



School of Computer Science and Engineering

Winter Semester 2023-24

Continuous Assessment Test – II

SLOT: C1 + TC1

Programme Name & Branch: B. Tech. Computer Science & Engineering (Core and Specializations)

Course Name & Code: Software Engineering & BCSE 301L

Class Number (s):

VL2023240500597, VL2023240500632, VL2023240500656, VL2023240500723, VL2023240500697, VL2023240500700, VL2023240500594, VL2023240500622, VL2023240500714, VL2023240500588, VL2023240500707, VL2023240500590, VL2023240500609, VL2023240500648, VL2023240500730, VL2023240500585, VL2023240500603, VL2023240500650, VL2023240500665, VL2023240500614, VL2023240500673, VL2023240500719, VL2023240500736

Faculty Name(s):

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Exam Duration: 90 Min.

Maximum Marks: 50

General instruction(s):

Printed material is not permitted.

Q.No	Questions	Marks
1.	Consider the scenario of students' academic record management software. In this a set of courses are created. Each course consists of a unique course number, number of credits, and the syllabus. Students are admitted to courses. Each student's details include his roll number, address, semester number and the courses registered for the semester. The marks of student for various subjects he credited are keyed in. Once the marks are keyed in, the semester weighted average (SWA) is calculated. The recent marks of the student are added to his previous marks and a weighted average based on the credit points for various subjects is calculated. The marks for the current semester are formatted and printed. The SWA appears on the report. A check must be made to determine if a student should be placed on the Vice-Chancellor's list for academic excellence. This is determined based on whether a student scores an SWA of 85 or higher. If the SWA is lower than 50, the student is placed on a conditional standing. (Conditional standing is the academic status assigned to students identified as not maintaining satisfactory academic performance in their course and who will be required to improve their academic performance and meet certain conditions if they wish to continue in their course). a) Create an Entity Relationship diagram that captures the information on the scenario. (3 Marks) b) Design a context diagram and DFD level 1 diagram for the scenario. (3+ 4 Marks)	10
2.	a) A simplified account system of a university is introduced as follows. Each student has a unique University Account which contains an account id and a student name. Based on this mother account, a student will have a Link Account, which has an email address and password. Students are allowed to reset the password but cannot change the email address. The link account is required when accessing Blackboard platform and	10

	Zoom software. Particularly, an important part of Blackboard is a list of courses, and it provides operations like adding new courses, downloading, and uploading homework. Similarly, a list of meetings is an important part of Zoom, and it can create new meetings or delete existing ones. Moreover, each Course is identified by a course id and course name, and it has at least one meeting and one homework. A Meeting has a unique meeting id and an invitation link. When joining a meeting by its id, the password is required. Finally, each Homework has its own course id, homework no., and a list of questions. Draw a static structure diagram by identifying the classes, attributes, and their relationship among the classes. (6 Marks) b) Draw a diagram to model the interaction among active objects within a system using lifeline for the specific action -the process of joining the online lecture of the course BCSE301L. (4 Marks)	
3.	a) Imagine you are developing firmware for a microcontroller based IoT device that monitors environmental conditions such as temperature, humidity, and air quality in a smart home. The device continuously samples sensor data and sends periodic updates to a central server for analysis and visualization. To efficiently handle asynchronous events and minimize CPU overhead, Identify the appropriate architecture control style for the scenario and justify the same. (5 Marks) b) How does temporal cohesion contribute to the overall organization and efficiency of a software module's functionality? Provide an example from a real-world application where temporal cohesion is utilized effectively. (5 Marks)	10
4.	a) You are testing a new e-commerce website for a retail clothing store. The website allows users to browse and purchase clothing items online. Describe how you would approach testing the checkout process on the website to ensure a smooth and efficient user experience. (4 Marks) b) You are assigned with testing a banking application's transfer functionality. The system allows users to transfer funds between their own accounts and to other accounts within the same bank. Perform Black box testing method to ensure the transfer functionality is working correctly in the bank. (Make your own assumptions) (6 Marks)	10
5.	Consider the following program segment <pre> Void Selection Sort (int array1[]) { int size=array1.length; for (int i=0; i<size; i++) { int minIndex=i; for (int j=i+1; j<size; j++) { if(array1[j] < array1[minIndex]) minIndex=j; } int temp= array1[minIndex]; array1[minIndex] =array1[i]; array1[i] =temp; } } </pre> a) Prepare the CFG and determine the cyclomatic complexity of the selection sort function. (5 Marks) b) Design a test suite for the selection sort that satisfies the Path coverage (Show the important steps in your test suite design method). (5 Marks)	10