Proposal

For this project, I will use Template Scripting Testing Language(TSTL) to test a python program named avltree.py. Source link: https://github.com/lessandro/avltree/blob/master/avltree.py. This program is about AVL tree. It provides us with the liberty to do pointer manipulations without having to worry about accessing invalid child references. Another benefit of that is being able to represent an empty tree as a single (empty) tree node, eliminating the need for separate classes for the tree and nodes.

I will test this program in two steps. First, I will write a test file with many different data to test this program. Second, I will use some invalid data to test whether the program can return the right response when it receive wrong data.

Avltree.py has insert, rebalance, rotate, update_height, lookup, cmp, remove, remove_self, take_rightmost, become_child functions.

Insert function: this function is used to insert a new element in the tree and rebalance it if necessary. I will check when the node is leaf or not, the new data is inserted correctly, and whether the new data has been put the right side of the tree. Also, I will test what if I put in the invalid data. Finally, I will test what if the tree has no node, 1 node.

Rebalance function: this function is used to rebalance the tree if it is unbalanced. Since half of the possible rotations for an AVL tree is a mirror of the other half, this function abstracts both cases in one using the variable “side” to refer to one child or the other. I will check is this function able to tell which side is bigger. Then I will test whether this function call the rotate() function correctly.

Rotate function: this function is used to rotate the tree replacing self with one of its children. The replace is done in place so that reference to the root node will continue pointing to the root of the updated tree. For this function, I will test if the function sort the data correctly and the

relationship of self() and child(). Then I will test if the tree can be rotated and whether the rotation is correctly.

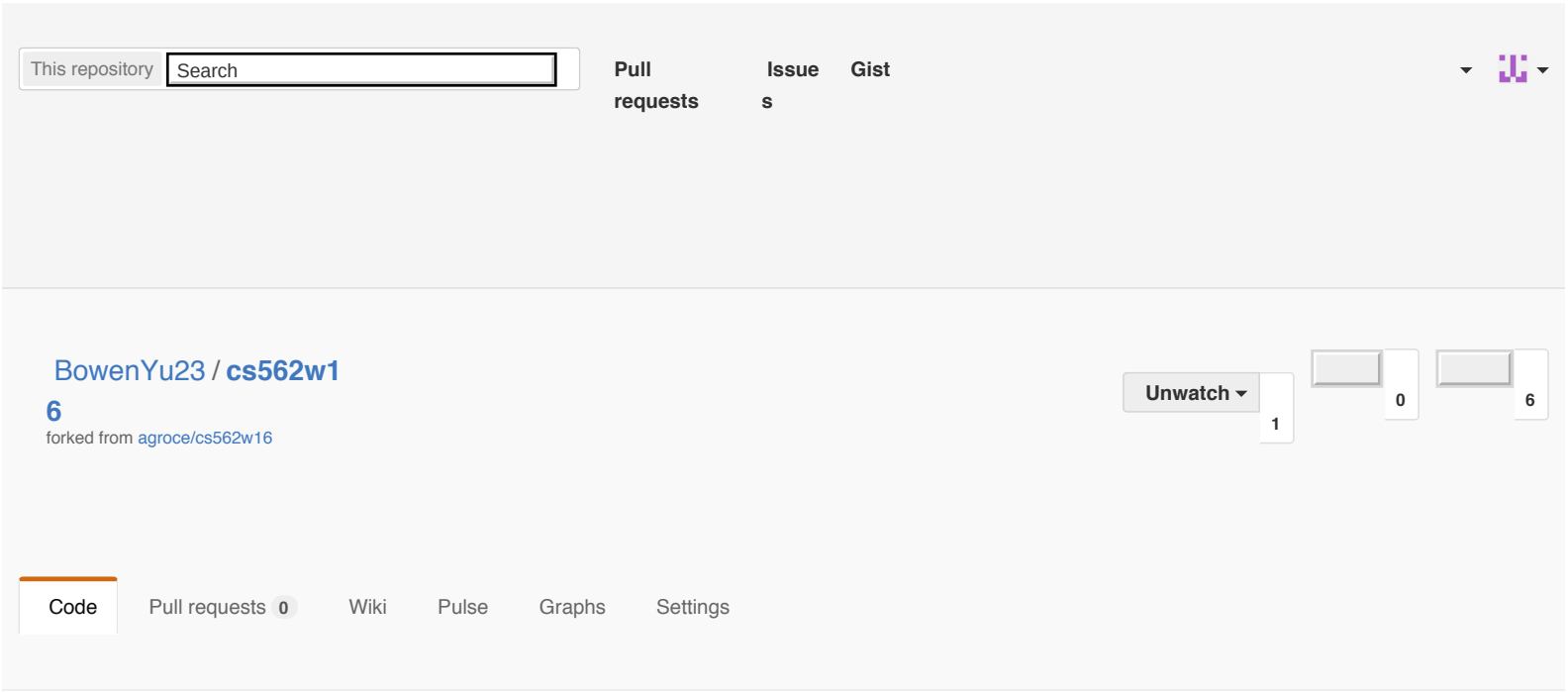
Update_height function: this function is usede to recalculate the height of this tree.

Lookup function: this function is used to look for an item in the tree. It would return a tuple with the data if found, otherwise None. I will test when the data cannot be found, whether it returns None. Likewise, when the data can be found, what will return. Finally, I will test what if I lookup a invalid data.

Remove function: this function is used to remove a node from the tree. I will check its correctness, like when the tree has no node or need to be rotated.

Remove_self function: this function mostly like remove function.

Cmp function is used to wrap around the user_supplied comparison function. Take_rightmost function is used to take the data of the rightmost node in the tress, then destroy it.. Become_child function is used to replace self with one of its children. Those functions are quite simple, and they are called by other functions.



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1

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