Library Management System for Stanford

Batch: PGP-BA April-2022 cohort 1

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Overview:

Stanford University is a private research university in California. The university was founded in 1885 and as of today, 83 Nobel laureates, 28 Turing Award laureates, and 8 Fields Medalists have been affiliated with Stanford as students, alumni, faculty, or staff.

For the benefits of the students Stanford started its own library in 1885. The library at Stanford was housed in one large room capable of accommodating 100 readers. As the university grew to enroll more than 20,000+ students in a given year the library grew as well. Today the library boasts of having more than 4 million books in it.

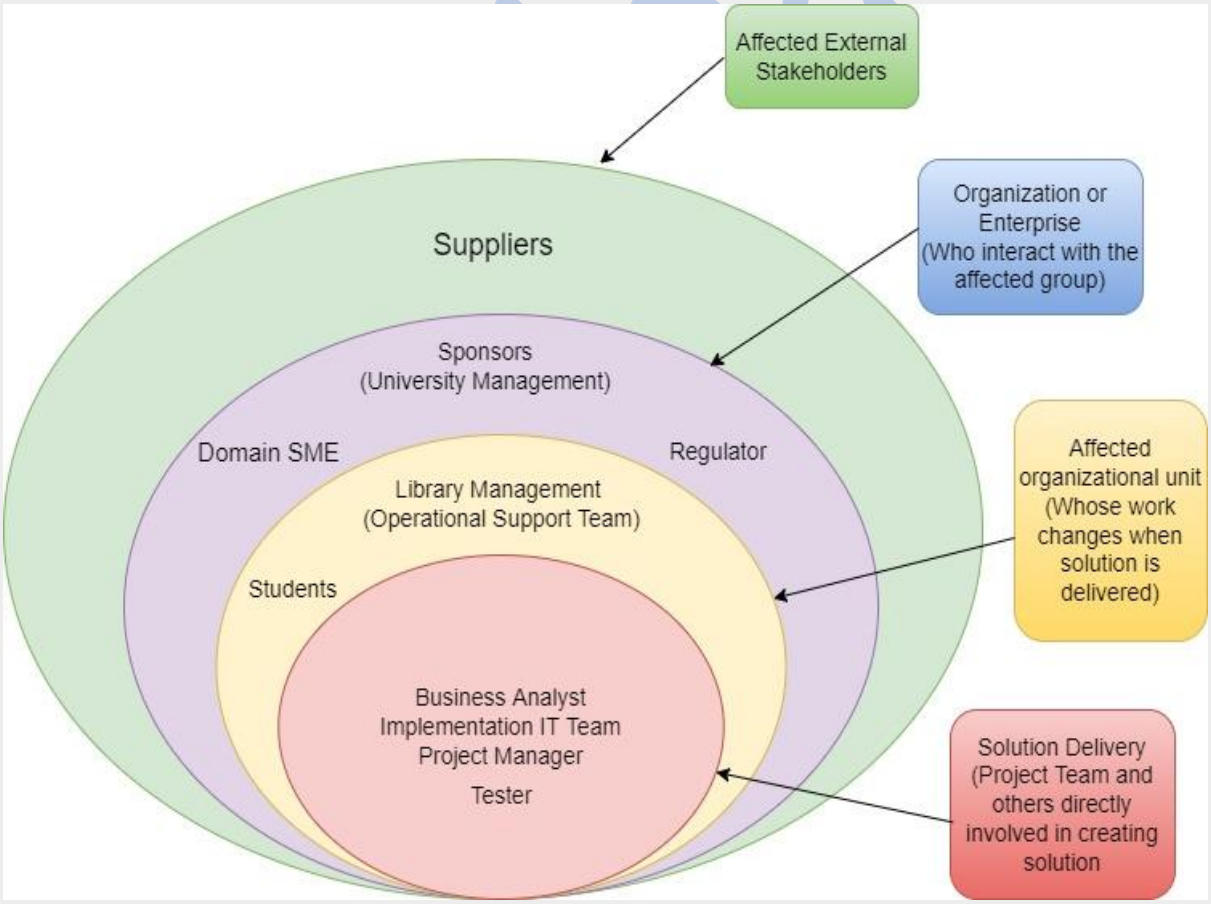
Business Analysis Core Concept Model (BACCM):

Need	Problem here is the manual tracking of books where it becomes difficult to manage large no. of students and keep track of every book in library available for issuance and pending to be returned. Current system also doesn't provide any reports and anti-theft functionality for students.		
Change	Transition from paper-based management to software-based library management system for proper tracking/maintenance of books.		
Solution	Development of software-based library management system to automate library's activities. It will help library staff, students and management in many ways to track, issue/reissue, find books easily.		
Context	Old paper-based tracking was getting difficult to manage and there was need to introduce automation for convenience and better utilization of resources.		
Value	• Reduce time to find, issue, return books. • Reduce cost. • Reduce overheads in library. • Provide reports for better decision making and analysis. • Anti-theft protection of books. • Improve student engagement in library. • Up to date records of books.		
Stakeholders	**Internal** • Implementation SME (IT Team) • Operational Support (Library management) • Domain SME • Tester • Project Manager	**Business Analyst**	**External** • End User/Customer (Student) • Sponsor (university management) • Regulator • Supplier

STAKEHOLDERS:

ACTOR	What he can do on the Software Created
Student	• Easily select the desired book and get this easily checked out using RFID scanner at checkout counter. • Access online system to check return date of book. • Access to free e-journals and e-books.
Library Staff	• Easily find books using name, author. • Tag students name along with the details using RFID Scanner while issuing books. • Categorize issuing period of books based on category like books, magazine and newspaper.
Management	• Get reports for analysis and decision making.

Onion Diagram:



RACI Matrix:

Stakeholders	Responsible	Accountable	Consulted	Informed
End User				I
Operational Team			C	
Tester			C	
Supplier				I
Sponsor				I
Regulators			C	
Domain SME			C	
Business Analyst	R			
Implementation IT Team	R			
Project Manager		A		

PROBLEM DEFINITION AND SOLUTION

Problem Statement:

The paper-based maintaining, organizing, and handling of countless books has become a nightmare for the library staff as the no. of students and books in university keeps on growing every year.

Few problems identified with manual library are as follows:

- A lot of time is wasted managing the manual library.
- The number of employees needed to manage the library is high.
- Fine calculation is a tedious and time-consuming affair.
- No reports could be generated on books issued due to the manual system.
- It is difficult to manage 4 million books present in the library.
- Students could deposit the books only in the library timings

Solution:

The university wanted a Library Management Software to automate their library's activities. Using the software one can find books with a click, issue/reissue books quickly, and it will manage all the data efficiently using this system. It also provides immediate and accurate information regarding any type of book, magazine, or research paper, thereby saving a lot of time and efforts.

Advantages of Library Management System:

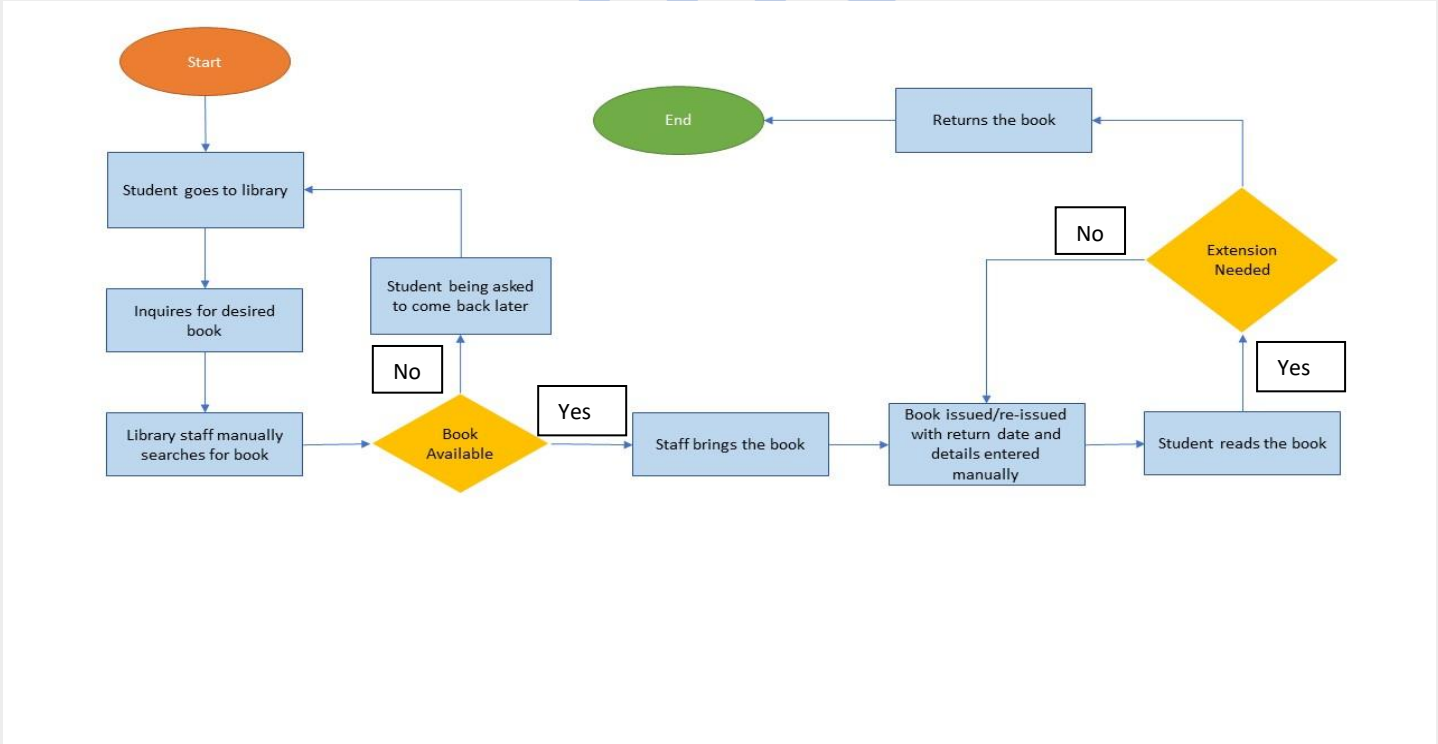
For student:

- Easy accessibility/availability of desired books.
- Easy monitoring/tracking of no. of days from possession to day of return.
- Access to free e-journals and e-books via online portal.
- Easy return of books at available stations outside of library using RFID scanner.
- A lot of time and effort is saved which was required to search for desired book.

For Library staff:

- 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.

EXISTING SYSTEM



PROPOSED SYSTEM

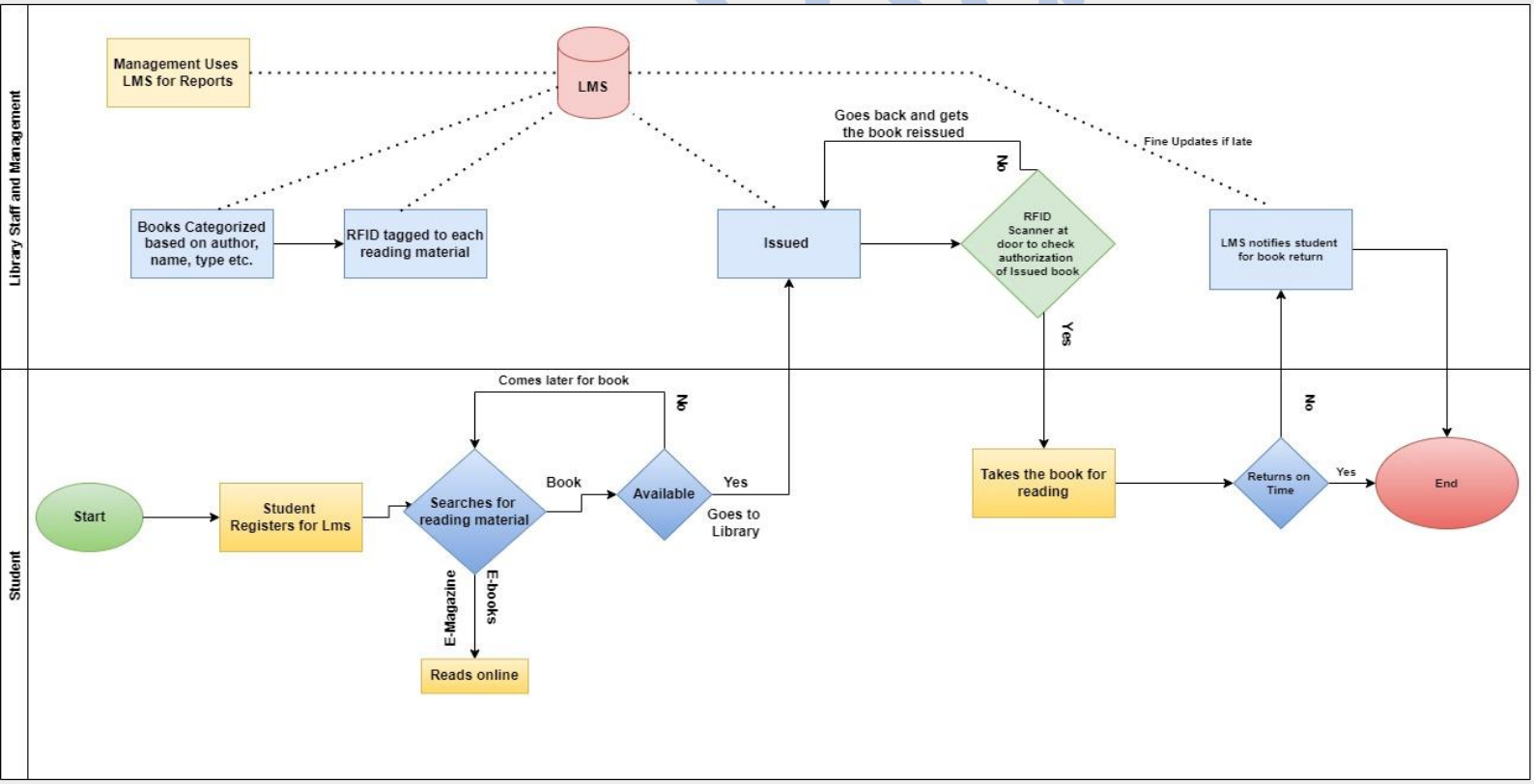
Proposed system is a software which is used to find books with a click, issue/reissue books quickly, and it will manage all the data efficiently using this system. It also provides immediate

and accurate information regarding any type of book, magazine, or research paper, thereby saving a lot of time and efforts.

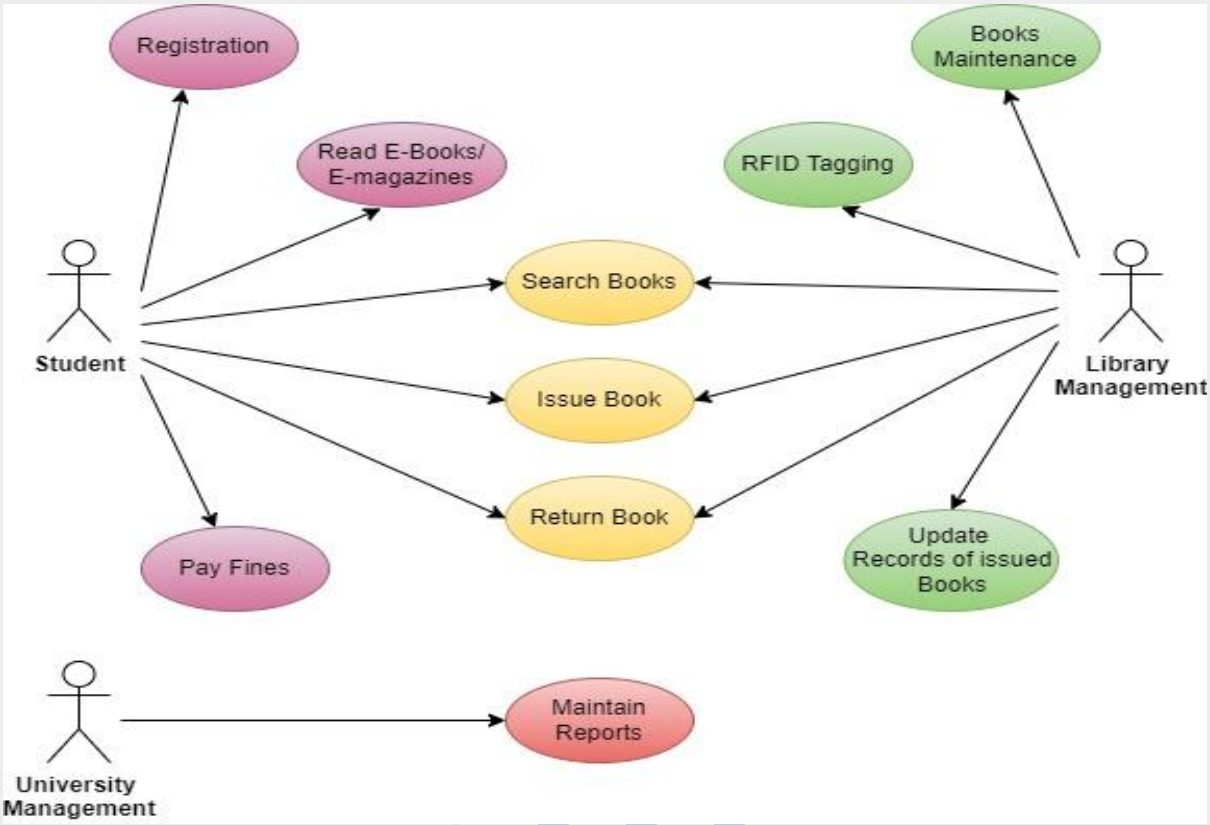
Features:

- Registration and online login facility for students.
- Single click issuance of books.
- Unique return window based on reading material (books 3 weeks, magazines 1 week and no issuance for newspapers.).
- Tracking of issued/returned books.
- Anti-theft prevention.
- Reports availability for management.
- Easy search options based on author, type, name of the book.
- E-magazines and e-papers for students.
- Book submission reminders before 3 days of submission.
- RFID functionality to easily track books and also keep record if dropped outside at drop box location authorized by university.

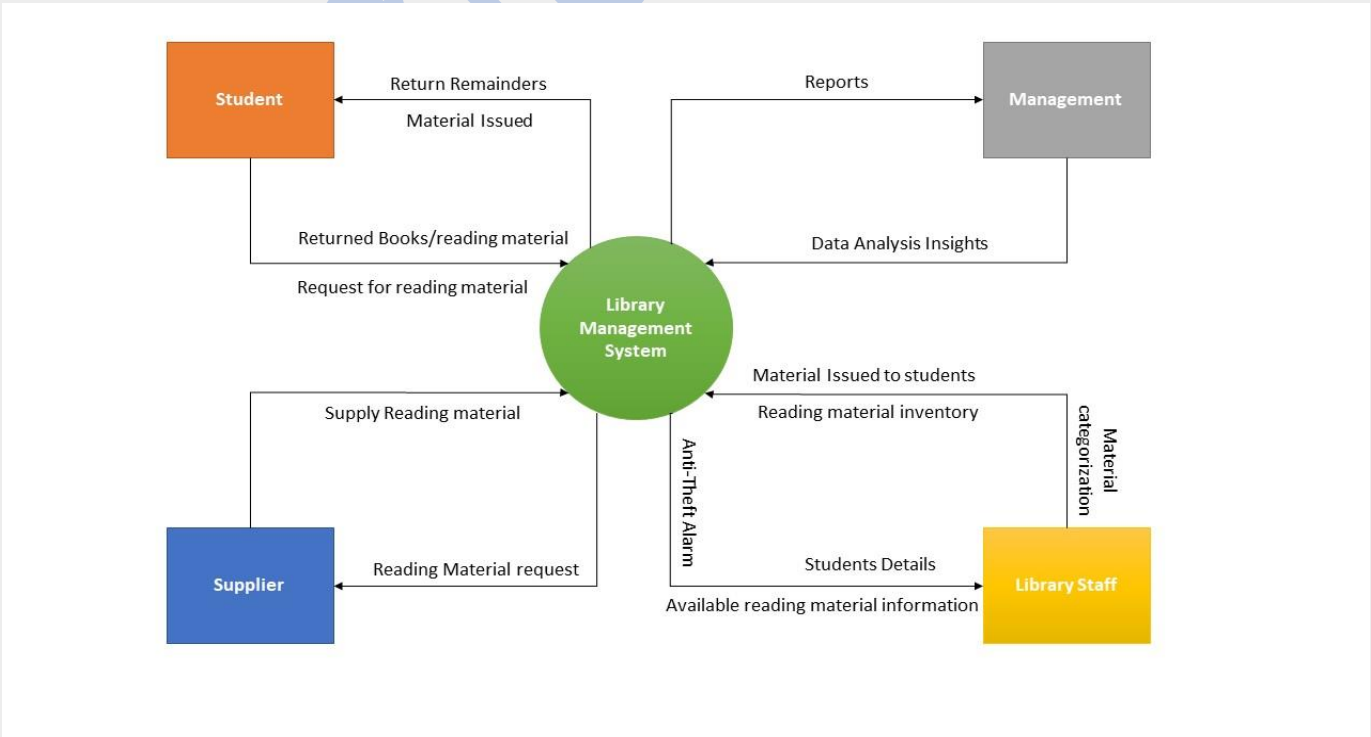
Flowchart for LMS



SCOPE using Use Case Diagram (UML)



SCOPE using Context Diagram



IN SCOPE

For students:

- Lms registration.
- Books availability based on name, author, type etc.
- Single click issue/reissue functionality.
- Issue date/return date tracking.
- RFID scanner at drop box for easy return anywhere outside library.
- Email notifications for book return.

For Library Staff:

- Classification of books for better accessibility by themselves and students.
- Database to manage complete information and available resources in library.
- Issue Date/return date monitoring.
- RFID tag for each book and scanner to track books and prevent anti-theft.

For Management:

- Reports.
- Student's information.
- Books inventory and details.

OUT OF SCOPE

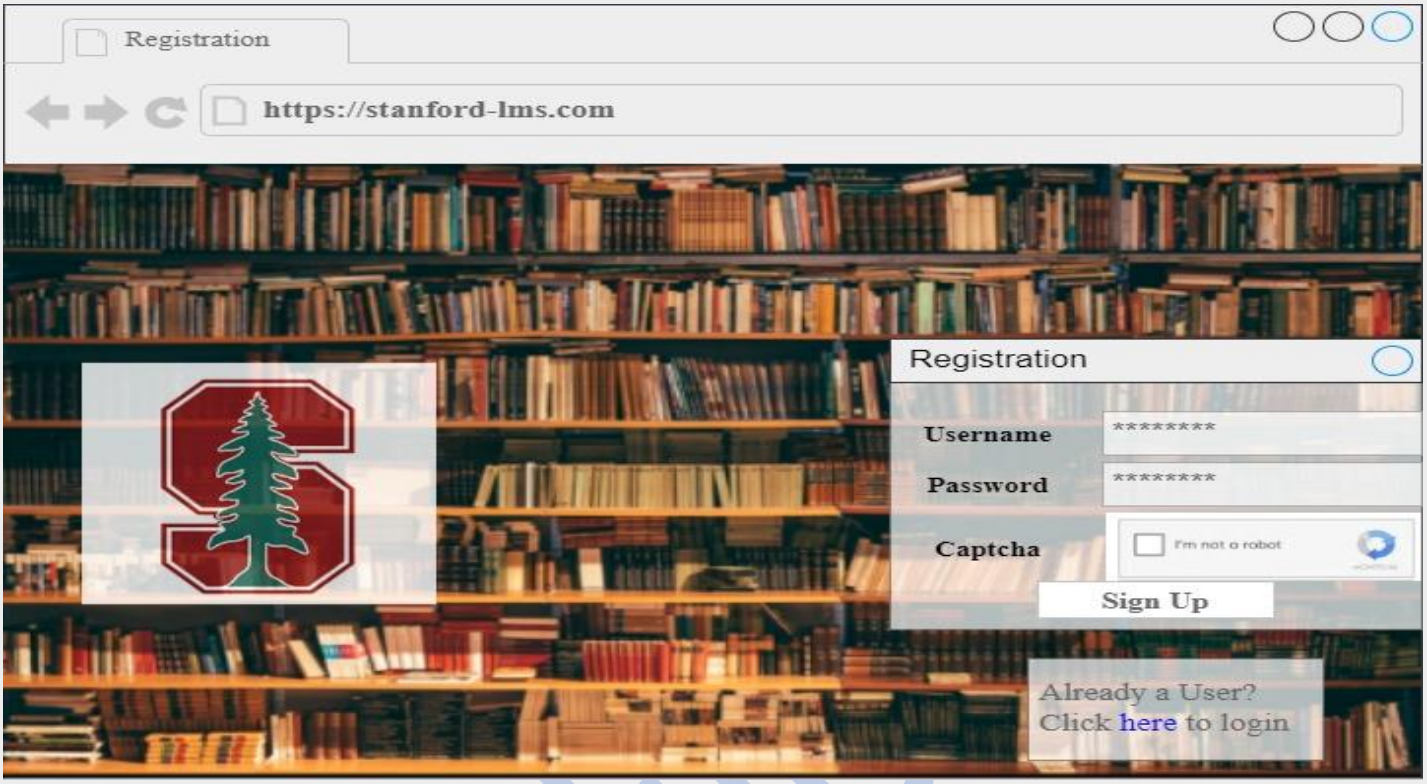
For student:

- Information about staff's salary.
- Reports for management.
- Book supplier information.
- Another student details.
- Accessibility to only university's students.

For Library:

- Confidential information about student.
- Student's payment method details.

Wireframes:


Registration
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Registration
Username
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Password
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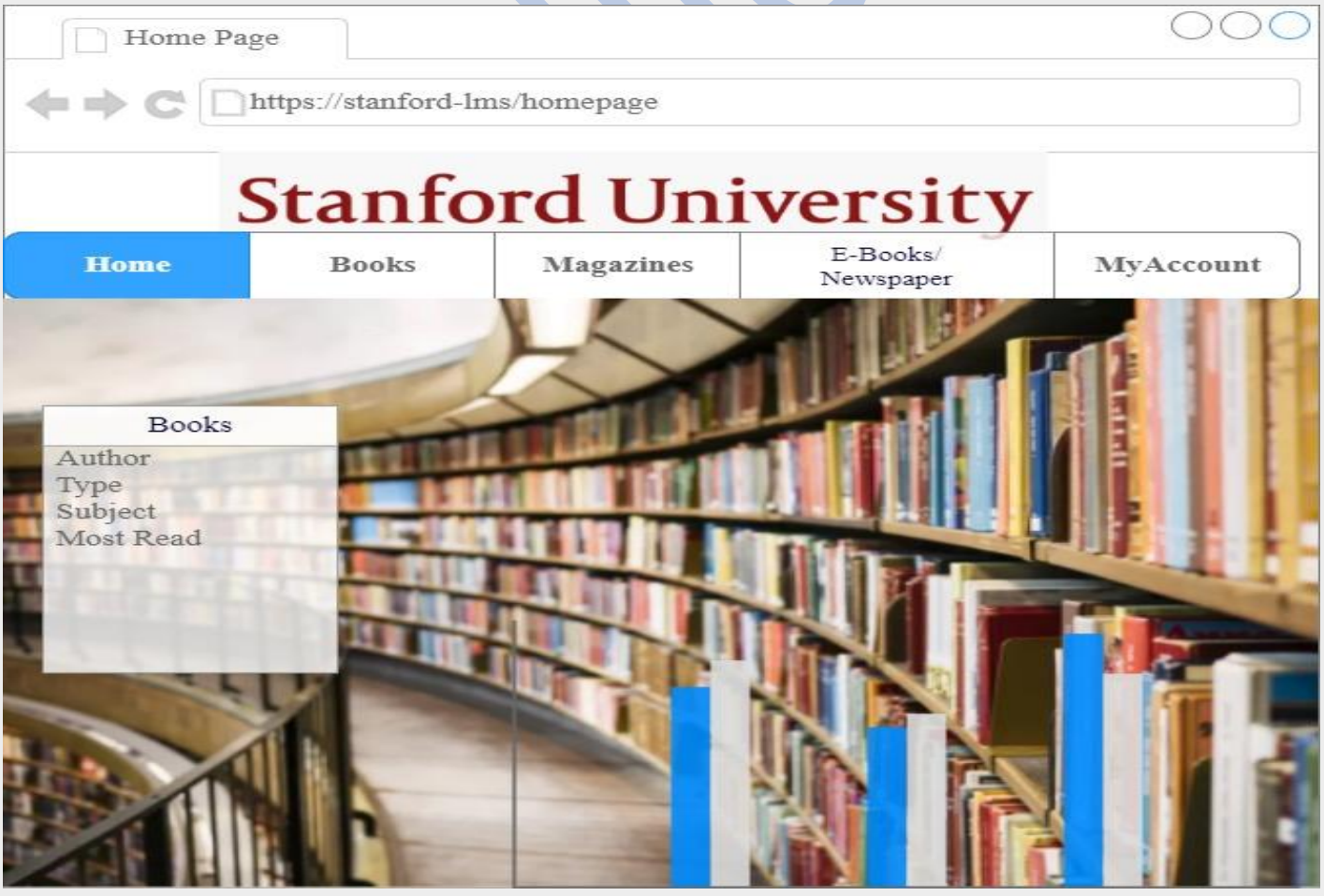
Captcha
I'm not a robot
Sign Up
Already a User?
Click here to login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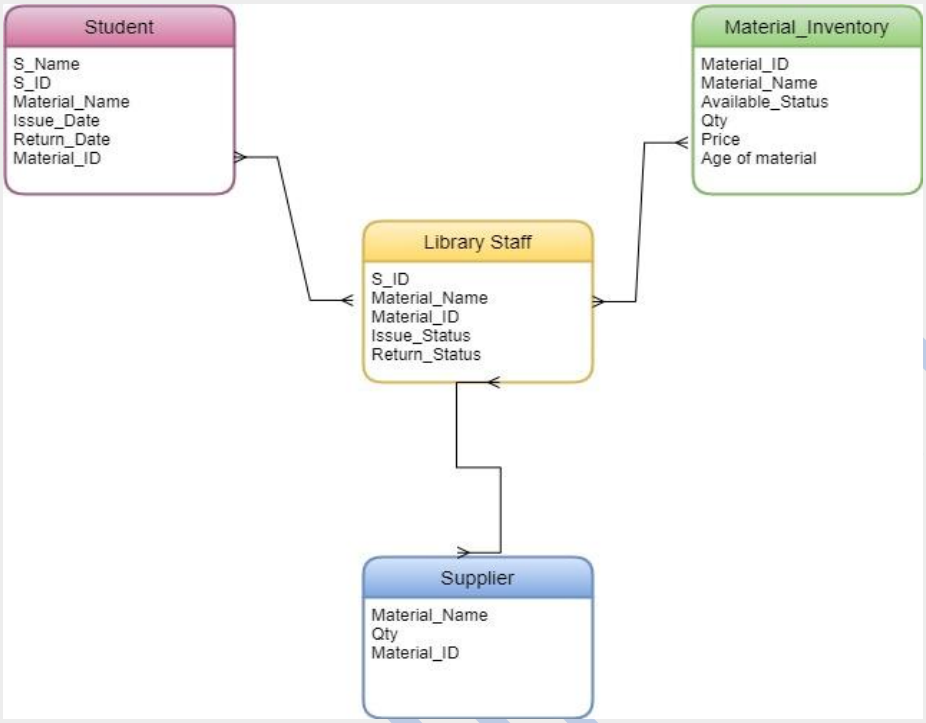
ER DIAGRAM FOR THE SOFTWARE



FUNCTIONAL REQUIREMENTS

Below are the functional requirements which should be met based in the LMS system.

For student:

- Sign Up/Sign In option on website.
- Proper categorization of books in different menu options based on subjects.
- Issue/Reissue a book with single click functionality.
- Track no. of issued/returned/pending books under his/her name.
- Time to return should display for particular book when selected.
- Get instant notification once a book is returned.
- Recommendations of books, magazines and other resources based on student's past history of issued books and interests.
- Should support readability for e-books and e-magazines.

For Library Staff:

- Database of all students who have issued books.
- Unique RFID for every reading material for proper tracking.
- Each category like books, magazine and research paper must have different issuance periods.
- RFID scanner to scan and to keep proper track of books.

- Instant notification if someone tries or accidentally takes out a book without getting it scanned.
- Options to check total no. of books issued, returned and available in library.
- Search option to locate books based on author or name of book.
- Track deadlines of return of books.

For Management:

- Option to generate reports based on their requirement like:
    - Most rented
    - Records of issued/unissued material
    - Amount of fine collected
    - No. of lost books
    - Total books, age of books etc.

NON-FUNCTIONAL REQUIREMENTS

Scalability: Must be scalable enough to handle more than 20,000+ students and millions of books.

Availability: Must be available whenever needed by the user.

Usability: Should be self-explanatory and user friendly.

Maintainability: Should be able to maintain easily and update as the no. of students and books increase.

Compatibility: Should be compatible with both windows and MacOS.

System Requirement:

- LMS can be used on any Windows and MacOS run computers
- Users will need an active internet connection.
- It will be RFID ready (NCIP 2.0 HTTP server available)
- Auto scheduled tasks like emails and database maintenance
- Data should be stored in cloud
- Highly secure, scalable, and reliable

Usability:

The screens should be self-explanatory and very user friendly.

Environments:

We are going to be creating and maintaining the program in Java. We chose Java because it will not change much over time and if we make it well, there will be very little maintenance to be done on the code.