

Reg. No.:

Name :



**VIT**<sup>®</sup>  
Vellore Institute of Technology  
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### Continuous Assessment Test II – October, 2022

Programme	: B.Tech CSE and its Specialization	Semester	: Fall-22-23
Course Title	: Structured and Object-Oriented Programming	Code	: BCSE102L
Faculty (s)	: Dr. T. Raja Sree	Class Nbr(s)	: CH2022231002276
Time	: 1½ Hours	Slot	: E1
		Max. Marks	: 50

#### Answer all the Questions

1. ☒ i) The officer has to allot the sequence number to the NCC students to arrange a parade. The allotment is based on the student's height. He needed to get the heights of the 10 students in centimetres and arrange them in ascending order. If the officer finds students that are about the same height, display the count and height on the board. Write a C program to perform the task. The program should use dynamic memory allocation correctly. (7 Marks)
- ☒ ii) The structure for an "employee" is given below. For a system with a 32-bit architecture, find out how many bytes will be allotted for the structure variable "employee" and detail it with the appropriate memory allocation diagram. (3 Marks) 10

```

struct employee
{
    int emp_ID;
    char name[25];
    float age;
    int contact_no;
}

```
- ☒ 2. Given an array A[] of distinct integers of size N, write a c program to find all pairs of elements in the A[] with minimum absolute difference using an array of pointers. Return a list of pairs in ascending order such that each pair [a, b] satisfies the following conditions: If a, and b are elements of A, and if a<b, then b-a equals the minimum absolute difference between any two elements in A. 10

Note: The absolute difference between the two real numbers x and y is |x-y|

Example:  
Input: [4,2,1,3]  
Output: [[1,2],[2,3],[3,4]]
- ☒ 3. Write a C program to find out whether a majority element exists in an integer array using pointers. If a majority exists in an array, print it. A majority element in an array arr[] of size n is an element that appears more than n/2 times and hence there is at most one such element. 10

Examples:

Input array = {3, 3, 4, 2, 4, 4, 2, 4, 4}

Output : 4

The frequency of 4 is 5 which is greater than half the size of the array.

Create an array of structures that stores the following details for 10 employees:

- NAME
- SALARY
- WORK PER DAY (in hours)

Increase the salary depending on the number of hours of work per day as follows:

Work per day (in hours)	8	10	$\geq 12$
Increase in Salary	Rs. 50	Rs. 100	Rs. 150

10

Write a menu-driven program that uses the structure mentioned above and allows the user to perform the following operations:

1. Add an employee record
2. Display the details of all the employees who did not get any increment in salary
3. Display the details of all the employees with their final salaries.
4. Display the details of all the employees, given work per day (in hours).

Write a menu-driven program to manage our School (SCOPE) library resources.

Create a menu from which the following can be done:

- 1 - Search for a book-by-book name or author name
- 2 - Issue a book
- 3 - Return or add a new book
- 4 - Display the total number of books in the library

10

The total number of books must increment or decrement appropriately in order to perform actions in menus 2 and 3. The Union datatype should be used to define the book and you must use pointers to access the union members.

