

# Logical Operators

Comparing pairs of TRUE and FALSE

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# Logical Operators

- And  $\&\&$
- Or  $\parallel$
- Exclusive Or (XOR)  $\wedge$
- Not  $!$



# Logical Operators

- What are they used for?
  - They compare two TRUE or FALSE values.
  - They compare pairs of relational expressions.
  - The comparison results in TRUE or FALSE.



# And Operator

- Represented by the symbol **&&**
- Requires both in the pair to be TRUE for the whole pair to be TRUE
- $( a == b \ \&\& \ b < c )$



# Comparing Values

- Truth Table for **&&**

TRUE && TRUE	TRUE
TRUE && FALSE	FALSE
FALSE && TRUE	FALSE
FALSE && FALSE	FALSE



# OR Operator

- Represented by the symbol **`||`**
- Requires at least ONE of the pair to be TRUE for the whole pair to be TRUE
- `( a == b || b < c )`



# Comparing Values

- Truth Table for `||`

TRUE		TRUE	TRUE
TRUE		FALSE	TRUE
FALSE		TRUE	TRUE
FALSE		FALSE	FALSE



# XOR Operator

- Represented by the symbol  $\wedge$
- Also called “Exclusive Or”
- Requires **ONLY ONE** of the pair to be TRUE for the whole pair to be TRUE
- If more than one are true, the result is **FALSE**.





# Comparing Values

- Truth Table for  $\wedge$

TRUE $\wedge$ TRUE	FALSE
TRUE $\wedge$ FALSE	TRUE
FALSE $\wedge$ TRUE	TRUE
FALSE $\wedge$ FALSE	FALSE



# Not Operator

- Represented by the symbol !
- Flips a value
  - TRUE becomes FALSE
  - FALSE becomes TRUE
- Is not used for comparison
- If more than one are true, the result is FALSE.



# Not Operator

- Not operator negates.
- Turns **TRUE** to **FALSE** and vice versa

$a \neq b$  the same as  $! (a === b)$

$a < b$  the same as  $! (a < b)$



# Multiple Conditions

- When dealing with more complex conditions, you can use parenthesis to group your logic.
  - `if( a == b || ( b == c && c == 5) )`

# Common Misconceptions

Stuff to watch out for, Stuff to remember

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# Common Misconceptions

- How do we see if a, b and c all have the same value?



# Common Misconceptions

- How do we see if a, b and c all have the same value?

a === b === c



# Common Misconceptions

- How do we see if a, b and c all have the same value?

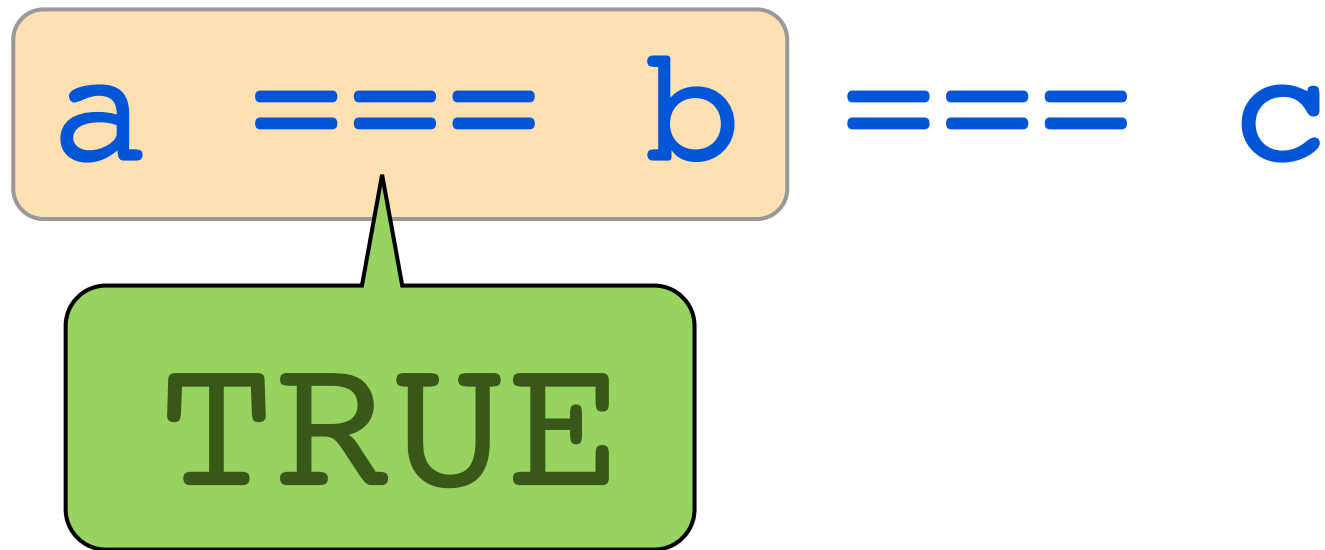
a === b === c





# Common Misconceptions

- How do we see if a, b and c all have the same value?





# Common Misconceptions

- How do we see if a, b and c all have the same value?

~~a === b === c~~

a === b && b === c



# Things to Remember

- Relational Operators go in between PAIRS of objects.
- Logical Operators go in between Relational Expressions or Boolean values.
- Always work in pairs.