CSE 326: Data Structures and Algorithms
Assignment #4
April 19, 1996
due: Wednesday, May 1

1. (a) Page 251, exercise 1a. Show the AVL tree after each insertion.
   (b) Page 251, exercise 1b.
   (c) Show the result of deleting the key 538 from the tree of part (1b).
2. (a) Number the nodes of the last tree in Figure 7.2 according to the order in which they are visited in an inorder traversal.
   (b) Using the numbers from part (2a) as the keys, show the result of doing an AVLDeleteMin on this AVL tree. (For your information, it is not hard to see that executing a DeleteMin on these worst case trees causes $\Theta(\log n)$ rotations to occur. You might be interested in proving this to yourself.)
3. Page 252, exercise 6. Hint: You can use each node's bit for anything you like, but you must retain the property that, given a node, you can determine its balance in $O(1)$ time, or else the AVL operations will no longer run in $O(\log n)$ time.
4. Page 252, exercise 9. Write the procedure recursively, following the ideas in the procedure AVLTreeDeleteMin handed out in class. Use that procedure as a subroutine for deleting the inorder successor of a node, when appropriate. You may also use the subroutine Rotate, Algorithm 7.3. Show that the running time of your procedure is $O(\log n)$.