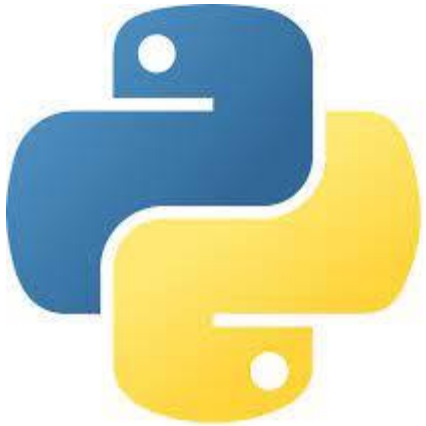
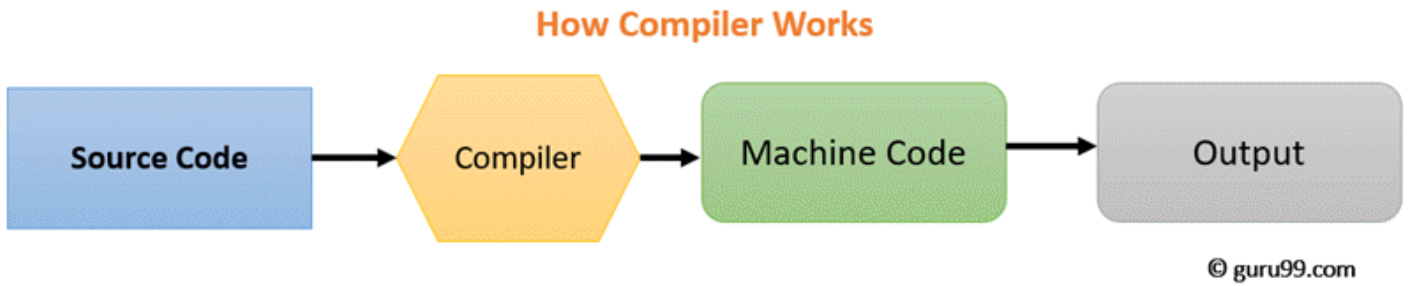


Introduction to Python Programming

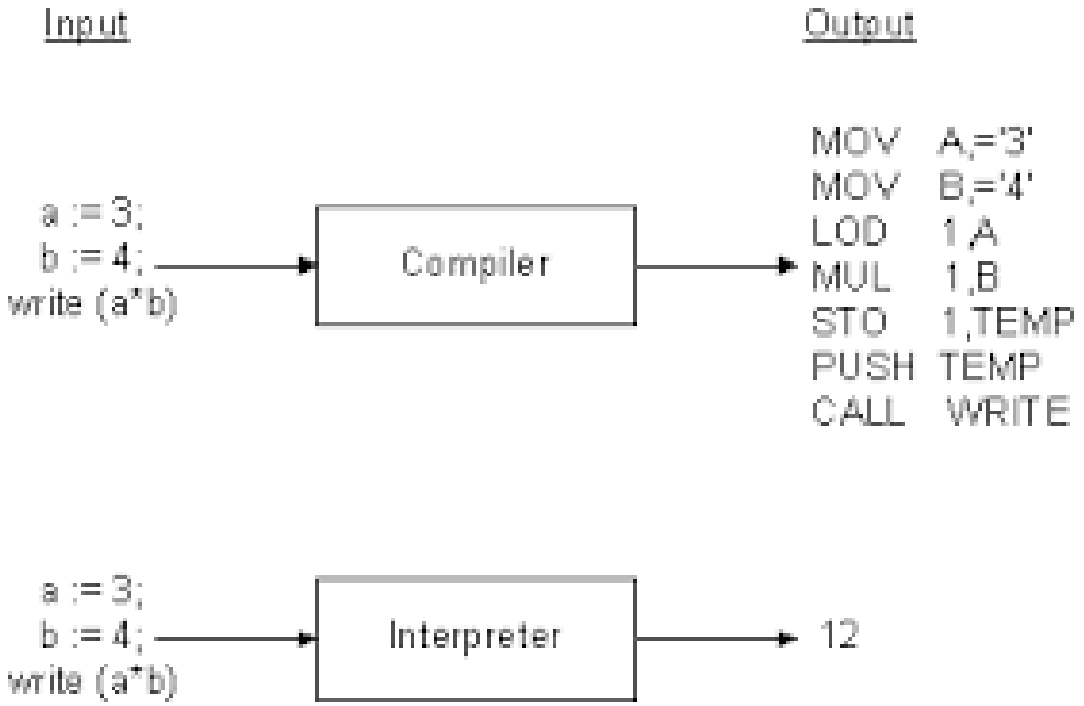
What is Python?

- Python is a very popular general-purpose **interpreted, interactive, object-oriented, and high-level programming** language.
- It was created by **Guido van Rossum** during 1985- 1990.



What is Python?

- An **interprete**r is a program that executes the programming code directly instead of just translating it into another format. It translates and executes programming language statements one by one.

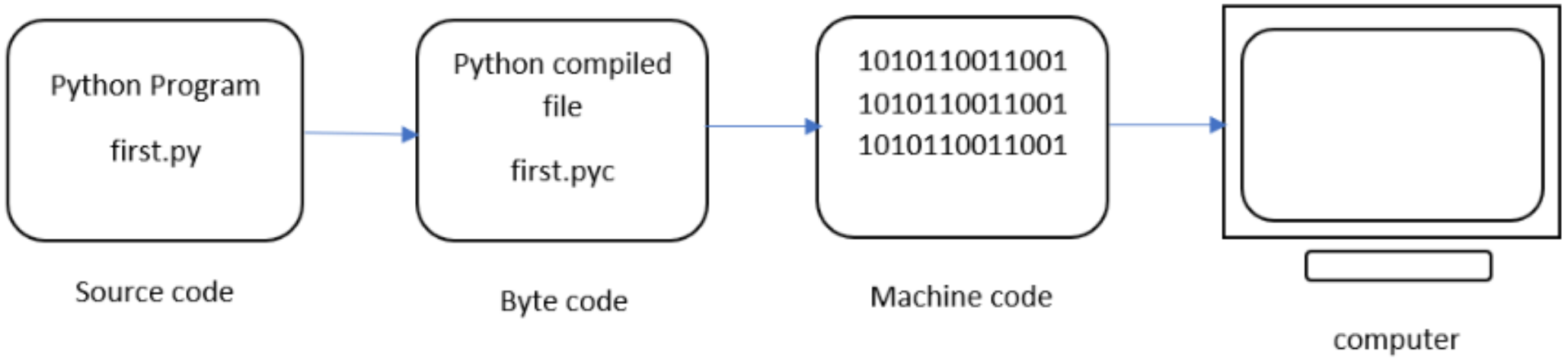


What is Python?

- **Interactive programming**, also known as **live coding**, refers to any computer programming language that allows the creator to make changes to the program **while it is already running.**
- With **interactive programming**, the designer can make changes to the code without having to run the program over again

What is Python?

Python Execution process



What is Python?

- Python is **dynamically-typed** and **garbage-collected** programming language.
- In dynamically-typed languages type checking is performed **at runtime**. (In **statically typed** the type of a variable is known at **compile time**.)
- **// Java example**

```
int num;
num = 5;
```

// Python example

```
num = 5
```

(Here type is determined during run time)

What is Python?

- A **garbage collected (GC)** programming language includes one or more garbage collectors (GC engines) that automatically free up memory space that has been allocated to objects no longer needed by the program.
- The reclaimed memory space can then be used for future object allocations within that program.
- It frees up developers from having to manually manage a program's memory. (E.g. : C# and Java)

What is Python?

- Note : Python supports multiple programming paradigms, including Procedural, Object Oriented and Functional programming language.
- Today, Python is very high in **demand** and all the major companies are looking for great Python Programmers to develop **websites, software components, and applications or to work with Data Science, AI, and ML technologies**.

Why to Learn Python?

- Python is consistently rated as one of the world's most popular programming languages. Python is fairly easy to learn.
- There are many other good reasons which makes Python as the top choice of any programmer:
  1. **Python is Open Source which means its available free of cost.**
  2. **Python is simple and so easy to learn**
  3. **Python is versatile and can be used to create many different things.**
  4. **Python has powerful development libraries include AI, ML etc.**
  5. **Python is much in demand**

Key advantages of learning Python

- **Python is Interpreted** – Python is processed at runtime by the interpreter. You do not need to compile your program before executing it.
- **Python is Interactive –** You can actually sit at a Python prompt and interact with the interpreter directly to write your programs.
- **Python is Object-Oriented** – Python supports Object-Oriented style or technique of programming that encapsulates code within objects.
- **Python is a Beginner's Language** – Python is a great language for the beginner-level programmers and supports the development of a wide range of applications from simple text processing to WWW browsers to games.

Careers with Python

- **Here are just a few of the career options where Python is a key skill:**
  - Game developer
  - Web designer
  - Python developer
  - Full-stack developer
  - Machine learning engineer
  - Data scientist
  - Data analyst
  - Data engineer
  - DevOps engineer
  - Software engineer
  - Many more other roles

Characteristics of Python

- **It supports functional and structured programming methods as well as OOP.**
- **It can be used as a scripting language or can be compiled to byte-code for building large applications.**
- **It provides very high-level dynamic data types and supports dynamic type checking.**
- **It supports automatic garbage collection.**
- **It can be easily integrated with C, C++, COM, ActiveX, CORBA, and Java.**

Other Important Features of 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.**
- **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 provides interfaces to all major commercial databases.**

Other Important Features of Python

- **Python supports GUI applications that can be created and ported to many system calls, libraries and windows systems**
- **Python has support for an interactive mode which allows interactive testing and debugging of snippets of code.**

Python Syntax compared to other programming languages

- **Python was designed for readability, and has some similarities to the English language.**
- **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.**

Good to Know

- **The most recent major version of Python is Python 3**
- **Python can be written in a text editor. It is possible to write Python in an Integrated Development Environment, such as Thonny, IDLE, Pycharm, NetBeans, Visual Studio or Eclipse which are particularly useful when managing larger collections of Python files.**

Installation

- To check if you have python installed on a Windows PC/Linux or Mac, open terminal/command prompt and run the following on the Command Line (cmd.exe)

```
C:\Users\Your Name>python --version
```

- If you find that you do not have Python installed on your computer, then you can download it for free from the following website: https://www.python.org/

Python running

- Python is an interpreted programming language, this means that as a developer you write Python (.py) files in a text editor and then put those files into the python interpreter to be executed.
- The way to run a python file is like this on the command line:

```
C:\Users\Your Name>python helloworld.py
```

Python running

- **The Python Command Line(Interactive mode)**

- To test a short amount of code in python sometimes it is quickest and easiest not to write the code in a file. This is made possible because Python can be run as a command line itself.
- Type the following on the Windows, Mac or Linux command line:

```
C:\Users\Your Name>python
```

```
C:\Users\Your Name>python
Python 3.6.4 (v3.6.4:d48eceb, Dec 19 2017, 06:04:45) [MSC v.1900 32 bit (Intel)]
on win32
Type "help", "copyright", "credits" or "license" for more information.
>>> print("Hello, World!")
```

Python running

- **The Python Command Line(Interactive mode)**
- Which will write "Hello, World!" in the command line:

```
C:\Users\Your Name>python
Python 3.6.4 (v3.6.4:d48eceb, Dec 19 2017, 06:04:45) [MSC v.1900 32 bit (Intel)]
on win32
Type "help", "copyright", "credits" or "license" for more information.
>>> print("Hello, World!")
Hello, World!
```

- Whenever you are done in the python command line, you can simply type the following to quit the python command line interface:

```
exit()
```