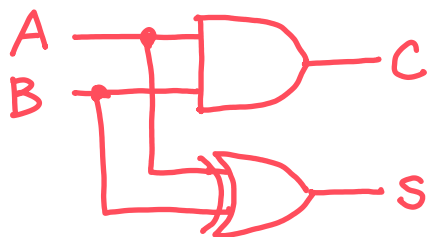


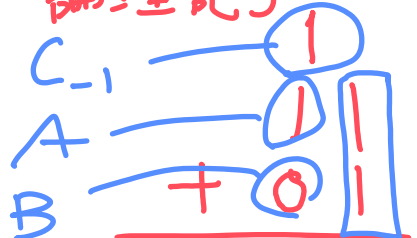
半加算器 (HA: Half Adder) と全加算器 (FA: Full Adder)

半加算器 (HA) の真理値表 (2 進数 1 桁の加算)

入力		出力
A	B	C S
0	0	0 0
0	1	0 1
1	0	0 1
1	1	1 0



論理記号



$$C = A \cdot B$$

$$S = A \oplus B = \bar{A} \cdot B + A \cdot \bar{B}$$

↑
XOR

全加算器 (FA) の真理値表

入力			出力	
A	B	C ₋₁	C	S
0	0	0	0	0
0	0	1	0	1
0	1	0	0	1
0	1	1	1	0
1	0	0	0	1
1	0	1	1	0
1	1	0	1	0
1	1	1	1	1

C₋₁ は桁上げ入力

$$C = \bar{A} \cdot B \cdot C_{-1} + A \cdot \bar{B} \cdot C_{-1} + A \cdot B \cdot \bar{C}_{-1} + A \cdot B \cdot C_{-1}$$

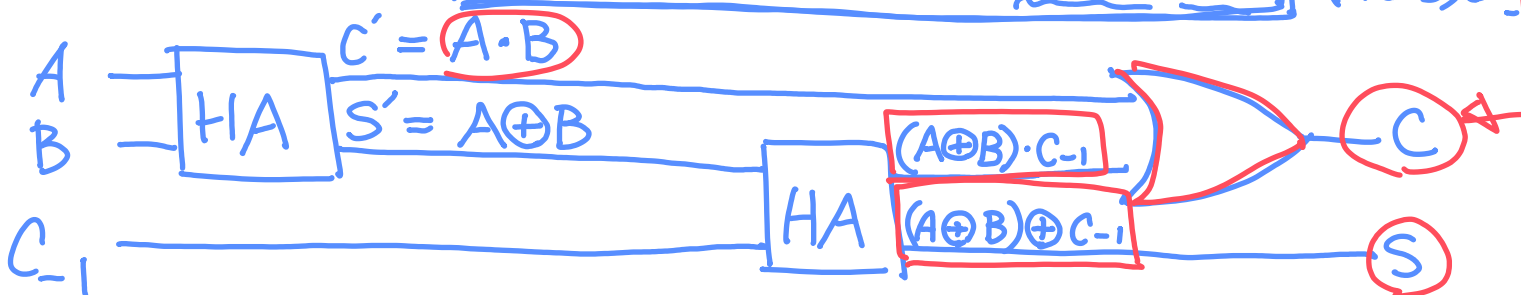
$$S = \bar{A} \cdot \bar{B} \cdot C_{-1} + \bar{A} \cdot B \cdot \bar{C}_{-1} + A \cdot \bar{B} \cdot \bar{C}_{-1} + A \cdot B \cdot C_{-1}$$

$$C = (\bar{A} \cdot B + A \cdot \bar{B}) C_{-1} + A \cdot B (\bar{C}_{-1} + C_{-1})$$

$$C = (A \oplus B) C_{-1} + A \cdot B$$

$$S = (\bar{A} \cdot B + A \cdot \bar{B}) \cdot \bar{C}_{-1} + (\bar{A} \cdot B + A \cdot B) C_{-1}$$

$$S = (A \oplus B) \cdot \bar{C}_{-1} + \overline{A \oplus B} \cdot C_{-1} = (A \oplus B) \oplus C_{-1}$$



→ ここで $A \oplus B = X$ とおき、 $C_{-1} = Y$ とおくと、

$$S = X \cdot \bar{Y} + \bar{X} \cdot Y = X \oplus Y = (A \oplus B) \oplus C_{-1}$$