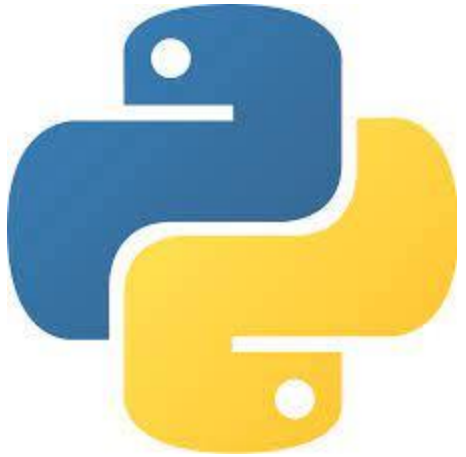

Python Programming

LECTURE-5

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Topics Covered

- Features of Python
- Keywords
- Data Types

Features of Python

- Python is a high level language. It is a free and open source language.
- It is an interpreted language, as Python programs are executed by an interpreter.
- Python programs are easy to understand as they have a clearly defined syntax and relatively simple structure.
- Python is case-sensitive. For example, NUMBER and number are not same in Python.
- Python is portable and platform independent, means it can run on various operating systems and hardware platforms.
- Python has a rich library of predefined functions.
- Python is also helpful in web development. Many popular web services and applications are built using Python.
- Python uses indentation for blocks and nested blocks.

Python Keywords

Keywords are reserved words. Each keyword has a specific meaning to the Python interpreter, and we can use a keyword in our program only for the purpose for which it has been defined. As Python is case sensitive, keywords must be written exactly as given in Table.

False	class	finally	is	return
None	continue	for	lambda	try
True	def	from	nonlocal	while
and	del	global	not	with
as	elif	if	or	yield
assert	else	import	pass	
break	except	in	raise	

Comments

Comments are used to add a remark or a note in the source code. Comments are not executed by interpreter.

They are added with the purpose of making the source code easier for humans to understand. They are used primarily to document the meaning and purpose of source code and its input and output requirements, so that we can remember later how it functions and how to use it.

For large and complex software, it may require programmers to work in teams and sometimes, a program written by one programmer is required to be used or maintained by another programmer. In such situations, documentations in the form of comments are needed to understand the working of the program. In Python, a comment starts with # (hash sign). Everything following the # till the end of that line is treated as a comment and the interpreter simply ignores it while executing the statement.

Example

```
#Variable amount is the total spending on
#grocery
amount = 3400
#totalMarks is sum of marks in all the tests
#of Mathematics
totalMarks = test1 + test2 + finalTest
```

eVerythIng Is an Object

Python treats every value or data item whether numeric, string, or other type (discussed in the next section) as an object in the sense that it can be assigned to some variable or can be passed to a function as an argument. Every object in Python is assigned a unique identity (ID) which remains the same for the lifetime of that object. This ID is akin to the memory address of the object. The function id() returns the identity of an object.

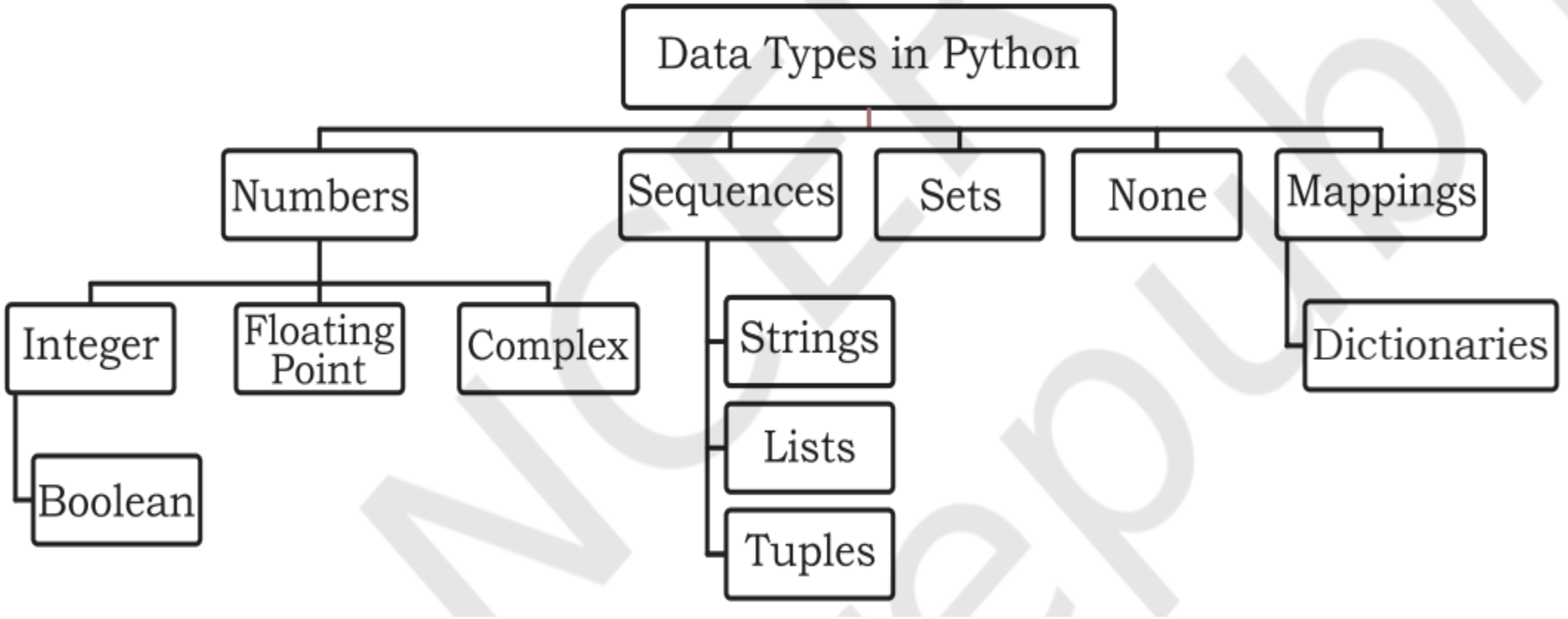
Example

```
>>> num1 = 20
>>> id(num1)
1433920576 #identity of
num1
>>> num2 = 30 - 10
>>> id(num2)
```

Data types

Every value belongs to a specific data type in Python.

Data type identifies the type of data values a variable can hold and the operations that can be performed on that data.



Different data types in Python

Number

Number data type stores numerical values only. It is further classified into three different types: int, float and complex.

Type/ Class	Description	Examples
`int`	integer numbers	–12, –3, 0, 125, 2
`float`	real or floating point numbers	–2.04, 4.0, 14.23
`complex`	complex numbers	3 + 4j, 2 – 2j

Boolean data type (bool) is a subtype of integer. It is a unique data type, consisting of two constants, True and False. Boolean True value is non-zero, non-null and non-empty. Boolean False is the value zero.

Example

```
>>> num1 = 10
>>> type(num1)
<class 'int'>
>>> num2 = -1210
>>> type(num2)
<class 'int'>
>>> var1 = True
>>> type(var1)
<class 'bool'>
```

Variables of simple data types like integers, float, boolean, etc., hold single values. But such variables are not useful to hold a long list of information, for example, names of the months in a year, names of students in a class, names and numbers in a phone book or the list of artefacts in a museum. For this, Python provides data types like tuples, lists, dictionaries and sets

Sequence

A Python sequence is an ordered collection of items, where each item is indexed by an integer. The three types of sequence data types available in Python are Strings, Lists and Tuples. We will learn about each of them in detail in later chapters. A brief introduction to these data types is as follows:

(A)String

String is a group of characters. These characters may be alphabets, digits or special characters including spaces. String values are enclosed either in single quotation marks (e.g., 'Hello') or in double quotation marks (e.g., "Hello"). The quotes are not a part of the string, they are used to mark the beginning and end of the string for the interpreter. For example,

```
>>> str1 = 'Hello Friend'
>>> str2 = "452"
```

We cannot perform numerical operations on strings, even when the string contains a numeric value, as in str2.

(B) List

List is a sequence of items separated by commas and the items are enclosed in square brackets [ ].

Example

```
#To create a list
>>> list1 = [5, 3.4, "New Delhi", "20C", 45]
#print the elements of the list list1
>>> print(list1)
[5, 3.4, 'New Delhi', '20C', 45]
```

(C) Tuple

Tuple is a sequence of items separated by commas and items are enclosed in parenthesis ( ). This is unlike list, where values are enclosed in brackets [ ]. Once created, we cannot change the tuple.

Example

```
#create a tuple tuple1
>>> tuple1 = (10, 20, "Apple", 3.4,
'a')
#print the elements of the tuple tuple1
>>> print(tuple1)
(10, 20, "Apple", 3.4, 'a')
```

Set

Set is an unordered collection of items separated by commas and the items are enclosed in curly brackets { }. A set is similar to list, except that it cannot have duplicate entries. Once created, elements of a set cannot be changed.

Example

```
#create a set
>>> set1 = {10,20,3.14,"New Delhi"}
>>> print(type(set1))
<class 'set'>
>>> print(set1)
{10, 20, 3.14, "New Delhi"}
#duplicate elements are not included in set
```

```
>>> set2 = {1,2,1,3}
>>> print(set2)
{1, 2, 3}
```

None

None is a special data type with a single value. It is used to signify the absence of value in a situation. None supports no special operations, and it is neither False nor 0 (zero).

Example

```
>>> myVar = None
>>> print(type(myVar))
<class 'NoneType'>
>>> print(myVar)
None
```

Mapping

Mapping is an unordered data type in Python. Currently, there is only one standard mapping data type in Python called dictionary.

(A) Dictionary

Dictionary in Python holds data items in key-value pairs. Items in a dictionary are enclosed in curly brackets { }. Dictionaries permit faster access to data. Every key is separated from its value using a colon (:) sign.

The key : value pairs of a dictionary can be accessed using the key. The keys are usually strings and their values can be any data type. In order to access any value in the dictionary, we have to specify its key in square brackets [ ].

```
#create a dictionary
>>> dict1 = {'Fruit':'Apple',
'Climate':'Cold', 'Price(kg)':120}
>>> print(dict1)
{'Fruit': 'Apple', 'Climate': 'Cold',
'Price(kg)': 120}
>>> print(dict1['Price(kg)'])
120
```