MSCCS-07/MSCCS-201/MCA-201

December - Examination 2019

MSCCS-Final/MCA-IInd Year Examination

Data Structure and Algorithm

Paper - MSCCS-07/MSCCS-201/MCA-201

Time : 03 Hours] **[Max. Marks :- 80**

Note: The question paper is divided into three sections A, B and C. Write answers as per given instructions.

Section - A $8 \times 2 = 16$

(Very Short Answer Questions)

Note: Answer **all** questions. As per the nature of the question delimit your answer in one word, one sentence or maximum upto 30 words. Each question carries 2 marks.

1. i. Which data structure is used to perform recursion? Why?
   ii. Give two examples of Sparse Matrices.
   iii. What is the linear data structure? Give an example.
   iv. What do you mean by NP, NP-hard and NP-complete problems? Give an example of each.
   v. What is Circular Queue? Give an example.
   vi. State Cook Levin Theorem.
   vii. State Travelling Salesman Problem.
   viii. Write the condition when a stack is full. Also, give an example.

Section - B $4 \times 8 = 32$

(Short Answer Questions)

Note: Answer **any four** questions. Each answer should not exceed 200 words. Each question carries 8 marks.

2. Explain the concept of Asymptotic Notation in detail with suitable example.
3. Explain the difference between Array and Stack with a suitable example.
4. Illustrate the linked list representation of the list. Also, explain with a suitable example.
5. Explain the adjacency matrix with the help of a suitable example.
6. How will you detect a cycle in a directed as well as in an undirected graph? Explain with the help of an example.
7. Write an algorithm for performing all the operations in the queue. Also, explain with a suitable example.
8. Describe the worst-case and best-case complexity of Bubble sort with a suitable example.
9. Write an algorithm to find the Fibonacci sequence of N^{th} member. Also, explain the same algorithm with an example.

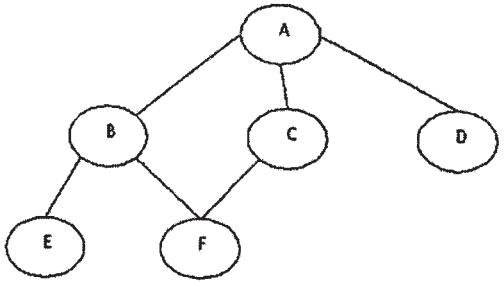
Section - C $2 \times 16 = 32$

(Long Answer Questions)

Note: Answer **any two** questions. You have to delimit your each answer maximum upto 500 words. Each question carries 16 marks.

10. Describe the following strategy with a suitable example:
    a. Divide and conquer strategy.
    b. Greedy strategy.
11. Write an algorithm to implement Kruskal's Algorithm. Discuss with the help of an example.

12. Apply BFS and DFS on the graph given below. Show algorithmic steps also:



13. The inorder and preorder traversal of the tree is given below:
    Inorder: DBMINEAFCJGK
    Preorder: ABDEIMNCFGJK
    i. Construct the corresponding Binary Tree.
    ii. Determine the postorder traversal of the tree drawn.