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HW 3

1) Given the sequence of in-order traversal for a general binary tree {9, 5, 1, 7, 2, 12, 8, 4, 3, 11 }, and given the sequence of post-order traversal for the same tree { 9, 1, 2, 12, 7, 5, 3, 11, 4, 8}, please explain how to reconstruct the binary tree and draw its graphical representation in your answer. Please include step by step explanations to guarantee partial credits. Note that this tree is a general binary tree, but not a BST.

Given the properties of post-order traversal, we know the root will always be the right-most element of the post-order array. (in this case 8.) We can then split the in-order array into the left (9,5,1,7,2,12) sub-tree and right (4,3,11) subtree.

The right-most element of the left sub-tree post-order array is 5, so we know the root of the sub-tree is 5. We look at the in-order traversal sub-array and split it into two sub-trees, the left (9), and right (1,7,2,12).

There's only one element in the left sub-array, so we set that as 5's left child and go back up a level to do the right-hand sub-tree.

The right-most element in the post-order sub-array is 7. We set this as the right child of 5 and make it the root of our new sub tree.

We continue with this procedure until we generate the final tree, which looks like this: