MTH 316 NONPARAMETRIC STATISTICS
Homework #7 (Due Thursday, October 31)

The following exercises are from Chapter 6, pages 191–194.

1. Problem 6.4
2. Problem 6.7
3. Problem 6.15
4. Problem 6.16

5. Consider the CaffeineTaps data in the Lock5Data package.

a. Create a 95% confidence interval for the difference between the mean tapping rates in the Caffeine and NoCaffeine groups using the bootstrap percentile procedure. Comment on your findings.
b. Create a 95% confidence interval for the difference between the mean tapping rates in the Caffeine and NoCaffeine groups using the WMW procedure. Comment on your findings.
c. Create a 95% confidence interval for the difference between the mean tapping rates in the Caffeine and NoCaffeine groups using the t-based procedure. Comment on your findings.
d. Which of the above procedures do you prefer? Please explain.

6. In the Lock5Data package, the dataset Smiles gives data "from a study examining the effect of a smile on the leniency of disciplinary action for wrongdoers. Participants in the experiment took on the role of members of a college disciplinary panel judging students accused of cheating. For each suspect, along with a description of the offense, a picture was provided with either a smile or neutral facial expression. Note, that for each individual only one picture was submitted. A leniency score was calculated based on the disciplinary decisions made by the participants."

a. Graph the leniency score for the smiling and non-smiling groups. Comment on if you can visually detect any difference in the leniency scores.
b. Calculate the mean and standard deviation of the leniencies for each group. Does it seem reasonable that the standard deviation of each group is the same? Please explain.
c. Conduct Levene's test. State the hypotheses and report the test statistic, P-value, and your conclusion.
d. Perform a two-sided two-sample t-test using pooled variance. State the hypotheses and report the test statistic, P-value, and your conclusion.
e. Perform a two-sided permutation test. State the hypotheses and report the P-value as well as your conclusion.