1181041

田耒井

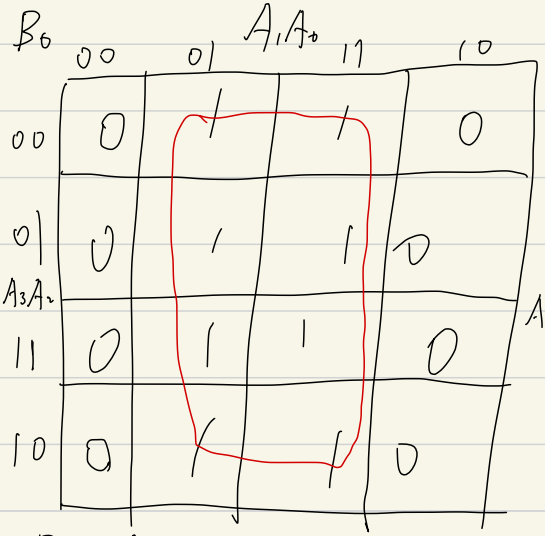
Q1

The truth table is:

$A_3A_2A_1A_0$	$B_3B_2B_1B_0$
0000	0000
0001	1111
0010	1110
0011	1101
0100	1100
0101	1011
0110	1010
0111	1001
1000	1000
1001	0111
1010	0110
1011	0101
1100	0100
1101	0011
1110	0010
1111	0001

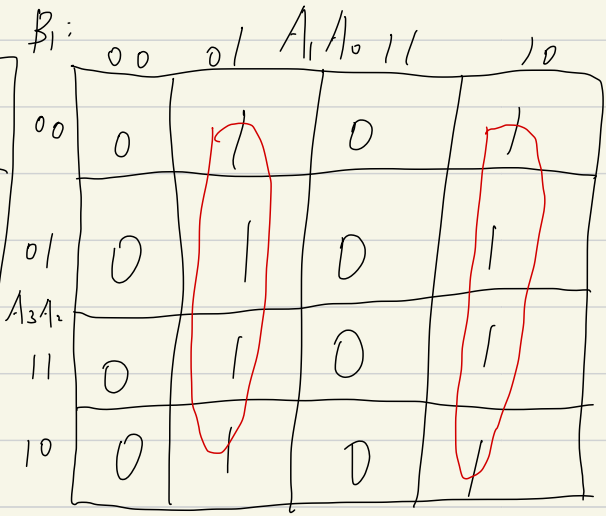
K-map:

B_0



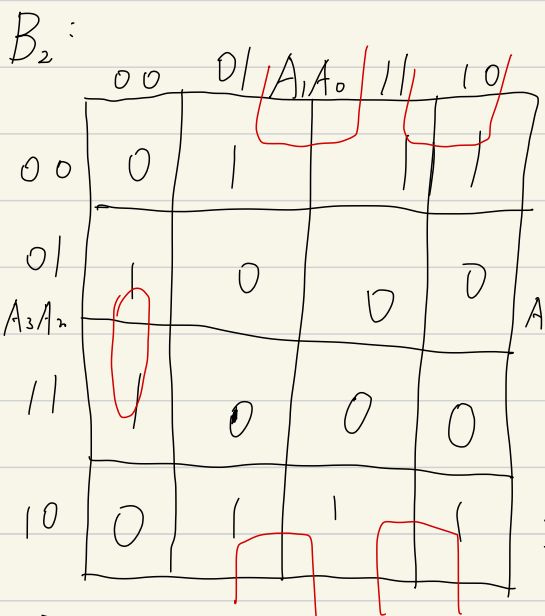
$B_0 = A_0$

B_1:



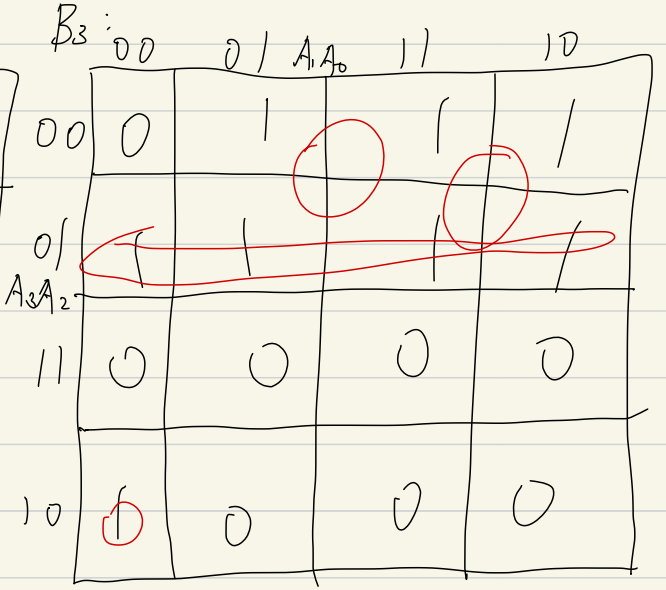
$B_1 = A_1'A_0 + A_1A_0'$

B_2:

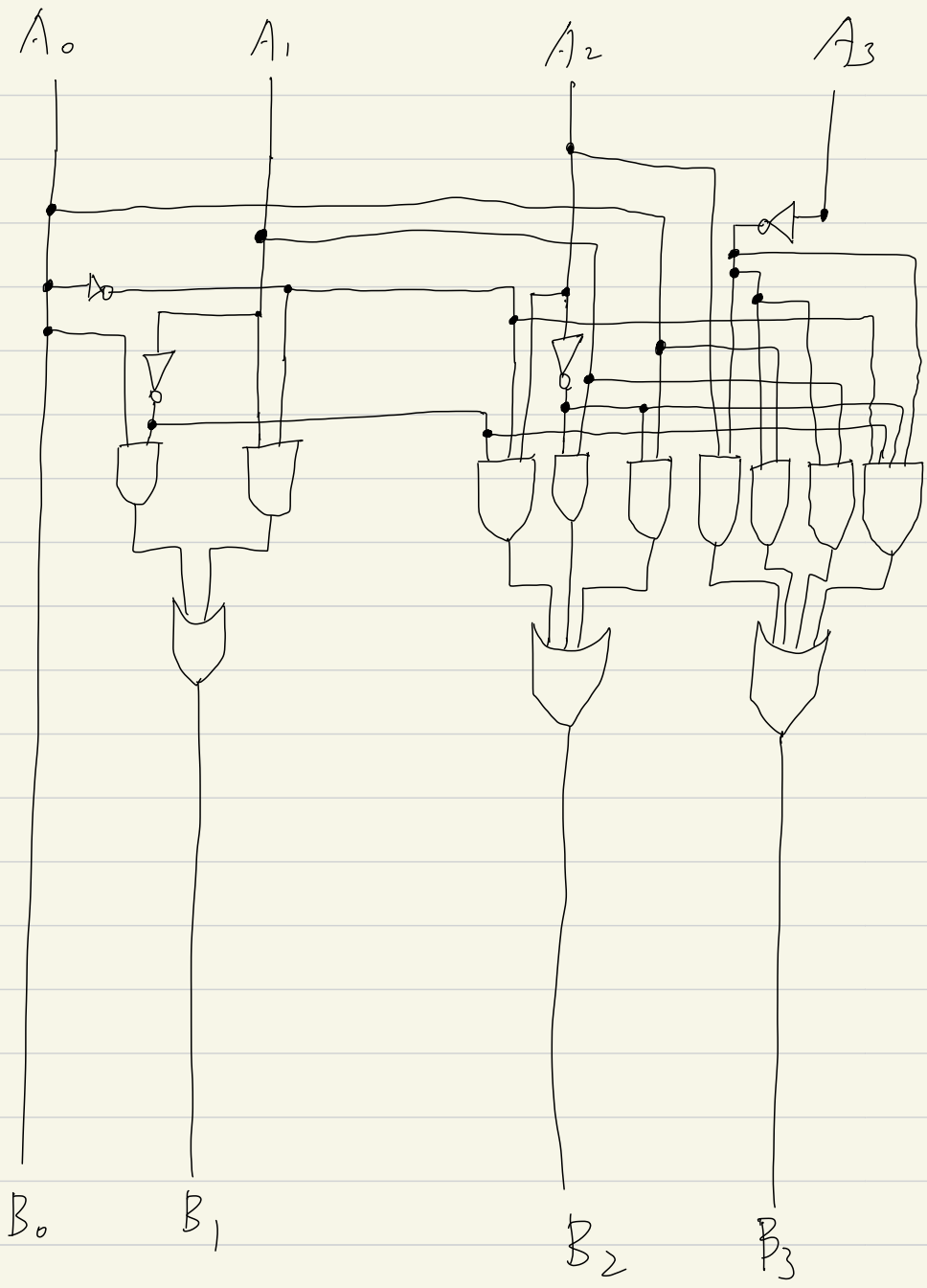


$B_2 = A_2A_1'A_0' + A_2'A_0 + A_2'A_1$

B_3:



$B_3 = A_3'A_2 + A_0A_3' + A_1A_3' + A_0'A_1'A_2'A_3$


A0
A1
A2
A3
B0
B1
B2
B3

Q2

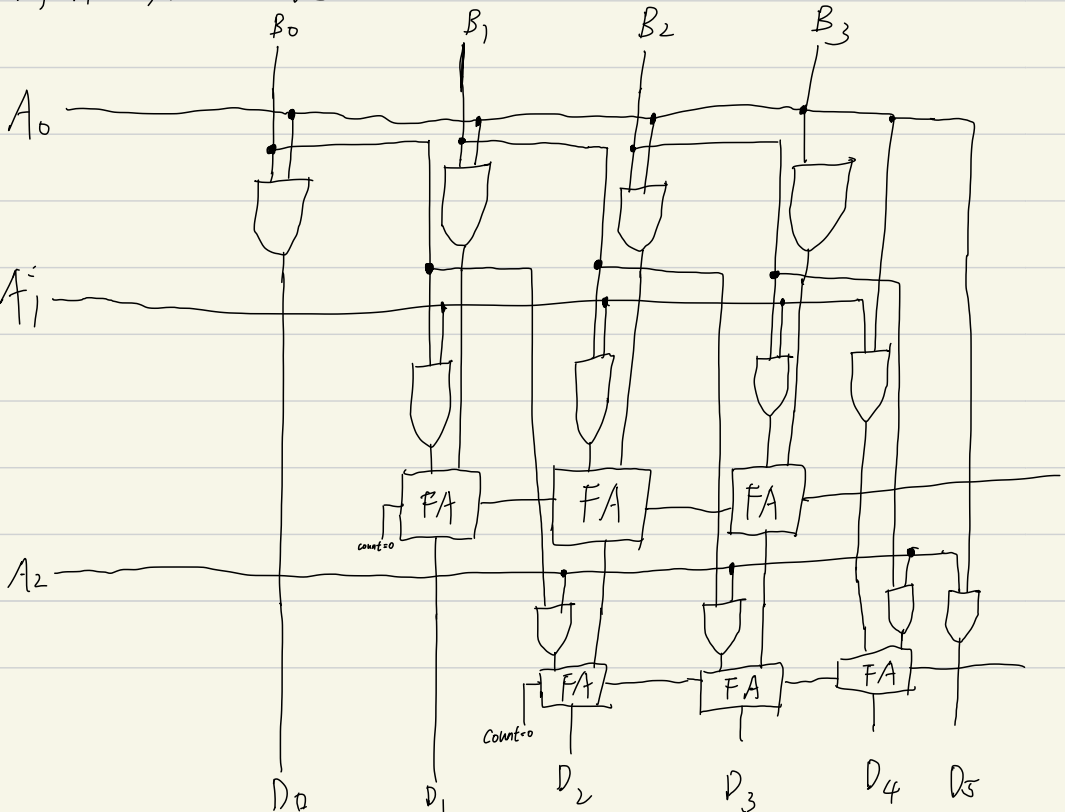
We know that

$$B_3B_2B_1B_0 \times A_2A_1A_0$$

$\Rightarrow$

$$\begin{array}{r} B_3B_2B_1B_0 \\ A_2A_1A_0 \\ \hline B_3A_0 \quad B_2A_0 \quad B_1A_0 \quad B_0A_0 \\ B_3A_1 \quad B_2A_1 \quad B_1A_1 \quad B_0A_1 \\ \hline C_4 \quad C_3 \quad C_2 \quad C_1 \quad C_0 \\ B_3A_2 \quad B_2A_2 \quad B_1A_2 \quad B_0A_2 \\ \hline D_5 \quad D_4 \quad D_3 \quad D_2 \quad D_1 \quad D_0 \end{array}$$

Hence, we have:

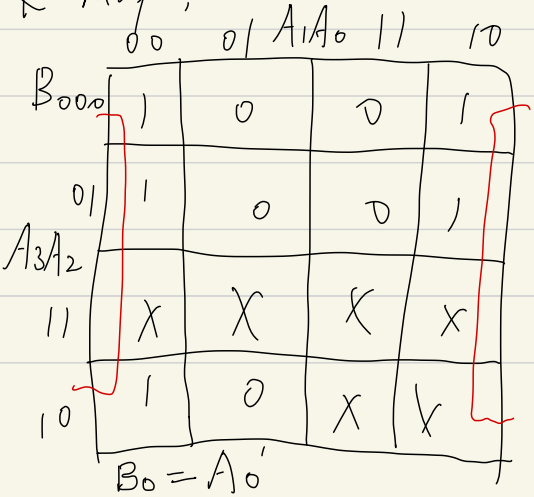


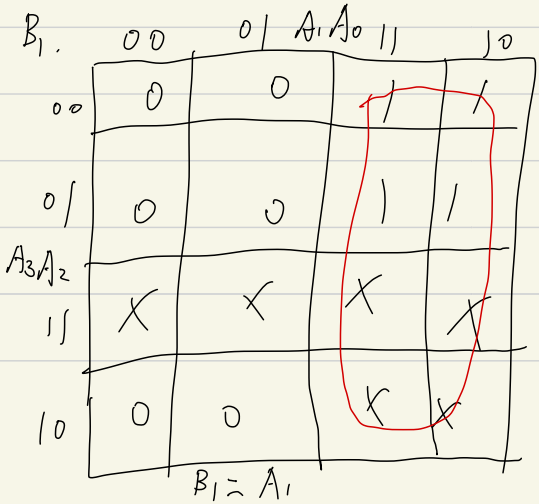
Q3.

The truth table of the circuit is:

BCD digit				9' complement			
A_3	A_2	A_1	A_0	B_3	B_2	B_1	B_0
0	0	0	0	1	0	0	1
0	0	0	1	1	0	0	0
0	0	1	0	0	1	1	1
0	0	1	1	0	1	1	0
0	1	0	0	0	1	0	1
0	1	0	1	0	1	0	0
0	1	1	0	0	0	1	1
0	1	1	1	0	0	1	0
1	0	0	0	0	0	0	1
1	0	0	1	0	0	0	0

K-map:





5

B_2

A_2A_3 \ A_1A_0	00	01	11	10
00	0	0	1	1
01	1	1	0	0
11	X	X	X	X
10	0	0	X	X

B_3

A_3A_2 \ A_1A_0	00	01	11	10
00	1	1	0	0
01	0	0	0	0
11	X	X	X	X
10	0	0	X	X

$B_2 = A_1'A_2A_3 + A_1A_2'A_3'$

$B_3 = A_1'A_2'A_3'$