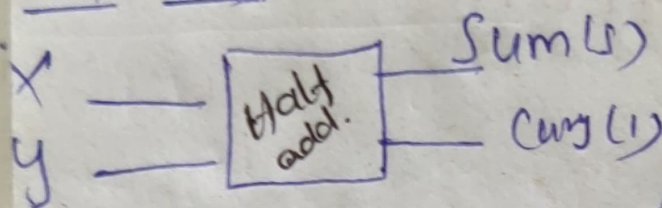


## Half Adder

\* Combinational circuit that performs the addition of two bits.

Block diag:

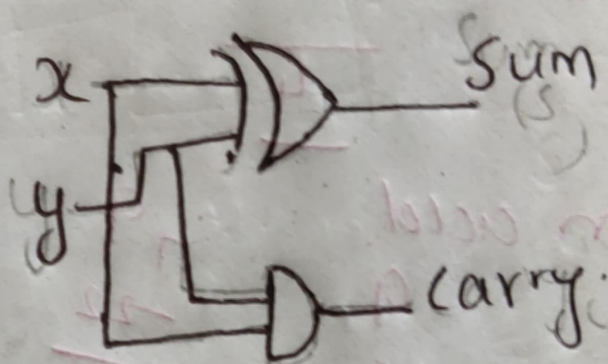


O/p equ

$$s = x \oplus y \rightarrow \text{xor gate}$$

$$C = x \cdot y$$

Circuit diag.



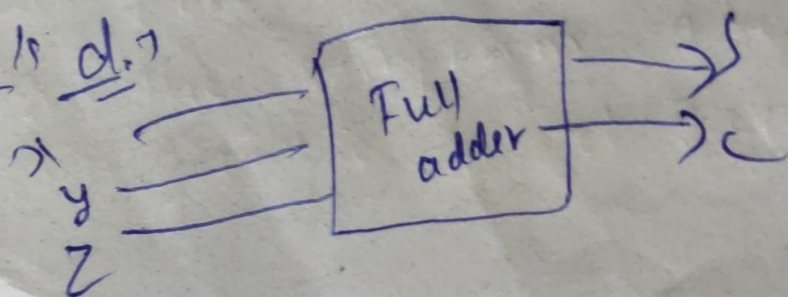
Truth table

x	y	s	c
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1

## Full adder:

\* Full adder is a comb. circuit that performs the addition of 3 bits.

Block diag.





# Truth table

x	y	z	S	C
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

O/p eay

sum

Kmap

yz	00	01	11	10
x=0		1		1
x=1	1		1	

$$S = \bar{x}\bar{y}z + \bar{x}y\bar{z} + x\bar{y}\bar{z} + xyz$$

$$x \oplus y \oplus z //$$

$$= \bar{x}(\bar{y}z + y\bar{z}) + x(\bar{y}\bar{z} + yz)$$

$$= \bar{x}(y \oplus z) + x(y \oplus z)$$

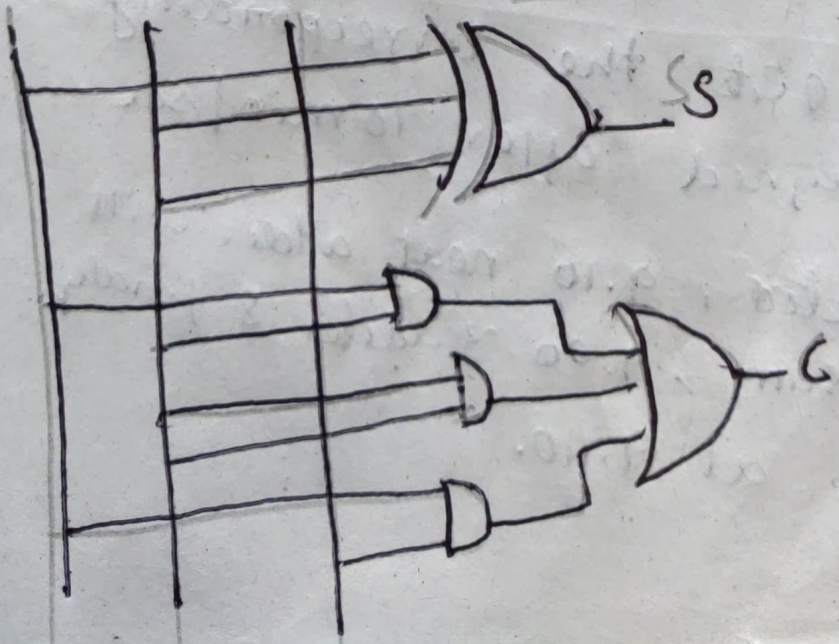
$$= x \oplus y \oplus z$$

yz	00	01	11	10
x=0			1	1
x=1	1	1	1	1

$$C = xy + yz + xz$$

$$x\bar{y}\bar{z} + x\bar{y}z + x\bar{y}z + x\bar{y}\bar{z}$$

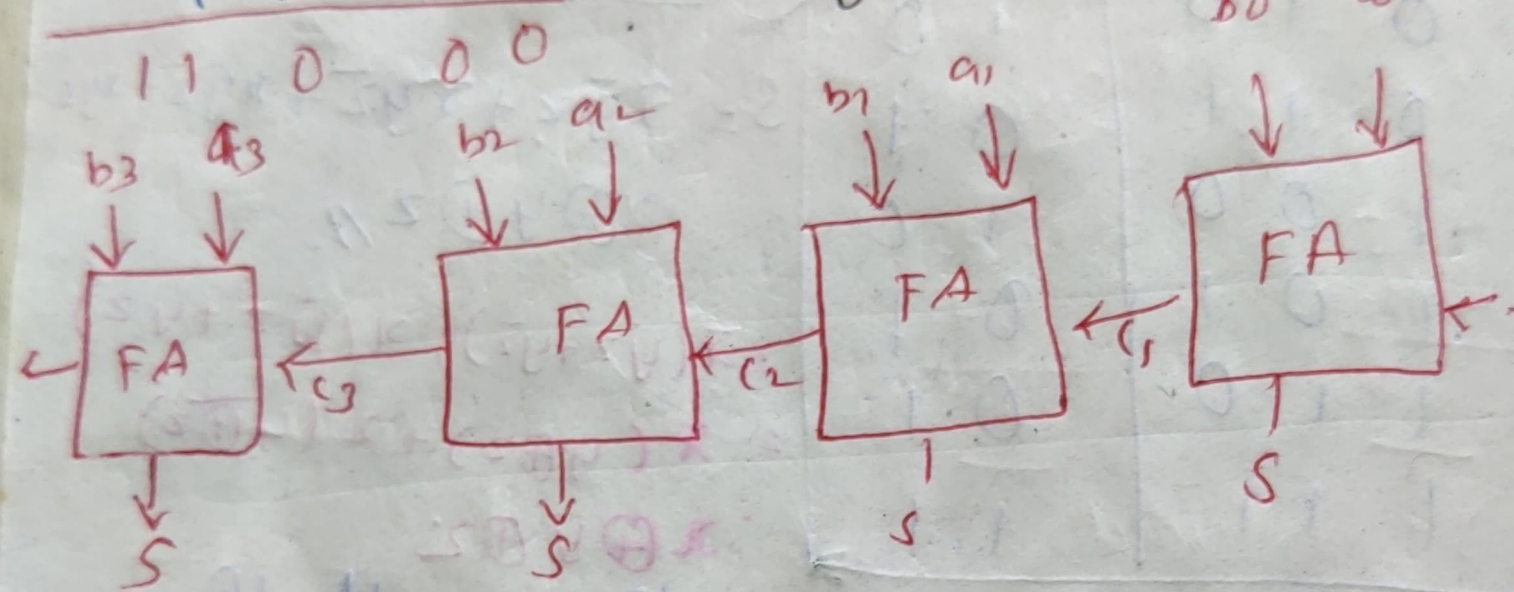
x y z





# Ripple carry adder: with Full adder

$a_3$   $a_2$   $a_1$   $a_0$   
 1   0   1   1  
 $b_3$   $b_2$   $b_1$   $b_0$   
 1   1   0   1



~~Ex 2~~ All 'p are available in 9 am sharp

- \* for ex: FA takes 10 minutes/sec.
- \* so each adder doing some work but not related to our work.
- \* when will get the corresponding o/p of each assigned after 10 min/sec.
- so. 9 clk it stated, 9.10 next adder will give the carry/sum, 9.20 3 adder 8 finally will get the o/p at 9.40.