VIT®
Vellore Institute of Technology

Course: BCSE102L - Structured and Object-Oriented Programming

# Final Assessment Test – June 2023

Class NBR(s): 5533/5538/5540/5543/5546/5549/5573/ 5575/5580/5583/5585/5588

Time: Three Hours Slot: D1

Max. Marks: 100

**KEEPING MOBILE PHONE/SMART WATCH, EVEN IN 'OFF' POSITION IS TREATED AS EXAM MALPRACTICE**

**General Instruction: Write the program Objective, Algorithm and code for all programs.**

**Answer ALL Questions**

**(10 X 10 = 100 Marks)**

1. a) Compare the effectiveness of input statements scanf () and gets ( ) when working with character arrays. Explain with an example. [4]

   b) Discuss any three unconditional branching statements in C with a neat syntax and code snippet. [6]

2. For the given range of numbers (a, b), compute and print the occurrence of values that are divisible by both m and n. Write a C program to compute and sum all such occurrences in a function and print the output.

3. a) Illustrate the need for storage classes in C. Discuss the different types of storage class with a code snippet. [5]

   b) List out any five string operations carried out with example. [5]

4. a) Show how does a pointer can be used to access an element stored in one-dimensional and two-dimensional array. [5]

   b) "While storing strings, use of array of pointer can save lot of memory than the array of strings" – Justify the statement with an example program. [5]

5. Define a structure data type called **time_struct** containing three member's hour (int), minute (int) and second (int). Write a C program that would assign values to the individual members and display the time in seconds. Do the operations in a function by passing the structure.
   For example:
   1 hour, 1 minute, 1 second should display as 3661 (i.e. 3600 + 60 + 1)

6. a) Analyze the characteristics of constructor and destructor. Show how a copy constructor declare and initializes an object using another object of the same class with a neat example. [5]

   b) [5]

```
int *r[ ];
*r = 10;
r++;
print f ("% d", & r);
print f ("% d", *r);
```

Explain the code snippet and support on value of 'r' in program.

7. The Forest department of India has decided to promote the forester grade employees to "Ranger (Grade I or Grade II)" designation based on certain qualifications. For Ranger Grade 1: The forester should have secured more than 60% of the marks in the UG and more than 75% of the marks in PG. For Ranger Grade 2: The forester should have secured more than 80% of the marks in both the UG and PG. If the marks are less than the requirement, their designation remains same.

Design four classes' **Employee, UG, PG** and **Ranger**. The **Employee** class should have data members such as emp_id (int) and name (char). Use member functions to initialize the data members. Create a new class **UG** by inheriting the **Employee** class and get the percentage of marks secured for all the employees. Create another new class **PG** by inheriting the **Employee** class and get the PG percentage of marks for all the employees. Create another class **Ranger** by inheriting the classes **UG** and **PG** and compute the ranger grades as per the eligibility criteria. Write a C++ program (using inheritance) with required number of data members and member functions to display the employee's id and designation.

8. a) Illustrate the use of virtual function to achieve dynamic polymorphism with an example program. Highlight the rules for using the virtual function in C++ programs. [5]

b) How function overloading differs from usage of virtual function. Explain with example. [5]

9. Write a C++ program to define a class **string**. Use overloaded == operator to compare two strings and print whether they are same or not. Use necessary data members and member functions to implement the same. Write the input and output for the developed program.

10. Illustrate the need for generic programming in C++. Explain the different ways to achieve the same with an example program.

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