

基本の論理演算

否定	NOT	$\overline{0} = 1 \quad \overline{1} = 0$			
論理積	AND	$0 \cdot 0 = 0$	$0 \cdot 1 = 0$	$1 \cdot 0 = 0$	$1 \cdot 1 = 1$
論理和	OR	$0 + 0 = 0$	$0 + 1 = 1$	$1 + 0 = 1$	$1 + 1 = 1$
否定論理積	NAND	$\overline{0 \cdot 0} = 1$	$\overline{0 \cdot 1} = 1$	$\overline{1 \cdot 0} = 1$	$\overline{1 \cdot 1} = 0$
否定論理和	NOR	$\overline{0 + 0} = 1$	$\overline{0 + 1} = 0$	$\overline{1 + 0} = 0$	$\overline{1 + 1} = 0$
排他的論理和	EXOR	$0 \oplus 0 = 0$	$0 \oplus 1 = 1$	$1 \oplus 0 = 1$	$1 \oplus 1 = 0$

NOT

X	$\overline{X}$
0	1
1	0

AND

X	Y	$X \cdot Y$
0	0	0
0	1	0
1	0	0
1	1	1

OR

X	Y	$X + Y$
0	0	0
0	1	1
1	0	1
1	1	1

NAND

X	Y	$\overline{X \cdot Y}$
0	0	1
0	1	1
1	0	1
1	1	0

NOR

X	Y	$\overline{X + Y}$
0	0	1
0	1	0
1	0	0
1	1	0

EXOR

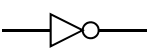
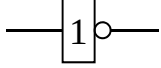
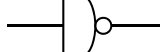
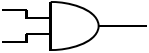
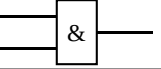
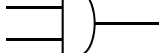
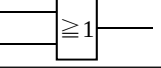
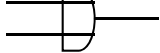
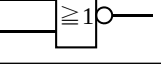
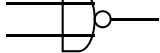
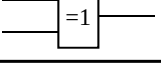
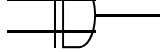
X	Y	$X \oplus Y$
0	0	0
0	1	1
1	0	1
1	1	0

$$X \oplus Y = \overline{X} \cdot Y + X \cdot \overline{Y}$$

論理演算の公理

有界則	$X \cdot 0 = 0$	$X + 1 = 1$
同一則	$X \cdot 1 = X$	$X + 0 = X$
べき等則	$X \cdot X = X$	$X + X = X$
相補則	$X \cdot \overline{X} = 0$	$X + \overline{X} = 1$
二重否定	$\overline{\overline{X}} = X$	
交換則	$X \cdot Y = Y \cdot X$	$X + Y = Y + X$
結合則	$X \cdot (Y \cdot Z) = (X \cdot Y) \cdot Z$	$X + (Y + Z) = (X + Y) + Z$
分配則	$X \cdot (Y + Z) = X \cdot Y + X \cdot Z$	$X + Y \cdot Z = (X + Y) \cdot (X + Z)$
吸収則	$X + X \cdot Y = X$	$X \cdot (X + Y) = X$
ド・モルガン則	$\overline{X \cdot Y} = \overline{X} + \overline{Y}$	$\overline{X + Y} = \overline{X} \cdot \overline{Y}$

論理ゲート

	MIL記号	JIS記号	慣用記号
NOT			
AND			
OR			
NAND			
NOR			
EXOR			

NOT, AND, ORゲートの回路

