Lab 1: Use MATLAB for Basic Statistics and Plotting

Assigned on 9/3/2015 and Due on 9/10/2015

The problems below are designed to use *MATLAB* to do some basic data manipulation and plotting. You are given a file called ppt.dat, and it contains precipitation in mm for the Southern Piedmont of the U.S. (Karl et al. 1994). The rows represent years from 1960 through 1989, and columns are for twelve months of each year. Solve Problems 1 – 6 below, turn in all MATLAB files and needed figures.

1. Read the data into *MATLAB.* (5 points)
2. Calculate the total annual ppt for each year and plot these data versus year. (Hint: use the MATLAB help facility to check on the sum command. Recall that you can perform operations on the transpose of a matrix.) (10 points)
3. Calculate the mean monthly ppt for each month and plot the values using a bar chart. (Hint: check on the **mean** and **bar** commands.) Plot the monthly means on a regular plot along with "error bars" showing the standard deviations of the monthly means. (Hint: check the **errorbar** command and the **std** command.) How different are the means and medians? Hint: check the **median** command.) (15 points)
4. Plot all monthly precipitation values consecutively. (You may want to examine the **reshape** command.) Is a seasonal pattern evident in the data? (10 points)

For each figure, you should add meaningful labels, legends, and titles.

Bonus Questions:

5. Write an m-file program to: (a) query for a year (see the **input** command); (b) for the selected year, calculate and display the minimum, maximum, and mean monthly precipitation (see the **min** and **max** commands); (c) make a stem plot of the data (see the **stem** command), labelling the axes and placing an appropriate title (see the **xlabel**, **ylabel** and **title** commands). (20 points)