

Type bool: Booleans in Python

Boolean values

The Python type bool has two values: True and False.

Comparison operators

The comparison operators take two values and produce a Boolean value.

Description	Operator	Example	Result of example
less than	<	3 < 4	True
greater than	>	3 > 4	False
equal to	==	3 == 4	False
greater than or equal to	>=	3 >= 4	False
less than or equal to	<=	3 <= 4	True
not equal to	!=	3 != 4	True

Logical operators

There are also three logical operators that produce Boolean values: and, or, and not.

Description	Operator	Example	Result of example
not	not	not (80 >= 50)	False
and	and	(80 >= 50) and (70 <= 50)	False
or	or	(80 >= 50) or (70 <= 50)	True

The and Logic Table

The and operator produces True if and only if both expressions are True.

As such, if the first operand is False, the second condition will not even be checked, because it is already known that the expression will produce False.

expr1	expr2	expr1 and expr2
True	True	True
True	False	False
False	True	False
False	False	False

The or Logic Table

The or operator evaluates to True if and only if at least one operand is True.

As such, if the first operand is True, the second condition will not even be checked, because it is already known that the expression will produce True.

expr1	expr2	expr1 or expr2
True	True	True
True	False	True
False	True	True
False	False	False

The not Logic Table

The not operator evaluates to True if and only if the operand is False.

expr1	not expr1
True	False
False	True

Double-negation can be simplified. For example, the expression not not (4 == 5) can be simplified to 4 == 5.

Order of Precedence for Logical Operators

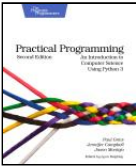
The order of precedence for logical operators is: not, and, then or. We can override precedence using parentheses and parentheses can also be added to make things easier to read and understand.

For example, the not operator is applied before the or operator in the following code:

```
>>> grade = 80
>>> grade2 = 90
>>> not grade >= 50 or grade2 >= 50
True
```

Parentheses can be added to make this clearer: (not grade >= 50) or (grade2 >= 50)

Alternatively, parentheses can be added to change the order of operations: not ((grade >= 50) or (grade2 >= 50))



- Chapter 5.1 A Boolean Type

Optional reading