

Question Paper

Exam Date & Time: 24-Jun-2024 (09:30 AM - 12:30 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

SECOND SEMESTER B.TECH. DEGREE EXAMINATIONS - JUNE 2024
SUBJECT: CSE 1071/CSE_1071 - PROBLEM SOLVING USING COMPUTERS

Marks: 50

Duration: 180 mins.

Answer all the questions.

- 1A) Compare and contrast between Compiler and Interpreter with examples for each. (2)
- 1B) Draw the flowchart to find the Fibonacci series up to the number entered by the user. (3)
- 1C) Explain with examples, any two data types in C. Write a C program to check if the entered character is a vowel or consonant using else if ladder statement. Display appropriate message if the entered character is not an alphabet. (5)
- 2A) Write a C program to read 'n' from the user and display the following pattern for given 'n'. (2)

1

1 2 1

1 2 3 2 1

- 2B) Write a C Program to input a number and express that number as sum of two prime numbers. (3)

[Hint: input the number: 16,
16 can be written as 3 + 13.
16 can be written as 5 + 11.]

- 2C) Write a C program to sort a 1D array in descending order. (5)
- 3A) Explain the following string handling functions of C with proper syntax: strcpy(), strcat(). (2)
- 3B) Write a C program to input a 2D array of size MXN and display the number of zeros in the matrix. Also, check whether the input matrix is a sparse matrix or not. (Hint: sparse matrix is a matrix in which the number of zero elements is more than the non-zero elements) (3)
- 3C) Compare and Contrast between the following with example programs for each: (5)
a) Local and Global variable
b) Actual and Formal parameters
- 4A) Write a recursive function in C called **sumDigits** that takes an integer as input and returns the sum of its digits. (3)
- 4B) Write a function in C to convert a decimal number to binary. (3)
- 4C) Assume you are involved in developing a payroll management system where the net salary of an employee needs to be calculated based on the gross salary and the applicable tax rate. To achieve this, a complete C program is required that implements a function called calculateNetSalary(), which accepts the Employee's name, gross salary, and tax rate as arguments passed by value. The net salary is computed and displayed inside the function by deducting the tax amount from the gross salary. (4)
- 5A) Define a structure named Event with the following details as its members: event ID (integer), title (3)

(string), attendees (integer), and room number (integer). Write a C program that should prompt to input 3 event details and display.

- 5B) What is a pointer? Write a complete C program that demonstrates the use of pointer arithmetic to calculate the sum of the first, third, and fifth elements of the array and display the result. (4)

Consider the following array of integers:

```
int nums[] = { 5, 15, 25, 35, 45};
```

Ensure that your program only uses pointer arithmetic for accessing and performing operations on the array elements (no array indexing like `nums[i]` should be used).

Input: 5, 15, 25, 35, 45

Sum of first, third, and fifth elements of the array: 75

- 5C) Outline a brief overview on three different types of cybercrime where computers become target of crime. (3)

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