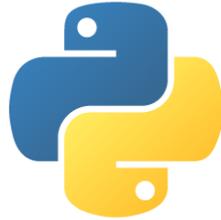


Introduction to Python



Python is a clear and powerful object-oriented programming language, comparable to Ruby, PHP, JavaScript, or Java. (https://madnight.github.io/github/#/pull_requests/2017/4)

Python's basic features:

- Uses a well-designed syntax, making the programs easier to read.
- Is ideal for prototype development and other ad-hoc programming tasks, without compromising maintainability.
- Comes with a large standard library that supports many common programming tasks such as connecting to web servers, searching text with regular expressions, reading and modifying files.
- Has an interactive mode that makes it easy to test short snippets of code. There's also a bundled development environment called IDLE.
- Is easily extended by adding new modules implemented in a compiled language such as C or C++.
- Can also be embedded into an application to provide a programmable interface.
- Runs anywhere, including Mac OS X, Windows, Linux, and UNIX.
- Is free and is an open source product.

Programming Language Features:

- A variety of basic data types are available: numbers (floating point, complex, and unlimited-length long integers), strings (both ASCII and Unicode), lists, and dictionaries.
- Python supports object-oriented programming with classes and multiple inheritance.
- Code can be grouped into modules and packages.
- The language supports raising and catching exceptions, resulting in cleaner error handling.

- Data types are strongly and dynamically typed. Mixing incompatible types (e.g. attempting to add a string and a number) causes an exception to be raised, so errors are caught sooner.
- Python contains advanced programming features such as generators and list comprehensions.
- Python's automatic memory management frees you from having to manually allocate and free memory in your code.

<https://wiki.python.org/moin/BeginnersGuide>

What you can do with Python:

- Robotics
- Web scraping
- Data science
- Web test
- Computer vision
- Web development

Advantages:

- Open Source software, supported by Python Software Foundation
- Available on all platforms
- Syntax readable
- Supports multiple programming paradigms
- Very large community

Disadvantages:

- Slow
- Python is not a very good language for mobile development.
- Python is not a good choice for memory intensive tasks.
- It's near impossible to build a high-graphic 3D game using Python.
- Python is not good for multi-processor/multi-core work.

Python 2.x and Python 3.x

- Python 2.0 was released on 16 October 2000 and had many major new features, including a cycle-detecting garbage collector and support for Unicode. With this release the development process was changed and became more transparent and community-backed.
- Python 3.0 (which early in its development was commonly referred to as Python 3000 or py3k), a major, backwards-incompatible release, was released on 3 December 2008, after a long period of testing. Many of its major features have been backported to the backwards-compatible Python 2.6.x and 2.7.x version series.

Jupyter Notebook

The Jupyter Notebook is an incredibly powerful tool for interactively developing and presenting data science projects. A notebook integrates code and its output into a single document that combines visualisations, narrative text, mathematical equations, and other rich media. The intuitive workflow promotes iterative and rapid development, making notebooks an increasingly popular choice at the heart of contemporary data science, analysis, and increasingly science at large.

This 'notebook' allows us to code using python, in a more clear and user-friendly environment.

I. Accessing the Tutorial

- A. You must first download the Python file that contains the tutorial, which is called **Python_Intro.ipynb**
- B. Download the file here **lib.umd.edu/gis/workshops**
- C. After the file has been downloaded, search for and open **Jupyter Notebook** (this can be found in the Start menu).
- D. Once this has been opened, you will see a list of folders available. Navigate to your downloads folder, and click on the **Python_Intro.ipynb** file you just downloaded.
- E. After a few seconds, the Jupyter notebook will load, with the tutorial file open.
 - a. Follow the instructions in the Jupyter Notebook to complete the tutorial.

