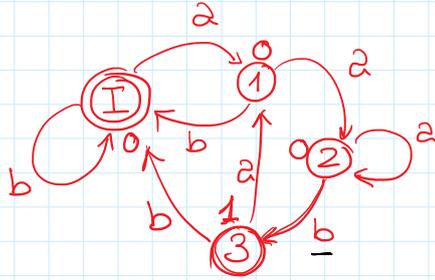
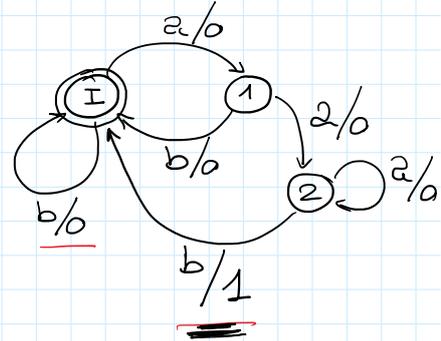


↔ AUTOMI A STATI FINITI

- m ingressi X
- m uscite Z
- n variabili di stato S
- $\sigma : X \times S \rightarrow S$
- $w : X \times S \rightarrow Z$

$\{a, b\}$

22b



RETI COMB

RETI SEQ

FUN
↓
esp booleano
↓
porte
AND/OR/NOT

AUTOMA
↓
rete seq
↓
2 reti comb. (σ, w)
1 registro

RETI SEQUENZIALI SINCRONE

MOORE

MEALY

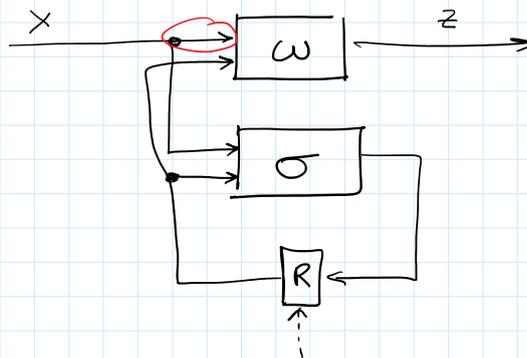
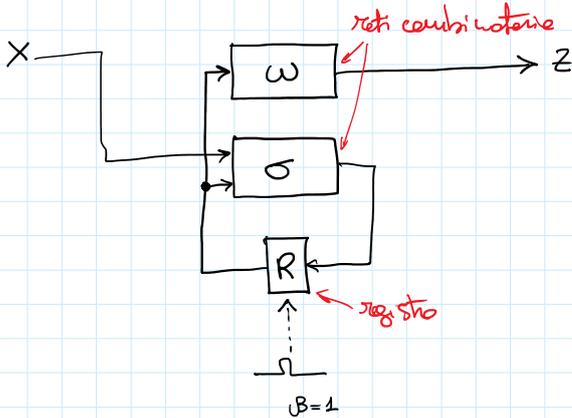
uscite dipendono solo dallo stato interno

le uscite dipendono da $\left. \begin{array}{l} \text{stato interno} \\ \text{e} \\ \text{ingressi} \end{array} \right\}$

$$z(t) = w(s(t))$$

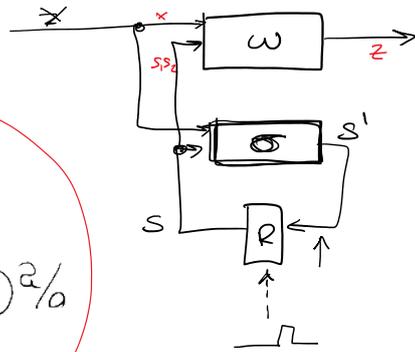
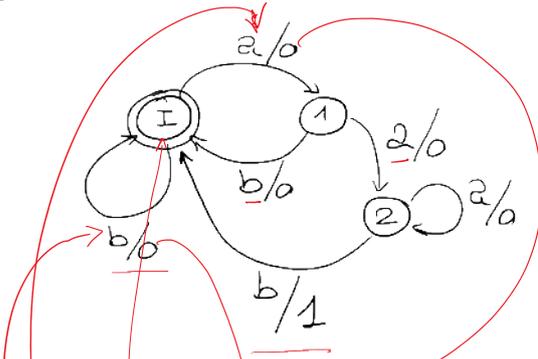
$$z(t) = w(s(t), x(t))$$

$$s(t+1) = \sigma(s(t), x(t))$$



$\{a, b\}$
 $x \begin{matrix} 0 \\ 1 \end{matrix}$

$I = 00$
 $1 = 01$
 $2 = 10$
 $Z = 1 \text{ bit}$



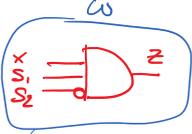
- 1) come è fatto W?
- 2) come è fatto S?
- 3) come è fatto R? (quanti bit ha)
- 4) quanto deve far durare il ciclo di clock?

1)

x	s ₁	s ₂	z
0	0	0	0
1	0	0	0
0	0	1	0
1	0	1	0
0	1	0	0
1	1	0	0
0	1	1	1
1	1	1	1



$Z = x s_1 \bar{s}_2$



1tp

2)

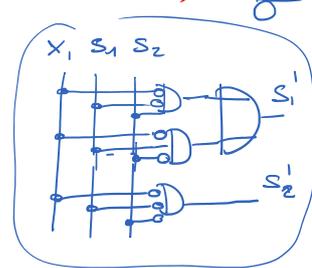
x	s ₁	s ₂	s' ₁	s' ₂
0	0	0	0	1
1	0	0	0	0
0	0	1	1	0
1	0	1	0	0
0	1	0	1	0
1	1	0	0	0
0	1	1	1	0
1	1	1	0	0

$s'_1 = \bar{x} \bar{s}_1 s_2 + \bar{x} s_1 \bar{s}_2$

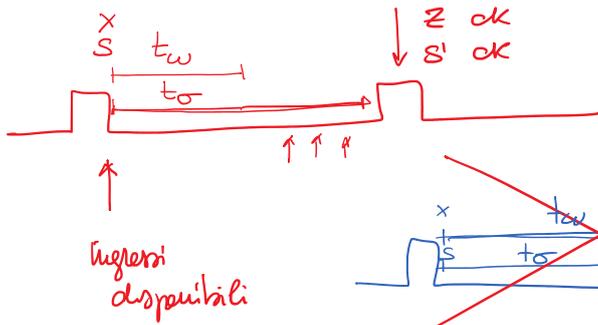
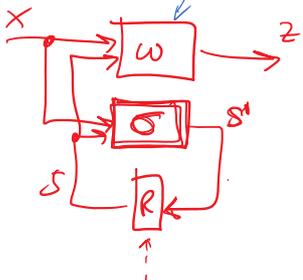
$s'_2 = \bar{x} \bar{s}_1 \bar{s}_2$

2 livelli di porte (max!)
 2tp

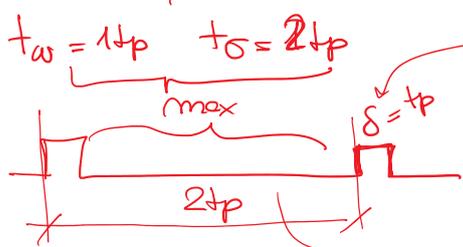
3) 2 bit! (s₁s₂)



4)



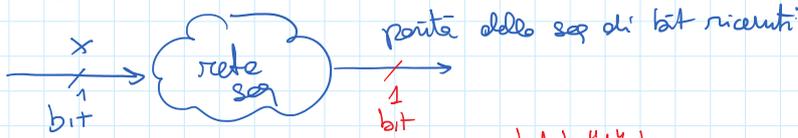
ingressi disponibili



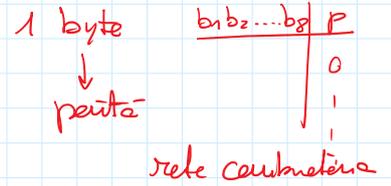
$T_c = 2tp + 1tp$

$B = \frac{1}{T_c}$

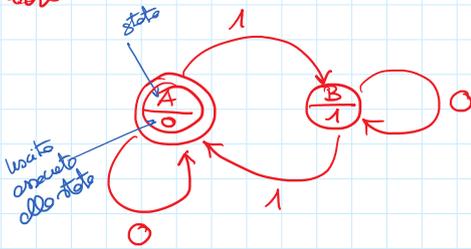
banda
 # transizioni dell'output
 See



parte delle seq di bit ricorrenzi
 0 → bit a "1" pari
 1 → bit a "1" dispari



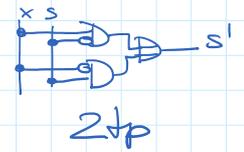
Automa di Moore



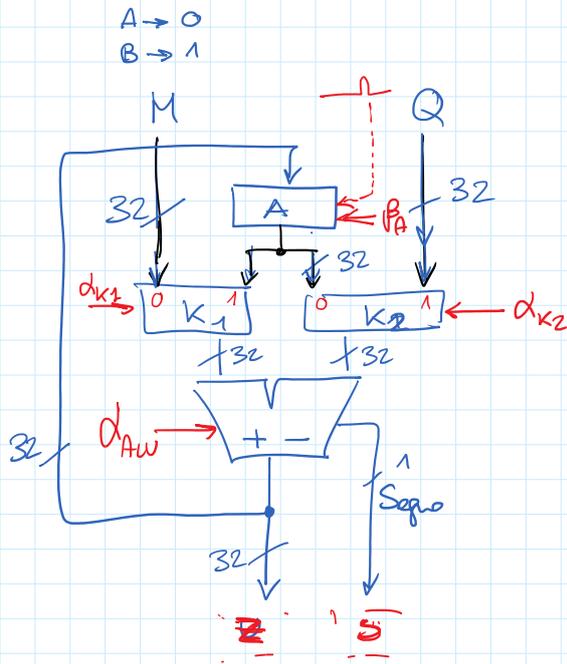
	0	1
0	0	1
1	1	0

x	s	s'
0	0	0
1	0	1
0	1	1
1	1	0

$s' = x\bar{s} + \bar{x}s$



$\tau = 2t_p + t_{cs}$



- M ingressi binari
- M uscite binarie
- τ vari di stato binarie

- 68 bit
- 33 bit uscite
- 32 bit stato interno

$W: X \times S \rightarrow Z$ $\sqrt{2^{33}}$ possibili combinazioni delle colonne $x \times z$

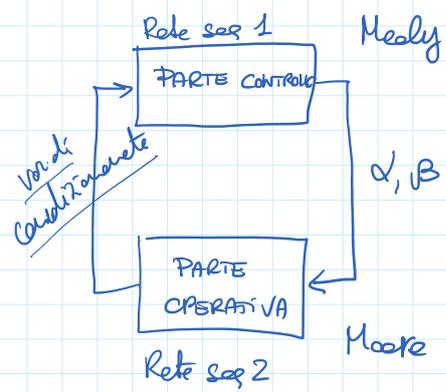
Combinazioni possibili $X \times S$?

$2^{68} \times 2^{32}$

MACCHINA ASM

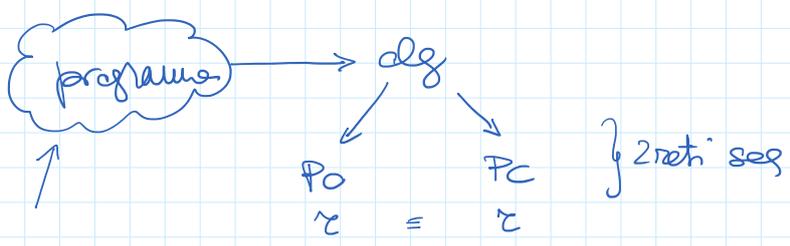
MACCHINA FW

UNITA FW



Sintesi "standard" automa → W, S, R

Componenti "standard"

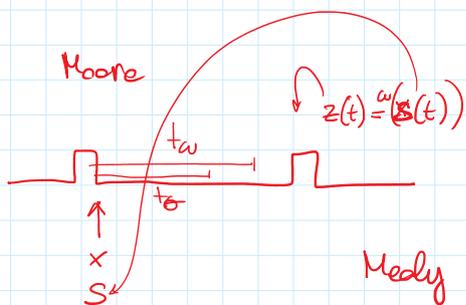


Ret Seq Moore vs Rate Seq Mealy

} che calcolano lo "stesso fun con stato"

Velocità?

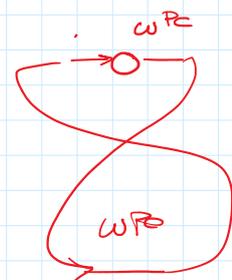
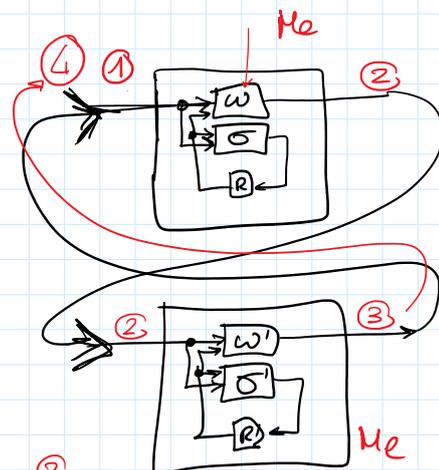
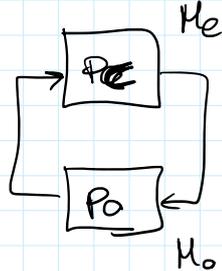
dimensioni?



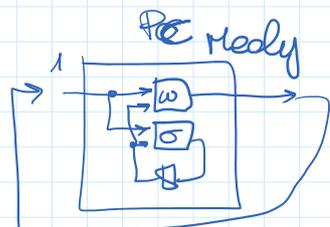
fori "realtime" rispetto a Moore

#slot Moore
 \geq
 #stat: Mealy
 \Downarrow
 meglio Mealy

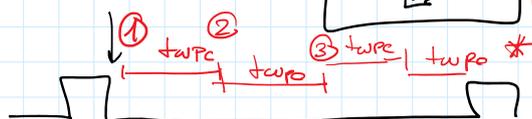
meglio Mealy



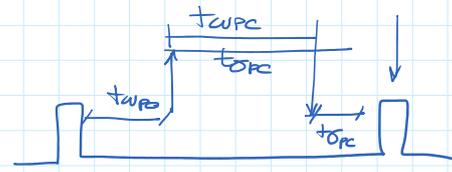
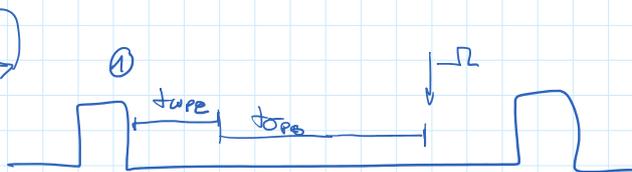
NON SI PUO' FARE



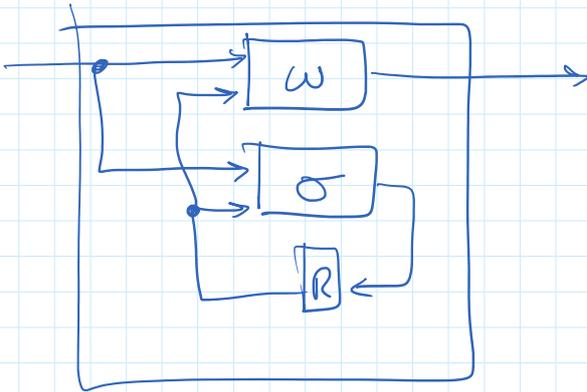
SI PUO' FARE



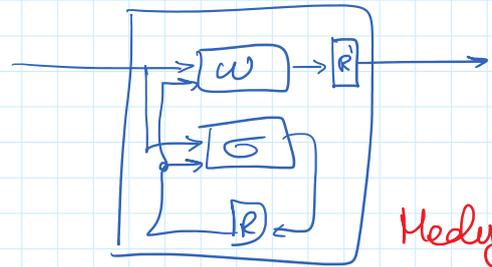
Po Moore



M_e

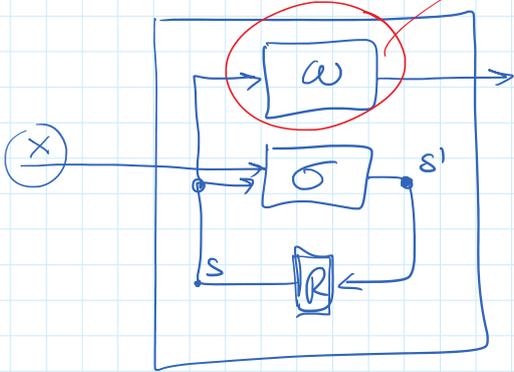


trasformato in una Moore?

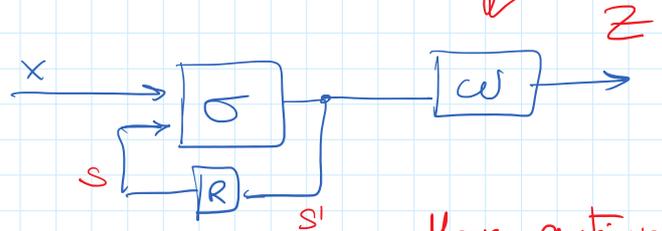


Moore ritardata

M_o



$M_e?$



Moore anticipata