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CS109

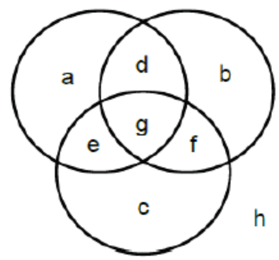
Section #1 Warm-ups

1 Lecture 1, 1-6-20: Counting

The Inclusion Exclusion Principle for three sets is:

$$|A \cup B \cup C| = |A| + |B| + |C| - |A \cap B| - |A \cap C| - |B \cap C| + |A \cap B \cap C|$$

Explain why in terms of a venn-diagram.



2 Lecture 2, 1-8-20: Permutations and Combinations

Suppose there are 7 blue fish, 4 red fish, and 8 green fish in a large fishing tank. You drop a net into it and end up with 6 fish. What is the probability you get 2 of each color?

3 Lecture 3, 1-10-20: Axioms of Probability

For each of the four statements below, evaluate True or False.

$$P(A|B) + P(A^C|B) = 1 \qquad P(A|B) + P(A|B^C) = 1 \qquad P(A \cap B) + P(A \cap B^C) = 1$$

$$P(A) = 0.4 \wedge P(B) = 0.6 \implies A = B^C$$

4 Lecture 4, 1-13-20: Conditional Probability and Bayes

Bayes Theorem is $P(H|E) = P(E|H) * P(H)/P(E)$ where H can be thought of as a hypothesis and E as evidence. This equation can be notoriously counter intuitive. Draw a diagram where $P(E|H) = 1$ and $P(E^C|H^C)$ is close to 1, but $P(H|E)$ is still close to 0. How can we interpret this?