AVL Deletions

Deletions in AVL trees can be handled in a similar way as insertions, though it’s a little more complicated.

First, do a standard BST deletion. Keep track of where a leaf node was (ultimately) removed and fix up the heights above that point.

If the deletion created an imbalance, apply a suitable fix to the tree…

Case #1: deletion \rightarrow left-left

Delete child on the right
Case #1: deletion → left-left

Single rotation

Case #2: deletion → left-right

Delete child on the right

Case #2: deletion → left-right

Double rotation

Another deletion case?

Delete child on the right
Another deletion case?

There are of course two more mirror image cases: right-left and right-right.

Let’s try an example…
Finishing up deletions

After a deletion, we update the heights and fix the first problem we find. Then…?

What is the complexity of doing a deletion?