Homework 12

```
import numpy as np
import matplotlib.pyplot as plt
%matplotlib inline
```

Problem 1: user input

- Prompt the user to enter their first name and store it in a variable called "first".
- Prompt the user to enter their last name and store it in a variable called "last".
- Prompt the user to enter their percentage in ChE 263 and store it in a variable called "pct".
- Convert the percentage to a letter grade called "grade".
- Then print the person's name, and grade; for example: "Tim Smith: A"
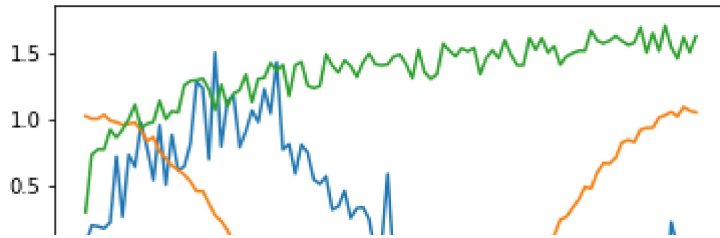
Problem 2: Numpy file I/O

Part a

Given the following code,

- Collect the data x,y,z,w into a single array called data.
- Write a plain numpy text data file called "data_1.dat".

```
x = np.linspace(0,2.0*np.pi,100)
y = np.sin(x)+np.random.randn(100)*0.2
z = np.cos(x)+np.random.rand(100)*0.1
w = x**0.2 + np.random.rand(100)*0.3
plt.plot(x,y,x,z,x,w)

#---- SAVE THE DATA TO AN ARRAY AND WRITE IT TO data_1.dat
```

```
[<matplotlib.lines.Line2D at 0x24caac76400>,
 <matplotlib.lines.Line2D at 0x24caac76668>,
 <matplotlib.lines.Line2D at 0x24caac76dd8>]
```


Part b

Repeat Part a with the following changes (you can reuse the data above)

- Write the file as "data_2.dat"
- Include a header that will look like this in the file: "# x_(t), y(m/s), z(K), w(m^3/s)"
- The data shoud be separated by commas.
- Format the data using %12.5f.

Part c

- Read the data file from Part b "data_2.dat" into a new array called "newData".
- Reproduce the plot from Part a using the data in variable newData.
- Add x and y axes labels, and a legend.

Problem 3: Pandas file I/O

Download the data from an Arduino temperature control device and import the data into Python with Pandas.

```
url = 'http://apmonitor.com/che263/uploads/Main/tclab.txt'
x = pd.read_csv(url)
```

Generate a plot that shows the measured temperature values on one plot and the heater values on another plot. Add appropriate labels to the plots such as x-label, y-label, title, and legend. Make sure that the plot is readable even when printed in black and white or for someone who may be color-blind. Horizontally align the time of two plots so that the heater effect on the temperature is observable.

Compute basic statistics for Temperature 1 and Temperature 2 such as Minimum, Maximum, Average, and Standard Deviation values. Write a table in an Excel workbook that summarizes the statistics. Open the workbook with Excel to verify that the solutions are written correctly.