**PYTHON BASIC OPERATORS**

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Operators are the constructs which can manipulate the value of operands.

## Types of Operator

* Arithmetic Operators
* Comparison (Relational)
* Assignment Operators
* Logical Operators
* Membership Operators
* Identity Operators

**ARITHMETIC OPERATORS**

|  |  |  |
| --- | --- | --- |
| **Operator** | **Description** | **Example** |
| + Addition | Adds values on either side of the operator. | a + b = 30 |
| - Subtraction | Subtracts right hand operand from left hand operand. | a – b = -10 |
| \* Multiplication | Multiplies values on either side of the operator | a \* b = 200 |
| / Division | Divides left hand operand by right hand operand | b / a = 2 |
| % Modulus | Divides left hand operand by right hand operand and returns remainder | b % a = 0 |
| \*\* Exponent | Performs exponential (power) calculation on operators | a\*\*b =10 to the power 20 |
| // | Floor Division - The division of operands where the result is the quotient in which the digits after the decimal point are removed. | 9//2 = 4 and 9.0//2.0 = 4.0 |

Example:

#!/usr/bin/python

a = 21

b = 10

c = 0

c = a + b

print "Line 1 - Value of c is ", c

c = a - b

print "Line 2 - Value of c is ", c

c = a \* b

print "Line 3 - Value of c is ", c

c = a / b

print "Line 4 - Value of c is ", c

c = a % b

print "Line 5 - Value of c is ", c

a = 2

b = 3

c = a\*\*b

print "Line 6 - Value of c is ", c

a = 10

b = 5

c = a//b

print "Line 7 - Value of c is ", c

|  |
| --- |
| Output:  Line 1 - Value of c is 31  Line 2 - Value of c is 11  Line 3 - Value of c is 210  Line 4 - Value of c is 2  Line 5 - Value of c is 1  Line 6 - Value of c is 8  Line 7 - Value of c is 2 |

## Python Comparison Operators

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| --- | --- | --- |
| **Operator** | **Description** | **Example** |
| == | If the values of two operands are equal, then the condition becomes true. | (a == b) is not true. |
| != | If values of two operands are not equal, then condition becomes true. |  |
| <> | If values of two operands are not equal, then condition becomes true. | (a <> b) is true. This is similar to != operator. |
| > | If the value of left operand is greater than the value of right operand, then condition becomes true. | (a > b) is not true. |
| < | If the value of left operand is less than the value of right operand, then condition becomes true. | (a < b) is true. |
| >= | If the value of left operand is greater than or equal to the value of right operand, then condition becomes true. | (a >= b) is not true. |
| <= | If the value of left operand is less than or equal to the value of right operand, then condition becomes true. | (a <= b) is true. |

Example:

#!/usr/bin/python

a = 21

b = 10

c = 0

if ( a == b ):

print "Line 1 - a is equal to b"

else:

print "Line 1 - a is not equal to b"

if ( a != b ):

print "Line 2 - a is not equal to b"

else:

print "Line 2 - a is equal to b"

if ( a <> b ):

print "Line 3 - a is not equal to b"

else:

print "Line 3 - a is equal to b"

if ( a < b ):

print "Line 4 - a is less than b"

else:

print "Line 4 - a is not less than b"

if ( a > b ):

print "Line 5 - a is greater than b"

else:

print "Line 5 - a is not greater than b"

a = 5;

b = 20;

if ( a <= b ):

print "Line 6 - a is either less than or equal to b"

else:

print "Line 6 - a is neither less than nor equal to b"

if ( b >= a ):

print "Line 7 - b is either greater than or equal to b"

else:

print "Line 7 - b is neither greater than nor equal to b"

Output:

Line 1 - a is not equal to b

Line 2 - a is not equal to b

Line 3 - a is not equal to b

Line 4 - a is not less than b

Line 5 - a is greater than b

Line 6 - a is either less than or equal to b

Line 7 - b is either greater than or equal to b

## Python Assignment Operators

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| --- | --- | --- |
| **Operator** | **Description** | **Example** |
| = | Assigns values from right side operands to left side operand | c = a + b assigns value of a + b into c |
| += Add AND | It adds right operand to the left operand and assign the result to left operand | c += a is equivalent to c = c + a |
| -= Subtract AND | It subtracts right operand from the left operand and assign the result to left operand | c -= a is equivalent to c = c - a |
| \*= Multiply AND | It multiplies right operand with the left operand and assign the result to left operand | c \*= a is equivalent to c = c \* a |
| /= Divide AND | It divides left operand with the right operand and assign the result to left operand | c /= a is equivalent to c = c / ac /= a is equivalent to c = c / a |
| %= Modulus AND | It takes modulus using two operands and assign the result to left operand | c %= a is equivalent to c = c % a |
| \*\*= Exponent AND | Performs exponential (power) calculation on operators and assign value to the left operand | c \*\*= a is equivalent to c = c \*\* a |
| //= Floor Division | It performs floor division on operators and assign value to the left operand | c //= a is equivalent to c = c // a |

Example

#!/usr/bin/python

a = 21

b = 10

c = 0

c = a + b

print "Line 1 - Value of c is ", c

c += a

print "Line 2 - Value of c is ", c

c \*= a

print "Line 3 - Value of c is ", c

c /= a

print "Line 4 - Value of c is ", c

c = 2

c %= a

print "Line 5 - Value of c is ", c

c \*\*= a

print "Line 6 - Value of c is ", c

c //= a

print "Line 7 - Value of c is ", c

Example:

Line 1 - Value of c is 31

Line 2 - Value of c is 52

Line 3 - Value of c is 1092

Line 4 - Value of c is 52

Line 5 - Value of c is 2

Line 6 - Value of c is 2097152

Line 7 - Value of c is 99864

## Python Logical Operators:

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| --- | --- | --- |
| **Operator** | **Description** | **Example** |
| and Logical AND | If both the operands are true then condition becomes true. | (a and b) is true. |
| or Logical OR | If any of the two operands are non-zero then condition becomes true. | (a or b) is true. |
| not Logical NOT | Used to reverse the logical state of its operand. |  |

## Python Membership Operators:

Python’s membership operators test for membership in a sequence, such as strings, lists, or tuples. There are two membership operators as explained below

|  |  |  |
| --- | --- | --- |
| **Operator** | **Description** | **Example** |
| in | Evaluates to true if it finds a variable in the specified sequence and false otherwise. | x in y, here in results in a 1 if x is a member of sequence y. |
| not in | Evaluates to true if it does not finds a variable in the specified sequence and false otherwise. | x not in y, here not in results in a 1 if x is not a member of sequence y. |

Example:

#!/usr/bin/python

a = 10

b = 20

list = [1, 2, 3, 4, 5 ];

if ( a in list ):

print "Line 1 - a is available in the given list"

else:

print "Line 1 - a is not available in the given list"

if ( b not in list ):

print "Line 2 - b is not available in the given list"

else:

print "Line 2 - b is available in the given list"

a = 2

if ( a in list ):

print "Line 3 - a is available in the given list"

else:

print "Line 3 - a is not available in the given list"

Output:

Line 1 - a is not available in the given list

Line 2 - b is not available in the given list

Line 3 - a is available in the given list

**Identity operators**

**Identity operators** compare the memory locations of two objects. There are two Identity operators as explained below

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| --- | --- | --- |
| **Operator** | **Description** | **Example** |
| is | Evaluates to true if the variables on either side of the operator point to the same object and false otherwise. | x is y, here is results in 1 if id(x) equals id(y). |
| is not | Evaluates to false if the variables on either side of the operator point to the same object and true otherwise. | x is not y, here is not results in 1 if id(x) is not equal to id(y). |

### Example

#!/usr/bin/python

a = 20

b = 20

if ( a is b ):

print "Line 1 - a and b have same identity"

else:

print "Line 1 - a and b do not have same identity"

if ( id(a) == id(b) ):

print "Line 2 - a and b have same identity"

else:

print "Line 2 - a and b do not have same identity"

b = 30

if ( a is b ):

print "Line 3 - a and b have same identity"

else:

print "Line 3 - a and b do not have same identity"

if ( a is not b ):

print "Line 4 - a and b do not have same identity"

else:

print "Line 4 - a and b have same identity"

When you execute the above program it produces the following result −

Line 1 - a and b have same identity

Line 2 - a and b have same identity

Line 3 - a and b do not have same identity

Line 4 - a and b do not have same identity