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Independant Events

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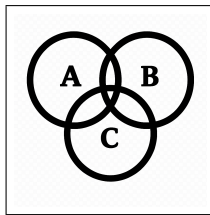


$$S = \{1, 2, 3, 4\}$$

$$A = \{1, 2\}$$

$$B = \{1, 3\}$$

$$C = \{1, 4\}$$



$$P(1) = P(2) = P(3) = P(4) = \frac{1}{4}$$

$$P(A) = P(B) = P(C) = \frac{1}{2}$$

$$A \cap B = \{1\} \rightarrow P(A \cap B) = \frac{1}{4}$$

$$A \cap C = \{1\} \rightarrow P(A \cap C) = \frac{1}{4}$$

$$B \cap C = \{1\} \rightarrow P(B \cap C) = \frac{1}{4}$$

$$\frac{1}{4} = P(A \cap B) = P(A) \times P(B) = \frac{1}{2} \times \frac{1}{2} = \frac{1}{4} \rightarrow A \perp\!\!\!\perp B = \text{👍}$$

$$\frac{1}{4} = P(A \cap C) = P(A) \times P(C) = \frac{1}{2} \times \frac{1}{2} = \frac{1}{4} \rightarrow A \perp\!\!\!\perp C = \text{👍}$$

$$\frac{1}{4} = P(B \cap C) = P(B) \times P(C) = \frac{1}{2} \times \frac{1}{2} = \frac{1}{4} \rightarrow B \perp\!\!\!\perp C = \text{👍}$$



$$S = \{HH, HT, TH, TT\}$$

$$P(HH) = \frac{1}{4}$$

$$P(HT) = \frac{1}{4}$$

$$P(TH) = \frac{1}{4}$$

$$P(TT) = \frac{1}{4}$$

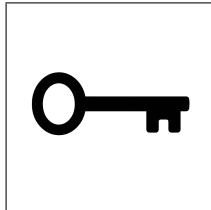
$$A = \{HH, HT\}$$

$$B = \{HH\}$$

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$$P(A) = \frac{2}{4} = 0.5$$

$$P(B) = \frac{1}{4} = 0.25$$

$$A \cap B = \{HH\} \Rightarrow P(A \cap B) = \frac{1}{4} = 0.25$$

$$P(A) \times P(B) = 0.5 \times 0.25 = 0.125$$

$$P(A \cap B) \neq P(A) \times P(B) \rightarrow B \perp\!\!\!\perp C = \text{👉}$$