Tuples

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Definitions

```
fruit = ('Apple', 'Orange', 'Banana')
```

```
tuple()
```

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What can you say about the tuples:

Write at least 2 sentences.

Students, write your response!

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Definitions

Definitions

- Lists vs Tuples

Definitions

- Your data is safe.

✔

Creating a `tuple`

Creating a `tuple`

- We have two basic ways to create a tuple.

- `()`
- `tuple()`

Creating a `tuple`

- A `tuple` can be created by enclosing values, separated by commas, in parentheses 👉 `()`.
- Another way to create a `tuple` is to call the `tuple()` function.

- `()`
- `tuple()`

```
tuple_1 = ('h', 'a', 'p', 'p', 'y')
word = 'happy'
tuple_2 = tuple(word)
print(tuple_1)
print(tuple_2)
```

What is the output? Try to figure out in your mind...

Creating a `tuple`

- A `tuple` can be created by enclosing values, separated by commas, in parentheses 👉 `()`.
- Another way to create a `tuple` is to call the `tuple()` function.

- `()`
- `tuple()`

```
tuple_1 = ('h', 'a', 'p', 'p', 'y')
word = 'happy'
tuple_2 = tuple(word)
print(tuple_1)
print(tuple_2)
```

⚠️ an iterable object can be converted into a `tuple`

```
('h', 'a', 'p', 'p', 'y')
('h', 'a', 'p', 'p', 'y')
```


Creating a `tuple` (review the pre-class)

Here is an example of creating an empty `tuple`:

```
1  empty_tuple = ()
2  print(type(empty_tuple))
3
```

Creating a `tuple` (review the pre-class)

Here is an example of creating an empty `tuple`:

```
1  empty_tuple = ()
2  print(type(empty_tuple))
3
```

```
1  <class 'tuple'>
2
```


Creating a `tuple`

- Take a look at the following example about creating a `tuple`:

```
1  my_tuple = ("Solar")
2
3  print(my_tuple, type(my_tuple), sep="\n")
4
5
6
```

What is the output? Try to figure out in your mind...

Creating a `tuple`

- Single element tuple :

```
1  my_tuple = ("Solar")
2
3  print(my_tuple, type(my_tuple), sep="\n")
4
5
6
```

Output

```
Solar
<class 'str'>
```


Creating a `tuple`

- If you want to create a single element `tuple`, an error will probably rise, unless you do not use a **comma**:

```
1  my_tuple = ("Solar",)
2
3  print(my_tuple, type(my_tuple), sep="\n")
4
5
6
```

⚠ comma makes it `tuple` type.

Output

```
('Solar',)
<class 'tuple'>
```

Creating a `tuple` (review the pre-class)

- Without parenthesis : 👇

```
1  solar = "Earth", "Venus", "Uranus"
2
3  print(solar, type(solar), sep="\n")
4
5
6
```


Creating a `tuple` (review the pre-class)

- Another way of creating a tuple :

```
1  solar = "Earth", "Venus", "Uranus"
2
3  print(solar, type(solar), sep="\n")
4
5
6
```

⚠️ Items separated with a **comma** without parentheses are accepted as `tuple` type by Python.

Output

```
('Earth', 'Venus', 'Uranus')
<class 'tuple'>
```

Creating a `tuple`

- `list` to `tuple`, `tuple` to `list`

```
my_tuple=(1, 4, 3, 4, 5, 6, 7, 4)

my_list = list(my_tuple)

print(type(my_list), my_list)

```


Creating a `tuple`

- `list` to `tuple`, `tuple` to `list`

```
my_tuple=(1, 4, 3, 4, 5, 6, 7, 4)

my_list = list(my_tuple)

print(type(my_list), my_list)

```

```
<class 'list'> [1, 4, 3, 4, 5, 6, 7, 4]

```

Creating a `tuple`

- `list` to `tuple`, `tuple` to `list`

```
my_tuple=(1, 4, 3, 4, 5, 6, 7, 4)

my_list = list(my_tuple)

print(type(my_list), my_list)

```

```
<class 'list'> [1, 4, 3, 4, 5, 6, 7, 4]

```

```
my_list = [1, 4, 3, 4, 5, 6, 7, 4]

my_tuple = tuple(my_list)

print(type(my_tuple), my_tuple)

```


Creating a `tuple`

- `list` to `tuple`, `tuple` to `list`

```
my_tuple=(1, 4, 3, 4, 5, 6, 7, 4)

my_list = list(my_tuple)

print(type(my_list), my_list)

```

```
<class 'list'> [1, 4, 3, 4, 5, 6, 7, 4]

```

```
my_list = [1, 4, 3, 4, 5, 6, 7, 4]

my_tuple = tuple(my_list)

print(type(my_tuple), my_tuple)

```

```
<class 'tuple'> (1, 4, 3, 4, 5, 6, 7, 4)

```

Creating a `tuple`

- Creating a tuple with `tuple()` function

```
1  mountain = tuple('Alps')
2  print(mountain)
3
```


Creating a `tuple`

- Creating a tuple with `tuple()` function

```
1  mountain = tuple('Alps')
2  print(mountain)
3
```

```
1  ('A', 'l', 'p', 's')
2
```

Creating a `tuple`

- Take a look at the following example :

```
tuple_1 = 'h', 'a', 'p', 'p', 'y'
tuple_2 = 1, 3, 5
print(tuple_1)
print(type(tuple_1))
print(tuple_2)
```

What is the output? Try to figure out in your mind...

Students, write your response!

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Creating a `tuple`

- Considering the parentheses: As we mentioned before, There is another and not so often used way to create a `tuple`. Take a look at the following example :

```
tuple_1 = 'h', 'a', 'p', 'p', 'y'
tuple_2 = 1, 3, 5
print(tuple_1)
print(type(tuple_1))
print(tuple_2)
```

⚠ There is no parenthesis

```
('h', 'a', 'p', 'p', 'y')
<class 'tuple'>
(1, 3, 5)
```

Using Tuples

- **Task** 👇
  - Let's create a `tuple` which consists of numbers from 1 to 10 using `range()` function.

Using Tuples

- **The code could be like :** 👇

```
1  number = tuple(range(1,11))
2
3  print(number, type(number), sep="\n")
4
5
```

Output

```
(1, 2, 3, 4, 5, 6, 7, 8, 9, 10)
<class 'tuple'>
```

How can We Use a Tuple?

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In one minute, write the usage of `tuples`..

Students, write your response!

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How can We Use a `tuple`?

- (..Continued) (review of the pre-class)
  - Just like the **`list`**s, the **`tuple`**s support indexing :

```
even_no = (0, 2, 4)
print(even_no[0])
print(even_no[1])
print(even_no[2])
print(even_no[3])

```


How can We Use a `tuple`?

- (..Continued)(review of the pre-class)
  - Just like the **`list`**s, the **`tuple`**s support indexing :

```
even_no = (0, 2, 4)
print(even_no[0])
print(even_no[1])
print(even_no[2])
print(even_no[3])

```

```
0
2
4
---------------------------------------------------------------------------
print(even_no[3]) : IndexError: tuple index out of range

```

How can We Use a `tuple`?

- (..Continued)(review of the pre-class)
  - `tuple` is **immutable**.

```
city_list = ['Tokyo', 'Istanbul', 'Moskow', 'Dublin']

city_tuple = tuple(city_list)

city_tuple[0] = 'New York'  # you can't assign a value

```


How can We Use a `tuple`?

- (..Continued)(review of the pre-class)
  - And one of the most important differences of `tuple`s from `list`s is that `tuple` object does not support item assignment. Yes, because `tuple` is immutable.

```
city_list = ['Tokyo', 'Istanbul', 'Moskow', 'Dublin']

city_tuple = tuple(city_list)

city_tuple[0] = 'New York'  # you can't assign a value

```

```
---------------------------------------------------------------------------
TypeError: 'tuple' object does not support item assignment

```

Using Tuples

- **Task** :
  - Let's access, select and print the string 'six" from the following tuple. 👇

```
mix_tuple = ("11", 11, [2, "two", ("six", 6)], (5, "fair"))

```

Students, write your response!

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Using Tuples

- **The code should be like this :** 👇

```
mix_tuple = ("11", 11, [2, "two", ("six", 6)], (5, "fair"))

str_six = mix_tuple[2][2][0]

print(str_six)

```

Using Tuples

- **Task** :
  - What is the output ? 👇

```
1  mix_tuple = ("11", 11, [2, "two", ("six", 6)], (5, "fair"))
2
3  str_six = mix_tuple[2][1:3]
4
5  print(str_six, type(str_six), sep="\n")
6
7
```

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Students, write your response!
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Using Tuples

- **The output :** 👇

```
1  mix_tuple = ("11", 11, [2, "two", ("six", 6)], (5, "fair"))
2
3  str_six = mix_tuple[2][1:3]
4
5  print(str_six, type(str_six), sep="\n")
6
7
```

Try to figure out how the output can be like that?

Output

```
['two', ('six', 6)]
<class 'list'>
```

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Using Tuples

- **Task** :
  - Access and print the **last** item and **its type** of the following tuple using **negative indexing** method : 👇

```
1  mix_tuple = ("11", 11, [2, "two", ("six", 6)], (5, "fair"))
2
```

Students, write your response!

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Using Tuples

- **The code should be like :** 👇

```
1  mix_tuple = ("11", 11, [2, "two", ("six", 6)], (5, "fair"))
2
3  last = mix_tuple[-1]
4
5  print(last, type(last), sep="\n")
6
7
```

Try to figure out how the output can be like that?

Output

```
(5, 'fair')
<class 'tuple'>
```

Using Tuples

- **Task** :
  - Let's access, select and print the "fair" of the following tuple. 👇 Use **two options** which consisting of *normal* and *negative* indexing methods.

```
1 mix_tuple = ("11", 11, [2, "two", ("six", 6)], (5, "fair"))
2
```

Students, write your response!

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Using Tuples

- **The code should be like :** 👇

```
1 mix_tuple = ("11", 11, [2, "two", ("six", 6)], (5, "fair"))
2
3 option_1 = mix_tuple[3][1]
4 option_2 = mix_tuple[-1][1]
5
6 print(option_1, option_2, sep = "\n")
7
8
```

Output

```
fair
fair
```

Refresh your mind with this interview question

Benefits of Immutability?

Try to write at least two things

Students, write your response!

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Dictionaries

Table of Contents

Definitions

```
greengrocer = {'fruit' : 'Apple', 'vegetable' : 'Tomato'}
```

```
dict()
```

What did you learn from the pre-class content about dictionaries in Python?

Students, write your response!

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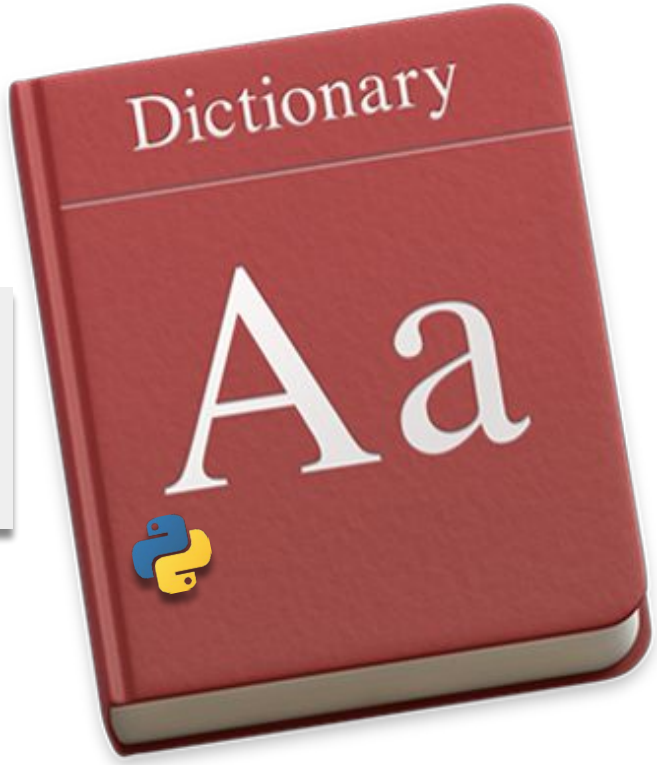
Definitions

- Dictionaries




```
{key1 : value1,
 key2 : value2}
```

Creating a `dict`

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Creating a `dict` (review)

- We have two basic ways to create a dictionary.

- `{}`
- `dict()`

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Creating a `dict` (review pre-class)

- Here is an example of simple structure of a `dict`:

```
my_dict = {'key1': 'value1',
           'key2': 'value2',
           'key3': 'value3'
           }

```


Creating a `dict` (review)

- A `dict` can be created by enclosing pairs, separated by commas, in curly-braces 👉 `{}`.
- Another way to create a `dict` is to call the `dict()` function.

```
grocer1 = {'fruit':'apple', 'drink':'water'}
grocer2 = dict(fruit='apple', drink='water')
print(grocer1)
print(grocer2)
```

- `{}`
- `dict()`

What is the output? Try to figure out in your mind...

Creating a `dict` (review)

- A `dict` can be created by enclosing pairs, separated by commas, in curly-braces 👉 `{}`.
- Another way to create a `dict` is to call the `dict()` function.

- `{}`
- `dict()`

```
grocer1 = {'fruit':'apple', 'drink':'water'}
grocer2 = dict(fruit='apple', drink='water')
print(grocer1)
print(grocer2)
```

```
{'fruit': 'apple', 'drink': 'water'}
{'fruit': 'apple', 'drink': 'water'}
```


Creating a `dict`(review pre-class)

- Accessing and assigning an item.

```
1  state_capitals = {'Arkansas': 'Little Rock',
2                    'Colorado': 'Denver',
3                    'California': 'Sacramento',
4                    'Georgia': 'Atlanta'
5                   }
6
7  print(state_capitals['Colorado']) # accessing method
8
```

Creating a `dict`(review pre-class)

- Assigning a value to a key

```
state_capitals = {'Arkansas': 'Little Rock',
                  'Colorado': 'Denver',
                  'California': 'Sacramento',
                  'Georgia': 'Atlanta'
                 }

print(state_capitals['Colorado']) # accessing method

```

```
Denver

```


Creating a `dict`(review pre-class)

- Let's add a new item into the **`dict`**.

```
state_capitals = {'Arkansas': 'Little Rock',
                  'Colorado': 'Denver',
                  'California': 'Sacramento',
                  'Georgia': 'Atlanta'
                 }

state_capitals['Virginia'] = 'Richmond' # adding a new item

print(state_capitals)

```

Creating a `dict` (review pre-class)

- Let's add a new item into the `dict`.

```
state_capitals = {'Arkansas': 'Little Rock',
                  'Colorado': 'Denver',
                  'California': 'Sacramento',
                  'Georgia': 'Atlanta'
                 }

state_capitals['Virginia'] = 'Richmond' # adding a new item

print(state_capitals)

```

```
{'Arkansas': 'Little Rock',
'Colorado': 'Denver',
'California': 'Sacramento',
'Georgia': 'Atlanta',
'Virginia': 'Richmond'}

```


Creating a `dict` (review pre-class)

Tips:

- Note that keys and values can be of different types.

```
mix_values = {'animal': ('dog', 'cat'),  # tuple type
              'planet': ['Neptun', 'Saturn', 'Jupiter'],  # list type
              'number': 40,  # int type
              'pi': 3.14,  # float type
              'is_good': True}  # bool type

mix_keys = {22 : "integer",
            1.2 : "float",
            True : "boolean",
            "key" : "string"}

```

Creating a `dict`

- **Task** 👇
  - Let's create a `dict` (named `family`) which consists of names of 3 members of your family.
  - Each person should have only the first **names.**
  - For example;

name1
name2
.
.

Create using curly braces 👉{}

Creating a `dict`

- The code can be like :

```
family = {'name1': 'Joseph',
          'name2': 'Bella',
          'name3': 'Aisha'
         }
```

Creating a `dict`

- **Task** 👇
  - Add a new family member name to the dictionary you created.

Students, write your response!

Creating a `dict`

- The code can be like :

```
family = {'name1': 'Joseph',
          'name2': 'Bella',
          'name3': 'Aisha'
         }
family['name4'] = 'Tom'
print(family)
```

```
family = {'name1': 'Joseph',
          'name2': 'Bella',
          'name3': 'Aisha',
          'name4': 'Tom'
         }
```

Creating a `dict`

- Now, it's time to create a `dict` using `dict()` function :

```
dict_by_dict = dict(animal='dog', planet='neptun', number=40, pi=3.14, is_good=True)

print(dict_by_dict)

```


Creating a `dict`

- Now, it's time to create a `dict` using `dict()` function :

```
dict_by_dict = dict(animal='dog', planet='neptun', number=40, pi=3.14, is_good=True)

print(dict_by_dict)

```

```
{'animal': 'dog',
'planet': 'neptun',
'number': 40,
'pi': 3.14,
'is_good': True}

```

Creating a `dict`

- Now, it's time to create a `dict` using `dict()` function :

```
1  dict_by_dict = dict(animal='dog', planet='neptun', number=40, pi=3.14, is_good=True)
2
3  print(dict_by_dict)
4
```

```
1  {'animal': 'dog',
2  'planet': 'neptun',
3  'number': 40,
4  'pi': 3.14,
5  'is_good': True}
6
```

⚠ **Avoid ! :**

- Do not use quotes for `keys` when using the `dict()` function to create a dictionary.

Creating a `dict`

- **Task** 👇
  - Create the same `dict` using `dict()` function.

Creating a `dict`

- The code can be like :

```
family = dict(name1 = 'Joseph', name2 = 'Bella', name3 = 'Aisha',
name4 = 'Tom')

print(family)
```

```
family = {'name1': 'Joseph',
          'name2': 'Bella',
          'name3': 'Aisha',
          'name4': 'Tom'
         }
```