UNIT 12 HW!

1. As part of a study of the effects of predatory intertidal crab species on snail populations, researchers measured the mean closing forces and the propodus heights of the claws on several crabs of three species. The data is in the file crab.csv.

a. Step 1: Use the code from Dr. McGee's lecture to plot a scatter plot of claw closing force versus propodus height, with different plotting symbols (or colors) to distinguish the three different crab species. Judging from an initial visual assessment of the scatterplots, you may apply a transformation and replot in this step. If a transformation is necessary, you only need to provide the scatterplot for the most visually satisfying transformation for now. You will formally assess the fit of the model in Step 4.

b. Step 2: Build a model (simply write it out like we did on the board or like it is done on "Second Step" in the Power Point slide for the life span versus metabolism example.) This model should allow for separate fits (separate lines) for each crab and should also allow for each line to have its own slope.

c. Step 3: Fit the model using SAS. You may simply copy and paste the parameter estimate table similar to the one displayed in the PowerPoint for UNIT 12 "Third Step".

d. Step 4: Provide a residual plot, studentized residual plot, histogram of residuals and qq plot of residuals to provide evidence of the appropriateness of the model. Provide each plot and short 1 or two sentence description of each plot.

e. Step 5: if the fit assessed in Step 4 is sufficient, interpret each coefficient in the model.

BONUS 1pt: How many degrees of freedom were used to estimate the error term (MSE)?

BONUS 1pt: What is the estimate of the MSE?

2. Read the introduction to the Mammal Brain Weight data that starts on page 239 (Section 9.1.2). Download the data set from Blackboard (Brain.csv). We would like to see if gestation length and litter size are associated with brain weight after controlling for different body sizes. That is, we already know that brain size is related to body weight; therefore, we don't want body size to be a confounding variable. We would like to measure the association of the other variables after taking into account the body size.
   Answer this question by forming an analysis by following the 5 steps laid out in the problem above (also listed in the life span / metabolism example in the PowerPoint for UNIT 12.)
   Remember in step 2 to only include the terms that will help you answer this question of interest (QOI).

BONUS 1pt: How many degrees of freedom were used to estimate the error term (MSE)?

BONUS 1pt: What is the estimate of the MSE?