

CS 535 Homework 6
Due: October 21 (W), in class.

1. Show the result of inserting keys 2, 1, 4, 5, 9, 3, 6, 7 into an initially empty AVL tree. Do the same but this time with an initially empty splay tree. Please show what happens at each step.
2. *Number of restructurings in AVL trees.* C-3.13, C-3.5.
3. Let D be an ordered dictionary implemented using an AVL tree. Suppose in addition to all the methods we have discussed in class, we also want to support the method **countGreaterThan**(k) which counts all the items with keys larger than k . (Note that this method returns a single non-negative integer.) Of course, we want to be able to do this in $O(\log n)$ time where n is the number of items. To do so, you would have to add an extra field to each internal node and maintain this field during updates.
 - a. What should the extra field be?
 - b. How should it be maintained in the course of an insertion and deletion so that the run times of these methods are still $O(\log n)$?
 - c. Describe an algorithm for implementing **countGreaterThan**(k).