

Name = Shahid Nazim.

ID # = 15531.

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T/Name = Sir, Muhammad Adil (Sahib).

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Q:- Sort the given list using Insertion sort.

56, 59, 45, 40, 43, 55.

Solution:

Total numbers are 6.

Total numbers of steps.

We know that

$$\text{steps} = \text{total \#} - 1 =$$

$$6 - 1 = 5 \text{ steps.}$$

Step #1.

Element = 59.

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

Proper position, 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

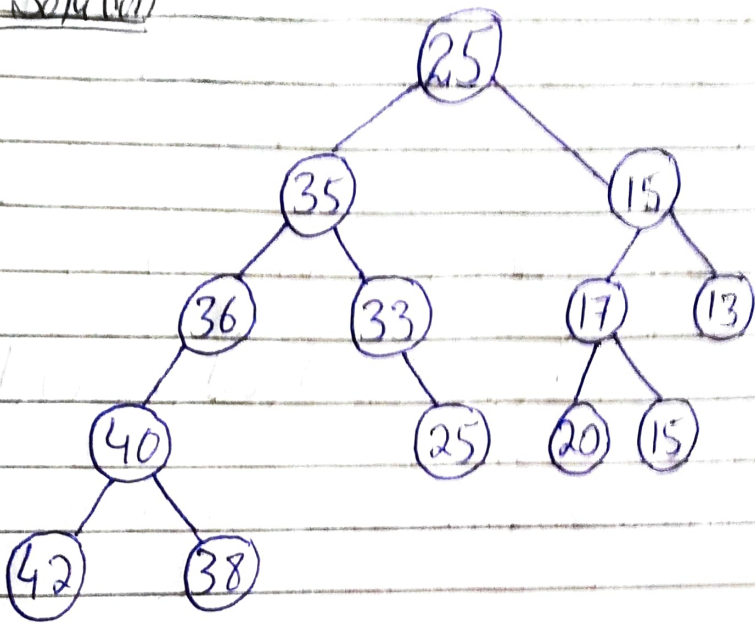
40, 43, 45, 55, 56, 59.

Ans

Q2:- Construct binary trees from given list of numbers & then verify the trees

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

Solution



Verification. using In-order traversal.

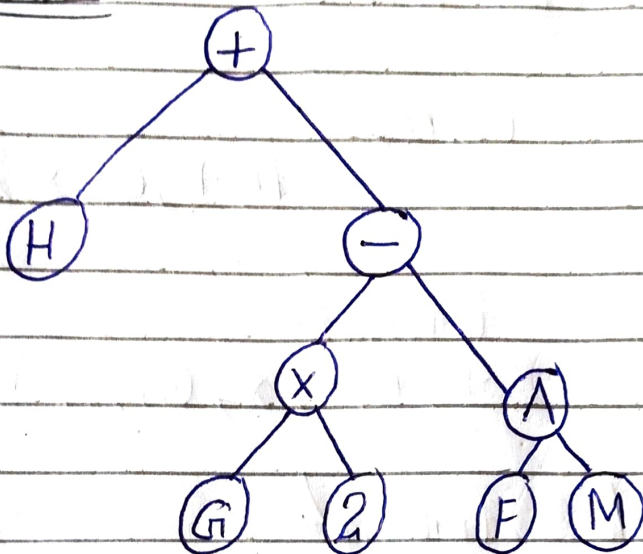
42, 40, 38, 36, 35, 33, 25, 25, 20, 17, 15, 15, 13.

Answer

Q3:- Construct Binary trees from given M.E.

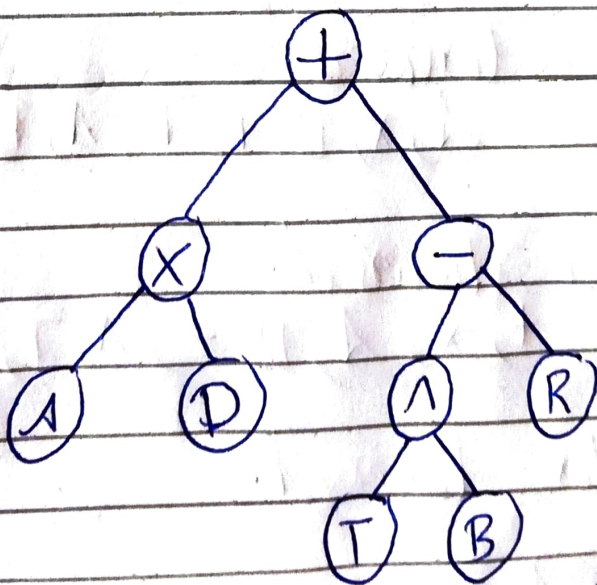
i):-  $H + G \times 2 - (F \wedge M)$

Solution



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

Solution:



Ans

Q4:- Apply all the three Binary Tree traversal Techniques on each of the tree constructed in Q3.

① Ans ⇒ Answer of part (i):

(a) In-order traversal.

H, +, G, x, Z, -, F, A, M

(b) Pre-order traversal.

+, H, -, x, G, Z, A, F, M.

(c) Post-order traversal.

H, G, Z, x, F, M, A, -, +.

② ⇒ Answer of part (ii):

In-order traversal.

A, x, D, +, T, A, B, -, R.

Pre-order traversal.

+, x, A, D, -, A, T, B, R.

Post-order traversal.

A, D, x, T, B, A, R, -, +.

Q5:- Fill in the blanks.

- i):- Element of a tree is called node -
  - ii):- The graphical line drawn b/w nodes of a tree is called edge -
  - iii):- Level number of a Root is zero(0) -
  - iv):- All the nodes with same level number belong to same family -
  - v):- The left-Most child node is older node -
  - vi):- A tree is a non-linear data structure -
  - vii) An ordered set of ordered trees is called a forest -
- The right-Most child node is younger node -