a	b	c	d	a’b’c’d’	a’b’c’d	a’b’cd’	a’b’cd	a’bc’d’	a’bc’d	a’bcd’	a’bcd	ab’c’d’	ab’c’d	ab’cd’	ab’cd	abc’d’	abc’d	abcd’	abcd	R	Y	G
0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0
0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0
0	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0
1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0
1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0
1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1

BREAK → 0000 - 0001 - 0010

a'b'c'd' + a'b'c'd + a'b'cd' = a'b'(c'd' + c'd + cd') = a'b'(c'(d'+d) + cd')
=a'b'(c' + cd') = a'b'(c' + d')

= a'b'c' + a'b'd'

sum of minterms: ∑(0, 1, 2)

product of maxterms: π(3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15)

YELLOW LED → 0011 - 0100 - 0101 - 0110 - 0111 - 1000 - 1001 - 1010

a'b'cd + a'bc'd' + a'bc'd + a'bcd' + a'bcd + ab'c'd' + ab'c'd + ab'cd' =
a'(b'cd + bc'd' + bc'd + bcd' + bcd) + a(b'c'd' + b'c'd + b'cd') = a'(b(c'd' +
c'd + cd' + cd) + b'cd) + a(b'c'(d'+d) + b'cd') = a'(b (c'(d+d') + c(d+d')) +
b'cd) + a(b'c' + b'cd') = a'(b + b'cd) + a(b'(c' + cd'))

= a'b + a'b'cd + ab'c' + ab'cd'

sum of minterms: ∑(3, 4, 5, 6, 7, 8, 9, 10)

product of maxterms: π(0, 1, 2, 11, 12, 13, 14, 15)

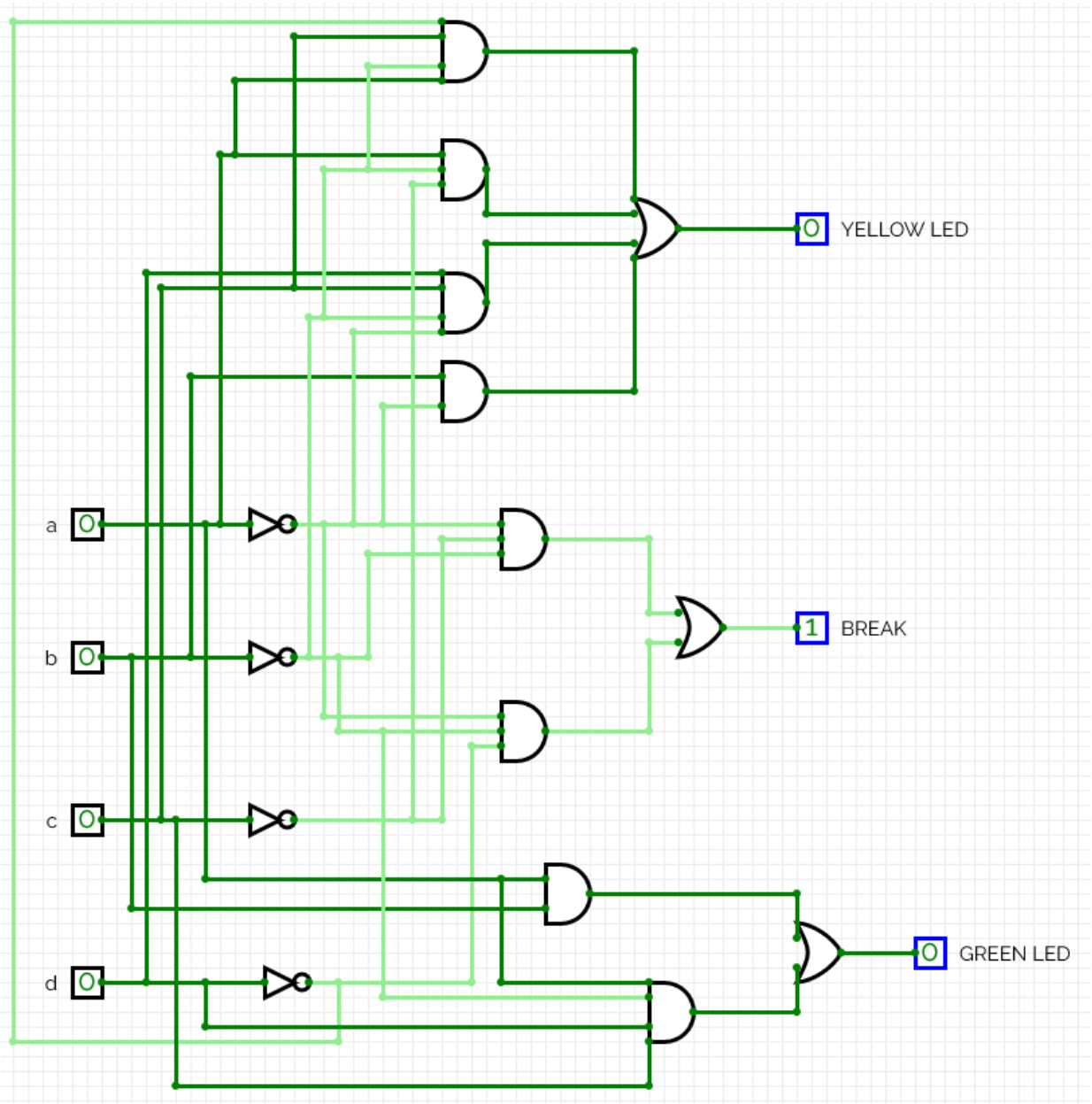
GREEN LED → 1011 - 1100 - 1101 - 1110 - 1111

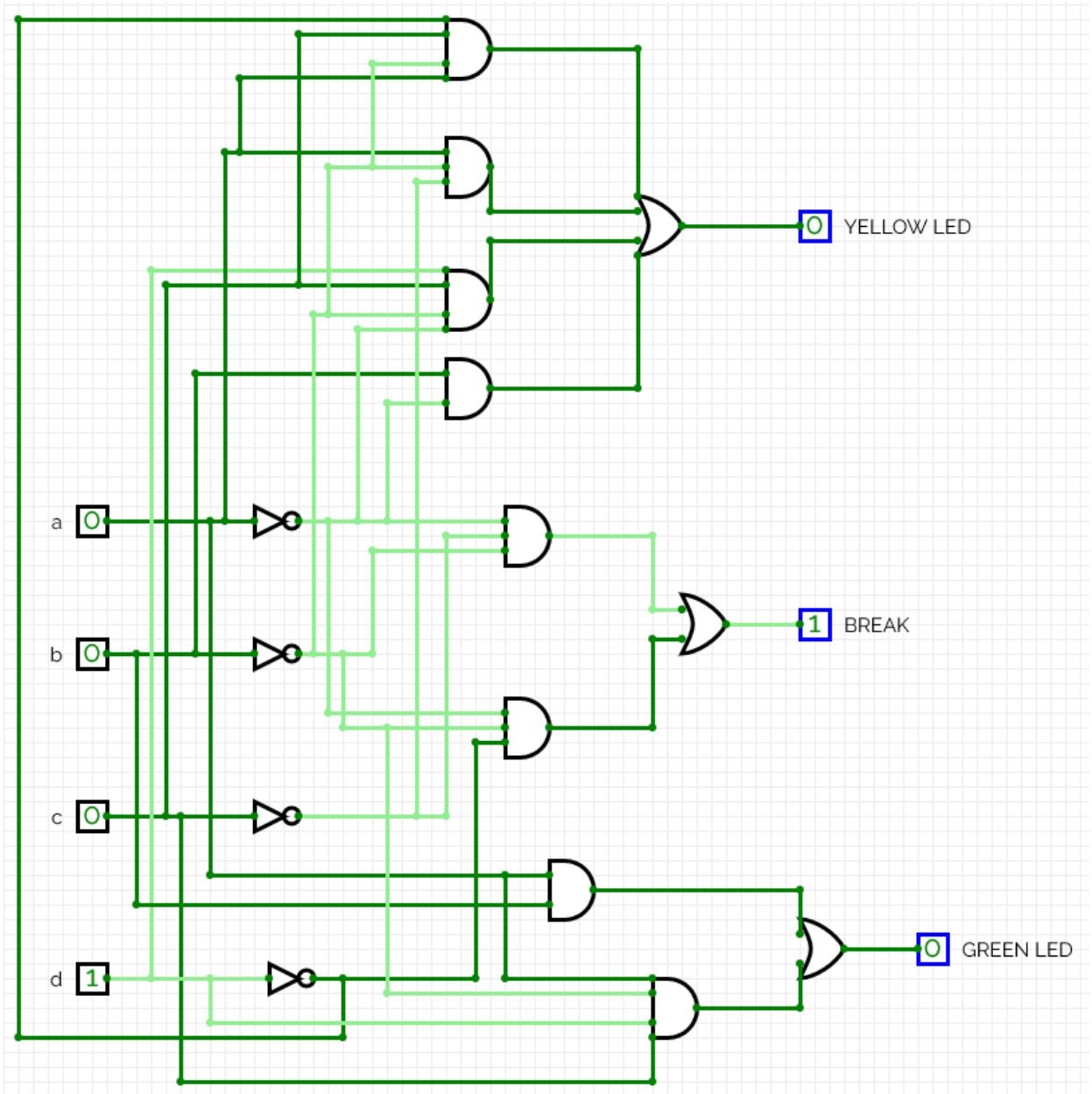
ab’cd + abc’d’ + abc’d + abcd’ + abcd = ab(c’d’ + c’d + cd’ +cd) + ab’cd

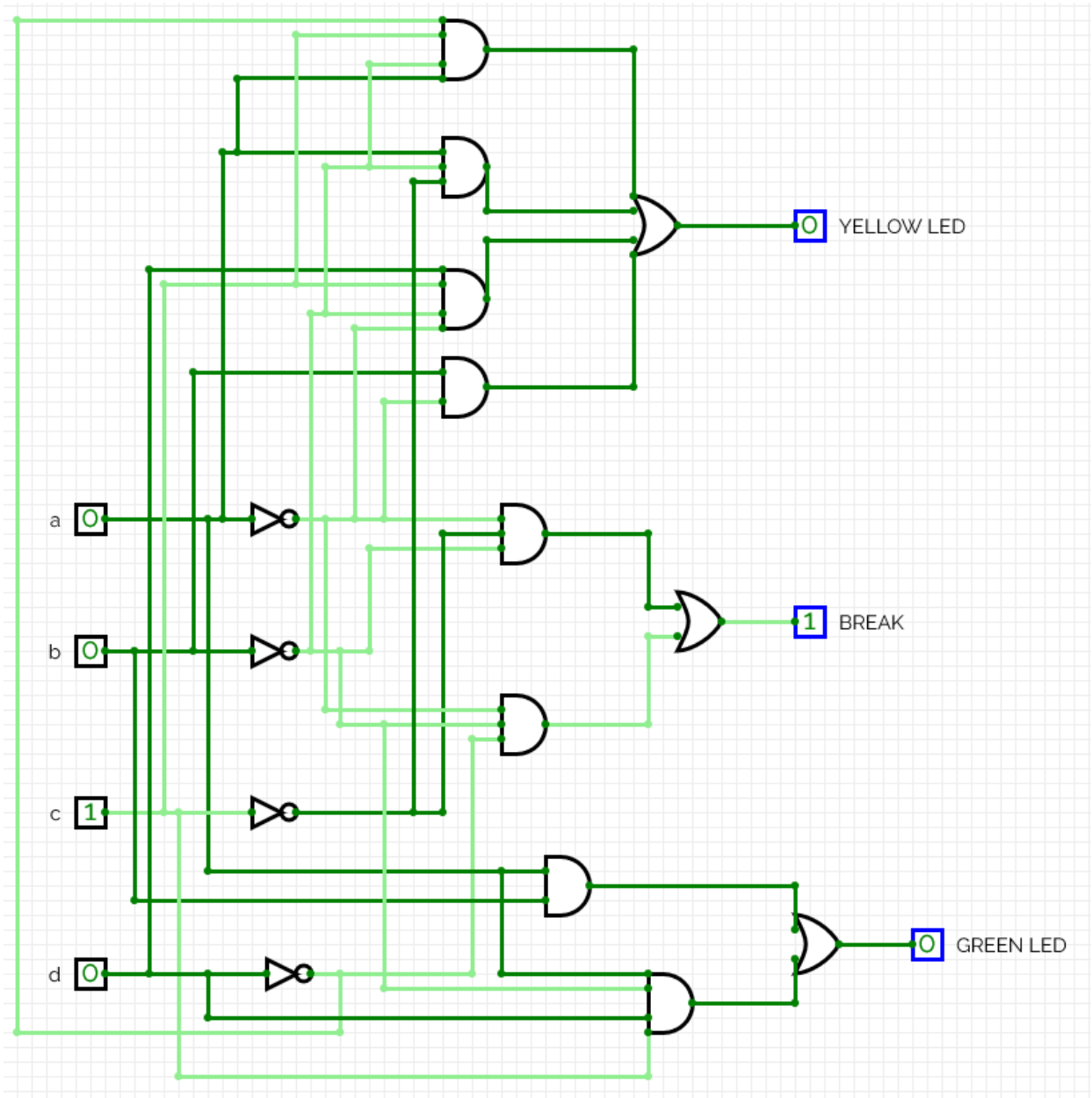
= ab + ab’cd

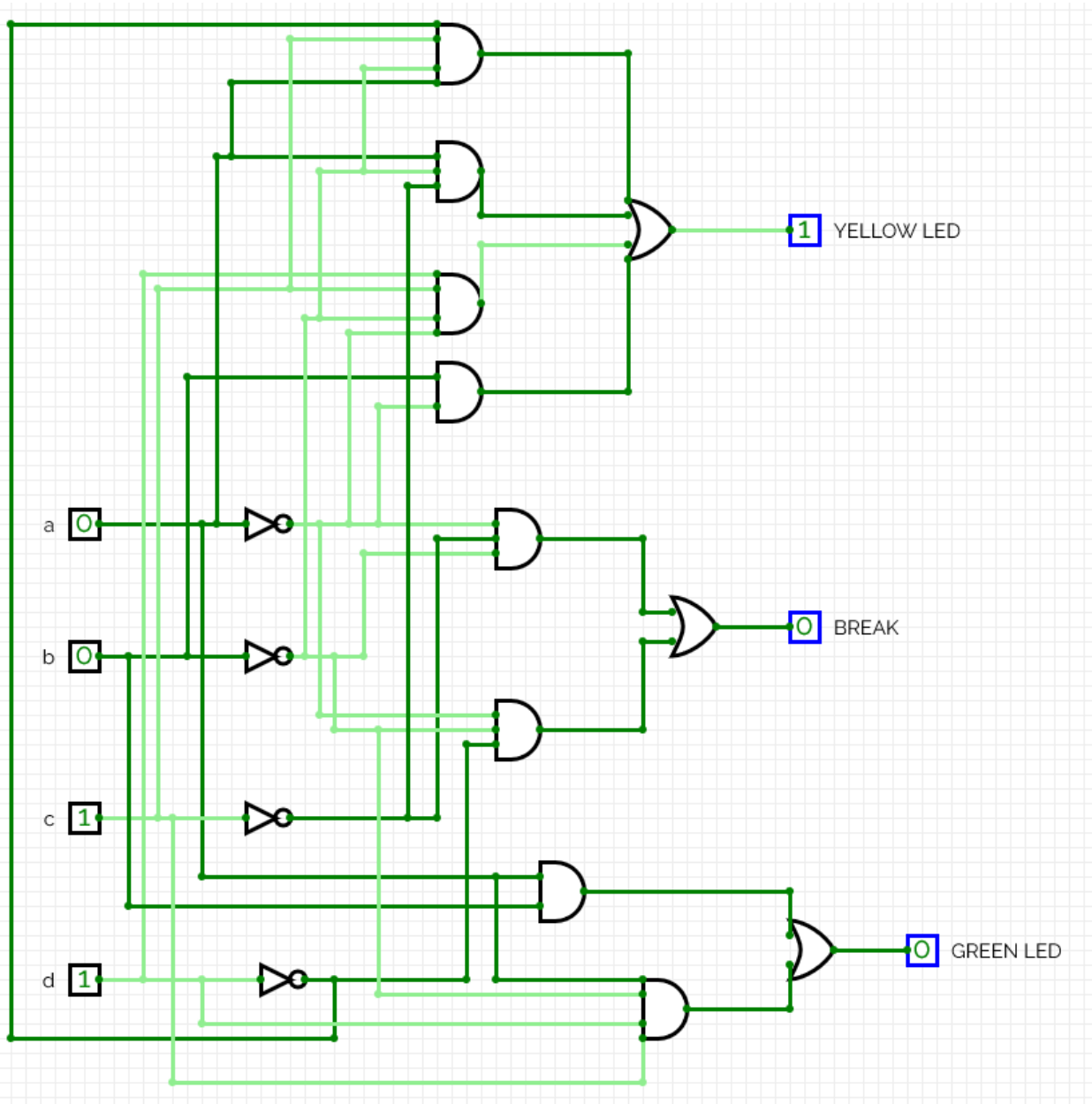
sum of minterms: $\sum(11, 12, 13, 14, 15)$

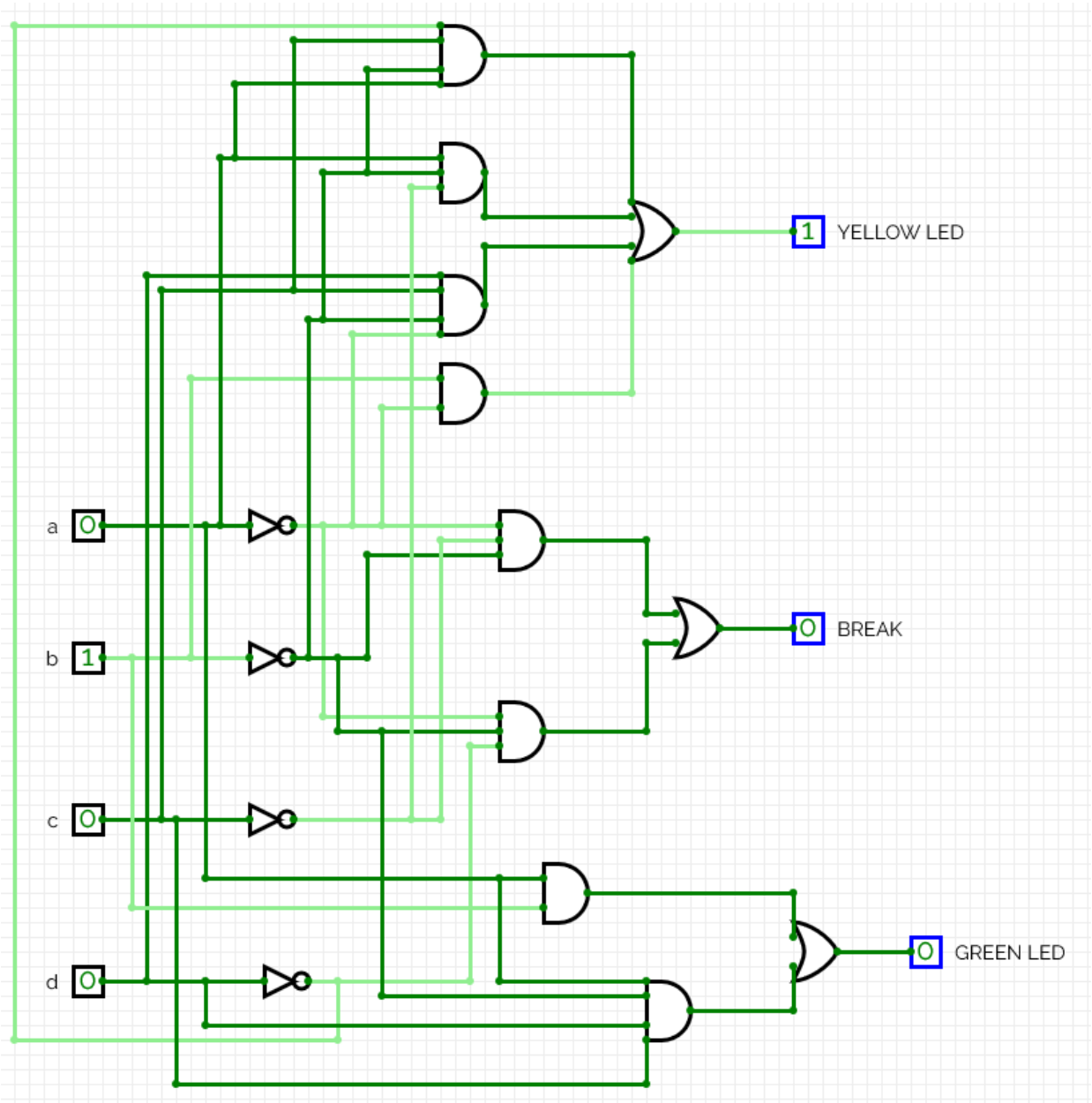
product of maxterms: $\pi(0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10)$

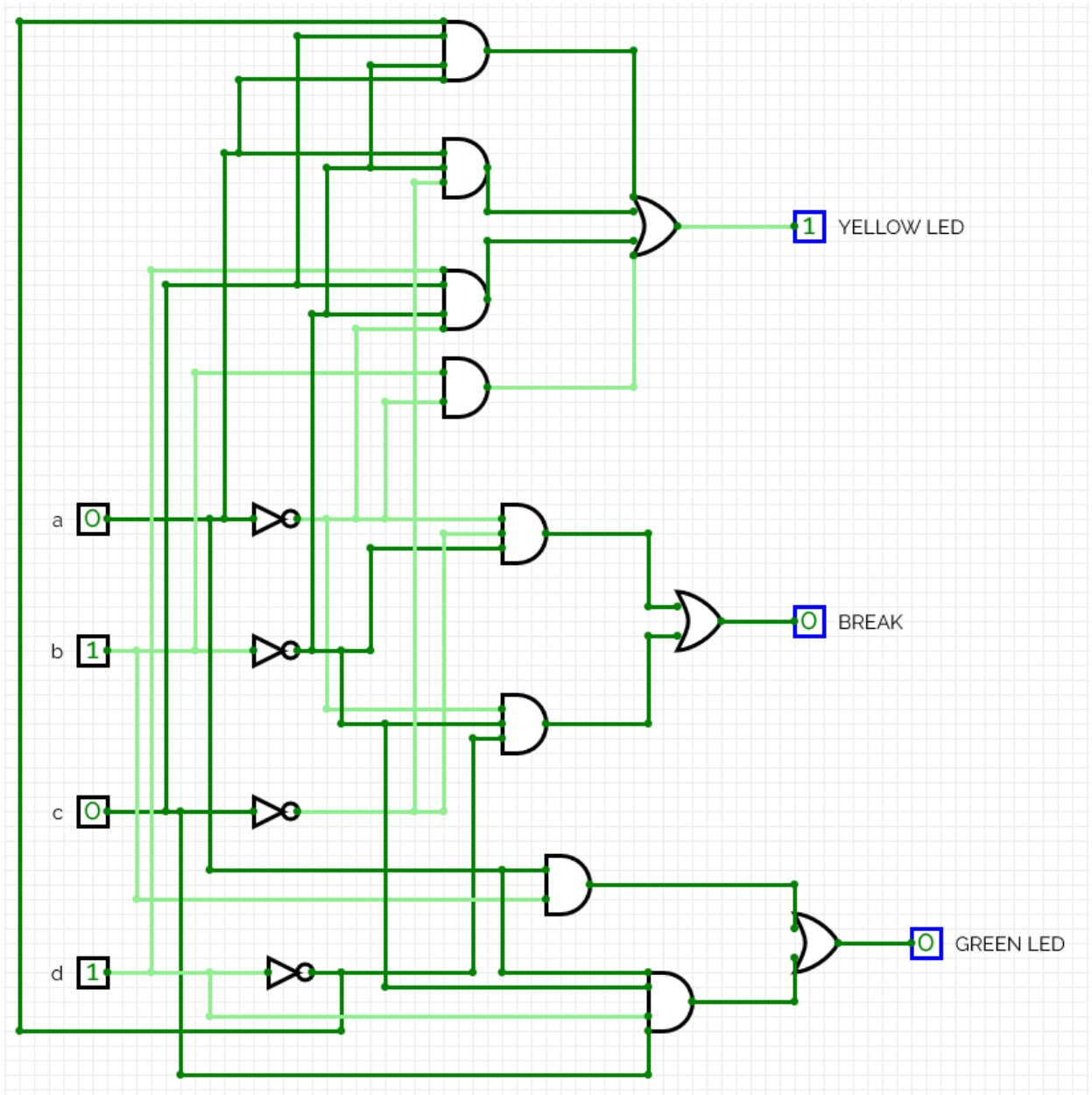

YELLOW LED
a
b
1
BREAK
c
d
GREEN LED

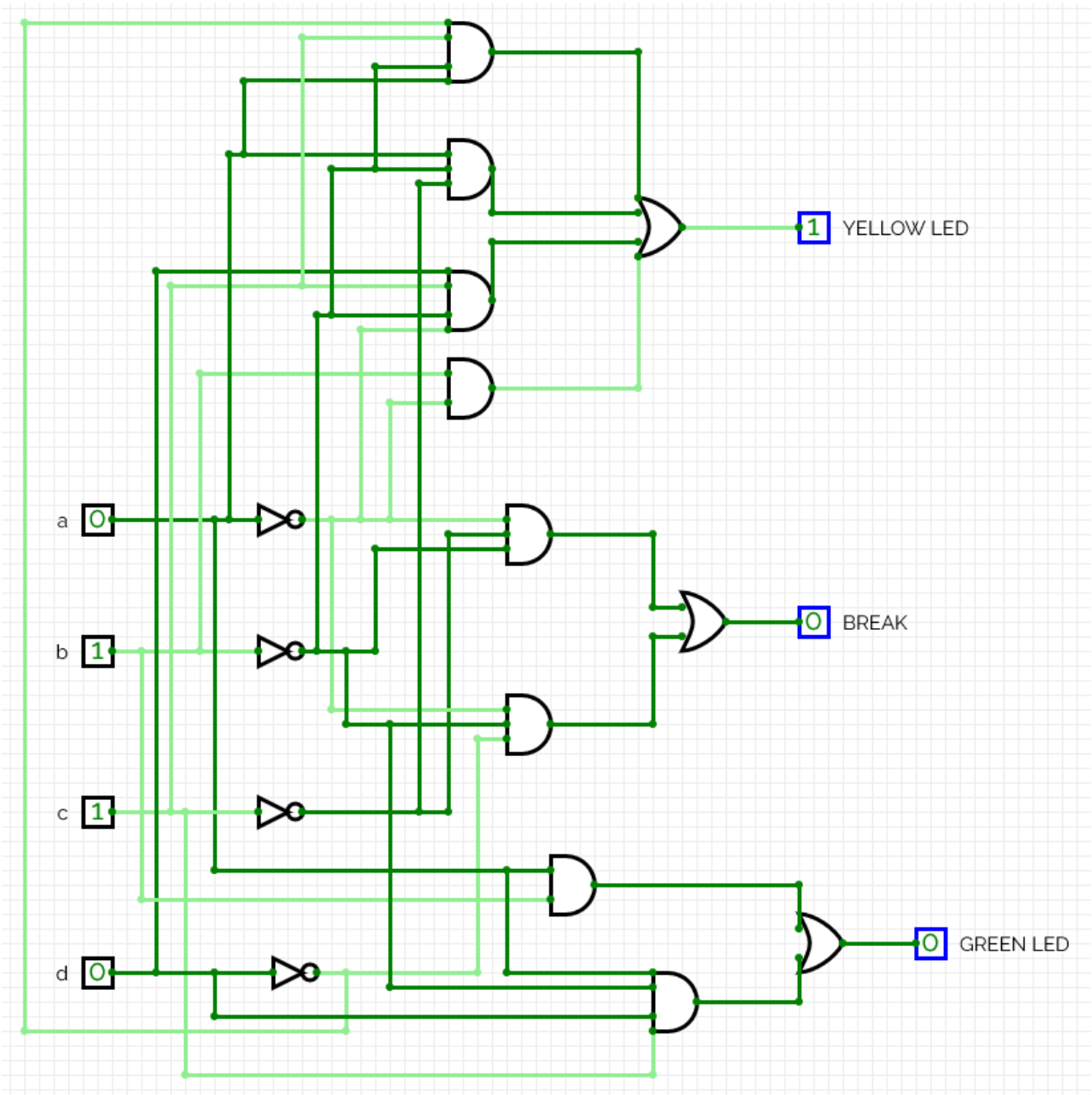

YELLOW LED
a
b
c
d
BREAK
GREEN LED

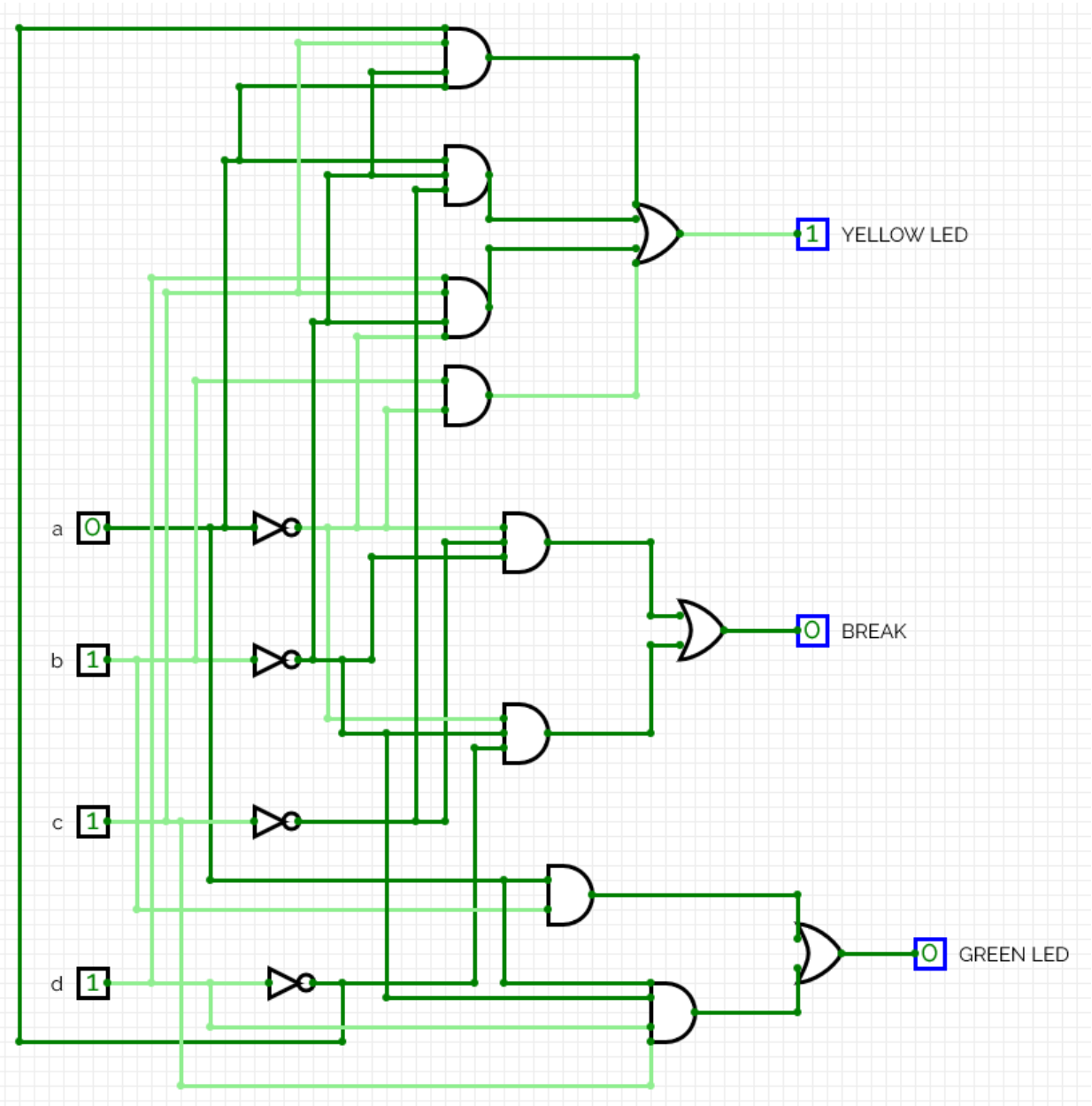

a
0
b
0
c
1
d
0
0
YELLOW LED
1
BREAK
0
GREEN LED

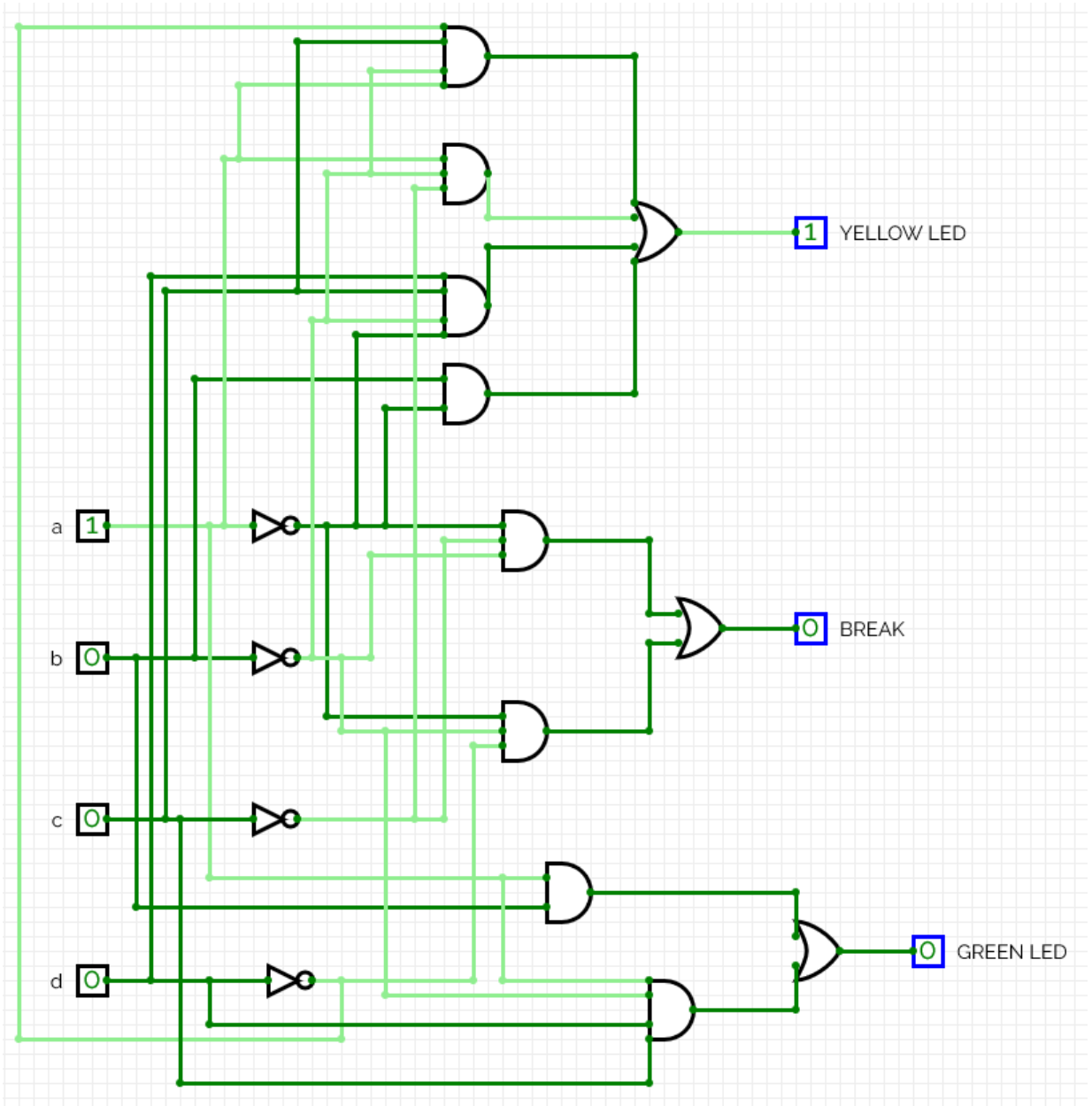

a
0
b
0
c
1
d
1
1
YELLOW LED
0
BREAK
0
GREEN LED

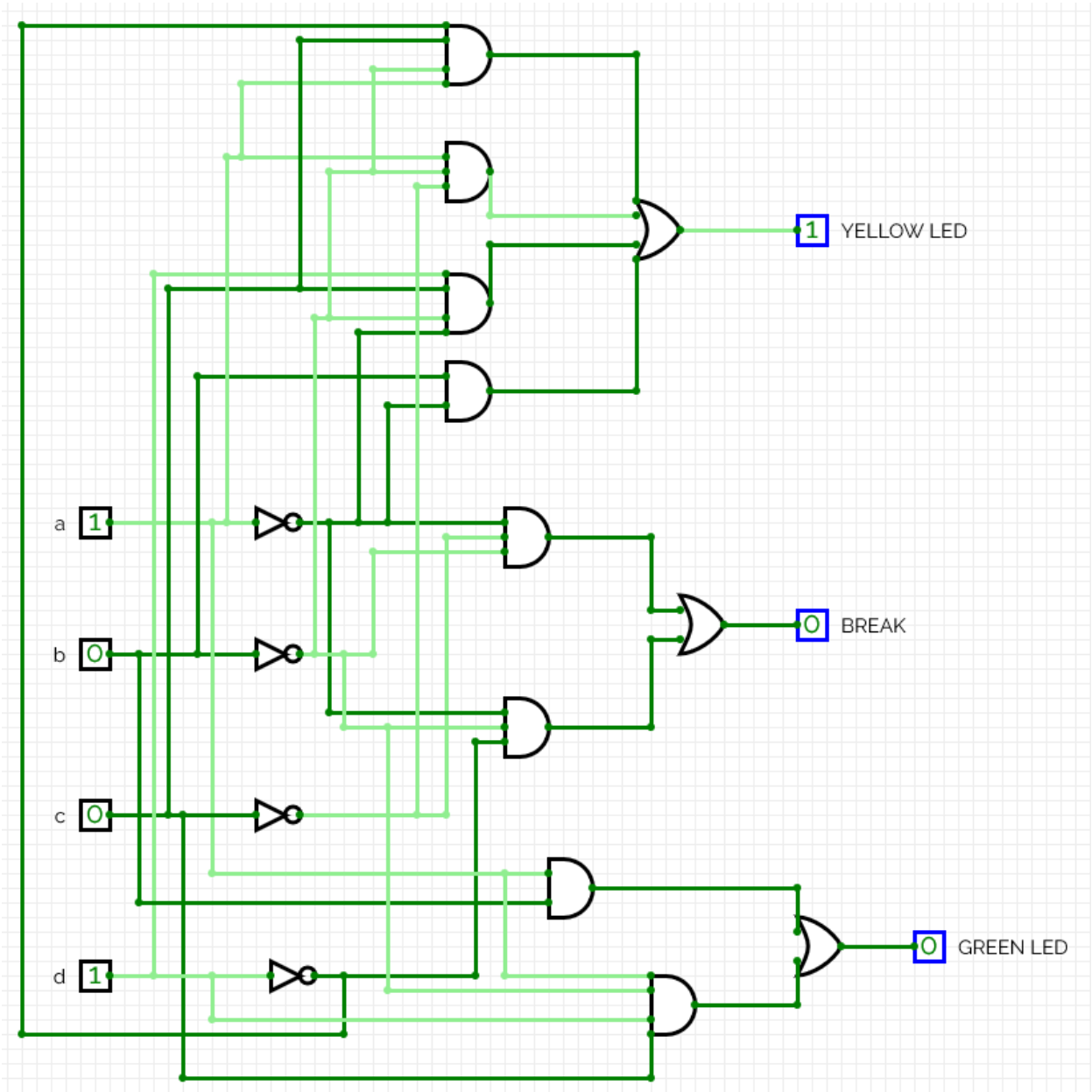

a
0
b
1
c
0
d
0
1
YELLOW LED
0
BREAK
0
GREEN LED

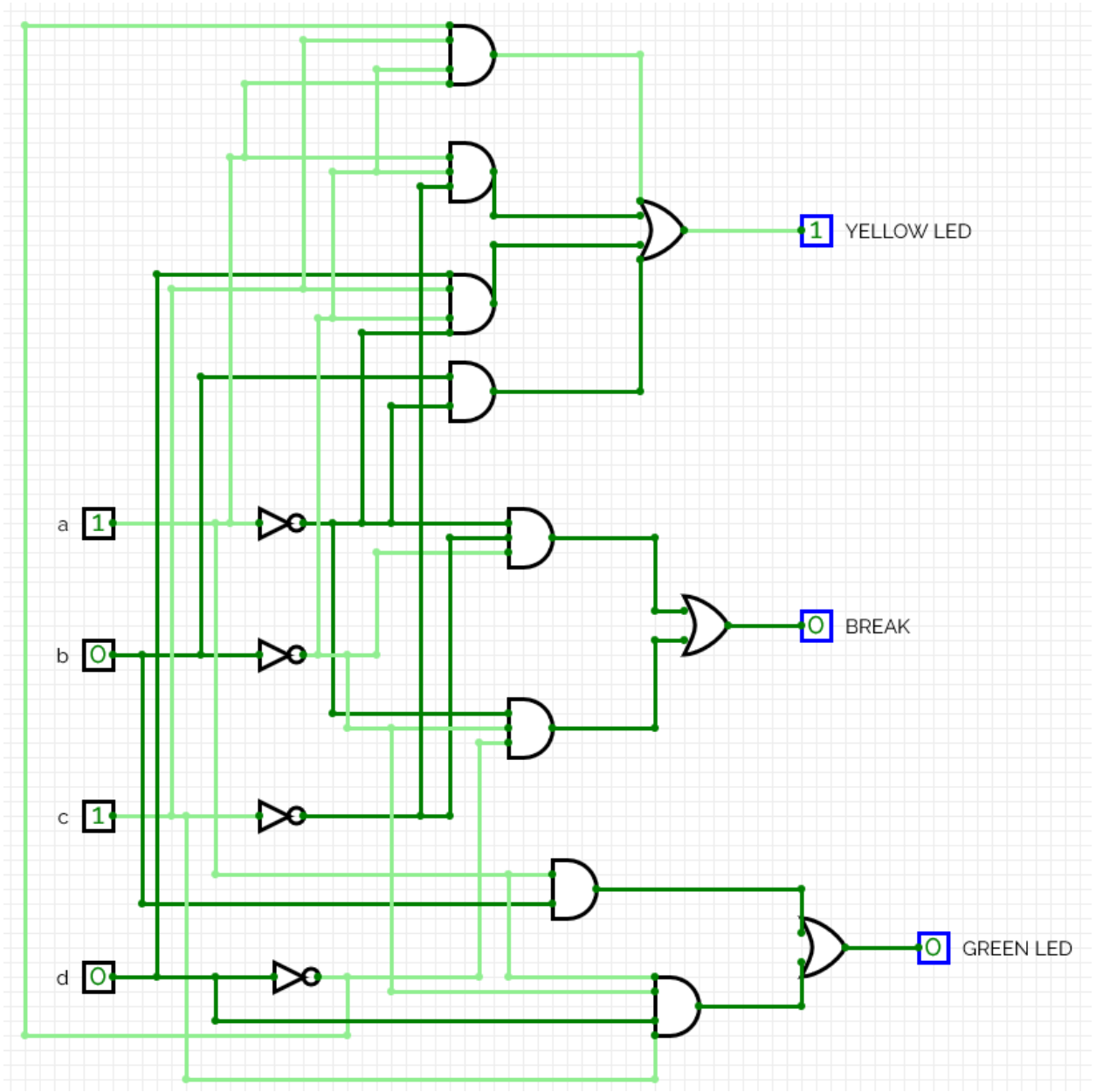

a
0
b
1
c
0
d
1
1
YELLOW LED
0
BREAK
0
GREEN LED

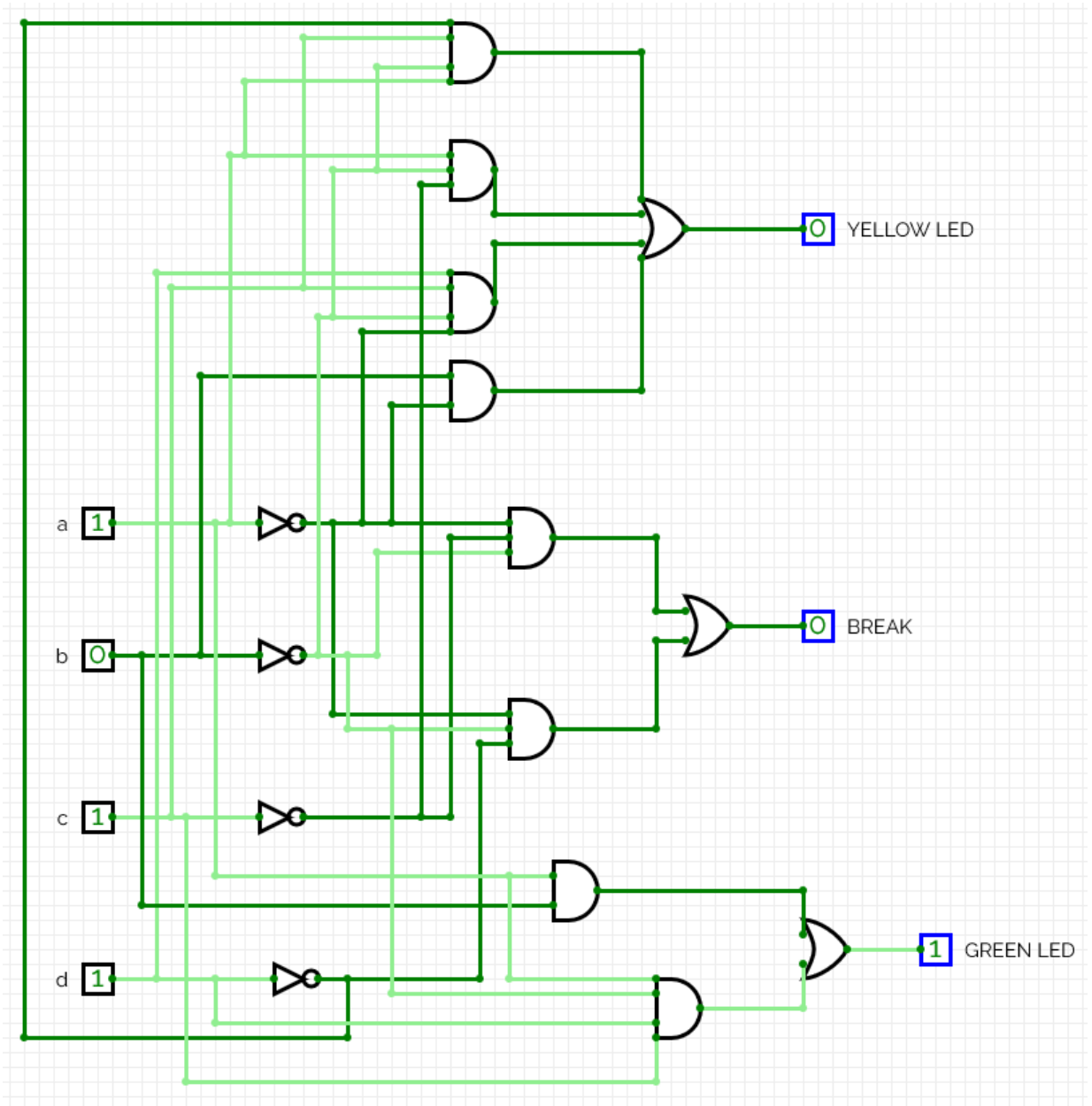

a
0
b
1
c
1
d
0
1
YELLOW LED
0
BREAK
0
GREEN LED

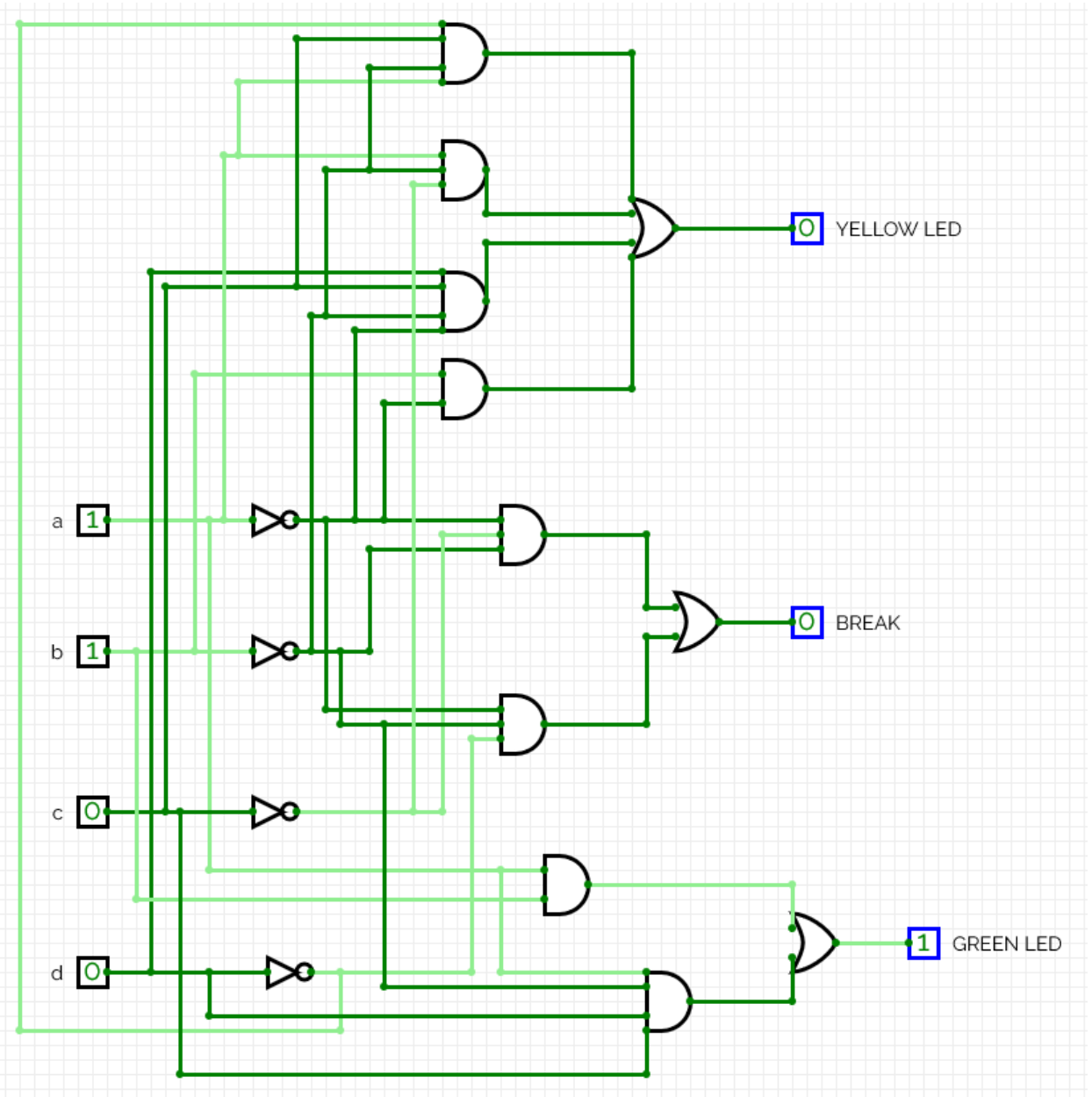

a
0
b
1
c
1
d
1
1
YELLOW LED
0
BREAK
0
GREEN LED

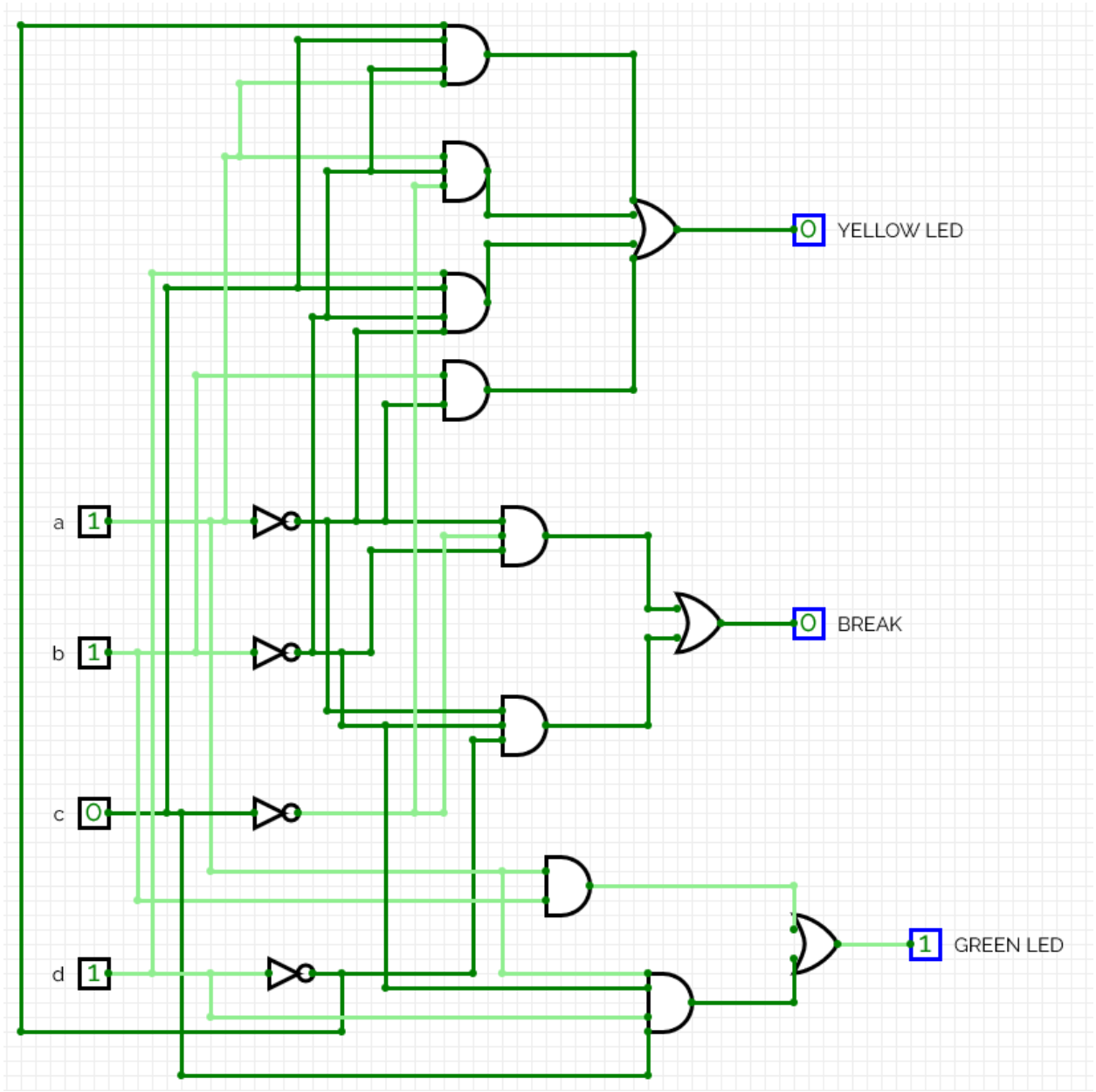

a
1
b
0
c
0
d
0
1
YELLOW LED
0
BREAK
0
GREEN LED

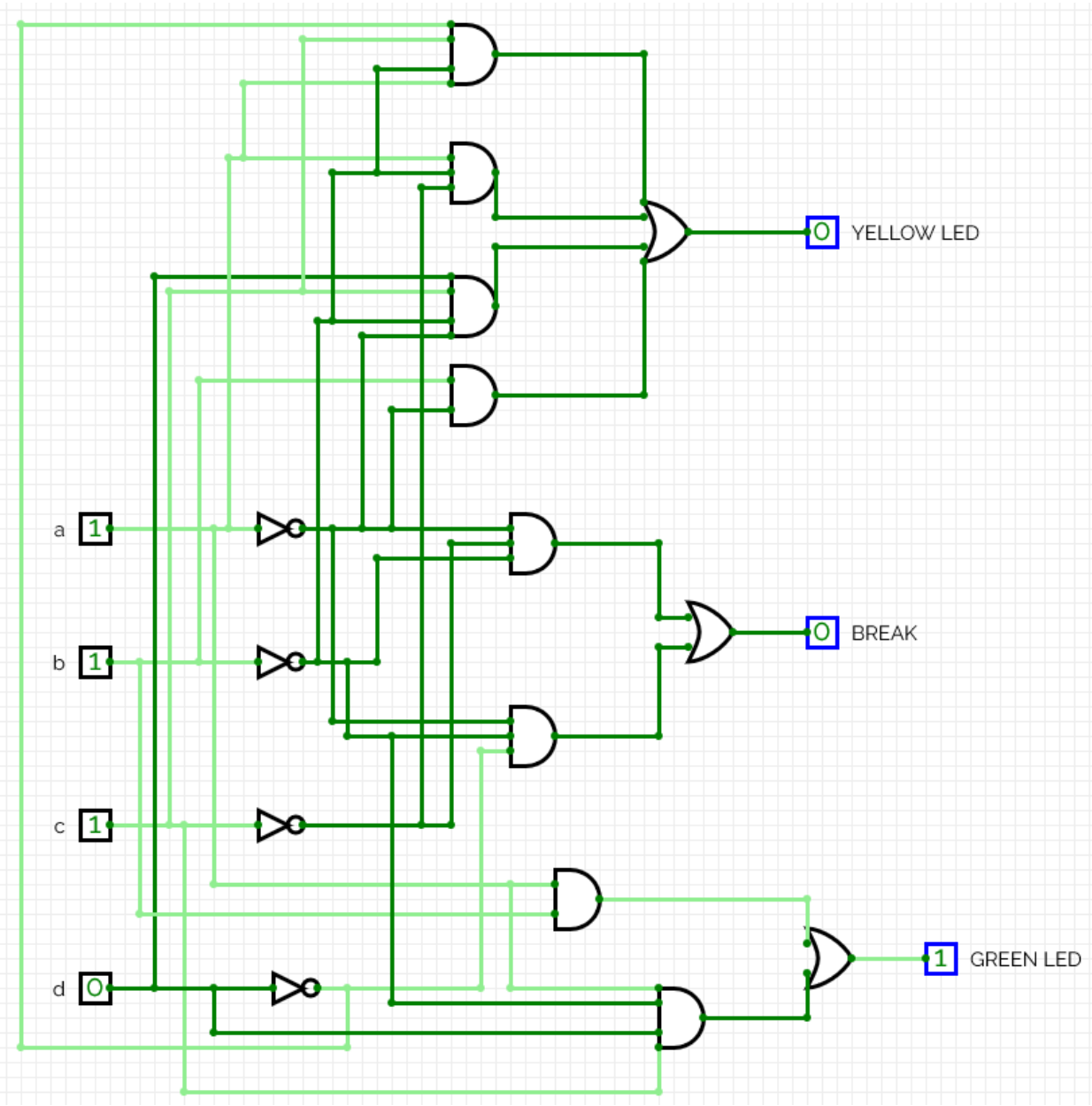

a
1
b
0
c
0
d
1
1
YELLOW LED
0
BREAK
0
GREEN LED

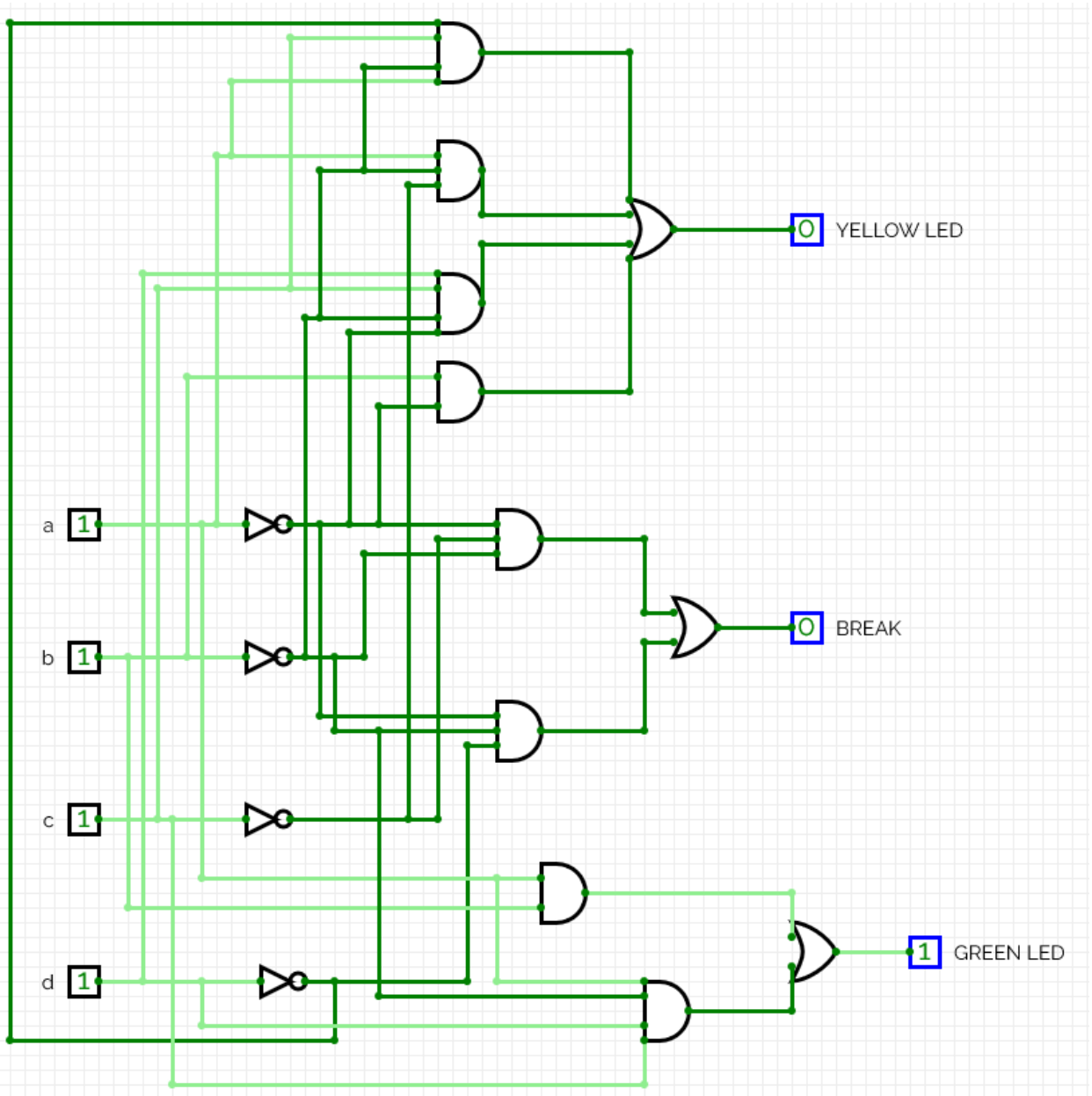

a
1
b
0
c
1
d
0
1
YELLOW LED
0
BREAK
0
GREEN LED


a
1
b
0
c
1
d
1
0
YELLOW LED
0
BREAK
1
GREEN LED


a
1
b
1
c
0
d
0
0
YELLOW LED
0
BREAK
1
GREEN LED


a
1
b
1
c
0
d
1
0
YELLOW LED
0
BREAK
1
GREEN LED


a
1
b
1
c
1
d
0
0
YELLOW LED
0
BREAK
1
GREEN LED


a
1
b
1
c
1
d
1
0
YELLOW LED
0
BREAK
1
GREEN LED

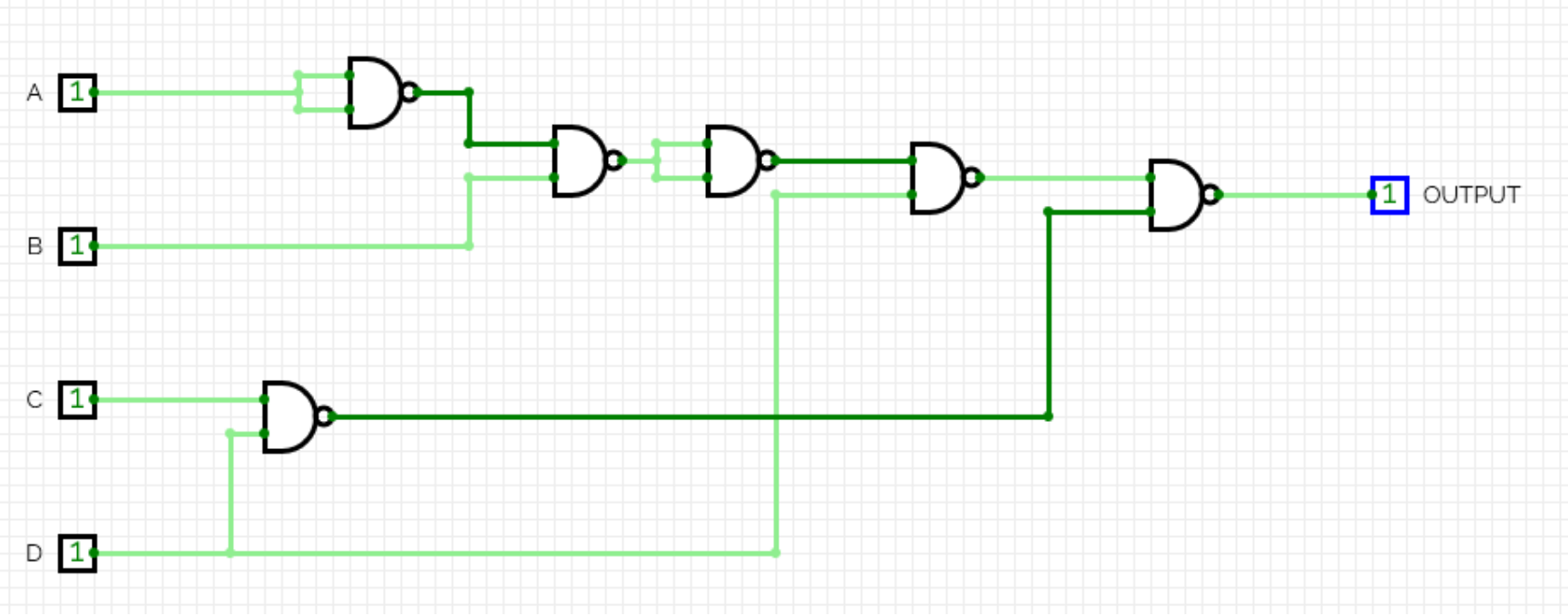
$(a + c)(a + b')(b + c)$

$= (a + c)(ab + ac + \cancel{bb'}^{0} + b'c) = (\cancel{aab}^{ab} + aac + ab'c + abc + acc + \cancel{b'cc}^{b'c})$

$= (ab + ac + ab'c + abc + b'c) = (ab + ac + ac(b' + \cancel{b}^{1}) + b'c)$

$= (ab + \underbrace{ac + ac}_{ac} + b'c) = (ab + b'b + ac + b'c) = (a + b')(b + c)$

Doesn't matter if added.
Doesn't change the result.


A
1
B
1
C
1
D
1
1
OUTPUT