Thời gian còn lại 0:20:33

Câu hỏi 1

Không hoàn thành

Chấm điểm của 2,00

In this question, you have to perform add **and delete on binary search tree**. Note that:

- When deleting a node which still have 2 children, **take the inorder successor** (smallest node of the right sub tree of that node) to replace it.

- When adding a node which has the same value as parent node, add it in the **left sub tree**.

Your task is to implement two functions: add and deleteNode. You could define one or more functions to achieve this task.

```
#include <iostream>
#include <string>
#include <sstream>
using namespace std;
#define SEPARATOR "#<ab@17943918#@>#"
template<class T>
class BinarySearchTree
{
public:
    class Node;
private:
    Node* root;
public:
    BinarySearchTree() : root(nullptr) {}
    ~BinarySearchTree()
    {
        // You have to delete all Nodes in BinaryTree. However in this task, you can ignore it.
    }

    //Helping function

    void add(T value){
        //TODO
    }

    void deleteNode(T value){
        //TODO
    }
    string inOrderRec(Node* root) {
        stringstream ss;
        if (root != nullptr) {
            ss << inOrderRec(root->pLeft);
            ss << root->value << " ";
            ss << inOrderRec(root->pRight);
        }
        return ss.str();
    }

    string inOrder(){
        return inOrderRec(this->root);
    }

    class Node
    {
    private:
        T value;
        Node* pLeft, * pRight;
        friend class BinarySearchTree<T>;
    public:
        Node(T value) : value(value), pLeft(NULL), pRight(NULL) {}
        ~Node() {}
    };
};
```

For example:

Test	Result

BinarySearchTree<int> bst;
bst.add(9);
bst.add(2);
bst.add(10);
bst.deleteNode(9);
cout << bst.inOrder();
	2 10

Test	Result

BinarySearchTree<int> bst;
bst.add(9);
bst.add(2);
bst.add(10);
bst.add(8);
cout << bst.inOrder()<<endl;
bst.add(11);
bst.deleteNode(9);
cout << bst.inOrder();
	2 8 9 10
	2 8 10 11

Answer: (penalty regime: 5, 10, 15, ... %)

Reset answer

```
//Helping functions

void add(T value){
    //TODO

}

void deleteNode(T value){
    //TODO

}
```

Precheck Kiểm tra