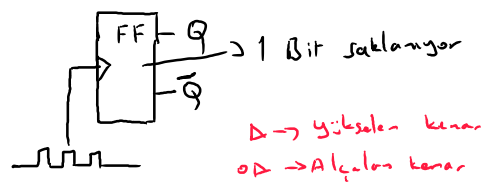


Flip - Floplar

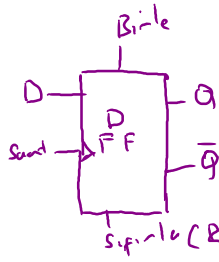


-D FF
-JK FF
-SR FF
-T FF

D Flip Flopu

Birle (SET)

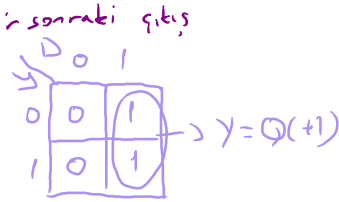
(t)



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

$$\left. \begin{array}{l} Q(t+1) = Y \\ Q(t) = y \end{array} \right\} \rightarrow \text{ile gösterilir}$$

giriş	saat	çıkışlar
D		Q, Q̄
0	[clock signal]	0, 1
1	[clock signal]	1, 0



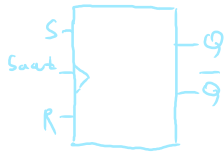
$$Y = D$$

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

y \ D	0	1
0	0	1
1	1	0

Uyarma tablosu

Set/Reset (SR) FF

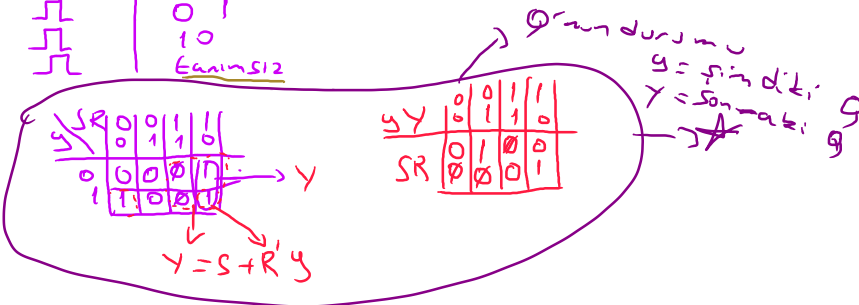


$$Q(t+1) = Q(t) \cdot R(t) + S(t)$$

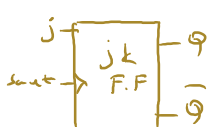
$$R(t) \cdot S(t) = 0 \text{ için tanımlı}$$

$$R(t) \cdot S(t) = 1 \text{ için tanımsız}$$

giriş	saat	çıkışlar
S, R		Q, Q̄
0, 0	[clock signal]	aynı kalır
0, 1	[clock signal]	0, 1
1, 0	[clock signal]	1, 0
1, 1	[clock signal]	tanımsız



J K F.F. → SR'in 11'inin tanımlı hali



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

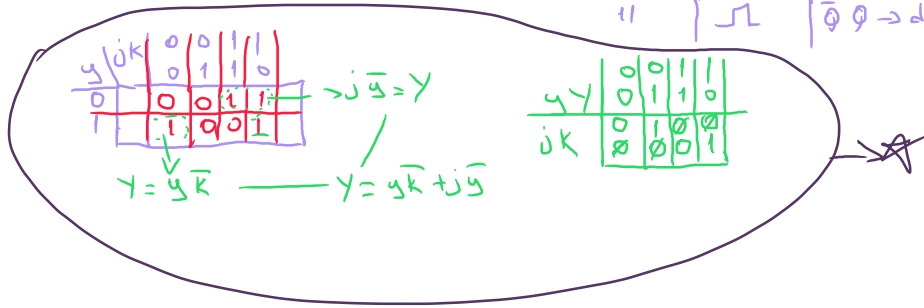
giriş	saat	çıkış
J, K		Q, Q̄
0, 0	[clock signal]	aynı kalır
0, 1	[clock signal]	0, 1
1, 0	[clock signal]	1, 0
1, 1	[clock signal]	1, 1

sonraki (t+1)

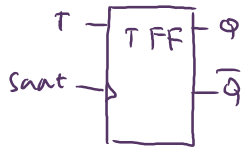
←

0 1
1 0
1 1

0 1
1 0
0 0 → deşillendir



TFF [Toggle (tersine çevirme)]



$$Q(t+1) = Q(t) \oplus T(t)$$

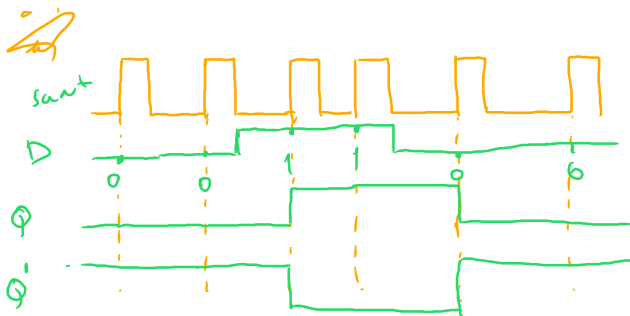
0 0 1 1
1 0 1 0
0 1 0 1

giriş T	S	çıkış Q, Q̄
0	0	Q, Q̄ → aynı
1	1	Q̄, Q → ters

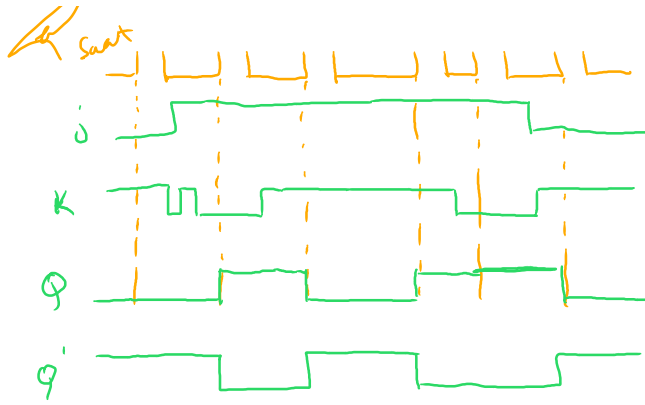
Y	T	0	1
0	0	0	1
1	1	1	0

$$Y = TQ' + T'Q$$

$$Y = T \oplus Q$$



Sant



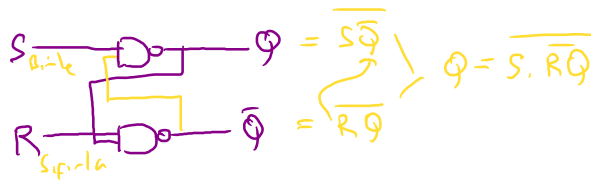
JK FF ile D ve T tipi FF yapılabilir mi?



Ara Uydu FF



Tutucular



$Q(t) = 1$ ise

$SR = 00$ $Q(t+1) = \text{tanımsız}$

$SR = 01$ $Q(t+1) = 0$

$SR = 10$ $Q(t+1) = 1$

$SR = 11$ $Q(t+1) = Q(t) = 1$

$Q(t) = 0$ ise

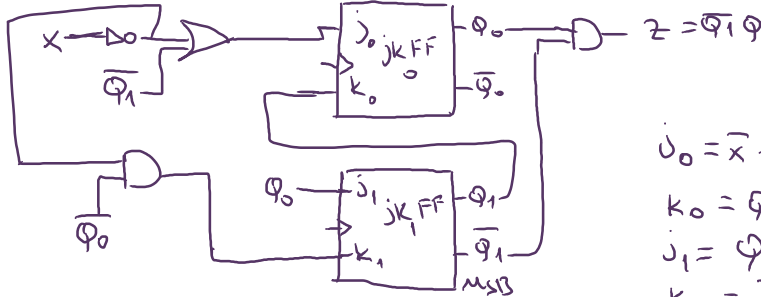
$SR = 00$ $Q(t+1) = \text{tanımsız}$

$SR = 01$ $Q(t+1) = 0$

$SR = 10$ $Q(t+1) = 1$

$SR = 11$ $Q(t+1) = 0 = Q(t)$

2



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

$$K_0 = Q_1$$

$$J_1 = Q_0$$

$$K_1 = \bar{x} \cdot \bar{Q}_0$$

F F girişleri

durumlar	y (x)		x=0				x=1				x=0				x=1				Z
	Q ₁	Q ₀	J ₀	K ₀	J ₁	K ₁	J ₀	K ₀	J ₁	K ₁	J ₀	K ₀	J ₁	K ₁	Q ₁ ⁺	Q ₀ ⁺	Q ₁ ⁺	Q ₀ ⁺	
d ₀	0	0	0	1	1	0	0	1	0	1	0	1	0	1	0	1	0	1	0
d ₁	0	1	1	0	1	0	1	0	1	0	1	0	1	1	1	1	1	1	1
d ₂	1	0	0	1	1	0	0	0	1	0	1	0	1	1	0	0	0	0	0
d ₃	1	1	1	0	1	1	0	0	1	1	0	1	1	0	1	0	0	0	0

y	x0	x1	Z
d0	d1	d1	0
d1	d3	d3	1
d2	d1	d2	0
d3	d2	d2	0

