

Testing in Software Engineering: Introduction, Approaches, Levels

Simarjeet Kaur

Assistant Professor

Department of Computer Science and Applications,

MindTrek College, Jalandhar, India

Email - jacksgirl64@gmail.com

***Abstract:** Testing plays a vital role for finding the faults and problems that exist in any software project or any type of website or any particular program, written in any specific language. Testing is an important part of the software development cycle. This process involves various techniques, methods and approaches for finding the faults and bugs or generating the bug report of an software or website before sending it into debugging phase, where the errors are being corrected. Without proper testing, the entire hard work of software developer goes waste. Project will be unsuccessful, if it is launched in the market without any proper testing. From this point, we can judge the importance of the testing which is an integral part of the software development process. Testing provide work as a tool for checking whether software or website is working as expected by comparing the output obtained by performing testing on the website or software with the expected output. In this way the software developer made the changes if output is not same as expected output. Moreover, Testing is also helpful for finding the loopholes that exist in the software so that they can be corrected before finalizing the software project*

***Key Words:** Testing, Vital, Faults, Integral, Debugging, Loopholes*

1. INTRODUCTION:

Testing is done in order to find out the fault or problems related with the software project or website before its launching. This process is performed for making the project successful so that project become fault free and error free. Many techniques and methods exist for performing the process of testing. The technique to be used for performing the process of testing on software or website, is depends on the type of stuff. It can be a single unit to be test or group of units or can be any particular module to be tested or collection of modules to be tested. In this way appropriate type or technique is used for performing the various test on the given input. Main motive of testing is to find out that the software or website is working properly for which it is created. Firstly expected output is recorded. After that appropriate test and techniques are used for generating the output by performing testing on the website or software to be used. After that output obtained by the process of testing is recorded. Now, the results of output obtained after performing the various tests on the input given, is compared with the expected output recorded.

- **NEED:** The whole success of the software or any website or any project depends upon the proper working of the system. For making sure that system is working properly software developer need to find out the loopholes of the system. Without finding out the faults and loopholes of the system, it is not possible to check that system is working properly. So, to handle and fixing the bugs of the system proper testing is needed. Testing helps the software developer to make the system error free and successful. That's why testing is required for making the system good.
- **WORKING:** Testing starts with module test plan. Then modules are divided into test units. After that test unit is divided into modules. Now various modules are tested. After that all these modules are connected with each other. Then testing starts system test and acceptance test. These test modules help to find out the fault in the system. After that system test plan and acceptance test plan is made. After these steps software requirements and client requirements are identified. In this way various problems related to the project can be find out and can be fixed in the debugging phase. Thus, testing is helpful for find out the problems related with the project. Working of the process of testing and the whole procedure in which testing works, is shown in the figure given below:-

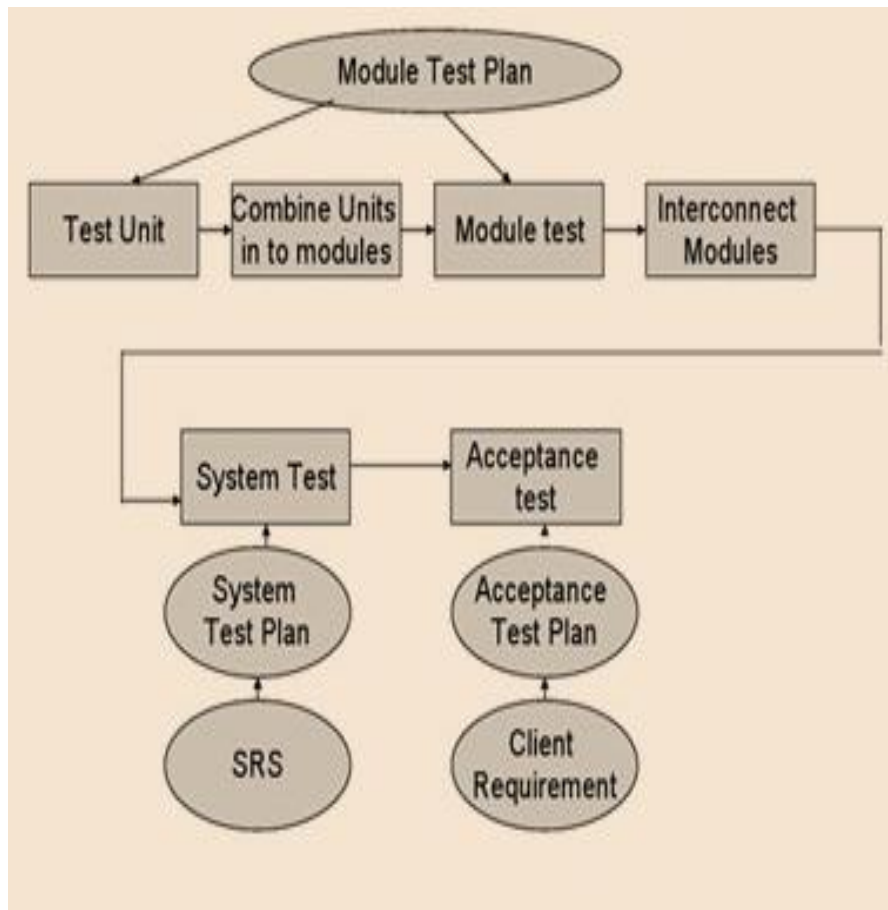


Figure. 1: Process of Software Testing

APPROACHES/LEVELS: There are two types of testing. Types or approaches are given below-

1. **Functional Testing:** This type of testing used to test the functions of the system to find out that they are working correctly or not. Components of functional testing are given below:

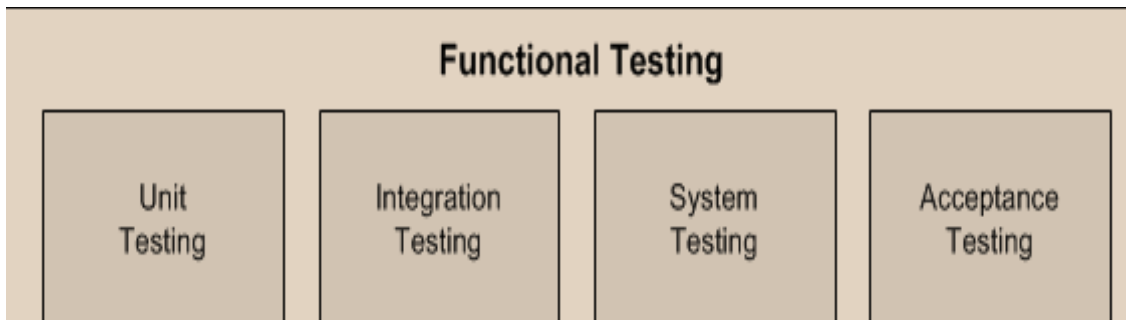


Figure. 2: Functional Testing types

- **Unit Testing:** Modules made by software developers are tested individually in this testing. This testing consider the various modules for testing.
 - **Integration Test:** In this testing the various modules are integrated after unit testing and collectively tested. This testing consider the integrated modules for testing.
 - **System Testing:** In this testing ,the whole system is tested against various error and bugs. This testing consider the whole system for testing.
 - **Acceptance testing:** In this testing, whole system is tested to check that system is working accurately according to the user’s need or not. This testing consider the acceptance of the user.
2. **Non-Functional Testing:** In this testing ,testing is done to checking that system is working according to the non-functional requirements like usability ,performance ,compatibility etc. This testing involves these types:

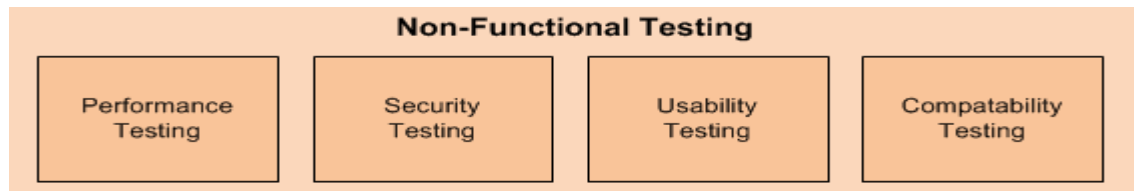


Figure. 3: Non-Functional Testing types

- **Performance Testing:** This testing is used to check that how much load and stress can be handle by system and how system behaves in such type of conditions.
- **Security Testing:** This testing is used for testing that how secure the system against. This testing helps to find out the various vulnerabilities of the system.
- **Usability Testing:** This testing used to check that how much efficient system is and how much user friendly the system is for the user. This includes learnability of the user also.
- **Compatability Testing:** This testing is used to check the compatibility of the system against various factors including hardware and software both.

2. CONCLUSION:

In the end, it can be said that we cannot neglect the importance of the testing .The whole success of any project either software type project or website type project, depends upon the testing. Because, testing helps to find out the loop holes and problems in the software. In this way, software tester sends the bug report for debugging phase , where the errors and bugs are fixed. Thus, testing is base for the debugging phase and helps to make the software error free and bug free. In this way, better software can be provided to the users and experience of users can be improved with the help of various techniques that are used to perform proper testing.

3. ACKNOWLEDMENT:

While making this research paper, I have put all of my best and possible efforts for making this research paper. I hope this research paper will be useful and helpful for the authors who want to do further research Related to Software testing and techniques to software testing.

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