STAT 221 Winter 2012

Exam 1 Preparation

Logistics:
- Tues Jan 31
- 53 minutes
- Open-notes, open-handouts
  - You may bring anything that I have provided or that you produce yourself
- Bring calculator
  - No computer use
- Handouts 1-10, Quizzes 1-10, HW1-3

Overview:
We have analyzed studies that involve one binary categorical (i.e., yes/no) variable, where the data are a sample (ideally, a random sample) from a population or process

We have studied two primary types of statistical inference:
- Statistical significance, where the goal is to assess the degree to which the sample data provide evidence supporting a research conjecture;
- Statistical confidence, where the goal is to estimate a population parameter with an interval of plausible values.

We have studied two ways to conduct statistical inference in this situation:
- Simulation-based
  - Tactile (e.g., with coins)
  - Technology (e.g., with applet)
- Theory-based
  - Normal distribution
  - When conditions are satisfied

Outline:
- Handout 1: Statistical Investigation Process
  - Observational unit, variable, categorical, quantitative, statistic
- Handout 2: Introduction to Statistical Significance
  - Coin flip model, simulation, reasoning process of statistical significance
- Handout 3: Statistical Tests of Significance
  - Null hypothesis, alternative hypothesis, p-value, strength of evidence
- Handout 4: Tests of Significance with Parameters
  - Parameter, probability
- Handout 5: Sampling
  - Population, sample, sample size, representative sample, generalizability, biased sampling, simple random sampling, sampling variability, precision
- Handout 6: Statistical Inference from Random Samples
- Handout 7: Two-Sided Tests, Interval Estimation
- Two-sided alternative, significance level, test decision, plausible value, confidence interval
- **Handout 8: Normal Approximation**
  - Normal distribution/curve, mean, standard deviation, empirical rule, z-score, theoretical result (normal approximation for distribution of sample proportion)
- **Handout 9: One-Proportion z-Test, z-Interval**
  - Test statistic, technical conditions, standard error, confidence interval, confidence level, margin-of-error, sample size determination, effect of sample size and confidence level
- **Handout 10: More on z-Tests, z-Intervals**
  - Role of sample size, interpretation of confidence level, statistical vs. practical significance, importance of random sampling

**Advice:**

- Organize notes for efficient retrieval of information/formulas
- Don’t plan to use notes too much
  - Prepare as if exam were closed book/notes
  - Focus on understanding, not memorization
  - Be cognizant of time constraint
- Expect similar questions to what we answer in class every day, in quizzes, on HW
- Be prepared to think/explain/interpret
  - Not just plug into formulas
  - Be ready to explain process of how you would do calculations
- Be ready to interpret computer output
  - Possibly exclude irrelevant output
- Read carefully
  - Be sure to answer the question asked
- Take advantage of information provided
  - Perhaps including computer output
- Relate conclusions to context
- Justify/explain your answers
  - Unless you are explicitly told not to bother
- Arrive on time!
- Prepare as thoroughly as you would for a closed-notes exam
  - Re-read handouts
  - Read online chapters
  - Re-work in-class examples
  - Re-work quiz questions
  - Re-work HW questions
  - Come to Mon class prepared with questions
  - Bring questions to office hours (Mon 10:30-11:30)