STAT 511: Assignment #3

Spring 2021

Due at the beginning of class on Monday, February 15

Instructions:

- Be neat and show thorough work to support your answers. Points will be deducted if your answer is not adequately supported or the work cannot be readily followed.
- Submit R code and any relevant R output, including figures, tables, tests, etc. If you have any handwritten answers, take pictures and compile into one file before submission.
- Upload a **maximum of two files** to CANVAS.
- This is an **individual** assignment. Collaboration is encouraged, but each person must write up their own solution.

KNN 4th Edition End of Chapter 2 Questions

1. Refer to the GPA problem in HW#1 (Can use R)

(a). Set up the ANOVA table.

(b). What does MSR measure in your ANOVA table? What does MSE measure? Under what condition do MSR and MSE estimate the same quantity?

(c). At $\alpha = 0.05$, conduct an F-test of whether or not $\beta_1 = 0$. State the null and alternative hypotheses, decision rule, and conclusion.

(d). Obtain the R-squared from your regression. Interpret this number.

2. Refer to the Muscle Mass problem in HW#1 (Can use R)

(a). Set up the ANOVA table.

(b). At $\alpha = 0.05$, conduct an F-test of whether or not $\beta_1 = 0$. State the null and alternative hypotheses, decision rule, and conclusion.

(c). What proportion of the total variation in Muscle Mass remains "unexplained" in the regression with Age? Is this proportion relatively small or large?

(d). Obtain the R-squared from your regression. Interpret this number.

3. Refer to the GPA problem in HW#1 (Can use R)

(a). Obtain the Pearson correlation coefficient and attach the appropriate sign.

(b). Obtain the Spearman rank correlation coefficient.

(c). Which correlation coefficient is stronger? Why?

4. Refer to the Muscle Mass problem in HW#1 (Can use R)

(a). Compute the Pearson product-moment correlation coefficient.

(b). Based on Part (a), test whether muscle mass and age are significantly correlated in the population at $\alpha = 0.05$,. State the null and alternative hypotheses, decision rule, and conclusion.

(c). Compute the Spearman rank correlation coefficient.

(d). Repeat the test in Part (b) using the Spearman rank correlation from Part (c).

(e). How do your correlation coefficient estimates and test conclusions in Parts (a) and (b) compare to those obtained in Parts (c) and (d)?