

# DSA

# Preparation

# Binary Tree

Just simplified my experience here...

Hope it goona help you all...

Save this pdf and thanks me later

 @himanshu\_shekhar16

 @himanshushekar

## What is Binary Tree Data Structure?

Binary Tree is defined as a Tree data structure with at most 2 children. Since each element in a binary tree can have only 2 children, we typically name them the left and right child.

## Binary Tree Representation

A Binary tree is represented by a pointer to the topmost node of the tree. If the tree is empty, then the value of the root is NULL.

## Binary Tree node contains the following parts:

1. Data
2. Pointer to left child
3. Pointer to right child

## Basic Operation On Binary Tree:

- Inserting an element.
- Removing an element.
- Searching for an element.
- Traversing an element.

## Auxiliary Operation On Binary Tree:

- Finding the height of the tree
- Find the level of the tree
- Finding the size of the entire tree.

# Problems

+ level order traversal

+ Reverse Level Order traversal

+ Height of a tree

+ Diameter of a tree

+ Mirror of a tree

+ Inorder Traversal of a tree both using recursion and Iteration

+ Preorder Traversal of a tree both using recursion and Iteration

+ Postorder Traversal of a tree both using recursion and Iteration

+ Left View of a tree

+ Right View of Tree

+ Top View of a tree

 Bottom View of a tree

 Zig-Zag traversal of a binary tree

 Check if a tree is balanced or not

 Diagnol Traversal of a Binary tree

 Boundary traversal of a Binary tree

 Construct Binary Tree from String with Bracket Representation

 Convert Binary tree into Doubly Linked List

 Convert Binary tree into Sum tree

 Construct Binary tree from Inorder and preorder traversal

 Find minimum swaps required to convert a Binary tree into BST

 Check if Binary tree is Sum tree or not

 Check if all leaf nodes are at same level or not

+ Check if a Binary Tree contains duplicate subtrees of size 2 or more [

IMP ]

+ Check if 2 trees are mirror or not

+ Sum of Nodes on the Longest path from root to leaf node

+ Check if given graph is tree or not. [ IMP ]

+ Find Largest subtree sum in a tree

+ Maximum Sum of nodes in Binary tree such that no two are adjacent

+ Print all "K" Sum paths in a Binary tree

+ Find LCA in a Binary tree

+ Find distance between 2 nodes in a Binary tree

+ Kth Ancestor of node in a Binary tree

+ Find all Duplicate subtrees in a Binary tree [ IMP ]

+ Tree Isomorphism Problem

+ Find a value in a BST

- + Deletion of a node in a BST
- + Find min and max value in a BST
- + Find inorder successor and inorder predecessor in a BST
- + Check if a tree is a BST or not
- + Populate Inorder successor of all nodes
- + Find LCA of 2 nodes in a BST
- + Construct BST from preorder traversal
- + Convert Binary tree into BST
- + Convert a normal BST into a Balanced BST
- + Merge two BST [ V.V.V>IMP ]
- + Find Kth largest element in a BST
- + Find Kth smallest element in a BST
- + Count pairs from 2 BST whose sum is equal to given value "X"
- + Find the median of BST in  $O(n)$  time and  $O(1)$  space
- + Count BST nodes that lie in a given range

- ✚ Replace every element with the least greater element on its right
- ✚ Given "n" appointments, find the conflicting appointments
- ✚ Check preorder is valid or not
- ✚ Check whether BST contains Dead end
- ✚ Largest BST in a Binary Tree [ V.V.V.V.V IMP ]
- ✚ Flatten BST to sorted list

Feel Free to connect with me –

<https://www.linkedin.com/in/himanshushekhar16/>