**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

## Week 2 – Monday

## »Getting started with Python«

Damian Trilling

d.c.trilling@uva.nl
@damian0604
www.damiantrilling.net

Afdeling Communicatiewetenschap
Universiteit van Amsterdam

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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

## Basic datatypes (variables)

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| (variable name | `firstname`) |

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

# Python lingo

## Basic datatypes (variables)

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|---|---|
| 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

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']
```

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!)

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## Functions

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## Functions

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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

```
1 mijnlijst = ["element 1", "element 2"]
2 anotherone = ["element 3", "element 4"]
3 mijnlist.extend(anotherone)     # or simply: mijnlijst += 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.

Indention: The Python way of structuring your program

# Indention

## Structure

The program is structured by TABs or SPACEs

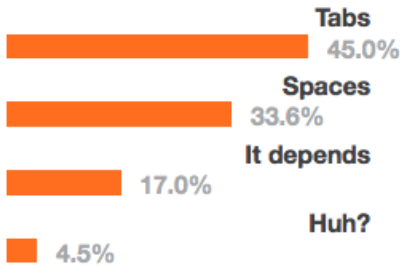
stackoverflow



Looking for a job?

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

## VII. TABS VS. SPACES




*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.

# Indention

## 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])
```

# Indention

## Structure

The program is structured by TABs or SPACEs

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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!**

# Indention

## 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")
```

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- it is to be executed repeatedly (`for` statement) – e.g., for each element from a list
- 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 'ewghjieh')?
- How does your program deal with impossible grades (e.g., 12 or -3)?
- ...

# Next meetings

# Wednesday

We will work together on "Describing an existing structured dataset" (Appendix A).
**Preparation: Make sure you understood all of today's concepts!**