MCS–021

BACHELOR OF COMPUTER APPLICATIONS (BCAOL)

DATA AND FILE STRUCTURES

Time: Three Hours

Maximum Marks: 100

Note: There are three Sections in the question paper A, B, C. Attempt each section. The number of questions to be attempted in each section are separately mentioned in the Sections. Also the marks assigned to each question are mentioned in the Section.

Section–A (5×4=20)

Note: Attempt any five questions from Question No. 1 to 7. Each question carries 4 marks.

1. Describe the asymptotic notations in brief.

2. What is sparse matrix? Explain how it is represented using an array.

3. What is stack? Discuss any four applications of the stack.

4. What is a graph? Discuss any one method representing a graph?

5. Create the binary tree for which the Post-order and In-order traversal are given below:

Post-Order : K L J I H G F E D C B A

In-Order : K J L I H A B G E F D C

6. Explain Depth first search Algorithm for a graph with a suitable example.

7. What is the need of life organization? Explain division-remainder hashing with the help of an example.

Section–B (5×10=50)

Note: Attempt any five questions from Question No. 8 to 14. Each question carries 10 marks.

8. Write a program in C language that accepts two matrices as input and prints the multiplication of the two matrices as output.

9. Create max heap tree for the following list of keys, inserted in the sequence. Also, apply sort algorithm on the tree to sort the keys. Show all the intermediate steps:

13, 6, 18, 35, 15, 22, 45, 8, 4, 60, 2

10. Write an algorithm to implement a stack using array.

11. What is minimum cost spanning tree ? Explain Prim's algorithm with the help of a suitable example.

12. Explain Red-Black tree and its properties with the help of a suitable examples.

13. How a DEQUEUE can be implemented using linked list? Explain with the help of a suitable example.

14. Create AVL tree for the following list of keys, inserted in the order:

5, 20, 8, 4, 40, 35, 26, 60, 12, 45

Section–C (2×15=30)

Note: Attempt any two questions from Q. No. 15 to 17. Each question carries 15 marks.

15. Create a B-tree of order-4 for the following list of keys, inserted in the given sequence in an empty tree.
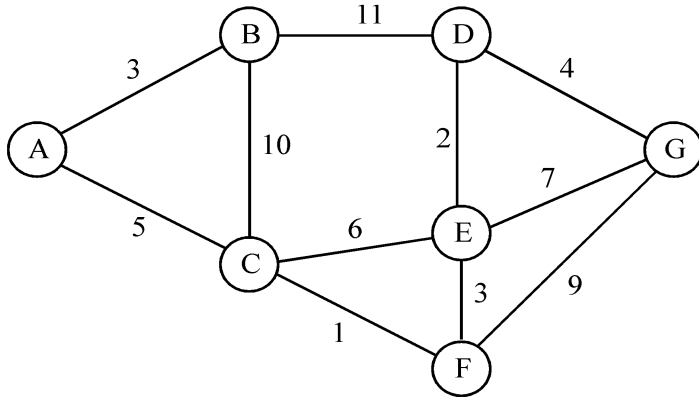
8, 15, 40, 7, 35, 5, 25, 45, 60, 4, 2, 6, 30, 50

Further delete the keys 4, 6, 30 and 15 from the tree. Show all the intermediate steps.

16. For the given graph below, find the shortest path from vertex A to all other vertices, using Dijkstra's algorithm:

17. Write short notes for the following:

i) Direct file organization

ii) Linear Data Structures vs. Non-Linear data Structure

iii) Tree Traversal methods