Statistics 201 Homework Assignment for Monday, November 18, 2013
Due Wed, November 27th

Use the **Patient Satisfaction** data from Problem 6.15 for this homework.

1. There are three predictor variables available for this data set: Age, Severity and Anxiety.
    a. Examine all subsets of predictor variables, and determine the best model and the worst model based on adjusted R^2. State what variables are in the best model and the worst model, and give the adjusted R^2 values for these two models.
    b. Repeat Part (a) but choose the best and worst model based on Cp, and show the Cp values for the best and worst models. Is the value of Cp reasonable for the final model you choose? Explain.
    c. Did you choose the same final model in Parts (a) and (b)? If so, use that final model for Part (d). If not, choose one of them to use in Part (d).
    d. For the final model you chose, give the regression equation, and an appropriate residual plot. Comment on whether you think the model is a good fit.

2. Using the same data, do a stepwise procedure using AIC as the criterion for the best model. Start with the full model and work backwards, but remember that "stepwise" allows variables to re-enter once they have been removed. You can read the instruction for how to do this in R in the R Word document labeled "Model Selection in R," or for specific directions, see below. If you are using R Commander, you can do it this way:
    - Fit the full model with all 3 variables; call the model Full
    - Go to the menu Models – Stepwise model selection. Click on AIC, then choose your method.

    To use stepwise in R, once you fit the full model (call it Full), use the command:

    ```
    > stepwise(Full, direction='backward/forward', criterion='AIC')
    ```

    (If you wanted to use only forward selection or backward elimination, you would change the "direction" to include only one of them. You can also use `'forward/backward'` to start with no variables and work forward, instead of working backwards first).
    a. Determine the best model using stepwise regression, starting with all variables in the model. Show your steps and report what model was ultimately selected.
    b. Explain what has been done by R after each of the first two steps.

3. Did you choose the same final model in Problem 1 and Problem 2? If not, explain which method you think gave you the best model. If you did choose the same model, explain whether that would always happen, and if not, which method would give you the best model in general.