

Inorder = [40 20 50 10 60 30] → Left, Root, Right.

Preorder = [10 20 40 50 30 60] → Root, Left, Right.

→ We get Root from preOrder and its corresponding Left Subtree

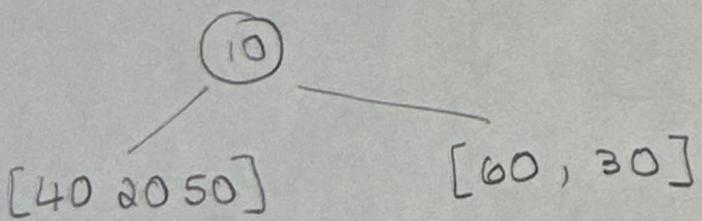
and right subtree, we can get from Inorder

Preorder = [10 20 40 50 30 60]

Inorder [40 20 50 10 60 30]

left

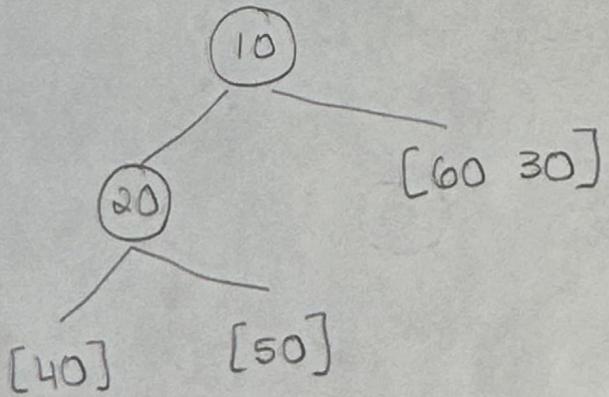
right



Left Tree:

Preorder = [10 20 40 50 30 60]

Inorder = [40 20 50]
 |
 |
 |
 40 20 50
 |
 |
 |
 left right

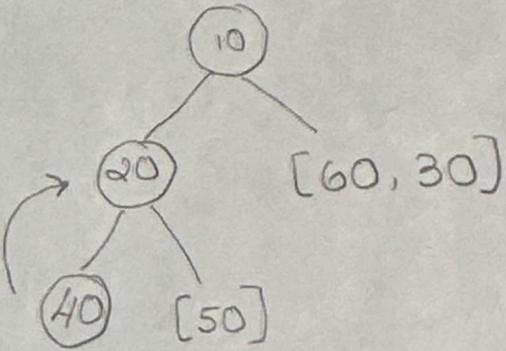


Left Child

Preorder = [10, 20, 40, 50, 30, 60]

Inorder = [40]

There is No child for this node.
so return to parent

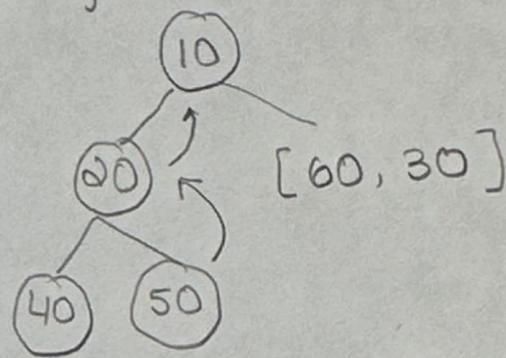


Right child

Post Order = [10, 20, 40, 50, 30, 60]

Inorder = [50]

No child or left or right subtree, so return back to parent

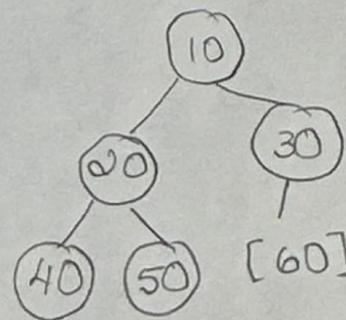


Right child

Post Order = [10, 20, 40, 50, 30, 60]

Inorder = [60 30]
left

The node Only has left child

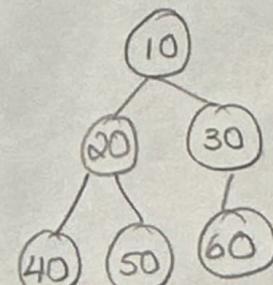


Left child:

Post Order = [10 20 40 50 30 60]

Inorder = [60]

No left or right child → return to parent



The Tree (Unique Binary Tree) is built

If you observe In preorder we went(moved) index by index
and tree was forming Left → Right

Preorder : [10 20 40 50 30 60]

1 → [10 20 40 50 30 60]

$$2 \rightarrow [10 \quad 20 \quad \underline{40} \quad 50 \quad 30 \quad 60]$$

$$3 \rightarrow [10 \quad 20 \quad 40 \quad \textcircled{50} \quad 30 \quad 60]$$

$$H \rightarrow [10 \quad 20 \quad 40 \quad 50 \quad 30 \quad 60]$$

4 → [10 20 40 50 30] 60
5 → [10 20 40 50 30] 60

Our root node for each subtree moved from left to right

To identify the left & right child \rightarrow we can use the inorder array \rightarrow Elements to the left of root are left children
Elements to right of root are right children

$$1 \rightarrow [\begin{array}{ccc} \underline{40} & \textcircled{20} & \underline{50} \\ \text{lyr} & & \text{signt} \end{array}]$$

Summary

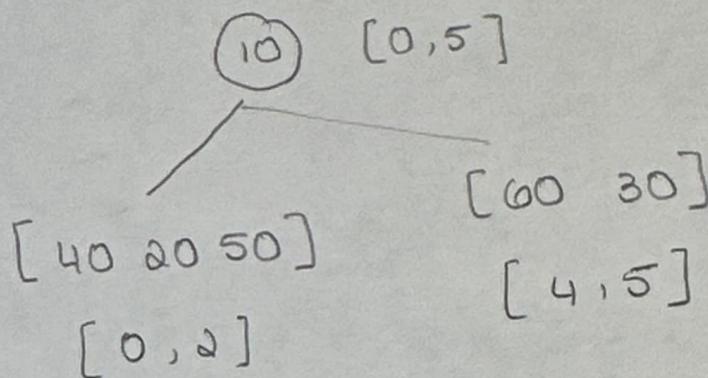
- ① Pre Order → Gives the root Node
 - ② In Order → Helps get the left & right child for the root Node

Visualize

Inorder = [40 20 50 10 60 30]

PreOrder = [10 20 40 50 30 60]
 ↑
 idx

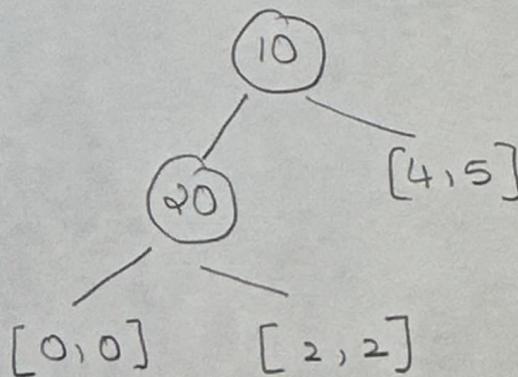
Start=0, End=5 [range of array]



left child

Preorder = [10 20 40 50 30 60]
 ↓ idx

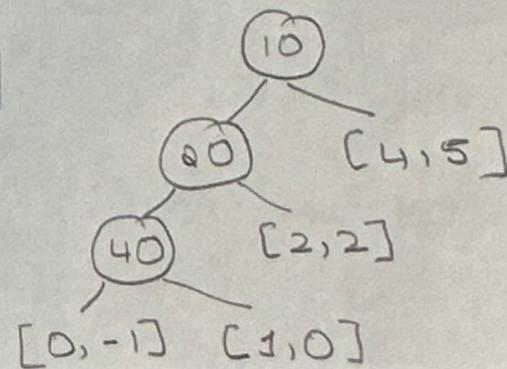
Inorder = [40 20 50]
 0 1 2



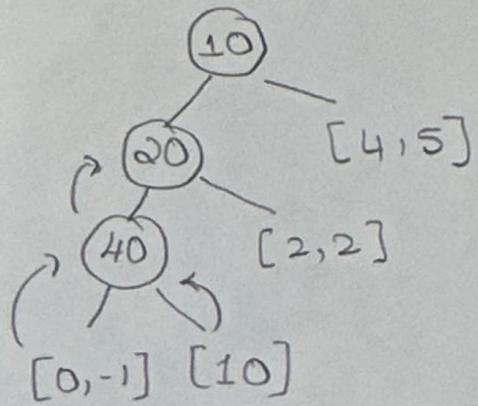
left child

Preorder = [10 20 40 50 30 60]
 ↓ idx

Inorder = [40]
 0



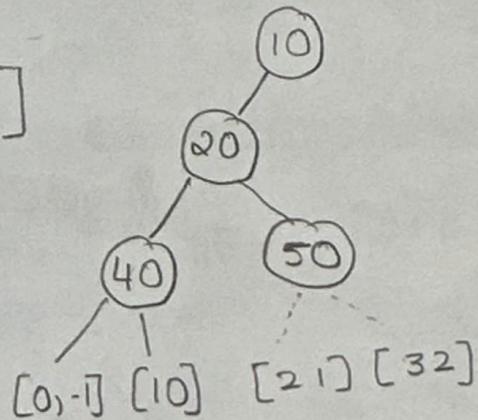
left child : $[0, -1] \rightarrow$ we see hear that left > right
 that mean No value \rightarrow so we return
 Similarly for right child $\rightarrow [1, 0] \rightarrow$ left > right
 return.



Right Child

Pre Order = $[10 \ 20 \ 40 \ 50 \ 30 \ 60]$

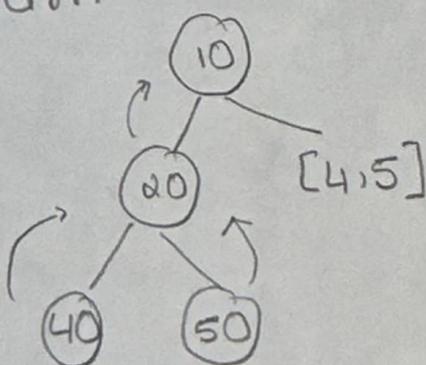
Inorder = $[50]$



Left & right child

Both have left > right , ie there are NO further Node

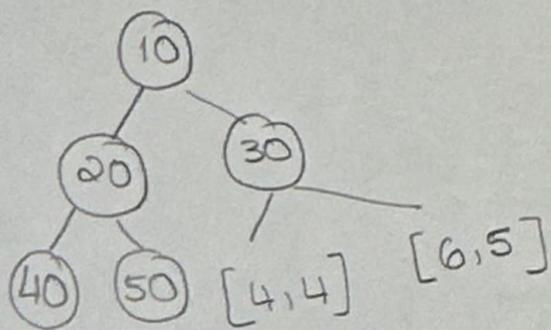
so we return



Right child

PostOrder = [10 20 40 50 30 60] \downarrow^{idx}

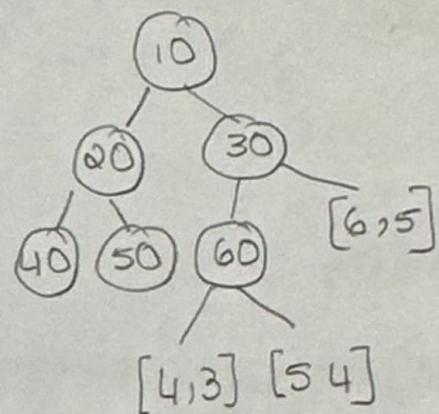
Inorder = [60, 50]



Left child

PostOrder = [10 20 40 50 30 60] \downarrow^{idx}

Inorder = [60]



Left & right \rightarrow [4, 3] [5, 4]

here we see that start > end \rightarrow so No node

similarly for right child $5 > 4 \rightarrow$ No Node

for right child \rightarrow [6, 5]

we see the same thing, $6 > 5 \rightarrow$ so no Node

Final Tree

