Questions on map(), filter() and reduce() Function

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1. Write a Python program to triple all numbers of a given list of integers. Use Python map.

In [16]:
```
list_int = [i for i in range(1,11)]
list_int
```

Out[16]:
```
[1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
```

In [17]:
```
def int_trippler(l):
    return list(map(lambda x : x*3, l))

int_trippler(list_int)
```

Out[17]:
```
[3, 6, 9, 12, 15, 18, 21, 24, 27, 30]
```

2. Write a Python program to add three given lists using Python map and lambda.

In [18]:
```
list1 = [i for i in range(1,10)]
list1
```

Out[18]:
```
[1, 2, 3, 4, 5, 6, 7, 8, 9]
```

In [19]:
```
list2 = [i for i in range(11,20)]
list2
```

Out[19]:
```
[11, 12, 13, 14, 15, 16, 17, 18, 19]
```

In [20]:
```
list3 = [i for i in range(21,30)]
list3
```

Out[20]:
```
[21, 22, 23, 24, 25, 26, 27, 28, 29]
```

In [21]:
```
def list_addition(l1, l2, l3):
    return list(map(lambda x,y,z : x+y+z, l1,l2,l3))

list_addition(list1, list2, list3)
```

Out[21]:
```
[33, 36, 39, 42, 45, 48, 51, 54, 57]
```

3. Write a Python program to listify the list of given strings individually using Python map.

In [11]:
```
l = ["MY", "NAME", "IS", "PYTHON"]

def listifier(input_list):
    return list(map(list, input_list))

listifier(l)
```

Out[11]:
```
[['M', 'Y'], ['N', 'A', 'M', 'E'], ['I', 'S'], ['P', 'Y', 'T', 'H', 'O', 'N']]
```

4. Write a Python program to create a list containing the power of said number in bases raised to the corresponding number in the index using Python map.

In [15]:
```
base_list = [i for i in range(10,101,10)]
base_list
```

Out[15]:
```
[10, 20, 30, 40, 50, 60, 70, 80, 90, 100]
```

In [23]:
```
index_list = [i for i in range(1,11)]
index_list
```

Out[23]:
```
[1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
```

In [24]:
```
def custom_power(base, index):
    return list(map(pow, base, index))

custom_power(base_list, index_list)
```

Out[24]:
```
[10,
 400,
 27000,
 2560000,
 312500000,
 46656000000,
 8235430000000,
 1677721600000000,
 387420489000000000,
 100000000000000000000]
```

5. Write a Python program to square the elements of a list using map() function.

In [25]:
```
list_int = [i for i in range(1,11)]
list_int
```

Out[25]:
```
[1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
```

In [26]:
```
def square_calc(l):
    return list(map(lambda x : x**2, l))

square_calc(list_int)
```

Out[26]:
```
[1, 4, 9, 16, 25, 36, 49, 64, 81, 100]
```

6. Write a Python program to convert all the characters in uppercase and lowercase and eliminate duplicate letters also sort list from a given sequence. Use map() function.

In [36]:
```
list_char = ['a', 'B', 'c', 'd', 'A', 'P', 'p', 'z']
def case_changer_dup_remover(l):
    return sorted(list(set(map(lambda x : (str(x).lower(), str(x).upper()), l))))

case_changer_dup_remover(list_char)
```

Out[36]:
```
[('a', 'A'), ('b', 'B'), ('c', 'C'), ('d', 'D'), ('p', 'P'), ('z', 'Z')]
```

7. Write a Python program to add two given lists and find the difference between lists. Use map() function.

In [37]:
```
list1 = [i for i in range(1,11)]
list1
```

Out[37]:
```
[1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
```

In [38]:
```
list2 = [i for i in range(10,21)]
list2
```

Out[38]:
```
[10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20]
```

In [44]:
```
def list_add_sub(l1, l2):
    return list(map(lambda x,y : (x+y , y-x), l1, l2))

list_add_sub(list1, list2)
```

Out[44]:
```
[(11, 9),
 (13, 9),
 (15, 9),
 (17, 9),
 (19, 9),
 (21, 9),
 (23, 9),
 (25, 9),
 (27, 9),
 (29, 9)]
```

8. Write a Python program to convert a given list of integers in a list and tuple of strings.

In [45]:
```
l_int = [i for i in range(1,11)]
l_int
```

Out[45]:
```
[1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
```

In [47]:
```
def stringify_list(l):
    return list(map(lambda x : str(x), l))

stringify_list(l_int)
```

Out[47]:
```
['1', '2', '3', '4', '5', '6', '7', '8', '9', '10']
```

In [48]:
```
def stringify_list_into_tuple(l):
    return tuple(map(lambda x : str(x), l))

stringify_list_into_tuple(l_int)
```

Out[48]:
```
('1', '2', '3', '4', '5', '6', '7', '8', '9', '10')
```

9. Write a Python program to create a new list taking specific elements from a tuple and convert a string value to integer.

In [123…
```
employee_data  = [('Krish Naik','15/05/1988','65kg'), ('Sudhanshu Kumar','17/05/1986','77kg'),
                  ('Navin Reddy','16/02/1989', '69kg'), ('Sunny Savita','25/09/1990', '65kg')]
```

In [124…
```
employee_name = list(map(lambda x : x[0], employee_data))
employee_name
```

Out[124]:
```
['Krish Naik', 'Sudhanshu Kumar', 'Navin Reddy', 'Sunny Savita']
```

In [125…
```
employee_dob = list(map(lambda x : x[1], employee_data))
employee_dob
```

Out[125]:
```
['15/05/1988', '17/05/1986', '16/02/1989', '25/09/1990']
```

In [126…
```
employee_weight = list(map(lambda x : int(x[2][:2]), employee_data))
employee_weight
```

Out[126]:
```
[65, 77, 69, 65]
```

10. Write a Python program to compute the square of first N Fibonacci numbers, using map function and generate a list of the numbers.

In [11]:
```
import itertools as it

def fib(x=0, y=1):
    yield x
    while True:
        yield y
        x, y = y, x + y
no_of_iterations = 12
l = list(it.islice(fib(), no_of_iterations))

square_fibonacci = list(map(lambda x : x **2, l))
square_fibonacci
```

Out[11]:
```
[0, 1, 1, 4, 9, 25, 64, 169, 441, 1156, 3025, 7921]
```

11. Write a Python program to compute the sum of elements of a given array of integers, use map() function.

In [19]:
```
l_int = [i for i in range(1,101)]
```

In [20]:
```
from array import array as arr
def add(num_array):
    sum = 0
    for i in num_array:
        sum += i
```

```
    return sum

num = arr('i', l_int)

num_array = list(map(int, num))
add(num_array)
```

Out[20]:
```
5050
```

12. Write a Python program to find the ration of positive numbers, negative numbers and zeroes in an array of integers

In [31]:
```
num = arr('i', [1,2,-2,-3,0,5,6,7,8,-7,0,-5,99,-101,-89,0,89])
len(num)
```

Out[31]:
```
17
```

In [38]:
```
def ratio_calc(num):
    n_pos = n_neg = n_zero = 0
    n = len(num)
    for x in num:
        if x == 0:
            n_zero += 1
        elif x > 0:
            n_pos += 1
        elif x < 0:
            n_neg += 1

    return "ratio of positive numbers: {}, negative numbers: {} and zeroes: {}".format(round(n_pos/n,2),
                                                                                       round(n_neg/n,2),
                                                                                       round(n_zero/n,2)
                                                                                        )

int_array = list(map(int, num))
ratio_calc(int_array)
```

Out[38]:
```
'ratio of positive numbers: 0.47, negative numbers: 0.35 and zeroes: 0.18'
```

13. Write a Python program to count the same pair in two given lists. use map() function.

In [54]:
```
import random
l1 = [random.randrange(1,10) for i in range(11)]
l1
```

Out[54]:
```
[4, 2, 6, 4, 3, 9, 1, 6, 2, 4, 7]
```

In [58]:
```
l2 = [random.randrange(1,10) for i in range(11)]
l2
```

Out[58]:
```
[7, 2, 6, 6, 9, 2, 2, 1, 2, 8, 8]
```

In [59]:
```
from operator import eq

def count_same_pair(list1, list2):
    return sum(map(eq, l1, l2))

count_same_pair(l1, l2)
```

Out[59]:
```
3
```

14. Write a Python program to interleave two given list into another list randomly using map() function.

In [62]:
```
import random
l1 = [random.randint(1,20) for i in range(11)]
l2 = [random.randint(1,20) for i in range(11)]
```

In [63]:
```
print(l1)
print(l2)
```

```
[16, 17, 20, 4, 14, 17, 8, 8, 4, 1, 13]
[5, 14, 11, 1, 1, 16, 15, 3, 18, 20, 18]
```

In [69]:
```
def interleave_list(list1, list2):
    """
    This functions adds two list elements in random sequence
    """
    return list(map(next, random.sample([iter(list1)]*len(list1) + [iter(list2)]*len(list2), len(list1)+len(l

interleave_list(l1, l2)
```

Out[69]:
```
[16, 17, 20, 4, 14, 5, 14, 11, 17, 8, 8, 4, 1, 1, 16, 1, 13, 15, 3, 18, 20, 18]
```

15. Write a Python program to split a given dictionary of lists into list of dictionaries using map function.

In [74]:
```
dict1 = {"Name" : ["Krish", "Sudhanshu", "Navin"], "Surname" : ["Naik", "Kumar", "Reddy"] }
```

In [76]:
```
def dict_list_of_dict(dict1):
    return list(map(dict, zip(*[[(key, val) for val in value] for key, value in dict1.items()])))
dict_list_of_dict(dict1)
```

Out[76]:
```
[{'Name': 'Krish', 'Surname': 'Naik'},
 {'Name': 'Sudhanshu', 'Surname': 'Kumar'},
 {'Name': 'Navin', 'Surname': 'Reddy'}]
```

16. Write a Python program to convert a given list of strings into list of lists using map function.

In [78]:
```
l_courses = ["DL", "ML", "NLP", "CV"]

def list_of_list(l):
    return list(map(list, l))

list_of_list(l_courses)
```

Out[78]:
```
[['D', 'L'], ['M', 'L'], ['N', 'L', 'P'], ['C', 'V']]
```

17. Write a Python program to convert a given list of tuples to a list of strings using map function.

In [83]:
```
mentors = [("Krish", "Naik"), ("Sudhanshu", "Kumar"), ("Navin", "Reddy"), ("Hitesh", "Choudhary")]

def ListofTuples_to_ListofStrings(l):
    return list(map(lambda x : x[0] + " "+ x[1],l))

ListofTuples_to_ListofStrings(mentors)
```

Out[83]:
```
['Krish Naik', 'Sudhanshu Kumar', 'Navin Reddy', 'Hitesh Choudhary']
```

18. Write a Python program to filter a list of integers using filter function.

In [106…
```
lint = [i for i in range(1,11)]

def even_filter(l):
    return list(filter(lambda x : x % 2 == 0 , l))

even_filter(lint)
```

Out[106]:
```
[2, 4, 6, 8, 10]
```

In [107…
```
def odd_filter(l):
    return list(filter(lambda x : x % 2 != 0 , l))

odd_filter(lint)
```

Out[107]:
```
[1, 3, 5, 7, 9]
```

19. Write a Python program to find intersection of two given arrays using Filter function.

In [104…
```
l1 = [1,2,3,4,5,6,7,8,9,10]
l2 = [2,4,6,8,11,12]

def intersection(list1, list2):
```

```
    return list(filter(lambda x : x in list1 , list2))

intersection(l1, l2)
```

Out[104]:
```
[2, 4, 6, 8]
```

20. Write a Python program to count the even, odd numbers in a given array of integers using filter function.

In [93]:
```
import random
def count_Even_odd(l) :
    even = len(list(filter(lambda x: x % 2 == 0, l)))

    print("Count of Even number in given list is: ", even)
    print("Count of odd number in given list is: ", len(l) - even)

list_num = [random.randrange(1,50) for i in range(10)]
list_num
```

Out[93]:
```
[37, 12, 16, 23, 43, 26, 32, 4, 27, 35]
```

In [94]:
```
count_Even_odd(list_num)
```

```
Count of Even number in given list is:  5
Count of odd number in given list is:  5
```

21. Write a Python program to find palindromes in a given list of strings using filter function.

In [103…
```
l_word = ['php', 'w3r', 'Python', 'abcd', 'Java', 'aaa']

def palindrome_filter(l):
    return list(filter(lambda x : x if x == x[::-1] else '', l))

palindrome_filter(l_word)
```

Out[103]:
```
['php', 'aaa']
```

22. Write a Python program to find all anagrams of a string in a given list of strings using filter function.

In [108…
```
l = ['wxyz', 'wxye', 'zywx', 'zxew', 'yzxw']

from collections import Counter

def anagrams_filter(main_string, list_words):
    return list(filter(lambda x: x if Counter(main_string) == Counter(x) else '', list_words))

anagrams_filter("wxyz", l)
```

Out[108]:
```
['wxyz', 'zywx', 'yzxw']
```

23. Write a Python program to calculate the product of a given list of numbers using reduce function.

In [121…
```
from functools import reduce

l = [i for i in range(1,11)]

def product_reduce(l_int):
    return reduce(lambda x,y : x*y, l_int)

product_reduce(l)
```

Out[121]:
```
3628800
```

24. Write a Python program to calculate the sum of numbers in a given list of numbers using reduce function.

In [122…
```
l_num = [i for i in range(10, 21)]

def sum_reduce(l_int):
```

```
    return reduce(lambda x,y : x+y, l_int)

sum_reduce(l_num)
```

Out[122]: 165

25. Write a Python program to multiply all the numbers in a given list using reduce function.

In [118…
```
l = [4, 3, 2, 2, -1, 18]
l1 = [2.2, 4.12, 6.6, 8.1, 8.3]

def multiply_reduce(l_int):
    return round(reduce(lambda x,y : x*y, l_int), 2)
```

In [119…
```
multiply_reduce(l)
```

Out[119]: -864

In [120…
```
multiply_reduce(l1)
```

Out[120]: 4021.86