**Lab Exercise 2- Functional Programming in Python**

**1. Using map() with lambda**

The map() function applies a given function to all the items in an iterable (like a list) and returns a new iterable with the results.

**Task**: You are given a list of numbers. Use map() and a lambda function to square each number in the list.

# List of numbers

numbers = [1, 2, 3, 4, 5]

# Use map() with lambda to square each number

squared\_numbers = list(map(lambda x: x \*\* 2, numbers))

# Print the result

print(squared\_numbers)

**2. Using filter() with lambda**

The filter() function is used to filter items from an iterable based on a function that returns True or False.

**Task**: Given a list of numbers, use filter() and a lambda function to select only the even numbers.

# List of numbers

numbers = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]

# Use filter() with lambda to filter even numbers

even\_numbers = list(filter(lambda x: x % 2 == 0, numbers))

# Print the result

print(even\_numbers)

**3. Using reduce() with lambda**

The reduce() function applies a function of two arguments cumulatively to the items of an iterable, reducing the iterable to a single value. (Note: reduce() is available in the functools module).

**Task**: Use reduce() and a lambda function to calculate the product of all elements in a list.

from functools import reduce

# List of numbers

numbers = [1, 2, 3, 4, 5]

# Use reduce() with lambda to compute the product of all numbers

product = reduce(lambda x, y: x \* y, numbers)

# Print the result

print(product)

**4. Using list.sort() with lambda**

You can sort a list in place using the list.sort() method. A lambda function can be provided to define a custom sorting key.

**Task**: Given a list of tuples representing (name, age), use list.sort() to sort the list by age in ascending order.

# List of tuples (name, age)

people = [('Alice', 25), ('Bob', 30), ('Charlie', 20), ('David', 35)]

# Use list.sort() with lambda to sort by age

people.sort(key=lambda x: x[1])

# Print the sorted list

print(people)