Computer Lab Session #2

Load the data set bears.mtw from the Minitab example data sets. Use
File > Open Worksheet > Look in Minitab sample data folder

This contains several variables measured on \( n=143 \) “bear capturing” occasions (but notice that the same bear may have been captured more than once; see columns “Name” and “Obs.n”). We will concentrated on \( y=\)“Weight”, \( x_1=\)“Chest.G” (chest circumference) and \( x_2=\)“Head.W” (head width)

Produce numerical and graphical summaries for \( y=\)“Weight”, \( x_1=\)“Chest.G” and \( x_2=\)“Head.W”. Use
Stat > Basic Statistics > Display Descriptive Statistics
Graph > Histogram, and Box Plot
Stat > Basic Statistics > Graphical Summary

- Do the distributions appear symmetric and bell-shaped, or skewed?
- Are there extreme values or “thick tails” in any of the distributions?

Based on these data, is there evidence that the average weight in the bear population exceeds 160 pounds? You have to set up and perform a test of hypothesis to answer this. Use
Stat > Basic Statistics > 1Sample Z...

Given the shape of the distribution of \( y=\)“Weight” in the data, what makes this testing procedure a good tool to use?

Fit two separate simple regression models for \( y=\)“Weight” on \( x_1=\)“Chest.G”, and \( y=\)“Weight” on \( x_2=\)“Head.W”. Use
Stat > Regression > Regression
Remember to also produce the fitted line plots. Use
Stat > Regression > Fitted Line Plot (“linear”)

- What can you say about the two regressions?
- Do the estimated regression slopes suggest positive or negative relationships? Is there a meaningful interpretation for the regression intercepts? (Practice the language you would use to interpret the regression parameter estimates).
- Between \( x_1=\)“Chest.G” and \( x_2=\)“Head.W”, which appears to be the best predictor for \( y=\)“Weight”? (Address this comparing the coefficients of determination \( R^2 \) of the two regressions).

Consider minimum, maximum and 25, 50, 75 percentiles of \( x_1=\)“Chest.G” on the data (you can look these up from the output of “Graphical Summaries”, for example, although there are several other ways to obtain them in Minitab). Use the estimated regression line for \( y=\)“Weight” on \( x_1=\)“Chest.G” to estimate the mean weight at each of these percentiles. For now, do this simply by using
Calc > Calculator
(Later on we will see how Minitab can produce interval estimates for the mean response as well as response prediction intervals).

- What can you say about these estimates?
- Which are the least reliable and why?