

# Algorithms and Data Structures: Binary and Binary search tree.

## Exercise - 3

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**Write the most efficient algorithm for the following problems in C++ and mention the Time and Space Complexity of your algorithms in the comments (at the end):**

- 1. Construct a binary tree using struct or class and implement the following functions:**

- a) Height**
- b) Diameter**

- 2. Write an algorithm which can implement the following traversals for a binary tree**

- a) Inorder Traversal**
- b) Preorder Traversal**
- c) Postorder Traversal**
- d) then construct a binary tree from inorder and preorder traversal with following test case.**

Input:

Inorder array = {5,8,10,3,14,20,22,25};

Pre-order array = {20,8,5,3,10,14,22,25}.

Output:



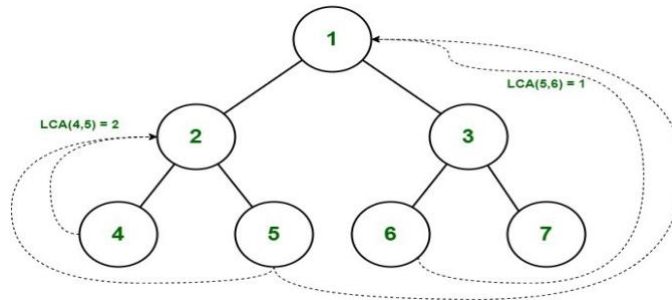


**3. Write an algorithm which can implement the following traversals for a binary tree:**

- a) Depth first search
- b) Level order Traversal
- c) Zig zag Traversal

**4. Write an algorithm which finds Lowest Common Ancestor of 2 given nodes in a binary tree.**

Testcase:



**5. Construct a binary search tree using struct or class and implement the following functions:**

- a)  $K^{\text{th}}$  smallest node
- b)  $K^{\text{th}}$  largest node
- c) Lowest common ancestor
- d) Insertion of a node
- e) Deletion of a node