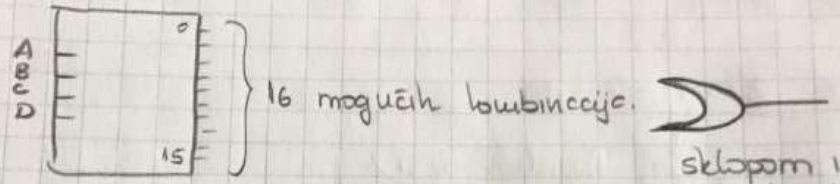
ZI
01.02.2017.

dugbog.

① Dekoderom želimo realizirati funkciju.

n ulaza, 2^n izlaza



C_1	C_2	a	C_4	b	c	d

$C_2 = a \oplus c \oplus d$

1 1 1 1

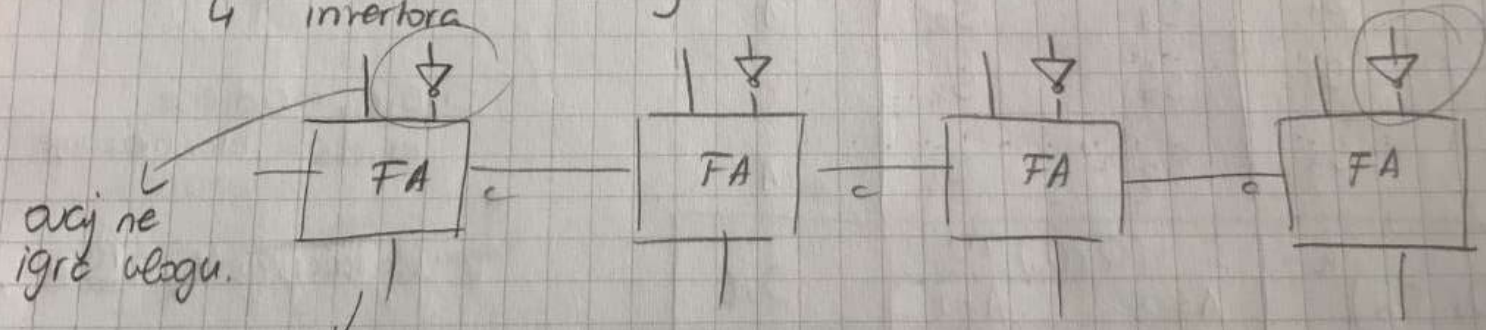
→ to je parni pariteta

mi želimo neparni

→ spojimo koje ćemo! tj. komplemente ćemo!

TREBAMO BIN. DEKODER 3/8

② 4 potpuna zbrajala } oduzimalo
4 invertora

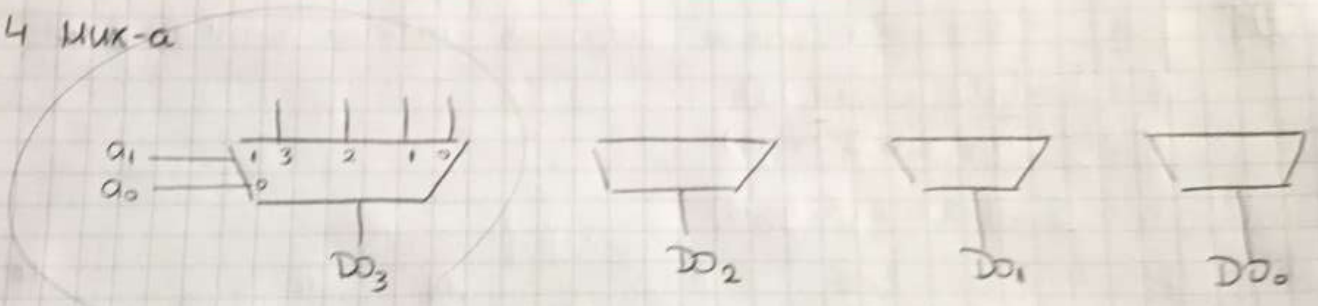


→ $4 \cdot t_{2c\ carry}$

→ $4 \cdot t_{inverbora}$

4·10
+
30
= 70

③ 4 MUX-a



	3 2 1 0		
00	3 2 1 0	nema posmaka. pojavljuje se isti podatak!	$d_0 = DI_3$
01	0 3 2 1	kruzni u desno za 1 (desno)	$d_1 = DI_0$
10	2 1 0 3	kruzn u lijevo za 1 (ljevo)	$d_2 = DI_2$
11	3 3 2 1	aritmeticki → DESNO	poniavlja se 1. bit. $d_3 = DI_3$

⑥ ROM kao generator funkcije

B C D	A=0 f	A=1	A=0 g	A=1	
a_2 a_1 a_0	d_3	d_2	d_1	d_0	
0 0 0	0	0	1_0	1_8	3
0 0 1	0	1	1_1	0_9	6
0 1 0	1	0	0_2	0_{10}	8
0 1 1	0	1	0_3	0_{11}	4
1 0 0	0	1	1_4	1_{12}	7
1 0 1	0	1	0_5	0_{13}	4
1 1 0	0	1	1_6	1_{14}	7
1 1 1	1	1	0_7	1_{15}	D

→ A

$f = \bar{A}\bar{B}C\bar{D} + BCD + A\bar{D} + AB$ (00 1 0; ^ ^ 1; ^^)

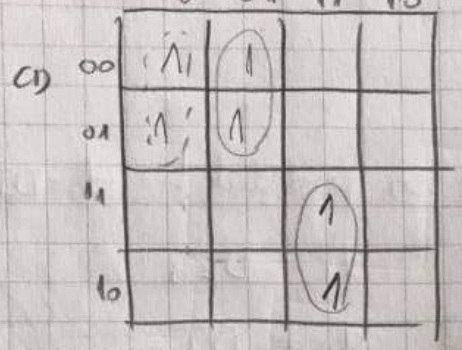
(7) PLA → programirejiv - može se programirati - možemo koristit više puta

$f = \Sigma m(0,1,4,5,14,15)$

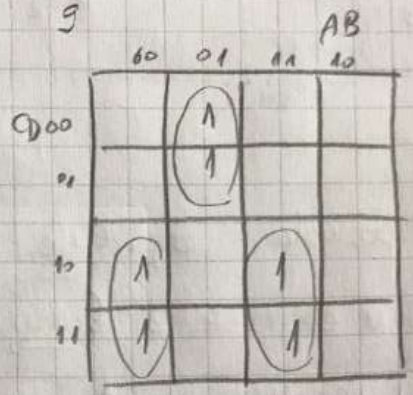
$g = \Sigma m(2,3,4,5,14,15)$

$h = \Sigma m(0,1,2,3,14,15)$

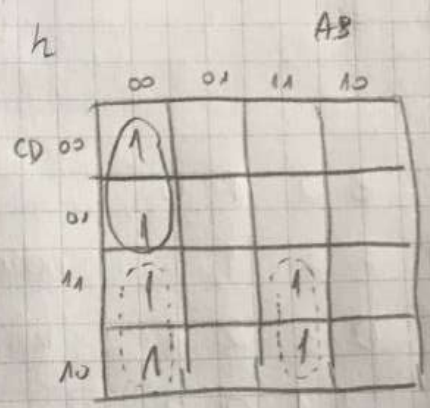
f



g



h



D se poništio

ukupno 4 implikanta ⇒ TO SU IZLAZI PLAA I

Izlazne (funkcije) = 3

ulazi A, B, C

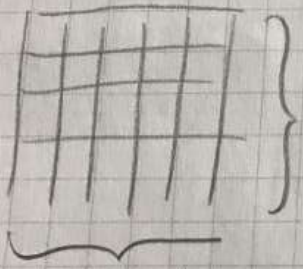
(8) Kapacitet je 2^{12} bita

$D_7 \dots D_0$ ⇒ RIJEČ ⇒ 8 bita

LOGIČKA RIJEČ - atomska.

$2\frac{1}{2}D$ organizacija → raspoređeno → s MUX-om biramo koju ćemo riječ

-adresni dekoder 64 izlaza → adresira riječi ⇒ FIZIČKE RIJEČI



64 redaka ima

64 kockice

$2^{12} : 2^6 = x$

$2^6 = x$

$x = 64$

-oddjednom adresiramo red od 64

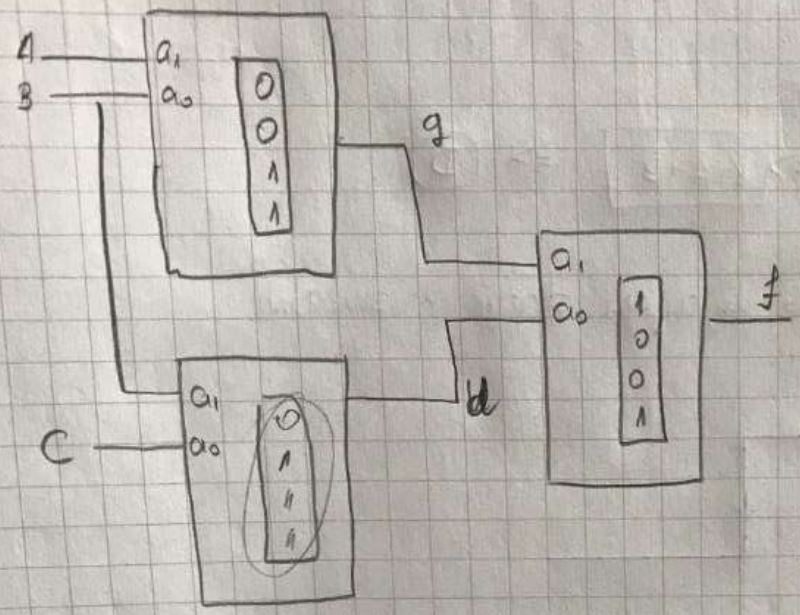
a van ide 8 jedan po jedan

U FIZIČKOJ IH JE 8 ⇒ $\frac{64}{8} = 8$

(E)

9) FPGA

Gledamo samo LUT → Look Up Tablicu.



$f(A,B,C) = \bar{A}\bar{B}\bar{C} + AB + AC$

$g = A$

$f = \overline{XOR} = \bar{g}\bar{d} + gd = \overline{g \ominus d}$

$f = \bar{A}\bar{d} + A\underbrace{d}_{(B+C)}$

$\bar{B}\bar{C}$

$d = B + C$

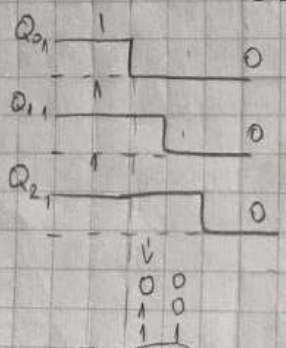
$\bar{d} = \bar{B}\bar{C}$

$-C$

10) A → b-bitni → 3 bitno

Stanje ∅ kad se dekodira bilo se tranzijentnih pogrešaka dekodiranje javlja ↓ privremena

↑ 12 7



→ dolse prebacuje lasni!

→ DVIJE POGREŠKE

(11)

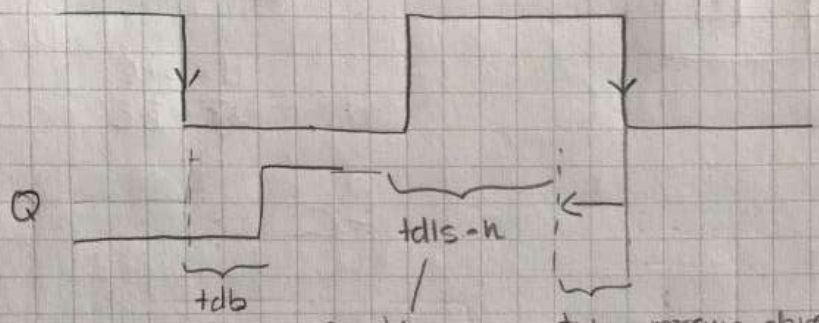
$Q_{n+1} = \overline{Q_n}\,\overline{B} + Q_n A B$

$A B Q^n \quad Q^{n+1} \quad JK$

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

$J = \overline{B} \qquad K = \overline{AB} \Rightarrow \boxed{K = \overline{A} + \overline{B}} \Rightarrow$ (D)

(12) 32 bistabila → istovremeno mijenjaju stanje → SINKRONI



Broj stupnjeva

tdb, tdls, tsetup moraju obvezno odredeni podatak. Moraju biti stabilan. do dovedeno novi CP

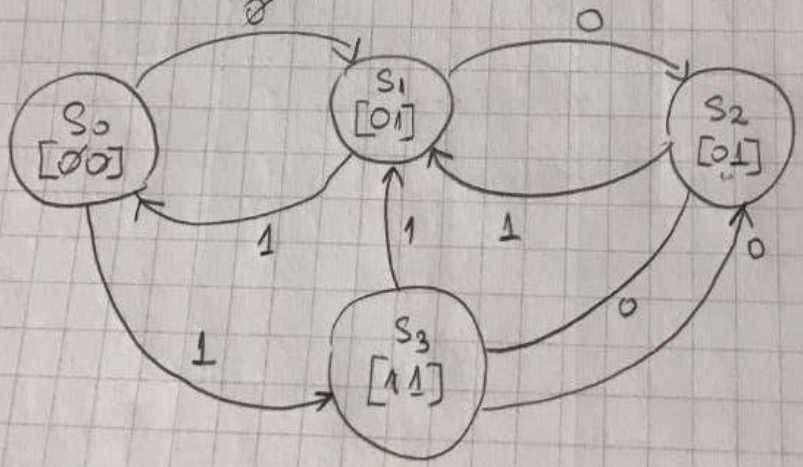
$\frac{1}{12{,}5\ \text{MHz}}$ → odnosno tdb, tdls, ts

podi

$\frac{1}{12{,}5\ 10^6} = tdb + t setup + n \cdot tdls$

$$\frac{\frac{1}{12{,}5 \cdot 10^6} - tdb - tsetup}{tdls} = n$$

(13) Automat izveden JK bistabilima, X, binarno kodiranje, $K_0 = ?$

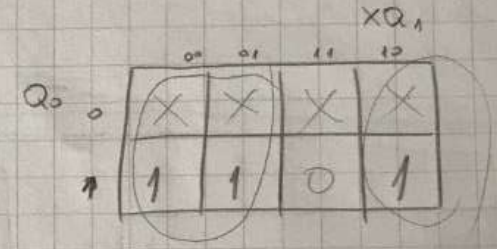


Q^u	Q^{u+1}		z
	$x=0$	$x=1$	
S_0 00	S_1 =00	S_3	00
S_1 01	S_2 =1	S_0	01
S_2 10	S_3	S_1	10
S_3 11	S_2	S_1	11

$(Q_1Q_0)^u$	$(Q_1Q_0)^{n+1}$	
	$x=0$	$x=1$
00	00	11
01	10	00
10	11	01
11	10	01

x	$(Q_1Q_0)^u$	$(Q_1Q_0)^{u+1}$	SET J_0	RSET K_0	J_1K_1
0	00	01	1	x	
0	01	10	x	1	
0	10	11	1	x	
0	11	10	x	1	
1	00	11	1	x	
1	01	00	x	1	
1	10	01	1	x	
1	11	01	x	0	

J	K	Q^u	Q^{u-1}
0	0	0.1	Q_u
0	1	0.1	0
1	0	0.1	1
1	1	0.1	$\overline{Q_u}$

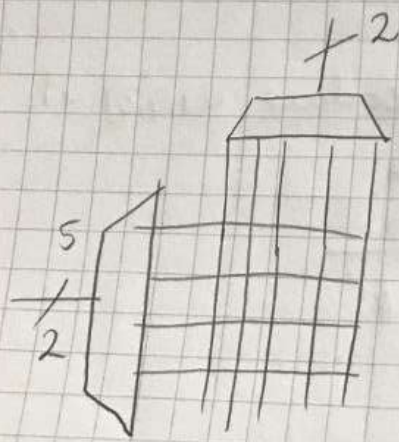


(14) mreži 1024 × 8 bita.

3D org. ulazi na dekoderu?

→ 3Dom se smanjuje dekoder → postigli smo 2x manje izlaza.

1024 → DESET BITOVA ZA TE RIJEČI



→ ukupno 4. ne svakom 2//

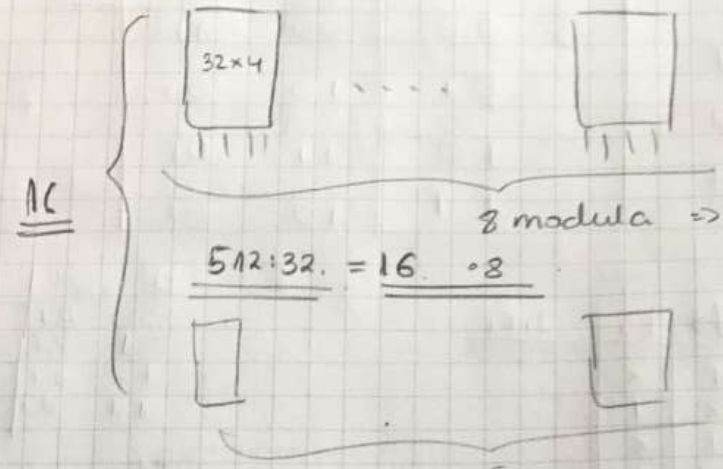
izlaza ukupno $2 \cdot 2^5 = 2^6$

- ukupno 10, na svakom 5

(15) Moramo ostvariti mem 512 × 32 , blokovi sa 32 × 4.

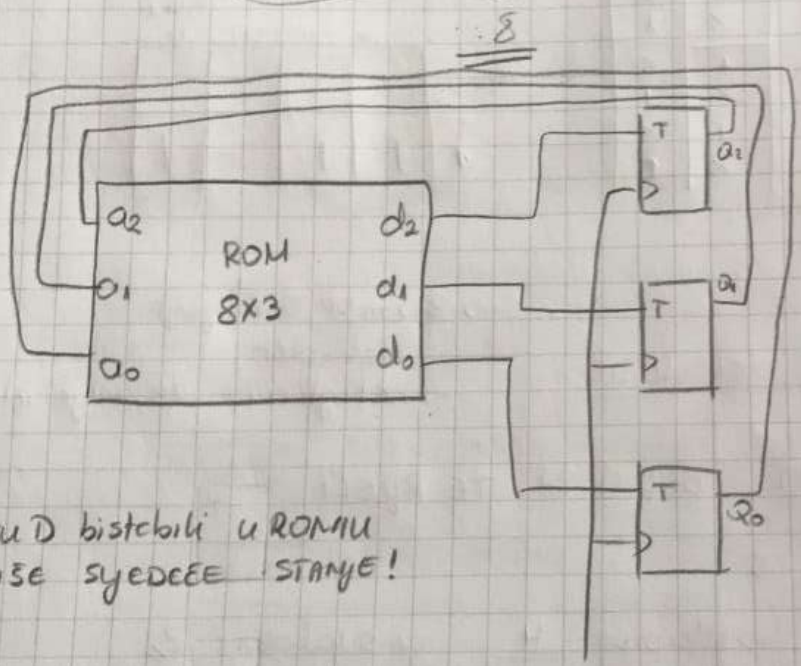
$512 \cdot 32 = n \cdot 32 \cdot 4$

$n = 128$



AC

$512 : 32 = 16 \cdot 8$



Zadano 0,1,5,3,7,4,1

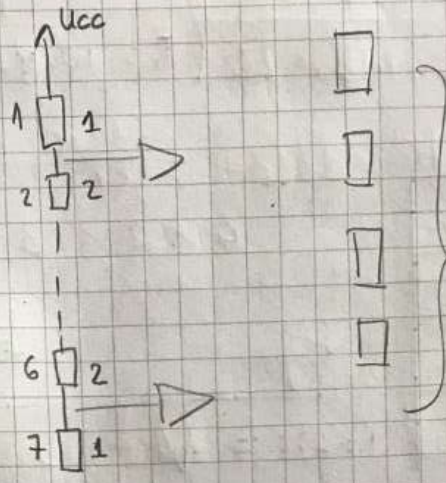
a_2 a_1 a_0 Q_2 Q_1 Q_0	$(Q_2 Q_1 Q_0)^{n+1}$ CP	d_2 d_1 d_0 T_2 T_1 T_0
0 0 0	1 1 1	1 1 1
0 0 1	0 0 0	
0 1 0	1 0 0	
0 1 1	0 1 0	
1 0 0	0 0 1	
1 0 1	0 1 1	1 1 0
SIGURAN START ← 1 1 0	0 0 0	1 1 0
1 1 1	1 0 1	0 1 0

19

7 komparatora

$U_{REF} = 7V$

$U_a = 0,9$



$2^n - 1$ podreje $\Rightarrow$ $2^7 - 1 \Rightarrow$ 127.

7 V referentno

1 V = podreje

$U_a \Rightarrow 0,9$ V $\rightarrow$ 1

Termometarski $\rightarrow$ 1 $\rightarrow$ B

20 n bitni DA pretvornik

težinski resporedeni