Question Paper

MANIPAL ACADEMY OF HIGHER EDUCATION

SECOND SEMESTER B.TECH. EXAMINATIONS (MIT MANIPAL) - AUGUST 2022
SUBJECT : CSE 1051 - PROBLEM SOLVING USING COMPUTERS
(MAKEUP)

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

Answer all the questions.

1A) Write an algorithm and draw a flowchart to convert a given decimal number into octal number. (4)
Hint: Decimal number system consists of 10 digits: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9. Octal number system consists of 8 digits namely: 0,1,2,3,4,5,6,7. They are denoted with base 10 and 8 respectively.

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Example: Convert a decimal
number(461)₁₀ to Octal:

        461/8=57 and remainder = 5
        57/8=7 and remainder = 1
        7/8=0 and remainder = 7
        So the octal number starts
from MSD to LSD, i.e. 715
        Therefore, (461)₁₀ = (715)₈
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1B) i) Name the high-speed computer memory that resides between the CPU and RAM? Give its salient (3)
features.
ii) Discuss the following phases in the execution of a typical C program.
• Preprocessing and compiling
• Linking
• Loading
• Execution

1C) i) Showing all the intermediate steps, evaluate the following expression10 * (2 - 3) / 2 % (5 + 7) + 8 (3)
*6 / 12
ii) The following expression has a single pair of parentheses missing which makes it syntactically wrong and it does not compile. Place a pair of parentheses so as to correct the expression and evaluate it for x = 3, y = 3, z = 5, w = 7. Show the stepwise evaluation. **x * w + y * z = 7**
iii) What will be the value of x after the following error free C code snippet is executed? Show the stepwise evaluation of the expression.
int i = 4 , j = 2 , k = 6 , x = 2;
x = i * (j / = k / 2);

2A) Write a C program using **switch** statement to calculate the net salary of an employee based on the (3)
grade as follows:

Grade	Basic salary
1	12000
2	15000
3	18000
4	20000

Net salary = Basic salary + HRA - (IT+PF)
where HRA is 10% of basic salary, IT = Rs.200, PF = 12% of basic salary.

2B) Write C program using for loop to check whether a given number is Perfect Number. (3)
(Perfect number is a number which is equal to sum of its divisor. For eg, divisors of 6 are 1, 2 and 3. The sum of these divisors is 6. So, 6 is called as a perfect number.)

2C) Write a C program to accept a sentence from the user and display the sentence after replacing all the vowels with a blank space. (4)

3A) Write a C program to read a matrix of order MxN and print its transpose. (3)

3B) Illustrate the working of pass by value and pass by reference in C program with suitable examples. (3)

3C) Write a C function **isFib()** to check whether the given number is a Fibonacci number or not. Read M x N matrix in main() and replace all the Fibonacci numbers in the principal diagonal by first digit of that number using above function and display the final matrix. (4)

Ex: Input:

M x N= 2 x 2

13 25

34 55

Output:

 1 25

34   5

4A) Discuss the steps involved in designing a recursive algorithm? (2)

4B) Write a C program to find the product of two numbers using Recursion. (3)

4C) Write a C program to create a structure of student with the following fields: name, and marks. Read the name and marks of n students in an array of structure and pass this array of structure to a function find_names( ) to print the names and marks of the students which get below average and above average marks. (5)

5A) Define a structure *Distance* with **inch** and **feet** as its members. Write a C program to read two distances, add them and display the result considering 12 inch = 1 feet. (3)
Eg: 4 feet 11 inch + 2 feet 9 inch = 7 feet 8 inch.

5B) Write a C program to compute the sum of **n** array elements using a pointer. (3)

5C) Explain any four cyber-crimes where computers are used to commit the crime. (4)

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