we have:

$$P(A_1 \cap A_2 \cap \cdots \cap A_{r-1} \cap A_r)$$

$$= P[(A_1 \cap A_2 \cap \cdots \cap A_{r-1}) \cap A_r]$$

$$= P(A_1 \cap A_2 \cap \cdots \cap A_{r-1})\, P(A_r | A_1 \cap A_2 \cap \cdots \cap A_{r-1})$$

$$\Rightarrow \frac{P(A_1 \cap A_2 \cap \cdots \cap A_{r-1} \cap A_r)}{P(A_1 \cap A_2 \cap \cdots \cap A_{r-1})} = P(A_r | A_1 \cap A_2 \cdots \cap A_{r-1})$$

Substituting $r = 2, 3, \ldots, n$ in succession, we obtain:

$$\frac{P(A_1 \cap A_2)}{P(A_1)} = P(A_2 | A_1)$$

$$\frac{P(A_1 \cap A_2 \cap A_3)}{P(A_1 \cap A_2)} = P(A_3 | A_1 \cap A_2)$$

$$\vdots$$

$$\frac{P(A_1 \cap A_2 \cap \cdots \cap A_n)}{P(A_1 \cap A_2 \cap \cdots \cap A_{n-1})} = P(A_n | A_1 \cap A_2 \cap \cdots \cap A_{n-1})$$

Multiplying both sides:

$$\frac{P(A_1 \cap A_2 \cap \cdots \cap A_n)}{P(A_1)} = P(A_2 | A_1) \cdot P(A_3 | A_1 \cap A_2) \cdots P(A_n | A_1 \cap A_2 \cdots \cap A_{n-1})$$

$$\therefore P(A_1 \cap A_2 \cap \cdots \cap A_n) = P(A_1)\; P(A_2 | A_1) \cdot P(A_3 | A_1 \cap A_2) \cdots P(A_n | A_1 \cap A_2 \cap \cdots \cap A_{n-1}).$$

$$x = \langle \underset{\overset{\uparrow}{x_3}}{1}\ \ \underset{\overset{\uparrow}{x_5}}{1}\ \ \underset{\overset{\uparrow}{x_6}}{1}\ \ \underset{\overset{\uparrow}{x_7}}{0} \rangle$$

$$y = \langle y_1, y_2, y_3, y_4, y_5, y_6, y_7 \rangle$$

$$\left.\begin{aligned} y_3 &= x_3 = 1 \\ y_5 &= x_5 = 1 \\ y_6 &= x_6 = 1 \\ y_7 &= x_7 = 0 \end{aligned}\right\}$$

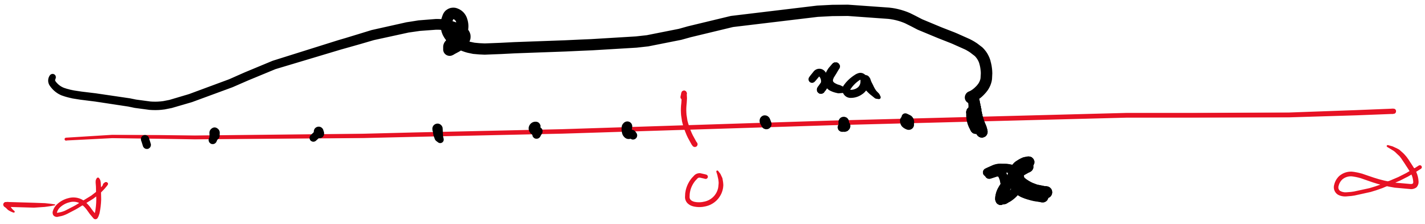
$$y_1 \oplus y_3 \oplus y_5 \oplus y_7 = 0$$

$$\Rightarrow \boxed{\begin{aligned} y_1 &= y_3 \oplus y_5 \oplus y_7 \\ &= 1 \oplus 1 \oplus 0 = 0 \end{aligned}}\ .$$

$$x = x' \oplus \underbrace{\epsilon}_{\text{error tuple}}$$

$$\epsilon = \boxed{x \oplus x'}$$

$$x = i = x_i$$



$$P(-\infty < X \leq x) = F(x)$$

$$\therefore F(x) = P\left[\sum_{a=-\infty}^{i} (X = x_a)\right]$$

$$= \sum_{a=-\infty}^{i} P(X = x_a)$$