

Basic python

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You can get this ppt and related files at:

https://github.com/ryan-leung/2016-JAN_python_workshop/

Learning Outcomes

- Know how to get a working python for your operating system.
- Define different data structures
- Make a loop with for and while
- Defining functions
- Reading files and plotting graphs

What is python



General-purpose, high-level programming language

Why python?



- Coding and debugging is a tough task
- Spend less time on it and get your work done!

Why python?

- Easy to learn.
- Increasing number of package.
- A powerful language used by sites like Google and Dropbox.
- Learn the coding in one hour.

What you need?

- A running computer, with Windows/Linux/OSX installed
- A text editor
- A python distribution

Configuration

How to install python and get it work?

Python distribution

Anaconda / Miniconda

<https://store.continuum.io/cshop/anaconda/>

<http://conda.pydata.org/miniconda.html>

Official Site

<https://www.python.org/downloads/>

Portable Python

<http://portablepython.com/>

IF you run Linux, get it from repository is faster:

```
sudo yum install python numpy scipy python-matplotlib ipython python-pandas  
sympy python-nose
```

```
sudo apt-get install python-numpy python-scipy python-matplotlib ipython  
ipython-notebook python-pandas python-sympy python-nose
```


Anaconda in Windows

Anaconda for Windows

PYTHON 2.7	PYTHON 3.5
<div>Windows 64-bit Graphical Installer</div> <div>337M</div>	<div>Windows 64-bit Graphical Installer</div> <div>392M</div>
<div>Windows 32-bit Graphical Installer</div> <div>321M</div>	<div>Windows 32-bit Graphical Installer</div> <div>316M</div>
Behind a firewall? Use these zipped Windows installers .	

Windows Anaconda Installation

1. Download the installer.
2. Double-click the .exe file to install Anaconda and follow the instructions on the screen.
3. Optional: [Verify data integrity with MD5](#).

Anaconda in Mac

Anaconda for OS X

PYTHON 2.7	PYTHON 3.5
Mac OS X 64-bit Graphical Installer 27411 (OS X 10.7 or higher)	Mac OS X 64-bit Graphical Installer 25711 (OS X 10.7 or higher)
Mac OS X 64-bit Command-Line installer 23911 (OS X 10.5 or higher)	Mac OS X 64-bit Command-Line installer 23311 (OS X 10.5 or higher)

OS X Anaconda Installation

1. Download the installer.
2. Double click the .pkg file and follow the instructions on the screen.
3. **Command-Line Installs:**

After downloading the installer, in the shell execute for Python 2.7:

```
bash Anaconda2-2.4.1-MacOSX-x86_64.sh
```

Or for Python 3.5:

```
bash Anaconda3-2.4.1-MacOSX-x86_64.sh
```

NOTE: You should type "bash", regardless of whether or not you are actually using the bash shell.

4. Optional: [Verify data integrity with MD5](#).

Anaconda in Linux

Anaconda for Linux

PYTHON 2.7	PYTHON 3.5
<div>Linux 64-bit</div> <div>23311</div>	<div>Linux 64-bit</div> <div>23511</div>
<div>Linux 32-bit</div> <div>27911</div>	<div>Linux 32-bit</div> <div>27711</div>

Linux Anaconda Installation

1. Download the installer.
2. After downloading the installer, in your terminal window execute for Python 2.7:

```
bash Anaconda2-2.4.1-Linux-x86_64.sh
```

Or for Python 3.5:

```
bash Anaconda3-2.4.1-Linux-x86_64.sh
```

NOTE: Type "bash" regardless of whether or not you are actually using the bash shell.

3. Optional: [Verify data integrity with MD5](#).

Install package (Normal build)

- To search/install packages, use “pip”
- Package list: <https://pypi.python.org/pypi>
- Command:
 - `pip search xxxxxx`
 - `pip install xxxxxx`

Full Commands:

<code>install</code>	Install packages.
<code>uninstall</code>	Uninstall packages.
<code>freeze</code>	Output installed packages in requirements format.
<code>list</code>	List installed packages.
<code>show</code>	Show information about installed packages.
<code>search</code>	Search PyPI for packages.
<code>zip</code>	Zip individual packages.
<code>unzip</code>	Unzip individual packages.
<code>bundle</code>	Create pybundles.
<code>help</code>	Show help for commands.

Install package (Anaconda build)

- To search/install packages, use “conda”
- Command:
 - `conda search xxxxxx`
 - `conda install xxxxxx`
- Other commands:

http://conda.pydata.org/docs/_downloads/conda-cheatsheet.pdf

Packages for Symbolic/numerical/statistical



NumPy



SciPy.org



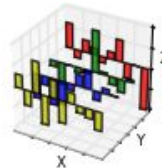
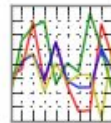
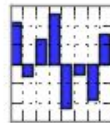
machine learning in Python



SymPy

pandas

$$y_{it} = \beta' x_{it} + \mu_i + \epsilon_{it}$$



- For symbolic
 - sympy
- For numerical
 - numpy
 - scipy
- For statistical and machine learning
 - scikit-learn
 - pandas

Python interpreter

Open by clicking “python” shortcut in start menu (Windows).

Or type “python” in terminal for Linux / OSX

ipython

- For more interaction and fun, we use *ipython* to run our python code
- You will see the power of scripting language compare to a compiling language in terms of developing speed.
- For more information with *ipython*:
 - <http://nbviewer.ipython.org/github/ipython/ipython/blob/2.x/examples/Notebook/Index.ipynb>

1. Syntax

https://github.com/ryan-leung/2016-JAN_python_workshop/blob/master/Syntax.ipynb

2. Data Structures and Loops

https://github.com/ryan-leung/2016-JAN_python_workshop/blob/master/Data%20Structures%20and%20Loops.ipynb

3. Functions

https://github.com/ryan-leung/2016-JAN_python_workshop/blob/master/Functions.ipynb

4. Files and Plots

https://github.com/ryan-leung/2016-JAN_python_workshop/blob/master/Files%20and%20Plot.ipynb

Practise and exercise session

Factorial

Write a program which can compute the factorial of a given numbers.

Suppose the input is:

8

Then, the output should be:

40320

Even Fibonacci numbers

Each new term in the Fibonacci sequence is generated by adding the previous two terms. By starting with 1 and 2, the first 10 terms will be:

1, 2, 3, 5, 8, 13, 21, 34, 55, 89, ...

By considering the terms in the Fibonacci sequence whose values **do not exceed four million**, find the **sum of the even-valued terms**.

10001st prime

By listing the first six prime numbers: 2, 3, 5, 7, 11, and 13, we can see that the 6th prime is 13.

What is the 10 001st prime number?