L22: Simple Linear Regression

Preparation

Directions: Please fill in Part I as you study the Reading Assignment. Once you finish the reading, complete the questions on Part II. You may use your notes, the key, and the help videos. Be sure to take this completed assignment to your group meeting where you can ask and help answer questions on this assignment.

Problems

Part I: Use the information in the reading assignment to complete these questions.

1. What is simple linear regression? Explain.
2. What is the formula on the Wiki in terms of $\hat{Y}, b_0, b_1$ and X which represents the linear equation used to estimate a line relating the variables X and Y (assuming a linear relation exists between these two variables).
3. For the line: $Y = 1.34 - 2.2X$, what is the slope?
4. For the line: $Y = 1.34 - 2.2X$, what is the Y-intercept?
5. Using the prediction line above in #4, predict the value of Y for the input value of $X = 5$.

Part II: To answer the following questions, use the Gharial Crocodiles Data in the Wiki under the data link in Course Resources.

6. What is the Explanatory Variable? (You will need to review the section in the Wiki on the crocodiles to answer this question)
7. What is the Response Variable? (You will need to review the section in the Wiki on the crocodiles to answer this question)
8. Create a scatter plot representing the relationship between Head Length and Body Length. Paste your plot below.
9. Use the software to compute the value of the y-intercept in the regression line.
10. Use the software to compute the slope of the regression line.
11. What is the equation for the regression line computed by the software?
12. Use the software to draw the regression line on the scatter plot. Insert the picture of scatter plot with graph of the regression line superimposed over the data.
13. For the observed head length of 51 cm, what is the observed body length? (Look in the data file to find this answer.)
14. Use the regression line you obtained in #2 above to predict the body length based on a head length of 51 cm.
15. Why are the values you obtained in #8 and #9 different? Explain.