= Python (programming language) =

Python is a widely used high @-@ level , general @-@ purpose , interpreted , dynamic programming language . Its design philosophy emphasizes code readability , and its syntax allows programmers to express concepts in fewer lines of code than possible in languages such as C + + or Java . The language provides constructs intended to enable clear programs on both a small and large scale .

Python supports multiple programming paradigms , including object @-@ oriented , imperative and functional programming or procedural styles . It features a dynamic type system and automatic memory management and has a large and comprehensive standard library .

Python interpreters are available for many operating systems , allowing Python code to run on a wide variety of systems . Using third @-@ party tools , such as Py2exe or Pyinstaller , Python code can be packaged into stand @-@ alone executable programs for some of the most popular operating systems , so Python @-@ based software can be distributed to , and used on , those environments with no need to install a Python interpreter .

CPython , the reference implementation of Python , is free and open @-@ source software and has a community @-@ based development model , as do nearly all of its variant implementations . CPython is managed by the non @-@ profit Python Software Foundation .

= = History = =

Python was conceived in the late 1980s , and its implementation began in December 1989 by Guido van Rossum at Centrum Wiskunde & Informatica (CWI) in the Netherlands as a successor to the ABC language (itself inspired by SETL) capable of exception handling and interfacing with the operating system Amoeba . Van Rossum is Python 's principal author , and his continuing central role in deciding the direction of Python is reflected in the title given to him by the Python community , benevolent dictator for life (BDFL) .

About the origin of Python , Van Rossum wrote in 1996 :

Over six years ago , in December 1989 , I was looking for a " hobby " programming project that would keep me occupied during the week around Christmas . My office ... would be closed , but I had a home computer , and not much else on my hands . I decided to write an interpreter for the new scripting language I had been thinking about lately : a descendant of ABC that would appeal to Unix / C hackers . I chose Python as a working title for the project , being in a slightly irreverent mood (and a big fan of Monty Python 's Flying Circus) .

Python 2 @.@ 0 was released on 16 October 2000 and had many major new features , including a cycle @-@ detecting garbage collector and support for Unicode . With this release the development process was changed and became more transparent and community @-@ backed .

Python 3 @.@ 0 (which early in its development was commonly referred to as Python 3000 or py3k) , a major , backwards @-@ incompatible release , was released on 3 December 2008 after a long period of testing . Many of its major features have been backported to the backwards @-@ compatible Python 2.6.x and 2.7.x version series .

= = Features and philosophy = =

Python is a multi @-@ paradigm programming language : object @-@ oriented programming and structured programming are fully supported , and many language features support functional programming and aspect @-@ oriented programming (including by metaprogramming and metaobjects (magic methods)) . Many other paradigms are supported via extensions , including design by contract and logic programming .

Python uses dynamic typing and a mix of reference counting and a cycle @-@ detecting garbage collector for memory management . An important feature of Python is dynamic name resolution (late binding) , which binds method and variable names during program execution .

The design of Python offers some support for functional programming in the Lisp tradition . The

language has map ( ) , reduce ( ) and filter ( ) functions ; list comprehensions , dictionaries , and sets ; and generator expressions . The standard library has two modules (itertools and functools) that implement functional tools borrowed from Haskell and Standard ML .

The core philosophy of the language is summarized by the document The Zen of Python (PEP 20) , which includes aphorisms such as :

Beautiful is better than ugly
Explicit is better than implicit
Simple is better than complex
Complex is better than complicated
Readability counts

Rather than requiring all desired functionality to be built into the language 's core , Python was designed to be highly extensible . Python can also be embedded in existing applications that need a programmable interface . This design of a small core language with a large standard library and an easily extensible interpreter was intended by Van Rossum from the start because of his frustrations with ABC , which espoused the opposite mindset .

While offering choice in coding methodology , the Python philosophy rejects exuberant syntax , such as in Perl , in favor of a sparser , less @-@ cluttered grammar . As Alex Martelli put it : " To describe something as clever is not considered a compliment in the Python culture . " Python 's philosophy rejects the Perl " there is more than one way to do it " approach to language design in favor of " there should be one ? and preferably only one ? obvious way to do it " .

Python 's developers strive to avoid premature optimization , and moreover , reject patches to non @-@ critical parts of CPython that would offer a marginal increase in speed at the cost of clarity . When speed is important , a Python programmer can move time @-@ critical functions to extension modules written in languages such as C , or try using PyPy , a just @-@ in @-@ time compiler . Cython is also available , which translates a Python script into C and makes direct C @-@ level API calls into the Python interpreter .

An important goal of Python 's developers is making it fun to use . This is reflected in the origin of the name , which comes from Monty Python , and in an occasionally playful approach to tutorials and reference materials , such as using examples that refer to spam and eggs instead of the standard foo and bar .

A common neologism in the Python community is pythonic , which can have a wide range of meanings related to program style . To say that code is pythonic is to say that it uses Python idioms well , that it is natural or shows fluency in the language , that it conforms with Python 's minimalist philosophy and emphasis on readability . In contrast , code that is difficult to understand or reads like a rough transcription from another programming language is called unpythonic .

Users and admirers of Python , especially those considered knowledgeable or experienced , are often referred to as Pythonists , Pythonistas , and Pythoneers .

= = Syntax and semantics = =

Python is intended to be a highly readable language . It is designed to have an uncluttered visual layout , often using English keywords where other languages use punctuation . Further , Python has fewer syntactic exceptions and special cases than C or Pascal .

= = = Indentation = = =

Python uses whitespace indentation , rather than curly braces or keywords , to delimit blocks ; this feature is also termed the off @-@ side rule . An increase in indentation comes after certain statements ; a decrease in indentation signifies the end of the current block .

= = = Statements and control flow = = =

Python 's statements include (among others) :