무료 전자 책

배우기

Angular 2

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#angular2

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1: Angular 2

Angular2 + Angular-Cli IDE .

Angular AngularJS Angular 1 . .

4.3.3	2017-08-02
4.3.2	2017-07-26
4.3.1	2017-07-19
4.3.0	2017-07-14
4.2.0	2017-06-08
4.1.0	2017-04-26
4.0.0	2017-03-23
2.3.0	2016-12-08
2.2.0	2016-11-14
2.1.0	2016-10-13
2.0.2	2016-10-05
2.0.1	2016-09-23
2.0.0	2016-09-14
2.0.0-rc.7	2016-09-13
2.0.0-rc.6	2016-08-31
2.0.0-rc.5	2016-08-09
2.0.0-rc.4	2016-06-30
2.0.0-rc.3	2016-06-21
2.0.0-rc.2	2016-06-15
2.0.0-rc.1	2016-05-03
2.0.0-rc.0	2016-05-02

Examples

angular-cli angular2

Angular 2 .

:

- Node.js v4 .
- npm v3 .

.

```
npm install -g @angular/cli
```

```
yarn global add @angular/cli
```

.

, **/ CLI** @ `ng` PATH .

.

.

```
ng new PROJECT_NAME
cd PROJECT_NAME
ng serve
```

, Angular 2 . .

.

.

```
ng init
```

. .

.

```
ng serve
```

. .

```
http://localhost:4200
```

Hot Module Reloading HTML, CSS ( ).

, ,

`ng generate <scaffold-type> <name>` (`ng g <scaffold-type> <name>`) .

```
# The command below will generate a component in the folder you are currently at
ng generate component my-generated-component
# Using the alias (same outcome as above)
ng g component my-generated-component
```

angular-cli .

	`ng g module my-new-module`
	`ng g component my-new-component`
	`ng g directive my-new-directive`
	`ng g pipe my-new-pipe`
	`ng g service my-new-service`
	`ng g class my-new-class`
	`ng g interface my-new-interface`
	`ng g enum my-new-enum`

. :

`ng gm my-new-module` `ng gm my-new-module` `ng gc my-new-component` `ng gc my-new-component` .

/

Angular 2 Apache Tomcat . .

```
ng build
```

```
ng build --prod
```

`/dist` .

Ahead-of-Time . .

```
ng build --prod --aot
```

Angular 2 Angular-Cli . jasmine . .

```
ng test
```

.

angular-cli github .

angular-cli Angular 2 .

2.0.0-rc.4

"Hello World!" (`AppComponent`) `AppComponent` .

:

- Node.js v5
- npm v3

  : / `node -v npm -v` .

1

. `angular2-example` `angular2-example` .

```
mkdir angular2-example
cd angular2-example
```

2

`package.json` , `tsconfig.json` , `typings.json` `systemjs.config.js` 4 .

: Official 5 Minute Quickstart .

`package.json` - npm . (Gulp .)

```
{
  "name": "angular2-example",
  "version": "1.0.0",
  "scripts": {
    "start": "tsc && concurrently \"npm run tsc:w\" \"npm run lite\" ",
    "lite": "lite-server",
    "postinstall": "typings install",
    "tsc": "tsc",
    "tsc:w": "tsc -w",
    "typings": "typings"
  },
  "license": "ISC",
```

```
  "dependencies": {
    "@angular/common": "2.0.0-rc.4",
    "@angular/compiler": "2.0.0-rc.4",
    "@angular/core": "2.0.0-rc.4",
    "@angular/forms": "0.2.0",
    "@angular/http": "2.0.0-rc.4",
    "@angular/platform-browser": "2.0.0-rc.4",
    "@angular/platform-browser-dynamic": "2.0.0-rc.4",
    "@angular/router": "3.0.0-beta.1",
    "@angular/router-deprecated": "2.0.0-rc.2",
    "@angular/upgrade": "2.0.0-rc.4",
    "systemjs": "0.19.27",
    "core-js": "^2.4.0",
    "reflect-metadata": "^0.1.3",
    "rxjs": "5.0.0-beta.6",
    "zone.js": "^0.6.12",
    "angular2-in-memory-web-api": "0.0.14",
    "bootstrap": "^3.3.6"
  },
  "devDependencies": {
    "concurrently": "^2.0.0",
    "lite-server": "^2.2.0",
    "typescript": "^1.8.10",
    "typings":"^1.0.4"
  }
}
```

`tsconfig.json` - TypeScript .

```
{
  "compilerOptions": {
    "target": "es5",
    "module": "commonjs",
    "moduleResolution": "node",
    "sourceMap": true,
    "emitDecoratorMetadata": true,
    "experimentalDecorators": true,
    "removeComments": false,
    "noImplicitAny": false
  }
}
```

`typings.json` - TypeScript .

```
{
  "globalDependencies": {
    "core-js": "registry:dt/core-js#0.0.0+20160602141332",
    "jasmine": "registry:dt/jasmine#2.2.0+20160621224255",
    "node": "registry:dt/node#6.0.0+20160621231320"
  }
}
```

`systemjs.config.js` - `systemjs.config.js` (webpack).

```
/**
 * System configuration for Angular 2 samples
 * Adjust as necessary for your application's needs.
```

```
 */
(function(global) {
  // map tells the System loader where to look for things
  var map = {
    'app':                        'app', // 'dist',
    '@angular':                   'node_modules/@angular',
    'angular2-in-memory-web-api': 'node_modules/angular2-in-memory-web-api',
    'rxjs':                       'node_modules/rxjs'
  };
  // packages tells the System loader how to load when no filename and/or no extension
  var packages = {
    'app':                        { main: 'main.js',  defaultExtension: 'js' },
    'rxjs':                       { defaultExtension: 'js' },
    'angular2-in-memory-web-api': { main: 'index.js', defaultExtension: 'js' },
  };
  var ngPackageNames = [
    'common',
    'compiler',
    'core',
    'forms',
    'http',
    'platform-browser',
    'platform-browser-dynamic',
    'router',
    'router-deprecated',
    'upgrade',
  ];
  // Individual files (~300 requests):
  function packIndex(pkgName) {
    packages['@angular/'+pkgName] = { main: 'index.js', defaultExtension: 'js' };
  }
  // Bundled (~40 requests):
  function packUmd(pkgName) {
    packages['@angular/'+pkgName] = { main: '/bundles/' + pkgName + '.umd.js',
defaultExtension: 'js' };
  }
  // Most environments should use UMD; some (Karma) need the individual index files
  var setPackageConfig = System.packageWithIndex ? packIndex : packUmd;
  // Add package entries for angular packages
  ngPackageNames.forEach(setPackageConfig);
  var config = {
    map: map,
    packages: packages
  };
  System.config(config);
})(this);
```

3

.

```
npm install
```

/ .

4

`angular2-example`

index.html .

```
<html>
  <head>
    <title>Angular2 example</title>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1">
    <!-- 1. Load libraries -->
    <!-- Polyfill(s) for older browsers -->
    <script src="node_modules/core-js/client/shim.min.js"></script>
    <script src="node_modules/zone.js/dist/zone.js"></script>
    <script src="node_modules/reflect-metadata/Reflect.js"></script>
    <script src="node_modules/systemjs/dist/system.src.js"></script>
    <!-- 2. Configure SystemJS -->
    <script src="systemjs.config.js"></script>
    <script>
      System.import('app').catch(function(err){ console.error(err); });
    </script>
  </head>
  <!-- 3. Display the application -->
  <body>
    <my-app></my-app>
  </body>
</html>
```

my-app .

Angular . AppComponent AppComponent .

5

app app . (AppComponent main.ts .)

```
mkdir app
```

6

app/app.component.ts .

```
import { Component } from '@angular/core';

@Component({
  selector: 'my-app',
  template: `
    <h1>{{title}}</h1>
    <ul>
        <li *ngFor="let message of messages">
            {{message}}
        </li>
    </ul>
  `
})
export class AppComponent {
    title = "Angular2 example";
```

```
    messages = [
        "Hello World!",
        "Another string",
        "Another one"
    ];
}
```

? , Angular HTML `@Component` `@Component` . `title` `messages` `AppComponent` `AppComponent` .

.

```
<h1>{{title}}</h1>
<ul>
    <li *ngFor="let message of messages">
        {{message}}
    </li>
</ul>
```

`h1` `title` `*ngFor` `messages` . `*ngFor` `li` `message` . .

```
<h1>Angular 2 example</h1>
<ul>
    <li>Hello World!</li>
    <li>Another string</li>
    <li>Another one</li>
</ul>
```

7

Angular `main.ts` .

`app/main.ts` .

```
import { bootstrap }    from '@angular/platform-browser-dynamic';
import { AppComponent } from './app.component';

bootstrap(AppComponent);
```

`bootstrap` `AppComponent` `bootstrap` Angular .

8

.

```
npm start
```

/ . lite-server TypeScript `package.json` (`.ts`) .

?

Angular 2 StackOverflow .

`AppComponent` , / . .

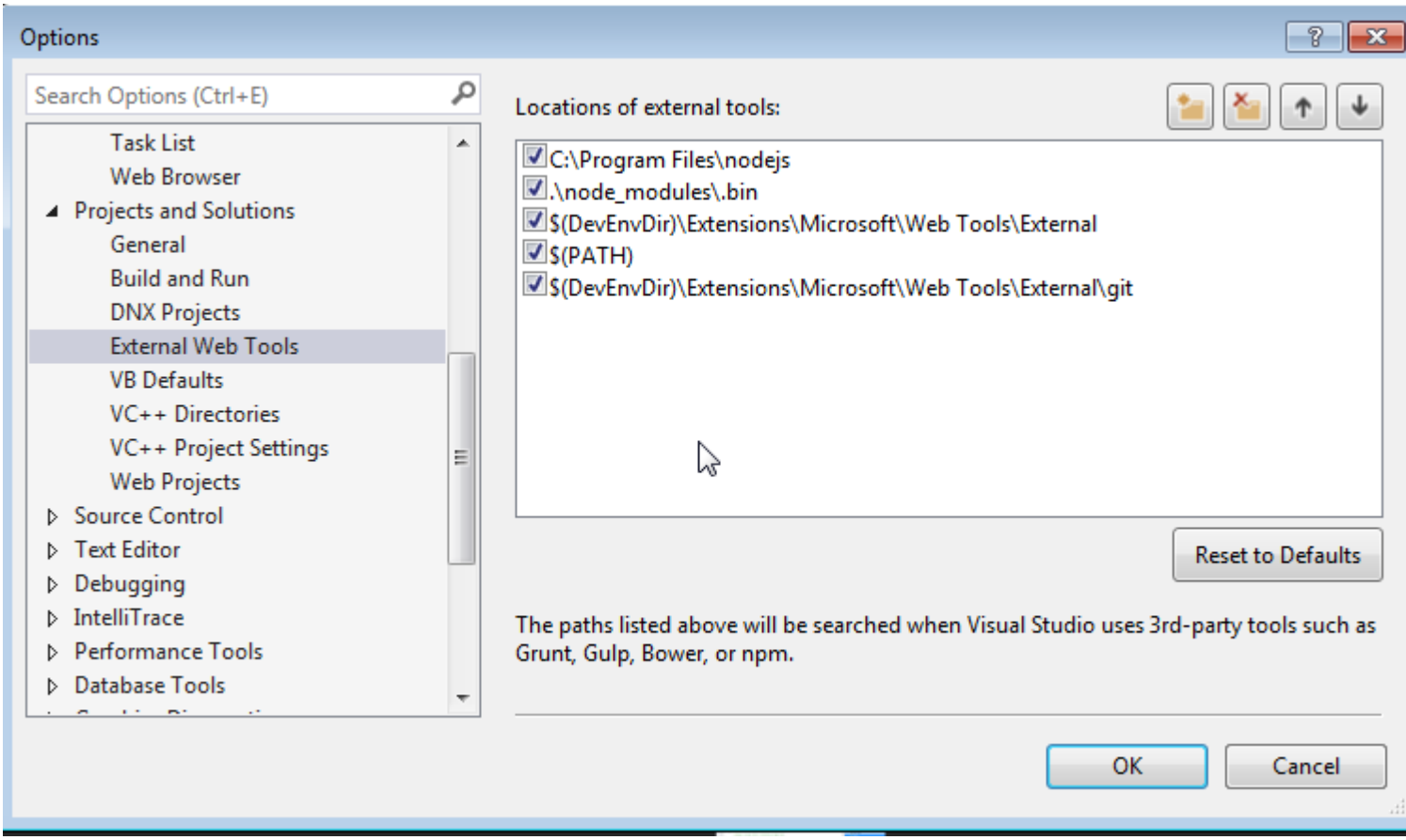
Visual Studio NPM NODE

1 : Node.js . C : / program files / nodejs .

2 : Visual Studio "> " .

3 : " > " .

4 : Node.js (C : / program files / nodejs) .



5 : Visual Studio npm npm .

.

XYZ MegaCorp Windows Angular2 .

() .

1. NPM
2.

NPM `.npmrc` .

```
proxy=http://[DOMAIN]%5C[USER]:[PASS]@[PROXY]:[PROXYPORT]/
https-proxy=http://[DOMAIN]%5C[USER]:[PASS]@[PROXY]:[PROXYPORT]/
```

`.typingsrc` .

```
proxy=http://[DOMAIN]%5C[USER]:[PASS]@[PROXY]:[PROXYPORT]/
https-proxy=http://[DOMAIN]%5C[USER]:[PASS]@[PROXY]:[PROXYPORT]/
rejectUnauthorized=false
```

. (`package.json` `%HOMEPATH%`).

`\` URL `%5C` . Steve Roberts . .pac npm

node.js / expressjs Angular 2 (http)

"Hello World!" . node.js (expressjs) Angular2 2.4.1 (`@NgModule`) .

- Node.js v4.xx
- npm v3.xx

`npm install -g typescript` `yarn global add typescript` typescript `yarn global add typescript` `yarn global add typescript` .

1

( ) . `Angular2-express` `Angular2-express` .

:

```
mkdir Angular2-express
cd Angular2-express
```

2

`node.js` `package.json` ( ) `app.js` ( ) .

package.json :

```
{
  "name": "Angular2-express",
  "version": "1.0.0",
  "description": "",
  "scripts": {
    "start": "node app.js"
  },
  "author": "",
  "license": "ISC",
```

```
  "dependencies": {
    "body-parser": "^1.13.3",
    "express": "^4.13.3"
  }
}
```

app.js :

```
var express = require('express');
var app = express();
var server = require('http').Server(app);
var bodyParser = require('body-parser');

server.listen(process.env.PORT || 9999, function(){
    console.log("Server connected. Listening on port: " + (process.env.PORT || 9999));
});

app.use(bodyParser.json());
app.use(bodyParser.urlencoded({extended: true}) );

app.use( express.static(__dirname + '/front' ) );

app.get('/test', function(req,res){ //example http request receiver
  return res.send(myTestVar);
});

//send the index.html on every page refresh and let angular handle the routing
app.get('/*',  function(req, res, next) {
    console.log("Reloading");
    res.sendFile('index.html', { root: __dirname });
});
```

npm install yarn .

. .

3

front Angular2-express .

:

```
mkdir front
cd front
```

. . package.json , systemjs.config.js , tsconfig.json

package.json :

```
{
  "name": "Angular2-express",
  "version": "1.0.0",
  "scripts": {
    "tsc": "tsc",
```

```
    "tsc:w": "tsc -w"
  },
  "licenses": [
    {
      "type": "MIT",
      "url": "https://github.com/angular/angular.io/blob/master/LICENSE"
    }
  ],
  "dependencies": {
    "@angular/common": "~2.4.1",
    "@angular/compiler": "~2.4.1",
    "@angular/compiler-cli": "^2.4.1",
    "@angular/core": "~2.4.1",
    "@angular/forms": "~2.4.1",
    "@angular/http": "~2.4.1",
    "@angular/platform-browser": "~2.4.1",
    "@angular/platform-browser-dynamic": "~2.4.1",
    "@angular/platform-server": "^2.4.1",
    "@angular/router": "~3.4.0",
    "core-js": "^2.4.1",
    "reflect-metadata": "^0.1.8",
    "rxjs": "^5.0.2",
    "systemjs": "0.19.40",
    "zone.js": "^0.7.4"
  },
  "devDependencies": {
    "@types/core-js": "^0.9.34",
    "@types/node": "^6.0.45",
    "typescript": "2.0.2"
  }
}
```

systemjs.config.js :

```
/**
 * System configuration for Angular samples
 * Adjust as necessary for your application needs.
 */
(function (global) {
  System.config({
    defaultJSExtensions:true,
    paths: {
      // paths serve as alias
      'npm:': 'node_modules/'
    },
    // map tells the System loader where to look for things
    map: {
      // our app is within the app folder
      app: 'app',
      // angular bundles
      '@angular/core': 'npm:@angular/core/bundles/core.umd.js',
      '@angular/common': 'npm:@angular/common/bundles/common.umd.js',
      '@angular/compiler': 'npm:@angular/compiler/bundles/compiler.umd.js',
      '@angular/platform-browser': 'npm:@angular/platform-browser/bundles/platform-
browser.umd.js',
      '@angular/platform-browser-dynamic': 'npm:@angular/platform-browser-
dynamic/bundles/platform-browser-dynamic.umd.js',
      '@angular/http': 'npm:@angular/http/bundles/http.umd.js',
      '@angular/router': 'npm:@angular/router/bundles/router.umd.js',
      '@angular/forms': 'npm:@angular/forms/bundles/forms.umd.js',
```

```
      // other libraries
      'rxjs':                      'npm:rxjs',
      'angular-in-memory-web-api': 'npm:angular-in-memory-web-api',
    },
    // packages tells the System loader how to load when no filename and/or no extension
    packages: {
      app: {
        main: './main.js',
        defaultExtension: 'js'
      },
      rxjs: {
        defaultExtension: 'js'
      }
    }
  });
})(this);
```

tsconfig.json :

```
{
  "compilerOptions": {
    "target": "es5",
    "module": "commonjs",
    "moduleResolution": "node",
    "sourceMap": true,
    "emitDecoratorMetadata": true,
    "experimentalDecorators": true,
    "removeComments": false,
    "noImplicitAny": false
  },
  "compileOnSave": true,
  "exclude": [
    "node_modules/*"
  ]
}
```

`npm install yarn  .`

`. index.html  :`

index.html :

```
<html>
  <head>
    <base href="/">
    <title>Angular2-express</title>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1">
    <!-- 1. Load libraries -->
     <!-- Polyfill(s) for older browsers -->
    <script src="node_modules/core-js/client/shim.min.js"></script>
    <script src="node_modules/zone.js/dist/zone.js"></script>
    <script src="node_modules/reflect-metadata/Reflect.js"></script>
    <script src="node_modules/systemjs/dist/system.src.js"></script>
    <!-- 2. Configure SystemJS -->
    <script src="systemjs.config.js"></script>
    <script>
      System.import('app').catch(function(err){ console.error(err); });
```

```
    </script>

  </head>
  <!-- 3. Display the application -->
  <body>
    <my-app>Loading...</my-app>
  </body>
</html>
```

. front app .

:

```
mkdir app
cd app
```

main.ts , app.module.ts , app.component.ts

main.ts :

```
import { platformBrowserDynamic } from '@angular/platform-browser-dynamic';

import { AppModule } from './app.module';

const platform = platformBrowserDynamic();
platform.bootstrapModule(AppModule);
```

app.module.ts :

```
import { NgModule }      from '@angular/core';
import { BrowserModule } from '@angular/platform-browser';
import { HttpModule } from "@angular/http";

import { AppComponent }   from './app.component';

@NgModule({
  imports:      [
    BrowserModule,
    HttpModule
  ],
  declarations: [
    AppComponent
  ],
  providers:[ ],
  bootstrap:    [ AppComponent ]
})
export class AppModule {}
```

app.component.ts :

```
import { Component } from '@angular/core';
import { Http } from '@angular/http';

@Component({
  selector: 'my-app',
```

```
  template: 'Hello World!',
  providers: []
})
export class AppComponent {
  constructor(private http: Http){
    //http get example
    this.http.get('/test')
     .subscribe((res)=>{
       console.log(res);
     });
  }
}
```

typescript javascript . dir (Angular2-express) 2 .

:

```
cd ..
cd ..
tsc -p front
```

.

```
Angular2-express
├── app.js
├── node_modules
├── package.json
├── front
|   ├── package.json
|   ├── index.html
|   ├── node_modules
|   ├── systemjs.config.js
|   ├── tsconfig.json
|   ├── app
|   |   ├── app.component.ts
|   |   ├── app.component.js.map
|   |   ├── app.component.js
|   |   ├── app.module.ts
|   |   ├── app.module.js.map
|   |   ├── app.module.js
|   |   ├── main.ts
|   |   ├── main.js.map
|   |   ├── main.js
```

, Angular2-express `node app.js` `node app.js` . `localhost:9999` .

4 !

4 ! Angular Angular 2 semver . . Angular Angular 4 . 3 Angular 3 .

Angular Angular 4 . @ angular / core . . if / else . Angular 4 Typescript 2.1 2.2 . Angular 4 .

4 .

.

Angular-CLI (Command Line Interface) .

- Angular 2 Angular 4 .
- github Angular4 . (.)
- Angular-CLI ( ) .

Angular-CLI . , v7.8.0 . Angular-CLI .

```
npm install -g @angular/cli
```

```
yarn global add @angular/cli
```

.

Angular-CLI Angular 4 .

```
ng new Angular4-boilerplate
```

cd Angular4-boilerplate 4 . .

2 4

. Angular 2 Angular 4 . Angular 2 Angular 4 Dependency Angular 2 . :

```
"dependencies": {
    "@angular/animations": "^4.1.0",
    "@angular/common": "4.0.2",
    "@angular/compiler": "4.0.2",
    "@angular/core": "^4.0.1",
    "@angular/forms": "4.0.2",
    "@angular/http": "4.0.2",
    "@angular/material": "^2.0.0-beta.3",
    "@angular/platform-browser": "4.0.2",
    "@angular/platform-browser-dynamic": "4.0.2",
    "@angular/router": "4.0.2",
    "typescript": "2.2.2"
   }
```

Angular 4 . npm npm . package.json .

github

git . angular4-boilerplate .

```
git@github.com:CypherTree/angular4-boilerplate.git
```

.

```
npm install

npm start
```

Angular 4 . .

angular4 -

```
Angular4-boilerplate
-karma
-node_modules
-src
   -mocks
   -models
      -loginform.ts
      -index.ts
   -modules
      -app
        -app.component.ts
     -app.component.html
      -login
    -login.component.ts
    -login.component.html
    -login.component.css
      -widget
     -widget.component.ts
     -widget.component.html
     -widget.component.css
    ........
   -services
       -login.service.ts
    -rest.service.ts
   -app.routing.module.ts
   -app.module.ts
   -bootstrap.ts
   -index.html
   -vendor.ts
-typings
-webpack
-package.json
-tsconfig.json
-tslint.json
-typings.json
```

:

src .

mocks .

model .

modules app, login, widget . typescript, html css . index.ts .

services . . http . .

app.routing.ts .

app.module.ts app .

bootstrap.ts .

webpack webpack .

package.json .

.

node_modules .

. login.component.html

```
<form>Dreamfactory – Addressbook 2.0
 <label>Email</label> <input id="email" form="" name="email" type="email" />
 <label>Password</label> <input id="password" form="" name="password"
 type="password" />
 <button form="">Login</button>
</form>
```

login.component.ts

```
import { Component } from '@angular/core';
import { Router } from '@angular/router';
import { Form, FormGroup } from '@angular/forms';
import { LoginForm } from '../../models';
import { LoginService } from '../../services/login.service';

@Component({
    selector: 'login',
    template: require('./login.component.html'),
    styles: [require('./login.component.css')]
})
export class LoginComponent {

    constructor(private loginService: LoginService, private router: Router, form: LoginForm) {
}

    getLogin(form: LoginForm): void {
      let username = form.email;
      let password = form.password;
      this.loginService.getAuthenticate(form).subscribe(() => {
          this.router.navigate(['/calender']);
      });
    }
}
```

index.ts .

```
export * from './login/login.component';
```

app.routes.ts .

```
const appRoutes: Routes = [
```

```
    {
        path: 'login',
        component: LoginComponent
    },
    ........
    {
        path: '',
        pathMatch: 'full',
        redirectTo: '/login'
    }
];
```

app.module.ts .

```
.....
import { LoginComponent } from './modules';
......
@NgModule({
    bootstrap: [AppComponent],
    declarations: [
       LoginComponent
       .....
       .....
       ]
      .....
  })
  export class AppModule { }
```

npm install npm . ,! . , angular4 - .

Angular 4 . Angular 2 .

Angular 2 : https://riptutorial.com/ko/angular2/topic/789/angular-2-

2: @HostBinding .

Examples

@HostBinding

@HostBinding . . . , . .

```
import { Directive, HostBinding, HostListener } from '@angular/core';

@Directive({
  selector: '[appButtonPress]'
})
export class ButtonPressDirective {
  @HostBinding('attr.role') role = 'button';
  @HostBinding('class.pressed') isPressed: boolean;

  @HostListener('mousedown') hasPressed() {
    this.isPressed = true;
  }
  @HostListener('mouseup') hasReleased() {
    this.isPressed = false;
  }
}
```

@HostBinding . . @HostBinding role . isPressed true .

@HostBinding . : https://riptutorial.com/ko/angular2/topic/9455/-hostbinding----------

3: Angular 2+ NPM

npm .

npm .

.

Examples

Angular 2+ npm .

`git` , `npm` , `gulp` , `typescript` .

.gitignore

`.gitignore` . .

```
npm-debug.log
node_modules
jspm_packages
.idea
build
```

.npmignore

`.npmignore` . .

```
examples
node_modules
src
```

gulpfile.js

Gulp `gulpfile.js` . . .

```
var gulp = require('gulp');
var embedTemplates = require('gulp-angular-embed-templates');
var inlineNg2Styles = require('gulp-inline-ng2-styles');

gulp.task('js:build', function () {
    gulp.src('src/*.ts') // also can use *.js files
        .pipe(embedTemplates({sourceType:'ts'}))
        .pipe(inlineNg2Styles({ base: '/src' }))
        .pipe(gulp.dest('./dist'));
});
```

index.d.ts

`index.d.ts` typescript . .

```
export * from './lib';
```

index.js

. NPM .

```
exports.AngularXMinimalNpmPackageModule = require('./lib').AngularXMinimalNpmPackageModule;
```

`lib` , `/lib` .

package.json

npm .

```
{
  "name": "angular-x-minimal-npm-package",
  "version": "0.0.18",
  "description": "An Angular 2+ Data Table that uses HTTP to create, read, update and delete
data from an external API such REST.",
  "main": "index.js",
  "scripts": {
    "watch": "tsc -p src -w",
    "build": "gulp js:build && rm -rf lib && tsc -p dist"
  },
  "repository": {
    "type": "git",
    "url": "git+https://github.com/vinagreti/angular-x-minimal-npm-package.git"
  },
  "keywords": [
    "Angular",
    "Angular2",
    "Datatable",
    "Rest"
  ],
  "author": "bruno@tzadi.com",
  "license": "MIT",
  "bugs": {
    "url": "https://github.com/vinagreti/angular-x-minimal-npm-package/issues"
  },
  "homepage": "https://github.com/vinagreti/angular-x-minimal-npm-package#readme",
  "devDependencies": {
    "gulp": "3.9.1",
    "gulp-angular-embed-templates": "2.3.0",
    "gulp-inline-ng2-styles": "0.0.1",
    "typescript": "2.0.0"
  },
  "dependencies": {
    "@angular/common": "2.4.1",
    "@angular/compiler": "2.4.1",
    "@angular/core": "2.4.1",
    "@angular/http": "2.4.1",
```

```
    "@angular/platform-browser": "2.4.1",
    "@angular/platform-browser-dynamic": "2.4.1",
    "rxjs": "5.0.2",
    "zone.js": "0.7.4"
  }
}
```

dist / tsconfig.json

dist . Typescript . typescript .

```
{
  "compilerOptions": {
    "emitDecoratorMetadata": true,
    "experimentalDecorators": true,
    "mapRoot": "",
    "rootDir": ".",
    "target": "es5",
    "lib": ["es6", "es2015", "dom"],
    "inlineSources": true,
    "stripInternal": true,
    "module": "commonjs",
    "moduleResolution": "node",
    "removeComments": true,
    "sourceMap": true,
    "outDir": "../lib",
    "declaration": true
  }
}
```

. . HTML `<angular-x-minimal-npm-package></angular-x-minimal-npm-package>` . npm .

src / angular-x-minimal-npm-package.component.ts

```
import {Component} from '@angular/core';
@Component({
    selector: 'angular-x-minimal-npm-package',
    styleUrls: ['./angular-x-minimal-npm-package.component.scss'],
    templateUrl: './angular-x-minimal-npm-package.component.html'
})
export class AngularXMinimalNpmPackageComponent {
    message = "Click Me ...";
    onClick() {
        this.message = "Angular 2+ Minimal NPM Package. With external scss and html!";
    }
}
```

src / angular-x-minimal-npm-package.component.html

```
<div>
  <h1 (click)="onClick()">{{message}}</h1>
</div>
```

src / angular-x-data-table.component.css

```
h1{
    color: red;
}
```

src / angular-x-minimal-npm-package.module.ts

```
import { NgModule } from '@angular/core';
import { CommonModule  } from '@angular/common';

import { AngularXMinimalNpmPackageComponent } from './angular-x-minimal-npm-
package.component';

@NgModule({
  imports: [ CommonModule ],
  declarations: [ AngularXMinimalNpmPackageComponent ],
  exports:  [ AngularXMinimalNpmPackageComponent ],
  entryComponents: [ AngularXMinimalNpmPackageComponent ],
})
export class AngularXMinimalNpmPackageModule {}
```

, .

`gulp tsc` `tsc` . `scripts.build` package.json . `gulp js:build && rm -rf lib && tsc -p dist` `gulp js:build && rm -rf lib && tsc -p dist` . .

.

```
npm run build
```

`/lib` in `/dist` . `index.js` `/lib` `/src` .

---

npm . .

```
npm publish
```

!!!

Angular 2+ NPM : https://riptutorial.com/ko/angular2/topic/8790/angular-2plus-npm--

4: Angular 2 jQuery

Angular 2.x jQuery, Google Analytics, JavaScript API .

Examples

CLI

NPM

`jQuery` NPM

```
npm install --save jquery
```

`angular-cli.json`

```
"scripts": [
    "../node_modules/jquery/dist/jquery.js"
]
```

`assets/js` `angular-cli.json` `angular-cli.json`

```
"scripts": [
    "assets/js/jquery.js"
]
```

`jquery` `jquery-cycle-plugin` assets `angular-cli.json` . .

Angular 2.x jQuery

Angular 2.x `jquery` .

jQuery `$`

```
declare var $: any;
```

`jQuery` for jQuery

```
declare var jQuery: any
```

Angular 2.x `$` `jQuery` .

Angular 2 jQuery : https://riptutorial.com/ko/angular2/topic/9285/angular-2-jquery----

5: Angular2 CanActivate

Examples

Angular2 CanActivate

:

```
export const MainRoutes: Route[] = [{
   path: '',
   children: [ {
      path: 'main',
      component: MainComponent ,
      canActivate : [CanActivateRoute]
   }]
}];
```

canActivateRoute :

```
@Injectable()
  export class  CanActivateRoute implements CanActivate{
  constructor(){}
  canActivate(next: ActivatedRouteSnapshot, state: RouterStateSnapshot): boolean {
     return true;
  }
}
```

Angular2 CanActivate : https://riptutorial.com/ko/angular2/topic/8899/angular2-canactivate

6: Angular2 Databinding

Examples

@()

: .

```
@Component({
  selector: 'parent-component',
  template: '<div>
               <child-component [users]="users"></child-component>
             </div>'
})
export class ParentComponent implements OnInit{
  let users : List<User> = null;

  ngOnInit() {
    users.push(new User('A', 'A', 'A@gmail.com');
    users.push(new User('B', 'B', 'B@gmail.com');
    users.push(new User('C', 'C', 'C@gmail.com');
  }
}
```

Input () .

```
@Component({
selector: 'child-component',
  template: '<div>
                  <table *ngIf="users !== null">
                    <thead>
                         <th>Name</th>
                         <th>FName</th>
                         <th>Email</th>
                    </thead>
                    <tbody>
                        <tr *ngFor="let user of users">
                            <td>{{user.name}}</td>
                            <td>{{user.fname}}</td>
                            <td>{{user.email}}</td>
                        </tr>
                    </tbody>
                  </table>

             </div>',
})
export class ChildComponent {
  @Input() users : List<User> = null;
}


export class User {
  name : string;
```

```
  fname : string;
  email : string;

  constructor(_name : string, _fname : string, _email : string){
     this.name = _name;
     this.fname = _fname;
     this.email = _email;
  }
}
```

Angular2 Databinding : https://riptutorial.com/ko/angular2/topic/9036/angular2-databinding

7: Angular2 In Memory API

Angular2-In-Memory-Web-Api API . .

Examples

mock-data.ts

API

```
export class MockData {
  createDb() {
    let mock = [
      { id: '1', name: 'Object A' },
      { id: '2', name: 'Object B' },
      { id: '3', name: 'Object C' },
      { id: '4', name: 'Object D' }
    ];

    return {mock};
  }
}
```

main.ts

XHRBackend InMemoryBackendService . .

```
createDb()
```

(MockData) SEED_DATA API .

```
import { XHRBackend, HTTP_PROVIDERS } from '@angular/http';
import { InMemoryBackendService, SEED_DATA } from 'angular2-in-memory-web-api';
import { MockData } from './mock-data';
import { bootstrap } from '@angular/platform-browser-dynamic';

import { AppComponent } from './app.component';

bootstrap(AppComponent, [
    HTTP_PROVIDERS,
    { provide: XHRBackend, useClass: InMemoryBackendService },
    { provide: SEED_DATA,  useClass: MockData }
]);
```

mock.service.ts

API get

```
import { Injectable }     from '@angular/core';
import { Http, Response } from '@angular/http';
import { Mock } from './mock';
```

```
@Injectable()
export class MockService {
  // URL to web api
  private mockUrl = 'app/mock';

  constructor (private http: Http) {}

  getData(): Promise<Mock[]> {
    return this.http.get(this.mockUrl)
                    .toPromise()
                    .then(this.extractData)
                    .catch(this.handleError);
  }

  private extractData(res: Response) {
    let body = res.json();
    return body.data || { };
  }

  private handleError (error: any) {
    let errMsg = (error.message) ? error.message :
      error.status ? `${error.status} - ${error.statusText}` : 'Server error';
    console.error(errMsg);
    return Promise.reject(errMsg);
  }
}
```

Test API

mock-data.ts

```
export class MockData {
    createDb() {
        let mock = [
            { id: '1', name: 'Object A' },
            { id: '2', name: 'Object B' },
            { id: '3', name: 'Object C' }
        ];

        let data = [
            { id: '1', name: 'Data A' },
            { id: '2', name: 'Data B' },
            { id: '3', name: 'Data C' }
        ];

        return { mock, data };
    }
}
```

.

```
app/mock
```

```
app/data
```

.

Angular2 In Memory API : https://riptutorial.com/ko/angular2/topic/6576/angular2-in-memory--api

8: Angular2

. control.value .

Examples

:

Angular 2 . ( ). .

```
export class CustomValidators {

static cannotContainSpace(control: Control) {
    if (control.value.indexOf(' ') >= 0)
        return { cannotContainSpace: true };

    return null;
}

static shouldBeUnique(control: Control) {
    return new Promise((resolve, reject) => {
        // Fake a remote validator.
        setTimeout(function () {
            if (control.value == "exisitingUser")
                resolve({ shouldBeUnique: true });
            else
                resolve(null);
        }, 1000);
    });
}}
```

null . .

Formbuilder

```
   constructor(fb: FormBuilder) {
    this.form = fb.group({
        firstInput: ['', Validators.compose([Validators.required,
CustomValidators.cannotContainSpace]), CustomValidators.shouldBeUnique],
        secondInput: ['', Validators.required]
    });
}
```

FormBuilder . FromBuilder .

1. .
2. . Validators.compose ([arrayOfValidators]) .
3. .

get / set formBuilder

formBuilder .

1. :

```
exampleForm : FormGroup;
constructor(fb: FormBuilder){
  this.exampleForm = fb.group({
      name : new FormControl({value: 'default name'}, Validators.compose([Validators.required,
Validators.maxLength(15)]))
   });
}
```

2.After :

```
this.exampleForm.controls['name'].setValue('default name');
```

formBuilder :

```
let name = this.exampleForm.controls['name'].value();
```

Angular2 : https://riptutorial.com/ko/angular2/topic/6284/angular2----

9: Angular2

Angular CSS . .

Examples

- .

app.component.html

```
<div>
  <div>
    <div *ngFor="let user of users">
      <button
        class="btn"
        [@buttonState]="user.active"
        (click)="user.changeButtonState()">{{user.firstName}}</button>
    </div>
  </div>
</div>
```

app.component.ts

```
import {Component, trigger, state, transition, animate, style} from '@angular/core';

@Component({
  selector: 'app-root',
  templateUrl: './app.component.html',
  styles: [`
     .btn {
      height: 30px;
      width: 100px;
      border: 1px solid rgba(0, 0, 0, 0.33);
      border-radius: 3px;
      margin-bottom: 5px;
     }

  `],
  animations: [
    trigger('buttonState', [
      state('true', style({
        background: '#04b104',
        transform: 'scale(1)'
      })),
      state('false',   style({
        background: '#e40202',
        transform: 'scale(1.1)'
      })),
      transition('true => false', animate('100ms ease-in')),
      transition('false => true', animate('100ms ease-out'))
    ])
  ]
})
```

```
export class AppComponent {
  users : Array<User> = [];
  constructor(){
    this.users.push(new User('Narco', false));
    this.users.push(new User('Bombasto',false));
    this.users.push(new User('Celeritas', false));
    this.users.push(new User('Magneta', false));
  }
}


export class User {
  firstName : string;
  active : boolean;

  changeButtonState(){
    this.active = !this.active;
  }
  constructor(_firstName :string, _active : boolean){
    this.firstName = _firstName;
    this.active = _active;
  }

}
```

Angular2 : https://riptutorial.com/ko/angular2/topic/8970/angular2-

10: Angular2 () ()

Examples

()

: .

```
@Component({
  selector: 'parent-component',
  template: '<div>
               <child-component [users]="users"></child-component>
             </div>'
})
export class ParentComponent implements OnInit{
  let users : List<User> = null;

  ngOnInit() {
    users.push(new User('A', 'A', 'A@gmail.com');
    users.push(new User('B', 'B', 'B@gmail.com');
    users.push(new User('C', 'C', 'C@gmail.com');
  }
}
```

Input () .

```
@Component({
selector: 'child-component',
  template: '<div>
                  <table *ngIf="users !== null">
                    <thead>
                         <th>Name</th>
                         <th>FName</th>
                         <th>Email</th>
                    </thead>
                    <tbody>
                        <tr *ngFor="let user of users">
                            <td>{{user.name}}</td>
                            <td>{{user.fname}}</td>
                            <td>{{user.email}}</td>
                        </tr>
                    </tbody>
                  </table>

             </div>',
})
export class ChildComponent {
  @Input() users : List<User> = null;
}


export class User {
  name : string;
```

```
  fname : string;
  email : string;

  constructor(_name : string, _fname : string, _email : string){
     this.name = _name;
     this.fname = _fname;
     this.email = _email;
  }
}
```

html

```
<child-component [isSelected]="inputPropValue"></child-component>
```

TS

```
export class AppComponent {
     inputPropValue: true
}
```

ts :

```
export class ChildComponent {
    @Input() inputPropValue = false;
}
```

html :

```
<div [class.simpleCssClass]="inputPropValue"></div>
```

inputPropValue , . false. .

Angular2 () () : https://riptutorial.com/ko/angular2/topic/8943/angular2--------

11: Angular2 .

. , , .

Examples

Angular . .

```
import { platformBrowserDynamic } from "@angular/platform-browser-dynamic";
import { AppModule } from "./src/app";
export function runAngular2App(legacyModel: any) {
       platformBrowserDynamic([
           { provide: "legacyModel", useValue: model }
       ]).bootstrapModule(AppModule)
       .then(success => console.log("Ng2 Bootstrap success"))
       .catch(err => console.error(err));
}
```

" " .

```
import { Injectable } from "@angular/core";
@Injectable()
export class MyService {
   constructor(@Inject("legacyModel") private legacyModel) {
      console.log("Legacy data – ", legacyModel);
    }
 }
```

.

```
require(["myAngular2App"], function(app) {
   app.runAngular2App(legacyModel); // Input to your APP
});
```

Angular2 . : https://riptutorial.com/ko/angular2/topic/9203/angular2--------

12: angular-cli@1.0.0-β10 3

, .

```
'lodash': {
  format: 'cjs',
  defaultExtension: 'js',
  main: 'index.js'
}
```

```
'moment': {
  main: 'moment.js'
}
```

Examples

angular-cli jquery

1. npm jquery .

```
npm install jquery --save
```

 .

.

```
typings install jquery --global --save
```

---

2. angular-cli-build.js jquery vendorNpmFiles .

 . angular-cli-build.js .

 node_modules .

```
var Angular2App = require('angular-cli/lib/broccoli/angular2-app');

module.exports = function(defaults) {
  return new Angular2App(defaults, {
    vendorNpmFiles: [
      // ...
      'jquery/dist/*.js'


    ]
  });
};
```

---

3. jquery SystemJS .

SystemJS system-config.ts .

```
/** Map relative paths to URLs. */
const map: any = {
  'jquery': 'vendor/jquery'
};

/** User packages configuration. */
const packages: any = {

// no need to add anything here for jquery

};
```

---

4. src / index.html

```
<script src="vendor/jquery/dist/jquery.min.js" type="text/javascript"></script>
```

.

```
<script src="vendor/jquery/dist/jquery.js" type="text/javascript"></script>
```

```
<script src="/vendor/jquery/dist/jquery.slim.js" type="text/javascript"></script>
```

```
<script src="/vendor/jquery/dist/jquery.slim.min.js" type="text/javascript"></script>
```

---

5. jquery :

.ts jquery .

```
declare var $:any;

@Component({
})
export class YourComponent {
  ngOnInit() {
    $.("button").click(function(){
       // now you can DO, what ever you want
     });
     console.log();
  }
}
```

jquery . !

.

, 1.0.0-beta.10 -cli !

. TypeScript . .

1. (`index.html`)

```
<script src="//cdn.somewhe.re/lib.min.js" type="text/javascript"></script>
<script src="/local/path/to/lib.min.js" type="text/javascript"></script>
```

   - (: `THREE` , `mapbox` , `$`)

2. lib `declare` . TypeScript . [1]

```
declare var <globalname>: any;
```

   libs `window` .

```
interface WindowIntercom extends Window { Intercom: any; }
declare var window: WindowIntercom;
```

3. lib .

```
@Component { ... }
export class AppComponent implements AfterViewInit {
    ...
    ngAfterViewInit() {
        var geometry = new THREE.BoxGeometry( 1, 1, 1 );
        window.Intercom('boot', { ... }
    }
}
```

   - : libs DOM .

angular-cli@1.0.0-β10 3 : https://riptutorial.com/ko/angular2/topic/2328/angular-cli-1-0-0-β10--3---

13: API RXJS Observables

Angular 2 Http RxJS API Angular 1.x .

Http . Http HTTP `GET` , `POST` , `PUT` , `DELETE` , `PATCH` , `HEAD` . HTTP `request` .

`Http` `Observable<Response>` RxJS . `.subscribe()` .

`Response` HTTP . / .

, `Http` *(cold)*. , . . GET PUT POST .

Examples

HTTP GET . `http.get()` subscribe Observable . `posts` .

```
var posts = []

getPosts(http: Http):void {
    this.http.get(`https://jsonplaceholder.typicode.com/posts`)
        .map(response => response.json())
        .subscribe(post => posts.push(post));
}
```

API

HTTP . . `http.get()` Observable `.map` Response Post .

```
import {Injectable} from "@angular/core";
import {Http, Response} from "@angular/http";

@Injectable()
export class BlogApi {

  constructor(private http: Http) {
  }

  getPost(id: number): Observable<Post> {
    return this.http.get(`https://jsonplaceholder.typicode.com/posts/${id}`)
      .map((response: Response) => {
        const srcData = response.json();
        return new Post(srcData)
      });
  }
}
```

`Post` .

```
export class Post {
  userId: number;
  id: number;
  title: string;
```

```
  body: string;

  constructor(src: any) {
      this.userId = src && src.userId;
      this.id = src && src.id;
      this.title = src && src.title;
      this.body = src && src.body;
  }
}
```

BlogApi Http Post .

.

. forkJoin .

forkJoin Observables . Observable .subscribe . .subscribe .forkJoin . posts tags .

```
loadData() : void {
    Observable.forkJoin(
        this.blogApi.getPosts(),
        this.blogApi.getTags()
    ).subscribe((([posts, tags]: [Post[], Tag[]]) => {
        this.posts = posts;
        this.tags = tags;
    }));
}
```

API RXJS Observables : https://riptutorial.com/ko/angular2/topic/3577/api---rxjs---observables

14: ASP.net Angular 2 TypeScript

: ASP.NET Asp.net 2 2

2 Asp.Net . MVC Angular 2 Angular 2 MVC .

Examples

Asp.Net Core + Angular2 + Gulp

Startup.cs

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Threading.Tasks;
using Microsoft.AspNetCore.Builder;
using Microsoft.AspNetCore.Hosting;
using Microsoft.AspNetCore.Identity.EntityFrameworkCore;
using Microsoft.EntityFrameworkCore;
using Microsoft.Extensions.Configuration;
using Microsoft.Extensions.DependencyInjection;
using Microsoft.Extensions.Logging;
using CoreAngular000.Data;
using CoreAngular000.Models;
using CoreAngular000.Services;
using Microsoft.Extensions.FileProviders;
using System.IO;

namespace CoreAngular000
{
    public class Startup
    {
        public Startup(IHostingEnvironment env)
        {
        var builder = new ConfigurationBuilder()
            .SetBasePath(env.ContentRootPath)
            .AddJsonFile("appsettings.json", optional: false, reloadOnChange:
true)
            .AddJsonFile($"appsettings.{env.EnvironmentName}.json", optional:
true);

        if (env.IsDevelopment())
        {

            builder.AddUserSecrets<Startup>();
        }

        builder.AddEnvironmentVariables();
        Configuration = builder.Build();
    }

    public IConfigurationRoot Configuration { get; }
```

```
    public void ConfigureServices(IServiceCollection services)
    {
        // Add framework services.
        services.AddDbContext<ApplicationDbContext>(options =>
            options.UseSqlServer(Configuration.GetConnectionString("DefaultConnection")));

        services.AddIdentity<ApplicationUser, IdentityRole>()
            .AddEntityFrameworkStores<ApplicationDbContext>()
            .AddDefaultTokenProviders();

        services.AddMvc();

        // Add application services.
        services.AddTransient<IEmailSender, AuthMessageSender>();
        services.AddTransient<ISmsSender, AuthMessageSender>();
    }

   public void Configure(IApplicationBuilder app, IHostingEnvironment env,
ILoggerFactory loggerFactory)
    {
        loggerFactory.AddConsole(Configuration.GetSection("Logging"));
        loggerFactory.AddDebug();

        if (env.IsDevelopment())
        {
            app.UseDeveloperExceptionPage();
            app.UseDatabaseErrorPage();
            app.UseBrowserLink();
        }
        else
        {
            app.UseExceptionHandler("/Home/Error");
        }

        app.UseDefaultFiles();
        app.UseStaticFiles();
        app.UseStaticFiles(new StaticFileOptions
        {
            FileProvider = new
PhysicalFileProvider(Path.Combine(env.ContentRootPath, "node_modules")),
            RequestPath = "/node_modules"
        });

        app.UseMvc(routes =>
        {
            routes.MapRoute(
                name: "default",
                template: "{controller=Home}/{action=Index}/{id?}");
        });
    }
}
}
```

tsConfig.json

```
    {
  "compilerOptions": {
    "diagnostics": true,
    "emitDecoratorMetadata": true,
    "experimentalDecorators": true,
```

```
    "lib": [ "es2015", "dom" ],
    "listFiles": true,
    "module": "commonjs",
    "moduleResolution": "node",
    "noImplicitAny": true,
    "outDir": "wwwroot",
    "removeComments": false,
   "rootDir": "wwwroot",
    "sourceMap": true,
    "suppressImplicitAnyIndexErrors": true,
    "target": "es5"
  },
  "exclude": [
    "node_modules",
    "wwwroot/lib/"
  ]
}
```

Package.json

```
   {
 "name": "angular dependencies and web dev package",
 "version": "1.0.0",
 "description": "Angular 2 MVC. Samuel Maícas Template",
 "scripts": {},
 "dependencies": {
   "@angular/common": "~2.4.0",
   "@angular/compiler": "~2.4.0",
   "@angular/core": "~2.4.0",
   "@angular/forms": "~2.4.0",
   "@angular/http": "~2.4.0",
   "@angular/platform-browser": "~2.4.0",
   "@angular/platform-browser-dynamic": "~2.4.0",
   "@angular/router": "~3.4.0",
  "angular-in-memory-web-api": "~0.2.4",
   "systemjs": "0.19.40",
   "core-js": "^2.4.1",
   "rxjs": "5.0.1",
   "zone.js": "^0.7.4"
 },
 "devDependencies": {
   "del": "^2.2.2",
   "gulp": "^3.9.1",
   "gulp-concat": "^2.6.1",
   "gulp-cssmin": "^0.1.7",
   "gulp-htmlmin": "^3.0.0",
   "gulp-uglify": "^2.1.2",
   "merge-stream": "^1.0.1",
   "tslint": "^3.15.1",
   "typescript": "~2.0.10"
  },
  "repository": {}
}
```

bundleconfig.json

```
    [
  {
    "outputFileName": "wwwroot/css/site.min.css",
```

```
    "inputFiles": [
      "wwwroot/css/site.css"
    ]
  },
  {
    "outputFileName": "wwwroot/js/site.min.js",
    "inputFiles": [
      "wwwroot/js/site.js"
    ],
    "minify": {
      "enabled": true,
      "renameLocals": true
    },
    "sourceMap": false
  }
]
```

bundleconfig.json gulpfile (RightClick bundleconfig.json, Bundler & Minifier> Convert to Gulp) .

/ / Index.cshtml

```
    @{
    ViewData["Title"] = "Home Page";
}
<div>{{ nombre }}</div>
```

wwwroot https://github.com/angular/quickstart seed . : **index.html main.ts, systemjs-angular-loader.js, systemjs.config.js, tsconfig.json app**

wwwroot / Index.html

```
    <html>
  <head>
    <title>SMTemplate Angular2 & ASP.NET Core</title>
    <base href="/">
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1">


    <script src="node_modules/core-js/client/shim.min.js"></script>

    <script src="node_modules/zone.js/dist/zone.js"></script>
    <script src="node_modules/systemjs/dist/system.src.js"></script>

    <script src="systemjs.config.js"></script>
    <script>
      System.import('main.js').catch(function(err){ console.error(err); });
    </script>
  </head>

  <body>
    <my-app>Loading AppComponent here ...</my-app>
  </body>
</html>
```

templateUrl Controllers . wwwroot / app / app.component.ts

```
import { Component } from '@angular/core';

@Component({
  selector: 'my-app',
  templateUrl: '/home/index',
 })
export class AppComponent  { nombre = 'Samuel Maícas'; }
```

[] Asp.Net Core + Visual Studio 2017 Angular2 + Gulp

1.
2. dotnet
3. npm install .

. .

https://github.com/SamML/CoreAngular000

MVC <-> 2

: ASP.NET HTML 2 / JS ANNUAL CALL CONTROLLER :

HTML View () .

```
 return File("~/html/About.html", "text/html");
```

HTML . . .

wwwroot / html / About.html

```
    <!DOCTYPE html>
<html>
  <head>
    <title>About Page</title>
    <base href="/">
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1">
      <link href="../css/site.min.css" rel="stylesheet" type="text/css"/>

    <script src="../node_modules/core-js/client/shim.min.js"></script>

    <script src="../node_modules/zone.js/dist/zone.js"></script>
    <script src="../node_modules/systemjs/dist/system.src.js"></script>

    <script src="../systemjs.config.js"></script>
    <script>
      System.import('../main.js').catch(function(err){ console.error(err); });
    </script>
  </head>

  <body>
    <aboutpage>Loading AppComponent here ...</aboutpage>
  </body>
</html>
```

(*)

: ASP.NET Core Controller Angular2 MVC .

```
import { Component } from '@angular/core';

@Component({
  selector: 'aboutpage',
  templateUrl: '/home/about',
})
export class AboutComponent  {

}
```

ASP.net Angular 2 TypeScript : https://riptutorial.com/ko/angular2/topic/9543/asp-net----angular-2--typescript---

15: ChangeDetectionStrategy

Examples

OnPush

myInput someInternalValue . .

```
import {Component, Input} from '@angular/core';

@Component({
  template:`
  <div>
    <p>{{myInput}}</p>
    <p>{{someInternalValue}}</p>
  </div>
  `
})
class MyComponent {
  @Input() myInput: any;

  someInternalValue: any;

  // ...
}
```

changeDetection: ChangeDetectionStrategy.Default . . MyComponent .,myInput someInternalValue 2 someInternalValue .

. changeDetection: .ChangeDetectionStrategy.OnPush changeDetection:

```
import {Component, ChangeDetectionStrategy, Input} from '@angular/core';

@Component({
  changeDetection: ChangeDetectionStrategy.OnPush
  template:`
  <div>
    <p>{{myInput}}</p>
    <p>{{someInternalValue}}</p>
  </div>
  `
})
class MyComponent {
  @Input() myInput: any;

  someInternalValue: any;

  // ...
}
```

changeDetection: ChangeDetectionStrategy.OnPush MyComponent . myInput .

ChangeDetectionStrategy :

https://riptutorial.com/ko/angular2/topic/2644/changedetectionstrategy---

16: Dropzone 2

Examples

Dropzone 2 .

npm angular2-dropzone-wrapper . --save-dev

```
import { DropzoneModule } from 'angular2-dropzone-wrapper';
import { DropzoneConfigInterface } from 'angular2-dropzone-wrapper';

const DROPZONE_CONFIG: DropzoneConfigInterface = {
  // Change this to your upload POST address:
  server: 'https://example.com/post',
  maxFilesize: 10,
  acceptedFiles: 'image/*'
};

@NgModule({
  ...
  imports: [
    ...
    DropzoneModule.forRoot(DROPZONE_CONFIG)
  ]
})
```

Dropzone dropzone .

```
<dropzone [config]="config" [message]="'Click or drag images here to upload'"
(error)="onUploadError($event)" (success)="onUploadSuccess($event)"></dropzone>
```

```
import {Component} from '@angular/core';
@Component({
    selector: 'app-new-media',
    templateUrl: './dropzone.component.html',
    styleUrls: ['./dropzone.component.scss']
})
export class DropZoneComponent {


    onUploadError(args: any) {
        console.log('onUploadError:', args);
    }

    onUploadSuccess(args: any) {
        console.log('onUploadSuccess:', args);
    }
}
```

Dropzone 2 : https://riptutorial.com/ko/angular2/topic/10010/dropzone--2

17: EventEmitter

Examples

```
class EventEmitter extends Subject {
    constructor(isAsync?: boolean)
    emit(value?: T)
    subscribe(generatorOrNext?: any, error?: any, complete?: any) : any
}
```

```
@Component({
  selector: 'zippy',
  template: `
  <div class="zippy">
    <div (click)="toggle()">Toggle</div>
    <div [hidden]="!visible">
      <ng-content></ng-content>
    </div>
 </div>`})
export class Zippy {
  visible: boolean = true;
  @Output() open: EventEmitter<any> = new EventEmitter();
  @Output() close: EventEmitter<any> = new EventEmitter();
  toggle() {
    this.visible = !this.visible;
    if (this.visible) {
      this.open.emit(null);
    } else {
      this.close.emit(null);
    }
  }
}
```

Emmiting Events

```
<zippy (open)="onOpen($event)" (close)="onClose($event)"></zippy>
```

```
import {EventEmitter} from 'angular2/core';
export class NavService {
    navchange: EventEmitter<number> = new EventEmitter();
    constructor() {}
    emitNavChangeEvent(number) {
        this.navchange.emit(number);
    }
    getNavChangeEmitter() {
        return this.navchange;
    }
}
```

-

```
import {Component} from 'angular2/core';
```

```
import {NavService} from '../services/NavService';

@Component({
    selector: 'obs-comp',
    template: `obs component, item: {{item}}`
    })
    export class ObservingComponent {
    item: number = 0;
    subscription: any;
    constructor(private navService:NavService) {}
    ngOnInit() {
        this.subscription = this.navService.getNavChangeEmitter()
        .subscribe(item => this.selectedNavItem(item));
    }
    selectedNavItem(item: number) {
        this.item = item;
    }
    ngOnDestroy() {
        this.subscription.unsubscribe();
    }
}

@Component({
    selector: 'my-nav',
    template:`
        <div class="nav-item" (click)="selectedNavItem(1)">nav 1 (click me)</div>
        <div class="nav-item" (click)="selectedNavItem(2)">nav 2 (click me)</div>
    `,
})
export class Navigation {
    item = 1;
    constructor(private navService:NavService) {}
    selectedNavItem(item: number) {
        console.log('selected nav item ' + item);
        this.navService.emitNavChangeEvent(item);
    }
}
```

.

EventEmitter : https://riptutorial.com/ko/angular2/topic/9159/eventemitter-

18: HTTP

HttpServiceLayer Http .

HttpServiceLayer Http .

.

```
import { Http } from '@angular/http';
```

.

Examples

Http

```
import { Http, Request, RequestOptionsArgs, Response, RequestOptions, ConnectionBackend,
Headers } from '@angular/http';
import { Router } from '@angular/router';
import { Observable } from 'rxjs/Observable';
import 'rxjs/add/observable/empty';
import 'rxjs/add/observable/throw';
import 'rxjs/add/operator/catch';
import { ApplicationConfiguration } from '../application-configuration/application-
configuration';

/**
* This class extends the Http class from angular and adds automaticaly the server URL(if in
development mode) and 2 headers by default:
* Headers added: 'Content-Type' and 'X-AUTH-TOKEN'.
* 'Content-Type' can be set in any othe service, and if set, it will NOT be overwritten in
this class any more.
*/
export class HttpServiceLayer extends Http {

  constructor(backend: ConnectionBackend, defaultOptions: RequestOptions, private _router:
Router, private appConfig: ApplicationConfiguration) {
    super(backend, defaultOptions);
  }

  request(url: string | Request, options?: RequestOptionsArgs): Observable<Response> {
    this.getRequestOptionArgs(options);
    return this.intercept(super.request(this.appConfig.getServerAdress() + url, options));
  }

  /**
  * This method checks if there are any headers added and if not created the headers map and
ads 'Content-Type' and 'X-AUTH-TOKEN'
  * 'Content-Type' is not overwritten if it is allready available in the headers map
  */
  getRequestOptionArgs(options?: RequestOptionsArgs): RequestOptionsArgs {
    if (options == null) {
      options = new RequestOptions();
    }
```

```
    if (options.headers == null) {
      options.headers = new Headers();
    }

    if (!options.headers.get('Content-Type')) {
      options.headers.append('Content-Type', 'application/json');
    }

    if (this.appConfig.getAuthToken() != null) {
      options.headers.append('X-AUTH-TOKEN', this.appConfig.getAuthToken());
    }

    return options;
  }

  /**
  * This method as the name sugests intercepts the request and checks if there are any errors.
  * If an error is present it will be checked what error there is and if it is a general one
then it will be handled here, otherwise, will be
  * thrown up in the service layers
  */
  intercept(observable: Observable<Response>): Observable<Response> {

    //  return observable;
    return observable.catch((err, source) => {
      if (err.status == 401) {
        this._router.navigate(['/login']);
        //return observable;
        return Observable.empty();
      } else {
        //return observable;
        return Observable.throw(err);
      }
    });
  }
}
```

Angular 's Http

Http Http .

, (,), :

```
export function httpServiceFactory(xhrBackend: XHRBackend, requestOptions: RequestOptions,
router: Router, appConfig: ApplicationConfiguration) {
  return  new HttpServiceLayer(xhrBackend, requestOptions, router, appConfig);
}

import { HttpModule, Http, Request, RequestOptionsArgs, Response, XHRBackend, RequestOptions,
ConnectionBackend, Headers } from '@angular/http';
import { Router } from '@angular/router';

@NgModule({
  declarations: [ ... ],
  imports: [ ... ],
  exports: [ ... ],
  providers: [
    ApplicationConfiguration,
    {
```

```
      provide: Http,
      useFactory: httpServiceFactory,
      deps: [XHRBackend, RequestOptions, Router, ApplicationConfiguration]
}
  ],
  bootstrap: [AppComponent]
})
export class AppModule { }
```

: ApplicationConfiguration .

HttpClient AuthToken (4.3)

```
import { Injectable } from '@angular/core';
import { HttpEvent, HttpHandler, HttpInterceptor, HttpRequest } from '@angular/common/http';
import { UserService } from '../services/user.service';
import { Observable } from 'rxjs/Observable';

@Injectable()
export class AuthHeaderInterceptor implements HttpInterceptor {

  constructor(private userService: UserService) {
  }

  intercept(req: HttpRequest<any>, next: HttpHandler): Observable<HttpEvent<any>> {
    if (this.userService.isAuthenticated()) {
      req = req.clone({
        setHeaders: {
          Authorization:  `Bearer ${this.userService.token}`
        }
      });
    }
    return next.handle(req);
  }
}
```

(some-module.module.ts)

```
{provide: HTTP_INTERCEPTORS, useClass: AuthHeaderInterceptor, multi: true},
```

HTTP : https://riptutorial.com/ko/angular2/topic/1413/http-

19: ngfor

`ngFor` Angular2 . iterable DOM iterable DOM .

Examples

```
<ul>
  <li *ngFor="let item of items">{{item.name}}</li>
</ul>
```

```
<div *ngFor="let item of items">
  <p>{{item.name}}</p>
  <p>{{item.price}}</p>
  <p>{{item.description}}</p>
</div>
```

```
<div *ngFor="let item of items; let i = index">
  <p>Item number: {{i}}</p>
</div>
```

. .

Angular2

Angular2 . :

-
-
-
-
-

`index` `Boolean` `Boolean` . .

```
<div *ngFor="let item of items; let firstItem = first; let lastItem = last">
  <p *ngIf="firstItem">I am the first item and I am gonna be showed</p>
  <p *ngIf="firstItem">I am not the first item and I will not show up :(</p>
  <p *ngIf="lastItem">But I'm gonna be showed as I am the last item :)</p>
</div>
```

*

```
import { Pipe, PipeTransform } from '@angular/core';
@Pipe({
  name: 'even'
})

export class EvenPipe implements PipeTransform {
    transform(value: string): string {
```

```
        if(value && value %2 === 0){
          return value;
        }
    }
}

@Component({
      selector: 'example-component',
      template: '<div>
                      <div *ngFor="let number of numbers | even">
                          {{number}}
                      </div>
                </div>'
})

export class exampleComponent {
    let numbers : List<number> = Array.apply(null, {length: 10}).map(Number.call, Number)
}
```

ngfor : https://riptutorial.com/ko/angular2/topic/8051/ngfor-

20: ngif

* **NgIf** : DOM . , DOM .

- <div * ngIf = "false"> </ div> <! - false ->
- <div * ngIf = "undefined"> </ div> <! - false ->
- <div * ngIf = "null"> </ div> <! - false . ->
- <div * ngIf = "0"> </ div> <! - false . ->
- <div * ngIf = "NaN"> </ div> <! - false ->
- <div * ngIf = ""> </ div> <! - false . ->
- true .

Examples

* ngIf . :

boolean .

```
loading: boolean = false;
```

`ngOnInit` .

```
ngOnInit() {
   this.loading = true;
}
```

boolean false .

```
 this.loading=false;
```

html `loading` * ngIf .

```
<div *ngIf="loading" class="progress">
   <div class="progress-bar info" style="width: 125%;"></div>
</div>
```

```
<p class="alert alert-success" *ngIf="names.length > 2">Currently there are more than 2
names!</p>
```

* ngFor * ngIf

NgFor .

- **index** - 0 iterable ()
- **first** - (boolean) iterable true
- **last** - (boolean) iterable true

- **even** - (boolean) true
- **odd** - (boolean) true

```
<div *ngFor="let note of csvdata; let i=index; let lastcall=last">
      <h3>{{i}}</h3> <-- to show index position
      <h3>{{note}}</h3>
      <span *ngIf="lastcall">{{anyfunction()}} </span><-- this lastcall boolean value will be
true only if this is last in loop
      // anyfunction() will run at the end of loop same way we can do at start
    </div>
```

* ngIf * ngFor .

*ngIf *ngFor ( ) *ngIf *ngFor .

1 :

```
<div *ngFor="let item of items; let i = index">
  <div *ngIf="<your condition here>">

   <!-- Execute code here if statement true -->

  </div>
</div>
```

2 :

```
<div *ngFor="let item of items; let i = index">
  <div *ngIf="i % 2 == 0">
    {{ item }}
  </div>
</div>
```

div .

div * ngFor use * ngIf div . * ngFor template .

```
<template ngFor let-item [ngForOf]="items">
    <div *ngIf="item.price > 100">
    </div>
</template>
```

div <template> DOM . DOM iterated div .

: Angular v4 <template> <ng-template> v5 . Angular v2.x <template> .

ngif : https://riptutorial.com/ko/angular2/topic/8346/ngif--

21: ngModel

ngModel Angular2 .

Examples

```
import { BrowserModule } from '@angular/platform-browser';
import { CommonModule } from '@angular/common';
import { FormsModule } from '@angular/forms';
import { HttpModule } from '@angular/http';

import { Component, DebugElement } from '@angular/core';
import { dispatchEvent } from "@angular/platform-browser/testing/browser_util";
import { TestBed, ComponentFixture} from '@angular/core/testing';
import {By} from "@angular/platform-browser";

import { MyComponentModule } from 'ng2-my-component';
import { MyComponent } from './my-component';

describe('MyComponent:',()=> {

  const template = `
    <div>
       <my-component type="text" [(ngModel)]="value" name="TestName" size="9" min="3" max="8"
placeholder="testPlaceholder" disabled=false required=false></my-component>
    </div>
  `;

  let fixture:any;
  let element:any;
  let context:any;

  beforeEach(() => {

      TestBed.configureTestingModule({
          declarations: [InlineEditorComponent],
          imports: [
            FormsModule,
            InlineEditorModule]
      });
      fixture = TestBed.overrideComponent(InlineEditorComponent, {
      set: {
        selector:"inline-editor-test",
        template: template
      }})
      .createComponent(InlineEditorComponent);
      context = fixture.componentInstance;
      fixture.detectChanges();
  });

  it('should change value of the component', () => {
        let input = fixture.nativeElement.querySelector("input");
        input.value = "Username";
        dispatchEvent(input, 'input');
        fixture.detectChanges();

        fixture.whenStable().then(() => {
```

```
            //this button dispatch event for save the text in component.value
            fixture.nativeElement.querySelectorAll('button')[0].click();
            expect(context.value).toBe("Username");
        });
    });
});
```

ngModel : https://riptutorial.com/ko/angular2/topic/8693/ngmodel-

22: ngrx

Ngrx Angular2 . . - [Redux] [1] - [RxJs] [2] : - Angular2 . (!) [1] : http://redux.js.org [2] : http : // reactivex. io / rxjs

Examples

: /

Redux / Ngrx .

- Redux .
- RxJs Observable .

, .

.

1. `User` `IUser` .
2. `Store` `User` .
3. `UserReducer`
4. `UserReducer`
5. `UserReducer` `UserReducer` `Store` .
6. `Store` .

Spoiler : Plunkr ( ) .

1) `IUser`

.

-
- UI ( )

`IUser` .

`user.interface.ts`

```
export interface IUser {
  // from server
  username: string;
  email: string;

  // for UI
  isConnecting: boolean;
  isConnected: boolean;
};
```

---

2) User

.
:

user.actions.ts

```
export const UserActions = {
  // when the user clicks on login button, before we launch the HTTP request
  // this will allow us to disable the login button during the request
  USR_IS_CONNECTING: 'USR_IS_CONNECTING',
  // this allows us to save the username and email of the user
  // we assume those data were fetched in the previous request
  USR_IS_CONNECTED: 'USR_IS_CONNECTED',

  // same pattern for disconnecting the user
  USR_IS_DISCONNECTING: 'USR_IS_DISCONNECTING',
  USR_IS_DISCONNECTED: 'USR_IS_DISCONNECTED'
};
```

, .

. .

- .
- catch `userService.login` .
- `userService.login` `dispatch` store `dispatch` . `user.isConnecting`
- HTTP (`setTimeout`)
- `HTTP` .

user.service.ts

```
@Injectable()
export class UserService {
  constructor(public store$: Store<AppState>) { }

  login(username: string) {
    // first, dispatch an action saying that the user's tyring to connect
    // so we can lock the button until the HTTP request finish
    this.store$.dispatch({ type: UserActions.USR_IS_CONNECTING });

    // simulate some delay like we would have with an HTTP request
    // by using a timeout
    setTimeout(() => {
      // some email (or data) that you'd have get as HTTP response
      let email = `${username}@email.com`;

      this.store$.dispatch({ type: UserActions.USR_IS_CONNECTED, payload: { username, email }
});
    }, 2000);
  }

  logout() {
    // first, dispatch an action saying that the user's tyring to connect
    // so we can lock the button until the HTTP request finish
```

```
    this.store$.dispatch({ type: UserActions.USR_IS_DISCONNECTING });

    // simulate some delay like we would have with an HTTP request
    // by using a timeout
    setTimeout(() => {
      this.store$.dispatch({ type: UserActions.USR_IS_DISCONNECTED });
    }, 2000);
  }
}
```

---

3) UserReducer

user.state.ts

```
export const UserFactory: IUser = () => {
  return {
    // from server
    username: null,
    email: null,

    // for UI
    isConnecting: false,
    isConnected: false,
    isDisconnecting: false
  };
};
```

---

4) UserReducer

2 .

-
- Action Action<{type: string, payload: any}>

: .

3 .

user.reducer.ts

```
export const UserReducer: ActionReducer<IUser> = (user: IUser, action: Action) => {
  if (user === null) {
    return userFactory();
  }

  // ...
}
```

factory (ES6) .

```
export const UserReducer: ActionReducer<IUser> = (user: IUser = UserFactory(), action: Action)
=> {
  // ...
}
```

. : ES6 Object.assign .

```
export const UserReducer: ActionReducer<IUser> = (user: IUser = UserFactory(), action: Action)
=> {
  switch (action.type) {
    case UserActions.USR_IS_CONNECTING:
      return Object.assign({}, user, { isConnecting: true });

    case UserActions.USR_IS_CONNECTED:
      return Object.assign({}, user, { isConnecting: false, isConnected: true, username:
action.payload.username });

    case UserActions.USR_IS_DISCONNECTING:
      return Object.assign({}, user, { isDisconnecting: true });

    case UserActions.USR_IS_DISCONNECTED:
      return Object.assign({}, user, { isDisconnecting: false, isConnected: false });

    default:
      return user;
  }
};
```

---

5) UserReducer UserReducer Store

app.module.ts

```
@NgModule({
    declarations: [
    AppComponent
    ],
    imports: [
    // angular modules
    // ...

    // declare your store by providing your reducers
    // (every reducer should return a default state)
    StoreModule.provideStore({
        user: UserReducer,
        // of course, you can put as many reducers here as you want
        // ...
    }),

    // other modules to import
    // ...
    ]
});
```

6) Store ▪

.

- UserComponent : **[ ]** @Input async . (user Observable<IUser> IUser).
- LoginComponent **[Smart component]** Store Observable user .

user.component.ts

```
@Component({
  selector: 'user',
  styles: [
    '.table { max-width: 250px; }',
    '.truthy { color: green; font-weight: bold; }',
    '.falsy { color: red; }'
  ],
  template: `
    <h2>User information :</h2>

    <table class="table">
      <tr>
        <th>Property</th>
        <th>Value</th>
      </tr>

      <tr>
        <td>username</td>
        <td [class.truthy]="user.username" [class.falsy]="!user.username">
          {{ user.username ? user.username : 'null' }}
        </td>
      </tr>

      <tr>
        <td>email</td>
        <td [class.truthy]="user.email" [class.falsy]="!user.email">
          {{ user.email ? user.email : 'null' }}
        </td>
      </tr>

      <tr>
        <td>isConnecting</td>
        <td [class.truthy]="user.isConnecting" [class.falsy]="!user.isConnecting">
          {{ user.isConnecting }}
        </td>
      </tr>

      <tr>
        <td>isConnected</td>
        <td [class.truthy]="user.isConnected" [class.falsy]="!user.isConnected">
          {{ user.isConnected }}
        </td>
      </tr>

      <tr>
        <td>isDisconnecting</td>
        <td [class.truthy]="user.isDisconnecting" [class.falsy]="!user.isDisconnecting">
          {{ user.isDisconnecting }}
        </td>
```

```
      </tr>
    </table>
  `
})
export class UserComponent {
  @Input() user;

  constructor() { }
}
```

login.component.ts

```
@Component({
  selector: 'login',
  template: `
    <form
      *ngIf="!(user | async).isConnected"
      #loginForm="ngForm"
      (ngSubmit)="login(loginForm.value.username)"
    >
      <input
        type="text"
        name="username"
        placeholder="Username"
        [disabled]="(user | async).isConnecting"
        ngModel
      >

      <button
        type="submit"
        [disabled]="(user | async).isConnecting || (user | async).isConnected"
      >Log me in</button>
    </form>

    <button
      *ngIf="(user | async).isConnected"
      (click)="logout()"
      [disabled]="(user | async).isDisconnecting"
    >Log me out</button>
  `
})
export class LoginComponent {
  public user: Observable<IUser>;

  constructor(public store$: Store<AppState>, private userService: UserService) {
      this.user = store$.select('user');
  }

  login(username: string) {
    this.userService.login(username);
  }

  logout() {
    this.userService.logout();
  }
}
```

Ngrx Redux RxJs Ngrx Ngrx RxJs . . Plunkr !

tho , !

ngrx : https://riptutorial.com/ko/angular2/topic/8086/ngrx

23: OrderBy

.

Examples

```
import {Pipe, PipeTransform} from '@angular/core';

@Pipe({
  name: 'orderBy',
  pure: false
})
export class OrderBy implements PipeTransform {

  value:string[] =[];

  static _orderByComparator(a:any, b:any):number{

    if(a === null || typeof a === 'undefined') a = 0;
    if(b === null || typeof b === 'undefined') b = 0;

    if((isNaN(parseFloat(a)) || !isFinite(a)) || (isNaN(parseFloat(b)) || !isFinite(b))){
      //Isn't a number so lowercase the string to properly compare
      if(a.toLowerCase() < b.toLowerCase()) return -1;
      if(a.toLowerCase() > b.toLowerCase()) return 1;
    }else{
      //Parse strings as numbers to compare properly
      if(parseFloat(a) < parseFloat(b)) return -1;
      if(parseFloat(a) > parseFloat(b)) return 1;
    }

    return 0; //equal each other
  }

  transform(input:any, config:string = '+'): any{

    //make a copy of the input's reference
    this.value = [...input];
    let value = this.value;

    if(!Array.isArray(value)) return value;

    if(!Array.isArray(config) || (Array.isArray(config) && config.length === 1)){
      let propertyToCheck:string = !Array.isArray(config) ? config : config[0];
      let desc = propertyToCheck.substr(0, 1) === '-';

      //Basic array
      if(!propertyToCheck || propertyToCheck === '-' || propertyToCheck === '+'){
        return !desc ? value.sort() : value.sort().reverse();
      }else {
        let property:string = propertyToCheck.substr(0, 1) === '+' ||
propertyToCheck.substr(0, 1) === '-'
          ? propertyToCheck.substr(1)
          : propertyToCheck;

        return value.sort(function(a:any,b:any){
```

```
          return !desc
            ? OrderBy._orderByComparator(a[property], b[property])
            : -OrderBy._orderByComparator(a[property], b[property]);
        });
      }
    } else {
      //Loop over property of the array in order and sort
      return value.sort(function(a:any,b:any){
        for(let i:number = 0; i < config.length; i++){
          let desc = config[i].substr(0, 1) === '-';
          let property = config[i].substr(0, 1) === '+' || config[i].substr(0, 1) === '-'
            ? config[i].substr(1)
            : config[i];

          let comparison = !desc
            ? OrderBy._orderByComparator(a[property], b[property])
            : -OrderBy._orderByComparator(a[property], b[property]);

          //Don't return 0 yet in case of needing to sort by next property
          if(comparison !== 0) return comparison;
        }

        return 0; //equal each other
      });
    }
  }
}
```

HTML -

```
<table>
   <thead>
    <tr>
     <th>First Name</th>
     <th>Last Name</th>
    <th>Age</th>
    </tr>
</thead>
<tbody>
   <tr *ngFor="let user of users | orderBy : ['firstName']>
       <td>{{user.firstName}}</td>
       <td>{{user.lastName}}</td>
       <td>{{user.age}}</td>
   </tr>
</tbody>
</table>
```

HTML -

```
<table>
   <thead>
    <tr>
     <th>First Name</th>
     <th>Last Name</th>
    <th>Age</th>
    </tr>
</thead>
```

```
<tbody>
   <tr *ngFor="let user of users | orderBy : ['-firstName']>
       <td>{{user.firstName}}</td>
       <td>{{user.lastName}}</td>
       <td>{{user.age}}</td>
   </tr>
</tbody>
</table>
```

OrderBy : https://riptutorial.com/ko/angular2/topic/8969/orderby-

24: ViewContainerRef.createComponent

Examples

. .

```
@Component({
  selector: 'dcl-wrapper',
  template: `<div #target></div>`
})
export class DclWrapper {
  @ViewChild('target', {
    read: ViewContainerRef
  }) target;
  @Input() type;
  cmpRef: ComponentRef;
  private isViewInitialized: boolean = false;

  constructor(private resolver: ComponentResolver) {}

  updateComponent() {
    if (!this.isViewInitialized) {
      return;
    }
    if (this.cmpRef) {
      this.cmpRef.destroy();
    }
    this.resolver.resolveComponent(this.type).then((factory: ComponentFactory < any > ) => {
      this.cmpRef = this.target.createComponent(factory)
        // to access the created instance use
        // this.cmpRef.instance.someProperty = 'someValue';
        // this.cmpRef.instance.someOutput.subscribe(val => doSomething());
    });
  }

  ngOnChanges() {
    this.updateComponent();
  }

  ngAfterViewInit() {
    this.isViewInitialized = true;
    this.updateComponent();
  }

  ngOnDestroy() {
    if (this.cmpRef) {
      this.cmpRef.destroy();
    }
  }
}
```

.

```
<dcl-wrapper [type]="someComponentType"></dcl-wrapper>
```

()

:

```
//our root app component
import {Component, NgModule, ViewChild, ViewContainerRef, ComponentFactoryResolver,
ComponentRef} from '@angular/core'
import {BrowserModule} from '@angular/platform-browser'
import {ChildComponent} from './childComp.ts'

@Component({
  selector: 'my-app',
  template: `
    <div>
      <h2>Hello {{name}}</h2>
      <input type="button" value="Click me to add element" (click) = addElement()> // call the
function on click of the button
      <div #parent> </div> // Dynamic component will be loaded here
    </div>
  `,
})
export class App {
  name:string;

  @ViewChild('parent', {read: ViewContainerRef}) target: ViewContainerRef;
  private componentRef: ComponentRef<any>;

  constructor(private componentFactoryResolver: ComponentFactoryResolver) {
    this.name = 'Angular2'
  }

  addElement(){
    let childComponent =
this.componentFactoryResolver.resolveComponentFactory(ChildComponent);
    this.componentRef = this.target.createComponent(childComponent);
  }
}
```

childComp.ts :

```
import{Component} from '@angular/core';

@Component({
  selector: 'child',
  template: `
    <p>This is Child</p>
  `,
})
export class ChildComponent {
  constructor(){

  }
}
```

app.module.ts :

```
@NgModule({
```

```
  imports: [ BrowserModule ],
  declarations: [ App, ChildComponent ],
  bootstrap: [ App ],
  entryComponents: [ChildComponent] // define the dynamic component here in module.ts
})
export class AppModule {}
```

Angular2 html

.

WidgetComponent , ChartWidget PatientWidget .

ChartWidget.ts

```
@Component({
selector: 'chart-widget',
templateUrl: 'chart-widget.component.html',
providers: [{provide: WidgetComponent, useExisting: forwardRef(() => ChartWidget) }]
})

export class ChartWidget extends WidgetComponent implements OnInit {
       constructor(ngEl: ElementRef, renderer: Renderer) {
    super(ngEl, renderer);
    }
    ngOnInit() {}
     close(){
      console.log('close');
    }
    refresh(){
      console.log('refresh');
    }
    ...
}
```

chart-widget.compoment.html (primeng Panel)

```
<p-panel [style]="{'margin-bottom':'20px'}">
    <p-header>
        <div class="ui-helper-clearfix">
           <span class="ui-panel-title" style="font-size:14px;display:inline-block;margin-
top:2px">Chart Widget</span>
            <div class="ui-toolbar-group-right">
               <button pButton type="button" icon="fa-window-minimize"
(click)="minimize()"</button>
              <button pButton type="button" icon="fa-refresh" (click)="refresh()"></button>
              <button pButton type="button"  icon="fa-expand" (click)="expand()" ></button>
             <button pButton type="button" (click)="close()" icon="fa-window-close"></button>
                   </div>
               </div>
    </p-header>
      some data
</p-panel>
```

DataWidget.ts

```
@Component({
    selector: 'data-widget',
    templateUrl: 'data-widget.component.html',
    providers: [{provide: WidgetComponent, useExisting: forwardRef(() =>DataWidget) }]
    })

export class DataWidget extends WidgetComponent implements OnInit {
       constructor(ngEl: ElementRef, renderer: Renderer) {
    super(ngEl, renderer);
    }
    ngOnInit() {}
    close(){
      console.log('close');
    }
    refresh(){
      console.log('refresh');
    }
    ...
}
```

data-widget.compoment.html (primeng Panel)

WidgetComponent.ts

```
@Component({
  selector: 'widget',
  template: '<ng-content></ng-content>'
})
export  class WidgetComponent{
}
```

. ,

```
@Component({

    selector: 'dynamic-component',
    template: `<div #container><ng-content></ng-content></div>`

})
export class DynamicComponent {
@ViewChild('container', {read: ViewContainerRef}) container: ViewContainerRef;

    public addComponent(ngItem: Type<WidgetComponent>): WidgetComponent {
    let factory = this.compFactoryResolver.resolveComponentFactory(ngItem);
    const ref = this.container.createComponent(factory);
    const newItem: WidgetComponent = ref.instance;
    this._elements.push(newItem);
    return newItem;
  }
}
```

. app.component.ts

```
@Component({
  selector: 'app-root',
  templateUrl: './app/app.component.html',
  styleUrls: ['./app/app.component.css'],
```

```
  entryComponents: [ChartWidget,  DataWidget],
})

export class AppComponent {
   private elements: Array<WidgetComponent>=[];
   private WidgetClasses = {
      'ChartWidget': ChartWidget,
      'DataWidget': DataWidget
  }
  @ViewChild(DynamicComponent) dynamicComponent:DynamicComponent;

   addComponent(widget: string ): void{
     let ref= this.dynamicComponent.addComponent(this.WidgetClasses[widget]);
     this.elements.push(ref);
     console.log(this.elements);

     this.dynamicComponent.resetContainer();
  }
}
```

app.component.html

```
<button (click)="addComponent('ChartWidget')">Add ChartWidget</button>
<button (click)="addComponent('DataWidget')">Add DataWidget</button>

<dynamic-component [hidden]="true" ></dynamic-component>

<hr>
Dynamic Components
<hr>
<widget *ngFor="let item of elements">
    <div>{{item}}</div>
   <div [innerHTML]="item._ngEl.nativeElement.innerHTML | sanitizeHtml">
   </div>
</widget>
```

https://plnkr.co/edit/lugU2pPsSBd3XhPHiUP1?p=preview

@yurzui .

view.directive.ts

'@ angular / core' {ViewRef, Directive, Input, ViewContainerRef} ;

```
@Directive({
    selector: '[view]'
})
export class ViewDirective {
  constructor(private vcRef: ViewContainerRef) {}

  @Input()
  set view(view: ViewRef) {
    this.vcRef.clear();
    this.vcRef.insert(view);
  }

  ngOnDestroy() {
    this.vcRef.clear()
```

```
  }
}
```

app.component.ts

```
private elements: Array<{ view: ViewRef, component: WidgetComponent}> = [];

...
addComponent(widget: string ): void{
  let component = this.dynamicComponent.addComponent(this.WidgetClasses[widget]);
  let view: ViewRef = this.dynamicComponent.container.detach(0);
  this.elements.push({view,component});

  this.dynamicComponent.resetContainer();
}
```

app.component.html

```
<widget *ngFor="let item of elements">
  <ng-container *view="item.view"></ng-container>
</widget>
```

https://plnkr.co/edit/JHpIHR43SvJd0OxJVMfV?p=preview

ViewContainerRef.createComponent : https://riptutorial.com/ko/angular2/topic/831/viewcontainerref-createcomponent-----

25: Visual Studio Angular2

Examples

Launch.json

1. ->
2. launch.json . launch.json . launch.json // new launch.json
   .

```
{
    "version": "0.2.0",
    "configurations": [
        {
            "name": "Launch Extension",
            "type": "extensionHost",
            "request": "launch",
            "runtimeExecutable": "${execPath}",
            "args": [
                "--extensionDevelopmentPath=${workspaceRoot}"
            ],
            "stopOnEntry": false,
            "sourceMaps": true,
            "outDir": "${workspaceRoot}/out",
            "preLaunchTask": "npm"
        }
    ]
}
```

launch.json .
launch.json
** // main.js **

```
{
    "version": "0.2.0",
    "configurations": [
        {
            "name": "Launch",
            "type": "node",
            "request": "launch",
            "program": "${workspaceRoot}/app/main.js", // put your main.js path
            "stopOnEntry": false,
            "args": [],
            "cwd": "${workspaceRoot}",
            "preLaunchTask": null,
            "runtimeExecutable": null,
            "runtimeArgs": [
                "--nolazy"
            ],
            "env": {
                "NODE_ENV": "development"
            },
```

```
            "console": "internalConsole",
            "sourceMaps": false,
            "outDir": null
        },
        {
            "name": "Attach",
            "type": "node",
            "request": "attach",
            "port": 5858,
            "address": "localhost",
            "restart": false,
            "sourceMaps": false,
            "outDir": null,
            "localRoot": "${workspaceRoot}",
            "remoteRoot": null
        },
        {
            "name": "Attach to Process",
            "type": "node",
            "request": "attach",
            "processId": "${command.PickProcess}",
            "port": 5858,
            "sourceMaps": false,
            "outDir": null
        }
    ]
}
```

3. .

Visual Studio Angular2 : https://riptutorial.com/ko/angular2/topic/7139/visual-studio---angular2-----

26: Webpack Angular2

Examples

2

webpack.config.js

```
const webpack = require("webpack")
const helpers = require('./helpers')
const path = require("path")
const WebpackNotifierPlugin = require('webpack-notifier');

module.exports = {

    // set entry point for your app module
    "entry": {
        "app": helpers.root("app/main.module.ts"),
    },

    // output files to dist folder
    "output": {
        "filename": "[name].js",
        "path": helpers.root("dist"),
        "publicPath": "/",
    },

    "resolve": {
        "extensions": ['.ts', '.js'],
    },

    "module": {
        "rules": [
            {
                "test": /\.ts$/,
                "loaders": [
                    {
                        "loader": 'awesome-typescript-loader',
                        "options": {
                            "configFileName": helpers.root("./tsconfig.json")
                        }
                    },
                    "angular2-template-loader"
                ]
            },
        ],
    },

    "plugins": [

        // notify when build is complete
        new WebpackNotifierPlugin({title: "build complete"}),

        // get reference for shims
        new webpack.DllReferencePlugin({
            "context": helpers.root("src/app"),
```

```
            "manifest": helpers.root("config/polyfills-manifest.json")
        }),

        // get reference of vendor DLL
        new webpack.DllReferencePlugin({
            "context": helpers.root("src/app"),
            "manifest": helpers.root("config/vendor-manifest.json")
        }),

        // minify compiled js
        new webpack.optimize.UglifyJsPlugin(),
    ],
}
```

vendor.config.js

```
const webpack = require("webpack")
const helpers = require('./helpers')
const path = require("path")

module.exports = {
    // specify vendor file where all vendors are imported
    "entry": {
        // optionally add your shims as well
        "polyfills": [helpers.root("src/app/shims.ts")],
        "vendor": [helpers.root("src/app/vendor.ts")],
    },

    // output vendor to dist
    "output": {
        "filename": "[name].js",
        "path": helpers.root("dist"),
        "publicPath": "/",
        "library": "[name]"
    },

    "resolve": {
        "extensions": ['.ts', '.js'],
    },

    "module": {
        "rules": [
            {
                "test": /\.ts$/,
                "loaders": [
                    {
                        "loader": 'awesome-typescript-loader',
                        "options": {
                            "configFileName": helpers.root("./tsconfig.json")
                        }
                    },
                ]
            },
        ],
    },

    "plugins": [

        // create DLL for entries
        new webpack.DllPlugin({
```

```
            "name": "[name]",
            "context": helpers.root("src/app"),
            "path": helpers.root("config/[name]-manifest.json")
        }),

        // minify generated js
        new webpack.optimize.UglifyJsPlugin(),
    ],
}
```

helpers.js

```
var path = require('path');

var _root = path.resolve(__dirname, '..');

function root(args) {
  args = Array.prototype.slice.call(arguments, 0);
  return path.join.apply(path, [_root].concat(args));
}

exports.root = root;
```

vendor.ts

```
import "@angular/platform-browser"
import "@angular/platform-browser-dynamic"
import "@angular/core"
import "@angular/common"
import "@angular/http"
import "@angular/router"
import "@angular/forms"
import "rxjs"
```

index.html

```
<!DOCTYPE html>
<html>
<head>
    <title>Angular 2 webpack</title>

    <script src="/dist/vendor.js" type="text/javascript"></script>
    <script src="/dist/app.js" type="text/javascript"></script>
</head>
<body>
    <app>loading...</app>
</body>
</html>
```

package.json

```
{
  "name": "webpack example",
  "version": "0.0.0",
  "description": "webpack",
  "scripts": {
```

```
    "build:webpack": "webpack --config config/webpack.config.js",
    "build:vendor": "webpack --config config/vendor.config.js",
    "watch": "webpack --config config/webpack.config.js --watch"
  },
  "devDependencies": {
    "@angular/common": "2.4.7",
    "@angular/compiler": "2.4.7",
    "@angular/core": "2.4.7",
    "@angular/forms": "2.4.7",
    "@angular/http": "2.4.7",
    "@angular/platform-browser": "2.4.7",
    "@angular/platform-browser-dynamic": "2.4.7",
    "@angular/router": "3.4.7",
    "webpack": "^2.2.1",
    "awesome-typescript-loader": "^3.1.2",
  },
  "dependencies": {
  }
}
```

Webpack Angular2 : https://riptutorial.com/ko/angular2/topic/9554/webpack--angular2

27: Zone.js

Examples

NgZone

`NgZone` DI (Dependency Injection) .

my.component.ts

```
import { Component, NgOnInit, NgZone } from '@angular/core';

@Component({...})
export class Mycomponent implements NgOnInit {
  constructor(private _ngZone: NgZone) { }
  ngOnInit() {
    this._ngZone.runOutsideAngular(() => {
      // Do something outside Angular so it won't get noticed
    });
  }
}
```

NgZone HTTP

`runOutsideAngular` 2 . , HTTP . Angular 2 `NgZone run NgZone` .

my.component.ts

```
import { Component, OnInit, NgZone } from '@angular/core';
import { Http } from '@angular/http';

@Component({...})
export class Mycomponent implements OnInit {
  private data: any[];
  constructor(private http: Http, private _ngZone: NgZone) { }
  ngOnInit() {
    this._ngZone.runOutsideAngular(() => {
      this.http.get('resource1').subscribe((data1:any) => {
        // First response came back, so its data can be used in consecutive request
        this.http.get(`resource2?id=${data1['id']}`).subscribe((data2:any) => {
          this.http.get(`resource3?id1=${data1['id']}&id2=${data2}`).subscribe((data3:any) =>
{
            this._ngZone.run(() => {
              this.data = [data1, data2, data3];
            });
          });
        });
      });
    });
  }
}
```

Zone.js : https://riptutorial.com/ko/angular2/topic/4184/zone-js

28: - ForLoop

1. <div * ngFor = " ; let i = index"> {{i}} {{item}} </ div>

`*ngFor` html .

`@View` . `@Component template` 'templateUrl' .

Examples

2 for-loop

plnkr ...

```
<!doctype html>
<html>
<head>
    <title>ng for loop in angular 2 with ES5.</title>
    <script type="text/javascript" src="https://code.angularjs.org/2.0.0-
alpha.28/angular2.sfx.dev.js"></script>
    <script>
        var ngForLoop = function () {
            this.msg = "ng for loop in angular 2 with ES5.";
            this.users = ["Anil Singh", "Sunil Singh", "Sushil Singh", "Aradhya", 'Reena'];
        };

        ngForLoop.annotations = [
                new angular.Component({
                    selector: 'ngforloop'
                }),
                new angular.View({
                    template: '<H1>{{msg}}</H1>' +
                            '<p> User List : </p>' +
                            '<ul>' +
                            '<li *ng-for="let user of users">' +
                            '{{user}}' +
                            '</li>' +
                            '</ul>',
                    directives: [angular.NgFor]
                })
        ];

        document.addEventListener("DOMContentLoaded", function () {
            angular.bootstrap(ngForLoop);
        });
    </script>
</head>
<body>
    <ngforloop></ngforloop>
    <h2>
      <a href="http://www.code-sample.com/" target="_blank">For more detail...</a>
    </h2>
</body>
</html>
```

NgFor -

NgFor . .

NgFor **trackBy** . **trackBy** index item . **trackBy** .

```
<li *ngFor="let item of items; let i = index; trackBy: trackByFn">
    {{i}} - {{item.name}}
</li>
```

: NgFor .

- .
- .
- **last** .
- .
- .

* ngFor

```
<table>
    <thead>
        <th>Name</th>
        <th>Index</th>
    </thead>
    <tbody>
        <tr *ngFor="let hero of heroes">
            <td>{{hero.name}}</td>
        </tr>
    </tbody>
</table>
```

* ngFor

```
   @Component({
     selector: 'main-component',
     template: '<example-component
                   *ngFor="let hero of heroes"
                   [hero]="hero"></example-component>'
   })


   @Component({
      selector: 'example-component',
      template: '<div>{{hero?.name}}</div>'
   })

   export class ExampleComponent {
     @Input() hero : Hero = null;
   }
```

* ng X

: 5 :

```
<div *ngFor="let item of items; let i = index">
  <div *ngIf="i % 5 == 0" class="row">
    {{ item }}
    <div *ngIf="i + 1 < items.length">{{ items[i + 1] }}</div>
    <div *ngIf="i + 2 < items.length">{{ items[i + 2] }}</div>
    <div *ngIf="i + 3 < items.length">{{ items[i + 3] }}</div>
    <div *ngIf="i + 4 < items.length">{{ items[i + 4] }}</div>
  </div>
</div>
```

- ForLoop : https://riptutorial.com/ko/angular2/topic/6543/---forloop

29: 2 -

Examples

Navbar

navbar.html 3 . (, ,)

```
<nav class="navbar navbar-default" role="navigation">
<ul class="nav navbar-nav">
  <li>
    <a id="home-navbar" routerLink="/home">Home</a>
  </li>
  <li>
    <a id="list-navbar" routerLink="/create" >List</a>
  </li>
  <li>
    <a id="create-navbar" routerLink="/create">Create</a>
  </li>
</ul>
```

navbar.e2e-spec.ts .

```
describe('Navbar', () => {

  beforeEach(() => {
    browser.get('home'); // before each test navigate to home page.
  });

  it('testing Navbar', () => {
    browser.sleep(2000).then(function(){
      checkNavbarTexts();
      navigateToListPage();
    });
  });

  function checkNavbarTexts(){
    element(by.id('home-navbar')).getText().then(function(text){ // Promise
      expect(text).toEqual('Home');
    });

    element(by.id('list-navbar')).getText().then(function(text){ // Promise
      expect(text).toEqual('List');
    });

    element(by.id('create-navbar')).getText().then(function(text){ // Promise
      expect(text).toEqual('Create');
    });
  }

  function navigateToListPage(){
    element(by.id('list-home')).click().then(function(){ // first find list-home a tag and
than click
        browser.sleep(2000).then(function(){
          browser.getCurrentUrl().then(function(actualUrl){ // promise
```

```
            expect(actualUrl.indexOf('list') !== -1).toBeTruthy(); // check the current url is
list
          });
        });

    });
  }
});
```

Angular2 -

cmd follows .

- `npm install -g protractor`
- `webdriver-manager update`
- `webdriver-manager start`

** protractor.conf.js .

useAllAngular2AppRoots : true .

```
  const config = {
  baseUrl: 'http://localhost:3000/',

  specs: [
      './dev/**/*.e2e-spec.js'
  ],

  exclude: [],
  framework: 'jasmine',

  jasmineNodeOpts: {
    showColors: true,
    isVerbose: false,
    includeStackTrace: false
  },

  directConnect: true,

  capabilities: {
    browserName: 'chrome',
    shardTestFiles: false,
    chromeOptions: {
      'args': ['--disable-web-security ','--no-sandbox', 'disable-extensions', 'start-
maximized', 'enable-crash-reporter-for-testing']
    }
  },

  onPrepare: function() {
    const SpecReporter = require('jasmine-spec-reporter');
    // add jasmine spec reporter
    jasmine.getEnv().addReporter(new SpecReporter({ displayStacktrace: true }));

    browser.ignoreSynchronization = false;
  },
  useAllAngular2AppRoots: true
};
```

```
if (process.env.TRAVIS) {
  config.capabilities = {
    browserName: 'firefox'
  };
}

exports.config = config;
```

dev .

```
describe('basic test', () => {

  beforeEach(() => {
    browser.get('http://google.com');
  });

  it('testing basic test', () => {
    browser.sleep(2000).then(function(){
      browser.getCurrentUrl().then(function(actualUrl){
        expect(actualUrl.indexOf('google') !== -1).toBeTruthy();
      });
    });
  });
});
```

cmd

```
protractor conf.js
```

2 - : https://riptutorial.com/ko/angular2/topic/8900/-2---

30: 2

`this.myForm = this.formBuilder.group`

this.myForm .

`'loginCredentials': this.formBuilder.group`

formControlName . `login` value `['', Validators.required],` secons `'email': ['', [Validators.required, customValidator]],` `'email': ['', [Validators.required, customValidator]],`

```
'hobbies': this.formBuilder.array
```

formGroupName .

```
<div *ngFor="let hobby of myForm.find('hobbies').controls; let i = index">
   <div formGroupName="{{i}}">...</div>
</div>
```

```
onAddHobby() {
    (<FormArray>this.myForm.find('hobbies')).push(new FormGroup({
      'hobby': new FormControl('', Validators.required)
    }))
  }
```

formGroup . . `<FormArray>`

```
removeHobby(index: number){
    (<FormArray>this.myForm.find('hobbies')).removeAt(index);
  }
```

.

Examples

```
    import {Component, OnInit} from '@angular/core';
import {
    FormGroup,
    FormControl,
    FORM_DIRECTIVES,
    REACTIVE_FORM_DIRECTIVES,
    Validators,
    FormBuilder,
    FormArray
} from "@angular/forms";
import {Control} from "@angular/common";
```

```
@Component({
  moduleId: module.id,
  selector: 'app-data-driven-form',
  templateUrl: 'data-driven-form.component.html',
  styleUrls: ['data-driven-form.component.css'],
  directives: [FORM_DIRECTIVES, REACTIVE_FORM_DIRECTIVES]
})
export class DataDrivenFormComponent  implements OnInit {
  myForm: FormGroup;

  constructor(private formBuilder: FormBuilder) {}

  ngOnInit() {
    this.myForm = this.formBuilder.group({
      'loginCredentials': this.formBuilder.group({
        'login': ['', Validators.required],
        'email': ['',  [Validators.required, customValidator]],
        'password': ['',  Validators.required]
      }),
      'hobbies': this.formBuilder.array([
        this.formBuilder.group({
          'hobby': ['', Validators.required]
        })
      ])
    });
  }

  removeHobby(index: number){
    (<FormArray>this.myForm.find('hobbies')).removeAt(index);
  }

  onAddHobby() {
    (<FormArray>this.myForm.find('hobbies')).push(new FormGroup({
      'hobby': new FormControl('', Validators.required)
    }))
  }

  onSubmit() {
    console.log(this.myForm.value);
  }
}

function customValidator(control: Control): {[s: string]: boolean} {
  if(!control.value.match("[a-z0-9!#$%&'*+/=?^_`{|}~-]+(?:\.[a-z0-9!#$%&'*+/=?^_`{|}~-
]+)*@(?:[a-z0-9](?:[a-z0-9-]*[a-z0-9])?\.)+[a-z0-9](?:[a-z0-9-]*[a-z0-9])?")) {
    return {error: true}
  }
}
```

HTML

```
<h3>Register page</h3>
<form [formGroup]="myForm" (ngSubmit)="onSubmit()">
  <div formGroupName="loginCredentials">
    <div class="form-group">
      <div>
        <label for="login">Login</label>
        <input  id="login" type="text" class="form-control" formControlName="login">
      </div>
      <div>
```

```
        <label for="email">Email</label>
        <input  id="email" type="text" class="form-control"  formControlName="email">
      </div>
      <div>
        <label for="password">Password</label>
        <input  id="password" type="text" class="form-control"  formControlName="password">
      </div>
    </div>
  </div>
  <div class="row" >
    <div  formGroupName="hobbies">
      <div class="form-group">
        <label>Hobbies array:</label>
        <div  *ngFor="let hobby of myForm.find('hobbies').controls; let i = index">
          <div formGroupName="{{i}}">
            <input id="hobby_{{i}}" type="text" class="form-control"  formControlName="hobby">
            <button *ngIf="myForm.find('hobbies').length > 1"
(click)="removeHobby(i)">x</button>
          </div>
        </div>
        <button (click)="onAddHobby()">Add hobby</button>
      </div>
    </div>
  </div>
  <button type="submit" [disabled]="!myForm.valid">Submit</button>
</form>
```

2 : https://riptutorial.com/ko/angular2/topic/6463/-2---

31: 2

Examples

:

```
import {Component} from '@angular/core';

@Component({
  selector: 'parent-component',
  templateUrl: './parent-component.html'
})
export class ParentComponent {
  users : Array<User> = [];
  changeUsersActivation(user : User){
    user.changeButtonState();
  }
  constructor(){
    this.users.push(new User('Narco', false));
    this.users.push(new User('Bombasto',false));
    this.users.push(new User('Celeritas', false));
    this.users.push(new User('Magneta', false));
  }
}


export class User {
  firstName : string;
  active : boolean;

  changeButtonState(){
    this.active = !this.active;
  }
  constructor(_firstName :string, _active : boolean){
    this.firstName = _firstName;
    this.active = _active;
  }

}
```

HTML :

```
<div>
  <child-component [usersDetails]="users"
                   (changeUsersActivation)="changeUsersActivation($event)">
   </child-component>
</div>
```

:

```
import {Component, Input, EventEmitter, Output} from '@angular/core';
import {User} from "./parent.component";
```

```
@Component({
  selector: 'child-component',
  templateUrl: './child-component.html',
  styles: [`
     .btn {
      height: 30px;
      width: 100px;
      border: 1px solid rgba(0, 0, 0, 0.33);
      border-radius: 3px;
      margin-bottom: 5px;
     }

  `]
})
export class ChildComponent{
  @Input() usersDetails : Array<User> = null;
  @Output() changeUsersActivation = new EventEmitter();

  triggerEvent(user : User){
    this.changeUsersActivation.emit(user);
  }
}
```

HTML :

```
<div>
  <div>
    <table>
      <thead>
        <tr>
          <th>Name</th>
          <th></th>
        </tr>
      </thead>
      <tbody *ngIf="user !== null">
        <tr *ngFor="let user of usersDetails">
          <td>{{user.firstName}}</td>
          <td><button class="btn" (click)="triggerEvent(user)">{{user.active}}</button></td>
        </tr>
      </tbody>
    </table>
  </div>
</div>
```

2 : https://riptutorial.com/ko/angular2/topic/8971/-2-----

32: 2

Examples

Angular 2 Jasmine . Jasmine .

`jasmine-core` (`jasmine`) .

```
npm install jasmine-core --save-dev --save-exact
```

Jasmine `./src/unit-tests.html` .

```
<!DOCTYPE html>
<html>
<head>
  <meta http-equiv="content-type" content="text/html;charset=utf-8">
  <title>Ng App Unit Tests</title>
  <link rel="stylesheet" href="../node_modules/jasmine-core/lib/jasmine-core/jasmine.css">
  <script src="../node_modules/jasmine-core/lib/jasmine-core/jasmine.js"></script>
  <script src="../node_modules/jasmine-core/lib/jasmine-core/jasmine-html.js"></script>
  <script src="../node_modules/jasmine-core/lib/jasmine-core/boot.js"></script>
</head>
<body>
   <!-- Unit Testing Chapter #1: Proof of life.  -->
   <script>
     it('true is true', function () {
       expect(true).toEqual(true);
     });
   </script>
</body>
</html>
```

Gulp, Webpack, Karma Jasmine

Webpack Webpack . ES6 (bavelle) . Typescript . Pug (Jade) .

.

webpack :

```
const webpack = require("webpack");
let packConfig = {
    entry: {},
    output: {},
    plugins:[
        new webpack.DefinePlugin({
            ENVIRONMENT: JSON.stringify('test')
        })
    ],
```

```
    module: {
       loaders: [
        {
            test: /\.js$/,
            exclude:/(node_modules|bower_components)/,
            loader: "babel",
            query:{
                presets:["es2015", "angular2"]
            }
        },
        {
            test: /\.woff2?$|\.ttf$|\.eot$|\.svg$/,
            loader: "file"
        },
        {
            test: /\.scss$/,
            loaders: ["style", "css", "sass"]
        },
        {
            test: /\.pug$/,
            loader: 'pug-html-loader'
        },
        ]
    },
    devtool : 'inline-cheap-source-map'
};
module.exports = packConfig;
```

webpack config karma.config.js .

```
const packConfig = require("./webpack.config.js");
module.exports = function (config) {
    config.set({
    basePath: '',
    frameworks: ['jasmine'],
    exclude:[],
    files: [
        {pattern: './karma.shim.js', watched: false}
    ],

    preprocessors: {
        "./karma.shim.js":["webpack"]
    },
    webpack: packConfig,

    webpackServer: {noInfo: true},

    port: 9876,

    colors: true,

    logLevel: config.LOG_INFO,

    browsers: ['PhantomJS'],

    concurrency: Infinity,

    autoWatch: false,
    singleRun: true
});
```

```
};
```

, , **karma.shim.js** . webpack . webpack **import require** .

karma.shim.js .

```
// Start of ES6 Specific stuff
import "es6-shim";
import "es6-promise";
import "reflect-metadata";
// End of ES6 Specific stuff

import "zone.js/dist/zone";
import "zone.js/dist/long-stack-trace-zone";
import "zone.js/dist/jasmine-patch";
import "zone.js/dist/async-test";
import "zone.js/dist/fake-async-test";
import "zone.js/dist/sync-test";
import "zone.js/dist/proxy-zone";

import 'rxjs/add/operator/map';
import 'rxjs/add/observable/of';

Error.stackTraceLimit = Infinity;

import {TestBed} from "@angular/core/testing";
import { BrowserDynamicTestingModule, platformBrowserDynamicTesting} from "@angular/platform-
browser-dynamic/testing";

TestBed.initTestEnvironment(
     BrowserDynamicTestingModule,
     platformBrowserDynamicTesting());

let testContext = require.context('../src/app', true, /\.spec\.js/);
testContext.keys().forEach(testContext);
```

TestBed . **src / app** **.spec.js** testContext .

. Personat . **src / test** . karma.shim.js .

. ? , karma.config.js :

```
gulp.task("karmaTests",function(done){
    var Server = require("karma").Server;
    new Server({
        configFile : "./karma.config.js",
        singleRun: true,
        autoWatch: false
    }, function(result){
        return result ? done(new Error(`Karma failed with error code ${result}`)):done();
    }).start();
});
```

config , . . .

Angular 2 "Tour of Heroes" .

```
import {
    TestBed,
    ComponentFixture,
    async
} from "@angular/core/testing";

import {AppComponent} from "./app.component";
import {AppModule} from "./app.module";
import Hero from "./hero/hero";

describe("App Component", function () {

    beforeEach(()=> {
        TestBed.configureTestingModule({
            imports: [AppModule]
        });

        this.fixture = TestBed.createComponent(AppComponent);
        this.fixture.detectChanges();
    });

    it("Should have a title", async(()=> {
        this.fixture.whenStable().then(()=> {
            expect(this.fixture.componentInstance.title).toEqual("Tour of Heros");
        });
    }));

    it("Should have a hero", async(()=> {
        this.fixture.whenStable().then(()=> {
            expect(this.fixture.componentInstance.selectedHero).toBeNull();
        });
    }));

    it("Should have an array of heros", async(()=>
        this.fixture.whenStable().then(()=> {
            const cmp = this.fixture.componentInstance;
            expect(cmp.heroes).toBeDefined("component should have a list of heroes");
            expect(cmp.heroes.length).toEqual(10, "heroes list should have 10 members");
            cmp.heroes.map((h, i)=> {
                expect(h instanceof Hero).toBeTruthy(`member ${i} is not a Hero instance.
${h}`)
            });
        })));

        it("Should have one list item per hero", async(()=>
        this.fixture.whenStable().then(()=> {
            const ul = this.fixture.nativeElement.querySelector("ul.heroes");
            const li = Array.prototype.slice.call(
                this.fixture.nativeElement.querySelectorAll("ul.heroes>li"));
            const cmp = this.fixture.componentInstance;
            expect(ul).toBeTruthy("There should be an unnumbered list for heroes");
            expect(li.length).toEqual(cmp.heroes.length, "there should be one li for each
hero");
            li.forEach((li, i)=> {
                expect(li.querySelector("span.badge"))
                    .toBeTruthy(`hero ${i} has to have a span for id`);
                expect(li.querySelector("span.badge").textContent.trim())
                    .toEqual(cmp.heroes[i].id.toString(), `hero ${i} had wrong id displayed`);
                expect(li.textContent)
                    .toMatch(cmp.heroes[i].name, `hero ${i} has wrong name displayed`);
            });
```

```
        }));

    it("should have correct styling of hero items", async(()=>
        this.fixture.whenStable().then(()=> {
            const hero = this.fixture.nativeElement.querySelector("ul.heroes>li");
            const win = hero.ownerDocument.defaultView ||hero.ownerDocument.parentWindow;
            const styles = win.getComputedStyle(hero);
            expect(styles["cursor"]).toEqual("pointer", "cursor should be pointer on hero");
            expect(styles["borderRadius"]).toEqual("4px", "borderRadius should be 4px");
        }));

    it("should have a click handler for hero items",async(()=>
        this.fixture.whenStable().then(()=>{
            const cmp = this.fixture.componentInstance;
            expect(cmp.onSelect)
                .toBeDefined("should have a click handler for heros");
            expect(this.fixture.nativeElement.querySelector("input.heroName"))
                .toBeNull("should not show the hero details when no hero has been selected");
            expect(this.fixture.nativeElement.querySelector("ul.heroes li.selected"))
                .toBeNull("Should not have any selected heroes at start");

            spyOn(cmp,"onSelect").and.callThrough();
            this.fixture.nativeElement.querySelectorAll("ul.heroes li")[5].click();

            expect(cmp.onSelect)
                .toHaveBeenCalledWith(cmp.heroes[5]);
            expect(cmp.selectedHero)
                .toEqual(cmp.heroes[5], "click on hero should change hero");
        })
    ));
});
```

beforeEach () **detectChanges ()** all .

async () fixture **StStable** . componentInstance **nativeElement** .

. . **getComputedStyle ()** Window . .

HTTP

API / . . Angular `XHRBackend` HTTP . . http `MockBackend MockConnection` .

`posts.service.ts` API `posts.service.ts` .

```
import { Http } from '@angular/http';
import { Injectable } from '@angular/core';
import { Observable }     from 'rxjs/rx';

import 'rxjs/add/operator/map';

export interface IPost {
    userId: number;
    id: number;
    title: string;
    body: string;
}

@Injectable()
```

```
export class PostsService {
    posts: IPost[];

    private postsUri = 'http://jsonplaceholder.typicode.com/posts';

    constructor(private http: Http) {
    }

    get(): Observable<IPost[]> {
        return this.http.get(this.postsUri)
                .map((response) => response.json());
    }
}
```

`posts.service.spec.ts` http API .

```
import { TestBed, inject, fakeAsync } from '@angular/core/testing';
import {
    HttpModule,
    XHRBackend,
    ResponseOptions,
    Response,
    RequestMethod
} from '@angular/http';
import {
    MockBackend,
    MockConnection
} from '@angular/http/testing';

import { PostsService } from './posts.service';

describe('PostsService', () => {
    // Mock http response
    const mockResponse = [
        {
            'userId': 1,
            'id': 1,
            'title': 'sunt aut facere repellat provident occaecati excepturi optio
reprehenderit',
            'body': 'quia et suscipit\nsuscipit recusandae consequuntur expedita et
cum\nreprehenderit molestiae ut ut quas totam\nnostrum rerum est autem sunt rem eveniet
architecto'
        },
        {
            'userId': 1,
            'id': 2,
            'title': 'qui est esse',
            'body': 'est rerum tempore vitae\nsequi sint nihil reprehenderit dolor beatae ea
dolores neque\nfugiat blanditiis voluptate porro vel nihil molestiae ut reiciendis\nqui
aperiam non debitis possimus qui neque nisi nulla'
        },
        {
            'userId': 1,
            'id': 3,
            'title': 'ea molestias quasi exercitationem repellat qui ipsa sit aut',
            'body': 'et iusto sed quo iure\nvoluptatem occaecati omnis eligendi aut
ad\nvoluptatem doloribus vel accusantium quis pariatur\nmolestiae porro eius odio et labore et
velit aut'
        },
        {
```

```
            'userId': 1,
            'id': 4,
            'title': 'eum et est occaecati',
            'body': 'ullam et saepe reiciendis voluptatem adipisci\nsit amet autem assumenda
provident rerum culpa\nquis hic commodi nesciunt rem tenetur doloremque ipsam iure\nquis sunt
voluptatem rerum illo velit'
        }
    ];

    beforeEach(() => {
        TestBed.configureTestingModule({
            imports: [HttpModule],
            providers: [
                {
                    provide: XHRBackend,
                    // This provides mocked XHR backend
                    useClass: MockBackend
                },
                PostsService
            ]
        });
    });

    it('should return posts retrieved from Api', fakeAsync(
        inject([XHRBackend, PostsService],
            (mockBackend, postsService) => {
                mockBackend.connections.subscribe(
                    (connection: MockConnection) => {
                        // Assert that service has requested correct url with expected method
                        expect(connection.request.method).toBe(RequestMethod.Get);

expect(connection.request.url).toBe('http://jsonplaceholder.typicode.com/posts');
                        // Send mock response
                        connection.mockRespond(new Response(new ResponseOptions({
                            body: mockResponse
                        })));
                    });

                postsService.get()
                    .subscribe((posts) => {
                        expect(posts).toBe(mockResponse);
                    });

            })));
});
```

-

.

```
import { Component } from '@angular/core';

@Component({
  selector: 'my-app',
  template: '<h1>{{title}}</h1>'
})
export class MyAppComponent{
  title = 'welcome';
}
```

angle . @angular/core/testing .

```
import { ComponentFixture, TestBed } from '@angular/core/testing';
import { MyAppComponent } from './banner-inline.component';

describe('Tests for MyAppComponent', () => {

  let fixture: ComponentFixture<MyAppComponent>;
  let comp: MyAppComponent;

  beforeEach(() => {
    TestBed.configureTestingModule({
      declarations: [
        MyAppComponent
      ]
    });
  });

  beforeEach(() => {

    fixture = TestBed.createComponent(MyAppComponent);
    comp = fixture.componentInstance;

  });

  it('should create the MyAppComponent', () => {

      expect(comp).toBeTruthy();

  });

});
```

. TestBed ComponentFixture .

TestBed configureTestingModule configureTestingModule . beforeEach .

TestBed createComponent . createComponent ComponentFixture . Fixture .

2 : https://riptutorial.com/ko/angular2/topic/2329/-2--

33: 2

2 ngForm . Angular 2 exportAs ngForm . ngForm (, ,) .

```
#f = ngForm (creates local template instance "f")
```

ngForm "ngSubmit" (@Output)

```
(ngSubmit)= "login(f.value,f.submitted)"
```

"ngModel" "name" .

```
<input type="text" [(ngModel)]="username" placeholder="enter username" required>
```

f.value JSON .

{username : 'Sachin', : 'Welcome1'}

Examples

RC3 API .

pw-change.template.html

```
<form class="container" [formGroup]="pwChangeForm">
    <label for="current">Current Password</label>
    <input id="current" formControlName="current" type="password" required><br />

    <label for="newPW">New Password</label>
    <input id="newPW" formControlName="newPW" type="password" required><br/>
    <div *ngIf="newPW.touched && newPW.newIsNotOld">
        New password can't be the same as current password.
    </div>

    <label for="confirm">Confirm new password</label>
    <input id="confirm" formControlName="confirm" type="password" required><br />
    <div *ngIf="confirm.touched && confirm.errors.newMatchesConfirm">
        The confirmation does not match.
    </div>

    <button type="submit">Submit</button>
</form>
```

pw-change.component.ts

```
import {Component} from '@angular/core'
import {REACTIVE_FORM_DIRECTIVES, FormBuilder, AbstractControl, FormGroup,
    Validators} from '@angular/forms'
```

```
import {PWChangeValidators} from './pw-validators'

@Component({
    moduleId: module.id
    selector: 'pw-change-form',
    templateUrl: `./pw-change.template.html`,
    directives: [REACTIVE_FORM_DIRECTIVES]
})

export class PWChangeFormComponent {
    pwChangeForm: FormGroup;

    // Properties that store paths to FormControls makes our template less verbose
    current: AbstractControl;
    newPW: AbstractControl;
    confirm: AbstractControl;

    constructor(private fb: FormBuilder) { }
    ngOnInit() {
        this.pwChangeForm = this.fb.group({
            current: ['', Validators.required],
            newPW: ['', Validators.required],
            confirm: ['', Validators.required]
        }, {
            // Here we create validators to be used for the group as a whole
            validator: Validators.compose([
                PWChangeValidators.newIsNotOld,
                PWChangeValidators.newMatchesConfirm
            ])
        );
        this.current = this.pwChangeForm.controls['current'];
        this.newPW = this.pwChangeForm.controls['newPW'];
        this.confirm = this.pwChangeForm.controls['confirm'];
    }
}
```

pw-validators.ts

```
import {FormControl, FormGroup} from '@angular/forms'
export class PWChangeValidators {

    static OldPasswordMustBeCorrect(control: FormControl) {
        var invalid = false;
        if (control.value != PWChangeValidators.oldPW)
            return { oldPasswordMustBeCorrect: true }
        return null;
    }

    // Our cross control validators are below
    // NOTE: They take in type FormGroup rather than FormControl
    static newIsNotOld(group: FormGroup){
        var newPW = group.controls['newPW'];
        if(group.controls['current'].value == newPW.value)
            newPW.setErrors({ newIsNotOld: true });
        return null;
    }

    static newMatchesConfirm(group: FormGroup){
        var confirm = group.controls['confirm'];
```

```
        if(group.controls['newPW'].value !== confirm.value)
            confirm.setErrors({ newMatchesConfirm: true });
        return null;
    }
}
```

.

2 :

```
import { Component } from '@angular/core';
import { Router , ROUTER_DIRECTIVES} from '@angular/router';
import { NgForm }    from '@angular/forms';

@Component({
    selector: 'login',
    template: `
<h2>Login</h2>
<form #f="ngForm" (ngSubmit)="login(f.value,f.valid)" novalidate>
    <div>
        <label>Username</label>
        <input type="text" [(ngModel)]="username" placeholder="enter username" required>
    </div>
    <div>
        <label>Password</label>
        <input type="password" name="password" [(ngModel)]="password" placeholder="enter
password" required>
    </div>
    <input class="btn-primary" type="submit" value="Login">
</form>`
   //For long form we can use **templateUrl** instead of template
})

export class LoginComponent{

    constructor(private router : Router){ }

    login (formValue: any, valid: boolean){
        console.log(formValue);

        if(valid){
            console.log(valid);
        }
    }
}
```

Angular 2 Form - /

..

ts

```
import {bootstrap} from '@angular/platform-browser-dynamic';
import {MyForm} from './my-form.component.ts';

bootstrap(MyForm);
```

```
import {Control} from @'angular/common';

export class CustomValidators {
  static emailFormat(control: Control): [[key: string]: boolean] {
    let pattern:RegExp = /\S+@\S+\.\S+/;
    return pattern.test(control.value) ? null : {"emailFormat": true};
  }
}
```

ts

```
import {Component} from '@angular/core';
import {FORM_DIRECTIVES, NgForm, FormBuilder, Control, ControlGroup, Validators} from
'@angular/common';
import {CustomValidators} from './custom-validators';

@Component({
  selector: 'my-form',
  templateUrl: 'app/my-form.component.html',
  directives: [FORM_DIRECTIVES],
  styleUrls: ['styles.css']
})
export class MyForm {
  email: Control;
  password: Control;
  group: ControlGroup;

  constructor(builder: FormBuilder) {
    this.email = new Control('',
      Validators.compose([Validators.required, CustomValidators.emailFormat])
    );

    this.password = new Control('',
      Validators.compose([Validators.required, Validators.minLength(4)])
    );

    this.group = builder.group({
      email: this.email,
      password: this.password
    });
  }

  onSubmit() {
    console.log(this.group.value);
  }
}
```

HTML

```
<form [ngFormModel]="group" (ngSubmit)="onSubmit()" novalidate>

  <div>
    <label for="email">Email:</label>
    <input type="email" id="email" [ngFormControl]="email">

    <ul *ngIf="email.dirty && !email.valid">
      <li *ngIf="email.hasError('required')">An email is required</li>
    </ul>
```

```
  </div>

  <div>
    <label for="password">Password:</label>
    <input type="password" id="password" [ngFormControl]="password">

    <ul *ngIf="password.dirty && !password.valid">
      <li *ngIf="password.hasError('required')">A password is required</li>
      <li *ngIf="password.hasError('minlength')">A password needs to have at least 4
characterss</li>
    </ul>
  </div>

  <button type="submit">Register</button>

</form>
```

2 : ( )

Angular 2.0.0 .

registration-form.component.ts

```
import { FormGroup,
    FormControl,
    FormBuilder,
    Validators }              from '@angular/forms';

@Component({
    templateUrl: "./registration-form.html"
})
export class ExampleComponent {
    constructor(private _fb: FormBuilder) { }

exampleForm = this._fb.group({
    name: ['DefaultValue', [<any>Validators.required, <any>Validators.minLength(2)]],
    email: ['default@defa.ult', [<any>Validators.required, <any>Validators.minLength(2)]]
})
```

registration-form.html

```
<form [formGroup]="exampleForm" novalidate (ngSubmit)="submit(exampleForm)">
    <label>Name: </label>
    <input type="text" formControlName="name"/>
    <label>Email: </label>
    <input type="email" formControlName="email"/>
    <button type="submit">Submit</button>
</form>
```

Angular 2 Forms (Reactive Forms)

app.module.ts

app.module.ts .

```
import { NgModule } from '@angular/core';
    import { BrowserModule } from '@angular/platform-browser';
    import { FormsModule, ReactiveFormsModule } from '@angular/forms';
    import { AppComponent } from './app.component';
    @NgModule({
      imports: [
        BrowserModule,
        FormsModule,
        ReactiveFormsModule,
     ],
    declarations: [
    AppComponent
     ]
  providers: [],
  bootstrap: [
    AppComponent
   ]
  })
export class AppModule {}
```

app.component.ts

```
import { Component,OnInit } from '@angular/core';
import template from './add.component.html';
import { FormGroup,FormBuilder,Validators } from '@angular/forms';
import { matchingPasswords } from './validators';
@Component({
    selector: 'app',
    template
})
export class AppComponent implements OnInit {
    addForm: FormGroup;
    constructor(private formBuilder: FormBuilder) {
    }
    ngOnInit() {

    this.addForm = this.formBuilder.group({
            username: ['', Validators.required],
            email: ['', Validators.required],
            role: ['', Validators.required],
            password: ['', Validators.required],
            password2: ['', Validators.required] },
          { validator: matchingPasswords('password', 'password2')
        })
    };

addUser() {
        if (this.addForm.valid) {
            var adduser = {
                username: this.addForm.controls['username'].value,
                email: this.addForm.controls['email'].value,
                password: this.addForm.controls['password'].value,
                profile: {
                    role: this.addForm.controls['role'].value,
                    name: this.addForm.controls['username'].value,
                    email: this.addForm.controls['email'].value
```

```
                }
            };
          console.log(adduser);// adduser var contains all our form values. store it where you
want
            this.addForm.reset();// this will reset our form values to null
        }
    }
}
```

app.component.html

```
<div>
  <form [formGroup]="addForm">
   <input type="text" placeholder="Enter username" formControlName="username" />
   <input type="text" placeholder="Enter Email Address" formControlName="email"/>
   <input type="password" placeholder="Enter Password" formControlName="password" />
   <input type="password" placeholder="Confirm Password" name="password2"
formControlName="password2"/>
   <div class='error' *ngIf="addForm.controls.password2.touched">
    <div class="alert-danger errormessageadduser"
*ngIf="addForm.hasError('mismatchedPasswords')">                                    Passwords do
not match
  </div>
</div>
<select name="Role" formControlName="role">
    <option value="admin" >Admin</option>
    <option value="Accounts">Accounts</option>
    <option value="guest">Guest</option>
</select>
<br/>
<br/>
<button type="submit" (click)="addUser()"><span><i class="fa fa-user-plus" aria-
hidden="true"></i></span> Add User </button>
</form>
</div>
```

validators.ts

```
export function matchingPasswords(passwordKey: string, confirmPasswordKey: string) {
    return (group: ControlGroup): {
        [key: string]: any
    } => {
        let password = group.controls[passwordKey];
        let confirmPassword = group.controls[confirmPasswordKey];

        if (password.value !== confirmPassword.value) {
            return {
                mismatchedPasswords: true
            };
        }
    }
}
```

Angular2 -

FormComponent.ts

```
import {Component} from "@angular/core";
import {FormBuilder} from "@angular/forms";

@Component({
 selector: 'app-form',
 templateUrl: './form.component.html',
 styleUrls: ['./form.component.scss'],
 providers : [FormBuilder]
})

export class FormComponent{
  form : FormGroup;
  emailRegex = /^\w+([\.-]?\w+)*@\w+([\.-]?\w+)*(\.\w{2,3})+$/;

  constructor(fb: FormBuilder) {

    this.form = fb.group({
      FirstName : new FormControl({value: null}, Validators.compose([Validators.required,
Validators.maxLength(15)])),
      LastName : new FormControl({value: null}, Validators.compose([Validators.required,
Validators.maxLength(15)])),
      Email : new FormControl({value: null}, Validators.compose([
        Validators.required,
        Validators.maxLength(15),
        Validators.pattern(this.emailRegex)]))
    });
  }
}
```

form.component.html

```
<form class="form-details" role="form" [formGroup]="form">
    <div class="row input-label">
      <label class="form-label" for="FirstName">First name</label>
      <input
        [formControl]="form.controls['FirstName']"
        type="text"
        class="form-control"
        id="FirstName"
        name="FirstName">
    </div>
    <div class="row input-label">
      <label class="form-label" for="LastName">Last name</label>
      <input
        [formControl]="form.controls['LastName']"
        type="text"
        class="form-control"
        id="LastName"
        name="LastName">
    </div>
    <div class="row">
      <label class="form-label" for="Email">Email</label>
      <input
        [formControl]="form.controls['Email']"
        type="email"
        class="form-control"
        id="Email"
```

```
        name="Email">
    </div>
    <div class="row">
      <button
        (click)="submit()"
        role="button"
        class="btn btn-primary submit-btn"
        type="button"
        [disabled]="!form.valid">Submit</button>
    </div>
  </div>
</form>
```

2 : https://riptutorial.com/ko/angular2/topic/4607/-2--

34: 2 Ahead (Ahead-of-time)

Examples

1. Angular 2 .

: Angular-CLI .

```
npm install angular/{core,common,compiler,platform-browser,platform-browser-
dynamic,http,router,forms,compiler-cli,tsc-wrapped,platform-server}
```

2 `.compiler` .

2.`tsconfig.json` `angularCompilerOptions` .

```
...
"angularCompilerOptions": {
    "genDir": "./ngfactory"
}
...
```

.

3. ngc .

`./node_modules/.bin/ngc -p src src` 2 . `ngfactory ngfactory` .

`"node_modules/.bin/ngc" -p src` for windows

4. NgFactory `main.ts` .

```
// this is the static platform browser, the usual counterpart is @angular/platform-browser-
dynamic.
import { platformBrowser } from '@angular/platform-browser';

// this is generated by the angular compiler
import { AppModuleNgFactory } from './ngfactory/app/app.module.ngfactory';

// note the use of `bootstrapModuleFactory`, as opposed to `bootstrapModule`.
platformBrowser().bootstrapModuleFactory(AppModuleNgFactory);
```

. Angular-CLI .

```
> ng serve
```

, ?

Q. ? Ans. Angular .

,

```
// ...
compile: function (el, scope) {
  var dirs = this._getElDirectives(el);
  var dir;
  var scopeCreated;
  dirs.forEach(function (d) {
    dir = Provider.get(d.name + Provider.DIRECTIVES_SUFFIX);
    if (dir.scope && !scopeCreated) {
      scope = scope.$new();
      scopeCreated = true;
    }
    dir.link(el, scope, d.value);
  });
  Array.prototype.slice.call(el.children).forEach(function (c) {
    this.compile(c, scope);
  }, this);
},
// ...
```

,

```
<ul>
  <li *ngFor="let name of names"></li>
</ul>
```

.

```
// ...
this._text_9 = this.renderer.createText(this._el_3, '\n', null);
this._text_10 = this.renderer.createText(parentRenderNode, '\n\n', null);
this._el_11 = this.renderer.createElement(parentRenderNode, 'ul', null);
this._text_12 = this.renderer.createText(this._el_11, '\n  ', null);
this._anchor_13 = this.renderer.createTemplateAnchor(this._el_11, null);
this._appEl_13 = new import2.AppElement(13, 11, this, this._anchor_13);
this._TemplateRef_13_5 = new import17.TemplateRef_(this._appEl_13,
viewFactory_HomeComponent1);
this._NgFor_13_6 = new import15.NgFor(this._appEl_13.vcRef, this._TemplateRef_13_5,
this.parentInjector.get(import18.IterableDiffers), this.ref);
// ...
```

AoT .

1. TypeScript Angular 2 .
2. ngc .
3. TypeScript .
4. TypeScript JavaScript .
5. .
6. Minification.
7. .

.

1. .
2. .
3. .

. UX angle2-seed angular-cli .

! !

CLI AoT

Angular CLI 17 AoT .

AoT .

```
ng build --prod --aot
```

2 Ahead (Ahead-of-time) : https://riptutorial.com/ko/angular2/topic/6634/-2-ahead--ahead-of-time--

35: 2

Angular 2 angle . .

" " . .

Examples

```
import { NgModule, CUSTOM_ELEMENTS_SCHEMA } from '@angular/core';
import { CommonModule } from '@angular/common';
import { AboutComponent } from './about.component';

@NgModule({
    imports: [ CommonModule ],
    declarations: [ AboutComponent ],
    exports: [ AboutComponent ],
    schemas: [ CUSTOM_ELEMENTS_SCHEMA ]
})

export class AboutModule { }
```

```
import { Component } from '@angular/core';

@Component({
  selector: 'myapp-about',
  template: `<my-webcomponent></my-webcomponent>`
})
export class AboutComponent { }
```

2 : https://riptutorial.com/ko/angular2/topic/7414/-2-----

36: CLI

.

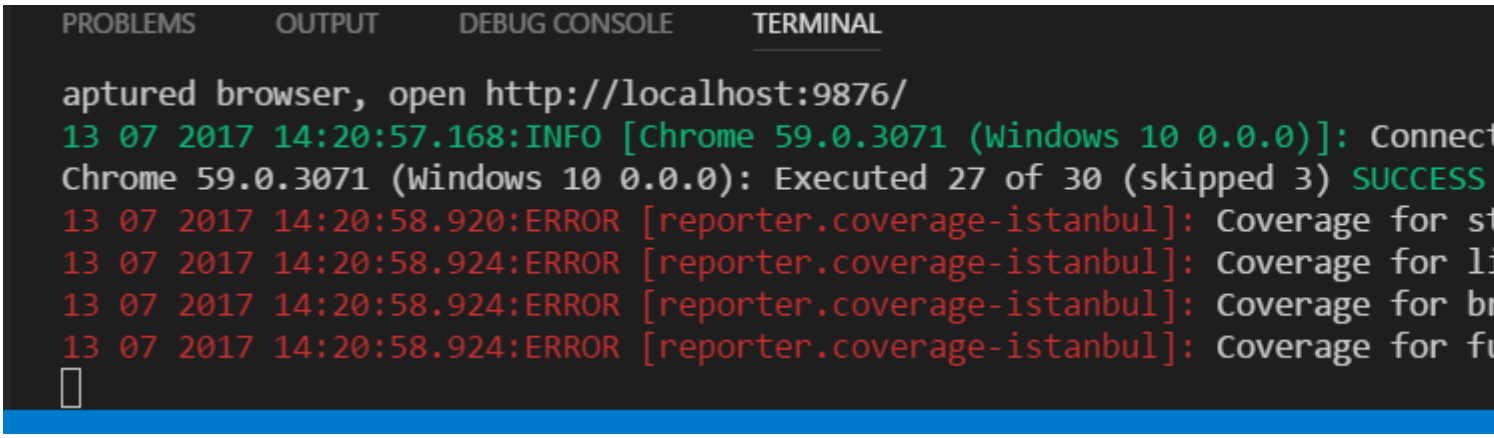
Angular CLI `ng test --cc` .

Examples

CLI

Angular CLI .

```
ng test --cc // or --code-coverage
```

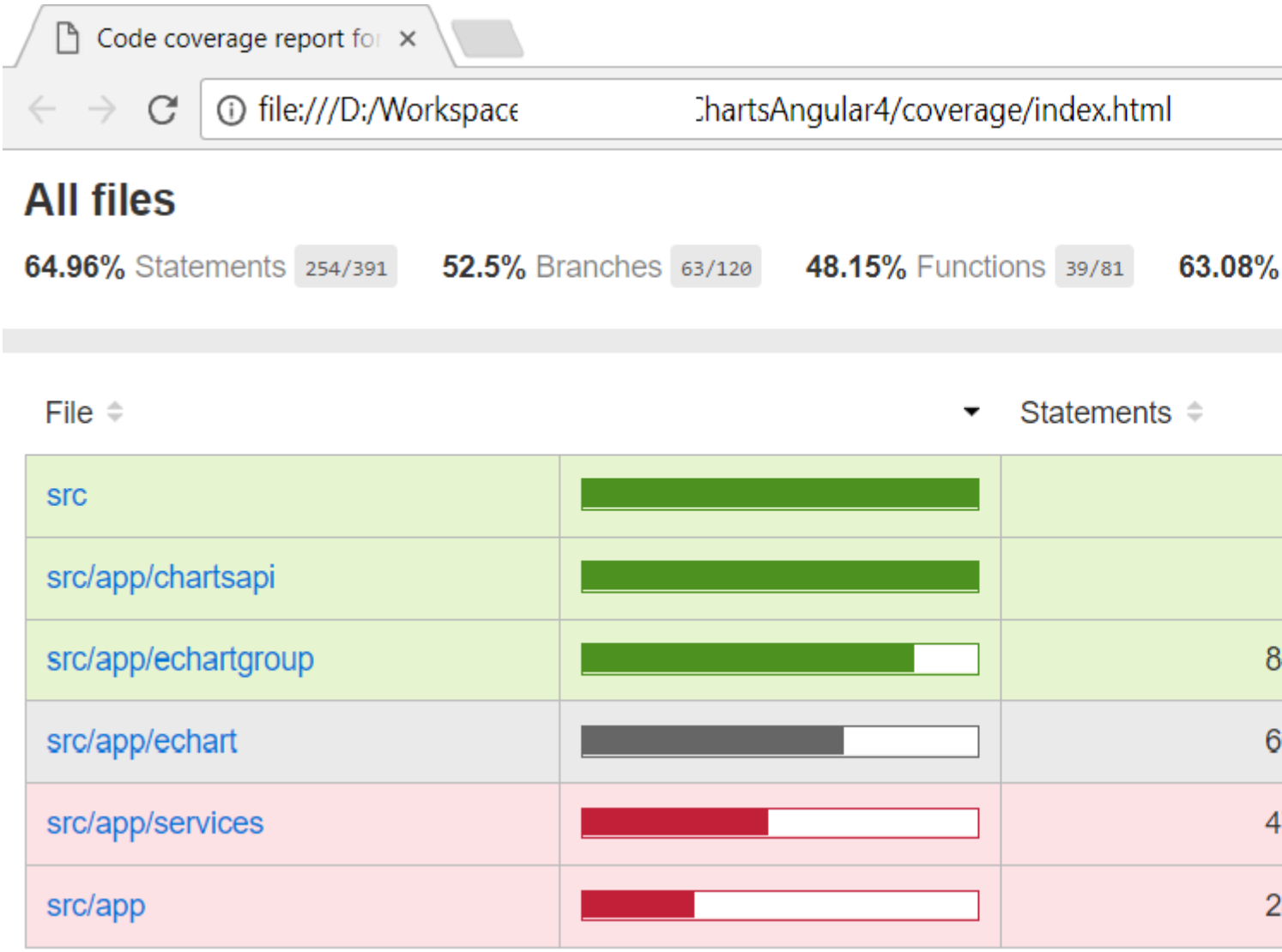


.

1. `npm install --save-dev karma-teamcity-reporter`
2. ``Add `require('karma-teamcity-reporter')` to list of plugins in karma.conf.js``
3. `ng test --code-coverage --reporters=teamcity,coverage-istanbul`

. .

dir `coverage` `index.html` .



`karma.conf.js` .

```
coverageIstanbulReporter: {
      reports: ['html', 'lcovonly'],
      fixWebpackSourcePaths: true,
      thresholds: {
        statements: 90,
        lines: 90,
        branches: 90,
        functions: 90
      }
    },
```

CLI : https://riptutorial.com/ko/angular2/topic/10764/-cli---

37: npm

NgModule npm TypeScript . npm , , .

Examples

```
/
    -src/
        awesome.service.ts
        another-awesome.service.ts
        awesome.module.ts
    -index.ts
    -tsconfig.json
    -package.json
    -rollup.config.js
    -.npmignore
```

.

src / awesome.service.ts :

```
export class AwesomeService {
    public doSomethingAwesome(): void {
        console.log("I am so awesome!");
    }
}
```

src / awesome.module.ts :

```
import { NgModule } from '@angular/core'
import { AwesomeService } from './awesome.service';
import { AnotherAwesomeService } from './another-awesome.service';

@NgModule({
    providers: [AwesomeService, AnotherAwesomeService]
})
export class AwesomeModule {}
```

.

/index.ts :

```
export { AwesomeService } from './src/awesome.service';
export { AnotherAwesomeService } from './src/another-awesome.service';
export { AwesomeModule } from './src/awesome.module';
```

compilerOptions.paths .

/tsconfig.json

```
{
  "compilerOptions": {
    "baseUrl": ".",
    "declaration": true,
    "stripInternal": true,
    "experimentalDecorators": true,
    "strictNullChecks": false,
    "noImplicitAny": true,
    "module": "es2015",
    "moduleResolution": "node",
    "paths": {
      "@angular/core": ["node_modules/@angular/core"],
      "rxjs/*": ["node_modules/rxjs/*"]
    },
    "rootDir": ".",
    "outDir": "dist",
    "sourceMap": true,
    "inlineSources": true,
    "target": "es5",
    "skipLibCheck": true,
    "lib": [
      "es2015",
      "dom"
    ]
  },
  "files": [
    "index.ts"
  ],
  "angularCompilerOptions": {
    "strictMetadataEmit": true
  }
}
```

.

/rollup.config.js

```
export default {
    entry: 'dist/index.js',
    dest: 'dist/bundles/awesome.module.umd.js',
    sourceMap: false,
    format: 'umd',
    moduleName: 'ng.awesome.module',
    globals: {
        '@angular/core': 'ng.core',
        'rxjs': 'Rx',
        'rxjs/Observable': 'Rx',
        'rxjs/ReplaySubject': 'Rx',
        'rxjs/add/operator/map': 'Rx.Observable.prototype',
        'rxjs/add/operator/mergeMap': 'Rx.Observable.prototype',
        'rxjs/add/observable/fromEvent': 'Rx.Observable',
        'rxjs/add/observable/of': 'Rx.Observable'
    },
    external: ['@angular/core', 'rxjs']
}
```

NPM

npm .

/package.json

```
{
  "name": "awesome-angular-module",
  "version": "1.0.4",
  "description": "Awesome angular module",
  "main": "dist/bundles/awesome.module.umd.min.js",
  "module": "dist/index.js",
  "typings": "dist/index.d.ts",
  "scripts": {
    "test": "",
    "transpile": "ngc",
    "package": "rollup -c",
    "minify": "uglifyjs dist/bundles/awesome.module.umd.js --screw-ie8 --compress --mangle --
comments --output dist/bundles/awesome.module.umd.min.js",
    "build": "rimraf dist && npm run transpile && npm run package && npm run minify",
    "prepublishOnly": "npm run build"
  },
  "repository": {
    "type": "git",
    "url": "git+https://github.com/maciejtreder/awesome-angular-module.git"
  },
  "keywords": [
    "awesome",
    "angular",
    "module",
    "minimal"
  ],
  "author": "Maciej Treder <contact@maciejtreder.com>",
  "license": "MIT",
  "bugs": {
    "url": "https://github.com/maciejtreder/awesome-angular-module/issues"
  },
  "homepage": "https://github.com/maciejtreder/awesome-angular-module#readme",
  "devDependencies": {
    "@angular/compiler": "^4.0.0",
    "@angular/compiler-cli": "^4.0.0",
    "rimraf": "^2.6.1",
    "rollup": "^0.43.0",
    "typescript": "^2.3.4",
    "uglify-js": "^3.0.21"
  },
  "dependencies": {
    "@angular/core": "^4.0.0",
    "rxjs": "^5.3.0"
  }
}
```

npm .

/.npmignore

```
node_modules
npm-debug.log
Thumbs.db
.DS_Store
src
!dist/src
plugin
!dist/plugin
*.ngsummary.json
*.iml
rollup.config.js
tsconfig.json
*.ts
!*.d.ts
.idea
```

.

.travis.yml

```
language: node_js
node_js:
- node

deploy:
  provider: npm
  email: contact@maciejtreder.com
  api_key:
    secure: <your api key>
  on:
    tags: true
    repo: maciejtreder/awesome-angular-module
```

https://github.com/maciejtreder/awesome-angular-module .

npm : https://riptutorial.com/ko/angular2/topic/10704/-npm--

38:

Examples

app.module.ts

```
import {appStoreProviders} from "./app.store";
providers : [
  ...
  appStoreProviders,
  ...
]
```

app.store.ts

```
import {InjectionToken} from '@angular/core';
import {createStore, Store, compose, StoreEnhancer} from 'redux';
import {AppState, default as reducer} from "../app.reducer";



export const AppStore = new InjectionToken('App.store');

const devtools: StoreEnhancer<AppState> =
    window['devToolsExtension'] ?
    window['devToolsExtension']() : f => f;

export function createAppStore(): Store<AppState> {
  return createStore<AppState>(
    reducer,
    compose(devtools)
  );
}

export const appStoreProviders = [
  {provide: AppStore, useFactory: createAppStore}
];
```

app.reducer.ts

```
export interface AppState {
  example : string
}

const rootReducer: Reducer<AppState> = combineReducers<AppState>({
 example : string
});

export default rootReducer;
```

store.ts

```
export interface IAppState {
```

```
  example?: string;
}

export const INITIAL_STATE: IAppState = {
  example: null,
};

export function rootReducer(state: IAppState = INITIAL_STATE, action: Action): IAppState {
  switch (action.type) {
    case EXAMPLE_CHANGED:
      return Object.assign(state, state, (<UpdateAction>action));
    default:
      return state;
  }
}
```

actions.ts

```
import {Action} from "redux";
export const EXAMPLE_CHANGED = 'EXAMPLE CHANGED';

export interface UpdateAction extends Action {
  example: string;
}
```

```
import * as Redux from 'redux';
import {Inject, Injectable} from '@angular/core';

@Injectable()
export class exampleService {
    constructor(@Inject(AppStore) private store: Redux.Store<AppState>) {}
    getExampleState(){
      console.log(this.store.getState().example);
   }
}
```

```
import * as Redux from 'redux';
import {Inject, Injectable} from '@angular/core';

@Injectable()
export class exampleService {
    constructor(@Inject(AppStore) private store: Redux.Store<AppState>) {}
    setExampleState(){
       this.store.dispatch(updateExample("new value"));
   }
}
```

actions.ts

```
export interface UpdateExapleAction extends Action {
  example?: string;
}

export const updateExample: ActionCreator<UpdateExapleAction> =
   (newVal) => ({
     type: EXAMPLE_CHANGED,
```

```
     example: newVal
});
```

redux

app.store.ts

```
 import {InjectionToken} from '@angular/core';
 import {createStore, Store, compose, StoreEnhancer} from 'redux';
 import {AppState, default as reducer} from "../app.reducer";


 export const AppStore = new InjectionToken('App.store');

const devtools: StoreEnhancer<AppState> =
     window['devToolsExtension'] ?
     window['devToolsExtension']() : f => f;

export function createAppStore(): Store<AppState> {
   return createStore<AppState>(
     reducer,
     compose(devtools)
   );
}

    export const appStoreProviders = [
      {provide: AppStore, useFactory: createAppStore}
    ];
```

Redux DevTools

: https://riptutorial.com/ko/angular2/topic/10652/-

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cli , cli / / / , 3 , .

Examples

angle-cli Angular2

:

- NodeJS :
- npm

---

cmd .

1. `npm install -g @angular/cli yarn global add @angular/cli`
2. `ng new PROJECT_NAME`
3. `cd PROJECT_NAME`
4. `ng serve`

---

localhost : 4200

,,

cmd . ng generate (ng g) Angular .

- : `ng g component my-new-component`
- : `ng g directive my-new-directive`
- : `ng g pipe my-new-pipe`
- : `ng g service my-new-service`
- : `ng g class my-new-classt`
- : `ng g interface my-new-interface`
- `ng g enum my-new-enum` : `ng g enum my-new-enum`
- : `ng g module my-module`

angular-cli.json .

ng2-bootstrap .

1. `npm install ng2-bootstrap --save yarn add ng2-bootstrap`
2. angular-cli.json node-modules .

```
"scripts": [
    "../node_modules/jquery/dist/jquery.js",
```

```
    "../node_modules/bootstrap/dist/js/bootstrap.js"
]
```

cli

outDir angular-cli.json .

```
ng build --target=production --environment=prod
ng build --prod --env=prod
ng build --prod
```

.

```
ng build --target=development --environment=dev
ng build --dev --e=dev
ng build --dev
ng build
```

--base-href your-url index.html () .

index.html href / myUrl / .

```
ng build --base-href /myUrl/
ng build --bh /myUrl/
```

scss / sass

`@angular/cli` **css** .

scss .

```
ng new project_name --style=scss
```

sass .

```
ng new project_name --style=sass
```

@ angular / cli .

Yarn @ angular / cli npm . @ angular / cli .

- (`npm install --global yarn`)
- @ angular / cli (`npm install -g @angular/cli yarn global add @angular/cli`)

@ angular / cli ,

```
ng set --global packageManager=yarn
```

npm @ angular / cli .

```
ng set --global packageManager=npm
```

: https://riptutorial.com/ko/angular2/topic/8956/-

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2 . . , , sidenav .

Examples

. . .

image-preview.html

html .

```
<!-- Icon as placeholder when no file picked -->
<i class="material-icons">cloud_upload</i>

<!-- file input, accepts images only. Detect when file has been picked/changed with Angular's
native (change) event listener -->
<input type="file" accept="image/*" (change)="updateSource($event)">

<!-- img placeholder when a file has been picked. shows only when 'source' is not empty -->
<img *ngIf="source" [src]="source" src="">
```

.ts

`<image-preview>` .

```
import {
    Component,
    Output,
    EventEmitter,
} from '@angular/core';

@Component({
    selector: 'image-preview',
    styleUrls: [ './image-preview.css' ],
    templateUrl: './image-preview.html'
})
export class MtImagePreviewComponent {

    // Emit an event when a file has been picked. Here we return the file itself
    @Output() onChange: EventEmitter<File> = new EventEmitter<File>();

    constructor() {}

    // If the input has changed(file picked) we project the file into the img previewer
    updateSource($event: Event) {
        // We access he file with $event.target['files'][0]
        this.projectImage($event.target['files'][0]);
    }

    // Uses FileReader to read the file from the input
    source:string = '';
    projectImage(file: File) {
        let reader = new FileReader;
```

```
        // TODO: Define type of 'e'
        reader.onload = (e: any) => {
            // Simply set e.target.result as our <img> src in the layout
            this.source = e.target.result;
            this.onChange.emit(file);
        };
        // This will process our file and get it's attributes/data
        reader.readAsDataURL(file);
    }
}
```

another.component.html

```
<form (ngSubmit)="submitPhoto()">
    <image-preview (onChange)="getFile($event)"></image-preview>
    <button type="submit">Upload</button>
</form>
```

. AngularJS 1.x . AngularJS 1.5.5 .

`ReactiveFormsModule`

```
import { Component, OnInit, OnDestroy } from '@angular/core';
import { FormControl } from '@angular/forms';
import { Subscription } from 'rxjs';

@Component({
  selector: 'component',
  template: `
    <input [formControl]="control" />
    <div *ngFor="let item of content">
      {{item.id}} - {{item.name}}
    </div>
  `
})
export class MyComponent implements OnInit, OnDestroy {

  public control = new FormControl('');

  public content: { id: number; name: string; }[];

  private originalContent = [
    { id: 1, name: 'abc' },
    { id: 2, name: 'abce' },
    { id: 3, name: 'ced' }
  ];

  private subscription: Subscription;

  public ngOnInit() {
    this.subscription = this.control.valueChanges.subscribe(value => {
      this.content = this.originalContent.filter(item => item.name.startsWith(value));
    });
  }

  public ngOnDestroy() {
    this.subscription.unsubscribe();
  }
```

```
}
```

: https://riptutorial.com/ko/angular2/topic/5597/---

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.

Examples

`@Component` .

- `providers` :
- `selector` : HTML
- `styles` : . : require . .
- `styleUrls` :
- `template` : HTML
- `templateUrl` : HTML

.

:

```
import { Component } from '@angular/core';

@Component({
  selector: 'app-required',
  styleUrls: ['required.component.scss'],
  // template: `This field is required.`,
  templateUrl: 'required.component.html',
})
export class RequiredComponent { }
```

HTML .

.

```
@Component({
  templateUrl: 'hero.component.html',
})
```

```
@Component({
  template: `<div>My template here</div>`,
})
```

. `@Component` . .

```
div { background: red; }
```

`div` HTML div .

.

```
<style>div[_ngcontent-c1] { background: red; }</style>
```

.

```
@Component({
  styleUrls: ['hero.component.css'],
})
```

```
styles: [ `div { background: lime; }` ]
```

require styles .

hero.component.html

```
<form (ngSubmit)="submit($event)" [formGroup]="form" novalidate>
  <input type="text" formControlName="name" />
  <button type="submit">Show hero name</button>
</form>
```

hero.component.ts

```
import { FormControl, FormGroup, Validators } from '@angular/forms';

import { Component } from '@angular/core';

@Component({
  selector: 'app-hero',
  templateUrl: 'hero.component.html',
})
export class HeroComponent {
  public form = new FormGroup({
    name: new FormControl('', Validators.required),
  });

  submit(event) {
    console.log(event);
    console.log(this.form.controls.name.value);
  }
}
```

hero.component.spec.ts

```
import { ComponentFixture, TestBed, async } from '@angular/core/testing';

import { HeroComponent } from './hero.component';
import { ReactiveFormsModule } from '@angular/forms';

describe('HeroComponent', () => {
  let component: HeroComponent;
  let fixture: ComponentFixture<HeroComponent>;

  beforeEach(async(() => {
    TestBed.configureTestingModule({
      declarations: [HeroComponent],
      imports: [ReactiveFormsModule],
```

```
    }).compileComponents();

    fixture = TestBed.createComponent(HeroComponent);
    component = fixture.componentInstance;
    fixture.detectChanges();
  }));

  it('should be created', () => {
    expect(component).toBeTruthy();
  });

  it('should log hero name in the console when user submit form', async(() => {
    const heroName = 'Saitama';
    const element = <HTMLFormElement>fixture.debugElement.nativeElement.querySelector('form');

    spyOn(console, 'log').and.callThrough();

    component.form.controls['name'].setValue(heroName);

    element.querySelector('button').click();

    fixture.whenStable().then(() => {
      fixture.detectChanges();
      expect(console.log).toHaveBeenCalledWith(heroName);
    });
  }));

  it('should validate name field as required', () => {
    component.form.controls['name'].setValue('');
    expect(component.form.invalid).toBeTruthy();
  });
});
```

`selector` .

:

```
import { Component, Input } from '@angular/core';

@Component({
  selector: 'app-required',
  template: `{{name}} is required.`
})
export class RequiredComponent {
  @Input()
  public name: String = '';
}
```

`app-required` ( ) .

```
import { Component, Input } from '@angular/core';

@Component({
  selector: 'app-sample',
  template: `
    <input type="text" name="heroName" />
    <app-required name="Hero Name"></app-required>
  `
```

```
})
export class RequiredComponent {
  @Input()
  public name: String = '';
}
```

: https://riptutorial.com/ko/angular2/topic/10838/-

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- `<element [variableName]="value"></element> //Declaring input to child when using @Input() method.`
- `<element (childOutput)="parentFunction($event)"></element> //Declaring output from child when using @Output() method.`
- `@Output() pageNumberClicked = new EventEmitter(); //Used for sending output data from child component when using @Output() method.`
- `this.pageNumberClicked.emit(pageNum); //Used to trigger data output from child component. when using @Output() method.`
- `@ViewChild(ComponentClass) //Property decorator is required when using ViewChild.`

pageCount	.
pageNumberClicked	.
pageChanged	.

Examples

- @Input @Output

DataListComponent . DataListComponent PagerComponent .

PagerComponent DataListComponent . PagerComponent Output DataListComponent .

```
import { Component, NgModule } from '@angular/core';
import { CommonModule } from '@angular/common';
import { DataListService } from './dataList.service';
import { PagerComponent } from './pager.component';

@Component({
    selector: 'datalist',
    template: `
        <table>
        <tr *ngFor="let person of personsData">
            <td>{{person.name}}</td>
            <td>{{person.surname}}</td>
        </tr>
        </table>

        <pager [pageCount]="pageCount" (pageNumberClicked)="pageChanged($event)"></pager>
    `
})
export class DataListComponent {
    private personsData = null;
    private pageCount: number;

    constructor(private dataListService: DataListService) {
        var response = this.dataListService.getData(1); //Request first page from the service
        this.personsData = response.persons;
        this.pageCount = response.totalCount / 10;//We will show 10 records per page.
    }
```

```
    pageChanged(pageNumber: number){
        var response = this.dataListService.getData(pageNumber); //Request data from the
service with new page number
        this.personsData = response.persons;
    }
}

@NgModule({
    imports: [CommonModule],
    exports: [],
    declarations: [DataListComponent, PagerComponent],
    providers: [DataListService],
})
export class DataListModule { }
```

PagerComponent . .

```
import { Component, Input, Output, EventEmitter } from '@angular/core';

@Component({
    selector: 'pager',
    template: `
    <div id="pager-wrapper">
        <span *ngFor="#page of pageCount" (click)="pageClicked(page)">{{page}}</span>
    </div>
    `
})
export class PagerComponent {
    @Input() pageCount: number;
    @Output() pageNumberClicked = new EventEmitter();
    constructor() { }

    pageClicked(pageNum){
        this.pageNumberClicked.emit(pageNum); //Send clicked page number as output
    }
}
```

- ViewChild

Viewchild . ViewChild .

DataListComponent . DataListComponent PagerComponent. DataListComponent PagerComponent .

```
import { Component, NgModule, ViewChild } from '@angular/core';
import { CommonModule } from '@angular/common';
import { DataListService } from './dataList.service';
import { PagerComponent } from './pager.component';

@Component({
    selector: 'datalist',
    template: `<input type='text' [(ngModel)]="searchText" />
               <button (click)="getData()">Search</button>
        <table>
        <tr *ngFor="let person of personsData">
            <td>{{person.name}}</td>
```

```
            <td>{{person.surname}}</td>
        </tr>
        </table>

        <pager></pager>
    `
})
export class DataListComponent {
    private personsData = null;
    private searchText: string;

    @ViewChild(PagerComponent)
    private pagerComponent: PagerComponent;

    constructor(private dataListService: DataListService) {}

    getData(){
        var response = this.dataListService.getData(this.searchText);
        this.personsData = response.data;
        this.pagerComponent.setPaging(this.personsData / 10); //Show 10 records per page
    }
}

@NgModule({
    imports: [CommonModule],
    exports: [],
    declarations: [DataListComponent, PagerComponent],
    providers: [DataListService],
})
export class DataListModule { }
```

.

. AfterViewInit AfterViewInit .

-

:

```
import { Injectable } from '@angular/core';
import { Subject } from 'rxjs/Subject';

@Injectable()
export class ComponentCommunicationService {

    private componentChangeSource = new Subject();
    private newDateCreationSource = new Subject<Date>();

    componentChanged$ = this.componentChangeSource.asObservable();
    dateCreated$ = this.newDateCreationSource.asObservable();

    refresh() {
        this.componentChangeSource.next();
    }

    broadcastDate(date: Date) {
        this.newDateCreationSource.next(date);
    }
```

```
}
```

:

```
import { Component, Inject } from '@angular/core';
import { ComponentCommunicationService } from './component-refresh.service';

@Component({
    selector: 'parent',
    template: `
    <button (click)="refreshSubsribed()">Refresh</button>
    <h1>Last date from child received: {{lastDate}}</h1>
    <child-component></child-component>
    `
})
export class ParentComponent implements OnInit {

    lastDate: Date;
    constructor(private communicationService: ComponentCommunicationService) { }

    ngOnInit() {
        this.communicationService.dateCreated$.subscribe(newDate => {
            this.lastDate = newDate;
        });
    }

    refreshSubsribed() {
        this.communicationService.refresh();
    }
}
```

:

```
import { Component, OnInit, Inject } from '@angular/core';
import { ComponentCommunicationService } from './component-refresh.service';

@Component({
    selector: 'child-component',
    template: `
    <h1>Last refresh from parent: {{lastRefreshed}}</h1>
    <button (click)="sendNewDate()">Send new date</button>
    `
})
export class ChildComponent implements OnInit {

    lastRefreshed: Date;
    constructor(private communicationService: ComponentCommunicationService) { }

    ngOnInit() {
        this.communicationService.componentChanged$.subscribe(event => {
            this.onRefresh();
        });
    }

    sendNewDate() {
        this.communicationService.broadcastDate(new Date());
    }

    onRefresh() {
```

```
        this.lastRefreshed = new Date();
    }
}
```

AppModule :

```
@NgModule({
    declarations: [
        ParentComponent,
        ChildComponent
    ],
    providers: [ComponentCommunicationService],
    bootstrap: [AppComponent] // not included in the example
})
export class AppModule {}
```

: https://riptutorial.com/ko/angular2/topic/7400/---

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.

Examples

HeroChildComponent @Input .

```
import { Component, Input } from '@angular/core';
import { Hero } from './hero';
@Component({
  selector: 'hero-child',
  template: `
    <h3>{{hero.name}} says:</h3>
    <p>I, {{hero.name}}, am at your service, {{masterName}}.</p>
  `
})
export class HeroChildComponent {
  @Input() hero: Hero;
  @Input('master') masterName: string;
}
```

setter

setter .

NameChildComponent .

```
import { Component, Input } from '@angular/core';
@Component({
  selector: 'name-child',
  template: '<h3>"{{name}}"</h3>'
})
export class NameChildComponent {
  private _name = '';
  @Input()
  set name(name: string) {
    this._name = (name && name.trim()) || '<no name set>';
  }
  get name(): string { return this._name; }
}
```

NameParentComponent.

```
import { Component } from '@angular/core';
@Component({
  selector: 'name-parent',
  template: `
  <h2>Master controls {{names.length}} names</h2>
  <name-child *ngFor="let name of names" [name]="name"></name-child>
  `
})
export class NameParentComponent {
```

```
  // Displays 'Mr. IQ', '<no name set>', 'Bombasto'
  names = ['Mr. IQ', '   ', '  Bombasto  '];
}
```

.

EventEmitter . .

EventEmitter . VoterComponent @Output .

```
import { Component, EventEmitter, Input, Output } from '@angular/core';
@Component({
  selector: 'my-voter',
  template: `
    <h4>{{name}}</h4>
    <button (click)="vote(true)"  [disabled]="voted">Agree</button>
    <button (click)="vote(false)" [disabled]="voted">Disagree</button>
  `
})
export class VoterComponent {
  @Input()  name: string;
  @Output() onVoted = new EventEmitter<boolean>();
  voted = false;
  vote(agreed: boolean) {
    this.onVoted.emit(agreed);
    this.voted = true;
  }
}
```

true false ( ) .

VoteTakerComponent ($ event) (onVoted) .

```
import { Component }      from '@angular/core';
@Component({
  selector: 'vote-taker',
  template: `
    <h2>Should mankind colonize the Universe?</h2>
    <h3>Agree: {{agreed}}, Disagree: {{disagreed}}</h3>
    <my-voter *ngFor="let voter of voters"
      [name]="voter"
      (onVoted)="onVoted($event)">
    </my-voter>
  `
})
export class VoteTakerComponent {
  agreed = 0;
  disagreed = 0;
  voters = ['Mr. IQ', 'Ms. Universe', 'Bombasto'];
  onVoted(agreed: boolean) {
    agreed ? this.agreed++ : this.disagreed++;
  }
}
```

.

. .

0 CountdownTimerComponent . .

```
import { Component, OnDestroy, OnInit } from '@angular/core';
@Component({
  selector: 'countdown-timer',
  template: '<p>{{message}}</p>'
})
export class CountdownTimerComponent implements OnInit, OnDestroy {
  intervalId = 0;
  message = '';
  seconds = 11;
  clearTimer() { clearInterval(this.intervalId); }
  ngOnInit()    { this.start(); }
  ngOnDestroy() { this.clearTimer(); }
  start() { this.countDown(); }
  stop()  {
    this.clearTimer();
    this.message = `Holding at T-${this.seconds} seconds`;
  }
  private countDown() {
    this.clearTimer();
    this.intervalId = window.setInterval(() => {
      this.seconds -= 1;
      if (this.seconds === 0) {
        this.message = 'Blast off!';
      } else {
        if (this.seconds < 0) { this.seconds = 10; } // reset
        this.message = `T-${this.seconds} seconds and counting`;
      }
    }, 1000);
  }
}
```

CountdownLocalVarParentComponent .

```
import { Component }                from '@angular/core';
import { CountdownTimerComponent }  from './countdown-timer.component';
@Component({
  selector: 'countdown-parent-lv',
  template: `
  <h3>Countdown to Liftoff (via local variable)</h3>
  <button (click)="timer.start()">Start</button>
  <button (click)="timer.stop()">Stop</button>
  <div class="seconds">{{timer.seconds}}</div>
  <countdown-timer #timer></countdown-timer>
  `,
  styleUrls: ['demo.css']
})
export class CountdownLocalVarParentComponent { }
```

.

() (#timer) . .

start seconds .

.

ViewChild .

. - . .

.

, ViewChild .

. . CountdownTimerComponent .

ViewChild . CountdownViewChildParentComponent.

```
import { AfterViewInit, ViewChild } from '@angular/core';
import { Component }                from '@angular/core';
import { CountdownTimerComponent }  from './countdown-timer.component';
@Component({
  selector: 'countdown-parent-vc',
  template: `
  <h3>Countdown to Liftoff (via ViewChild)</h3>
  <button (click)="start()">Start</button>
  <button (click)="stop()">Stop</button>
  <div class="seconds">{{ seconds() }}</div>
  <countdown-timer></countdown-timer>
  `,
  styleUrls: ['demo.css']
})
export class CountdownViewChildParentComponent implements AfterViewInit {
  @ViewChild(CountdownTimerComponent)
  private timerComponent: CountdownTimerComponent;
  seconds() { return 0; }
  ngAfterViewInit() {
    // Redefine `seconds()` to get from the `CountdownTimerComponent.seconds` ...
    // but wait a tick first to avoid one-time devMode
    // unidirectional-data-flow-violation error
    setTimeout(() => this.seconds = () => this.timerComponent.seconds, 0);
  }
  start() { this.timerComponent.start(); }
  stop() { this.timerComponent.stop(); }
}
```

.

ViewChild AfterViewInit .

@ViewChild timerInputComponent timerComponent .

#timer . .

.

ngAfterViewInit . Angular . 0 .

Angular ngAfterViewInit . Angular . .

setTimeout 1 tick seconds .

.

.

. .

MissionService MissionControlComponent AstronautComponent .

```
import { Injectable } from '@angular/core';
import { Subject }    from 'rxjs/Subject';
@Injectable()
export class MissionService {
  // Observable string sources
  private missionAnnouncedSource = new Subject<string>();
  private missionConfirmedSource = new Subject<string>();
  // Observable string streams
  missionAnnounced$ = this.missionAnnouncedSource.asObservable();
  missionConfirmed$ = this.missionConfirmedSource.asObservable();
  // Service message commands
  announceMission(mission: string) {
    this.missionAnnouncedSource.next(mission);
  }
  confirmMission(astronaut: string) {
    this.missionConfirmedSource.next(astronaut);
  }
}
```

MissionControlComponent .

```
import { Component }          from '@angular/core';
import { MissionService }     from './mission.service';
@Component({
  selector: 'mission-control',
  template: `
    <h2>Mission Control</h2>
    <button (click)="announce()">Announce mission</button>
    <my-astronaut *ngFor="let astronaut of astronauts"
      [astronaut]="astronaut">
    </my-astronaut>
    <h3>History</h3>
    <ul>
      <li *ngFor="let event of history">{{event}}</li>
    </ul>
  `,
  providers: [MissionService]
})
export class MissionControlComponent {
  astronauts = ['Lovell', 'Swigert', 'Haise'];
  history: string[] = [];
  missions = ['Fly to the moon!',
              'Fly to mars!',
              'Fly to Vegas!'];
  nextMission = 0;
  constructor(private missionService: MissionService) {
    missionService.missionConfirmed$.subscribe(
      astronaut => {
        this.history.push(`${astronaut} confirmed the mission`);
      });
```

```
  }
  announce() {
    let mission = this.missions[this.nextMission++];
    this.missionService.announceMission(mission);
    this.history.push(`Mission "${mission}" announced`);
    if (this.nextMission >= this.missions.length) { this.nextMission = 0; }
  }
}
```

AstronautComponent . AstronautComponent MissionControlComponent .

```
import { Component, Input, OnDestroy } from '@angular/core';
import { MissionService } from './mission.service';
import { Subscription }   from 'rxjs/Subscription';
@Component({
  selector: 'my-astronaut',
  template: `
    <p>
      {{astronaut}}: <strong>{{mission}}</strong>
      <button
        (click)="confirm()"
        [disabled]="!announced || confirmed">
        Confirm
      </button>
    </p>
  `
})
export class AstronautComponent implements OnDestroy {
  @Input() astronaut: string;
  mission = '<no mission announced>';
  confirmed = false;
  announced = false;
  subscription: Subscription;
  constructor(private missionService: MissionService) {
    this.subscription = missionService.missionAnnounced$.subscribe(
      mission => {
        this.mission = mission;
        this.announced = true;
        this.confirmed = false;
    });
  }
  confirm() {
    this.confirmed = true;
    this.missionService.confirmMission(this.astronaut);
  }
  ngOnDestroy() {
    // prevent memory leak when component destroyed
    this.subscription.unsubscribe();
  }
}
```

AstronautComponent . . AstronautComponent . .

MissionService MissionControlComponent . MissionControlComponent AstronautComponent .

: https://riptutorial.com/ko/angular2/topic/9454/---

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Examples

```
// my-feature.module.ts
import { CommonModule } from '@angular/common';
import { NgModule }     from '@angular/core';

import { MyComponent } from './my.component';
import { MyDirective } from './my.directive';
import { MyPipe }      from './my.pipe';
import { MyService }   from './my.service';

@NgModule({
  imports:      [ CommonModule ],
  declarations: [ MyComponent, MyDirective, MyPipe ],
  exports:      [ MyComponent ],
  providers:    [ MyService ]
})
export class MyFeatureModule { }
```

, (`app.module.ts`) :

```
// app.module.ts
import { NgModule }      from '@angular/core';
import { BrowserModule } from '@angular/platform-browser';

import { AppComponent }    from './app.component';
import { MyFeatureModule } from './my-feature.module';

@NgModule({
  // import MyFeatureModule in root module
  imports:      [ BrowserModule, MyFeatureModule ],
  declarations: [ AppComponent ],
  bootstrap:    [ AppComponent ]
})
export class AppModule { }
```

: https://riptutorial.com/ko/angular2/topic/6551/-

45:

Examples

```
@Component({
  selector: 'example-test-compnent',
  template: '<div>
                  <div>{{user.name}}</div>
                  <div>{{user.fname}}</div>
                  <div>{{user.email}}</div>
             </div>'
})

export class ExampleTestComponent implements OnInit{

    let user :User = null;
    ngOnInit(): void {
       this.user.name = 'name';
       this.user.fname= 'fname';
       this.user.email= 'email';
    }

}
```

```
describe('Example unit test component', () => {
  let component: ExampleTestComponent ;
  let fixture: ComponentFixture<ExampleTestComponent >;

  beforeEach(async(() => {
    TestBed.configureTestingModule({
      declarations: [ExampleTestComponent]
    }).compileComponents();
  }));

  beforeEach(() => {
    fixture = TestBed.createComponent(ExampleTestComponent );
    component = fixture.componentInstance;
    fixture.detectChanges();
  });


  it('ngOnInit should change user object values', () => {
    expect(component.user).toBeNull(); // check that user is null on initialize
    component.ngOnInit(); // run ngOnInit

    expect(component.user.name).toEqual('name');
    expect(component.user.fname).toEqual('fname');
    expect(component.user.email).toEqual('email');
  });
});
```

: https://riptutorial.com/ko/angular2/topic/8955/-

46:

Examples

.

Angular 2 .

: .

```
    <base href='/'>
```

index.html head . Angular 2 .

package.json / .

```
"dependencies": {
  ......
  "@angular/router": "3.0.0-beta.1",
  ......
}
```

.

```
class Route {
  path : string
  pathMatch : 'full'|'prefix'
  component : Type|string
  .........
}
```

(`route/routes.ts`) . . ":" .

. ProviderRouter RouterConfig .

```
import { provideRouter, RouterConfig } from '@angular/router';
import { BarDetailComponent } from '../components/bar-detail.component';
import { DashboardComponent } from '../components/dashboard.component';
import { LoginComponent } from '../components/login.component';
import { SignupComponent } from '../components/signup.component';

export const appRoutes: RouterConfig = [
  { path: '', pathMatch: 'full', redirectTo: 'login' },
  { path: 'dashboard', component: DashboardComponent },
  { path: 'bars/:id', component: BarDetailComponent },
  { path: 'login', component: LoginComponent },
  { path: 'signup',   component: SignupComponent }
];

export const APP_ROUTER_PROVIDER = [provideRouter(appRoutes)];
```

.

`main.ts` (. systemjs.config)

```
import { bootstrap } from '@angular/platform-browser-dynamic';
import { AppComponent } from './components/app.component';
import { APP_ROUTER_PROVIDER } from "./routes/routes";

bootstrap(AppComponent, [ APP_ROUTER_PROVIDER ]).catch(err => console.error(err));
```

/ . . ROUTER_DIRECTIVES .

```
import { ROUTER_DIRECTIVES } from '@angular/router';

@Component({
  selector: 'demo-app',
  template: `
    ..................................
    <div>
      <router-outlet></router-outlet>
    </div>
    ..................................
  `,
  // Add our router directives we will be using
  directives: [ROUTER_DIRECTIVES]
})
```

. RouterOutlet RouterConfig . html . RouterLink href . :

```
import { Component } from '@angular/core';
import { ROUTER_DIRECTIVES } from '@angular/router';

@Component({
  selector: 'demo-app',
  template: `
    <a [routerLink]="['/login']">Login</a>
    <a [routerLink]="['/signup']">Signup</a>
    <a [routerLink]="['/dashboard']">Dashboard</a>
    <div>
      <router-outlet></router-outlet>
    </div>
  `,
  // Add our router directives we will be using
  directives: [ROUTER_DIRECTIVES]
})
export class AppComponent { }
```

. RouterLink .

{ } '@ / ' . '@ angular / router' {ROUTER_DIRECTIVES} () .

```
@Component({
  selector: 'demo-app',
  template: `
        <ul>
          <li *ngFor="let bar of bars | async">
```

```
            <a [routerLink]="['/bars', bar.id]">
              {{bar.name}}
            </a>
          </li>
        </ul>
    <div>
      <router-outlet></router-outlet>
    </div>
  `,
  // Add our router directives we will be using
  directives: [ROUTER_DIRECTIVES]
})
export class AppComponent { }
```

RouterLink .

. , , . .

RouterConfig .

```
import { ProjectsComponent } from '../components/projects.component';
import { MessagesComponent} from '../components/messages.component';

export const appRoutes: RouterConfig = [
  { path: '', pathMatch: 'full', redirectTo: 'login' },
  { path: 'dashboard', component: DashboardComponent,
    children: [
      { path: '', redirectTo: 'projects', pathMatch: 'full' },
      { path: 'projects', component: 'ProjectsComponent' },
      { path: 'messages', component: 'MessagesComponent' }
    ] },
  { path: 'bars/:id', component: BarDetailComponent },
  { path: 'login', component: LoginComponent },
  { path: 'signup',   component: SignupComponent }
];
```

DashboardComponent . DashboardComponent . <router-outlet></router-outlet> .
DashboardComponent RouterOutlet .

```
import { Component } from '@angular/core';

@Component({
  selector: 'dashboard',
  template: `
    <a [routerLink]="['projects']">Projects</a>
    <a [routerLink]="['messages']">Messages</a>
    <div>
      <router-outlet></router-outlet>
    </div>
  `
})
export class DashboardComponent { }
```

, RouterOutlet . dashboard projects ., . .

```
Cannot match any routes: 'dashboard'
```

.

ResolveData

.

/ 3.0.0-beta.2

users.service.ts

```
...
import { Http, Response } from '@angular/http';
import { Observable } from 'rxjs/Rx';
import { User } from './user.ts';



@Injectable()
export class UsersService {

    constructor(public http:Http) {}

    /**
     * Returns all users
     * @returns {Observable<User[]>}
     */
    index():Observable<User[]> {

        return this.http.get('http://mywebsite.com/api/v1/users')
            .map((res:Response) => res.json());
    }

    /**
     * Returns a user by ID
     * @param id
     * @returns {Observable<User>}
     */
    get(id:number|string):Observable<User> {

        return this.http.get('http://mywebsite.com/api/v1/users/' + id)
            .map((res:Response) => res.json());
    }
}
```

users.resolver.ts

```
...
import { UsersService } from './users.service.ts';
import { Observable } from 'rxjs/Rx';
import {
    Resolve,
    ActivatedRouteSnapshot,
    RouterStateSnapshot
} from "@angular/router";
```

```
@Injectable()
export class UsersResolver implements Resolve<User[] | User> {

    // Inject UsersService into the resolver
    constructor(private service:UsersService) {}

    resolve(route:ActivatedRouteSnapshot, state:RouterStateSnapshot):Observable<User[] | User>
{
        // If userId param exists in current URL, return a single user, else return all users
        // Uses brackets notation to access `id` to suppress editor warning, may use dot
notation if you create an interface extending ActivatedRoute with an optional id? attribute
        if (route.params['id']) return this.service.get(route.params['id']);
        return this.service.index();
    }
}
```

users.component.ts

. `data.users` `data.user` *app.routes.ts* ( ) .

```
...
import { ActivatedRoute} from "@angular/router";



@Component(...)
export class UsersComponent {

    users:User[];


    constructor(route: ActivatedRoute) {
        route.data.subscribe(data => {
            // data['Match key defined in RouterConfig, see below']
            this.users = data.users;
        });
    }

    /**
     * It is not required to unsubscribe from the resolver as Angular's HTTP
     * automatically completes the subscription when data is received from the server
     */
}
```

app.routes.ts

```
...
import { UsersResolver } from './resolvers/users.resolver';



export const routes:RouterConfig = <RouterConfig>[
    ...
    {
        path: 'user/:id',
        component: UserComponent,
        resolve: {
```

```
            // hence data.user in UserComponent
            user: UsersResolver
        }
    },
    {
        path: 'users',
        component: UsersComponent,
        resolve: {
            // hence data.users in UsersComponent, note the pluralisation
            users: UsersResolver
        }
    },
    ...
]
...
```

app.resolver.ts

.

: . ' '. *providers* . .

```
...
import { UsersService } from './users.service';
import { UsersResolver } from './users.resolver';

export const ROUTE_RESOLVERS = [
    ...,
    UsersService,
    UsersResolver
]
```

main.browser.ts

.

```
...
import {bootstrap} from '@angular/platform-browser-dynamic';
import { ROUTE_RESOLVERS } from './app.resolver';

bootstrap(<Type>App, [
    ...
    ...ROUTE_RESOLVERS
])
.catch(err => console.error(err));
```

, app.routing.ts app.module.ts ( ) . WebPack SystemJS .

home, home / counter home / counter / fetch-data . . Route . . app.module.ts

Angular . URL URL.

```
import { NgModule } from "@angular/core";
import { RouterModule, Routes } from "@angular/router";
```

```
import { HomeComponent } from "./components/home/home.component";
import { FetchDataComponent } from "./components/fetchdata/fetchdata.component";
import { CounterComponent } from "./components/counter/counter.component";

const appRoutes: Routes = [
    {
        path: "",
        redirectTo: "home",
        pathMatch: "full"
    },
    {
        path: "home",
        children: [
            {
                path: "",
                component: HomeComponent
            },
            {
                path: "counter",
                children: [
                    {
                        path: "",
                        component: CounterComponent
                    },
                    {
                        path: "fetch-data",
                        component: FetchDataComponent
                    }
                ]
            }
        ]
    },
    {
        path: "**",
        redirectTo: "home"
    }
];

@NgModule({
    imports: [
        RouterModule.forRoot(appRoutes)
    ],
    exports: [
        RouterModule
    ]
})
export class AppRoutingModule { }
```

Siraj

: https://riptutorial.com/ko/angular2/topic/2334/

47: (3.0.0)

( ) .

`app.routes.ts` .

1.
2. `routes` . `path` `component` .

Examples

. .

(`main.ts`).

```
//main.ts

import {bootstrap} from '@angular/platform-browser-dynamic';

//Import the App component (root component)
import { App } from './app/app';

//Also import the app routes
import { APP_ROUTES_PROVIDER } from './app/app.routes';

bootstrap(App, [
  APP_ROUTES_PROVIDER,
])
.catch(err => console.error(err));
```

.

(app) HTML / .

```
//app.ts

import {Component} from '@angular/core';
import {Router, ROUTER_DIRECTIVES} from '@angular/router';

@Component({
    selector: 'app',
    templateUrl: 'app.html',
    styleUrls: ['app.css'],
    directives: [
        ROUTER_DIRECTIVES,
    ]
})
export class App {
    constructor() {
    }
}

<!-- app.html -->
```

```
<!-- All of your 'views' will go here -->
<router-outlet></router-outlet>
```

`<router-outlet></router-outlet>` . HTML .

: . `<router-outlet>` .

( )

.

TypeScript .

().

```
<a routerLink="/home">Home</a>
```

`/home` . `/home` Home .

.

```
<a *ngFor="let link of links" [routerLink]="link">{{link}}</a>
```

`links` , `app.ts` :

```
public links[] = [
    'home',
    'login'
]
```

`routerLink` = `<a>` `routerLink` .

```
 <a routerLink="home">home</a>
 <a routerLink="login">login</a>
```

. Angular .

`links[]` .

: @ angle / router 3.0.0.-beta.2 . .

TypeScript

```
//app.routes.ts

import {provideRouter} from '@angular/router';

import {Home} from './routes/home/home';
import {Profile} from './routes/profile/profile';

export const routes = [
```

```
    {path: '', redirectTo: 'home'},
    {path: 'home', component: Home},
    {path: 'login', component: Login},
];

export const APP_ROUTES_PROVIDER = provideRouter(routes);
```

`provideRouter` .

`Home Profile` . `Component` .

.

`path` : . **'/ .....' .** Angular .

`component` :

`redirectTo` : . .

. `provideRouter` boostrap .

. .

.

(Route Guard)

- .
- .
- .
- .

Route Guards . *true* . *false* .

.

- *CanActivate* : .
- *CanActivateChild* : .
- *CanDeactivate* : .
- *CanLoad* : .
- : .

.

Route Guards .

.

```
import { Injectable }     from '@angular/core';
import { CanActivate }    from '@angular/router';

@Injectable()
export class SynchronousGuard implements CanActivate {
  canActivate() {
    console.log('SynchronousGuard#canActivate called');
    return true;
  }
}
```

. Observable Promise .

, , .

```
import { Injectable }     from '@angular/core';
import { CanActivate, Router, ActivatedRouteSnapshot, RouterStateSnapshot } from
'@angular/router';
import { Observable }     from 'rxjs/Rx';
import { MockAuthenticationService } from './authentication/authentication.service';

@Injectable()
export class AsynchronousGuard implements CanActivate {
    constructor(private router: Router, private auth: MockAuthenticationService) {}

    canActivate(route:ActivatedRouteSnapshot,
state:RouterStateSnapshot):Observable<boolean>|boolean {
        this.auth.subscribe((authenticated) => {
            if (authenticated) {
                return true;
            }
            this.router.navigateByUrl('/login');
            return false;
        });
    }
}
```

app.routes

canActivate Guard

```
import { provideRouter, Router, RouterConfig, CanActivate } from '@angular/router';

//components
import { LoginComponent } from './login/login.component';
import { DashboardComponent } from './dashboard/dashboard.component';

export const routes: RouterConfig = [
    { path: 'login', component: LoginComponent },
    { path: 'dashboard', component: DashboardComponent, canActivate: [AuthGuard] }
```

```
}
```

APP_ROUTER_PROVIDERS

```
export const APP_ROUTER_PROVIDERS = [
    AuthGuard,
    provideRouter(routes)
];
```

main.ts (*boot.ts*)

.

1. (Guard)
2. **Guard** (Guard **APP_ROUTER_PROVIDERS**).
   Guard .

```
import { bootstrap } from '@angular/platform-browser-dynamic';
import { provide } from '@angular/core';

import { APP_ROUTER_PROVIDERS } from './app.routes';
import { AppComponent } from './app.component';

bootstrap(AppComponent, [
    APP_ROUTER_PROVIDERS
])
.then(success => console.log(`Bootstrap success`))
.catch(error => console.log(error));
```

route config `currentUser` .

.

.

```
export const routes = [
{
  path: 'Dash',
  pathMatch : 'prefix',
  component: DashCmp,
  canActivate: [AuthGuard],
  resolve: {
      currentUser: CurrentUserResolver
  },
  children: [...[
    path: '',
    component: ProfileCmp,
    resolve: {
        currentUser: currentUser
    }
  ]]
  }
];
```

`AuthService`

```
import { Injectable } from '@angular/core';
import { Http, Headers, RequestOptions } from '@angular/http';
import { Observable } from 'rxjs/Rx';
import 'rxjs/add/operator/do';

@Injectable()
export class AuthService {
  constructor(http: Http) {
    this.http = http;

    let headers = new Headers({ 'Content-Type': 'application/json' });
    this.options = new RequestOptions({ headers: headers });
  }
  fetchCurrentUser() {
    return this.http.get('/api/users/me')
      .map(res => res.json())
      .do(val => this.currentUser = val);
 }
}
```

`AuthGuard` .

```
import { Injectable } from '@angular/core';
import { CanActivate } from "@angular/router";
import { Observable } from 'rxjs/Rx';

import { AuthService } from '../services/AuthService';

@Injectable()
export class AuthGuard implements CanActivate {
  constructor(auth: AuthService) {
    this.auth = auth;
  }
  canActivate(route, state) {
    return Observable
      .merge(this.auth.fetchCurrentUser(), Observable.of(true))
      .filter(x => x == true);
  }
}
```

`CurrentUserResolver` .

```
import { Injectable } from '@angular/core';
import { Resolve } from "@angular/router";
import { Observable } from 'rxjs/Rx';

import { AuthService } from '../services/AuthService';

@Injectable()
export class CurrentUserResolver implements Resolve {
  constructor(auth: AuthService) {
    this.auth = auth;
  }
  resolve(route, state) {
    return this.auth.currentUser;
  }
}
```

(3.0.0) : https://riptutorial.com/ko/angular2/topic/1208/--3-0-0--

48:

`AfterViewInit` `AfterViewChecked` .

- `OnChanges` ( )
- `OnInit` ( )
- `DoCheck` ( )
- `AfterContentInit` ( )
- `AfterContentChecked` ( )
- `AfterViewInit` ( ) ( )
- `AfterViewChecked` ( ) ( )
- `OnDestroy` ( )

- -

Examples

OnInit

.

( )

```
import { Component, OnInit } from '@angular/core';

@Component({
    selector: 'so-oninit-component',
    templateUrl: 'oninit-component.html',
    styleUrls: ['oninit-component.']
})
class OnInitComponent implements OnInit {

    ngOnInit(): void {
        console.log('Component is ready !');
    }
}
```

OnDestroy

.

```
import { Component, OnDestroy } from '@angular/core';

@Component({
    selector: 'so-ondestroy-component',
```

```
    templateUrl: 'ondestroy-component.html',
    styleUrls: ['ondestroy-component.']
})
class OnDestroyComponent implements OnDestroy {

    ngOnDestroy(): void {
        console.log('Component was destroyed !');
    }
}
```

OnChanges

.

```
import { Component, OnChanges, Input } from '@angular/core';

@Component({
    selector: 'so-onchanges-component',
    templateUrl: 'onchanges-component.html',
    styleUrls: ['onchanges-component.']
})
class OnChangesComponent implements OnChanges {
    @Input() name: string;
    message: string;

    ngOnChanges(changes: SimpleChanges): void {
        console.log(changes);
    }
}
```

.

```
name: {
    currentValue: 'new name value',
    previousValue: 'old name value'
},
message: {
    currentValue: 'new message value',
    previousValue: 'old message value'
}
```

AfterContentInit

.

(OnInit)

```
import { Component, AfterContentInit } from '@angular/core';

@Component({
    selector: 'so-aftercontentinit-component',
    templateUrl: 'aftercontentinit-component.html',
    styleUrls: ['aftercontentinit-component.']
})
class AfterContentInitComponent implements AfterContentInit {
```

```
    ngAfterContentInit(): void {
        console.log('Component content have been loaded!');
    }
}
```

AfterContentChecked

.

( )

```
import { Component, AfterContentChecked } from '@angular/core';

@Component({
    selector: 'so-aftercontentchecked-component',
    templateUrl: 'aftercontentchecked-component.html',
    styleUrls: ['aftercontentchecked-component.']
})
class AfterContentCheckedComponent implements AfterContentChecked {

    ngAfterContentChecked(): void {
        console.log('Component content have been checked!');
    }
}
```

AfterViewInit

. Angular 2 . Angular 2 jQuery .

```
import { Component, AfterViewInit } from '@angular/core';

@Component({
    selector: 'so-afterviewinit-component',
    templateUrl: 'afterviewinit-component.html',
    styleUrls: ['afterviewinit-component.']
})
class AfterViewInitComponent implements AfterViewInit {

    ngAfterViewInit(): void {
        console.log('This event fire after the content init have been loaded!');
    }
}
```

AfterViewChecked

.

( )

```
import { Component, AfterViewChecked } from '@angular/core';

@Component({
    selector: 'so-afterviewchecked-component',
```

```
    templateUrl: 'afterviewchecked-component.html',
    styleUrls: ['afterviewchecked-component.']
})
class AfterViewCheckedComponent implements AfterViewChecked {

    ngAfterViewChecked(): void {
        console.log('This event fire after the content have been checked!');
    }
}
```

DoCheck

```
import { Component, DoCheck, Input } from '@angular/core';

@Component({
    selector: 'so-docheck-component',
    templateUrl: 'docheck-component.html',
    styleUrls: ['docheck-component.']
})
class DoCheckComponent implements DoCheck {
    @Input() elements: string[];
    differ: any;
    ngDoCheck(): void {
        // get value for elements property
        const changes = this.differ.diff(this.elements);

        if (changes) {
            changes.forEachAddedItem(res => console.log('Added', r.item));
            changes.forEachRemovedItem(r => console.log('Removed', r.item));
        }
    }
}
```

: https://riptutorial.com/ko/angular2/topic/2935/--

49:

.

. app.module BrowserModule RouterModule .

Examples

@NgModule . @NgModule @NgModule .

- bootstrap : . .
- declarations : . (ng generate component)
- exports :
- imports : ( )
- providers : (di)

:

```
import { AppComponent } from './app.component';
import { BrowserModule } from '@angular/platform-browser';
import { NgModule } from '@angular/core';

@NgModule({
  bootstrap: [AppComponent]
  declarations: [AppComponent],
  exports: [],
  imports: [BrowserModule],
  providers: [],
})
export class AppModule { }
```

@NgModule imports .

core.module , ReservePipe ( ) :

```
import { CommonModule } from '@angular/common';
import { NgModule } from '@angular/core';
import { ReversePipe } from '../reverse.pipe';

@NgModule({
  imports: [
    CommonModule
  ],
  exports: [ReversePipe], // export things to be imported in another module
  declarations: [ReversePipe],
})
export class CoreModule { }
```

app.module :

```
import { CoreModule } from 'app/core/core.module';
```

```
@NgModule({
  declarations: [...], // ReversePipe is available without declaring here
                       // because CoreModule exports it
  imports: [
    CoreModule,        // import things from CoreModule
    ...
  ],
  providers: [],
  bootstrap: [AppComponent]
})
export class AppModule { }
```

: https://riptutorial.com/ko/angular2/topic/10840/

50:

Examples

. , . .

app / app.module.ts

```
import { NgModule } from '@angular/core';
import { BrowserModule  } from '@angular/platform-browser';
import { AppComponent } from './app.component';
import { EagerComponent } from './eager.component';
import { routing } from './app.routing';
@NgModule({
  imports: [
    BrowserModule,
    routing
  ],
  declarations: [
    AppComponent,
    EagerComponent
  ],
  bootstrap: [AppComponent]
})
export class AppModule {}
```

app / app.component.ts

```
import { Component } from '@angular/core';
@Component({
  selector: 'my-app',
  template: `<h1>My App</h1>    <nav>
      <a routerLink="eager">Eager</a>
      <a routerLink="lazy">Lazy</a>
    </nav>
    <router-outlet></router-outlet>
  `
})
export class AppComponent {}
```

app / app.routing.ts

```
import { ModuleWithProviders } from '@angular/core';
import { Routes, RouterModule } from '@angular/router';
import { EagerComponent } from './eager.component';
const routes: Routes = [
  { path: '', redirectTo: 'eager', pathMatch: 'full' },
  { path: 'eager', component: EagerComponent },
  { path: 'lazy', loadChildren: './lazy.module' }
];
export const routing: ModuleWithProviders = RouterModule.forRoot(routes);
```

app / eager.component.ts

```
import { Component } from '@angular/core';
@Component({
  template: '`<p>Eager Component</p>`'
})
export class EagerComponent {}
```

LazyModule LazyComponent (simliar) LazyModule .

app / lazy.module.ts

```
import { NgModule } from '@angular/core';
import { LazyComponent }   from './lazy.component';
import { routing } from './lazy.routing';
@NgModule({
  imports: [routing],
  declarations: [LazyComponent]
})
export class LazyModule {}
```

app / lazy.routing.ts

```
import { ModuleWithProviders } from '@angular/core';
import { Routes, RouterModule } from '@angular/router';
import { LazyComponent } from './lazy.component';
const routes: Routes = [
  { path: '', component: LazyComponent }
];
export const routing: ModuleWithProviders = RouterModule.forChild(routes);
```

app / lazy.component.ts

```
import { Component } from '@angular/core';
@Component({
  template: `<p>Lazy Component</p>`
})
export class LazyComponent {}
```

: https://riptutorial.com/ko/angular2/topic/7751/--

51:

Angular CLI Angular CLI . Angular CLI .

Angular CLI *Angular CLI* .

Angular 2 , , , NgModule .

Examples

CLI

```
ng new NewProject
```

```
ng init NewProject
```

: https://riptutorial.com/ko/angular2/topic/9152/--

52:

.

. / . HTTP .

Examples

mobile.angular.io --mobile .

cli .

```
ng new serviceWorking-example
cd serviceWorking-example
```

, .

ng sets apps.0.serviceWorker = true .

@ angular / service-worker .

> serviceWorker = true @ angular / service-worker . `npm install --save-dev @angular/service-worker` .angular-cli.json `ng set apps.0.serviceWorker=false` .

.angular-cli.json . "serviceWorker": true

true .

ngsw-manifest.json (ngsw-manifest.json .) dist / root . index.html .

ng build --prod

dist / .

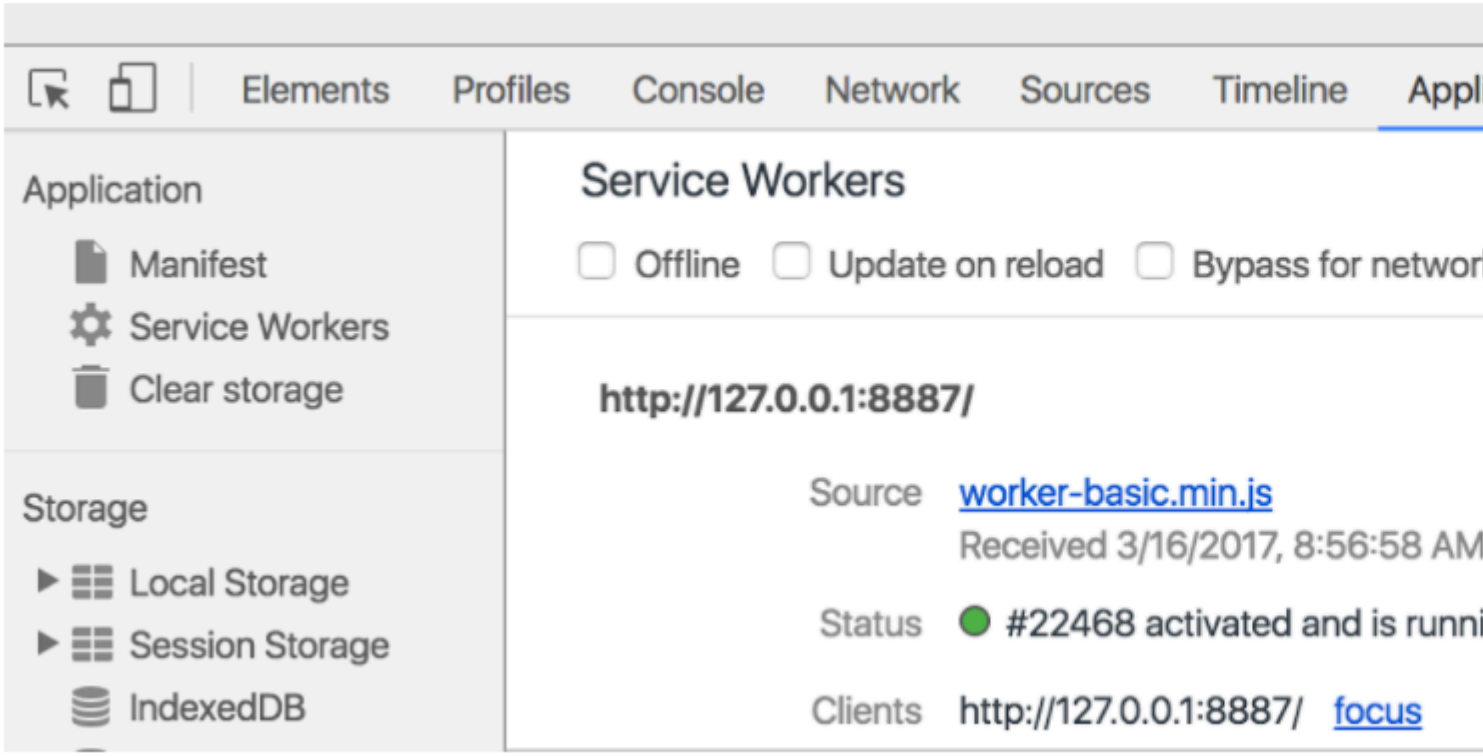
.

- worker-basic.min.js
- sw-register.HASH.bundle.js
- ngsw-manifest.json

index.html (ASW) sw-register .

(Chrome Web Server).

. -> .



.

.

http : // localhost : 4200 / index.html .

http : // localhost : 4200 / . .

/index.html URL /index.html / / some / route .

. .

(19-7-2017). , .

ngsw-manifest.json

```
{
  "routing": {
    "routes": {
      "/": {
        "prefix": false
      }
    },
    "index": "/index.html"
  }
}
```

. http : // localhost : 4200 / http : // localhost : 4200 / index.html .

.

.

https://developers.google.com/web/fundamentals/getting-started/primers/service-workers

https://docs.google.com/document/d/19S5ozevWighny788nI99worpcIMDnwWVmaJDGf_RoDY/edit#

SW precache .

https://coryrylan.com/blog/fast-offline-angular-apps-with-service-workers

: https://riptutorial.com/ko/angular2/topic/10809/-

53: 2

Examples

```
import { NgModule } from '@angular/core';

@NgModule({
  declarations: [], // components your module owns.
  imports: [], // other modules your module needs.
  providers: [], // providers available to your module.
  bootstrap: [] // bootstrap this root component.
})
export class MyModule {}
```

, , . .

.

```
// app.module.ts

import { NgModule } from '@angular/core';
import { BrowserModule } from '@angular/platform-browser';
import { HttpModule } from '@angular/http';
import { MyRootComponent } from './app.component';

@NgModule({
  declarations: [MyRootComponent],
  imports: [BrowserModule, HttpModule],
  bootstrap: [MyRootComponent]
})
export class MyModule {}
```

`MyRootComponent` `MyModule` . Angular 2 .

```
import { platformBrowserDynamic } from '@angular/platform-browser-dynamic';
import { MyModule }               from './app.module';

platformBrowserDynamic().bootstrapModule( MyModule );
```

`MyModule` . `MyModule` Angular 2 .

```
import { NgModule }      from '@angular/core';
import { BrowserModule } from '@angular/platform-browser';

import { AppComponent }  from './app.component';

@NgModule({
  imports: [ BrowserModule ],
  declarations: [ AppComponent ],
  bootstrap:    [ AppComponent ]
})
export class AppModule { }
```

ES5 Javascript . .

```
import { platformBrowser } from '@angular/platform-browser';
import { AppModuleNgFactory } from './main.ngfactory';

// Launch with the app module factory.
platformBrowser().bootstrapModuleFactory(AppModuleNgFactory);
```

ngc .

2 : https://riptutorial.com/ko/angular2/topic/5508/---2--

54: ngx-bootstrap datepicker + input

Examples

ngx-bootstrap datepicker

datepicker.component.html

```
<div (clickOutside)="onClickedOutside($event)" (blur)="onClickedOutside($event)">
      <div class="input-group date" [ngClass]="{'disabled-icon': disabledDatePicker == false
}">
        <input (change)="changedDate()" type="text" [ngModel]="value" class="form-control"
id="{{id}}" (focus)="openCloseDatepicker()" disabled="{{disabledInput}}" />
        <span id="openCloseDatePicker" class="input-group-addon"
(click)="openCloseDatepicker()">
                <span class="glyphicon-calendar glyphicon"></span>
            </span>
      </div>

      <div class="dp-popup" *ngIf="showDatepicker">
        <datepicker [startingDay]="1" [startingDay]="dt" [minDate]="min"  [(ngModel)]="dt"
(selectionDone)="onSelectionDone($event)"></datepicker>
      </div>
    </div>
```

datepicker.component.ts

```
import {Component, Input, EventEmitter, Output, OnChanges, SimpleChanges, ElementRef, OnInit}
from "@angular/core";
import {DatePipe} from "@angular/common";
import {NgModel} from "@angular/forms";
import * as moment from 'moment';

@Component({
  selector: 'custom-datepicker',
  templateUrl: 'datepicker.component.html',
  providers: [DatePipe, NgModel],
  host: {
    '(document:mousedown)': 'onClick($event)',
  }
})

export class DatepickerComponent implements OnChanges , OnInit{
  ngOnInit(): void {
    this.dt = null;
  }

  inputElement : ElementRef;
  dt: Date = null;
  showDatepicker: boolean = false;

  @Input() disabledInput : boolean = false;
  @Input() disabledDatePicker: boolean = false;
  @Input() value: string = null;
  @Input() id: string;
```

```
@Input() min: Date = null;
@Input() max: Date = null;

@Output() dateModelChange = new EventEmitter();
constructor(el: ElementRef) {
  this.inputElement = el;
}

changedDate(){
  if(this.value === ''){
    this.dateModelChange.emit(null);
  }else if(this.value.split('/').length === 3){
    this.dateModelChange.emit(DatepickerComponent.convertToDate(this.value));
  }
}

clickOutSide(event : Event){
  if(this.inputElement.nativeElement !== event.target) {
    console.log('click outside', event);
  }
}

onClick(event) {
  if (!this.inputElement.nativeElement.contains(event.target)) {
    this.close();
  }
}
ngOnChanges(changes: SimpleChanges): void {
  if (this.value !== null && this.value !== undefined && this.value.length > 0) {
    this.value = null;
    this.dt  = null;
  }else {
    if(this.value !== null){
      this.dt = new Date(this.value);
      this.value = moment(this.value).format('MM/DD/YYYY');
    }
  }
}

private static transformDate(date: Date): string {
  return new DatePipe('pt-PT').transform(date, 'MM/dd/yyyy');
}

openCloseDatepicker(): void {
  if (!this.disabledDatePicker) {
    this.showDatepicker = !this.showDatepicker;
  }
}

open(): void {
  this.showDatepicker = true;
}

close(): void {
  this.showDatepicker = false;
}

private apply(): void {
  this.value = DatepickerComponent.transformDate(this.dt);
  this.dateModelChange.emit(this.dt);
}
```

```
  onSelectionDone(event: Date): void {
    this.dt = event;
    this.apply();
    this.close();
  }

  onClickedOutside(event: Date): void {
    if (this.showDatepicker) {
      this.close();
    }
  }

  static convertToDate(val : string): Date {
    return new Date(val.replace('/','-'));
  }

}
```

ngx-bootstrap datepicker + input : https://riptutorial.com/ko/angular2/topic/10549/--ngx-bootstrap-datepicker-plus-input

55:

Examples

null

```
    @Component({
        ...
        animations: [
            trigger('appear', [
                transition(':enter', [
                    style({
                      //style applied at the start of animation
                    }),
                animate('300ms ease-in', style({
                    //style applied at the end of animation
                }))
                ])
            ])
        ]
    })
    class AnimComponent {

    }
]
```

 50px 50px 100px 50px 20px .

state @Component .

state . size "small", "medium" "large" .

 @Component trigger .[@size]="size" .

```
@Component({
  template: '<div [@size]="size">Some Text</div><button
(click)="toggleSize()">TOGGLE</button>',
  animations: [
    trigger('size', [
      state('small', style({
        height: '20px'
      })),
      state('medium', style({
        height: '50px'
      })),
      state('large', style({
        height: '100px'
      })),
      transition('small => medium', animate('100ms')),
      transition('medium => large', animate('200ms')),
      transition('large => small', animate('300ms'))
    ])
  ]
})
```

```
export class TestComponent {

    size: string;

    constructor(){
        this.size = 'small';
    }
    toggleSize(){
        switch(this.size) {
            case 'small':
                this.size = 'medium';
                break;
            case 'medium':
                this.size = 'large';
                break;
            case 'large':
                this.size = 'small';
        }
    }
}
```

: https://riptutorial.com/ko/angular2/topic/8127/

56:

Examples

/ my.service.ts

```
import { Injectable } from '@angular/core';

@Injectable()
export class MyService {
  data: any = [1, 2, 3];

  getData() {
    return this.data;
  }
}
```

.

main.ts

```
import { bootstrap } from '@angular/platform-browser-dynamic';
import { AppComponent } from 'app.component.ts';
import { MyService } from 'services/my.service';

bootstrap(AppComponent, [MyService]);
```

RC5 . ngmodule . *app_module.ts*

```
import { NgModule }       from '@angular/core';
import { BrowserModule  } from '@angular/platform-browser';
import { routing, appRoutingProviders } from './app-routes/app.routes';
import { HttpModule} from '@angular/http';

import { AppComponent }   from './app.component';
import { MyService } from 'services/my.service';

import { routing } from './app-resources/app-routes/app.routes';

@NgModule({
    declarations: [ AppComponent ],
    imports:      [ BrowserModule,
                    routing,
                    RouterModule,
                    HttpModule ],
    providers: [    appRoutingProviders,
                    MyService
    ],
    bootstrap:    [AppComponent],
})
export class AppModule {}
```

`MyComponent`

components / my.component.ts

. .

```
import { Component, OnInit } from '@angular/core';
import { MyService } from '../services/my.service';

@Component({
    ...
    ...
    providers:[MyService] //
 })
export class MyComponent implements OnInit {
    data: any[];
    // Creates private variable myService to use, of type MyService
    constructor(private myService: MyService) { }

    ngOnInit() {
        this.data = this.myService.getData();
    }
}
```

Promise.resolve

/ my.service.ts

```
import { Injectable } from '@angular/core';

@Injectable()
export class MyService {
    data: any = [1, 2, 3];

    getData() {
        return Promise.resolve(this.data);
    }
}
```

`getData()` Promise REST `getData()` . `.then()` . .

components / my.component.ts

```
import { Component, OnInit } from '@angular/core';
import { MyService } from '../services/my.service';

@Component({...})
export class MyComponent implements OnInit {
    data: any[];
    // Creates private variable myService to use, of type MyService
    constructor(private myService: MyService) { }

    ngOnInit() {
        // Uses an "arrow" function to set data
        this.myService.getData().then(data => this.data = data);
    }
}
```

.

```
import 'rxjs/add/operator/toPromise';

import { Http } from '@angular/http';
import { Injectable } from '@angular/core';

interface LoginCredentials {
  password: string;
  user: string;
}

@Injectable()
export class AuthService {
  constructor(private http: Http) { }

  async signIn({ user, password }: LoginCredentials) {
    const response = await this.http.post('/login', {
      password,
      user,
    }).toPromise();

    return response.json();
  }
}
```

.

```
import { ConnectionBackend, Http, HttpModule, Response, ResponseOptions } from
'@angular/http';
import { TestBed, async, inject } from '@angular/core/testing';

import { AuthService } from './auth.service';
import { MockBackend } from '@angular/http/testing';
import { MockConnection } from '@angular/http/testing';

describe('AuthService', () => {
  beforeEach(() => {
    TestBed.configureTestingModule({
      imports: [HttpModule],
      providers: [
        AuthService,
        Http,
        { provide: ConnectionBackend, useClass: MockBackend },
      ]
    });
  });

  it('should be created', inject([AuthService], (service: AuthService) => {
    expect(service).toBeTruthy();
  }));

  // Alternative 1
  it('should login user if right credentials are passed', async(
    inject([AuthService], async (authService) => {
      const backend: MockBackend = TestBed.get(ConnectionBackend);
      const http: Http = TestBed.get(Http);

      backend.connections.subscribe((c: MockConnection) => {
```

```
      c.mockRespond(
        new Response(
          new ResponseOptions({
            body: {
              accessToken: 'abcdef',
            },
          }),
        ),
      );
    });

    const result = await authService.signIn({ password: 'ok', user: 'bruno' });

    expect(result).toEqual({
      accessToken: 'abcdef',
    });
  }))
);

// Alternative 2
it('should login user if right credentials are passed', async () => {
  const backend: MockBackend = TestBed.get(ConnectionBackend);
  const http: Http = TestBed.get(Http);

  backend.connections.subscribe((c: MockConnection) => {
    c.mockRespond(
      new Response(
        new ResponseOptions({
          body: {
            accessToken: 'abcdef',
          },
        }),
      ),
    );
  });

  const authService: AuthService = TestBed.get(AuthService);

  const result = await authService.signIn({ password: 'ok', user: 'bruno' });

  expect(result).toEqual({
    accessToken: 'abcdef',
  });
});

// Alternative 3
it('should login user if right credentials are passed', async (done) => {
  const authService: AuthService = TestBed.get(AuthService);

  const backend: MockBackend = TestBed.get(ConnectionBackend);
  const http: Http = TestBed.get(Http);

  backend.connections.subscribe((c: MockConnection) => {
    c.mockRespond(
      new Response(
        new ResponseOptions({
          body: {
            accessToken: 'abcdef',
          },
        }),
      ),
```

```
      );
    });

    try {
      const result = await authService.signIn({ password: 'ok', user: 'bruno' });

      expect(result).toEqual({
        accessToken: 'abcdef',
      });

      done();
    } catch (err) {
      fail(err);
      done();
    }
  });
});
```

: https://riptutorial.com/ko/angular2/topic/4187/---

57:

Params	
	html
(templateUrl)	`<selector>` html . templateUrl html .
	.

!

SANITIZING XSS ( ) . 100 % .

.

```
<tag [attribute]="expression or variable reference | pipeName">
```

.

```
<tag attribute="expression or variable reference | pipeName">
```

```
<tag attribute={{expression or variable reference | pipeName}}
```

Examples

( )

Angular2 .

```
RootOfProject
|
+-- app
|   |-- app.component.ts
|   |-- main.ts
|   |-- pipeUser.component.ts
|   \-- sanitize.pipe.ts
|
|-- index.html
|-- main.html
|-- pipe.html
```

main.ts

```
import { bootstrap } from '@angular/platform-browser-dynamic';
```

```
import { AppComponent } from './app.component';

bootstrap(AppComponent);
```

index.html .

app.component.ts

```
import { Component } from '@angular/core';
import { PipeUserComponent } from './pipeUser.component';

@Component({
    selector: 'main-app',
    templateUrl: 'main.html',
    directives: [PipeUserComponent]
})

export class AppComponent { }
```

.

pipeUser.component.ts

```
import { Component } from '@angular/core';
import { IgnoreSanitize } from "./sanitize.pipe";

@Component({
    selector: 'pipe-example',
    templateUrl: "pipe.html",
    pipes: [IgnoreSanitize]
})

export class PipeUserComponent{
    constructor () { }
    unsafeValue: string = "unsafe/picUrl?id=";
    docNum: string;

    getUrl(input: string): any {
        if(input !== undefined) {
            return this.unsafeValue.concat(input);
            // returns : "unsafe/picUrl?id=input"
        } else {
            return "fallback/to/something";
        }
    }
}
```

.

sanitize.pipe.ts

```
import { Pipe, PipeTransform } from '@angular/core';
import { DomSanitizationService } from '@angular/platform-browser';

@Pipe({
    name: 'sanitaryPipe'
```

```
})
export class IgnoreSanitize implements PipeTransform {

   constructor(private sanitizer: DomSanitizationService){}

   transform(input: string) : any {
       return this.sanitizer.bypassSecurityTrustUrl(input);
   }

}
```

.

index.html

```
<head>
    Stuff goes here...
</head>
<body>
    <main-app>
        main.html will load inside here.
    </main-app>
</body>
```

main.html

```
<othertags>
</othertags>

<pipe-example>
    pipe.html will load inside here.
</pipe-example>

<moretags>
</moretags>
```

pipe.html

```
<img [src]="getUrl('1234') | sanitaryPipe">
<embed [src]="getUrl() | sanitaryPipe">
```

html .

```
<head>
    Stuff goes here...
</head>

<body>

    <othertags>
    </othertags>

    <img [src]="getUrl('1234') | sanitaryPipe">
    <embed [src]="getUrl() | sanitaryPipe">

    <moretags>
```

```
    </moretags>

</body>
```

: https://riptutorial.com/ko/angular2/topic/5942/------

58: API 2 CRUD

- @Injectable () // .
- request.subscribe () // . . .
- constructor (private wikiService : WikipediaService) {} // .

Examples

Angular2 API

API API . Wikipedia API Wiki .

```
    import { Http, Response } from '@angular/http';
    import { Injectable } from '@angular/core';
    import { Observable }     from 'rxjs/Observable';
    import 'rxjs/Rx';

    @Injectable()
    export class WikipediaService{
        constructor(private http: Http) {}

        getRandomArticles(numberOfArticles: number)
        {
            var request =
this.http.get("https://en.wikipedia.org/w/api.php?action=query&list=random&format=json&rnlimit="
+ numberOfArticles);
            return request.map((response: Response) => {
                return response.json();
            },(error) => {
                console.log(error);
                //your want to implement your own error handling here.
            });
        }
    }
```

API .

```
import { Component, OnInit } from '@angular/core';
import { WikipediaService } from './wikipedia.Service';

@Component({
    selector: 'wikipedia',
    templateUrl: 'wikipedia.component.html'
})
export class WikipediaComponent implements OnInit {
    constructor(private wikiService: WikipediaService) { }

    private articles: any[] = null;
    ngOnInit() {
        var request = this.wikiService.getRandomArticles(5);
        request.subscribe((res) => {
            this.articles = res.query.random;
```

```
            });
        }
}
```

API 2 CRUD : https://riptutorial.com/ko/angular2/topic/7343/-api--2-crud

59:

Examples

Md2Select

:

```
<md2-select [(ngModel)]="item" (change)="change($event)" [disabled]="disabled">
<md2-option *ngFor="let i of items" [value]="i.value" [disabled]="i.disabled">
{{i.name}}</md2-option>
</md2-select>
```

.

```
<md2-select></md2-select>
<md2-option></md2-option>
<md2-select-header></md2-select-header>
```

Md2

. .

.

```
<span tooltip-direction="left" tooltip="On the Left!">Left</span>
<button tooltip="some message"
    tooltip-position="below"
    tooltip-delay="1000">Hover Me
</button>
```

Md2Toast

Toast .

.

```
import {Md2Toast} from 'md2/toast/toast';

@Component({
 selector: "..."
})

export class ... {

...
constructor(private toast: Md2Toast) { }
toastMe() {
this.toast.show('Toast message...');
```

```
---  or  ---

this.toast.show('Toast message...', 1000);
}

...

}
```

Md2Datepicker

Datepicker .

```
<md2-datepicker [(ngModel)]="date"></md2-datepicker>
```

.

Md2Accordion Md2Collapse

Md2Collapse : Collapse .

.

```
<div [collapse]="isCollapsed">
  Lorum Ipsum Content
</div>
```

Md2Accordion : .

.

```
<md2-accordion [multiple]="multiple">
  <md2-accordion-tab *ngFor="let tab of accordions"
                     [header]="tab.title"
                     [active]="tab.active"
                     [disabled]="tab.disabled">
    {{tab.content}}
  </md2-accordion-tab>
  <md2-accordion-tab>
    <md2-accordion-header>Custom Header</md2-accordion-header>
    test content
  </md2-accordion-tab>
</md2-accordion>
```

: https://riptutorial.com/ko/angular2/topic/10005/--

60:

@ / - @ / -

Examples

URL . LocationStrategy URL URL .

Location href URL .

```
import {Component} from '@angular/core';
import {Location} from '@angular/common';

@Component({
    selector: 'app-component'
})
class AppCmp {

  constructor(_location: Location) {

    //Changes the browsers URL to the normalized version of the given URL,
    //and pushes a new item onto the platform's history.
    _location.go('/foo');

  }

  backClicked() {
    //Navigates back in the platform's history.
    this._location.back();
  }

  forwardClicked() {
    //Navigates forward in the platform's history.
    this._location.back();
  }
}
```

AsyncPipe

Observable Promise . . .

```
@Component({
  selector: 'async-observable-pipe',
  template: '<div><code>observable|async</code>: Time: {{ time | async }}</div>'
})
export class AsyncObservablePipeComponent {
  time = new Observable<string>((observer: Subscriber<string>) => {
    setInterval(() => observer.next(new Date().toString()), 1000);
  });
}
```

angular2

@ angular / core **VERSION** .

```
import { Component, VERSION } from '@angular/core';

@Component({
  selector: 'my-app',
  template: `<h1>Hello {{name}}</h1>
  <h2>Current Version: {{ver}}</h2>
  `,
})
export class AppComponent  {
   name = 'Angular2';
   ver = VERSION.full;
}
```

(,) .

```
@Component({
  selector: 'currency-pipe',
  template: `<div>
    <p>A: {{myMoney | currency:'USD':false}}</p>
    <p>B: {{yourMoney | currency:'USD':true:'4.2-2'}}</p>
  </div>`
})
export class CurrencyPipeComponent {
  myMoney: number = 100000.653;
  yourMoney: number = 5.3495;
}
```

3 .

- **currencyCode** : ISO 4217 .
- **symbolDisplay** : .
- **digitInfo** : .

: https://angular.io/docs/ts/latest/api/common/index/CurrencyPipe-pipe.html

: https://riptutorial.com/ko/angular2/topic/8252/-----

61:

Examples

: WARN

:

```
typings WARN deprecated 10/25/2016: "registry:dt/jasmine#2.5.0+20161003201800" is deprecated
(updated, replaced or removed)
```

.

```
npm run typings -- install dt~jasmine --save --global
```

[jazmine] .

: https://riptutorial.com/ko/angular2/topic/7814/--

62: URL / route / subroute

Examples

app.module.ts

```
import {routes} from "./app.routes";

@NgModule({
   declarations: [AppComponent],
   imports: [BrowserModule, mainModule.forRoot(), RouterModule.forRoot(routes)],
   providers: [],
   bootstrap: [AppComponent]
})

export class AppModule { }
```

app.routes.ts

```
import { Routes } from '@angular/router';
import {SubTreeRoutes} from "./subTree/subTreeRoutes.routes";

export const routes: Routes = [
  ...SubTreeRoutes,
  { path: '',  redirectTo: 'home', pathMatch: 'full'}
];
```

subTreeRoutes.ts

```
import {Route} from '@angular/router';
import {exampleComponent} from "./example.component";

export const SubTreeRoutes: Route[] = [
  {
    path: 'subTree',
    children: [
      {path: '',component: exampleComponent}
    ]
  }
];
```

URL / route / subroute : https://riptutorial.com/ko/angular2/topic/8910/-url----route---subroute---

63: @ ngrx /

@ ngrx / Store Angular 2 . . . . Observer Store . TestBed Store .

$	
actionReducer $	
obs $	

any . Store Observer . any .

null StoreMock .

.

Examples

```
class ObserverMock implements Observer<any> {
  closed?: boolean = false; // inherited from Observer
  nextVal: any = ''; // variable I made up

  constructor() {}

  next = (value: any): void => { this.nextVal = value; };
  error = (err: any): void => { console.error(err); };
  complete = (): void => { this.closed = true; }
}

let actionReducer$: ObserverMock = new ObserverMock();
let action$: ObserverMock = new ObserverMock();
let obs$: Observable<any> = new Observable<any>();

class StoreMock extends Store<any> {
  constructor() {
    super(action$, actionReducer$, obs$);
  }
}

describe('Component:Typeahead', () => {
    beforeEach(() => {
        TestBed.configureTestingModule({
            imports: [...],
            declarations: [Typeahead],
            providers: [
                {provide: Store, useClass: StoreMock} // NOTICE useClass instead of useValue
            ]
        }).compileComponents();
```

```
    });
});
```

Store . *MockStore* . Store .

```
import { Injectable } from '@angular/core';
import { TestBed, async} from '@angular/core/testing';
import { AppComponent } from './app.component';
import {DumbComponentComponent} from "./dumb-component/dumb-component.component";
import {SmartComponentComponent} from "./smart-component/smart-component.component";
import {mainReducer} from "./state-management/reducers/main-reducer";
import { StoreModule } from "@ngrx/store";
import { Store } from "@ngrx/store";
import {Observable} from "rxjs";


class MockStore {
  public dispatch(obj) {
    console.log('dispatching from the mock store!')
  }

  public select(obj) {
    console.log('selecting from the mock store!');

    return Observable.of({})
  }
}


describe('AppComponent', () => {
  beforeEach(() => {
    TestBed.configureTestingModule({
      declarations: [
        AppComponent,
        SmartComponentComponent,
        DumbComponentComponent,
      ],
      imports: [
        StoreModule.provideStore({mainReducer})
      ],
      providers: [
        {provide: Store, useClass: MockStore}
      ]
    });
  });

  it('should create the app', async(() => {

    let fixture = TestBed.createComponent(AppComponent);
    let app = fixture.debugElement.componentInstance;
    expect(app).toBeTruthy();
  }));
```

Store . *store.dispatch ()* " " .

```
import {TestBed, async} from '@angular/core/testing';
import {AppComponent} from './app.component';
import {DumbComponentComponent} from "./dumb-component/dumb-component.component";
```

```
import {SmartComponentComponent} from "./smart-component/smart-component.component";
import {mainReducer} from "./state-management/reducers/main-reducer";
import {StoreModule} from "@ngrx/store";
import {Store} from "@ngrx/store";
import {Observable} from "rxjs";

describe('AppComponent', () => {
  beforeEach(() => {
    TestBed.configureTestingModule({
      declarations: [
        AppComponent,
        SmartComponentComponent,
        DumbComponentComponent,
      ],
      imports: [
        StoreModule.provideStore({mainReducer})
      ]
    });

  });


  it('should create the app', async(() => {
    let fixture = TestBed.createComponent(AppComponent);
    let app = fixture.debugElement.componentInstance;

  var mockStore = fixture.debugElement.injector.get(Store);
  var storeSpy = spyOn(mockStore, 'dispatch').and.callFake(function () {
  console.log('dispatching from the spy!');
});


}));


});
```

2 - (+)

- postRequest post .

```
import {Injectable} from '@angular/core';
import {Http, Headers, Response} from "@angular/http";
import {PostModel} from "./PostModel";
import 'rxjs/add/operator/map';
import {Observable} from "rxjs";

@Injectable()
export class PostService {

  constructor(private _http: Http) {
  }

  postRequest(postModel: PostModel) : Observable<Response> {
      let headers = new Headers();
      headers.append('Content-Type', 'application/json');
    return this._http.post("/postUrl", postModel, {headers})
      .map(res => res.json());
  }
```

```
}
```

- postService postExample .
- postquest result 'Success'else 'Fail'

```
import {Component} from '@angular/core';
import {PostService} from "./PostService";
import {PostModel} from "./PostModel";

@Component({
  selector: 'app-post',
  templateUrl: './post.component.html',
  styleUrls: ['./post.component.scss'],
  providers : [PostService]
})
export class PostComponent{


  constructor(private _postService : PostService) {

  let postModel = new PostModel();
  result : string = null;
  postExample(){
    this._postService.postRequest(this.postModel)
      .subscribe(
        () =>  {
          this.result = 'Success';
        },
        err =>  this.result = 'Fail'
      )
  }
}
```

- http mockBackend . .
- postService .

```
describe('Test PostService', () => {
  beforeEach(() => {
    TestBed.configureTestingModule({
      imports: [HttpModule],
      providers: [
        PostService,
        MockBackend,
        BaseRequestOptions,
        {
          provide: Http,
          deps: [MockBackend, BaseRequestOptions],
          useFactory: (backend: XHRBackend, defaultOptions: BaseRequestOptions) => {
            return new Http(backend, defaultOptions);
          }
        }
      ]
    });
  });



  it('sendPostRequest function return Observable', inject([PostService, MockBackend],
```

```
(service: PostService, mockBackend: MockBackend) => {
    let mockPostModel = PostModel();

    mockBackend.connections.subscribe((connection: MockConnection) => {
      expect(connection.request.method).toEqual(RequestMethod.Post);
      expect(connection.request.url.indexOf('postUrl')).not.toEqual(-1);
      expect(connection.request.headers.get('Content-Type')).toEqual('application/json');
    });

    service
      .postRequest(PostModel)
      .subscribe((response) => {
        expect(response).toBeDefined();
      });
  }));
});
```

```
describe('testing post component', () => {
  let component: PostComponent;
  let fixture: ComponentFixture<postComponent>;


  let mockRouter = {
    navigate: jasmine.createSpy('navigate')
  };

  beforeEach(async(() => {
    TestBed.configureTestingModule({
      declarations: [PostComponent],
      imports: [RouterTestingModule.withRoutes([]),ModalModule.forRoot() ],
      providers: [PostService ,MockBackend,BaseRequestOptions,
        {provide: Http, deps: [MockBackend, BaseRequestOptions],
          useFactory: (backend: XHRBackend, defaultOptions: BaseRequestOptions) => {
            return new Http(backend, defaultOptions);
          }
        },
        {provide: Router, useValue: mockRouter}
      ],
      schemas: [ CUSTOM_ELEMENTS_SCHEMA ]
    }).compileComponents();
  }));

  beforeEach(() => {
    fixture = TestBed.createComponent(PostComponent);
    component = fixture.componentInstance;
    fixture.detectChanges();
  });




  it('test postRequest success', inject([PostService, MockBackend], (service: PostService,
mockBackend: MockBackend) => {
    fixturePostComponent = TestBed.createComponent(PostComponent);
    componentPostComponent = fixturePostComponent.componentInstance;
    fixturePostComponent.detectChanges();


    component.postExample();
    let postModel = new PostModel();
```

```
    let response = {
      'message' : 'message',
      'ok'      : true
    };
    mockBackend.connections.subscribe((connection: MockConnection) => {
      postComponent.result = 'Success'
      connection.mockRespond(new Response(
        new ResponseOptions({
          body: response
        })
      ))
    });
    service.postRequest(postModel)
      .subscribe((data) => {
        expect(component.result).toBeDefined();
        expect(PostComponent.result).toEqual('Success');
        expect(data).toEqual(response);
      });
  }));
});
```

simple.action.ts

```
import { Action } from '@ngrx/store';

export enum simpleActionTpye {
    add = "simpleAction_Add",
    add_Success = "simpleAction_Add_Success"
}

export class simpleAction {
    type: simpleActionTpye
    constructor(public payload: number) { }
}
```

simple.efficts.ts

```
import { Effect, Actions } from '@ngrx/effects';
import { Injectable } from '@angular/core';
import { Action } from '@ngrx/store';
import { Observable } from 'rxjs';

import { simpleAction, simpleActionTpye } from './simple.action';


@Injectable()
export class simpleEffects {

    @Effect()
    addAction$: Observable<simpleAction> = this.actions$
        .ofType(simpleActionTpye.add)
        .switchMap((action: simpleAction) => {
            console.log(action);

            return Observable.of({ type: simpleActionTpye.add_Success, payload: action.payload
})
            //   if you have an api use this code
            // return this.http.post(url).catch().map(res=>{ type: simpleAction.add_Success,
```

```
payload:res})
        });
    constructor(private actions$: Actions) { }
}
```

simple.reducer.ts

```
import { Action, ActionReducer } from '@ngrx/store';

import { simpleAction, simpleActionTpye } from './simple.action';

export const simpleReducer: ActionReducer<number> = (state: number = 0, action: simpleAction):
number => {
    switch (action.type) {
        case simpleActionTpye.add_Success:
            console.log(action);
            return state + action.payload;
        default:
            return state;
    }
}
```

store / index.ts

```
import { combineReducers, ActionReducer, Action, StoreModule } from '@ngrx/store';
import { EffectsModule } from '@ngrx/effects';
import { ModuleWithProviders } from '@angular/core';
import { compose } from '@ngrx/core';

import { simpleReducer } from "./simple/simple.reducer";
import { simpleEffects } from "./simple/simple.efficts";


export interface IAppState {
    sum: number;
}

// all new reducers should be define here
const reducers = {
    sum: simpleReducer
};

export const store: ModuleWithProviders = StoreModule.forRoot(reducers);
export const effects: ModuleWithProviders[] = [
    EffectsModule.forRoot([simpleEffects])
];
```

app.module.ts

```
import { BrowserModule } from '@angular/platform-browser'
import { NgModule } from '@angular/core';

import { effects, store } from "./Store/index";
import { AppComponent } from './app.component';

@NgModule({
  declarations: [
```

```
    AppComponent
  ],
  imports: [
    BrowserModule,
    // store
    store,
    effects
  ],
  providers: [],
  bootstrap: [AppComponent]
})
export class AppModule { }
```

app.component.ts

```
import { Component } from '@angular/core';

import { Store } from '@ngrx/store';
import { Observable } from 'rxjs';

import { IAppState } from './Store/index';
import { simpleActionTpye } from './Store/simple/simple.action';

@Component({
  selector: 'app-root',
  templateUrl: './app.component.html',
  styleUrls: ['./app.component.css']
})
export class AppComponent {
  title = 'app';

  constructor(private store: Store<IAppState>) {
    store.select(s => s.sum).subscribe((res) => {
      console.log(res);
    })
    this.store.dispatch({
      type: simpleActionTpye.add,
      payload: 1
    })
    this.store.dispatch({
      type: simpleActionTpye.add,
      payload: 2
    })
    this.store.dispatch({
      type: simpleActionTpye.add,
      payload: 3
    })
  }
}
```

0 1 3 6

@ ngrx / : https://riptutorial.com/ko/angular2/topic/8038/---ngrx---

64:

- `<input [value]="value">` - name .
- `<div [attr.data-note]="note">` - data-note note .
- `<p green></p>` -

Angular 2 https://angular.io/docs/ts/latest/guide/attribute-directives.html.

Examples

```
<div [class.active]="isActive"></div>

<span [style.color]="'red'"></span>

<p [attr.data-note]="'This is value for data-note attribute'">A lot of text here</p>
```

.

```
import { Component } from '@angular/core';
@Component({
  selector: 'my-app',
  template: `
    <h1>Angular 2 App</h1>
    <p>Component is directive with template</p>
  `
})
export class AppComponent {
}
```

```
<div *ngFor="let item of items">{{ item.description }}</div>

<span *ngIf="isVisible"></span>
```

```
import {Directive, ElementRef, Renderer} from '@angular/core';

@Directive({
  selector: '[green]',
})

class GreenDirective {
  constructor(private _elementRef: ElementRef,
              private _renderer: Renderer) {
    _renderer.setElementStyle(_elementRef.nativeElement, 'color', 'green');
  }
}
```

:

```
<p green>A lot of green text here</p>
```

* ngFor

form1.component.ts :

```
import { Component } from '@angular/core';

// Defines example component and associated template
@Component({
    selector: 'example',
    template: `
      <div *ngFor="let f of fruit"> {{f}} </div>
      <select required>
        <option *ngFor="let f of fruit" [value]="f"> {{f}} </option>
      </select>
    `
})

// Create a class for all functions, objects, and variables
export class ExampleComponent {
    // Array of fruit to be iterated by *ngFor
    fruit = ['Apples', 'Oranges', 'Bananas', 'Limes', 'Lemons'];
}
```

:

```
<div>Apples</div>
<div>Oranges</div>
<div>Bananas</div>
<div>Limes</div>
<div>Lemons</div>
<select required>
  <option value="Apples">Apples</option>
  <option value="Oranges">Oranges</option>
  <option value="Bananas">Bananas</option>
  <option value="Limes">Limes</option>
  <option value="Lemons">Lemons</option>
</select>
```

`*ngFor` : `let` **`variableName`** `of` **`object/array`**

`fruit = ['Apples', 'Oranges', 'Bananas', 'Limes', 'Lemons'];` ,

Apples, Oranges `fruit` .

`[value]="f" *ngFor` `fruit` (`f`) .

AngularJS Angular2 `<select>` `ng-repeat` `ng-options` .

`*ngFor` `ng-repeat` .

:

Angular2 |

Angular2 | ngFor

Angular2 |

copy-text.directive.ts

```
import {
    Directive,
    Input,
    HostListener
} from "@angular/core";

@Directive({
    selector: '[text-copy]'
})
export class TextCopyDirective {

    // Parse attribute value into a 'text' variable
    @Input('text-copy') text:string;

    constructor() {
    }


    // The HostListener will listen to click events and run the below function, the
HostListener supports other standard events such as mouseenter, mouseleave etc.
    @HostListener('click') copyText() {

        // We need to create a dummy textarea with the text to be copied in the DOM
        var textArea = document.createElement("textarea");

        // Hide the textarea from actually showing
        textArea.style.position = 'fixed';
        textArea.style.top = '-999px';
        textArea.style.left = '-999px';
        textArea.style.width = '2em';
        textArea.style.height = '2em';
        textArea.style.padding = '0';
        textArea.style.border = 'none';
        textArea.style.outline = 'none';
        textArea.style.boxShadow = 'none';
        textArea.style.background = 'transparent';

        // Set the texarea's content to our value defined in our [text-copy] attribute
        textArea.value = this.text;
        document.body.appendChild(textArea);

        // This will select the textarea
        textArea.select();

        try {
            // Most modern browsers support execCommand('copy'|'cut'|'paste'), if it doesn't
it should throw an error
            var successful = document.execCommand('copy');
            var msg = successful ? 'successful' : 'unsuccessful';
            // Let the user know the text has been copied, e.g toast, alert etc.
            console.log(msg);
        } catch (err) {
```

```
            // Tell the user copying is not supported and give alternative, e.g alert window
with the text to copy
            console.log('unable to copy');
        }

        // Finally we remove the textarea from the DOM
        document.body.removeChild(textArea);
    }
}

export const TEXT_COPY_DIRECTIVES = [TextCopyDirective];
```

some-page.component.html

TEXT_COPY_DIRECTIVES .

```
...
    <!-- Insert variable as the attribute's value, let textToBeCopied = 'http://facebook.com/'
-->
    <button [text-copy]="textToBeCopied">Copy URL</button>
    <button [text-copy]="'https://www.google.com/'">Copy URL</button>
...
```

```
import { Directive, ElementRef, HostListener, Input } from '@angular/core';

@Directive({ selector: '[appHighlight]' })
export class HighlightDirective {
  @Input('appHighlight') // tslint:disable-line no-input-rename
  highlightColor: string;

  constructor(private el: ElementRef) { }

  @HostListener('mouseenter')
  onMouseEnter() {
    this.highlight(this.highlightColor || 'red');
  }

  @HostListener('mouseleave')
  onMouseLeave() {
    this.highlight(null);
  }

  private highlight(color: string) {
    this.el.nativeElement.style.backgroundColor = color;
  }
}
```

.

```
import { ComponentFixture, ComponentFixtureAutoDetect, TestBed } from '@angular/core/testing';

import { Component } from '@angular/core';
import { HighlightDirective } from './highlight.directive';

@Component({
  selector: 'app-test-container',
  template: `
```

```
    <div>
      <span id="red" appHighlight>red text</span>
      <span id="green" [appHighlight]="'green'">green text</span>
      <span id="no">no color</span>
    </div>
  `
})
class ContainerComponent { }

const mouseEvents = {
  get enter() {
    const mouseenter = document.createEvent('MouseEvent');
    mouseenter.initEvent('mouseenter', true, true);
    return mouseenter;
  },
  get leave() {
    const mouseleave = document.createEvent('MouseEvent');
    mouseleave.initEvent('mouseleave', true, true);
    return mouseleave;
  },
};

describe('HighlightDirective', () => {
  let fixture: ComponentFixture<ContainerComponent>;
  let container: ContainerComponent;
  let element: HTMLElement;

  beforeEach(() => {
    TestBed.configureTestingModule({
      declarations: [ContainerComponent, HighlightDirective],
      providers: [
        { provide: ComponentFixtureAutoDetect, useValue: true },
      ],
    });

    fixture = TestBed.createComponent(ContainerComponent);
    // fixture.detectChanges(); // without the provider
    container = fixture.componentInstance;
    element = fixture.nativeElement;
  });

  it('should set background-color to empty when mouse leaves with directive without
arguments', () => {
    const targetElement = <HTMLSpanElement>element.querySelector('#red');

    targetElement.dispatchEvent(mouseEvents.leave);
    expect(targetElement.style.backgroundColor).toEqual('');
  });

  it('should set background-color to empty when mouse leaves with directive with arguments',
() => {
    const targetElement = <HTMLSpanElement>element.querySelector('#green');

    targetElement.dispatchEvent(mouseEvents.leave);
    expect(targetElement.style.backgroundColor).toEqual('');
  });

  it('should set background-color red with no args passed', () => {
    const targetElement = <HTMLSpanElement>element.querySelector('#red');

    targetElement.dispatchEvent(mouseEvents.enter);
```

```
    expect(targetElement.style.backgroundColor).toEqual('red');
  });

  it('should set background-color green when passing green parameter', () => {
    const targetElement = <HTMLSpanElement>element.querySelector('#green');

    targetElement.dispatchEvent(mouseEvents.enter);
    expect(targetElement.style.backgroundColor).toEqual('green');
  });
});
```

: https://riptutorial.com/ko/angular2/topic/2202/

65: : @Input @Output

1. : [propertyName]
2. : (propertyName)
3. ( ) : [(propertyName)]

Examples

@input .

```
import { Input } from '@angular/core';
```

.

```
@Input() car: any;
```

' ', " .

```
<car-component [car]="car"></car-component>
```

(this.car).

:

1. car.entity.ts

```
export class CarEntity {
   constructor(public brand : string, public color : string) {
   }
}
```

2. car.component.ts

```
import { Component, Input } from '@angular/core';
import {CarEntity} from "./car.entity";

@Component({
    selector: 'car-component',
    template: require('./templates/car.html'),
})

export class CarComponent {
    @Input() car: CarEntity;

    constructor() {
        console.log('gros');
    }
}
```

3. garage.component.ts

```
import { Component } from '@angular/core';
import {CarEntity} from "./car.entity";
import {CarComponent} from "./car.component";

@Component({
    selector: 'garage',
    template: require('./templates/garage.html'),
    directives: [CarComponent]
})

export class GarageComponent {
    public cars : Array<CarEntity>;

    constructor() {
        var carOne : CarEntity = new CarEntity('renault', 'blue');
        var carTwo : CarEntity = new CarEntity('fiat', 'green');
        var carThree : CarEntity = new CarEntity('citroen', 'yellow');
        this.cars = [carOne, carTwo, carThree];
    }
}
```

4. garage.html

```
<div *ngFor="let car of cars">
<car-component [car]="car"></car-component>
</div>
```

5. car.html

```
<div>
    <span>{{ car.brand }}</span> |
    <span>{{ car.color }}</span>
</div>
```

Angular2 @Input @Output

`@Input()` Button . `@Output` .

```
import { Component, Input, Output, EventEmitter } from '@angular/core';

@Component({
    selector: 'limited-button',
    template: `<button (click)="onClick()"
                       [disabled]="disabled">
                   <ng-content></ng-content>
               </button>`,
    directives: []
})

export class LimitedButton {
    @Input() clickLimit: number;
    @Output() limitReached: EventEmitter<number> = new EventEmitter();

    disabled: boolean = false;
```

```
    private clickCount: number = 0;

    onClick() {
        this.clickCount++;
        if (this.clickCount === this.clickLimit) {
            this.disabled = true;
            this.limitReached.emit(this.clickCount);
        }
    }
}
```

:

```
import { Component } from '@angular/core';
import { LimitedButton } from './limited-button.component';

@Component({
    selector: 'my-parent-component',
    template: `<limited-button [clickLimit]="2"
                               (limitReached)="onLimitReached($event)">
                   You can only click me twice
               </limited-button>`,
    directives: [LimitedButton]
})

export class MyParentComponent {
    onLimitReached(clickCount: number) {
        alert('Button disabled after ' + clickCount + ' clicks.');
    }
}
```

Angular2 @

. . ngOnChanges @Input .

```
import { Component, OnChanges, OnInit } from '@angular/core';
import { Http, Response } from '@angular/http';
import { ChildComponent } from './child.component';

@Component ({
    selector : 'parent-component',
    template : `
        <child-component [data]="asyncData"></child-component>
    `
})
export class ParentComponent {

    asyncData : any;

    constructor(
        private _http : Http
    ){}

    ngOnInit () {
        this._http.get('some.url')
```

```
            .map(this.extractData)
            .subscribe(this.handleData)
            .catch(this.handleError);
    }

    extractData (res:Response) {
        let body = res.json();
        return body.data || { };
    }

    handleData (data:any) {
        this.asyncData = data;
    }

    handleError (error:any) {
        console.error(error);
    }
}
```

. . ngOnChanges . ngOnChanges . .

```
import { Component, OnChanges, Input } from '@angular/core';

@Component ({
    selector : 'child-component',
    template : `
        <p *ngIf="doesDataExist">Hello child</p>
    `
})
export class ChildComponent {

    doesDataExist: boolean = false;

    @Input('data') data : any;

    // Runs whenever component @Inputs change
    ngOnChanges () {
        // Check if the data exists before using it
        if (this.data) {
            this.useData(data);
        {
    }

    // contrived example to assign data to reliesOnData
    useData (data) {
        this.doesDataExist = true;
    }
}
```

: @Input @Output : https://riptutorial.com/ko/angular2/topic/3046/-------input--output

66:

Examples

.

.

```
import { Component } from '@angular/core';

@Component({
  ...
  template: `
    <div>
      <p [hidden]="!visible" (window:resize)="onResize($event)" >Now you see me...</p>
      <p>now you dont!</p>
    </div>
  `
  ...
})
export class MyComponent {
  visible: boolean = false;
  breakpoint: number = 768;

  constructor() {
  }

  onResize(event) {
    const w = event.target.innerWidth;
    if (w >= this.breakpoint) {
      this.visible = true;
    } else {
      // whenever the window is less than 768, hide this component.
      this.visible = false;
    }
  }
}
```

`visible` false `p` . `visible` `onResize` . `window:resize` `window:resize` .

: https://riptutorial.com/ko/angular2/topic/5276/---

67:

1 .

Examples

2

.

```
<div>
  Hello my name is {{name}} and I like {{thing}} quite a lot.
</div>
```

{}:

.

```
My name is {{name}}
```

"" .

[]:

[] . this.currentVolume this .

```
<video-control [volume]="currentVolume"></video-control>
(): HANDLING EVENTS
```

(): HANDLING EVENTS ()

```
<my-component (click)="onClick($event)"></my-component>
```

[()]:

[()] . .

<input [(ngModel)] = "myName"> this.myName .

*: ASTERISK

. , ngFor .

```
<my-component *ngFor="#item of items">
</my-component>
```

* ngIf * ngSwitch.

: https://riptutorial.com/ko/angular2/topic/9471/

68:

ES2015 ES2015 . ES2015 ES2015 .

Examples

import .

```
import { HeroComponent } from '../heroes/hero.component.ts';
import { Hero }          from '../heroes/hero.model.ts';
import { HeroService }   from '../heroes/hero.service.ts';
```

. " index.ts ( ).

```
export * from './hero.model.ts';   // re-export all of its exports
export * from './hero.service.ts'; // re-export all of its exports
export { HeroComponent } from './hero.component.ts'; // re-export the named thing
```

.

```
import { Hero, HeroService } from '../heroes/index';
```

. .

```
import * as h from '../heroes/index';
```

! `* as h` h .

: https://riptutorial.com/ko/angular2/topic/10717/

69:

| Angular 2 . AngularJS .

/	
@ ({, })	.
:	?
:	true, false .
(, args []?)	
:	
args : []	. args? ? transform (value, arg1, arg2?)

Angular2 HTML Angular2 Pipe .

Examples

.

```
<p>Today is {{ today | date:'fullDate' | uppercase}}.</p>
```

my.pipe.ts

```
import { Pipe, PipeTransform } from '@angular/core';

@Pipe({name: 'myPipe'})
export class MyPipe implements PipeTransform {

  transform(value:any, args?: any):string {
    let transformedValue = value; // implement your transformation logic here
    return transformedValue;
  }

}
```

my.component.ts

```
import { Component } from '@angular/core';

@Component({
  selector: 'my-component',
  template: `{{ value | myPipe }}`
})
export class MyComponent {
```

```
    public value:any;

}
```

my.module.ts

```
import { NgModule } from '@angular/core';
import { BrowserModule } from '@angular/platform-browser';

import { MyComponent } from './my.component';
import { MyPipe } from './my.pipe';

@NgModule({
  imports: [
    BrowserModule,
  ],
  declarations: [
    MyComponent,
    MyPipe
  ],
})
export class MyModule { }
```

Angular2 .

DatePipe	date	{{ dateObj | date }} // output is 'Jun 15, 2015'
UpperCasePipe	uppercase	{{ value | uppercase }} // output is 'SOMETEXT'
LowerCasePipe	lowercase	{{ value | lowercase }} // output is 'sometext'
CurrencyPipe	currency	{{ 31.00 | currency:'USD':true }} // output is '$31'
PercentPipe	percent	{{ 0.03 | percent }} //output is %3

. .

---

hotel-reservation.component.ts

```
import { Component } from '@angular/core';

@Component({
    moduleId: module.id,
    selector: 'hotel-reservation',
    templateUrl: './hotel-reservation.template.html'
})
export class HotelReservationComponent {
    public fName: string =  'Joe';
    public lName: string = 'SCHMO';
    public reservationMade: string = '2016-06-22T07:18-08:00'
    public reservationFor: string = '2025-11-14';
    public cost: number = 99.99;
```

```
}
```

hotel-reservation.template.html

```
<div>
    <h1>Welcome back {{fName | uppercase}} {{lName | lowercase}}</h1>
    <p>
        On {reservationMade | date} at {reservationMade | date:'shortTime'} you
        reserved room 205 for {reservationDate | date} for a total cost of
        {cost | currency}.
    </p>
</div>
```

```
Welcome back JOE schmo
On Jun 26, 2016 at 7:18 you reserved room 205 for Nov 14, 2025 for a total cost of
$99.99.
```

JsonPipe

JsonPipe .

```
@Component({
  selector: 'json-example',
  template: `<div>
    <p>Without JSON pipe:</p>
    <pre>{{object}}</pre>
    <p>With JSON pipe:</p>
    <pre>{{object | json}}</pre>
  </div>`
})
export class JsonPipeExample {
  object: Object = {foo: 'bar', baz: 'qux', nested: {xyz: 3, numbers: [1, 2, 3, 4, 5]}};
}
```

```
Without JSON Pipe:
object
With JSON pipe:
{object:{foo: 'bar', baz: 'qux', nested: {xyz: 3, numbers: [1, 2, 3, 4, 5]}}
```

PLATFORM_PIPES .

```
import { bootstrap }    from '@angular/platform-browser-dynamic';
import { provide, PLATFORM_PIPES } from '@angular/core';

import { AppComponent } from './app.component';
import { MyPipe } from './my.pipe'; // your custom pipe

bootstrap(AppComponent, [
  provide(PLATFORM_PIPES, {
            useValue: [
                MyPipe
            ],
            multi: true
```

```
        })
]);
```

: https://scotch.io/tutorials/create-a-globally-available-custom-pipe-in-angular-2

app / pipes.pipe.ts

```
import { Pipe, PipeTransform } from '@angular/core';

@Pipe({name: 'truthy'})
export class Truthy implements PipeTransform {
  transform(value: any, truthy: string, falsey: string): any {
    if (typeof value === 'boolean'){return value ? truthy : falsey;}
    else return value
  }
}
```

app / my-component.component.ts

```
import { Truthy} from './pipes.pipe';

@Component({
  selector: 'my-component',
  template: `
    <p>{{value | truthy:'enabled':'disabled' }}</p>
  `,
  pipes: [Truthy]
})
export class MyComponent{ }
```

```
import { Component } from '@angular/core';
import { Observable } from 'rxjs/Observable';
import 'rxjs/add/observable/of';

@Component({
  selector: 'async-stuff',
  template: `
    <h1>Hello, {{ name | async }}</h1>
    Your Friends are:
    <ul>
      <li *ngFor="let friend of friends | async">
        {{friend}}
      </li>
    </ul>
  `
})
class AsyncStuffComponent {
  name = Promise.resolve('Misko');
  friends = Observable.of(['Igor']);
}
```

.

```
<h1>Hello, Misko</h1>
Your Friends are:
<ul>
```

```
  <li>
    Igor
  </li>
</ul>
```

```
import { Pipe, PipeTransform } from '@angular/core';
import { DatePipe } from '@angular/common'


@Pipe({name: 'ifDate'})
export class IfDate implements PipeTransform {
  private datePipe: DatePipe = new DatePipe();

  transform(value: any, pattern?:string) : any {
    if (typeof value === 'number') {return value}
    try {
      return this.datePipe.transform(value, pattern)
    } catch(err) {
      return value
    }
  }
}
```

Angular 2 ( ) . . `pure` `false` . `name` , . ( ) . 2 `AsyncPipe` .

. Angular . . Angular 2 Angular 1.x . Angular 1 . Angular 2 .

```
import {Pipe, PipeTransform, OnDestroy} from '@angular/core';

@Pipe({
  name: 'countdown',
  pure: false
})
export class CountdownPipe implements PipeTransform, OnDestroy  {
  private interval: any;
  private remainingTime: number;

  transform(value: number, interval: number = 1000): number {
    if (!parseInt(value, 10)) {
      return null;
    }

    if (typeof this.remainingTime !== 'number') {
      this.remainingTime = parseInt(value, 10);
    }

    if (!this.interval) {
      this.interval = setInterval(() => {
        this.remainingTime--;

        if (this.remainingTime <= 0) {
          this.remainingTime = 0;
          clearInterval(this.interval);
          delete this.interval;
        }
      }, interval);
    }
```

```
    return this.remainingTime;
  }

  ngOnDestroy(): void {
    if (this.interval) {
      clearInterval(this.interval);
    }
  }
}
```

.

```
{{ 1000 | countdown:50 }}
{{ 300 | countdown }}
```

OnDestroy . .

: .

table.component.ts

```
...
import { DYNAMIC_PIPES } from '../pipes/dynamic.pipe.ts';

@Component({
    ...
    pipes: [DYNAMIC_PIPES]
})
export class TableComponent {
    ...

    // pipes to be used for each column
    table.pipes = [ null, null, null, 'humanizeDate', 'statusFromBoolean' ],
    table.header = [ 'id', 'title', 'url', 'created', 'status' ],
    table.rows = [
        [ 1, 'Home', 'home', '2016-08-27T17:48:32', true ],
        [ 2, 'About Us', 'about', '2016-08-28T08:42:09', true ],
        [ 4, 'Contact Us', 'contact', '2016-08-28T13:28:18', false ],
        ...
    ]
    ...

}
```

dynamic.pipe.ts

```
import {
    Pipe,
    PipeTransform
} from '@angular/core';
// Library used to humanize a date in this example
import * as moment from 'moment';

@Pipe({name: 'dynamic'})
export class DynamicPipe implements PipeTransform {
```

```
    transform(value:string, modifier:string) {
        if (!modifier) return value;
        // Evaluate pipe string
        return eval('this.' + modifier + '(\'' + value + '\')')
    }

    // Returns 'enabled' or 'disabled' based on input value
    statusFromBoolean(value:string):string {
        switch (value) {
            case 'true':
            case '1':
                return 'enabled';
            default:
                return 'disabled';
        }
    }

    // Returns a human friendly time format e.g: '14 minutes ago', 'yesterday'
    humanizeDate(value:string):string {
        // Humanize if date difference is within a week from now else returns 'December 20,
2016' format
        if (moment().diff(moment(value), 'days') < 8) return moment(value).fromNow();
        return moment(value).format('MMMM Do YYYY');
    }
}

export const DYNAMIC_PIPES = [DynamicPipe];
```

table.component.html

```
<table>
    <thead>
        <td *ngFor="let head of data.header">{{ head }}</td>
    </thead>
    <tr *ngFor="let row of table.rows; let i = index">
        <td *ngFor="let column of row">{{ column | dynamic:table.pipes[i] }}</td>
    </tr>
</table>
```

```
| ID | Page Title     | Page URL    | Created          | Status     |
-------------------------------------------------------------------
|  1 | Home           | home        | 4 minutes ago    | Enabled    |
|  2 | About Us       | about       | Yesterday        | Enabled    |
|  4 | Contact Us     | contact     | Yesterday        | Disabled   |
-------------------------------------------------------------------
```

.

```
import { Pipe, PipeTransform } from '@angular/core';

@Pipe({ name: 'reverse' })
export class ReversePipe implements PipeTransform {
  transform(value: string): string {
    return value.split('').reverse().join('');
  }
}
```

spec .

```
import { TestBed, inject } from '@angular/core/testing';

import { ReversePipe } from './reverse.pipe';

describe('ReversePipe', () => {
  beforeEach(() => {
    TestBed.configureTestingModule({
      providers: [ReversePipe],
    });
  });

  it('should be created', inject([ReversePipe], (reversePipe: ReversePipe) => {
    expect(reversePipe).toBeTruthy();
  }));

  it('should reverse a string', inject([ReversePipe], (reversePipe: ReversePipe) => {
    expect(reversePipe.transform('abc')).toEqual('cba');
  }));
});
```

: https://riptutorial.com/ko/angular2/topic/1165/

70:

?

- `setTitle(newTitle: string): void;`
- `getTitle(): string;`

Examples

1. .
2. setTitle

```
import {Title} from "@angular/platform-browser";
@Component({
  selector: 'app',
  templateUrl: './app.component.html',
  providers : [Title]
})

export class AppComponent implements {
   constructor( private title: Title) {
     this.title.setTitle('page title changed');
   }
}
```

: https://riptutorial.com/ko/angular2/topic/8954/-

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