Library Management System for Stanford Simplilearn Project for CBAP

Project Submission

by: Onyinye Oji

On July 17 2022

Table of Contents

Introduction

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 benefit of the students, Stanford started its library in 1885. The library at Stanford was housed in one large room capable of accommodating 100 readers.

Business Objective

As the university grew to enrol 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. The paper-based maintaining, organizing, and handling of countless books became a nightmare. The university wanted Library Management Software to automate its 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 effort.

Stakeholders

ACTOR	What he can do on the Software Created
Student	● Search up books, magazines or research papers to be borrowed online via the web or mobile interface. ● They can be issued /reissued books through the online library ● Get up-to-date records of all books, research papers, magazines, and other materials available in the library. ● Students can access the library system online to know the return date. ● Access to free e-journals and e-books through the software. ● Books borrowed can be returned at any time in the RFID-enabled book drop box station.
Library Staff	● Use of an RFID reader to capture the details of the book. ● Tag students' names along with the book they borrowed. ● Search for books on the LMS by search criteria like the name of the book or author.
Management	● keep records of different categories of material available in the library like books, magazines, research papers, journals, and newspapers. ● The Management System should be able to classify books subject-wise. ● Categories like books, magazines, research papers, journals, and newspapers will have different issuing periods. For example, a book can be issued for 3 weeks but a magazine only for 1 week. Newspapers cannot be issued for use outside the library and so on. ● The system should be able to record information like author, book name, publisher name, book edition, date

	and year of publication, cost of the book, and date of purchase of each book. ● Record information from the RFID tags ● Record the issue date and return date of the books borrowed. ● The system shall be able to calculate fines automatically in case of delayed return of books. ● Send emails automatically to the students 3 days before the return date to avoid the late return of books.

Problem Definition And Solution

LIBRARY:

Problems with the manual library:

- A lot of time is wasted managing the manual library.
- The number of employees needed to manage the library is high.
- The 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:

- Students could deposit the books only in the library timings.

Advantages of LMS

Advantages of Library Management System:

- To manage the library system for Stanford.
- Ease of Librarian duties
- Reduce overheads and increase the 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

The existing system is manual /paper-based with the following issues; The number of employees needed to manage the library is high and students could only deposit the books only in the library timings. The 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.

The existing system doesn't have any of the features of the proposed system.

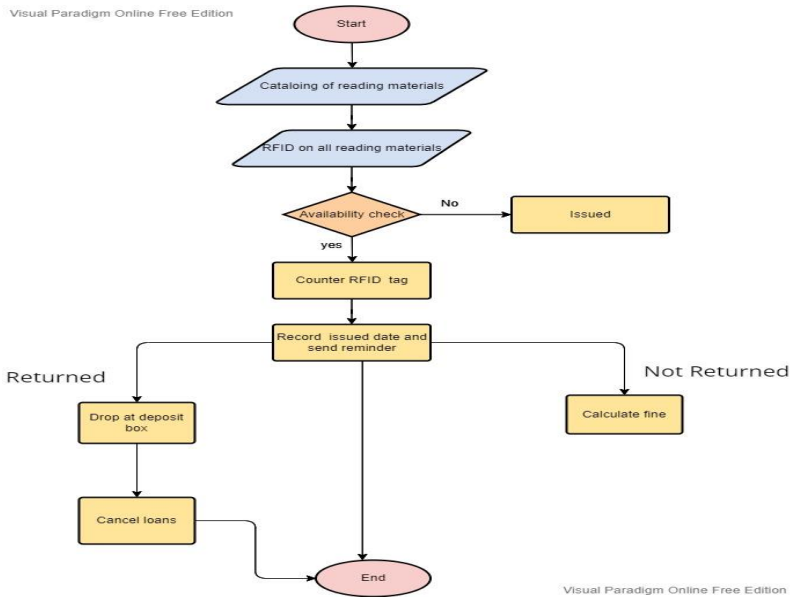
Proposed System

The proposed system is a Library Management System that would reduce overheads and increase the productivity of library staff, cost reduction, and will generate dynamic reports for better decision-making.

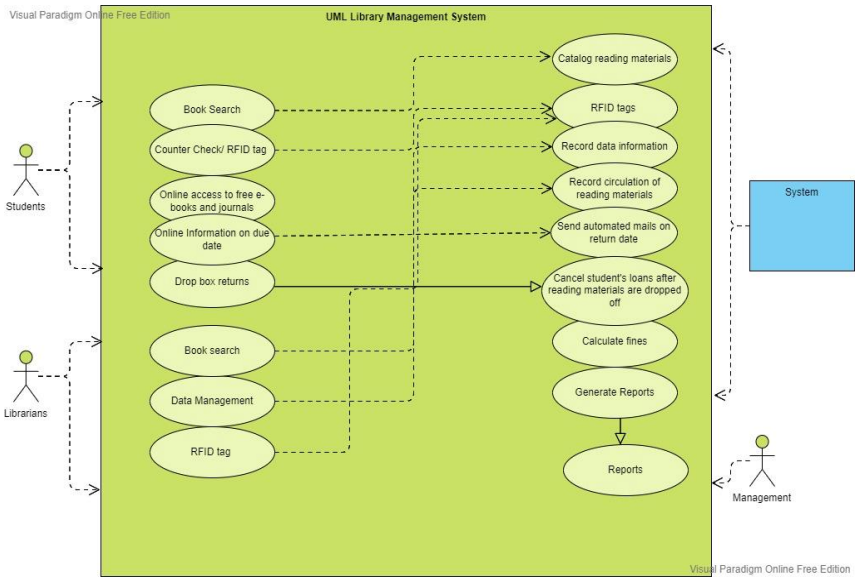
The following states how the system will be for the user:

- User-friendly interface.
- Improve student engagement in the library.
- Availability of up-to-date records of all books, research papers, magazines, and other materials available in the library.
- Ease of return of borrowed books through the use of book drop box stations installed outside the library.

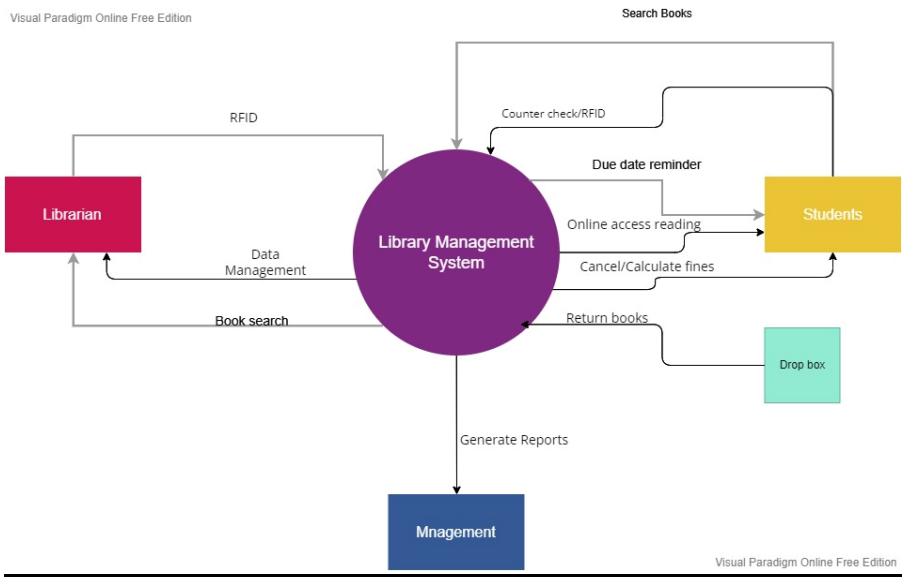
Flowchart for LMS



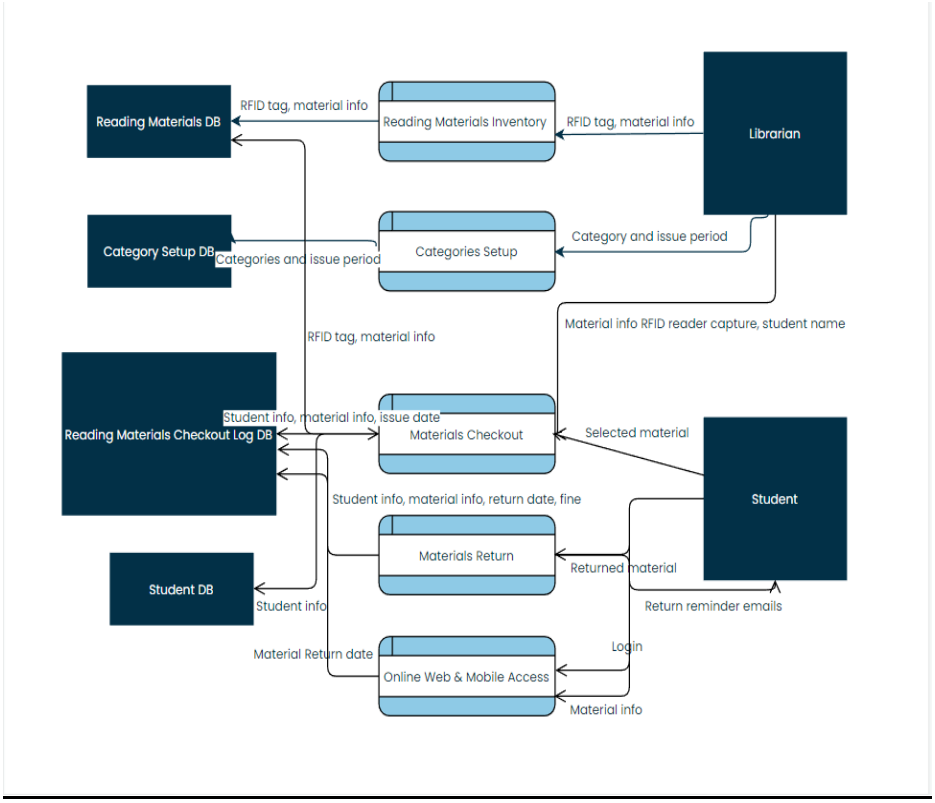
SCOPE using Use Case Diagram (UML)



Scope using Context Diagram



Data Flow Diagram



In Scope

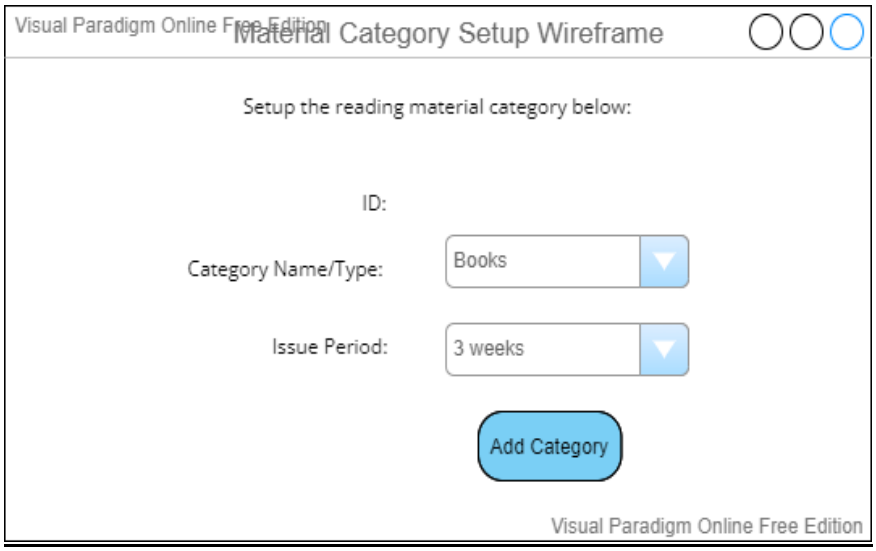
- Catalogue Management: The LMS should keep records of different categories of material available in the library like books, magazines, research papers, journals, and newspapers. The books should be classified subject-wise in the software.
- Membership Management: Details of students; the name, ID and password of each user. The system helps in ascertaining the track record of the member.
- Search Feature: Library staff should be able to search for books on the LMS by search criteria like the name of the book or author.
- Data Management: Information of all reading materials like the author, book name, publisher name, book edition, date and year of publication, cost of the book, and date of purchase of the book will be stored in the database.
- RFID: The system will have anti-theft detection, and every reading material available shall have an RFID tag on it. The library staff will use an RFID reader to capture the details of the book to be borrowed by any student. The student's name is tagged along with the book.
- Students can return books at any time in the RFID-enabled book drop box station. A student’s loan is immediately cancelled once the student deposits the book in the drop box.

- Circulation Management: System will record the issue date and return date of the book and if need be, do an automatic calculation of fines in case of delayed return of books.
- Online Services: System shall send automated emails to the students 3 days before the return date to avoid the late return of books. Students should be able to access the library system online to know the return date. They should be able to access it via the web or mobile interface. Access to free e-journals and e-books through the software.
- Report Generation: System shall generate the following reports
    i. Which books are most rented?
    ii. Records of issued and unissued materials in the library (management will decide whether to stock them or not)
    iii. Amount of fine collected in a day, week, and month.
    iv. Number of lost books
    v. Report on the total number of books, journals, etc.
    vi. Age of books, that is, which books are more than 20 years old. College generally would prefer not to have very old books since new versions come up every few years.

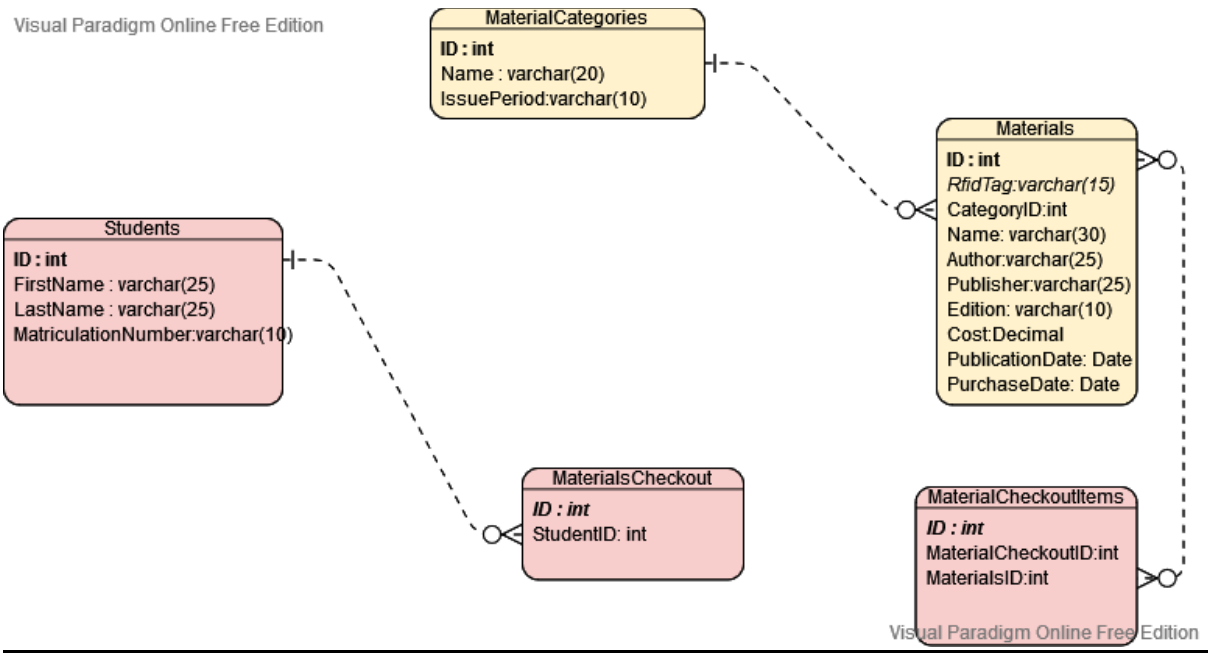
Out Of Scope

- Online editing of students' details.
- Online reading material search and reserve by students
- Online book extension dates or cancellations.
- Feedback option for students
- View and update information online by the Librarian.

Wireframes



Er Diagram For The Software



Functional Requirements

- The LMS should keep records of different categories of material available in the library like books, magazines, research papers, journals, and newspapers and the books should be classified subject-wise in the software.

- The LMS should be able to issue a timeline for each category like books, magazines, research papers, journals, and newspapers to be borrowed, the timeline will have different issuing periods. For example, a book can be issued for 3 weeks but a magazine only for 1 week. Newspapers cannot be issued for use outside the library and so on.
- The LMS should record the data from RFID tags and store the same in its database. Every reading material available shall have an RFID tag on it. For each reading material record information like author, book name, publisher name, book edition, date and year of publication, cost of the book, and date of purchase of the book.
- The LMS will record the issue date and return date of the book.
- The LMS shall do an automatic calculation of fines in case of delayed return of books.
- Library staff should be able to search for books on the LMS by search criteria like the name of the book or author.
- Students should be able to access the library system online to know the return date. They should be able to access it via the web or mobile interface.
- The system shall send automated emails to the students 3 days before the return date to avoid the late return of books.
- Access to free e-journals and e-books through the software.
- The LMS shall immediately cancel a student's loan once a student deposits the book in the drop box. Book drop box stations to be installed outside the library. Students can return books at any time in the RFID-enabled book drop.

Non-Functional Requirements

- The LMS shall be very interactive
- Library Management System shall handle expected and non-expected errors in ways that prevent loss of information and long downtime period.
- The LMS should give Management the following reports:
    i. Which books are most rented?
    ii. Records of issued and unissued materials in the library (management will decide whether to stock them or not)
    iii. Amount of fine collected in a day, week, and month.
    iv. Number of lost books
    v. Report on the total number of books, journals, etc.
    vi. Age of books, that is, which books are more than 20 years old. College generally would prefer not to have very old books since new versions come up every few years.

System Requirement

Data should be stored in the cloud

Highly secure, scalable, and reliable.

Usability

Users will need an active internet connection.

Auto scheduled tasks like emails and database maintenance

Environments

LMS can be used on any Windows and macOS-run computers

It will be RFID-ready (NCIP 2.0 HTTP server available).