Laboratory Work #0 - SOLID

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Git repository: https://github.com/livia994/lab_tmps

Objectives:

- Get familiar with the SOLID Principles;
- Choose a specific domain;
- Implement 2 SOLID letters in a simple project.

Used SOLID Principles:

- Single Responsibility Principle
- Open/Closed Principle

Implementation

This implementation follows the Single Responsibility Principle by dividing responsibilities among different classes: Book for storing book data, *BookManager* for managing the collection of books, and *BorrowManager* for handling book borrowing. It also adheres to the Open/Closed Principle by allowing easy extension of borrowing policies (e.g., *StandardPolicy*, *PremiumPolicy*) without modifying existing code.

```
class Book:
    def __init__(self, title, author):
        self.title = title
        self.author = author
        self.borrowed = False


class BookManager:
    def __init__(self):
        self.books = []

    def add_book(self, book):
        self.books.append(book)


class BorrowPolicy:
    def can_borrow(self, borrowed_count):
```

```
        raise NotImplementedError


class StandardPolicy(BorrowPolicy):
    def can_borrow(self, borrowed_count):
        return borrowed_count < 3```
```

Output:

```
Library Books:
Title: The Great Gatsby, Author: F. Scott Fitzgerald, Status: Available
Title: 1984, Author: George Orwell, Status: Available
Title: To Kill a Mockingbird, Author: Harper Lee, Status: Available
You have borrowed 'The Great Gatsby'
You have borrowed '1984'
Cannot borrow 'To Kill a Mockingbird'.

After Borrowing:
Title: The Great Gatsby, Author: F. Scott Fitzgerald, Status: Borrowed
Title: 1984, Author: George Orwell, Status: Borrowed
Title: To Kill a Mockingbird, Author: Harper Lee, Status: Available
You have returned 'The Great Gatsby'
You have borrowed 'To Kill a Mockingbird'

Final Status:
Title: The Great Gatsby, Author: F. Scott Fitzgerald, Status: Available
Title: 1984, Author: George Orwell, Status: Borrowed
Title: To Kill a Mockingbird, Author: Harper Lee, Status: Borrowed
```

Conclusion:

In this laboratory work, I successfully implemented two SOLID principles—**Single Responsibility Principle (SRP)** and **Open/Closed Principle (OCP)**—in a book-related project. By adhering to SRP, the code was structured with clear, well-defined responsibilities across classes, making it easier to understand, maintain, and test. Each class had a single focus, reducing complexity and promoting cleaner code.

By applying OCP, the project was designed to allow future extensions (such as new borrowing policies) without modifying existing code. This promotes flexibility and reduces the risk of introducing bugs when making updates. Together, these principles enhance code scalability, maintainability, and adaptability, ensuring that the system can evolve over time without requiring significant rework.