Software Testing Methodologies

Introduction to Automation

Agenda -

- Introduction to Automated Software Testing
- Process of Automated Testing
- Advantages & Disadvantages
- Choosing Automation Tools

Definition of Automation

“Automation is the use of tools and strategies that reduce human involvement or interaction in unskilled, repetitive or redundant tasks”

Automation Software Testing

- **Automation Testing** is a software testing technique that performs using special automated testing software tools to execute a test case suite. On the contrary, Manual Testing is performed by a human sitting in front of a computer carefully executing the test steps.

- The automation testing software can also enter test data into the System Under Test, compare expected and actual results and generate detailed test reports. Software Test Automation demands considerable investments of money and resources.

- Successive development cycles will require execution of same test suite repeatedly. Using a test automation tool, it's possible to record this test suite and re-play it as required. Once the test suite is automated, no human intervention is required. This improved ROI of Test Automation. The goal of Automation is to reduce the number of test cases to be run manually and not to eliminate Manual Testing altogether.

Why Test Automation?

Test Automation is the best way to increase the effectiveness, test coverage, and execution speed in software testing. Automated software testing is important due to the following reasons:

- Manual Testing of all workflows, all fields, all negative scenarios is time and money consuming.
- It is difficult to test for multilingual sites manually.
- Test Automation in software testing does not require Human intervention. You can run automated test unattended (overnight).
- Test Automation increases the speed of test execution.
- Automation helps increase Test Coverage.
- Manual Testing can become boring and hence error-prone.

Which Test Cases to Automate and Which to Not ?

Test cases to be automated can be selected using the following criterion to increase the automation ROI:

- High Risk – Business Critical test cases
- Test cases that are repeatedly executed
- Test cases that are very tedious or difficult to perform manually
- Test cases which are time-consuming

The following category of test cases are not suitable for automation:

- Test cases that are newly designed and not executed manually at least once
- Test cases for which the requirements are frequently changing
- Test cases which are executed on an ad-hoc basis.

Automated Testing Process

Following steps are followed in an Automation Process:

Step 1). Test Tool Selection

Step 2). Define scope of Automation

Step 3). Planning, Design and Development

Step 4). Test Execution

Step 5). Maintenance

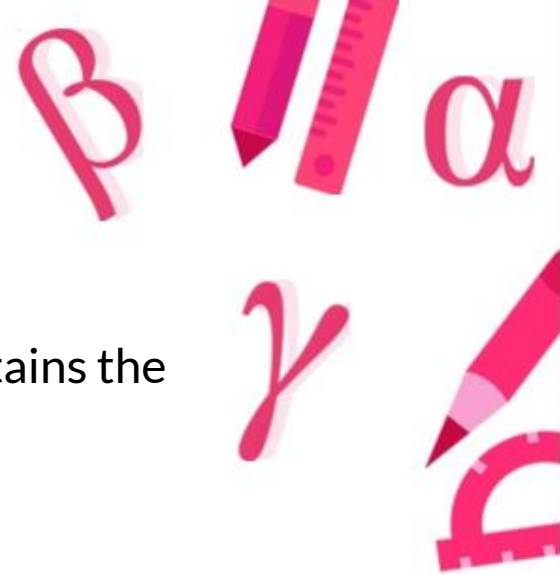
Test Tool Selection

Test tool selection largely depends on the technology the application under test is built on. For instance, QTP does not support informatica. So QTP cannot be used for testing informatica applications. It's a good idea to conduct a proof of concept of tool on AUT.

Define the Scope of Automation

The scope of automation is the area of your application under test which will be automated.
Following points help determine scope:

- The features that are important for the business.
- Scenarios which have a large amount of data.
- Common functionalities across applications.
- Technical feasibility.
- The extent to which business components are reused.
- The complexity of test cases.
- Ability to use the same test cases for cross-browser testing.



Planning, Design, and Development

During this phase, you create an Automation strategy & plan, which contains the following details:

- Automation tools selected
- Framework design and its features
- In-Scope and Out-of-scope items of automation
- Automation test bed preparation
- Schedule and Timeline of scripting and execution
- Deliverables of Automation Testing

Test Execution

- **Automation Scripts** are executed during this phase. The scripts need input test data before there are set to run. Once executed they provide detailed test reports.

- **Execution** can be performed using the automation tool directly or through the Test Management tool which will invoke the automation tool.

- **Example:** Quality center is the Test Management tool which in turn it will invoke QTP for execution of automation scripts. Scripts can be executed in a single machine or a group of machines. The execution can be done during the night, to save time.

Test Automation Maintenance Approach

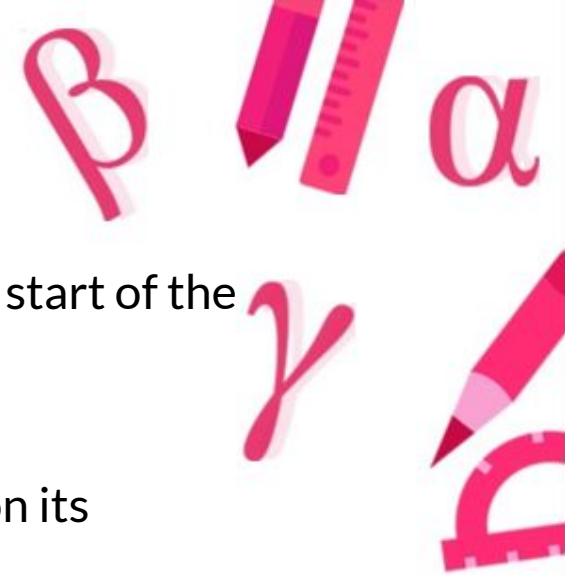
Test Automation Maintenance Approach is an automation testing phase carried out to test whether the new functionalities added to the software are working fine or not. Maintenance in automation testing is executed when new automation scripts are added and need to be reviewed and maintained in order to improve the effectiveness of automation scripts with each successive release cycle.

Framework for Automation

A framework is set of automation guidelines which help in:

- Maintaining consistency of Testing
- Improves test structuring
- Minimum usage of code
- Less Maintenance of code
- Improve reusability
- Non Technical testers can be involved in code
- The training period of using the tool can be reduced
- Involves Data wherever appropriate

Automation Tool Best Practices:



- The scope of Automation needs to be determined in detail before the start of the project. This sets expectations from Automation right.

- **Select the right automation tool:** A tool must not be selected based on its popularity, but it's fit to the automation requirements.

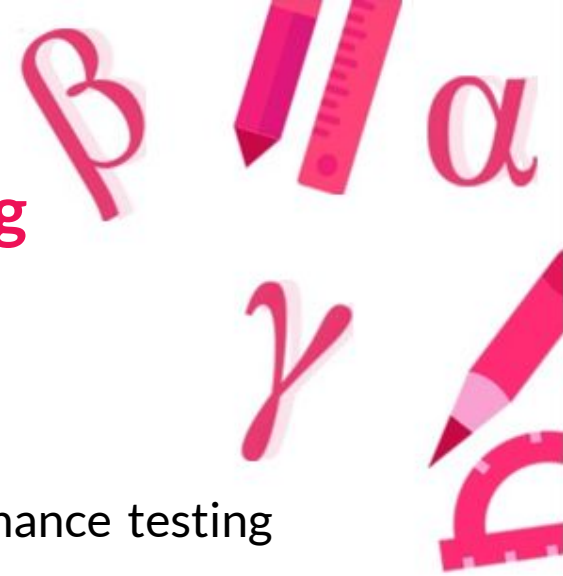
- Choose an appropriate framework

- **Scripting Standards-** Standards have to be followed while writing the scripts for Automation. Some of them are-
  - Create uniform scripts, comments, and indentation of the code.
  - **Adequate Exception handling -** How error is handled on system failure or unexpected behavior of the application.
  - **User-** defined messages should be coded or standardized for Error Logging for testers to understand.

Automation Tool Best Practices:

- **Measure metrics-** Success of automation cannot be determined by comparing the manual effort with the automation effort but by also capturing the following metrics.
  - Percent of defects found
  - The time required for automation testing for each and every release cycle
  - Minimal Time is taken for release
  - Customer Satisfaction Index
  - Productivity improvement

Advantages & Disadvantages of Automated Testing



Advantages :

- Easy to cover up all cases in a limited time period.
- You can perform different types of testing like load testing, performance testing using tool.
- Automated testing can be performed on different operating systems

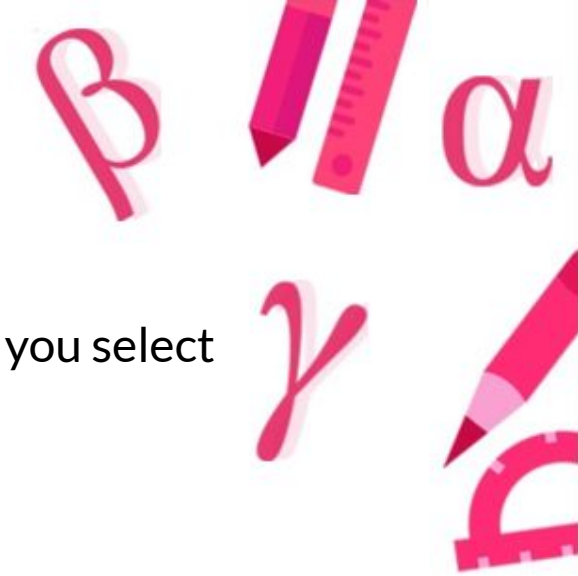
Disadvantages:

- Purchase a tools and Maintenance.
- Automation testing is more expensive work as comparing with manual testing.
- Language wise there are many tools to test various type of software, means all tools will not support to all software which are developed in different languages

Choosing Automation Tools

- Ease of integration
- Compatibility
- Performance
- Types of tests
- Maintainability
- Affordability

Choosing Automation Tools



Selecting the right tool can be a tricky task. Following criterion will help you select the best tool for your requirement-

- Environment Support
- Ease of use
- Testing of Database
- Object identification
- Image Testing
- Error Recovery Testing
- Object Mapping

Choosing Automation Tools

- Scripting Language Used
- Support for various types of test – including functional, test management, mobile, etc…
- Support for multiple testing frameworks
- Easy to debug the automation software scripts
- Ability to recognize objects in any environment
- Extensive test reports and results
- Minimize training cost of selected tools

Software Testing Tools

- HP Quick Test Professional
- Selenium
- Test stack.White
- Testing Anywhere
- WinRunner
- LoadRunner

Thankyou!