B. Les seize opérateurs logique

a	b	y_0
0	0	0
0	1	0
1	0	0
1	1	0

$\mathbf{y_0 = 0}$

$y_0 = \left|\begin{array}{c|c|c|c} a & a & \overline{a} & \overline{a} \\ b & \overline{b} & b & \overline{b} \end{array}\right|$

$y_0 = \left|\begin{array}{cc} a\overline{a} \\ b\overline{b} \end{array}\right|$

0

a	b	y_1
0	0	0
0	1	0
1	0	0
1	1	1

$aetb$

$y_1 = ab$

$y_1 = \left|\begin{array}{c|c|c|c} a & a & \overline{a} & \overline{a} \\ b & \overline{b} & b & \overline{b} \end{array}\right| = \left|\begin{array}{c|c} a & \overline{a} \\ b\overline{b} & b \end{array}\right|$

$y_1 = a \left|\begin{array}{c|c} \overline{a} \\ b \end{array}\right| = \left|\begin{array}{cc} a\overline{a} \\ ab \end{array}\right|$

1

a	b	y_2
0	0	0
0	1	0
1	0	1
1	1	0

$\mathbf{y_2 = a\overline{b}}$

$y_2 = \left|\begin{array}{c|c|c|c} a & a & \overline{a} & \overline{a} \\ b & \overline{b} & b & \overline{b} \end{array}\right| = \left|\begin{array}{c|c} a & \overline{a} \\ b\overline{b} & \overline{b} \end{array}\right|$

$y_2 = a \left|\begin{array}{c|c} \overline{a} \\ \overline{b} \end{array}\right| = \left|\begin{array}{cc} a\overline{a} \\ a\overline{b} \end{array}\right|$

2

a	b	y_3
0	0	0
0	1	0
1	0	1
1	1	1

$\mathbf{y_3 = a}$

$y_3 = \left|\begin{array}{c|c|c|c} a & a & \overline{a} & \overline{a} \\ b & \overline{b} & b & \overline{b} \end{array}\right| = \left|\begin{array}{c|c} a & \overline{a} \\ b\overline{b} & \overline{b} \end{array}\right| = \left|\begin{array}{cc} a\overline{b} \\ ab \end{array}\right|$

$y_3 = a \left|\begin{array}{c|c} \overline{b} \\ b \end{array}\right| = \left|\begin{array}{cc} a\overline{b} \\ ba \end{array}\right|$

3

a	b	y_4
0	0	0
0	1	1
1	0	0
1	1	0

$\mathbf{y_4 = \overline{a}b}$

$y_4 = \left|\begin{array}{c|c|c|c} a & \overline{a} & \overline{a} & \overline{a} \\ b & b & \overline{b} & \overline{b} \end{array}\right| = \left|\begin{array}{c|c} a & \overline{a} \\ b & \overline{b}b \end{array}\right|$

$y_4 = \left|\begin{array}{c|c} a & \overline{a} \\ b & \end{array}\right| = \left|\begin{array}{cc} a\overline{a} \\ b\overline{a} \end{array}\right|$

4

a	b	y_5
0	0	0
0	1	1
1	0	0
1	1	1

$\mathbf{y_5 = b}$

$y_5 = \left|\begin{array}{cc} \overline{a}b \\ ab \end{array}\right| = \left|\begin{array}{c|c} \overline{a} & \\ a & b \end{array}\right|$

$y_5 = \left|\begin{array}{c|c|c|c} a & \overline{a} & a\overline{a} & ab \\ b & \overline{b} & b & b\overline{a} \end{array}\right|$

5

a	b	y_6
0	0	0
0	1	1
1	0	1
1	1	0

$y_6 = \left|\begin{array}{cc} \overline{a}b \\ a\overline{b} \end{array}\right|$

$y_6 = \left|\begin{array}{c|c} \overline{a} & a \\ \overline{b} & b \end{array}\right|$

6

a	b	y_7
0	0	0
0	1	1
1	0	1
1	1	1

$y_7 = \left|\begin{array}{c} a \\ b \end{array}\right|$

$y_7 = \left|\begin{array}{c} \overline{a}b \\ a\overline{b} \\ ab \end{array}\right| = \left|\begin{array}{c|c} & \overline{a}b \\ a & \overline{b} \\ & b \end{array}\right|$

$y_7 = \left|\begin{array}{cc} \overline{a}b \\ a \end{array}\right| = \left|\begin{array}{cc} \overline{a}b \\ aa \end{array}\right|$

7

a	b	y_8
0	0	1
0	1	0
1	0	0
1	1	0

$\mathbf{y_8 = \overline{a}\overline{b}}$

$y_8 = \left|\begin{array}{c|c|c|c} a & \overline{a} & \overline{a} & \overline{a} \\ b & b & \overline{b} & \overline{b} \end{array}\right| = \left|\begin{array}{c|c|c} a & \overline{a} & \\ b & b\overline{b} & \end{array}\right|$

$y_8 = \left|\begin{array}{cc} a\overline{a} \\ b\overline{a} \end{array}\right| = \left|\begin{array}{c|c|c} a & \overline{a} & \\ b & & \end{array}\right| = \overline{\left|\begin{array}{c} a \\ b \end{array}\right|}$

8

a	b	y_9
0	0	1
0	1	0
1	0	0
1	1	1

$\mathbf{y_9 = \left|\begin{array}{c} \overline{a}\overline{b} \\ ab \end{array}\right|}$

$y_9 = \left|\begin{array}{c|c} a & \overline{a} \\ b & \end{array}\right|$

$y_9 = \left|\begin{array}{c|c} a & b \\ b & \overline{a} \end{array}\right| = \left|\begin{array}{cc} ab \\ b\overline{a} \end{array}\right|$

9

a	b	y_{10}
0	0	1
0	1	0
1	0	1
1	1	0

$\mathbf{y_{10} = \overline{b}}$

$y_{10} = \left|\begin{array}{c|c|c|c} a & a & \overline{a} & \\ b & \overline{b} & a & \overline{b} \end{array}\right| = \left|\begin{array}{c|c} a & \overline{a} \\ b & \overline{b} \end{array}\right|$

$y_{10} = \left|\begin{array}{cc} a\overline{a} \\ \overline{b} \end{array}\right| = \left|\begin{array}{cc} a\overline{b} \\ \overline{b}a \end{array}\right|$

10

a	b	y_{11}
0	0	1
0	1	0
1	0	1
1	1	1

$\mathbf{y_{11} = b \to a}$

$y_{11} = \left|\begin{array}{c} \overline{a}\overline{b} \\ a\overline{b} \\ ab \end{array}\right| = \left|\begin{array}{c|c} & \overline{a}\overline{b} \\ a & \overline{b} \\ & b \end{array}\right|$

$y_{11} = \left|\begin{array}{cc} \overline{a}\overline{b} \\ a \end{array}\right| = \left|\begin{array}{cc} \overline{a}\overline{b} \\ aa \end{array}\right| = \left|\begin{array}{c} a \\ \overline{b} \end{array}\right|$

11

a	b	y_{12}
0	0	1
0	1	1
1	0	0
1	1	0

$\mathbf{y_{12} = \overline{a}}$

$y_{12} = \left|\begin{array}{cc} \overline{a}\overline{b} \\ \overline{a}b \end{array}\right| = \overline{a} \left|\begin{array}{c|c} \overline{b} \\ b \end{array}\right| = \left|\begin{array}{c|c} \overline{a} & \\ b & \overline{b} \end{array}\right|$

$y_{12} = \left|\begin{array}{c} \overline{a} \\ b\overline{b} \end{array}\right| = \left|\begin{array}{cc} \overline{a}\overline{b} \\ b\overline{a} \end{array}\right|$

12

a	b	y_{13}
0	0	1
0	1	1
1	0	0
1	1	1

$\mathbf{y_{13} = \left|\begin{array}{c} \overline{a} \\ b \end{array}\right|}$

$y_{13} = \left|\begin{array}{c} \overline{a}\overline{b} \\ \overline{a}b \\ ab \end{array}\right| = \left|\begin{array}{c|c} \overline{a} & \overline{b} \\ & b \\ ab & \end{array}\right| = \left|\begin{array}{cc} \overline{a}\overline{a} \\ ab \end{array}\right|$

$y_{13} = \left|\begin{array}{c} \overline{a}\overline{b} \\ b\overline{a} \\ ab \end{array}\right| = \left|\begin{array}{c|c|c} \overline{a} & \overline{b} & \\ b & \overline{a} & \\ ab & & \end{array}\right| = \left|\begin{array}{cc} \overline{a}\overline{b} \\ b \end{array}\right| \left|\begin{array}{c} \\ \overline{a} \end{array}\right|$

13

a	b	y_{14}
0	0	1
0	1	1
1	0	1
1	1	0

$y_{14} = \left|\begin{array}{c} \overline{a} \\ \overline{b} \end{array}\right| = \overline{a\overline{b}}$

$y_{14} = \left|\begin{array}{c} \overline{a}\overline{b} \\ \overline{a}b \\ a\overline{b} \end{array}\right| = \left|\begin{array}{c|c} \overline{a} & \overline{b} \\ b & \\ a\overline{b} & \end{array}\right| = \left|\begin{array}{c} \overline{a} \\ a\overline{b} \end{array}\right|$

$y_{14} = \left|\begin{array}{c} \overline{a}\overline{b} \\ a\overline{b} \end{array}\right|$

14

a	b	y_{15}
0	0	1
0	1	1
1	0	1
1	1	1

$\mathbf{y_7 = 1}$

$y_{15} = \left|\begin{array}{c} \overline{a}\overline{b} \\ \overline{a}b \\ a\overline{b} \\ ab \end{array}\right| = \left|\begin{array}{c|c} \overline{a} & \overline{b} \\ b & \\ & \\ a & \overline{b} \\ & b \end{array}\right|$

$= \left|\begin{array}{cc} \overline{a} & \overline{b} \\ a & b \end{array}\right|$

15