



Python programming language

A programming language

A programming language is : a formal language that specifies a set of instructions that can be used to produce various kinds of output.

Programming languages generally consist of instructions for a computer. Programming languages can be used to create programs that implement specific algorithms.

Elements: All programming languages have some primitive building blocks for the description of data and the processes or transformations applied to them (like the addition of two numbers or the selection of an item from a collection). These primitives are defined by syntactic and semantic rules, which describe their structure and meaning respectively.

Syntax: A programming language's surface form is known as its syntax (*the arrangement of words and phrases to create well-formed sentences in a language*) .

Most programming languages are purely textual; they use sequences of text including words, numbers, and punctuation, much like written natural languages. On the other hand, there are some programming languages, which are graphical in nature, using visual relationships between symbols to specify a program.

Programming language syntax is usually defined using a combination of regular expressions (for lexical structure)

expression ::= atom | list

atom ::= number | symbol

number ::= [+ -]?[0'-'9']+

symbol ::= ['A'-'Z'"a'-'z'].*

list ::= '(' expression* ')'

Because there are many programming languages available today, this is the usual first question of newcomers. who the language is the best ??We answered python

Why Do People Use Python?

Given that there are roughly 1 million Python users out there at the moment, there really is no way to answer this question with complete accuracy; the choice of development tools is sometimes based on personal preference

What is Python?

Python is a powerful high-level, object-oriented programming language created by Guido van Rossum.

It has simple easy-to-use syntax, making it the perfect language for someone trying to learn computer programming for the first time.

This is a comprehensive guide on how to get started in Python, why you should learn it and how you can learn it.

Python is a general-purpose language. It has wide range of applications from Web development, scientific and mathematical computing to desktop graphical user Interfaces.

The syntax of the language is clean and length of the code is relatively short. It's fun to work in Python because it allows you to think about the problem rather than focusing on the syntax.

More information on Python Language:"

❖ ***History of Python:*** Python is a fairly old language created by Guido Van Rossum. The design began in the late 1980s and was first released in February 1991.

❖ ***Why Python was created?***

In late 1980s, Guido Van Rossum was working on the Amoeba distributed operating system group. He wanted to use an interpreted language like ABC (ABC has simple easy-to-understand syntax) that could access the Amoeba system calls. So, he decided to create a language that was extensible. This led to design of a new language which was later named Python.

❖ *Why the name Python?*

No. It was not named after a dangerous snake. Rossum was fan of a comedy series from late seventies. The name "Python" was adopted from the same series Monty Python's Flying Circus"

Features of Python Programming

1. *A simple language which is easier to learn*

Python has a very simple and elegant syntax. It's much easier to read and write Python programs compared to other languages like: C++, Java, C#. Python makes programming fun and allows you to focus on the solution rather than syntax.

2. *Free and open-source*

You can freely use and distribute Python, even for commercial use. Not only can you use and distribute software's written in it, you can even make changes to the Python's source code.

3. *Portability*

You can move Python programs from one platform to another, and run it without any changes.
It runs seamlessly on almost all platforms including Windows, Mac OS X and Linux.

4. *Extensible and Embeddable*

Suppose an application requires high performance. You can easily combine pieces of C/C++ or other languages with Python code.
This will give your application high performance as well as scripting capabilities which other languages may not provide out of the box.

5. *A high-level, interpreted language*

Unlike C/C++, you don't have to worry about daunting tasks like memory management, garbage collection and so on.
Likewise, when you run Python code, it automatically converts your code to the language your computer understands. You don't need to worry about any lower-level operations.

6. ***Large standard libraries to solve common tasks***

Python has a number of standard libraries which makes life of a programmer much easier since you don't have to write all the code yourself. Standard libraries in Python are well tested and used by hundreds of people. So you can be sure that it won't break your application.

7. ***Object-oriented***

Everything in Python is an object. Object oriented programming (OOP) helps you solve a complex problem intuitively.

With OOP, you are able to divide these complex problems into smaller sets by creating objects.

Applications of Python

1-Web Applications

You can create scalable Web Apps using frameworks and CMS (Content Management System) that are built on Python.

2-Scientific and Numeric Computing

There are numerous libraries available in Python for scientific and numeric computing. Also, the language is heavily used in machine learning, data mining and deep learning.

3-Creating software Prototypes

Python is slow compared to compiled languages like C++ and Java. It might not be a good choice if resources are limited and efficiency is necessary. However, Python is a great language for creating prototypes.

4- Good Language to Teach Programming

Python is used by many companies to teach programming to kids and newbies. It is a good language with a lot of features and capabilities. Yet, it's one of the easiest language to learn because of its simple easy-to-use syntax.

4 Reasons to Choose Python as First Language

1-Simple Elegant Syntax

Programming in Python is fun. It's easier to understand and write Python code. Why? The syntax feels natural. Take this source code for an example:

```
a = 2  
  
b = 3  
  
sum = a + b  
  
print(sum)
```

Even if you have never programmed before, you can easily guess that this program adds two numbers and prints it.

2-Not overly strict

You don't need to define the type of a variable in Python. Also, it's not necessary to add semicolon at the end of the statement.

3-Expressiveness of the language

Python allows you to write programs having greater functionality with fewer lines of code.

4-Great Community and Support

Python has a large supporting community. There are numerous active forums online, which can be handy if you are stuck. Some of them are:

Learn Python subedit

Google Forum for Python

❖ *Install and Run Python in Windows*

1. Go to [Download Python](#) page on the official site and click **Download Python 3.6.0** (You may see different version name).
2. When the download is completed, double-click the file and follow the instructions to install it.
When Python is installed, a program called IDLE is also installed along with it. It provides graphical user interface to work with Python.
3. Open IDLE, copy the following code below and press enter.

```
4. print("Hello, World!")
```

5. To create a file in IDLE, go to **File > New Window** (Shortcut: **Ctrl+N**).
6. Write Python code (you can copy the code below for now) and save (Shortcut: **Ctrl+S**) with **.py** file extension like: hello.py or your-first-program.py

```
print("Hello, World!")
```

7. Go to **Run > Run module** (Shortcut: **F5**) and you can see the output. Congratulations, you've successfully run your first Python program.

❖ *Your First Python Program*

Often, a program called "Hello, World!" is used to introduce a new programming language to beginners. A "Hello, World!" is a simple program that outputs "Hello, World!".

However, Python is one of the easiest language to learn, and creating "Hello, World!" program is as simple as writing `print("Hello, World!")`. So, we are going to write a different program.

❖ *Program to Add Two Numbers*

```
# Add two numbers
```

```
num1 = 3
```

```
num2 = 5
```

```
sum = num1+num2
```

```
print(sum)
```

How this program works?

Line 1: # Add two numbers

Any line starting with # in Python programming is a comment. Comments are used in programming to describe the purpose of the code. This helps you as well as other programmers to understand the intent of the code. Comments are completely ignored by compilers and interpreters.

Line 2: num1 = 3

Here, num1 is a variable. You can store a value in a variable. Here, 3 is stored in this variable.

Line 3: num2 = 5

Similarly, 5 is stored in num2 variable.

Line 4: sum = num1+num2

The variables num1 and num2 are added using + operator. The result of addition is then stored in another variable sum.

Line 5: print(sum)

The print() function prints the output to the screen. In our case, it prints 8 on the screen.

❖ *Few Important Things to Remember*

Some of the ways in which Python is used includes:

- *Desktop graphical application development, including games;*
- *Mathematical and scientific analysis of data; and,*
- *Web and internet development.*
- *Python is a widely used simple and powerful programming language.*
- *Python is a free and open-source software.*
- *High-level Language.*
- *Python is Portable to many platforms (can use it on Windows, Linux, Mac,..).*
- *Program portability*
- *Support libraries*
- *Component integration*
- *Enjoyment*