

Assignment #7 — Due Friday, March 23, 2007, by 4:00 P.M.

Turn in homework in lecture, discussion, or your TA's mailbox. Please indicate the discussion section you expect to attend to pick up this assignment.

311: Tues. 1:00–2:15**312:** Wed. 2:30–3:45**313:** Wed. 1:00–2:15**Many more of you should heed the following and include *much* less computer output!**

Many problems on this assignment require using the computer. Your turned in solutions should not include all of the computer output and graphs that you will produce. Write your solutions and include only sparingly computer output or graphs when necessary to support a point you are making in response to the problem question.

If a problem asks for a graph, provide it. If the problem asks for you to comment about a graph, you do not need to include the graph in your solution.

1. The data set `corn.txt` contains the harvest weight and number of ears of corn collected at eight sites on the island Antigua. Data was collected at four parcels within each site. (This data is also in the `library(DAAG)` with the name `ant111b`.) Here, all treatments are the same, but there are two sources of variation, among sites and within sites.
 - (a) Download the data and make a dotplot of the number of ears by site (variables `ears` and `site`). Visually, do the standard assumptions look okay? Which source of variation is larger?
 - (b) Fit a random effects model of the form $y_{ij} = \mu + a_i + e_{ij}$. Report the grand mean. Make a table showing the sample mean and fitted value for each site. Report the numerical estimates of the standard deviation for each source of variation.
 - (c) Suppose that there was also a parcel V at site WLAN where the data was not recorded, but the corn was grown under the same conditions. Estimate the number of ears of corn in this parcel. Include a standard error with the estimate.
 - (d) Suppose there was also a parcel VI at the same site as parcel V. What is the standard deviation of the estimated difference in the number of ears of corn in parcels V and VI?
 - (e) What is the standard deviation of the difference in numbers of ears of corn between two parcels at a new site on the island?
 - (f) Estimate the mean number of ears of corn on average in the six parcels in a new site (with a standard deviation).

Work to do, but not turn in.

- Read Chapter 10 of the textbook, especially sections 10.3–10.5.
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