ECE 3020 Homework 8
Due Date: Friday, October 27, 3:00 PM

1) The following values are to be inserted in an initially-empty binary search tree one-by-one in the given order: 12, 26, 49, 15, 30, 9, 57, 62, 41, 75, 66, 63

   a) Show the final tree that results if these values are inserted into an ordinary binary search tree. What is the height of the tree?

   b) If an AVL tree is used instead of an ordinary binary search tree, show the sequence of trees that result from insertion of these values. For each insertion that causes the tree to become unbalanced, show the tree after insertion but before rebalancing and then show the tree that results after the rebalancing operation. Show the final tree after all insertions and rebalancing operations are done and write the balance next to each node in the final tree. What is the height of the final tree?

2) Show, by hand, the execution of heapsort on the following array:

   [14 23 7 16 72 55 29 31 12 18 91]

   Use the heapsort implementation described in Section 5.10 of the book, which "heapifies" the array in the first step and then does n=11 "deletemax" operations to produce an array sorted from smallest to largest value. Show the contents of the array after each step of heapify and after each of the first 4 deletemax operations. A step of heapify corresponds to a single bubble-down operation.