PYTHON FUNCTIONS

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Functions are the most important aspect of an application. A function can be defined as the organized block of reusable code, which can be called whenever required.

Python allows us to divide a large program into the basic building blocks known as a function. The function contains the set of programming statements enclosed by {}. A function can be called multiple times to provide reusability and modularity to the Python program.

The Function helps to programmer to break the program into the smaller part. It organizes the code very effectively and avoids the repetition of the code. As the program grows, function makes the program more organized.

Python provide us various inbuilt functions like **range()** or **print()**. Although, the user can create its functions, which can be called user-defined functions.

There are mainly two types of functions.

- **User-define functions** - The user-defined functions are those define by the **user** to perform the specific task.
- **Built-in functions** - The built-in functions are those functions that are **pre-defined** in Python.

Advantage of Functions in Python

There are the following advantages of Python functions.

- Using functions, we can avoid rewriting the same logic/code again and again in a program.
- We can call Python functions multiple times in a program and anywhere in a program.
- We can track a large Python program easily when it is divided into multiple functions.
- Reusability is the main achievement of Python functions.
- However, Function calling is always overhead in a Python program.

Creating a Function

Python provides the **def** keyword to define the function. The syntax of the define function is given below.

Syntax:

```
def my_function(parameters):
    function_block
return expression
```

Let's understand the syntax of functions definition.

- The **def** keyword, along with the function name is used to define the function.
- The identifier rule must follow the function name.
- A function accepts the parameter (argument), and they can be optional.
- The function block is started with the colon (:), and block statements must be at the same indentation.
- The **return** statement is used to return the value. A function can have only one **return**

Function Calling

In Python, after the function is created, we can call it from another function. A function must be defined before the function call; otherwise, the Python interpreter gives an error. To call the function, use the function name followed by the parentheses.

Consider the following example of a simple example that prints the message "Hello World".

```
#function definition
def hello_world():
   print("hello world")
# function calling
hello_world()
```

Output:

```
hello world
```

The return statement

The return statement is used at the end of the function and returns the result of the function. It terminates the function execution and transfers the result where the function is called. The return statement cannot be used outside of the function.

Syntax

```
return [expression_list]
```

It can contain the expression which gets evaluated and value is returned to the caller function. If the return statement has no expression or does not exist itself in the function then it returns the **None** object.

Consider the following example:

Example 1

```
# Defining function
def sum():
    a = 10
    b = 20
    c = a+b
    return c
# calling sum() function in print statement
print("The sum is:",sum())
```

Output:

```
The sum is: 30
```

In the above code, we have defined the function named **sum**, and it has a statement **c = a+b**, which computes the given values, and the result is returned by the return statement to the caller function.

Example 2 Creating function without return statement

```
# Defining function
def sum():
    a = 10
    b = 20
    c = a+b
# calling sum() function in print statement
print(sum())
```

Output:

```
None
```

In the above code, we have defined the same function without the return statement as we can see that the **sum()** function returned the **None** object to the caller function.

Arguments in function

The arguments are types of information which can be passed into the function. The arguments are specified in the parentheses. We can pass any number of arguments, but they must be separate them with a comma.

Consider the following example, which contains a function that accepts a string as the argument.

Example 1

```
#defining the function
def func (name):
    print("Hi ",name)
#calling the function
func("Devansh")
```

Output:

```
Hi Devansh
```

Example 2

```
#Python function to calculate the sum of two variables
#defining the function
def sum (a,b):
    return a+b;

#taking values from the user
a = int(input("Enter a: "))
b = int(input("Enter b: "))

#printing the sum of a and b
print("Sum = ",sum(a,b))
```

Output:

```
Enter a: 10
Enter b: 20
```

```
Sum =  30
```

Call by reference in Python

In Python, call by reference means passing the actual value as an argument in the function. All the functions are called by reference, i.e., all the changes made to the reference inside the function revert back to the original value referred by the reference.

Example 1 Passing Immutable Object (List)

```
#defining the function
def change_list(list1):
   list1.append(20)
   list1.append(30)
   print("list inside function = ",list1)

#defining the list
list1 = [10,30,40,50]

#calling the function
change_list(list1)
print("list outside function = ",list1)
```

Output:

```
list inside function =  [10, 30, 40, 50, 20, 30]
list outside function =  [10, 30, 40, 50, 20, 30]
```

Example 2 Passing Mutable Object (String)

```
#defining the function
def change_string (str):
   str = str + " Hows you "
   print("printing the string inside function :",str)

string1 = "Hi I am there"

#calling the function
change_string(string1)
 print("printing the string outside function :",string1)
```

Output:

```
printing the string inside function : Hi I am there Hows you
printing the string outside function : Hi I am there
```

Types of arguments

There may be several types of arguments which can be passed at the time of function call.

1. Required arguments
2. Keyword arguments
3. Default arguments
4. Variable-length arguments

Required Arguments

Till now, we have learned about function calling in Python. However, we can provide the arguments at the time of the function call. As far as the required arguments are concerned, these are the arguments which are required to be passed at the time of function calling with the exact match of their positions in the function call and function definition. If either of the arguments is not provided in the function call, or the position of the arguments is changed, the Python interpreter will show the error.

Consider the following example.

Example 1

```
def func(name):
    message = "Hi "+name
    return message
name = input("Enter the name:")
print(func(name))
```

Output:

```
Enter the name: John
Hi John
```

Example2

```
#the function simple_interest accepts three arguments and returns the simple interes
t accordingly
```

```
def simple_interest(p,t,r):
    return (p*t*r)/100
p = float(input("Enter the principle amount? "))
r = float(input("Enter the rate of interest? "))
t = float(input("Enter the time in years? "))
print("Simple Interest: ",simple_interest(p,r,t))
```

Output:

```
Enter the principle amount: 5000
Enter the rate of interest: 5
Enter the time in years: 3
Simple Interest:  750.0
```

Example 3

```
#the function calculate returns the sum of two arguments a and b
def calculate(a,b):
    return a+b
calculate(10) # this causes an error as we are missing a required arguments b.
```

Output:

```
TypeError: calculate() missing 1 required positional argument: 'b'
```

Default Arguments

Python allows us to initialize the arguments at the function definition. If the value of any of the arguments is not provided at the time of function call, then that argument can be initialized with the value given in the definition even if the argument is not specified at the function call.

Example 1

```
def printme(name,age=22):
    print("My name is",name,"and age is",age)
printme(name = "john")
```

Output:

```
My name is John and age is 22
```

Example 2

```
def printme(name,age=22):
    print("My name is",name,"and age is",age)
printme(name = "john") #the variable age is not passed into the function howeve
r the default value of age is considered in the function
printme(age = 10,name="David") #the value of age is overwritten here, 10 will be
 printed as age
```

Output:

```
My name is john and age is 22
My name is David and age is 10
```

Variable-length Arguments (*args)

In large projects, sometimes we may not know the number of arguments to be passed in advance. In such cases, Python provides us the flexibility to offer the comma-separated values which are internally treated as tuples at the function call. By using the variable-length arguments, we can pass any number of arguments.

However, at the function definition, we define the variable-length argument using the ***args** (star) as *<variable - name >.

Consider the following example.

Example

```
def printme(*names):
    print("type of passed argument is ",type(names))
    print("printing the passed arguments...")
    for name in names:
        print(name)
printme("john","David","smith","nick")
```

Output:

```
type of passed argument is  <class 'tuple'>
printing the passed arguments...
john
David
smith
nick
```

In the above code, we passed ***names** as variable-length argument. We called the function and passed values which are treated as tuple internally. The tuple is an iterable sequence the same as the list. To print the given values, we iterated ***arg names** using for loop.

Keyword arguments(**kwargs)

Python allows us to call the function with the keyword arguments. This kind of function call will enable us to pass the arguments in the random order.

The name of the arguments is treated as the keywords and matched in the function calling and definition. If the same match is found, the values of the arguments are copied in the function definition.

Consider the following example.

Example 1

```
#function func is called with the name and message as the keyword arguments

def func(name,message):
    print("printing the message with",name,"and ",message)

    #name and message is copied with the values John and hello respectively
    func(name = "John",message="hello")
```

Output:

```
printing the message with John and  hello
```

Example 2 providing the values in different order at the calling

```
#The function simple_interest(p, t, r) is called with the keyword arguments the
order of arguments doesn't matter in this case
def simple_interest(p,t,r):
    return (p*t*r)/100
print("Simple Interest: ",simple_interest(t=10,r=10,p=1900))
```

Output:

```
Simple Interest:  1900.0
```

If we provide the different name of arguments at the time of function call, an error will be thrown.

Consider the following example.

Example 3

```
#The function simple_interest(p, t, r) is called with the keyword arguments.
def simple_interest(p,t,r):
    return (p*t*r)/100

# doesn't find the exact match of the name of the arguments (keywords)
print("Simple Interest: ",simple_interest(time=10,rate=10,principle=1900))
```

Output:

```
TypeError: simple_interest() got an unexpected keyword argument 'time'
```

The Python allows us to provide the mix of the required arguments and keyword arguments at the time of function call. However, the required argument must not be given after the keyword argument, i.e., once the keyword argument is encountered in the function call, the following arguments must also be the keyword arguments.

Consider the following example.

Example 4

```
def func(name1,message,name2):
    print("printing the message with",name1,",",message,",and",name2)
#the first argument is not the keyword argument
func("John",message="hello",name2="David")
```

Output:

```
printing the message with John , hello ,and David
```

The following example will cause an error due to an in-proper mix of keyword and required arguments being passed in the function call.

Example 5

```
def func(name1,message,name2):
    print("printing the message with",name1,",",message,",and",name2)
```

```
func("John",message="hello","David")
```

Output:

```
SyntaxError: positional argument follows keyword argument
```

Python provides the facility to pass the multiple keyword arguments which can be represented as **kwargs. It is similar as the *args but it stores the argument in the dictionary format.

This type of arguments is useful when we do not know the number of arguments in advance.

Consider the following example:

Example 6: Many arguments using Keyword argument

```
def food(**kwargs):
    print(kwargs)
food(a="Apple")
food(fruits="Orange", Vagitables="Carrot")
```

Output:

```
{'a': 'Apple'}
{'fruits': 'Orange', 'Vagitables': 'Carrot'}
```

Scope of variables

The scopes of the variables depend upon the location where the variable is being declared. The variable declared in one part of the program may not be accessible to the other parts.

In python, the variables are defined with the two types of scopes.

1. Global variables
2. Local variables

The variable defined outside any function is known to have a global scope, whereas the variable defined inside a function is known to have a local scope.

Consider the following example.

Example 1 Local Variable

```
def print_message():
    message = "hello !! I am going to print a message." # the variable message is lo
cal to the function itself
    print(message)
print_message()
print(message) # this will cause an error since a local variable cannot be accessi
ble here.
```

Output:

```
hello !! I am going to print a message.
  File "/root/PycharmProjects/PythonTest/Test1.py", line 5, in
    print(message)
NameError: name 'message' is not defined
```

Example 2 Global Variable

```
def calculate(*args):
    sum=0
    for arg in args:
        sum = sum +arg
    print("The sum is",sum)
sum=0
calculate(10,20,30) #60 will be printed as the sum
print("Value of sum outside the function:",sum) # 0 will be printed  Output:
```

Output:

```
The sum is 60
Value of sum outside the function: 0
```

Python Built-in Functions

The Python built-in functions are defined as the functions whose functionality is pre-defined in Python. The python interpreter has several functions that are always present for use. These functions are known as Built-in Functions. There are several built-in functions in Python which are listed below:

Python abs() Function

The python **abs()** function is used to return the absolute value of a number. It takes only one argument, a number whose absolute value is to be returned. The argument can be an integer and floating-point number. If the argument is a complex number, then, abs() returns its magnitude.

Python abs() Function Example

```
#  integer number
integer = -20
print('Absolute value of -40 is:', abs(integer))

#  floating number
floating = -20.83
print('Absolute value of -40.83 is:', abs(floating))
```

Output:

```
Absolute value of -20 is: 20
Absolute value of -20.83 is: 20.83
```

Python all() Function

The python **all()** function accepts an iterable object (such as list, dictionary, etc.). It returns true if all items in passed iterable are true. Otherwise, it returns False. If the iterable object is empty, the all() function returns True.

Python all() Function Example

```
# all values true
k = [1, 3, 4, 6]
print(all(k))

# all values false
k = [0, False]
print(all(k))

# one false value
k = [1, 3, 7, 0]
print(all(k))

# one true value
k = [0, False, 5]
```

```
print(all(k))

# empty iterable
k = []
print(all(k))
```

Output:

```
True
False
False
False
True
```

Python bin() Function

The python **bin()** function is used to return the binary representation of a specified integer. A result always starts with the prefix 0b.

Python bin() Function Example

```
x =  10
y =  bin(x)
print (y)
```

Output:

```
0b1010
```

Python bool()

The python **bool()** converts a value to boolean(True or False) using the standard truth testing procedure.

Python bool() Example

```
test1 = []
print(test1,'is',bool(test1))
test1 = [0]
print(test1,'is',bool(test1))
```

```
test1 = 0.0
print(test1,'is',bool(test1))
test1 = None
print(test1,'is',bool(test1))
test1 = True
print(test1,'is',bool(test1))
test1 = 'Easy string'
print(test1,'is',bool(test1))
```

Output:

```
[] is False
[0] is True
0.0 is False
None is False
True is True
Easy string is True
```

Python bytes()

The python **bytes()** in Python is used for returning a **bytes** object. It is an immutable version of the bytearray() function.

It can create empty bytes object of the specified size.

Python bytes() Example

```
string = "Hello World."
array = bytes(string, 'utf-8')
print(array)
```

Output:

```
b ' Hello World.'
```

Python callable() Function

A python **callable()** function in Python is something that can be called. This built-in function checks and returns true if the object passed appears to be callable, otherwise false.

Python callable() Function Examplex = 8

```
print(callable(x))
```

Output:

```
False
```

Python compile() Function

The python **compile()** function takes source code as input and returns a code object which can later be executed by exec() function.

Python compile() Function Example

```
# compile string source to code
        code_str = 'x=5\ny=10\nprint("sum =",x+y)'
        code = compile(code_str, 'sum.py', 'exec')
        print(type(code))
        exec(code)
        exec(x)
```

Output:

```
<class 'code'>
sum = 15
```

Python exec() Function

The python **exec()** function is used for the dynamic execution of Python program which can either be a string or object code and it accepts large blocks of code, unlike the eval() function which only accepts a single expression.

Python exec() Function Example

```
        x = 8
        exec('print(x==8)')
        exec('print(x+4)')
```

Output:

```
True
12
```

Python sum() Function

As the name says, python **sum()** function is used to get the sum of numbers of an iterable, i.e., list.

Python sum() Function Example

```
s = sum([1, 2,4 ])
print(s)

s = sum([1, 2, 4], 10)
print(s)
```

Output:

```
7
17
```

Python any() Function

The python **any()** function returns true if any item in an iterable is true. Otherwise, it returns False.

Python any() Function Example

```
l = [4, 3, 2, 0]
print(any(l))

l = [0, False]
print(any(l))

l = [0, False, 5]
print(any(l))

l = []
```

```
print(any(l))
```

Output:

```
True
False
True
False
```

Python ascii() Function

The python **ascii()** function returns a string containing a printable representation of an object and escapes the non-ASCII characters in the string using \x, \u or \U escapes.

Python ascii() Function Example

```
normalText = 'Python is interesting'
print(ascii(normalText))

otherText = 'Pythön is interesting'
print(ascii(otherText))

print('Pyth\xf6n is interesting')
```

Output:

```
'Python is interesting'
'Pyth\xf6n is interesting'
Pythön is interesting
```

Python bytearray()

The python **bytearray()** returns a bytearray object and can convert objects into bytearray objects, or create an empty bytearray object of the specified size.

Python bytearray() Example

```
string = "Python is a programming language."
# string with encoding 'utf-8'
arr = bytearray(string, 'utf-8')
print(arr)
```

Output:

```
bytearray(b'Python is a programming language.')
```

Python eval() Function

The python **eval()** function parses the expression passed to it and runs python expression(code) within the program.

Python eval() Function Example

```
x = 8
print(eval('x + 1'))
```

Output:

```
9
```

Python float()

The python **float()** function returns a floating-point number from a number or string.

Python float() Example

```
# for integers
print(float(9))

# for floats
print(float(8.19))

# for string floats
print(float("-24.27"))

# for string floats with whitespaces
print(float("    -17.19\n"))

# string float error
print(float("xyz"))
```

Output:

```
9.0
8.19
-24.27
-17.19
ValueError: could not convert string to float: 'xyz'
```

Python format() Function

The python **format()** function returns a formatted representation of the given value.

Python format() Function Example

```
# d, f and b are a type

# integer
print(format(123, "d"))

# float arguments
print(format(123.4567898, "f"))

# binary format
print(format(12, "b"))
```

Output:

```
123
123.456790
1100
```

Python frozenset()

The python **frozenset()** function returns an immutable frozenset object initialized with elements from the given iterable.

Python frozenset() Example

```
# tuple of letters
letters = ('m', 'r', 'o', 't', 's')

fSet = frozenset(letters)
```

```
print('Frozen set is:', fSet)
print('Empty frozen set is:', frozenset())
```

Output:

```
Frozen set is: frozenset({'o', 'm', 's', 'r', 't'})
Empty frozen set is: frozenset()
```

Python getattr() Function

The python **getattr()** function returns the value of a named attribute of an object. If it is not found, it returns the default value.

Python getattr() Function Example

```
class Details:
    age = 22
    name = "Phill"

details = Details()
print('The age is:', getattr(details, "age"))
print('The age is:', details.age)
```

Output:

```
The age is: 22
The age is: 22
```

Python globals() Function

The python **globals()** function returns the dictionary of the current global symbol table.

A **Symbol table** is defined as a data structure which contains all the necessary information about the program. It includes variable names, methods, classes, etc.

Python globals() Function Example

```
age = 22
globals()['age'] = 22
print('The age is:', age)
```

Output:

```
The age is: 22
```

Python hasattr() Function

The python **any()** function returns true if any item in an iterable is true, otherwise it returns False.

Python hasattr() Function Example

```
l = [4, 3, 2, 0]
print(any(l))

l = [0, False]
print(any(l))

l = [0, False, 5]
print(any(l))

l = []
print(any(l))
```

Output:

```
True
False
True
False
```

Python iter() Function

The python **iter()** function is used to return an iterator object. It creates an object which can be iterated one element at a time.

Python iter() Function Example

```
# list of numbers
list = [1,2,3,4,5]
```

```
listIter = iter(list)

# prints '1'
print(next(listIter))

# prints '2'
print(next(listIter))

# prints '3'
print(next(listIter))

# prints '4'
print(next(listIter))

# prints '5'
print(next(listIter))
```

Output:

```
1
2
3
4
5
```

Python len() Function

The python **len()** function is used to return the length (the number of items) of an object.

Python len() Function Example

```
strA = 'Python'
print(len(strA))
```

Output:

```
6
```

Python list()

The python **list()** creates a list in python.

Python list() Example

```
# empty list
print(list())

# string
String = 'abcde'
print(list(String))

# tuple
Tuple = (1,2,3,4,5)
print(list(Tuple))
# list
List = [1,2,3,4,5]
print(list(List))
```

Output:

```
[]
['a', 'b', 'c', 'd', 'e']
[1,2,3,4,5]
[1,2,3,4,5]
```

Python locals() Function

The python **locals()** method updates and returns the dictionary of the current local symbol table.

A **Symbol table** is defined as a data structure which contains all the necessary information about the program. It includes variable names, methods, classes, etc.

Python locals() Function Example

```
def localsAbsent():
    return locals()

def localsPresent():
    present = True
    return locals()
```

```
print('localsNotPresent:', localsAbsent())
print('localsPresent:', localsPresent())
```

Output:

```
localsAbsent: {}
localsPresent: {'present': True}
```

Python map() Function

The python **map()** function is used to return a list of results after applying a given function to each item of an iterable(list, tuple etc.).

Python map() Function Example

```
def calculateAddition(n):
  return n+n

numbers = (1, 2, 3, 4)
result = map(calculateAddition, numbers)
print(result)

# converting map object to set
numbersAddition = set(result)
print(numbersAddition)
```

Output:

```
<map object at 0x7fb04a6bec18>
{8, 2, 4, 6}
```

Python memoryview() Function

The python **memoryview()** function returns a memoryview object of the given argument.

Python memoryview () Function Example

```
#A random bytearray
randomByteArray = bytearray('ABC', 'utf-8')
```

```
mv = memoryview(randomByteArray)

# access the memory view's zeroth index
print(mv[0])
# It create byte from memory view
print(bytes(mv[0:2]))

# It create list from memory view
print(list(mv[0:3]))
```

Output:

```
65
b'AB'
[65, 66, 67]
```

Python object()

The python **object()** returns an empty object. It is a base for all the classes and holds the built-in properties and methods which are default for all the classes.

Python object() Example

```
python = object()

print(type(python))
print(dir(python))
```

Output:

```
<class 'object'>
['__class__', '__delattr__', '__dir__', '__doc__', '__eq__', '__format__', '__ge__',
'__getattribute__', '__gt__', '__hash__', '__init__', '__le__', '__lt__', '__ne__',
'__new__', '__reduce__', '__reduce_ex__', '__repr__', '__setattr__', '__sizeof__',
'__str__', '__subclasshook__']
```

Python open() Function

The python **open()** function opens the file and returns a corresponding file object.

Python open() Function Example

```
# opens python.text file of the current directory
f = open("python.txt")
# specifying full path
f = open("C:/Python33/README.txt")
```

Output:

```
Since the mode is omitted, the file is opened in 'r' mode; opens for reading.
```

Python chr() Function

Python **chr()** function is used to get a string representing a character which points to a Unicode code integer. For example, chr(97) returns the string 'a'. This function takes an integer argument and throws an error if it exceeds the specified range. The standard range of the argument is from 0 to 1,114,111.

Python chr() Function Example

```
# Calling function
result = chr(102) # It returns string representation of a char
result2 = chr(112)
# Displaying result
print(result)
print(result2)
# Verify, is it string type?
print("is it string type:", type(result) is str)
```

Output:

```
ValueError: chr() arg not in range(0x110000)
```

Python complex()

Python **complex()** function is used to convert numbers or string into a complex number. This method takes two optional parameters and returns a complex number. The first parameter is called a real and second as imaginary parts.

Python complex() Example

```
# Python complex() function example
# Calling function
a = complex(1) # Passing single parameter
b = complex(1,2) # Passing both parameters
# Displaying result
print(a)
print(b)
```

Output:

```
(1.5+0j)
(1.5+2.2j)
```

Python delattr() Function

Python **delattr()** function is used to delete an attribute from a class. It takes two parameters, first is an object of the class and second is an attribute which we want to delete. After deleting the attribute, it no longer available in the class and throws an error if try to call it using the class object.

Python delattr() Function Example

```
class Student:
    id = 101
    name = "Pranshu"
    email = "pranshu@abc.com"
# Declaring function
    def getinfo(self):
        print(self.id, self.name, self.email)
s = Student()
s.getinfo()
delattr(Student,'course') # Removing attribute which is not available
s.getinfo() # error: throws an error
```

Output:

```
101 Pranshu pranshu@abc.com
AttributeError: course
```

Python dir() Function

Python **dir()** function returns the list of names in the current local scope. If the object on which method is called has a method named __dir__(), this method will be called and must return the list of attributes. It takes a single object type argument.

Python dir() Function Example

```
# Calling function
att = dir()
# Displaying result
print(att)
```

Output:

```
['__annotations__', '__builtins__', '__cached__', '__doc__', '__file__', '__loader__',
'__name__', '__package__', '__spec__']
```

Python divmod() Function

Python **divmod()** function is used to get remainder and quotient of two numbers. This function takes two numeric arguments and returns a tuple. Both arguments are required and numeric

Python divmod() Function Example

```
# Python divmod() function example
# Calling function
result = divmod(10,2)
# Displaying result
print(result)
```

Output:

```
(5, 0)
```

Python enumerate() Function: Python **enumerate()** function returns an enumerated object. It takes two parameters, first is a sequence of elements and the

second is the start index of the sequence. We can get the elements in sequence either through a loop or next() method.

Python enumerate() Function Example

```
# Calling function
result = enumerate([1,2,3])
# Displaying result
print(result)
print(list(result))
```

Output:

```
<enumerate object at 0x7ff641093d80>
[(0, 1), (1, 2), (2, 3)]
```

Python dict()

Python **dict()** function is a constructor which creates a dictionary. Python dictionary provides three different constructors to create a dictionary:

- If no argument is passed, it creates an empty dictionary.
- If a positional argument is given, a dictionary is created with the same key-value pairs. Otherwise, pass an iterable object.
- If keyword arguments are given, the keyword arguments and their values are added to the dictionary created from the positional argument.

Python dict() Example

```
# Calling function
result = dict() # returns an empty dictionary
result2 = dict(a=1,b=2)
# Displaying result
print(result)
print(result2)
```

Output:

```
{}
{'a': 1, 'b': 2}
```

Python filter() Function

Python **filter()** function is used to get filtered elements. This function takes two arguments, first is a function and the second is iterable. The filter function returns a sequence of those elements of iterable object for which function returns **true value**. The first argument can be **none**, if the function is not available and returns only elements that are **true**.

Python filter() Function Example

```
# Python filter() function example
def filterdata(x):
    if x>5:
        return x
# Calling function
result = filter(filterdata,(1,2,6))
# Displaying result
print(list(result))
```

Output:

```
[6]
```

Python hash() Function

Python **hash()** function is used to get the hash value of an object. Python calculates the hash value by using the hash algorithm. The hash values are integers and used to compare dictionary keys during a dictionary lookup. We can hash only the types which are given below:

Hashable types: * bool * int * long * float * string * Unicode * tuple * code object.

Python hash() Function Example

```
# Calling function
result = hash(21) # integer value
result2 = hash(22.2) # decimal value
# Displaying result
print(result)
print(result2)
```

Output:

```
21
461168601842737174
```

Python help() Function

Python **help()** function is used to get help related to the object passed during the call. It takes an optional parameter and returns help information. If no argument is given, it shows the Python help console. It internally calls python's help function.

Python help() Function Example

```
# Calling function
info = help() # No argument
# Displaying result
print(info)
```

Output:

```
Welcome to Python 3.5's help utility!
```

Python min() Function

Python **min()** function is used to get the smallest element from the collection. This function takes two arguments, first is a collection of elements and second is key, and returns the smallest element from the collection.

Python min() Function Example

```
# Calling function
small = min(2225,325,2025) # returns smallest element
small2 = min(1000.25,2025.35,5625.36,10052.50)
# Displaying result
print(small)
print(small2)
```

Output:

```
325
1000.25
```

Python set() Function

In python, a set is a built-in class, and this function is a constructor of this class. It is used to create a new set using elements passed during the call. It takes an iterable object as an argument and returns a new set object.

Python set() Function Example

```
# Calling function
result = set() # empty set
result2 = set('12')
result3 = set('PythonProgram')
# Displaying result
print(result)
print(result2)
print(result3)
```

Python hex() Function:

Python **hex()** function is used to generate hex value of an integer argument. It takes an integer argument and returns an integer converted into a hexadecimal string. In case, we want to get a hexadecimal value of a float, then use float.hex() function.

Python hex() Function Example

```
# Calling function
result = hex(1)
# integer value
result2 = hex(342)
# Displaying result
print(result)
print(result2)
```

Output:

```
0x1
0x156
```

Python id() Function:

Python **id()** function returns the identity of an object. This is an integer which is guaranteed to be unique. This function takes an argument as

an object and returns a unique integer number which represents identity. Two objects with non-overlapping lifetimes may have the same id() value.

Python id() Function Example

```
# Calling function
val = id("PythonProgram") # string object
val2 = id(1200) # integer object
val3 = id([25,336,95,236,92,3225]) # List object
# Displaying result
print(val)
print(val2)
print(val3)
```

Output:

```
139963782059696
139963805666864
139963781994504
```

Python setattr() Function

Python **setattr()** function is used to set a value to the object's attribute. It takes three arguments, i.e., an object, a string, and an arbitrary value, and returns none. It is helpful when we want to add a new attribute to an object and set a value to it.

Python setattr() Function Example

```
class Student:
    id = 0
    name = ""

    def __init__(self, id, name):
        self.id = id
        self.name = name

student = Student(102,"Sohan")
print(student.id)
print(student.name)
#print(student.email) product error
```

```
setattr(student, 'email','sohan@abc.com') # adding new attribute
print(student.email)
```

Output:

```
102
Sohan
sohan@abc.com
```

Python slice() Function

Python **slice()** function is used to get a slice of elements from the collection of elements. Python provides two overloaded slice functions. The first function takes a single argument while the second function takes three arguments and returns a slice object. This slice object can be used to get a subsection of the collection.

Python slice() Function Example

```
# Calling function
result = slice(5) # returns slice object
result2 = slice(0,5,3) # returns slice object
# Displaying result
print(result)
print(result2)
```

Output:

```
slice(None, 5, None)
slice(0, 5, 3)
```

Python sorted() Function

Python **sorted()** function is used to sort elements. By default, it sorts elements in an ascending order but can be sorted in descending also. It takes four arguments and returns a collection in sorted order. In the case of a dictionary, it sorts only keys, not values.

Python sorted() Function Example

```
str = "PythonProgram" # declaring string
```

```
# Calling function
sorted1 = sorted(str) # sorting string
# Displaying result
print(sorted1)
```

Python next() Function

Python **next()** function is used to fetch next item from the collection. It takes two arguments, i.e., an iterator and a default value, and returns an element.

This method calls on iterator and throws an error if no item is present. To avoid the error, we can set a default value.

Python next() Function Example

```
number = iter([256, 32, 82]) # Creating iterator
# Calling function
item = next(number)
# Displaying result
print(item)
# second item
item = next(number)
print(item)
# third item
item = next(number)
print(item)
```

Output:

```
256
32
82
```

Python input() Function

Python **input()** function is used to get an input from the user. It prompts for the user input and reads a line. After reading data, it converts it into a string and returns it. It throws an error **EOFError** if EOF is read.

Python input() Function Example

```
# Calling function
val = input("Enter a value: ")
# Displaying result
print("You entered:",val)
```

Output:

```
Enter a value: 45
You entered: 45
```

Python int() Function

Python **int()** function is used to get an integer value. It returns an expression converted into an integer number. If the argument is a floating-point, the conversion truncates the number. If the argument is outside the integer range, then it converts the number into a long type.

If the number is not a number or if a base is given, the number must be a string.

Python int() Function Example

```
# Calling function
val = int(10) # integer value
val2 = int(10.52) # float value
val3 = int('10') # string value
# Displaying result
print("integer values :",val, val2, val3)
```

Output:

```
integer values : 10 10 10
```

Python isinstance() Function

Python **isinstance()** function is used to check whether the given object is an instance of that class. If the object belongs to the class, it returns true. Otherwise returns False. It also returns true if the class is a subclass.

The **isinstance()** function takes two arguments, i.e., object and classinfo, and then it returns either True or False.

Python isinstance() function Example

```
class Student:
    id = 101
    name = "John"
    def __init__(self, id, name):
        self.id=id
        self.name=name

student = Student(1010,"John")
lst = [12,34,5,6,767]
# Calling function
print(isinstance(student, Student)) # isinstance of Student class
print(isinstance(lst, Student))
```

Output:

```
True
False
```

Python oct() Function

Python **oct()** function is used to get an octal value of an integer number. This method takes an argument and returns an integer converted into an octal string. It throws an error **TypeError**, if argument type is other than an integer.

Python oct() function Example

```
# Calling function
val = oct(10)
# Displaying result
print("Octal value of 10:",val)
```

Output:

```
Octal value of 10: 0o12
```

Python ord() Function

The python **ord()** function returns an integer representing Unicode code point for the given Unicode character.

Python ord() function Example

```
# Code point of an integer
print(ord('8'))

# Code point of an alphabet
print(ord('R'))

# Code point of a character
print(ord('&'))
```

Output:

```
56
82
38
```

Python pow() Function

The python **pow()** function is used to compute the power of a number. It returns x to the power of y. If the third argument(z) is given, it returns x to the power of y modulus z, i.e. (x, y) % z.

Python pow() function Example

```
# positive x, positive y (x**y)
print(pow(4, 2))

# negative x, positive y
print(pow(-4, 2))

# positive x, negative y (x**-y)
print(pow(4, -2))

# negative x, negative y
```

```
print(pow(-4, -2))
```

Output:

```
16
16
0.0625
0.0625
```

Python print() Function

The python **print()** function prints the given object to the screen or other standard output devices.

Python print() function Example

```
print("Python is programming language.")

x = 7
# Two objects passed
print("x =", x)

y = x
# Three objects passed
print('x =', x, '= y')
```

Output:

```
Python is programming language.
x = 7
x = 7 = y
```

Python range() Function

The python **range()** function returns an immutable sequence of numbers starting from 0 by default, increments by 1 (by default) and ends at a specified number.

Python range() function Example

```
# empty range
print(list(range(0)))
```

```
# using the range(stop)
print(list(range(4)))

# using the range(start, stop)
print(list(range(1,7 )))
```

Output:

```
[]
[0, 1, 2, 3]
[1, 2, 3, 4, 5, 6]
```

Python reversed() Function

The python **reversed()** function returns the reversed iterator of the given sequence.

Python reversed() function Example

```
# for string
String = 'Java'
print(list(reversed(String)))

# for tuple
Tuple = ('J', 'a', 'v', 'a')
print(list(reversed(Tuple)))

# for range
Range = range(8, 12)
print(list(reversed(Range)))

# for list
List = [1, 2, 7, 5]
print(list(reversed(List)))
```

Output:

```
['a', 'v', 'a', 'J']
['a', 'v', 'a', 'J']
[11, 10, 9, 8]
[5, 7, 2, 1]
```

Python round() Function

The python **round()** function rounds off the digits of a number and returns the floating point number.

Python round() Function Example

```
# for integers
print(round(10))

# for floating point
print(round(10.8))

# even choice
print(round(6.6))
```

Output:

```
10
11
7
```

Python issubclass() Function

The python **issubclass()** function returns true if object argument(first argument) is a subclass of second class(second argument).

Python issubclass() Function Example

```
class Rectangle:
  def __init__(rectangleType):
    print('Rectangle is a ', rectangleType)

class Square(Rectangle):
  def __init__(self):
    Rectangle.__init__('square')

print(issubclass(Square, Rectangle))
print(issubclass(Square, list))
print(issubclass(Square, (list, Rectangle)))
```

```
print(issubclass(Rectangle, (list, Rectangle)))
```

Output:

```
True
False
True
True
```

Python str

The python **str()** converts a specified value into a string.

Python str() Function Example

```
str('4')
```

Output:

```
'4'
```

Python tuple() Function

The python **tuple()** function is used to create a tuple object.

Python tuple() Function Example

```
t1 = tuple()
print('t1=', t1)

# creating a tuple from a list
t2 = tuple([1, 6, 9])
print('t2=', t2)

# creating a tuple from a string
t1 = tuple('Java')
print('t1=',t1)

# creating a tuple from a dictionary
t1 = tuple({4: 'four', 5: 'five'})
print('t1=',t1)
```

Output:

```
t1= ()
t2= (1, 6, 9)
t1= ('J', 'a', 'v', 'a')
t1= (4, 5)
```

Python type()

The python **type()** returns the type of the specified object if a single argument is passed to the type() built in function. If three arguments are passed, then it returns a new type object.

Python type() Function Example

```
List = [4, 5]
print(type(List))

Dict = {4: 'four', 5: 'five'}
print(type(Dict))

class Python:
    a = 0

InstanceOfPython = Python()
print(type(InstanceOfPython))
```

Output:

```
<class 'list'>
<class 'dict'>
<class '__main__.Python'>
```

Python vars() function

The python **vars()** function returns the __dict__ attribute of the given object.

Python vars() Function Example

```
class Python:
```

```
    def __init__(self, x = 7, y = 9):
      self.x = x
      self.y = y

InstanceOfPython = Python()
print(vars(InstanceOfPython))
```

Output:

```
{'y': 9, 'x': 7}
```

Python zip() Function

The python **zip()** Function returns a zip object, which maps a similar index of multiple containers. It takes iterables (can be zero or more), makes it an iterator that aggregates the elements based on iterables passed, and returns an iterator of tuples.

Python zip() Function Example

```
numList = [4,5, 6]
strList = ['four', 'five', 'six']

# No iterables are passed
result = zip()

# Converting itertor to list
resultList = list(result)
print(resultList)

# Two iterables are passed
result = zip(numList, strList)

# Converting itertor to set
resultSet = set(result)
print(resultSet)
```

Output:

```
[]
{(5, 'five'), (4, 'four'), (6, 'six')}
```