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Program = BS(S.E)

Paper = Data Structure & Algorithms

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Q1 = Sort the given list using Insertion Sort.

56, 59, 45, 40, 43, 55

Sol:-

~~n~~ $n-1 = \text{Steps}$

$6-1 = 5$

\Rightarrow Step # 1 : Element 59

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

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

40, 43, 45, 56, 59, 55

Step 5 :- Element 55

40, 43, 45, 56, 59, 55

40, 43, 45, 56, 55, 59

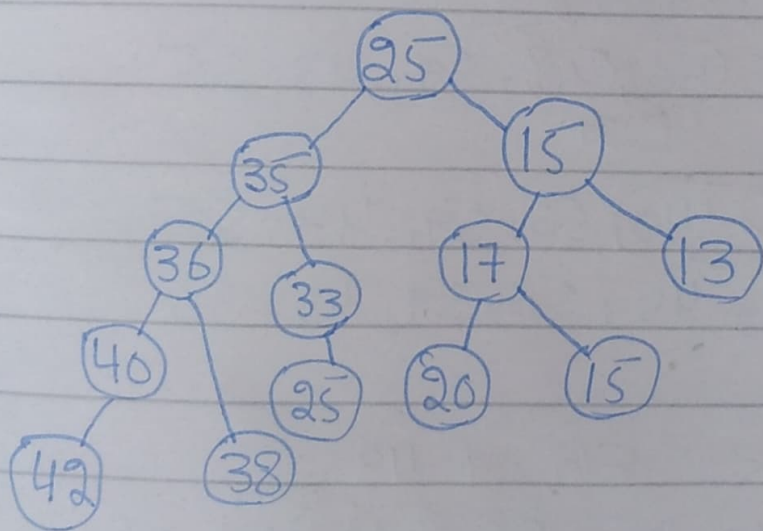
⇒

40, 43, 45, 55, 56, 59

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.

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



Verification :-

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

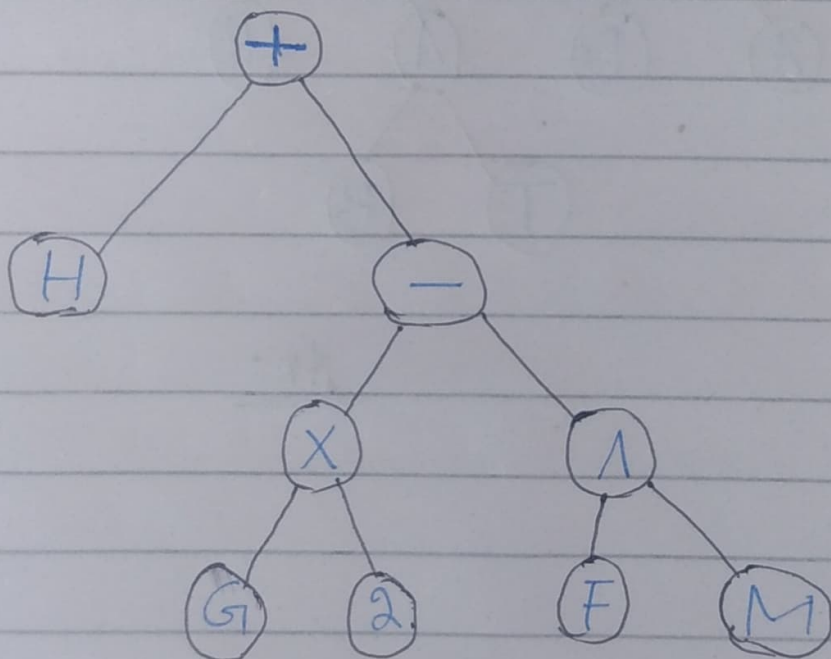
Q3 :- Construct binary trees from given mathematical expressions.

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

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

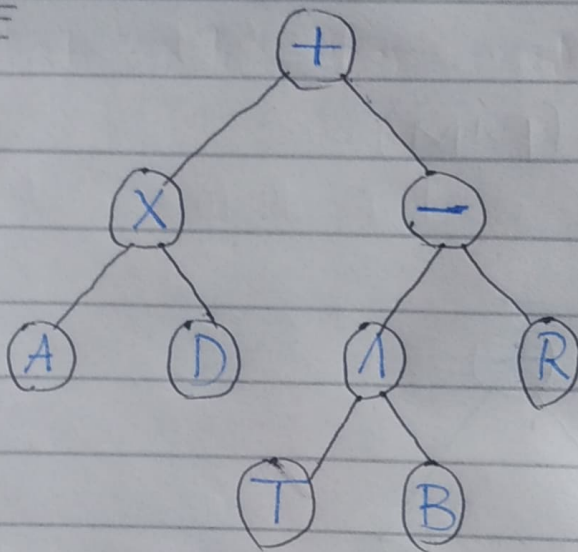
1) $H + G \times 2 - (F \wedge M)$

Solution :-



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

Sols:-



Ans

Q4:- Apply all the three Binary tree transversal techniques on each of the tree Constructed in Q3.

Ans: Part (i) Answer :

(A) In-order transversal :

H, +, G, X, 2, -, F, A, M

(B) Pre-order transversal :

+, H, -, X, G, 2, A, F, M.

(C) Post-order transversal :

H, G, 2, X, F, M, A, -, +

Part (ii) Answer :

(A) In-order transversal.

A, X, D, +, T, A, B, -, R

(B) Pre-order traversal :
+, x, A, D, -, \wedge , T, B, R.

(C) Post order traversal :
A, D, x, T, B, \wedge , R, -, +.

Q5 :- Fill in the blanks.

- (i) Elements of a tree are called nodes.
- (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) The Right-most child node is younger node.
- (vii) A tree is a non-linear data structure.
- (viii) An ordered set of ordered trees is called forest.