STA 371G Outline
Fall 2018

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Office Hours: Monday & Wednesday 5:00-6:00 PM. You are welcome to come by my office at other times.

Wednesday, August 29

Topics:

- Introduction
- Probability
- Random variables

Reading Assignments:
You are recommended to read:
Chapter 1 of OpenIntro Statistics, 3rd edition

Wednesday, September 5

Topics:

- Probability distributions
- Mean, variance and standard deviation of a random variable

Reading Assignments:
If you are not familiar with the topics discussed in class, you are recommended to read:
pp. 156-168, 189-195, of Data analysis and decision making, 4th edition
or
pp. 196-206, 225-231 of Data analysis and decision making, 3rd edition

You are also recommended to read:
pp. 1-14 of "1TopicSummary_ProbabilityConceptsAndNormalDistributions.pdf" (available in Canvas/files)

To learn more about these topics, you may further read:
Chapters 2.1, 2.2, 2.4, and 2.5 of OpenIntro Statistics, 3rd edition

Monday, September 10

- Add a constant to a random variable
- Multiply a random variable by a constant
- Independent random variables, sum of independent random variables
- Continuous random variables
- Probability density function: area under the curve represents probability
- Standard normal distribution $Z \sim \mathcal{N}(0, 1)$
- Normal distribution $X \sim \mathcal{N}(\mu, \sigma^2)$

Reading Assignments:

To get familiar with the normal distribution, you are recommended to read:
pp. 211-215, 217-225 of Data analysis and decision making, 4th edition
or
pp. 247-250, 253-260 of Data analysis and decision making, 3rd edition

You are also recommended to read:
pp. 15-30 of "1TopicSummary_ProbabilityConceptsAndNormalDistributions.pdf" (available in Canvas/files)

You may further read:
Chapters 3.1.1, 3.1.2, 3.1.4 and 3.1.5 of OpenIntro Statistics, 3rd edition

Wednesday, September 12

- If $X \sim \mathcal{N}(\mu, \sigma^2)$, then $P(X < x) = P(\frac{X-u}{\sigma} < \frac{x-u}{\sigma}) = P(Z < \frac{x-u}{\sigma})$.
- Standard normal calculations in Excel: NORMSDIST,
  or in R: pnorm (type "?pnorm" in R for help).
- Understand the meaning of the standard deviation σ in a normal distribution: $P(\mu - \sigma < X < \mu + \sigma) =?$ and $P(\mu - 2\sigma < X < \mu + 2\sigma) =?$
- Normal calculations in Excel:
  NORMSDIST, NORMDIST
  NORMSINV, NORMINV
  or in R:
  pnorm, qnorm (type "?pnorm" and "?qnorm" in R for help).
- Standardizing a normal random variable $Z = \frac{X-\mu}{\sigma} \sim \mathcal{N}(0, 1)$
  Interpretation: the value of Z is the number of standard deviations that X deviates towards the left (if $Z < 0$) or the right (if $Z > 0$) of the mean.
- Plot a normal distribution in Excel and R