Exam 1 Preparation

- Logistical details
  - Wed Feb 8
  - 110 minutes
  - Open-book, open-notes
  - Calculator needed

- Coverage
  - Handouts 1 – 7
  - Sections 2.1 – 2.4, 4.2 – 4.3

- Resources available online
  - This preparation sheet
  - Handouts
  - Quizzes and solutions
  - Investigation assignments and solutions
  - Optional exercises from text

- Types of questions to expect
  - Short answer
  - Calculations
  - Interpretations and explanations
  - Similar to handout examples, quizzes, investigations, optional exercises

- Advice for preparing
  - Prepare and organize your notes carefully
  - Don’t study less because it’s open-notes/book
  - Plan not to rely on your notes/book too much
  - Focus on understanding, not memorization
  - Re-read, work through handouts
  - Review quiz, investigation, optional exercise questions
  - Ask questions during office hours
  - Work on practice exam after you fell well-prepared

- Advice during the exam
  - Show up on time!
  - Be cognizant of time constraint
  - Read carefully
  - Write and explain clearly
  - Show details of calculations
  - Relate conclusions to context
  - Do not elaborate excessively
Outline (of most important topics)

- Probability basics
  - Interpretation as long-run relative frequency
    - Approximation by simulation
  - Sample space
    - Event
    - Equal likeliness assumption
  - Counting methods
    - Multiplication rule
    - Permutations
    - Combinations
  - Conditional probability
    - Intuitive idea
    - Formal definition
    - Calculation from probability table
    - Representation in probability tree
  - Independence
    - Intuitive idea
    - Formal definition, multiple ways to check

- Probability rules
  - Complement rule
  - Addition rule
    - For disjoint events, general
  - Multiplication rule
    - General, for two independent events, for many independent events
  - Law of total probability
    - Calculating unconditional probability from conditional ones
  - Bayes’ rule
    - Calculating “reverse” conditional probabilities
    - Using probability table

- Discrete random variables
  - Probability distribution
  - Expected value
    - Calculation
    - Interpretation
    - Decision applications
  - Variance, standard deviation
  - Binomial distribution
    - Conditions
    - Parameters \((n, p)\)
    - Calculations
    - Expected value, variance, SD
    - Statistical significance, p-value
  - Poisson distribution
    - Calculations