

The Python Programming Language

Origins

Python is an interpreted script language and was developed at the beginning of the 1990s by Guido van Rossum in the Netherlands. It is a successor of ABC, a programming language mainly used for teaching purposes. Python was also inspired by C, Lisp, Perl and Java.

Python is named after Monty Python, a British group of comedians. To conclude, Monty Python is mentioned in the documentation, in the source code of the interpreter and in many modules.

The most important implementations of Python are

- CPython, the reference implementation by van Rossum, developed using the C programming language
- Jython, a Java implementation
- IronPython, a .NET implementation by Microsoft
- PyPy, a Python interpreter developed using Python itself (unstable)

The current version of Python is 2.5.1.

Characteristics

The most important characteristic of Python is that it is designed to be easy to read, it is often described as “pseudo code that works”. It uses only the most important key words and language constructs, for example there are only two kinds of loops. As a contrast PHP uses four kinds of loops, Perl even has five. Python also uses English words where other programming languages use punctuation (Python uses “*and*” to join conditions whereas C uses “&&”). Python is intended to be used in large software projects with lots of programmers.

Additionally, Python has a very large standard library containing modules for accessing WWW servers, sending mail, accessing databases or creating graphical interfaces. There are also interfaces to COM, DCOM, ODBS and so on.

Furthermore, Python can be easily extended using modules written in the C or C++ programming languages.

Python is a so called multi-paradigm programming language which means that you can program either using an object-oriented way or you can use a functional or imperative programming style. The Python interpreter also does translate the source code of a script into a so called bytecode which is then executed much faster than reading every line of source code before executing it. Additionally, you don't have to end a line using a semicolon which also increases readability.

Syntax

As already said, Python uses only the most important language constructs to make the source code more clean. A very interesting aspect of the Python programming language is that it uses no curly braces to delimit statement blocks. Python rather uses indentations to delimit those blocks. If the indentation is increased, a new block begins.

The most important keywords of the language are:

- *if ... elif ... else:*
A conditional block. Python doesn't use *switch-case* or things like *goto*, you have to

- implement these things on your own
- *def*:
Defines a function
- *for*:
Iterates over an array
- *while*:
Creates a loop which is executed until a certain condition is fulfilled
- *class*:
Defines a class

An example Python program:

```
# This is a comment

def add(a, b):
    a + b = c
    return c

number1 = 2
number2 = 3

print add(number, number2)
```

Another example program:

```
mark = 3

if mark < 5:
    print "You've passed the exam"
else:
    print "You have not passed the exam"
```

A third example program:

```
# Print numbers from 0 to 20

x = 0

while x < 21:
    print x
```

Data types

Python has the default data types known from other programming languages (int, float, string), there are also arrays and dictionaries (key-value-pairs).

Because the data type is set by the value of a variable and not by the name, you don't have to declare variables, you can just assign a value to a variable without setting the data type (in C and Java, you have to write something like `int i = 5`, whereas in Python you can just write `i = 5`).

Everything in Python is an object, even the data types, so you work with variables using object

methods, which is often done on strings (string objects are also immutable, so they create new strings if you use an object method to change them):

```
text = "This doesn't work!"
text_new = text.replace("doesn't", "does")

# Prints "This does work!"
print text_new
```

Who uses Python?

A lot of large companies and projects use the Python programming language:

- Zope Application Server
- Google
- YouTube
- BitTorrent
- NASA
- Industrial Light & Magic

Python is also used as an embedded scripting language in programs like OpenOffice, Gimp and Blender.