

Software Requirements Specification Template

Software Engineering

The following annotated template shall be used to complete the Software Requirements Specification (SRS) assignment.

Template Usage:

Text contained within angle brackets ('<', '>') shall be replaced by your project-specific information and/or details. For example, <Project Name> will be replaced with either 'Smart Home' or 'Sensor Network'.

Italicized text is included to briefly annotate the purpose of each section within this template. This text should not appear in the final version of your submitted SRS.

This cover page is not a part of the final template and should be removed before your SRS is submitted.

Library Management System

Software Requirements Specification

Version 1

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Group 8

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CS 250- Introduction to Software Systems

Library Management System

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Revision History

Date	Description	Author	Comments
<date>	<Version 1>	<Your Name>	<First Revision>

Document Approval

The following Software Requirements Specification has been accepted and approved by the following:

Signature	Printed Name	Title	Date
	<Your Name>	Software Eng.	
	Dr. Gus Hanna	Instructor, CS 250	

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1. Introduction

The introduction to the Software Requirement Specification (SRS) document should provide an overview of the complete SRS document. While writing this document please remember that this document should contain all of the information needed by a software engineer to adequately design and implement the software product described by the requirements listed in this document. (Note: the following subsection annotations are largely taken from the IEEE Guide to SRS).

1.1 Purpose

This SRS is intended to be a thorough and exhaustive document that outlines the requirements, functions, and limitations for creating the "Library Management System." It outlines the project's objectives and goals and gives a clear roadmap and requirements for the software development process.

This SRS's primary target is present and potential members of the "Book's Paradise Library." This audience comprises library personnel and administrators who will be involved in the program's management and operation, as well as library users who will interact with the software to access library resources and services. Other stakeholders participating in the development process, such as software developers, designers, and project managers, may also consult the SRS to understand the project's needs and objectives.

What is the purpose of this SRS and the (intended) audience for which it is written.

1.2 Scope

The software product is produced as a "Library Management System." This software is intended to serve as a comprehensive digital platform for library management and member services at the BPL. The goal is to streamline and enhance library management procedures, providing library staff and users with a user-friendly and efficient way of accessing library materials and services.

The LMS will have various functionalities, allowing users to search for books. It will provide information on any books owned by the library, featuring titles, authors, descriptions, and real-time availability. The users can check out and reserve books and manage their accounts through profile customization. Also, they will be informed of due dates and reservation pick-up dates via email. This software will allow the librarians to manage their inventory, allows librarians to add new books, update current information, and maintain clear contact with the users. The system will not process financial transactions or any payment for the library materials, such as late fees or fines.

The LMS has unique benefits, objectives, and goals to improve the user's experience by providing an intuitive and user-friendly interface for searching and accessing library materials. It aims to improve library staff's efficiency in managing inventory and providing client service.

Library Management System

This subsection should:

- (1) *Identify the software product(s) to be produced by name; for example, Host DBMS, Report Generator, etc*
- (2) *Explain what the software product(s) will, and, if necessary, will not do*
- (3) *Describe the application of the software being specified. As a portion of this, it should:*
 - (a) *Describe all relevant benefits, objectives, and goals as precisely as possible. For example, to say that one goal is to provide effective reporting capabilities is not as good as saying parameter-driven, user-definable reports with a 2 h turnaround and on-line entry of user parameters.*
 - (b) *Be consistent with similar statements in higher-level specifications (for example, the System Requirement Specification) , if they exist. What is the scope of this software product.*

1.3 Definitions, Acronyms, and Abbreviations

This subsection should provide the definitions of all terms, acronyms, and abbreviations required to properly interpret the SRS. This information may be provided by reference to one or more appendixes in the SRS or by reference to other documents.

LMS	Library Management System
SRS	Software Requirement Specification
BPL	Bookworm's Paradise Library
Members	These are users that have standard access to the library, they do not have any special privileges that are for library staff.
Staff	They are users who are employed by the library, which include the administrator and librarians. In addition, to the standard access that regular members have, the staff have more privileges to carry out their duties.

1.4 References

This subsection should:

- (1) *Provide a complete list of all documents referenced elsewhere in the SRS, or in a separate, specified document.*
 - (2) *Identify each document by title, report number - if applicable - date, and publishing organization.*
 - (3) *Specify the sources from which the references can be obtained.*
- This information may be provided by reference to an appendix or to another document.*

1.5 Overview

The remaining sections of this document provide a general description of the LMS, its specific requirements, and analysis models. Section 2 covers the general description, discussing product perspective, function, user characteristics, general constraints, assumptions, and dependencies. Section 3 is about the specific requirements, including interface requirements and functional requirements, and provides examples of use cases, non-functional requirements, inverse requirements, design constraints, and logical database requirements. Section 4 will contain models of the product, such as sequence diagrams, data flow diagrams, and state transition diagrams.

This subsection should:

- (1) Describe what the rest of the SRS contains
- (2) Explain how the SRS is organized.

2. General Description

This section of the SRS should describe the general factors that affect 'the product and its requirements'. It should be made clear that this section does not state specific requirements; it only makes those requirements easier to understand.

2.1 Product Perspective

This subsection of the SRS puts the product into perspective with other related products or projects. (See the IEEE Guide to SRS for more details).

This product is designed for the BPL staff and users. In addition, this product is also made to connect the BPL database via a computer browser. The application must communicate with the database to search and reserve books.

2.2 Product Functions

The LMS contains the following functions:

- Library Catalog and Search Function
- User Account Management Function
- Book Checkout and Return Functions
- Reservations and Hold Management
- Notification Function

This subsection of the SRS should provide a summary of the functions that the software will perform.

2.3 User Characteristics

This subsection of the SRS should describe those general characteristics of the eventual users of the product that will affect the specific requirements. (See the IEEE Guide to SRS for more details).

Library Management System

There are three types of users. Two of these types of library staff consist of the librarian and administrator. The third type is standard members of the library. Library staff is the controller and has the privileges of an administrator. A user who will be accessing the library

→ Features of the library staff

◆ Admin

- Account management for all Librarians and users.
- Generate reports for system management

◆ Librarian

- Can view the catalog of different books
- Can modify the items in the database
 - Add/remove books and their information
- User member registration
- Can help the user checkout and return books
- Can access member user's accounts

→ Features of the user

- ◆ Can view the catalog and search for different books
- ◆ Can modify their own library profile
- ◆ Can request to reserve a certain book

2.4 General Constraints

This subsection of the SRS should provide a general description of any other items that will limit the developer's options for designing the system. (See the IEEE Guide to SRS for a partial list of possible general constraints).

- Insufficient access to advanced hardware, software, or other development resources can impede the development.
- The lack of developers with expertise in specific programming languages, frameworks, and libraries.
- The lack of knowledge of data encryption to prevent user information from leaking.
- This system will be designed around the library's website on a computer browser.

2.5 Assumptions and Dependencies

This subsection of the SRS should list each of the factors that affect the requirements stated in the SRS. These factors are not design constraints on the software but are, rather, any changes to them that can affect the requirements in the SRS. For example, an assumption might be that a specific operating system will be available on the hardware designated for the software product. If, in fact, the operating system is not available, the SRS would then have to change accordingly.

The assumptions are:

- This system can only be accessed by website browsers such as Chrome and Firefox
- A user account must be needed to view the library
- The system should have a large storage capacity and have fast access to the database
- Require advanced technology

- All books of the library have a barcode for them.

The Dependencies:

- The hardware and software for the product will be run
- A properly trained librarians and administrators to operate the system
- A database that is accessible by the library system that stores the user and library information
- Computer browsers must be available to access the system.
- Existing old database for initial implementation of new database.

3. Specific Requirements

This will be the largest and most important section of the SRS. The customer requirements will be embodied within Section 2, but this section will give the D-requirements that are used to guide the project's software design, implementation, and testing.

Each requirement in this section should be:

- Correct
- Traceable (both forward and backward to prior/future artifacts)
- Unambiguous
- Verifiable (i.e., testable)
- Prioritized (with respect to importance and/or stability)
- Complete
- Consistent
- Uniquely identifiable (usually via numbering like 3.4.5.6)

Attention should be paid to the carefully organize the requirements presented in this section so that they may easily accessed and understood. Furthermore, this SRS is not the software design document, therefore one should avoid the tendency to over-constrain (and therefore design) the software project within this SRS.

3.1 External Interface Requirements

3.1.1 User Interfaces

3.1.1.1 Library Catalog and Search Function

- Users
 - ◆ From a computer browser, users can visit the library's website to be able to access the library catalog for all books.
 - ◆ Will see a search bar and list of books with their accurate description and availability.
 - ◆ Provides additional options to search for books by title, author, genre, and ISBN.
- Staff
 - ◆ Can modify the catalog to add or remove books or other books.
 - ◆ Can edit the description and cover of library books.
 - ◆ Has all additional functions that librarian users have.

3.1.1.2 User Account Management Function

→ Users

- ◆ Will see a login and signup button
- ◆ Login option will show a textbox of username and password
- ◆ Signup option will show some textbox asking for user general information, such as name, phone number, username, and password
- ◆ Update and manage to give the user the option to modify their personal information.
- ◆ Options on how to view the website can be changed, including dark/light theme, size of the font, button size, languaging setting, and others.

→ Librarian

- ◆ Can create, view, and edit member users' accounts

→ Administrator

- ◆ Can create, view, and edit librarian users' accounts

3.1.1.3 Book Checkout and Returning System

→ Member Users

- ◆ Will not be able to see any interface
- ◆ Will be able to check out books with the staff.
- ◆ Will be able to return books without staff.

→ Staff

- ◆ Can check out books for users.
- ◆ See User information
 - First and last name
 - Library card number and expiration date
 - Any unpaid balance on the account
- ◆ Book information when checkout and returning
 - The ISBN
 - The title
 - The author
 - The checkout and due date

3.1.1.4 Reservations and Hold Management

→ Members

- ◆ The members, after finding their desired book, can click on a reservation button to request to reserve their book, unless the book is no longer available, at which point the button will be greyed out and the button would state that the book is no longer available.

- ◆ Afterward, a message from the notification function will inform users that it is reserved and available for pickup.

→ Staff

- ◆ Receives an alert from the notification function alert that a user has requested to reserve a certain book.
- ◆ Can approve or deny requests to reserve library books for users.

3.1.1.5 Notification System

→ Members

- ◆ Will receive automatic notification in their email or accounts regarding their upcoming due dates.
- ◆ Includes a calendar of all library events and due dates.

→ Staff

- ◆ Modify the settings of the notification alerts of member-level users, such as turning off and on automatically, and how often they are sent
- ◆ Set up new events of the library and notify users of future planned events of the library.

3.1.2 Hardware Interfaces

- Windows, IOS
- Mouse and keyboard
- Barcode Scanner
- Receipt printer

3.1.3 Software Interfaces

- Any computer browser like Google Chrome or Firefox.
- Latest version of Microsoft Access so the database can port data from Excel.
- IntelliJ IDEA version 2023.1.1, integrated development environment(IDE) where the system will be developed.
- Microsoft SQL Server 2022

3.1.4 Communications Interfaces

- Communication with the system requires a constant internet connection.

3.2 Functional Requirements

This section describes specific features of the software project. If desired, some requirements may be specified in the use-case format and listed in the Use Cases Section.

3.2.1 Reservation and Hold Management

3.2.1.1 Introduction

This function allows a particular book to be reserved by the users or the staff.

3.2.1.2 Inputs

Use the search function to find a book and click the reserve button.

3.2.1.3 Processing

The staff will get notified that a user has a pending request to reserve a particular book. The staff will update the request from pending to complete once the staff has found the book

3.2.1.4 Outputs

The user will receive a notification of the reservation status and a pick-up by date.

3.2.1.5 Error Handling

For any error where the user cannot obtain the book, the function will drop the reservation for that book.

3.2.2 Library Catalog and Search Function

3.2.2.1 Introduction

This function allows users and staff to search for particular books

3.2.2.2 Inputs

The users and staff will input title, ISBN, author, or genre.

3.2.2.3 Process

The system will search through the database for the book

3.2.2.4 Outputs

It will return a list of books that best fit the input provided by the user's input.

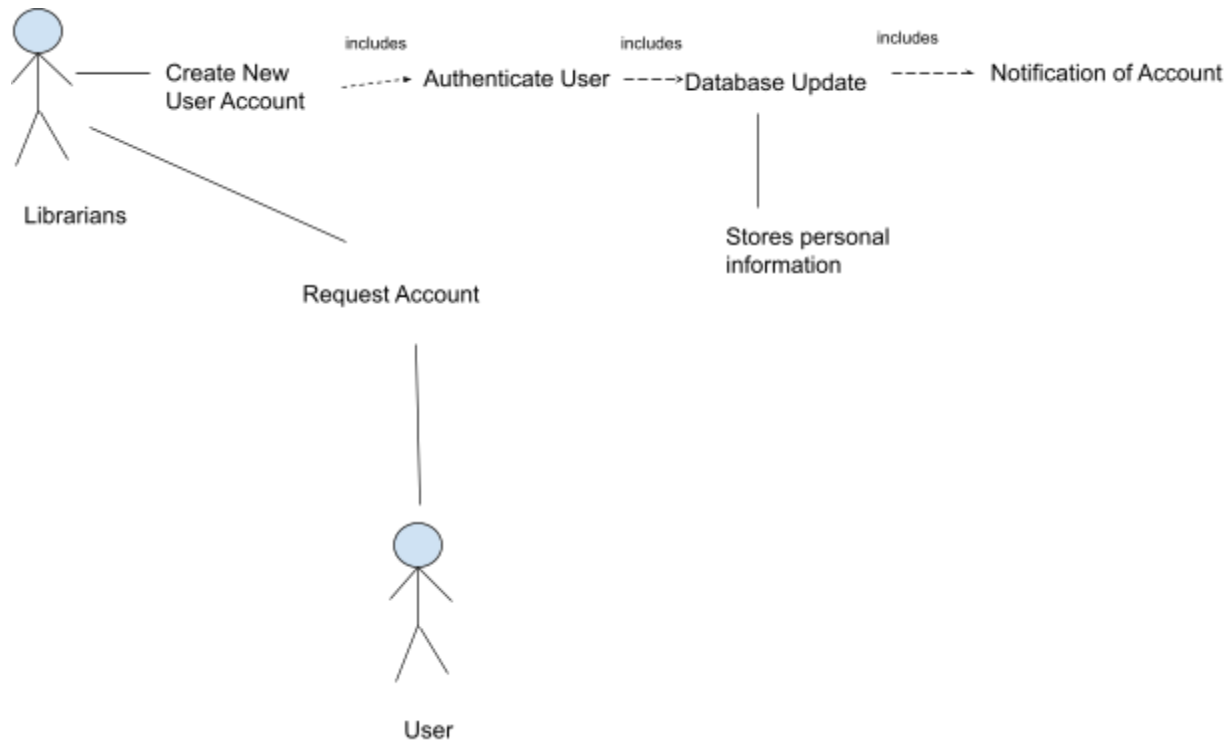
3.2.2.5 Error Handling

If the function cannot find the book, then the function will notify the user that the book is unavailable in the library.

...

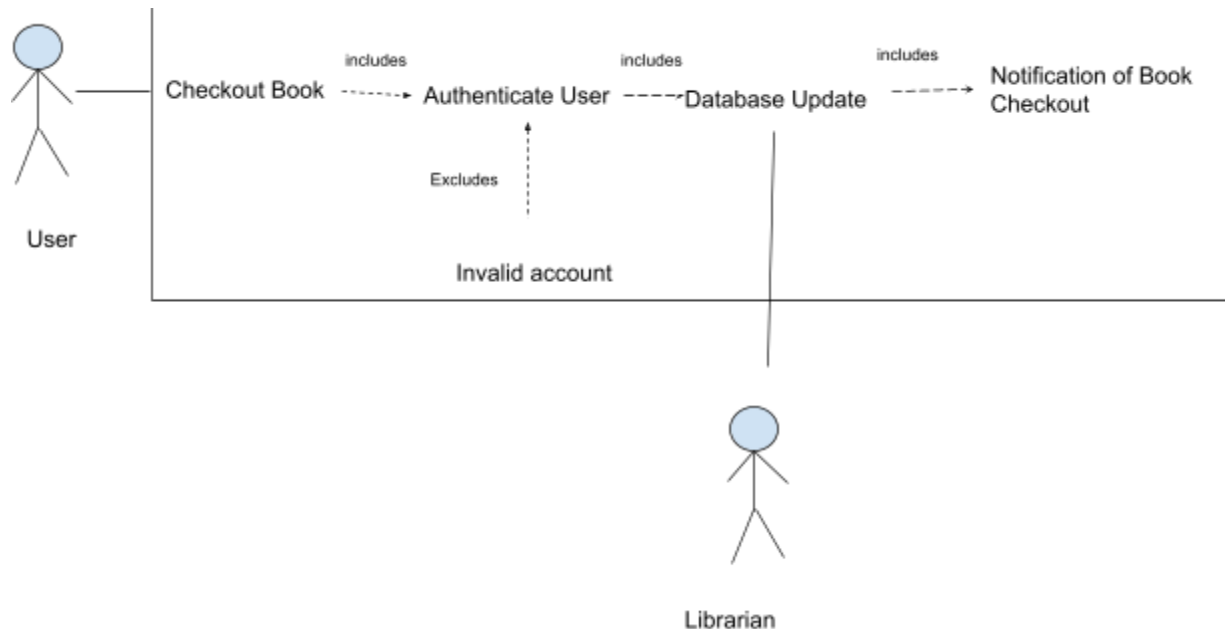
3.3 Use Cases

3.3.1 Use Case #1 (User Account Management Function (create new account))



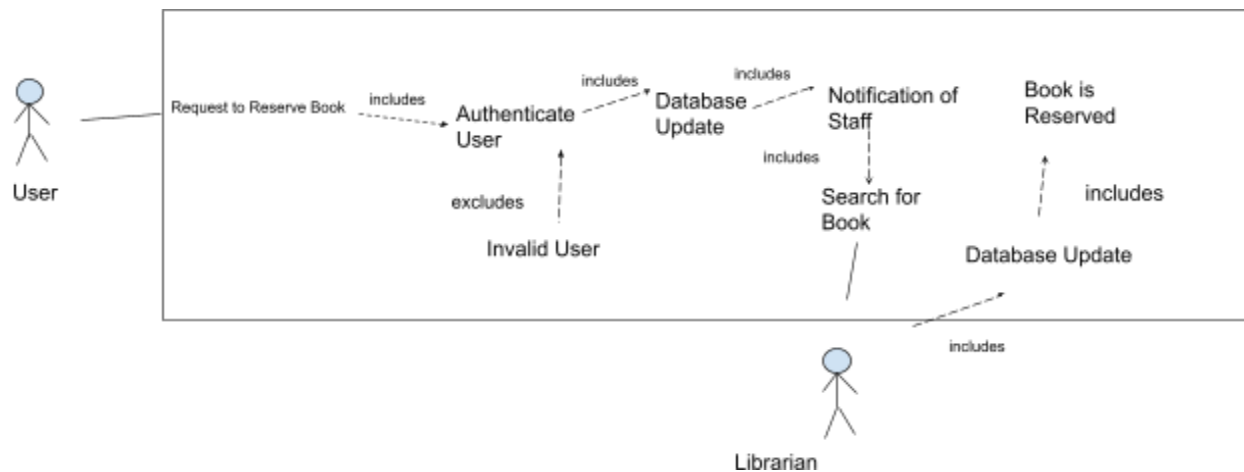
The user would go and request to make an account. The Librarians would actually create the account and then update the database to store the personal information. Then the user would receive an email that would confirm that their account has been created.

3.3.2 Use Case #2(Book Checkout and Returning Function) (Check out book)



The user would start the process of checking out the book. Which includes either inputting login information or using a library card. Then the database updates that the book has been updated. The user is then emailed that the book has been checked out.

3.3.2 Use Case #3(Reservations and Hold Management) (Reserve Book)



The user would start the process to reserve a book, which there would be login information to check. Then, the database would update for the request that the book is requesting to be reserved. Then the staff would be notified of this request, the staff would then search for the book to reserve it. Then the database updated again that the book has been reserved. A notification is then sent by email that confirms the reservation.

3.4 Classes / Objects

3.4.1 <Class / Object #1>

3.4.1.1 Attributes

3.4.1.2 Functions

<Reference to functional requirements and/or use cases>

3.4.2 <Class / Object #2>

...

3.5 Non-Functional Requirements

Non-functional requirements may exist for the following attributes. Often these requirements must be achieved at a system-wide level rather than at a unit level. State the requirements in the following sections in measurable terms (e.g., 95% of transaction shall be processed in less than a second, system downtime may not exceed 1 minute per day, > 30 day MTBF value, etc).

3.5.1 Performance

- Results of any function must take less than 5 seconds to complete.
- Must be capable of running on any on-site devices with internet browsing capabilities.
- Should be able to interact with the system in less than 5 seconds of browser loading in.

3.5.2 Reliability

- When danger is presented to the system, there are a number of back-ups of the library catalog that will be regularly created to prevent any significant data loss.
- Capable of running for 24 hours without any significant issues.

3.5.3 Availability

- This should run for 24 hours for library users with easy access at any time.

3.5.4 Security

3.5.4.1 Users

- Two Two-factor authentication to ensure user account security.
- User's personal information that is provided from the account creation process must be encrypted and properly secured.
- Users can securely access their accounts with a user-defined account name and password.
- Standard users may not edit any functions of the systems beyond their own personal account.

3.5.4.2 Staff

- Database of the collection

3.5.5 Maintainability

- This system should be able to be maintained by BPL IT staff.

3.5.6 Portability

- Should be able to run on any computer
- Should be able to run on any smartphone device that is updated to the latest version of IOS and Android.

3.6 Inverse Requirements

- This product will not handle any services regarding payment of new membership fees, late fees, or any other service that requires payment.

3.7 Design Constraints

- Access to the system must be able to be accessed by any onsite computer device and smartphone.
- This product will be built for computer browsers,
- This system may not endanger any human being.

Specify design constraints imposed by other standards, company policies, hardware limitation, etc. that will impact this software project.

3.8 Logical Database Requirements

- On-demand access to view library products.
- Safe containment of user's personal information

Will a database be used? If so, what logical requirements exist for data formats, storage capabilities, data retention, data integrity, etc.

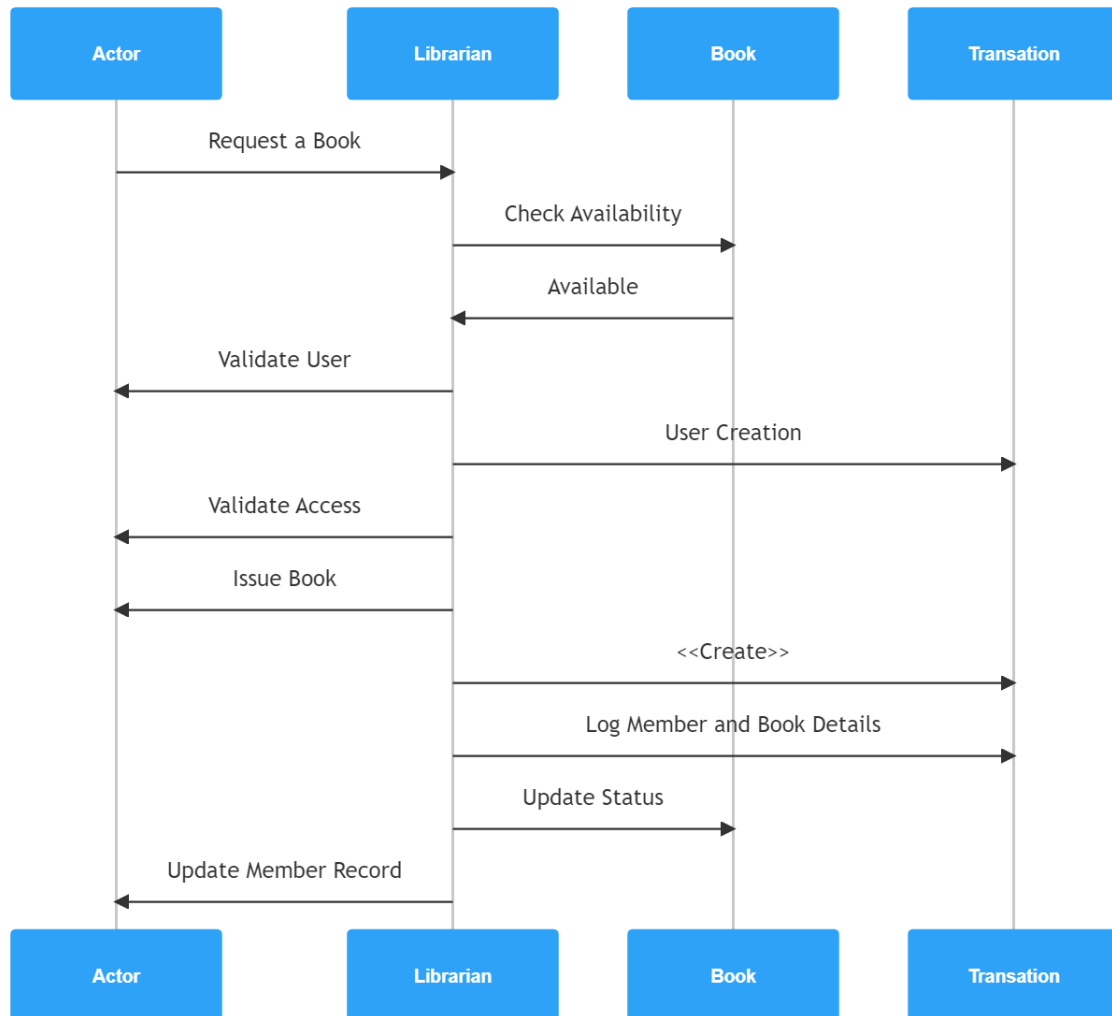
4. Analysis Models

List all analysis models used in developing specific requirements previously given in this SRS. Each model should include an introduction and a narrative description. Furthermore, each model should be traceable the SRS's requirements.

4.1 Sequence Diagrams

4.1.1 Actor Checking Out a Book

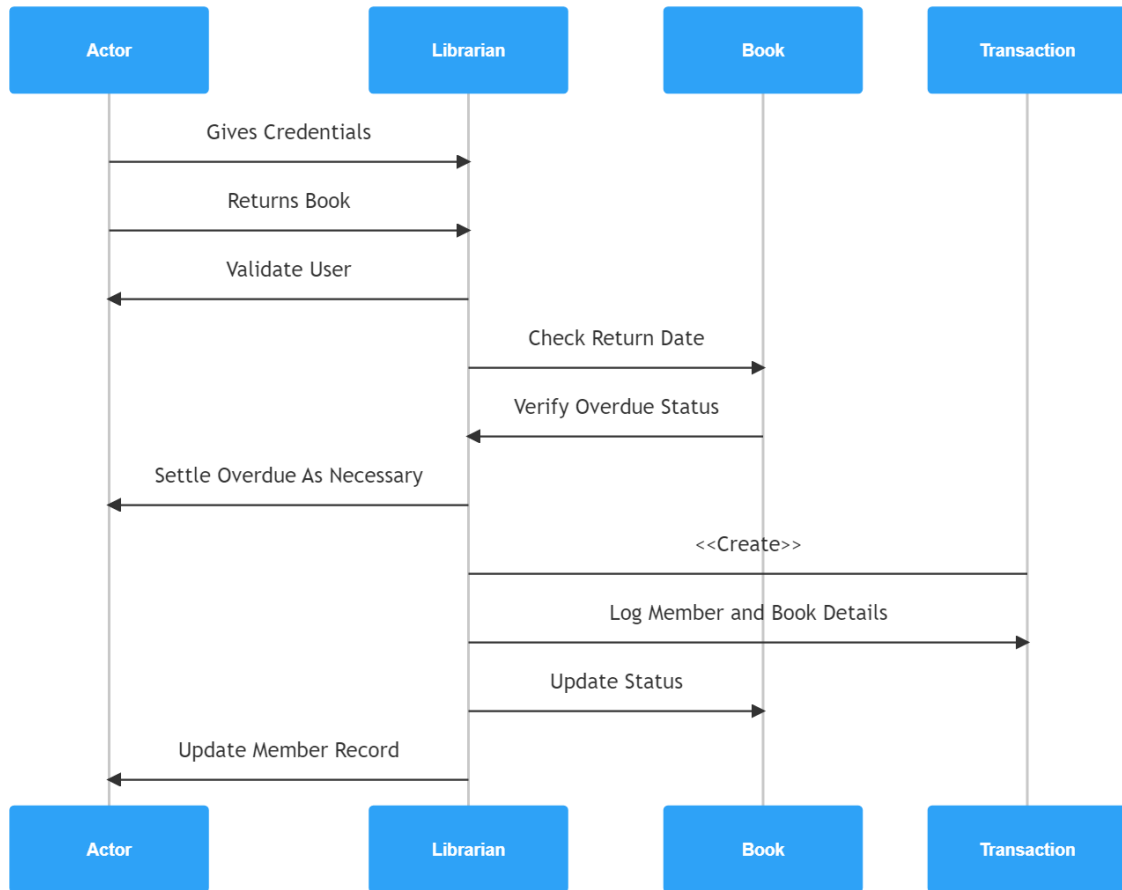
Library Management System



This diagram outlines the sequence in which a user member interacts with the librarian and the LMS for the purposes of checking out a book.

4.1.1 Actor Returning a Book

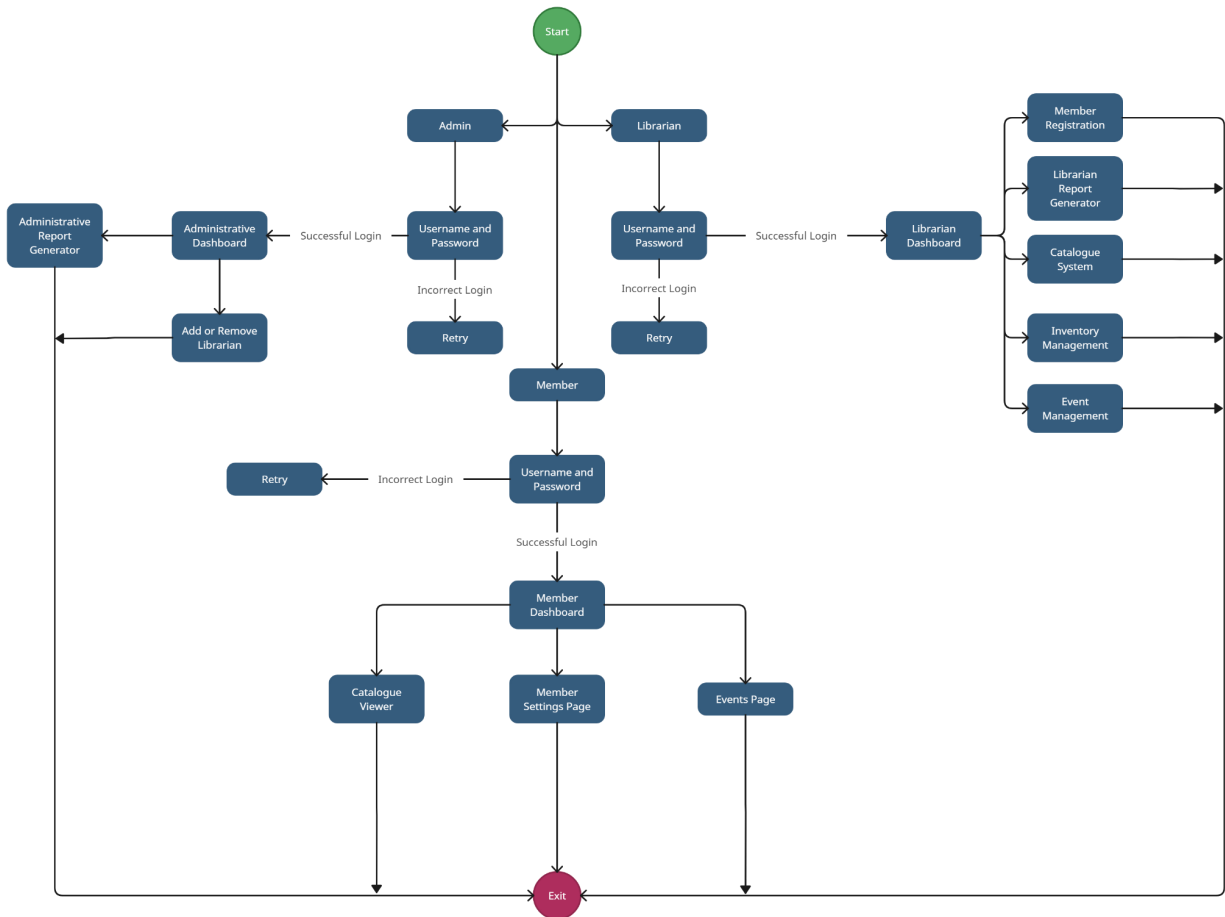
Library Management System



This diagram outlines the sequence in which a user member interacts with the librarian and the LMS for the purposes of returning a book.

4.2 State-Transition Diagrams (STD)

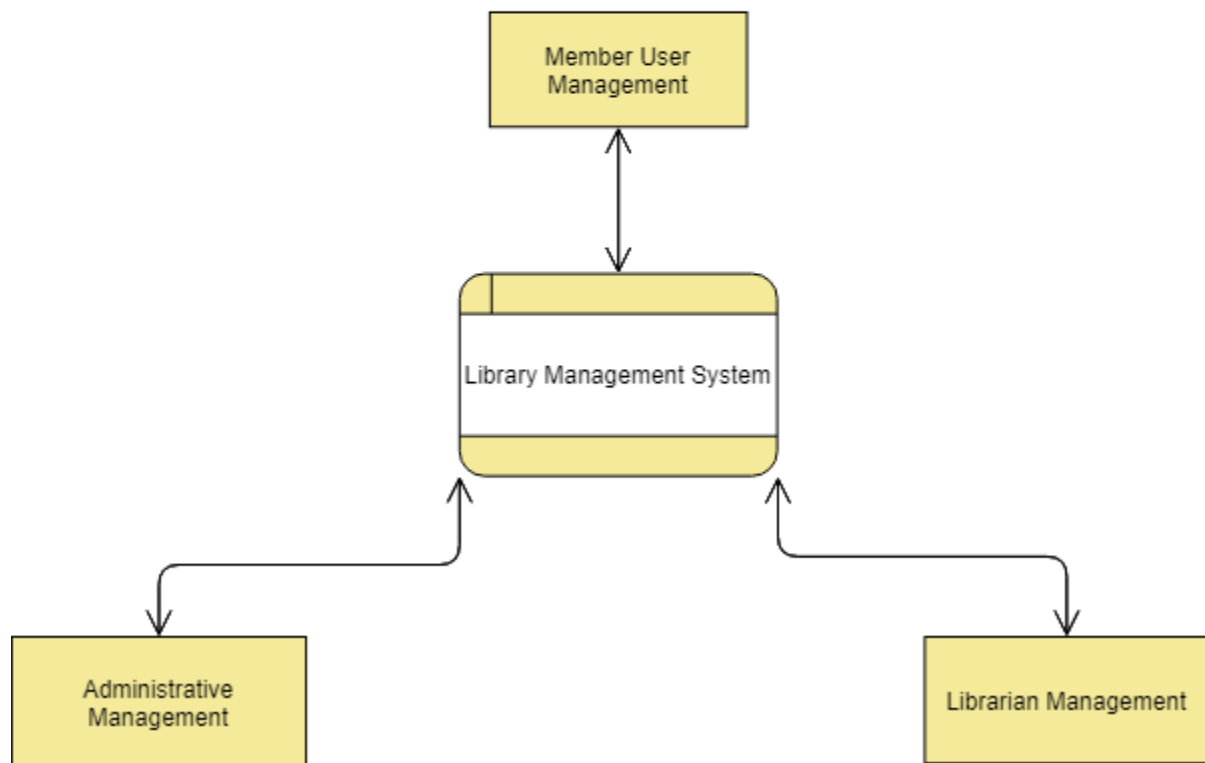
4.2.1 State-Transition Diagram for Admin, Librarian Staff, and Member Users



4.3 Data Flow Diagrams (DFD)

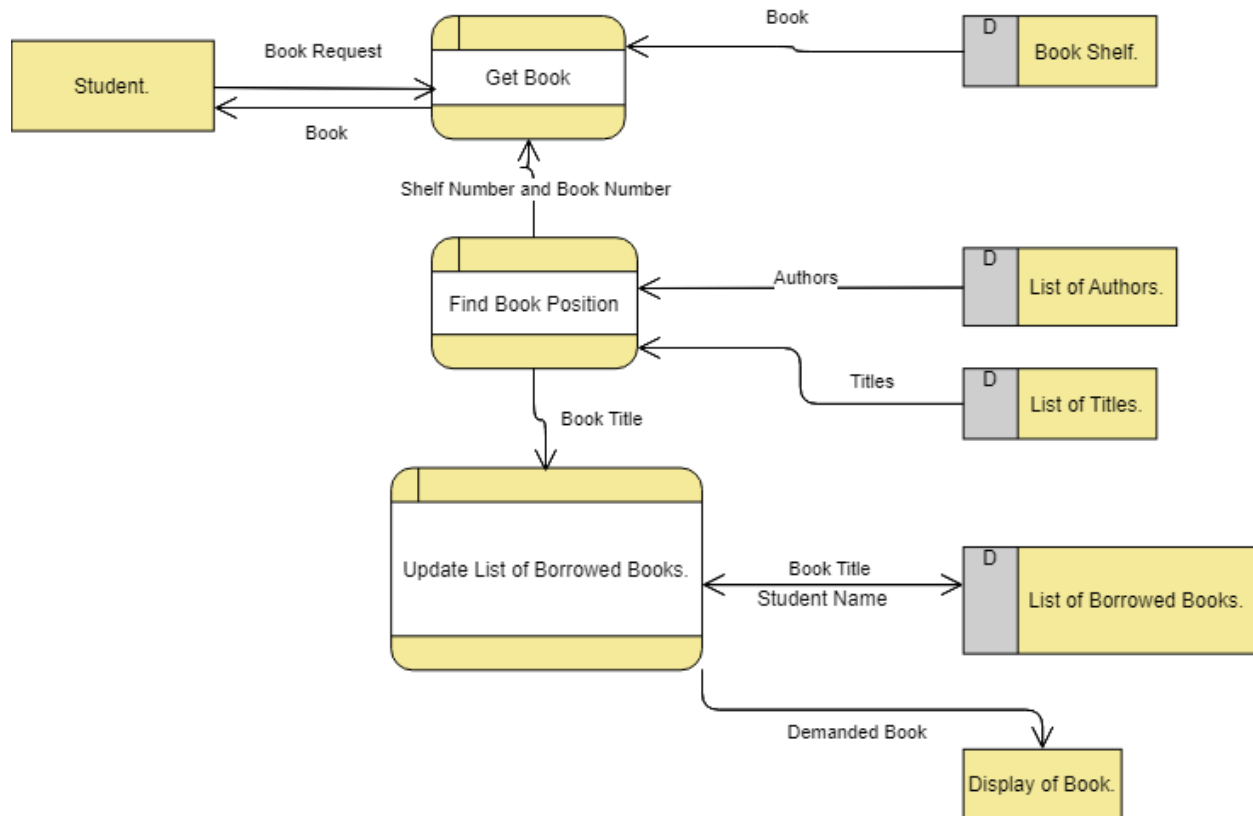
4.3.1 Level 0

Data Flow Diagram for level 0 for Library Management System



4.3.2 Level 1

Data Flow Diagram at Level 1 for Library Management System.



5. Change Management Process

Identify and describe the process that will be used to update the SRS, as needed, when project scope or requirements change. Who can submit changes and by what means, and how will these changes be approved.

5.1 Change Request

Changes to the scope of the software can be requested by the client at any time during the duration of the contract. Should changes be made that require additions of features not already established, a revision shall be made and documented highlighting all changes to official documentation.

5.2 Change Approval

Change approval will be at the discretion of the project manager after conducting a meeting with all relevant project leads and client personnel. Once changes have been approved, the new revision is to be made in the official and live documentation.

A. Appendices

Appendices may be used to provide additional (and hopefully helpful) information. If present, the SRS should explicitly state whether the information contained within an appendix is to be considered as a part of the SRS's overall set of requirements.

Example Appendices could include (initial) conceptual documents for the software project, marketing materials, minutes of meetings with the customer(s), etc.

A.1 Appendix 1

A.2 Appendix 2