

Instructions: For Problems 8.7, 8.31, and 8.35, I want you to do a “complete” one-way classification analysis of each data set (there are two data sets in Problem 8.35). By “complete analysis,” I want you to follow these steps. Don’t pay attention to the parts in OL. All of the R code I use for examples in the notes is online. Also, note I haven’t analyzed any of the data sets, so I don’t know what any one analysis will look like.

Do the following for each data set:

1. Look at the treatment group data visually. I use boxplots in the notes to do this. Does it look like the variation levels among the groups are similar (don’t be too picky here). Why is this important? If they are vastly different, you might consider performing a transformation and seeing what effect that has on the variation levels; see Example 8.4 (notes).
2. State the null and alternative hypothesis and define all notation you use. Perform an overall F test. You would be silly not to use R to do this (don’t do it by hand!). Report the ANOVA table, overall F statistic, and p-value. Do you reject H_0 ? Identify the rejection region by drawing a picture which indicates when you will reject H_0 (doing this by hand is fine). If you transformed the data in (1), then you will be doing all of your analyses on the transformed scale.
3. If you don’t reject H_0 , then essentially the analysis is done, that is, you cannot conclude there are differences among the population means. Either way, look at the qq-plot of the residuals to assess the normality assumption, even though moderate departures from normality aren’t overly problematic for the F test (robustness).
4. If your overall F test rejected H_0 , then perform a follow-up Tukey analysis by writing simultaneous confidence intervals for all pairwise population mean differences. How do the population means compare? Provide a ranking diagram which shows how the population means are ordered. For Problem 8.35, a central thrust of the analysis is determining whether the two data sets suggest the same population mean ordering (read the problem setup carefully).
5. Finally, write a one paragraph summary of your analysis. This should be a “high level” summary that the general public (e.g., your client) can understand. Don’t get overly technical here. Although you are the technical expert, your job is to convey the technical findings clearly in the context of the problem. Therefore, this should be written in plain English. Your summary for Problem 8.35 should be for both analyses combined.
6. Include all of your R code and output so Cenxiao knows what you are doing.