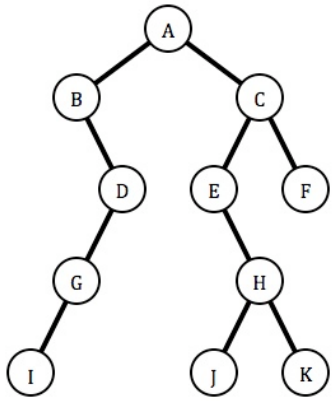
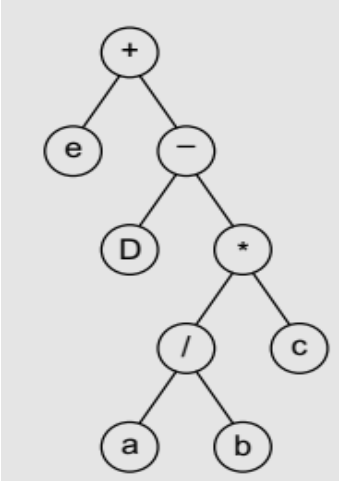
Assignment 7 – Trees (3 weeks)

Problem 1. Consider the tree given below. Create (draw) and find the in-order, pre-order, post-order, and level-order traversal (bread first traversal).



Problem 2. For the expression tree given below, do the following:
a. Extract the infix expression it represents.
b. Find the corresponding prefix and postfix expressions.
c. Evaluate the infix expression, given a = 30, b =10, c = 2, d = 30, e = 10.



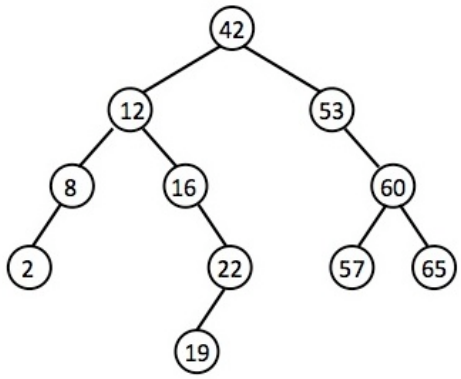
Problem 3. Convert the prefix expression –/ab*+bcd into infix expression and then draw the corresponding expression tree.

Problem 4. Write algorithms for the following operations on a binary tree:

a. Count the number of nodes of the tree.
b. Count the number of leaves of the tree.
c. Find the height of the tree.

Problem 5. Given a binary search tree shown below. Please do the following tasks:

a. Add node 9 to the tree.
b. Remove node 12 from the tree.
c. Remove node 53 from the tree.

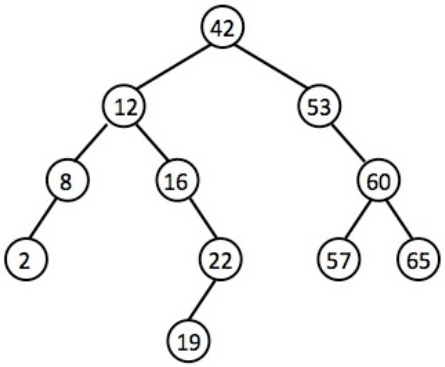


Problem 6. Create a binary search tree with the input given below:
98, 2, 48, 12, 56, 32, 4, 67, 23, 87, 23, 55, 46

a. Insert nodes 21, 39, 45, 54, and 63 into the tree.
b. Delete nodes 23, 56, 2, and 45 from the tree.

Problem 7. Given a binary search tree shown below.

a. Remove node 65 from the original tree.
b. Remove node 16 from the original tree.
c. Remove node 12 from the original tree.
d. Remove node 42 from the original tree.



Problem 8. Do the following tasks:

a. Find the result of in-order, pre-order, and post-order traversals.
b. Show the deletion of the root node.
c. Insert 11, 22, 33, 44, 55, 66, and 77 in the tree.