Programming with Python March 03-04 2025

Note: Brief Summary of contents discussed.

Lambda And Map

Lambda function: A lambda function in Python is an anonymous (unnamed) function defined using the lambda keyword. It can take **any number of arguments but only one expression**, which is evaluated and returned.

Basic Syntax: `lambda arguments: expression`

#Add two numbers

```
add = lambda x, y: x + y

print(add(3, 5))
```

#Square a number

```
square = lambda x: x**2

print(square(4))
```

#Check even or odd

```
is_even = lambda x: "Even" if x % 2 == 0 else
"Odd"

print(is_even(7))
```

#Sum of cubes of two numebrs

```
sum2cubes  = lambda x, y: x**3 + y**3

sum2cubes(2, 3)
```

Map: In Python, map is used for applying a given function to each element of an iterable/sequence such as lists and returns a map object (which can be converted into a list or sequence)

```
result = map(function, iterable/sequence object)
```

Examples/Exercises :

1. Find cube of every element in a list using map and lambda.

```
lst = [1, 2, 3, 4, 5]
list(map(lambda x: x**3, lst)
#[[1, 8, 27, 64, 125]
```

2. Find the absolute value of each element in a list using map.

```
#Using Built-in function abs
list(map(abs, (-1, 2, -10, 2))
[1, 2, 10, 2]
```

—

```
#user defined function
def my_absolute(x):
    return x if x > 0 else -x
list(map(myabs, (-1, 2, -10, 2))
[1, 2, 10, 2]
```

3. Given a list of numbers, use map() to return a list with each number squared.

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

Output: [1, 4, 9, 16, 25]

4. Convert a list of numeric strings into integers using map().

   str_numbers = ['10', '20', '30', '40']

   # Output: [10, 20, 30, 40]

5. Given a list of lowercase words, use map() to capitalize the first letter of each word.

```
words = ['python', 'map', 'function']

# Output: ['Python', 'Map', 'Function']

def my_capitalize(st):

    return st[0].upper() + st.lower[1:].lower()

list(map(my_capitalize, words))
```

6. Use map() to add two lists of numbers element by element.

   list1 = [1, 3, 5]

   list2 = [2, 4, 6]

   # Output: [3, 7, 11]

7. Use map to Convert Temperature from Celsius to Fahrenheit

   Formula: F=(C×1.8)+32F = (C \times 1.8) + 32F=(C×1.8)+32

   temps_celsius = [0, 20, 37, 100]

   # Output: [32.0, 68.0, 98.6, 212.0]

8. Given a list of words, return a list containing the length of each word.

   words = ['map', 'lambda', 'function', 'python']

   # Output: [3, 6, 8, 6]

Exercises:

1. Flatten a nested list

```
nested_list = [[1, 2, 3], [4, 5], [6, 7, 8, 9]]
flattened_list = [item for sublist in nested_list
for item in sublist]
print(flattened_list)
# Output: [1, 2, 3, 4, 5, 6, 7, 8, 9]
```

2. Find Prime Numbers in a Range (1-100)

```
primes = [x for x in range(2, 101) if all(x % i !=
0 for i in range(2, int(x**0.5) + 1))]
print(primes)
# Output: [2, 3, 5, 7, 11, 13, 17, ..., 97]
```

3. Transpose a Matrix

```
matrix = [[1, 2], [3, 4], [5, 6]]
transposed = [[row[i] for row in matrix] for i in
range(len(matrix[0]))]
print(transposed)
# Output: [[1, 3, 5], [2, 4, 6]]
```

4. Find Pairs with a Specific Sum (Sum = 10)

```
numbers = [1, 2, 3, 7, 8, 9]
pairs = [(x, y) for i, x in enumerate(numbers) for
y in numbers[i+1:] if x + y == 10]
print(pairs)
# Output: [(1, 9), (2, 8), (3, 7)]
```

5. Count Vowels in Each Word

```
words = ["python", "education", "data", "science"]

vowel_count =
{word: sum(1 for letter in word if letter.lower()
in 'aeiou') for word in words}

print(vowel_count)

# Output: {'python': 1, 'education': 5, 'data': 2,
'science': 3}
```

6. Given a list of email addresses that might have extra spaces or uppercase letters, write a function to clean them.

7. Given a matrix (list of lists), transpose it using list comprehension:

```
matrix = [[1, 2], [3, 4], [5, 6]]

# Output: [[1, 3, 5], [2, 4, 6]]

[[e[0] for e in matrix] for i in
range(len(matrix[0]))]
```