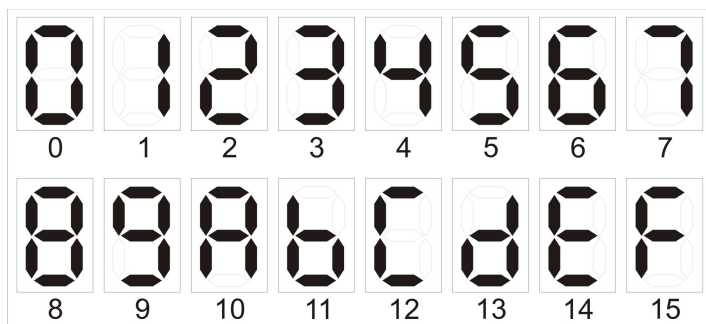
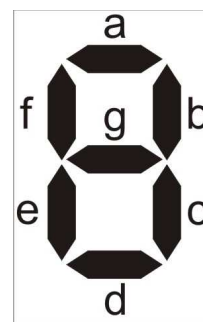


II KOLOKVIJUM
(REŠENJE ZADATAKA - grupa 1)

1. **ZADATAK** (20 poena) Naći zakon funkcionisanja kombinacione mreže koja se koristi za prikazivanje karaktera (slika 1.) na displeju sa sedam segmenata (slika 2.)



Slika 1.



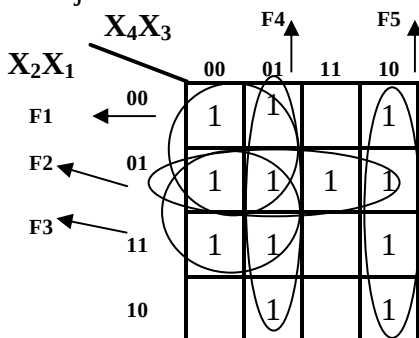
Slika 2.

a) Kreirati tabelu sa vrednostima funkcija a, b, c, d, e, f i g ;

	A	B	C	D	a	b	c	d	e	f	g
0	0	0	0	0	1	1	1	1	1	1	0
1	0	0	0	1	0	1	1	0	0	0	0
2	0	0	1	0	1	1	0	1	1	0	1
3	0	0	1	1	1	1	1	1	0	0	1
4	0	1	0	0	0	1	1	0	0	1	1
5	0	1	0	1	1	0	1	1	0	1	1
6	0	1	1	0	1	0	1	1	1	1	1
7	0	1	1	1	1	1	1	0	0	0	0
8	1	0	0	0	1	1	1	1	1	1	1
9	1	0	0	1	1	1	1	1	0	1	1
10	1	0	1	0	1	1	1	0	1	1	1
11	1	0	1	1	0	0	1	1	1	1	1
12	1	1	0	0	1	0	0	1	1	1	0
13	1	1	0	1	0	1	1	1	1	0	1
14	1	1	1	0	1	0	0	1	1	1	1
15	1	1	1	1	1	0	0	0	1	1	1

(4 poena)

b) Izvršiti minimizaciju funkcije c i g definisane u a).
funkcija c :



$$F_1 = \overline{X_4} \overline{X_2}$$

$$F_2 = \overline{X_2} X_1$$

$$F_3 = \overline{X_4} X_1$$

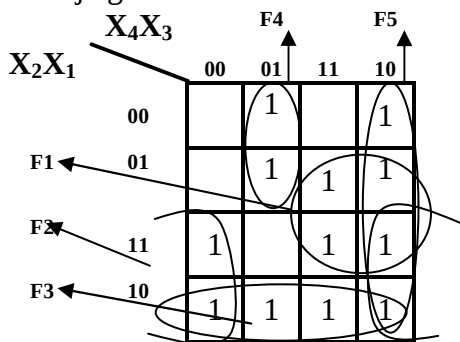
$$F_4 = \overline{X_4} X_3$$

$$F_5 = X_4 \overline{X_3}$$

$$c = F_1 + F_2 + F_3 + F_4 + F_5 = \overline{X_4} \overline{X_2} + \overline{X_2} X_1 + \overline{AD} + \overline{X_4} X_3 + X_4 \overline{X_3}$$

(8 poena)

funkcija g:



$$F_1 = X_4 X_1$$

$$F_2 = \overline{X}_3 X_2$$

$$F_3 = X_2 \overline{X}_1$$

$$F_4 = \overline{X}_4 X_3 \overline{X}_2$$

$$F_5 = X_4 \overline{X}_3$$

$$g = F_1 + F_2 + F_3 + F_4 + F_5 = X_4 X_1 + \overline{X}_3 X_2 + X_2 \overline{X}_1 + \overline{X}_4 X_3 \overline{X}_2 + X_4 \overline{X}_3$$

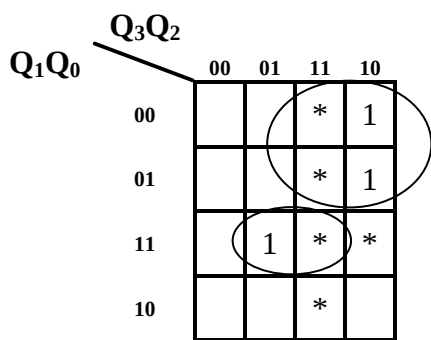
(8 poena)

2. ZADATAK (30 poena)

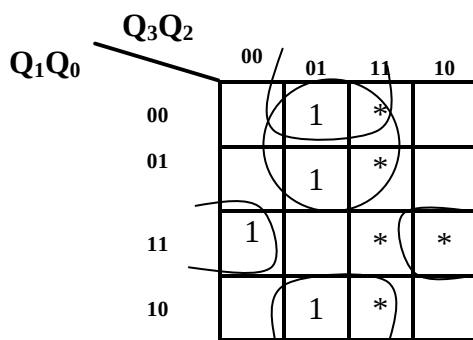
Projektovati sinhroni brojački registar osnove 11. Na raspolaganju su D flipflopovi i logička kola.

	t_n				t_{n+1}			
	Q_3	Q_2	Q_1	Q_0	Q_3	Q_2	Q_1	Q_0
0	0	0	0	0	0	0	0	1
1	0	0	0	1	0	0	1	0
2	0	0	1	0	0	0	1	1
3	0	0	1	1	0	1	0	0
4	0	1	0	0	0	1	0	1
5	0	1	0	1	0	1	1	0
6	0	1	1	0	0	1	1	1
7	0	1	1	1	1	0	0	0
8	1	0	0	0	1	0	0	1
9	1	0	0	1	1	0	1	0
10	1	0	1	0	0	0	0	0
11	1	0	1	1	*	*	*	*
12	1	1	0	0	*	*	*	*
13	1	1	0	1	*	*	*	*
14	1	1	1	0	*	*	*	*
15	1	1	1	1	*	*	*	*

(5 poena)

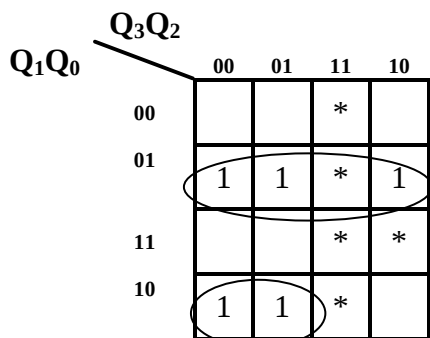


$$Q_3^{n+1} = Q_3^n Q_1^n Q_0^n + Q_2^n Q_1^n Q_0^n$$

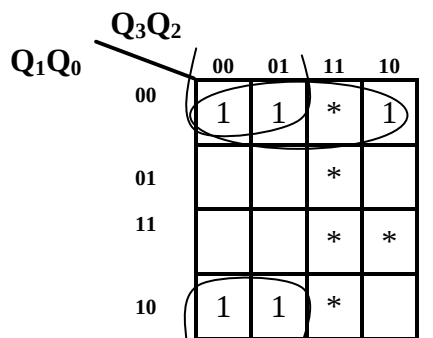


$$Q_2^{n+1} = Q_2^n Q_1^n + Q_2^n Q_0^n + Q_2^n Q_1^n Q_0^n$$

(10 poena)



$$Q_1^{n+1} = Q_1^n Q_0^n + Q_3^n Q_1^n Q_0^n$$



$$Q_0^{n+1} = Q_1^n Q_0^n + Q_3^n Q_0^n$$

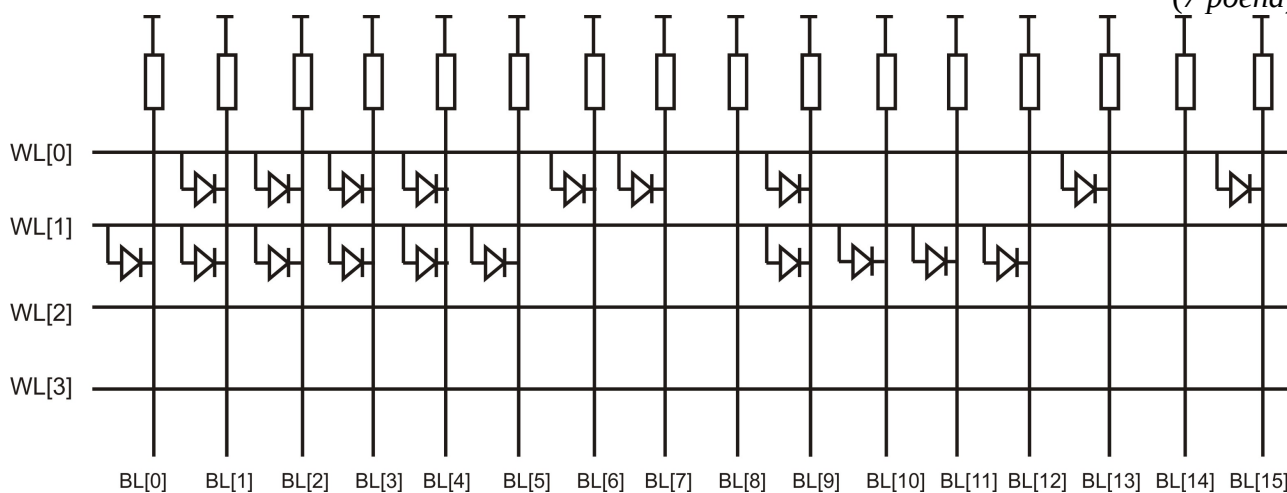
(10 poena)

3. ZADATAK (25 poena)

a) Prikazati osnovnu memorijsku ćeliju kod PROM memorije izvedene diodnim poljem. Prikazati memoriju tipa 4x16 izvedenu ovom tehnologijom u koji je upisan sledeći sadržaj po lokacijama: Lok_0 = A2DE, Lok_1=1E3F, Lok_2=prazno, Lok_3=prazno.

Lok	Sadržaj	b ₀	b ₁	b ₂	b ₃	b ₄	b ₅	b ₆	b ₇	b ₈	b ₉	b ₁₀	b ₁₁	b ₁₂	b ₁₃	b ₁₄	b ₁₅
0	A2DE	0	1	1	1	1	0	1	1	0	1	0	0	0	1	0	1
1	1E3F	1	1	1	1	1	1	0	0	0	1	1	1	1	0	0	0
2	0000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

(7 poena)

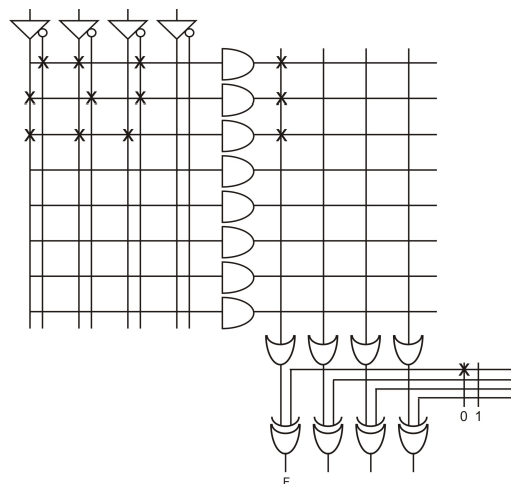


(6 poena)

b) Implementirati zadatak f-ju PLA kolom dimenzija 4x8x4. Za f-ju sa tri ulazne promenljive važi $F(0) = (0, 1, 3, 5, 6)$.

	A	B	C	F
0	0	0	0	0
1	0	0	1	0
2	0	1	0	1
3	0	1	1	0
4	1	0	0	1
5	1	0	1	0
6	1	1	0	0
7	1	1	1	1

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



(12 poena)

4. ZADATAK (25 poena)

Prikazati ALU74181 i obeležiti stanja na ulazu i izlazu za sledeće operacije:

a) Aritmetička operacija $F = \overline{A}B - 1$, $A=1010$, $B=1110$;

$A=1010$, $B=1110$, $F=1001$, $S=1011$, $A=B=0$, $M=0$, $C_{N+4}=0$

(8 poena)

b) Logička operacija $F = \overline{A \oplus B}$, $A=0100$, $B=1100$;

$A=1010$, $B=1110$, $F=0111$, $S=1001$, $A=B=0$, $M=0$

(8 poena)

c) Aritmetička operacija $A=0101$, $F=1111$, $S=1101$, $M=0$, $B=0101$, $C_{N+4}=0$

(9 poena)

NAPOMENA: Za položeni kolokvijum je potrebno najmanje 55 poena.

PREDMETNI NASTAVNIK i PREDMETNI ASISTENT