# STQA Mini Project No. 2

## Title

Create a small web-based application by selecting relevant system environment/platform and programming languages. Narrate concise Test Plan consisting features to be tested and bug taxonomy. Narrate scripts in order to perform regression tests. Identify the bugs using Selenium Web Driver and IDE and generate test reports encompassing exploratory testing.

## ProblemDefinition:

Perform Web testing and identify the bugs using Selenium Web Driver and IDE and generate test reports encompassing exploratory testing.

## Prerequisite:

KnowledgeofCoreJava

## Software Requirements:

Eclipse photon R latest Version, JAVA 1.8, selenium-server-standalone-3.13.0 Chromedriver.exe

## LearningObjectives:

We are going to learn how Identify the bugs using Selenium WebDriver and IDEand generate test reports encompassing exploratory testing.

## Outcomes:

You are able to Web Testing using Automation Tool like Selenium Web driver and IDE

## TheoryConcepts:

* + 1. **What is Selenium?**

Selenium is a free (open source) automated testing suite for web applications across different browsers and platforms.

Selenium is a suite of software tools to automate Web Browsers.

* It is an Open source suite of tools mainly used for Functional and Regression Test Automation.

Selenium is a free (open source) automated testing suite for web applications across different browsers and platforms.

It is quite similar to HP Quick Test Pro (QTP now UFT) only that Selenium focuses on automating web- based applications. Testing done using Selenium tool is usually referred as Selenium Testing.

## Selenium supports various Operating environments.

* + MS Windows
  + Linux

## Selenium supports variousBrowsers.

* + MozillaFirefox
  + IE
  + Google Chrome
  + Safari
  + Opera

## Note: Selenium IDE supports Mozilla Firefox only.

* **Selenium supports various programming environments to write programs (Testscripts)**
  + Java
  + C#
  + Python
  + Perl
  + Ruby
  + PHP

## History of the SeleniumProject

Selenium first came to life in 2004.

* In 2006, Selenium Web Driver was launched at Google.
* In 2008, the whole Selenium team decided to merge Selenium Web Driver with Selenium RC in order to form more powerful tool called Selenium2.0

## Selenium1

(Selenium IDE + Selenium RC + Selenium Grid)

## Selenium2

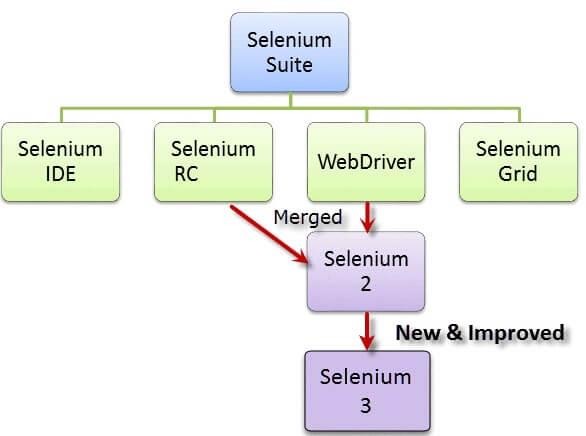
(Selenium IDE + Selenium RC + Selenium Web Driver + Selenium Grid)

## Selenium’s Tools Suite

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.

* + - * **Selenium Integrated Development Environment(IDE)**
      * **Selenium Remote Control(RC)**
      * **Web Driver**
      * **Selenium Grid**



* + 1. **Brief Introduction Selenium IDE**

It is a Firefox browser plug in, used to create and execute Test cases.

## Selenium IDE Features:

* Create Test Cases, Test suites (We can Record test cases or type Test steps using element locators and Selenese commands)
* Edit Test Cases
* Execute Test cases, Test suites
* Debug Test Cases.
* Enhance Test Cases
* Export Test cases to other formats (java, ruby etc…) Note:**selenium IDE Test case default format is html**

## Drawbacks of Selenium IDE

* It supports Mozilla Firefox browser only.
* It doesn’t support Programming logic/features to enhance Test cases.
* It doesn’t support Data Driven Testing.
* It is not suitable for complex test case design.
* No centralized maintenance of Objects/Elements

1. **Selenium RC (\* Out dated) -**Currently, Selenium RCisstill being developed but only in maintenance mode.

## Selenium WebDriver

* + It is a Programming interface to create and execute Test cases.

Selenium IDE has IDE but doesn’t have Programming interface

* + Selenium Web Driver has Programming interface but doesn’t have IDE
  + It communicates Directly to the browser.
  + No need of Separate Server such as RC Server
  + UFT/QTP has both IDE as well as Programming interface
  + Faster Execution than IDE &RC

## Selenium Web Driver supports various programming environments to write programs.

* + Java,
  + C#
  + Perl
  + Python
  + Ruby
  + PHP
* Using Element/Object locators/properties and Web driver Methods we can create and execute Test cases.
* Selenium Webdriver supports various browsers to create and execute test case/test script/test Note:**Browser driver varies from one browser to another.**

## Selenium WebDriver supports various operating environments

* + MSWindows
  + Linux

## Drawback of Selenium Web Driver

* It doesn’t generate detailed Test Reports.
* No centralized maintenance of Object/elements
* It require Programming Knowledge
* cannot support the readily new browser
* Installation is More Complicated than Selenium IDE
* No built-in mechanism for logging runtime message

## Selenium Grid

* Selenium Grid isused to execute tests across multiple browsers, operating environments and machines in parallel.
* Selenium Grid 2 supports Selenium RC Tests as well as Selenium Web Driver Tests.

1. Selenium Web Driver to create Test cases using element locators and Web driver methods.
2. Java Programming to enhance test cases.
3. TestNG Framework to group test cases, execute test batches and generate detailed testreports.

## Features:

* + Enables**simultaneous running of tests**in**multiple browsers andenvironments.**
  + **Saves time**enormously.
  + Utilizes the**hub-and-nodes**concept. The hub acts as a central source of Selenium commandstoeach node connected toit.

## Note on Browser and Environment Support

* + Because of their architectural differences, Selenium IDE, Selenium RC, and WebDriversupport different sets of browsers and operating environments.

|  |  |  |
| --- | --- | --- |
|  | **Selenium IDE** | **Web Driver** |
| **Browser Support** | Mozilla Firefox | Internet Explorer versions 6 to 11, both 32 and 64-bit  Microsoft Edge version 12.10240 & above ( partial support some |

|  |  |  |
| --- | --- | --- |
|  | **Selenium IDE** | **WebDriver** |
|  |  | functionalities underdevelopment) Firefox 3.0 andabove  Google Chrome 12.0. andaboveOpera 11.5 andabove  Android - 2.3 and above for phones and tablets (devices &emulators)  iOS 3+ for phones (devices & emulators) and 3.2+ for tablets (devices & emulators)  HtmlUnit 2.9 and above |
| **Operating System** | Windows,Mac OS X, Linux | All operating systems where the browsers above can run. |

* + **Note:**Selenium WebDriveristermed as the successor of Selenium RC which has been deprecated & officially announced by SeleniumHQ.

## How to Choose the Right Selenium Tool for YourNeed

|  |  |  |
| --- | --- | --- |
| **Tool** | **Why Choose?** | |
|  |  | * To learn about concepts on automated testing and Selenium,including: * Selenese commands such as type, open, clickAndWait, assert, verify,etc. * Locators such as id, name, xpath, css selector,etc. * Executing customized JavaScript code using run Script * Exporting test cases in various formats. * To create tests with little ornoprior knowledgeinprogramming. * To createsimpletest cases and test suites that you can export later to RC or WebDriver. |
| **Selenium IDE** |
|  |
|  | * To test a web application against Firefoxonly. |
|  | |
| **Selenium RC** | * To design a testusinga more expressive language than Selenese * To run your test against different browsers (except HtmlUnit) on different operating systems. * To deploy your tests across multiple environments using Selenium Grid. | |

|  |  |  |
| --- | --- | --- |
| **Tool** | **Why Choose?** | |
|  | * To test your application against a new browser that supportsJavaScript. * To test web applications with complex AJAX-basedscenarios. | |
|  |  | * To use a certain programming languageindesigning your testcase. * To test applications that are richinAJAX-basedfunctionalities. * To execute tests on theHtmlUnitbrowser. |
| **WebDriver** |
|  |
|  | * To create customized testresults. |
|  | |
| **Selenium Grid** | * To run your Selenium RC scripts in multiple browsers and operating systems simultaneously. * To run a huge test suite, that needstocompleteinthe soonest timepossible. | |

* + 1. **Advantages ofSelenium**

1. It is an Open source Software.
2. It supports various Operating environments (Windows, Linux, Macetc…)
3. It supports various browsers (IE, Mozilla Firefox, Chrome, safari, Operaetc…)
4. It supports various programming environments (Java, Perl, Python, Ruby andPHP)
5. It supports parallel Test execution.
6. It usesless Hardware resources.

## Disadvantages ofSelenium

1. It supports Web based Applications only.
2. No reliable support fromanybody.
3. No centralized maintenance ofElements/objects
4. Difficulttosetupenvironment.
5. Difficult touse.
6. Limited support for Image basedtesting.
7. New features may not workproperly.
8. No other tool integration for test management & NobuiltinReportingfacility.

## Selenium Versus UFT

|  |  |
| --- | --- |
| Selenium | UFT / QTP |
| 1) Open Source | Vendor tool, License is required. |
| 2) Supports various OS Environments. | MS Windows only. |
| 3) Supports various Programming Environments | VBScript only. |
| 4) No Object Repositories | Local and Shared object Repositories. |
| 5) No built-in Reporting feature. | Built-in reporting feature. |
| 6) Selenium WebDriver has no IDE and Selenium IDE has no Programming Interface. | UFT has both IDE and Programming Interface. |
| 7) Uses less Hardware resources. | Uses more Hardware resources |
| 8) Difficult to setup environment and use. | Easy to setup and use. |
| 9) Limited support for Image Testing | Rich support for Image Testing |
| 10) No Reliable support | Support from HP |
| 11) No other tool integration for Test management. | UFT can be integrated with ALM/QC for Test Management. |
| 12) New features may not work properly. | New features will properly. |
| 13) No Add ins for supporting Application Environments. | Add ins are required for supporting Application environments. |
| 14) Supports Web Applications only | Supports Desktop and Web Applications. |
| 15) No Authorized Certification | Authorized Certification program. |

* + 1. **What isTestNG?**

TestNG is a powerful testing framework, an enhanced version of JUnit which was in use for a long time before TestNG came into existence. NG stands for 'Next Generation'.

TestNG framework provides the following features −

* + - * Annotations help us organize the testseasily.
      * Flexible testconfiguration.
      * Test cases can be grouped moreeasily.
      * Parallelization of tests canbeachieved usingTestNG.
      * Support for data-driventesting.
      * Inbuiltreporting.

## Conclusion

In this way you learn how to use Selenium Open Source Tool for perform Automation Testing on web based application.