



PYTHON FOR COMPUTATIONAL PROBLEM SOLVING

Functional Programming - Filter

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Filter() Function



- Filter function filters the given sequence with the help of a function that tests each element in the sequence to be true or not.
- There are cases where we want to remove a few elements of the input iterable. Then we make use of the filter function.
- **Syntax:** `filter(function, sequence/iterable)`
- **function:** function that tests if each element of a sequence is true or not.
- **sequence:** The sequence which needs to be filtered, it can be sets, lists, tuples, or containers of any iterators.
- **Returns:** an iterator that is already filtered.

Filter() Function



The filter function has the following characteristics.

- Input : an iterable of some number of elements (say n)
- Output: a lazy iterable of 0 to n elements (between 0 and n)
- Elements in the output: apply the callback on each element of the iterable – if the function returns true, then the input element is selected otherwise the input element is rejected.

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Examples

Example 1: Program to list the marks which are greater than 70

marks = [55, 78, 90, 87, 65, 45]

```
def myFunc(m):  
    if m < 70 :  
        return False  
    else:  
        return True
```

```
Distinction = list(filter(myFunc, marks))  
print("Students with marks greater than 70 are", Distinction)
```

Output:

Students with marks greater than 70 are [78, 90, 87]

Examples



Example 2: Function that filters vowels

```
def fun(char):  
    letters = ['a', 'e', 'i', 'o', 'u']  
    if (char in letters):  
        return True  
    else:  
        return False  
  
characters = ['h', 'e', 'l', 'l', 'o', 'w', 'o', 'r', 'l', 'd']  
vowels = list(filter(fun, characters))  
print('The filtered letters are:', vowels)
```

Output

The filtered letters are: ['e', 'o', 'o']

Examples



Example 3 –Use of lambda function to filter out the odd and even numbers from a list.

```
sequence = [0,1, 1, 2, 3, 5, 8,19]
# result contains list of odd numbers
result = filter(lambda x: x % 2 != 0, sequence)
print("The odd number list is",list(result))
```

```
# result contains list of even numbers
result = filter(lambda x: x % 2 == 0, sequence)
print("The even number list is",list(result))
```

Output:

```
The odd number list is [1, 1, 3, 5, 19]
The even number list is [0, 2, 8]
```

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Examples



Example 4: Function to check whether a number is a multiple of 3 using Lambda function in filter function

```
#def is_multiple_of_3(num):  
    return num % 3 == 0
```

```
# Create a list of numbers to filter  
numbers = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]  
result = list(filter(lambda x: is_multiple_of_3(x), numbers))  
print("The list of multiples of 3 is", result)
```

Output:

The list of multiples of 3 is [3, 6, 9]

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Examples



Example 5 : To pickup all words whose length exceeds 5 using map,filter and Lambda function.

```
Names=[ 'Ram', 'Tejas', 'Aditya', 'Ravi', 'Dinesh', 'Raghu' ]  
#finds all names whose length exceeds 5 and converts them to uppercase  
print(list(map(str.upper, filter(lambda name : len(name) > 5, Names))))
```

Output:

```
['ADITYA', 'DINESH']
```




THANK YOU

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