Getting Started with Python

DSP Lab (ECE 4163 / ECE 6183)

2022

We will be using Version 3 of Python for this course.
Throughout this course we will use a Python library called `PyAudio`.

1 Learning Python

Students will need to gain some experience using Python to do the assignments. Students who are new to Python should spend time practicing Python independently during the first two weeks. This section gives suggestions to get started (or to review) Python.

1.1 Python class at Google by Nick Parlante

- https://developers.google.com/edu/python/?hl=en
- https://www.youtube.com/watch?v=tKTZoB2Vjuk

1.2 Introduction to Scientific Python by David Pine

- http://www.physics.nyu.edu/pine/Teaching.html
- http://physics.nyu.edu/~physlab/Lab_Main/PythonMan.pdf

1.3 `www.python.org`

The most accurate explanations are from the Python Software Foundation. A good tutorial for learning Python online is the official document from `www.python.org`, which includes a very detailed tutorial and a library reference.

- The Python Tutorial: https://docs.python.org/3/tutorial/index.html
- The Python Standard Library: https://docs.python.org/3/library/index.html

1.4 *Beginning Python from Novice to Professional*

For beginners, we suggest the book *Beginning Python from Novice to Professional* by Magnus Lie Hetland. For NYU students, the electronic version of the book is available at SpringerLink database from library website:

- https://bobcat.library.nyu.edu/permalink/f/1c17uag/nyu_aleph005580084

In this book, there is a very detailed tutorial on installing Python on different platforms in Chapter 1. This chapter also gives the basics of variables, functions, modules, and how to compile and run your Python script.

To start the first a few programming assignments, we suggest students go through Chapters 1-2, 5-6, which explains the necessary basics of Python programming such as

- definitions of different types of variables, such as `int`, `bool`, etc.
- operations on `lists`
- using `def` to define a function
- conditionals and loops such as `if, elif, else`, `for` and `while`
- objects and methods in Python

Students should try to type out some of the examples in the book and find the answers raised during programming. For instance, try to find the results from the following lines:

```
print 1/2
print 1.0/2
print float(1)/2
```

and try to figure if the results due to the above lines are the same, why or why not?

What is the difference of the following two lines?

```
y = x
y = x[:]
```

1.5 *Learning Python* by Mark Lurtzt (optional)

To understand Python further, we suggest the advanced book *Learning Python* by Mark Lurtz. If you want to learn Python further so that it is one of your professional skills, then this book will be very helpful. This book has about 1600 pages ☺.

1.6 Supplements of Learning Python

- Python Guide for begginers: https://wiki.python.org/moin/BeginnersGuide

Besides understanding basics of Python, such as the content in the first few chapters of *Beginning Python from Novice to Professional*, we list the following webpage as a reference:

- Audio in Python: https://wiki.python.org/moin/Audio/

which gives the links of some popular materials about using Python for audio applications.

2 Install or update Python

2.1 Windows Users

Note that Windows does not include Python by default, therefore students who use Windows should go through this section to install Python. The latest version of `Python` for windows is available at the official Python website:

`https://www.python.org/downloads/windows/`

In this course, we will use Python 3.

Click the link for the latest Python Release. Then, for example, find the `Windows x86 MSI installer` at the bottom of all the available versions. The page may like this:

Files

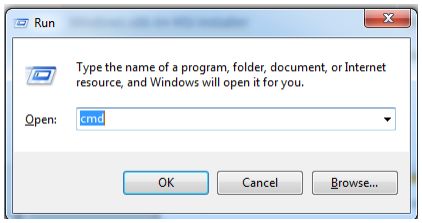
Version	Operating System	Description
Gzipped source tarball	Source release	
XZ compressed source tarball	Source release	
Mac OS X 32-bit i386/PPC installer	Mac OS X	for Mac OS X 10.5 and later
Mac OS X 64-bit/32-bit installer	Mac OS X	for Mac OS X 10.6 and later
Windows debug information files	Windows	
Windows debug information files for 64-bit binaries	Windows	
Windows help file	Windows	
Windows x86-64 MSI installer	Windows	for AMD64/EM64T/x64, not Itanium processors
Windows x86 MSI installer	Windows	

All the downloadable installers of Python2.

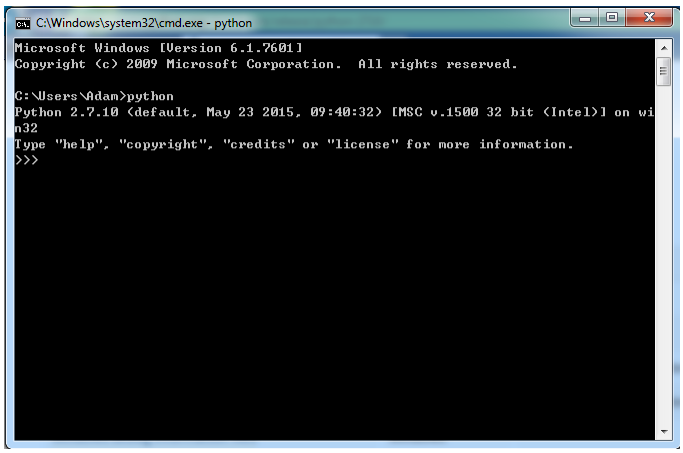
When the download is finished, double click the downloaded file to start installation. We suggest students install Python in the default directory (e.g., `C:/Python37/`) during the installation, to avoid unnecessary modifications when installing `PyAudio` later.

During the installation, students need to select the option `"Add python.exe to Path"`.

After the installation is complete, test that Python is correctly installed by pressing `<WIN> + <R>`, which leads to the program `Run` in Windows. In the `Run` window, type `cmd` as shown:



Then the `Prompt` ('terminal' in Windows) will open. Type `python` in the `Prompt` window, then the current version of Python on you computer will be shown.



2.2 Mac OS X and Linux Users

Most of the popular versions of Mac OS X and Linux (e.g. Ubuntu and Fedora) include Python by default. Students using Mac OS X or Linux might not need to re-install Python. On either platform, one can type `python` in the Terminal to see the current version of Python in the system.

Students who use Mac can also consider obtaining the latest version of Python from the official website:

`https://www.python.org/downloads/mac-osx/`

Students who use Linux can also consider to download the source release of the latest version Python through `Gzipped source tarball` and then compile and install it.

Again, it is not necessary to use the latest version of Python for this course.