

c) Korišćenjem tehnike potpunog komplementa izračunati $Y = -31 + 12$

$$Y = -31 + 12 = -19$$

$-2^{n-1} \div 2^{n-1} - 1$ opseg koji se može predstaviti sa n bitova

$n=6 \rightarrow$ opseg je $-32 \div 31$ (-23, -16 i +7 pripadaju ovom opsegu što znači da je potrebno minimum 6 bitova za prikazivanje u nepotpunom komplementu)

+12	0	0	1	1	0	0
-----	---	---	---	---	---	---

+31	0	1	1	1	1	1
-----	---	---	---	---	---	---

-31	1	0	0	0	0	0
-----	---	---	---	---	---	---

 nep.kompl.

+

-31	1	0	0	0	0	1
-----	---	---	---	---	---	---

 pot.kompl.

-31	1	0	0	0	0	1
-----	---	---	---	---	---	---

+12	0	0	1	1	0	0
-----	---	---	---	---	---	---

+ 1 0 1 1 0 1 pot.kompl.

- 1

1	0	1	1	0	0
---	---	---	---	---	---

- 1 0 0 0 1 1

-19

d) Predstaviti u standardnom floating point formatu jednostruke tačnosti broj: $-3.3328 \cdot 10^2$

$$-3,3328 \cdot 10^2 = -333,28 = (-101001101,010001)_2 = (-1, 01001101010001 \cdot 2^8)_2$$

$$e - 127 = 8$$

$$e = (135)_{10} = (10000111)_2$$

$$m = 1,00010001010001$$

$$s = 1$$

31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	1	0	0	0	0	1	1	1	0	0	0	1	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
s	e								f																						

2. ZADATAK (I kolokvijum=35p, Ispit=25p) Za kolo dato na slici:

a) Napisati logičku funkciju kola i srediti izraz pravilima Bulove algebre

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

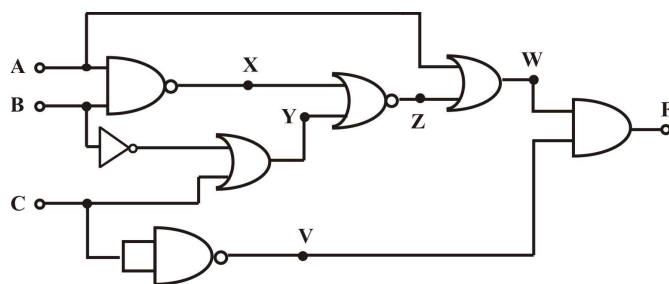
$$Y = \overline{B} + C$$

$$Z = X + Y = \overline{\overline{A + B} + \overline{B} + C} = \overline{\overline{A + B} + \overline{B} + C} = \overline{A + B + C} = \overline{ABC}$$

$$W = A + Z = A + \overline{ABC} = A(1 + \overline{BC}) = A \cdot 1 = A$$

$$V = \overline{C} \cdot C = \overline{C} + C = 1$$

$$F = W \cdot \overline{C} = A \cdot \overline{C}$$



(20 poena)

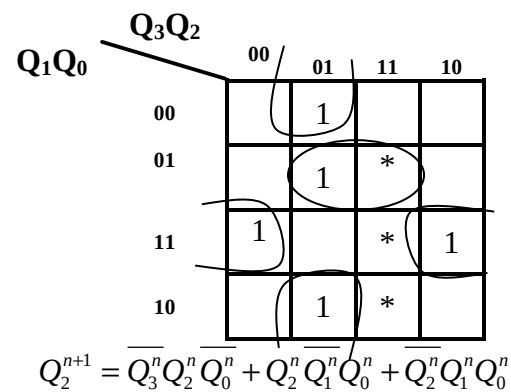
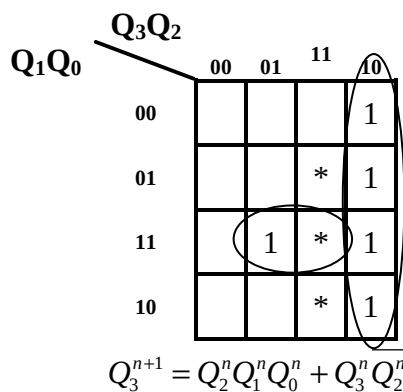
b) Odrediti logička stanja na izlazu

A	B	C	$\overline{C}$	$F = A \cdot \overline{C}$
0	0	0	1	0
0	0	1	0	0
0	1	0	1	0
0	1	1	0	0
1	0	0	1	1
1	0	1	0	0
1	1	0	1	1
1	1	1	0	0

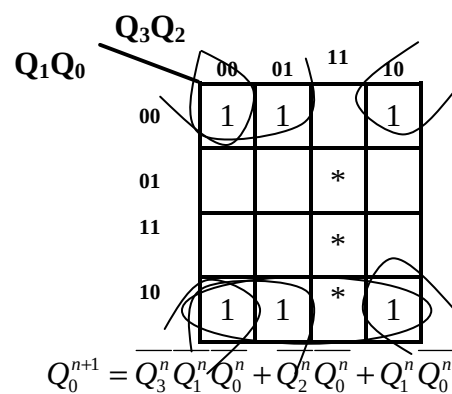
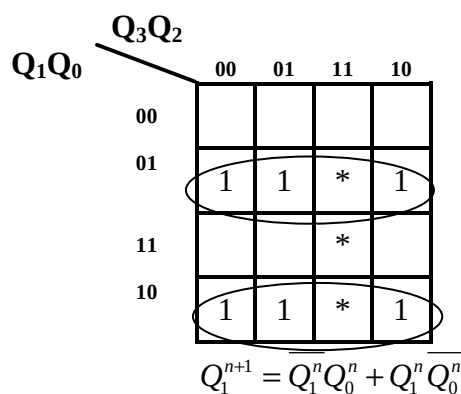
3. ZADATAK (II kolokvijum=35p, Ispit=25p)

Projektovati sinhroni brojački registar osnovne 13. 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	1	0	1	1
11	1	0	1	1	1	1	0	0
12	1	1	0	0	0	0	0	0
13	1	1	0	1	*	*	*	*
14	1	1	1	0	*	*	*	*
15	1	1	1	1	*	*	*	*



(10 poena)

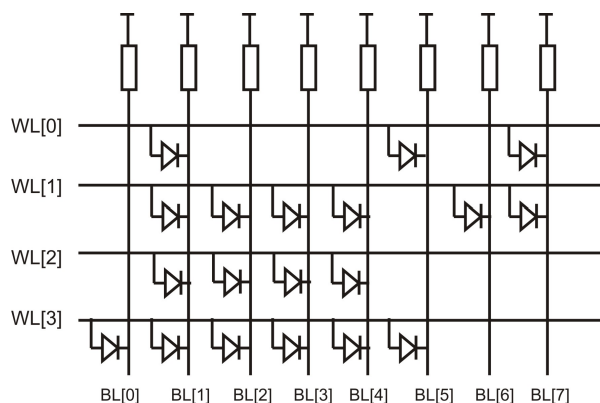


(10 poena)

4. ZADATAK (II kolokvijum=35p, Ispit=25p)

a) Prikazati osnovnu memorijsku ćeliju kod PROM memorije tipa 4x8 u koji je upisan sledeći sadržaj po lokacijama: Lok_0 = A2, Lok_1= DE, Lok_2=1E, Lok_3=3F.

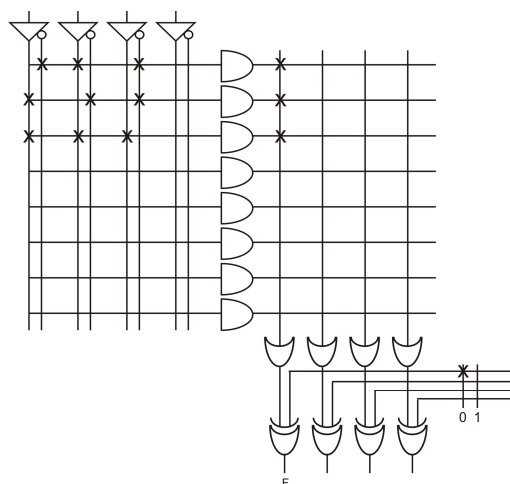
Lok	Sadržaj	b ₀	b ₁	b ₂	b ₃	b ₄	b ₅	b ₆	b ₇
0	A2	0	1	0	0	0	1	0	1
1	DE	0	1	1	1	1	0	1	1
2	1E	0	1	1	1	1	0	0	0
3	3F	1	1	1	1	1	1	0	0



b) Implementirati zadatu f-ju PLA kolom dimenzija 4x8x4. Za f-ju sa tri ulazne promenljive važi F(1)= (2, 4, 7).

	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

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



5. ZADATAK (I kolokvijum=30p) Data je tablica istinitosi koja je prikazana na sledeći način:

A	B	C	F
0	0	0	0
0	0	1	1
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	0

Predstaviti logičku funkciju koristeći tehniku:

a) **zbir proizvoda**

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

$$3 \quad 1 \quad 2 \quad +1 \text{ ILI kolo} = 7 \text{ log.kola}$$

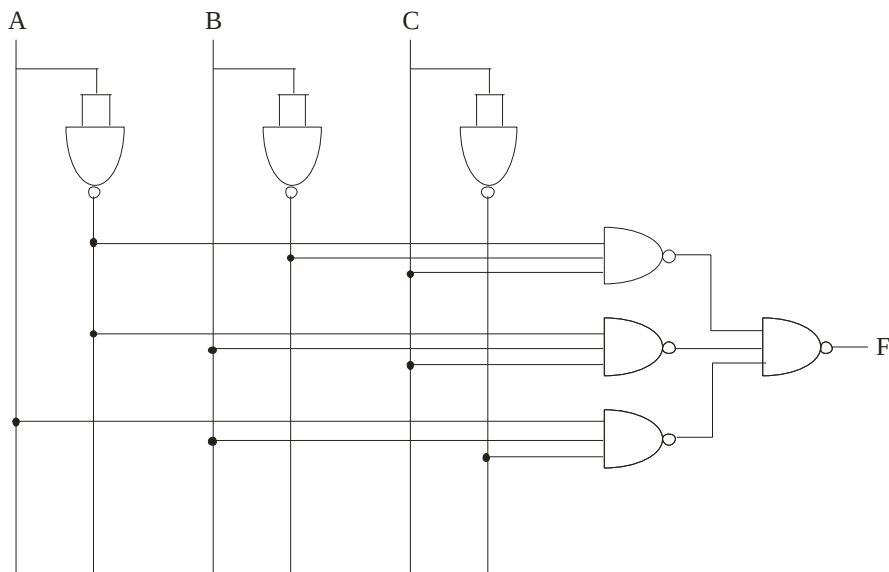
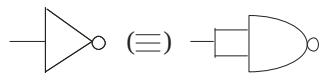
b) **proizvod zbira**

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

$$1 \quad 2 \quad 2 \quad 2 \quad 1 \quad + 1 \text{ I kolo} = 9 \text{ log.kola}$$

Potreban je manji broj logičkih kola za realizaciju zbira proizvoda i zato se realizuje funkcija a) i to samo pomoću NI kola.

$$F_{zp} = \overline{\overline{A}}\overline{\overline{B}}\overline{\overline{C}} + \overline{\overline{A}}\overline{\overline{B}}\overline{\overline{C}} + \overline{\overline{A}}\overline{\overline{B}}\overline{\overline{C}} = \overline{\overline{\overline{A}}\overline{\overline{B}}\overline{\overline{C}}} + \overline{\overline{\overline{A}}\overline{\overline{B}}\overline{\overline{C}}} + \overline{\overline{\overline{A}}\overline{\overline{B}}\overline{\overline{C}}} = \overline{\overline{\overline{A}}\overline{\overline{B}}\overline{\overline{C}}} \cdot \overline{\overline{\overline{A}}\overline{\overline{B}}\overline{\overline{C}}} \cdot \overline{\overline{\overline{A}}\overline{\overline{B}}\overline{\overline{C}}}$$



6. ZADATAK (II kolokvijum=30p)

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

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

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

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

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

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

NAPOMENA: Za uspešno položeni ispit (zadaci 1,2,3 i 4), I kolokvijum (zadaci 1,2 i 5) odnosno II kolokvijum (zadaci 3,4 i 6) potrebno je osvojiti najmanje 55% od maksimalnog broja poena.

PREDMETNI NASTAVNIK i PREDMETNI ASISTENT