

Course
&
Test Series

Program and Programming Language

Program and Programming Language

An ordered set of instructions to be executed by a computer to carry out a specific task is called a **program**, and the language used to specify this set of instructions to the computer is called a **programming language**.

As we know that computers understand the language of 0s and 1s which is called **machine language** or low level language. However, it is difficult for humans to write or comprehend instructions using 0s and 1s. This led to the advent of high-level programming languages like **Python, C++, Visual Basic, PHP, Java** that are easier to manage by humans but are not directly understood by the computer.

A program written in a high-level language is called **source code**. Language translators like compilers and interpreters are needed to translate the source code into machine language.

Python uses an interpreter to convert its instructions into machine language, so that it can be understood by the computer. An interpreter processes the program statements one by one, first translating and then executing. This process is continued until an error is encountered or the whole program is executed successfully.

In both the cases, program execution will stop. On the contrary, a compiler translates the entire source code, as a whole, into the object code. After scanning the whole program, it generates error messages, if any.

1. Low-Level Language: Low-level languages are closest to machine language (binary).

They are hard for humans to read but very fast for computers to execute.

Types:

Machine Language - written in 0s and 1s

Example:

11001010 00001111

(Very hard for humans)

Assembly Language - uses short codes called *mnemonics* instead of binary.

Example:

MOV A, 5

ADD B, A



CBSE



ICSE



NTSE



Banking &
Insurance



Central Govt.
Service



State Govt.
Services



LAW
Entrance



MBA
Entrance



Railways & Metro
Services

...many more

abhyasonline.in



**Course
&
Test Series**

Program and Programming Language



CBSE

Features:

- Very fast execution
- Hardware-specific
- Hard to learn and understand
- Used in device drivers, embedded systems, etc.



ICSE

2. High-Level Language: High-level languages are close to human language (English-like syntax) and easy to read and write. They are independent of hardware.

Examples:

Python, C, C++, Java, JavaScript, Ruby, etc.



NTSE

Example (Python):

```
a = 10
b = 20
print(a + b)
```

☞ Much easier to understand, right?

**Banking &
Insurance**

**Central Govt.
Service**

**State Govt.
Services**

**LAW
Entrance**

**MBA
Entrance**

**Railways & Metro
Services**

...many more

abhyasonline.in

Features:

- Easy to learn and use
- Portable across systems (same code runs on Windows, Mac, Linux)
- Slower than low-level because they need to be translated (by a compiler or interpreter)
- Used in applications, AI, web development, etc.

3. Mid-Level Language: Mid-level (or intermediate-level) languages combine features of both low-level and high-level languages.

They can handle hardware-level operations and high-level logic.

Examples:

C, C++, Rust

Example (C):

```
int a = 10, b = 20;
printf("%d", a + b);
```

- You can work with memory directly using pointers (low-level)
- You can also use logic and functions (high-level)

Features:

- Fast and efficient
- Can access hardware (like assembly)
- Easier to understand than low-level
- Commonly used for system software, operating systems, and embedded programs



**Course
&
Test Series**

Program and Programming Language

- CBSE
- ICSE
- NTSE
- Banking & Insurance
- Central Govt. Service
- State Govt. Services
- LAW Entrance
- MBA Entrance
- Railways & Metro Services
- ...many more

abhyasonline.in

Python

Python is a popular programming language. It was created by Guido van Rossum, and released in 1991.

It is used for:

- web development (server-side),
- software development,
- mathematics,
- system scripting.



Features of Python:

- Python is a high level language.
- It is a free and open source language.
- It is an interpreted language, as Python programs are executed by an interpreter.
- Python programs are easy to understand as they have a clearly defined syntax and relatively simple structure.
- Python is case-sensitive. For example, NUMBER and number are not same in Python.
- Python is portable and platform independent, means it can run on various operating systems and hardware platforms.
- Python has a rich library of predefined functions.
- Python is also helpful in web development. Many popular web services and applications are built using Python.
- Python uses indentation for blocks and nested blocks

What can Python do?

- Python can be used on a server to create web applications.
- Python can be used alongside software to create workflows.
- Python can connect to database systems. It can also read and modify files.
- Python can be used to handle big data and perform complex mathematics.
- Python can be used for rapid prototyping, or for production-ready software development.

Why Python

- Python works on different platforms (Windows, Mac, Linux, Raspberry Pi, etc).
- Python has a simple syntax similar to the English language.
- Python has syntax that allows developers to write programs with fewer lines than some other programming languages.

Course
&
Test Series

Program and Programming Language

- Python runs on an interpreter system, meaning that code can be executed as soon as it is written. This means that prototyping can be very quick.
- Python can be treated in a procedural way, an object-oriented way or a functional way.

 CBSE

Editors of Python

- VS Code (Visual Studio Code)
- Thonny
- Sublime Text
- Jupyter Notebook
- Google Colab

 ICSE

 NTSE

Syntax Of Python File

C:\Users\Your Name>python myfile.py

Python Syntax compared to other programming languages

- Python was designed for readability, and has some similarities to the English language with influence from mathematics.
- Python uses new lines to complete a command, as opposed to other programming languages which often use semicolons or parentheses.
- Python relies on indentation, using whitespace, to define scope; such as the scope of loops, functions and classes. Other programming languages often use curly-brackets for this purpose.

 Banking & Insurance

 Central Govt. Service

Features of Python

Easy to Learn and Use

- Simple and clean syntax similar to English.
- Ideal for beginners and fast development.

Interpreted Language

- Python code is executed line-by-line.
- No need to compile, which makes debugging easier.

High-Level Language

- Abstracts low-level details like memory management.
- Focuses on logic rather than hardware.

Dynamically Typed

- No need to declare variable types explicitly.
- Data types are determined at runtime.

 State Govt. Services

 LAW Entrance

 MBA Entrance

 Railways & Metro Services

...many more

How to Run Python Code Online - Step-by-Step (in bullets):

Open a Web Browser

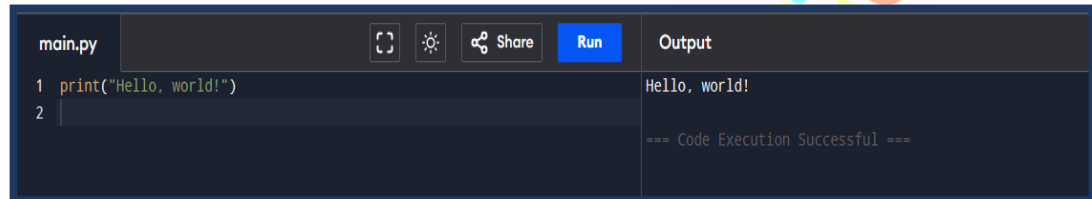
- Visit an Online Python Compiler

abhyasonline.in

Course
&
Test Series

Program and Programming Language

- Some popular and free options:
- <https://replit.com>
- Write Your Python Code
- Type your code in the provided code editor area.
- Example:
- `print("Hello, world!")`
- Click the "Run" Button
- Usually at the top or bottom of the screen.
- The output will appear below or next to the editor.
- View the Output
- See the result of your code immediately after clicking Run.



```
main.py [Refresh] [Settings] [Share] [Run] Output
1 print("Hello, world!")
2
Hello, world!
=== Code Execution Successful ===
```

- Banking & Insurance
 - Central Govt. Service
 - State Govt. Services
 - LAW Entrance
 - MBA Entrance
 - Railways & Metro Services
 - ...many more
- abhyasonline.in

