LIBRARY MANAGEMENT SYSTEM FOR STANFORD

MASTERS PROGRAM IN
BUSINESS ANALYSIS

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PREPARED BY:
NATTAR KANI MURUGAN

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CONTENTS

<u>Library Management System for Stanford</u>

<u>Stakeholders</u>

Actor	What they can do on the software created
Student	● Library management systems can provide students with access to a wide range of resources, including books, journals, databases, and other materials. This allows them to conduct research and find information on a variety of topics. ● Library management systems typically allow students to search for and borrow materials online, making it easy to find and obtain the resources they need without having to physically visit the library. ● Using the newly created software the student will be able to track the status of the books borrowed and fine pending in their accounts with ease
Library staff	● Library staff, including assistants and volunteers, use the library management system to help with tasks such as shelving books, processing new items, and helping patrons with finding and checking out materials. ● They use the system to manage the library's collection, track borrowing and returning of books, and manage the library's operations.
Management	● Management can oversee the library's operations and may use the library management system to monitor the library's performance.
Vendors	● Vendors who provide hardware, software, or other services related to the library management system

Problem Definition and Solution

- **Wastage of time:** There are lots of processes required in the manual library which leads to time wastage, especially in terms of charging and discharging of books.
- **Wastage of resources:** The manual approach requires manual record-keeping; a significant amount of paperwork was necessary to maintain user information as well as library resources. This data loss was primarily caused by human processing.
- **Impossible to track the library resources:** As books and other library materials are charged and discharged manually, it will be extremely difficult, if not impossible, to reclaim the material itself if the record of the loan is lost.
- **Inadequacy of personnel:** Libraries in academic settings are accustomed to welcoming new students every year, therefore usage is occasionally growing. The difficulty of having more work with fewer hands is faced by librarians.

In light of the aforementioned, the computerized system for managing library operations makes best use of the staff and resources already available to serve students. The goal of this design is to address the numerous difficulties that the manual library system faces. The new Library Management system will coexist with the current manual system rather than replace it. RFID technology is integrated with other library management systems, such as inventory and circulation management systems, to provide a more seamless experience for library staff and students.

Advantages of Library Management System

- **Improvement in control and performance:** The system is developed to cope up with the current issues and problems of the library. And it can also pace up the entire library process.
- **Saves cost:** After the computerized system is implemented less human force will be required to maintain the library thus reducing the overall cost.
- **Saves time:** Librarians will be able to keep track of all the inventory with ease. Student check in and check out time will be reduced.
- **Data handling:** The new Library Management System helps to keep track of the entire historical and present data of the library' resources.
- **Better reporting:** By keeping track of all the library resources, the management can take better informed decisions based on the detailed report provided by the new Library Management system.

Existing Library Management System

- **Check-in and check-out of library resources:** Students have to approach the library personnel to take or submit the book after use.
- **Data Management:** Librarians have to manually keep track of books, catalog them, and maintain records of who has borrowed them.
- **Manual fine calculation:** The fines for overdue is calculated by the library personnel.
- **Help desk:** Students should always approach the library personnel for any queries. Like availability of a particular book, latest issue of any journal, different journal publications available.
- **Time restrictions:** Access to the library's resources can be limited to specific hours when the librarian is available.

Proposed system:

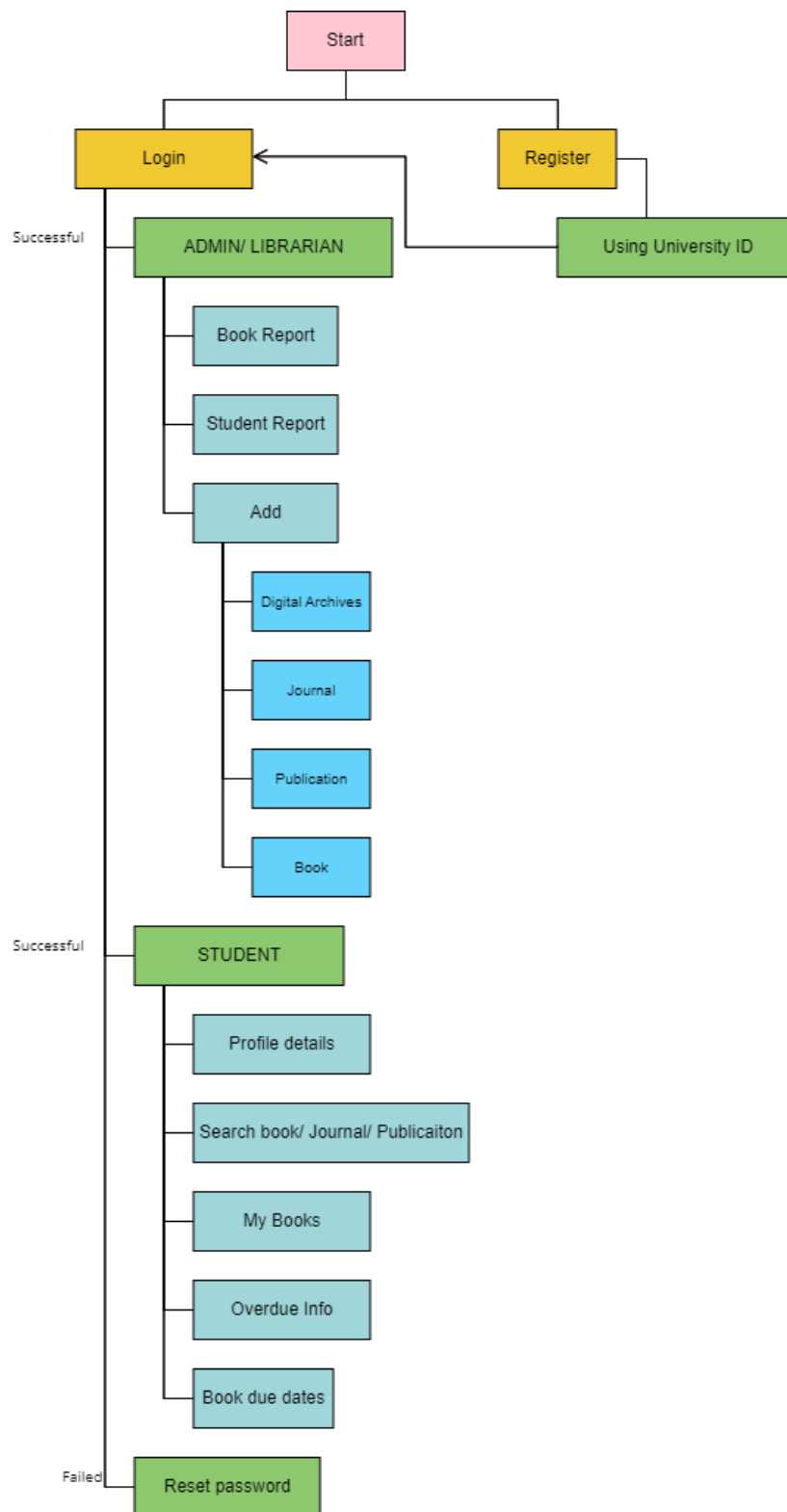- **Improved efficiency:** A new library management system can streamline library operations and automate many routine tasks, such as book check-in and check-out, inventory management, and data entry. This can help librarians and staff save time and improve efficiency.
- **Enhanced user experience:** A new library management system can provide a more user-friendly interface for library patrons, making it easier for them to find and access the resources they need.
- **Better data management and reporting:** A new library management system can provide better data management and reporting capabilities, making it easier for librarians and staff to track library usage, assess collection needs, and evaluate library performance.
- **Improved security:** A new library management system can improve the security of library resources by providing better control over who has access to materials and by tracking the borrowing and returning of items more accurately.
- **Inventory management:** RFID tags can also be used to manage inventory by providing a fast and accurate way to track items in the library's collection. RFID readers can quickly identify missing or misplaced items and alert library staff to take corrective action.
- **Security:** RFID tags can be used to enhance security by triggering an alarm if an item is taken out of the library without being properly checked out.
- **Self-drop in stations:** RFID-enabled stations can quickly and easily scan library materials and allow students to drop out items without the need for assistance from library staff.
- **Easy tracking of book records:** Students will be able to access the online platform using computer or mobile and can keep track of the return date of the book, fine amount to be paid for due items.
- **Automated reminder messages:** Students will receive automated reminders to submit the borrowed books before the submission date.
- **Digitalization:** It will provide greater access to electronic resources, such as e-books, e-journals, and digital archives, which can expand the library's collection and improve access to information for users.

As is diagram

Library Management System for Stanford

As is diagram | Existing system

Student

Gets a Book

Returns a book

Librarian

Manual Data entered about the checkout

Return date calculation

Manual Data entered about the checkin

If any

Calculation of Fine

Documentation of Library Resources

Management

Yes

Decides the Books to be stored in the libarary

Diagram Key

- Student
- Librarian
- Management

Future Process Chart - Online Library Management System

```
                          ┌──────────┐
                          │  Start   │
                          └──────────┘
                    ┌──────────┴──────────┐
             ┌──────────┐            ┌──────────┐
             │  Login   │◄───────    │ Register │
             └──────────┘            └──────────┘
  Successful │     ┌─────────────────────┐   │
             │     │  ADMIN/ LIBRARIAN    │───┘ ┌──────────────────────┐
             │     └─────────────────────┘     │  Using University ID  │
             │          └──────────┐           └──────────────────────┘
             │              ┌──────────────┐
             │              │  Book Report │
             │              └──────────────┘
             │              ┌──────────────┐
             │              │ Student Report│
             │              └──────────────┘
             │              ┌──────────────┐
             │              │     Add      │
             │              └──────────────┘
             │                   ┌──────────────────┐
             │                   │ Digital Archives  │
             │                   └──────────────────┘
             │                   ┌──────────────────┐
             │                   │     Journal       │
             │                   └──────────────────┘
             │                   ┌──────────────────┐
             │                   │    Publication    │
             │                   └──────────────────┘
             │                   ┌──────────────────┐
             │                   │      Book         │
             │                   └──────────────────┘
  Successful │     ┌─────────────┐
             │     │  STUDENT    │
             │     └─────────────┘
             │         ┌────────────────┐
             │         │ Profile details │
             │         └────────────────┘
             │         ┌─────────────────────────────────┐
             │         │ Search book/ Journal/ Publicaiton │
             │         └─────────────────────────────────┘
             │         ┌────────────────┐
             │         │   My Books      │
             │         └────────────────┘
             │         ┌────────────────┐
             │         │  Overdue Info   │
             │         └────────────────┘
             │         ┌────────────────┐
             │         │ Book due dates  │
             │         └────────────────┘
      Failed │     ┌────────────────┐
             └─────│ Reset password  │
                   └────────────────┘
```

Future Process Chart - Checkout process

```
                    ┌──────────┐
                    │  Start   │
                    └────┬─────┘
                         │
                    ┌────▼─────────┐
                    │ Drops a book │
                    └────┬─────────┘
                         │
                    ┌────▼────┐
           Self     │Checkouts│    Manual
      ┌─────────────┤         ├─────────────┐
      │             └─────────┘              │
      │                              ┌───────▼────────┐
      │                              │ Get to the     │
┌─────▼────────┐                     │ library staff  │
│ Can use RFID │                     └────────────────┘
│ self checkout│
│ station      │
└──────┬───────┘
       │
       └──────────┬──────────────┐
                  │
          ┌───────▼─────────┐
          │ Gets submission │
          │ date reminder   │
          │ message         │
          └───────┬─────────┘
                  │
             ┌────▼────┐
             │   End   │
             └─────────┘
```
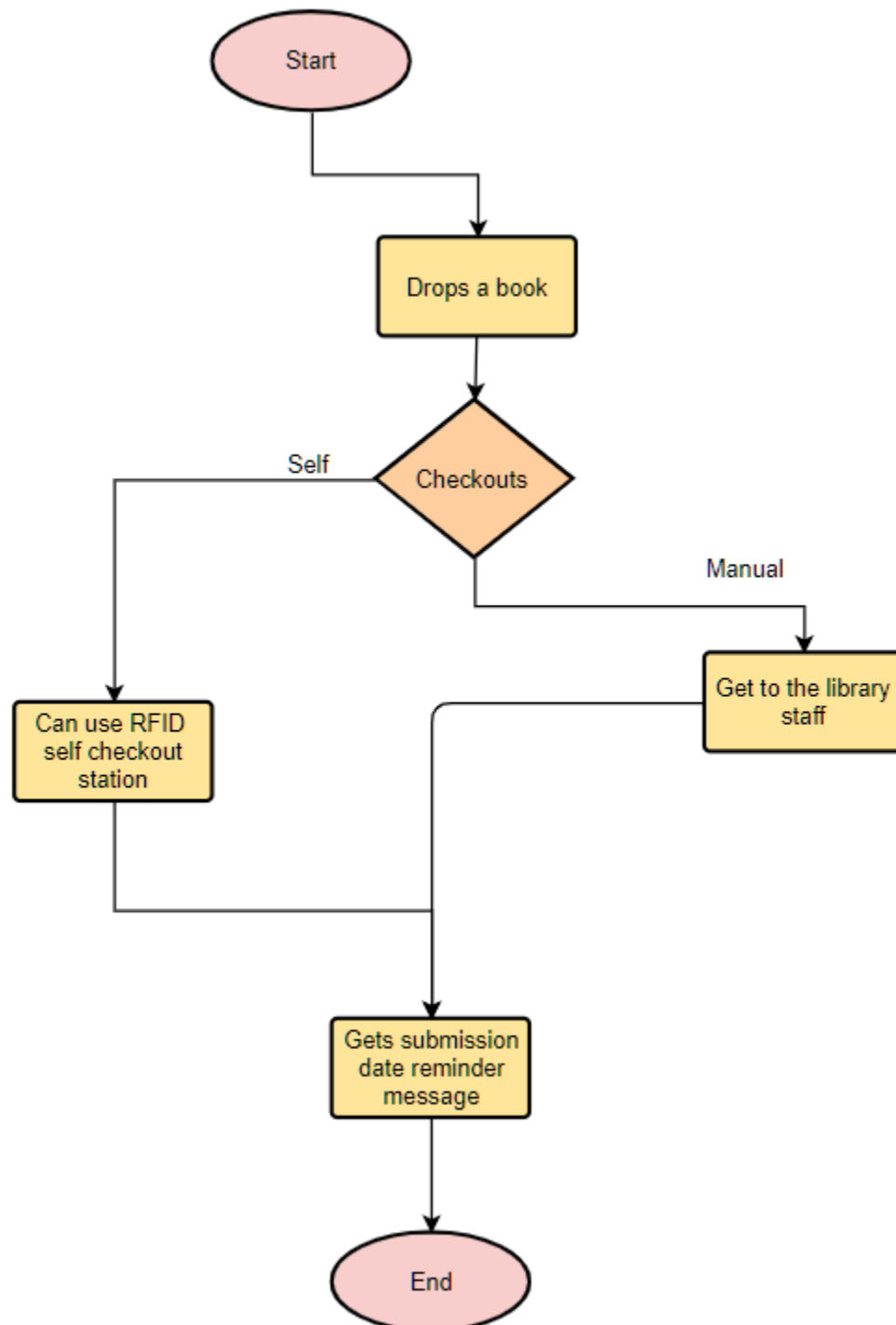
Use Case Diagram
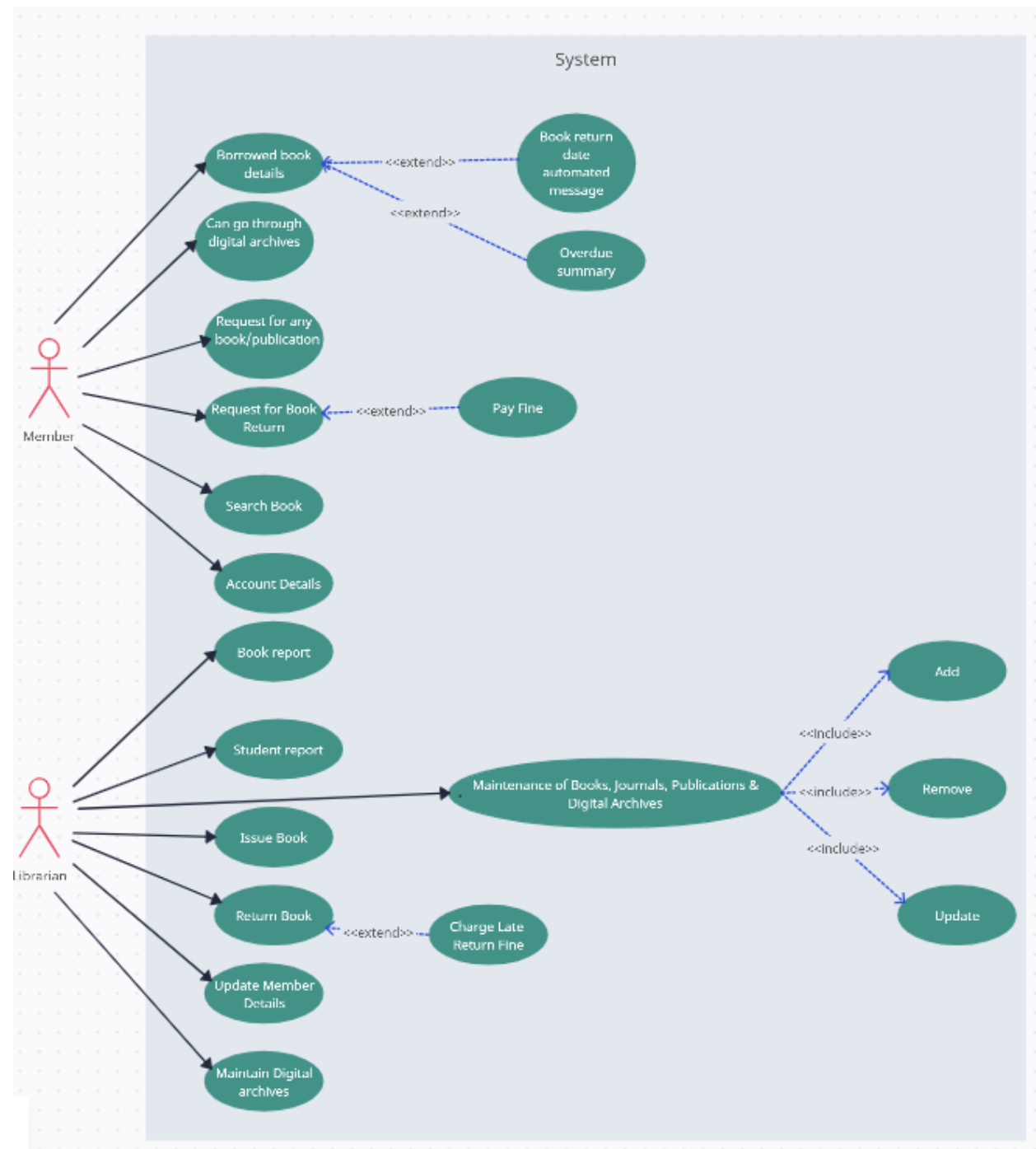
Main features to be developed

- Digital record of all the books, publications, journals, magazines
- Create a server model to update all the library resources and student & library staff/ admin login
- Automated fine and submission date calculation
- RFID reader installation and detection to be done
- Automatic RFID detector in the entrance and self checkout RFID stations
- User friendly website and mobile application that can be accessed by student and library staff
- Book reports to be generated based on the usage
- Easy search engine to access library resources
- Cloud storage of all the data

Project scope

- Objective: Company ABC will design an online library management system which works in Windows/ Mac OS computers and a mobile application using Java. It will be RFID ready with NCIP 2.0 HTTP server available
- Timeline: Finished website and app to be delivered 8 months from the start of the project
- Deliverables: Completed program with graphics and cloud database
- Reports: Project manager to provide weekly updates
- Budget: XXX
- Exclusions: Marketing of the online LMS
- Support: Operational and technical support to be provided for 1 month from the deployment of the software

Out of scope

- RFID sensors in all the library resources
- Setting up of RFID self checkout booth
- Publish & market apps in marketing channels inside the University

<u>Waterfall Model - Block diagram</u>

Waterfall Block Diagram for Library Management System for Stanford
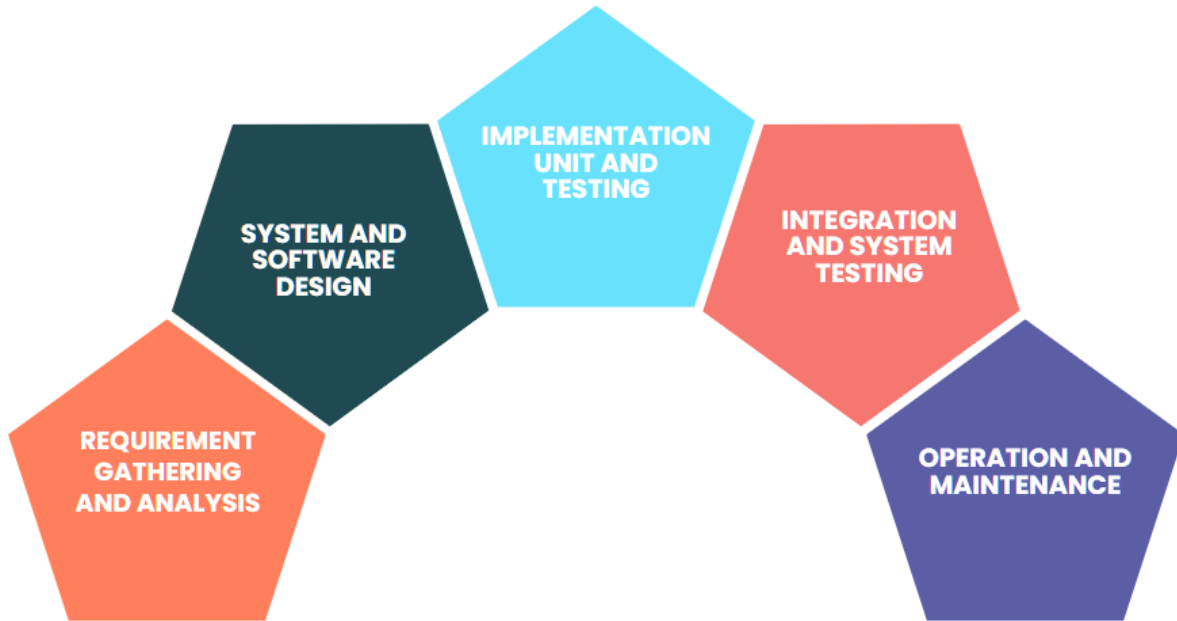
Data flow diagram for the Library Management System

Level 0 - DFD
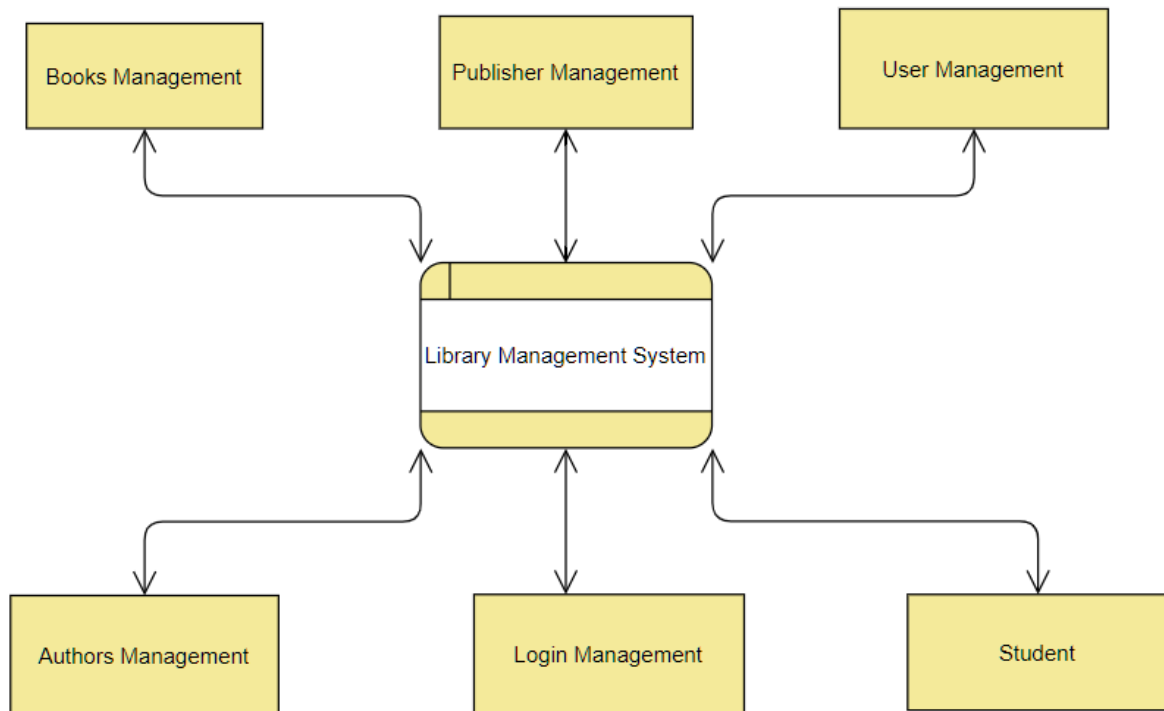
Level 1 - DFD
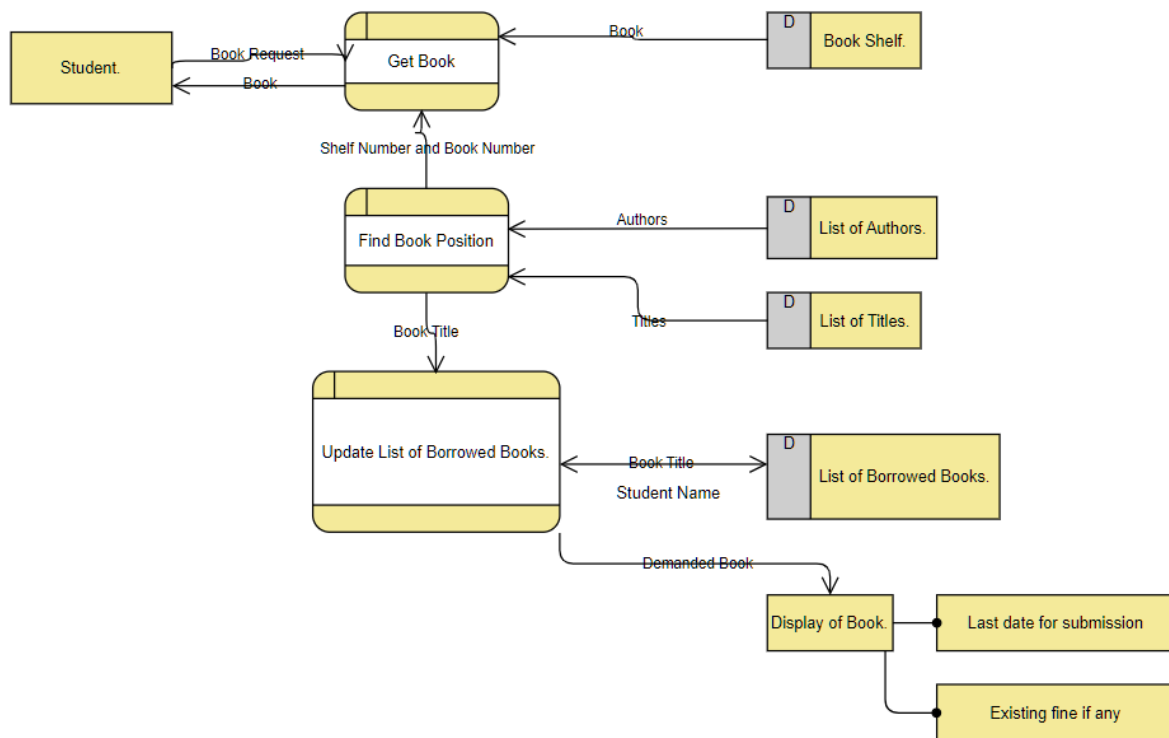
Level 2 - DFD
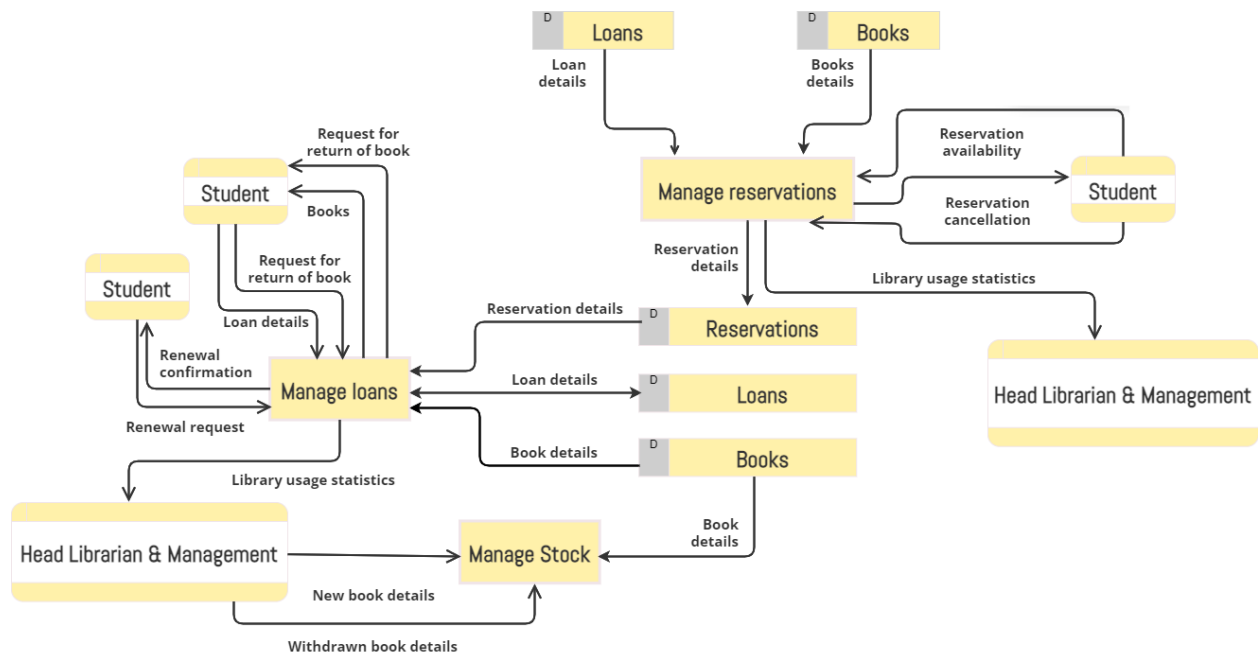
ER Diagram for Online Library Management System
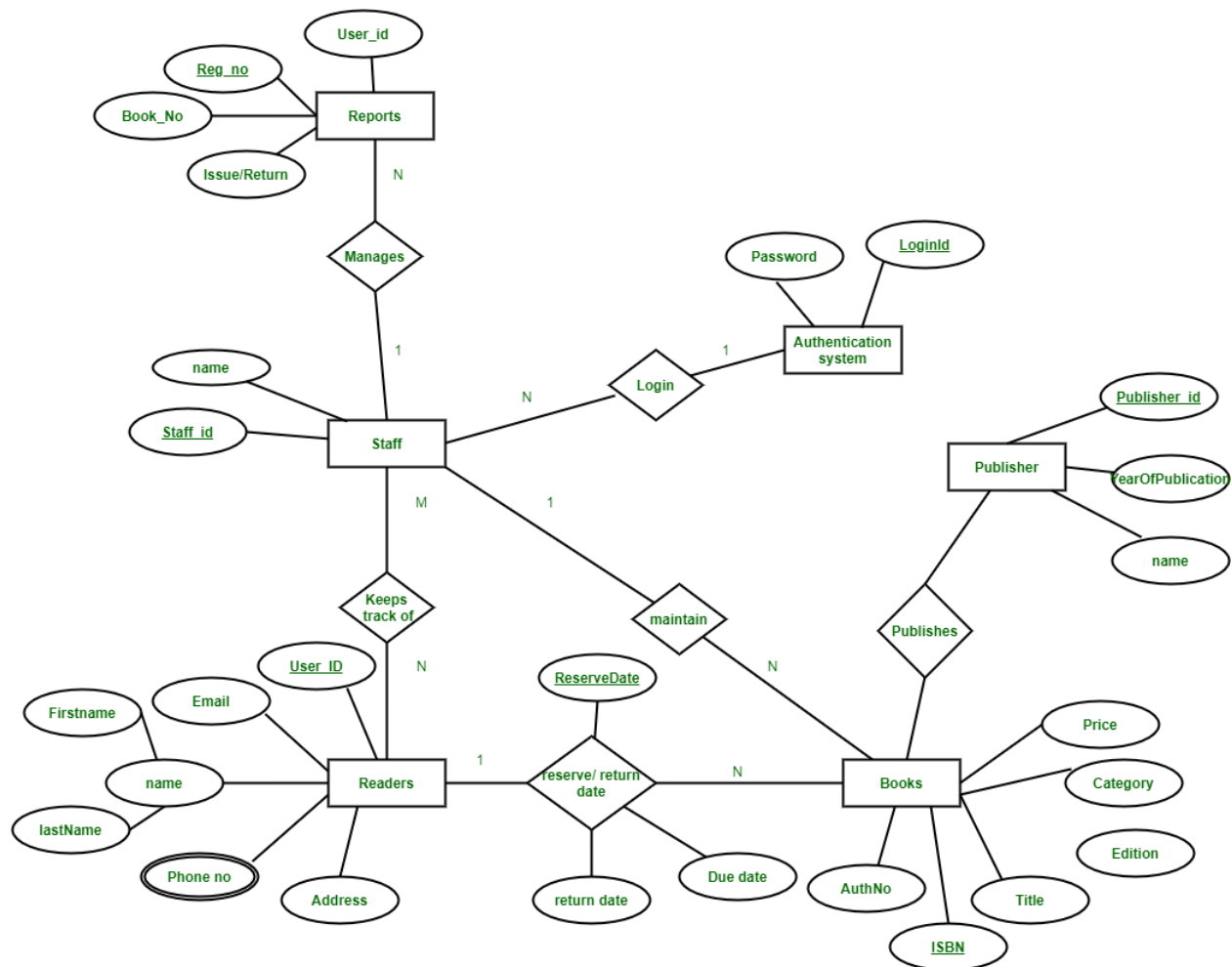
- A reader can reserve N books but one book can be reserved by only one reader. The relationship 1:N
- A publisher can publish many books but a book is published by only one publisher. The relationship 1:N
- Staff keeps track of readers. The relationship is M:N
- Staff maintains multiple reports. The relationship 1:N
- Staff maintains multiple Books. The relationship 1:N
- Authentication system provides login to multiple staff. The relation is 1:N

Business Requirement

The requirements in this document are prioritized as follows:

Value	Rating	Description
1	Critical	This requirement is critical to the success of the project. The project will not be possible without this requirement.
2	High	This requirement is high priority, but the project can be implemented at a bare minimum without this requirement.
3	Medium	This requirement is somewhat important, as it provides some value but the project can proceed without it.
4	Low	This is a low priority requirement, or a "nice to have" feature, if time and cost allow it.
5	Future	This requirement is out of scope for this project, and has been included here for a possible future release.

Functional Requirement

Priority	Description	Rationale	Use Case Reference	Impacted Stakeholders
General / Base Functionality				
1	A new Windows and MacOS driven web application and mobile application to be built using Java + RFID ready with NCIP 2.0 HTTP server	Single repository to track all the library resources by the management with very little manpower		Development team

Testing team |
| 2 | A cloud server working as a repository for all the books, publications, journals, magazines available | Easy management & tracking of library resources available | | Development team

Testing team

Management |
| 3 | Self checkout RFID booth stations | To ease the dropping off process | | Project Manager |

Priority	Description	Rationale	Use Case Reference	Impacted Stakeholders
3	RFID scanner in the entrance	To avoid theft of library resources		Project Manager
4	Technical and operational support by the team for 1 month from installation			
5	Marketing of the website + app using official University channel	Better reach of the website + app		Project Manager
5	Payment of overdue using the website			
Security Requirements				
1	New book record creation shall be done only by Admin/ personnel appointed by the management			
Reporting Requirements				
2	The website updates the report dashboard			
Usability Requirements				
1	User interface for the LMS shall be responsive, allowing for proper display on Windows, Mac OS computer and mobile			

Non - Functional Requirement

ID	Requirement
NFR-001	The system must be scalable enough to support 100,000 visits at the same time while maintaining optimal performance
NFR-002	Supports Windows 10, Windows 11, Mac OS version 13
NFR-003	The system must perform without failure in 95% of use cases
NFR-004	The web dashboard must be available to students 99.98 percent of the time every month during University hours.
NFR-005	The date format should be as follows month:date:year

Website mockups

Home page - Admin
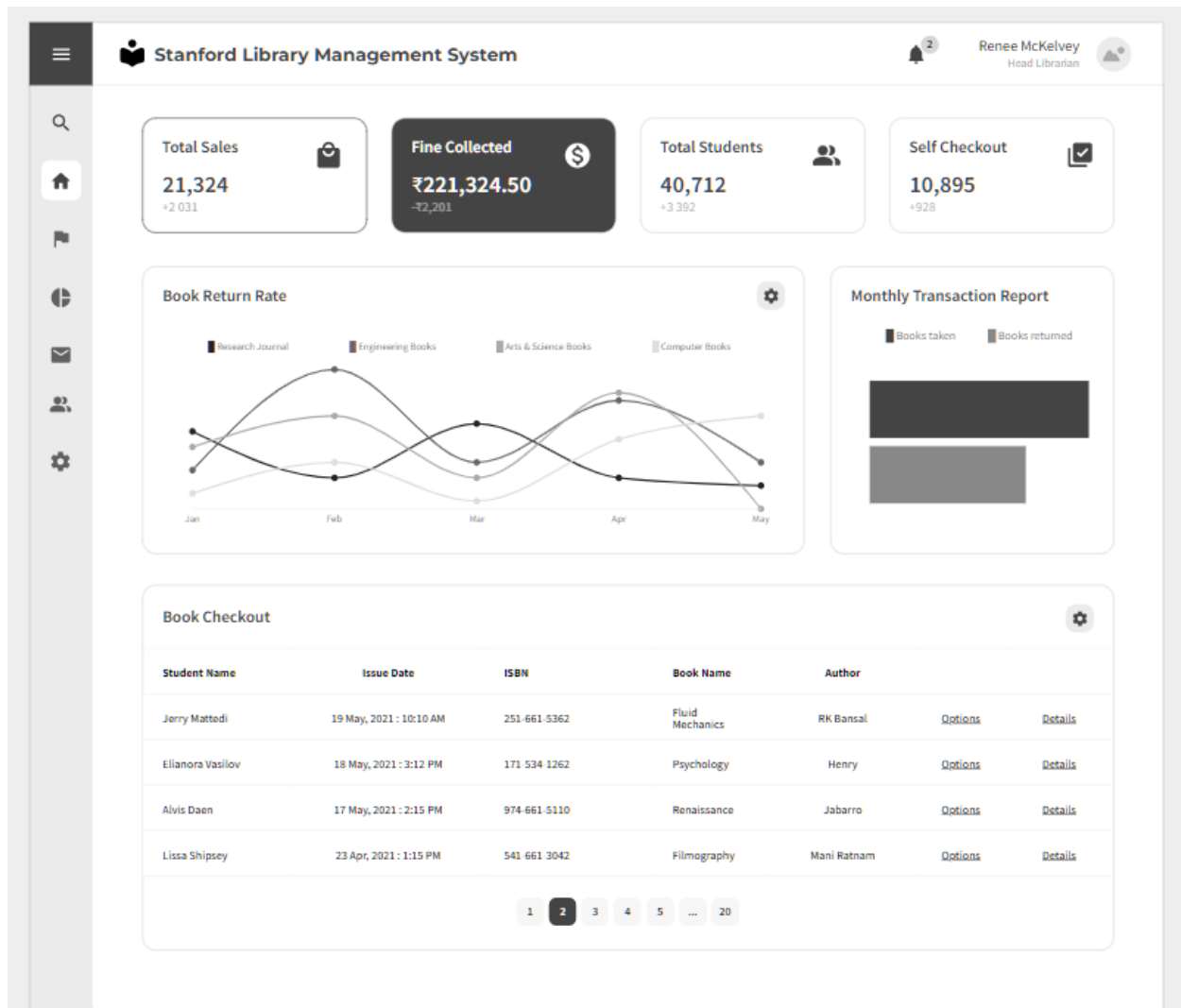
Add new Book record - Admin side
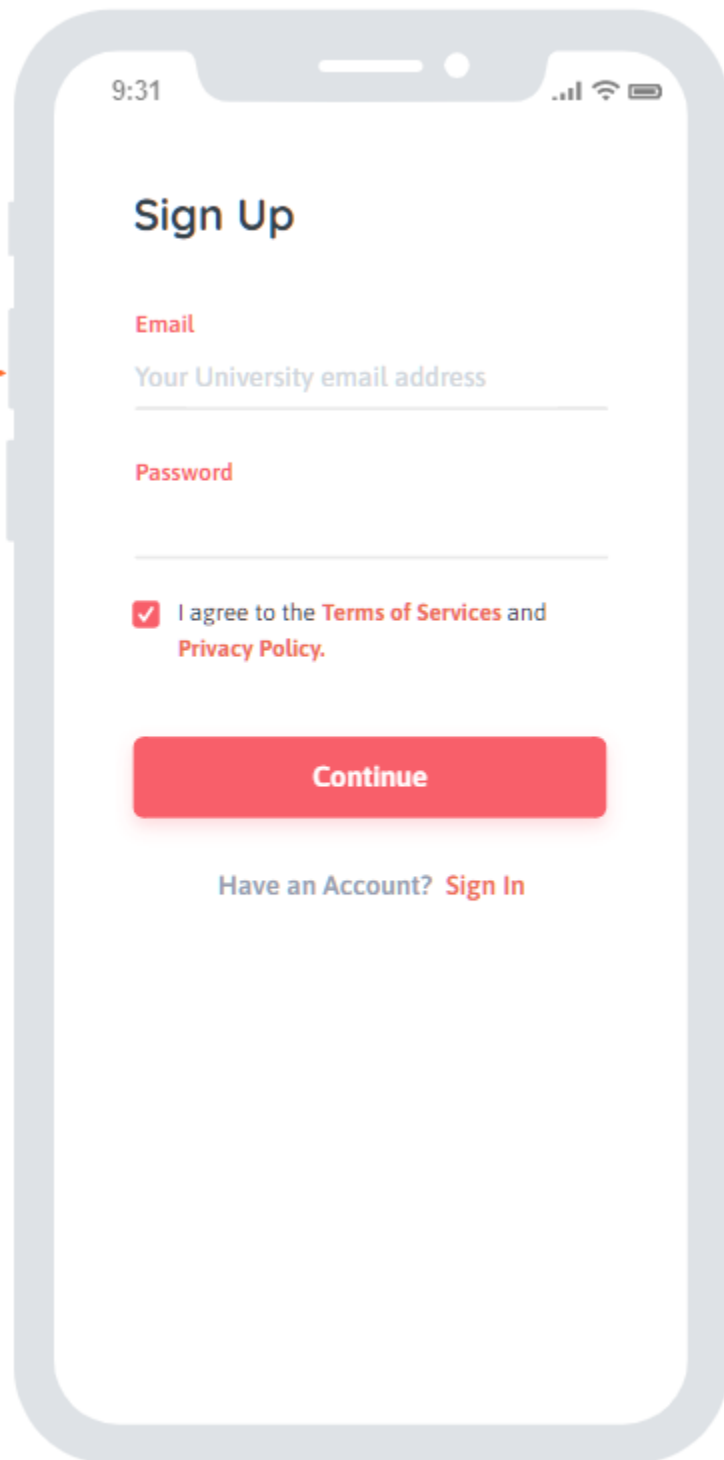
Student Login - Mockup App screen

Student Login - Mockup App screen

Student Home Page Menu