Programming and Problem Solving through Python Language
O Level / A Level

Chapter - 6 : Functions

Function

A function is a block of organized, reusable code that is used to perform a single, related action. Functions provide better modularity for application and a high degree of code reusing.

Types of functions

1) **Predefined standard library functions** – such as input(), list(), str(), format() etc – These are the functions which already have a definition library files, so we just call them whenever there is a need to use them.
2) **User Defined functions –** The functions that we create in a program are known as user defined functions.

Need functions in C

Functions are used because of following reasons –

1) To improve the readability of code.
2) Improves the reusability of the code, same function can be used in any program rather than writing the same code from scratch.
3) Debugging of the code be easier if you use functions, as errors are easy to be traced.
4) Reduces the size of the code, duplicate set of statements are replaced by function calls.

Syntax of a function

```
def functionname( parameters ):
   "function_docstring"
    function_suite
    return [expression]
```

Function Definition

- A function definition is the actual function and start with the "**def**" keyword.
- The definition contains the code that will be executed.
- The first line of a function definition, called the function header, and specifies the parameter list.
- A function header end with a colon.
- The header is the function body, containing the statements that the function will perform.
- The function body consists of indented statements.
- A return statement should be included to specify the returning a value.

Parameters

- The parameter list consists of none or more parameters.
- Parameters are called arguments, if the function is called.
- Parameter can be mandatory or optional.
- The optional parameters (zero or more) must follow the mandatory parameters.

Program : Write a function to calculate the sum of 2 no and print the result.

```
def sum(a,b):
    "function to calculate the sum of 2 no"
    r=a+b
    print("sum =",r)

a=10
b=20
r=sum(a,b)
```

Program : Write a function to calculate the sum of 2 no and return the result.

```
def sum(a,b):
    "function to calculate the sum of 2 no"
    r=a+b
    return(r)

a=10
b=20
r=sum(a,b)
print("sum =",r)
```

Program : Write a function to find the maximum of 2 no and return the result.

```
def MAX(a,b):
    "function to calculate the sum of 2 no"
    if a>b :
        r=a
    else:
        r=b
    return(r)

a=10
b=20
r=MAX(a,b)
print("Maximum =",r)
```

Note-> Maintaining reference of the passed object and appending values in the same object

Program : Write a function to modify the items in the existing list.

```
def changeme( mylist ):
   "This changes a passed list into this function"
    print ("Values inside the function before change: ", mylist)

    mylist[2]=50
    print ("Values inside the function after change: ", mylist)
    return

# Now you can call changeme function
mylist = [10,20,30]
changeme( mylist )
print ("Values outside the function: ", mylist)
```

Output

```
Values inside the function before change:  [10, 20, 30]
Values inside the function after change:  [10, 20, 50]
Values outside the function:  [10, 20, 50]
```

Note-> argument is being passed by reference and the reference is being overwritten inside the called function

Program : Write a function to modify the items in the existing list.

```
def changeme( mylist ):
   "This changes a passed list into this function"
   mylist = [1,2,3,4] # This would assi new reference in mylist
   print ("Values inside the function: ", mylist)
   return

# Now you can call changeme function
mylist = [10,20,30]
changeme( mylist )
print ("Values outside the function: ", mylist)
```

Output

```
Values inside the function:  [1, 2, 3, 4]
Values outside the function:  [10, 20, 30]
```

Assignment

1. Write a function to find the sum of 4 numbers and return the result.
2. Write a function to calculate the area of rectangle.
3. Write a function to calculate the area of circle.
4. Write a function to calculate the factorial of a number.
5. Write a function to calculate the sum of first 10 natural number.