Library management system

Software Requirements Specification

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1. Problem Statement

The current state of the library management system poses challenges that hinder efficient book retrieval for users. The difficulty in locating books within the library, specifically in terms of rack, row, and section identification, results in a cumbersome experience for patrons. This lack of streamlined organization leads to time-consuming searches, affecting the overall usability of the library resources. Additionally, the absence of an automated notification system exacerbates issues related to overdue books. Users face the inconvenience of not receiving timely reminders about due dates, leading to late returns and potential penalties. To address these concerns, there is a pressing need for a comprehensive library management web application that enhances book location accessibility and integrates SMS notifications to improve user accountability and overall library experience.

2. Introduction

The Library Management System (LMS) project emerges as a response to the evolving needs of modern libraries, aiming to revolutionize traditional book management processes. Libraries, as bastions of knowledge, have long faced challenges in optimizing book location tracking and user communication. This project seeks to address these challenges through the development of an innovative web-based application that leverages technology to enhance accessibility, efficiency, and user engagement within the library ecosystem.

In the contemporary landscape, library users often grapple with the cumbersome task of locating books within vast collections. The inefficiencies in book tracking, exacerbated by outdated systems, result in frustration and hinder the seamless utilization of library resources. Furthermore, the absence of a reliable notification system for due dates contributes to late returns and administrative complexities. The LMS project aspires to streamline these processes by introducing a real-time book location tracking mechanism and an automated notification system, particularly through SMS, fostering a more intuitive and responsive library experience for both librarians and patrons. This introduction sets the stage for a comprehensive exploration of the envisioned system's objectives and functionalities, laying the groundwork for the subsequent detailed Software Requirements Specification (SRS).

3. Purpose of the Document

The Software Requirements Specification (SRS) document serves as a foundational blueprint for the development and implementation of the Library Management System (LMS). Its primary purpose is to clearly define and communicate the functional and non-

functional requirements that the system must meet. This document acts as a bridge between stakeholders, including project managers, developers, and end-users, ensuring a shared understanding of the project objectives, features, and constraints.

The SRS document outlines the scope of the project, providing a comprehensive overview of the envisioned system's capabilities and limitations. It acts as a reference guide throughout the software development life cycle, guiding the design, implementation, and testing phases. By detailing the specific functionalities, user interactions, performance expectations, and security considerations, the SRS document minimizes misunderstandings and facilitates effective communication among all stakeholders.

Furthermore, the document aids in project management by establishing a baseline for project scope and requirements. It serves as a contractual agreement between the development team and the stakeholders, helping manage expectations and ensuring that the final product aligns with the intended goals. Ultimately, the purpose of this document is to set a solid foundation for the successful development, deployment, and maintenance of the Library Management System.

4. Scope of the Project:

The scope of the Library Management System (LMS) project encompasses the design and development of a modern, web-based application tailored to revolutionize traditional library operations. The primary focus is on addressing two critical challenges faced by existing library systems: efficient book location tracking and the absence of an effective notification system for due dates.

- **Book Location Tracking:** The project aims to implement a robust system for tracking the real-time location of books within the library. This includes the creation and maintenance of a centralized book database containing essential details such as title, author, ISBN, rack number, row, and section. Users will benefit from a user-friendly search interface that provides accurate and up-to-date information on the location of each book.
- **Notification System:** The project will introduce an automated notification system to enhance communication between the library and its users. This system, particularly through SMS, will notify users about upcoming due dates for borrowed books. The goal is to reduce instances of late returns, streamline the borrowing process, and improve overall user adherence to library policies.
- **User Registration and Preferences**: To enable effective communication, the project includes a user registration system where patrons provide contact information, including mobile numbers. Additionally, users will have the option to customize their notification preferences, allowing for a personalized experience.
- **Scalability and Adaptability:** The LMS will be designed to be scalable, accommodating a growing number of books and users over time. The system will also be adaptable to changes in library shelving arrangements or policies, ensuring its relevance and effectiveness in the long term.

- **User Interface and Accessibility:** The project emphasizes the development of an intuitive and user-friendly interface for both librarians and patrons. Accessibility features will be incorporated to ensure inclusivity and usability for individuals with disabilities.

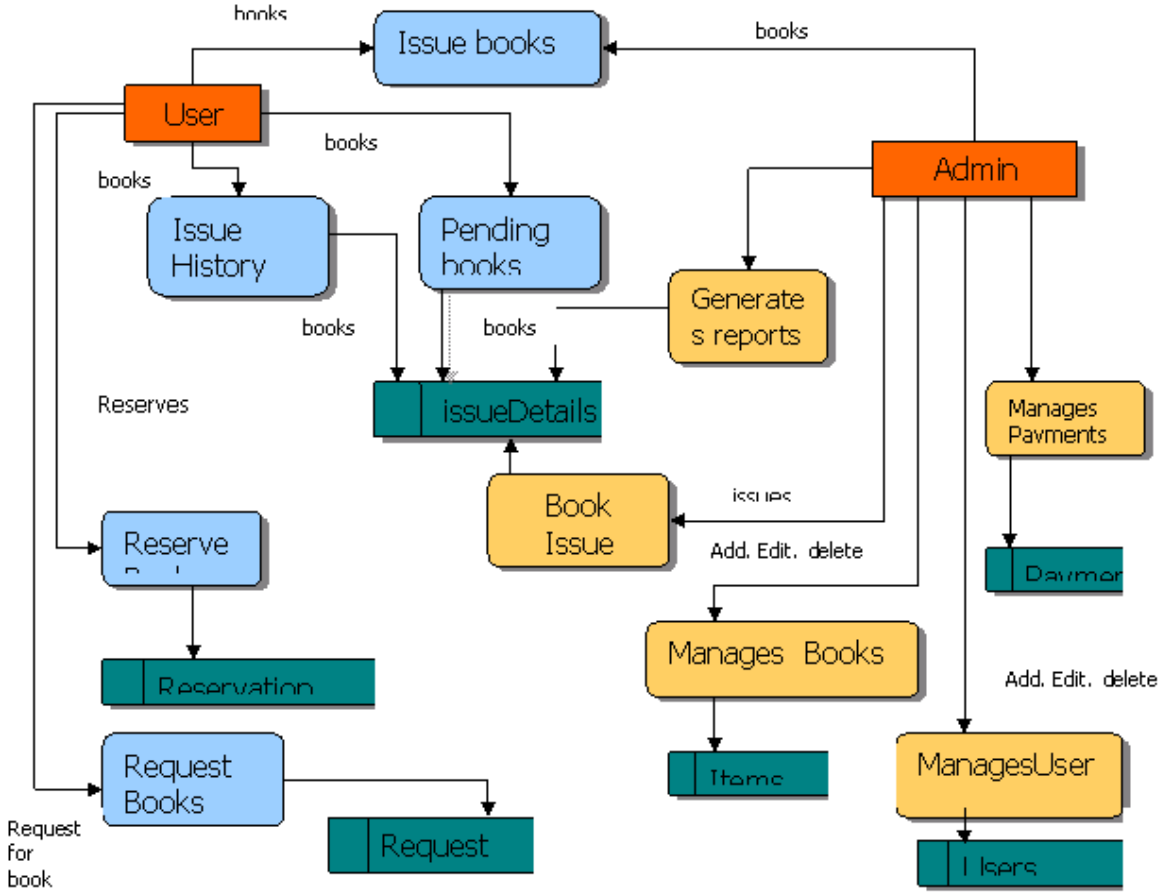

Fig-1

5. Functional Requirements

5.1 Book Location Tracking

- **User Authentication:** The system shall have a secure authentication mechanism for both librarians and library users.

- **Book Database:** Maintain a comprehensive database of all books, including details such as title, author, ISBN, rack number, row, and section.

- **Search Functionality:** Provide a user-friendly search interface allowing users to locate books based on title, author, or category.

- **Real-Time Location Updates:** Ensure real-time updates of book locations to reflect changes in the library's shelving arrangement.

5.2 Notification System

- **Due Date Calculation:**Calculate due dates for borrowed books based on the library's borrowing policies.

- **User Registration:**Capture user contact information, including mobile numbers, during the registration process.

- **SMS Notifications:**Integrate an SMS gateway to send automated notifications to users regarding upcoming due dates.

- **Customizable Reminders:**

Allow users to customize notification preferences and set reminders for due dates.

6. Non-Functional Requirements

6.1 Performance

- **Scalability:**The system should be scalable to handle a growing number of books and users.

- **Response Time:**Ensure quick response times for book searches and notification delivery.

6.2 Security

- **Access Control:**

Requirement: Implement role-based access control (RBAC) to restrict access to sensitive functionalities based on user roles (e.g., librarian, administrator, regular user).

Explanation: Access control ensures that users have appropriate permissions, limiting access to specific features and data based on their roles, enhancing system security.

- **Authentication:**

Requirement: User authentication must be performed securely using strong encryption protocols.

Explanation: Secure authentication ensures that only authorized users can access the system, preventing unauthorized access and protecting user accounts.

- **Data Encryption:**

Requirement: All data transmitted between the client and server must be encrypted using secure protocols (e.g., HTTPS) to prevent unauthorized interception.

Explanation: Data encryption protects sensitive information during transmission, safeguarding it from potential eavesdropping and unauthorized access.

- **Secure Session Management:**

Requirement: Implement secure session management practices to protect user sessions from unauthorized access or hijacking.

Explanation: Utilize secure session tokens, employ session timeout mechanisms, and ensure that session data is transmitted over HTTPS to prevent eavesdropping.

6.3 Usability

- **User Interface:**Design an intuitive and user-friendly interface for easy navigation and interaction.

- **Accessibility:**Ensure accessibility features for users with disabilities.

6.4 Reliability

- **Data Backup:**Implement regular data backup procedures to prevent data loss.

- **Fault Tolerance:**Design the system to handle unexpected errors gracefully without compromising functionality.

6.5 Hardware Interfaces

- **Server Side:**
  - Processor: Pentium 3.0 GHz or higher
  - RAM: 256 Mb or more
  - Hard Drive: 10 GB or more
- **Client side:**

- Processor: Pentium III or 2.0 GHz or higher.
- RAM: 256 Mb or more

6.6 Software Interfaces

- **Database:** Firebase
- **Application:** AngularJs
- **Web Server:** Firebase

6.7 Communications Interfaces

- The Customer must connect to the Internet to access the Website:
- Dialup Modem of 52 kbps
- Broadband Internet

Dialup or Broadband Connection with a Internet Provider.

7. Constraints

The system must be compatible with modern web browsers (Chrome, Firefox, Safari, Edge). The availability of an SMS gateway for notification services.

8. Conclusion

The Library Management System aims to streamline book location tracking and enhance user communication through automated SMS notifications. By addressing these key functionalities and adhering to the outlined requirements, the system seeks to improve the overall efficiency and user experience within the library environment.

9. References

- IEEE. IEEE Std 830-1998 IEEE Recommended Practice for Software Requirements Specifications. IEEE Computer Society, 1998.
- https://www.geeksforgeeks.org/library-management-system/