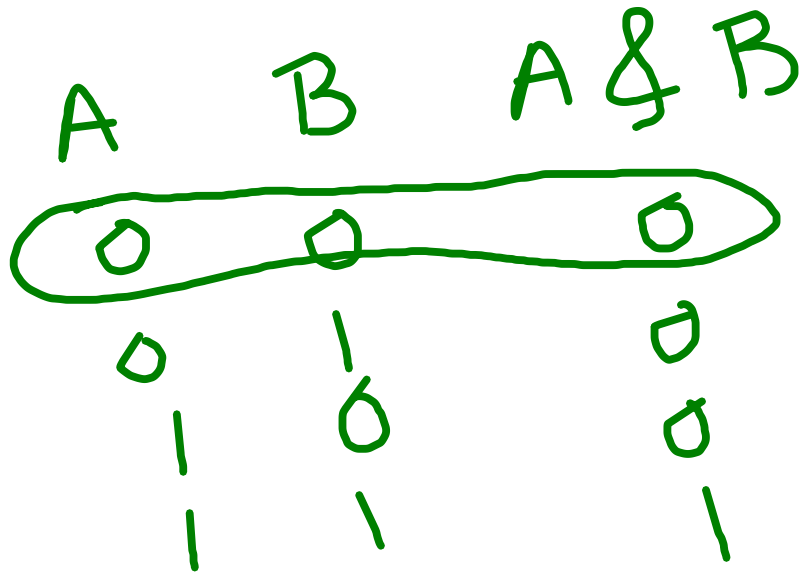


# BITWISE

## OPERATORS

AND



OR

A | B



XOR

A ^ B



NOT >>>

>>> 1  
0

<<<

4 >>> 1

~ 101 → 5

010

= 4 >>> 1 0100

100 → 100 (L)

101 → 1000

-4

1111 1100

-4 >>> 1

-4 >>> 1

-2

100

110

010

$$\begin{array}{r}
 \underline{0110} \\
 i \rightarrow 1001 \\
 + 1 \\
 \hline
 1010
 \end{array}$$

$$\begin{array}{r}
 1010 \\
 8 \overline{) 0100} \\
 \hline
 0000
 \end{array}
 \quad
 \begin{array}{r}
 1 \\
 \hline
 \hline
 \end{array}$$

$$\begin{array}{r}
 0110 \\
 = \\
 i \rightarrow 1001 \\
 + 1 \\
 \hline
 1010 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 1010 \\
 8 \overline{) 0100} \\
 \hline
 0000 \\
 \hline
 \end{array}
 \quad
 \begin{array}{r}
 1 \\
 \hline
 \hline
 \end{array}$$

$$\begin{array}{r}
 x = 5 \quad 00101 \\
 y = 8 \quad 01000 \\
 \hline
 \quad \quad 01
 \end{array}$$

$$\begin{array}{r}
 00101 \\
 01000 \\
 \hline
 01101
 \end{array}$$

$$\begin{array}{r}
 x = x^y \\
 \hline
 y = x^y = 5
 \end{array}$$

$$x = \therefore = 8$$

$$\begin{array}{r}
 x = 01101 \quad 01101 \\
 01000 \quad 00101 \\
 \hline
 00101 \quad 01000 \\
 \hline
 00101 \rightarrow 5
 \end{array}$$

$$\begin{array}{r} \boxed{1011} \rightarrow 11 \\ 1010 \rightarrow 10 \\ \hline \end{array}$$

$$\times 4 (x-1)$$

$$\begin{array}{r} 10000 \\ 801111 \\ \hline 00000 \end{array}$$

$$\begin{array}{r} <1011 \\ 81010 \\ \hline 1010 \end{array}$$

$$\begin{array}{r} 44 \\ - \end{array}$$

$$\begin{array}{r} 4 \\ \hline 011 \\ \hline 100 \end{array} \begin{array}{l} \nearrow \\ \searrow \end{array} \begin{array}{l} -4 \\ \end{array}$$

↕

~ ~ ~

710

$$\begin{array}{r}
 1010 \\
 \hline
 1011 \rightarrow n \\
 \& \\
 1010
 \end{array}$$

$$\underline{\underline{3}}$$

$$n = n \& (n-1)$$

$$n = 1010$$

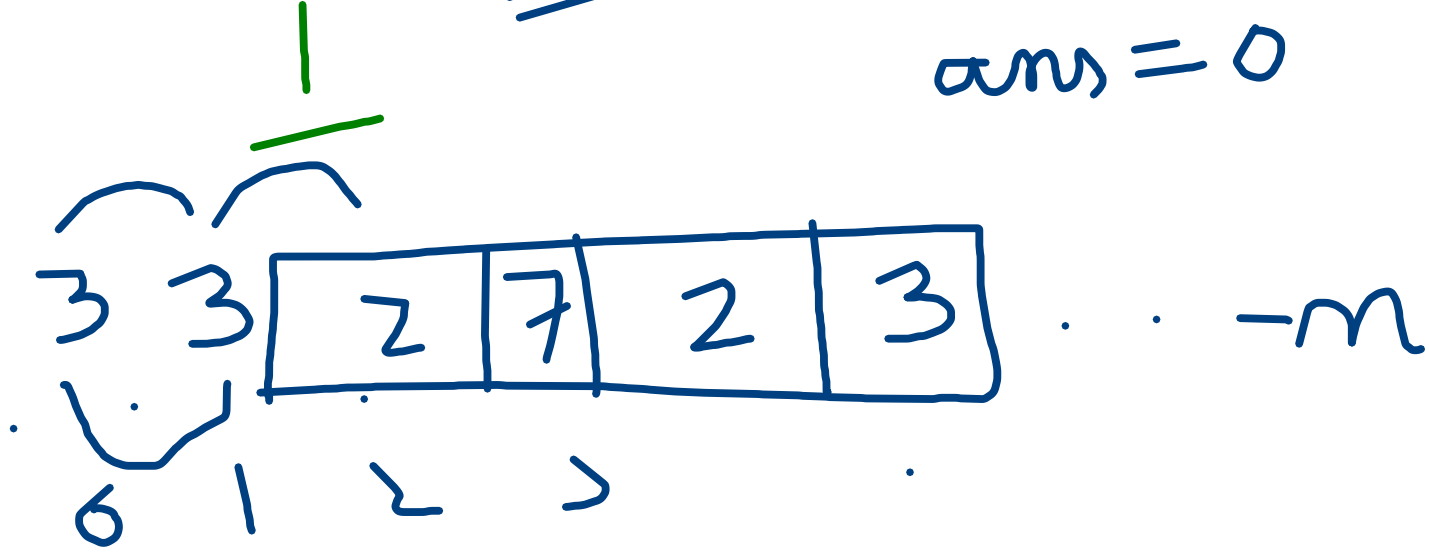
$$\begin{array}{r}
 1010 \\
 \& 1001 \\
 \hline
 1000
 \end{array}$$

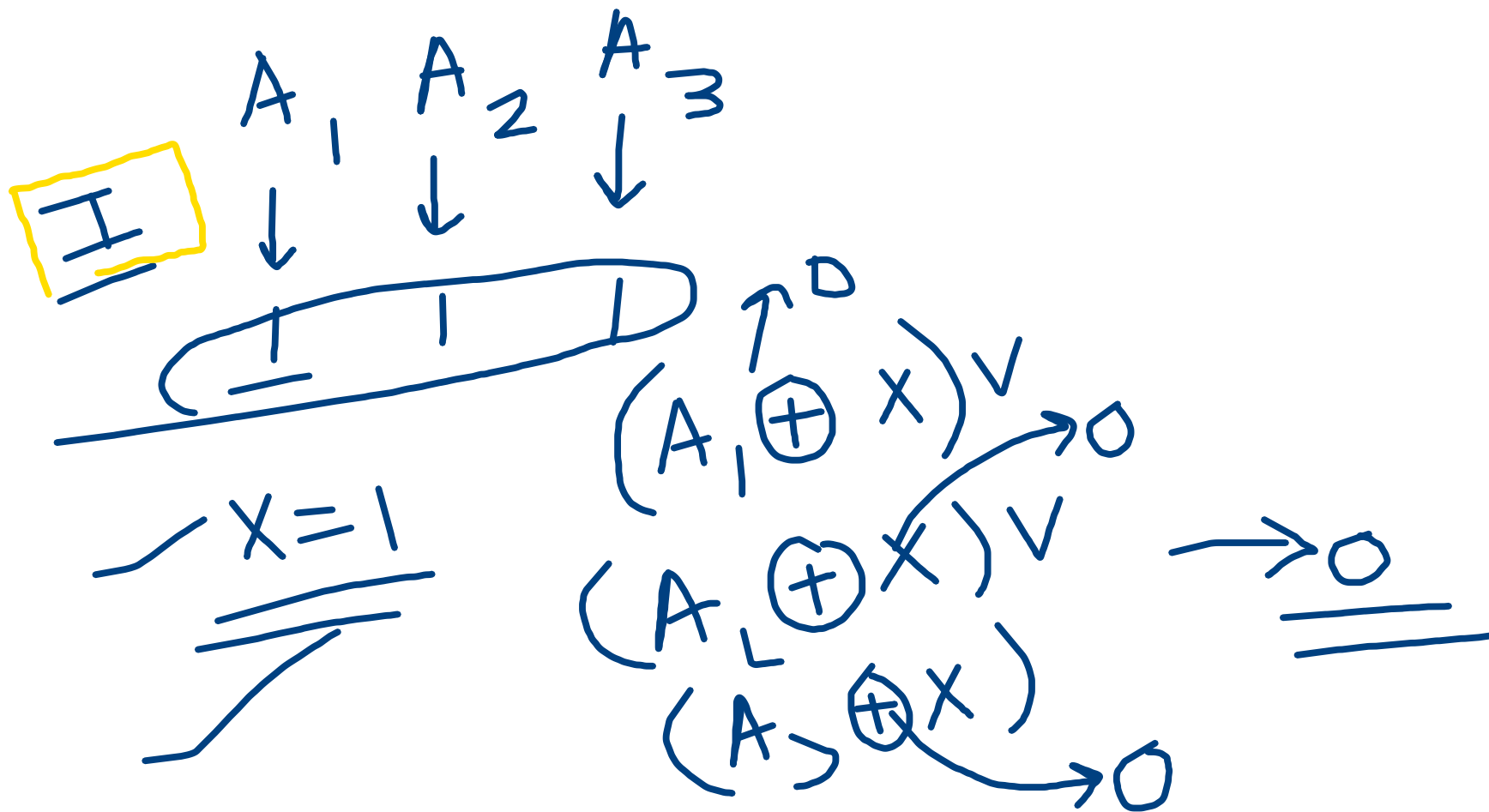
$$\begin{array}{r}
 1000 \\
 \& 0111 \\
 \hline
 0
 \end{array}$$



$$\underline{\underline{0}} \wedge X = X$$

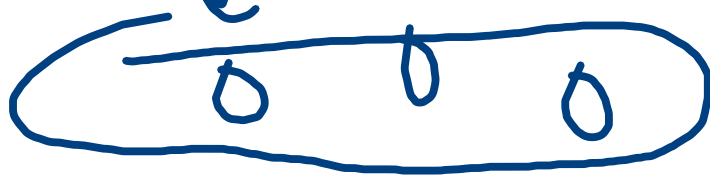
$$ans = 0$$





II

$A_1 \quad A_L \quad A_3$



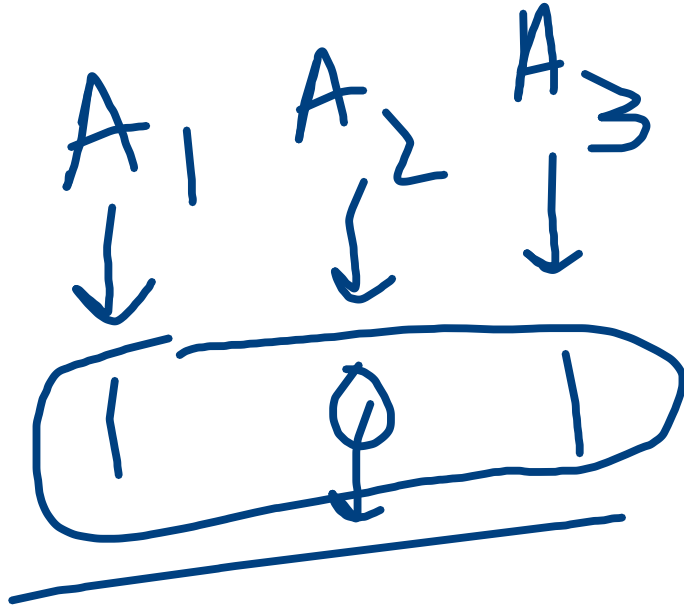
$X=0$

$$(\cancel{0 \oplus 0}) \vee (\cancel{0 \oplus 0}) \vee (-)$$

$= 0$

III

0 OR 1  
OR 0

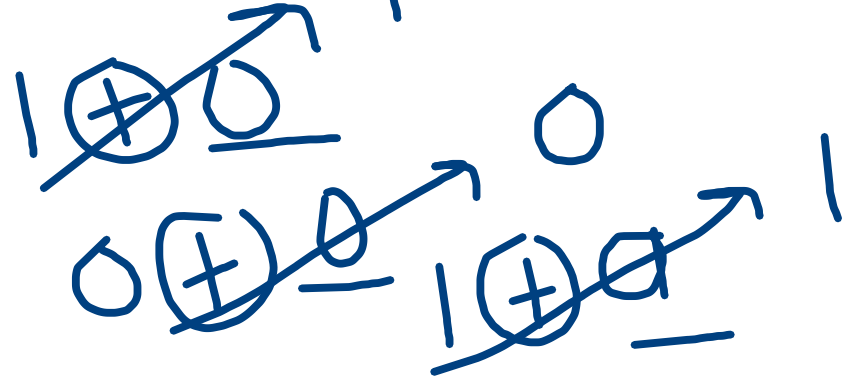


1

1 OR 0 OR 1

$X = 0$

$X = 1$



$$\underline{(A_0 \oplus X) \vee (A_1 \oplus X)}$$

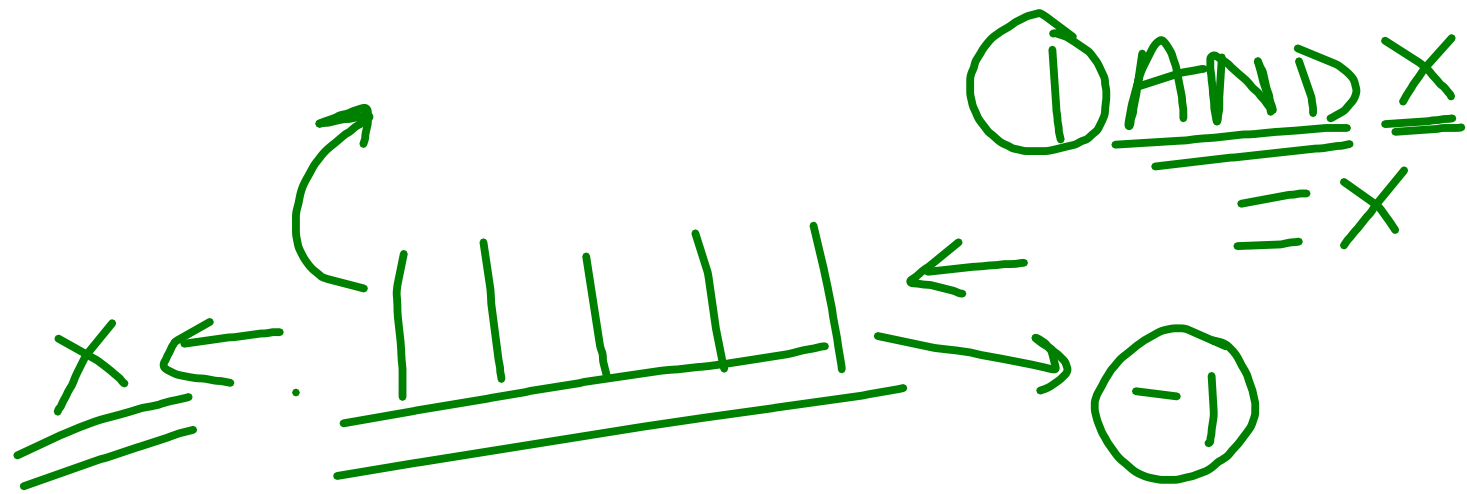


0	0	1	1
1	0	0	1
1	0	1	1

AND

$X = 0001$

1	→ 1	1
0	→ 0	0
0 + 0	→ 1	1
AND	OR	1



$$\underline{\underline{\min = \max}}$$

$$\underline{X = A_0}$$

$$X \text{ AND } A_1$$

$$X \text{ AND } A_2$$

