**Why Testing is Necessary:**

Human Testing is essential because we all make mistakes. Some of those mistakes are not important, but some are expensive or could be life-threatening. We have to test everything that we produce because thing can go wrong, human can make at any time. Error can cause a mistake or failure at any stage of SDLC. Testing will be helpful.

* To identify defects
* To reduce the mistakes in the components or system.
* Increase the overall quality of the system.
* The testing is important since it discovers defects/bugs before the delivery to the client, which guarantees the quality of the software.
* It makes the software more reliable and easier to use.
* Thoroughly tested software ensures reliable and high-performance software operations.

**Basic concepts of Testing**

**Software Testing**

* It is a process of identify or catching the defects in the software for all possible conditions is called Software testing.

**Why software Testing?**

* Software testing is a method of determining whether the actual software products meets the expected requirements and ensuring that the software products is free of defects.
* When a software development project is going on, you need to know that errors may appear in any phase of the life cycle.

**Importance of Software Testing:**

* Software testing is important because if there are any bugs or errors in the software they can be identified early and fixed before the software products is delivered.
* A properly tested software products ensure dependability, security, and high performance, which leads to time savings, cost effectiveness, and customer satisfaction.
* Ensures that the software developed is according to the customer requirements or not.
* Ensures that the software is error free .
* Ensures that the software works as expected by the customer in all possible ways such as stability, response time, capacity.
* Non Functional testing ensures that software is performing as expected by the customer.

**Quality Assurance:**

Quality assurance is the way of preventing mistakes and defects in the manufactured products and avoid problems when delivering products or services to customers.

* Purpose of QA is to provide confidence to the customers by constant delivery of products according to specification.
* It includes procedures and tools applied by the software professionals to ensure that software meet the specified standard for its intended use and performance.

**Bug Free Software:**

* Bug it nothing but the defects which are accepted by the developers, due to which produces an incorrect or unexpected results.
* Bug free software provides proper and accurate visibility of the software project.
* Bug free software means it will deliver the products without any defects.

**Goal of Software testing :**

* The goal of software testing is to find errors, gaps, or missing requirements in comparison to the actual requirements.
* To deliver the product effectively to customers without any errors.

**Testing v/s Quality:**

**Testing:** It represents the operations -levels activity of actually checking the software for error and bugs.

**Usability Testing:** Testing the user-friendliness of an application.

**Compatibility Testing:** Testing the functionality of an application in different configurations or platform.

**Functional Testing:** Testing each and every component of an application rigorously or thoroughly according to the customer requirement specifications.

**Performance testing:** Testing the stability and response time of an application by applying the load.

**Quality:**

Quality is the degree/state to which the product has to meet in order to satisfy the requirements of the customer.

**Defect Prevention:**

* Defects prevention is a process to identify the root cause of the defects and establish the process to avoid defects.
* By focusing on the Defects prevention, we can work on improving the quality of the software.

**How much testing is enough?**

* **The level of risk**

Technical

Safety

Business Risks

* Project Constraints

Time

Budget

**Types of Testing:-**

1.Functional Testing

2.Non Functional Testing

**Functional Testing**

Testing each and every parameter, functional follow of the application that is complete functionality of the application is called Functional testing.

**Need of Functional testing**

* Functional testing ensures that software is working properly as per the customer requirement specification.

**Non functional testing**

Testing the stability, appearance, capacity, performance and security of the application and it also defines how the software operates .

**Need of Non functional testing**

**Performance testing**:

* Testing the stability and response time of an application by applying load is called as performance testing.
* Performance testing is used to measure processing speed, response time, resource consumption, throughput, efficiency.

There are 3 types of performance testing

1. **Load test**:

* Testing the stability and response time of an application by applying load up to and including limits.
* Load tests refers to the load size and related values.

1. **Stress test**:

* Testing the stability and response time of an application by applying load which is more than designed number of users.
* It determines the applications ability to handle large amounts of data.

**Testing techniques:**

* **Blackbox testing**:
* Verifying the functionality of an application against requirement specification is called as black box testing.
* It is done by test engineers.
* It ignores the internal mechanism of a system and focuses only on the output generated.

**Advantages :**

Programming knowledge is not required.

Test engineers and developers are independent each other.

Tastings are done from users point of view.

**Disadvantages :**

Testing only the small number of inputs so that time taken will be more.

It is hard to design test cases without knowing about requirement specifications.

Unnecessary repetition of test inputs.

Many programs paths are remain untested.

* **White box testing(Structural testing)**
* Testing each and every line of the code is called as white box testing.
* It is done by developers.
* Here they test internal logic of the code.
* By using test cases they determines appropriate output.
* Here code is visible and readable.

**Advantages:**

* It helps in optimizing the code.
* Very easy to find out which type of input will help for testing

**Disadvantages**:

* Skilled tester is needed so it increase the cost.
* It is hard to look into every bit of code so which leads to failure of the application
* **Positive testing**: Testing the software by providing valid data.
* **Negative testing**: Testing the software by providing invalid data.
* **Static testing/Dry run testing:**
* These testing is used by developers
* It is done before compilation.
* It involves code review, Inspection and walkthrough.
* Manually read the code and syntax checking to find the errors are methods of static testing.
* **Dynamic testing:**
* It involves giving input values to the software and checking whether the output is as expected.
* It takes place after compilation.
* It helps to find the defects.