CS 1713
Introduction to Computer Programming II
Assignment 3
Due Wednesday February 22

1. (100 pts) Write a program that implements the following functions *iteratively (no recursion).*

```
double factorial(int n)
double exponent(double x, int n)
```

The functions implemented should follow below guidelines

- *factorial:* Computes $n! = n \times (n-1) \times \ldots \times 1$
- *exponent:* Computes the sum of first n terms of e^x using the following approximation.

$$f(x,n) = e^x = \sum_{i=0}^{n} \frac{x^i}{i!} = \frac{x^0}{0!} + \frac{x^1}{1!} + \frac{x^2}{2!} + \ldots + \frac{x^n}{n!}$$

You can use $pow()$ and $factorial()$ functions in your exponent function.

In $main()$ use $argc$ and $argv$ read the value of n and x from the user and compute and print the approximation of e^x for all values up to n using the function *exponent*. Print the results as a table as shown below. Also, print the exact value of e^x using the math library function $exp()$. When you increase the value of i your result should get closer to the result of *exp*.

Name your program assign3.c Sample execution of the program is given below. First parameter is n and second parameter is x. You need to use functions $atoi()$ and $atof()$ in *stdlib.h* to convert strings to integer and double respectively.

```
fox01> assign3 10 2.2

         i     Approximation
--------------------------------
         0     1.0000000000
         1     3.2000000000
         2     5.6200000000
         3     7.3946666667
         4     8.3707333333
         5     8.8002026667
         6     8.9576747556
         7     9.0071659835
         8     9.0207760712
         9     9.0241029815
        10     9.0248349018
Exact Value =    9.0250134994
```

Submit your program electronically using the blackboard system

The program you submit should be your own work. Cheating will be reported to office of academic integrity. Both the copier and copiee will be held responsible.