

Homework #1

Due 8am EST Tuesday Sept 15, 2020

Econ B2000, MA Econometrics

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This first HW has complicated multiple due dates for different parts, see details below. In general HW are due after each class, where I usually give you night-owls the option of working until 8am the next morning.

Each student should submit a separate assignment, even if it is an identical computer file to the rest of your study group. When submitting assignments, please include your name and the assignment number as part of the filename. Please write the names of your study group members at the beginning of your homework.

1. What are the names of the people in your study group?
2. Work on the Hawkes stats review - you must complete the diagnostic test by end of the day Monday Sept 23.

During class on Monday Sept 15, we'll do experiments on sequences of random numbers. Typically I give out dice in class but obviously not this year. If you have any old dice, then you might enjoy playing with sanding, heating, drilling, gluing, squeezing or whatever to see if you can adjust which numbers come up. If you haven't got dice handy, don't worry! You can also download an app or find a website that gives random numbers (usually integers in an interval). I know, there are ones in R too.

Before class, you should have done about 20 experiments where you roll the dice (or use the app) and record whether the result was a 6 or not. If you've got an app, then drawing integers from interval $[1,6]$ is like fair dice; integers from $[1,5]$ will be rather boring and never produce a 6; but integers from $[1,8]$ or $[1,10]$ will produce 6 but at a lower rate than fair dice.

3. *this is due before class* "Adjust" the dice or play with the random number generator. Can you get them to roll a 6 more or less often than would be expected? How would you know - what is "more often"? Can you write some code in R that will simulate a fair roll?
4. Open up R (on laptop or cloud). Replicate the commands given in the lecture notes *R Basics for Lecture 1* to do some simple stats on the PUMS-NY data. Those notes request that you find average ages for men and women after accounting for the top-coding. Tell me something else interesting, that you learned from the data, for example about educational attainments in different neighborhoods in the city. Are there surprises for you?
5. Differences in means can be complicated. Find the mean return on SP500 index (choose a time period). What is the mean return on days when the previous day's return was positive? When the previous 2 days were positive? Negative? Now read about "hot hands fallacy" and tell if you think that helps investment strategy. (You might start with this tweet (<https://twitter.com/profnoto/status/992466904475455489?lang=en>), and read the papers referenced.)

The dice example is from Andrew Gelman's book on Teaching Stats.