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جامعة النجاح الوطنية

كلية الهندسة وتكنولوجيا المعلومات

Computer Engineering Department
Data Structures and Algorithms (10636211)
HW 3

ILOs [3]	Due to: 7/12/2021	10 points
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In this assignment, you will write a C++ code to do the following **two classes**:

1. Define a class called **NODE** to store the information for a node in a binary search tree. Your class should include the following:
 - data : (Integer Number)
 - bf : (Integer Number) balance factor
 - Constructors
2. Define a class called **MyAVL** to implement the AVL tree. Your class should provide the following public functions:
 - ***void insertData(int data);***
to insert a new data to the AVL tree. [You have to rebalance the tree after insertion]
 - ***void deleteData(int data);***
to delete the listed data. [You have to rebalance the tree after deletion]
 - ***int getHeight();***
to return the height of your AVL tree.
 - ***void printInOrder();***
 - ***Operator overload >> to read from file the nodes, then build the AVL tree.***
to build a tree from a file:
 - **Constructors + Destructor**
 - One of the constructors takes an array of integers and the size of it to build the tree.
 - Feel free to add other private functions you may need, for example:
 - *Implement the rotation functions.*
 - *The balance factor difference of a NODE**

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Inputfile sample:

```
9 #of nodes
19 22 16 12 11 17 30 25 35
```

Test your code using the following main function:

```
int main()
{
    /* option1
    MyAVL myTree;
    char fileName [64];
    cout << "Enter the file name: ";
    cin>> fileName;
    ifstream in(fileName);
    in>>myTree;
    */
    /* option2

    int data[]={19, 22, 16, 12, 11, 17, 30, 25, 35};
    MyAVL myTree(data,9);
    */

    myTree.printInorder(); // result: 11 12 16 17 19 22 25 30 35
    myTree.insertData(27):
    cout << "Current Height = "<<myTree.getHeight()<<endl;
    myTree.insertData (40):
    cout << "Current Height = "<<myTree.getHeight()<<endl;
    myTree.insertData (18):
    cout << "Current Height = "<<myTree.getHeight()<<endl;
    myTree.deleteData(11):
    cout << "Current Height = "<<myTree.getHeight()<<endl;
    myTree.printInorder();
    return 0;
}
```