HABIB UNIVERSITY

Data Structures & Algorithms

CS/CE 102/171 Spring 2023

Instructor: Maria Samad

Reconstructing Binary Search Trees – Using Preorder Traversal

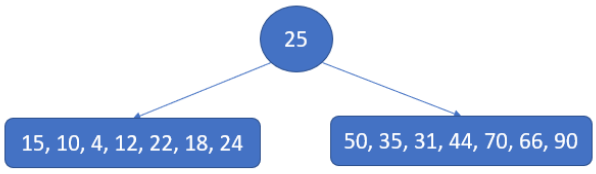
Student Name: _____

1. Reconstruct Binary Search Trees from the given Preorder traversal sequence:
   Preorder Sequence = **[25, 15, 10, 4, 12, 22, 18, 24, 50, 35, 31, 44, 70, 66, 90]**

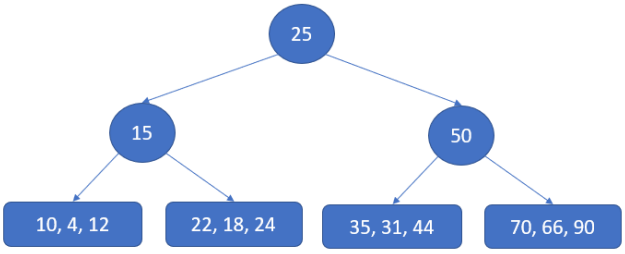
Answer:

- Preorder Sequence, so the Node at index = 0 is always the Root
- Start constructing the BST by adding a new node, i.e. Root first

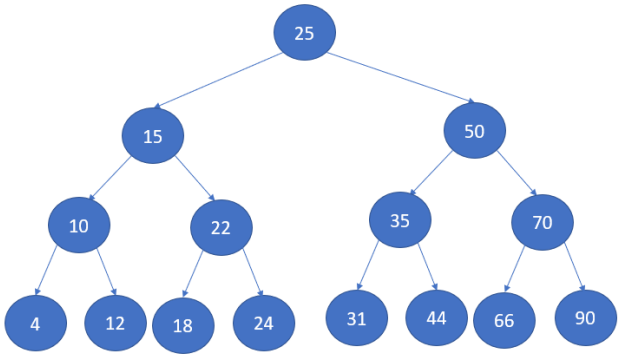
- Search for the next immediately higher value than the root, which is 50 here, so all the nodes before 50 will be a part of left subtree, and all the nodes after 50 (inclusive) will be a part of the right subtree
- Extend the BST by adding these subtree representations



- Apply the same logic on Left and Right Subtree
- For the left subtree, applying Preorder gives us Root from index = 0, and everything smaller than Root in left and everything bigger than Root in the right
- Same for the Right Subtree



- Continue the same process for the sequences in next level to get the final BST:

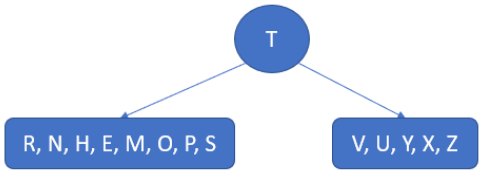


2. Reconstruct Binary Search Trees from the given Preorder traversal sequence:
   Preorder Sequence = **[T, R, N, H, E, M, O, P, S, V, U, Y, X, Z]**

Answer:

- Preorder Sequence, so the Node at index = 0 is always the Root
- Start constructing the BST by adding a new node, i.e. Root first

- Search for the next immediately higher letter than the root, i.e. V, so all the nodes before V will be a part of left subtree, and all the nodes after V (inclusive) will be a part of the right subtree
- Extend the BST by adding these subtree representations



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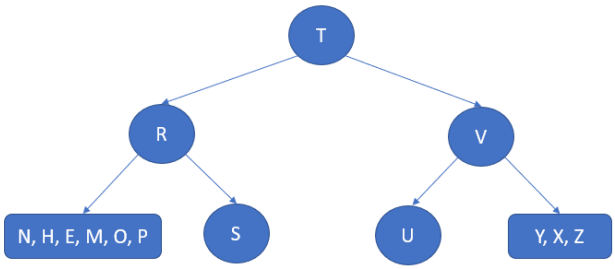

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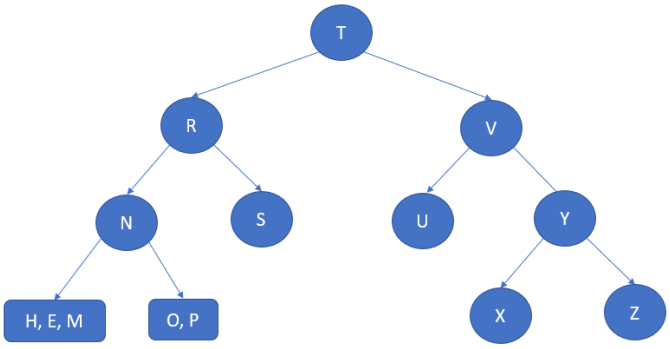

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