MAT2440 Module 1 – A brief introduction to programming in python.

Objectives: Learn to write some basic python programs.

1. Create a new trinket titled "2440 Module 1" to begin today's activities. Type all of today's work into this trinket. White space is very important in python. Curly brackets are not used to block code into a control loop or function. Use the tab key to put code inside of a control loop or function (see the examples below).

2. Basics:

   (a) For loops repeat a procedure multiple times.

   ```
   for i in range(10):
       print i  #range counts from 0 to 9
   ```

   (b) If/Else statements help direct your program if there are multiple cases.

   ```
   if n==0:
       print n
   elif n>0:
       print 2*n
   else:
       print 0
   ```

   (c) Functions take in data, manipulate it and return a value/string/etc.

   ```
   def square(n):
       return n*n
   ```

3. Write code to do the following:

   (a) Write a function that computes $x^2 + \sin(x)$.

   (b) Write a function that computes the derivative of $x^{3/2}$.

   (c) Write an if/else statement that returns a 1 if a number n is positive, 0 if n is zero, and -1 if n is negative.

   (d) Write a for loop that computes "$1 + 2 + 3 + \cdots + 100$".

(e) Write a function that takes in a positive integer n as an input and returns the sum "$1 + 2 + 3 + \cdots + n$".

(f) Write a for loop that counts the number of e's in the string "new york city college of technology".