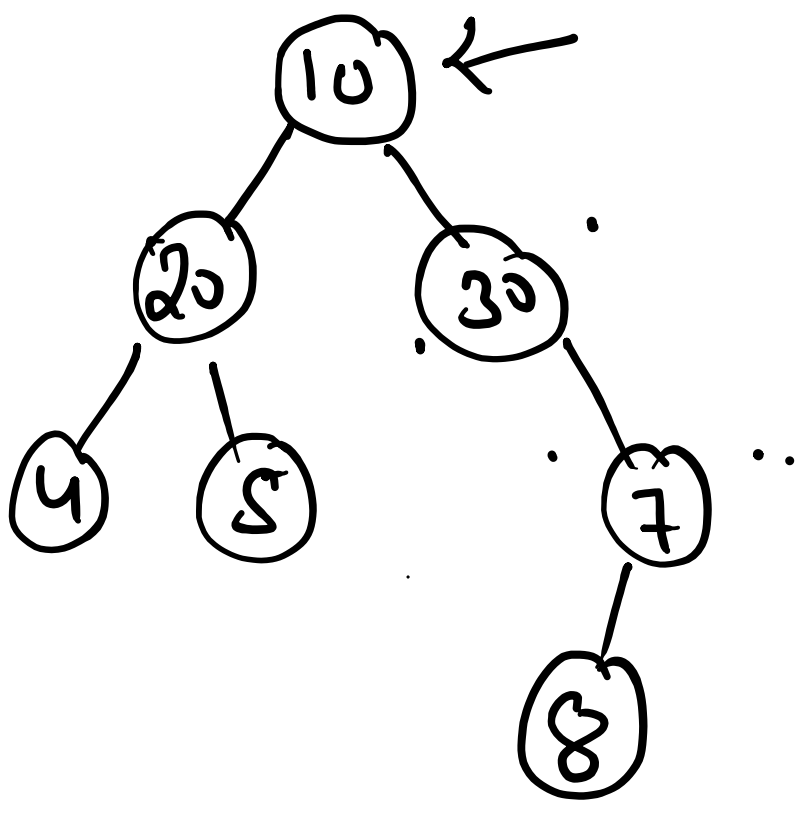
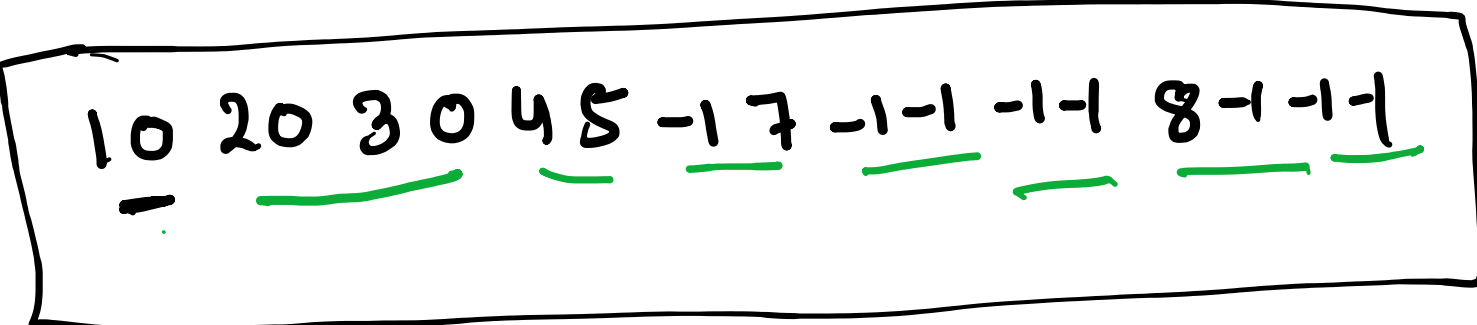


- 1. Remove
- 2. Print
- 3. Add both Child



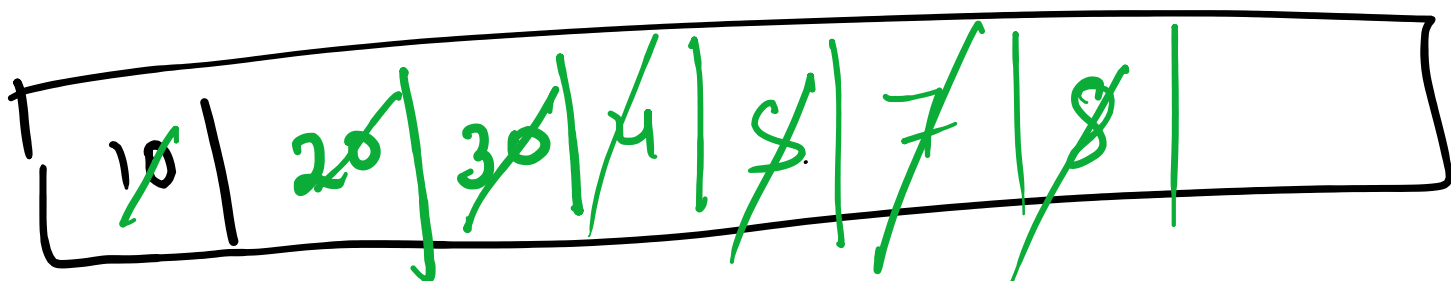
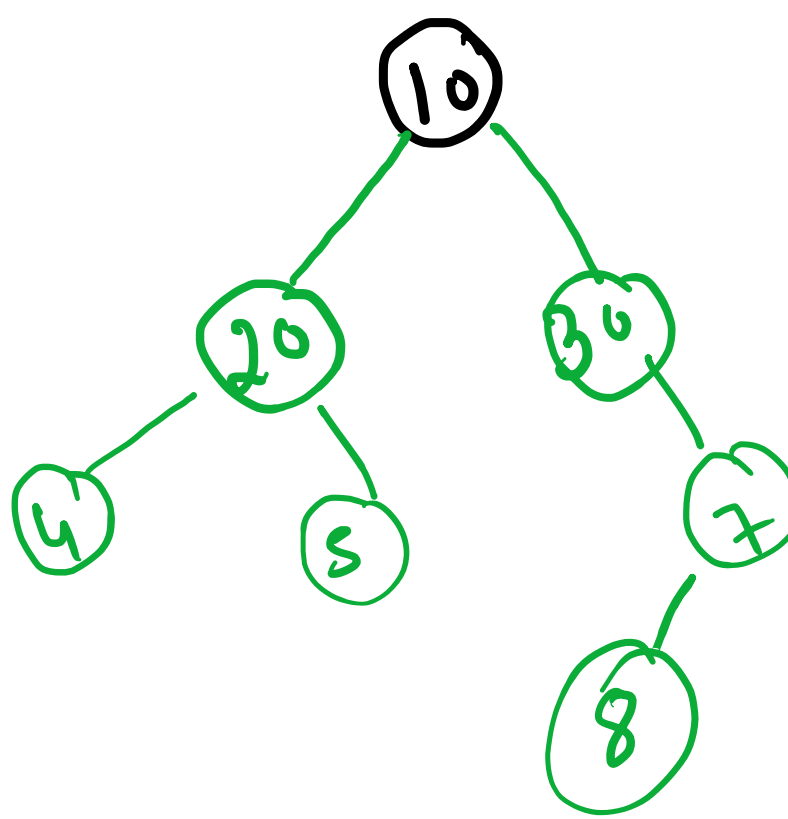
(1) 10 20 30 4 5 7 8



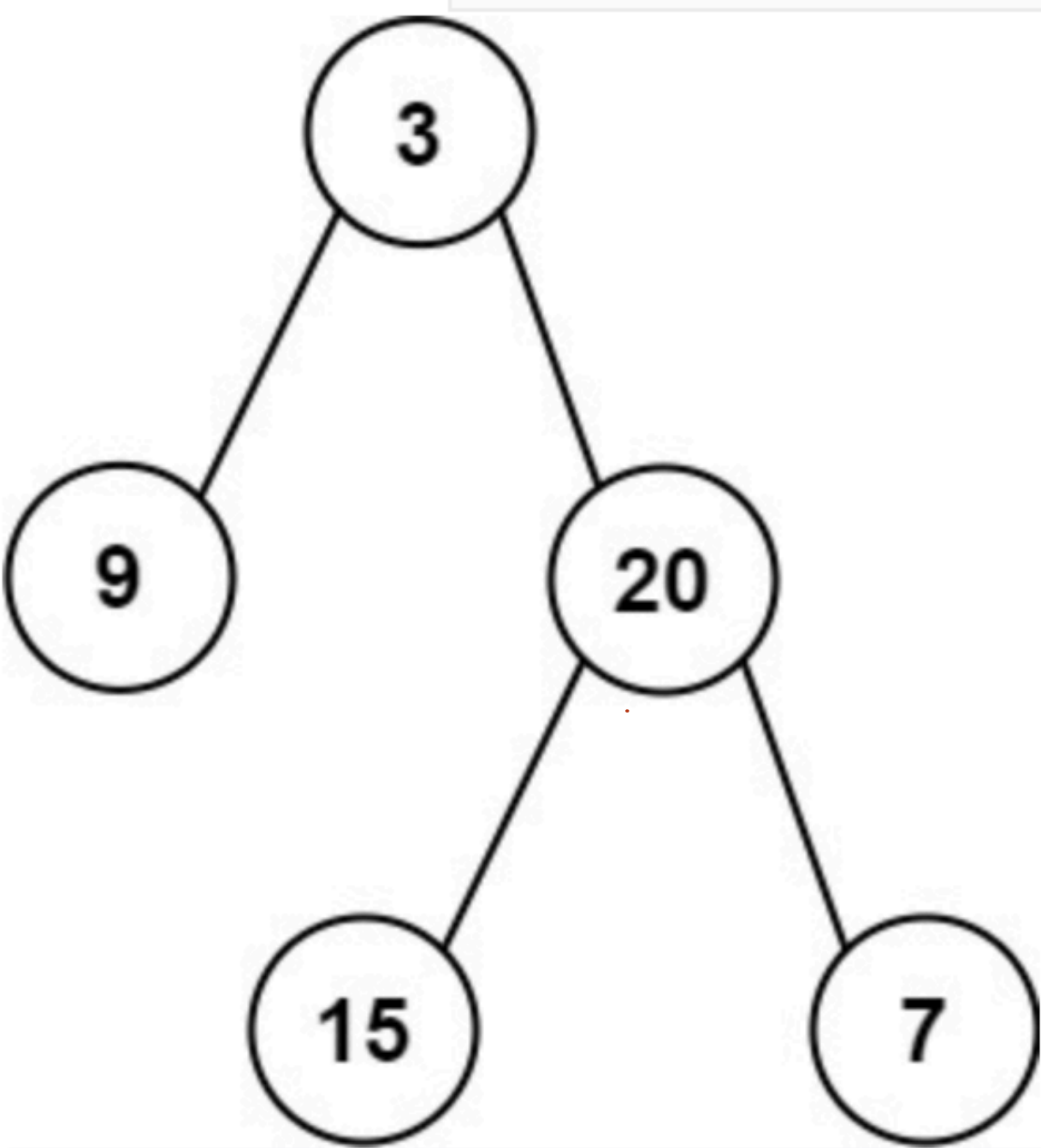
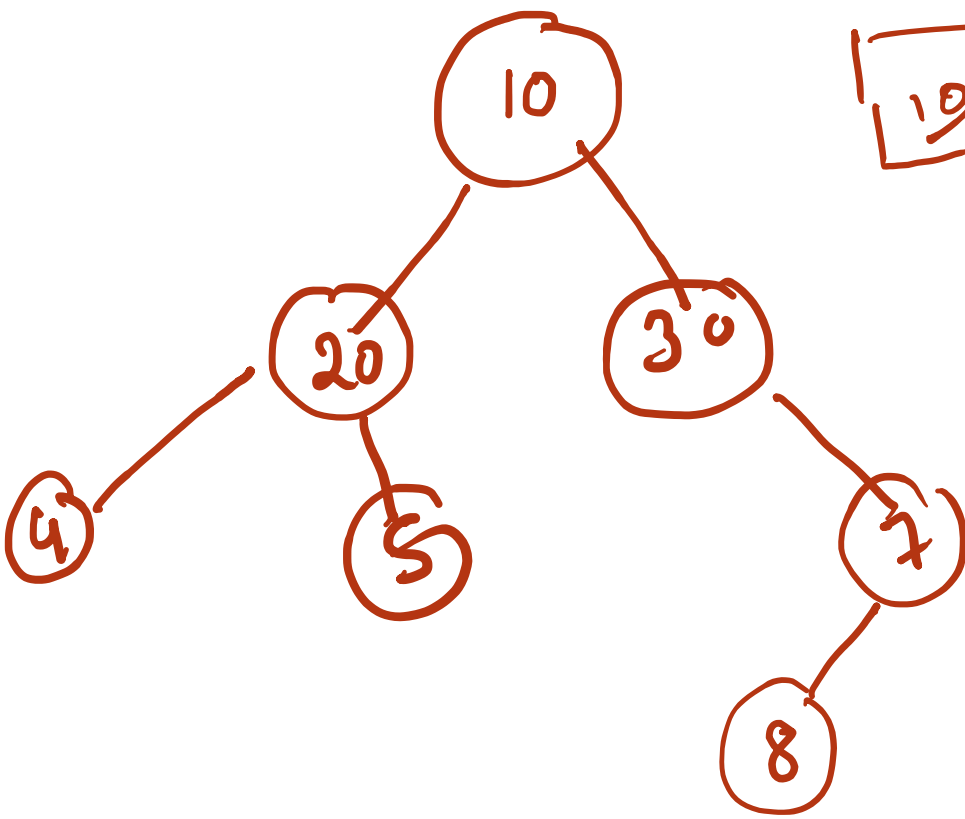
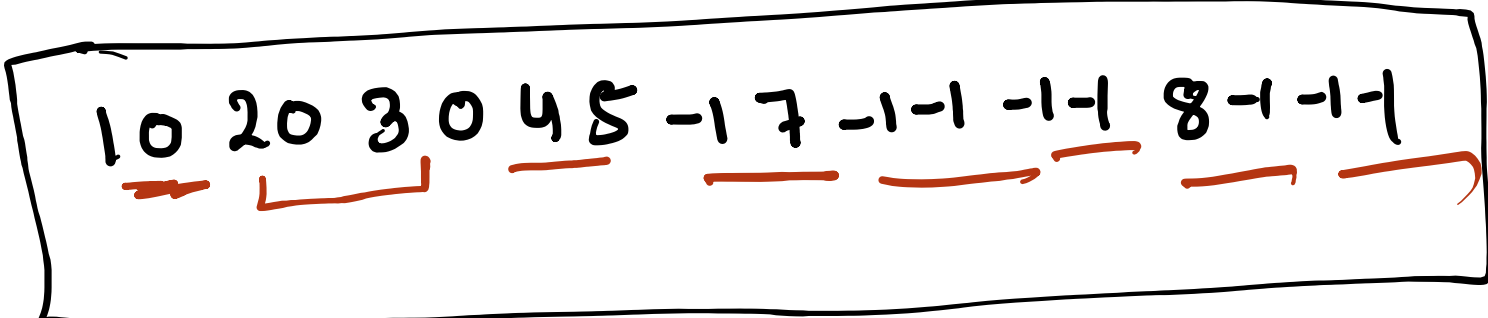
-1 -> null

Binary Tree

- 1. Remove
- 2. Print
- 3. Add both Child



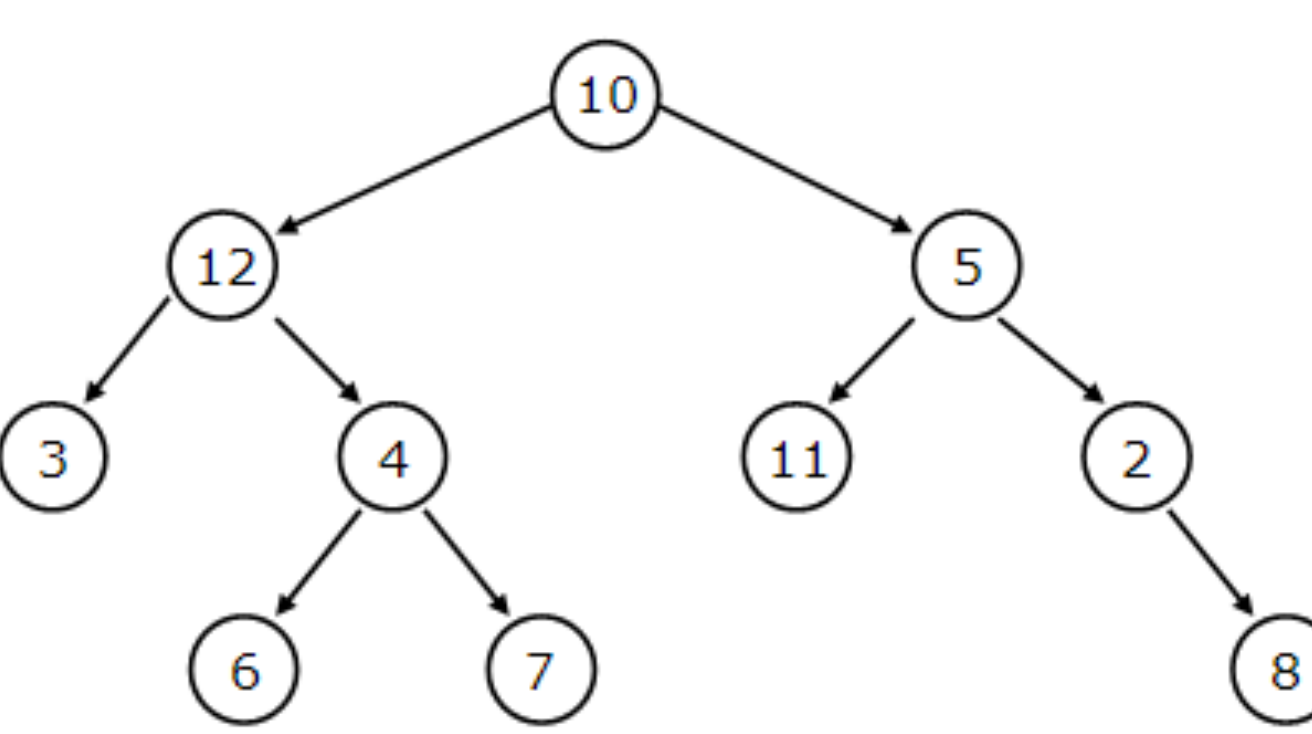
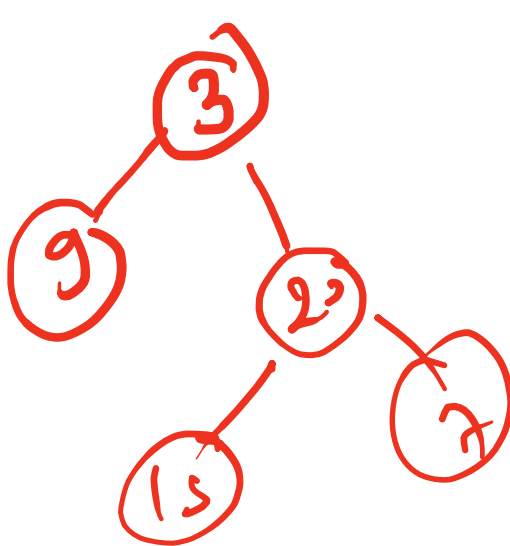
```
private void CreateTree() {  
    // TODO Auto-generated method stub  
    int x = sc.nextInt();  
    Node nn = new Node();  
    nn.val = x;  
    root = nn;  
    Queue<Node> q = new LinkedList<>();  
    q.add(nn);  
    while(!q.isEmpty()) {  
        Node n = q.poll();  
        int c1 = sc.nextInt();  
        int c2 = sc.nextInt();  
        if(c1 != -1) {  
            Node left = new Node();  
            left.val = c1;  
            n.left = left;  
            q.add(left);  
        }  
        if(c2 != -1) {  
            Node right = new Node();  
            right.val = c2;  
            n.right = right;  
            q.add(right);  
        }  
    }  
}
```



Input: preorder = [3,9,20,15,7], inorder = [9,3,15,20,7]

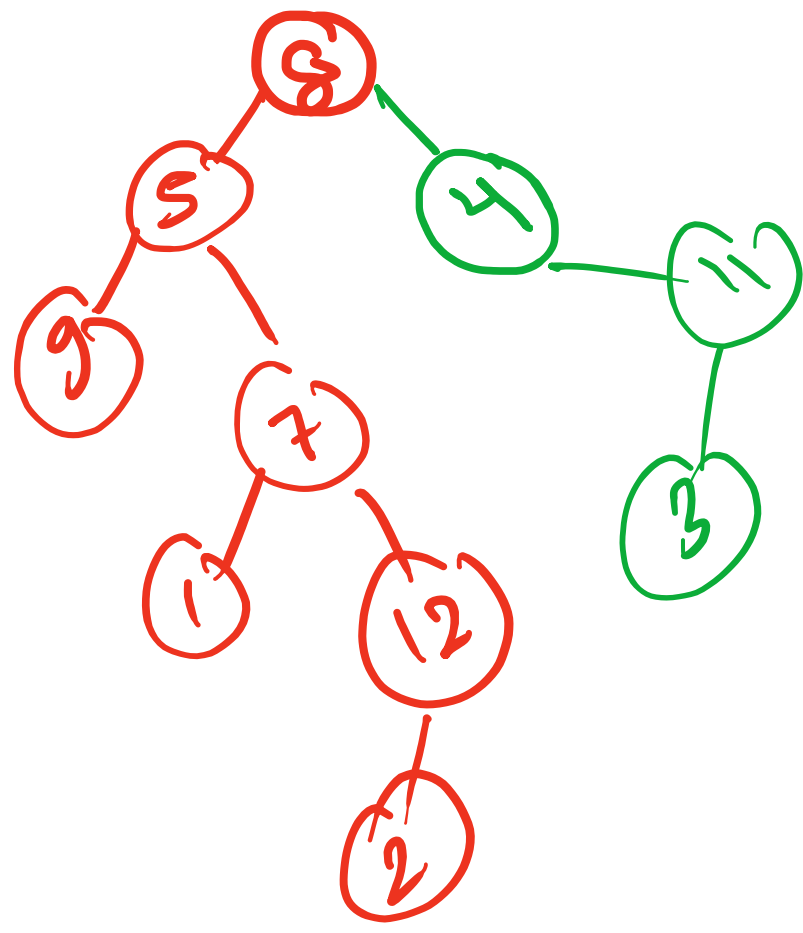
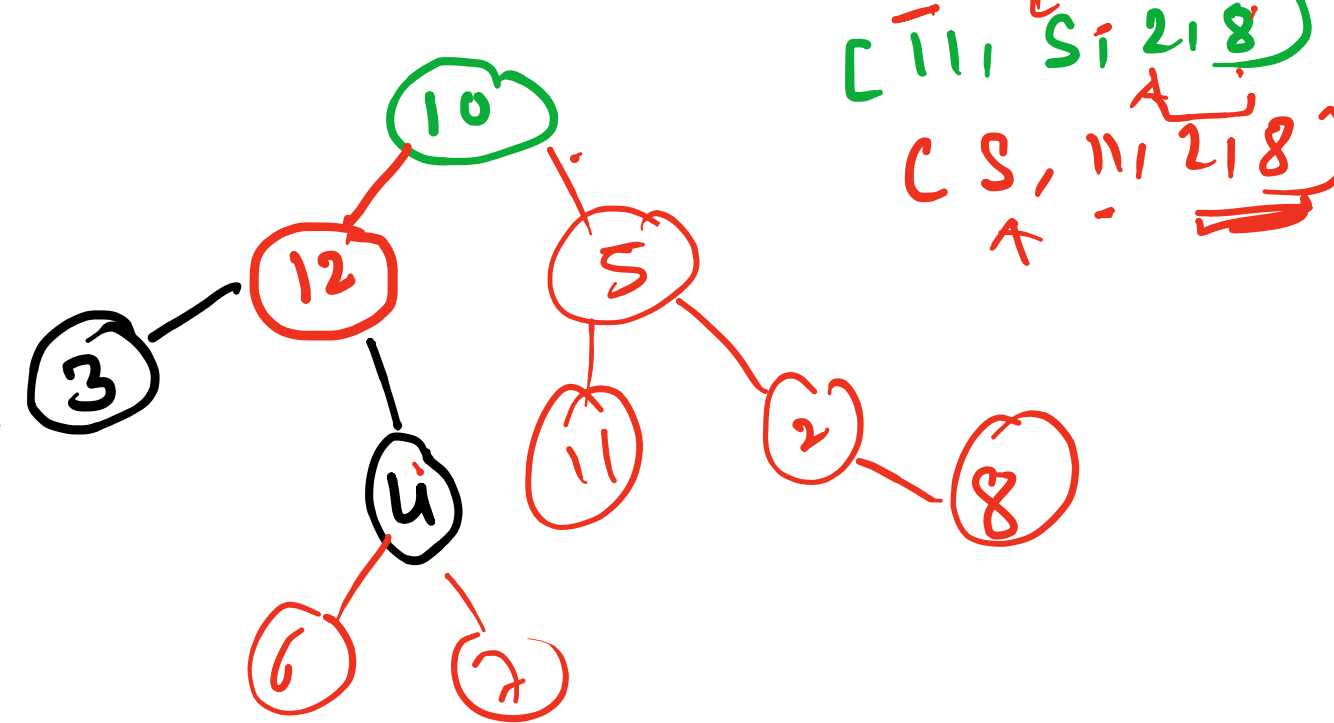
Input: preorder = [3,9,20,15,7], inorder = [9,3,15,20,7]

Root Left Right
Left Root + Right



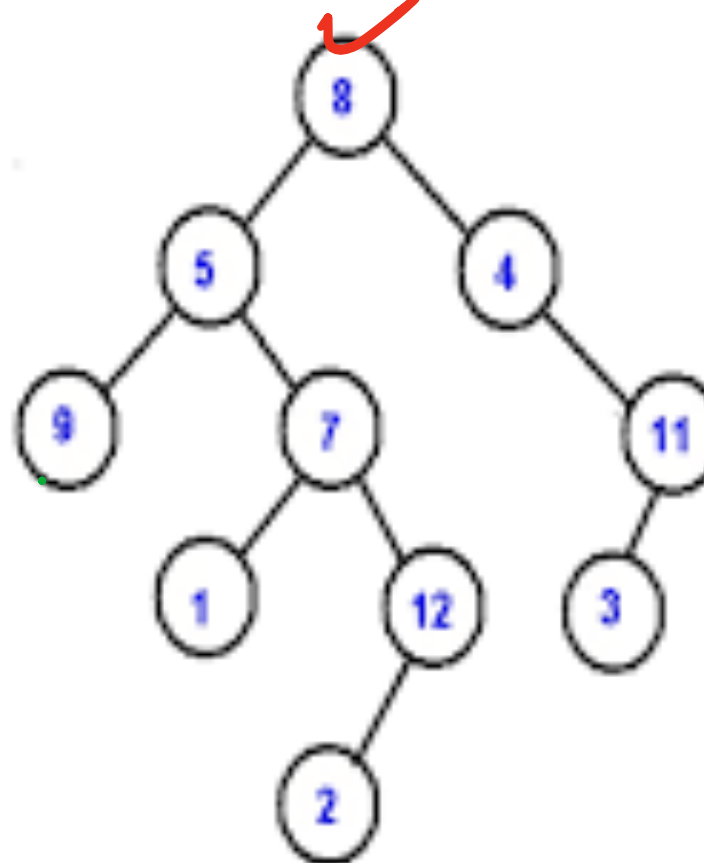
Levelorder tree traversal
10, 12, 5, 3, 4, 11, 2, 6, 7, 8
Inorder tree traversal
3, 12, 6, 4, 7, 10, 11, 5, 2, 8
Preorder tree traversal
10, 12, 3, 4, 6, 7, 5, 11, 2, 8
Postorder tree traversal
3, 6, 7, 4, 12, 11, 8, 2, 5, 10

[3, 12, 6, 4, 7]
[10, 5, 11, 2, 8]



8
S-0+1=0

PreOrder - 8, 5, 9, 7, 1, 12, 4, 11, 3
InOrder - 9, 5, 1, 7, 2, 12, 8, 3, 11
PostOrder - 9, 1, 2, 12, 7, 5, 3, 11, 4, 8
LevelOrder - 8, 5, 4, 9, 7, 11, 1, 12, 3, 2



idx=110
6-0=0
0 5
end-si=6-c
end-si+1

```
public TreeNode CreateTree(int[] pre, int[] in, int plo, int phi, int ilo, int ihi) {  
    if(plo>phi || ilo>ihi) {  
        return null;  
    }  
    TreeNode nn = new TreeNode(pre[plo]);  
    int idx=search(in, ilo, ihi, pre[plo]);  
    nn.left=CreateTree(pre, in, ++, ilo, idx-1);  
    nn.right=CreateTree(pre, in, ++, idx+1, ihi);  
    return nn;  
}
```

class object this static
Exception T