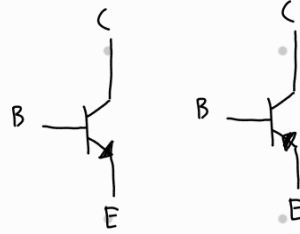
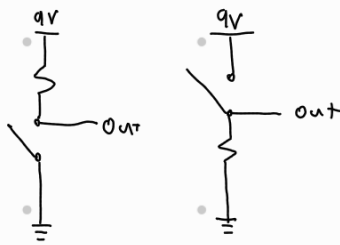


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6 → 7480

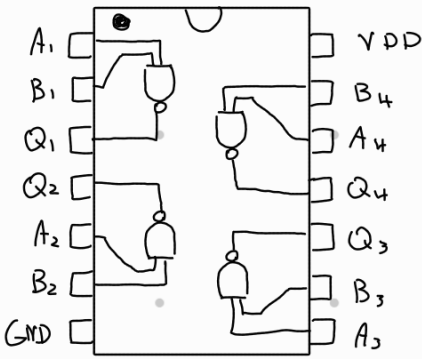
(≤ switch) Pull-up;
(> switch) Pull-down;

NPN: PNP:



* OFF → logic low → must be to gnd. not dangling.

CD4093/4011.



Simplify:

a) $Y'X = Y'X$

b/c) 0.

d/e) $Y'X' + Y'X$

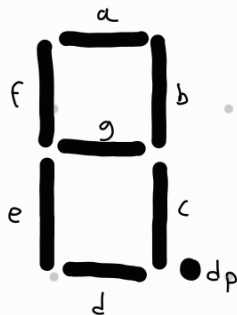
$Y'(X' + X) = Y'(1) = Y'$

f) $Y'X'$

g) $Y'X' + YX$...

$((Y'X' + YX)')$

$((Y'X')'(YX)')$



	Y	X	a	b	c	d	e	F	g	dp
7	0	0	0	0	0	1	1	1	1	1
4	0	1	1	0	0	1	1	0	0	1
8	1	0	0	0	0	0	0	0	0	1
0	1	1	0	0	0	0	0	0	1	1

Min terms

a: $Y'X$

d/e: $Y'X' + Y'X$

f: $Y'X'$

g: $Y'X' + YX$

* $b/c = 0$

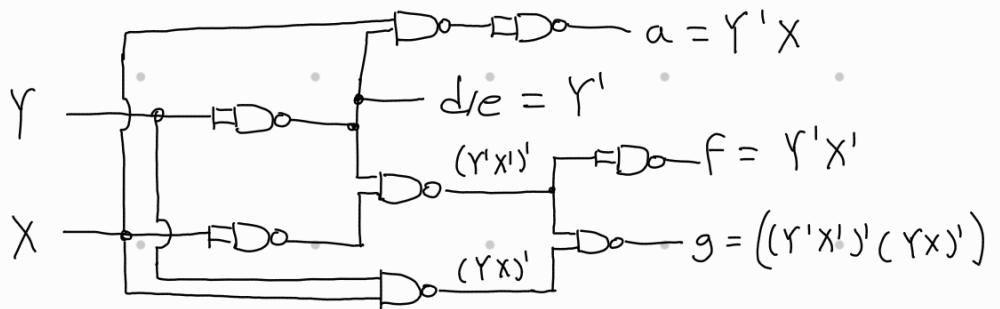
* $d = e$

* $dp = 1$

* LED

On with

logic 0.



* push button depressed → logic 0

to make push button return logic 1 when pressed:

NAND

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

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27/01/2026