CS115 Introduction to Programming with Python

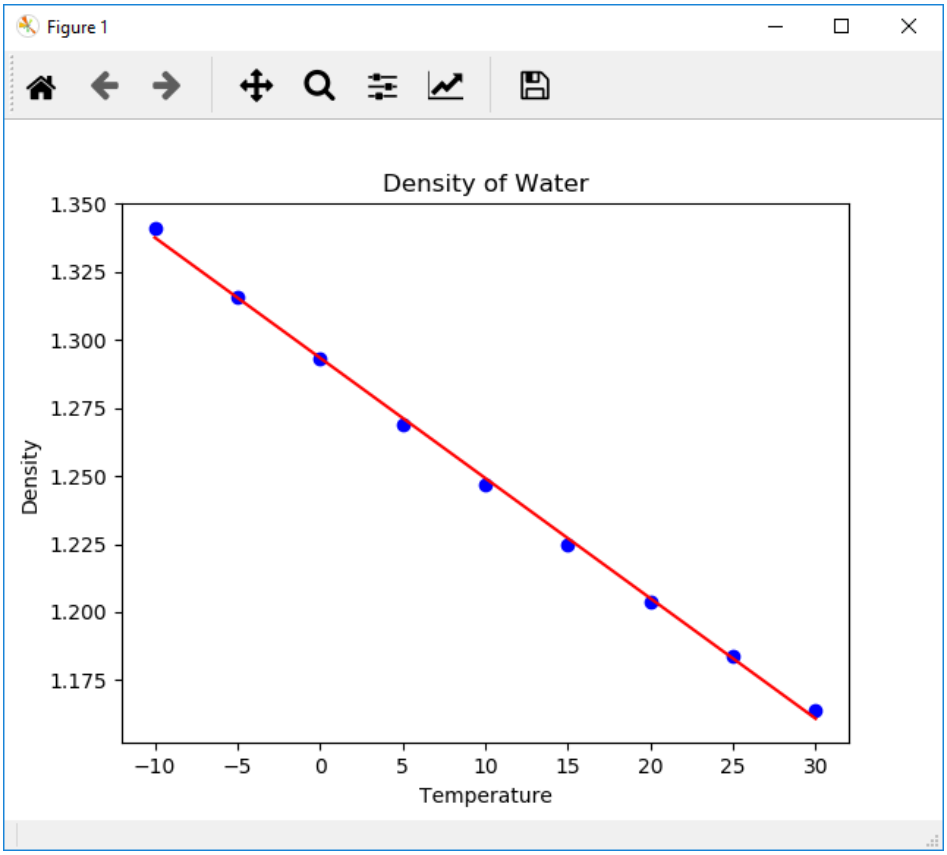
Lab Guide 10

Objectives: Data visualization with matplotlib and numpy.

1. An experiment measures and writes the density of water at different temperatures. The results are as follows:
   Temps: -10,-5,0,5,10,15,20,25,30
   Densities: 1.341,1.316,1.293,1.269,1.247,1.225,1.204,1.184,1.164

   Write a script that does the following:

   a. Load the data into two numpy arrays, `temps` and `dens`.
   b. Create the plot below, by first plotting the temperatures vs. the densities.
   c. Find the first-degree polynomials for the curve fitting these measurements and produce a plot of the curve in the format shown below. All formatting should be done according to the figure below.



2. Download the file `pop_data.txt`, and create a Python script that does the following:
    a. Import the data in the file into a numpy array, `arr_pop`.
    b. The regions in the file are 1 – Africa, 2 – America, 3 – Asia, 4 – EU. Select the records whose region is EU and store as a new numpy array, `arr_eu`.
    c. Open a new Figure1 window and create the bar charts and plots shown below using the EU data.

3. In the Figure 2 window, create the charts shown below.
    a. Select the data about employed males in Turkey (column 9) and employed females in Turkey (column 10). Data about Turkey is stored in the row with the index 27.
    b. Create the histogram in the same Figure window which shows the frequencies of GDPperCapita in EU (from `arr_eu`), using 4 bins.