



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

SLOT: G1+TG1

Programme Name & Branch : B.Tech. & Computer Science (Core and Specialization)
Course Code and Course Name : BCSE301L and Software Engineering
Faculty Name(s) : common to all
Class Number(s) : 2303, 2265, 2259, 2249, 2231, 2268, 2276, 2300, 2301, 2292, 5540, 2273, 2233, 2284, 2289, 2242, 2236, 2279, 2281, 2253, 2299, 2305
Date of Examination : 22.03.2025
Exam Duration : 90 minutes **Maximum Marks: 50**

ANSWER KEY

Q. No	Question	M	CO	BL
1.	Global Finance Corp. (GFC) is a multinational banking and financial services company with a large customer base and complex IT infrastructure. They handle sensitive customer data, including financial transactions, personal information, and investment portfolios. GFC experienced a sophisticated cyberattack originating from an external source. The attackers exploited a vulnerability in the company's firewall, gaining access to the internal network. They then moved laterally, compromising several servers, including those hosting customer databases and transaction processing systems which impacted in Data Breach (Sensitive information loss), System disruption, Financial Loss and Reputation Damage. Assume you are the Risk Management Team Head in GFC, classify various types of risks involved and prepare a Risk Management plan that should be relevant for above mentioned scenario ANS: Risk Management (2m) and explanation of the sub topics (each 2m) 1. Risk Identification (data, service, network) 2. Risk Analysis (Vulnerability Management, Access Controls, Incident Response, Data Security) 3. Risk Planning (sufficient Investment in Security, Proactive Monitoring, Contingency Planning) 4. Risk Monitoring (Strengthen Data Security, Improve Incident Response)	10	C O 2	B L 6
2.	Style Sphere was a start-up e-commerce platform focused on sustainable and ethically sourced fashion. It targeted a specific demographic: environmentally conscious millennials and Gen Z consumers looking for unique, high-quality apparel. The company has faced lot of challenges to take it forward and to generate the revenue. They have their own software application that runs the e-commerce platform but facing issues with customer acquisition, building trust and supply chain. Modify the requirement by identifying the various sources of changing requirements along with its factors and explain the types of volatile requirements for making the newer version of the e-commerce application. (7) ANS: Requirement changes to be done, (3) 1. Niche Focus & Differentiation 2. Content Marketing & Storytelling 3. Data-Driven Optimization 4. Strategic Partnerships	10	C O 3	B L 4



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	Types of Volatile Requirements: (4) • Mutable requirements • Emergent requirements • Consequential requirements • Compatibility requirements For the above scenario, do we need to implement requirement validation techniques? Justify your answer with suitable example (3) ANS: YES, after validation only requirements will be finalized. ➤ The specification is examined to ensure that ➤ All software requirements have been stated unambiguously ➤ Inconsistencies, omissions, and errors have been detected and corrected ➤ The work products conform to the standards established for the process, the project, and the product Validation Techniques: 1. Requirements reviews 2. Prototyping 3. Test-case generation 4. Automated consistency analysis			
3.	a) An ABC Company requires antivirus software to enhance the security of their applications. As you own the start-up, the company approaches you to design their software by giving their requirements as follows. 1. Core Detection Capabilities (signature based, heuristic approach, ML based detection), 2. Real-time monitoring and protection from both system and web, 3. Automatic malware removal, 4. Low resource consumption, 5. Daily updates form server, 6. Attractive User Interface, 7. Code security, 8. Legal considerations. Based on the above requirements build the software model based on the elements of the requirements model. ANS: 1. scenario- based elements (3) use case diagram related to scenario-3m 2. Behavioural elements (3) State transition diagram related to scenario-3m 3. flow oriented Model (4) Data flow or sequence or activity diagram (3m)	10	C O 3	B L 6
4.	a) Hint to solve the below question: - These are fundamental design principles in software engineering that influence the maintainability, reusability, and overall quality of an application. It is a measure within the module and between the modules. (i) code Snippet: <pre>def calculate_average(numbers): """Calculates the average of a list of numbers.""" if not numbers: return 0</pre>	4		



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<pre>return sum(numbers) / len(numbers) (ii) Code Snippet: class Utility: def print_message(self, message): print(message) def calculate_square(self, number): return number * number def read_file(self, filename): with open(filename, 'r') as file: return file.read()</pre> Identify the type of bonding and justify whether it should be high or low? For both the above given code snippets. ANS: (i) functional Cohesion, high All elements contribute to a single, well-defined task. (Best) (ii) coincidental Cohesion, low Elements are grouped arbitrarily, with no logical relationship. (Worst)			C O 3	B L 4
b) User Interface (UI) design is the process of creating the visual layout and interactive elements of a digital product, such as a website, mobile app, or software application. Its primary goal is to make the user's interaction with the product intuitive, efficient, and enjoyable. List out any four key aspects (principles, design process and elements) of UI Design. ANS: Principles: (any 2 can be given 2 marks) • Clarity: The interface should be easy to understand and navigate. • Consistency: Use consistent design elements, such as colors, fonts, and icons, throughout the interface. • Familiarity: Leverage familiar design patterns and conventions to reduce the learning curve. • Efficiency: Enable users to accomplish their tasks quickly and easily. • Responsiveness: The interface should respond quickly to user actions. • Aesthetics: The interface should be visually appealing and contribute to a positive user experience. • Forgiveness: The interface should allow users to easily recover from errors. • Accessibility: The interface should be usable by people with disabilities. Design Process: (any 2 can be given 2 marks) • User Research: Understanding the target audience and their needs. • Information Architecture: Organizing the content and navigation of the interface. • Wireframing: Creating low-fidelity sketches of the interface layout. • Prototyping: Developing interactive mockups of the interface. • Visual Design: Applying visual elements to create the final design. • Testing: Evaluating the usability of the interface with users.	6			



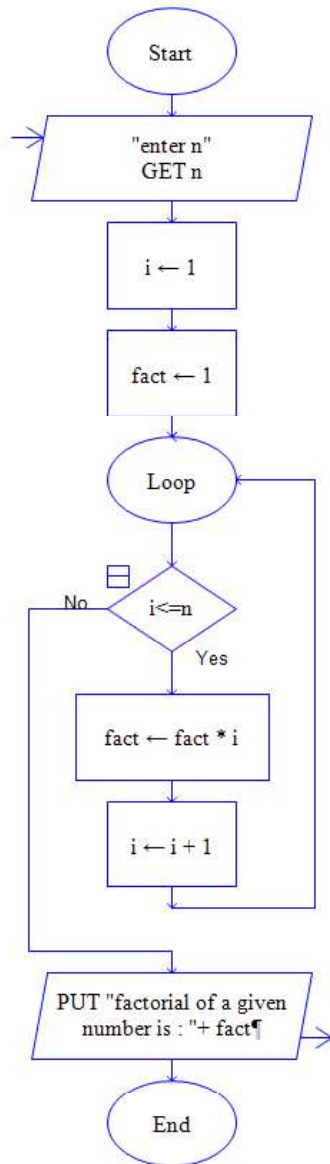
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	Key Elements: (any 2 can be given 2 marks) • Layout: The arrangement of elements on the screen. • Typography: The choice and use of fonts. • Color: The selection and application of colors. • Icons: The use of visual symbols to represent actions or objects. • Buttons: Interactive elements that trigger actions. • Forms: Input fields for collecting user data. • Navigation: The system for moving between different parts of the interface.			
5.	<pre>def factorial(n): if n == 0: return 1 else: result = 1 for i in range (1, n + 1): result *= i return result a. Compute cyclomatic complexity for the above code using flow graph/chart method. (5) ANS: (flowchart/flow graph-3 marks and Cyclomatic complexity-2 marks)</pre>	10	C O 5	B L 5



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E=10
N=9
 $V(G)=E-N+2=10-9+2=3$
 $V(G)=3$
OR
CC = Number of decision points + 1

Decision Points in Factorial:

1. if n == 0:



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2. for i in range(1, n + 1): (loop condition) Therefore, there are 2 decision points. Cyclomatic Complexity: CC=2+1 CC=3 b. Understand the Boundaries and generate at least five test cases for the above code using Boundary Value Analysis Technique. (5) ANS: (any 5 Test Cases with explanation may be awarded 5 marks) When testing the factorial function using Boundary Value Analysis (BVA), we focus on the values at the edges of the input domain. For the factorial function, the input is a non-negative integer. Understanding the Boundaries: • Minimum Valid Input: 0 (factorial of 0 is 1) • Typical Valid Input: A small positive integer (e.g., 1, 2, 3, 4, 5) • Maximum Valid Input: The largest integer for which the factorial can be calculated without overflow (this depends on the system's integer limits). For practical purposes, we can consider a reasonable upper bound. • Invalid Input (Below Minimum): Negative integers. Test Cases: 1. Minimum Valid Input (0): ○ Input: 0 ○ Expected Output: 1 2. Value Just Above the Minimum (1): ○ Input: 1 ○ Expected Output: 1 3. Typical Valid Input (Small Positive Integer): ○ Input: 5 ○ Expected Output: 120 4. Value Just Below the Maximum Valid Input: ○ Input: (Consider a reasonable upper bound, e.g., 10) 9 ○ Expected Output: 362880 5. Maximum Valid Input: ○ Input: 10 ○ Expected Output: 3628800 6. Invalid Input (Negative Integer): ○ Input: -1			
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	- Expected Behavior: This should ideally raise an exception or return an error message, depending on how the function is designed to handle invalid input. 7. Edge case, large number: - Input: 12 - Expected Output: 479001600 (This test checks how the function handles the transition to larger numbers)			
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