

Logic Gates

AND

- Boolean multiplication and Logical conjunction
- Basic gate



Input 1	Input 2	Output
0	0	0
0	1	0
1	0	0
1	1	1

NAND (NOT AND)

- Derived gate; Universal gate
- 7400-TTL and 4011-CMOS
- 3-input NAND - 7410-TTL
- 4-input NAND - 7420-TTL
- 8-input NAND - 7430-TTL



Input 1	Input 2	Output
0	0	1
0	1	1
1	0	1
1	1	0

NOR (NOT OR)

- Derived gate; Universal gate
- 7402-TTL and 4001-CMOS
- 3-input NOR - 7427-TTL
- 5-input NOR - 74260-TTL
- 8-input NOR - 744078-TTL



Input 1	Input 2	Output
0	0	1
0	1	0
1	0	0
1	1	0

NOT (Inverter)

- Boolean Complement and Logical negation
- Produces the 1's complement
- Unary logic gate; Basic gate
- NOT substitute - combine NAND inputs
- NOT substitute - combine NOR inputs
- 7404-TTL and 4049-CMOS



Input	Output
0	1
1	0

OR

- Boolean addition and Logical disjunction
- Basic gate
- 74LS32-TTL, 74HC32-TTL, and 4071-CMOS



Input 1	Input 2	Output
0	0	0
0	1	1
1	0	1
1	1	1

XNOR- Exclusive NOT OR (NXOR)

- Derived gate
- 74266-TTL and 4077-CMOS



Input 1	Input 2	Output
0	0	1
0	1	0
1	0	0
1	1	1

XOR (Exclusive OR)

- Addition modulo 2 (addition without carry)
- Derived gate
- A "Toffoli gate" or "reversible XOR" is XOR with an additional output (one of the inputs)



Input 1	Input 2	Output
0	0	0
0	1	1
1	0	1
1	1	0