6.3.1. JK trigger 设计同步时序电路.

A	Q_1^n	Q_0^n	Q_1^{n+1}	Q_0^{n+1}	Y
0	0	0	0	1	0
0	0	1	1	0	0
0	1	0	1	1	0
0	1	1	0	0	1
1	0	0	1	1	0
1	0	1	0	0	0
1	1	0	0	1	0
1	1	1	1	0	1

$Y = Q_1^n Q_0^n$

① $Q_1^{n+1} = \bar{A}\bar{Q_1^n}Q_0^n + \bar{A}Q_1^n\bar{Q_0^n} + A\bar{Q_1^n}\bar{Q_0^n} + AQ_1^nQ_0^n$

$= (\bar{A}Q_0^n + A\bar{Q_0^n})\bar{Q_1^n} + (\bar{A}\bar{Q_0^n} + AQ_0^n)Q_1^n$

$J_1\bar{Q_1^n} + \bar{K}_1Q_1^n$

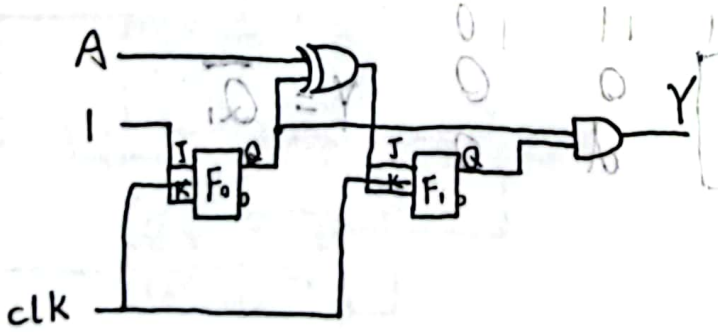
$\therefore J_1 = \bar{A}Q_0^n + A\bar{Q_0^n}$

$K_1 = \overline{\bar{A}Q_0^n} \cdot \overline{AQ_0^n} = (A+Q_0^n)(\bar{A}+\bar{Q_0^n})$

$= A\bar{Q_0^n} + \bar{A}Q_0^n = J_1$

② $Q_0^{n+1} = \bar{A}\bar{Q_1^n}\bar{Q_0^n} + \bar{A}Q_1^n\bar{Q_0^n} + A\bar{Q_1^n}\bar{Q_0^n} + AQ_1^n\bar{Q_0^n} = \bar{Q_0^n}$

$= 1\cdot\bar{Q_0^n} + 0\cdot Q_0^n \quad J_0 = 1,\ K_0 = 1$



6.3.2.

A	Q_1	Q_0	Q_1^*	Q_0^*	Y
0	0	0	d	d	d
0	0	1	0	1	1
0	1	0	1	1	0
0	1	1	0	1	0
1	0	0	1	0	1
1	0	1	0	0	1
1	1	0	1	0	0
1	1	1	d	d	d

Q_1^*

A \ Q_1Q_0	00	01	11	10
0	d	0	0	1
1	1	0	d	1

$Q_1^* = \overline{Q_0} = D_1$

$\Rightarrow D_1 = \overline{Q_0}$

Q_0^*

A \ Q_1Q_0	00	01	11	10
0	d	1	1	1
1	0	0	d	0

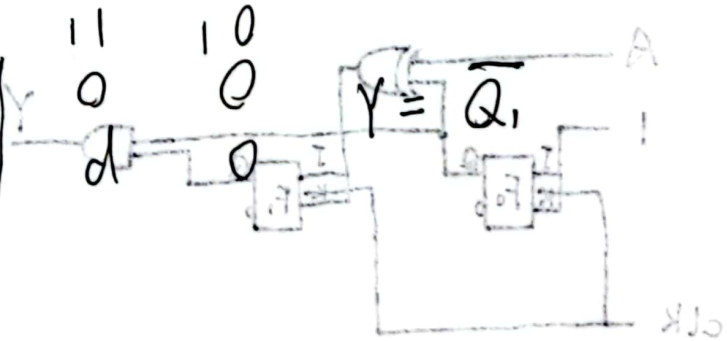
$Q_0^* = \bar{A} = D_0$

$\Rightarrow D_0 = \bar{A}$

Y

A \ Q_1Q_0	00	01	11	10
0	d	1	0	0
1	1	1	d	0

$Y = \overline{Q_1}$



6.3.3. use JK trigger

A	Q_1	Q_0	Q_1^*	Q_0^*	Y
0	0	0	0	0	0
1	0	0	0	1	0
1	0	1	0	1	0
0	0	1	1	1	0
0	1	1	1	1	1
1	1	1	1	0	1
0	1	0	0	0	0
1	1	0	1	0	1

$$Q_1^* = \bar{A}\bar{Q}_1 Q_0 + \bar{A} Q_1 Q_0 + A Q_1 Q_0 + A Q_1 \bar{Q}_0$$

$$= \bar{A} Q_0 + A Q_1 = \bar{A} Q_0 (Q_1 + \bar{Q}_1) + A Q_1$$

$$= \bar{A} Q_0 \cdot \bar{Q}_1 + (\bar{A} Q_0 + A) Q_1 = \bar{A} Q_0 \cdot \bar{Q}_1 + (A + Q_0) \cdot Q_1$$

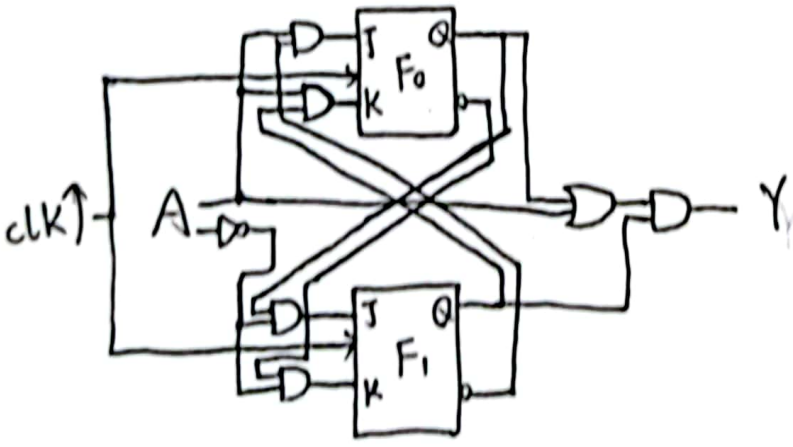
$$J_1 = \bar{A} Q_0 \cdot \quad K_1 = \overline{A + Q_0} = \bar{A}\bar{Q}_0$$

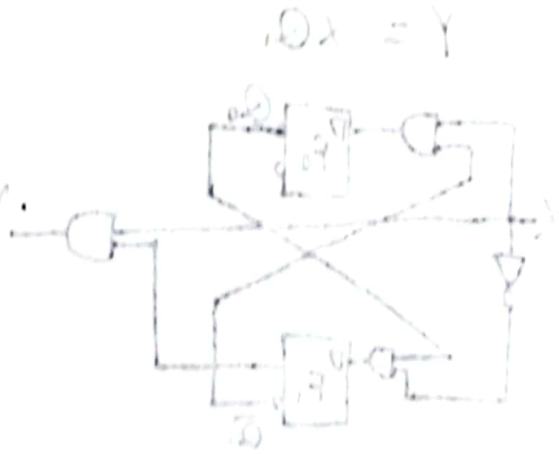
$$Q_0^* = A\bar{Q}_1 + \bar{A} Q_0 = (A\bar{Q}_1 + \bar{A}) Q_0 + A\bar{Q}_1 \bar{Q}_0$$

$$= A\bar{Q}_1 \cdot \bar{Q}_0 + (\bar{A} + \bar{Q}_1) Q_0$$

$$J_0 = A\bar{Q}_1 \cdot \quad K_0 = \overline{\bar{A} + \bar{Q}_1} = A Q_1$$

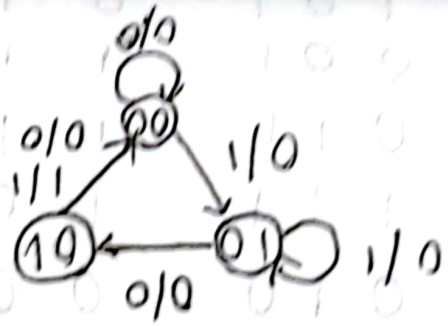
$$Y = \bar{A} Q_1 Q_0 + A Q_1 Q_0 + A Q_1 \bar{Q}_0 = Q_1 (Q_0 + A\bar{Q}_0) = Q_1 (Q_0 + A)$$





6.3.4. D trigger

	Q_0			
	S_0	S_1		
Q_1	S_2	X	$\Rightarrow$	00 01 10 11



X	Q_1	Q_0	Q_1^*	Q_0^*	Y
0	0	0	0	0	0
1	0	0	0	1	0
0	0	1	1	0	0
1	0	1	0	1	0
0	1	0	0	0	0
1	1	0	0	0	1
0	1	1	d	d	d
1	1	1	d	d	d

$$Q_1^* = \bar{x} Q_0 = D_1$$

$$Q_0^* = x\bar{Q}_1\bar{Q}_0 + x\bar{Q}_1 Q_0 = x\bar{Q}_1 = D_0$$

$$Y = xQ_1$$