SOFTWARE TESTING

AND QUALITY ASSURANCE

LAB MANUAL

TYBsc Computer

Science (V Semester)

For Academic Year (2023-
24)

CERTIFICATE

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OF INFORI

MOHANLAL RA

COMMERCE DIWA

This is to certify that the Mr./Miss. ____________________ of T.Y.B.Sc.(CS) Semester-V has completed the practical work in the subject of **Software Testing And Quality Assurance** during the Academic year 2023-24 under the guidance of **Dr. Sanjivani Nalkar** being the partial requirement for the fulfillment of the curriculum of Degree of Bachelor of Science in Computer Science, University of Mumbai.

Place: **Date:**

Sign of Subject In Charge Sign of External Examiner

Sign of Incharge / H.O.D

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List of Practical's:

1. Install Selenium IDE; Write a test suite containing minimum 4 test cases for different formats.
2. Conduct a test suite for any two web sites.
3. Install Selenium server (Selenium RC) and demonstrate it using a script in Java/PHP.
4. Write and test a program to login a specific web page.
5. Write and test a program to update 10 student records into table into Excel file
6. Write and test a program to select the number of students who have scored more than 60 in any one subject (or all subjects).
7. Write and test a program to provide total number of objects present / available on the page.
8. Write and test a program to get the number of items in a list / combo box.
9. Write and test a program to count the number of check boxes on the page checked and unchecked count.
10. Load Testing using JMeter, Android Application testing using Appium Tools, Bugzilla Bug tracking tools.

Practical :1

Install Selenium IDE; Write a test suite containing minimum 4 test cases for different formats.

Solution:

Introduction to Selenium

A. History of Selenium

- In 2004 invented by Jason R. Huggins and team.
- Original name is JavaScript Functional Tester [JSFT]
- Open source browser based integration test framework built originally by Thought works.
- 100% JavaScript and HTML
- Web testing tool
- That supports testing Web 2.0 applications
- Supports for Cross-Browser Testing(ON Multiple Browsers). And multiple Operating Systems
- Cross browser – IE 6/7, Firefox .8+, Opera, Safari 2.0+

B. What is Selenium?

- Acceptance Testing tool for web-apps
- Tests run directly in browser
- Selenium can be deployed on Windows, Linux, and Macintosh.

Implemented entirely using browser technologies –

- JavaScript
- DHTML
- Frames

Selenium Components-

- Selenium IDE
- Selenium Core
- Selenium RC

C. Selenium IDE

- Selenium-IDE (Integrated Development Environment) is the tool you use to develop your Selenium test cases.
- It is Firefox plug-in
- Firefox extension which allows record/play testing paradigm
- Automates commands, but asserts must be entered by hand

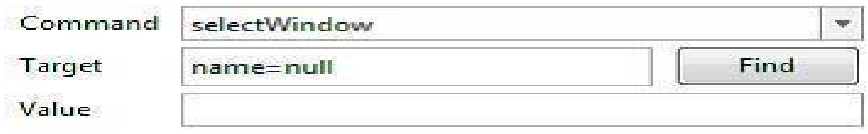
Creates the simplest possible Locator Based on Selenese.

D. Overview of Selenium IDE:

- Test Case Pane
- Toolbar
- Menu Bar
- Log/Reference/UI-Element/Rollup Pane
- Test Case Pane:
- Your script is displayed in the test case pane.

It has two tabs.-

One for displaying the command (source)and their parameters in a readable "table" format.



Command	selectWindow
Target	name=null
Value	

1. **Toolbar:** The toolbar contains buttons for controlling the execution of your test cases, including a step feature for Menu Bar
2. **File Menu:** The File menu allows you to create, open and save test case and test suite files.
3. **Edit Menu:** The Edit menu allows copy, paste, delete, undo and select all operations for editing the commands in your test case.
4. **Options Menu:** The Options menu allows the changing of settings. You can set the timeout value for certain commands, add user- defined user

extensions to the base set of Selenium commands, and specify the format (language) used when saving your test cases.

E. Introducing Selenium Commands-

The command set is often called selenese. Selenium commands come in three “flavors”:

- Actions,
- Accessors
- Assertions.

Actions: user actions on application / Command the browser to do something. Actions are commands that generally manipulate the state of the application.

- Click link- click / Click and wait
- Selecting items

Accessors: Accessors examine the state of the application and store the results in variables, e.g. "storeTitle".

Assertions: For validating the application we are using Assertions

- For verifying the web pages
- For verifying the text
- For verifying alerts
- Assertions can be used in 3 modes:
- assert
- verify
- waitFor

Example: "assertText","verifyText" and "waitForText".

NOTE:

- When an "assert" fails, the test is aborted.
- When a "verify" fails, the test will continue execution

- "waitFor" commands wait for some condition to become true
- Commonly Used Selenium Commands

These are probably the most commonly used commands for building test.

- **open** - opens a page using a URL.
- **click/clickAndWait** - performs a click operation, and optionally waits for a new page to load.
- **verifyTitle/assertTitle** - verifies an expected page title.
- **verifyTextPresent**- verifies expected text is somewhere on the page.
- **verifyElementPresent** -verifies an expected UI element, as defined by its HTML tag, is present on the page.
- **verifyText** - verifies expected text and it‟s corresponding HTML tag are present on the page.
- **verifyTable**-verifies a table‟s expected contents
- **waitForPageToLoad** -pauses execution until an expected new page loads. Called automatically when clickAndWait is used.
- **waitForElementPresent** -pauses execution until an expected UI element, as defined by its HTML tag, is present on the page.

F. Recording and Run settings

- When Selenium-IDE is first opened, the record button is ON by default.
- During recording, Selenium-IDE will automatically insert commands into your test case based on your actions.
- Remember Base URL MODE - Using Base URL to Run Test Cases in Different Domains

Record Absolute recording mode – Run Test Cases in Particular Domain.

Running Test Cases

- Run a Test Case- Click the Run button to run the currently displayed test case.

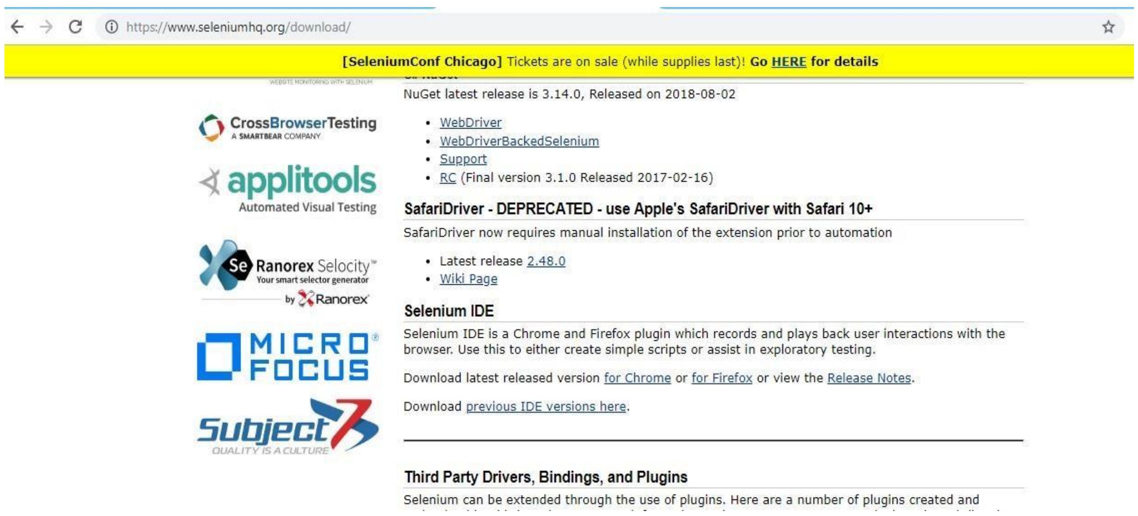
- Run a Test Suite- Click the Run All button to run all the test cases in the currently loaded test suite.
- Stop and Start -The Pause button can be used to stop the test case while it is running. The icon of this button then changes to indicate the Resume button. To continue click Resume.
- Stop in the Middle- You can set a breakpoint in the test case to cause it to stop on a particular command. This is useful for debugging your test case. To set a breakpoint, select a command, right-click, and from the context menu select Toggle Breakpoint.
- Start from the Middle- You can tell the IDE to begin running from a specific command in the middle of the test case. This also is used for debugging. To set a start point, select a command, right-click, and from the context menu select Set/Clear Start Point.
- Run Any Single- Command Double-click any single command to run it by itself. This is useful when writing a single command. It lets you immediately test a command you are constructing, when you are not sure if it is correct. You can double-click it to see if it runs correctly. This is also available from the context menu.
- Test Suite: A test suite is a collection of tests. Often one will run all the tests in a test suite as one continuous batch-job. When using Selenium- IDE, test suites also can be defined using a simple HTML file. The syntax again is simple. An HTML table defines a list of tests where each row defines the file system path to each test.

G. Installing the IDE

Using Firefox, first, download the IDE from the SeleniumHQ downloads page Firefox will protect you from installing addons from unfamiliar locations, so you will need to click „Allow" to proceed with the installation, as shown in the following screenshot.

When downloading from Firefox, you"ll be presented with the following window.

- Select Install Now. The Firefox Add-ons window pops up, first showing a progress bar, and when the download is complete, displays the following.
- Restart Firefox. After Firefox reboots you will find the Selenium-IDE listed under the Firefox Tools menu.
- Opening the IDE: To run the Selenium-IDE, simply select it from the Firefox Tools menu. It opens as follows with an empty script-editing window and a menu for loading, or creating new test cases.
- Click on recording button and start performing testing. When finish with testing stop recording


https://www.seleniumhq.org/download/

[SeleniumConf Chicago] Tickets are on sale (while supplies last)! **Go HERE for details**

NuGet latest release is 3.14.0, Released on 2018-08-02

- WebDriver
- WebDriverBackedSelenium
- Support
- RC (Final version 3.1.0 Released 2017-02-16)

SafariDriver - DEPRECATED - use Apple's SafariDriver with Safari 10+

SafariDriver now requires manual installation of the extension prior to automation

- Latest release 2.48.0
- Wiki Page

Selenium IDE

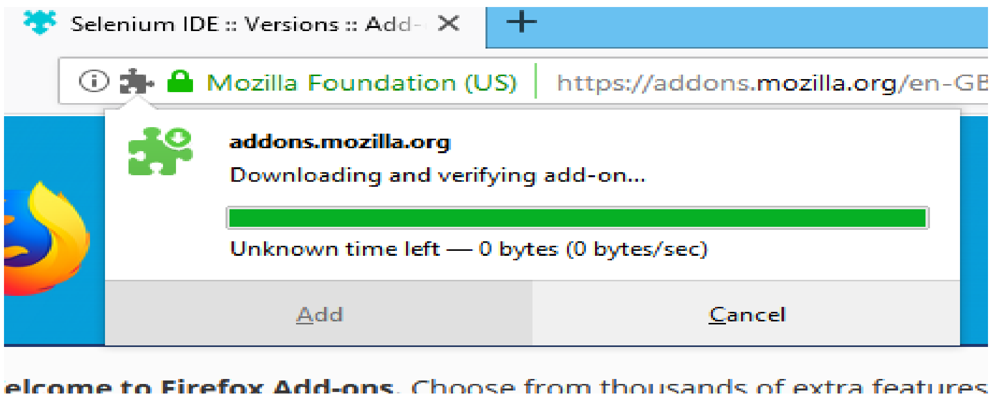
Selenium IDE is a Chrome and Firefox plugin which records and plays back user interactions with the browser. Use this to either create simple scripts or assist in exploratory testing.

Download latest released version for Chrome or for Firefox or view the Release Notes.

Download previous IDE versions here.

Third Party Drivers, Bindings, and Plugins

Selenium can be extended through the use of plugins. Here are a number of plugins created and


Selenium IDE :: Versions :: Add-

Mozilla Foundation (US) https://addons.mozilla.org/en-GE

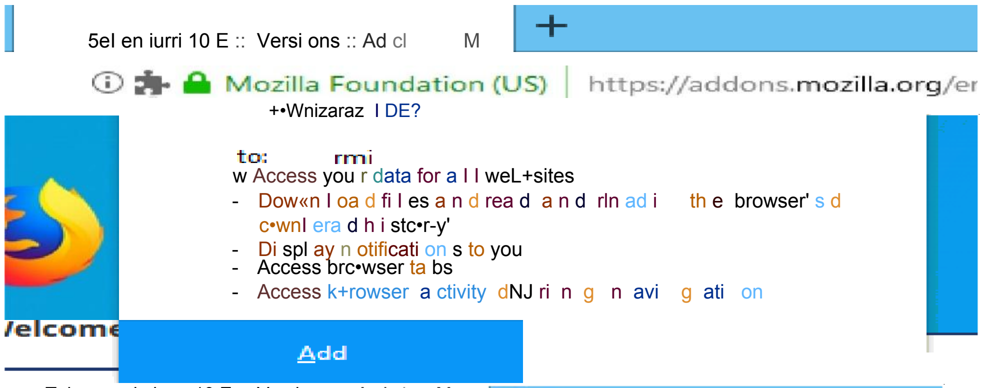
addons.mozilla.org

Downloading and verifying add-on...

Unknown time left — 0 bytes (0 bytes/sec)

elcome to Firefox Add-ons. Choose from thousands of extra features

AcJ d S-



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Mozilla Foundation (US) | https://addons.mozilla.org/er

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w Access you r data for a l l weL+sites

- Dow«n l oa d fi l es a n d rea d a n d rln ad i th e browser' s d c•wnl era d h i stc•r-y'
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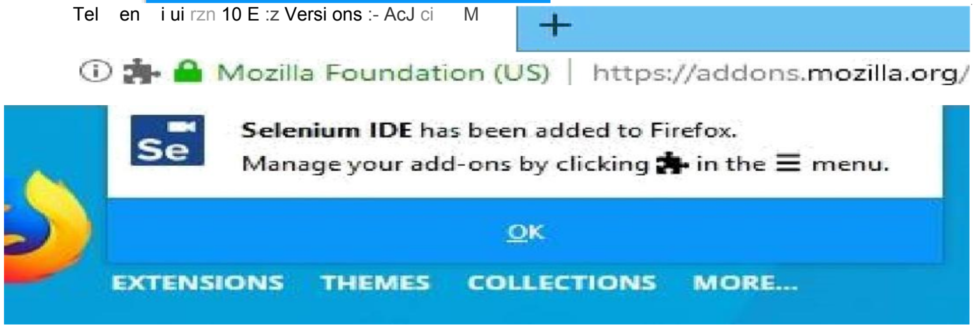
- Access brc•wser ta bs
- Access k+rowser a ctivity dNJ ri n g n avi g ati on

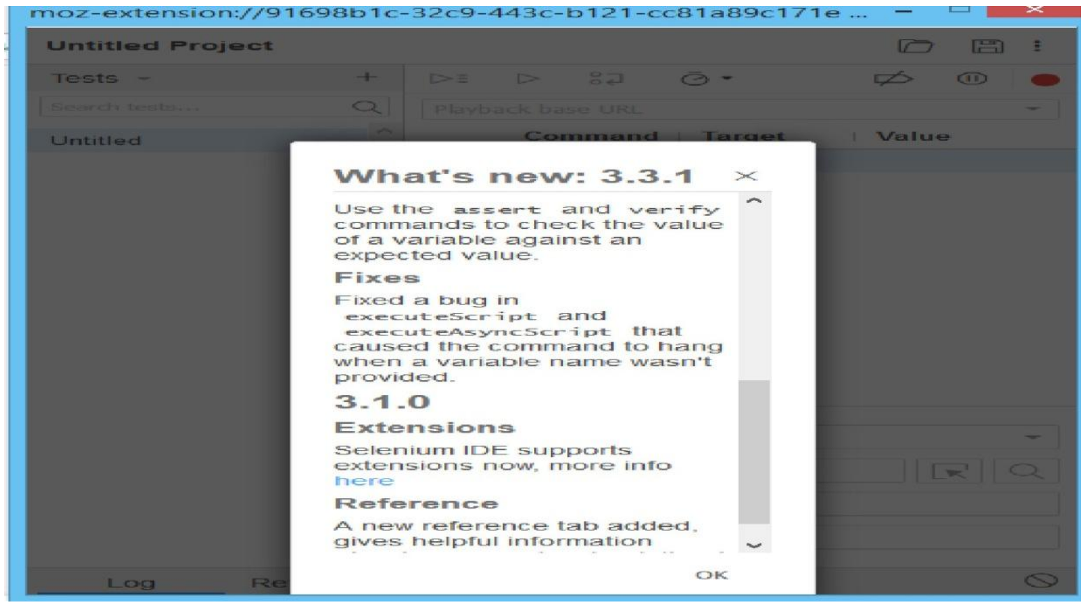


Tel en i ui rzn 10 E :z Versi ons :- AcJ ci M

Mozilla Foundation (US) | https://addons.mozilla.org/

Selenium IDE has been added to Firefox.

Manage your add-ons by clicking in the menu.



moz-extension://91698b1c-32c9-443c-b121-cc81a89c171e ...

What's new: 3.3.1

Use the `assert` and `verify` commands to check the value of a variable against an expected value.

Fixes

Fixed a bug in `executeScript` and `executeAsyncScript` that caused the command to hang when a variable name wasn't provided.

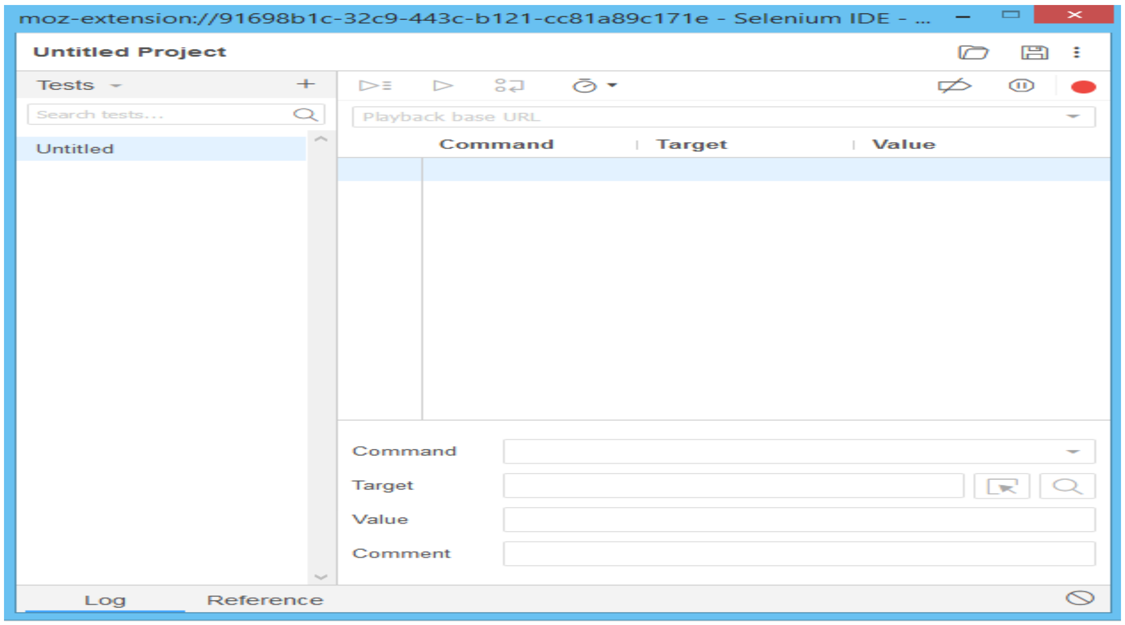
3.1.0

Extensions

Selenium IDE supports extensions now, more info here

Reference

A new reference tab added, gives helpful information



Now, Write a test suite containing minimum 4 test cases.

TC'S #1: Manual Steps:

- Open (Example : Type www.google.com)
- Type "Mumbai University" in the Google Search Input Box
- Click outside on an empty spot
- Click Search Button
- Verify the Text Present as "Mumbai University"
- Assert the Title as "Mumbai University - Google Search"
- Save the test case with .HTML Extension.

TC'S #2: Manual Steps:

- Open (Example : Type www.google.com)
- Type "Selenium RC" in the Google Search Input Box
- Click outside on an empty spot
- Click Search Button
- Verify the Text Present as "Selenium RC"
- Assert the Title as "Selenium RC - Google Search"
- Save the test case with .HTML Extension.

TC'S #3: Manual Steps:

- Open (Example : Type www.google.com)
- Type "Guru99" in the Google Search Input Box
- Click outside on an empty spot
- Click Search Button
- Verify the Text Present as "Guru99"
- Assert the Title as "Guru99"- Google Search"
- Save the test case with .HTML Extension.

TC'S #4: Manual Steps:

- Open (Example : Type www.google.com)
- Type "Software testing Help" in the Google Search Input Box
- Click outside on an empty spot
- Click Search Button
- Verify the Text Present as "Software testing Help"
- Assert the Title as "Software testing Help "- Google Search"
- Save the test case with .HTML Extension.

Steps for creating test suite:

1. Create more Tc"s save each Test Case with <.html> extension.
2. Open Firefox
3. Open Tools → Selenium IDE
4. File → Open → new Test Suite
5. File → Open → Add Test cases
6. Add more test cases
7. Save Suite with <.Html> extensions. Run the test suite

Practical : 2

2. Conduct a test suite for any two web

sites. Solution:

TC'S #1: Manual Steps:

- Open (Example : Type www.google.com)
- Type "Mumbai University" in the Google Search Input Box
- Click outside on an empty spot
- Click Search Button
- Verify the Text Present as "Mumbai University"
- Assert the Title as "Mumbai University - Google Search"
- Save the test case with .HTML Extension.

TC#2: Manual Steps

- Open Firefox Web Browser
- In the address bar, Type http://www.yahoo.com
- In the search input button, Type " JVM's Mehta College"
- Click on the "Web Search" submit button
- Wait for Search Results to come on "http:/search.yahoo.com"
- Verify "JVM's Mehta college" text is present anywhere in the search results: (Select and highlight anywhere in the search results page, " JVM's Mehta college " text is present.)
- Verify the browsers title has the value " JVM's Mehta college " - Search Results"
- Save the test case with .HTML Extension.

Steps for creating test suite:

- Create more Tc’s save each Test Case with <.html> extension.
- Open Firefox
- Open Tools → Selenium IDE
- File → Open → new Test Suite
- File → Open → Add Test cases
- Add more test cases

Save Suite with <.Html> extensions and Run the test suite

Practical : 3

3.Install Selenium server (Selenium RC) and demonstrate it using a script in Java/PHP

i.Introduction

Selenium-RC is the solution for tests that need more than simple browser actions and linear execution. Selenium-RC uses the full power of programming languages to create more complex tests like reading and writing files, querying a database, emailing test results. You"ll want to use Selenium- RC whenever your test requires logic not supported by Selenium-IDE. What logic could this be? For example, Selenium-IDE does not directly support:

- Condition statements
- Iteration
- logging and reporting of test results
- Error handling, particularly unexpected errors
- Database testing
- Test case grouping
- Re-execution of failed tests
- Test case dependency
- Screenshot capture of test failures

Although these tasks are not supported by Selenium directly, all of them can be achieved by using programming techniques with a language-specific Selenium- RC client library

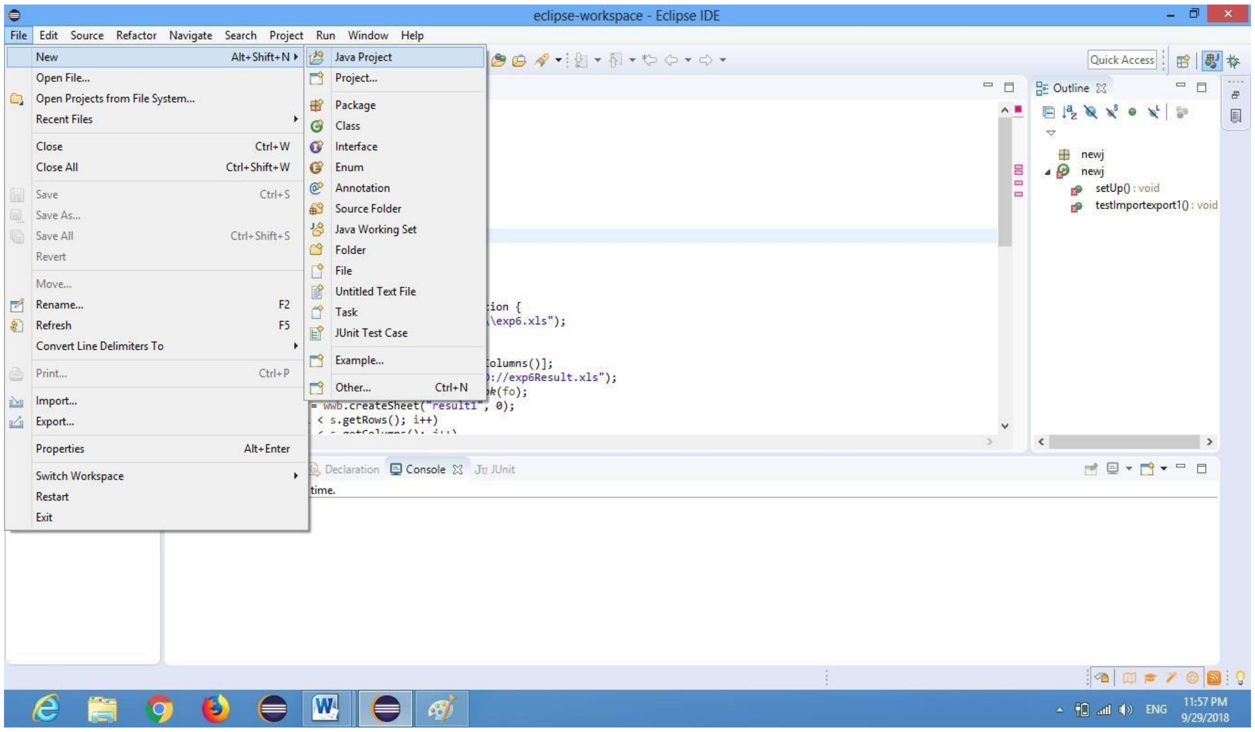
ii.Installation of Eclipse

Eclipse (@ www.eclipse.org) is an *open-source* Integrated Development Environment (IDE) supported by IBM. Eclipse is popular for Java application development (Java SE and Java EE) and Android apps. It also supports C/C++, PHP, Python, Perl, and other web project developments via extensible plug-ins. Eclipse is cross-platform and runs under Windows, Linux and Mac OS.

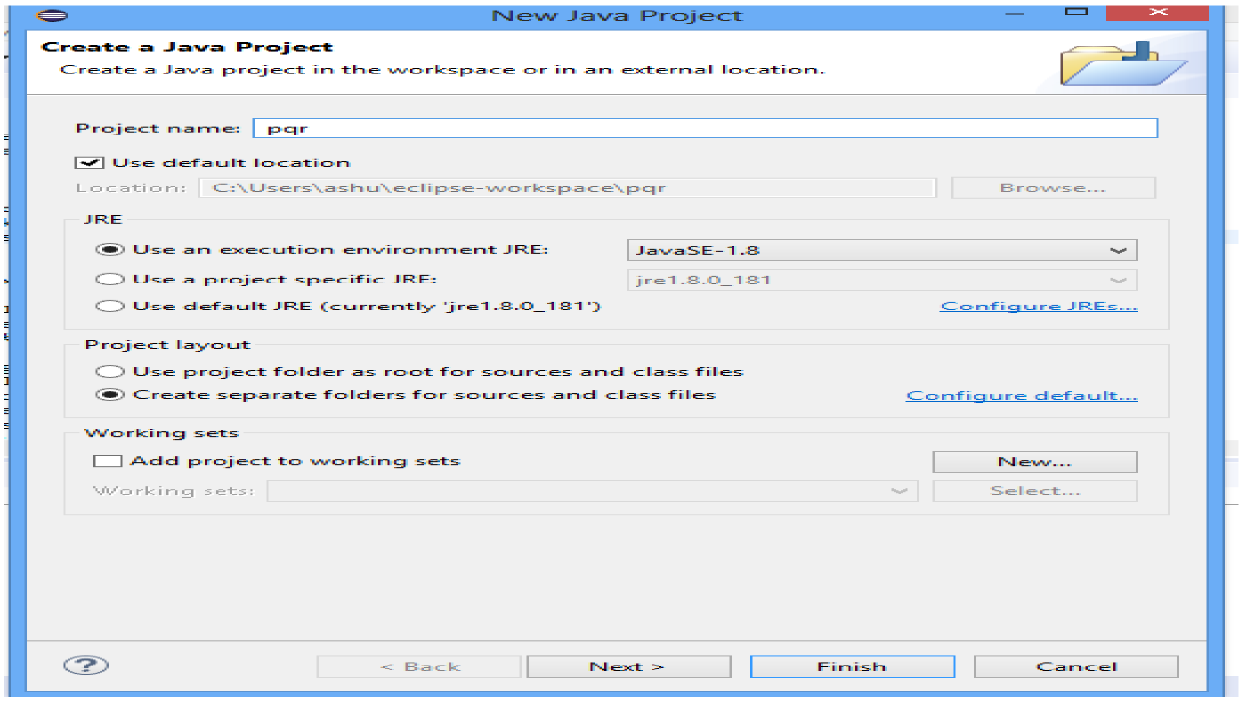
Install Eclipse for Java Developers using below steps:

- Go to URL – http://www.eclipse.org/downloads/
- Select Eclipse IDE for Java Developers (Click on Windows 32 bit platform)
- Click on OK button and save to a local drive (i.e. C: or D:, etc)
- Unzip the downloaded zip file and rename that to **Eclipse**
- Create one more folder "Eclipse-Workspace" (i.e. C:Eclipse- Workspace)in the same drive where Eclipse is unzipped and renamed.
- Create Eclipse desktop shortcut (go to C:Eclipse folder –> right click Eclipse.exe and then click on "desktop create shortcut")
- Create project in Eclipse using below steps:
- Click on File->New->Java project. Give name java project and click on next
- Go to libraries Add external jar files if required. Click on finish.
- Right Click on created project Go to src and add java class. Click on finish.

To execute this steps screenshots are also provide below:



```
tion {
\exp6.xls");
columns()];
://exp6Result.xls");
k(fo);
= wwb.createSheet("result1", 0);
< s.getRows(); i++)
```


New Java Project

Create a Java Project

Create a Java project in the workspace or in an external location.

Project name: pqr

[✓] Use default location

Location: C:\Users\ashu\eclipse-workspace\pqr

JRE

(●) Use an execution environment JRE: JavaSE-1.8

( ) Use a project specific JRE: jre1.8.0_181

( ) Use default JRE (currently 'jre1.8.0_181')

Project layout

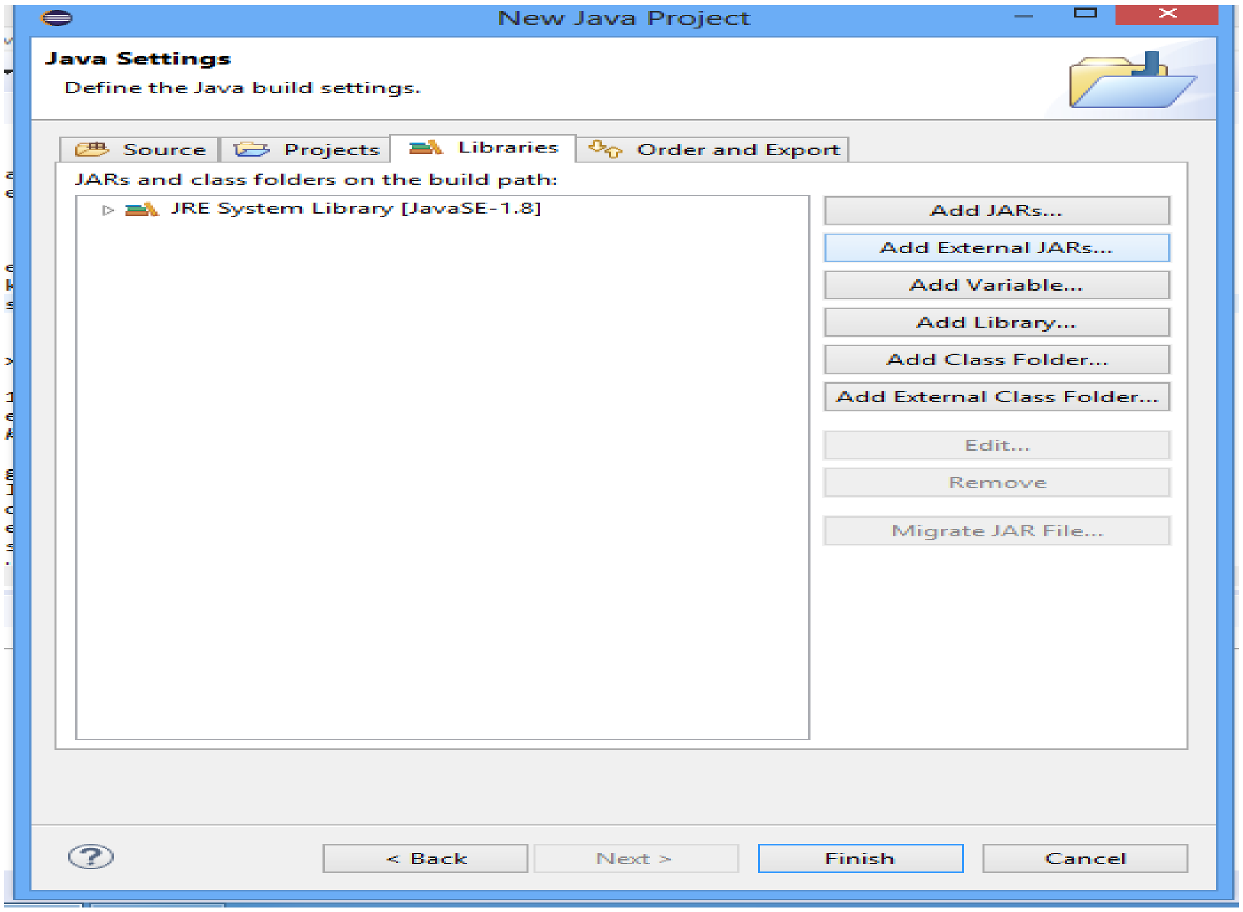
( ) Use project folder as root for sources and class files

(●) Create separate folders for sources and class files

Working sets

[ ] Add project to working sets

Working sets:

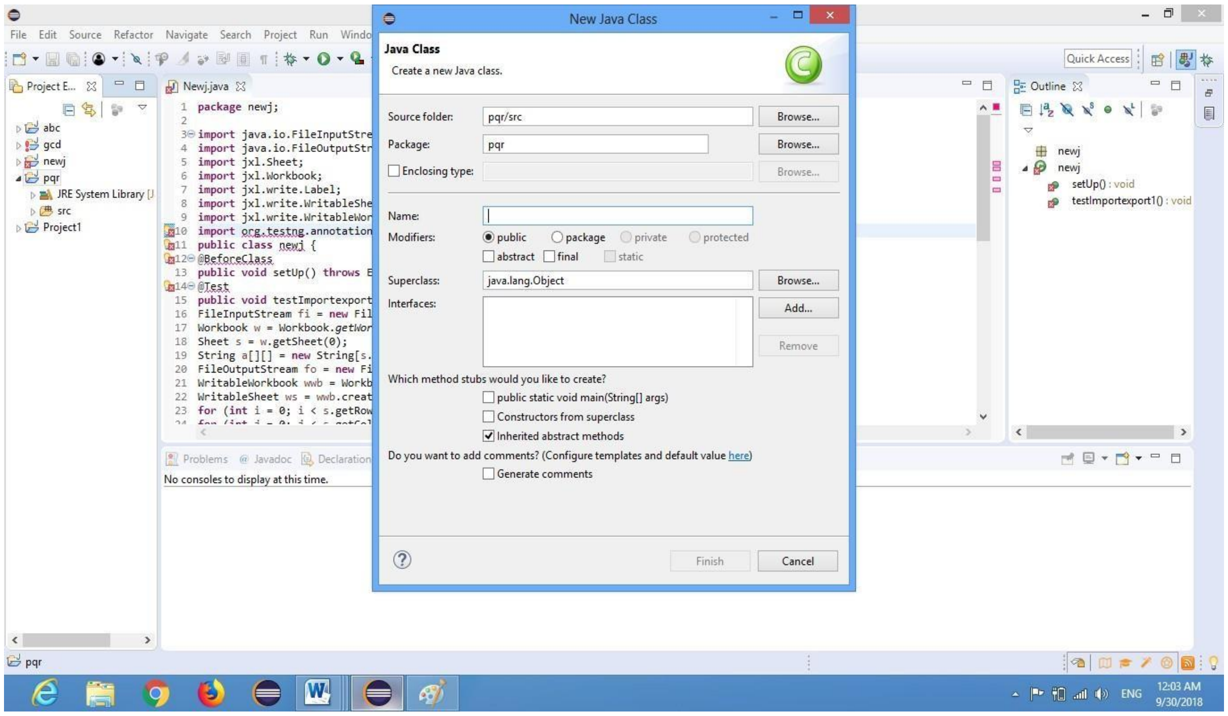

New Java Project

Java Settings

Define the Java build settings.

JARs and class folders on the build path:

▷ JRE System Library [JavaSE-1.8]



```
package newj;

import java.io.FileInputStre
import java.io.FileOutputStr
import jxl.Sheet;
import jxl.Workbook;
import jxl.write.Label;
import jxl.write.WritableShe
import jxl.write.WritableWor
import org.testng.annotation
public class newj {
@BeforeClass
public void setUp() throws E
@Test
public void testImportexport
FileInputStream fi = new Fil
Workbook w = Workbook.getWor
Sheet s = w.getSheet(0);
String a[][] = new String[s.
FileOutputStream fo = new Fi
WritableWorkbook wwb = Workb
WritableSheet ws = wwb.creat
for (int i = 0; i < s.getRow
```

No consoles to display at this time.

Java Class

Create a new Java class.

Source folder: pqr/src

Package: pqr

[ ] Enclosing type:

Name:

Modifiers: [✓ public] package private protected

[ ] abstract [ ] final [ ] static

Superclass: java.lang.Object

Interfaces:

Which method stubs would you like to create?

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

[ ] Constructors from superclass

[✓] Inherited abstract methods

Do you want to add comments? (Configure templates and default value here)

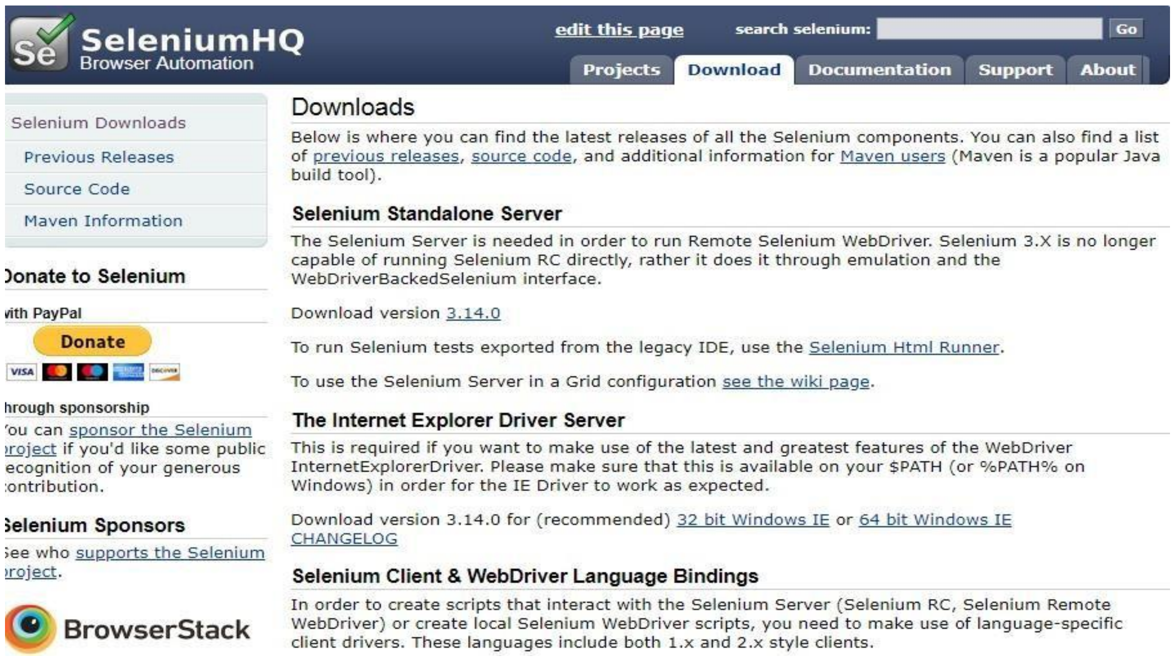
[ ] Generate comments

iii. Selenium Server:

To download and run selenium server we need to follow steps given below:

1.Download Selenium Standalone Server from this link

https://www.seleniumhq.org/download/



Donate to Selenium

with PayPal

through sponsorship

You can sponsor the Selenium project if you'd like some public recognition of your generous contribution.

Selenium Sponsors

See who supports the Selenium project.

Downloads

Below is where you can find the latest releases of all the Selenium components. You can also find a list of previous releases, source code, and additional information for Maven users (Maven is a popular Java build tool).

Selenium Standalone Server

The Selenium Server is needed in order to run Remote Selenium WebDriver. Selenium 3.X is no longer capable of running Selenium RC directly, rather it does it through emulation and the WebDriverBackedSelenium interface.

Download version 3.14.0

To run Selenium tests exported from the legacy IDE, use the Selenium Html Runner.

To use the Selenium Server in a Grid configuration see the wiki page.

The Internet Explorer Driver Server

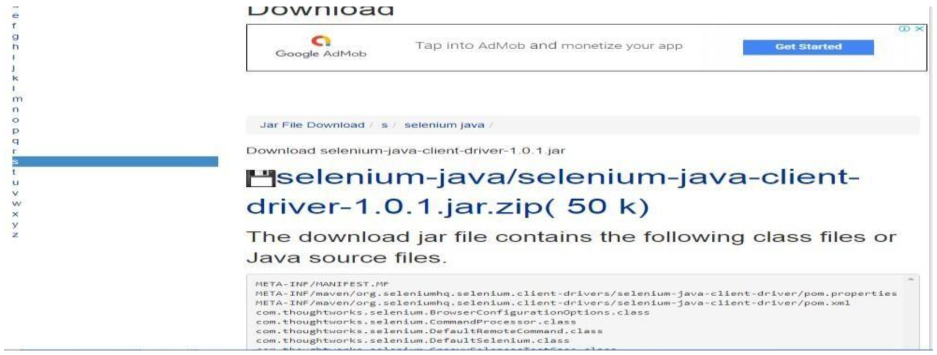
This is required if you want to make use of the latest and greatest features of the WebDriver InternetExplorerDriver. Please make sure that this is available on your $PATH (or %PATH% on Windows) in order for the IE Driver to work as expected.

Download version 3.14.0 for (recommended) 32 bit Windows IE or 64 bit Windows IE CHANGELOG

Selenium Client & WebDriver Language Bindings

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

2. Download Selenium Client server from this link http://www.java2s.com/Code/Jar/s/Downloadseleniumjavaclientdriver101jar.html



Download
Google AdMob
Tap into AdMob and monetize your app
Get Started
Jar File Download / s / selenium java /

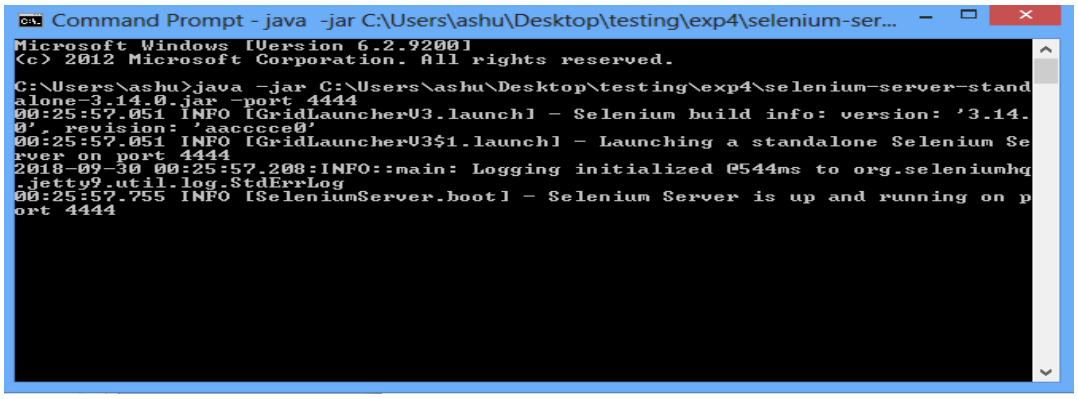
Download selenium-java-client-driver-1.0.1.jar

selenium-java/selenium-java-client-driver-1.0.1.jar.zip(50 k)

The download jar file contains the following class files or Java source files.

```
META-INF/MANIFEST.MF
META-INF/maven/org.seleniumhq.selenium.client-drivers/selenium-java-client-driver/pom.properties
META-INF/maven/org.seleniumhq.selenium.client-drivers/selenium-java-client-driver/pom.xml
com.thoughtworks.selenium.BrowserConfigurationOptions.class
com.thoughtworks.selenium.CommandProcessor.class
com.thoughtworks.selenium.DefaultRemoteCommand.class
com.thoughtworks.selenium.DefaultSelenium.class
```

3. To start selenium server open cmd and hit command given below java -jar C:\Users\Admin\Desktop\selenium-server-standalone- 3.14.0.jar -port 4444


Command Prompt - java -jar C:\Users\ashu\Desktop\testing\exp4\selenium-ser...

```
Microsoft Windows [Version 6.2.9200]
(c) 2012 Microsoft Corporation. All rights reserved.

C:\Users\ashu>java -jar C:\Users\ashu\Desktop\testing\exp4\selenium-server-stand
alone-3.14.0.jar -port 4444
00:25:57.051 INFO [GridLauncherV3.launch] - Selenium build info: version: '3.14.
0', revision: 'aacccce0'
00:25:57.051 INFO [GridLauncherV3$1.launch] - Launching a standalone Selenium Se
rver on port 4444
2018-09-30 00:25:57.208:INFO::main: Logging initialized @544ms to org.seleniumhq
.jetty9.util.log.StdErrLog
00:25:57.755 INFO [SeleniumServer.boot] - Selenium Server is up and running on p
ort 4444
```

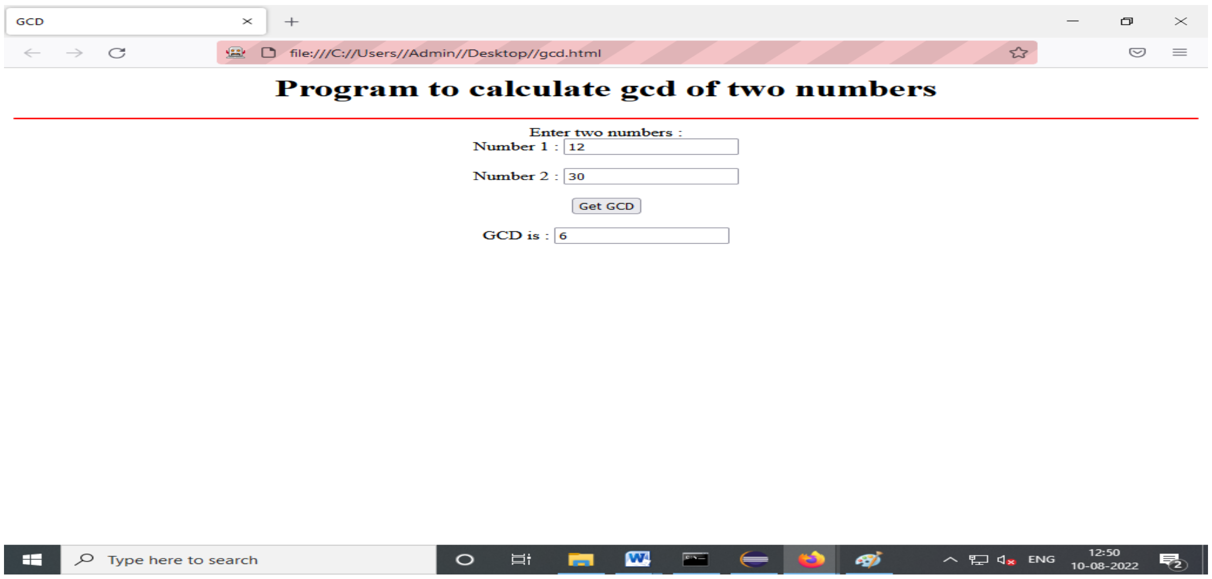
Code for gcd.html

```
<html>
<head>
<title> GCD </title>
<script type="text/javascript">
function gcd()
{
var x,y;
x=parseInt(document.myform.n1.value);
y=parseInt(document.myform.n2.value);
while(x!=y)
{ if(x>y)
x=x-y;
else
y=y-x;
}
document.myform.result.value=x;
}
</script>
</head>
<body>
<h1 align="center"> Program to calculate gcd of two numbers </h1>
<hr color="red">
<center>
Enter two numbers :
<form name="myform">
Number 1 : <input type="text" name="n1" value=""> <br> <br>
Number 2 : <input type="text" name="n2" value=""> <br> <br>
```

```
<input type="button" name="btn" value="Get GCD" onClick="gcd()"> <br>
<br>
GCD is : <input type="text" name="result" value="">
</form>
</body>
</html>
```

Source Code:

```
package pracgcd;
import org.openqa.selenium.By;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.firefox.FirefoxDriver;
public class GCD {

        public static void main(String[] args) {
                // TODO Auto-generated method stub


System.setProperty("webdriver.gecko.driver","C://Users//Admin//Desktop//g
eckodriver.exe");
                WebDriver driver = new FirefoxDriver();
                driver.get("file:///C://Users//Admin//Desktop//gcd.html" );
                driver.manage().window().maximize();
                driver.findElement(By.id("n1")).sendKeys("2");
                driver.findElement(By.id("n2")).sendKeys("14");
                //driver.findElement(By.id("txt1")).sendKeys("49");
                driver.findElement(By.name("gcd")).click();
                String result=
driver.findElement(By.name("result")).getAttribute("name=result");
System.out.println("the gcd is:"+ result);
        }
}
```



Program to calculate gcd of two numbers

Enter two numbers :
Number 1 : 12

Number 2 : 30

Get GCD

GCD is : 6

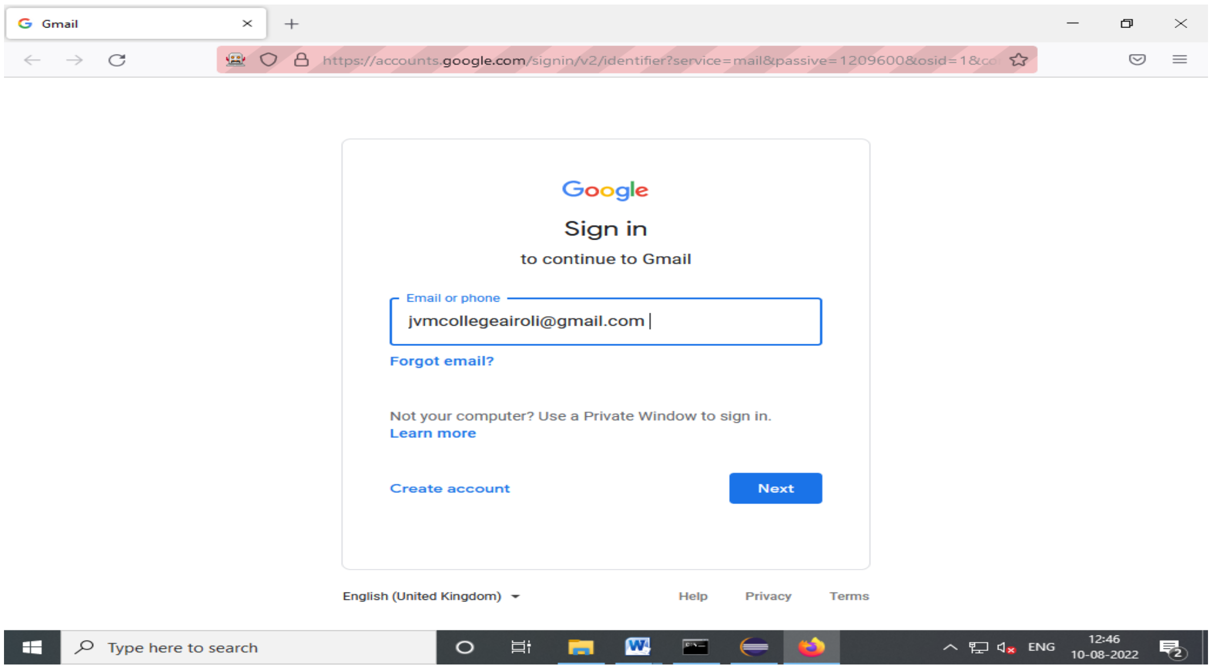
Practical : 4

4. Write and test a program to login a specific

web page Solution:

Source Code:

```
package prackage;
import org.openqa.selenium.By;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.firefox.FirefoxDriver;
public class Pack {

        public static void main(String[] args) {
                // TODO Auto-generated method stub


System.setProperty("webdriver.gecko.driver","C://Users//Admin//Desktop//g
eckodriver.exe");
                WebDriver driver=new FirefoxDriver();
driver.get("https://mail.google.com");


driver.findElement(By.id("identifierId")).sendKeys("jvmcollegeairoli@gmail.c
om ");
                //
driver.findElement(By.id("Passwd")).sendKeys("yourPassword");
driver.findElement(By.id("signIn")).click();

        }

}
```


Gmail
https://accounts.google.com/signin/v2/identifier?service=mail&passive=1209600&osid=1&co

Google

Sign in

to continue to Gmail

Email or phone

jvmcollegeairoli@gmail.com

Not your computer? Use a Private Window to sign in.

Practical : 5

5. Write and test a program to update 10 student records into table into Excel file.

Solution:

Introduction to TestNG:

TestNG is a testing framework inspired from JUnit and NUnit but introducing some new functionality that make it more powerful and easier to use, such as:

- Annotations.
- Run your tests in arbitrarily big thread pools with various policies available (all methods in their own thread, one thread per test class, etc...).
- Test that your code is multithread safe.
- Flexible test configuration.
- Support for data-driven testing (with @DataProvider).
- Support for parameters.
- Powerful execution model (no more Test Suite).
- Supported by a variety of tools and plug-ins (Eclipse, IDEA, Maven, etc...).
- Embeds bean Shell for further flexibility.
- Default JDK functions for runtime and logging (no dependencies).
- Dependent methods for application server testing.

TestNG is designed to cover all categories of tests: unit, functional, end-to-end, integration, etc...

- Installing TestNG in eclipse

- Select Help / Software updates / Find and Install.
- Search for new features to install.
- New remote site.

For Eclipse 3.4 and above, enter http://beust.com/eclipse.
For Eclipse 3.3 and below, enter

http://beust.com/eclipse1. Make sure the check box

next to URL is checked and click Next. Eclipse will

then guide you through the process.

Launching your tests in Eclipse

We finished writing our tests, now how can we run them?

You can launch TestNG from the command line, using a Eclipse plug-in or even programmatically. We are going to use the Eclipse plugin. Follow the steps described on the official TestNG documentation over here

If you installed TestNG correctly, you will see this menu when

you right click on the XML file:

Click on “Run as TestNG Suite” and your test will start running. You will then see this nice results tree:

Selenium Tests with Microsoft Excel

Parameterizing a test from external sources such as Microsoft Excel is always Recommended in order to handle large amount of test data. To read data from Excel, we need APIs which support opening file, reading data, and writing data into Excel. We should know various classes and methods which support above mentioned operations. In this post, let us try to figure out which is the API that supports all the activities we need to do during execution of a test.Jxl.jar is an open source Java API which supports read Excel spreadsheets and to write into Excel spreadsheets. Below are some of the operations that we can handle with this API.

- Read data from Excel spreadsheet
- Read and write formulas into spreadsheets
- Generate spreadsheets
- Supports formatting of font, number, and date
- Supports coloring of cells

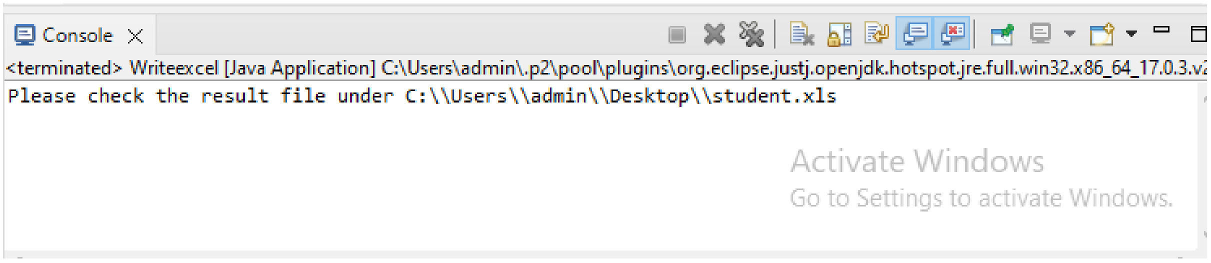
To access the methods and classes provided by this API inside Eclipse we need to add this JAR file to the Java Build Path. (I have explained steps to add external Jar files to Java Build Path in previous posts)

Download the jxl.jar from "http://jexcelapi.sourceforge.net/" Add the JAR file to Java Build Path

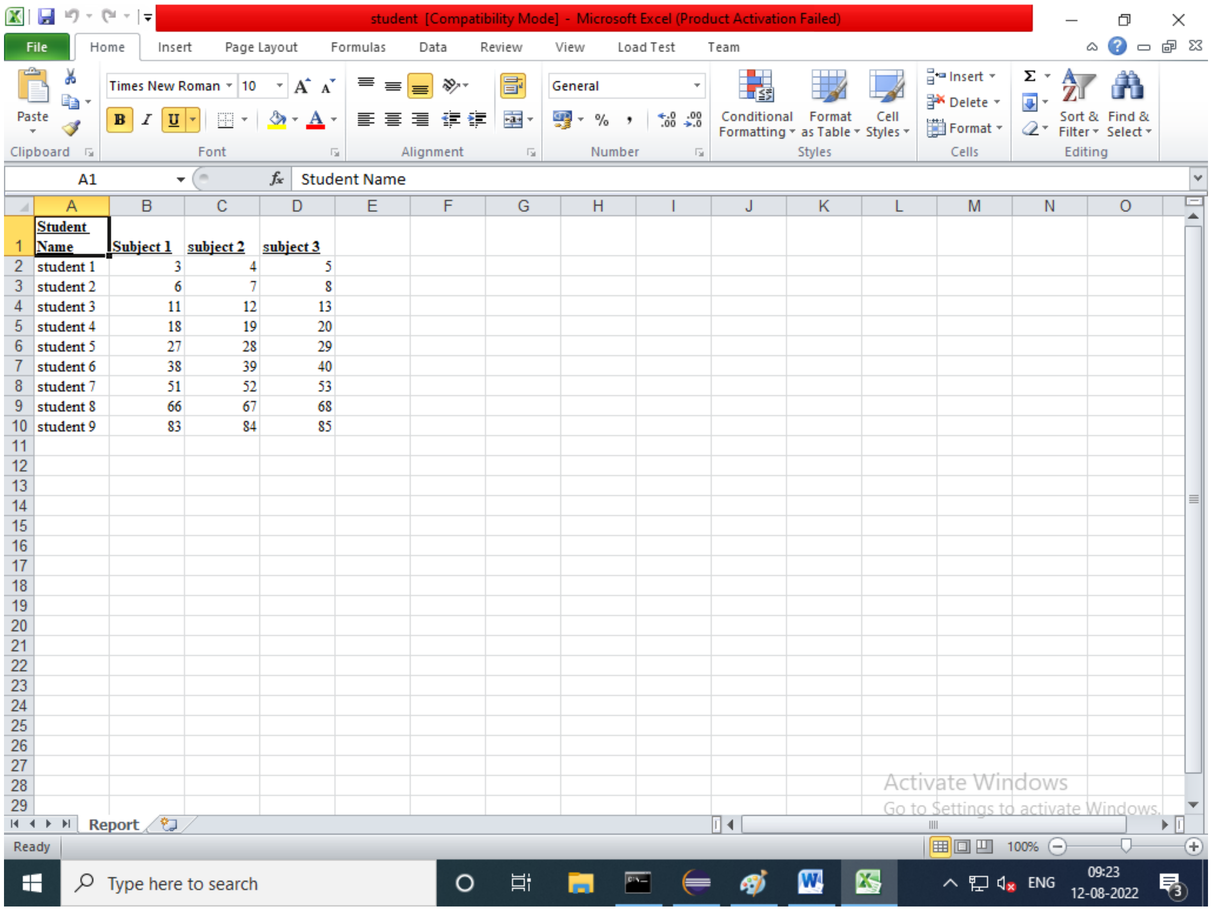
Source Code:

```
package excelproj;
import java.io.File;
import java.io.IOException;
import java.util.Locale;
import  jxl.CellView;
import jxl.JXLException;
import jxl.Workbook;
import jxl.WorkbookSettings;
import jxl.format.UnderlineStyle;
import jxl.write.Formula;
import jxl.write.Label;
import jxl.write.Number;
import jxl.write.WritableCellFormat;
import jxl.write.WritableFont;
import jxl.write.WritableSheet;
import jxl.write.WritableWorkbook;
import jxl.write.WriteException;
import jxl.write.biff.RowsExceededException;

public class Writeexcel {
      private static final String Firstcolumn = null;
      //public static void main(String[] args) {
              // TODO Auto-generated method stub
      private WritableCellFormat timesBoldUnderline;
      private WritableCellFormat times;
      private String inputFile;
      public void setOutputFile(String inputFile) {
      this.inputFile = inputFile;
      }
public void write() throws IOException, WriteException { File file = new
File(inputFile);
WorkbookSettings wbSettings = new WorkbookSettings();
wbSettings.setLocale(new Locale("en", "EN"));
WritableWorkbook workbook = Workbook.createWorkbook(file,
wbSettings); workbook.createSheet("Report", 0);
WritableSheet excelSheet = workbook.getSheet(0);
createLabel(excelSheet); createContent(excelSheet);
workbook.write(); workbook.close();
      }
private void createLabel(WritableSheet sheet)
throws WriteException {
      // Lets create a times font
WritableFont times10pt = new WritableFont(WritableFont.TIMES, 10);
      // Define the cell format
times = new WritableCellFormat(times10pt);
      // Lets automatically wrap the cells
times.setWrap(true);
// Create a bold font with underlines
WritableFont times10ptBoldUnderline = new WritableFont(
WritableFont.TIMES, 10, WritableFont.BOLD, false,
UnderlineStyle.SINGLE);
timesBoldUnderline = new WritableCellFormat(times10ptBoldUnderline);
      // Lets automatically wrap the cells
 timesBoldUnderline.setWrap(true);
      CellView cv = new CellView(); cv.setFormat(times);
cv.setFormat(timesBoldUnderline); cv.setAutosize(true);
      // Write a few headers
      addCaption(sheet, 0, 0, "Student Name");
      addCaption(sheet, 1, 0, "Subject 1");
      addCaption(sheet, 2, 0, "subject 2");
      addCaption(sheet, 3, 0, "subject 3");
      }
private void createContent(WritableSheet sheet) throws WriteException,
RowsExceededException {
      // Write a few number
      for (int i = 1; i < 10; i++) {
      //First column
              addLabel(sheet, 0, i, "student " + i);
       //Second column
              addNumber(sheet, 1, i, ((i*i)+10));
addNumber(sheet, 1, i, ((i*i)+2));
      addNumber(sheet, 2, i, ((i*i)+3));
      addNumber(sheet, 3, i, ((i*i)+4));
      }
      }

private void addCaption(WritableSheet sheet, int column, int row, String
s)
throws RowsExceededException, WriteException { Label label;
label = new Label(column, row, s, timesBoldUnderline);
sheet.addCell(label);
      }
private void addNumber(WritableSheet sheet, int column, int row,
Integer integer) throws WriteException, RowsExceededException {
Number number;
number = new Number(column, row, integer, times);
sheet.addCell(number);
      }
private void addLabel(WritableSheet sheet, int column, int row, String s)
throws WriteException, RowsExceededException { Label label;
label = new Label(column, row, s, times); sheet.addCell(label);
      }
public static void main(String[] args) throws JXLException, IOException {
              //TODO Auto-generated  void method stub
      Writeexcel test = new Writeexcel();
      test.setOutputFile("C:\\Users\\admin\\Desktop\\student.xls");

test.write();
System.out.println("Please check the result file under
C:\\\\Users\\\\admin\\\\Desktop\\\\student.xls ");
```

```
}   }
```



```
<terminated> Writeexcel [Java Application] C:\Users\admin\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_17.0.3.v2
Please check the result file under C:\\Users\\admin\\Desktop\\student.xls
```



student [Compatibility Mode] - Microsoft Excel (Product Activation Failed)

	A	B	C	D
1	**Student Name**	**Subject 1**	**subject 2**	**subject 3**
2	student 1	3	4	5
3	student 2	6	7	8
4	student 3	11	12	13
5	student 4	18	19	20
6	student 5	27	28	29
7	student 6	38	39	40
8	student 7	51	52	53
9	student 8	66	67	68
10	student 9	83	84	85

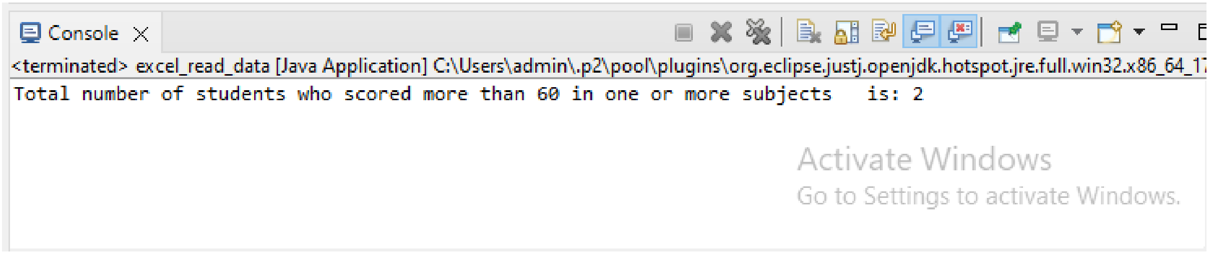
Report

Practical : 6

6.Write and test a program to select the number of students who have scored more than 60 in any one subject (or all subjects).

Solution:

```
package Excelwriter;
import java.io.File;
import java.io.IOException;
import jxl.Cell;
import jxl.CellType;
import jxl.Sheet;
import jxl.Workbook;
import jxl.read.biff.BiffException;

public class excel_read_data {
        private String inputFile;
        public void setInputFile(String inputFile) {
        this.inputFile = inputFile;
        }
        public void read() throws IOException {
        File inputWorkbook = new File(inputFile); Workbook w;
        boolean flag=false;
        int count=0;
        try {
        w = Workbook.getWorkbook(inputWorkbook);
        // Get the first sheet
        Sheet sheet = w.getSheet(0);
        // Loop over first 10 column and lines

        for (int j = 0; j < sheet.getRows(); j++) {
        for (int i = 0; i < sheet.getColumns(); i++) { Cell cell =
    sheet.getCell(i, j);
        if (cell.getType() == CellType.NUMBER) {
        if(Integer.parseInt(cell.getContents())>60){ flag = true;
        if(flag == true){
        count++; flag=false;
        }
        break;
        }
        }
        }
        }
    System.out.println("Total number of students who scored more than
    60 in one or more subjects   is: " +count);
        }
     catch (BiffException e) { e.printStackTrace();
        }
        }
        public static void main(String[] args) throws IOException {
            // TODO Auto-generated method stub
            excel_read_data test = new excel_read_data();

        test.setInputFile("C:\\Users\\admin\\Desktop\\student.xls");
            test.read();

    }
        }
```



```
<terminated> excel_read_data [Java Application] C:\Users\admin\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_17
Total number of students who scored more than 60 in one or more subjects   is: 2
```

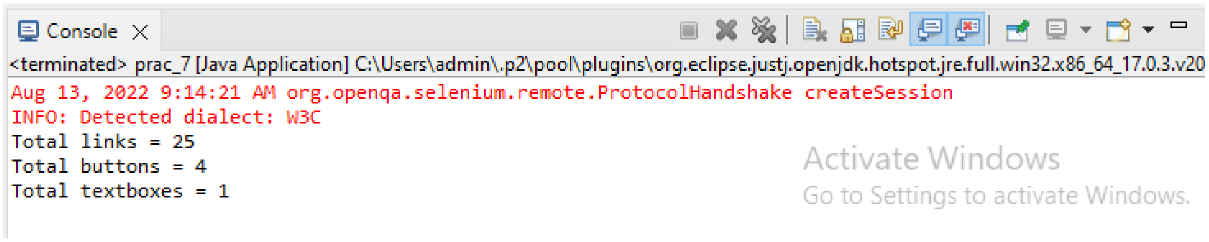
Practical : 7

7. Write and test a program to provide total number of objects present / available on the page.

Solution:

Source Code:

```
package prac7;
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 prac_7 {

    public static void main(String[] args) {
        // TODO Auto-generated method stub
System.setProperty("webdriver.gecko.driver","C://Users//Admin//Desktop/
/geckodriver.exe");
              WebDriver driver = new FirefoxDriver();
driver.get("http://google.co.in/");
              java.util.List<WebElement> links =
driver.findElements(By.tagName("a")); System.out.println("Total links = "+
links.size());
//                    java.util.List<WebElement> buttons =
driver.findElements(By.tagName("button"));
              List<WebElement> buttons =
driver.findElements(By.xpath("//input[@type='button' or
@type='submit']"));
              System.out.println("Total buttons = "+ buttons.size());
List<WebElement> textboxes =
              driver.findElements(By.xpath("//input[@type='text' or
@type='password']"));

//                    java.util.List<WebElement> textboxes =
driver.findElements(By.xpath("//input[@type='text'[@class='inputtext']"));
              System.out.println("Total textboxes = " + textboxes.size());

      }

}
```



```
<terminated> prac_7 [Java Application] C:\Users\admin\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_17.0.3.v20
Aug 13, 2022 9:14:21 AM org.openqa.selenium.remote.ProtocolHandshake createSession
INFO: Detected dialect: W3C
Total links = 25
Total buttons = 4
Total textboxes = 1
```

Practical : 8

8. Write and test a program to get the number of items in a list / combo box.

Solution:

- Write this java test code in eclipse. before running this code makes sure your selenium RC server is running)

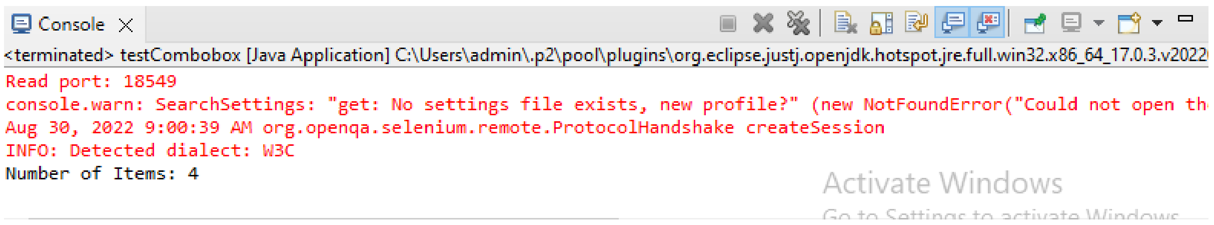
- Write Combocount.html as shown below and save under desktop

```
<html>
<body>
<select>
<option>Volvo</option>
<option>Express</option>
<option>Mercedes</option>
<option>RajaHamsa</option>
</select>
</body>
</html>
```

  - Write the below code in eclipse
  - Make sure that the path of your combocount.html file must be correct for your system , in this example it is

    file:///C:/Users/Desktop/combocount.html

```
package p8;
import java.io.BufferedWriter;
import java.io.File;
import java.io.FileWriter; import java.io.IOException;
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 testCombobox {

        public static void main(String[] args) {
                // TODO Auto-generated method stub


System.setProperty("webdriver.gecko.driver","C://Users//Admin//
                                        Desktop//geckodriver.exe");

        WebDriver driver = new FirefoxDriver();
        driver.get("file:///C://Users//admin//Desktop//combocount.html");

        Select se = new Select(driver.findElement(By.xpath("//select")));

        List<WebElement> l = se.getOptions();
        l.size();
        System.out.println("Number of Items: " + l.size());

        }

    }
```



```
<terminated> testCombobox [Java Application] C:\Users\admin\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_17.0.3.v2022
Read port: 18549
console.warn: SearchSettings: "get: No settings file exists, new profile?" (new NotFoundError("Could not open th
Aug 30, 2022 9:00:39 AM org.openqa.selenium.remote.ProtocolHandshake createSession
INFO: Detected dialect: W3C
Number of Items: 4
```