Impact Factor (SJIF): 4.542

International Journal of Advance Research in Engineering, Science & Technology

e-ISSN: 2393-9877, p-ISSN: 2394-2444

Volume 4, Issue 4, April-2017

Study on Software Testing Techniques

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***Abstract*:** *As the complexity of today's software application grows rapidly, demand for enhancement in software testing technique is necessary. Because existing techniques used in practice are insufficient, produce high quality software with minimum cost is increasing. Every Different systems and development methods have different testing techniques. Different quality aspects or the quality assurance of a software system is evaluated by different testing techniques.. Now a day's various testing strategies are proposed and evaluated. Advanced testing Techniques represent the future direction for the area of software testing.*

Keywords: Software Testing Life cycle (STLC), Testing Strategies, Automation Testing

I. INTRODUCTION

Software is a set of instructions that execute a specific task, called a program. There are two categories of software are system software and application software. A software product has to be gone through a series of process of development of software, testing and identify errors/fixing bugs after that software should only be released, Testing is the procedure of evaluating a system with the purpose of verifying whether it is suitable to release in market for end users as well as if it would satisfies the specified requirements or not. Testing is a process of executing a system to identify any errors, or missing requirements according to the actual requirements. So the software testing performs during the software development phase and it is very essential phase to SDLC for finding bugs and errors in developed software and develop a software or product which satisfy all the end users requirements. Software testing is a critical and essential element of software quality assurance to check the quality of the developed software. Testing of a software works in areas such as product performance, stability and bug fixing by performing test case execution under the well-defined conditions and get the expected results. Testing is also important to ensure that the system will not met to any failure because of any unexpected activity or errors present in the software after the development phase is completed. Execution of testing procedure evaluates results of system/integration/regression testing. [1]

II. SOFTWARE TESTING LIFE CYCLE(STLC)

Different phases of Software Testing Life Cycle are as follow:

1. Planning for testing a software,
2. Analysis of requirements of end users,
3. Test Case development
4. Test case Execution
5. Testing Cycles,
6. Implementation
7. Final execution

Planning: Planning is an important and initial phase of the STLC, all the testing strategy is defined and Preparation of the test plan would be done in this phase. This phase covers the Reporting procedures identification, problem, bugs and errors classification, acceptance criteria and defined condition, databases for testing, and schedule for project testing.
Analysis: In Analysis phase, it validate functional Business Requirements, develop test case format, develop test

cycles, define impact importance of performance testing and stress testing, for the project and software development, planning of the test cycles is required. After planning the cycle It analyzes data and resources, maintain them, review the documentation of the project.

Test case Development: in this phase, it develop the test case and then review it and according to requirement changes are made in test plan and in test cycle matrices, verify that test plan and cases and it write test cases continuously and add new test cases based on requirements and changes, define the risk criteria and assessment strategies, develop the final test plan and test case according to changes.

.**Test Case Execution**: In Execution phase it completes all test plans, and Test Cycle matrices, complete all test cases manually and fix bugs.

Test Cycles: In this phase the software is tested again, revise test cases, and add new test cases as required, Run the test case in front and back end, verification is performed and bugs is reported.

Implementation: In this phase Execution of all front end and back end test cases - manual and automated is performed, Implement Performance testing, prepare defect tracking, complexity and design metrics.

Final Execution: After completing the Implementation, assessment meeting can be conducted to review the project which is ready to handover to the end users. Activities performed in this phase are - Prepare final testing Report of bugs and defect present in the project and matrices associated with this defect. and to prevent similar problems in future project it identify various strategies, Review test cases to evaluate other cases, Clean up automated test cases and variables.

III. SOFTWARE TESTING LEVELS

Software testing process has different levels during the process of testing. The software testing levels are: [2]

- Functional Testing
- Non-Functional Testing

A. Functional Testing

Functional Testing establish confidence that a program does what it is supposed to do. [3]

For testing a software, input is given to that particular software and then it examine results for this testing process. Functional testing is performed on a entire system or project to evaluate the system's acceptance with its requirements and defined conditions. [2]

Unit Testing: Unit testing is to verify a single program or a section of a single program. It breaks the software development into a set of modules and different team or different person evaluate those different modules Then, the developer examine whether the module developed by developer is working as properly with its expectation or not, this is called as Unit Testing.

Integration Testing: Integration Testing is to verify interaction between sections of system or program. In software program every module has been developed independently, than they integrate together and errors arise in the integration of different modules. In integration testing Those Errors has to be fixed.

System testing: System Testing is testing of the complete software from every perspective. Behavior of the entire system is verified and validate by system testing. Testing verify the behavior and working of the system against the objectives of the original system.

Regression Testing: Whenever changes are made in software application, it is quite obvious that the changes made in one module within the application affect other modules of the application. Regression testing is performed to verify that whenever some changes is made in application, bugs which was fixed earlier hasn't resulted in another functionality of application after changes are implemented in application. The regression testing ensures that a change, such as a bug fix should not result in another fault in application.

Acceptance Testing: In Acceptance Testing the system ensures that the product and system are accepted by customer. And the conformation for acceptance of the system is given by it. It also known as user acceptance testing.

Alpha Testing: Alpha testing is done at development site by test teams. This is performed after the acceptance testing. This Testing is performed after most of the code is completed or after the system contains most of the functionality. This is also done before reaching to the customers.

Beta Testing: Beta testing is the second phase of the software testing process. After alpha testing has been successfully performed Beta testing would be performed for sampling of the intended audience test the application. In beta testing the application would hand over to the end users outside of system team environment for finding the actual errors and issue in system from the user perspective. Beta testing is also known as **pre-release testing**.

B. Non-Functional Testing

Testing an application from its non functional attributes which involves testing a software from the nonfunctional requirements which are also important such as performance, security, user interface, etc. [2]

Performance Testing: performance Testing is used to test whether the product handles a variety of events efficiently. It is mostly identify performance issues or any bottlenecks present in the software. It doesn't concern about finding bugs in a software.
Stress Testing: stress testing is to test the software under the unfavorable conditions, and to check the stability of the software by applying the load to the system and to identify the breaking point. Stress testing is intent to test the behavior of software under abnormal conditions or under the stressful condition. That's why this is called stress testing.
Usability Testing: Usability testing is a black-box technique and is a way to evaluate how users interact with a developed software product. It can help to discover the errors, potential bugs and improvements in the software by detecting through the usage and operation of the system from user perspective.
Security Testing: Security testing identifies any flaws and threats while testing of the software from security point of view. It protects company data and resources from possible intruders, mistaken usages, unauthorized or accidental users, hackers, and other attackers. It test database and network software for security purpose.

IV. SOFTWARE TESTING TECHNIQUES

Various testing Techniques are used to develop test cases require for testing software, it gives effective and accurate testing. The testing techniques are as follow: [2]

Black-Box Testing: The software is tested only based on its performance, The Tester doesn't have any knowledge and understanding of the internal structure or a working of the application, the tester perform testing without peering about the system architecture and doesn't allow to access to the source code, This type of testing is called black-box testing.
Grey-Box Testing: The testing is performed with having a limited knowledge and understanding of the internal structure or a working of the application is called grey box testing. In grey-box testing, the tester has the knowledge about some interior parts, the tester allows to explore and access to design documents and the database of the application, so test a tester can prepare better test data, develop better test cases and test scenarios while preparing a test plan.
White-Box Testing: In **white-box** testing on an application, a tester wants to know the understanding of the internal structure or a working of the application and having complete knowledge of the code. So the White-box testing is the detailed internal logic of software. White-box testing is also called **glass testing** or **open-box testing**.

V. TYPES OF TESTING

Manual testing: Manual testing is the process of testing software manually without using any script prepared by tester or any automated testing tool. Here, the tester's role is to tests the software to discover any bug or to identify any unexpected behavior. Unit testing, integration testing, system testing, and user acceptance testing are the various stages for manual testing. [2]
Automation Testing: The major advancement in the testing process compared with manual testing process is towards the Automation testing. In Automation testing, to test the software tester writes scripts and uses automated tools. In Automation Testing, test perform by using this automated tools can be run the test scenarios repeatedly and also quickly. Automating testing is similar to the programmer write programs using a coding language to automate any manual programming process. Similarly in automation testing tester uses the automated tools and script for efficient testing process.

If manual testing is used for a large software project or large system then it requires a large testing teams and it spends a lot of time in testing process with increase in work over head. So expanding the test team more than a certain size is also problematic. That's why Automation testing is identified for betterment of manual testing in large systems. So various tools for automation testing is used. Proper use of this tools expand person's capacity efficiently. Regression testing becomes time consuming when done manually. After the fixing of any bugs or errors in the software it tests the software working again. The reason is sometimes after the bug fixation the error ratio even gets higher. So to automate regression testing, regression test suite is prepared using a set of automated test suites. [4]

VI. CONCLUSION

In the software development process Software testing is an important activity and it has a strong relation with the other phases of software development process. Testing is sometimes time consuming and an intensive process, so enhancement in software testing techniques and innovative methodologies are essential. For enhancement in testing

strategies, to automate a software testing process is One of the objective of software testing, thereby significantly reducing its cost and Time, minimizing human error and to make a software more Reliable.

REFERENCE

[1] Software Project Management By Sanjay mohapatra
[2] Software Testing (software System Evaluation) TutorialsPoint
[3] Beginners Guide to Software testing By Padmini C(Symbiosys Technologies)
[4] **Muhammad Abid Jamil1,2, Muhammad Arif2, Normi Sham Awang Abubakar 1, Akhlaq Ahmad1, 3 -** Software Testing Techniques: A Literature Review, 6th International Conference on Information and Communication Technology for The Muslim World, 2016
[5] **S.Kannan1; T.Pushparaj2 -** A Study on Variations of Bottlenecks in Software Testing, International Journal of Computer Sciences and Engineering, Volume-2, Issue-5, E-ISSN: 2347-2693, May 2004.
[6] **Mohd. Ehmer Khan1, Farmeena Khan2 -** Importance of Software Testing in Software Development Life Cycle, IJCSI International Journal of Computer Science Issues, Vol. 11, Issue 2, No 2, March 2014, ISSN (Print): 1694-0814