**Assignment 4 – C243 – Spring 2013**

**Stacks, Queues, and the Standard Template Library**

**Due: 02/21/13 by 9:30pm**

**20 points**

**Program 1 - 5 points - (Inefficient) palindrome checker:**

The purpose of this program is to get comfortable with using stacks, queues, and the STL. You will find a program, **main.cc**, in /home/mscheess/c243s13/p4.

This is a modified version of the program on pp. 881-882 in the Savitch handout I gave you. My version simply reads in a line of characters entered by the user, uses a stack to print the string in reverse, and uses a queue to print the characters in the same order as entered by the user.

To compile:

**g++ -o palindrome main.cc**

Compile it and try it out. Then modify it to use the stack and the queue to determine whether the string entered by the user is a palindrome. To simplify testing,

just enter strings of characters that are all uppercase alpha or all lowercase alpha.

For example, for the palindrome: Madam, I’m Adam!

just test with:

MADAMIMADAM

or:

madamimadam

(Obviously, using a stack and a queue is not a very efficient way to test whether a string is a palindrome. The idea here is to get you used to using stacks and queues in the STL.)

**Program 2 - 15 points – Simple stack-based calculator:**

The data file for this program is the file **postfix.dat**, which is in: /home/mscheess/c243s13/p4

Each of the lines in the file is a mathematical expression in **reverse polish (postfix) notation**. For each mathematical expression, you will use a stack (a queue is not useful here) to compute and display the value of the mathematical expression. (We’ll cover reverse polish in class.) For lines with invalid mathematical expressions, you’ll simply output a line that says “Invalid reverse polish expression.” You may assume that lines in the file contain only **digits, +, -, / , \***. A space will separate different elements in a line.

For file input, use **input file stream**, not **redirection**.

Use appropriate programming conventions and style. Hand in hardcopies and upload to Dropbox in Oncourse.