Functions & Libraries

Jannusch Bigge

14.11.2023

Functions

Functions

Often we want to do the same thing multiple times.

Functions

Often we want to do the same thing multiple times.

But we don't want to write the same code multiple times.

Functions

Often we want to do the same thing multiple times.

But we don't want to write the same code multiple times.

Solution: Functions

- Reusable code

Functions

Often we want to do the same thing multiple times.

But we don't want to write the same code multiple times.

Solution: Functions

- Reusable code
- Easier to read

Functions

Often we want to do the same thing multiple times.

But we don't want to write the same code multiple times.

Solution: Functions

- Reusable code
- Easier to read
- Easier to debug

Functions - Definition in Python

Definition:

```
def function_name(arguments):
    # do something
    return something
```

Functions - Definition in Python

Definition:

```
def function_name(arguments):
    # do something
    return something
```

- **def** *name*(*arguments*): - Start of the function

Functions - Definition in Python

Definition:

```
def function_name(arguments):
    # do something
    return something
```

- **def** *name*(*arguments*): - Start of the function
- **return** *something* - End of the function

Functions - Calling

Define:

```
def fibbonacci(number):
    a = 0
    ...
        b = a + b
    return a
```

Calling the function:

```
>>> result = fibbonacci(6)
>>> print(result)
8
```

Some examples

You allready know some functions:

- **print**(*something*)

Some examples

You allready know some functions:

- **print**(*something*)
- **len**(*something*)

Some examples

You allready know some functions:

- **print**(*something*)
- **len**(*something*)
- **range**(*something*)

Some examples

You allready know some functions:

- **print**(*something*)
- **len**(*something*)
- **range**(*something*)
- **input**(*something*)

Return values

You can return none, one or multiple values.

Return values

You can return none, one or multiple values.

- **None** - Nothing

Return values

You can return none, one or multiple values.

- **None** - Nothing
- **return a** - One value

How to access multiple return values?

Return values

You can return none, one or multiple values.

- **None** - Nothing
- **return a** - One value
- **return a, b, c** - Multiple values

How to access multiple return values?

Tuples

Special data type in Python: **Tuple**

Tuples

Special data type in Python: **Tuple**

Stores multiple values in one variable.

Tuples

Special data type in Python: **Tuple**

Stores multiple values in one variable.

- Immutable
- Ordered
- Can contain multiple data types

Tuples - Examples

```
>>> my_tuple = (1, 2, 3)
>>> print(my_tuple)
(1, 2, 3)
>>> print(my_tuple[0])
1
>>> print(my_tuple[1])
2
>>> print(my_tuple[2])
3
```

Stuff like **len()** and **for** works as expected.

Now we know how to write and use functions.

Now we know how to write and use functions.

Let's start using code from other people.

Libraries

Libraries

Many libraries solve a lot of problems.

Libraries

Many libraries solve a lot of problems.

- **math** - Math functions
- **secrets** - strong random numbers
- **numpy** - fast/complex math
- **matplotlib** - plotting
- **pandas** - data analysis
- **tensor-flow** - machine learning

Libraries

To use a library you have to import it.

Libraries

To use a library you have to import it.

```
import math
```

Libraries

To use a library you have to import it.

```
import math
```

Now you can use the functions from the library.

Libraries

To use a library you have to import it.

```
import math
```

Now you can use the functions from the library.

```
print(math.sqrt(4))
2.0
```

Sometimes you only want to import a single function.

Libraries

To use a library you have to import it.

```
import math
```

Now you can use the functions from the library.

```
print(math.sqrt(4))
2.0
```

Sometimes you only want to import a single function.

```
from math import sqrt
print(sqrt(4))
2.0
```

Libraries

pip

Some libraries are not installed by default.

You have to install them first.

But we will talk about that next week.

Next week: Using functions and libraries