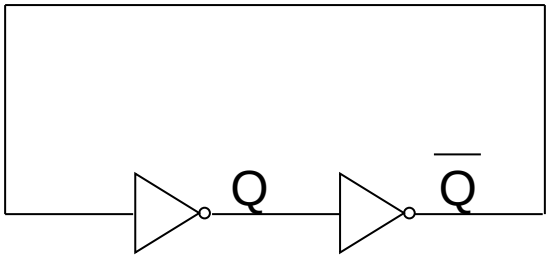
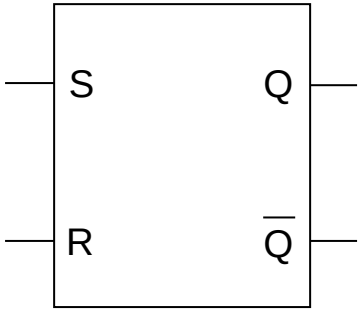
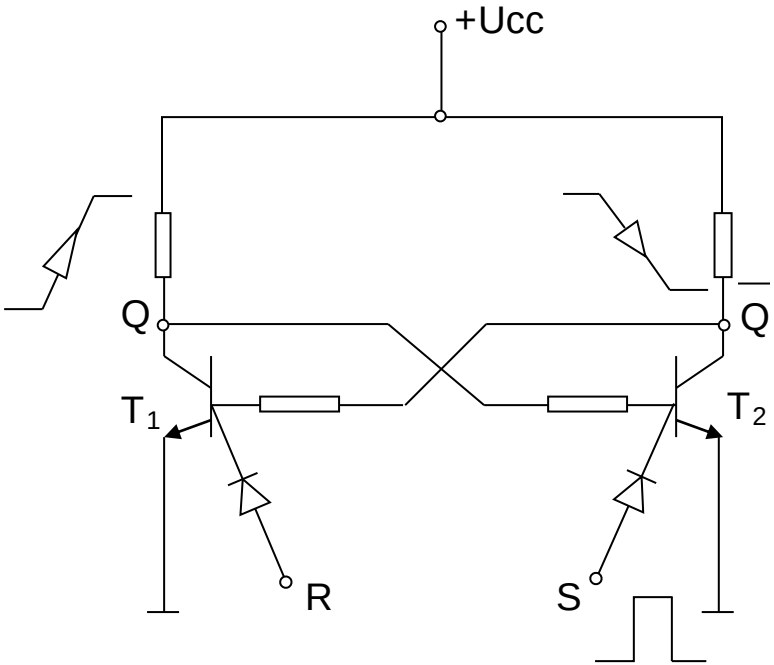
Sekvencijalni sklopovi

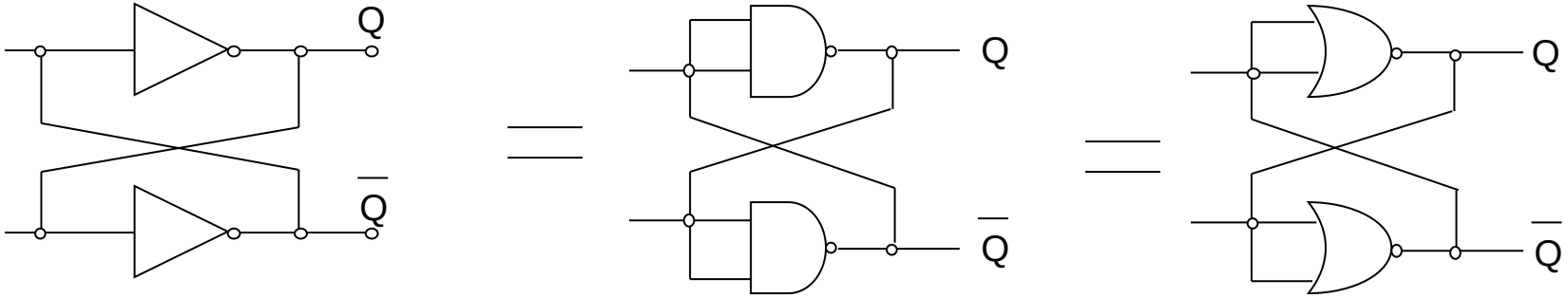
Bistabili

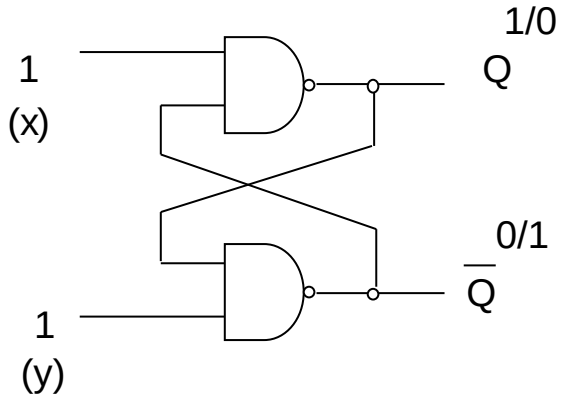






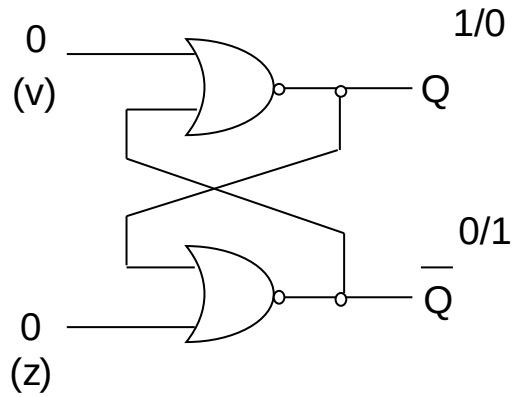
Osnovni bistabili od NI i NILI kola





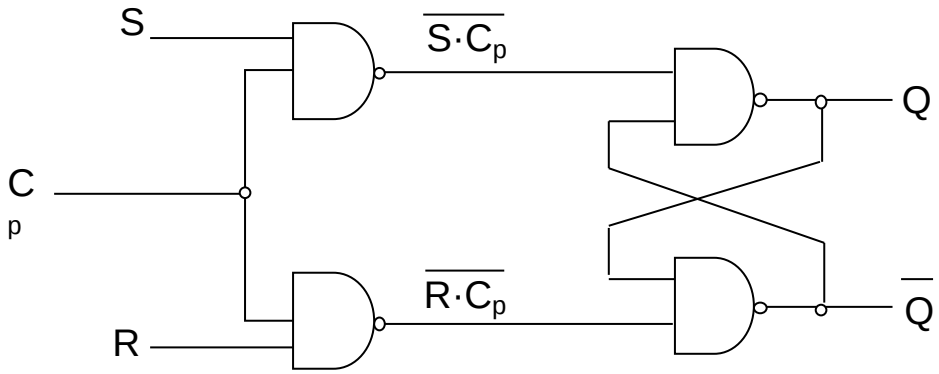
X	Y	Q	$\overline{Q}$	
1	1	0 ili 1	1 ili 0	
0	1	1	0	$X=\overline{S}$
1	0	0	1	$Y=\overline{R}$
0	0	1	1	Z.S.

Osnovni bistabili od NI i NILI kola

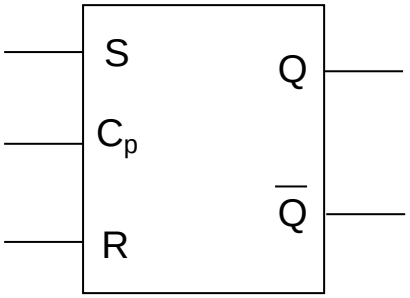


v	z	Q_{n+1}	$\overline{Q}_{n+1}$	
0	0	Q_n	$\overline{Q}_n$	
0	1	1	0	Z=S
1	0	0	1	V=R
1	1	0	0	Z.S.

Sinhroni bistabil



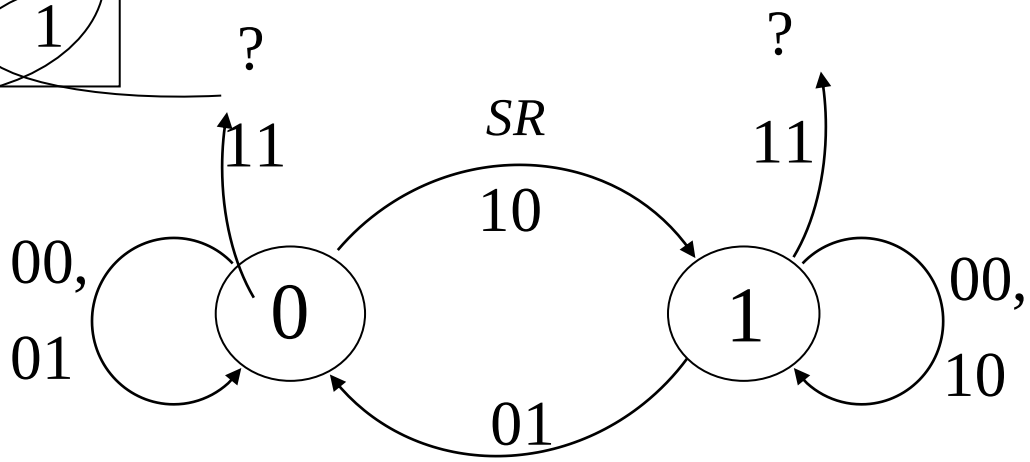
S	R	Q_{n+1}
0	0	Q_n
0	1	0
1	0	1
1	1	Z.S.



Q_n	S	R	Q_{n+1}
0	0	0	0
0	0	1	0
0	1	0	1
0	1	1	Z.S.
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	Z.S.

SR bistabil

Q_n \ SR	00	01	11	10
0			x	1
1	1		x	1



$$Q_{n+1} = S + Q_n \overline{R}$$

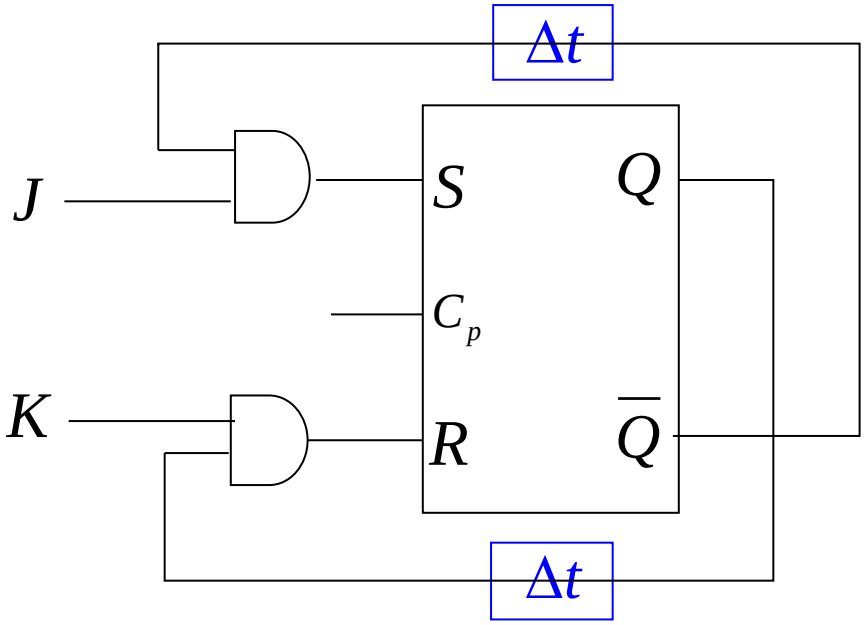
$$S \cdot R = 0$$

$$\left.\begin{array}{l} S = 0;\ S = 0 \\ R = 0;\ R = 1 \end{array}\right\} \begin{array}{l} S{=}0 \\ R = x \end{array}$$

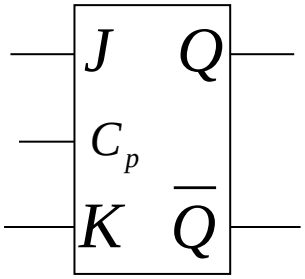
$$\left.\begin{array}{l} S = 0;\ S = 1 \\ R = 0;\ R = 0 \end{array}\right\} \begin{array}{l} S{=}x \\ R = 0 \end{array}$$

Q_n	Q_{n+1}	S	R
0	0	0	x
0	1	1	0
1	0	0	1
1	1	x	0

JK bistabil



J	K	Q_{n+1}
0	0	Q_n
0	1	0
1	0	1
1	1	$\overline{Q_n}$

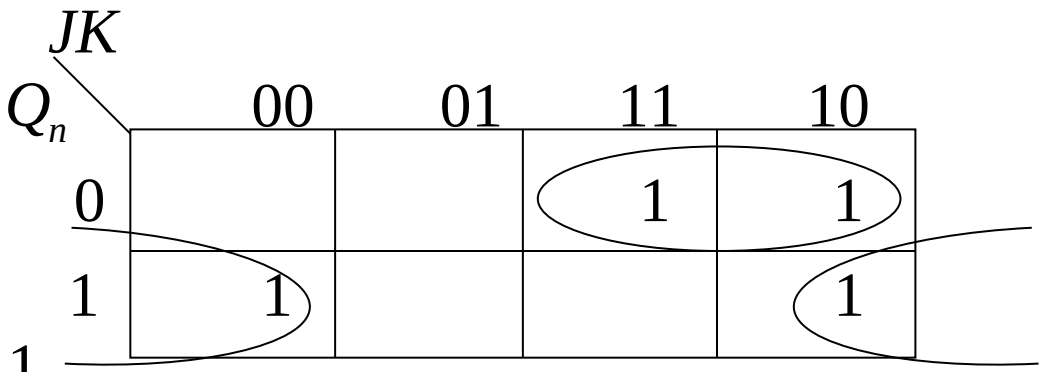


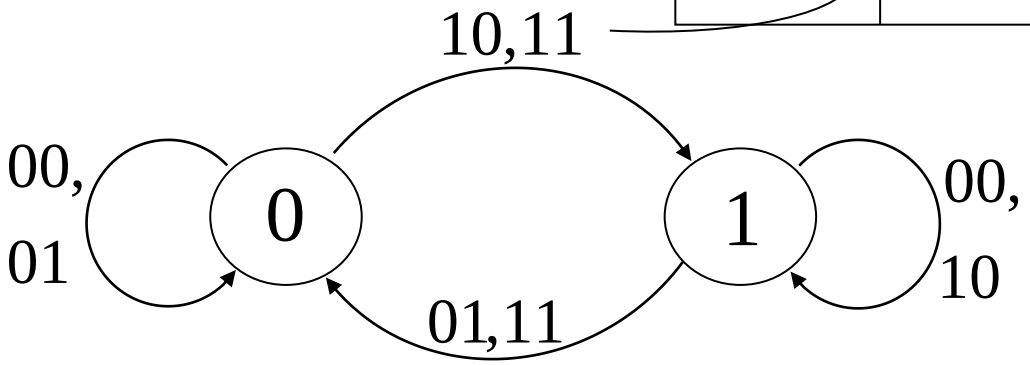
JK bistabil

Q_n	J	K	Q_{n+1}
0	0	0	0
0	0	1	0
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	0

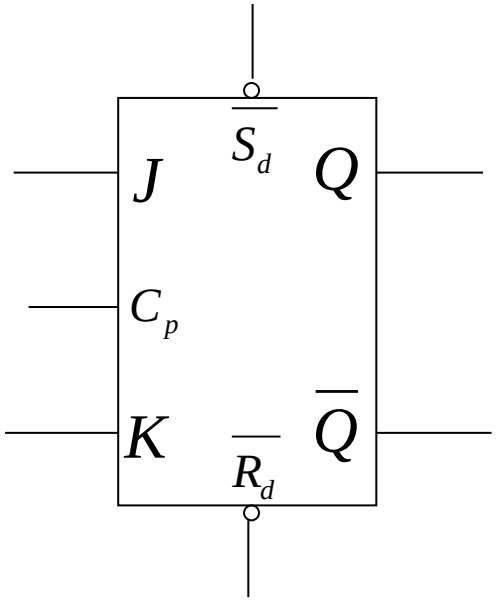
Q_n	Q_{n+1}	J	K
0	0	0	x
0	1	1	x
1	0	x	1
1	1	x	0

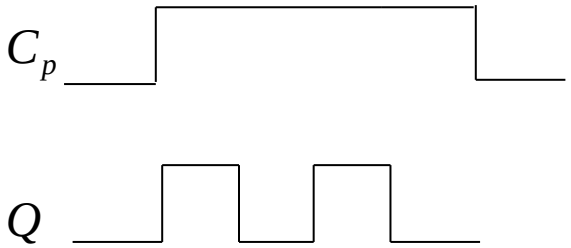
$$Q_{n+1} = \overline{Q_n} J + Q_n \overline{K}$$



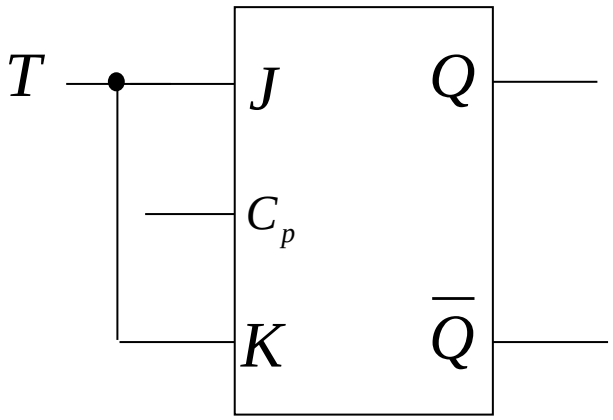


JK bistabil sa asinhronim ulazima





T bistabil



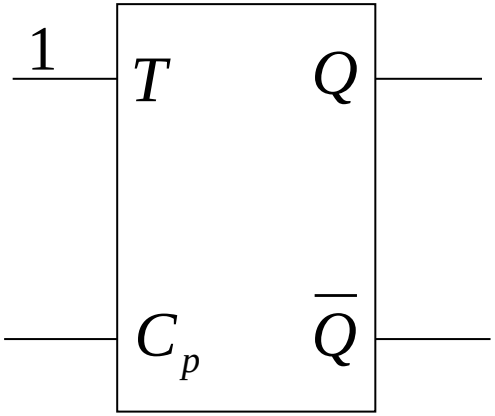
T	Q_{n+1}
0	Q_n
1	$\overline{Q_n}$

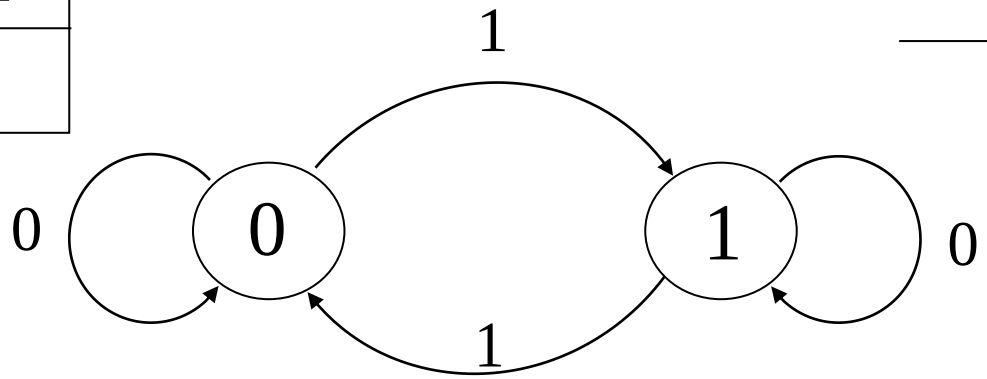
Q_n	T	Q_{n+1}
0	0	0
0	1	1
1	0	1
1	1	0

Q_n	Q_{n+1}	T
0	0	0
0	1	1
1	0	1
1	1	0

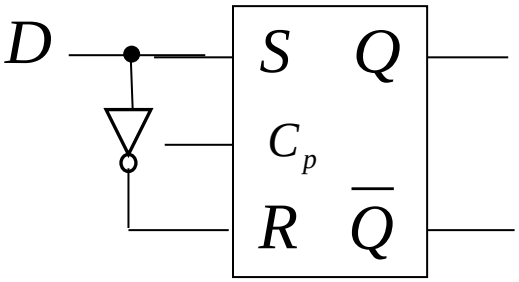
$$Q_{n+1} = \overline{Q_n} T + Q_n \overline{T}$$

Q_n \ T	0	1
0		1
1	1	





D bistabil

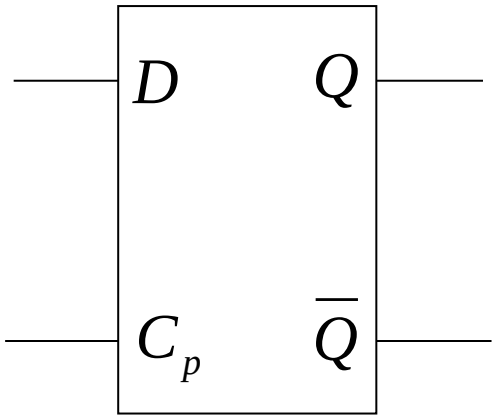


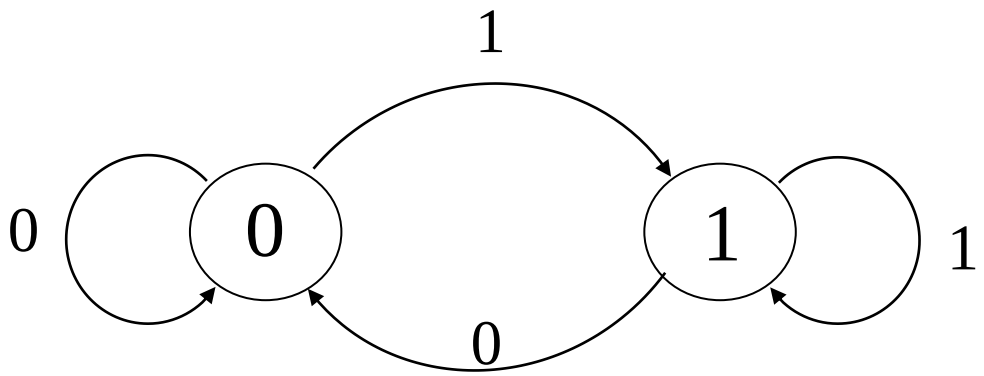
D	Q_{n+1}
0	0
1	1

Q_n	D	Q_{n+1}
0	0	0
0	1	1
1	0	0
1	1	1

Q_n	Q_{n+1}	D
0	0	0
0	1	1
1	0	0
1	1	1

$$Q_{n+1} = D$$

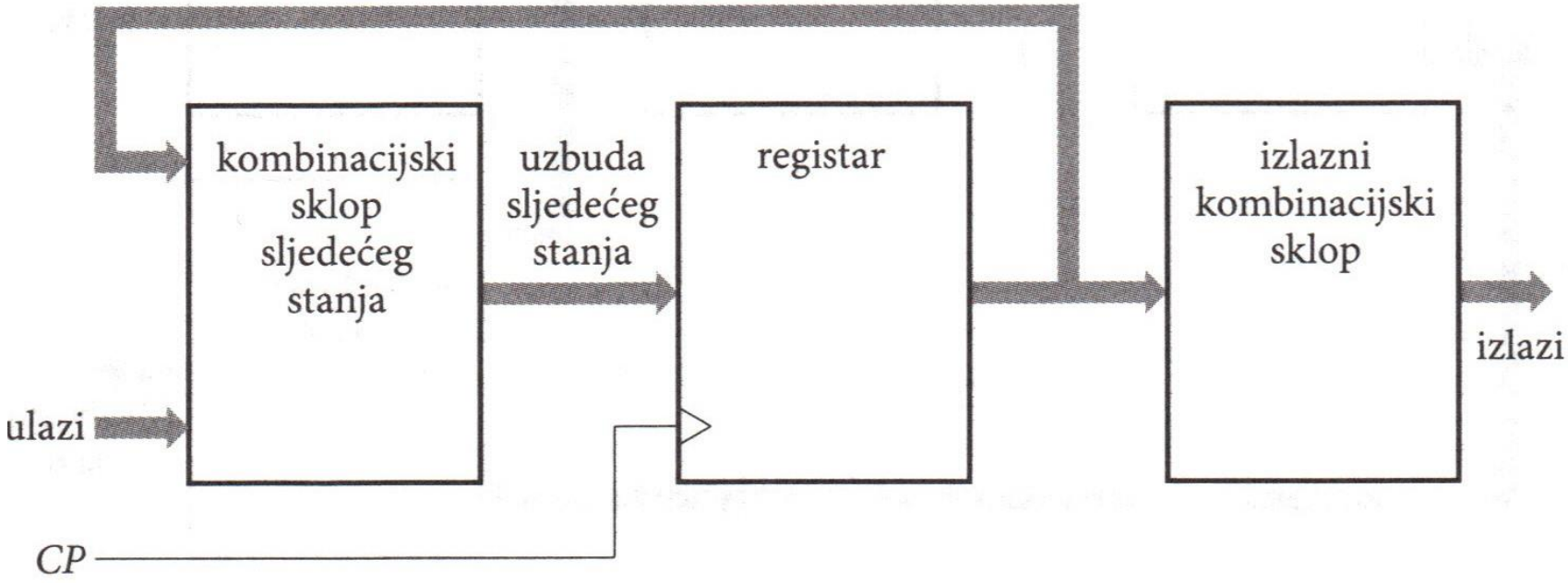




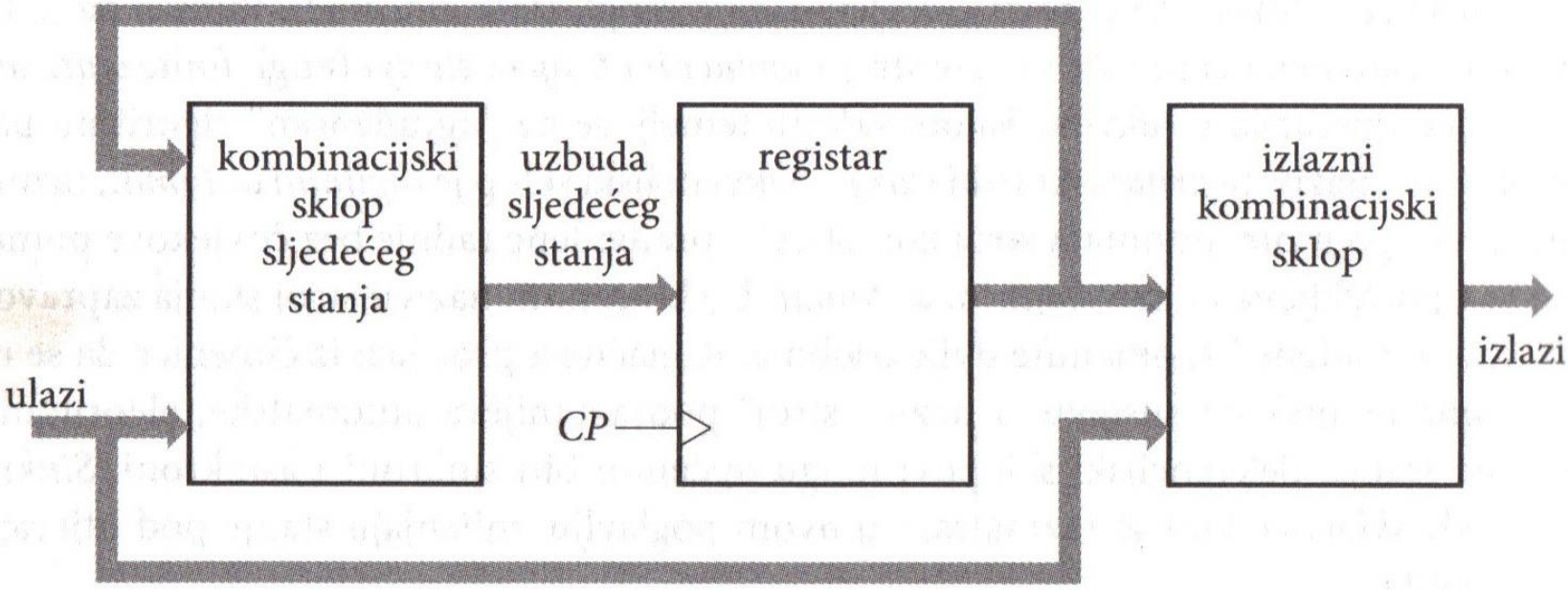
Sinhroni sekvencijalni sklopovi

Analiza

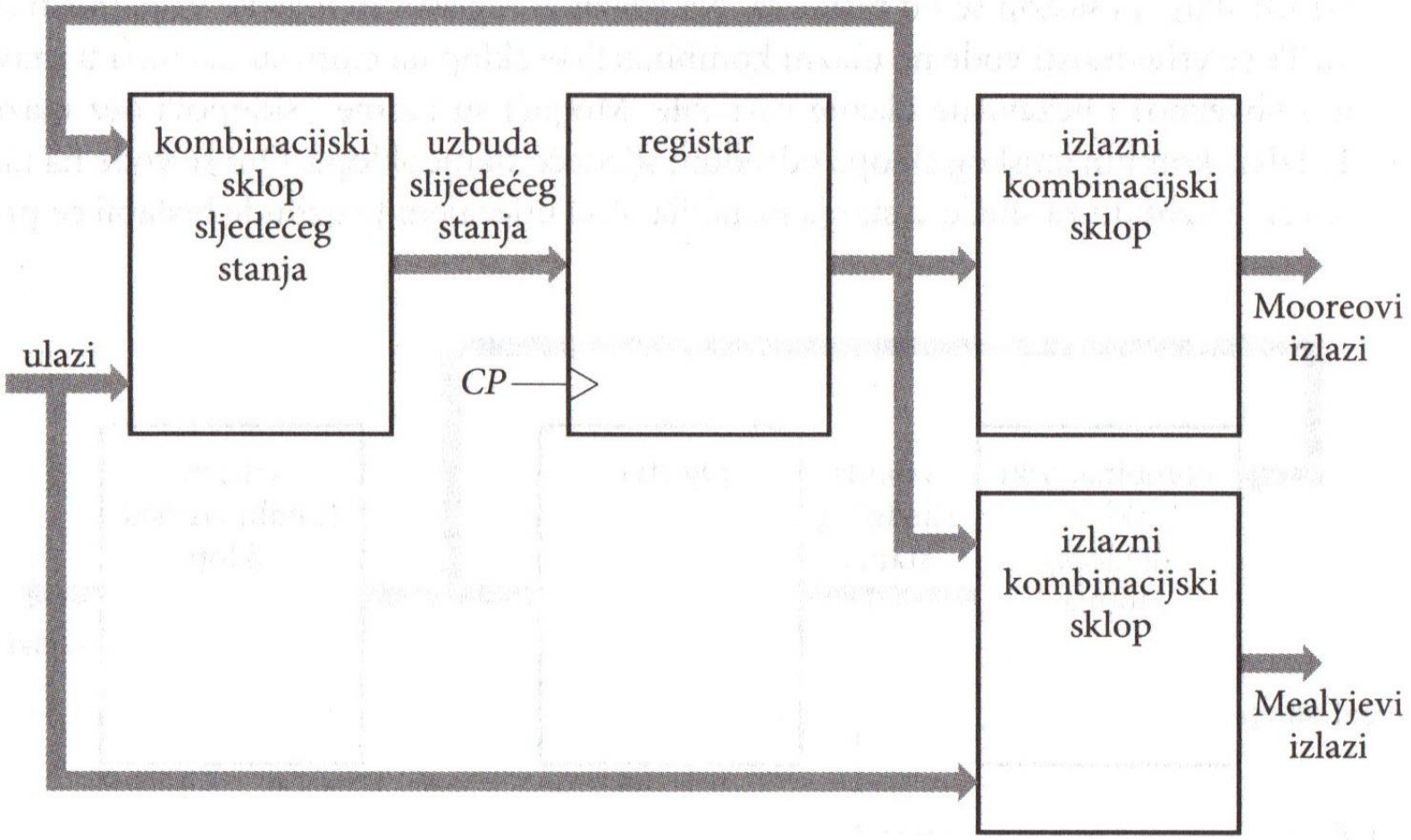
Opšta struktura SSS-a
Mooreov stroj



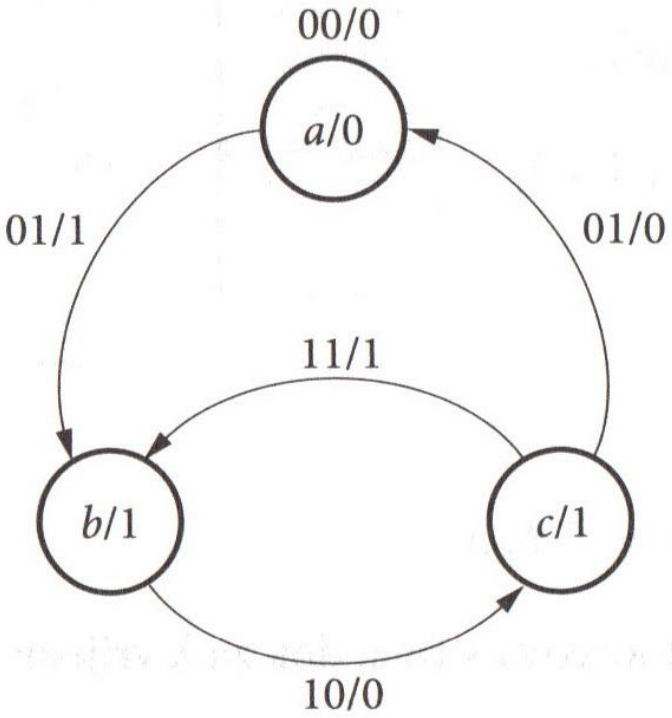
Opšta struktura SSS-a
Mealyjev stroj

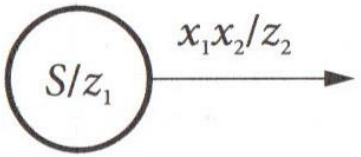


Opšta struktura SSS-a
Stroj mješovitog tipa



Dijagram stanja stroja stanja

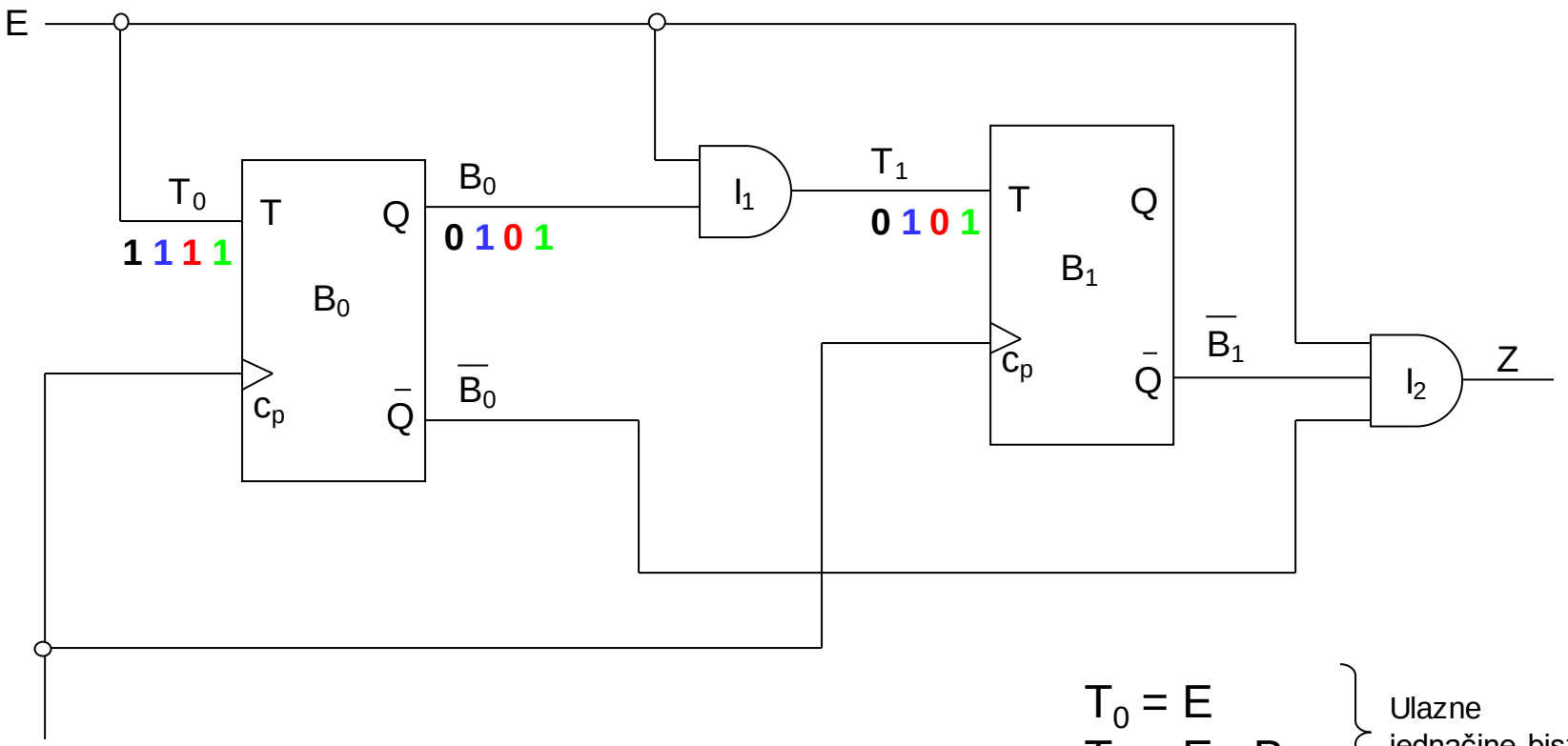




b)

S – stanje SSS-a
x_1x_2 – ulazi
z_1 – Mooreov izlaz
z_2 – Mealyjev izlaz

Analiza sinhronih sekvencijalnih sklopova



$T_0 = E$
$T_1 = E \cdot B_0$

} Ulazne jednačine bistabila

$Z = E \cdot \overline{B_1} \cdot \overline{B_0}$

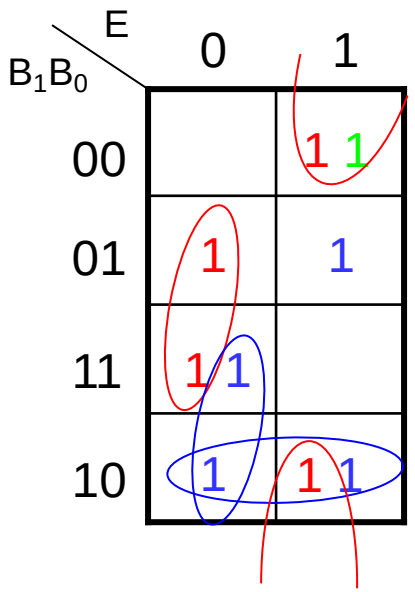
Izlazna jednačina sklopa

Tablica stanja sklopa

Postojeće stanje		Sljedeće stanje		Izlaz	
		E=0	E=1	E=0	E=1
B_1	B_0	B_1B_0	B_1B_0	Z	Z
0	0	0 0	0 1	0	1
0	1	0 1	1 0	0	0
1	0	1 0	1 1	0	0
1	1	1 1	0 0	0	0

Tablica stanja sklopa – drugi oblik

Sadašnje stanje			Buduće stanje		Izlaz
$(B_1)_n$	$(B_0)_n$	E	$(B_1)_{n+1}$	$(B_0)_{n+1}$	Z
0	0	0	0	0	0
0	0	1	0	1	1
0	1	0	0	1	0
0	1	1	1	0	0
1	0	0	1	0	0
1	0	1	1	1	0
1	1	0	1	1	0
1	1	1	0	0	0



$$(B_1)_{n+1}=\overline{E}B_1+B_1\overline{B}_0+E\overline{B}_1B_0$$

$$(B_0)_{n+1}=\overline{E}B_0+E\overline{B}_0$$

$$Z=E\overline{B}_1\overline{B}_0$$

Znakovna tablica stanja sklopa

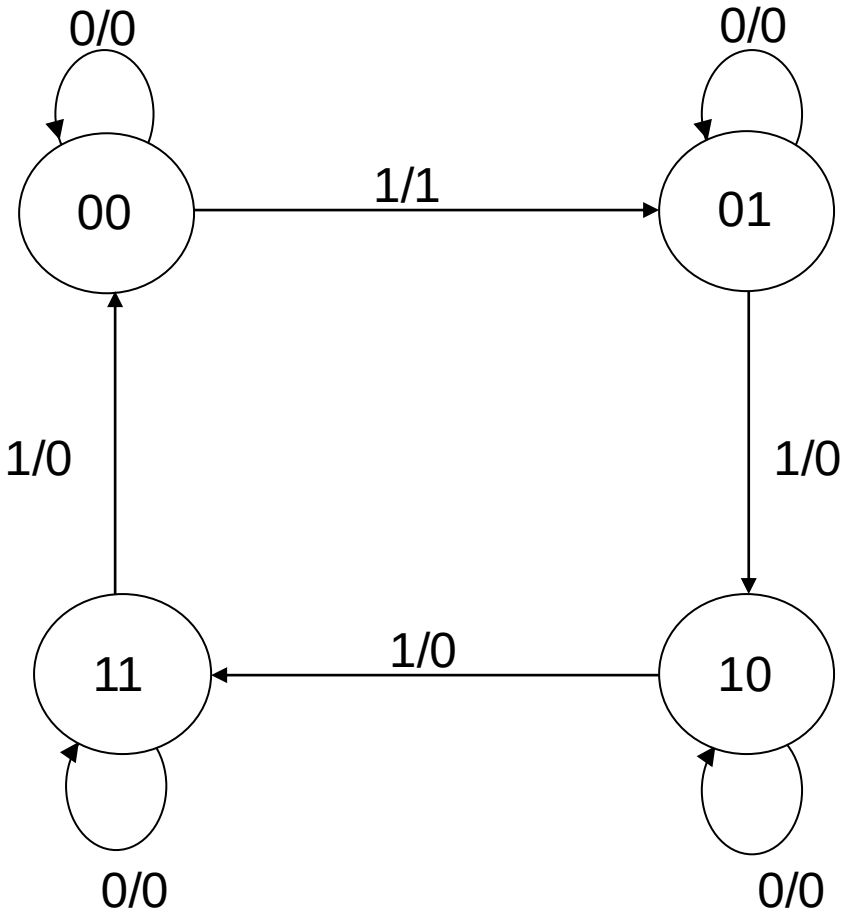
Sadašnje stanje	Sljedeće stanje ulaz E	
	0	1
a	a	b
b	b	c
c	c	d
d	d	a

$a = 00$ $c = 10$
$b = 01$ $d = 11$

Sadašnje stanje	Izlaz z ulaz E	
	0	1
a	0	1
b	0	0
c	0	0
d	0	0

$a = 00$ $c = 10$
$b = 01$ $d = 11$

Dijagram stanja sklopa



0/0

E/Z