

Syllabus: Introduction to Python

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Introduction

Python is a popular, general-purpose, multi-paradigm, open-source, scripting language. It is designed to emphasize code readability – has a clean syntax with high level data types. It is suited for interactive work and quick prototyping, while being powerful enough to write large applications in.

Python has a large number of available and well-written modules for everything from abstract syntax trees to ZIP file manipulation. Its ecosystem features an extensive set of tools including a JIT compiler¹ and fancy IDE's².

In this half-day workshop, you will be introduced to basic Python language syntax and to its ecosystem.

Objectives

After taking this course, you should be able to:

- use Python interactively
- execute a Python script at the shell prompt
- use Python types, expressions, and None
- use string literals and string type
- use Python statements (if...elif..else, for, pass, continue, ...)
- understand the difference between expressions and statements
- understand assignment semantics
- write and call a simple function
- utilize high-level data types such as lists and dictionaries
- understand the difference between mutable and immutable types
- write a simple class and access methods and attributes
- import and utilize a module
- read from and write to a text file
- understand interpreter and compilers: CPython, PyPy, Cython
- see demonstration of IDE's: IDLE, IPython, IPython Notebook, hosted environments
- understand the role of package managers: easy_install, pip
- understand what NumPy does and what SciPy is (are?)
- learn about resources for learning Python³



Figure 1: Python logo from <http://www.python.org>. The name is not after those dangerous reptiles; it is from the seventies comedy series "Monte Python's Flying Circus".

¹ PyPy (<http://pypy.org>)

² For instance, IPython (<http://ipython.org>)

IP[y]:
IPython

Figure 2: IPython (<http://ipython.org>) is a rich architecture for interactive computing. Version 1.0.0 was released on Aug, 2013.

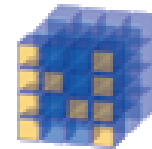


Figure 3: NumPy (<http://www.numpy.org>) implements an N-dimensional array and is considered as the fundamental package for scientific computing with Python.

³ tutorials, books, MOOC's, videos, web sites, Python Koans, Python Challenge, and Project Euler

Intended Audience

This workshop is for those who have some experience in using at least one scripting language⁴ but who do not know Python. It is assumed that you can edit a text file using your favorite editor, and be able to execute your script file on the command line of a shell.

⁴ Stata, R, MATLAB, Perl, Ruby, emacs lisp, bash, or PowerShell, etc.

Installation

Python comes pre-installed in Mac OS X and Linux. Since Python 3 is not backward compatible and not all the modules are upgraded into Python 3, we will use the latest version of Python 2 (2.7 as of writing this), which is the default for OS X and Linux.

A nice instruction for installing Python on Windows is at The Hitchhiker's Guide to Python site⁵.

Installation of pip is optional but encouraged, since pip is the tool for installing and managing Python packages. An installation guide is at <http://www.pip-installer.org/en/latest/installing.html>.

⁵ <http://docs.python-guide.org/en/latest/starting/install/win/>

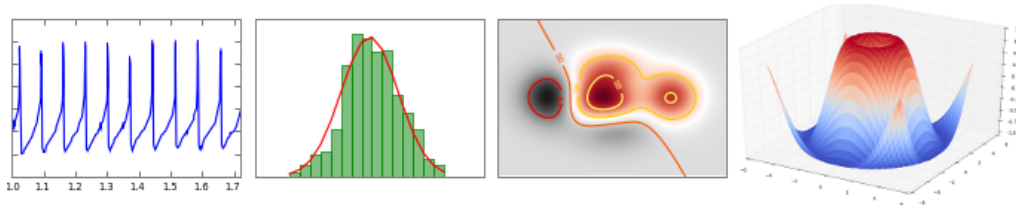


Figure 4: These plots are generated using the matplotlib module (<http://matplotlib.org>), which is a python 2D plotting library created by John Hunter, who unfortunately died of complications from cancer treatment in 2012.

Location and Date

Location: #217 Wallace Hall Bowl 001 Robertson Hall (Lower Level)

Date: Tue Jan. 14th, 2014 1:30 – 4:30 pm

Schedule

| Section | Format | Topic |
|---------------------|----------------|----------------------------|
| Basic Syntax | Lecture & Quiz | Hello World to List & Dict |
| Intermediate Syntax | Lecture & Quiz | Mutable to File IO |
| Ecosystem | Demo & QA | Compilers to Resources |
| (Optional) | Survey | Evaluation |

Table 1: Each of the three sections will last 50 minutes total with a 15-20 minute break in between the sections. At the end of each section, a homework or in-depth lab material will be provided.