

Logic Gates

Electrical Engineering

Seven gates, their Boolean expressions, and when each output is 1.

A prime mark means the complement, so A' reads as not A.

Gate	Expression	Output is 1 when
AND	$A \cdot B$	Both inputs are 1
OR	$A + B$	At least one input is 1
NOT	A'	The input is 0
NAND	$(A \cdot B)'$	Not both inputs are 1
NOR	$(A + B)'$	Both inputs are 0
XOR	$A'B + AB'$	The two inputs differ
XNOR	$AB + A'B'$	The two inputs match

NAND and NOR are each functionally complete: any logic function at all can be built from copies of one gate type.