

Gbegbe Decalo Jacques

Ottawa

#300094197

Devoir 3

ITI 1500

Exercice 3-2

a)  $F(x, y, z) = \Sigma(0, 1, 5, 7)$

$F = x'y' + xz$

		$y$		
$x \backslash z$	0	1	1	
1		1	1	1

b)  $F(x, y, z) = \Sigma(1, 2, 3, 6, 7)$

		$y$		
$x \backslash z$	0	1	1	1
1	1	1	1	1

$F = y + x'z$

c)  $F(x, y, z) = \Sigma(2, 3, 4, 5)$

		$y$		
$x \backslash z$	0	1	1	
1	1	1		

$F = x'y + xy'$

d)  $F(x, y, z) = \Sigma(1, 2, 3, 5, 6, 7)$

		$y$		
$x \backslash z$	0	1	1	1
1		1	1	1

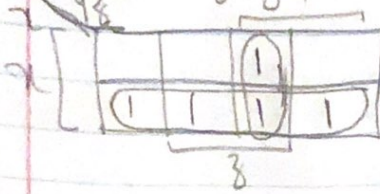
$F = y + z$

e)  $F(x, y, z) = \Sigma(0, 2, 4, 6)$

		$y$		
$x \backslash z$	0	1		1
1	1			1

$F = x'z' + xz' \Rightarrow F = z'$

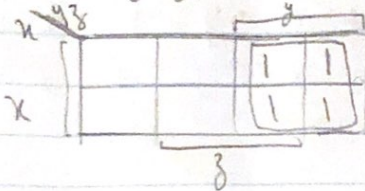
$$f) F(x, y, z) = \sum(3, 4, 5, 6, 7)$$



$$F = yz + x$$

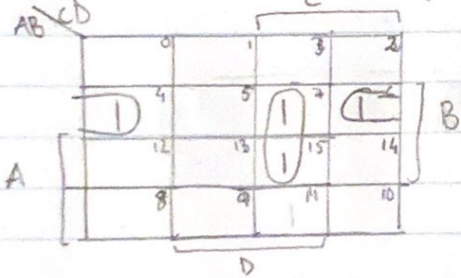
### Exercise 3-4

$$a) F(x, y, z) = \sum(2, 3, 6, 7)$$



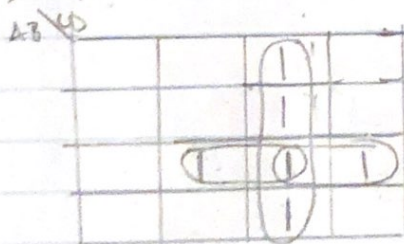
$$F = y$$

$$b) F(A, B, C, D) = \sum(4, 6, 7, 15)$$



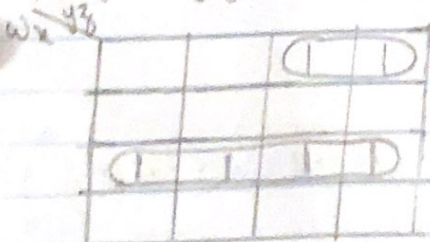
$$F = A'BD' + BCD$$

$$c) F(A, B, C, D) = \sum(3, 7, 11, 13, 14, 15)$$



$$F = CD + ABD + ABC$$

$$d) F(w, x, y, z) = \sum(2, 3, 12, 13, 14, 15)$$



$$F = w'x'y + wx$$



e)  $F(w, x, y, z) = \sum(11, 12, 13, 14, 15)$

$w, x, y, z$

1	1	1	1
		1	1

$$F = wx + wyz$$

f)  $F(w, x, y, z) = \sum(8, 10, 12, 13, 14)$

$w, x, y, z$

1	1		
1			1

$$F = wyz' + wy'z' + wx y'$$

$$F = wz' + wx y'$$

g)  $F(w, x, y, z) = \sum(0, 1, 4, 5, 10, 11, 14, 15)$

$w, x, y, z$

1	1		
1			
		1	1
		1	1

$$F = w'y' + wy$$

h)  $F(w, x, y, z) = \sum(2, 3, 6, 7, 8, 9, 12, 13)$

$w, x, y, z$

		1	1
		1	1
1	1		
1	1		

$$F = w'y + wy'$$

### Exercise 3-5

a)  $F(w, x, y, z) = \sum(1, 4, 5, 6, 12, 14, 15)$

$w, x, y, z$

	1		
1			1
		1	
			1

$$F = xz' + wx y + w'y'z$$

b)  $F(A,B,C,D) = \Sigma(2,3,6,7,12,13,14)$

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

$$F = ABC' + A'C + BCD'$$

c)  $F(w,x,y,z) = \Sigma(1,3,4,5,6,7,9,11,13,15)$

w \ xz	00	01	11	10
00		1	1	
01	1	1	1	1
11		1	1	
10		1	1	

$$F = z + w'x$$

d)  $F(A,B,C,D) = \Sigma(0,2,4,5,6,7,8,10,13,15)$

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

$$F = A'CD' + A'CD + BD + AB'D'$$

$$F = A'D' + BD + ABD'$$

### Exercise 3-8

a)  $xy + yz + xy'z$

x \ yz	00	01	11	10
00			1	
01		1	1	
11			1	1

$$F = \Sigma(3,5,6,7)$$

b)  $C'D + ABC' + ABD' + A'B'D$

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

$$F = \Sigma(1,3,5,9,12,13,14)$$

*Hilroy*



c)  $wyz + w'x' + wxz'$

$w \backslash yz$	00	01	11	10
0	1	1	1	1
1	1		1	1
			1	

$F = \Sigma(0, 1, 2, 3, 11, 12, 14, 15)$

d)  $A'B + A'CD + B'CD + BC'D$

$AB \backslash CD$	00	01	11	10
00			1	
01	1	1	1	1
10	1			
11			1	

$F = \Sigma(3, 4, 5, 6, 7, 11, 12)$

### Exercise 3-10

a)  $F(w, x, y, z) = \Sigma(0, 2, 5, 7, 8, 10, 12, 13, 14, 15)$

$w \backslash xz$	00	01	11	10
0	1			1
1	1	1	1	1
	1			1

Essentials:  $xz, x'z'$

$F = xz + x'z' + wx$

b)  $F(A, B, C, D) = \Sigma(0, 2, 3, 5, 7, 8, 10, 11, 14, 15)$

$AB \backslash CD$	00	01	11	10
00	1		1	1
01		1	1	
10			1	1
11	1		1	1

Essentials:  $AC, A'BD, B'D$

$F = AC + B'D + A'BD + B'C$

c)  $F(A, B, C, D) = \Sigma(1, 3, 4, 5, 10, 11, 12, 13, 14, 15)$

$AB \backslash CD$	00	01	11	10
00		1	1	
01	1	1		
10	1	1	1	1
11			1	1

Essentials:  $AC, BC'$

$F = BC' + AC + A'B'D$



d)  $F(w,x,y,z) = \Sigma(0,1,4,5,6,7,9,11,14,15)$

$w \backslash x \ y \ z$

1	1		
1	1	1	1
		1	1
		1	1
		1	1

Essentials:  $xy, w'y'$

$F = w'y' + xy + wx'z$

e)  $F(A,B,C,D) = \Sigma(0,1,3,4,8,9,10,13,15)$

$AB \backslash CD$

1	1	1	
		1	
		1	
	1	1	
1	1		1

Essentials:  $B'C', AB'D'$

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

f)  $F(w,x,y,z) = \Sigma(0,1,2,4,5,6,7,10,15)$

$w \backslash x \ y \ z$

1	1		1
1	1	1	1
			1
		1	
			1

Essentials:  $w'y', x'yz', xyz$

$F = w'y' + x'yz' + xyz + w'x$

Exercise 3-15

a)  $F(x,y,z) = \Sigma(0,1,4,5,6)$

$d(x,y,z) = \Sigma(2,3,7)$

$x \backslash y \ z$

1	1	x	x
1	1	x	1

$\bar{F} = 2^0 = 1$

$F = \Sigma(0,1,2,3,4,5,6,7)$

b)  $F(A,B,C,D) = \Sigma(0,6,8,13,14)$

$d(A,B,C,D) = \Sigma(2,4,10)$

$AB \backslash CD$

1			x
x			1
	1		1
1			x

$F = B'D' + CD' + ABC'D$

$F = \Sigma(0,2,6,8,10,13,14)$



c)  $F(A,B,C,D) = \Sigma(5,6,7,12,14,15)$

$d(A,B,C,D) = \Sigma(3,9,11,15)$

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

$F = BC + ABD + A'BD$

$F = \Sigma(5,6,7,12,14,15)$

d)  $F(A,B,C,D) = \Sigma(4,12,7,2,10)$

$d(A,B,C,D) = \Sigma(0,6,8)$

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

$F = C'D' + B'D' + ABC$

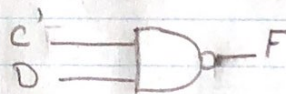
$F = \Sigma(0,2,4,6,7,8,10,12)$

### Exercise 3-16

a)  $F(A,B,C,D) = AC'D' + A'C + ABC + AB'C + A'C'D'$

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

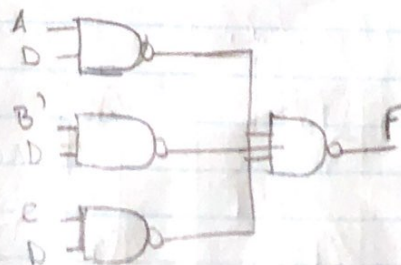
$F = C + D' = (C'D)'$



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

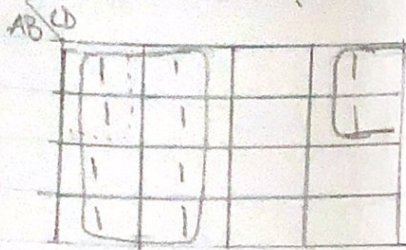
AB \ CD	00	01	11	10
00		1	1	
01			1	
11		1	1	
10		1	1	

$F = AD + B'D + CD = ((AD)' + (B'D)' + (CD)')'$

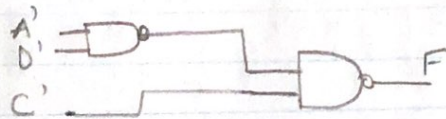




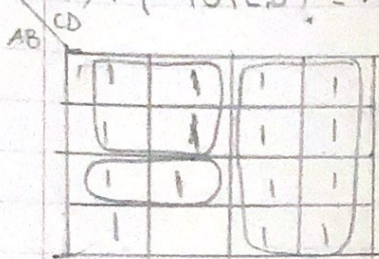
$$c) F(A,B,C,D) = (A'+C'+D')(A'+C')(C'+D')$$



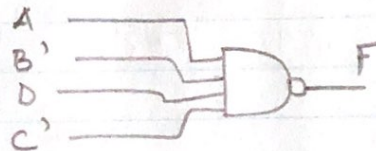
$$F = C' + A'D' = (C(A'D'))'$$



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

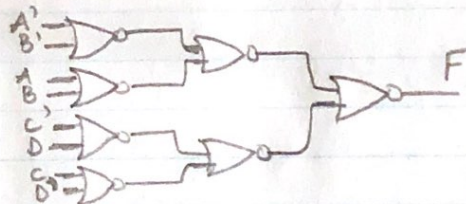
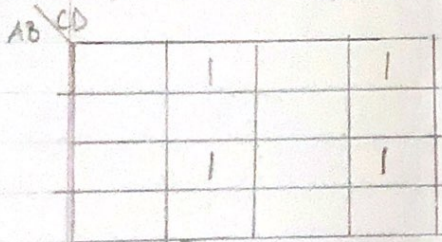


$$F = A' + B + D + C = (AB'DC')'$$



### Exercise 3-18

$$a) F(A,B,C,D) = (A \oplus B)'(C \oplus D)$$



$$\begin{aligned} F &= (A \oplus B)'(C \oplus D) \\ &= (A'B + AB')(C'D + CD) \\ &= ABC'D + ABC'D + A'B'CD + A'B'C'D \end{aligned}$$

$$\begin{aligned} F' &= (AB + A'B')(C'D' + C'D) \\ &= ((A'B')' + (A+B)')((C'+D)' + (C+D'))' \end{aligned}$$

$$b) F = (AB + A'B')(C'D + CD)$$

$$= (((AB)'(A'B'))'((C'D)'(CD'))')$$

$$F = (((AB)'(A'B'))'((C'D)'(CD'))')$$

