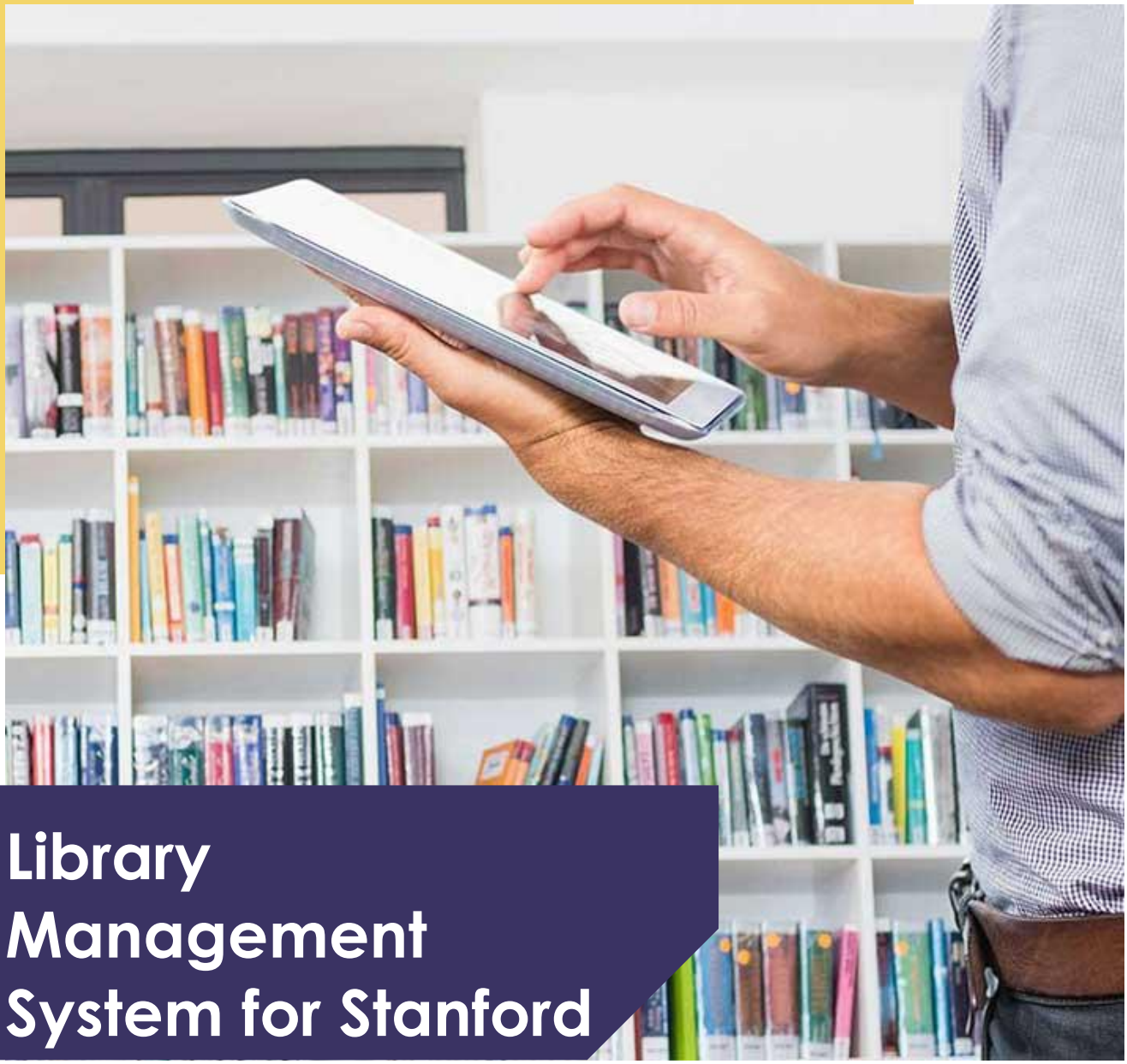


Library Management System for Stanford

Simplilearn Course-end

Project 2: CBAP Preparation

Submitted by:

Arpit Singh Negi

INTRODUCTION

Stanford University, founded in 1885, is among the world's top research universities. Over time, its library has expanded to house more than 4 million books. The current manual system for managing, issuing, and organizing books has become inefficient. To overcome these challenges, a Library Management System (LMS) is proposed to automate all library processes using RFID and digital records.

Project Overview

The LMS will:

- Allow fast searching, issuing, and reissuing of books.
- Automate fine calculation and notifications.
- Provide online access for students (web & mobile).
- Enable dynamic reporting for management.
- Integrate with RFID for anti-theft and self-service returns.

This ensures efficiency, accuracy, and security in managing Stanford's large library resources.

Business Analyst core concept model (BACCM) as per babok v3

Change	Replace manual system with an automated RFID-enabled LMS
Need	Manual management of 4M+ books is time-consuming, error-prone, and inefficient.
Solution	LMS for automated issue/return, cataloging, fine calculation, reports, and online student portal.
Stakeholders	Students, Library Staff, Manager, Developers, Sponsors, Book Suppliers.
Value	Cost reduction, staff productivity, real-time reports, improved student experience.
Context	Existing paper-based process is outdated and cannot scale; digital transformation is necessary.

Task 1: Identifying stakeholders – Create a list of stakeholders (as taught in Business Analysis Planning and Monitoring Knowledge Area)

External Stakeholders	Internal Stakeholders
Library Staff	Project Manager
Book Suppliers	Developer
End User (Stanford Students)	Tester
Stanford Management	Operational Support
Customer (Sponsor)	Business Analyst
Payroll Team	Library Manager

Task 2: Identify the problem statement in this system

Stanford University is a private research university located in California, established in 1885. Over the years, the university has become renowned, with 83 Nobel laureates, 28 Turing Award laureates, and 8 Fields Medalists associated with it as students, alumni, faculty, or staff. The university also established its library in 1885 for the benefit of its students. Initially, the library was a single room accommodating up to 100 readers. As the university expanded, enrolling over 20,000 students annually, the library also grew, now boasting a collection exceeding 4 million books.

The manual management of the library led to several challenges:

- Managing the library manually was extremely time-consuming.
- A large workforce was needed to handle daily library operations.
- Calculating fines for overdue books was tedious and inefficient.
- Generating reports for books issued was not possible with the manual approach.
- Organizing and tracking over 4 million books proved very difficult.
- Book returns were restricted to library operating hours only.

Reliance on paper-based methods for maintaining and organizing the library's resources became overwhelming as the collection expanded. To address these difficulties, the university decided to implement a Library Management Software. This software system would automate library operations, including searching books instantly, streamlining book issue and return processes, and efficiently managing library data. With this solution, users can quickly access accurate information about any book, journal, or research paper, greatly reducing time and effort for both students and library staff.

Task 3: Identify advantages of the new Library Management System

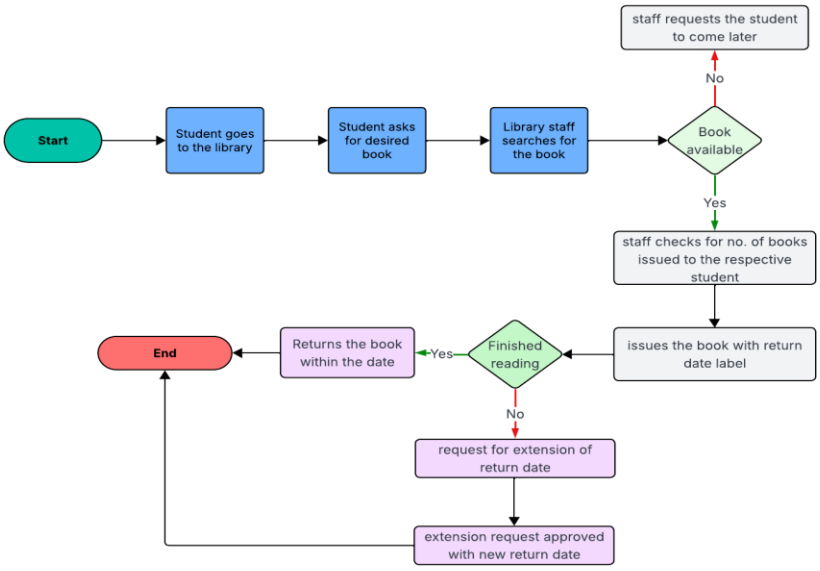
Advantages of Library Management System:

- Reduce overheads and increase productivity of library staff
- Cost reduction

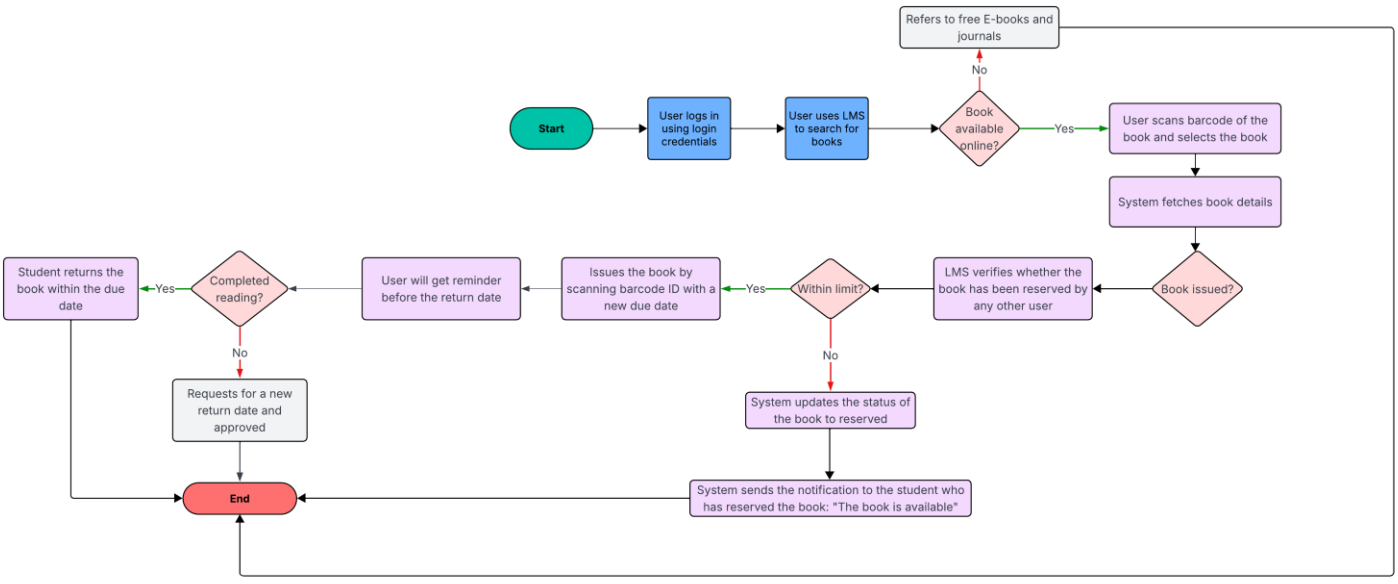
- Up-to-date records of all books, research papers, magazines, and other materials available in the library
- Improve student engagement in the library
- It will generate dynamic reports for better decision-making

Task 4: Create as-is and future process map (using flowcharts)

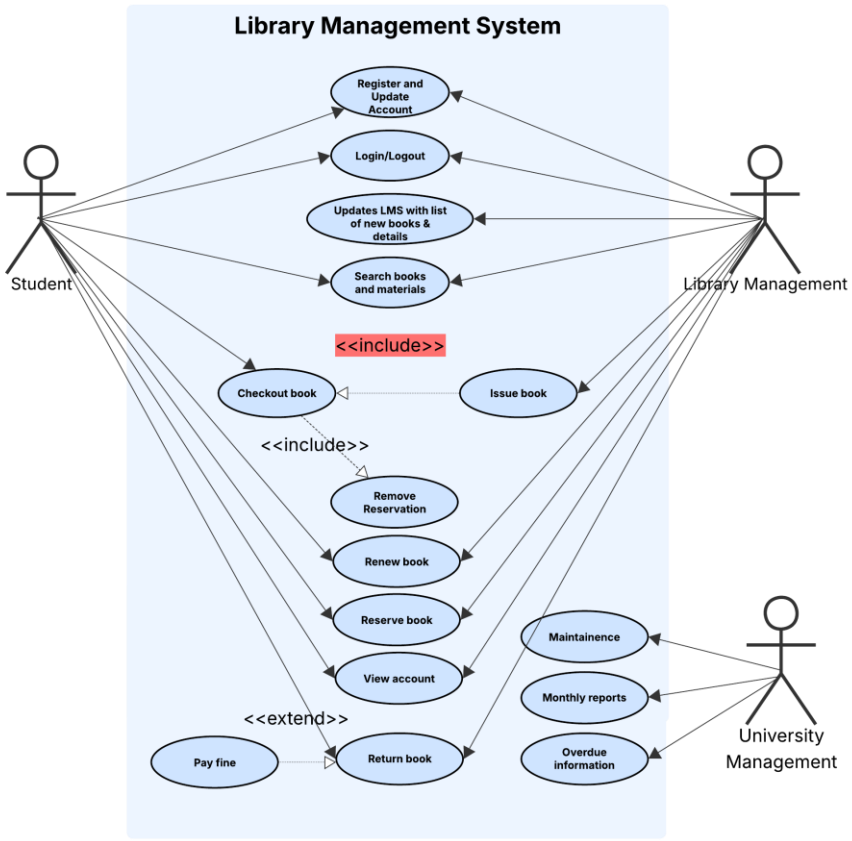
As-is Process Map:



Future Process Map:



Task 5: As a Business Analyst working on this project, find out the scope of the Library Management System. To find the scope you can use Use-Case Diagram (UML) or Context Diagram



Task 6: Write down the main features that need to be developed

The core features to be developed for the Library Management System are as follows:

- User registration and secure login within the Library Management System.
- The system maintains comprehensive records of all categories available in the library, including books, magazines, research papers, journals, and newspapers.
- Books are organized by subject, allowing for easy retrieval and classification within the software.
- Each material type—books, magazines, research papers, journals, newspapers—will have specific issuance periods. For example, books may be borrowed for three weeks, while magazines are issued for only one week; newspapers are for library use only.
- Every reading item will have an RFID tag, with its information stored in the database. Material records will include details such as author, title, publisher, edition, publication date and year, cost, and date of purchase.
- When students select a reading item for borrowing, library staff use an RFID reader to scan and record the item, tagging the student's name to the borrowed resource.
- The system records both the issue and expected return dates for all items.
- Automatic fine calculation for overdue returns, streamlining the fee management process.
- Library staff can search for reading materials using criteria such as book title or author name in the LMS.
- Students have online access to the library system to check return dates and other borrowing details, accessible via web and mobile interfaces.
- Automated email notifications are sent to students three days before their return date as reminders to avoid late fees.
- Access provided to free e-journals and e-books through the software.
- Anti-theft protection: RFID detectors are positioned at library exits; these can detect unissued books within a 2-meter range and will trigger an alarm if an item not checked out tries to leave the premises.

- RFID-enabled book drop box stations installed outside the library allow students to return books at any time. Loans are updated and cleared automatically when items are deposited.
- Management reporting features include:
  - Most frequently borrowed books.
  - Records of issued and unissued library materials (to help with stocking decisions).
  - Fine collections segmented by day, week, and month.
  - Tracking the number of lost books.
  - Reports on total quantities of books, journals, and other resources.
    Identifying books older than 20 years, supporting decisions to remove outdated materials.

Task 7: Write the in-scope and out-of-scope items for this software

In-scope for this software:

● User registration and login capabilities for the LMS.

● Maintenance of records for various library materials, including books, magazines, research papers, journals, and newspapers.

● Subject-wise classification of books within the software.

● RFID reader integration to capture book details.

● Recording of issue and return dates for borrowed materials.

● Automatic fine calculation for overdue book returns.

● Online access to the library system for users to view return dates.

● Web and mobile interface support for system access.

● Automated email alerts sent to students three days before the return date to help prevent late returns.

● Access to free e-journals and e-books provided through the system.

● Anti-theft detection enabled by RFID readers.

● Installation of RFID-enabled book drop box stations to allow immediate cancellation of student loans upon book deposit.

● Instant loan cancellation after a book is deposited in the drop box.

● Generation of management reports, including:

  ▪ Most frequently rented books

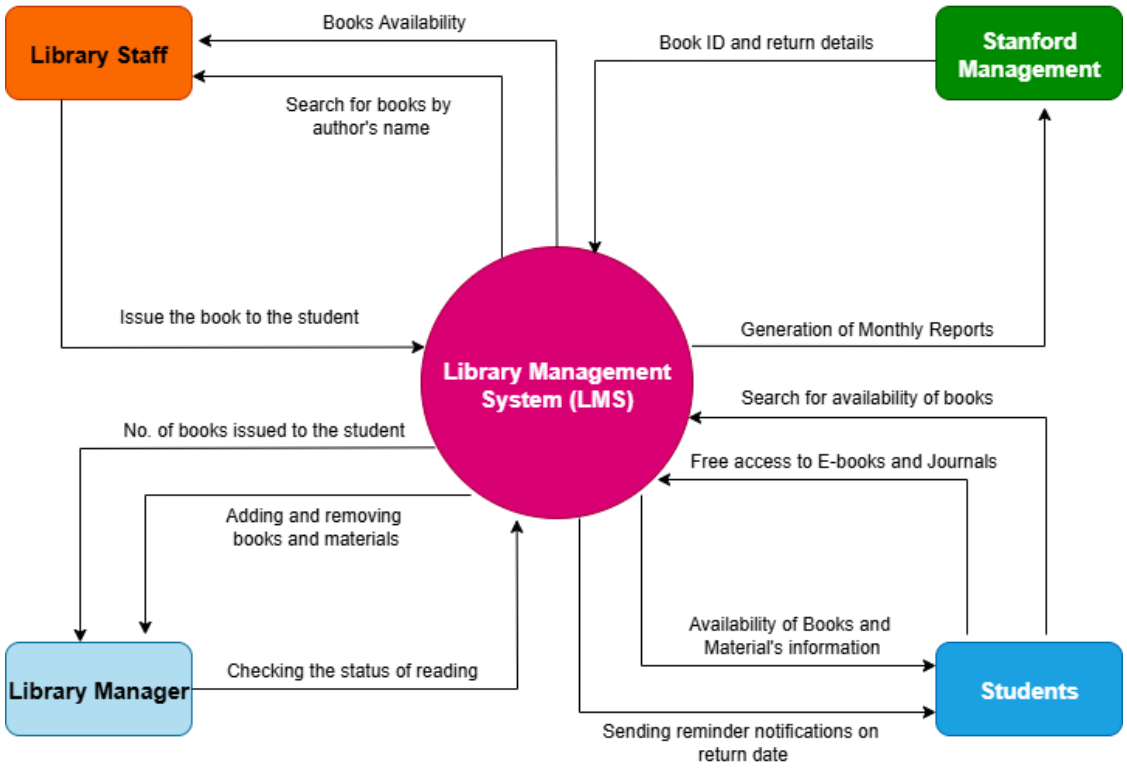
  ▪ Issued and unissued material records

- Fine collection amounts by day, week, and month
- Number of lost books
- Report on total counts of books, journals, and other resources
- Identification of books older than 20 years for collection review

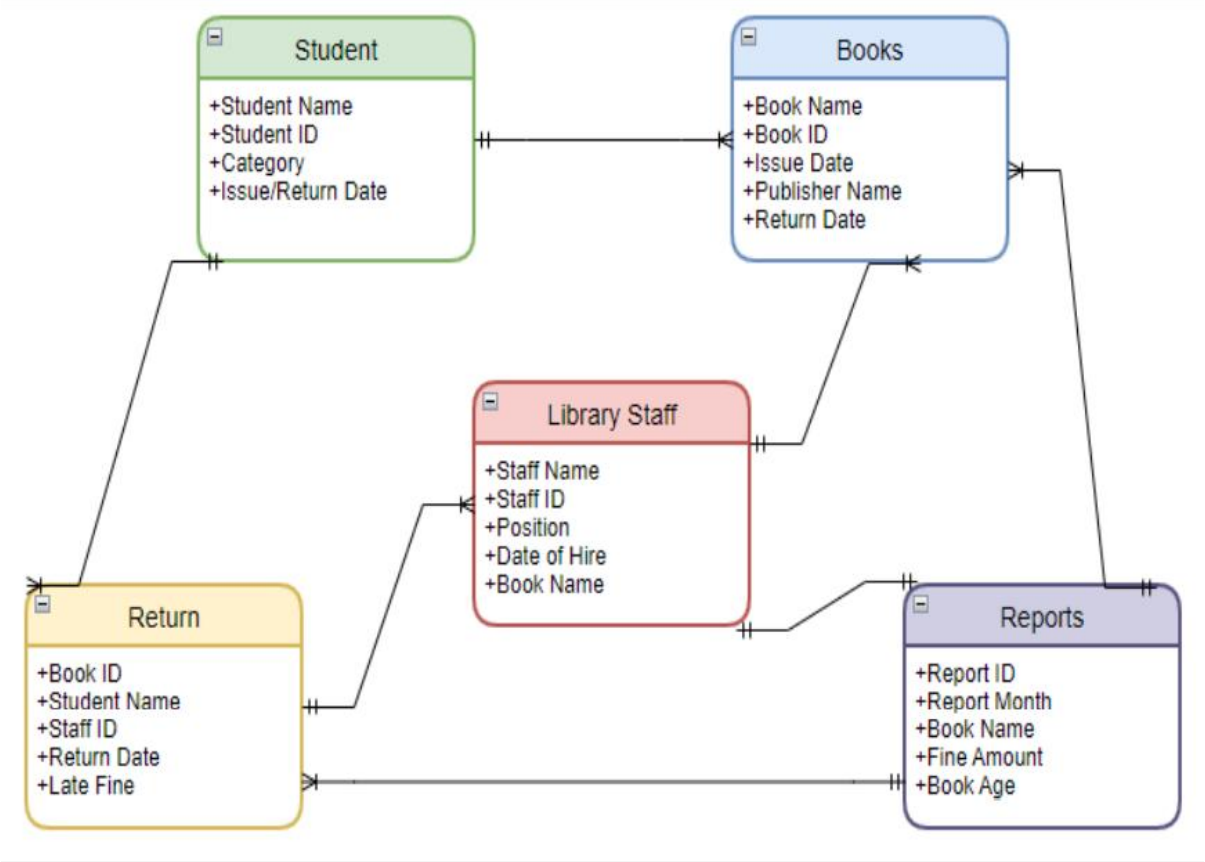
Out-of-scope for this software:

- Book sale management
- Access for non-university users
- Membership management features
- Dedicated mobile application development
- Lending of newspapers
- Management of short books
- Student information tracking
- Notifications for book suppliers
- Library staff information management
- Handling user book donations

Task 8: Draw a data flow diagram for the system



Task 9: Draw an ER diagram of the system



Task 10: Write out the Business Requirements, both Functional and Non-functional Requirements

Functional Requirements:

- Online web interface for the Library Management System.
- Student registration and login functionality.
- The LMS must maintain records for all types of library materials, such as books, magazines, research papers, journals, and newspapers.
- Books should be sorted and searchable by subject within the system.
- The system must track both the issue and return dates for borrowed items.
- Automatic fine calculation for overdue returns.

- Students must be able to access the system online to check return dates.
- The system should be accessible through both web and mobile interfaces.
- Automated email notifications sent to students three days before the booked return date.
- Users should have access to complimentary e-journals and e-books.
- Implementation of anti-theft features using RFID readers to monitor materials.
- RFID-equipped book drop box stations to automatically cancel loans once a book is deposited.
- Monthly generation of library management reports, covering:
  - Most frequently borrowed books
  - Overview of issued and unissued items
  - Fine collections per day, week, and month
  - Records of lost books
  - Statistical reports on total volumes of books, journals, and more
  - Details on library holdings older than 20 years

Non-Functional Requirements:

- **Scalability and Performance:**
  - Support for simultaneous login of over 20,000 students
  - Efficient navigation and viewing of a catalog of more than 4 million items
- **Reliability:**
  - Server must perform all designated operations accurately, including user registration, authentication, book searching, issue and return processing, and continuous synchronization between the application and database
- **Usability:**
  - User interface must be intuitive and self-explanatory
- **Accessibility:**
  - System will be a GUI-based application installed on the main server node
- **Availability:**
  - The web interface should be operational on both intranet and internet platforms
- **Maintainability:**
  - System should be straightforward to maintain, with the ability to handle minor updates without impacting current operations
- **Portability:**

- LMS must function across Windows and MacOS computers

- **Security:**
  - System will restrict access to authorized users, ensure network security, and grant functionality only to verified individuals

Task 11: Draw wireframes or mock screens for any two of the features namely book record creation and any other feature as deemed fit by the student