

1.2

$$2) \quad (10011001)_2 = 1 \times 2^7 + 1 \times 2^4 + 1 \times 2^3 + 1 \times 2^0 = (153)_{10}$$

$$4) \quad (01000100)_2 = 1 \times 2^6 + 1 \times 2^2 = (68)_{10}$$

1.3

$$1) \quad (37)_{10} = (100101)_2$$

$$3) \quad (65)_{10} = (1000001)_2$$

1.4

$$\begin{aligned} 2)、Y_2 &= \bar{A} \bar{B} + \bar{B} \bar{C} + A \bar{C} \\ &= \bar{A} \bar{B} (C + \bar{C}) + (A + \bar{A}) \bar{B} \bar{C} + A (B + \bar{B}) \bar{C} \\ &= \bar{A} \bar{B} C + \bar{A} \bar{B} \bar{C} + A \bar{B} \bar{C} + A B \bar{C} \end{aligned}$$

所以A、B、C取001、000、100、110时 $Y_2=1$

1.5

$$1) \overline{A+BC+D} = \bar{A} \bullet (\overline{BC}) \bullet \bar{D} = \bar{A} \bullet (\bar{B} + \bar{C}) \bullet \bar{D}$$

$$\begin{aligned} 4) \quad Y_2 &= \bar{A} \bar{B} + \bar{A} B + A \bar{B} + A B \\ &= \bar{A} (B + \bar{B}) + A (B + \bar{B}) \\ &= \bar{A} + A \\ &= 1 \end{aligned}$$

1.6 1)、

$$\begin{cases} Y_1 = A\bar{B} + B\bar{C} + C\bar{A} \\ Y_2 = \bar{A}B + \bar{B}C + \bar{C}A \end{cases}$$

A	B	C	Y1	Y2
0	0	0	0	0
0	0	1	1	1
0	1	0	1	1
0	1	1	1	1
1	0	0	1	1
1	0	1	1	1
1	1	0	1	1
1	1	1	0	0

$$Y_1 = Y_2$$

1.6 3)、

$$\begin{cases} Y_1 = \overline{A \oplus B \oplus C} \\ Y_2 = ABC + A\bar{B}\bar{C} + \bar{A}B\bar{C} + \bar{A}\bar{B}C \end{cases}$$

$$\begin{aligned} Y_1 &= \overline{A \oplus B \oplus C} = \overline{(A\bar{B} + \bar{A}B) \oplus C} = \overline{(A\bar{B} + \bar{A}B)\bar{C} + (A\bar{B} + \bar{A}B)C} \\ &= \overline{A\bar{B}\bar{C} + \bar{A}B\bar{C} + ABC + \bar{A}\bar{B}C} = \overline{Y_2} \end{aligned}$$

A	B	C	Y1	Y2
0	0	0	1	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	0	1

$$Y_1 = \overline{Y_2}$$

$$\begin{aligned}
1.8 \quad 1)、Y_1 &= A B + B C + C A \\
&= A B (C + \bar{C}) + (A + \bar{A}) B C + A (B + \bar{B}) C \\
&= A B C + A B \bar{C} + \bar{A} B C + A \bar{B} C
\end{aligned}$$

$$\begin{aligned}
4)、Y_4 &= \overline{A B + A D + \bar{B} C} = (\bar{A} + \bar{B}) \cdot (\bar{A} + \bar{D}) \cdot (B + \bar{C}) \\
&= \bar{A} B + \bar{A} \bar{C} + \bar{B} \bar{C} \bar{D} \\
&= \bar{A} B (C D + \bar{C} D + C \bar{D} + \bar{C} \bar{D}) + \bar{A} \bar{C} (B D + \bar{B} D + B \bar{D} + \bar{B} \bar{D}) + (A + \bar{A}) \bar{B} \bar{C} \bar{D} \\
&= \bar{A} \bar{B} \bar{C} \bar{D} + \bar{A} \bar{B} \bar{C} D + \bar{A} B \bar{C} \bar{D} + \bar{A} B \bar{C} D + \bar{A} B C \bar{D} + \bar{A} B C D + A \bar{B} \bar{C} \bar{D}
\end{aligned}$$

$$\begin{aligned}
 1.9 \quad 1) & \quad A(\bar{A} + B) + B(B + C) + B \\
 & \quad = AB + B + BC + B \\
 & \quad = B
 \end{aligned}$$

$$\begin{aligned}
 4) & \quad (A + AB + ABC) \cdot (A + B + C) \\
 & \quad = A(1 + B + BC) \cdot (A + B + C) \\
 & \quad = A \cdot (A + B + C) \\
 & \quad = A + AB + AC \\
 & \quad = A
 \end{aligned}$$

1.10

$$1)、(A + \bar{B})\overline{C + D}$$

$$\text{反函数为 } (\bar{A} \cdot B) + \overline{\bar{C} \cdot D} = \bar{A}B + C + \bar{D}$$

$$3)、\overline{AB + C} + \bar{A}D$$

$$\text{反函数为 } (\bar{A} + \overline{\bar{B} \cdot C}) \cdot (A + \bar{D}) = (\bar{A} + B + \bar{C})(A + \bar{D})$$

$$= \bar{A} \bar{D} + AB + B\bar{D} + A\bar{C} + \bar{C} \bar{D}$$

$$= \underline{\bar{A} \bar{D}} + \underline{AB} + \underline{B\bar{D}} + \underline{\bar{A} \bar{D}} + \underline{A\bar{C}} + \underline{\bar{C} \bar{D}}$$

$$= \bar{A} \bar{D} + AB + \bar{A} \bar{D} + A\bar{C} = \bar{A} \bar{D} + AB + A\bar{C}$$

消去多余项

1.10

$$1)、(A + \bar{B})\bar{C} + \bar{D}$$

$$\text{反函数为 } \overline{(A + \bar{B})\bar{C} + \bar{D}} = \overline{(A + \bar{B}) + \bar{C} + \bar{D}} = \bar{A}B + C + D$$

$$3)、\overline{AB + \bar{C}} + \bar{A}D$$

反函数为

$$\overline{\overline{AB + \bar{C}} + \bar{A}D} = \overline{\overline{AB + \bar{C}}} \cdot \overline{\bar{A}D} = (\bar{A} + B + \bar{C})(A + \bar{D})$$

$$= \bar{A} \bar{D} + AB + B\bar{D} + A\bar{C} + \bar{C} \bar{D}$$

$$= \underline{\bar{A} \bar{D} + AB + B\bar{D}} + \underline{\bar{A} \bar{D} + A\bar{C} + \bar{C} \bar{D}} \quad \text{消去多余项}$$

$$= \bar{A} \bar{D} + AB + \bar{A} \bar{D} + A\bar{C} = \bar{A} \bar{D} + AB + A\bar{C}$$

1.11

b)、
$$Y = \overline{A} + C$$

A \ BC	00	01	11	10	
0	1	1	1	1	\overline{A}
1	0	1	1	0	

C

1.11

$$Y = \overline{A}\overline{C} + \overline{B}C + \overline{B}\overline{D}$$

d)、

$\overline{A}\overline{C}$

AB \ CD	00	01	11	10
00	1	1	1	1
01	1	1	0	0
11	0	0	0	0
10	1	0	1	1

四个角 $\overline{B}\overline{D}$

$\overline{B}C$

$$1.11 \quad Y = \overline{A}\overline{C} + \overline{B}C + \overline{A}\overline{B} + \overline{B}\overline{D}$$

$$d)、= \overline{A}\overline{C} + \overline{B}C + \overline{B}\overline{D}$$

$\overline{A}\overline{C}$

AB \ CD	00	01	11	10
00	1	1	1	1
01	1	1	0	0
11	0	0	0	0
10	1	0	1	1

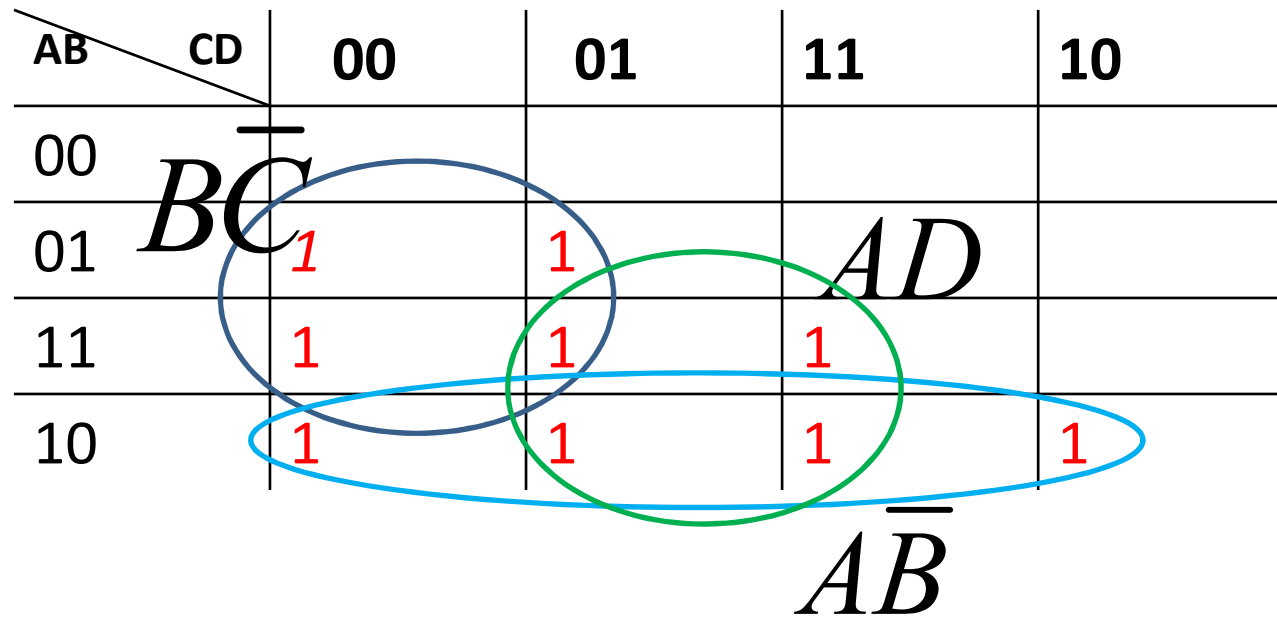
四个角 $\overline{B}\overline{D}$

$\overline{A}\overline{B}$

$\overline{B}C$

1.12

$$3) \quad Y = A\bar{B} + B\bar{C}\bar{D} + ABD + \bar{A}B\bar{C}D$$



$$Y = A\bar{B} + B\bar{C} + AD$$

1.14

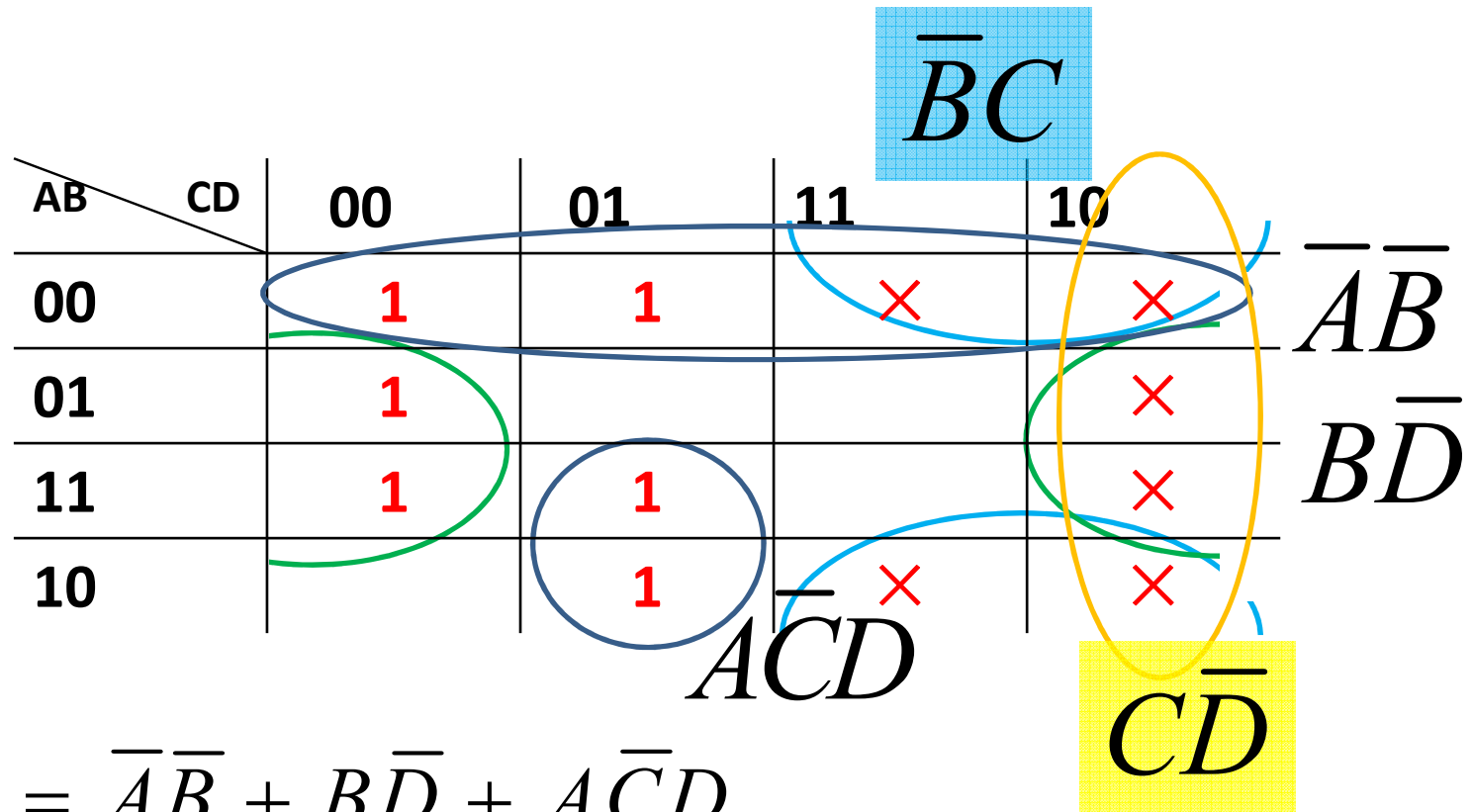
4)、
$$\begin{cases} F(A, B, C, D) = \sum m(0, 1, 2, 3, 4, 5, 6) \\ AB + AC = 0 \end{cases}$$

		$\overline{A}\overline{C}$		$\overline{A}\overline{B}$		
AB \ CD		00	01	11	10	
00		1	1	1	1	$\overline{A}\overline{D}$
01		1	1		1	
11		×	×	×	×	
10				×	×	

$$\begin{cases} F = \overline{A}\overline{B} + \overline{A}\overline{C} + \overline{A}\overline{D} \\ AB + AC = 0 \end{cases}$$

1.15 3)、

$$F(A, B, C, D) = \sum m(0, 1, 4, 9, 12, 13) + \sum d(2, 3, 6, 10, 11, 14)$$



$$\left\{ \begin{array}{l} F = \bar{A}\bar{B} + B\bar{D} + A\bar{C}\bar{D} \\ \bar{B}C + C\bar{D} = 0 \end{array} \right.$$