4-7

A_3	A_2	A_1	A_0
0	0	0	0
0	0	0	1
0	0	1	0
0	0	1	1
0	1	0	0
0	1	0	1
0	1	1	0
0	1	1	1
1	0	0	0
1	0	0	1
1	0	1	0
1	0	1	1
1	1	0	0
1	1	0	1
1	1	1	0
1	1	1	1

$$X = \bar{A}_3\bar{A}_2A_1A_0 + \bar{A}_3A_2\bar{A}_1\bar{A}_0 + \bar{A}_3A_2\bar{A}_1A_0 + \bar{A}_3A_2A_1\bar{A}_0 + \bar{A}_3A_2A_1A_0$$

$$= \bar{A}_3(\bar{A}_2A_1A_0 + A_2\bar{A}_1\bar{A}_0 + A_2\bar{A}_1A_0 + A_2A_1\bar{A}_0 + A_2A_1A_0)$$

$$= \bar{A}_3(A_1A_0 + A_2A_0 + A_2A_1 + A_2\bar{A}_1\bar{A}_0 + A_2A_1A_0)$$

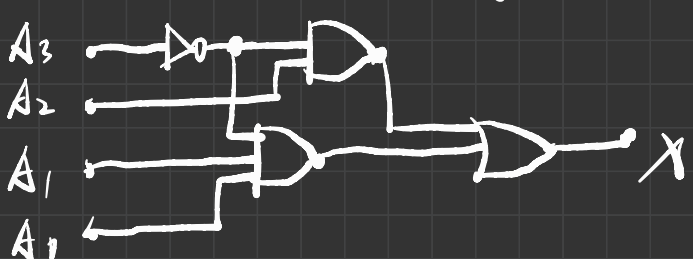
$$= \bar{A}_3[A_1A_0 + A_2(A_0 + A_1 + \bar{A}_1\bar{A}_0 + A_1A_0)]$$

$$= \bar{A}_3[A_1A_0 + A_2(A_0 + A_1 + \bar{A}_1\bar{A}_0 + \bar{A}_1\bar{A}_0 + A_1A_0)]$$

$$= \bar{A}_3[A_1A_0 + A_2(A_0 + \bar{A}_1 + A_1 + \bar{A}_0 + A_1A_0)]$$

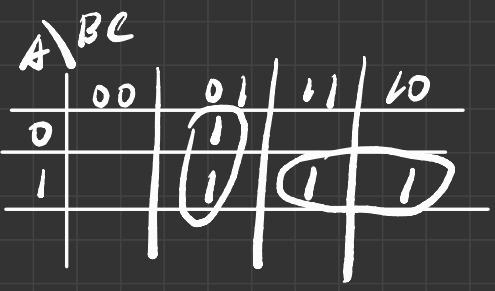
$$= \bar{A}_3[A_1A_0 + A_2(A_0 + \bar{A}_1 + A_1 + \bar{A}_0)]$$

$$= \bar{A}_3(A_1A_0 + A_2) = \bar{A}_3A_1A_0 + \bar{A}_3A_2$$

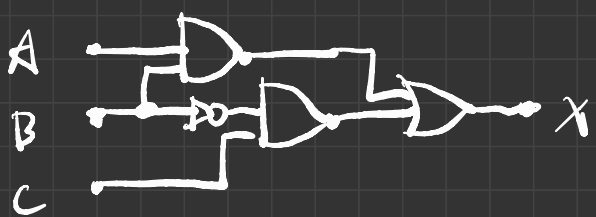


4-8. Let the status of door be A, ignition be B, lights be C.

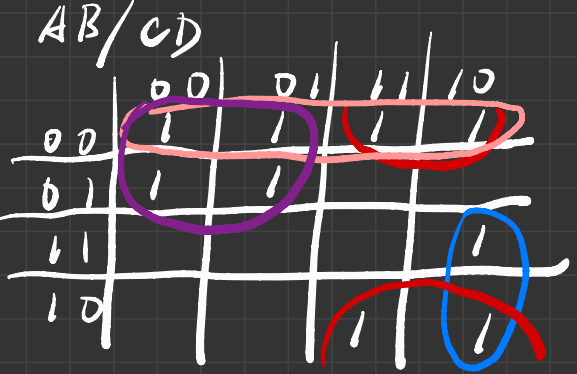
A	B	C	X
0	0	0	0
0	0	1	1
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	1



$X = \bar{B}C + AB$.

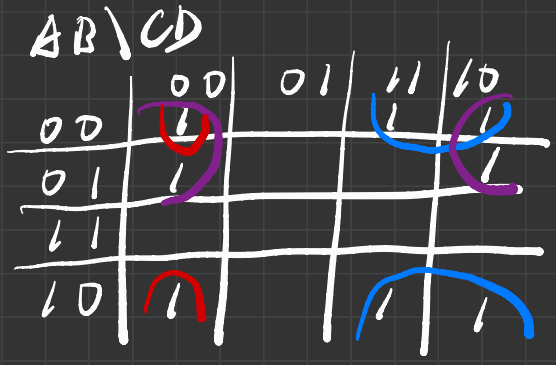


4-11 (a)



$X = \bar{A}\bar{C} + \bar{A}\bar{B} + \bar{B}C + AC\bar{D}$

b)



$X = \bar{B}CD + A\bar{D} + \bar{B}C$

c)

$X = AB + AC$