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Subject: **Programming Lab1**

Experiment No. 3

AIM: Write programs to analyze lists using map, reduce and filter methods.

THEORY :

● **LIST** : A Python list is an ordered and changeable collection of data objects. Unlike an array, which can contain objects of a single type, a list can contain a mixture of objects. SYNTAX : List_name=[contents]

● **LAMBDA FUNCTIONS :** Python Lambda Functions are anonymous functions meaning that the function is without a name. This function can have any number of arguments but only one expression, which is evaluated and returned. The lambda keyword is used to define an anonymous function in Python. SYNTAX : lambda arguments : expression ➢ Map, Filter, and Reduce are paradigms of functional programming. They allow the programmer (you) to write simpler, shorter code, without necessarily needing to bother about intricacies like loops and branching.

● **MAP** : The map() function in Python takes in a function and a list as an argument. The function is called with a lambda function and a list and a new list is returned which contains all the lambda-modified items returned by that function for each item. It can take any number of iterables. SYNTAX : map(funct, iterables)

● **FILTER** : The filter() function in Python takes in a function and a list as arguments.While map() passes each element in the iterable through a function and returns the result of all elements having passed through the function, filter(), first of all, requires the function to return boolean values (true or false) and then passes each element in the iterable through the function, "filtering" away those that are false. It takes only one iterable. SYNTAX : filter(func, iterable) ● **REDUCE** : The reduce() function in Python takes in a function and a list as an argument. The function is called with a lambda function and an iterable and a new reduced result is returned. This performs a repetitive operation over the pairs of the iterable. reduce() applies a function of two arguments cumulatively to

the elements of an iterable, optionally starting with an initial argument. The reduce() function belongs to the functools module. SYNTAX : reduce(func, iterable)

CODE 1

Python Program to find square of each element in list using map and lambda

```
[8]  n=int(input("How many numbers you want to add in list : "))
     print("Enter ",n," elements")
     l=[]
     for i in range(0,n):
       l.append(int(input()))
     square = list(map(lambda x: x**2,l))
     print(square)
```

```
How many numbers you want to add in list : 5
Enter  5  elements
12
13
11
19
23
[144, 169, 121, 361, 529]
```

CODE 2

Python program to filter element in list as even and odd using filter and lambda

```
n=int(input("How many numbers you want to add in list : "))
print("Enter ",n," elements")

l=[]

for i in range(0,n):
  l.append(int(input()))

odd = filter(lambda x: x % 2 != 0, l)
print("Odd elements in list : ",list(odd))

even = filter(lambda x: x % 2 == 0, l)
print("Even elements in list : ",list(even))
```

```
How many numbers you want to add in list : 7
Enter  7  elements
23
56
77
20
11
56
87
Odd elements in list :  [23, 77, 11, 87]
Even elements in list :  [56, 20, 56]
```

CODE 3

Python program to add all elements in list using reduce and lambda

```
from functools import reduce
n=int(input("How many numbers you want to add in list : "))
print("Enter ",n," elements")

l=[]

for i in range(0,n):
  l.append(int(input()))

print("Result of adding all numbers in list : ")
addList = reduce(lambda x,y: x + y,l)
print(addList)
```

```
How many numbers you want to add in list : 5
Enter  5  elements
34
45
21
67
88
Result of adding all numbers in list :
255
```

CODE 4

Python program to check if the first letter of the name is capital.

```
n=int(input("How many names you want to add in list : "))
print("Enter ",n," names")

l=[]

for i in range(0,n):
  l.append(input())

names = list(filter(lambda a:a[0].isupper(),l))
print("Names with first letter capital ", names)
```

```
How many names you want to add in list : 5
Enter  5  names
Manav
John
paul
Pete
Marsh
Names with first letter capital  ['Manav', 'John', 'Pete', 'Marsh']
```

CONCLUSION : Thus we learnt about 3 different built-in functions of python map() ,reduce() and filter() and understand their uses in different instances. We also learnt to reduce the lines of code and also how to avoid using loops using these functions.Using these we have coded multiple amounts of different codes in which we have implemented these functions.