Class Name Changed - 1pts

This is the class name that I changed from BST to AVL

Node Updated - 2pts

I also added another attribute to the node class which is the height of the node

height and getHeight - 2pts

so I updated the height method to call the function getHeight instead and the function getHeight will return -1 if the node is null or it will call the function node\_height from previous assignment to calculate the height of the node.

balance and getBalance - 5pts

the balance function will call the getBalance function. In the getBalanace, it will call the getHeight of the Left and Right Chilren nodes to calculate the balance factor.

rightRotate - 10pts

Right Rotate basically moves the left children to the location of the current node. The current node now will be the right child and the right child becomes the left child. After the rotation, it will update the Height of nodes using the updateHeight function.

leftRotate - 10pts

Similarly, left Rotate moves the right child to the location of our current node, the left child becomes the right child and the current node becomes the left child

rebalance - 10pts

rebalance function will call the getBalance to check the balance factor of our current node and depending on the cases, it will perform different operations like right rotate, left rotate and so on.

Revised Insert - 10pts

Insert\_value is almost the same. It will recursively call itself until it find the location to insert the new node but it also updated with updateHeight and rebalance at the end of the function to always keep the tree balance.

(5 points) - Show output from running the avl.py file.

(5 points) - Show output from running the pytest file.

(15 point) Briefly show that your avg\_avl\_heights.py file does the correct tests. Give a short overview.

Similar to the average height experiment of the previous assignment, I imported avl.py and use 2 function random\_sequence and make\_avl to generate a random sequence and insert them into the tree. I have a Heights list to store all the height from 5 experiments and then calculate the average.

(10 points) Show your results table.

(15 points) Give your analysis.

As n increase, the height in all 5 experiments are all the same the increase exactly the same as O of log 2 of n. This is because the tree is always kept balance by our methods. Thus, it always has near minimum height.