



VIT

Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

REG.NO.:

SCHOOL OF COMPUTER SCIENCE AND ENGINEERING
CONTINUOUS ASSESSMENT TEST - I
WINTER SEMESTER 2024-2025

SLOT: G2 + TG2

Programme Name & Branch : B. Tech. Computer Science and Engineering
Course Code and Course Name : Software Engineering / BCSE 301L
Faculty Name(s) : Dr. POORNIMA N, Dr. KRISHNARAJ N, Dr. RAMESH BABU K, Dr. USHUS ELIZEBETH ZACHARIAH, Dr. PRIYA PONNUSWAMY P, Dr. SHASHANK MOULI SATAPATHY, Dr. ANTO S, Dr. BAIJU B V, Dr. PRABIN S M, Dr. DEEPA.K, Dr. SAURABH AGRAWAL, Dr. DEEPIKA J, Dr. BASKARAN P, Dr. NAVEENKUMAR J, Dr. SIVAPRAKASH S, Dr. ANAND BIHARI, Dr. ADRIJA BHATTACHARYA, Dr. SAMRIDDI SARKAR, Dr. BHAWANA TYAGI

Class Number(s) : VL2024250505798, VL2024250502260, VL2024250502306, VL2024250502232, VL2024250502277, VL2024250502297, VL2024250502302, VL2024250502251, VL2024250504790, VL2024250502235, VL2024250502282, VL2024250502280, VL2024250504806, VL2024250502304, VL2024250504791, VL2024250502237, VL2024250502237, VL2024250502290, VL2024250502287, VL2024250504789

Date of Examination : 02.02.2025
Exam Duration : 90 minutes
Maximum Marks: 50

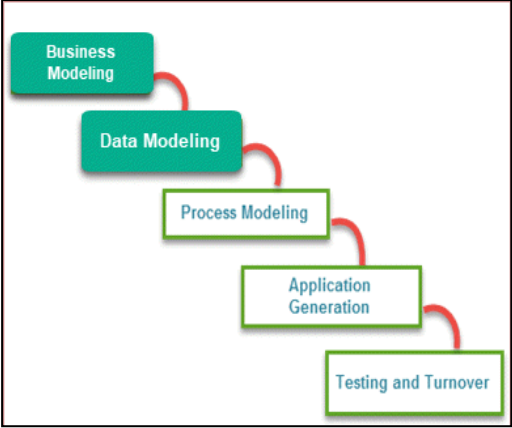
General instruction(s):

- Answer All Questions
 - M - Max mark; CO – Course Outcome; BL – Blooms Taxonomy Level (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create)
1. Apply and assess the principles of various process models for the software development.
 2. Demonstrate various software project management activities that include planning, Estimations, Risk assessment and Configuration Management
 3. Perform Requirements modelling and apply appropriate design and testing heuristics to produce quality software systems.

Q. No	Question	M	CO	BL
1.	A systems analyst is assigned to develop a customer relationship management (CRM) system for a retail chain with strict deadlines. The client needs a quickly developed, customizable system with features like customer tracking, sales reports, and inventory management. Given the time constraints and the importance of user feedback, an iterative, user-focused development model is ideal for this project. This approach ensures rapid delivery while meeting the client's specific needs. a. Outline the steps involved in each phase with a neat diagram for developing the CRM system using RAD. Solution To develop the CRM system using the Rapid Application Development (RAD) model, the process starts with the Requirements Planning Phase, where stakeholders and the systems analyst collaborate to define high-level requirements like customer tracking, sales reports, and inventory management. Next is the User Design Phase, where users actively participate in iterative prototyping to visualize system interfaces and functionalities, ensuring customization based on feedback. In the Construction Phase, the prototypes are quickly converted into a working system using modular components and prebuilt tools, with continuous user testing and feedback for refinement. Finally, in the Cutover Phase, the system is deployed in the retail chain, followed by training and support to ensure smooth adoption. This iterative and user-focused process ensures rapid delivery within deadlines while meeting client expectations.	10	1	3



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	 b. How would you ensure that the system is delivered on time while meeting the client's specific requirements, including customer tracking, sales reports, and inventory management? Solution Adopt an Agile Development Model: Use iterative development cycles (sprints) to deliver key functionalities, such as customer tracking, sales reports, and inventory management, incrementally. This ensures the most critical features are prioritized and delivered quickly. Involve Stakeholders Regularly: Collaborate closely with the client and end-users to gather feedback after each sprint. This ensures the system aligns with their specific needs and reduces the risk of rework. Utilize Prototyping and Customizable Frameworks: Start with a prototype or use pre-built CRM frameworks that can be quickly customized to save time while maintaining quality.			
2.	The project manager for a software development team is tasked with delivering a web-based inventory management system for a small business. The client expects frequent updates, high-quality software, and the ability to adapt to changing requirements throughout the development process. As part of the Agile framework, the team decides to adopt Extreme Programming (XP) practices. a. List down 12 agile principles and explain any six agile principles that would be implemented to ensure the timely delivery of high-quality software for the client. Solution: 1. Individuals and interactions are given priority over processes and tools 2. Adaptive, empowered, self-organizing team 3. Focuses on working software rather than comprehensive documentation 4. Welcome changes in requirements, even late in the development phase 5. Daily cooperation between businesspeople and developers 6. Priority is customer collaboration over contract negotiation 7. It enables you to satisfy customers through early and frequent delivery 8. A strong emphasis is placed on face-to-face communication 9. Developing working software is the primary indicator of progress 10. Promote sustainable development pace 11. A continuous focus is placed on technical excellence and sound design 12. Regular team improvement reviews are conducted.	10	1	3



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3.	a) You are a project manager overseeing the development of a new software system for a retail organization. The system includes several features that interact with both internal and external systems. Below are the details of the project's information domain characteristics: - The system will accept 30 external inputs (I), such as product details and user credentials. - It will generate 60 external outputs (O), such as invoices and sales reports. - It will support 23 external inquiries (E), like querying stock levels and order status. - The system will manage 8 files (F) containing data related to products, customers, and transactions. - It will interact with 2 external interfaces (N), such as payment gateways and supplier APIs. It is given that the complexity weighting factors for I, O, E, F, and N are 4, 5, 4, 10, and 7, respectively. There are 14 value adjustment factors influencing the system's development effort: - Four factors are not applicable, four factors have a value of 3 and the remaining six factors have a value of 4. Calculate the Function Point (FP) metric to estimate the size of the software project. (7 Marks) Solution $\begin{aligned} \text{UFP} &= (30 \times 4) + (60 \times 5) + (23 \times 4) + (8 \times 10) + (2 \times 7) \\ &= 120 + 300 + 92 + 80 + 14 = 606 \\ \text{CAF} &= 0.65 + (0.01 \times F) \\ F &= (4 \times 0) + (4 \times 3) + (6 \times 4) = 0 + 12 + 24 = 36 \\ \text{CAF} &= 0.65 + (0.01 \times 36) = 0.65 + 0.36 = 1.01 \\ \text{FP} &= 606 \times 1.01 = 612.06 \end{aligned}$	10	2	4
	b) Given a project to develop an e-commerce website, identify three potential milestones and their corresponding deliverables. (3 Marks) Solution: Milestone 1: Completion of Website Design - Deliverables: Wireframes, UI/UX prototypes, and finalized design mockups for all pages (e.g., home page, product page, cart, and checkout). Milestone 2: Development of Core Functionalities - Deliverables: Implementation of user registration/login, product catalog, shopping cart functionality, and payment gateway integration. Milestone 3: Testing and Deployment - Deliverables: Completed system testing report, user acceptance testing (UAT) approval, and live deployment of the website on the production server.			
4.	Shirley Hopkins is developing a program in leadership training for middle-level managers. Shirley has listed a number of activities that must be completed before a training program of this nature can be conducted. The activities, immediate predecessors, and times appear in the accompanying table.	10	2	4

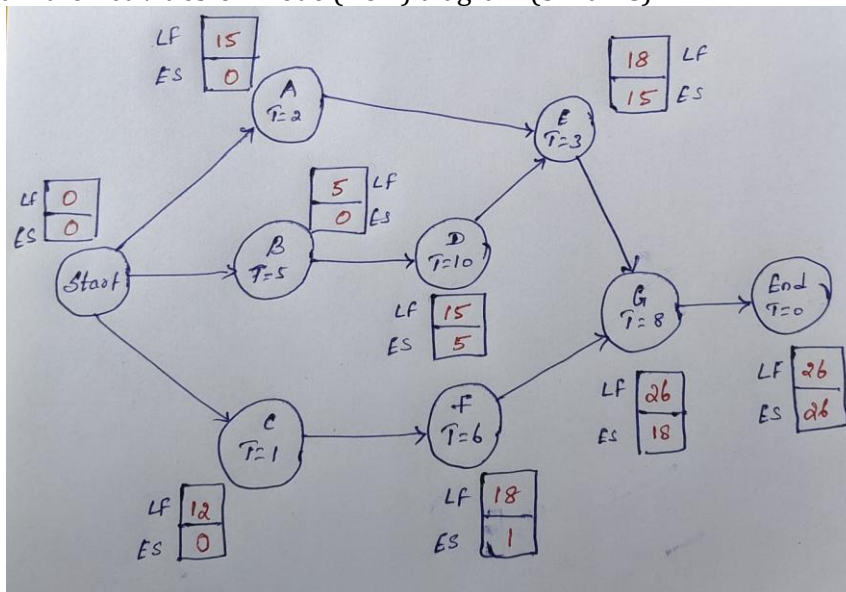


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Activity	Immediate Predecessor	Time (days)
A	-	2
B	-	5
C	-	1
D	B	10
E	A,D	3
F	C	6
G	E,F	8

- Draw the Activities-on-Arrow (AOA) diagram (3 Marks)



- Calculate Early start, Early Finish, Late Start, Late Finish and Slack (4 Marks)

Activity	Time	Early Start (ES)	Early Finish (EF)	Late Start (LS)	Late Finish (LF)	Slack (S)
A	2	0	2	13	15	13
B	5	0	5	0	5	0
C	1	0	1	11	12	11
D	10	5	15	5	15	0
E	3	15	18	15	18	0
F	6	1	7	12	18	11
G	8	18	26	18	26	0



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	- Identify the critical path for the project. (2 Marks) The critical path: B → D → E → G - Determine the total project duration (completion date) (1 Mark) Total Project Time = 5 + 10 + 3 + 8 = 26 hours			
5.	A development team is tasked with creating a healthcare monitoring system designed for elderly patients with chronic illnesses. The system is expected to include essential features such as real-time health monitoring, emergency alert notifications, medication reminders, and doctor-patient communication. However, the hospital management team, acting as the client, has only provided broad objectives and has not yet clearly defined the specific functionalities required for the system. Evaluate how the key tasks of requirements engineering would be applied to develop a healthcare monitoring system. Solution: - Inception : Basic Understanding - Elicitation : Clear Understanding - Elaboration : Refinement - Negotiation : Settlement of Conflicts - Specification : SRS - Validation : Formal Technical Review Team Validates - Management : Changed Requirement Management To develop the healthcare monitoring system, the team begins with Inception, where they gain a basic understanding of the client’s broad objectives, focusing on the key features like real-time monitoring and emergency alerts. Next, during Elicitation, they work closely with hospital management, doctors, and patients to gather detailed requirements, ensuring a clear understanding of what functionalities are needed. In Elaboration, the team refines these requirements by analyzing use cases, prioritizing features, and addressing technical constraints. During Negotiation, any conflicting requirements between stakeholders are resolved to align everyone on a common goal. The agreed-upon features are then documented in the Specification phase as a Software Requirements Specification (SRS). This document undergoes Validation, where a formal technical review ensures all requirements are clear, complete, and feasible. Finally, Management involves tracking and accommodating any changes in requirements throughout the development process, ensuring the system meets evolving client needs.	10	3	3
