

1/

		$x_1 \cdot x_0$			
	f	0001	1110	4	
$x_3 \cdot x_2$	00	0	1	0	1
	01	0	0	0	0
	11	0	1	0	1
	10	1	1	1	0
		2		1	

$$f = x_3 \cdot x_0 + \bar{x}_2 \cdot \bar{x}_1 + x_3 \cdot x_2 \cdot x_1 + \bar{x}_3 \cdot \bar{x}_2 \cdot \bar{x}_0$$

		$x_1 \cdot x_0$			
	\bar{f}	0001	1110		
$x_3 \cdot x_2$	00	1	1	0	1
	01	1	0	0	0
	11	1	1	1	1
	10	1	1	1	0

$$\bar{f} = \bar{x}_3 \cdot x_2 + x_2 \cdot \bar{x}_1 \cdot \bar{x}_0 + \bar{x}_3 \cdot x_1 \cdot x_2 + x_3 \cdot \bar{x}_0 \cdot x_1 \cdot \bar{x}_0$$

$$f = \overline{\bar{x}_3 \cdot x_2 \cdot x_2 \cdot \bar{x}_1 \cdot \bar{x}_0 \cdot \bar{x}_3 \cdot x_1 \cdot x_2 \cdot x_3 \cdot \bar{x}_0 \cdot x_1 \cdot \bar{x}_0}$$

$$f = (x_3 + \bar{x}_2) \cdot (\bar{x}_2 + x_1 + x_0) \cdot (x_3 + \bar{x}_1 + \bar{x}_0) \cdot (\bar{x}_2 + x_0 + \bar{x}_1 + x_0)$$

(8p)

de Morgans sets använd 2991.

2/

$$u = \bar{a} \cdot \bar{c} + \bar{a} \cdot b \cdot c + \bar{b} \cdot \bar{d} + \bar{b} \cdot c \cdot \bar{d}$$

cd

		cd			
	ab	0001	1110		
ab	00	1	1	0	1
	01	1	1	1	1
	11	0	0	0	0
	10	1	0	0	1

$$u = \bar{a} \cdot b + \bar{a} \cdot \bar{c} + \bar{b} \cdot \bar{d} \quad (8p)$$

3) Se 4-1 multiplexer i läro boken

4/ a)

	86_{10}	Σ
1	0	
2	1	86
4	1	84
8	0	
16	1	80
32	0	
64	1	
128	0	

$$= 01010110_2$$

b) $01010110 = 56_{16}$

c) $01010110 = 126_8$

d) ${}^2 01010110 = 10101001$

$$\begin{array}{r} 10101001 \\ + \quad \quad \quad 1 \\ \hline 10101010 \end{array}$$

Svar: 10101010

4) f0010!

$$76_{10} = 01001100_2$$

1	0
2	0
4	1
8	1
16	0
32	0
64	1
128	0

$$76 - 86 = 01001100 + 10101010 = 11110110$$

Negativ!

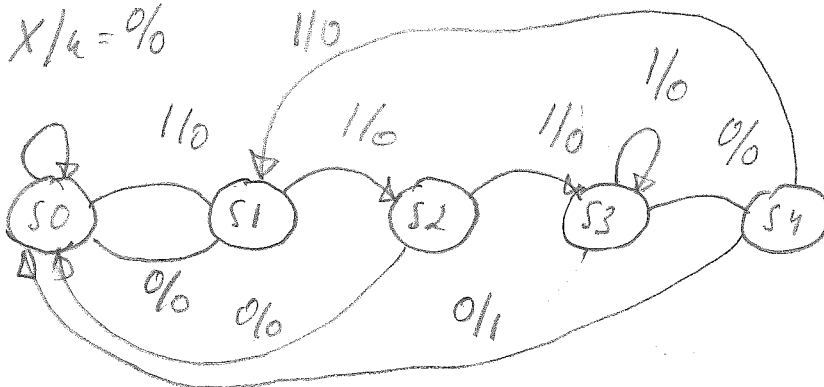
$$211110110 \Rightarrow 00001001$$

$$\underline{\hspace{10em} 1}$$

$$00001010_2$$

Sum: $-00001010_2 = -10_{10}$

5)



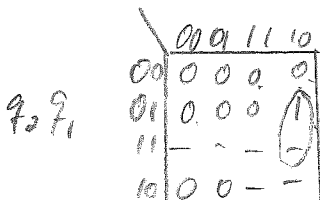
Kodning: $S0 = 000, S1 = 001, S2 = 010, S3 = 011, S4 = 100$

Nästa tillstånd
 $q_2^+ q_1^+ q_0^+$

Nuv.
 tillstånd
 $q_2 q_1 q_0$

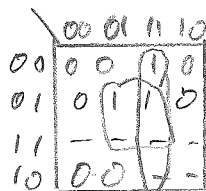
$q_2 q_1 q_0$	X=0	X=1
000	000/0	001/0
001	000/0	010/0
010	000/0	011/0
011	100/0	011/0
100	000/1	001/0

$q_2^+ \quad q_0^+$



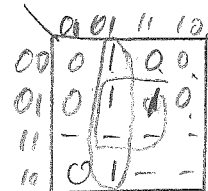
$$q_2^+ = q_1 \cdot q_0 \cdot X$$

$q_1^+ \quad q_0^+$



$$q_1^+ = q_0 \cdot X + q_1 \cdot X$$

$q_0^+ \quad q_0^+$



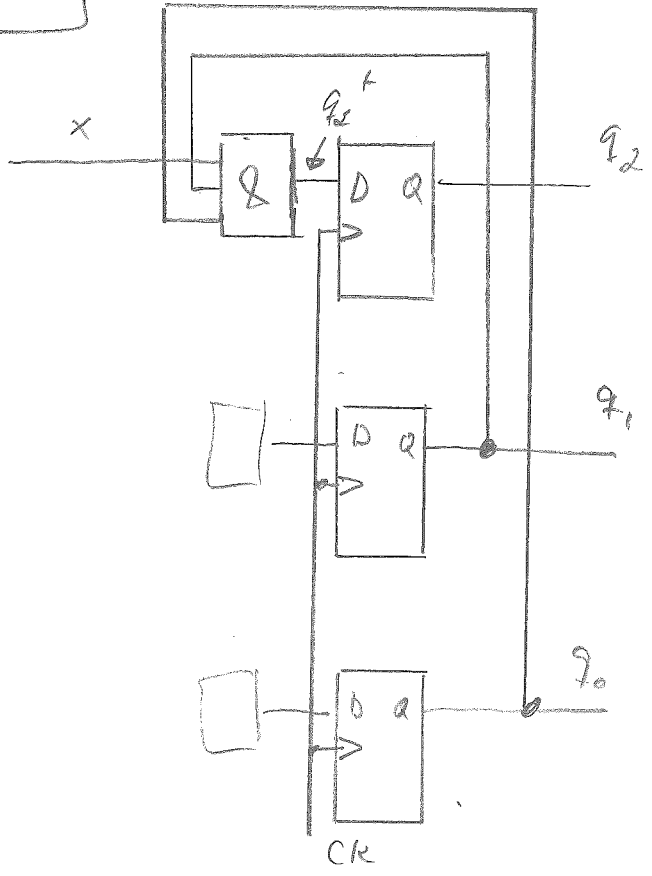
$$q_0^+ = q_0 \cdot \bar{X} + q_1 \cdot X$$

$$u = q_2 \cdot \bar{X}$$

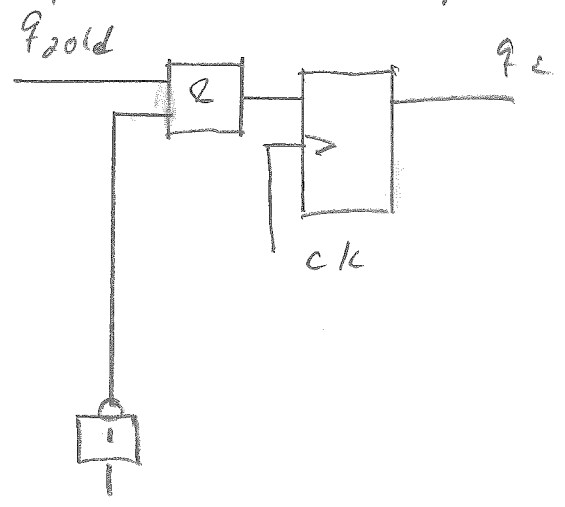
5 poente

tentamen april-14

sid 3.

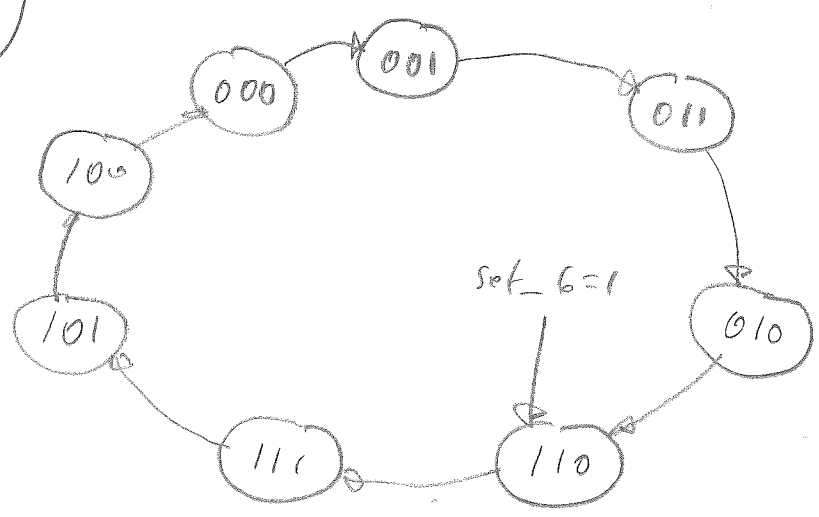


Komplettera sen varje D-vippa med reset:



q_{2old}^+ är lösningen ovan!

6)



6) for ts.

q_2	q_1	q_0	q_2	q_1	q_0
0	0	0	0	0	1
0	0	1	0	1	1
0	1	0	1	1	0
0	1	1	0	1	0
1	0	0	0	0	0
1	0	1	1	0	0
1	1	0	1	1	1
1	1	1	1	0	1

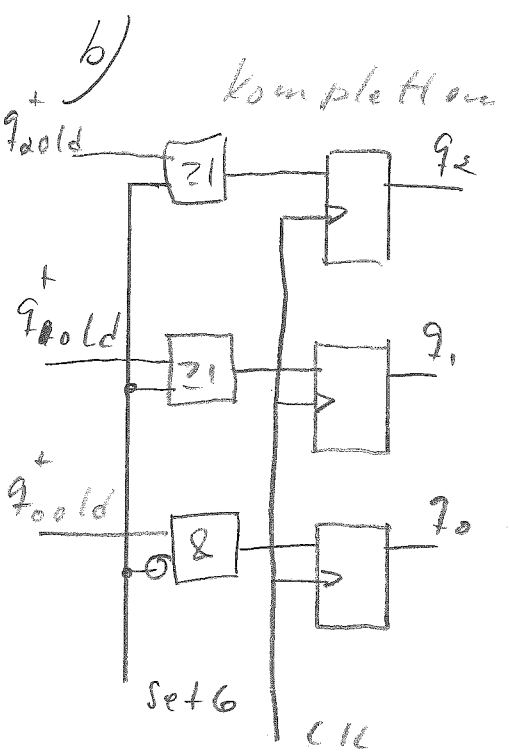
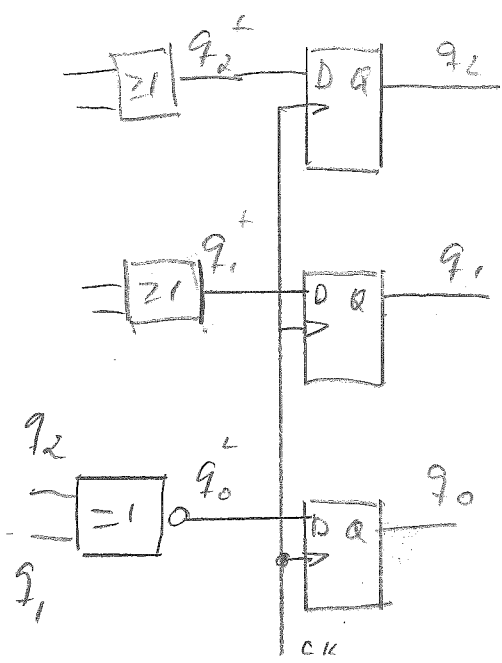
q_2	q_1	q_0	q_2	q_1	q_0
0	0	0	0	0	1
0	0	1	0	1	1
0	1	0	1	1	0
0	1	1	0	1	0
1	0	0	0	0	0
1	0	1	1	0	0
1	1	0	1	1	1
1	1	1	1	0	0

$$q_2^+ = q_1 \cdot \bar{q}_0 + q_2 \cdot q_0$$

$$q_1^+ = q_1 \cdot q_0 + \bar{q}_2 \cdot q_0$$

$$q_0^+ = \bar{q}_2 \cdot \bar{q}_1 + q_2 \cdot q_1 = \bar{q}_2 \oplus q_1$$

a)



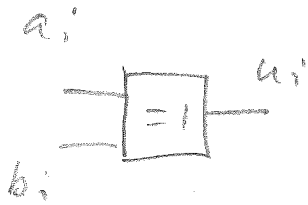
$$q_{2\text{New}}^+ = q_{2\text{old}}^+ + \text{set } 6$$

$$q_{1\text{New}}^+ = q_{1\text{old}}^+ + \text{set } 6$$

$$q_{0\text{New}}^+ = q_{0\text{old}}^+ \cdot \overline{\text{set } 6}$$

(8 p)

7]

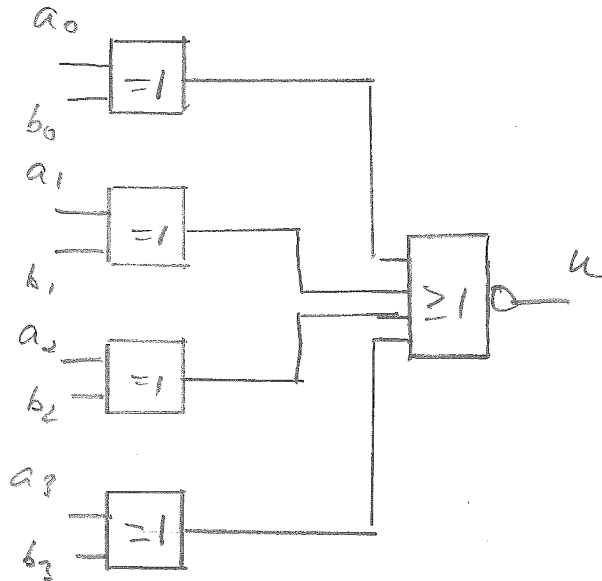


$$\text{om } a_i = b_i \Rightarrow u_i = 0$$

$$\text{d.v.r. } f(u_0, u_1, u_2, u_3) = 1 \Rightarrow$$

$$\Rightarrow f(u_0, u_1, u_2, u_3) = \overline{u_0} \cdot \overline{u_1} \cdot \overline{u_2} \cdot \overline{u_3} =$$

$$= \overline{u_0 + u_1 + u_2 + u_3}$$



(8 p)

