

Diploma in

## Python Programming

Welcome to Python





- Introduction to Python <
- Characteristics and applications of Python <
  - Install an Integrated Development 
    Environment (IDE)
    - Create a simple.py script <

**Objectives** 











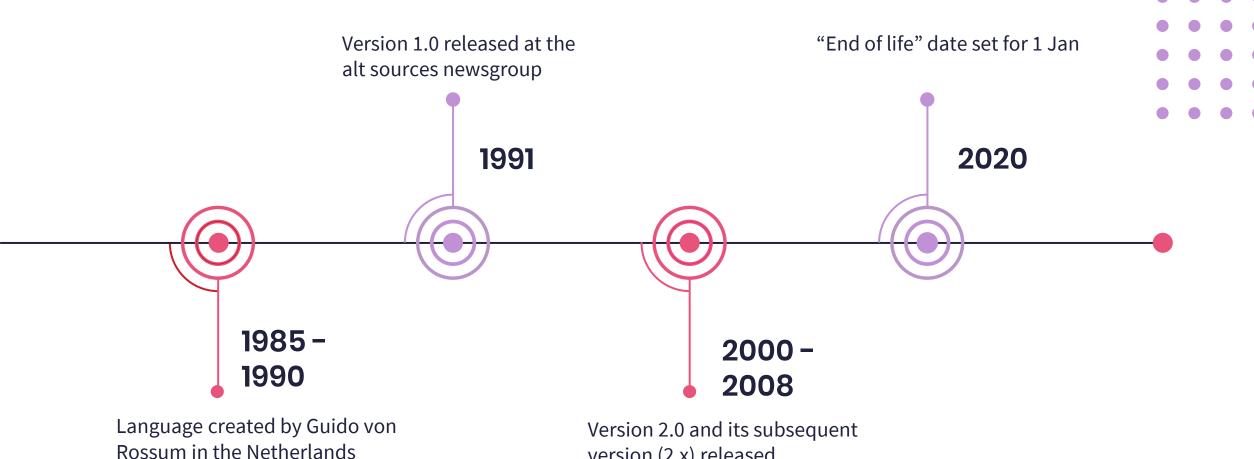
## **Python**

A general-purpose interpreted, interactive, object-oriented, and high-level programming language



### >>> The history of Python





version (2.x) released

## DID YOU KNOW?

## Where did "Python" come from?

Guido von Rossum was a big fan of Monty Python's Flying Circus!



### Later versions

- Latest versions of Python 2 and Python 3 are Python 2.7.18 and Python 3.8.5 respectively
- Small but significant changes were made in Python 3
- Advisable that one programs with Python 3 when you have a choice, as it is a maintained version









### Open-source

- Python is free and open-source, also available under the GNU General Public License
- Design philosophy emphasises readability and allows programmers to express concepts in fewer lines of code



# Why learn Python?

- Python is designed to be highly readable
- It uses English words frequently
- Fewer syntactical constructs
- A must for careers in data science and software engineering







### Key advantages

- Beginner-friendly
- More forgiving on errors
- Easier to debug code
- Supports development of a wide range of applications



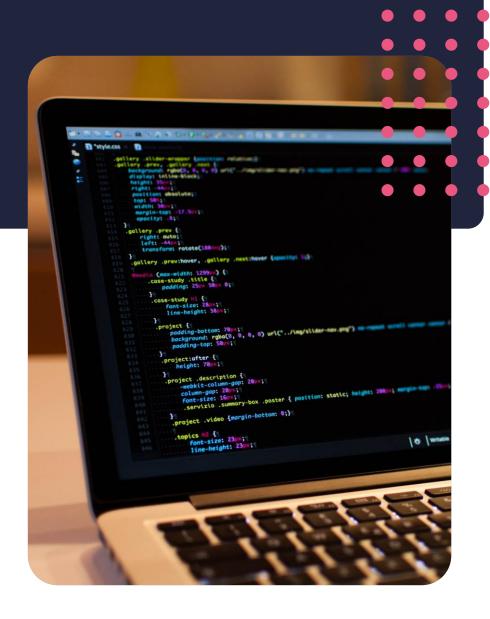
### Key advantages

It is interpreted – processed at run time by an Interpretor

#### **Python Interpreter**

A programme that turns the Python language (code) into a language that can be understood by a machine

- No need to compile programming before execution
- Similar to PERL and PHP programming languages





### Key advantages

It is interactive

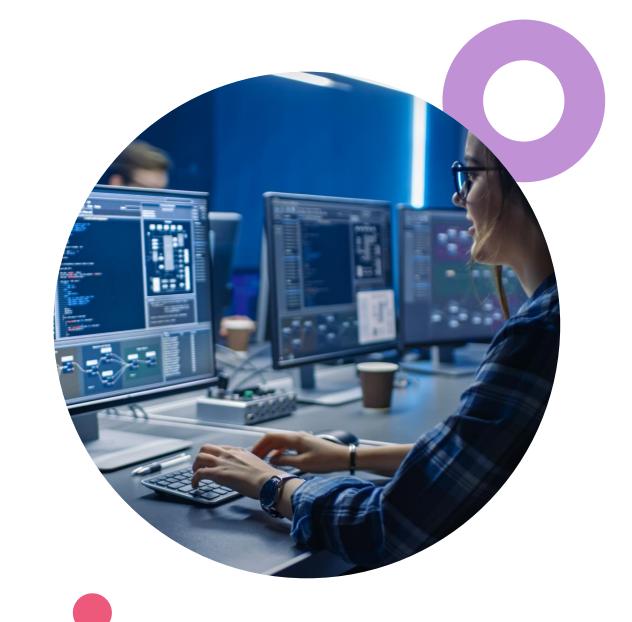
### **Python Interpreter**

 You can use a Python prompt to interact with the interpreter directly to write your programming of your choice



### Object-oriented

- Everything in Python is an object
- Python supports an object-oriented style or a technique of programming that encapsulates code within objects
- With Object-Oriented programming (OOP), complex problems can be divided into smaller sets



## DID YOU KNOW?

### Python's influence

Python is one of the nine languages that influenced the design of JavaScript





# Characteristics and applications





# Object-oriented programming

Supports inheritance, encapsulation, abstraction and polymorphism principles.

In Structured Programming, programmes are divided into self-contained functions.





# Important characteristics

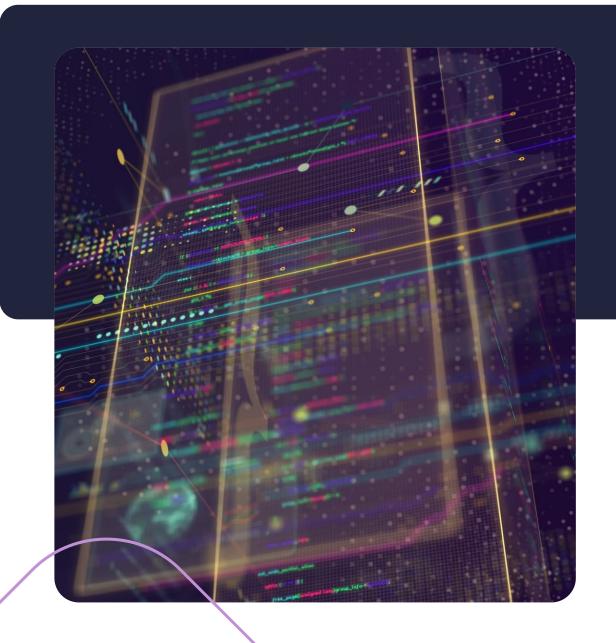
- Supports functional and structural programming methods as well as Object-Oriented Programming
- Can be used as a scripting language or compiled to Bytecode for large applications
- Supports automatic garbage collection





### User-friendly

- Extensible and embeddable easily integrated with C, C++, COM, Active X, COBRA and Java programming languages
- Easy-to-learn as there are few keywords and a simple structure
- Easy-to-read as it is more clearly defined
- Easy-to-maintain





## **Applications**

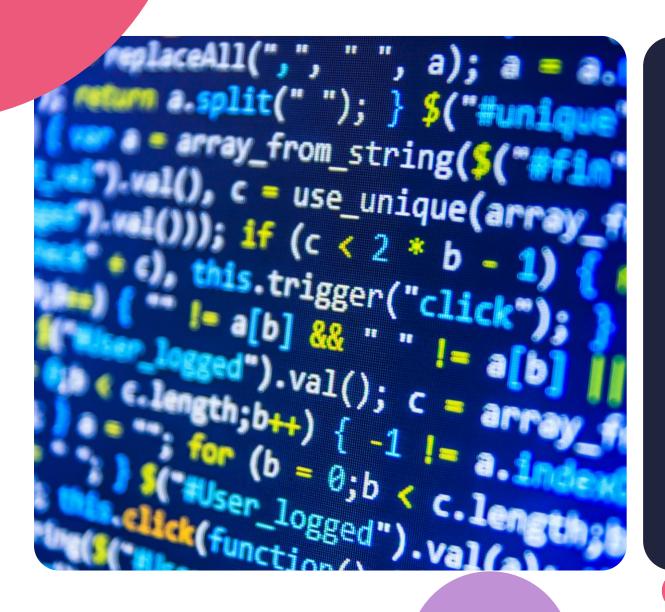
Dominates a wide range of areas

- Broad standard library portable and cross-platform compatible on UNIX, Windows, Macintosh
- Interactive mode allows interactive testing and debugging



- Runs on a wide variety of platforms and has the same interface
- Able to add low-level modules to the Interpreter, enabling programmers to add and customise their tools for efficiency
- Python provides interfaces to all major commercial databases





- Supports Graphical User Interfaces (GUI), which can be created and ported to many system calls, libraries and Windows Systems
- Compared to Shell scripting, it provides better structure and support

# Platforms that use Python

- Google web-search system
- BitTorrent peer-to-peer file sharing
- Intel, Cisco, HP, Seagate, IBM hardware testing
- NASA, Fermilab communities scientific tasks
- iRobot commercial robotic vacuum cleaners





## DID YOU KNOW?

### Python poetry...

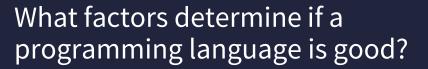
Tim Peters, one of the major contributors to the language included a poem in the Interpretor. To see it, all you need to do is write "import this"!







### Criteria



- Simplicity a language closer to human language is more easily understood
- Writability a language should provide a comprehensive set of constructs and APIs to be useful for general and specific tasks



### Reliability

- Support for pointers, union and aliasing etc. should be discouraged
- Support for assertions, error checking and exception handling should be provided by the language so abnormal conditions can be properly taken care of





# Appropriate data structures

- Support for a variety of primitive data types
- Have the provision to construct user-defined data types as needed





### Other factors

- Availability
- Market demand
- Community support
- Operating System (OS) limitations
- Available extensions and libraries

Python matches these criteria to be the language that should be first taught to students



# Reasons for Python's growth

- Introduction of Big Data, Machine Learning and Data Science into scientific and corporate communities has led to wider adoption
- Python has powerful libraries for these specialisations – Tensorflow, Scikit-learn and Pandas
- Increased learning and adoption of Python as a preferred language





# **Career** opportunities

- There is an increase in opportunities globally
- Python is a requirement for Machine Learning and Data Science
- General increase in Python programming jobs

