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SEPM :-

ASSIGNMENT NO: 02

Q1] Differentiate between CPM and PERT

PERT

CPM

- | | |
|--|--|
| 1) PERT stands for project evaluation and review techniques | CPM stands for critical path Method |
| 2) PERT is a technique of project management which is used to manage uncertain activities of any project which is used to manage uncertain activities of any project | CPM is a technique of project management which is used to manage only certain activities of any project. |
| 3) It is event oriented technique which means that network is constructed on the basis of event | It is activity oriented technique which means that network is constructed on the basis of activities |
| 4) It is a probability model | It is a deterministic model |
| 5) It majorly focuses on time as meeting time target or estimation of percent completion is more important | It majorly focuses on time-cost trade off as minimizing cost is more important |

6) It is appropriate for high precision time estimation

6) It is appropriate for reasonable time estimation

Q2] Explain the difference between: total slack and free slack

Total slack

→ The amount of time a task can be delayed without delaying the overall project completion

Free slack

The amount of time task can be delayed without delaying the start of its immediate successor

→ Affects the project deadline if exceeded

Affects only the next task in the sequence.

→ Total = latest start - earliest start
slack

Free = Earliest finish - Earliest start of next task of the task

→ Depends on both preceding and succeeding activities

Depends only on succeeding activities

→ Allows for more flexibility in project scheduling

Provides limited flexibility only for adjusting the next task.

→ It is calculated as :-

$$\text{Total Slack} = \text{latest Finish time} - \text{earliest Finish time}$$

It is calculated as

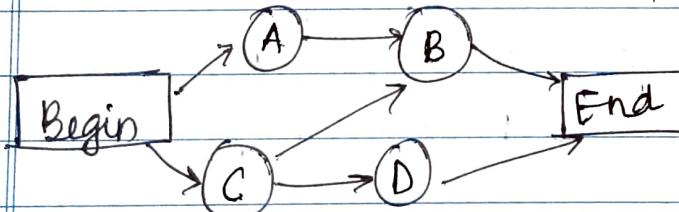
$$\text{Free slack} = \text{earliest start of next activity} - \text{earliest finish current Activity.}$$

(B2) AON vs AOA Diagrams

AON (Activity on Node)

- 1) Activities are represented as nodes
- 2) Focuses on the activities themselves
- 3) No dummy activities required
- 4) Easier to understand commonly used in modern project
- 5) It is more commonly used in modern project management software (such as MS Project & Primavera)

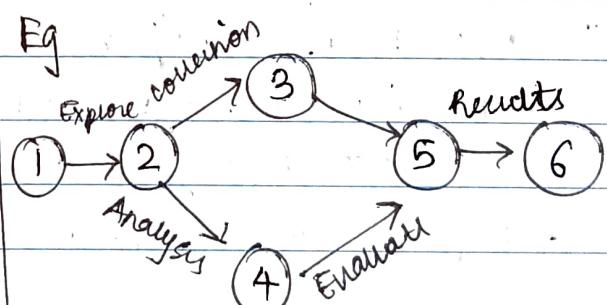
6) Eg AON Diagrams



AOA (Activity on Arrow)

- Activities are represented as arrows
- Focuses on the sequence and dependencies
- Dummy activities are often used to share dependencies
- More complex due to the need for dummy activities
- It was traditionally used in PERT & CPM networks but is less common now.

Eg



Q3] Explain Risk Identification, risk projection, RMM plan in detail.

Ans Risk management is a crucial aspect of software engineering that helps in anticipating, analyzing and mitigation potential threats that may arise during the software development process. It consists of various steps including risk identification, Risk projection (Analysis and Estimation) & the Risk Mitigation Monitoring and Management (RMM) plan.

Risk Identification

→ Risk Identification is the process of recognizing potential risks that could affect the success of a project. The goal is to identify uncertainties that might have a negative impact on project scope, cost, schedule, quality or performance.

Steps in Risk Identification

- (i) Review project scope & objectives
- (ii) Identify risks categories as technical, financial, operational, or managerial
- (iii) Use Risk Identification Techniques
 - Brainstorming :- Gather team to list potential risks
 - SWOT Analysis :- Identify strengths, weaknesses, & threats
 - Expert Judgment :- consult experienced professionals
- (iv) Document Risks:- Create a risk register listing identified risks with detail.

Risk Projection

IMPACT &

Involves analyzing identified risks to estimate their likelihood.

IMPACT & SECURITY:-

Aspects of Risk Projection

- (i) Likelihood Assessment - Assign a probability score
- (ii) Impact Analysis:- Evaluate how much damage the risk can cause
- (iii) Risk Exposure calculation:- Risk Exposure = Probability × Impact
- (iv) Risk Prioritization = High exposure risks require immediate action.

RMM Plan:-

The RMM plan is a structured approach to handling risks by reducing their probability & impact, monitoring their status & defining management strategies.

It stands for Risk Mitigation, Monitoring & Management components of an RMM Plan.

- (i) Risk mitigation
Strategies to reduce or prevent risks before they occur.
- (ii) Risk Monitoring
Ongoing tracking of risks to detect changes
- (iii) Risk management
Defines what actions to take if a risk materializes.

Q4]

Consider an XYZ company undertake a project to computerize working of ABC city Bank, then

- (i) Develop W.B.S for the same project
- (ii) Develop responsibility matrix

Ans: For XYZ company undertaking a project to computerise
ABC city bank

- (i) WBS (Work Breakdown Structure) divides the project into manageable sections, ensuring a structured approach to implementation

Level-wise WBS for the Project

- 1. Project Initiation & Planning
 - 1.1 Requirement Analysis
 - 1.2 Feasibility Study
 - 1.3 Risk Assessment & Planning
 - 1.4 Project Schedule & Budgeting

2. System Design & Architecture

- 2.1 Database Design
- 2.2 Software Architecture
- 2.3 Security Architecture
- 2.4 Hardware & Network Infrastructure

3. Software Development

- 3.1 Core Banking System Development
- 3.2 Customer Management Module
- 3.3 Transaction Processing System
- 3.4 Online & Mobile Banking

4. Integration & Testing

- 4.1 System Integration
- 4.2 Functional Testing
- 4.3 Security & Performance Testing
- 4.4 User Acceptance Testing (UAT)

5 Deployment and Implementation

- 5.1 Server & Database Setup
- 5.2 Software Installation
- 5.3 Data Migration from legacy systems
- 5.4 CIo-Line and Monitoring.

6 Training & Documentation

- 6.1 Employee Training sessions
- 6.2 User Manuals & Technical Documentation
- 6.3 Customer support training
- 6.4 Troubleshooting guide.

7 Maintenance & Support

- 7.1 Bug Fixes and Updates
- 7.2 System Performance & Monitoring
- 7.3 Customer Support & Helpdesk
- 7.4 Future Enhancements & Upgrades

(ii) Responsibility Assignment Matrix(RAM)

The Responsibility matrix (RACI matrix) defines roles and responsibilities of different team members for each major task in the project.

Task / Activity	Project manager	Business Analyst	Software Developer	Testers	IT Support.	Bank Staff
Requirement Analysis	R	A	C	-	-	I
System Design	R	C	A	-	I	I
Software Development	C	I	A	-	-	I
Testing	I	C	C	A	-	R
Integration & Deployment	R	C	A	C	I	I
Training & Documentation	R	A	C	-	I	C
Maintenance Support	R	C	C	-	A	I

Q5] Explain software configuration Management in detail.

Ans: Software configuration Management (SCM) is a systematic approach to managing changes in software throughout its development lifecycle.

→ It ensures that software modifications are well-tracked, controlled & documentatized to maintain consistency, integrit

and reliability.

Objectives of SCM

- (i) Version Control :- Tracks different versions of software & ensure smooth updates
- (ii) Change Management :- Manages modifications in code, design, and documentation systematically
- (iii) Configuration Identification :- Establishes a structured way to identify software components
- (iv) Configuration Control :- Ensures that changes are reviewed & appraised before implementation
- (v) Auditing & Status Accounting :- Keeps record of software changes, for transparency & traceability
- (vi) Build & Release Management :- Helps in controlled software releases & deployment

SCM Process Components:

- (i) Configuration Identification :-
 - Defines all items in the software system that need to be managed (eg - source code, documents, libraries)
- (ii) Configuration Control:
 - controls modification to config items through an appraisal process
- (iii) Version Control:
 - Maintains different versions of software to avoid conflicts and loss of work. Uses VCS like Git.
- (iv) Change Management:
 - Tracks all changes made to software & ensures proper documentation
- (v) Config Audits & Reviews
 - conducts audits to ensure software is in the expected state

Tools & techniques used in SCM

(i) Version control systems

Cit :- Distributed version control

SVM :- distributed version control

(ii) Build & Release management tools:

→ Jenkins, GitHub → Automate software builds & deployments

(iii) Issue & Change Tracking tools:-

→ JIRA → tracks schedule, bugs, issues.

Q6] Explain the significance of Gantt charts in project management

Ans A Gantt chart is a visual project management tool that represents a project's schedule over time

Key Features of Gantt charts:-

- Task Representation :- Displays project tasks as horizontal bars along a pipeline.
- Time Scheduling :- Shows start & end dates for each task.
- Dependencies :- Illustrates relationships between tasks
- Progress Tracking :- Allows teams to update completion status
- Resource Allocation :- Helps in assigning resources efficiently

Importance of Gantt charts

1. Clear Project Planning & Scheduling
- Provides a structured breakdown of tasks & milestones
- Helps in defining deadlines & realistic expectations
2. Task Dependencies
- Shows which tasks depend on others, ensuring proper sequencing
- Helps identify the critical path.

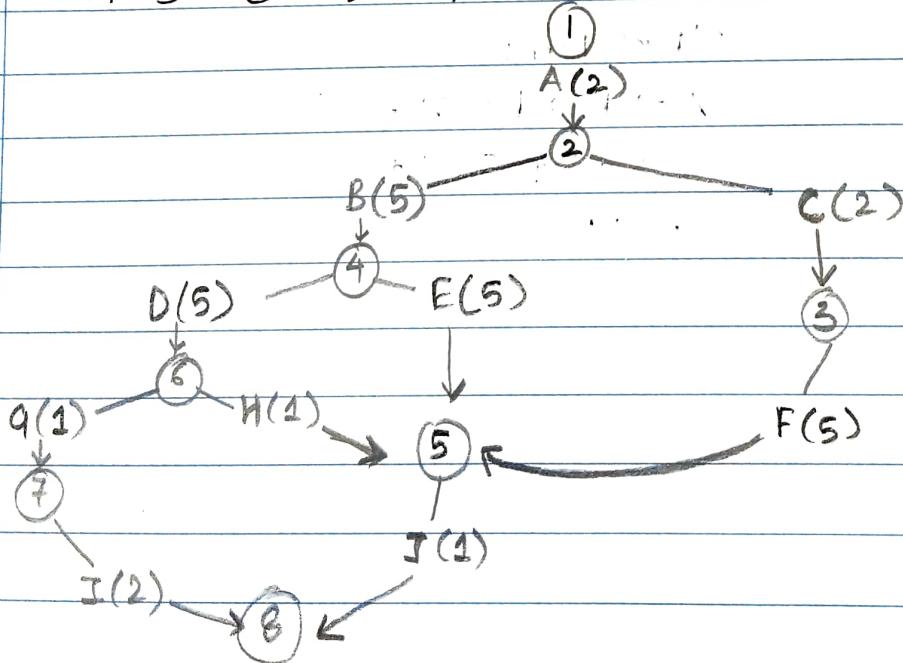
- 3. Resource Allocation & Workload Balancing :-
- Ensures resources are allocated efficiently
- Avoids resource overloading
- 4. Real Time Progress Tracking
- Helps teams monitor progress by updating task completion percentages
- Identifies delays early.
- 5. Helps in Risk Management
- Identifies Potential Bottlenecks & delays before they become critical issues
- Allows for contingency planning if tasks falls behind the schedule

Q7] Draw the AON & AOA network diagram for the following project & show the critical path

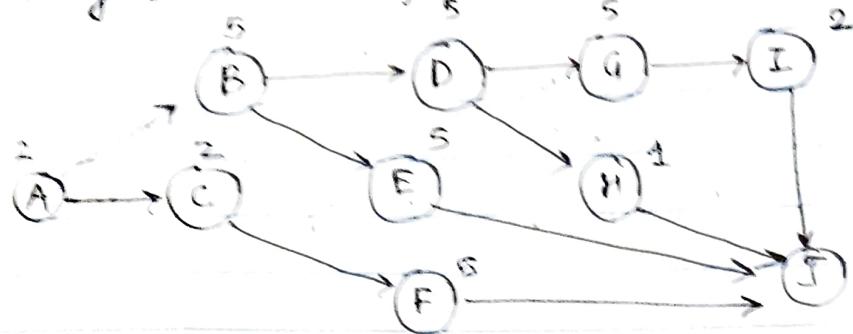
Activity	A	B	C	D	E	F	G	H	I	J
Time	2	5	2	5	5	5	1	1	2	1
Immediate Predecessor	-	A	A	B	B	C	D	D	G	E, F, H

AON :- For the given predecessors ; identify the various paths & calculate the duration

$A \rightarrow B \rightarrow C \rightarrow D \rightarrow G \rightarrow I$



Activity on Node Diagram (ADN)



Critical Path Calculation

Forward Pass :-

$$A \Rightarrow ES = 0, EF = .2$$

$$B \Rightarrow ES = 2, EF = 5+2=7$$

$$C \Rightarrow ES = 2, EF = 2+2=4$$

$$D \Rightarrow ES = 7, EF = 7+5=12$$

$$E \Rightarrow ES = 7, EF = 7+5=12$$

$$F \Rightarrow ES = 4, EF = 4+5=9$$

$$G \Rightarrow ES = 12, EF = 12+1=13$$

$$H \Rightarrow ES = 12, EF = 12+1=13$$

$$I \Rightarrow ES = 13, EF = 13+2=15$$

$$J \Rightarrow ES = 15, EF = 15+1=16$$

Backward pass

$$J \Rightarrow LF = 16, LS = 16-1=15$$

$$I \Rightarrow LF = 15, LS = 15-2=13$$

$$H \Rightarrow LF = 13, LS = 13-1=12$$

$$F \Rightarrow LF = 15, LS = 15-5=10$$

$$E \Rightarrow LF = 15, LS = 15-5=10$$

$$G \Rightarrow LF = 13, LS = 13-1=12$$

$$D \Rightarrow LF = 12, LS = 12-5=7$$

$$C \Rightarrow LF = 10, LS = 10-2=8$$

$$B \Rightarrow LF = 7, LS = 7-5=2$$

$$A \Rightarrow LF = 2, LS = 2-2=0$$

Slack :-

$$A \Rightarrow 0 - 0 = 0$$

$$B \Rightarrow 2-2 = 0$$

$$C \Rightarrow 13-4 = 7$$

$$D \Rightarrow 7-7 = 0$$

$$E \Rightarrow 15-12=3$$

$$F \Rightarrow 15-9=6$$

$$G \Rightarrow 13-13=0$$

$$H \Rightarrow 12-12=0$$

$$I \Rightarrow 15-15=0$$

$$J \Rightarrow 16-16=0$$

Critical Path:-

$$A \rightarrow B \rightarrow D \rightarrow H \rightarrow J$$

$$= 2 + 5 + 5 + 1 + 1$$

$$= 14$$