Engr 101 **September 16, 2019**
Assignment 03 **Due: September 27, 2019**
Series for trig functions

The value of sin(x) and cos(x) can be written as infinite series as:

$$\sin(x) = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \cdots$$

$$\cos(x) = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} + \cdots$$

In each case x is a real number in radians.

Write a program in C which will prompt the user for a value of x in degrees and an accuracy number. Using the equations above calculate and print the value of sin(x) and cos(x) to the required accuracy. Use $\pi = 3.141592653589793$

If the accuracy number entered AND the value of x entered are both zero, your program should terminate. Otherwise, it should continue running and issue another prompt for input values.

If the accuracy number is less than 10^{-9} you should set the accuracy to 10^{-9} and issue a message that you have done so.

Here are typical results from a program that runs correctly.

```
Enter a value for x... 30
Enter a value for the accuracy... 0.001
Sin of 30.000000000 is 0.500002133
Cos of 30.000000000 is 0.866025264

Enter a value for x... 45
Enter a value for the accuracy... 0.0000001
Accuracy reset to 0.000001
Sin of 45.000000000 is 0.707106783
Cos of 45.000000000 is 0.707106781

Enter a value for x... 0
Enter a value for the accuracy... 0
Press any key to continue . . .
```

Your program must contain *at least* five functions: one to calculate factorials, one to input the value of x and the accuracy, one to print the sin value, one to print the cosine value, and one to explain the program and how it works.