### Requirements Specification Document for a Small Library Management System (LMS)

#### \*\*1. Introduction\*\*

The Library Management System (LMS) is designed to streamline book tracking, member management, checkouts, reservations, and reporting for small libraries. It supports librarians, members, and administrators with intuitive workflows.

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#### \*\*2. Functional Requirements\*\*

##### \*\*2.1 User Management\*\*

- \*\*FR1.1\*\*: Role-based access (Admin, Librarian, Member).

- \*\*FR1.2\*\*: Members can register via a form; accounts require Librarian/Admin approval.

- \*\*FR1.3\*\*: Users can update profiles (email, phone, password).

##### \*\*2.2 Book Management\*\*

- \*\*FR2.1\*\*: Add/Edit/Archive books (title, author, ISBN, genre, publication year, copies).

- \*\*FR2.2\*\*: Search/filter books by title, author, genre, or ISBN.

- \*\*FR2.3\*\*: Import/export book data via CSV (Librarians/Admins only).

##### \*\*2.3 Checkout & Returns\*\*

- \*\*FR3.1\*\*: Members can check out up to 5 books for 14 days.

- \*\*FR3.2\*\*: Automatic availability updates and due date reminders (email).

- \*\*FR3.3\*\*: Return books via scan/ID; recalculate availability and fines.

##### \*\*2.4 Reservations\*\*

- \*\*FR4.1\*\*: Reserve unavailable books; notify members when available.

- \*\*FR4.2\*\*: 48-hour hold period for reserved books before releasing to next in line.

##### \*\*2.5 Overdue & Fines\*\*

- \*\*FR5.1\*\*: Calculate fines ($0.50/day per book).

- \*\*FR5.2\*\*: Block checkouts if fines exceed $10 or overdue books exist.

##### \*\*2.6 Reporting & Dashboard\*\*

- \*\*FR6.1\*\*: Generate reports (popular books, checkouts, fines). Export to PDF/CSV.

- \*\*FR6.2\*\*: Admin dashboard with stats (total books, active checkouts, revenue).

- \*\*FR6.3\*\*: Member dashboard to view checkouts, reservations, and fines.

##### \*\*2.7 Notifications\*\*

- \*\*FR7.1\*\*: Email reminders for due dates (3 days before, 1 day after overdue).

- \*\*FR7.2\*\*: Configurable notification preferences (email/SMS).

##### \*\*2.8 Audit & Security\*\*

- \*\*FR8.1\*\*: Log all actions (logins, checkouts, book updates).

- \*\*FR8.2\*\*: Password reset via email with OTP.

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#### \*\*3. Non-Functional Requirements\*\*

##### \*\*3.1 Performance\*\*

- \*\*NFR1.1\*\*: Support 100 concurrent users with <2s response time for searches.

##### \*\*3.2 Security\*\*

- \*\*NFR2.1\*\*: Encrypt data in transit (HTTPS) and at rest (AES-256).

- \*\*NFR2.2\*\*: Annual penetration testing and GDPR compliance.

##### \*\*3.3 Usability\*\*

- \*\*NFR3.1\*\*: Responsive UI compatible with Chrome, Firefox, Safari, and Edge.

- \*\*NFR3.2\*\*: WCAG 2.1 AA compliance for accessibility.

##### \*\*3.4 Reliability\*\*

- \*\*NFR4.1\*\*: 99.9% uptime during operational hours (8 AM–10 PM local time).

- \*\*NFR4.2\*\*: Daily backups with 30-day retention.

##### \*\*3.5 Scalability\*\*

- \*\*NFR5.1\*\*: Support 10,000 books and 2,000 users without performance loss.

##### \*\*3.6 Deployment\*\*

- \*\*NFR6.1\*\*: Deployable on AWS/Azure with Docker.

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#### \*\*4. Compliance Requirements\*\*

- \*\*CR1\*\*: Adhere to local data protection laws (e.g., GDPR, CCPA).

- \*\*CR2\*\*: Maintain audit logs for 2 years.

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#### \*\*5. Out-of-Scope\*\*

- Mobile app development.

- Inter-library loan management.

- Advanced analytics (machine learning).

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#### \*\*6. Glossary\*\*

- \*\*ISBN\*\*: International Standard Book Number.

- \*\*WCAG\*\*: Web Content Accessibility Guidelines.

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This document outlines core requirements for a small-scale LMS. Adjustments can be made based on stakeholder feedback or technical constraints.

From the requirements specification document, the main entities for the Library Management System (LMS) are:

1. **User**
   * Attributes: UserID, Name, Email, Phone, Role (Admin/Librarian/Member), Password, Status (Active/Pending/Blocked)
   * Relationships: Can register, update profiles, and have role-based access.
2. **Book**
   * Attributes: BookID, Title, Author, ISBN, Genre, PublicationYear, CopiesAvailable, Status (Available/CheckedOut/Archived)
   * Relationships: Can be added, edited, archived, searched, and reserved.
3. **Checkout**
   * Attributes: CheckoutID, UserID, BookID, CheckoutDate, DueDate, ReturnDate, FineAmount
   * Relationships: Tracks books checked out and returned by members.
4. **Reservation**
   * Attributes: ReservationID, UserID, BookID, ReservationDate, Status (Pending/Completed/Expired)
   * Relationships: Allows members to reserve unavailable books.
5. **Fine**
   * Attributes: FineID, UserID, BookID, Amount, Status (Paid/Unpaid)
   * Relationships: Tracks overdue fines and blocks checkouts if unpaid fines exceed $10.
6. **Report**
   * Attributes: ReportID, ReportType, GeneratedBy, GeneratedDate, ExportFormat (PDF/CSV), Data
   * Relationships: Used to generate statistical and financial reports.
7. **Notification**
   * Attributes: NotificationID, UserID, Type (Email/SMS), Message, SentDate, Status (Sent/Pending)
   * Relationships: Used to send reminders for due dates, reservations, and fines.
8. **Audit Log**
   * Attributes: LogID, UserID, Action, Timestamp, Details
   * Relationships: Logs all actions for security and compliance purposes.

These entities cover the core functionalities of the LMS, including user management, book tracking, checkouts, reservations, fines, reporting, notifications, and security auditing.