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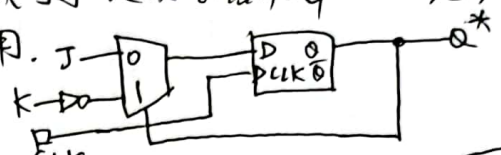
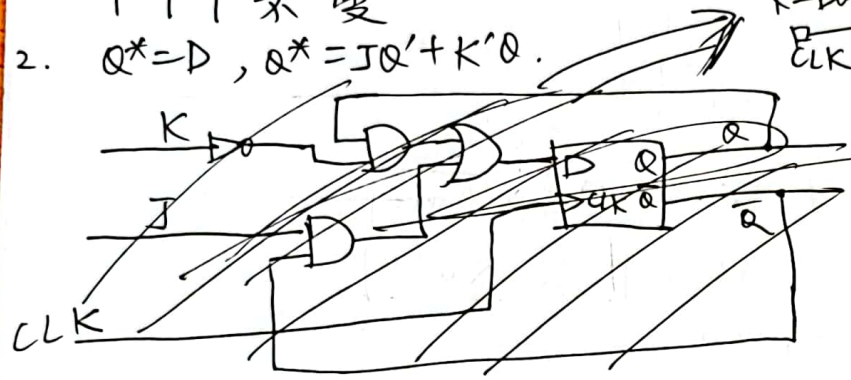
1.

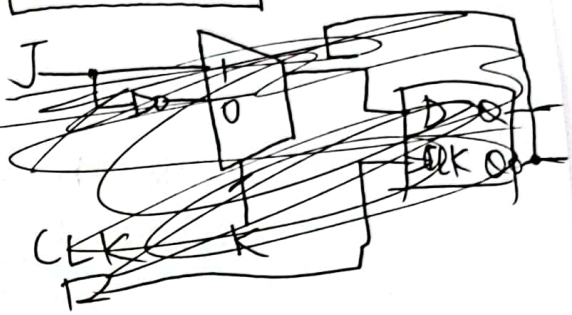
S	R	Q	$\overline{Q}$
0	0	禁止	
0	1	0	1
1	0	1	0
1	1	不变	

经观察状态表，发现可与SR锁存器状态一一对应，因此可以作为一个SR锁存器使用。



2. $Q^* = D$，$Q^* = JQ' + K'Q$.





3. (a)

S	R	Q	$\overline{Q}$
0	0	保持不变 禁止	
0	1	禁止	
1	0	禁止	
1	1	保持不变 禁止	

不能当SR锁存器用.

(b)

S	R	Q	$\overline{Q}$
0	0	禁止	
0	1	禁止	
1	0	禁止	
1	1	禁止	

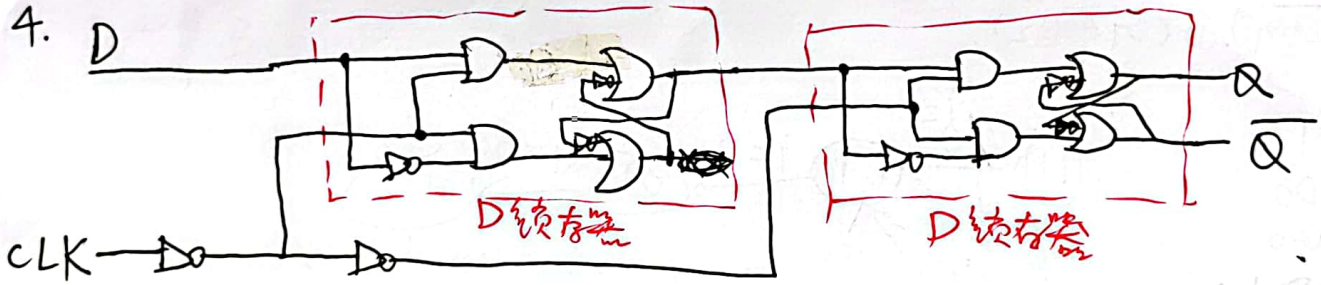
不能.

(c)

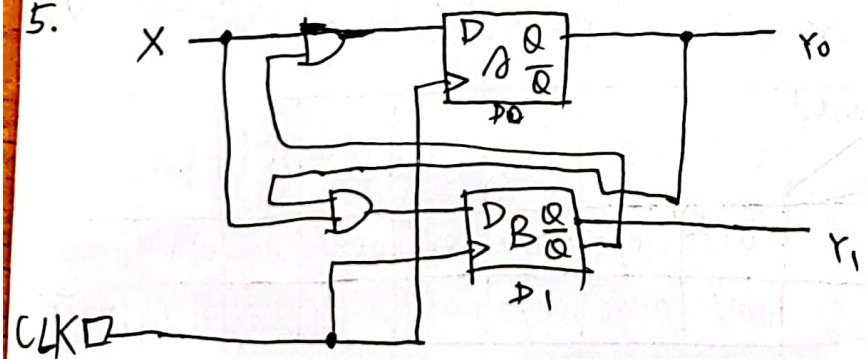
S	R	Q	$\overline{Q}$
0	0	禁止	
0	1	禁止	
1	0	禁止	
1	1	禁止	

不能.

4.



5.

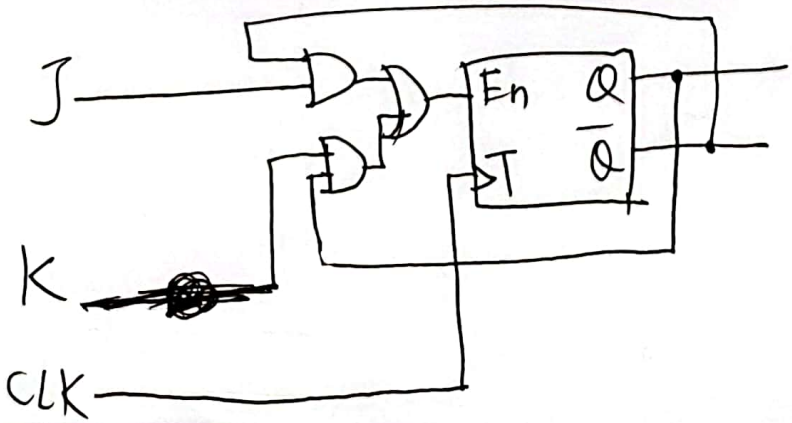


寄存器驱动 Y_1 Y_0.

$D_1 = Y_1^* = Y_0 \cdot X$

$D_0 = Y_0^* = \overline{Y_1} \cdot X$.

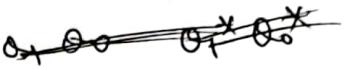
6.



$Q^* = JQ' + \overline{K}Q$.

7.

x	Q_1	Q_0	Q_1^*	Q_0^*	J	K	y
0	0	0	0	0	0	1	0
0	0	1	0	1	0	1	0
0	1	0	1	0	1	1	0
0	1	1	0	0	0	1	1
1	0	0	0	1	0	1	0
1	0	1	1	0	1	1	0
1	1	0	0	0	0	1	0
1	1	1	0	0	0	1	1



8. $Q_1(t+1) = \overline{X} \cdot Q_0(t) + X \cdot \overline{Q_0(t)}$.

$Q_2(t+1) = \overline{X} \cdot Q_1(t) + X \cdot Q_0(t)$

$y = \overline{X} \cdot \overline{Q_1(t) + Q_0(t)}$

9.

Q_0	Q_1	Q_2	Q_0^*	Q_1^*	Q_2^*	D_0	D_1	D_2	Y
0	0	0	1	0	0	1	0	0	1
0	0	1	0	0	0	0	0	0	0
0	1	0	1	0	1	1	0	1	0
0	1	1	0	0	1	0	0	1	0
1	0	0	0	1	0	0	1	0	0
1	0	1	0	1	0	0	1	0	0
1	1	0	0	0	0	0	0	0	0
1	1	1	0	0	1	0	0	1	0

9. $D_0 = (\overline{Q_0+Q_1}) \oplus (Q_1 \oplus Q_2)$.

$D_1 = Q_0$

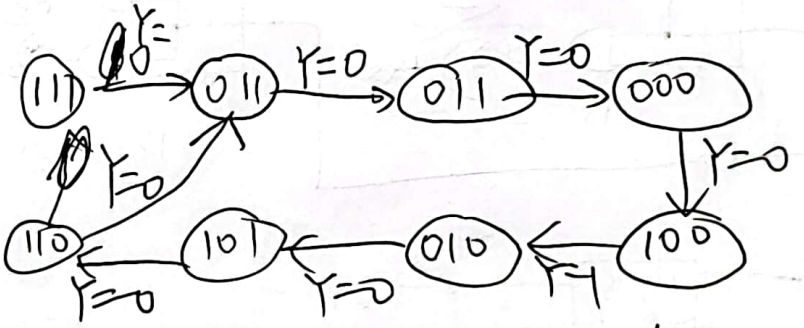
$D_2 = Q_1$.

$Q_0^* = D_0$

$Q_1^* = Q_0$

$Q_2^* = Q_1$.

$Y = Q_0\overline{Q_1}\overline{Q_2}$.



能自启动.

10. $P_1 = \overline{J}Q_2Q_3$

$P_2 = Q_2 \oplus Q_3$

$P_3 = \overline{Q_1}\overline{Q_3}$

$Y = J\overline{Q_1} + \overline{J}Q_2Q_3$.

$Q_1^* = D_1$

$Q_2^* = D_2$

$Q_3^* = D_3$

$Q_1^*Q_2^*Q_3^*$ / Y, $Q_1Q_2Q_3$	000	001	010	011	100	101	110	111
0	001/0	010/0	011/0	000/1	000/0	010/0	010/0	000/1
1	001/0	010/0	011/0	100/0	000/1	010/1	010/1	100/1

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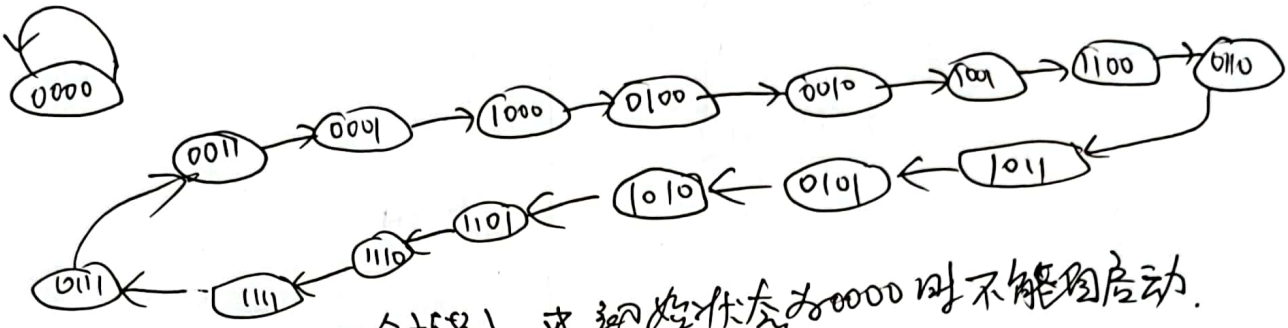
11. $Q_0^* = D_0 = Q_2 \oplus Q_3$, $Q_1^* = D_1 = Q_0$, $Q_2^* = D_2 = Q_1$, $Q_3^* = D_3 = Q_2$.



15进制（∵0000会挂起）∴初始状态为0000时不能自启动.

~~12. $Q_1^* = Y$, $Q_2^* = \overline{X} \cdot Y = Q_1$~~

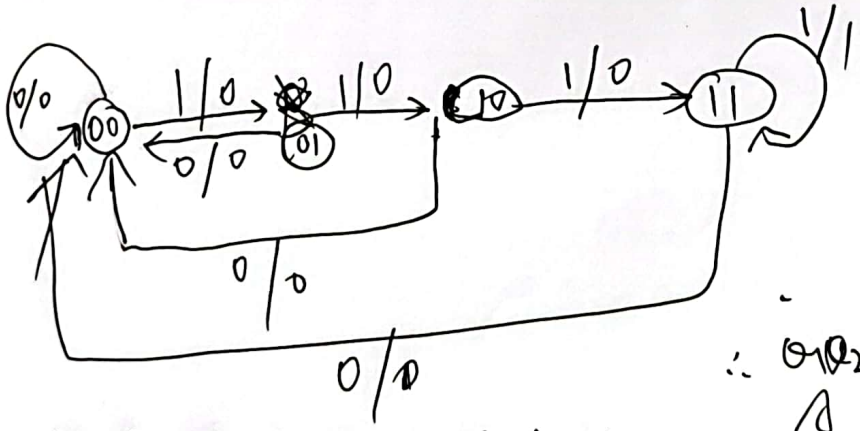
Q_1Q_2	XY=00	01	10	11	Z: X=0	X=1
00	挂0	10	00	10	1	0
01	01	11	01	11	0	0
10	10	01	10	00	1	0
11	11	00	11	01	0	0

激励表　　状态转换表

12. $En_1 = Y$, $D_1 = \overline{Q_1}$.
$En_2 = Q_1 \cdot Y \cdot \overline{X}$, $D_2 = \overline{Q_2}$.
$Z = \overline{Q_2} \cdot \overline{X}$.

Q_1Q_2	XY=00	01	10	11
A	A	C	A	C
B	B	D	B	D
C	C	B	C	A
D	D	A	D	B

13.

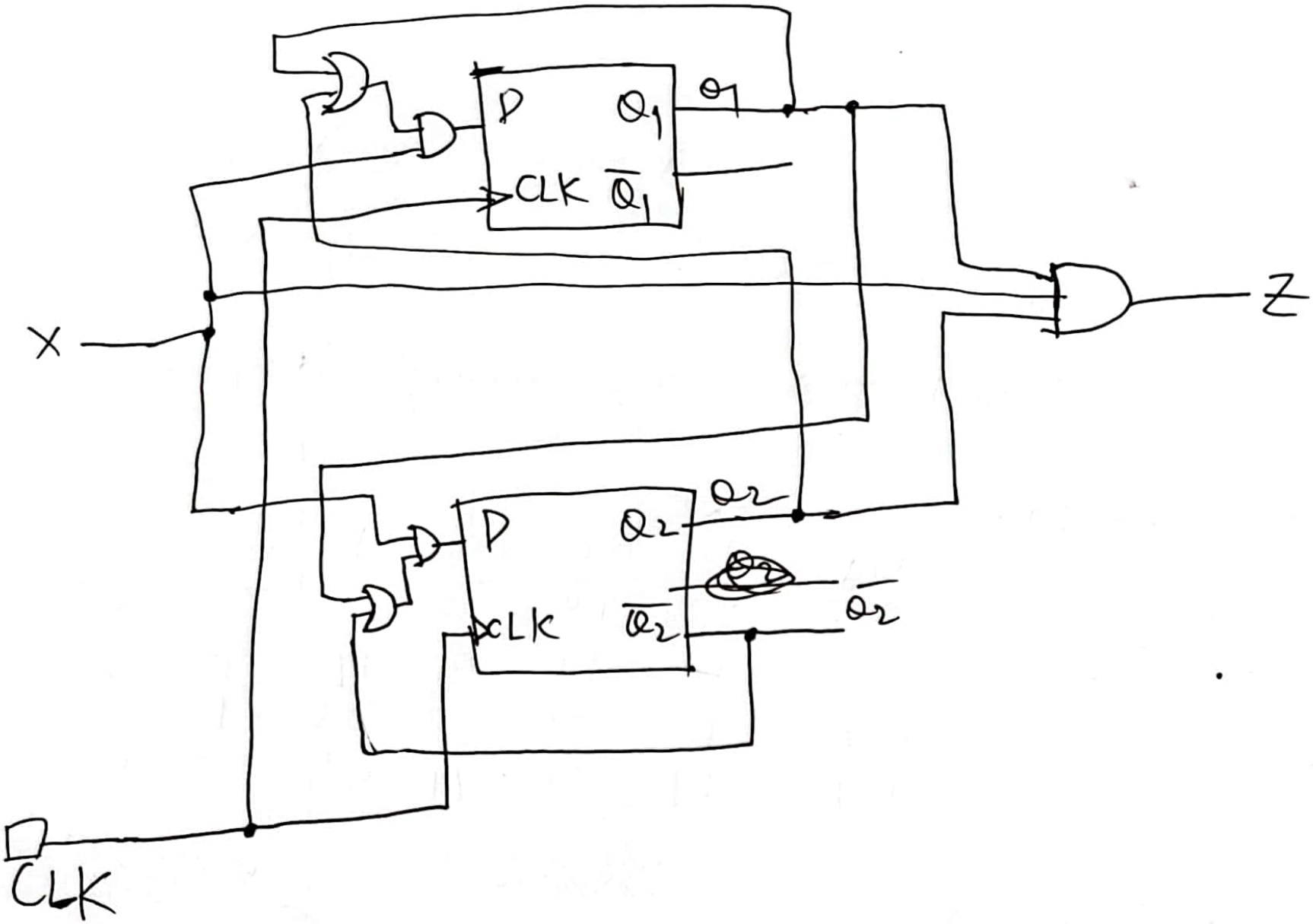


记A:00, B:01, C:10, D:11.

输入 X	0	1
Q_1Q_2	次态 $Q_1^*Q_2^*$	
A	A	B
B	A	C
C	A	D
D	A	D

$Q_1^* = X(Q_1 + Q_2)$, $Q_2^* = X(Q_1 + \overline{Q_2})$,
$Z = XQ_1Q_2$.

~~图~~ 图见下方:


D
Q_1
Q_1
CLK
$\overline{Q_1}$
X
Z
D
Q_2
Q_2
CLK
$\overline{Q_2}$
$\overline{Q_2}$
CLK