Reg. No:

VIT
Vellore Institute of Technology

Final Assessment Test – April 2025

Course: BCSE102L - Structured and Object-Oriented Programming
Class NBR(s): 4094/4097/4099/4101 Slot: C2
Time: Three Hours Max. Marks: 100

- KEEPING MOBILE PHONE/ANY ELECTRONIC GADGETS, EVEN IN 'OFF' POSITION IS TREATED AS EXAM MALPRACTICE
- DON'T WRITE ANYTHING ON THE QUESTION PAPER

Answer ALL Questions
(10 X 10 = 100 Marks)

1. Given 'n' integers, write a C program to print all numbers that are sum-equivalent to the first number. Two numbers 'm' and 'n' are said to be sum-equivalent if 'm' and 'n' have the same number of digits and the sum of the digits in 'm' and 'n' are equal. 12381 is sum-equivalent to 10545. Here both the numbers are five digit numbers. Sum of the digits in 12381 is 1+2+3+8+1=15. Similarly the sum of the digits in 10545 is 15.

2. Compare **static, extern, auto, and register** storage classes.

3. Use a two-dimensional array to solve the following problem: A company has four salespeople (1 to 4) who sell five different products (1 to 5). Once a day, each salesperson passes in a slip for each type of product sold. Each slip contains the following:

   a) The salesperson number

   b) The product number

   c) The total dollar value of that product sold that day

   Thus, each salesperson passes in between 0 and 5 sales slips per day. Assume that the information from all the slips for last month is available. Write a C program **using function** that will read all this information for last month's sales and summarize the total sales by salesperson and by product. All totals should be stored in the two-dimensional array sales. After processing all the information for last month, display the results in tabular format, with each column representing a salesperson and each row representing a particular product. Cross-total each row to get the total sales of each product for last month. Cross-total each column to get the total sales by salesperson for last month. Your output should include these cross-totals to the right of the totalled rows and to the bottom of the totalled columns.

4. What is pointer arithmetic? Provide examples of incrementing, decrementing and performing arithmetic operations on pointers.

5. A record contains name of cricketer, his age and number of test matches that he has played and the average runs that he has scored in each test match. Create an array of structures to hold records of 20 such cricketers and then write a C program to read these records and arrange them in ascending order by average runs.

6. The Certified Careers Institute is granting scholarship to those students who passed in each subject and scored more than 175 marks out of 200 marks. Steve is a C++ developer in the institute. He is assigned the task of developing the application. A student is applicable for scholarship only if the student passes in each subject and total marks scored are more than 175 out of 200. Code the application using class and object concept.

7. Construct a class name called *"Ram"* that has one data member called *"bank_balance" with* initial value using constructor and another friend class name called *"Jene". That* has one data member called *"amount_withdraw"* and another one is member function called *"Withdraw_Money"* which is defined to display current balance at Ram account, amount withdrawn by Jene and display amount available in Ram account after withdrawn by Jene. In main function, declare two different objects for the mentioned two classes and access the necessary function for execution.

8. Create a C++ class called 'Set'. A 'Set' is internally as an array of integers. Include an integer data member to hold the size of the array. Derive two classes named 'OrderedSet' and 'UnOrderedSet' from 'Set' class.
Include functions to perform Set Union and Intersection operations and write a C++ program to test the operations on Sets.

9.a) Define a class string. Use overload <= operator to compare two strings using friend function.

OR

9.b) Write a program in C++ to overload binary operator + and - to find addition and subtraction of complex numbers using friend function.

10.a) List the differences between function overloading and function templates with suitable example.

OR

10.b) How do you create and use function templates and class templates in C++? Explain with example code.

⇦⇦⇦ BH/D/TY⇨⇨⇨