

2.5

$$\begin{array}{l} 3 \\ 52 \end{array} \quad B = A_s \bar{A}_c \quad P[A|B] = \frac{P[A \cap B]}{P[B]} =$$
$$P[A|B] = \frac{3}{50} \quad \left. \begin{array}{l} \cancel{\frac{1}{52} \cdot \frac{1}{51}} \rightarrow \frac{3}{50} \\ \cancel{\frac{1}{52}} \cdot \frac{1}{51} \end{array} \right\} = \frac{3}{50}$$

$$a) \quad P[X|A] = 1 - P[X^c|A]$$

$$P[\text{rec } 1 | \text{send } 0] = 0.05 \quad P[\text{send } 0] = \frac{1}{2}$$

$$P[\text{rec } 0 | \text{send } 1] = 0.1 \quad P[\text{rec } 1 | \text{send } 1] = 0.9$$

$$P[\text{send } 1 | \text{rec } 1] = \frac{P[\text{rec } 1 | \text{send } 1] P[\text{send } 1]}{P[\text{rec } 1]}$$

LOTP

$$P[\text{rec } 1] \downarrow \underbrace{P[\text{rec } 1 | \text{send } 1] P[\text{send } 1]}_{+}$$

$$+ P[\text{rec } 1 | \text{send } 0] P[\text{send } 0]$$

$$= \frac{1}{2} (0.9 + 0.05) = \frac{0.95}{2} = 0.475$$

$$P[\text{send } 1 | \text{rec} 1] = \frac{\frac{0.9}{2}}{\frac{0.95}{2}} = \frac{0.9}{0.95}$$

$$P[\text{Send } 1 | \text{rec } 110] = \frac{P[\text{rec } 110 | \text{send } 1] P[\text{send } 1]}{P[\text{rec } 110]} =$$

$$P[\text{send } 1] = \frac{1}{2}$$

$$P[\text{rec } 110 | \text{send } 1] = 0.9 \cdot 0.9 \cdot 0.1$$

1 → 111

$$P[\text{rec } \underline{111} | \text{send } \underline{1}] = 0.9 \cdot 0.9 \cdot 0.9$$

111

110

000

LOTP

$$\begin{aligned} P[\text{rec } 110] &\stackrel{d}{=} P[\text{rec } 110 | \text{send } 1] P[\text{send } 1] + \\ &+ P[\text{rec } 110 | \text{send } 0] P[\text{send } 0] \quad (\approx) \end{aligned}$$

$$P[\text{rec } 110 | \text{send } 0] = 0.05 \cdot 0.05 \cdot 0.95$$

$$\textcircled{2} \quad \frac{1}{2} \left(0.9^2 \cdot 0.1 + 0.95 \cdot 0.05^2 \right) =$$

$$\frac{0.9^2 \cdot 0.1}{2}$$

$$= \frac{1}{2} \left(0.9^2 \cdot 0.1 + 0.95 \cdot 0.05^2 \right)$$

$$= \frac{0.9^2 \cdot 0.1}{0.9^2 \cdot 0.1 + 0.95 \cdot 0.05^2} \approx 0.971$$

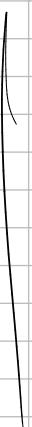
$$P[\text{send 1} | \text{rec 1}] \approx 0.95$$

A

$$P[\text{send 1} | \text{rec 10}] \approx 0.971$$

$$0.95 < 0.971$$

$$1 \rightarrow 1$$



$$1 \rightarrow \boxed{111}$$

(30) A, B, C

Ann 30

$$E_1 = \{A > B\}$$

Bof 25

$$E_2 = \{A > C\}$$

Charlie ???

E_1 indep. E_2
if

$$\boxed{P[E_1 \cap E_2] = P[E_1] P[E_2]}.$$

$$P[E_1] = \frac{1}{2}, P[E_2] = \frac{1}{2}$$

$$P[E_1 \cap E_2] = \frac{1}{4}$$

Sample space



LOTE

(32)

$$a) P[A > B] \stackrel{\downarrow}{=} P[A > B | A=4] P[A=4]$$

$$+ P[A > B | A=0] P[A=0] =$$

$$= 1 \cdot \frac{4}{6} + 0 \cdot \frac{2}{6} = \frac{2}{3}$$

$$P[B > C] = P[3 > C] = \frac{4}{6} = \frac{2}{3}$$

A > B, B > C

$$\text{IP}[A > B, B > C] = \text{IP}[A > 3, C < 3] \quad (=)$$

(i, j) $i \in \{1, \dots, 6\}$

$j \in \{1, \dots, 6\}$

$$\Omega = \{(i, j)\}, |\Omega| = 6^2$$

$\begin{array}{r} 1 2 3 4 \\ \hline 4 4 4 4 6 0 \end{array}$

$\begin{array}{r} 1 2 3 4 5 6 \\ \hline 6 6 1 \underline{2 2 2 2} \end{array}$

$$A > 3, C < 3$$

$$|A > 3, C < 3|$$

$$= \frac{|A > 3, C < 3|}{|\Omega|} =$$

$$\leq \frac{16}{36} = \frac{4}{9}.$$