ENGR 3703 Homework #2

- 1. Complete all steps in python_intro_7.py.
- 2. Complete all steps in *python_intro_8.py*.
- 3. Write a python program that will calculate the function sin(x). Make sure your program meets the following requirements:
 - 1. The value of x can be specified and changed in the code (or as user input).
 - 2. The value of x_0 can be specified and changed in the code (or as user input).
 - 3. The definition of fractional error is:

$$\epsilon = \frac{|f_{true} - f_{apprx}|}{|f_{true}|}$$

This can be expressed as *percent error* by multiplying the above equation by 100%. Note f_{true} is the true/known value of f and f_{apprx} is the approximate value from the Taylor series expansion with N terms.

Your program should continue to calculate the Talyor series until $\epsilon \le 10^{-6}$.

- 4. Demonstrate your program works correctly by running it for the following case: $x_0 = \pi/12$, $x = \pi/2$.
- 4. Write a python program that will calculate the function e^x . Make sure your program meets the following requirements:
 - 1. The value of x can be specified and changed in the code (or as user input).
 - 2. The value of x_0 can be specified and changed in the code (or as user input).
 - 3. Your program should continue to calculate the Talyor series until $\epsilon \le 10^{-7}$.
 - 4. Demonstrate your program works correctly by running it for the following case: $x_0 = 0.0$, x = 4.0.
- 5. Use your program from #4 to use base points, x_0 = 0.0, 0.5, 1.5, 2.0, 2.5, 3.0, 3.5 and x = 4.0 to determine the number of terms, N_{ϵ} required to get an answer that has $\epsilon \le 10^{-10}$
 - 1. Make a graph of N_{ϵ} versus h (Note $h = x-x_0$).

For all problems upload your python code and the results of running your code. Note a screenshot showing the results is sufficient for showing the results. VVVVI --- Please compile this all into one document and make it into a single pdf before uploading.... We are expecting a single file with your work and will grade accordingly.