Software Requirements Specification

for

Library Management System (LMS)

Version <version 1>

Prepared by

Islam Sayed Abd Eleziz	**202220093**
Mohamed Mohamed Sayed	**202220200**

Instructor: ***Dr. Mohammed Reda***

Course: **Software Engineering**

Teaching Assistant: **Mohamed Karam**

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Revision History

Name	Date	Reason For Changes	Version

1. Introduction

1.1 Purpose

The purpose of this document is to outline the software requirements for a Library Management System (LMS). The LMS aims to streamline the process of managing book inventory, user borrowing, returns, and tracking book availability. This SRS provides a detailed description of the system's functionalities and serves as a guide for developers and stakeholders.

1.2 Document Conventions

This document uses the following conventions:

*- *REQ-1, REQ-2, etc.* are used to denote specific requirements.*

*- Keywords like *"must," "shall,"* and *"should"* indicate mandatory requirements.*

1.3 Intended Audience and Reading Suggestions

This document is intended for:

*- *Developers:* To understand the system's requirements.*

*- *Project Managers:* To plan and track development progress.*

*- *Testers:* To develop test cases.*

*- *Users and Librarians:* To understand the system's functionality.*

1.4 Product Scope

The Library Management System (LMS) will automate the processes of tracking books, managing user accounts, borrowing, and returning books. The system will reduce manual errors, improve efficiency, and provide real-time data on inventory and user activities.

1.5 References

- IEEE Software Requirements Specification Template.

- User Interface Guidelines for LMS.

2. Overall Description

2.1 Product Perspective

The LMS is a standalone application that will replace traditional paper-based systems. It will offer integration with existing library hardware like barcode scanners and printers for receipts.

2.2 Product Functions

- User registration and login.

- Search and catalog books.

- Borrowing and returning of books.

- Managing user accounts and profiles.

- Generating reports for inventory and user activities.

2.3 User Classes and Characteristics

- Librarians: Manage book inventory and user accounts.

- Students/Users: Search, borrow, and return books.

- Administrators: Manage system settings and generate reports.

2.4 Operating Environment

The system will operate on Windows, macOS, and Linux with support for web-based access on popular browsers like Chrome, Firefox, and Edge.

2.5 Design and Implementation Constraints

- The system must use a relational database like MySQL or PostgreSQL. - It must follow standard security protocols for user authentication. - The application will be developed using Python or JavaScript for backend and Next.js for frontend.

2.6 User Documentation

- User manual for librarians and administrators.

- Online help guide integrated into the application.

- Tutorial videos for basic operations.

2.7 Assumptions and Dependencies

- The library has a stable internet connection for web-based features. - Users have basic knowledge of operating computers.

3. External Interface Requirements

3.1 User Interfaces

1- Login Page: Allows users to log in with their credentials.

2- Dashboard: Provides an overview of system features.

3- Search Bar: Enables users to search for books using titles, authors, or ISBN.

4- Borrow/Return Interface: Manages the borrowing and return process.

3.2 Hardware Interfaces

- Barcode scanners for quick check-out/check-in of books.

- Printers for generating receipts or inventory reports.

3.3 Software Interfaces

- MySQL/PostgreSQL for database management.

- REST APIs for communication between the frontend and backend.

3.4 Communications Interfaces

HTTP/HTTPS for secure web communication.

4. System Features

4.1 System Feature 1

4.1.1 *Description and Priority*

- This feature enables new users to register for an account and existing users to log in securely.

- *Priority*: High

- *User Class*: Students/Users, Librarians, Administrators.

*4.1.2 *Stimulus/Response Sequences**

*- *Registration*:*

1. User provides personal information (name, email, password, etc.).

2. System validates the input and checks for duplicate accounts.3. Upon successful validation, the system creates a new user account.

*- *Login*:*

1. User enters login credentials (username and password).

2. System verifies the credentials.

3. If credentials are correct, the user is granted access to the dashboard

4.1.3 Functional Requirements

- REQ-1: The system shall allow users to register with a unique email address.
- REQ-2: The system shall validate user input during registration (e.g., email format, password strength).
- REQ-3: The system shall authenticate users based on their login credentials.
- REQ-4: The system shall lock the account after 5 consecutive failed login attempts.

4.2 Feature: Book Return

4.2.1 Description and Priority

- Allows users to search the library's inventory of books by title, author, genre, or ISBN.

*- *Priority*: High*

*- *User Class*: Students/Users, Librarians*

4.2.2 Stimulus/Response Sequences

1. User enters a search query (e.g., book title or author).

2. The system retrieves matching results from the database.

3. The system displays the list of books along with their availability status.

4.2.3 Functional Requirements

- REQ-5: The system shall provide a search bar for users to search by title, author, genre, or ISBN.

- REQ-6: The system shall return search results within 3 seconds for queries with less than 1000 entries.

- REQ-7: The system shall display the availability status (available, borrowed, reserved) of each book in the search results

4.3 Book Borrowing.

4.3.1 Description and Priority

- Enables users to borrow books from the library, updating the system to reflect the transaction.

- Priority: High

- User Class: Students/Users, Librarians

4.3.2 Stimulus/Response Sequences

1. User selects a book from the catalog.

2. The system checks the book's availability.

3. If available, the user confirms the borrowing request.

4. The system updates the book's status to "borrowed" and records the due date (typically 14 days from the borrow date).

4.3.3 Functional Requirements

- REQ-8: The system shall allow users to borrow a maximum of 5 books at a time.

- REQ-9: The system shall update the status of a borrowed book to "borrowed".

- REQ-10: The system shall record the borrowing date and calculate the due date (14 days from the borrowing date).

4.4 Book Return

4.4.1 Description and Priority

- Facilitates the process of returning borrowed books and updates their availability in the system.

- Priority: High

- User Class: Students/Users, Librarians

4.4.2 Stimulus/Response Sequences

1. User scans or selects the borrowed book from their account page.

2. The system updates the book's status to "available".

3. The system checks if the book is overdue and applies any fines if necessary.

4.4.3 Functional Requirements

- REQ-11: The system shall update the status of a returned book to "available".

- REQ-12: The system shall check if the book is overdue and calculate fines if applicable.

- REQ-13: The system shall notify the user of any overdue fines during the return process

4.5 Overdue Management and Fines

4.5.1 Description and Priority

- This feature manages overdue books and calculates fines for late returns.

- Priority: Medium

- User Class: Students/Users, Librarians

4.5.2 Stimulus/Response Sequences

1. The system checks the due date of borrowed books daily.

2. For overdue books, the system sends notifications to the user and applies a fine.

3. The user is informed of the overdue status and fine amount during login or book return

4.5.3 Functional Requirements

- REQ-14: The system shall send overdue notifications via email to users with late books.

- REQ-15: The system shall calculate fines based on the number of overdue days (e.g., $0.50 per day).

- REQ-16: The system shall display the total fine amount on the user's account page.

5. Other Nonfunctional Requirements

5.1 Performance Requirements

The system must support up to 1000 concurrent users without performance degradation.

5.2 Safety Requirements

The system must ensure data backup every 24 hours.

5.3 Security Requirements

- Users must be authenticated using unique login credentials.

- All sensitive data must be encrypted.

5.4 Software Quality Attributes

- The system must be maintainable, scalable, and reliable.

- It should have a user-friendly interface.

5.5 Business Rules

- Only registered users can borrow books.

- Books must be returned within 14 days to avoid fines.

6. Other Requirements

The system should provide an API for integration with mobile applications in the future.

Appendix A: Glossary

- LMS: Library Management System.

- ISBN: International Standard Book Number.

Appendix B: Analysis Models

- Class diagrams, sequence diagrams, and use-case diagrams will be provided in separate documents.

Appendix C: To Be Determined List

- Further integration with external e-book services (TBD).