CSE 312 Midterm Topics

What to bring to the exam
- Calculator, note sheet (8.5”x11”, handwritten or typed, both sides), pencil/pen, eraser, student ID

Study suggestions
- Go through lecture notes, and write down important theorems, definitions, and concepts on note sheet
  - If your class notes aren’t clear, check out previous quarter’s slides or the textbook for alternative explanations (both linked from course web)
  - If you were absent for any lectures, find the lecture notes on the course calendar.
- Do lots of practice problems. Do as many past worksheet problems as you can.
- After studying, test yourself by doing the practice midterms on the course calendar.
- Ask your peers or the course staff if you’re confused about anything.
  - Post questions on the discussion board under the topic “Midterm Exam”.

List of topics
Counting
- Product rule
- Permutations (order matters)
  - k-permutations
- Combinations (order doesn’t matter)
  - Binomial Theorem
- Understand “with vs. without replacement” (whether repeats are allowed)
- Complementing
- Inclusion-exclusion
- Pigeonhole principle

Probability
- Basic axioms and their corollaries
- Sample space and events
- Equally-likely outcomes
- Independent events
- Conditional probability: definition, chain rule
- Law of Total Probability
- Bayes’ Theorem
- Naïve Bayes Classifier

Discrete random variables and expectation
- Definition of random variable
- Probability mass function
- Expectation
  - Definition
- $E[aX+b] = aE[X]+b$, if $a$ and $b$ are constants
- $E[X+Y] = E[X]+E[Y]$
- Indicator random variables

- Independence of random variables
- Variance and standard deviation
  - Definition
  - $Var(X) = E[X^2] - (E[X])^2$
  - $Var(aX + b) = a^2 Var(X)$, if $a$ and $b$ are constants
  - **If $X$ & $Y$ independent, $Var(X + Y) = Var(X) + Var(Y)$**

- Important distributions: uniform, Bernoulli, binomial, geometric, Poisson
  - Know what situations they are used for, their probability mass functions, expectations, variances