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<td><strong>a and b</strong></td>
<td><strong>a or b</strong></td>
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Programming languages make decisions in binary terms

Two boolean values: True and False

True and False can be assigned to variables, just like strings and numbers

Logical operators for boolean values: ==, !=, and, or, and not
Equivalence

\[ a \equiv b \]

Evaluates to True when \( a \) and \( b \) are the same:

- Both \( a \) and \( b \) are True
- Both \( a \) and \( b \) are False
Negation

\(a \neq b\)

Evaluates to True when \(a\) and \(b\) are \emph{not} the same:

- \(a\) is True and \(b\) is False
- \(a\) is False and \(b\) is True
And

a and b

Evaluates to True when both a and b are True:

- a is True and b is True
Or
\[ a \text{ or } b \]

Evaluates to True when \( a \) is True or \( b \) is True:

- \( a \) is True and \( b \) is True
- \( a \) is True and \( b \) is False
- \( a \) is False and \( b \) is True
Not
not a

Evaluates to True when a is False and False when a is True:

• a is False
• b is False
### Truth Table

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Order of Execution
Highest to Lowest

a == b
a != b
not a
a and b
a or b
Conditional Statements

Allow you to change the flow of a Python program
Consist of if-statements
Introduce code blocks
If/Else-Statements

if
else

Begins with the keyword if
Followed by a Boolean expression
May be followed by an else block for alternate conditions
If/Else If-Statements

If-statement with more than one condition

Multiple elif blocks are permitted

else block is optional
Semantic Indentation

Code blocks are meaningful in Python

Indentation marks blocks of code and is not an optional format

Code blocks must be indented consistently by the same amount

As a result, Python code is clearer and more legible
Introduction to Computer Programming
CSCI-UA 2

Control Structures
Boolean Logic and If-Statements