YILDIZ TEKNİK ÜNİVERSİTESİ

BİLGİSAYAR MÜHENDİSLİĞİ BÖLÜMÜ

Ders: BLM2022 Bilgisayar Donanımı

ÖDEV-1 Raporu

Öğrenci Adı Soyadı: Sait Yalçın

Öğrenci No: 20011024

Öğrenci e-posta: sait.yalcin@std.yildiz.edu.tr

Ders Yürütücüsü: Dr.Öğr.Üyesi Ali Can KARACA

Nisan 2022

İÇİNDEKİLER

Soru 1

M_2 M_1 J K → Tüm JK lar için

1 0 D_T $\overline{D_T}$

D_T	q	Q_1	J	K
0	0	0	0	X
0	1	0	X	1
1	0	1	1	X
1	1	1	X	0

D_T \ qQ	00	01	11	10
0	X	X	X	1
1	X	X	0	X

J

D_T \ qQ	00	01	11	10
0	0	X	X	X
1	X	1	X	X

q	Q_1	J	K
0	0	0	X
0	1	1	X
1	0	X	1
1	1	X	0

M_2	M_1	J_3	K_3	J_2	K_2	J_1	K_1	J_0	K_0
1	1			$\overline{q_1}\cdot\overline{q_0}$	$\overline{q_1}\cdot\overline{q_0}$	$\overline{q_0}$	$\overline{q_0}$	1	$\overline{1}$

q_3	q_2	q_1	q_0	Q_3	Q_2	Q_1	Q_0	J_3	K_3	J_2	K_2	J_1	K_1	J_0	K_0
0	0	0	0	1	1	1	1	1	X	1	X	1	X	1	X
0	0	0	1	0	0	0	0	0	X	0	X	0	X	X	1
0	0	1	0	0	0	0	1	0	X	0	X	X	1	1	X
0	0	1	1	0	0	1	0	0	X	0	X	X	0	X	1
0	1	0	0	0	0	1	1	0	X	X	1	1	X	1	X
0	1	0	1	0	1	0	0	0	X	X	0	0	X	X	1
0	1	1	0	0	1	0	1	0	X	X	0	X	1	1	X
0	1	1	1	0	1	1	0	0	X	X	0	X	0	X	1
1	0	0	0	0	1	1	1	X	1	1	X	1	X	1	X
1	0	0	1	1	0	0	0	X	0	0	X	0	X	X	1
1	0	1	0	1	0	0	1	X	0	0	X	X	1	1	X
1	0	1	1	1	0	1	0	X	0	0	X	X	0	X	1
1	1	0	0	1	0	1	1	X	0	X	1	1	X	1	X
1	1	0	1	1	1	0	0	X	0	X	0	0	X	X	1
1	1	1	0	1	1	0	1	X	0	X	0	X	1	1	X
1	1	1	1	1	1	1	0	X	0	X	0	X	0	X	1

J_3

q_3q_2 \ q_1q_0	00	01	11	10
00	1	0	0	0
01	0	0	0	0
11	X	X	X	X
10	X	X	X	X

K_3

q_3q_2 \ q_1q_0	00	01	11	10
00	X	X	X	X
01	X	X	X	X
11	0	0	0	0
10	1	0	0	0

$J_3 = \overline{q_2}\cdot\overline{q_1}\cdot\overline{q_0}$

$K_3 = \overline{q_2}\cdot\overline{q_1}\cdot\overline{q_0}$

J_2

q_3q_2 \ q_1q_0	00	01	11	10
00	1	0	0	0
01	x	x	x	x
11	x	x	x	x
10	1	0	0	0

K_2

q_3q_2 \ q_1q_0	00	01	11	10
00	x	x	x	x
01	1	0	0	0
11	1	0	0	0
10	x	x	x	x

$\Rightarrow \dfrac{J_2, K_2}{\overline{q_1} \cdot \overline{q_0}}$

J_1

q_3q_2 \ q_1q_0	00	01	11	10
00	1	0	x	x
01	1	0	x	x
11	1	0	x	x
10	1	0	x	x

K_1

q_3q_2 \ q_1q_0	00	01	11	10
00	x	x	0	1
01	x	x	0	1
11	x	x	0	1
10	x	x	0	1

$\Rightarrow \dfrac{J_1, K_1}{\overline{q_0}}$

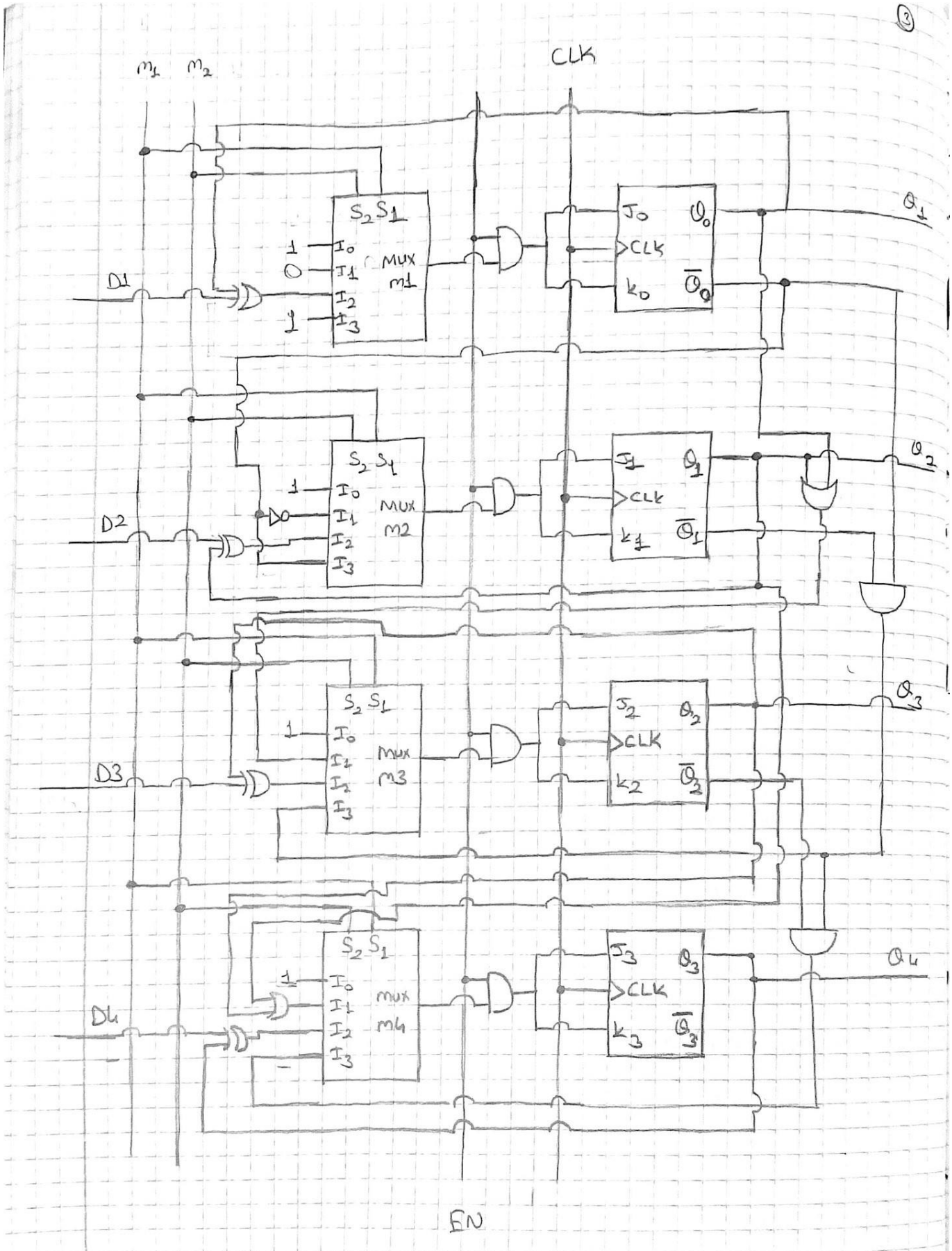
J_0

1	x	x	1
1	x	x	1
1	x	x	1
1	x	x	1

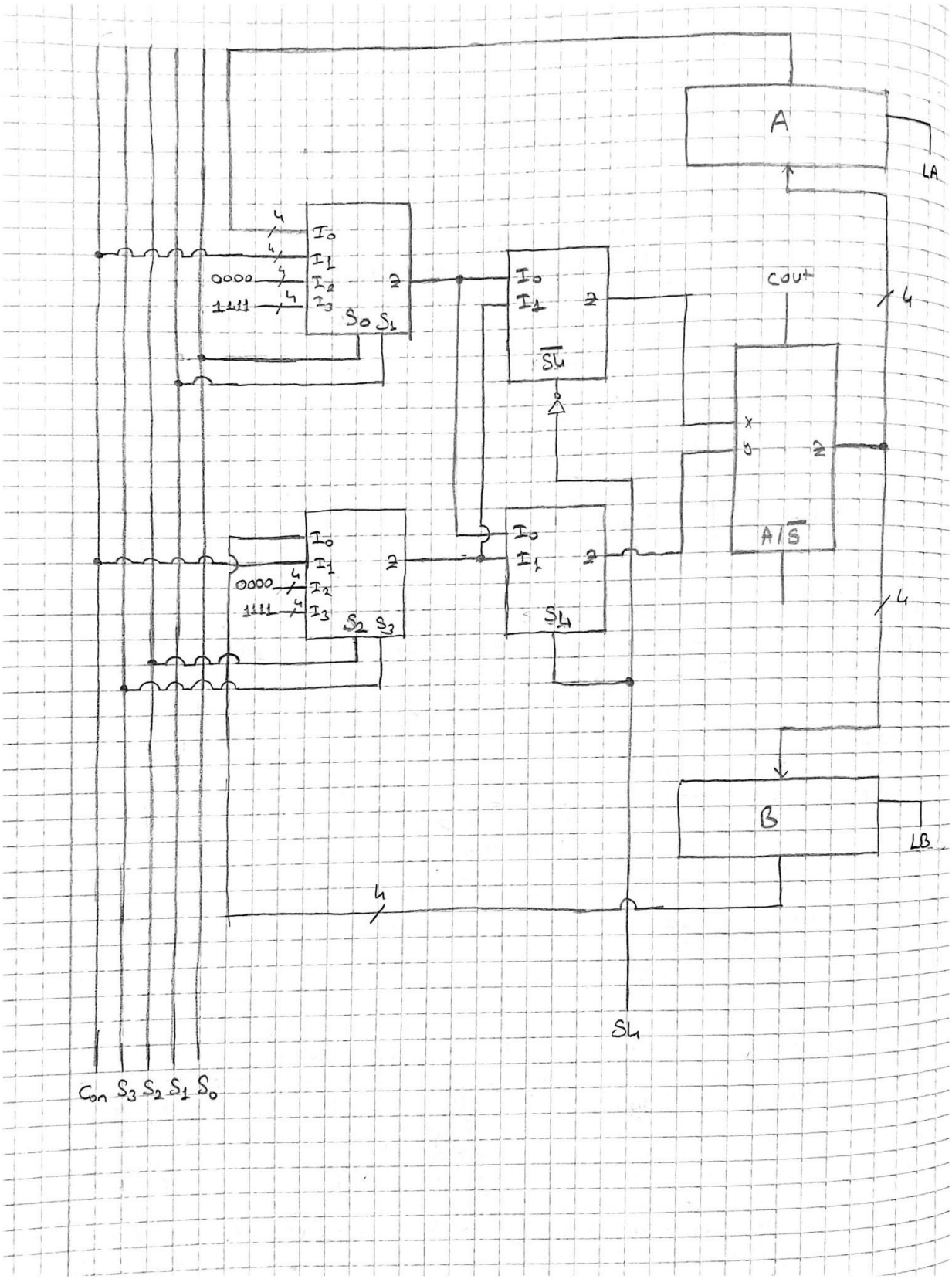
K_0

x	1	1	x
x	1	1	x
x	1	1	x
x	1	1	x

$\Rightarrow \dfrac{J_0, K_0}{1}$


m1 m2
CLK
S2 S1
1
0
1
I0
I1
I2
I3
MUX
m1
D1
J0
CLK
k0
Q0
Q0
S2 S1
1
0
I0
I1
I2
I3
MUX
m2
D2
J1
CLK
k1
Q1
Q1
S2 S1
1
I0
I1
I2
I3
mux
m3
D3
J2
CLK
k2
Q2
Q2
S2 S1
1
I0
I1
I2
I3
mux
m4
D4
J3
CLK
k3
Q3
Q3
Q4
EN

Soru 2


A
LA
B
LB
Cout
A/S
0000
1111
I_0
I_1
I_2
I_3
S_0 S_1
S_2 S_3
$\overline{SL}$
SL
Cin S_3 S_2 S_1 S_0

Kontrol İşaretleri:

Not: Adder/Substracter'ın (x-y) yaptığı varsayılıyor.

- tar ← con

  A ← con: $S1=0$, $S0=1$; $S3=1$, $S2=0$; $S4=0$; $A/\bar{S}=1$; $LA=1$, $LB=0$

  B ← con: $S1=0$, $S0=1$; $S3=1$, $S2=0$; $S4=0$; $A/\bar{S}=1$; $LA=0$, $LB=1$

- tar ← src

  B ← A: $S1=0$, $S0=0$; $S3=1$, $S2=0$; $S4=0$; $A/\bar{S}=1$; $LA=0$, $LB=1$

  A ← B: $S1=1$, $S0=0$; $S3=0$, $S2=0$; $S4=0$; $A/\bar{S}=1$; $LA=1$, $LB=0$

  B ← B: $S1=1$, $S0=0$; $S3=0$, $S2=0$; $S4=0$; $A/\bar{S}=1$; $LA=0$, $LB=1$

  A ← A: $S1=0$, $S0=0$; $S3=1$, $S2=0$; $S4=0$; $A/\bar{S}=1$; $LA=1$, $LB=0$

- tar ← A+B

  A ← A+B: $S1=0$, $S0=0$; $S3=0$, $S2=0$; $S4=0$; $A/\bar{S}=1$; $LA=1$, $LB=0$

  B ← A+B: $S1=0$, $S0=0$; $S3=0$, $S2=0$; $S4=0$; $A/\bar{S}=1$; $LA=0$, $LB=1$

- tar ← A-B

  A ← A-B: $S1=0$, $S0=0$; $S3=0$, $S2=0$; $S4=1$; $A/\bar{S}=0$; $LA=1$, $LB=0$

  B ← A-B: $S1=0$, $S0=0$; $S3=0$, $S2=0$; $S4=0$; $A/\bar{S}=0$; $LA=0$, $LB=1$

- tar ← src+1 ($c_{on}=1$)

  A ← A+1: $S1=0$, $S0=0$; $S3=0$, $S2=1$; $S4=0$; $A/\bar{S}=1$; $LA=1$, $LB=0$

  A ← B+1: $S1=0$, $S0=1$; $S3=0$, $S2=0$; $S4=0$; $A/\bar{S}=1$; $LA=1$, $LB=0$

  B ← B+1: $S1=0$, $S0=1$; $S3=0$, $S2=0$; $S4=0$; $A/\bar{S}=1$; $LA=0$, $LB=1$

  B ← A+1: $S1=0$, $S0=0$; $S3=0$, $S2=1$; $S4=0$; $A/\bar{S}=1$; $LA=0$, $LB=1$

- tar ← src-1 ($c_{on}=1$)

  A ← A-1: $S1=0$, $S0=0$; $S3=0$, $S2=1$; $S4=0$; $A/\bar{S}=0$; $LA=1$, $LB=0$

  A ← B-1: $S1=0$, $S0=1$; $S3=0$, $S2=0$; $S4=1$; $A/\bar{S}=0$; $LA=1$, $LB=0$

  B ← B-1: $S1=0$, $S0=1$; $S3=0$, $S2=0$; $S4=1$; $A/\bar{S}=0$; $LA=0$, $LB=1$

  B ← A-1: $S1=0$, $S0=0$; $S3=0$, $S2=1$; $S4=0$; $A/\bar{S}=0$; $LA=0$, $LB=1$

tar ← $\overline{src}$

A ← $\overline{A}$: S1=0, S0=0; S3=1, S2=1; S4=0; A/$\overline{S}$=0, LA=1, LB=0

A ← $\overline{B}$: S1=1, S0=1; S3=0, S2=0; S4=0; A/$\overline{S}$=0; LA=1, LB=0

B ← $\overline{B}$: S1=1, S0=1; S3=0, S2=0; S4=0; A/$\overline{S}$=0; LA=0, LB=1

B ← $\overline{A}$: S1=0, S0=0; S3=1, S2=1; S4=0; A/$\overline{S}$=0; LA=0, LB=1

tar ← $\overline{src}$ +1

A ← $\overline{A}$+1: S1=0, S0=0; S3=1, S2=0; S4=0; A/$\overline{S}$=0; LA=1, LB=0

A ← $\overline{B}$+1: S1=1, S0=0; S3=0, S2=0; S4=0; A/$\overline{S}$=0; LA=1, LB=0

B ← $\overline{B}$+1: S1=1, S0=0; S3=0, S2=0; S4=0; A/$\overline{S}$=0; LA=0, LB=1

B ← $\overline{A}$+1: S1=0, S0=0; S3=1, S2=0; S4=0; A/$\overline{S}$=0; LA=0, LB=1