CSC325 – Advanced Data Structures **Program #2 – AVL Trees**

In this assignment you are to write a Python program to create and manipulate AVL tree abstract data structure.

You are provided with the template in which you must implement several functions:
(1) function to insert new value into the tree;
(2) function to find leaves of an AVL tree;
(3) function to check if a given value is in the tree.

Your program must:

- take a file containing values to be inserted as a command line argument,
- **insert values into appropriate tree nodes (1),**
- print tree representation,
- print the output of an in-order traversal of the tree,
- **print leaves of the tree (2),** and
- **print if given values exist in the tree (3)**.

Following is the output of the program run applied on provided test file:

```
>python avl-tree.py test-1.txt
Values to be inserted: ['10', '3', '18', '2', '4', '13', '40', '39', '12', '38', '14', '11']

Value 10 is inserted.
Value 3 is inserted.
Value 18 is inserted.
Value 2 is inserted.
Value 4 is inserted.
Value 13 is inserted.
Value 40 is inserted.
Value 39 is inserted.
Value 12 is inserted.
Value 38 is inserted.
Value 14 is inserted.
Value 11 is inserted.

AVLTree: AVLNode(13, balance = 0, left = AVLNode(10, balance = 0, left = AVLNode(3, balance =
0, left = AVLNode(2, balance = 0, left = None, right = None), right = AVLNode(4, balance = 0,
left = None, right = None)), right = AVLNode(12, balance = -1, left = AVLNode(11, balance =
0, left = None, right = None), right = None)), right = AVLNode(18, balance = 1, left =
AVLNode(14, balance = 0, left = None, right = None), right = AVLNode(39, balance = 0, left =
AVLNode(38, balance = 0, left = None, right = None), right = AVLNode(40, balance = 0, left =
None, right = None))))

In-order traversal: 2 3 4 10 11 12 13 14 18 38 39 40

Leaves: 2 4 11 14 38 40

Value 10 is in tree
Value 17 is not in tree
Value 35 is not in tree
Value 38 is in tree
Value 40 is in tree
```

Together with your source code include a separate file *Namingformat.py* with your **information** as the **values** of the following variables:

```
myName = 'first_name last_name'
myTechID = '0000000'
myTechEmail = 'abc123' #only your email id omit @latech.edu
```

You must properly cite the sources if you use **any help** from peers or **any code/ideas** from online resources. **Failure to do so will be treated as a plagiarism.** Properly citing the sources should be done as a **comment** in your code. Some examples:

```
# found this code at: <source url>
# used idea from: <source url>
# <peer name> helped me with this part
```