Introduction to Programming and Data Structures

Python – Hands-on

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The Python interpreter

Source code $\rightarrow$ **(Python interpreter)** $\rightarrow$ **Executable**

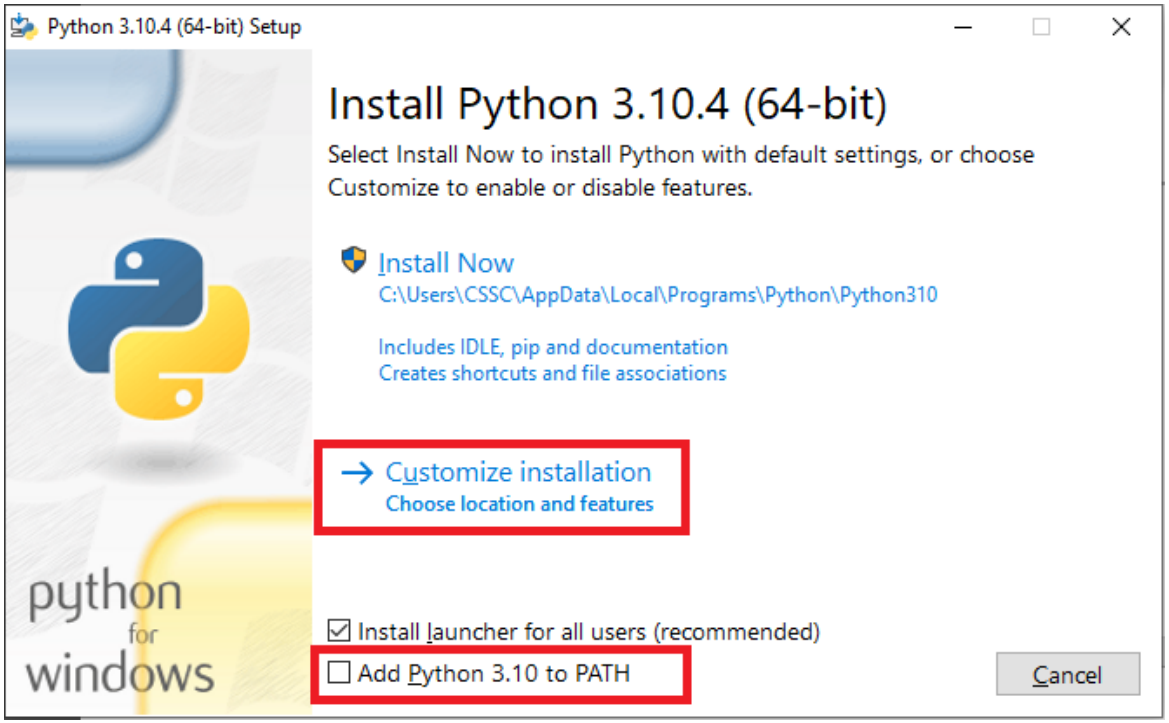
Standard versions of Python

Significant Features	Python 2	Python 3
`print`	As a statement	As a function
`xrange()`	Yes	No
Returning lists	Yes	No
Returning iterable objects	No	Yes
Unicode	No	Yes
`byte` type	No	Yes
Exception handling with `as`	No	Yes
Integer division	Traditional	New

Note: Python 1 is no more in use and Python 2 is soon to be obsolete.

Python installation

On Windows:



On Linux:

```
$ sudo apt-get update
$ sudo apt-get install <python_version> (say python3.10.4)
$ python3 --version
```

Installing/updating Python modules (i.e., packages)

Installing a specific module:

```
python -m pip3 install <module> (e.g. math, pandas, numpy)
```

Installing a specific version of module:

```
python -m pip3 install <module> == <version>
```

Installing a specific module with a minimum version:

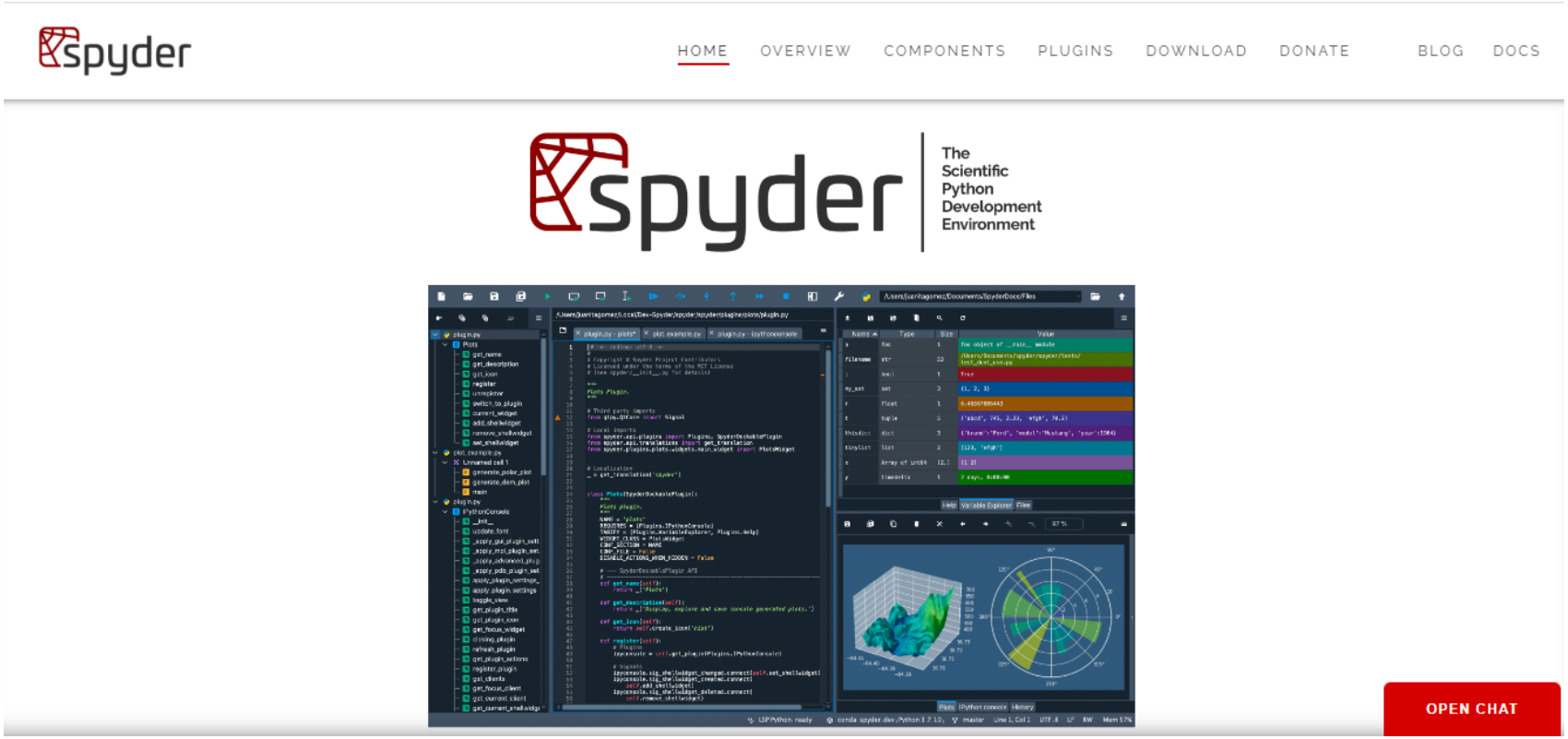
```
python -m pip3 install <module> >= <version>
```

Updating a specific module:

```
python -m pip3 install --upgrade <module>
```

Note: Installations/updates are to be done from the command prompt (not from the Python environment).

Installing Spyder (An IDE for Python)



Source: `https://www.spyder-ide.org` (current version is 5.4.3)

Installing Jupyter Lab

Installing JupyterLab 1.0:

`https://jupyter.org/install.html`

Installation with pip:

```
pip install jupyterlab
```

Running JupyterLab 1.0:

```
jupyter-lab
```

Installing Jupyter Notebook

Installing Jupyter Notebook:

`https://jupyter.org/install.html`

Installation with pip:

```
pip install notebook
```

Running Jupyter Notebook:

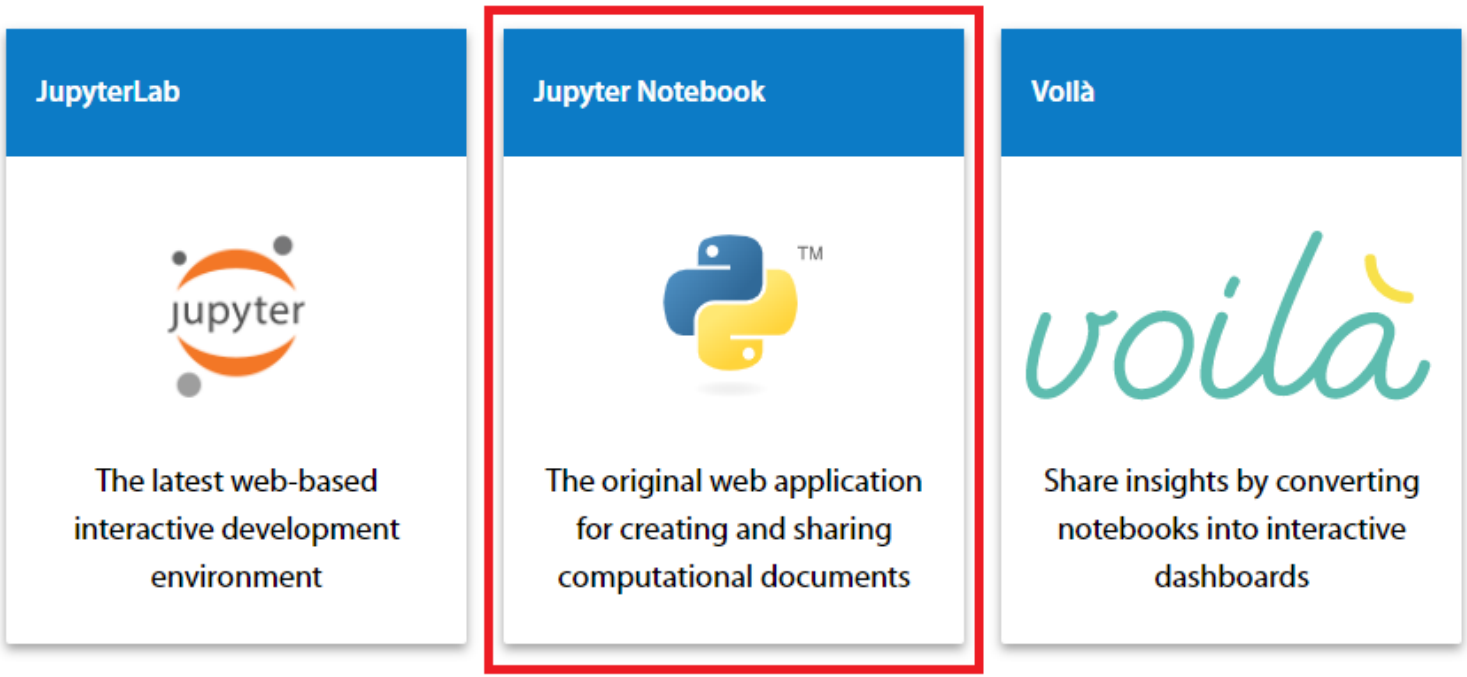
```
jupyter notebook
```

Using Jupyter Notebook in browser

Available at: `https://jupyter.org`

Open Jupyter Notebook in browser:
`https://jupyter.org/try`

Try Jupyter Notebook Application:



Installing modules (i.e., packages) on Jupyter Notebook

Installation in Jupyter shell:

```
!pip install <module> (e.g. xgboost)
```

Installation in Jupyter kernel:

```
import sys
!{sys.executable} -m pip install <module> (e.g. xgboost)
```

An important note

`pip` is generally connected with Python 2 on Linux and Mac, whereas `pip3` is connected with Python 3.

On the other hand, both `pip` and `pip3` can be used to install Python 3 packages on Windows.

The first Python program (in Python 3)

Source: Welcome2Python.py

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```
print("Welcome 2 Python")
```

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```
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Execution: Welcome2Python.py

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Source: Welcome2Python.py

```
print("Welcome 2 Python")
```

Execution: Welcome2Python.py

Welcome 2 Python**(cursor here!!!)**

Dissecting a code

```
# Import Statements
import math
# Function Definitions
def div(a, b):
    return a/b # Note the indentation
# Statements
var1 = 3
var2 = 2
# Functions
division = div(var1, var2) # Function call
print(division) # Prints 1.5
print(not (division > math.pi)) # Prints True
```

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Note: The program name can be anything.