**ENGR 102**

**Lab Assignment #1A [100 POINTS]**

**Activity #1:** Getting Set Up – To Do in Lab (Individual)

For this course, we will be using Python 3 (Anaconda distribution), and the Spyder IDE. Your initial task is to install both of these on your own laptop.

1. First, download and install the Anaconda distribution of Python.
   1. Visit: <https://www.anaconda.com/>
   2. Click the download button, and follow the instructions for your operating system. It is available for Windows, MacOS, and Linux.
   3. **Be sure to install the 3.7 version** (not version 2.7). The current version at the time of writing is 3.7.
2. Create a directory on your laptop that you will use for your ENGR 102 programs
   1. This will help to ensure your programs are all in one place
   2. For later weeks, you may be required to submit all files from a directory
   3. You may wish to create more organization, but at the least, create a single directory.
3. Be sure you have the ability to zip and unzip files/directories.

**Activity #2:** Writing Your First Programs – To Do in Lab (Individual Submission – Team Discussions)

To ensure you’ve gotten everything set up correctly, you will write a simple, initial program.

1. Start the Spyder IDE and try creating you first program
   1. Create a Python File
      1. From the File menu, choose “New File”
      2. Select the directory that you created above for your ENGR 102 projects.
         1. You probably will want to pick a different name than the default “untitled”, perhaps “Lab01”
   2. Now create a new Python file
      1. From the file menu, select “New” then “File”
      2. Pick a name (such as FirstProgram, or HowdyWorld)
   3. You should now see a blank area with a tab labeled with the name you picked, followed by .py
2. Write the “Howdy, World!” program [**20 POINTS**]
   1. In the main window in Spyder, type the command:
      1. print(“Howdy, World!”)
      2. You should notice that the IDE helps you by suggesting additional text, like matching quotation marks and parentheses.
   2. From the “Run” menu, select “Run” (it should have a green arrow in front of it)
      1. You may have to pick “Howdy, World” when you do this
   3. You should see a new window at the bottom of the Spyder screen.
      1. Inside this window you should first see a line that shows what was executed: the Python interpreter command and the name of your Python file
      2. Then, you should see the output of your code, the text: Howdy, World!
   4. To run the program again, you can click on the run in the Spyder environment.
      1. Try changing the text within the quotation marks to print other things, and running again.
3. Ensure you have the Anaconda Python system installed correctly.
   1. First, create another new Python File
      1. Go to the file menu, create a new Python File, and give it a new name, like “InstallTest”.
      2. You should see another new tab open in the main Spyder window, with the name of your file in it, and a blank screen.
         1. Note: you can switch between these files by clicking the tabs.
4. Create a simple program, with just two lines: [**20 POINTS**]
   * 1. import numpy
     2. import matplotlib
   1. Run this program and ensure it works. If it does not, it means you do not have the full install of the Anaconda system.
5. Write a simple program involving mathematical calculations
   1. First, create another new Python File
   2. Try writing the following program, with 3 lines: [**20 POINTS**]
      1. First, the line from math import \*
      2. Then, the line: print(cos(0))
      3. Then, the line: print(sin(0))
   3. Now, run this new program.
   4. You should see two lines output, one with 1.0 (the cosine of 0), one with 0.0 (the sine of 0).
6. See what an error looks like [**20 POINTS**]
   1. First, what is the result if you divide 1 by 0?
   2. Modify your previous program, to see what happens if you try computing this
      1. Add the line: print(1/0)
   3. What happens?
      1. This is the sort of error you will see if you have a bug, like dividing by 0.
      2. What happens if the new line comes before the others in your program?
      3. What happens if the new line comes after the others in your program?
   4. After experimenting a bit, remove this line, so you again have a working program
7. If you did not do so before, add the initial comments to each file
8. Find the programs you wrote in your computer, and practice zipping them into a directory
   1. Go to the directory you created.
   2. You should be able to find three files (each with the .py extension) in that directory.
      1. The “Hello, World” program
      2. The test of the Anaconda install
      3. The math test
   3. Create a single .zip file with them and upload them to the submission link provided [**20 POINTS**]