Software Requirements Specification

Library Management System Web Application

Version<1.0>

Table of Contents

1. Introduction

The creation of the Software Requirements Specification (SRS) provides an overview of the entire SRS with cause, scope, definitions, acronyms, abbreviations, references and evaluation of the SRS.The aim of this document is to gather and analyze and give an in-depth insight of the complete Library Management Web Application by defining the problem statement in detail. Nevertheless, it also concentrates on the abilities required through stakeholders and their desires even as defining excessive-stage product functions. The detailed requirements of the Library Management Web Application are provided in this document.

1.1 Purpose

The reason for the record is to acquire and examine all assorted thoughts which have come up to define the gadget, its requirements with respect to consumers. Also, we will predict and sort out how we hope this product can be used which will gain a higher expertise of the task, outline concepts that may be evolved later, and record thoughts which are being considered, but may be discarded because the product develops.

In brief, the cause of this SRS file is to offer an in depth overview of our software program product, its parameters and desires. This document describes the venture's target market and its personal interface, hardware and software requirements. It defines how our consumer, team and target audience see the product and its capability. Nonetheless, it enables any designer and developer to help in software transport lifecycle (SDLC) approaches.

1.2 Scope

The scope of a library management system typically includes the following features:

- Cataloging: ability to catalog books, periodicals, and other materials in the library's collection.
- Circulation: ability to track the lending of library materials and manage the due dates for returned items.
- User management: ability to track information about library users, including contact information and borrowing history.
- Search and discovery: ability to search the library's catalog and provide access to the materials it contains.
- Reports and analytics: ability to generate reports and statistics on library usage and collections. Automated Notifications, SMS, Email and online renewals of books.

1.3 Overview

The remaining sections of this document provide a general description, including characteristics of the users of this project, and the functional and data requirements of the product. General description of the project is discussed in section 2 of this document. Section 3 gives the functional requirements, data requirements and constraints and assumptions. Section 3 also gives the specific requirements of the library. Section 3 also discusses the external interface requirements and gives detailed description of functional requirements. Section 4 is for supporting information.

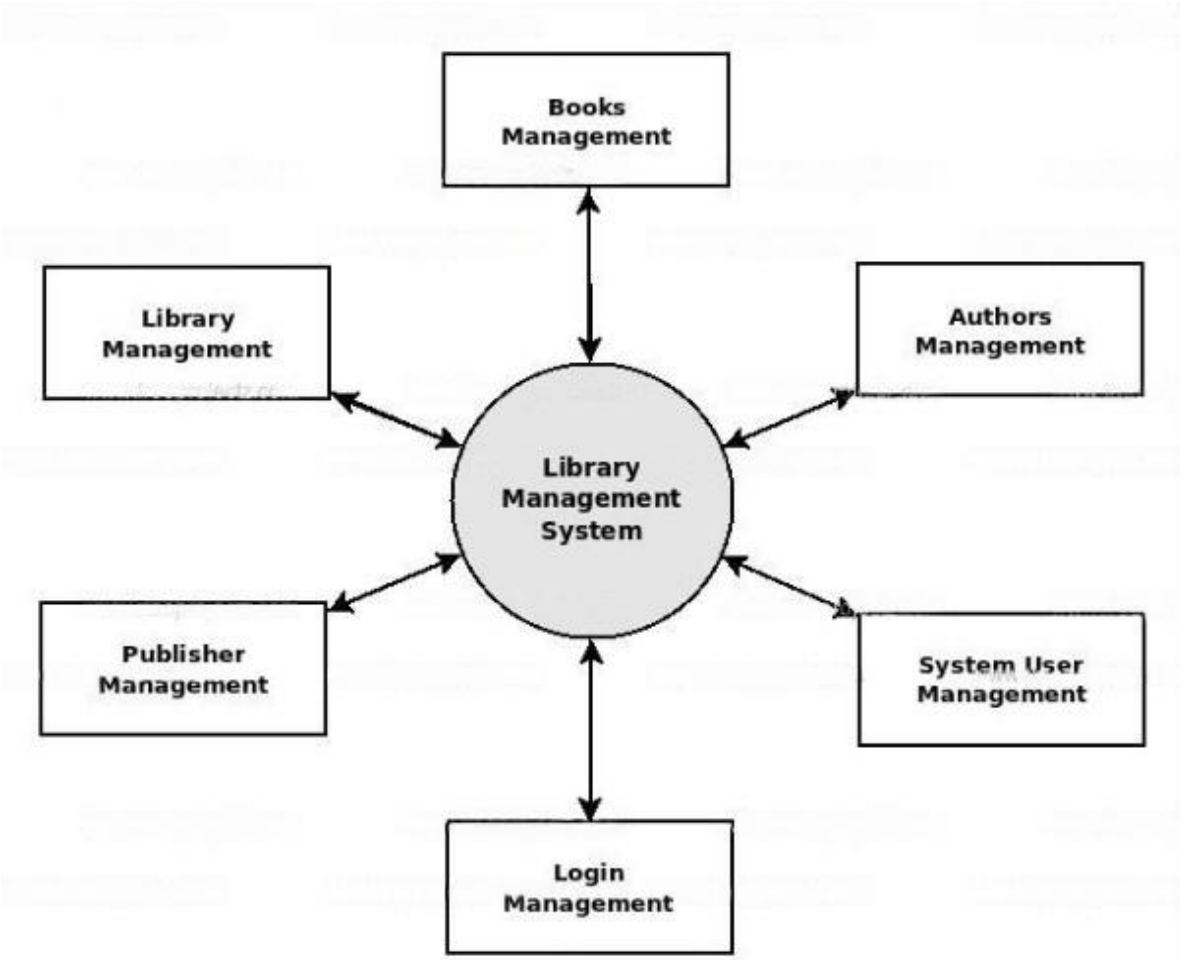
2. Overall Description

Library Management System is a replacement for the ordinary library management systems which depend on paper work for recording books and users information.

Library Management System is an application which refers to library systems which are generally small or medium in size. It is used by librarians to manage the library using a computerized system where he/she can add new books, videos and Page sources. Books and student maintenance modules are also included in this system which would keep track of the students using the library and also a detailed description about the books a library contains. With this computerized system there will be no loss of book record or member record which generally happens when a non-computerized system is used.

A Digital Library Management System is a software application that helps automate the various tasks associated with managing a library. It helps to keep track of books, magazines, journals, and other library materials. The system also helps in handling tasks such as circulation, cataloging, and tracking of overdue books. LMS typically includes features for acquisitions, serial control, and management of electronic resources. Additionally, it can also provide access to the library's catalog and enable users to reserve or renew books online.

2.1 System Architecture



2.2 User Interface

- Login Interface : In case the user is not registered yet, he can enter the details and register.Which asks the user to type his username and password . If the user entered either his username or password incorrectly then an error message occurs.
- Search : The member or librarian can enter the type of book he is looking for and the title he is interested in ,then he can search for the required book by entering the book name. Categories
- view : Categories view shows the books categories view with ability for Liberians to add/edit or delete categories from the list.
- Librarian's Control Panel: This control panel will allow librarians to add, confirm, or remove users; add, edit, or remove a medium. And manage

2.3 Data flow and database design

User Registration: Users can create an account and provide necessary information.

User Login: Users can log in using their username and password.

Search Books: Users can search for books based on title, author, subject, etc.

Book Information: Detailed information about a book is displayed to the user, including availability and borrower details.

Borrow Books: Users can borrow books if they are available.

Return Books: Users can return borrowed books.

Update Book Information: Librarians can update book information, such as availability and borrower details.

Add New Books: Librarians can add new books to the library collection.

Database Design for Digital Library Management System:

Users Table: Contains user information such as name, email, password, etc.

Books Table: Contains book information such as title, author, subject, ISBN, etc.

Borrowers Table: Contains borrower information such as user ID, book ID, date borrowed, date due, etc.

Librarians Table: Contains librarian information such as name, email, password, etc.

Categories Table: Contains book categories, such as fiction, non-fiction, etc.

Publishers Table: Contains publisher information, such as name, address, etc.

These tables can be related through relationships like One-to-Many or Many-to-Many based on the requirement of the system.

2.4 Security Features

- System will use secured database
- Normal users can just read information but they cannot edit or modify anything except their
- personal and some other information.
- System will have different types of users and every user has access constraints.
- System use shall not cause any harm to human users
- Access control: to specify who can access and modify library content and metadata.
- Auditing and logging: to keep track of who accesses the library and when, for security and accountability purposes.
- Firewall protection: to prevent unauthorized access from external sources.
- Authentication and authorization: to ensure only authorized users have access to the library.

3. Functional Requirements

3.1 Librarian:

- Insert book: This action is done to add new book to library book collection Delete
- modify book : This event is to delete an existing book or modify its information.
- Delete member: Admin can delete a member due to some specific rules.
- Return book: Admin should confirm the return of books borrowed by user.

3.2 Normal User:

Register: When new user enters for the first time then he has to register
Extending borrowing deadline : Members can extend the borrowing time to some limit decided by Admin.

3.3 Reports and statistics:

Reports and statistics in a library management system (LMS) are tools that provide valuable insights and information about library activities, resources, and users. Some common reports and statistics in an LMS include:

- Circulation Reports: Reports that show the number of items checked out, returned, and overdue, as well as the most popular resources and items in demand.

- Resource Utilization Reports: Reports that provide information on the usage and availability of resources, such as books, e-books, and audio-visual materials.

- User Activity Reports: Reports that provide information on user activities, such as the number of searches conducted, resources viewed, and loans made.

- Budget Reports: Reports that provide information on the library's budget, including expenditures, revenue, and financial trends.

- Collection Development Reports: Reports that provide information on the growth and development of the library's collection, including new acquisitions and de-accessions.

- User Demographic Reports: Reports that provide information on the demographics of library users, including age, gender, location, and borrowing history.

4. Non-Functional Requirements

4.1 Performance requirements:

Performance requirements in a library management system (LMS) refer to the system's requirements for speed, reliability, scalability, and response time. Some common performance requirements in an LMS include:

- Response Time: The system should respond to user requests in a timely manner, without significant delays or lag, providing an efficient user experience.

- Load Time: The system should load quickly, without significant delays or timeouts, even during periods of high traffic or usage.

- Scalability: The system should be able to scale to accommodate growth and changing user needs, without impacting performance or causing downtime.

- Reliability: The system should be highly reliable, with a low failure rate and minimal downtime, to ensure that users can access the system when they need it.

- Concurrent User Capacity: The system should be able to handle a large number of concurrent users, without impacting performance or causing slowdowns.

- Data Processing Speed: The system should be able to process data quickly, without significant delays or slowdowns, even when working with large datasets.

- Error-Handling: The system should be able to handle errors and unexpected events in a graceful manner, without causing disruptions or crashes.

performance requirements is critical to ensuring that the LMS provides a fast, reliable, and efficient user experience, and that the system can support the growing needs and demands of the library and its users

The system shall accommodate a high number of books and users without any fault. When a library management system will be implemented, librarians and users will easily access libraries as searching and book transactions will be much faster .

4.2 Security Requirements:

Security requirements in a library management system (LMS) refer to the measures and controls that are needed to protect sensitive information, prevent unauthorized access, and maintain the confidentiality and privacy of library users and staff. Some common security requirements in an LMS include:

- User Authentication: The system should provide secure and robust user authentication, with the ability to assign different levels of access and permissions to different users.

- Data Encryption: The system should encrypt sensitive data, such as user passwords and credit card information, to prevent unauthorized access and theft.

- Data Backup: The system should have a secure and reliable backup and recovery plan in place, to prevent data loss and ensure the availability of critical information.

- Access Control: The system should provide granular access control, with the ability to restrict access to sensitive data and resources based on user roles and permissions.

- Auditing and Logging: The system should provide detailed logging and auditing of all user activities, to facilitate incident response and forensic investigations.

- Threat Prevention: The system should be protected against common security threats, such as malware, viruses, and hacker attacks, with the ability to detect and respond to security incidents in a timely and effective manner.

  e security requirements are critical to ensuring the LMS can provide a secure and trustworthy environment for library users and staff, and maintain the confidentiality and privacy of sensitive information.

4.3 Usability requirements:

Usability requirements for a library management system include:

- Easy navigation and intuitive interface for users to find and access materials
- Search functionality that allows users to quickly find specific items
- A system for managing and tracking loans, including due dates and overdue items
- Integration with other systems, such as cataloging and user accounts
- A system for managing and tracking fines and fees
- An option for remote access to the system, such as through a website or mobile app
- A system for generating reports and statistics on usage and circulation.
- Accessibility for visually impaired users.
- Easy to use self-checkout system

4.4 Reliability requirements:

Reliability requirements in a library management system (LMS) refer to the level of performance, dependability, and availability that is required for the system to function effectively and meet the needs of library users and staff. Some common reliability requirements in an LMS include:

- Availability: The system should be available and accessible to users at all times, with minimal downtime for maintenance and upgrades.
- Performance: The system should respond quickly to user requests, even during periods of heavy use, and provide fast and efficient access to information.
- Scalability: The system should be able to handle increased demand and growth, with the ability to add resources and scale up as needed.
- Data Integrity: The system should ensure the accuracy and completeness of data, and prevent data loss or corruption.
- Security: The system should provide adequate security measures to protect against unauthorized access, theft of sensitive data, and other security threats.
- Backup and Recovery: The system should have a robust backup and recovery plan in place, with the ability to restore data quickly and efficiently in the event of a disaster or system failure.
- Disaster Recovery: The system should have backup and recovery procedures in place to ensure that data is not lost in the event of a disaster.
- Compatibility: The system should be compatible with other systems and technologies.

4.5 Compatibility Requirements:

Compatibility requirements in a library management system (LMS) refer to the technical specifications and standards that must be met in order to ensure that the LMS can effectively communicate and integrate with other systems, tools, and platforms that it interacts with. Some common compatibility requirements in an LMS include:

- Operating System Compatibility: Compatibility with popular operating systems, such as Windows, MacOS, and Linux.
- Web Browser Compatibility: Compatibility with popular web browsers, such as Google Chrome, Mozilla Firefox, and Microsoft Edge.
- Mobile Platform Compatibility: Compatibility with popular mobile platforms, such as iOS and Android, for access to the LMS from mobile devices.
- Database Compatibility: Compatibility with popular databases, such as MySQL, Microsoft SQL Server, and Oracle.
- Data Format Compatibility: Compatibility with common data formats, such as CSV, XML, and JSON, for data integration and exchange with other systems.
- Library Standards Compatibility: Compatibility with industry standards, such as MARC and Z39.50, for data exchange with other library systems.
- Server: Apache, IIS
- Programming languages: PHP, Java, Python
- Storage: Hard disk space and RAM according to size of the library.

5. Constraints and Assumptions:

5.1 Technical constraints

There are several technical constraints that can arise when designing and implementing a library management system (LMS). Some of these include:

- Data storage: LMSs require large amounts of data storage to store information about books, users, and other library materials. This can be a constraint if the library does not have enough storage space or if the system is not designed to handle the amount of data being generated.

- Network infrastructure: LMSs rely on a stable and reliable network infrastructure to function properly. If the library's network is not robust enough to support the system, it can lead to poor performance and slow response times.

- Compatibility: LMSs must be compatible with the library's existing hardware and software systems. If the system is not compatible, it can lead to integration issues and added costs for upgrading or replacing existing equipment.

- Data security: LMSs contain sensitive information about users and library materials. It must be protected from unauthorized access and data breaches, which can be a constraint if the system is not designed with adequate security measures.

- Scalability: As the library grows or the number of users increase, the system must be able to handle the increased load. If the system is not designed to be scalable, it can lead to poor performance and system crashes.
- Digital Format Compatibility: ability to handle different file formats and convert them into usable digital format.
- Search Engine Capabilities: robust search engine to search through vast collections of digital resources
- Data Preservation: ensuring long-term preservation of digital resources, including backup and disaster recovery.
- Interoperability: ability to integrate with other systems, such as archives and catalogs.
- Technical Support: availability of technical support for users and administrators.

5.2 Resource constraints

Resource constraints refer to limitations on the resources (such as time, budget, manpower, hardware, software, etc.) available for the development, deployment, and operation of a library management system (LMS). Some common resource constraints in an LMS include:

- Budget: The amount of money available for the development and deployment of the LMS.
- Time: The amount of time available for the development and deployment of the LMS.
- Manpower: The number of staff available for the development and deployment of the LMS, including software developers, librarians, and support staff.
- Hardware: The availability of hardware resources, such as computers, servers, and storage devices, for the LMS.
- Software: The availability of software resources, such as libraries, tools, and platforms, for the LMS.
- Data Storage: The amount of data storage available for the LMS, including both disk space and bandwidth.
- Technical Expertise: The level of technical expertise available for the development and deployment of the LMS, including software developers, database administrators, and network engineers.
- Bandwidth: Large amounts of bandwidth are required to access digital library content quickly and efficiently.
- Maintenance: Regular software and hardware maintenance is necessary to ensure the smooth operation of a digital library system.
- User accessibility: Digital library systems need to be accessible to users from various locations and devices.

These resource constraints can impact the functionality, performance, and overall success of the LMS, and it's important to carefully manage and allocate resources in order to ensure the successful deployment and operation of the system.

5.3 Schedule constraints

Schedule constraints refer to limitations on the timeline for the development, deployment, and operation of a library management system (LMS). Some common schedule constraints in an LMS include:

- Project Deadline: The deadline for completing the development and deployment of the LMS.

- Milestones: Key milestones in the development and deployment of the LMS, such as completing design, coding, testing, and deployment phases.

- Availability: The availability of staff and resources, including software developers, librarians, hardware and software, for the development and deployment of the LMS.

- Maintenance Windows: The times during which the LMS may be taken offline for maintenance or updates, and the length of these maintenance windows.

- User Availability: The availability of users, including library users and staff, for testing and providing feedback on the LMS.

- Third-Party Integration: The availability of third-party tools and systems that may need to be integrated with the LMS.

- It's important to carefully manage schedule constraints in order to ensure the successful deployment and operation of the LMS, and to minimize any impact on the library and its users. This may involve adjusting the schedule, allocating additional resources, or making other accommodations as necessary.

5.4 External interfaces:

External interfaces in a library management system (LMS) refer to the connections or points of interaction between the LMS and other systems, tools, or platforms outside the LMS. Some common external interfaces in an LMS include:

- User Interfaces: Interfaces for library users and staff, such as web portals, mobile apps, and self-service kiosks.
- Third-Party Systems: Interfaces with external systems, such as payment gateways, catalogs, and e-book platforms.
- Library Automation Systems: Interfaces with other library automation systems, such as circulation systems and catalogs.
- Electronic Resources: Interfaces with electronic resources, such as databases, e-journals, and e-books.
- Social Media: Interfaces with social media platforms, such as Facebook and Twitter, for marketing and outreach.
- Data Integration: Interfaces with data sources, such as the library catalog and circulation records, for data management and integration.
- Reporting and Analytics: Interfaces with reporting and analytics tools, such as business intelligence systems, for data analysis and decision-making.
- User-friendly search engine
- Browse and download options for books, journals and other materials
- User account management for library members
- Recommendation system for books and articles
- Integration with social media for sharing and promotion
- User-generated ratings and reviews
- Mobile compatibility for on-the-go access
- Easy access to library catalog and holdings
- Notifications and alerts for due dates and new arrivals
- Option to renew or request materials online.

5.4.1 Hardware Interfaces

A library management system (LMS) is a software application that helps libraries manage and organize their collections, circulation, and other operations. Hardware interfaces in an LMS are the physical components that connect the software to the library's equipment and devices. Some examples of hardware interfaces in an LMS include:

- Barcode scanners: Used to scan the barcode on a book's spine or cover, which allows the system to quickly identify the item and check it out to a user.
- RFID readers: Used to read RFID tags on books, which can be used for inventory management and tracking.
- Card readers: Used to read the magnetic strip or RFID chip on a user's library card, which allows them to check out items and access their account information.
- Printer: Used to print out receipts, overdue notices, and other information.
- Touch screen: Used as a user interface to interact with the system and perform various tasks like check-in, check-out, and searching
- Biometric readers: Used to verify

5.4.2 Software Interfaces :

- Catalog: The interface for searching and browsing the library's catalog of books, journals, and other materials.
- Circulation: The interface for managing the check-in and check-out of library materials.
- User Account Management: The interface for managing user accounts, including borrowing history, fines, and contact information

6. Appendices

6.1 Use cases:

- Check Out Books: Users can check out books from the library using the circulation interface.
- Renew Books: Users can renew books that they have checked out from the library.
- Place Holds: Users can place holds on books that are currently checked out.
- Pay Fines: Users can pay fines for overdue books or lost materials using the user account management interface.
- Search Catalog: Users can search the library's catalog to find books and other materials.
- Manage User Accounts: Library staff can manage user accounts, including adding new users and updating existing user information.
- Manage Library Collection: Library staff can manage the library's collection, including adding new books and removing outdated materials.
- Generate Reports: Library staff can generate reports on circulation, collections, and other library activities.
- Acquire New Materials: Library staff can use the acquisitions interface to request and purchase new materials for the library's collection.

6.2 Data dictionary

A data dictionary in a library management system (LMS) is a reference that lists and describes the data elements used in the LMS. It provides detailed information about each data element, including its name, definition, type, format, and constraints. A sample data dictionary for an LMS could include the following data elements:

1. User ID: A unique identifier for each library User.
2. First Name: The first name of the library user.
3. Last Name: The last name of the library user.
4. Address: The postal address of the library user.
5. Phone Number: The phone number of the library user.
6. Email Address: The email address of the library user.
7. Library Card Number: A unique identifier for each library card.
8. Book ID: A unique identifier for each book in the library's collection.
9. Title: The title of the book.
10. Author: The author of the book.
11. ISBN: The International Standard Book Number (ISBN) of the book.
12. Call Number: The call number used to locate the book in the library.
13. Check Out Date: The date when the book was checked out by a user.
14. Due Date: The date when the book is due to be returned to the library.
15. Check In Date: The date when the book was checked in to the library.
16. Fine Amount: The amount of any fines due for an overdue book.

This is just a sample data dictionary and the actual data elements used in an LMS can vary depending on the specific requirements and features of the system.

6.3 Wireframes

Wireframes are visual representations of the user interface (UI) of a software application, including the layout, navigation, and functionality. In a library management system (LMS), wireframes can be used to illustrate the design and flow of the system's various pages and screens. Some common wireframes in an LMS could include:

- Login Screen: The screen where users and library staff log in to the system.
- Search Catalog: A screen for searching and browsing the library's catalog of books and other materials.
- Book Details: A screen that displays detailed information about a specific book, including the title, author, ISBN, and availability.
- My Account: A screen for users to view their borrowing history, fines, and other account information.
- Check Out: A screen for checking out books from the library.
- Renew Books: A screen for renewing books that have been checked out.
- Place Holds: A screen for placing holds on books that are currently checked out.
- Manage User Accounts: A screen for library staff to manage user accounts, including adding new users and updating existing user information.
- Manage Library Collection: A screen for library staff to manage the library's collection, including adding new books and removing outdated materials.
- Generate Reports: A screen for library staff to generate reports on circulation, collections, and other library activities.

6.4 Examples of forms, reports

Forms and reports are two important components of a library management system (LMS). Some examples of forms and reports commonly used in an LMS include:

Forms:

- User Registration: A form for new users to register for library services.
- Checkout Form: A form for checking out library materials.
- Return Form: A form for returning library materials.
- Request Form: A form for users to request materials that are not available in the library.
- Feedback Form: A form for users to provide feedback on library services and materials.

Reports:

- Circulation Report: A report showing the number of materials checked out and returned, as well as information on late returns and overdue materials.
- User Report: A report showing information on users, including their registration information, check-out history, and fines.
- Inventory Report: A report showing the status of library materials, including items on hold, items checked out, and items that are lost or damaged.
- Acquisition Report: A report showing information on new materials added to the library collection, including titles, authors, and publication dates.
- Usage Report: A report showing information on how library materials are being used, including the most popular items, the number of times items have been checked out, and the average check-out time.
- These forms and reports help library staff manage the library collection, monitor usage patterns, and track the performance of the LMS. They also provide valuable data that can be used to improve library services and meet the needs of library users.