Question Paper

Exam Date & Time: 06-Jan-2023 (02:30 PM - 05:30 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

FIRST SEMESTER B.TECH. EXAMINATIONS - JANUARY 2023
SUBJECT: CSE 1071 / CSE-1071 - PROBLEM SOLVING USING COMPUTERS

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

Answer all the questions.

1A)	"The overall performance of the computer is improved by cache memory". YES or NO! Justify your answer with points to support it. Write an algorithm to convert the given binary number into decimal form. (E.g. $101_2 \rightarrow 5_{10}$)	(3)
1B)	List any four functions of a control unit in the computer. Draw a flowchart to show the computation of a^n, where "a" is the base and "n" is the power.	(3)
1C)	Distinguish between machine and high-level language (any four points). Evaluate the following expressions. Show all intermediate steps. **i) A= 2*3*4/(5+1)-2/3*(4+5)** **ii) B=2*3/4+4/4+8-2+5/8**	(4)
2A)	Assume that a, b, and c are integers variables with a = 13, b = 7 and integer occupies 16 bits (2 bytes). Determine the result of the following expressions: i) c= a & b ii) c = a < < 3 iii) c = a >> 2	(2)
2B)	i) Write a program in C to check whether a number can be expressed as sum of two prime Numbers. [HINT: Input a positive integer: 16 Expected Output: 16 = 3 + 13 16 = 5 + 11] ii) Write a Program in C to find Least Common Multiple (LCM) of any two numbers. (3+2 = 5 marks)	(5)
2C)	Write a program in C using while loop to find sum of first and last digit of a number.	(2)
3A)	Seventy-five numbers are entered from the keyboard into an array. Write a program to find out how many of them are positive, how many are negative, how many are even, and how many odd using the conditional operator. (1½+1½ = 3 marks)	(3)
3B)	Write a C Program to copy n characters of a string from the m^{th} position in another string.	(3)
3C)	Write a C Program to fill a square matrix with values zero on the diagonals, 1 on the upper right triangle and -1 on the lower triangle.	(4)
4A)	Write a C program using functions to check whether two given strings are anagrams. [Hint: Two strings are anagram of each other if we can rearrange characters of one string to form another string. All the characters of one string must be present in another string and should appear same number of times in other string. Strings can contain any ASCII characters.] Example : rescued and secured, resign and singer, stone and tones, pears and spare, ELEVEN PLUS TWO and TWELVE PLUS ONE	(3)
4B)	Write a C program to compare two strings by passing reference as parameter to the function with	(5)

prototype: int compare_string (char *, char *), without using any string handling functions. [Note: Input and output should be in main ()]

4C) With the help of a recursion call tree, predict the output of the following C program. (3)

```
#include<stdio.h>
int fn(int i, int p)
{
if(i==0) return 0;
else if(i%2) return fn(i/2, 2*p)+p;
else return fn(i/2, 2*p)-p;
}
int main()
{
printf("%d",fn(24,1));
return 0;
}
```

5A) Explain the classification of cybercrime where computers become the target of crime with six examples. (3)

5B) What will be the output of following programs: (3)

i)
```
#include<stdio.h>
int main()
{
        char *ptr;
        char string[] = "learn C from 2braces.com";
        ptr = string;
        ptr += 6;
        printf("%s",ptr);
        return 0;
}
```

ii)
```
#include<stdio.h>
int main()
{
        printf("%d", sizeof(void *));
        return 0;
}
```

5C) Define a structure COLLEGE with the following members: Student Name, Student Id, Students Marks in 5 subjects. Write a C program to read data of 5 students and print the same. Compute total marks of each student, percentage and print percentage with name (if percentage>=80 print first, percentage< 80 and >=60 print second, percentage< 60 and >=40 print third, and if percentage< 40 fail. (4)

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