第三章作业

习题3、4、6、7、9、11

3.

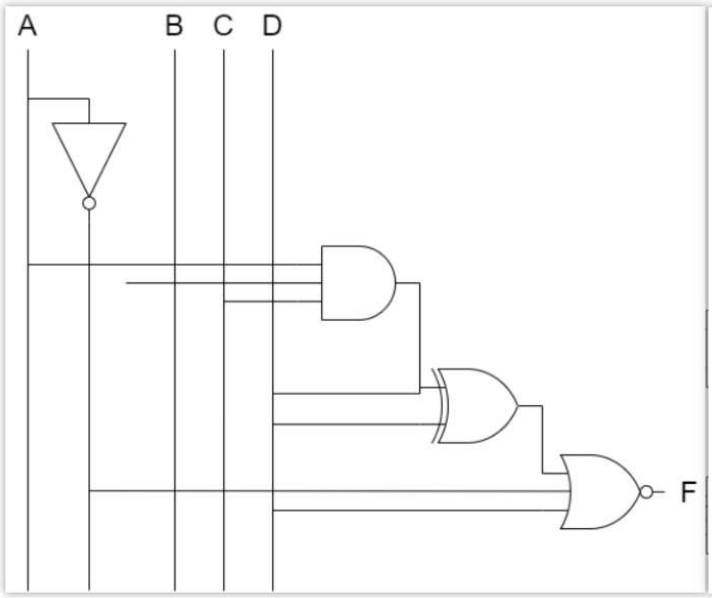
$F_1 = AB + \overline{A}C + \overline{A}BD$

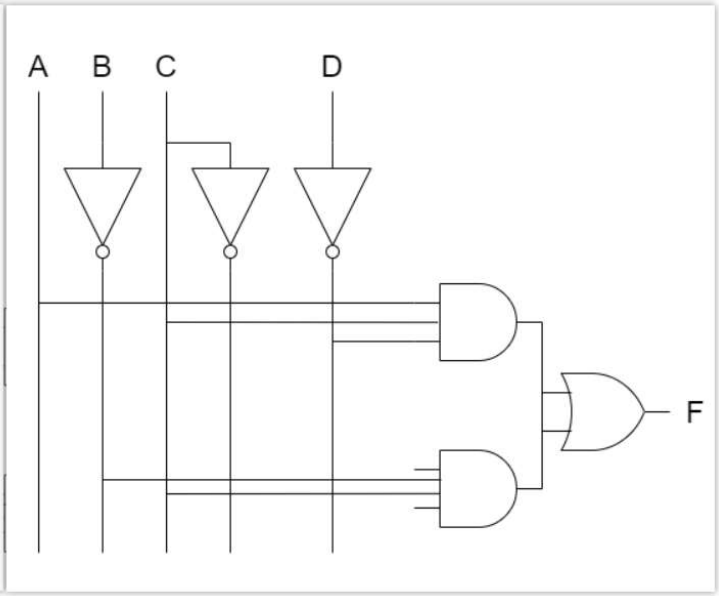
$F_2 = \overline{A}C + \overline{A}BD + \overline{B}CD + A\overline{B}C\overline{D}$

4.

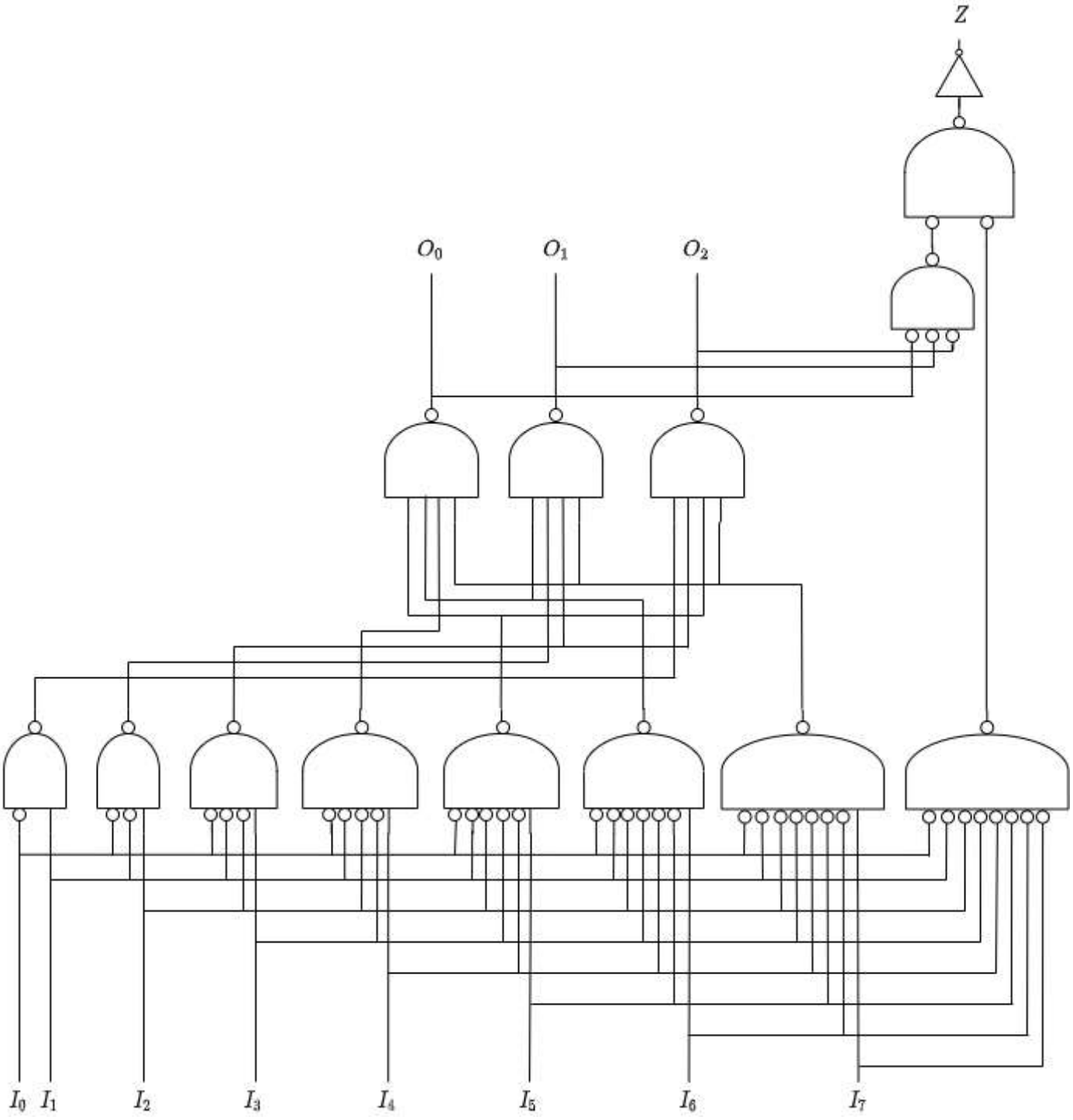
A	B	C	D	$\overline{A \cdot B \cdot C \oplus D + \overline{A} + D}$
0	0	0	0	0
0	0	0	1	0
0	0	1	0	0
0	0	1	1	0
0	1	0	0	0
0	1	0	1	0
0	1	1	0	0
0	1	1	1	0
1	0	0	0	1
1	0	0	1	0
1	0	1	0	1
1	0	1	1	0
1	1	0	0	1
1	1	0	1	0
1	1	1	0	0
1	1	1	1	0

$\therefore F = A \cdot \overline{C} \cdot \overline{D} + A \cdot \overline{B} \cdot C \cdot \overline{D}$



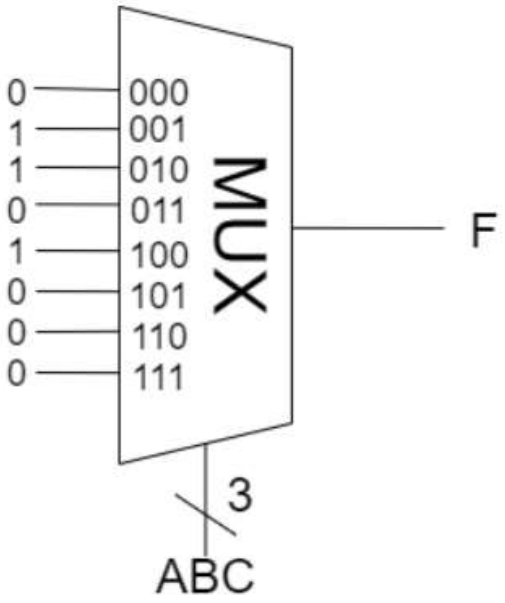


6.

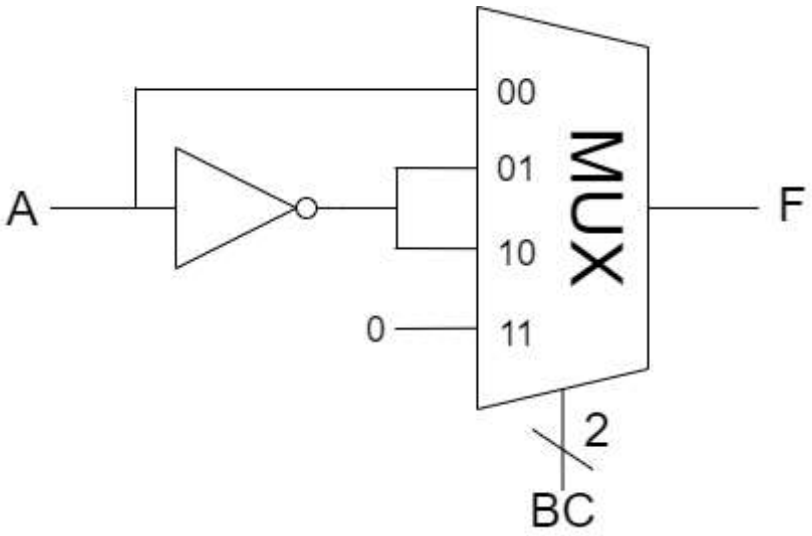


7.

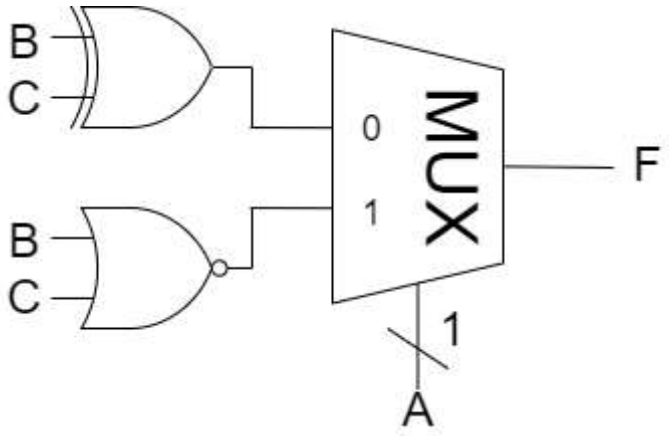
(1)


0
1
1
0
1
0
0
0
000
001
010
011
100
101
110
111
MUX
F
3
ABC

(2)


A
00
01
10
11
MUX
F
0
2
BC

(3)


B
C
B
C
0
1
MUX
F
1
A

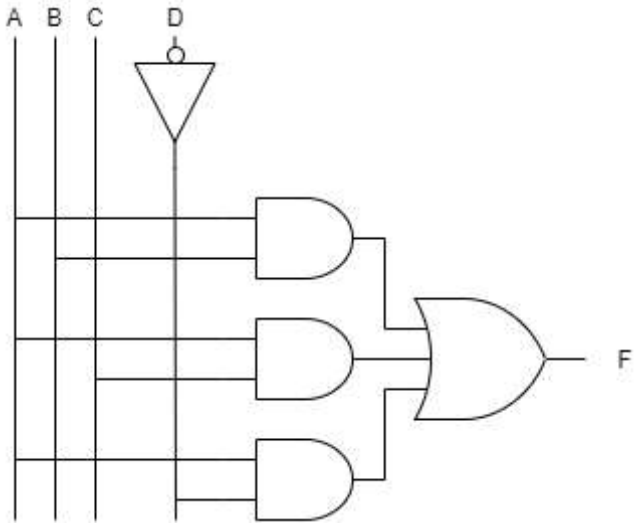
9.

(1)

将真值表上半部分的无关项真值都看作 0, 下半部分的无关项真值都看作 1.

$\therefore F = A \cdot (\overline{A} + B + C + \overline{D}) = A \cdot B + A \cdot C + A \cdot \overline{D}$

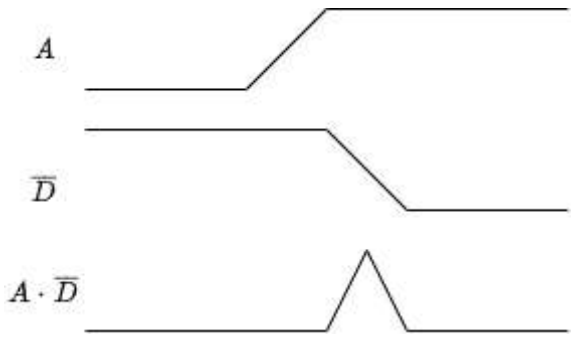
(2)



(3)

存在竞争冒险.

路径 A, B, C 的路径延迟是相同的, 可以只分析 A 与 $\overline{D}$ 路径.



如图, 当 A 由低电位转为高电位, $\overline{D}$ 由高电位转为低电位时, 会发生毛刺现象.

11.

(a)

$T_{pd} = 40 + 55 = 95\ (\text{ps})$

$T_{cd} = 25\ (\text{ps})$

(b)

$T_{pd} = 40 + 15 + 15 + 55 = 125\ (\text{ps})$

$T_{cd} = 15 + 15 + 25 = 55\ (\text{ps})$

(c)

$T_{pd} = 30 + 45 = 75\ (\text{ps})$

$T_{cd} = 15 + 25 = 40\ (\text{ps})$

传输延迟最长的是 2.30b, 传输延迟最短的是 2.30c.