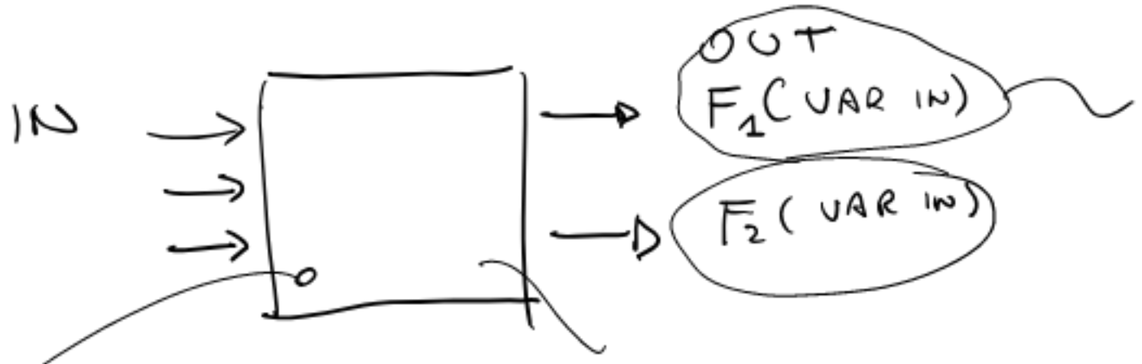
CIRCUITO DIGITALE



Rappr. algebrica F

$F = A \cdot B + C$

Descritto TAU. VER.

SVILUPP. MINTERM MAXTERM

Rappr. Alg. F.

A	B	m	M	F
0	0	$\bar{A}\bar{B}$	$A+B$	F_1
0	1	$\bar{A}B$	$A+\bar{B}$	F_2
1	0	$A\bar{B}$	$\bar{A}+B$	F_3
1	1	AB	$\bar{A}+\bar{B}$	F_4
		Π	Π	Π
		m_i	M_i	

$$F = \sum_{i=1}^{2^{NVAR}} m_i \cdot F_i = \prod_{i=1}^{2} (M_i + F_i)$$

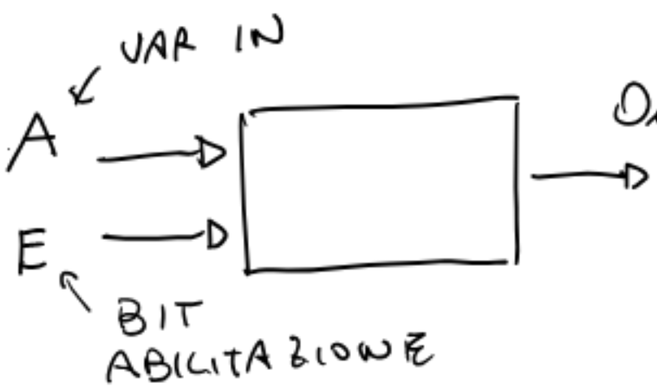
$F_i = 1$ | $F_i = 0$

$$F = \sum_{\substack{i=1 \\ F_i=1}}^{2^{NVAR}} m_i = \prod_{\substack{i=1 \\ F_i=0}}^{2} M_i$$

LOGICA COMBINATORIA

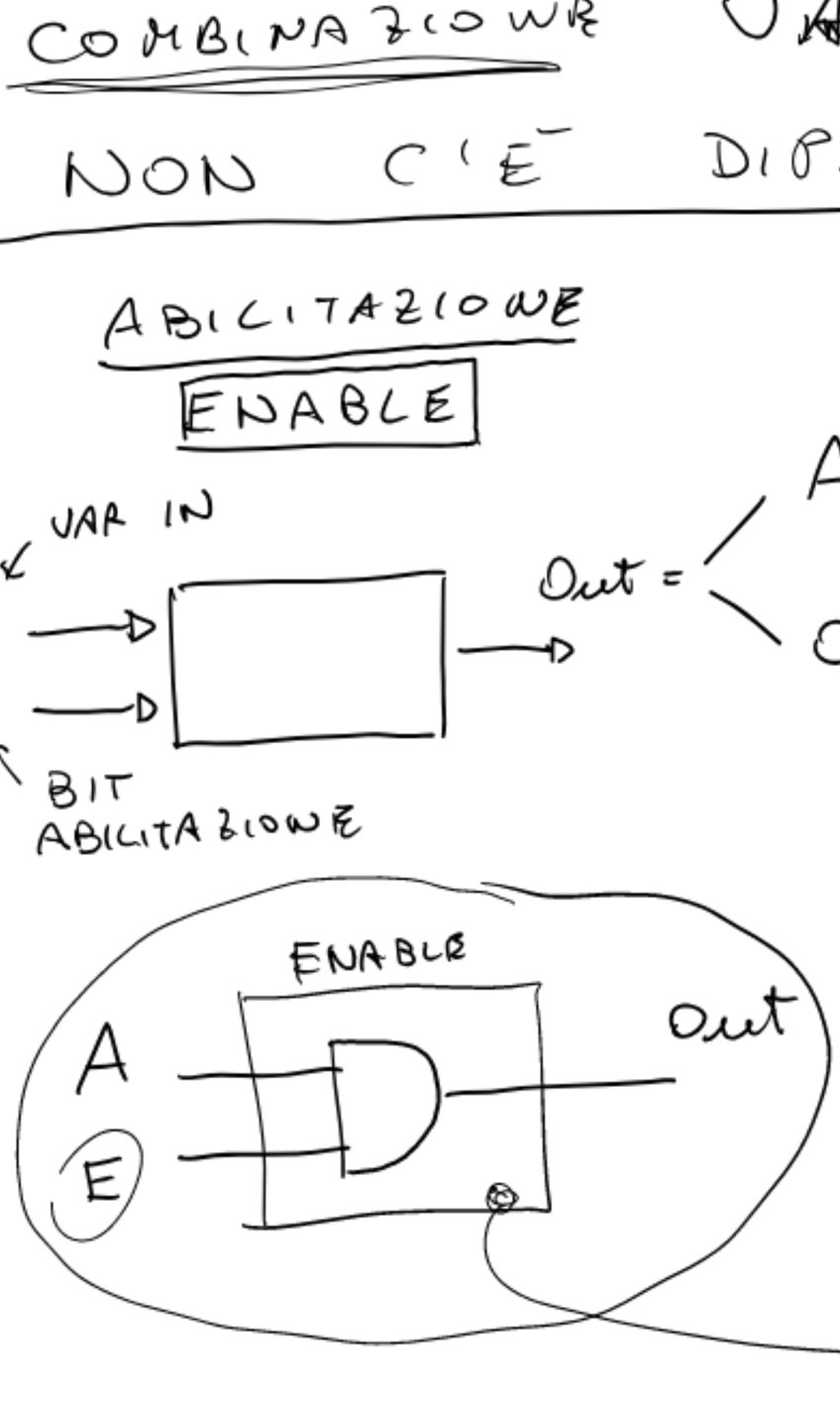
- a) Lo stato di F è univocamente definito dalle COMBINAZIONI DELLE VAR IN A, B, C...
- b) NON C'È DIPENDENZA DAL TEMPO

ABILITAZIONE
ENABLE

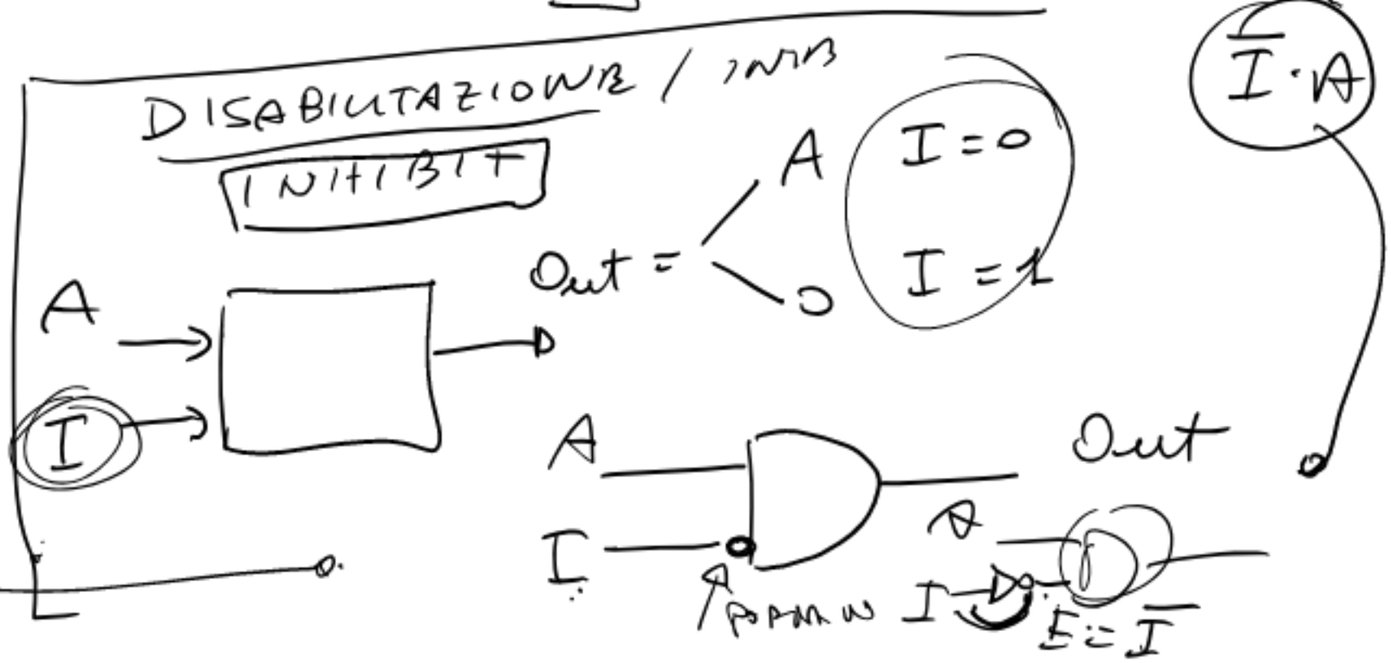


(I)

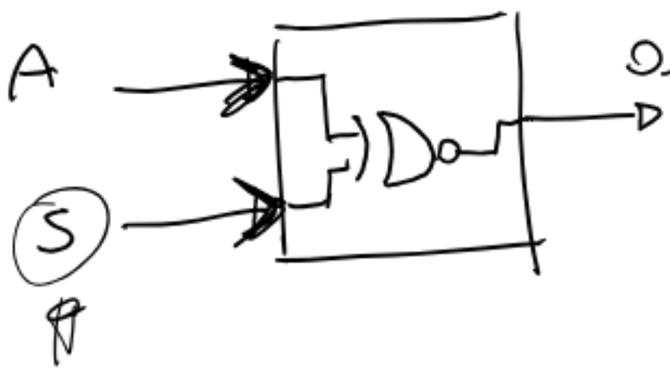
E	A	Out = E·A
0	0	0
0	1	0
1	0	0
1	1	1

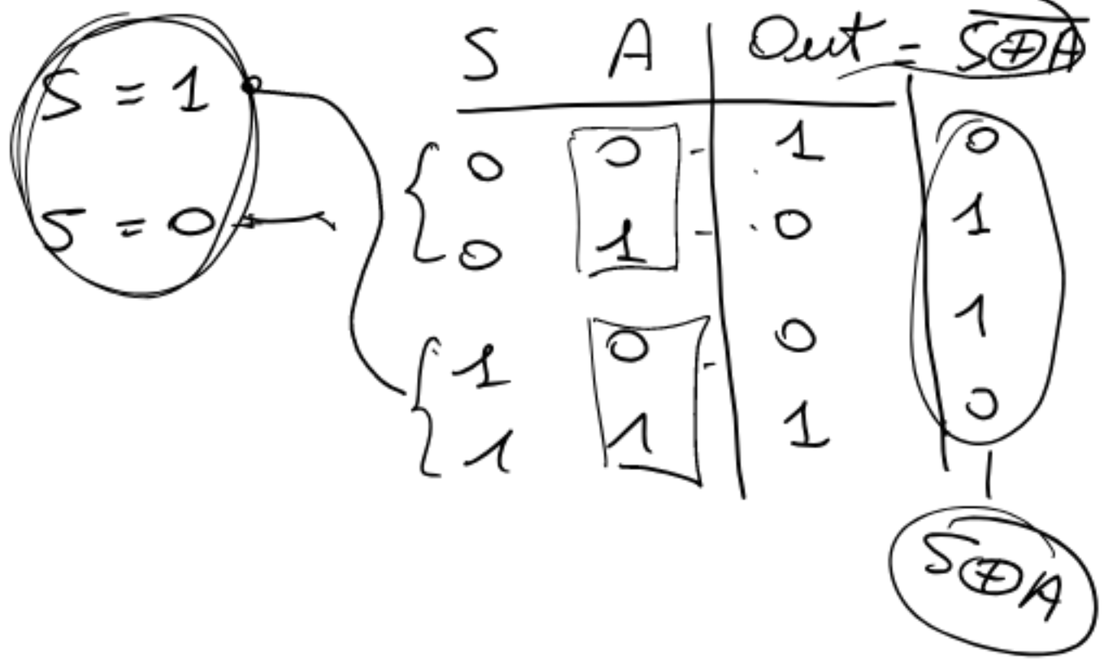


DISABILITAZIONE / INIBIZIONE
INITIBIT



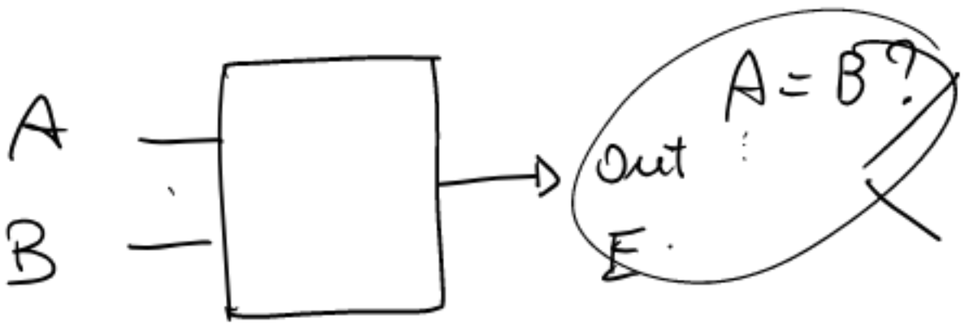
TRUE/FALSE





XOR XNOR

UGUAGLIANZA



A	B	E	D
0	0	1	0
0	1	0	1
1	0	0	1
1	1	1	0

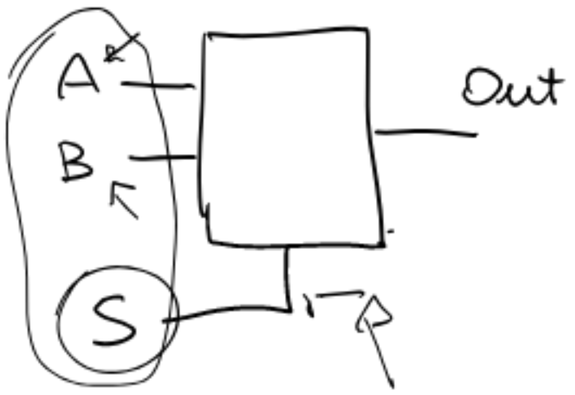
$E = \overline{A \oplus B}$

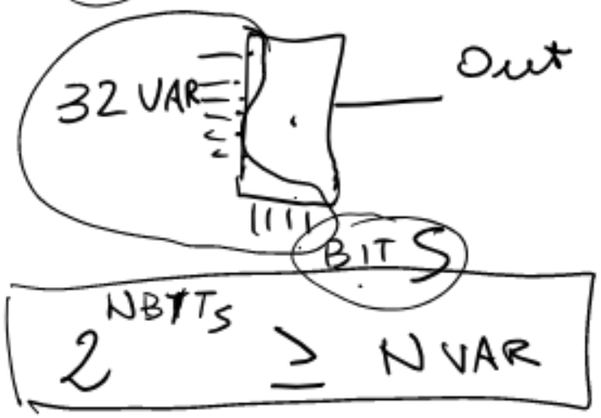
$D = A \oplus B$

MUX

4-1 / 8-1 / 16-1 / 32-1 /

2-1





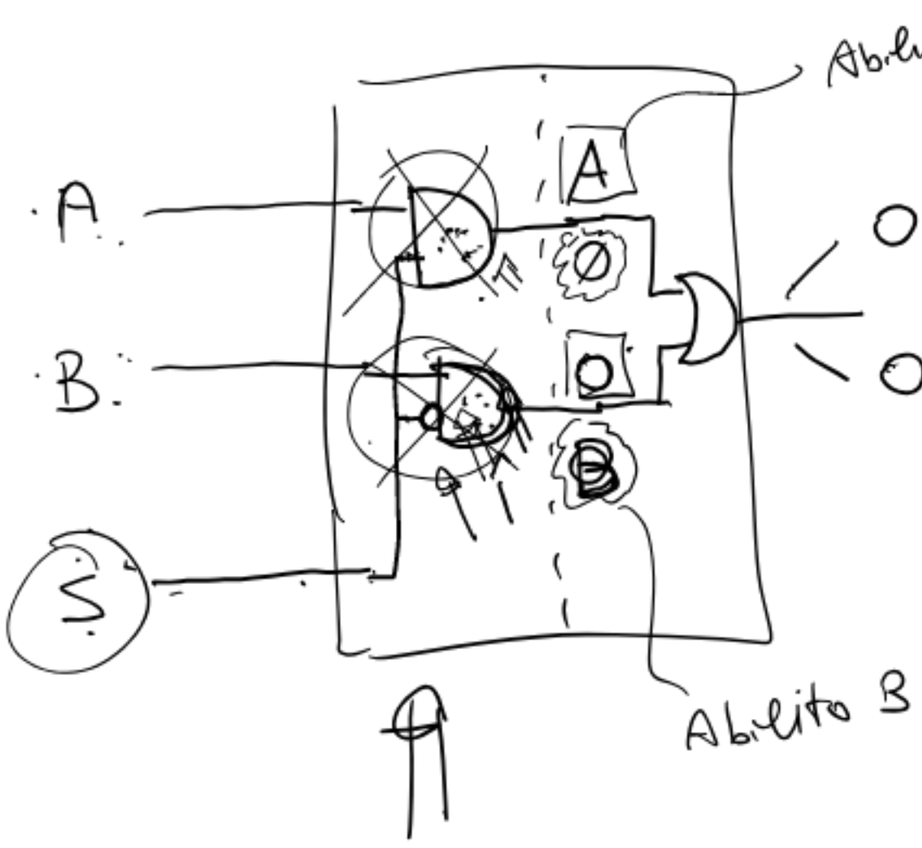
$2^{NBITS} \geq N\,VAR$

$2^{5} = 32$

$N_{BITS} = 5$

32 +
5
37 VAR RIDONDANTE

2^{37}



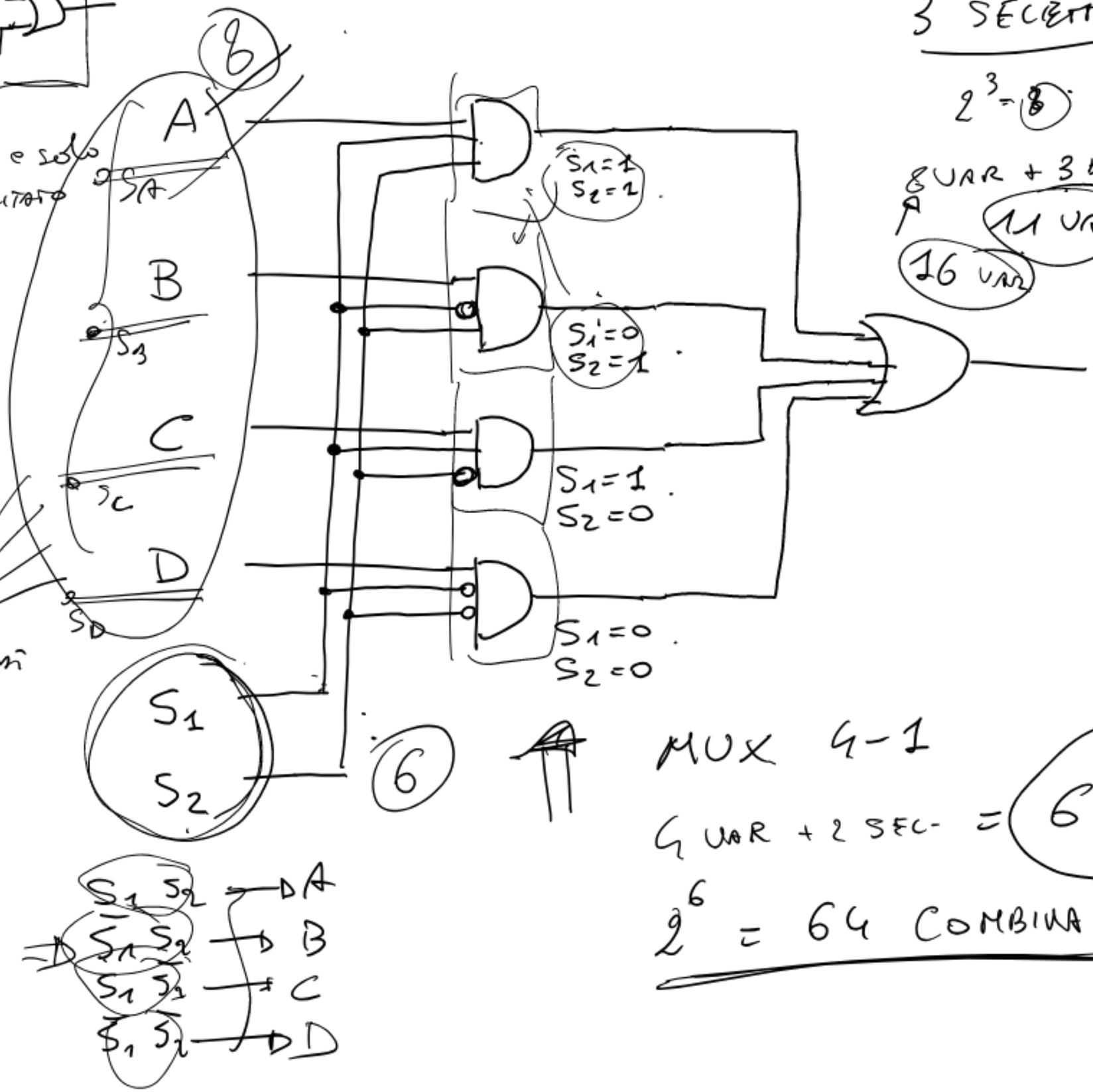
$0 + A = A \Rightarrow S = 1$

$0 + B = B \Rightarrow S = 0$

MUX 2-1

Come è solo 1 ABILITATO

MUX 4-1



MUX 8-1

3 SELETTORI

$2^3 = 8$

$S_1\ S_2\ S_3$
$S_1\ S_2\ \overline{S_3}$
$S_1\ \overline{S_2}\ S_3$

8 VAR + 3 BIT

11 VAR

16 VAR

Out 4-1

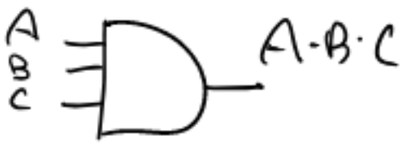
4 VAR

~~1 BIT~~ ~~S~~

2 BITS ?

$2^2 = 4$ combi

AND 3 IN

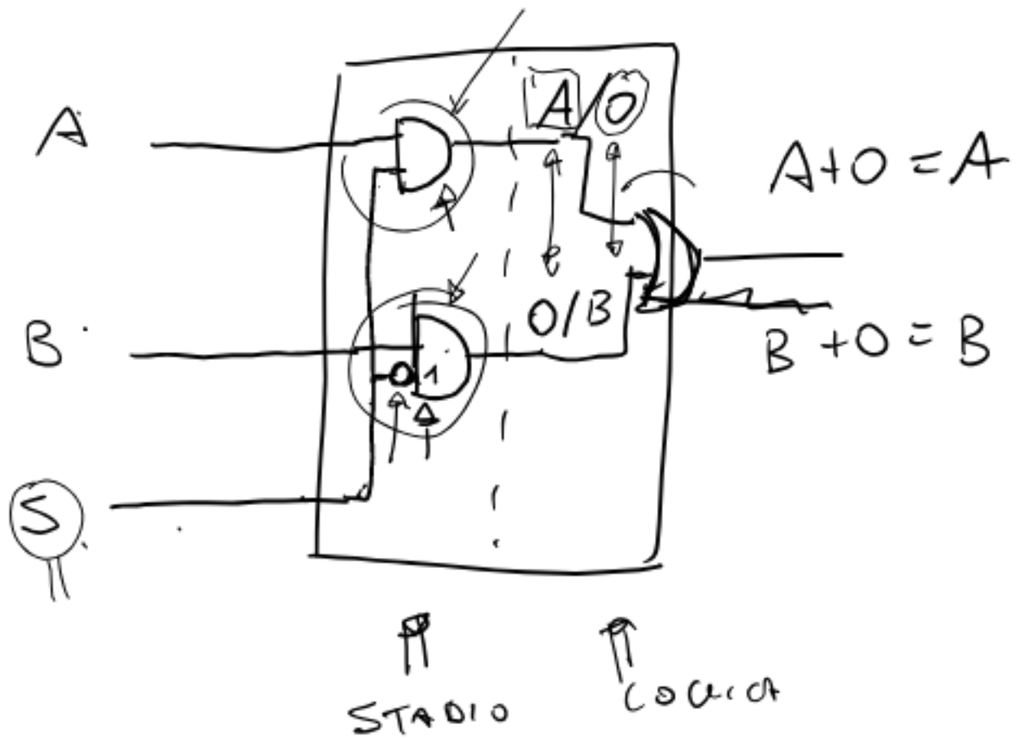


MUX 4-1

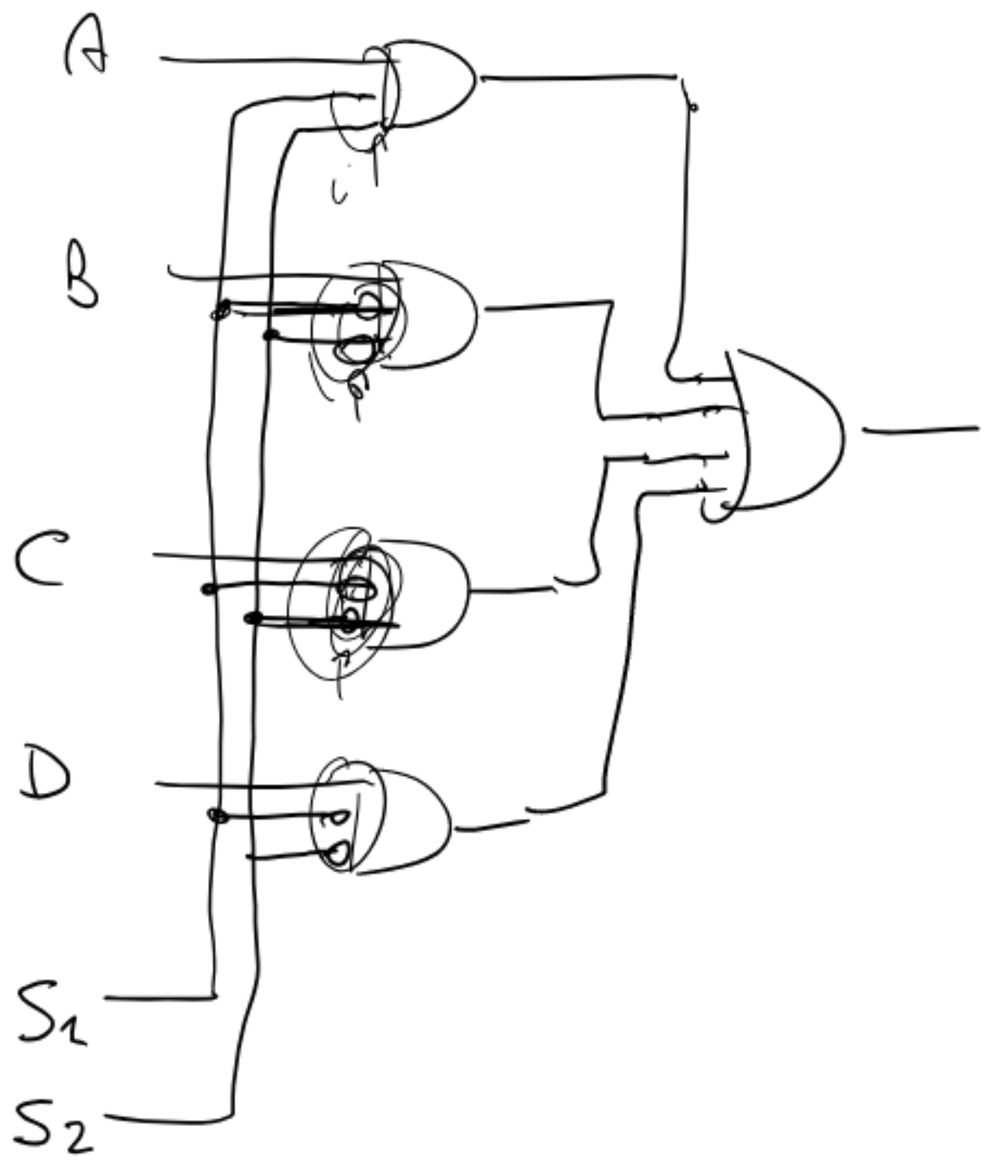
4 VAR + 2 SEL. = 6 VAR IN

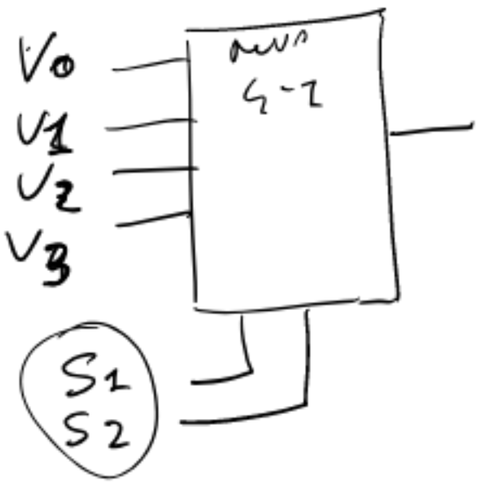
$2^6 = 64$ COMBINAZIONI

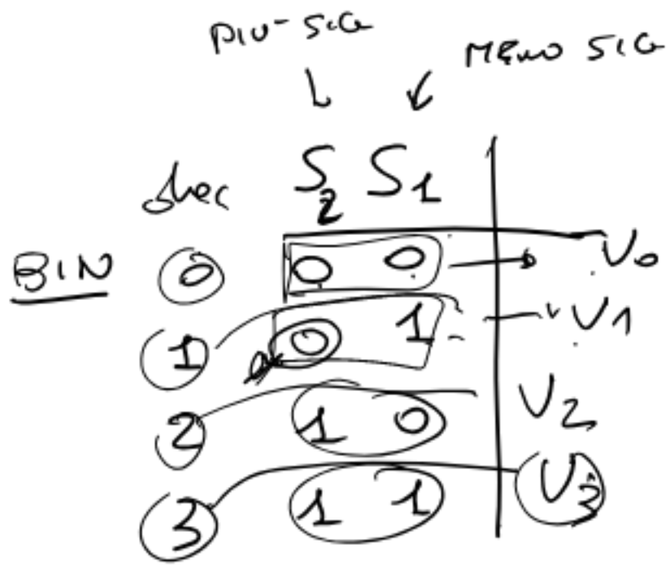
MUX 2-1

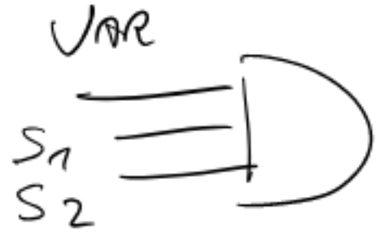


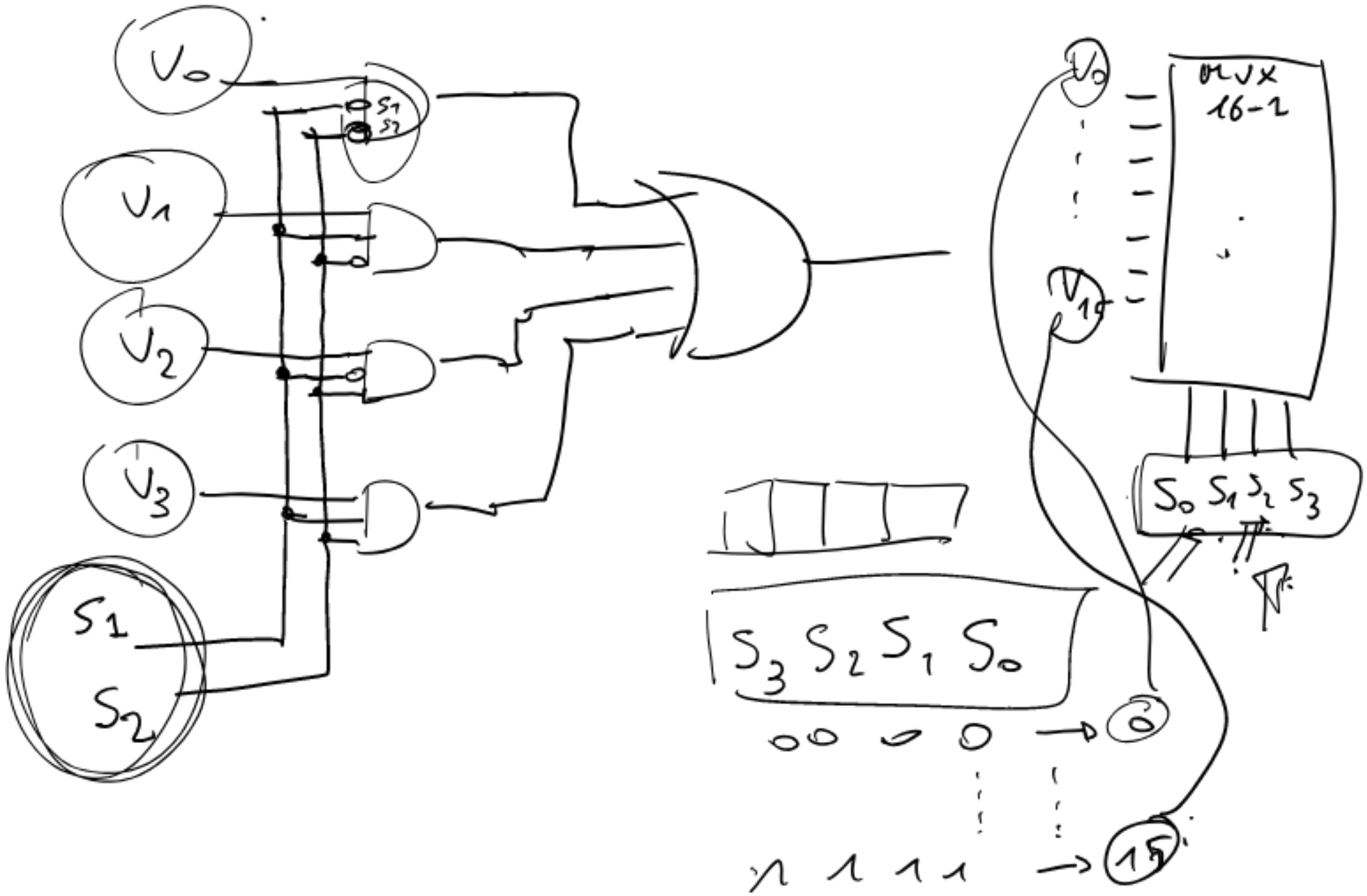
MUX 4-1



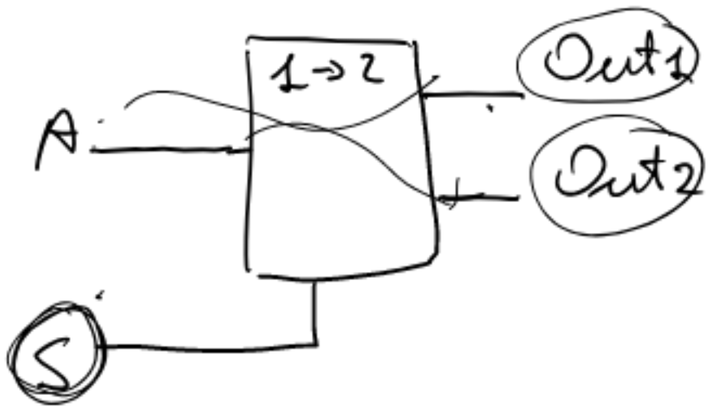

MUX
4-1
V_0
V_1
V_2
V_3
S_1
S_2

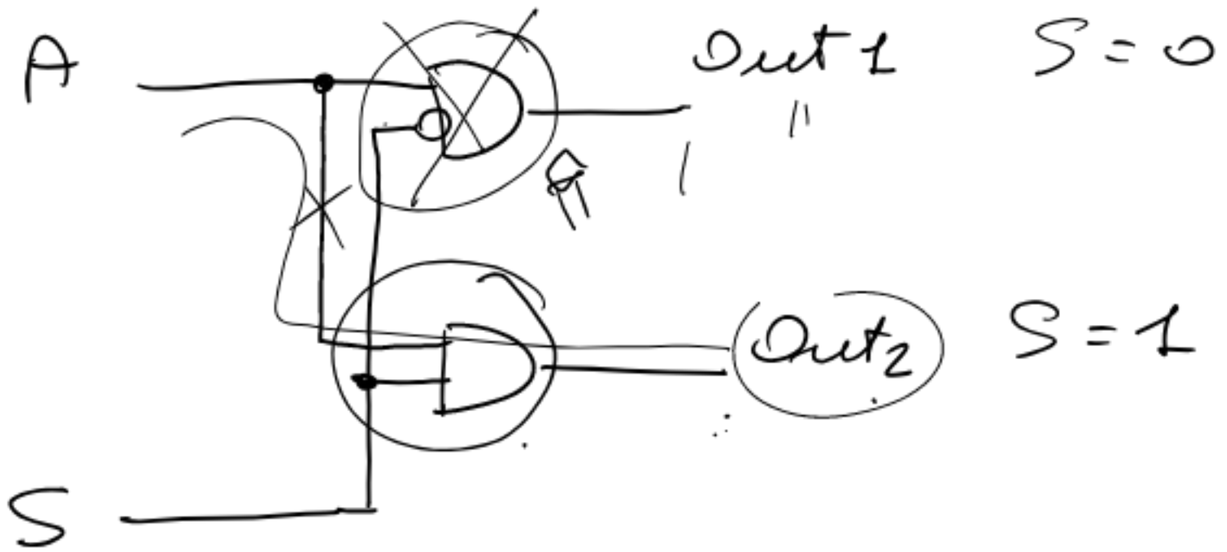

PIU' SIG.
MENO SIG.
dec
S_2 S_1
BIN
0 0 0 V_0
1 0 1 V_1
2 1 0 V_2
3 1 1 V_3


VAR
S_1
S_2

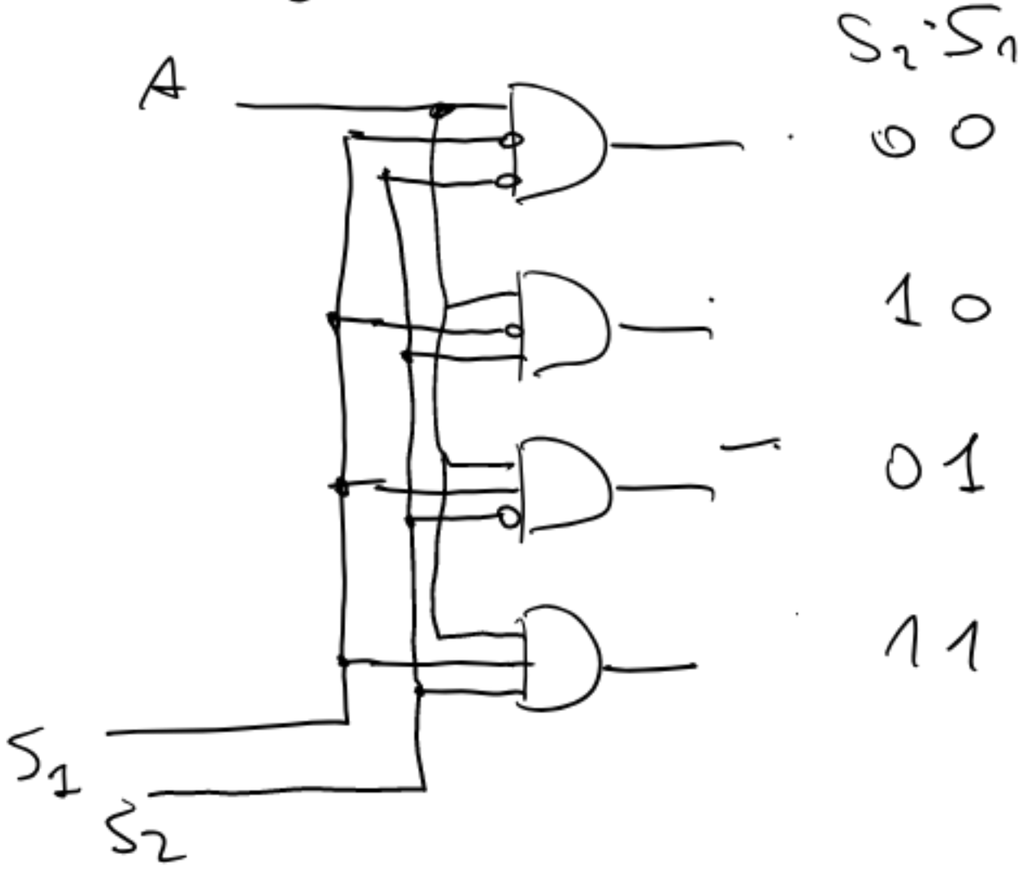

V_0
V_1
V_2
V_3
S_1
S_2
MUX
16-1
V_0
V_1
V_{15}
S_0 S_1 S_2 S_3
S_3 S_2 S_1 S_0
0 0 0 0
0
1 1 1 1
15

DEMUX





DEMUX 1 -> 4



SOMMATORE (?)

$A_0 \oplus A_1$

CARRY RIPORTO

0 ÷ 15

N_1 [0/1] | | | . N_2 [ ] .

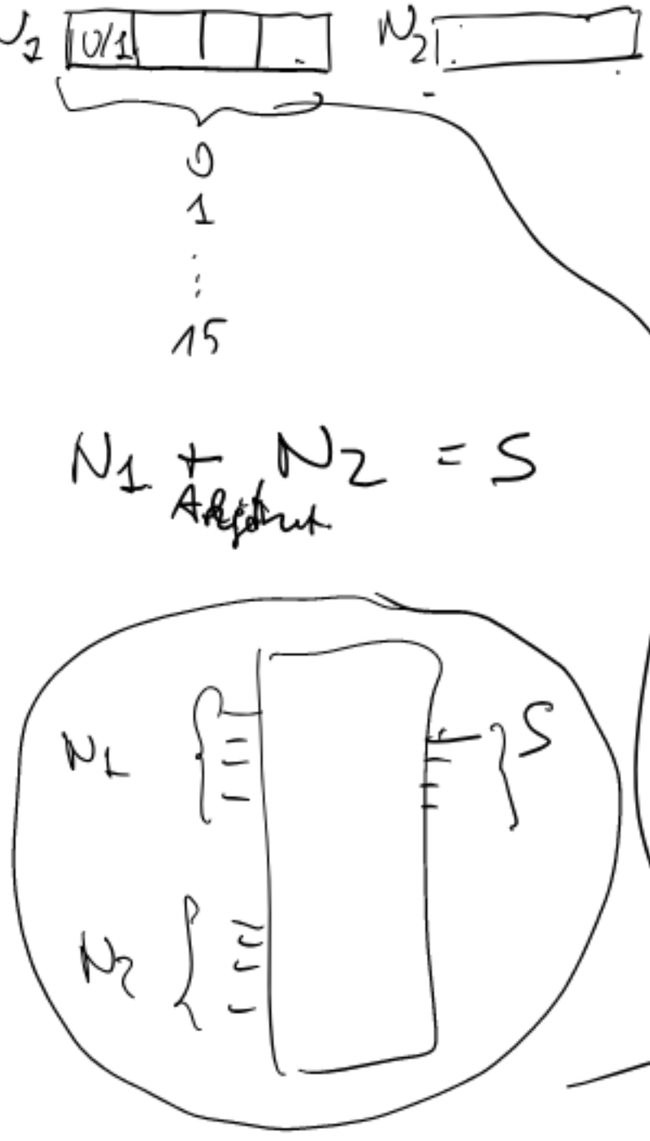
0
1
⋮
15

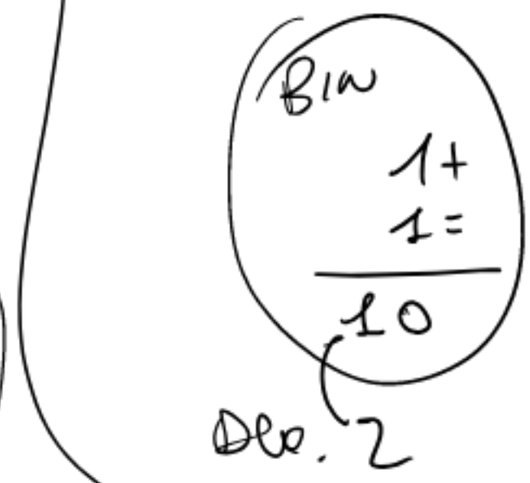
$N_1 + N_2 = S$
Addizione

B_{in}	A_{in}	S	C
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1

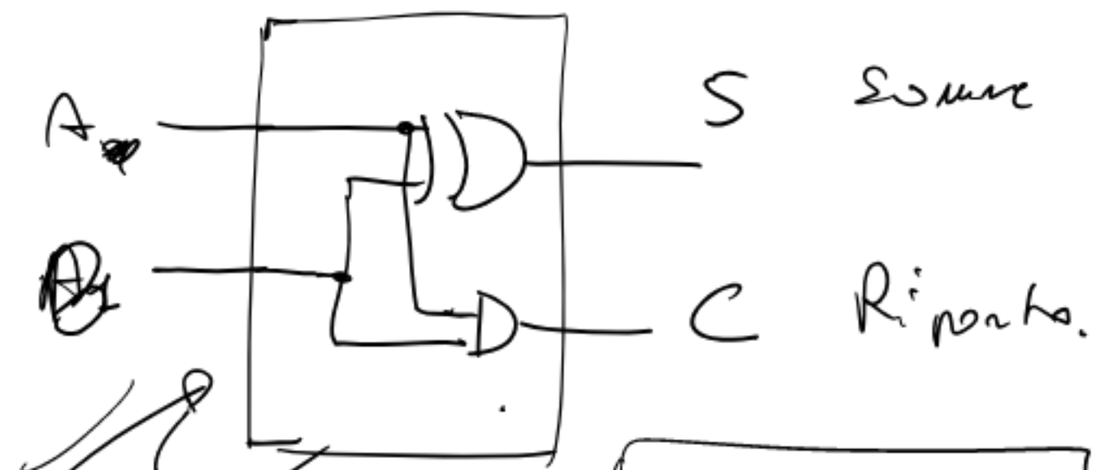
$C = A_{in} \cdot B_{in}$

$S = A_{in} \oplus B_{in}$





A_3 A_2 A_1 A_0 (=A)
B_3 B_2 B_1 B_0 (= B

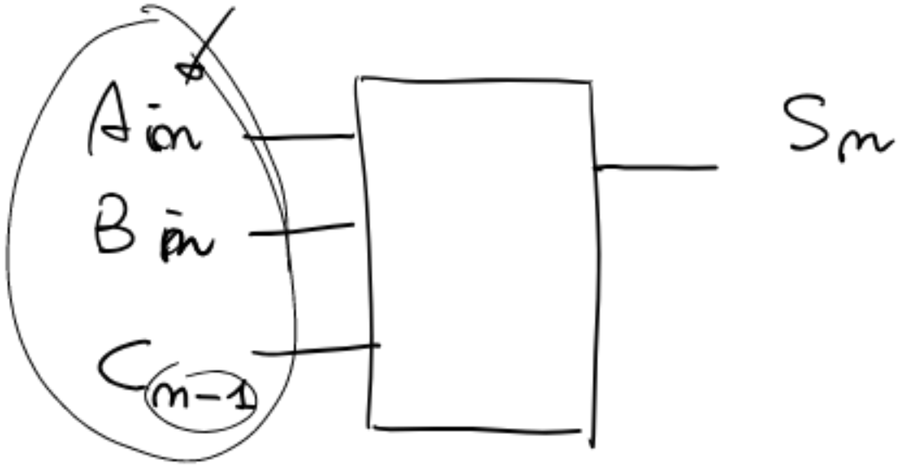


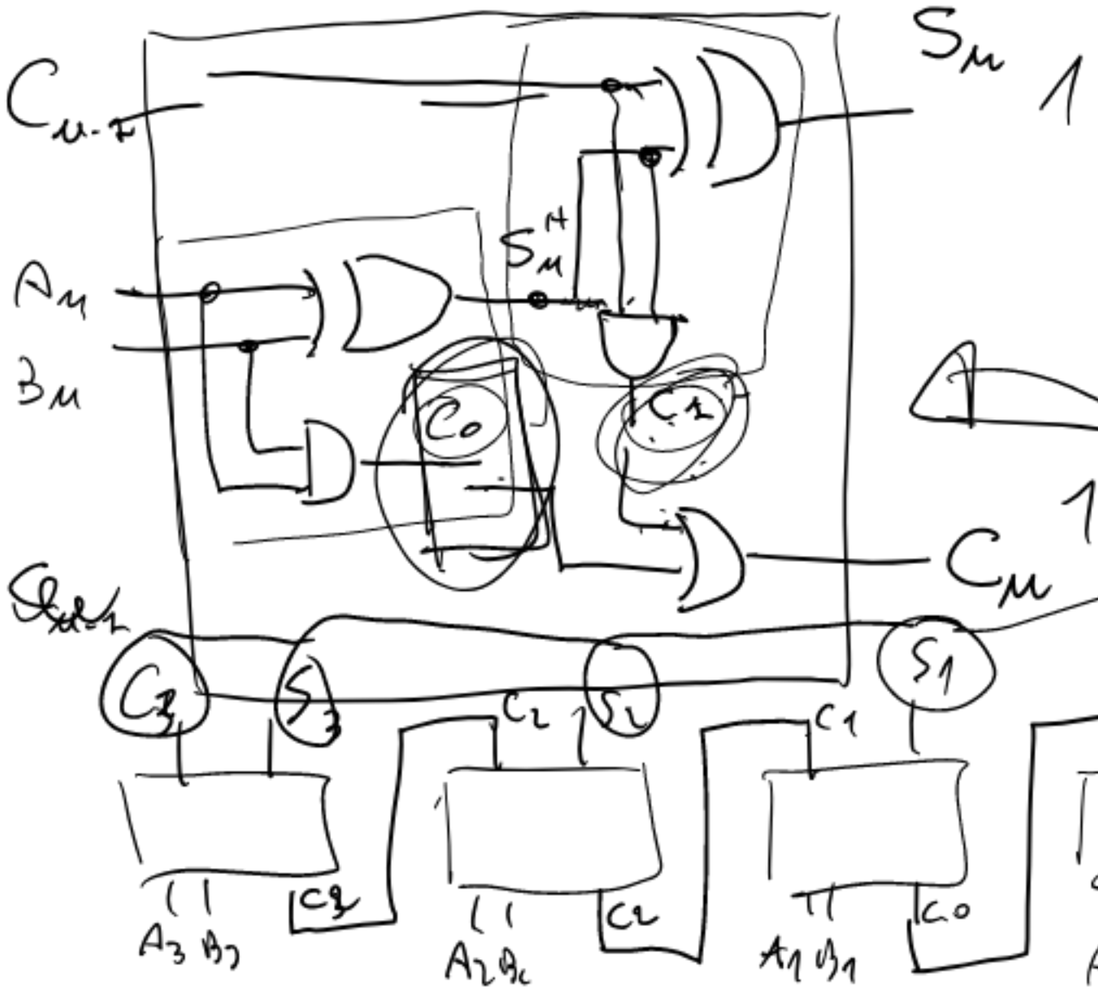
$\prod A$

0 0 1 1 +
0 1 0 1 =
0

HALF - ADDER

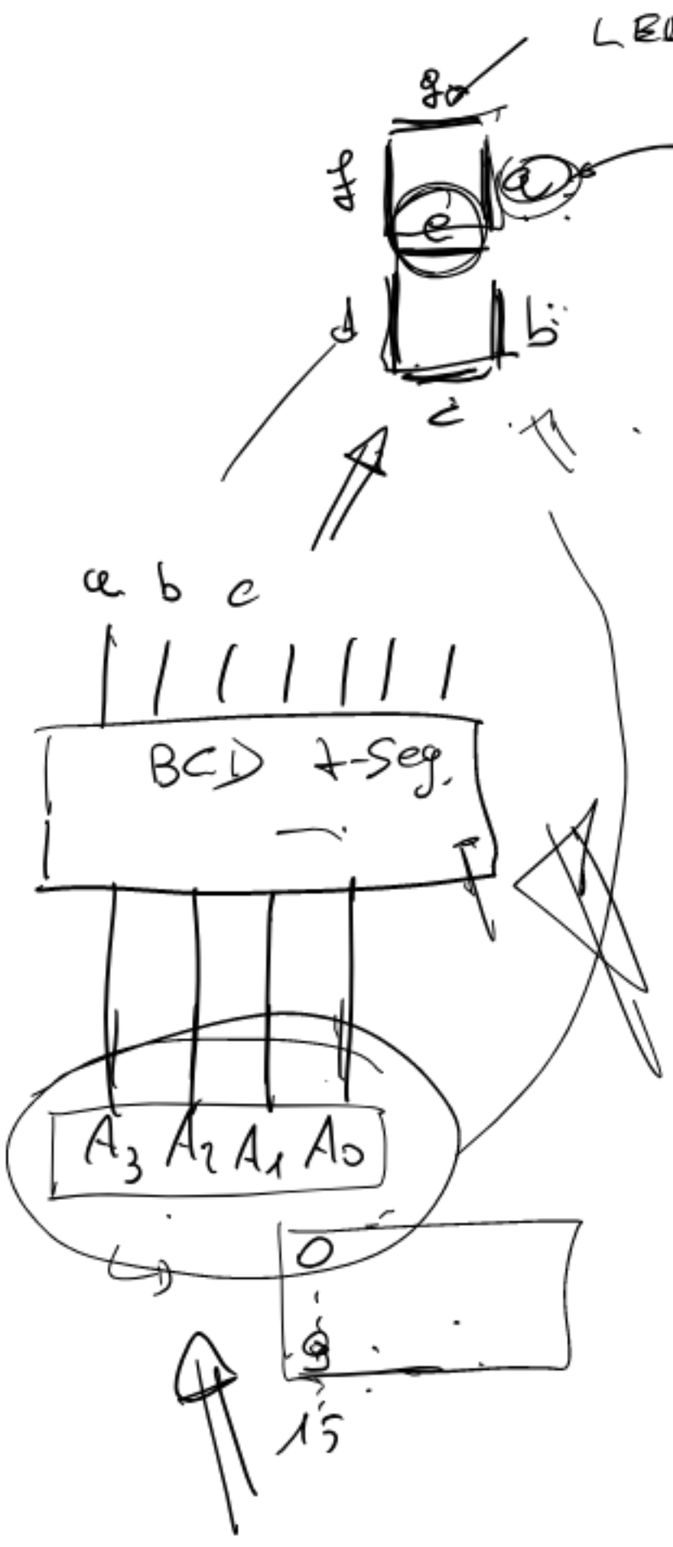
SOMMATORE





C_{M-1}	A_M	B_M	S_M^H	S	C_0	C_1	C_M
0	0	0	0	0	0	0	0
0	0	1	1	1	0	0	0
0	1	0	1	1	0	0	0
0	1	1	0	0	1	0	1
1	0	0	0	1	0	0	0
1	0	1	1	0	0	1	1
1	1	0	1	0	0	1	1
1	1	1	0	1	1	0	1

$$C_M = C_0 + C_1$$



DISPLAY

	A_3	A_2	A_1	A_0	a	b
0	0	0	0	0	1	
	0	0	0	1	1	
→	0	0	1	0	1	
	0	0	1	1	1	
	0	1	0	0	0	
g	0	1	0	1	0	
	0	1	1	0		
9						