

DIGLOG - masovne (14.02.2013.)

ZAVRŠNI ISPIT → zadaci (grupa A) ferk.fer.hr/ucenje.pdf

Prijeđep učenju knoz primjer (na izmišljennom katalogu), tj. kako se sastavljaju ispitni iz DIGLOGA

izmišljeni primjer

izmišljeni zadaci

→ važno razumjeti elementarni dio teorije, tada nam se 8 izmijenjnih zadataka može smatrati kao 8 različitih zadataka

→ ogranici zadaci zadataka

↳ zadaci se mogu zadati no 100 načina

- učiti KONCEPTE, ne STRUKTURU

↳ uvijek se radi varijante zadataka, ali su koncepti ponaučljivi

21 → A ferko.fer.hr /diglog

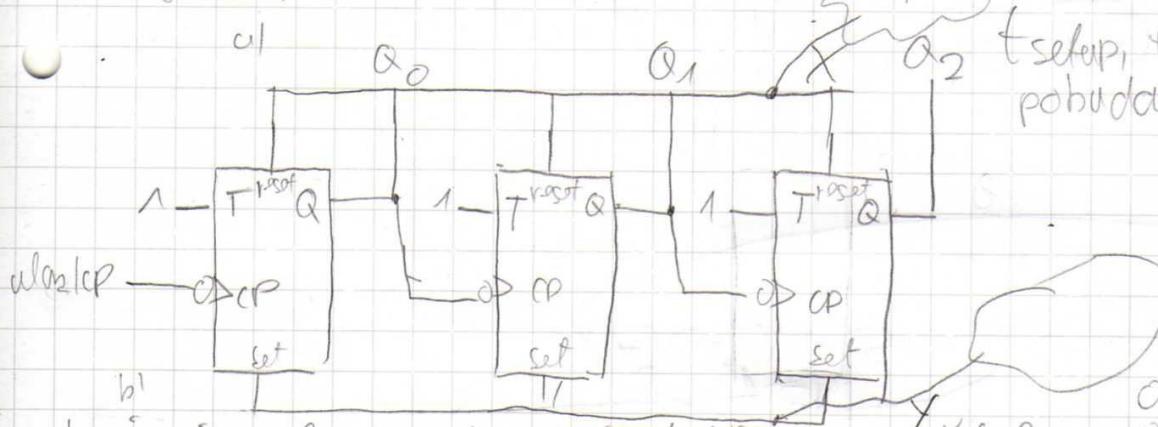
① 42% nije tačno napisano

↳ u kojem formatku treba aktivirati ulaz u postupljajući?

↳ koliko bistabila trebamo?

$$F = Q_2 \bar{Q}_1 Q_0$$

tsetup, thold → koliko dugi pobudat treba biti stabilne



→ koji je izlaz najmanje težine; zašto?

Q0 zato što se mijenja na svaki impuls fakta

0	0	0
0	0	1
0	1	0
0	1	1

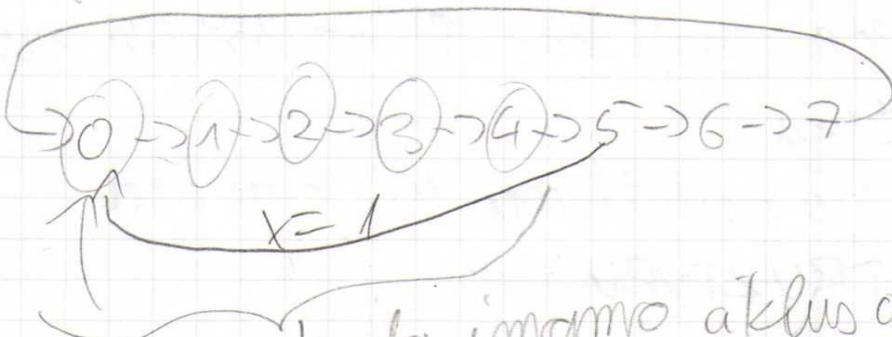
- padijuci brod Q1 upala nječe niko padajući brod

normalan akcios \rightarrow 8 stanja

$0 \rightarrow 1 \rightarrow 2 \rightarrow 3 \rightarrow 4 \rightarrow 5 \rightarrow 6 \rightarrow 7 \rightarrow$

↳ ako nista ne poduzimamo, ovako će mom brojati, učnost:

1. niset \rightarrow prilikom kraćenja akcija učimo u melu i
2. je u akciju



→ kada imamo akciju od 5 stanja
→ kod je a stanju 5 | to NUE logalno stanje i
je lujima X da bi nesetirao stanje i odu u melu

$$X = \text{stanje} \equiv 5$$

$$= Q_2 \cdot \overline{Q_1} \cdot Q_0 \quad || \text{ u } Q_2 \text{ za prizanje}$$

set

$0 \rightarrow 1 \rightarrow 2 \rightarrow 3 \rightarrow 4 \rightarrow 5 \rightarrow 6 \rightarrow 7$

→ ako djelujemo na prekid, učimo u stanje 7
⇒ kad uđe u stanje 4, moramo otići u stanje
7

$$Y = \text{stanje} \equiv 4$$

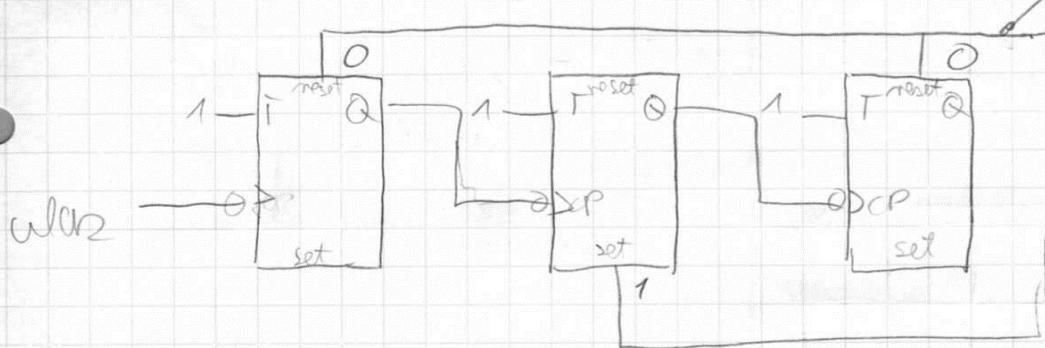
$$= Q_2 \cdot \overline{Q_1} \cdot \overline{Q_0}$$

djeluje s log. 0

2a djelovanje s log. 0 => KOMPLEMENT

$$Q_2 \bar{Q}_1 \bar{Q}_0 = \bar{Q}_2 + Q_1 + Q_0 \Rightarrow RJ.$$

HPR. SVEMIRSKA VARIJANTA



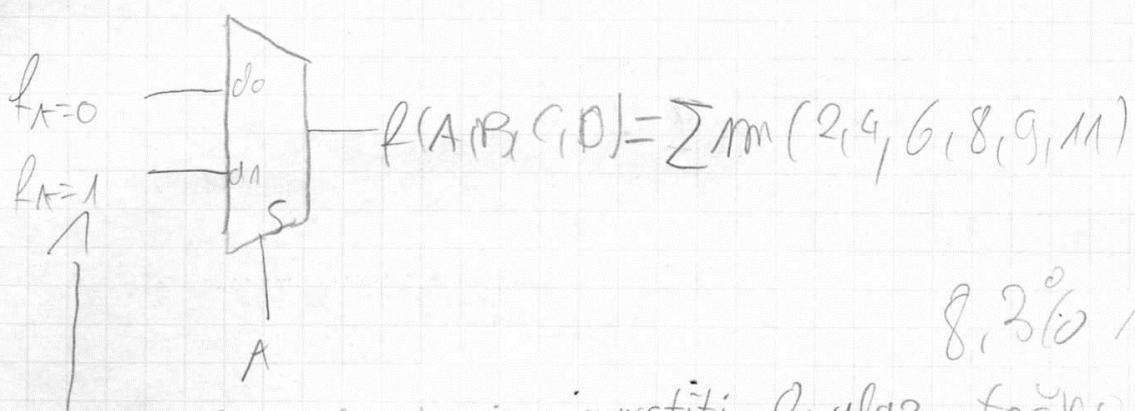
WDR

→ ključno pogledati
kako brojilo odlaže
kad prekrenemo
aklas = 010

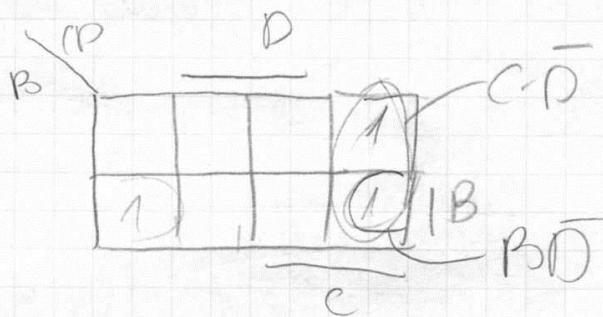
0 → 1 → Q → 3 → 4 → 5 → 6 → 7

RJ, Q2 · Q1 · Q0

$$2) f(A, B, C, D) = \sum m(2, 4, 6, 8, 9, 11)$$

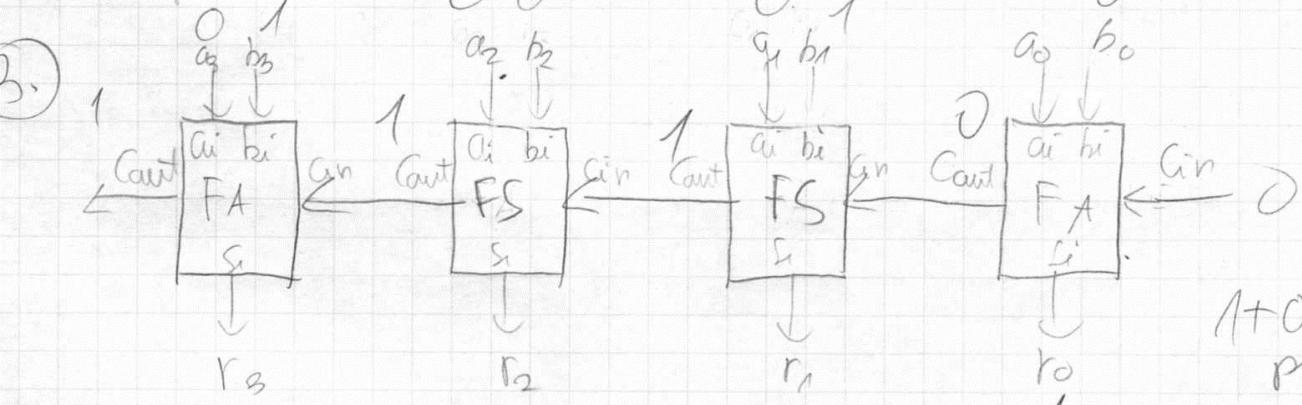


$$f(0, B, C, D) = \bar{B}C\bar{D} + B\bar{C}\bar{D} + B\bar{C}D \Rightarrow \text{minimizirati u K-tabeli}$$



$$f(0, B, C, D) = \bar{D}(B+C)$$

\rightarrow broj varijanti, pogledati kako se funkcija ostvaruje
multiplexorom



$$1+0+0=1; \text{ prijenos } 0$$

FS \rightarrow odvzimalo

26% nije točno

UVJET PRVO NACRTATI

$$R: 0111 \xrightarrow{r=1} 1010$$

④ 2 načira

87% nijé

a) kompletan vmemenski dijagram

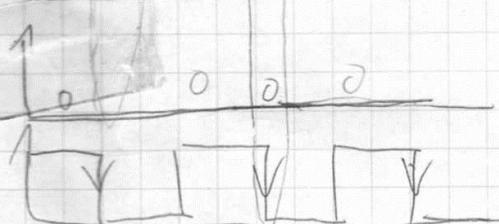
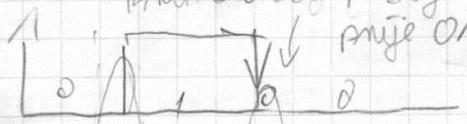
b) sjetiti se kako sklop izgleda i zaključiti gdje se sve javljaju greske

→ transijentna pogreška - nestane mukom nekog vmemena

hpri. brojib umnijed

krozko u 000 poslije 001 i

nije 010!



globati, kad imamo stanjje

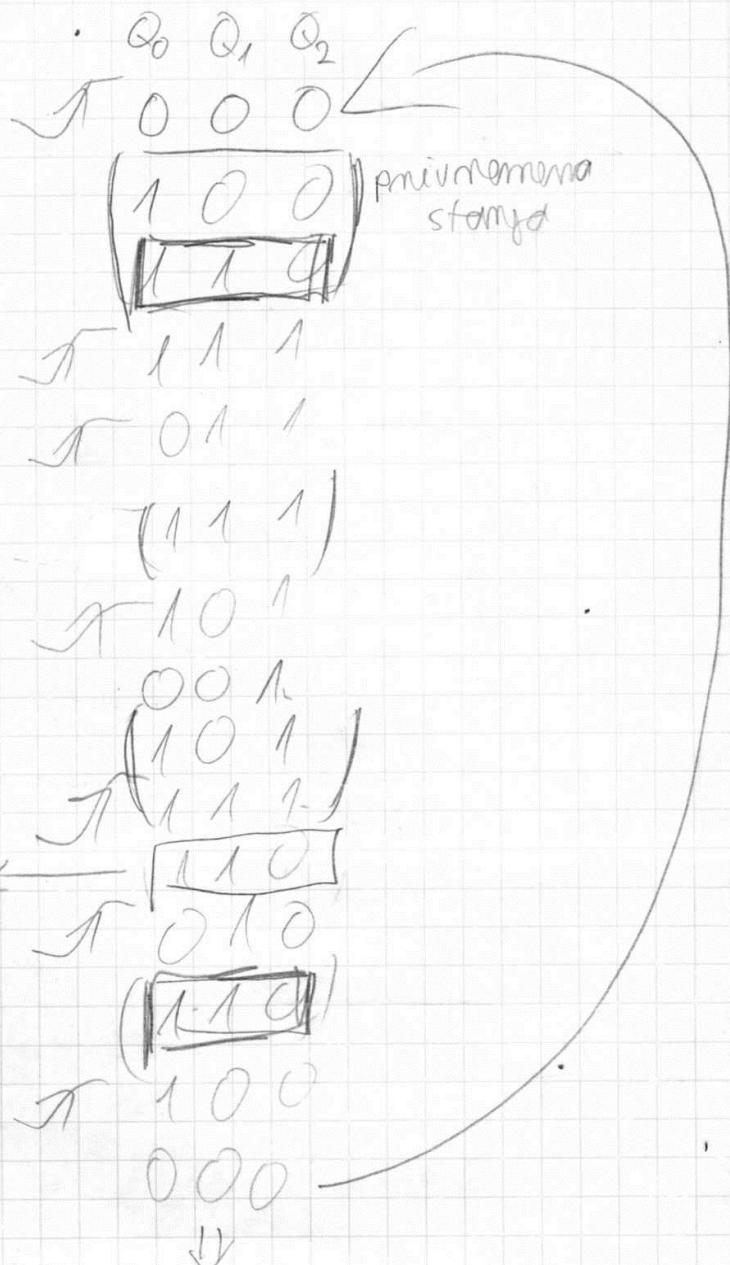
3 (kaliko puta se javlja)

→ 2 transijentne pogreške jer

de se 2 puta javiti broj

3 (ne brojimo kod se 3

stvarno javlja u oktisu)



meritati trobitno asinkrono binarno
brojilo i samo POSTUPNO pisati kako
se mijenjaju stanja

$$⑤ C_{out} = a_i b_i + C_{in} (a_i \oplus b_i)$$

36%

$$C_{out} = a_i b_i + C_{in} (\underbrace{a_i + b_i}_{\text{propagacija}})$$

generirajući

član

a_i, b_i, C_{in}

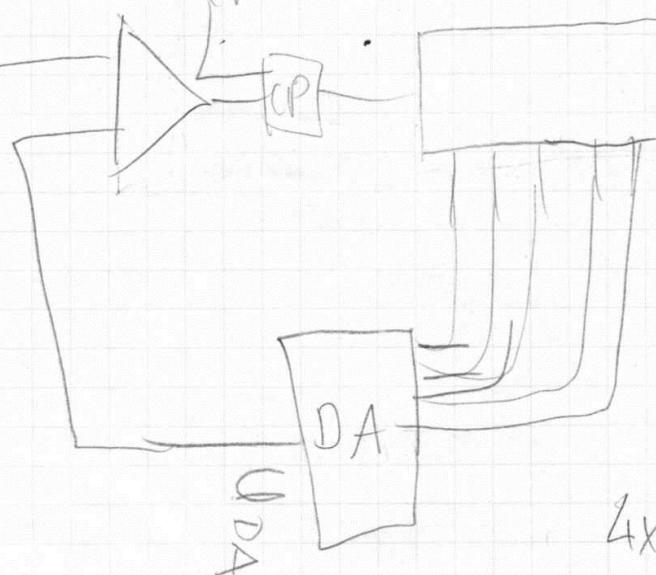
Si

C_{out}

0 0

0 1

CP



85%

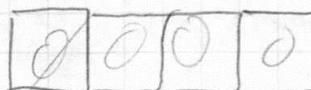
4x više zato što će raditi četvrtine konaka umjesto četvrtih pa troka više vrijemena

$$\frac{U_{max}}{256}$$

$$\frac{U_{max}}{1024}$$

$$⑦ Q_3 \quad Q_2 \quad Q_1 \quad Q_0$$

Li%



1 0 0 0

1 1 0 0

1 0 1 0

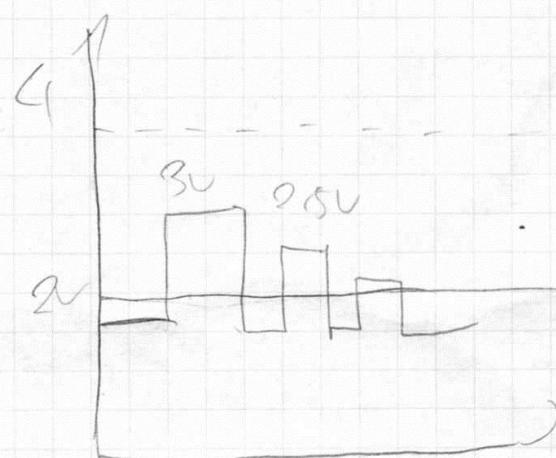
1 0 0 1

1 0 0 0

sukcesivna

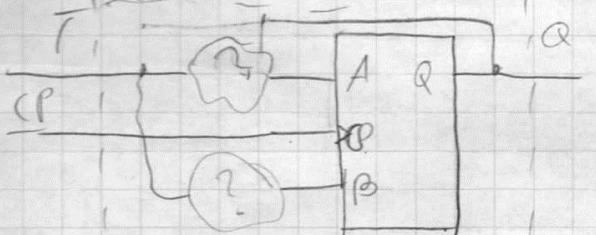
aproximacija

→ ako je 1 naprijed us, onda će i bilo koji drugi biti good us



8.

UVUEK SHEMU!



Ai nam ovisi o T i
stanjia Q

55%

$$\overline{T}$$

mogemo i ovako:

T	$T \cdot Q_n$	Q_{n+1}	A	B
0	0	0	1	X
0	1	1	X	1
1	0	1	0	X
1	1	0	X	0

$$A(T, Q_n) = \sum m(0) + \sum d(1, 3)$$

$$A = \overline{T}$$

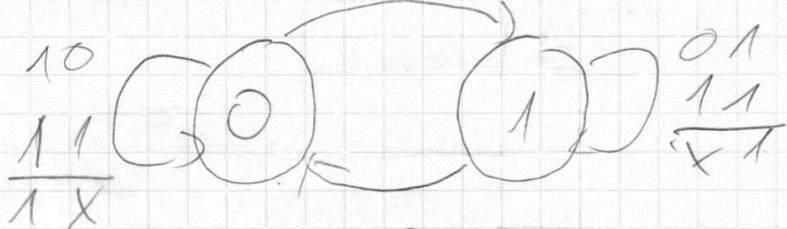
don't careovi:
nigde nisu li '0 ili '1

$$Q_{n+1} = Q_n B + \bar{Q}_n A$$

$$0 X$$

$$\overline{0} 1$$

$$0 0$$



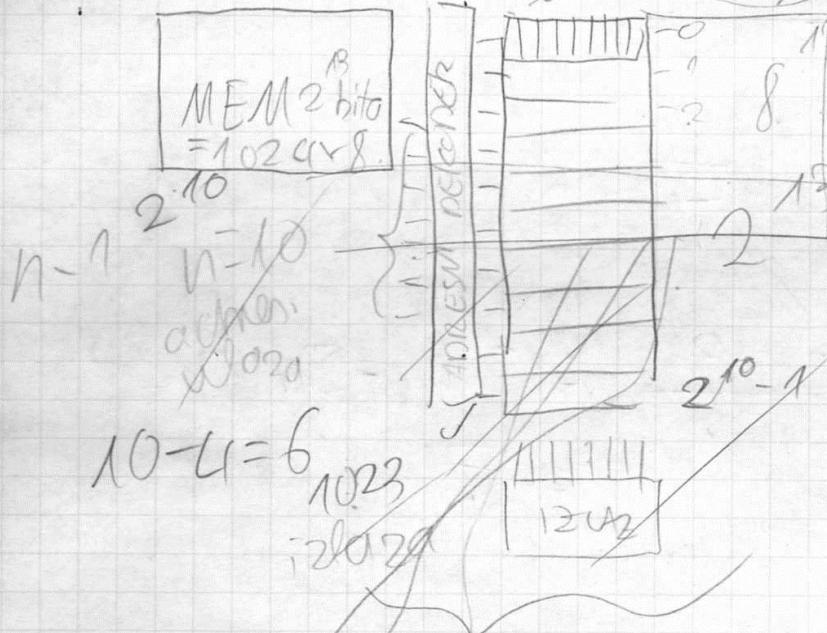
$$\begin{matrix} 00 \\ 10 \\ 11 \\ \hline \overline{X} 0 \end{matrix}$$

\Rightarrow citamo iz
tablice!

II

treba nam za određivanje dijagrama promjene stanja
bitabila $\times A$

9. 62%



10 hitova

15 12 pokosa

8 bita

-0

-1

-2

-3

-4

-5

-6

-7

-8

-9

-10

-11

-12

-13

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-198

-199

-200

10 hitova

15 12 pokosa

= 8 bitový pokos

$2^{13} \cdot 2^3 \cdot 2^n \Rightarrow n=10$

→ u 1 fizičkej miere

2 logické

10. 57%

6 primarnih
implikantov
(najviac 2 možnos)

svo
zloknutie miest

AB	CD	EF	GH	IJ
00	00	00	00	00
00	00	00	00	01
00	00	00	01	00
00	00	00	01	01
00	01	00	00	00
00	01	00	00	01
00	01	00	01	00
00	01	00	01	01
00	10	00	00	00
00	10	00	00	01
00	10	00	01	00
00	10	00	01	01
00	11	00	00	00
00	11	00	00	01
00	11	00	01	00
00	11	00	01	01
01	00	00	00	00
01	00	00	00	01
01	00	00	01	00
01	00	00	01	01
01	01	00	00	00
01	01	00	00	01
01	01	00	01	00
01	01	00	01	01
01	10	00	00	00
01	10	00	00	01
01	10	00	01	00
01	10	00	01	01
01	11	00	00	00
01	11	00	00	01
01	11	00	01	00
01	11	00	01	01

3 bitová primarna implikanta

↳ sú zaokneňené a ktoré

jeď sú pokrývajú niekoľko

mintermov

(11) $x = \boxed{1}$ scitati koja je funkcija na izlazu (firma)

$$y = \underline{\quad}$$

$$\bar{x} + \bar{y} = x \cdot y$$

$$(\bar{A} + C) \cdot A = Y = A \cdot C$$

$$P = (B + \bar{Y})(A + \bar{C})(A + B + Y)$$

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

$$= (\bar{A} + B + \bar{C})(A + \bar{C})(A(\cancel{A + \bar{C}}) + B) \quad \begin{array}{c} BC \\ \diagup A \\ A + B \end{array} \quad \begin{array}{c} \Sigma \\ \hline 0010 \\ 101111 \\ \hline 1A \\ B \end{array}$$

$$f(A, B, C) = \sum m(3, 4, 6, 7)$$

(12)

11

↳ min. i maks.

15%

= 16 komplement

min. postaju

max. i obrnuto

(13) 43% nije zadovoljilo

↳ f-ja finančnog stanja, gledamo
mjesečne kategorije imaju samo Q_1, Q_2, Q_3

(14) 2 načina: 1) projekcijati sklop

2) Q_3, Q_2, Q_1, Q_0 → dovedi se 4 (100), gledamo
što se dovodi na $Q_3 \rightarrow R_1$

→ mo
nost
niz
fakta

$$R_1 \quad \begin{matrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{matrix} \equiv 4 \rightarrow 1 \quad 1, A \quad 37\%$$

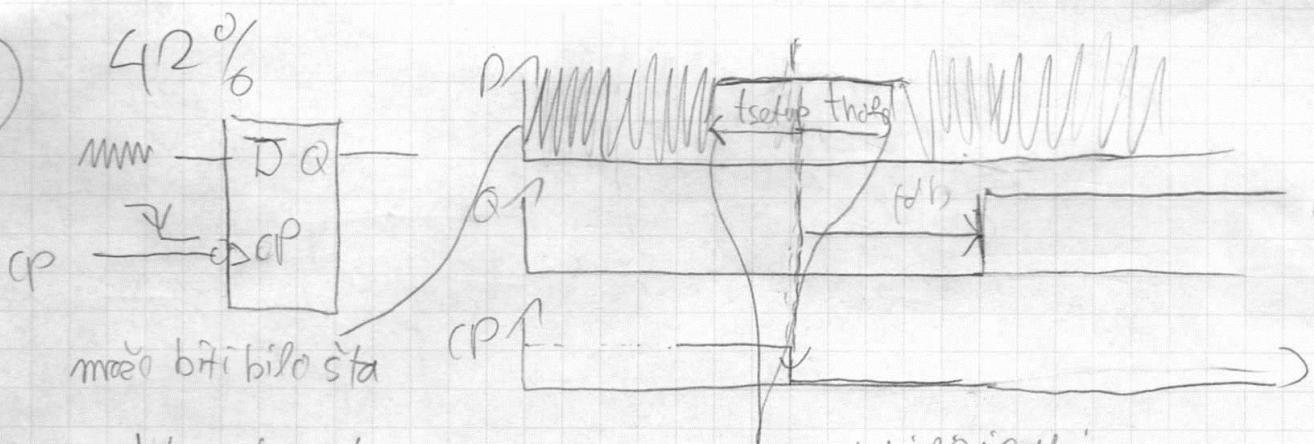
$$R_2 \quad \begin{matrix} 1 & 1 & 0 & 0 \end{matrix} \equiv 12 \rightarrow \underline{10}$$

zato što su R_3, \dots, R_0 spojeni na 0

gledamo sljedeća stanja, prema zadatku:

$$\dots \rightarrow 6 \rightarrow 4 \rightarrow 1 \rightarrow 8 \rightarrow \dots \rightarrow 9 \rightarrow 12 \rightarrow 10 \quad \underline{10} \quad \underline{10}$$

15.



Zbog K_0 $t_{\text{DB}} + t_{\text{setup}}$

MORA se stabilizirati

→ svakom opomčenju

Zbog J_0 $t_{\text{DB}} + t_{\text{delay}} + t_{\text{setup}}$ moraju biti zadovoljeno

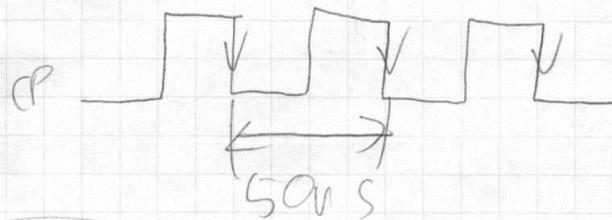
→ ČEKATI NA PUŽE

Zbog K_1 $t_{\text{DB}} + t_{\text{delay}} + t_{\text{setup}}$

$$f = \frac{1}{50\text{ns}} = 20 \text{ MHz}$$

prematravamo što se dobaci
na svaki t_{DB}

npr. $K_0 = t_{\text{DB}}$ zato što moramo
čekati $\overline{Q_1}$ izlaz + t_{setup} (vrijeme
postavljanja bistabilne u neko stanje)



85%

transistorno
stanje
pobuda

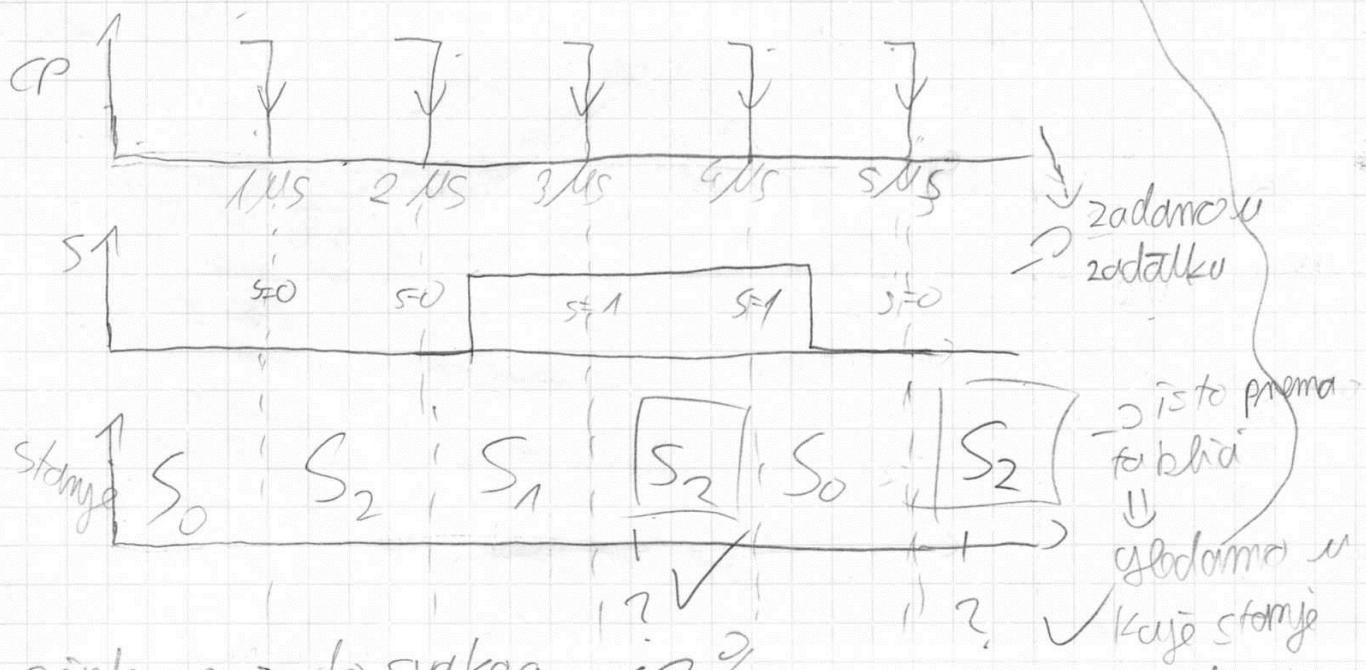
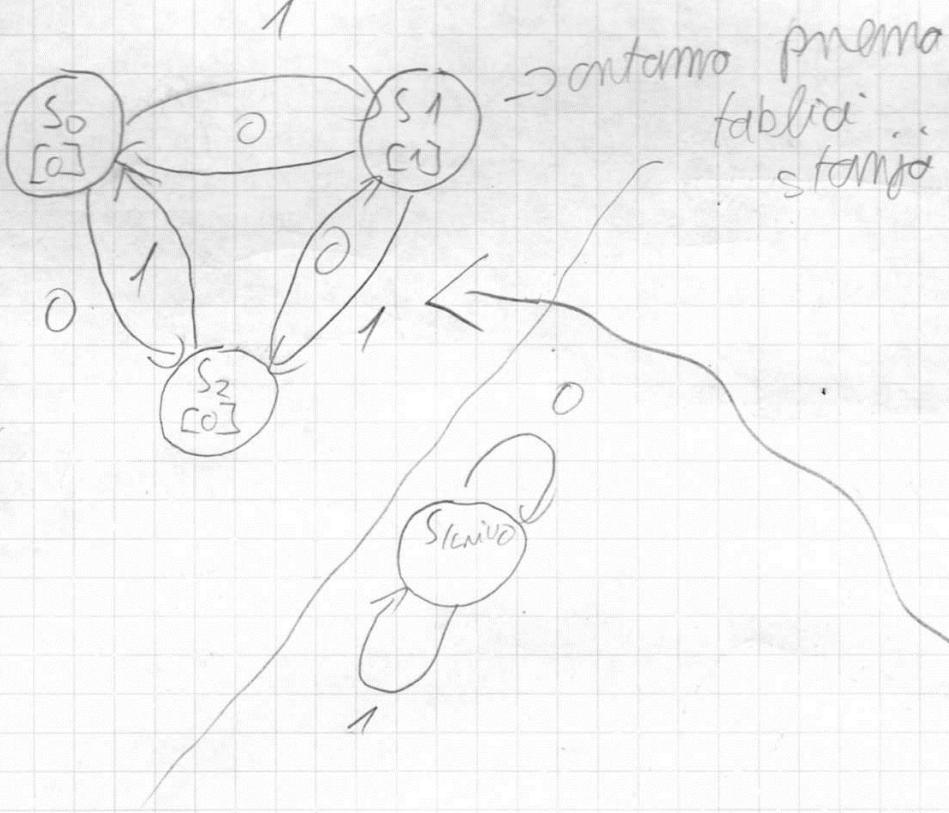
16.

Q_1	Q_0	S	J_1	K_1	J_0	K_0	Q_1	Q_0	S
-------	-------	-----	-------	-------	-------	-------	-------	-------	-----

S_0	0	0,0	0	1	1	1	0	1 s_2	0
S_0	0	0,1	1	1	0	1	1	1 s_1	0
S_1	0	1,0	1	0	1	1	1	0 s_1	0
S_1	0	1,1	0	0	0	1	0	0 s_0	0
S_1	1	0,0	0	1	0	0	0	0 s_0	1
S_1	1	0,1	1	1	0	0	1	1 s_2	1
S_1	1	1,0	1	0	0	0	1	1	1
S_{neivo}	X	1,1	0	0	1	0	1	1	1

citamo sa
slike

$$\begin{aligned} J_0 &= S \cdot Q_1 + \overline{S} \cdot \overline{Q}_1 = \overline{S} \oplus Q_1, \quad K_0 = \overline{Q}_1, \quad J_1 = Q_0 \cdot \overline{S} + S \cdot \overline{Q}_0 = \\ &= S \oplus Q_0 \\ K_1 &= \overline{Q}_0, \quad O = Q_1 \end{aligned}$$



17. sinkron \rightarrow do svakog 63%
bistabilni isti signal tako

78%

- sigurnom stanju \rightarrow NEMA (S_{inivo})

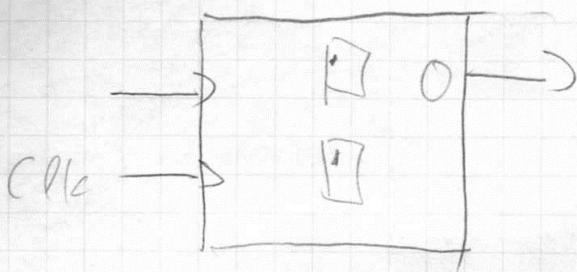
Lijepo ako se možemo vratiti u

akciju

18. Noovi - Nealy \rightarrow gledamo što je na 0

- (a) sintagma promjeni u izolaciji - isto
prema slici (gledamo utjecaje na ulaz i
izlaz)

(10) 79%



$$D_1 = Q_1 + Q_0 + S$$

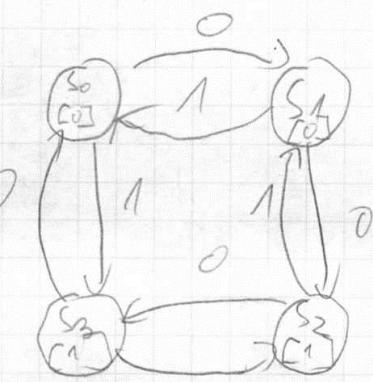
$$D_0 = \bar{Q}_0$$

$$O = Q_1$$

$$f_{ik} \cdot S_i \cdot S'_i = i'$$

transistors
transistor-potencia

slj. sistem je



$O_1 O_0, S$	$D_1 \quad D_0$	$Q_1 \quad Q_0$	O
S0 0010	0 1	0 1	0
S1 0011	1 1	1 1	1
S2 0110	1 0	1 0	0
S3 0111	0 0	0 0	0
S4 1010	1 1	1 1	1
S5 1011	0 1	0 1	1
S6 1110	0 0	0 0	0
S7 1111	1 0	1 0	1

prema
D-bistabilno

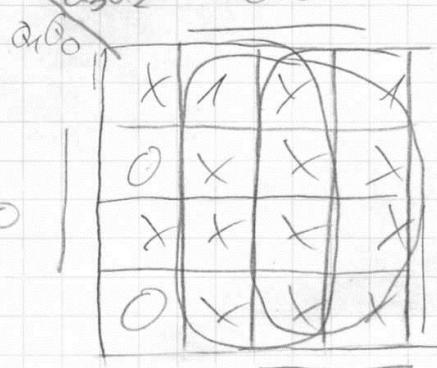
	Q_3	Q_2	Q_1	Q_0
S_0	0	0	0	1
S_1	0	0	1	0
S_2	0	1	0	0
S_3	1	0	0	0

fizikalni kod

Q_3	Q_2	Q_1	Q_0
0	0	0	0
0	0	0	1
0	0	1	0
0	0	1	1
0	1	0	0
1	0	0	0
1	0	1	0
1	1	0	0

0	
x	0 → 2a. logalma
0	stampa prema
x	polaze O od
1	ranije, ostalo
x	stampa X
1	(don frame)
x	

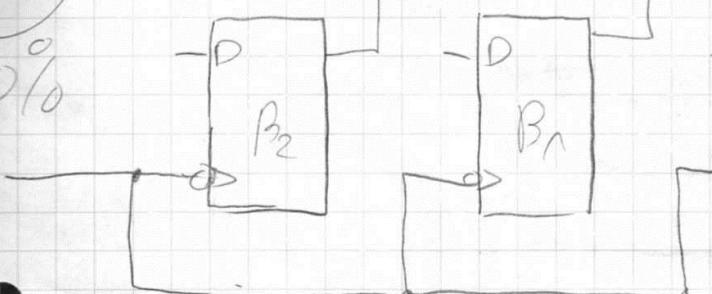
$$O = Q_2 + Q_3$$



$$n i i 1$$

$$O_1, O = Q_2 + Q_3$$

SHEMA:



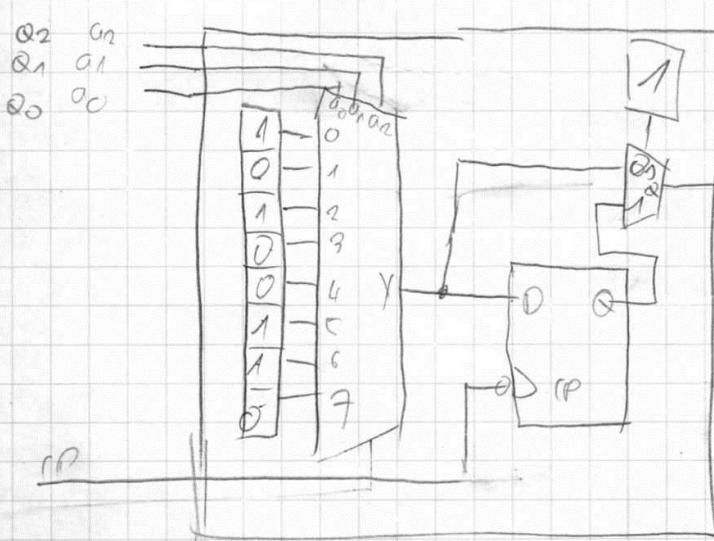
Q_2

trenutno
stanje

sljedeće
stanje

$P_2 \quad P_1 \quad P_0$

Q_2	Q_1	Q_0			
0	0	0	1	1	0
0	0	1	1	0	0
0	1	0	1	1	1
0	1	1	1	0	1
1	0	0	0	0	0
1	0	1	0	1	0
1	1	0	0	1	1
1	1	1	0	0	1



$$D_1(Q_2, Q_1, Q_0) = \sum m(0, 2, 5, 6)$$

→ tablica istinitosti:

trenutno stanje

→ sljedeće stanje; prema

zadatkom u zadatku

(3 → 5 → 2 → 7 → ...)

→ tražimo što se upisuje u LUB1 pa gledamo što smo dobili kod Q_1 (sljedeće stanje) i to upisujemo

21. 81% klasnički oblik Mealyjevog automata, ali ne možemo ga konvertiti

časnučna pobuda	časnučna stanje	sljedeća stanje	izlaz	časnučna stanje	sljedeća stanje	
a_2	a_1	a_0	d_2	d_1	d_0	
S'	Q_1	Q_0	0	Q_1	Q_0	
0 0	Q_0	0	0	0 1	1	1
0 1	0	Q_1	0	1 0	0	2
0 1 1	Q_2	1	1	1 1	0	7
0 1 1	Q_3	1	0 0	0	0	4
1 0	Q_0	0	0 0	0 0	0	0
1 0	Q_1	0	0 0	0 0	0	0
1 1	Q_2	1	0 1	0	1	5
1 1 1	Q_3	1	1 1	1	1	7

→ glodamo šemu iz zadatka

→ čitamo u kojoj stanji
idemo i taj kod pisemo
→ izlaz 0 → isto čitamo
iz dijagrama
stanja

22. $P_{\text{din}} = C \cdot U^2 \cdot f$ 44,4%

$$P_{\text{din},1} = C \cdot 5^2 \cdot 100$$

$$P_{\text{din},2} = C \cdot 4^2 \cdot (1+p) \cdot 100$$

$$P_{\text{din},2} = 1,1 P_{\text{din},1}$$

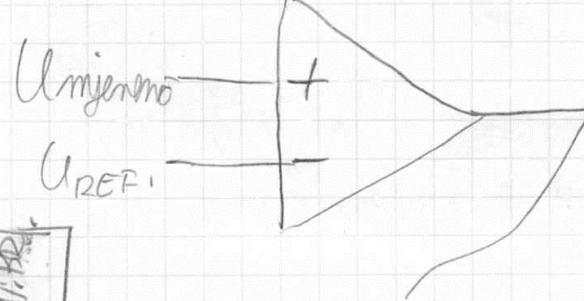
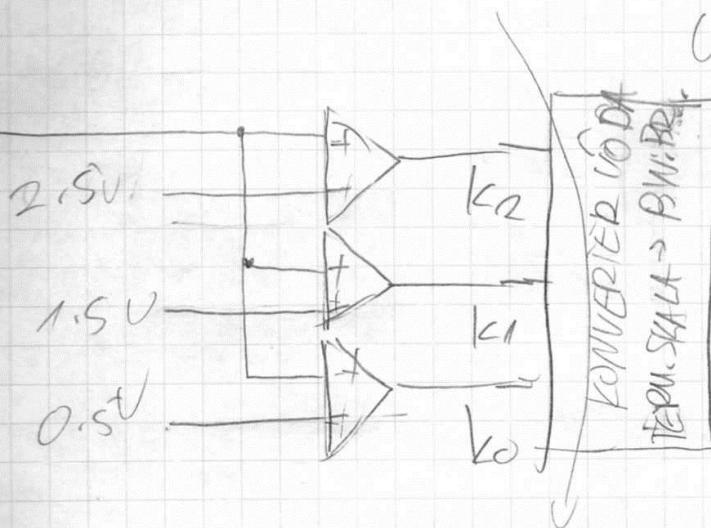
$$\cancel{C \cdot 4^2 \cdot (1+p) \cdot 100} = 1,1 \cancel{C \cdot 5^2 \cdot 100}$$

$$1+p = \frac{1 \cdot 1 \cdot 5^2}{4^2} = \frac{1 \cdot 1 \cdot 25}{16} = \frac{25+25}{16} = \frac{27,5}{16}$$

$$p = \frac{11,5}{16} = 0,71$$

23. 91% - favorit za mogućnost riješenja
za dodatak
mjerim napone 0,3V

Umjemo



= 1 ako $U_{\text{mjerimo}} > U_{\text{ref}}$

O inače broj 1 kod
 $K_2 K_1 K_0$

Za $U_{\text{mjerimo}} > 0 \text{ i } < 0.5V$

$\approx 0.7V$: vedrood $K_0(\text{j}, 0.5V) > 0.5 \text{ i } < 1.5V$
i fupisemo 1, kod ostalih 0 $> 1.5 \text{ i } < 2.5V$

K_2	K_1	K_0	N_A	N_D
0	0	0	0	0
0	0	1	0	1
0	1	0	X	X
0	1	1	1	0
1	0	0	X	X
1	0	1	X	X
1	1	0	X	X
1	1	1	1	1

K_2	K_1	K_0	N_A	N_D
0	0	0	0	0
0	0	1	0	1
0	1	0	X	X
0	1	1	1	0
1	0	0	X	X
1	0	1	X	X
1	1	0	X	X
1	1	1	1	1

K_2	K_0	K_1
0	0	1
1	1	X

MJE CJECA
TABCTCA
ISIWITOSTI!

$$N_A = K_1 \quad \textcircled{A}$$

ostala (nospođena) rama!

stoji → don't care!