Reg. No.:

Name : 22BRS1033

VIT

Vellore Institute of Technology

Continuous Assessment Test 1(CAT 1) – Mar 2023

Programme	B.Tech. CSE and its Specialization	Semester	:	Winter Semester 2022-23
Course Code	BCSE102L	Class Nbr(s)	:	CH2022232300561 CH2022232300562 CH2022232300563 CH2022232300564 CH2022232300733 CH2022232300734 CH2022232300784
Course Title	: Structured and Object-Oriented Programming			
Faculty(s)	Dr. SUGANESHWARI Dr. DHANALAKSHMI R Dr. SUSEELA S Dr. KIRUTHIKA Dr. VATCHALA S Dr. DEEPA NIVETHIKA Dr. SENDHIL R	Slot	:	C1
Time	90 Minutes	Max. Marks	:	50

Answer all the Questions

Q. No.	Sub-division	Question Text	Marks
1.		NTA conducts JEE exams which comprise the Mains and the Advanced tests. Each of which carries 100 marks. Those who take 180 and above are eligible for the level 4 test. Those who secured below 180 are rejected for the level 4 test and will be allowed for the level 3 test. There are two levels of the test – level 3 and level 4. Write a C program to read the marks of n students scored in Mains and advanced and display whether the student is qualified for level-3 or level 4 test.	10
2.		An insurance company follows the following rules to calculate premiums. 1. if a person's health is excellent and the person is between 25 to 35 years old, lives in a city, and is a male, then the premium is Rs.4 per thousand, and his policy amount cannot exceed Rs. 2 lakhs. Example: Rs 5000 for policy amount then Premium Amount is 5*4=20 Rs then it's to be added to the policy amount.	10

		2. if a person satisfies all the above conditions except that the gender is female, then the premium is Rs.3 per thousand, and her policy amount cannot exceed Rs.1 lakh. 3. if a person's health is poor and he is between 25 to 35 years of age, he lives in a village and is a male, then the premium is Rs.6 per thousand, and his policy cannot exceed Rs.10,000. 4. In all other cases, the person is not insured. Write a program to output whether the person should be insured, their premium rate, and the maximum amount they can be insured.	
3.		Imagine you are supposed to create a web page that allows users to input two equal-size arrays and click a button to merge them using a function. The function would take in the two arrays as parameters, merge them, and return the merged array. The merged array could then be displayed on the web page for the user to see. Keep the resultant in a new array. This resultant array is formed by copying the first array as it is, and reverse of the second array being copied after the first in the resultant. Perform sorting (descending order) operation for the resultant array and print it. Implement the same by-passing appropriate arrays to functions.	10
4.		The hacker hacked the bank server. One techie in the software team worked spontaneously and made the code that changed all the clients' passwords to save their money. Your task is to mimic his work for the smaller set of databases. You will be given n passwords, each with a variable length. Procedure to change the Password: If the length of the password is even, then. Compare the first character and last character of the string. If both are equal, then replace the last character with – First < than the second, then replace the last character with + Else replace the last character with $ Finally, replace the odd place characters with * Else Identify the middle alphabet, if that is greater than the last one, then replace the previous character of the middle as the last alphabet and vice versa. if it is lesser, then replace the next character of the middle as the first alphabet and vice versa	10

		If both are equal, then replace the even place characters with =	
5.		Write a function to calculate the employee's gross pay for this month. An additional 5% HRA is given to the initial HRA (x+5%). Initial HRA Calculation: Gross pay HRA(x) < 750 3% >=1000 4% Your program will get the net pay of last month's salary from the employee, and it has to print the gross pay of the employee and the net pay after the HRA updation. Note: 1. Write a function 'amount' that should return the gross pay when the net pay is passed as an argument to that function 2. Write a function 'finale' that should print the revised net pay of the employee by getting the updated HRA via an argument, and the gross pay will be returned by the function 'amount' (i.e., function call for amount has to be inside the 'finale' function). Sample calculation: 1000 is the gross pay HRA Percentage and net pay calculation are given below 1000* 4/100 =40 1000 + 40 =1040	10
			Total 50

Q. No.	Sub-division	Question Text	Marks
1.		Write a C program to divide the integer array into two halves using function recursion. Call the user-defined "divide" function recursively, with the left half of the split array being passed as an argument for that function. Let the recursive function to get executed until the array size becomes one. Count the number of iterations to reach the base condition. Explain the working procedure of recursive function with stack structure	10
2.		Consider that you are going to analyze the characters in the given string. Write a C program to extract the characters in the given string and print whether the character is an uppercase alphabet, lowercase alphabet, digits, whitespace, special symbols. Print the count of each category by storing their counts in an array. Use appropriate looping constructs to implement this.	10
3.		Write a c program to find the sum of the series 1!/1+2!/2+3!/3+4!/4+5!/5 ... n!/n by utilizing user defined recursive function? Get the value of n from the user. Do not use any storage classes. Without returning the calculated result from the function, display the result in main (10 marks)	10
4.		ABC car showroom sells various types of cars such as Hatchback, Sedan,	

SUVs, and MUV. Due to the year-end sale, the showroom provides a 3%, 5%, 10%, and 15% discount for various car models Hatchback, Sedan, SUV, and MUV respectively. Also applies 12% of GST for the total amount of purchase. Write a C program to implement the above scenario which will read the type_of_the_car, price_of_the_car and extra-fitting_price_of_the_car as input from the user and estimate the Net amount to be paid to the showroom. If the type of car is other than Hatchback, Sedan, SUV, and MUV then display "Invalid Type". (Difficulty Level: Easy) 10

The net amount to be paid to the showroom is estimated as follows:

(For example-if the purchased car is Hatchback)

```
Total = price_of_the_car + extra-fitting_price_of_the_car
Discount = Total * 0.03  // 0.03 denotes 3%
                                        wastage
gst = (Total - Discount) * 0.12  // 0.12 denotes
                                        12% GST

net = Total – Discount + gst
```

Write a C Program that reads the input as a string from the user in main (). (1 mark)

The input should be a sentence with two words. Pass this string to a function.(1 mark)

Inside the function do the following operations:

- For the first word, keep only the first character of the word to be in upper case and the rest of the characters in lower case. (1 mark)
- For the second word, convert all the characters into upper case letter. (1 mark)
- Print the revised string consisting of the two words in the function itself (1 mark)
- Find the length of the entire string. Print its length in the function itself in the next line of the revised string. Use appropriate string function to print this result in the next line. (1 mark)
- Return the length of the string, if the length is less than 20. Else return the size of the string. (2 marks)

Consider the input string given by the user is:

- "computer programming"
- Revised string to be printed in the function is "Computer PROGRAMMING"

What is the significant different between length and size of the string? What is the value that will get returned for the input string that is considered? (2 marks)

Total 50

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Continuous Assessment Test-1 (CAT-1) – March 2023

Programme	: B.TECH CSE and its Specialization	Semester	:	Winter 2022-23
Course Title	: Structured and Object-Oriented Programming	Code	:	BCSE102L
		Slot	:	G1
Faculty	: Dr. R. Sendhil Dr. Vijayaprabakaran K Dr. Ilavendhan A Dr. Vallidevi K Dr. S Jahangeer Sidiq Dr. Pankaja Lakshmi P Dr. Palani Thanaraj K	Class Nbr	:	CH2022232300541 CH2022232300534 CH2022232300536 CH2022232300537 CH2022232300540 CH2022232300538 CH2022232300542
Duration	: 1 hour 30 mins	Max. Marks	:	50

Answer all the Questions

Ques. No.	Question Description	Marks
1.	Prajan studying 2nd Standard in a CBSE Board. He needs to complete his maths subject homework with some basic arithmetic calculations. Your task is to write a menu-driven C program using a switch case with the flowchart, to perform various arithmetic operations like Addition, Subtraction, Multiplication, Division, and Modulo operations with different data types like an integer for subtraction, division and modulo, float datatype for Addition and Multiplication.	[10]
2.	Write a C program to help the VIBRANCE organizers in picking the lucky person from the registered list. The organizers have planned to pick five registered participants and they have planned to implement the following: Hint: The registered participants will get the register numbers in six digits, which start with the number 233 and the remaining digits are one of the following 001, 002, and so on till 100. Examples of some numbers are: 233001, 233002, ...233100 i) To find the sum of all the digits for those five lucky dips. Example: 233031 - 12, 233034 – 15 and 233036 - 17. **(2 Marks)** ii) Based on the unit's digit value (digit in the 0^{th} place of the sum) of the sum obtained in the previous step, the lucky winners prizes are announced. **(6 Marks)** a) If the unit's digit value is less than or equal to the number three, then that registered number will get the first prize. So print the result in the format given: Register Number - First Prize Example: 233031 - First Prize b) If the unit's digit value is 4 or 5 then, the registered number will get the second prize. So print the result in the format given: Register Number - Second Prize Example: 233034 - Second Prize c) If the unit's digit value is from 6 to 9, the registered number will get the third prize. Print the result in the format given: Register Number - Third Prize. Example: 233036 - Third Prize iii) Finally, print the number of prize winners declared under each prize category. **(2 Marks)**	[10]

3. A sports club is conducting game events for the 10 registered participants (Player_A, Player_B……, Player_J). Each participant is eligible for all three game events. Based on their performance in the game, a score will be awarded to them. Each participant got a score for each they participated if they did not participate "0" score will be given. For example, the scores of each player (A, B, ….J) in three different game events are stored in the following format; [10]

Football = {10,7,4,6,9,5,9,0,10,8}

Gymnastics = {8,10,9,7,4,10,9,8,7,0}

Athletics = {8,10,5,10,8,4,7,8,9,9}

Write a C program to read ten players' scores for each event and store them in the above format using an array. Find each game's Star Player (max score in a game) and find the overall star player of the sports day's gaming events (i.e. player who got a max score in all three games).

4. Read the String with the combination of alphanumeric, space, and special characters. Write a menu-driven program in C language to analyze the input string under different string operations. Use switch cases to perform the following operation [10]

1) Display the string in reverse order **(2 Marks)**

2) Display the total number of spaces, alphabets, numbers, and special characters in the given string **(2 Marks)**

3) Copy the input string and paste it into another string without using the predefined string copy function. Also, display the number of characters copied from the source to the destination string. **(3 Marks)**

4) Consider all the alphabets in the string and then sort them in ascending order. **(3 Marks)**

5. Raju works for a XYZ car manufacturing company, and his task is to design a system that keeps track of the total number of cars produced by the company, as well as the number of cars produced by each factory of the company. He decides to use C programming language to implement this system. To achieve this, Raju defines a variable called "total_cars" that keeps track of the total number of cars produced by the company. He also defines a variable called "factory_cars" to keep track of the number of cars produced by each factory of the company. His task is to implement a subroutine called "produce_car" that takes an integer input argument from the factory manager representing the factory number to produce a car. The factory number is bounded by a constraint $0 \leq N \leq 9$. For example, every time produce_car subroutine is called, a car is produced from the specified factory. The subroutine should increment both the "total_cars" and the corresponding "factory_cars" variables, and then print a message indicating that a car has been produced by the specified factory also indicating the total number of cars produced by the company. Given a moderate car sales season, assume that the factory manager schedules five production calls in a given time. Use arrays where ever applicable. [10]

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