

8. 下列各等式分別是依據哪一項布林法則推導出來的?

(a) $\overline{AB+CD} + \overline{EF} = AB+CD+EF \Rightarrow \overline{A} = A$

(b) $A\overline{A}B + A\overline{B}\overline{C} + AB\overline{B} = A\overline{B}\overline{C} \Rightarrow A \cdot \overline{A} = 0$

(c) $A(B\overline{C} + B\overline{C}) + AC = A(B\overline{C}) + AC \Rightarrow A+A = A$

(d) $AB(\overline{C} + C) + AC = AB + AC \Rightarrow A + \overline{A} = 1$

(e) $A\overline{B} + A\overline{B}C = A\overline{B} \Rightarrow A + \overline{A}B = A + B$

(f) $ABC + \overline{A}B + \overline{A}B\overline{C}D = ABC + \overline{A}B + D \Rightarrow A + \overline{A}B = A$

9. 在下列各表示式中應用狄摩根定理

(h) $\overline{(A+B)(C+D)} = \overline{A}B + \overline{C}D$

10. 在下列各表示式中應用狄摩根定理

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

(b) $\overline{AB(CD+EF)} = \overline{A} + \overline{B} + (\overline{C} + \overline{D})(\overline{E} + \overline{F})$

(c) $\overline{A+B+C+D} + \overline{A}B\overline{C}D = \overline{A}B\overline{C}D + (\overline{A} + \overline{B} + \overline{C} + \overline{D}) = \overline{A} + \overline{B} + \overline{C} + \overline{D}$

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

38. 利用卡諾圖找出各表示式的最小 SOP 形式

(a) $\overline{A}B\overline{C} + \overline{A}B\overline{C} + A\overline{B}C = \overline{A}B + \overline{B}C$

AB	00	01	11	10
C	0	1	1	1
1	1	1	1	1

(b) $AC(\overline{B} + C) = A\overline{B}C + AC = AC$

AB	00	01	11	10
C	0	1	1	1
1	1	1	1	1

(c) $\overline{A}(BC + B\overline{C}) + A(B\overline{C} + B\overline{C}) = B$

AB	00	01	11	10
C	0	1	1	1
1	1	1	1	1

(d) $\overline{A}\overline{B}\overline{C} + A\overline{B}\overline{C} + \overline{A}B\overline{C} + AB\overline{C} = \overline{C}$

AB	00	01	11	10
C	0	1	1	1
1	1	1	1	1

39. 利用卡諾圖將下列各表示式化簡成最小 SOP 形式

(c) $DE\bar{F} + \bar{D}E\bar{F} + \bar{D}\bar{E}\bar{F} = \bar{D}\bar{F} + E\bar{F} = \bar{F}(D+E)$

	DE			
	00	01	11	10
F	1	1	1	1
1				

42. 利用卡諾圖將下列各表示式簡化成最小 SOP 形式

(a) $A + B\bar{C} + CD = A + B\bar{C} + CD$

	AB			
	00	01	11	10
C	1	1	1	1
0				
1	1	1	1	1
10			1	1

(b) $\bar{A}\bar{B}\bar{C}\bar{D} + \bar{A}B\bar{C}\bar{D} + ABCD + ABC\bar{D} = \bar{A}\bar{B}\bar{C} + ABC$

	AB			
	00	01	11	10
C	1			
0				
01	1			
11			1	1
10			1	1

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

	AB			
	00	01	11	10
C		1	1	
0				
01				1
11			1	1
10			1	1

(d) $(\bar{A}\bar{B} + A\bar{B})(CD + C\bar{D}) = \bar{B}C$

	AB			
	00	01	11	10
C	1	1	1	1
0				
01	1	1	1	1
10	1	1	1	1

(e) $\bar{A}\bar{B} + A\bar{B} + \bar{C}\bar{D} + C\bar{D} = \bar{B} + \bar{D}$

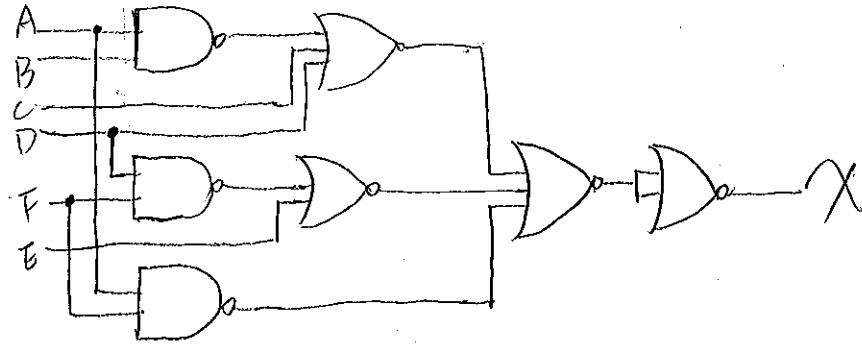
	AB			
	00	01	11	10
C	1	1	1	1
0				
01	1	1	1	1
11	1	1	1	1
10	1	1	1	1

10. 使用 NAND 閘, NOR 閘, 或兩者的組合來實現下列邏輯表示式

(a) $X = \bar{A}B + CD + (\bar{A} + B)(ACD + BE) = \bar{A}B + CD + \bar{A}B + \bar{A}B\bar{E} = \bar{A} + CD$



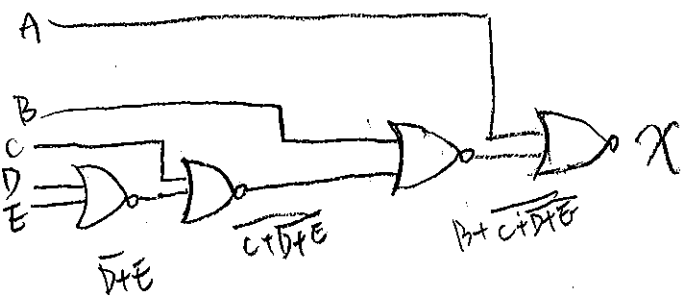
(b) $X = ABC\bar{D} + D\bar{E}F + \bar{A}F$



(c) $X = \bar{A}[B + \bar{C}(D+E)]$

$$\overline{A + B + C + D + E}$$

$$= A(B + \bar{C}(D + E))$$



11. 根據表 5-6 的真值表來實現其邏輯電路

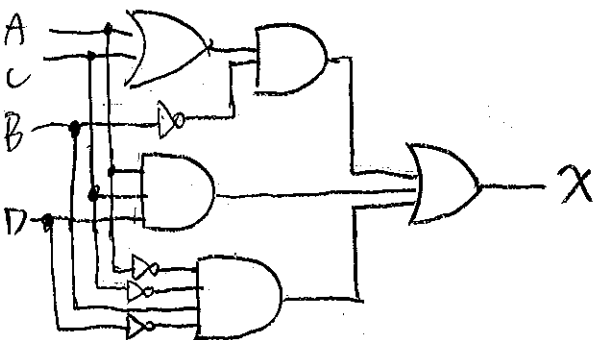
$X = \bar{A}B\bar{C} + \bar{A}B\bar{C} + \bar{A}B\bar{C} + \bar{A}B\bar{C} + \bar{A}B\bar{C} = \bar{C} + AB$



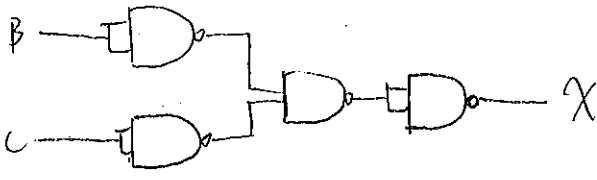
A\B	00	01	11	10
C\B				
00				1
01				1
11	1	1	1	1
10	1			

12. 依據表 5-7 的真值表, 將邏輯電路實現出來

$X = \bar{A}B\bar{C}\bar{D} + \bar{A}B\bar{C}D + \bar{A}B\bar{C}\bar{D} + \bar{A}B\bar{C}D + \bar{A}B\bar{C}\bar{D} + \bar{A}B\bar{C}D + \bar{A}B\bar{C}\bar{D} + \bar{A}B\bar{C}D = \bar{A}\bar{B} + \bar{B}C + ACD + \bar{A}B\bar{C}\bar{D}$
 $= (A+C)\bar{B} + ACD + \bar{A}B\bar{C}\bar{D}$

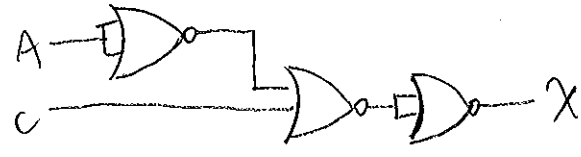


19. 只用 NAND 閘, 實現出圖 5-42 的邏輯電路

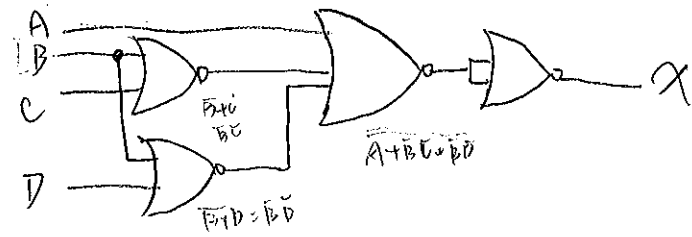


20. 只用 NOR 閘, 重做問題 18

(a)



b)



21. 只用 NOR 閘, 重做問題 19.

