



DIRO
IFT 1215

DÉMONSTRATION N° 3

– Correction –

Max Mignotte

DIRO, Département d'Informatique et de Recherche Opérationnelle, local 2377.

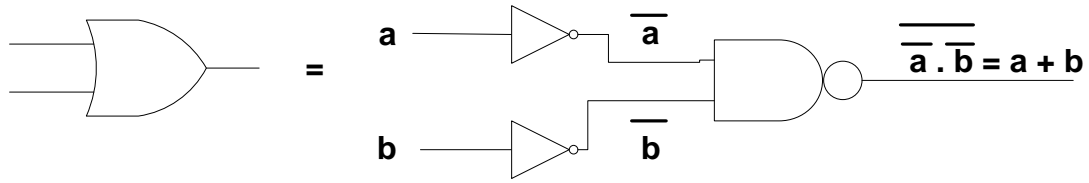
[http: //www.iro.umontreal.ca/~mignotte/ift1215/](http://www.iro.umontreal.ca/~mignotte/ift1215/)

E-mail: mignotte@iro.umontreal.ca

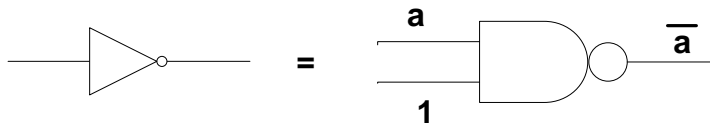
Démo 3

Exercice A.1

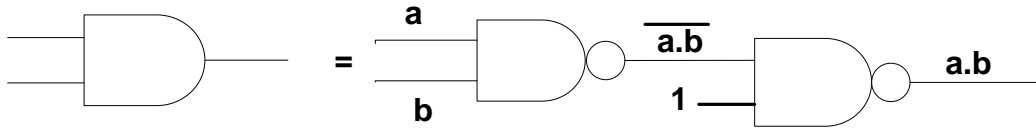
1.



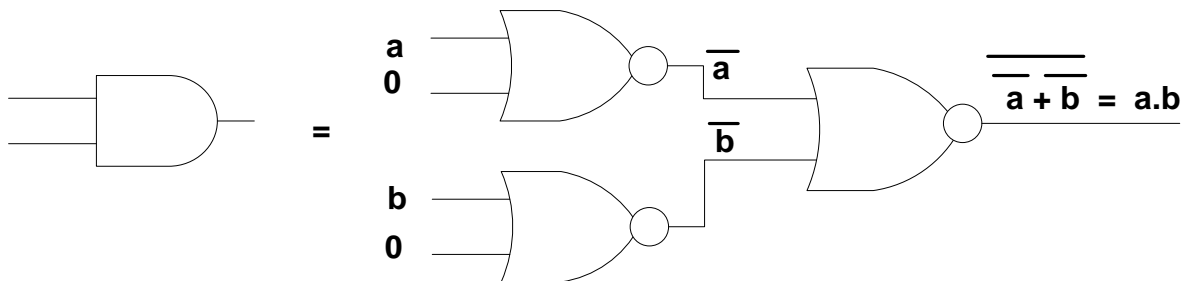
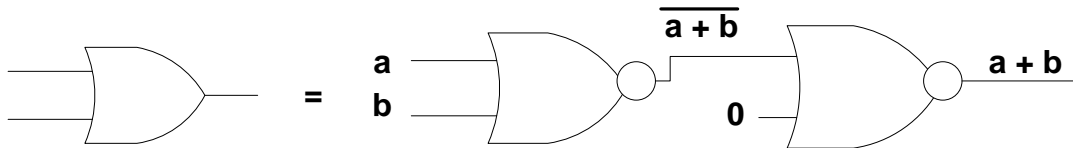
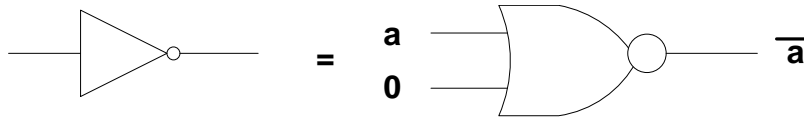
2.



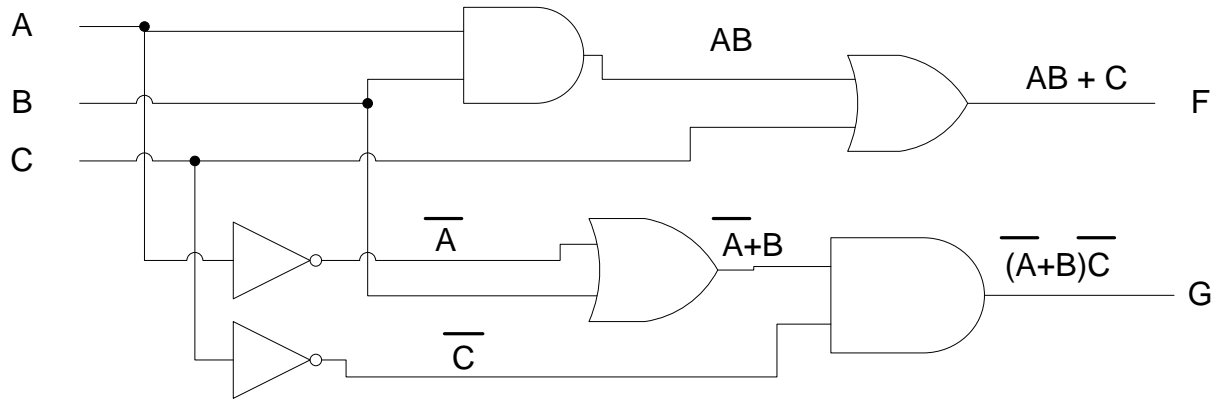
3.



Exercice A.2



Exercice A.3

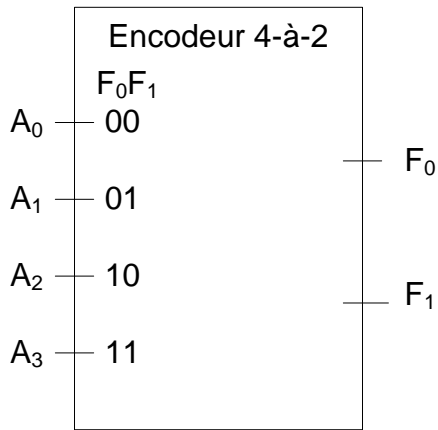


A	B	C	AB	$F = AB + C$	\bar{A}	$\bar{A} + B$	\bar{C}	$G = (\bar{A} + B)\bar{C}$
0	0	0	0	0	1	1	1	1
0	0	1	0	1	1	1	0	0
0	1	0	0	0	1	1	1	1
0	1	1	0	1	1	1	0	0
1	0	0	0	0	0	0	1	0
1	0	1	0	1	0	0	0	0
1	1	0	1	1	0	1	1	1
1	1	1	1	1	0	1	0	0

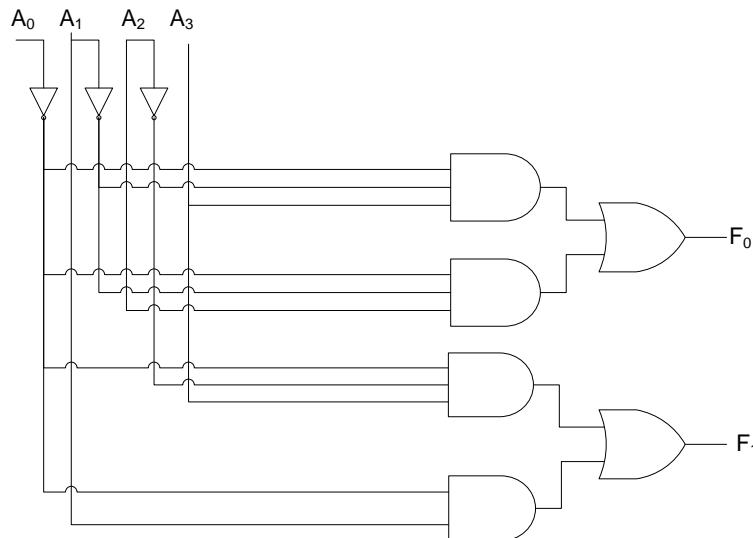
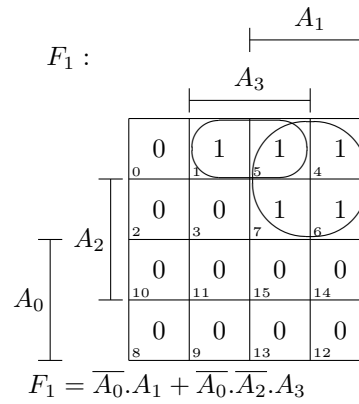
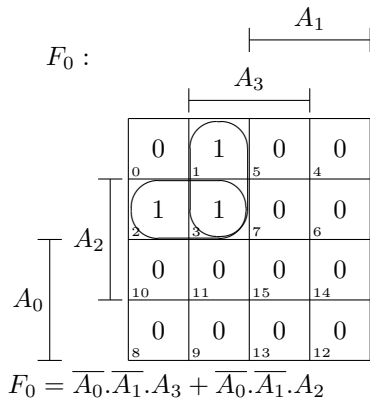
Exercice A.4

A	B	C	$A \oplus B \oplus C$
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1

Exercice A.5



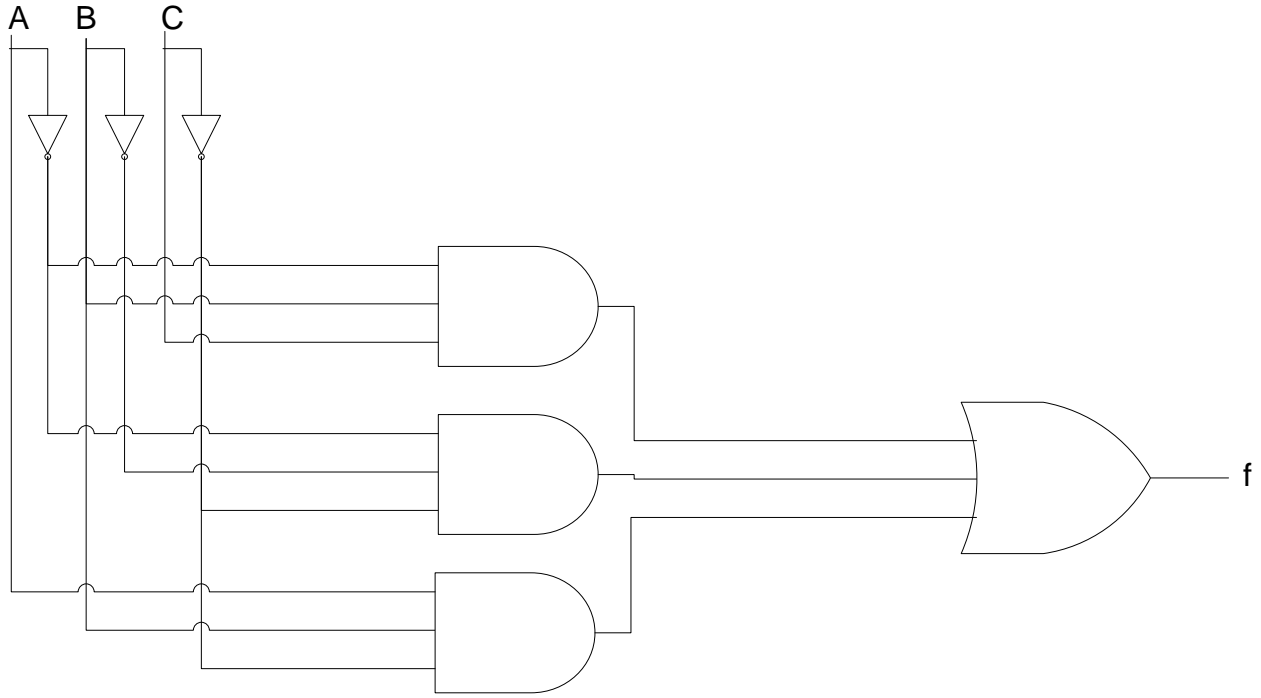
Index	A ₀	A ₁	A ₂	A ₃	F ₀	F ₁
0	0	0	0	0	0	0
1	0	0	0	1	1	1
2	0	0	1	0	1	0
3	0	0	1	1	1	0
4	0	1	0	0	0	1
5	0	1	0	1	0	1
6	0	1	1	0	0	1
7	0	1	1	1	0	1
8	1	0	0	0	0	0
9	1	0	0	1	0	0
10	1	0	1	0	0	0
11	1	0	1	1	0	0
12	1	1	0	0	0	0
13	1	1	0	1	0	0
14	1	1	1	0	0	0
15	1	1	1	1	0	0



Nombre d'entrées = 18

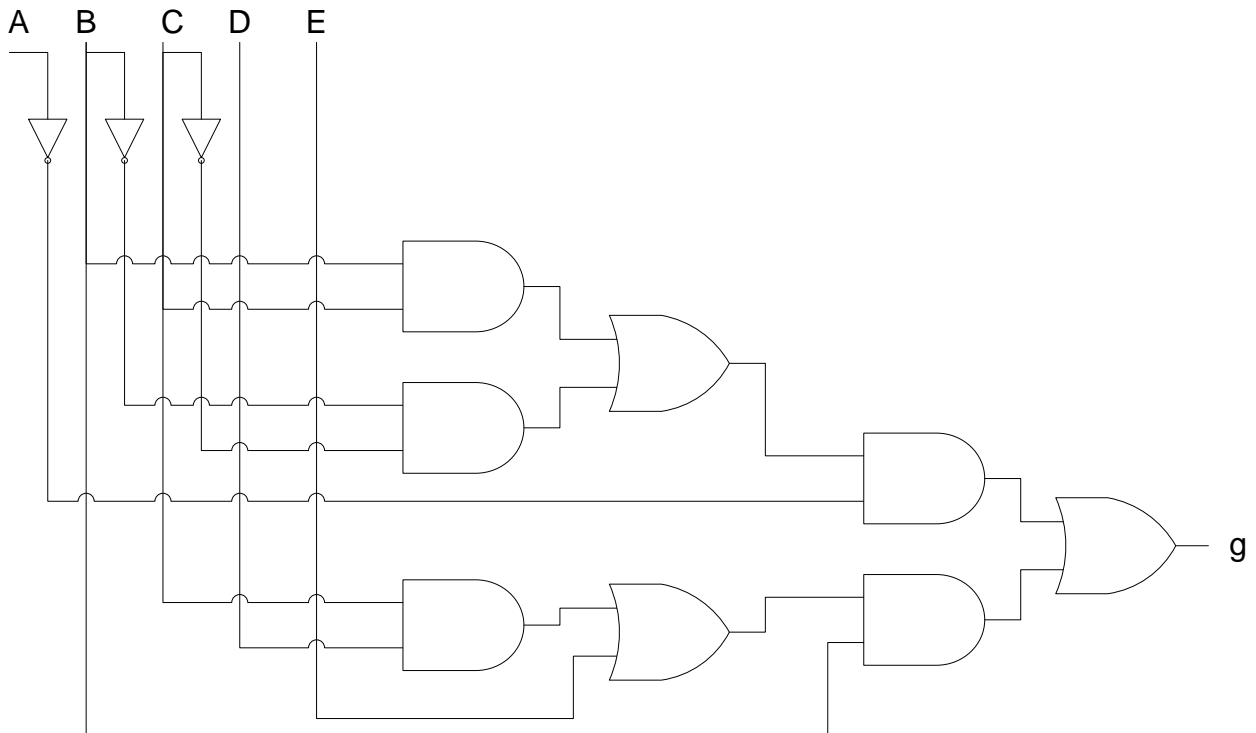
Exercice A.6

$$f(A, B, C) = \overline{A} \cdot B \cdot C + \overline{A} \cdot \overline{B} \cdot \overline{C} + A \cdot B \cdot \overline{C}$$



Exercice A.7

$$g(A, B, C, D, E) = \overline{A}(BC + \overline{B}\overline{C}) + B(CD + E)$$



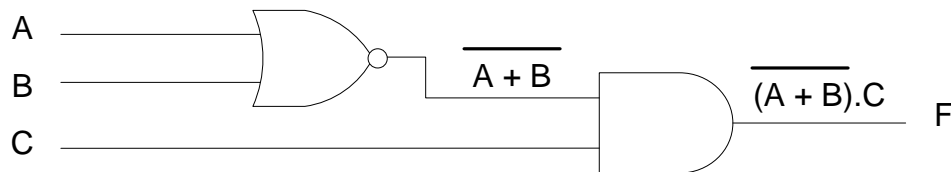
Exercice A.8

$$\begin{aligned}
 f(A, B, C) &= ABC + \overline{A}B\overline{C} \\
 g(A, B, C) &= (A \oplus C)B \\
 &= (A\overline{C} + \overline{A}C)B \\
 &= AB\overline{C} + \overline{A}BC
 \end{aligned}$$

Pour montrer que f est différente de g , il suffit de trouver trois valeurs a , b et c des variable A , B et C telles que $f(a, b, c) \neq g(a, b, c)$. Prenons $a = 1$, $b = 1$ et $c = 0$.

$$\begin{aligned}
 f(1, 1, 0) &= 1.1.0 + \overline{1}.1.\overline{0} \\
 &= 0 \\
 g(1, 1, 0) &= 1.1.\overline{0} + \overline{1}.1.0 \\
 &= 1 \\
 \text{Ainsi } f &\neq g
 \end{aligned}$$

Exercice A.9



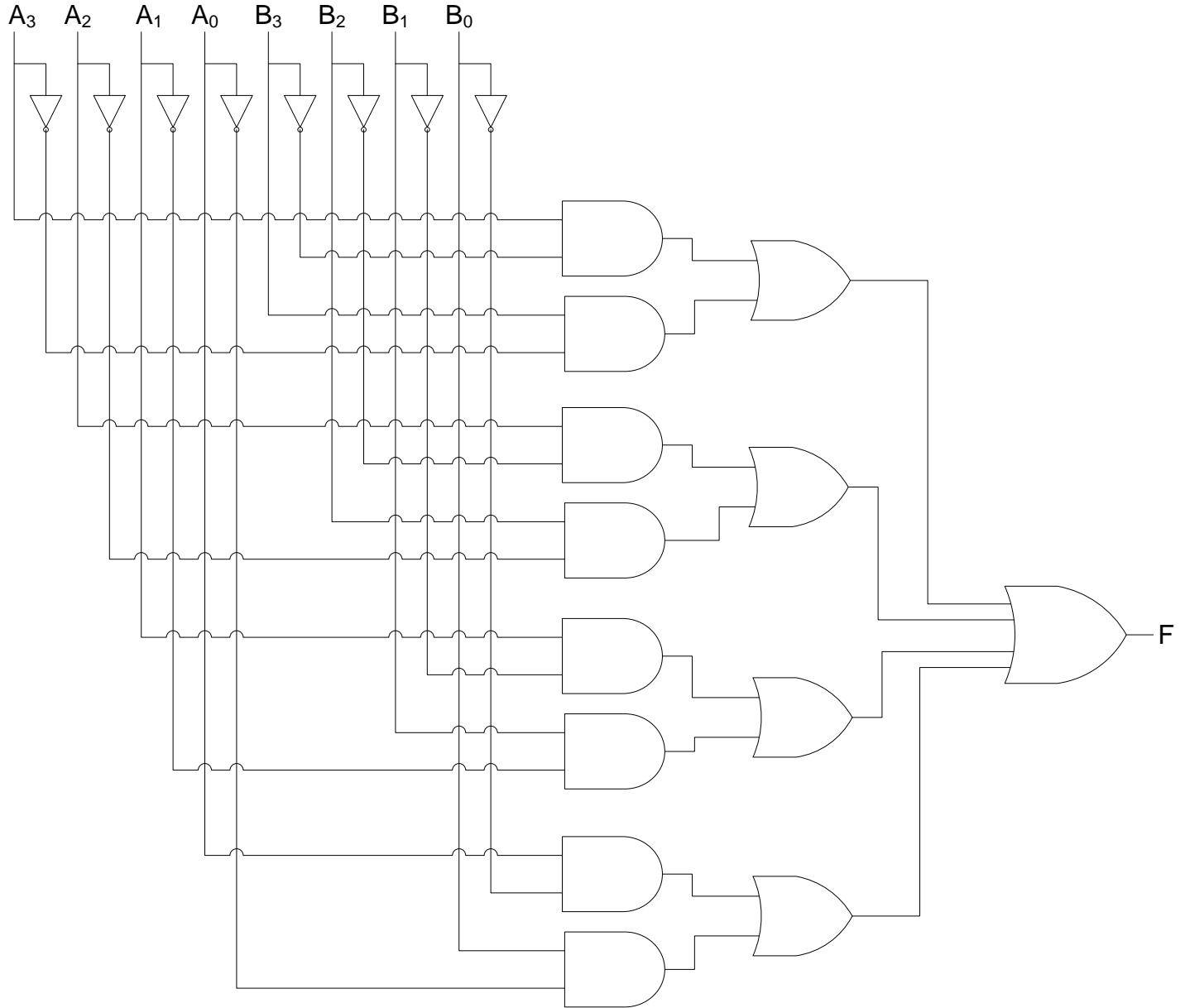
$$\begin{aligned}
 F &= \overline{A + B}.C \\
 &= \overline{A}.B.C
 \end{aligned}$$

Exercice A.10

comparateur 1-bit de A et $B = 0$ si identique, 1 autrement

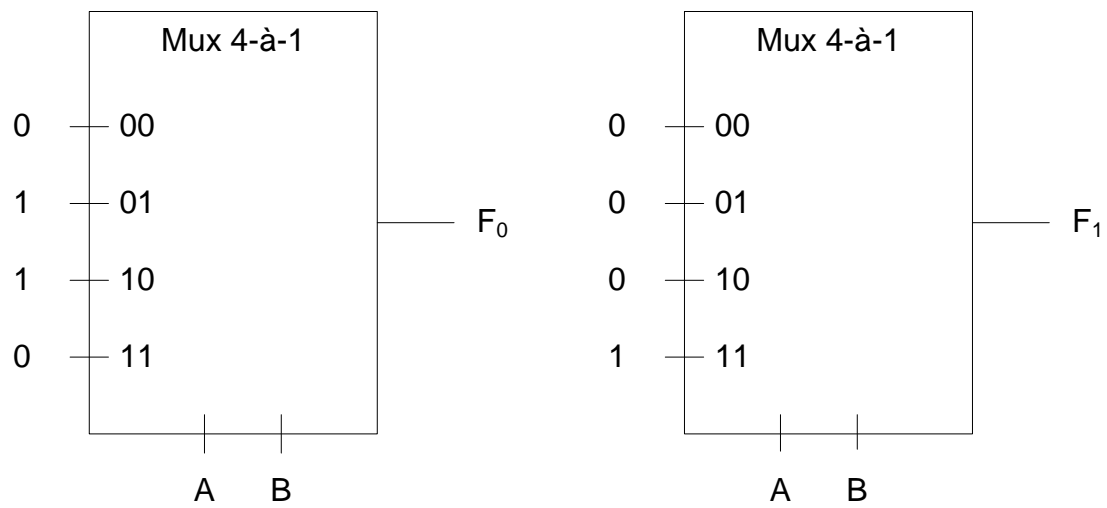
$$\begin{aligned}
 &= \overline{A}.B + A.\overline{B} \\
 &= A \oplus B
 \end{aligned}$$

comparateur 4-bit de $A_3A_2A_1A_0$ et $B_3B_2B_1B_0 = (A_3 \oplus B_3) + (A_2 \oplus B_2) + (A_1 \oplus B_1) + (A_0 \oplus B_0)$



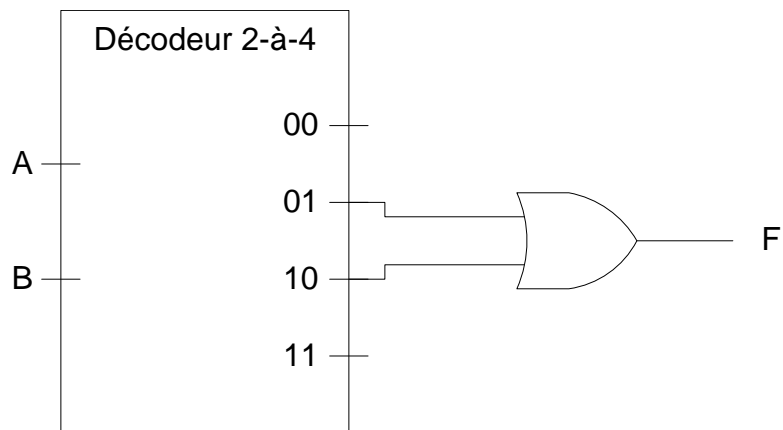
Exercice A.12

A	B	F_0	F_1
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1



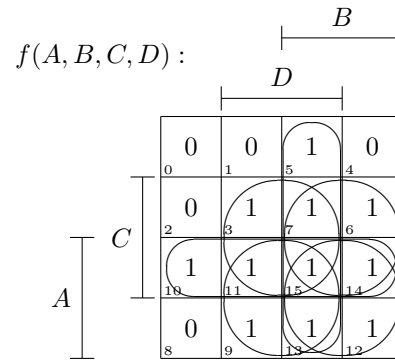
Exercice A.15

$$F(A, B) = A \oplus B = A.\bar{B} + \bar{A}.B$$



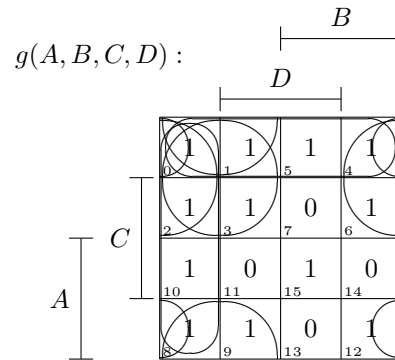
Exercice A.27

Index	A	B	C	D	f
0	0	0	0	0	0
1	0	0	0	1	0
2	0	0	1	0	0
3	0	0	1	1	1
4	0	1	0	0	0
5	0	1	0	1	1
6	0	1	1	0	1
7	0	1	1	1	1
8	1	0	0	0	0
9	1	0	0	1	1
10	1	0	1	0	1
11	1	0	1	1	1
12	1	1	0	0	1
13	1	1	0	1	1
14	1	1	1	0	1
15	1	1	1	1	1



$$f(A, B, C, D) = AB + AC + AD + BC + BD + CD$$

Index	A	B	C	D	g
0	0	0	0	0	1
1	0	0	0	1	1
2	0	0	1	0	1
3	0	0	1	1	1
4	0	1	0	0	1
5	0	1	0	1	1
6	0	1	1	0	1
7	0	1	1	1	0
8	1	0	0	0	1
9	1	0	0	1	1
10	1	0	1	0	1
11	1	0	1	1	0
12	1	1	0	0	1
13	1	1	0	1	0
14	1	1	1	0	0
15	1	1	1	1	1



$$g(A, B, C, D) = A.B.C.D + \bar{A}.\bar{B} + \bar{A}.\bar{C} + \bar{A}.\bar{D} + \bar{B}.\bar{C} + \bar{B}.\bar{D} + \bar{C}.\bar{D}$$

Exercice A.28

Index	A	B	C	D	f
0	0	0	0	0	d
1	0	0	0	1	0
2	0	0	1	0	1
3	0	0	1	1	0
4	0	1	0	0	0
5	0	1	0	1	0
6	0	1	1	0	0
7	0	1	1	1	0
8	1	0	0	0	1
9	1	0	0	1	d
10	1	0	1	0	1
11	1	0	1	1	1
12	1	1	0	0	0
13	1	1	0	1	0
14	1	1	1	0	0
15	1	1	1	1	0

