

Introduction to Computing

Introduction to Python

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1 Fundamentals

2 Installation

3 The first Python program

The Python interpreter

Source code → **(Python interpreter)** → **Executable**

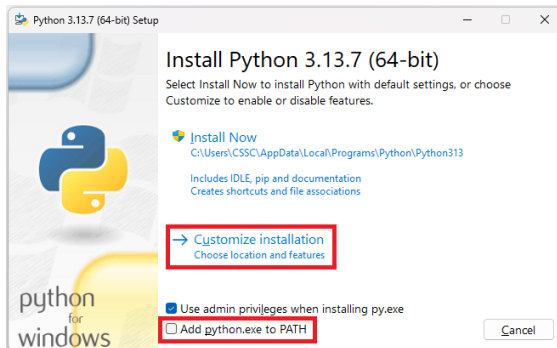
Standard versions of Python

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

Note: Python 1 is no more in use and Python 2 is almost obsolete.

Python installation

On Windows:



On Linux:

```
$ sudo apt-get update
$ sudo apt-get install <python_version> (say python3.13.7)
$ 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:

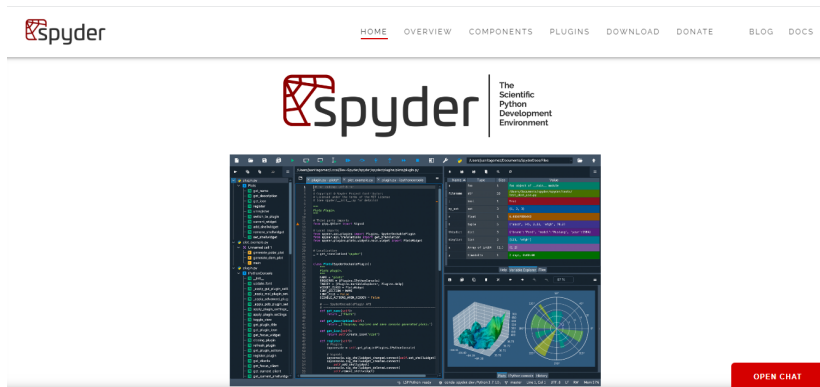
```
python -m pip3 install <module> >= <version>
```

Updating a specific module:

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

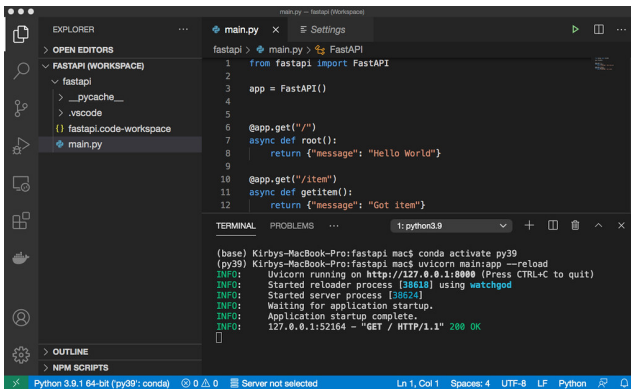
Note: Installations/updates are to be done from the command prompt (not from the Python environment).

Installing Spyder (An IDE for Python)



Source: <https://www.spyder-ide.org> (current version is 6.0.8)

Installing Visual Studio Code (An IDE for Python)



The screenshot shows the Visual Studio Code IDE with a workspace named 'FASTAPI (WORKSPACE)'. The Explorer sidebar on the left shows the file structure with 'main.py' selected. The main editor displays the code for 'main.py', which is a FastAPI application. The code includes imports for 'FastAPI' and 'uvicorn', and defines two endpoints: a root endpoint that returns 'Hello World' and an '/item' endpoint that returns 'Got item'. The bottom panel shows the 'TERMINAL' with the command prompt and the output of running the application using 'uvicorn main:app --reload'. The output shows the application running on 'http://127.0.0.1:8000' and a successful GET request.

```
main.py - fastapi (Microspace)

fastapi > cd main.py > FastAPI
1 from fastapi import FastAPI
2
3 app = FastAPI()
4
5
6 @app.get("/")
7 async def root():
8     return {"message": "Hello World"}
9
10 @app.get("/item")
11 async def getitem():
12     return {"message": "Got item"}
```

```
(base) Kirbys-MacBook-Pro:fastapi mac$ conda activate py39
(py39) Kirbys-MacBook-Pro:fastapi mac$ uvicorn main:app --reload
INFO:     Uvicorn running on http://127.0.0.1:8000 (Press CTRL+C to quit)
INFO:     Started server process [38624] using watchgod
INFO:     Waiting for application startup.
INFO:     Application startup complete.
INFO:     127.0.0.1:52164 - "GET / HTTP/1.1" 200 OK
```

Source: <https://code.visualstudio.com/Download> (current version is 1.103)

Installing Jupyter Lab

Installing JupyterLab 4.4.6:

<https://jupyter.org/install.html>

Installation with pip:

```
pip install jupyterlab
```

Running JupyterLab 4.4.6:

```
jupyter-lab
```

Installing Jupyter Notebook

Installing Jupyter Notebook:

<https://jupyter.org/install.html>

Installation with pip:

```
pip install notebook
```

Running Jupyter Notebook:

```
jupyter notebook
```

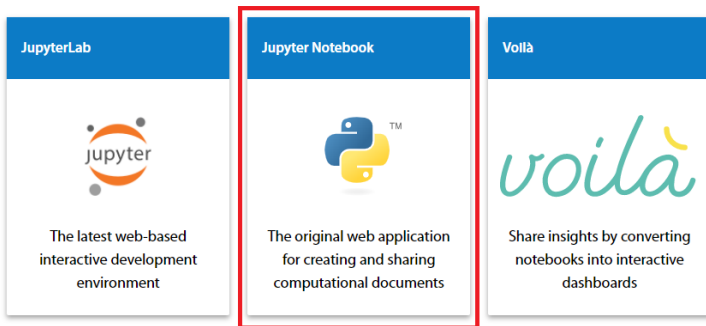
Using Jupyter Notebook in browser

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")
```

The first Python program (in Python 3)

Source: Welcome2Python.py

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

Execution: Welcome2Python.py

The first Python program (in Python 3)

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
```

Dissecting a code

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```

Note: The program name can be anything.

Homework

- Complete the installation of the latest version of Python on a machine. Run the following program, note the output, and understand its purpose.

```
import math
num = 111
if num < 2:
    print('Not a prime')
else:
    for i in range(2, int(math.sqrt(num)) + 1):
        if num % i == 0:
            print('Not a Prime')
            exit()
    print('Prime')
```

- Try installing the pandas module on a machine. Show the installation report.