

# Logic Design Quiz 1 Solution

1

(a)

$$\begin{aligned} & ((x'+w)y' + w'y' + z(x+y))' \\ & = ((x'+w)y')'(w'y')'(z(x+y))' \\ & = (xw'+y)(w+y)(z'+x'y') \end{aligned}$$

(b)

$$\begin{aligned} & (xw(y'+z)' + yz'(x+w))' \\ & = (xw(y'+z))'(yz'(x+w))' \\ & = ((x'+w')+(y'+z))((y'+z)+(x'w')) \end{aligned}$$

2.

(1) SOP 有 4 種化簡方式

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

$$F = C'D' + AD + BD' + CD$$

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

$$F = C'D' + AD + CD + BC$$

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

$$F = C'D' + AC' + CD + BC$$

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

$$F = C'D' + AC' + CD + BD'$$

(2)POS

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

$$F' = A'C'D + B'CD'$$

$$F = (A + C + D')(B + C' + D)$$

3.

(a)

$$E=(14)_{10}, A=(10)_{10}$$

$$\begin{aligned}(EA02)_{16} &= E * 16^3 + A * 16^2 + 0 * 16^1 + 2 * 16^0 \\ &= 14 * 16^3 + 10 * 16^2 + 0 * 16^1 + 2 * 16^0 \\ &= (59906)_{10}\end{aligned}$$

(b)

$$(34)_5 = 3 * 5^1 + 4 * 5^0 = 19$$

4.

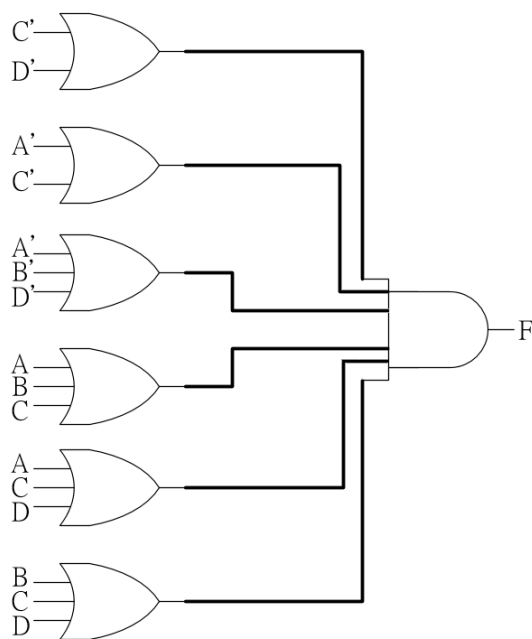
CD \ AB	00	01	11	10
00	0	0	0	1
01	0	1	0	1
11	1	0	0	0
10	0	1	0	0

$$F' = AC + CD + ABD + A'B'C' + A'C'D' + B'C'D'$$

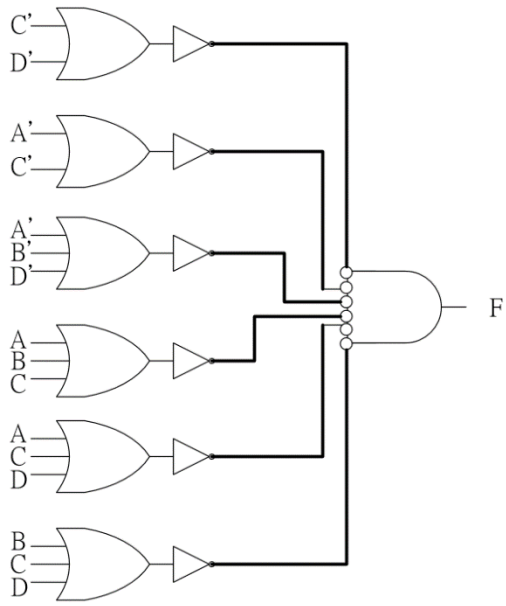
$$F = (AC + CD + ABD + A'B'C' + A'C'D' + B'C'D')'$$

$$= (A' + C')(C' + D')(A' + B' + D')(A + B + C)(A + C + D)(B + C + D)$$

Step1.



### Step2.



### Step3.

