Basic Data Input

- To get started, you can give students binary data already in the R format.
  - save() one or more R objects to a file (with .rda extension)
  - Put it on a Web site.
- Students use load() to read the data into an R session directly
  - load(url("http://eeyore.ucdavis.edu/ESR2010/bayAreaHousing.rda"))
- *Note the use or url() – it is an example of a "connection", a stream of bytes that come from "somewhere", in this case a URL, but could be a file, another program outputting data, a character string.*

Reading ASCII data

- Have to know how to read standard rectangular data
  - tab separated, comma-separated, etc.
- R has functions for this, i.e.
  - read. table(), read.csv(), etc.
  - read.fwf() for fixed width format.
- For efficiency reasons, very beneficial to use colClasses parameter to specify target type.
- But there are lots of issues.

Strings or factors

- Common "gotcha"
- For better or worse, by default, R turns strings in rectangular data read from an ASCII file into factor objects.
- Use stringsAsFactors = FALSE

Problems in reading

- Quote characters
- Missing values
- Character Encoding
- Comment characters

Interactive code

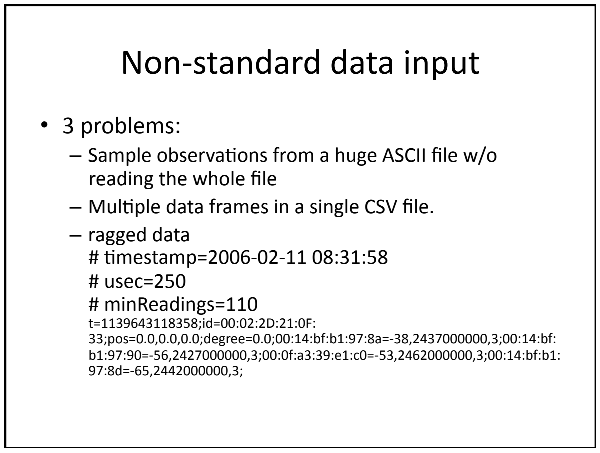
- read.table("~/problemData2",
  quote = "",
  comment.char = "",
  fill = TRUE)

Accessing files - Paths

- Students need to know about working directories (getwd() & setwd())
- This is where the R session is "rooted"
  - all relative file names are relative to this directory.
- Students need to recognize that their code will not work if they move files, change directories, etc.
  - i.e. their code is not runnable and so we cannot help fix things.
- Using URLs makes things universally locatable.

Binary data

- R can read binary data.
- But one has to read the bytes and interpret them based on the actual known format of the data, e.g.
  - read 2 integers
  - then followed by n real numbers where n is the value of the second of the first two integers read, …
- Students should not necessarily deal with this, but be aware of the existence of different binary formats & why they are used (compact representation)



Non-standard data input

- 3 problems:
  - Sample observations from a huge ASCII file w/o reading the whole file
  - Multiple data frames in a single CSV file.
  - ragged data

```
# timestamp=2006-02-11 08:31:58
# usec=250
# minReadings=110
t=1139643118358;id=00:02:2D:21:0F:
33;pos=0.0,0.0,0.0;degree=0.0;00:14:bf:b1:97:8a=-38,2437000000,3;00:14:bf:
b1:97:90=-56,2427000000,3;00:0f:a3:39:e1:c0=-53,2462000000,3;00:14:bf:b1:
97:8d=-65,2442000000,3;
```