

时序逻辑作业

刘哲晗 24371277

一、

1. 组合逻辑电路、储存电路

2. $R_D S_D = 0$

3. $Q_{n+1} = JQ_n + \overline{K}Q_n$

4. $Q_{n+1} = D$

5. 同步时序、异步时序

6. N

7. 反馈复位法、预置法

8. 100

9. 256

10. SR触发器、JK触发器、D触发器

二、

1. C

2. B

3. B

4. D

5. C

6. A

7. D

8. B

9. B

10. A

三

先看是何种触发器，再微调。

脚标为n 目前状态

1、

$$1. (1) \quad D_1 = \overline{Q_3^n} \quad D_2 = Q_1^n \quad D_3 = Q_1^n Q_2^n$$

代入D触发器方程: $Q^{n+1} = D \ (CP=1)$ $Q^{n+1} = \overline{Q} \ (CP=0)$.

得状态: $Q_1^{n+1} = \overline{Q_3^n}$ $\cancel{Q_2^{n+1} = \overline{Q_1^{n+1}}} \quad \cancel{Q_3^{n+1} = Q_1^{n+1} \cdot Q_2^n}$

$$Q_2^{n+1} = Q_1^n \quad Q_3^{n+1} = Q_1^n \cdot Q_2^n$$

$$C = \overline{Q_1^n \cdot Q_3^n}$$

$$(2) \quad Q_3^n \quad Q_2^n \quad Q_1^n \quad Q_3^{n+1} \quad Q_2^{n+1} \quad Q_1^{n+1} \quad C$$

$$\checkmark \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 1 \quad 1$$

$$\checkmark \quad 0 \quad 0 \quad 1 \quad 0 \quad 1 \quad 0 \quad 1$$

$$0 \quad 1 \quad 0 \quad 0 \quad 0 \quad 1 \quad 1$$

$$\checkmark \quad 0 \quad 1 \quad 1 \quad 1 \quad 1 \quad 1 \quad 1$$

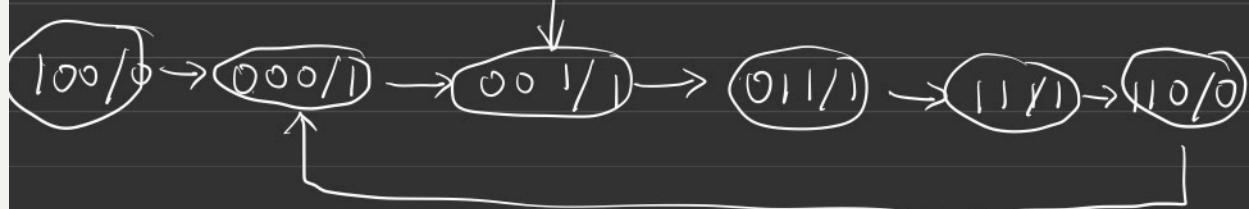
$$1 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$$

$$1 \quad 0 \quad 1 \quad 0 \quad 1 \quad 0 \quad 1$$

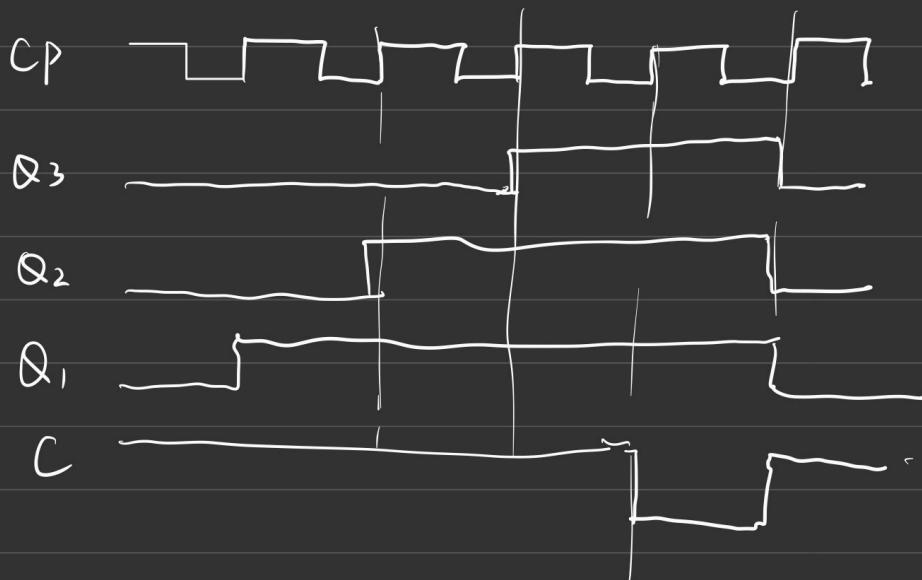
$$\checkmark \quad 1 \quad 1 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$$

$$\checkmark \quad 1 \quad 1 \quad 1 \quad 1 \quad 1 \quad 0 \quad 1$$

$$(01/1) \rightarrow (010/1) \quad Q_1 Q_2 Q_1 / C.$$

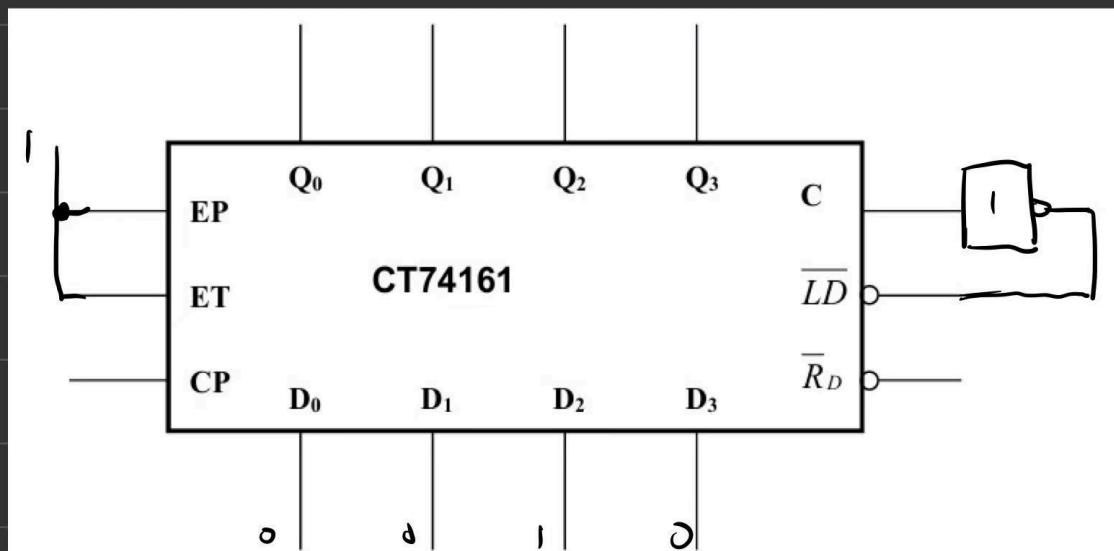


时序图 只写循环!

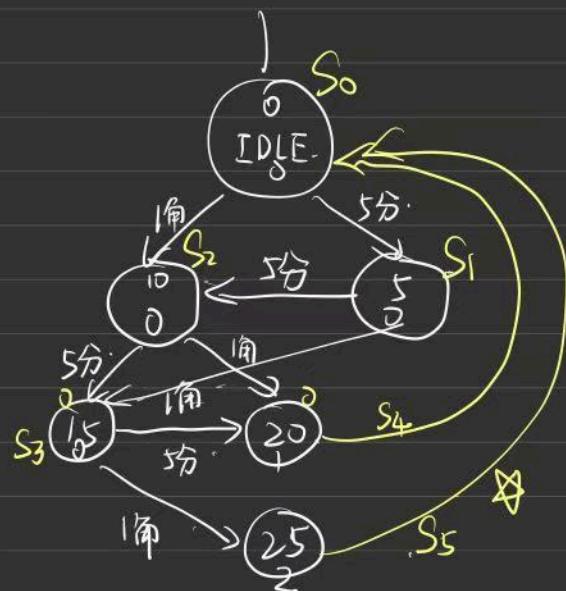


(3) 自启动功能的同步五进制加法计数器

2.



3.



状态 -

In	current S	next S'
0	0 0 0	0 0 1
1	0 0 0	0 1 0
0	0 0 1	0 1 0
1	0 0 1	0 1 1
0	0 1 0	0 1 1
1	0 1 0	1 0 0
0	0 1 1	1 0 0
1	0 1 1	1 0 1

输出逻辑

S ₂	S ₁	S ₀	Out
0	0	0	00
0	0	1	00
0	1	0	00
0	1	1	00
1	0	0	01
1	0	1	10

In	含义	S	含义 编码
0	投入5分	S ₀	未投入 000
1	1角	S ₁	5分 001
Out	含义	S ₂	1角 010
00	钱不够	S ₃	1角5分 011
01	刚好够	S ₄	2角 100
10	够找5分钱	S ₅	2角5分 101

状态转移逻辑函数表达式:

$$\begin{aligned}s'_2 &= m_5 + m_6 + m_7 = \overline{s_2} s_1 \overline{s_0} I + \overline{s_2} s_1 s_0 \overline{I} + \overline{s_2} s_1 s_0 I \\s'_1 &= m_1 + m_2 + m_3 + m_4 = \overline{s_2 s_1 s_0} I + \overline{s_2 s_1} s_0 \overline{I} + \overline{s_2 s_1} s_0 I + \overline{s_2} s_1 \overline{s_0} \overline{I} \\s'_0 &= m_0 + m_3 + m_4 + m_7 = \overline{s_2 s_1 s_0} \overline{I} + \overline{s_2 s_1} s_0 I + \overline{s_2} s_1 \overline{s_0} \overline{I} + \overline{s_2} s_1 s_0 I\end{aligned}$$