



# VIT

Vellore Institute of Technology  
(Deemed to be University under section 3 of the UGC Act, 1956)

## Final Assessment Test – May 2024

Course: BCSE102L - Structured and Object-Oriented Programming

Class NBR(s): 1127/1129/1131/1133/1134/1137/

1140/1142/1144/1146/1148/1150/1152/1154/

1156/1158/1160

Slot: C2

Time: Three Hours

Max. Marks: 100

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

Answer any TEN Questions

(10 X 10 = 100 Marks)

1. a) Explain the different types of looping statements used in C programming language with suitable examples. [5]
- b) Write a C program to print the following pattern, given the number of rows as input (Maximum – 5): [5]  
Eg: Number of rows = 5  
#  
##  
###  
####  
#####
2. Explain the C storage classes with proper examples.
3. Use a matrix to store the rainfall data in a city (in centi-meters per day), in which each row holds the rainfall in a month (from Jan to Dec 2023). Number of entries in a row is the number of days the city received the rain. If there is no rain in a day then it can be ignored. Now, write a C program to compute the average rainfall in each month using the matrix and display it. Use function to compute the average values.
4. Write a C program to store a set of strings. Sort them based on their length and display the sorted list of strings.
5. Using dynamic memory allocation methods, write a C program to allocate memory for 'n' number of float values and find the maximum and minimum values among the 'n' float values.
6. Design a structure called 'Student' with necessary details (Reg\_no, Name, Dept, CGPA). Write a C program to read details of "n" students in an array. Filter out only the students having CGPA greater than 8.0 and display their details.
7. What are the differences between friend function and member function of a C++ class? Explain the friend function with a suitable example (C++ program).

8. Design a C++ class 'Polygon' which stores the number of sides of the polygon and has a method to compute the area of the polygon. From 'Polygon' create two new classes 'Square' and 'Cube'. In the class "square" introduce a method to compute the perimeter of a square. In the class cube, consider a function to compute the volume of a cube. Write a C++ program to create objects of the "square" and "cube" classes and test the functionalities.
9. Design a C++ class 'BMI' with appropriate function to compute the Body-Mass index of a person and displaying the recommended weight. Design another C++ class 'Person' with necessary details. Now create a new class 'Healthy\_Person' from 'BMI' and 'Person'. Write a C++ program to create an object of Healthy Person and provide the recommend weight.
10. Design a C++ class "Int\_Array" as follows"
- Two private data members is an integer pointer and an integer to store the size of the array.
  - A constructor to dynamically allocate memory for "n" integers
  - Separate member functions to read and display the array elements.
  - An operator function to add each element of the integer array with the corresponding element (by index) of the array of another object.
  - An operator function to subtract each element of the array of another object from each element of the host object array.

Write a C++ program to test the execution of "Int Array" class objects.

11. Explain how dynamic polymorphism is implemented using function over ridding and virtual functions. Give appropriate example.
12. What is meant by generic data type? Write a C++ program with a function template to add two values. Test the function with any three data types in the main function.

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