**Mission 8.5: Defining Custom Functions with def ():**

I. Situation:

1. Defining a function
   1. By defining a custom function with the *def ():* function, you can run a script (multiple lines of code) with a single command. This can be used in many ways, including to make loops.
   2. Indentation. All of the code that is part of a custom function definition must be indented 4 spaces. IDLE does this automatically.

II. Mission: Your team will define a function using def (): that will allow a user to execute your simple calculator program from the previous mission as many times as they like by returning to a menu of options.

1. Examine an example program:
   1. First, download “menu\_loop.py” from TomasinosClass.com, open it in IDLE, and run it. See what happens if you input red, blue, or exit.
   2. Next, examine the code in an IDLE edit window. Notice how a custom function named red\_pill\_blue\_pill is defined using def ():

\*If you want to see an infinite loop in action, download and run infinite\_loop.py from TomasinosClass.com. It will print a never-ending list of random 1s and 0s. Hit ctrl+c to break any program running in a python shell.

* 1. Also notice that that red\_pill\_blue\_pill loops back to the input line (ln2) by executing itself at the end of the if code and elif code. This is called a loop. As long as the user inputs red or blue, the program will continue by looping back to line 2.
  2. To avoid an infinite loop\* with no end, there must be an input that does not return to line 2. This is accomplished by the “else” condition, which simply prints a message and then ends the program.
  3. The last line of the script is a “function call.” It simply calls for a function (in this case the custom function red\_pill\_blue\_pill) to be executed.

1. Define your function:
   1. Open your simple calculator program in IDLE, and save a new copy of it as XXXXXloop\_simple\_calc.py
   2. Make sure you are making edits to the new copy of the file.
   3. At top, define your function using def (): You may name it something like loop\_calc.
   4. Edit your code so that at the end of each if and elif section the final line calls for your function by name. Don’t forget the parenthesis.
   5. Make sure you add an exit option. You could add “exit” as an input that leads to an elif. Otherwise, you could just make sure your else code does not loop.
   6. Don’t forget to call your function at the last line, so it will run!
   7. As always, test and save your file to drive.