Statistics 4004: Homework 3

Due Thursday Feb 7, start of class

2019-01-30

For each assignment, turn in by the due date/time. Late assignments must be arranged prior to submission. In every case, assignments are to be typed neatly using proper English in Markdown.

This week, we spoke about Reproducible Research, R and version control, getting, cleaning and munging data and finally, summarizing data. Again, we are focusing on Reproducible Analysis which, for us, is accomplished by mixing code, figures and text into a cohesive document that fully describes both the process we took to go from data to results and the rational behind our data driven conclusions. This week we begin creating tidy data sets. While others have proposed standards for sharing data with statiticians, as practicing data scientists, we realize the often onerous task of getting, cleaning and formatting data is usually in our hands. Again, we will use BitBucket to turn in and retrieve the homework assignments.

Problem 1

Work through the "Getting_and_Cleaning_Data" *swirl* lesson part 3 and "Exploratory_Data_Analysis" *swirl* lesson parts 2, 5 and 7.

From the R command prompt:
install.packages("swirl")
library(swirl)
install_course("Getting_and_Cleaning_Data")
swirl()

Nothing to turn in

Problem 2

Read through the Git help Chapters 1 and 2. https://git-scm.com/book/en/v2

Just good stuff to know, you will NOT be tested on it but may find it helpful if you want a little more Git.

Nothing to turn in

Problem 3

Create a new R Markdown file (file–>new–>R Markdown; author = you, choose PDF).

The filename should be: HW2_pid, i.e. for me it would be HW2_rsettlag.

You will use this new R Markdown file to solve problems 4-7.

Problem 4 [1 point]

Scenario: You are given a dataset and being a good data scientist, import, munge and summarize the data. The summary stats look like so:

Table 1: summary of Anscombe dataset

	x1	x2	x3	x4	y1	y2	y3	y4
mean	9.00	9.00	9.00	9.00	7.50	7.50	7.50	7.50
sd	3.32	3.32	3.32	3.32	2.03	2.03	2.03	2.03

Part A.

What are your initial thoughts?

You proceed with creating a linear model as per your collaborators requirements and get the following coefficients:

Table 2: linear model for x1 vs y1, x2 vs y2, etc in Anscombe data

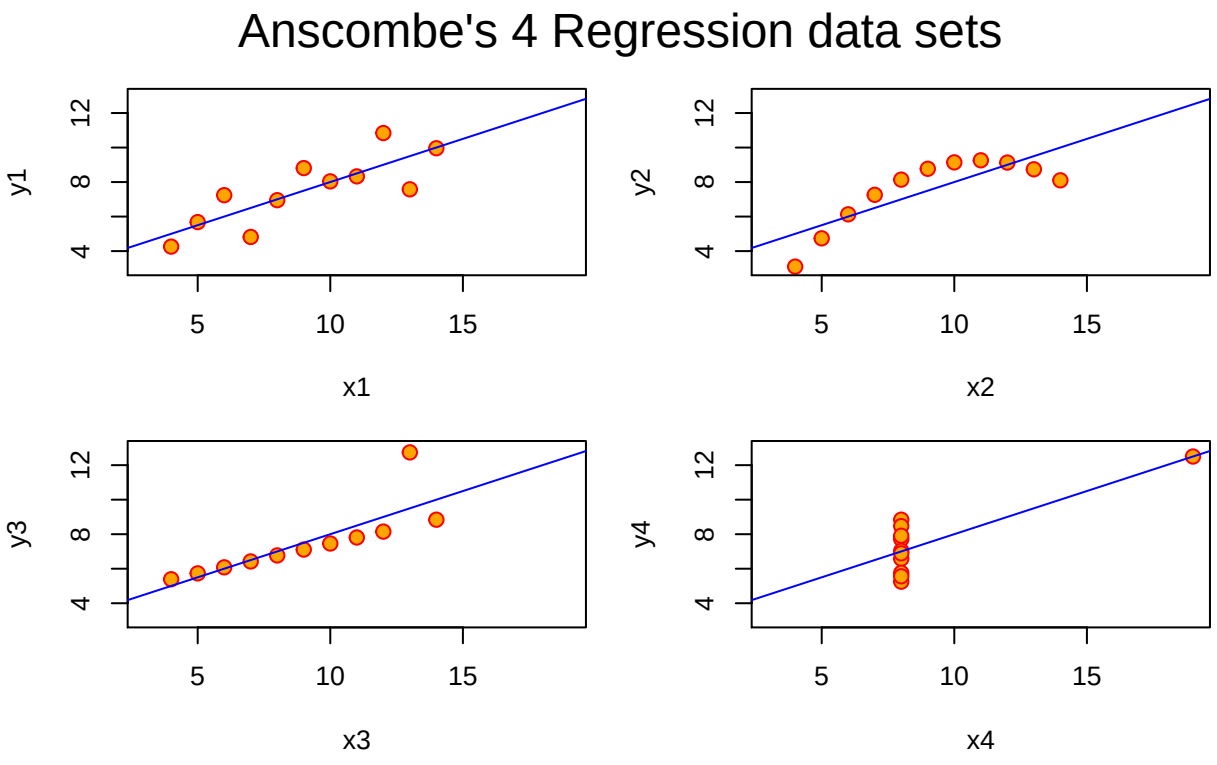
	lm1	lm2	lm3	lm4
(Intercept)	3.0000909	3.000909	3.0024545	3.0017273
x1	0.5000909	0.500000	0.4997273	0.4999091

Part B.

What are your thoughts after seeing the regression coefficient output?

Part C.

You then plot the data to obtain the result shown in Figure 1 below. What is the lesson here?



Problem 5

In these exercises, you will import, munge, clean and summarize datasets from Wu and Hamada's *Experiments: Planning, Design and Analysis* book used in the graduate experiment design class. For each one, please weave your code and text to describe both your process and observations. Make sure you create a tidy dataset describing the variables, create a summary table of the data, note any issues with the data, and create a single plot of each dataset highlighting some feature of the data.

Part A [2 point]

Brain weight (g) and body weight (kg) for 62 species.
http://www2.isye.gatech.edu/~jeffwu/wuhamadabook/data/BrainandBodyWeight.dat
Part B [2 point] Gold Medal performance for Olympic Men's Long Jump, year is coded as 1900=0.
http://www2.isye.gatech.edu/~jeffwu/wuhamadabook/data/LongJumpData.dat
Part C [2 point]

<http://www2.isye.gatech.edu/~jeffwu/wuhamadabook/data/CMM.dat>

Problem 6

Optional Extra Credit [1 point]

Problem 7

Please knit this document to PDF (name should be `HW3_pid`) and push to BitBucket:

In the R Terminal, type:

1. git pull
2. git add HW3_pid.[pR]* (NOTE: this should add two files)
3. git commit -m "final HW3 submission"
4. git push

Grading Rubric:

- 1 points: successfully submitted to BitBucket
- 2 point: Neat, well written document
- 7 points: correct answers to problems as given
- 1 bonus point