Problem 1 (10 points)

(10 points) In hmw#1 you fitted the linear regression of $Y =$ second test score on $X =$ first test score, from the data file scores.mtw.

- Calculate the confidence interval for the mean-second score, and the prediction interval for the second score, at first score = 75 and first score = 120. Interpret and comment.
- Use minitab to produce the 95% confidence and prediction bands about the estimated regression line. Interpret and comment.

Problem 2 (40 points)

Consider the data set in bears.mtw:

1. (10 points) separate male and female bears, and fit two distinct regression lines for $Y=$Weight on $X=$Chest.G. Interpret and comment. In particular, compare the results you obtain for each group with the ones discussed in class for the overall regression. How do the coefficient estimates compare? And the quantitative measurements of the explanatory performance of the regression line? How do the residuals plot compare? After dividing in two groups, are there still curvature and/or non-constant variance problems?
2. (15 points) Do a complete analysis of $Y=$Weight on $X=$Age.
3. (15 points) Do a complete analysis of $Y=$Length on $X=$Age.

"Complete analysis" in 2 and 3 means:

start with a regression line for the whole group, and
A. fit the model, interpret and comment on the results.
B. produce residual plots (and/or other diagnostics), interpret and comment on the results.
Now repeat iteratively A and B for the models that are suggested by the analysis at each stage (introduce new terms in the regression --functions of $X$ as for example its square?, Transform $Y$? Separate males and females and fit two models? Eliminate some outliers from the analysis? etc.).

In Problem 2 you are not required to calculate or refer to confidence or prediction intervals, but of course you can do it if you want (e.g. if it helps making a point in your interpretations or comments)