| |
|---|
| Experiment No.7 |
| To Setup and Run Selenium Tests in Jenkins Using Maven. |
| Date of Performance: |
| Date of Submission: |

**Aim:** To Setup and Run Selenium Tests in Jenkins Using Maven

**Objective:** Objective is to setup enables seamless integration of automated testing into the CI/CD pipeline, facilitating faster feedback loops and promoting a culture of continuous improvement in software development.

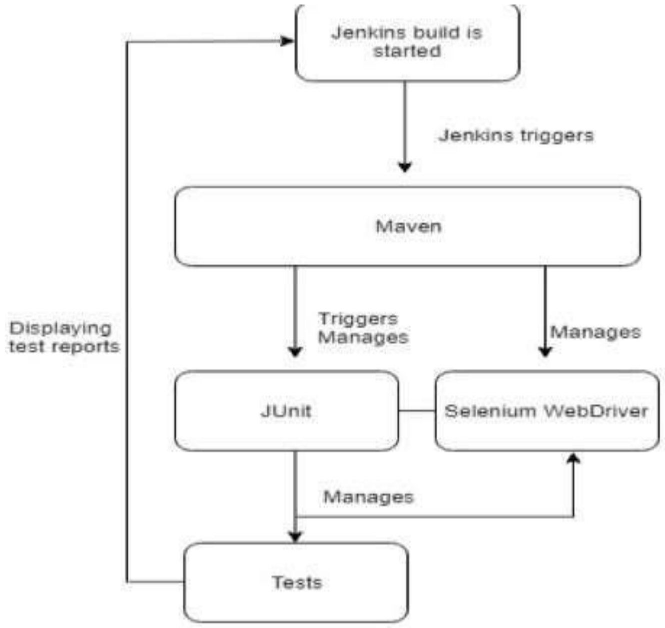
**Theory:**

Jenkins is the leading open-source continuous integration tool developed by Hudson lab. It is cross-platform and can be used on Windows, Linux, Mac OS and Solaris environments. Jenkins is written in Java. It has taken the place as one of the best open-source tools that allow continuous integration and build management.

Running Selenium tests in Jenkins allows you to run your tests every time your software changes and deploy the software to a new environment when the tests pass. Jenkins can schedule your tests to run at specific time. You can save the execution history and Test Reports. Jenkins supports Maven for building and Testing a project in continuous integration

Maven is a powerful project / build management tool, based on the concept of a POM (Project Object Model) that includes project information and configuration information for Maven such as construction directory, source directory, dependency, test source directory, Goals, plugins, etc.

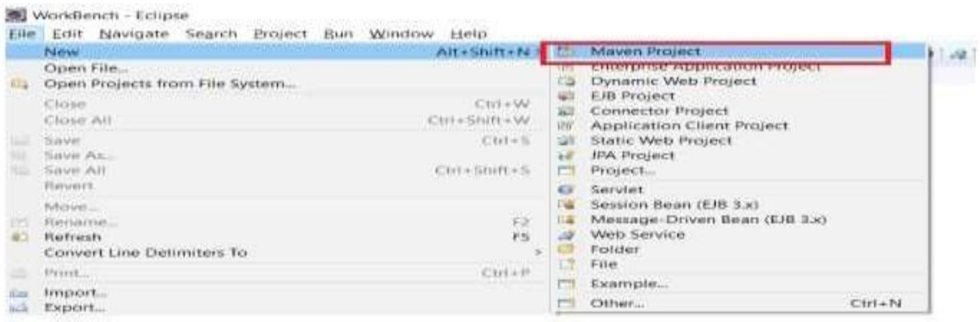
Integrating Maven with Selenium provides following benefits Apache Maven provides support for managing the full lifecycle of a test project. Maven is used to define project structure, dependencies, build, and test management. Using pom.xml(Maven) you can configure dependencies needed for building testing and running code. Maven automatically downloads the necessary files from the repository while building the project.



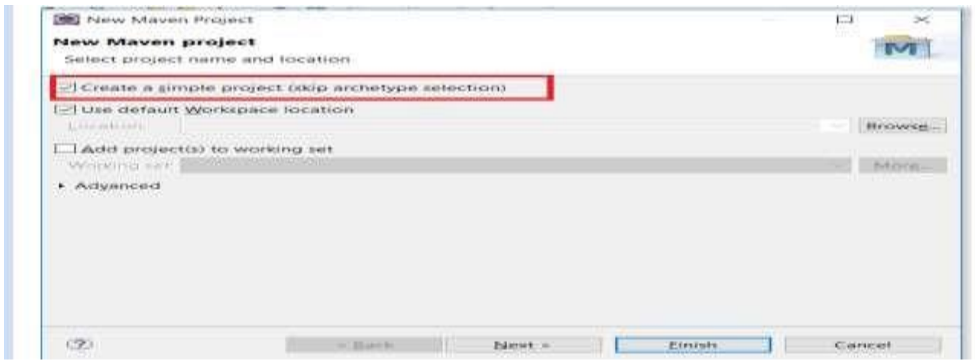
**Steps:**

---Create a Maven Selenium script---

1. In Eclipse IDE, create a new project by selecting **File | New | Maven Project** from Eclipse menu.

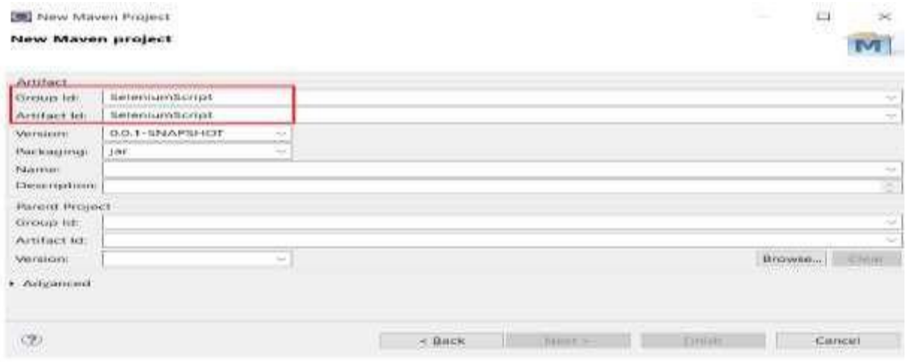


2. On the **New Maven Project** dialog select the **Create a simple project** and click **Next**



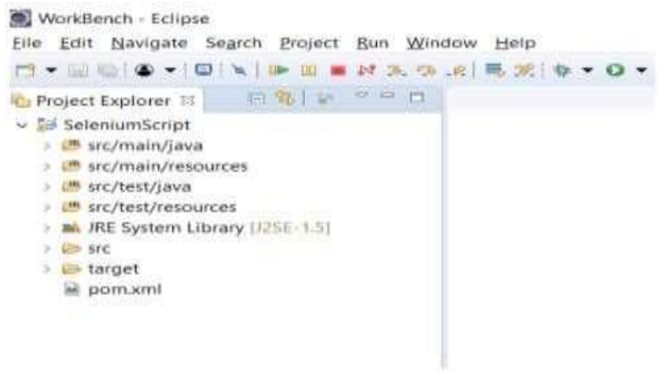
☑ Create a simple project (skip archetype selection)
☑ Use default Workspace location
Location:
☐ Add project(s) to working set
Working set:

3. Enter **SeleniumScript** in **Group Id**: and **Artifact Id**: and click finish

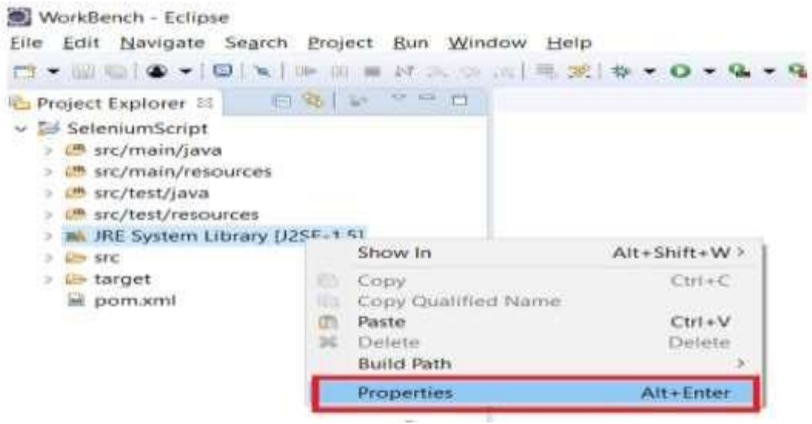


Artifact
Group Id: SeleniumScript
Artifact Id: SeleniumScript
Version: 0.0.1-SNAPSHOT
Packaging: jar
Name:
Description:
Parent Project
Group Id:
Artifact Id:
Version:

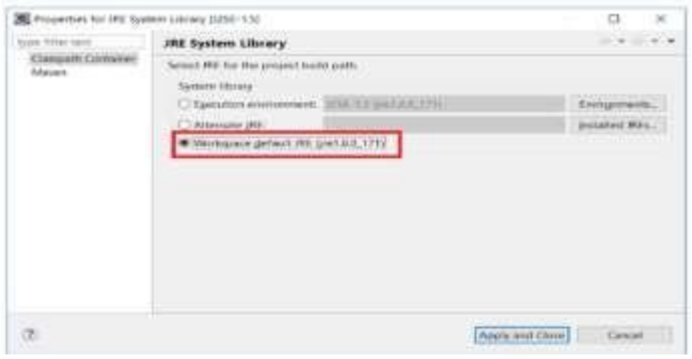
4. Eclipse will create webdriverTest.



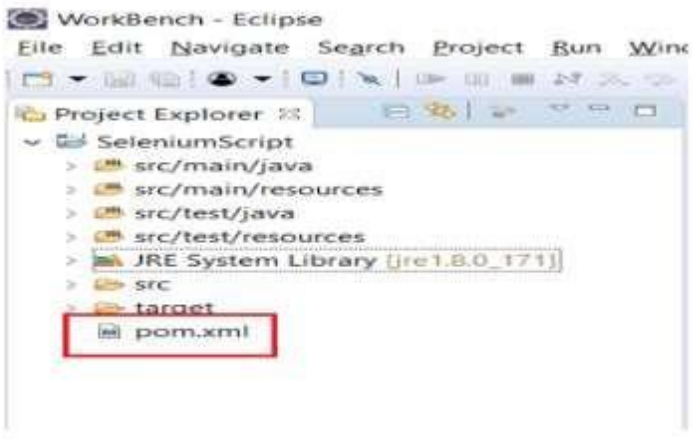
5. Right click on JRE System Library and select the Properties option from the menu.



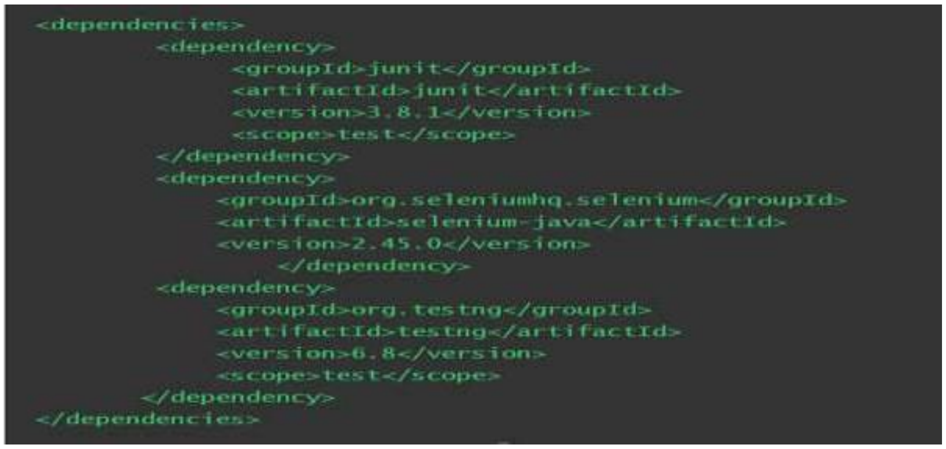
6. On the Properties for JRE System Library dialog box , make sure Workspace default JRE is selected and click ok.



7. Select pom.xml from project explorer.

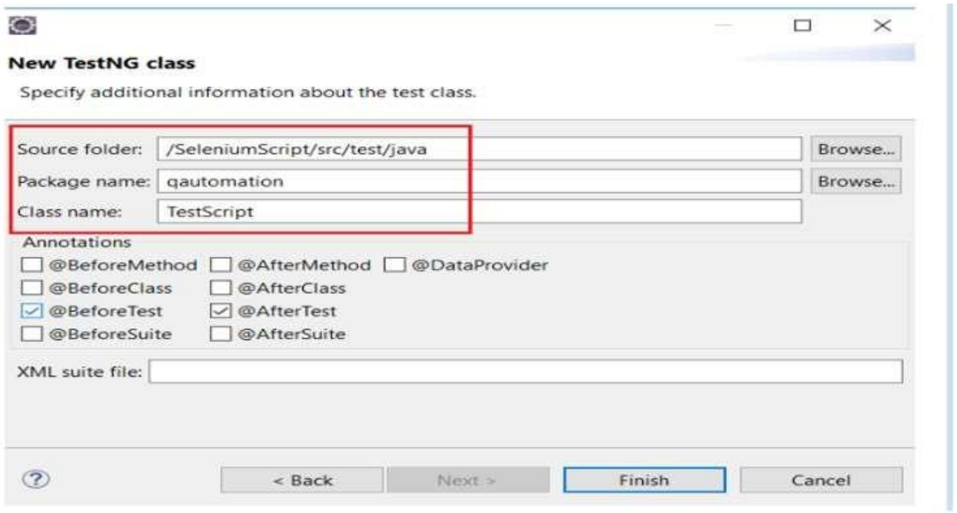


8. Add selenium, Maven, TestNG, Junit dependencies to pom.xml in the code.



```
<dependencies>
        <dependency>
             <groupId>junit</groupId>
             <artifactId>junit</artifactId>
             <version>3.8.1</version>
             <scope>test</scope>
        </dependency>
        <dependency>
            <groupId>org.seleniumhq.selenium</groupId>
            <artifactId>selenium-java</artifactId>
            <version>2.45.0</version>
                </dependency>
        <dependency>
            <groupId>org.testng</groupId>
            <artifactId>testng</artifactId>
            <version>6.8</version>
            <scope>test</scope>
       </dependency>
</dependencies>
```

9. Create a new file TestNG class File|New|Others|TestNG|TestNG Class. Enter Package name as "Qautomation" and "TestScript" in the Name:textbox and click on the Finish button.



**New TestNG class**

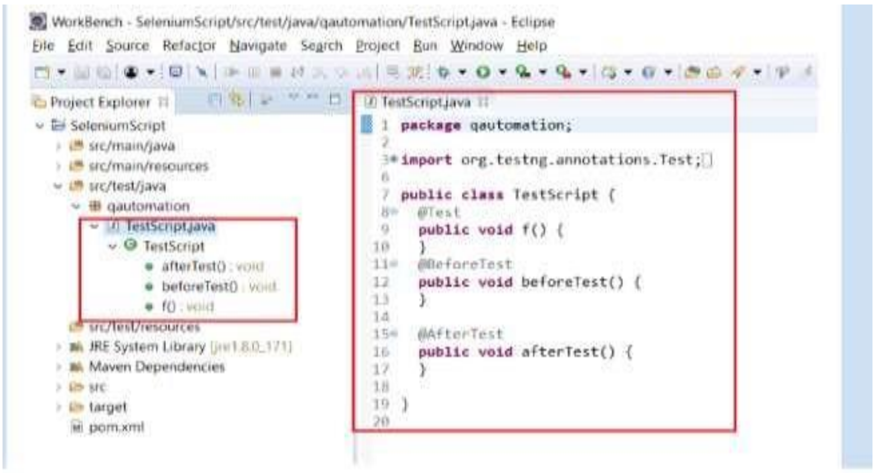
Specify additional information about the test class.

Source folder: /SeleniumScript/src/test/java
Package name: qautomation
Class name: TestScript

Annotations
- [ ] @BeforeMethod
- [ ] @AfterMethod
- [ ] @DataProvider
- [ ] @BeforeClass
- [ ] @AfterClass
- [✓] @BeforeTest
- [✓] @AfterTest
- [ ] @BeforeSuite
- [ ] @AfterSuite

XML suite file:

10. Eclipse will create the TestScript class



```
package qautomation;

import org.testng.annotations.Test;

public class TestScript {
  @Test
  public void f() {
  }
  @BeforeTest
  public void beforeTest() {
  }

  @AfterTest
  public void afterTest() {
  }

}
```

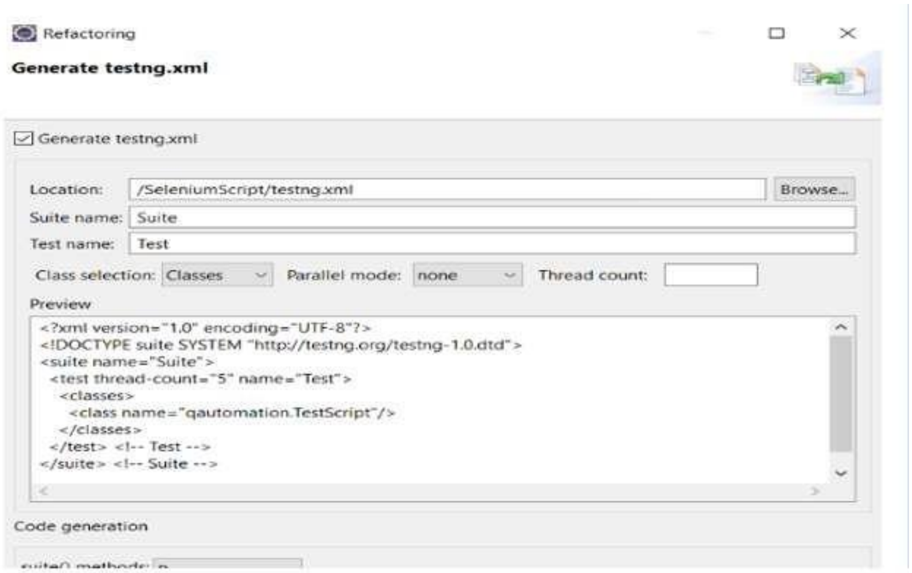
11. Add following code to the TestScript class and respective browser drivers for chrome,firefox and IE.

```
package qautomation;
import org.testng.annotations.Test;
import org.testng.annotations.BeforeTest;
import java.util.HashMap;
import java.util.Map;
import java.util.concurrent.TimeUnit;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.chrome.ChromeDriver;
import org.openqa.selenium.chrome.ChromeOptions;
import org.openqa.selenium.firefox.FirefoxDriver;
import org.openqa.selenium.firefox.FirefoxOptions;
import org.openqa.selenium.firefox.FirefoxProfile;
import org.openqa.selenium.ie.InternetExplorerDriver;
import org.openqa.selenium.remote.DesiredCapabilities;
import org.testng.Assert;
import org.testng.annotations.AfterTest;
 public class TestScript {
        public static WebDriver driver=null;
        public String browser = System.getProperty("browser"); public String url =
        System.getProperty("URL");

@BeforeTest
public void beforeTest()
{

        if(browser.equalsIgnoreCase("Chrome"))
        {
        System.setProperty("webdriver.chrome.driver",
        System.getProperty("user.dir")+"\\chromedriver.exe");
        Map<String, Object> prefs = new HashMap<String, Object>();
        ChromeOptions options = new ChromeOptions();
        options.setExperimentalOption("prefs", prefs);
        options.addArguments("--disable-arguments");
        options.addArguments("--test-type");
        options.addArguments("test");
        options.addArguments("disable-infobars");
        driver = new ChromeDriver(options);
        }
        else if(browser.equalsIgnoreCase("FireFox"))
        {
        System.setProperty(FirefoxDriver.SystemProperty.DRIVER_USE_MARIONETTE
        ,"true");
        System.setProperty(FirefoxDriver.SystemProperty.BROWSER_LOGFILE,Syste
        m.getProperty("user.dir")+"\\FireFoxLogs.txt");
        System.setProperty("webdriver.gecko.driver",
        System.getProperty("user.dir")+"\\geckodriver_v23.exe");
        FirefoxProfile profile = new FirefoxProfile();
        profile.setAcceptUntrustedCertificates(false);
        FirefoxOptions options = new FirefoxOptions().setProfile(profile);
        driver = new FirefoxDriver(options);
        driver.manage().timeouts().implicitlyWait(20, TimeUnit.SECONDS);
        driver.manage().window().maximize();
        }
        else if (browser.equalsIgnoreCase("IE"))
        {
        System.setProperty("webdriver.ie.driver",
        System.getProperty("user.dir")+"\\IEDriverServer351.exe");
        DesiredCapabilities caps = DesiredCapabilities.internetExplorer();
        caps.setCapability(InternetExplorerDriver.INTRODUCE_FLAKINESS_BY_IGNO
        RING_SECURITY_DOMAINS,true);
        caps.setCapability(InternetExplorerDriver.IGNORE_ZOOM_SETTING,true);
        caps.setCapability(InternetExplorerDriver.UNEXPECTED_ALERT_BEHAVIOR,"
        accept");
        caps.setCapability(InternetExplorerDriver.REQUIRE_WINDOW_FOCUS,true);
        caps.setCapability(InternetExplorerDriver.INITIAL_BROWSER_URL,"http://www.
        google.com/");
        driver = new InternetExplorerDriver(caps);
        driver.manage().timeouts().implicitlyWait(20, TimeUnit.SECONDS);
        driver.manage().window().maximize();
        }
        driver.manage().timeouts().implicitlyWait(20, TimeUnit.SECONDS);
        driver.manage().window().maximize();
}
@Test
public void TestApplication() {
driver.get(url);
String title = driver.getTitle();
System.out.println("Title="+title);
Assert.assertTrue(title.contains("QAutomation"));
}
@AfterTest
public void afterTest() {
        driver.quit();
        }
}
```

12. Right click on the WebdriverTest and select TestNG| Convert to TestNG. Eclipse will create testing.xml which says that you need to run only one test with the name TestApplication.



☑ Generate testng.xml

Location: /SeleniumScript/testng.xml
Suite name: Suite
Test name: Test
Class selection: Classes  Parallel mode: none  Thread count:

Preview

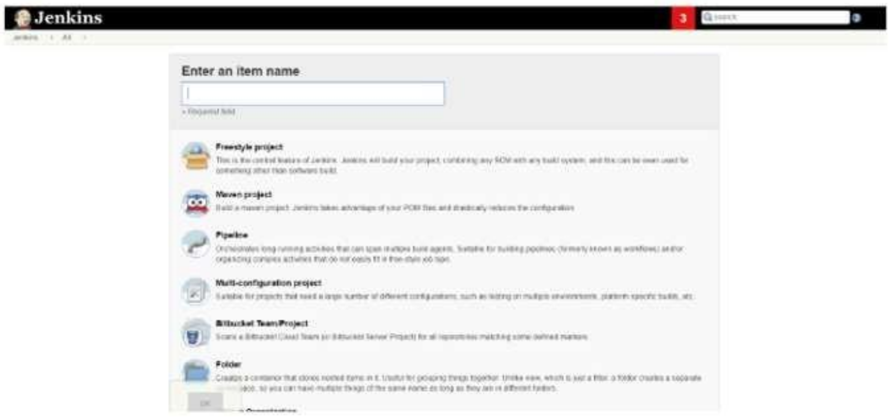
```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE suite SYSTEM "http://testng.org/testng-1.0.dtd">
<suite name="Suite">
  <test thread-count="5" name="Test">
    <classes>
      <class name="qautomation.TestScript"/>
    </classes>
  </test> <!-- Test -->
</suite> <!-- Suite -->
```

13. Adding dependencies and plugins
    Additionally we need to add
    1. Maven-compiler-plugin
    2. Maven-surefire-plugin
    3. Testng.xml

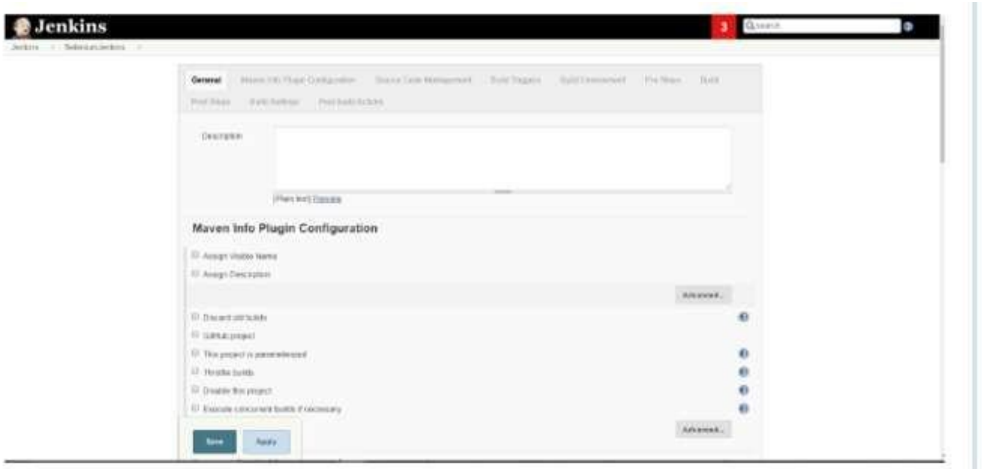
**---------Integrating your test to Jenkins-------------**

1. Launch and login into jenkins URL – [http://localhost:8080/](http://localhost:8080/)

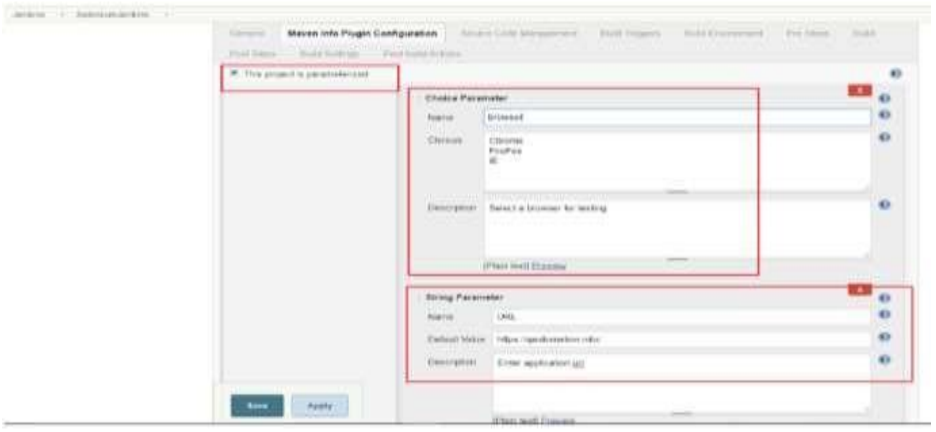
2. Click on new item and enter an appropriate name for the new job , select Maven Project and click on save.



3. A new empty job has been created at this point.



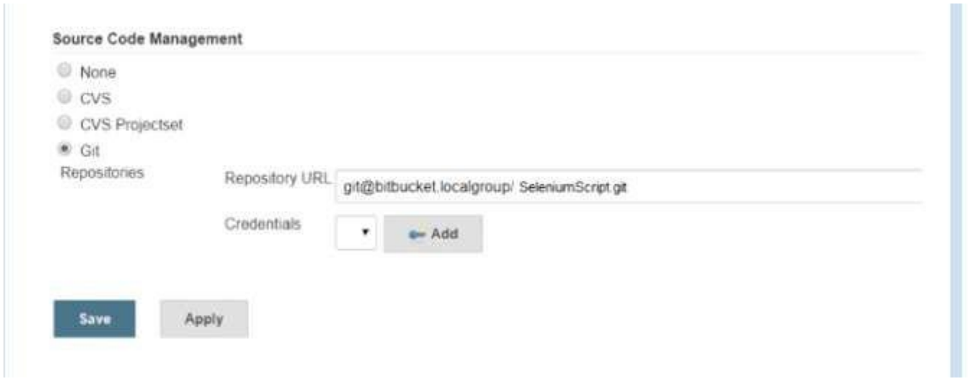
4. Jenkins Parameterized Build in Jenkins just check the checkbox **This project is paramerized** and add the parameter by **Add Parameter** as per your project requirement.


Maven Info Plugin Configuration
This project is parameterized
Choice Parameter
String Parameter
Save
Apply

Choice Parameter
Name: Browser
Choices: Chrome
FireFox
IE
Description: Select a browser for testing

String Parameter
Name: URL
Description: Enter application url

5. If code is located on Git Under **Source Management** , select the appropriate repository for the location of project and pass the URL and credentials.



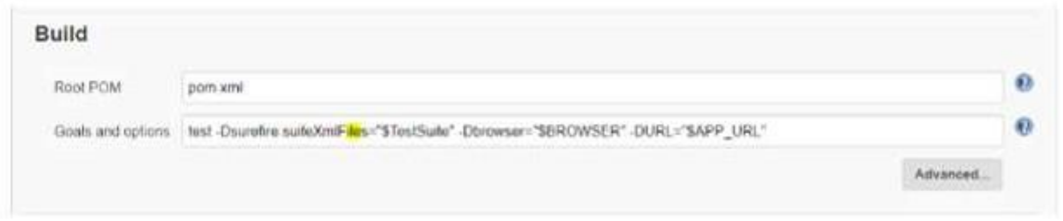
● Git

Repositories: Repository URL: git@bitbucket.localgroup/ SeleniumScript.git

Credentials:

6. In the "pre-steps" build section another set of parameters can be passed to the Jenkins build. Specify the Maven targets that need to be executed in order to run test.

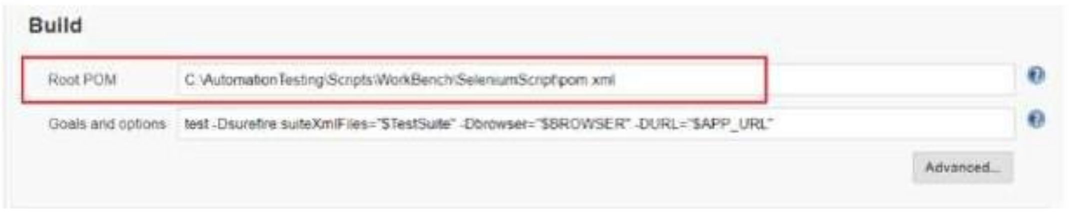
if your source code is located on Git the do below setting under **Build** section:



Root POM: pom.xml

Goals and options: test -Dsurefire.suiteXmlFiles="$TestSuite" -Dbrowser="$BROWSER" -DURL="$APP_URL"

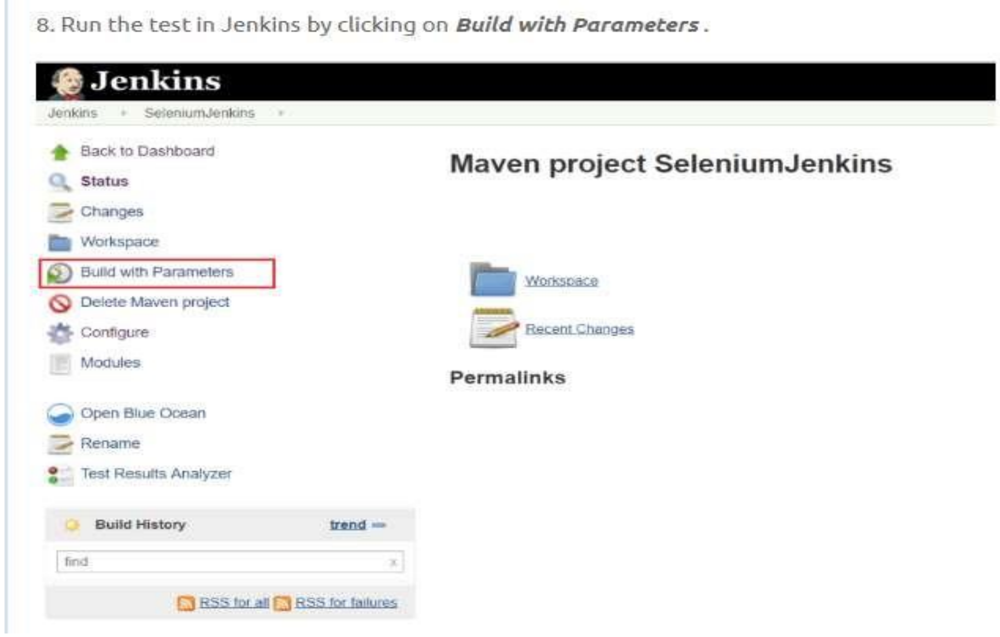
If you have selenium code on your local just pass the pom.xml path in ***Root POM*** .



Root POM: C:\AutomationTesting\Scripts\WorkBench\SeleniumScript\pom.xml

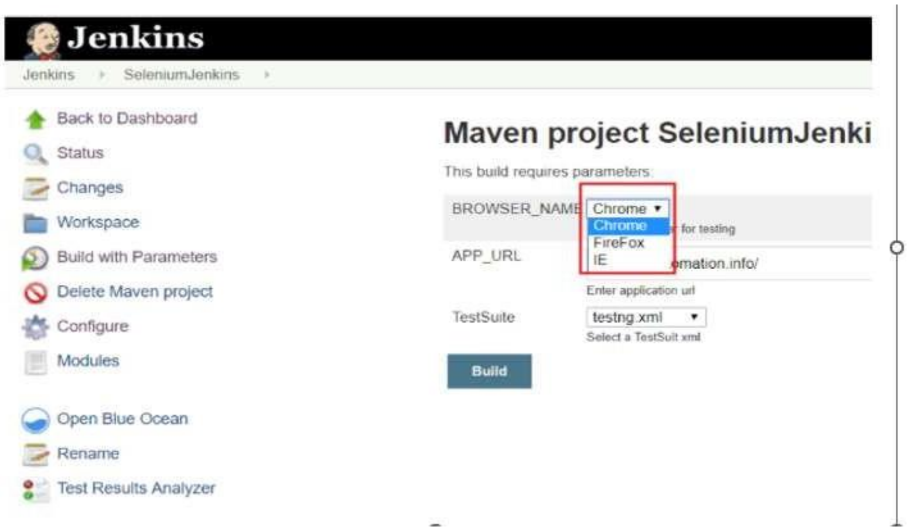
Goals and options: test -Dsurefire.suiteXmlFiles="$TestSuite" -Dbrowser="$BROWSER" -DURL="$APP_URL"

7. Run the test in Jenkins by clicking on Building with Parameters.



8. Run the test in Jenkins by clicking on ***Build with Parameters***.

8. Select the browser you want to run from dropdown.



Maven project SeleniumJenki

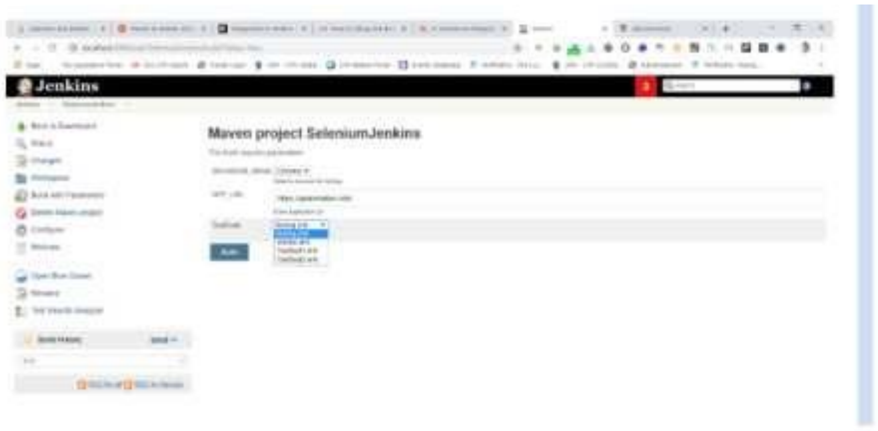
This build requires parameters

BROWSER_NAME: Chrome (Chrome / FireFox / IE) … for testing

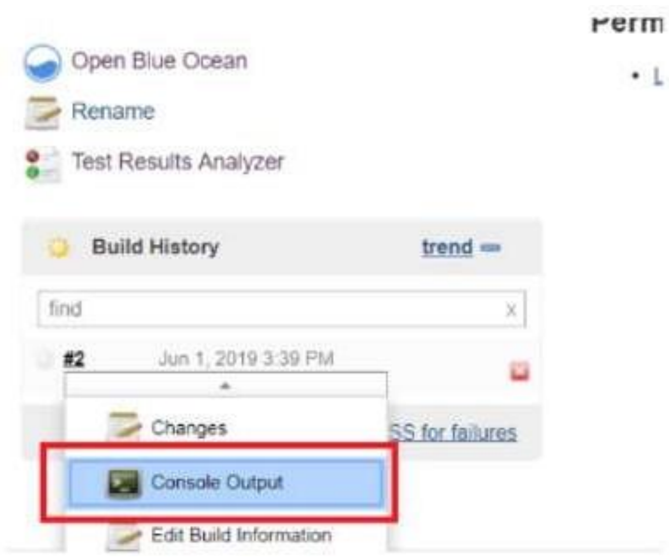
APP_URL: …mation.info/ — Enter application url

TestSuite: testng.xml — Select a TestSuit xml

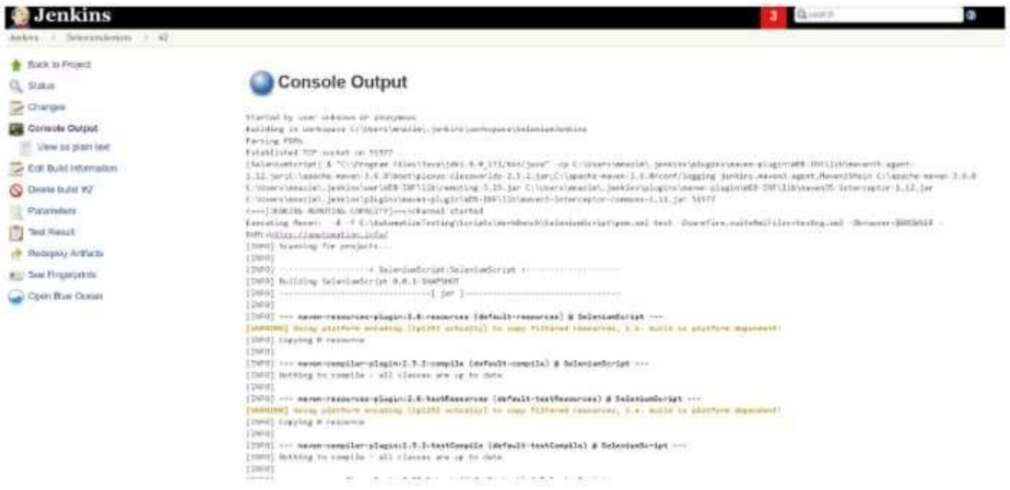
9. Select the TestSuit file.



10. Click the build button and go to console output .



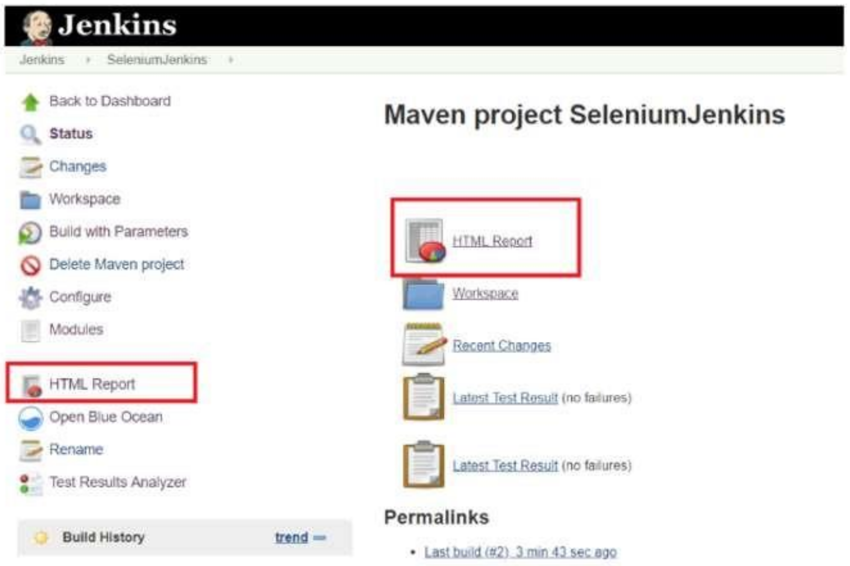
11. See the logs from **Console Output** window.



```
Started by user unknown or anonymous
Building in workspace C:\Users\[illegible]\.jenkins\workspace\SeleniumJenkins
Parsing POMs
Established TCP socket on 51577
[SeleniumScript] $ "C:\Program Files\Java\jdk1.8.0_171/bin/java" -cp C:\Users\[illegible]\.jenkins\plugins\maven-plugin\WEB-INF\lib\maven35-agent-
1.12-jar;C:\apache-maven-3.6.0\boot\plexus-classworlds-2.5.2.jar;C:\apache-maven-3.6.0/conf/logging jenkins.maven3.agent.Maven35Main C:\apache-maven-3.6.0
C:\Users\[illegible]\.jenkins\war\WEB-INF\lib\remoting-3.35.jar C:\Users\[illegible]\.jenkins\plugins\maven-plugin\WEB-INF\lib\maven35-interceptor-1.12.jar
C:\Users\[illegible]\.jenkins\plugins\maven-plugin\WEB-INF\lib\maven3-interceptor-commons-1.12.jar 51577
<===[JENKINS REMOTING CAPACITY]===>channel started
Executing Maven:  -B -f C:\AutomationTesting\Scripts\WorkBench\SeleniumScript\pom.xml test -Dsurefire.suiteXmlFiles=testng.xml -Dbrowser=[illegible] -
[illegible] <https://[illegible]>
[INFO] Scanning for projects...
[INFO]
[INFO] -------------------< SeleniumScript:SeleniumScript >-------------------
[INFO] Building SeleniumScript 0.0.1-SNAPSHOT
[INFO] --------------------------------[ jar ]---------------------------------
[INFO]
[INFO] --- maven-resources-plugin:2.6:resources (default-resources) @ SeleniumScript ---
[WARNING] Using platform encoding (Cp1252 actually) to copy filtered resources, i.e. build is platform dependent!
[INFO] Copying 0 resource
[INFO]
[INFO] --- maven-compiler-plugin:3.7.0:compile (default-compile) @ SeleniumScript ---
[INFO] Nothing to compile - all classes are up to date
[INFO]
[INFO] --- maven-resources-plugin:2.6:testResources (default-testResources) @ SeleniumScript ---
[WARNING] Using platform encoding (Cp1252 actually) to copy filtered resources, i.e. build is platform dependent!
[INFO] Copying 0 resource
[INFO]
[INFO] --- maven-compiler-plugin:3.7.0:testCompile (default-testCompile) @ SeleniumScript ---
[INFO] Nothing to compile - all classes are up to date
[INFO]
```

**Note** : Blue color of ball of console output is that build is successful

12. View the html report just click on the link.

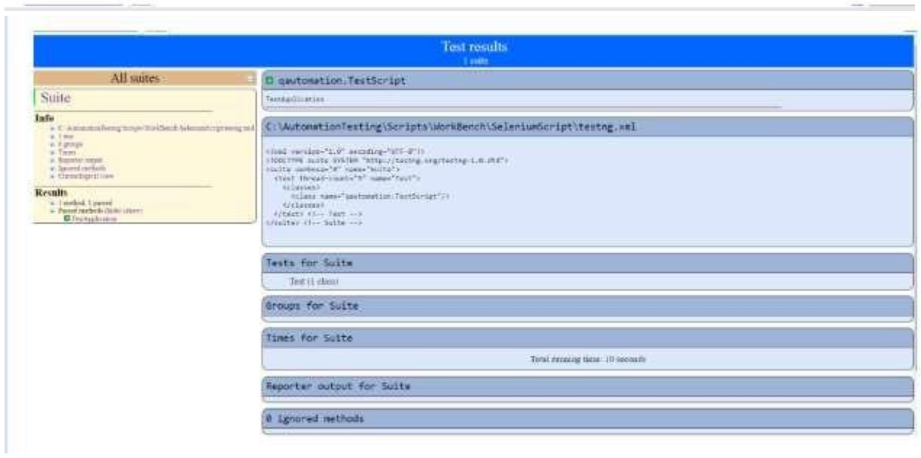


## Maven project SeleniumJenkins

- HTML Report
- Workspace
- Recent Changes
- Latest Test Result (no failures)
- Latest Test Result (no failures)

**Permalinks**

- Last build (#2), 3 min 43 sec ago



qautomation.TestScript

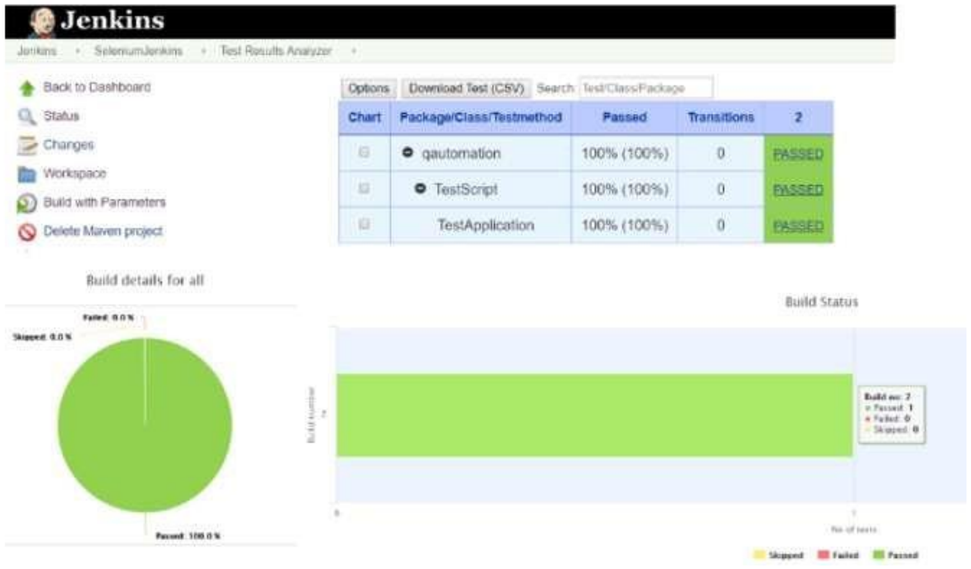
TestApplication

C:\AutomationTesting\Scripts\WorkBench\SeleniumScript\testng.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE suite SYSTEM "http://testng.org/testng-1.0.dtd">
<suite verbose="0" name="Suite">
  <test thread-count="5" name="Test">
    <classes>
      <class name="qautomation.TestScript"/>
    </classes>
  </test> <!-- Test -->
</suite> <!-- Suite -->
```

Total running time: 10 seconds

13. Click Test Analyzer to analyse the result.



| Chart | Package/Class/Testmethod | Passed | Transitions | 2 |
|---|---|---|---|---|
| ☐ | qautomation | 100% (100%) | 0 | PASSED |
| ☐ | TestScript | 100% (100%) | 0 | PASSED |
| ☐ | TestApplication | 100% (100%) | 0 | PASSED |

Build no: 2
Passed: 1
Failed: 0
Skipped: 0

**Conclusion:**

Q1. Which browsers are supported by selenium webdriver?

Selenium WebDriver supports a wide range of web browsers, making it versatile for automated testing across various platforms. The most commonly used browsers compatible with Selenium WebDriver include Google Chrome, Mozilla Firefox, Microsoft Edge (Chromium), Safari (on macOS), and Opera. Each browser typically requires a specific WebDriver implementation: ChromeDriver for Google Chrome, GeckoDriver for Firefox, EdgeDriver for Microsoft Edge, SafariDriver for Safari, and OperaChromiumDriver for Opera based on Chromium. These WebDriver implementations act as intermediaries, facilitating communication between the Selenium commands in your test scripts and the browser being automated, ensuring compatibility and functionality.

Q2. What are some features of selenium 4?

Selenium 4 introduces several key features that enhance web automation capabilities. One notable feature is the Grid 4, offering improved scaling and better resource handling for parallel test execution. The Relative Locators feature simplifies element location by allowing developers to find elements based on their relationship with other elements, like locating an element to the left of another. Selenium 4 also brings native support for Chrome DevTools Protocol (CDP), enabling more advanced interactions with the browser. Additionally, it offers enhanced error handling with the W3C standardization, making tests more robust and stable. These features collectively provide a more efficient and flexible framework for web automation with Selenium.