Pre-class preparation

Please read the following textbook sections from Blitzstein and Hwang's *Introduction to Probability* (second edition) **AND** watch the following video:

- Required for all: Textbook section 2.4 (stop before Example 2.4.5)
- Video: Independence

Objectives

By the end of the day's class, students should be able to do the following:

- Explain what is meant by the statement "conditional probabilities are probabilities"
- Define independence of events using set theory notation.
- State in common language how to determine if two events are independent.
- Interpret conditional independence in common language.
- Distinguish between conditional independence and unconditional independence.

Reflection Questions

Please submit your answers to the following questions to the corresponding Canvas assignment by 7:45AM:

1. In Theorem 2.4.2 of the textbook, we see that if $P(A \cap E) > 0$ and $P(B \cap E) > 0$:

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

   If we assume $P(A \cap B) > 0$ and $P(B \cap E) > 0$, provide another formula for $P(A|B,E)$ that is an example of Bayes Rule with extra conditoning.

2. Prove the following: If A and B are independent events, then A^c and B^c are also independent.

3. (Optional) Is there anything from the pre-class preparation that you have questions about? What topics would you like would you like some more clarification on?