

ESERCIZIO 1

$$m = 0001 \quad b = 01 \quad b = \left\lceil \frac{m+1}{5} \right\rceil - 1$$

Caso $b = 1$

$$0001101 \quad 7 \text{ bit}$$

$\begin{array}{c} \uparrow \\ 3 \\ 2 \\ 0 \end{array}$

$$2^3 + 2^2 + 2^0 = 8 + 4 + 1 = 13$$

A) 0001101 (13)

In modulo e Segno (-13)

$$\begin{array}{r} 1001101 \\ \hline \text{Segno} \qquad \text{Valore assoluto} \end{array}$$

B) 0001101 (13)

- faccio il complemento a 1

$$1110010$$

- Sommo 1

$$\begin{array}{r} 1110010 \\ 0000001 \\ \hline 1110011 \end{array}$$

(-13)

$\begin{array}{c} \uparrow \\ 6 \\ 5 \\ 4 \\ 1 \\ 0 \end{array}$

$$-2^6 + 2^5 + 2^4 + 2^1 + 2^0 = -64 + 32 + 16 + 2 + 1 = -13 \quad \checkmark$$

c) 0001101 Sommare 1111111
 (13) (-1)

$$\begin{array}{r}
 1 \ 1 \ 1 \ 1 \ 1 \ 1 \\
 | 0 \ 0 \ 0 \ 1 \ 1 \ 0 \ 1 \\
 | 1 \ 1 \ 1 \ 1 \ 1 \ 1 \ 1 \\
 \hline
 (1) 0 \ 0 \ 0 \ 1 \ 1 \ 0 \ 0
 \end{array}$$

$\uparrow \uparrow$
3 2

$$2^3 + 2^2 = 8 + 4 = 12$$

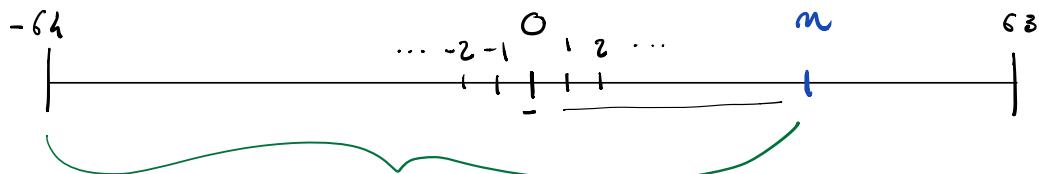
Overflow? NO.

- Somma due numeri con segno espresso
- gli ultimi due bit sono uguali

d) q in complemento a 2 su 7 bit
 $q < m$

$$[-2^{k-1}; 2^{k-1}-1]$$

$$[-2^6; 2^6-1] \rightarrow [-64; 63]$$



$$12 + 1 + 64 = 77 \quad \text{a somma 77 diverse codifiche per } q.$$

Esercizio 2

A) I forma canonica

a	b	c	d	y
0	0	0	0	0
0	0	0	1	0
0	0	1	0	0
0	0	1	1	0
0	1	0	0	1
0	1	0	1	1
0	1	1	0	0
0	1	1	1	0
1	0	0	0	0
1	0	0	1	0
1	0	1	0	1
1	0	1	1	0
1	1	0	0	1
1	1	0	1	0
1	1	1	0	0
1	1	1	1	0

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

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

$$\rightarrow a\bar{b}cd$$

$$\rightarrow ab\bar{c}d$$

$$\rightarrow ab\bar{c}\bar{d}$$

$$y = \bar{a}b\bar{c}\bar{d} + \bar{a}b\bar{c}d + a\bar{b}c\bar{d} + ab\bar{c}\bar{d} + abc\bar{d}$$

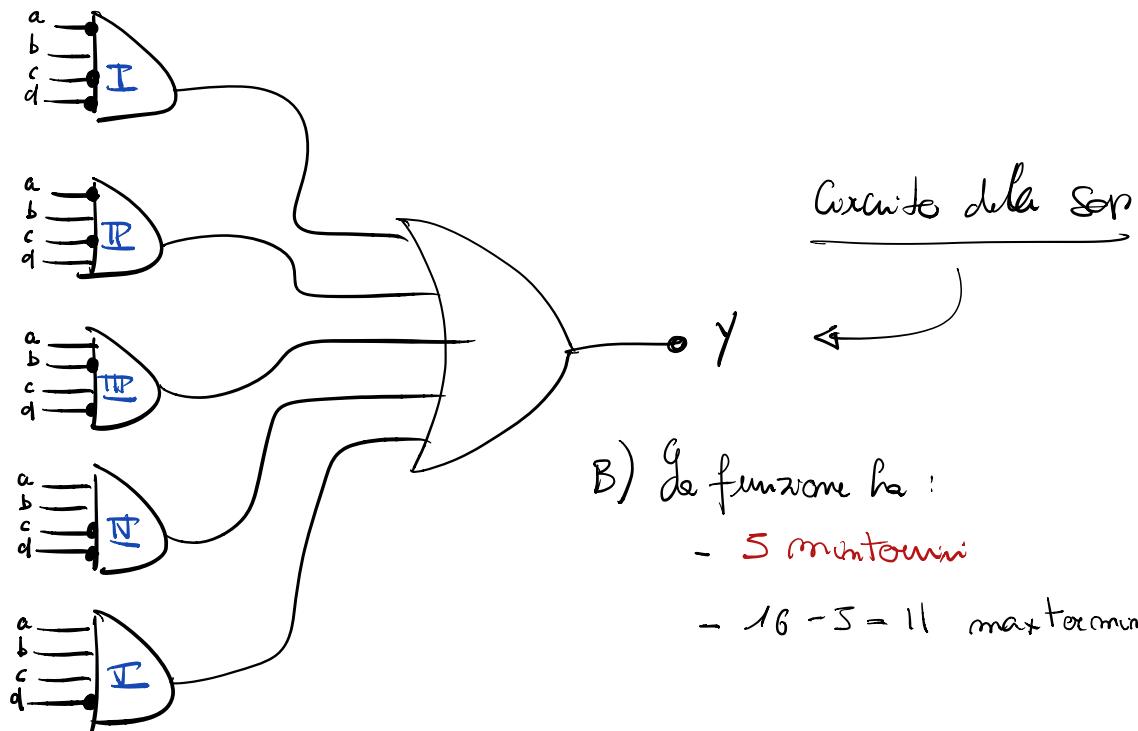
I

II

III

IV

V



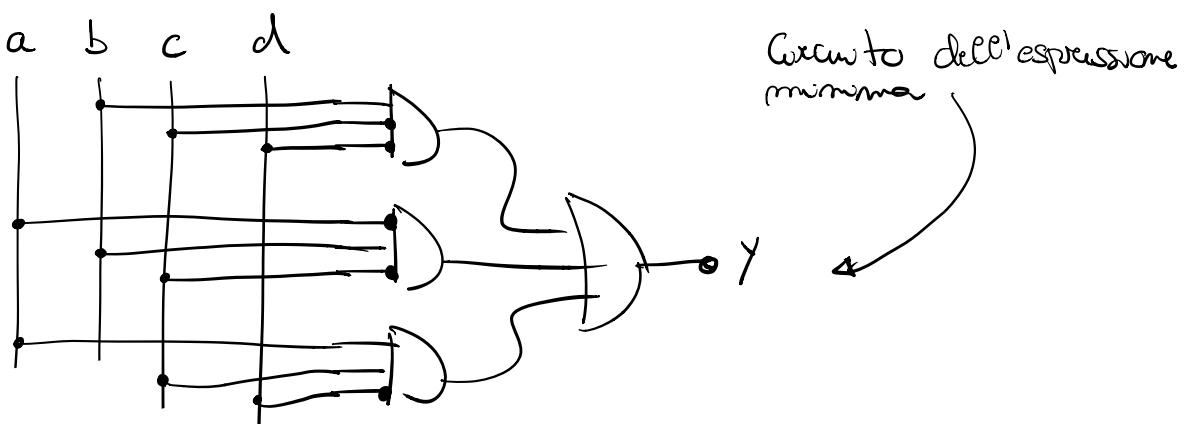
c) Mappa di Karnaugh

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

$$y = b\bar{c}\bar{d} + \bar{a}b\bar{c} + ac\bar{d}$$

espressione minima

d)



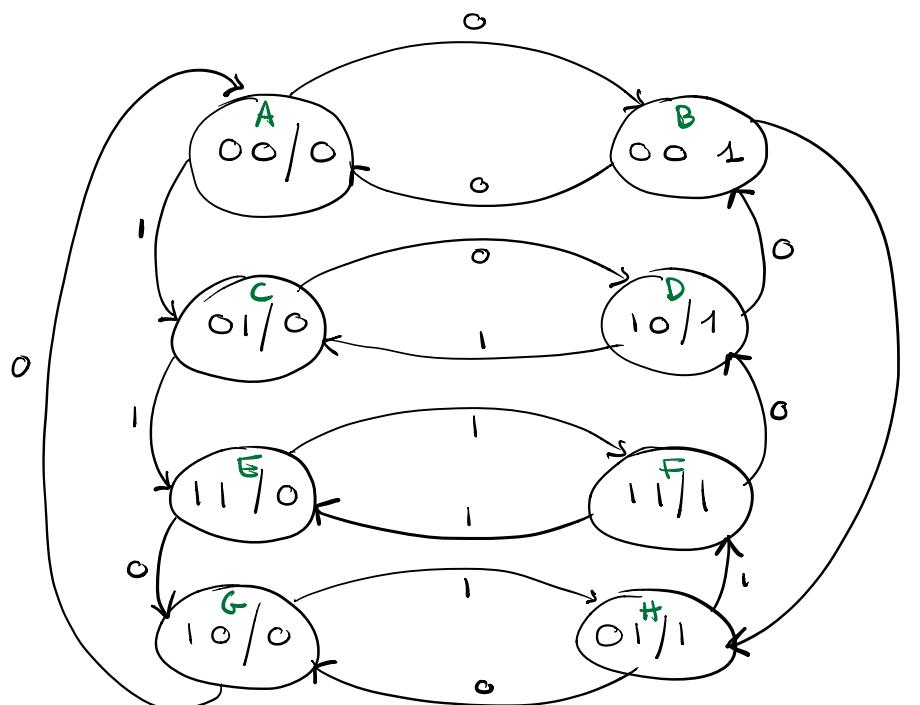
ESERCIZIO 3

A) STATO :

- Gli ultimi 2 bit ricevuti im input b_1, b_0 .
- Valore corrente dell' uscita y

$b_1, b_0 / y$

GLI ULTIMI DUE BIT RICEVUTI SONO
 b_1, b_0 E L'USCITA È STABILISCA SU
VALORE y



B) e C)

	q_2	q_1	q_0	I	q'_2	q'_1	q'_0	y
A	0	0	0	0	0	0	0	0
B	0	0	1	0	0	0	1	1
C	0	1	0	0	0	0	0	0
D	0	1	0	0	0	0	0	0
E	1	0	0	0	0	0	0	0
F	1	0	0	0	0	0	0	0
G	1	0	0	0	0	0	0	0
H	1	0	0	0	0	0	0	0
A	0	1	0	0	0	0	0	0
B	0	1	0	0	0	0	0	0
C	0	1	0	0	0	0	0	0
D	0	1	0	0	0	0	0	0
E	1	0	0	0	0	0	0	0
F	1	0	0	0	0	0	0	0
G	1	0	0	0	0	0	0	0
F	1	0	0	0	0	0	0	0
#	0	1	0	0	0	0	0	0

$$q'_2 = q_1 \quad q'_1 = I$$

$q_0 I$					
$q_2 q_1$		00	01	11	10
00		1	0	1	0
01		1	0	1	0
11		0	1	0	1
10		0	1	0	1

$$q'_0 = \overline{q_2} \overline{q_1} \overline{I} + q_2 \overline{q_1} I + \overline{q_2} q_1 I + q_2 q_1 \overline{I}$$

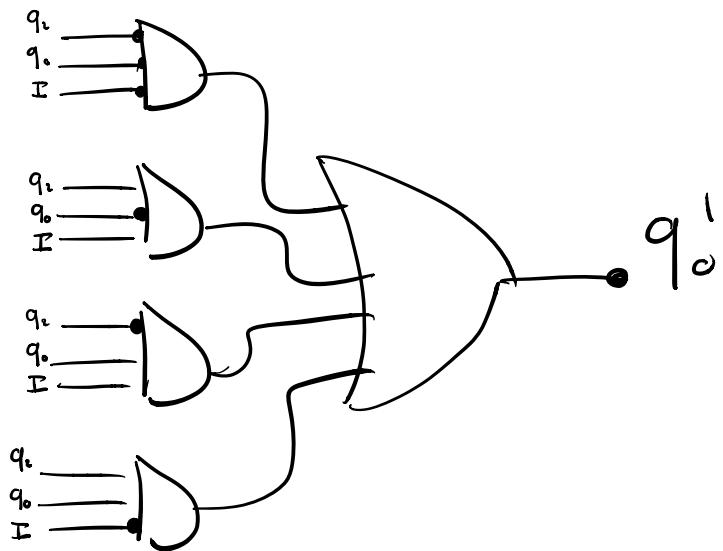
$$y = q_0$$

I correnti per q'_2 , q'_1 e y sono dei fili (delle case di un bit di stato/input)

$$q_0' =$$

$$\overline{q_2} \overline{q_0} I + q_2 \overline{q_0} I + \overline{q_2} q_0 I$$

$$+ q_2 q_0 \overline{I}$$



ESERCIZIO 4

- Ogni registro con indirizzo K contiene il valore 2^k
- \$12 immediatamente e' contenuto il valore 1

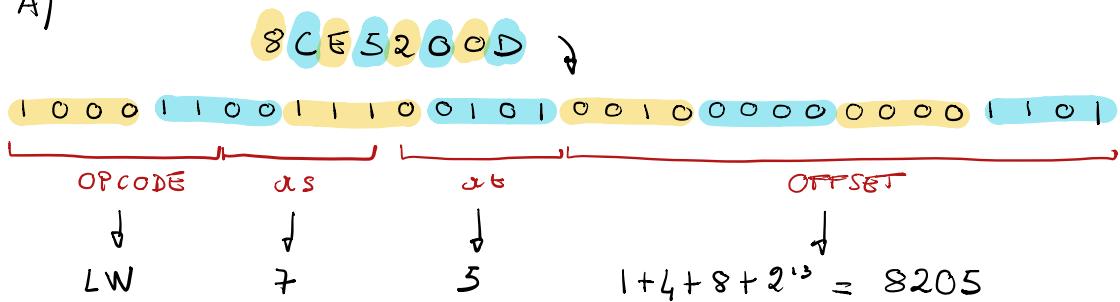
ISTRUZIONE

8CE5200D

RegDef = 0 ✓

AluSrc = 0 ✗

A)

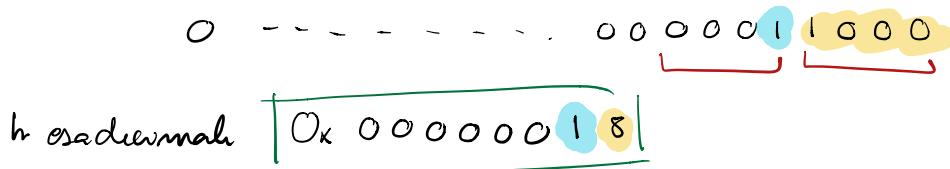


Formato I LW \$5 8205(\$7)

B) AluSrc = 0 **SACCATO** è la ALU regre

$$(rs) + (rt) = (7) + (5) = 14 + 10 = 24$$

$$2h = 16 + 8 = 2^4 + 2^3$$



c) Reg DAF è corretto (c) ✓

Viene scritto il registrato \$5

Cambierebbe il valore scritto in \$5