Create Tuple with One Item

To create a tuple with only one item, you have to add a comma after the item, otherwise Python will not recognize it as a tuple.

Example

One item tuple, remember the commma:

```
thistuple = ("apple",)
print(type(thistuple))

#NOT a tuple
thistuple = ("apple")
print(type(thistuple))
```

Remove Items

Note: You cannot remove items in a tuple.

Tuples are **unchangeable**, so you cannot remove items from it, but you can delete the tuple completely:

Example

The del keyword can delete the tuple completely:

```
t1= ("apple", "banana", "cherry")
del t1
print (thistuple) #this will raise an error because the tuple no longer exists
```

Join Two Tuples

To join two or more tuples you can use the + operator:

Example

Join two tuples:

```
tuple1 = ("a", "b”, "c")
tuple2 = (1, 2, 3)

tuple3 = tuple1 + tuple2
print(tuple3)
```

The tuple () Constructor

It is also possible to use the tuple () constructor to make a tuple.

Example

Using the tuple () method to make a tuple:

```
thistuple = tuple (("apple", "banana", "cherry"))
# note the double round-brackets
print (thistuple)
```

Tuple Methods

Python has two built-in methods that you can use on tuples.

Method	**Description**
count()	Returns the number of times a specified value occurs in a tuple
index()	Searches the tuple for a specified value and returns the position of where it was found

Example

Return the number of times the value 5 appears in the tuple:

```
T1 = (1, 3, 7, 8, 7, 5, 4, 6, 8, 5  )

x = T1.count(5)

print(x)
```

Example

Search for the first occurrence of the value 8, and return its position:

```
T1 = (1, 3, 7, 8, 7, 5, 4, 6, 8, 5)
x = T1.index(8)

print(x)
```

Dictionary

- Python **Dictionaries** allow you store and retrieve related information in a way that means something both to humans and computers. Or dictionary is an associative array (also known as hashes). Any key of the dictionary is associated (or mapped) to a value.
- Dictionaries are non-ordered and contain "keys" and **"values”.**
- Each key is **unique** and the values can be just about anything, but usually they are string, int, or float, or a list of these things.
- Like lists dictionaries can easily be changed, can be shrunk and grown at run time.
- Dictionaries **don't** support the sequence operation of the sequence data types like strings, tuples and lists.
- Dictionaries belong to the built-in mapping type.

Example

```
my_Dictionay = {'ID': 1110, 'Name':'John', 'Age': 12}
print (my_Dictionay['ID'])
print (my_Dictionay['Age'])
#insert
my_Dictionay['Total Marks']=600
```

Output

```
1110
12
{'Total Marks': 600, 'Age': 12, 'ID': 1110, 'Name': 'John'}
```

Clears a dictionary.

d.clear() empties dictionary d of all key-value pairs:

```
>>>
>>> d = {'a': 10, 'b': 20, 'c': 30}
>>> d
{'a': 10, 'b': 20, 'c': 30}

>>> d.clear()
>>> d
{}
```

- d.get (<key>)

Returns the value for a key if it exists in the dictionary.
d.get (<key>) searches dictionary d for <key> and returns the associated value if it is found. If <key> is not found, it returns none:
>>>

```
>>> d = {'a': 10, 'b': 20, 'c': 30}

>>> print(d.get('b'))
20
>>> print (d.get ('z'))
None
```

If <key> is not found and the optional <default> argument is specified, that value is returned instead of None:
>>>

```
>>> print (d.get('z', -1))
-1
```

- d.keys ()

Returns a list of keys in a dictionary.
d.keys () returns a list of all keys in d:
>>>

```
>>> d = {'a': 10, 'b': 20, 'c': 30}
>>> d
{'a': 10, 'b': 20, 'c': 30}

>>> list (d.keys())
['a', 'b', 'c']
```

- d.values ()

Returns a list of values in a dictionary.
d.values() returns a list of all values in d:
>>

```
>>> list (d.values ())
[10, 20, 30]
```

Any duplicate values in d will be returned as many times as they occur:

```
>>>
>>> d = {'a': 10, 'b': 10, 'c': 10}
>>> d
{'a': 10, 'b': 10, 'c': 10}

>>> list (d.values ())
[10, 10, 10]
```

Python Operators

Operators are used to perform operations on variables and values.

Types of Operator

Python language supports the following types of operators.

- Arithmetic Operators
- Comparison (Relational) Operators
- Assignment Operators
- Logical Operators
- Bitwise Operators
- Membership Operators
- Identity Operators

Let us have a look on all operators one by one.

Python 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. But if one of the operands is negative, the result is floored, i.e., rounded away from zero (towards negative infinity) −	9//2 = 4 and 9.0//2.0 = 4.0, -11//3 = -4, -11.0//3 = -4.0

```
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

These operators compare the values on either sides of them and decide the relation among them. They are also called Relational operators.

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.	(a != b) is true.
<>	If values of two operands are not equal, then condition	(a <> b)

	becomes true.	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.

Ex.

```
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"
```

Python Assignment Operators

Assume variable a holds 10 and variable b holds 20, then −

[Show Example]

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 / 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

```
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
```

Python Bitwise Operators

Bitwise operator works on bits and performs bit by bit operation. Assume if a = 60; and b = 13; Now in the binary format their values will be 0011 1100 and 0000 1101 respectively. Following table lists out the bitwise operators supported by Python language with an example each in those, we use the above two variables (a and b) as operands −

a = 0011 1100

b = 0000 1101

----
a&b = 0000 1100
a|b = 0011 1101
a^b = 0011 0001
~a = 1100 0011
There are following Bitwise operators supported by Python language

Operator	Description	Example
& Binary AND	Operator copies a bit to the result if it exists in both operands	(a & b) (means 0000 1100)
| Binary OR	It copies a bit if it exists in either operand.	(a | b) = 61 (means 0011 1101)
^ Binary XOR	It copies the bit if it is set in one operand but not both.	(a ^ b) = 49 (means 0011 0001)
~ Binary Ones Complement	It is unary and has the effect of 'flipping' bits.	(~a) = -61 (means 1100 0011 in 2's complement form due to a signed binary number.
<< Binary Left Shift	The left operands value is moved left by the number of bits specified by the right operand.	a << 2 = 240 (means 1111 0000)
>> Binary Right	The left operands value is moved right by	a >> 2 = 15

Shift	the number of bits specified by the right operand.	(means 0000 1111)

Ex.

```
a = 60            # 60 = 0011 1100
b = 13            # 13 = 0000 1101
c = 0

c = a & b;        # 12 = 0000 1100
print "Line 1 - Value of c is ", c

c = a | b;        # 61 = 0011 1101
print "Line 2 - Value of c is ", c

c = a ^ b;        # 49 = 0011 0001
print "Line 3 - Value of c is ", c

c = ~a;           # -61 = 1100 0011
print "Line 4 - Value of c is ", c

c = a << 2;       # 240 = 1111 0000
print "Line 5 - Value of c is ", c

c = a >> 2;       # 15 = 0000 1111
print "Line 6 - Value of c is ", c
```

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

```
Line 1 - Value of c is 12
Line 2 - Value of c is 61
Line 3 - Value of c is 49
Line 4 - Value of c is -61
Line 5 - Value of c is 240
Line 6 - Value of c is 15
```

Python Logical Operators

There are following logical operators supported by Python language. Assume variable a holds 10 and variable b holds 20 then

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.	Not(a and b) is false.

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 −

[Show Example]

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.

Python Identity Operators

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

[Show Example]

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).

Python Operators Precedence

The following table lists all operators from highest precedence to lowest.

[Show Example]

Sr.No.	Operator & Description
1	** Exponentiation (raise to the power)

2	~ + - Complement, unary plus and minus (method names for the last two are +@ and -@)
3	* / % // Multiply, divide, modulo and floor division
4	+ - Addition and subtraction
5	>> << Right and left bitwise shift
6	**&** Bitwise 'AND'
7	^ | Bitwise exclusive `OR' and regular `OR'
8	<= < > >= Comparison operators
9	<> == != Equality operators
10	= %= /= //= -= += *= **= Assignment operators
11	**is is not** Identity operators
12	**in not in** Membership operators
13	**not or and** Logical operators