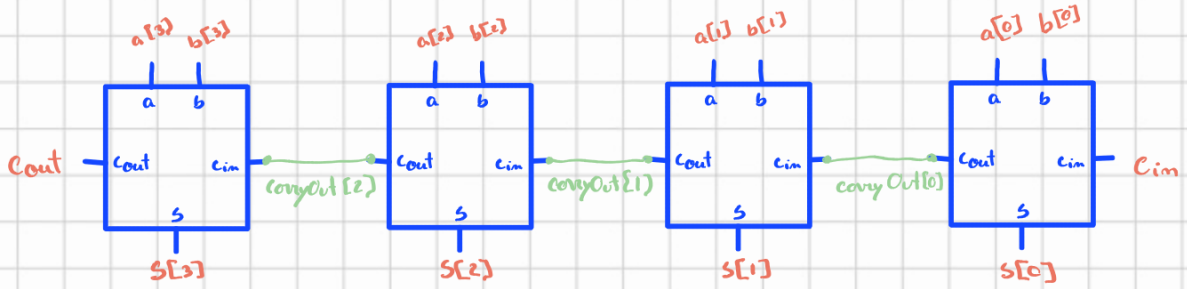
c_{in}	a	b	S	c_{out}
0	0	0	0	0
0	0	1	1	0
0	1	0	1	0
0	1	1	0	1
1	0	0	1	0
1	0	1	0	1
1	1	0	0	1
1	1	1	1	1

c_{in} \ ab	00	01	11	10
0	0	1	0	1
1	1	0	1	0

$$S = \bar{a}\bar{b}c_{in} + \bar{a}b\bar{c_{in}} + ab c_{in} + a\bar{b}\bar{c_{in}}$$
$$= c_{in}(\bar{a}\bar{b} + ab) + \bar{c_{in}}(\bar{a}b + a\bar{b})$$
$$= c_{in}(\overline{a \oplus b}) + \bar{c_{in}}(a \oplus b)$$
$$= (c_{in} \oplus (a \oplus b))$$
$$= c_{in} \oplus a \oplus b$$

c_{in} \ ab	00	01	11	10
0	0	0	1	0
1	0	1	1	1

$$C_{out} = b c_{in} + ab + a c_{in}$$
$$= c_{in}(a + b) + ab$$



$1001_2 = 9_{10}$

$0011_2 = 3_{10}$

Op = 000:

$9 + 3 = 12$

1100

op = 001:

$9 - 3 = 6$

0110

op = 010:

$9 \times 3 = 27$

11011

op = 011:

9 | 3
9 | (3)
0

0011

op = 100:

9 | 3
9 | 3
(0)

0000

Op = 101: AND

1001
0011
0001

op = 110: OR

1001
0011
1011

op = 111: XOR

1001
0011
1010

-9