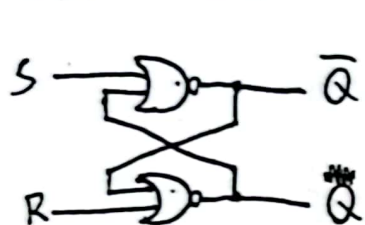


习题 P45 3.1 $SR \rightarrow Q$



SR	Q^{n+1}	\bar{Q}^{n+1}
00	Q^n	\bar{Q}^n
01	0	1
10	1	0
11	0	0 无效

$$Q^{n+1} = S + \bar{R}Q^n$$

$$\text{且 } \bar{S} + \bar{R} = 1$$



1. 初始 $Q=0$ 由 $S=1$ 置 1

2. 保持 1

3. 初始 $Q=1$ 由 $R=1$ 置 0

4. 保持 0

5. 置 0



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

3.5. D 触发器的输出 Q

$$10\bar{0} + 2 = 102$$
$$\bar{L} = \bar{q} + \bar{e} \bar{L}$$

The timing diagram shows three signals over time:

- CLK (Clock):** A periodic square wave.
- D (Data):** A signal that changes at various points in time.
- Q (Output):** A signal that remains low until the first rising edge of CLK, where it transitions to high. It remains high for the rest of the duration shown.

CLK 由 0 \rightarrow 1 時:

Q置为0

CLK 由 1 \rightarrow 0 时:

stay static

3.3 锁存器

D	C	Q	\bar{Q}
0	0	X	X
0	1	0	1
1	0	X	X
1	1	1	0

对子

Handwritten:

3.10 . JK :

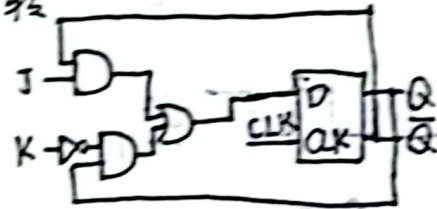
CLK	J	K	Q^{n+1}
1	0	0	Q^n 保持
1	1	0	1
1	0	1	0
1	1	1	$\overline{Q^n}$ 翻转

$$Q^{n+1} = J\overline{Q^n} + \overline{K}Q^n$$

D:

CLK	D	Q^{n+1}
1	1	1 $Q^{n+1} = D$
1	0	0

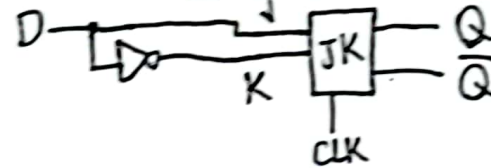
① D trigger 构造 JK trigger :



$$Q^{n+1} = D = J\overline{Q^n} + \overline{K}Q^n$$

$J\overline{Q^n} + \overline{K}Q^n$ 传入 D . 实现 .

② JK trigger 构造 D trigger :

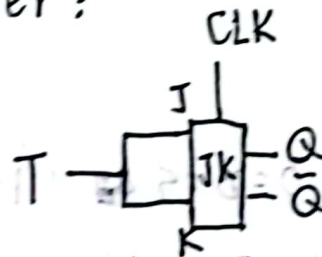


$$J = D, K = \overline{D}$$

if $D = 1$: $J = 1, K = 0, Q^{n+1} = 1$
 else : $J = 0, K = 1, Q^{n+1} = 0$
 $\therefore Q^{n+1} = D$. 实现 .

③ JK trigger 构造 T trigger :

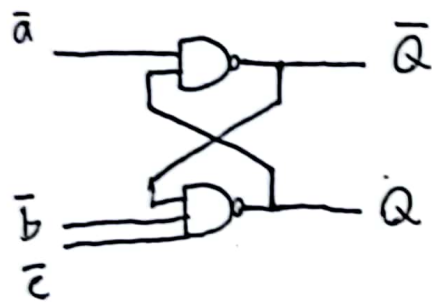
T	Q^{n+1}
0	Q^n 保持
1	$\overline{Q^n}$ 翻转



$$J = K = T$$

if $T = 0$: $J = K = 0$, 保持 .
 else : $J = K = 1$, 翻转 .

2.



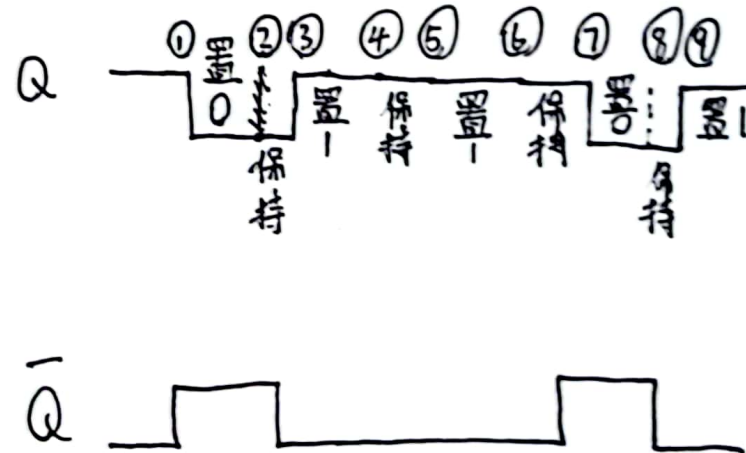
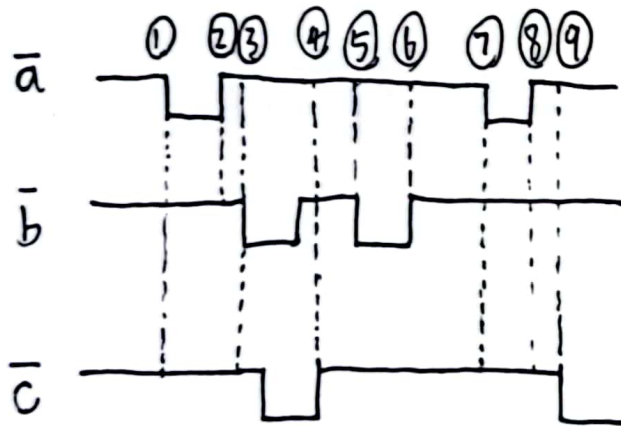
$\bar{a}\bar{b}\bar{c}$	Q^{n+1}	$\overline{Q^{n+1}}$
000	1	0
001	1	0
010	1	0
011	0	1
100	1	0
101	1	0
110	1	0
111	Q^n	$\overline{Q^n}$

特征方程:

$$Q^{n+1} = b + c + \bar{a}Q^n$$

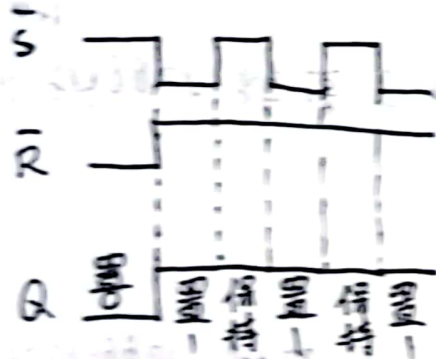
约束条件: ~~$\bar{a} + \bar{b} + \bar{c} = 1$~~

$$\bar{a} + \bar{b}\bar{c} = 1$$



3. $\bar{S}\bar{R}$ 锁存器: $Q^{n+1} = \overline{\overline{Q^n} \cdot \bar{S}} = Q^n + S$
 $\overline{Q^{n+1}} = \overline{\overline{Q^n} \cdot \bar{R}} = Q^n + R$

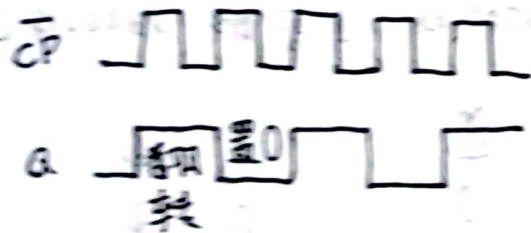
工作原理: 在 $\bar{S} = \bar{R} = 1$, 即 $S = R = 0$ 时: $Q^{n+1} = Q^n$, $\overline{Q^{n+1}} = \overline{Q^n}$, 保持稳定, 防抖动.



→ 去抖动结果.

4. JK: \overline{CP} 仅在上沿起作用.

① 初时 $Q=0$ $\bar{Q}=1$, 翻转



② $JK = 01$, 置 0

③ $JK = 11$, 翻转

\overline{CP} 仅在上沿起作用.

$J = Q^n$



④ $Q=0$, $JK=01$, 置 0
一直置 0.