



SNS COLLEGE OF TECHNOLOGY
Coimbatore-37.
An Autonomous Institution



COURSE NAME : 23CAT602 - DATA STRUCTURES & ALGORITHMS

I YEAR/ I SEMESTER

UNIT – III SORTING & SEARCHING

Topic: Tree Searching

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TREE SEARCHING

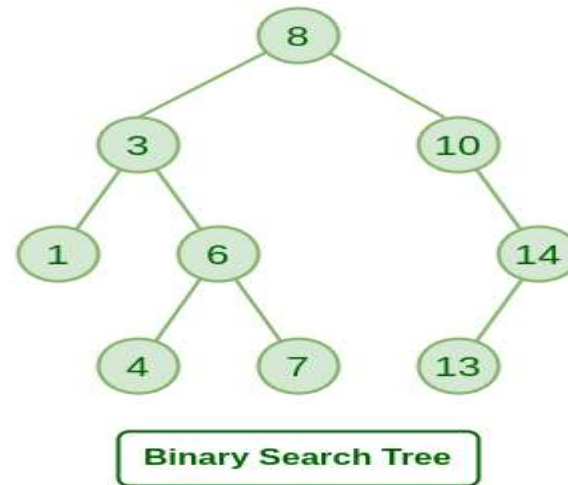


Binary Search Tree is a node-based binary tree data structure which has the following properties:

The left subtree of a node contains only nodes with keys lesser than the node's key.

The right subtree of a node contains only nodes with keys greater than the node's key.

The left and right subtree each must also be a binary search tree.





TREE SEARCHING



Handling approach for Duplicate values in the Binary Search tree:

- ✓ You can not allow the duplicated values at all.
- ✓ We must follow a consistent process throughout i.e either store duplicate value at the left or store the duplicate value at the right of the root, but be consistent with your approach.
- ✓ We can keep the counter with the node and if we found the duplicate value, then we can increment the counter



TREE SEARCHING



Below are the various operations that can be performed on a BST:

Insert a node into a BST: A new key is always inserted at the leaf. Start searching a key from the root till a leaf node. Once a leaf node is found, the new node is added as a child of the leaf node.

Time Complexity: $O(N)$, where N is the number of nodes of the BST

Auxiliary Space: $O(1)$

Inorder traversal: In case of binary search trees (BST), Inorder traversal gives nodes in non-decreasing order. We visit the left child first, then the root, and then the right child.



TREE SEARCHING



Time Complexity: $O(N)$, where N is the number of nodes of the BST

Auxiliary Space: $O(1)$

Preorder traversal: Preorder traversal first visits the root node and then traverses the left and the right subtree. It is used to create a copy of the tree. Preorder traversal is also used to get prefix expression on of an expression tree.



TREE SEARCHING



Time Complexity: $O(N)$, where N is the number of nodes of the BST

Auxiliary Space: $O(1)$

Postorder traversal: Postorder traversal first traverses the left and the right subtree and then visits the root node. It is used to delete the tree. In simple words, visit the root of every subtree last.



THANK YOU