Software Requirements Specification (SRS) Library Management System

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1. Introduction

Libraries play an important role in educational institutions by providing access to books, journals, and other learning resources. Managing a library manually is time-consuming and can lead to errors such as missing records, incorrect book availability, and difficulty in tracking borrowed books. With the growth of technology, there is a need for an automated system that can handle library operations efficiently and accurately.

1.1 Purpose

The purpose of this document is to describe the requirements of the **Library Management System (LMS)**. This Software Requirements Specification (SRS) provides a detailed overview of the system, its functions, and constraints. It is intended for developers, system designers, testers, and end users to clearly understand how the system should work.

1.2 Document Conventions

This document follows standard Software Requirements Specification (SRS) conventions for the **Library Management System (LMS)**. All main sections and subsections are numbered for easy identification and reference. Important terms related to the library system such as **Admin**, **Librarian**, **User**, **Book**, and **Database** are written in **bold** when first introduced.

Functional requirements of the Library Management System are identified using labels such as **FR-1, FR-2**, etc., where each requirement describes a specific system function like book management, user management, or issue and return operations.

All descriptions are written in clear and simple English to ensure that the document is easily understandable by developers, librarians, testers, and other stakeholders involved in the Library Management System project.

1.3 Intended Audience and Reading Suggestions

Intended Audience

This document is intended for software developers, system designers, testers, and project managers involved in the development of the **Library Management System (LMS)**. It is also useful for librarians, administrators, and students who want to understand the system's features and functionality. Additionally, this document can be referred to by instructors and evaluators for academic assessment purposes.

Reading Suggestions

Readers are advised to start with the **Introduction** section to understand the overall purpose and scope of the Library Management System. The **Overall Description** section provides a high-level view of the system and its users. The **System Features** section should be read carefully to understand the detailed functional requirements. Non-technical readers may focus on the Introduction and Overall Description, while technical readers such as developers and testers should review the entire document for complete system understanding.

1.4 Project Scope

The scope of the **Library Management System (LMS)** is to provide an automated and efficient solution for managing library operations. The system focuses on maintaining digital records of books, users, and library transactions such as issuing and returning books. It helps librarians reduce manual work and minimize errors in record keeping.

The Library Management System allows administrators to manage book details, user information, and monitor library activities. Users can search for books, view availability, and keep track of borrowed books. The system also supports fine calculation for late returns and generates reports for better management and decision-making.

This project is intended for use in educational institutions such as schools and colleges, as well as public libraries. The scope of this system is limited to library-related activities and does not include external systems such as online book purchasing or inter-library loan services.

1.5 References

1. IEEE Std 830-1998, *IEEE Recommended Practice for Software Requirements Specifications*, IEEE Computer Society.
2. Roger S. Pressman, *Software Engineering: A Practitioner's Approach*, McGraw-Hill Education.
3. Ian Sommerville, *Software Engineering*, Pearson Education.
4. W3Schools, *HTML, CSS, JavaScript Documentation*, available online for web development reference.
5. Alliance University Central Library Gate Way to Knowledge.

2. Overall Description

The **Library Management System (LMS)** is a software application developed to automate and manage library operations efficiently. It replaces the manual system of record keeping by maintaining digital records of books, users, and transactions in a centralized database. The system allows administrators and librarians to manage book details, issue and return books, and calculate fines, while users can search for books and check availability.

The system is web-based and can be accessed through standard devices such as computers and mobile phones using a web browser. It improves accuracy, reduces paperwork, and saves time by providing a simple and reliable solution for library management.

2.1 Product Perspective

The **Library Management System (LMS)** is a standalone software application designed to replace the existing manual library management process. It uses a centralized database to store and manage information related to books, users, and library transactions. The system provides a user-friendly interface for administrators, librarians, and users to interact with library data efficiently. It can also be integrated with other institutional systems if required in the future.

2.2 Product Functions

- Major system functions include:
- Allows administrators and librarians to add, update, and delete book records
- Manages user registration and authentication
- Supports searching books and checking availability
- Handles issuing and returning of books
- Automatically calculates fines for late book returns
- Maintains records of all library transactions
- Generates reports related to books, users, and fines

2.3 User Classes and Characteristics

- **Administrator**
    - Has full control over the Library Management System
    - Manages system settings and user accounts
    - Can add, update, or remove librarian and user details
    - Requires basic computer and system management knowledge
- **Librarian**
    - Responsible for managing book records
    - Issues and returns books to users
    - Maintains daily library transaction records
    - Requires basic computer skills and knowledge of library operations
- **User / Member**
    - Searches for books and checks availability
    - Borrows and returns books
    - Views issued books and fine details
    - Requires basic knowledge of using a computer or mobile device

2.4 Operating Environment

- The Library Management System operates in a web-based environment
- Can be accessed using desktops, laptops, tablets, or smartphones
- Requires a web browser such as Chrome, Edge, or Firefox
- Runs on a server with a database for storing library data
- Requires an active internet connection for proper functioning

2.5 Design and Implementation Constraints

- The system must follow standard software engineering and coding practices
- It should be developed using approved programming languages and database technologies
- Data security and user privacy must be maintained
- The system should comply with institutional and library rules
- Hardware and software limitations of the organization must be considered
- The system should be easy to maintain and upgrade

2.6 User Documentation

- A user manual will be provided for administrators, librarians, and users
- The manual will explain system features and usage steps
- Online help and instructions will be available within the system
- Installation and setup guidelines will be provided for administrators
- Troubleshooting information will be included for common issues

2.7 Assumptions and Dependencies

- Users have basic knowledge of using computers or mobile devices
- The system assumes continuous availability of internet connectivity
- A server and database must be available for system operation
- The system depends on proper hardware and software resources
- Regular data backup is required to prevent data loss
- System performance depends on network speed and server capacity

3. System Features (Functional Requirements)

FR-1 User Authentication

- The system shall allow users to register and log in securely
- Only authorized users can access the system
- Different access levels are provided for Admin, Librarian, and User

FR-2 Book Management

- The system shall allow the admin or librarian to add new books
- The system shall allow updating and deleting book records
- Each book record shall include title, author, category, and availability status

FR-3 User Management

- The system shall store user details such as name and ID
- The admin can add, update, or remove users
- User records shall be maintained securely

FR-4 Book Issue and Return

- The system shall record book issue details
- The system shall update book availability automatically
- The system shall record return dates of books

FR-5 Fine Management

- The system shall calculate fines for late book returns
- Fine details shall be visible to users and librarians

FR-6 Search and Reports

- The system shall allow users to search books easily
- The system shall generate reports for books, users, and transactions

4. External Interface Requirements

4.1 User Interface

- The system shall provide a simple and user-friendly web interface
- Screens shall be easy to understand and navigate
- Forms and buttons shall be clearly labeled

4.2 Hardware Interface

- The system shall run on standard devices such as desktops, laptops, tablets, and smartphones
- No special hardware is required other than basic input/output devices

4.3 Software Interface

- The system shall operate on standard web browsers
- A database system shall be used to store library data
- The system shall work with standard operating systems

4.4 Communication Interface

- The system shall use internet connectivity for communication
- Data transfer shall be done securely using standard protocols

5. Non-Functional Requirements

5.1 Performance

- The system shall provide fast response time for user actions
- It shall support multiple users simultaneously

5.2 Security

- Only authorized users shall access the system
- User data shall be stored securely
- Passwords shall be protected

5.3 Reliability

- The system shall function correctly without failure
- Data stored in the system shall be accurate and consistent

5.4 Usability

- The system shall be easy to learn and use
- The interface shall be simple and user-friendly

5.5 Scalability

- The system shall support an increase in users and books
- Future enhancements shall be possible without major changes

6. System Architecture Overview

The solution follows a layered architecture consisting of:

- The Library Management System follows a **three-tier architecture**
- **Presentation Layer**:
    - Provides the user interface
    - Allows users to interact with the system through a web browser
- **Application Layer**:
    - Contains the business logic of the system
    - Handles operations such as book issue, return, and fine calculation
- **Database Layer**:
    - Stores all library data such as books, users, and transactions
    - Ensures data consistency and security
- This architecture improves system performance, scalability, and maintainability

7. System and Data Models (Placeholder)

This section provides a placeholder for the system and data models of the **Library Management System**. The detailed models such as **Use Case Diagrams**, **Class Diagrams**, **Entity–Relationship (ER) Diagrams**, and **Data Flow Diagrams (DFD)** will be included in the final design phase of the project. These models will help in understanding the system structure, data relationships, and interaction between different components of the system.

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9. Validation and Acceptance Criteria

- The system shall be validated by testing all functional requirements
- User authentication shall be tested for correct access control
- Book management functions shall work accurately without data loss
- Issue and return operations shall update book availability correctly
- Fine calculation shall be accurate for late returns
- The system shall meet all non-functional requirements such as performance and security
- The project shall be accepted only after successful testing and approval by

10.Appendices

This section includes additional information that supports the **Library Management System** project but is not part of the main requirements. It may contain sample screenshots, data dictionaries, glossary of terms, test cases, or future enhancement notes. The appendices help readers gain a better understanding of the system and provide reference material for implementation and maintenance.