SELENIUM

The ART of Browser (HTML+DOM) Testing
…the automated way!

Presented By: Mabeth Borres of GA-SEI31

WHY WEB TEST AUTOMATION?

- Would you love a world where the computer does the testing of your web application for you? Particularly tedious form validations? Or, mundane site navigation links testing?

SELENIUM… OR FIRSTLY, 'JAVASCRIPTTESTRUNNER'

- Open-source browser automation tool developed by Jason Huggins (of THOUGHTWORKS) in 2004
- THOUGHTWORKS Product
- Originally named 'JavaScriptTestRunner' - HTML + DOM testing

SO, WHY THE NAME 'SELENIUM' ?

- Selenium is a well-known antidote for Mercury poisoning.

Selenium is often being compared with Mercury's QuickTest Pro (QTP)

MERCURY INTERACTIVE*

- ➤ Evolution

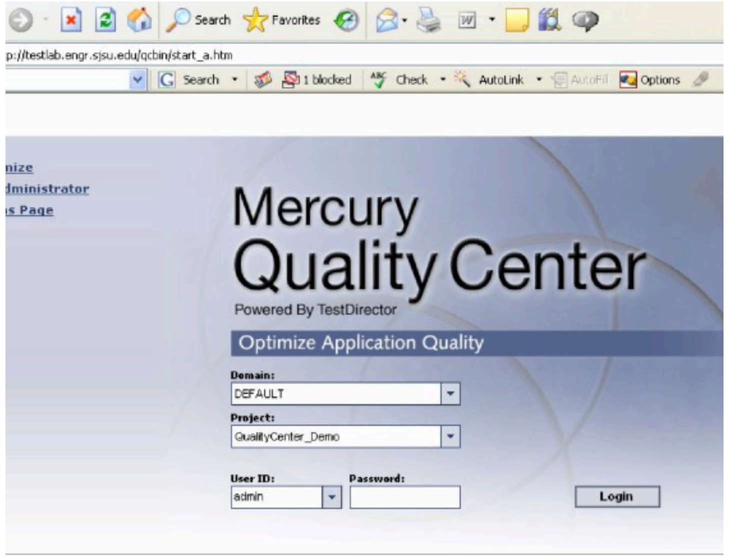
MERCURY INTERACTIVE

MICRO FOCUS

Unified Functional Testing (UFT)

Functional Test Automation Software

Intelligent test automation for web, mobile, API, hybrid, RPA, and enterprise apps



p://testlab.engr.sjsu.edu/qcbin/start_a.htm

Mercury Quality Center

Powered By TestDirector

Optimize Application Quality

Domain: DEFAULT

Project: QualityCenter_Demo

User ID: admin

Password:

Project:

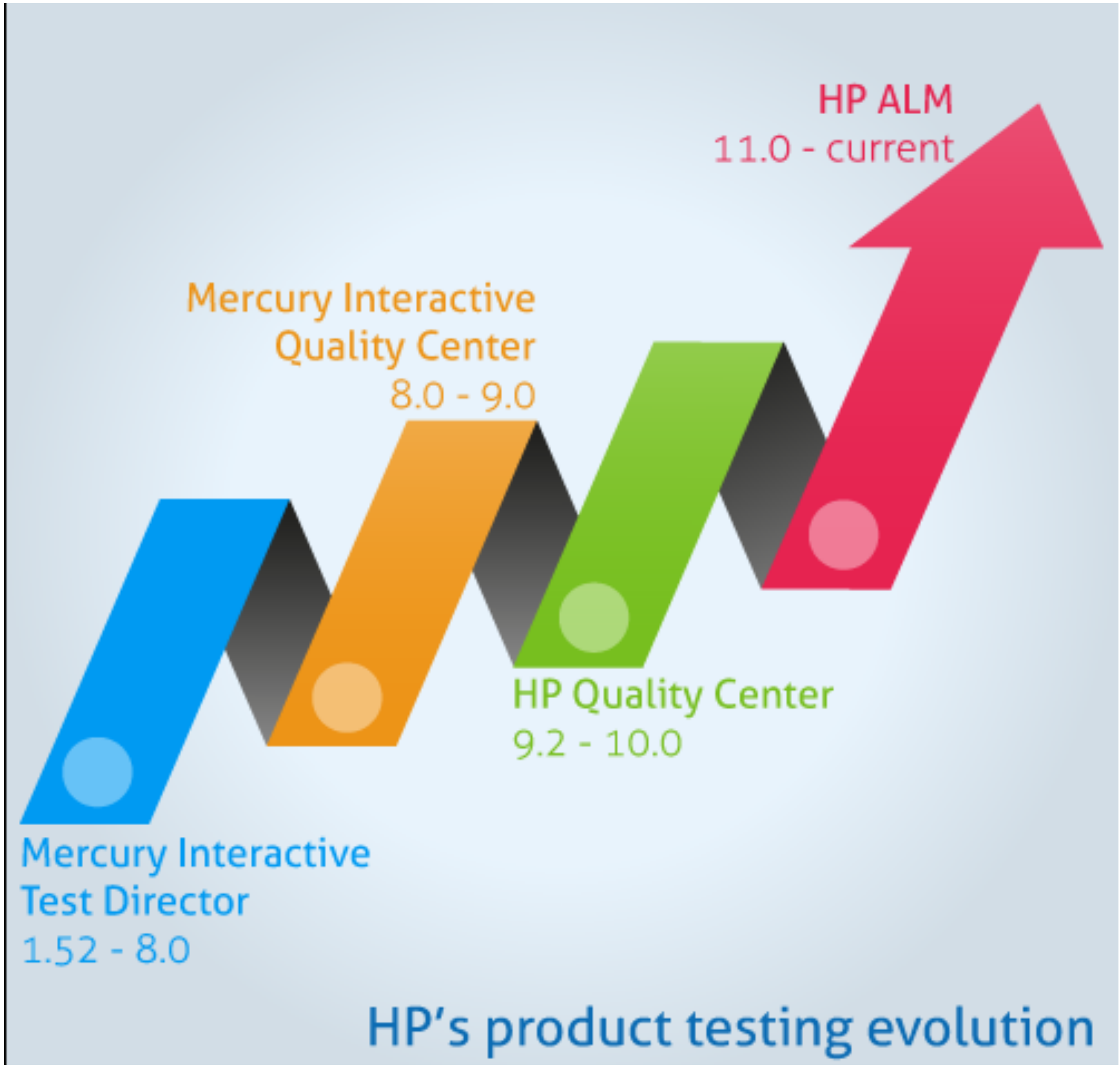
User ID:

Password:

TestDirector 8.0

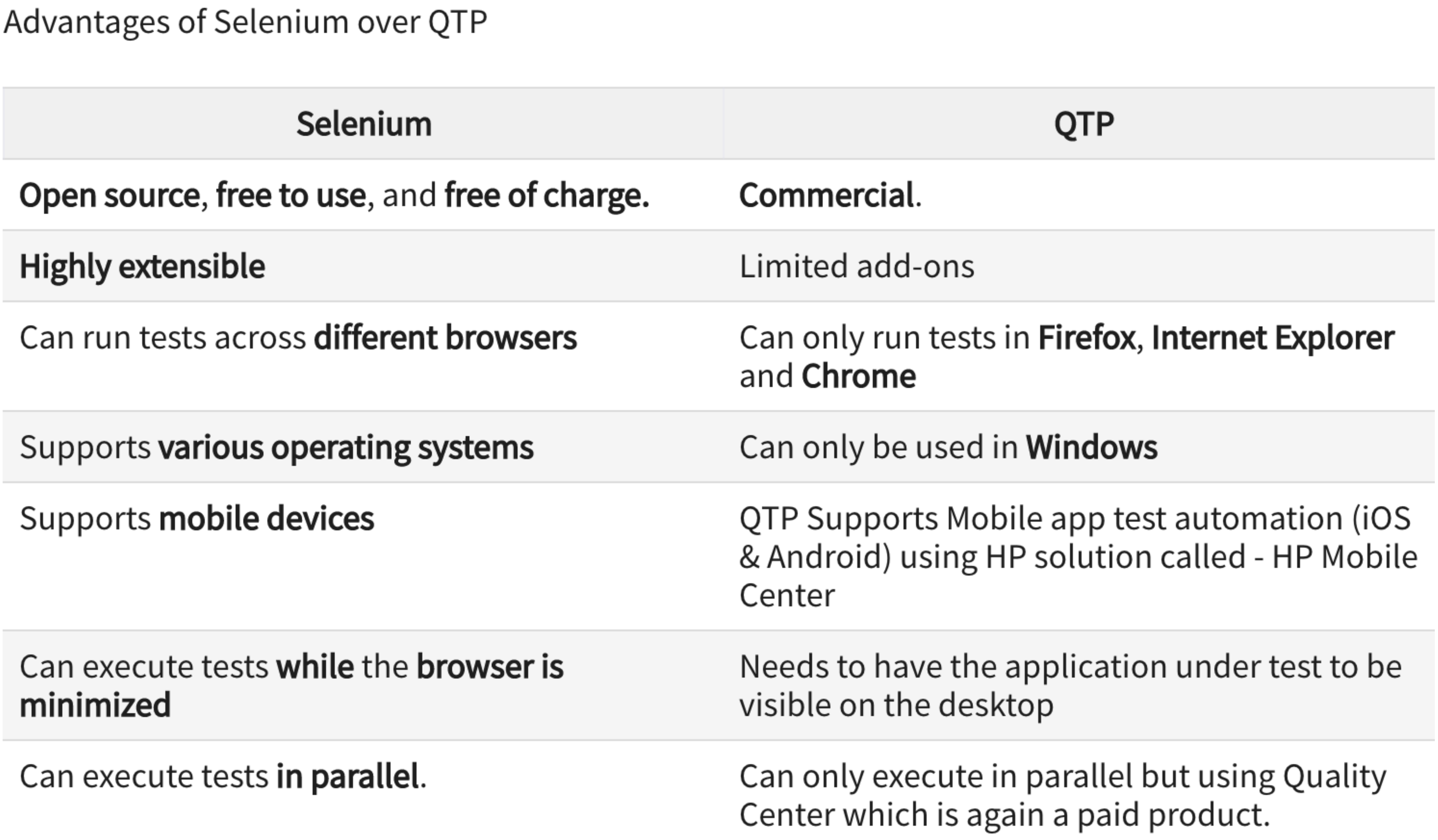
GENERAL ACCESS

Presenter's first test automation experience, professionally



HP's product testing evolution

ADVANTAGES OF SELENIUM OVER QUICKTEST PRO

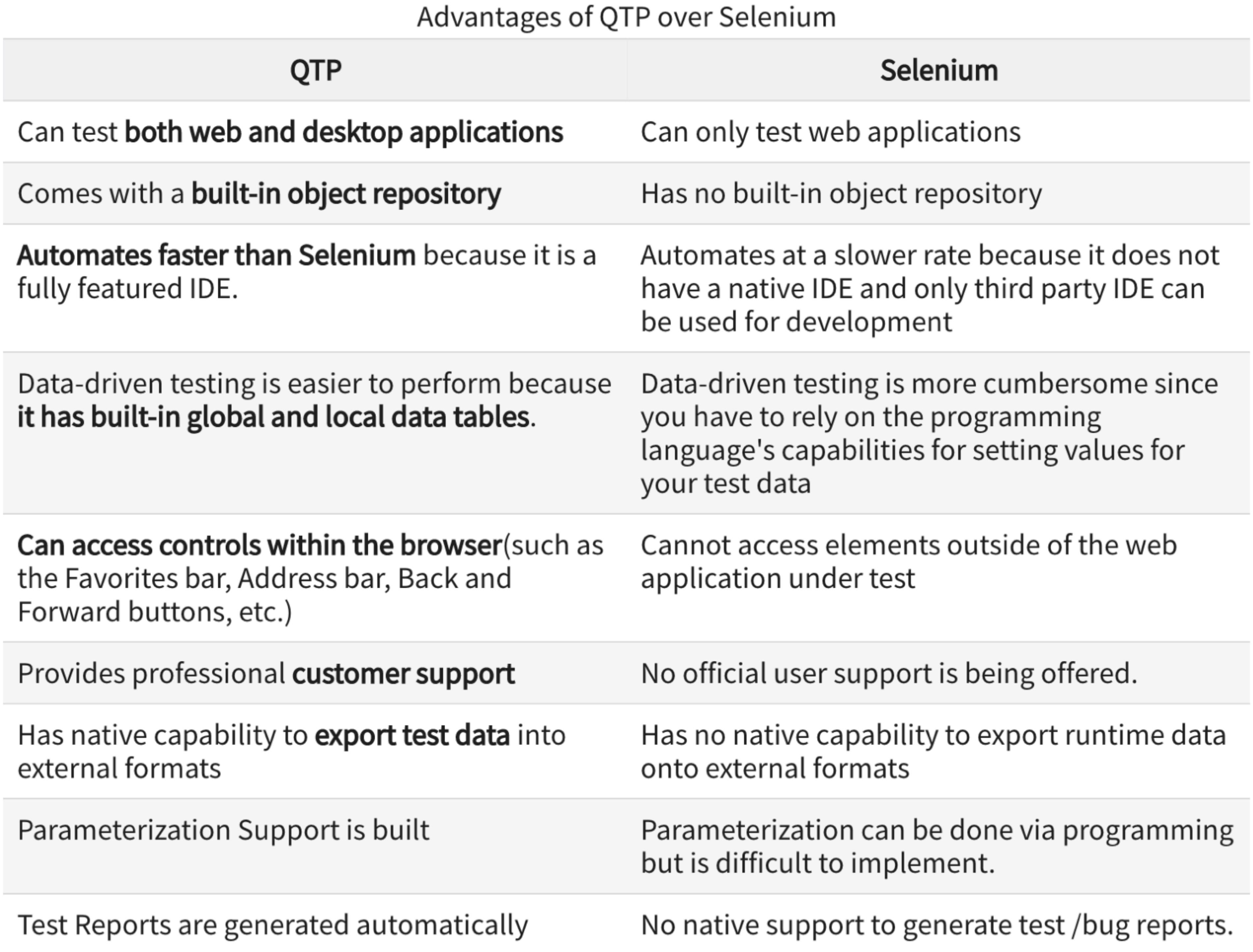


Advantages of Selenium over QTP

Selenium	QTP
Open source, **free to use**, and **free of charge.**	**Commercial**.
Highly extensible	Limited add-ons
Can run tests across **different browsers**	Can only run tests in **Firefox**, **Internet Explorer** and **Chrome**
Supports **various operating systems**	Can only be used in **Windows**
Supports **mobile devices**	QTP Supports Mobile app test automation (iOS & Android) using HP solution called - HP Mobile Center
Can execute tests **while** the **browser is minimized**	Needs to have the application under test to be visible on the desktop
Can execute tests **in parallel**.	Can only execute in parallel but using Quality Center which is again a paid product.

WINNING POINTS: COST - FLEXIBILITY - PARALLEL TESTING

WHY OTHERS CHOOSE QUICKTEST PRO



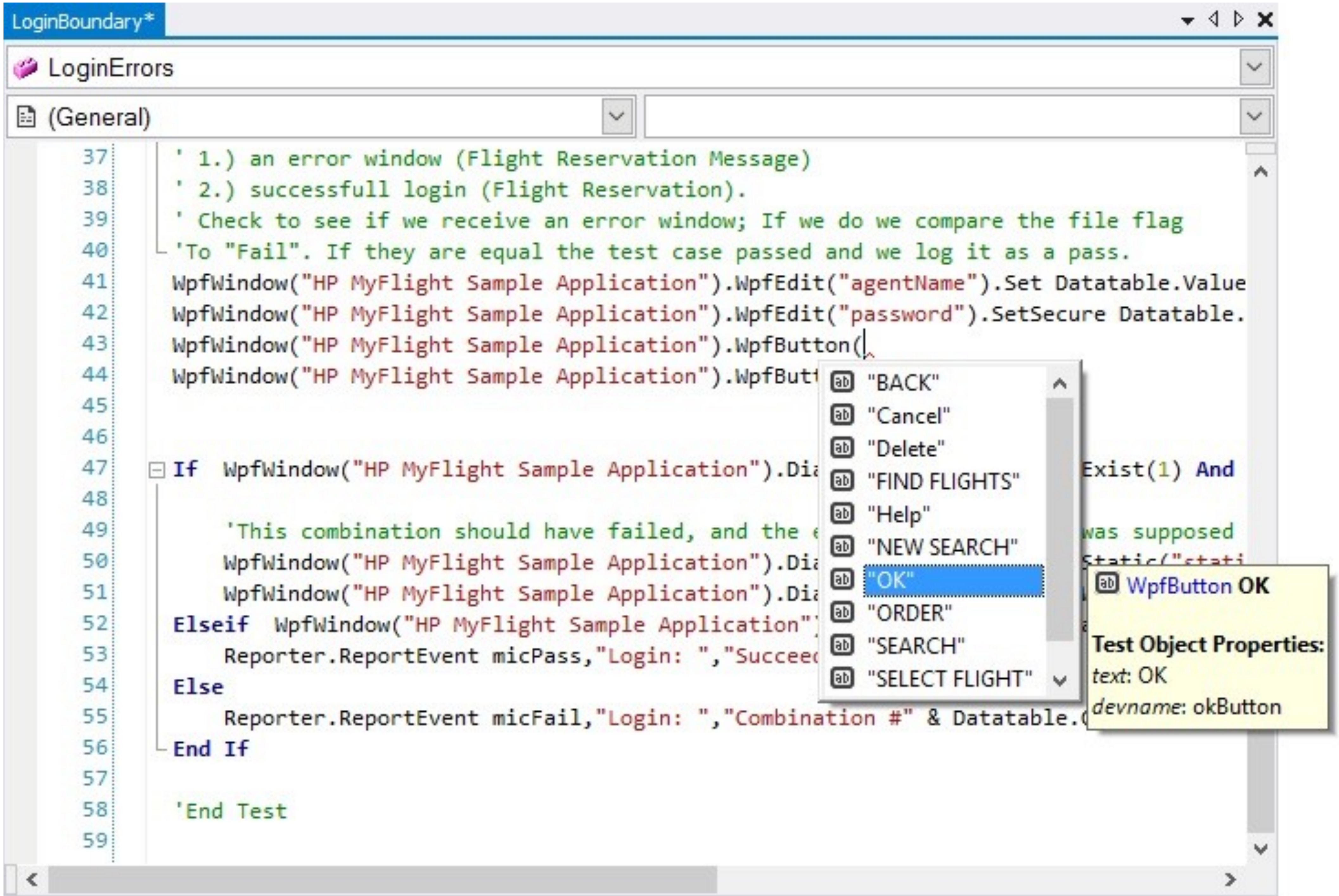
Advantages of QTP over Selenium

QTP	Selenium
Can test **both web and desktop applications**	Can only test web applications
Comes with a **built-in object repository**	Has no built-in object repository
Automates faster than Selenium because it is a fully featured IDE.	Automates at a slower rate because it does not have a native IDE and only third party IDE can be used for development
Data-driven testing is easier to perform because **it has built-in global and local data tables**.	Data-driven testing is more cumbersome since you have to rely on the programming language's capabilities for setting values for your test data
Can access controls within the browser(such as the Favorites bar, Address bar, Back and Forward buttons, etc.)	Cannot access elements outside of the web application under test
Provides professional **customer support**	No official user support is being offered.
Has native capability to **export test data** into external formats	Has no native capability to export runtime data onto external formats
Parameterization Support is built	Parameterization can be done via programming but is difficult to implement.
Test Reports are generated automatically	No native support to generate test /bug reports.

Catch: IDE or Integrated Development Environment

VBSCRIPT – VISUAL BASIC SCRIPTING (QTP)

- ➤ JavaScript
- ➤ Rules
- ➤ Over
- ➤ VBScript,
- ➤ Peace!



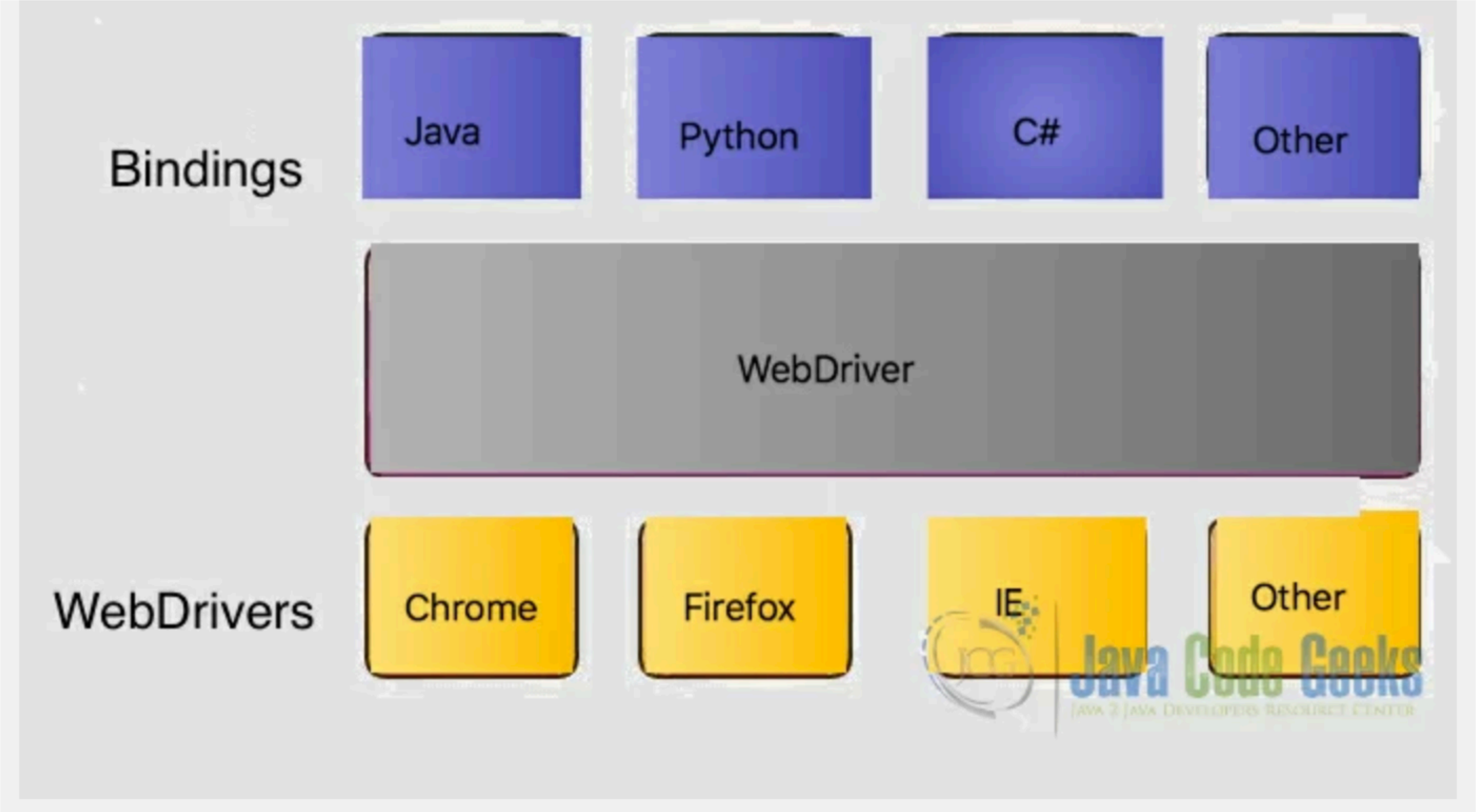
```
' 1.) an error window (Flight Reservation Message)
' 2.) successfull login (Flight Reservation).
' Check to see if we receive an error window; If we do we compare the file flag
'To "Fail". If they are equal the test case passed and we log it as a pass.
WpfWindow("HP MyFlight Sample Application").WpfEdit("agentName").Set Datatable.Value
WpfWindow("HP MyFlight Sample Application").WpfEdit("password").SetSecure Datatable.
WpfWindow("HP MyFlight Sample Application").WpfButton(
WpfWindow("HP MyFlight Sample Application").WpfButt


If  WpfWindow("HP MyFlight Sample Application").Dia                    Exist(1) And

    'This combination should have failed, and the e                     was supposed
    WpfWindow("HP MyFlight Sample Application").Dia                     Static("stati
    WpfWindow("HP MyFlight Sample Application").Dia
Elseif  WpfWindow("HP MyFlight Sample Application")
    Reporter.ReportEvent micPass,"Login: ","Succeed
Else
    Reporter.ReportEvent micFail,"Login: ","Combination #" & Datatable.(
End If

'End Test
```

Just like any other language… LEARN its Data Types, Syntax, Libraries, Operators, etc

SELENIUM TOOL SUITE

- **Selenium IDE**, a Browser add-on that you can only use in creating relatively simple test cases and test suites.
- **Selenium Remote Control**, also known as **Selenium 1**, which is the first Selenium tool that allowed users to use programming languages in creating complex tests.
- **WebDriver**, the newer breakthrough that allows your test scripts to communicate directly to the browser, thereby controlling it from the OS level.
- **Selenium Grid** is also a tool that is used with Selenium RC to execute parallel tests across different browsers and operating systems.

SELENIUM 2 ARCHITECTURE



Selenium Architecture

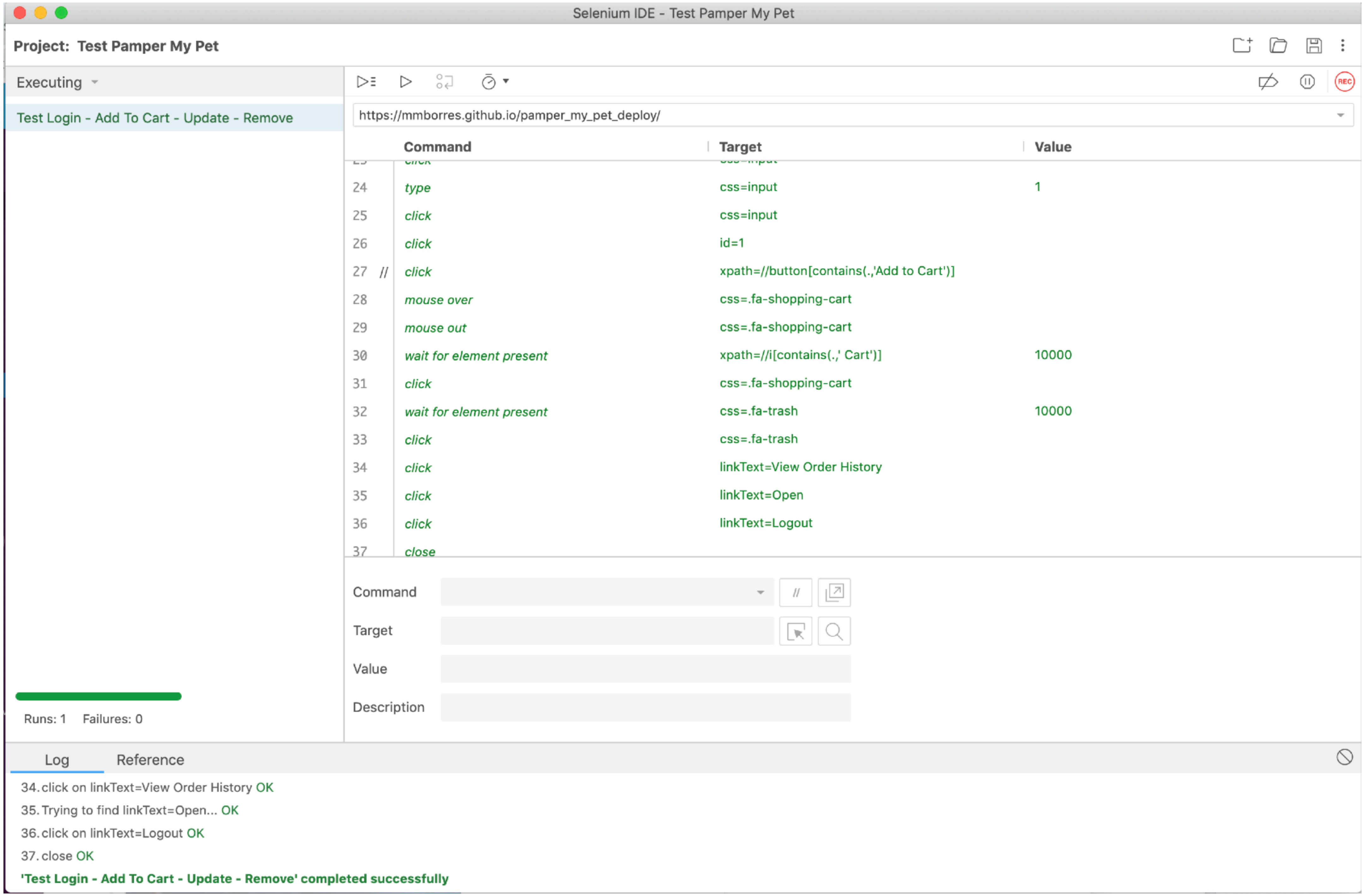
Used Java for this Demo

SELENIUM IDE

- Demo
- Easiest to install and use
- Test Prototyping
- Knowledge of HTML and DOM
- Test: https://mmborres.github.io/index.html

SELENIUM IDE TEST

- Script



Selenium IDE - Test Pamper My Pet

Project: Test Pamper My Pet

Executing

Test Login - Add To Cart - Update - Remove

https://mmborres.github.io/pamper_my_pet_deploy/

		Command	Target	Value
23		click	css=input	
24		type	css=input	1
25		click	css=input	
26		click	id=1	
27	//	click	xpath=//button[contains(.,'Add to Cart')]	
28		mouse over	css=.fa-shopping-cart	
29		mouse out	css=.fa-shopping-cart	
30		wait for element present	xpath=//i[contains(.,' Cart')]	10000
31		click	css=.fa-shopping-cart	
32		wait for element present	css=.fa-trash	10000
33		click	css=.fa-trash	
34		click	linkText=View Order History	
35		click	linkText=Open	
36		click	linkText=Logout	
37		close		

Command

Target

Value

Description

Runs: 1 Failures: 0

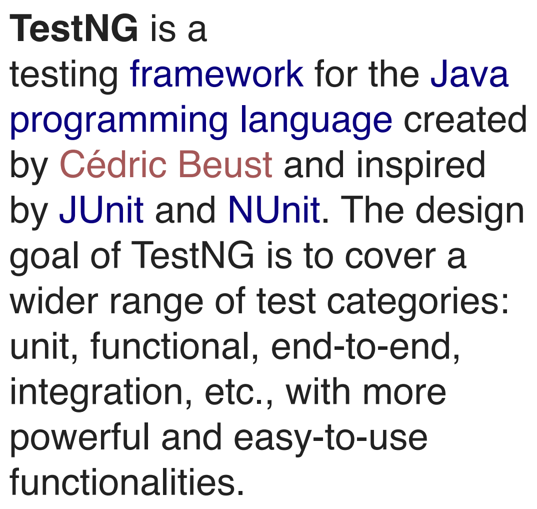
Log Reference

```
34. click on linkText=View Order History OK
35. Trying to find linkText=Open... OK
36. click on linkText=Logout OK
37. close OK
'Test Login - Add To Cart - Update - Remove' completed successfully
```

Record once and reuse whenever

SELENIUM WEB DRIVER

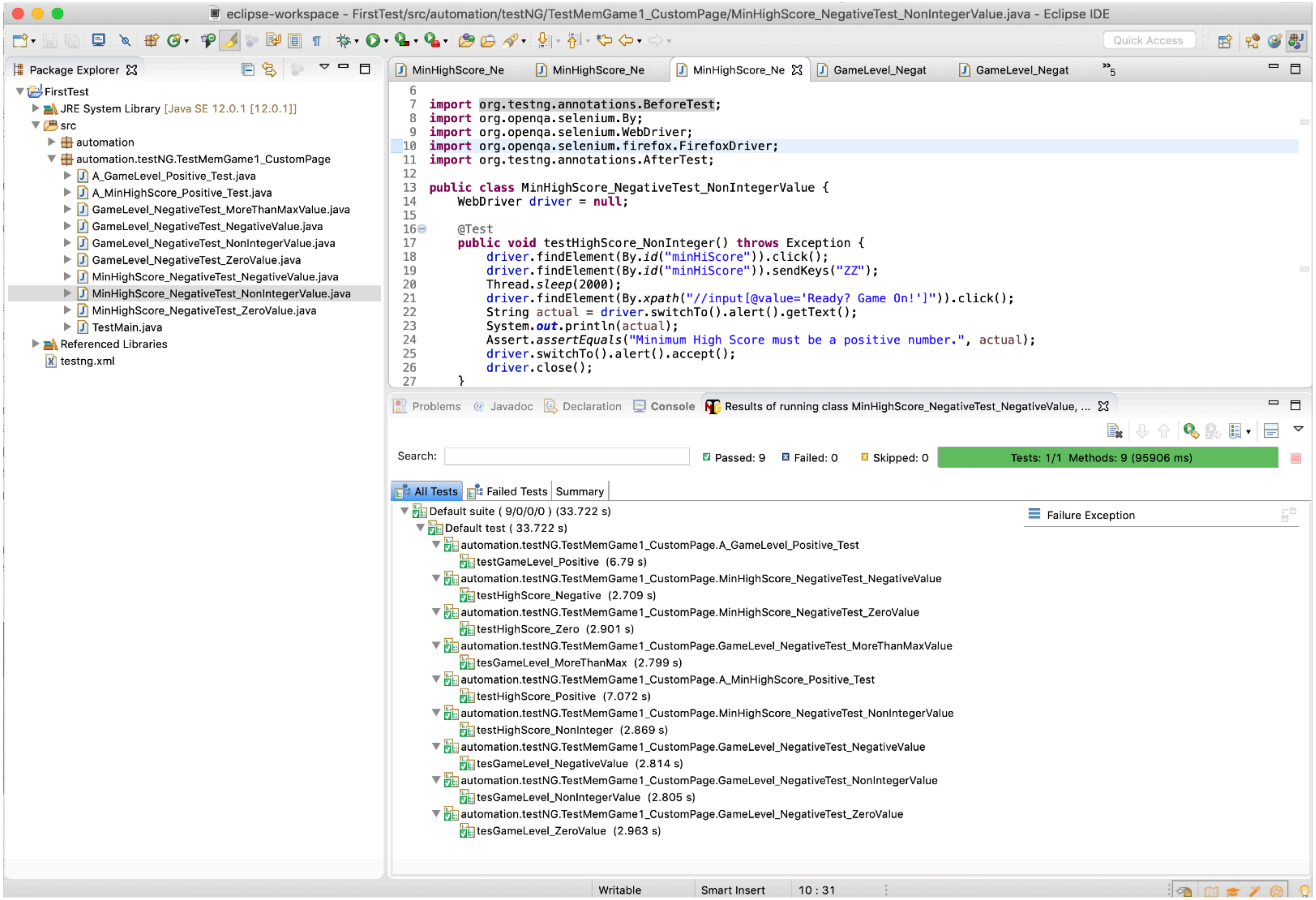
- Demo
- Download Required Drivers
- Language Knowledge: ex. Java
- Identify Elements of the Page:
  - XPath
  - ID
  - CSS Selector
  - Classname



TestNG is a testing framework for the Java programming language created by Cédric Beust and inspired by JUnit and NUnit. The design goal of TestNG is to cover a wider range of test categories: unit, functional, end-to-end, integration, etc., with more powerful and easy-to-use functionalities.

WEB DRIVER IN JAVA + TESTNG

- ➤ Java



```
FirstTest
    JRE System Library [Java SE 12.0.1 [12.0.1]]
    src
        automation
        automation.testNG.TestMemGame1_CustomPage
            A_GameLevel_Positive_Test.java
            A_MinHighScore_Positive_Test.java
            GameLevel_NegativeTest_MoreThanMaxValue.java
            GameLevel_NegativeTest_NegativeValue.java
            GameLevel_NegativeTest_NonIntegerValue.java
            GameLevel_NegativeTest_ZeroValue.java
            MinHighScore_NegativeTest_NegativeValue.java
            MinHighScore_NegativeTest_NonIntegerValue.java
            MinHighScore_NegativeTest_ZeroValue.java
            TestMain.java
    Referenced Libraries
    testng.xml
```

```java

import org.testng.annotations.BeforeTest;
import org.openqa.selenium.By;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.firefox.FirefoxDriver;
import org.testng.annotations.AfterTest;

public class MinHighScore_NegativeTest_NonIntegerValue {
    WebDriver driver = null;

    @Test
    public void testHighScore_NonInteger() throws Exception {
        driver.findElement(By.id("minHiScore")).click();
        driver.findElement(By.id("minHiScore")).sendKeys("ZZ");
        Thread.sleep(2000);
        driver.findElement(By.xpath("//input[@value='Ready? Game On!']")).click();
        String actual = driver.switchTo().alert().getText();
        System.out.println(actual);
        Assert.assertEquals("Minimum High Score must be a positive number.", actual);
        driver.switchTo().alert().accept();
        driver.close();
    }
```

```
Search:            ☑ Passed: 9   ☒ Failed: 0   ◻ Skipped: 0   Tests: 1/1  Methods: 9 (95906 ms)

Default suite ( 9/0/0/0 ) (33.722 s)
    Default test ( 33.722 s)
        automation.testNG.TestMemGame1_CustomPage.A_GameLevel_Positive_Test
            testGameLevel_Positive  (6.79 s)
        automation.testNG.TestMemGame1_CustomPage.MinHighScore_NegativeTest_NegativeValue
            testHighScore_Negative  (2.709 s)
        automation.testNG.TestMemGame1_CustomPage.MinHighScore_NegativeTest_ZeroValue
            testHighScore_Zero  (2.901 s)
        automation.testNG.TestMemGame1_CustomPage.GameLevel_NegativeTest_MoreThanMaxValue
            tesGameLevel_MoreThanMax  (2.799 s)
        automation.testNG.TestMemGame1_CustomPage.A_MinHighScore_Positive_Test
            testHighScore_Positive  (7.072 s)
        automation.testNG.TestMemGame1_CustomPage.MinHighScore_NegativeTest_NonIntegerValue
            testHighScore_NonInteger  (2.869 s)
        automation.testNG.TestMemGame1_CustomPage.GameLevel_NegativeTest_NegativeValue
            tesGameLevel_NegativeValue  (2.814 s)
        automation.testNG.TestMemGame1_CustomPage.GameLevel_NegativeTest_NonIntegerValue
            tesGameLevel_NonIntegerValue  (2.805 s)
        automation.testNG.TestMemGame1_CustomPage.GameLevel_NegativeTest_ZeroValue
            tesGameLevel_ZeroValue  (2.963 s)
```

Create Java Class, Run as TestNG