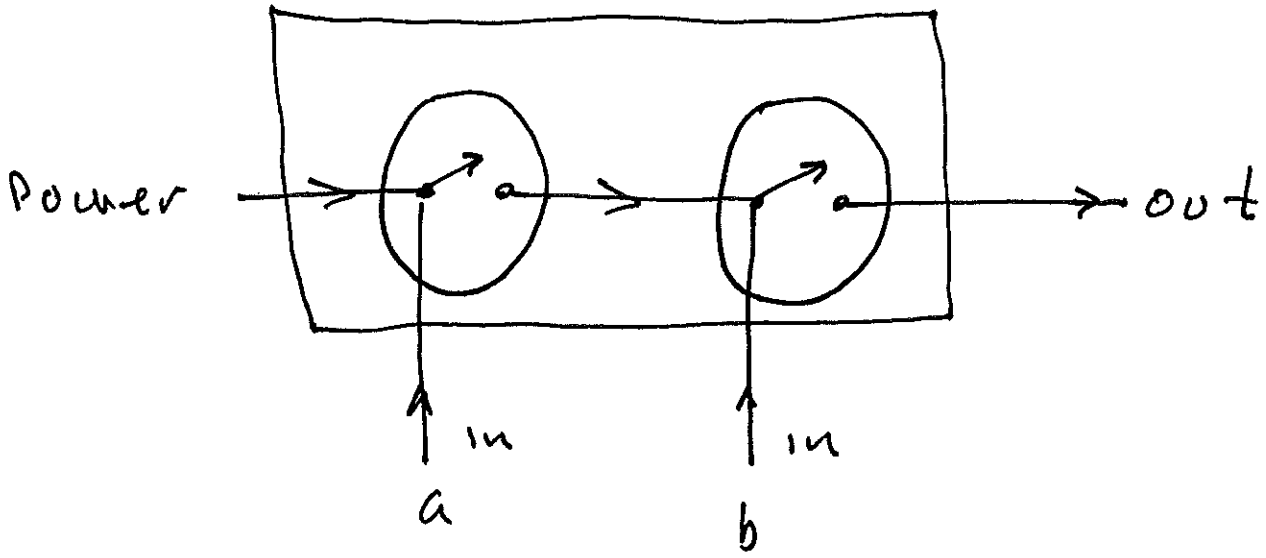
CMPS 10 11-10-09

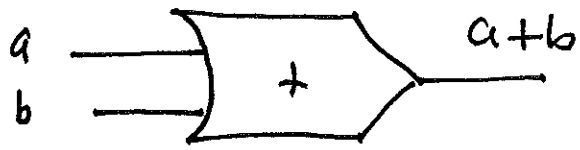
Logic Gates

and

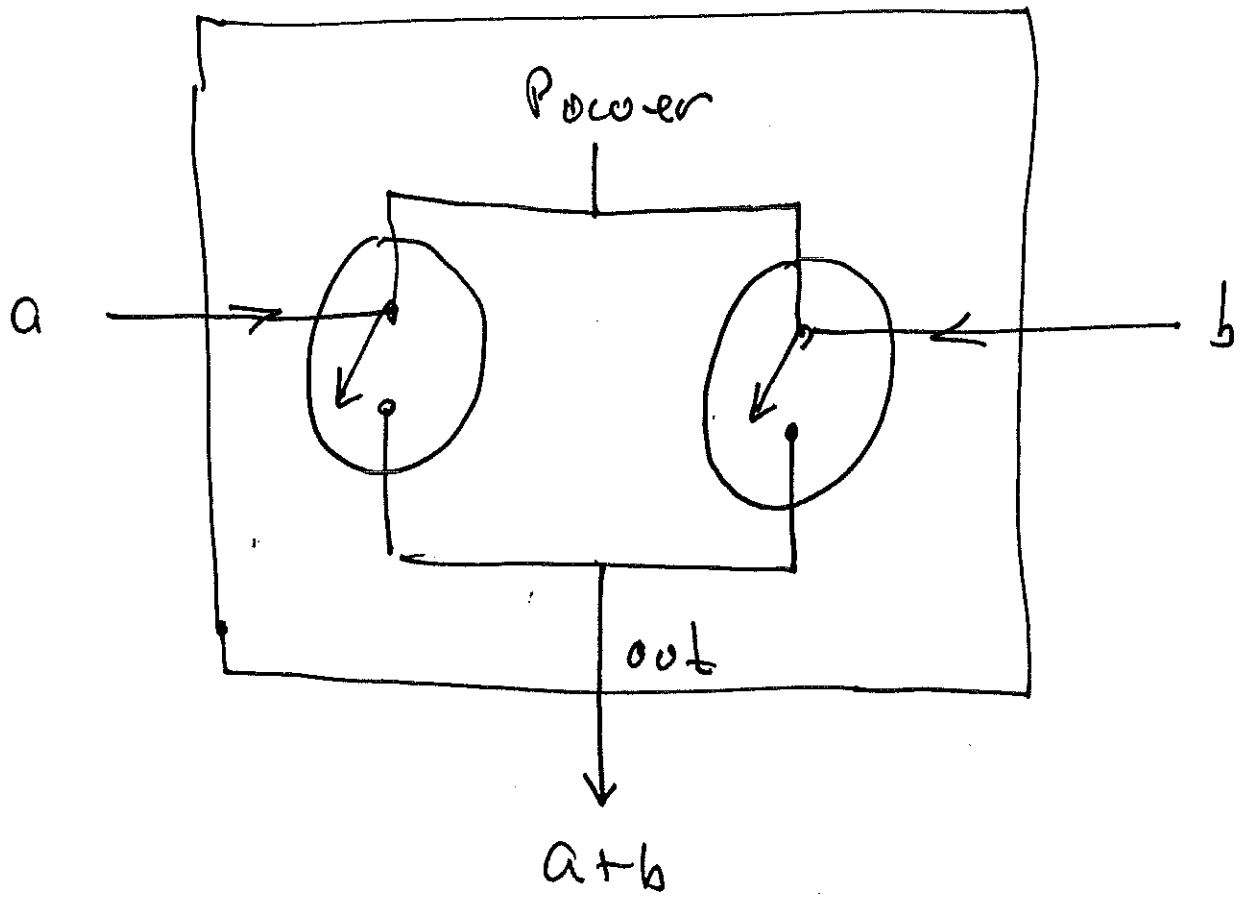
a	b	a · b
0	0	0
0	1	0
1	0	0
1	1	1



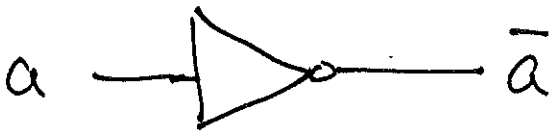
or



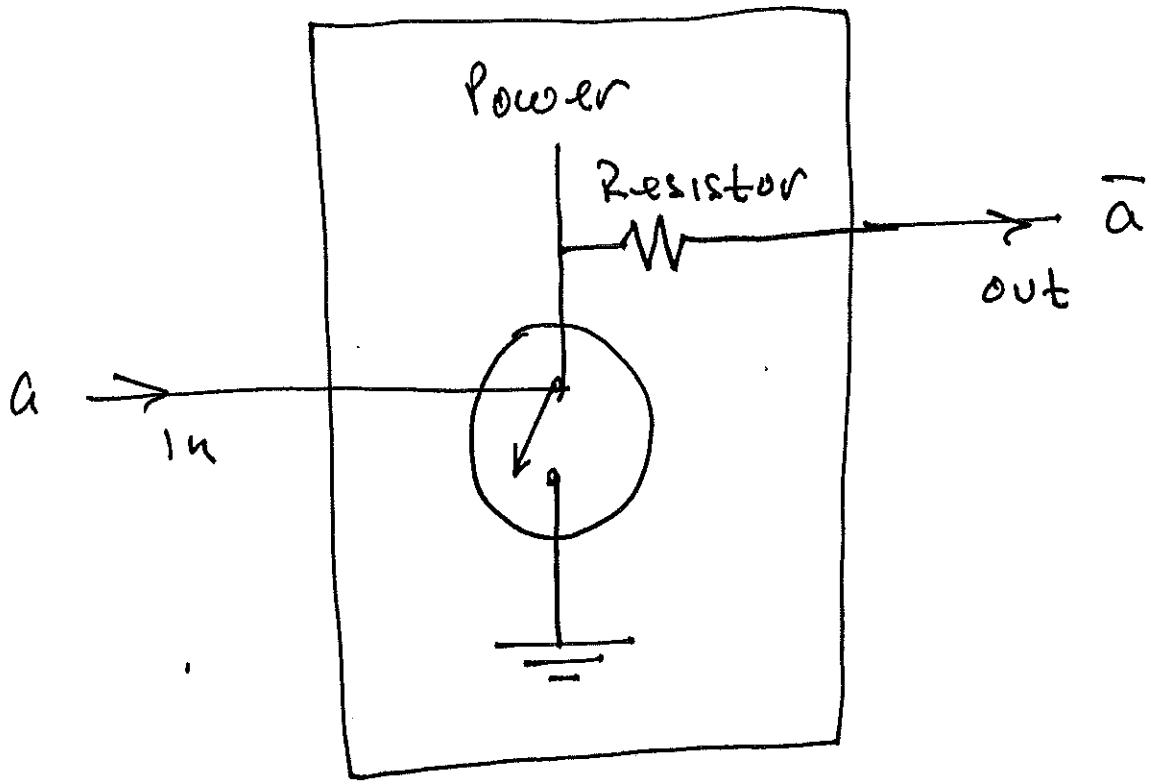
a	b	a + b
0	0	0
0	1	1
1	0	1
1	1	1



Not

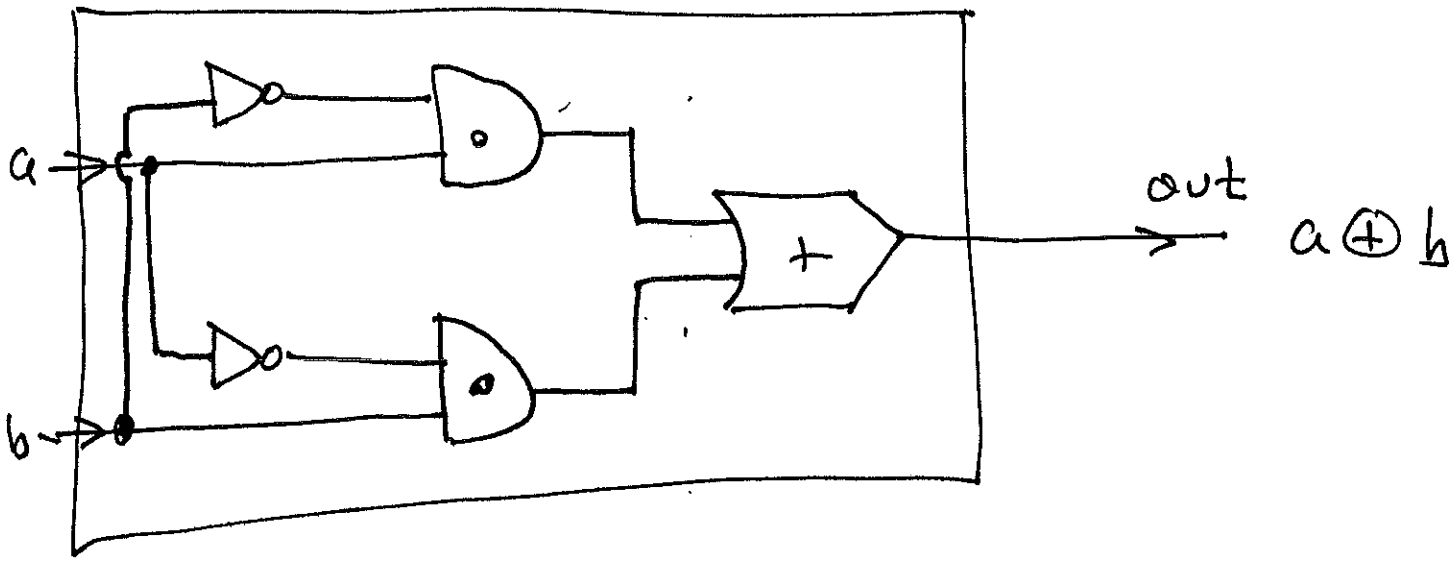


a	ā
0	1
1	0



Recall : exor (symbol $\oplus$)

a	b	$a \oplus b$
0	0	0
0	1	1
1	0	1
1	1	0



$$a \oplus b \equiv (a \cdot \bar{b}) + (\bar{a} \cdot b)$$

Truth Table for $(a \cdot \bar{b}) + (\bar{a} \cdot b)$

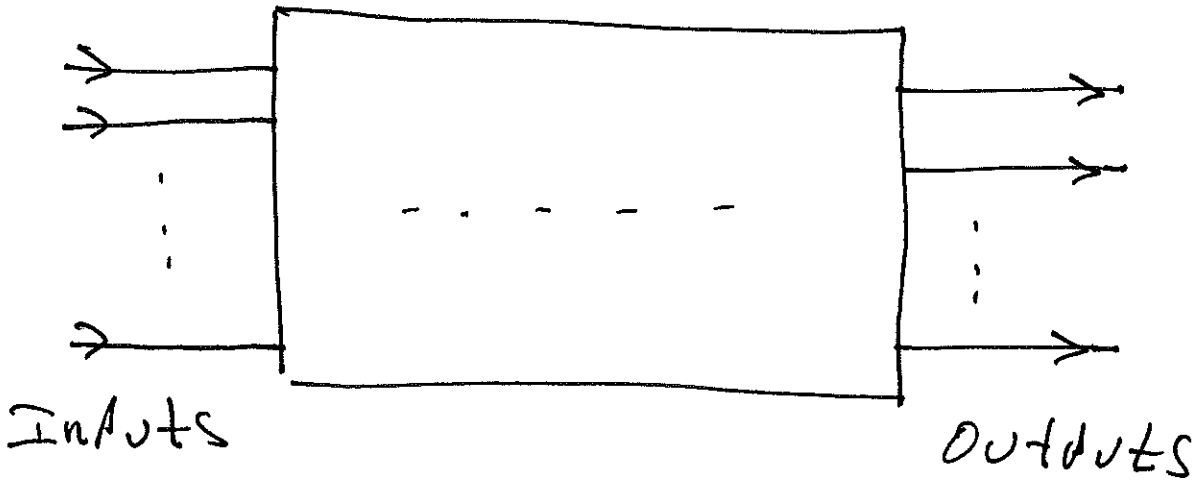
a	b	$\bar{a}$	$\bar{b}$	$a \cdot \bar{b}$	$\bar{a} \cdot b$	$(a \cdot \bar{b}) + (\bar{a} \cdot b)$
0	0	1	1	0	0	0
0	1	1	0	0	1	1
1	0	0	1	1	0	1
1	1	0	0	0	0	0

This Truth Table proves that

$$a \oplus b \equiv (a \cdot \bar{b}) + (\bar{a} \cdot b)$$

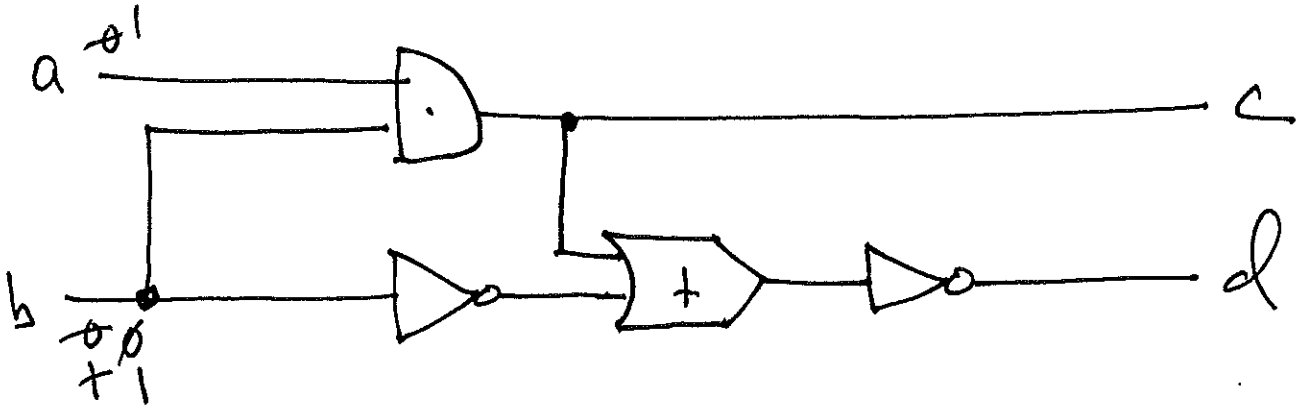
Def: A Combinational Circuit

is a collection of logic gates THAT TRANSFORMS some Binary inputs to some Binary outputs



Require: output Depend on Current Values of inputs.

Ex



TRUTH TABLE:

a	b	c	d
0	0	0	0
0	1	0	1
1	0	0	0
1	1	1	0

note: $c \equiv a \cdot b$

$$d = \overline{(a \cdot b) + \bar{b}}$$