CHAPTER 3
TYPES OF TESTING

1. Retesting
2. Regression testing
3. Smoke testing
4. Sanity testing
5. Security testing
6. Performance testing
    a. Load testing
    b. Stress testing
    c. Endurance/Soak testing
    d. Spike testing
    e. Volume testing
7. Installation testing
8. Re-installation testing
9. Un-installation testing
10. Recovery testing
11. Configuration testing
12. Compatibility testing
13. Usability testing
14. User interface testing
15. Localization testing
16. Internationalization testing

(1) Functional Testing:-

1. **FUNCTIONAL TESTING** is a type of software testing whereby the system is tested against the functional requirements/specifications.
2. Functions (or features) are tested by feeding them input and examining the output. Functional testing ensures that the requirements are properly satisfied by the application.
3. This type of testing is not concerned with how processing occurs, but rather, with the results of processing. It simulates actual system usage but does not make any system structure assumptions.

4. During functional testing, Black Box Testing technique is used in which the internal logic of the system being tested is not known to the tester.
5. Functional testing is normally performed during the levels of System Testing and Acceptance Testing.
6. Typically, functional testing involves the following steps:
   - Identify functions that the software is expected to perform.
   - Create input data based on the function's specifications.
   - Determine the output based on the function's specifications.
   - Execute the test case.
   - Compare the actual and expected outputs.

(2) Retesting:-

1. During the **test execution** period, when tester executes the test cases then if there is a difference between the expected and actual result **i.e. defect** , that defect is reported to the developer(Programmer) by the tester for defect fixing. Once after the developer completes the defect fixing then they report back the updated build to the tester. Here the tester then re-executes the same fail test case in which the defect was found **to confirm** that the defect is been removed or not. This process of re-executing the fail test case with the same input data is called **Retesting. It is also called as Confirmation testing**
2. **What is Retesting? :-** Re-execution of failed test case is called as Retesting.
3. **When to do Retesting? :-** After the defect fixing by developer.
4. **Why there is need of doing Retesting?** :- To confirm whether the developer has removed the defect from s/w or not.
5. **Who?** :-Software tester
6. **How?** :- By executing the fail test cases with the same input data

(3) Regression Testing:-

1. Regression Testing is done to check the impact of changed part on the unchanged part whether the changes has produced any new defect or not.
2. Regression testing is done when there is a changes such as :-
    a. Defect fixing
    b. Any new Requirement/features is been added.
    c. Modifying the existing requirement/feature
    d. Removing the existing requirement/feature
3. Regression testing is repetitive in nature that's why it is mostly done through automation testing using automation tools such as Selenium, QTP(Quick Test Professionals), RFT(Rational Functional Tester).
4. **What is Regression testing? :-** Re-execution of passed test case is called as Regression testing.
5. **When to do Regression testing? :-** After if there is any changes made/implemented in the s/w.
6. **Why there is need of doing Regression testing?** :- To check whether the changes made in the s/w is not producing any new defect or not
7. **Who?** :-Software tester
8. **How?** :- By executing the pass test cases which is found by doing **Impact Analysis** on **RTM**
9. **What is Impact Analysis:-**
    a. It is the process of identifying the directly linked passed test cases which is related with the failed test cases or changes done , from RTM.
    b. This process gives us the answer of "How much regression need to be done?" i.e. find out the area which are impacted due to the changes in the s/w.
    c. Impact analysis is basically analyzing the impact of the changes in the deployed application or product.
    d. It tells us about the parts of the system that may be unintentionally affected because of the change in the application and therefore need careful regression testing.
10. **What is RTM:-**
    a. It is a document which shows the cross reference relationship between the Requirement and Test cases.
    b. It is also called as "**Bi-directional Traceability Matrix**"

c. **Requirement Traceability Matrix (RTM**) is a document that maps and traces user requirement with test cases. It captures all requirements proposed by the client and requirement traceability in a single document, delivered at the conclusion of the Software development life cycle.
d. The main purpose of Requirement Traceability Matrix is to validate that all requirements are checked via test cases such that no functionality is unchecked during Software testing.

(4) Smoke testing:-

1. **Checking the all basic Functionality of the s/w to verify whether it is stable and eligible or not for further testing process is called as SMOKE TESTING**.
2. Smoke testing is a type of software testing and the purpose of Smoke Tests it to confirm whether the Testing team can proceed with further testing. Smoke tests are a minimal set of tests run on each build.
3. Smoke testing is a process where the software build is verified before it is deployed to Testing environment to ensure the stability of the application. That's why it is called as **"Build verification Testing"** or ***"Confidence Testing"*** .After verifying the build testers accepts the build that's why it is also called as **"Build Acceptance Testing". It is also called as "Shallow and Wide Testing"**
4. In simple terms, we are verifying whether the important features are working and there are no showstoppers in the build that is under testing.
5. It is done by just with mouse clicks without going deeper and without giving keyboard inputs. (But in rare cases, there will be a need of keyboard inputs)

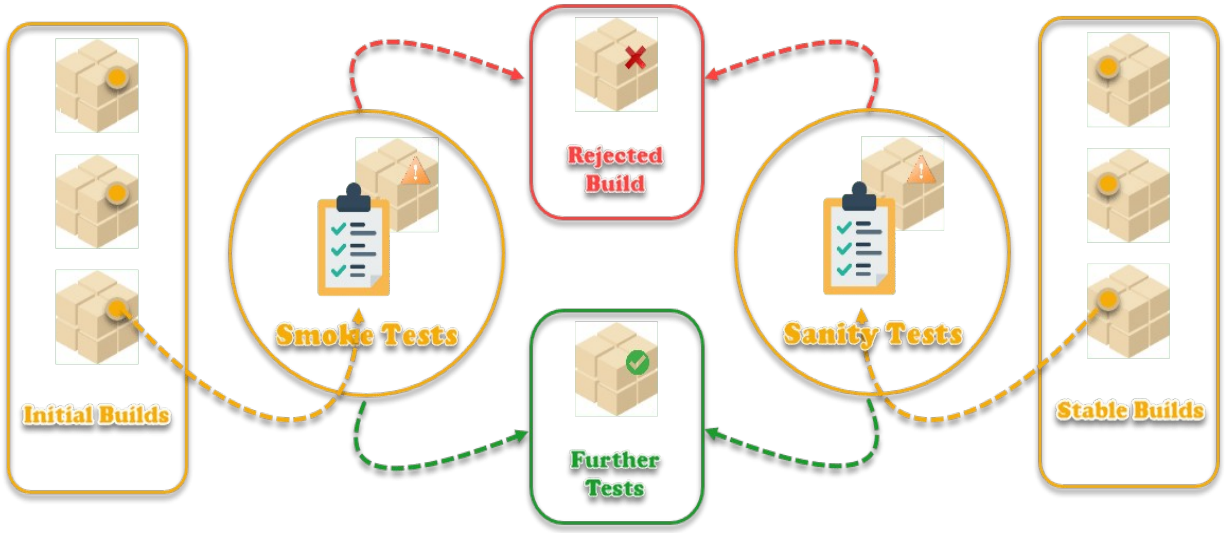
(5) Sanity testing:-

1. **Checking the basic Functionality of the s/w after minor changes is done in the s/w is called as SANITY TESTING.**
2. **It is mainly done during the pre-release phase where the software build is going to hit the production.**
3. **It is done on the matured builds whereas smoke is done on the initial (fresh) builds. It is sub-set of Regression testing(Sub-**

Regression testing). It is also called as "Narrow and Deep Testing"

4. Sanity testing is a kind of Software Testing performed after receiving a software build, with minor changes in code, or functionality, to ascertain that the bugs have been fixed and no further issues are introduced due to these changes. The goal is to determine that the proposed functionality works roughly as expected. If sanity test fails, the build is rejected to save the time and costs involved in a more rigorous testing.
5. It is done by giving keyboard inputs.
6. **According o ISTQB**, SMOKE and SANITY are same because in both we talk about the software build, we talk about the functionality, we talk about the rejection if build's if builds health is not well for further feasible testing.

Difference between Smoke and Sanity testing



Both the terms Smoke and Sanity are used interchangeably to a great extent in the IT industry, but there are also a few critical differences between them, as explained below:

Feature	*Smoke Testing*	*Sanity Testing*
Test Coverage	Smoke testing is a shallow and broad approach.	Sanity testing is usually a narrow and in-depth approach.
Motive	It is designated to touch every part of the application quickly.	It basically emphasis on the small sections of the application and check whether it is working correctly after a minor change.
Technique	The test cases for smoke testing can be either manual or automated or sometimes a hybrid approach.	A sanity test is performed generally without test scripts or test cases but manually.
Performed By	The application developers or QA team or testing team perform this testing.	The testing team or QA team usually performs sanity.
Subset	It can be a subset of acceptance testing or regression testing.	Sanity testing is more of a Monkey and Exploratory testing. It is also called as subset of regression testing
Documentation	Properly documented. Smoke testing is usually managed separately as a Smoke Test Suite.	No proper documentation is available. Sanity testing is generally performed with the experience only and focus on the defect and nearby area.

Importance in the Software Industry:

Similarities	*Explanation*
Saves Time	Smoke and Sanity tests are efforts to save time by quickly determining if an application is working correctly or not. Also, it ensures that the compilation is eligible for rigorous testing.
Save cost	The saving of time and effort leads to saving the cost of testing the application. Employing the correct approach and eliminating the mistakes in the early stage, lowers the effort and time, thus minimizing the damage.
Integration risk	We perform end-to-end tests on each build so that functionality-based problems get discovered earlier. So, the risk of having integration issues minimizes.
Quality improvement	Here, the main problems are detected and corrected much earlier in the software test cycle, which increases the quality of the software.
Evaluation of progress	It is easier for project managers to assess the progress of development. Since with each compilation, we certify that the product from end to end is working correctly after the addition of new features.

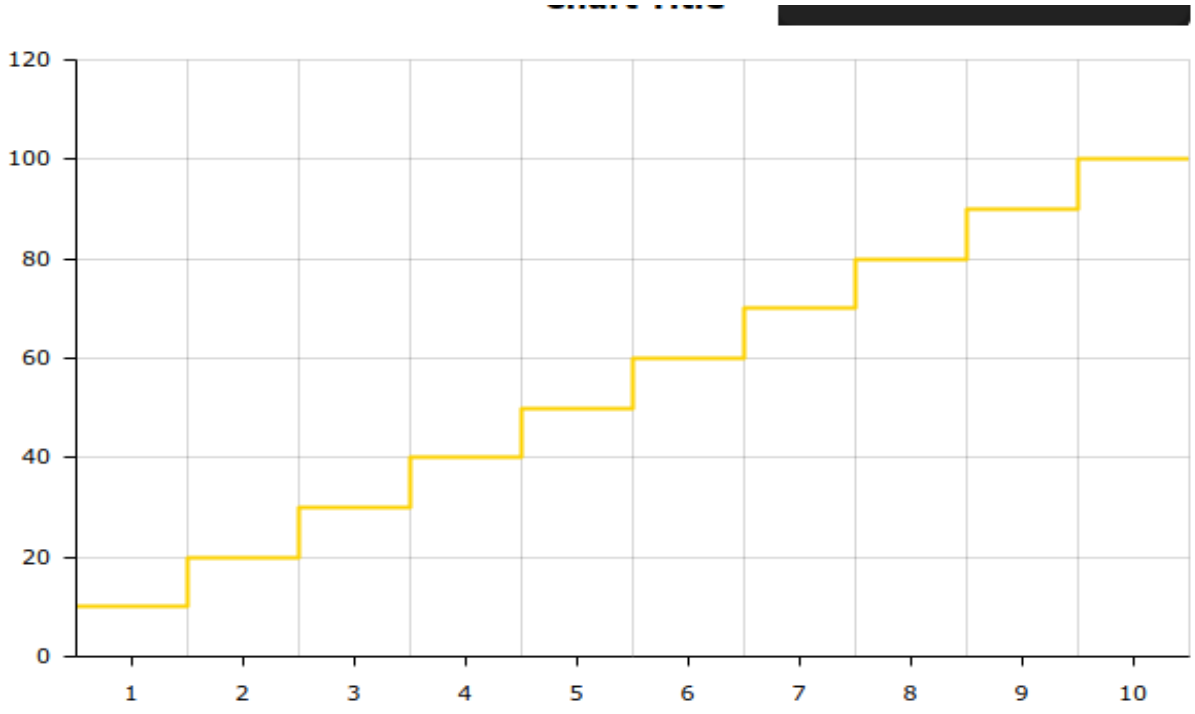
(6) Security testing:-

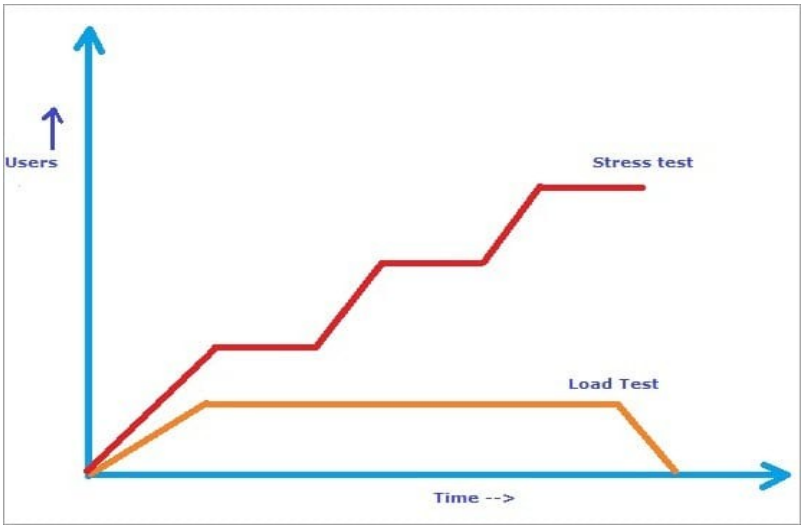
- It is a type of non-functional testing.
- It is a type of Software Testing that uncovers vulnerabilities, threats, risks in a software application and prevents malicious attacks from intruders.
- Security testing is basically a type of software testing that's done to check whether the application or the product is secured or not. It checks to see if the application is vulnerable to attacks, if anyone hack the system or login to the application without any authorization.
- It is a process to determine that an information system protects data and maintains functionality as intended.
- The security testing is performed to check whether there is any information leakage in the sense by encrypting the application or using wide range of software's and hardware's and firewall etc.
- There are several measures of testing carried out for doing the security testing. And they are as follows:-
  - **Authentication:** Only the valid user should be able get access to the system
  - **Authorization:** Only the authenticated user should be able to access to controls as per the user's role
  - **Vulnerability Scanning**: This is done through automated software to scan a system against known vulnerability signatures.
  - **Security Scanning:** It involves identifying network and system weaknesses, and later provides solutions for reducing these risks. This scanning can be performed for both Manual and Automated scanning.
  - **Penetration testing**: This kind of testing simulates an attack from a malicious hacker. This testing involves analysis of a particular system to check for potential vulnerabilities to an external hacking attempt.
  - **Risk Assessment:** This testing involves analysis of security risks observed in the organization. Risks are classified as Low, Medium and High. This testing recommends controls and measures to reduce the risk.

- **Security Auditing:** This is an internal inspection of Applications and Operating systems for security flaws. An audit can also be done via line by line inspection of code
- **Ethical hacking:** It's hacking an Organization Software systems. Unlike malicious hackers, who steal for their own gains, the intent is to expose security flaws in the system.
- **Session control:** user should be log out automatically from application after particular required session period

(7) Performance testing:-

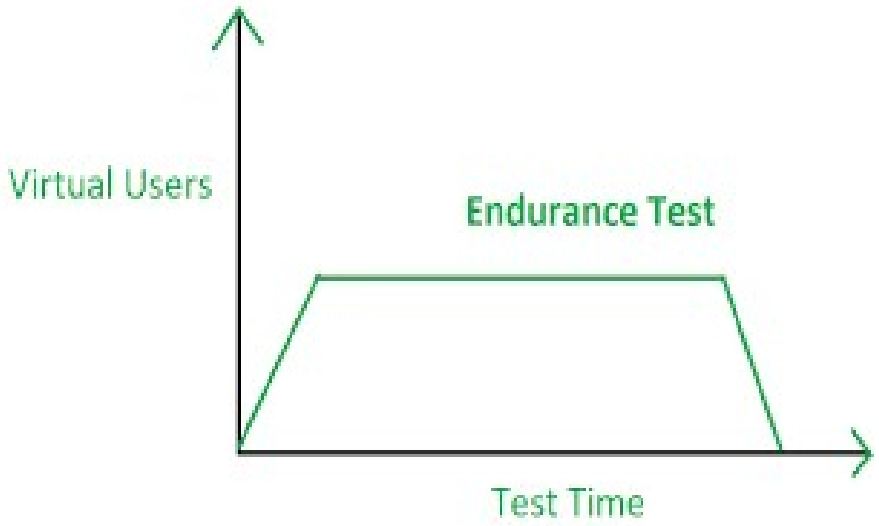
- It is type of Non- Functional Testing.
- To check the behaviour of the application or software with respect to the **response time** is called as Performance Testing. **(Response time**:- the time duration between the first request and last response is called as Response time)
- **There are several type of Performance Testing:-**
  ➔ **Load testing:-**Testing the application with the peak load is called as Load testing.**(Peak load:-** total No. Of users given by customer**)**.It is conducted to understand the behaviour of the application under a specific expected load.

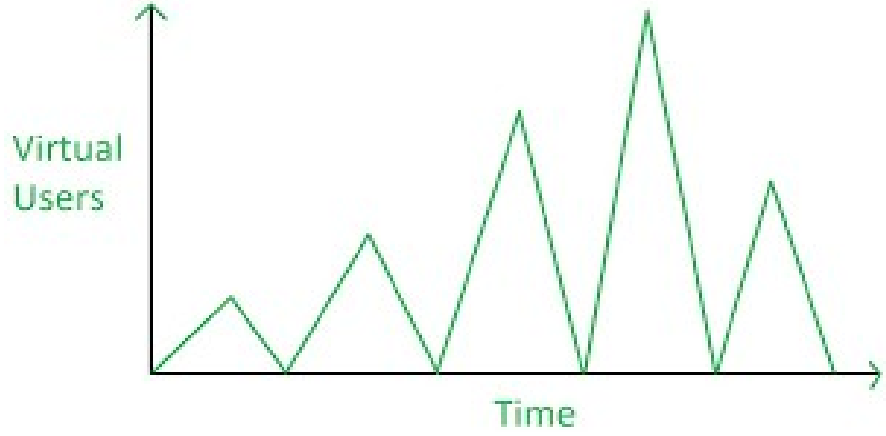




➔ **<u>Stress Testing:-</u>**Testing the application with beyond the peak load is called stress testing. The main purpose of stress testing is to determine the **Degradation point** (Saturation point) and **Crash point** (Breaking point) of the application when the application is loaded with beyond the peak load.

➔ **<u>Endurance Testing:-</u>**Testing the application with a significant load extended over a significant period of time, to discover how the system behaves under sustained use. It is also known as **Soak testing**. The main purpose of the Endurance testing is to check the memory leaks. For example, in software testing, a system may behave exactly as expected when tested for 1 hour but when the same system is tested for 3 hours, problems such as memory leaks cause the system to fail or behave randomly. The main goal is to discover how the system behaves under sustained use. That is, to ensure that the throughput and/or response times after some long period of sustained activity are as good or better than at the beginning of the test.





➔ **Spike Testing:-**It is a type of software performance testing that is done by suddenly increasing or decreasing the load on the system or software application. The goal of spike testing is to determine whether the system will fail or survive in case of dramatic changes in load. The objective of Spike Testing is: To evaluate the behaviour of the system or software application under the load

changed abruptly And To observe the performance of the system under abruptly changed load.

➔ **Volume Testing:-** Testing the application with respect to the database size is called as volume testing. Volume testing refers to testing a software application or the product with a certain amount of data. E.g., if we want to volume test our application with a specific database size, we need to expand our database to that size and then test the application's performance on it. The purpose of **volume testing** is to determine system performance with increasing volumes of data in the database.