1. Why do we call Python as a general purpose and high-level programming language?

[Python](https://en.wikipedia.org/wiki/Python_(programming_language)) was conceived as a language that emphasized code readability and extensibility. The former allowed non-software engineers to easily learn and write computer programs, while the latter allowed domain specialists to easily create libraries suited to their own use cases. Its design philosophy emphasizes [code readability](https://en.wikipedia.org/wiki/Code_readability) with the use of [significant indentation](https://en.wikipedia.org/wiki/Off-side_rule). For these reasons, Python has been used across a wide range of domains and considered one of the general-purpose programming languages.

Python is [dynamically-typed](https://en.wikipedia.org/wiki/Type_system#DYNAMIC) and [garbage-collected](https://en.wikipedia.org/wiki/Garbage_collection_(computer_science)). It supports multiple [programming paradigms](https://en.wikipedia.org/wiki/Programming_paradigm),including [structured](https://en.wikipedia.org/wiki/Structured_programming) (particularly [procedural](https://en.wikipedia.org/wiki/Procedural_programming)), [object-oriented](https://en.wikipedia.org/wiki/Object-oriented_programming) and [functional programming](https://en.wikipedia.org/wiki/Functional_programming). It is often described as a "batteries included" language due to its comprehensive [standard library](https://en.wikipedia.org/wiki/Standard_library).

1. Why is Python called a dynamically typed language?

In python a variable does not have a stated type within the source code, but can store whatever data is presented to them at the time. The type of a variable is therefore determined dynamically at run time.

1. List some pros and cons of Python programming language?

**Pros:**

* Simple and easy-to-understand syntax.
* Object Oriented Programming-driven.
* Supports imperative and functional programming.
* Extensive library.
* Supports multiple platforms (Web and mobile computing).
* Python is easily extensible with *C*/*C*++/Java code.
* Open Source and large community support.

Cons:

* Python is slow.
* Weak in mobile computing.
* Has limitations with database access.
* Despite being open source, there is no commercial support point.
* Since Python is dynamic, more errors show at run-time.

1. In what all domains can we use Python?

* Web Development
* Networking and Internet
* Machine Learning
* Scientific Computation

1. What are variable and how can we declare them?

Variables are containers for storing data values. Python has no command for declaring a variable. A variable is created the moment you first assign a value to it.

Eg : x = 5 #will become an integer variable when 5 is assigned.

Str\_name = ‘Nikhil’ #will become string when data is assigned within the inverted commas.

1. How can we take an input from the user in Python?

We can take the input directly to the variable name using the input() function as shown below:

name = input(‘Enter your name:’) #will prompt to enter the name and accept the input

1. What is the default datatype of the value that has been taken as an input using input() function?

The default data type will be string.

1. What is type casting?

The conversion of one data type into the other data type is known as type casting in python or type conversion in python.

1. Can we take more than one input from the user using single input() function? If yes, how? If no, why?

Yes, using [split()](https://www.geeksforgeeks.org/python-string-split/) method. This function helps in getting multiple inputs from users. It breaks the given input by the specified separator. If a separator is not provided then any white space is a separator. Generally, users use a split() method to split a Python string but one can use it in taking multiple inputs.

Example:

x,y = input("Enter 2 values :").split()

1. What are keywords?

Python keywords are reserved words. They are used by python interpreters to understand the program. Keywords define the structure of programs.

1. Can we use keywords as a variable? Support your answer with reason.

We can’t use keywords to name program entities such as variables, classes, and functions.  It’s because keywords have predefined meanings.

1. What is indentation? What's the use of indentation in Python?

Python indentation refers to adding white space before a statement to a particular block of code. In another word, all the statements with the same space to the right, belong to the same code. Indentation is a very important concept of Python because without properly indenting the Python code, there will be Indentation-Error and the code will not get compiled.

1. How can we throw some output in Python?

By using the print() function.

Example: print(“X”) will give the output as X.

1. What are operators in Python?

Operators are used to perform operations on variables and values.

Example of operators are +, -, \*, /.

1. What is difference between / and // operators?

The ‘/’ operator is used for float or decimal division whereas the ‘//’ operator is used for integer division.

1. Write a code that gives following as an output.

iNeuroniNeuroniNeuroniNeuron

print("iNeuroniNeuroniNeuroniNeuron")

1. Write a code to take a number as an input from the user and check if the number is odd or even.

x = int(input("Enter a number : "))

if x%2 == 0:

    print("Number is even !!")

else:

    print("Number is odd !!")

1. What are boolean operator?

The operators such as not, and, or that are used to perform logical operations in Python, with results of the operations involving them being returned in TRUE or FALSE.

1. What will the output of the following?

```

1 or 0 -> gives TRUE

0 and 0 -> gives TRUE

True and False and True -> gives FALSE

1 or 0 or 0 -> gives TRUE

```

1. What are conditional statements in Python?

Conditional statements are also called decision-making statements. We use those statements while we want to execute a block of code when the given condition is true or false.

Type of condition statement in Python:

* If statement.
* If Else statement.
* Elif statement.
* Nested if statement.
* Nested if else statement.

1. What is use of 'if', 'elif' and 'else' keywords?

Python uses the ‘if’ keyword to implement decision control. Along with the ‘if’ statement, the ‘else’ condition can be optionally used to define an alternate block of statements to be executed if the boolean expression in the ‘if’ condition evaluates to False. The ‘elif’ condition is used to include multiple conditional expressions after the ‘if’ condition or between the ‘if’ and ‘else’ conditions.

1. Write a code to take the age of person as an input and if age >= 18 display "I can vote". If age is < 18 display "I can't vote".

age = int(input("Enter your age : "))

if age >= 18:

    print("You can vote!!")

else:

    print("You cannot vote!!")

1. Write a code that displays the sum of all the even numbers from the given list of numbers = [12, 75, 150, 180, 145, 525, 50].

Ans.

numbers = [12, 75, 150, 180, 145, 525, 50]

sum = 0

for x in numbers:

    if x%2 == 0:

        print(x)

        sum = sum + x

print("The sum of even numbers is : ", sum)

1. Write a code to take 3 numbers as an input from the user and display the greatest no as output.

Ans.

x = int(input("Enter the 1st number:"))

y = int(input("Enter the 2nd number:"))

z = int(input("Enter the 3rd number:"))

if x>y and x>z:

    print("The largest is : ", x)

elif y>x and y>z:

    print("The largest is : ", y)

else:

    print("The largest is : ", z)

1. Write a program to display only those numbers from a list that satisfy the following conditions

- The number must be divisible by five

- If the number is greater than 150, then skip it and move to the next number

- If the number is greater than 500, then stop the loop

numbers = [12, 75, 150, 180, 145, 525, 50]

Ans:

for i in numbers:

    if i>500:

        break

    elif i%5==0:

        if i>150:

            continue

        print(i)

1. What is a string? How can we declare string in Python?

A 'string' is simply a list of characters in order. A character is anything you can type on the keyboard in one keystroke, like a letter, a number, or a backslash. For example, "hello" is a string.

We can declare a string in python in 3 ways

* Using single quotes(‘ ‘)
* Using double quotes(” “)
* Using triple quotes (‘’’ ‘’’)

1. How can we access the string using its index?

In Python indexing of strings starts from 0 till n-1, where n is the size of string.

Syntax : SampleSTR[n]

Where SampleSTR is a sample string with n characters.

1. Write a code to get the desired output of the following

```

string = "Big Data iNeuron"

desired\_output = "iNeuron"

```

Ans:

print(string[9: :1])

1. Write a code to get the desired output of the following

```

string = "Big Data iNeuron"

desired\_output = "norueNi"

```

Ans:

print(string[-1:-8:-1])

1. Resverse the string given in the above question.

print(string[-1 : : -1])

1. How can you delete entire string at once?

del() function can be used.

1. What is escape sequence?

An escape sequence is a sequence of characters that does not represent itself when used inside a character or string [literal](https://en.wikipedia.org/wiki/Literal_(computer_programming)), but is translated into another character or a sequence of characters that may be difficult or impossible to represent directly. An escape character is a backslash \ followed by the character you want to insert.

1. How can you print the below string?

'iNeuron's Big Data Course'

Ans:

print("'iNeuron's Big Data Course'")

1. What is a list in Python?

The list is a sequential data structure in Python. It can contain a group of elements, which can be of the same or different data types.

1. How can you create a list in Python?

We can create a list object using square brackets, i.e. []

1. How can we access the elements in a list?

By using for loop and by using the indexes.

1. Write a code to access the word "iNeuron" from the given list.

lst = [1,2,3,"Hi",[45,54, "iNeuron"], "Big Data"]

Ans:

print(lst[4][2])

#first index if for the main list and second index for the list inside lst

1. Take a list as an input from the user and find the length of the list.

user\_input = []

print("Enter 5 random numbers:")

for i in range(1,6):

    num = int(input())

    user\_input.append(num)

print(user\_input)

1. Add the word "Big" in the 3rd index of the given list.

lst = ["Welcome", "to", "Data", "course"]

lst = ["Welcome", "to", "Data", "course"]

lst[3] = "Big"

print(lst)

1. What is a tuple? How is it different from list?

Python provides another type that is an ordered collection of objects, called a tuple.

* Tuples are identical to lists in all respects, except Tuples are defined by enclosing the elements in parentheses (()) instead of square brackets ([]). Tuples are immutable.

1. How can you create a tuple in Python?

Tuples are defined by enclosing the elements in parentheses (). Eg : t1 = ()

1. Create a tuple and try to add your name in the tuple. Are you able to do it? Support your answer with reason.

Cannot add name as tupple is immutable, we cannot edit the tupple.

1. Can two tuple be appended. If yes, write a code for it. If not, why?

Because tuples are immutable (cannot be changed after creation) sequences, you will need to create a new one each time you want to "append" to it.

1. Take a tuple as an input and print the count of elements in it.

lst = []

print("Enter 4 numbers : ")

for i in range(4):

    lst.append(int(input()))

print("List of numbers : ", lst)

lst = tuple(lst)

print(type(lst))

print(len(lst))

1. What are sets in Python?

Sets are used to store multiple items in a single variable. Set is one of 4 built-in data types in Python used to store collections of data, the other 3 are [List](https://www.w3schools.com/python/python_lists.asp), [Tuple](https://www.w3schools.com/python/python_tuples.asp), and [Dictionary](https://www.w3schools.com/python/python_dictionaries.asp), all with different qualities and usage.

A set is a collection which is unordered, unchangeable, and unindexed.

1. How can you create a set?

We use curly brackets to store the items in a set. Eg : name = {" Nikhil", "Sanchez", "Alvarez"}

1. Create a set and add "iNeuron" in your set.

s = set()

s.add("iNeuron")

print(s)

1. Try to add multiple values using add() function.

s = set()

s.add(1)

s.add(2)

s.add(3)

s.add(4)

s.add(6)

print(s) # output : {1, 2, 3, 4, 6}

1. How is update() different from add()?

add() accepts an element as an argument and if that element is not already present in the set, then it adds that to the set.

update() expects a single or multiple iterable sequences as arguments and appends all the elements in these iterable sequences to the set.

1. add() is faster than update().
2. add () accepts immutable parameters only. Whereas accepts iterable sequences.
3. add() accepts a single parameter, whereas update() can accept multiple sequences.
4. What is clear() in sets?

The clear() method in Python removes all the elements from a given [Set](https://beginnersbook.com/2019/03/python-sets/).

**Syntax**

set.clear()

1. What is frozen set?

Python frozenset() Method creates an immutable Set object from an iterable. It is a built-in Python function. As it is a set object therefore we cannot have duplicate values in the frozenset.

1. How is frozen set different from set?

The frozenset() is an inbuilt function in Python which takes an iterable object as input and makes them immutable. Simply it freezes the iterable objects and makes them unchangeable. In Python, frozenset is same as set except its elements are immutable. This function takes input as any iterable object and converts them into immutable object. The order of element is not guaranteed to be preserved.

1. What is union() in sets? Explain via code.

It's a function that combines two sets into one. The function can combine one set with multiple other sets or Python iterable objects.

s1 = {1, 2, 3, 4, 6}

s2 = {20,30,40,50,60}

s3 = s1.union(s2)

print(s3) # output: {1, 2, 3, 4, 6, 40, 50, 20, 60, 30}

1. What is intersection() in sets? Explain via code.

Python set intersection() method returns a new set with an element that is common to all set. The intersection of two given sets is the largest set, which contains all the elements that are common to both sets.

s1 = {1, 2, 3, 4, 6, 10, 40}

s2 = {20,30,40,50,60, 6, 3}

s3 = s1.intersection(s2)

print(s3) # output: {40, 3, 6}

1. What is dictionary in Python?

Dictionaries are used to store data values in key : value pairs. A dictionary is a collection which is ordered, changeable and do not allow duplicates. Dictionaries are written with curly brackets, and have keys and values.

1. How is dictionary different from all other data structures.

Dictionary is a default python data structure used to store the data collection in the form of key-value pairs. Dictionaries are written inside the curly brackets ({}), separated by commas. However, the key and value of the data are separated by placing a semi-colon between them(:). Dictionary elements are ordered, changeable, and do not allow duplicates. Remember that the key name of every data value should be unique and are case-sensitive. Later, you can access the dictionary elements by simply using the key name and retrieving its corresponding data value.

1. How can we delare a dictionary in Python?

A Dictionary in python is declared by enclosing a comma-separated list of key-value pairs using curly braces({})

1. What will the output of the following?

```

var = {}

print(type(var))

```

Output : <class 'dict'>

1. How can we add an element in a dictionary?

Here's what the syntax looks like: new\_dict[key] = Value.

We can also use the update() method to add new items to a dictionary. Here's what that would look like: new\_dict.update({"key": Value}).

1. Create a dictionary and access all the values in that dictionary.

details = {"Name":"Nova","Age":27,"Job":"CS"}

print(details)

# {'Name': 'Nova', 'Age': 27, 'Job': 'CS'}

1. Create a nested dictionary and access all the element in the inner dictionary.

details = {"Names":{"Name1":"Ram","Name2":"Nova"},"age":25}

print(details["Names"])

# {'Name1': 'Ram', 'Name2': 'Nova'}

1. What is the use of get() function?

The method **get()** returns a value for the given key. If key is not available then returns default value None.

1. What is the use of items() function?

Python item() method returns a new view of the dictionary. This view is collection of key value tuples. This method does not take any parameter and returns empty view if the dictionary is empty.

1. What is the use of pop() function?

In python, pop() is an inbuilt function that removes an item from a sequence(list, set, dictionary) and returns the value of the removed item.

1. What is the use of popitems() function?

Python dictionary popitem() method removes the last inserted key-value pair from the dictionary and returns it as a tuple.

1. What is the use of keys() function?

The keys() method in [Python Dictionary](https://www.geeksforgeeks.org/python-dictionary/), returns a view object that displays a list of all the keys in the dictionary in order of insertion.

1. What is the use of values() function?

Python values() method is used to collect all the values from a dictionary. It does not take any parameter and returns a dictionary of values. It returns an empty dictionary if the dictionary has no value.

1. What are loops in Python?

A loop statement allows us to execute a statement or group of statements multiple times.

1. How many type of loop are there in Python?

|  |  |
| --- | --- |
| 1 | [while loop](https://www.tutorialspoint.com/python/python_while_loop.htm)  Repeats a statement or group of statements while a given condition is TRUE. It tests the condition before executing the loop body. |
| 2 | [for loop](https://www.tutorialspoint.com/python/python_for_loop.htm)  Executes a sequence of statements multiple times and abbreviates the code that manages the loop variable. |
| 3 | [nested loops](https://www.tutorialspoint.com/python/python_nested_loops.htm)  You can use one or more loop inside any another while, for or do..while loop. |

1. What is the difference between for and while loops?

[For loop](https://www.tutorialspoint.com/python/python_for_loop.htm) executes a sequence of statements multiple times and abbreviates the code that manages the loop variable.

[While loop](https://www.tutorialspoint.com/python/python_while_loop.htm) repeats a statement or group of statements while a given condition is TRUE. It tests the condition before executing the loop body.

1. What is the use of continue statement?

[Continue statement](https://www.tutorialspoint.com/python/python_continue_statement.htm) causes the loop to skip the remainder of its body and immediately retest its condition prior to reiterating.

1. What is the use of break statement?

[Break statement](https://www.tutorialspoint.com/python/python_break_statement.htm) terminates the loop statement and transfers execution to the statement immediately following the loop.

1. What is the use of pass statement?

[Pass statement](https://www.tutorialspoint.com/python/python_pass_statement.htm) the pass statement in Python is used when a statement is required syntactically but you do not want any command or code to execute.

1. What is the use of range() function?

The range() function is used to generate a sequence of numbers over time. At its simplest, it accepts an integer and returns a range object (a type of iterable).

1. How can you loop over a dictionary?

You can loop through a dictionary by using a for loop. When looping through a dictionary, the return value are the keys of the dictionary, but there are methods to return the values as well.

Eg: details = {"Name1":"Ram","Name2":"Nova","age":25}

* Print all key names in the dictionary, one by one:

for x in details:

print(x)

* Print all *values* in the dictionary, one by one:

for x in details:

    print(details[x])

* Loop through both *keys* and *values*, by using the items() function:

for x,y in details.items():

    print(x,y)

### Coding problems

1. Write a Python program to find the factorial of a given number.

num = int(input("Enter the number to find the factorial :"))

fact = 1

if num<0:

    print("-ve numbers don't have factorial!")

elif num ==0:

    print("Factorial of 0 is 1!")

else:

    for i in range(1,num+1):

        fact = fact\*i

    print(fact)

1. Write a Python program to calculate the simple interest. Formula to calculate simple interest is SI = (P\*R\*T)/100

p = int(input("Enter the principal amount :"))

r = int(input("Enter the rate of interest : "))

t = int(input("Enter the time period :"))

SI = (p\*r\*t)/100

print("The Simple interest amount is :", SI)

1. Write a Python program to calculate the compound interest. Formula of compound interest is A = P(1+ R/100)^t.

p = int(input("Enter the principal amount :"))

r = int(input("Enter the rate of interest :"))

t = int(input("Enter the time period :"))

CI = p\*pow((1+ r/100),t)-p

print("The Simple interest amount is :", CI)

1. Write a Python program to check if a number is prime or not.

num = int(input("Enter the number :"))

result = False

if num > 1:

    for i in range(2, num):

        if (num % i) == 0:

           result = True

        break

if result:

    print("Entered number is not a prime number!")

else:

    print("Entered number is prime!")

1. Write a Python program to check Armstrong Number.

n = int(input("Enter a number: "))

sum = 0

y = n

while y > 0:

   digit = y % 10

   sum += digit \*\* 3

   y //= 10

if n == sum:

   print(n,"is an Armstrong number")

else:

   print(n,"is not an Armstrong number")

1. Write a Python program to find the n-th Fibonacci Number.

nterms = int(input("How many terms? "))

n1, n2 = 0, 1

count = 0

if nterms <= 0:

   print("Please enter a positive integer")

elif nterms == 1:

   print("Fibonacci sequence upto",nterms,":")

   print(n1)

else:

   print("Fibonacci sequence:")

   while count < nterms:

       print(n1)

       nth = n1 + n2

       n1 = n2

       n2 = nth

       count += 1

1. Write a Python program to interchange the first and last element in a list.

lst = [1,2,3,4,5,6,7,8,9,10]

m = lst[-1]

lst[-1] = lst[0]

lst[0]=m

print(lst)

1. Write a Python program to swap two elements in a list.

lst = []

print("Enter 5 elements for the list: ")

for i in range(5):

    lst.append(int(input()))

print("Enter Positions of Two Numbers to Swap: ")

p1 = int(input())

p2 = int(input())

p1new = lst[p1-1]

p2new = lst[p2-1]

lst[p1-1] = p2new

lst[p2-1] = p1new

print(lst)

1. Write a Python program to find N largest element from a list.

lst = [21, 51, 52, 85, 40, 98, 70, 500, 100]

n = int(input("How many large numbers to find : "))

new\_list = []

for i in range(0, n):

    max1 = 0

    for j in range(len(lst)):

        if lst[j] > max1:

            max1 = lst[j]

    lst.remove(max1)

    new\_list.append(max1)

print("Largest numbers = ",new\_list)

1. Write a Python program to find cumulative sum of a list.

lst = []

print("Enter 6 numbers :")

for i in range(6):

    lst.append(int(input()))

new\_list=[]

m=0

for j in range(0,len(lst)):

    m+=lst[j]

    new\_list.append(m)

print("The cumulative sum is : ",new\_list)

1. Write a Python program to check if a string is palindrome or not.

x = input("Enter the string for palindrome check : ")

w = ""

for i in x:

    w = i + w

if (x == w):

    print("Yes")

else:

    print("No")

1. Write a Python program to remove i'th element from a string.

Str =  input("Enter the string : ")

i = int(input("Enter the index of character to be removed : "))

newStr = Str.replace(Str[i], "", 1)

print ("String formed by removing i'th character : " , newStr)

1. Write a Python program to check if a substring is present in a given string.

main = input("Enter the main string : ")

sub = input("Enter the substring to be checked : ")

if sub in main:

    print("It is present in the string")

else:

    print("No! it is not present")

1. Write a Python program to find words which are greater than given length k.

result = []

str\_main = input("Enter the sentence : ")

words = str\_main.split(" ")

k = int(input("Enter the length : "))

for x in words:

    if len(x) > k:

        result.append(x)

print ("The words in the string with length greater than" , leng , "is :" , result)

1. Write a Python program to extract unique dictionary values.
2. Write a Python program to merge two dictionaries.

d1 = {'a': 100, 'b': 200}

d2 = {'x': 300, 'y': 200}

d1.update(d2)

print(d1)

1. Write a Python program to convert a list of tuples into dictionary.

```

Input : [('Sachin', 10), ('MSD', 7), ('Kohli', 18), ('Rohit', 45)]

Output : {'Sachin': 10, 'MSD': 7, 'Kohli': 18, 'Rohit': 45}

```

l = [('Sachin', 10), ('MSD', 7), ('Kohli', 18), ('Rohit', 45)]

d = {}

for a, b in l:

    d.setdefault(a, []).append(b)

print (d)

1. Write a Python program to create a list of tuples from given list having number and its cube in each tuple.

```

Input: list = [9, 5, 6]

Output: [(9, 729), (5, 125), (6, 216)]

```

list = [9, 5, 6]

res = [(val,pow(val,3)) for val in list]

print(res)

1. Write a Python program to get all combinations of 2 tuples.

```

Input : test\_tuple1 = (7, 2), test\_tuple2 = (7, 8)

Output : [(7, 7), (7, 8), (2, 7), (2, 8), (7, 7), (7, 2), (8, 7), (8, 2)]

```

test\_tuple1 = (7, 2)

test\_tuple2 = (7, 8)

res = [(a,b) for a in test\_tuple1 for b in test\_tuple2]

res = res + [(a,b) for a in test\_tuple1 for b in test\_tuple2]

print(res)

1. Write a Python program to sort a list of tuples by second item.

```

Input : [('for', 24), ('Geeks', 8), ('Geeks', 30)]

Output : [('Geeks', 8), ('for', 24), ('Geeks', 30)]

```

def Sort\_Tuple(tup):

tup.sort(key = lambda x: x[1])

return tup

tup = [('rishav', 10), ('akash', 5), ('ram', 20), ('gaurav', 15)]

print(Sort\_Tuple(tup))

1. Write a python program to print below pattern.

```

\*

\* \*

\* \* \*

\* \* \* \*

\* \* \* \* \*

```

def pypart(n):

    myList = []

    for i in range(0,n+1):

        myList.append(" \*"\*i)

        print("\n".join(myList))

n = 10

pypart(n)

1. Write a python program to print below pattern.

```

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```

1. Write a python program to print below pattern.

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```

print("Print equilateral triangle Pyramid using asterisk symbol ")

size = 8

m = (2 \* size) - 2

for i in range(0, size):

    for j in range(0, m):

        print(end=" ")

    m = m - 1

    for j in range(0, i + 1):

        print("\*", end=' ')

    print("")

1. Write a python program to print below pattern.

```

1

1 2

1 2 3

1 2 3 4

1 2 3 4 5

```

rows = 5

for i in range(1, rows + 1):

    for j in range(1, i + 1):

        print(j, end=' ')

    print('')

1. Write a python program to print below pattern.

```

A

B B

C C C

D D D D

E E E E E

```

print("Print equilateral triangle Pyramid with characters ")

s = 5

asciiValue = 65

m = (2 \* s) - 2

for i in range(0, s):

    for j in range(0, m):

        print(end="")

    m = m - 1

    for j in range(0, i + 1):

        alphabate = chr(asciiValue)

        print(alphabate, end=' ')

        asciiValue += 1

    print(" ")