



VIT

Vellore Institute of Technology  
(Deemed to be University under section 3 of U.E.A. Act, 1956)

REG.NO.:

SCHOOL OF COMPUTER SCIENCE ENGINEERING AND INFORMATION SYSTEMS

CAT-2

WINTER SEMESTER 2025-2026

SLOT: B2+TB2



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Programme Name & Branch : B. Tech. IT  
Course Code and Course Name : BITE307L, Software Engineering  
Faculty Name(s) : Dr. Jagadeesh G, Dr. Karthikeyan P, Dr. Prabhu J, Dr. Sujatha R  
Class Number(s) : VL2025260502947, VL2025260502956, VL2025260502945, VL2025260502959

Date of Examination : 16.03.2026, 9:30 AM – 11:00 AM  
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)
- Course Outcomes
3. Develop abstract models and architectural design for software development
  4. Choose appropriate software testing and evolution strategies
  5. Create an outline of software project management plan including risk, configuration and quality aspects

| Q.No. | Question                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Max Marks | CO | BL |
|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|----|----|
| 1.    | <b>Scenario 01:</b> The Election Commission of India plans to develop a secure electronic voting system for conducting elections across the country. The system will allow voters to authenticate themselves, cast votes, and enable officials to manage election activities. To ensure better organization, the developers divide the system into different levels such as user interface, vote validation and election rules, data processing, and secure database storage. Each level performs a specific responsibility and communicates only with its adjacent level.<br><br><b>Question:</b><br>Based on the above scenario, identify the architectural style that divides the system into multiple levels of responsibility and justify your answer. Explain how this architecture improves security, maintainability, and system organization in the e-voting system. | 10        | 03 | 01 |
| 2.    | Consider the following C program and perform the necessary analysis. Draw the Control Flow Graph (CFG) for the given program and use it to                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 10        | 04 | 03 |



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|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |    |    |
|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|
|    | determine all the independent execution paths present in the program. From the constructed control flow graph, identify the critical path. Further, calculate the Cyclomatic Complexity of the program using an appropriate method and, based on the obtained complexity value, determine whether the program is suitable for testing.<br><br>#include <stdio.h><br>int main()<br>{<br>int i = 1;<br>int num;<br>int fact = 1;<br>1. printf("Enter a number: ");<br>2. scanf("%d", &num);<br>3. if(num < 0)<br>4. {<br>5. printf("Factorial not defined for negative numbers");<br>6. }<br>7. else<br>8. {<br>9. while(i <= num)<br>10. {<br>11. fact = fact * i;<br>12. i++;<br>13. }<br>14. printf("Factorial = %d", fact);<br>15. }<br>16. return 0;<br>17. } |    |    |    |
| 3. | <b>Scenario 02:</b> A software development team decides to change their development practice. Instead of writing the program first, they begin by writing test cases that specify the expected behavior of the system. Initially, these tests fail because the required code has not yet been implemented. The developers then write the minimum amount of code required to make the tests pass and later improve the structure of the code without changing its functionality.                                                                                                                                                                                                                                                                                  | 10 | 04 | 03 |



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|          | <b>Question: Analyze the development approach followed in the above scenario and evaluate how this approach can improve software quality, reliability, and maintainability compared to traditional development methods.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |          |            |          |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |    |    |    |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|------------|----------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|------|---|----|----|----|
| 4.       | <p><b>Scenario 03:</b> After World War II, a government research laboratory developed a software system to perform complex scientific and defense-related calculations. Over the years, the system continued to be used for various tasks such as data processing and simulations. However, the software was designed for older hardware and used outdated programming methods. Many of the original developers were no longer available, making maintenance difficult. The organization must now evaluate whether to continue maintaining the system or replace it with a modern solution.</p> <p><b>Question: Based on this scenario, discuss the factors that should be considered when assessing the software environment and deciding whether the system should be retained, improved, or replaced.</b></p> | 10       | 04         | 02       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |    |    |    |
| 5.       | <p>Following Project Consists of 7 activities, Construct a network diagram. Find the critical path of the project and project duration.</p> <table><tr><th>ACTIVITY</th><th>PRECEDENCE</th><th>DURATION</th></tr><tr><td>A</td><td>-</td><td>4</td></tr><tr><td>B</td><td>A</td><td>3</td></tr><tr><td>C</td><td>A</td><td>5</td></tr><tr><td>D</td><td>-</td><td>2</td></tr><tr><td>E</td><td>D</td><td>3</td></tr><tr><td>F</td><td>B</td><td>4</td></tr><tr><td>G</td><td>C, E</td><td>4</td></tr></table>                                                                                                                                                                                                                                                                                                    | ACTIVITY | PRECEDENCE | DURATION | A | - | 4 | B | A | 3 | C | A | 5 | D | - | 2 | E | D | 3 | F | B | 4 | G | C, E | 4 | 10 | 05 | 04 |
| ACTIVITY | PRECEDENCE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | DURATION |            |          |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |    |    |    |
| A        | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 4        |            |          |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |    |    |    |
| B        | A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 3        |            |          |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |    |    |    |
| C        | A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 5        |            |          |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |    |    |    |
| D        | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2        |            |          |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |    |    |    |
| E        | D                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 3        |            |          |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |    |    |    |
| F        | B                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 4        |            |          |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |    |    |    |
| G        | C, E                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 4        |            |          |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |    |    |    |