

36-617: Applied Linear Models

Fall 2019

HW01 – Due Friday Aug 30, 5pm

- Please turn the homework in online in our course webspace at canvas.cmu.edu, under Assignments. Upload one file per person. It can be pdf, doc, docx, or txt, but pdf is strongly preferred.
- Please install the latest version of R on your personal computer using the instructions under the appropriate link in the “Download and Install R” section of <https://cran.r-project.org/>. After R is installed,
 - In your web browser, open <http://www.cs.cmu.edu/~10702/R2/Rintro.pdf> so you can read it. (This is also available in the hw01 folder in the Files area of our Canvas course site.)
 - If you have never used R before, type in all of the examples from Rintro.pdf into R.
 - If you have used R before, read the examples in Rintro.pdf and try to predict what will happen. Type in any examples where you are not sure.
- For the exercises below, please download the course notes *Using R for Data Analysis and Graphics: Introduction, Code and Commentary*, by J. H. Maindonald, Centre for Mathematics and Its Applications, Australian National University ([usingR.pdf](#)), and the accompanying data file ([usingR.RData](#)). You can get these in the hw01 folder in the Files area of our Canvas site.

Save the file “usingR.RData” to whatever directory or folder you will work on this assignment in. Then start R, and use “change directory” under the “File” menu in R (or use the R command `setwd()`) to change to that directory.

Install the “usingR” files with the command

```
> load("usingR.RData")
```

and verify that all the files have been installed with the `ls()` command, as follows:

```
> ls()
[1] "ais"           "anesthetic"    "austpop"       "Cars93.summary"
[5] "dewpoint"      "dolphins"      "elasticband"   "florida"
[9] "hills"         "huron"         "islandcities"  "kiwishade"
[13] "leafshape"     "milk"          "moths"         "oddbooks"
[17] "orings"        "possum"        "primates"      "rainforest"
[21] "seedrates"     "tinting"
```

It is not necessary to do anything else to load individual data files for this assignment, just use the data files as indicated in the MainDonald class notes. If you quit R, save your workspace; R will save your work in a file called “.RData”. If you double-click on the “.RData” file to restart R, all your old work, including the above files, should be accessible again.

Exercises

1. Read & try all of Chapter 1 of Maindonald. You may also need the data file `austpop.txt` which you can also find in the hw01 folder. Then please do and turn in the following exercises:

- (a) Chapter 1, #1.
 - (b) Chapter 1, #2.
 - (c) Chapter 1, #3.
2. Read & try all of Chapter 2 of Maindonald. You will use the data sets you created for Chapter 1, as well as some of the data sets you loaded with “load(usingR.Rdata)”. Then please do and turn in the following exercises:
- (a) Chapter 2, #1.
 - (b) Chapter 2, #2.
 - (c) Chapter 2, #5. Note that the formula for the volume of a sphere didn’t quite come out right in the notes. It is $4\pi r^3/3$. What happens when you type “pi” at the R prompt?
 - (d) Chapter 2, #6.
3. Read & try all of Chapter 3 of Maindonald. Again you will use the data sets you have created or loaded previously. Note that all of the following commands produce graphing windows: `dev.new()`, `x11()`, `windows()` (for MS Windows), `quartz()` (for Macs); and `dev.off()` makes the graphing window go away. Then please do and turn in the following exercises:
- (a) Chapter 3, #1. Note: I personally think `lag.plot(huron$mean.height, do.lines=F)` looks better (and easier to interpret!) than just `lag.plot(huron$mean.height)`.
 - (b) Chapter 3, #3.
 - (c) Chapter 3, #5.

If you encounter anything mystifying in the above exercises, please discuss with me and/or the TA.

Some good online sources for R help:

- QuickR: <http://www.statmethods.net/>
- Cookbook for R: <http://www.cookbook-r.com/>
- Online course: <https://www.datacamp.com/courses/free-introduction-to-r>

...and I’m sure you can find more by Googling!