# Vidush Somany Institute of Technology & Research, Kadi

CE / CSE / IT (3rd Semester)

Subject – Data Structures and Algorithms (CT303-N)

Assignment-3

1) How can a general tree be converted into a binary tree? Provide a step-by-step explanation.

2) Explain binary search tree with suitable example.

3) Create Binary Search Tree for following Data and write pre-order traversal, in-order traversal and post-order traversal of the constructed tree.

   a. 10, 15, 28, 09, 39, 31, 30, 14, 07, 08

   b. 38, 13, 51, 10, 12, 40, 84, 25, 89, 37, 66, 95

4) What is AVL tree? Explain various rotations with suitable example.

5) Create AVL tree for following Data and write pre-order traversal of the constructed tree.

   a. 10, 15, 28, 09, 39, 31, 30, 14, 07, 08

   b. 28, 73, 89, 75, 74, 13, 10

6) Explain Weight balanced tree with proper example.

7) Insert 38, 75, 85, and 15 in the AVL tree shown below. Draw rebalancing of tree after every insertion.
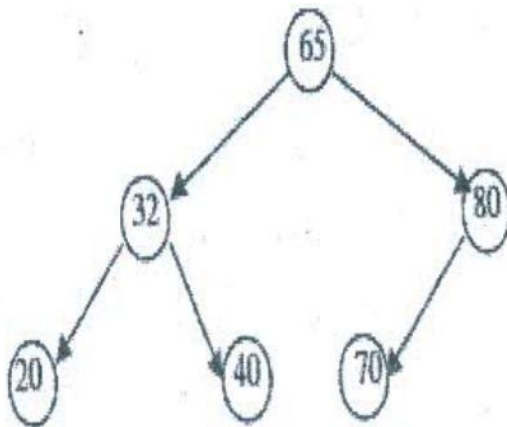
8) Construct a binary tree from the traversals given below:

    a. In-order: D, B, A, E, G, C, H, F, I

       Pre-order: A, B, D, C, E, G, F, H, I

    b. In-order: B, I, D, A, C, G, E, H, F

       Post-order: I, D, B, G, C, H, F, E, A

    c. Pre-order: G, B, Q, A, C, K, F, P, D, E, R, H

       In-order: Q, B, K, C, F A, G, P, E, D, H, R

9) Search the number 50 from the given data using binary search technique. Illustrate the searching process.

    10, 14, 20, 39, 41, 45, 49, 50, 60

10) Define:

    1. Acyclic graph 2. Leaf node 3. Complete binary tree 4. Connected graph

    5. Threaded tree 6. Degree of node 7. M-ary tree 8. Null graph 9. Weight graph

    10. Adjacent Nodes 11. Mixed graph. 12. Loop (Sling) 13. Forest

11) Create 2-3 Tree for the following sequence: 50, 100, 150, 200

12) Discuss Threaded Binary Tree with proper example.

13) Construct 5 Order (5 Way) Tree from following data.

    1, 7, 6, 2, 11, 5, 10, 13, 12, 20, 16, 24, 3, 4, 18, 19, 14, 25

14) Explain path of the graph with suitable example.

15) Which data structures are used for finding the traversal of DFS and BFS? Explain both with its algorithms and proper example.

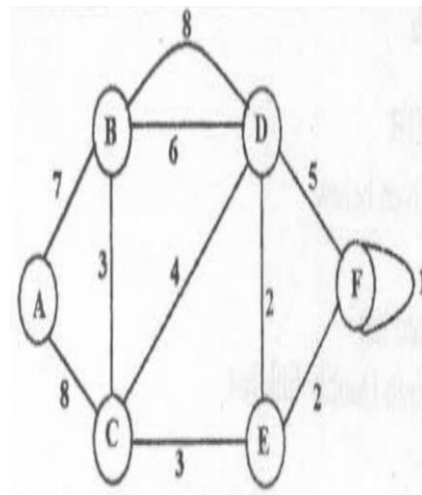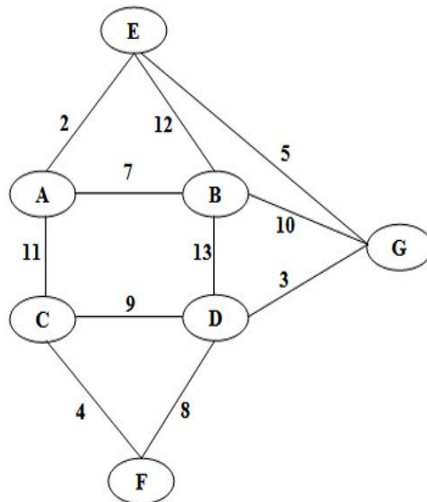16) Explain DFS and BFS with appropriate example.

17) Explain Dijkstra's shortest path algorithm. And find out the shortest path from node 0 to all other node using the algorithm.
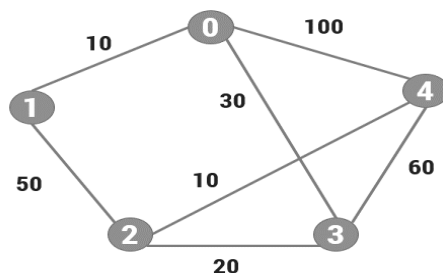
18) Traverse the mentioned graphs using BFS and DFS.
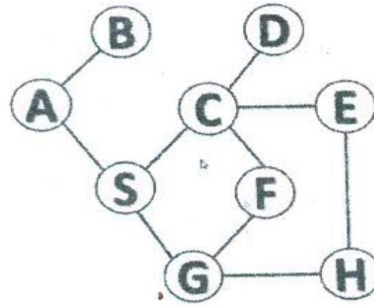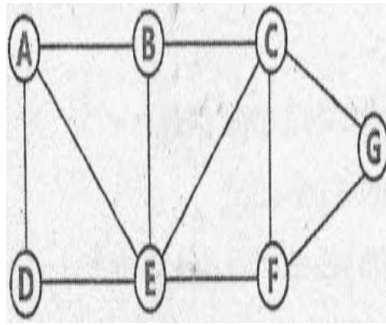
19) Find the minimum spanning tree of following graphs using prim's method and Kruskal's method. (Consider A as start node in both the graphs)

20) Show the possible adjacency matrix and adjacency list representation for the given graph.