

You are encouraged to start up a Python environment (like Spyder or Jupyter Notebook). If you do so, you can try out the examples while listening. If you prefer to listen only, that's fine as well.

Big Data and Automated Content Analysis

I+II

Week 2 – Wednesday

»Getting started with Python«

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Today

① The very, very, basics of programming with Python

Datatypes

Functions and methods

Modifying lists and dictionaries

Indention: The Python way of structuring your program

② Exercise

③ Next meetings

The very, very, basics of programming

See also Chapter 4.

Python lingo

Basic datatypes (variables)

int 32

float 1.75

bool True, False

string "Damian"

Python lingo

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(**variable name** firstname)

"firstname" and **firstname** is not the same.

Python lingo

Basic datatypes (variables)

int 32

float 1.75

bool True, False

string "Damian"

(**variable name** firstname)

"firstname" and **firstname** is not the same.

"5" and **5** is not the same.

But you can transform it: `int("5")` will return 5.

You cannot calculate `3 * "5"` (In fact, you can. It's "555").

But you can calculate `3 * int("5")`

Python lingo

More advanced datatypes

Python lingo

More advanced datatypes

```
list firstnames = ['Damian', 'Lori', 'Bjoern']  
    lastnames =  
    ['Trilling', 'Meester', 'Burscher']
```

Note that the elements of a list, the keys of a dict, and the values of a dict can have any datatype! (Better to be consistent, though!)

Python lingo

More advanced datatypes

```
list firstnames = ['Damian', 'Lori', 'Bjoern']  
    lastnames =  
        ['Trilling', 'Meester', 'Burscher']  
list ages = [18, 22, 45, 23]
```

Note that the elements of a list, the keys of a dict, and the values of a dict can have any datatype! (Better to be consistent, though!)

Python lingo

More advanced datatypes

```
list firstnames = ['Damian', 'Lori', 'Bjoern']
    lastnames =
    ['Trilling', 'Meester', 'Burscher']

list ages = [18, 22, 45, 23]

dict familynames= {'Bjoern': 'Burscher',
                   'Damian': 'Trilling', 'Lori': 'Meester'}

dict {'Bjoern': 26, 'Damian': 31, 'Lori':
    25}
```

Note that the elements of a list, the keys of a dict, and the values of a dict can have any datatype! (Better to be consistent, though!)

Python lingo

Functions

Python lingo

Functions

functions Take an input and return something else
`int(32.43)` returns the integer 32. `len("Hello")`
returns the integer 5.

Python lingo

Functions

- functions** Take an input and return something else
`int(32.43)` returns the integer 32. `len("Hello")` returns the integer 5.
- methods** are similar to functions, but directly associated with an object. `"SCREAM".lower()` returns the string "scream"

Python lingo

Functions

- functions** Take an input and return something else
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- methods** are similar to functions, but directly associated with an object. `"SCREAM".lower()` returns the string "scream"

Both functions and methods end with `()`. Between the `()`, *arguments* can (sometimes have to) be supplied.

Writing own functions

You can write an own function:

```
1 def addone(x):  
2     y = x + 1  
3     return y
```

Functions take some input (“argument”) (in this example, we called it *x*) and *return* some result.

Thus, running

```
1 addone(5)
```

returns 6.

Modifying lists and dictionaries

Modifying lists

Appending to a list

```
1 mijnlijst = ["element 1", "element 2"]
2 anotherone = "element 3" # note that this is a string, not a list!
3 mijnlijst.append(anotherone)
4 print(mijnlijst)
```

gives you:

```
1 ["element 1", "element 2", "element 3"]
```

Modifying lists

Merging two lists (= extending)

```
1 mijnlijst = ["element 1", "element 2"]
2 anotherone = ["element 3", "element 4"]
3 mijnlist.extend(anotherone)
4 print(mijnlijst)
```

gives you:

```
1 ["element 1", "element 2", "element 3", "element 4"]
```

Modifying dicts

Adding a key to a dict (or changing the value of an existing key)

```
1 mydict = {"whatever": 42, "something": 11}
2 mydict["somethingelse"] = 76
3 print(mydict)
```

gives you:

```
1 {'whatever': 42, 'somethingelse': 76, 'something': 11}
```

If a key already exists, its value is simply replaced.

Indentation: The Python way of structuring your program

Indentation

Structure

The program is structured by TABs or SPACES

Stack Overflow Developer ...

stackoverflow.com/research/developer-survey-2015

overflow developer survey

stackoverflow

Overview

Developer Profile

Technology

I. Most Popular Technologies

II. Most Loved, Dreaded, and Wanted Tools

III. Desktop Operating System

IV. Text Editor

V. IDE Theme

VI. Source Control

VII. Tabs vs. Spaces

VIII. Caffeine

Work

Community

Back to top

Looking for a job?

about 10% of developers still don't use it.

VII. TABS VS. SPACES

Tabs

45.0%

Spaces

33.6%

It depends

17.0%

Huh?

4.5%

25,807 responses

After millennia of heated debate, mercifully, at long last, we have an answer. **Most developers prefer tabs to spaces.**

Upon closer examination of the data, a trend emerges: Developers increasingly prefer spaces as they gain experience. Stack Overflow reputation correlates with a preference for spaces, too: users who have 10,000 rep or more prefer spaces to tabs at a ratio of 3 to 1.

tab

Alles markeren

Hoofdlettergevoelig

4 van 8 overeenkomsten

Indentation

Structure

The program is structured by TABs or SPACEs

```
1 firstnames=['Damian','Lori','Bjoern']
2 age={'Bjoern': 27, 'Damian': 32, 'Lori': 26}
3 print ("The names and ages of these people:")
4 for naam in firstnames:
5     print (naam,age[naam])
```


Indentation

Structure

The program is structured by TABs or SPACEs

```
1 firstnames=['Damian','Lori','Bjoern']
2 age={'Bjoern': 27, 'Damian': 32, 'Lori': 26}
3 print ("The names and ages of these people:")
4 for naam in firstnames:
5     print (naam,age[naam])
```

Don't mix up TABs and spaces! Both are valid, but you have to be consequent!!! Best: always use 4 spaces!

Indentation

Structure

The program is structured by TABs or SPACES

```
1 print ("The names and ages of all these people:")
2 for naam in firstnames:
3     print (naam,age[naam])
4     if naam=="Damian":
5         print ("He teaches this course")
6     elif naam=="Lori":
7         print ("She is a former assistant")
8     elif naam=="Bjoern":
9         print ("He helped teaching this course in the past")
10    else:
11        print ("No idea who this is")
```

Indentation

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- an alternative block should be executed if an error occurs (try and except statements)

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- it is only to be executed under specific conditions (if, elif, and else statements)
- an alternative block should be executed if an error occurs (try and except statements)
- a file is opened, but should be closed again after the block has been executed (with statement)

We'll now together do some simple exercises ...

Exercises

1. Warming up

- Create a list, loop over the list, and do something with each value (you're free to choose).

2. Did you pass?

- Think of a way to determine for a list of grades whether they are a pass (>5.5) or fail.
- Can you make that program robust enough to handle invalid input (e.g., a grade as 'ewghjeh')?
- How does your program deal with impossible grades (e.g., 12 or -3)?
- ...

Next meetings

Friday

We will work together on “Describing an existing structured dataset” (Appendix A).

Preparation: Make sure you understood all of today's concepts!