BIM A+

European Master in
Building Information Modelling

Introduction to Python programming language

Topic 2: Fundamentals of programming

BIM A+3: Parametric Modelling in BIM

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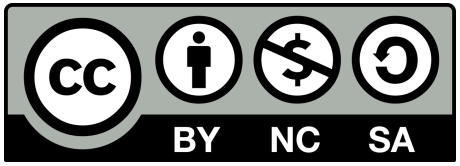

Compiled vs Scripting languages

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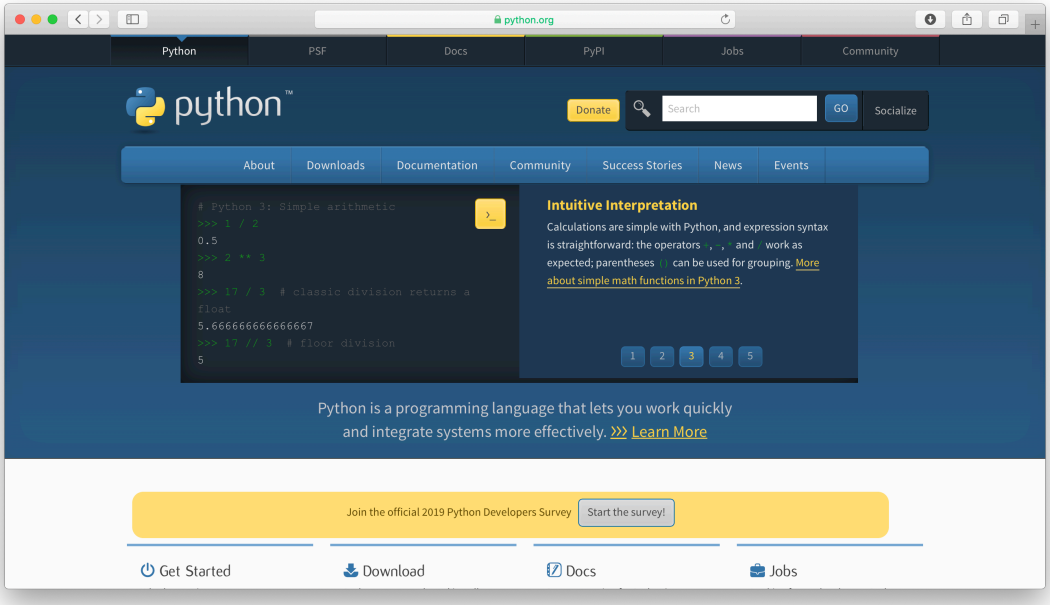
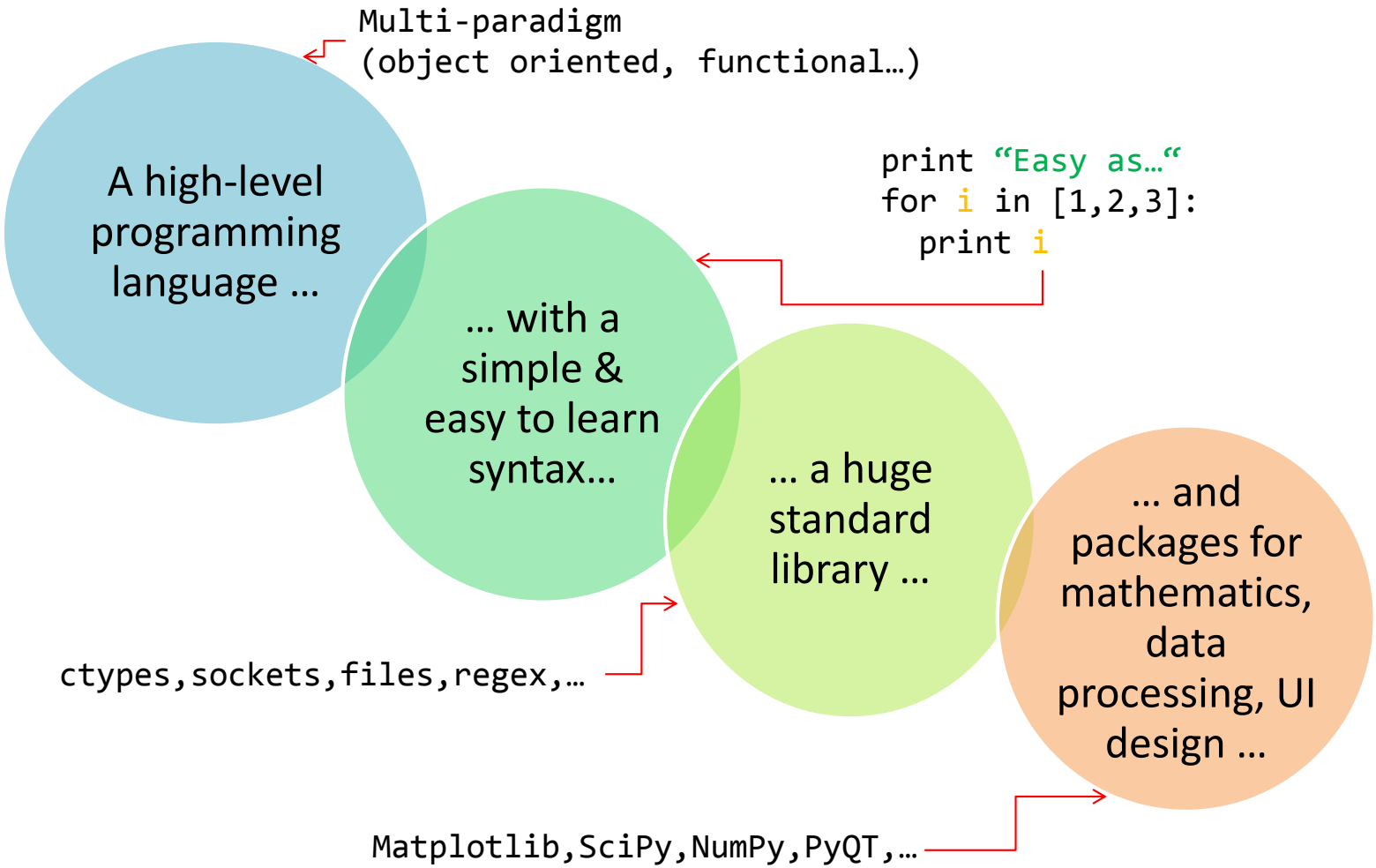
- Compiled
  - A program is executed (i.e. the source is first compiled, and the result of that compilation is expected)
  - A "program" in general, is a sequence of instructions written so that a computer can perform certain task.
  - Examples: C/C++, Fortran, Objective-C, Swift, …
- Scripting
  - A script is interpreted
  - A "script" is code written in a scripting language. A scripting language is nothing but a type of programming language in which we can write code to control another software application.
  - Examples: Python, Ruby, Perl, …

What is Python?

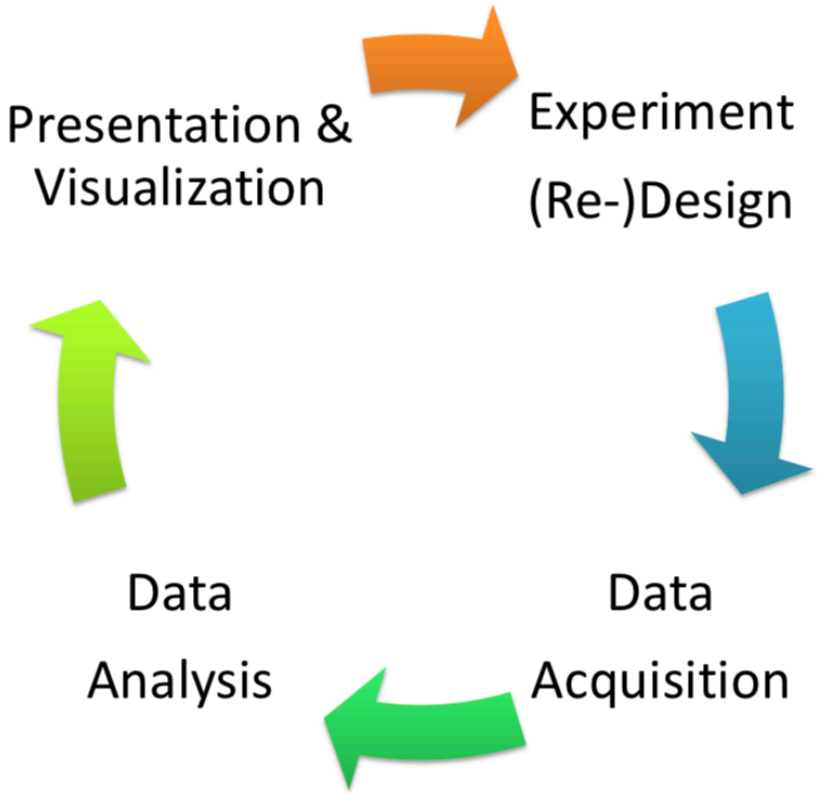
- Python is a general purpose programming language that is often applied in scripting roles.
  - So, Python is programming language as well as scripting language.
  - Python is also called as Interpreted language
- Differences between program and scripting language.
  - A program is executed (i.e. the source is first compiled, and the result of that compilation is expected)
  - A "program" in general, is a sequence of instructions written so that a computer can perform certain task.



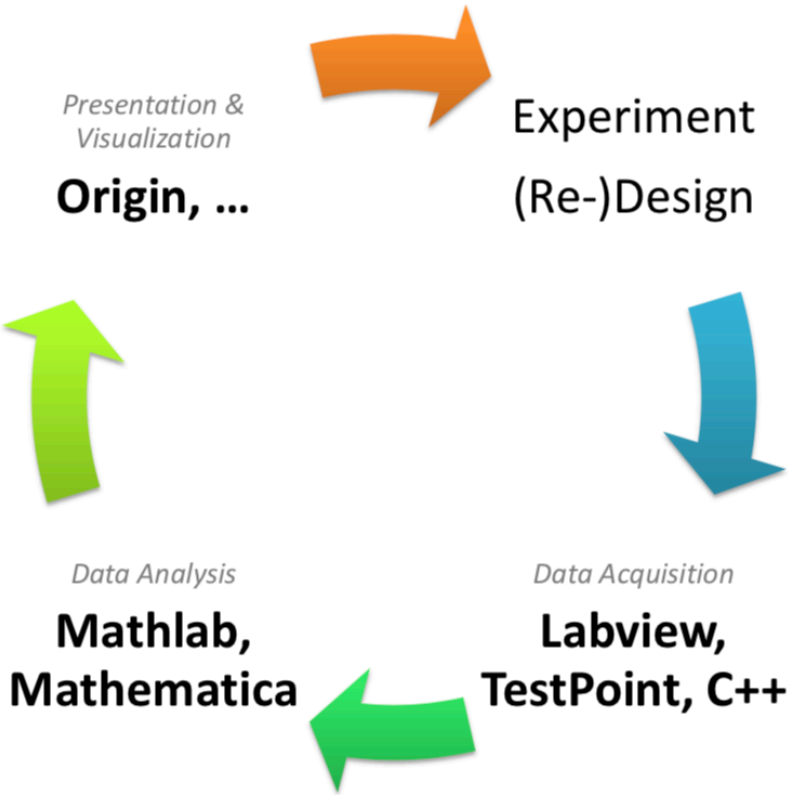
Why Python?


Multi-paradigm
(object oriented, functional…)
A high-level programming language …
print “Easy as…“
for i in [1,2,3]:
print i
… with a simple & easy to learn syntax…
… a huge standard library …
… and packages for mathematics, data processing, UI design …
ctypes,sockets,files,regex,…
Matplotlib,SciPy,NumPy,PyQT,…

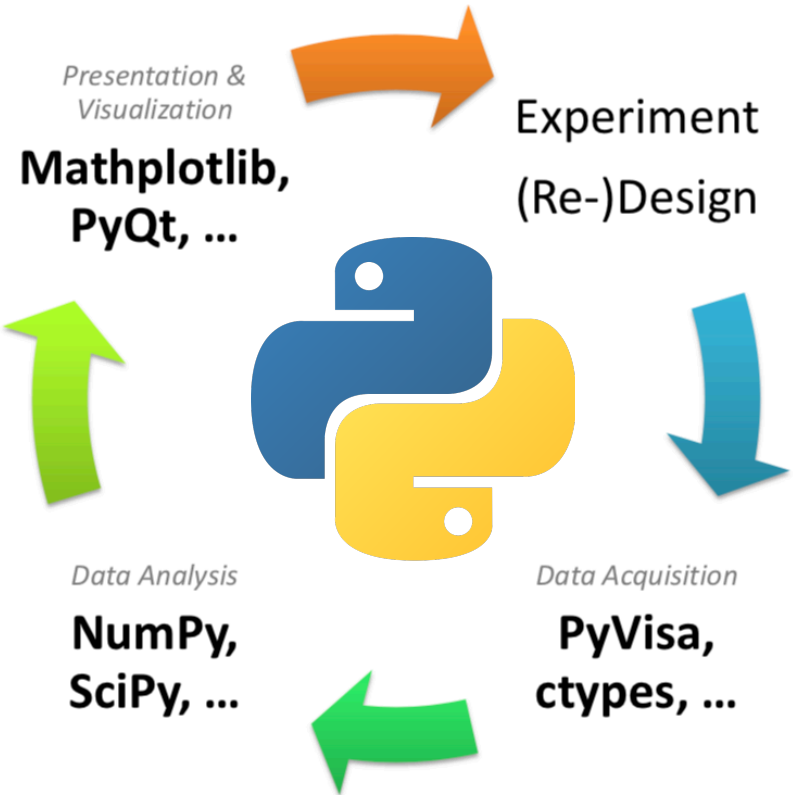
Scientific/Engineering workflow



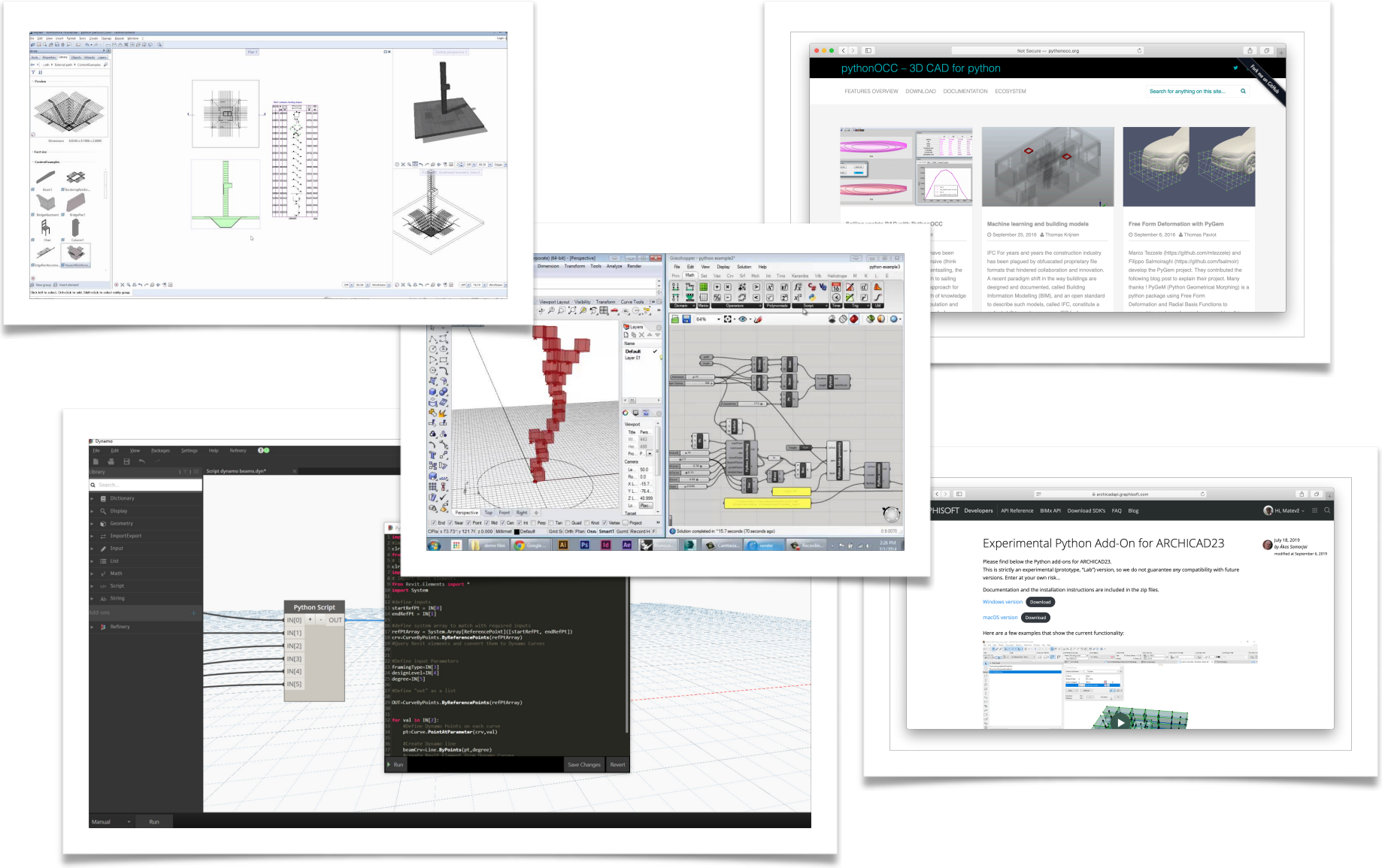
Scientific/Engineering workflow using software



Scientific/Engineering workflow using Python



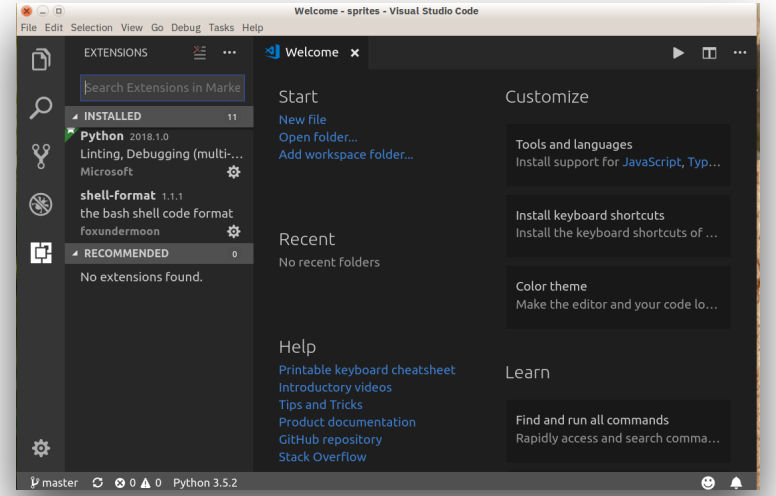
BIM and Python



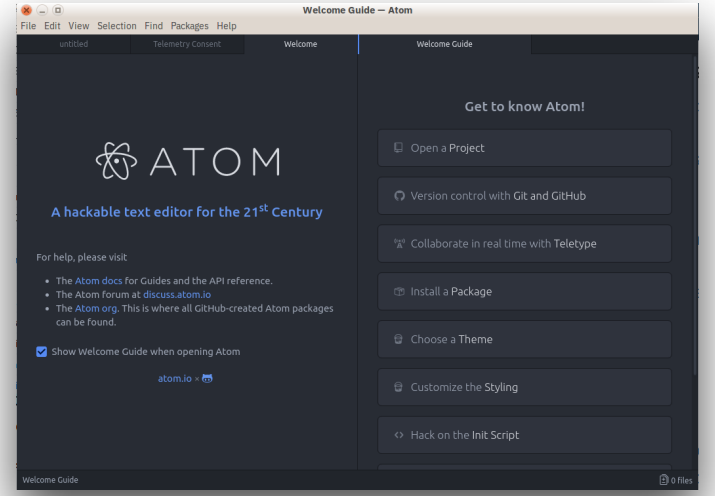
How to get started?

- Download and install
  - Official distribution: https://www.python.org
  - Anaconda (Science friendly distribution): https://www.anaconda.com
- Documentation
  - Python has one of the best documentation
  - Official documentation: https://www.python.org/doc/
- Additional resources
  - Learning Data Science: Our Favourite Python Resources: https://hackernoon.com/learning-data-science-our-favorite-python-resources-from-free-to-not-877fca5c92f0
  - Talk Python to Me: https://talkpython.fm/home

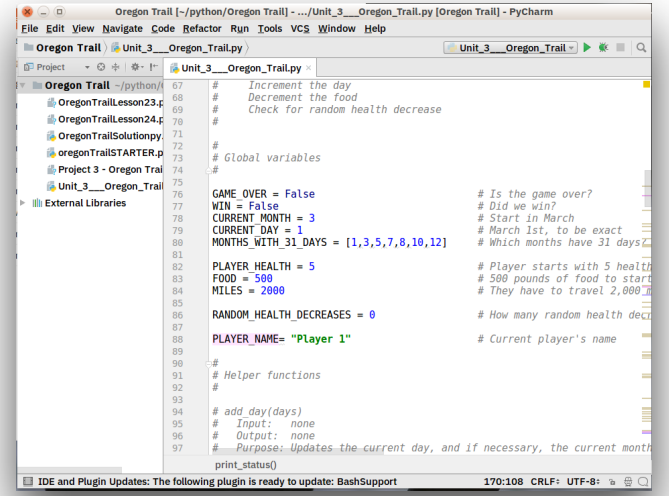
Python editors



https://code.visualstudio.com



https://atom.io



https://www.jetbrains.com/pycharm/

Python vs MATLAB

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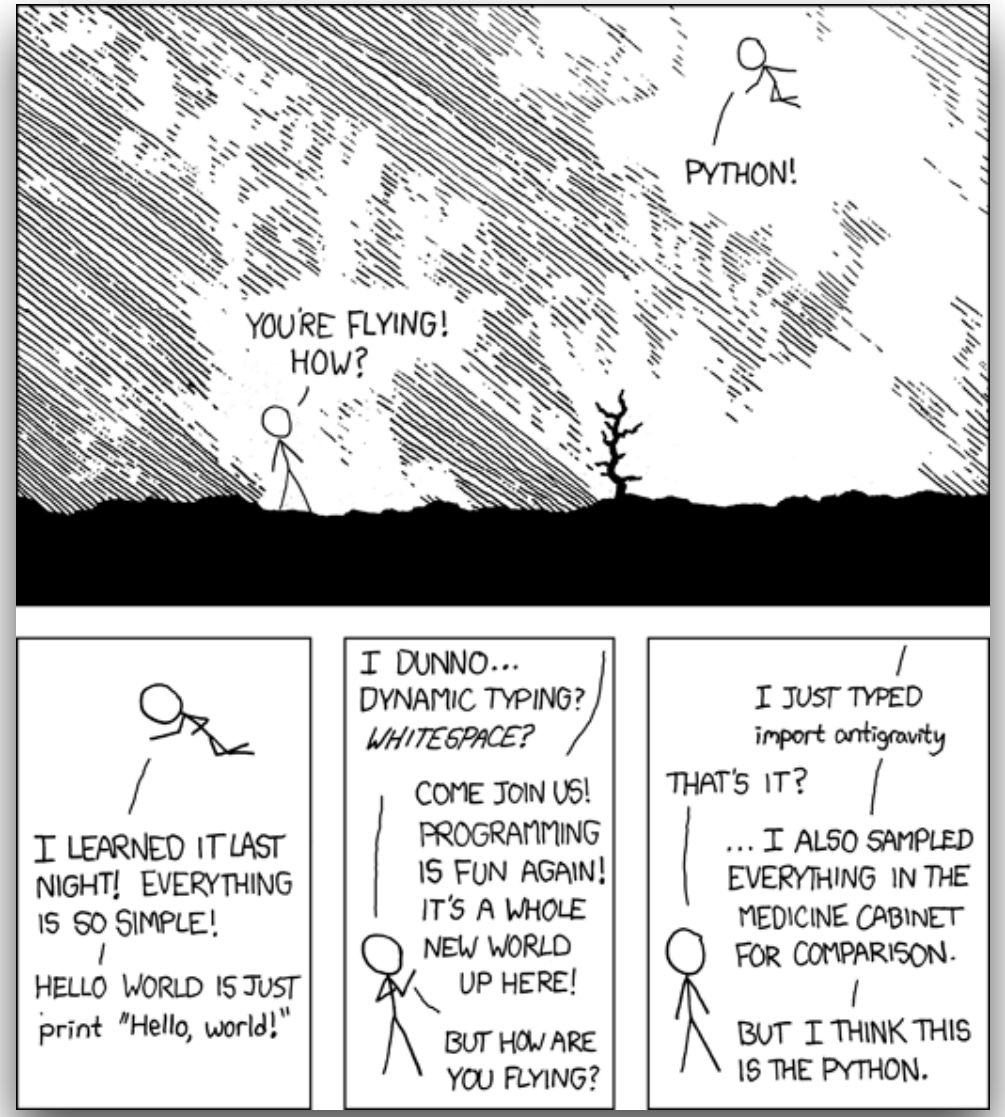

https://www.coriers.com/our-favorite-python-books-courses-and-youtube-videos/

Demo