

Python Interview Questions

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① What are differences between List and tuples in Python?

LIST

- (i) List are mutable i.e they can be edited.
- (ii) List are slower than tuples.
- (iii) Syntax
`list_1 = [10, 'shyam', 20]`.
- (iv) List has a variable size.

TUPLES

- (i) Tuples are immutable (tuples are list which can't be edited).
- (ii) Tuples are faster than List.
- (iii) Syntax
`tup_1 = (10, 'shyam', 20)`.
- (iv). tuple has a fixed size.

② What are key features of Python?

- (i) Python is a interpreted language. that means python does not need to be compiled before it's run.
- (ii) 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.
Example. `x = 11` and then `x = "I am string"` without errors.
- (iii) Python is well suited to object oriented programming, in that it allows definition of classes along with composition and inheritance.
- (iv) Python, functions are first like objects, that means that they can assigned to variables, returned from other functions and passed into functions.
- (v) Writing python code is fast but running it is often slower than compiled language.
- (vi) Python finds in many spheres.
Web application, automation, scientific modelling, Big Data applications.

③ What type of language is Python? programming or scripting?

- Python is capable of scripting but in general sense, it is considered as a general purpose programming language.

④ Python an Interpreted Language. Explaining ..

- An interpreted language is any programming language which is not a machine level code, before runtime. Therefore Python is an interpreted language.

⑤ What is PEP8?

- PEP stands for Python Enhancement Proposal
- It is a set of rules that specify how to format Python code for maximum readability.

⑥ How is Memory manage in Python?

- memory management in Python is managed by Python Private heap space. all python objects and data structures are located in a private heap.
- programmer does not have access to this private heap.
- Allocation of heap space for python objects is done by Python memory manager. The C API's gives access to some tools for the programmer to code.
- Python also has an inbuilt garbage collector, which recycles all the unused memory and so that it can be made available to heap space.

⑦ What is namespace in Python?

- Namespace is a naming system used to make sure that names are unique to avoid naming conflicts.

⑧ What are Python PATH?

- It is an environment variable which is used when module is imported.
- Whenever module is imported, PYTHONPATH also looks up to check for the presence of imported modules in various dictionaries.
- Interpreter uses to determine which module to load.

⑨ What are Python modules? Name some commonly used built-in modules in Python?

- Python modules are files containing Python code.
- This code can either be functions, classes or variables.
- Python modules .py file containing executable code.
- Some of commonly used built-in modules are:
OS, sys, math, random, datetime, JSON.

(10) What are local variables and global variables in Python?

(i) global variable:

- Variable declared outside a function or in global space are called global variables.
- These variables can be accessed by any function in the program.

(ii) Local variables:

- Any variable declared inside a function is known as local variable.
- This variable is in the local space and does not in global space.

Example:

```
g = 5  
def add():  
    b = 3  
    c = g + b  
    print(c)  
add()
```

Note:

When you try to access the local variable outside the function add(), it will throw an error.

(11) Is Python case sensitive?

- Yes, Python is a case-sensitive language.

(12) What is type conversion in Python?

- Type conversion refers to the conversion of one data type to another.

`int()`

`list()`

`float()`

`dict()`

`ord()` - char to integer.

`str()`

`hex()`

`complex(real, imag)` - function

`oct()`

converts real numbers to complex

`tuple()`

converts string to tuple

`set()`.

converts list to set

(13) What is difference between Python Arrays and lists?

- Arrays and list, in Python have same way of storing data.

(14) List

- list can hold any data type elements.
- list in Python is a collection of item which can contain elements of multiple data-types, which may be numeric, character etc.
- It is an ordered collection supporting negative indexing.
- list are mutable, which means you can add or remove items after a list created.
- list item do not need to be unique.

(15) Array

- An array is also a data structure that stores a collection of items.
- Arrays are mutable, ordered, enclosed in square brackets, and able to store non-unique items.
- Array vector containing homogeneous element.
- Elements are allocated with contiguous memory location, allowing easy modification, that is addition, deletion, accessing of elements.
- Array can hold only a single data type elements.

(16) What are functions in Python?

- function is a block of code which is executed only when it is called.
- To define a Python function, def keyword is used.
- function can return data as a result.
- You can pass data, known as parameters, into a function.

```
def Newfunc():
```

```
    print("Welcome to Python")
```

```
Newfunc();
```

(17) What is __init__?

- __init__ is a method or constructor in Python.
- This method automatically called to allocate memory when a new object/instance of a class is created.

class Employee:

def __init__(self, name, post):

self.name = name

self.post = post

e1 = Employee('shyam', 'Data Scientist')

print(e1.name)

print(e1.post)

Q6) What is lambda function?

- An anonymous function is known as a lambda function.
- This function can have any number of parameters but, can have a single statement.
- An anonymous function is a function that is defined without name.

Syntax

lambda arguments : expression

Example:

a = lambda x,y: x+y

print(a(5,6))

Q7) What is self in python?

- self is an instance or an object of a class.
- self variable in the init method refers to the newly created object while in other methods; it refers to the object whose method was called.

Q8) How does break, continue, and pass work?

(i) break

- Allow loop termination when some condition is met and the control is transferred to the next statement.

(ii) continue

- Allow skipping some part of loop when some specific condition is met and the control is transferred to the beginning of the loop.

(iii) Pass

- used when you need to some block of code syntactically, but you want to skip its execution.
- basically it's null operation, Nothing happens when pass is executed.

(1a) What does [::-1] do?

- [::-1] it is used to reverse the order of an array or a sequence.
- [::-1] seprint a reversed copy of ordered data structure such as array or a list.
- original array or list remains unchanged.

```
my_arr = [1, 2, 3, 4, 5]
my_arr[::-1]
```

(2) What are Python Iterators?

- Iterators are objects which can be traversed through an iterated upon.
- that means you can traverse all the values,
- iterator is an object which implements the iterator protocol, which consists of methods - `__iter__()` and `__next__()`.

(21) How can you generate random numbers in Python?

- Random module is the standard module that is used to generate a random number.

```
import random
random.random()
```
- `random.random()` method return the floating point number that is range of (0,1)
- The function generates random float numbers.
- that method are used with the `random` class are the bound methods of `Random` instances:
 - (i) `randrange(a,b)`
 - (ii) `uniform(a,b)`
 - (iii) `normalvariate(mean, std)`,
 - (iv). `Random` class,

Q22 What is difference between range and xrange?

- range() and xrange() are two functions that could be used to iterate a certain number of times in for loops.
- In Python3 there is no xrange, but range function behave like xrange in Python2.

(i) range():

This return a return object (a type of iterable).

(ii) xrange():

- This function returns a generator object that can be used to display numbers only by looping.
- Because range is displayed on demand and hence called as "Lazy evaluation".

- Both are implemented in different ways and different characteristics.

- entries associated with items.

(i) Return Type.

(ii) Memory.

(iii) Operation usage.

(iv) Speed.

(i) Return type

- range() returns range object.

- xrange returns xrange object.

(ii) Memory

- Variable storing the range created by range() takes more memory as compared to variable storing the range using xrange().

(iii) Operation usage:

- As range() returns the list, all operation can be used on it.
- all operation that can be applied on the list can be used on it.

- `xrange()` returns `xrange` objects, operation associated to list cannot be applied on them. (Disadvantages).

(iv) Speed :

- `xrange()` evaluates only the generator object containing only the value that are required by lazy evaluation, therefore faster in implementation than `range()`.
- `range()` is faster if iterating over same sequence multiple times.
- `xrange()` has to reconstruct the integer object every time, but `range` will have real integer object.

(23) What is pickling and unpickling?

- pickle module accepts any python objects and converts it into a string representation and dumps onto 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.

(24) What are generators in Python?

- function that return an iterable object set of items are called generators.
- generators are used to create iterators, but with different approach.
- generators are simply functions which return an iterable set of items.

(25) What is purpose of is, not and in operators?

- operators are special function, they can take one or more values and produce corresponding result.

`is` : return true when 2 operands are true

`not` : return the inverse of boolean value.

`in` : checks if some element is present in some sequence.

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

(i) `Help()` :

`Help()` function is used to display documentation string and also

facilitate you to see help related to module, keyword, attribute.

(ii) dir():

- `dir()` function is used to display the defined symbols.

Q27 Whenever Python exists, why isn't all memory deallocated?

- (i) Whenever Python exists, 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 deallocated or freed.

(ii) It is impossible to de-allocate those portions of memory that are reserved by a library.

(iii) On exit, because of having own efficient cleanup mechanism, Python would try to deallocate/destroy every other objects.

Q28 What are dictionaries in Python?

- built-in datatype in Python is called dictionary.
- It defines one-to-one relationship between keys and values.
- Dictionaries contain pairs of keys and their corresponding values.
- Dictionaries are indexed by keys.

Q29 How can the ternary operators be used in Python?

- Ternary operator is the operator that is used to show the condition statements. This consists of True or False value.

Syntax

[on/true] if [expression] else [or/false] $x, y = 25, 50$ if $x < y$

Q30 What does this mean: *args, **kwargs? Why would we use it?

- We use *args when we are unsure how many arguments are going to be passed to a function.

- **kwargs is used when we don't know how many keywords arguments will pass to a function.

(31) Explain split(), sub(), subn() methods of "re" module in Python.

- To modify strings, Python 're' module is providing 3 methods.

(i) split()

Uses a regex pattern to "split" a given string into a list.

(ii) sub():

find all substring where the regex pattern matches and then replace them with a different string.

(iii) subn()

- It is similar to sub() and also return the new string along with no of replacements.

(32) What are Negative Indexed and why are they used?

- Sequences in Python are indexed and it consists of positive as well as negative numbers.

positive - positive number starts from 0,

Negative - Negative number starts from -1,

- Negative index is used to remove any new-line spaces from the string and allows string to except last characters that is given as [:-1]

- Negative index is also used to show the index to represent string in reverse order

(33) How can he file deleted in Python?

- To delete a file in Python, need to import os module

- need to use os.remove() function.

os.remove("abc.txt")

(34) What are built-in types of Python?

i) Integers,

ix) String

ii) floating points

x) Boolean

iii) complex Numbers.

xi) Built-in functions.

(35) What advantages do NumPy Arrays offer over Python lists?

- Python lists are efficient general purpose containers.
- Python supports insertion, deletion, appending, and concatenation.
- Python comprehensions make them easy to construct and manipulate.

(ii) They have certain limitations

- they don't support "vectorized" operations like element wise addition and multiplication. They can contain objects of differing types.

(iii) NumPy is efficient and more convenient.

- lot of vector and matrix operations for free, which sometimes allow one to avoid unnecessary work.

(iv) NumPy Array is faster and built-in with NumPy. FFTs, convolutions, fast searching, basic statistics, linear algebra, histograms etc.

(36) How to add values to a Python Array?

- Elements can be added to an array using append(), extend(), and insert(i, x) functions.

(37) How to remove values from a Python Array?

- Array element can be removed using pop() or remove() method.

(i) remove()

- Remove method takes a single element as an argument and removes it from the list.
- If element doesn't exist, it throws value Error: list.remove(x).
- Remove method only removes first occurrence of the specified value.
- Removes only one that matches object (not index).

(ii) pop:

- Use pop() method to remove an element in array.
- Pop is only way that returns the object.
- Pop removes the deleted value from left.

(Q) Does Python have OOPS concepts?

- Python is an object-oriented programming language.
- Python can be treated as procedural as well as structural language.

(Q) What is difference between deep and shallow copy (Ans)?

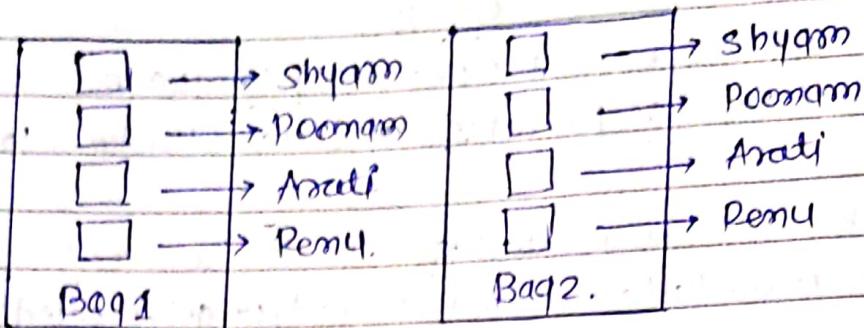
- Shallow copy is used when a new instance type gets created, and it keeps the values that are copied for the new instance.
- Shallow copy is used to copy the reference pointers just like it copies value.



- Shallow copy means constructing a new collection object and then populating it with references to the child objects found in the original.
- References of object is copied in other objects.
- It means that any changes made to a copy of object do reflect in the original object.
- This is implemented as using "copy" function.
- The copying process does not recurse and therefore won't create copies of the child objects themselves.

Deep copy

- Deep copy is a process occurs recursively.
- first constructing a new collection object and then recursively populating it with copies of the child objects found in the original.
- In case of, a copy of objects is copied in other object.
- any changes made to a copy of objects do not effect in the original object.
- implemented using deepcopy() function.



Pre-copy

(28) How is Multithreading achieved in Python?

- (i) Python has multithreading package but if you want to multithread to speed your code up, then it's not a good idea to use it.
- (ii) Python has a construct called the Global Interpreter Lock (GIL).
- (iii) GIL passing adds overhead to execution.
If you want to make your code run faster then using the threading package often isn't good idea.

(29) What is the process of compilation and linking in Python?

- compiling and linking allows new extensions to be compiled program without any errors.
- linking can be done only when it passes the compiled procedure.
- If dynamic loading is used then it depends on the style that is being provided with the system.
- Python interpreters can be used to provide dynamic loading of the code.
- generate setup files and rebuild the interpreter.

(30) What are Python libraries? Name a few of them.

- Python libraries are a collection of Python packages, some of the most used python libraries are, NumPy, Pandas, Matplotlib, scikit-learn.

(31) What is split used for,

- split method is used to separate a given string in Python.
`print(a.split())`