Lab10. Implementation of Map, Filter and Reduce Function

Question1. Write a program to implement MAP function. Find the square root of a list of numbers [1, 2, 4, 6] using map and sqrt functions. Check the answer against your user defined function mymap().

In [9]:

```python
from math import sqrt
lst=[1,2,4,6]
map_object=map(sqrt,lst)
print(list(map_object))


def mymap(f, seq):
    result = []
    for elt in seq:
        result.append(f(elt))
    return result
mymap(sqrt,lst)
```

```
[1.0, 1.4142135623730951, 2.0, 2.449489742783178]
```

Out[9]:

```
[1.0, 1.4142135623730951, 2.0, 2.449489742783178]
```

Question2. Write a program to implement FILTER function. Filter all upper case letters in a list ['x', 'Y', '2', '3', 'Z', 'b'] using filter function. Check the answer against your user define function myfilter().

In [16]:

```python
filter_object=filter(str.isupper,['x', 'Y', '2', '3', 'Z', 'b'])
print(list(filter_object))

def filter(f, seq):
    result = []
    for elt in seq:
        if f(elt):
            result.append(elt)
    return result
filter(str.isupper,['x', 'Y', '2', '3', 'Z', 'b'])
```

```
['Y', 'Z']
```

Out[16]:

```
['Y', 'Z']
```

Question3.Write a program to create a lambda function that takes two characters and concatenates them. Now, apply this function inside REDUCE function that will reduce the list of characters ['a', 'b', 'c', d'] with the intial value 'x'.

In [26]:

```python
from functools import reduce
(lambda x,y:x+y)('a','b')
reduce (lambda x,y:x+y,['a','b','c','d'],'x')
```

Out[26]:

```
'xabcd'
```

Question4. Imagine an accounting routine used in a book shop. It works on a list with sublists, which look like this:

Write a Python program, which returns a list with 2-tuples. Each tuple consists of an order number and the product of the price per items and the quantity. The product should be decreased by RS 10 if the value of the order is smaller than RS 100.00. Write a Python program using lambda and map functions.

In [1]:

```
tab = [[34587,'Learning Python , Mark Lutz',4,40.95],
       [98762,'Programming Python , Mark Lutz',5,56.80],
       [77226,'Head first Python , Paul Barry',3,32.95],
       [88112,'Einfuhrung in Python , Bernd Klein',3,24.99]]
print(*tab, sep='\n')
```

```
[34587, 'Learning Python , Mark Lutz', 4, 40.95]
[98762, 'Programming Python , Mark Lutz', 5, 56.8]
[77226, 'Head first Python , Paul Barry', 3, 32.95]
[88112, 'Einfuhrung in Python , Bernd Klein', 3, 24.99]
```

In [2]:

```
prg = []
prg1 = []
final = []
nprg = []
for i in range(4):
    j=tab[i][2]*tab[i][3]
    if j < 100:
        j = j - 10
        nprg.append(round(j,2))
    else:
        nprg.append(round(j,2))
    prg1.append(tab[i][0])
t1=tuple(prg1)
t2=tuple(nprg)
final.append(t1)
final.append(t2)
print(final)
```

```
[(34587, 98762, 77226, 88112), (163.8, 284.0, 88.85, 64.97)]
```

In [ ]:

Problem Solving Using Python and R Lab
Lab10. Implementation of Map, Filter and Reduce Functions

Reference: https://ocw.mit.edu/ans7870/6/6.005/s16/classes/25-map-filter-reduce/

Question1. Write a program to implement MAP function. Find the square root of a list of numbers [1, 2, 4, 6] using map and sqrt functions. Check the answer against your user defined function **mymap()**.

```
from math.import sqrt
    lst = [1,2,4,6]
    map_object = map(sqrt,lst)
    print( list(map_object))
```

```
def mymap(f, seq):
    result = [ ]
    for elt in seq:
        result.append(f(elt))
    return result
mymap(sqrt, lst)
```

Question2. Write a program to implement FILTER function. Filter all upper case letters in a list ['x', 'Y', '2', '3', 'Z', 'b'] using filter function. Check the answer against your user define function **myfilter()**.

```
filter_object = filter(str.isupper, ['x', 'Y', '2', '3', 'Z', 'b'])

print( list(filter_object))
def filter(f,seq):
    result = [ ]
    for elt in seq:
        if f(elt):
            result.append(elt)
    return result
filter(str.isupper,['x', 'Y', '2', '3', 'Z', 'b'])
```

Question3. Write a program to create a lambda function that takes two characters and concatenates them. Now, apply this function inside REDUCE function that will reduce the list of characters ['a', 'b', 'c', 'd'] with the intial value 'x'.

```
from functools import reduce

(lambda x,y : x+y)('a','b')

reduce(lambda x, y: x+y, ['a', 'b', 'c', 'd'], 'x')
```

Question4. Imagine an accounting routine used in a book shop. It works on a list with sublists, which look like this:

Order No	Book Title and Author	Quantity	Price per Item
34587	Learning Python, Mark Lutz	4	40.95
98762	Programming Python, Mark Lutz	5	56.80
77226	Head First Python, Paul Barry	3	32.95
88112	Einführung in Python3, Bernd Klein	3	24.99

Write a Python program, which returns a list with 2-tuples. Each tuple consists of an order number and the product of the price per items and the quantity. The product should be decreased by RS 10 if the value of the order is smaller than RS 100.00. Write a Python program using **lambda** and **map** functions.

```
tab= [[34587, "Learning Python, Mark Lutz', 4,40.95],

      [98762, 'Programming python, Mask Lutz', 5,56.80],

      [77226, 'Head first Python, Paul Barry', 3, 32.95],

      ['88112, 'Einfuhrung in python, Bernd Klein', 3,34.99]]

print(* tab; sep= '\n')

  Prg= []                          t1= tuple(prg1)

Prg1 = []                          t2 = tuple(nprg)

fnal = []                          fnal. append (t1)

nprg = []                          fnal. append (t2)

for i in range(4):                    print(final)

  j= tab[i][2].* tab[i][3]

  if j<100:

      j= j-10

      nprg. append (round(j,2))

else:

    nprg. append ( round(j,2))

    prg1. append (tab[i][0])
```