{p r o g r a m m i n g}

Introduction to Python

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Agenda

- Introduction to programming
- Introduction to Jupyter Notebook
- Programming:
  - Variables
  - Data types
  - Lists
  - For-loops
  - Dictionaries
  - Functions

Your expectations?

Introduction to programming

What is a program?

- "*A sequence of instructions, written to perform a specific task on a computer*" - Wikipedia

- The instructions has to be written in a language that the computer can understand, **a programming language**
  - Ex: Java, JavaScript, C++, Python

Introduction to programming

Why learn Python?

- Python is the fastest-growing major programming language today
- Syntax is simple and easy to learn
- Versatile language:
  - Web development
  - Data science
  - Machine learning
  - Game development
  - ...and much more!
- Widely used in the industry, both in large and small companies
- Extremely popular with a huge community of developers who can support you

Let’s move around :)

Introduction to Jupyter Notebook

What is it?

- A very popular and powerful tool that combines:
  - Code
  - Rich text
  - Images
  - Mathematical equations
  - Plots
  - Interactive figures and widgets

...and much more, into a single document.

Introduction to Jupyter Notebook

Let's try it out!

1. Download .ipynb file from https://github.com/mykys
2. Open the file in https://jupyter.org/try

Introduction to Jupyter Notebook

Exercise

1. **Add new cell**
    a. [+]
    b. esc + a
    c. esc + b
2. **Remove cell**
    a. [scissor]
    b. esc + dd
3. **Run cell**
    a. Shift + enter

Python

What is a variable?

- a reserved memory location to store values
- a variable name can be anything - the more descriptive, the better :)
  - x = 30 | age = 30
- good to remember when naming variables:
  - the name should start with a letter
  - cannot start with a number
  - alpha-numeric characters (A-z & 0-9) and underscores
  - case sensitive, Age and AGE are different
- snake case is preferred
  - pink_programming | PinkProgramming

Python

What is a variable?

- how much memory being reserved depends on what value you want to store
- no need to declare (create) a variable explicitly
- the equal sign (=) is used to assign a value to a variable
  - age = 30 | variable to the left and value to the right
- the value of a variable can change
  - age = 40

Python

Data types

- int : 10
- float : 10.5
- String : “Pink”
- boolean : True

Exercise: Create four variables and assign values of different types to them (1a-c)

Python

How do we use variables?

Exercise: Explore with arithmetic operators +, -, *, /! (2)

Python

Lists

- a data structure that can store a collection of items
- defined using square brackets [item1, item2, item3, ….]
- each item is separated with a comma
- index (position) starts from 0,1,2,…,n

Exercise: Get the first, second and last value from the list fruits (ex)

Exercise: Create a new list with names of your friends. Repeat the exercise above. (3a-b)

Python

Lists

- count number of items in the list : len([...])
- add an item to the end of the list : append(*item*)
- insert an item at a given position : insert(*position, item*)
- remove the first occurence of this item : remove(*item*)

These are some of the basic functions. More can be found in the documentation :)

Exercise: Try some of the basic functions implemented for lists (4a-f)

Python

For-loops

- useful when we want to go through every item in i.e. a list

Exercise: Print each name in your list of names.

Exercise: Add a small change to each name in your list

Python

For-loops

- useful when we want to go through every item in i.e. a list

Exercise: Print each name in your list of names.

Exercise: Add a small change to each name in your list

Python

Dictionaries

- a data structure that can store a collection of key-value pairs
- defined using curly brackets {key1 : value1, key2 : value 2, ...}
- a colon (:) separates each key from its associated value
- each key-value pair is separated with a comma

Exercise: Get the capital of other countries using the dictionary *countries* (6a)

Python

Dictionaries

- add a new key-value pair : countries[“germany”] = “berlin”
- update existing key-value pair : countries[“sweden”] = “malmo”
- remove existing key-value pair : **del** countries[“sweden”] (delete key)

Exercise: (6b-g)

- Add a new key-value pair to *countries*
- Update existing key-value pair
- Remove existing key-value pair

Python

Dictionaries

Exercise: Print all countries and capitals in your dictionary *countries*

Python

Functions

- What is a function?
  - a block of code that will run when being called
- Why do we want to use functions?
  - reuse code
  - a function usually performs one action, i.e. add two numbers
- How do we create a function?
  - See Jupyter Notebook

Exercise: Create three functions that can subtract, multiply and divide two numbers.

How do you feel?

Thank you for your participation! :)