Conditional Probability

CS 3130/ECE 3530:
Probability and Statistics for Engineers

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Notation for Events

- $A \cap B =$
- $A \cup B =$
- $A^c =$

Set Theory Rules

- Associative Law:

- Commutative Law:

- Distributive Law:

- DeMorgan's Law:

Probability Rules

- **Inclusion-Exclusion Rule:**

- **Complement Rule:**

- **Difference Rule:**

Conditional Probability

Meet someone who was born in a long month (31 days) and want to know probability that they were born in a month with letter "r".

Conditional Probability

- Definition:

Conditional Probability

- Definition:

- Multiplication rule for joint probabilities:

Tree Diagram

Samping Without Replacement

I have a box with 10 red balls and 10 green balls. I draw 2 balls from the box without replacing them. What is the probability that I get 2 red balls?

Samping Without Replacement

If I draw 3 balls without replacement, what is the probability that they are all red?

In Class Problem

A fair die is thrown twice. A is the event sum of values is 5. And B is the event that at least one throw is a 2. Calculate $P(A \mid B)$.

In Class Problem

You have two urns, one with 4 black balls and 3 white balls, the other with 2 black balls and 2 white balls. You pick one urn at random and then select a ball from the urn. What is the probability the ball is white?