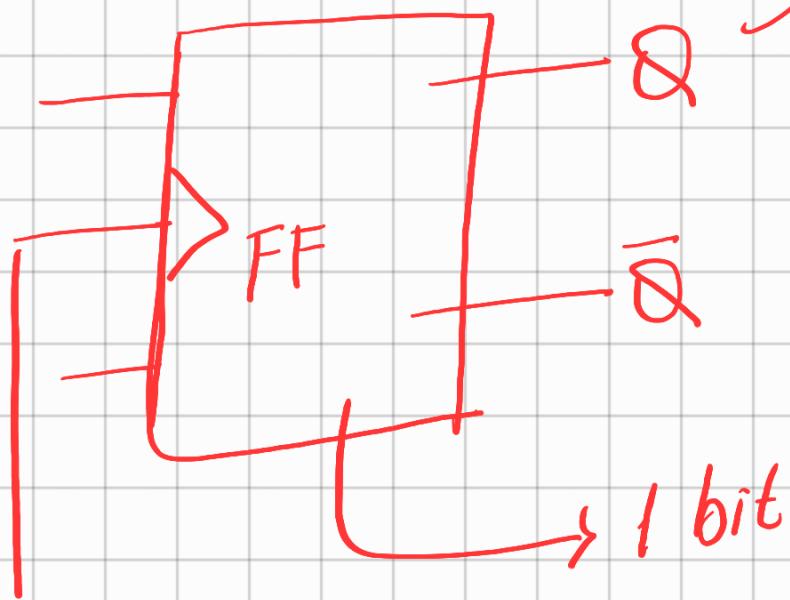
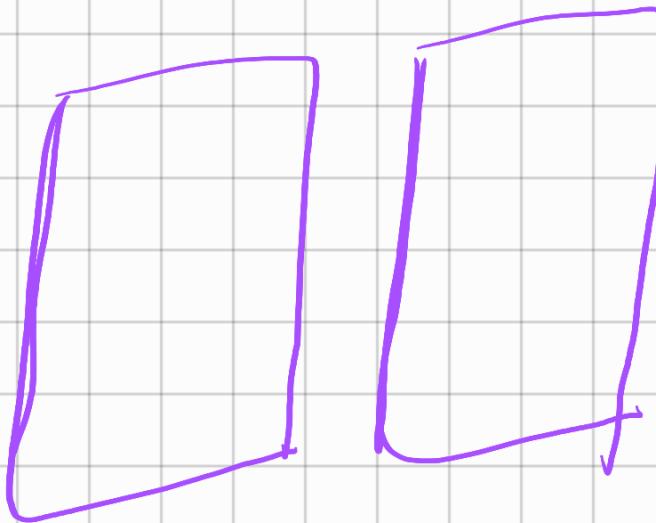


# Flip-Floplar



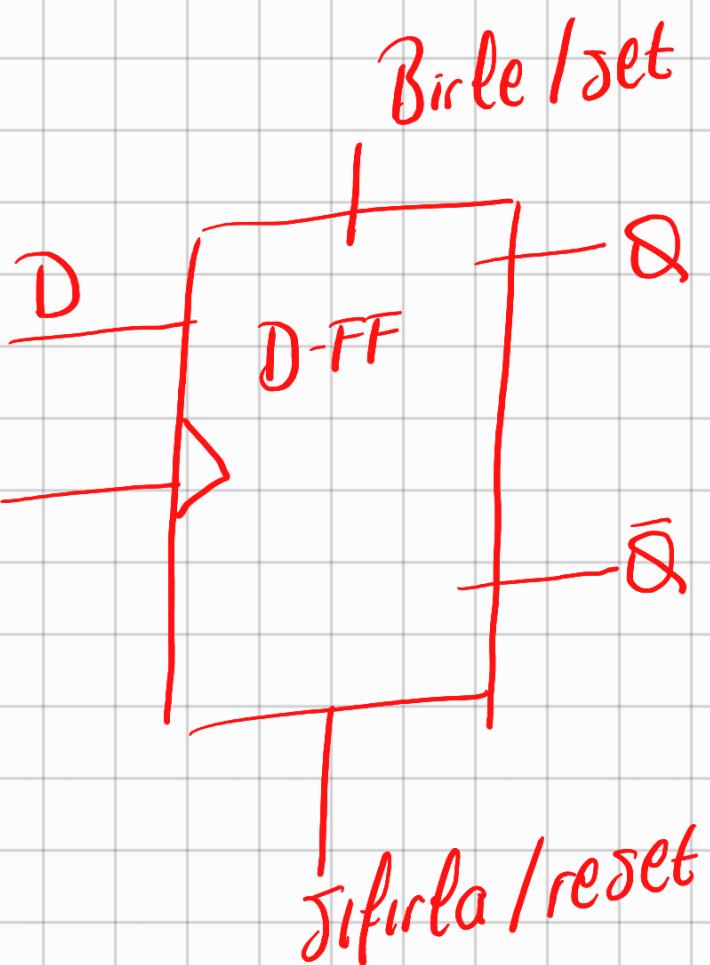
1 girişli  
ve 2 girişli  
olabilir



$2^{3 \text{ bit}} \rightarrow 8$  farklı  
durum

\*  
DFF  
JKFF  
JRFF  
TFF

DFF  
Σ



$$Q(t+1) = D(t)$$

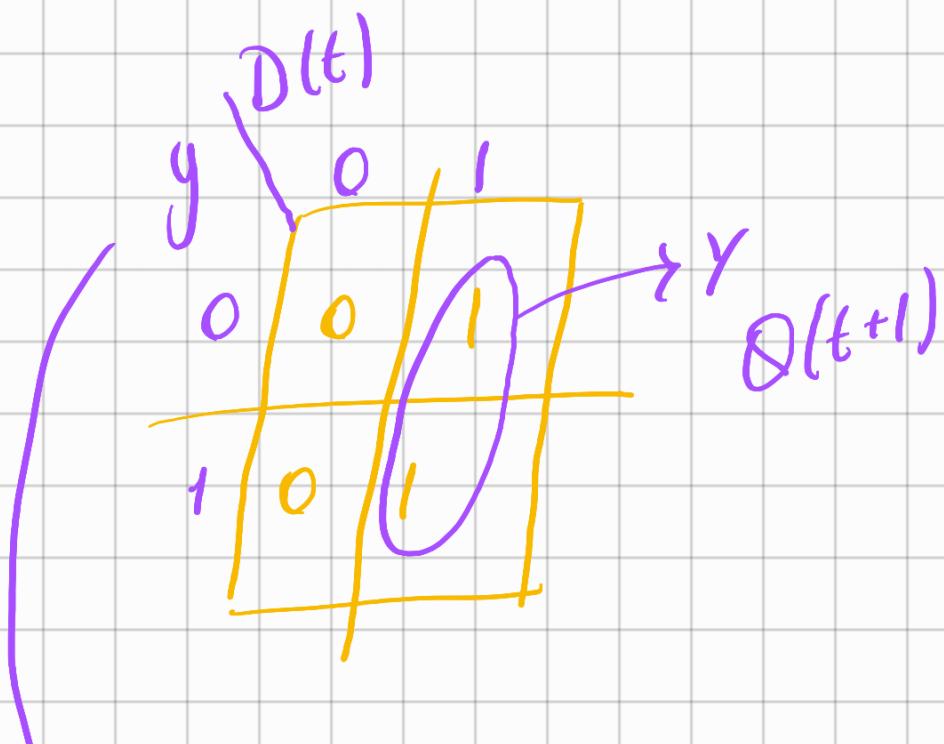


|  
 |  
 |  
 |  
 |  
 t      t+1

$$Q(t+1) = Y$$

$$Q(t) = y$$

piris	jaat	cikolar
D	-	Q Q̄
0	-	0 1
1	-	1 0



$Q(t)$

Bunları  
Bil

$$y=D$$

$Q(t) \quad Q(t+1)$

Uyarma  
tablosu

$y'$	00	01	11	10
D	0	1	t	0

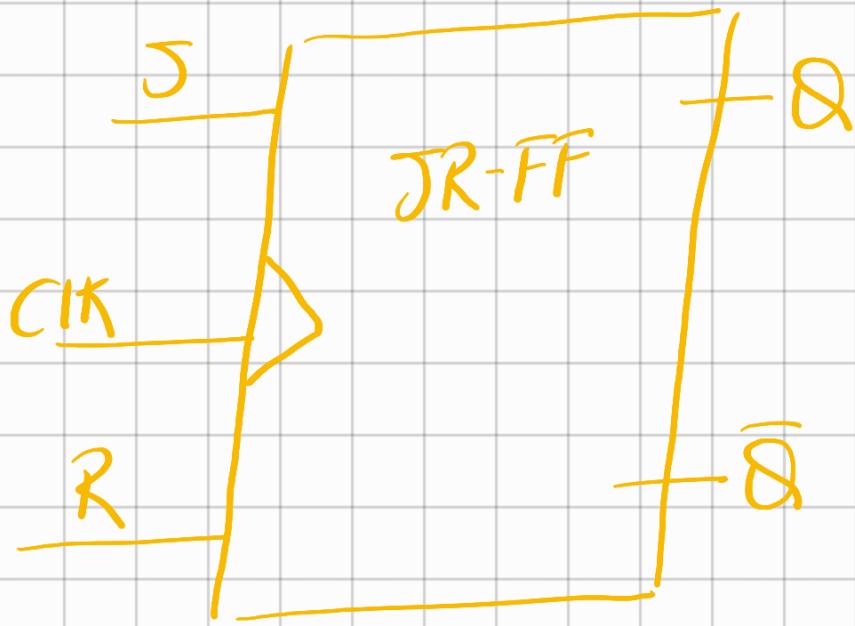
JRFF

(set/reset  
FF)



215

$$y = yK + \delta$$

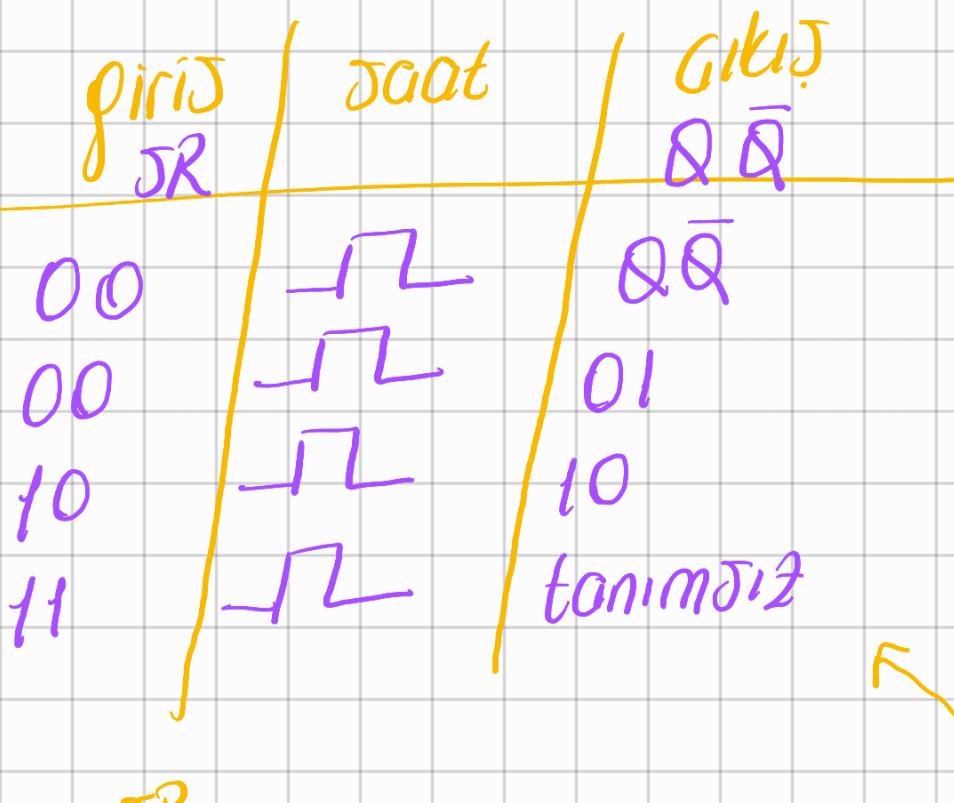


2 girişli  
bir  
flip-flop'tur

$$Q(t+1) = Q(t) \overline{R(t)} + \delta(t)$$

$$R(t) \delta(t) = 0 \text{ için tonimli}$$

$$R(t) \delta(t) = 1 \text{ için tonimsız}$$



$y$	00	01	11	10
$J$	0	0	0	1
$R$	1 1	0	$\emptyset$	1

$\rightarrow y$

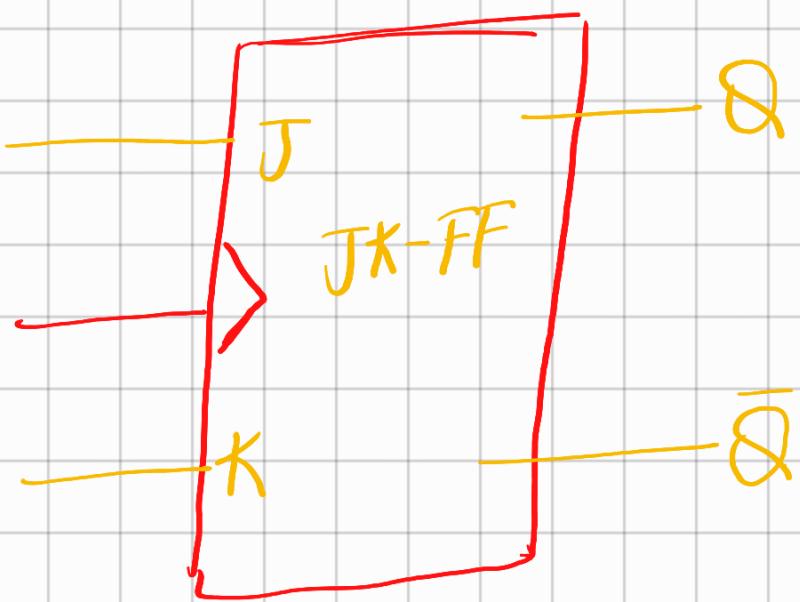
$$y = J + R'y$$

$yR$	00	01	11	10
$JR$	$0\emptyset$	10	$\emptyset 0$	01

→ uyarmo tablosu

$$\left. \begin{array}{l} y = Q(t) \\ y = Q(t+1) \end{array} \right\}$$

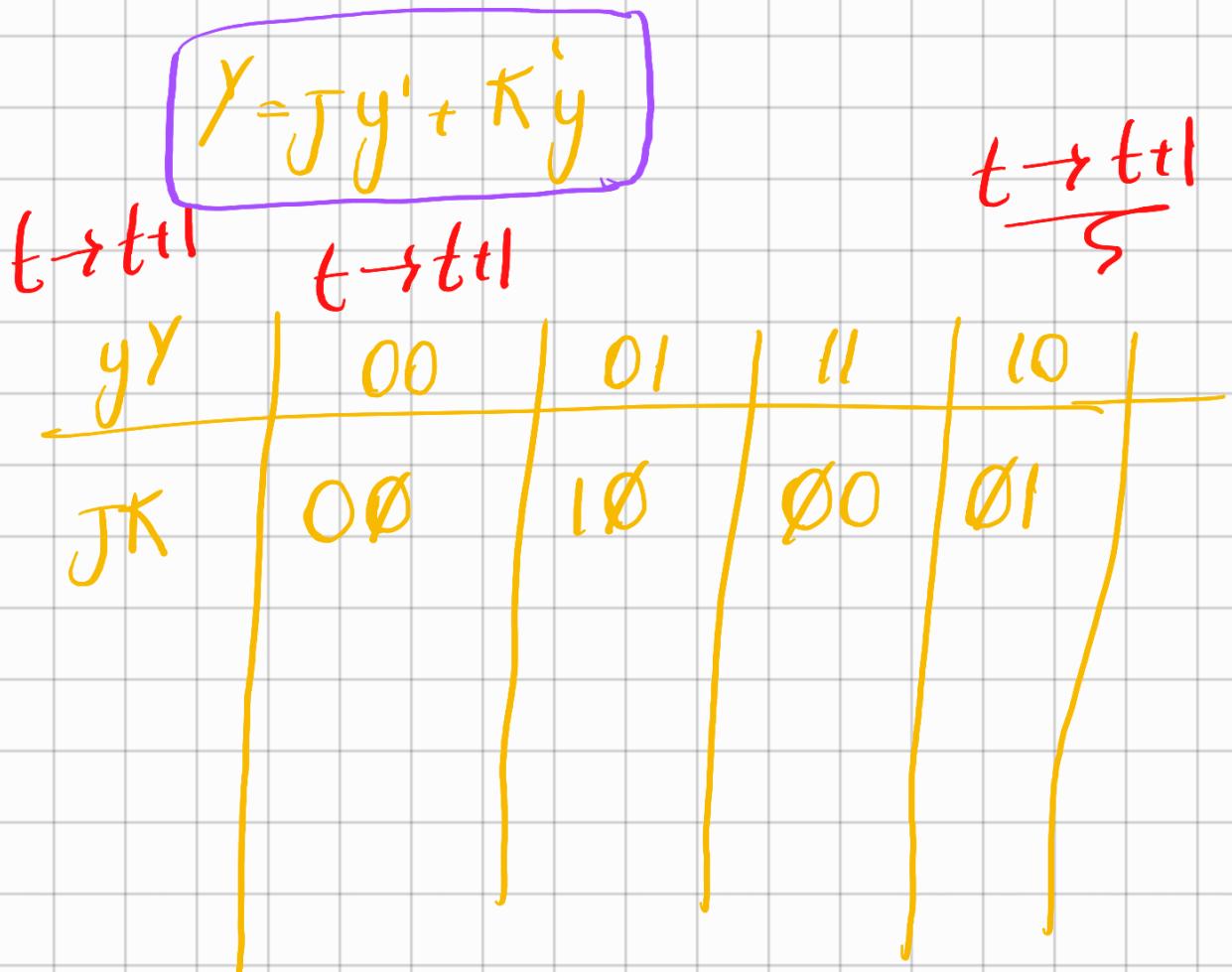
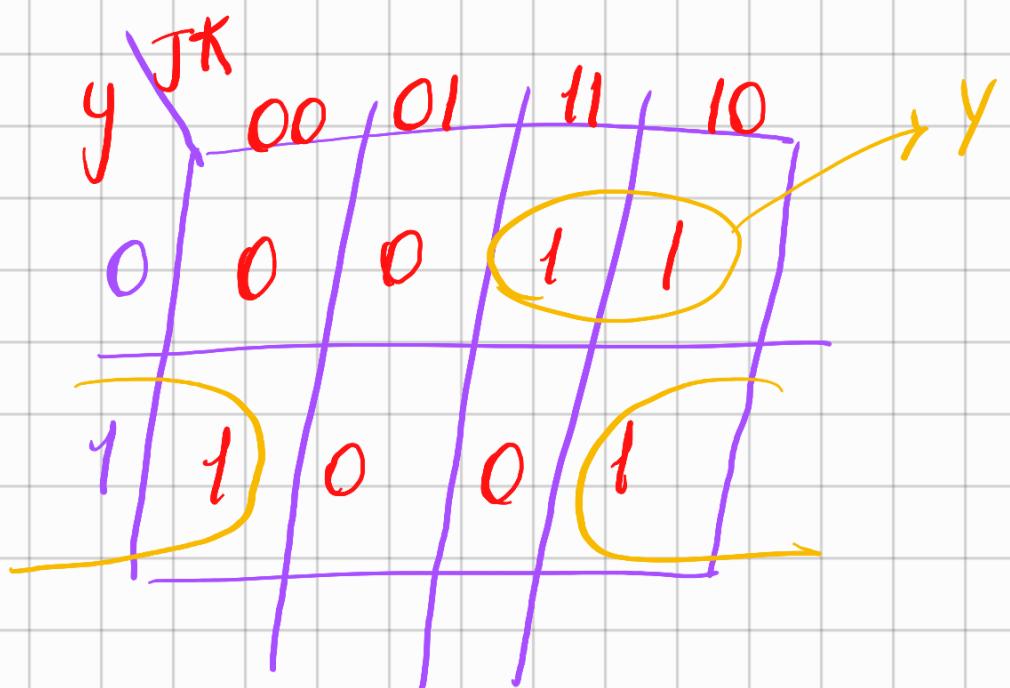
JKFF



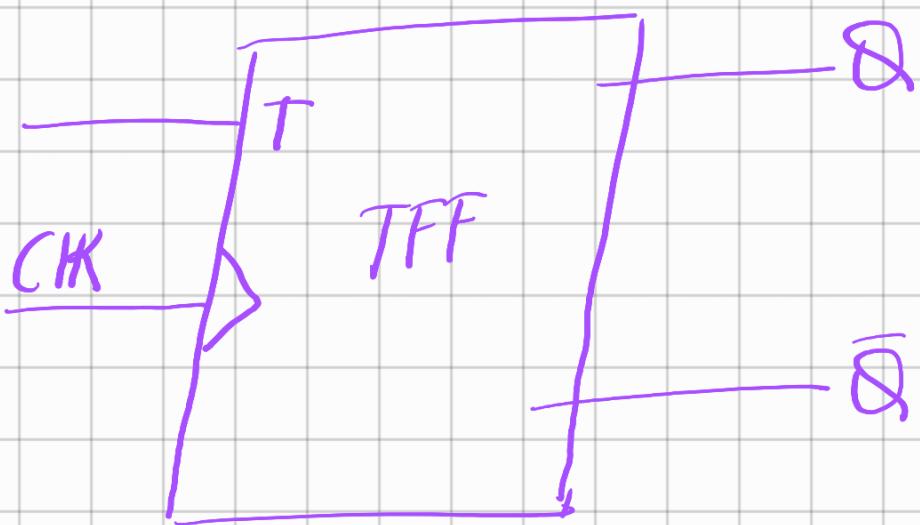
$$Q(t+1) = Q(t) \cdot K(t) + \bar{Q}(t) J(t)$$

$$\hookrightarrow yK' + jy'$$

piri	J	K	R	$J_{00} t$	$G(t, j)$	$(t+1)$
00	0	0	1	0	Q	Q
01	0	1	0	1	Q	Q
10	1	0	0	0	Q	Q
11	1	1	0	1	Q	Q



T-FF (toggle)

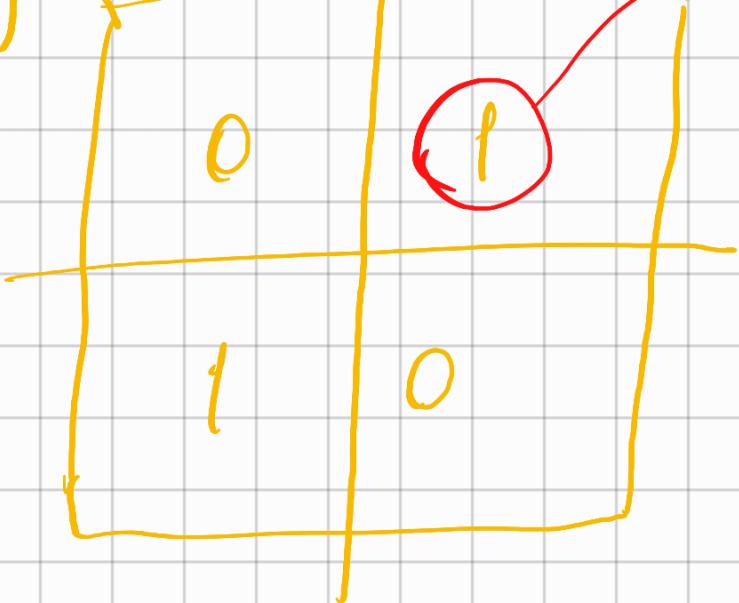


$$\boxed{Q(t+1) \rightarrow Q(t) \oplus T(t)}$$

$$Y = y \oplus T$$



$$y \xrightarrow{T} Y$$



$$Y = Ty' + T'y$$

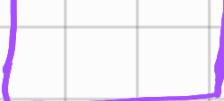
$$Y = T \oplus y$$

$$\overline{Y} = \overline{D}$$



$Q$

D-FF



JK-FF

CLK A purple square wave representing the clock signal.

J

K

Q

$\bar{Q}$

$$y = Jy' + K'y$$

giriş

JK

çıkış

Q

00

Q

01

0

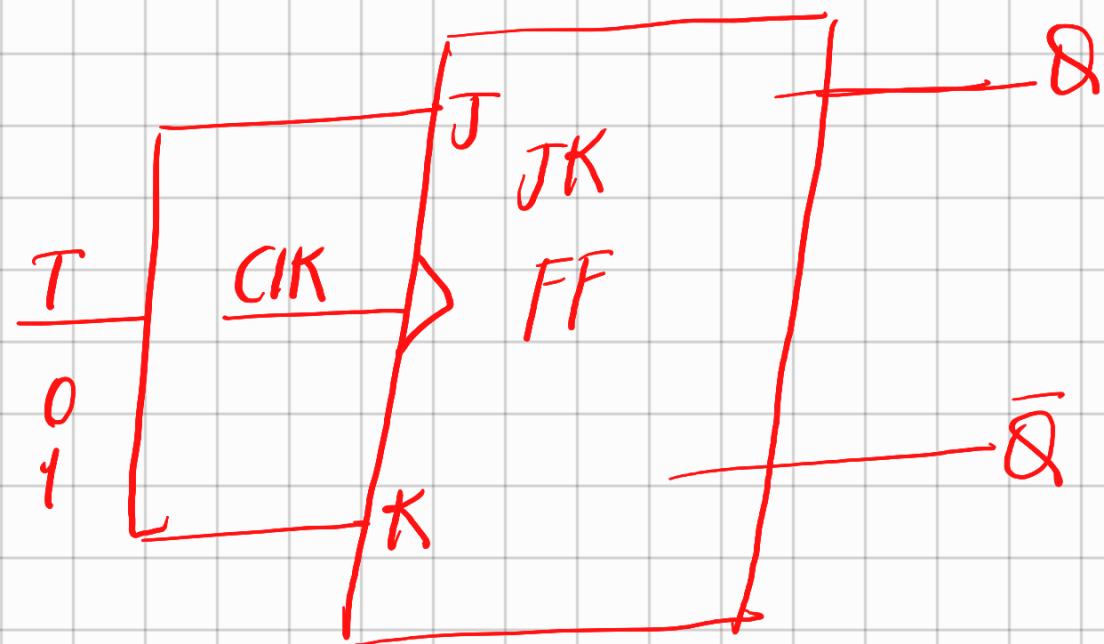
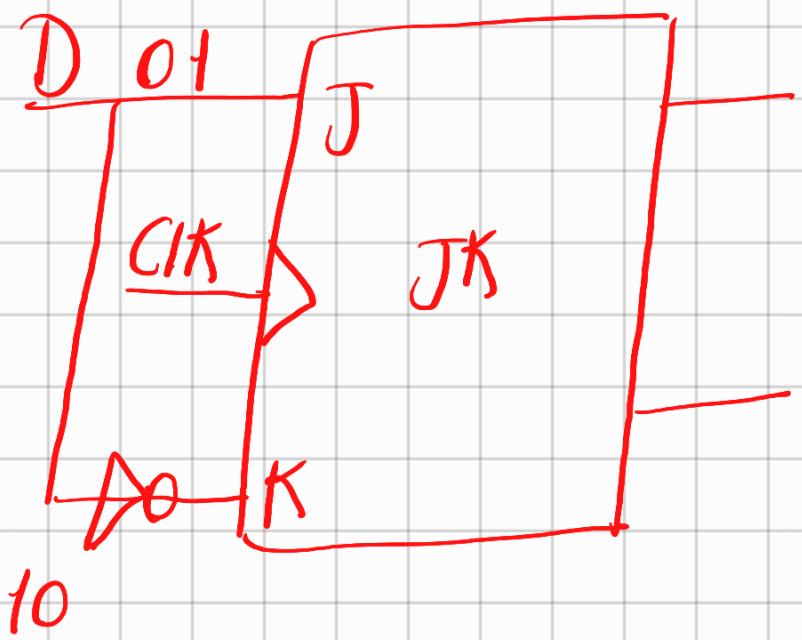
10

1

11

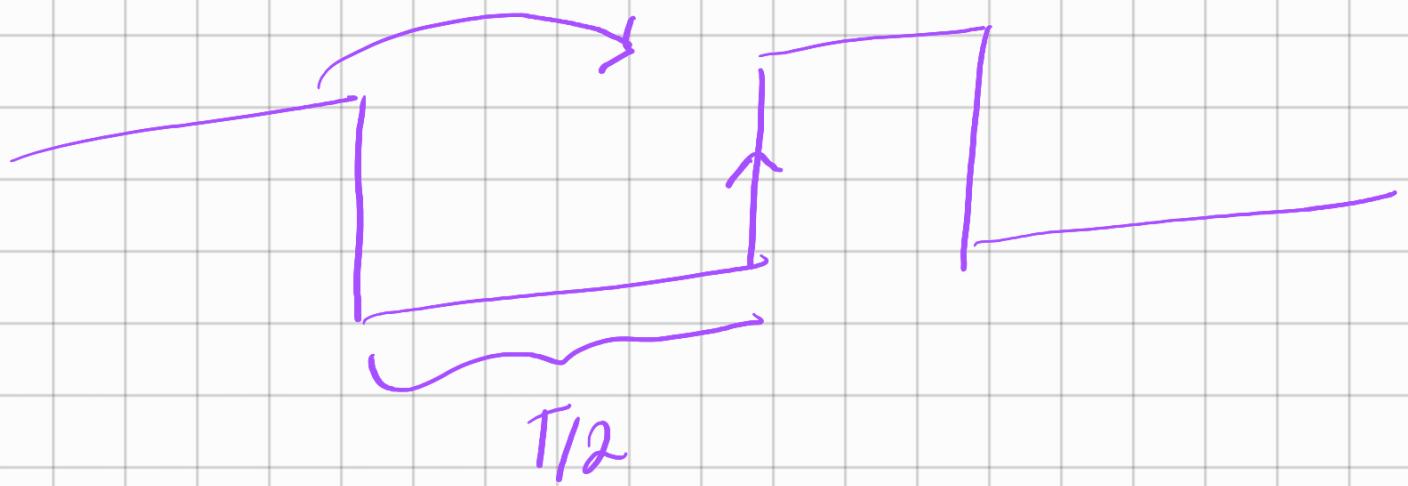
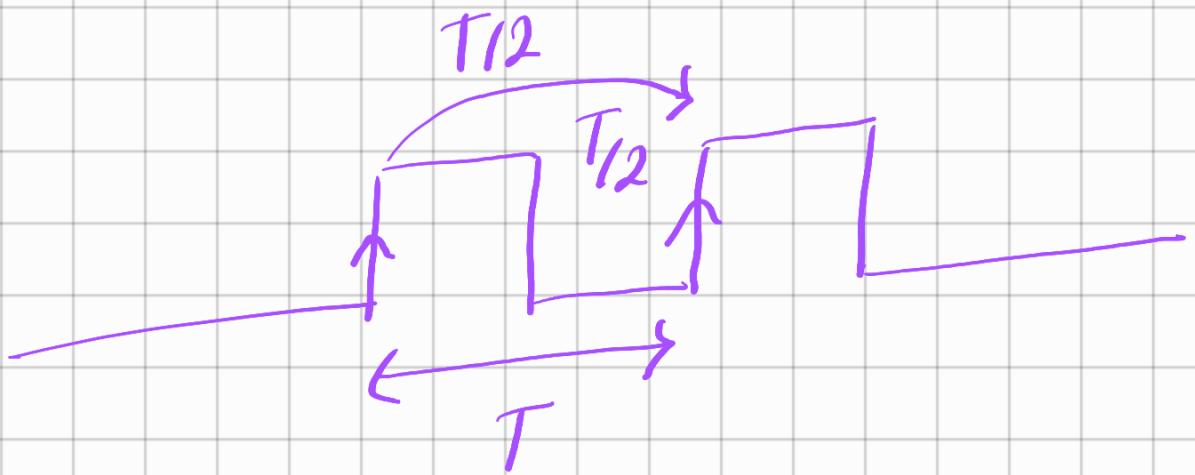
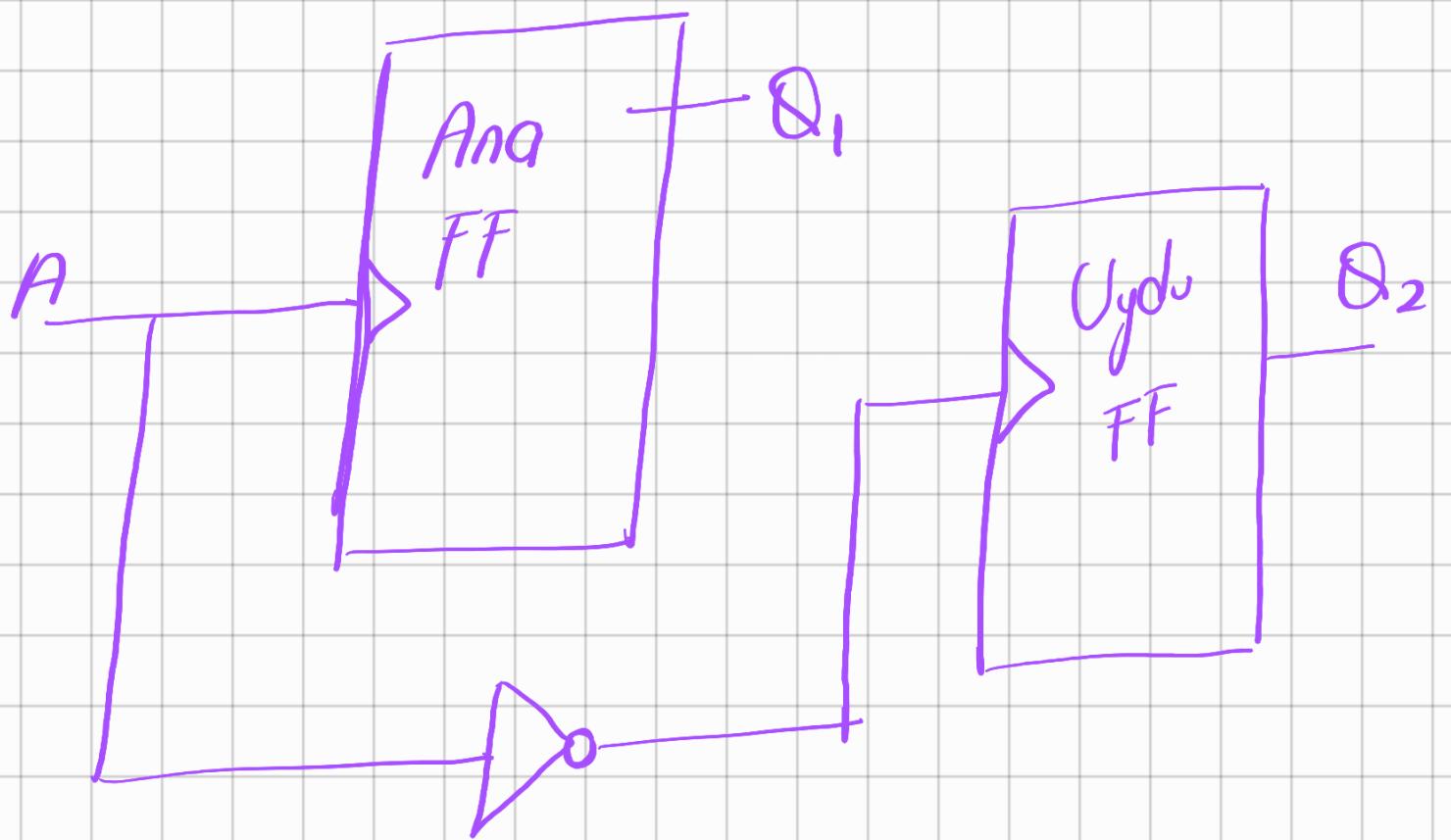
Q̅

Örnek  $\rightarrow$  JK-FF T ve D tipi FF yapmak mümkün müdür?



Ano Uydu FF

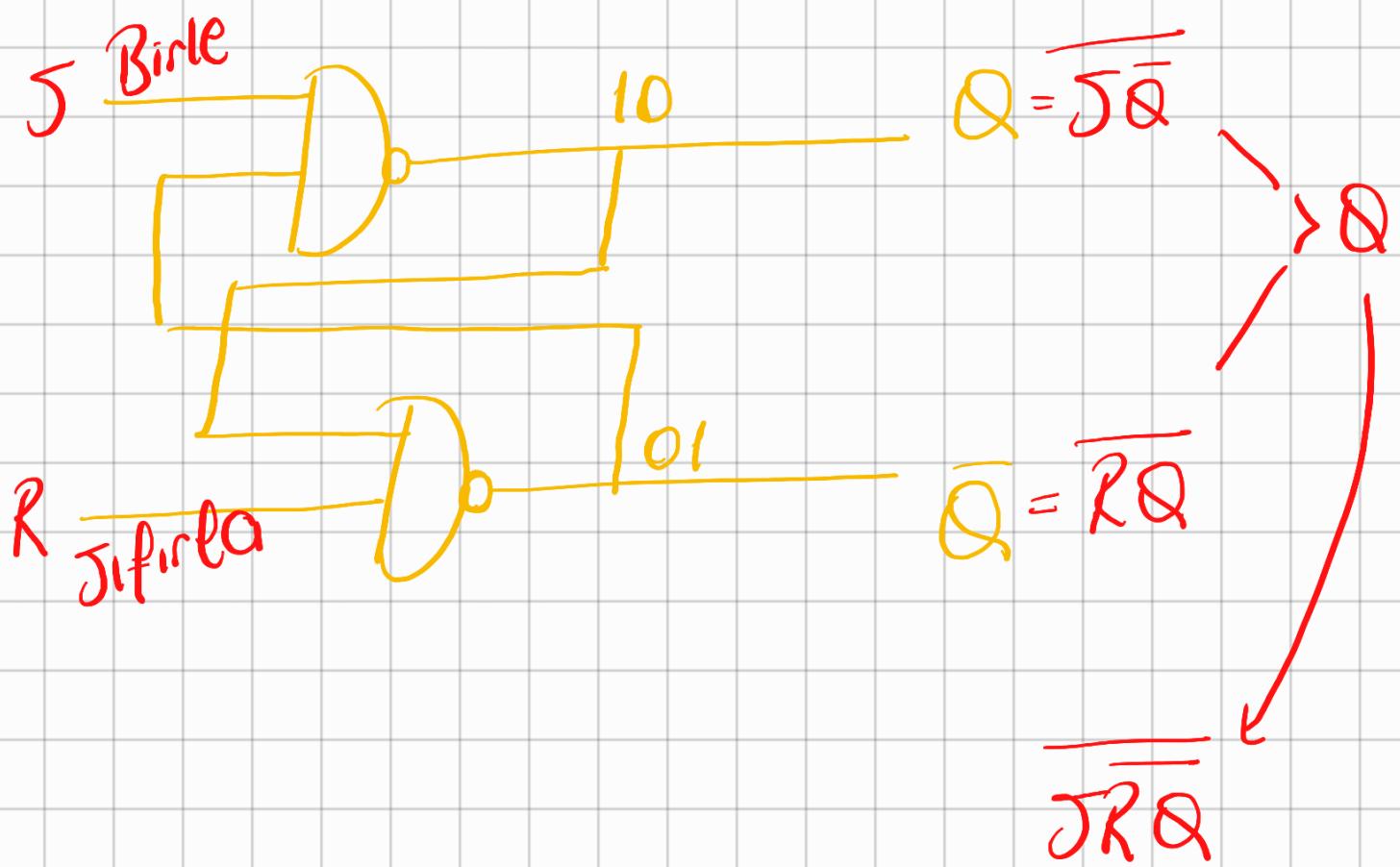




$$T = 1/F$$

$$T_{1/2} = 1/T_{1/2} = 2F$$

Efectuador (latches)



$$\overline{Q(t) = 1 \text{ ije}}$$

$$JR = 00$$

$$JR = 01$$

$$JR = 10$$

$$Q(t+1) = \tan(\omega_1 t)$$

$$Q(t+1) = 0$$

$$Q(t+1) = 1$$

$JR = 10$  $Q(t+1) = 1$  $JR = 11$  $Q(t+1) = Q(t) = 1$  $\underbrace{Q(t) = 0 \text{ ije}}$  $JR = 00$  $Q(t+1) = \text{fonksiyon}$  $JR = 01$  $Q(t+1) = 0$  $JR = 10$  $Q(t+1) = 1$  $JR = 11$  $Q(t+1) = Q(t) = 0$ 

flip flopların harıçanıde latchesi  
de kulanılır

① Ardışılı Derre Analiz yöntemleri  
inceleme Süreci

① FF (Durum soklama brimleri)  
- Durre cikislarina Ait  
- Isecepe 10

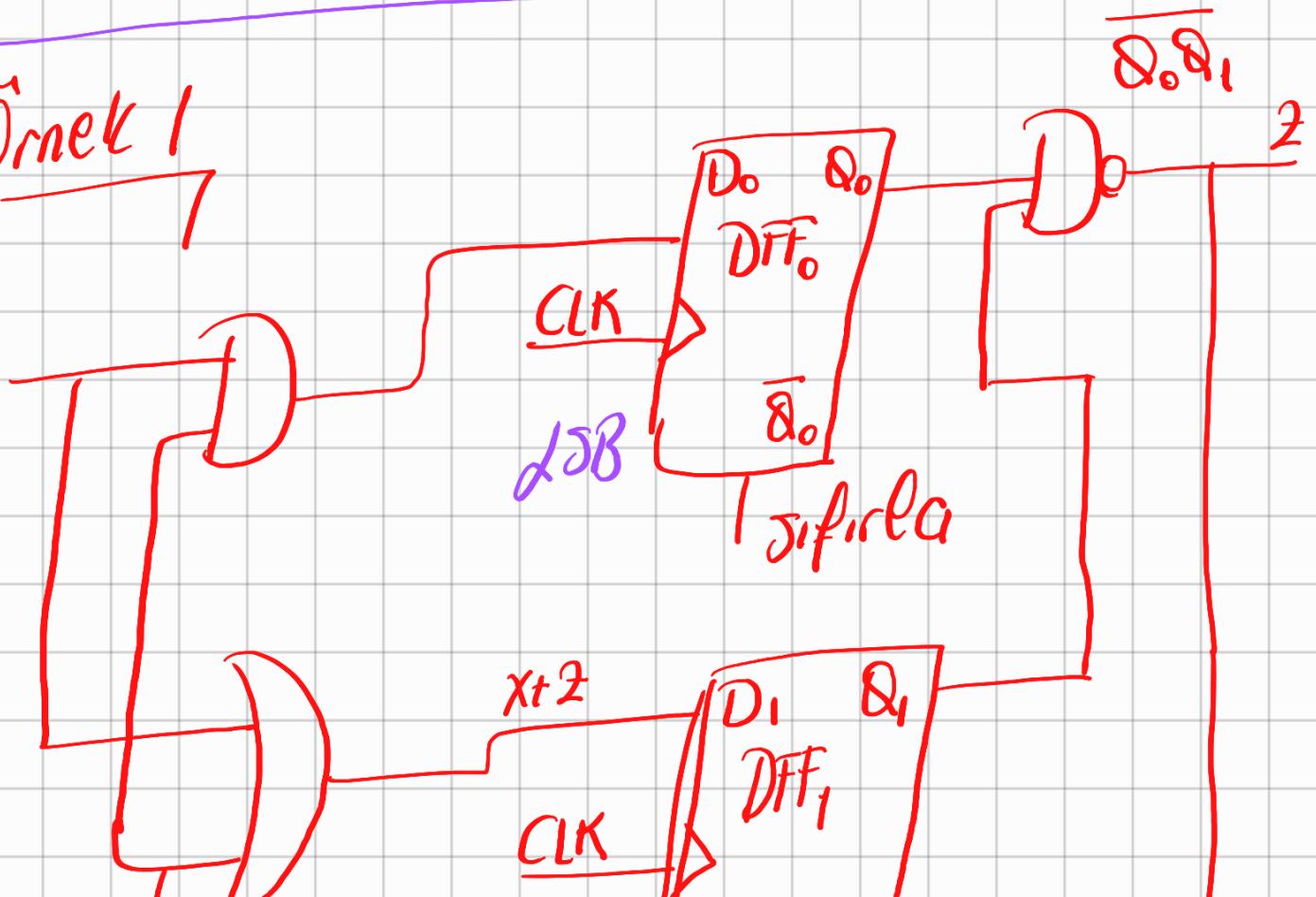
ve devre  
boole fonksiyonları devreye  
bölerek yazılırlar

② FF(ds) geçiş fonksiyonları  
kullanarak bir son-  
raki durum fonksiyonları  
elde edilir

③ Durum tablosu oluşturular

④ Durum diyagramı çizilir

Örnek 1





$$D_o = X_1 Z = X_1 (\bar{Q}_1, Q_o)$$

$$D_i = X + Z = X + (\bar{Q}_1, \bar{Q}_o)$$

$$Z = (\bar{Q}_1, \bar{Q}_o)$$

Jimpedel durum | Jimdiki durumlar

	$\bar{Q}_1$	$Q_o$	$Q_o$
$d_0$	0	0	0
$d_1$	0	1	1
$d_2$	1	0	0
$d_3$	1	1	1

(t+1)

Bir sonraki  
durumlar

FF périodları

$x=0$

$x=1$

$X=0$	$X=1$	$X=0$	$X=1$
$D_1 D_0$	$D_1 D_0$	$Q_1^+ Q_0^+$	$Q_1^+ Q_0^+$
10	11	10	11
10	11	10	11
10	11	10	11
00	10	00	10

$$Y = D$$

$G_{1k1j}$
1
1
1
0

$(y)_t$

Zimdiki  
durum

$d_0$

$d_1$

$Y(t+1)$

Bir sonraki  
durum

$d_2$

$d_3$

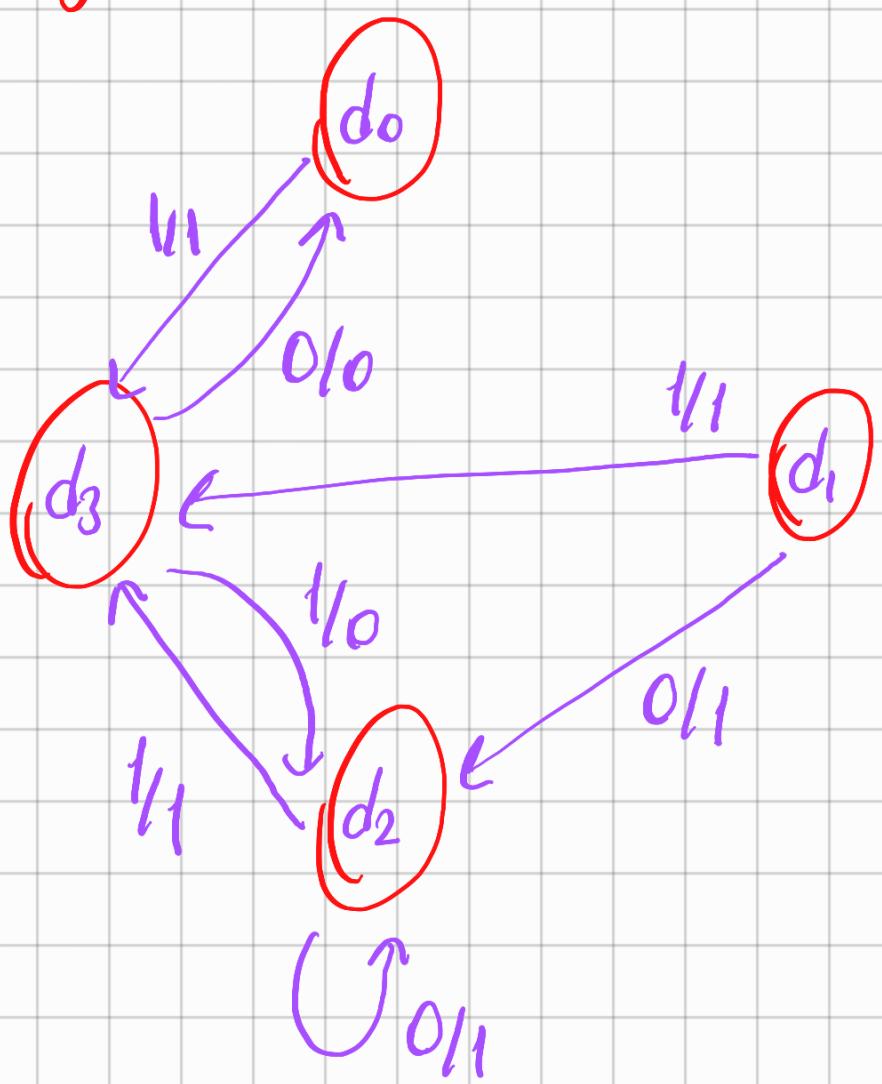
$G_{1k1j}$   
2

1

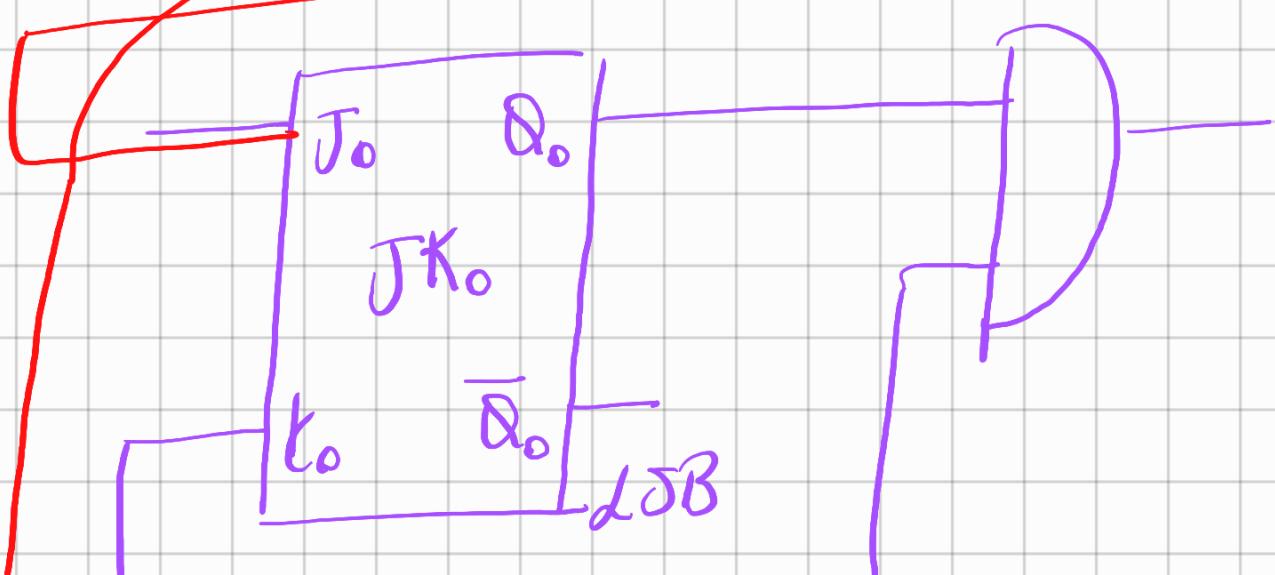
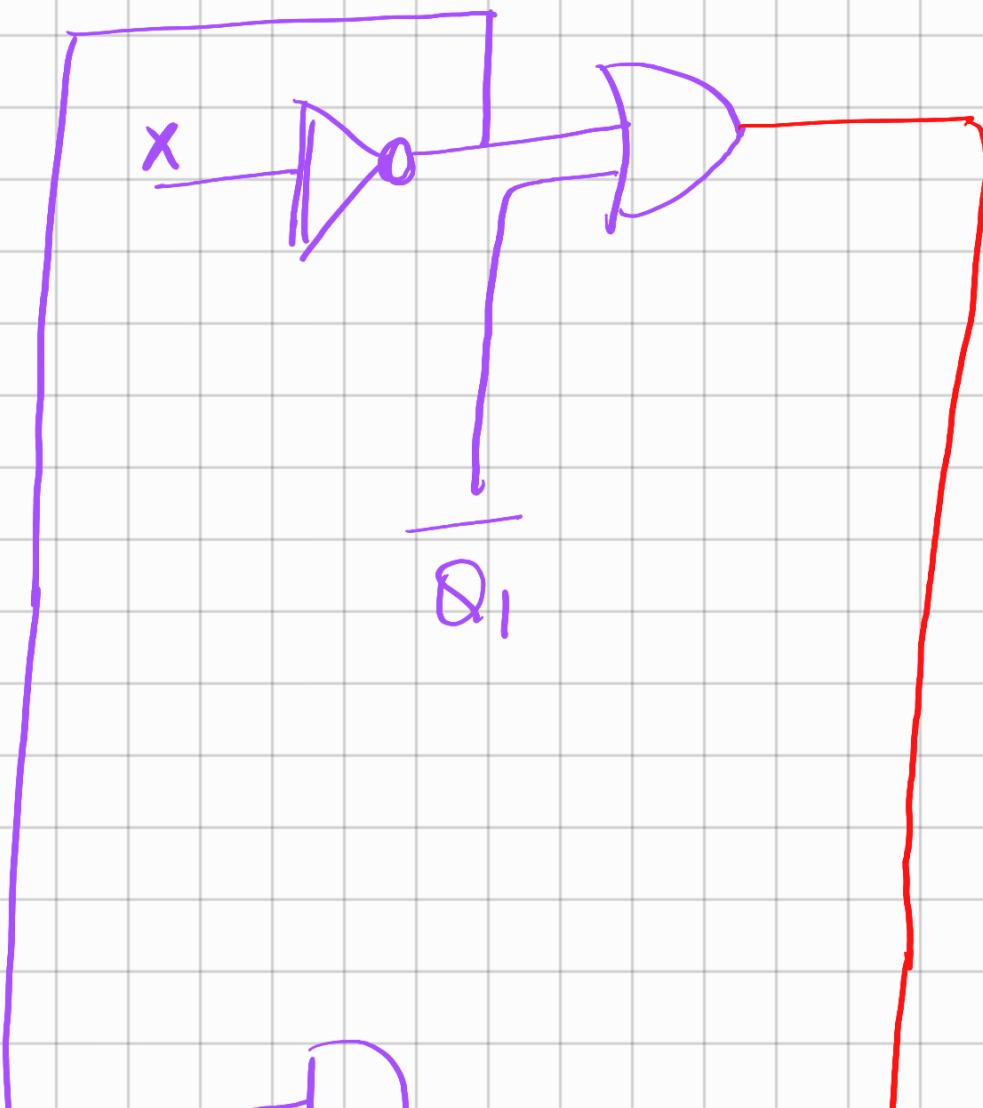
1

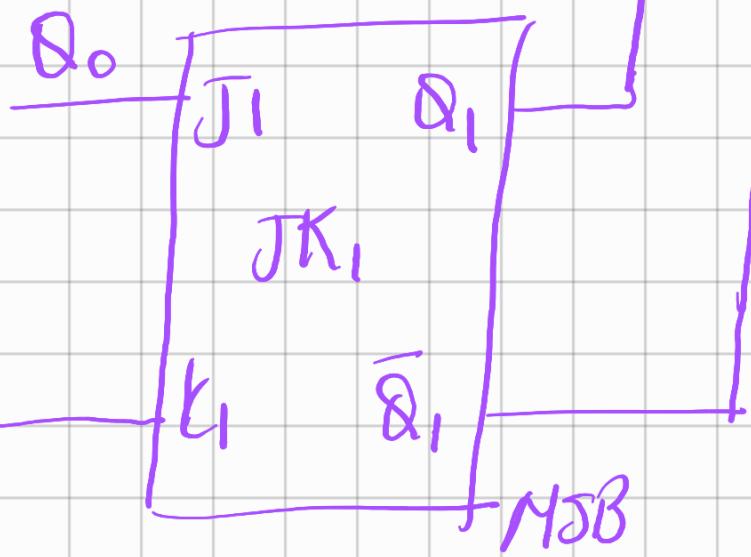
$d_1$	$d_2$	$d_3$	$d_1$	$d_2$	$d_3$	$d_1$	$d_2$	$d_3$	$d_1$
$d_2$	$d_3$	$d_1$	$d_2$	$d_3$	$d_1$	$d_2$	$d_3$	$d_1$	$d_2$
$d_3$	$d_1$	$d_2$	$d_3$	$d_1$	$d_2$	$d_3$	$d_1$	$d_2$	$d_3$

8/4



X/4 Durum Diyagramı





2FF  $\rightarrow$  4 durum

$$J_0 = \bar{X} + \bar{Q}_1$$

$$K_0 = Q_1$$

$$J_1 = Q_0$$

$$K_1 = \bar{X} \bar{Q}_0$$

$$Z = \bar{Q}_1 Q_0$$

Jinpedel  
durum | Jin diki  
durumlar

$$Q_1 \quad Q_0$$

$d_0$	0	0
$d_1$	0	1
$d_2$	1	0
$d_3$	1	1

FF pırıtları

$x=0$

$x=1$

$J_1 K_1$	$J_0 K_0$	$J_1 K_1$	$J_0 K_0$
01	10	00	10
10	10	10	10
01	11	00	01
10	11	10	01

$y$        $(t+1)$

Bir sonraki durumlar

$x=0$

$x=1$

$Q_1$	$Q_0$	$Q_1^+$	$Q_0^+$
0	1	0	1

1	1		1	1
0	1		1	0
1	0		1	0

J K      | Bir sonraki  
durumlar

0 0	Q
0 1	0
1 0	1
1 1	$\bar{Q}$

Giriş (2) |

0
1
0
0

Q(t+1)

$y(t)$

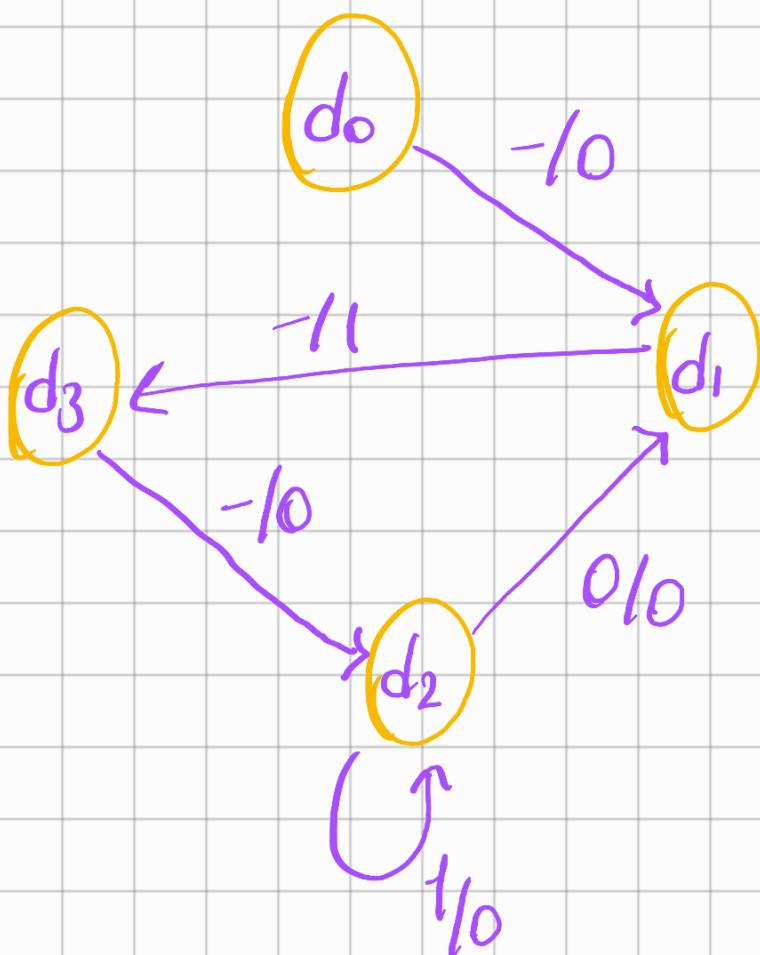
Şimdiki  
durum

$y_{\alpha(tii)}$

Gökç  
(2)

Bir sonraki  
durum  
 $x=0$        $x=1$

$d_0$	$d_1$	$d_1$	0
$d_1$	$d_3$	$d_3$	1
$d_2$	$d_1$	$d_2$	0
$d_3$	$d_2$	$d_2$	0



Durum Diyagramı

~~Do~~

