CSE 312 Midterm Notes

- Wednesday, February 7 (in lecture)
- Bring **calculator,** handwritten 2-sided note sheet, pencil/pen, eraser, student ID
- There will be a review session on Monday, February 5 at 2:30-4:30pm (location TBD) - please bring questions!

Study suggestions
- Go through online lecture notes, and write down important theorems/concepts on note sheet
    - If you don't understand the notes for a topic, please ask on the Google group or email the course staff! Also, you can check previous quarter's slides or the textbook for alternative explanations (both linked from course webpage).
- **Do lots of practice problems**. Start by doing the "Midterm Review" quiz section worksheet and additional practice problems (linked from the website). Go back and make sure how you know how to solve the section problems. We have also posted many additional problems next to each section worksheet for you to try.
- After studying, test yourself by doing the practice midterms.
- **Please ask your peers or the course staff if you're confused about anything!**
    - Post on the discussion board, or email the course staff. We want you to do well!

Rough list of topics
Counting
- Product rule
- Permutations
    - K-permutations
    - Understand "with vs. without replacement" (whether repeats are allowed)
- Combinations
    - Binomial Theorem
- Complementing
- Inclusion-exclusion
- Pigeonhole principle

Probability
- Basic axioms
- Equally-likely outcomes
- Sample space and events
- Conditional Probability
- Law of Total Probability
- Bayes' Theorem
- Independent Events
- Naive Bayes Classifier

Discrete random variables and expectation
- Definition of random variable
- Independence of random variables
- Probability mass function
- Definition of expectation
- Linearity of expectation
  - Indicator variables
- Variance
  - Definition
  - Theorem: $Var(X) = E[X^2] - (E[X])^2$
  - **If X & Y independent,** $Var(X + Y) = Var(X) + Var(Y)$
  - $Var(aX + b) = a^2 Var(X)$