

Python Data Types

Data types are the classification or categorization of data items. Data types represent a kind of value which determines what operations can be performed on that data. Numeric, non-numeric and Boolean (true/false) data are the most used data types. However, each programming language has its own classification largely reflecting its programming philosophy.

Python has the following standard or built-in data types:

Numeric

A numeric value is any representation of data which has a numeric value. Python identifies three types of numbers:

- **Integer:** Positive or negative whole numbers (without a fractional part)
- **Float:** Any real number with a floating point representation in which a fractional component is denoted by a decimal symbol or scientific notation
- **Complex number:** A number with a real and imaginary component represented as $x+yj$. x and y are floats and j is -1 (square root of -1 called an imaginary number)

Boolean

Data with one of two built-in values True or False. Notice that 'T' and 'F' are capital. true and false are not valid booleans and Python will throw an error for them.

Sequence Type

A sequence is an ordered collection of similar or different data types. Python has the following built-in sequence data types:

- **String:** A string value is a collection of one or more characters put in single, double or triple quotes.
- **List :** A list object is an ordered collection of one or more data items, not necessarily of the same type, put in square brackets.
- **Tuple:** A Tuple object is an ordered collection of one or more data items, not necessarily of the same type, put in parentheses.

Dictionary

A dictionary object is an unordered collection of data in a key:value pair form. A collection of such pairs is enclosed in curly brackets. For example: {1:"Steve", 2:"Bill", 3:"Ram", 4: "Farha"}

type() function

Python has an in-built function **type()** to ascertain the data type of a certain value. For example, enter `type(1234)` in Python shell and it will return `<class 'int'>`, which means 1234 is an integer value. Try and verify the data type of different values in Python shell, as shown below.

```
>>> type(1234)
<class 'int'>
>>> type(55.50)
<class 'float'>
>>> type(6+4j)
<class 'complex'>
>>> type("hello")
<class 'str'>
>>> type([1,2,3,4])
<class 'list'>
>>> type((1,2,3,4))
<class 'tuple'>
>>> type({1:"one", 2:"two", 3:"three"})
<class 'dict'>
```

Mutable and Immutable Objects

Data objects of the above types are stored in a computer's memory for processing. Some of these values can be modified during processing, but contents of others can't be altered once they are created in the memory.

Number values, strings, and tuple are immutable, which means their contents can't be altered after creation.

On the other hand, collection of items in a List or Dictionary object can be modified. It is possible to add, delete, insert, and rearrange items in a list or dictionary. Hence, they are mutable objects.