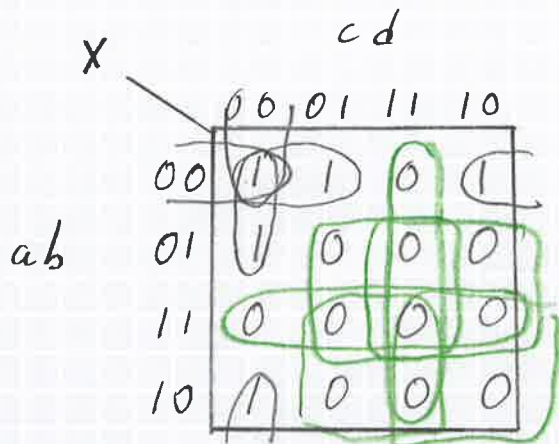


1)

a	b	c	d	X
0	0	0	0	1
0	0	0	1	1
0	0	1	0	1
0	0	1	1	0
0	1	0	0	1
0	1	0	1	0
0	1	1	0	0
0	1	1	1	0
1	0	0	0	1
1	0	0	1	0
1	0	1	0	0
1	0	1	1	0
1	1	0	0	0
1	1	0	1	0
1	1	1	0	0
1	1	1	1	0



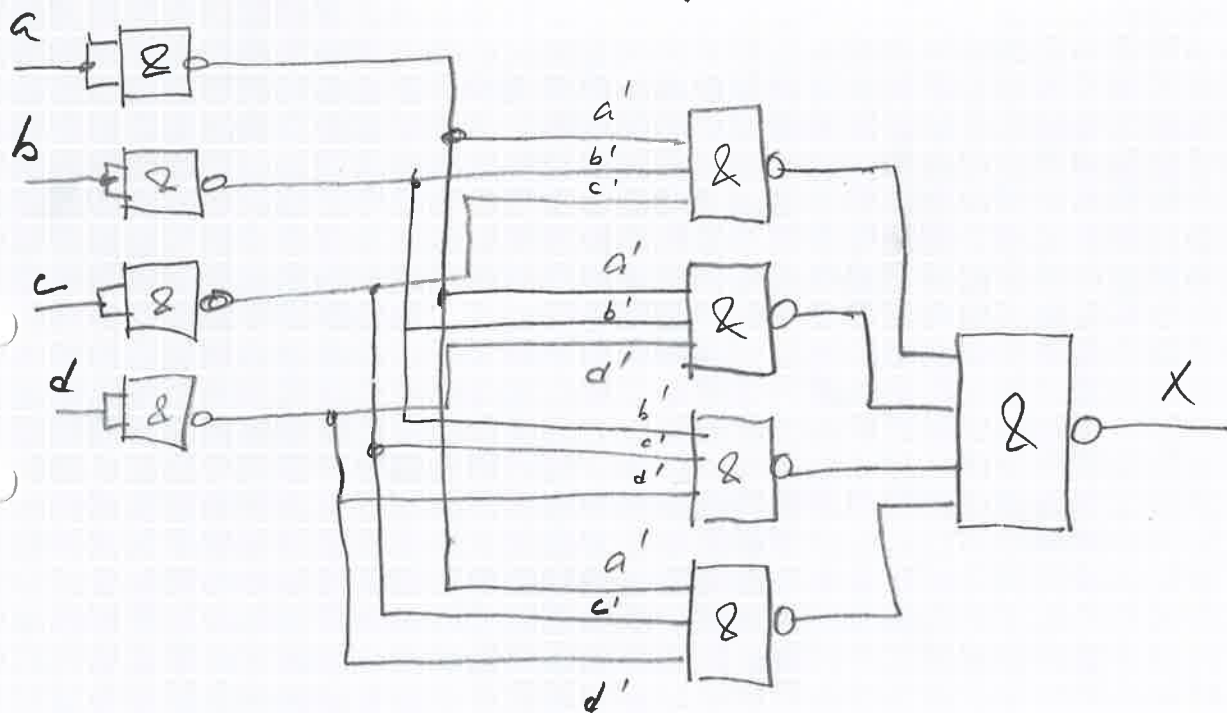
gröna
primimplikater
behövs ej här!

a) Tag fram villkoren för $X=1$

$$X = b'c'd + a'b'd + a'b'c + a'c'd'$$

b) $X'' = (b'c'd + a'b'd + a'b'c + a'c'd)''$
 (De Morgans lag \Rightarrow)

$$X = ((b'c'd)' \cdot (a'b'd)' \cdot (a'b'c)' \cdot (a'c'd)')$$

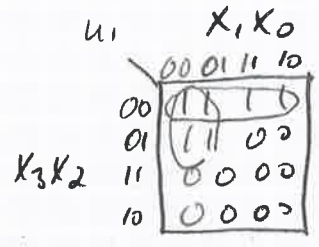


2)

Tent 13/1 - 15

Sid 2

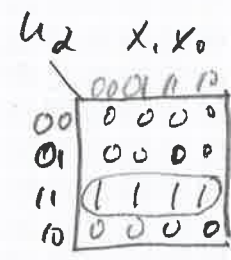
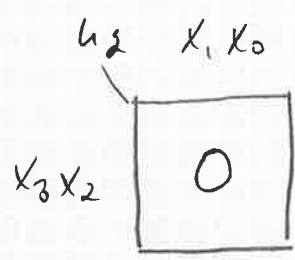
x_4, x_3, x_2, x_1, x_0	u_1, u_2, u_3
00000	100
00001	100
00010	100
00011	100
00100	100
00101	100
00110	001
00111	001
01000	001
01001	001
01010	001
01011	001
01100	001
01101	001
01110	001
01111	001
10000	001
10001	001
10010	001
10011	001
10100	001
10101	001
10110	001
10111	001
11000	001
11001	001
11010	001
11011	001
11100	010
11101	010
11110	010
11111	010



alla = 0

$x_4 = 0$ $x_4 = 1$

Svar: $u_1 = x_4' \cdot x_3' \cdot x_2' + x_4' \cdot x_3' \cdot x_1'$

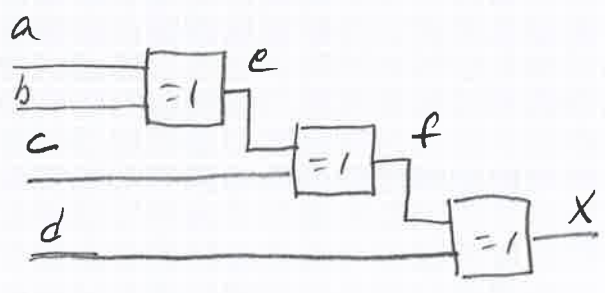


$x_4 = 0$ $x_4 = 1$

Svar: $u_2 = x_4 \cdot x_3 \cdot x_2$

Svar: $u_3 = u_2 \cdot u_1'$ (fås ur tabell)
eller $u_3 = (u_2 + u_1)'$

3)



a	b	c	d	e	f	X
0000	0000	0000	0000	00	0	0
0001	0001	0001	0001	00	1	1
0010	0010	0010	0010	01	1	1
0011	0011	0011	0011	01	0	0
0100	0100	0100	0100	11	1	1
0101	0101	0101	0101	11	0	0
0110	0110	0110	0110	10	0	0
0111	0111	0111	0111	10	1	1
1000	1000	1000	1000	11	1	1
1001	1001	1001	1001	11	0	0
1010	1010	1010	1010	10	0	0
1011	1011	1011	1011	10	1	1
1100	1100	1100	1100	00	0	0
1101	1101	1101	1101	00	1	1
1110	1110	1110	1110	01	1	1
1111	1111	1111	1111	01	0	0

tent 13/1-15

sid 3

4) a) $93_{10} = 1011101_2$

b) $1011101_2 = 5D_{16}$

c) $11011101_2 = 135_8$

	Σ
1	93
2	92
4	92
8	88
16	80
32	64
64	64

d)

$$201011101_2 = 10100010$$

$$\begin{array}{r} 10100010 \\ + 1 \\ \hline 10100011_2 \end{array}$$

Obs: 8 bitar!

Svar: 10100011_2

e) $80 + (-93) = 01010000_2 + 10100011_2$

$$\begin{array}{r} 01010000 \\ 10100011 \\ \hline 11110011_2 \end{array}$$

l:a MSB => telet negativ!

för att få motsvarande positiva tal ta 2-komp!

$$11110011_2 = 00001100 =$$

$$\begin{array}{r} 00001100 \\ + 1 \\ \hline 00001101_2 = -13_{10} \end{array}$$

Svar: -13_{10}

5)

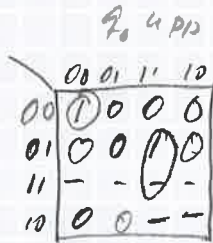
Toufana 13/11-15

sid 4

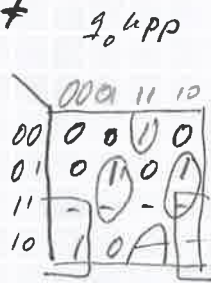
$q_2^+ q_1^+ q_0^+$

$q_2 q_1 q_0$	$u_{pp}=0$	$u_{pp}=1$
000	100	001
001	000	010
010	001	011
011	010	100
100	011	000
101	---	---
110	---	---
111	---	---

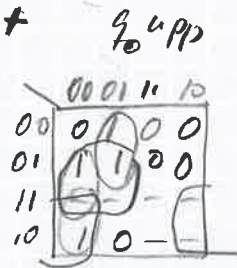
q_2^+



q_1^+



q_0^+

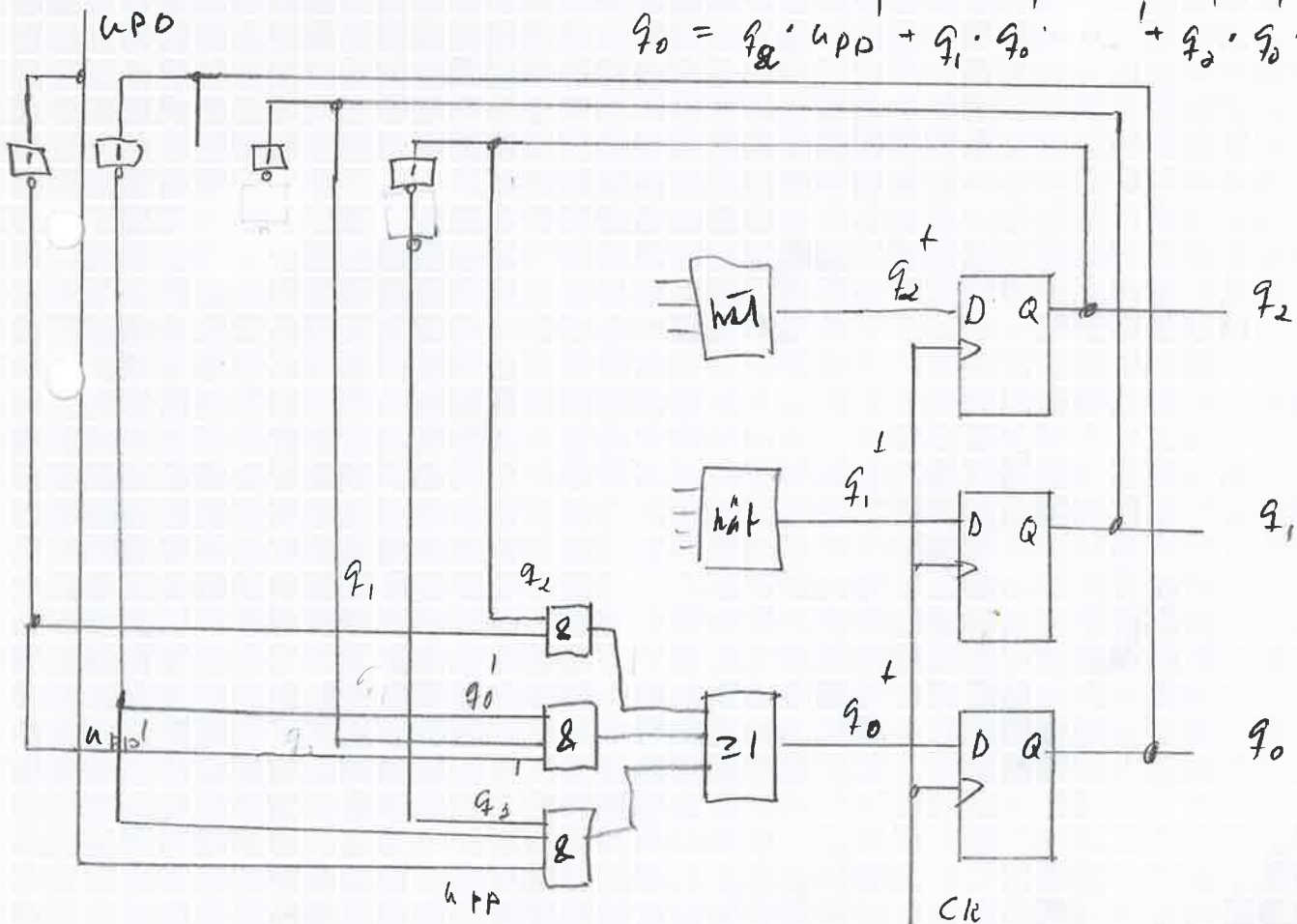


(5P)

$$q_2^+ = q_2 \cdot q_1 \cdot q_0 \cdot u_{pp} + q_1 \cdot q_0 \cdot u_{pp}$$

$$q_1^+ = q_2 \cdot u_{pp} + q_1 \cdot q_0 \cdot u_{pp} + q_1 \cdot q_0 \cdot u_{pp} + q_1 \cdot q_0 \cdot u_{pp}$$

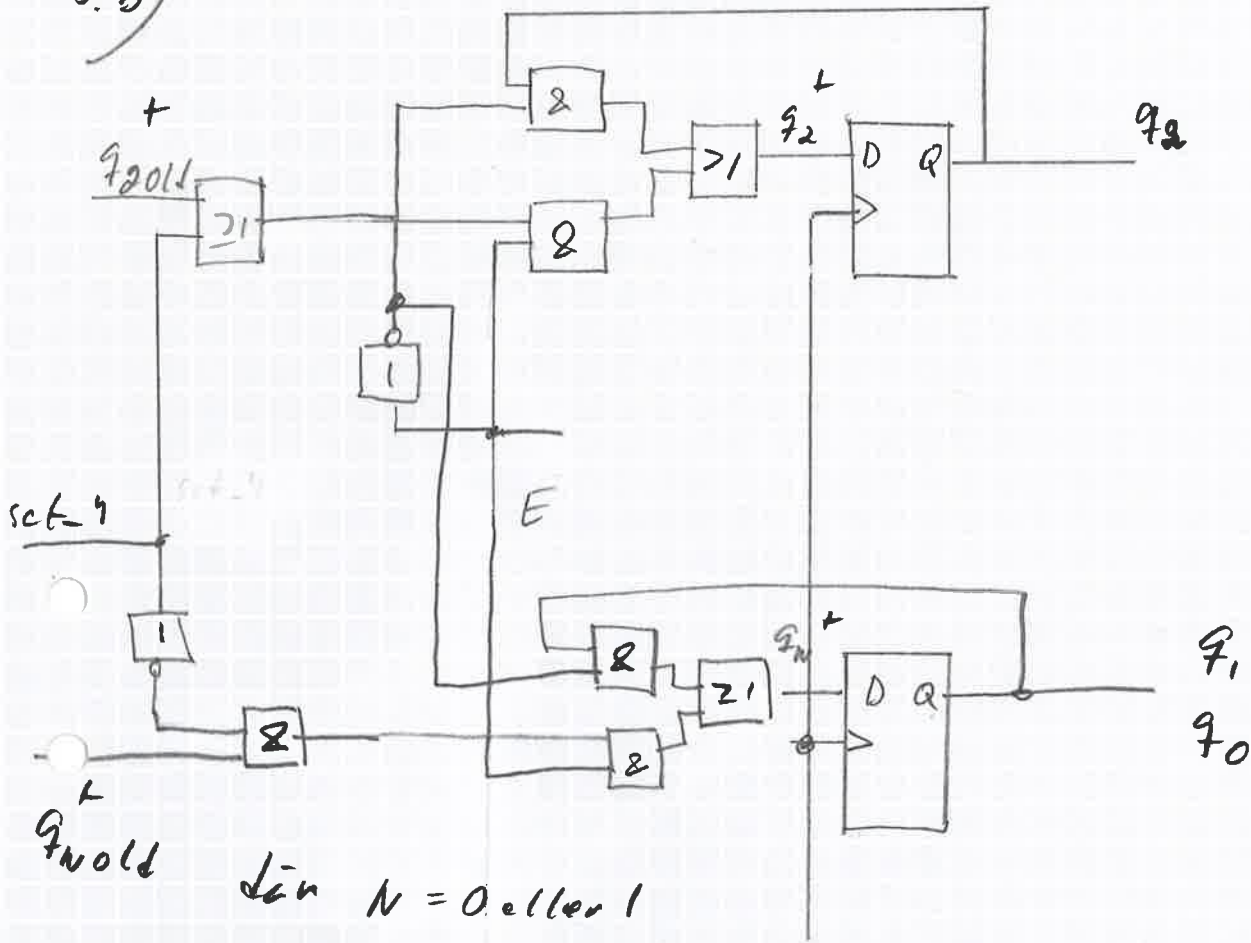
$$q_0^+ = q_2 \cdot u_{pp} + q_1 \cdot q_0 + q_2 \cdot q_0 \cdot u_{pp}$$



5.6)

tent 13/1-15

sid 5



$$q_2^+ = q_2 \cdot E' + E \cdot (q_{2old} + \text{set-4})$$

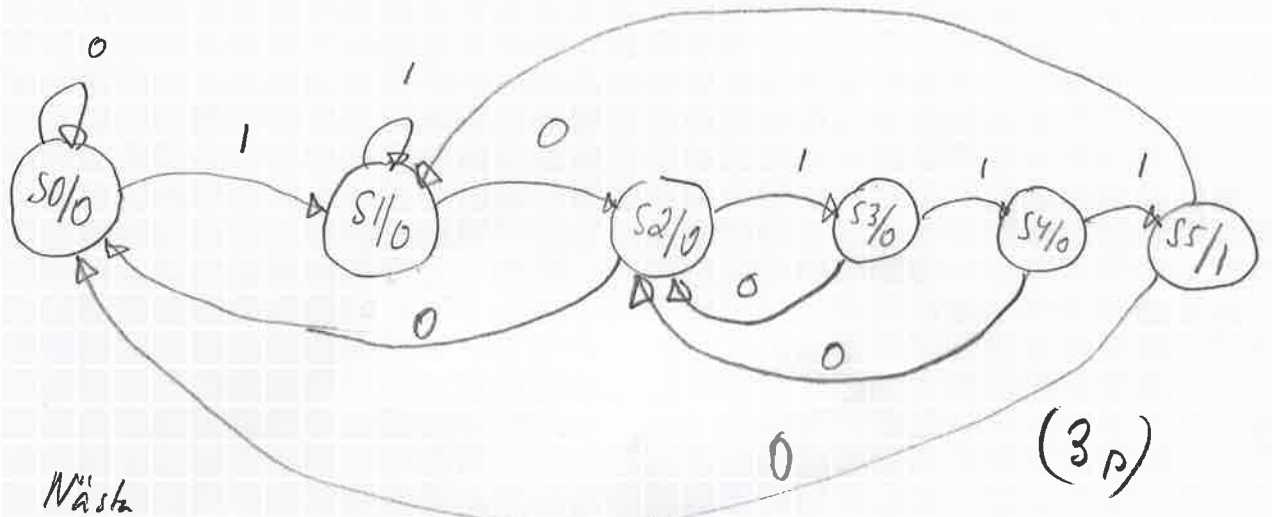
$$q_1^+ = q_1 \cdot E' + E \cdot (q_{1old} + \text{set-4}')$$

q_{2old} och q_{1old} är lösningen från a

$N = 0, 1$ d.v.s. samma lösning för
vipporna 0 och 1,

(4p)

7.)



(3 p)

b)

Nuv. tilld.	Nästa tillstånd		u
	X=0	X=1	
S0	S0	S1	0
S1	S2	S1	0
S2	S0	S3	0
S3	S0	S4	0
S4	S0	S5	0
S5	S0	S1	1

Nuv. $q_2 q_1 q_0$	Nästa $q_2^+ q_1^+ q_0^+$		u
	X=0	X=1	
000	000	001	0
001	010	001	0
010	000	011	0
011	010	100	0
100	010	101	0
101	000	001	1

q_2^+ $q_0 \cdot X$

	00	01	11	10
00	0	0	0	0
01	0	0	1	0
11	-	-	-	-
10	0	1	0	0

q_1^+ $q_0 \cdot X$

	00	01	11	10
00	0	0	0	1
01	0	1	0	1
11	-	-	-	-
10	1	0	0	0

q_0^+ $q_0 \cdot X$

	00	01	11	10
00	0	1	1	0
01	0	1	0	0
11	-	-	-	-
10	0	1	1	0

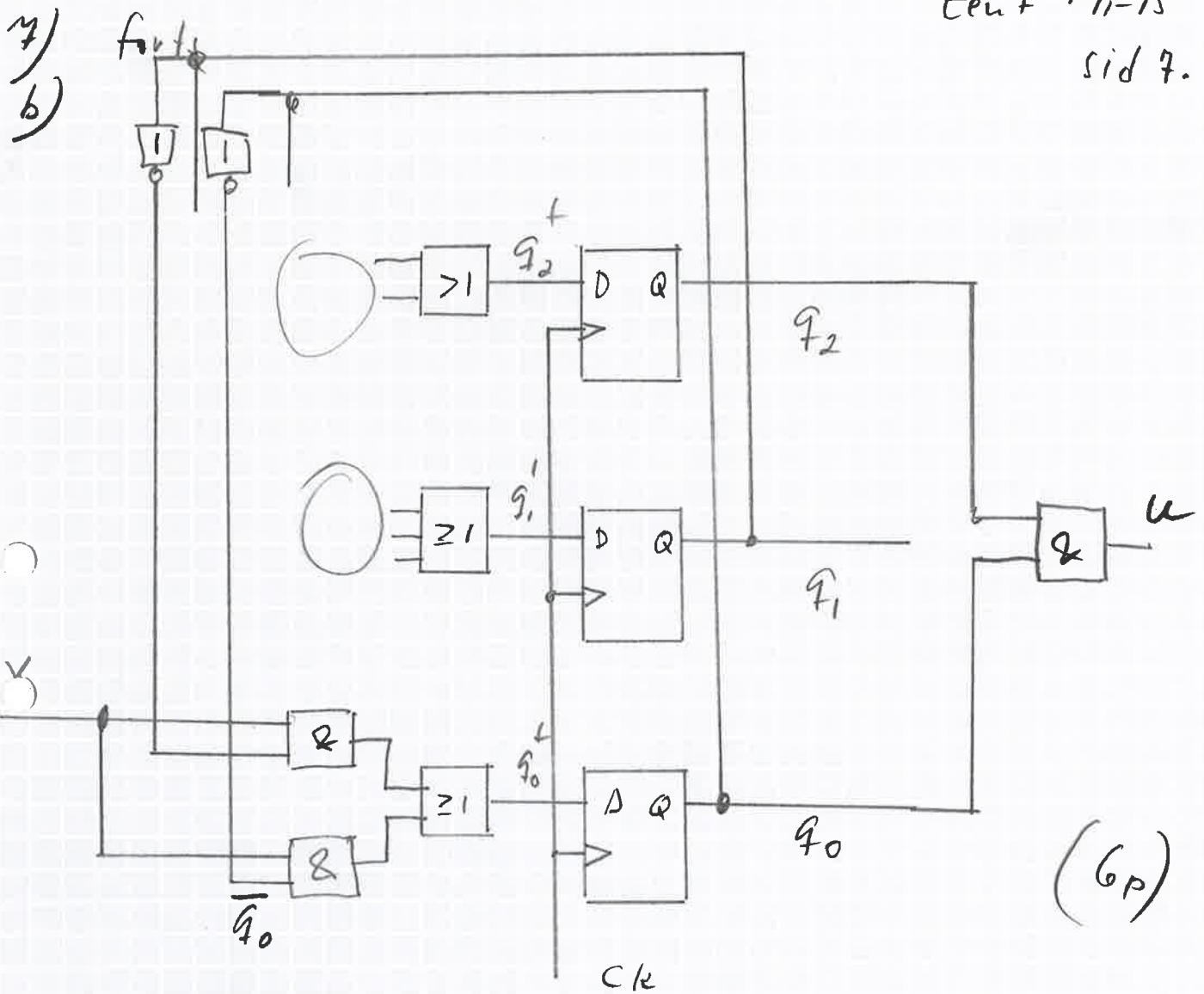
$$q_2^+ = q_2 \cdot \overline{q_0} \cdot X + q_1 \cdot q_0 \cdot X$$

$$q_1^+ = q_2 \cdot \overline{q_0} \cdot \overline{X} + q_1 \cdot \overline{q_0} \cdot X + \overline{q_2} \cdot q_0 \cdot \overline{X}$$

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

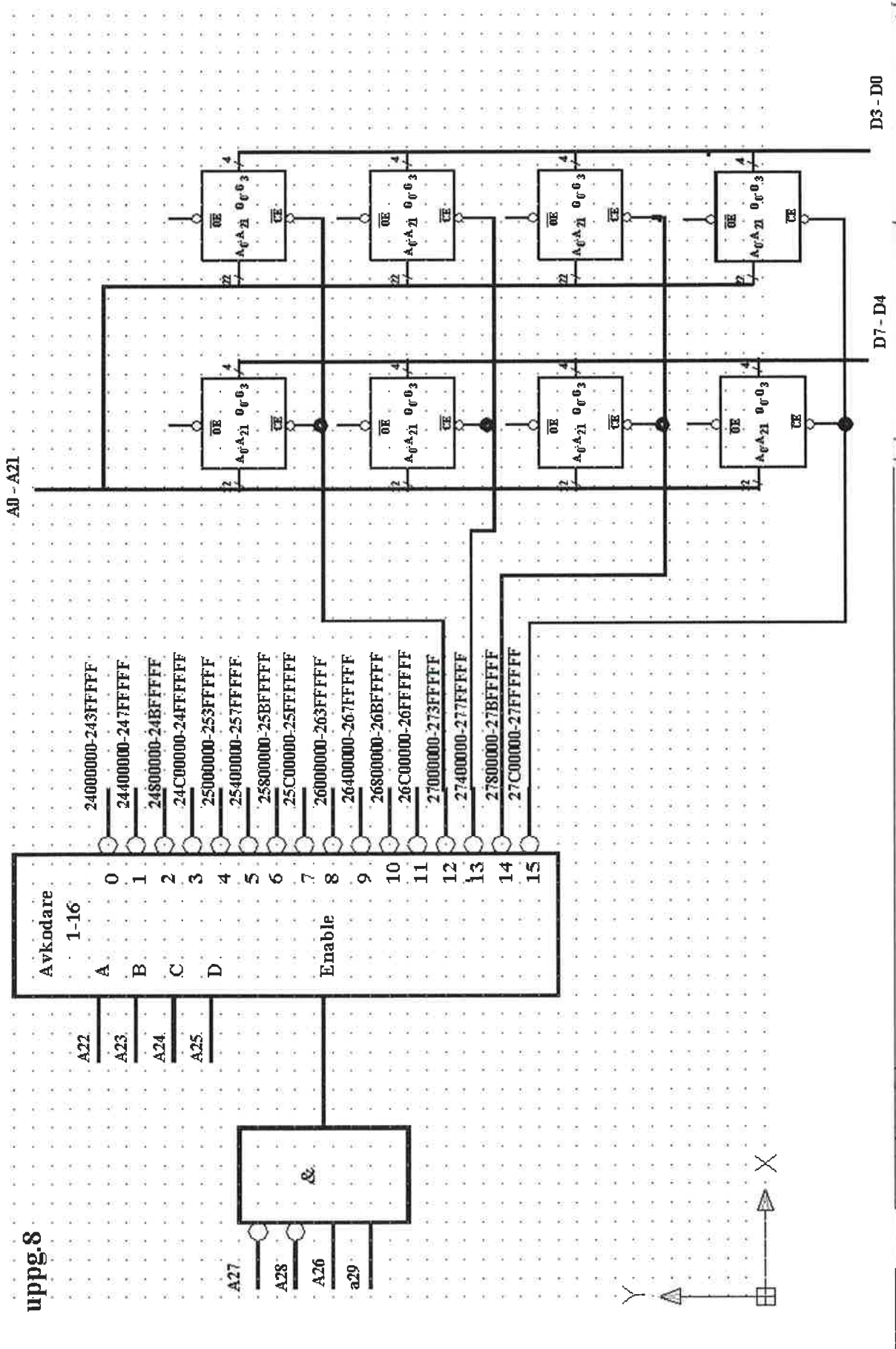
$$u = q_2 \cdot q_0$$

vänd.



De kombinatoriska näta som styr vippe 1 och 2 har inte ritats ut. Endast de nät som styr vippe 0 är fullständigt.

uppg.8



D3 - D0

D7 - D4

A0 - A21

Avkodare
1-16

A

B

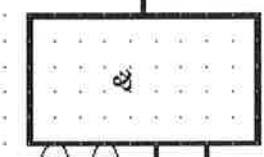
C

D

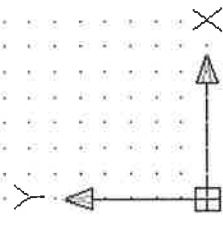
Enable

- 24000000-243FFFFF
- 24400000-247FFFFF
- 24800000-24BFFFFF
- 24C00000-24FFFFF
- 25000000-253FFFFF
- 25400000-257FFFFF
- 25800000-25BFFFFF
- 25C00000-25FFFFF
- 26000000-263FFFFF
- 26400000-267FFFFF
- 26800000-26BFFFFF
- 26C00000-26FFFFF
- 27000000-273FFFFF
- 27400000-277FFFFF
- 27800000-27BFFFFF
- 27C00000-27FFFFF

A22
A23
A24
A25



A27
A28
A29



D7 - D4
D3 - D0