Submission Details

Grade: 15 / 20

Show Rubric

Assignment 9.1 Implementing Trees

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Attempts 1

Allowed Attempts 2

1.) Define what is a binary tree?

A binary tree is a non-linear and hierarchal data structure that has two children for each node. This children are called the right child and the left child. The top most node is the root while the bottom most are called the leaves. Binary trees are often specified by hierarchical relationships, and more specific kinds of trees founded upon binary trees include binary search trees (BSTs), heaps, and expression trees (GeeksforGeeks, 2025b).

2.) What are the key components of a Binary tree?

The key components of a binary tree are the following:

- Node - It is the fundamental part of a binary tree that has a data and a link to two child nodes.
- Root - It is the starting point of the tree where it has no parents.
- Parent Node - A node that has at most two child.
- Child node - It is the descendant of the parent node.
- Leaf node - it is the bottom most node and has no children.
- Edge - it is the connection of the nodes.
- Depth of a node - it is the number of edges from a specific node to the root node. Root node has zero depth.
- Height - It is the number of nodes from the deepest leaf to the root of a tree.

3.) What are the operations that can be performed in a Binary tree?

The operations that can be performed in a binary tree are traversal, search, insertion, and delete. Traversal is the how the process of visiting of all the node and it has two categories, depth-first search and breadth-first search. Search is the searching the tree to find a node in the tree with that value. As binary trees are not ordered as binary search trees, we usually use any investigation technique to search. Insertion is the adding of a node in a tree and deletion is the removing of a node in a tree.

4.) What are the conditions for a Binary Search Tree?

The conditions for a binary search tree is that the left subtree contains less than the value of the node while the right value contains higher value than the node. All values should not have a duplicate. Each node has also have two children

two children.

5.) Give simple sample program in C++ that uses the above algorithm. Explain how the program works.

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