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:**

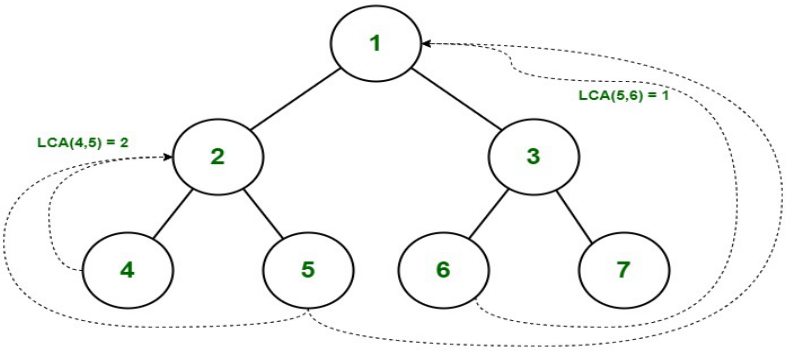
    a) **Inorder Traversal**
    b) **Preorder Traversal**
    c) **Postorder Traversal**

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) **Kth smallest node**
    b) **Kth largest node**
    c) **Lowest common ancestor**

6. **Write an algorithm to implement the following function for a binary search tree:**

    a) **Insertion of a node**
    b) **Deletion of a node**

7. **Write an algorithm to construct binary tree from Inorder traversal and Preorder traversal.**

    Testcase:

    Input:

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

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

    Output: