Math 8452, Homework #6. Due on 7/15/20 (Wed section) or 7/16/20 (Thu section).

Reading from the textbook:

- Read Section 8.4 on a bootstrap confidence interval for Kendall's tau.

Problems to do:

1. (To turn in - Numerical answers and R code.) Using the data in the table below, find point estimates, bootstrap standard errors, bootstrap bias estimates, and 95% bootstrap percentile confidence intervals for (a) the population mean μ, (b) the population standard deviation σ, and (c) the population coefficient of variation σ/μ. Please draw at least 1000 bootstrap samples, and please assume that the point estimates are the sample mean $\bar{x}$, the sample standard deviation s, and the sample coefficient of variation $s/\bar{x}$, respectively. Are any of the estimates seriously biased?

7	10	10	10	11
12	12	13	13	14
14	15	22	31	37

2. (To turn in.) Using listing, find the bootstrap distribution of the sample range (maximum minus minimum) if the data are 3, 8, and 10.

3. (Not to turn in.) Continue to work on the course project. I am very interested in meeting with you to talk about your ideas and your progress. Please contact me if you'd like to set up a time.

Note: I will add another problem or two to this assignment based on what we do next week.

Please see the next page for suggestions about the course project.

Course Project Suggestions and Comments:

- If you're doing a data analysis project, please compare your nonparametric results to the results that you would obtain from normal-theory methods. Please also assess whether the assumptions needed for the inference techniques that you use are met or not. Doing some exploratory data analysis (such as plotting the data) is also recommended.
- Each presenter has 15 minutes to present. There will also be time for questions.
- Please practice your presentation to ensure that the amount of material you have is appropriate for 15 minutes. It is quite easy to have too little or too much material. It is better to explain a limited amount of material very well than to explain a lot of material poorly.
- I recommend using a variety of different methods. I also recommend putting your primary focus on methods that will help you answer interesting questions about your data.
- Your target audience is your fellow students, who haven't seen any part of your project yet. Thus, you should definitely provide some background on your data.
- Here are some of the things I'll be looking for in your presentation. (i) Was the data explained clearly? (ii) Were the methods applied correctly? (iii) How interesting was the talk?
- **Due date:** Your two-page executive summary and your slides are due by Monday, July 27.
- You know a lot of methods from other courses. Please feel free to incorporate appropriate techniques in your analysis even if you're not aware of nonparametric alternatives.
- You are welcome to contact me for early feedback on your summary or your presentation.
- I'll be announcing the presentation schedule very soon.