

**Padmabhooshan Vasantraodada Patil Institute of Technology, Sangli
(Budhgaon)**

(Approved by AICTE, New Delhi, Recognized by Government of Maharashtra, Affiliated to DBATU Lonere)
Department of Computer Science & Engineering

SOFTWARE REQUIREMENTS SPECIFICATION (SRS)

Library Management System

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1. INTRODUCTION

With the increase in the number of readers, better management of libraries system is required. The Library management system focuses on improving the management of libraries in a city or town. “What If you can check whether a book is available in the library through your phone?” or “what if instead of having different library cards for different libraries you can just have one ?” or “you can reserve a book or issue a book from your phone sitting at your home!”. The Integrated Library Management system provides you the ease of issuing, renewing, or reserving a book from an library within your town through your phone. The Integrated Library Management system is developed on the android platform which basically focuses on issuing, renewing and reserving a book.

1.1 Purpose

This is the Software Requirements Specification (SRS) for the Library Management System. The purpose of this document is to convey information about the application's requirements, both functional and non-functional, to the reader. This document provides (a) a description of the environment in which the application is expected to operate, (b) a definition of the application's capabilities, and (c) a specification of the application's functional and nonfunctional requirements. The document is intended to serve several groups of audiences:

- First, it is anticipated that the SRS will be used by the application designers. Designers will use the information recorded here as the basis for creating the application's design.
- Second, the client for the project, the library manager in our case, is expected to review this document. The SRS will serve to establish a basis for agreement between the client and development team about the functionality to be provided by the application.
- Third, the application maintainers will review the document to clarify their understanding of what the application does.
- Fourth, test planners will use this document to derive test plans and test cases. Finally, the project manager will use this document during project planning and monitoring

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1.2 Scope of Product

The purpose of this software development project is to create a new application called: Library Management System. The client for this project wishes to enter the PC-based LAN environment. The Library Management System will be PC-base with a LAN, allowing library users to search for books and library staff members to manage the book inventory and user database. The application will provide the following capabilities:

- The application will be access via a LAN on a PC terminal in the Library
- Library staff will be able to manage library user accounts including remove, change, and add.
- Library staff will be able to manage the book inventory database including remove, change, and add.
- The application will record all books that are checked out, checked in, and recalled.
- The application will generate reports for administrative purposes.
- The application will provide search function on books based on ISBN, subject, title, or author.

The project's client has determined that this application will provide the following benefits:

- Provide additional flexibility and convenience to the library users.
- Provide better reliability and security of the library information.
- Provide a more productive environment for the library staff member.
- Reduce the cost of the library operations.

1.3 Definitions, Acronyms, and Abbreviations

SRS - Software Requirements Specification.

PC - Personal Computer.

LAN - Local Area Network.

PVPIT – PVP Institute Of Technology.

ISBN - International Standardized Bin Number.

ILS-Integrated Library System.

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1.4 References

1. Merlin Dorfman, Richard H. Thayer, "Standards, Guidelines, and Examples on System and software Requirements Engineering", PVPIT, 1990.

2.https://www.academia.edu/24074814/Library_Management_System_SRS

3.<https://github.com>

4.https://en.wikipedia.org/wiki/Integrated_library_system

1.5 Overview

A brief description of the content of each chapter is given below.

Introduction

Provides an overview of the project. Summarizes the major capabilities of the product.

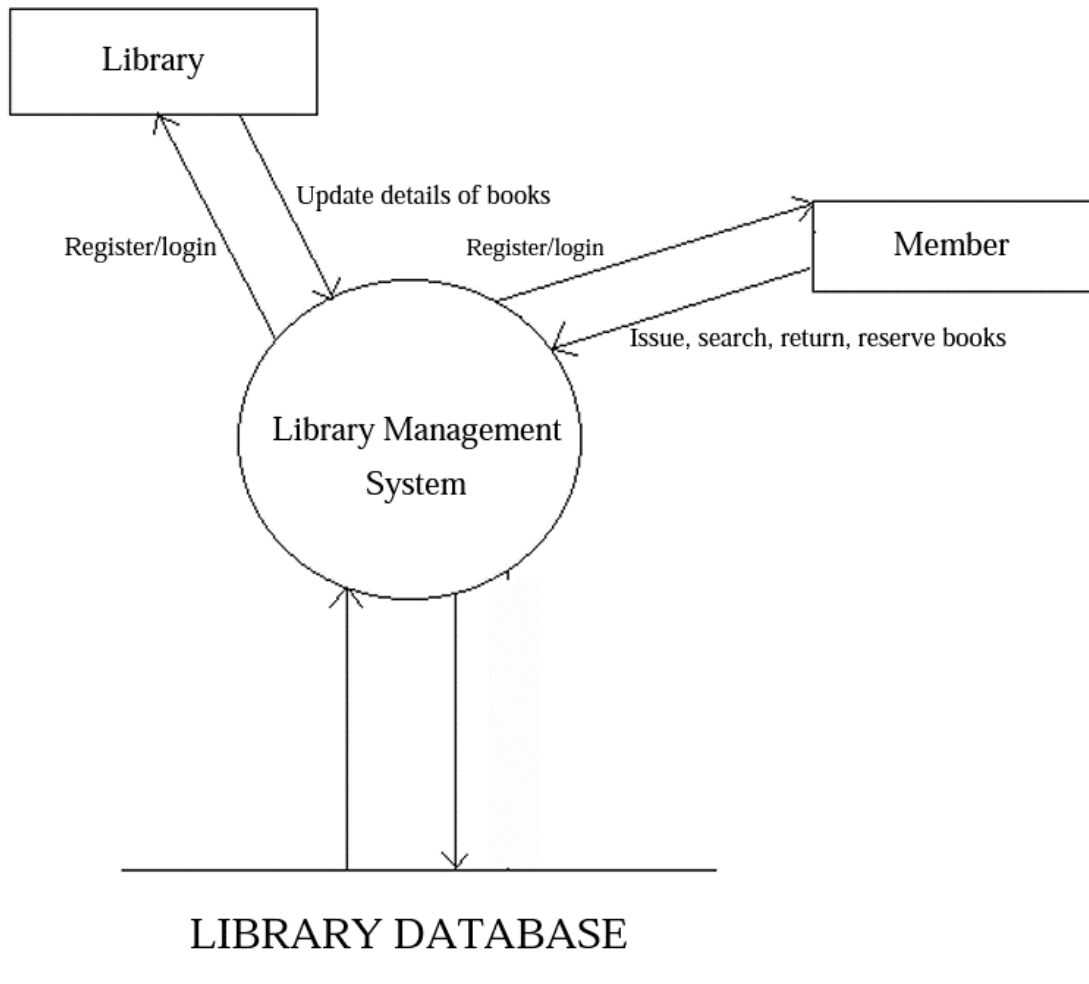
2.0 General Description

Presents the environment in which the application is expected to operate, provides an overview of the system requirements, describes assumptions about possible users of the application, possible constraints on the project, and the underlying assumptions that on which the requirements analysis is based.

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Flow Diagram:

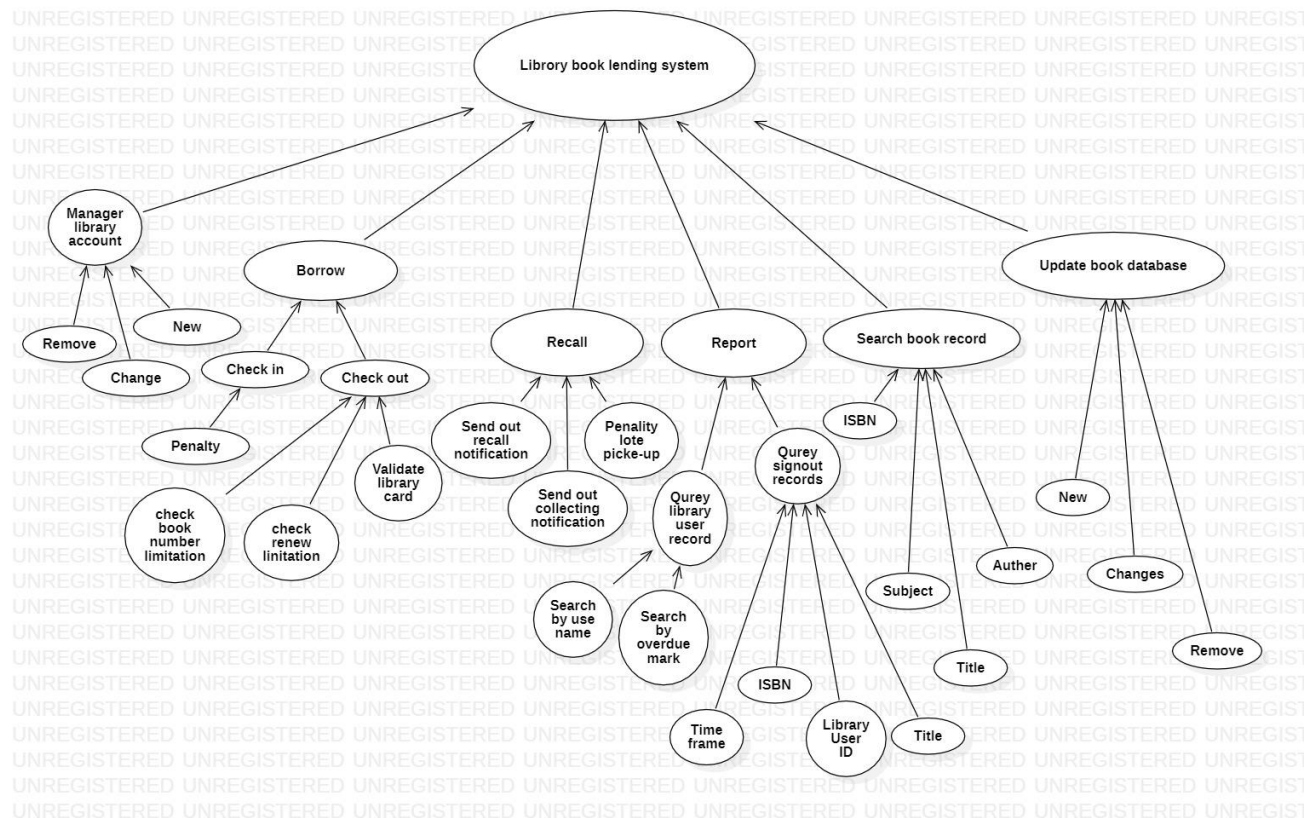


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2.1 Product Functions

The high level summary of functions in Library Book System is described in the following concept map



2.2 General Constraints

The current hardware for the existing Library Book System is mainframe with text type terminal. Therefore, if the new system is PC based, there will be a need to replace with PC hardware and new network facility.

The Library Book System can potentially have hundreds of users. It is unrealistic to provide training for everyone. Therefore, the system should be designed for easy to use, providing help instructions, and appropriate error messages for invalid user inputs.

Security is important to library operation. Library user is allowed to use the Library Book System only for searching book records. User should never be able to break into the system and to perform any modification.

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Reliability is vital to library operation. The Library Book System should not have any unscheduled down time during library operation hours. Any down time in operation hours has significant impact to the operation and cause inconvenience to everyone in library.

2.3 Assumptions and Dependencies

The following is a list of assumptions and dependencies that would affect the software requirements if they turned out to be false:

- Users have basic understanding to PC and Windows.
- There is a method to convert all book records and library user records from the existing system into the Library Book System

3.0 Specific Requirements:

This section contains the detailed requirements. In this section, the users of "Search Book Record" are refereed to librarians and patrons (library users). Users of other sections are only refereed to the librarian card holder (librarians and library managers.)

3.1 Functional Requirements

3.1.1 User Interface

The user interface requirements are concerned with the user interface and how information is presented to the user.

3.1.1.1 Library user account manage system SRS-001: The system shall display the user account information including user ID, last and first name, and user position, privilege. SRS-002: The system shall use a graphic user interface which allows librarians to choice actions including removing, changing and adding user account and account information..

3.1.1.2 Book borrowing system.

SRS-003: When check out the books, the system shall show all the book borrowing information about a particular user including:

- the first and last name of the user
- the library card number
- the library card expiring date
- if the user has unpaid penalty

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- the number of books the user has not return

SRS-004: When check out the books, when required by librarians, the system shall show the information about books which is borrowed before and not returned yet including:

- the ISBN of the book
- the title of the book
- the borrowing and due date of the book
- the branch which the book is checked out

SRS-005: When check out the books, the system shall display the information of the book which is just being checking out including: ISBN, title, due date.

SRS-006: When check in the books, the system shall show the title, ISBN of the book which is being checked in. When check in is finished, a "check in" stamp shall be seen.

3.1.1.3 Book recall system

SRS-007: When recalling the book, the system shall display a list of all the copies of the book which is borrowed out ordered by book lend out time.

SRS-008: When the recalled book is arrived, the system shall display the last and first name, the recall date and the arriving date of the book. If only one copy of book is arrived and more than one user are waiting, users shall be displayed ordered by recalling time. When check in recall book is finished, a "check in recall" stamp shall be seen.

3.1.1.4 Search book record

SRS-009: The system shall display a list of books which are match the search criteria sorted by book titles including:

- the category
- the ISBN
- the title
- the author

SRS-008: When required by users, the system shall display the information about a particular book including:

- the category

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- the title the ISBN
- the publisher
- the brief description of the book (if any stored in database)
- the location in library

3.1.2 Data Entry

The data entry requirements are concerned with how data is entered and validated. SRS-010: The system shall allow a user to enter his/her data via a keyboard or choose an item via a mouse.

- SRS-011: Whenever the "date" data is needed, it shall be entered only by choose date from a online calendar.
- SRS-012: The system shall allow the user to enter the library card number and ISBN both by typing or scanning.
- SRS-013: The system shall allow the user to enter book borrowing, recalling data as frequently as required.

3.1.2.1 Library user account manage system

- SRS-014: The system shall allow the user to attach notes to each account
- SRS-015: The system shall allow the user to add or change information in an account including: last name, first name, user ID, user position, user privilege.
- SRS-016: the system shall allow the user to delete an entire account.

3.1.2.2 Book borrowing system.

- SRS-017: The system shall allow the user to specify a checking out book using its ISBN.
- SRS-018: The system shall allow the user to specify a patron by the library card number.
- SRS-019: The system shall allow the user to specify a checking in book using its ISBN.
- SRS-020: The system shall allow the user to specify that a penalty is paid.
- SRS-021: The system shall check and show the number of books which are checked out and if the number is exceeded the limitation for patrons except for librarian card holders.
- SRS-022: The system shall check and show if the book can only be used in library
- SRS-023: The system shall let the librarian card holders to check out books which can only be used in library.
- SRS-024: The system shall commit the check in and check out data to the database as soon as the data is entered.

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3.1.2.3 Book recall system

- SRS-025: The system shall allow the user to specify a recalled book by book ISBN
- SRS-026: The system shall allow the user to choose one copy of book to recall from a list of copies which are borrowed out.
- SRS-027: The system shall allow the user to record the record notification send out date, the book arrive date, the pick-up notification send out date.
- SRS-028: The system shall allow the user typing in search criteria including book title, key word in title, ISBN, subject, category.
- SRS-029: The system shall allow the user choose language option which the searched book is used including English, Spanish and French.
- SRS-030: If the search result are a list of books, the system shall allow the user to choose any one of them to see the details.

3.1.2.5 Update book database

SRS-031: The system shall allow the user to add or change the record information including:

- the category
- the title
- the ISBN
- the publisher
- the brief description of the book
- the location in library
- the purchase date
- the price

SRS-032: the system shall allow the user to put "delete" stamp for a existing book and specify the deleting reason.

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Use Case Model Description:

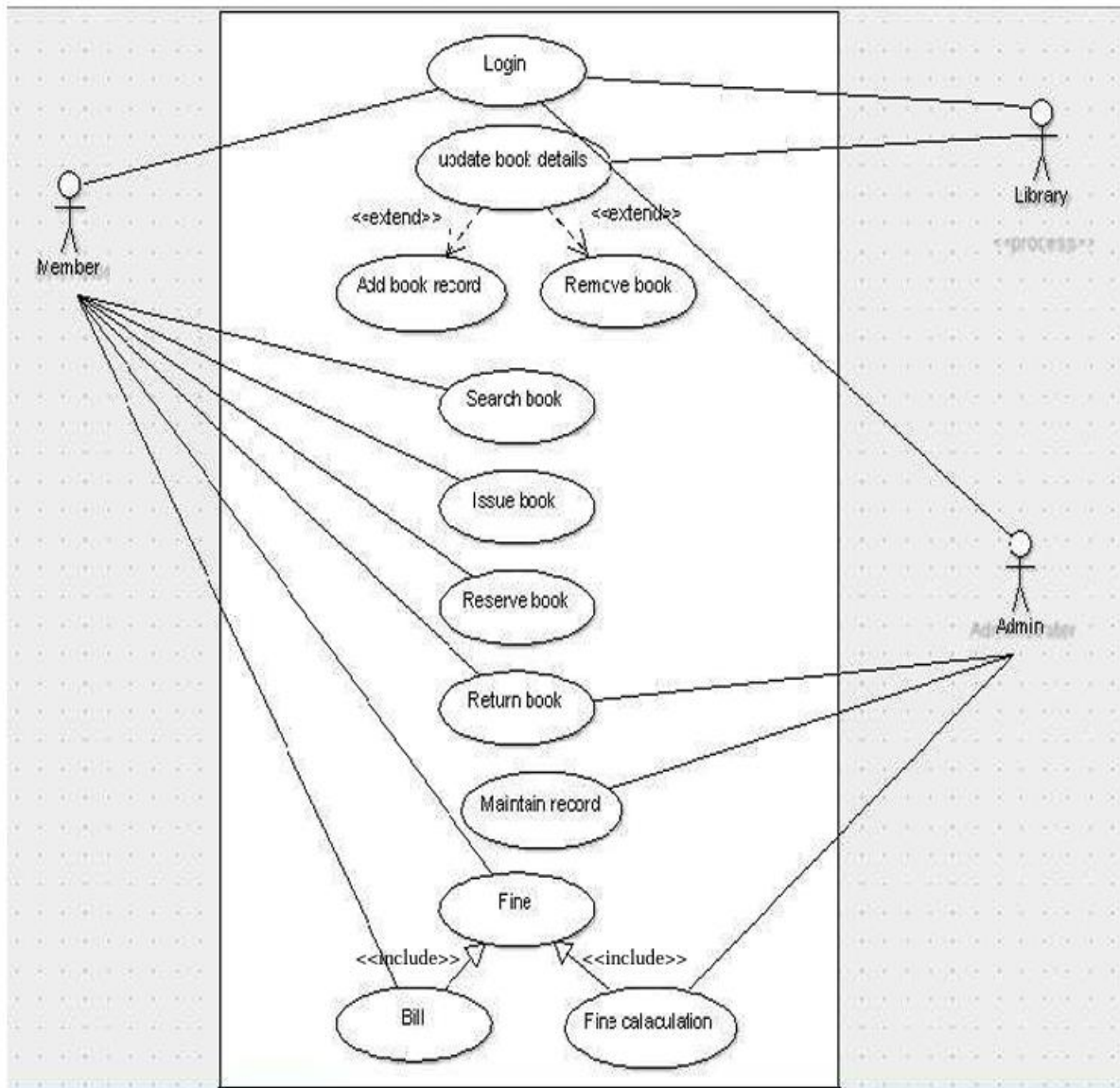
Use Case selection	Description
Use Case name	Add student and library record
Level	Sub-Functional level
Primary actor	Student, Library
Stakeholders and interest	Student: wants to register into the system. Library: wants to register into the system and update book details. Administrator: responsible for the management of the transaction of fine and also login and register details.
Pre-condition	Students and Library have submitted their registration form.
Post-condition	Record for a student/library has been added.
Main success scenario	1 Student/Library opens the application to access the services of the LMS 2 Student/Library sign-up to get registered online. 3 He/She provides correct information and secret password. 4 He/She got registered.
Alternative flow	1 Student/Library opens the application in their phone 2 He/She tries to sign-up 3 He/She fails and receives an error 4 He/She will report an error and the error will be rectified as soon as possible.
Specific requirement	<ul style="list-style-type: none">The response time for registration is 1 minute.The response time for login is 1 minute

Table 1: table for use case description.

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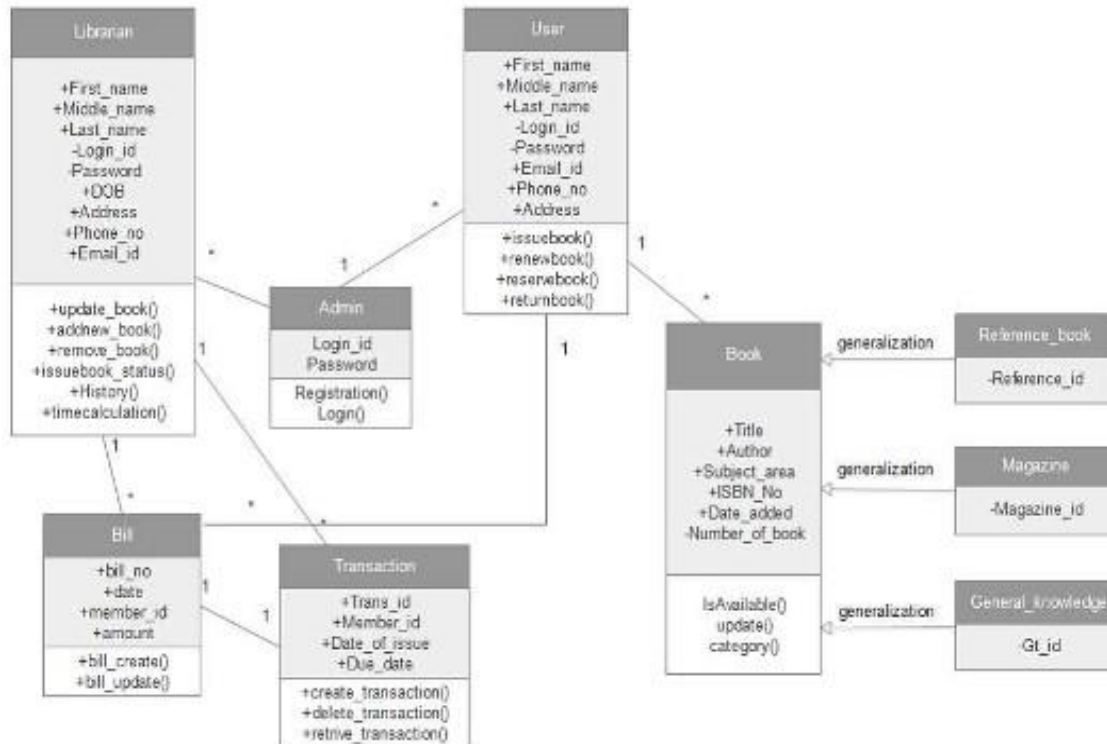
Use Case Diagram:



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Class Diagram:

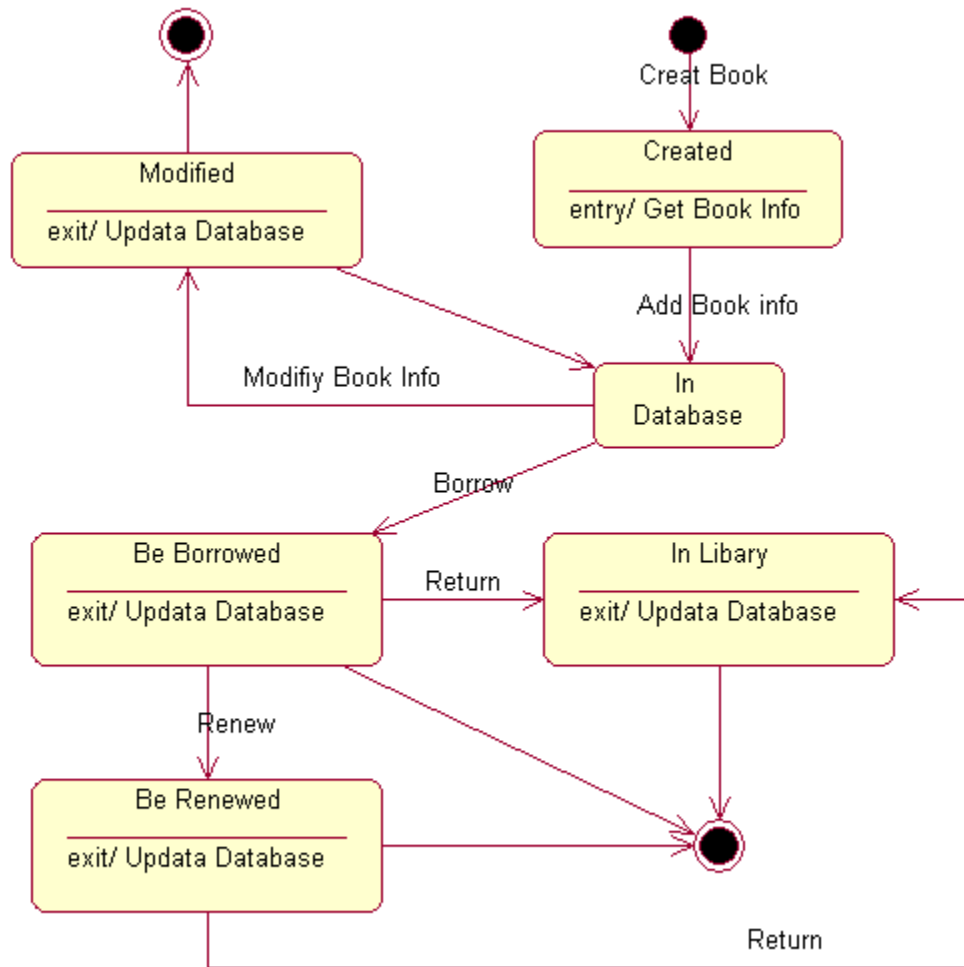


A SRS Class Diagram is a visual representation of the classes and objects used within a software system. It helps to define the software's architecture and provides a clear framework for how the system can be developed and maintained. It can be used to identify and analyze relationships between software entities, as well as to identify common and unique attributes of particular classes. This enables software developers to envision a system as a set of interconnected components and avoids costly mistakes from arising. SRS Class Diagrams also allow for the quick identification of any redundant features or components. Overall, it is an effective tool for aiding software development.

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Object Diagram:



In UML, object diagrams provide a snapshot of the instances in a system and the relationships between the instances. By instantiating the model elements in a class diagram, you can explore the behavior of a system at a point in time.

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3.1.3 Report Generation

the report generation requirements are concerned with the report generation capabilities of the Library system.

SRS-034: The system shall have a report feature that will allow the user to generate a report showing the information of all the sign out book in a time period which is the search criteria input by user. The information includes the number of books, the time period and the information is grouped by book categories.

SRS-035: The system shall have a report feature that will allow the user to generate a report showing the information about all the users who have overdue books and penalty.

SRS-036: The system shall have a report feature that will allow the user to generate a report showing the information of a particular patron.

SRS-037: The system shall have a report feature that will allow the user to generate a report showing the information of book purchase information in a period including the book titles, category, the author, the publisher, the price. It also shall give statistic data about the total number of books purchased, the money paid by category.

SRS-038: The system shall be generate those reports to the display, a file or a printer which is linked to the system.

3.2 Performance Requirements

- SRS-039: The check in and check out system shall respond to the user no more than 5 seconds. The search function shall respond to the user no more than 9 seconds.

3.3 Design Constraints

- SRS-040: The system shall be installed in a windows-NT network.

3.4 Security Requirements

- SRS-041: The account management system shall only be used by managers or users with defined privileges.
- SRS-042: The check-in, check-out and recall system shall only be used by users who have librarian ID. SRS-043: The Patron information report shall be generated by users who have librarian ID.

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- SRS-044: The book sign out report or book purchase report shall only be generated by managers or users with defined privileges.
- SRS-045: Database update data shall be committed to the database only after the managers have approved.

3.5 Reliability

- SRS-041: The system shall be recovered within 10 minutes if it is down.
- SRS-042: The system shall be recovered without intervention at user terminal if it is down.
- SRS-043: The system shall show appropriate messages at terminal when system is down.
- SRS-044: The system shall have 99% reliability during library operating hours.
- SRS-045: Scheduled down time after library operating hours shall not be more than 1 hour per day.
- SRS-046: The system shall generate error messages when the user attempts to enter invalid data.

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3.6 Hardware Requirement

The hardware requirements for a library management system (LMS) will depend on various factors, including the scale of the library, the number of users, and the specific features and functionalities of the LMS. Here are some general hardware requirements that can be included in a Software Requirements Specification (SRS) document for a library management system:

1. Server:

- Processor: A multi-core processor, such as Intel Xeon or AMD Ryzen, to handle database operations and user requests efficiently.
- RAM: At least 8GB or more for handling concurrent connections and data processing.
- Storage: A fast SSD (Solid State Drive) with sufficient capacity to store the LMS database, digital assets, and other data.
- Network Interface: Gigabit Ethernet for fast data transfer.

2. Database Server (if separate):

- Similar hardware specifications as the main server.
- Optimized for database operations, with a high-performance database management system (DBMS) like MySQL, PostgreSQL, or Microsoft SQL Server.

3. Workstations (for library staff and patrons):

- Processor: Modern multi-core processors for responsive user interfaces.
- RAM: 4GB or more for smooth performance while using the LMS.
- Storage: Sufficient storage for local data and user profiles.
- Display: Monitors with appropriate resolution for displaying library information.
- Network Connectivity: Ethernet or Wi-Fi for network access.

4. Barcode Scanners (if used):

- Compatible with the LMS software.
- USB connectivity.

5. Printers:

- Network or USB-connected printers for generating reports, receipts, and library card printing.

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- Compatible with the LMS software for seamless integration.

6. Networking:

- Routers and switches to provide a reliable and high-speed network connection throughout the library.

7. Backup System:

- A robust backup solution for regular data backups and disaster recovery.

8. Security:

- Firewalls, antivirus software, and intrusion detection systems to protect the LMS and data from security threats.

9. Uninterruptible Power Supply (UPS):

- To ensure that the LMS remains operational during power outages and to prevent data loss.

10. Mobile Devices (optional):

- If the LMS includes a mobile app or supports mobile access, ensure that it is compatible with a range of smartphones and tablets.

It's important to note that these hardware requirements can vary depending on the specific LMS software you choose and the scale of your library. It's advisable to consult with the software vendor or development team to determine the exact hardware specifications that will best suit your library's needs. Additionally, consider scalability to accommodate future growth in users and data.