

Variables and data types play a fundamental role in programming. They are essential for storing and manipulating data. Here's an overview of their roles and how they are used in Python:

Variables:

- Variables are like containers that hold data in memory.
- They have a name (identifier) and a value.
- Variables are used to store data temporarily, and their values can change during the program's execution.

Data Types:

- Data types define the kind of data that variables can hold.
- They specify the format and size of data that can be stored in a variable, and they determine how operations can be performed on that data.

In Python, some common data types include:

- Integers (int): Used to store whole numbers.
- Floating-Point Numbers (float): Used to store numbers with decimal points.
- Strings (str): Used to store text, such as characters and words.
- Booleans (bool): Used to represent True or False values.
- Lists: Used to store collections of items.
- Tuples: Similar to lists, but immutable (cannot be changed once defined).
- Dictionaries: Used to store key-value pairs.
- Sets: Used to store unique, unordered items.

Here's how variables and data types are used in Python:

1. Variable Declaration:

- Variables are declared by assigning a value to an identifier.
- Example

```
age = 25  
name = "John"
```

2. Data Type Assignment:

- Python automatically determines the data type of a variable based on the assigned value.

- Example:

```
x = 5 , x is an integer  
y = 3.14 , y is a float  
z = "Hello" , z is a string
```

3. Data Manipulation:

- You can perform operations on variables based on their data types. For example, you can perform mathematical operations on numeric variables or concatenate strings.

- Example:

```
result = x + 10          # Numeric operation  
greeting = "Hello, " + name  # String concatenation
```

4. Type Conversion:

- You can convert between data types using built-in functions. For example, you can convert an integer to a string or vice versa.

5. Data Storage:

- Variables store data that can be used later in the program. This is essential for retaining and manipulating information as your program runs.