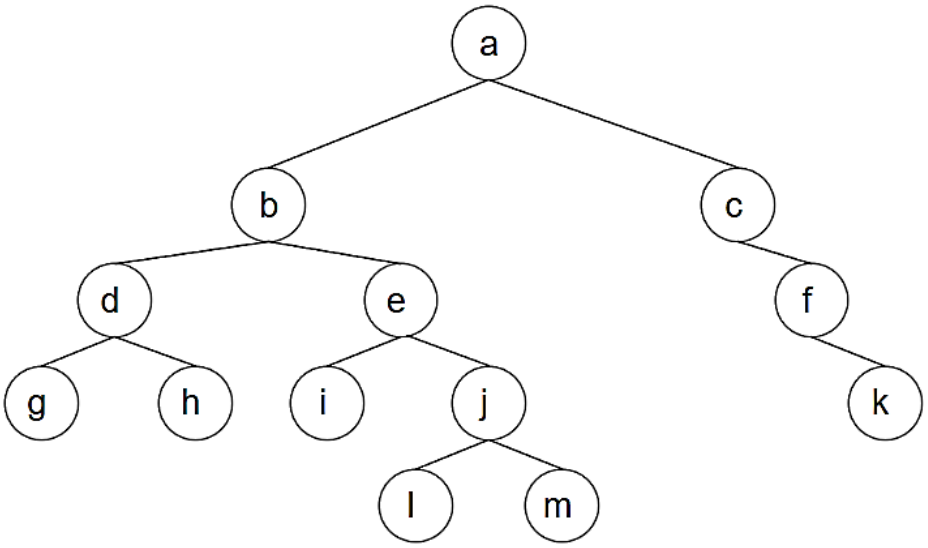
**Binary Tree and Binary Search Tree**

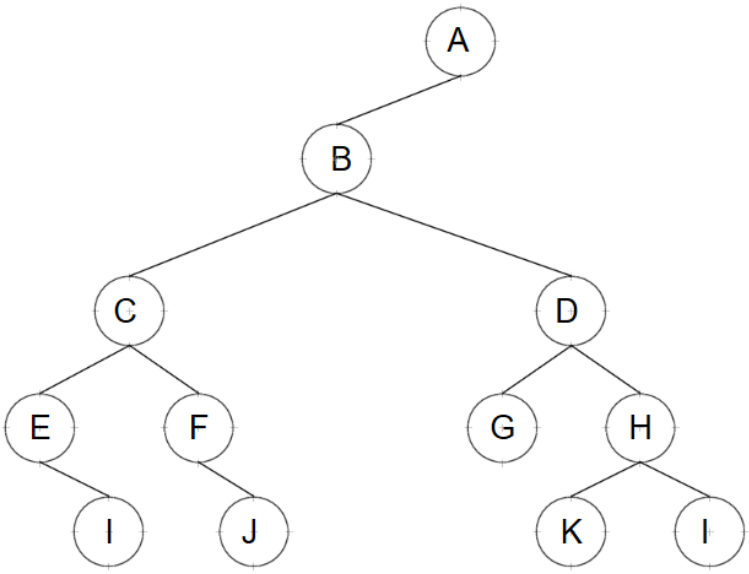
1. Consider the following binary tree…



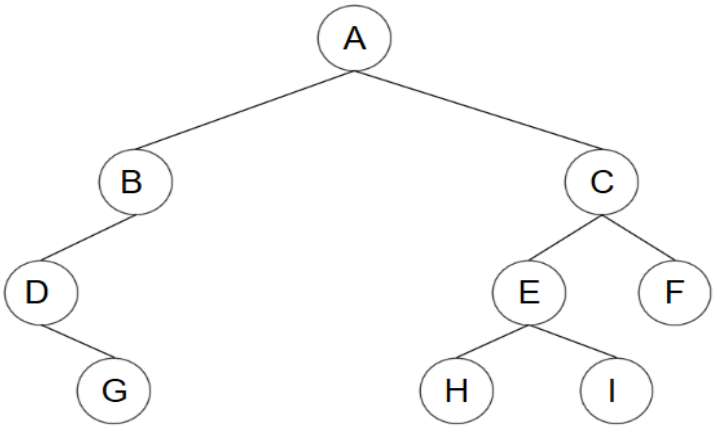

   i. How many nodes are here?
   ii. What is the root node?
   iii. What are the leaves?
   iv. What is the depth?

2. Consider the binary trees given below. Determine the order in which the vertices of the binary trees will be visited under preorder, inorder and postorder traversal.

   a)



b)




3. Draw a Binary Tree for each of the following.
    a. Tim, Dot, Eva, Roy, Tom, Kim, Guy, Amy, Jon, Ann, Jim
    b. 14, 15, 4, 9, 7, 18, 3, 5, 16, 4, 20, 17, 9, 14, 5
    c. A, B, C, D, E, F, G

    Note: Duplicates are allowed. If the value is smaller than the content of the node, put the value in the left branch, if it is greater than or equal, put the value in the right branch.

4.

i. Draw the binary search tree for the following.

    5, 9, 6, 8, 1, 2, 10

ii. Insert the value 14, 11, 17 and 3 to the above binary search tree and draw the respective binary tree structure.

iii. From the final binary search tree structure which you receive after adding the above values, draw the respective binary search tree structure for each of the following scenario.

    a. Delete the value 8
    b. Delete the value 10
    c. Delete the value 9
    d. Delete the value 5

5. In the below binary search tree, carry out the following operations in sequence: Add 5, add 17, delete 23, and delete 9. Draw the respective binary search tree structure for each of the above operations.