

# 4 - Logic Gates

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8:17 PM


## LOGIC GATES

- are simple digital circuits working on variables


Gate

Boolean equation


Truth table

• NOT -  Y,  $Y = \bar{A}$


A	Y
0	1
1	0

• BUF  
buffer  Y,  $Y = A$


A	Y
0	0
1	1

• AND  Y,  $Y = AB$


A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1

• OR  Y,  $Y = A + B$


A	B	Y
0	0	0
0	1	1
1	0	1
1	1	1

• XOR  Y,  $Y = A \oplus B$


A	B	Y
0	0	0
0	1	1
1	0	1
1	1	0

• NAND  Y,  $Y = \overline{AB}$


A	B	Y
0	0	1
0	1	1
1	0	1
1	1	0

• NOR  Y,  $Y = \overline{A + B}$


A	B	Y
0	0	1
0	1	0
1	0	0
1	1	0

• XNOR  Y,  $Y = \overline{A \oplus B}$


A	B	Y
0	0	1
0	1	0
1	0	0
1	1	1

• NOR3  Y,  $Y = \overline{A + B + C}$

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

• NAND3  Y,  $Y = \overline{ABC}$

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

• XOR3  Y,  $Y = A \oplus B \oplus C$

Odd Parity (output is 1 if the number of inputs equal to 1 is odd)

Single input Gates

Two inputs Gates

Multiple input gates.

Odd Parity (output is 1 if the number of inputs equal to 1 is odd)