Statistics 101 – Homework 5

Due Monday, February 22, 2010
Homework is due on the due date at the end of the lecture.

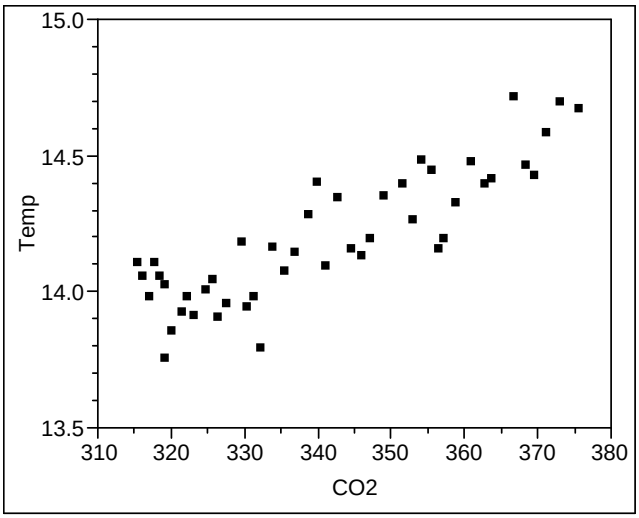
Reading:	February 12 – February 17	Chapter 8
	February 19	Chapter 9
	February 22	Chapter 11

Assignment:

1. Do the following problems from the text, *Intro Stats*, 3rd Edition. If you have an earlier edition of the text, check with someone who has the 3rd Edition to make sure you do the correct problems.

   a) Chapter 8 – problems 1, 3, 5, 7, 9, 13, 14, 21, 22, and 45.
   b) Chapter 9 – problems 3, 4, 9, 11, and 12.

2. A problem on Homework 4 looked at the relationship between global temperatures and the amount of carbon dioxide in the atmosphere. Annual atmospheric carbon dioxide (CO2) concentrations measured as parts per million by volume (ppmv) are derived from air samples collected at Mauna Loa Observatory in Hawaii. Additionally the annual average global temperatures (degrees Celsius) are recorded. Below are a plot and summaries of the data.



CO2 (ppmv), x		Temperature (C), y		
Mean, $\bar{x}$	341.1	Mean, $\bar{y}$	14.2	Correlation
Std Dev, s_x	18.33	Std Dev, s_y	0.242	$r = +0.864$

   a) Calculate the estimate of the slope coefficient for the line of best fit.

b) Give an interpretation of the estimate of the slope coefficient within the context of the problem.
c) Calculate the estimate of the y-intercept for the line of best fit.
d) Why is it inappropriate to give an interpretation of the estimate of the y-intercept given the context of the problem?
e) Give the prediction equation for predicting global temperature from CO2 concentration.
f) In August 2008, the CO2 concentration was 386 ppmv. Using the prediction equation in e), predict the average global temperature.
g) How does your prediction compare to the actual average global temperature of 14.54 C?
h) According to these data, is the increase in CO2 causing the increase in average global temperature? Explain briefly.

3. On homework 4 you used JMP to look at the relationship between the weight and city mpg for a sample of 57 cars selected from the 2004 model year. In this exercise we will look at using weight to predict the city mpg for those cars. Remember weight is the explanatory variable and city mpg is the response. You can find the JMP data table on the course website.

   Use Analyze – Fit Y by X – Fit Line to find the line of best fit between weight and city mpg. From the pull down menu next to Linear Fit in the output window, select Plot Residuals. Use the JMP output to answer the following questions. Be sure to turn in a copy of the JMP output with your assignment.

   a) Give the prediction equation for predicting city mpg given the weight of the car.
   b) Give an interpretation of the estimated slope coefficient within the context of the problem.
   c) Predict the city mpg for a Toyota Camry that weighs 3296 pounds. What is the residual for this car?
   d) Give the value of R^2 and an interpretation of this value within the context of the problem.
   e) What is the value of the correlation coefficient?
   f) Give the value of s_e. Give an interpretation of this value within the context of the problem.
   g) Describe the plot of residuals versus Weight. What does this plot indicate about the appropriateness of the linear model relating weight and city mpg?