VIT®

Vellore Institute of Technology

(Deemed to be University under section 3 of UGC Act, 1956)

## Continuous Assessment Test I – Feb 2024

| | | | | | |
|---|---|---|---|---|---|
| **Programme** | : | **B.Tech. Computer Science and Engineering** | **Semester** | : | **Winter Sem 2023-24** |
| **Course Title** | : | **Structured and Object Oriented Programming** | **Code** | : | **BCSE102L** |
| | | | **Slot** | : | **B1** |
| **Faculty** | : | **Dr. Valarmathi P,**<br>**Dr. Mansoor Hussain D,**<br>**Dr. Amutha S,**<br>**Dr. Yogesh C,**<br>**Prof. Prethija G,**<br>**Prof. Deepika R,**<br>**Prof. Pavithra L,**<br>**Prof Safiya Parvin A,**<br>**Dr. Kavi Priya G,**<br>**Prof. Johnsi R** | **Class Number** | : | **CH2023240501321**<br>**CH2023240501317**<br>**CH2023240501319**<br>**CH2023240501327**<br>**CH2023240501348**<br>**CH2023240501335**<br>**CH2023240501330**<br>**CH2023240501376**<br>**CH2023240503343**<br>**CH2023240503347** |
| **Time** | : | **1 ½ hours** | **Max. Marks** | : | **50** |

**Answer all the questions (50 Marks)**

| Q.No. | Sub. Sec. | Question Description | Marks | COs |
|---|---|---|---|---|
| 1. | | Assume that you are a computer science student working on a project to model the population growth using the following mathematical sequence, $S(n) = 2 * S(n-1) - S(n-2) + 3$, where $S(0) = 1$ and $S(1) = 4$. The professor asked you to simulate and display the first 10 terms of this population growth sequence using C programming. | 10 | CO1 |
| 2. | a) | Mrs. Jessy wants to ensure that only reasonable inputs are accepted. Enhance the C program to include validation checks for the input values. Specifically, ensure that both the number of classes and the number of students per class are positive integers. If any input is invalid, print an error message and terminate the program. | 4 | CO1 |
| | b) | Write a C program to assist system administrator Mrs. Smith in ensuring the security of user passwords. The C program should prompt users to set a password and check its strength based on criteria including minimum length, inclusion of uppercase, lowercase, digits, and special characters, and ensuring it is not a palindrome. If the password fails these checks, users are prompted to try again until a strong password is set. Additionally, impose a limit of 3 attempts for setting a valid password, terminating the program if this limit is exceeded. | 6 | CO1 |
| 3 | | Write a C program to handle strings, s1 and s2, initially set as "beautiful big sky country" and "how now brown cow" respectively.<br>i. The program should print the length of s1 and the substring length of s2 from its 9th character. [2 Marks]<br>ii. Perform a lexicographical comparison between s1 and s2 and display the result. [2 Marks] | 10 | CO1 |

| | | | | |
|---|---|---|---|---|
| | | iii. Print the substring of s1 from its 11th character, duplicate the substring of s2 from its 9th character into s1 from its 11th character, and add "s!" to s1. [4 marks]<br>iv. Display the modified s1. [2 Marks]<br>Utilize appropriate functions and develop the code and also provide a sample output illustrating each string operation. | | |
| 4 | | One dimensional array $A[n]$ of length is given. Write code in C for copying this array into a two dimensional array $B[m][p]$ such that the first 'p' entries of A are copied into the first row of B and so on. Assume that n is a non-prime number such that $n = m * p$ , where m and p values are given as input by the user. Ensure that each row of B contains elements in ascending order. If the input array A does not contain enough elements to fill all rows of B, fill the remaining elements with zeros. Additionally, ensure that the array A contains distinct elements.<br>Example: Input: n=8, m=2, p=4 and A[8]={5,3,2,7,8,1,6,4}<br>Output : B should be<br>5 3 2 7<br>8 1 6 4 | 10 | CO2 |
| 5 | | A student management system has to be developed for a University. The University demands the following conditions to be incorporated in the system to efficiently handle the student information, including student IDs, names, and marks of three different subjects. Develop the student management system to ensure flexibility and scalability for enrolling new students.<br>The conditions are given as follows.<br>i. Store the student IDs, name, and the marks of three different subjects for n students using dynamic memory allocation.<br>ii. Implement a user-defined function by passing the address to display the information of each student. | 6<br>4 | CO2 |