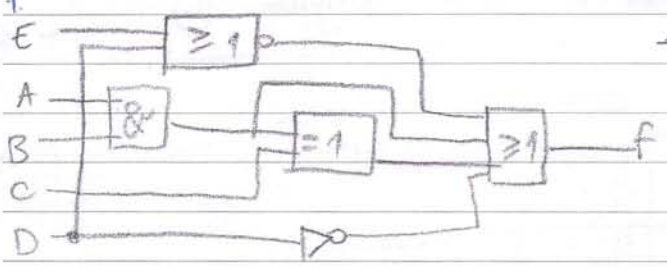
MASOVNE DIGITALNA by Čupko

grupa A

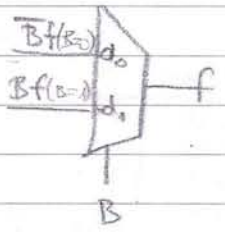
1.



→trebaju nam dvije rezidualne funkcije

(Steinmanov teorem)

$$f=(\overline{D+E})+AB+(AB\oplus C)+\overline{D}$$



funkcija više ne ovisi o varijabli B

$$f=\overline{B}f(B=0)+Bf(B=1)$$

ovo nolamo znak

$$f_{B=0}=(\overline{D+E})+C+\overline{D}$$

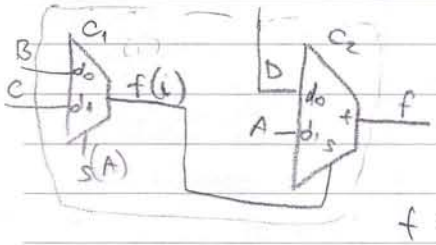
$$f_{B=0}=\overline{D}\overline{E}+C+\overline{D}=\overline{D}+C$$

(ovo teorem k tablici, ali je lakše da $\overline{D}$ pojede $\overline{E}$)

2. d_0, d_1, s, y

→ paralelno povezivanje u svemiru

» c1 (B, C, A, i) → d_0, d_1, s → y



$$i=\overline{A}B+AC$$

$$f=\overline{i}D+iA$$

$$f=(\overline{\overline{A}B+AC})D+(\overline{A}B+AC)A$$

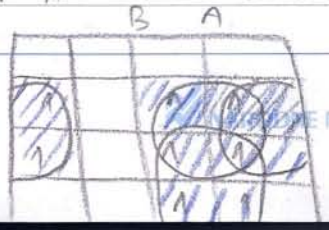
$$\overline{\overline{A}B+AC}=\overline{\overline{A}B}\cdot\overline{AC}$$

$$=(A+\overline{B})(\overline{A}+\overline{C})$$

$$=A\overline{C}+\overline{A}\overline{B}+\overline{B}\overline{C}$$

$$f=A\overline{C}D+\overline{A}\overline{B}D+\overline{B}\overline{C}D+AC$$

$$f=AC+AD+\overline{B}D$$



(n|2^n) inače

3. -> pažljivo čitati tekst zadatka -> boldano je s razlogom!
↳ u ovom zadatku je trebalo minimizirati, jer tu je pri minimizaciji ideti.. jedna varijabla (b)

4. -> pazi na oznake reda gore!

trenutno stanje → sljedeće

$Q_2Q_1Q_0$	$T_2\ T_1\ T_0$	$Q_2Q_1Q_0$
0 0 0	0 1 1	0 1 1
0 0 1	0 0 1	0 0 0
0 1 0	0 1 1	0 0 1
0 1 1	1 0 1	1 1 0
1 0 0	0 1 1	1 1 1
1 0 1	0 0 1	1 0 0
1 1 0	0 1 1	1 0 1
1 1 1	1 0 1	0 1 0

(d)

-> pazi na ulaze! kod prvog bistabila na T ide 1 ...

$T_0 = 1$

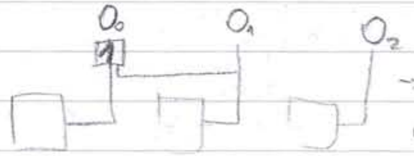
$T_1 = \overline{Q_0}$

$T_2 = Q_1Q_0$

$Q^n\ Q^{n+1}$	T
0 0	0
1 0	1
0 1	1
1 1	0

0 -> 3 -> 6 -> 5 -> 4 -> 7 -> 2 -> 1 -> 0

-> 365 je prošlo dana!

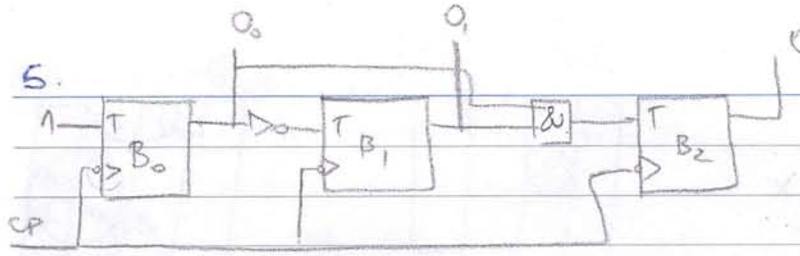


-> da se to provjeri isti je postupak samo za $O_2O_1O_0$ se gledaju Q-ove iz trenutnog stanja

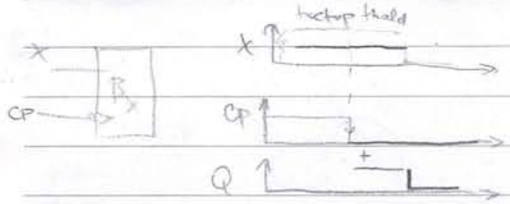
Čupko i sarkazam ☺

O_2	O_1	O_0
0	0	0
0	0	0
0	1	0
0	1	1
1	0	0
1	0	0
1	1	0
1	1	1

5.



padajući brid



koliko vremena prije nailaska brida takta mora postaviti bistabil

t_{setup} - vrijeme postavljanja

t_{hold} - vrijeme pridržavanja

koliko vremena od nailaska brida mora pobuda ostati ista

t_{db} - vrijeme kašnjenja bistabila

t_{dls} - vrijeme kašnjenja logičkog sklopa

nakon t_{db} B_0 se mijenja, za B_0 ne treba uzimati t_{setup} jer je fiksiran u 1, pa t_{dls} radi invertora, pa t_{setup} za B_1

$T_0 = t_{db}$

$T_1 = t_{dls} + t_{setup}$

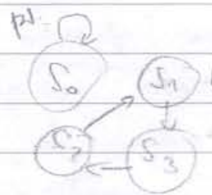
$T_2 = t_{db} + t_{dls} + t_{setup}$ ← max

$T_{cp} = \max(T_0, T_1, T_2)$

$f = \frac{1}{T_{cp}}$

6.

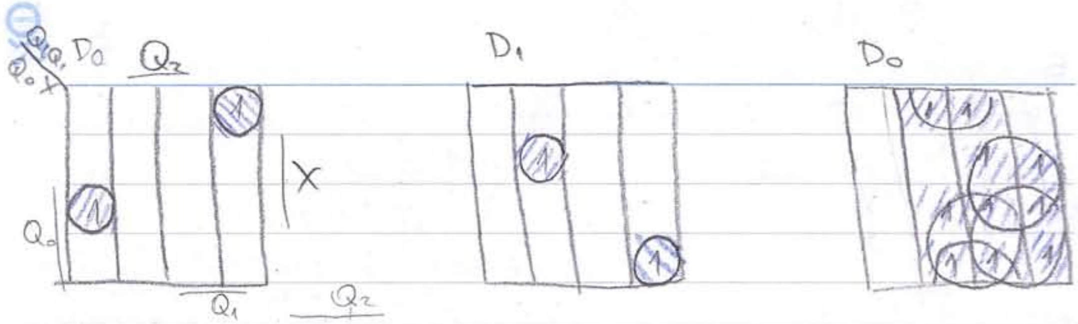
$Q_2 Q_1 Q_0$ x	$D_2 D_1 D_0$	$Q_2 Q_1 Q_0$	Y
0 0 0 0	0 0		
0 0 0 1	0 0		
0 0 1 0	1 1		
0 0 1 1	1 0		
0 1 0 0	0 0		
0 1 0 1	0 0		
0 1 1 0	0 0		
0 1 1 1	0 0		
1 0 0 0	0 0		
1 0 0 1	0 1		
1 0 1 0	0 0		
1 0 1 1	0 0		
1 1 0 0	0 0		
1 1 0 1	0 0		
1 1 1 0	0 0		
1 1 1 1	0 0		

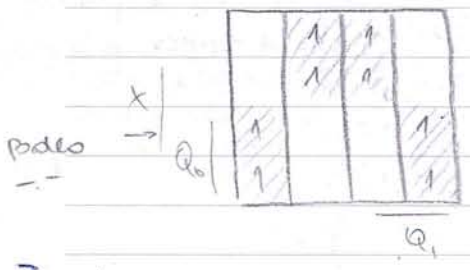


Nema siguran start

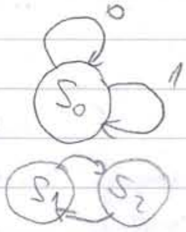
Za siguran start mora imati samo jedan ciklus

$Q^n Q_{n+1}$	D
0 0	0
0 1	1
1 0	0
1 1	1





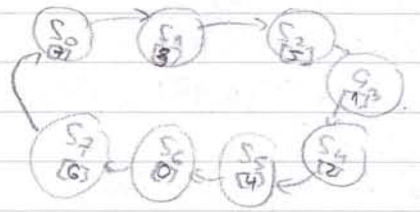
Y ne treba u zadatku uopće!

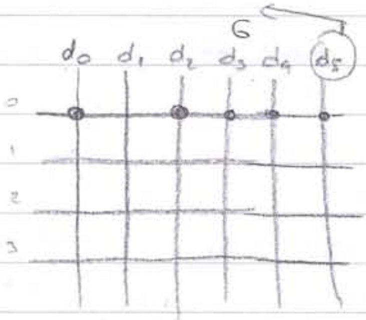


NEMA SIGURAN START!

7. 4×6

-> ovo je ustvari automat

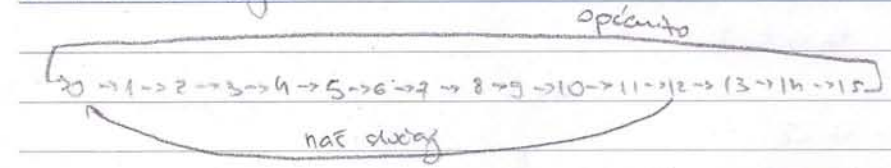




-> znači gledano izlaz mora biti 7 kada je stanje 0 te onda se gleda kako je spojeno Q_2 Q_1 vijedu na koju se memorijska adresa upisuje, a Q_0 gleda koje se pozicije propuštaju. A punimo memoriju sa vrijednostima stanja

-> pazi napomenu na to koji je bit najveće težine da se pri pretvaranju u oktalni sustav ne zezneš

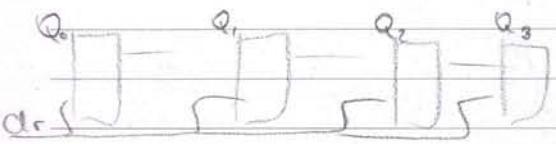
8. 4-bitno brojilo



→ preticanje citlus tako da se prebacimo u stanje 0

$Q_3 + Q_2 \overline{Q_1} + \overline{Q_0}$

tj. brojf 12



9.

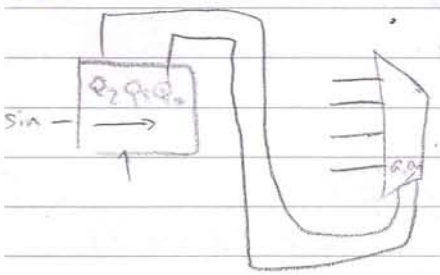
Q_n A B	Q_{n+1}	T
0 0 0	1	1
0 0 1	1	0
0 1 0	0	0
0 1 1	0	1
1 0 0	1	1
1 0 1	1	0
1 1 0	0	0
1 1 1	1	0

→ samo upisti u tablicu

(pazi na to gdje ti je Q_4)

tablica istine

10.



Trenutno $Q_2 Q_1 Q_0$	Sljedeće	sin
0 0 0	1 0 0	1
0 0 1	0 0 0	0
0 1 0	1 0 1	1
0 1 1	0 0 1	0
1 0 0	0 1 0	0
1 0 1	1 1 0	1
1 1 0	1 1 1	1
1 1 1	0 1 1	0

$$sin = \overline{Q_2}\,\overline{Q_1}\,\overline{Q_0} + \overline{Q_2}\,Q_1\,\overline{Q_0} + Q_2\,\overline{Q_1}\,Q_0 + Q_2\,Q_1\,\overline{Q_0}$$

na d0 se dovodi sin ($Q_2=0$, $Q_0=0$)

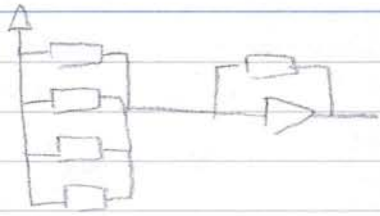
$d_0 = \overline{Q_1} + Q_1 = 1$ (d)

na d1 se dovodi sin ($Q_2=0$, $Q_0=1$)

$d_1 = 0$

11. težinski D/A pretvornik

težine $t_3 t_2 t_1 1$



U_{Ref} ' $R_f = 3k\Omega$

$$\frac{-U_{Ref}}{R_0} = \frac{U_i}{R_f}$$

$R_0 = 30\, k\Omega$

$0011 = -0{,}3V$

$$-3k \cdot \left(\frac{1}{R_0} + \frac{1}{R_1} + \frac{0}{R_2} + \frac{0}{R_3}\right) = 3k \cdot \frac{1}{30} + \frac{1}{R_1} =$$

12.

$c_1\ c_2\ d_1$ $y_1 y_2 y_3$	očitani zaštitni $c_2 c_1$ bitovi	pravi $c_2 c_1$	sindrom smazaji	smanz mačajan
0 0 0	0 0	1 1	1	1
0 0 1	0 0	0 0	0	0
0 1 0	1 0	1 1	0	1
0 1 1	1 0	0 0	1	0
1 0 0	0 1	1 1	1	0
1 0 1	0 1	0 0	0	1
1 1 0	1 1	1 1	0	0
1 1 1	1 1	0 0	1	1

$c_1 = \overline{d_1}$ $\qquad S_{znač} \overset{odr}{=} c_2 \oplus c_2$

$c_2 = \overline{d_1}$

(C)

$\Sigma m(0,3,4,7)$

Sutra u 16.00