Software Requirements Specification

for

Library Management System

Version 1

Prepared by Group 7

Syracuse University CSE 687

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Version	Date	A/D/C (Add, Delete, Change)	Author	Document Section #	Description
01	April 1, 2024	--	Bhumika Dasari	All	Initial Revision

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1. Introduction

1.1. Purpose

This Software Requirements Specification (SRS) is intended to delineate software requirements for the users Library Management system. This SRS is intended to provide guidance to the developers of the system to implement required functionality, as well as the test team to develop appropriate Verification and Validation (V&V) plans and procedures required to demonstrate to the users that the system was built to this specification.

1.2. Scope

This document specifies the requirements for the following capabilities.
1.   Library Management, including user interface and mobile application support
2.   Catalog Management
3.   Borrowing and lending capabilities
4.   User Interface and Accessibility
5.   Resource Discovery and Search functionalities

1.3. Definitions

BDD	Block Definition Diagram.
SRS	System Requirements Specification
UML	Unified Modeling Language
V&V	Verification and Validation
API	Application Programming Interface
LMS	Library Management System
IA	Information Assurance
STIGS	Security Technical Implementation Guides

1.4. References

1. IEEE Std 830-1998 - IEEE Recommended Practice for Software Requirements Specifications - Revision of IEEE Std 830-1993

1.5. Overview

This document follows the recommended format specified in IEEE Std 830-1998 IEEE Recommended Practice for Software Specifications. For Section 3, the specific template A.5 for organizing information by feature is followed.
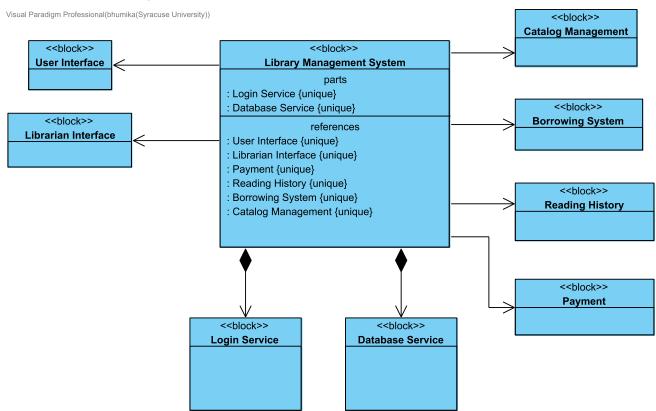
2. Overall Description

2.1. Product Perspective

This document encompasses a comprehensive set of capabilities essential for both librarians and users to ensure effective operation and utilization of the Library Management System (LMS). From the librarian's perspective, it delineates functionalities enabling system monitoring, catalog management, user administration, transaction oversight, inventory control, reporting, collaboration with other libraries, security maintenance, and technical support. Simultaneously, from the user's viewpoint, it underscores the importance of intuitive interfaces facilitating resource discovery, borrowing, renewals, reservations, and access to personalized features. By integrating these capabilities seamlessly, the LMS not only empowers librarians to streamline administrative tasks and enhance library services but also enriches the user experience by providing convenient access to a diverse array of resources and services tailored to individual preferences and needs.

2.1.1. Library Management System System Architecture

Block Definition Diagram

📘*Borrowing System*

This component handles the borrowing and return of books by library patrons, including tracking loan periods, reservations, and overdue books.

📘*Catalog Management*

This component is responsible for managing the library's catalog, including adding new books, updating book information, and maintaining the overall catalog.

📘*Database Service*

This component is responsible for managing the database that stores all the library-related data, such as books, user information, and borrowing records.

📘*Librarian Interface*

This block represents the interface specifically designed for librarians or library staff to interact with the library management system. It provides access to functionalities tailored for librarians.

📘*Library Management System*

This is the core component of the system, responsible for managing and coordinating various library-related tasks and functionalities.
It contains references to several sub-components, including Login Service, Database Service, User Interface, Librarian Interface, Payment, Reading History, Borrowing System, and Catalog Management.

Login Service

This component handles the user authentication and login process for the library management system.

Payment

This component is responsible for handling any payments related to library services, such as fines for overdue books or fees for specific services.

Reading History

This component keeps track of the reading history of library users, allowing them to view their past book borrowings and returns.

User Interface
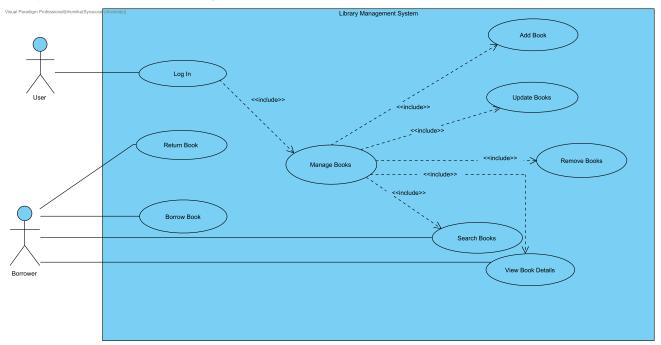
This block represents the user interface of the library management system, which is the main interaction point for users (e.g., library patrons) to access the system's functionalities.

2.2. Product Functions

The following use case diagram depicts the users of the system, and the intended way in which they will interact with the system.

2.2.1. Library Management System Use Cases

Analysis Model Use Case Diagram

Library Management System

Add Book

Log In

User

<<include>>

Update Books

<<include>>

Return Book

<<include>>

Manage Books

<<include>>

Remove Books

<<include>>

Borrow Book

<<include>>

Borrower

Search Books

View Book Details

2.3. Use Case Description

2.3.1. Analysis Model Use Case Diagram

Add Book

ID: UC06

This function allows the user to add a new book to the library's collection.

Details

Level	N/A
Complexity	N/A
Use Case Status	N/A
Implementation Status	N/A
Preconditions	N/A
Post-conditions	N/A
Author	N/A
Assumptions	N/A

Relationships

Relationship	From	To
--->\<\<include>>	⬤Manage Books	⬤Add Book

⬤ *Borrow Book*

ID: UC04

This function allows a borrower to borrow a book from the library.

Primary Actors

⚲ Borrower

Details

Level	N/A
Complexity	N/A
Use Case Status	N/A
Implementation Status	N/A
Preconditions	N/A
Post-conditions	N/A
Author	N/A
Assumptions	N/A

Relationships

Relationship	From	To
——unnamed	⚲ Borrower	⬤Borrow Book

⚲ *Borrower*

ID: AC02

The borrower is the person who borrows books from the library. They are distinct from the user, as the user may perform administrative tasks in the system, while the borrower is the end-user who borrows and returns books.

Properties

Abstract	false
Leaf	false
Root	false

Relationships

Relationship	From	To
——unnamed	⚲ Borrower	⬤Return Book
——unnamed	⚲ Borrower	⬤Borrow Book
——unnamed	⚲ Borrower	⬤Search Books
——unnamed	⚲ Borrower	⬤View Book Details

▢ *Library Management System*

Properties

Abstract	false
Leaf	false
Root	false

Children Summary

Name	Description
Add Book	This function allows the user to add a new book to the library's collection.
Borrow Book	This function allows a borrower to borrow a book from the library.
Log In	This function allows the user to log into the system, using authentication such as a username and password.
Manage Books	This function gives the user the ability to perform various operations related to managing the books in the library, such as adding new books, updating existing book information, and removing books from the system.
Remove Books	This function allows the user to remove books.
Return Book	This function allows a borrower to return a book that they had previously borrowed from the library.
Search Books	This function allows users (both the administrative user and borrowers) to search for books within the library's collection.
Update Books	This function allows the user to update the information associated with existing books in the library's collection.
View Book Details	This function allows users to view detailed information about a specific book, such as the title, author, publication date, and availability status.

Log In

ID: UC02

This function allows the user to log into the system, using authentication such as a username and password.

Primary Actors

 User

Details

Level	N/A
Complexity	N/A
Use Case Status	N/A
Implementation Status	N/A
Preconditions	N/A
Post-conditions	N/A
Author	N/A
Assumptions	N/A

Relationships

Relationship	From	To
--->`<<include>>`	⬤Log In	⬤Manage Books
——unnamed	👤 User	⬤Log In

⬤ *Manage Books*

ID: UC05

This function gives the user the ability to perform various operations related to managing the books in the library, such as adding new books, updating existing book information, and removing books from the system.

Details

Level	N/A
Complexity	N/A
Use Case Status	N/A
Implementation Status	N/A
Preconditions	N/A
Post-conditions	N/A
Author	N/A
Assumptions	N/A

Relationships

Relationship	From	To
--->`<<include>>`	⬤Manage Books	⬤Add Book
--->`<<include>>`	⬤Manage Books	⬤Remove Books
--->`<<include>>`	⬤Manage Books	⬤Search Books
--->`<<include>>`	⬤Manage Books	⬤View Book Details
--->`<<include>>`	⬤Manage Books	⬤Update Books
--->`<<include>>`	⬤Log In	⬤Manage Books
┅┅➤unnamed	⬤Manage Books	📄Add
┅┅➤unnamed	⬤Manage Books	📄Hold
┅┅➤unnamed	⬤Manage Books	📄Reading History
┅┅➤unnamed	⬤Manage Books	📄Borrow
┅┅➤unnamed	⬤Manage Books	📄New Arrivals

⬤ *Remove Books*

ID: UC08

This function allows the user to remove books.

Details

Level	N/A

Complexity	N/A
Use Case Status	N/A
Implementation Status	N/A
Preconditions	N/A
Post-conditions	N/A
Author	N/A
Assumptions	N/A

Relationships

Relationship	From	To
···>> <<include>>	●Manage Books	●Remove Books

●*Return Book*

ID: UC03

This function allows a borrower to return a book that they had previously borrowed from the library.

Primary Actors

⚧ Borrower

Details

Level	N/A
Complexity	N/A
Use Case Status	N/A
Implementation Status	N/A
Preconditions	N/A
Post-conditions	N/A
Author	N/A
Assumptions	N/A

Relationships

Relationship	From	To
——unnamed	⚧ Borrower	●Return Book

●*Search Books*

ID: UC09

This function allows users (both the administrative user and borrowers) to search for books within the library's collection.

Primary Actors

⚧ Borrower

Details

Level	N/A
Complexity	N/A

Use Case Status	N/A
Implementation Status	N/A
Preconditions	N/A
Post-conditions	N/A
Author	N/A
Assumptions	N/A

Relationships

Relationship	From	To
--->\<\<include\>\>	🔵Manage Books	🔵Search Books
——unnamed	🧍Borrower	🔵Search Books

🔵 *Update Books*

ID: UC07

This function allows the user to update the information associated with existing books in the library's collection.

Details

Level	N/A
Complexity	N/A
Use Case Status	N/A
Implementation Status	N/A
Preconditions	N/A
Post-conditions	N/A
Author	N/A
Assumptions	N/A

Relationships

Relationship	From	To
--->\<\<include\>\>	🔵Manage Books	🔵Update Books

🧍 *User*

ID: AC01

The user interacts with the Library Management System to perform various actions such as logging in, borrowing books, returning books, and managing books.

Properties

Abstract	false
Leaf	false
Root	false

Relationships

Relationship	From	To
——unnamed	🧍User	🔵Log In

View Book Details

ID: UC10

This function allows users to view detailed information about a specific book, such as the title, author, publication date, and availability status.

Primary Actors
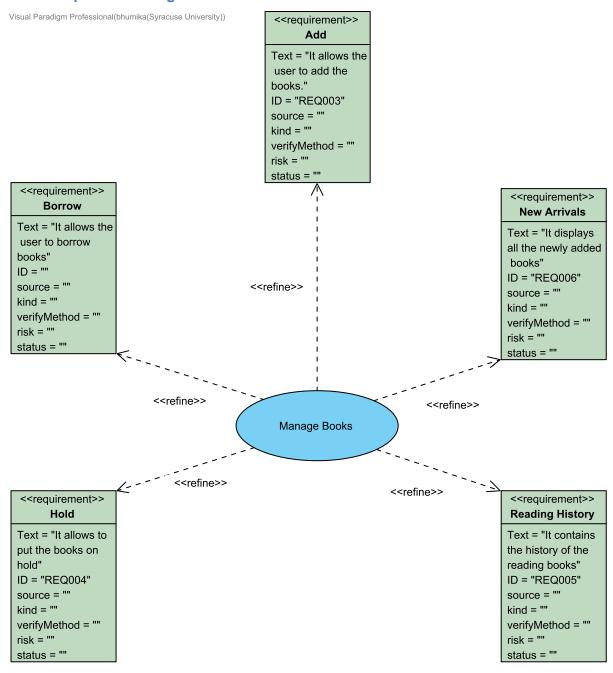
🧍 Borrower

Details

Level	N/A
Complexity	N/A
Use Case Status	N/A
Implementation Status	N/A
Preconditions	N/A
Post-conditions	N/A
Author	N/A
Assumptions	N/A

Relationships

Relationship	From	To
---><<include>>	Manage Books	View Book Details
unnamed	🧍 Borrower	View Book Details

2.3.2. Requirement Diagram1

<<requirement>>
Add

Text = "It allows the
  user to add the
books."
ID = "REQ003"
source = ""
kind = ""
verifyMethod = ""
risk = ""
status = ""

<<requirement>>
Borrow

Text = "It allows the
  user to borrow
books"
ID = ""
source = ""
kind = ""
verifyMethod = ""
risk = ""
status = ""

<<requirement>>
New Arrivals

Text = "It displays
all the newly added
  books"
ID = "REQ006"
source = ""
kind = ""
verifyMethod = ""
risk = ""
status = ""

<<refine>>

<<refine>>

Manage Books

<<refine>>

<<refine>>

<<refine>>

<<requirement>>
Hold

Text = "It allows to
put the books on
hold"
ID = "REQ004"
source = ""
kind = ""
verifyMethod = ""
risk = ""
status = ""

<<requirement>>
Reading History

Text = "It contains
the history of the
reading books"
ID = "REQ005"
source = ""
kind = ""
verifyMethod = ""
risk = ""
status = ""

📄 2.3.3. Add
ID: REQ003

It allows the user to add the books.

📄 2.3.4. Borrow
ID: REQ004

It allows the user to borrow books

📄 2.3.5. Hold
ID: REQ004

It allows to put the books on hold

📄 2.3.6. New Arrivals
ID: REQ006

It displays all the newly added books

📄 2.3.7. Reading History
ID: REQ005

It contains the history of the reading books

🔵 2.3.8. Manage Books
ID: UC05

This function gives the user the ability to perform various operations related to managing the books in the library, such as adding new books, updating existing book information, and removing books from the system.

2.4. User Characteristics

Refer to Use Case Diagram above and the descriptions of the Actors.
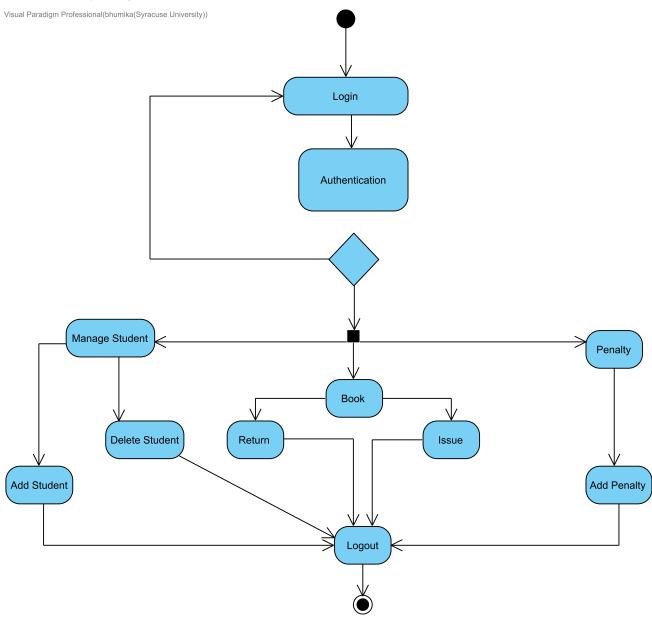
2.5. Constraints

These are defined specifically in Section 3

3. Specific Requirements

3.1. Overview

To assist librarians and users in efficiently managing library resources, activities, and services, this section outlines the detailed features of the system and the associated requirements.

3.1.1. Activity Diagram1

3.1.2. Add Penalty

This component allows the user to add a penalty to a student's record.

3.1.3. Add Student

This component enables the user to add a new student to the system.

3.1.4. Authentication

This component handles the authentication process, verifying the user's and librarian's credentials.

3.1.5. Book

This component represents the management of books in the system, including operations such as issuing and returning books.

3.1.6. Delete Student

This component allows the user to delete a student from the system.

3.1.7. Issue

This component handles the process of issuing a book to a student.

3.1.8. Login

This component allows the user to log into the system

3.1.9. Logout

This component enables the user to log out of the system.

3.1.10. Manage Student

This component allows the user to manage student-related operations, such as adding, deleting, or updating student information.

3.1.11. Penalty

This component is responsible for managing penalties, such as fines, associated with overdue or lost books.

3.1.12. Return

This component allows the user to return a book that has been issued.

3.1.13. unnamed

3.1.14. unnamed

3.1.15. unnamed

3.2. Performance Requirements

3.2.1. Transaction Processing time:

The system shall process checkouts, returns, and renewals within 5 seconds per transaction on average.

3.2.2. Search Responsiveness:

The system shall display search results for library items within 2 seconds of the user's query submission.

3.2.3. Concurrent User Handling:

The system shall support a minimum of 100 concurrent users without a noticeable degradation in performance.

3.3. Design Constraints

3.3.1. Accessability

The system shall support multiple languages to cater to all users, including but not limited to:
1. English
2. French

3.3.2. Data Encryption

The software shall employ data encryption across all interfaces to ensure confidentiality and integrity of sensitive information, such as user data, transaction records, and library resources.

3.3.3. Software Quality

The software shall be developed and maintained in accordance with industry standard ISO/ IEC 5055:2021. This ensures that the software meets established quality standards, follows best practices in development and maintenance processes, and promotes interoperability and reliability.

3.4. Software System Attributes

3.4.1. Information Assurance Compliance

The software shall conform to commercial standard Information Assurance (IA) controls and Security Technical Implementation Guides (STIGS) to mitigate security risks, protect against cyber threats, and ensure compliance with industry regulations and best practices.

3.4.2. Authorized Configuration Changes

The software shall allow only authorized users with appropriate privileges to make configuration changes. This ensures that system settings and parameters are modified only by authorized personnel, reducing the risk of unauthorized access or unintended system alterations.