CSC 258
Four common Boolean operators

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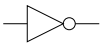
not 

This is a unary operator; the rest are binary operators.
Our symbol: an overbar, e.g. $\bar{p}$
Other common symbols: ~ ′ ¬
Funny note: The ′ symbol is postfix; others are prefix.
In e-mail: Use an apostrophe for ′; may require more parentheses than overbar
Truth table:

p	$\bar{p}$
0	1
1	0

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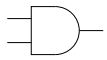
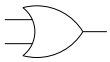
and 

Our symbol: multiplication
Other common symbols: ∧ & ∩
Truth table:

p	q	pq
0	0	0
0	1	0
1	0	0
1	1	1

or 

Our symbol: +
Other common symbols: ∨ | ∪
Truth table:

p	q	$p + q$
0	0	0
0	1	1
1	0	1
1	1	1

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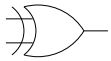
exclusive or (also called "xor") 

Our symbol: ⊕
In e-mail: Use the word "xor"
Truth table:

p	q	$p \oplus q$
0	0	0
0	1	1
1	0	1
1	1	0

CSC 258
Some Boolean algebra identities

identity laws:

$a \cdot 1 = a$

$a + 0 = a$

base laws:

$a \cdot 0 = 0$

$a + 1 = 1$

idempotence:

$aa = a$

$a + a = a$

excluded middle:

$a + \bar{a} = 1$

non-contradiction:

$a \cdot \bar{a} = 0$

double-negation:

$\bar{\bar{a}} = a$

exclusive-or definition:

$a \oplus b = a\bar{b} + \bar{a}b$

commutative:

$ab = ba$

$a + b = b + a$

$a \oplus b = b \oplus a$

associative:

$(ab)c = a(bc)$

$(a + b) + c = a + (b + c)$

$(a \oplus b) \oplus c = a \oplus (b \oplus c)$

distributive:

$a(b + c) = ab + ac$

$a + bc = (a + b)(a + c)$

de Morgan's laws:

$\overline{a + b} = \bar{a}\bar{b}$

$\overline{(ab)} = \bar{a} + \bar{b}$

etc

absorption:

$a(a + b) = a$

$a + ab = a$

$a + \bar{a}b = a + b$

no name:

$ab + a\bar{b} = a$