Question Paper

Exam Date & Time: 06-Dec-2023 (09:30 AM - 12:30 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

FIRST SEMESTER B.TECH. DEGREE EXAMINATIONS - NOVEMBER / DECEMBER 2023
SUBJECT: CSE 1071 / CSE_1071 - PROBLEM SOLVING USING COMPUTERS

Marks: 50 **Duration: 180 mins.**

Answer all the questions.

1A)	Compare Machine language and High-level language (any four points).	(2)
1B)	Draw a flowchart to show the computation of a^n, where 'a' is the base and 'n' is the power.	(3)
1C)	Using the control flow diagram, discuss the working of a ***Switch*** control structure in C. Write a complete C program using an ***if-else*** control structure to compute an employee's income tax as per the tax rates and salary range given in the table. (2+3 = 5 marks)	(5)
2A)	Discuss continue statement. Write a C program to display the sum of n numbers entered by the user. Terminate if the user enters a negative number.	(2)
2B)	Compare and Contrast exit-controlled and entry-controlled loop (2 points each). Write a C program to read N numbers (positive integers) and find the second largest number among them (without using arrays and functions). (1+2 = 3 marks)	(3)
2C)	i) Illustrate the working of binary search algorithm in the array A={10,12,24,29,39,40,51,56,69}to search the element k= 56. ii) Write a C program to read a 1D array of size n and delete prime numbers from the array. Display the modified array. (2+3 = 5 marks)	(5)
3A)	Write a C program to accept a word (string) from the keyboard and print the letters in the word in alphabetical order.	(2)
3B)	A spacecraft arrives at Mars, but its memory has been corrupted by radiation. Fortunately, it can receive updates in the form of a single digit number at a time and are stored in a matrix of the order 3X4. The numbers from the matrix are added column wise to get the final update which is a code word which in turn indicates the next task that the spacecraft is supposed to do. Develop a C program to store the updates in a matrix,add them from right column to the left, while adding the carry can be added to the column left to it and get the final code word in a 1D array. Sample updates, its corresponding storage as a matrix and addition to get the final code wordin a 1D array is given below.	(3)

Updates (Input): 6 7 9 1 0 3
5 9 3 2 5 4
Updates in matrix form:

6	7	9	1
0	3	5	9
3	2	5	4

After adding column wise:

1	0	4	0	4

3C) Write a C program to read a matrix of order M X M and Display the same in matrix form in the main function. Write a function **isSaddle( )** which takes the matrix read, and its dimensions as parameters, finds and displays the saddle points (numbers) in the matrix. [A saddle point (number) is one which is minimum in its row and largest in its column. Write another function SumofDigits, which takes an integer as parameter, calculates and returns the sum of the digits of the integer. Invoke SumofDigits from isSaddle( ) with saddle point(s) as parameter(s). Display the sum of the digits of the saddle number(s). (5)

Sample I/O:

The entered matrix is:
24 26 28
2 8 14
1 3 6
The saddle point is 24 and found at 0 row
and 0 column.
The sum of the digits of saddle point is 6.

4A) Write a C program to read and display the 1D integer array. Use recursive function named "Sort" to sort integer array elements in ascending order. Pass 1D array as argument to the function. Demonstrate with neat diagram the function call and return for taking suitable input. (3)

4B) With appropriate example program, discuss how to return multiple values from a function using pointers. (3)

4C) Write a C program to read and display a 2D integer array. Write a function Statistics() that accepts 2D array as argument to the function. The function Statistics() will find sum and average of all elements of an array and return sum and average using pointers. (4)

5A) Describe the following with the help of an example. (3)
i) Any two methods for initializing the structure members.
ii) Structure within structure.

5B) Develop a Sales Report Generation System in C using an array of structures. The program should allow users to input sales data for N salespersons, including their name, sales amount for three different products, and generate a report displaying total sales and commission for each salesperson, assuming commission is 5% of total sales. (4)

5C) Explain about any three different types of cybercrimes where computer's become target of crime. (3)

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