Lab 6:

(35 pts) Due Thursday, April 9

This lab must be done on your own.

0. Pick a partner and get started on your project
1. (4 pts) Write a class declaration and separate class definition (a .hpp and a .cpp file) for a node that has as parameters a pointer to an int, a double, and a next and prev pointer.
    a. Include a constructor that has no input parameters and sets the next and prev pointers to Null, the int to 0, and the double to 0.0
    b. Include a constructor that has one input parameter, an int, and sets the next and prev pointers to Null, the int to the input parameter, and the double to 0.0
    c. Include a constructor that hs 2 input parameters, an int, and a double, and sets the next and prev pointers to Null, the int to the first input parameter, and the double to the second input parameter.
2. (8 pts) Insert the following numbers into an AVL tree. Show the tree after each insert:
   10, 18, 24, 22, 32, 38, 29, 27, 30, 40, 35, 26

   (2 pts) How many nodes are there in the tree? What 2 power of 2s does that fall between? (e.g., 2^1 and 2^2, 2^2 and 2^3, etc.) At most, how many comparisons to find any node in your tree?

   (3 pts) How is this an improvement over a regular binary search tree?

3. (6 pts) Write the pseudo-code for a right-rotation. Give an example of a tree in which you'd need to use a right rotation. Step-by-step, modify the tree using your pseudocode.
4. (8 pts) Write pseudocode for a double right-left rotation. Give an example of a tree in which you'd need to use this double rotation. Step-by-step, modify the tree using your pseudocode.
5. (4 pts)With an AVL tree, each node must have a left and right pointer, pointing to its left and right child. Would it be beneficial to add a parent pointer, pointing to the parent of each node? Justify your answer.