Python Basics for Beginners

A simple introduction to Python programming

Introduction to Programming

Step 1: Understand the Problem. The first step in solving any problem, algorithmic or otherwise, is to understand the problem thoroughly. ...

Step 2: Design the Algorithm. ...

Step 3: Implement the Algorithm. ...

Step 4: Test the Algorithm. ...

Step 5: Analyze the Algorithm

Developing an algorithm:

- **How to Create an Algorithm**
- Analyze the problem. ...
- Design the algorithm. ...
- Select appropriate tools and technologies. ...
- Implement the algorithm. ...
- Test the algorithm. ...
- Optimize the algorithm. ...
- Document the algorithm

FLOWCHART AND PSEUDOCODE:

A flowchart is a graphical or symbolic representation of a process.

Common flowchart symbols

Flowcharts have some standard symbols that allow them to be read and understood by a wider group of people. These are some of the most commonly-used symbols:

Terminal

The terminal is an oval that indicates the beginning and end of a program. It usually contains the words Start or End.

Flowline

The flowline is a line from one symbol pointing towards another to show the process's order of operation. This displays the flow of execution in a program.

Input/Output

Input/output is represented by a rhomboid and indicates the input or output of data. This is similar to setting a value to a variable.

Process

A process, represented by a rectangle, is an operation that manipulates data. Think of this as changing the value of a number-based variable using an operator such as +.

Decisions are represented by a rhombus and show a conditional operation that will determine which path a program should take.

EXAMPLE:

Algorithm 1: Add two numbers entered by the user

Step 1: Start
Step 2: Input (read) first number A
Step 3: Input (read) first number B Step
Step 4: Add A and B and assign the result to SUM. SUM←A+B Step
Step 5: Display SUM Step
Step 6: Stop

Introduction to python:

What is 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.

What can Python do?

- Python can be used on a server to create web applications.
- Python can be used alongside software to create workflows.

Why Python?

- Python works on different platforms (Windows, Mac, Linux, Raspberry Pi, etc).
- Python has a simple syntax similar to the English language.

Interactive mode and script mode in python

What is Script Mode?

Script mode is where you write your code in a .py file and then run it with the python command

What is the Interactive Mode?

Interactive mode is where you type your code into the Python interpreter directly.

Example1:

```
print(1)
x = 2
print(x)
```

Output:

```
>>>1
   2
```

Interactive mode	Script mode
A way of using the Python interpreter by typing commands and expressions at the prompt.	A way of using the Python interpreter to read and execute statements in a script.
Cant save and edit the code	Can save and edit the code
If we want to experiment with the code, we can use interactive mode.	If we are very clear about the code, we can use script mode.
we cannot save the statements for further use and we have to retype all the statements to re-run them.	we can save the statements for further use and we no need to retype all the statements to re-run them.
We can see the results immediately.	We cant see the code immediately.

Indentation in python:

- A block is a group of statements in a program or script.
- Python does not use braces({}) to indicate blocks of code for class and function definitions or flow control.
- In python Blocks of code are denoted by line indentation.
- Python programs get structured through indentation, i.e. code blocks are defined by their indentation.

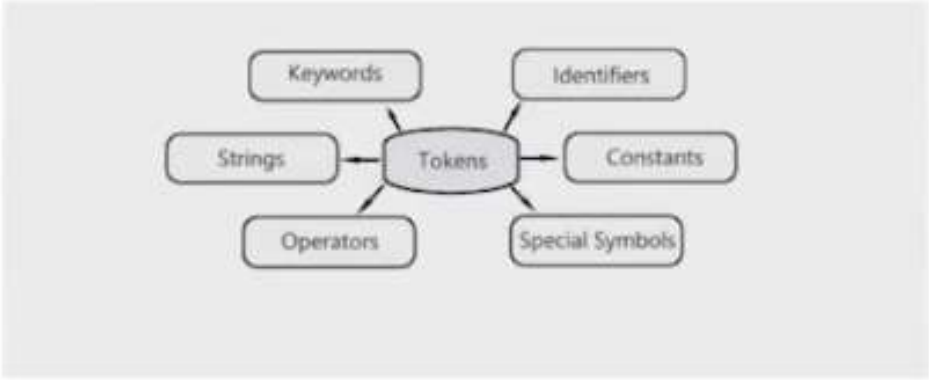
Comments:

Comments are the non-executable statements in a program.

• Comments make the program easily readable and understandable by the programmer as well as other users.

TOKENS IN PYTHON:

A token is the smallest individual unit in a python program. All statements and instructions in a program are built with tokens.



Variables

Variables are containers for storing data values.

Creating Variables

Python has no command for declaring a variable.

A variable is created the moment you first assign a value to it.

Example

```
   x=5
y="John
 print(x)
 print(y)
```

LITERALS in python

In Python, literals are fixed values that are stored in the source code of a program and do not change during execution. They are used to represent data that should not be altered by users, such as software operating parameters.

CODE:

```
# String Literals

a = 'Hello'

b = "Students"

c = '''This is a learning platform'''


# Driver code

print(a)

print(b)

print(c)
```

First Python Program

- Code: print("Hello, World!")
- print() is used to display output on screen

Python Syntax Basics

- Indentation defines code blocks
- No semicolons or braces needed
- Comments: # for single-line, ''' for multi-line

Variables and Data Types

- Store data in memory using variables
- Common types: int, float, str, bool
- Example: name = "Alice", age = 25

Operators in Python

- Arithmetic: +, -, *, /, %
- Comparison: ==, !=, >, <
- Logical: and, or, not