Homework 10: Debugging

For the following exercises, write your code in one `.cpp` *file for each problem. Be sure to use a plain text editor (i.e., NOT Word).*

Make sure that your code compiles without error in order to get credit. Do not hesitate to ask for help if needed!

Do NOT submit executables to me. If you are having trouble getting your code to compile, and you can't figure it out on your own, email me with your code attached and I'll try to help you debug. Better yet, come to office hours!

Problem 1 (10 pts)

Download the program `HW10-CalcExp.cpp` from Google Drive and debug it.

The program is supposed to calculate an approximation to the exponential function e^{-x} using its Taylor expansion

$$e^{-x} = \sum_{n=0}^{\infty} \frac{(-x)^n}{n!}$$

the approximation being that only a finite number of terms in the series are kept by the program.

(a) Your first step is to get rid of all the compile-time errors in the program

(b) Then fix any run-time error if any happen.

(c) Finally, you need to check that the results are correct after your program compiles and runs.
To help you with that, I have included `cout` statements that will print intermediate results at each step of the loop.

Make sure to add comments for all the changes you make to the program.

Obviously, a program written like this has some limitations. In particular, it will run into issues with going past the maximum `int` value when calculating the factorial of `n` if you include too many terms, so the program will only work for values of `x` that are not too large (in absolute value).

Be sure that you have resolved any logic errors that prevent you from getting an approximate result for e^{-5} to within 1% accuracy. It is fine if it does not work well for larger values of `x`.

For this problem, submit your debugged code with comments describing all changes you've made and discussing what limitations you discovered that prevent you from getting a better precision.