Software Requirement Specification

For

Library Management System

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1.Introduction

1.1.Purpose

The purpose of this document is to provide a comprehensive Software Requirements Specification (SRS) for the Library Management System (LMS). This document serves as a blueprint for the design, development, and testing of the LMS, outlining the system's functional and non-functional requirements. It is intended to facilitate a shared understanding among project stakeholders, including developers, testers, and end-users, to ensure the successful implementation of the system.

1.2.Document Convention

Entire document must be justified
Convention for Main title

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Convention for Subtitle

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Convention for Header

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Convention for Body

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1.3 Scope of Development Project

The Library Management System is designed to streamline and enhance the management of library resources, optimizing the processes involved in cataloging, borrowing, returning, and monitoring of library materials. It aims to provide an efficient and user-friendly platform for librarians, staff, and library patrons to access and manage library resources effectively.

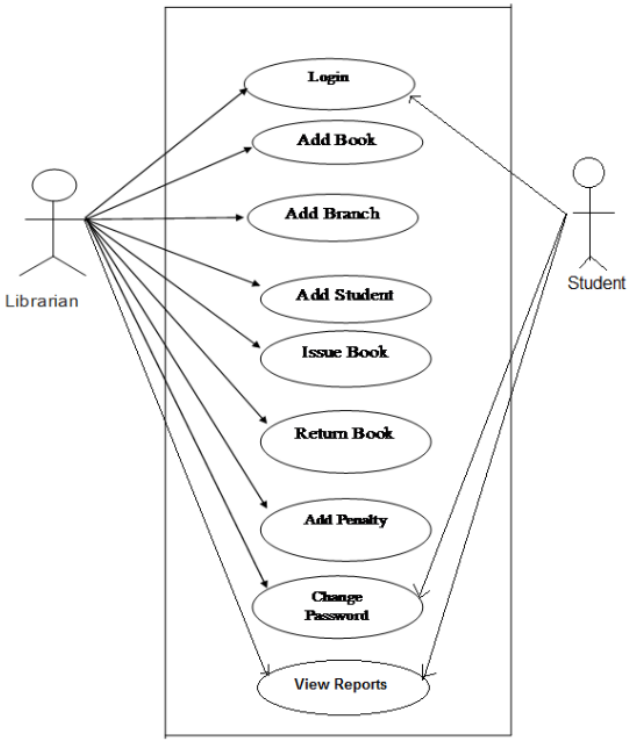
1.4 Definitions, Acronyms and Abbreviations

LMS - Library Management System
ER- Entity Relationship
UML - Unified Modeling Language

IDE- Integrated Development Environment
SRS- Software Requirement Specification

2.Overall Descriptions

2.1.Product Perspective

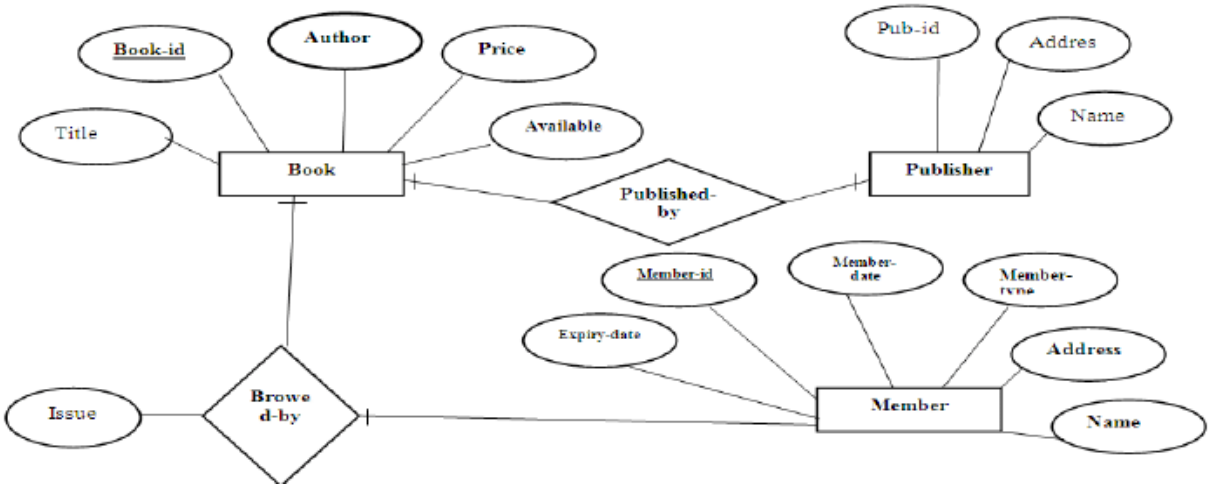


Use case diagram for Library Management System

In a Library Management System (LMS), the flow begins with librarians or administrators being able to add books, branches, and student records. They log into the system, navigate to the respective sections, and input details, which are then validated and stored in the database. Once these foundational elements are in place, the system allows for the issuance and return of books. When issuing a book, they search for students and books, verify availability, and record check-outs with due dates. Returning a book involves searching for the book, verifying its status and due date, checking it in, and calculating penalties for overdue items if necessary. Additionally, the LMS offers the capability to add penalties for late returns and provides access to view various reports related to library activities and usage, aiding in efficient library management.

2.2 Product Function

ER Diagram for Library Management System



The Online Library System provides online real time information about the books available in the Library and the user information. The main purpose of this project is to reduce the manual work. This software is capable of managing Book Issues, Returns, Calculating/Managing Fine, Generating various Reports for Record-Keeping according to end user requirements. The Librarian will act as the administrator to control members and manage books. The member's status of issue/return is maintained in the library database. The member's details can be fetched by the librarian from the database as and when required. The valid members are also allowed to view their account information.

2.3 User Classes and Characteristics

Librarian Features:

- Issue books to library members.
- Access and view different book categories available in the library.
- Review the list of books within each category.
- Accept returned books from students.
- Add new books to the library database along with their details.
- Edit and update information for existing library books.
- Generate reports about the library's current book collection.
- Generate reports about books that have been issued to library members.
- Access and manage student accounts.

Member Features:

- View the various book categories offered by the library.

- Explore the list of books available within each category.
- Create a personal library account.
- Check the books currently checked out under their name.
- Request new book acquisitions.
- Review their borrowing history, including previously issued books.
- Search for specific books within the library's collection

2.4 Operating Environment

The product will be operating in windows environment. The Library Management System is a website and shall operate in all famous browsers, for a model we are taking Microsoft Internet Explorer,Google Chrome,and Mozilla Firefox.Also it will be compatible with the IE 6.0. Most of the features will be compatible with the Mozilla Firefox & Opera 7.0 or higher version. The only requirement to use this online product would be the internet connection. The hardware configuration include Hard Disk: 40 GB, Monitor: 15" Color monitor, Keyboard: 122 keys. The basic input devices required are keyboard, mouse and output devices are monitor, printer etc.

2.5 Assumptions and Dependencies

Assumptions:

1. Hardware and Infrastructure: It is assumed that the library has access to the necessary hardware and infrastructure to support the LMS, including servers, network infrastructure, and internet connectivity.
2. User Skills: It is assumed that library staff and users have a basic level of computer literacy and can navigate the LMS interface with minimal training.
3. Data Availability: Assumption that bibliographic data for library materials is available in digital form or can be acquired through sources like ISBN databases.
4. Software Compatibility: Assumption that the chosen technology stack and software components are compatible with the existing IT environment of the library.
5. Budget and Resources: Assuming that the project has adequate funding and resources to cover development, maintenance, and support costs.
6. Compliance: Assuming that the library will comply with relevant legal and ethical standards, including copyright laws and data protection regulations.

Dependencies:

1. Data Migration: The success of the LMS project may depend on the smooth migration of existing library data (catalog records, user information, circulation history) from legacy systems to the new LMS.
2. Integration: Dependencies exist when integrating the LMS with other systems such as academic databases, e-resources, and institutional portals, requiring coordination with external vendors or IT departments.

3. Training: The availability of training materials and sessions for library staff and users is crucial for successful adoption of the LMS, making training schedules and resources a dependency.
4. Vendor Dependencies: If the library relies on third-party vendors for software components or services, project timelines and functionality can be dependent on vendor deliverables and support.
5. External Data Sources: If the LMS relies on external data sources (e.g., ISBN databases, interlibrary loan networks), it depends on the availability and reliability of these sources.
6. Regulatory Changes: Dependencies may arise if there are changes in regulatory requirements (e.g., new copyright laws) that impact the LMS, necessitating adjustments or compliance measures.
7. User Feedback: The project may depend on continuous feedback from library staff and users to refine and enhance the LMS, making user engagement and feedback loops a critical dependency.

2.6 Software Requirements:

Operating System: Windows NT, windows 98, Windows XP
Language: Java Runtime Environment, Net beans 7.0.1 (front end)
Database: MS SQL Server (back end)

2.7 Data Requirement:

The inputs consist of the query to the database and the output consists of the solutions for the query. The output also includes the user receiving the details of their accounts. In this project the inputs will be the queries as fired by the users like create an account, selecting books and putting it into account. Now the output will be visible when the user requests the server to get details of their account in the form of time, date and which books are currently in the account.

3 External Interface Requirement

3.1 GUI

It enables users to quickly access reports like book issuance and returns within specific timeframes. Additionally, it offers stock verification and search functionalities based on various criteria. The system allows for customization of the user interface by administrators, ensuring that all software modules seamlessly integrate into this graphical interface while adhering to a standardized template. The design prioritizes simplicity, with all interfaces following a consistent format. The user interface facilitates interaction with the user management module, including a dedicated section for login and logout procedures.

- **Login Interface:**For new users, registration is available, allowing them to create an account. Once registered, users can log in by entering their username and password. In case of incorrect credentials, error messages will be displayed.
- **Search:**Members and librarians can search for specific books by entering book types and titles of interest.

- **Categories View:**The Categories view presents available book categories and offers librarians the ability to add, edit, or remove categories from the list.
- **Librarian's Control Panel:**This control panel empowers librarians to manage user accounts, resources, and lending options, including adding and removing users, editing resource information, and overseeing lending processes.

4. System Features

- User authentication and validation using individual member IDs.
- Administrator oversight involves actions such as updating account statuses, displaying a warning if a member attempts to borrow more books than the library's policy allows, and imposing fines on members who fail to return items on time.
- Ensuring proper accountability by restricting access to a member's own account information, with only administrators having the ability to view and manage all member accounts.

5.Other Non Functional Requirements

5.1 Performance Requirement

The proposed system that we are going to develop will be used as the Chief performance system within the different campuses of the university which interacts with the university staff and students. Therefore, it is expected that the database would perform functionally all the requirements that are specified by the university.

- The performance of the system should be fast and accurate
- Library Management System shall handle expected and non-expected errors in ways that
- prevent loss in information and long downtime period. Thus it should have inbuilt error
- testing to identify invalid username/password
- The system should be able to handle large amount of data. Thus it should accommodate
- high number of books and users without any fault

5.2 Safety Requirement

- The database may get crashed at any certain time due to virus or operating system failure. Therefore, it is required to take the database backup so that the database is not lost. Proper UPS/inverter facility should be there in case of power supply failure.

5.3 Security Requirement

- Access Control: Implement role-based access control (RBAC) to restrict system access based on user roles and permissions. Only authorized personnel should have access to sensitive data.
- Authentication: Use strong authentication mechanisms like two-factor authentication (2FA) for user logins to prevent unauthorized access.
- Data in Transit: Encrypt data transmitted between the client and server using secure protocols like HTTPS to protect against eavesdropping.

- Data at Rest: Encrypt sensitive data stored in databases and files to prevent unauthorized access even if physical storage media are compromised.
- Firewall and Intrusion Detection:Deploy a firewall to filter incoming and outgoing traffic, and use intrusion detection systems (IDS) to detect and respond to suspicious activities.
- Redundancy and High Availability:Ensure the LMS is designed for high availability, with failover mechanisms in place to minimize downtime.Maintain redundant hardware and data centers to mitigate the risk of system failures.

5.4 Requirement Attributes

- There may be multiple admins creating the project, all of them will have the right to
- create changes to the system. But the members or other users cannot do changes
- The project should be open source
- The Quality of the database is maintained in such a way so that it can be very user
- friendly to all the users of the database
- The user be able to easily download and install the system

5.5 Business Rules

- **Membership Rules:**Patrons must be registered members to borrow library materials.Membership validity periods and renewal policies should be clearly defined.Different membership types (e.g., student, faculty, public) may have varying privileges and borrowing limits.
- **Borrowing and Returning Rules:**Loan periods, renewal limits, and fine policies for overdue materials should be established.Rules for handling reserved items and waiting lists, including notification procedures when a reserved item becomes available.Procedures for checking in and inspecting returned items for damage or missing components.
- **Fines and Fee Rules:**Clear policies on overdue fines, lost item charges, and damaged material fees.Processes for collecting and recording fines and fees, as well as procedures for waiving or reducing fines in exceptional cases.

5.6 User requirements:

- **User Authentication and Access Control:**Secure login and authentication for library staff and patrons.Role-based access control to restrict access to sensitive information and functions.
- **Cataloging and Database Management**:Efficient cataloging of library materials (books, journals, multimedia, etc.).Support for various types of materials (e.g., print, digital, multimedia).Easy database maintenance and updates.
- **Search and Discovery:**User-friendly search interface for patrons to find library materials.Advanced search capabilities, including keyword, author, title, and subject searches.Availability status and location information for each item.
- **Circulation Management:**Check-in and check-out of library materials.Holds and reservations management.Overdue item tracking and fine calculation.
- **Integration with Online Resources:**Access to digital databases, e-books, and online journals.Federated searching across multiple online resources.

- **User Feedback and Surveys:**
  Mechanisms for collecting user feedback and conducting surveys to improve services.

6.Other Requirements:

6.1 Class Diagram