SOFTWARE TESTING

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ABSTRACT:-

Software testing is any activity aimed at evaluating an attribute or capability of a program or system and determining that it meets its required results. Testing is more than just debugging. The purpose of testing can be quality assurance, verification and validation, or reliability estimation. Testing can be used as a generic metric as well. Correctness testing and reliability testing are two major areas of testing. Software testing is a trade-off between budget, time and quality.This Paper include all the types of testing and the need of testing and also discuss about the tools of the testing

INTRODUCTION:-

Software testing is the process of evaluation a software item to detect differences between given input and expected output. Also to assess the feature of A software item. Testing assesses the quality of the product. Software testing is a process that should be done during the development process. In other words software testing is a verification and validation process.

Software Testing is necessary because we all make mistakes. Some of those mistakes are unimportant, but some of them are expensive or dangerous. We need to check everything and anything we produce because things can always go wrong.

Since we assume that our work may have mistakes, hence we all need to check our own work. However some mistakes come from bad assumptions and blind spots, so we might make the same mistakes when we check our own work as we made when we did it. So we may not notice the flaws in what we have done.

Ideally, we should get someone else to check our work because another person is more likely to spot the flaws.

NEED FOR SOFTWARE TESTING:-

Software testing is very important because of the following reasons:

1. Software testing is really required to point out the defects and errors that were made during the development phases.

2. It's essential since it makes sure of the Customer's reliability and their satisfaction in the application.

3. It is very important to ensure the Quality of the product. Quality product delivered to the customers helps in gaining their confidence.

4. Testing is necessary in order to provide the facilities to the customers like the delivery of high quality product or software application which requires lower maintenance cost and hence results into more accurate, consistent and reliable results.

5. Testing is required for an effective performance of software application or product.

6. It's important to ensure that the application should not result into any failures because it can be very expensive in the future or in the later stages of the development.

7. It's required to stay in the business.

TYPES OF TESTING:-

Verification

Verification is the process to make sure the product satisfies the conditions imposed at the start of the development phase. In other words, to make sure the product behaves the way we want it to.

Validation

Validation is the process to make sure the product satisfies the specified requirements at the end of the development phase. In other words, to make sure the product is built as per customer requirements.

Basics of software testing

There are two basics of software testing: blackbox testing and whitebox testing.

Blackbox Testing

Black box testing is a testing technique that ignores the internal mechanism of the system and focuses on the output generated against any input and execution of the system. It is also called functional testing.

Whitebox Testing

White box testing is a testing technique that takes into account the internal mechanism of a system. It is also called structural testing and glass box testing.

Black box testing is often used for validation and white box testing is often used for verification.

Types of testing

There are many types of testing like

- Unit Testing
- Integration Testing
- Functional Testing
- System Testing
- Stress Testing
- Performance Testing
- Usability Testing
- Acceptance Testing
- Regression Testing
- Beta Testing

Unit Testing

Unit testing is the testing of an individual unit or group of related units. It falls under the class of white box testing. It is often done by the programmer to test that the unit he/she has implemented is producing expected output against given input.

Integration Testing

Integration testing is testing in which a group of components are combined to produce output. Also, the interaction between software and hardware is tested in integration testing if software and hardware components have any relation. It may fall under both white box testing and black box testing.

Functional Testing

Functional testing is the testing to ensure that the specified functionality required in the system requirements works. It falls under the class of black box testing.

System Testing

System testing is the testing to ensure that by putting the software in different environments (e.g., Operating Systems) it still works. System testing is done with full system implementation and environment. It falls under the class of black box testing.

Stress Testing

Stress testing is the testing to evaluate how system behaves under unfavorable conditions. Testing is conducted at beyond limits of the specifications. It falls under the class of black box testing.

Performance Testing

Performance testing is the testing to assess the speed and effectiveness of the system and to make sure it is generating results within a specified time as in performance requirements. It falls under the class of black box testing.

Usability Testing

Usability testing is performed to the perspective of the client, to evaluate how the GUI is user-friendly? How easily can the client learn? After learning how to use, how proficiently can the client perform? How pleasing is it to use its design? This falls under the class of black box testing.

Acceptance Testing

Acceptance testing is often done by the customer to ensure that the delivered product meets the requirements and works as the customer expected. It falls under the class of black box testing.

Regression Testing

Regression testing is the testing after modification of a system, component, or a group of related units to ensure that the modification is

working correctly and is not damaging or imposing other modules to produce unexpected results. It falls under the class of black box testing.

Beta Testing

Beta testing is the testing which is done by end users, a team outside development, or publicly releasing full pre-version of the product which is known as beta version. The aim of beta testing is to cover unexpected errors. It falls under the class of black box testing.

Testing automation:-

Software testing can be very costly. Automation is a good way to cut down time and cost. Software testing tools and techniques usually suffer from a lack of generic applicability and scalability. The reason is straight-forward. In order to automate the process, we have to have some ways to generate oracles from the specification, and generate test cases to test the target software against the oracles to decide their correctness. Today we still don't have a full-scale system that has achieved this goal. In general, significant amount of human intervention is still needed in testing. The degree of automation remains at the automated test script level.

The problem is lessened in reliability testing and performance testing. In robustness testing, the simple specification and oracle: doesn't crash, doesn't hang suffices. Similar simple metrics can also be used in stress testing.

When to stop testing?

Testing is potentially endless. We can not test till all the defects are unearthed and removed -- it is simply impossible. At some point, we have to stop testing and ship the software. The question is when.

Realistically, testing is a trade-off between budget, time and quality. It is driven by profit models. The pessimistic, and unfortunately most often used approach is to stop testing whenever some, or any of the allocated resources -time, budget, or test cases - are exhausted.

Alternatives to testing:-

Software testing is more and more considered a problematic method toward better quality. Using testing to locate and correct software defects can be an endless process. Bugs cannot be completely ruled out. Just as the complexity barrier indicates: chances are testing and fixing problems may not necessarily improve the quality and reliability of the software. Sometimes fixing a problem may introduce much more severe problems into the system, happened after bug fixes, such as the telephone outage in California and eastern seaboard in 1991. The disaster happened after changing 3 lines of code in the signaling system.

TOOLS FOR SOFTWARE TESTING:

1) Open Source Tools

a) Test Management tools

- TET (Test Environment Toolkit)
  - The goal behind creating the Test Environment Toolkit (TET) was to produce a test driver that accommodated the then current and anticipated future testing needs of the test development community. To achieve this goal, input from a wide sample of the community was used for the specification and development of TET's functionality and interfaces.
- TETware
  - The TETware is the Test Execution Management Systems which allows you to do the test administration, sequencing of test, reporting of the test result in the standard format (IEEE Std 1003.3 1991) and this tools is supports both UNIX as well as 32-bit Microsoft Windows operating systems, so portability of this is with test cases you developed. The TETware tools allow testers to work on a single, standard, test harness, which helps you to deliver software projects on time. This is easily available for download on ftp download.
- Test Manager
- The Test Manager is an automated software testing tool is used in day to days testing activities. The Java programming language is used to develop this tool. Such Test Management tools are used to facilitate regular Software Development activities, automate & mange the testing activities
- RTH
  - RTH is called as "Requirements and Testing Hub". This is a open source test management tool where you can use as requirement management tool along with this it also provides the bug tracking facilities.

b) Functional Testing Tools

- Selenium
- Soapui
- Watir
- HTTP::Recorder
- WatiN
- Canoo WebTest
- Webcorder
- Solex
- Imprimatur
- SAMIE
- Swete
- ITP
- WET
- WebInject

c) Load Testing Tools

- Jmeter
- FunkLoad

2) Proprietary/Commercial tools

a) Test Management tools

- HP Quality Center/ALM
- QA Complete
- T-Plan Professional
- Automated Test Designer (ATD)
- Testuff
- SMARTS
- QAS.TCS (Test Case Studio)
- PractiTest
- Test Manager Adaptors
- SpiraTest
- TestLog
- ApTest Manager
- DevTest

b) Functional Testing Tools

- QuickTest Pro
- Rational Robot
- Sahi
- SoapTest
- Badboy
- Test Complete
- QA Wizard
- Netvantage Functional Tester

- PesterCat
- AppsWatch
- Squish
- actiWATE
- liSA
- vTest
- Internet Macros
- Ranorex

c) Load Testing Tools

- HP LoadRunner
- LoadStorm
- NeoLoad
- Loadtracer
- WebLOAD Professional
- Forecast
- ANTS – Advanced .NET Testing System
- vPerformer
- Webserver Stress Tool
- preVue-ASCII
- Load Impact

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