PYTHON VARIABLE

1-Introduction to python
2-Variable in python

- a **variable** is a name that refers to a memory location where a value is stored.
- a variable is a container for data.

3-Charcteristic of variable

- **Dynamic Typing**: no need to declare any variable like (int, float, string)
- **No Explicit Declaration**: Just assign a value, and Python will automatically create the variable
- **Mutable**: You can change the value of a variable as many times as you need during the execution of your program

4- Rules to define variable in python

- **Must start with a letter (a-z, A-Z) or an underscore (_)**.
- **Can contain letters, digits (0-9), and underscores**, but cannot start with a digit.
- **Case-sensitive**: age, Age, and AGE are different variables.
- **Cannot be a Python keyword** (e.g., True, False, if, for, class, etc.).

Syntax:

```python
variable_name = value
```

```python
# Example 1: Integer Variable
age = 25  # Here, 'age' is a variable, and it stores an integer value 25
print(age)  # Output: 25

# Example 2: String Variable
name = "Alice"  # 'name' is a variable, storing a string "Alice"
print(name)  # Output: Alice

# Example 3: Float Variable
price = 19.99  # 'price' is a variable, storing a floating-point number
print(price)  # Output: 19.99

# Example 4: Boolean Variable
is_active = True  # 'is_active' is a variable, storing a Boolean value
print(is_active)  # Output: True
```

1. Storing and Printing a Value

python

```python
# Storing the value 10 in a variable called 'x'
x = 10
# Printing the value of 'x'
print(x)  # Output: 10
```

2. Using Variables in Expressions

python

```python
# Assigning values to variables
a = 5
b = 3
# Adding two variables and storing the result in 'result'
result = a + b
# Printing the result
print(result)  # Output: 8
```

3. Changing the Value of a Variable

```python
# Initial value
score = 50
print(score)  # Output: 50

# Changing the value of 'score'
score = 100
print(score)  # Output: 100
```

4. Concatenating Strings

```python
# Assigning values to variables
first_name = "John"
last_name = "Doe"

# Concatenating strings and storing in a new variable
full_name = first_name + " " + last_name
print(full_name)  # Output: John Doe
```

5. Using Variables in a Calculation

```python
# Assigning values to variables
length = 10
width = 5

# Calculating the area of a rectangle
area = length * width
print(area)  # Output: 50
```

Reassigning Values to Variables

Python allows you to reassign a variable to a new value at any time.

```python
x = 10  # Initial value of x
print(x)  # Output: 10

# Reassigning the value of x
x = 20
print(x)  # Output: 20
```

Final Notes:

- **Variables can store any type of data**, including numbers, strings, lists, dictionaries, objects, etc.
- **Variables are dynamic**, meaning their type is automatically determined by the value assigned to them, and they can change type during execution.