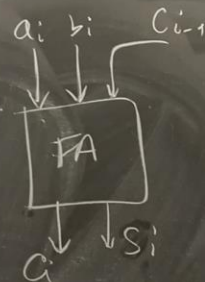
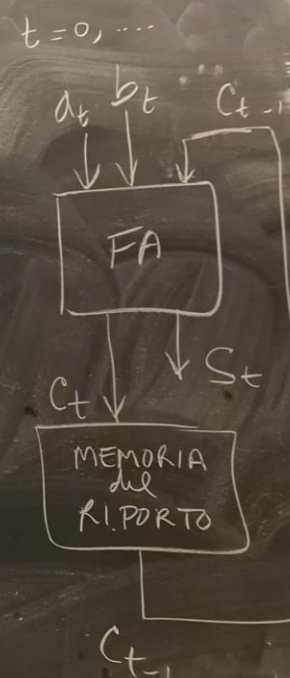


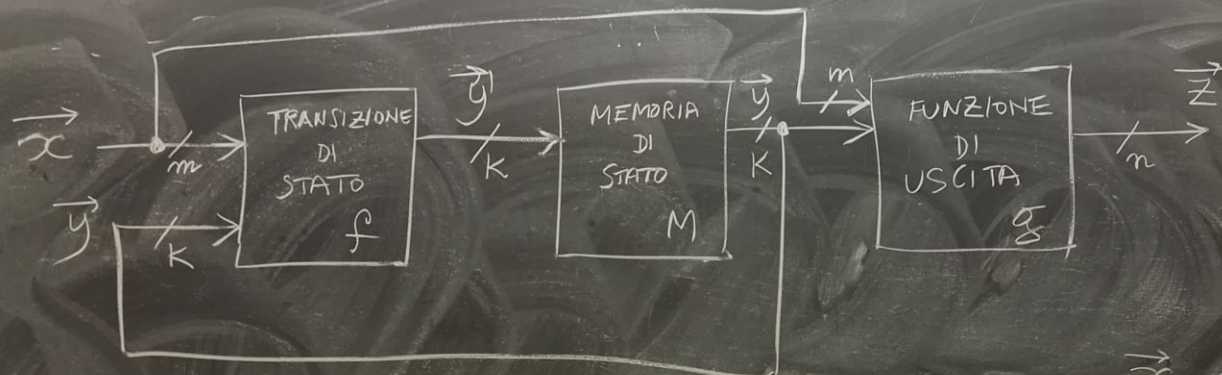
Ret Sequenzi
(Sincrono)

$$\begin{array}{r} n=4 \leftarrow \\ \begin{array}{r} 1011 \\ + 0110 \\ \hline 0001 \end{array} \end{array}$$



Serial
adder





SCHEMA A BLOCCHI

x → ingresso esterno
 y → stato (interno) presente
 y' → " futuro
 z → uscita

esterno
interno) presente
futuro
to

EQUAZIONI CARATTERISTICHE

$$\begin{cases} \vec{y}' = f(\vec{x}, \vec{y}) \\ \vec{z} = g(\vec{x}, \vec{y}) \end{cases}$$

M = registro di stato

AUTOMA A
STATI FINITI (ASF,
UK: FSM)



Ret. Sequenzi
(Sincrono)

$\vec{x}$		y	y'		z
a_t	b_t	C_{t-1}	C_t	S_t	
0	0	0	0	0	
0	0	1	0	1	
0	1	0	0	1	
0	1	1	0	0	
1	0	0	0	0	
1	0	1	1	0	
1	1	0	1	0	
1	1	1	1	1	

$g(\vec{x}, y)$

$f(\vec{x}, y)$

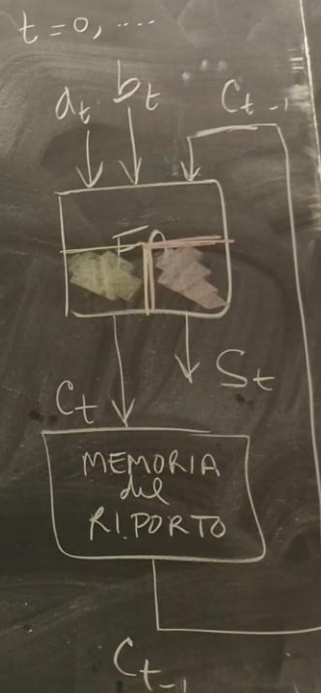
$$S_t \rightarrow Z \quad (n=1)$$

$$C_t \rightarrow y' \quad (k=1)$$

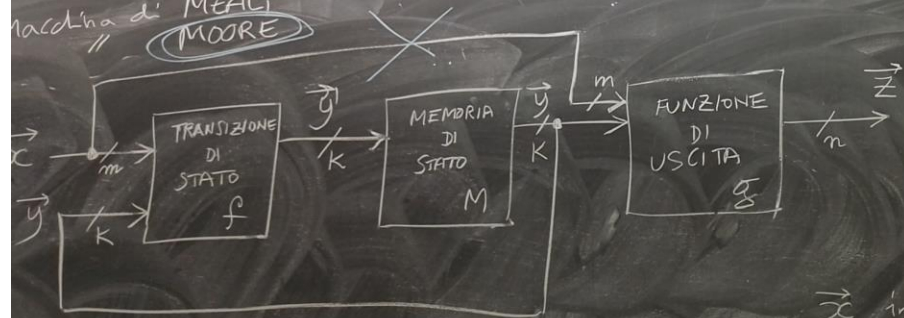
$$C_{t-1} \rightarrow y$$

$$a_t, b_t \rightarrow \vec{x} \quad (m=2)$$

"Serial
adder"



macchina di MEALY
// MOORE



SCHEMA A BLOCCHI

$\vec{x}$ ingresso esterno
 $\vec{y}$ stato (interno) presente
 $\vec{y}'$ " futuro
 $\vec{Z}$ uscita

EQUAZIONI CARATTERISTICHE

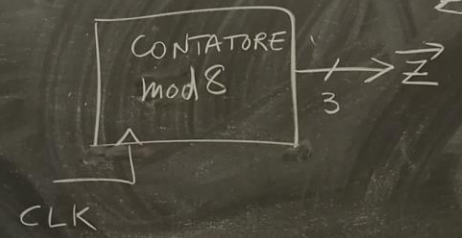
$$\begin{cases} \vec{y}' = f(\vec{x}, \vec{y}) \\ \vec{Z} = g_{\text{MEALY}}(\vec{x}, \vec{y}) \end{cases} \quad \vec{Z} = g_{\text{MOORE}}(\vec{y})$$

M = registro di stato

Reti Sequenziali
(Sincrone)

$$f_{CLK} = \frac{1}{T_{CLK}}$$

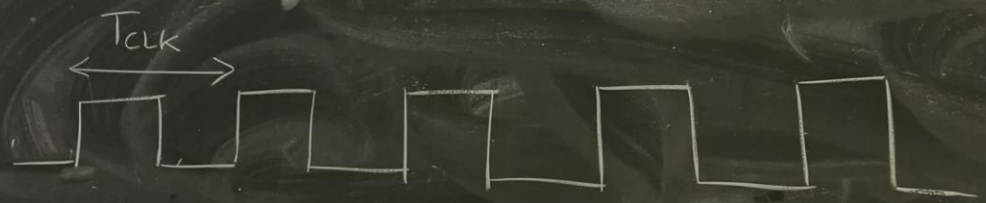
"colpi di
clock"



no $\vec{x}$

$$\vec{Z} = (z_2 z_1 z_0)_{nat}$$

$$\vec{Z} = \vec{y}$$



no $\vec{z}$
 $\vec{z} = (z_2 z_1 z_0)_{nat}$
 $\Rightarrow \vec{z}$
 $\boxed{\vec{z} = \vec{y}}$

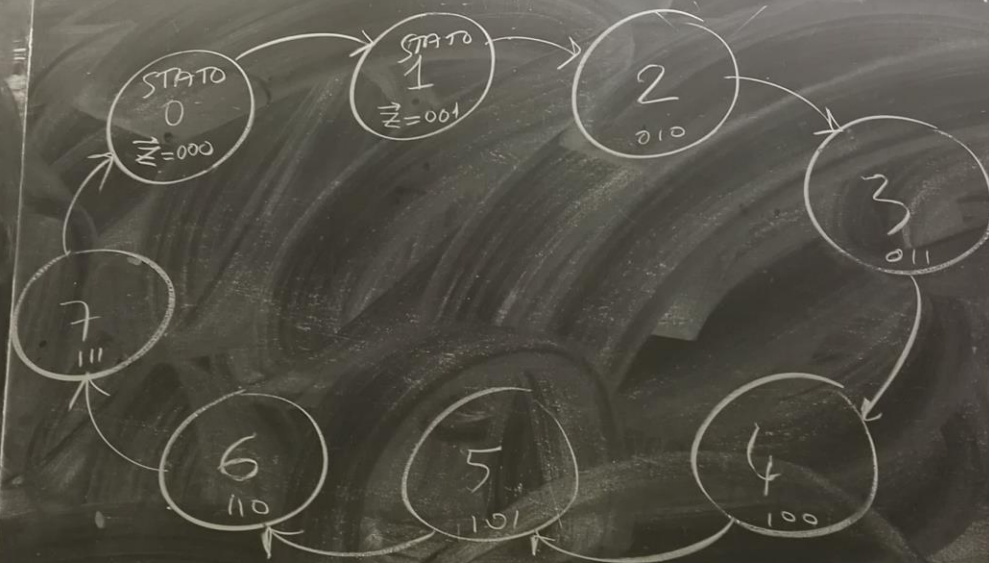
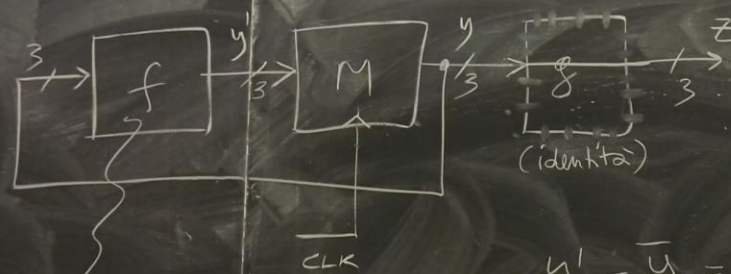


DIAGRAMMA DEGLI STATI



(identità)

$$\vec{y}' = f(\vec{y}) = \vec{y} + 1 \pmod{2}$$

$$\begin{aligned} y'_0 &= \bar{y}_0 = y_0 \oplus 1 \\ y'_1 &= y_1 \oplus y_0 \\ y'_2 &= y_2 \oplus (y_1 y_0) \end{aligned}$$

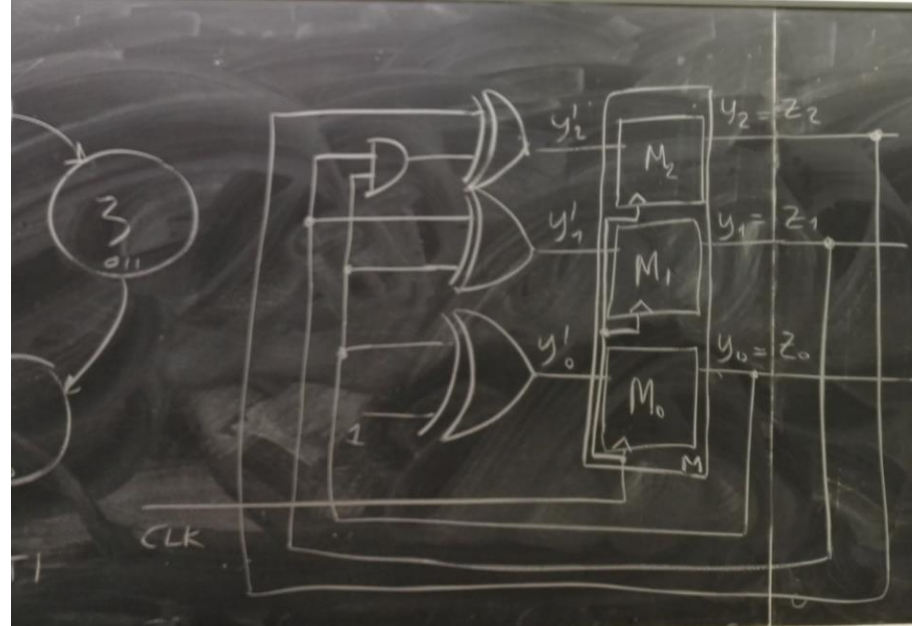
STATO PRESENTE				STATO FUTURO			
y_2	y_1	y_0		y'_2	y'_1	y'_0	
0	0	0	→	0	0	1	↓
0	0	1	→	0	1	0	↓
0	1	0	→	0	1	1	↓
0	1	1	⇒	1	0	0	↓
1	0	0	→	1	0	1	↓
1	0	1	→	1	1	0	↓
1	1	0	→	1	1	1	↓
1	1	1	⇒	0	0	0	↓

y_2	y_1	y_0		y'_2	y'_1	y'_0	
0	0	0		0	0	1	
0	0	1		0	1	0	
0	1	0		0	1	1	
0	1	1		1	0	0	
1	0	0		1	0	1	
1	0	1		1	1	0	
1	1	0		1	1	1	
1	1	1		0	0	0	

$$\begin{aligned} y'_1 &= \bar{y}_1 y_0 + y_1 \bar{y}_0 \\ &= y_1 \oplus y_0 \end{aligned}$$

Tobias Dantzig
NUMERO





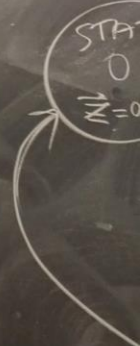
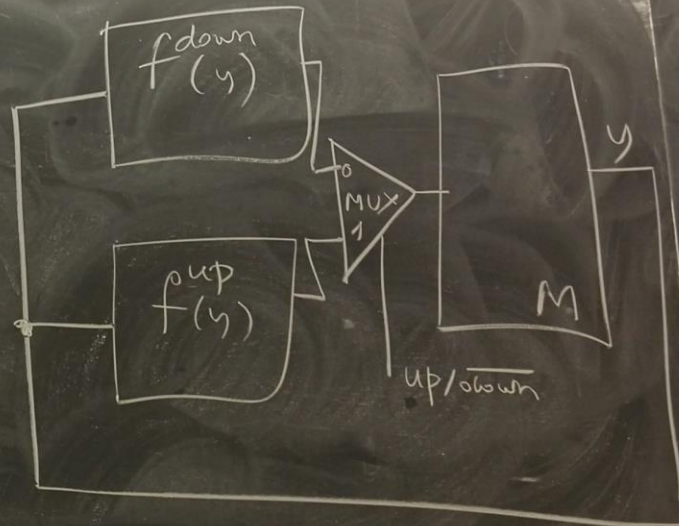
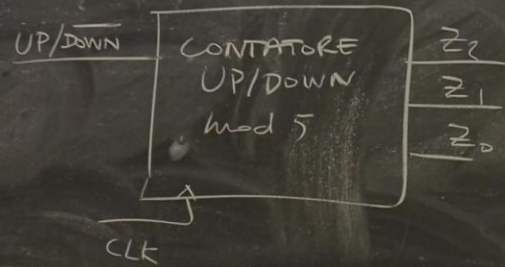
STATO PRESENTE	STATO FUTURO
$y_2 y_1 y_0$	$y'_2 y'_1 y'_0$
0 0 0	0 0 1
→ 0 0 1	0 1 0
0 1 0	1 0 0
⇒ 0 1 1	1 1 0
1 0 0	0 0 0
→ 1 0 1	0 1 1
1 1 0	1 0 1
⇒ 1 1 1	1 1 1

$$y'_0 = \overline{y_0} = y_0 \oplus 1$$

$$y'_1 = y_1 \oplus y_0$$

$$y'_2 = y_2 \oplus (y_1 y_0)$$

Ret' Sepungz'z'
(Sincron)



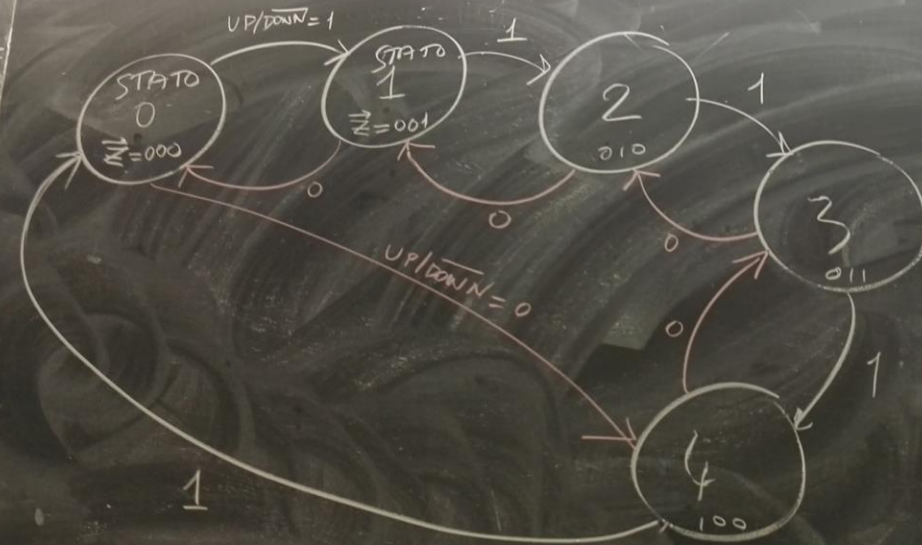


DIAGRAMMA DEGLI STATI



$f(y)$

up

$$\begin{cases} y'_2 = y_1 y_0 \\ y'_1 = y_1 \oplus y_0 \\ y'_0 = \overline{y_2} \overline{y_0} = \overline{y_2 + y_0} \end{cases}$$

$f(y)$

down

$$\begin{cases} y'_2 = \\ y'_1 = \\ y'_0 = \end{cases}$$

STATO
PRESENTE

STATO
FUTURO

$y_2 y_1 y_0$	$y'_2 y'_1 y'_0$
0 0 0	0 0 1
0 0 1	0 1 0
0 1 0	0 1 1
0 1 1	1 0 0
1 0 0	0 0 0
1 0 1	X X X
1 1 0	X X X
1 1 1	X X X

101, 110 e 111
NON POSSONO
OCCORRERE

