

# Challenge Set 5

*Deadline: Mar 16 2018 at 5pm*

Challenge problems are **optional** problems for those interested in testing their abilities. For each correct answer to a challenge question, bonus points of 0.3 are given towards the final overall grade, i.e., you can potentially earn up to 4.5 points towards the final grade if you get all questions correct (note that 4.5 points on your final grade is a non-trivial amount of points because no scaling ratio is applied). Proper workings must be shown to get any points, and there is no partial credit. Also, because these are bonus questions, instructors will not provide any help or hints (unlike typical problem or practice set questions where generous assistance will be provided) to be fair to all students. Please submit your solutions to SME office 244E or during lectures in person by the deadline.

**Q1.** The attached Excel spreadsheet contains the annual percentage rate of interest charged on new car loans at nine of the largest banks in six US cities.

Using a statistical software of your choice, answer the following questions:

- i. (0.6 points) Construct an ANOVA table and ascertain if there is a significant difference in interest rates between cities. Which pair of cities have significant differences according to the Tukey's test? (at  $\alpha = 5\%$ )
- ii. (0.3 points) Redo the analysis in part i, but now, you assume that each row of data corresponds to the same bank in each state, e.g., the data in row 1 is the rate charged by Bank A in all six states. (at  $\alpha = 5\%$ )