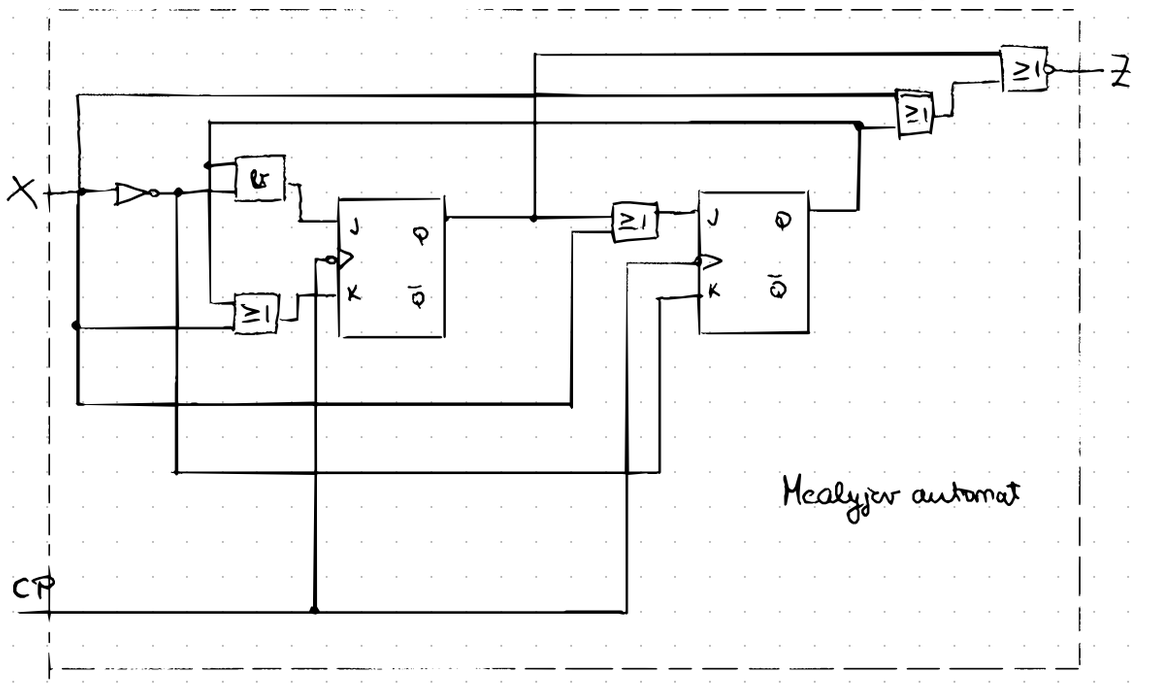
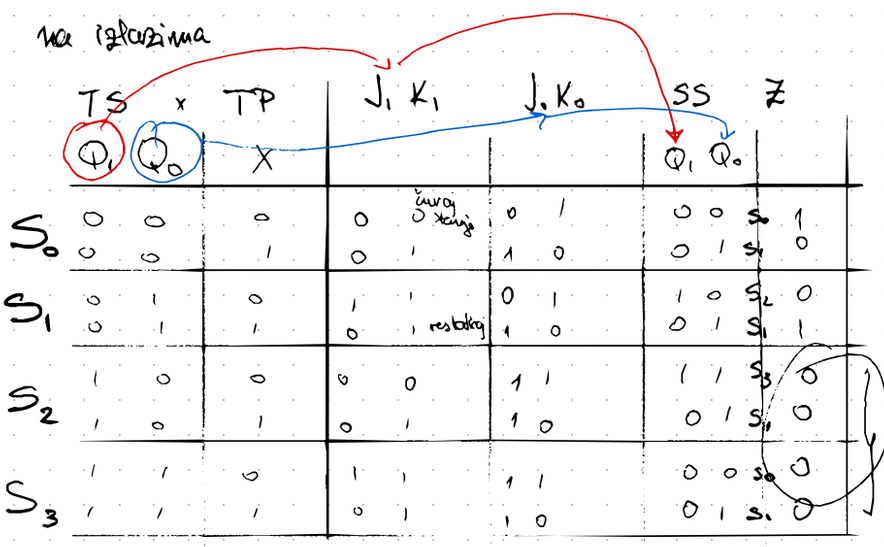
Za sklop sa slike nacrtati dijagram promjene stanja.



Za trenutno stanje i trenutnu pobudu gledamo što će biti na izlazima



Preko sheme odredimo:

$J_1 = Q_0 \cdot \bar{X}$

$K_1 = Q_0 + X$

$J_0 = Q_1 + X$

$K_0 = \bar{X}$

$Z = \overline{Q + (X \oplus Q_0)}$

$\bar{Q}_1$ je 0 pa je ovo 0

$$Z = \bar{Q}_1 \cdot \overline{(X \oplus Q_0)} = \bar{Q}_1 \cdot \overline{(X \cdot \bar{Q}_0 + \bar{X} Q_0)}$$

$$= \bar{Q}_1 \cdot \left(\overline{X \cdot \bar{Q}_0} \cdot \overline{\bar{X} Q_0} \right) = \bar{Q}_1 \left((\bar{X} + Q_0)(X + \bar{Q}_0) \right)$$

pretpost. da je stanje S_i kodirano bin. reprezentacijom od i

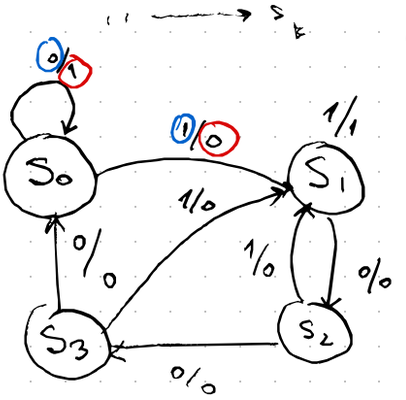
00 ⟶ S_0

01 ⟶ S_1

10 ⟶ S_2

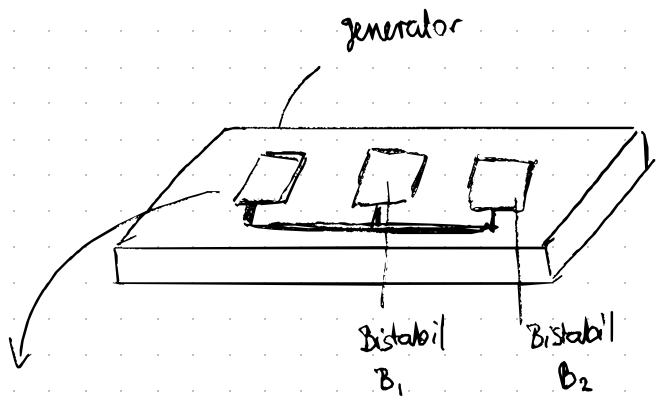
11 ⟶ S_3

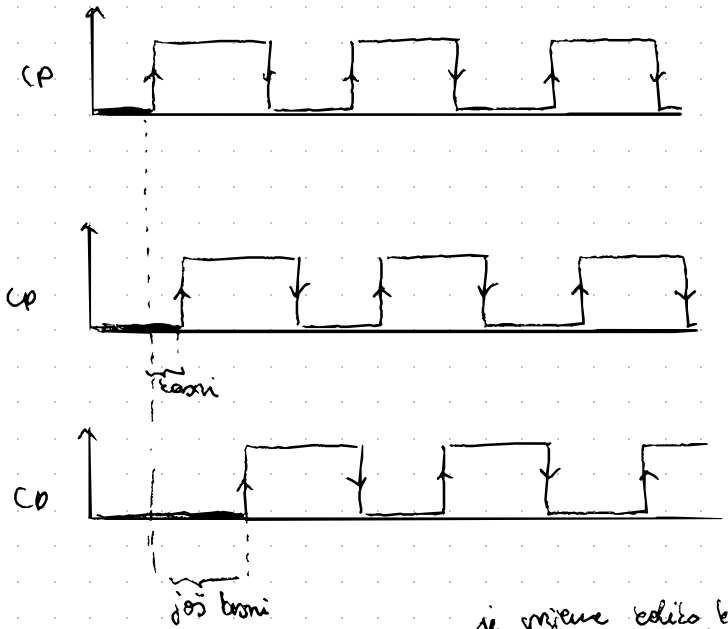
→ radimo dijagram pobuda



X → označimo lijevo S_0–S_3 i pridružimo u desnom stupcu

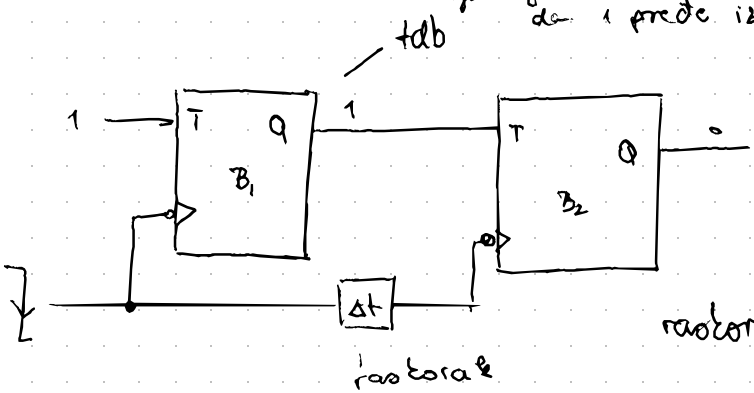
- S_0 kada dobije (X = 0) ide u S_0 (00) i izbacuje 1
- S_0 kada dobije (X = 1) ide u S_1 (01) i izbacuje 0





* kada je uključen CP, ne dolazi odmah u isto vrijeme signal na dva bistabila

je vrijeme kašnjenja da 1 prođe iz Q u T



raskorak mora biti < tdb

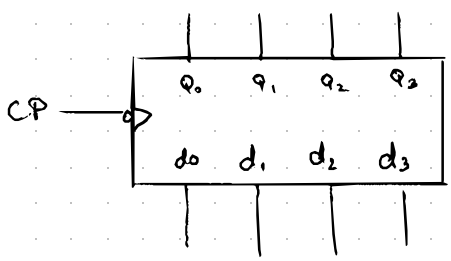
max freq rada ne utječe o vremenu zadržavanja

$\Delta t \leq tdB_1 - thold\ B_2$

Standardni sekvencijski moduli

- sinkroni
  - registri
    - serijski
    - paralelni
  - brojila
- asinkroni
  - brojila

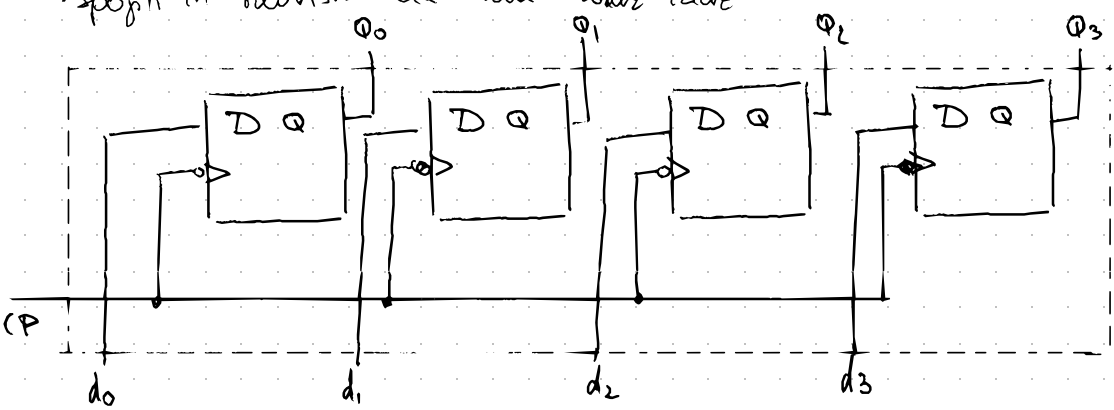
1. n-bitni paralelni registar



4bitovni paralelni registar

- na ulaz pošaljemo 4-bitni podatak
- okinemo signalom takta

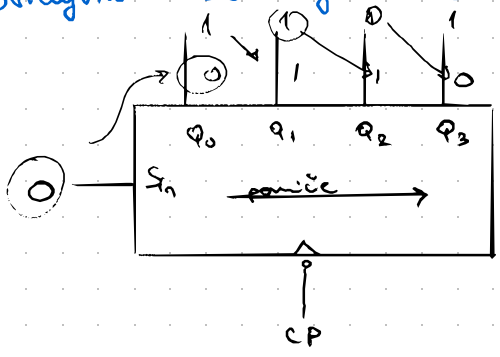
- potrebam sklop koji pamti podatke ⟶ BISTABIL
  - ali trebra nam onaj koji baš baš pamti ⇒ D-bistabil
- spojiti ih neovisno da idu ulaz-izlaz



- sve podatke paralelno dovedemo → paralelni reg.
- na sklidanje, registar pamti dovedenu kodnu riječ

2. n-bitovni posmačni (pomačni) registar

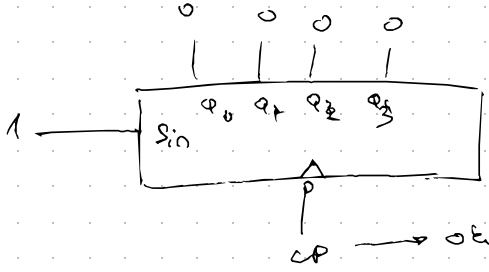
- uobičajeno ima serijski ulaz i paralelne izlaze



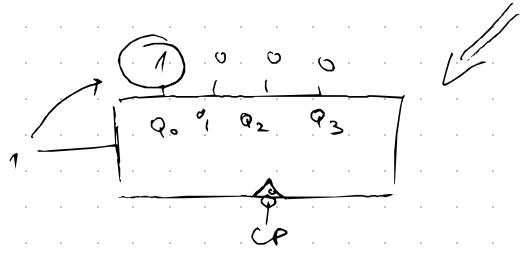
Sin ... serial input

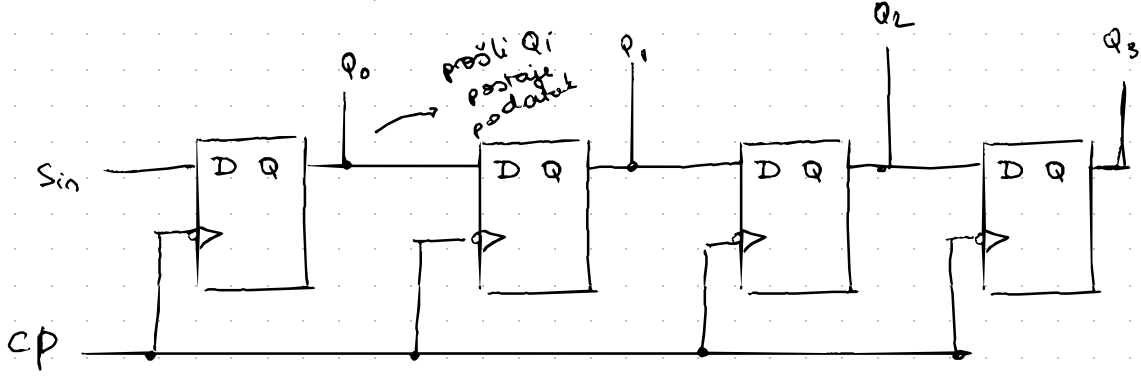
- kada ga okinemo (generiramo padajući brid), Q_1 poprima vrijednost Q_0, a Q_0 poprima S_{in}

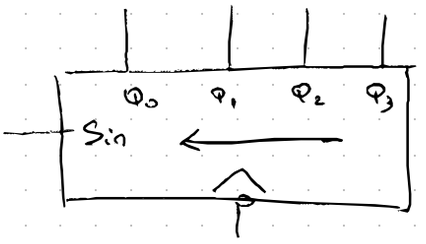
↳ pomak udesno



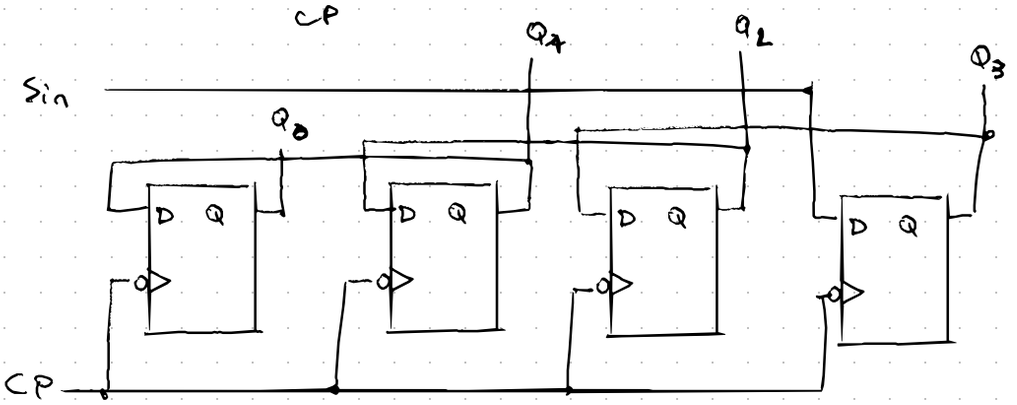
→ okinemo na 1 pa ga ugasimo





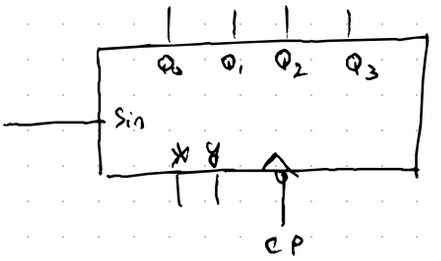


ovaj radi ulijevo



ZADATAK:

Nacrtati implementaciju 4-bit registra čiji je simbol:



pri čemu ovisno o ulazima XY registar obavlja sljedeće operacije

	X	Y	operacija
0	0	0	čuvaj upisani podatak
1	0	1	pomakni u desno
2	1	0	pomakni u lijevo
3	1	1	rotacija u desno

Anka pa ti si super ❤