

## Tutorial 5

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Name: Zhaokun Su

Breakout group: 4

Zid: z5235878

$$P(C) = \sum_{a,b} P(a, b, C)$$

$$= P(A \cap B \cap C) + P(A \cap \bar{B} \cap C) + \\ P(\bar{A} \cap B \cap C) + P(\bar{A} \cap \bar{B} \cap C)$$

$$= P(A) \cdot P(B|A) \cdot P(C|B)$$

$$+ P(A) \cdot P(\bar{B}|A) \cdot P(C|\bar{B})$$

$$+ P(\bar{A}) \cdot P(B|\bar{A}) \cdot P(C|B)$$

$$+ P(\bar{A}) \cdot P(\bar{B}|\bar{A}) \cdot P(C|\bar{B})$$

$$= 0.4 \times 0.8 \times 0.2 + 0.4 \times (1-0.8) \times 0.3 \\ + (1-0.4) \times 0.5 \times 0.2 + (1-0.4) \times (1-0.5) \times 0.3$$

$$= 0.064 + 0.024 + 0.06 + 0.09$$

$$= 0.238$$