TOPSTechnologies

Core Python Concept

Presented for :

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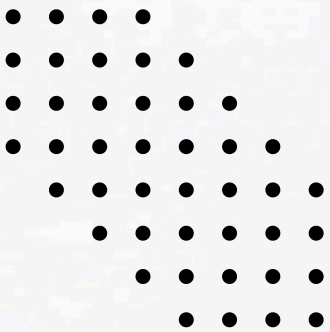

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Python Integer

Python int is the whole number, including negative numbers but not fractions. In Python, there is no limit to how long an integer value can be.

Float

This is a real number with a floating-point representation. It is specified by a decimal point. Optionally, the character e or E followed by a positive or negative integer may be appended to specify scientific notation. . Some examples of numbers that are represented as floats are 0.5 and -7.823457. They can be created directly by entering a number with a decimal point, or by using operations such as division on integers. Extra zeros present at the number's end are ignored automatically.

String

A string is a sequence of characters. Python treats anything inside quotes as a string. This includes letters, numbers, and symbols. Python has no character data type so single character is a string of length 1.

List

A list is a built-in dynamic sized array (automatically grows and shrinks) that is used to store an ordered collection of items. We can store all types of items (including another list) in a list. A list may contain mixed type of items, this is possible because a list mainly stores references at contiguous locations and actual items maybe stored at different locations.

- *List can contain duplicate items.*
- *List in Python are Mutable. Hence, we can modify, replace or delete the items.*
- *List are ordered. It maintain the order of elements based on how they are added.*
- *Accessing items in List can be done directly using their position (index), starting from 0.*

Tuples

Python Tuple is a collection of objects separated by commas. A tuple is similar to a Python list in terms of indexing, nested objects, and repetition but the main difference between both is Python tuple is immutable, unlike the Python list which is mutable.

Dictionary

A Python dictionary is a data structure that stores the value in key: value pairs. Values in a dictionary can be of any data type and can be duplicated, whereas keys can't be repeated and must be immutable.

Set

A Set in Python is used to store a collection of items with the following properties.

- *No duplicate elements. If try to insert the same item again, it overwrites previous one.*
- *An unordered collection. When we access all items, they are accessed without any specific order and we cannot access items using indexes as we do in lists.*

- *Internally use hashing that makes set efficient for search, insert and delete operations. It gives a major advantage over a list for problems with these operations.*
- *Mutable, meaning we can add or remove elements after their creation, the individual elements within the set cannot be changed directly.*

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Variables

In Python, variables are used to store data that can be referenced and manipulated during program execution. A variable is essentially a name that is assigned to a value. Unlike many other programming languages, Python variables do not require explicit declaration of type. The type of the variable is inferred based on the value assigned.

Memory Allocation

Understanding Memory allocation is important to any software developer as writing efficient code means writing a memory-efficient code. Memory allocation can be defined as allocating a block of space in the computer memory to a program. In Python memory allocation and deallocation method is automatic as the Python developers created a garbage collector for Python so that the user does not have to do manual garbage collection.

Garbage Collection

1. *Garbage collection is a process in which the interpreter frees up the memory when not in use to make it available for other objects.*
2. *Assume a case where no reference is pointing to an object in memory i.e. it is not in use so, the virtual machine has a garbage collector that automatically deletes that object from the heap memory*

Reference Counting

Reference counting works by counting the number of times an object is referenced by other objects in the system. When references to an object are removed, the reference count for an object is decremented. When the reference count becomes zero, the object is deallocated.

For example, Let's suppose there are two or more variables that have the same value, so, what Python virtual machine does is, rather than creating another object of the same value in the private heap, it actually makes the second variable point to that originally existing value in the private heap. Therefore, in the case of classes, having a number of references may occupy a large amount of space in the memory, in such a case referencing counting is highly beneficial to preserve the memory to be available for other objects

Types of Python Operators

list of different types of Python operators -

1. *Arithmetic Operators*
2. *Assignment Operators*
3. *Comparison Operators*
4. *Logical Operators*
5. *Bitwise Operators*
6. *Special Operators*

1. Python Arithmetic Operators

Arithmetic operators are used to perform mathematical operations like addition, subtraction, multiplication.

2. Python Comparison Operators

Comparison operators compare two values/variables and return a boolean result: True or False.

3. Python Logical Operators

Logical operators are used to check whether an expression is True or False. They are used in decision-making.

4. Python Bitwise operators

Bitwise operators act on operands as if they were strings of binary digits. They operate bit by bit, hence the name.