**What is Selenium?**

Selenium is a free (open source) automated testing suite for web applications across different browsers and platforms. Testing done using Selenium tool is usually referred as Selenium Testing.

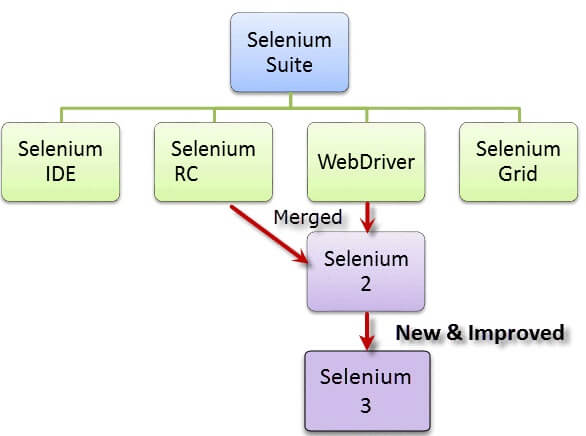
Selenium is not just a single tool but a **suite of software's,** each catering to different testing needs of an organization. **It has four components**.

1. Selenium Integrated Development Environment (IDE)

2. Selenium Remote Control (RC)

3. WebDriver

4. Selenium Grid



At the moment, Selenium RC and WebDriver are merged into a single framework to form Selenium 2. Selenium 1, by the way, refers to Selenium RC.

1. **Selenium Integrated Development Environment (IDE)** is the simplest framework in the Selenium suite and is the easiest one to learn. It is a Firefox plugin that you can install as easily as you can with other plugins. However, because of its simplicity, Selenium IDE should only be used as a prototyping tool. If you want to create more advanced test cases, you will need to use either Selenium RC or WebDriver.
2. **Selenium RC** was the flagship testing framework of the whole Selenium project for a long time. This is the first automated web testing tool that allowed users to use a programming language they prefer. As of version 2.25.0, RC can support the following programming languages: Java, C#, PHP, Python, Perl, Ruby.
3. **WebDriver** proves itself to be better than both Selenium IDE and Selenium RC in many aspects. It implements a more modern and stable approach in automating the browser's actions. WebDriver, unlike Selenium RC, does not rely on JavaScript for Automation. It controls the browser by directly communicating with it. The supported languages are the same as those in Selenium RC. Java, C#, PHP, Python, Perl, Ruby.
4. **Selenium Grid** is a part of the Selenium Suite that specializes in running multiple tests across different browsers, operating systems, and machines in parallel.

**What is meant by Selenium WebDriver?**

**Selenium WebDriver** is a collection of open source APIs which are used to automate the testing of a web application. It supports many programming languages Java, C#, PHP, Python, Perl, Ruby. It supports many browsers such as Firefox, Chrome, IE, and Safari.

**WebDriver** is a public interface, we just define a reference variable(driver) whose type is interface. Now any object we assign to it must be a instance of a class (FireFoxDriver) that implement the interface.

**Advantages of Selenium:**

* 1. Open source software.
* 2. Supports various programming languages.
* 3. Supports various operating systems.
* 4. Selenium supports various browsers.
* 5. Selenium supports Parallel testing.
* 6. Selenium uses less Hardware resources.

**Limitations of Selenium:**

* 1. No reliable Technical support.
* 2. It supports Web based applications only.
* 3. Do not support automation tests on Web Services like SOAO OR REST.
* 4. Selenium WebDriver has programming interface, no IDE.
* 5. Cannot automate captcha.
* 6. Limited support for Image properly.
* 7. No built-in Reporting facilities. Need plugins like Junit or TestNG test reports.

**Selenium Driver object Syntax:**

private static WebDriver driver;  
 private String browserOptions=System.getProperty ("browser");

private String url=System.getProperty ("url");

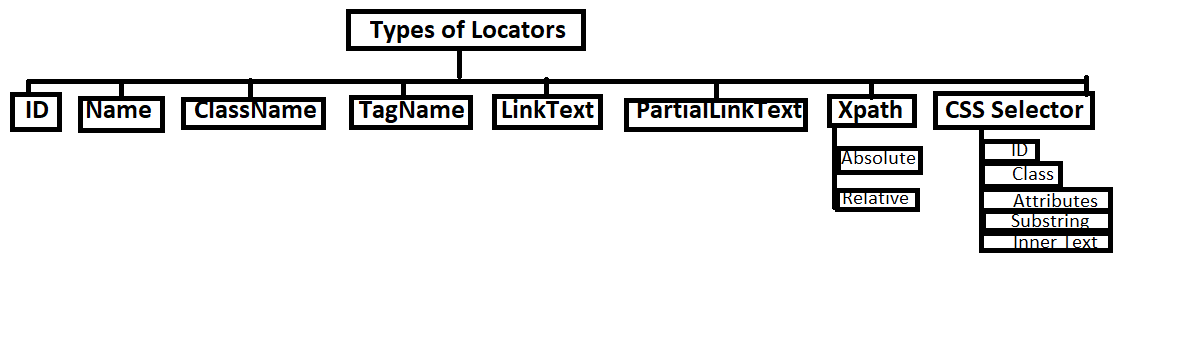
// to pass the variable browser – > go to Run > Edit configuration> in VM options add Dbrowser="chrome" -Durl=”web -address “ and then apply

public void chooseBrowser ( ) {  
 switch (browserOptions) {  
 case "firefox":  
 System.setProperty ("webdriver.gecko.driver","C:\\Users\\sball\\Downloads\\geckodriver-v0.22.0-win64\\geckodriver.exe");  
FirefoxOptions options = new FirefoxOptions().setProfile(new FirefoxProfile ());  
WebDriver driver = new FirefoxDriver(options);

break;  
 case "chrome":  
 System.setProperty ("webdriver.chrome.driver","C:\\Users\\sball\\Downloads\\chromedriver\_win32\\chromedriver.exe");  
 driver=new ChromeDriver ();  
 System.out.println (url);  
 break;  
 case "safari" :  
 driver=new SafariDriver ();  
 break;  
 case "ie" :  
 System.setProperty ("webdriver.ie.driver","C:\\Users\\sball\\Downloads\\MicrosoftWebDriver.exe");  
 driver=new InternetExplorerDriver ();  
 break;  
 }  
 }  
**Web Element:** is a reference to the elements of the web page or DOM. [ DOM – it defines the logical structure of elements and they the way JavaScript sees its containing pages data].

**Locators:** is termed as an address of that identifies a web element uniquely within web page.

Selenium WebDriver uses 8 locators to find the elements on a web page.



-**By ID:**

<input id="email" class="required" type="text"/>

WebElement Ele = driver.findElement(By.id("toolbar"));

**By Name:**

<input name="register" class="required" type="text"/>

WebElement register= driver.findElement(By.name("register"));

**By ClassName:**

<input name="register" class="required" type="text"/>

WebElement classtest =driver.findElement(By.className(“required”));

**By TagName:**

Select select = new Select(driver.findElement(By.tagName("select")));

select.selectByVisibleText("Nov");

or

select.selectByValue("11");

**By LinkText:**

<a href="http://www.seleniumhq.org">Downloads</a>

WebElement download = driver.findElement(By.linkText("Downloads"));

**By PartialLinkText:**

<a href="seleniumhq.org">Download selenium server</a> WebElement download = driver.findElement(By.PartialLinkText("Download"));

**Xpath:** [Inspect > for windows ctrl + f ]

Syntax:

//htmltag[@atribute1='value1’ and @attribure2-‘value2’]

//input[@class='octext']

//input[@name='quesry'] and @value=’text’]

//input[contains(@class,'octext')]

//input[starts-with(@class,'oct')]

//input[ends-with(@class,'ext')]

**Single (forward) Slash “/”:** It represents the absolute path. In this case, the XPath engine navigates the DOM right from the first node.

**Double (forward) Slash “//”:** It represents the relative path. In this case, the XPath engine searches for the matching element anywhere in the DOM.

**CSS Selector:**

WebElement CheckElements =driver.findElements(By.cssSelector("input[id=email']"));

**Most common interaction commands in Selenium**

1) get()

2) getCurrentUrl()

3) findElement(By, by).click()

4) isEnabled()

5) findElement(By, by).sendKeys()

6) findElement(By, by).getText()

7) Submit()

8) findElements(By, by)

9) findElements(By, by).size()

10) driver.manager().pageLoadTimeout(time,unit

11) driver.manager().timouts().implicitlyWait()

12) getTitle()

13) driver.navigate().to ("url") and driver.navigate().back() and driver.naviagte.forward()

14) getScreenshotAs()

15) moveToElement() - of Actions class

16) dragAndDrop() - of Action class

17) 20) switchTo() and accept(), dismiss() and sendKeys() - of Alert class

18) getWindowHandle() and getWindowHandles() - to handle multiple windows

19) assertEquals(),assertNotEquals(), assertTrue() and assertFalse()

20) close() and quit() - quit is used to quit driver instance.

**Assertions in selenium can be used in 3 modes which are explained below:**

**1. assert:** If you use assert in your tests then the test will be aborted if the assert fails. Next test case will start executing in case you are running a test suite.

**2. verify:** If verify is used then the test case will not abort even if the verify fails. It will continue executing and log the failure for the failed conditions.

**3. waitFor:** waitFor command waits for the condition to become true. If the condition is true already the test case continues else it waits for the conditions to become true. If the condition doesn’t becomes true within specified time-out period test will fail and halt

**Selenium waits or how will you handle synchronization or timeout.**

**Implicitwaits:** Implicit wait will instruct the WebDriver to wait and poll the DOM until the web element is found if implicit wait time is elapsed, whichever happens first. Default value is 0.

If the element is not found in given time and throws TIMEOUTEXCEPTION,ElementNotVisibleException

Once set, it is effective for the life of the driver, unless reset.

**Syntax :**

**driver.manage.timeouts().implicitlyWait(20, TimeUnit.Seconds)**

implicitlywait globally applies to all the web elements, applied to driver.

>> Selenium waits for until action is performed

**Explicitwaits:** Explicit wait is condition we define on WebDriver, to wait for certain condition to occur before proceeding to next steps in the code. it means we are checking two things, a elapsed time and expected conditions.

**Syntax :**

**WebDriverWait wait=new WebDriverWait(driver.timeout);**

**Element ele=wait.unitl((ExpectedConditions.visivilityOffElementLocated(locator));**

**FluentWait:** Fluent wait is used to tell the WebDriver to wait for a condition, as well as the frequency with which we want to check the condition before throwing and “ ElementNotVisibleException” exception

**Syntax :**

**Wait wait-new FluentWait(WebDriver reference).withTimeout(timeout, SECONDS).pollingEvery(timeout, SECONDS).ignoring(Exception.class);**

Note : implicit and explicit waits are dynamic waits [ eg: if we place 20 seconds wait if then action is performed in 2 seconds it does not wait for other 18 seconds but Thread.sleep() will wait for 20 seconds ]. delay time -- 250 milliseconds

**DesiredCapabiities in Selenium:** is a class helps us to tell the WebDriver, which environment we re going to use in our test scripts. Every test scenario should be executed on some specific testing environment. Testing environment can be a web browser, mobile device, mobile emulator, mobile simulator, etc.

**DesiredCapabilities cap=new DisiredCapabiities();**

setCapability method can be used in selenium Grid.

getCapabiity() , getBrowserName(), setBrowserName(), getVersion(), setVersion, getPlatform(),setPlatform().

**Actions Class**

*// Drag and Drop* Actions act=**new** Actions (driver);  
  
 WebElement toBeMoved=d.findElement (By.*id* (**"draggable"**));  
 WebElement moveTo=d.findElement (By.*id* (**"droppable"**));  
  
 act.clickAndHold (toBeMoved).moveToElement (moveTo).release (toBeMoved).build ().perform ();  
*// Mousehover*Actions act=**new** Actions(driver);  
WebElement ele=driver.findElement (By.*xpath* (**"//li[@class='Department MegaNavEnabled First']"**));  
act.moveToElement (ele).perform ();

*// Mousehover***public void** usingDragAndDrop() {  
  
 WebElement barLength = d*river*.findElement (By.*xpath* (**"//div[@id='slider-spb']"**));  
 **int** priceRange=barLength.getSize ().getWidth ();  
 System.***out***.println (**"total sise of the bar : "** +priceRange);  
 WebElement slideBar = *driver*.findElement (By.*xpath* (**"//\*[@id='slider-pb']/div[1]/a[1]"**));  
 Actions moveSlider = **new** Actions (*driver*);  
 moveSlider.dragAndDropBy (slideBar, 262, 0).build ().perform ();  
}

**//or**

**public void** usingClickAndHold () {  
 WebElement slider = *driver*.findElement (By.*xpath* (**"//[@id='slider-spb']"**));  
 Actions action = **new** Actions (*driver*);  
 action.clickAndHold (slider).moveByOffset (150, 0).release ().perform ();  
}

**Alert**

**public void** alerts()  
{  
 *// if the alert got exposed  
 // then we have to first switch to that alert to confirm or decline* Alert al=driver.switchTo ().alert ();  
   
 *// to accept* al.accept ();  
  
 *// to decline* al.dismiss ();  
}

**Screenshot:**

public void takeScrShot() throws IOException {  
 TakesScreenshot ts=(TakesScreenshot)*driver*;  
 File scrShotFile=ts.getScreenshotAs (OutputType.*FILE*);  
 FileHandler.*copy* (scrShotFile, new File ("C:\\Users\\sball\\IdeaProjects\\cathbdd\\src\\test\\java\\com\\cath\\kidston\\bbd\\ScreenShot\\screenShot.png"));  
  
}

**Read data from Excel Sheet:**

**public class** GetDataFromExl {  
  
 *// to obtain data from column1* **public** ArrayList<String> getcol1() **throws** IOException {  
  
 FileInputStream instm=**new** FileInputStream (**"C:\\Users\\sball\\Desktop\\testdatalogin.xls"**);  
 HSSFWorkbook bk=**new** HSSFWorkbook (instm );  
 HSSFSheet sh=bk.getSheetAt (0);  
  
 Iterator <Row> rw= sh.iterator ();  
  
 ArrayList<String> uid=**new** ArrayList <String> ();  
  
 **while**(rw.hasNext ())  
 {  
 uid.add (rw.next ().getCell (0).getStringCellValue ());  
  
 }  
 **return** uid;  
 }  
  
 *// to obtain data from column2* **public** ArrayList<String> getcol2() **throws** IOException {  
  
 FileInputStream ipst=**new** FileInputStream (**"C:\\Users\\sball\\Desktop\\testdatalogin.xls"**);  
 HSSFWorkbook book=**new** HSSFWorkbook ((ipst));  
 HSSFSheet sheet=book.getSheetAt (0);  
 Iterator<Row> rw2=sheet.iterator ();  
  
 ArrayList<String> pwd=**new** ArrayList <String> ();  
 **while**(rw2.hasNext ())  
 {  
 pwd.add (rw2.next ().getCell (1).getStringCellValue ());  
 }  
 **return** pwd;  
 }

*// to obtain all excel data passing column number as arguments* **public** ArrayList<String> addExcelData(**int** colNumber ) **throws** IOException {  
 FileInputStream inpstm=**new** FileInputStream (**"C:\\Users\\sball\\Desktop\\testdatalogin.xls"**);  
 HSSFWorkbook book=**new** HSSFWorkbook (inpstm);  
 HSSFSheet sheet=book.getSheetAt (0);  
 ArrayList<String> coldata=**new** ArrayList <String> ();  
 Iterator<Row> rows=sheet.iterator ();  
 **while** (rows.hasNext ())  
 {  
 coldata.add (rows.next ().getCell (colNumber).getStringCellValue ());  
 }  
 **return** coldata;  
 }  
}

**public class** ReadExIterator {  
GetDataFromExl **getData**=**new** GetDataFromExl ();  
**private static** WebDriver *exldr*;  
 **@Before  
 public void** openBrows()  
 {  
 System.*setProperty* (**"webdriver.chrome.driver"**,**"C:\\Users\\sball\\Downloads\\chromedriver\_win32\\chromedriver.exe"**);  
 *exldr*=**new** ChromeDriver ();  
 *exldr*.manage ().window ().maximize ();  
 }  
 **@Test  
 public void** login() **throws** IOException, InterruptedException {  
 *// declare ArrayList to get column 1 data* ArrayList <String> getCol1 = **new** ArrayList <String> ();  
 *// declare ArrayList to get column 2 data* ArrayList <String> getCol2 = **new** ArrayList <String> ();  
 *exldr*.get (**"https://www.everything5pounds.com/en/login"**);  
 *// get data from column1* getCol1 = **getData**.getcol1 ();  
 *// get data from column2* getCol2 = **getData**.getcol2 ();  
 WebElement uidtxt = *exldr*.findElement (By.*id* (**"j\_username"**));  
 WebElement pwdtxt = *exldr*.findElement (By.*id* (**"j\_password"**));  
 *// use for to till size of array and sent data from index 0* **for** (**int** i = 0; i <= getCol1.size (); i++) {  
 uidtxt.sendKeys (getCol1.get (i));  
 *exldr*.manage ().timeouts ().implicitlyWait (5, TimeUnit.***SECONDS***);  
 uidtxt.clear ();  
  
 pwdtxt.sendKeys (getCol2.get (i));  
 *exldr*.manage ().timeouts ().implicitlyWait (5, TimeUnit.***SECONDS***);  
 uidtxt.clear ();  
  
 } }  
 **@Test  
public void** loginParameters() **throws** IOException {  
  
 *// similar to above method but this parameterized and code reusability.* ArrayList <String> collist1 = **new** ArrayList <String> ();  
 ArrayList <String> collist2 = **new** ArrayList <String> ();  
  
 collist1 = **getData**.addExcelData (0);  
 collist2 = **getData**.addExcelData (1);  
  
 *exldr*.get (**"https://www.everything5pounds.com/en/login"**);  
  
 WebElement uidtxt = *exldr*.findElement (By.*id* (**"j\_username"**));  
 WebElement pwdtxt = *exldr*.findElement (By.*id* (**"j\_password"**));  
  
 **for** (**int** i = 0; i <= collist1.size ();i++)  
 {  
 uidtxt.sendKeys (collist1.get (i));  
 *exldr*.manage ().timeouts ().implicitlyWait (10, TimeUnit.***SECONDS***);  
 uidtxt.clear ();  
  
 pwdtxt.sendKeys (collist2.get (i));  
 *exldr*.manage ().timeouts ().implicitlyWait (10,TimeUnit.***SECONDS***);  
 pwdtxt.clear ();  
  
 }  
 *exldr*.quit ();  
  
}