CS 2433 C/C++ Programming
Programming assignment 2
5 points
Due date and time: 11:59 PM, September 1, 2016

Objective: Familiarize with (assignment, **if**, **while** and **for**) statements, I/O procedures **printf** and **scanf**, header file, and use of the 'gcc' command. (NOTE: Use of the 'gcc' compiler is mandatory.)

Problem: Design and implement a C program that reads an integer from '**stdin**' (keyboard) and computes and prints the values of the following expressions on '**stdout**' (terminal screen):

1) n! (n factorial)
2) 2^n (n^{th} power of 2)
3) n! / 2^n (n factorial divided by the n^{th} power of n)

If the integer is negative, a message should be printed out and no further computation performed.

Requirements:

1) The program must be well documented. Documentation must include your name, course name and number, program due date, and a description of the program. Also, your documentation must include build instructions showing any compilation parameters used. (penalty 1pt)
2) Read an integer using the **scanf** procedure (penalty 2 point).
3) Computation of each of these expression must be performed twice. You must calculate the first two using both a "while loop" and a "for loop", then use the results from each to calculate the third. Results of computations must be printed with appropriate heading. For example, assuming 3 is the input, one of the printed messages is "Value of 3! computed using a while loop is 6." There should be five more similar printed messages. Note that the ratio may be a floating point number. (See sample output below.) (penalty 4*1/2 = 2 points).
4) If the input value is negative, an appropriate message must be printed and computation of the expressions skipped. (penalty 1pt)
5) Your programs must compile and run correctly on the department's csx.cs.okstate.edu server to get any credit. (penalty 5 points)
6) Submit the solutions using the "handin" command. Example submission command is "handin cs2433 programA progA.c". The 'programA' specifies the folder to which you are submitting the file 'progA.c'.

Sample output on input 3:

```
Value of 3! computed using while loop is 6
Value of 2 to the power 3 computed using while loop is 8
The ratio of 3! to 2 to the power 3 is 0.75
Value of 3! computed using for loop is 6
Value of 2 to the power 3 computed using for loop is 8
The ratio of 3! to 2 to the power 3 is 0.75
```

In addition to the textbook (Savitch: Chapter 2, Flow of Control) and the Zybooks site (sections 3 and 4), the following Web sites may be of use to you as references regarding C language functions.

http://www.cplusplus.com/reference/

http://www.cprogrammingexpert.com/C/Tutorial/