# @Override annotation in Java

@Override annotation is used when we override a method in sub class.

**public** **class** ParentClass {

**public** **void** displayMethod(String msg){

System.***out***.println(msg);

}

}

**class** SubClass **extends** ParentClass

{

@Override

**public** **void** displayMethod(String msg){

System.***out***.println("Message is: "+ msg);

}

**public** **static** **void** main(String args[]){

SubClass obj = **new** SubClass();

obj.displayMethod("Hello Glasgow!!");

}

}

**Output:**

Message is: Hello Glasgow!!

In the above example we are overriding a method displaymethod() in the child class. Even if we don’t use the @Override annotation, the program would still run fine without any issues.

Using @Override annotation while overriding a method is considered as a best practice in java coding:

1) If programmer makes any mistake such as wrong method name, wrong parameter types while overriding, you would get a compile time error. As by using this annotation you instruct compiler that you are overriding this method. If you don’t use the annotation then the sub class method would behave as a new method (not the overriding method) in sub class.

2) It improves the readability of the code. So if you change the signature of overridden method then all the sub classes that override this particular method would throw a compilation error, which would eventually help you to change the signature in the sub classes. If you have lots of classes in your application then this annotation would really help you to identify the classes that require changes when you change the signature of a method.

<https://beginnersbook.com/2014/07/override-annotation-in-java/>

Listeners “listen” to the event defined in the selenium script and behave accordingly. The main purpose of using listeners is to create logs for events and customize reports.

**Listeners in Selenium: Types of listeners**

Listeners mainly comprise of two types, namely

* WebDriver listeners
* TestNG listeners

**WebDriver listeners**

WebDriverEventListener is an interface.

EventFiringWebDriver- This is a class that actually fires the Webdriver event. These Webdriver events are helpful to view the events triggered by the webdriver.

EventFiringWebDriver dispatches events and the WebDriverEventListener catches them.

**How to implement Listeners in Selenium WebDriver Script**

**Step 1:** Create a Class “ActivityCapture” to implement the WebDriverEventListener methods

**Step 2:** Create another Class “ListenerDemo” and write a script

**Step 3:** Create EventFiringWebDriver object in the Class “ListenerDemo“, and pass driver object as a parameter

**Step 4:** Under the “ListenerDemo“, create an object of the Class “ActivityCapture” to implement all the methods of WebDriverEventListener to register with the EventFiringWebDriver

Add different methods which help in easy execution.

afterChangeValueOf() method is called every time when you want to return the value of the element after it is been changed or modified

Override the methods which help in invoking of functions from the base class in the derived class.

**ActivityCapture program:**

1. Instantiate the WebDriver instance with the browser driver, ChromeDriver
2. Create an object of the EventFiringWebDriver and call it eventHandler
3. Declare the JavaScriptExecutor which acts as an interface while executing the selenium script
4. Create an object of the EventCapture eCapture and register the event
5. Get the URL of the web page: eventHandler.navigate().to(“https://www.edureka.co/blog/”);
6. Perform actions on the web page like scrolling, using the JavaScriptExecutor
7. Find the element on the web page using the element locator, the LinkText
8. Use the object of the EventFiringWebDriver to navigate to a new page: eventHandler.navigate().to(“https://www.edureka.co/all-courses”);
9. Then navigate back to the first page
10. Quit the driver execution using this command eventHandler.quit();
11. Unregister the object of the ActivityCapture, eCapture

The register action enables listening to events in the WebDriverEventListener, and the unregister action stops the listening.

**By using Class AbstractWebDriverEventListener, we can include only those events which we are interested.**

**public** **class** classname **implements** **WebDriverEventListener**

**public** **class** classname **extends** **AbstractWebDriverEventListener**

**simple example:**

<https://www.seleniumeasy.com/selenium-tutorials/webdriver-event-listener-example>

**People often ask the difference between WebDriverEventListener and Log4j, Here both are used for logging purposes BUT, WebDriverEventListener will trigger ONLY webdriver events and Using Log4j we will print all the messages that we provide and along with webdriver events.**

**import** org.openqa.selenium.By;

**import** org.openqa.selenium.WebDriver;

**import** org.openqa.selenium.WebElement;

**import** org.openqa.selenium.support.events.WebDriverEventListener;

//WebDriver Event Listeners

**public** **class** ActivityCapture **implements** WebDriverEventListener{

@Override

**public** **void** beforeNavigateTo(String arg0, WebDriver arg1) {

System.***out***.println("Before navigating "+arg0.toString());

System.***out***.println("Before navigating "+arg1.toString());

}

@Override

**public** **void** afterNavigateTo(String arg0, WebDriver arg1) {

System.***out***.println("After navigating "+arg0.toString());

System.***out***.println("After navigating "+arg1.toString());

}

**public** **void** beforeChangeValueOf(WebElement arg0, WebDriver arg1) {

System.***out***.println("Value of the:" + arg0.toString()

+ " before any changes made");

}

**public** **void** afterChangeValueOf(WebElement arg0, WebDriver arg1, CharSequence[] ch) {

System.***out***.println("Element: \"" + arg0.getAttribute("placeholder") + "\" was updated to: " + arg0.getAttribute("value"));

}

@Override

**public** **void** beforeClickOn(WebElement arg0, WebDriver arg1) {

System.***out***.println("Before clicking On "+arg0.toString());

}

@Override

**public** **void** afterClickOn(WebElement arg0, WebDriver arg1) {

System.***out***.println("After clicking On Element: "+arg0.toString());

}

@Override

**public** **void** beforeNavigateBack(WebDriver arg0) {

System.***out***.println("Before navigating back "+arg0.toString());

}

@Override

**public** **void** afterNavigateBack(WebDriver arg0) {

System.***out***.println("After navigating back "+arg0.toString());

}

@Override

**public** **void** beforeNavigateForward(WebDriver arg0) {

System.***out***.println("Before navigating Forword "+arg0.toString());

}

@Override

**public** **void** afterNavigateForward(WebDriver arg0) {

System.***out***.println("After navigating forword "+arg0.toString());

}

@Override

**public** **void** onException(Throwable arg0, WebDriver arg1) {

System.***out***.println("See Error: " + arg0.getMessage());

System.***out***.println("Test case: " + arg1.toString());

}

@Override

**public** **void** beforeFindBy(By arg0, WebElement arg1, WebDriver arg2) {

System.***out***.println("before FindBY "+arg0.toString());

}

@Override

**public** **void** afterFindBy(By arg0, WebElement arg1, WebDriver arg2) {

System.***out***.println("After FindBy "+arg0.toString());

}

/\*

\* non overridden methods of WebListener class

\*/

**public** **void** beforeScript(String arg0, WebDriver arg1) {

// **TODO** Auto-generated method stub

}

**public** **void** afterScript(String arg0, WebDriver arg1) {

// **TODO** Auto-generated method stub

}

**public** **void** beforeNavigateRefresh(WebDriver arg0) {

// **TODO** Auto-generated method stub

}

**public** **void** afterNavigateRefresh(WebDriver arg0) {

// **TODO** Auto-generated method stub

}

**public** **void** beforeAlertAccept(WebDriver arg0) {

// **TODO** Auto-generated method stub

}

**public** **void** afterAlertAccept(WebDriver arg0) {

// **TODO** Auto-generated method stub

}

**public** **void** beforeAlertDismiss(WebDriver arg0) {

// **TODO** Auto-generated method stub

}

**public** **void** afterAlertDismiss(WebDriver arg0) {

// **TODO** Auto-generated method stub

}

}

**import** java.util.concurrent.TimeUnit;

**import** org.openqa.selenium.By;

**import** org.openqa.selenium.JavascriptExecutor;

**import** org.openqa.selenium.WebDriver;

**import** org.openqa.selenium.chrome.ChromeDriver;

**import** org.openqa.selenium.support.events.EventFiringWebDriver;

**public** **class** ListenerDemo {

**public** **static** **void** main (String [] args) **throws** InterruptedException{

System.*setProperty*("webdriver.chrome.driver", "G:\\Selenium CTS OBL\\chromedriver\_win32\\chromedriver.exe");

System.***out***.println("Started Listeners Class");

WebDriver driver = **new** ChromeDriver();

driver.manage().window().maximize();

driver.manage().timeouts().implicitlyWait(15, TimeUnit.***SECONDS***);

JavascriptExecutor js = (JavascriptExecutor)driver;

EventFiringWebDriver eventHandler = **new** EventFiringWebDriver(driver);

ActivityCapture eCapture = **new** ActivityCapture();

//Registering with EventFiringWebDriver

//Register method allows to register our implementation of WebDriverEventListner to listen to the WebDriver events

eventHandler.register(eCapture);

//navigating to the webpage "www.edureka.co"

eventHandler.navigate().to("https://www.edureka.co/blog/");

js.executeScript("window.scrollBy(0,400)");

driver.manage().timeouts().implicitlyWait(30, TimeUnit.***SECONDS***);

eventHandler.findElement(By.*linkText*("Software Testing")).click();

//navigating to the webpage "www.edureka.co/all-courses/"

eventHandler.navigate().to("https://www.edureka.co/all-courses");

//navigating back to the first page

eventHandler.navigate().back();

eventHandler.quit();

//Unregister allows to detach

eventHandler.unregister(eCapture);

System.***out***.println("End of Listeners Class");

}

}

**Output:**

Started Listeners Class

Before navigating https://www.edureka.co/blog/

Before navigating ChromeDriver: chrome on WINDOWS (ca0c8bd4d58c1c77a46cc0bb4ecd180a)

After navigating https://www.edureka.co/blog/

After navigating ChromeDriver: chrome on WINDOWS (ca0c8bd4d58c1c77a46cc0bb4ecd180a)

before FindBY By.linkText: Software Testing

After FindBy By.linkText: Software Testing

Before clicking On [[ChromeDriver: chrome on WINDOWS (ca0c8bd4d58c1c77a46cc0bb4ecd180a)] -> link text: Software Testing]

After clicking On Element: [[ChromeDriver: chrome on WINDOWS (ca0c8bd4d58c1c77a46cc0bb4ecd180a)] -> link text: Software Testing]

Before navigating https://www.edureka.co/all-courses

Before navigating ChromeDriver: chrome on WINDOWS (ca0c8bd4d58c1c77a46cc0bb4ecd180a)

After navigating https://www.edureka.co/all-courses

After navigating ChromeDriver: chrome on WINDOWS (ca0c8bd4d58c1c77a46cc0bb4ecd180a)

Before navigating back ChromeDriver: chrome on WINDOWS (ca0c8bd4d58c1c77a46cc0bb4ecd180a)

After navigating back ChromeDriver: chrome on WINDOWS (ca0c8bd4d58c1c77a46cc0bb4ecd180a)

End of Listeners Class

|  |  |
| --- | --- |
|  | |
| **TestNG Listeners** | **WebDriver Listeners** |
| Used to generate the report for tests. Helps in capturing screenshots. | Performs jobs like TestNG listeners like logging in and reporting but works on different events |

**TestNG Listener**

TestNG manages everything through Suite, Test and Classes or packages. Listeners gives us the ability to act before and after of every Suite, Test, and Methods.

Using TestNG listeners we could generate logs and customize TestNG Reports.

TestNG can generate step by step logs with the help of Listeners.

**TestNG provides us below listeners:**

1. IExecutionListener
2. IAnnotationTransformer
3. ISuiteListener
4. ITestListener
5. IConfigurationListener
6. IMethodInterceptor
7. IInvokedMethodListener
8. IHookable
9. IReporter

**TestNG Listeners in Selenium WebDriver can be implemented at two levels:**

* Class level: In this, you implement listeners for each particular class no matter how much test cases it includes.
* Suite level: In this, you implement listeners for a particular suite which includes several classes as test cases.

**ITestListener**

**When we use ITestListener?**

1. After successfully completing each test.
2. After each failed test.
3. After each test skipped.
4. After the completion of all tests.

### ****Methods in ITestListener****

1. **onStart** is invoked after the test class is instantiated and before any configuration method is called
2. **onTestSuccess** is invoked on success of a test
3. **onTestFailure** is invoked on failure of a test
4. **onTestSkipped** is invoked whenever a test is skipped
5. **onTestFailedButWithinSuccessPercentage** is invoked each time a method fails but is within the success percentage requested.
6. **onFinish** is invoked after all the tests have run and all their Configuration methods have been called.
7. **onTestStart:** This method is invoked before any tests method is invoked. This can be used to indicate that the particular test method has been started.

**For example:** @Test(successPercentage=60, invocationCount=5), in this annotation success percentage is 60% and invocation count is 5, that means out of 5 times if at least 3 times ((⅗)\*100= 60) the test method gets passed, it would be considered as passed.

For every ITestListener method we usually pass the following arguments:

* **“ITestResult”** interface along with its instance “result” which describes the result of a test.

Note: If you want to trace your exception through ITestResult then you need to avoid try/catch handling.

* **“ITestContext”** interface along with its instance “context” which describes the test context containing all the information of the given test run

Example code for running the test at the class level:

**import** org.testng.ITestContext;

**import** org.testng.ITestListener;

**import** org.testng.ITestResult;

**public** **class** ListenersTestNG **implements** ITestListener{

**public** **void** onTestStart(ITestResult result) {

System.***out***.println("New Test Started" +result.getName());

}

**public** **void** onTestSuccess(ITestResult result) {

System.***out***.println("Test Successfully Finished" +result.getName());

}

**public** **void** onTestFailure(ITestResult result) {

System.***out***.println("Test Failed" +result.getName());

}

**public** **void** onTestSkipped(ITestResult result) {

System.***out***.println("Test Skipped" +result.getName());

}

**public** **void** onTestFailedButWithinSuccessPercentage(ITestResult result) {

System.***out***.println("Test Failed but within success percentage" +result.getName());

}

**public** **void** onStart(ITestContext context) {

System.***out***.println("This is onStart method" +context.getOutputDirectory());

}

**public** **void** onFinish(ITestContext context) {

System.***out***.println("This is onFinish method" +context.getPassedTests());

System.***out***.println("This is onFinish method" +context.getFailedTests());

}

}

Make sure we add a Listeners annotation just above our class name to implement the above added methods.

Syntax: @Listeners(PackageName.ClassName.class)

**import** org.openqa.selenium.By;

**import** org.openqa.selenium.WebDriver;

**import** org.openqa.selenium.chrome.ChromeDriver;

**import** org.testng.Assert;

**import** org.testng.SkipException;

**import** org.testng.annotations.Listeners;

**import** org.testng.annotations.Test;

@Listeners(ListenersTestNG.**class**)

**public** **class** TestNGListenersTest {

@Test //Passing Test

**public** **void** sampleTest1() **throws** InterruptedException

{

System.*setProperty*("webdriver.chrome.driver", "G:\\Selenium CTS OBL\\chromedriver\_win32\\chromedriver.exe");

WebDriver driver = **new** ChromeDriver();

driver.get("https://www.apple.com/");

driver.manage().window().maximize();

driver.findElement(By.*xpath*("//\*[@id=\'ac-globalnav\']/div/ul[2]/li[3]")).click();

Thread.*sleep*(2000);

driver.findElement(By.*cssSelector*("#chapternav &gt; div &gt; ul &gt; li.chapternav-item.chapternav-item-ipad-air &gt; a")).click();

Thread.*sleep*(2000);

driver.findElement(By.*linkText*("Why iPad")).click();

Thread.*sleep*(2000);

driver.quit();

}

@Test //Failing Test

**public** **void** sampleTest2() **throws** InterruptedException

{

System.***out***.println("Forcely Failed Test Method");

Assert.*assertTrue*(**false**);

}

**private** **int** i = 0;

@Test(successPercentage = 60, invocationCount = 5) //Test Failing But Within Success Percentage

**public** **void** sampleTest3() {

i++;

System.***out***.println("Test Failed But Within Success Percentage Test Method, invocation count: " + i);

**if** (i == 1 || i == 2) {

System.***out***.println("sampleTest3 Failed");

Assert.*assertEquals*(i, 6);

}

}

@Test //Skipping Test

**public** **void** sampleTest4()

{

**throw** **new** SkipException("Forcely skipping the sampleTest4");

}

}

**Output:**

New Test StartedsampleTest1

Test FailedsampleTest1

New Test StartedsampleTest2

Forcely Failed Test Method

Test FailedsampleTest2

New Test StartedsampleTest3

Test Failed But Within Success Percentage Test Method, invocation count: 1

sampleTest3 Failed

Test Failed but within success percentagesampleTest3

New Test StartedsampleTest3

Test Failed But Within Success Percentage Test Method, invocation count: 2

sampleTest3 Failed

Test Failed but within success percentagesampleTest3

New Test StartedsampleTest3

Test Failed But Within Success Percentage Test Method, invocation count: 3

Test Successfully FinishedsampleTest3

New Test StartedsampleTest3

Test Failed But Within Success Percentage Test Method, invocation count: 4

Test Successfully FinishedsampleTest3

New Test StartedsampleTest3

Test Failed But Within Success Percentage Test Method, invocation count: 5

Test Successfully FinishedsampleTest3

New Test StartedsampleTest4

Test SkippedsampleTest4

This is onFinish method[ResultMap map={[TestResult name=sampleTest3 status=SUCCESS method=TestNGListenersTest.sampleTest3()[pri:0, instance:TestNGListenersTest@17b4f4c] output={null}]=TestNGListenersTest.sampleTest3()[pri:0, instance:TestNGListenersTest@17b4f4c], [TestResult name=sampleTest3 status=SUCCESS method=TestNGListenersTest.sampleTest3()[pri:0, instance:TestNGListenersTest@17b4f4c] output={null}]=TestNGListenersTest.sampleTest3()[pri:0, instance:TestNGListenersTest@17b4f4c], [TestResult name=sampleTest3 status=SUCCESS method=TestNGListenersTest.sampleTest3()[pri:0, instance:TestNGListenersTest@17b4f4c] output={null}]=TestNGListenersTest.sampleTest3()[pri:0, instance:TestNGListenersTest@17b4f4c]}]

This is onFinish method[ResultMap map={[TestResult name=sampleTest2 status=FAILURE method=TestNGListenersTest.sampleTest2()[pri:0, instance:TestNGListenersTest@17b4f4c] output={null}]=TestNGListenersTest.sampleTest2()[pri:0, instance:TestNGListenersTest@17b4f4c], [TestResult name=sampleTest1 status=FAILURE method=TestNGListenersTest.sampleTest1()[pri:0, instance:TestNGListenersTest@17b4f4c] output={null}]=TestNGListenersTest.sampleTest1()[pri:0, instance:TestNGListenersTest@17b4f4c]}]

PASSED: sampleTest3

PASSED: sampleTest3

PASSED: sampleTest3

FAILED: sampleTest1

Now, suppose you have multiple classes in your project, then adding TestNG Listeners in Selenium WebDriver to each class might be a pain. In such cases, you can create a test suite and add Listeners tag to your suite (xml file) instead of adding Listeners to each class.

<?xml version=*"1.0"* encoding=*"UTF-8"*?>

<!DOCTYPE suite SYSTEM "https://testng.org/testng-1.0.dtd">

<suite name=*"TestNG Listeners Suite"* parallel=*"false"*>

<listeners>

<listener class-name=*"ListenersTestNG"*/>

</listeners>

<test name=*"Test"*>

<classes>

<class name=*"TestNGListenersTest"*/>

</classes>

</test> <!-- Test -->

</suite> <!-- Suite -->

**Output:**

New Test StartedsampleTest1

Test FailedsampleTest1

New Test StartedsampleTest2

Forcely Failed Test Method

Test FailedsampleTest2

New Test StartedsampleTest3

Test Failed But Within Success Percentage Test Method, invocation count: 1

sampleTest3 Failed

Test Failed but within success percentagesampleTest3

New Test StartedsampleTest3

Test Failed But Within Success Percentage Test Method, invocation count: 2

sampleTest3 Failed

Test Failed but within success percentagesampleTest3

New Test StartedsampleTest3

Test Failed But Within Success Percentage Test Method, invocation count: 3

Test Successfully FinishedsampleTest3

New Test StartedsampleTest3

Test Failed But Within Success Percentage Test Method, invocation count: 4

Test Successfully FinishedsampleTest3

New Test StartedsampleTest3

Test Failed But Within Success Percentage Test Method, invocation count: 5

Test Successfully FinishedsampleTest3

New Test StartedsampleTest4

Test SkippedsampleTest4

This is onFinish method[ResultMap map={[TestResult name=sampleTest3 status=SUCCESS method=TestNGListenersTest.sampleTest3()[pri:0, instance:TestNGListenersTest@286778] output={null}]=TestNGListenersTest.sampleTest3()[pri:0, instance:TestNGListenersTest@286778], [TestResult name=sampleTest3 status=SUCCESS method=TestNGListenersTest.sampleTest3()[pri:0, instance:TestNGListenersTest@286778] output={null}]=TestNGListenersTest.sampleTest3()[pri:0, instance:TestNGListenersTest@286778], [TestResult name=sampleTest3 status=SUCCESS method=TestNGListenersTest.sampleTest3()[pri:0, instance:TestNGListenersTest@286778] output={null}]=TestNGListenersTest.sampleTest3()[pri:0, instance:TestNGListenersTest@286778]}]

This is onFinish method[ResultMap map={[TestResult name=sampleTest2 status=FAILURE method=TestNGListenersTest.sampleTest2()[pri:0, instance:TestNGListenersTest@286778] output={null}]=TestNGListenersTest.sampleTest2()[pri:0, instance:TestNGListenersTest@286778], [TestResult name=sampleTest1 status=FAILURE method=TestNGListenersTest.sampleTest1()[pri:0, instance:TestNGListenersTest@286778] output={null}]=TestNGListenersTest.sampleTest1()[pri:0, instance:TestNGListenersTest@286778]}]

===============================================

TestNG Listeners Suite

Total tests run: 8, Passes: 3, Failures: 4, Skips: 1

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**Reference links:**

Sample login page

<https://www.roseindia.net/html/how-to-create-simple-html-login-page.shtml>

<https://www.roseindia.net/tutorialfiles/211321.login.html>

<https://codepen.io/colorlib/pen/rxddKy>

Listeners:

<https://www.swtestacademy.com/how-to-use-testng-listeners/>

<https://stqatools.com/testng-listeners/>

<https://examples.javacodegeeks.com/enterprise-java/testng/testng-listeners-example/#example_ITestListener>

<https://www.lambdatest.com/blog/testng-listeners-in-selenium-webdriver-with-examples/>

<https://dzone.com/articles/testng-listeners-in-selenium-webdriver-with-exampl>

<https://www.toolsqa.com/selenium-webdriver/testng-listeners/>

<https://www.softwaretestingmaterial.com/testng-listeners/>

<https://www.edureka.co/blog/listeners-in-selenium/>

WebDriver Event Listener

<http://learn-automation.com/what-is-listeners-in-selenium-webdriver/>

<https://www.seleniumeasy.com/selenium-tutorials/webdriver-event-listener-example>

<https://selenium.dev/selenium/docs/api/java/org/openqa/selenium/support/events/WebDriverEventListener.html>

<https://blog.testproject.io/2018/06/04/event-listeners/>

<https://www.abodeqa.com/webdrivereventlistener-in-selenium-webdriver/>

**Customizing in emailable report:**

1. Showing Report name and date at the top of the summary table.

2. Added column for test start time and end time to shown in hh:mm:ss format.

3. Added additional column which shows no. of total test methods.

4. Total suite time is displayed in hh:mm:ss format rather than milliseconds.

5. Added exception info column to add exception message on failure.

6. Added screenshot column to add screen shots on failure.

<https://www.seleniumeasy.com/testng-tutorials/customized-testng-emailable-report2>

Headless browser testing

<https://chercher.tech/java/headless-browsers-selenium-webdriver#headless-chrome>

**import** org.openqa.selenium.By;

**import** org.openqa.selenium.WebDriver;

**import** org.openqa.selenium.chrome.ChromeDriver;

**import** org.openqa.selenium.chrome.ChromeOptions;

**public** **class** HeadlessChromeTesting

{

**public** **static** **void** main(String[] args) {

//set the driver server exe path

System.*setProperty*("webdriver.chrome.driver", "G:\\Selenium RS 2019\\chromedriver\_win32\\chromedriver.exe");

ChromeOptions options = **new** ChromeOptions();

// set chrome as Headless

options.setHeadless(**true**);

//Instantiate Chrome Driver

WebDriver driver = **new** ChromeDriver(options);//options

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

// get the title of the page

System.***out***.println("Page title is - " + driver.getTitle());

// get the title of the url

System.***out***.println("Current Url : "+ driver.getCurrentUrl());

// find the element

System.***out***.println("Size : "+ driver.findElement(By.*name*("q")).getSize());

// close the browser

driver.close();

}

}

Properties file with Java in Selenium

<https://chercher.tech/java/properties-file-read-write-java-selenium-webdriver>

Page Object Model in Selenium

<https://chercher.tech/java/page-object-model-selenium-webdriver>