



Introduction to Programming

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Outline

- What is **Computer Programming**?
- Why Learn **Computer Programming**?
- Types of Programming Languages
- Python Programming Language
- **IDE (Integrated Development Environment)**



What is Computer Program?

- A **program** is a set of step-by-step instructions that directs the computer to do the tasks you want it to do and produce the results you want.

```
1 # checking response.status_code (if you get 502, try rerunning the code)
2 if response.status_code != 200:
3     print(f"Status: {response.status_code} - Try rerunning the code")
4 else:
5     print(f"Status: {response.status_code}")
6
7 # using BeautifulSoup to parse the response object
8 soup = BeautifulSoup(response.content, "html.parser")
9
10 # finding Post images in the soup
11 images = soup.find_all("img", attrs={"alt": "Post image"})
12
13 # downloading images
14 images = 0
```



What is Computer Programming?

- **Computer Programming** is the process of writing instructions for a computer to perform certain tasks or solve problems.
- Instructions must be written in a way the computer can understand.
- **Programming languages** are used to write programs.

Why Learn Programming?

- **Programming** is important because it allows us to:
 - **Solve Problems**
 - **Build Applications**
 - **Control Technology**





What are Programming Languages?

- **Programming languages** are the tools we use to write programs.
- **Programming languages** allow us, as humans, to write instructions in a form we can understand, and then have these instructions converted into a form that a computer can read and execute.



Example of Programming Languages

- **Python:** Easy to learn and great for beginners. Used in web development, data analysis, and AI.
- **JavaScript:** Essential for creating interactive websites.
- **C++:** A powerful language used in game development and system programming.
- **Java:** Commonly used for mobile apps, especially Android.
- **SQL:** Used to manage and analyze data in databases.
- ...



Syntax of Programming Languages

- **Programming syntax** refers to the set of rules that dictate the structure and format of a programming language.
- Each programming language has its own **syntax** (rules and structure) like any human language (ex. English) has different grammar and vocabulary.



Programming Languages

- Computers only understand **binary code**.

```
0110101101101011 110000000110101 1011110100100100
1010010100100100 0010100100010011 1110100100010101
1110100100010101 0001110110000000 1110000111100000
0000100000000001 0100101101110100 0000001000101011
0010100101110000 0101001001001001 1010100110101000
```

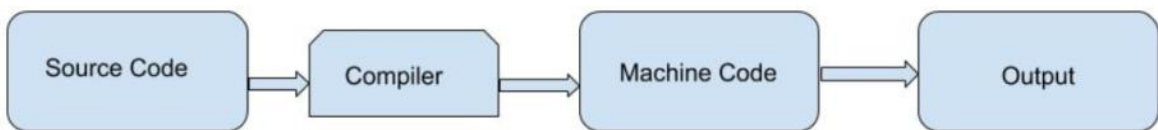


Low-Level Programming Language vs. High-Level Programming Language

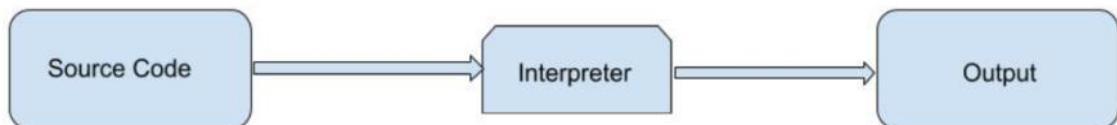
- **High-level Programming Languages:**
 - Human Friendly Languages
 - C++, C#, Python, Java, JavaScript, PHP, ...
- **Low-level Programming Languages:**
 - Machine Friendly Languages
 - Machine Language, Assembly Language



Compilers and Interpreters



How Compiler Works



How Interpreter Works



Compiled and Interpreted Languages

- **Compiled Languages** → Code written in compiled languages is translated into machine code before execution.
 - **Example** – C, C++, Java
- **Interpreted Languages** → Code in interpreted languages is executed line by line by an interpreter.
 - **Example** – Python, JavaScript, PHP



Programming Objectives

- **A program should solve a problem and should be:**
 - **Correct:** It actually solves the problem
 - **Efficient:** Without wasting time or space
 - **Readable:** Understandable by another person
 - **User-friendly:** In a way that is easy for its user to use



How to Write a Program?

- Step 1** – Understand the Problem
- Step 2** – Plan Your Solution
- Step 3** – Choose a Programming Language
- Step 4** – Write the Code
- Step 5** – Run the Program
- Step 6** – Test and debug the Program
- Step 7** – Improve Your Code



Python Programming Language

- **Python** is a widely used **object-oriented** interpreted language.
- It is a general-purpose programming
- The extension of program files written in Python is **.py**





Python Programming Language

- Python was created by Guido van Rossum and first released on February 20, 1991.
- The first version of Python was **Python 0.9.0**.
- The latest version of Python is **Python 3.13.1**.
- **Python** is a general-purpose programming language (GPL) for building software in a wide variety of application domains.



IDE (Integrated Development Environment)

- **IDE** is a software that provides tools for programmers to write, test, and debug code in one place.
- It typically includes a code editor, a compiler or interpreter, and debugging tools.
- Some popular **IDEs** for **Python**:

