Introduction to (Scientific) Programming with Python

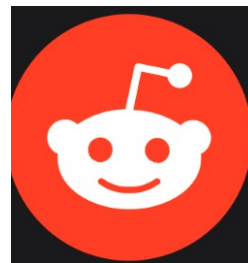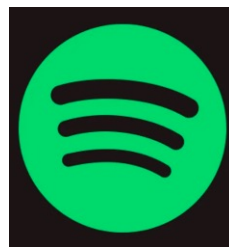**Jelka Stojanov, Timo Flesch**

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Outline

- Why Python?

- Practical
  - Part 1: Intro to Python
  - Part 2: Python for scientific programming
  - Part 3: Python for statistical data analysis

- Additional resources

Why Python?

It's a general-purpose programming language, used to power many of the apps you use every day!

Why Python?

There are free (!) add-ons for everything:

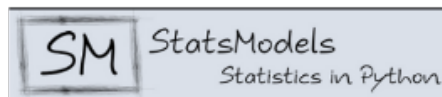Create your own experiments!

Organise and analyse numerical data!

Make beautiful figures!

Perform sophisticated statistical analyses!

Hop on the machine learning hype train!

Why Python?

It's just better than its competitors!

> Matlab is very expensive! Python is **free**. When using the right packages/add-ons, Python has the same functionality and syntax as Matlab.

> Python is much easier to learn, as the **syntax is less complex**. At least for science, there is a **better community/ecosystem**. Some Python packages run C(++) code in the background, which makes them almost as fast as their C++ counterparts.

> Python is a **general-purpose language**. It can be used for almost everything. R was developed for statistical analyses.
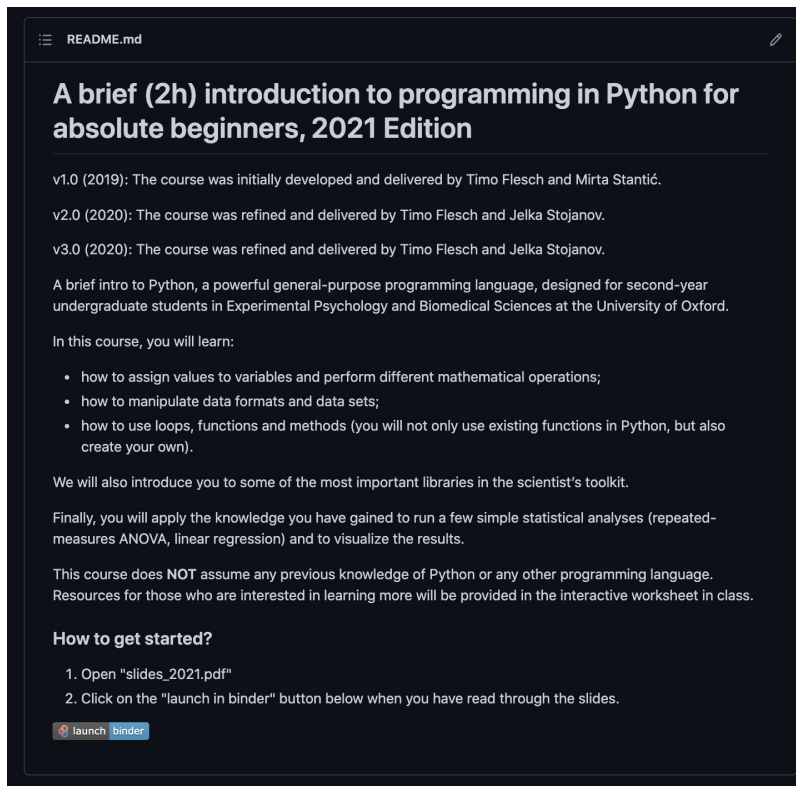
> Again, much **simpler syntax**. You can achieve the same results with fewer lines of code.

Python Practical

1. Go to http://www.github.com/timoflesch/intro2python

Python Practical

2. Click on the "launch binder" button:

Python Practical

3. Stare at this screen for a while:

Python Practical

4. Now this screen (or similar) should show up:
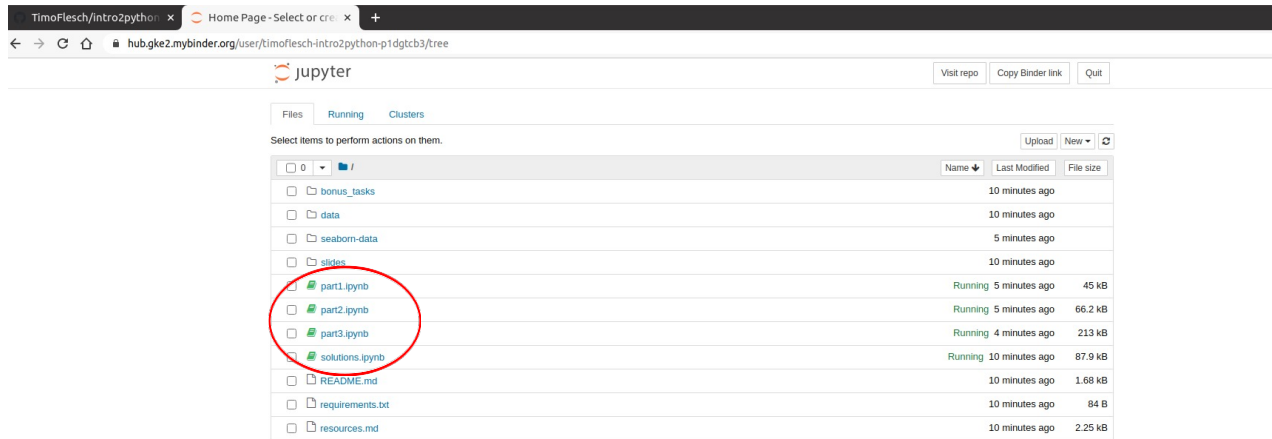
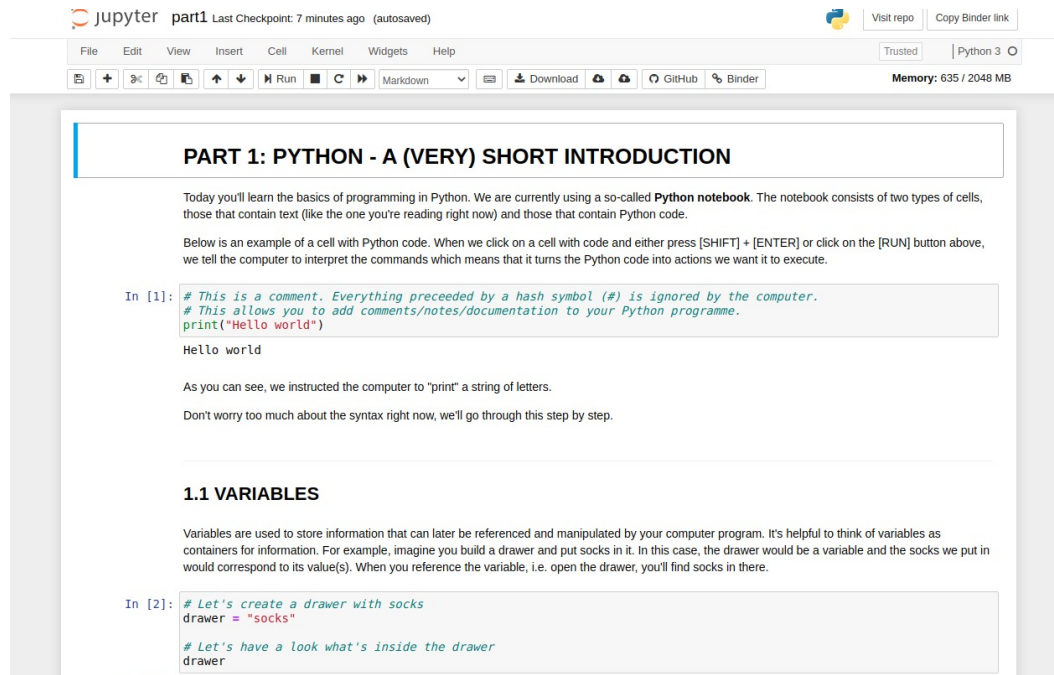From here you can open the worksheets that we have provided for you. This will run an interactive Python session in your browser, where you can write and execute your own Python programs.

Python Practical

5. You are now running an interactive worksheet with Python code in your web-browser. **Have fun** ☺

Outlook

Learn to code!

1. A complete course https://www.learnpython.org

2. Ditto https://www.w3schools.com/python/

3. Advanced course https://automatetheboringstuff.com

How to install Python?

1. Just Python https://www.python.org/downloads/

2. Jupyter Notebook (that you have used/will use today) https://jupyter.org/install

3. Anaconda (a collection of useful packages and other software for data scientists)

https://www.anaconda.com/distribution/

Outlook

Text editors

1. Atom https://atom.io/

2. Visual Studio Code https://code.visualstudio.com/

3. Sublime https://www.sublimetext.com/

All-in-one solutions (similar to the Matlab interface or R-Studio)

1. Spyder (free) https://www.spyder-ide.org/

2. Pycharm (free basic and commercial pro version) https://www.jetbrains.com/pycharm/

Outlook

Coding challenges

1. Hackerrank https://www.hackerrank.com/

2. Leetcode https://leetcode.com

Python for psychologists

https://www.marsja.se/best-python-libraries-psychology/