For Tuesday:

Topic:	Multiple linear regression
Text:	Chapter 4

Exercises:

1. Pollen Removal 2. Reconsider the study on proportion of pollen removed and duration of visit to the flower for bumblebee queens and honeybee workers, in previous exercise, data set will also be in this weeks' folder. i) Write down a model that describes the mean proportion of pollen removed as a straight-line function of duration of visit, with separate intercepts and separate slopes for bumblebee queens and honeybee workers. ii) How would you test whether the effect of duration of visit on proportion removed is the same for queens as for workers?

2. Kentucky Derby. In the data set Kentucky Derby, is a listing of Kentucky Derby horse race winners from 1896 to 2011. In all those years the race was 1.25 miles in lengths so that winning time and speed are exactly inversely related. Nevertheless, a simple regression model for changes over time - such as a straight line model that include "year" or a quadratic curve that includes "Year" and "Year^2" -might work better for one of those response variables than the other.

   (a) Find a model for describing the mean of either winning time or winning speed as a function of year, whichever works better.

   (b) Quantify the amount by which the mean winning time or speed on fast tracks exceeds the mean on slow tracks (using the two-category variable "Conditions"), after accounting for the effect of year.

   (c) After accounting for the effects of year and track conditions, is there any evidence that the mean winning time or speed depends on number of horses in the race ("Starters")? Is there any evidence of an interactive effect of "Starters" and "Conditions"; that is, does the effect of number of horses on the response depend on whether the track was fast or slow? Describe the effect of number of horses on mean winning time or speed (Data from Kentucky Derby: Kentucky Derby Racing Results, www.kentuckyderby.info/kentuckyderby-results.php (July 2011)).

For Thursday:

Topic:	Oral presentation
Text:	-

Exercises:

1. Male and Female Intelligence. Males and females tend to exhibit different types of intelligence. Although there is substantial variability between individuals of the same gender, males on average tend to perform better at navigational and spatial tasks, and females tend to perform better at verbal fluency and memory tasks. This is not a controversial conclusion. Some researchers, however, ask whether males and females differ, on average, in their overall intelligence, and that is controversial because any single intelligence measure must rely on premises about the types of intelligence that are important. Even if researchers don't make a subjective judgment about type of intelligence being tested, they are constrained by the available tools for measuring intelligence. Mathematical knowledge is easy to test, for example, but wisdom, creativity, practical knowledge, and social skill are not.

   The data set shows several intelligence test scores for random samples of 1,306 American men and 1,278 American women between the ages of 16 and 24 in 1981. The column labeled AFQT shows the percentile scores on the Armed Forces Qualifying Test, which is designed for evaluating the suitability of military recruits but which is also used by researchers as a general intelligence test, The AFQT score is a combination of scores from four component tests: word knowledge, paragraph comprehension, arithmetic reasoning, and mathematical knowledge. The data set includes each individual's score on these components (The overall AFQT score reported here, officially called AFQT89, is based on a nontrivial combination of component scores). How would you graphically display the data? How is this done with R?

2. Comparing Male and Female Incomes, After Accounting for Education and IQ. The data set contains annual income in 2005, intelligence scores (AFQT) measured in 1981, and years of education completed by 2006 for 1,306 males and 1,278 females who were between the ages of 14 and 22 when selected for the survey in 1979, who were available for re-interview in 2006, and who had paying jobs in 2005. Is there any evidence that the mean salary for males

exceed the mean salary for females with the same years of education and AFQT scores? Bu how many dollars or by what percent is the male mean larger?