKey] CGRectValue].size;

    [UIView animateWithDuration:0.3 animations:^{
        CGRect f = self.view.frame;
        f.origin.y = -keyboardSize.height;
        self.view.frame = f;
    }];
}

-(void)keyboardWillHide:(NSNotification *)notification
{
    [UIView animateWithDuration:0.3 animations:^{
        CGRect f = self.view.frame;
        f.origin.y = 0.0f;
        self.view.frame = f;
    }];
}
```

: https://riptutorial.com/ko/ios/topic/436/-

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Examples

.

```
// Default UINavigationBar appearance throughout the app
[[UINavigationBar appearance] setTitleTextAttributes:@{NSForegroundColorAttributeName:
[UIColor whiteColor],
                                                       NSFontAttributeName : [UIFont
fontWithName:@"HelveticaNeue-CondensedBold" size:17],
                                                       }];

[[UINavigationBar appearance] setTintColor:[UIColor whiteColor]];
[[UINavigationBar appearance] setBarTintColor:[UIColor KNGRed]];
[[UINavigationBar appearance] setTranslucent:NO];
[[UINavigationBar appearance] setBarStyle:UIBarStyleBlack];
[[UIBarButtonItem appearanceWhenContainedIn: [UISearchBar class], nil] setTintColor:[UIColor
KNGGray]];
```

SWIFT

```
navigationController?.navigationBar.titleTextAttributes = [NSForegroundColorAttributeName:
UIColor.white, NSFontAttributeName:UIFont(name: "HelveticaNeue-CondensedBold", size: 17)!,]
navigationController?.navigationBar.tintColor = .white
navigationController?.navigationBar.barTintColor = .red
navigationController?.navigationBar.isTranslucent = false
navigationController?.navigationBar.barStyle = .black
```

: https://riptutorial.com/ko/ios/topic/7066/-

206:

- UIUserNotificationSettings.types : UIUserNotificationType // .
- UIUserNotificationSettings.categories : //

, , .

Examples

`didFinishLaunchingWithOptions` AppDelegate .

```
func application(application: UIApplication, didFinishLaunchingWithOptions launchOptions:
[NSObject: AnyObject]?) -> Bool {
    // Override point for customization after application launch.
    if UIDevice.currentDevice().systemVersion.compare(v, options: .NumericSearch) ==
NSOrderedAscending {
        // Register for Push Notitications, if running iOS < 8
        if application.respondsToSelector("registerUserNotificationSettings:") {
            let types:UIUserNotificationType = (.Alert | .Badge | .Sound)
            let settings:UIUserNotificationSettings = UIUserNotificationSettings(forTypes:
types, categories: nil)

            application.registerUserNotificationSettings(settings)
            application.registerForRemoteNotifications()
        } else {
            // Register for Push Notifications before iOS 8
            application.registerForRemoteNotificationTypes(.Alert | .Badge | .Sound)
        }
    } else {
        var center = UNUserNotificationCenter.currentNotificationCenter()
        center.delegate = self
        center.requestAuthorizationWithOptions((UNAuthorizationOptionSound |
UNAuthorizationOptionAlert | UNAuthorizationOptionBadge)) {(granted: Bool, error: NSError) ->
Void in
            if !error {
                UIApplication.sharedApplication().registerForRemoteNotifications()
                // required to get the app to do anything at all about push notifications
                print("Push registration success.")
            } else {
                print("Push registration FAILED")
                print("ERROR: \(error.localizedFailureReason!) -
\(error.localizedDescription)")
                print("SUGGESTIONS: \(error.localizedRecoveryOptions) -
\(error.localizedRecoverySuggestion!)")
            })
    }

    return true
}
```

-C

```
#define SYSTEM_VERSION_LESS_THAN(v) ([[[UIDevice currentDevice] systemVersion] compare:v
options:NSNumericSearch] == NSOrderedAscending)

if( SYSTEM_VERSION_LESS_THAN( @"10.0" ) )
{
        if ([application respondsToSelector:@selector(isRegisteredForRemoteNotifications)])
    {
        // iOS 8 Notifications
        [application registerUserNotificationSettings:[UIUserNotificationSettings
settingsForTypes:(UIUserNotificationTypeSound | UIUserNotificationTypeAlert |
UIUserNotificationTypeBadge) categories:nil]];

        [application registerForRemoteNotifications];
    }
    else
    {
        // iOS < 8 Notifications
        [application registerForRemoteNotificationTypes:
         (UIRemoteNotificationTypeBadge | UIRemoteNotificationTypeAlert |
UIRemoteNotificationTypeSound)];
    }

}
else
{
    UNUserNotificationCenter *center = [UNUserNotificationCenter currentNotificationCenter];
    center.delegate = self;
    [center requestAuthorizationWithOptions:(UNAuthorizationOptionSound |
UNAuthorizationOptionAlert | UNAuthorizationOptionBadge) completionHandler:^(BOOL granted,
NSError * _Nullable error)
     {
         if( !error )
         {
             [[UIApplication sharedApplication] registerForRemoteNotifications];  // required
to get the app to do anything at all about push notifications
             NSLog( @"Push registration success." );
         }
         else
         {
             NSLog( @"Push registration FAILED" );
             NSLog( @"ERROR: %@ - %@", error.localizedFailureReason,
error.localizedDescription );
             NSLog( @"SUGGESTIONS: %@ - %@", error.localizedRecoveryOptions,
error.localizedRecoverySuggestion );
         }
     }];
}


//to check if your App lunch from Push notification
//-------------------------------------------------
    //Handel Push notification
    if (launchOptions != nil)
    {
        // Here app will open from pushnotification
        //RemoteNotification
        NSDictionary* dictionary1 = [launchOptions
objectForKey:UIApplicationLaunchOptionsRemoteNotificationKey];
        //LocalNotification
        NSDictionary* dictionary2 = [launchOptions
objectForKey:UIApplicationLaunchOptionsLocalNotificationKey];
```

```
        if (dictionary1 != nil)
        {
            //RemoteNotification Payload
            NSLog(@"Launched from push notification: %@", dictionary1);
            //here handle your push notification
        }
        if (dictionary2 != nil)
        {
            NSLog(@"Launched from dictionary2dictionary2dictionary2 notification: %@",
dictionary2);
            double delayInSeconds = 7;
            dispatch_time_t popTime = dispatch_time(DISPATCH_TIME_NOW,
(int64_t)(delayInSeconds * NSEC_PER_SEC));
            dispatch_after(popTime, dispatch_get_main_queue(), ^(void){
                // [self addMessageFromRemoteNotification:dictionary2 updateUI:NO];
            });
        }

     }
     else
         {}
    //----------------------------------------------
```

APN (iOS APN).

APN .

AppDelegate .

```
func application(application: UIApplication, didRegisterForRemoteNotificationsWithDeviceToken
deviceToken: NSData) {
    print("DEVICE TOKEN = \(deviceToken)")
}

func application(application: UIApplication, didFailToRegisterForRemoteNotificationsWithError
error: NSError) {
    print(error)
}
```

-C

```
- (void)application:(UIApplication *)application
didRegisterForRemoteNotificationsWithDeviceToken:(NSData *)deviceToken
{
NSString * deviceTokenString = [[[[deviceToken description]
                     stringByReplacingOccurrencesOfString: @"<" withString: @""]
                    stringByReplacingOccurrencesOfString: @">" withString: @""]
                   stringByReplacingOccurrencesOfString: @" " withString: @""];

NSLog(@"The generated device token string is : %@",deviceTokenString);
}

- (void)application:(UIApplication*)application
didFailToRegisterForRemoteNotificationsWithError:(NSError*)error
{
    NSLog(@"Failed to get token, error: %@", error.description);
}
```

.

:

```
func application(application: UIApplication, didRegisterForRemoteNotificationsWithDeviceToken
deviceToken: NSData) {
    print("DEVICE TOKEN = \(deviceToken)")
}
```

Swift3 :

```
@objc(userNotificationCenter:willPresentNotification:withCompletionHandler:) @available(iOS
10.0, *)
func userNotificationCenter(_ center: UNUserNotificationCenter, willPresent notification:
UNNotification, withCompletionHandler completionHandler: @escaping
(UNNotificationPresentationOptions) -> Void)
{
    //To show notifications in foreground.
   print("Userinfo2 \(notification.request.content.userInfo)")
}
```

-C

```
- (void)application:(UIApplication *)application
didRegisterForRemoteNotificationsWithDeviceToken:(NSData *)deviceToken
{
if(application.applicationState == UIApplicationStateInactive) {
    NSLog(@"Inactive - the user has tapped in the notification when app was closed or in
background");
    //do some tasks
    [self handelPushNotification:userInfo];
}
else if (application.applicationState == UIApplicationStateBackground) {
    NSLog(@"application Background - notification has arrived when app was in background");
    [self handelPushNotification:userInfo];
}
else {
    NSLog(@"application Active - notication has arrived while app was opened");
    //Show an in-app banner
    //do tasks
}
}
```

:

```
func application(application: UIApplication, didFailToRegisterForRemoteNotificationsWithError
error: NSError) {
    print(error)
}
```

-C

```
- (void)application:(UIApplication*)application
didFailToRegisterForRemoteNotificationsWithError:(NSError*)error
```

APN .

```
let isPushEnabled = UIApplication.sharedApplication().isRegisteredForRemoteNotifications()
```

( )

AppDelegate.swift . (,) . .

```
let application = UIApplication.sharedApplication()
let settings = UIUserNotificationSettings(forTypes: [.Alert, .Badge, .Sound], categories: nil)
application.registerUserNotificationSettings(settings)
```

didRegisterUserNotificationSettings didRegisterUserNotificationSettings .

```
func application(application: UIApplication, didRegisterUserNotificationSettings
notificationSettings: UIUserNotificationSettings) {
    application.registerForRemoteNotifications()
}
```

. .

```
func application(application: UIApplication, didRegisterForRemoteNotificationsWithDeviceToken
deviceToken: NSData) {
    let tokenChars = UnsafePointer<CChar>(deviceToken.bytes)
    var tokenString = ""

    for i in 0..<deviceToken.length {
        tokenString += String(format: "%02.2hhx", arguments: [tokenChars[i]])
    }

    print("Push token: \(tokenString)")
}

func application(application: UIApplication, didFailToRegisterForRemoteNotificationsWithError
error: NSError) {
    print("didFailToRegisterForRemoteNotificationsWithError: \(error)")

}
```

. APNS . APNS API . . Apple .

. JSON .

```
func application(application: UIApplication, didReceiveRemoteNotification userInfo: [NSObject
: AnyObject]) {
    print("Received notification: \(userInfo)")
}
```

C

```
- (void)application:(UIApplication *)application didReceiveRemoteNotification: (NSDictionary
*)userInfo
{
    NSLog(@"Received notification: %@", userInfo);
}
```

iOS 10

```
#define SYSTEM_VERSION_GREATER_THAN_OR_EQUAL_TO(v)  ([[[UIDevice currentDevice] systemVersion]
compare:v options:NSNumericSearch] != NSOrderedAscending)

-(void) application:(UIApplication *)application didReceiveRemoteNotification:(NSDictionary
*)userInfo fetchCompletionHandler:(void
(^)(UIBackgroundFetchResult))completionHandler
{
    // iOS 10 will handle notifications through other methods
    NSLog(@"Received notification: %@", userInfo);


    if( SYSTEM_VERSION_GREATER_THAN_OR_EQUAL_TO( @"10.0" ) )
    {
        NSLog( @"iOS version >= 10. Let NotificationCenter handle this one." );
        // set a member variable to tell the new delegate that this is background
        return;
    }
    NSLog( @"HANDLE PUSH, didReceiveRemoteNotification: %@", userInfo );

    // custom code to handle notification content

    if( [UIApplication sharedApplication].applicationState == UIApplicationStateInactive )
   {
       NSLog( @"INACTIVE" );
       completionHandler( UIBackgroundFetchResultNewData );
   }
   else if( [UIApplication sharedApplication].applicationState == UIApplicationStateBackground
)
   {
       NSLog( @"BACKGROUND" );
       completionHandler( UIBackgroundFetchResultNewData );
   }
   else
   {
       NSLog( @"FOREGROUND" );
       completionHandler( UIBackgroundFetchResultNewData );
   }
}

- (void)userNotificationCenter:(UNUserNotificationCenter *)center
   willPresentNotification:(UNNotification *)notification
     withCompletionHandler:(void (^)(UNNotificationPresentationOptions
options))completionHandler
{
    NSLog( @"Handle push from foreground" );
   // custom code to handle push while app is in the foreground
    NSLog(@"%@", notification.request.content.userInfo);
}
```

```
- (void)userNotificationCenter:(UNUserNotificationCenter *)center
didReceiveNotificationResponse:(UNNotificationResponse *)response
     withCompletionHandler:(void (^)())completionHandler
{

    NSLog( @"Handle push from background or closed" );
    // if you set a member variable in didReceiveRemoteNotification, you  will know if this is
from closed or background
    NSLog(@"%@", response.notification.request.content.userInfo);
}
```

ID

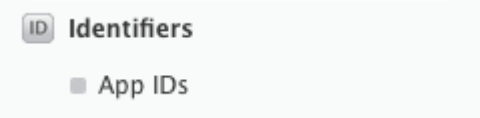
- Apple
- ID (: com.example.MyApp)
- developer.apple.com
- iOS ( )

Apple App ID APN

1- developer.apple.com . ( )

2- "" .

3 - 'App ID' .



4- "+" .

5 - ID .

6- App ID Edit .

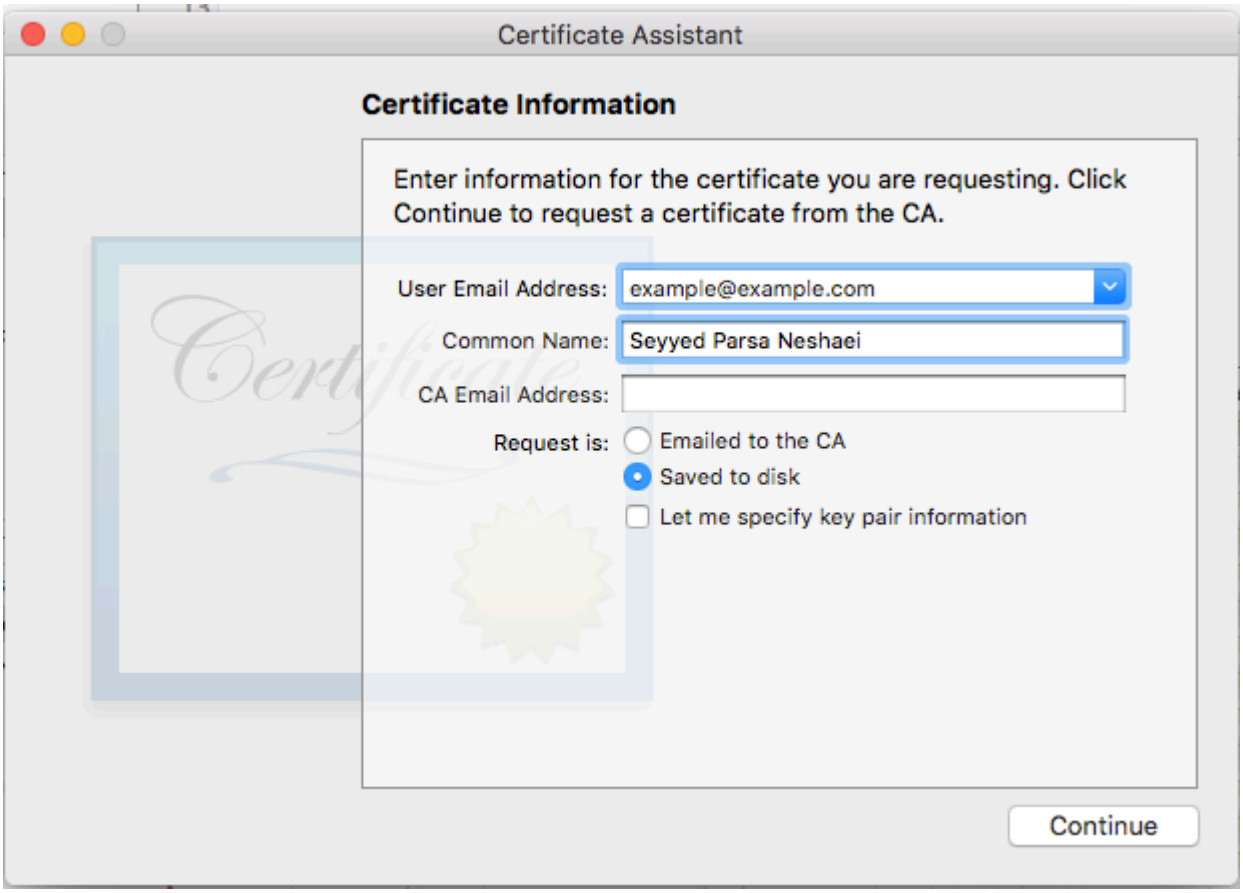
7 - .

Mac 8-

9 - -> .

.

11- .



12- CA .

13 - CA

14 - .

Apple .

Xcode APN

1-

2 -

3 .

.

.

-C

```
[[UIApplication sharedApplication] unregisterForRemoteNotifications];
```

```
UIApplication.sharedApplication().unregisterForRemoteNotifications()
```

.

: **.**

. . .

(`someNumber`).

-C

```
[UIApplication sharedApplication].applicationIconBadgeNumber = someNumber;
```

```
UIApplication.shared.applicationIconBadgeNumber = someNumber
```

`someNumber = 0` .

. PHP .

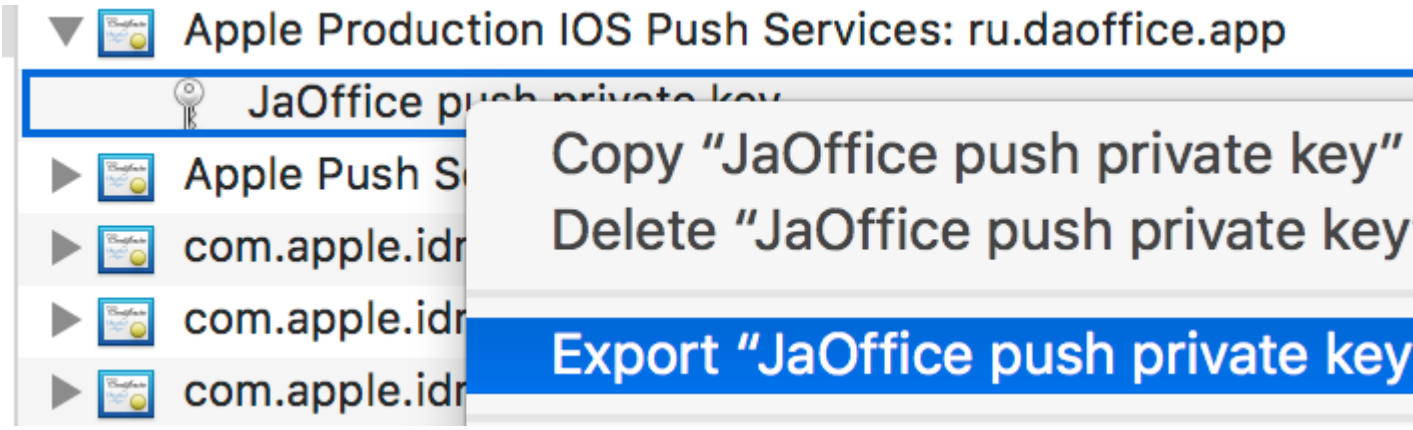
1. (: send_push.php) ( ) .
2. , .
3. , dev_path prod_path ('APNS ')
4. 'php send_push' .
5.

```
<?php

// Put your device token here (without spaces):
$deviceToken = '20128697f872d7d39e48c4a61f50cb11d77789b39e6fc6b4cd7ec80582ed5229';
// Put your final pem cert name here. it is supposed to be in the same folder as this script
$cert_name = 'final_cert.pem';
// Put your private key's passphrase here:
$passphrase = '1234';

// sample point
$alert = 'Hello world!';
$event = 'new_incoming_message';

// You can choose either of the paths, depending on what kind of certificate you are using
$dev_path = 'ssl://gateway.sandbox.push.apple.com:2195';
$prod_path = 'ssl://gateway.push.apple.com:2195';

////////////////////////////////////////////////////////////////////////////////

$ctx = stream_context_create();
stream_context_set_option($ctx, 'ssl', 'local_cert', $cert_name);
stream_context_set_option($ctx, 'ssl', 'passphrase', $passphrase);

// Open a connection to the APNS server
$fp = stream_socket_client(
    $dev_path, $err,
    $errstr, 60, STREAM_CLIENT_CONNECT|STREAM_CLIENT_PERSISTENT, $ctx);

if (!$fp)
    exit("Failed to connect: $err $errstr" . PHP_EOL);
```

```
echo 'Connected to APNS' . PHP_EOL;

// Create the payload body
// it should be as short as possible
// if the notification doesnt get delivered that is most likely
// because the generated message is too long
$body['aps'] = array(
                      'alert' => $alert,
                      'sound' => 'default',
                      'event' => $event
                      );

// Encode the payload as JSON
$payload = json_encode($body);

// Build the binary notification
$msg = chr(0) . pack('n', 32) . pack('H*', $deviceToken) . pack('n', strlen($payload)) .
$payload;

// Send it to the server
$result = fwrite($fp, $msg, strlen($msg));

if (!$result)
    echo 'Message not delivered' . PHP_EOL;
else
    echo 'Message successfully delivered' . PHP_EOL;

// Close the connection to the server
fclose($fp);
```

.cer .pem .

1. aps.cer .
2. " " .p12 (key.p12). . 1 . . .



3. .
4. .cer .pem

```
openssl x509 -in aps.cer -inform der -out aps.pem
```

5.

.pem . 2 . . .

```
openssl pkcs12 -nocerts -out key.pem -in key.p12
```

6. .

```
cat key.pem aps.pem > final_cert.pem
```

7. final_cert.pem . 5 .

: https://riptutorial.com/ko/ios/topic/3492/-

207:

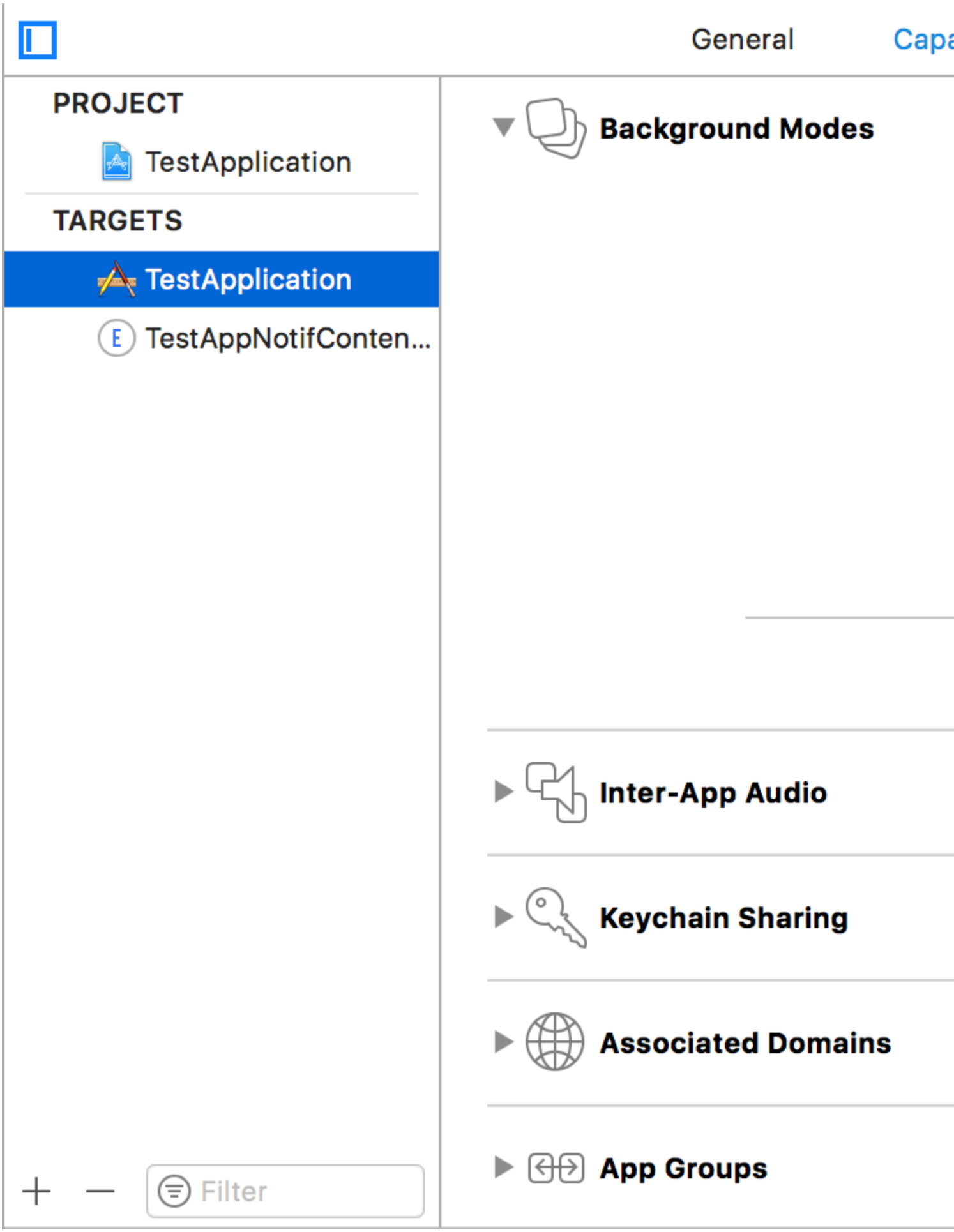
. UNNotificationServiceExtension UNNotificationContentExtension . , .

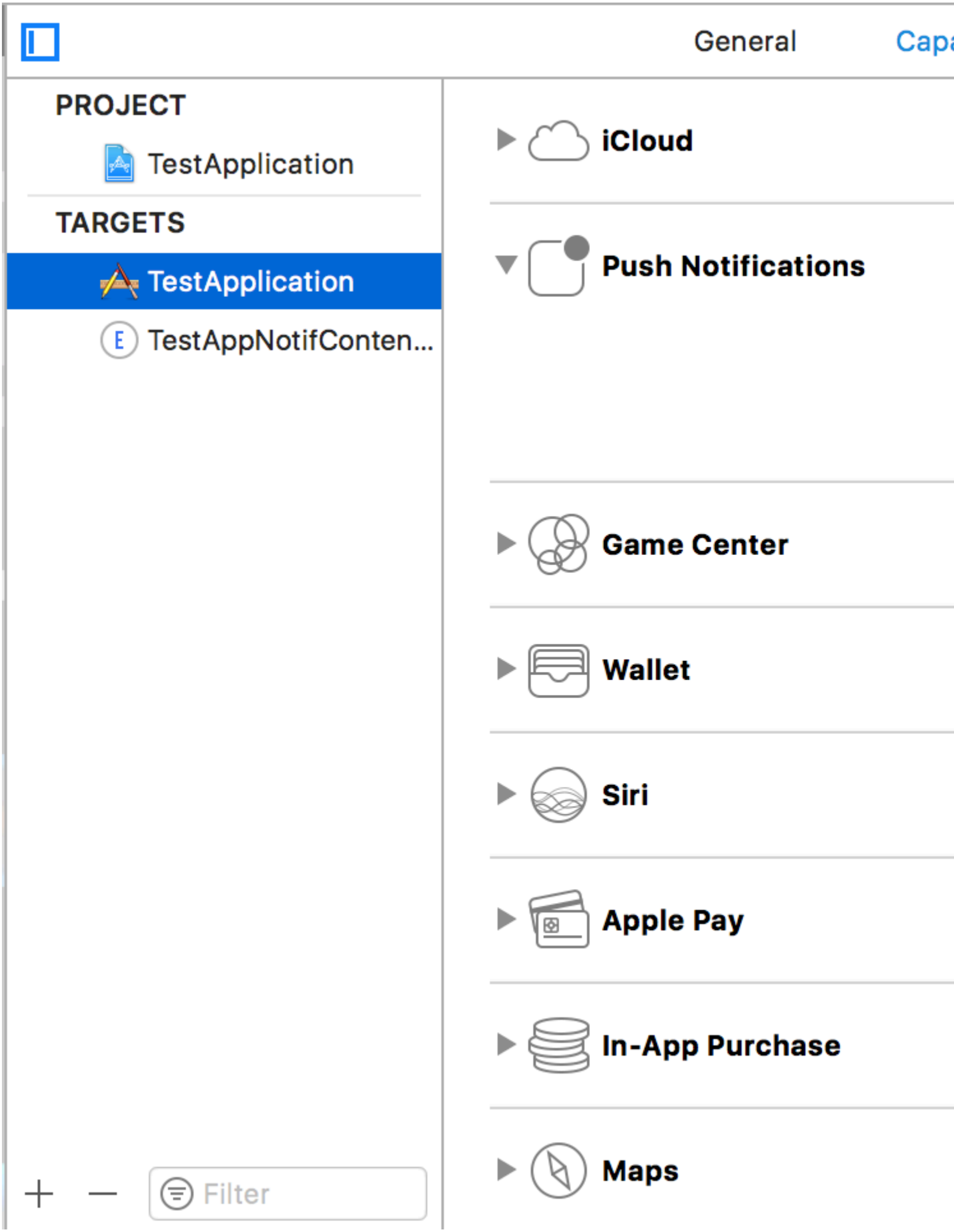
Examples

UNNotificationContentExtension

1

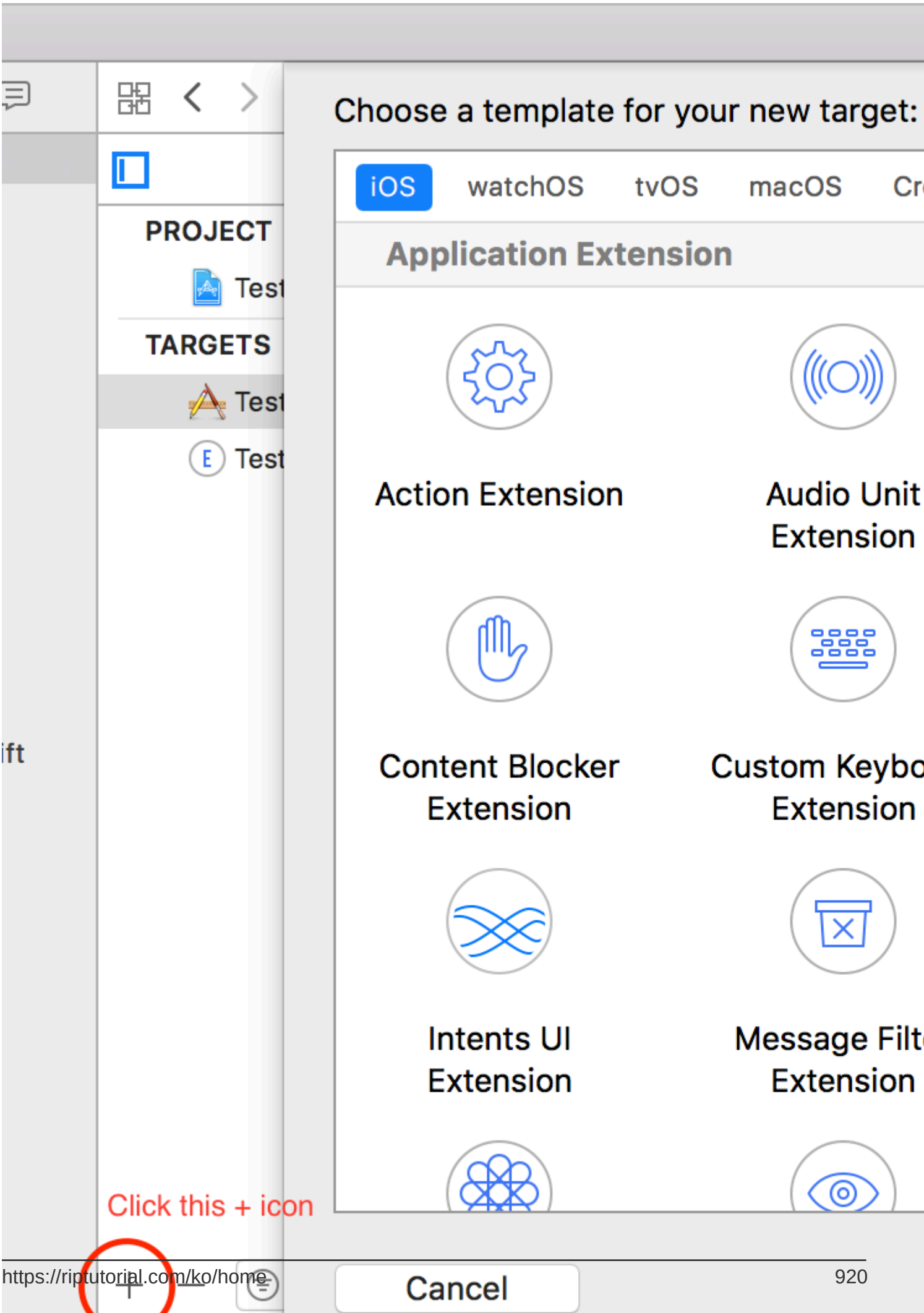
. .


General
Capa
PROJECT
TestApplication
TARGETS
TestApplication
TestAppNotifConten...
Filter
Background Modes
Inter-App Audio
Keychain Sharing
Associated Domains
App Groups


General
Capa
PROJECT
TestApplication
TARGETS
TestApplication
TestAppNotifConten...
Filter
iCloud
Push Notifications
Game Center
Wallet
Siri
Apple Pay
In-App Purchase
Maps

2 : UNNotificationContentExtension

+ -> -> ->


Choose a template for your new target:
iOS
watchOS
tvOS
macOS
Application Extension
Action Extension
Audio Unit Extension
Content Blocker Extension
Custom Keyboard Extension
Intents UI Extension
Message Filter Extension
PROJECT
Test
TARGETS
Test
Test
Click this + icon
Cancel

- UNNotificationDefaultContentHidden : .
- UNNotificationCategory : `UNUserNotificationCenter` `UNUserNotificationCenter` . UI
  . .
  . .
- UNNotificationExtensionInitialContentSizeRatio : , ContentExtension . 1 .

4 : `UNNotificationAction` `UNNotificationCategory`

AppDelegate.swift `didFinishLaunchingWithOptions`

```
    let userNotificationAction:UNNotificationAction = UNNotificationAction.init(identifier:
"ID1", title: "வணக்கம்", options: .destructive)
    let userNotificationAction2:UNNotificationAction = UNNotificationAction.init(identifier:
"ID2", title: "Success", options: .destructive)

    let notifCategory:UNNotificationCategory = UNNotificationCategory.init(identifier:
"CATID1", actions: [userNotificationAction,userNotificationAction2], intentIdentifiers:
["ID1","ID2"] , options:.customDismissAction)

    UNUserNotificationCenter.current().delegate = self
    UNUserNotificationCenter.current().setNotificationCategories([notifCategory])
    UIApplication.shared.registerForRemoteNotifications()
```

`ID1` `ID2` `UNNotificationAction` `CATID1` (ContentExtension info.plist categoryID plist)
`UNNotificationCategory` . `UNUserNotificationCenter`
`didRegisterForRemoteNotificationsWithDeviceToken`

: AppDelegate.swift `import UserNotifications` `import UserNotifications`
`UNUserNotificationCenterDelegate`

5 : NotificationContent

```
 'aps': {
    'badge': 0,
    'alert': {
        'title': "Rich Notification",
        'body': "Body of RICH NOTIFICATION",
        },
    'sound' : "default",
    'category': "CATID1",
    'mutable-content':"1",
    },
'attachment': "2"
```

6 : ContentExtension

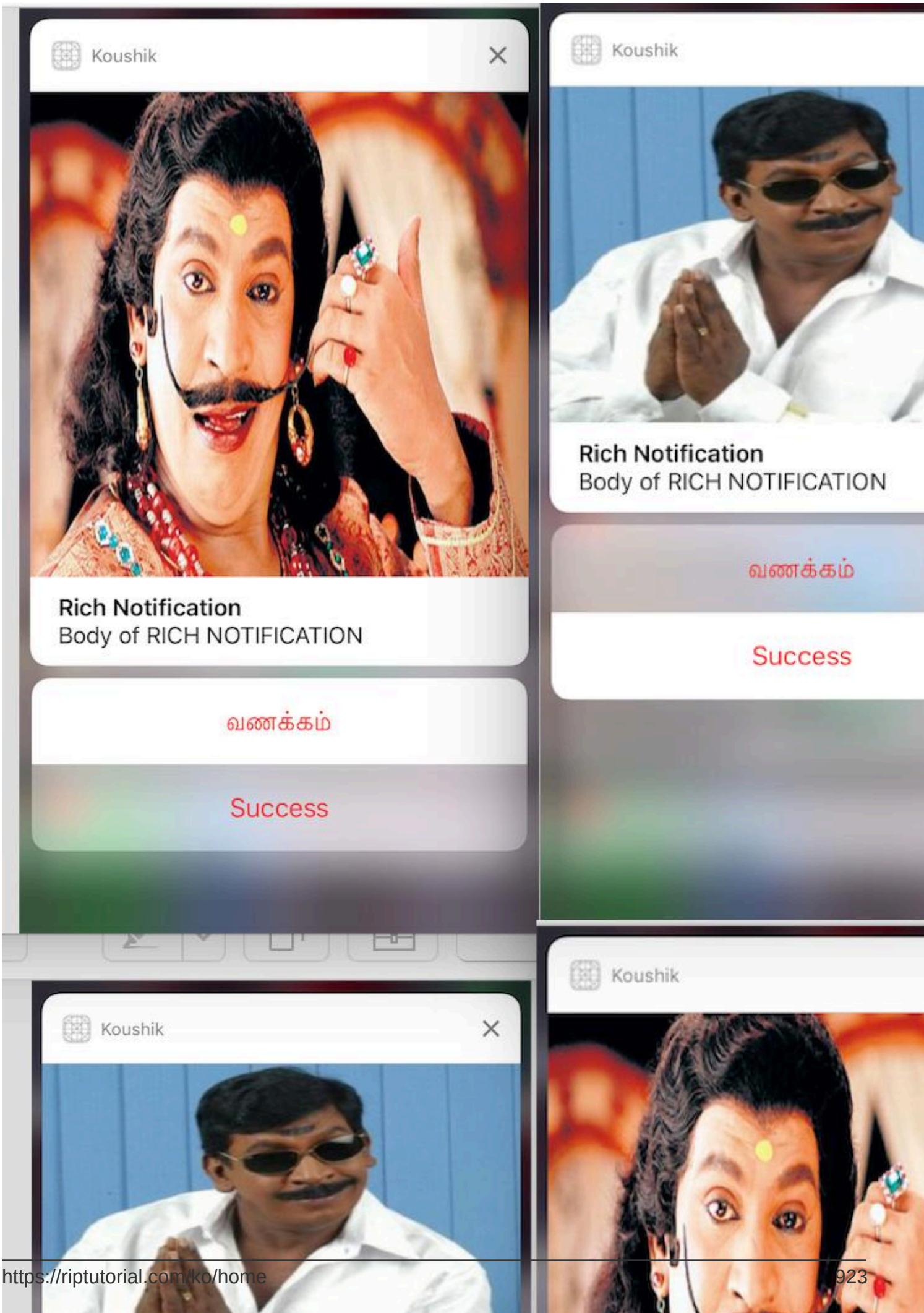
. .

```
import UIKit
import UserNotifications
import UserNotificationsUI

class NotificationViewController: UIViewController, UNNotificationContentExtension {
```

```
@IBOutlet var imageView: UIImageView?
override func viewDidLoad() {
    super.viewDidLoad()
}

func didReceive(_ notification: UNNotification) {
     self.title = "Koushik"
    imageView?.backgroundColor = UIColor.clear
    imageView?.image = #imageLiteral(resourceName: "welcome.jpeg")
}

func didReceive(_ response: UNNotificationResponse, completionHandler completion: @escaping
(UNNotificationContentExtensionResponseOption) -> Void) {

    self.title = "Koushik"
    imageView?.image = UIImage.init(named: "Success.jpeg")

    if(response.actionIdentifier == "ID1")
    {
       imageView?.image = UIImage.init(named: "Success.jpeg")
    }
    else
    {
        imageView?.image = UIImage.init(named: "welcome.jpeg")
    }

    }
}
```

7 :

/ .


Koushik
Rich Notification
Body of RICH NOTIFICATION
வணக்கம்
Success
Koushik
Rich Notification
Body of RICH NOTIFICATION
வணக்கம்
Success
Koushik
Koushik

`UNNotificationExtensionDefaultContentHidden` YES 3 4 .

: https://riptutorial.com/ko/ios/topic/10769/-

208: - iOS 10.

iOS 10 / API `UserNotifications.framework` . .

, , . 50MB / gif / .

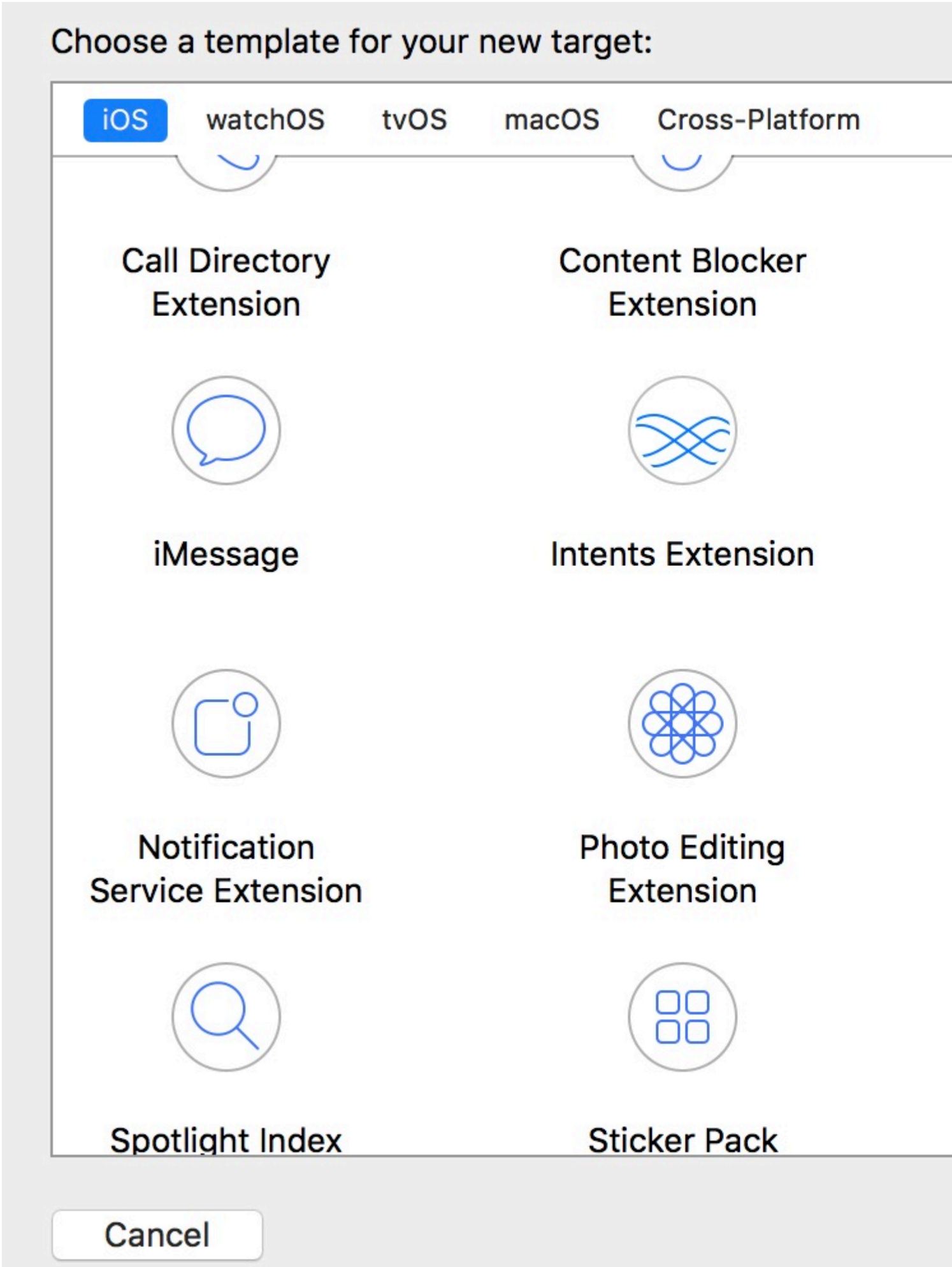
Examples

?

.

. .

1. xCode `Navigator Targets . Add New Target .`
2. `Notification Content Extension` :



3. `info.plist` `UNNotificationExtensionCategory` .

5. `category key` Info.plist (3).

:

```
{
 aps: {
 alert: { … },
 category: 'io.swifting.notification-category'
 }
}
```

:

```
let mutableNotificationContent = UNMutableNotificationContent()
mutableNotificationContent.category = "io.swifting.notification-category"
mutableNotificationContent.title = "Swifting.io Notifications"
mutableNotificationContent.subtitle = "Swifting.io presents"
mutableNotificationContent.body = "Custom notifications"
```

API (
https://developer.apple.com/reference/usernotificationsui/unnotificationcontentextension?utm_source=swi
.

- iOS 10. : https://riptutorial.com/ko/ios/topic/9501/------ios-10-

209:

Core Data . iOS SDK Model-View-Controller .

API . . . .

Examples

:

```
NSManagedObjectContext *context = ((AppDelegate*)[[UIApplication sharedApplication]
delegate]).persistentContainer.viewContext;
```

:

```
NSFetchRequest<EntityName *> *fetchRequest = [EntityName fetchRequest];
NSError *error ;
NSArray *resultArray= [context executeFetchRequest:fetchRequest error:&error];
```

.

```
NSFetchRequest<EntityName *> *fetchRequest = [EntityName fetchRequest];
NSSortDescriptor *sortDescriptor = [NSSortDescriptor sortDescriptorWithKey:@"someKey"
ascending:YES];
fetchRequest.sortDescriptors = @[sortDescriptor];
NSError *error ;
NSArray *resultArray= [context executeFetchRequest:fetchRequest error:&error];
```

,

```
NSManagedObject *entityNameObj = [NSEntityDescription
insertNewObjectForEntityForName:@"EntityName" inManagedObjectContext:context];
[entityNameObj setValue:@"someValue" forKey:@"someKey"];
```

.

```
[((AppDelegate*)[[UIApplication sharedApplication] delegate]) saveContext];
```

: https://riptutorial.com/ko/ios/topic/9489/-

210:

iOS . . iOS , .

Examples

iOS

Localizable.strings . . - .

```
"str" = "str-language";
```

Objective-C str :

```
//Try to provide description on the localized string to be able to create a proper
documentation if needed
NSString *str = NSLocalizedString(@"string", @"description of the string");
```

Swift str :

```
let str = NSLocalizedString("string", comment: "language");
```

: https://riptutorial.com/ko/ios/topic/1579/

S. No		Contributors
1	iOS	Ali Beadle, Allan Burleson, Anand Nimje, Anatoliy, Ashutosh Dave, Bhadresh Kathiriya, bjtitus, Blachshma, bmike, Charlie H, Cin316, Community, Dair, dan, deyanm , Efraim Weiss, Erik Godard, FelixSFD, Fogmeister, Hudson Taylor, Irfan, J F, Jack Ngai, James, Josh Brown, jrf, Kampai, Kevin, Losiowaty, M. Galban, Maddyゾゾ, Matthew Cawley, Md. Ibrahim Hassan, Midhun MP, Miguel Cabezas, Muhammad Zohaib Ehsan, Pro Q, PSN, RamenChef, Sam Fischer, Seyyed Parsa Neshaei, shim, Skeleton Bow, Stephen Leppik, Steve Moser, Suragch, SuzGupta, The_Curry_Man, ThrowingSpoon, Undo, user3480295, user6939352, Vignan
2	3D	4444, Harshal Bhavsar, LinusGeffarth, Md. Ibrahim Hassan, Onur Tuna, Stephen Leppik, tobeiosdeveloper
3	AFNetworking	4444, Mayank Patel, OhadM, Ruby
4	AppDelegate	CodeChanger, Oleh Zayats, Saumil Shah
5	Applicationloader appstore .ipa	Anuj Joshi
6	ARC (Automatic Reference Counting)	4444, Irfan, John Militer, Ketan P, Tricertops
7	Autolayout /	Mehul Chuahan
8	AVPlayer AVPlayerViewController	Bonnie, Chirag Desai, Gazi Alankus, Harshal Bhavsar, Konda Yadav, Stephen Leppik
9	AVSpeechSynthesizer	Ali Beadle, Bhumit Mehta, Harshal Bhavsar, Midhun MP, Stephen Leppik
10	AWS SDK	OhadM
11	CAAnimation	Bhavin Ramani, James P, Mr. Xcoder, Narendra Pandey, Rahul, Rob, Undo
12	CAGradientLayer	Bhavin Ramani, Harshal Bhavsar, Sam Fischer, Stephen Leppik, Undo
13	CALayer	Alistra, Dunja Lalic, HariKrishnan.P, Harshal Bhavsar, ignotusverum, iOS BadBoy, Kamil Harasimowicz, Luiz

		Henrique Guimaraes, Stephen Leppik, Suragch, Viktor Simkó, william205
14	CAShapeLayer	Filip Radelic, HariKrishnan.P, Harshal Bhavsar, Narendra Pandey, Stephen Leppik
15	CGContext	4444, Narendra Pandey
16	CLLocation	amar, Duly Kinsky, FelixSFD, Siddharth Sunil, Sujania, That lazy iOS Guy , void, Zee
17	CloudKit	Seyyed Parsa Neshaei
18	CoreBluetooth	Beto Caldas
19	CoreImage / OpenCV	Md. Ibrahim Hassan
20	CoreImage	Md. Ibrahim Hassan
21	CTCallCenter	MANI, Md. Ibrahim Hassan, OhadM
22	Cydia	gkpln3
23	DispatchGroup	Brandon, Fonix
24	EventKit	Seyyed Parsa Neshaei
25	FacebookSDK	Brian, Harshal Bhavsar, Irfan, Mehul Chuahan, OhadM, Ravi Prakash Verma, Stephen Leppik
26	FileHandle	Nikhlesh Bagdiya
27	GameCenter	4444, Cyril Ivar Garcia, Harshal Bhavsar, Stephen Leppik
28	GameplayKit	BennX, Seyyed Parsa Neshaei
29	GCD ( )	Andrea Antonioni, DS Dharma, Fonix, Md. Ibrahim Hassan, skyline75489
30	GPX iOS	Uma
31	HTML NSAttributed .	Md. Ibrahim Hassan
32	IBOutlets	Fabio, SharkbaitWhohaha
33	iOS - Robbie Hanson XMPP	Saheb Roy
34	iOS 10 API	rohit90, Stephen Leppik
35	iOS Google Places API	Cyril Ivar Garcia, Vignan

36	iOS TTS	Ali Abbas, Stephen Leppik
37	iOS	Bhavin Ramani, byJeevan, James P, Joshua, njuri, Samuel Teferra, Sandy
38	iOS	bryanjclark, Dunja Lalic, FelixSFD, sanman
39	iOS	Saeed-rz
40	iOS PDF	Mansi Panchal, Narendra Pandey
41	iOS AirPrint	Md. Ibrahim Hassan
42	iOS Core SpotLight	Md. Ibrahim Hassan
43	MKDistanceFormatter	Harshal Bhavsar, Md. Ibrahim Hassan, Stephen Leppik, Undo
44	MKMapView	Arnon Rodrigues, Brian, FelixSFD, Harshal Bhavsar, Kosuke Ogawa, Mahesh, Mehul Thakkar, Ortwin Gentz, Reinier Melian, Stephen Leppik
45	ModelPresentationStyles	Dishant Kapadiya
46	MPMediaPickerDelegate	FelixSFD, George Lee
47	MPVolumeView	lostAtSeaJoshua
48	MVP	Oleh Zayats
49	MVVM	JPetric
50	MyLayout	
51	NSArray	Krunal, user5553647
52	NSAttributedString	Bhavin Ramani, Harshal Bhavsar, Jinhuan Li, Kirit Modi, Luiz Henrique Guimaraes, Mansi Panchal, Stephen Leppik, Tim, Tim Ebenezer, Undo
53	NSAttributedString UIImage .	Md. Ibrahim Hassan
54	NSBundle	wdywayne
55	NSData	Felipe Cypriano, maxkonovalov, Seyyed Parsa Neshaei
56	NSDate	Bonnie, Charles, dasdom, Dunja Lalic, ERbittuu, FelixSFD, Harshal Bhavsar, Jon Snow, Josh Caswell, lostAtSeaJoshua, maxkonovalov, Mehul Thakkar, NSNoob, Nykholas, OhadM, Sally, Samuel Teferra,

		Sandy, Seyyed Parsa Neshaei, Stephen Leppik, tharkay, tobeiosdeveloper
57	NSHTTPCookieStorage	balagurubaran
58	NSInvocation	Md. Ibrahim Hassan
59	NSNotificationCenter	Alex Kallam, Alex Koshy, Anand Nimje, Bence Pattogato, Bright Future, Ichthyocentaurs, Jacopo Penzo, James P, Kirit Modi, Tarun Seera
60	NSPredicate	Brendon Roberto, Joshua, Mehul Chuahan
61	NSTimer	AJ9, James P, Maddyツヅ, Samuel Teferra, tfrank377, That lazy iOS Guy , Undo, william205
62	NSURL	Adnan Aftab, ApolloSoftware, tharkay
63	NSURL	bluey31, dasdom, dgatwood, Duly Kinsky, Harshal Bhavsar, Narendra Pandey, Otávio, R P, sage444, Stephen Leppik
64	NSURLConnection	byJeevan
65	NSUserActivity	Samuel Spencer
66	NSUserDefaults	Anand Nimje, Emptyless, Harshal Bhavsar, Husein Behboodi Rad, J F, James P, Josh Caswell, Kirit Modi, Mr. Xcoder, Roland Keesom, Seyyed Parsa Neshaei, user3760892, william205
67	Objective-C	Noam
68	Objective-C	halil_g
69	OpenGL	Fonix
70	plist iOS	SNarula
71	QR	Bluewings, Efraim Weiss
72	SLComposeViewController	Md. Ibrahim Hassan
73	SqlCipher	Nirav
74	StackView UIScrollView	mourodrigo
75	StoreKit	askielboe
76	Swift : AppDelegate rootViewController /	cleverbit

77	SWIFT BRIDGING HEADER	yogesh wadhwa
78	SWRevealViewController	Reinier Melian, tharkay
79	UI	P. Pawluś
80	UIActivityViewController	Amandeep, Harshal Bhavsar, Stephen Leppik, Vivek Molkar
81	UIAlertController	Andrii Chernenko, Arefly, Bhavin Ramani, FelixSFD, Harshal Bhavsar, Irfan, juliand665, Kirit Modi, Muhammad Zohaib Ehsan, Narendra Pandey, Nikita Kurtin, NSNoob, pableiros, Senseful, Seyyed Parsa Neshaei, shim, Stephen Leppik, Sunil Sharma, Suragch, user3480295
82	UIAppearance	azimov, Harshal Bhavsar, Stephen Leppik, Undo
83	UIBarButtonItem	Ahmed Khalaf, Dunja Lalic, hgwhittle, Suragch, william205
84	UIBezierPath	Bean, Igor Bidiniuc, Suragch, Teja Nandamuri
85	UIButton	Aleksei Minaev, Arefly, dasdom, ddb, Fabio Berger, FelixSFD, fredpi, James, James P, Jojodmo, Joshua, mattblessed, Mr. Xcoder, mtso, Nate Lee, NSNoob, P. Pawluś, Quantm, RamenChef, Roland Keesom, Sachin S P, tharkay, Viktor Simkó, william205, WMios
86	UICollectionView	Adam Eberbach, AJ9, Alex Koshy, Anand Nimje, Anh Pham, Bhavin Ramani, Bhumit Mehta, Brian, Dalija Prasnikar, ddb, Dima Deplov, Harshal Bhavsar, Kevin DiTraglia, Koushik, Mark, Rodrigo de Santiago, Stephen Leppik, Suragch, Undo
87	UICollectionView UIKit	beyowulf
88	UIColor	Amanpreet, Anh Pham, Avineet Gupta, Brett Ponder, Cin316, Community, dasdom, DeyaEldeen, Douglas Hill, Elias Datler, Fabio Berger, FelixSFD, Gary Riches, Harshal Bhavsar, Honey, ing0, iphonic, Irfan, JAL, Jaleel Nazir, Jojodmo, Luca D'Alberti, maxkonovalov, mtso, nielsbot, NSNoob, pableiros, Reinier Melian, Rex, Sally, Samer Murad, Sandy, shim, The_Curry_Man, Tommie C., Viktor Simkó, WMios, Yagnesh Dobariya
89	UIControl -	Brandon
90	UIDatePicker	Pavel Gatilov

91	UIDevice	Bhavin Ramani, FelixSFD, Md. Ibrahim Hassan, Mehul Chuahan, Nef10, pableiros, Ramkumar chintala
92	UIFeedbackGenerator	beyowulf
93	UIFont	Mr. Xcoder
94	UIGestureRecognizer	Adam Preble, dannyzlo, Dunja Lalic, Harshal Bhavsar, John Leonardo, Josh Caswell, Md. Ibrahim Hassan, Ruby , Stephen Leppik, Sujania, Suragch, Undo
95	UIImage	Adrian Schönig, Alexander Tkachenko, Bean, Bhavin Ramani, Dipen Panchasara, Dunja Lalic, Emptyless, FelixSFD, Harshal Bhavsar, Heberti Almeida, Jimmy James, Mahmoud Adam, maxkonovalov, Md. Ibrahim Hassan, Muhammad Zeeshan, RamenChef, Reinier Melian, Rex, rob180, Ronak Chaniyara, sage444, Sandy, Seyyed Parsa Neshaei, Sujania, Sunil Sharma, The_Curry_Man, user3480295, Vineet Choudhary
96	UIImage	Rahul
97	UIImagePickerController	Brian, stonybrooklyn, william205
98	UIImageView	Adam Eberbach, Anh Pham, Bean, Caleb Kleveter, DeyaEldeen, Dunja Lalic, FelixSFD, il Malvagio Dottor Prosciutto, Irfan, Joshua, mattblessed, Md. Ibrahim Hassan, njuri, Quantm, Reinier Melian, Rex, Rob, Samuel Spencer, Sunil Sharma, Suragch, william205
99	UIImage .	Md. Ibrahim Hassan
100	UIKit	beyowulf, Mark Stewart, Md. Ibrahim Hassan
101	UILabel	4oby, Akilan Arasu, Alex Koshy, alvarolopez, Andres Canella, Andrii Chernenko, Anh Pham, Ashwin Ramaswami, AstroCB, Barlow Tucker, bentford, Bhumit Mehta, Brian, byJeevan, Caleb Kleveter, Chathuranga Silva, Chris Brandsma, Cin316, Code.Warrior, Community, Daniel Bocksteger, Daniel Stradowski, danshevluk, dasdom, ddb, DeyaEldeen, Dunja Lalic, Eric, Erwin, esthepiking, Fabio Berger, Fahim Parkar, Felix, FelixSFD, Franck Dernoncourt, gadu, ggrana, GingerHead, gvuksic, HaemEternal, hankide, Hans Sjunnesson, Harshal Bhavsar, Hossam Ghareeb, idobn, Imanou Petit, iOS BadBoy, iphonic, Irfan, J F, Jacky, Jacobanks, johnpenning, Jojodmo, Josh Brown, Joshua, Joshua J. McKinnon, jtbandes, juanjo, kabiroberai, Kai Engelhardt, KANGKANG, Khanh Nguyen, Kireyin, leni,

		Luca D'Alberti, lufritz, Lukas, Luke Patterson, Lumialxk, Mad Burea, Mahmoud Adam, Md. Ibrahim Hassan, Moshe, Nadzeya, Narendra Pandey, Nathan Levitt, Nirav D, njuri, noelicus, NSNoob, Ollie, Quantm, Radagast the Brown, Rahul Vyas, RamenChef, ramsserio, rfarry, sage444, Scotow, Seyyed Parsa Neshaei, Shahabuddin Vansiwala, solidcell, Sravan, stackptr, Sunil Sharma, Suragch, sushant jagtap, TDM, tharkay, The_Curry_Man, Tibor Molnár, Tyler, Undo, user3480295, vasili111, Vignan, Viktor Simkó, william205, WMios, Yagnesh Dobariya
102	UILabel	Md. Ibrahim Hassan
103	UILabel attributedText	vp2698
104	UILocalNotification	Bhumit Mehta, Brian, Byte1518, D4ttatraya, David, ElonChan, Harshal Bhavsar, hgwhittle, kamwysoc, KrishnaCA, rajesh sukumaran, Rex, Samuel Spencer, themathsrobot, tktsubota, william205, Wolverine, Xenon
105	UINavigationController	dasdom, Oleh Zayats, sage444, Suragch, william205, WMios
106	UIPageViewController	azimov, Bright Future, Harshal Bhavsar, Mayuri R Talaviya, Stephen Leppik, stonybrooklyn, Victor M
107	UIPheonix - UI	StackUnderflow
108	UIPickerView	FelixSFD, Hasintha Janka, MCMatan, Md. Ibrahim Hassan, Moritz, NinjaDeveloper
109	UIRefreshControl TableView	Md. Ibrahim Hassan, Mohammad Rana
110	UIScrollView	Bhavin Ramani, LinusGeffarth, maxkonovalov, Rex, sanman, Sujania, Sunil Sharma, Suragch, tharkay, torinpitchers
111	UIScrollView AutoLayout	Aaron, Brandon, Shrikant K
112	UISearchController	Harshal Bhavsar, Mehul Chuahan, mtso, Stephen Leppik, Tarvo Mäesepp
113	UISegmentedControl	Kamil Harasimowicz
114	UISplitViewController	Cerbrus, Koushik
115	UIStackView	Anuj Joshi, danshevluk, Harshal Bhavsar, Kof, Lior Pollak , Sally, sasquatch, Stephen Leppik, william205

116	UIStackView	Harshal Bhavsar, Rahul, Stephen Leppik
117	UIStoryboard	Adriana Carelli, Mr. Xcoder, Vignan
118	UISwitch	Bhavin Ramani, FelixSFD, Md. Ibrahim Hassan, Mr. Xcoder, RamenChef, Sujay
119	UITabBarController	Alexi, Anand Nimje, Cristina, Mehul Chuahan, Quantm, Srinija
120	UITableView	AJ9, Alex Koshy, Andres Kievsky, Anh Pham, animuson, Bean, Brendon Roberto, Brian, dasdom, DeyaEldeen, Dima Deplov, Dunja Lalic, Erik Godard, Glorfindel, Harshal Bhavsar, Jojodmo, Kof, Luca D'Alberti, Luis, Meng Zhang, Nathan, Nirav Bhatt, Nirav D, RamenChef, Rex, RodolfoAntonici, Ruby, Samuel Spencer, Seslyn, simple_code, Srinija, Steve Moser, Sujania, Sujay, Suragch, Tamarous, user3480295
121	UITableViewCell	Rahul
122	UITableViewCells	Kamil Harasimowicz
123	UITableViewController	Aju
124	UITextField	Alex Koshy, Ali Elsokary, Ashvinkumar, Duly Kinsky, Fabio Berger, FelixSFD, J F, Joshua, Kof, Luiz Henrique Guimaraes, Maddyゾゾ, P. Pawluś, RamenChef, Reinier Melian, Ruby, samwize, sasquatch, shim, SourabhV, Suragch, sushant jagtap, tharkay, william205, WMios
125	UITextField	Andreas, animuson, Md. Ibrahim Hassan, midori, Ruby
126	UITextView	Anh Pham, animuson, Bole Tzar, Bright Future, Cris , Dunja Lalic, Eonil, gadu, Harshal Bhavsar, Hejazi, Md. Ibrahim Hassan, njuri, Roland Keesom, Ruby, Suragch, sushant jagtap, william205, WMios
127	UIView	Adam Preble, alaphao, Anh Pham, Caleb Kleveter, Community, Cory Wilhite, D4ttatraya, ddb, DeyaEldeen, Douglas Starnes, hgwhittle, iphonic, Irfan, James, Jojodmo, Jota, Kotha Sai Ram, Luca D'Alberti, maxkonovalov, Md. Ibrahim Hassan, muazhud, Narendra Pandey, Nikhil Manapure, NSNoob, pableiros, pckill, Peter DeWeese, Rahul Vyas, sasquatch, shallowThought , Sunil Sharma, That lazy iOS Guy , The_Curry_Man, Viktor Simkó, william205
128	UIViewController	dasdom, Dunja Lalic, shim, Suragch, tassinari, william205

129	UIView	Bright Future, Darshit Shah, Md. Ibrahim Hassan, SpaceDog
130	UIWebView	Allan Burleson, dchar4life80X, iOS BadBoy, J F, Julian135, KANGKANG, Kevin DiTraglia, maxkonovalov, Md. Ibrahim Hassan, Ortwin Gentz, Ramkumar chintala, Sunil Sharma
131	URL	azimov, Brian, Dunja Lalic, Harshal Bhavsar, James P, Stephen Leppik
132	UUID (Universally Unique Identifier)	Anand Nimje, FelixSFD, Harshal Bhavsar, James P, Mehul Chuahan, Rahul Vyas, Seyyed Parsa Neshaei, shim, Stephen Leppik, sushant jagtap
133	WCSessionDelegate	pkc456
134	WKWebView	Brandon, byJeevan, Mahmoud Adam, Yevhen Dubinin
135	XCTest -	D4ttatraya, dasdom, Jan ATAC, Josh Brown, msohng, Raphael Silva, Seyyed Parsa Neshaei, Tarun Seera
136	XIB UIView	backslash-f, Code.Warrior, Harshal Bhavsar, idocode, Nirav Bhatt, Sharpkits Innovations, Stephen Leppik
137		Md. Ibrahim Hassan
138		Vinod Kumar
139		FelixSFD, Md. Ibrahim Hassan
140	(Coreplot)	MarmiK, Md. Ibrahim Hassan
141	I / O	Idan
142		ajmccall, breakingobstacles, Mick MacCallum, pableiros, sushant jagtap
143	(MKBlockQueue)	StackUnderflow
144		Doc, Fonix, Juan Campa, Kevin DiTraglia, Tien
145		Alvin Abia, H. M. Madrone, Harshal Bhavsar, James P, Stephen Leppik
146		Daniel Ormeño
147		NobodyNada
148		Md. Ibrahim Hassan

149		Tien
150		Rahul
151	Xcode	Kyle Decot, Shardul
152		Seyyed Parsa Neshaei
153		Seyyed Parsa Neshaei
154		Ashish Kakkad
155		Harshal Bhavsar, Irfan, satheeshwaran, Stephen Leppik, Vineet Choudhary
156		Adriana Carelli, Andreas, Bhadresh Kathiriya, Harshal Bhavsar, Md. Ibrahim Hassan, user459460
157		Arulkumar, Ashish Kakkad, BorisE, Bright Future, Dima Deplov, dispute, FelixSFD, Honey, ignotusverum, Irfan, Jake Runzer, juanjo, Kasun Randika, Kendall Lister, Kyle KIM, Luca D'Alberti, muazhud, OhadM, RamenChef, rustproofFish, salabaha, StackUnderflow, Steve Moser, Suragch, Tamarous, timbroder, Undo, WMios, Yagnesh Dobariya
158	(MessageBox)	StackUnderflow
159		D4ttatraya
160		4444, animuson, Joshua, Mehul Chuahan, Ruby, Tamarous, user459460
161		J F, KrauseFx, SM18, tharkay
162	UITextField	D4ttatraya
163		Alexi, Dima Deplov, Harshal Bhavsar, Maddyゾゾ, njuri, Stephen Leppik, Tommie C.
164		Arnon Rodrigues, Harshal Bhavsar, Kilian Koeltzsch, Md. Ibrahim Hassan, Stephen Leppik
165		Alex Rouse, danshevluk, Harshal Bhavsar, Mr. Xcoder, shim, Stephen Leppik, Steve Moser, william205, WMios
166	UIView	Md. Ibrahim Hassan
167	FCM	Saeed-rz
168		Harshal Bhavsar, Kirit Vaghela, Stephen Leppik, Tommie

		C.
169		Seyyed Parsa Neshaei
170		Durai Amuthan.H
171	C	Harshal Bhavsar, njuri, Stephen Leppik
172	/	Abhijit
173		amar, Arefly, Harshal Bhavsar, Stephen Leppik
174		Alex Koshy, Josh Caswell, Sour LeangChhean, yogesh wadhwa
175	ID	yogesh wadhwa
176	(ATS)	breakingobstacles, D4ttatraya, esthepiking, FelixSFD, Mehul Chuahan, nathan
177		Nermin Sehic
178		Cyril Ivar Garcia, Martin, rigdonmr, WMios
179		midori
180		Md. Ibrahim Hassan, Seyyed Parsa Neshaei
181		Md. Ibrahim Hassan
182		subv3rsion
183		Andreas, Md. Ibrahim Hassan
184	Aseets	D4ttatraya
185		J.Paravicini
186		Tiko
187		alaphao, amar, Anuj Joshi, Bean, Bhumit Mehta, BlackDeveraux, dasdom, Dennis, Dima Deplov, Dinesh Raja, Đông An, Harshal Bhavsar, Hasintha Janka, Irfan, Jano, juanjo, keithbhunter, Mahesh, Mert Buran, Mr. Xcoder, NSNoob, ozgur, Pärserk, Rajesh, Sally, Sandy, Stephen Leppik, Suragch, Undo, user3480295, Vignan
188		Harshal Bhavsar, Justin, Ruby, Stephen Leppik, Zev Eisenberg
189	-	D4ttatraya, Harshal Bhavsar, Mehul Chuahan, Mihriban

		Minaz, Mithrandir, Muhammad Zohaib Ehsan, Pärserk, sanman
190		Jano
191	iOS	Phani Sai
192	iOS	Md. Ibrahim Hassan
193		Faran Ghani, simple_code
194		Ashish Kakkad
195		HaemEternal
196		Dunja Lalic, Josh Caswell, Seyyed Parsa Neshaei, Sunil Sharma, Unheilig
197		Md. Ibrahim Hassan, RamenChef
198		Harshal Bhavsar, Mayuri R Talaviya, Mehul Chuahan, mtso, quant24, Stephen Leppik, sushant jagtap, william205
199		Tim
200		abjurato, avojak, Matthew Seaman, Mehul Chuahan
201		Alexander Tkachenko, Greg, Harshal Bhavsar, Mr. Xcoder, Richard Ash, Shog9, slxl, Stephen Leppik, Steve Moser, Suragch, V1P3R, william205, WMios
202		Md. Ibrahim Hassan, Mehul Chuahan
203		Amanpreet, Anh Pham, Ashish Kakkad, Bhadresh Kathiriya, BloodWoork, Bonnie, Honey, Hossam Ghareeb , iOS BadBoy, J F, Patrick Beard, Pavel Gurov, sanman, Seyyed Parsa Neshaei, tilo
204		Koushik
205	- iOS 10.	Oleh Zayats
206		Ankit chauhan, Md. Ibrahim Hassan
207		4444, animuson, Joshua, Ruby, WMios