Software Project Management

Unit 3 Activity Planning and Risk Management

Nov-Dec 2022

Q 1 a) Explain objectives of activity planning in detail with suitable example.

Q 1 b) List different project scheduling techniques Explain the difference between CPM and PERT

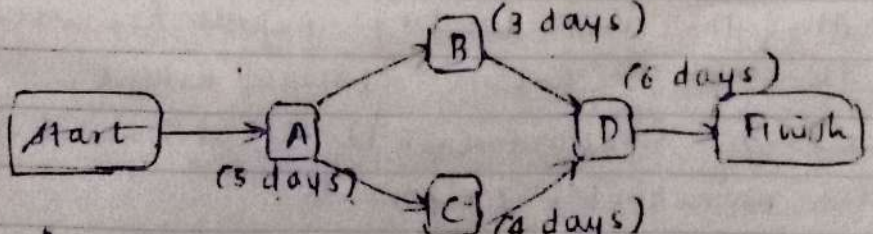
Ans. Project scheduling Techniques

Several techniques are used to plan, schedule, and control project activities.

1. Gantt chart: A bar chart showing activities vs time. Simple visual representation of schedule progress
2. Critical Path Method (CPM) Determines the longest path of activities and earliest/latest times Used for projects with predictable activity durations
3. Program Evaluation and Review Technique (PERT) Uses probabilistic time estimates for uncertain activities Suitable for research and development projects
4. Critical Chain Project Management (CCPM) Focuses on resource availability and buffers. Minimizes multitasking and delays.
5. Line of Balance (LOB): Used for repetitive production processes (e.g., construction units)
6. Resource Allocation and Leveling: Adjusts Resources to minimize conflict & ensure optimal usage
7. Work Breakdown Structure (WBS). Breakdown of project into smaller manageable components.

Basis	CPM (Critical Path Method)	PERT (Program Evaluation and Review Technique)
Nature of Project	Deterministic	Probabilistic
Time Estimates	Single fixed time estimate for each activity	Three time estimates (optimistic, pessimistic, most likely)
Focus	Minimizing time and cost	Estimating time when uncertainty exists
Type of Projects	Construction, manufacturing, routine projects	R&D, defence, new product development
Activity Duration	Known and predictable	Uncertain and variable
Critical Path	Well defined	Not clearly defined, probability used
Cost Control	Emphasized	Not emphasized
Use	Scheduling and controlling projects	Planning and analysing time estimates

Q2 a) What is network Model? Explain the with neat sketch thus



A network model (or network diagram) is a graphical representation of a project's activities and the logical relationships between them.

It shows the sequence of activities, their dependencies, and the flow of work in a project. A network model helps in:

Identifying the critical path
- Determining project duration
- Coordinating and monitoring project progress

Understanding activity dependencies

Network diagrams are commonly used in CPM (Critical Path Method) and PERT (Program Evaluation and Review Technique)

Components

- Nodes (Events / Activities): Represent tasks or milestones
- Arrows: Show the order or dependency between tasks
- Paths: Routes from start to finish through the network
- Critical Path: Longest Path determining minimum project time.
- Activity A must be completed before B or C can start
- B and C can run in parallel
- Both B and C must finish before D starts
- D leads to project completion.

* Paths:

- Path 1: A → B → D = 5 + 3 + 6 = 14 days
- Path 2: A → C → D = 5 + 4 + 6 = 15 days

* Critical Path

- Longest Path: A → C → D (15 days)

A network model visually maps project tasks and relationships, making it easier to plan, analyze time, and monitor project progress.

May-Jun 2023

Q 1 b) What is Project Risk Management? What are the RM processes?

Ans Project Risk Management (PRM) is the process of identifying, analyzing, and responding to potential risks that may affect a project's objectives such as time, cost, quality, or scope. It involves assessing uncertain events and taking proactive actions to minimize threats and maximize opportunities.

Goals of RM

- Reduce the probability and impact of negative risks (threats)
- Increase the probability and impact of positive risks (opportunities)

Improve decision-making and project success rate

RM Processes

1. Risk Identification: Identify and document potential risks that could affect the project (threats and opportunities). Tools: brainstorming, checklists, SWOT, expert judgement.
2. Risk Analysis: Determine likelihood and impact of each risk. Two types: Qualitative (priority ranking) and Quantitative (numeric assessment).
3. Risk Prioritization / Risk Evaluation: Rank risks based on severity and decide which require urgent response. Often uses a risk matrix.
4. Risk Response planning: Develop strategies to deal with risks: avoid, mitigate, transfer, accept for threats; exploit, enhance, share, accept for opportunities.
5. Risk Monitoring and Control: Track risks, implement response plans, monitor new risks, and update the risk register throughout the project.

Risk Management cycle

Identify → Analyze → Prioritize → Plan Response → Monitor/Control → Review/Update

Project Risk Management is essential for ensuring project success by proactively managing uncertainties. It helps in preventing failures, reducing losses, and improving planning accuracy.

Q 2 a) Describe IT Project Risk Identification Framework Explain the types of risk with examples.

Ans An IT Project Risk Identification framework is a structured approach for discovering, documenting, and prioritizing potential risks that could negatively affect the outcome of an IT project. Its purpose is to proactively surface uncertainties before they escalate into major issues, enabling better planning, decision-making and mitigation strategies.

Core Components

1. Risk Context Definition
   - Establish project scope, objectives, stakeholders, and constraints.
   - Understand the project environment (technical, regulatory, organizational).
2. Risk Categories

Organizing risks into categories makes identification more systematic, such as:

- Technical risks - software complexity, integration challenges, technology maturity.
- Project management risks - scheduling, budgeting, resource allocation.
- Operational risks - process failures, support readiness, scalability.
- Security and compliance risks - data protection, regulatory requirements
- Vendor and third-party risks - dependency failures, contract issues.

Stakeholder and People risks - resistance to change, communication breakdowns

3. Risk Identification Techniques

Brainstorming sessions, expert interviews, SWOT analysis, Work Breakdown Structure (WBS) review, lessons learned from past projects, root cause analysis, checklists and risk libraries, user surveys and workshops, assumption and constraint analysis.

4. Risk Documentation

- Capture risks in a Risk Register, typically including: Risk description and category, probability and severity, impacted areas (scope, cost, time, quality), risk owner, mitigation and contingency plans, status tracking.

5. Risk Prioritization

- Assess each risk via:
  - Probability x Impact Matrix
  - Risk scoring or qualitative ranking (high, medium, low)
- Visual tools such as heat maps or risk dashboards

6. Communication and Review

- Regular reporting and risk review meetings
- Update risk register throughout the project lifecycle
- Tools such as Jira, MS Project, or risk management platforms.

Benefits

1. Prevents major project failures: Risks surfaced early allow proactive mitigation.
2. Improves resource and budget planning: Helps determine where attention is needed.
3. Enhances stakeholder confidence: Transparent risk tracking improves trust
4. Supports continuous improvement: Lessons learned feed future project frameworks.

Process flow

Initiate → Identify Risks → Document → Analyze and Prioritize → Mitigate & Monitor → Review and Communicate Continuously

e.g. Outputs: Risk Register, Risk Heat Map, Mitigation Strategy Plan, Lessons-learned Documentation.

A well-structured IT Project Risk Identification Framework provides a repeatable and scalable method to uncover potential threats and uncertainties, reducing surprises and increasing the likelihood of project success. It is integral to strong project governance and continuous improvement.

Q 2 b) How do Network Diagrams help in Project Planning? Define Predecessor, Successor, and Parallel Activities. Give a real-world example of each.

Ans A network diagram is a visual representation of a project's activities and their dependencies. It shows the sequence in which tasks must be performed, illustrating relationships between activities, critical paths, and potential bottlenecks. Network diagrams are widely used in project scheduling methods such as Critical Path Method (CPM) and Program Evaluation Review Technique (PERT).

Benefits

- Clarifies task sequencing: Shows the logical order of activities and dependency links.
- Identifies the critical path: Highlights the longest sequence of tasks determining total project duration.
- Improves time estimation: Helps forecast schedules based on task duration and dependencies.
- Supports resource planning: Identifies task overlaps and resource conflicts.
- Enhances risk management: Makes bottlenecks and schedule risks easier to detect.

Improves communication: Provides a visual tool for team, stakeholders, and decision-makers.

1 Predecessor Activity

A predecessor is a task that must be completed before another task can begin. It directly determines the start of its dependent activity.

e.g. In building a website:

- Task A: Requirements Gathering
- Task B: Create UI Wireframes

Here, Requirements Gathering is the predecessor to Create UI wireframes, because wireframes cannot be developed until requirements are defined.

2 Successor Activity

A successor is a task that cannot begin until another task (its predecessor) is finished. It follows in sequence.

e.g. Using the same project:

- Task B: Create UI Wireframes (predecessor)
- Task C: Front-end development

Front-end development is the successor because it must wait for wireframes to be approved.

3 Parallel (or Concurrent) Activities

Parallel activities are tasks that can occur simultaneously because they are not dependent on each other.

e.g. In IT system rollout:

- Task D: User training material preparation
- Task E: Server configuration setup

These can be done in parallel, since training materials do not depend on server configuration work.

NOV - DEC 2023

Q1 a) Explain the difference between the Critical Path Method (CPM) and the Program Evaluation Review Technique

SPM

1. Explain objectives of activity planning in detail with suitable example (PERT) formulate a network model for a simple project using either CPM or PERT, and calculate the early start, early finish, late start, and late finish dates for each activity.

Ans. using CPM

Activity	Description	Duration (days)	Predecessor(s)
A	Requirements Gathering	4	–
B	System Design	3	A
C	Database setup	5	A
D	UI Development	6	B
E	System Integration	4	C, D
F	Testing	3	E

Step 1 forward path (ES & EF)

- ES = Maximum of EF of predecessor(s)
- EF = ES + duration.

Activity	Duration	Predecessor(s)	ES	EF
A	4	–	0	4
B	3	A	4	7
C	5	A	4	9
D	6	B	7	13
E	4	C, D	max(9,13)=13	17
F	3	E	17	20

Project Duration = 20 days

Step 2 Backward Pass (LS and LF)

- LF = Min LF of successors
- LS = LF - Duration

Activity	Duration	Successor	LF	LS
F	3	–	20	17
E	4	F	17	13
D	6	E	13	7
C	5	E	13	8
B	3	D	7	4
A	4	B, C	min(4,8) = 4	0

- LF(F) = 20 ; LS(F) = 20 - 3 = 17

E pred of F, so LF(E) = LS(F) = 17
LS(E) = 17 - 4 = 13

Project Schedule Table

Activity	Duration	ES	EF	LS	LF	Slack
A	4	0	4	0	4	0
B	3	4	7	4	7	0
C	5	(4)	9	(8)	13	4
D	6	7	13	7	13	0
E	4	13	17	13	17	0
F	3	17	20	17	20	0

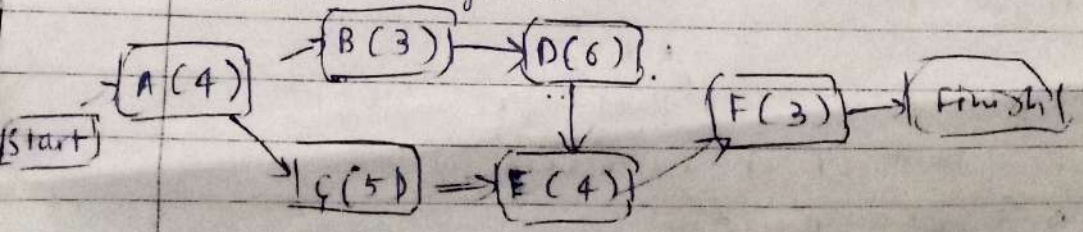
diff in slack

Critical Path: Critical path is the longest path through the network with zero slack.

Critical path sequence: A → B → D → E → F

Total duration = 20 days

Network diagram:



Q1 b) Explain the objectives of activity planning and discuss the different types of project schedules. Describe the steps involved in sequencing and scheduling activities.

Ans: Types of project schedules

Project schedules represent the planned timeline for activities and tasks. Common types include:

1. Master / Project Summary Schedule
   - A high-level schedule that outlines key milestones and major phases.
   - Used by senior management for decision-making and monitoring progress.
2. Detailed schedule
   - Contains all tasks, dependencies, resource assignments, and time estimates.
   - ~~It~~ Used by the project team for executing day-to-day work.
3. Milestone Schedule
   - Focuses only on major deliverables and checkpoints.
   - Useful for stakeholder reporting and tracking major accomplishments.
4. Baseline Schedule
   - The approved final version of the schedule used to measure performance.
   - Any deviation from the baseline indicates delays or changes.
5. Rolling Wave (Progressive) Schedule
   - Developed in stages: near-term work is scheduled in detail, future work planned at a high level.
   - Useful when project details evolve.
6. Resource-Loaded Schedule
   - Includes specific resource allocation (people, equipment, budget)
   - Helps identify resource shortages or over-allocations.

Steps in Sequencing Activities

Sequencing activities is the process of determining the logical order in which project tasks must be executed based on their dependencies.

Step 1: Identify Activities: Use the Work Breakdown Structure (WBS) to list all required tasks.

Step 2: Determine Activity Relationships / Dependencies: Identify dependencies such as:

- Finish-to-Start (FS)
- Start-to-Start (SS)
- Finish-to-Finish (FF)
- Start-to-Finish (SF)

Step 3: Identify Constraints: Identify limitations such as deadlines, resource availability, or technical requirements.

Step 4: Sequence the Activities: Arrange activities in the correct order using:

- Network diagrams
- Precedence Diagramming Method (PDM)

5. Develop the Activity Relationship Diagram: Create a visual representation showing the flow and connections among tasks.

Steps in Scheduling Activities

Scheduling activities is the process of assigning time estimates, resources, and dates to the sequenced tasks to create an executable project timeline.

Step 1: Estimate Activity Durations: Use expert judgement, historical data, PERT, or three-point estimating.

Step 2: Assign Resources: Allocate people, equipment, and materials to each activity.

Step 3: Calculate the Critical Path: Use the Critical Path Method (CPM) to determine the longest path and shortest project duration.

Step 4 Develop the Schedule: Convert the network logic with a calendar format using.
- Gantt chart
- CPM schedule
- Project management software (MS Project, Primavera)

Step 5 Optimize / Adjust the Schedule: Apply techniques like:
- Resource Levelling
- Crashing
- Fast-tracking

Step 6. Set the Schedule Baseline: Approve the schedule and lock it for performance tracking.

Step 7: Monitor and control the schedule compare actual vs. planned progress and revise as needed.

Q12 a) Explain the different risk response strategies and how to evaluate the risk to the schedule

Ans Risk response strategies are actions taken to address identified project risks They differ for negative (threats) and positive (opportunities) risks.

A. Strategies for Negative Risks (Threats)

1. Avoid
Eliminating the risk entirely by changing the project plan.
- e.g., using a proven technology instead of an experimental one to avoid technical failure.

2. Mitigate
- Reducing the probability or impact of the risk
- e.g., additional training to reduce errors, adding quality checks.

3. Transfer
Shifting responsibility to a third party
- e.g. insurance, outsourcing specialized work, warranties, performance bonds.

4. Accept
Taking no action unless risk occurs

- Passive acceptance: no plan until the risk happens
- Active acceptance: preparing contingency reserves or backup plans.

B. Strategies for Positive Risks (Opportunities)

1. Exploit
   - Ensuring that opportunity definitely happens
   - e.g., assigning the best team to finish work early
2. Enhance
   - Increases the chance of benefit of the opportunity
   - e.g, improving processes to gain faster results
3. Share
   - Partnering with another party to maximize benefits
   - e.g, forming joint ventures for market expansion
4. Accept
   Taking advantage if it occurs, but not actively pursuing it.

How to Evaluate Risk to the Schedule

Evaluating Schedule Risks involves assessing how uncertainties could affect project timelines

Step 1: Identify Schedule Risks
Use tools like brainstorming, expert judgement, historical data, and risk registers.

Step 2: Perform Qualitative Risk Analysis.
- Prioritize risks based on:
  - Probability (Likelihood to occur)
  - Impact (effect on schedule if it occurs)
- Use a probability-impact matrix to rank risks from low to high.

Step 3: Perform Quantitative Schedule Analysis
Analyze the numerical effect of schedule risks using techniques such as:
- Schedule Risk Analysis / Simulation

Monte Carlo analysis to calculate likely completion dates
Sensitivity analysis (e.g., Tornado diagrams) to identify the biggest risk drivers.

Step 4 Determine the critical path
Identify tasks with zero float and analyze potential delays.
Any risk affecting critical path directly impacts project completion time.

~~Step 5:~~ ~~Determine the Critical Path~~
~~Identify tasks with zero float and analyze potential delays.~~

Step 5. Evaluate ~~the~~ Contingency and Reserves
Add buffer time for high-risk activities
Include management reserves for unknown risks.

Step 6: Create Response and Contingency Plans
Plan actions that will prevent or reduce the effect of schedule delays.

Step 7: Monitor and Control Schedule Risks
Track warning indicators and update the risk register regularly.

q(2b) ~~Explain the different risk response strategies and tools to evaluate the risk to~~

q(2b) Define risk management and explain the different stages of the risk management process. Discuss the different techniques for risk identification and prioritization.

Ans Risk Management
Risk management is the systematic process of identifying, analyzing, evaluating, and responding to risks throughout the project lifecycle. to minimize negative impacts (threats) and maximize positive

outcomes (opportunities). It ensures project objectives such as time, cost, quality, and scope are achieved despite uncertainties

Stages of RM Process

1. Risk Identification
   - Recognizing potential risks that could affect the project.
   - Producing a risk register listing all risks, causes, and possible effects.
2. Risk Analysis

   Risk analysis can be
   - Qualitative Analysis: Assessing risks based on probability and impact to determine priorities.
   - Quantitative Analysis: Numerical evaluation of effects on project objectives such as schedule, cost, and deliverables.
3. Risk Evaluation / Prioritization
   - Ranking risks based on significance so that the most critical risks are addressed first.
   - Use tools such as probability – impact matrix or risk scoring.
4. Risk Response Planning
   - Determining strategies to handle identified risks
   - For Threats: avoid, mitigate, transfer, accept.

     For opportunities: exploit, enhance, share, accept.
5. Risk Monitoring and Control
   - Track identified risks and evaluating effectiveness of response plans.
   - Identifying new risks and making adjustments as necessary.
   - Updating the risk register and reporting status.

Techniques for Risk Identification

- Brainstorming: Group discussion among stakeholders to list possible risks.
- Interviews/Expert Judgement: One-on-One discussions with experienced experts.
- SWOT Analysis: Identifying strengths, weaknesses, opportunities, and threats.
- Delphi Technique: Anonymous expert feedback aggregated to reach consensus.
- Checklist Analysis: Using past project checklists or industry standards to identify risks.
- Root Cause Analysis: Identifying underlying causes rather than symptoms.
- Assumption Analysis: Reviewing project assumptions to uncover areas of uncertainty.
- Documentation/Lessons Learned Review: Reviewing historical data from previous similar projects.
- Work Breakdown Structure (WBS) Review: Identifying risks associated with each component of work.

Techniques for Risk Prioritization

- Probability-Impact Matrix: Categorizes risks based on likelihood and severity (Low, Medium, High).
- Risk scoring/Risk Index: Numerical calculation: Risk score = Probability x Impact.
- Pareto Analysis (80/20 Rule): Helps focus on critical few risks causing most problems.
- Sensitivity Analysis/Tornado Diagram: Shows which risks have the highest effect on the project.
- Failure Mode and Effects Analysis (FMEA): Assigns

Risk Priority Numbers (RPN) to failures.
Expected Monetary Value ~~(EVM~~ (EMV): Calculates financial impact EMV = Probability x Cost.
Monte Carlo Simulation: Uses statistical modeling to see possible project outcomes.

Nov - Dec 2024

Q1 b) With the neat sketch explain formulating a network model.

Ans. A network model is a graphical representation of the sequence and interdependencees of project activities. It is used in project scheduling tools such as CPM (Critical Path Method) and PERT to determine the logical order of tasks and the total project duration...
The network model helps to:
Show relationships between activities
Identify the critical path (longest path through the network)
Detect parallel activities and dependencies
Plan resource allocation and scheduling

Steps in Formulating a Network Model

1 List all activities: Identify project tasks, usually derived from the Work Breakdown Structure (WBS), and label them (e.g., A, B, C, ...)
2 Identify Dependencies: Determine which tasks must be completed before others can start (precedence relationships).
3 Arrange Activities in Sequence: Place them in ordered flow from project start to finish.

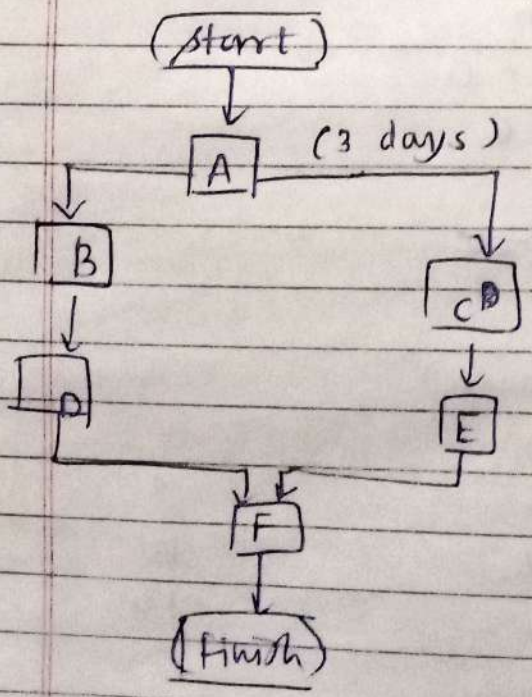
4 Draw the Network Diagram use nodes (circles or boxes) to represent activities and arrows to show precedence (flow of work).

5 Assign Activity Durations Specify estimated time needed specify estim for each activity.

6 Analyse the Network Calculate Earliest Start (ES), earliest Finish (EF), latest start (LS), latest finish (LF), and float / slack to find the critical path.

Activity	Description	Predecessor	Duration (days)
A	Requirements	-	3
B	Design	A	4
C	Procurement	A	35
D	Development	B	6
E	Installation	C	3
F	Testing	D, E	4

Network Diagram (Arrow Flow Diagram)



Arrows show the sequence of activities
Boxes / nodes represent activities with durations

- Activities D and E must finish before F can start (convergence in the network)
- Critical path calculation would identify the longest duration route.

Q 2 b) Describe with an example how the effect of risk on project schedule is evaluated using PERT

Ans PERT (Program Evaluation and Review Technique) is used to estimate activity durations by considering uncertainty and risk. Instead of using a single deterministic duration, PERT uses three time estimates.

- O - Optimistic Time: Duration if everything goes better than expected.
- M - Most likely time: Normal expected duration
- P - Pessimistic Time: Duration if major problems occur.

PERT Expected Time formula

$$\text{Expected Duration (TE)} = \frac{O + 4M + P}{6}$$

PERT Standard Deviation

$$SD = \frac{P - O}{6}$$

Variance

$$\text{Variance} = SD^2$$

e.g. Activity	O (days)	M (days)	P (days)
A	4	6	8
B	5	7	13
C	2	4	10

Step 1: Calculate Expected Time (TE)

Activity A

$TE_A = \frac{4+4(6)+8}{6} = \frac{4+24+8}{6} = \frac{36}{6} = 6$ days

Activity B

$TE_B = \frac{5+4(7)+13}{6} = \frac{5+28+13}{6} = \frac{46}{6} \approx 7.67$ days

Activity C

$TE_C = \frac{2+4(4)+10}{6} = \frac{2+16+10}{6} = \frac{28}{6} \approx 4.67$ days.

Step 2 Calculate Standard Deviation

Activity	SD formula	SD value
A	(8-4)/6	0.67
B	(13-5)/6	1.33
C	(10-2)/6	1.33

Step 3. Calculate Total Expected Project Duration

$TE_{total} = 6 + 7.67 + 4.67 = 18.34$ days

Step 4. Calculate Total Standard Deviation

$SD_{total} = \sqrt{0.67^2 + 1.33^2 + 1.33^2} = \sqrt{0.45 + 1.77 + 1.77}$

≈ 2.0 days

Evaluating the Likelihood of Completing the Project Within a Target Time

Suppose management wants to know the probability of completing the project in 20 days

Z-score formula

$Z = \frac{(Target - TE_{total})}{SD_{total}} = \frac{20 - 18.34}{2} = \frac{1.66}{2} \approx 0.83$

Using the standard normal distribution table:
$Z = 0.83$ corresponds to a probability of ~ 0.797 (79.7%)
There is approximately an 80% chance of completing the project within 20 days.

* Risk Management Tools

1) SpiraPlan (Inflectra)

- SpiraPlan is primarily a project/program management platform but includes a fully integrated risk management module.
- In SpiraPlan risks are treated as first-class artifacts (separate from defects/issues), each with their own type (e.g., schedule risk, technical risk, business risk), attributes and lifecycle workflow.

Typical risk attributes include Probability, Impact, and Exposure (Probability x Impact), which helps rank and prioritize risks.

For each risk, you can assign an owner, link it to project releases/components, set review dates (risks evolve over time), and track its status.

SpiraPlan supports risk mitigations: you can define mitigation strategies, schedule tasks to implement mitigations, and link these back to the parent risk - so risk management becomes part of your project execution workflow.

Audit trails and history tracking are built in - meaning any change in risk status, impact or mitigation is recorded for accountability.

SpiraPlan also supports advanced risk analysis frameworks like Failure Mode and Effects Analysis (FMEA), useful especially in safety-critical or hardware projects.

Reporting and dashboards: risk register views, "risk-cube" (matrix of probability vs impact), summary, detailed reports (HTML/ Excel, / PDF / etc.) let stakeholders see risk exposure at a glance.
SpiraPlan works well for software development, IT projects, or other projects where risk needs to be integrated into the project lifecycle - especially when you also want to manage requirements, tasks, releases, Q.A, etc. from the same tool.

2) Risk Management Studio
"Risk Management Studio" as a generic tool name typically refers to specialized tools that focus solely on risk management (rather than full project management). Their purpose is to document risks, assess them, prioritize, track mitigation, and report - possibly across projects or portfolios. This type of tool embodies what risk-management tools more broadly aim to.
Advantages: Because they are dedicated, they may offer more flexible/customizable risk-identification frameworks, richer risk-analysis options (e.g. probabilistic models, Monte Carlo simulations, sensitivity analysis), advanced reporting and dashboards, and possibly support for enterprise-level risk management (multiple projects, aggregated risk heat maps, cross-project risk dependencies).
Typical risk management stages supported: risk register creation, risk scoring (probability x impact or other metrics), prioritization, mitigation, ~~monitoring~~, or where compliance (regulatory or cross-project risk oversight is needed.

3) GRC cloud (Resolver Systems)

- GRC cloud is a GRC-class tool (governance, risk, compliance) that supports risk management, security management, and incident management
- For risk, it supports risk assessment, documentation, scoring, prioritization, and tracking - similar to dedicated risk tools. Risks are often given a "risk score" (based on likelihood, impact, etc.) and risk-areas can be visualized with a heat map.
- Alerts and automated notifications are supported - e.g. when risk status changes, upcoming review dates, or when risk thresholds are crossed.
- Because it's a GRC tool, it helps integrate risk management with broader compliance and governance requirements - helpful for organizations regulated by laws, standards or internal policies.
- Useful in environments where risk is not only about project schedule or technical uncertainty - but also compliance risk, financial risk, operational risk, security risk, or regulatory risk.

e.g. Enterprises needing enterprise-wide risk & compliance oversight - for example, in manufacturing, healthcare, finance, IT, infrastructure, or any regulated industry.

Assignment No. 3

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Date

Unit III: Activity Planning and Risk Management

Q 1. What are objectives of activity planning? Explain in detail.

Ans Objectives of activity planning are the goals that guide process of identifying, sequencing, and scheduling activity in a project or any organized effort. Activity planning ensures that work is structured, resources are efficiently allocated, and timelines are realistic.

Main objectives:

1. Define project activity clearly: Break down project into manageable tasks to avoid ambiguity and confusion.
2. Establish dependencies: Identify logical dependencies between tasks (which activities must precede or follow others).
3. Estimate resources and durations: Assess the time, manpower, equipment, and budget required for each activity.
4. Develop a realistic schedule: sequence time and activities to create an achievable project timeline.
5. Identify critical activities: Highlight the tasks that directly affect project completion (critical path).
6. Support coordination and communication: Provide a clear plan that team and stakeholders can follow, reducing misunderstandings.
7. Facilitate monitoring and control: serve as a baseline for tracking progress, managing delays, and making adjustments.
8. Optimize resource utilization: Balance workloads and minimize bottlenecks by allocating resources effectively.

complete the project efficiently.

Q.12 What are forward and backward pass?

Ans. 1. Forward Pass

- Purpose: To calculate the Earliest Start (ES) and Earliest Finish (EF) times of each activity.

1. Start from the beginning of the network
2. Move forward through activities.
3. Apply:
   - EF = ES + Duration
   - Successor's ES = Maximum EF of all of its predecessors
- Result: You get minimum project duration (earliest completion time).
- Example:
- Activity A (5 days) starts at day 0 → EF = 0+5 = 5
- Activity B (10 days), depends on A) = ES = 5, EF = 15

2. Backward Pass

- Purpose: To calculate the Latest Start (LS) and Latest Finish (LF) times of each activity (without delaying the project).

1. Start from the end of the network (project completion).
2. Move backward through activities.
3. Apply:
   - LS: LF - Duration
   - Predecessor's LF = Minimum LS of all its successors.
- Result: You identify stack (float) and critical path.
- Example:
- If project must finish by day 15:
  - Activity B (10 days) → LF = 15 → LS = 15 - 10 = 5
  - Activity A (5 days) → LF = 5 → LS = 5 - 5 = 0

Q.13. What is activity table? Explain activity table of forward pass.

Aspect	Forward Pass	Backward Pass
Purpose	Calculates earliest times (Earliest start - ES, Earliest Finish - EF) for activities	Calculates latest times (Latest start - LS, Latest Finish - LF) for activities
Direction of Calculation	Moves left → right (from project start to finish).	Moves right → left (from project finish to start)
Formula	EF = ES + Duration	LS = LF - Duration
Dependency Rule	If activity has multiple predecessors → ES = maximum EF of predecessors.	If activity has multiple successors → LF = minimum LS of successors.
Result	Finds earliest project completion time.	Finds latest allowable start/finish times without delaying the project.
Usefulness	Helps schedule tasks as early as possible.	Helps determine slack and identify the critical path.
Starting Point	Start event (ES = 0).	End event (LF = project duration from forward pass).

Q.15 What do you understand by critical path?

Ans The critical path is longest path through a