



무료 전자 책

배우기

selenium-webdriver

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webdriver

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1: selenium-webdriver

selenium-webdriver , .

selenium-webdriver . selenium-webdriver .

0.0.1	2016-08-03
-------	------------

Examples

WebDriver Selenium ([Selenium HQ Downloads](#)) . WebDriver / . Chrome Selenium .

<https://sites.google.com/a/chromium.org/chromedriver/>

chromedriver.exe chromedriver.exe .

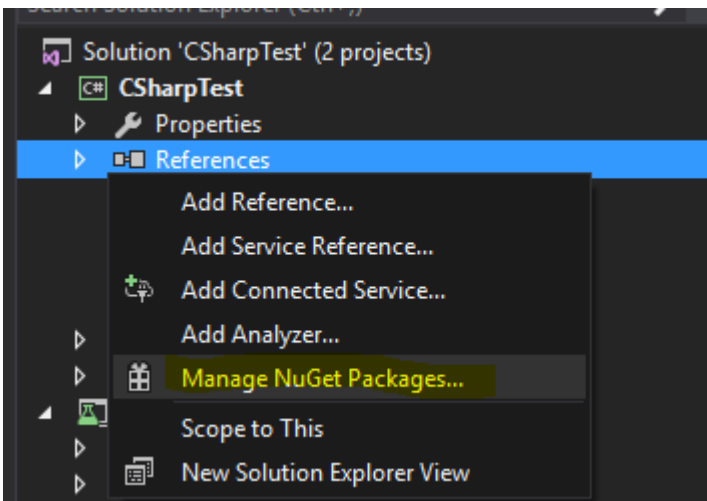
WebDriver (: C # Selenium HQ Downloads .dll Visual Studio) . NuGet .

. WebDriver selenium-webdriver .

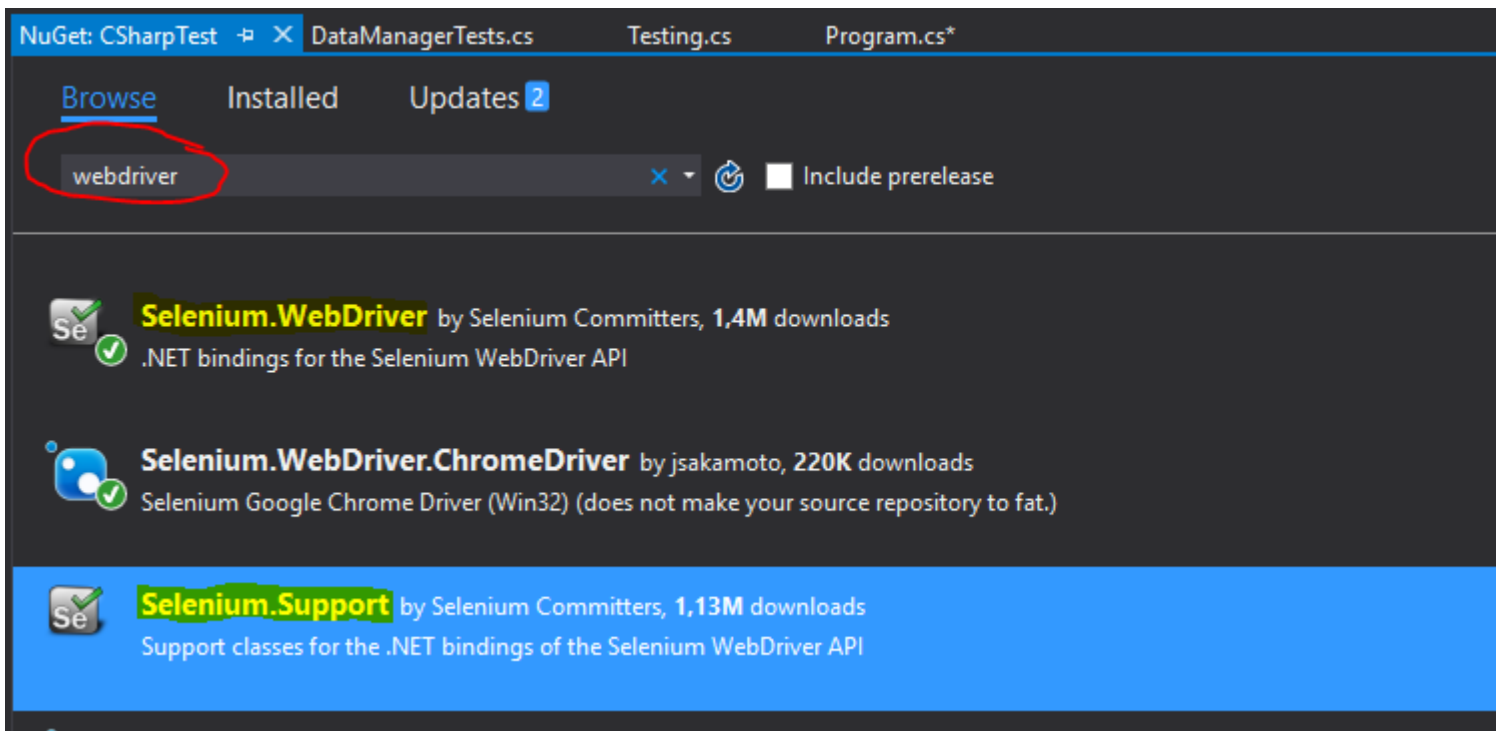
Visual Studio [NuGet]

Selenium WebDriver NuGet .

"References" "Manage NuGet Packages" :



" webdriver " . .



" Selenium.WebDriver " " Selenium.Support "() ().

WebDrivers .

- Selenium.WebDriver.ChromeDriver (Google)
- [PhantomJS](#) ()
-

Selenium WebDriver ?

Selenium . Selenium WebDriver (Selenium RC), Selenium IDE Selenium Grid
 Selenium .

WebDriver [DOM](#)

- [GeckoDriver](#) (Mozilla Firefox)
- [ChromeDriver](#) (Google)
- [SafariDriver](#) ()
- [InternetExplorerDriver](#) (MS InternetExplorer)
- [MicrosoftWebDriver](#) [EdgeDriver](#) (MS Edge)
- [OperaChromiumDriver](#) ()

:

- EventFiringWebDriver
- HtmlUnitDriver
- PhantomJSDriver
- RemoteWebDriver

Selenium WebDriver API Selenium . "Synthesized JavaScript events" "Native OS " .

:

- <http://www.seleniumhq.org/>
- <http://www.aosabook.org/en/selenium.html>
- <https://www.w3.org/TR/webdriver/>

Java

Selenium Webdriver Java Selenium Selenium Webdriver JAR .

Selenium webdriver Java . Maven . Maven Selenium webdriver Java . JAR .

Maven Selenium Webdriver :

1. windows maven : <https://maven.apache.org/install.html>
2. selenium-learning
3. pom.xml .
4. pom.xml

```
<?xml version="1.0" encoding="UTF-8"?>
  <project xmlns="http://maven.apache.org/POM/4.0.0"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://maven.apache.org/POM/4.0.0
http://maven.apache.org/xsd/maven-4.0.0.xsd">
    <modelVersion>4.0.0</modelVersion>
    <groupId>SeleniumLearning</groupId>
    <artifactId>SeleniumLearning</artifactId>
    <version>1.0</version>
    <dependencies>
      <dependency>
        <groupId>org.seleniumhq.selenium</groupId>
        <artifactId>selenium-learning</artifactId>
        <version>3.0.0-beta1</version>
      </dependency>
    </dependencies>
  </project>
```

: . <http://docs.seleniumhq.org/download/maven.jsp> .

5. .

```
mvn clean install
```

.

6. Eclipse IDE Eclipse .

```
mvn eclipse:eclipse
```

7. IDE ,

Eclipse -> -> -> -> -> -> -> pom.xml -> ->

Maven -> Enable Dependency Management m2eclipse .

Jar Selenium Webdriver

1. Eclipse .

Eclipse -> -> -> -> () ->

2. <http://www.seleniumhq.org/download/> jar . **Selenium Standalone Server Selenium Client & WebDriver Language Binding** . Java Java jar . .

Selenium Client & WebDriver Language Bindings

In order to create scripts that interact with the Selenium Server (Selenium RC, Selenium Remote WebDriver) or create local Selenium WebDriver scripts, you need to make use of language-specific client drivers. These languages include both 1.x and 2.x style clients.

While language bindings for [other languages exist](#), these are the core ones that are supported by the main project hosted on google code.

Language	Client Version	Release Date	Download	Change log	Javadoc
Java	3.0.0-beta1	2016-07-28	Download	Change log	Javadoc
C#	2.53.1	2016-06-28	Download	Change log	API docs
Ruby	3.0.0.beta1	2016-07-28	Download	Change log	API docs
Python	2.53.6	2016-06-28	Download	Change log	API docs
Javascript (Node)	2.53.3	2016-06-28	Download	Change log	API docs

: Selenium Standalone Server . .

3. zip . .jar .

4. Eclipse 1 .

-> Java -> -> Jars -> jar -> lib jar -> -> Jar -> -> lib (client-combined-3.0.0-beta1-nodeps.jar) ->

Selenium Standalone Server .

5. .

: selenium-3.0.0 jar .

[selenium-webdriver](https://riptutorial.com/ko/selenium-webdriver/topic/878/selenium-webdriver-selenium-webdriver) : <https://riptutorial.com/ko/selenium-webdriver/topic/878/selenium-webdriver-selenium-webdriver>

2: HTML

HTML . Allure, ExtentReports ReportNG .

Examples

TestNG, Java Maven Selenium ExtentReports .

ExtentReports . . .

1.

Maven pom.xml .

```
<dependency>
  <groupId>com.aventstack</groupId>
  <artifactId>extentreports</artifactId>
  <version>3.0.6</version>
</dependency>
```

2.

pom.xml maven surefire .

```
<build>
<defaultGoal>clean test</defaultGoal>
<plugins>
  <plugin>
    <groupId>org.apache.maven.plugins</groupId>
    <artifactId>maven-compiler-plugin</artifactId>
    <version>3.6.1</version>
    <configuration>
      <source>${jdk.level}</source>
      <target>${jdk.level}</target>
    </configuration>
  </plugin>
  <plugin>
    <groupId>org.apache.maven.plugins</groupId>
    <artifactId>maven-surefire-plugin</artifactId>
    <version>2.19.1</version>
    <configuration>
      <suiteXmlFiles>
        <suiteXmlFile>testng.xml</suiteXmlFile>
      </suiteXmlFiles>
    </configuration>
  </plugin>
</plugins>
</build>
```

3. ExtentReports

test.java .

```

public class TestBase {
    WebDriver driver;

    ExtentReports extent;
    ExtentTest logger;
    ExtentHtmlReporter htmlReporter;
    String htmlReportPath = "C:\\Screenshots/MyOwnReport.html"; //Path for the HTML report to
be saved

    @BeforeTest
    public void setup(){
        htmlReporter = new ExtentHtmlReporter(htmlReportPath);
        extent = new ExtentReports();
        extent.attachReporter(htmlReporter);

        System.setProperty("webdriver.chrome.driver", "pathto/chromedriver.exe");
        driver = new ChromeDriver();

    }

    @Test
    public void test1(){
        driver.get("http://www.google.com/");
        logger.log(Status.INFO, "Opened site google.com");
        assertEquals(driver.getTitle(), "Google");
        logger.log(Status.PASS, "Google site loaded");
    }

    @AfterMethod
    public void getResult(ITestResult result) throws Exception {
        if (result.getStatus() == ITestResult.FAILURE)
        {
            logger.log(Status.FAIL, MarkupHelper.createLabel(result.getName() + " Test case
FAILED due to below issues:", ExtentColor.RED));
            logger.fail(result.getThrowable());
        }
        else if (result.getStatus() == ITestResult.SUCCESS)
        {
            logger.log(Status.PASS, MarkupHelper.createLabel(result.getName() + " Test Case
PASSED", ExtentColor.GREEN));
        }
        else if (result.getStatus() == ITestResult.SKIP)
        {
            logger.log(Status.SKIP, MarkupHelper.createLabel(result.getName() + " Test Case
SKIPPED", ExtentColor.BLUE));
        }
    }

    @AfterTest
    public void testend() throws Exception {
        extent.flush();
    }

    @AfterClass
    public void tearDown() throws Exception {
        driver.close();
    }
}

```

Allure

TestNG, Java Maven Sureium Allure .

jcenter .

```
<repository>
  <id>jcenter</id>
  <name>bintray</name>
  <url>http://jcenter.bintray.com</url>
</repository>
```

pom.xml .

```
<dependency>
  <groupId>org.aspectj</groupId>
  <artifactId>aspectjweaver</artifactId>
  <version>${aspectj.version}</version>
</dependency>
<dependency>
  <groupId>ru.yandex.qatools.allure</groupId>
  <artifactId>allure-testng-adaptor</artifactId>
  <version>1.5.4</version>
</dependency>
```

```
<plugin>
  <groupId> org.apache.maven.plugins</groupId>
  <artifactId>maven-surefire-plugin</artifactId>
  <version>2.20</version>
  <configuration>
    <argLine>-
javaagent:${settings.localRepository}/org/aspectj/aspectjweaver/${aspectj.version}/aspectjweaver-
${aspectj.version}.jar
    </argLine>
    <properties>
      <property>
        <name>listener</name>
        <value>ru.yandex.qatools.allure.testng.AllureTestListener</value>
      </property>
    </properties>
    <suiteXmlFiles>testng.xml</suiteXmlFiles>
    <testFailureIgnore>>false</testFailureIgnore>
  </configuration>
</plugin>
```

Allure Report

test.java

```
public class test{
  WebDriver driver;
  WebDriverWait wait;

  @BeforeMethod
```



```

public void setup() {
    System.setProperty("webdriver.chrome.driver", "path to/chromedriver.exe");
    driver = new ChromeDriver();
    driver.get("https://www.google.com/");
    wait = new WebDriverWait(driver,50);
}

@Test("Title check")
@Description("Checking the title of the loaded page.")
@Test
public void searchTest(){
    String title = driver.getTitle();
    LogUtil.log("Title Fetched: "+title);
    assertEquals(title,"Google");
    LogUtil.log("Test Passed. Expected: Google | Actual: "+title);
    System.out.println("Page Loaded");
}

@AfterMethod
public void teardown(){
    driver.close();
}
}

```

LogUtil . . .

LogUtil.java

```

public final class LogUtil {

    private LogUtil() {
    }

    @Step("{0}")
    public static void log(final String message){
        //intentionally empty
    }
}

```

@Title ("") Allure Report .

@Description ("") .

@Step ("") .

xml "target / allure-results /"

Allure Report Jenkins Jenkins .

Jenkins HTML . Allure CLI Java . Allure CLI Java 1.7+ .

PPA : debian Allure CLI

```

$ sudo apt-add-repository ppa:yandex-qatools/allure-framework
$ sudo apt-get update
$ sudo apt-get install allure-commandline

```

Trusty Precise. allure .

OS

Homebrew Allure CLI .

```
$ brew tap qatools/formulas  
$ brew install allure-commandline
```


allure .

Windows Unix

1. <https://github.com/allure-framework/allure-core/releases/latest> zip .
2. allure-commandline .bin .
3. Windows allure.bat Unix .

Commandline / Terminal allure-report .

```
$ allure generate directory-with-results/
```

 Allure

- Overview
- Categories
- Suites**
- Graphs
- Timeline
- Behaviors
- Packages

En

< Collapse

Suites



name ▾ duration ▾ status ▾

Filter test cases by status: 0 0 2 0 0

> Smoke : Test1

1

▼ Sanity : Test1

1

✔ Title check

2s 061ms

HTML : <https://riptutorial.com/ko/selenium-webdriver/topic/10721/html->

3: Java Selenium Webdriver

Selenium webdriver . Selenium IDE webdriver . , , PHP, , , .

Examples

Java Selenium Webdriver URL

```
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.firefox.FirefoxDriver;

class test_webdriver{
    public static void main(String[] args) {
        WebDriver driver = new FirefoxDriver();
        driver.get("http://stackoverflow.com/");
        driver.close();
    }
}
```

to ()

to () .

```
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.firefox.FirefoxDriver;
class navigateWithTo{
    public static void main(String[] args) {
        WebDriver driver = new FirefoxDriver();
        driver.navigate().to("http://www.example.com");
        driver.close();
    }
}
```

Java Selenium Webdriver : <https://riptutorial.com/ko/selenium-webdriver/topic/9158/java-selenium-webdriver->

4: Java @FindBy

- CLASS_NAME : @FindBy (className = "classname")
- CSS : @FindBy (css = "css")
- ID : @FindBy (id = "id")
- ID_OR_NAME : @FindBy (how = ID_OR_NAME, = "idOrName")
- LINK_TEXT : @FindBy (linkText = "text")
- NAME : @FindBy (name = "name")
- PARTIAL_LINK_TEXT : @FindBy (partialLinkText = "text")
- TAG_NAME : @FindBy (tagName = "tagname")
- XPATH : @FindBy (xpath = "xpath")

. :

```
@FindBy(id = "id")
```

```
@FindBy(how = How.ID, using = "id")
```

ID . ID_OR_NAME .

```
@FindBy(how = How.ID_OR_NAME, using = "idOrName")
```

```
PageFactory.initElements() @FindBy .
```

Examples

Page . :

```
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.WebElement;
import org.openqa.selenium.firefox.FirefoxDriver;
import org.openqa.selenium.support.FindBy;
import org.openqa.selenium.support.PageFactory;

public class LoginPage {

    @FindBy(id="loginInput") //method used to find WebElement, in that case Id
    WebElement loginTextbox;

    @FindBy(id="passwordInput")
    WebElement passwordTextBox;

    //xpath example:
    @FindBy(xpath="//form[@id='loginForm']/button(contains(., 'Login'))")
    WebElement loginButton;

    public void login(String username, String password){
        // login method prepared according to Page Object Pattern
        loginTextbox.sendKeys(username);
        passwordTextBox.sendKeys(password);
    }
}
```

```
        loginButton.click();
        // because WebElements were declared with @FindBy, we can use them without
        // driver.find() method
    }
}
```

:

```
class Tests{
    public static void main(String[] args) {
        WebDriver driver = new FirefoxDriver();
        LoginPage loginPage = new LoginPage();

        //PageFactory is used to find elements with @FindBy specified
        PageFactory.initElements(driver, loginPage);
        loginPage.login("user", "pass");
    }
}
```

@FindBy - WebElements .

Java @FindBy : <https://riptutorial.com/ko/selenium-webdriver/topic/6777/java--findby-->

5: Python, Ruby Javascript Selenium-webdriver CI

CircleCI .

Examples

CircleCI Selenium Python Unittest2

Circle.yml

```
machine:
  python:
    # Python version to use - Selenium requires python 3.0 and above
    version: pypy-3.6.0
  dependencies:
    pre:
      # Install pip packages
      - pip install selenium
      - pip install unittest
  test:
    override:
      # Bash command to run main.py
      - python main.py
```

main.py

```
import unittest2

# Load and run all tests in testsuite matching regex provided
loader = unittest2.TestLoader()
# Finds all the tests in the same directory that have a filename that ends in test.py
testcases = loader.discover('.', pattern="*test.py")
test_runner = unittest2.runner.TextTestRunner()
# Checks that all tests ran
success = test_runner.run(testcases).wasSuccessful()
```

example_test.py

```
class example_test(unittest.TestCase):
    def test_something(self):
        # Make a new webdriver instance
        self.driver = webdriver.Chrome()
        # Goes to www.google.com
        self.driver.get("https://www.google.com")
```

Python, Ruby Javascript Selenium-webdriver CI : <https://riptutorial.com/ko/selenium-webdriver/topic/10091/python--ruby--javascript---selenium-webdriver-ci>

6: Selenium-WebDriver

Examples

ElementNotInteractableException : DOM

- **ElementNotSelectableException** : Throw
- **ElementNotVisibleException** : DOM , (), Throw
- **ErrorResponseException** : Throw firefox
- **ImeActivationFailedException** : IME Throw
- **ImeNotAvailableException** : IME . IME IME
- **InvalidArgumentException** :
- **InvalidCookieDomainException** : URL Cookie Throw.
- **InvalidElementStateException** :
 - **ElementNotInteractableException**
 - **ElementNotSelectableException**
 - **ElementNotVisibleException**
- **InvalidSelectorException** : WebElement . xpath (, xpath) WebElements (: "count (// input)")
- **InvalidSwitchToTargetException** : Throw
- **MoveTargetOutOfBoundsException** : ActionsChains move () (,) throw.
- **NoAlertPresentException** : Throw Alert ()
- **NoSuchAttributeException** : . (IE8 .inner Firefox .textContent)
- **NoSuchElementException** : Throw
 - find_by ...
 - (). selenium.webdriver.support.wait.WebDriverWait ()
- **NoSuchFrameException** - Throw
- **NoSuchWindowException** : Throw

```
print driver.window_handles
```
- **RemoteDriverServerException** :
- **StaleElementReferenceException** : [] Throw DOM .
StaleElementReferenceException
 - .
 - .
 - iframe
- **TimeoutException** : Throw
- **UnableToSetCookieException** :
- **UnexpectedAlertPresentException** : () throw.
- **UnexpectedTagNameException** :
- **WebDriverException** : . WebDriverException InvalidStateException

Selenium-WebDriver : <https://riptutorial.com/ko/selenium-webdriver/topic/10546/selenium-webdriver->

7: Selenium

Examples

`WebDriverException` `Selenium-WebDriver` `catch` `Selenium-WebDriver` .

.

```
from selenium.common.exceptions import WebDriverException as WDE
```

:

```
try:
    element = driver.find_element_by_id('ID')
except WDE:
    print("Not able to find element")
```

.

```
from selenium.common.exceptions import ElementNotVisibleException
from selenium.common.exceptions import NoAlertPresentException
...
```

:

```
from selenium.common.exceptions import UnexpectedAlertPresentException

try:
    driver.find_element_by_tag_name('a').click()
except UnexpectedAlertPresentException as e:
    print(e.__dict__["msg"])
```

Selenium : <https://riptutorial.com/ko/selenium-webdriver/topic/9548/selenium---->

8:

Examples

Selenium Java .

.

1. : (" ");
2. : var popuResult = confirm (" ");
3. : var person = prompt (" stackoverflow ?", " / ");

.

.

1. accept ()
2. dismiss ()
3. getText ()
4. sendKeys ()

:

```
Alert simpleAlert = driver.switchTo().alert();
String alertText = simpleAlert.getText();
System.out.println("Alert text is " + alertText);
simpleAlert.accept();
```

:

```
Alert confirmationAlert = driver.switchTo().alert();
String alertText = confirmationAlert.getText();
System.out.println("Alert text is " + alertText);
confirmationAlert.dismiss();
```

:

```
Alert promptAlert = driver.switchTo().alert();
String alertText = promptAlert .getText();
System.out.println("Alert text is " + alertText);
//Send some text to the alert
promptAlert .sendKeys("Accepting the alert");
Thread.sleep(4000); //This sleep is not necessary, just for demonstration
promptAlert .accept();
```

.

try-catch .

```
try{
    // Your logic here.
} catch(UnhandledAlertException e){
    Alert alert = driver.switchTo().alert();
    alert.accept();
}
// Continue.
```

#

Selenium C# .

```
IAAlert alert = driver.SwitchTo().Alert();
// Prints text and closes alert
System.out.println(alert.Text);
alert.Accept();
or
alert.Dismiss();
```

try-catch .

```
try{
    // Your logic here.
} catch(UnhandledAlertException e){
    var alert = driver.SwitchTo().Alert();
    alert.Accept();
}
// Continue.
```

Python .

1. :

```
alert = driver.switch_to_alert()
```

2. *switch_to* :

```
alert = driver.switch_to.alert
```

3. *ExplicitWait* :

```
from selenium.webdriver.common.by import By
from selenium.webdriver.support.ui import WebDriverWait
from selenium.webdriver.support import expected_conditions as EC

alert = WebDriverWait(driver, TIMEOUT_IN_SECONDS).until(EC.alert_is_present())
```

4. *Alert* :

```
from selenium.webdriver.common.alert import Alert
```

```
alert = Alert(driver)
```

```
JavaScript prompt() :
```

```
alert.send_keys('Some text to send')
```

```
* :
```

```
alert.accept()
```

```
.
```

```
alert.dismiss()
```

```
.
```

```
alert.text
```

* *PS* `alert.dismiss()` `JavaScript alert()` `alert.confirm()`

: <https://riptutorial.com/ko/selenium-webdriver/topic/6048/>

9:

Examples

Selenium WebDriver

. WebDriver .

Wait .

-
-
-

.

WebDriver DOM . WebDriver WebDriver . 0. WebDriver . .

Java :

```
driver.manage().timeouts().implicitlyWait(15, TimeUnit.SECONDS);
// You need to import the following class - import java.util.concurrent.TimeUnit;
```

C# :

```
driver.Manage().Timeouts().ImplicitlyWait(TimeSpan.FromSeconds(15));
```

UI (DOM) WebDriver 15 .

. . .

. WebDriver X .

WebDriverWait ExpectedConditions . id username 10 . .

Java :

```
//Import these two packages:
import org.openqa.selenium.support.ui.ExpectedConditions;
import org.openqa.selenium.support.ui.WebDriverWait;

//Declare a WebDriverWait variable. In this example, we will use myWaitVar as the name of the
variable.
WebDriverWait myWaitVar = new WebDriverWait(driver, 30);

//Use myWaitVar with ExpectedConditions on portions where you need the explicit wait to occur.
In this case, we will use explicit wait on the username input before we type the text tutorial
onto it.
```

```
myWaitVar.until(ExpectedConditions.visibilityOfElementLocated(By.id("username")));
driver.findElement(By.id("username")).sendKeys("tutorial");
```

ExpectedConditions . Java .

C# :

```
using OpenQA.Selenium;
using OpenQA.Selenium.Support.UI;
using OpenQA.Selenium.PhantomJS;

// You can use any other WebDriver you want, such as ChromeDriver.
using (var driver = new PhantomJSDriver())
{
    driver.Navigate().GoToUrl("http://somedomain/url_that_delays_loading");

    // We aren't going to use it more than once, so no need to declare this a variable.
    new WebDriverWait(driver, TimeSpan.FromSeconds(10))
        .Until(ExpectedConditions.ElementIsVisible(By.Id("element-id")));

    // After the element is detected by the previous Wait,
    // it will display the element's text
    Console.WriteLine(driver.FindElement(By.Id("element-id")).Text);
}
```

10 . WebDriver WebDriverTimeoutException .

: 10 .

. . 30 2 . WebDriver (30) 2 . . .

Java :

```
Wait wait = new FluentWait(driver).withTimeout(30, SECONDS).pollingEvery(2,
SECONDS).ignoring(NoSuchElementException.class);

WebElement testElement = wait.until(new Function() {
    public WebElement apply(WebDriver driver) {
        return driver.findElement(By.id("testId"));
    }
});
```

(: NoSuchElementException) . AJAX . .

.

.

: By classname, xpath, link text, tag name cssSelector

▪
 , WebDriver .

#

```
WebDriverWait wait = new WebDriverWait(driver, TimeSpan.FromSeconds(10));  
wait.Until(ExpectedConditions.ElementIsVisible(By.Id("element-id")));
```

```
WebDriverWait wait = new WebDriverWait(driver, 10);  
wait.until(ExpectedConditions.visibilityOfElementLocated(By.id("element-id")));
```

▪
 .

#

```
WebDriverWait wait = new WebDriverWait(driver, TimeSpan.FromSeconds(10));  
wait.Until(ExpectedConditions.InvisibilityOfElementLocated(By.Id("element-id")));
```

```
WebDriverWait wait = new WebDriverWait(driver, 10);  
wait.until(ExpectedConditions.invisibilityOfElementLocated(By.id("element-id")));
```

▪
 #

```
IWebElement element = driver.FindElement(By.Id("element-id"));
```

```
WebDriverWait wait = new WebDriverWait(driver, TimeSpan.FromSeconds(10));  
wait.Until(ExpectedConditions.TextToBePresentInElement(element, "text"));
```

```
WebElement element = driver.findElement(By.id("element-id"));
```

```
WebDriverWait wait = new WebDriverWait(driver, 10);  
wait.until(ExpectedConditions.textToBePresentInElement(element, "text"));
```

▪
 .

, WebElement WebElement WebElement By .

▪

Ajax



```
using OpenQA.Selenium
using OpenQA.Selenium.Chrome;
using System.Threading;

namespace WebDriver Tests
{
    class WebDriverWaits
    {
        static void Main()
        {
            IWebDriver driver = new ChromeDriver(@"C:\WebDriver");

            driver.Navigate().GoToUrl("page with ajax requests");
            CheckPageIsLoaded(driver);

            // Now the page is fully loaded, you can continue with further tests.
        }

        private void CheckPageIsLoaded(IWebDriver driver)
        {
            while (true)
            {
                bool ajaxIsComplete = (bool)(driver as
IJavaScriptExecutor).ExecuteScript("return jQuery.active == 0");
                if (ajaxIsComplete)
                    return;
                Thread.Sleep(100);
            }
        }
    }
}
```

ajax . IJavaScriptExecutor JavaScript .while ajaxIsComplete == true return .

jQuery.active 0 ajax . ajax jQuery.active jQuery.active jQuery.active == 0 Ajax .

(WebDriverWait) . .

(Java):

```
Wait wait = new FluentWait<>(this.driver)
    .withTimeout(driverTimeoutSeconds, TimeUnit.SECONDS)
    .pollingEvery(500, TimeUnit.MILLISECONDS)
    .ignoring(StaleElementReferenceException.class)
    .ignoring(NoSuchElementException.class)
    .ignoring(ElementNotVisibleException.class);

WebElement foo = wait.until(ExpectedConditions.presenceOfElementLocated(By.yourBy));

// or use your own predicate:
WebElement foo = wait.until(new Function() {
```

```
public WebElement apply(WebDriver driver) {
    return element.getText().length() > 0;
}
});
```

Explicit wait `FluentWait<WebDriver> DEFAULT_SLEEP_TIMEOUT = 500; NotFoundException .`

FluentWait `NoSuchElementException . .`

```
Wait<WebDriver> wait = new FluentWait<WebDriver>(driver)
    .withTimeout(30, SECONDS) //actually wait for the element to be present
    .pollingEvery(5, SECONDS) //selenium will keep looking for the element after every 5seconds
    .ignoring(NoSuchElementException.class); //while ignoring this condition
wait.until(ExpectedConditions.visibilityOf(driver.findElement(By.id("username"))));
```

[: https://riptutorial.com/ko/selenium-webdriver/topic/4435/](https://riptutorial.com/ko/selenium-webdriver/topic/4435/)

10: Selenium Webdriver

C #, Groovy, Java, Perl, PHP, Python Ruby .

-> Google -> .

Examples

#

```
using OpenQA.Selenium;
using OpenQA.Selenium.Chrome;

namespace BasicWebdriver
{
    class WebDriverTest
    {
        static void Main()
        {
            using (var driver = new ChromeDriver())
            {
                driver.Navigate().GoToUrl("http://www.google.com");
            }
        }
    }
}
```

" Google .

```
using (var driver = new ChromeDriver())
```

```
IWebDriver WebDriver . ChromeDriver ChromeDriver ( ChromeDriver ). IWebDriver
IDisposable driver.Quit(); using driver.Quit(); .
```

[NuGet WebDriver](#) , "chromedriver.exe" .

```
driver.Navigate().GoToUrl("http://www.google.com");
```

```
driver.Url = "http://www.google.com";
```

. URL .

Back() , Forward() Refresh() .

using .

```
from selenium import webdriver
```

```

from selenium.webdriver.common.keys import Keys

def set_up_driver():
    path_to_chrome_driver = 'chromedriver'
    return webdriver.Chrome(executable_path=path_to_chrome_driver)

def get_google():
    driver = set_up_driver()
    driver.get('http://www.google.com')
    tear_down(driver)

def tear_down(driver):
    driver.quit()

if '__main__' == __name__:
    get_google()

```

" Google .

```

if '__main__' == __name__:
    get_google()

```

get_google() .

```

def get_google():
    driver = set_up_driver()

```

get_google() driver set_up_driver() :

```

def set_up_driver():
    path_to_chrome_driver = 'chromedriver'
    return webdriver.Chrome(executable_path=path_to_chrome_driver)

```

chromedriver.exe chromedriver.exe . get_google() Google .

```

driver.get('http://www.google.com')

```

tear_down() .

```

tear_down(driver)

```

tear_down() .

```

driver.quit()

```

. .

3 .

- 1.
2. Google
- 3.

```
import org.openqa.selenium;
import org.openqa.selenium.chrome;

public class WebDriverTest {
    public static void main(String args[]) {
        System.setProperty("webdriver.chrome.driver", "C:\\path\\to\\chromedriver.exe");
        WebDriver driver = new ChromeDriver();

        driver.get("http://www.google.com");
        driver.quit();
    }
}
```

" Google .

```
System.setProperty("webdriver.chrome.driver", "C:\\path\\to\\chromedriver.exe");
WebDriver driver = new ChromeDriver();
```

ChromeDriver (chromedriver.exe) . ChromeDriver() / .

```
driver.get("http://www.google.com");
```

URL (<http://www.google.com>) . Java WebDriver API WebDriver get() navigate() (:

driver.navigate.back() navigate() .

```
driver.quit();
```

```
driver.close();
```

() . quit() .

Usecase : FB .

```
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.firefox.FirefoxDriver;
import org.testng.annotations.BeforeClass;
import org.testng.annotations.Test;

public class FaceBookLoginTest {
    private static WebDriver driver;
    HomePage homePage;
    LoginPage loginPage;
    @BeforeClass
    public void openFBPage(){
        driver = new FirefoxDriver();
        driver.get("https://www.facebook.com/");
        loginPage = new LoginPage(driver);
    }
}
```

```

}
@Test
public void loginToFB(){
    loginPage.enterUserName("username");
    loginPage.enterPassword("password");
    homePage = loginPage.clickLogin();
    System.out.println(homePage.getUserName());
}
}

```

: :

```

import org.openqa.selenium.WebDriver;
import org.openqa.selenium.WebElement;
import org.openqa.selenium.support.FindBy;

public class LoginPage {

    WebDriver driver;
    public LoginPage(WebDriver driver){
        this.driver = driver;
    }
    @FindBy(id="email")
    private WebElement loginTextBox;

    @FindBy(id="pass")
    private WebElement passwordTextBox;

    @FindBy(xpath = "//*[@data-testid='royal_login_button']")
    private WebElement loginBtn;

    public void enterUserName(String userName){
        if(loginTextBox.isDisplayed()) {
            loginTextBox.clear();
            loginTextBox.sendKeys(userName);
        }
        else{
            System.out.println("Element is not loaded");
        }
    }
    public void enterPassword(String password){
        if(passwordTextBox.isDisplayed()) {
            passwordTextBox.clear();
            passwordTextBox.sendKeys(password);
        }
        else{
            System.out.println("Element is not loaded");
        }
    }
    public HomePage clickLogin(){
        if(loginBtn.isDisplayed()) {
            loginBtn.click();
        }
        return new HomePage(driver);
    }
}

```

:

```
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.WebElement;
import org.openqa.selenium.support.FindBy;

public class HomePage {

    WebDriver driver;
    public HomePage(WebDriver driver){
        this.driver = driver;
    }

    @FindBy(xpath="//a[@data-testid='blue_bar_profile_link']/span")
    private WebElement userName;

    public String getUsername(){
        if(userName.isDisplayed()) {
            return userName.getText();
        }
        else {
            return "Username is not present";
        }
    }
}
```

Selenium Webdriver : <https://riptutorial.com/ko/selenium-webdriver/topic/3990/-selenium-webdriver->

11: ()

Actions / . , , . (.Build()) (.Perform()) . , , .

- dragAndDrop (WebElement , WebElement)
- dragAndDropBy (WebElement , int xOffset, int yOffset)
- ()

	.
	.
x	x .
y	y .

Selenium WebDriver Actions . Actions , .

Examples

#

```
using OpenQA.Selenium;
using OpenQA.Selenium.Firefox;
using OpenQA.Selenium.Interactions;

namespace WebDriverActions
{
    class WebDriverTest
    {
        static void Main()
        {
            IWebDriver driver = new FirefoxDriver();

            driver.Navigate().GoToUrl("");
            IWebElement source = driver.FindElement(By.CssSelector(""));
            IWebElement target = driver.FindElement(By.CssSelector(""));
            Actions action = new Actions(driver);
            action.DragAndDrop(source, target).Perform();
        }
    }
}
```

IWebElement source IWebElement , target .


```

import org.openqa.selenium.By;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.WebElement;
import org.openqa.selenium.firefox.FirefoxDriver;
import org.openqa.selenium.interactions.Actions;

/**
 * Drag and Drop test using source and target webelement
 */
public class DragAndDropClass {
    public static void main(String[] args) {
        WebDriver driver = new FirefoxDriver();
        driver.get("");
        WebElement source = driver.findElement(By.cssSelector(""));
        WebElement target = driver.findElement(By.cssSelector(""));
        Actions action = new Actions(driver);
        action.build();
        action.dragAndDrop(source, target).perform();
    }
}

```

(x y,) .

```

WebElement source = driver.findElement(By.cssSelector(""));
Actions action = new Actions(driver);
action.build()
action.dragAndDropBy(source, x, y).perform(); // x and y are integers value

```

#

(: "Admin").

```

Actions mouseHover = new Actions(driver);
mouseHover.MoveToElement(driver.FindElement(By.LinkText("Admin"))).Perform();

```

:

- mouseHover .
- driver .
- mouseHover Actions driver .

.

:

```

Actions mouseHover = new Actions(driver);

```

```
mouseHover.MoveToElement(driver.FindElement(By.LinkText("Admin"))).Perform();  
  
Assert.IsTrue(driver.FindElement(By.LinkText("Edit Record")).Displayed);  
Assert.IsTrue(driver.FindElement(By.LinkText("Delete Record")).Displayed);
```

() : <https://riptutorial.com/ko/selenium-webdriver/topic/4849/----->

12: /

- `driver.manage (). window (). maximize ();`
- `driver.manage (). window (). setSize (DimensionObject);`
- `driver.manage (). window (). getSize ()`

Examples

:

```
//Initialize Browser
System.setProperty("webdriver.gecko.driver", "E:\\path\\to\\geckodriver.exe");
WebDriver driver = new FirefoxDriver();
driver.get("https://www.google.com/");

//Set Browser window size
driver.manage().window().maximize();
```

:

```
//Initialize Browser
System.setProperty("webdriver.gecko.driver", "E:\\path\\to\\geckodriver.exe");
WebDriver driver = new FirefoxDriver();
driver.get("https://www.google.com/");

//Initialize Dimension class object and set Browser window size
org.openqa.selenium.Dimension d = new org.openqa.selenium.Dimension(400, 500);
driver.manage().window().setSize(d);
```

:

```
//Initialize Browser
System.setProperty("webdriver.gecko.driver", "E:\\path\\to\\geckodriver.exe");
WebDriver driver = new FirefoxDriver();
driver.get("https://www.google.com/");

//Get Browser window size and print on console
System.out.println(driver.manage().window().getSize());
```

/ : <https://riptutorial.com/ko/selenium-webdriver/topic/10093/----->

13:

Examples

#

```
driver.Manage().Window.Maximize();
```

.

```
driver.Manage().Window.Position = new System.Drawing.Point(1, 1);
```

.Point x y . . .

```
System.Drawing.Point windowPosition = driver.Manage().Window.Position;
```

.

```
driver.Manage().Window.Size = new System.Drawing.Size(100, 200);  
System.Drawing.Size windowSize = driver.Manage().Window.Size;
```

URL

URL .

```
string url = driver.Url;
```

URL .

```
driver.Url = "http://stackoverflow.com/";
```

.

```
string handle = driver.CurrentWindowHandle;
```

.

```
IList<String> handles = driver.WindowHandles;
```

```
driver.maximize_window()
```

```
driver.get_window_position() # returns {'y', 'x'} coordinates
```

```
driver.set_window_position(x, y) # pass 'x' and 'y' coordinates as arguments
```

```
driver.get_window_size() # returns {'width', 'height'} values
```

```
driver.set_window_size(width, height) # pass 'width' and 'height' values as arguments
```

```
driver.title
```

URL

```
driver.current_url
```

```
driver.current_window_handle
```

```
driver.window_handles
```

```
. ( ). .
```

```
:
```

```
browser.getAllWindowHandles().then(function (handles) {  
    browser.driver.switchTo().window(handles[1]);  
    browser.driver.close();  
    browser.driver.switchTo().window(handles[0]);  
});
```

```
:
```

```
Set<String> handlesSet = driver.getWindowHandles();  
List<String> handlesList = new ArrayList<String>(handlesSet);  
driver.switchTo().window(handlesList.get(1));  
driver.close();  
driver.switchTo().window(handlesList.get(0));
```

```
:
```

- 1.
- 2.
- 3.
- 4.
- 5.

```
# Open "Google" page in parent window  
driver.get("https://google.com")
```

```
driver.title # 'Google'
```

```
# Get parent window
```

```
parent_window = driver.current_window_handle

# Open "Bing" page in child window
driver.execute_script("window.open('https://bing.com')")

# Get list of all windows currently opened (parent + child)
all_windows = driver.window_handles

# Get child window
child_window = [window for window in all_windows if window != parent_window][0]

# Switch to child window
driver.switch_to.window(child_window)

driver.title # 'Bing'

# Close child window
driver.close()

# Switch back to parent window
driver.switch_to.window(parent_window)

driver.title # 'Google'
```

: <https://riptutorial.com/ko/selenium-webdriver/topic/5181/--->

14: e2e

Selenium Selenium Webdriver + TestNG + Maven + Jenkins .

HTML .

Examples

TestNG

TestNG junit . **testng.xml** . CI .

testng.xml

testng.xml xml . "testng" .

testng.xml .

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE suite SYSTEM "http://testng.org/testng-1.0.dtd">
<suite name="Smoke"> //name of the suite
  <test name="Test1"> //name of the test
    <classes>
      <class name="test.SearchTest">
        <methods>
          <include name="searchTest"/>
        </methods>
      </class>
    </classes>
  </test>
</suite>
```

. testng.xml pom.xml

. git / bitbucket Jenkins .

e2e : <https://riptutorial.com/ko/selenium-webdriver/topic/10724/-e2e->

15:

Selenium Grid . . . C #, Groovy, Java, Perl, PHP, Python Ruby . . . Windows, Linux OS X . . .

Apache 2.0 . . .

- jar , jar .
- java -jar <jar-file-full-name>.jar -<your parameters if any>

	hub node .
	hub node .
	node URL .
browserName	node , ,
maxInstances	. 5 5 .
nodeConfig	Json . , .
hubConfig	Json . , , .

Examples

Selenium Grid Java

```
String hubUrl = "http://localhost:4444/wd/hub"
DesiredCapabilities capability = DesiredCapabilities.firefox(); //or which browser you want
RemoteWebDriver driver = new RemoteWebDriver(hubUrl, capability);
```

Selenium Grid

. 2 .

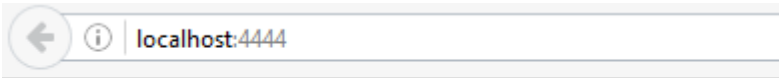
- [Selenium-server-standalone-jar](#)

1. Selenium-server-standalone-jar
2. Selenium-server-standalone-jar .

3. following :

1. `java -jar selenium-server-standalone-<Version>.jar -role hub`
2. **Json** `java -jar selenium-server-standalone-<Version>.jar -role hub -hubConfig hubConfig.json`

4. <http://localhost:4444> .



You are using grid 2.52.0

Find help on the official selenium wiki : [more help here](#)

default monitoring page : [console](#)

console -> View config .

- Selenium-server-standalone-.jar
 - [Chrome](#)
 - [FireFox](#)
 - [Microsoft Edge](#)
 -
 -
 - [Microsoft Edge \(Windows 10\)](#)

1. Selenium-server-standalone-.jar

2. .

3. .

4. jar .

5. following :

1. `java -jar selenium-server-standalone-<VERSION NUMBER>.jar -role node`
2. **Json** `java -jar selenium-server-standalone-<Version>.jar -role node -nodeConfig nodeConfig.json`

6. <http://localhost:4444/grid/console> .

Json

:

```
java -jar selenium-server-standalone-<version>.jar -role hub -hubConfig hubConfig.json
```

```
{
  "_comment" : "Configuration for Hub - hubConfig.json",
  "host": ip,
  "maxSessions": 5,
  "port": 4444,
  "cleanupCycle": 5000,
  "timeout": 300000,
  "newSessionWaitTimeout": -1,
  "servlets": [],
  "prioritizer": null,
```

```
"capabilityMatcher": "org.openqa.grid.internal.utils.DefaultCapabilityMatcher",
"throwOnCapabilityNotPresent": true,
"nodePolling": 180000,
"platform": "WINDOWS"
}
```

java -jar selenium-server-standalone-<version>.jar -role node -nodeConfig nodeConfig.json

```
{
  "capabilities":
  [
    {
      "browserName": "opera",
      "platform": "WINDOWS",
      "maxInstances": 5,
      "seleniumProtocol": "WebDriver",
      "webdriver.opera.driver": "C:/Selenium/drivers/operadriver.exe",
      "binary": "C:/Program Files/Opera/44.0.2510.1159/opera.exe"
    },
    {
      "browserName": "chrome",
      "platform": "WINDOWS",
      "maxInstances": 5,
      "seleniumProtocol": "WebDriver",
      "webdriver.chrome.driver": "C:/Selenium/drivers/chromedriver.exe",
      "binary": "C:/Program Files/Google/Chrome/Application/chrome.exe"
    },
    {
      "browserName": "firefox",
      "platform": "WINDOWS",
      "maxInstances": 5,
      "seleniumProtocol": "WebDriver",
      "webdriver.gecko.driver": "C:/Selenium/drivers/geckodriver.exe",
      "binary": "C:/Program Files/Mozilla Firefox/firefox.exe"
    }
  ],
  "proxy": "org.openqa.grid.selenium.proxy.DefaultRemoteProxy",
  "maxSession": 5,
  "port": 5555,
  "register": true,
  "registerCycle": 5000,
  "hub": "http://localhost:4444",
  "nodeStatusCheckTimeout": 5000,
  "nodePolling": 5000,
  "role": "node",
  "unregisterIfStillDownAfter": 60000,
  "downPollingLimit": 2,
  "debug": false,
  "servlets" : [],
  "withoutServlets": [],
  "custom": {}
}
```

: <https://riptutorial.com/ko/selenium-webdriver/topic/2504/-->

16:

- (int ms)
- keyPress (int keycode)
- keyRelease (int keycode)
- mouseMove (int x, int y)
- mousePress (int)
- mouseRelease (int)
- mouseWheel (int wheelAmt)

ms	
	A VK_A . . https://docs.oracle.com/javase/7/docs/api/java/awt/event/KeyEvent.html
x, y	
	.
wheelAmt	, /

Selenium Webdriver Robot API . Robot F1 .

Examples

API (JAVA)

```
import java.awt.AWTException;
import java.awt.Robot;
import java.awt.event.KeyEvent;

public class KeyBoardExample {
    public static void main(String[] args) {
        try {
            Robot robot = new Robot();
            robot.delay(3000);
            robot.keyPress(KeyEvent.VK_Q); //VK_Q for Q
        } catch (AWTException e) {
            e.printStackTrace();
        }
    }
}
```

. ENTER Selenium WebDriver

```
import java.awt.AWTException;
import java.awt.Robot;
import java.awt.event.KeyEvent;
```

```

import org.openqa.selenium.By;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.firefox.FirefoxDriver;
import org.testng.annotations.Test;

public class LoginTest {

    @Test
    public void testEnterKey() throws InterruptedException
    {
        WebDriver driver=new FirefoxDriver();
        Robot robot=null;
        driver.get("test-url");
        driver.manage().window().maximize();
        driver.findElement(By.xpath("xpath-expression")).click();
        driver.findElement(By.xpath("xpath-expression")).sendKeys("username");
        driver.findElement(By.xpath("xpath-expression")).sendKeys("password");
        try {
            robot=new Robot();
        } catch (AWTException e) {
            e.printStackTrace();
        }
        //Keyboard Activity Using Robot Class
        robot.keyPress(KeyEvent.VK_ENTER);
    }
}

```

Robot API (JAVA)

:

```

import java.awt.Robot;

public class MouseClass {
    public static void main(String[] args) throws Exception {
        Robot robot = new Robot();

        // SET THE MOUSE X Y POSITION
        robot.mouseMove(300, 550);
    }
}

```

/ :

```

import java.awt.Robot;
import java.awt.event.InputEvent;

public class MouseEvent {
    public static void main(String[] args) throws Exception {
        Robot robot = new Robot();

        // LEFT CLICK
        robot.mousePress(InputEvent.BUTTON1_MASK);
        robot.mouseRelease(InputEvent.BUTTON1_MASK);

        // RIGHT CLICK
        robot.mousePress(InputEvent.BUTTON3_MASK);
        robot.mouseRelease(InputEvent.BUTTON3_MASK);
    }
}

```

```
    }  
}
```

:

```
import java.awt.Robot;  
import java.awt.event.InputEvent;  
  
public class MouseClass {  
    public static void main(String[] args) throws Exception {  
        Robot robot = new Robot();  
  
        // MIDDLE WHEEL CLICK  
        robot.mousePress(InputEvent.BUTTON3_DOWN_MASK);  
        robot.mouseRelease(InputEvent.BUTTON3_DOWN_MASK);  
  
        // SCROLL THE MOUSE WHEEL  
        robot.mouseWheel(-100);  
    }  
}
```

: [https://riptutorial.com/ko/selenium-webdriver/topic/4877/-](https://riptutorial.com/ko/selenium-webdriver/topic/4877/)

17:

Examples

.

-
- JSON
-

JSON

JSON .

-
-

, , .

.

JSON .

```
{
  "capabilities": [
    {
      "browserName": "firefox",
      "acceptSslCerts": true,
      "javascriptEnabled": true,
      "takesScreenshot": false,
      "firefox_profile": "",
      "browser-version": "27",
      "platform": "WINDOWS",
      "maxInstances": 5,
      "firefox_binary": "",
      "cleanSession": true
    },
    {
      "browserName": "chrome",
      "maxInstances": 5,
      "platform": "WINDOWS",
      "webdriver.chrome.driver": "C:/Program Files (x86)/Google/Chrome/Application/chrome.exe"
    },
    {
      "browserName": "internet explorer",
      "maxInstances": 1,
      "platform": "WINDOWS",
      "webdriver.ie.driver": "C:/Program Files (x86)/Internet Explorer/iexplore.exe"
    }
  ],
  "configuration": {
    "_comment" : "Configuration for Node",
    "cleanUpCycle": 2000,
    "timeout": 30000,
    "proxy": "org.openqa.grid.selenium.proxy.WebDriverRemoteProxy",
```

```
"port": 5555,  
"host": ip,  
"register": true,  
"hubPort": 4444,  
"maxSessions": 5  
}  
}
```

```
java -jar selenium-server-standalone-<version>.jar -role hub
```

```
java -jar selenium-server-standalone-<version>.jar -role node -hub  
http://localhost:4444/grid/register // default port is 4444
```

: <https://github.com/SeleniumHQ/selenium/wiki/Grid2>

: [https://riptutorial.com/ko/selenium-webdriver/topic/1359/-](https://riptutorial.com/ko/selenium-webdriver/topic/1359/)

18:

- driver.switchTo (). frame ();
- driver.switchTo (). frame (String id);
- driver.switchTo (). frame (int index);
- driver.switchTo (). frame (WebElement frameElement);
- driver.switchTo (). defaultContent ();
- #
- driver.SwitchTo (). Frame (int frameIndex);
- driver.SwitchTo (). Frame (IWebElement frameElement);
- driver.SwitchTo (). Frame (string frameName);
- driver.SwitchTo (). DefaultContent ();
-
- driver.switch_to_frame (nameOrId)
- driver.switch_to.frame (nameOrId)
- driver.switch_to_frame (index)
- driver.switch_to.frame (index)
- driver.switch_to_frame (frameElement)
- driver.switch_to.frame (frameElement)
- driver.switch_to_default_content ()
- driver.switch_to.default_content ()
-
- driver.switchTo (). frame (nameOrId)
- driver.switchTo (). frame (index)
- driver.switchTo (). defaultContent ()

nameOrId	id .
	0 .
frameElement	WebElement .

Examples

Java

HTML HTML iframe .

```
<iframe src="../../../images/eightball.gif" name="imgboxName" id="imgboxId">
  <p>iframes example</p>
  <a href="../../../images/redball.gif" target="imgbox">Red Ball</a>
</iframe><br />
```

... iframe iframe .

ID (iframe ID)

```
driver.switchTo().frame("imgboxId"); //imgboxId - Id of the frame
```

(iframe).

```
driver.switchTo().frame("imgboxName"); //imgboxName - Name of the frame
```

(if iframe). iframe .

```
driver.switchTo().frame(0); //0 - Index of the frame
```

: 0, 1, 2.

webelement (WebElement).

```
driver.switchTo().frame(frameElement); //frameElement - webelement that is the frame
```

Red Ball :

```
driver.switchTo().frame("imgboxId");  
driver.findElement(By.linkText("Red Ball")).Click();
```

Java

...

```
driver.switchTo().defaultContent();
```

C

1. .

1. . ID .

```
driver.SwitchTo().Frame(1);
```

2. .

```
driver.SwitchTo().Frame("Name_of_Frame");
```

3. **IWebElement** , ID .

ID .

```
driver.SwitchTo().Frame(driver.FindElement(By.Id("ID_OF_FRAME")));  
driver.SwitchTo().Frame(driver.FindElement(By.CssSelector("iframe[title='Title_of_Frame']")));
```

```
new WebDriverWait(driver, TimeSpan.FromSeconds(10))
    .Until(ExpectedConditions.ElementIsVisible(By.Id("Id_Of_Frame")));
```

:

```
driver.SwitchTo().DefaultContent()
```

C#

..

```
webDriver.SwitchTo().DefaultContent();
```

.

```
(-) . 2 (Frame_Son, Frame_Daughter).
```

1. :

```
driver.switchTo().frame("Frame_Son");
driver.switchTo().frame("Frame_Daughter");
```

2. Phone Parent : , . .

```
driver.switchTo().defaultContent();
driver.switchTo().frame("Frame_Parent");
```

3. : . .

```
driver.switchTo().defaultContent();
driver.switchTo().frame("Frame_Parent");
driver.switchTo().frame("Frame_Daughter");
```

.

. NoSuchElementException .

..

```
try{
    new WebDriverWait(driver, 300).ignoring(StaleElementReferenceException.class).
        ignoring(WebDriverException.class).
until(ExpectedConditions.visibilityOf((driver.findElement(By.id("cpmInteractionDivFrame"))));
    catch{
```

```
// 300 .}
```

: <https://riptutorial.com/ko/selenium-webdriver/topic/4589/>-

19:

selenium .

Examples

1. *Actions* ("BROWSE TEMPLATES")

```
from selenium import webdriver
from selenium.webdriver.common.action_chains import ActionChains

driver = webdriver.Chrome()
driver.get('http://www.w3schools.com/')
target = driver.find_element_by_link_text('BROWSE TEMPLATES')
actions = ActionChains(driver)
actions.move_to_element(target)
actions.perform()
```

2. *JavaScript* ("BROWSE TEMPLATES")

```
from selenium import webdriver

driver = webdriver.Chrome()
driver.get('http://www.w3schools.com/')
target = driver.find_element_by_link_text('BROWSE TEMPLATES')
driver.execute_script('arguments[0].scrollIntoView(true);', target)
```

3. ("BROWSE TEMPLATES")

```
from selenium import webdriver

driver = webdriver.Chrome()
driver.get('http://www.w3schools.com/')
target = driver.find_element_by_link_text('BROWSE TEMPLATES')
target.location_once_scrolled_into_view
```

location_once_scrolled_into_view *x, y* .

4. *Keys*

```
from selenium import webdriver
from selenium.webdriver.common.keys import Keys

driver = webdriver.Chrome()
driver.get('http://www.w3schools.com/')
driver.find_element_by_tag_name('body').send_keys(Keys.END) # Use send_keys(Keys.HOME) to
scroll up to the top of page
```

, send_keys(Keys.DOWN) / send_keys(Keys.UP) send_keys(Keys.PAGE_DOWN) / send_keys(Keys.PAGE_UP)

1. () // . .

.

```
public static boolean scroll_Page(WebElement webelement, int scrollPoints)
{
try
{
    System.out.println("----- Started - scroll_Page -----");
    driver = ExecutionSetup.getDriver();
    dragger = new Actions(driver);

    // drag downwards
    int numberOfPixelsToDragTheScrollbarDown = 10;
    for (int i = 10; i < scrollPoints; i = i + numberOfPixelsToDragTheScrollbarDown)
    {
        dragger.moveToElement(webelement).clickAndHold().moveByOffset(0,
numberOfPixelsToDragTheScrollbarDown).release(webelement).build().perform();
    }
    Thread.sleep(500);
    System.out.println("----- Ending - scroll_Page -----");
    return true;
}
catch (Exception e)
{
    System.out.println("----- scroll is unsuccessfully done in scroll_Page -----");
    e.printStackTrace();
    return false;
}
}
```

2. () // . .

.

```
public static boolean scroll_Page_Up(WebElement webelement, int scrollPoints)
{
try
{
    System.out.println("----- Started - scroll_Page_Up -----");
    driver = ExecutionSetup.getDriver();
    dragger = new Actions(driver);
    // drag upwards
    int numberOfPixelsToDragTheScrollbarUp = -10;
    for (int i = scrollPoints; i > 10; i = i + numberOfPixelsToDragTheScrollbarUp)
    {
        dragger.moveToElement(webelement).clickAndHold().moveByOffset(0,
numberOfPixelsToDragTheScrollbarUp).release(webelement).build().perform();
    }
    System.out.println("----- Ending - scroll_Page_Up -----");
    return true;
}
catch (Exception e)
{
    System.out.println("----- scroll is unsuccessfully done in scroll_Page_Up-----");
    e.printStackTrace();
}
```

```
        return false;
    }
}
```

3. () Page Down . . .

<div> .

```
public static boolean pageDown_New(WebElement webeScrollArea, int iLoopCount)
{
    try
    {
        System.out.println("----- Started - pageDown_New -----");
        driver = ExecutionSetup.getDriver();
        dragger = new Actions(driver);

        for (int i = 0; i <= iLoopCount; i++)
        {

dragger.moveToElement(webeScrollArea).click().sendKeys(Keys.PAGE_DOWN).build().perform();
        }
        System.out.println("----- Ending - pageDown_New -----");
        return true;
    }
    catch (Exception e)
    {
        System.out.println("----- Not able to do page down -----");
        return false;
    }
}
```

4. () UP Page Up . . .

<div> .

```
public static boolean pageUp_New(WebElement webeScrollArea, int iLoopCount)
{
    try
    {
        System.out.println("----- Started - pageUp_New -----");
        driver = ExecutionSetup.getDriver();
        dragger = new Actions(driver);

        for (int i = 0; i <= iLoopCount; i++)
        {

dragger.moveToElement(webeScrollArea).click().sendKeys(Keys.PAGE_UP).build().perform();
        }
        System.out.println("----- Ending - pageUp_New -----");
        return true;
    }
    catch (Exception e)
    {
        System.out.println("----- Not able to do page up -----");
        return false;
    }
}
```

```
}
```

5. () . . .

```
<div> .
```

```
public static boolean scrollDown_Keys(WebElement webeScrollArea, int iLoopCount)
{
    try
    {
        System.out.println("----- Started - scrollDown_Keys -----");
        driver = ExecutionSetup.getDriver();
        dragger = new Actions(driver);

        for (int i = 0; i <= iLoopCount; i++)
        {
            dragger.moveToElement(webeScrollArea).click().sendKeys(Keys.DOWN).build().perform();
        }
        System.out.println("----- Ending - scrollDown_Keys -----");
        return true;
    }
    catch (Exception e)
    {
        System.out.println("----- Not able to do scroll down with keys-----
---");
        return false;
    }
}
```

6. () . . .

```
<div> .
```

```
public static boolean scrollUp_Keys(WebElement webeScrollArea, int iLoopCount)
{
    try
    {
        System.out.println("----- Started - scrollUp_Keys -----");
        driver = ExecutionSetup.getDriver();
        dragger = new Actions(driver);

        for (int i = 0; i <= iLoopCount; i++)
        {
            dragger.moveToElement(webeScrollArea).click().sendKeys(Keys.UP).build().perform();
        }
        System.out.println("----- Ending - scrollUp_Keys -----");
        return true;
    }
    catch (Exception e)
    {
        System.out.println("----- Not able to do scroll up with keys-----
-");
        return false;
    }
}
```

7. () / / . .

. , .

```
public static boolean scroll_without_WebE(int scrollPoint)
{
    JavascriptExecutor jse;
    try
    {
        System.out.println("----- Started - scroll_without_WebE -----");

        driver = ExecutionSetup.getDriver();
        jse = (JavascriptExecutor) driver;
        jse.executeScript("window.scrollTo(0," + scrollPoint + ")", "");

        System.out.println("----- Ending - scroll_without_WebE -----");
        return true;
    }
    catch (Exception e)
    {
        System.out.println("----- scroll is unsuccessful in scroll_without_WebE ----
        -----");
        e.printStackTrace();
        return false;
    }
}
```

8. () / / . . .

.

```
public static boolean scroll_to_WebE(WebElement webe)
{
    try
    {
        System.out.println("----- Started - scroll_to_WebE -----");

        driver = ExecutionSetup.getDriver();
        ((JavascriptExecutor) driver).executeScript("arguments[0].scrollIntoView();", webe);

        System.out.println("----- Ending - scroll_to_WebE -----");
        return true;
    }
    catch (Exception e)
    {
        System.out.println("----- scroll is unsuccessful in scroll_to_WebE -----
        -----");
        e.printStackTrace();
        return false;
    }
}
```

: . .

: <https://riptutorial.com/ko/selenium-webdriver/topic/9063/>

20:

. switchTo () .

Examples

```
<iframe "id="iframe_Login1">
  <iframe "id="iframe_Login2">
    <iframe "id="iframe_Login3">
      </iframe>
    </iframe>
  </iframe>
</iframe>
```

switchTo () frame () .

driver.switchTo (). (iframe_Login1); driver.switchTo (). (iframe_Login2); driver.switchTo (). (iframe_Login3);

parentFrame () defaultContent () .

parentFrame () :

```
driver.switchTo ().parentFrame ();
```

defaultContent () : iframe .

```
driver.switchTo ().defaultContent ();
```

: <https://riptutorial.com/ko/selenium-webdriver/topic/9803/--->

21:

- ByChained (params By [] bys)

By Selenium . Selenium Web Elements

1. ID - .
2. - .
3. CSS (xpath) - .
4. XPATH - CSS (: XPATH). : div::parent .

.
: , DOM . ""(3-5). Python .

```
from selenium import webdriver
import time

browser = webdriver.Firefox()
browser.get("https://app.website.com")

reports_element = browser.find_element_by_xpath("//button[contains(text(), 'Reports')]")

# Element not found! Try giving time for the browser to download all DOM elements:
time.sleep(10)

reports_element = browser.find_element_by_xpath("//button[contains(text(), 'Reports')]")
# This returns correct value!
```

Examples

WebDriver

WebElements .

By .

By By ..

1. ID
- 2.
- 3.
- 4.
- 5.
- 6.
7. CSS
8. XPath
9. JavaScript

```
<form name="loginForm">
Login Username: <input id="username" name="login" type="text" />
Password: <input id="password" name="password" type="password" />
<input name="login" type="submit" value="Login" />
```

ID . ID .

```
driver.findElement(By.id(username));

driver.findElement(By.id(password));
```

7 .

ID

ID :

```
<div id="coolestWidgetEvah">...</div>
```

```
Java      - WebElement element = driver.findElement(By.id("coolestWidgetEvah"));
C#        - IWebElement element = driver.FindElement(By.Id("coolestWidgetEvah"));
Python    - element = driver.find_element_by_id("coolestWidgetEvah")
Ruby      - element = driver.find_element(:id, "coolestWidgetEvah")
JavaScript/Protractor - var elm = element(by.id("coolestWidgetEvah"));
```

:

```
<div class="cheese"><span>Cheddar</span></div>
```

```
Java      - WebElement element = driver.findElement(By.className("cheese"));
C#        - IWebElement element = driver.FindElement(By.ClassName("cheese"));
Python    - element = driver.find_element_by_class_name("cheese")
Ruby      - cheeses = driver.find_elements(:class, "cheese")
JavaScript/Protractor - var elm = element(by.className("cheese"));
```

:

```
<iframe src="..."></iframe>
```

```
Java      - WebElement element = driver.findElement(By.tagName("iframe"));
C#        - IWebElement element = driver.FindElement(By.TagName("iframe"));
Python    - element = driver.find_element_by_tag_name("iframe")
Ruby      - frame = driver.find_element(:tag_name, "iframe")
JavaScript/Protractor - var elm = element(by.tagName("iframe"));
```

:

```
<input name="cheese" type="text"/>
```

```
Java      - WebElement element = driver.findElement(By.name("cheese"));
C#        - IWebElement element = driver.FindElement(By.Name("cheese"));
Python    - element = driver.find_element_by_name("cheese")
Ruby      - cheese = driver.find_element(:name, "cheese")
JavaScript/Protractor - var elm = element(by.name("cheese"));
```

:

```
<a href="http://www.google.com/search?q=cheese">cheese</a>>
```

```
Java      - WebElement element = driver.findElement(By.linkText("cheese"));
C#        - IWebElement element = driver.FindElement(By.LinkText("cheese"));
Python    - element = driver.find_element_by_link_text("cheese")
Ruby      - cheese = driver.find_element(:link, "cheese")
JavaScript/Protractor - var elm = element(by.linkText("cheese"));
```

:

```
<a href="http://www.google.com/search?q=cheese">search for cheese</a>>
```

```
Java      - WebElement element = driver.findElement(By.partialLinkText("cheese"));
C#        - IWebElement element = driver.FindElement(By.PartialLinkText("cheese"));
Python    - element = driver.find_element_by_partial_link_text("cheese")
Ruby      - cheese = driver.find_element(:partial_link_text, "cheese")
JavaScript/Protractor - var elm = element(by.partialLinkText("cheese"));
```

CSS

CSS :

```
<div id="food" class="dairy">milk</span>
```

```
Java      - WebElement element = driver.findElement(By.cssSelector("#food.dairy")); //# is
used to indicate id and . is used for classname.
C#        - IWebElement element = driver.FindElement(By.CssSelector("#food.dairy"));
Python    - element = driver.find_element_by_css_selector("#food.dairy")
Ruby      - cheese = driver.find_element(:css, "#food span.dairy.aged")
JavaScript/Protractor - var elm = element(by.css("#food.dairy"));
```

CSS : http://www.w3schools.com/cssref/css_selectors.asp

XPath

XPath :

```
<input type="text" name="example" />
```

```

Java      - WebElement element = driver.findElement(By.xpath("//input"));
C#       - IWebElement element = driver.FindElement(By.XPath("//input"));
Python   - element = driver.find_element_by_xpath("//input")
Ruby     - inputs = driver.find_elements(:xpath, "//input")
JavaScript/Protractor - var elm = element(by.xpath("//input"));

```

XPath . http://www.w3schools.com/xsl/xpath_intro.asp

JavaScript

javascript DOM WebElement .

jQuery :

```

Java      - WebElement element = (WebElement)
           ((JavascriptExecutor)driver).executeScript("return $('cheese')[0]");

C#       - IWebElement element = (IWebElement)
           ((IJavaScriptExecutor)driver).ExecuteScript("return $('cheese')[0]");

Python   - element = driver.execute_script("return $('cheese')[0]");
Ruby     - element = driver.execute_script("return $('cheese')[0]");
JavaScript/Protractor -

```

: [SimpleBrowser JavaScript](#) .

[C #]

. OpenQA.Selenium.Support.PageObjects.ByChained .

```
element = driver.FindElement(new ByChained(By.TagName("input"), By.ClassName("class"));
```

By AND (, By)

driver.Navigate().GoToUrl(url); driver.Navigate().GoToUrl(url); . .

: . "" .

#

```

using (var driver = new ChromeDriver())
{
    new Thread(() =>
    {
        driver.Navigate().GoToUrl("http://stackoverflow.com");
    }).Start();
}

```

```
new WebDriverWait(driver, TimeSpan.FromSeconds(10))
    .Until(ExpectedConditions.ElementIsVisible(By.XPath("//div[@class='summary']/h3/a")));
}
```

WebDriverTimeout .catch Wait .

#

```
using (var driver = new ChromeDriver())
{
    driver.Manage().Timeouts().SetPageLoadTimeout(TimeSpan.FromSeconds(5));

    try
    {
        driver.Navigate().GoToUrl("http://stackoverflow.com");
    }
    catch (WebDriverTimeoutException)
    {
        new WebDriverWait(driver, TimeSpan.FromSeconds(10))
            .Until(ExpectedConditions.ElementIsVisible
                (By.XPath("//div[@class='summary']/h3/a")));
    }
}
```

: . .

: <https://riptutorial.com/ko/selenium-webdriver/topic/3991/-->

22:

Examples

#

()

```
interactionWebElement.Clear();
```

()

```
interactionWebElement.SendKeys("Text");
```

```
string valueinTextBox = interactionWebElement.GetAttribute("value");
```

```
string textOfElement = interactionWebElement.Text;
```

```
interactionWebElement.Click();
```

```
interactionWebElement.Submit();
```

```
bool isDisplayed=interactionWebElement.Displayed;
```

```
bool isEnabled = interactionWebElement.Enabled;
```

```
bool isSelected=interactionWebElement.Selected;
```

interactionWebElement

```
IWebElement childElement = interactionWebElement.FindElement(By.Id("childElementId"));
```

interactionWebElement

```
Ilist<IWebElement> childElements =  
interactionWebElement.FindElements(By.TagName("childElementsTagName"));
```

:(-)

```
interactionWebElement.clear();
```

- :

```
interactionWebElement.sendKeys("Text");
interactionWebElement.sendKeys(Keys.CONTROL + "c"); // copy to clipboard.
```

:

```
interactionWebElement.getAttribute("value");
interactionWebElement.getAttribute("style");
```

:

```
String elementsText = interactionWebElement.getText();
```

:

```
Select dropDown = new Select(webElement);
dropDown.selectByValue(value);
```

:

```
interactionWebElement.click();
interactionWebElement.submit(); //for forms
interactionWebElement.isDisplayed();
interactionWebElement.isEnabled(); // for exampale - is clickable.
interactionWebElement.isSelected(); // for radio buttons.
```

org.openqa.selenium.interactions.Actions :

:

```
Action dragAndDrop = builder.clickAndHold(someElement)
    .moveToElement(otherElement)
    .release(otherElement)
    .build();
```

```
dragAndDrop.perform();
```

:

```
Action selectMultiple = builder.keyDown(Keys.CONTROL)
    .click(someElement)
    .click(someOtherElement)
    .keyUp(Keys.CONTROL);
```

```
dragAndDrop.perform();
```

():

```
builder.doubleClick(webElement).perform();
```



```
builder.moveToElement(webElement).perform(); //hovering
```

Javascript :

```
// Scroll to view element:  
((JavascriptExecutor) driver).executeJavaScript("arguments[0].scrollIntoView(true);",  
webElement);
```

: <https://riptutorial.com/ko/selenium-webdriver/topic/4280/--->

23:

Examples

JUnit

JUnit TestWatcher .

```
public class TestRules extends TestWatcher {  
  
    @Override  
    protected void failed(Throwable e, Description description) {  
        // This will be called whenever a test fails.  
    }  
}
```

```
public class testClass{  
  
    @Rule  
    public TestRules testRules = new TestRules();  
  
    @Test  
    public void doTestSomething() throws Exception{  
        // If the test fails for any reason, it will be caught by testRules.  
    }  
}
```

EventFiringWebDriver

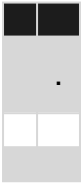
EventFiringWebDriver . WebDriverEventListener , onException .

```
EventFiringWebDriver driver = new EventFiringWebDriver(new FirefoxDriver());  
WebDriverEventListener listener = new AbstractWebDriverEventListener() {  
    @Override  
    public void onException(Throwable t, WebDriver driver) {  
        // Take action  
    }  
};  
driver.register(listener);
```

: <https://riptutorial.com/ko/selenium-webdriver/topic/8226/>

24:

-
- `deselectAll ()`
- `deselectByIndex (int index)`
- `deselectByValue (java.lang.String value)`
- `deselectByVisibleText (java.lang.String)`
- `getAllSelectedOptions ()`
- `getFirstSelectedOption ()`
- `getOptions ()`
- `isMultiple ()`
- `selectByIndex (int index)`
- `selectByValue (java.lang.String)`
- `selectByVisibleText (java.lang.String)`



Select class of Selenium WebDriver select . . .

C # Select `SelectElement`

Examples

HTML .

```
<html>
<head>
<title>Select Example by Index value</title>
</head>
<body>
<select name="Travel"><option value="0" selected> Please select</option>
<option value="1">Car</option>
<option value="2">Bike</option>
<option value="3">Cycle</option>
<option value="4">Walk</option>
</select>
</body>
</html>
```

Java

```
public class selectByIndexExample {
    WebDriver driver;
    @Test
```

```

public void selectSamples()
{
    driver = new FirefoxDriver();
    driver.get("URL GOES HERE");
    WebElement element=driver.findElement(By.name("Travel")); //This is the 'Select'
element locator
    Select sel=new Select(element);
    sel.selectByIndex(1); //This will select the first 'Option' from 'Select' List i.e.
Car
}
}

```

```

public class selectByValueExample {
    WebDriver driver;
    @Test
    public void selectSamples()
    {
        driver = new FirefoxDriver();
        driver.get("URL GOES HERE");
        WebElement element=driver.findElement(By.name("Travel")); //This is the 'Select'
element locator
        Select sel=new Select(element);
        sel.selectByValue("Bike"); //This will select the 'Option' from 'Select' List which
has value as "Bike".
        //NOTE: This will be case sensitive
    }
}

```

```

public class selectByVisibilityTextExample {
    WebDriver driver;
    @Test
    public void selectSamples()
    {
        driver = new FirefoxDriver();
        driver.get("URL GOES HERE");
        WebElement element=driver.findElement(By.name("Travel")); //This is the 'Select'
element locator
        Select sel=new Select(element);
        sel.selectByVisibleText("Cycle"); //This will select the 'Option' from 'Select' List
who's visibility text is "Cycle".
        //NOTE: This will be case sensitive
    }
}

```



WebDriver .

```

WebElement element=driver.FindElement(By.name("Travel"));
SelectElement selectElement = new SelectElement(title);
selectElement.SelectByIndex(0);

```

```

WebElement element=driver.FindElement(By.name("Travel"));
SelectElement selectElement = new SelectElement(title);

```

```
selectElement.SelectByIndex("1");  
//NOTE: This will be case sensitive
```

```
IWebElement element=driver.FindElement(By.name("Travel"));  
SelectElement selectElement = new SelectElement(title);  
selectElement.SelectByText("Walk");
```

: <https://riptutorial.com/ko/selenium-webdriver/topic/6426/>-

25:

. By Selenium . . WebElements () .

. . , HTML . UI .

API HTML . Rue . , .

.

1. . .

2. .

3. .

4. , . .

```
public boolean hasDisplayedUserFullName (String userFullName) {
    return driver.findElement(By.xpath("xpathExpressionUsingFullName")).isDisplayed();
}
```

5. iframe iframe .

:

1.

2. UI . .

3. .

4. .

5.

Examples

(Java)

.

```
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.WebElement;
import org.openqa.selenium.support.FindBy;
import org.openqa.selenium.support.PageFactory;

/**
 * Class which models the view of Sign-In page
 */
public class SignInPage {

    @FindBy(id="username")
    private usernameInput;
```

```

    @FindBy(id="password")
    private passwordInput;

    @FindBy(id="signin")
    private signInButton;

    private WebDriver driver;

    public SignInPage(WebDriver driver) {
        this.driver = driver;
    }

    /**
     * Method to perform login
     */
    public HomePage performLogin(String username, String password) {
        usernameInput.sendKeys(username);
        passwordInput.sendKeys(password);
        signInButton.click();
        return PageFactory.initElements(driver, HomePage.class);
    }
}

import org.openqa.selenium.WebDriver;
import org.openqa.selenium.WebElement;
import org.openqa.selenium.support.FindBy;
import org.openqa.selenium.support.PageFactory;
/**
 * Class which models the view of home page
 */
public class HomePage {
    @FindBy(id="logout")
    private logoutLink;

    private WebDriver driver;

    public HomePage(WebDriver driver) {
        this.driver = driver;
    }

    /**
     * Method to log out
     */
    public SignInPage logout() {
        logoutLink.click();
        wait.ForPageToLoad();
        return PageFactory.initElements(driver, SignInPage.class);
    }
}

/**
 * Login test class
 */
public class LoginTest {
    public void testLogin() {
        SignInPage signInPage = new SignInPage(driver);
        HomePage homePage = signInPage.login(username, password);
        signInPage = homePage.logout();
    }
}

```

```
}
```

#

, Selenium Page Object . C # .

```
using OpenQA.Selenium;
using OpenQA.Selenium.Support.PageObjects;
using OpenQA.Selenium.Support.UI;
using System;
using System.Collections.Generic;

public class WikipediaHomePage
{
    private IWebDriver driver;
    private int timeout = 10;
    private By pageLoadedElement = By.ClassName("central-featured-logo");

    [FindsBy(How = How.Id, Using = "searchInput")]
    [CacheLookup]
    private IWebElement searchInput;

    [FindsBy(How = How.CssSelector, Using = ".pure-button.pure-button-primary-progressive")]
    [CacheLookup]
    private IWebElement searchButton;

    public ResultsPage Search(string query)
    {
        searchInput.SendKeys(query);
        searchButton.Click();
    }

    public WikipediaHomePage VerifyPageLoaded()
    {
        new WebDriverWait(driver, TimeSpan.FromSeconds(timeout)).Until<bool>((drv) => return
        drv.ExpectedConditions.ElementExists(pageLoadedElement));

        return this;
    }
}
```

:

- CacheLookup . .
- searchButton 2 ID ID .
- (Chrome) FireBug .
- Search() Search() (ResultsPage) .
- ()
- (//) ()
- .(DriverClass .)
- PageObjects (enterUsername enterPassword) Login enterUsername
enterPassword Login .
- PageObjects elementLocators Test .
- (: DateUtil, excelUtils)
-

- `conf (: ,)`
- `screenCapture`
- `DriverClass . wait.until (ExpectedConditions) . .`

: <https://riptutorial.com/ko/selenium-webdriver/topic/4853/-->

26:

- `ExecuteAsyncScript (, params [] args);`
- `ExecuteScript (, params [] args);`

Examples

#

`IWebDriver JavaScript IWebDriver IJavaScriptExecutor .`

```
IWebDriver driver;  
IJavaScriptExecutor jsDriver = driver as IJavaScriptExecutor;
```

`Javascript IJavaScriptExecutor . .`

```
jsDriver.ExecuteScript("alert('running javascript');");
```

`Javascript execute_script("javascript script here") . execute_script webdriver javascript .`

```
from selenium import webdriver  
driver = webdriver.Chrome()  
driver.execute_script("alert('running javascript');")
```

`Java Javascript Javascript webdriver . executeScript() JavascriptExecutor :`
`((JavascriptExecutor)driver) . driver.executeScript() Javascript String .`

```
WebDriver driver = new ChromeDriver();  
JavascriptExecutor JavascriptExecutor = ((JavascriptExecutor)driver);  
JavascriptExecutor.executeScript("alert('running javascript');");
```

```
require "selenium-webdriver"  
  
driver = Selenium::WebDriver.for :chrome  
driver.execute_script("alert('running javascript');")
```

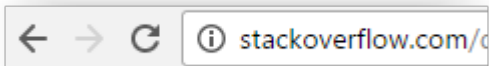
[: https://riptutorial.com/ko/selenium-webdriver/topic/6986/---](https://riptutorial.com/ko/selenium-webdriver/topic/6986/---)

27:

- #
- void Back ()
- void ()
- void GotToUrl (string url)
- void Refresh ()
-
- driver.back ()
- driver.forward ()
- driver.get ("URL")
- driver.refresh ()
-
- driver.navigate (). back ();
- driver.navigate (). forward ();
- driver.navigate (). to ("URL");
- driver.navigate (). refresh ();

Examples

() [C #]



Navigate() .

```
IWebDriver driver
INavigation navigation = driver.Navigate();
```

```
//like pressing the back button
navigation.Back();
//like pressing the forward button on a browser
navigation.Forward();
//navigate to a new url in the current window
navigation.GoToUrl("www.stackoverflow.com");
//Like pressing the reload button
navigation.Refresh();
```

() [Java]

URL :

```
driver.navigate().to("http://www.example.com");
```

:

```
driver.navigate().back();
```

:

```
driver.navigate().forward();
```

:

```
driver.navigate().refresh();
```

WebDriver

WebDriver, . . .

-
- **WebElements**
-

`get (String) WebElements` `findElement (By) . . .`

```
void get (java.lang.String url)
```

. HTTP GET . . .

```
//Initialising driver
WebDriver driver = new FirefoxDriver();

//setting timeout for page load
driver.manage().timeouts().pageLoadTimeout(20, TimeUnit.SECONDS);

//Call Url in get method
driver.get("https://www.google.com");
//or
driver.get("https://seleniumhq.org");
```

getCurrentUrl

```
java.lang.String getCurrentUrl()
```

URL . URL .

```
//Getting current url loaded in browser & comparing with expected url
String pageURL = driver.getCurrentUrl();
Assert.assertEquals(pageURL, "https://www.google.com");
```

getTitle

```
java.lang.String getTitle()
```

null .

```
//Getting current page title loaded in browser & comparing with expected title  
String pageTitle = driver.getTitle();  
Assert.assertEquals(pageTitle, "Google");
```

getPageSource

```
java.lang.String getPageSource()
```

. (:) .

```
//get the current page source  
String pageSource = driver.getPageSource();
```

void close()

. .

```
//Close the current window  
driver.close();
```

void quit()

. .

```
//Quit the current driver session / close all windows associated with driver  
driver.quit();
```

Selenium 2.0 .

: <https://riptutorial.com/ko/selenium-webdriver/topic/7272/>

28:

Examples

PhantomJS [C #]

PhantomJS .

PhantomJS .

```
using OpenQA.Selenium;
using OpenQA.Selenium.PhantomJS;
```

```
var driver = new PhantomJSDriver();
```

PhantomJSDriver . WebDriver .

```
using (var driver = new PhantomJSDriver())
{
    driver.Navigate().GoToUrl("http://stackoverflow.com/");

    var questions = driver.FindElements(By.ClassName("question-hyperlink"));

    foreach (var question in questions)
    {
        // This will display every question header on StackOverflow homepage.
        Console.WriteLine(question.Text);
    }
}
```

. UI PhantomJS . PhantomJSOptions PhantomJSDriverService . :

```
// Options are used for setting "browser capabilities", such as setting a User-Agent
// property as shown below:
var options = new PhantomJSOptions();
options.AddAdditionalCapability("phantomjs.page.settings.userAgent",
"Mozilla/5.0 (Windows NT 6.1; Win64; x64; rv:25.0) Gecko/20100101 Firefox/25.0");

// Services are used for setting up the WebDriver to your likings, such as
// hiding the console window and restricting image loading as shown below:
var service = PhantomJSDriverService.CreateDefaultService();
service.HideCommandPromptWindow = true;
service.LoadImages = false;

// The same code as in the example above:
using (var driver = new PhantomJSDriver(service, options))
{
    driver.Navigate().GoToUrl("http://stackoverflow.com/");

    var questions = driver.FindElements(By.ClassName("question-hyperlink"));
```

```

foreach (var question in questions)
{
    // This will display every question header on StackOverflow homepage.
    Console.WriteLine(question.Text);
}
}

```

: (: PhantomJSDriverService) F12 .

SimpleBrowser [C #]

SimpleBrowser JavaScript WebDriver.

PhantomJS , .

, [SimpleBrowser.WebDriver](#) .

```

using OpenQA.Selenium;
using SimpleBrowser.WebDriver;

```

:

```

using (var driver = new SimpleBrowserDriver())
{
    driver.Navigate().GoToUrl("http://stackoverflow.com/");

    var questions = driver.FindElements(By.ClassName("question-hyperlink"));

    foreach (var question in questions)
    {
        // This will display every question header on StackOverflow homepage.
        Console.WriteLine(question.Text);
    }
}

```

Java

HTMLUnitDriver

HTMLUnitDriver HtmlUnit Webdriver (GUI) . HTML , , API . AJAX . .

: HTMLUnitDriver http://stackoverflow.com/ .

```

import java.util.List;
import java.util.concurrent.TimeUnit;
import org.openqa.selenium.By;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.WebElement;
import org.openqa.selenium.htmlunit.HtmlUnitDriver;

```

```
class testHeadlessDriver{
    private void getQuestions() {
        WebDriver driver = new HtmlUnitDriver();
        driver.get("http://stackoverflow.com/");
        driver.manage().timeouts().implicitlyWait(60, TimeUnit.SECONDS);
        List<WebElement> questions = driver.findElements(By.className("question-
hyperlink"));
        questions.forEach((question) -> {
            System.out.println(question.getText());
        });
        driver.close();
    }
}
```

(Mozilla Firefox, Google Chrome, IE) GUI .

: <https://riptutorial.com/ko/selenium-webdriver/topic/3931/>-

29:

- `src = ((TakesScreenshot) driver).getScreenshotAs (OutputType.FILE);`
- `FileUtils.copyFile (src, ("D : \ screenshot.png"));`

Examples

:

```
public class Sample
{
    public static void main (String[] args)
    {
        //Initialize Browser*
        System.setProperty("webdriver.gecko.driver", "***E:\\path\\to\\geckodriver.exe**");
        WebDriver driver = new FirefoxDriver();
        driver.manage().window().maximize();
        driver.get("https://www.google.com/");

        //Take Screensnshot
        File src = ((TakesScreenshot) driver).getScreenshotAs (OutputType.FILE);
        try {
            //Save Screenshot in destination file
            FileUtils.copyFile(src, new File("D:\\screenshot.png"));
        } catch (IOException e) {
            e.printStackTrace();
        }
    }
}
```

:

```
File src = ((TakesScreenshot) driver).getScreenshotAs (OutputType.FILE);
```

:

```
FileUtils.copyFile(src, new File("D:\\screenshot.png"));
```

: [https://riptutorial.com/ko/selenium-webdriver/topic/10094/-](https://riptutorial.com/ko/selenium-webdriver/topic/10094/)

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