# **Question Paper**

Exam Date & Time: 07-May-2024 (09:30 AM - 12:30 PM)



### MANIPAL ACADEMY OF HIGHER EDUCATION

#### SECOND SEMESTER B.TECH. DEGREE EXAMINATIONS - APRIL / MAY 2024 SUBJECT: CSE 1071/CSE\_1071 - PROBLEM SOLVING USING COMPUTERS

Marks: 50

#### Duration: 180 mins.

#### Answer all the questions.

1A)	Memory is a storage for the computer data, primary memory is classified into two types. Illustrate the two types of primary memory.	(2)
1B)	Write an algorithm and draw a flowchart to find the Fibonacci series till term≤1000.	(3)
1C)	<ul> <li>i) Write a C program to find all smallest positive integers that are divisible by two or more given integers.</li> <li>Input: Enter the number of integers: 3</li> <li>Enter 3 integers:</li> <li>2</li> <li>3</li> <li>5</li> <li>Output: The smallest positive integer divisible by 2, 3, 5 is: 30</li> <li>ii) Write a C program to check if a year (input by the user) is a leap year or not using Conditional Operators by considering all the conditions .</li> </ul>	(5)
2A)	Construct a C program to check whether the given number is even or odd number using the Bitwise XOR operator.	(2)
2B)	Develop a C program to convert the given Octal number to decimal and further convert it to binary value and display it. Example: Enter an octal number: 45 the equivalent decimal value is 37 Binary equivalent: 100101	(3)
2C)	Discover a C program to read a 2D matrix of size M*M. Check whether the average row sum & column sum is greater than 10. If so, find the transpose of the matrix. Display the initial matrix, average value of both row sum and column sum, and the final matrix.	(5)
3A)	Write a C program to read a sentence and display the initial character of each word in that sentence.	(2)
3B)	Write a program to read a matrix of order MXN and check whether the given matrix is a lower triangular matrix or not. If it is a lower triangular matrix, print the elements in lower triangle along with appropriate message otherwise print 'Not a lower triangle matrix'. [Note: A matrix is said to be a lower triangular matrix if all the elements above the principal diagonal are zeros.] Sample Input:	(3)

## Order of Matrix: 3 3

Input Matrix:

- 100
- 230
- 456

Expected Output:

Given Matrix is the Lower Triangular Matrix

- 1
- 23
- 456

Write a function isAutomorphic() to check whether given integer (>0) is Automorphic number or not (5) and return 1 or 0 accordingly. Write a main function to read n values into a 1D array and replace all automorphic numbers by -1 and print the final array. [Note: A number is said to be automorphic if its square ends with the same digits as the number itself. Eg: Given an integer, say N = 25, the square of N is 625. Hence, N = 25 is an automorphic number because the square ends in the same digits as the number N].

Write a C program that reads and displays a square matrix whose dimension and elements are (3)taken from the user. Using a function, replace all the odd numbers in the even position by reversing the number and even numbers in the odd position by the sum of digits. [Hint: Even position is when both indices are even while odd position is when both indices are odd. Display the modified matrix in the main program.]

Sample Output:

4A)

Enter th	ne size	of Matrix	A:		
3					
3					
Enter th	ne eleme	ents:			
13					
14					
12					
23					
24					
27					
20					
21					
35					
Entered elements:					
13	14	12			
23	24	27			
20	21	35			
Replaced elements:					
After Function					
31	14	12			
23	6	27			
20	21	53			
How does C language allow nesting of functions? Explain the same with a suitable					

4B) 4C) program.

(3)

Write a C program which reads and displays a 1D array of integers from the user. The main (4) program passes this array to a recursive function binarySearch(int x[], int element, int start, int end). The recursive function takes the array and performs the binary search for a given element input by the user. The main program displays whether the element is found or not.

5A) A word is defined as a string of alphabets that does not contain a blank or any special characters (3) (such as , ; . n etc.). A sentence is considered as a sequence of words separated by blanks and is terminated by '.' , '?' or 'n' character. Write a C program that defines a function int WordCount(char\* s, char \*w) which counts the number of occurrences of a word 'w' in a sentence 's'. Use pointers to store sentence and word of any size.

- 5B) Create a structure medicine\_details. It has attributes medicine\_name, exp\_date, medicine\_price, (4) exp\_date (a nested structure) includes day, month, and year. Write a C program to maintain 'n' number of records for different medicines, define a function isExpired(struct Date currentDate, struct Date expDate) and list the medicines which are expired based on the dates entered by the user.
- 5C) Explain in detail about any two cybercrimes where computers become target of crime with suitable (3) example. Suggest one attack to consume server bandwidth and justify.

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