

**VIT**[®]Vellore Institute of Technology
(Deemed to be University under section 3 of the U. in Act, 1929)**Final Assessment Test – November/December 2023**

Course: CSE1008 - Programming in C

Time: Three Hours

Max. Marks: 100

KEEPING MOBILE PHONE/SMART WATCH, EVEN IN 'OFF' POSITION, IS TREATED AS EXAM MALPRACTICE**Answer ALL Questions****(10 X 10 = 100 Marks)**

1. Design and write an algorithm (only flowchart / pseudo code & strictly avoid writing C code) to perform the following tasks:-
 - ✓ Subject-wise top three student performers
 - a. Total subjects: 6
 - ✓ Year-wise top three student performers
 - b. Number of years: 4
 - ✓ Program-wise top three student performers
 - c. Total Programs: 6 (BTech-CSE, BTech-IT, BTech-BBS, BTech-DS, BTech-AI & BTech-IoT)
2. Discuss the requirements for various typecasting approaches, then use appropriate C program to illustrate the following typecasting techniques:-
 - Implicit
 - ExplicitCreate a C program to perform the following operations using bitwise operator:-
 - Comparing any two chosen numbers
 - Encrypting / camouflaging first four letters in your name
3. Create a C program that uses any looping approach to store and carry out the operations listed below on the given data set.
Given Data-set:
{ {{1,2,3},{3,2,1},{2,1,3}}, {{4,5,6},{5,6,4},{6,5,4}}, {{7,8,9},{9,8,7},{8,7,9}}, {{1,3,5},{5,3,1},{3,1,5}}} }
Operations:
 - Display / print the data-set
 - Multiply first three as well as last three data elements with 10
4. Investigate the pros and cons of recursion and iteration in C programming with adequate justifications. Build a C program that prints a Fibonacci series up to 12 numbers using the recursion approach.
5. Compare and contrast calloc and malloc techniques. To accomplish the following goals, implement a C program that uses calloc-based dynamic memory allocation:-
 - ✓ Average of 10 integers
 - ✓ Display a array of 10 floating point numbers and print the sum of all these numbers.

6. Design and demonstrate a comprehensive student record management system in C to perform the following functions:-

- ✓ Input interface for getting values for the student record
- ✓ Display module for printing the student record
- ✓ Search module to search a student by giving the register number of the student
- ✓ Change module for editing any values in the student record

Student Record specifications (with sample values):

- ✓ Student Name ("abcde")
- ✓ Register number("23BBS0036")
- ✓ Student Age ("18")
- ✓ Year of entry ("2023")
- ✓ Branch ("BTech")
- ✓ Program ("CSE")
- ✓ CGPA ("9.99")

Hint:- You may utilize pointers and are expected to deploy structures and functions.

7. Develop a C program that will list every file and sub-directory in a directory.
8. Devise a modular C program to execute the following tasks using functions and pointers:-

- ✓ Get a 10 digit number and your full name
- ✓ Print the original number and name
- ✓ Reverse the number and the name
- ✓ Find the sum of digits of the entered number

9. Mention the benefits of using macros in C programming. Write an adequate C program to illustrate the concepts listed below:-

- ✓ Union
- ✓ Macro

Note: For demonstration, separate test cases should be used.

10. Construct a C program to display the given pattern and recreate a new pattern as per the given specifications:-

Given Pattern:

```
2  2  2  2  2
2  3  3  3  2
2  4  4  4  2
2  3  3  3  2
2  2  2  2  2
```

Specifications for new pattern:

- ✓ All outer elements are multiplied by 2
- ✓ All inner elements are multiplied by 5

