Software testing is an activity carried out methodologically to check whether the actual results match the expected results and ensure the system under test meets business, user, legal, and any other requirements imposed on the system. (What You ordered versus what You got).

In simple terms, Software Testing means a process of verifying and validating the functionality of software feature(s) or system to ensure it satisfies specified requirements, acts or behaves the way it is expected. A process of finding defects in software applications.

Activities carried out during testing are called Testing Activities with terms Fundamental Test Process which are:

1. Test Planning and Control
2. Test Analysis and Design
3. Test Implementation and Execution
4. Evaluating Exit Criteria and Reporting
5. Test Closure Activities

During **Test Planning** we define the objectives of testing and the specification of intended test activities in order to meet the goals and objectives of the project, while Test Control is an ongoing activity of comparing actual progress against the plan and reporting the status including deviation from the plan.

**Test Analysis and Design** is the activity during which general testing objectives are transformed into tangible test conditions and test cases/test scripts. There are three major tasks during test analysis and design which are:

1. Reviewing of the test basis such as requirements
2. Identifying and prioritizing test conditions
3. Designing and prioritizing high-level test cases

**Test Implementation and** Execution is the activity of implementing test procedures or scripts as specified and carrying out tests to identify defects/bugs and any other potential issues. Test implementation has the following major tasks:

1. Finalizing, implementing, and prioritizing test cases including identification of test data
2. Developing and prioritizing test procedures
3. Creating test suites from the test procedures for efficient test
4. Verifying that the test environment has been set up correctly
5. Performing the test. I call it “Do it”

**Evaluating Exit Criteria** is the activity of assessing test execution against the defined objectives, it has the following major tasks:

1. Checking test logs against the exit criteria specified in the test plan.
2. Assessing if more tests are needed or if the specified exit criteria should be changed
3. Writing a test summary report for stakeholders

**Test Closure** is an activity to collect data from completed test activities to consolidate experience, test ware, facts, and numbers. This occurs at the project milestones. The major tasks involve;

1. Checking which of the planned deliverables have been delivered
2. Closing of the incident report and raising change records for any that remain
3. Documenting the acceptance of the system under test.

**Software Testing Objectives**

Testing has different goals and objectives, however, these are the major objectives of software testing:

1. Finding defects that may have been created while developing the software.
2. We also want to Gain confidence about the level of quality of that particular software according to the industry standard.
3. It is only through testing that we are able to provide information for decision-making because other teams are involved in software development projects, testing gives a clearer picture of how the project is doing.
4. Prevention of defects can be linked to finding defects, defects found must be properly fixed to avoid reoccurrence.
5. Through testing we make sure the software system or application satisfies the System Requirements Specifications and Business Requirement Specifications by examining to detect the differences between existing and the required conditions.

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There are Levels of Testing

1. Unit Testing
2. Component Testing
3. Integration Testing
4. System Testing
5. Acceptance Testing

Unit Testing is a level of software testing where individual units of software are tested, as the name depicts it is the smallest testable part of any software. The purpose is to validate that each unit of the software performs as specified or designed. Unit testing is the responsibility of the programmer. (The meal you prepared, you must taste).

Generally, Software as a whole is made of several components. Component Testing is a type of testing performed on each individual component separately without integrating with other components. This can also be referred to as Unit testing, Program Testing, or Module Testing.

Integration Testing is a level of software testing where individual units or components are combined and tested as a group. The main purpose of this type of test is to expose faults in the interaction between the integrated units or components. (is the head interacting well with the neck, are the legs cooperating with the whole body when they are connected, etc)

System Testing is the process in which the quality assurance (QA) team evaluates how the various components of an application interact together in the fully integrated system. The whole purpose of this type of test is to evaluate the system's COMPLIANCE with the specified requirements.

Acceptance Testing is a level of software testing where we test systems for acceptability to evaluate system compliance with the business requirements and assess whether it is accepted for delivery

It is a formal testing with respect to users' needs, requirements, and business processes. It also comprises Alpha Test and Beta Test.

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Software Development Life Cycle

Software Development Life Cycle is a standard process followed in an organization to conduct all the steps necessary to analyze, design, implement, and maintain software systems.

There are 6 stages involved in Software Development Life Cycle (SDLC) which are:

1. Requirements
2. Design
3. Development
4. Testing
5. Deployment
6. Maintenance

The requirements stage involves the process of gathering requirements from the business owner, analyzing, and then documenting them. This is fundamental and the basis for all software development.

Design stage is where UI/UX designer will design the prototype of the application based on the requirements documents/specifications.

At the Development stage, Developer(s) will profer solution by writing code.

Testing stage involves the execution of various tests to ensure ALL works as PLANNED.

Deployment is making sure the application is available to users.

Maintenance addresses issue during operation if needed

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Software testing is a formal process carried out by a committed testing team in which a piece of software, parts of software, or even multiple pieces of software are examined to detect differences between existing and required conditions.

Why do we need to plan for testing activities?

1. Testing is a complex process, it needs to be planned.
2. Test planning is essential in ensuring testing identifies and reveals as many errors in the software as possible, by so doing bringing software to an acceptable level of quality and giving efficiency regarding budgetary and scheduling limitations.

IEEE Standard for Software Test Documentation defines Test Planning as “a document describing the scope, approach, resources, and schedule of intended testing activities”

What is a Test Plan?

A test plan is a managerial detailed document that captures the test strategies, objectives, schedule, estimations, deadlines, and every resource required to complete the project. (you can think of it as a blueprint for carrying out tests needed to ensure the software is working correctly). A test plan is controlled by test managers.

It is an ongoing process throughout the project lifecycle with test plans being developed for each phase of software development: Integration test plan, Unit test plan, Acceptance test plan

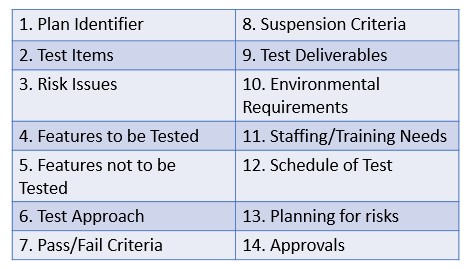
Successful test planning enables the mapping of tests to the software requirements and defines the **entry and exit criteria** for each phase of testing.

Levels of Test Plan

1. Master test plan
2. Unit test plan
3. Integration test plan
4. System test plan
5. And Acceptance test plan

There is a hierarchy of test plans, however, the test plan document will follow the same structure for each level of the test plan. The only difference is the content and details.

Test Plans follow a strict structure to ensure all aspects of testing are covered. This is stated by the ANSI/IEEE 829-1988 Test Plan Structure.



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