STAT 422/722 Spring 2016 Homework #2

Professor Adam Kapelner

Optionally Due *4th floor JMHH* Thursday, February 15 5PM

(this document last updated Wednesday 8th February, 2017 at 11:41am)

Instructions and Philosophy

The problems below are color coded: green problems are considered *easy* and marked "[easy]"; yellow problems are considered *intermediate* and marked "[harder]", red problems are considered *difficult* and marked "[difficult]" and purple problems are extra credit. The green problems are intended to be "giveaways" if you went to class. Do as much as you can of the others; I expect you to at least attempt the purple problems.

This homework is worth 100 points but the point distribution will not be determined until after the due date. See syllabus for the policy on late homework.

Up to 10 points are given as a bonus if the homework is typed using LaTeX. Links to instaling LaTeX and the programs for compiling LaTeX is written about in the syllabus. You are encouraged to use `overleaf.com`. If you are handing in homework this way, (1) upload `hwxx.tex` and `preamble.tex` from the correct github folder, (2) read the comments in the code as there is *one line to comment out*, (3) you should replace my name with your name and (4) your section. If you are asked to make drawings, you can take a picture of your handwritten drawing and insert them as figures or leave space using the "\vspace" command and draw them in after printing or attach them stapled.

The document is available with spaces for you to write your answers. If not using LaTeX, you must print this document and write in your answers. You must print after downloading and opening in Adobe reader (not from Google Chrome viewer). I do not accept homeworks not on the correctly paginated printout of this document. Write your name and section below (A or B).

You may collaborate, but hand in your own copy with your own wording. See the syllabus for more information.

NAME: _____ COURSE (422 or 722): _____

SECTION ("A" for Tuesday or "B" for Wednesday): _____

Problem 1

We will be investigating equivalence testing.

(a) [easy] In the context of linear or logistic regression, if you want to prove that a predictor has a linear effect on the response (controlling for other variables), what are the null and alternative hypotheses?

(b) [easy] In the context of linear or logistic regression, if you want to prove that a predictor does not have a linear effect on the response (controlling for other variables), what are the null and alternative hypotheses?

(c) [easy] You collect four data points

predictor	response
2.47	0.50
0.57	1.95
0.84	1.91
2.18	2.51

Test the theory in (a)

(d) [harder] Test the theory in (b). Use $\delta = 0.5$ as a margin of practical equivalence

(e) [difficult] How can you get both (c) and (d) at the same time? Discuss

Problem 2

We will be investigating dredging and multiple testing corrections.

(a) [easy] Create a dataframe in JMP with one column called Y and ten columns called X1, X2, ..., X10.