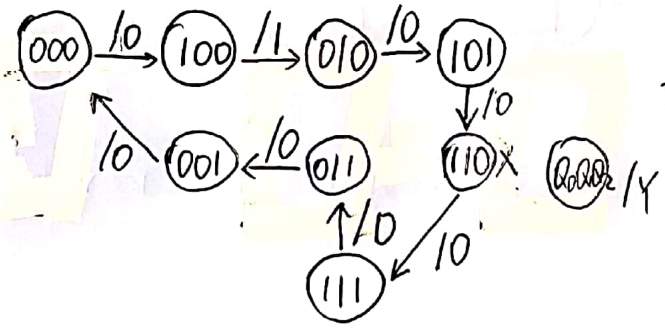
19041012 方亮 数电第六章

题6.4

驱动方程

$$\begin{cases} D_0 = (Q_0+Q_1)' \oplus (Q_1 \oplus Q_2) = Q_0Q_1'Q_2 + Q_0'Q_2' + Q_1Q_2' \\ D_1 = Q_0 \\ D_2 = Q_1 \end{cases}$$

状态方程 $\begin{cases} Q_0^* = Q_0'Q_2' + Q_0Q_1'Q_2 + Q_1Q_2' \\ Q_1^* = Q_0 \\ Q_2 = Q_1 \end{cases}$ 输出方程 $Y = Q_0Q_1'Q_2'$



故电路能够自启动

题6.10

CLK	$A_3A_2A_1A_0$	$B_3B_2B_1B_0$	CI	CO	S
0	1001	0011	0	1	0
1	0100	0001	1	1	0
2	0010	0000	1	0	1
3	1001	0000	0	0	1
4	1100	0000	0	0	0

4位被加信号：$A_3A_2A_1A_0 = 1100$

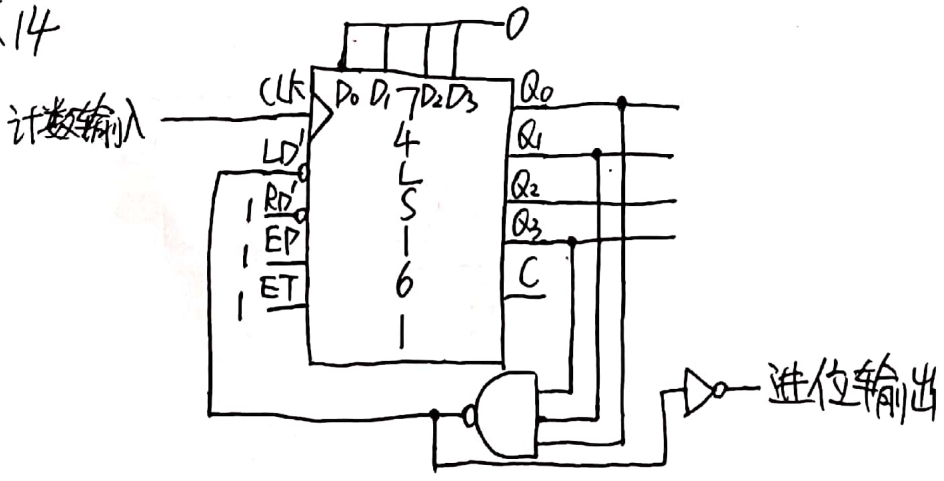
$B_3B_2B_1B_0 = 0000$

这是一个4位串行加法器电路

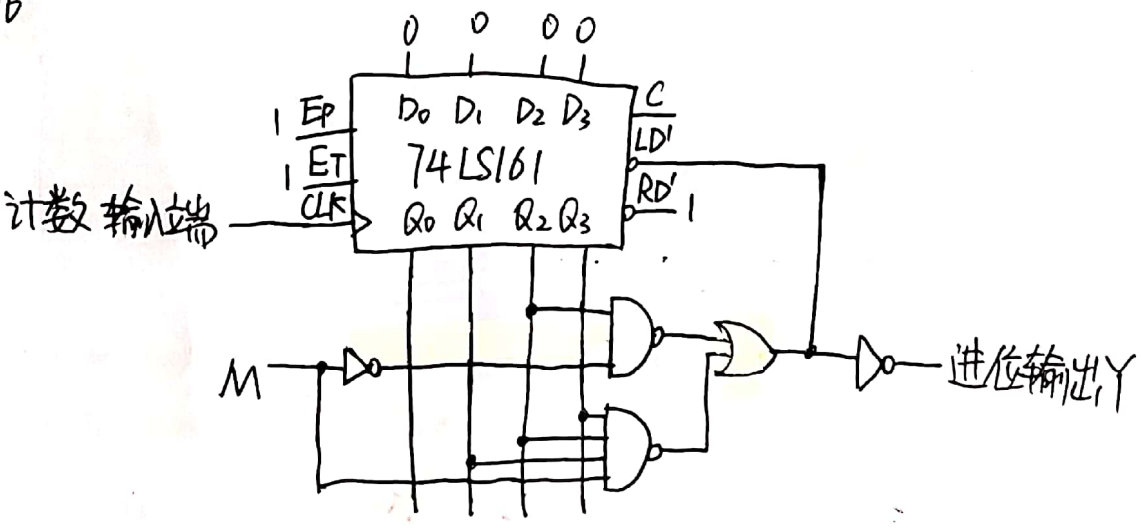
题6.12 当$Q_3=1$ $Q_1=1$ $R_D=0$异步置零，即10→0但10非稳定状态。

故只有0~9十个稳定状态，故为十进制计数器

题6.14

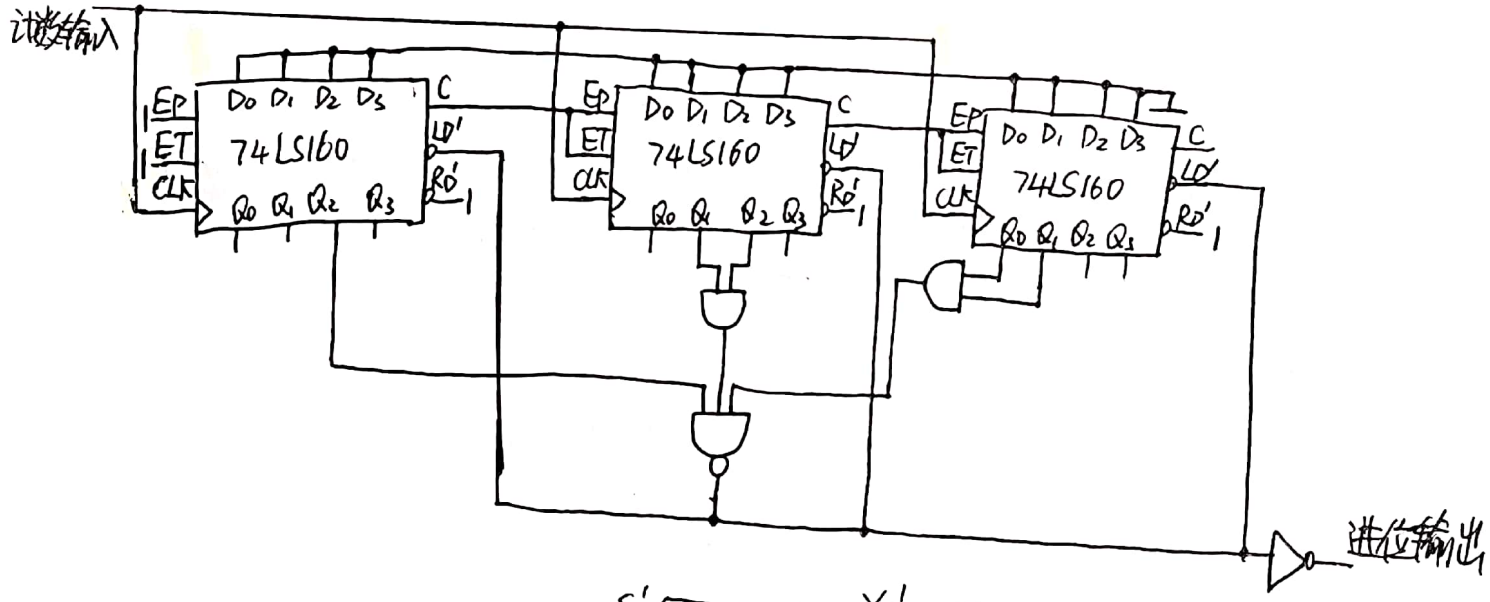


题6.16

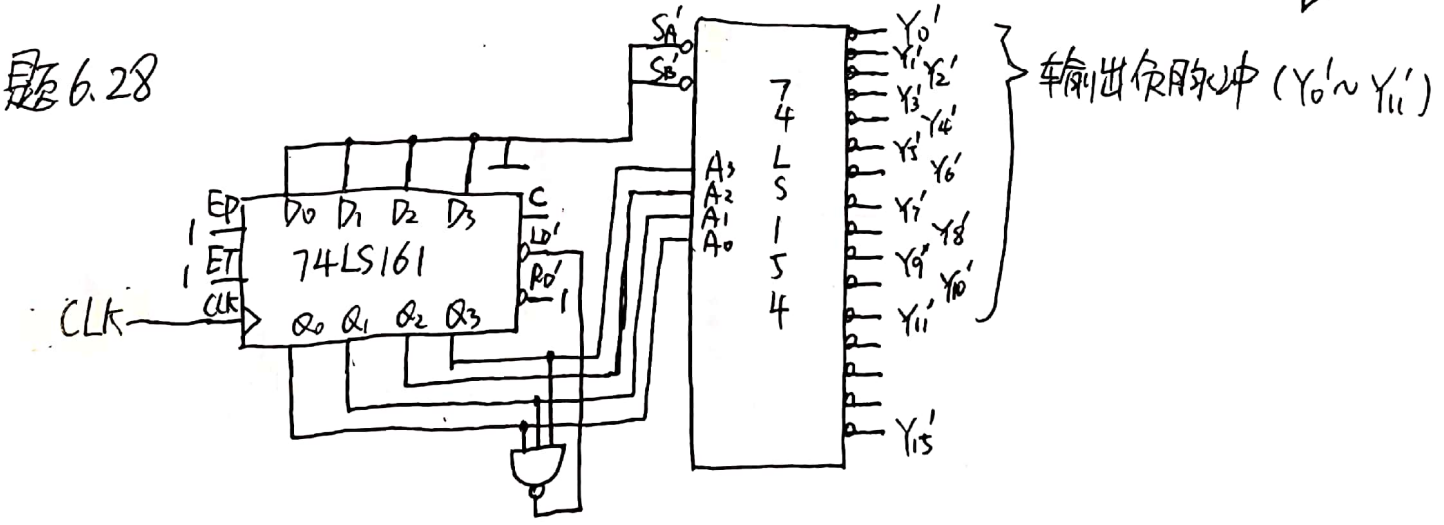


题6.20 16×5+2=82 故这是83进制计数器，两片之间是16进制

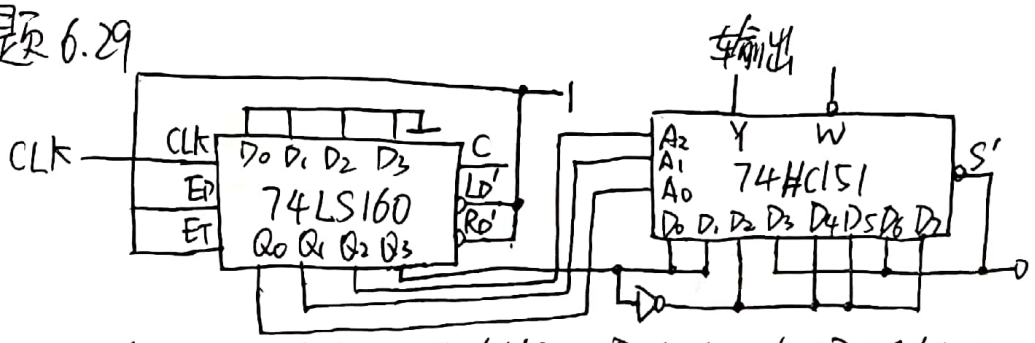
题6.22



题6.28



题6.29



$$Y=D_0(A_2'A_1'A_0')+D_1(A_2'A_1'A_0)+D_2(A_2'A_1A_0')+D_3(A_2'A_1A_0)$$
$$+D_4(A_2A_1'A_0')+D_5(A_2A_1'A_0)+D_6(A_2A_1A_0')+D_7(A_2A_1A_0)$$

若 $A_2=Q_2$, $A_1=Q_1$, $A_0=Q_0$

$$Y=Q_3'Q_2'Q_1'Q_0'+Q_3Q_2Q_1'Q_0'+Q_3'Q_2Q_1'Q_0+Q_3'Q_2Q_1Q_0+Q_3Q_2'Q_1'Q_0'+Q_3Q_2'Q_1'Q_0$$
$$=Q_3(A_2'A_1'A_0')+Q_3(A_2'A_1'A_0)+Q_3'(A_2'A_1A_0')+0(A_2'A_1A_0)$$
$$+Q_3'(A_2A_1'A_0')+Q_3'(A_2A_1'A_0)+0\cdot A_2A_1A_0'+Q_3'A_2A_1A_0$$

即 $D_0=D_1=Q_3$, $D_2=D_4=D_5=D_7=Q_3'$, $D_3=D_6=0$.

题6.30

CLK	Q_2	Q_1	Q_0	R	Y	G
0	0	0	0	0	0	0
1	0	0	1	1	0	0
2	0	1	0	0	1	0
3	0	1	1	0	0	1
4	1	0	0	1	1	1
5	1	0	1	0	0	1
6	1	1	0	0	1	0
7	1	1	1	1	0	0

$$R=Q_2'Q_1'Q_0+Q_2Q_1'Q_0'+Q_2Q_1Q_0=Q_2Q_1'Q_0'+Q_2'Q_1'Q_0+0\cdot Q_1Q_0'+Q_2Q_1Q_0$$

$D_{10}=Q_2$, $D_{11}=Q_2'$, $D_{12}=0$, $D_{13}=Q_2$, $A_{10}=Q_0$, $A_{11}=Q_1$

$$Y=Q_2'Q_1Q_0'+Q_2Q_1'Q_0'+Q_2Q_1Q_0'$$

$D_{20}=Q_2$, $D_{21}=0$, $D_{22}=1$, $D_{23}=0$, $A_{20}=Q_0$, $A_{21}=Q_1$

$$G=Q_2'Q_1Q_0+Q_2Q_1'Q_0'+Q_2Q_1'Q_0$$

$D_{30}=Q_2$, $D_{31}=Q_2$, $D_{32}=0$, $D_{33}=Q_2'$