数电 2014级 期末.

王翔

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一、(1) 3CA.B

(2) 155.5625

(3) 0100 0011 1000 . 1000

(4) 11001

(5) 1101 1011

(6) 4

(7) 最高位

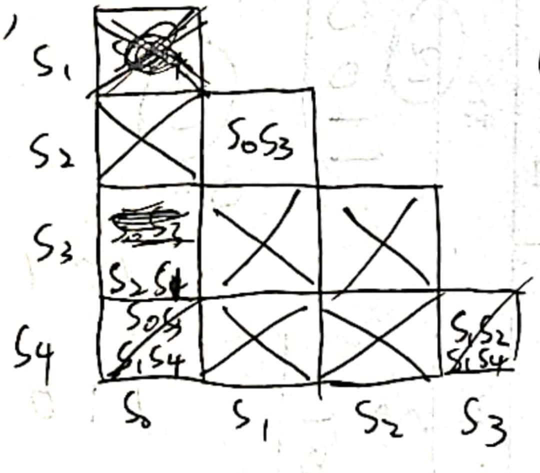
(8) 输出只与当前状态机的状态有关，而与输入无关.

(9) 0, 2, 4, 5, 9, 10, 12, 15

(10) 一定

二、1、

(1)



(2) S_0 与 S_3 等价

S_1 与 S_2 等价

理由：由隐含表可知，

S_0 与 S_3 等价 取决于 S_1 与 S_2 是否等价

而 S_1 与 S_2 是否等价 取决于 S_0 与 S_3 是否等价

故 S_0 与 S_3，S_1 与 S_2 等价

(3)

	00	01	1X
S_0	S_0/1	S_1/0	S_4/1
S_1	S_0/0	S_4/0	S_1/1
S_4	S_0/1	S_1/0	S_1/1

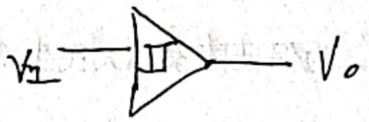
2、$Y = A\bar{C} + \bar{A}B + \bar{A}C$

当 $B=1$ $C=0$ 时，$Y = A+\bar{A}$

故 A 存在竞争条件。

由于 $Y = A+\bar{A}$，故存在~~[illegible]~~ 静态 1 型冒险。

3、

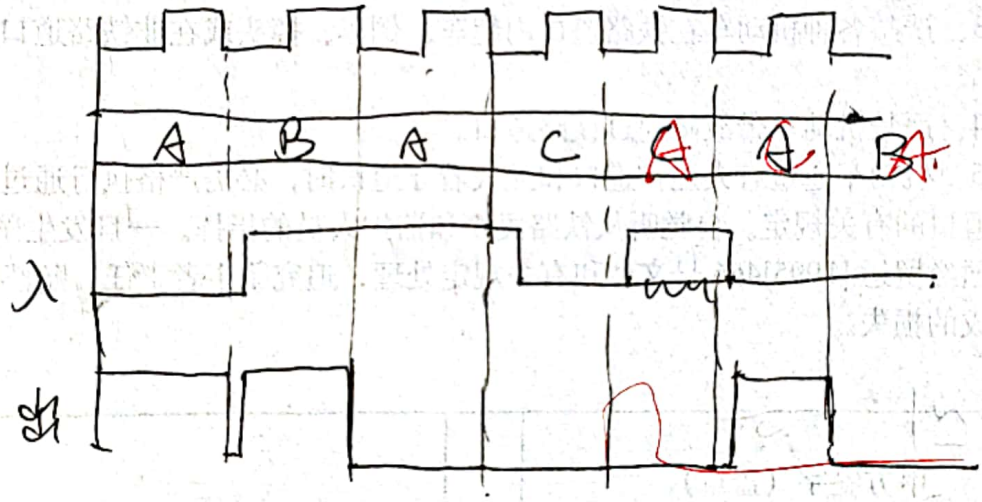


$U_T^+ = 2.2V$

$U_T^- = 1.4V$

$\Delta V = 0.8V$

4、



三、(1) $F_1 = \overline{Y_0+Y_1+Y_2+Y_4} = \bar{Y}_0\bar{Y}_1\bar{Y}_2\bar{Y}_4$

$= \Pi M(0,1,2,4) = \Sigma m(3,5,6,7)$

$F_0 = \overline{Y_0+Y_3+Y_5+Y_6} = \bar{Y}_0\bar{Y}_3\bar{Y}_5\bar{Y}_6 = \Pi M(0,3,5,6)$

$= \Sigma m(1,2,4,7)$

(2)

F_1 D_2 \ D_1D_0	00	01	11	10
0	0	0	1	0
1	0	1	1	1

$F_1 = D_2D_0 + D_2D_1 + D_1D_0$

F_0 D_2 \ D_1D_0	00	01	11	10
0	0	1	0	1
1	1	0	1	0

$F_0 = D_2\bar{D}_1\bar{D}_0 + \bar{D}_2\bar{D}_1D_0 + D_2D_1D_0 + \bar{D}_2D_1\bar{D}_0$

(3)

D_2	D_1	D_0	F_1	F_0
0	0	0	0	0
0	0	1	0	1
0	1	0	0	1
0	1	1	1	0
1	0	0	0	1
1	0	1	1	0
1	1	0	1	0
1	1	1	1	1

(4)

这电路功能

求 $D_2+D_1+D_0$ 之

加法器

F_0 是结果

F_1 是进位

F_1 与 F_0 共用结或了

$D_2+D_1+D_0$ 的结果.

四

(2)

	D	C	B	A	F_1	F_0
0	0	0	0	0	0	0
1	0	0	0	1	0	1
2	0	0	1	0	0	1
3	0	0	1	1	0	0
4	0	1	0	0	0	1
5	0	1	0	1	0	0
6	0	1	1	0	0	1
7	0	1	1	1	1	0
8	1	0	0	0	0	1
9	1	0	0	1	1	0
10	1	0	1	0	0	1
11	1	0	1	1	1	0
12	1	1	0	0	0	1
13	1	1	0	1	1	0
14	1	1	1	0	1	0
15	1	1	1	1	1	1

(1)

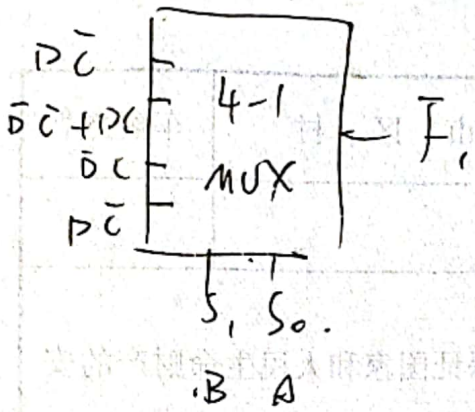
$F_1=\Pi M(0,1,3,4,6,7,9,10,12,13,15)$.

$F_1=\bar{D}\bar{C}B\bar{A}+\bar{D}C\bar{B}A+D\bar{C}\bar{B}\bar{A}+D\bar{C}BA+DCB\bar{A}$

$=B\bar{A}(\bar{D}\bar{C}+DC)+\bar{B}\bar{A}(D\bar{C})+\bar{B}\bar{A}\cdot(\bar{D}C)+BA(\bar{D}\bar{C})$

$=m_0(D\bar{C})+m_1(\bar{D}C)+m_2(\bar{D}\bar{C}+DC)+m_3(D\bar{C})$

故 $f_0 = D\bar{C}$　$f_1 = \bar{D}C$　$f_2 = D\bar{C} + DC$　$f_3 = DC$

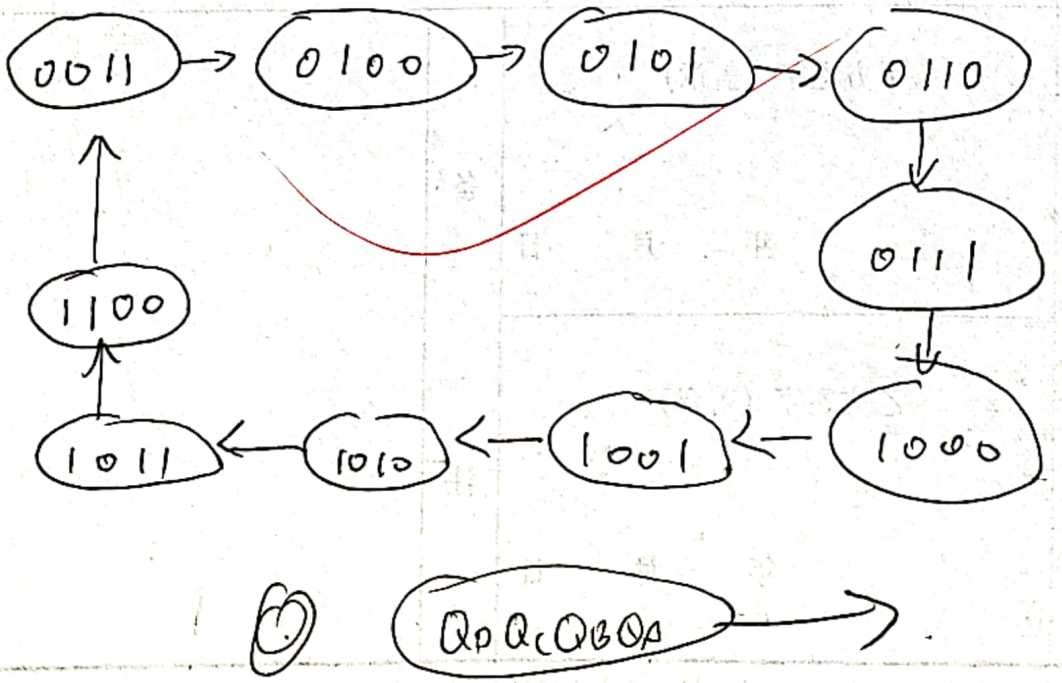


3. (1) $P = T = 1$.　$A = B = 1$　$C = D = 0$.

$CR = 1$,　$LD = \overline{Q_C Q_D} = \bar{Q}_C + \bar{Q}_D$

(2) $M = 10$　10进制.

(3)



十、 $M=6$， 三个触发器 D_2 D_1 D_0

(1)

n			n+1		
Q_2	Q_1	Q_0	Q_2	Q_1	Q_0
0	0	0	0	0	1
0	0	1	0	1	1
0	1	0	X	X	X
0	1	1	1	1	1
1	0	0	0	0	0
1	0	1	X	X	X
1	1	0	1	0	0
1	1	1	1	1	0

(2) Q^{n+1} 卡诺图

Q_2 \ Q_1Q_0	00	01	11	10
0	001	011	111	XXX
1	000	XXX	110	100

(3)

Q_2^{n+1}

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

Q_1^{n+1}

Q_1 \ Q_2Q_0	00	01	11	10
0	0	1	1	X
1	0	X	1	0

Q_0^{n+1}

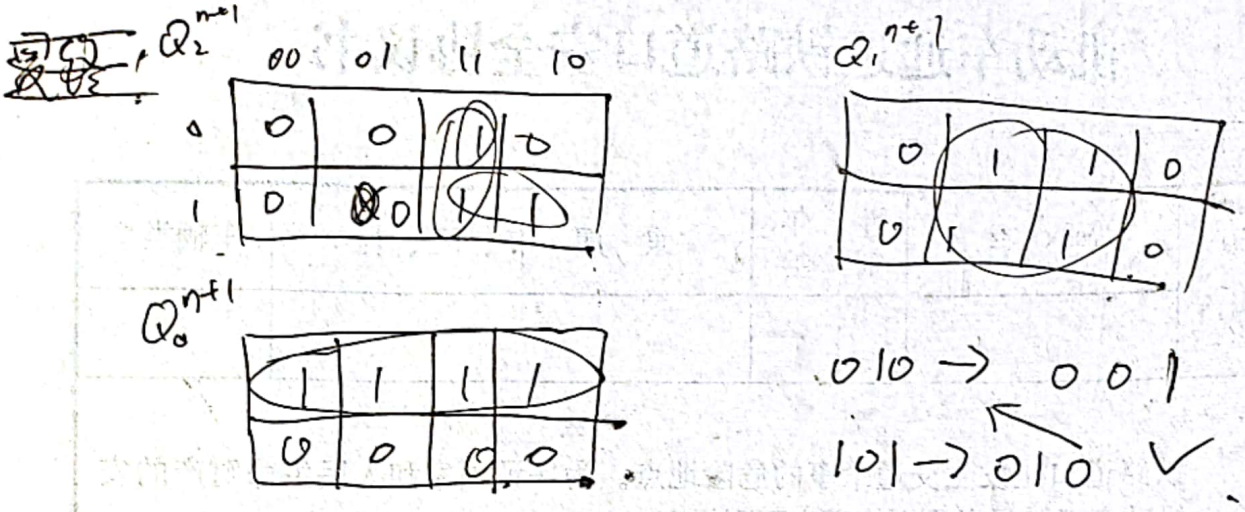
Q_0 \ Q_2Q_1	00	01	11	10
0	1	1	1	X
1	0	X	0	0

010 → 101

101 → 010

不能自动.

把 Q_2 010 改成 0



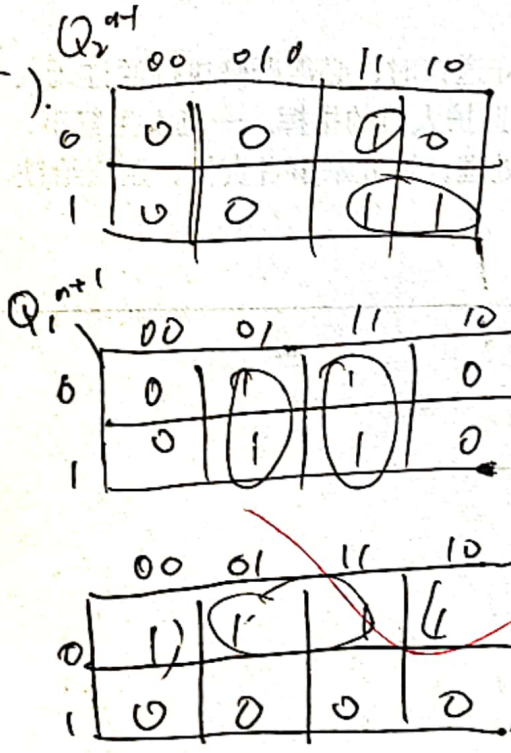
010 → 001 ✓

101 → 010 ✓

(4) $Q_2^{n+1} = Q_2Q_1 + Q_1Q_0$

$Q_1^{n+1} = Q_0$ $\quad Q_0^{n+1} = \overline{Q_2}$

(5).



$J_2 = Q_1Q_0$

$\overline{K_2} = Q_1 \rightarrow K_2 = \overline{Q_1}$

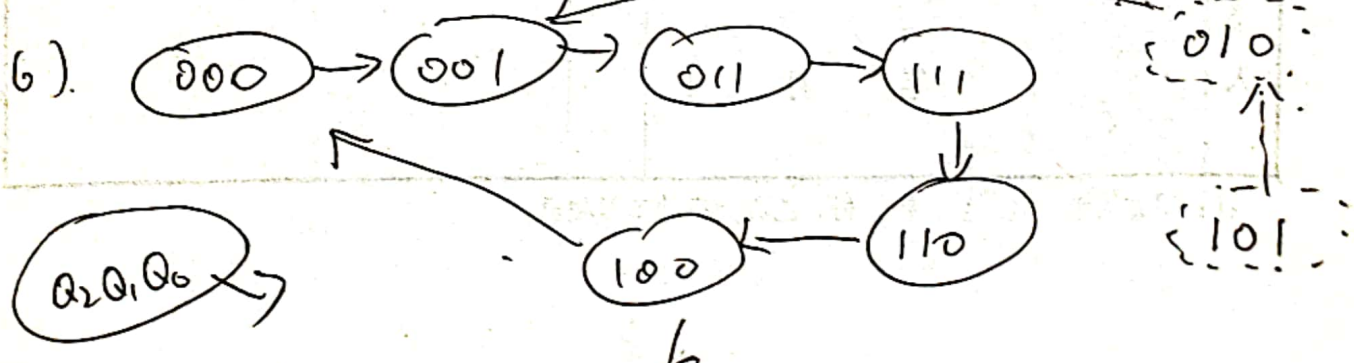
$J_1 = Q_0$

$\overline{K_1} = Q_0 \rightarrow K_1 = \overline{Q_0}$

$J_0 = \overline{Q_2}$

$\overline{K_0} = \overline{Q_2}$ $\quad K_0 = Q_2$

(6).



最终答案：

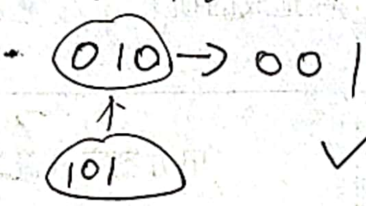
(1)

	n: Q_2	Q_1	Q_0	n+1: Q_2	Q_1	Q_0	
0	0	0	0	0	0	1	1
1	0	0	1	0	1	1	3
2	0	1	0	0	0	1	1
3	0	1	1	1	1	1	7
4	1	0	0	0	0	0	0
5	1	0	1	0	1	0	2
6	1	1	0	1	0	0	4
7	1	1	1	1	1	0	6

(2) Q^{n+1}

Q_2 \ Q_1Q_0	00	01	11	10
0	001	011	111	001
1	000	010	110	100

(3) 无效状态

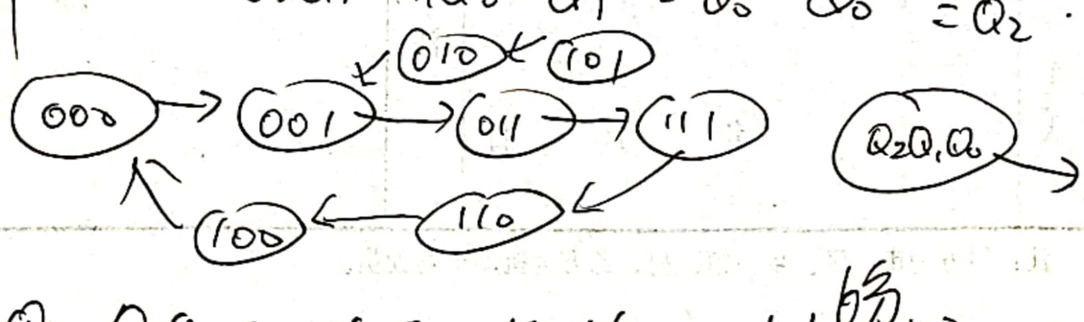


(3) 可以自启动.

(5) $J_2 = Q_1Q_0$ $K_2 = \overline{Q_1}$ $J_1 = Q_0$ $K_1 = \overline{Q_0}$ $J_0 = \overline{Q_2}$ $K_0 = Q_2$

(4) $Q_2^{n+1} = Q_2Q_1 + Q_1Q_0$ $Q_1^{n+1} = Q_0$ $Q_0^{n+1} = \overline{Q_2}$.

(6)



(7) Q_2 Q_1 Q_0 均可分频输出，均分的频.