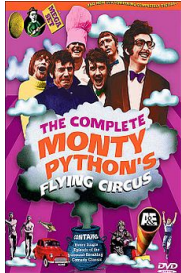


## Python



VS



Guido van Rossum

**Guido van Rossum** a Dutch programmer created the Python programming language.

Guido started Python in 1989 as a “hobby” programming project.

Python first released in 1991; Python 2 in 2000; Python 3 in 2008.

He named language after *Monty Python's Flying Circus*.

In the Python community, Van Rossum is known as a “Benevolent Dictator For Life” (BDFL), meaning that he continues to oversee the Python development process, making decisions where necessary. He is currently employed by Google, where he spends half his time working on Python development.

### What makes Python a popular programming language?

- Simple, consistent syntax
- Easy to learn
- Available free on Mac, Windows and Linux
- Very powerful and industrial strength
- Many libraries – databases, networking, web services, numerical packages, graphical user interfaces (GUI), 3D graphics, others
- Program safety – features that enhance security and robustness, e.g., no buffer overflow, no integer overflow
- Multi-paradigm – imperative (structured), functional, and object-oriented programming

### A Sample Python Program (Imperative Paradigm)

```
# Simple Python program to show program structure
import random
def pickVerb(verbs):
    verb = random.choice(verbs)
    return verb
L = [ 'ran', 'jumped', 'walked' ]
a = pickVerb(L)
print(a)
```

Python uses indentation to show structure.

Amount of indent is enforced within a structure.

Note: No declarations! Python is dynamically typed.

### Who uses Python?

- Software developers in industry (Google, YouTube), video game makers, web developer, graphics developers (ILM), financial service providers, business software providers, government agencies (CIA, NSA)
- Scientists in Physics, Biology, geography, weather services, NASA, national labs (Los Alamos, Lawrence Livermore)
- Computer scientists, especially for teaching intro courses.

### Python 2 vs. Python 3

Python 1 released 1994

Python 2 released 2000

Python 3 released 2008

During the last few years, the Python community has been transitioning from Python 2 to Python 3. This effort is almost done. Most libraries have been converted.

- Python 3 removes inconsistencies and redundancies.
- Python 3 is a major redesign to improve performance and to be friendlier to international community (UNICODE).

## Python 2 vs. Python 3

Changes in Python 3 break almost all Python 2 programs.

```
def silly():  
    x = input('Enter an integer: ')  
    y = x / 2  
    print 'y is', y  
  
silly()
```

Python 2 program

The BIG 3.

Several dozen changes  
for advanced programs.

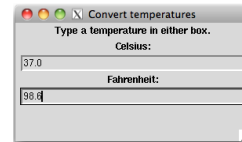
```
def silly():  
    x = int(input('Enter an integer: '))  
    y = x // 2  
    print('y is', y)  
  
silly()
```

Python 3 program

- 2to3 – conversion tool is available.

## Demos – Graphical User Interface (GUI)

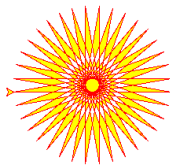
Temperature conversion program.



## Demos – Turtle Graphics

Python's built-in turtle commands can draw intricate shapes using programs that repeat simple moves. The code to draw the star.

```
from turtle import *  
  
color('red', 'yellow')  
begin_fill()  
while True:  
    forward(200)  
    left(170)  
    if abs(pos()) < 1:  
        break  
end_fill()  
done()
```



## Demos – vPython 3D Graphics

vPython designed for Physics  
education by David Scherer.

vPython needs to be installed  
after Python is installed.

Documentation at  
<http://vpython.org/webdoc/index.html>

```
from visual import *
```

```
# create three "visual" objects  
redbox = box(pos=vector(4,2,3), size=(8.,4.,6.), color=color.red)  
greenball = sphere(pos=vector(4,7,3), radius=2, color=color.green)  
myArrow = arrow(pos=vector(2,7,6), size=(6), color=color.blue)
```

Great tutorial at <http://vpython.org/webdoc/visual/VisualIntro.html>

