2024春 数字电子技术基础试题　　参考解答之电路分析题　　Ver 1.0　2024.12.9

二、(15分)　　蓝笔为分析，不用写在试卷上　　基本题。

① $G_1G_0=00$：$A_2A_1A_0=00A$，

A	B	Y
0	0	0 (=D_0)
0	1	0 (=D_0)
1	0	1 (=D_1)
1	1	1 (=D_1)

$\Rightarrow Y=AB'+AB=A$

②

$G_1G_0=01$：$A_2A_1A_0=01A$，

A	B	Y
0	0	0 (=$D_2=B$)
0	1	1 (=D_2)
1	0	1 (=$D_3=B'$)
1	1	0 (=D_3)

$\Rightarrow Y=A'B+AB'=A\oplus B$

③ $G_1G_0=10$：$A_2A_1A_0=10A$，

A	B	Y
0	0	0 (=D_4)
0	1	0 (=D_4)
1	0	0 (=$D_5=B$)
1	1	1 (=D_5)

$\Rightarrow Y=AB$

④ $G_1G_0=11$：$A_2A_1A_0=11A$，

A	B	Y
0	0	0 (=$D_6=B$)
0	1	1 (=D_6)
1	0	1 (=$D_7=B'$)
1	1	0 (=D_7)

$\Rightarrow Y=A'B+AB'=A\oplus B$

三、(15分)　　主要是细心耐心，个人感觉还不错。

(1) 所有触发器的时钟输入均为同一CLK，则为同步时序逻辑。

(2) $Y_1=\Sigma m(0,3,6)=Q_2'Q_1'Q_0'+Q_2'Q_1Q_0+Q_2Q_1Q_0'$

$Y_2=\Sigma m(0,2,4,7)=Q_2'Q_1'Q_0'+Q_2Q_1'Q_0'+Q_2'Q_1Q_0'+Q_2Q_1Q_0=Q_1'Q_0'+Q_2'Q_1Q_0'+Q_2Q_1Q_0$

(3) 驱动方程：$J_0=K_0=Q_2(Q_1\odot Q_0)$　　$J_1=K_1=1$　　$J_2=Q_0+Q_1$　　$K_2=Q_0\odot Q_1$

状态方程　$Q_0^*=J_0Q_0'+K_0'Q_0=Q_0'\underbrace{[Q_2(Q_1'Q_0'+Q_1Q_0)]}_{Q_2Q_1'Q_0'}+Q_0\underbrace{[Q_2'+Q_1\odot Q_0]}_{Q_1'Q_0+Q_1Q_0}=\Sigma m(1,3,4,5)$

Q_2 \ Q_1Q_0	00	01	11	10
0	0	1	1	0
1	1	1	0	0

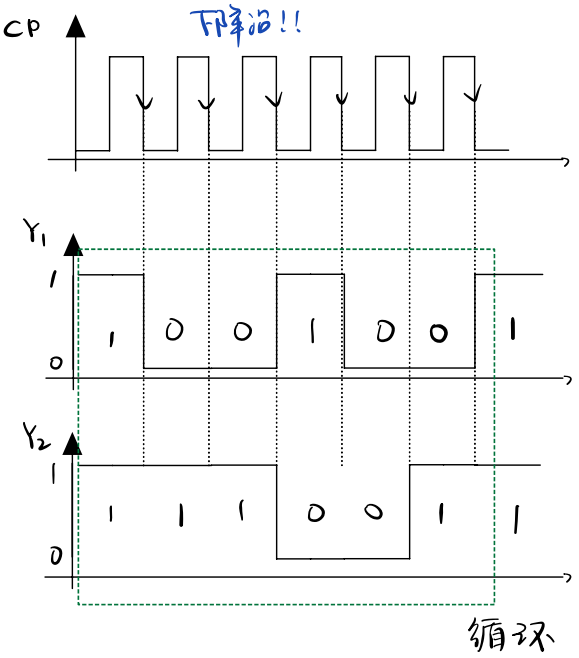
$Q_1^*=Q_1'$

$Q_2^*=J_2Q_2'+K_2'Q_2=(Q_0+Q_1)Q_2'+(Q_0\oplus Q_1)Q_2=Q_0Q_2'+Q_1Q_2'+Q_0Q_1'Q_2+Q_0'Q_1Q_2$

$=\Sigma m(1,2,3,5,6)$

Q_2 \ Q_1Q_0	00	01	11	10
0	0	1	1	1
1	0	1	0	1

(4)



	Q_2	Q_1	Q_0	Y_1	Y_2
0	0	0	0	1	1
2	0	1	0	0	1
4	1	0	0	0	1
3	0	1	1	1	0
5	1	0	1	0	0
7	1	1	1	0	1
0	0	0	0	1	1
1	0	0	1	0	0
7	1	1	1	0	1
6	1	1	0	1	0
4	1	0	0	0	1

(5) 为六进制计数器。