

Basic Logic

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These slides introduce simple logic concepts

Basic Logic

- Common Sense Logic

- Defining an expression(operand) as **True** or **False**

- The Earth is round → T
 - MSOE is in Illinois → F
 - 5 is not an integer → F
 - $5 + 8 = 13$ → T
 - $\#ants < \#bears$ → F

A = the sun revolves around the earth

B = It is no longer 1957

- A → F
 - B → T

Basic Logic

- Common Sense Logic
 - Logic Expression
 - Operation Operand \rightarrow T or F
 - Operand Operation Operand \rightarrow T or F
 - Operations
 - NOT – flips the evaluation of the operand
 - T \rightarrow F or F \rightarrow T
 - OR – evaluates as True if **either** operand is True
 - AND – evaluates as True if **both** operands are True

Basic Logic

- Truth Table
 - Shows the result(s) of a logical operation

All possible combinations of the inputs

Operation		
Inputs		Result
F	F	T
F	T	F
T	F	F
T	T	T

Basic Logic

- **NOT** – flips the evaluation of the operand
 - **T** → **F** or **F** → **T**
 - **not operand**

A = the earth is round

B = 5 > 8

not A → F

not B → T

not (not A) → T

NOT	
A	Not A
F	T
T	F

Basic Logic

- **OR** – evaluates as True if **either** operand is true
 - op1 or op2

A = the earth is round

B = $5 > 8$

C = most cars have 4 wheels

A or B → T

A or C → T

B or C → T

(not A) or B → F

OR		
A	B	A or B
F	F	F
F	T	T
T	F	T
T	T	T

Basic Logic

- **AND** – evaluates as True if **both** operands are true
 - op1 and op2

A = the earth is round

B = $5 > 8$

C = most cars have 4 wheels

A and B → F

A and C → T

B and C → F

A and (not B) → T

AND		
A	B	A and B
F	F	F
F	T	F
T	F	F
T	T	T