Software Requirements Specification (SRS) for Library Management System

1. Introduction

1.1 Purpose

The purpose of this document is to define the software requirements for a Library Management System (LMS). This document serves as a guideline for developers, testers, and stakeholders to understand the system's functionalities and constraints.

1.2 Scope

The LMS is designed to facilitate the management of library resources, including books, journals, and digital media. It supports user registration, book lending, inventory management, and report generation. The system aims to improve operational efficiency, reduce manual errors, and enhance user experience.

1.3 Definitions, Acronyms, and Abbreviations

- **LMS**: Library Management System
- **ISBN**: International Standard Book Number
- **UI**: User Interface

1.4 References

- IEEE Software Requirements Specification Template

1.5 Overview

This document outlines the functionalities, design constraints, and requirements for the LMS. It details user interactions, system operations, and expected outcomes.

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2. Overall Description

2.1 Product Perspective

The LMS will replace the existing manual library management system. It integrates with third-party APIs for ISBN verification and supports multi-user roles.

2.2 Product Features

- User registration and authentication
- Book catalog management
- Borrowing and returning of books
- Overdue notifications
- Inventory tracking
- Reporting and analytics

2.3 User Classes and Characteristics

- **Librarians**: Manage inventory, issue books, and generate reports.
- **Students/Users**: Search, borrow, and return books.
- **Administrators**: Configure system settings and manage user roles.

2.4 Operating Environment

- Web-based application accessible via modern browsers
- Supported on desktop and mobile devices
- Database: MySQL or PostgreSQL

2.5 Design and Implementation Constraints

- The system must comply with data privacy regulations (e.g., GDPR).
- Maximum response time for user queries should not exceed 3 seconds.

2.6 Assumptions and Dependencies

- Reliable internet connection is required.
- ISBN verification relies on external APIs.

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3. Specific Requirements

3.1 Functional Requirements

1. **User Management**
    - Users can register, login, and update profiles.
    - Admins can manage user roles and permissions.
2. **Book Management**
    - Librarians can add, edit, or remove book records.
    - The system supports searching by title, author, and ISBN.
3. **Borrowing System**
    - Users can borrow and return books.
    - The system tracks due dates and sends reminders for overdue items.
4. **Reporting**
    - Generate reports on borrowed books, inventory, and overdue items.

3.2 Non-functional Requirements

- **Performance**: System should support up to 500 concurrent users.
- **Usability**: User-friendly UI with accessibility features.
- **Security**: Role-based access control and encrypted data storage.
- **Scalability**: Support future expansion to include e-books.

3.3 External Interface Requirements

- **API Integration**: ISBN verification API.
- **UI/UX**: Intuitive design following accessibility standards.

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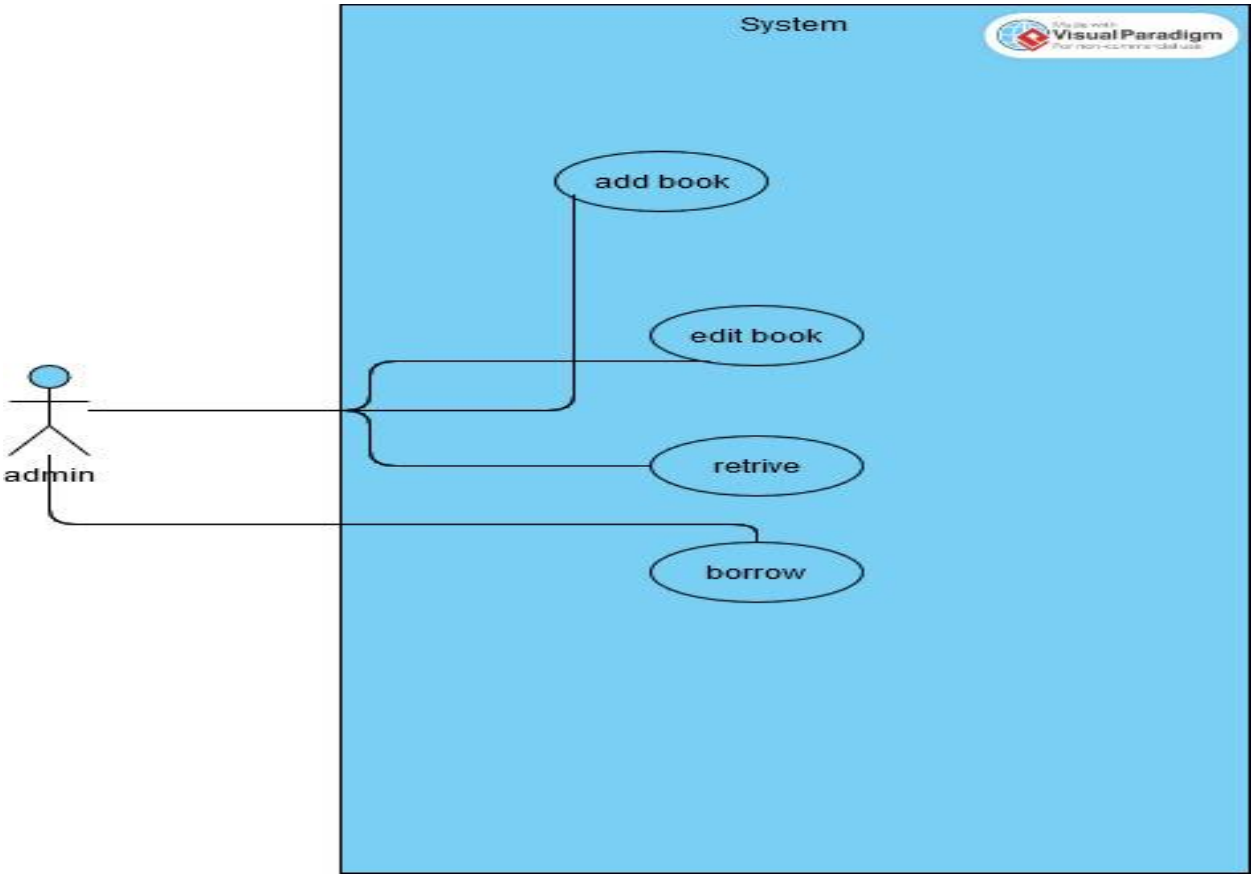
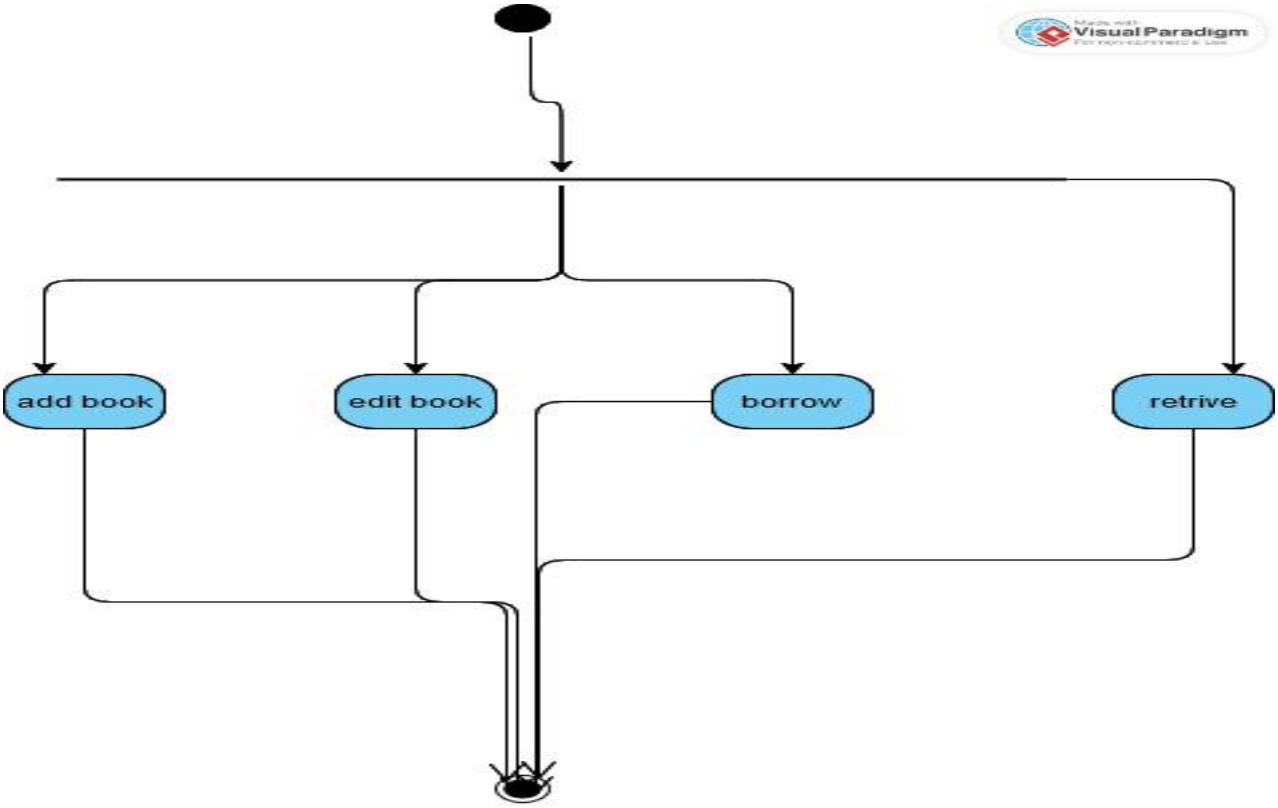
4. System Design

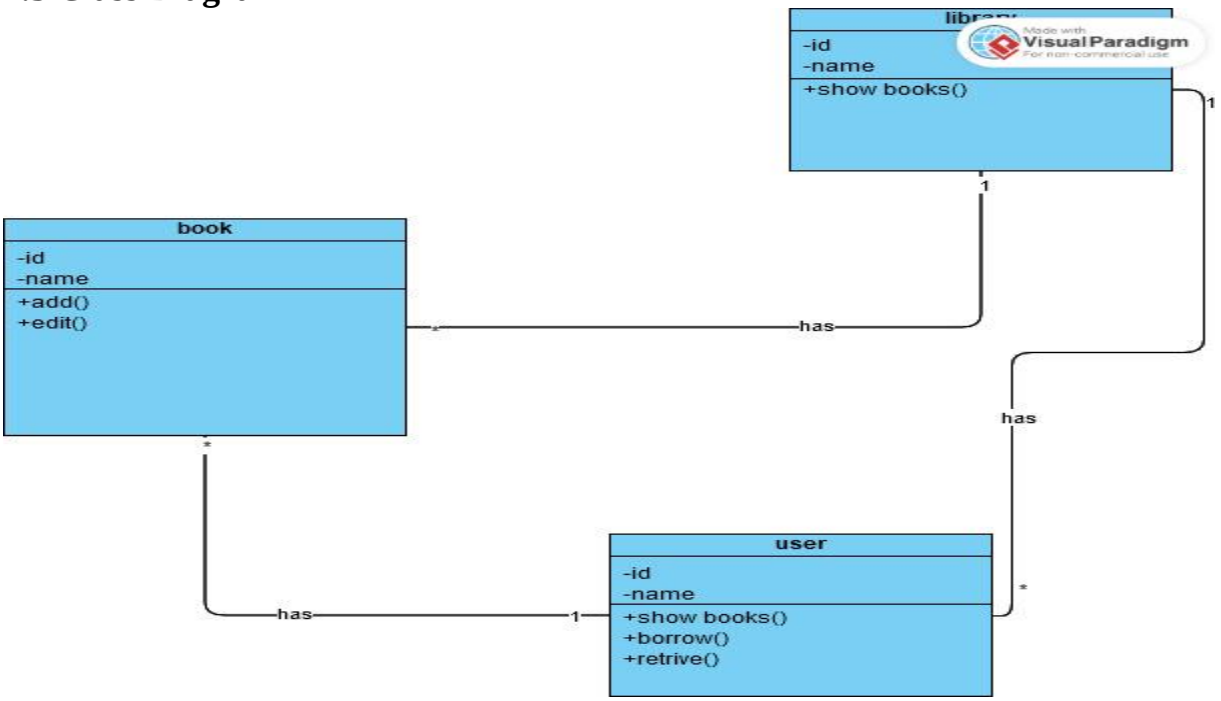
4.1 Use Case



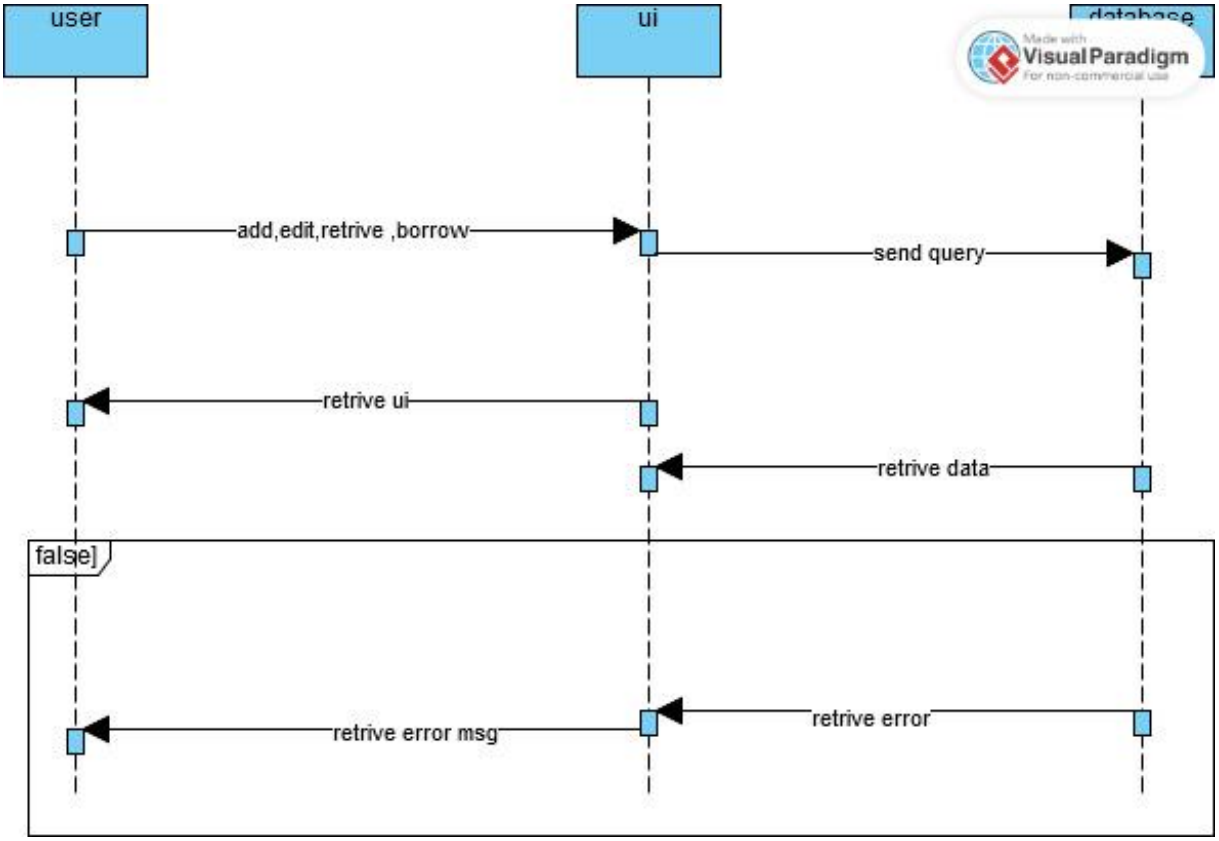
4.2 Activity Diagram



4.3 Class Diagram



4.4 Sequence Diagram



5. Testing and Validation

5.1 Testing Methodology

The testing process will follow a phased approach, including unit testing, integration testing, system testing, and user acceptance testing (UAT). Automated tools will be employed where applicable to ensure consistent results.

5.2 Test Cases

- **User Management**: Validate registration, login, and profile update functionalities.
- **Book Management**: Verify the addition, editing, searching, and removal of book records.
- **Borrowing System**: Test the borrowing, returning, and overdue notification processes.
- **Reporting**: Check the accuracy of generated reports.

5.3 Performance Testing

- Stress test the system with up to 500 concurrent users.
- Measure response times for search queries and transaction processing.

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6. Future Work and Enhancements

6.1 Planned Features

- **E-book Integration**: Expand the system to manage and lend digital books.
- **Mobile App Development**: Create a native mobile application for better accessibility.
- **Advanced Analytics**: Implement AI-driven insights for inventory optimization and user preferences.

6.2 Long-term Goals

- Enable multi-language support to cater to diverse user bases.
- Integrate with external library networks for resource sharing.
- Incorporate voice search and virtual assistant capabilities.