**Experiment No. 0: Introduction to Python Programming Lab**

**🧪 Aim:**

To introduce students to Python programming concepts and demonstrate the use of variables, data types, operators, and basic input/output statements.

**🎯 Objective:**

* Understand and write simple Python programs.
* Use variables and perform basic arithmetic operations.
* Accept user input and display output.
* Recognize the advantages of Python over other languages.

**📚 Theory / Concepts:**

Python is an **interpreted, high-level, general-purpose programming language** created by **Guido van Rossum** and first released in **1991**. It is known for its simple and readable syntax, which makes it ideal for beginners as well as professionals. It supports multiple programming paradigms including **procedural, object-oriented, and functional programming**.

**🔹 Key Features of Python:**

1. **Easy to Read and Write:**  
   Python has a clean and readable syntax. For example, it uses indentation instead of braces {} to define blocks of code.
2. **Interpreted Language:**  
   Python code is executed line by line, making debugging easier.
3. **Dynamically Typed:**  
   No need to declare variable types explicitly (e.g., x = 5 without specifying int).
4. **Extensive Standard Library:**  
   Python comes with a rich set of libraries and modules to perform various tasks including file handling, mathematics, networking, data science, etc.
5. **Portability:**  
   Python is platform-independent, meaning a Python program written on one operating system can run on another without modification.
6. **Open Source:**  
   Python is freely available and maintained by a large community.

**🔹 Basic Concepts in Python Programming:**

1. **Variables and Data Types:**  
   Variables are containers for storing data values. Python supports several data types:
   * int: Integer
   * float: Decimal number
   * str: String
   * bool: Boolean (True/False)

Example:

python

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name = "John"

age = 25

height = 5.9

is\_student = True

1. **Input and Output:**
   * input() is used to take user input as a string.
   * print() is used to display output.

Example:

python

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name = input("Enter your name: ")

print("Hello", name)

1. **Operators:**
   * **Arithmetic**: +, -, \*, /, //, %, \*\*
   * **Assignment**: =, +=, -=, etc.
   * **Comparison**: ==, !=, <, >, <=, >=
   * **Logical**: and, or, not
2. **Indentation:**  
   Python uses whitespace (usually 4 spaces) to define code blocks. Improper indentation leads to errors.
3. **Comments:**  
   Comments help in understanding the code and are not executed.
   * Single-line: # This is a comment
   * Multi-line: ''' comment ''' or """ comment """
4. **Data Structures Overview (Just Mentioned Here):**  
   Though explored in later experiments, Python supports built-in data structures like:
   * List
   * Tuple
   * Dictionary
   * Set

**📋 Algorithm / Logic:**

1. Start the Python interpreter or open a Python file in an IDE (like PyCharm, VSCode, Jupyter, or IDLE).
2. Declare and initialize variables with user input.
3. Perform arithmetic operations.
4. Use print() to show outputs.
5. End the program.

**✅ Result:**

The program was executed successfully, displaying user-entered data along with computed information, thus fulfilling the aim of understanding Python fundamentals.

**❓ Viva Questions:**

1. What is Python? Who developed it?
2. What are the different data types in Python?
3. Is Python compiled or interpreted?
4. Explain the use of the input() and print() functions.
5. What is the significance of indentation in Python?
6. Differentiate between = and == in Python.
7. What is the purpose of comments in Python?
8. Explain dynamic typing with an example.
9. Name a few IDEs used for Python development.
10. What are the advantages of using Python over C/C++?