For the exercises below, please write a program to perform the requested tasks for each question. When the demonstrators come to mark your work, they will ask you to run the programs you have written to demonstrate that they work.

1. Strings and Input/Output [2 marks]

Write a program that uses input() and asks the user to input

- a string
- set of three numbers, separated by comma

Create a float array, that contains the three numbers above.
Then write an **output file** containing:

- the original string, the string in upper case, everything before the first letter “e” in the string
- the first number as an integer, the second as a float with 2 decimal places, the third as a float in scientific notation with three sig figs.

Tip: Have the input part of the code in a separate Code Cell, so that you don't have to input the numbers every time.

2. Input/Output [1 ½ marks]

Make a copy of the straight line fitting script you made in week 4. Open it and add a data input section that will ask the user to input the following:

- The x and y data in comma separated lists that will then be stored in arrays.
- The label for the x axis.
- The label for the y axis.

(Remember not to call your variables **xlabel** and **ylabel** as this will overwrite the functions.)
Modify the rest of your code to use these variables at the appropriate points.
Also, edit the code to print out the slope, intercept and errors to 3 significant figures
Run your code, entering the Hooke's Law data to check that it still works and add comments to highlight the changes you have made.

3. Reading and analyzing 1 column data [1 ½ marks]

In this week's folder on LC there is a file called "two_gauss.txt" (also linked here). Copy this file to your current folder and read the data into Python. This is a large table of data with one column.

a. How many data points are there?
b. Make a histogram of the data with enough bins to resolve the features of the data.
c. The data contains samples drawn from two different Gaussian distributions. By looking at the plot, choose a value to split the data into two parts corresponding to the two peaks. For each Gaussian, estimate
    - The number of samples
    - The mean
    - The standard deviation