Week 2: Data Structures and Functions

Objective

Understand Python lists, tuples, dictionaries, sets, and functions.
Implement lambda functions and recursion.
Develop a data cleaning script.

Tasks Completed

Basic Python Programs:
- Sum of squares using list comprehension.
- Filtering even numbers using lambda functions.
- Factorial calculation using recursion.

Client Project:
- Created a script to remove duplicates and filter data based on conditions.

Python Scripts

1. Sum of Squares using List Comprehension

```
python
numbers = [1, 2, 3, 4, 5]
squares = [x**2 for x in numbers]
print("Squares:", squares)
```

OUTPUT:

```
========== RESTART: /Users
/achu/Documents/week1_1.py ==========
==========
Squares: [1, 4, 9, 16, 25]
>>>
```

2. Filtering Even Numbers using Lambda Function

```
python
numbers = [10, 15, 20, 25, 30]
even_numbers = list(filter(lambda x: x % 2 == 0, numbers))
print("Even Numbers:", even_numbers)
```

OUTPUT:

```
========== RESTART: /Users/achu/Documents/week1_1.py ==========
Even Numbers: [10, 20, 30]
>>>
```

3. Factorial Calculation using Recursion

```
python
def factorial(n):
    return 1 if n == 0 else n * factorial(n - 1)
num = int(input("Enter a number: "))
print(f"Factorial of {num} is {factorial(num)}")
```

OUTPUT:

```
========== RESTART: /Users/achu/Documents/week1_1.py ==========
Enter a number: 45
Factorial of 45 is 119622220865480194561963161495657715064383733760000000000
>>>
```

4. Data Cleaning Script (Removing Duplicates and Filtering Data)

```
python
data = ["apple", "banana", "apple", "cherry", "banana", "date"]
unique_data = list(set(data)) # Remove duplicates
filtered_data = [item for item in unique_data if len(item) > 5] # Filter items with more than 5 letters
print("Cleaned Data:", filtered_data)
```

OUTPUT:

```
========== RESTART: /Users/achu/Documents/week1_1.py ==========
Cleaned Data: ['banana', 'cherry']
>>>
```

Key Learnings

Learned different Python data structures and their use cases.

Implemented lambda functions and recursion effectively.

Developed a practical script for data cleaning and transformation.

Conclusion

Week 2 focused on Python's powerful data structures and functions.

The hands-on practice helped in understanding how to manipulate and clean data efficiently.