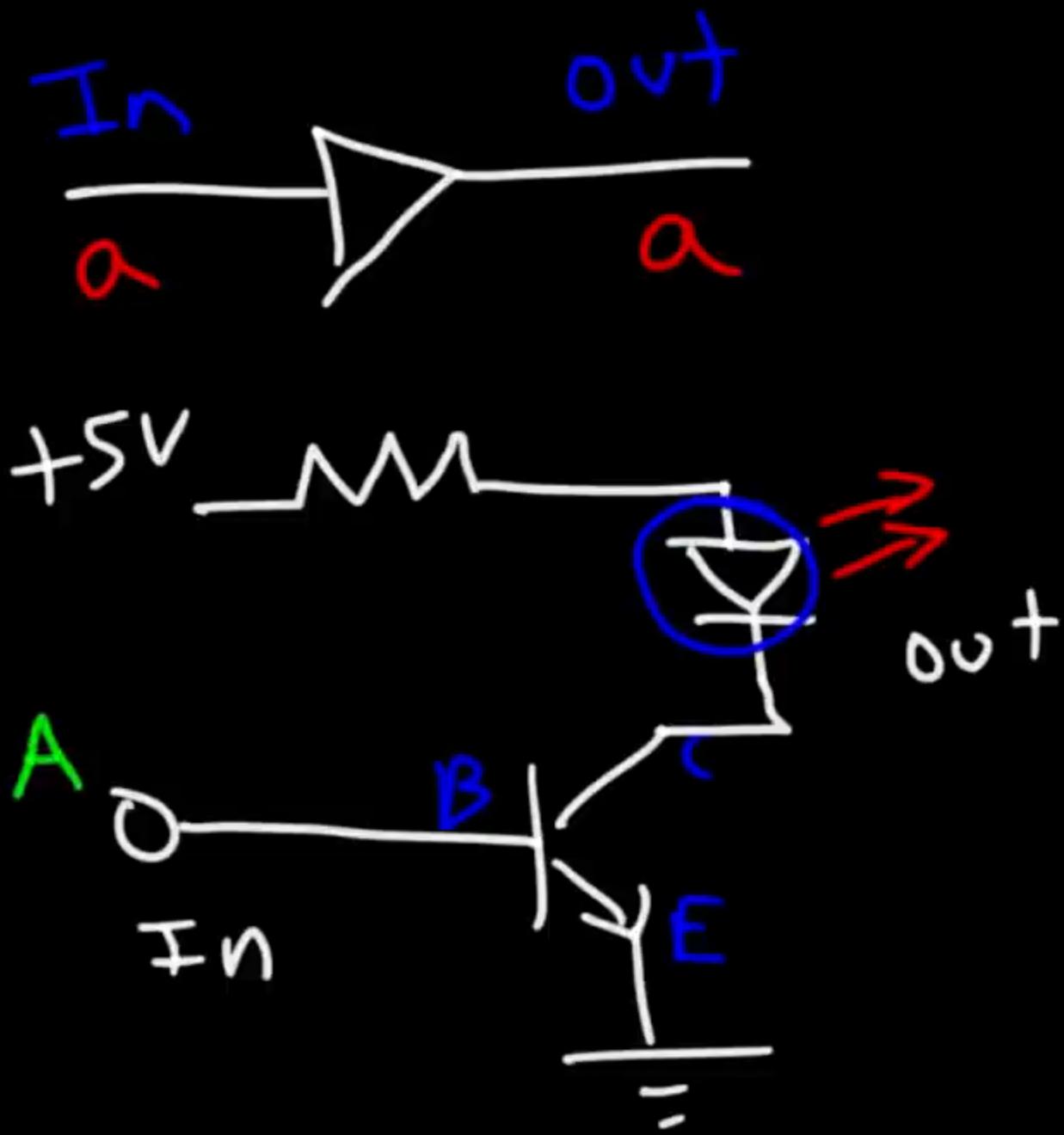


Binary

0 → off

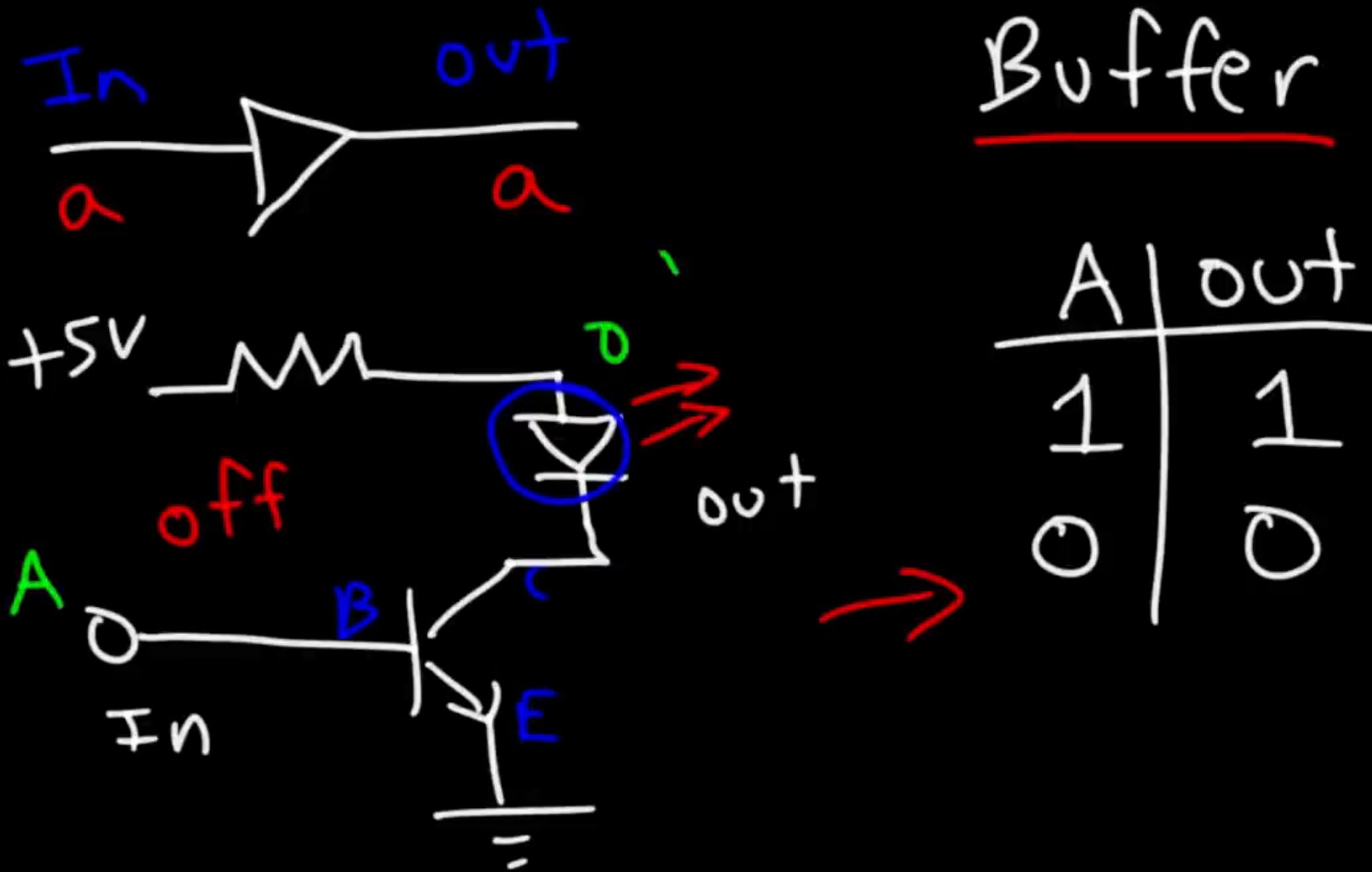
1 → on





Buffer

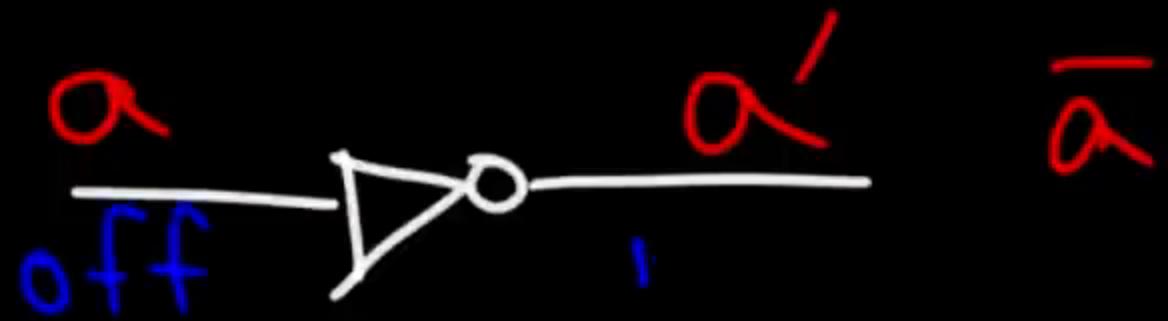
A	out
1	1
0	0



Buffer

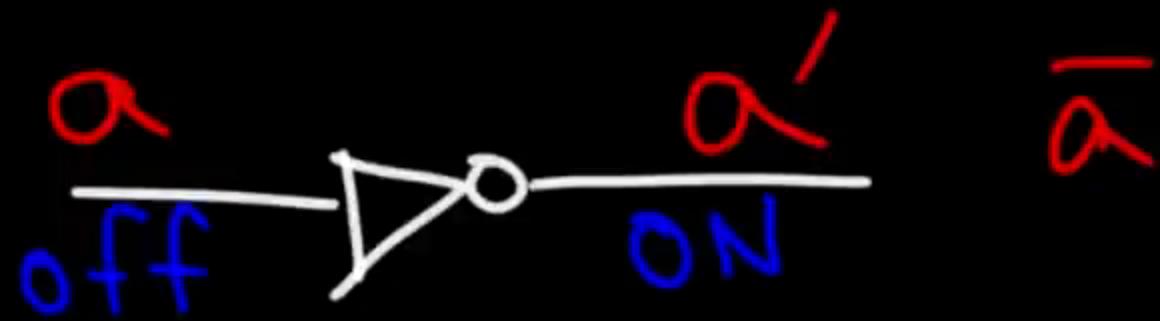
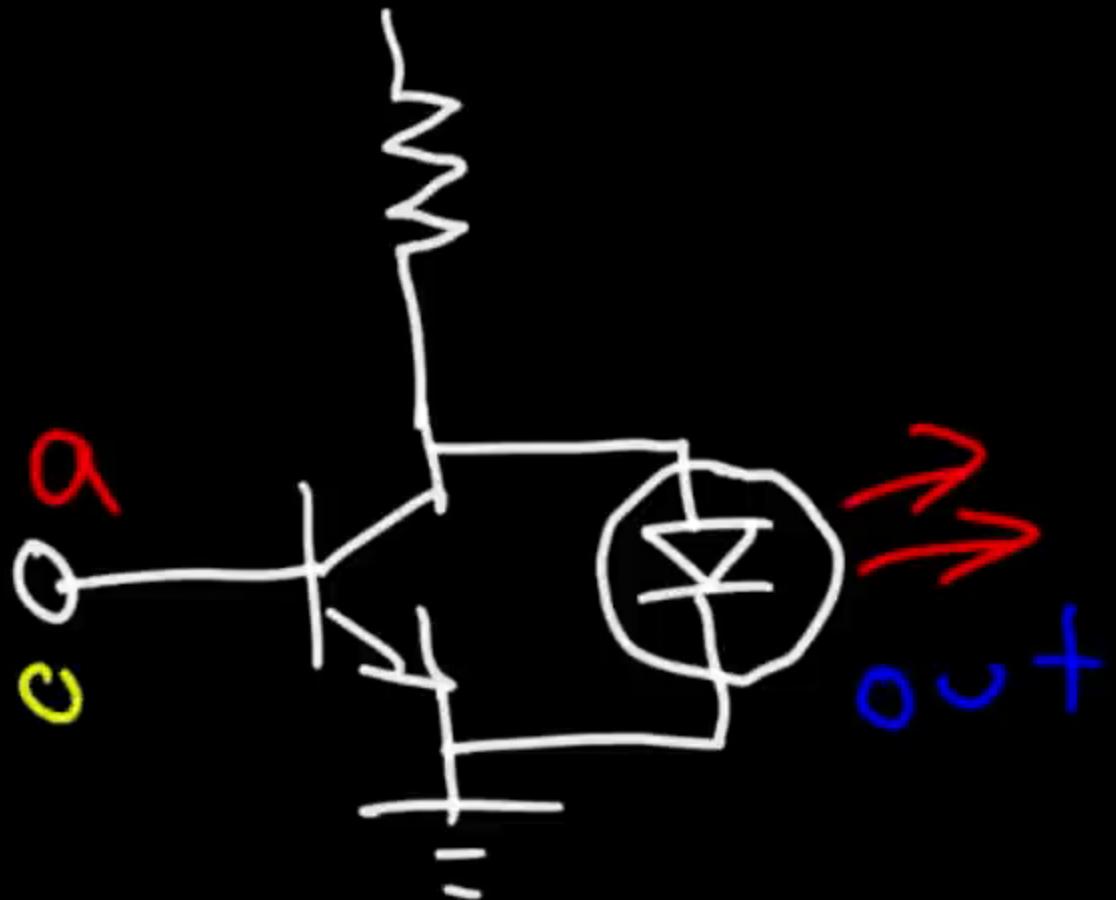
A	out
1	1
0	0

NOT



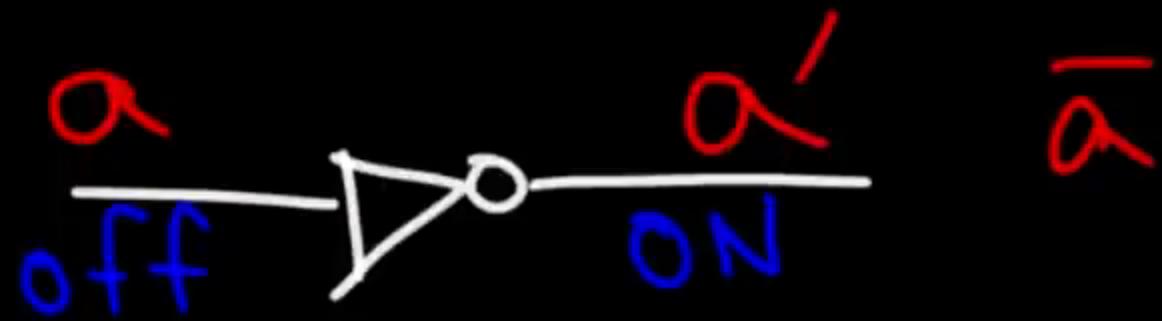
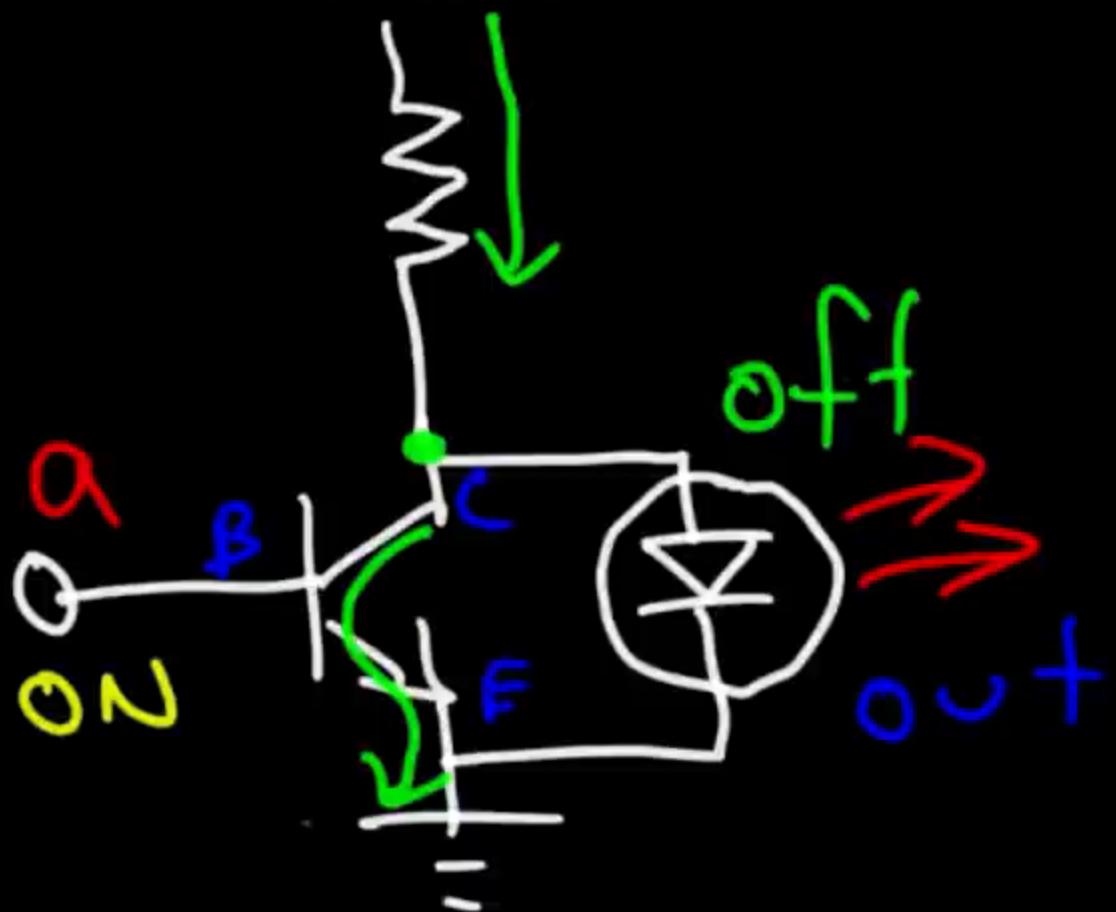
a	out
0	1
1	0

NOT



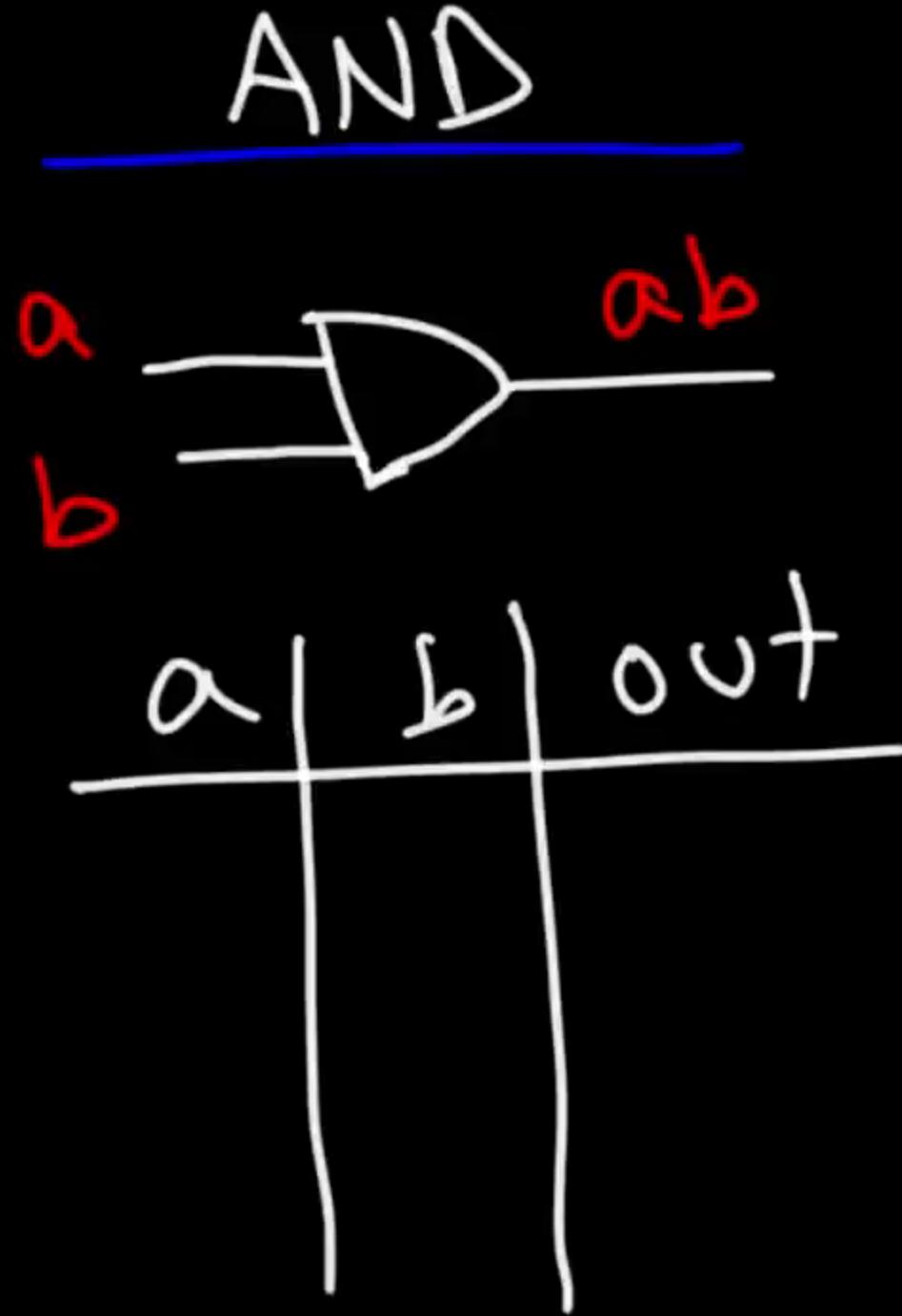
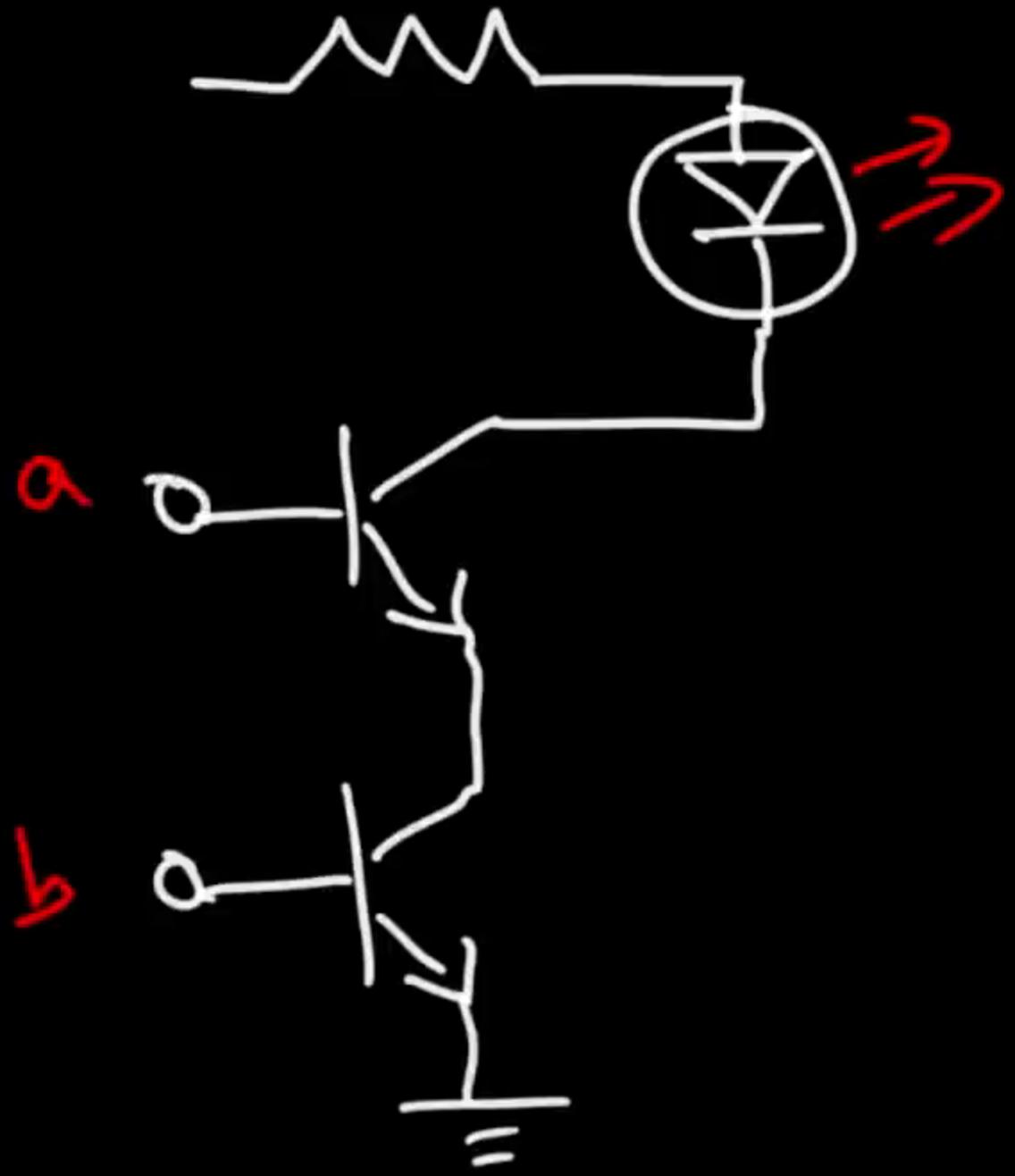
a	out
0	1
1	0

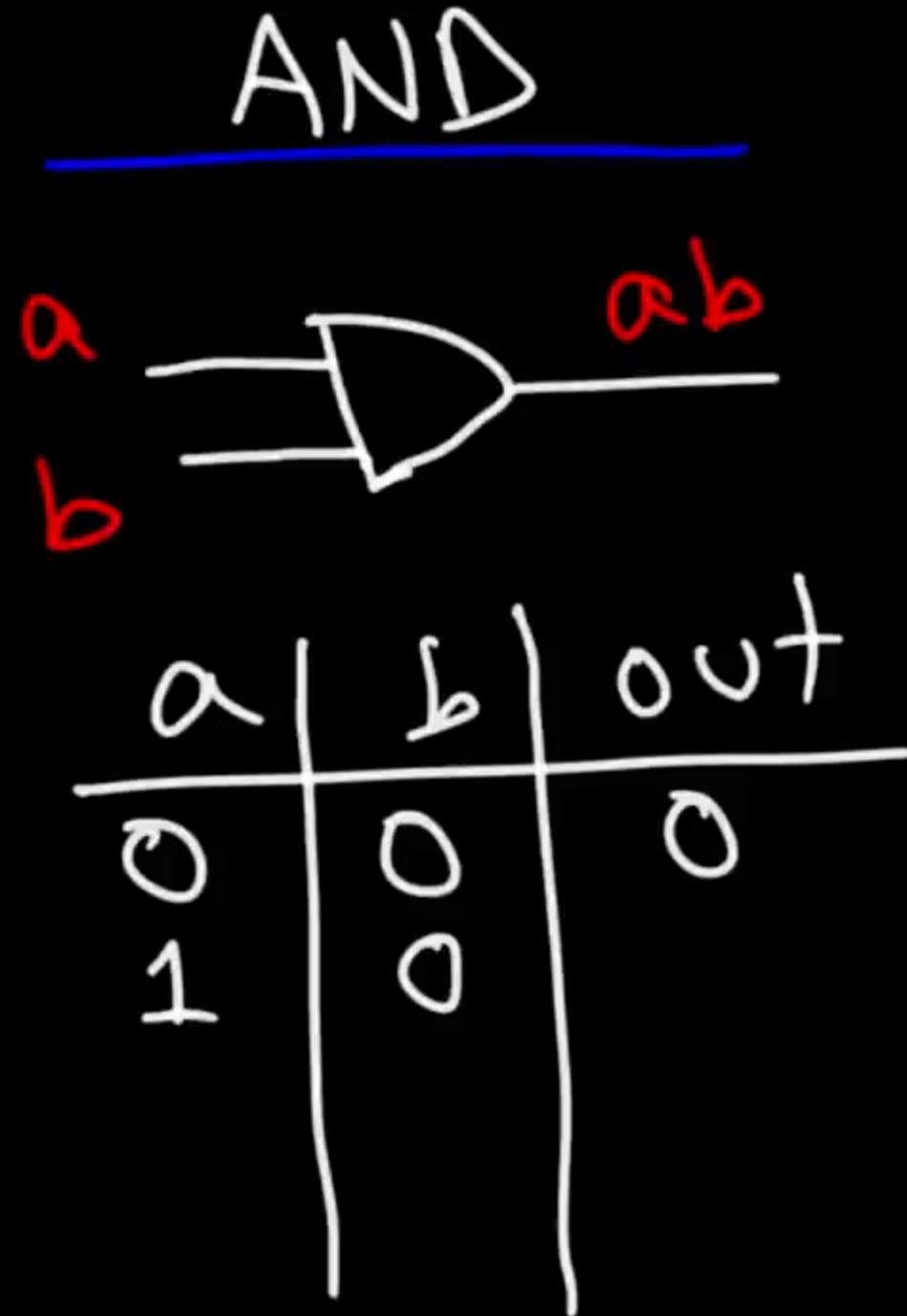
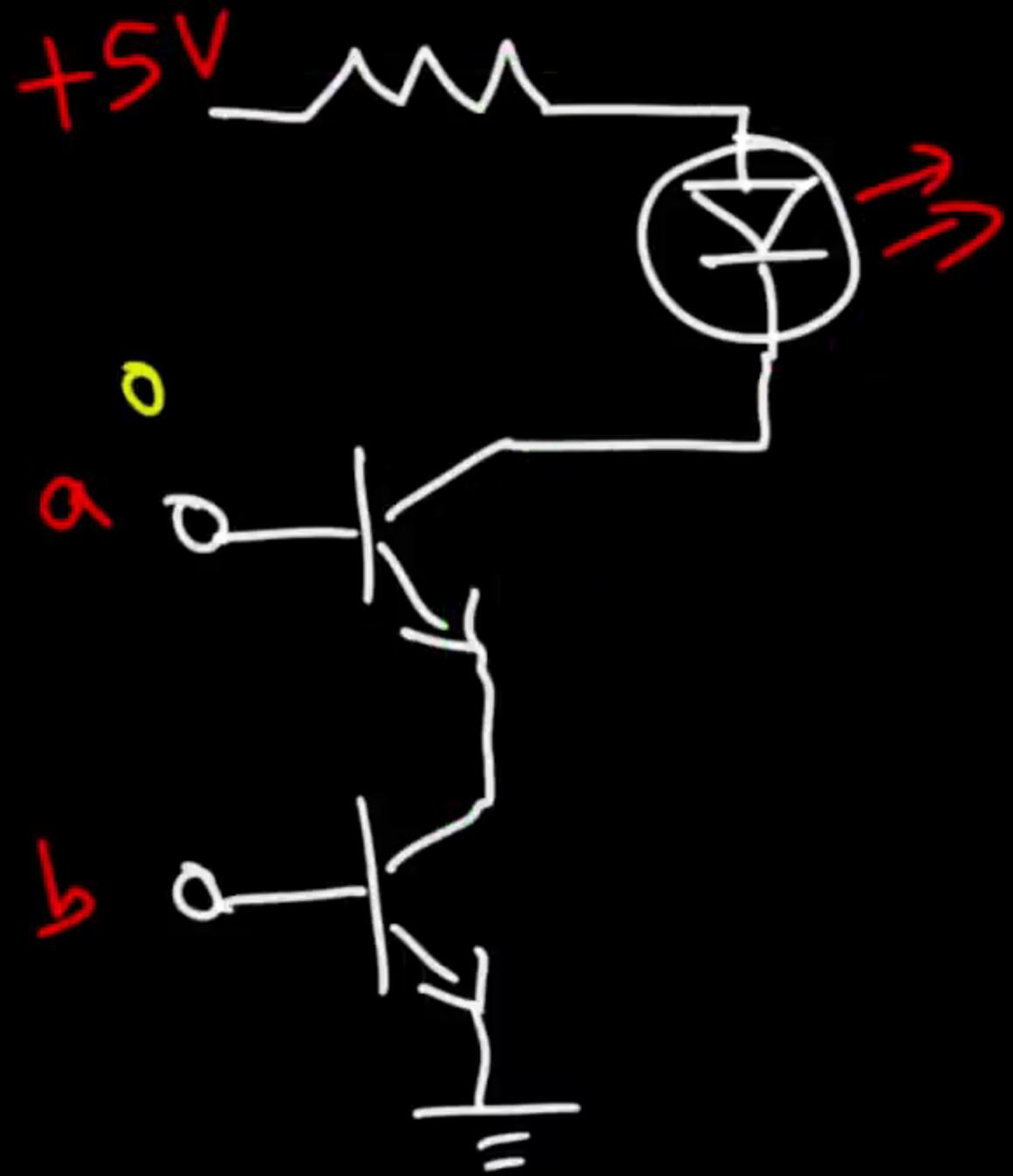
NOT



a	out
0	1
1	0

ANI

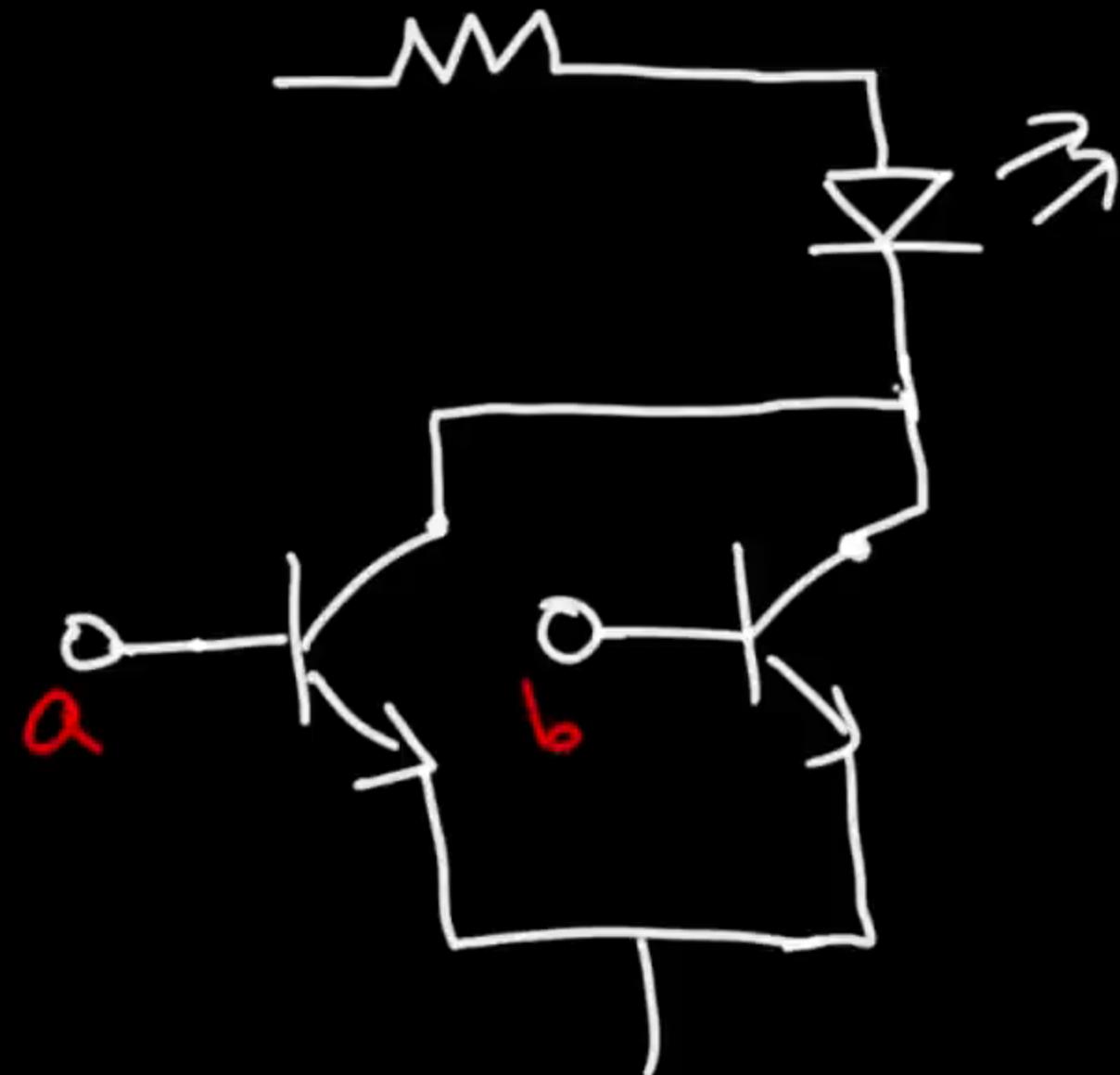
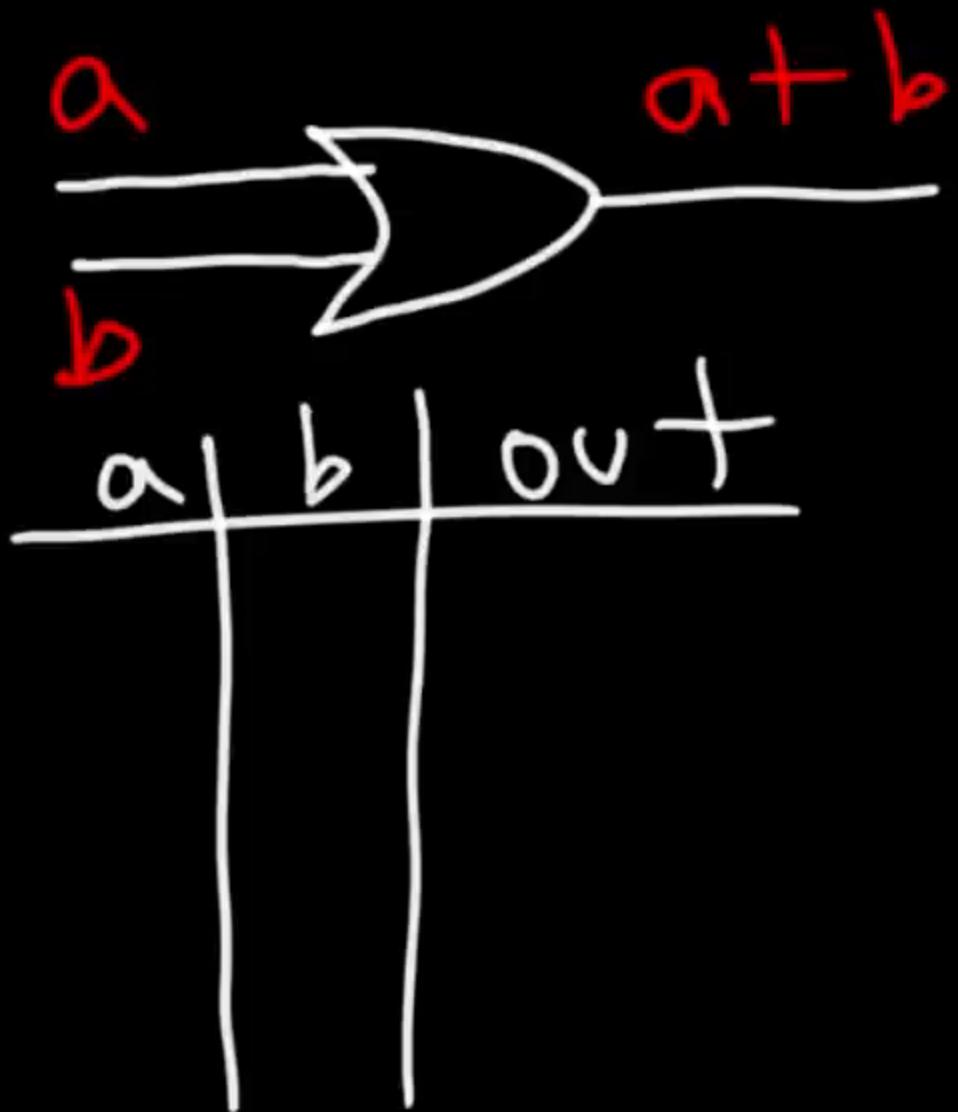




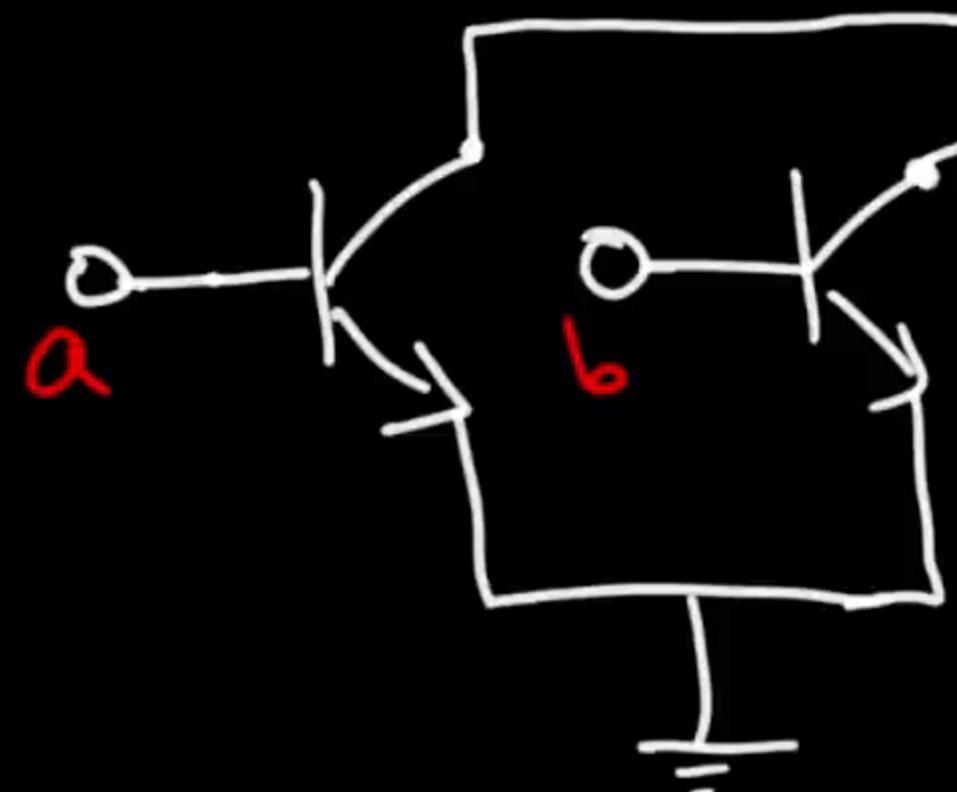
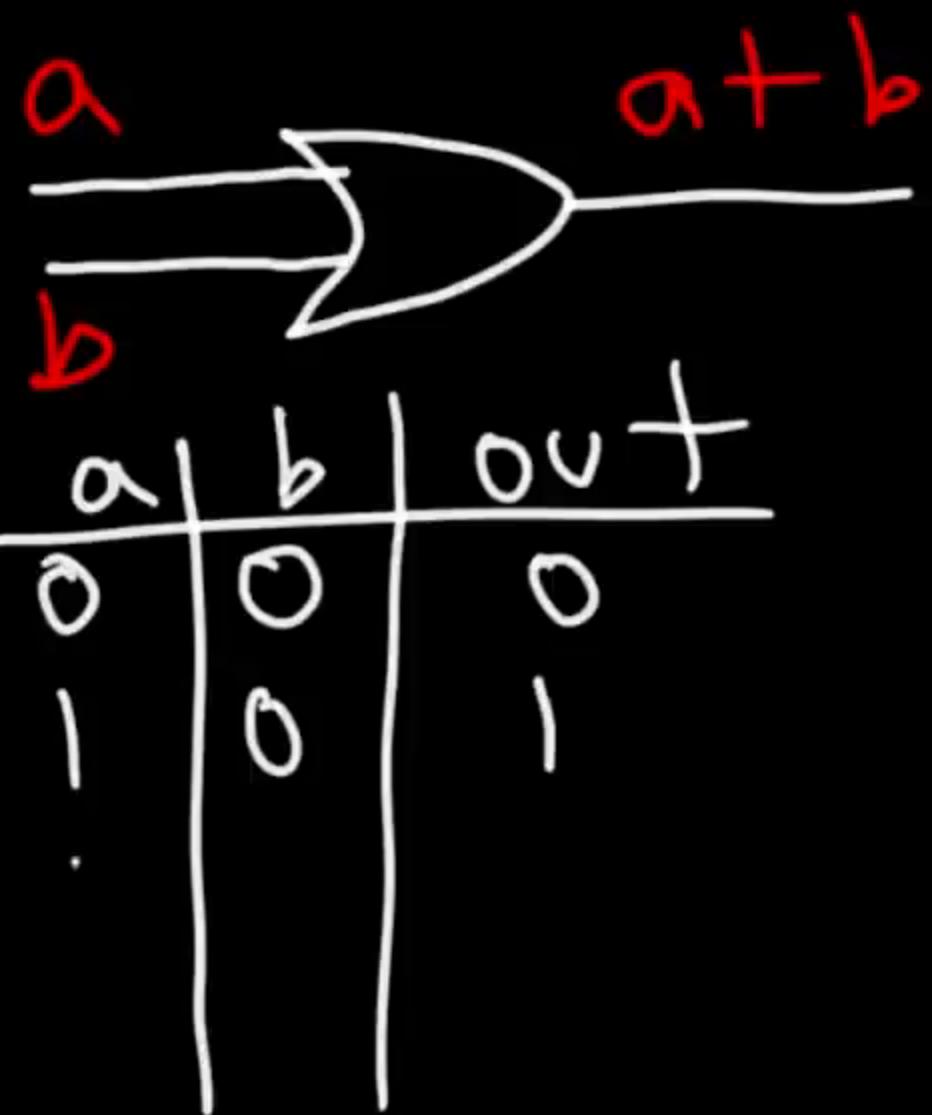
OR



OR



OR



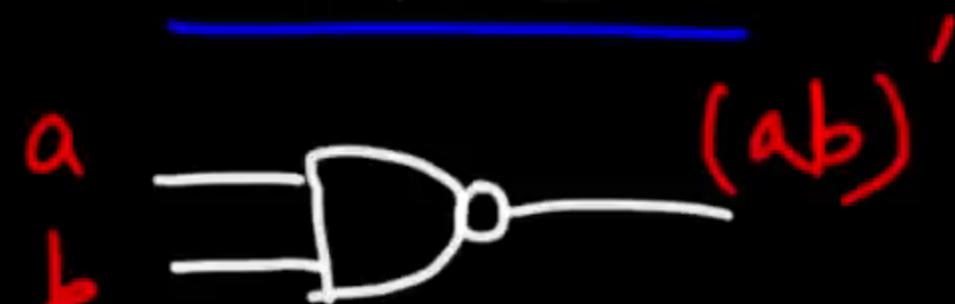
AND

AND



a	b	ab
1	1	1

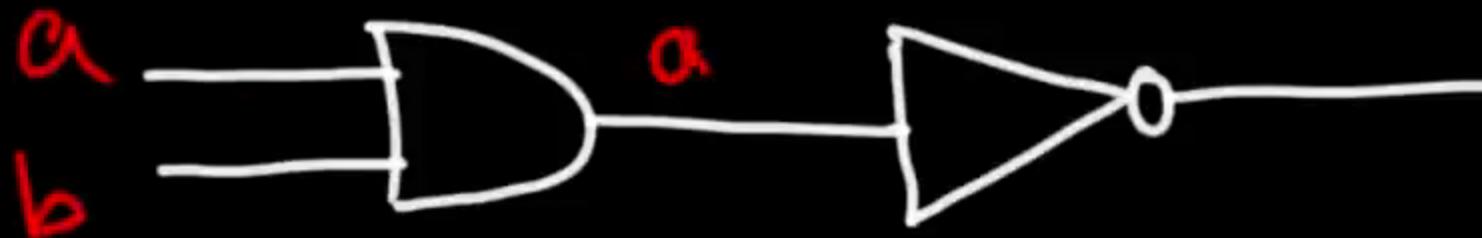
NAND

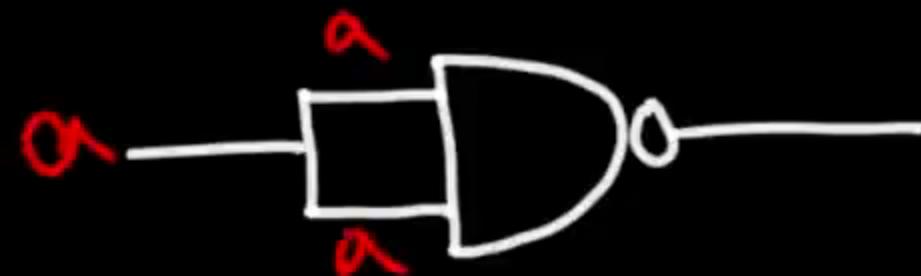


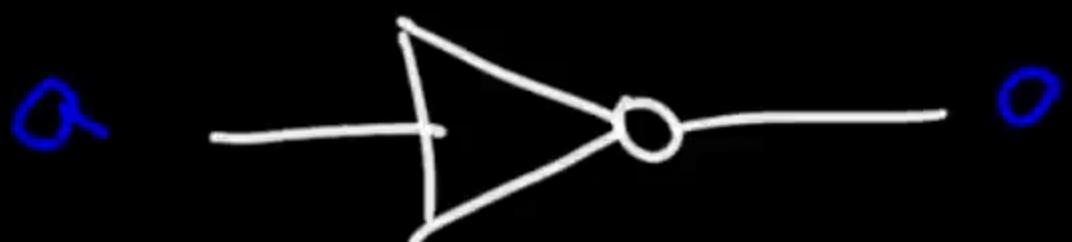
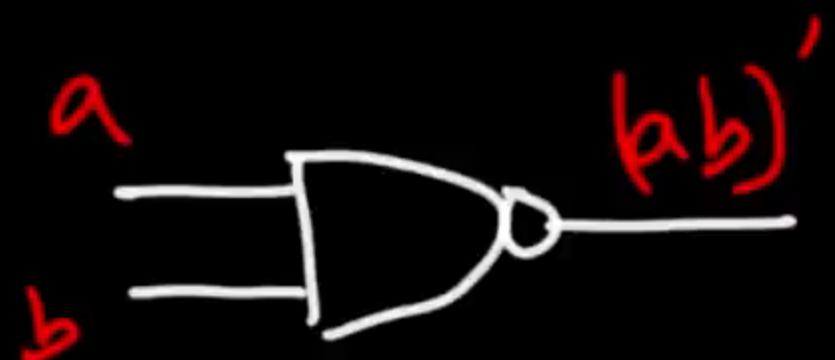
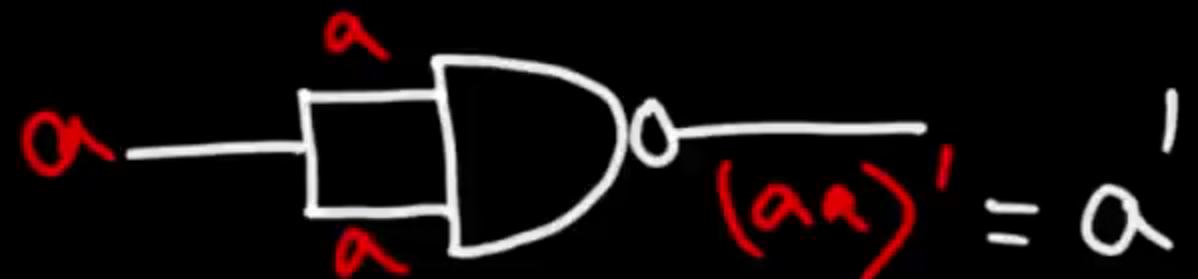
a	b
1	1

AND

NOT







$$a \cdot a = a$$

$$0 \cdot 0 = 0$$

$$1 \cdot 1 = 1$$



a	b	$(ab)'$
0	0	1
1	0	1
0	1	1
1	1	0



a	a	$(aa)'$
0	0	1
1	1	0

OR



NOR

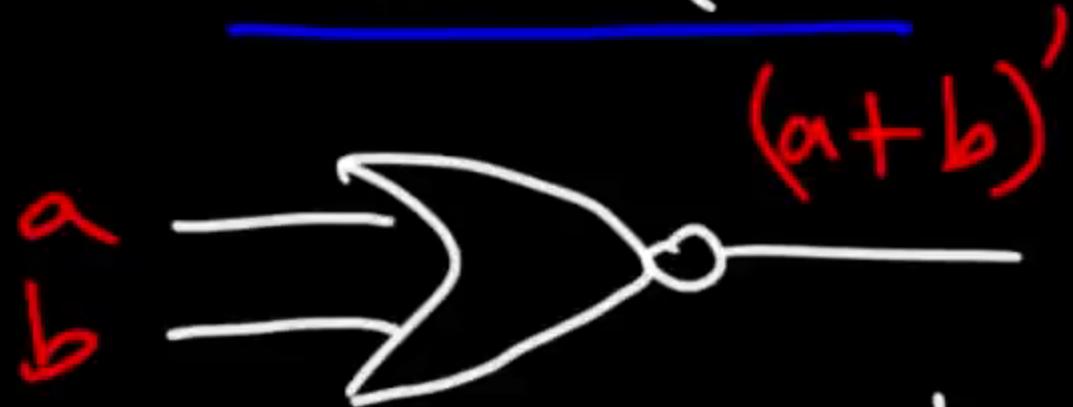
.

OR



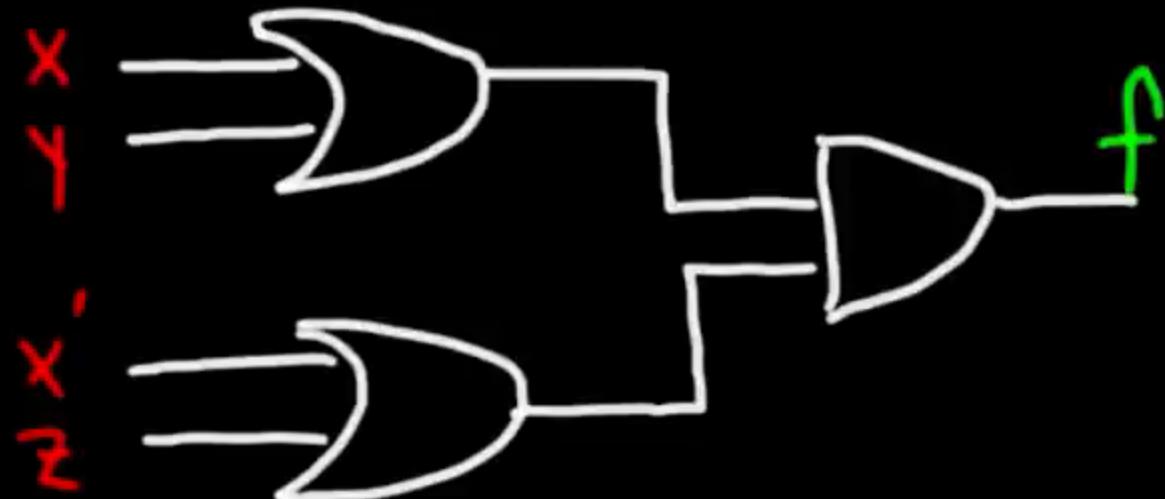
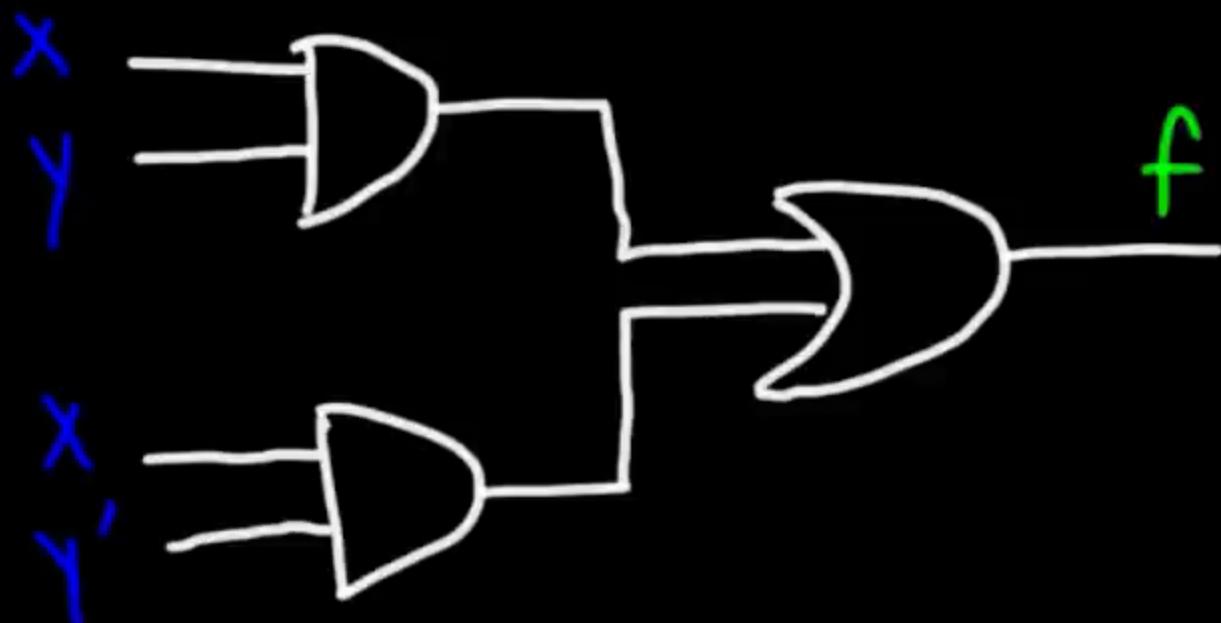
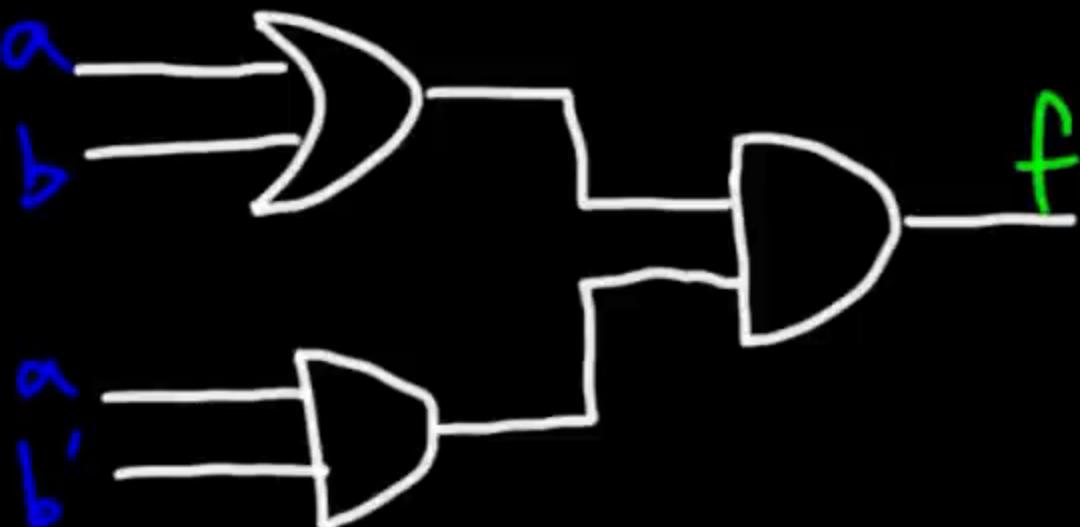
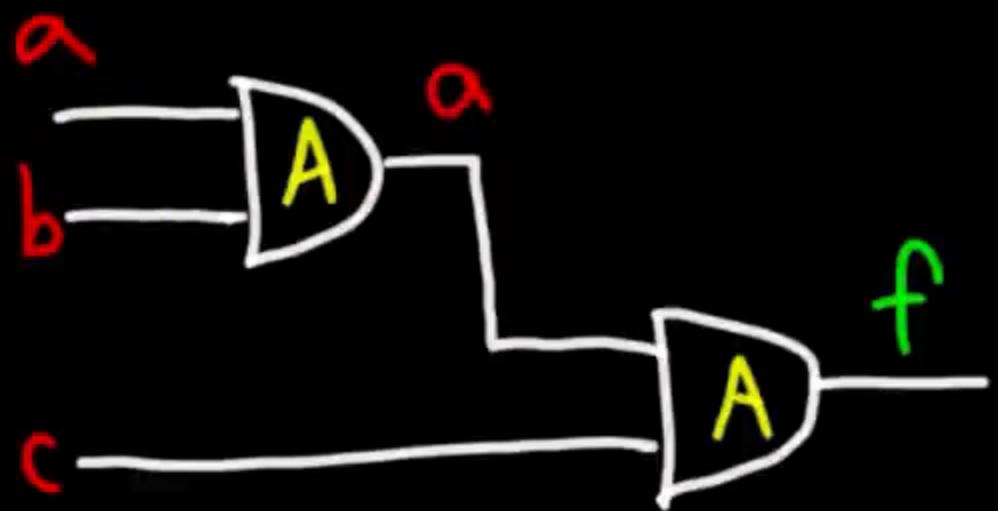
a	b	$a + b$
0	0	0
1	0	1
0	1	1
1	1	1

NOR

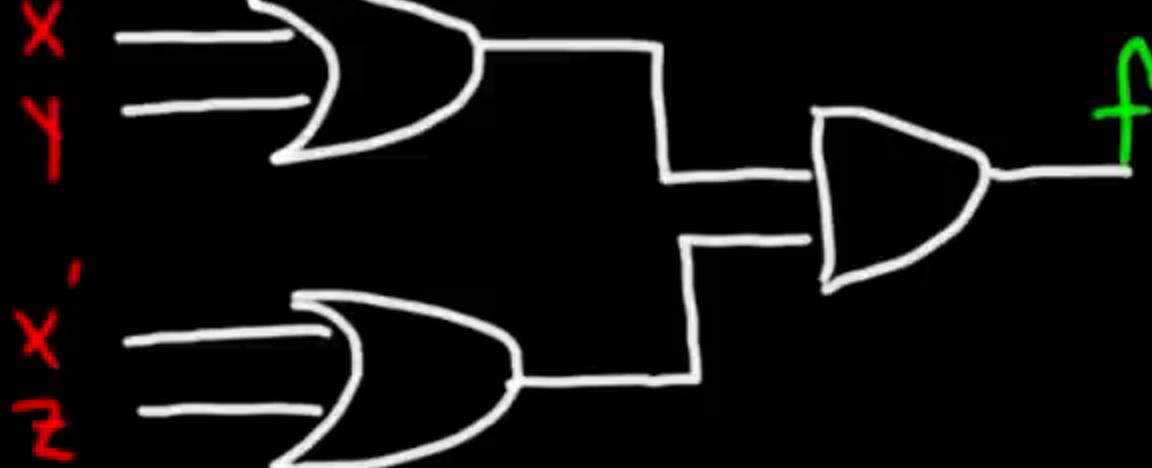
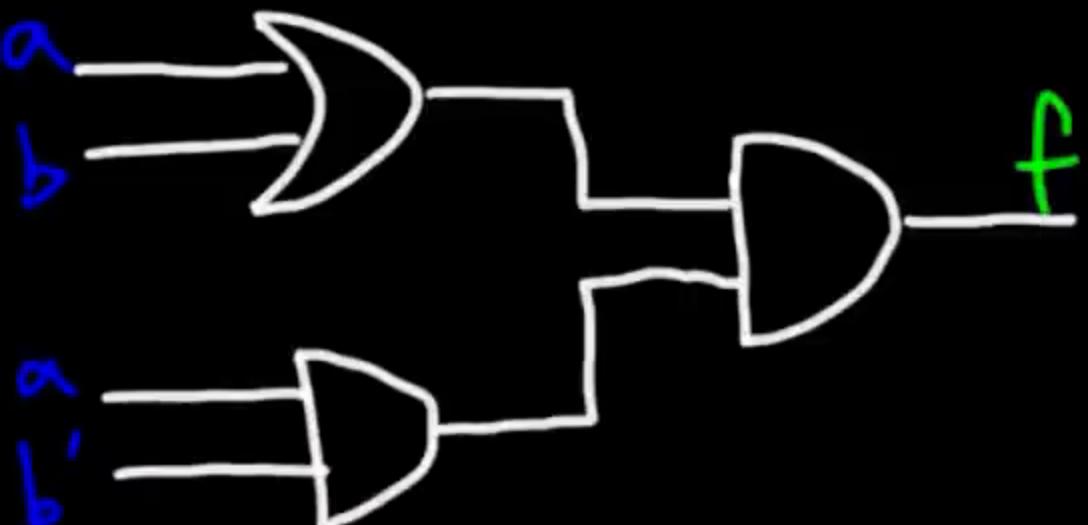
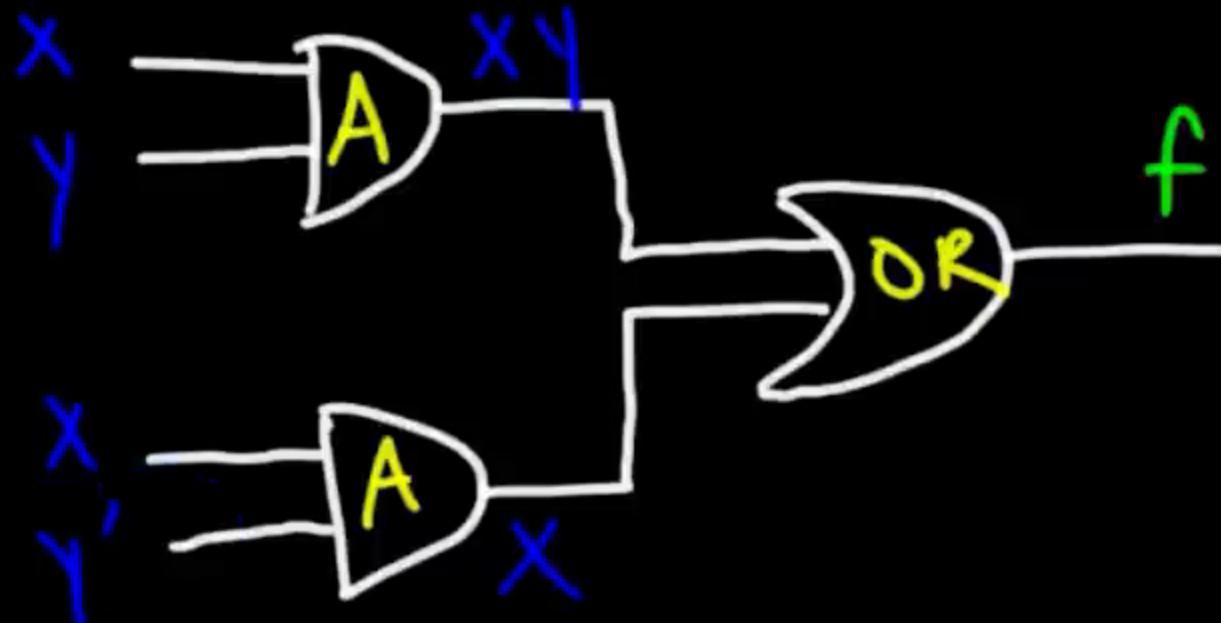
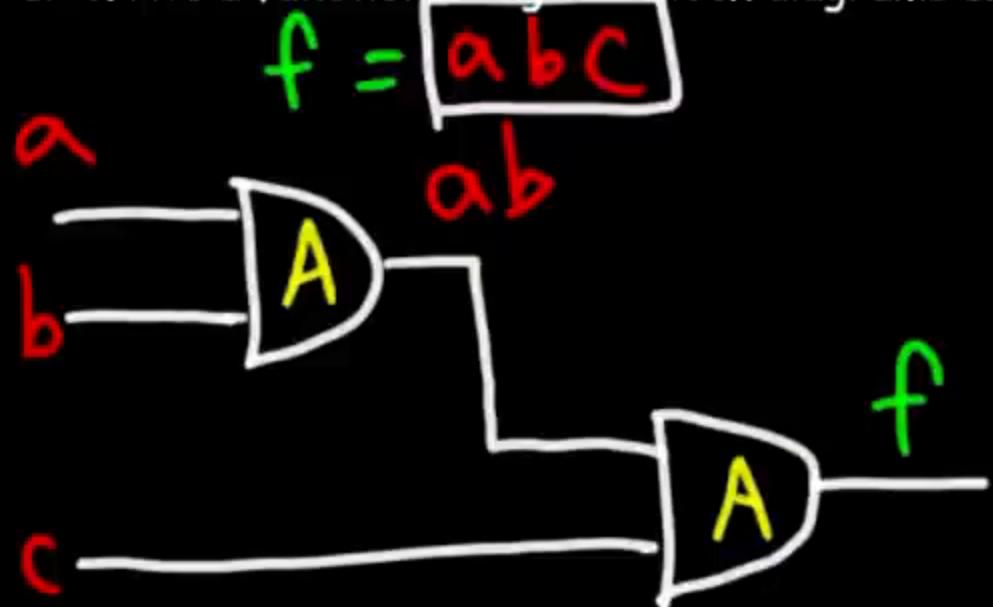


a	b	$(a+b)'$
0	0	1
1	0	0
0	1	0
1	1	0

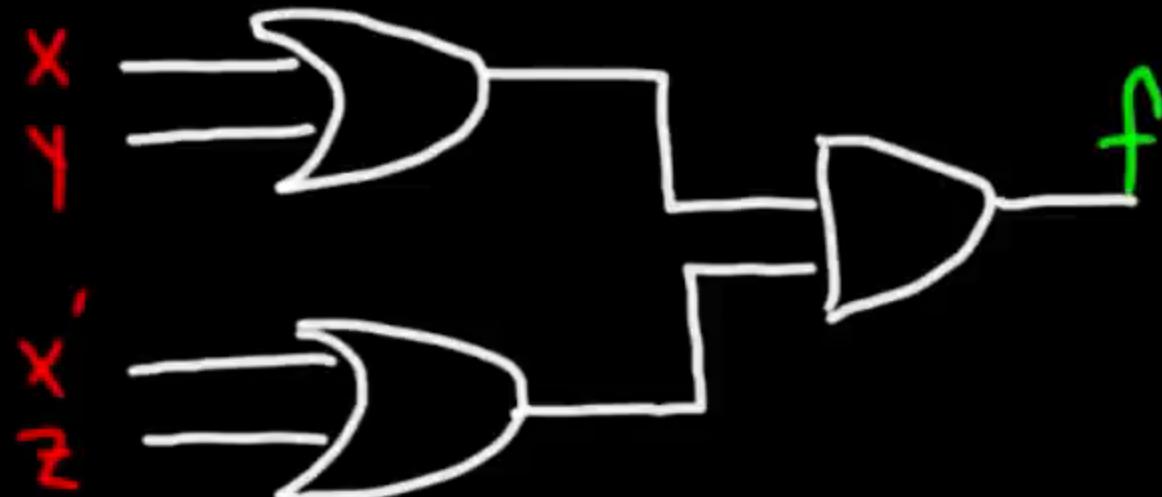
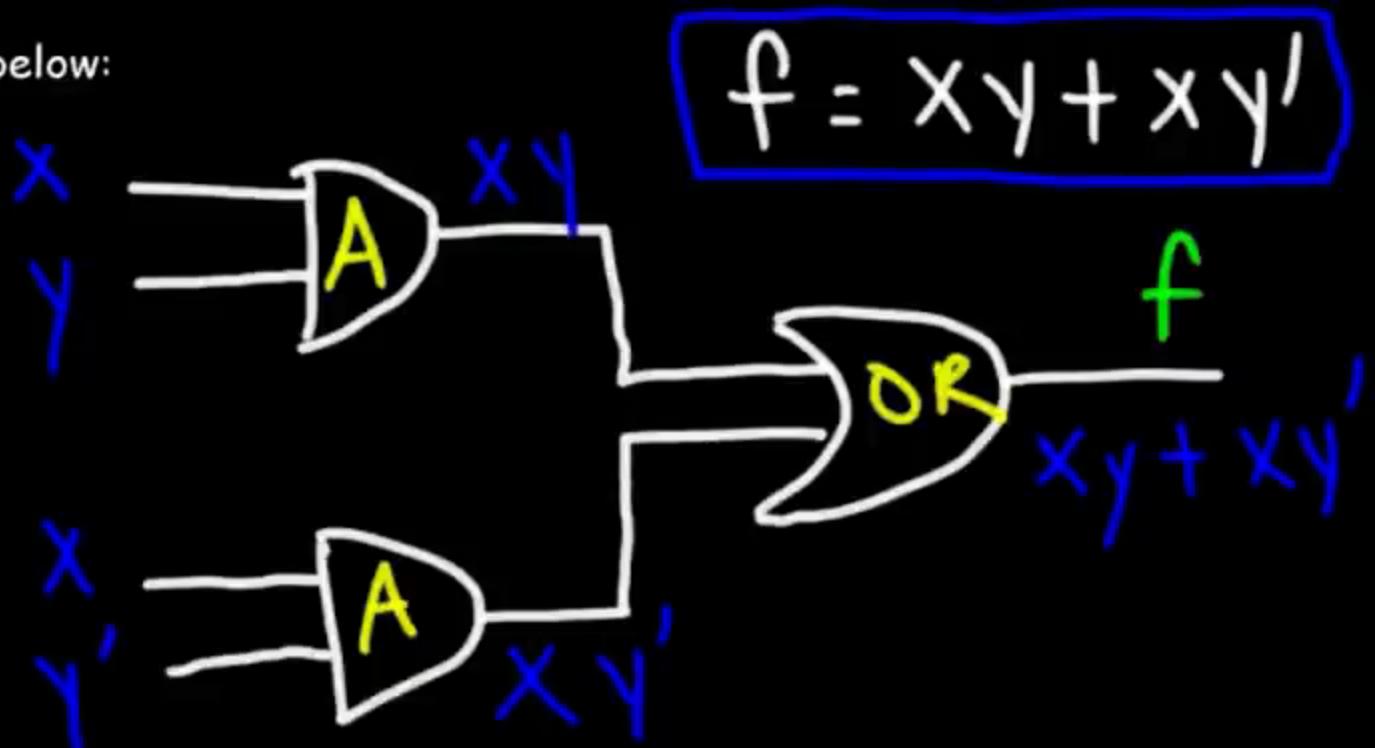
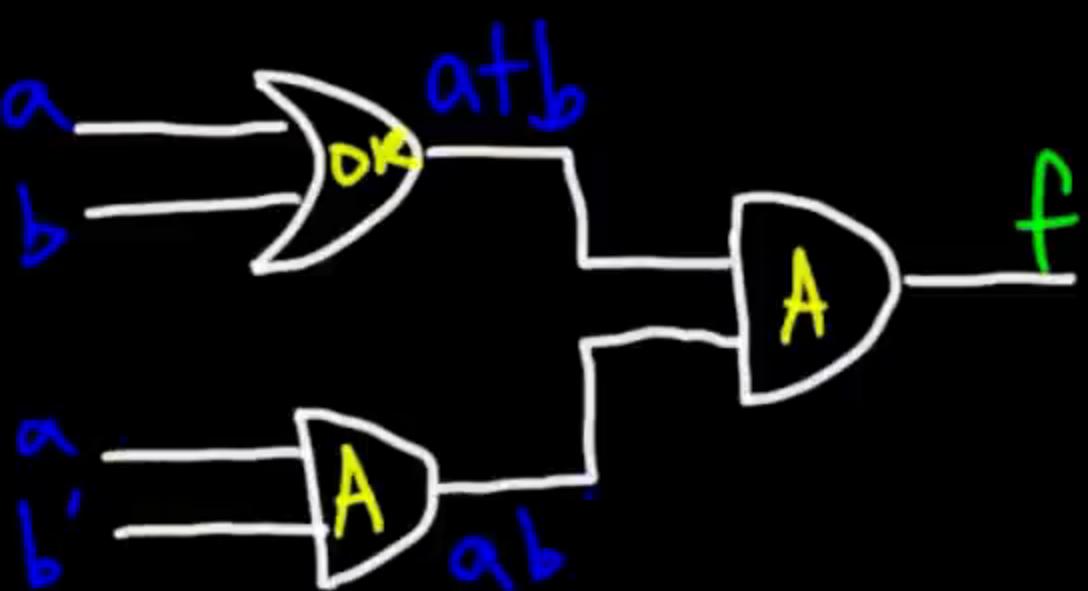
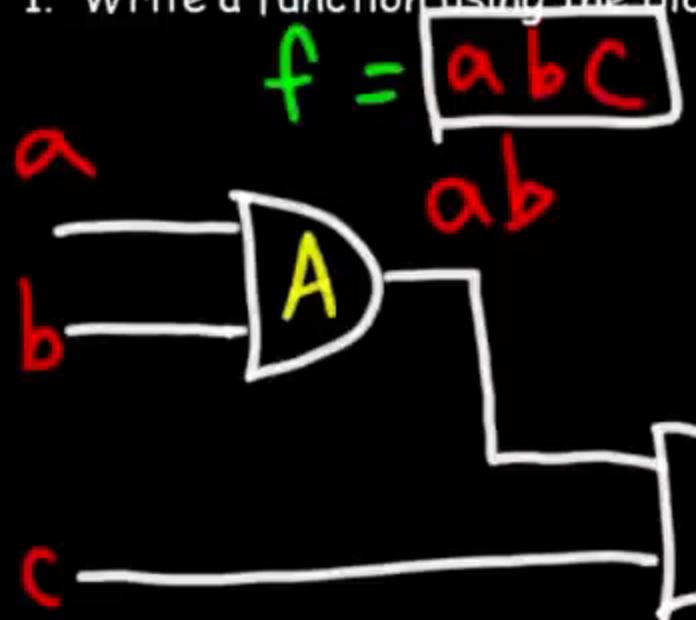
1. Write a function using the block diagrams shown below:



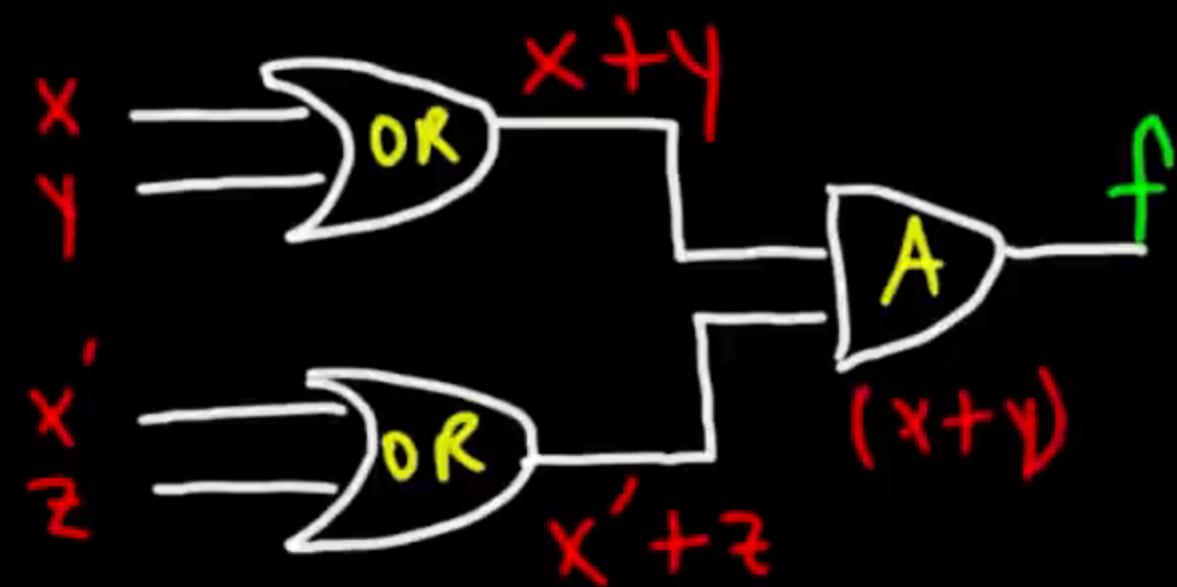
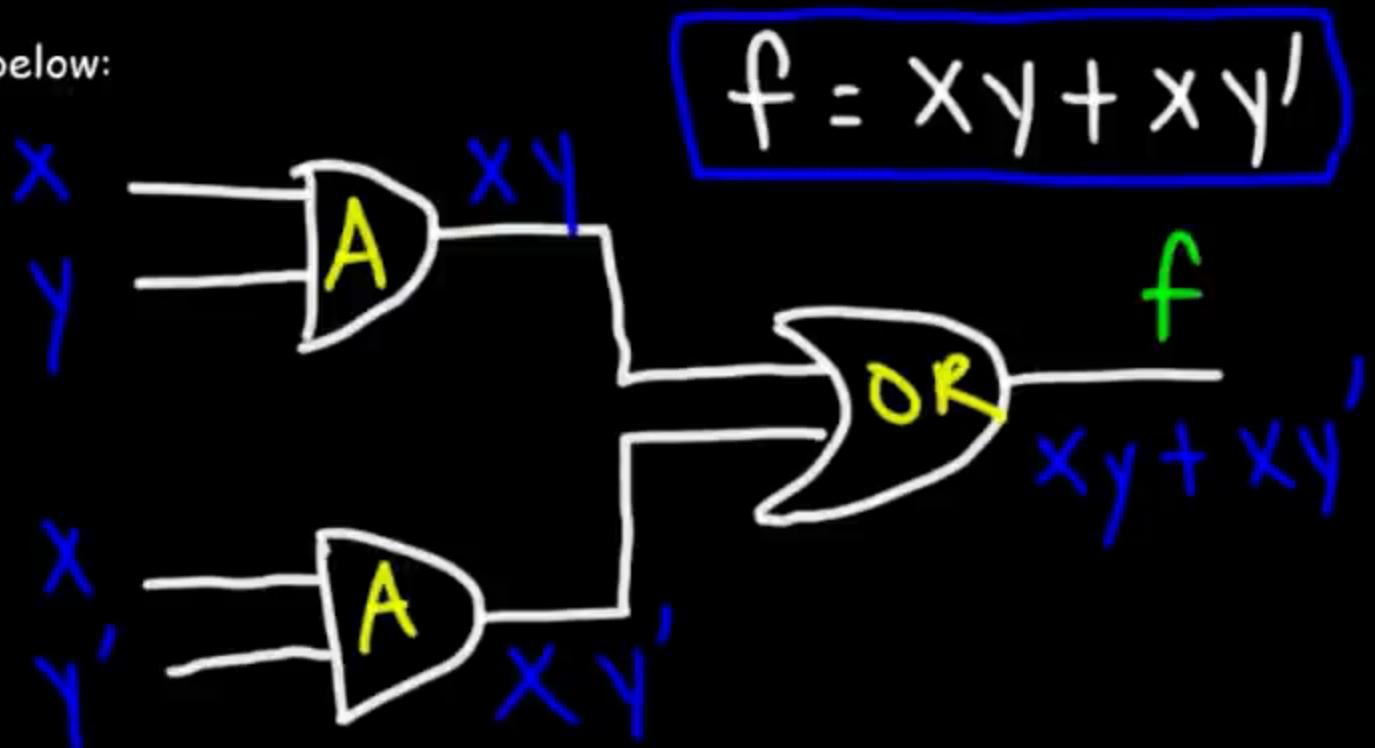
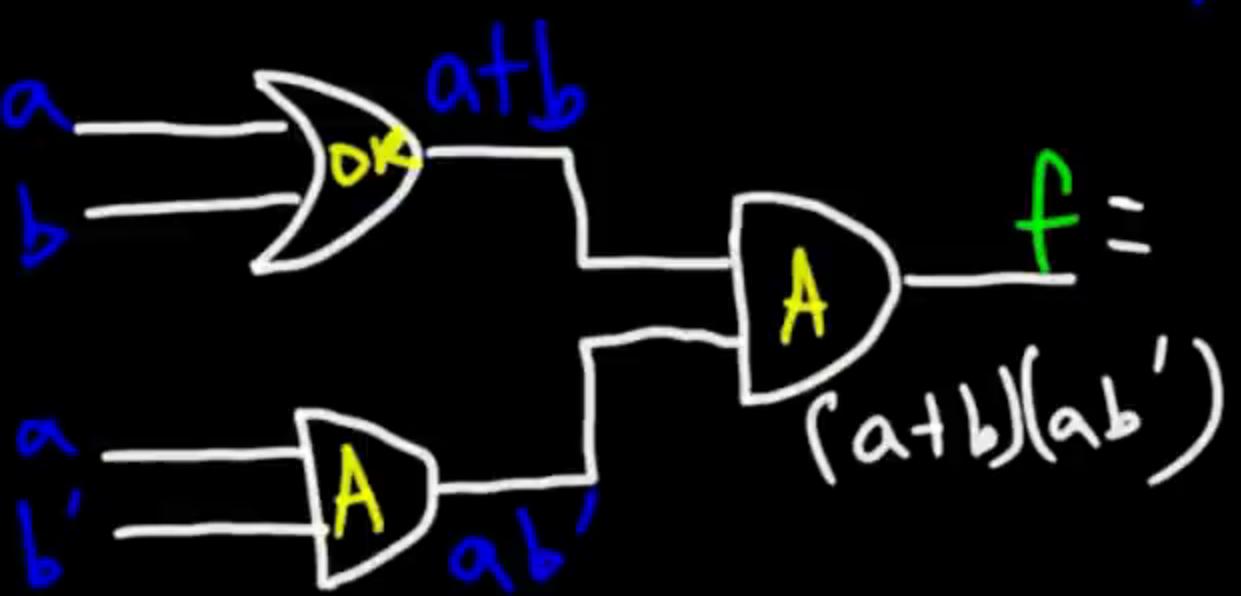
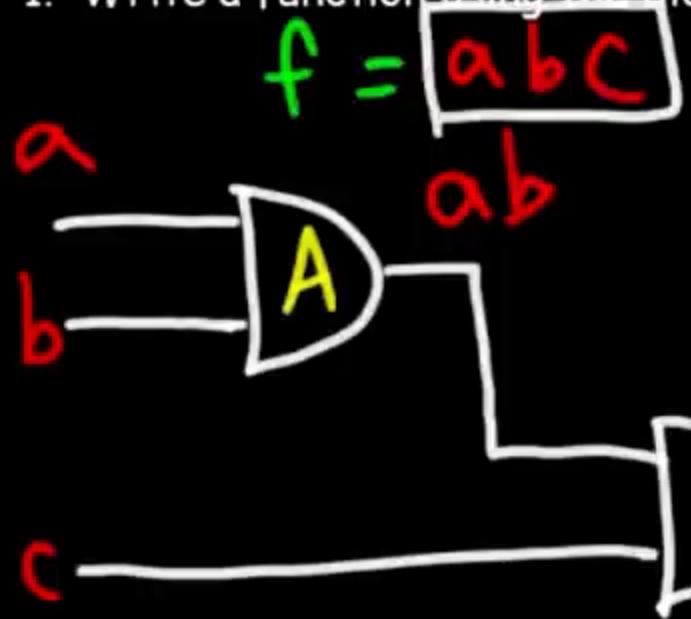
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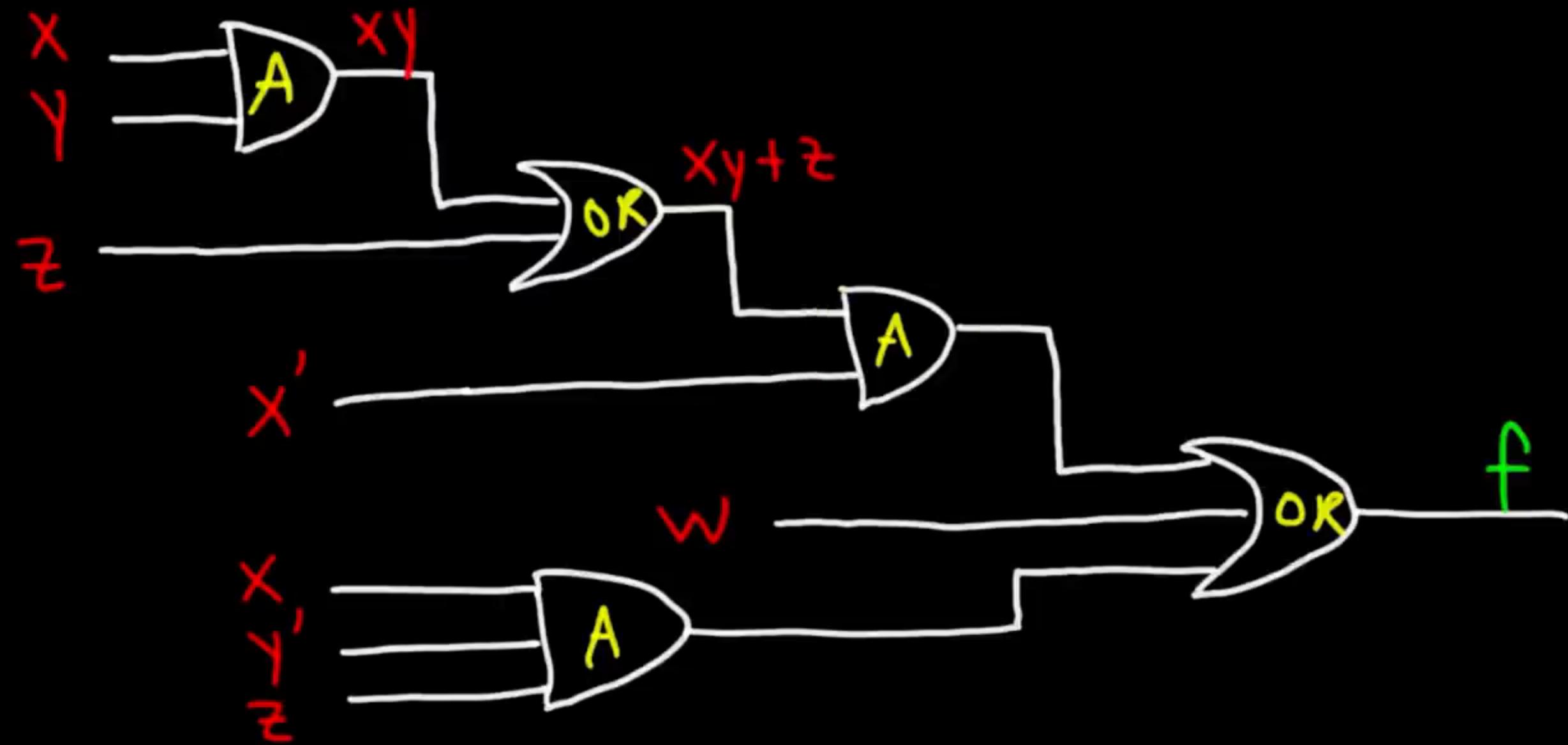
1. Write a function using the block diagrams shown below:



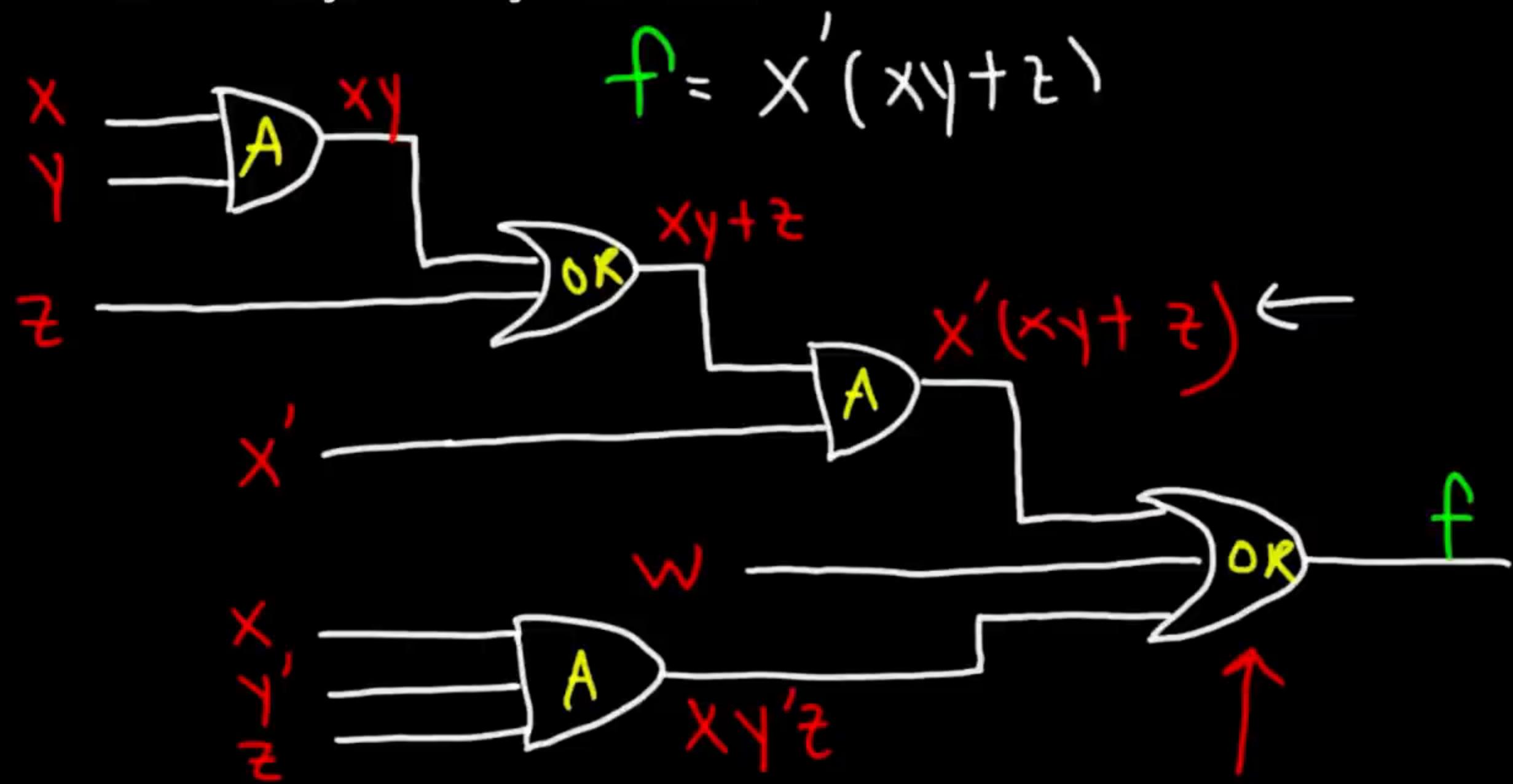
1. Write a function using the block diagrams shown below:



1. Write a function using the block diagrams shown below:



1. Write a function using the block diagrams shown below:



2. Draw a block diagram given the function shown below:

$$f = \boxed{ab} + c$$

AND OR

2. Draw a block diagram given the function shown below:

$$f = xy + x'y + y'z$$

2. Draw a block diagram given the function shown below:

$$f = \overline{x}\overline{y} + \overline{x}y + \overline{y}z$$

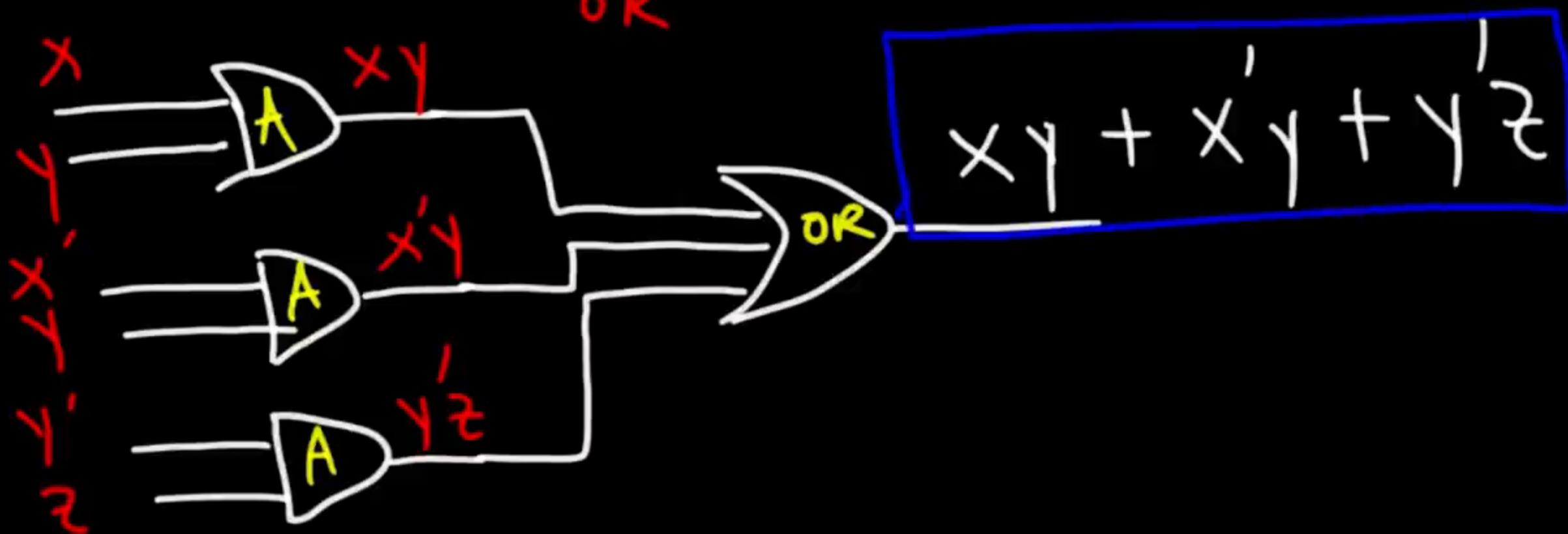
AND
AND **AND**
OR



2. Draw a block diagram given the function shown below:

$$f = \overline{x}\overline{y} + \overline{x}y + \overline{y}\overline{z}$$

AND **AND** **AND**
↑ ↓ ↑
OR



$$f = (a+b')(a \cdot$$

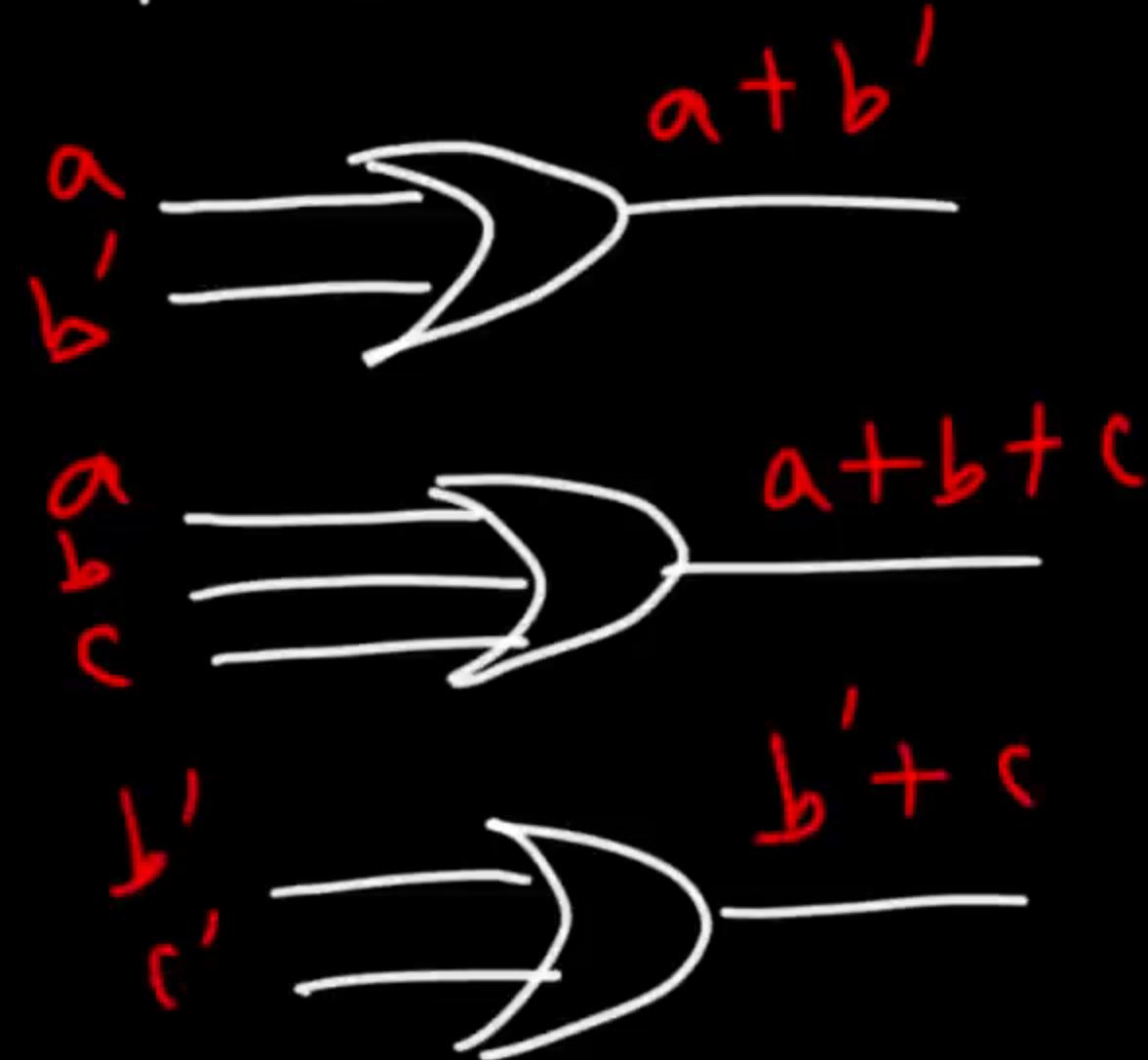
$$f = \underbrace{(a+b')}_1 (a+b+c) (b'+c')$$

POS \rightarrow product of sums

$$f = (a+b')(a+b+c)(b'+c')$$

\downarrow \downarrow \downarrow
OR OR OR

$$f = (a+b')(a+b+c)(b'+c')$$



3. Describe each of the following expressions as SOP, POS, both, or neither. Discuss the number of variables, literals, product terms, and sum terms. Identify any minterms (standard product terms) or maxterms (standard sum terms).

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$$xy' + xy'z' + x'y'z w + x'y'z'$$

10

$$x, y'$$

$$xy', xy'z'$$

3. Describe each of the following expressions as SOP, POS, both, or neither. Discuss the number of variables, literals, product terms, and sum terms. Identify any minterms (standard product terms) or maxterms (standard sum terms).

$$xy' + xy'z' + x'y'z w + x'y'z'$$

Variables

↳ x, y, z, w

literals $\rightarrow 12$

SOP

3. Describe each of the following expressions as SOP, POS, both, or neither. Discuss the number of variables, literals, product terms, and sum terms. Identify any minterms (standard product terms) or maxterms (standard sum terms).

$$(x+y)($$

3. Describe each of the following expressions as SOP, POS, both, or neither. Discuss the number of variables, literals, product terms, and sum terms. Identify any minterms (standard product terms) or maxterms (standard sum terms).

$$(x+y)(x'+z)(y+z')(x+y+z')$$

4 sum terms \rightarrow POS

3. Describe each of the following expressions as SOP, POS, both, or neither. Discuss the number of variables, literals, product terms, and sum terms. Identify any minterms (standard product terms) or maxterms (standard sum terms).

$$(x+y)(x'+z)(y+z')(x+y+z')$$

2 2 2 3

literals \rightarrow 9

variables \rightarrow x, y, z

4 sum terms \rightarrow POS

3. Describe each of the following expressions as SOP, POS, both, or neither. Discuss the number of variables, literals, product terms, and sum terms. Identify any minterms (standard product terms) or maxterms (standard sum terms).

$$xy'z'w \rightarrow \boxed{\text{SOP/POS}}$$

SOP \rightarrow Sum

3. Describe each of the following expressions as SOP, POS, both, or neither. Discuss the number of variables, literals, product terms, and sum terms. Identify any minterms (standard product terms) or maxterms (standard sum terms).

$$xy'z'w \rightarrow \boxed{\text{SOP/POS}}$$

SOP \rightarrow Sum of one product term

POS \rightarrow Product of four sum terms

Variables \rightarrow

3. Describe each of the following expressions as SOP, POS, both, or neither. Discuss the number of variables, literals, product terms, and sum terms. Identify any minterms (standard product terms) or maxterms (standard sum terms).

$$a + b + c' + d + e' \rightarrow \boxed{\text{POS/SOP}}$$

SOP \rightarrow Sum

3. Describe each of the following expressions as SOP, POS, both, or neither. Discuss the number of variables, literals, product terms, and sum terms. Identify any minterms (standard product terms) or maxterms (standard sum terms).

$$a + b + c' + d + e' \rightarrow \boxed{\text{POS/SOP}}$$

SOP \rightarrow Sum of 5 product terms

POS \rightarrow Product of 1 sum term
 $(a + b + c' + d + e')$

1 literal $\rightarrow \cancel{x}, y'$

3. Describe each of the following expressions as SOP, POS, both, or neither. Discuss the number of variables, literals, product terms, and sum terms. Identify any minterms (standard product terms) or maxterms (standard sum terms).

product term $\rightarrow x^1, y^1, xy^1, x^1y^2$

Sum term \rightarrow

literal \rightarrow

3. Describe each of the following expressions as SOP, POS, both, or neither. Discuss the number of variables, literals, product terms, and sum terms. Identify any minterms (standard product terms) or maxterms (standard sum terms).

$$a(b + cd') =$$

3. Describe each of the following expressions as SOP, POS, both, or neither. Discuss the number of variables, literals, product terms, and sum terms. Identify any minterms (standard product terms) or maxterms (standard sum terms).

$$a(b + cd')$$

4 variables $\rightarrow a, b, c, d$

4 literals $\rightarrow a, b, c, d'$

Sum(OR)

Product(AND)

Sum (OR)

$$a + b = b + a$$

$$a + (b + c) = (a + b) + c$$

$$a + 0 = a$$

Product (AND)

$$ab = ba$$

$$a(bc) = (ab)c$$

$$a \cdot 1 = a$$

Sum(OR)

$$a + 1 = 1$$

↑

null

Product(AND)

$$a \cdot 0 = 0$$

Sum(OR)

$$a + \overline{0} = 1$$

null



Product (AND)

$$a \cdot 0 = 0$$

a	b	<u>a+b</u>
1	1	1
0	1	0

Sum(OR)

$$a + a' = 1$$

Product(AND)

$$a \cdot a' = 0$$

complement "

Sum(OR)

$$a + a' = 1$$

"complement"

Product(AND)

$$a \cdot a' = 0$$

