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A Comparative Analysis of Automation Testing Tools - Selenium and Test Complete (TC)

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ABSTRACT: Software testing plays a crucial role in the software development lifecycle. This process can be carried out manually or automated using testing tools. Automated testing tools simplify the testing process for testers by providing various features and capabilities.

With a plethora of software testing tools available in the market, selecting the right one that aligns with specific requirements is vital.

The objective of this study is to analyse the features of two commercially available testing tools, Selenium and TestComplete, and assist users in selecting the tool that best suits their needs. Furthermore, the study investigates how these tools contribute to reducing resource requirements for script reuse and minimizing maintenance efforts.

KEYWORDS: Software Development life cycle (SDLC), Manual Testing, Automation testing, Selenium, TestComplete (TC)

I. INTRODUCTION

The process of software testing involves evaluating or exercising a system component to determine if it complies with certain requirements. This step aims to identify the various defects that are available in the software.

The process of testing software is generally done in two ways: manual and automation. The former involves carrying out a set of tests that are usually followed by a written test plan. This method is very time-consuming and requires a lot of experience. On the other hand, automation is more efficient and provides a scripting facility.

The use of automation testing tools can help reduce the number of manual tasks and improve the speed of the testing process. It can also help prevent the development of redundant and repetitive tests. This method covers all the aspects of manual testing and provides a comprehensive analysis of the obstacles that prevent it from working properly. One of the most common tools used by software testers for automating the process is the Test Complete (TC) suite.

II. METHODOLOGY

Several functional testing tools are available commercially or openly on the market today. An important aspect of testing automation is the ability to record scripts and then play back the scripts.

2.1 AUTOMATED SOFTWARE TESTING TOOLS

A list of requirements should be outlined when choosing a tool for evaluation when choosing an automated software testing tool. We may waste time downloading, installing, and evaluating tools that don't meet all of our requirements, or may not meet any of them. Several major testing tool vendors were evaluated, including Selenium and Test Complete, on their test tool characteristics, test execution capabilities, test reporting capabilities, script reusability capabilities, and playback capabilities.

Because of the more advantages of automation testing over manual testing, different companies are developing various automated test tools for various applications as a result. We can categorize these automated testing tools as follows based on the license associated with these tools:



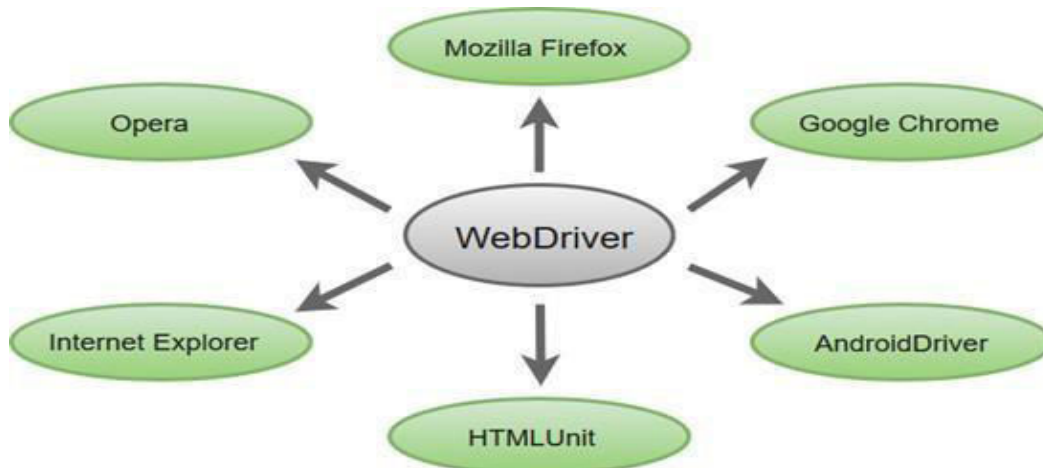
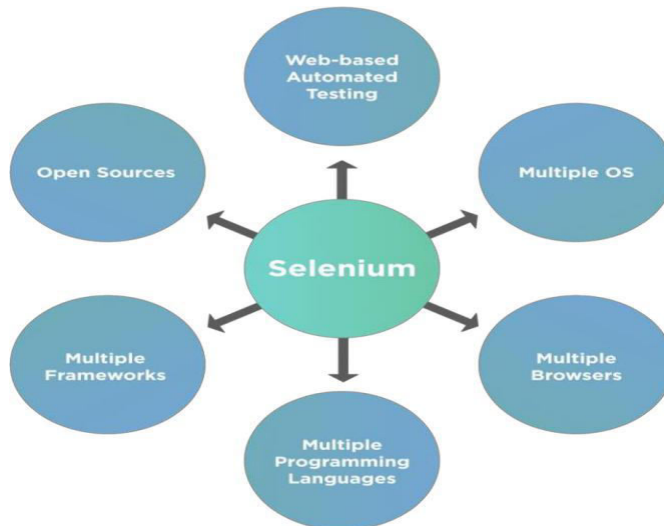
- Open source test tools.
- Commercial test tools.

Open Source Test Tools: Unlike closed-source testing tools, open-source testing tools do not require the purchase of licenses and the code is available to the user for modification. The users of these test tools can use them for free. A vendor can provide it for free or give it to you for free, such as the Selenium software.

Commercial Test Tools: Predict a commercial test tool refers to a testing tool that requires a license to fully utilize its functionalities. Closed source testing tools fall under this category. Commercial software tools are available for purchase. User should pay for the software in order to use it. Costs may vary based on the test tool's functionality. An example under this category is Test Complete.

2.1.1 SELENIUM

Selenium is a one of the most efficient open-source automated testing tools which provide an excellent testing framework for testing wide variety of applications exporting scripts in almost every language including java, .net, c#. Selenium's main feature is multi-browser support for test case execution





2.1.2 TESTCOMPLETE (TC)

TestComplete is a tool developed by Smartbear software to perform the functional testing. It gives testers the ability to create automated tests for Microsoft Windows, Web, Android (operating system), and iOS applications.

TestComplete creates and automates many software test types. A recording and playback test creation can record a tester performing a manual test, and allow it to be replayed and maintained ever so often.



III. EVALUATION STUDY

In the market different tools are available like open source and commercial web testing

& window application. Although the core functions of these tools are similar, they differ in functionality, features, and usability. As a result of the above factors, we have selected two functional testing tools for comparison, Selenium and TestComplete.

For this comparative study we used Selenium 2.9.0 and TestComplete 11.0. Comparison between these two tools is made based on different parameters. These

different parameters can be Record-playback capability, Script generation capability, Script languages support, Application support, Technical support, Data-driven testing capability, Report generation capability, Debugging support, Easy to learn, License and Training cost etc.

Table below lists all evaluation parameters with parameters meaning

3.1 EVALUATION PARAMETERS

Features	Explanation
Pricing	The cost of licensing the tools if they are paid
Cross platforms.	To what degree tool supports operating system
Applications support	Which type of applications are supported by tools
Cross Browsers	How many browsers tools able to work with



Record-Playback.	These automation tools can record scripts to run under different conditions
Script-language.	Programming language used to modify and create testing scripts.
Ease of Learning.	Working with GUI easy or not
Technical support	Tools provide any technical support or not
Data-Driven Framework.	The ability of tool to reduce efforts
Programming skills.	Require programming skills or based on predefined steps
Training-Cost (USD).	The training cost for tool if exist
Debugging support.	Does the tool handle error and provide debugging
Report Generation.	Effective analysis for test script with tool
Product support	Tools supported by which software company

IV. COMPARISON OF AUTOMATED TESTING TOOLS BASED ON THE LISTED FEATURES

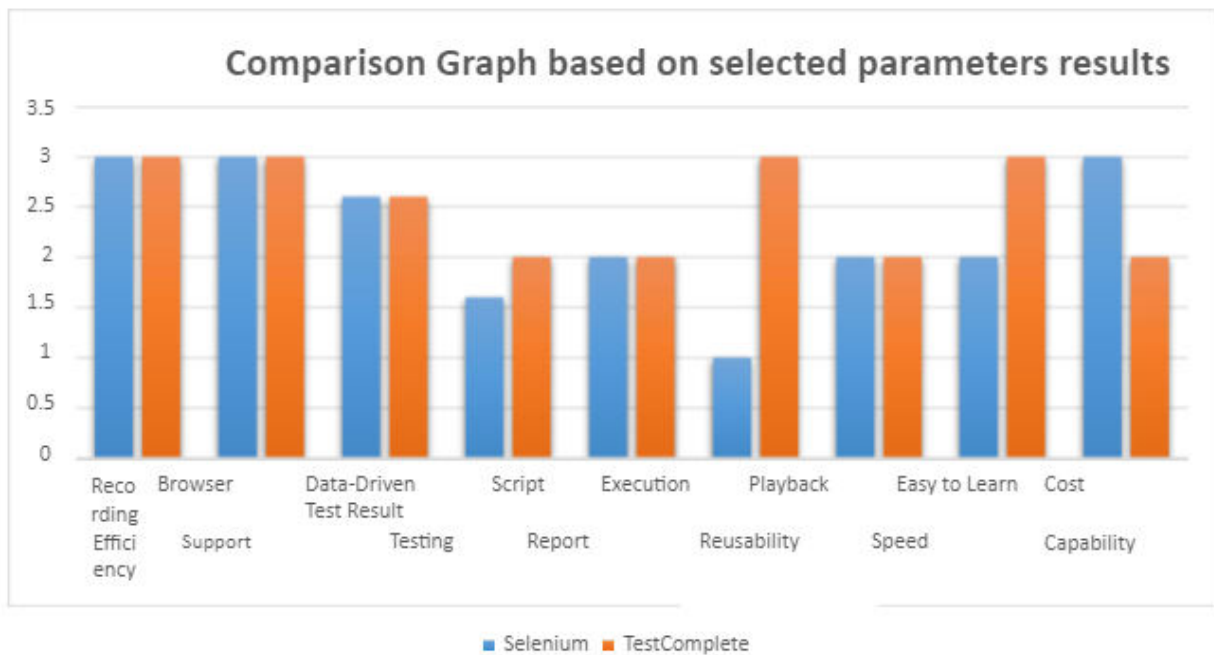
Fe ature s	Selenium	TestComplete
Pricing	Open source and free of cost.	Licensed and it costs 1999.
Cross platforms.	Windows, Linux, Unix, MAC	Windows 7 and Later
Applications support	Web applications only	Web, Desktop and Mobile application
Browsers-support	Chrome-Firefox-IE-Opera	Chrome-Firefox-IE-Opera
Record-Playback.	Supports	Supports
Script-language.	Java, C#, Ruby, Python, PHP and JavaScript	VBScript, Delphi, C++, C# and JavaScript
Ease of Use	Experience needed	Experience needed
Technical support	No official technical support	Good technical support via phone, mail, web forum
Data-Driven Framework.	Excel, CSV	Excel, CSV, SQL
Training-Cost (USD).	350	449



Debugging support.	Strong	Strong
Report Generation.	HTML	HTML
Product support	Open source community	Smartbear support with support forum

V. RESULT AND ANALYSIS OF STUDY

For the purpose of rating the comparison parameters, we have used a 3-point scale i.e. 3, 2, 1 as Positive, Average, and Bad respectively. So the value of different parameters has been calculated on this 3-point scale. Through the use of selected automated tools, it produces different values for different parameters. A comparative study is based on the calculated values of parameters. This figure illustrates an overall comparison graph of Selenium's and TestComplete's automated functional testing tools.



VI. RESULT AND ANALYSIS OF STUDY

One can select a testing tool based on the type of application need to be tested, budget, and the efficiency required. Selenium and TestComplete are very good test automation tools. Each tool has its own pros and cons.

As Selenium can reduce the cost as it is open source, however, the amount of effort involved in scripting for Selenium has increased. TestComplete has a Simple UI and Playback feature to understand. TestComplete is best for applications with lesser security needs. Thus while testing it is having lack of data security.

Future work will encounter more tools and features that will help build a user-based requirement model. Thus According to the user needs this comparative study will help users to select best from Selenium and TestComplete tool.



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