PCB 6466 HOMEWORK 4 - ANOVAs DUE MON OCT 7

Instructions

For each question:

a) test assumptions, show results of those tests, and summarize those findings. If transforms are needed, explain and show how those helped.
b) clearly answer the question with the appropriate statistical analysis
c) report needed tables. Graphs are optional but may be helpful
d) provide R code as an appendix
e) submit as a pdf with your name on the first page and in the filename

Questions:

1. Medley and Clements (1998 – see zinc.txt data) studied diatom diversity grouped by different concentrations of zinc in various rivers. Notice that some sites in a river (e.g., the Arkansas River) could have several Zn contaminant levels, coded here as categorical Background, Low, Medium, and High. Use their data to perform a One Way ANOVA of species diversity as a function of different Zn levels. Present your results in both a standard analysis of variance table and a linear model output, and discuss the statistical and biological meaning of your findings (2 points).

2. Swearingen and Holt (1976 – see barley.txt data) performed an experiment with 4 different varieties of barley to test the hypothesis that varieties differ significant in yields. Use a randomized-block ANOVA to test their hypothesis, present your results in a standard analysis of variance table and a linear model output, and discuss the statistical and biological meaning of your findings (4 points).

3. A study was conducted (possum.txt) to test the hypothesis that opossums that had invaded urban Victoria (British Columbia) were larger than opossums from other locations in their native range (e.g., SE US, and other locations). But of course sex and age also affect body size, and need to be included in analyses. Use both skull width (skullW) and total length (totalL) as two separate measures of size. After accounting for sex and age, are Victoria's opossums bigger than those elsewhere? (4 points)