

Part 3, Data and Packages: Exercises

1. Read data from various sources into data frames:
 - Directly from the keyboard.
 - Using the data editor `fix()`.
 - From a text file in which the data values are delimited by white space.
 - From an SPSS data set (in a `.sav` or `.por` file) or from some other source supported by the `foreign` package.
 - From an Excel spreadsheet.
2. Explore the properties of various kinds of objects:
 - Create a character vector, a numeric vector, a logical vector, a character matrix, a numeric matrix, a factor, a data frame, a list, and a function.
 - Apply each of the following functions to these objects: `length()`, `class()`, `mode()`, and `attributes()`.
 - Look at the help files for each of these functions – e.g., `?length`.
 - What did you learn?
3. R has a number of “coercion” functions, prefixed with `as.`, and a number of “predicate” functions, prefixed with `is.:` for example, `is.matrix` and `as.matrix`.
 - Get a complete list of these functions via the commands `apropos("^is\\.")` and `apropos("^is\\.")`. *Note:* The quoted arguments to `apropos()` are “regular expressions” – a powerful notation for searching text that will be familiar to Unix users; see `?regex` for how regular expressions are used in R.
 - Using the objects created in the previous exercise, experiment with (for example) the coercion functions `as.matrix`, `as.vector`, and `as.character`, and with the predicates `is.vector` and `is.character`. What did you learn?
4. A general alternative to attaching a data frame to the search path is to use the `with()` function, the first argument of which can be a data frame, and the second argument an expression to be evaluated within the “environment” of the data frame. For example, having read the `Prestige` data frame into memory, but not having attached it to the search path, `with(Prestige, mean(education))` calculates the mean of the variable `education` in the `Prestige` data frame.
 - Perform some computations using `with()`.
 - Look up the help file for `with` – `?with`.
 - What are the advantages and disadvantages of using `with()` instead of attaching a data frame to the search path?

5. If you have an active Internet connection, visit the contributed-packages page of the CRAN web site, <http://cran.r-project.org/src/contrib/PACKAGES.html>. Identify one or more packages that interest you, and install them on your computer via the *Packages* → *Install package(s)* menu in the R Console. Once they are installed, explore the help files for these packages and try out some of the examples; see `?example`. (You can, alternatively, install packages from the workshop CD.)