

A COMPOSITION ON SOFTWARE TESTING

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Abstract-- Software testing means to cut errors, reduce maintenances and to short the cost of software development. Many software development and testing methods are used from many past years to improve software quality and software reliability. The major problem arises in the field of software testing is to find the best test case to performs testing of software. There are many kind of testing methods used for making a best case. Teasing is a important part of software development cycle .The process of testing is not bounded to detection of 'error' in software but also enhances the surety of proper functioning and help to find out the functional and non functional particularities .Testing activities focuses on the overall progress of software.

Keywords: -- *Level of testing, Black box Testing, White Box Testing.*

I. INTRODUCTION

The concept of software testing is very old in the age of computers .The testing of a software is important to determine the quality of software. The process of testing takes 40-50% development efforts. The testing is the major step in software engineering. As in the fourth generation language come into the picture the proportion of efforts and time spent to testing increased. Apart from many verification techniques the system is tested before it is used. The process of testing is adopted to make a quality product. To make a system reliable and correct many automatic methods are used like static and dynamic analysis. These all technique has their own pros and cons. There are many functional and non functional methods but in this paper we are focusing on functional methods only.

II. GOAL AND OBJECTIVE OF TESTING

A. Definition:

Testing is refer to verify that a program give correct and expected output on the basis of specified input. The other definition of software testing given by Dijkstra "A process of executing a program with the goal of finding errors". [3]

By Miller "Testing should have major intent of finding errors".

These all definition implies the testing is the process of finding of errors in a software system not their absence. A best test is that which has high chances of finding undiscovered errors. Testing is the process done to enhance the quality of software.

B. Fault and Faliur:

Fault and failure both are strictly related but both have different meaning. If a software is tested and the result is responses as 'fail' this stated that a programming is showing some undesirable behavior which is called 'failure'.

- Failure is the inability of a system to perform required function with specific requirement [2].
- Fault- The failure is derived from fault .A incorrect process in computer to perform in unanticipated manner.
- Error -The intermediate unstable or unanticipated state is known as error.[2]

FAULT->ERROR->FAILURE[6]

III. LEVEL OF TESTING

A. Unit Test:

A unit is the smallest piece of software going for testing [7]. It may contain many or few lines of code. Unit testing is low level kind of testing .the unit testing is the responsibility of the programmer himself/herself. The main purpose of this testing is to ensure that a particular unit or module is working according to functional specifications[8] .The programmer perform this testing before given the unit to formal testing team. The main aim is to check over each part/unit of the program to have better functionalities.

B. Integration Test:

In general integration mean by which the small piece of software are clubbed/aggregated to form a large component .this type of testing can perform on both low level and high level .this testing is performed of programmer[8] .Integration testing aimed attest each component aggregate according to its specification. The main focus is on the communication among the integrated component. Integration testing integrates part of application to find that they are function correctly or not. The purpose of this level is to detect faults amongst the interaction between integrated units. There are two methods of doing integration testing.

- **BOTTOM UP**- Firstly the unit is followed by high level combination of unit called module.
- **TOP UP**-- First high level modules are tested first and then low level modules are tested.

C. System Testing:

This testing is used for requirement analysis .in this type of testing verifies that weather the system is working according to requirement specification or not .The aim is to discover the failure that are not arises at the system and not detected at unit testing or integration testing level [8]. It helps in discovering the confidence that a quality product is delivered .The system testing is generally done to check the performance and reliability of the system.

D. Regression Test:

In practical regression test is not considered as the different level of testing[10][11]. It is 'retesting'. It is considered as

retesting each unit and then combines these units as a whole component. When the new changes are done in software and there may be possibilities that other areas of application may get affected by these changes. To verify that fixed bugs doesn't leads to any validation in business rule or any disturbance in functionality regression testing is done.

E. Acceptance Testing:

In this level of testing a system is tested for the acceptability. Acceptance testing is done by quality assurance team[10][11]. The QA team uses some predefined test cases to test the system. The testing is done before the system is handed to end user or customer. the aim of acceptance testing is not to find out simple errors, cosmetic errors and spelling mistake but also to find 'bug 'in whole system that will lead to system failure and application crash. The acceptance testing used to ensure that the application is acceptable foe delivery or not.

IV. METHODS OF TESTING

Software can be tested by two methods or we can say that there are main two methods of software testing.

- Black Box Testing
- White Box Testing

A. Black Box Testing:

This is also known as functional testing [4]. This type of testing is based on the output requirement of the system with any knowledge of coding in program or internal structure .in other words this type of testing is done to examine the functionality of an application without concern about the internal working of the software. when tester perform black box test he will work on system's user interface by given input and check for the output without know about the coding and other inner working of code. It checks for all possible combination of end users.

1. Advantages Of Black Box Testing

- Tester performs better because tester and designer are independent.
- Tester does not need any knowledge of programming.
- It is done to satisfy user not designer.
- It is well suited for large code module.
- Test case can be designed as soon as specifications are designed.

2. Disadvantages Of Black Box Testing

- Test cases are difficult to design.
- There is a blind coverage because tester cannot target on specific module of code.
- All areas of code are not covered because tester does not have any knowledge about internal working.
- Test can be repeated or redundant.

3. Techniques Of Black Box Testing[5]

- Equivalence partitioning
- Boundary value analysis
- Cause after graphing

B. White Box Testing:

It is known as clear box testing, glass box testing, transparent box and structural testing [10]. White box testing test the internal structure or working of an application. This testing is highly effective in finding errors and bugs in the program. In white box testing tester uses specific knowledge of program to verify the output [3]. The test is accurate only if tester has the knowledge of what the program is supposed to do. The failure of white box testing may lead to changes that require all black boxes testing to be repeated.

Black box testing can be done at any level of software testing process. It is generally done at unit level .In this testing tester need to have a look inside the complete source code and find which module of code is behaving in correctly.

1. Advantages Of White Box Testing

- It helps in optimization of codes.
- Waste line of code can be removed.
- Maximum area of test gets covered.
- All paths in module will be executed at least one time.

2. Disadvantages Of White Box Testing

- It is a complex method of testing.
- As skilled testers are needed the cost of testing also increased.
- Sometime many paths get untested.

3. Techniques Of White Box Testing[5]

- Path Testing
- Loop Testing
- Control Structure

V. CONCLUSIONS

The software testing is the process of finding the faults in a system .testing is perform on each level of system development to make a whole system error free, but it is also proved that after spending too much of efforts on testing it is impossible to design a error free system. Testing is the major part of software quality control. Which implies controlling the quality of software engineering product. Large loses can be avoided if right testing adopted at right phase.

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