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Study of Various Testing Techniques With Respect To Application Software

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***Abstract*-** Any Software which is created for some purpse will be true software if it is tested properly. Testing is very essential component of Software Development Life Cycle .Testing is process of finding whether the program meets required specification or not. Testing is very important for performance and usability. It is process of analysing and evaluating the system components. In this we analyse difference between actual result and expected result is studied.

***Keywords*:** Testing, Tools, Software, Error, System.

I. Introduction

Software testing is the process of testing the software products. Effective software testing will contribute to the delivery of higher quality software products, more satisfied users, lower maintenance costs, more accurate, and reliable results. Software testing is an important concept and requires great amount of effort. Following things are to be considered in testing ,who will be responsible for testind ,what should be tested, which testing tools should be used . The most important thing in testing is to identify various test cases so that testing may be done completely and nothing is left untested. Day by day requirements of user is changing in order to meet changing requirements suitable updates must be made and all those updates are to be tested so that system may be deployed very easily. Software testing is very crucial area of research and lot of work is to be done for efficient testing.

There are various tools available for testing by which considerable time is reduced in testing and there is improvement in results. Selection of tools depends on skills of tester.

Testing process also verifies that whether software is working as per the specification. Software testing do not show absence of errors it shows presence of errors.

Main aim of software testing is to minimize error, reduce software cost and to reduce maintenance.

Three main things are done in software testing:

1. Verification is the process of checking that whether software is developed as per specification or not.
2. Error Detection: In this various input are given to the system and output is measured against the input to find presence of error.
3. Validation is the process of checking whether software is as per the need of user.

II. Software Testing Objectives

Some important goals of testing are ensuring quality , ensuring reliability ,validation ,verification ,usability and error free.

There are following steps generally used when we want to test an application.

To find which functionalities are to be performed by application .

To create test data based on specification of the application .

To check output based on test data.

To write test Scenarios and execution of test scenarios.

To compare factual and expected results based on test cases.

Types of Testing:

1.) Unit testing

In this we test individual modules of application This type of testing is done by programmers not by testing personal because it needs detailed knowledge of internal structure of programs used in application. This is lowest level testing. [1] This testing takes very small amount of time. Person with limited skill can perform this type of testing.

2.) Integration testing

In this type of testing independent modules are combined and then tested for required functionality. This testing mainly focus on interfaces used to connect various modules. Integration Testing is done when we want to combine two or more unit tested components to form a larger component. This style of testing requires large amount of time. Person with reasonable good skill can perform this type of testing.

3.) System Testing

This checks entire system ,mostly all the specifications are fulfilled is checked. In this testing entir functionality,

interface, documentation are tested. After this testing application can be delivered.

4.) Acceptance Testing
This testing is done when complete system is delivered to end user ,this testing make sure that all the services mentioned in specification is fulfilled.

5) White Box Testing:
White box testing is very important in finding and solving the problem because it can detect bugs earlier before they start creating problem . [3] In this input is given to the system and it is checked that how inout is processed to output. We can use white box testing at unit testing, integration testing and system testing levels. It is also called as structural testing ,the test should have knowledge of programming and every part of code is to be tested. This testing helps in code optimization .This testing is costly.

6) Black box Testing
In this testing we test the application on the basis of output requirements without consideration of internal structure of the program. It is also referred ac correctness testing. This testing is also called as behavioural testing.In this testing code is not used, this testing is done for predicting end user requirement. In this there is no need for tester to have programming knowledge.[5] Developer team and testing team are independent

7) Grey Box Testing
This testing is also called as translucent testing. It is a mix of black box testing and white box testing. Tester have slight knowledge of logic of application program. In this tester check both input, output and process which has contributed for input output conversion .

8) Red Box Testing
Red box testing technique is also referred as user acceptance testing. In this testing it is checked whether software is accepted by the user or not .This testing is performed by the end user after the implementation of the application program[6].

There are two types of red box testing
a) Alpha Testing: It is performed in a controlled environment. This testing is used to make sure that application program is as per the specification approved in documentation.

b) Beta Testing: It is performed in a uncontrolled environment i.e real environment .Tha application program is given to group of people to use it and give their feedback about the program and specify what are the shortcomings so that they can be rectified.

9) Ad-hoc Testing
In this testing we do testing without any formal plan .In this testing is done randomly. It is informal way of testing . Sometimes this testing can find those defects which are not identified by normal testing.

10) Performance testing
Performance Testing is done to determine the time required to perform the task ,it is also used to find whether system satisfy the non functional requirements which were specified in requirement specification .This testing checks speed ,reliability, load handling .Mostly this type of testing is used in Web site testing.

Types of performance test includes :Volume test, Load test, Stress test, Strength test.
a) Stress Testing: In this system is checked beyond normal operational capacity. It checks system, load capacity .

b) Load testing: A load test is performed to check load taking capacity of system In this behaviour of system is identified at normal load and peak load.

c) Endurance Testing. In this type of testing system behaviour is checked after a particular time to check whether its performance is uniform or not .

d) Volume Testing :In this it is checked how much volume of data system can handle.

e)Security Testing: Security testing is done to check whether system data and functionality is protected or not.

f) Strength Testing :In this testing strength and weakness of system are checked.

g) Recovery Testing: In this testing it is checked whether software can recover successfully after failure .In this after recovery software is checked against test data to predict the correctness of result.

h) Compatibility Testing: This checks application software compatibility with the underlying environment. This may involve browser compatibility, operating system compatibility, memory compatibility.

11) Comparison Testing
This testing is done to compare the current version of software application with its previous version to check whether improvement is there or not.

12) Gorilla Testing
In this testing is done heavily ,this testing is done to test the module for robustness.

13) Install/Uninstall Testing
Installation and uninstallation testing is done when software is installed or uninstalled on different operating system.

14) Monkey Testing
In this we assume a user to be monkey and we assume that user will input values without knowing the application The aim of this testing is that whether application software is cached by random inputs .In this testing user is not aware of functionality of software.

15) Mutation Testing
In this type of testing source code is changed and then again tested for improved functionality.

III. Testing Principles

1. Testing should be done early, if testing is delayed it will be very complex to fix the bug.
2. There should be differential testing i.e important components should be given more testing time than less important components.
3. We should avoid excessive testing.
4. Testing should be in accordance with need of user.
5. We should define Test Plan: Test Plan explains objective of test , test technique , test environment, output of the test, risks and mitigation, test schedule, and tools to be used. Test plan should be in accordance with objectives of organization and client.
6. Different persons of different ability should be evolved in testing. This will make testing very efficient because different skills are used in testing.
7. There should be some point where testing should be stopped if we are satisfied by the performance of the system.
8. Testing should be context dependent i.e we should not apply same testing procedure to all types of application.
9. Test cases must be reviewed regularly because sometimes same test cases can not do test properly.

IV. Experiment

We have applied testing technique on a online application developed for BCA addmission.Firstly we have applied browser compatibility testing to check whether application run on all browsers. We have applied load testing to check whether multiple candidates filling the form can fill form without difficulty. We have applied security testing to check whether user data is protected or not. Volume testing proved that we have to change functionality to handle high volume of data. Both alpha and beta testing were applied to make system acceptable to all users. Interface were tested for user friendliness.

Conclusion

Software testing plays an important role in software development life cycle. It optimizes time and cost by early detection of errors and rectifying them. Testing ensures that product has no errors and delivered to customer, satisfying his requirements. Testing is an art where tester needs creativity, experience with proper knowledge on techniques. The testing purpose can be verification, validation and quality assurance. Our paper compared three main testing techniques that helps in testing a software in more effective manner.

Every Software testing tools have their own capabilities which tool to be used depends on the context . After review I would like to conclude that Software testing is a basic activity of SDLC. We can never say that a product is "Perfect". Testing is a never ending process. Testing only shows the presence of errors not the absence. Manual testing is quite difficult and hence cost effective whereas testing cost can be reduced using automated testing tools. In this paper we have discussed current and future challenges of testing. Software testing is and will continue to act as fundamental activity of software engineering.

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