IMPORTANT JAVA TOPICS FOR SELENIUM

1. Loops **for** and **for each**, **while**
2. Conditions **if** and **switch**
3. Exception Handling
4. Collection (List, Set, HashMap)
5. String Methods
6. OOPs concepts,Encapsulation, Polymorphism, Inheritance, Abstract class

**WHAT IS SELENIUM?**

Selenium is a **free** and **open source** web application automation tool. Also we can call it as **Functional Testing** web application automation tool.

1. **Free:** We can use Selenium for commercial purpose without purchasing any license.

Download Selenium

* + **URL**: <http://docs.seleniumhq.org/download/>
  + **Heading**: Selenium Stand Alone Server
  + **Link**: Download Version 2.50.1
  + **File:** selenium-server-standalone-2.50.1.jar

1. **Open Source:** We can view, download and customize the source code of selenium itself. We can see the source code in following website: <https://github.com/SeleniumHQ/selenium>
2. **Web Application Automation Tool:** Selenium is software which is used to test the web application automatically but we can’t automate other type of applications such as Standalone (Desktop) and Client Server applications.

**FLAVORS OF SELENIUM**

1. Selenium core
2. Selenium RC(Selenium 1)
3. Selenium WebDriver (Selenium 2)
4. Selenium IDE
   1. Selendroid - Only for Android
   2. Appium – both Android and Apple

**IQ1.** What is the latest version of selenium is Selenium? **Selenium Webdriver 2.50.1**

**IQ2.** What are the languages supported by Selenium**? Java, C# (.net), Ruby, Python, Javascript, Pearl, PHP, Haskell, Objective C, R, Dart, and Tcl**

**IQ3.** What are the OS supported by selenium? **All OS’s like Windows, Mac, Linux etc IQ4**. Which OS is not supported by selenium? **Unix**

**IQ5**. Can we do Performance Testing using Selenium? **No. But we can integrate selenium with Jmeter. IQ6.** What type of test cases we automate? **Regression Test Cases**

**IQ7.** Do we Automate Integration testing? **Yes. Different types of test cases which is part of regression. IQ8.** Do we automate Negative test cases? **Yes.**

**IQ9.** Which test cases are automated first? **Smoke test cases. (Sanity, Dry Run(Automation), Build Verification Testing(BVT), Skim(UAT))**

### IQ10. Is 100% Automation is possible? No. Why? Because, we don’t have technology to automate the features or it may be very costly or it may require manual intervention.

**Examples**

* 3D games
* Verification of audio, video clips.
* Capturing the attendance using access cards and biometrics scanners, Entering product details using barcode scanner, Payment through credit card swiping. OTP.
* Captcha (Completely Automated Public Turing Test to tell computers and humans Apart)

**REQUIRED SOFTWARE’S**

1. JDK (Java Development Kit)
2. Eclipse, Browser (Firefox)
3. Selenium Jar file / Maven dependencies
4. Any a web application

**STEPS TO CONFIGURE SELENIUM**

1. Go to required location example **D:** & create a folder with the name **ProjectWorkspace.**
2. In Eclipse go to **File > Switch Workspace > Other**
3. Browse & select newly created folder and click on **OK**. It will restart the Eclipse.
4. Go to **File > New > Project** (Create a Java Project). Specify the name as **Automation** and click **Finish**

and **Yes**.

1. Right click on Java Project (i.e **Automation**) and select **New**->**Folder**, give name as **jar file** and click

### Finish.

1. Copy the **selenium jar file**, right click on **jar file** folder and select **Paste**.
2. Expand **jar file** folder, right click on copied Selenium jar file, go to **Build Path** and select **Add to Build Path.**
3. Right click on **src**, go to **New > Package** and give name as **capgemini** (Everything should be written in small case and click Finish)
4. Right click on **capgemini** and go to **New >Class**. Give class name as **Demo**. Select Public Static void Main.

Write code as shown below and execute.

**package** capgemini

**import** org.openqa.selenium.firefox.FirefoxDriver;

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

**public class** Demo

{

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

{

Webdriver drv = **new** FirefoxDriver();

}

}

### Script: Demo1

**package** capgemini;

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**public class** Checkbox {

**public static void** main(String[] args) **throws** InterruptedException { WebDriver driver=**new** FirefoxDriver();

driver.get("file:///D:/Checkbox.html"); Thread.*sleep*(2000);

//Resize the browser

Dimension d=**new** Dimension(200, 200); driver.manage().window().setSize(d); Thread.*sleep*(2000);

//Move the browser

Point p=**new** Point(300, 200); driver.manage().window().setPosition(p); Thread.*sleep*(2000);

}

}

**IQ11.** How do you close the browser without using **close**() method? Ans: Using **quit()** method **IQ12.** How do you open the page without using **get()** method? Ans: Using **navigate().to(url) IQ13.** How do you click on back button? Ans: Using **navigate().back()**

**IQ14.** How do you refresh the page? Ans: Using **navigate().refresh() IQ15.** What is the difference between **get()** and **navigate()** method?

Ans: Using **get()** method we can only open the web page, where as using **navigate()** method we can open the page, click back and forward and we can refresh the web page.

**package** capgemini;

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**public class** Demo2

{

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

{

WebDriver driver=**new** FirefoxDriver(); Thread.sleep(2000); driver.get(["http://www.google.com"](http://www.google.com/)); Thread.sleep(2000); driver.navigate().to(["http://www.gmail.com"](http://www.gmail.com/)); Thread.sleep(2000); driver.navigate().back(); Thread.sleep(2000); driver.navigate().forward(); Thread.sleep(2000); driver.navigate().refresh(); Thread.sleep(2000); driver.quit();

}

}

**IQ16.** Write a script to open google.com and verify that title is Google and also verify that it is redirected to google.co.in

**package** capgemini;

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**public class** Demo1

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.get(["http://www.google.com"](http://www.google.com/)); String title=driver.getTitle(); **if**(title.equals("Google"))

{

System.***out***.println("Pass:Title is Google");

}

#### else

{

System.***out***.println("Fail:Title is not Google: actual title is"+title);

}

String url=driver.getCurrentUrl();

**if**(url.contains("google.co.in"))

{

System.***out***.println("Pass: url has co.in");

}

#### else

{

System.***out***.println("Fail:url dont have co.in"+url);

}

}

}

1. How selenium performs action on the browser?

Ans: By calling the **native methods** of the browser.

**Q18.** Which protocol is used by Selenium to interact/communicate with the browser? Ans: **JSON Wire Protocol (Java Script Object Notation)**

**HANDLING CHROME BROWSER**

* + Selenium performs the action on the browser by calling its **native method**.
  + Firefox browser is open source hence Selenium can directly call its **native methods.** But for other browsers we need **driver executable file** (API).

### Write the code as shown below in main method and execute

**package** capgemini;

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

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

**public class** Demo6

{

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

{

WebDriver driver=**new** ChromeDriver(); driver.get("file:///D:/Demo1.html"); driver.close();

}

}

**Assignment:** Write a script to open google.com in edge (EdgeDriver)

**package** capgemini;

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

**import** org.openqa.selenium.edge.EdgeDriver;

**public class** Demo6

{

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

{

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

driver.get("file:///D:/Demo1.html"); driver.close();

}

}

INHERITANCE AND METHOD OVERRIDING

class A

{

void testA()

{

System.out.println(“A1”);

}

void testB()

{

System.out.println(“B1”);

}

}

class B extends A

{

void testB()

{

System.out.println(“B2”);

}

void testC()

{

System.out.println(“C2”);

}

}

B b1=new B(); b1.testA(); -A1 b1.testB();-B2

b1.testC();-C2 B b1=new B(); A a1=b1;

A1.testA();-A1

A1.testB();-B2

A1.testC();

**RUNTIME POLYMORPHISM**

We use runtime polymorphism in selenium so that it can execute the script on any browser. In order to do this we create the object of required browser and store it in the reference variable of parent interface called ‘**WebDriver”.**

Script to open Chrome and IE browsers using user input:

**package** capgemini;

**import** java.util.Scanner;

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

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**import** org.openqa.selenium.edge.EdgeDriver;

**public class** Demo7

{

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

{

Scanner sc=**new** Scanner(System.in); System.out.println("Enter browser? GC/FF/Edge"); String browser=sc.next();

WebDriver driver;

**if**(browser.equals("GC"))

{

driver=**new** ChromeDriver();

}

**else if**(browser.equals("Edge"))

{

driver=**new** EdgeDriver();

}

#### else

{

driver=**new** FirefoxDriver();

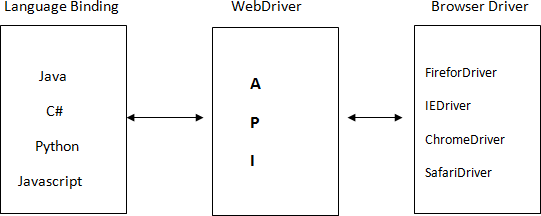
}

driver.get(["http://localhost/login.do"](http://localhost/login.do)); System.out.println(driver.getTitle()); System.out.println(driver.getCurrentUrl()); driver.close();

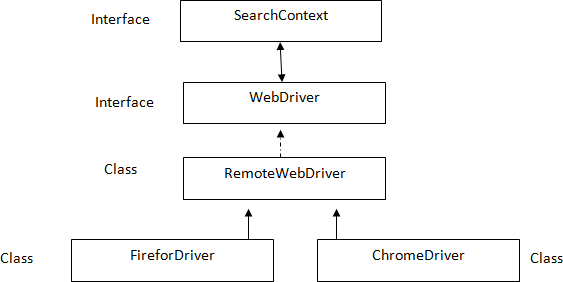
}

}

**ARCHITECTURE OF SELENIUM WEBDRIVER:**



Selenium supports multiple coding languages. Each language has its own binding which communicates with WebDriver API. The WebDriver API performs the action on the browser by using browser specific drivers (Uses **JSON Wire Protocol**)



**ARCHITECTURE OF WEBDRIVER API**

**SearchContext** is super most interfaces which are extended by **WebDriver** interface. Abstract methods of these two interfaces is implemented in **Remote WebDriver** class and overridden in respective browser classes such as FirefoxDriver, ChromeDriver, InternetExplorerDriver, SafariDriver etc.

**Q19**. Explain the following statement: WebDriver driver=new FirefoxDriver();

1. **WebDriver** is a interface
2. **driver** is reference variable

**iii.** = is assignment operator

1. **new** is keyword
2. **FirefoxDriver** is constructor
3. **;** is statement delimiter

**WHAT IS WEB ELEMENT?**

* Anything present on the web page is called as **WebElement**. Such as textbox, button, link etc.
* Elements are created using HTML. It stands for ‘Hyper Text Markup Language’.
* In HTML pre-defined key words within angle brace. It is called as ‘**tag’**. We can use notepad to create the web page. After writing the code we should save the file with extension **.html**

Example: Open the ‘Notepad’ and write following code:

<html>

<body>

<a href=[http://localhos](http://localhose/)t id=”al” name =”nl” class=”cl”>actitime</a>

</body>

</html>

* Go to File and select Save. Navigate to required location. Specify the file name ex: Demo.html and click Save.
* Double click on newly created file which opens the file on default browser.

### Selenium code to open the above web page:

WebDriver driver=new FirefoxDriver(); driver.get(“file:///D:/Demo.html”);

**THE HTML ELEMENT CONTAINS FOLLOWING 3 COMPONENTS**

* 1. Tag
  2. Attribute
  3. Text

1. **Tag:** Anything present after the less than (<) symbol. Ex: html, body, a
2. **Attribute:** Anything present after the tag till the greater than (>) symbol. Ex: href=[http://localhose](http://localhose/) id=”al” name =”nl” class=”cl”>
3. **Text**: Anything present after the greater than (>) symbol till the end of the tag. Ex: actitime

**HOW TO SEE HTML ELEMENT?**

- To see the source code of the element, which is present on the web page, we right click on the element

and select ‘Inspect Element’.

STEPS TO INSTALL Chropath

### Search for Chropath Chrome Plugin or Firefox plugin

1. **Add them to Chrome and Firefox**

If right clicking (Context Click) is disabled, then press F12. Click on the inspect button and then click on required element.

Choose ChroPath option from the right-side panel

**WHAT IS LOCATORS?**

Locators are used to identify the element.

In Selenium before performing any action (click, type etc) we should find the element using **locators**. In Selenium there are 8 types are **locators**. All of them are **static methods** in **By** class (it is an abstract class).

* + All the methods takes string as argument and it returns an object of type **By.**
  + The **By** object is used as input argument for **findElement()** method.
  + Return type of **findElement()** method is **WebElement** (it is an Interface).

**THE LIST OF SELENIUM LOCATORS:**

1. By.tagName
2. By.id
3. By.name
4. By.className
5. By.linkText
6. By.partialLinkText
7. By.cssSelector
8. By.xpath
9. Relative Locators in Selenium(Introduced in Selenium 4)

### Code: Selenium code to click on a link using ‘tagName’:

**package** capgemini;

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

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

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**public class** Demo7

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.get("file:///D:///Demo.html"); By b=By.*tagName*("a"); WebElement e = driver.findElement(b); e.click();

}

}

### Optimized code:

using **tagName**

-

driver.findElement(By.tagName("a")).click();

In the browser find the element by tag name ‘a’ and click on it.

* using **id**

driver.findElement(By.id("a1")).click();

* using **name**

driver.findElement(By.name("n1")).click();

* using **className**

driver.findElement(By.className("c1")).click();

* using **linkText** driver.findElement(By.linkText("actitime")).click(); **Note**: the locator

‘linkText’ can be used only if the element is a link (tag of the element should be a).

* using **partialLinkText**

driver.findElement(By.partialLinkText("acti")).click();

Note: this locator is used to handle dynamic links. driver.findElement(By.partialLinkText("Inbox")).click(); driver.findElement(By.partialLinkText("BuildNo")).click();

### Important Note:

* + If specified locator is matching with more than one element then **findElement**() method

### returns the address of first matching element.

* + If the specified locator is not matching with any of the element then **findElement**() method will

throw ‘**NoSuchElementException**’.

### Script: Write a script to login to actitime application.

**package** capgemini;

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

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**public class** Demo8

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.get(["http://localhost/login.do"](http://localhost/login.do)); driver.findElement(By.*id*("username")).sendKeys("admin"); driver.findElement(By.*name*("pwd")).sendKeys("manager"); driver.findElement(By.*id*("loginButton")).click();

}

}

* using **cssSelector**

<html>

<body>

UN<input type="text"> PW<input type="password">

</body>

</html>

In the above sample page to identify the password field we can’t use id, name, className, linkText, partialLinkText because they are not present. We can use ‘tagName’ but it has duplicate user field. In this situation we can use **cssSelector**. CSS stands for Cascading Style Sheets.

### cssSelector has following syntax:

**Tag[AttributeName=’AttributeValue’]**

Ex: input[type=’password’]

To check whether CSS expression is correct or not, we can use **ChroPath in Mozilla Firefox or Chrome**.

### Ex: findElement by using cssSelector

**package** capgemini;

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

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**public class** Demo6

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.get("file:///D:/Demo2.html"); driver.findElement(By.*cssSelector*("input[type='text']")).sendKeys("admin");

driver.findElement(By.*cssSelector*("input[type='password']")).sendKeys("manag er");

}

}

* using **xpath**

**xpath** is the path of the element in HTML tree.

<html>

<body>

FN<input type="text"> LN<input type="text">

</body>

</html>

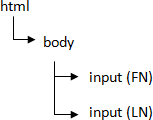
In the above sample web page we can’t use cssSelector because it is same as first name field. In this

case we can use ‘xpath’.

We write the xpath expression using /(forward slash). The first forward slash represents beginning of the tree (root).

After every forward slash we should specify tag of immediate child element. We can also use index which starts from 1.

### HTML Tree:

****

Xpath for First Name: /html/body/input[1] Xpath for Last Name: /html/body/input[2]

### Checking xpath using Firefox:

* Open the required page in Mozilla Firefox
* Press F12. Select ‘xpath’.
* Type ‘xpath’ expression /html/body/input [1]. It will highlight matching element.

**package** capgemini;

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

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**public class** Day6Demo2

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.get("file:///D/Demo2.html"); driver.findElement(By.*xpath*("/html/body/input[1]")).sendKeys("a"); driver.findElement(By.*xpath*("/html/body/input")).sendKeys("c"); driver.findElement(By.*xpath*("/html/body/input[2]")).sendKeys("b");

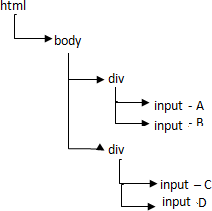
}

}

**TYPES OF XPATH**

1. Absolute xpath
2. Relative xpath
3. xpath by Attribute
4. xpath by text() function
5. xpath by contains() function

Let’s consider the following html tree to deriver xpath expression



### Absolute xpath

Specifying complete path of the element form the root till the element is called as absolute xpath. Ex:

|  |  |
| --- | --- |
| **Xpath** | **Matching Element** |
| **/html/body/div[1]/input[1]** | A |
| **/html/body/div[1]/input[2]** | B |
| **/html/body/div[2]/input[1]** | C |
| **/html/body/div[2]/input[2]** | D |
| **/html/body/div[1]/input** | AB |
| **/html/body/div[2]/input** | CD |
| **/html/body/div/input[1]** | AC |
| **/html/body/div/input[2]** | BD |
| **/html/body/div/input** | ABCD |
| **/html/body/div[1]/input[1]| /html/body/div[2]/input[2]** | AD |
| **/html/body/div[1]/input[2]| /html/body/div[2]/input[1]** | BC |
| **/html/body/div[1]/input[1]| /html/body/div[1]/input[2]|**  **/html/body/div[2]/input[1]** | ABC |

**Q20**. WRITE A SCRIPT TO TAKE SCREENSHOT OF THE APPLICATION?

**package** capgemini;

**import** java.io.File;

**import** java.io.IOException;

**import** org.apache.commons.io.FileUtils; **import** org.openqa.selenium.OutputType;

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

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

**public class** Copyscreenshot

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.get(["http://localhost/login.do"](http://localhost/login.do));

File fptr = ((TakesScreenshot)drv).getScreenshotAs(OutputType.***FILE***);

FileUtils.copyFile(fptr, new File("./screenshots/"+imagecount+++"\_filename.png"));

}

}

### Limitations:

* We can only take screenshot in PNG(Portable Network Graphics) format.
* We can’t take screenshot of the popup.
* We can’t take screenshot of multiple browser.
* We can’t take screenshot of required area on the Web page.

**TYPES OF XPATH**

### Relative xpath

Absolute ‘xpath’ is very lengthy. In order to reduce the length of expression we can use relative

‘xpath’.

In relative ‘xpath’ we use double forward slash(//) which represents any child, also called as

‘descendent’.

|  |  |
| --- | --- |
| **Xpath** | **Matching element** |
| **//div[1]/input[1]** | A |
| **//div[1]/input[2]** | B |
| **//div[2]/input[1]** | C |
| **//div[2]/input[2]** | D |
| **//div[1]/input** | AB |
| **//div[2]/input** | CD |
| **//input[1]** | AC |
| **//input[2]** | BD |
| **//input** | ABCD |
| **//div[1]/input[1]| //div[2]/input[2]** | AD |
| **//div[1]/input[2]| //div[2]/input[1]** | BC |
| **//div[1]/input[1]| //div[1]/input[2]| //div[2]/input[1]** | ABC |

**Q21.** What is the different between single forward slash and double forward slash?

Ans: Single forward slash represent immediate child where as double forward slash represents any child (descendent).

**Q22.** What is the difference between ‘//a’ and ‘//table//a’?

**Ans**: ‘//a’ matches with all the links present which are in the entire page.

Whereas ‘//table//a’ matches with all the links which are present inside the table. **Q23.** Derive an ‘xpath’

which matches with all the images present on the web page? **Ans: ‘//img’**

**Q24.** Write an ‘xpath’ which matches with all the links and all the images present on the web page?

### Ans: ‘//a|//img’

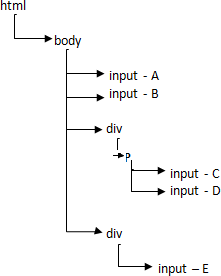
Important Note: **xpath** matches with hidden elements also.

**Q25.** What is the difference between //input and //div//input?

//Input matches with all the inputs present in the entire web page.

//div//input matches with all the inputs present inside the ‘div’.

//div/input matches with all the immediate child input of ‘div’



//div//input -> CDE

//div/input -> E

//input -> ABCDE

//p/input -> CD

### xpath by Attribute

To identify the element uniquely, we can include attribute in the ‘xpath’ expression using below syntax

### //tag[@AttributeName=’AttributeValue’]

//input[@id=’username’]

**Note:** We can use more than one attribute in an ‘xpath’ expression:

//input[@id=’username’] [@type =’text’]

//input[@id=’username’] AND [@type =’text’]

//input[@id=’username’] OR [@type =’text’]

### xpath by text() function

If Attribute is matching with more than one element or if the attribute is not present then we can identify the element using its text. It has following syntax:

### //tag[text()=’textValue’]

Examples:

//div[text()=’Login ‘]

//div[text()=’Users’]

//td[text()=’Java’]

//div[@class=’label’][text()=’Users’]

Important Note: If there is a ‘Non Breakable Space’ in attribute value or in text value then ‘xpath’ will

not identify the element. Ex: HTML code present in source file.

### xpath by contains() function

When we inspect the element, we cannot make out whether the space is given using the space bar

or by using the key work or using the ‘&nbsp’.

**<html>**

**<body>**

**<botton type="&nbsp submit &nbsp">&nbsp Sign in &nbsp</button>**

**</body>**

**</html>**

HTML code displayed in firebug:

### <button type=” submit “> Sign in </button>

Even though we write the ‘xpath’ by copy pasting the value from the source code displayed in the firebug, it will not match with any element.

Ex: //button[@type=’ submit ‘] No Match

//button[text()=’ Sign in ‘]No Match

**Contains:** We can use contains function when there is a ‘Non Breakable Space’ to identify the element. It has following syntax

### 1: //tag [contains(@AttributeName,’AttributeValue’)] 2: //tag [contains(text(), ‘textValue’)].

Example:

//button[contains(@type, ‘submit’)]

//button[contains(@text, ‘Sign in’)]

//input[contains(@value, ‘Create Type of Work’)]

**Q26.** How do you handle if there is ‘Non Breakable Space’ between the strings? Ex: <button>&nbsp Sign &nbsp in &nbsp</button>

Xpath: //button [contains(text(),’Sign’)][contains(text(),’in’)]

Note: We can use contains function to handle dynamic element also. Ex: <span>(build 27261)</span>. In this example build number 27261 will be changing. //span[contains(text(),’build’)]

**Q27.** When do we use contains function?

Ans:We use ‘contains’ function if there is a ‘Non Breakable Space’ in attribute value or text value. We use

‘contains’ function when the element is dynamic (some part of its value keeps changing)

**Important Note**: Out of 8 locators we use following 4 important locators.

1. ID
2. Name
3. linkText
4. Xpath

Sometimes ***xpath*** written using one browser may not work in another browser. In such cases we can convert **xpath** into **cssSelector** as shown below.

//input[@name=’UN’]  input[name=’UN’]

//input[@id=’UN’]  input #UN or #UN

//class[@id=’UN’]  input.UN

//a  a

//table/tbody  table>tbody

//table//td  table td

//\*[@id=’UN’]  #UN

//\*[@class=’UN’]  .UN

Note: \* indicates any tag

In ‘cssSelector’ we can’t identify the element using its text and cssSelector do not support backward

traversing. We can’t use independent dependent concept.

//table/..  Not possible

//a[text()=’abc’]  Not possible

**Relative Locators**

Relative Locators, introduced in Selenium 4, allow you to locate web elements based on their position relative to other elements. This is useful when traditional locators such as ID, Name, Class, XPath, and CSS Selectors are not effective due to dynamic attribute changes.

Why Use Relative Locators?

* Enhanced Readability – Instead of complex XPath, you can use simple relative positioning.
* Improved Maintainability – If the structure of a webpage changes, relative locators still work in many cases.
* Works Well for Dynamic Webpages – Useful for testing pages where elements don’t have unique attributes.

**Supported Relative Locators in Selenium**

The **RelativeLocator** class in Selenium provides the following locators:

|  |  |
| --- | --- |
| Locator | Description |
| above() | Finds an element located **above** another element |
| below() | Finds an element located **below** another element |
| toLeftOf() | Finds an element located **to the left** of another element |
| toRightOf() | Finds an element located **to the right** of another element |
| near() | Finds an element **near (within 50px by default)** another element |

**relative\_locators.html**

<!DOCTYPE html>

<html lang="en">

<head>

<meta charset="UTF-8">

<meta name="viewport" content="width=device-width, initial-scale=1.0">

<title>Relative Locators in Selenium</title>

</head>

<body>

<h2>Login Form</h2>

<label for="username">Username:</label>

<input type="text" id="username" name="username">

<img src="user-icon.png" id="userIcon" alt="User Icon">

<br><br>

<label for="password">Password:</label>

<input type="password" id="password" name="password">

<br><br>

<button id="loginBtn">Login</button>

<button id="resetBtn">Reset</button>

<br><br>

<p id="supportText">Need Help?</p>

<a href="#" id="supportBtn">Support</a>

<p id="footerText">© 2025 Educatio</p>

</body>

</html>

import org.openqa.selenium.By;

import org.openqa.selenium.WebDriver;

import org.openqa.selenium.WebElement;

import org.openqa.selenium.chrome.ChromeDriver;

import org.openqa.selenium.support.locators.RelativeLocator;

public class RelativeLocatorsTest {

public static void main(String[] args) {

// Initialize WebDriver

WebDriver driver = new ChromeDriver();

// Open the HTML page

driver.get("file:///D:/relative\_locators.html");

// Locate elements using relative locators

WebElement usernameInput = driver.findElement(By.id("username"));

WebElement passwordInput = driver.findElement(By.id("password"));

WebElement loginButton = driver.findElement(RelativeLocator.with(By.tagName("button")).above(passwordInput));

WebElement resetButton = driver.findElement(RelativeLocator.with(By.tagName("button")).toRightOf(loginButton));

WebElement supportLink = driver.findElement(RelativeLocator.with(By.tagName("a")).near(By.id("supportText")));

WebElement footerText = driver.findElement(RelativeLocator.with(By.tagName("p")).below(By.id("supportBtn")));

// Interacting with elements

usernameInput.sendKeys("testuser");

passwordInput.sendKeys("password123");

loginButton.click();

// Print text of located elements

System.out.println("Support Link Text: " + supportLink.getText());

System.out.println("Footer Text: " + footerText.getText());

// Close the browser

driver.quit();

}

}

**SYNCHRONIZATION**

Process of matching Selenium speed with application is called as Synchronization. On real time applications when Selenium try to find the element it may through ‘NoSuchElementException’ even though specified locator is correct. To handle this we can use ‘Sleep’ method of thread class as shown below.

**package** capgemini;

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

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**public class** DemoLogout

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.get(["http://localhost/login.do"](http://localhost/login.do)); driver.findElement(By.*id*("username")).sendKeys("admin"); driver.findElement(By.*name*("pwd")).sendKeys("manager"); driver.findElement(By.*id*("loginButton")).click();

#### try

{

Thread.*sleep*(20000);

}

**catch** (InterruptedException e)

{

e.printStackTrace();

}

driver.findElement(By.*id*("logoutLink")).click(); driver.close();

}

}

**USING IMPLICITLYWAIT**

If we use **sleep()** method we should specify it in all the locations where application is slow. This will increase the time taken to write script, it consumes lot of space and increases maintenance of the script and it always waits for specified duration. Ex: if the duration is 20 sec, it will always waits for 20 sec even though element is displayed in the 5 sec.

To overcome all these limitations, we should use the synchronization option given by Selenium called

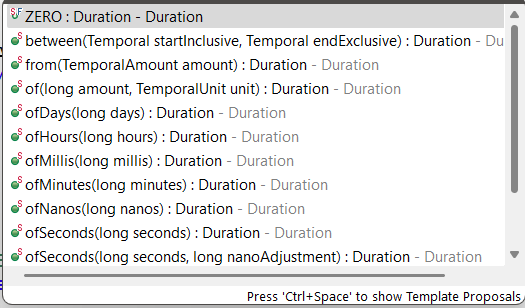
**implicitlyWait** as shown below.

WebDriver driver=new FirefoxDriver(); driver.manage().timeouts().implicitlyWait( Duration.ofSeconds(5));

The duration specified in **implicitlyWait** statement is used only by **findElement()** and **findElements().**

But do not by any other methods.

It takes one argument Duration. The duration can be anyone of the following



If we use **implicitlyWait** then if the element is not located the **findElement()** method will keep searching for the element after every 500 MILLISECONDS. This is duration is called as “**Poling Period**”. This is specified in a class called **FluentWait**.

If the element is not located even after the duration then we get **NoSuchElementException**.

**Q33.**Can we specify **ImplicitlyWait** statement multiple times in the Selenium script? **Yes. Q34.** Is it necessary to write **ImplicitlyWait** statement multiple times? **No.**

**USING EXPLICIT WAIT**

**WebDriverWaits** itself is called Explicit Wait.

Wherever we can’t use **implicitlyWait** (Other than findElement) we should use **Explicit Wait**. Since we specify the waiting condition explicitly it is called as **Explicit Wait**.

When the control comes to **wait.until** statement it will keep checking the condition after every 500 Mili Seconds. If the condition is satisfied it will go to next statement. If the condition is not satisfied even after the duration we get **TimeoutException**.

All the conditions are present in the class called **ExpectedConditions**. These conditions are also called as

### Predicate.

**Q35:** Print the title of the home page after login to the application.

**import** java.util.concurrent.TimeUnit; **import** org.openqa.selenium.By; **import** org.openqa.selenium.WebDriver;

**import** org.openqa.selenium.firefox.FirefoxDriver;

**import** org.openqa.selenium.support.ui.ExpectedConditions; **import**

org.openqa.selenium.support.ui.WebDriverWait; **public class** Demo

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.manage().timeouts().implicitlyWait( Duration.ofSeconds(5));

driver.get(["http://demo.actitime.com"](http://demo.actitime.com/)); driver.findElement(By.id("username")).sendKeys("admin"); driver.findElement(By.name("pwd")).sendKeys("manager"); driver.findElement(By.id("loginButton")).click();

WebDriverWait wait = **new** WebDriverWait(drv, Duration.*ofSeconds*(10)); WebElement ele =

wait.until(ExpectedConditions.*visibilityOf*(drv.findElement(By.*id*("logoutlink")))); ele.click();

String title=driver.getTitle(); System.out.println(title);

}

}

**Q36.** What are the differences between ‘Implicit’ and ‘Explicit’ wait?

|  |  |
| --- | --- |
| **Implicit** | **Explicit** |
| **We do not specify the condition** | We should specify the condition |
| **We can handle ‘Findelement’ and ‘Findelements’** | We can handle any method |
| **After the duration we get ‘NoSuchElement’**  **exception** | After the duration we get ‘Timeout’  exception |

### Script: Handling findElement using explicitWait

**import** java.util.concurrent.TimeUnit; **import** org.openqa.selenium.By; **import** org.openqa.selenium.WebDriver;

**import** org.openqa.selenium.firefox.FirefoxDriver;

**import** org.openqa.selenium.support.ui.ExpectedConditions; **import**

org.openqa.selenium.support.ui.WebDriverWait; **public class** Day11Demo3

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.manage().timeouts().implicitlyWait( Duration.ofSeconds(5));

driver.get(["http://demo.actitime.com"](http://demo.actitime.com/)); driver.findElement(By.*id*("username")).sendKeys("admin"); driver.findElement(By.*name*("pwd")).sendKeys("manager"); driver.findElement(By.*id*("loginButton")).click();

WebDriverWait wait = **new** WebDriverWait(drv, Duration.*ofSeconds*(10)); if( WebElement ele = wait.until(ExpectedConditions.titleIs("actiTIME -

Enter Time-Track"))){ driver.findElement(By.*id*("logoutLink")).click();

}

}

}

**Q37.** Write a script to login and logout from the application without specifying the waiting period or without using any of the Synchronization methods.

**package** capgemini;

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

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

**import** org.openqa.selenium.NoSuchElementException;

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**public class** Demo4

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.manage().timeouts().implicitlyWait( Duration.ofSeconds(5));

driver.get(["http://demo.actitime.com"](http://demo.actitime.com/)); driver.findElement(By.*id*("username")).sendKeys("admin"); driver.findElement(By.*name*("pwd")).sendKeys("manager"); driver.findElement(By.*id*("loginButton")).click(); **while**(**true**)

{

#### try

{

}

driver.findElement(By.*id*("logoutLink")).click();

#### break;

**catch**(NoSuchElementException e)

{

System.***out***.println("Bye");

}

}

}

}

**Q38.** Write a code to print the value present in the text box?

**package** capgemini;

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

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

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**public class** Assign1

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.get("file:///D:/Demo2.html"); WebElement tv=driver.findElement(By.*id*("t3")); String printText=tv.getAttribute("value");

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

}

}

**Q39.** Write a code to change the value present in the text box?

**package** capgemini;

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

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

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**public class** Assign2

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.get("file:///D:/Demo2.html"); WebElement tv=driver.findElement(By.*id*("t3"));

tv.clear(); tv.sendKeys("Webdriver");

}

}

**Q40.** Write a script to remove text present in the text box without using clear method?

**package** capgemini;

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

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**public class** Assign3

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.get("file:///D:/Demo2.html");

WebElement tv=driver.findElement(By.*id*("t4")); tv.sendKeys(Keys.***CONTROL***+"a"); tv.sendKeys(Keys.***DELETE***);

}

}

**Q41.** Write a script to clear the text present in the text box by pressing back space?

**package** capgemini;

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

**import** org.openqa.selenium.Keys;

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

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**public class** Assign4

{

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

{

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

driver.get("file:///D:/Demo2.html");

WebElement tv=driver.findElement(By.*id*("t4")); String st=tv.getAttribute("value");

**int** count=st.length(); **for**(**int** i=1;i<=count;i++) tv.sendKeys(Keys.***BACK\_SPACE***);

}

}

**Q42.** Write a script to copy & paste the value present in one text box into another text box?

**package** capgemini;

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

**import** org.openqa.selenium.Keys;

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

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**public class** Assign5

{

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

{

WebDriver drv = **new** FirefoxDriver(); drv.manage().window().maximize(); drv.navigate().to("file:///D:/demopage.html"); WebElement v1=drv.findElement(By.*id*("name")); v1.sendKeys("Hello"); v1.sendKeys(Keys.***CONTROL***+"a"); v1.sendKeys(Keys.***CONTROL***+"c");

WebElement v2=drv.findElement(By.*id*("displayed-text")); v2.clear();

v2.sendKeys(Keys.***CONTROL***+"v");

}

}

**Q43**. Write a script to print text of the link?

**package** capgemini;

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

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

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**public class** Assign6

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.get(["http://www.facebook.com"](http://www.facebook.com/)); WebElement v1=driver.findElement(By.*xpath*("//input[@id='persist\_box']/../../../../td[2]/a"

));

String text = v1.getText(); System.***out***.println(text);

}

}

**Q44.** Write a script to print x and y coordinates of an element?

**package** capgemini;

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

**import** org.openqa.selenium.Point;

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

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**public class** Assign7

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.get(["http://www.facebook.com"](http://www.facebook.com/));

WebElement em=driver.findElement(By.id("email")); Point p=em.getLocation();

System.out.println("X coordinate (in pixels): "+p.getX()); System.out.println("Y coordinate (in pixels): "+p.getY());

}

}

**Q45.** Write a script to verify that email text box and Next button present in Gmail login page are aligned horizontally? (x value should be same)

**package** capgemini;

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

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

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**public class** Assign9

{

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

{

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

driver.get(["http://www.gmail.com"](http://www.gmail.com/));

WebElement em=driver.findElement(By.*id*("Email")); Point p1=em.getLocation();

**int** x1=p1.getX();

System.***out***.println("X value of email field: "+x1); WebElement nxt=driver.findElement(By.*id*("next"));

Point p2=nxt.getLocation();

**int** x2=p2.getX();

System.***out***.println("X value of next button: "+x2);

**if**(x2-x1<=0)

{

System.***out***.println("Email textbox and next button aligned horizontally");

}

#### else

{

System.***out***.println("Not alligned Horizontally");

}

}

}

**Q46.** Write a script to print width and height of a text box?

**package** capgemini;

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

**import** org.openqa.selenium.Dimension;

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

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**public class** Assign9

{

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

{

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

driver.get(["http://www.gmail.com"](http://www.gmail.com/));

WebElement em=driver.findElement(By.id("Email")); Dimension s = em.getSize();

System.out.println("Height of the textbox: "+s.getHeight()); System.out.println("Width of the textbox: "+s.getWidth());

}

}

**Q47.** Write a script to verify that width of email textbox and next button is same which are present in Gmail login page?

**package** capgemini;

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

**import** org.openqa.selenium.Dimension;

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

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**public class** Assign9

{

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

{

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

driver.get(["http://www.gmail.com"](http://www.gmail.com/));

WebElement em=driver.findElement(By.*id*("Email")); Dimension s1 = em.getSize();

**int** w1 = s1.getWidth();

WebElement nxt=driver.findElement(By.*id*("next"));

Dimension s2=nxt.getSize();

**int** w2=s2.getWidth();

System.***out***.println("Width of Email textbox: "+w1); System.***out***.println("Width of next button: "+w2); **if**(w1==w2)

{

System.***out***.println("Width of email textbox and next button is same");

}

#### else

{

System.***out***.println("Width of email textbox & next button is not same");

}

}

}

**Q48**. Write a script to verify that height of email password and login button which are present in FB login page are same?

**package** capgemini;

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

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

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**public class** Assign8

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.get(["http://www.facebook.com"](http://www.facebook.com/));

WebElement em=driver.findElement(By.*id*("email")); Dimension s1=em.getSize();

**int** h1=s1.getHeight();

System.***out***.println("Height of Email textbox: "+h1); WebElement pwd=driver.findElement(By.*id*("pass"));

Dimension s2=pwd.getSize();

**int** h2=s2.getHeight();

System.***out***.println("Height of passowd textbox: "+h2);

WebElement button=driver.findElement(By.*id*("u\_0\_v"));

same");

Dimension s3=button.getSize();

**int** h3=s3.getHeight();

System.***out***.println("Height of login button: "+h3);

**if**(h1-h2==0&&h2-h3==0&&h3-h1==0)

{

System.***out***.println("Height of email, password and login button is

}

#### else

{

System.***out***.println("Height of email, password and login button is not the same");

}

}

}

**Q49.** Write a script to verify that email text box present in Facebook login page is empty?

Hint: get the value and check the length of it. Length should be 0.

**package** capgemini;

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

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

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**public class** Assign8

{

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

{

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

driver.get(["http://www.facebook.com"](http://www.facebook.com/));

WebElement em=driver.findElement(By.id("email")); String t = em.getAttribute("value"); **if**(t.length()==0)

{

System.**out**.println("Textbox present in Facebook login page is empty");

}

#### else

{

System.**out**.println("Textbox present in Facebook login page is not empty");

}

}

}

**Q50.** Write a script to verify the status of the check box which is present in FaceBook login page? Note: IsSelected method is used to verify the checkbox or radio button is selected.

**package** capgemini;

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

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

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**public class** Assign

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.get(["http://www.facebook.com"](http://www.facebook.com/));

WebElement chkbox=driver.findElement(By.*id*("persist\_box")); WebElement radbtn=driver.findElement(By.*id*("u\_0\_e"));

**if**(chkbox.isSelected())

{

}

#### else

{

}

System.***out***.println("Checkbox is selected");

System.***out***.println("Checkbox is deselected");

**if**(radbtn.isSelected())

{

System.***out***.println("Radio button is selected");

}

#### else

{

System.***out***.println("Radio button is deselected");

}

}

}

**Q51**. Write a script to verify whether login button is enabled or not which is present in the FB page?

**package** capgemini;

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

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

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**public class** assign10

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.get(["http://www.facebook.com"](http://www.facebook.com/));

WebElement log=driver.findElement(By.*id*("u\_0\_v"));

**if**(log.isEnabled())

{

}

#### else

{

}

}

}

System.***out***.println("Login button is enabled");

System.***out***.println("Login button is disabled");

**Q52**. Write a script to verify that logo of actitime is displayed on the login page?

**package** capgemini;

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

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

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**public class** Assign11

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.get(["http://localhost/login.do"](http://localhost/login.do));

WebElement logo=driver.findElement(By.*id*("logoContainer"));

**if**(logo.isDisplayed())

{

System.***out***.println("Logo is displayed");

}

#### else

{

System.***out***.println("Log is not displayed");

}

}

}

**Q53**. How do you execute an exe file in Selenium?

In Selenium there is No option to run exe file. We can use runtime class to execute the exe files.

**package** capgemini;

**import** java.io.IOException;

**public class** Day13Demo1

{

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

{

Runtime.*getRuntime*().exec("C:/Windows/system32/calc.exe");

}

}

**Q54.** Write a script to delete all the cookies present in the browser?

**package** capgemini;

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**public class** Demo

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.manage().deleteAllCookies();

}

}

**Q56.** What are the different ways of clicking on a button?

1. click()
2. sendKeys()
3. submit()//this works only if button code is submit
4. javascript
5. AutoIt
6. Robot Class

**package** capgemini;

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

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

org.openqa.selenium.WebElement;

**import** org.openqa.selenium.firefox.FirefoxDriver;

**public class** Demo

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.get(["http://demo.vtiger.com"](http://demo.vtiger.com/));

String xp="//button[text()='Sign in']"; WebElement btn = driver.findElement(By.*xpath*(xp)); btn.sendKeys(Keys.***ENTER***);

}

}

**Q57.** How do you get the font size of the text box? Or how do you get style property of an element? Ans: Using **getCssValue()**

**package** capgemini;

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

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

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**public class** Day13Demo5

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.get(["http://demo.vtiger.com"](http://demo.vtiger.com/));

WebElement un = driver.findElement(By.*id*("username")); String s = un.getCssValue("font-size"); System.***out***.println(s);

driver.close();

}

}

**Q58**. Write a script to print background color of a textbox?

**package** capgemini;

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

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

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**public class** Demo

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.get(["http://localhost/login.do"](http://localhost/login.do));

WebElement un=driver.findElement(By.id("username")); System.out.println(un.getCssValue("color"));

}

}

**IMPORTANT METHODS OF WEBELEMENT INTERFACE**

* 1. clear()
  2. click()
  3. getAttribute()
  4. getCssValue()
  5. getLocation()
  6. getSize()
  7. getText()
  8. isDisplayed()
  9. isEnabled()
  10. isSelected()
  11. sendkeys()
  12. submit()

**JAVASCRIPT**

If the method of Selenium is not working such as sendkeys(), click() etc. then we can use javascript as alternative option. Ex: if the textbox is disabled we can use sendkeys() method. In such cases we can use javascript.

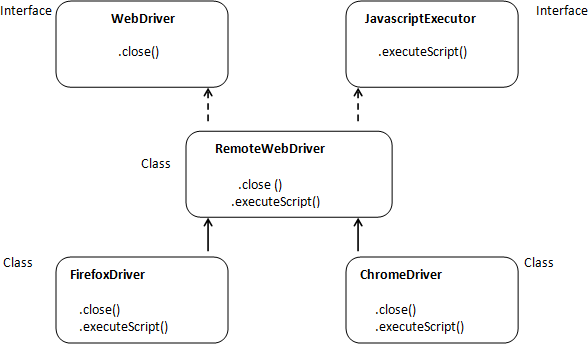
### Steps to Run Java Script Manually

1. Open the required page in Firefox. Press F12 to open ‘Firebug’.
2. Click on ‘Console’ tab.
3. Type the java script in the textbox available at the bottom of ‘Firebug’ window and press enter.

|>alert (‘Hi’)  (press Enter)

### Executing Java Script in Selenium

- To run the Java Script in Selenium we should use **executeScript()** method.



The **executeScript()** method declared is declared in **JavascriptExecutor** interface which is implemented in **RemoteWebDriver**, but after creating the object of the browser we will ‘upcast’ it to **WebDriver** interface which will hide all the methods of **JavascriptExecutor**. In order to access those methods we should

‘downcast’ it.

**package** capgemini;

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**import** org.openqa.selenium.remote.RemoteWebDriver;

**public class** Javascript1

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.get(["http://localhost/login.do"](http://localhost/login.do));

RemoteWebDriver r=(RemoteWebDriver) driver;

r.executeScript("alert('Hi')");

}

}

**Q59**. How do you click on the button using Java Script?

**package** capgemini;

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**import** org.openqa.selenium.remote.RemoteWebDriver;

**public class** Demo

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.get(["http://localhost/login.do"](http://localhost/login.do));

RemoteWebDriver r= (RemoteWebDriver) driver;

String c="document.getElementById('loginButton').click()"; r.executeScript(c);

}

}

**Q60.** How do you enter the text into the textbox without using ‘sendkeys’?

### Using Javascript.

**package** capgemini;

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**import** org.openqa.selenium.remote.RemoteWebDriver;

**public class** Demo9

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.get(["http://demo.vtiger.com/"](http://demo.vtiger.com/));

RemoteWebDriver r= (RemoteWebDriver) driver;

String c="document.getElementById('username').value='admin'"; r.executeScript(c);

}

}

**Q49.** Write a code to remove the value present in the textbox using Java Script?

**package** capgemini;

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**import** org.openqa.selenium.remote.RemoteWebDriver;

**public class** Demo10

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.get(["http://demo.vtiger.com/"](http://demo.vtiger.com/));

RemoteWebDriver r= (RemoteWebDriver) driver;

String c="document.getElementById('username').value=''"; r.executeScript(c);

}

}

**Q61**. How do you enter the value if textbox is disabled? **Ans:** Using **Javascript**.

**package** capgemini;

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**import** org.openqa.selenium.remote.RemoteWebDriver;

**public class** Javascript2

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.get("file:///D:/Demo2.html");

RemoteWebDriver r= (RemoteWebDriver) driver;

String c="document.getElementById('t1').value='Wonderful'"; r.executeScript(c);

}

}

**Q62.** How do you scroll the web page? By using java **script(scrollTo) Q63.** Write a script to scroll to the bottom of the web page?

**package** capgemini;

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**import** org.openqa.selenium.remote.RemoteWebDriver;

**public class** Demo11

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.get("https://ww.google.com/");

RemoteWebDriver r= (RemoteWebDriver) driver;

String c="window.scrollTo(0,document.body.scrollHeight)"; r.executeScript(c);

}

}

**Q64.** Write a script to scroll to the specific element? Hint: get the Y coordinate of the element using get

location method and pass it as argument for ‘scrollTo’ method.

**package** capgemini;

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

**import** org.openqa.selenium.Point;

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

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

**import** org.openqa.selenium.firefox.FirefoxDriver; **import** org.openqa.selenium.remote.RemoteWebDriver; **public class** Javascript3

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.get("file:///D:/mydownloads/Google%20News.htm"); driver.manage().window().maximize();

RemoteWebDriver r= (RemoteWebDriver) driver;

WebElement el=driver.findElement(By.*linkText*("Business »")); System.***out***.println(el.getText());

Point l = el.getLocation();

**int** y=l.getY();

String s="window.scrollTo(0,"+y+")";

r.executeScript(s);

}

}

**HANDLING MULTIPLE ELEMENTS**

In order to handle multiple elements we use **findElements**() method which returns **List of WebElement**

[**List<WebElement>**]. List should be imported from java.util package. Under the List we frequently use the following two methods.

1. list**.size()** - It returns element present in the List (return type int)
2. list**.get()** – It returns element present in the specified index (return type WebElement)

**Note**: For findElements() method we can use any of the 8 locators, but frequently use is xpath. Sample page

<html>

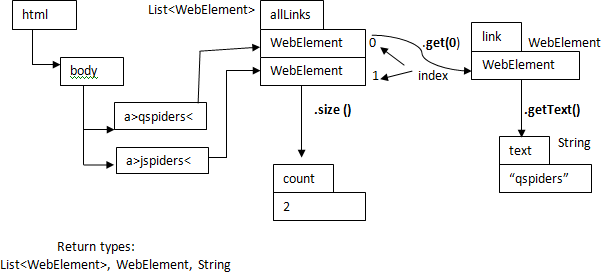
<body>

</body>

</html>

<a href=”[https://www.capgemini.com](https://www.capgemini.com/)”>capgemini</a>

<a href=”[https://www.ibm.com](https://www.ibm.com/)”>ibm</a>



Sample html page > Demo4.html

<html>

<body>

<div>

</div>

<a [href="https://www.capgemini.com">capgemini</a>](http://www.capgemini.com/)

<a [href="https://www.ibm.com">ibm</a>](http://www.ibm.com/)

<br><br>

<input type="checkbox"><br><br>

<input type="checkbox"><br><br>

<input type="checkbox"><br><br>

<input type="checkbox"><br><br>

<input type="checkbox"><br><br>

<input type="checkbox"><br><br>

<br><br>

<div>

<table border="1">

<tbody>

<tr>

<td>1</td>

<td>Java</td>

<td>300</td>

</tr>

<tr>

<td>2</td>

<td>Selenium</td>

<td>400</td>

</tr>

<tr>

</tr>

<td>3</td>

<td>CRM</td>

<td>500</td>

</body>

</html>

</tbody>

</table>

</div>

**package** capgemini;

**import** java.util.List;

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

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

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**public class** Elements1

{

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

{

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

driver.get("file:///D:/Demo4.html");

List<WebElement> allLinks = driver.findElements(By.*xpath*("//a"));

**int** count = allLinks.size(); System.***out***.println("Total Number of links: "+count);

WebElement link = allLinks.get(0); String text = link.getText(); System.***out***.println(text);

}

}

**Q65.** Write a script to print text of links present on the page.

**package** capgemini;

**import** java.util.List;

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

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

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**public class** Elements1

{

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

{

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

driver.get("file:///D:/Demo4.html");

List<WebElement> allLinks = driver.findElements(By.*xpath*("//a"));

**for**(**int** i=0;i<allLinks.size();i++)

{

String text = allLinks.get(i).getText();

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

}

}

}

### Note: alternate for loop

for(WebElement link:allLinks)

{

System.out.println(link.getText()

}

**Q66**. Write a script to count the no.of checkboxes present on the page.

**Q67**. Write a script to select all the check boxes present on the page from top to bottom

**package** capgemini;

**import** java.util.List;

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

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

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**public class** Elements1

{

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

{

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

driver.get("file:///D:/Demo4.html");

List<WebElement> allchkbox = driver.findElements(By.xpath("//input"));

**int** count = allchkbox.size(); System.out.println("Total no. of checkboxes: "+count);

//select all check boxes from top to bottom

**for**(**int** i=0;i<count;i++)

{

WebElement chkbox = allchkbox.get(i);

chkbox.click();

}

//deselect all checkboxes from bottom to top

**for**(**int** i=count-1;i>=0;i--)

{

allchkbox.get(i).click();

}

}

}

**Q68.** Write a script to print all the url present on the page.

**package** capgemini;

**import** java.util.List;

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

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

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**public class** Elements1

{

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

{

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

driver.get("file:///D:/Demo4.html");

List<WebElement> allLinks = driver.findElements(By.*xpath*("//a"));

**for**(WebElement link:allLinks)

{

String url = link.getAttribute("href"); System.***out***.println(url);

}

}

}

**Q69**. Write a script to print the contents of the table.

**package** capgemini;

**import** java.util.List;

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

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

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**public class** Elements1

{

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

{

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

driver.get("file:///D:/Demo4.html");

List<WebElement> allCells = driver.findElements(By.xpath("//td"));

**int** count=allCells.size();

**for**(**int** i=0;i<count;i++)

{

WebElement cell = allCells.get(i); String text = cell.getText();

System.out.println(text);

}

}

}

**Q70.** Write a script to print all numbers present in the table.

**Q71**. Write a script to print sum of all the numbers present in the table.

**package** capgemini;

**import** java.util.List;

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

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

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**public class** Elements1

{

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

{

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

**int** sum=0; driver.get("file:///D:/Demo4.html");

List<WebElement> allCells = driver.findElements(By.*xpath*("//td"));

**int** count=allCells.size();

**for**(**int** i=0;i<count;i++)

{

String text = allCells.get(i).getText();

#### try

{

**int** x = Integer.*parseInt*(text);

System.***out***.println(x); //prints only numbers sum=sum+x;

}

**catch**(NumberFormatException e)

{

//System.out.println(text); //Prints only strings

}

}

System.***out***.println("Sum is: "+sum);

}

}

**Q72.** Write a script to print on numbers present in the table without using Try-Catch

**package** capgemini;

**import** java.util.List;

**import** org.apache.commons.lang3.StringUtils;

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

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

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**public class** Elements1

{

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

{

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

driver.get("file:///D:/Demo4.html");

List<WebElement> allCells = driver.findElements(By.*xpath*("//td"));

**int** count=allCells.size();

**for**(**int** i=0;i<count;i++)

{

String text = allCells.get(i).getText();

**if**(StringUtils.*isNumeric*(text))

{

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

}

}

}

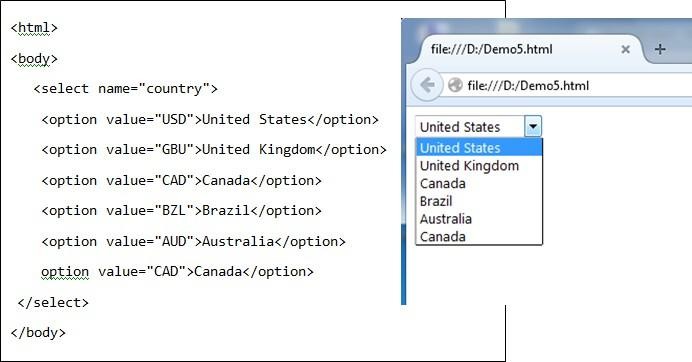
}

**Q73**. What are the difference between findElement() and findElements()

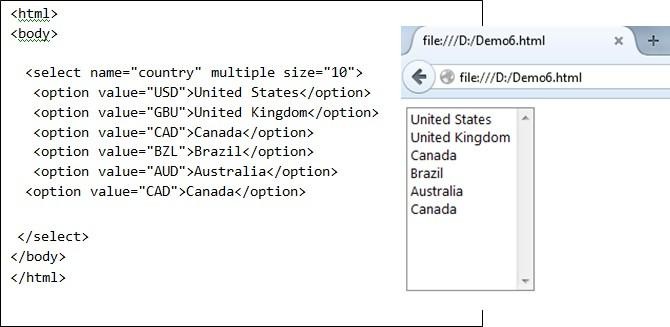
|  |  |
| --- | --- |
| **findElement()** | **findElements()** |
| **Return type is WebElement** | Return Type is List<WebElement> |
| **If the specified locator is matching with Multiple elements, it returns first matching**  **element.** | If the specified locator is matching with multiple elements it returns all the matching elements. |
| **If the specified locator is not matching with any of the element then it will throw**  **NoSuchElementException.** | If the specifies locator is not matching with any of the element it will not throw any exception instead  of this it returns empty list. |

**HANDLING LISTBOX**

Sample html page: Demo5.html (Single select listbox)



Sample webpage: Demo6.html (Multiselect Listbox)



To handle the listbox, we use Select class of selenium. It should be imported from the following packages:

### import org.openqa.selenium.suport.ui.Select

**Select** class has parameterized constructor (single arg constructor) it takes an argument type **WebElement** (address of the listbox). In order to select the required option present in the listbox we can use any one the following method **of Select** class.

1. **selectByVisibleText(str**) > takes string argument
2. **selectByIndex(int)** > takes integer argument
3. **selectByValue(str)** > takes string argument
4. **selectByPartialVisibleText(str**) > takes string argument

If the specified option is duplicate in will select first matching option(in dropdown list) and if the specified option is not present(text, value or index), we get ***NoSuchElementException.***

**Select** class can also be used to handle mulitselect listbox. If the specified option is duplicate in mutliselect listbox, it selects all the matching option.

In ***Select*** class we also have the following 4 methods. This can be used on Multiselect listbox

1. **deselectByVisibleText(str)**
2. **deselectByIndex(int)**
3. **deselectByValue(str)**
4. **deselectAll()**
5. **deselectByPartialVisibleText(str)**

**Q74.** Script to verify whether the listbox is single select or mutliselect Note: We use **isMultiple()** methods present in Select class.

**package** capgemini;

**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.support.ui.Select;

**public class** Listbox1

{

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

{

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

driver.get("file:///D:/Demo6.html");

WebElement listBox = driver.findElement(By.*name*("country")); Select select=**new** Select(listBox);

**boolean** v = select.isMultiple();

//returns true if it is multiselect listbox

//returns false if it is single select listbox

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

//selects specific option select.selectByVisibleText("United Kingdom"); select.selectByIndex(3); select.selectByValue("AUD");

//deselect specific option select.deselectByVisibleText("United Kingdom"); select.deselectByIndex(3); select.deselectByValue("AUD");

}

}

**Q75**. Write a script to count no.of options present in the listbox

**Q76**. Write a scrtipt to select all the options present in the listbox and deselect all the option

**package** capgemini;

**import** java.util.List;

**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.support.ui.Select;

**public class** Listbox1

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.get("file:///D:/Demo6.html"); WebElement listBox = driver.findElement(By.*name*("country"));

Select select=**new** Select(listBox); List<WebElement> allOptions = select.getOptions();

**int** count=allOptions.size(); System.***out***.println(count);

**for**(**int** i=0;i<count;i++)

{

select.selectByIndex(i);

}

select.deselectAll();

}

}

**Q77**. Write a script to print all the contents of the listbox

**package** capgemini;

**import** java.util.List;

**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.support.ui.Select;

**public class** Listbox1

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.get("file:///D:/Demo6.html"); WebElement listBox = driver.findElement(By.name("country"));

Select select=**new** Select(listBox); List<WebElement> allOptions = select.getOptions(); **for**(**int** i=0;i<allOptions.size();i++)

{

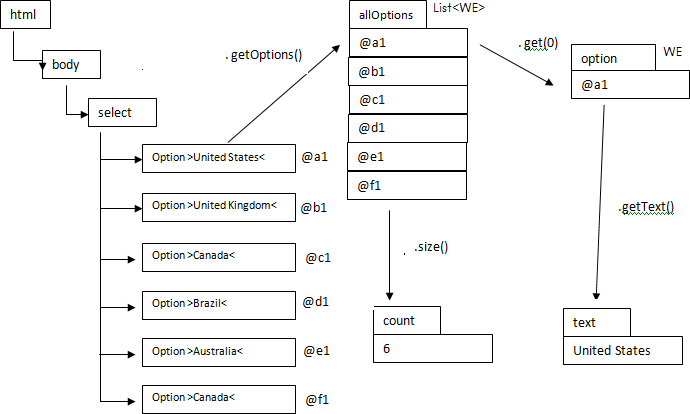
WebElement option = allOptions.get(i);

String text = option.getText(); System.out.println(text);

}

}

}



**Q78.** Write a script to search for specified option in the listbox

**package** capgemini; **import** java.util.List; **import** java.util.Scanner;

**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.support.ui.Select;

**public class** Listbox1

{

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

{

System.***out***.println("Enter option to search:");

Scanner sc=**new** Scanner(System.***in***); String eText=sc.next();

**int** found=0; System.***out***.println("Searching. "); WebDriver driver=**new** FirefoxDriver(); driver.get("file:///D:/Demo6.html");

WebElement listBox = driver.findElement(By.*name*("country")); Select select=**new** Select(listBox);

List<WebElement> allOptions = select.getOptions();

**for**(**int** i=0;i<allOptions.size();i++)

{

String atext = allOptions.get(i).getText();

**if**(atext.equals(eText))

{

found++;

}

}

**if**(found==0)

{

System.***out***.println(eText+" is not found"); //No matching

}

**else if**(found==1) // if found >1 then duplicates

{

System.***out***.println(eText+" is found"); //matching found

}

#### else

{

System.***out***.println(eText+ "is duplicate");

}

driver.close();

}

}

**Q79.** Write a script to print the content of list in sorted order.

**package** capgemini;

**import** java.util.ArrayList;

**import** java.util.Collections;

**import** java.util.List; **import** java.util.Scanner; **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.support.ui.Select;

**public class** Listbox1

{

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

{

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

driver.get("file:///D:/Demo6.html");

WebElement listBox = driver.findElement(By.*name*("country")); Select select=**new** Select(listBox);

List<WebElement> allOptions = select.getOptions(); ArrayList<String> allText=**new** ArrayList<String>();

**for**(**int** i=0;i<allOptions.size();i++)

{

String text = allOptions.get(i).getText();

allText.add(text);

}

Collections.*sort*(allText);

**for**(String s:allText)

{

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

}

}

}

## Q80.

* Australia
* Brazil
* Canada
* Canada
* United Kingdom
* United States
  1. //Write a script to print only duplicates.
  2. //Write a script to print all the options except duplicates

package capgemini; import java.util.HashSet;

import java.util.List;

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.support.ui.Select; public class Listbox1

{

public static void main(String[] args)

{

WebDriver driver=new FirefoxDriver();

driver.get("file:///D:/Demo6.html");

WebElement listBox = driver.findElement(By.*name*("country")); Select select=new Select(listBox);

List<WebElement> allOptions = select.getOptions(); HashSet<String> allText=new HashSet<String>(); for(int i=0;i<allOptions.size();i++)

{

String text = allOptions.get(i).getText(); if(allText.add(text)==false)

{

System.*out*.println(text); //print duplicate

}

}

}

}

//Write a script to print all the options except duplicates

**package** capgemini; **import** java.util.HashSet; **import** java.util.List;

**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.support.ui.Select;

**public class** Listbox1

{

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

{

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

driver.get("file:///D:/Demo6.html");

WebElement listBox = driver.findElement(By.*name*("country")); Select select=**new** Select(listBox);

List<WebElement> allOptions = select.getOptions();

HashSet<String> allText=**new** HashSet<String>();

**for**(**int** i=0;i<allOptions.size();i++)

{

String text = allOptions.get(i).getText();

allText.add(text);

}

**for**(Object o:allText)

{

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

}

}

}

**Q81.** Write a script to sort the content of the listbox without using sort() method of collection ( Hint: using comparator() method of String class, it it returns any positive then swap the values.)

**HANDLING AUTOSUGGESTION**

In some of the textbox when we type a letter or set of characters it will automatically display set of options which is called as Autosuggestion.

Example: Google

### Steps:

1. Open the browser
2. Go to [www.google.com](http://www.google.com/)
3. Type “selenium” in the search textbox which display autosuggestions
4. Count the no.of autosuggestions
5. Print all the autosuggestions
6. Select one of them.

### Script:

package capgemini; import java.util.List;

import org.openqa.selenium.By; import org.openqa.selenium.WebDriver;

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

public class GoogleHomePage {

public static void main(String[] args){ WebDriver driver;

driver.navigate().to([https://www.google.com](https://www.google.com/)); driver.manage().window().maximize();

WebElement searchbox = drv.findElement(By.name("q")); searchbox.sendKeys("Selenium");

List<WebElement> suggestion\_list = driver.findElements(By.xpath("//ul[@role='listbox']/li"));

for (WebElement suggest : suggestion\_list) { if(suggest.getText().toLowerCase().contains("selenium

download")) {

}

}

}

suggest.click(); break;

**Q82**. Write a script to perform the following steps

* Go to [www.makemytrip.com](http://www.makemytrip.com/)
* specify Bang in the “from” field
* count the no of autosuggestions displayed
* print all the autosuggestions
* print the second option without using index Hint: press key down using sendKeys() method.

**package** capgemini;

**import** java.util.List;

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

**import** org.openqa.selenium.Keys;

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

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**public class** Autosug1

{

**public static void** main(String[] args) **throws** InterruptedException{ WebDriver driver=**new** FirefoxDriver();

driver.manage().window().maximize(); driver.get(["http://www.makemytrip.com/flights"](http://www.makemytrip.com/flights));

WebElement textbox=driver.findElement(By.*id*("from\_typeahead1")); textbox.clear();

textbox.sendKeys("Bang"); Thread.*sleep*(2000); List<WebElement> allOptions =

driver.findElements(By.*xpath*("//div[@class='tt-suggestion']"));

**int** count=allOptions.size(); System.***out***.println("No. of autosuggestions"+count); System.***out***.println("List of autosuggstions");

**for**(**int** i=0;i<count;i++)

{

String text=allOptions.get(i).getText(); System.***out***.println(text);

}

textbox.sendKeys(Keys.***ARROW\_DOWN***); textbox.sendKeys(Keys.***ARROW\_DOWN***);

textbox.sendKeys(Keys.***ENTER***);

}

}

### If listbox is developed using select tag then only we can use Select class.

If the listbox developed using some other tag such as input, div, li, ul(unorderedlist),ol etc then if we try to use Select class we get ***UnexceptedTagNameException.***

To handle this situation we can use **click()** or **sendKeys**() method.

**Q83**. How do you handle listbox without using Select class Ans: using sendKeys() or click() method

**Q84.** How do you handle dropdown menu.

*Ans*: Dropdown menu is a element on which if we move the mouse pointer it will display list of options to handle dropdown menu. And we use ***moveToElement()*** method of ***Actions*** class. t has parameterized constructor it takes an argument of type **WebDriver**.Whenever we call any methods of **Actions** class we should always call ***perform()*** method.

Example

**package** capgemini;

**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;

**public class** Autosug2

{

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

{

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

driver.get(["http://www.actimind.com"](http://www.actimind.com/));

WebElement menu =driver.findElement(By.*xpath*("//span[text()='About Company']"));

Actions actions=**new** Actions(driver); actions.moveToElement(menu).perform(); driver.findElement(By.*linkText*("Basic Facts")).click();

}

}

**Q85.** Write a script to perform following steps: 1. go to istqb.in, 2. go to Foundation > Registration >

Corporate Registration > select Online Registration

**package** capgemini;

**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;

**public class** Autosug2

{

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

{

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

driver.manage().window().maximize(); driver.manage().timeouts().implicitlyWait(10, TimeUnit.***SECONDS***); driver.get(["http://www.istqb.in"](http://www.istqb.in/));

Actions actions=**new** Actions(driver);

WebElement menu = driver.findElement(By.*linkText*("FOUNDATION")); actions.moveToElement(menu).perform();

WebElement submenu1=driver.findElement(By.*linkText*("REGISTRATION")); actions.moveToElement(submenu1).perform();

WebElement submenu2 = driver.findElement(By.*linkText*("Corporate Registration"));

actions.moveToElement(submenu2).perform();

driver.findElement(By.*linkText*("Online Registration")).click();

}

}

**Q86.** How do you handle context menu?

Ans: Right clicking is also called **as Contextclick**.

When we right click on any element we get list of options which is called as context menu.

To right click on the element we use ***contextClick()*** method of ***Actions*** class. and to select required option in the contextmenu, we press the shortcut such as "t" for new tab, "w" for newwindow etc using ***sendKey()*** method of ***Actions*** class.

Example

**package** capgemini;

**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;

**public class** Autosug3

{

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

{

WebDriver driver = **new** FirefoxDriver(); driver.get(["http://localhost/login.do"](http://localhost/login.do));

WebElement link=driver.findElement(By.*linkText*("Actimind Inc.")); Actions

actions=**new** Actions(driver); actions.contextClick(link).perform(); actions.sendKeys("t").perform();

}

}

**Q87**. How do you perform drag and drop action in selenium.

**Ans:** using **dragAndDrop()** method of **Actions** class

package capgemini;

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;

public class Autosug4

{

public static void main(String[] args)

{

WebDriver driver=new FirefoxDriver();

String url=["http://www.dhtmlgoodies.com/submitted-scripts/i-google-like-](http://www.dhtmlgoodies.com/submitted-scripts/i-google-like-) drag- drop/index.html";

driver.get(url);

Actions actions=new Actions(driver);

WebElement source=driver.findElement(By.*xpath*("//h1[text()='Block 1']"));

WebElement target=driver.findElement(By.*xpath*("//h1[text()='Block 3']")); actions.dragAndDrop(source, target).perform();

}

}

Note: We can use Actions class to double click on the element Ex: actions.doubleClick(fileElement).perform();

**ENCAPSULATION**

Hiding the data and binding with methods is called as Encapsulation. Data will be stored in a variable in java for any given variable we should perform following steps:

1. **Declaration**
2. **Initialization**
3. **Utilization**

public class A

{

private int i;

public void A(int j)

{

i=j;

}

public int getValue()

{

return i;

}

}

public class B

{

public static void main(String[] args)

{

A a=new A(5);

int x=a.getValue() System.out.println(x);

}

}

There are two classes in the given example; the purpose of class A is only to manage the variable i. whereas the purpose of class B is only to execute the code.

**USING ENCAPSULATION IN SELENIUM**

* Selenium code to enter “admin” in the username textbox.

driver.findElement(By.id("username")).sendKeys("admin");

* Above code can we written as shown below

WebElement unTextBox= driver.findElement(By.id("username")); unTextBox.sendKeys("admin");

WebElement unTextBox;

unTextBox= driver.findElement(By.id("username")); unTextBox.sendKeys("admin");

Example:// class LoginPage

package capgemini;

import org.openqa.selenium.By;

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

public class LoginPage

{

private WebElement unTextBox;

public LoginPage(WebDriver driver)

{

unTextBox=driver.findElement(By.*id*("username"));

}

public void setUserName()

{

unTextBox.sendKeys("admin");

}

}

//class MainMethod

**package** capgemini;

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**public class** MainMethod

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.get(["http://localhost/login.do"](http://localhost/login.do));

LoginPage l=**new** LoginPage(driver); l.setUserName();

}

}

### Enhanced program:

//class LoginPage

**package** capgemini;

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

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

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

**public class** LoginPage

{

**private** WebElement unTextBox; **private** WebElement pwTextBox; **private** WebElement loginButton;

**public** LoginPage(WebDriver driver)

{

unTextBox=driver.findElement(By.*id*("username")); pwTextBox=driver.findElement(By.*name*("pwd")); loginButton=driver.findElement(By.*id*("loginButton"));

}

**public void** login(String un, String pw)

{

unTextBox.sendKeys(un); pwTextBox.sendKeys(pw);

loginButton.click();

}

}

//class MainMethod

**package** capgemini;

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**public class** MainMethod

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.get(["http://localhost/login.do"](http://localhost/login.do));

LoginPage l=**new** LoginPage(driver);

l.login("admin","manager");

}

}

**Note:** The login() method present in LoginPage class can be used to enter valid and invalid inputs:

**public class** MainMethod

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.get(["http://localhost/login.do"](http://localhost/login.do));

LoginPage l=**new** LoginPage(driver); l.login("abc","xyz");

Thread.*sleep*(2000); l.login("admin","manager");

}

}

But when we execute the above code we get ***StaleElementReferenceException*** because when it clicks on loginbutton after entering invalid username and password, page will be reloaded and address of the element will be changed. But the reference variables such as unTextBox will be holding old address. It will try to enter valid username using old address which is invalid. Hence we get the Exception.

**SCRIPT TO EXPLAIN StaleElementReferenceException**

**public class** MainMethod

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.get(["http://localhost/login.do"](http://localhost/login.do));

//stores username address in @a1

WebDriver unTexBox=driver.findElement(By.id(“username”));

//refresh and username get new address x1

driver.navigate().refresh();

//try to enter admin using old address a1

unTextBox.sendKeys(“admin”);

}

}

**POM CONCEPTS**

To avoid StaleElementReferenceException we use Page Object Model POM class. POM is one of the Java design pattern. POM concept is used by both developers and testengineers (automation) to develop and test webpages.

In POM class we declare the element using ***FindBy Annotation*** and we write it as ***@FindBy***. It should be imported from the following package

Import org.openqa.selenium.support.FindBy;

### Syntax 1: single element

@FindBy(locator=”locator value”) private WebElement elementname;

### Syntax2: multiple element

@FindBy(locator=”locator value”)

private List<WebElement> elementname;

To initialize the element we use ***initElements()*** method of PageFactory class. It takes two arguments

### WebDriver

* **Object of POM class**

***initElement()*** method will only loads the element (reference variable),but it will not initialize actually. Element are actually initialized during runtime when we try to perform any action on the element. This process is called as ***Lazy Initialization***. This will avoid **StaleElementReferenceException.** Since only one element is loaded at a time it will improve the performance of the script execution.

Example: //POM class

**package** capgemini;

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

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

**import** org.openqa.selenium.support.FindBy; **import** org.openqa.selenium.support.PageFactory; **public class** LoginPage

{

@FindBy(id="username") **private** WebElement unTextBox; @FindBy(name="pwd")

**private** WebElement pwTextBox;

@FindBy(id="loginButton")

**private** WebElement loginButton;

**public** LoginPage(WebDriver driver)

{

PageFactory.*initElements*(driver, **this**);

}

**public void** login(String un, String pw)

{

unTextBox.sendKeys(un); pwTextBox.sendKeys(pw);

loginButton.click();

}

}

//class MainMethod

**package** capgemini;

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**public class** MainMethod

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.get(["http://localhost/login.do"](http://localhost/login.do));

LoginPage l=**new** LoginPage(driver); l.login("abc","xyz"); Thread.*sleep*(3000);

l.login("admin","manager");

}

}

**Q88.** what is pom?

Ans: it is one of the java designing pattern to develop and test webpage.

**Q89**. How do you declare the element in the pom class? Ans:Usng FindBy Annotation (@FindBy)

* @FindBy(id=”username”)
* private WebElement unTextBox;

**Q90**. How do you handle multiple elements in pom class?

Ans: we handle it using @FindBy itself and we change the datatype to List<WebElement>

**package** capgemini;

**import** java.util.List;

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

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

**import** org.openqa.selenium.support.FindBy; **import** org.openqa.selenium.support.PageFactory; **public class** LoginPage

{

@FindBy(xpath="//input[@type='checkbox']") **private** List<WebElement> allChkBox; **public** LoginPage(WebDriver driver)

{

PageFactory.*initElements*(driver, **this**);

}

**public void** selectAllChkBox()

{

**int** count=allChkBox.size();

**for**(**int** i=0;i<count;i++)

{

allChkBox.get(i).click();

}

}

}

### // Main method

**package** capgemini;

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**public class** MainMethod

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.get("file:///D:/Demo4.html"); LoginPage l=**new** LoginPage(driver);

l.selectAllChkBox();

//deselects all l.selectAllChkBox();

}

}

**Q91.** What happens if we do not use intiElements() method in POM class? Ans: we get NullPointerException

**Q92**. Can we develop POM class without the constructor? Ans: Yes. We should explicitly call initElements() method.

//class LoginPage

**package** capgemini;

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

**import** org.openqa.selenium.support.FindBy;

**public class** LoginPage

{

@FindBy(id="username")

**private** WebElement unTextBox;

**public void** setUserNAme(String un)

{

unTextBox.sendKeys(un);

}

}

//Main Method

**package** capgemini;

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**import** org.openqa.selenium.support.PageFactory;

**public class** MainMethod

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.get(["http://localhost/login.do"](http://localhost/login.do));

LoginPage l=**new** LoginPage();

PageFactory.*initElements*(driver, l);

l.setUserNAme("admin");

}

}

**Q93.** What is the difference between Page Object Model and PageFactory

Ans: POM is java design concept. PageFactory is class which implements cocept.

**Q94.** What is the advantage of using POM class?

Ans: it will avoid StaleElementReferenceException and it improve the performance

**Q95.** What is Object Repository?

It is the location where we store the objects(elements)

**Q96**. What is Page Object Repository?

Ans: It is the location where we store the elements present on the page. Page ObjectModel is also called as Page Object Repository

### LIMITATIONS OF @FindBy

* We cannot use variables in place of locatorvalue in the FindBy Annotation Below code is invalid. int i=1;

@FindBy(id=”username”+i) private WebElement unTextBox;

**TESTNG – TEST NEXT GENERATION**

It is unit testing framework. Basically TestNG is used by developers to perform unit testing and it is also used in selenium to perform BlackBox testing.

* **Run multiple test classes**
* **Generate Reports**
* **Rerun only failed classes etc**

TestNG is available as plug-in for Eclipse IDE

STEPS TO INSTALL  **TestNG**

1. Open the eclipseIDE > click on Help > select Eclipse Market Place
2. Search for TestNG
3. Click Install Button of TestNG
4. Select “Accept” and click finish.
5. Click “ok” on the popup
6. Click “yes” which restarts the Eclipse
7. Right click JavaProject and go to Properties
8. Click on Java Build Path
9. Click on “Libraries” tab
10. Click on “Add Library”
11. Select TestNG > click Next > click finish and click on OK, this will associate TestNG with current Java Project.

FOLLOWING 4 ARE THE REQUIRED JAR FILES:

1. testing.jar
2. jcommander.jar
3. bash-2.ob4.jar
4. snakeyaml.jar

**TestNG class** While creating TestNG class we should not use

* 1. Default package
  2. No main() method
  3. No System.out.println Example:

**package** testNg;

**import** org.testng.Reporter;

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

**public class** TestNGdemo1

{

@Test

**public void** testDemo()

{

Reporter.*log*("Welcome to testNG", **true**);

}

}

When we execute the above code it will automatically generate execution result in html format, in order to see it

1. Refresh the Javaproject which will displays “test-output” folder
2. Expand the folder & right click on “emailable-report.html”
3. Goto Open With and select WebBrowser

### TestNG Suite

It is an xml file , which contains list of all TestNG classes which are to be executed. Suite file is used for Batch execution. To create it:

1. Right click on Java Project
2. Goto TestNG
3. Select Convert to TestNG
4. Click finish
5. It creates TestNG.xml file inside the JavaProject

### To Execute it

1. Right click on xml file.
2. Goto Run as & select TestNG suite.

### Content of TestNG Suite

<suite name="Suite" parallel="none">

<test name="Test">

<classes>

<class name="testNg.TestNGdemo1"/>

</classes>

</test>

</suite>

**Q97.** How do you execute only failed test classes?

Ans: using *TestNG-Failed.xml* file present in *test-output* folder

**Q98.** If class contains multiple test methods in which order they are executed? Ans: Alphabetical order (ascending)

**Q99**. How to execute the test method in required order? Ans: using priority.

**Note:** Default priority is 0.

If the priority is duplicate then those methods will be executed in alphabetical order. We can specify –ve value for priority and it will execute them in ascending order.

Variable and decimal numbers are not allowed. **Q100**. How do you run a test method multiple-time? Ans: using invocationCount.

**Note:** Defualt invocationCount is 1.

If we specify 0 or –ve number it will not execute the test method. Fraction numbers and variables are not allowed.

**Q101**. What are the import annotations used in TestNG with respect to selenium. Ans: @Test – this indicates test method.

@BeforeMethod – this method will be executed before the execution of every test methods.

@AfterMethod – this method is executed after execution of every method

@BeforeClass – this method is executed only once at the beginning of the class @AfterClass – this method is executed only once at the end of the class.

Example:

package testNg;

import org.testng.Reporter;

import org.testng.annotations.AfterClass; import org.testng.annotations.AfterMethod; import org.testng.annotations.BeforeClass;

import org.testng.annotations.BeforeMethod;

import org.testng.annotations.Test; public class TestngDemo2

{

@BeforeClass

public void openApp()

{

Reporter.*log*("OpenApp", true);

}

@AfterClass

public void closeApp()

{

Reporter.*log*("CloseApp",true);

}

@BeforeMethod public void login()

{

Reporter.*log*("Login",true);

}

@AfterMethod

public void logout()

{

Reporter.*log*("Logout",true);

}

@Test (priority=2, invocationCount=2)

public void editUser()

{

Reporter.*log*("Edit User",true);

}

@Test

public void register()

{

Reporter.*log*("Register",true);

}

@Test

public void deleteUser()

{

Reporter.*log*("Delete User",true);

}

}

**Output>>** OpenApp Login Delete User Logout Login Register Logout Login

Edit User Logout Login Edit User Logout CloseApp

**Q102**. How do make a test depend on other test? Ans: By using dependsonMethods option. **Q103**. If both primary and dependency are specified which one will be used? Ans: dependency Example

**package** testNg;

**import** org.testng.Assert;

**import** org.testng.Reporter;

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

**public class** TestngDemo3

{

@Test (priority=2)

**public void** createUser()

{

Reporter.*log*("Create User",**true**); Assert.*fail*();

}

@Test (priority=1,dependsOnMethods={"createUser"})

**public void** deleteUser()

{

Reporter.*log*("Delete User",**true**);

}

}

In the above example deleteUser() method depends on createUser() method i.e If createUser() method is executed successfully (passed), then only it will execute deleteUser() method.

If createUser() method is failed, then it will skip the execution of deleteUser() method. **Q104.** What if 2 methods are dependent on each other? Ans: we get TestNGException Error is Cyclic dependencies

**Q105.** How do you intentionally fail the test? Ans: Using Assert.fail()

**Q106**. How do you compare actual and expected results without using if-else statement? Ans:

Assert.assertEquals() statement

**package** testNg;

**import** java.util.Scanner;

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**import** org.testng.Assert;

**import** org.testng.Reporter;

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

**public class** TestngDemo4

{

**public** WebDriver driver;

**public** String eTitle;

@BeforeMethod

**public void** preCondition()

{

System.***out***.println("Enter expected title:"); Scanner sc=**new** Scanner(System.***in***);

}

@Test

eTitle=sc.next(); Reporter.*log*("eTitle: "+eTitle,**true**); driver=**new** FirefoxDriver();

**public void** testGoogle()

{

driver.get(["http://www.google.com"](http://www.google.com/)); String aTitle=driver.getTitle(); Reporter.*log*("aTitle: "+aTitle,**true**);

Assert.*assertEquals*(aTitle, eTitle);

}

@AfterMethod

**public void** postCondition()

{

driver.close();

}

}

**Note:** If comparison fails then the statements which are present after the Assert statement of current test method will not be executed

Example

@Test

Public void testGoogle()

{

Reporter.log(“Step1”,true); Assert.assertEquals(“abc”,”xyz”); Reporter.log(“step2”,true)

}

During the execution of above test method it will print step1 that comparison fails, hence it will not print step2.

**Q107**. What are the important methods available under **Assert** Class? Ans:

* **assertEquals()**
* **assertNotEquals()**
* **assertTrue()**
* **assertFalse()**
* **assertSame()**
* **assertNotSame()**
* **assertNull()**
* **assertNotNull()**
* **fail()**

All the above methods are static methods of Assert Class. In order to continue the execution even after failure of the comparison, we can use **SoftAssert** . But all methods are nonstatic

Example

**package** testNg;

**import** org.testng.Reporter;

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

**import** org.testng.asserts.SoftAssert;

**public class** TestngDemo3

{

@Test

**public void** testGoogle()

{

SoftAssert s= **new** SoftAssert(); Reporter.*log*("Step1",**true**); s.assertEquals("xyz","abc"); Reporter.*log*("Step2",**true**); Reporter.*log*("Step3",**true**); s.assertAll();

Reporter.*log*("Step4",**true**);

}

}

Output Step1

Step2

Step3

FAILED: testGoogle

Note: To update status of the comparison into the result window we should use assertAll() method. Any statement after assertAll() method will not be executed if comparison fails.

**Q109**. What is the difference between Assert and SoftAssert ?

|  |  |
| --- | --- |
| **Assert** | **SoftAssert** |
| **If comparison fails remaining statement will not**  **be executed in current class** | Executes remaining statements even if  comparison fails |
| **All methods are static** | All methods are non-static |
| **We do not call assertAll() method** | We should call assertAll() method |

**AUTOMATION FRAMEWORK**

It is the standard rules, best practices and folder structure which should be followed while automating the application testing.

We should follow the Automation Framework to have consistency. In automation framework we have 3 stages.

* 1. **Automation Framework Design**
  2. **Automation Framework Implementation**
  3. **Automation Framework Execution**

**I. AUTOMATION FRAMEWORK DESIGN**

This is the initial stage where automation lead or manager will specify files and folder structures, naming conventions and rules which should be followed to develop and execute the automation script.

Based on the design framework is categorized into following types:

* + 1. **Method-driven Automation Framework**
    2. **Data-driven Automation Framework**
    3. **Module-driven Automation framework**
    4. **Keyword-driven Automation framework**
    5. **Hybrid Automation Framework**

**Note:** The above type of Framework can be customized and implemented in a company with different names. Such as Cucumber, Robot, Protractor, Craft etc. Generally, folder structures are decided based on the file types

Example:

|  |  |
| --- | --- |
| **File Types** | **Location** |
| **.java** | javaproject/src |
| **.class** | javaproject/bin |
| **.xml** | javaproject |
| **.html** | javaproject/test-output |
| **.jar** | javaproject/jarfiles |
| **.exe** | javaproject/exefiles |
| **.xlsx** | javaproject/testdata |
| **.bat** | javaproject |
| **.war** | javaproject |

### Steps to configure Automation Framework

1. Goto required location (ex: D:) drive and create a folder (ex: BCSM6).
2. Go to **File > Switch Work Space** other, browse and select above folder and click OK.
3. Create a javaproject with the name **“Automation”.**
4. Create a folder with the name **“exefiles”**under “**Automation”** and copy paste “**chromedriver.exe”**

### and “IEDriverServer.exe”.

1. Create a folder with the name **“jarfiles”** under **Automation** and copy paste “**selenium server**

### standalone” jar file.

1. Expand “**jarfile”** folder and right click on “**selenium server standalone”** jar file and select **Build Path**

### > Add to Build Path.

1. Associate **TestNG** to the javaproject.
2. Create a folder with the name **“testdata”** under **“automation”** which is used to store excel files.
3. Create two packages under **“src”** with the name **“pom”** and **“scripts**”.
   * pom packages is used to store POM class.
   * script package is used to store TestNG class

While writing scripts we develop two types of classes:

### POM class

1. **TestNG class**

First we should always develop **pom** class. It is used to store elements and perform the action. We use

**TestNg** class for execution purpose.

Ex: //POM class

**package** pom;

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

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

**import** org.openqa.selenium.support.FindBy; **import** org.openqa.selenium.support.PageFactory; **public class** LoginPage

{

@FindBy(id="username")

**private** WebElement unTextBox;

**public** LoginPage(WebDriver driver)

{

PageFactory.*initElements*(driver, **this**);

}

**public void** setName(String un)

{

}

//TestNG

unTextBox.sendKeys(un);

}

**package** scripts;

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

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

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

**import** pom.LoginPage;

**public class** Demo

{

@Test

**public void** TestDemo()

{

WebDriver driver=**new** FirefoxDriver(); driver.manage().timeouts().implicitlyWait(Duation.ofSeconds(10)); driver.get(["http://localhost"](http://localhost/));

LoginPage l=**new** LoginPage(driver); l.setName("admin");

}

}

**HANDLING FRAMES**

1. Webpage present inside another webpage is called as embedded webpage. Developer creates embedded webpage using **iframe** html tage.
2. If right click on any element which inside the frame it will display **This frame** option in the context menu.
3. To transfer the control into the frame we should use following statemen:t

### driver.switchTo().frame(arg);

where arg > can be index of the frame (int) or id of the frame (string) or element of the frame (WebElement).

In order to transfer the control back to the main page we can use the following statements:

### driver.switchTo().defaultContent();

1. In case of nested frames, to switch from child frame to parent frame we can use following statements;

### driver.switchTo().parentFrame();

Example:

### Content of DemoB.html

<html>

<body>

t2:<input id="t2" type="text"/>

</body>

</html>

Content of DemoA.html

<html>

<body>

t1:<input id="t1" type="text"/><br><br>

<iframe id="f1" class="c1" src="DemoB.html"/>

</body>

</html>

### Script:

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

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**class** Demo

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.get("file:///D:/DemoA.html"); driver.findElement(By.*id*("t1")).sendKeys("abc");

driver.switchTo().frame(0); driver.findElement(By.*id*("t2")).sendKeys("xyz"); driver.switchTo().defaultContent(); driver.findElement(By.*id*("t1")).sendKeys("123c");

}

}

### Assignment:

Write a script to perform following steps:

1. open the browser and enter the following url http:// [www.zoho.com/crm/lp/login.html](http://www.zoho.com/crm/lp/login.html)
2. Enter invalid email address, invalid password and click on Sign in. Verify that error msg is displayed.

**package** example;

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

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

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**class** Exam

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.manage().window().maximize(); driver.manage().timeouts().implicitlyWait(Duration.ofSeconds(5)); driver.get(["https://www.zoho.com/crm/lp/login.html"](http://www.zoho.com/crm/lp/login.html));

driver.findElement(By.*id*("lid")).sendKeys("admin1"); driver.findElement(By.*id*("pwd")).sendKeys("1234");

driver.findElement(By.*id*("submit\_but")).click();

driver.switchTo().defaultContent(); driver.switchTo().frame("zohoiam");

WebElement errMsg=driver.findElement(By.*id*("msgpanel"));

**if**(errMsg.isDisplayed());

{

System.***out***.println(errMsg.getText());

}

}

}

Note: If the page is refreshed or new page is loaded then control will be automatically transferred to main page (from the frame).

Embeded web page can also be created using **frameset** html tag.

**II. AUTOMATION FRAMEWORK IMPLIMENTAION**

This is the second stage of the framework where we convert Manual testcased (regression) into automation script byu developing two types of classes **POM** and **TestNG**.

**Sample Test Cases (TC) TC1:** Valid Login

**Pre-condition:** Login page should be present Steps:

1. Enter valid user name.
2. Enter valid password.
3. Click on Login button.
4. Click on Logout link.

**Post-condition:** Browser should be closed.

**TC2:** Invalid login Steps:

1. Enter invalid username
2. Enter invalid password
3. Click on Login button.

Verify that errot message is displayed.

## TC3:

Verify Build Number

1. Enter valid username
2. Enter valid password
3. Click on login button
4. click on Help
5. click on About actiTIME
6. verify that build number is 272661
7. click on logout
8. click on close

Steps to develop POM class

* 1. Execute the test case manual which gives more clarify on the steps which is to be automated.
  2. While executing the testcase notedown the page, its elements and the action
  3. For each page present on the application create a POM class under “pom” package.
  4. The name of the class should be same as Title of the page ending with the word Page.
  5. In every POM class we should declare the element usig **FindBy annotation @FindBy**, initialize it using **initElemetns**() and uitilize it using getters and setters methods.

Example LoginPage

|  |  |
| --- | --- |
| Elements | Actions |
| **unTextBox** | senKeys() |
| **pwTextBox** | sendKeys() |
| **loginButton** | click() |
| **errorMessage** | Verify |

Enter Time-Track Page

|  |  |
| --- | --- |
| Elements | Actions |
| **logoutButton** | click() |
| **Help** | click() |
| **About actiTime** | click() |
| **BuildNumber** | Verify |
| **Close** | click() |

### //POM for LoginPage

**package** pom;

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

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

**import** org.openqa.selenium.support.FindBy; **import** org.openqa.selenium.support.PageFactory; **import** org.testng.Assert;

**public class** LoginPage

{

@FindBy(id="username")

**private** WebElement unTextBox; @FindBy(name="pwd")

**private** WebElement pwTextBox; @FindBy(id="loginButton") **private** WebElement loginButton;

@FindBy(xpath="//span[contains(text()'is invalid')]")

**private** WebElement errMsg;

**public** LoginPage(WebDriver driver)

{

PageFactory.*initElements*(driver, **this**);

}

**public void** setUserName(String un)

{

unTextBox.sendKeys(un);

}

**public void** setPassword(String pw)

{

pwTextBox.sendKeys(pw);

}

**public void** clickLoginButton()

{

loginButton.click();

}

**public void** verifyErrMsg()

{

Assert.*assertTrue*(errMsg.isDisplayed());

}

}

### //EnterTimeTrackPage POM class

**package** pom;

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

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

**import** org.openqa.selenium.support.FindBy; **import** org.openqa.selenium.support.PageFactory; **import** org.testng.Assert;

**public class** EnterTimeTrackPage

{

@FindBy(id="logoutLink")

**private** WebElement logoutLink; @FindBy(xpath="(//div[@class='popup\_menu\_arrow'])[3]")

**private** WebElement help; @FindBy(linkText="About actiTIME") **private** WebElement aboutActiTIME;

@FindBy(xpath="//span[contains(text(),'build')]")

**private** WebElement buildNumber; @FindBy(xpath="//im[@title='Close']")

**private** WebElement close;

**public** EnterTimeTrackPage(WebDriver driver)

{

PageFactory.*initElements*(driver, **this**);

}

**public void** clickLogoutLink()

{

logoutLink.click();

}

**public void** clickAboutActiTime()

{

aboutActiTIME.click();

}

**public void** verifyBuildNumber(String eBuildNumber)

{

String aBuildNumber=buildNumber.getText(); Assert.*assertEquals*(aBuildNumber, eBuildNumber);

}

**public void** clickClose()

{

close.click();

}

}

### Summary:

Class #1: LoginPage Methods:

1. setUserName
2. setPassword
3. clickLoginButton
4. verifyErrMsg

Class #2: EnterTimeTrackPage Methods:

1. clickLogoutLink
2. clickHelp
3. clickAboutActiTIME
4. verifyBuildNumber
5. clickClose

### Developing TestNG class

- For every manual test case we should develop a ‘TestNG’ class. In all the test cases some of the steps will be common such as pre-conditions and post-conditions. In order to handle this we use ‘Inheritance’ concept.

**Ex:** Create a class with the name ‘BaseTest’ and scripts package and write the code as shown below.

**package** script;

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

**import** org.openqa.selenium.firefox.FirefoxDriver; **import** org.testng.annotations.BeforeMethod; **import** org.testng.annotations.BeforeMethod;

**public class** BaseTest

{

**public** WebDriver driver;

@BeforeMethod

**public void** preCondition()

{

driver=**new** FirefoxDriver(); driver.get(["http://localhost"](http://localhost/));

driver.manage().timeouts().implicitlyWait(Duration.ofSeconds(5));

}

@AfterMethod

**public void** postCondition()

{

driver.close();

}

}

* We cannot directly execute ‘BaseTest’ class as there is No test method
* All the TestNG class should extend ‘BaseTest’ class

**Important Note:** Steps to convert manual test cases into automation script or steps to develop TestNG class

1. Create a class inside script package and name of the class should be same as respective test case ID
2. Extend the **TestNG** class from **BaseTest** class
3. Create a method using **@Test** annotation and the name of the method should start with test and end with the class name
4. Write the manual test case steps as inline comment
5. Below each inline comment call the required method of POM class
6. Execute the script and ensure that it is working fine

### Hiding Methods of Object class

1. In eclipse IDE go to Windowselect Preferences
2. Go to JavaAppearanceType filters and click on Add ‘java.lang.Object’. Click on ‘OK’ and again

on ‘Ok’ button.

### Automation Script for Test Case #1:

**package** scripts;

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

pom.LoginPage;

**public class** ValidLogin **extends** BaseTest

{

@Test

**public void** testValidLogin()

{

//Enter valid user name

LoginPage l=**new** LoginPage(driver); l.setUserName("admin");

//Enter valid password l.setPassword("manager");

//Click on login button l.clickLoginButton();

//Click on logout link

EnterTimeTrackPage e=**new** EnterTimeTrackPage(driver); e.clickLogoutLink();

}

}

### Automation Script for Test Case #2:

**package** scripts;

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

**import** pom.LoginPage;

**public class** InvalidLogin **extends** BaseTest

{

@Test

**public void** testInvalidLogin()

{

//Enter invalid user name LoginPage l=**new** LoginPage(driver);

l.setUserName("abc");

//Enter invalid password l.setPassword("xyz");

//Click on login button l.clickLoginButton();

//Verify Error Message l.verifyErrMsg();

}

}

### Automation Script for Test Case #3:

**package** scripts;

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

**import** pom.EnterTimeTrackPage;

**import** pom.LoginPage;

**public class** VerifyBuildNumber **extends** BaseTest

{

@Test

**public void** testVerifyBuildNumber()

{

//Enter valid user name

LoginPage l=**new** LoginPage(driver); l.setUserName("admin");

//Enter valid password l.setPassword("manager");

//Click on login button l.clickLoginButton();

EnterTimeTrackPage e=**new** EnterTimeTrackPage(driver);

//click on Help e.clickHelp();

//click on About ActiTIME e.clickAboutActiTime();

//Verify Build Number e.verifyBuildNumber("(build 29885)");

//close About ActiTIME popup e.clickClose();

//Click on logout link e.clickLogoutLink();

}

}

**III. AUTOMATION FRAMEWORK EXECUTION**

To run all the scripts present in the frame work we use TestNG suite file. To Create It:

1. Right click on Java Project(Ex: **Automation**),
2. Select **TestNG****Convert to TestNG** and click on **Finish**.
3. It creates **testng.xml** file inside Javaproject folder as shown below.

<suite name="Suite" parallel="none">

<test name="Test">

<classes>

<class name="scripts.VerifyBuildNumber"/>

<class name="scripts.InvalidLogin"/>

<class name="scripts.ValidLogin"/>

</classes>

</test>

</suite>

1. Right click on **testng.xml** file;
2. Go to “**Run As**” and select “**TestNG suite**”.
3. It will execute all the scripts present in the suite file and generate the results in HTML format (emailable-report.html) inside the**”test-output”** foler (refresh javaproject folder).

### Executing Framework from command prompt:

1. Go to the location where eclipse is present i.e. right click on the eclipse short cut and select open file location.
2. Go to plugins  org.testng.elcipselib folder
3. Copy bsh, jcommander, snake and testng jar files.
4. Paste then inside “jarfiles” folder of framework
5. Open the command prompt and navigate to location where TestNG.xml is present

*D:\BCSM6\Automation>*

1. Type following command and execute:

*java -cp bin;jarfiles/\* org.testng.TestNG testng.xml*

### Using batch file:

Instead of opening command prompt navigating the required location and typing and executing the command, we can use Batch file so that all these steps can be done by just double clicking it.

Example:

1. Open the Notepad and type the following command; “*java -cp bin;jarfiles/\**

*org.testng.TestNG testng.xml”*

1. Go to File and select Save. Navigate to java project folder (Ex: *D:/BCSM6/Automation)*

and specify the name file as **“RunMe.bat”** and click Save.

1. Double click on the batch file “**RunMe.bat”**

METHOD-DRIVEN FRAMEWORK

Executing the script by calling the methods present in the frameworks is called as ‘Method Driven Framework’. Methods will avoid repetition of the steps and they will increase re-usability of the code.

In order to test the features thoroughly that is with all possible inputs only methods are not sufficient we should use external files such as excel file. If this feature is available in the framework then such type of framework is called **‘Data-Driven Framework’**.

To handle the excel file we use API provided by Apache called POI (Poor Obfuscation Implementation). We can download it from following URL: [**http://mirror.fibergrid.in/apache/poi/release/bin/poi-bin-**](http://mirror.fibergrid.in/apache/poi/release/bin/poi-bin-3.13-20150929.zip)[**3.13-**](http://mirror.fibergrid.in/apache/poi/release/bin/poi-bin-3.13-20150929.zip)[**20150929.zip**](http://mirror.fibergrid.in/apache/poi/release/bin/poi-bin-3.13-20150929.zip). After downloading the file extract it which creates a folder with the name ‘poi-3.13’

It has many jar files, only following 4 jar files are required.

1. poi-3.13-20150929
2. poi-ooxml-3.13-20150929
3. poi-ooxml-schemas-3.13-20150929
4. xmlbeans-2.6.0

Copy above jar files into ‘jarfiles’ folder of the Framework and then associate them to Java project.

### Steps to read Data from Excel Sheet

1. Open the excel file, go to sheet 1.
2. Go to Row 0, Go to Cell 0
3. Get the value present in the call and print it

**package** example;

**import** java.io.FileInputStream;

**import** java.io.IOException;

**import** org.apache.poi.EncryptedDocumentException;

**import** org.apache.poi.openxml4j.exceptions.InvalidFormatException;

**import** org.apache.poi.ss.usermodel.Cell;

**import** org.apache.poi.ss.usermodel.Workbook;

**import** org.apache.poi.ss.usermodel.WorkbookFactory;

**public class** ExcelData1

{

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

{

FileInputStream fis=**new** FileInputStream("D:/TestData.xlsx");

Workbook wb=WorkbookFactory.*create*(fis);

Cell c = wb.getSheet("Sheet1").getRow(0).getCell(1); System.***out***.println(c);

}

}

**IQ:**

1. Write a script to print content of the excel sheet where it has data in 3X3 matrix

**package** capgemini;

**import** java.io.FileInputStream;

**import** java.io.IOException;

**import** org.apache.poi.EncryptedDocumentException;

**import** org.apache.poi.openxml4j.exceptions.InvalidFormatException;

**import** org.apache.poi.ss.usermodel.Cell;

**import** org.apache.poi.ss.usermodel.Workbook; **import** org.apache.poi.ss.usermodel.WorkbookFactory; **public class** ExcelData2{

**public static void** main(String[] args) **throws**Exception{ FileInputStream fis=**new** FileInputStream("D:/TestData.xlsx");

Workbook wb=WorkbookFactory.*create*(fis);

**for**(**int** i=0;i<=2;i++){

**for**(**int** j=0;j<=2;j++){

Cell c = wb.getSheet("Sheet1").getRow(i).getCell(j); System.***out***.println(c+" ");

}

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

}

}

}

**Note:** Sheet name, row index or cell index is invalid we get ‘NullPointerException’

In order to count number of rows present in the sheet we should use **getLastRowNum**() method which returns the index of the last row.

To count the number of cells in the specified row we should use **getLastCellNum**() method which returns the count and not the index.

**package** capgemini;

**import** java.io.FileInputStream;

**import** java.io.IOException;

**import** org.apache.poi.EncryptedDocumentException;

**import** org.apache.poi.openxml4j.exceptions.InvalidFormatException;

**import** org.apache.poi.ss.usermodel.Workbook;

**import** org.apache.poi.ss.usermodel.WorkbookFactory;

**public class** ExcelData3{

**public static void** main(String[] args) **throws** Exception{ FileInputStream fis=**new** FileInputStream("D:/TestData.xlsx");

Workbook wb=WorkbookFactory.*create*(fis);

**int** rc=wb.getSheet("Sheet1").getLastRowNum(); System.***out***.println(rc);

**int** cc=wb.getSheet("Sheet1").getRow(0).getLastCellNum(); System.***out***.println(cc);

}

}

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | 0 | 1 | 2 | 3 | 4 |  |
| 0 | **A** | **A** | **A** |  |  | 3 |
| 1 | **B** |  |  |  | **B** | 5 |
| 2 |  | **C** | **C** |  |  | 3 |
| 3 |  |  |  | **D** |  | 4 |
| 4 |  |  |  |  |  | 0 |
| 5 |  | **F** |  |  |  | 2 |

### Integrating excels features in the framework

1. Ensure that **POI jar files** are associated with framework
2. Create a package with the name **generics** under **src**
3. Then create class with the name **Excel**
4. Write the code as shown below

**package** generics;

**import** java.io.FileInputStream;

**import** org.apache.poi.ss.usermodel.Workbook;

**import** org.apache.poi.ss.usermodel.WorkbookFactory;

**public class** Excel{

**public static** String getCellData(String xlpath,String sheet,**int** row,**int** cell){ String v="";

#### try

{

FileInputStream fis=**new** FileInputStream(xlpath);

Workbook wb=WorkbookFactory.create(fis); v=wb.getSheet(sheet).getRow(row).getCell(cell).toString();

}

**catch**(Exception e)

{

}

**return** v;

}

**public static int** getRowCount(String xlpath,String sheet){

**int** rc=0;

#### try

{

FileInputStream fis=**new** FileInputStream(xlpath);

Workbook wb=WorkbookFactory.create(fis); rc=wb.getSheet(sheet).getLastRowNum();

}

**catch**(Exception e)

{

}

**return** rc;

}

}

### Taking data from Excel sheet in framework

1. Go to **testdata** folder of the framework and create an excel file with the name **TDR.xlsx** (Test Data Repository)
2. Rename the Sheet1 as **ValidLogin** (respective class name)
3. Enter the data as shown below

|  |  |
| --- | --- |
| **UserName** | **Password** |
| admin | manager |

1. **Save** and close the excel file
2. Update the **TestNG class** as shown below

**package** capgemini;

**import** generics.Excel;

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

**import** pom.EnterTimeTrackPage;

**import** pom.LoginPage;

**public class** ValidLoginExcel **extends** BaseTest

{

@Test

**public void** testValidLogin1()

{

String xlpath="./testdata/TDR.xlsx";

//DOT->current path of Java Project String sheet="ValidLogin"; String un=Excel.*getCellData*(xlpath, sheet, 1, 0);

String pw=Excel.*getCellData*(xlpath, sheet, 1, 1); LoginPage l=**new** LoginPage(driver); l.setUserName(un);

l.setPassword(pw); l.clickLoginButton();

EnterTimeTrackPage e=**new** EnterTimeTrackPage(driver); e.clickLogoutLink();

}

}

Executing invalid login scripts with multiple inputs

**package** capgemini;

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

**import** pom.LoginPage;

**import** generics.Excel;

**public class** InvalidLoginExcel **extends** BaseTest

{

@Test

**public void** testInvalidLogin() **throws** InterruptedException

{

String xlpath="./testdata/TDR.xlsx";

String sheet="InvalidLogin";

**int** rc=Excel.*getRowCount*(xlpath,sheet);

**for**(**int** i=1;i<=rc;i++)

{

String un=Excel.*getCellData*(xlpath, sheet, i, 0); String pw=Excel.*getCellData*(xlpath, sheet, i, 1); LoginPage l= **new** LoginPage(driver);

l.setUserName(un); l.setPassword(pw); l.clickLoginButton(); Thread.*sleep*(1000); l.verifyErrMsg();

}

}

}

Q. How do you send a data from TestNG suite file or xml file into TestNG Methods?

Ans: Using Parameter. Example:

//Sending part

<suite name="Suite" parallel="none">

<test name="Test">

<parameter name="state" value="Kararnatak"/>

<parameter name="city" value="Bangalore"/>

<parameter name="area" value="Basavanagudi"/>

<classes>

<class name="example.DemoA"/>

</classes>

</test>

</suite>

//Receiving Part

**package** capgemini;

**import** org.testng.Reporter;

**import** org.testng.annotations.AfterMethod;

**import** org.testng.annotations.BeforeMethod;

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

**import** org.testng.xml.XmlTest;

**public class** DemoA

{

@BeforeMethod

**public void** precondition(XmlTest x)

{

String s=x.getParameter("state");

Reporter.*log*(s,**true**);

}

@Test

**public void** testA(XmlTest x)

{

String c=x.getParameter("city");

Reporter.*log*(c,**true**);

}

@AfterMethod

**public void** postCondition(XmlTest x)

{

String a=x.getParameter("area");

Reporter.*log*(a,**true**);

}

}

Q. How do you execute all the scripts simultaneously on multiple browsers? Ans: using parallel option available in TestNg along with testNG parameter. Ex: update precondition method of BaseTest class as shown below

@BeforeMethod

**public void** preCondition(XmlTest x)

{

String browser=x.getParameter("browser"); Reporter.*log*("Browser is:"+browser,**true**);

**if**(browser.equals("GC"))

{

}

#### else

{

}

driver=**new** ChromeDriver();

driver=**new** FirefoxDriver();

driver.manage().window().maximize(); driver.get(["http://localhost"](http://localhost/)); driver.manage().timeouts().implicitlyWait(Duration.ofSeconds(10));

}

### Content of TestNG.xml

<<suite name="Suite" parallel="tests">

<test name="TestGC">

<parameter name="browser" value="GC"/>

<classes>

<class name="scripts.VerifyBuildNumber"/>

<class name="scripts.InvalidLogin"/>

<class name="scripts.ValidLogin"/>

</classes>

</test>

<test name="TestFF">

<parameter name="browser" value="FF"/>

<classes>

<class name="scripts.VerifyBuildNumber"/>

<class name="scripts.InvalidLogin"/>

<class name="scripts.ValidLogin"/>

</classes>

</test>

</suite>

When we execute TestNG suite file it will create two threads. Because we have specified **parallel** option as

**tests a**nd we have 2 test blocks.

If first thread will execute all the scripts on Chrome browser, where as second thread will execute all the scripts on Firefox browser.

**HANDLING POPUP**

With respect to Selenium we can categorize the popup into following types:

1. Hidden Division Popup
2. Alert and Confirmation Popup
3. File Upload Popup
4. File Download Popup
5. Child Browser Popup

1. HIDDEN DIVISION POPUP

Characteristics:

1. We cannot move the popup
2. We can Inspect the popup
3. It will be colorful

Solution:

To handle Hidden Division Popup we use **findElement()** method. Ex: calendar popup, a type of hidden division popup

Write a script to select a date in Calendar Popup.

**import** java.util.concurrent.TimeUnit; **import** org.openqa.selenium.By; **import** org.openqa.selenium.WebDriver;

**import** org.openqa.selenium.firefox.FirefoxDriver;

**class** Demo

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.manage().window().maximize(); driver.manage().timeouts().implicitlyWait(20, TimeUnit.***SECONDS***); driver.get(["http://www.yatra.com/"](http://www.yatra.com/)); driver.findElement(By.*id*("BE\_flight\_depart\_date")).click(); driver.findElement(By.*id*("a\_2016\_3\_19")).click();

}

}

**Assg:** Write a script to select today’s date in the calendar:

**import** java.util.concurrent.TimeUnit; **import** org.openqa.selenium.By; **import** org.openqa.selenium.WebDriver;

**import** org.openqa.selenium.firefox.FirefoxDriver;

**class** Demo

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.manage().window().maximize(); driver.manage().timeouts().implicitlyWait(10, TimeUnit.***SECONDS***); driver.get(["http://www.yatra.com/"](http://www.yatra.com/)); driver.findElement(By.*id*("BE\_flight\_depart\_date")).click();

driver.findElement(By.*xpath*("//td[contains(@class,'curent-date')]")).click();

}

}

2. ALERT AND CONFIRMATION POPUP

Characteristics:

1. We can move the popup
2. We cannot inspect the popup
3. If the popup has Alert Symbol (!) it is called as Alert Popup
4. If the popup has Confirmation (?) Symbol, it is called as confirmation popup Note: Both are called as javascript popup.

Solution:

To Alert Popup we use **switchTo** and **alert** statement then we use following methods of Alert Interface.

1. getText() - get the msg present on the pop
2. accept() – to click on OK
3. dismiss() – to click on Cancel.

**import** java.util.concurrent.TimeUnit; **import** org.openqa.selenium.Alert; **import**

org.openqa.selenium.By;

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**class** Demo

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.manage().window().maximize(); driver.manage().timeouts().implicitlyWait(20, TimeUnit.***SECONDS***); driver.get(["https://www.irctc.co.in/eticketing/loginHome.jsf"](http://www.irctc.co.in/eticketing/loginHome.jsf)); driver.findElement(By.*id*("loginbutton")).click();

Alert alert=driver.switchTo().alert(); String msg=alert.getText(); System.***out***.println(msg); alert.accept();

//after alert is closed control will be transferred back to page

//alert.dismiss(); // we get NoAlertPresentException

}

}

3. FILE UPLOAD POPUP

Characteristics:

1. Clicking on **Browse** button will display a popup with the title file upload.
2. We can move the popup, but we cannot inspect it.

Solution

1. To handle file upload popup we specify Absolute path of the file as an argument for sendKeys() method.

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

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**class** Demo

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.get(["http://www.2shared.com/"](http://www.2shared.com/)); driver.findElement(By.*id*("upField")).sendKeys("D:\\Book1.xlsx");

}

}

Note: Above code will not work if Attachment Icon is present instead of Browse button. like in Gmail. In such cases we use **AutoIt** function.

**Assg:** Write a script to login to Naukri and upload CV.

**import** java.util.concurrent.TimeUnit; **import** org.openqa.selenium.By; **import** org.openqa.selenium.WebDriver;

**import** org.openqa.selenium.firefox.FirefoxDriver;

**class** Demo

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.manage().window().maximize(); driver.manage().timeouts().implicitlyWait(10, TimeUnit.***SECONDS***); driver.get(["http://www.naukri.com/"](http://www.naukri.com/)); driver.findElement(By.*id*("login\_Layer")).click(); driver.findElement(By.*id*("eLogin")).sendKeys(["abc@gmail.com"](mailto:abc@gmail.com)); driver.findElement(By.*id*("pLogin")).sendKeys("xyz123"); driver.findElement(By.*xpath*("//button[text()='Login']")).submit(); driver.findElement(By.*xpath*("//a[text()='View Profile']")).click(); driver.findElement(By.*id*("uploadLink")).click(); driver.findElement(By.*id*("attachCV")).sendKeys("D:\\Resume.docx");

}

}

4. FILE DOWNLOAD POPUP

Characteristics:

1. We can move the popup
2. We cannot inpsect the popup
3. popup will have two radio button: **Open with** and **Save file**

Solution

To handle File Download Popup, we use **setPreference()** of **FirefoxProfile class.** Which will programmatically change the settings of the browser so that it will download the file automatically without displaying the popup.

We can refer following website to change any settings of Firefox:

[**http://kb.mozillazine.org/About.config\_entries**](http://kb.mozillazine.org/About.config_entries)

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

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

**import** org.openqa.selenium.firefox.FirefoxDriver; **import**

org.openqa.selenium.firefox.FirefoxProfile; **class** Demo

{

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

{

FirefoxProfile profile=**new** FirefoxProfile();

//if file is .zip never display popup download it directly String key="browser.helperApps.neverAsk.saveToDisk"; String value="application/zip"; profile.setPreference(key,value);

//open firefox with above setting

WebDriver driver=**new** FirefoxDriver(profile); driver.get(["http://docs.seleniumhq.org/download/"](http://docs.seleniumhq.org/download/)); String xp="//td[text()='Java']/../td[4]/a"; driver.findElement(By.*xpath*(xp)).click();

}

}

Note: We cannot handle file download popup display in other browser. We should use **AutoIt.**

5. CHILD BROWSER POPUP

Characteristics:

* 1. We can move the popup
  2. We can inspect the popup
  3. It will have minimize and maximize button with address bar.

Q1: What is the difference between close() and quit() method

Ans: **close()** method closes current browser, whereas **quit()** method closes all the browser

Q2. Write a script to count no. of browsers open by selenium. Q3. Write a script to print window handle of all the browsers. Q4.. Write a script to print title of all the browsers

Q5. Write a script to close all the browsers without using quit() method.

**import** java.util.Set;

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**class** Demo

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.get(["http://www.naukri.com/"](http://www.naukri.com/)); Set<String> allWH=driver.getWindowHandles(); **int** count=allWH.size(); System.***out***.println(count);

**for**(String wh:allWH)

{

driver.switchTo().window(wh); String title=driver.getTitle(); System.***out***.println(title); driver.close();

}

}

}

### Assgn:

1. Write a script to close only child browser.

**import** java.util.Set;

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**class** Demo

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.get(["http://www.naukri.com/"](http://www.naukri.com/)); String mTitle=driver.getTitle();

Set<String> allWH=driver.getWindowHandles();

**for**(String wh:allWH)

{

driver.switchTo().window(wh); String title=driver.getTitle();

**if**(mTitle.equals(title))

{

System.***out***.println("Main Browser is "+mTitle);

}

#### else

{

System.***out***.println(title+" - child browser is closed"); driver.close();

}

}

}

}

2. Write a script to close specified browser.

**import** java.util.Scanner;

**import** java.util.Set;

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

**import** org.openqa.selenium.firefox.FirefoxDriver;

**class** Demo

{

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

{

WebDriver driver=**new** FirefoxDriver(); driver.get(["http://www.naukri.com/"](http://www.naukri.com/)); Set<String> allWH=driver.getWindowHandles(); System.***out***.println("List Of Browsers:"); **for**(String wh:allWH)

{

driver.switchTo().window(wh); String title=driver.getTitle(); System.***out***.println(title);

}

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

//Close specific browser

System.***out***.println("Enter Specific browser name:"); Scanner sc=**new** Scanner(System.***in***);

String browser=sc.next();

**for**(String wh:allWH)

{

driver.switchTo().window(wh); String title=driver.getTitle();

**if**(browser.equals(title))

{

driver.close();

}

#### else

{

driver.switchTo().window(wh);

}

}

}

}

**EXCEPTIONS:**

1. InterruptedException (Java checked)
2. IllegalStateException (Java Unchecked)
3. NoSuchElementException (Selenium Unchecked)
4. IOException (Java checked)
5. TimeoutException (Selenium Unchecked)
6. UnreachableBrowserException (Selenium Unchecked)
7. InvalidElementStateException (Selenium Unchecked) – when we try to enter data in a disabled textbox.
8. IndexOutOfBoundsException (Java Unchecked)
9. NumberFormatException (java Unchecked)
10. NoSuchFrameException (selenium unchecked)
11. UnexpectedTagNameException (selenium unchecked)
12. StaleElementReference Exception (selenium unchecked)
13. TestNGException (TestNG unchecked
14. EncryptedDocumentException (Java unchecked)
15. Invalid FormatException (Java unchecked)
16. NoAlertPresentException (selenium unchecked)
17. SessionNotFoundException (Selenium unchked)
18. NoWindowException (Selenium Unchecked)

**LIMITATIONS OF SELENIUM WEB DRIVER:**

1. We can automate only web applications
2. We can’t minimize the browser
3. Using selenium we can’t perform any action on the browser which is already opened. Every time it will open the new browser.
4. We can take screenshot only in png format. Other format is not supported.
5. We can’t take screenshot of popup, multiple browsers and specific area.
6. We can’t specify the password in encrypted format.
7. We cannot handle file upload popup if it has attachment icon instead of Browse button.
8. We cannot handle file download popup in the browsers other than Firefox
9. We cannot handle new tab in selenium.
10. We cannot handle window popup.

Extent Reports:

Extent Report is an open-source library for generating test reports in automation testing. It is one of the best reporting tools for Selenium and is widely used in various organizations. It has been more widely used for report generation than inbuilt reports in various automation testing frameworks because of its enhanced features and customization. It is a simple yet powerful reporting library that can be integrated with automation testing frameworks like TestNG, JUnit, and more.

### Prerequisites To Generate Extent Reports

<!--Extent Reports-->

<!-- https://mvnrepository.com/artifact/com.aventstack/extentreports -->

<dependency>

<groupId>com.aventstack</groupId>

<artifactId>extentreports</artifactId>

<version>5.1.2</version>

</dependency>

### How To Generate Extent Reports in Selenium Using TestNG?

Three classes are used to generate and customize the Extent Reports in Selenium. They are:

1. *ExtentSparkReporter*.
2. *ExtentReports.*
3. *ExtentTest.*

The *ExtentSparkReporter* is used to create an HTML file and accepts a file path to the directory where the output should be saved. The *ExtentSparkReporter* is also used to customize the report generated. It allows many configurations to be made through the *config()* method.

The ExtentReports class generates HTML reports based on the path provided in the ExtentSparkReporter class. ExtentReports uses this path by mapping itself to the ExtentSparkReporter object using the attachReporter() method.

The ExtentTest class logs the test steps in the HTML file to generate a detailed report. The ExtentReports and ExtentTest classes are used with built-in methods.

# Extent Report Base Class

import org.testng.ITestResult; import org.testng.annotations.\*;

import com.aventstack.extentreports.\*;

import com.aventstack.extentreports.reporter.ExtentSparkReporter; import com.aventstack.extentreports.reporter.configuration.Theme;

public class BaseTest {

ExtentSparkReporter extentSparkReporter; ExtentReports extentReports;

ExtentTest extentTest;

@BeforeTest

public void startReporter()

{

extentSparkReporter = new ExtentSparkReporter(System.getProperty("user.dir") + "/test- output/extentReport.html");

extentReports = new ExtentReports(); extentReports.attachReporter(extentSparkReporter);

//configuration items to change the look and feel

//add content, manage tests etc extentSparkReporter.config().setDocumentTitle("Simple Automation Report"); extentSparkReporter.config().setReportName("Test Report"); extentSparkReporter.config().setTheme(Theme.STANDARD);

extentSparkReporter.config().setTimeStampFormat("EEEE, MMMM dd, yyyy, hh:mm a '('zzz')'");

}

@AfterMethod

public void getResult(ITestResult result) { if(result.getStatus() == ITestResult.FAILURE) {

extentTest.log(Status.FAIL,result.getThrowable());

}

else if(result.getStatus() == ITestResult.SUCCESS) { extentTest.log(Status.PASS, result.getTestName());

}

else {

extentTest.log(Status.SKIP, result.getTestName());

}

}

@AfterTest

public void tearDown() {

//to write or update test information to the reporter extentReports.flush();

}

}

# TestNG Implementation Class

import org.testng.Assert;

import org.testng.SkipException; import org.testng.annotations.Test;

public class TestExtentReportBasic extends BaseTest{

@Test

public void testPassed() {

extentTest = extentReports.createTest("Test Case 1", "This test case has passed"); Assert.assertTrue(true);

}

@Test

public void testFailed() {

extentTest = extentReports.createTest("Test Case 2", "This test case has failed"); Assert.assertTrue(false);

}

@Test

public void testSkipped() {

extentTest = extentReports.createTest("Test Case 3", "This test case has been skipped"); throw new SkipException("The test has been skipped");

}

}

# Taking Screenshots and attaching it to Extent Reports

//Taking Screenshots

String screenshotPath = System.*getProperty*("user.dir") + "/test-output/screenshots"; File screenshot = ((TakesScreenshot) drv).getScreenshotAs(OutputType.***FILE***);

String screenshotName = "screenshot\_" + *imagecount*++ +"\_" +drv.getTitle()+".png"; screenshotPath = screenshotPath + File.***separator*** + screenshotName; FileUtils.*copyFile*(screenshot, **new** File(screenshotPath)); extent\_test.addScreenCaptureFromPath(screenshotPath);

# Robot Class

RobotClass is a part of the java.awt package and is used for automating keyboard and mouse operations in Java. It is mainly used in Selenium to handle scenarios where normal WebDriver interactions do not work, such as:

* Uploading files
* Handling pop-ups and authentication windows
* Simulating keyboard events (Ctrl + A, Enter, etc.)
* Simulating mouse movements and clicks

**Key Methods in RobotClass:**

|  |  |
| --- | --- |
| Method | Description |
| keyPress(int keycode) | Simulates a key press (e.g., KeyEvent.VK\_ENTER) |
| keyRelease(int keycode) | Releases a pressed key |
| mouseMove(int x, int y) | Moves the mouse to a specific (x, y) coordinate |
| mousePress(int buttons) | Simulates mouse button press |
| mouseRelease(int buttons) | Releases the pressed mouse button |
| delay(int ms) | Adds a delay (in milliseconds) to simulate human-like interaction |
| createScreenCapture(Rectangle screenRect) | Captures a screenshot of the screen |

Fileupload.html

<!DOCTYPE html>

<html lang="en">

<head>

<meta charset="UTF-8">

<meta name="viewport" content="width=device-width, initial-scale=1.0">

<title>File Upload Test</title>

</head>

<body>

<h2>Upload a File</h2>

<form>

<input type="file" id="fileUpload">

<br><br>

<input type="submit" value="Upload">

</form>

</body>

</html>

Selenium Script:

import org.openqa.selenium.By;

import org.openqa.selenium.WebDriver;

import org.openqa.selenium.WebElement;

import org.openqa.selenium.chrome.ChromeDriver;

import java.awt.\*;

import java.awt.datatransfer.StringSelection;

import java.awt.event.KeyEvent;

import java.time.Duration;

public class FileUploadTest {

public static void main(String[] args) {

// Set up ChromeDriver

WebDriver driver = new ChromeDriver();

driver.manage().timeouts().implicitlyWait(Duration.ofSeconds(10));

// Load the HTML file (use file:// path)

String filePath = "file:///C: Fileupload.html";

driver.get(filePath);

// Locate the file input field

WebElement uploadButton = driver.findElement(By.id("fileUpload"));

uploadButton.click(); // Click to open file dialog

// Use RobotClass to simulate file upload

try {

Robot robot = new Robot();

// Copy the file path to clipboard

StringSelection file = new StringSelection("C:\\path\\to\\your\\file.txt");

Toolkit.getDefaultToolkit().getSystemClipboard().setContents(file, null);

// Simulate Ctrl + V (Paste)

robot.keyPress(KeyEvent.VK\_CONTROL);

robot.keyPress(KeyEvent.VK\_V);

robot.keyRelease(KeyEvent.VK\_V);

robot.keyRelease(KeyEvent.VK\_CONTROL);

// Simulate Enter key

robot.keyPress(KeyEvent.VK\_ENTER);

robot.keyRelease(KeyEvent.VK\_ENTER);

System.out.println("File uploaded successfully!");

} catch (Exception e) {

e.printStackTrace();

}

// Close the browser after a short delay

try {

Thread.sleep(3000);

} catch (InterruptedException e) {

e.printStackTrace();

}

driver.quit();

}

}