EXPERIMENT NO: 07

AIM: Use Library functions and user defined functions in python.

THEORY:

Library functions: Library functions are built in functions in python. Following are some of the built in functions.

1. Reduce() :Python's reduce() implements a mathematics technique commonly known as folding or reduction. It reduces a list of items to a single cumulative value. It seperates on any iterable performs the following step :

i) Apply a function to the first two items in a iterable and generates a partial result.

ii) Uses this partial result with third item in the iterable to generate another partial result.

iii) Repeat the process until the iterable is exhausted and then return a single a simple cumulative value

Syntax: functions.reduce(myfunction,iterable,initializer)

2.Map() : Applies a given function to each item of an iterable (list,tuple etc) and return a list of results.

Syntax: map(function, iterable,…)

1)Functions- The function to be called for each element of the specified iterable.

2)Iterables- One or more iterables separated by comma.

3. Filter(): This method filters the given sequence with the help of a function that test each element in sequence to be true or not.

Syntax: filter(function, sequence)

Function- Tests if each element is true or not.

Sequence- Sequence which needs to be filtered, can be set, list etc.

Returns- An iterator that is already filtered.

User defined function: When you don't find a suitable in built function to serve your purpose you can define one. It is a reusable block of code defined to perform a certain task

Lambda: The Lambda keyword is used to define anonymous functions in python usually meant for one time use.

Syntax: lambda(arguments) expression.

The lambda function can have '0' or more arguments after ':' symbol.

When this function is called, the expression after ':' is executed.

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.

a) Creating a function: In Python, we can use def keyword to define the function.

Syntax:

```
def my_function():
 function-suite
 return <expression>
```

b) Calling a function: To call the function, use the function name followed by the parentheses.

```
def hello_world():
 print("hello world")
hello_world()
```

Output:

```
hello world
```

c) Arguments in function: The information into the functions can be passed as the argumenta. The arguments are specified in the parentheses. We can give any number of arguments, but we have to separate them with a comma.

Example

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

Output:

```
hi ABC
```

d) **return** Statement: The statement return [expression] exits a function, optionally passing back an expression to the caller. A return statement with no arguments is the same as return None.

Example

```
# Function definition is here
def sum( arg1, arg2 ):
 # Add both the parameters and return them."
 total = arg1 + arg2
 print "Inside the function: ", total
 return total;
# Now you can call sum function
total = sum(10, 20 );
print "Outside the function: ", total
```

Output:

```
Outside the function: 30
```

#PROBLEM DEFINITIONS

(1) Write a script that converts numbers to characters using map function.

```
def num_char(num):
  return char(num)
numbers:[72,69,76,76,79]
characters:map(num_char, numbers)
print(list(characters))
```

OUTPUT

```
[‘H’,’E’,’L’,’L’,’O’]
```

(2) WAP script that gives the ASCII value of characters using map function

```
def ascii(char):
return ord(char)
characters = [‘A’,’B’,’C’,’D’]
ascii_val = map(ascii characters)
print(list(ascii_val))
```

OUTPUT

```
[65,66,67,68]
```

(3) Write a user defined function that square all the numbers in a list. Use a map function.

```
def sq(num):

return num**2

nums[2,4,6,8]

square=map(sq,nums)

print(list(square))
```

OUTPUT

```
[4,16,36,64]
```

(4) Write a user defined function to filter and print only the vowels in a given list and print them (use filter functions).

```
def vowel(n):
v=[‘a’,’e’,’i’,’o’,’u’]
if n in v:
return true
else:
return false
list=[‘a’,’b’,’c’,’d’,’e’,]
vowels=filter(vowel,list)
for I in vowels:
print(i)
```

OUTPUT

```
a

e
```

(5) Write a user defined function to filter out even and odd number in a given list and display the respective list separately (filter function and lambda function)

```
def given (n):

if n in vow:

        return n

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

mylist 2=list(filter(lambda n:nx2==0,mylist2))

print(mylist2)

odd=list(filter(lambda n:n^2!=0,mylist))
```

```
print(odd)
```

OUTPUT

```
[2,4,6,8]

[1,3,5,7,9]
```

(6) **Write a script to calculate the factorial of a number using reduce function.**

```
import functools
def factorial(n):
if n==0:
return 1
else:
return functools.reduce(lambda x,y:x*y, range (I,n+1))
print(factorial(3))
```

OUTPUT

```
6
```

(7) **[i]Write a python script to map the lowercase city name in list into uppercase.Use lambda function.**

```
city=[‘mumbai’,’delhi’,’kolkata’]
low=list(map(lambda x:x.upper(),city)
print(low)
```

OUTPUT

```
[‘MUMBAI’,’DELHI’,’KOLKATA’]
```

[ii]Write a python script to sum all the numbers in a list using reduce and lambda function.

```
from functools import reduce

list=[1,3,7,8,10]

m=reduce(lambda a,b:a+b,list)

print(“sum:”,m)
```

OUTPUT

```
Sum:29
```

[iii] Write a python script to find maximum of all the numbers in a list using reduce and lambda function.

```
from functools import reduce
```

```
list=[1,3,7,8,10]

m=reduce (lambda a,b:a if a>b else b,list)

print(“The maximum is :”,m)
```

OUTPUT

```
The maximum:10
```

CONCLUSION:_ Hereby, we have understood and implemented library functions and user defined functions.

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