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## Python: The Complete Guide

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### ① Introduction to Python

Python is a **high-level, interpreted, general-purpose programming language** known for:

-  **Readability & Simplicity**
-  **Rapid Development**
-  **Versatility across domains**

### Key Features:

-  **Interpreted** – executes code line by line
-  **High-level** – abstracts low-level operations
-  **Dynamically typed** – no need for explicit variable types
-  **Multi-paradigm** – supports OOP, functional & procedural
-  **Open Source** – free to use, share & modify

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### ② History of Python

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July Year



Event

1980s	Guido van Rossum begins designing Python at CWI, Netherlands
1989	Python project officially starts
1991	Python 0.9.0 released (exceptions, functions, core types)
1994	Python 1.0 released (modules, standard library)
2000	Python 2.0 released (list comprehensions, garbage collection)
2008	Python 3.0 released (Unicode, better integer division)
2020	Python 2 officially retired – Python 3.x is standard

**Fun Fact:** Guido van Rossum is known as Python's "Benevolent Dictator For Life" (BDFL) until 2018.

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### 3 Python Features

- **Readable Syntax** – easy to write & understand

```
for i in range(5):
    print("Hello, Python! 🙋")
```

- **Interpreted** – debug line by line
- **Dynamic Typing** – variables can change type

```
x = 10    # int
x = "Hi!" # str
```

-  **Object-Oriented** – classes, objects, inheritance, polymorphism
  -  **Extensive Standard Library** – math, regex, HTTP, JSON, OS operations
  -  **Cross-Platform** – Windows, Linux, macOS
  -  **Community Support** – large, active, and growing
  -  **Extensible & Embeddable** – integrates with C/C++ & Java
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## 4 Python Versions

- **Python 2.x** – Old version (deprecated)
  - **Python 3.x** – Current, modern, widely used
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## 5 Python Ecosystem & Libraries

◆ Category	📦 Popular Libraries
Web Development	Django, Flask, FastAPI
Data Science & ML	NumPy, Pandas, Scikit-learn, TensorFlow, PyTorch
Visualization	Matplotlib, Seaborn, Plotly
Automation & Scripting	Selenium, BeautifulSoup, Requests

Game Development Pygame, Panda3D

Networking Twisted, Paramiko

GUI Development Tkinter, PyQt, Kivy

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## 6 Uses of Python

-  **Web Development** – Django, Flask, FastAPI
  -  **Data Science & ML** – Pandas, NumPy, TensorFlow, PyTorch
  -  **AI & Deep Learning** – NLP, Computer Vision
  -  **Automation & Scripting** – File handling, web scraping
  -  **Game Development** – Pygame, game prototypes
  -  **DevOps & SysAdmin** – Server automation, cloud scripts
  -  **Cybersecurity** – Pen-testing, malware analysis
  -  **IoT & Embedded Systems** – MicroPython on Raspberry Pi
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## 7 Python vs Other Languages

### ◆ Feature

### Python

### Java

### C++

Syntax	Simple & readable	Verbose	Complex
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Typing	Dynamic	Static	Static
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Speed	Moderate	Faster	Fastest
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Use Case	Web, Data Science, Automation	Enterprise apps, Android	System programming, Games
Memory Mgmt	Automatic GC	Automatic GC	Manual & RAII

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## 8 Why Python is Popular

-  **Beginner-Friendly**
  -  **Huge Library Ecosystem**
  -  **Cross-Platform & Open Source**
  -  **Strong Community Support**
  -  **Rapid Prototyping & MVPs**
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