Week 4: Discussion

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Probability :: a review of how to approach problems including

- independence :: when one event has no influence on another. ex: flipping two coins (they are independent of one another).
- disjoint probability :: if one event happens, the other cannot (and vice versa). ex: rolling a 2 or a 3 with a die.
- conditional probability :: the most important formula is

  $$P(A|B) = \frac{P(A\&B)}{P(B)}$$

  Rearranging this slightly, the following equation is also important: $P(A\&B) = P(A|B)P(B)$.
- Binomial problems — These problems are when the order of events doesn't matter. For instance, if you flip a coin and want to know the probability of 1 out of 5 M&Ms being red, then you don't care whether the first one is red, just whether the total number of red M&Ms is 1. When order doesn't matter, think binomial probability. When a problem is binomial, identify
  - n — the number of trials.
  - x — the number of successes.
  - p — the probability of a single success in one trial.

  Then the probability of exactly x successes in n trials is

  $$P(\text{exactly } x \text{ of } n \text{ trials}) = \binom{n}{x} p^x (1-p)^{n-x} = \frac{n!}{x!(n-x)!} p^x (1-p)^{n-x}$$
- when you see the words "at least", think about using the complement or breaking it up into a binomial problem.
  for example: P(at least 1 of 3 M&M's is orange) = 1 − P(none of the 3 M&M's is orange)

Review the practice exam posted on Moodle :: Solutions are posted on Moodle.