Object Oriented Programming

1. E-commerce Product Management

Scenario: You are developing an e-commerce system. Create a class Product with attributes name, price, and stock.

- Write a method purchase(quantity) that decreases stock and calculates the total price.
- Handle cases where requested quantity exceeds available stock.

2. Library Book Lending System

Scenario: You are designing a library system. Create a class Book with attributes title, author, and is_available.

- Implement methods borrow() and return_book() that update availability.
- Ensure a borrowed book cannot be re-borrowed until returned.

Inheritance

Employee Salary Management

Scenario: You need a system for employee types with different salaries.

- Create a base class Employee with attributes name and base_salary.
- Define a subclass Manager that inherits from Employee and adds bonus.
- Write a method calculate_salary() to compute the total salary.

Regex

1. Find Dates in DD/MM/YYYY Format

- Write a regex to detect dates formatted as 23/05/2025 or 05/12/1999.
- Example valid inputs: 30/01/2023, 01/08/2000
- Example invalid inputs: 32/13/2023, 2025/05/23

2. Validate Strong Passwords

Create a regex to enforce password rules:

- At least **8 characters** long.
- Contains **one uppercase letter**.
- Contains **one number**.
- Contains **one special character** (@, $, #, !, etc.).

3. Extract URLs from Text

- Write a regex to find URLs in a document.
- Example valid inputs: https://example.com, www.testsite.org
- Hint: Handle both http:// and https:// cases.

String Manipulation

1. **Reverse Words in a Sentence**
   - Given a string "Hello World" write a function to reverse only the words while maintaining their order.
   - Expected Output: "olleH dlroW"
2. **Check for Anagrams**
   - Write a function that checks whether two strings are anagrams (contain the same characters but in different order).
   - Example: "listen" and "silent" should return True.

3. **Find Most Frequent Character in a String**

- Given a string, find the character that appears the most and return it along with the count.
- Example: "banana" → Most frequent: a (3 times).

Date and Time Handling

1. **Find the Difference Between Two Dates**
   - Write a function that calculates the number of days between two given dates.
   - Example Input: ('2025-05-05', '2025-05-10') → Output: 5 days.
2. **Check If a Year is a Leap Year**
   - Create a function that determines if a given year is a leap year.
   - Example Input: 2024 → Output: True, 2023 → Output: False.