Python Programming

1. Introduction

Python is created by Dutch Guido van Rossum around 1991. Python is an open-source project. The mother site is www.python.org.

The main features of Python are:

- Python is an easy and intuitive language. Python scripts are easy to read and understand.
- Python (like Perl) is *expressive*. A single line of Python code can do many lines of code in other general-purpose languages (such as C/C++/Java).
- Python is free and open-source. It is cross-platform and runs on Windows, Linux/UNIX, and Mac OS.
- Python is well suited for *rapid application development* (RAD). You can code an application in Python in much shorter time than other general-purpose languages (such as C/C++/Java). Python can be used to write small applications and rapid prototypes, but it also scales well for developing large-scale project.
- Python is a scripting language. Like most of the scripting languages (e.g., Perl, JavaScript), Python associates types with objects, instead of variables. That is, a variable can be assigned a value of any type, a list (array) can contain objects of different types.
- Python provides high-level data types such as dynamic array and dictionary (or associative array).
- Python is object-oriented.
- Python is not a fully compiled language. It is compiled into internal byte-codes, which is then interpreted. Hence, Python is not as fast as fully-compiled languages such as C/C++.
- Python comes with a huge set of libraries including graphical user interface (GUI) toolkit, web programming library, networking, and etc.

Python has 3 versions:

- Python 1: the initial version.
- Python 2: released in 2000, with many new features such as garbage collector and support for Unicode.

- Python 3 (Python 3000 or py3k): A major upgrade released in 2008. Python 3 is NOT backward compatible with Python 2.

Python 2 or Python 3?

Currently, two versions of Python are supported in parallel, version 2.7 and version 3.5. There are unfortunately incompatible. This situation arises because when Guido Van Rossum (the creator of Python) decided to bring significant changes to Python 2, he found that the new changes would be incompatible with the existing codes. He decided to start a new version called Python 3, but continue maintaining Python 2 without introducing new features. Python 3.0 was released in 2008, while Python 2.7 in 2010.

AGAIN, TAKE NOTE THAT PYTHON 2 AND PYTHON 3 ARE NOT COMPATIBLE!!! You need to decide whether to use Python 2 or Python 3.

2. Installation and Getting Started

2.1 Installation

Ubuntu 16.04LTS

Both the Python 2.7 and Python 3.5 should have already installed by default. You can verify via these commands:

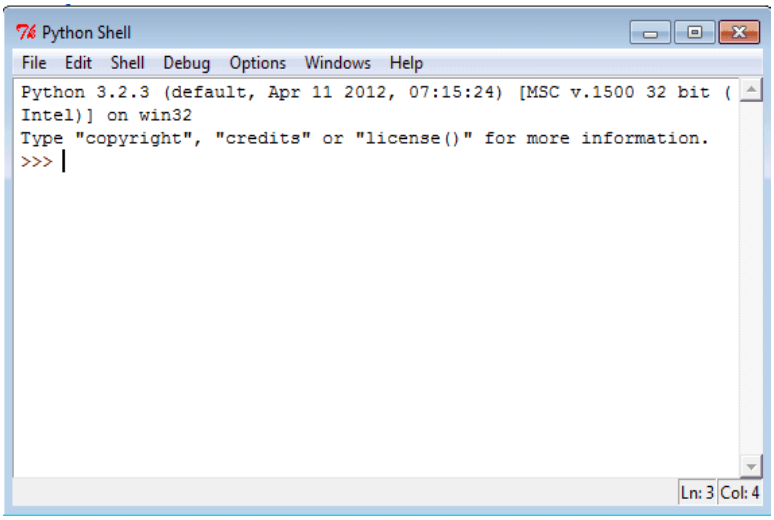
```
$ python3 --version
Python 3.5.2
$ python --version
Python 2.7.12
```

Otherwise, you can install Python via:

```
# Installing Python 2
$ sudo apt-get install python
# Installing Python 3
$ sudo apt-get install python3
```

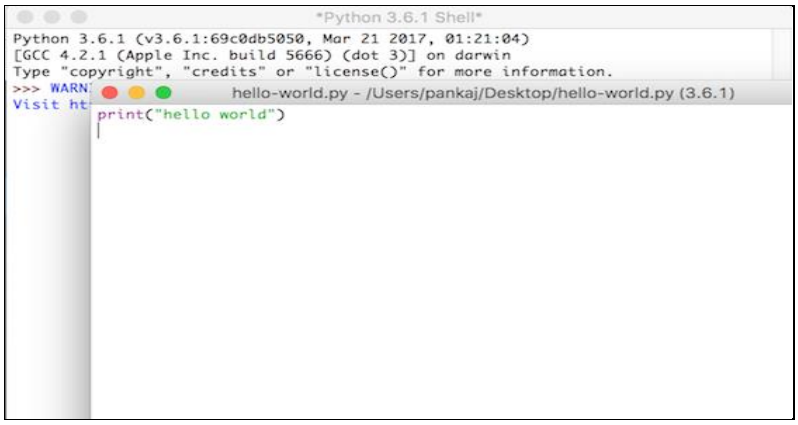
Windows

From http://www.python.org/download/, download the 32-bit or 64-bit MSI installer, and run the downloaded installer.



MacOS

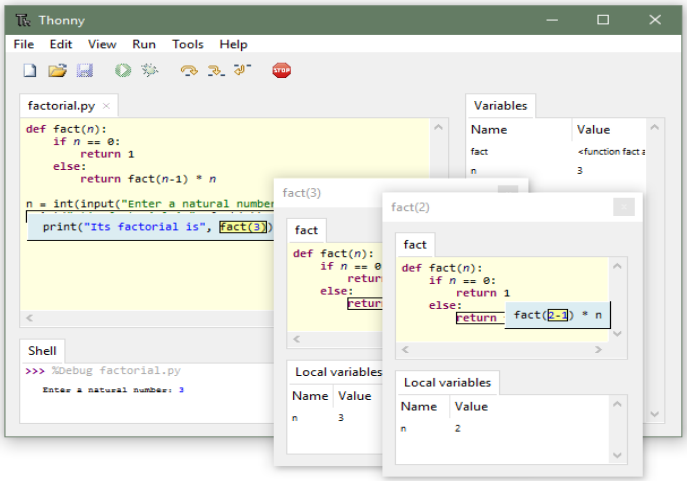
From http://www.python.org/download/, download the installer, and run the downloaded installer.



Windows / Linux / MacOS (Alternative IDE for beginners)

Thonny

http://thonny.org



2.2 Documentation

- Python documentation and language reference are provided online @ http://docs.python.org.
- https://www.ntu.edu.sg/home/ehchua/programming/webprogramming/Python1_Basics.html

2.3 Getting Started

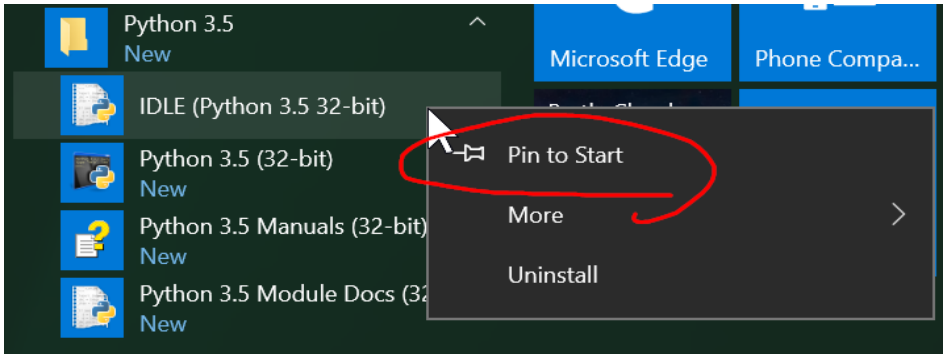
Interactive Python Command-Line Shell

You can run the Python Interpreter in interactive mode under a command-line shell.

- In Ubuntu/Mac OS:

```
$ python
Python 2.7.12
......
Type "help", "copyright", "credits" or "license" for more information.
>>>
$ python3
Python 3.5.2
......
Type "help", "copyright", "credits" or "license" for more information.
>>>
```

- In Windows: Click the START button ⇒ Python ⇒ Python (Command-line); or run "`python.exe`" from the Python installed directory.



The Python's command-prompt is denoted as >>>. You can enter Python statement at the command-prompt, e.g.,

```
>>> print('hello, world')
hello, world
>>> x = 123
>>> x
123
>>>
```

Exiting Python Command-Line Session

To exit an interactive command-line session:

- Type `exit()`, or
- (For Ubuntu/Mac OS) Press Ctrl-D (for End-of-File (EOF)), or
- (For Windows) Press Ctrl-Z + Enter