

# **STAT 3011 Discussion 007**

**Probability: Week 4**

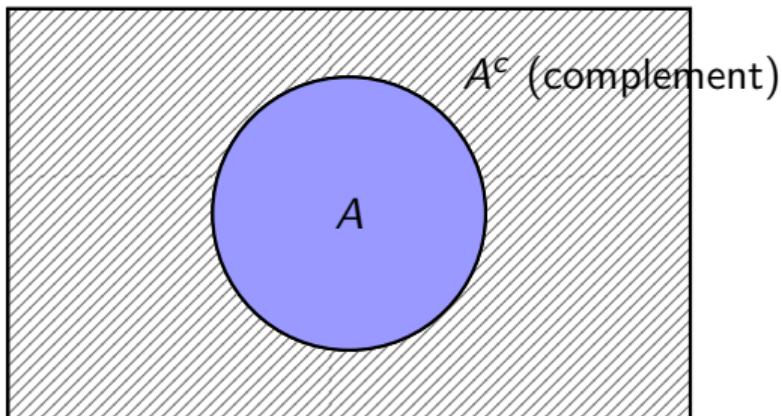
Talha Hamza  
University of Minnesota

**Spring 2025**

# Complement: $A^c$

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$$S = 1$$



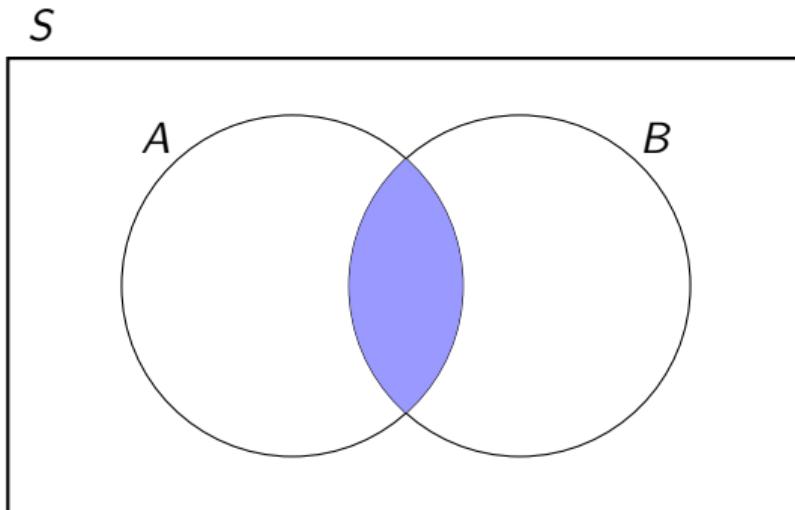
$$P(A^c) = 1 - P(A)$$

$$P(A) + P(A^c) = 1$$

**Complement:** All outcomes in the sample space **not** in  $A$ .

## Intersection: $A \cap B$

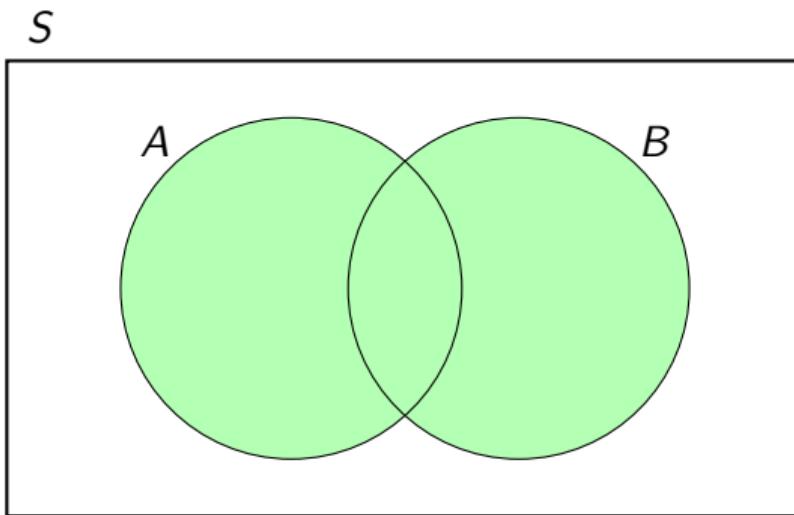
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$A \cap B = \{\text{outcomes in both } A \text{ AND } B\}$

## Union: $A \cup B$

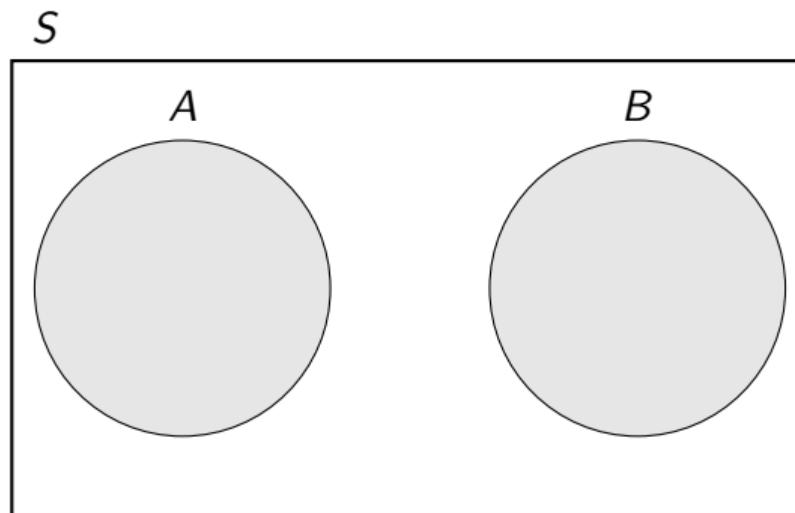
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$A \cup B = \{\text{outcomes in } A \text{ OR } B\}$

# Disjoint Events

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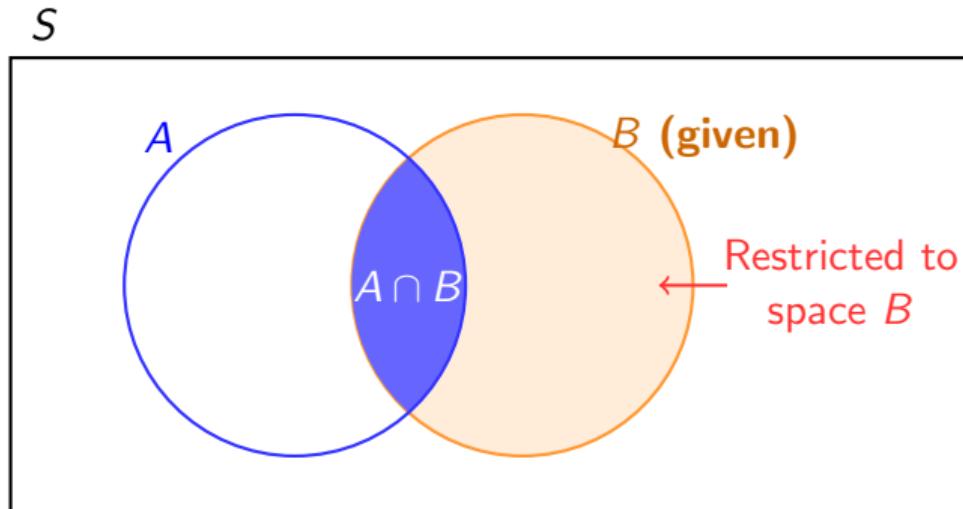


$$A \cap B = \emptyset$$

**Disjoint events** = events that **cannot happen at the same time**

# Conditional Probability: $P(A | B)$

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$$P(A | B) = \frac{P(A \cap B)}{P(B)} \quad \text{where } P(B) > 0$$

# Probability Formulas

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**Addition Rule:**

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

**Independence Rule:**

If events  $A$  and  $B$  are independent, then:

$$P(A \cap B) = P(A) \cdot P(B)$$

**Conditional Probability Formula:**

Read as Probability of event A occurring GIVEN that B has already occurred

$$P(A|B) = \frac{P(A \cap B)}{P(B)} \quad \text{where } P(B) > 0$$

# Questions?

# Office Hours & Contact

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## Office Hours

- Wednesday & Thursdays: 2:30 – 3:30 PM (in-person, Ford Hall 495)

 Email: hamza050@umn.edu