Field of Study

Computer Science

1 Problem Suitable for Object-Oriented Design

Identified Problem

The selected problem is a **Library Management System**. A library needs to manage books, registered members, and borrowing operations. The system must track available books, members, and loan transactions.

Justification

This problem is well suited for object-oriented design because:

- It is composed of real-world entities such as books and users

- Each entity has clear responsibilities

- The system can be easily extended

- It naturally supports encapsulation, inheritance, and polymorphism

2 Static and Dynamic Aspects of the Objects

2.1 Book Object

Static aspects (attributes):

- title

- author

- ISBN

- availability status

Dynamic aspects (methods):

- borrow()

- returnBook()

- getDetails()

2.2   Member Object

Static aspects (attributes):

- member ID

- name

- list of borrowed books

Dynamic aspects (methods):

- borrowBook()

- returnBook()

2.3   Library Object

Static aspects (attributes):

- list of books

- list of members

Dynamic aspects (methods):

- addBook()

- removeBook()

- registerMember()

3   Inheritance

A general class **Member** can be extended into specialized classes:

- StudentMember

- TeacherMember

These subclasses inherit common attributes and methods from the Member class.