ab \ cd	00	01	11	10
00	1	1	1	0
01	0	1	1	0
11	0	1	1	0
10	1	0	1	1

$$S = cd + b\bar{d} + \bar{a}\bar{b}\bar{c} + a\bar{b}\bar{d}$$

ab \ cd	00	01	11	10
00	0	1	0	0
01	1	0	1	1
11	0	1	1	1
10	1	0	0	0

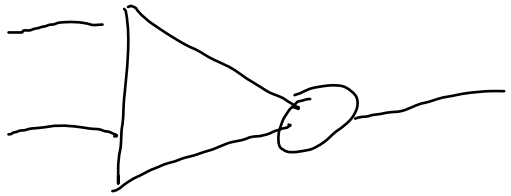
$$S = bc + \bar{a}b\bar{d} + abd + \bar{a}\bar{b}\bar{c}d + a\bar{b}\bar{c}\bar{d}$$

ab \ cd	00	01	11	10
00	0	1	0	0
01	1	0	1	1
11	0	1	1	1
10	1	0	0	0

$$S = cb + \bar{a}\bar{b}\bar{c}d + \bar{a}bc\bar{d} + ab\bar{c}d + a\bar{b}\bar{c}\bar{d}$$

$$S = cb + \bar{a}\bar{b}\bar{c}d + a\bar{b}\bar{c}\bar{d} + b\bar{c}(\bar{a}\bar{d} + ad)$$

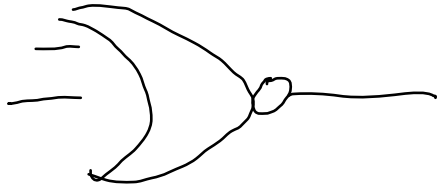
NON



OU

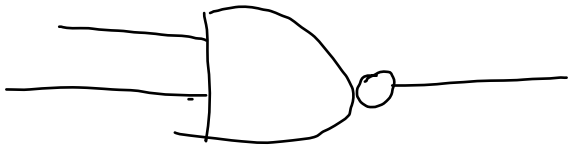
ET

NON OU

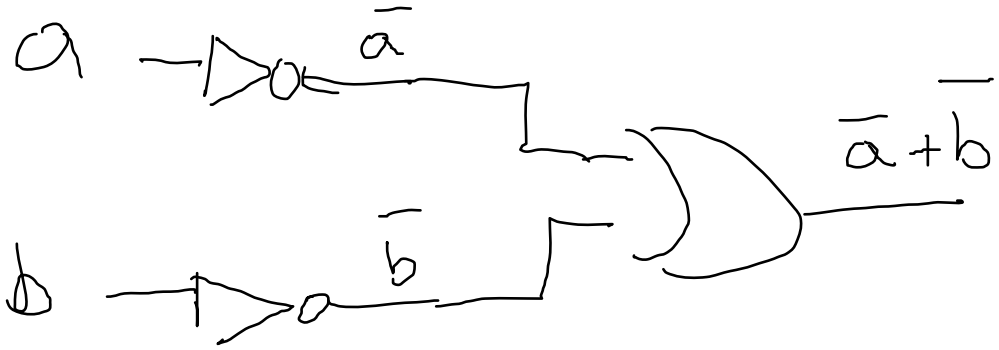


XOR

NON ET



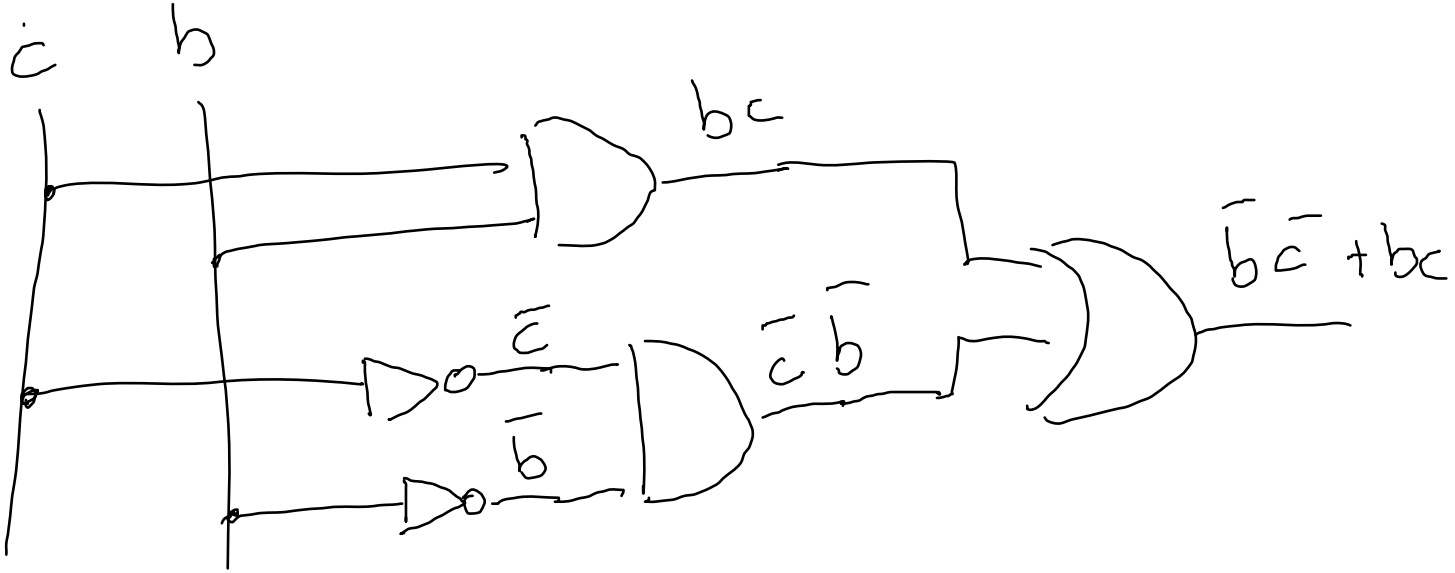
b \ a	0	1
0	1	1
1	1	0



$$S = \bar{a} + \bar{b}$$

a \ bc	00	01	10	11
0	1	0	0	1
1	1	0	0	1

$$S = \bar{b}\bar{c} + bc$$



$b.\bar{b}$

a \ bc	00	01	10	11
0	1	0	0	1
1	1	0	0	1

$$S = \bar{b}c + b\bar{c}$$

b	c	S
0	0	0
0	1	1
1	0	1
1	1	0

$$\bar{S} = \overline{\bar{b}c + b\bar{c}} = \overline{\bar{b}c} \cdot \overline{b\bar{c}}$$

$$= (b + \bar{c}) \cdot (\bar{b} + c)$$

$$= b\bar{b} + bc + \bar{c}\bar{b} + \bar{c}c = b\bar{c} + \bar{b}c$$

$$= b \oplus c$$

$b.\bar{b}$

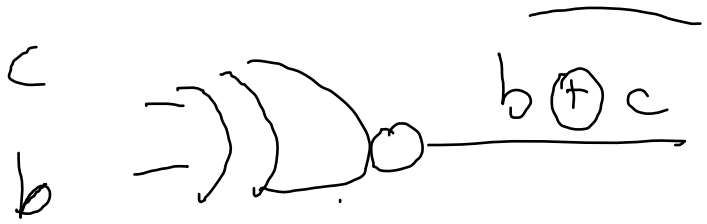
a \ bc	00	01	10	11
0	1	0	0	1
1	1	0	0	1

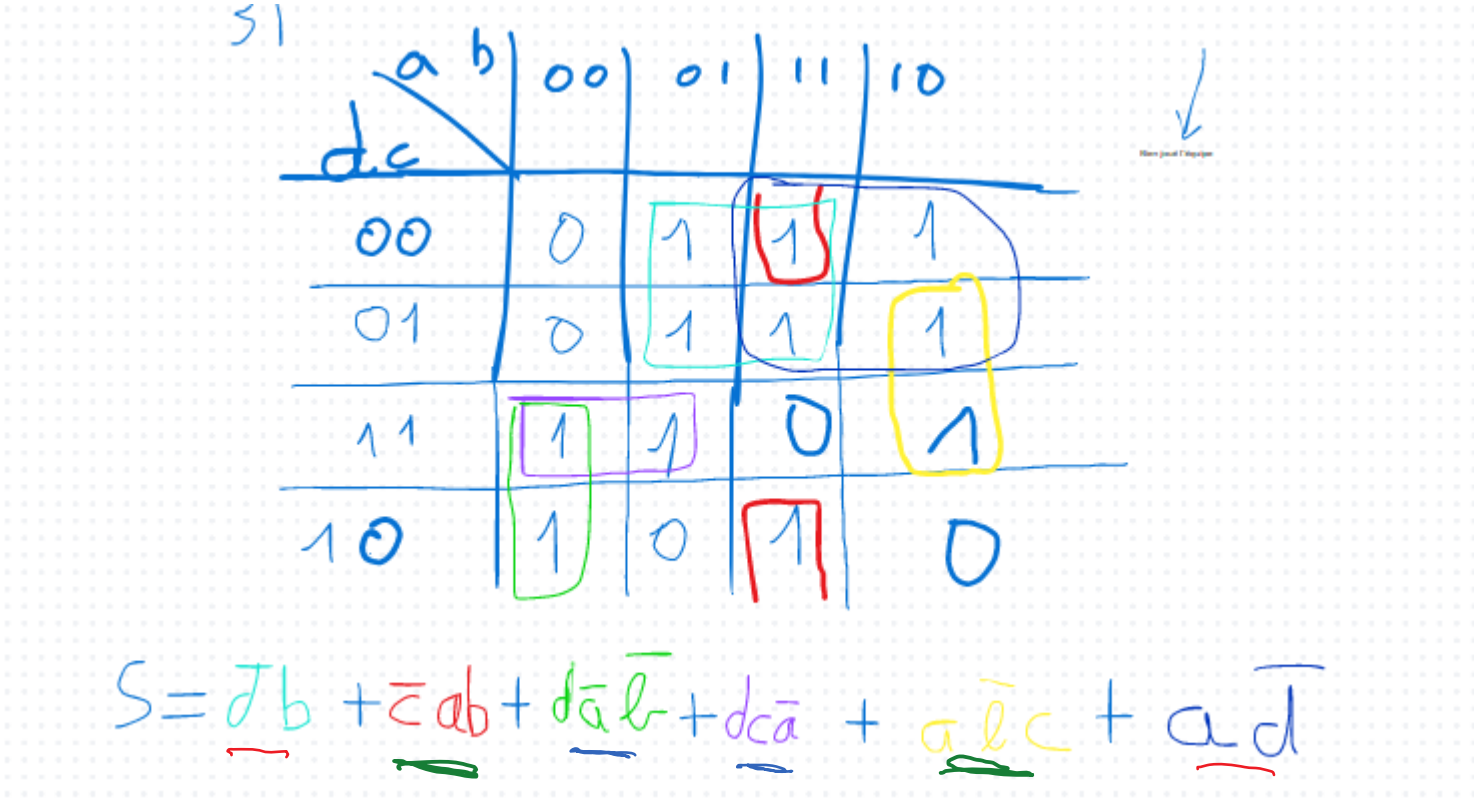
$$S = \bar{b}\bar{c} + bc$$

b	c	S
0	0	0
0	1	1
1	0	1
1	1	0

$$\bar{S} = \overline{\bar{b}\bar{c} + bc} = b \oplus c$$

$$S = \overline{b \oplus c}$$



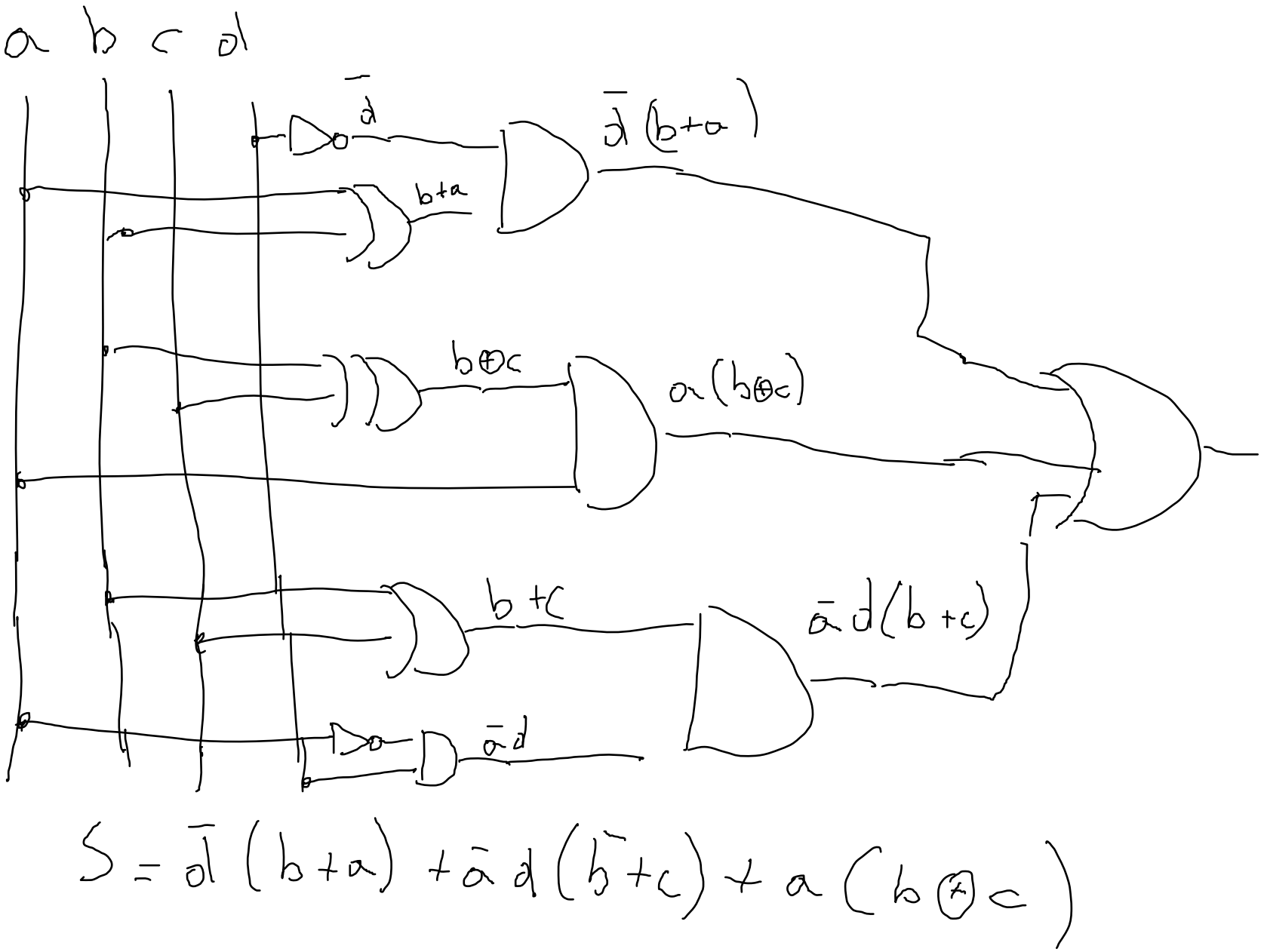


$$S = \bar{d}b + \bar{c}ab + d\bar{a}\bar{b} + dc\bar{a} + a\bar{b}c + a\bar{d}$$

$$S = \bar{d}(b+a) + \bar{a}d(\bar{b}+c) + a(\bar{b}c + \bar{c}b)$$

$$S = \bar{d}(b+a) + \bar{a}d(\bar{b}+c) + a(b \oplus c)$$

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



$$S = \bar{d}(b+a) + \bar{a}d(\bar{b}+c) + a(b \oplus c)$$

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

$$F1 = a.b.\bar{c} + \bar{a}.\bar{b}.c + a.\bar{b}.\bar{c} + a.\bar{b}.c$$

c \ ab	00	01	11	10
0	0	0	1	1
1	1	0	0	1

$$F_1 = a\bar{c} + c\bar{b}$$

$$F_1 = a\bar{c}\,(b + \bar{b}) + \bar{b}c\,(\bar{a} + a)$$

$$= a\bar{c} + \bar{b}c$$

$$F2 = \bar{a}.\bar{b}.c.\bar{d} + \bar{a}.b.\bar{c}.d + a.\bar{b}.c.\bar{d} + \bar{a}.\bar{b}.\bar{c}.\bar{d} + a.b.\bar{c}.d + \bar{a}.b.c.d + a.\bar{b}.\bar{c}.\bar{d}$$

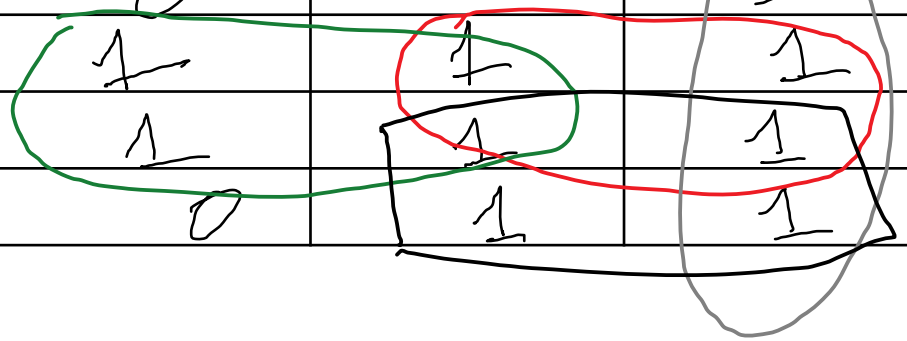
$\bar{a}\,b\,\bar{c}\,d$

cd \ ab	00	01	11	10
00	1	0	0	1
01	0	1	1	0
11	0	1		0
10	1	0	0	1

$$F_2 = \bar{c}\,\bar{d}\,\bar{b} + c\bar{d}\,\bar{b} + d\,\bar{a}\,b + b\,\bar{c}\,d$$

$$F3= \bar{a}.\bar{b}.\bar{c}.\bar{d} + \bar{a}.\bar{b}.\bar{c}.d + \bar{a}.\bar{b}.c.d + \bar{a}.\bar{b}.c.\bar{d} + a.b.\bar{c}.d + a.b.c.d + a.\bar{b}.\bar{c}.d + a.\bar{b}.c.d + a.\bar{b}.c.\bar{d}$$

cd \ ab	11	10	00	01
00	0	0	1	0
01	1	1	1	0
11	1	1	1	0
10	0	1	1	0



$$F_3 = c\bar{b} + \bar{b}d + \bar{a}\bar{b} + ad$$