CS 3753&5163 HW1

Electronic submission due 11:59pm, Sept 12, 2018

1. (20 points) Install and learn basic python by following the lecture given in class. Type in all commands or change the commands to see what happens. Initial at one of the following.

   ____ I certify that I have installed Anaconda or similar python environment and have practiced python by following the tutorial.

   ____ I already know python and therefore I choose not to do this exercise. I understand that it is my own decision and I am responsible for all consequences.

2. (50 points) Python programming. Please use the code skeleton provided on the course website.
   a. Write a python function to merge sort a list of numbers. Test your function on a small random integer array of 10 elements.
   b. Write a python function to calculate the summary statistics of an array of numbers: max, min, mean, standard deviation, 75 percentile, 25 percentile. (These values must be calculated with functions defined by yourself instead of using existing functions in python.) Use the three sets of random numbers as generated in the code skeleton to test your code and output the summary statistics for each data set.
   c. Write a python function that accepts a list of numbers in any range, then scales the numbers to integers in [0, 15], and then count the number of occurrences of each integer in the dataset. Test your function on the three datasets used in 2b and output the counts.

3. (30 points) Plotting.
   a. For the three sets of data generated in 2b, plot the summary statistics in one figure. Try to reproduce all the details of the Fig 1 on next page.

   b. Using the counts you collected in 2c, plot the distribution of the three data sets in one figure. Try to reproduce all the details of Fig 2 on next page.

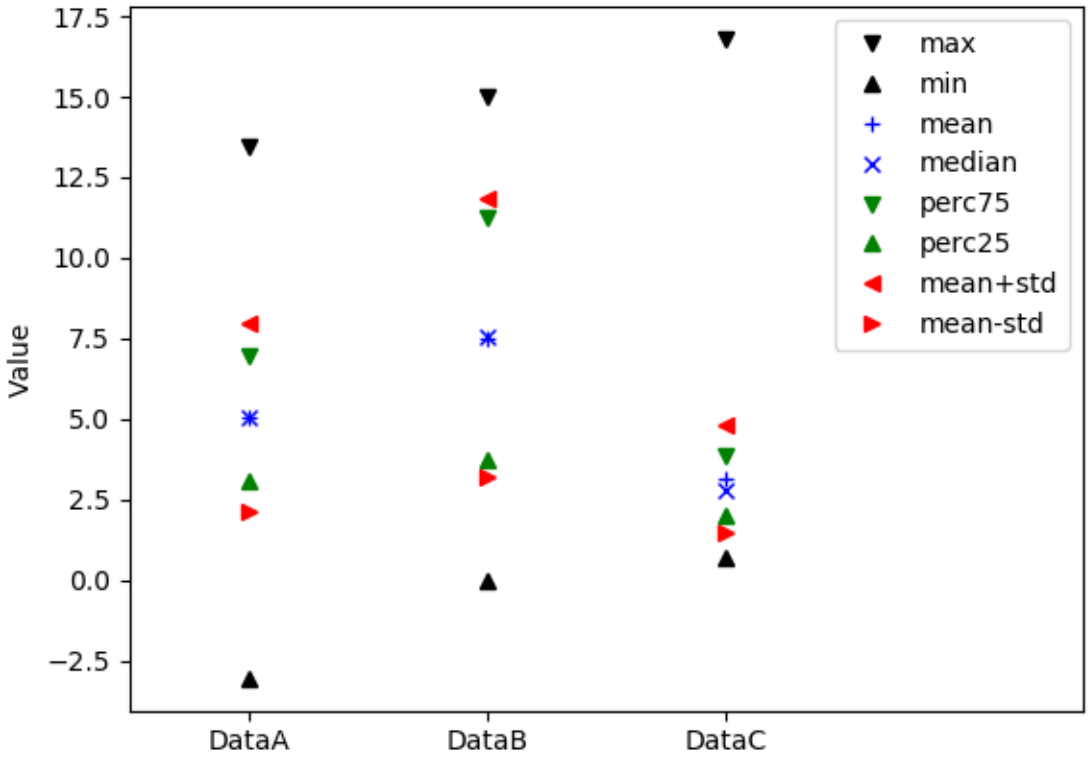

Fig. 1 Summary statistics of three data sets

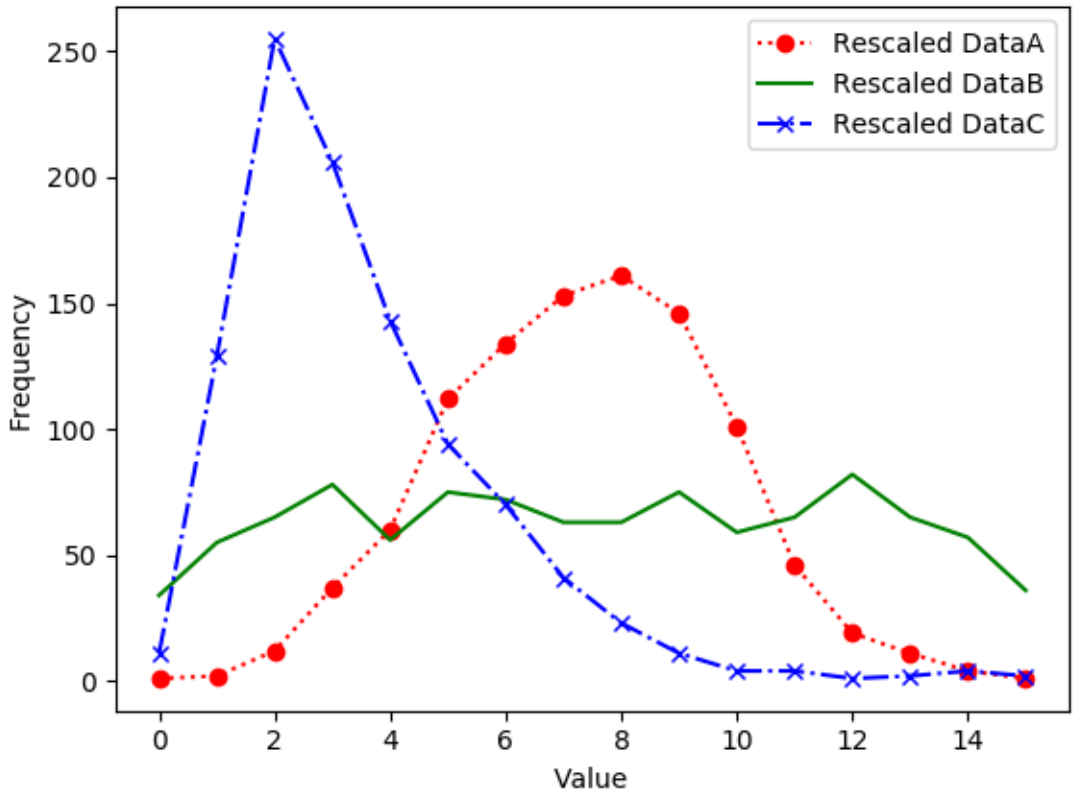

Fig. 2 Distribution of three data sets rescaled to [0, 15]