**Level of Testing**

* **Unit Testing : by developer**
* **Integration Testing : by QA, and developer**
* **System Testing : by QA**
* **UAT (user acceptance testing) : by customer/user/client**

**Types of testing:**

**Black box testing: we need to validate the output in respect of given requirement and input. (code and logic will not be validated). It is also known as Behavioral Testing**

**White box testing: we need the review the code, every line of code or block of code or statement or decision statement must be executed at least once.**

**Integration Testing (functional testing):** Integration testing is performed when various modules are integrated (joined) with each other to form a sub-system or a system. This mostly focuses in the design and construction of the software architecture.

This is further classified into Bottom-Up Integration and Top-Down Integration testing.

* **Bottom-Up Integration Testing:** Here the lowest level components are tested first and then the testing of higher level components is done using 'Drivers'. The entire process is repeated till the time all the higher level components are tested.
* **Top-Down Integration Testing:** This is totally opposite to bottom-up approach, as it tests the top level modules and the branch of the modules are tested step by step using 'Stubs', until the related module comes to an end.

**System Testing (functional and non-functional testing):** This testing conducted on a complete, integrated system, to evaluate the system's compliance with the specified requirements. This is done to check if the system meets its functional and non-functional requirements and is also intended to test beyond the bounds defined in the software / hardware requirement specifications.

**User Acceptance Testing:** Acceptance testing is performed to verify that the product is acceptable to the customer and if it's fulfilling the specified requirements of that customer.

This testing includes Alpha and Beta testing.

* **Alpha Testing:** Alpha testing is performed at the developer's site by the customer in a closed environment. This is done after the system testing.
* **Beta Testing:** This is done at the customer's site by the customer in the open environment. The presence of the developer, while performing these tests, is not mandatory. This is considered to be the last step in the software development life cycle as the product is almost ready.

**Functional Testing:** The software is tested for the functional requirements. This checks whether the application is behaving according to the (SRS/FRS/BRS) specification.

System should work based on given requirement or needs

**Performance Testing:** This testing checks whether the system is performing properly, according to the user's requirements. Performance testing depends upon the Load and Stress Testing, that is internally or externally applied to the system.

Load (no. of user) in Limit, Load out of limit -> output (response and behavior of system)

* Load Testing: In this type of performance testing, the system is raised beyond the limits in order to check the performance of the system when higher loads are applied.
* Stress Testing: In this type of performance testing, the system is tested beyond the normal expectations or operational capacity. Usability Testing: This is also known as 'Testing for User Friendliness'. It checks the ease of use of an application.

**Retest –**

**Regression Testing:** Regression testing is one of the most important types of testing, which checks whether a small change in any component of the application affects the unchanged components or not. This is done by re-executing the previous versions of the application.

**Smoke Testing:** It is used to check the testability of the application, and is also called 'Build Verification Testing or Link Testing'. That means, it checks whether the application is ready for further testing and working, without dealing with the finer details.

**Sanity Testing:** Sanity testing checks for the behavior of the system. This is also called Narrow Regression Testing.

**Parallel Testing:** Parallel testing is done by comparing results from two different systems like old vs new or manual vs automated.

**Recovery Testing:** Recovery testing is very necessary to check how fast the system is able to recover against any hardware failure, catastrophic problems or any type of system crash.

**Installation Testing:** This type of software testing identifies the ways in which installation procedure leads to incorrect results.

**Compatibility Testing:** Compatibility testing determines if an application under supported configurations performs as expected, with various combinations of hardware and software packages.

**Configuration Testing:** This testing is done to test for compatibility issues. It determines minimal and optimal configuration of hardware and software, and determines the effect of adding or modifying resources such as memory, disk drives, and CPU.

**Compliance Testing(Acceptance Clause):** This checks whether the system was developed in accordance with standards, procedures, and guidelines.

**Error-Handling Testing:** This determines the ability of the system to properly process erroneous transactions.

**Manual-Support Testing/UI:** This type of software testing is an interface between people and application system.

**Inter-Systems Testing:** This method is an interface between two or more application systems.

**Exploratory Testing:** Exploratory testing is similar to ad-hoc testing, and is performed to explore the software features.

**Volume Testing:** This testing is done when huge amount of data is processed through the application.

**Scenario Testing:** Scenario testing provides a more realistic and meaningful combination of functions, rather than artificial combinations that are obtained through domain or combinatorial test design.

**User Interface Testing:** This type of testing is performed to check, how user-friendly the application is. The user should be able to use the application, without any assistance by the system personnel.

**Static and Dynamic Analysis:** In static analysis, it is required to go through the code in order to find out any possible defect in the code, whereas, in dynamic analysis the code is executed and analyzed for the output.

**Statement Coverage:** It assures that the code is executed in such a way that every statement of the application is executed at least once.

**Decision Coverage:** This helps in making decision by executing the application, at least once to judge whether it results in true or false.

**Condition Coverage:** In this type of software testing, each and every condition is executed by making it true and false, in each of the ways, at least once.

**Path Coverage:** Each and every path within the code is executed at least once to get a full path coverage, which is one of the important parts of the white box testing.

**Security Testing:** Testing that confirms how well a system protects itself against unauthorized internal or external, or willful damage of code; means security testing of the system. Security testing assures that the program is accessed by the authorized personnel only.

**Mutation Testing:** In mutation testing, the application is tested for the code that was modified after fixing a particular bug/defect.