23/3/23

| Reg. No. | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|

| Question Paper Code | 11749 |
|---|---|

**B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV/DEC 2022 (MARCH 2023)**

First Semester

**Computer Science and Business Systems**

**20ESPC106 - FUNDAMENTALS OF COMPUTER SCIENCE**

(Regulations 2020)

Duration: 3 Hours | Max. Marks: 100

**PART - A (10 × 2 = 20 Marks)**

Answer ALL Questions

| | | *Marks, K-Level,CO* |
|---|---|---|
| 1. | Define an algorithm, and write an algorithm to find the largest among three numbers. | *2,K1,CO1* |
| 2. | Identify the hierarchy of the operations and evaluate the following expression: A=2*3/4+4/4+8-2+5/8. | *2,K1,CO1* |
| 3. | Write a for loop statement to print numbers from 10 to 1. | *2,K1,CO2* |
| 4. | State the recursion. Give an example. | *2,K1,CO2* |
| 5. | Define Array. Give an example. | *2,K1,CO4* |
| 6. | What is pointer variable? How to declare it? | *2,K1,CO4* |
| 7. | How will you define a structure in C? What is the use of it? | *2,K1,CO5* |
| 8. | State the difference(s) between structure and union. | *2,K1,CO5* |
| 9. | What are the two main ways a file can be organized? | *2,K1,CO6* |
| 10. | Why files are needed? List the file operations in the C paradigm. | *2,K1,CO6* |

**PART - B (5 × 13 = 65 Marks)**

Answer ALL Questions

| | | | |
|---|---|---|---|
| 11. | a) | (i) Write an algorithm and draw a flowchart reflecting the steps to check if a number is prime or not. | *8,K2,CO1* |
| | | (ii) Classify the data types supported by the C language with suitable examples. | *5,K2,CO1* |
| | | **OR** | |
| | b) | Illustrate the various types of operators available in C with the necessary programs. | *13,K2,CO1* |
| 12. | a) | Describe the decision-making statements and branching statements in the C programming language with suitable examples. | *13,K2,CO2* |
| | | **OR** | |
| | b) | (i) Write a C program to check if the given integer is a Palindrome or not. | *5,K2,CO2* |

*K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create*

(ii) Write a C program to calculate the factorial of a number using recursion. Also, write a non-recursive function to do the same job. 8,K2,CO2

13. a) Explain multidimensional array with help of suitable examples. 13,K2,CO4

**OR**

b) (i) Can we assign a pointer variable to another pointer variable? Assess your answer with the help of an example. 8,K3,CO4

(ii) Construct a C program to swap the content of two variables using pointers. 5,K3,CO4

14. a) (i) Construct a C program using union, to prepare the employee pay roll of a company. The number of records is created based on the user input. 8,K3,CO5

(ii) Is it possible to create an array of structures? If yes, demonstrate with the help of an example. 5,K3,CO5

**OR**

b) (i) Compare Structure and Union with suitable examples. 7,K2,CO5

(ii) Explain in detail about Typedef and Table lookup. 6,K2,CO5

15. a) (i) Explain the following file functions in C: 6,K2,CO6

1) fseek()
2) ftell()
3) rewind()

(ii) With the help of a case study to show, how does random access file differ from a sequential access file. 7,K2,CO6

**OR**

b) (i) Write a C program to copy the content of one file into another file. 5,K2,CO6

(ii) Illustrate the various operations that can be done on files. Give the appropriate examples. 8,K3,CO6

## PART - C (1 × 15 = 15 Marks)

16. a) (i) Write a C program for Scientific calculator using built-in functions. 7,K3,CO3

(ii) Construct a C program for Swapping of two numbers and changing the value of a variable using pass by reference. 8,K3,CO3

**OR**

b) The Tower of Hanoi is a mathematical puzzle. It consists of three rods and N disks. The task is to move all the disks from one rod to another, following the certain rules: 15,K3,CO3

1) Only one disk can be transferred at a time.
2) Only the uppermost disk can be moved from one stack to the top of another stack or empty rod.
3) A larger disk cannot be placed on a smaller disk.

Figure 1 represents the initial condition of the Tower of Hanoi:

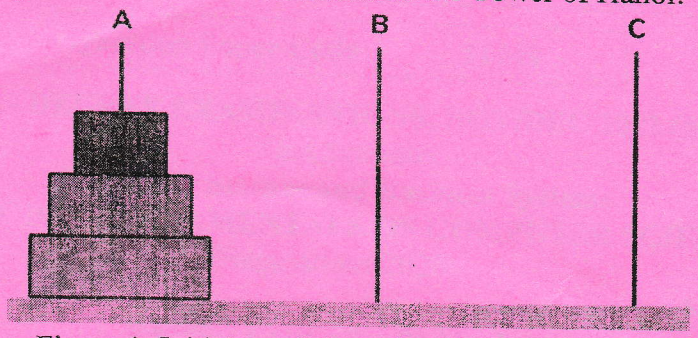


Figure 1: Initial condition of Tower of Hanoi

The final solution of the Tower of Hanoi is given in figure 2.

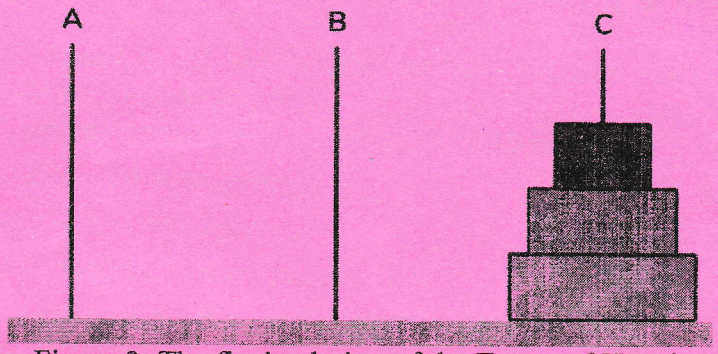


Figure 2: The final solution of the Tower of Hanoi

Suggest a solution to the Tower of Hanoi problem with relevant diagrams, and implement the C program using recursion to solve the Tower of Hanoi problem.