VIT
Vellore Institute of Technology
CHENNAI

Reg. Number: 24BLC1198

Continuous Assessment Test (CAT) – II - MAR 2025

Programme	:	**B.Tech**	Semester	:	**WINTER 2024-25**
Course Code & Course Title	:	BCSE102L – Structured and Object Oriented Programming	Slot	:	**G2**
Faculty	:	Dr Sivakami R Dr. S Jahangeer Sidiq Dr.N.Sivaramakrishnan	Class Number	:	**CH2024250502428** **CH2024250502430** **CH2024250502424**
Duration	:	90 Minutes	Max. Mark		**50**

General Instructions:

- Write only your registration number on the question paper in the box provided and do not write other information.
- Only non-programmable calculator without storage is permitted.

Q. No	Sub sec.	Description	Marks
1		Assume you have to store details of multiple employees in a company. Each employee has the following details: • **Employee ID** (integer) • **Name** (string of maximum 50 characters) • **Department** (string of maximum 30 characters) • **Joining Date** (which consists of Day, Month, and Year) • **Resignation Date** (which consists of Day, Month, and Year) Using nested structure, write a C program that dynamically allocates memory to store these details for n employees (where n is entered by the user). The program should calculate and display the total number of days each employee worked in the company, using their Joining Date and Resignation Date. **Assume:** Each month consists of 30 days. Each year consists of 360 days. The program should input all employee details, calculate the total days worked, and then display all details along with the days worked for each employee.	15
2	i.	You are intended to develop an online warehouse management system. When a new customer is sending a query to the system, based on the availability, the system will allocate the space or it will return 'not available'. Create a class named WMS with data members; customer name, requirement of space (Length and Breadth in meters) and number of days required. The member function set_data() will get the input from the user and initialize the data members and generate_quotation() function will display the quotation for the requirement. The rent of one square meter space for one day is Rs.100/- and the initial available space is 5000 square meters. Create the static data member 'available space' (in square meters) and define	10

		the static function named avail_space() to check the availability of calculated required space in the warehouse by checking the status of 'available space'. Write the C++ program to implement the above scenario for 'n' number of customers and generate the quotation for the requirements.	

	ii.	Complete the following incomplete code to produce the expected output:
		`#include <iostream>`
		`using namespace std;`
		
		`class Book {`
		`  string name;`
		`  float price;`
		
		`public:`
		`  // Define appropriate member functions here`
		`};`
		
		`int main() {`
		`  Book obj1("Logic Gates", 689);`
		`  Book obj2 = obj1;`
		`  Book obj3;`
		`  obj1.display();`
		`  obj2.display();`
		`  obj3.display();`
		`  return 0;`
		`}`
		
		Expected Output:
		Name: Logic Gates, Price: 689
		Name: Logic Gates, Price: 789
		Name: Mastering C++, Price: 550
			5

3		Design a C++ program to simulate a Smart Home Automation System using class, array of objects, member functions, and a friend function.
		• Create a class SmartDevice with the following private data members: deviceID, deviceName, status *(ON or OFF)*
		• Implement the following member functions:
		  o turnOn(): Turns the device ON.
		  o turnOff(): Turns the device OFF.
		  o displayStatus(): Displays the current status of the device.
		• Define a friend function toggleAllDevices() that toggles the status of all smart devices (ON to OFF and vice versa).
		• Demonstrate the functionality by creating an array of smart device objects, initializing their data members, turning them ON/OFF, displaying their current statuses, and using the friend function to toggle all device statuses.
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4		Design a Hospital Management System to manage different types of employees in a hospital. The hospital has various categories of staff, including doctors, nurses, and administrative staff. Each category of staff has specific	10

		attributes and functionalities. The doctors have specialties, the nurses have different shifts (day shift, afternoon shift, night shift) and the administrative staff has specific roles such as receptionist, accountant, and human resources manager. Develop a C++ program that implements the following classes: a) **Employee.** b) **Doctor.** c) **Nurse.** d) **AdministrativeStaff.** The Employee class should serve as the base class for all staff members and contain member variables 'name' and 'employeeID'. The Doctor class should be derived from the Employee class and have an additional member variable 'specialty'. The Nurse class should also be derived from the Employee class and have an additional member variable 'shift'. The AdministrativeStaff class should be derived from the Employee class and have an additional member variable 'role'. In your main function, create instances of a doctor, a nurse, and an administrative staff member. Set their attributes accordingly and demonstrate the functionality of each class by displaying their details.	

**********All the best **********