Python Operators

Python Operators

Operators are used to perform operations on variables and values.

In the example below, we use the + operator to add together two values:

Example[Get your own Python Server](https://www.w3schools.com/python/python_server.asp)

print(10 + 5)

[Run example »](https://www.w3schools.com/python/trypython.asp?filename=demo_oper)

Python divides the operators in the following groups:

* Arithmetic operators
* Assignment operators
* Comparison operators
* Logical operators
* Identity operators
* Membership operators
* Bitwise operators

Python Arithmetic Operators

Arithmetic operators are used with numeric values to perform common mathematical operations:

|  |  |  |  |
| --- | --- | --- | --- |
| **Operator** | **Name** | **Example** | **Try it** |
| + | Addition | x + y | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_oper_add) |
| - | Subtraction | x - y | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_oper_sub) |
| \* | Multiplication | x \* y | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_oper_mult) |
| / | Division | x / y | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_oper_div) |
| % | Modulus | x % y | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_oper_mod) |
| \*\* | Exponentiation | x \*\* y | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_oper_exp) |
| // | Floor division | x // y | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_oper_floordiv) |

Python Assignment Operators

Assignment operators are used to assign values to variables:

|  |  |  |  |
| --- | --- | --- | --- |
| **Operator** | **Example** | **Same As** | **Try it** |
| = | x = 5 | x = 5 | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_oper_ass1) |
| += | x += 3 | x = x + 3 | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_oper_ass2) |
| -= | x -= 3 | x = x - 3 | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_oper_ass3) |
| \*= | x \*= 3 | x = x \* 3 | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_oper_ass4) |
| /= | x /= 3 | x = x / 3 | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_oper_ass5) |
| %= | x %= 3 | x = x % 3 | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_oper_ass6) |
| //= | x //= 3 | x = x // 3 | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_oper_ass7) |
| \*\*= | x \*\*= 3 | x = x \*\* 3 | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_oper_ass8) |
| &= | x &= 3 | x = x & 3 | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_oper_ass9) |
| |= | x |= 3 | x = x | 3 | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_oper_ass10) |
| ^= | x ^= 3 | x = x ^ 3 | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_oper_ass11) |
| >>= | x >>= 3 | x = x >> 3 | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_oper_ass12) |
| <<= | x <<= 3 | x = x << 3 | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_oper_ass13) |

Python Comparison Operators

Comparison operators are used to compare two values:

|  |  |  |  |
| --- | --- | --- | --- |
| **Operator** | **Name** | **Example** | **Try it** |
| == | Equal | x == y | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_oper_compare1) |
| != | Not equal | x != y | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_oper_compare2) |
| > | Greater than | x > y | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_oper_compare4) |
| < | Less than | x < y | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_oper_compare5) |
| >= | Greater than or equal to | x >= y | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_oper_compare6) |
| <= | Less than or equal to | x <= y | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_oper_compare7) |

Python Logical Operators

Logical operators are used to combine conditional statements:

|  |  |  |  |
| --- | --- | --- | --- |
| **Operator** | **Description** | **Example** | **Try it** |
| and | Returns True if both statements are true | x < 5 and  x < 10 | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_oper_logical1) |
| or | Returns True if one of the statements is true | x < 5 or x < 4 | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_oper_logical2) |
| not | Reverse the result, returns False if the result is true | not(x < 5 and x < 10) | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_oper_logical3) |

Python Identity Operators

Identity operators are used to compare the objects, not if they are equal, but if they are actually the same object, with the same memory location:

|  |  |  |  |
| --- | --- | --- | --- |
| **Operator** | **Description** | **Example** | **Try it** |
| is | Returns True if both variables are the same object | x is y | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_oper_identity1) |
| is not | Returns True if both variables are not the same object | x is not y | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_oper_identity2) |

Python Membership Operators

Membership operators are used to test if a sequence is presented in an object:

|  |  |  |  |
| --- | --- | --- | --- |
| **Operator** | **Description** | **Example** | **Try it** |
| in | Returns True if a sequence with the specified value is present in the object | x in y | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_oper_membership1) |
| not in | Returns True if a sequence with the specified value is not present in the object | x not in y | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_oper_membership2) |

Python Bitwise Operators

Bitwise operators are used to compare (binary) numbers:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Operator** | **Name** | **Description** | **Example** | **Try it** |
| & | AND | Sets each bit to 1 if both bits are 1 | x & y | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_oper_and) |
| | | OR | Sets each bit to 1 if one of two bits is 1 | x | y | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_oper_or) |
| ^ | XOR | Sets each bit to 1 if only one of two bits is 1 | x ^ y | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_oper_xor) |
| ~ | NOT | Inverts all the bits | ~x | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_oper_not) |
| << | Zero fill left shift | Shift left by pushing zeros in from the right and let the leftmost bits fall off | x << 2 | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_oper_left_shift) |
| >> | Signed right shift | Shift right by pushing copies of the leftmost bit in from the left, and let the rightmost bits fall off | x >> 2 | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_oper_right_shift) |

Operator Precedence

Operator precedence describes the order in which operations are performed.

Example

Parentheses has the highest precedence, meaning that expressions inside parentheses must be evaluated first:

print((6 + 3) - (6 + 3))

[Run example »](https://www.w3schools.com/python/trypython.asp?filename=demo_precedence_parentheses)

Example

Multiplication \* has higher precedence than addition +, and therefor multiplications are evaluated before additions:

print(100 + 5 \* 3)

[Run example »](https://www.w3schools.com/python/trypython.asp?filename=demo_precedence_multiplication)

The precedence order is described in the table below, starting with the highest precedence at the top:

|  |  |  |
| --- | --- | --- |
| **Operator** | **Description** | **Try it** |
| () | Parentheses | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_precedence_parentheses) |
| \*\* | Exponentiation | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_precedence_exponent) |
| +x  -x  ~x | Unary plus, unary minus, and bitwise NOT | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_precedence_bitwise_not) |
| \*  /  //  % | Multiplication, division, floor division, and modulus | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_precedence_multiplication) |
| +  - | Addition and subtraction | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_precedence_subtraction) |
| <<  >> | Bitwise left and right shifts | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_precedence_shift) |
| & | Bitwise AND | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_precedence_bitwise_and) |
| ^ | Bitwise XOR | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_precedence_bitwise_xor) |
| | | Bitwise OR | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_precedence_bitwise_or) |
| ==  !=  >  >=  <  <=  is  is not  in  not in | Comparisons, identity, and membership operators | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_precedence_like) |
| not | Logical NOT | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_precedence_not) |
| and | AND | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_precedence_and) |
| or | OR | [Try it »](https://www.w3schools.com/python/trypython.asp?filename=demo_precedence_or) |

If two operators have the same precedence, the expression is evaluated from left to right.

Example

Addition + and subtraction - has the same precedence, and therefor we evaluate the expression from left to right:

print(5 + 4 - 7 + 3)

[Run example »](https://www.w3schools.com/python/trypython.asp?filename=demo_precedence_same)

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Test Yourself With Exercises

Exercise:

Multiply 10 with 5, and print the result.

print(10 5)

Submit Answer »

[Start the Exercise](https://www.w3schools.com/python/exercise.asp?filename=exercise_operators1)

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