Q1)
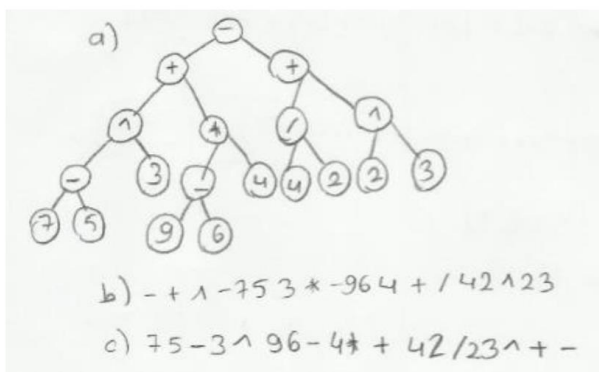
An infix presentation of an expression tree is given below.

[((7-5)^3) + ((9-6)*4)] - [(4/2) + (2^3)]

a. Draw the expression tree according to given infix presentation.

b. Write the prefix presentation sequence of this tree

c. Write the postfix presentation sequence of this tree

Soln :

b) - + ^ - 7 5 3 * - 9 6 4 + / 4 2 ^ 2 3

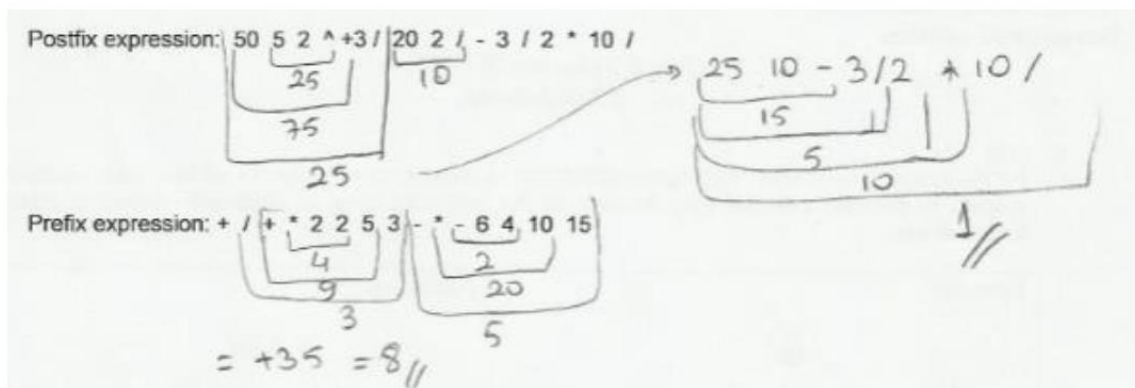c) 7 5 - 3 ^ 9 6 - 4 * + 4 2 / 2 3 ^ + -

Q2)

Evaluate the following expressions, solve the mathematical operations.

Postfix expression: 50 5 2 ^ +3 / 20 2 / - 3 / 2 * 10 /
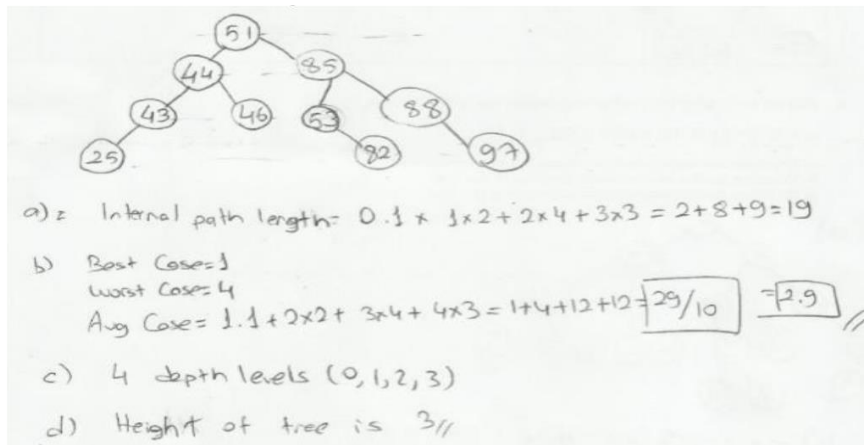
Prefix expression: + / + * 2 2 5 3 - * - 6 4 10 15
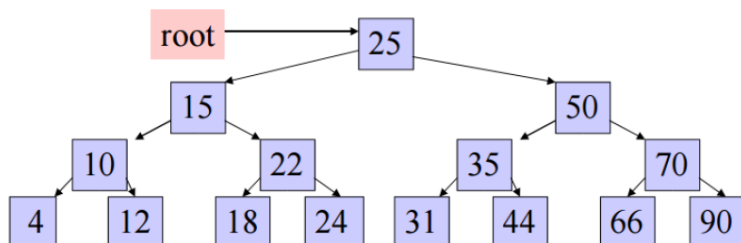
Q3)

Construct a BST (Binary search tree) from the following sequence.

$$51,44,43,25,46,85,53,88,82,97$$

a. What is the internal path length or total depth of this tree?
b. What is the best, worst, average case search times of this tree?
c. How many depth levels does this tree have?
d. What is the height of this tree?

a): Internal path length = 0.1 × 1×2 + 2×4 + 3×3 = 2+8+9 = 19

b) Best Case = 1
   Worst Case = 4
   Avg Case = 1.1 + 2×2 + 3×4 + 4×3 = 1+4+12+12 = 29/10 = 2.9

c) 4 depth levels (0,1,2,3)

d) Height of tree is 3 //

Q4)

Soln :

InOrder(root) visits nodes in the following order:
   4, 10, 12, 15, 18, 22, 24, 25, 31, 35, 44, 50, 66, 70, 90

A Pre-order traversal visits nodes in the following order:
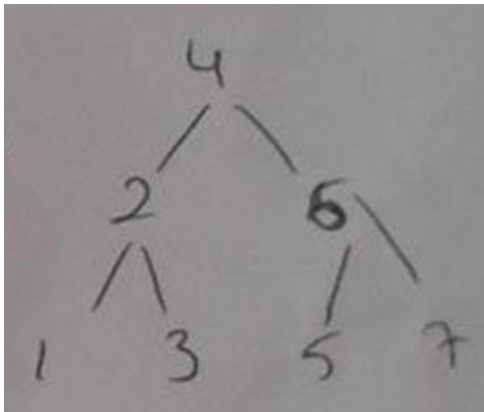   25, 15, 10, 4, 12, 22, 18, 24, 50, 35, 31, 44, 70, 66, 90

A Post-order traversal visits nodes in the following order:
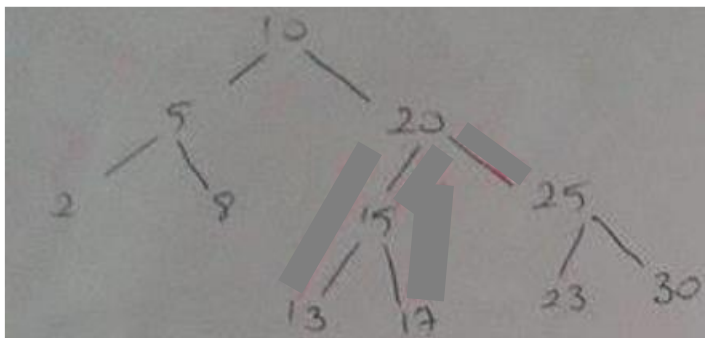   4, 12, 10, 18, 24, 22, 15, 31, 44, 35, 66, 90, 70, 50, 25

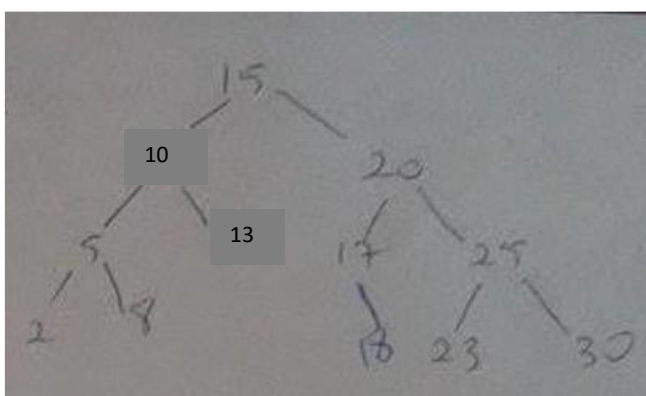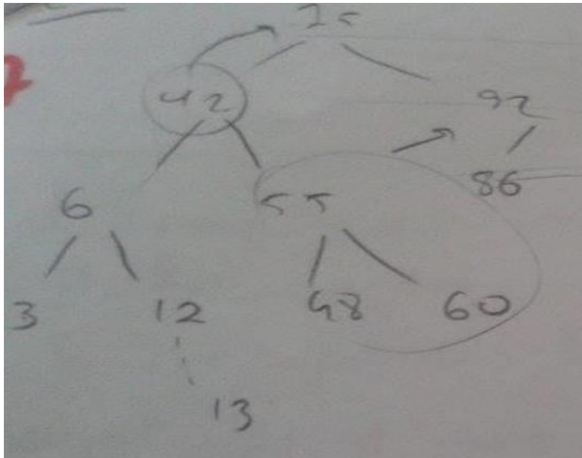Q5) Insert 1,2,3,4,5,6,7 to avl tree

Soln :

Q6) insert 18 into avl

Soln :

Q7) insert 13 into avl

Soln :