Exercise class 2

Introduction to Programming and Numerical Analysis

Class 3

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What is a variable?

A variable **points** to a piece of **data** stored on **memory**.


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Atomic types

Four **atomic types**:

- Booleans (`True`, `False`)
- Integers (1, 0, -3, 1582, ...)
- Floating point (0.1, 3.141592.., 2.71828..., ...)
- Strings (`'abc'`, `'123'`, `'hello world'`, ...)

Atomic types don't keep their reference when changed. They are "put in a new folder" instead.

Containers

Containers can be comprised of several atomic type variables:

- Lists, `[]`
- Dictionaries, `{}`
- Tuples, `()`
- Pandas DataFrames, `pd.DataFrame()`
- NumPy arrays, `np.array()`
- ...

Containers can be changed and keep their reference! Can lead to all sorts of nasty bugs...

(Tuples are an exception as they can't be changed.)

In the DataCamp courses

Introduction to Data Science in Python touches on different atomic types.

Intermediate Python introduces dictionaries and Pandas DataFrames.

Conditions

Conditions consist of `if`, `else` or `elif` followed by an expression which evaluates to a **boolean** type:

```
if x>0:
    print('x is positive')
elif x<0:
    print('x is negative')
else:
    print('x is 0')
```

Boolean expressions may also include boolean operators: `and`, `or`, `not`, `is`

Loops

Computers are really good at performing **the same task over and over**. We can use loops!

- `for`-loops for when you want a **specific number of iterations**. Ie. iterate over elements in a list, the number of variables in a data set, the number of time periods in a dynamic model etc.
- `while`-loops for repeating a process **until some condition holds**. Ie. evaluate function until it converges.

DataCamp course *Intermediate Python* explains conditionals and loops. List comprehensions are covered in *Python Data Science Toolbox part 2*.

Time for exercises

DataCamp courses:

- Introduction to Data Science in Python
- Intermediate Python
- Python Data Science Toolbox (Part 1)
- Python Data Science Toolbox (Part 2)

Otherwise:

- Run code from lectures - make sure you understand what's going on

Next time...

Video lectures:

- Functions
- Floating point numbers
- Classes

Exercises

- Last exercise class for DataCamp