Binary Search Tree

Assignment Questions

PW SKILLS

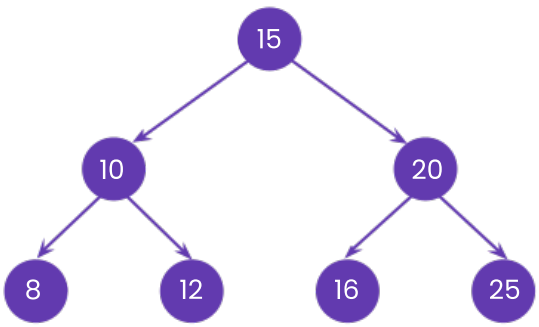
Q1. Write an iterative program to search for an element in BST. Also construct a sample BST and try to search for elements in the same.
The input for BST is : 15, 10, 20, 8, 12, 16, 25

Search for 25 in it.

Expected output: The given key is the right node of the node with key 20

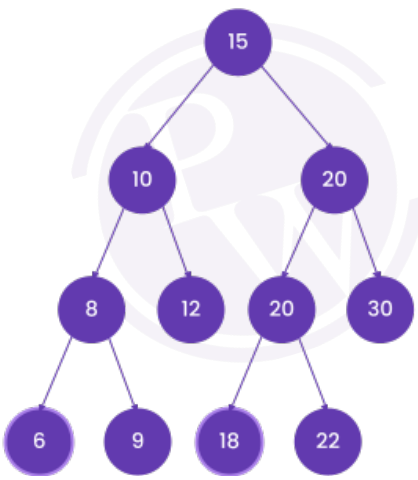
Q2. Given a BST and a positive number k, find the k'th largest node in the BST.

For example, consider the following binary search tree. If k = 2, the k'th largest node is 20.

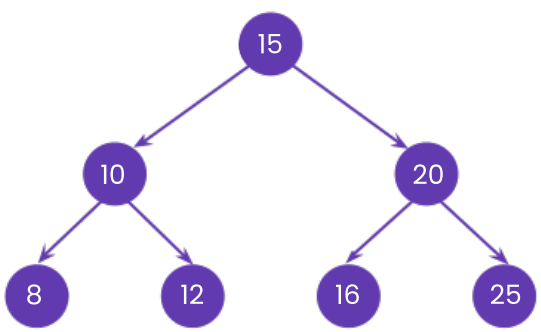


Q3. Given a binary search tree, find a pair with a given sum present in it.

For example, consider the following BST. If the given sum is 14, the pair is (8, 6).



Q4. Given a BST, find the inorder predecessor of a given key in it. If the key does not lie in the BST, return the previous greater node (if any) present in the BST.



The predecessor of node 15 is 12
The predecessor of node 10 is 8
The predecessor of node 20 is 16
The predecessor doesn't exist for node 8
The predecessor of node 12 is 10
The predecessor of node 16 is 15
The predecessor of node 25 is 20

A node's inorder predecessor is a node with maximum value in its left subtree, i.e., its left subtree's right-most child. If the left subtree of the node doesn't exist, then the inorder predecessor is one of its ancestors

Q5. Given a BST and two nodes x and y in it, find the lowest common ancestor (LCA) of x and y. The solution should return null if either x or y is not the actual node in the tree.

LCA (6, 12) = 10
LCA (10, 12) = 10
LCA (20, 6) = 15
LCA (18, 22)= 20
LCA (30, 30) = 30