Here’s a detailed course outline for **Python: Data Types, Variables, and Basic I/O**, tailored to help you understand syntax and structure effectively:

**Python: Data Types, Variables, and Basic I/O**

This lesson covers the following:

1. **Variables**
2. **Data Types**: Strings, Integers, Floats, Booleans, NoneType
3. **Basic Input/Output (I/O)**

**1. Variables**

**Definition**: Variables are containers that store data. In Python, you don’t need to declare the data type explicitly—it’s dynamically assigned based on the value.

**Syntax:**

variable\_name = value

**Example:**

# Assigning values to variables

name = "Fareeha"

age = 25

is\_learning = True

# Printing variables

print("Name:", name)

print("Age:", age)

print("Is learning:", is\_learning)

**Key Rules for Naming Variables:**

* Must start with a letter or underscore \_.
* Can contain letters, numbers, and underscores.
* Cannot start with a number.
* Case-sensitive (name and Name are different).

**2. Data Types**

Python provides built-in data types. Let’s explore the most common ones.

**a) Strings**

* Text enclosed in single ' ' or double " " quotes.
* **Example**:
* greeting = "Hello, World!"
* print(greeting)

**b) Integers and Floats**

* **Integers**: Whole numbers (e.g., 10, -5).
* **Floats**: Decimal numbers (e.g., 3.14, -0.5).
* **Example**:
* age = 25 # Integer
* pi = 3.14 # Float
* print("Age:", age)
* print("Value of pi:", pi)

**c) Booleans**

* Represents True or False.
* **Example**:
* is\_active = True
* is\_retired = False
* print("Active:", is\_active)
* print("Retired:", is\_retired)

**d) NoneType**

* Represents the absence of a value using None.
* **Example**:
* nothing = None
* print("Value:", nothing)

**e) Type Checking**

* Use type() to check the type of a variable.
* **Example**:
* print(type(name)) # Output: <class 'str'>
* print(type(age)) # Output: <class 'int'>

**3. Basic Input/Output (I/O)**

**a) Input: Getting user input using input()**

* **Syntax**:
* user\_input = input("Prompt message: ")
* **Example**:
* name = input("What is your name? ")
* print("Hello,", name)

**b) Output: Displaying information using print()**

* Use placeholders for dynamic output with f-strings.
* **Example**:
* age = 25
* print(f"I am {age} years old.")

**Practice Exercises**

1. **Variables and Data Types**:
   * Create variables for your name, age, and favorite color. Print their values.
   * Check the type of each variable using type().
2. **Basic I/O**:
   * Write a program that asks the user for their name and age, then prints a greeting with their name and tells them how old they will be in 5 years.
   * Example:
   * name = input("Enter your name: ")
   * age = int(input("Enter your age: "))
   * print(f"Hi {name}, you will be {age + 5} years old in 5 years!")
3. **Data Type Conversion**:
   * Convert a float to an integer, an integer to a string, and a string to a float.
4. **Challenge Task for GitHub**:  
   Create a Python script that:
   * Takes three inputs: name, age, and a number.
   * Outputs a personalized message including their name and age, and calculates what their age will be multiplied by the number they input.
   * Example output:
   * Enter your name: Fareeha
   * Enter your age: 25
   * Enter a number: 2
   * Hello Fareeha, in 2 years, your age will be 50.

**Flashcard Questions**

1. What is a variable, and how do you define it in Python?
2. List the rules for naming variables.
3. What are the main data types in Python?
4. How do you check the type of a variable?
5. Write a code snippet to get user input and display it using print().
6. Convert a float 3.14 to an integer and a string in Python.
7. What is the purpose of None in Python?

Let me know when you're ready for the next topic or need clarification on this one!