**Introduction to Python**

Python is general purpose, high level and interpreted and dynamically typed programming language. Which is used to implemented any kind of programs.

* Python is used in web development, data analysis, artificial intelligence, automation.
* Python is a popular programming language. It was created by Guido van Rossum, and released in 1991.

**Why learn Python**

* Easy to read & write
* Easy to understand
* Less in syntax
* Time consummations is less
* Python works on different platforms

**Interpreted**

Line by line converts into machine understandable and executes

**Compiler**

A block of code will be executed at a time

**General purpose**

Python can be used any where in software development

**High level programming language**

The language which is human readable

**Low level programming language**

Low level programming language is directly interact with the computers.

**Python Comments**

Comments in python are used to explain code and improve readability. They are ignored by the interpreter

1. **Single line comment**

Use the # symbol to write a comment on a single line

1. **Multi-line comments**

Triple quotes(“”” or ‘’’ ‘’’)can be used for multi-line coments.

**Variables in Python**In Python, Variables are used to store data values. Python does not require you to declare a variable type. It determines the type based on assigned values.EX: **Declaring Variables**x = 10 # Integery = 3.14 # Floatname = “Madhuri" # Stringactive= True #Boolean

**Variable Naming Rules**Must start with a letter (A-Z or a-z) or an underscore\_Cannot start with a numberCan contain letters, numbers, and underscores (\_)Cannot use Python keywords (e.g., if, else, while, def)**EX:**valid\_name = “Hello” \_invalid = 5 # Starts with an underscore 9number = 100 # (cannot start with a number)**Assigning Multiple Variables**

Python allows multiple variables to be assigned at once.EX:a, b, c = 1, 2, 3print (a, b, c) #Output: 1,2,3Can also assign the same value to multiple variables**EX:**x = y = z = "Same Value"**Variable Types**Python variables can hold different types of data.EX:Num = 10 # Integer pi = 3.14 # Float text = "Python” # Stringflag = True # Booleanitems = [1, 2, 3] # List**Type ()**: To check the data type, use type( )print (type (Num)) # Output: <class 'int’>print(type(pi)) # Output: <class 'float'>**Changing Variable Type**Changing one type of data into another type of data dynamically is know as Type Casting.**EX:**x = 5 # Integer x = str(x) # Now it's a string y = int("10") # Converts string "10" to integer 10 z = float (3) # Converts integer 3 to float 3.0**Global and Local Variables**Two types of Variables**Local Variables**The variable which can be declared inside the function is known as local variableEX:def greet (): message = “Hello, World!” # Local variable print(message)greet () # Output: Hello, World! # print(message) # This would cause an error because 'message' is not accessible outside the function.

**Global Variables**The variable which can be declared outside of the function is known as global variable**EX:**greeting = "Hello, World!" def say\_hello(): print(greeting) # Accessing the global variablesay\_hello() # Output: Hello, World!print(greeting) # Output: Hello, World!

* Another way to declare a global variable inside a function by using **global keyword.**

EX:count = 0 def increment(): global count # Declare 'count' as a global variable count=count+1increment() print(count) # Output: 1**Data Types**

Python has several build-in data types.

**1. Numeric Types**

* **int** → Integer (e.g., 10, -5, 1000)
* **float** → Floating-point number (e.g., 10.5, -3.14, 2.0)
* **complex** → Complex numbers (e.g., 3+4j, 2-1j)

**2. Sequence Types**

* **list** → Ordered, mutable collection (e.g., [1, 2, 3])
* **tuple** → Ordered, immutable collection (e.g., (1, 2, 3))
* **range** → Sequence of numbers (e.g., range(1, 10))

**3. Text Type**

* **str** → String (e.g., "hello", 'Python')

**4. Set Types**

* **set** → Unordered, mutable collection of unique elements (e.g., {1, 2, 3})
* **frozen set** → Immutable set (e.g., frozen set ({1, 2, 3}))

**5. Mapping Type**

* **dict** → Key-value pairs (e.g., {"name": "John", "age": 30})

**6. Boolean Type**

* **bool** → Represents True or False (e.g., True, False)

**7. Binary Types**

* **bytes** → Immutable sequence of bytes (e.g., b"hello")
* **bytearray** → Mutable sequence of bytes
* **memoryview** → View of memory buffer

**8. None Type**

* **NoneType** → Represents a null value (None)

**Operators in Python**

Operators in Python are special symbols that perform operations on variables and values. Python has several types of operators

Python divides the operators in the following groups:

* Arithmetic operators
* Assignment operators
* Comparison operators
* Logical operators
* Identity operators
* Membership operators
* Bitwise operators

1. **Arithmetic operators**

Arithmetic operators are used with numeric values to perform common mathematical operations

**EX:**

**A=10, b=3**

Addition ------> a=10, b=3--------->a+b=13

Subtraction-------->a-b=7

Multiplication--------->a\*b=30

Division------------>a/b=3.333

Floor Division------------>a//b=3

Modulus--------------->a%b=1

Exponentiation---------->a\*\*b=1000