Software testing

Software testing :-

Software testing is nothing but to check correctness, completeness the quality of ~~of~~ developed software according to requirement of client.

~~Sof~~ Software :-

Software is a collection of programmes developed by developer in which ~~user~~ ~~take~~ it takes user input and results desire output.

Need of software testing :-

i) Aeroplane crash
ii) U.S Bank
iii) To security purpose
iv) To avoid the problem or bugs for users
v) easy to use the software for custumer

- **Completeness :-**

Completeness is nothing but to check software, develope as per the custumer requirement.

- **Correctness :-**

Correctness is nothing but to check software, working accurately as per custumer requirements.

- quality :-

Quality is important because -

i) to save the lifes.
ii) easy to use to end user.
iii) custumer satistification
iv) to save money.

* Resources involved in Software Testing :-

1. Custumer
↓
2. Buisness Analyst [Gather Requirements]
↓
3. Developer [developed appl^n as per requirement]
↓
4. Tester [check correct^n, completness of functionality]
↓
5. Final Product.

positive testing → Name field
eg. facebook sign.

Negative testing → entering wrong input
eg. enter Name instead of digit.

* SQA [Software Quality Assurance]

→ Communication bet^n custumer and buisness analysist is called software quality assu-rance.

→ SQA is done to monitor and measure software development factor. SQA monitor major factor in software development.

* Factors involved in SQA :-

i> To meet the custumer requirement
ii> to meet the custumer expectation.
iii> cost of project
iv> timing and deliveary
v> maintainance.

i> to meet the custumer requirement :-
- Which type of application custumer want i.e. banking domain, telecom domain.
- For which ~~custumer~~ purpose custumer want software.

ii> to meet the custumer expectation :-
- Privay :- privacy includes security it include security of privacy.

- Performance :- Developed software or application should work under heavy load.

iii> Costing of Project :-
Project costing for mns is as per hourly hour cost.

iv> Timming delivary :-
If company exceeds the deliv-ary time then company have to pay penalty to custumer it is called Escalation.

v> Maintainance :- It is part of service provided by the company after delivery of project upto certain time of period.

* SDLC (Software Devolopment Life cycle)
It is standard procedure to an devlope particular software.

Q. Why SDLC required / Importance of SDLC -

i> To understand that how many resources we gonna need to devlope particular software.
ii> To understand that how much benifits I can got by competiting the software.
iii> To collect information from custumer what exactly he wants.
iv> Within time period project should be delivard to custumer.

* Stages of SDLC :-

Information Gathering
↓
Analysis
↓
Design
↓
Coding (Devolopment)
↓
Testing
↓
Maintaindnce

1) Information Gathering -

i) In information gathering Buisness analysis is going to gather all the requirement from the client.

ii) Once he gatherd all requirement he is going to prepared for BRS document

iii) BRS is nothing but it is bridge between derolopment team, testing team and custumer

* BRS → Buisness Requirement specification

2) Analysis -

i) Under analysis phase SRH document is prepared.

ii) SRS is nothing but software requirement specification. SRH is made on the basis of BRS document.

iii) ~~SRH~~ ~~SRH~~ SRS is nothing but it is technical requirement or technical document prepared by BA on the basis of BRS document.

iv) BRS and SRS document made by Buisness Analysist.

v) BRS is nothing but the doc. shows custumer reqn in his language.

Q. What SRS document include ?

→ functional flow diagram

↓

functional requirement

↓

Use cases

↓

Snap shots

i) Functional flow diagram :-
Functional flow diag. shows flow of your graph or ~~f~~ shows flow & relationship between task.

ii) Functional requirement :-
Functional requirement means which are required to complete specific function

iii) Use cases :-
a) It is a functionality in terms of input and output.
b) It is diagramatically representation of particular task.

iv) Snapshots :-
a) Snap shot are visualisation of functionality before development of product.
b) Snap shot are created by B.A.
c) Snapshot gives idea to developer how software supposed to be look like.

3] Design - It contains -
a) High Level design
b) Low level design.

a) High Level design -
i) It contain design of working of main module.
ii) It include what and how any module do work.
iii) high level design by design architecture.

b) Low level design -
i) It include static logic of every sub module
ii) It design for working of sub module
iii) It created by front end developer

eg In Gmail compose, Inbox, draft, are main module.

4) Coding :-
It is set of programme written by developer for creates software application.
a) Front end developer -
i) He is going to cover functionality of perticular software.

b) Back end developer -
i) Data managment
ii) Data security & data gathering.

5) Testing :-
Testing is nothing but to check correctness, completeness and quality of developed softwares.

a) White box testing :-
i) It is done by developer.
ii) It is also called as code level testing unit testing and clear testing
To check small units of codes or check only perticular field is called unit testing
iii) Developer check only positive scenarios

b) Black box testing :-

i) It is done by tester.

ii) It is also known as system and functionality testing.

iii) In black box testing, overall functionality is tested.

iv) In black box both positive and negative scenario are tested.

c) Grey Box testing :-

i) It is combination of white box & black box testing.

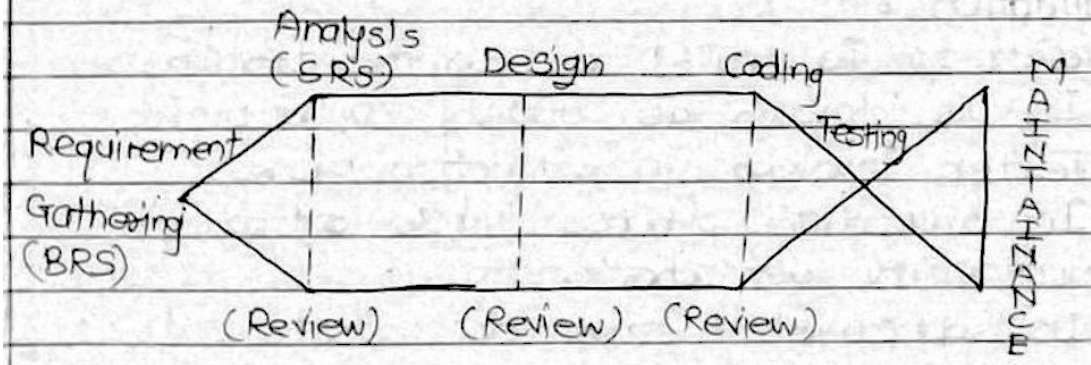
ii) Tester is involved in grey box testing.

iii) To do grey box testing tester is well known programming knowledge.

6) Maintainance :-

Maintainance means provide service after delivery of project.

* Fish Model :-



↳ verification ↳ validation

↳ Static Testing ↳ Dynamic Testing

↳ Quality Assurance ↳ Quality control.

* Fish model is advanced version of SDLC

1) Verification
2) Validation.

1) Verification :-

i) Verification process is also called as quality assurance.
ii) It is also known as static Testing.
iii) Under verification, BA is going to check his own document wheather the custumer all requirements are fullfilled or not. BA also review BRS & SRS dos.
iv) Designer review his own design wheather it perfect as per custumer requirement or not.
v) Coder is check his own code find the error and fixe the errors.
vi) In verification to check wheather the develop. software as per custumer requirement or not.
vii) In static testing do only positive checking and review.

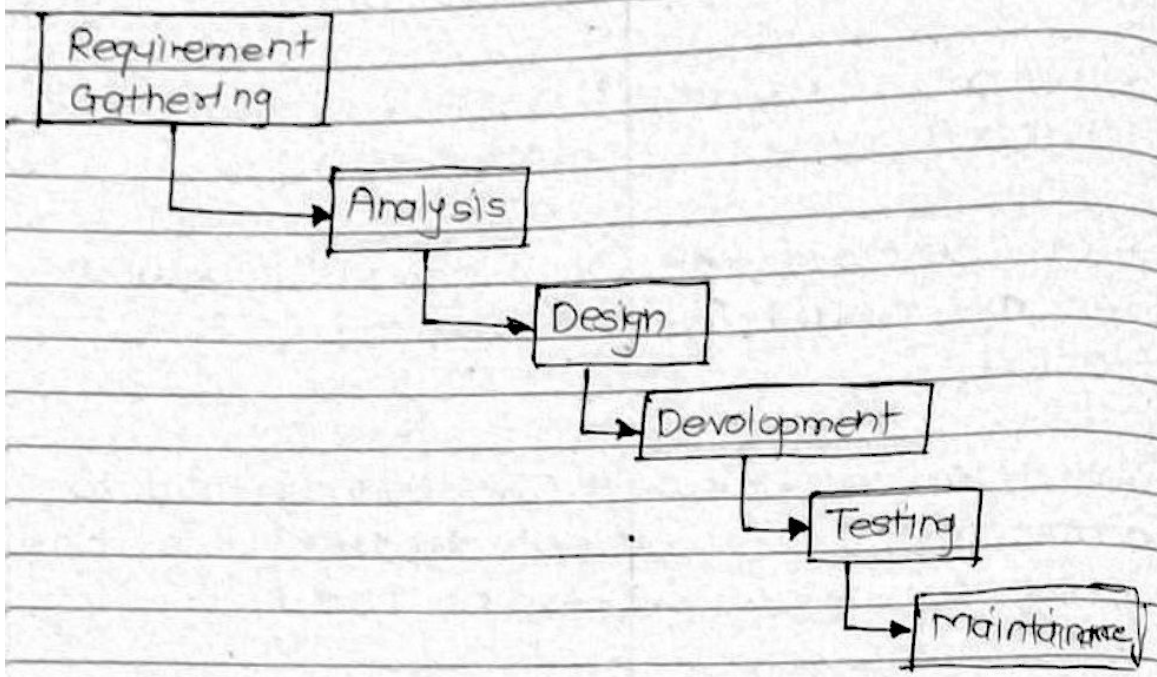
2) Validation :-

i) Validation is called as dynamic testing.
ii) It also known as quality control process
iii) Tester involved in validation process.
iv) In validation process whole software functionality get check.
v) In dynamic testing do positive and negative checking.

Q. Diffance Betn Validation & verification

Verification	Validation
① It is static testing.	① It is dynamic testing
② Verification is also called as Quality Assurance.	② Validation is also called as Quality control.
③ Software Developer, BA, Designer are involved in verification.	③ Tester is involved in validation.
④ Verification is review process.	④ In validation end to end funtionality is going to be tested.
⑤ i) In verification developer is review his own code. ii) Designer review his own design iii) BA is going to review his own doc. BRS & SRS.	⑤ In validation tester check overall functionality of application.
⑥ Verification is white box / static testing related to developer.	⑥ Validation is nothing but black box testing related to tester.
⑦ Only positive scenario is check in verification.	⑦ Both positive & negative scenario checks in validation.
⑧ Verification is IN process	⑧ Validation is End process.
⑨ In verification wheather developing buit is correct or not going to be check.	⑨ In validn wheather the devlpr build is correct or not as per customer reqn that going to be checked.

* Waterfall Model :-



i) Waterfall model is step by step implementation of SDLC.
ii) It is mainly used in product base company / organization.
iii) It is also called as Linear sequential model.
iv) Duration of waterfall model is 3 months.
v) In waterfall model whenever first phase is over than the procedure goes to the next phase.
vi) If any new requirement from custumer we can't accept and can't goes to revert back.

Q. How they fixe error ?
→ In waterfall models when tester is found any bug, then he do not send to the devoloper, insted of doing that

tester lock the bugs make report and then those bugs get fixed in next revision of product.

Advantages of Waterfall model :-

i) Requirements are fix and clear.
ii) Simple and easy to understand.
iii) Phase are procedure and complete at time.
iv) Process and results are well documented.
v) Works well for smaller projects.
vi) Works well for smaller process where requirements are very well understandable.

Disadvantages :-

i) If any requirement change than we need to start from first stage that is nothing but information gathering.
ii) It is not suitable for project when the requirement are continuous changes.
iii) Poor model for long and annoying project.
iv) High amount of risks and uncertainity.

• V- Model :-

Verification (Development)	Validation (Testing)
Information gathe--ring & Analysis	i> Assessment of development phase ii> Test plan prepare iii> Requir phase test
Design and coding	i> Test case design ii> Design phase test iii> Programme phase test
Integration (build installation)	i> smoke testing ii> system and functi testing iii> User acceptance testing iv> Documentation
Maintainance	i> Defect removal effi: ii> Req for change iii> Regression testing iv> Post mortaum testing

i> It is look like word V so it is called as V- model.

ii> In V- model verification and validation are runing parallel thats why it is called as V- model.

iii> In V- model development phase are to mapped with testing stages.

iv> V- model duration period is 3 months

v> V- model genrally used in big organizatn

1) Information Gathering and Analysis :-

i) Assesment of development phase :-

a) In this phase we are going to make strategy for testing.

b) In this phase we are going to decide which methodology is used in our testing process either it is manual or automation.

ii) Test plan preparation :-

a) It is project level document which is prepared by team leader.

b) By using test plan we are going to decide how much time tester required to complete the testing.

c) On the basis of test plan we are going to decide relese date of our project

d) Test estimation created in this phase.

iii) Requirement Phase Testing :-

Phase means unit. In this part is estimated requirement for phase are to be finished.

2) Coding and Design :-

a) Test case design.

b) Design phase testing.

c) Programme phase testing.

a) Test case design :-

i a) In this phase tester is involve.

ii b) In this phase tester is going to White test cases on the basis of requirements.

iii> He is going to write positive and negative test cases.

b> Design Phase testing :-

i> Under design phase testing tester and developer is involved.

ii> In this, phase tester is going to test design wheather it is prepared as per custumer requirement or not.

iii> Developer is involved because he knows the code and he can solved problems easily.

c> Programme phase testing :-

i> This code testing is starting from small unit of programme.

ii> It is like white box testing.

3] Integration Testing :-

Integration testing is nothing but developer is going to connect two or more than two modles.

Developer is responsible for positive integration -

a> Smoke testing
b> Systeam and function testing
c> User Acceptance testing
d> Documentation.

a) Smoke testing :-

i) In this testing basic functionality are get started.

ii) When we recived a built from developer for testing purpose then we are going to check wheather the built is ready or not.

iii) Only measure functionality get tested.

b) Systeam and functional testing :-

i) It is done by tester.

ii) Under this testing tester is going to test overall functionality of our application.

iii) Overall functionality is nothing but functional and non functional testing is going to perform.

c) User Acceptance testing :-

i) After systeam and functional testing product move to the UAT phase.

ii) In this phase product is deployed in user environment, tester and user both are involved in this testing

iii) When user validate it is a conect product then product sent it to the final production

iv) User is going to validate the product on the basis of requirements.

d) Documentation :-

i) It is nothing but report of testing.

ii) Whenever tester done testing on any module he creates document testing sumary it includes :-

a) Total no. of test cases.
b) how many test cases are execeuted.
c) Total no. of test cases.
d) how many test cases are execeuted.
e) how many test cases are passed or failed.
f) how many test cases are blocked or not run.

Tester send summary report document to the team leader.

4] Maintainance :-

① Defect removal efficiency.
② ~~Requirement~~ Request for change.
③ Regression testing.
④ Post mortum testing.

① Defect removal efficiency :- (DRE)

i) DRE calculates the at which level you testst the application. It means the level of test productivity or quality.

ii) formula for DRE = $\frac{a}{a+b}$

a = defect found by tester.
b = defect found during UAT

iii) The ratio 0.821 consider as robust testing

C.R (custumer reqn)

② Request for change :-

i) If custumer want some changes in his product at the time of release ie nothing but C.R. These C.R are added into the SRS document at the end for CR custumer have to pay extra money for this

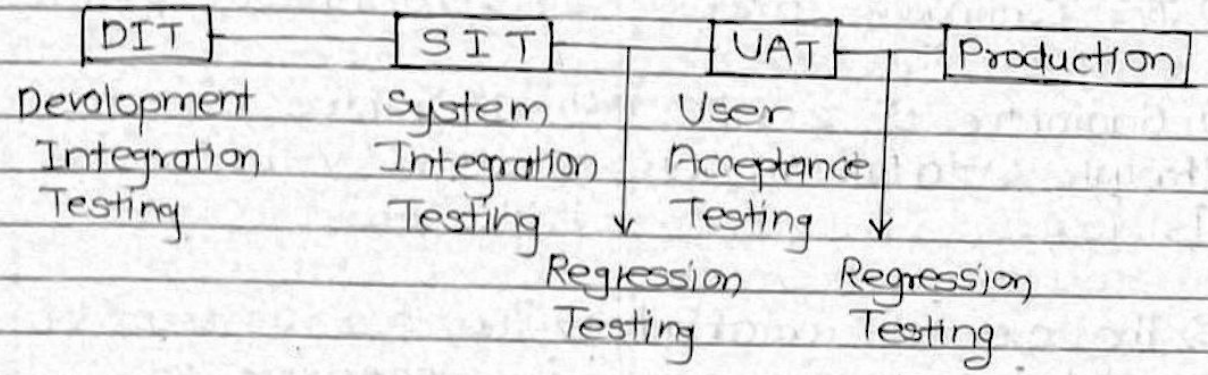
③ Regression testing :-

i) Under the regression testing basic core functionality are testing.

ii) It is done -

a) When tester complete systeam and integration testing.

b) After completion of UAT tester is going to check basic functionality of systeam.



When we add any defect that time the defect is fixed by devoloper then tester is going to check wheather defect is fixed or not that is nothing but retesting because of that issue fixing any other functionality of our application does not get impacted, than we are going to check is nothing but regression testing.

(4) Post Mortum testing :-
i) It is done by white box tester.
ii) When whole testing is done and product is ready for production if product does not producing desired output the white box tester should have to check all modules in details.

Waterfall Model	V- Model
(1) In waterfall model steps move in linear way	(1) In V- model step do not move in linear way.
(2) Testing activity start after the development phase.	(2) Testing activity start with 1st stage or parallel.
(3) It's continuous process	(3) Simultaneous process
(4) Guarantee of sucess through waterfall model is low.	(4) Guarantee of sucess through V- model is high.
(5) The cost of waterfall model is low.	(5) The cost of V-model is expensive.
(6) If any requirement change is occurs then we cannot revert back to that respective phase.	(6) If any requirement change is occurs then we can revert back to that phase by paying some extra amount.

interative = repeatative

Agile Methodology :-

① Agile is an iterative approach to project managment and software devolopment that helps team deliver value to their custumer, Faster and within a short period of time.

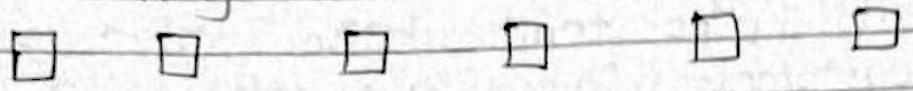
Diffrent types of Agile Methadology :-

1) XP (Eextreme Programming)
2) ~~scrum~~ SCRUM
3) LEAN
4) KANBAN
5) DSDM (Dynamic system devlopment method)
6) FDD (Feature driven devolopment)

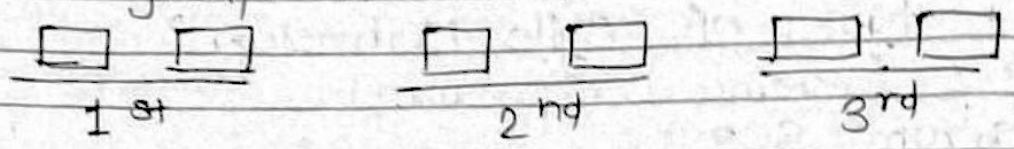
We are working in scrum agile methadology.

i) Scrum agile methadology is incremental and iterative approach.
ii) frequently changes in requirement does not impact devolopment phase and testing phase. This methaddogy is module driven methadology.
iii) In agile methadology requirement are changing frequently and those are not impacted on any phase.
iv) Most of time agile is used in service based organization.
v) At any point of devolopment phase custumer can request for change.
vi) The request for change does not affect on any other module of systeam.

vii) Custumer don't have to extra money
viii) In agile sprint wise delivery.
eg. suppose there is a software project having 6 module.



In agile method, this project divided in group of module



According to the no. of modules to be developed team formation perform by product owner or scrum master.

V-Model ⟶ Agile Methodology

1. Custumer ⟶ 1. ~~Stake~~ Stack Holder
2. Buisness Analyst ⟶ 2. Product Owner
3. BRS ⟶ 3. Product backlog
4. SRS ⟶ 4. Sprint backlog
5. Functional requirement in SRS ⟶ 5. User stories
6. ~~Release~~ Release ⟶ 6. Sprint
7. Project Manager ⟶ 7. Scrum Master.

There are three type of actors :-

1) ~~Stack Holder~~ Stack Holder
2) Product owner
3) Scrum Master

1) ~~Stake~~ Stack holder -

i) Stack holder is top most body of our organization.

ii) He is give the requirement to product owner.

2) Product owner -

i) Product owner is nothing but he is going to collect the requirement from stake holder.

ii) He is responsible to prepare product backlog and sprint backlog.

iii) Product owner is bridge between developer, tester and stake holder.

3) ~~Stake~~ Scrum Master -

i) Scrum master is chair person of scrum meeting

ii) He is going to check wheather the sprint is going smosthly or not.

There are two types of backlog / document in agile -

1) Product backlog
2) Sprint backlog.

1) Product backlog -
i) It is nothing but product owner is going to store all requirement for whole product.
ii) It is prepare by product owner.

2) sprint backlog -
i) Under the sprint backlog we are going to store current sprint user stories.
ii) sprint backlog contains detail information and the requirements which are required for the module developme

* User stories :-
i) User stories are functional requirement for the module development.
ii) User stories are get decided in estimation phase.

* Test Cases :-
i) Test cases are design by tester on the basis of user stories.
ii) Test case is nothing but how to test perticular module.

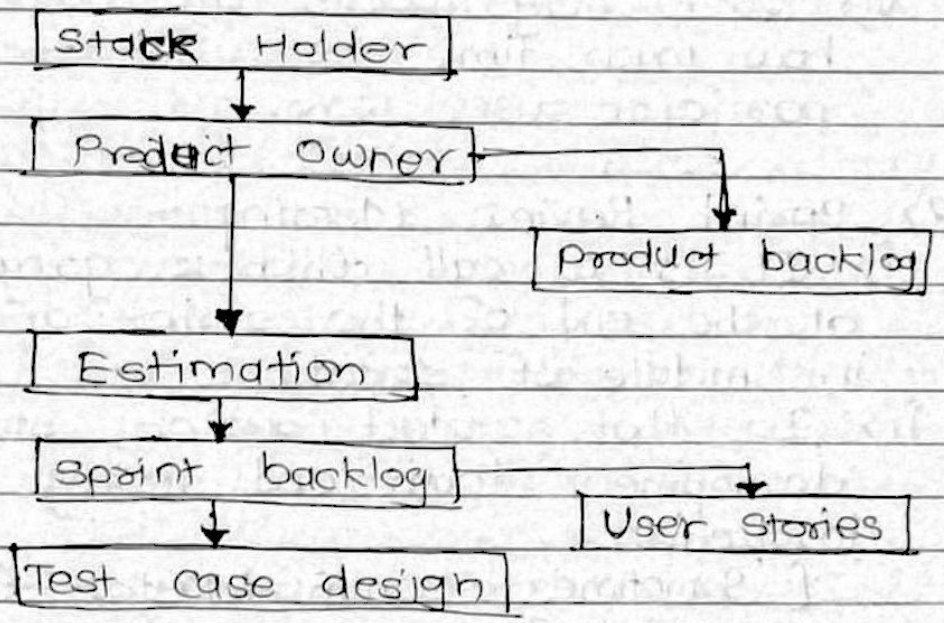
* Estimation :-
i) Estimation is nothing but how much time we want to test that particular application.
ii) Estimation is done on the basis of 3 factors.
① Knowledge ② Efforts
③ Complexity.

① Knowledge - Wherever team formation is done each member of team should have knowledge about domain of the project.

② Efforts - Under the efforts we decide how much efforts are required for the project. How many resource we need to complete that project.

③ Complexity - Complexity is given on the basis of how much that particular requirement are user stories is complex In short easy medium or hard.

* Architecture of Agile Methadology :-



There are four type of Ceremony in Agile Methadology or meeting -

① sprint grooming and planning session
② scrum meeting
③ sprint review meeting
④ sprint retrospective meeting.

g. Planning poker.com.
In both sprint we check our sprint is going as per our plan or not.

1) Sprint Grooming and Planning section -
i) In the sprint grooming session, product owner is going to groome the requirements / user stories to development team as well as testing team.
ii) He explain what custumer wants exactly in the sprint.
iii) In the sprint planning meeting they are going to estimate the user stories which was groomed in the grooming session
iv) We are going to estimate the user story on the basis of knowledge, effort and complexity.
v) In the sprint planning meeting, testing team giving user story / requirements.
vi) User story points are nothing but how much time we want to test that particular user story.

2) Sprint Review Meeting -
i) It is a call which is going to scheduled at the end of the sprint or sometimes in middle of sprint.
ii) In that product owner, stake holder, development team and testing team is involved.
[Sometimes scrum Master is also involved.]
iii) In sprint review meeting we are going to give demo of our product to stake holder.
iv) In short we are explaining how we have developed the product.

3) Scrum Meeting -

i) Scrum meeting is daily stand up meeting in which we are going to discuss progress of our sprint.

ii) People involved in the scrum meeting are scrum Master, developing team and testing team.

iii) There are three main questions are asked in meeting -

a) What we did yesterday ?

→ In this we are going to tell status of our yesterday works.

b) What are we going to do today ?

→ In that we are going to tell whats the today task for me for the day.

c) What are going to do tomorrow ?

→ In that we are going to discuss tomorrows plan.

d) What are the road block or issue ?

→ In this, we are going to discuss difficuty in executing test cases.

iv) Error or defect in code compilation.

v) Lack of co-operation from the team.

vi) Defect not resolved by developer then it is discuss in scrum meeting scrum master says solves the issue within 2-3 days.

4) Sprint Restropestive meeting -

i) It is a meeting which is scheduled at after finishing the first sprint and before starting of the next sprint.

ii) In this meeting product owner, developing team, testing team and scrum master is involved.

iii) In this meeting we are going to discuss what ~~went~~ went well & what went wrong.
iv) If something went well then we will continue these things in next sprint.
v) If something went wrong then we are going to discuss how to overcome this issue in next sprint.

Advantages of Agile Methodology -
1) Check point after each module.
2) Sprint wise delivery.
3) Working software is delivered frequently.
4) Customer, developer and tester constantly interact with each other.
5) Change request (CR) are always welcome
6) Require less time to develope a product.
7) Implementation of Automation is there

Disadvantages -
1) Less documentation.
2) There is no time for knowledge transfer in agile, because sprint time is only 1 month.
3) The project can quickly go out of track if the product owner is not clear about the requirement.
4) Cost of Agile methodology is high as compared to other module.
5) It requires an expert project member to take a crucial / critical decision in the meeting.

* User Stories :-

User stories are nothing but an functional requirement for module to be developed.

User stories consist of two parts -

i) Description Criteria

ii) Acceptance criteria.

i) Description criteria -

Description is nothing but what exactly user wants and what is desired outputs that is discription criteria.

ii) Acceptance Criteria -

This are the scenario or conditions, when scenario or conditions are true then system generates correct output otherwise system should show failure.

* Integration Testing :-

Integration testing nothing but we are going to connect two or more modules and then we are going to check the functionality of connected modules, wheather it is working fine or not as per the custumer requirements.

There are two types of integration testing

a) Front end integration testing

b) Back end integration testing.

a) Front end integration testing -
In front end integration testing, developer connects modules by called functions

b) Back end integration testing -
Back end integration testing include two or more tables in data base.

There are three types of testing approaches -
i) Top down approach
ii) Bottom up approach
iii) Bi-directional / sandwich approach.

i) Top down approach -
a) We have main module but we don't have a sub module.
b) Then developer is going to creates one dummy programme for the sub module.
c) That dummy programme is called nothing but "STUB".
d) That "STUB" is written in by developer in XML formate.

ii) Bottom Up Approach -
a) We have sub module for testing but we don't have a main module.
b) In that case we use this approach.
c) To check sub-module developer creates one dummy programme for main module.
d) The main module programme is called as "Driver".
e) It is also written in "XML" format.

iii) Bi-directional Approach -

a) In Bi-directional approach both type of testing is used.

b) When we won't to check functionality of main module but we don't have sub-module then we use "STUB" programe

c) When we want to check functionality of sub-module but don't have main module then we use "Driver".

Diffence Between Smoke testing and Sanity Testing :-

Smoke Testing	Sanity Testing
① smoke testing is nothing but we are going to check wheather the build is ready for testing or not.	① Sanity testing is narrow regression test that focus on one or few areas of functionality. It focus on one particular part of our application.
② smoke testing is perform by developer and tester.	② Sanity testing is usually performed by tester.
③ Smoked testing is exe-cercised the entire system from end to end.	③ Sanity testing exercercise only the particular component of the entire systeam
④ Smoke testing is nothing but normal health check up of application.	④ sanity is specialized check up testing.
⑤ Smoke testing is part of tester acceptance testing.	⑤ Sanity testing is subset or part of regression testing.

⑥ Smoke testing is usually performed when we recived a build from the devoloper.	⑥ Sanity testing is usually performed before product goes to the UAT phase. Also, when any minimum changes are occured in our appl^n then also we are going to perform sanity testing to check particular module functionality.

Zero level testing / Ground level testing :-

i) Zero level testing is also called as smoke testing and build verification testing.

ii) After integration testing is done we can start for zero level testing.

iii) Data base analysis creates the test environment.

iv) Once testing environment is ready tester is going to do testing and check that wheather the systeam is generates desire o/p or not.

v) Tester do testing for -

a) Basic core functionality
b) Tab validation
c) Link Validation
d) Page validation
e) GUI Testing (Graphical User Interface)

a) Basic core functionality :-

In that tester tests basic functionality of our application like buttons, icons etc.

b) Tab validation :-

i) Tab validation test involves functioning tabs.

ii) Whenever we enter any value in tab by using on screen keyboard or physical keyboard.

iii) Those characters numbers and symbols get generated in tabs.

c) Link validation :-

It is the process in which sequence of interlink pages get tested.

eg. If user clicks on flight icon then flight information page should be open.

d) Page validation :-

i) It is also called as page navigation testing.

ii) In that we click on "Next" or "Back" button or arrow (→←) then page should navigate front and back.

e) GUI ~~and~~ Testing :-

i) GUI stands for Graphical User Interface.

ii) In this tester checks wheather the pages are displayed correctly or not, image should be visible clearly on the page.

iii) This validation of visualization is called as Graphical User Interface.