Python – Data Types

Shahriar's Intelligence Academy

Understanding Data Types

Definition:

Data types define the **type of data a variable** can hold, specifying how the **interpreter processes it.**

Purpose:

Ensures **efficient memory allocation** and enables **data manipulation.**

Common Python Data Types:

Integer (int) – Represents whole numbers (e.g., 5, -20).

Float – Represents decimal numbers (e.g., 3.14, -7.89).

String (str) – Represents text data (e.g., "Hello", 'Python').

Boolean (bool) – Represents True/False values.

Integer Data Types

Definition:

Integer (int) is used to **store whole numbers**, both **positive and negative**, WITHOUT any decimal point.

Key Features:

- Supports mathematical operations (addition, subtraction, multiplication, etc.).
- Unbounded in Python; can hold arbitrarily large values.

Example:

```
age = 25  # Positive integer
temperature = -10  # Negative integer
population = 7800000000  # Large integer
```

Float Data Types

Definition:

Float (float) is a data type used to **store real numbers**, which include both **integers and fractional parts**.

Key Features:

- Useful for representing precise measurements.
- Supports scientific notation (e.g., 1.23e3 for 1230).

Example:

```
pi = 3.14159  # Value of pi
price = 19.99  # Product price
scientific_notation = 1.5e2  # Equivalent to 150.0
```

String Data Types

Definition:

String (str) is used to store a **sequence of characters** enclosed in **quotes** (single, double, or triple quotes).

Key Features:

- Immutable (cannot be changed once created).
- Supports operations like concatenation, slicing, and formatting.

Example:

```
name = "Alice"  # Double quotes
greeting = 'Hello, World!'  # Single quotes
multiline_text = """This is
a multi-line string."""  # Triple quotes
```

Boolean Data Types

Definition:

Boolean (bool) is a data type that represents one of **two values: True or False.**

Key Features:

- Often used in logical operations and conditional statements.
- Result of comparison operations (e.g., 5 > 3).

Example:

```
is_valid = True  # Boolean variable
comparison = 10 > 5  # Evaluates to True
empty_check = bool("")  # Evaluates to False
```

Types Casting

Definition:

Typecasting is the **process of converting one data type** into another.

Key Features:

- int() – Converts **data to an integer**.
- float() – Converts **data to a float**.
- str() – Converts **data to a string.**
- bool() – Converts **data to a Boolean**.

Example - Types Casting

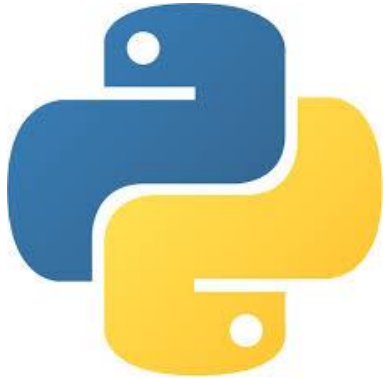
```python
# Integer to Float
num = 10
num_float = float(num)  # Output: 10.0
```

```python
# Float to Integer
pi = 3.14
pi_int = int(pi)  # Output: 3
```

```python
# String to Integer
text = "123"
number = int(text)  # Output: 123
```

```python
# Any to Boolean
is_empty = bool("")  # Output: False
```

Thank You!



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