Complete the following questions from your textbook: 12.2, 12.8, 12.10, 13.8

1. This question uses the data on flower length of three varieties of the plant *Heliconia* from exercise 12.27 on page 759 of your textbook. The data are in Assign6_1.csv.
   a. Conduct a complete exploratory analysis of the flower length data for each of the three plant varieties. Comment on any problems you see proceeding with a formal analysis of variance.
   b. Construct a boxplot of the data (flower length is the response and plant variety is the factor). Comment on what the boxplot tells you.
   c. Complete an analysis of variance flower length. What is the F-test telling you?
   d. Analyze the residuals from the model fit in c. Any potential issues with assumptions?
   e. Find P-values for the three possible mean comparisons using the Bonferroni procedure. Which of the mean flower lengths appear to be different? Using a “Bonferroni-based-t-statistic” find a 98% two-sided confidence interval for the difference in mean flower length between the red and yellow plant varieties.
   f. Practically speaking, do you think that moderate nonconformance to assumptions will invalidate the conclusions you reach.

2. This question uses the plant nitrogen data from exercise 13.31 on page 798 of your textbook. The data are in Assign6_2.csv.
   a. What are the two factors? What are the levels of the two factors? How many observations are available for each treatment combination?
   b. Construct three (3) boxplots (three separate graphs). Percent nitrogen is the response for each graph. Two of the graphs should use the two factors individually. The third graph should use the two factors simultaneously. Be sure the two factors are each being recognized as factors by R. Comment on what you learn/conclude from each graph and any difficulties interpreting the graph.
   c. Find variances for each level of each factor individually (I values for the first factor, J values for the second factor). Does unequal variance seem like it is an issue?
   d. Construct an interaction plot for the data. Judiciously choose the factor that appears on the x-axis. Summarize what you learn from this plot.
   e. Complete an analysis of variance of the full dataset. Interpret the results (significance tests) in terms of each factor and the interaction. In the presence of a significant interaction, give specific meaning to the two main effects. Refer to your interaction plot as well.
   f. Conduct a residual analysis (two graphs – residuals versus fitted and normal probability plot of residuals) and interpret.
   g. Two of the plant species have fairly similar mean responses and exhibit the same general trend as water level is increased. Create a new dataset (e.g. using the subset function) that just includes those two species (but all their data). Repeat the analysis of variance in e. Did anything change?