

# PYTHON PROGRAMMING

## Chap - 1

# Introduction to Python Programming



By-

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# Chap – 1 Introduction to Python Programming

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# Introduction to Python Programming:

Python is an easy to learn, powerful programming language. It has a simple but effective approach to efficient high-level data structures and object-oriented programming. Python's attractive syntax and dynamic typing, along with its defined format, make it ideal language for scripting and rapid application development across multiple platforms.

Python is a great language with which you can learn programming. There are many reasons for this, but simple explanation is that it is easy to read and quick to write. Python has a very human-friendly syntax, which makes writing beautiful code is easy.

# Overview of Python:

Python is a high-level, interpreted, interactive and object-oriented scripting language. Python is designed to be highly readable. It uses English keywords frequently where as other languages use punctuation, and it has less syntactical constructions than other languages.

- **Python is Interpreted** – Python is processed at runtime by the interpreter. You do not need to compile your program before executing it. This is similar to PERL and PHP.
- **Python is Interactive** – You can actually sit at a Python prompt and interact with the interpreter directly to write your programs.
- **Python is Object-Oriented** – Python supports Object-Oriented style or technique of programming that encapsulates code within objects.
- **Python is a Beginner's Language** – Python is a great language for the beginner-level programmers and supports the development of a wide range of applications from simple text processing to WWW browsers to games.

# History of Python:

Python was developed by Guido van Rossum in the late 1980s and early 1990s at the National Research Institute for Mathematics and Computer Science in the Netherlands. It first appeared in 1991, Python 2.0 was released in the year 2000 and Python 3.0 was released in the year 2008.



The language was named Python after the famous British television comedy show Monty Python's Flying Circus, which was one of Guido's favorite television Program.

Python is derived from many other languages, including ABC, Modula-3, C, C++, Algol-68, SmallTalk, and Unix shell and other scripting languages.

Python is copyrighted. Like Perl, Python source code is now available under the GNU General Public License (GPL). Python is now maintained by a core development team at the institute, although Guido van Rossum still holds a vital role in directing its progress.

# Version of Python:

The following table lists all the important versions of Python:

Version	Release Date	Important Features
Python 0.9.0	February 1991	<ul style="list-style-type: none"><li>•Classes with inheritance exception handling</li><li>•Functions</li><li>•Modules</li></ul>
Python 1.0	January 1994	<ul style="list-style-type: none"><li>•Functional programming tools (lambda, map, filter and reduce).</li><li>•Support for complex numbers.</li><li>•Functions with keyword arguments</li></ul>
Python 2.0	October 2000	<ul style="list-style-type: none"><li>•List comprehension.</li></ul>
Python 2.7.0 - <b>EOL - Jan 2020</b>	July 2010	<ul style="list-style-type: none"><li>•Cycle-detecting garbage collector.</li><li>•Support for Unicode. Unification of data types and classes</li></ul>

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Version	Release Date	Important Features
Python 3	December 2008	<ul style="list-style-type: none"><li>•Backward incompatible.</li><li>•print keyword changed to print() function</li><li>•raw_input() function depreciated</li><li>•Unified str/Unicode types.</li><li>•Utilities for automatic conversion of Python 2.x code</li></ul>
Python 3.6	December 2016	
Python 3.6.5	March 2018	
Python 3.7.0	May 2018	<ul style="list-style-type: none"><li>•New C API for thread-local storage</li><li>•Built-in breakpoint()</li><li>•Data classes</li><li>•Context variables</li><li>•<a href="#">More..</a></li></ul>

# Version of Python:

The following table lists all the important versions of Python:

Version	Release Date	Important Features
Python 3.8	October 2019	<ul style="list-style-type: none"><li>•Assignment Expression</li><li>•Positional-only parameters</li><li>•Parallel filesystem cache for compiled bytecode files</li><li>•<a href="#">More..</a></li></ul>
Python 3.9 - <b>Current Version</b>	October 2020	<ul style="list-style-type: none"><li>•Dictionary Merge &amp; Update Operators</li><li>•New removeprefix() and removesuffix() string methods</li><li>•Builtin Generic Types</li><li>•<a href="#">More..</a></li></ul>



# Needs of Python:

According to the Institute of Electrical Electronics and Electronics Engineers (IEEE), Python ranks third after C and Java. Python job market search ranks fifth, according to [www.indeed.co.in](http://www.indeed.co.in) dated on 2016. Clearly, all the data shows the growing demand in the Python job market.

This language is great if you just want to learn for fun or build your career around Python. Python has a major role to play in surprisingly new technologies. Whether it's a cloud platform, mobile app development, BigData, new block chain technology. Python language platform for developing and delivering scalable and robust deliver applications.

# Features of Python:

- **Easy-to-learn** – Python has few keywords, simple structure and a clearly defined syntax. This allows the student to pick up the language quickly.
- **Easy-to-read** – Python code is more clearly defined and visible to the eyes.
- **Easy-to-maintain** – Python's source code is fairly easy-to-maintain.
- **A broad standard library** – Python's bulk of the library is very portable. Python programs can run on any platform, you can carry code created in Windows machine and run it on Mac or Linux.
- **Portable** – Python can run on a wide variety of hardware platforms and has the same interface on all platforms.
- **Extendable** – You can add low-level modules to the Python interpreter. These modules enable programmers to add to or customize their tools to be more efficient.

# Applications of Python:

Python is known for its general-purpose nature that applies it to every domain of software development. The dragon can be used in any area of development.

One of the most famous platform where Python is extensively used is YouTube. The other places where you will find Python being extensively used are the special effects in Hollywood movies, drug evolution and discovery, traffic control system, ERP systems, cloud hosting, e-commerce platform, CRM systems and whatever field you can think of.

Here we are specifying the application are where the Python can be applied:

**1. Web Applications:** We can use Python to develop web applications. HTML & XML, Email Processing, Request etc. libraries are available to handle similar Internet Protocols.

# Applications of Python:

**2. Desktop GUI Applications:** Python provides GUI library to develop user interface in Python based application, Some other useful toolkits wxWidgets, Kivy, pyqt that are useable on several platforms. The Kivy is popular for writing multitouch applications.

**3. Software Development:** Python is helpful for software development process. It works as a support language and can be used for build control and management, testing etc.

**4. Scientific and Numeric:** Python is popular and widely used in scientific and numeric computing. Some useful library and package are SciPy, Pandas, Ipython etc. SciPy is group of packages of engineering, science and mathematics.

**5. Business Applications:** Python is used to build business applications like ERP and e-commerce systems. Tryton is a high level application platform.

# Applications of Python:

**6. Console Based Application:** We can use Python to develop console based applications. E.g.: Ipython.

**7. Audio or Video based applications:** Python is awesome to perform multiple task and can be used to develop multimedia applications. Some of real applications are: TimPlayer, cplay etc.

**8. 3D CAD Applications:** To create CAD application Fandango is a real application which provides full features of CAD.

**9. Enterprise Applications:** Python can be used to create applications which can be used within an Enterprise or an Organization. Some real time applications are: OpenErp, Tryton, Picalo etc.

**10. Applications for Images:** Using Python several applications can be developed for image. Applications developed are: VPython, Gogh, imgSeek etc.

# Installing Python on Windows:

Python is available on a wide variety of platforms including Linux and Mac OS X. Lets understand how to setup our Python environment on Windows.

Here are the simple steps to Install Python on Windows machine:

- 1) Open a Web browser and go to <https://www.python.org/downloads/>.
- 2) Follow the link for the Windows installer *python-XYZ.msi* file where XYZ is the version you need to install.
- 3) To use this installer *python-XYZ.msi*, the Windows system must support Microsoft Installer 2.0. Save the installer file to your local machine and then run it to find out if your machine supports MSI.
- 4) Run the downloaded file. This brings up the Python install wizard, which is really easy to use. Just accept the default settings, wait until the install is finished, and you are done.

# Installing Python IDE:

Code and debug programs are easily created for Python code editor developers. Using this Python IDE (Integrated Development Environment) you can manage a large database and deploy quickly. Developers can use these editors to create desktop or web applications.

Many Python IDEs are available. The most useful Python IDE are as follows:

- 1) Pycharm:** Pycharm is a cross-platform IDE used for Python programming. This editor can be used on Windows, Mac OS and Linux. This software contains API that can be used by the developers to write their own Python plugins so that they can extend the basic functionalities.
- 2) Spyder:** Spyder is a scientific integrated development environment written in Python. This software is designed for and by scientists who can integrate with Matplotlib, SciPy, NumPy, Pandas and other open-source software. Spyder is available through Anaconda distribution on Windows, MacOS and Linux.

# Installing Python IDE:

**3) IDLE:** IDLE (Integrated Development and Learning Environment) is a default editor that comes with Python. This software helps a beginners to learn Python easily. IDLE software package is optional for many Linux distributions. The tool can be used on Windows, MacOS, and Linux.

**4) Visual Studio Code:** Visual Studio Code (VS Code) is an open-source environment developed by Microsoft. This IDE can be used for Python development.

**5) Atom:** Atom is a useful code editor tool preferred by programmers due to its simple interface compared to the other editors. Atom users can submit packages and them for the software.

**6) Jupyter:** Jupyter is a tool for people who have just started with data science. It is easy to use, interactive data science IDE across many programming languages that just not work as an editor, but also as an educational tool or presentation.