Guided Exercise

Python

Part-1

**1. Setting Up The Environment: Installing Python**

**Objective:**

Ensure every learner has Python installed and can run a simple Python script.

**Setup Guidelines:**

1. **Download Python:**
   * Go to the [official Python website](https://www.python.org/downloads/).
   * Click on the button that says “Download Python” (it will download the latest version).
   * A file will start downloading (it might be named something like **python-3.x.x.exe**).
2. **Install Python:**
   * Find the downloaded file on your computer, usually in the "Downloads" folder.
   * Double-click on the file to open it.
   * You'll see a window with a checkbox at the bottom that says "Add Python to PATH". Make sure to tick this checkbox.
   * Click on the “Install Now” option.
   * Wait for the installation to complete. It should say "Setup was successful".
3. **Check Installation:**
   * Open your computer's command prompt or terminal.
   * Type **python --version** and press 'Enter'.
   * It should display the version of Python you installed, like "Python 3.x.x".

**2. Writing Your First Python Script: Hello, World!**

**Objective:**

Introduce learners to their first Python program.

**Concepts Involved:**

* Python's print function.
* Running a Python script.

**Step by Step Guided Instructions:**

1. **Create a New Text File:**
   * Right-click on your desktop or in any folder.
   * Choose "New" and then "Text Document". This will create a new text file.
   * Rename this file to **hello.py**. The **.py** is very important as it tells the computer this is a Python script.
2. **Write Your Script:**
   * Double-click on the **hello.py** file to open it.
   * Type in the following: **print("Hello, World!")**.
   * Save the file and close it.
3. **Run Your Script:**
   * Open your computer's command prompt or terminal.
   * Navigate to the location of your **hello.py** file (If you saved it on the desktop, you'd use the command **cd desktop**).
   * Type **python hello.py** and press 'Enter'.
   * You should see the message "Hello, World!" displayed in the command prompt or terminal.

**Rationale:**

This exercise introduces learners to the process of writing and running a Python script. By seeing the message they wrote appear on the screen, they'll feel a sense of accomplishment and understand the basics of how scripts are executed.

**3. Basic Data Types in Python**

**Objective:**

Familiarize with basic data types like numbers and text.

**Concepts Involved:**

* Variables.
* Data types.

**Step by Step Guided Instructions:**

1. **Open Python Interactive Shell:**
   * Open your command prompt or terminal.
   * Type **python** and press 'Enter'. This starts Python in interactive mode, which lets you type and run Python right there.
2. **Try Out Different Data Types:**
   * Type **5** and press 'Enter'. You'll see **5** as the output.
   * Now, type **"I am learning Python!"** (with the quotes) and press 'Enter'. You'll see the message **I am learning Python!** displayed.
   * Try typing **5 + 3** and pressing 'Enter'. You should see **8** as the output.
3. **Understanding Variables:**
   * Type **a = 5** and press 'Enter'. This stores the number **5** in a "box" named **a**.
   * Now, type **b = 3** and press 'Enter'.
   * Try typing **a + b** and pressing 'Enter'. You should see **8** as the output.

**Rationale:**

This exercise helps learners understand that computers can store different types of information, like numbers and text. They also learn that this information can be stored in named "boxes" (variables) and used later.

**4. Simple Operations with Text (Strings)**

**Objective:**

Understand how to manipulate and play with text in Python.

**Concepts Involved:**

* Strings.
* String operations.

**Step by Step Guided Instructions:**

1. **Open Python Interactive Shell:**
   * If you've closed it from the last exercise, open your command prompt or terminal.
   * Type **python** and press 'Enter'.
2. **Playing with Strings:**
   * Type **"Hello" + " World!"** and press 'Enter'. You should see **Hello World!** as the output. This shows how we can combine (or "concatenate") two pieces of text.
   * Type **'Python ' \* 3** and press 'Enter'. You should see **Python Python Python** as the output. This shows how we can repeat a piece of text multiple times.
3. **Storing Strings in Variables:**
   * Type **greeting = "Hello, my name is "** and press 'Enter'.
   * Type **name = "Alex"** and press 'Enter'.
   * Now, type **greeting + name** and press 'Enter'. You should see **Hello, my name is Alex** as the output.

**Rationale:**

This exercise teaches learners that text (or "strings") can be manipulated in various ways in Python, whether it's combining them, repeating them, or storing them in variables.

**5. Making Decisions with Python (Basic Logic)**

**Objective:**

Understand the basic decision-making ability of Python using simple conditions.

**Concepts Involved:**

* Conditions.
* Boolean logic (True or False).

**Step by Step Guided Instructions:**

1. **Open Python Interactive Shell:**
   * If not already open, get into the Python mode in your terminal or command prompt.
2. **Understanding True and False:**
   * Type **5 > 3** and press 'Enter'. You should see **True** as the output, because 5 is indeed greater than 3.
   * Type **5 < 3** and press 'Enter'. You should see **False** because this statement is not correct.
3. **Using Conditions with Variables:**
   * Type **apple\_price = 10** and press 'Enter'.
   * Type **banana\_price = 5** and press 'Enter'.
   * Now, type **apple\_price > banana\_price** and press 'Enter'. You should see **True** because apples are more expensive in this scenario.

**Rationale:**

This activity is crucial to demonstrate that computers can make decisions based on logic. The learners will see that Python can evaluate conditions and return a simple **True** or **False** answer, which forms the backbone of many advanced operations they'll learn later.

**6. Taking Inputs and Displaying Outputs**

**Objective:**

Understand how to get input from the user and display a customized message.

**Concepts Involved:**

* User input.
* Displaying outputs.

**Step by Step Guided Instructions:**

1. **Open Python Interactive Shell:**
   * If not already open, start the Python mode in your terminal or command prompt.
2. **Getting User Input:**
   * Type **name = input("What is your name? ")** and press 'Enter'.
   * You'll see the message "What is your name?". Type your name and press 'Enter'.
   * Your name is now stored in the **name** variable.
3. **Displaying a Personalized Message:**
   * Now, type **print("Hello, " + name + "!")** and press 'Enter'.
   * You should see a message like **Hello, [Your Name]!**.

**Rationale:**

Interactivity is a fundamental aspect of many programs. This exercise lets learners see how they can get information from users and use that information immediately in the program.

**7. Simple Math with Python**

**Objective:**

Learn how to perform basic arithmetic operations.

**Concepts Involved:**

* Arithmetic operations (addition, subtraction, multiplication, division).

**Step by Step Guided Instructions:**

1. **Open Python Interactive Shell:**
   * If not already open, initiate the Python interactive mode.
2. **Trying Out Basic Arithmetic:**
   * Type **5 + 3** and press 'Enter'. You should see **8**.
   * Type **10 - 3** and press 'Enter'. You should see **7**.
   * Type **4 \* 4** and press 'Enter'. You should see **16**.
   * Type **8 / 2** and press 'Enter'. You should see **4.0**.
3. **Using Variables for Arithmetic:**
   * Type **length = 10** and press 'Enter'.
   * Type **breadth = 5** and press 'Enter'.
   * Now, type **area = length \* breadth** and press 'Enter'.
   * Type **print(area)** and press 'Enter'. You should see **50**.

**Rationale:**

Basic arithmetic operations form the core of many complex calculations in programming. By playing with numbers directly and then using variables, learners get a feel of how Python can act as a powerful calculator.

**8. Fun with Repetition: Introduction to Loops**

**Objective:**

Learn the concept of repetition in Python using a simple loop.

**Concepts Involved:**

* The **for** loop.
* Iterating over a range.

**Step by Step Guided Instructions:**

1. **Open Python Interactive Shell:**
   * Start the Python mode if it isn't already active.
2. **Repeating an Action:**
   * Type **for i in range(5):** and press 'Enter'. (Notice the colon at the end!)
   * The cursor will move a bit to the right, showing an indentation. Now type **print("I love Python!")** and press 'Enter'.
   * After pressing 'Enter', press it again to tell Python you're done with the loop.
   * You should see the message "I love Python!" printed five times.

**Rationale:**

Repetition is a crucial concept in programming, enabling tasks to be repeated multiple times without rewriting the code each time. This simple loop introduction lays the foundation for more complex iterations and loop-based logic they'll encounter later.