Problem Set 1

Quant I

When solving R questions, always report the code you use, together with the result. Please format it in a way that is readable. You may want to look at Knitr, which will greatly simplify things for you (e.g., http://kbroman.org/knitr_knutshell/).

1. Use R to solve (2pt each):

    a. $1 + 2(3 + 4)$

    b. $4^3 + 3^{2+1}$

    c. $\sqrt{(4+3)(2+1)}$

    d. $\left(\frac{1+2}{3+4}\right)^2$

2. Enter the following vector into a variable called myvar. Calculate its length (3pt), mean(3pt), median (3pt), and standard deviation (3pt)

$$\{2, 7, 9, 11, 23, 24, 29, 101\}$$

3. Let x_1 be the following vector:

$$x_1 = \{3, 7, 11, 12, 18, 23\}$$

    a. Add 3 to each number in x_1 (use only one command). (3pt)
    b. Subtract 2 from each number and square the result. (3pt)
    c. Take the log (base 10) of the sum of all numbers in x_1. (6pts)

4. Enter the integers 1 to 100000 into a vector called "abc" (3pt).

5. Import the data PS1.csv from this folder. This data includes three variables derived from the Correlates of War dataset: 'Country', 'year', and 'Battle Deaths'.

    a. What value appears in column 3, row 15 (use R code, not Excel!)? (2pts)
    b. How many rows are there? (3 pts)
    c. How many different countries are listed in the data (6pts)?
    d. Which country is the most represented in the data? (6pts)
    e. Missing values in variable 'Battledeaths' are currently coded as -9. Change it to 'NA' (6pts).
    f. In what year did Turkey experience its largest war (as measured by the number of battle deaths) (6 pts)?

g. Plot Turkey's number of battle deaths in each of its fighting years using a time series plot (a line). (6pts)
h. Plot the distribution of Turkey's battledeaths in the data using a boxplot (4pts)
i. Plot the distribution of Turkey's battledeaths in the data using a boxplot *next to* a distribution of battledeaths in the entire data (6pts)
    1. Are you happy with the graphical result? Why/why not? What would you do to fix it? (3pt)
    2. Fix it (that's a hint that you were not happy above...) (3pt)
j. On average, does Turkey experience more or fewer battledeaths per war than the average battledeaths for all wars? (5pts)

6. Create a *function* that prints, for a given country, the total (i.e., sum) number of battle deaths associated with that country and its rank on that metric, compared to other countries.[1] (9pts)

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[1]E.g., it should print "Turkey had a total of x battle deaths and was the country with the kth largest total number of battle deaths" (this is a made-up example)