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Date:2020/1/2

Program Assignment

2019 fall

I use C++ to finish the assignment.

This program contains a head file “program assignment 1.h” and a cpp file “program assignment1.cpp ”.

Content:

In head file, there are two class, one is for node, and the other one is for binarytree.

In the class node, there are four types of property. They are key\_value, parent, left, and right, which are very useful when construct the binarytree.

In the class binarytree, there are some operations we will use to generate the standard tree and splay tree, and then we can output three types of file the assignment required for the two types of tree respectively.

Running-time analysis:

In the general case, the binary tree is balanced and every insertion should take only . Hence, total time is .

In the worst case, the tree is totally tilted, which means that every node in the tree has at most on child. Every insertion should take . Total time is .

For the visualized representation prints: I perform a post order traversal to obtain the postorder node list and their depth. It takes Then I build a matrix to record the shapes of the tree according to the postorder node list and their depth, and then print it. It takes Total time complexity is

For the parenthesis representation: It takes since it is simply performing recursion to each node and print it.

For the left boundary nodes: It takes to check if the node is left boundary and print it.