

# DIGITALVEKNIK 10-01-14

1.

$S_1 S_0$	$X_1 X_0$	$u_3 u_2 u_1 u_0$
00	00	0000
	01	0001
	10	0010
	11	0011
01	00	0100
	01	0101
	10	0110
	11	0111
10	00	1000
	01	1001
	10	1010
	11	1011
11	00	1100
	01	1101
	10	1110
	11	1111

$u_3$  MED NAND

$u_3$	$S_1 S_0$	$X_1 X_0$
0	00	00
0	00	01
0	00	10
0	00	11
1	01	00
1	01	01
1	01	10
1	01	11
1	10	00
1	10	01
1	10	10
1	10	11
1	11	00
1	11	01
1	11	10
1	11	11

$u_3 = S_1 \cdot X_1 \cdot X_0$

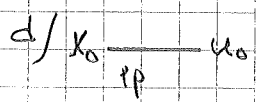
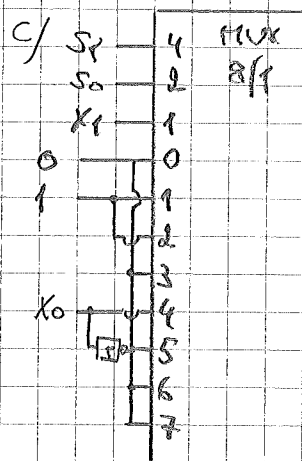
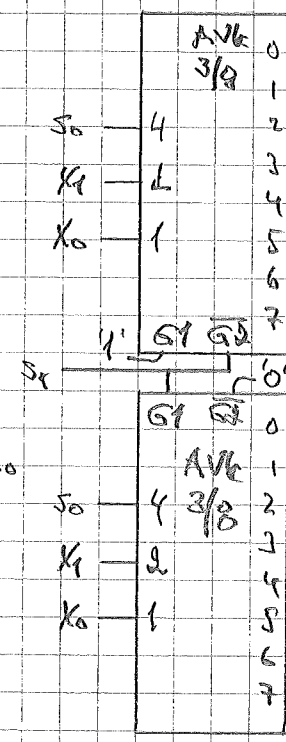


$X+2$

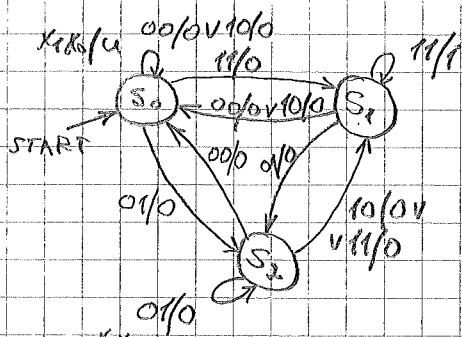
$3 \cdot X$

$X^2$

b/



2.



	$x_1 x_0$	00	01	11	10
$S_0$	$q_1 q_0$	00	01	11	10
$S_1$		00/0	10/0	01/1	00/0
$S_2$		00/0	10/0	01/0	01/0

$q_1 q_0$	$x_1 x_0$	00	01	11	10
00	$q_1^*$	0	1	0	0
01		0	1	0	0
11		-	-	-	-
10		0	1	0	0

$J_1$	$k_1$
0	1
0	1
-	-
-	-
1	0
1	1

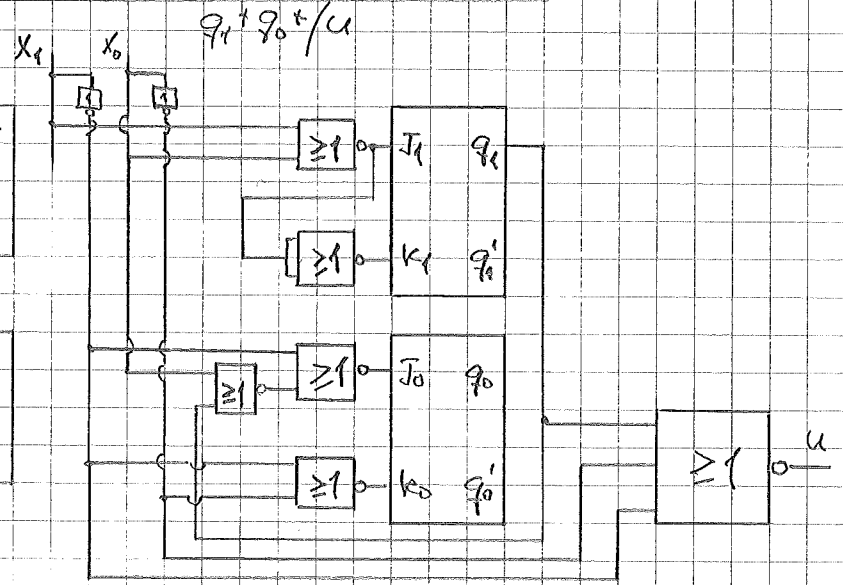
$q_1 q_0$	$x_1 x_0$	00	01	11	10
00	$q_0^*$	0	0	1	0
01		0	0	1	0
11		-	-	-	-
10		0	0	1	1

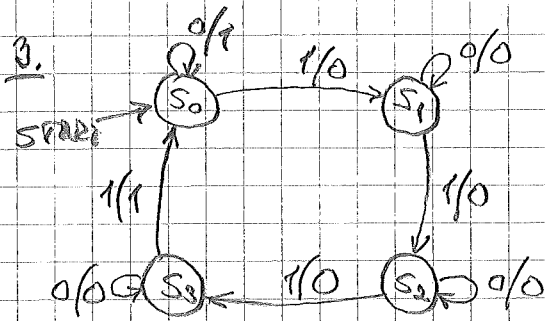
$J_0$	$k_0$
0	0
0	1
-	-
-	-
1	1
0	0
1	1

$u$
0
0
-
0

$$\begin{cases}
 J_1 = x_1' \cdot x_0 \\
 k_1 = x_1 + x_0' = [(x_1 + x_0)']' \\
 J_0 = x_1 \cdot (q_1 + x_0) = [x_1' + (q_1 + x_0)']' \\
 k_0 = x_1' + x_0' = [(x_1 + x_0)']'
 \end{cases}$$

$$u = x_1 \cdot x_0 \cdot q_1' = (q_1 + x_1' + x_0')'$$



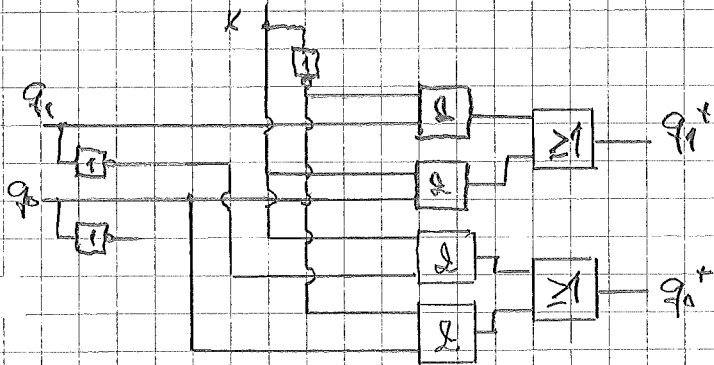


		X	
		0	1
S <sub>0</sub> S <sub>1</sub>	00	00/0	01/0
S <sub>1</sub> S <sub>2</sub>	01	01/0	11/0
S <sub>2</sub> S <sub>3</sub>	11	11/0	10/0
S <sub>3</sub> S <sub>0</sub>	10	10/0	00/0

$q_1^+ q_0^+ / u$

	X		
	0	1	0
00	0	0	1
01	0	1	0
11	1	1	0
10	1	0	0

$q_1^+ \quad q_0^+ \quad u$



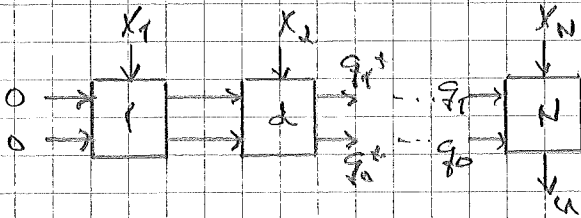
$$\begin{cases} q_1^+ = q_0 \cdot X + q_1 \cdot X' \\ q_0^+ = q_1' \cdot X + q_0 \cdot K' \end{cases}$$

$$u = q_1' \cdot q_0' \cdot X' + q_1 \cdot q_0' \cdot X =$$

$$= q_0' \cdot (q_1' \cdot X' + q_1 \cdot X) =$$

$$= q_0' \cdot (q_1 \oplus X)' \quad \text{MEALY}$$

$$u = q_1' \cdot q_0' \quad \text{MOORE}$$



$$q_1^+ = (q_1 + X) \cdot (q_0 + X')$$

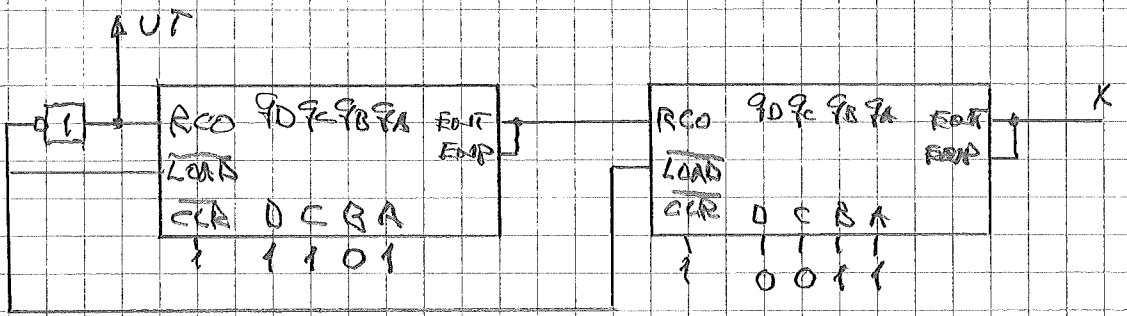
$$q_0^+ = (q_0 + X) \cdot (q_1' + X')$$

$$u = q_0' \cdot (q_1' + X) \cdot (q_1 + X')$$

CELL 1:  $q_1 q_0 = 00 \Rightarrow \begin{cases} q_1^+ = 0 \\ q_0^+ = X \end{cases}$

CELL i:  $q_1 = 0 \Rightarrow \begin{cases} q_1^+ = q_0 \cdot X \\ q_0^+ = X + q_0 \cdot X' \end{cases}$

4. a)



$$13 + 16 = 29$$

b)

