SWE 4603

Software Testing and Quality Assurance

Lecture 8

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Lesson Outcome

- Automation Testing

Week on:
- Chapter 15: Automation and Testing Tools

Automation Testing

Automation Testing

What is Automated Software Testing?

❖ is the methodology that helps to validate the functioning of the software before it is moved to production.

❖ In this process, **automated testing tools** are used by the QA teams for executing the test scripts.

❖ With the use of automated software testing tools, QA teams can quickly test the software, prepare the defect reports, and compare the software results with the expected results.

Automation Testing

What is Automated Software Testing?

- ❖ automated testing process provides several benefits
  - ➢ faster delivery
  - ➢ eases regression testing time
  - ➢ ensures quality software along with reducing manual testing efforts.
- ❖ automated testing ensures faster and quality releases utilizing automated testing tools.
- ❖ It is actually a process that validates if the software is functioning appropriately and meeting the given requirements using the test automation tools.

Automation Testing

Why Automated Software Testing is important?

❖ automated software testing uses **open source/paid test automation tools** to test applications quickly and more efficiently 24×7 without any human intervention.

❖ It takes up different testing approaches and replaces several tasks of manual testers and ensures to improve the overall test coverage effectively.

❖ pre-written scripts are tested to ensure quality software is released and essentially reduces the regression testing time.

❖ Test automation also helps enterprises to improve the communication between DevOps, QA teams and product owners who depend on the results of these automated tests as these results are more reliable than the manual testing results.

❖ It helps QA teams to re-check and validate the outcomes quickly and more effectively with less human effort.

Automation Testing

What are the benefits of Automated Software Testing?

The benefits have been broadly classified as

1. **Application-Wise benefits**

2. **Cost-wise benefits.**

Automation Testing

Application-Wise benefits
❖ **Increases test coverage:**
➢ helps to perform more number of automated test scripts and increases the test coverage and the scope of tests to enhance the applications quality.
➢ It also helps in saving time and significantly reduces manual testing efforts.
❖ **Ensures test accuracy:**
➢ Manual test cycles might lead to errors, but with automated software testing tools, there is an assurance that the testing practice and validation of the application is performed with good accuracy as errors are identified at every phase.
❖ **Eases regression testing time:**
➢ lot of time, and human efforts can be saved when automated regression testing is practiced with testing tools and manual testers get time to be used for other quality works.
❖ **Facilitates with reusable test scripts:**
➢ it eases the tester's efforts as the test scripts can be reused with some minor changes made in the test scripts.
➢ Also, these scripts can be used multiple times as they can be stored, and can be re-used for repeating the tests.

Automation Testing

Cost-Wise Benefits
❖ **Saves Cost:**
➢ With automated app testing, enterprises can effectively save their budget as the test cases are run at a faster speed, defects are identified early and fixed before it is moved to production.
➢ Though the initial costs of automation are high, but when once the automated test framework is developed, it eases the testing tasks and remarkably saves the overall costs.
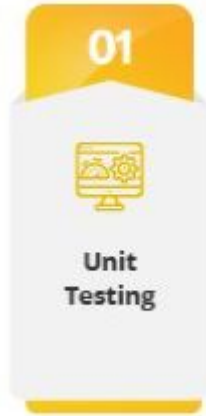❖ **Increases ROI:**
➢ With the development of an effective test automation framework, returns are huge as testing is performed faster with the inbuilt features.
➢ Moreover, automation testing delivers faster and quality results, improves the time to market and finally ensures increased return on investment.
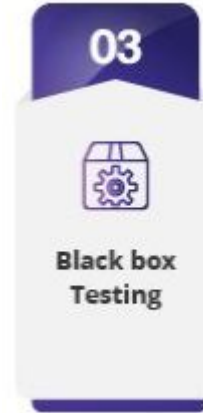❖ **Saves Time:**
➢ As tests are run automatically 24×7, automated software testing helps to save time.
➢ Moreover, with automated testing tools, manual scripts are automated and the regression testing time will be drastically reduced.
➢ This eventually leads to saving the delivery time of the application and largely saves lot of manual efforts and saves time.

Automation Testing

Automation testing in use

01 Unit Testing

These tests are usually written by the developers but sometimes automation testers also write them. These tests are usually performed during the software development phase.

03 Black box Testing

is performed to check if there are any incorrect or missing functions, checks for the existence of any interface errors, or any behavior related or performance errors and also checks the presence of termination errors, if any.

05 Functional Testing

to check if all the functions work as expected or not. This involves testing APIs, database, security testing and also tests the overall functionality of the application.
Regression testing:

Automation Testing

02

Smoke Testing

This type of testing is performed to check whether the build is stable or not. If the build is not stable, then it will be sent back to the developers as unstable build and if the build is stable then testers will accept it to perform further testing on the build

06

Regression Testing

to check whether all the existing features are functioning well even with recent code changes. It basically verifies that the old code works in the same way as they were before making any changes to the code
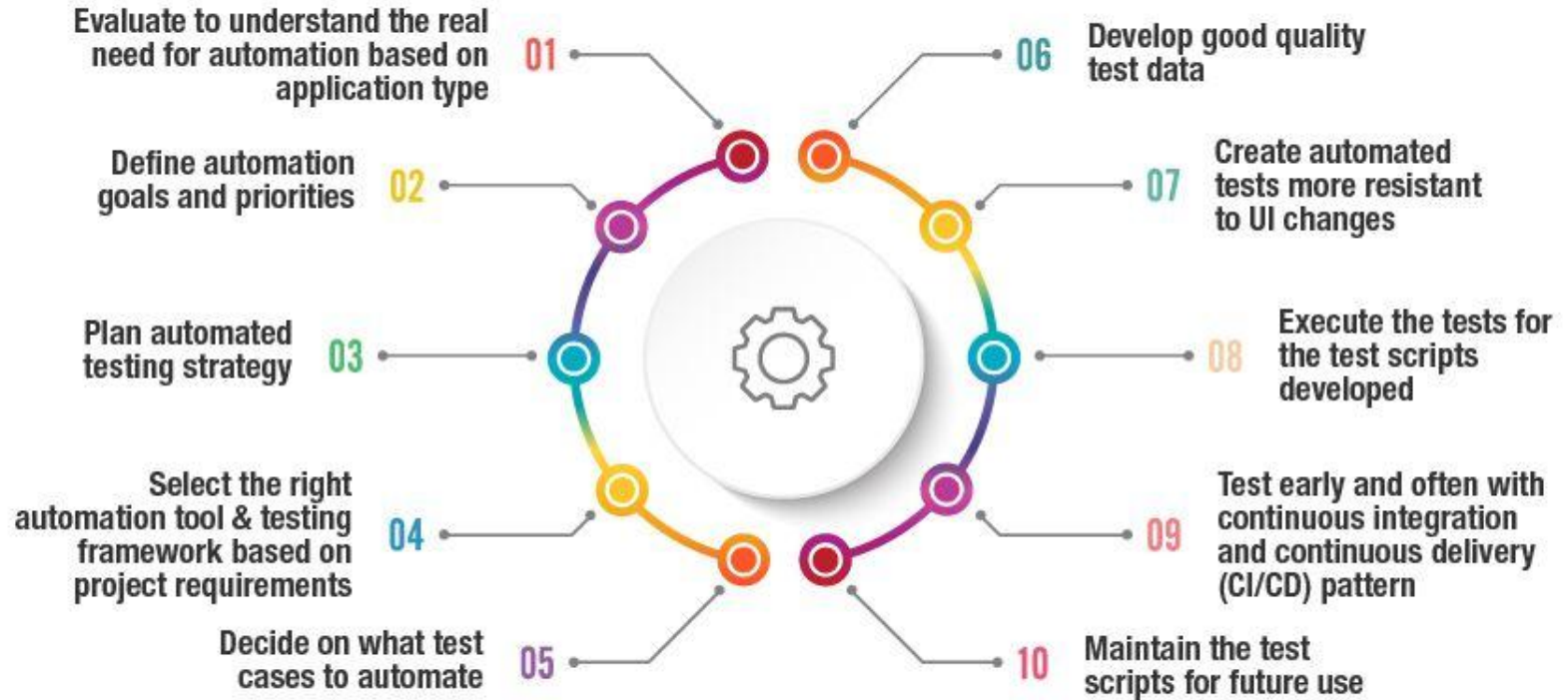
04

Integration Testing

In this integration testing, the application modules are typically integrated logically and tested as a group. checks and verifies the data communication between different modules of the application.

Automation Testing

Evaluate to understand the real need for automation based on application type — 01

02 — **Define automation goals and priorities**

Plan automated testing strategy — 03

Select the right automation tool & testing framework based on project requirements — 04

Decide on what test cases to automate — 05

06 — **Develop good quality test data**

07 — **Create automated tests more resistant to UI changes**

08 — **Execute the tests for the test scripts developed**

09 — **Test early and often with continuous integration and continuous delivery (CI/CD) pattern**

10 — **Maintain the test scripts for future use**

10 Basic Steps for a Well-Defined Test Automation

Automation Testing

What Does an Automation Tester Do?

- ❖ The QA automation tester is responsible for designing and writing test automation scripts as the first phase and they use various types of test automation frameworks to achieve successful test automation.

- ❖ They run test scripts to ensure all the scenarios are successfully tested and they have a close association with the developers and other QA analysts.

- ❖ They log bugs and issues in various test management tools such that the developers work on these bugs and fix them.

- ❖ Once again automated regression testing is done to ensure the new functionalities do not affect the functionalities of existing features.

Automation Testing

What are Automation testing challenges and how to overcome them?

Lack of Highly Skilled Test Automation Experts

Lack of Proper communication & collaboration between Developer and QA teams

Proper Selection of Right Test Automation Tool

Challenges with Scaling Test

Involves High Initial Investment Costs

Automation Testing

Tools for automation testing

- ❖ Katalon Studio

- ❖ Applum

- ❖ Selenium

- ❖ UFT

- ❖ Eggplant

Automation Testing

Selection Criterias for tools

❖ **Match the tool to its appropriate use**: Before selecting the tool, it is necessary to know its use. A tool may not be a general one or may not cover many features. Rather, most of the tools are meant for specific tasks.

❖ **Select the tool to its appropriate SDLC phase:** Since the methods of testing changes according to the SDLC phase, the testing tools also change.

❖ **Select the tool to the skill of the tester:** The individual performing the test must select a tool that conforms to his skill level. For example, it would be inappropriate for a user to select a tool that requires programming skills when the user does not possess those skills.

Automation Testing

Selection Criterias for tools

- ❖ **Select a tool which is affordable:** Tools are always costly and increase the cost of the project. Therefore, choose the tool which is within the budget of the project.

- ❖ **Determine how many tools are required for testing the system:** A single tool generally cannot satisfy all test requirements. It may be possible that many test tools are required for the entire project.

- ❖ **Select the tool after examining the schedule of testing:** First, get an idea of the entire schedule of testing activities and then decide whether there is enough time for learning the testing tool and then performing automation with that tool. If there is not enough time to provide training on the tool, then there is no use of automation.

Automation Testing Framework

What is Test Automation Framework?

❖ Test Automation Framework as a set of guidelines for creating and designing test cases. It is a conceptual part of the automated testing that helps testers to use resources more efficiently.

❖ A framework is defined as a set of rules or best practices that can be followed in a systematic way that ensures to deliver the desired results.

❖ An automation testing framework is a platform developed by integrating various hardware, software resources along with using various tools for automation testing and web service automation framework, based on a qualified set of assumptions. This framework enables efficient design and development of automated test scripts and ensures reliable analysis of issues or bugs for the system or application under test (AUT).

Automation Testing Framework

Purpose of a Test Automation Framework

❖ Enhances efficiency during the design and development of automated test scripts by enabling the reuse of components or code

❖ Enables reliable issue and bug detection and delivers proper root-cause analysis with minimum human intervention for the system under test

❖ Reduces dependence on teams by automatically selecting the test to execute according to test scenarios

❖ Improves utilization of various resources and enables maximum returns on efforts

❖ Ensures an uninterrupted automated testing process with little man-power involvement