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OVERVIEW AND ANALYSIS OF AUTOMATED TESTING TOOLS: RANOREX, TEST COMPLETE, SELENIUM

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Abstract - *There are many softwares in the present market and are released without proper evaluation. At present, number of such software systems are being used as web-based applications. These web applications are very complex to use them aptly for the required purpose. It is very difficult to test such complex web applications. There are two types of Automation-Manual and Automated. Automated testing uses automation tools to reduce human intervention and repeatable tasks. This way we can find the quality and error free software. As even these automation tools contain errors and are to be chosen specifically for testing their software. This paper provides a comparison between the tools and review them for you to choose the best tool which will be suitable for your requirements. The paper highlights the comparison between Ranorex, Testcomplete and Selenium automation tools available in market and their use in the software project scenario.*

Keywords: **Ranorex, Test complete, Selenium, Automated Testing, Testing tools, Cross platform.**

1. INTRODUCTION

Software testing is the process of analysing software quality by using the software with applicable test cases to determine if proposed software requirements are being satisfied. Testing is a fundamental aspect of software engineering. Testing applications thoroughly and efficiently is necessary for deployment when attracting new customers and also maintaining loyal customers. Testing is essential because software reliability is defined using testing and major percent of the software development budget for software projects is allocated for testing. Software testing is necessary because errors are often introduced into software inadvertently as it is designed and constructed. Software operation has become even more difficult today, due to the fact that there are more lines of code, dealing with several interfaces and languages and so more thorough testing is required. When software testing is not performed properly then the software released by the company may have several errors and bugs which will incur huge financial loss to the company and needs updates for its drawbacks.

Software testing practice is primarily focussed on recognizing errors in the software. The individual who developed the software for his requirements would have an insight of what he actually wanted as an outcome from the software. So they might test for the errors and try to fix them to get their desired product. Such type of testing by the individuals is manual testing. Manual testing includes testing a software manually for defects, i.e., without using any automated tool or any script. In this type, the tester plays the role of an end-user and tests the software to identify any unexpected behaviour or bug and ensure correct working of the software. There are different stages for manual testing such as unit testing, integration testing, system testing, and user acceptance testing.

Testers use test plans, test cases, or test scenarios to test a software to make sure the completeness of software. These testers also may explore the software for testing purpose to make it flawless. Even then there are several problems prevailing with this process. They are not related to the result of the process but pertained to the procedure of the process taking place. After repeatedly performing this they found out the manual testing to be highly time consuming process. It also is not reusable because it doesn't have any scripting language. It requires arduous effort and still some mistakes may be present unaddressed and uncovered. As it decreases human involvement the automation testing is cost efficient. This creates a void for a different testing process and Automated testing has occupied this filled it to a certain extent to overcome the drawbacks of the manual testing. A defining factor for successfully applying test automation in software projects is choosing and using the right set of test automation tools. This is certainly a difficult task, especially for those new to software test automation, because there are so many tools in the market to choose from, each having different strengths and weaknesses. There is no one tool that can fit all automated testing needs, which makes finding the right tool difficult. They vary in their features and applications leaving the user in a state of confusion of which tool to use. The main objective of the research paper is to give an overview and analyse the tools present.

2. BENEFITS OF AUTOMATED TESTING

The goal of automation is to reduce number of test cases to be run manually and not eliminate manual testing all

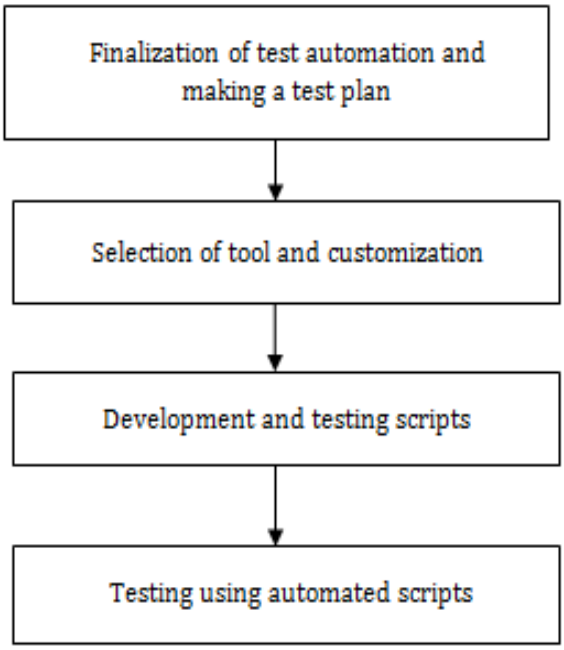
together. So which test cases to automate? The answer is test cases that are executed repeatedly and are time consuming.

- ✓ System continues running even if a test case fails and does not waste time in that rectifying it but continues testing other cases.
- ✓ We don't need to attend the testing all time and can be left unattended all night long.
- ✓ Easy maintenance and easy to update reusable modules.
- ✓ We can track components of the automated testing system in a database.
- ✓ Text strings stored in variables easy to find and update.
- ✓ Automated testing is consistent and testing can be done over and over with less overhead.
- ✓ Standardized testing and reproducible results.
- ✓ Difficult to test for multi lingual sites manually.
- ✓ Automation increases speed of execution and test coverage.

2.1 Concerns of automated testing:

1) Test cases that are newly designed and not executed manually atleast once are not recommended for automation.
2) Test cases for which the requirements are changing frequently.
3) Maintenance becomes necessary to improve effectiveness of automation scripts.

TEST AUTOMATION PROCESS LIFE CYCLE



3. OVERVIEW OF TOOLS:

Overview of some of the tools will now be described. The selected tools are based on its high usage and better availability for the purpose of testing. You could also have a look on more number of tools to get a brief idea on which tool suits your testing more apt. We report the features of the tool and leave it to you for decision.

3.1 RANOREX:

This is a cost effective complete tool used for automated testing. Even though there are many tools available in the market, what makes it stand out of them is that this tool does not necessitate to study a scripting language since it is written in pure .Net code. From the user's perspective it makes the testing simpler. We can use any of these three languages C#, VB.net and Iron Python. Ranorex is based on XPath. This is how finding your required components becomes easier in a web based application and does not miss anything. Usually there arises a problem with record and play back methods since tests are joined to the code. These methods are dependent on the expertise to develop the tests in order to test all the components. Ranorex is based on the phenomenon of Image based recognition. It provides flexible test automation interface and makes working on it easier. This user interface allows for managing test cases and combinations. Also the use of data variables is allowed. As ranorex is cost benefitable though its support is restricted to only companies, it is suggested for prolonged projects.

Concerns:

Third party integration is limited. Even if we could do it ourselves, if we refer ranorex libraries through other applications then they don't meet our needs most of the time. For instance, Ranorex has its web driver integration as private and people who refer ranorex libraries with visual studio cannot run their tests against EDGE browser.

3.2 TESTCOMPLETE:

Test Complete is another automated testing tool with integrated version control facility and is developed by smart bear software. Test complete provides various types of recording such as keyword, script, low level procedure. It is based on the screen or window coordinates and HTTP task. Record and playback test type tools record a tester performing a manual test and allows it to be played back and maintained over as an automated test. There is an availability of TestExecute module separately from the Testcomplete to execute the test scripts. TestComplete offers different types of testing such as Functional, regression, Unit disturbed, Load, Web and manual testing. It is easy to operate and can generate five types of scripts-VbScript,

Delphi, C++, C# and JScripts. This TestComplete tool has been awarded the ATI Automation Honors award, as the Best Commercial Automated Functional Testing Tool in 2010, and it is used in multinational companies like Adobe, Qlik Tech etc.

Concerns:

Applications compiled with TestComplete's library cannot use the debug version of flash player to avoid errors. Also the key word driven tests are not supported.

3.3 SELENIUM:

It is one of fast developing tools in automated testing market. Selenium is actually an integration of Selenium IDE, Selenium Core, Selenium 1 (known as Selenium RC), Selenium 2 (known as Selenium Web driver), Selenium-Grid. Initially it was developed by Jason Huggins and later accompanied by a team of testers. The generation of test scripts in selenium can be done by multiple web browsers. It also can be applied for execution of test cases. Apart from this it has a test domain specific language to execute the test cases and generate reports in multiple programming languages. It is an open source and can run on any operating system which makes it standout from all the other tools. The software can be downloaded from the website itself. It also has a large storage which stores and displays objects based on the hierarchy they were present. It has a detailed keyword view with different functionalities and add-ons. The image based object recognition in this tool is developed and used to perform different functionalities which are otherwise unable to be recognized by the tool. This helps and supports any graphic based environment and the test report generating graphs for faster and easier analysis.

Concerns:

Selenium IDE is Firefox plugin, thus its support is confined to Firefox only. It does not support iteration and condition statement. It does not have proper error handling, database testing.

4. PARAMETERS FOR COMPARISON:

When we begin or research for the right automated software testing tool, it is vital to make a rundown of prerequisites to check while selecting a tool for assessment. If we fail to do so we may end up wasting time by selecting a wrong tool or selecting a tool which only fulfils our requirements partially. Scope of automation needs to be determined in detail before the start of the project. This gives an idea of what to be expected from the testing tool. So these are some checkpoints for comparison and these could vary depending on your requirements.

i. Execution speed- How well is the execution speed of the tool for testing.

ii. Cross platform- Whether the tool runs on different operating systems.

iii. Script language- The ability of the tool to generate scripting in required language

iv. Data driven testing- The ability of tools to make work simpler.

v. Playback capability-If the tool supports record and playback option.

vi. Application support- Which type of software can be tested using this tool

vii. Easy to learn- How easy is the user interface to operate and work on it. Ranorex is little complex than TC due to more features, we rate the TC as extremely good (5pt) and Ranorex as fairly good(4pt).

viii. Cost - Licence cost of the tool if it needs to be purchased from the official site.TC is little costly than Ranorex tool

ix. Test Result report generation- How effective and thorough are the analysis of test scripts generated.

4.1 OVERVIEW OF COMPARISON:

For a better analysation and deeper understanding of the tool's features we compare them on this criteria. The comparison results need to be picked based on your requirements for the tool and need not be the same for everyone.

Criteria for testing	Ranorex	Testcomplete	Selenium
Execution speed	High	Very high	High
Cross platform	Windows	Windows	Windows, linux,unix,mac
Scripting language	No specific scripting lang. is used as it is written in .NET language using C#, VB.Net, and Iron Python	VBScript, Delphi, C++, C#, Java script.	Java, C#, Ruby, Python, PHP, Perl, Java script.
Data driven testing(Tools can accept and make changes in these without affecting test scripts)	CSV, Excel, SQL	Excel, Csv, Sql	Excel, Csv.
Playback capability	Supports record and playback option	Supports record and playback option	Supports record and playback option
Application support	Desktop, mobile, web applications	Web, app, mobile applications	Web applications only
Easy to learn (as all need experience relative ranking is given 1st-easiest 2nd –easier 3rd-easy)	Needs Experience but easy even for non-programmers. 2nd place.	Needs experience but easier among these three. 1st among these	Needs experience and programming skill. 3rd among the three.
Cost of tool and additional training cost	Approximately 1850. Training cost-1080.	Approximately 1100. Training cost-450.	Open source. Can be downloaded from official site. Training cost-350.
Test result report generation	HTML.	HTML, XML	HTML.

5. CONCLUSION:

In our research paper after getting an overview of the automated tools we conclude that automated testing is suitable in most cases compared to manual testing. Our research work consists of a selected well known and best tools in the market for analysation. Software testing tools are dissimilar. Test tool selection largely depends on technology the application under test is built on. This is one of the main challenges to be tackled before automation. A tool must not be selected based on its popularity but it's fit to the automation requirements. The automation software can also enter test data into the system under test, compare expected and actual results and generate detailed test reports. The best approach is to use a selection process that is completely tailored towards your requirements. Scope of automation is the area of your application under test which will be automated. Ease of use, support multiple testing frameworks and other parameters mentioned are important to be checked upon selection of tool. One can also select a testing tool based on the type of application need to be tested, budget, and the efficiency required. Ranorex, TestComplete, Selenium are very good tools for test automation. Each tool has its own pros and cons. Using one of them can be decided based on the application features and scope of testing. Ranorex is more suitable for web based applications as it has many tools in built to the software package and also does not necessitate for learning of the scripting language. Selenium can reduce the cost and limit the budget as it is open source. The cross platform to work in any operating system or any browser makes this tool unique. The test report generation is also good for this tool. TestComplete has easy to learn UI and efficient playback. TestComplete is suitable to use for applications with lesser security needs. The execution speed also makes us inclined towards using this tool. For a beginner, it is suggested to switch to Ranorex with testing becoming simpler with no need for scripting language.

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