TESTING CONCEPTS

SDLC (Software Development Life Cycle) :

SDLC Means Software Development Life Cycle. It includes following phases like

(1) Initial Phase.

(2) Analysis Phase.

(3) Design Phase.

(4) Coding Phase.

(5) Testing Phase.

(6) Delivery & Maintenance Phase.

(1) Initial Phase :

Initial phase is a starting phase. It includes roles & responsibility of the project and guidelines & documentation of the project.

(2) Analysis Phase :

Analysis phase mainly needs

(a) Requirement Analysis.

(b) Feasibility Study (Through studies).

(c) Type of technology.

Once we read the above three terms. We will prepare SRS document based on above three terms.

> BRS → Bussiness Requirement Specification.
>
> FRS → Functional Requirement Specification.
>
> SRS → Software Requirement Specification.

(3) Design Phase :

Design phase divides into two categories. They are

(a) High Level Design (HLD)

(b) Low Level Design (LLD)

HLD → It is "Overall description of the project".

LLD → It is "In-depth description of each module".

(4) Coding Phase :

Coding phase done by the developer. Developer starts coding for each and every module based on the requirements.

(5) Testing Phase :

Testing we can done based on the requirements.

(6) Delivery & Maintenance Phase :

After completion of testing phase, the project will be deliver to the particular person (or) client. This process is known as delivery & maintenance phase.

These are the six phases used in the Software Development Life Cycle(SDLC).

STLC (Software Testing Life Cycle) :

STLC Means Software Testing Life Cycle. It includes following terms like,

(1) Test Plan.

(2) Test development.

(3) Test Execution.

(4) Result Analysis.

(5) Bug Tracking Report.

(1) Test Plan :

Test plan is a document which is used to roadmap all our testing activities. This is prepared based on "SRS documentation". Test plan document describes or it tells what to test, when to test, how to test, where to test.

Context Of Test Plan :

a) Introduction.
b) Version Number.
c) Scope of Test Plan.
d) Environment.
e) Test Strategy.
f) Test Schedule.
g) Functions to be tested.
h) Functions not to be tested.
i) Entry Criteria.
j) Exit Criteria.

(2) Test Development :

Test development is nothing but test plan and test case preparation.

(3) Test Execution :

Executing the test cases is known as "Test Execution". Here test cases are divided into two categories. They are,

a) Expected Results → It is nothing but "SRS".
b) Actual Results → It is nothing but our "Output Result".

In test execution, we will execute the test cases and compare expected result with actual result.

(4) Result Analysis :

Here, we compare the expected result and actual result, to make test case either pass/fail, According to the expected result.

(5) Bug Tracking Report :

The deviation between the expected results and the actual results is known as "Bug Report".

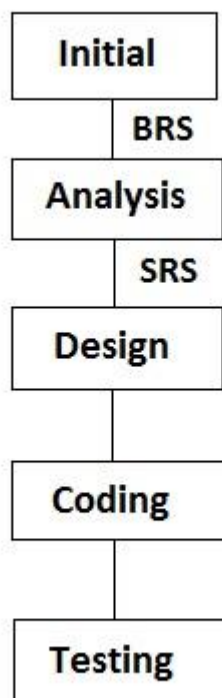If any test case fails, we will report that failed test case as a bug to the developer.

These are the five terms used in the Software Testing Life Cycle(STLC).

Software Methodologies :

There are 3 types of software methodologies. They are,

1. Waterfall Model.
2. V & V Model.
3. Agile Method.

1. Waterfall Method :

```
        ┌──────────────┐
        │   Initial    │
        └──────────────┘
               │ BRS
        ┌──────────────┐
        │   Analysis   │
        └──────────────┘
               │ SRS
        ┌──────────────┐
        │    Design    │
        └──────────────┘
               │
        ┌──────────────┐
        │    Coding    │
        └──────────────┘
               │
        ┌──────────────┐
        │   Testing    │
        └──────────────┘
```

In waterfall model, after completion of one phase other starts. The drawback of waterfall model is "changing of requirement is not possible".
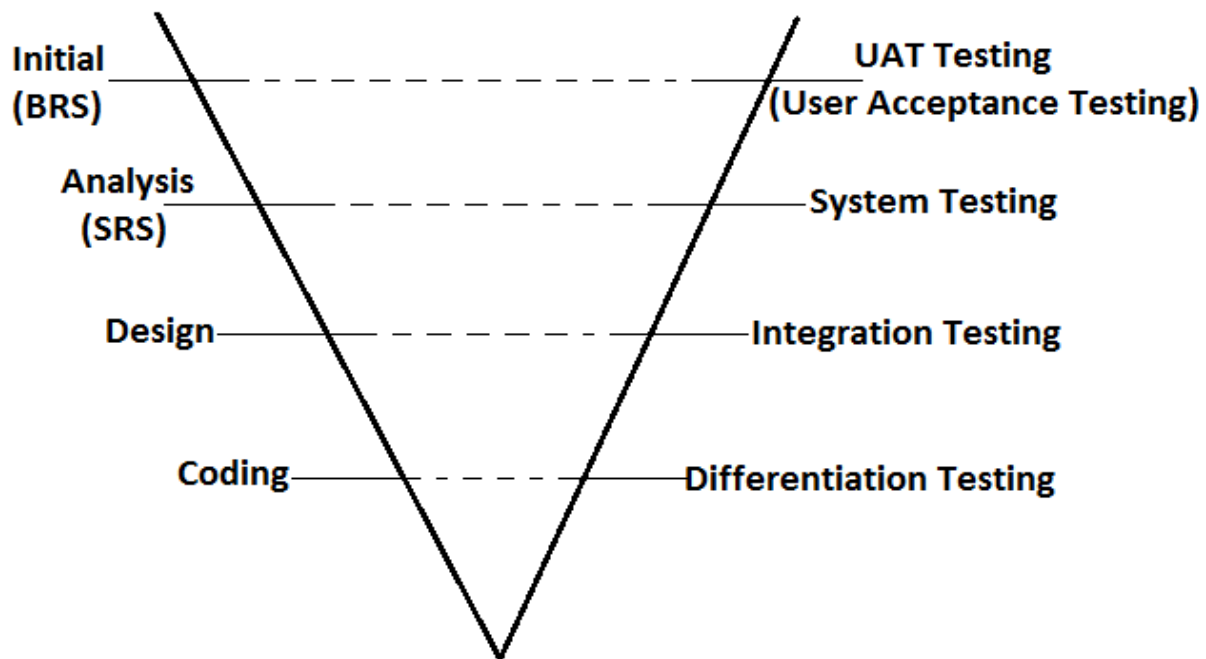
2. V & V Model (Verification & Validation Model) :

Verification :-

Verification is a process to develop the product as right product. Verification activities involves in reviewing of documents, specifications, codes, requirements.

<u>Validation :-</u>

Validation is actual testing of the application with given inputs.

Initial (BRS)	UAT Testing (User Acceptance Testing)
Analysis (SRS)	System Testing
Design	Integration Testing
Coding	Differentiation Testing

In this model, Verification & Validation both works parallelly. "Changing of requirement is possible" in this model.

SRS will give more details of each requirement.

3. <u>Agile Method :</u>

Agile Method is used to reduce the no. of documents. It uses "SCRUM Meeting" to reduce the no. of documents. SCRUM Meeting is used to know the project status on daily basis. There we take the decision and go for further based on meeting.

Whereas, In Waterfall and V&V Models documentation is required in each and every phase. In Agile Method, "Changing of requirement is possible".

Levels Of Testing :

There are four levels in the testing. They are,

1. Unit Testing.
2. Integration Testing.
3. System Testing.
4. User Acceptance Testing.

1. Unit Testing :

- Unit testing is done by the developer.
- It is also used to find the errors.
- It is a code level testing.

2. Integration Testing :

To test the dataflow from one module to the another module is known as "Integration Testing". This testing can be done in two ways. They are,

a) Top to Bottom.
b) Bottom to Top.

a) Top to Bottom :-

Testing approaches from main module to sub module is known as Top to bottom. If sub module is not created we will use a temporary program called as "STUBS" to stimulate the sub module.

b) Bottom to Top :-

Testing approaches from sub module to main module is known as Bottom to Top. If main module is not created we will use a temporary program called as "Drivers" to stimulate the main module.

3. System Testing :

It is a overall testing based on the requirements, to test the completely integrated system is working as per the requirement or not.

4. User Acceptance Testing :

It is a final level testing. We can done before releasing the product to the client. This testing carried with an "user prospective".

UAT testing is divided into two categories. They are,
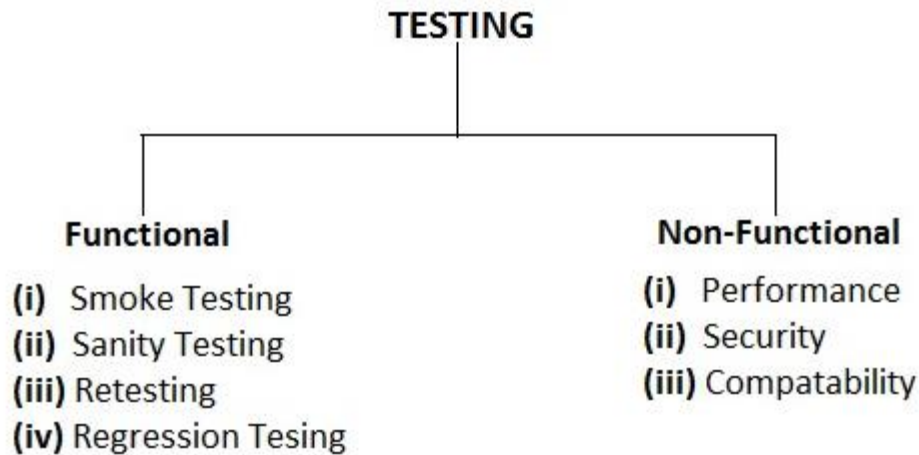
     a) Alpha Testing.
     b) Beta Testing.

a) Alpha Testing : (at developer)

Testing of software conducting at the developer side by End-User.

b) Beta Testing : (at client)

Testing of software conducting at the End-User side by developer.

Types Of Testing :

```
                        TESTING
                           |
          +----------------+----------------+
          |                                 |
      Functional                      Non-Functional
   (i)   Smoke Testing             (i)   Performance
   (ii)  Sanity Testing            (ii)  Security
   (iii) Retesting                 (iii) Compatability
   (iv)  Regression Tesing
```

1. Smoke Testing :

Smoke testing is to test whether the application is suitable (or) not for the further testing. Here, in the smoke testing major applications are tested.

2. Sanitary Testing :

Sanity testing is also used to test the major functionality of the application. In the sanitary testing the "in-depth testing" of the application is performed.

➢ What is difference between smoke and sanitary testing?

Actually both are same,

Sanitary testing will test a bit in-depth of the application where as in the smoke testing we will test the major functionality of the applications.

For Example, We are testing Mobile Phone…..

In Smoke testing, we will check whether the buttons are present or not. Whereas in Sanitary testing, we will check whether all buttons are working or not.

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3. <u>Retesting</u> :

        After fixation of bug, we will retest whether the bug is fixed or not. This is called "<u>retesting</u>".

4. <u>Regression Testing</u> :

        After fixation or modification of same tested application, to test whether the fixation is effecting any other functionality. This is called "<u>regression testing</u>".

5. <u>Performance Testing</u> :

        Time taken to complete a particular task is said to be <u>Performance</u>.

a) <u>Load Testing</u> :

        Applying maximum load and measure system performance.

    Example:- Lift.

b) <u>Stress Testing</u> :

        Gradually increase the load from maximum and measure system performance.

c) <u>Stability Testing</u> :

        Stability testing checks if the software (or) application can continuously function well in a long period of time.

Example :-

    Continuously making a call and rejecting a call occurs without hanging.

Testing Techniques :

There are three types of testing techniques. They are,

a) Black Box Testing.
b) White Box Testing.
c) Grey Box Testing.

a) Black Box Testing :

It is a functional testing based on the requirements with no knowledge of programming.

b) White Box Testing :

Testing approaches to examine the program structure is known as "White Box Testing".

c) Grey Box Testing :

Combination of both black box testing and white box testing is known as "Grey Box Testing".

Bug Life Cycle :

When the first time, we found the bug till the point it is fixed or closed it will assign various status like new, open, fix, differ(duplicate), reopen, close.

This span of period is known as "Bug Life Cycle".

There are various stages in the Bug life cycle. They are shown in bellow figure.
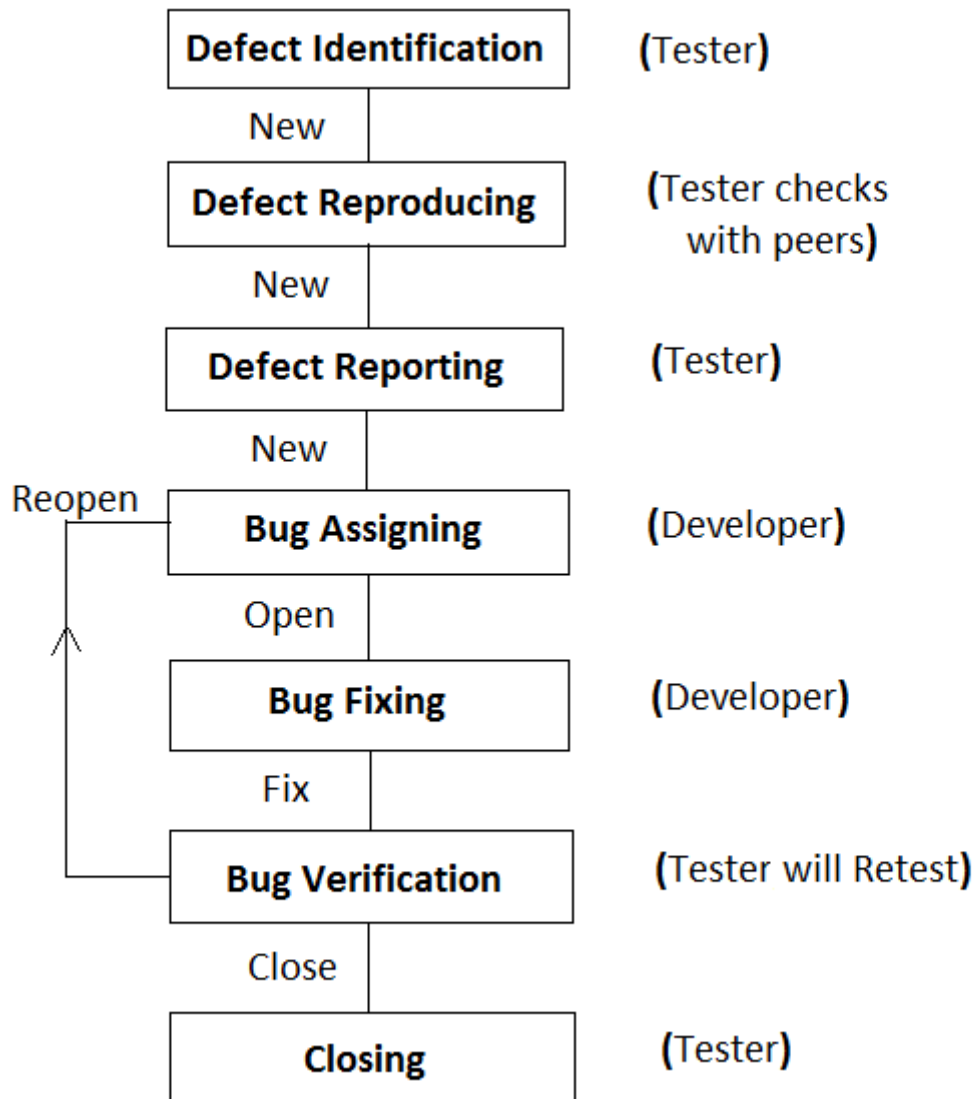
Fig. Bug Life Cycle

DEFFER Status :-

Developer will accept the bug and they will keep it for future release. It is called "DEFFER Status".

(If the requirement is not available they will put it in the deffer status).

Contents of the Bug Life Cycle :-

1. Summary (1 line description).
2. Seviority.
3. Priority.
4. Version Number (Software Version Number).
5. Environment.
6. Detailed description of steps.
7. Attachments.
8. Assigned to others (Assigning).

Seviority :- (testers)

It means impact of the bug.

(Degree of importance)

Seviority is given by "testers".

Seviority is of four types. They are,

1. Seviority-1 → Critical.
2. Seviority-2 → High.
3. Seviority-3 → Medium.
4. Seviority-4 → Low.

1. Critical :

It is given for restarts, hangs and crashes, for this types of bugs we will give Critical Seviority.

Ex :- Closing, Restart.

2. High :

If the bug is effecting entire functionality, then we will give High Seviority.

Ex:- If SMS application is not working with special characters and working with normal characters then we will give high seviority.

3. Medium :

     If the bug is effecting only particular module (or) page (or) functionality, then we will give medium seviority.

Ex :- If delivery report is not displayed after sending the SMS then we will give medium seviority.

(Because it is not effecting whole SMS but it is effecting settings of message only).

4. Low :

     All usability bugs comes under low seviority.

Ex :- Screen alignments, logos, colors, font, spelling mistakes all comes under low.

Priority :

     It is the process in which sequence is allocated for different types of bugs, It means it tells which bug is to fix first, next and last.

     Priority should be given by "developer".

     There are three types of priority. They are,

         1. High.
         2. Medium.
         3. Low.

➢ **What is relationship between priority and seviority ?**

     All usability bugs comes under low seviority & high priority and All crashes, hangs comes under high priority and high seviority.

     Generally, high priority comes under high seviority but in some cases high seviority comes under low seviority. Because of unavailable of requirements are needs to be get clarify from the customer.

Traceability Matrix / Bi-directional Matrix :

It is document showing relationship between the requirement ID and test case ID and this document is used to know the coverage of all functionality.

This traceability matrix is used to check the all functionality are covered for test case preparation (or) not.

➢ **How do you come to know test case completion of all functionality ?**

Based on Traceability Matrix.

➢ **What is Regression Testing ?**

After fixation (or) modification of bug to ensure that it is not effecting any other functionality is called "Regression Testing".

It can be done in two ways.

1. After fixation of the bug.
2. When new functionality is added.

➢ **How regression testing can be done ?**

It can be done based on traceability matrix.

Test Case :

It is the inputs to test the application, It is a document describing inputs like test description, test steps, expected results, actual results & result analysis to test the application.

Test Case Format :

Requirement ID	Test Case ID	Test Description	Test Steps	Expected Results	Actual Results	Result Analysis
R001	R001_1	What To Test	How To Test	SRS	Output Result	Pass/Fail

Context Of Test Plan :

1. **Introduction :-**

   It gives the introduction of the project.

2. **Version Number :-**

   It gives the version number of the document.

3. **Scope Of The Test Plan :-**

   On which part of the application, we are focusing.

4. **Environment :-**

   Environment means Requirements.

   (what are the things required for testing i.e.., test mobile, test application build, data cable, SIM card and test case)

5. **Test Strategy :-**

   Test Strategy means step by step procedure for testing.

➤ **What is difference between test plan and test strategy ?**
   - Test plan is a project level document.
   - Test strategy is a company level document.

     Test Strategy includes in Test plan.

6. **Test Schedule :-**

   When to start testing, when to stop testing.

7. **Functions to be tested :-**

   Which are the functions to be tested.

8. **Functions not to be tested :-**

   Which are the functions not to be tested.

9. **Entry Criteria :-**

- Testers should understand the requirement document first (SRS).
- Testers should prepare the test cases.
- Test Cases should be reviewed by peers.
- Test Environment / test setup should be ready.

10. **Exit Criteria :-**

- All test cases should be executed.
- All known bugs should be reported.
- There should not be any crash (which are visible through naked eye).
- There should not more than 3 major bugs and 5 minor bugs.

Techniques To Write Test Cases :-

There are three techniques to write the test cases. They are,

1. Boundary Value Analysis.
2. Equivalent Partition.
3. Error Guessing.

1. **Boundary Value Analysis :-**

It is a technique to find whether the application is accepting the expected range of values and rejecting the values which falls out of range.

Ex :- The Requirement is User ID text box has to accept alphabetic characters(a-z) with length of 4-10 characters.

Boundary Value Analysis is done like this,

Max Value   = 10 pass

Max Value-1 = 9 pass

Max value+1 = 11 fail

Like that,

        Min Value   =   4 pass

        Min Value+1   =   5 pass

        Min Value-1   =   3 fail

Like this, we will check the corner value and come out with a conclusion whether the application is accepting correct range of values.

2. Equivalent Partition :-

In this technique, we will divide the inputs into two groups.

    a) Valid group (Valid inputs should give valid results).
    b) Invalid group (Invalid inputs should give invalid results).

Ex :- If the requirement is username should accept only alphabetic pass, so equivalent partition is all alphabets should pass other than alphabets should fail.

3. Error Guessing :-

This technique is used to find bug, based on the user experience.

➢ **What is difference between boundary value analysis and equivalent partition?**
- Boundary Value Analysis comes whenever boundary conditions comes.
- Equivalent Partition can be used "only" whenever the conditions comes.

Types Of Testing :

1. Exploratory Testing :-

Testing can be done without any format of test cases and requirement (or) test document.

It is called as "Exploratory Testing".

2. Adhoc Testing :-

Testing can be done without any format of test cases and requirement (or) test document.

It is called as "Adhoc Testing" (or) "Random Testing".

➢ **What is difference between Adhoc Testing and Exploratory Testing ?**

Actually both are same but slight difference is,

- In exploratory testing, testers may learn (or) know the application as they test it.
- In adhoc testing, testers have significant understanding of application before tested.

3. Security Testing :-

Testing how well the system protect against the unauthorized internal (or) external access.

4. Volume Testing :-

Applying break down data and measure system performance is known as "Volume Testing".

5. Monkey Testing :-

Monkey testing means executing few test cases here and there to ensure the application is not crashing.

6. Gorilla Testing :-

Heavily testing one functionality called as "Gorilla Testing".

Interview Questions :

➢ **Error :-**

The deviation between expected result and actual result is known as "Error".

➢ **Defect :-**

When an error found by the test engineer, then it is called as "Defect".

➢ **Bug :-**

The defect is agree by the developer, then it is converts into bug, which has to fix by the developer.

➢ **Build :-**

The application under testing is called "build".

➢ **Use Case :-**

It is nothing but the pictorial representation of application. It is a block diagram representation of application, how it will works to user.

(or)

A simple flow between the user and the system. It is done by team load/test load/tester.

➢ **Test Case :-**

Test cases are derived from use cases.

➢ **Static Testing :-**

It comes under "verification" process. Verification means process to develop the product as a right product. Verification activities involves in reviewing of documents, codes, specifications & requirements.

➢ **Dynamic Testing :-**

It comes under "validation" process. Validation means actual testing of the application with given inputs.

➢ **Boundary Value Analysis :-**

To check whether the application is accepting expected range of inputs and rejecting the inputs which falls out of range is known as "Boundary value Analysis".

➢ **Equivalent Partition :-**

In this technique, we will divide inputs into two categories valid and invalid groups based on the requirements. So valid input should give valid output and invalid input should give invalid output.

➢ **Difference between Retesting and Regression testing?**
  • In Retesting, we are not concentrating how the fixation effecting other functionalities.
  • In Regression testing, we are concentrating how the fixation effecting other functionalities.

➢ **What is difference between integration testing and system testing?**

Integration Testing	**System Testing**
1. It is a low level testing. 2. Test dataflow from one module to another module. 3. In starting we will do integration testing.	1. It is a high level testing. 2. It is a overall testing based on the requirements. 3. Finally, we will do this system testing. Once all the functionalities are developed and not vice versa.

➢ **Test Scenario :-**

It is nothing but preparation of test cases and execute test cases, whether the coding is according to customers requirement (or) not.

It is set of test cases and sequence in which they are executed.

➢ **WAP Testing :-**

Testing the wireless application protocols used in the network application is known as "WAP Testing".

➢ **Web Testing :-**

Testing the web applications such as protocols, websites etc…, is known as "Web Testing".

➢ **Why we use Active Sync?**

Active Sync is software which is used to connect device to desktop using cradle (USB Cable).

➢ **In which format, we will get the build?**

Windows Mobile → We will get 'cab' file.

Symbian Mobile → We will get 'sisx' file.

Android Mobile → We will get 'apk' file.

o Cab means cabinet file.
o Sisx means Symbian Synchronize.
o Apk means Android package.

➢ **If requirements are changing continuously. What you will do?**
o If change of requirements is <u>small</u>, we will update the test cases and test deliverables, according to that.
o If change of requirements is <u>big</u>, we will role it as a new project.

➢ **How do you write the test plan?**

We will write the test plan based on the requirements.

➢ **Quality Assurance (QA) :-**

Quality Assurance is involved in software development process, it monitor and improve the process and it is oriented for prevention.

➢ **Quality Control (QC) :-**

Quality Control is involved in software testing process, executing the program (or) testing the program & evaluating the result and it is oriented for detection.

➢ **END To END Testing :-**

In End to End Testing, we will test the applications which are connected in live networks like server, client etc...,

➢ **Test Deliverable :-**

Test deliverable is nothing but the test document, test cases, test plan, test summary report.

➢ **Test Summary :-**

Test Summary is nothing but test executing report and it tells how many test cases are executed, how many test cases are pass, how many test cases are fail and how many test cases can run.

➢ **Graphical User Interface(GUI) (or) Interface Map :-**

Testing the user interface design of application, we will test color, fonts, Screen alignments etc...,

➢ **Test bed :-**

Test bed is an execution environment configured for software testing. It consists the specific hardware, network topology, operating system.

➢ **How do you design the test scenario?**

We will test scenario based on SRS document.

➢ **What is test data?**

Test data is nothing but <u>inputs</u>.

➢ **Why does software have bugs?**
  o Miscommunication (or) No Communication.
  o Programming Errors.
  o Syntax Errors.
  o Changing Requirements.
  o Time Force.

➢ <u>**Test Server**</u> **:-**

Test server is the place where the developer put their developed module , which are accessed to test.

➢ **What is the purpose of testing?**

Testing is the process used to help in identify of correctness, completeness and produce the bug in free product.

➢ **What is Software Testing?**

To test, whether the feature of the application working (or) not as per the requirement is known as "Software Testing".

➢ <u>**Simulator**</u> **:-**

It is a software works like actual device.

➢ <u>**Emulator**</u> **:-**

Emulator is nothing but combination of both hardware and software.

➢ **Functional and Non-Functional Testing :-**

→ Functional testing is used to test the functional requirements.

→ Non-Functional testing is used to test the performance.

➢ **Mobile Application Testing :-**

Testing the third party applications which are compatibility with mobile phones (Windows Mobile, Symbian Mobile, Android Mobile).

➢ **Mobile Handset Testing :-**

Testing the basic core applications of mobile phones like Call, SMS, Bluetooth etc…., is known as "Mobile Handset Testing".

➢ **Test Environment :-**

Test Environment is nothing but test setup that means test build, test devices, USB Cable, SIM Card and network environment.

➢ **What is difference between System and User Acceptance Testing?**

System testing can be done first and then finally user acceptance testing can be done.

➢ **Negative Testing :-**

Aim to show software should not work called "Negative Testing".

Ex:- Making a call without SIM Card the error should be pop up.

Sending message without SIM Card the error should be pop up.

➢ **Positive Testing :-**

Aim to show software should work properly as per the requirements.

Ex:- Making a call with SIM Card there should not be any error.

Sending message with SIM Card there should not be any error.

- **For any given requirements minimum number of test cases derived is** <u>two</u> (<u>one positive & one negative</u>).
- **For any given requirements maximum number of test cases derived is** depends <u>based on the requirements</u>.

- <u>**Interaction Test Cases :-**</u>

  Testing interaction of multiple applications known as Interaction test cases.

  Ex:- When call is active receive SMS, MMS.

  While browsing internet receive a call.

- **What is difference between FRS and SRS?**

  → SRS is derived from the FRS.

  → FRS will be bit In-depth analysis i.e.., it will clearly explain the characterstics of each requirement.

- **How do you know when to stop testing?**

  It is difficult to know when to stop testing exactly but based on some common factors we can make to decide stop. They are,

  - Deadlines of project.
  - Test case complete with certain percentage passed.
  - Coverage of all functionality.
  - Bug rate falls bellow a certain level.

- **If there is no time complete testing. What is your approach?**

  At that time, we will cover high level testing. That means,

  - Testing the feature which covers the multiple functions.
  - Security Testing.
  - User Interface Testing.

➢ **How do you write the test cases?**

Test case can be write based on "FRS". If FRS is not available we will write based on "SRS".

➢ **If the requirement is not clear (or) understand? What you will do?**

We will ask the developer to explain it.

➢ Emergency call means '<u>911</u>'.

➢ **What is Field Testing?**

In the field testing, I have just involved in voice call performance testing i.e.., Make 100 calls from the land line number & then measure the call success rate and Make a call from different mobile networks.

➢ <u>**KPT Testing :-**</u>

KPT Testing means Key point Performance Testing.

→ Time taken to display the end call summary.

→ Time taken to connect the call.

➢ **How do you start testing?**

We will start testing based on test plan.

➢ **If you report the bug to the developer, the developer will not accept your bug. What you will do?**

We provide necessary logs, screen shots at that time. Even though he is not accepting then we will have meeting with the client and discuss about this issue.