Tuples

Tuples are used to store multiple items in a single variable.

Tuple is one of 4 built-in data types in Python used to store collections of data, the other 3 are List, Set, and Dictionary, all with different qualities and usage.

A tuple is a collection which is ordered and **unchangeable**.

Tuples are written with round brackets.

Create a Tuple:

```
thistuple = ("apple", "banana", "cherry")
print(thistuple)
```

Tuple Items

Tuple items are ordered, unchangeable, and allow duplicate values.

Tuple items are indexed, the first item has index `[0]`, the second item has index `[1]` etc.

Allow Duplicates

Since tuples are indexed, they can have items with the same value:

Example

Tuples allow duplicate values:

```
thistuple = ("apple", "banana", "cherry", "apple", "cherry")
print(thistuple)
```

Tuple Length

To determine how many items a tuple has, use the `len()` function:

Example

Print the number of items in the tuple:

```
thistuple = ("apple", "banana", "cherry")
print(len(thistuple))
```

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 comma:

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

#NOT a tuple it’s a string
thistuple = ("apple")
print(type(thistuple))
```

Tuple Items - Data Types

Tuple items can be of any data type:

Example

String, int and boolean data types:

```
tuple1 = ("apple", "banana", "cherry")
tuple2 = (1, 5, 7, 9, 3)
tuple3 = (True, False, False)
```

Type() tuple

```
mytuple = ("apple", "banana", "cherry")
print(type(mytuple))
```

```
Output: <class 'tuple'>
```

The tuple() Constructor

It is also possible to use the `tuple()` constructor to make a tuple.note the double brackets.

Example

Using the tuple() method to make a tuple:

```
thistuple = tuple(("apple", "banana", "cherry"))
print(thistuple)
```

Output : ('apple', 'banana', 'cherry')

Access Tuple Items

You can access tuple items by referring to the index number, inside square brackets:

Example

Print the second item in the tuple:

```
thistuple = ("apple", "banana", "cherry")
print(thistuple[1])
```

Output : banana

Negative Indexing

Negative indexing means start from the end.

`-1` refers to the last item, `-2` refers to the second last item etc.

Example

Print the last item of the tuple:

```
thistuple = ("apple", "banana", "cherry")
print(thistuple[-1])
```

Output : cherry

Range of Indexes

```
thistuple = ("apple", "banana", "cherry", "orange", "kiwi", "melon", "mango")

print(thistuple[2:5])


#This will return the items from position 2 to 5.


#Remember that the first item is position 0,

#and note that the item in position 5 is NOT included
```

Output : ('cherry', 'orange', 'kiwi')

Check if Item Exists

To determine if a specified item is present in a tuple use the `in` keyword:

Example

Check if "apple" is present in the tuple:

```
thistuple = ("apple", "banana", "cherry")
if "apple" in thistuple:
  print("Yes, 'apple' is in the fruits tuple")
```

Output : Yes, 'apple' is in the fruits tuple

Change Tuple Values

Once a tuple is created, you cannot change its values. Tuples are **unchangeable**, or **immutable** as it also is called.

But there is a workaround. You can convert the tuple into a list, change the list, and convert the list back into a tuple.

Example

Convert the tuple into a list to be able to change it:

```
x = ("apple", "banana", "cherry")
y = list(x)
y[1] = "kiwi"
x = tuple(y)

print(x)
```

Output : ("apple", "kiwi", "cherry")

Add Items

Since tuples are immutable, they do not have a build-in `append()` method, but there are other ways to add items to a tuple.

1. **Convert into a list**: Just like the workaround for *changing* a tuple, you can convert it into a list, add your item(s), and convert it back into a tuple.

Example

Convert the tuple into a list, add "orange", and convert it back into a tuple:

```
thistuple = ("apple", "banana", "cherry")
y = list(thistuple)
y.append("orange")
thistuple = tuple(y)
```

Output : ('apple', 'banana', 'cherry', 'orange')

2. **Add tuple to a tuple**. You are allowed to add tuples to tuples, so if you want to add one item, (or many), create a new tuple with the item(s), and add it to the existing tuple:

Example

Create a new tuple with the value "orange", and add that tuple:

```
thistuple = ("apple", "banana", "cherry")
y = ("orange",)
thistuple += y

print(thistuple)
```

Output : ('apple', 'banana', 'cherry', 'orange')

Remove Items

Note: You cannot remove items in a tuple.

Tuples are **unchangeable**, so you cannot remove items from it, but you can use the same workaround as we used for changing and adding tuple items:

Example

Convert the tuple into a list, remove "apple", and convert it back into a tuple:

```
thistuple = ("apple", "banana", "cherry")
y = list(thistuple)
y.remove("apple")
thistuple = tuple(y)
```

Output : ('banana', 'cherry')

Or you can delete the tuple completely:

Example

The `del` keyword can delete the tuple completely:

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

Output : error

Loop Through a Tuple

You can loop through the tuple items by using a `for` loop.

Example

Iterate through the items and print the values:

```
thistuple = ("apple", "banana", "cherry")
for x in thistuple:
  print(x)
```

```
Output : apple
               banana
          cherry
```

Loop Through the Index Numbers

You can also loop through the tuple items by referring to their index number.

Use the `range()` and `len()` functions to create a suitable iterable.

Example

Print all items by referring to their index number:

```
thistuple = ("apple", "banana", "cherry")
for i in range(len(thistuple)):
  print(thistuple[i])
```

```
Output : apple
          banana
          Cherry
```

Using a While Loop

Print all items, using a `while` loop to go through all the index numbers:

```
thistuple = ("apple", "banana", "cherry")
i = 0
while i < len(thistuple):
  print(thistuple[i])
  i = i + 1
```

```
Output : apple
          banana
          Cherry
```

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)
```

```
Output : ('a', 'b', 'c', 1, 2, 3)
```

Multiply Tuples

If you want to multiply the content of a tuple a given number of times, you can use the `*` operator:

Example

Multiply the fruits tuple by 2:

```
fruits = ("apple", "banana", "cherry")
mytuple = fruits * 2

print(mytuple)
```

```
Output : ('apple', 'banana', 'cherry', 'apple', 'banana',
'cherry')
```

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