

Department of Computer Science and Information Technology

Name				Id	
Course	CSCI380 Software Engineering				
Date		Time		Duration	60 minutes
Pages		Calculators	Not Allowed	Documents	Not Allowed

### Question I: [50 points] Choose the correct answers

#### Part MCQ (40 points = 20x2)

- What is the primary goal of software engineering?**
  - To write code as quickly as possible
  - To minimize the cost of hardware
  - To create efficient and reliable software systems
  - To generate profit from software sales
- What is a primary benefit of applying software engineering principles?**
  - Improved software quality and maintainability.
  - Reduced software reliability.
  - Increased development costs.
  - Faster development without regard to quality
- How does software engineering contribute to cost-effectiveness in software development?**
  - By increasing development costs through complex methodologies.
  - By providing techniques for efficient resource management and defect prevention.
  - By encouraging developers to waste resources on unnecessary features.
  - By ignoring the need for budgeting and planning.
- Maintenance can be:**
  - Corrective
  - Perfective
  - Adaptive
  - All of the above
- Which SDLC model is risk-driven and combines elements of both the waterfall and iterative approaches?**
  - V-Model
  - Rapid Prototype Model
  - Waterfall Model
  - Spiral Model
- Which model is most suitable for projects with well-defined requirements and minimal changes expected?**
  - Spiral Model
  - Rapid Prototype Model
  - Waterfall Model
  - All of the above
- In the Spiral Model, what does each iteration represent?**
  - A new version of the final product.
  - A loop through the requirements gathering phase.
  - A risk analysis and prototype development cycle.
  - A test and validation phase.
- When is the Incremental Model most suitable?**
  - For projects with well-defined, stable requirements.
  - For projects with a very short development timeline.
  - For projects where risk management is not a concern.
  - For large projects where requirements are initially unclear

9. What is the primary goal of requirement analysis in the SDLC?
- To write code efficiently.
  - To understand and document the needs of the stakeholders.
  - To design the user interface.
  - To test the software for defects.
10. What is a "functional requirement"?
- A constraint on the software's performance.
  - A specification of the hardware needed.
  - A user interface design guideline.
  - A description of what the software should do.
11. What does "elicitation" mean in the context of requirement analysis?
- Validating the requirements.
  - Discovering and gathering requirements from various sources.
  - Prioritizing the requirements.
  - Translating requirements into code.
12. Which type of feasibility assesses if the proposed solution can be implemented within the available resources?
- Technical feasibility
  - Economic feasibility
  - Schedule feasibility
  - Operational feasibility
13. Which type of feasibility examines whether the proposed system aligns with existing business operations and workflows?
- Technical feasibility
  - Economic feasibility
  - Schedule feasibility
  - Operational feasibility
14. The creeping commitment of a feasibility study contains the following feasibility checkpoints:
- Scope Definition, Problem Analysis, then Decision Analysis
  - Requirement Elicitation, Requirement Analysis, then Requirement Specification
  - Requirement Analysis, Design, Implementation, Testing, then Maintenance
  - Problem Definition, Scope Documentation, Planning, then Decision Making
15. What is the primary goal of Joint Requirements Planning (JRP)?
- To write code during the requirements gathering phase.
  - To facilitate collaborative requirements gathering from stakeholders.
  - To design the user interface without stakeholder input.
  - To replace all other requirement elicitation techniques.
16. What is the role of the "scribe" in a JRP session?
- To document the requirements and decisions.
  - To lead the discussion.
  - To present technical solutions.
  - To test the software prototypes.
17. What is a "project scope" in software project management?
- The budget allocated to the project.
  - The programming language used in the project.
  - The hardware requirements for the project.
  - The detailed description of the deliverables and boundaries of the project.
18. What does "critical path" refer to in project scheduling?
- The shortest path to complete the project.
  - The longest sequence of dependent tasks that determines the shortest possible project duration.
  - The tasks that are most likely to be delayed.
  - The tasks that require the most resources.

**19. What does a functional requirement primarily describe?**

- a. How well the system performs.
- b. The system's security features.
- c. What the system should do.
- d. The user interface design.

**20. What does a non-functional requirement primarily describe?**

- a. How well the system performs or its quality attributes.
- b. The specific features of the system.
- c. The data that the system processes.
- d. The programming language used.

**Part True/False (10 points = 10x1)**

		<b>T / F</b>
<b>1</b>	Decision Support Systems are designed to automate routine administrative tasks within an office environment.	<b>F</b>
<b>2</b>	Office Automation Systems primarily focus on processing high volumes of routine business transactions.	<b>F</b>
<b>3</b>	A key characteristic of Transaction Processing Systems is their flexibility to adapt to non-standard operations.	<b>F</b>
<b>4</b>	Stakeholders are only individuals who will directly use the software being developed.	<b>F</b>
<b>5</b>	Investors and end users are typically considered stakeholders in a software development project	<b>T</b>
<b>6</b>	A software development project manager's ability to clearly define and manage project scope is crucial for preventing scope creep	<b>T</b>
<b>7</b>	A software development project manager should discourage any changes to the project scope once the project plan is finalized to avoid delays	<b>F</b>
<b>8</b>	A feasibility analysis for a software development project primarily aims to determine if the project is likely to be successful and worth the investment	<b>T</b>
<b>9</b>	A feasibility study is typically conducted only at the very beginning of a software development project.	<b>F</b>
<b>10</b>	A well-conducted feasibility study can help identify potential risks and obstacles in a software development project before significant resources are committed.	<b>T</b>

## Question 2: Project Management [50 points]

Consider the following assumption: A project is broken into the tasks shown in the following table along with the dependencies, duration and the need SE & programmer's size for each task.

Task	Duration (months)	Dependency	SE & Programmer
A	2	-	2
B	1	A	1
C	3	B	5
D	4	B	3
E	2	C	4
F	5	C	6
G	3	E, F	3
H	2	D, G	2

### Part A – Gantt:

1. (15 pts) Build the Gantt chart to calculate the duration to finish the project, the number of SE's needed (Minimum number of SEs).

Task	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A	2	2														
B			1													
C				5	5	5										
D				3	3	3	3									
E							4	4								
F							6	6	6	6	6					
G												3	3	3		
H															2	2
# of SE	2	2	1	8	8	8	13	10	6	6	6	3	3	3	2	2

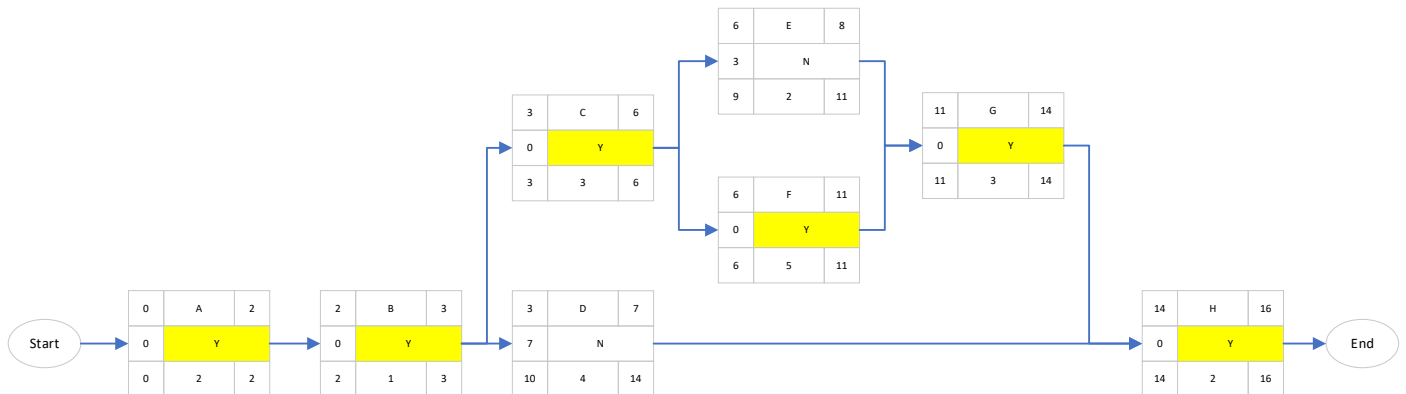
2. (5 pts) Calculate the minimum number of software engineers and programmers that should be employed in this project.

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**Part B – PERT:**

- 3. (15 pts)** Give the PERT graph/chart for the above project, consider that each node should have the following information:

Early Start	Task Number	Early Finish
Slack Time	Critical? Yes or NO	
Late Start	Duration	Late Finish



- 4. (10 pts)** Using the above Pert diagram, find the critical path, explain.

**A – B – C – F – G - H**

- 5. (5 pts)** What do we mean by slack time? explain the usefulness of slack time.

Slack time represents the flexibility in scheduling non-critical activities. It's the difference between the latest time an activity can start or finish and the earliest time it can start or finish. It indicates how much a particular activity can be delayed.

**Usefulness:**

- **Project Flexibility:** provides project managers with flexibility in scheduling
- **Resource Management:** reallocate resources to critical activities

In essence, slack time is a valuable tool for project managers to ensure projects are completed on time and within budget, while also providing the ability to handle unexpected events.