



Department of Computer Science and Engineering (Data Science)

Experiment No 4

Aim: Implement Lambda Functions using Python

Theory:

Lambda Function

A Lambda Function in Python programming is an anonymous function or a function having no name. It is a small and restricted function having no more than one line. Just like a normal function, a Lambda function can have multiple arguments with one expression. In Python, lambda expressions (or lambda forms) are utilized to construct anonymous functions. The lambda keyword is used to declared lambda function in python (just as you use def to define normal functions). Every anonymous function you define in

Syntax of Lambda Function in Python

The formal syntax to write a lambda function is as given below:

lambda p1, p2: expression

Here, p1 and p2 are the parameters which are passed to the lambda function. You can add as many or few parameters as you need. However, notice that we do not use brackets around the parameters as we do with regular functions. The last part (expression) is any valid python expression that operates on the parameters you provide to the function.

Example of lambda function in Python

Now that you know about lambdas let's try it with an example

```
adder = lambda x, y: x + y  
print (adder (1, 2))
```

Here, we define a variable that will hold the result returned by the lambda function.

The lambda keyword used to define an anonymous function. x and y are the parameters that we pass to the lambda function. This is the body of the function, which adds the 2 parameters we passed. Notice that it is a single expression. You cannot write multiple statements in the body of a lambda function.

lambdas in filter ()

The filter function is used to select some elements from a sequence of elements. The sequence can be any iterator like lists, sets, tuples, etc.

The elements which will be selected is based on some pre-defined constraint.

It takes 2 parameters:

A function that defines the filtering constraint

A sequence (any iterator like lists, tuples, etc.)

lambdas in filter (): Example Find the numbers greater than 4 from the given list

For example,



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```
sequences = [10,2,8,7,5,4,3,11,0, 1]
filtered_result = filter (lambda x: x > 4, sequences)
print(list(filtered_result))
```

Here's the output:
 [10, 8, 7, 5, 11]

lambdas in map ()

the map function is used to apply a particular operation to every element in a sequence. Like filter (), it also takes 2 parameters: A function that defines the op to perform on the elements. One or more sequences. For example, here is a program that prints the squares of numbers in each list element:

```
sequences = [10,2,8,7,5,4,3,11,0, 1]
filtered_result = map (lambda x: x*x, sequences)
print(list(filtered_result))
```

Output:

[100, 4, 64, 49, 25, 16, 9, 121, 0, 1]

Lambda reduce

The reduce function, like map (), is used to apply an operation to every element in a sequence. However, it differs from the map in its working.

These are the steps followed by the reduce () function to compute an output:

Step 1) Perform the defined operation on the first 2 elements of the sequence.

Step 2) Save this result

Step 3) Perform the operation with the saved result and the next element in the sequence.

Step 4) Repeat until no more elements are left.

It also takes two parameters. A function that defines the operation to be performedA sequence (any iterator like lists, tuples, etc.) For example, here is a program that returns the product of all elements in a list:

```
from functools import reduce
sequences = [1,2,3,4,5]
product = reduce (lambda x, y: x*y, sequences)
print(product)
```

Import reduce from the functools moduleHere, we define a list called sequences which contains some numbers. We declare a variable called product which will store the reduced valueA lambda function that runs on each element of the list. It will return the product of that number as per the previous result. Print the result returned by the reduce function.



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Lab Assignments to complete in this session

1. Write program using lambda function to display odd numbers from the given the list
2. Write program using lambda function to display addition of all numbers from the given the list
3. Write program using lambda function to Multiply all the elements from the given list by 5
4. Write program using lambda function to display numbers divisible by 9 from the given the list
5. Write a Python program to sort a list of tuples using Lambda.
Original list of tuples:
[('English', 88), ('Science', 90), ('Maths', 97), ('Social sciences', 82)]
Sorting the List of Tuples:
[('Social sciences', 82), ('English', 88), ('Science', 90), ('Maths', 97)]
6. Write a Python program to find the intersection of two given arrays using Lambda
Original arrays:
[1, 2, 3, 5, 7, 8, 9, 10]
[1, 2, 4, 8, 9]
Intersection of the said arrays: [1, 2, 8, 9]
7. Write a Python program to count the even and odd numbers in each array of integers using Lambda.
Original arrays:
[1, 2, 3, 5, 7, 8, 9, 10]
Number of even numbers in the above array: 3
Number of odd numbers in the above array: 5
8. Write a Python program to add two given lists using map and lambda.
Original list:
[1, 2, 3]
[4, 5, 6]
Result: after adding two list
[5, 7, 9]



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