Tuples

A tuple is a collection of different data types which is ordered and unchangeable (immutable). Tuples are written with round brackets, (). Once a tuple is created, we cannot change its values. We cannot use add, insert, remove methods in a tuple because it is not modifiable (mutable). Unlike list, tuple has few methods. Methods related to tuples:

- **tuple**(): to create an empty tuple
- **count**(): to count the number of a specified item in a tuple
- **index**(): to find the index of a specified item in a tuple
    - operator: to join two or more tuples and to create a new tuple

Creating a Tuple

- Empty tuple: Creating an empty tuple

```
# syntax
empty_tuple = ()
# or using the tuple constructor
empty_tuple = tuple()
```

Tuple with initial values

```
# syntax
tpl = ('item1', 'item2','item3')
fruits = ('banana', 'orange', 'mango', 'lemon')
```

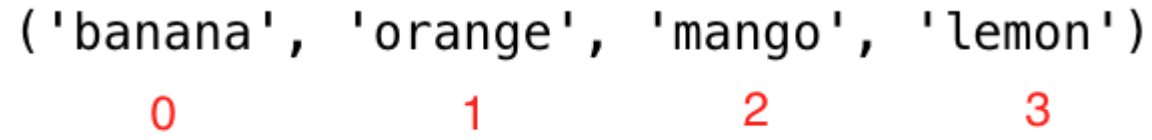
Tuple length

We use the *len()* method to get the length of a tuple.

```
# syntax
tpl = ('item1', 'item2', 'item3')
len(tpl)
```

Accessing Tuple Items

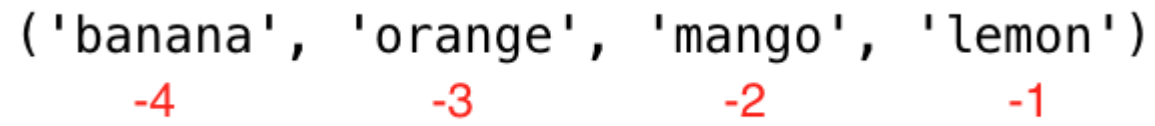
- Positive Indexing Similar to the list data type we use positive or negative indexing to access tuple items.




```
# Syntax
tpl = ('item1', 'item2', 'item3')
first_item = tpl[0]
second_item = tpl[1]
fruits = ('banana', 'orange', 'mango', 'lemon')
first_fruit = fruits[0]
second_fruit = fruits[1]
```

```
last_index =len(fruits) - 1
last_fruit = fruits[las_index]
```

Negative indexing Negative indexing means beginning from the end, -1 refers to the last item, -2 refers to the second last and the negative of the list/tuple length refers to the first item.




```
# Syntax
tpl = ('item1', 'item2', 'item3','item4')
first_item = tpl[-4]
second_item = tpl[-3]
fruits = ('banana', 'orange', 'mango', 'lemon')
first_fruit = fruits[-4]
second_fruit = fruits[-3]
last_fruit = fruits[-1]
```

Slicing tuples

We can slice out a sub-tuple by specifying a range of indexes where to start and where to end in the tuple, the return value will be a new tuple with the specified items.

Range of Positive Indexes

- `# Syntax`
- `tpl = ('item1', 'item2', 'item3','item4')`
- `all_items = tpl[0:4]  # all items`
- `all_items = tpl[0:]  # all items`

```
    middle_two_items = tpl[1:3]  # does not include item at index 3
fruits = ('banana', 'orange', 'mango', 'lemon')
all_fruits = fruits[0:4]    # all items
all_fruits= fruits[0:]      # all items
orange_mango = fruits[1:3]  # doesn't include item at index 3
orange_to_the_rest = fruits[1:]
```

Range of Negative Indexes

```
# Syntax
tpl = ('item1', 'item2', 'item3','item4')
all_items = tpl[-4:]         # all items
middle_two_items = tpl[-3:-1]  # does not include item at index 3 (-1)
fruits = ('banana', 'orange', 'mango', 'lemon')
all_fruits = fruits[-4:]    # all items
orange_mango = fruits[-3:-1]  # doesn't include item at index 3
orange_to_the_rest = fruits[-3:]
```

Changing Tuples to Lists

We can change tuples to lists and lists to tuples. Tuple is immutable if we want to modify a tuple we should change it to a list.

```
# Syntax
```

```
tpl = ('item1', 'item2', 'item3','item4')
lst = list(tpl)
fruits = ('banana', 'orange', 'mango', 'lemon')
fruits = list(fruits)
fruits[0] = 'apple'
print(fruits)     # ['apple', 'orange', 'mango', 'lemon']
fruits = tuple(fruits)
print(fruits)     # ('apple', 'orange', 'mango', 'lemon')
```

Checking an Item in a Tuple

We can check if an item exists or not in a tuple using *in*, it returns a boolean.

```
# Syntax
tpl = ('item1', 'item2', 'item3','item4')
'item2' in tpl # True
fruits = ('banana', 'orange', 'mango', 'lemon')
print('orange' in fruits) # True
print('apple' in fruits) # False
fruits[0] = 'apple' # TypeError: 'tuple' object does not support item
assignment
```

Joining Tuples

We can join two or more tuples using + operator

```
# syntax
tpl1 = ('item1', 'item2', 'item3')
tpl2 = ('item4', 'item5','item6')
tpl3 = tpl1 + tpl2
fruits = ('banana', 'orange', 'mango', 'lemon')
vegetables = ('Tomato', 'Potato', 'Cabbage','Onion', 'Carrot')
fruits_and_vegetables = fruits + vegetables
```

Deleting Tuples

It is not possible to remove a single item in a tuple but it is possible to delete the tuple itself using *del*.

```
# syntax
tpl1 = ('item1', 'item2', 'item3')
del tpl1
```