

## ① Midterm topic :-

- (1) Project Planning
- (2) Project model
- (3) SRA
- (4) Software quality Assurance
- \*\* (5) Testing & its types

### ① Project planning →

# Project planning is a discipline addressing how to complete a project in a certain timeframe, usually with defined stages and designated resource. It is essential.

# Achieving success in software development require planning.

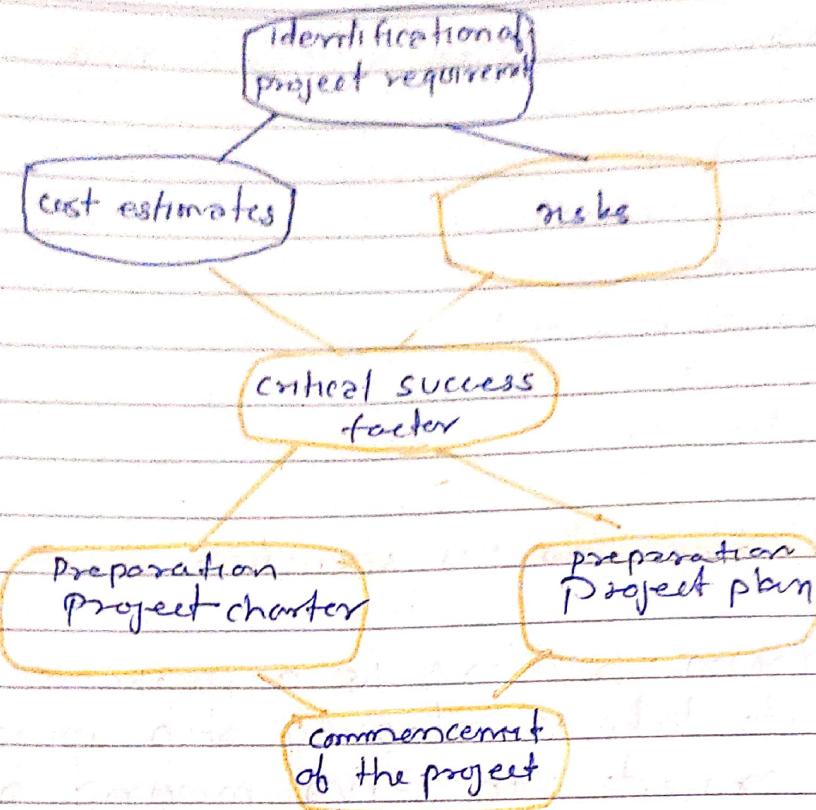
# It involves deciding what task need to be done, in what order to do the tasks & what resource are needed to accomplish task.

# Project planning process comprises several activities which are essential for carrying out a project systematically.

# These activities include estimation of time, effort & resource required & it refers to the series of task performed over a period of time for developing software.

## Project planning

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### # Need of project planning

- ① objective and scope of project
- ② Techniques used to performed planning
- ③ Effort (in time)
- ④ Resources required for project.
- ⑤ Risks associated with project.

### # Benefit of project planning

- ① It ensures that software is developed according to user requirements.
- ② It determines the available resource & activities.
- ③ It monitors the progress of project.
- ④ It identifies role of each project management team member.
- ⑤ It provide overview to management about cost of project.

# A typical project plan is divided into the following sections.

- ① Introduction
- ② Project organization
- ③ Risk analysis
- ④ Resource requirement
- ⑤ Work breakdown
- ⑥ Project schedule.

## # WBS - Work breakdown structure

A work breakdown structure is a project management tool that takes a step by step approach to complete large projects with several moving pieces. Work breakdown structure in project management & system engineering is a deliverable oriented breakdown of a project into small components.

The top-level breakdown usually matches the life cycle model (LCM).

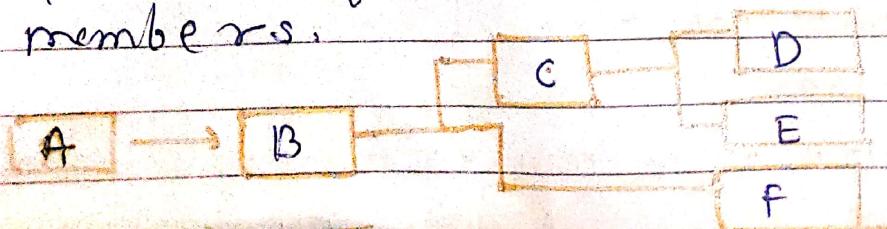
The next level breakdown usually matches organization process model (PM).

**IMPORTANT:** ① It must be a tree structure. There should be no loops or cycles in WBS.

② Every task & deliverable description must be understandable & unambiguous.

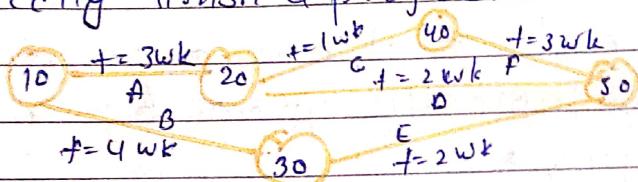
③ Every task must have a completion criterion.

④ The purpose of WBS is communication with team members.



## PERT (Program Evaluation & Review Technique)

- # This technique creates a graph that shows the dependences among the tasks.
- # the graph may not always have only one starting subtask or only one stopping subtask. The whole task is only completed when all the subtasks are completed.
- # It provides a visual representation of a project timeline & breaks down individual tasks.
- # It is a project management planning tool used to calculate amount of time it will take to realistically finish a project.



## fourth generation model

- # It encompasses a broad array of software tools that have one thing in common.
- # Each enables the software engineer to specify some characteristic of software at high level.
- # Implementation using a GUI enables the software developer to represent desired result in a manner.
- # In addition, 4GT developed software must be built in a manner that enable maintenance to be performed.

## ② Project model $\Rightarrow$

### ① formal method $\Rightarrow$

It is branch of software engineering, in which we analyse software system.

formal method used in developing computer system are mathematically based techniques for describing system properties.

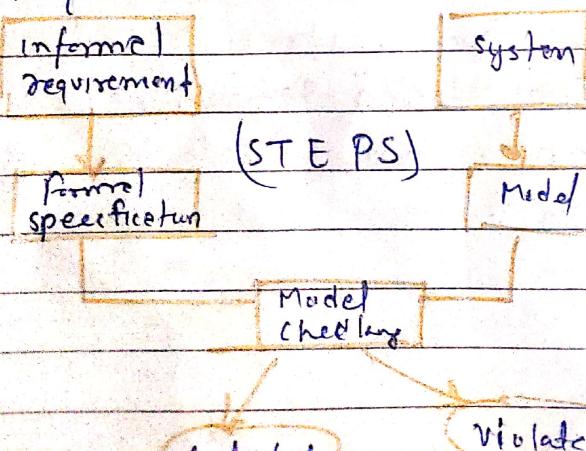
formal method provide framework within which people can specify, develop & verify system in a systematic.

A method is formal if it has a sound mathematical basis, typically given by a formal specification language.

### ## important of formal method $\Rightarrow$

#### in software

- ① It ensure that software is correct & reliable & correctness, consistency of a software.
- ② It is used to achieve software quality by applying testing, verification and validation process.



## SRA (Software requirement analysis)

It is a systematic approach for documenting the workflow processes in each functional area.

# It is significant & essential activity after elicitation.

# We analyze, refine and scrutinize the gathered requirement to make consistent requirement.

# After completion of this analysis, it is expected that the understandability of the project may improve significantly.

# Use the interaction with customer to clarify point of confusion & to understand which requirement are more important than others.

1. Draw the context diagram

2. Develop prototype

STEPS

3. Model the requirement

① Draw the context → It defines that the boundaries & interface of the proposed system with external world.

② Develop prototype → Prototype helps the client to visualize the proposed system & increase understanding of the requirement.

③ Model requirement → This consists of various graphical representation of the functions like data flow diagram, Entity-relationship diagram, data dictionaries.

④ Finalise requirement → After modeling requirement, we will have a better understanding of the system behaviour.

## # Software quality Assurance ↗

It is ongoing process that ensure the software product meets & complies with the organization established & standaralized quality specification.

SQA is a set of activities that verifies that everyone involved with the project has correctly implemented all procedure & processes.

# It works parallel to software development.

# It focuses on improving the software development project.  
b) Its ultimate goal is to catch a products shortcoming & deficiencies before the general public sees it.

## # Quality v/s Assurance ↗

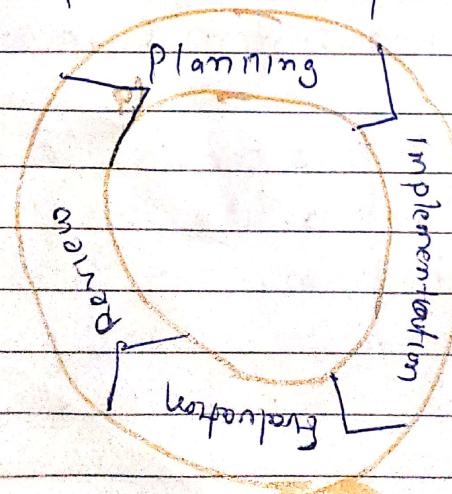
Quality is simply stated " fit for use or purpose".

It is all about meeting the needs & expectation of customers with respect to functionality, design, reliability, durability & price of project.

Assurance is nothing but a positive declaration on a product or service which gives confidence.

It provide a guarantee that product will work without any problem as per expectation.

Quality  
Assurance  
Cycle



1. Plan      }  
2. Do      } steps.  
3. Check  
4. Act

Plan ⇒ organization should plan & establish the process related objectives.

Do ⇒ Development & testing of process & also add changes in process.

Check ⇒ Monitoring of process, modify the process & check whether it meet the predetermined objective.

Act ⇒ A tester should implement action that are necessary to achieve improvement in the process.

### Quality control (QC)

\* It is software engineering process used to ensure quality in a product or a service.

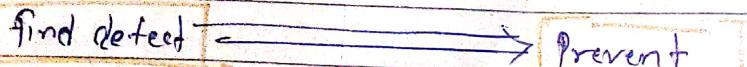
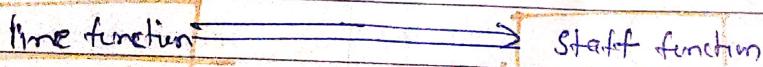
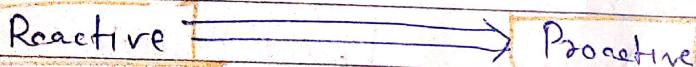
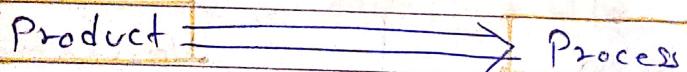
\* Its main aim of quality control is to check

\* whether the product meet specification & requirement of the customers.

\* QC also evaluates people on their quality level level skill set & impacts training & certification. This evaluation is required for the service based organization and help provide "perfect" service to the customer.

QC v/s Q.A

(Q.A)



## Testing & its types

Testing is the process of evaluating a system or its components.

According to ANSI/IEEE 1059 standard, Testing can be defined as "A process of analyzing a software item to detect the difference between existing & required conditions and to evaluate the feature of the software item".

Following professionals are involved in testing of a system within their respective capacities.

- (1) Software Tester
- (2) Software Developer
- (3) Project Lead/ Manager
- (4) End User

It is not possible to test the software at any time during its cycle. The next two section state when testing should be started and when to end it during SDLC.

- (1) When to start testing
- (2) When to stop testing.

## Difference between verification & validation

### Verification

Ensure that software system meet all functionality

Done by developer

If takes place first & includes the checking for documentation.

It have static activities

It is an objective process

### Validation

Ensure that functionality meet the intended behavior

Done by Tester

It occurs after verification mainly involve checking of produc

(5) It have dynamic activities

(5) It is an subjective process

## # Difference between Testing, Assurance & control

| Assurance                                 | Control   | Testing  |
|---|---|--|
| ① It ensure the implementation of process | ① It ensure the verification of developed software.                   | ① It ensure the identification of bugs/errors. |
| ② focuses on process & procedures         | ② focuses on actual testing by executing software to identify errors. | ② focus on actual testing                      |
| Process                                   | Product oriented  | Product oriented                               |
| ③ Oriented activities                     | ③ Product oriented  | ③ Preventive process                           |
| ④ Preventive activities                   | ④ Corrective activities   | ④ Preventive process                           |
| ⑤ It's subset of Software Test life Cycle | ⑤ It's subset of quality assurance                                    | ⑤ It's subset of QC                            |

## # Difference between Testing & Debugging =

Testing → It involves the identification of bug/error/defect in software without correcting it. Testing is performed in the testing phase. Quality Assurance background are involved.

Debugging → It involves identifying, isolating & fixing the problem/bug.

Debugging is the part of white box & unit testing & can be performed in the development phase while conducting unit testing.

## Testing myths

- (1) Testing is too expensive
- (2) Testing is time consuming
- (3) Testing cannot be started if the product is not fully developed
- (4) Complete Testing is possible
- (5) If the software is tested then it must be bug free
- (6) missed defect are due to tester.
- (7) Tester should be responsible for quality of product
- (8) Any one can test a software application
- (9) A tester task is only to find bugs.

## Types of Testing =>

### ① Manual Testing =>

This type includes the testing of the software manually i.e without using any automated tool or any script.

In this type the tester takes over the role of an end user & test the software to identify any un-expected behaviour or bug.

It also includes exploratory testing as tester explore the software to identify error in it.

#### ② Unit testing

#### ③ Integration testing

#### ④ System testing & user

#### ⑤ Acceptance testing

②

## Automation testing

Automation testing which is also known as 'Test Automation' when tester writes scripts and uses another software to test the software.

This process involves automation of a manual process.

It is used to re-run the test scenarios that performed manually, quickly & repeatedly.

It is also used to test the application from load, performance & stress point of view.

~~Testing methods~~

### ① Black Box Testing



internal not known

It is that testing in which the tester does not have knowledge about coding. It does not have knowledge of language in which coding is done. We only check the functionality of the software that is input we pass & the output the software produce.

The technique of testing without having any knowledge of the interior working of the application is Black Box testing.

### # Disadvantage

- ① Test cases are difficult to design
- ② Inefficient testing
- ③ Limited coverage & Blind Coverage.



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## # White Box Testing -

In white box testing tester has knowledge of coding & internal structure of the existing software whether structure is correct or not.

White box testing is also called glass testing or open box testing.

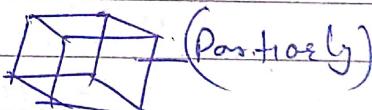
The tester need to possess knowledge of the internal working of code.

# If help in optimizing code.

Disadvantage :-

- ① Due to the fact that a skilled tester is needed to perform white box testing.
- ② It is difficult to maintain white box testing.
- ③ It is impossible to look into every nook & corner to find out hidden error that may create problem as many paths will go untested.

## # Grey Box testing -



(Partially)

It is a technique to test the application with limited knowledge of internal working of an application.

In software testing the form, the more you know the better carries a lot of weight when testing an application.

- ① Disadvantage :- ① source code is not available.
- ② test coverage is limited.
- ③ the test can be redundant.

## ~~IMP~~ Level of testing →

levels of testing include the different methodologies that can be used while conducting software Testing.

- ① Functional testing
- ② Non-functional testing.

### ① Functional testing =

This is a type of black box testing that is based on the specification of the software that is to be tested.

It is conducted on a complete, integrated system to evaluate the system compliance with its specified requirement.

① UNIT Testing → It is performed by developer. This is used to check independent & individual modules. The goal of unit testing is to isolate each part of program & show the individual parts or correct in term of requirement & functionality.

### ② Integration testing →

This testing will integrate all the modules one by one and check the compatibility issue whether one module is compatible with other module.

The testing of combined part of an application to determine if they function correctly together is integrated testing.

- ① Bottom up integration
- ② Top - Up integration.

## Performance Testing

It check the speed & effectiveness of the software to make sure that it generate the result within the specified time.

It is mostly used to identify any bottleneck or performance issue rather than finding bugs.

It has two type load & stress.

① Load testing - A process of testing the behaviour of software by applying maximum load in term of software accessing & manipulated large data.

This type of testing identifies the maximum capacity of software & its behavior at peak time.

② Stress testing -

In this testing, we check how the system behave under heavy load mean comparatively of software how much load software can handle. It include the testing of software behaviour under abnormal conditions.

## Usability testing

It ensure that a good & user friendly GUI is designed & is easy to use for end user.

It is a black box technique & is used to identify any error & improvement in software by observing the user through their usage & operation. UI testing can be considered as a sub part of Usability testing.

## Security testing

It involves the testing of software in order any flaws or gap from security & vulnerability point of view. It includes:

① confidentiality, Integrity, Authentication, Availability.