

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

Matevž Dolenc

Univerza v Ljubljani



Universidade do Minho





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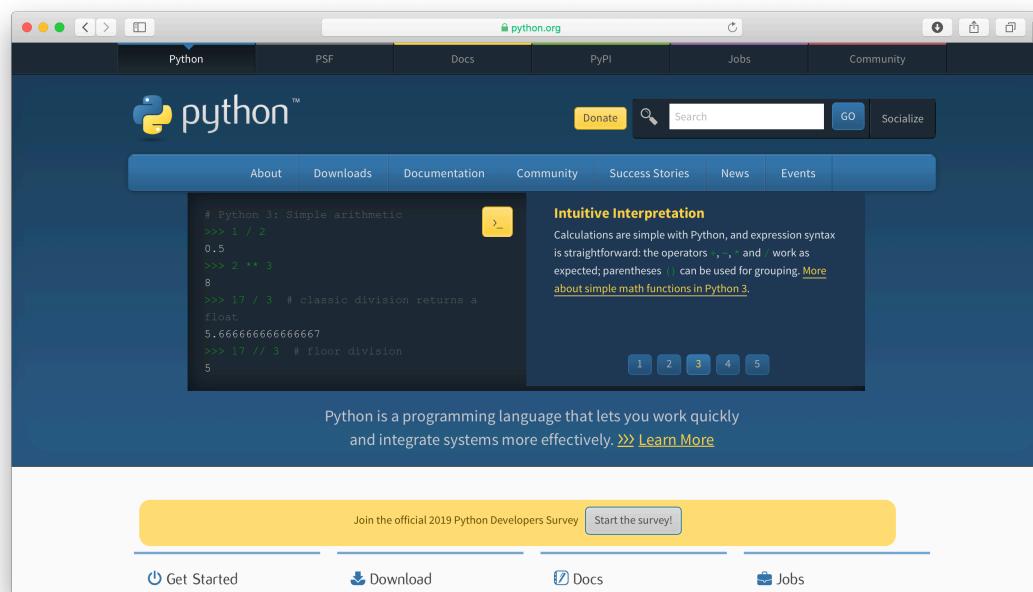
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Compiled vs Scripting languages

- 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, ...

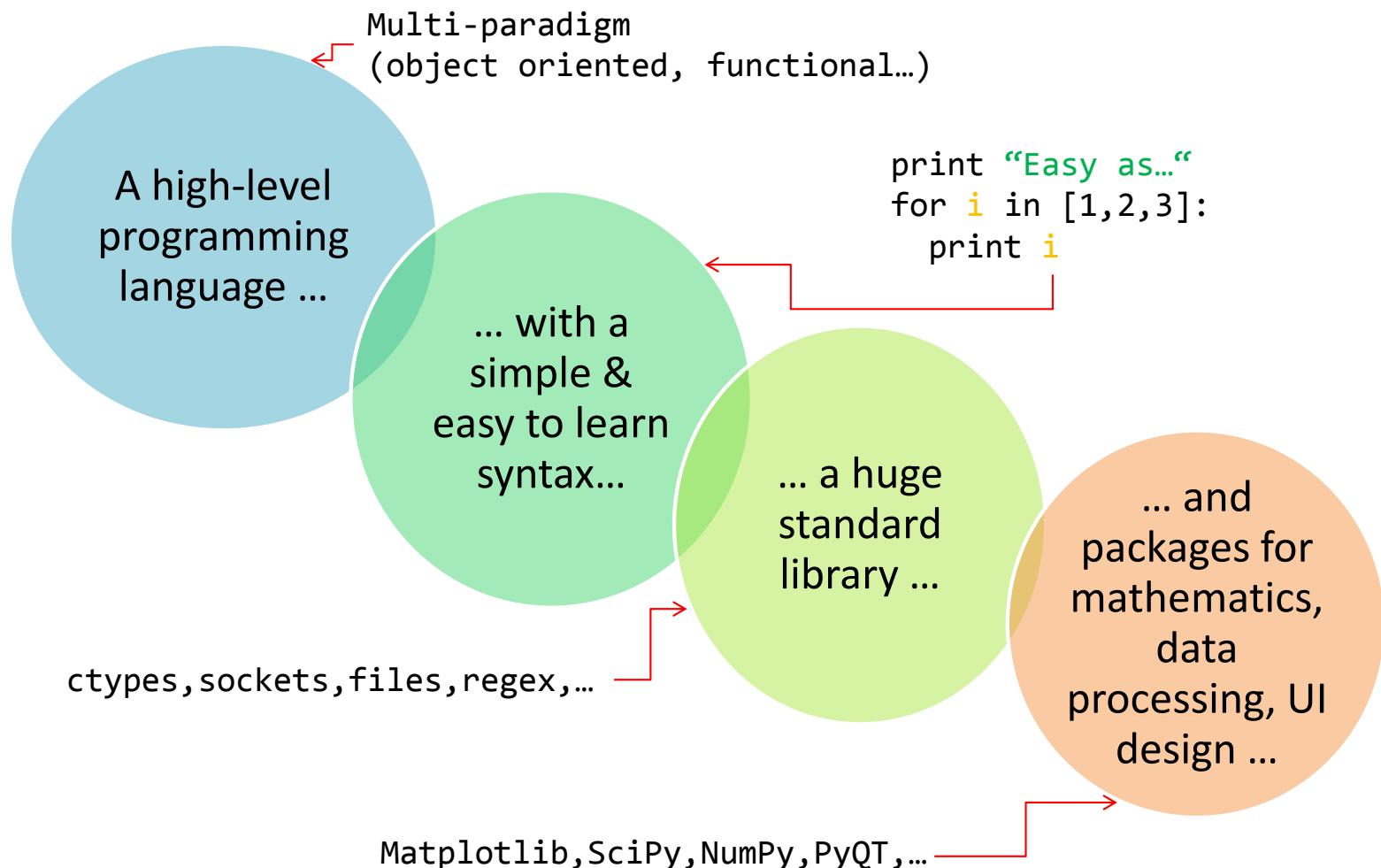
What is Python?

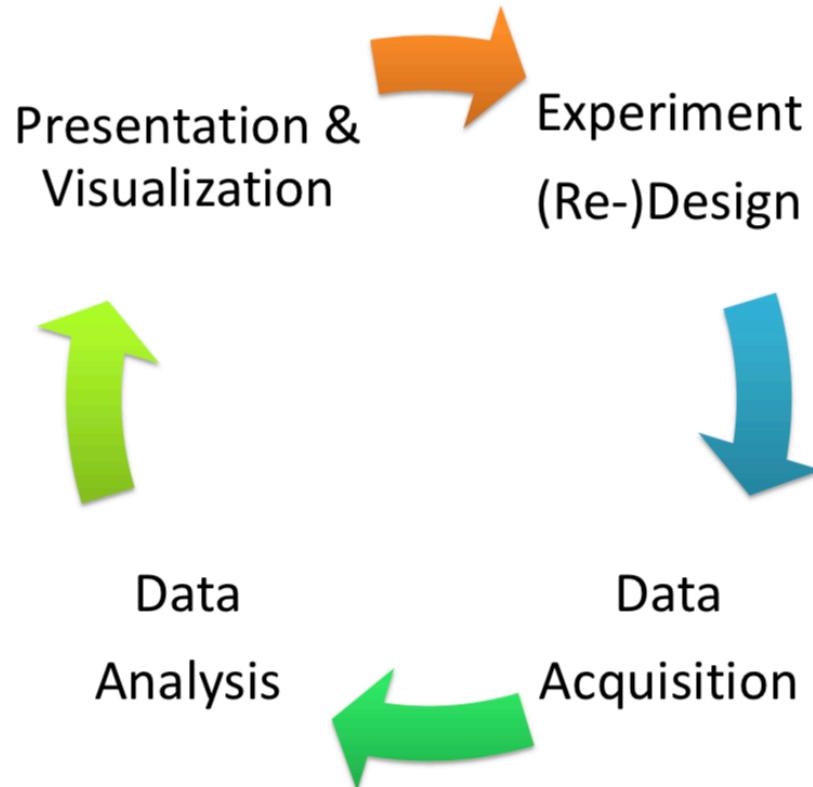
- Python is a general purpose programming language that is often applied in scripting roles.
 - So, Python is programming language as well as scripting language.
 - Python is also called as Interpreted language
- Differences between program and scripting language.
 - A program is executed (i.e. the source 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?

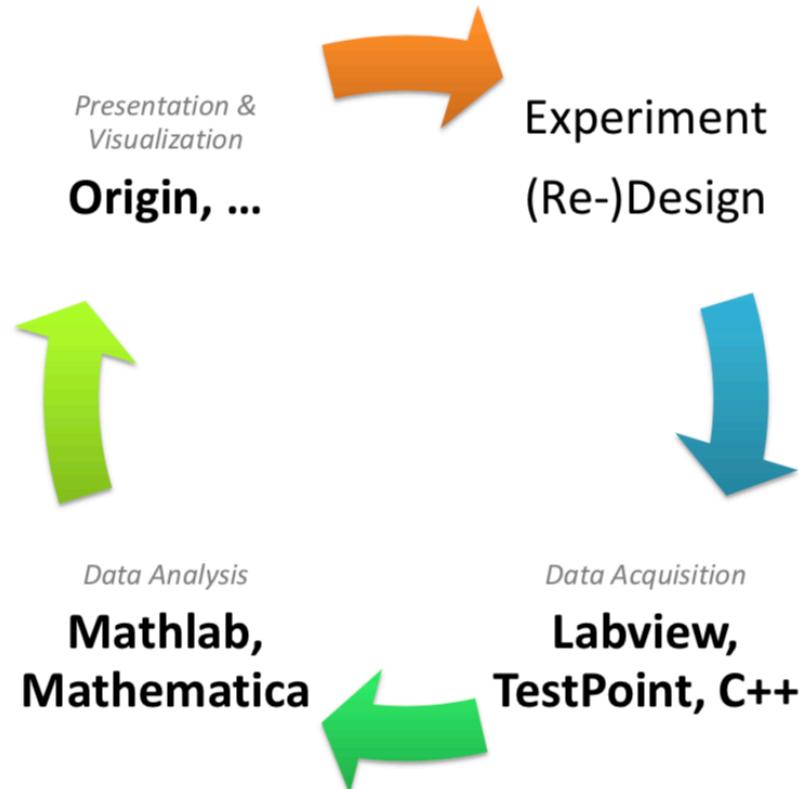
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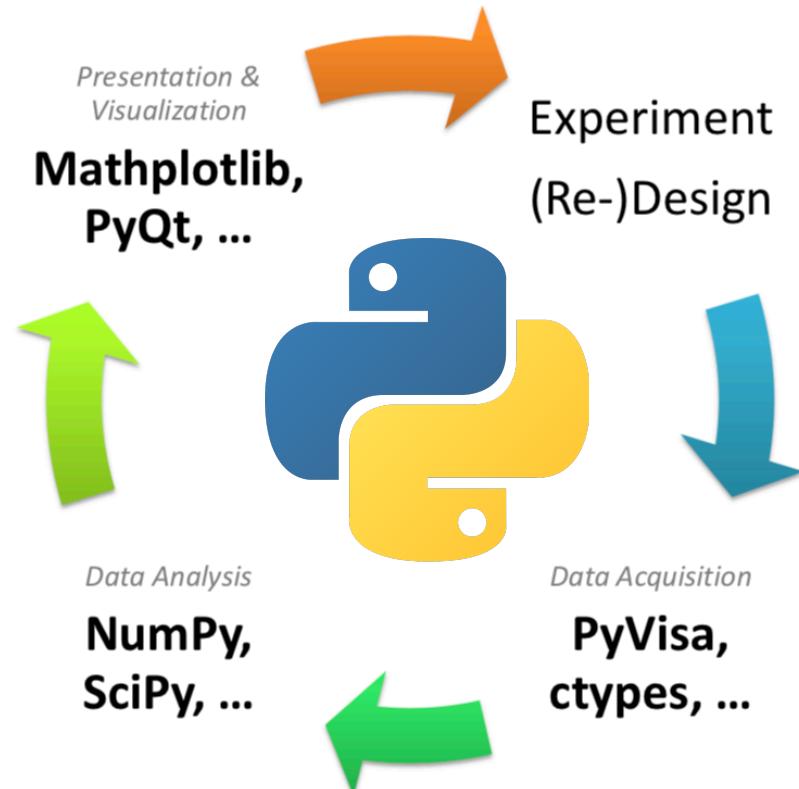




Scientific/Engineering workflow using software

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BIM and Python

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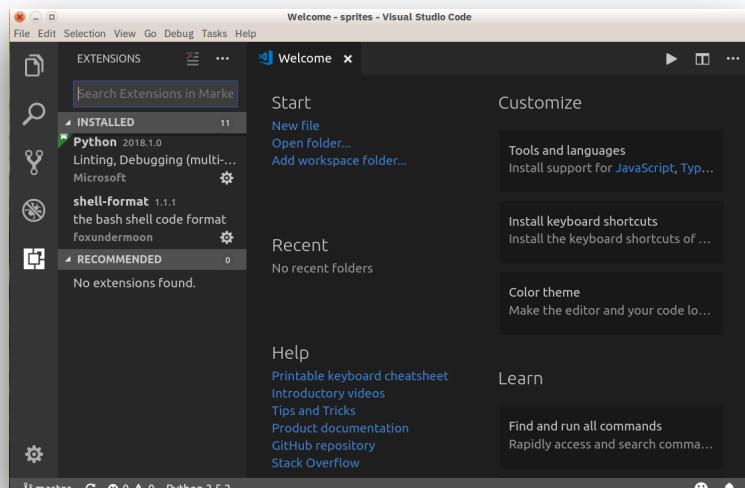
The collage consists of four main images:

- Top Left:** A screenshot of a CAD software interface showing a 3D model of a structural component and its corresponding 2D cross-sections.
- Top Right:** A screenshot of the pythonOCC website, which is a 3D CAD library for Python. It shows examples of 3D models and deformation analysis.
- Bottom Left:** A screenshot of the ArchiCAD Graphisoft Python Add-On interface. It shows a 3D view of a building model, a Python script editor with code for creating beams, and a graphical interface for defining input parameters.
- Bottom Right:** A screenshot of the PHISOC Python Add-On for ARCHICAD23. It shows a 3D view of a building model and a Python script editor with code for creating curves and points.

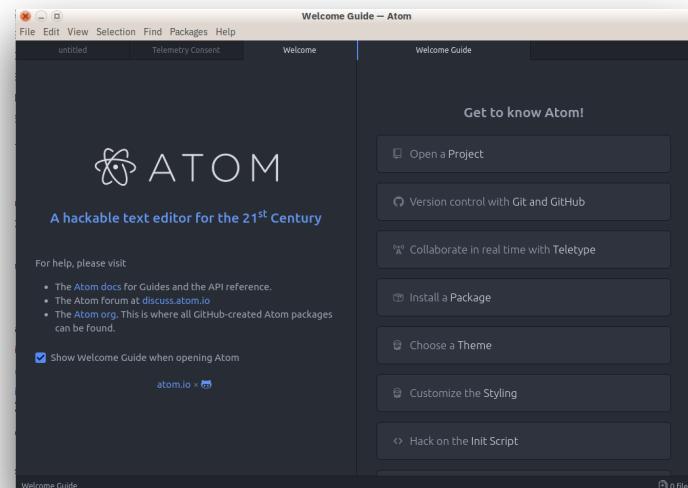
How to get started?

- 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>

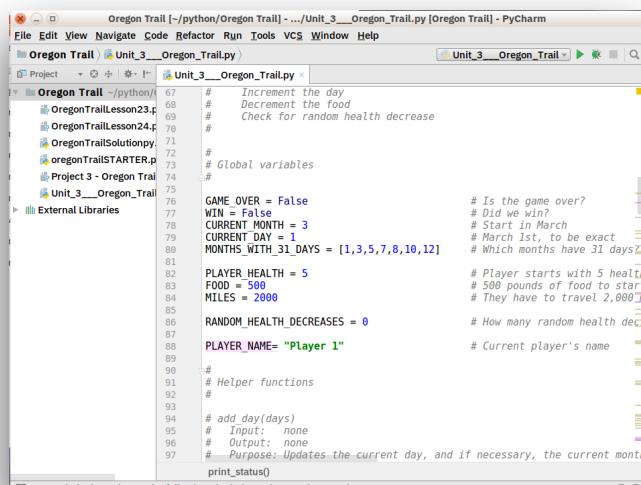
Python editors



<https://code.visualstudio.com>



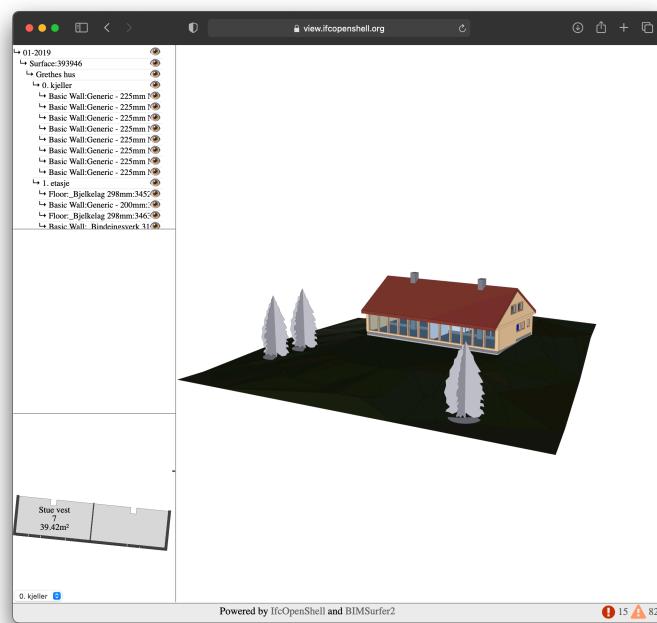
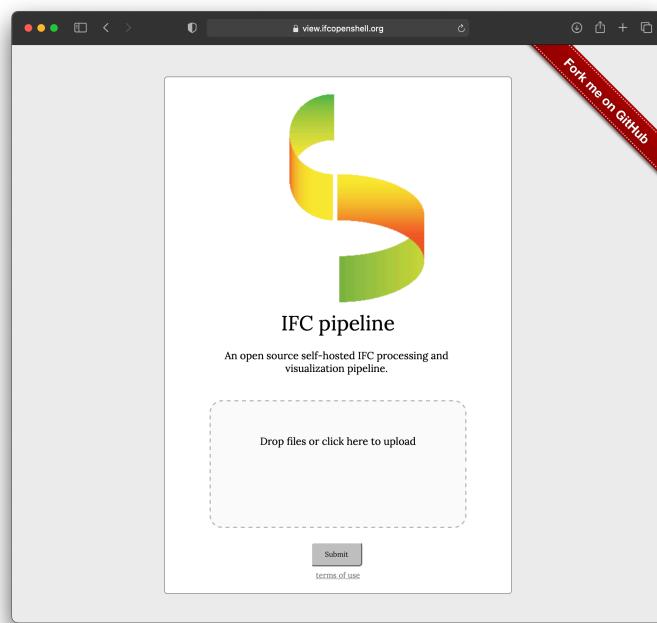
<https://atom.io>



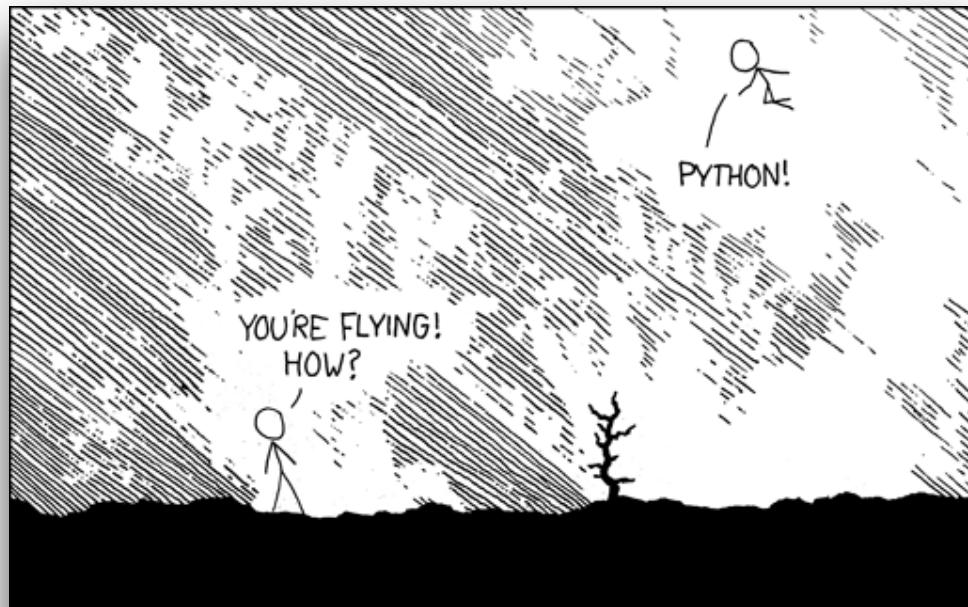
<https://www.jetbrains.com/pycharm/>

Python and IFC

- Download and install IfcOpenShell-Python
 - <http://ifcopenshell.org>
- Read articles about IfcOpenShell
 - <http://academy.ifcopenshell.org>
- Try IFC pipeline (but do not stress the service!)
 - <https://view.ifcopenshell.org>







I LEARNED IT LAST NIGHT! EVERYTHING IS SO SIMPLE!
/ HELLO WORLD IS JUST
print "Hello, world!"

I DUNNO...
DYNAMIC TYPING?
WHITESPACE?
/ COME JOIN US!
PROGRAMMING IS FUN AGAIN!
IT'S A WHOLE NEW WORLD UP HERE!
BUT HOW ARE YOU FLYING?

I JUST TYPED
import antigravity
THAT'S IT? /
... I ALSO SAMPLED
EVERYTHING IN THE
MEDICINE CABINET
FOR COMPARISON.
/ BUT I THINK THIS
IS THE PYTHON.

Demo