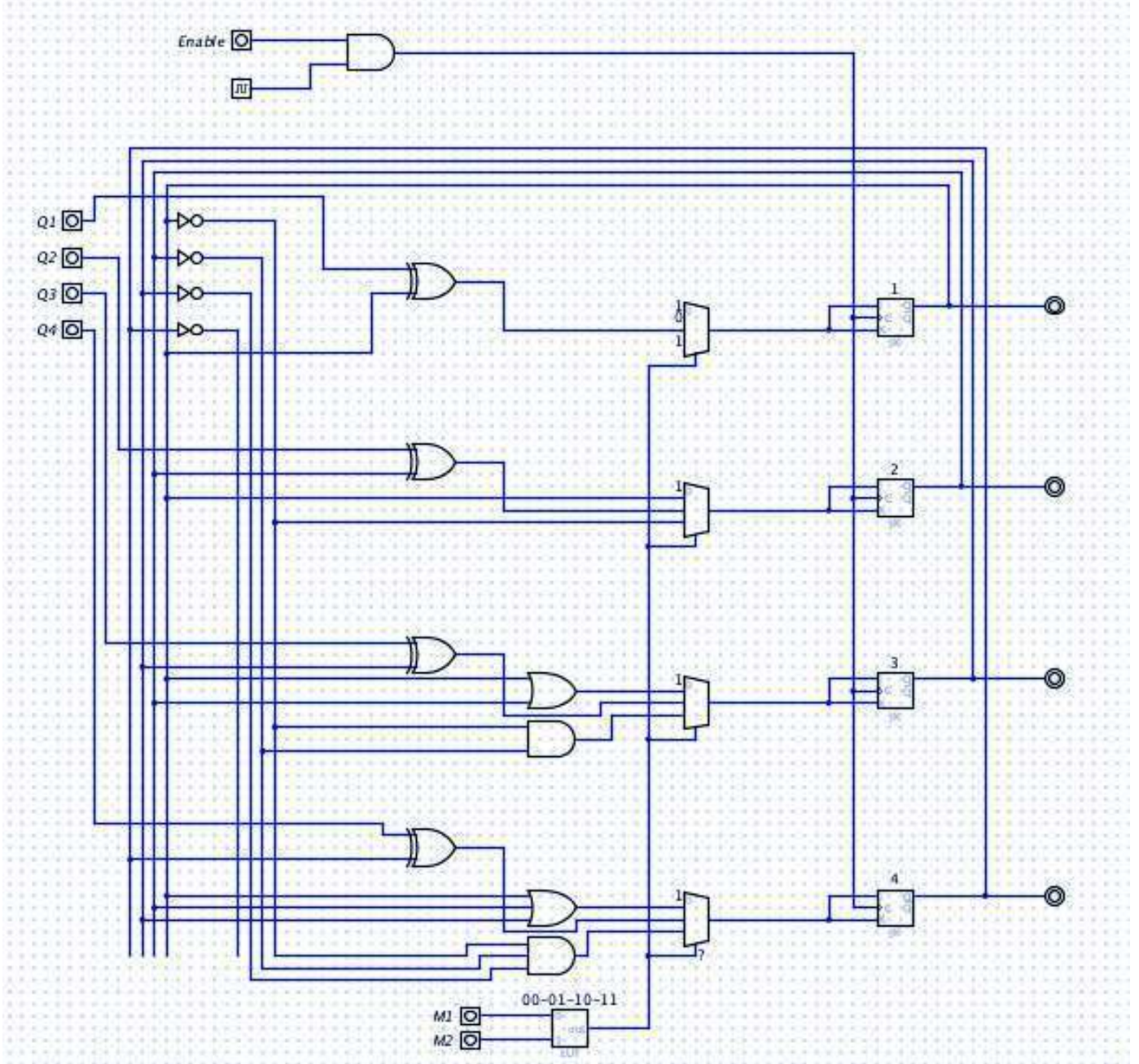


BLM 2022 BİLGİSAYAR DONANIMI ÖDEV – 1
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1. SORU



clk	JK	Q
t	00	\overline{Q}_0 (No change)
t	01	0
t	10	1
t	11	\overline{Q}_0 toggles

$$\boxed{F = 0}$$

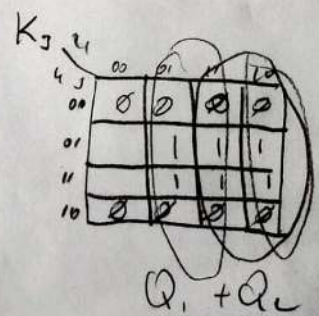
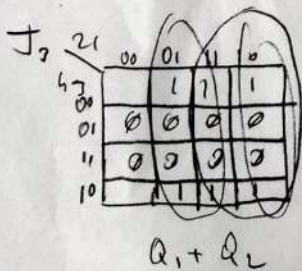
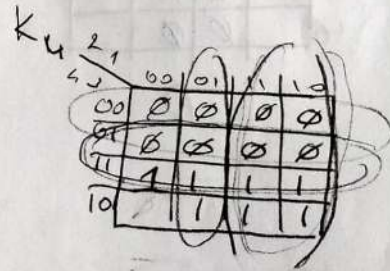
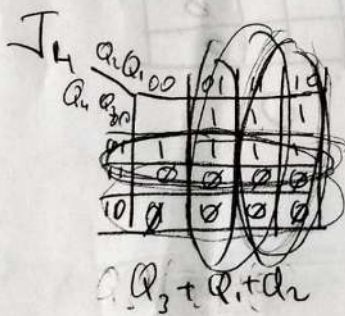
Q	Q ⁺	JK
$Q_4 Q_3 Q_2 Q_1$	$Q_4 Q_3 Q_2 Q_1$	0000

$$\boxed{M_2 = 0 \quad M_1 = 0}$$

Q	Q ⁺	JK
$Q_4 Q_3 Q_2 Q_1$	$\overline{Q}_4 \overline{Q}_3 \overline{Q}_2 \overline{Q}_1$	1111

$$M_2 = 0 \quad M_1 = 1$$

Q_3	Q_2	Q_1	Q_0	Q_3^+	Q_2^+	Q_1^+	Q_0^+	JK_3	JK_2	JK_1	JK_0
0	0	0	0	0	0	0	0	00	00	00	00
0	0	0	1	1	1	1	1	10	10	10	00
0	0	1	0	1	1	1	0	10	10	00	00
0	0	1	1	1	1	0	1	10	10	01	00
0	1	0	0	1	1	0	0	10	00	00	00
0	1	0	1	1	0	1	1	10	01	10	00
0	1	1	0	1	0	1	0	10	01	00	00
0	1	1	1	1	0	0	1	10	01	01	00
1	0	0	0	1	0	0	0	00	00	00	00
1	0	0	1	0	1	1	1	01	10	10	00
1	0	1	0	0	1	1	0	01	10	00	00
1	0	1	1	0	1	0	1	01	10	01	00
1	1	0	0	0	1	0	0	01	00	00	00
1	1	0	1	0	0	1	1	01	01	10	00
1	1	1	0	0	0	1	0	01	01	00	00
1	1	1	1	0	0	0	1	01	01	01	00



$$M_2 = 1$$

$$M_1 = 0$$

D_i	a	Q	J	K
0	0	0	0	0
0	1	0	0	1
1	0	1	1	0
1	1	1	0	0

J

D_i	a	1
0	0	0
1	1	0

K

D_i	a	0	1
0	0	0	1
1	0	0	0

$$JK = D_i \oplus a$$

$$M_2 = 0$$

$$M_1 = 1$$

DERAM

J_2

Q_1	00	01	11	10
00	1	0	0	0
01	1	0	0	0
11	1	0	0	0
10	1	0	0	0

=

K_2

Q_1	00	01	11	10
00	0	0	1	0
01	0	0	1	0
11	0	0	1	0
10	0	0	1	0

J

Q_1	00	01	11	10
00	0	0	0	0
01	0	0	0	0
11	0	0	0	0
10	0	0	0	0

0

=

K

Q_1	00	01	11	10
00	0	0	0	0
01	0	0	0	0
11	0	0	0	0
10	0	0	0	0

0

$$M_2 = 1$$

$$M_1 = 1$$

$$\begin{array}{c} 0/10 \\ 1/1\bar{q} \end{array}$$

$$\begin{array}{c|c} 00 & 00 \\ 01 & 10 \\ 10 & 01 \\ 11 & 00 \end{array}$$

Q_4	Q_3	Q_2	Q_1	Q_4^+	Q_3^+	Q_2^+	Q_1^+	JK_4	JK_3	JK_2	JK_1
0	0	0	0	1	1	1	1	10	10	10	10
0	0	0	1	0	0	0	0	00	00	00	01
0	0	1	0	0	0	0	1	00	00	01	10
0	0	1	1	0	0	1	0	00	00	00	01
0	1	0	0	0	0	1	1	00	01	10	10
0	1	0	1	0	1	0	0	00	00	00	01
0	1	1	0	0	1	0	1	00	00	01	10
0	1	1	1	0	1	1	0	00	00	00	01
1	0	0	0	0	1	1	1	01	10	10	10
1	0	0	1	1	0	0	0	00	00	00	01
1	0	1	0	1	0	0	1	00	00	01	10
1	0	1	1	1	0	1	0	00	00	00	01
1	1	0	0	1	0	1	1	00	01	10	10
1	1	0	1	1	1	0	0	00	00	00	01
1	1	1	0	1	1	0	1	00	00	01	10
1	1	1	1	1	1	1	0	00	00	00	00

J_4

$Q_3 \backslash Q_2 Q_1$	00	01	11	10
00	1			
01				
11	0	0	0	0
10	0	0	0	0

K_4

$Q_3 \backslash Q_2 Q_1$	00	01	11	10
00	0	0	0	0
01	0	0	0	0
11				
10	1			

$JK_4 = \overline{Q_3} \overline{Q_2} \overline{Q_1}$

$JK_{x_1} = \overline{Q_3} \overline{Q_2} \overline{Q_1}$

$$M_2 = 1 \quad M_1 = 1$$

DENAMI

J_3

$Q_2 \backslash Q_1$	00	01	11	10
00	1	1		
01	0	0	0	0
11	0	0	0	0
10	1			

K_3

$Q_2 \backslash Q_1$	00	01	11	10
00	0	0	0	0
01	1			
11	1			
10	0	0	0	0

$JK_3 = \overline{Q_2} \overline{Q_1}$

J_2

$Q_1 \backslash Q_0$	00	01	11	10
00	1		0	0
01	1		0	0
11	1		0	0
10	1		0	0

K_2

$Q_1 \backslash Q_0$	00	01	11	10
00	0	0		1
01	0	0		1
11	0	0		1
10	0	0		1

$JK_2 = \overline{Q_1}$

J_1

$Q_0 \backslash Q_{-1}$	00	01	11	10
00	1	0	0	1
01	1	0	0	1
11	1	0	0	1
10	1	0	0	1

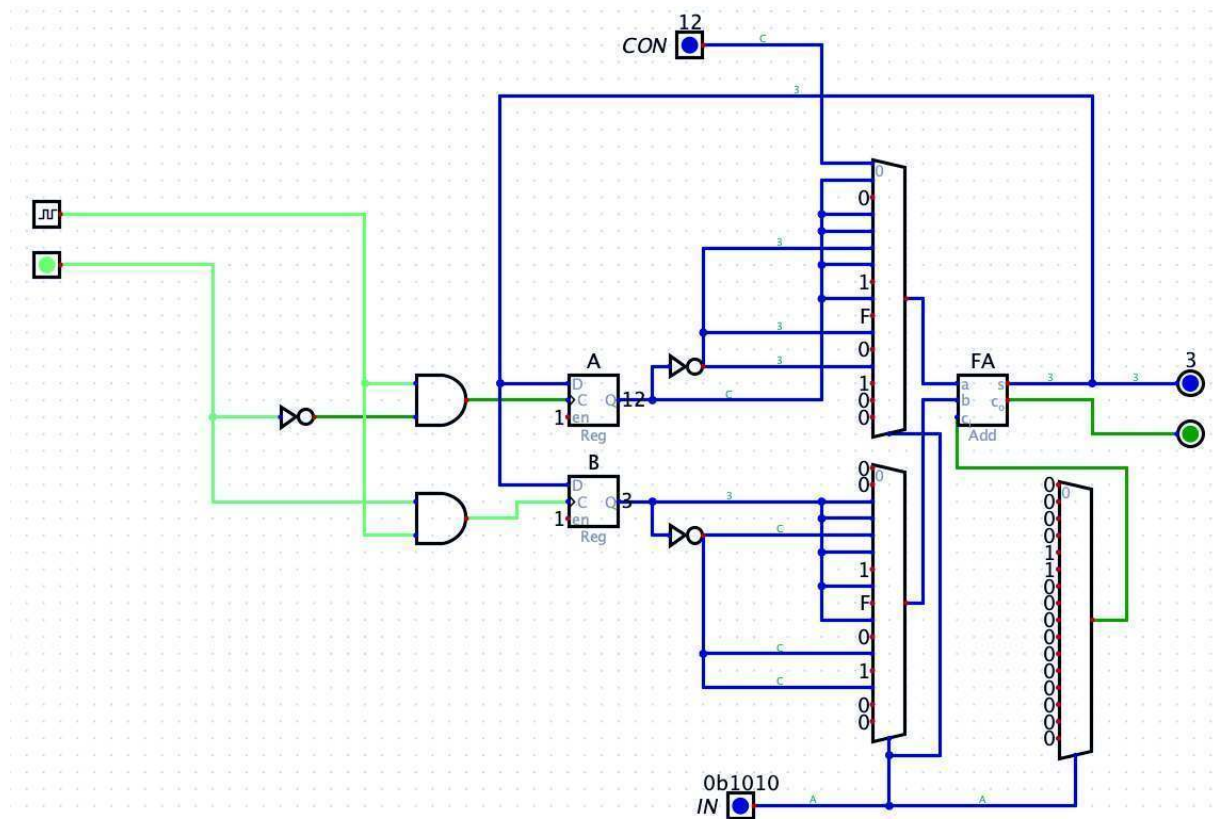
K_1

$Q_0 \backslash Q_{-1}$	00	01	11	10
00	0	1	1	0
01	0	1	1	0
11	0	1	1	0
10	0	1	1	0

$JK_1 = 1$

②

2. SORU



2. SORU B

IN - 0000 - 0 \Rightarrow tar \leftarrow con	
IN - 0001 - 1 \Rightarrow tar \leftarrow src	- tar \leftarrow A
IN - 0010 - 2 \Rightarrow tar \leftarrow src	- tar \leftarrow B
IN - 0011 - 3 \Rightarrow tar \leftarrow A+B	-
IN - 0100 - 4 \Rightarrow tar \leftarrow A-B	-
IN - 0101 - 5 \Rightarrow tar \leftarrow B-A	-
IN - 0110 - 6 \Rightarrow tar \leftarrow src+1	- tar \leftarrow A+1
IN - 0111 - 7 \Rightarrow tar \leftarrow src+1	- tar \leftarrow B+1
IN - 1000 - 8 \Rightarrow tar \leftarrow src-1	- tar \leftarrow A-1
IN - 1001 - 9 \Rightarrow tar \leftarrow src-1	- tar \leftarrow B-1
IN - 1010 - 10 \Rightarrow tar \leftarrow $\overline{\text{src}}$	- tar \leftarrow $\overline{\text{A}}$
IN - 1011 - 11 \Rightarrow tar \leftarrow $\overline{\text{src}}$	- tar \leftarrow $\overline{\text{B}}$
IN - 1100 - 12 \Rightarrow tar \leftarrow $\overline{\text{src}}+1$	- tar \leftarrow $\overline{\text{A}}+1$
IN - 1101 - 13 \Rightarrow tar \leftarrow $\overline{\text{src}}+1$	- tar \leftarrow $\overline{\text{B}}+1$