

Addition, Subtraction

	2's comp	
+ 80	01010000	01010000
- 5	1111011	1111011
+ 75 X	01001011	01001011
		+ 1
+ 25	11110001	01001011
+ 105	01101001	
		1000010

EEL201: Digital Electronic Circuits

Shouri Chatterjee
July-December 2009

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-25 1 1 1 0 0 1 1 0

-105 1 0 0 1 0 1 1 0

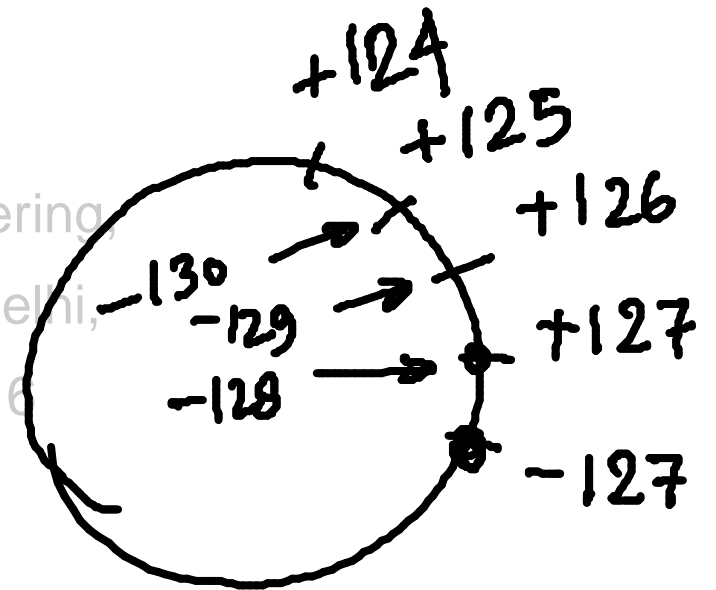
(1) 0 1 1 1 1 0 0

124

-5 1 1 1 1 1 0 1 0

-5 1 1 1 1 1 0 1 0

(1) 1 1 1 1 0 1 0 0



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$$\begin{array}{r} A \text{ (-ive)} \\ \hline \end{array} \quad A_2 = A_1 + 1$$

$$\begin{array}{r} B \text{ (-ive)} \\ \hline \end{array} \quad B_2 = B_1 + 1$$

$$\begin{array}{r} A+B \\ \hline \end{array} \quad (A+B)_2 = A_2 + B_2 = A_1 + B_1 + 2$$

$$(A+B)_1 = (A+B)_2 - 1$$

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$$\begin{array}{r} A \text{ (-ive)} \\ B \text{ (+ive)} \\ \hline A+B \text{ (-ive)} \end{array}$$

$$A_2 = A_1 + 1$$

$$B_2 = B_1$$

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$$\begin{array}{r} A_2 + B_2 = (A+B)_2 = A_1 + B_1 + 1 \\ = (A+B)_1 + 1 \end{array}$$

- 105	10010110
+ 5	00000101
- 100	10011011

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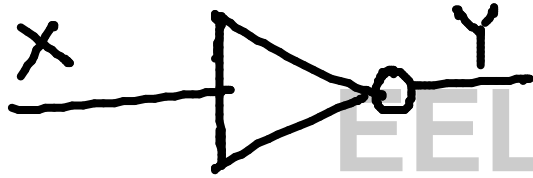
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GATES

NOT



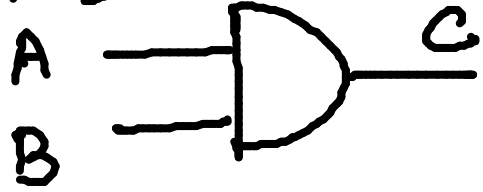
X	Y
0	1
1	0

$$Y = \overline{X}$$

$$X'$$

EEL201: Digital Electronic Circuits

AND



A	B	C
0	0	0
0	1	0
1	0	0
1	1	1

$$C = A B$$

OR



A	B	C
0	0	0
0	1	1
1	0	1
1	1	1

$$C = A + B$$

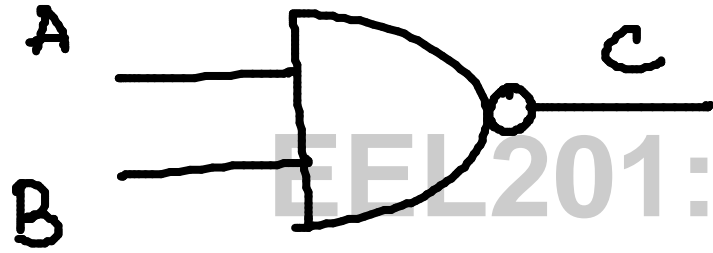
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NAND

NOT-AND

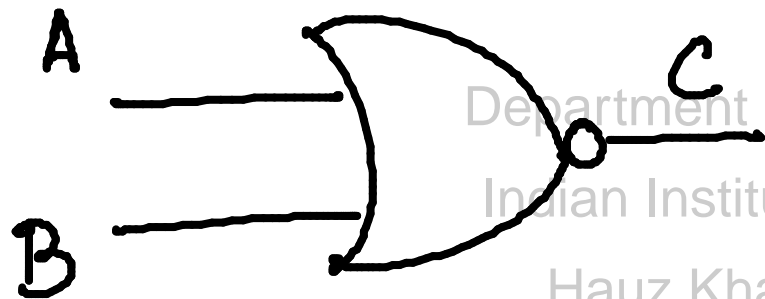


A	B	C
0	0	1
0	1	1
1	0	1
1	1	0

$$C = \overline{AB}$$

NOR

NOT-OR



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

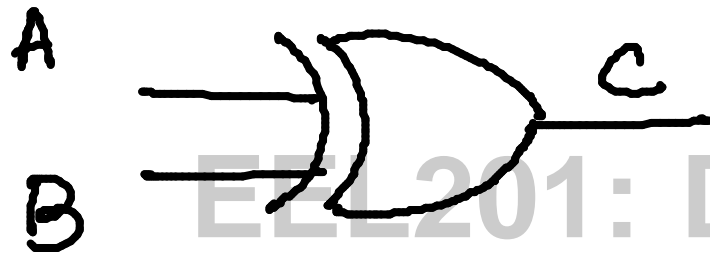
$$C = \overline{A+B}$$

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XOR



A	B	C
0	0	0
0	1	1
1	0	1
1	1	0

$$A \cdot \bar{B} +$$

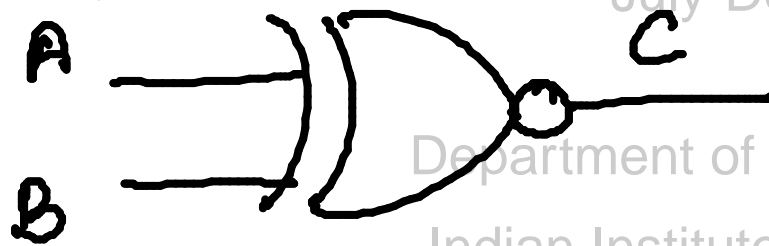
$$B \cdot \bar{A}$$

$$= A \oplus B$$

$$\bar{A}\bar{B} + AB$$

$$= \overline{A \oplus B}$$

XNOR



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De Morgan

$$\overline{A + B} = \bar{A} \bar{B}$$

$$\overline{AB} = \bar{A} + \bar{B}$$

A	B	A+B	$\overline{A+B}$	\bar{A}	\bar{B}	$\bar{A} \bar{B}$
0	0	0	1	1	1	1
0	1	1	0	1	0	0
1	0	1	0	0	1	0
1	1	1	0	0	0	0



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