PHYS 210, Assignment 4

Create a new directory somewhere in your home directory with the name `yourusername_assignment_4` to store the files you will create for this assignment. To hand the assignment in, copy the directory with your results to `/home2/phys210/yourusername/`. Make sure it's there and has the right permissions (read and execute for everyone, write for you).

1 Reading files

1. Read the sample file from lecture into an array, using `numpy.loadtxt`. Verify that the array has the correct number of rows and columns.
2. Calculate the mean of the second column and the variance of the third column. You may use either your code from the last assignment or `numpy.mean` and `numpy.var`.
3. Read the first three lines of the code you just wrote for the previous two questions and output it.

Put the commented code in a file called `reading_files.py`.

2 Formatting

1. The first row of the sample data could be described as "Data-point number 1 has values of x=1.24 and y=3.14, with errors of 0.012 and 0.52, respectively." Read the sample data and produce analogous output for the second and third row, using "old style" string formatting.
2. Repeat the previous exercise but now use "new style" string formatting, i.e., the `format` string method.
3. One useful application of string formatting is creating filenames on the fly. Create variables storing your username, number of this assignment (4), and the filename of the code for this exercise (`string_formatting.py`). Using those, create a string containing the full path and filename and output it.

Put the commented code in a file called `string_formatting.py`.

3 Writing files

1. Repeat the second question from the first exercise but instead of using `print` to display the mean and variance, write the result to a file called `stats.txt`, using the format "Mean[x] = ..." and "Var[x] = ..." on the next line.

2. You should still have the sample data in an array. Imagine that the units of the "x" column are wrong and need to be corrected by a factor of 10. Multiply the "x" column of the sample data array by 10 and write the resulting array to file called `data_new.txt` using `numpy.savetxt`.

Put the commented code in a file called `writing_files.py`.