

Name Liaq - Ahmad.

Id 15419

Subject Data Structure

Teacher Sir Adil

Semester 3rd

Exam Final

Q1) Sort the given list using Insertion sort.

56, 59, 45, 40, 43, 55

Solution

Here we have six numbers to be sorted.

Steps = Total number - 1 = 6 - 1 = 5

So we have 5 steps.

Step # 1

element = 59

(56), (59), 45, 40, 43, 55

proper position in this step no change

56, 59, 45, 40, 43, 55

Step # 2

Element = 45

56, (59), (45), 40, 43, 55

(56), (45), 59, 40, 43, 55

45, 56, 59, 40, 43, 55

Step # 3

Element = 40

45, 56, (59), (40), 43, 55

45, (56), (40), 59, 43, 55

(45), (40), 56, 59, 43, 55

40, 45, 56, 59, 43, 55

Step # 4

Element = 43

40, 45, 56, (59), (43), 55

40, 45, (56), (43), 59, 55

40, (45), (43), 56, 59, 55

40, 43, 45, 56, 59, 55

Step # 5 Element = 55

40, 43, 45, 56, (59), (55)

40, 43, 45, (56), (55), 59

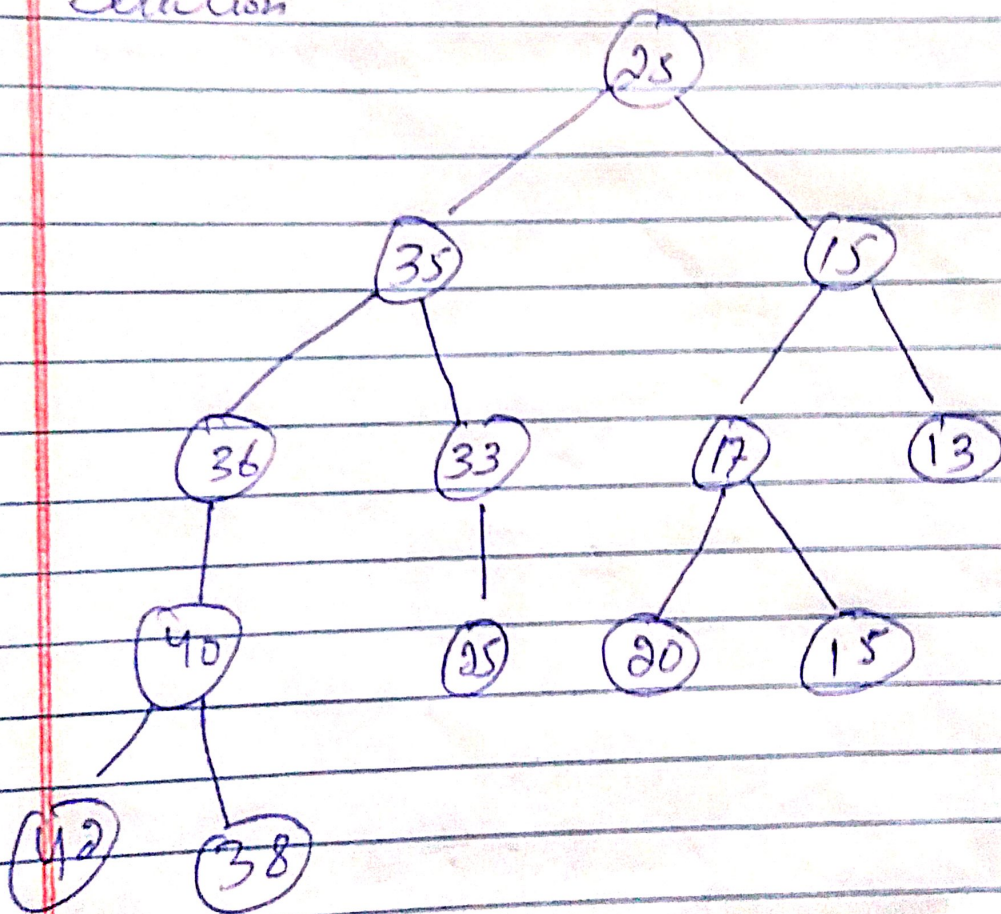
40, 43, 45, 55, 56, 59

Now no need for further step because it is sorted.

Q2 Construct Binary Trees from given list of numbers and then verify the tree

25, 15, 35, 17, 33, 36, 25, 13, 15, 40, 38, 42, 20

Solution



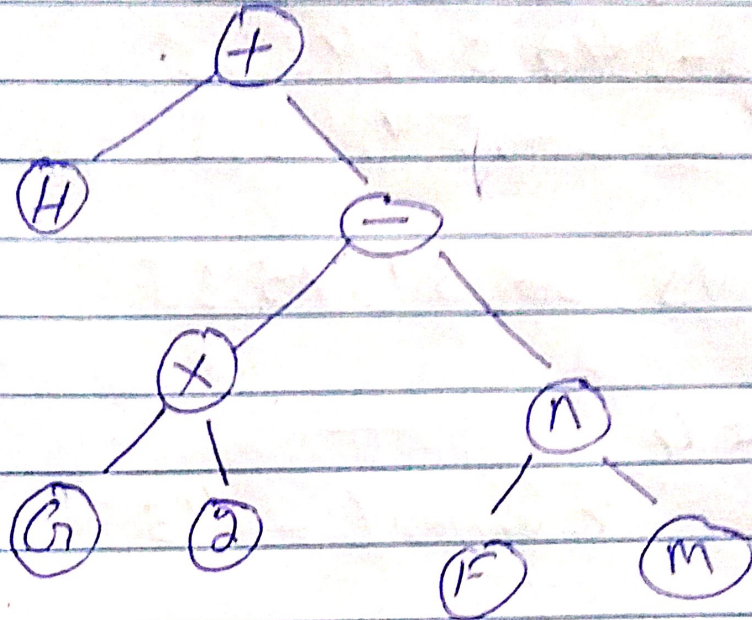
Verification - using in-order traversal.

42, 40, 38, 36, 35, 33, 25, 25, 20, 17, 15, 15, 13.

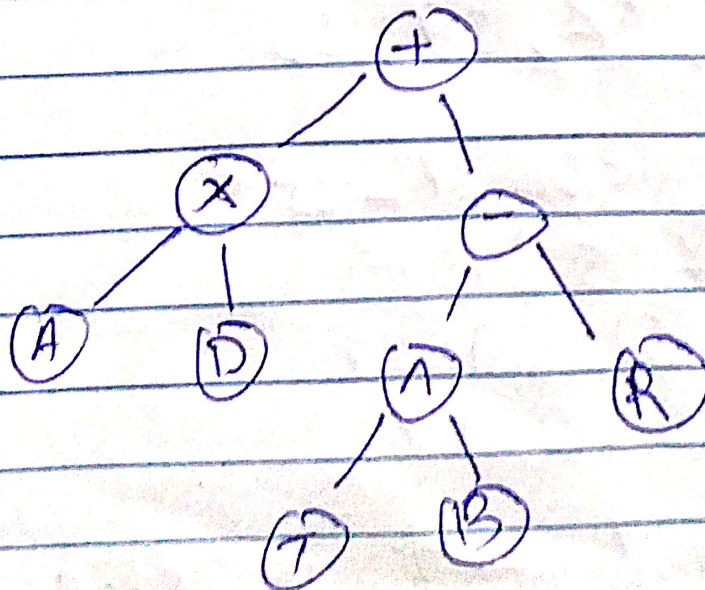
Answered.

Q3 Construct binary trees from given mathematical expressions.

(i) $H + G \times 2 - (F \wedge M)$



(ii) $A \times D + T \wedge B - R$



Q4 Apply all the three binary tree Traversal Techniques on each of the tree constructed in Q43.

(1) (i) H, +, G, X, Q, F, A, M, -

(ii) +, H, -, X, G, Q, A, F, M

(iii) H, G, Q, X, F, M, A, -, +

(2) (i) A, X, d, +, T, A, B, -, R

(ii) +, X, A, d, -, A, T, B, R

(iii) A, d, X, T, B, A, R, -, +

Q5 Fill all the blanks.

(1) Elements of a Tree are called Node

(2) The graphical line drawn between Nodes of a tree is called Edge

(3) Level Number of a Root is First Subset

(4) All the nodes with same level number belong to Same Level Number Family

(5) The left-most child node is Older node

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- (6) The right most child Node is Younger node.
- (7) A tree is a Non-Linear node.
- (8) An ordered set of ordered trees is called a Forest.