### What is Python?

Python is a general-purpose computer programming language. It is a high-level, object-oriented language which can run equally on different platforms such as Windows, Linux, UNIX, and Macintosh. It is widely used in data science, machine learning and artificial intelligence domain.

It is easy to learn and require less code to develop the applications.

### What are the applications of Python?

Python is used in various software domains some application areas are given below.

* Web and Internet Development
* Games
* Scientific and computational applications
* Language development
* Image processing and graphic design applications
* Enterprise and business applications development
* Operating systems
* GUI based desktop applications

### What are the advantages of Python?

* Interpreted
* Free and open source
* Extensible
* Object-oriented
* Built-in data structure
* Readability
* High-Level Language
* Cross-platform  
  Interpreted: Python is an interpreted language. It does not require prior compilation of code and executes instructions directly.
* Free and open source: It is an open source project which is publicly available to reuse. It can be downloaded free of cost.
* Portable: Python programs can run on cross platforms without affecting its performance.
* Extensible: It is very flexible and extensible with any module.
* Object-oriented: Python allows to implement the Object Oriented concepts to build application solution.
* Built-in data structure: Tuple, List, and Dictionary are useful integrated data structures provided by the language.

### What do you mean by Python literals?

Literals can be defined as a data which is given in a variable or constant. Python supports the following literals:

### Explain Python Functions?

A function is a section of the program or a block of code that is written once and can be executed whenever required in the program. A function is a block of self-contained statements which has a valid name, parameters list, and body. Functions make programming more functional and modular to perform modular tasks. Python provides several built-in functions to complete tasks and also allows a user to create new functions as well.

There are two types of functions:

* Built-In Functions: copy(), len(), count() are the some built-in functions.
* User-defined Functions: Functions which are defined by a user known as user-defined functions.

### What is zip() function in Python?

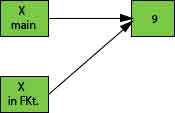
The Python zip() function is used to transform multiple lists, i.e., list1, list2, list3 and many more into a single list of tuples. This method takes an iterable and returns a tuple of the iterable. If we don't pass iterable, it returns an empty iterator. See this

### What is Python's parameter passing mechanism?

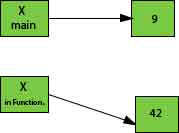
There are two parameters passing mechanism in Python:

* Pass by references
* Pass by value

By default, all the parameters (arguments) are passed "by reference" to the functions. Thus, if you change the value of the parameter within a function, the change is reflected in the calling function as well. It indicates the original variable. For example, if a variable is declared as a = 10, and passed to a function where it?s value is modified to a = 20. Both the variables denote to the same value.



The pass by value is that whenever we pass the arguments to the function only values pass to the function, no reference passes to the function. It makes it immutable that means not changeable. Both variables hold the different values, and original value persists even after modifying in the function.



Python has a default argument concept which helps to call a method using an arbitrary number of arguments.

### What is the difference between remove() function and del statement?

The del statement is used to remove list, dictionary or a key. We need to pass an index which we want to delete. Del is a fast way to remove elements from the list.

The remove() method is used to remove elements from the list. It searches the element before deleting which makes it slower than del. Del and remove both are used to remove element but del has a performance edge over remove. See an example.

### What is swapcase() function in the Python?

It is a string's function which converts all uppercase characters into lowercase and vice versa. It is used to alter the existing case of the string. This method creates a copy of the string which contains all the characters in the swap case. If the string is in lowercase, it generates a small case string and vice versa. It automatically ignores all the non-alphabetic characters. See an example below.

### How to remove whitespaces from a string in Python?

To remove the whitespaces and trailing spaces from the string, Python providies strip([str]) built-in function. This function returns a copy of the string after removing whitespaces if present. Otherwise returns original string

### How to remove leading whitespaces from a string in the Python?

To remove leading characters from a string, we can use lstrip() function. It is Python string function which takes an optional char type parameter. If a parameter is provided, it removes the character. Otherwise, it removes all the leading spaces from the string

### Why do we use join() function in Python?

This method is used to concatenate a string with an iterable object. It returns a new string which is the concatenation of the strings in iterable. It throws an exception TypeError if iterable contains any non-string value. See an example below.

### Give an example of shuffle() method?

This method shuffles the given string or an array. It randomizes the items in the array. This method is present in the random module. So, we need to import it and then we can call the function. It shuffles elements each time when the function calls and produces different output.

### What is the use of break statement?

It is used to terminate the execution of the current loop. Break always breaks the current execution and transfer control to outside the current block. If the block is in a loop, it exits from the loop, and if the break is in a nested loop, it exits from the innermost loop.

### What is tuple in Python?

A tuple is a built-in data collection type. It allows us to store values in a sequence. It is immutable, so no change is reflected in the original data. It uses () brackets rather than [] square brackets to create a tuple. We cannot remove any element but can find in the tuple. We can use indexing to get elements. It also allows traversing elements in reverse order by using negative indexing. Tuple supports various methods like max(), sum(), sorted(), Len() etc.

### Which are the file related libraries/modules in Python?

Python provides libraries/modules including functions that facilitate us to manipulate text files and binary files on the file system. By using these libraries, we can create files, update their contents, copy, and delete files.

These libraries are os, os.path, and the shutil.

**os and os.path**: os and os.path libraries include functions for accessing the filesystem.

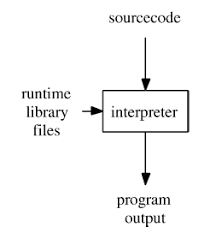
**shutil**: This library is used to copy and delete the files.

### What are the different file processing modes supported by Python?

Python provides three modes to open files. The read-only, write-only, read-write and append mode. 'r' is used to open a file in read-only mode, 'w' is used to open a file in write-only mode, 'rw' is used to open in reading and write mode, 'a' is used to open a file in append mode. If the mode is not specified, by default file opens in read-only mode.

* Read-only mode : Open a file for reading. It is the default mode.
* Write-only mode: Open a file for writing. If the file contains data, data would be lost. Other a new file is created.
* Read-Write mode: Open a file for reading, write mode. It means updating mode.
* Append mode: Open for writing, append to the end of the file, if the file exists.

is Python interpreted language?

* Python is an interpreted language. The Python language program runs directly from the source code. It converts the source code into an intermediate language code, which is again translated into machine language that has to be executed.
* Unlike Java or C, Python does not require compilation before execution.
* 

### What is the Python decorator?

Python decorator is a concept which allows to call or declare a function inside a function, pass a function as an argument, return a function from the function. The decorator provides extra facility to the function. It also helps to organize a piece of code within a function.

1. # Decorator example
2. **def** decoratorfun():
3. **return** another\_fun

**Functions vs. Decorators**

A function is a block of code that performs a specific task whereas a decorator is a function that modifies other functions.

### What are iterators in Python?

In Python, iterators are used to iterate a group of elements, containers like a list. Iterators are the collection of items, and it can be a list, tuple, or a dictionary. Python iterator implements \_\_itr\_\_ and next() method to iterate the stored elements. In Python, we generally use loops to iterate over the collections (list, tuple).

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### What is a generator in Python?

In Python, the generator is a way that specifies how to implement iterators. It is a normal function except that it yields expression in the function. It does not implements \_\_itr\_\_ and next() method and reduce other overheads as well.

If a function contains at least a yield statement, it becomes a generator. The yield keyword pauses the current execution by saving its states and then resume from the same when required.

### What is a dictionary in Python?

The Python dictionary is a built-in data type. It defines a one-to-one relationship between keys and values. Dictionaries contain a pair of keys and their corresponding values. It stores elements in key and value pairs. The keys are unique whereas values can be duplicate. The key accesses the dictionary elements.

Keys index dictionaries.

### What is Pass in Python?

Pass specifies a Python statement without operations. It is a placeholder in a compound statement. If we want to create an empty class or functions, this pass keyword helps to pass the control without error.

### Explain docstring in Python?

A Python documentation string is called docstring. It is used for documenting Python functions, modules and classes. It should be the first statement in a module, class or function.

String literals occurring immediately after a simple assignment at the top are called "attribute docstrings".

String literals occurring immediately after another docstring are called "additional docstrings".

Python uses triple quotes to create docstrings even though the string fits on one line.

Docstring phrase ends with a period (.) and can be multiple lines. It may consist of spaces and other special chars.

### What is pickling and unpickling in Python?

Pickling is a process in which a pickle module accepts any Python object, converts it into a string representation and dumps it into a file by using dump() function.

Unpickling is a process of retrieving original Python object from the stored string representation for use.

**Pickle is a standard module which serializes and de-serializes a Python object structure.**

### What is the usage of help() and dir() function in Python?

Help() and dir() both functions are accessible from the Python interpreter and used for viewing a consolidated dump of built-in functions.

**Help() function**: The help() function is used to display the documentation string and also facilitates us to see the help related to modules, keywords, and attributes.

**Dir() function**: The dir() function is used to display the defined symbols.

### What is the usage of enumerate () function in Python?

The enumerate() function is used to iterate through the sequence and retrieve the index position and its corresponding value at the same time.

**What is the difference between list and tuples?**

|  |  |
| --- | --- |
| **LIST vs TUPLES** | |
| **LIST** | **TUPLES** |
| Lists are mutable i.e they can be edited. | Tuples are immutable (tuples are lists which can’t be edited). |
| Lists are slower than tuples. | Tuples are faster than list. |
| Syntax: list\_1 = [10, ‘Chelsea’, 20] | Syntax: tup\_1 = (10, ‘Chelsea’ , 20) |

### ****What are the key features of Python?****

* Python is an **interpreted** language. That means that, unlike languages like C and its variants, Python does not need to be compiled before it is run. Other interpreted languages include PHP and Ruby.
* Python is **dynamically typed**, this means that you don’t need to state the types of variables when you declare them or anything like that. You can do things like x=111 and then x="I'm a string" without error
* Python is well suited to **object orientated programming** in that it allows the definition of classes along with composition and inheritance. Python does not have access specifiers (like C++’s public, private), the justification for this point is given as “we are all adults here”
* In Python, **functions** are**first-class objects**. This means that they can be assigned to variables, returned from other functions and passed into functions. Classes are also first class objects
* **Writing Python code is quick** but running it is often slower than compiled languages. Fortunately，Python allows the inclusion of C based extensions so bottlenecks can be optimized away and often are. The numpy package is a good example of this, it’s really quite quick because a lot of the number crunching it does isn’t actually done by Python
* Python finds **use in many spheres** – web applications, automation, scientific modelling, big data applications and many more. It’s also often used as “glue” code to get other languages and components to play nice.

### ****What is the difference between deep and shallow copy?****

***Ans:*** Shallow copy is used when a new instance type gets created and it keeps the values that are copied in the new instance. Shallow copy is used to copy the reference pointers just like it copies the values. These references point to the original objects and the changes made in any member of the class will also affect the original copy of it. Shallow copy allows faster execution of the program and it depends on the size of the data that is used.

Deep copy is used to store the values that are already copied. Deep copy doesn’t copy the reference pointers to the objects. It makes the reference to an object and the new object that is pointed by some other object gets stored. The changes made in the original copy won’t affect any other copy that uses the object. Deep copy makes execution of the program slower due to making certain copies for each object that is been called.

**How is Multithreading achieved in Python?**

**Ans:**

1. Python has a multi-threading package but if you want to multi-thread to speed your code up, then it’s usually not a good idea to use it.
2. Python has a construct called the Global Interpreter Lock (GIL). The GIL makes sure that only one of your ‘threads’ can execute at any one time. A thread acquires the GIL, does a little work, then passes the GIL onto the next thread.
3. This happens very quickly so to the human eye it may seem like your threads are executing in parallel, but they are really just taking turns using the same CPU core.
4. All this GIL passing adds overhead to execution. This means that if you want to make your code run faster then using the threading package often isn’t a good idea.

### ****How can the ternary operators be used in python?****

**Ans:** The Ternary operator is the operator that is used to show the conditional statements. This consists of the true or false values with a statement that has to be evaluated for it.

Syntax:

The Ternary operator will be given as:  
[on\_true] if [expression] else [on\_false]x, y = 25, 50big = x if x < y else y

Example:

The expression gets evaluated like if x<y else y, in this case if x<y is true then the value is returned as big=x and if it is incorrect then big=y will be sent as a result.

**How is memory managed in Python?**

**Ans:**

1. Memory management in python is managed by ***Python private heap space***. All Python objects and data structures are located in a private heap. The programmer does not have access to this private heap. The python interpreter takes care of this instead.
2. The allocation of heap space for Python objects is done by Python’s memory manager. The core API gives access to some tools for the programmer to code.
3. Python also has an inbuilt garbage collector, which recycles all the unused memory and so that it can be made available to the heap space.

**Explain Inheritance in Python with an example.**

**Ans:** Inheritance allows One class to gain all the members(say attributes and methods) of another class. Inheritance provides code reusability, makes it easier to create and maintain an application. The class from which we are inheriting is called super-class and the class that is inherited is called a derived / child class.

They are different types of inheritance supported by Python:

1. Single Inheritance – where a derived class acquires the members of a single super class.
2. Multi-level inheritance – a derived class d1 in inherited from base class base1, and d2 are inherited from base2.
3. Hierarchical inheritance – from one base class you can inherit any number of child classes
4. Multiple inheritance – a derived class is inherited from more than one base class.

**What is the usage of help() and dir() function in Python?**

**Ans:** Help() and dir() both functions are accessible from the Python interpreter and used for viewing a consolidated dump of built-in functions.

1. Help() function: The help() function is used to display the documentation string and also facilitates you to see the help related to modules, keywords, attributes, etc.
2. Dir() function: The dir() function is used to display the defined symbols.

**Whenever Python exits, why isn’t all the memory de-allocated?**

**Ans:**

1. Whenever Python exits, especially those Python modules which are having circular references to other objects or the objects that are referenced from the global namespaces are not always de-allocated or freed.
2. It is impossible to de-allocate those portions of memory that are reserved by the C library.
3. On exit, because of having its own efficient clean up mechanism, Python would try to de-allocate/destroy every other object.

### ****What is dictionary in Python?****

**Ans:** The built-in datatypes in Python is called dictionary. It defines one-to-one relationship between keys and values. Dictionaries contain pair of keys and their corresponding values. Dictionaries are indexed by keys.

### ****What is monkey patching in Python?****

**Ans:** In Python, the term monkey patch only refers to dynamic modifications of a class or module at run-time.

Consider the below example:

|  |  |
| --- | --- |
| 1  2  3  4 | # m.py  class MyClass:  def f(self):  print "f()" |

We can then run the monkey-patch testing like this:

|  |  |
| --- | --- |
| 1  2  3  4  5  6  7 | import m  def monkey\_f(self):  print "monkey\_f()"    m.MyClass.f = monkey\_f  obj = m.MyClass()  obj.f() |

The output will be as below:

monkey\_f()

As we can see, we did make some changes in the behavior of f() in MyClass using the function we defined, monkey\_f(), outside of the module m.

### ****What does this mean:**** \*args, \*\*kwargs****? And why would we use it?****

**Ans:** We use \*args when we aren’t sure how many arguments are going to be passed to a function, or if we want to pass a stored list or tuple of arguments to a function. \*\*kwargsis used when we don’t know how many keyword arguments will be passed to a function, or it can be used to pass the values of a dictionary as keyword arguments. The identifiers args and kwargs are a convention, you could also use \*bob and \*\*billy but that would not be wise.

### ****Write a one-liner that will count the number of capital letters in a file. Your code should work even if the file is too big to fit in memory.****

**Ans:**  Let us first write a multiple line solution and then convert it to one liner code.

|  |  |
| --- | --- |
| 1  2  3  4  5  6 | with open(SOME\_LARGE\_FILE) as fh:  count = 0  text = fh.read()  for character in text:      if character.isupper():  count += 1 |

### ****What are negative indexes and why are they used?****

**Ans:** The sequences in Python are indexed and it consists of the positive as well as negative numbers. The numbers that are positive uses ‘0’ that is uses as first index and ‘1’ as the second index and the process goes on like that.

The index for the negative number starts from ‘-1’ that represents the last index in the sequence and ‘-2’ as the penultimate index and the sequence carries forward like the positive number.

The negative index is used to remove any new-line spaces from the string and allow the string to except the last character that is given as S[:-1]. The negative index is also used to show the index to represent the string in correct order.

### ****How can you randomize the items of a list in place in Python?****

**Ans:** Consider the example shown below:

|  |  |
| --- | --- |
| 1  2  3  4 | from random import shuffle  x = ['Keep', 'The', 'Blue', 'Flag', 'Flying', 'High']  shuffle(x)  print(x) |

The output of the following code is as below.

['Flying', 'Keep', 'Blue', 'High', 'The', 'Flag']

### ****Write a sorting algorithm for a numerical dataset in Python.****

**Ans:** The following code can be used to sort a list in Python:

|  |  |
| --- | --- |
| 1  2  3  4 | list = ["1", "4", "0", "6", "9"]  list = [int(i) for i in list]  list.sort()  print (list) |

**Explain split(), sub(), subn() methods of “re” module in Python.**

**Ans:** To modify the strings, Python’s “re” module is providing 3 methods. They are:

* split() – uses a regex pattern to “split” a given string into a list.
* sub() – finds all substrings where the regex pattern matches and then replace them with a different string
* subn() – it is similar to sub() and also returns the new string along with the no. of replacements.

### ****How can you generate random numbers in Python?****

**Ans:** Random module is the standard module that is used to generate the random number. The method is defined as:

|  |  |
| --- | --- |
| 1  2 | import random  random.random |

### ****What is the difference between range & xrange?****

**Ans:** For the most part, xrange and range are the exact same in terms of functionality. They both provide a way to generate a list of integers for you to use, however you please. The only difference is that range returns a Python list object and x range returns an xrange object.

### ****What is pickling and unpickling?****

**Ans:** Pickle module accepts any Python object and converts it into a string representation and dumps it into a file by using dump function, this process is called pickling. While the process of retrieving original Python objects from the stored string representation is called unpickling.

**How To Save An Image Locally Using Python Whose URL Address I Already Know?**

**Ans:** We will use the following code to save an image locally from an URL address

|  |  |
| --- | --- |
| 1  2 | import urllib.request  urllib.request.urlretrieve("URL", "local-filename.jpg") |

**What are Python decorators?**

A Python decorator is a specific change that we make in Python syntax to alter functions easily.

**How are arguments passed by value or by reference?**

Everything in Python is an object and all variables hold references to the objects. The references values are according to the functions; as a result you cannot change the value of the references. However, you can change the objects if it is mutable.

**What is Dict and List comprehensions are?**

They are syntax constructions to ease the creation of a Dictionary or List based on existing iterable.

**What are the built-in type does python provides?**

There are mutable and Immutable types of Pythons built in types Mutable built-in types

* List
* Sets
* Dictionaries

Immutable built-in types

* Strings
* Tuples
* Numbers
* **What is namespace in Python?**
* In Python, every name introduced has a place where it lives and can be hooked for. This is known as namespace. It is like a box where a variable name is mapped to the object placed. Whenever the variable is searched out, this box will be searched, to get corresponding object.

**What is lambda in Python?**

* It is a single expression anonymous function often used as inline function.

**Why lambda forms in python does not have statements?**

A lambda form in python does not have statements as it is used to make new function object and then return them at runtime.

**What is pass in Python?**

Pass means, no-operation Python statement, or in other words it is a place holder in compound statement, where there should be a blank left and nothing has to be written there.

**In Python what are iterators?**

In Python, iterators are used to iterate a group of elements, containers like list.

**In Python what is slicing?**

A mechanism to select a range of items from sequence types like list, tuple, strings etc. is known as slicing.

**What are generators in Python?**

The way of implementing iterators are known as generators. It is a normal function except that it yields expression in the function.

**What is docstring in Python?**

A Python documentation string is known as docstring, it is a way of documenting Python functions, modules and classes.

**How can you copy an object in Python?**

To copy an object in Python, you can try copy.copy () or copy.deepcopy() for the general case. You cannot copy all objects but most of them.

**What is negative index in Python?**

Python sequences can be index in positive and negative numbers. For positive index, 0 is the first index, 1 is the second index and so forth. For negative index, (-1) is the last index and (-2) is the second last index and so forth.

**How you can convert a number to a string?**

In order to convert a number into a string, use the inbuilt function str(). If you want a octal or hexadecimal representation, use the inbuilt function oct() or hex().

**What is the difference between Xrange and range?**

Xrange returns the xrange object while range returns the list, and uses the same memory and no matter what the range size is.

**What is module and package in Python?**

In Python, module is the way to structure program. Each Python program file is a module, which imports other modules like objects and attributes.

The folder of Python program is a package of modules. A package can have modules or subfolders.

**Mention what are the rules for local and global variables in Python?**

**Local variables**: If a variable is assigned a new value anywhere within the function's body, it's assumed to be local.

**Global variables**: Those variables that are only referenced inside a function are implicitly global.

**How can you share global variables across modules?**

To share global variables across modules within a single program, create a special module. Import the config module in all modules of your application. The module will be available as a global variable across modules.

**Explain how to delete a file in Python?**

By using a command os.remove (filename) or os.unlink(filename)

**Explain how can you generate random numbers in Python?**

To generate random numbers in Python, you need to import command as

import random

random.random()

This returns a random floating point number in the range [0,1).

**What are the supported data types in Python?**

Python has five standard data types −

* Numbers
* String
* List
* Tuple
* Dictionary

### What Are The Principal Differences Between The Lambda And Def?

#### Lambda Vs. Def.

* Def can hold multiple expressions while lambda is a uni-expression function.
* Def generates a function and designates a name to call it later. Lambda forms a function object and returns it.
* Def can have a return statement. Lambda can’t have return statements.
* Lambda supports to get used inside a list and dictionary.

### What Is A Function Call Or A Callable Object In Python?

A function in Python gets treated as a callable object. It can allow some arguments and also return a value or multiple values in the form of a tuple. Apart from the function, Python has other constructs, such as classes or the class instances which fits in the same category.

**What are the different types of sequences in Python?**

Answer:  
Different types of [sequences in Python are Strings](https://www.educba.com/sequences-in-python/), Unicode strings, lists, tuples, buffers and xrange objects.

**What is Lambda form in Python?**

Answer:  
Lambda keyword is used to create small random anonymous throw away functions.

**What is Pickling in Python?**

Answer:  
Pickle is a standard module which serializes and de-serializes a python object structure.

**How can an object be copied in Python?**

Answer:  
By using two ways objects can be copied in python: Shallow copy & Deep copy.

Let us move to the next Python Interview Questions.

**How do I convert a string to a number?**

Answer:  
There are different built-in functions by which we can convert values from one data type to another.

**Describe how to send email from a Python Script?**

Answer:  
The smtplib module is used to defines an SMTP client session object that can be used to send email using Pythons Script.

**19. What is the command used for exiting help command prompt?**

Answer:  
The command name is “quit”