

SEPM ASSIGNMENT 2.

Q1. Differentiate between CPM and PERT.

PERT

CPM

a) It is a technique of project management which is used to manage uncertain activities of any project.

a) CPM is a technique of project management which is used to manage only certain activities of any project.

b) It is event oriented technique which means network is based on event.

b) It is activity oriented technique which means network is based on activities.

c) It is a probability model.

c) It is a deterministic model.

d) It majorly focuses on time as meeting time target as estimation of percent completion is more important.

d) It majorly focuses on time-cost trade-off as minimizing cost is more important.

e) It is appropriate for high precision time estimation.

e) It is appropriate for reasonable time estimation.

f) It has non-repetitive nature of job.

f) It has repetitive nature of job.

g) It doesn't use dummy activities.

g) It uses dummy activities for representing sequence of activities.

Q2. Explain The difference between :-

- (i) Total Slack and free Slack.
- (ii) AON and AOA diagrams.

Aspect	Total Slack (Total Float)	Free Slack (free float)
Definition	Amount of time a task can be delayed without delaying the project's overall completion date.	Amount of time a task can be delayed without delaying the early start of any successor task.
Calculation	Difference between the latest start time and earliest start time or latest finish time and earliest finish time of a task.	Difference between the early start time of next task and earliest finish time of current task.
Impact	Indicates the flexibility or buffer available for a task within the project schedule.	Indicates the flexibility or buffer available for a task without affecting the start time of subsequent task.
Focus	Concerned with the project's overall timeline and completion date.	Concerned with the relationship between individual tasks within the project.

(ii) AON and AoA diagrams

Aspect	AON Diagrams	AoA diagrams
Representation	Activities represented by nodes connected by arrows depicting the sequence of activities.	Activities represented by arrows connecting nodes representing events or points in time.
Activity Representation	Nodes represent activities, arrows show dependencies.	Nodes represent events or milestones, lines represent activities between events.
Flexibility	Offers more flexibility in representing complex relationships between activities, as nodes can be rearranged and connected with multiple arrows.	Maybe less flexible in representing complex project structure, as activities are directly connected between events.
Critical Path Identification	Identified by tracing the longest path from the start node to the end node through the network.	Identified by tracing the longest path from the initial event to the final event through the network.

Q3. Explain Risk identification, Risk projection, RMMM plan in detail.

A 1. Risk Identification

Risk identification is the process of recognizing and documenting potential risks that could affect a project, its objectives, or outcomes. It's a crucial step in risk management that involves systematically identifying, describing and understanding the risks that could impact the project.

Possible Risks :-

- Product size :- risks associated with overall size of the software to be built.
- Business impact :- Risks associated with constraints imposed by management or the market place.

Possible Risks :-

- Customer characteristics :- Risks associated with sophistication of the customer and the developers ability to communicate with the customer in a timely manner.
- Process definition :- risks associated with the degree to which the software process has been defined and is followed.
- Development Environment :- Risks associated with availability and quality of the tools to be used to build the project.

2. Risk Projection :-

- **Technology to be build.** Risk projection, also known as risk assessment or risk analysis, involves analyzing identified risks to estimate their potential impact on the project behavior and outcomes. This step helps in prioritizing risks based on their severity and likelihood, allowing project teams to focus their efforts on managing high priority risks effectively. Here's how risk projection is typically carried out.
- **Risk Analysis :-** Each identified risk is analysed to determine its potential impact on project objectives in terms of scope, schedule, cost, quality and other relevant factors.
- **Quantitative Analysis :-** Quantitative analysis involves assessing risks based on subjective criteria such as expert judgement, experience, and historical data to determine their relative importance and prioritize them accordingly.
- **Risk prioritization:-** Risks are prioritized based on their severity, likelihood, and potential impact on project success. High priority risks are given more attention, resources for mitigation and contingency planning.

3. RMMM Plan (Risk mitigation, monitoring and management plan):

The Risk MMM outlines how identified risks will be managed throughout the project lifecycle. It includes strategies for mitigating, monitoring and responding to risks to minimize their impact on project objectives. Here's what a typical RMMM plan entails:

Risk Mitigation:-

It is an activity used to avoid problems (Risk avoidance).

Steps for mitigating the risks :-

1. Finding out the risk.
2. Removing causes that are reason for risk creation.
3. Controlling the corresponding documents from time to time.
4. Conducting timely reviews to speed up the work.

Risk Monitoring:

It is an activity used for project tracking.

It has the following primary objectives as follows.

1. To check if predicted risks occur or not.
2. To ensure proper application of risk aversion steps defined for risk.
3. To collect data for future risk analysis.
4. To allocate what problems are caused by which risks throughout the project.

Risk Management and planning:

It assumes that the mitigation activity failed and the risk is a reality. This task is done by Project manager when risk becomes reality and causes severe problems. If the project manager effectively uses project mitigation to remove risks successfully then it is easier to manage the risks. This shows that the response that will be taken for each risk will be taken for each risk by a manager. The main objective of the risk management plan is the risk register. The risk register describes and focuses on the predicted threats to a SW project.

- Q4. Consider a XYZ company undertake a project to computerized working of ABC city bank, then.
- (i) Develop a W.B.S for the same.
 - (ii) Develop responsibility matrix.

→ Work Breakdown Structure (WBS):

A WBS is a hierarchical decomposition of the project into manageable sections. Below is a four level WBS for computerized ABC city bank.

Level 1: Project Name

- Computerization of ABC

Level 2 :- Major phases

1. Project Initialization.
2. Requirement Analysis.
3. System design and development.
4. Testing and quality assurance.
5. Maintenance & Support.

Level 3 :- Subtasks under each phase.

Phase	Subtasks.
1. Project Initialization	Project Charter, feasibility study, stakeholder identification, project planning
2. Requirement Analysis.	Data collection, user needs assessments, functional and non-functional req documentation
3. System Design & Development	System architecture design, database design, frontend and backend development, API integration
4. Testing & quality assurance.	Unit testing, integration testing, security testing, performance testing
5. Deployment & Training	System deployment, user testing, documentation preparation
6. Maintenance & Support.	Bug fixes, system upgrades, security patches, user support

(ii) Responsibility Assignment matrix (RAM).

A RAM or RACI matrix assigns roles and responsibility to team members.

Task	Project Manager	Business analyst	Developers	QA Team	IT support	End users
Project Initialization	R, A	C	-	-	-	-
Requirement analysis	A	R	C	-	-	I
System design	A	C	R	-	-	-
Development	A	C	C	R	-	-
Testing	A	C	B	E	R	I
Deployment	A	C	R	C	R	I
User Training	C	R	C	-	-	R
Maintainence & Support	A	-	C	C	R	I

• R (Responsible): Person who does the work.

• A (Accountable): Person who ensures the work is completed

• C (Consulted): Person who provides input or expertise.

• I (Informed): Person who is kept updated on progress.

Q5. Explain Software configuration management in detail.

→ Software configuration management (SCM) is a set of practices and processes used to systematically manage and control changes to software products throughout their lifecycle. It involves tracking and managing software configurations, ensuring that all changes are properly documented, controlled and tested to maintain the integrity and quality of the software. Here's a detailed explanation of SCM:

1. Version Control :-

- Version Control is a fundamental aspect of SCM, involving the management of different versions of software artifacts such as source code, documents and binaries.
- Version Control Systems (VCS) are used to track changes made to files, allowing developers to collaborate on projects, manage concurrent development, and revert to previous versions if needed.
- VCS tools like Git, Subversion (SVN), Mercurial provide features like branching, merging, tagging and conflict resolution to facilitate effective version control.

2. Configuration Identification :

Configuration identification involves uniquely identifying and labelling software components, versions and releases throughout their lifecycle.

- Each software configuration item (SCI) is assigned a unique identifier and documented in a configuration management system (cms) or repository.

3. Change Management :

- Change management encompasses the process of requesting, evaluating, approving, implementing and verifying changes to software configurations.
- Change requests (CR's) are submitted to propose modifications, additions or deletions to software components.
- Changes are implemented, tested and validated before being integrated into the mainline codebase or relaxed as a new part of a new software version.

4. Config

4. Configuration Control:-

- Configuration control involves enforcing policies and procedures to manage changes systematically and prevent unauthorized modifications to software configurations.
- Access controls, permissions, and workflow automation are implemented to regulate who can make changes to software artifacts and under what conditions.
- Versioning and audit trails are maintained to track the history of changes and favourite accountable and traceable.

5. Configuration status Accounting:-

- Configuration status accounting (CSA) involves capturing and reporting information about the current state and history of software configurations.
- CSA provides visibility into the state of configuration items, including their versions, changes, dependencies and relationships.

6. Release Management:-

- Release management focuses on planning, co-ordinating and delivering software releases to users or customers.
- It involves defining release packages, managing release schedules, conducting release testing and co-ordinating deployment activities.

Q6. Explain the significance of Gantt-charts in project management.

- Gantt charts are visual representations of tasks plotted against time. They represent crucial information in a project, such as who is assigned to what, task durations, and overlapping activities. A Gantt chart depicts the completion of each work in a project using timelines. These timelines explain how the various tasks are completed. Gantt charts are useful because they show the activities and progress and progress of a project.

Benefits of Gantt chart :-

1. Allows better tracking

Project leaders and members can use a gantt chart to keep track of tasks, milestones and overall workflow. The chart can show potential constraints or concerns, allowing project leaders and members to make appropriate adjustments.

2. Provides high level overview.

For both individuals who are directly committed, and those with less involvement, such as executives and other stakeholders, a Gantt chart provides an overall perspective of a project and its timeframe.

3. Boosts Productivity

A Gantt chart enables workers to collaborate in order to increase production. A gantt chart's great visibility helps workers focused on the tasks they need to finish. This transparency also ensures that all team members are held accountable for their tasks. Keep track of your project plans and teams progress and generate detailed report with project planning software.

4. Illustrates overlaps and dependencies.

A Gantt chart illustrates how tasks in a project may intersect. It also demonstrates how the start of one job might be contingent on the completion of another. This type of data enables project managers to schedule work and allocate resources in a way that does not stymie project progress.

5. Manage Complex Information

A Gantt chart's visuals can aid in the simplification of a complex set of tasks. The chart depicts tasks in a straightforward and simple manner for those who must complete them. Team members can stay focused and avoid becoming overwhelmed by a huge number of duties because of this transparency.

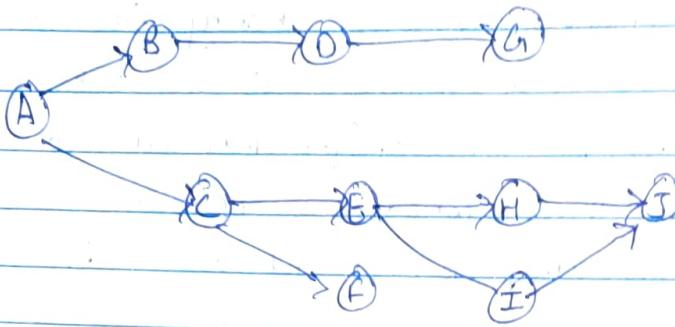
6. Balance Multiple projects.

Managers can quickly track many projects using a gantt chart. Because the chart shows how to give the proper resources at the right time, it allows those managers to balance the work on each project.

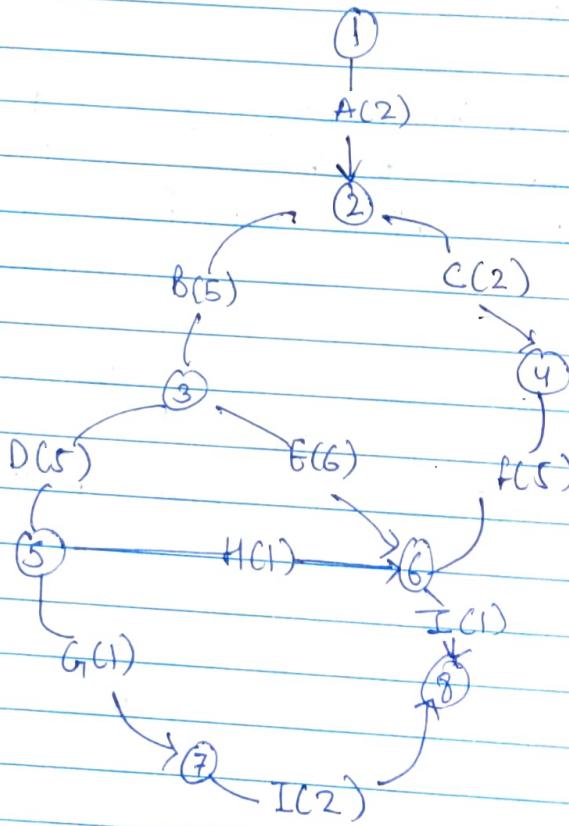
Q7. Draw the AOA and AON network diagram for the following project and show the critical path.

Activity	Time	Immediate predecessor
A	2	-
B	5	A
C	2	A
D	5	B
E	5	B
F	5	C
G	1	D
H	1	D
I	2	G
J	1	E, F, H, I

→ AoN (Activity on Node)



AOA (Activity on Arrow)



Critical Path calculation

Forward Pass (ES & EF) :

$$A: ES = 0, EF = 0 + 2 = 2$$

$$B: ES = 2, EF = 2 + 5 = 7$$

$$C: ES = 2, EF = 2 + 2 = 4$$

$$D: ES = 7, EF = 7 + 5 = 12$$

$$E: ES = 7, EF = 7 + 5 = 12$$

$$F: ES = 4, EF = 4 + 5 = 9$$

$$G: ES = 12, EF = 12 + 1 = 13$$

$$H: ES = 12, EF = 12 + 1 = 13$$

$$I: ES = 13, EF = 13 + 1 = 13$$

$$J: ES = \max(12 \text{ from } E, 9 \text{ from } F, 13 \text{ from } H, 15 \text{ from } I) \\ = 15 + 1 = 16.$$

Project duration = 16 units

Backward Pass (LS & LF) :

$$J: LF = 16, LS = 16 - 1 = 15$$

$$I: LF = 15, LS = 15 - 2 = 13$$

$$H: LF = 15, LS = 13 - 1 = 12$$

$$G: LF = 13, LS = 13 - 1 = 12$$

$$F: LF = 15, LS = 9 - 5 = 4$$

$$E: LF = 15, LS = 12 - 5 = 7$$

$$D: LF = 12, LS = 12 - 5 = 7$$

$$C: LF = 4, LS = 4 - 2 = 2$$

$$B: LF = 7, LS = 7 - 5 = 2$$

$$A: LF = 2, LS = 2 - 2 = 0$$

Slack Calculation :-

$$\text{Slack} = \text{LS} - \text{ES} \quad (\text{or LF} - \text{EF})$$

$$A: 0 - 0 = 0$$

$$B: 2 - 2 = 0$$

$$C: 2 - 2 = 0$$

$$D: 7 - 7 = 0$$

$$E: 7 - 7 = 0$$

$$F: 4 - 4 = 0$$

$$G: 12 - 12 = 0$$

$$H: 12 - 12 = 0$$

$$I: 13 - 13 = 0$$

$$J: 15 - 15 = 0$$

Critical Path : A \rightarrow B \rightarrow D \rightarrow G \rightarrow I \rightarrow J.

$$\text{Duration} : 2 + 5 + 5 + 1 + 2 + 1 = 16$$

All activities have zero slack, but this path is the longest and determines the project duration.