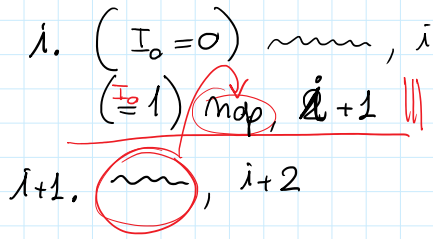


$$mop \equiv \forall i: \beta_i = \emptyset$$



Condizioni di Bernstein

$$R(I+1 \rightarrow I) = \{I\}$$

$$W(I+1 \rightarrow I) = \{I\}$$

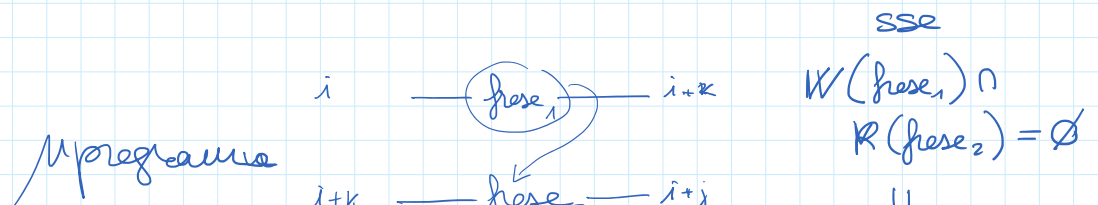
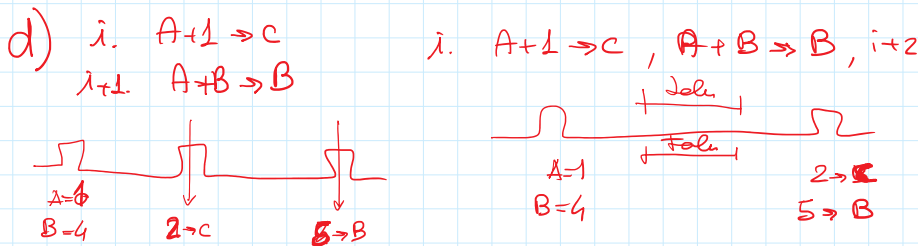
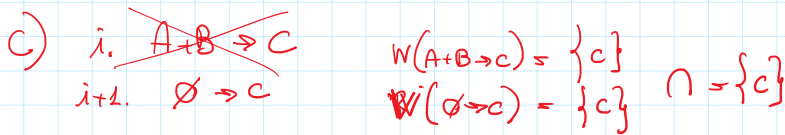
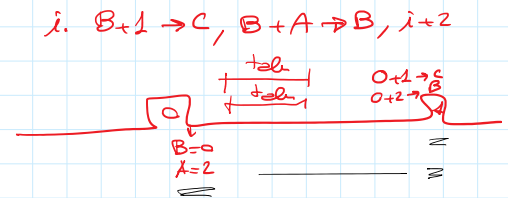
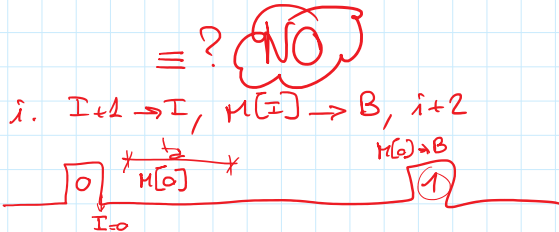
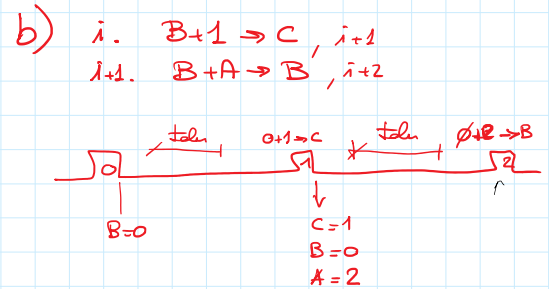
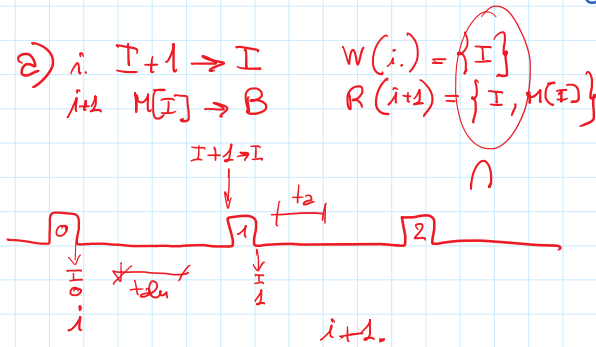
$$R(M[I] + A \rightarrow B) = \{I, M[i], A\}$$

$$W(\quad) = \{B\}$$

$$R(\mu-op) = \{ \text{reg letti da } \mu-op \}$$

$$W(\mu-op) = \{ \text{reg scritti da } \mu-op \}$$

- a) $W(\mu-op_1) \cap R(\mu-op_2) \neq \emptyset$
- b) $R(\mu-op_1) \cap W(\mu-op_2) \neq \emptyset$
- c) $W(\mu-op_1) \cap W(\mu-op_2) \neq \emptyset$
- d) $R(\mu-op_1) \cap R(\mu-op_2) \neq \emptyset$



Programma
 $i+k \xrightarrow{\quad} fase_2 \xrightarrow{\quad} i+j$

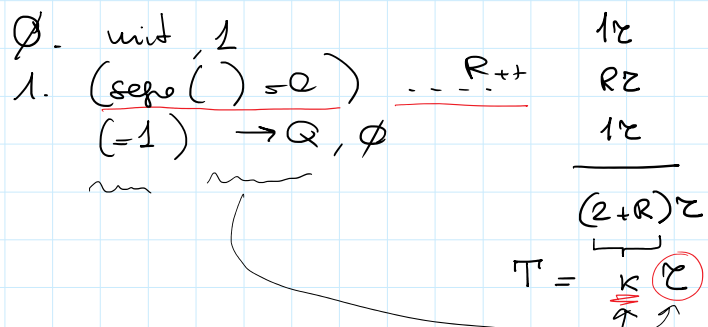
$$R(fase_2) = \emptyset$$



i. $fase_1, fase_2, i+j$

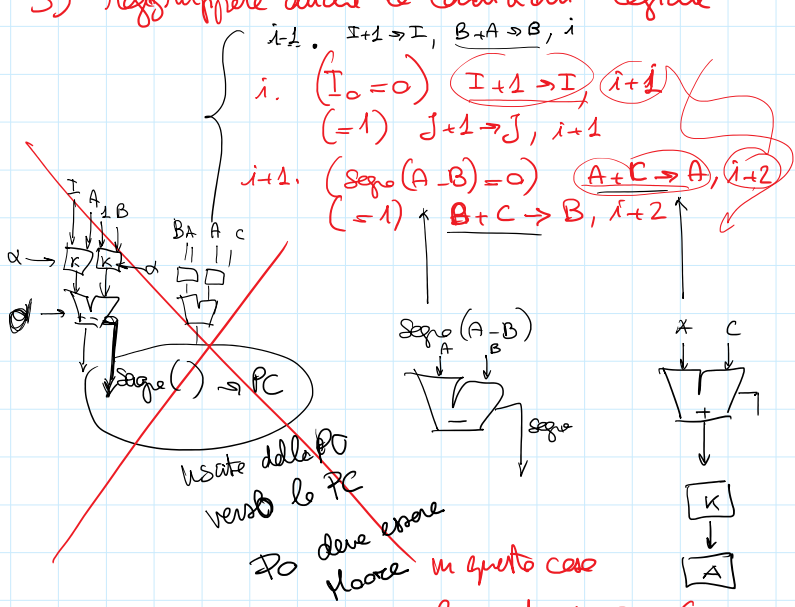
ottimizzazioni del μ codice

divisione fra interi



- 1) eliminazione delle NOP
tutte le NOP tranne quelle che attendono eventi esterni sono eliminabile
- 2) raggruppamento di μ -operazioni
- 3) raggruppare anche le condizioni logiche

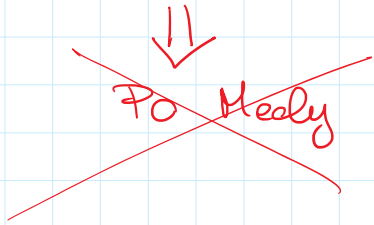
ottimizzazioni
tipo "merge" di istruzioni dopo aver verificato Bernstein



- i. $(I_0, \text{segno}(A-B) = 00) \quad I+1 \rightarrow I, \quad A+C \rightarrow A, \quad i+1$
 $(=01) \quad I+1 \rightarrow I, \quad B+C \rightarrow B, \quad i+2$
 $(=10) \quad J+1 \rightarrow J, \quad A+C \rightarrow A, \quad i+2$
 $(=11) \quad J+1 \rightarrow J, \quad B+C \rightarrow B, \quad i+2$

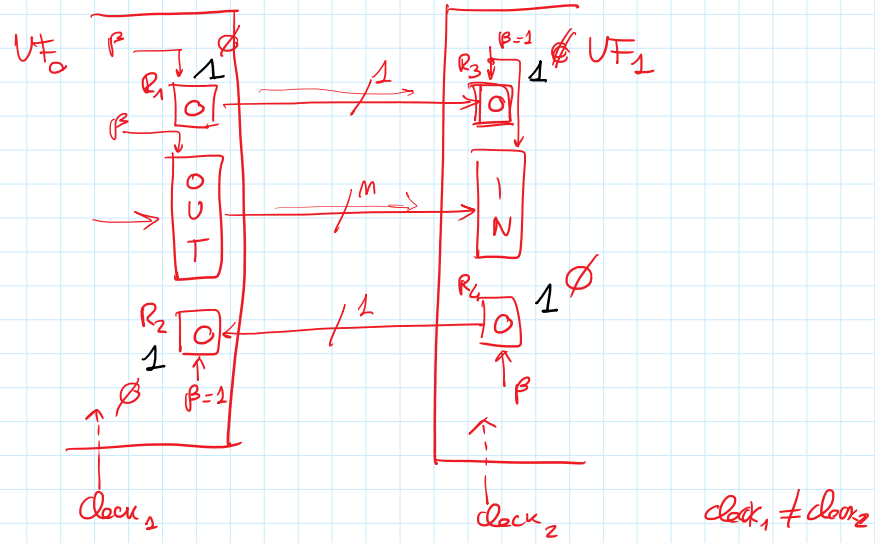
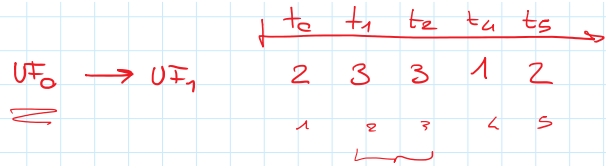
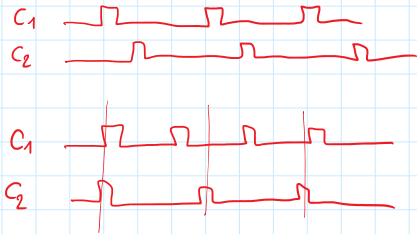
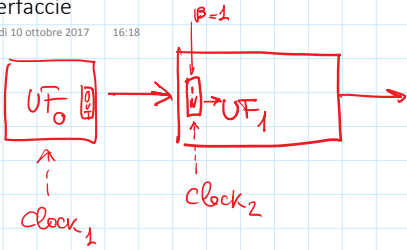
verificare che PO Moore
verifico della condizione di compattezza

le usate di PO ($\text{segno}(B-A)$)
dipendono dagli upstream ($\alpha_{A1}, \alpha_{K1}, \alpha_{K2}$)



PC Me
PO + Me

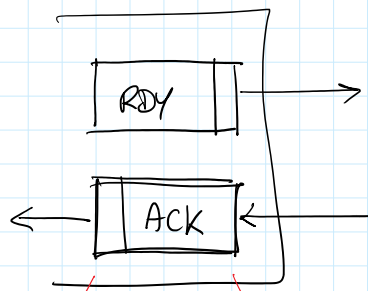
ciclo zero registri che non si stabilizza mai



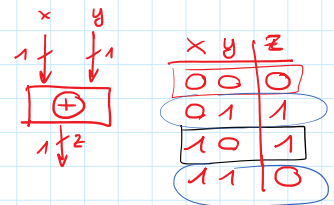
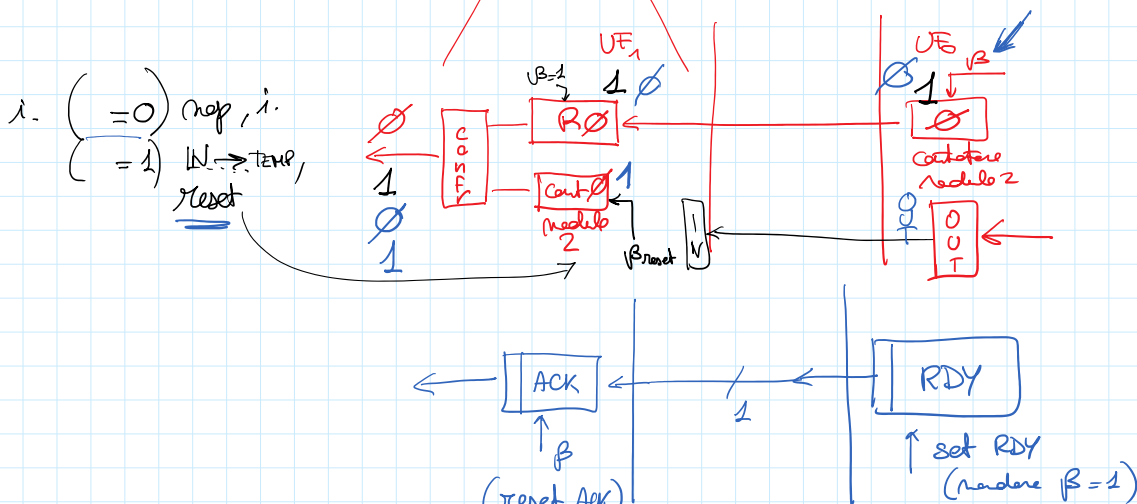
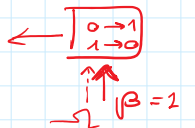
- $i. (R_2=0) \dots \rightarrow OUT, 1 \rightarrow R_2, i+1$
- $i+1. (R_2=1) \rightarrow R_2$
- $i. (R_2=0) \text{ mop, } i$
- $(=1) IN \rightarrow \dots, 1 \rightarrow R_4, i+1$
- $i+1. (R_3=1) \text{ mop, } i+1$
- $\rightarrow (=0) 0 \rightarrow R_4, \dots$

Protocollo a livelli (4 x comunicazione)

protocollo a transizione di livello



contatore modulo 2



↑
β
(reset Ack)

2

↑ set RDY
(mandare β=1)

