

Boolean Logic

- Truth tables describe the behavior of logical operators

Operand(s)	Result
Operand Values	Result Values

A	not A
0	1
1	0

- The **not** operator **flips** the value of its operand

Boolean Logic

- **and** operator
 - Takes two operands
 - Produces one result
 - Result is true if and only if both operands are true

A	B	A and B
0	0	0
0	1	0
1	0	0
1	1	1

Boolean Logic

- **or** operator
 - Takes two operands
 - Produces one result
 - **Result is true if one operand is true (or both operands are true)**

A	B	A or B
0	0	0
0	1	1
1	0	1
1	1	1

Boolean Logic

- **Exclusive or operator**
 - Takes two operands
 - Produces one result
 - Result is true if exactly one operand is true

A	B	A xor B
0	0	0
0	1	1
1	0	1
1	1	0

Boolean Logic

- When is **not(A and B)** true?

A	B	A and B	not (A and B)
0	0	0	1
0	1	0	1
1	0	0	1
1	1	1	0

- We call this operation **nand**

Boolean Logic

- When is **not(A or B)** true?

A	B	A or B	not (A or B)
0	0	0	1
0	1	1	0
1	0	1	0
1	1	1	0

- We call this operation **nor**

Boolean Logic

- Example:
 - Construct a truth table for A and (B or not C):

A	B	C	not C	B or not C	A and (B or not C)
0	0	0	1	1	0
0	0	1	0	0	0
0	1	0	1	1	0
0	1	1	0	1	0
1	0	0	1	1	1
1	0	1	0	0	0
1	1	0	1	1	1
1	1	1	0	1	1