Data Science with Python Programming

- Presentation By Uplatz
- Contact us: https://training.uplatz.com
- Email: info@uplatz.com
- Phone: +44 7836 212635

Uplatz

Variables and Data Types

Learning outcomes:

- What is a Variable?
- Declaration of variable
- Variable assignment
- Data types in Python
- Checking Data type
- Data types Conversion

What is a Variable?

- Generally, while doing programming in any programming language, you have to utilise different variables to store different data. Variables are only hold memory areas to store values. This implies, when you make a variable you hold some space in memory.
- Variables are nothing but reserved memory locations to store values. This means when you create a variable, you reserve some space in memory.

What is a Variable?

- You may jump at the chance to store data of different information types like character, wide character, integer, floating point, double floating point, Boolean and so on. In view of the data type of a variable, the working framework (Operating system) assigns memory and chooses what can be put away in the saved memory.

Declaration of Variable

- **Variables** are containers for storing data values. Unlike other programming languages, **Python** has no command for declaring a **variable**. A **variable** is created the moment you first assign a value to it.
- Python is completely object oriented, and not "**statically typed**". You do not need to declare variables before using them, or declare their type. Every variable in Python is an object.

Assigning Values to Variables

Python variables do not need explicit declaration to reserve memory space. The declaration happens automatically when you assign a value to a variable. The equal sign (=) is used to assign values to variables.

The operand to the left of the = operator is the name of the variable and the operand to the right of the = operator is the value stored in the variable.

Assigning Values to Variables

For example :

Age = 20 # An integer assignment

Percentage = 71.58 # A floating point

Name = “Rossum" # A string

print (Age)

print (Percentage)

print (Name)

Here **20, 71.58 and Rossum** are the **values** assigned to **Age, Percentage and Name** variable respectively.

Assigning Values to Variables

Multiple Assignment :

Python allows you to assign a single value to several variables simultaneously. For example:

x = y = z = 10

Here, an integer object is created with the value 10, and all three variables are assigned to the same memory location. You can also assign multiple objects to multiple variables. For example:

a, b, c = 1, 2, "john"

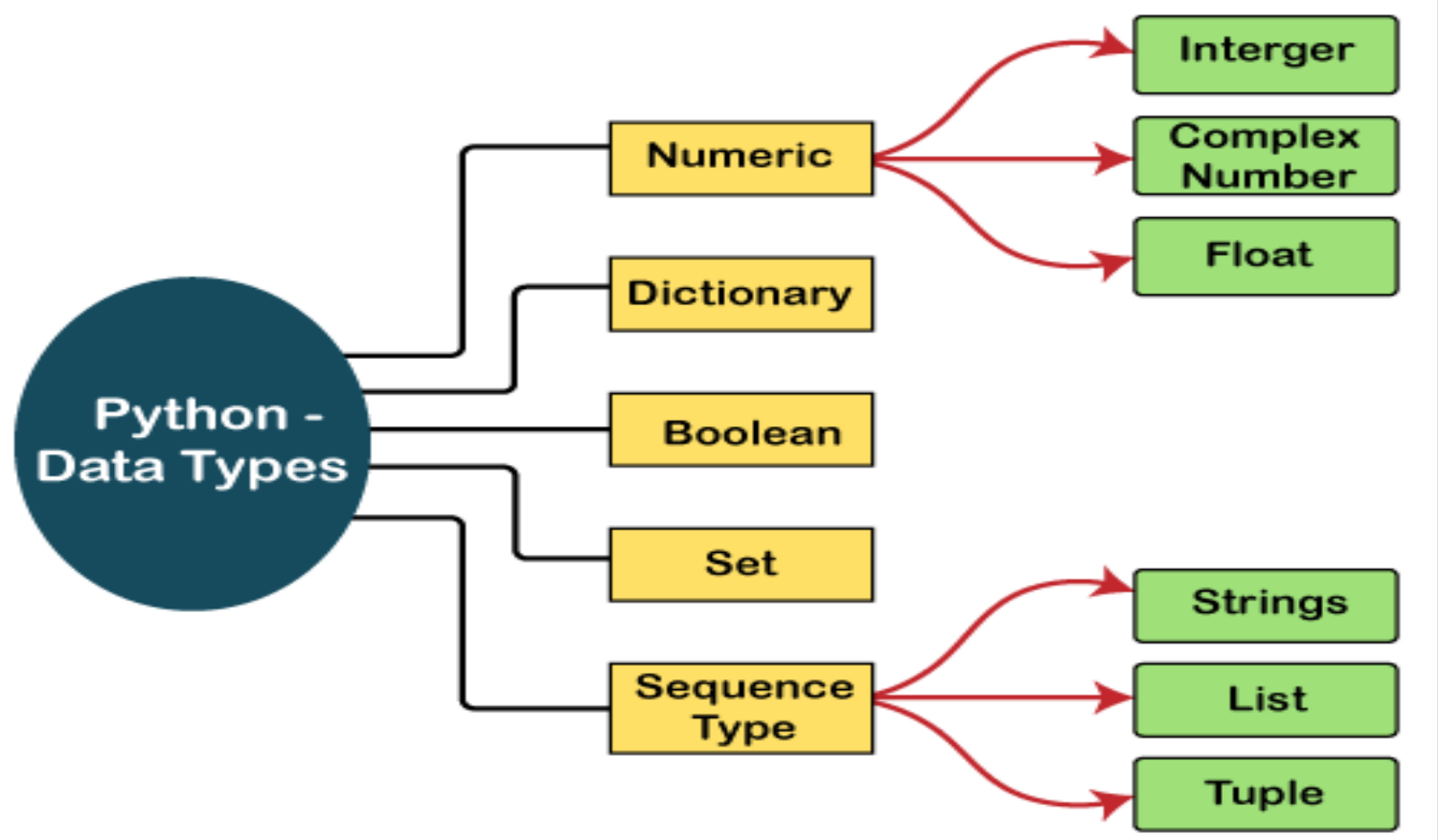
Here, two integer objects with values 1 and 2 are assigned to variables a and b respectively, and one string object with the value "john" is assigned to the variable c.

Data Types in Python

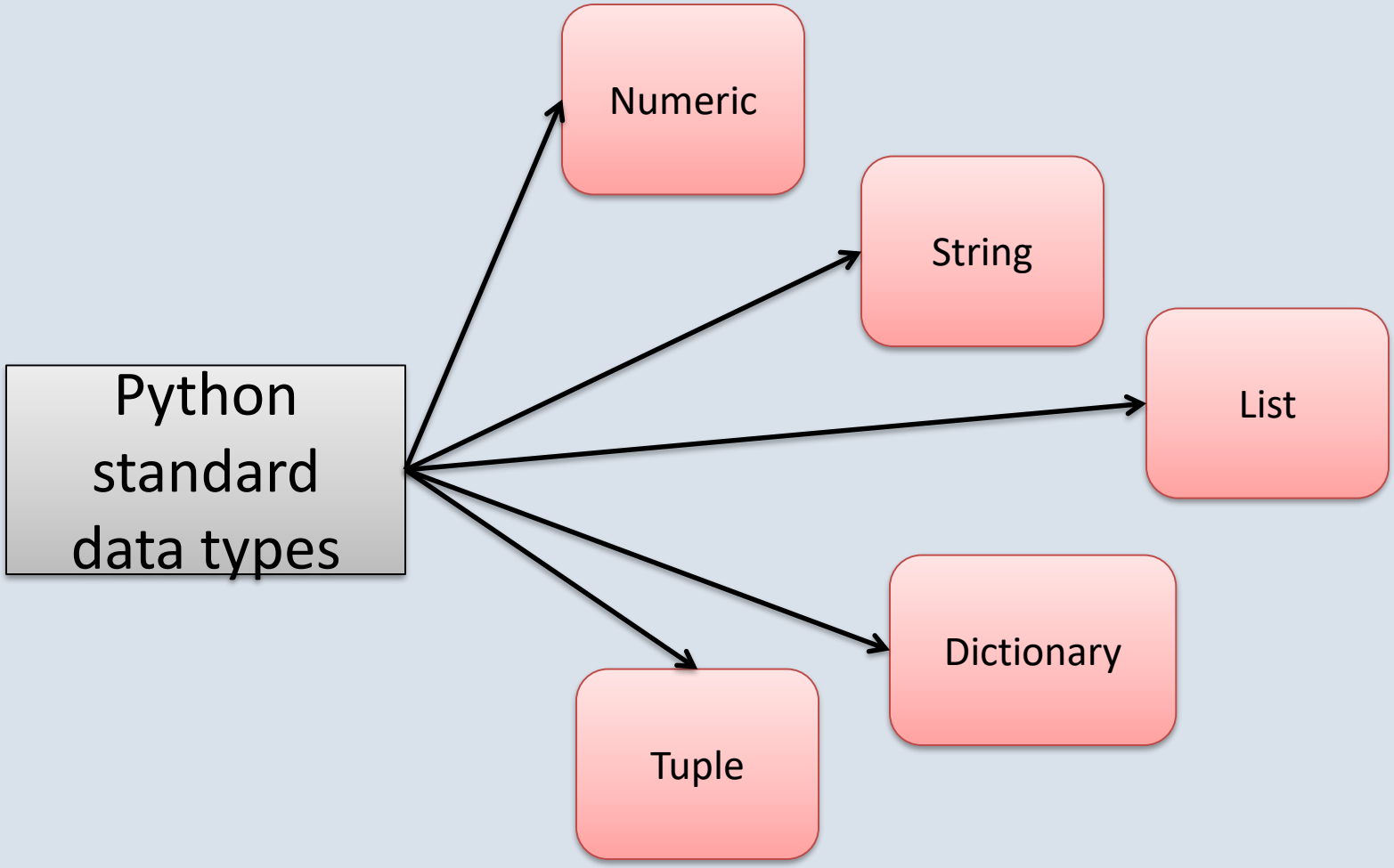
Data types are the classification or categorization of data items. Data types represent a kind of value which determines what operations can be performed on that data.
Python provides various standard data types that define the storage method on each of them. The data types defined in Python are given below.

Numbers
Sequence Type
Boolean
Set
Dictionary

Data Types in Python

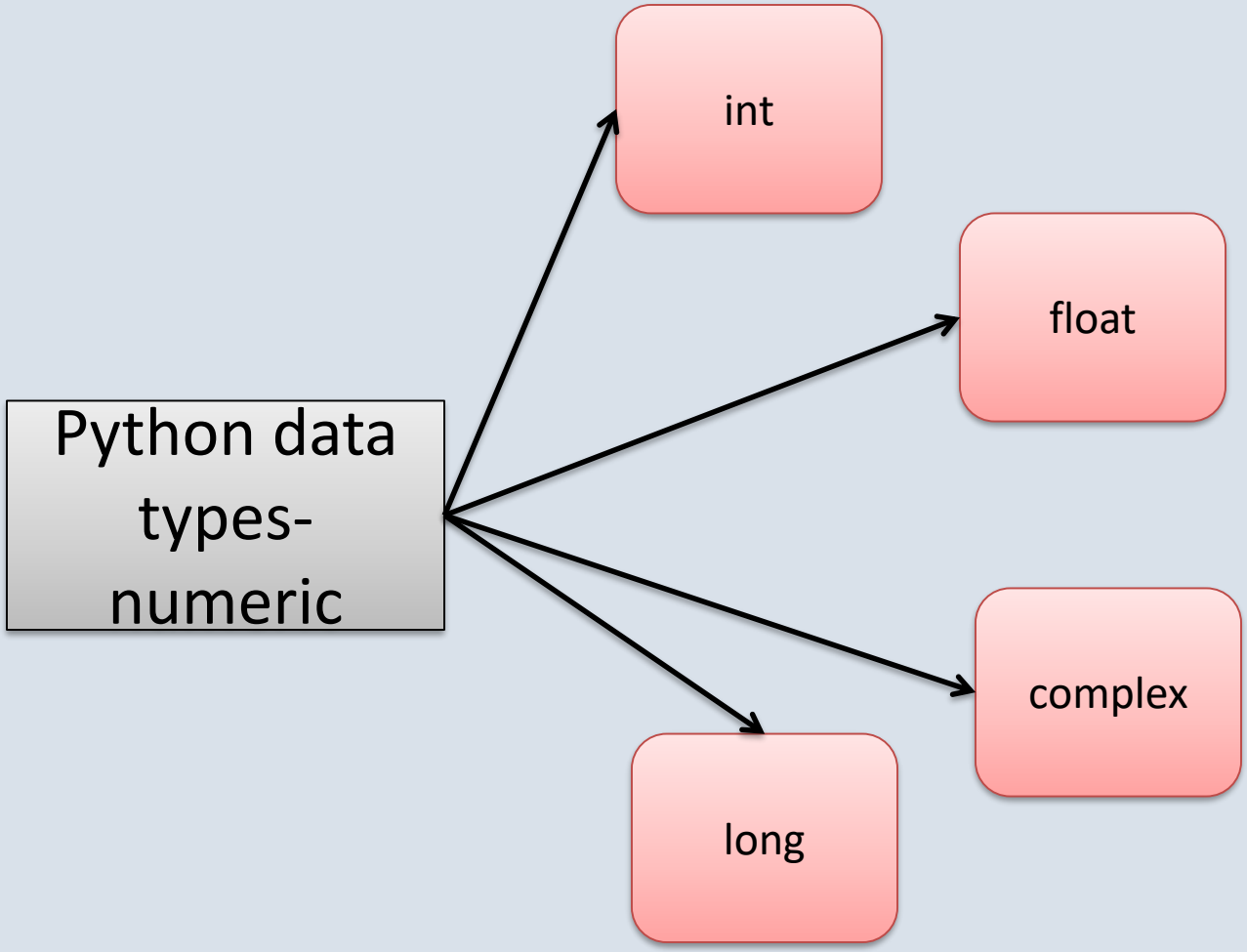


Data Types in Python

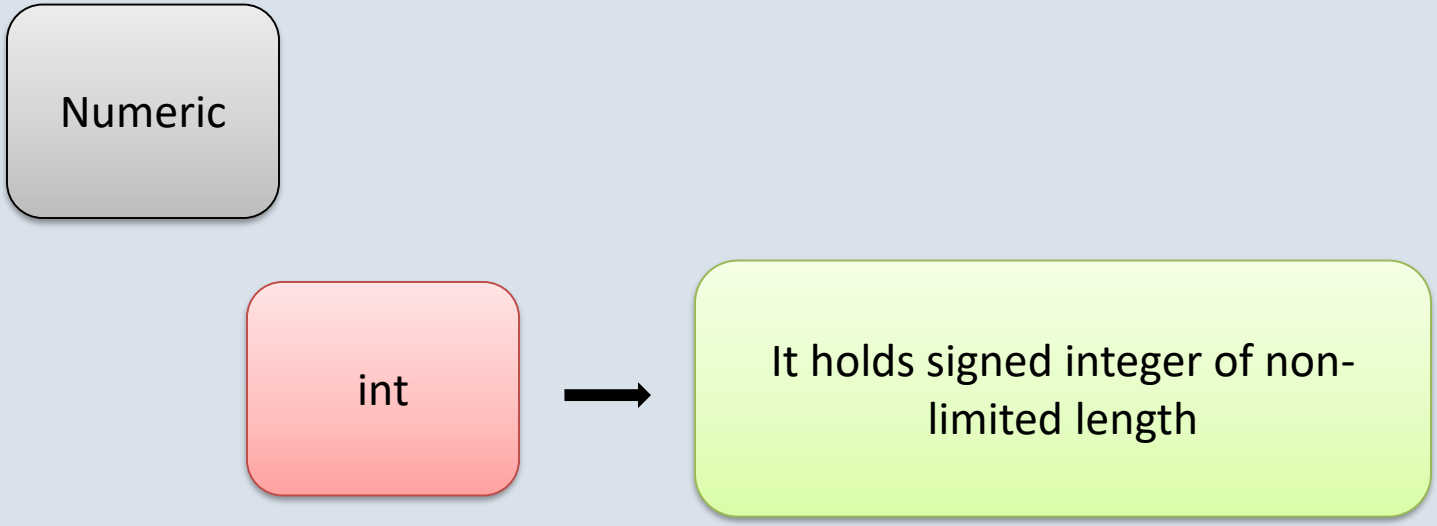


Uplatz

Data Types in Python



Data Types in Python



Uplatz

Data Types in Python

Numeric

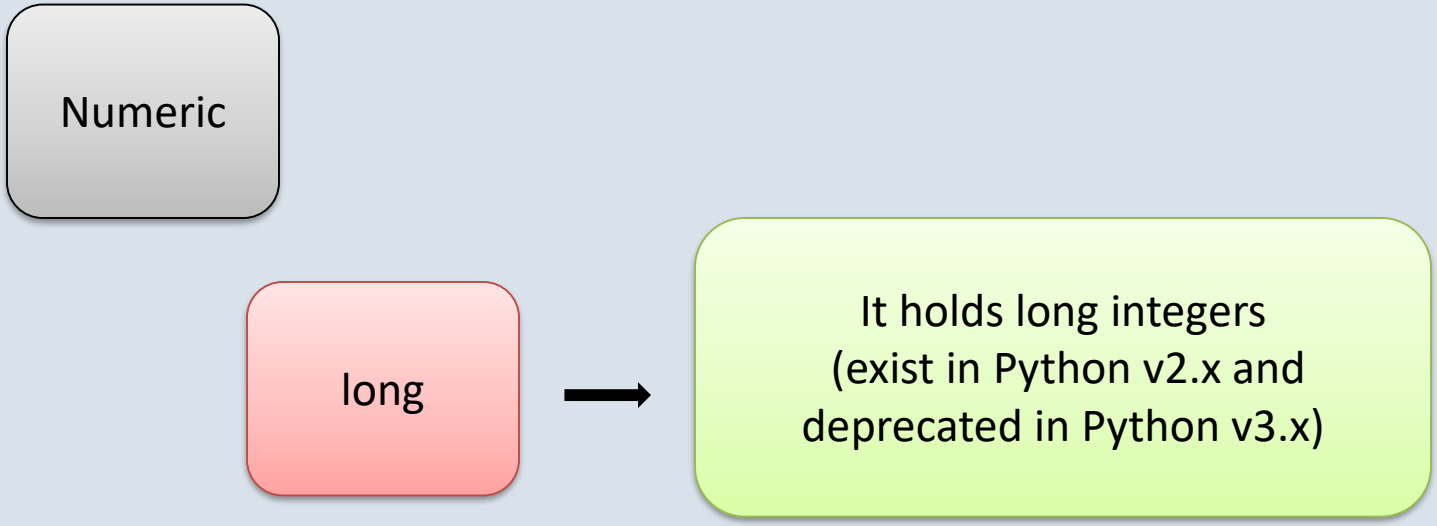
float → It holds floating precision numbers and it is accurate up-to 15 decimal places

Data Types in Python

Numeric

complex → It holds complex numbers. Either 'j' or 'J' is acceptable

Data Types in Python



Data Types in Python

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.
Example: **x = True**

Please note that Python is a case sensitive programming language. Thus, **Manpower** and **manpower** are two different identifiers in Python.

Data Types in Python

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.

Data Types in Python

Sequence Type:

Example:

x = "Hello World" # str

y = ["apple", “Mango", “Orange"] # list

z = (“Pineapple", "banana", "cherry") # tuple

Data Types in Python

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:

D = {1:”Physics”, 2:“Chemistry", 3:“Maths“}

Data Types in Python

Set:

Python Set is the unordered collection of the data type. It is iterable, mutable(can modify after creation), and has unique elements.

The set is created by using a **built-in** function **set(),** or a sequence of elements is passed in the curly braces and separated by the comma.

Example:

```
set1 = set()   #Empty set
set2 = {'James', 2, 3,'Python'}
```

How to check the data type?

Using function, type()

Show which class a **variable** or a **value** belongs to.

How to check the data type?

```
a=100
print(type(a))
b=10.235
print(type(b))
```

Using function, type()

Output:

```
<class 'int'>
<class 'float'>
```

Data Type Conversion

Python defines type conversion functions to directly convert one data type to another which is useful in day to day and competitive programming.

There are several built-in functions to perform conversion from one data type to another. These functions return a new object representing the converted value.

Data Type Conversion

1. int(a,base) : This function converts any data type to integer. 'Base' specifies the base in which string is if data type is string.

2. float() : This function is used to convert any data type to a floating point number

3. ord() : This function is used to convert a character to integer.

Data Type Conversion

4. hex() : This function is to convert integer to hexadecimal string.

5. oct() : This function is to convert integer to octal string.

6. tuple() : This function is used to **convert to a tuple**.

7. set() : This function returns the **type after converting to set**.

8. list() : This function is used to convert **any data type to a list type**.

Data Type Conversion

9. dict() : This function is used to convert a tuple of order (key,value) into a dictionary.

10. str() : Used to convert integer into a string.

11. complex(real,imag) : This function converts real numbers to complex(real,imag) number.

12. chr(number) : This function converts number to its corresponding ASCII character.