Homework #00 • MATH495/STAT490 • Think Probability!

- please respect page limits.
- submit your write-up Wednesday 10 September (unless indicated otherwise).
- remember that the class e-mail is open for discussion.
- refer to *Guidelines for Reports*.

***) Student Info Sheet** (second copy of form, due 08 September)

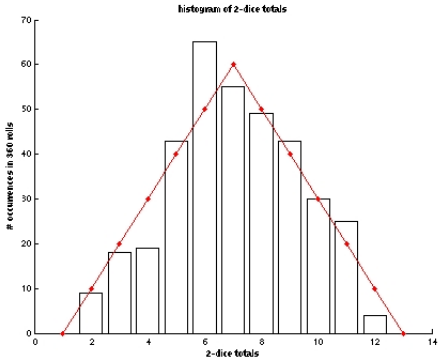
A) Think Probability! ($\leq$1 page, due 08 September) Discover a personal interest in applied probability by researching a topic of individual choice and writing a short two-paragraph essay (in your own words please). The topic can really be anything which raises awareness of the ubiquity of probability or randomness. For instance: a specific probabilistic/random phenomena (brownian motion, acoustics of white noise), a biography (Blaise Pascal, Pierre de Fermat), an application (economics of gambling), or a current socio-scientific concern (stock prices, weather forecasting). **Creativity counts** (for example, choosing one of the above examples is likely not very creative). Include discussion of the mathematical aspects of your topic (especially emphasize those that are quantitative); be specific and state facts. Give references; they can be either print, or web-based (please verify accuracy). You may attach one image. Be prepared to announce your topic in next Monday's lecture.

bonus: Post your essay on the web.

B) Probability Investigations in Matlab (2 pages) Matlab is a computing environment which allows both interactive use and pre-programmed scripts. Plotting is simple. As a first example, download *w01dice.m* from the class webpage. It is a script which simulates many rolls of a pair of standard dice (see webpage for informative links).

The script will produce the histogram below. Play around by editing the file *w01dice.m* to see how it works. If you mess up the file, just download a new copy! Remember, you can get info about command *xyz* just by typing *help xyz* at the Matlab prompt.

Your task here is to modify this script to *load* the dice – that is, reassign the probabilities of the dice to change the probabilities of the dice game *craps*. (See #1.13, Ross.) There is a constraint that you may not change the probability of any side by more than 1/12. By experimentation, what is the best set of identically *loaded* dice you can find for the gambler. What about for the house? You should write on your plots for this problem. State your results clearly and explain the reasoning/strategy behind your explorations.



C) #1.36-38, Ross (1.5 pages) Please give clear written explanations of your solution (full sentences are not necessary, point-form is encouraged).