**Library Management Simulation**

Requirements-

Pages-

1. Home Page
2. Login Page for admin, teachers, students, and guests.
3. Logout Page for admin, teachers, students, and guests.
4. New user registration page
5. Password recovery page
6. List of books page
7. List of papers page
8. Student details page

Databases-

1. Students detail table.
2. Teachers detail table.
3. Books detail table.
4. Papers detail table.
5. Fines table.
6. Books count table.

Functional Requirements-

1. Student
   1. Student Login

* Student runs the system, system requests for student id and password.
* The student with valid id and password can only be permitted to use the library services.
* The student should be able to logout after he/she finishes using the system.
  1. Password Recovery
* If a student forgets his/her password. He/she requests for password recovery to the system.
* System validates the user and sends the correct password to the student’s registered mail.
  1. Search and issue the book.
* The student will enter the name of the book he wants to issue.
* The system will find the books based on the text entered and display the list.
* The student if finds the book will issue it.
* The details such as the issue date of the book, name of the student, book ISBN and name are stored in the database and the available count of books is changed.
  1. Search the previous year papers.
* Student can search for the previous year papers.
* On viewing the list of paper displayed by the system, the student can download the papers.

1. Teacher

2.1) Teacher Login

* Teacher runs the system, system request for teacher’s id and password.
* Teacher with valid id and password can only access further
* Teacher should be able to logout after he/she finishes using the system.

2.2) Password recovery

* If a teacher forgets his/her password. He/she requests for password recovery to the system.
* System validates the user and sends the correct password to the teacher’s registered mail.

2.3) Upload papers

* Teachers can upload a pdf/picture file of the question paper and fill its complete details in the database.

1. Guest

3.1) Guest login

* Guest will not have user id and password; they will have to enter email and ask the system to provide them access.
* Guest must be able to logout.

1. Librarian

4.1) Librarian Login

* Librarian by entering the id and password logins into system.
* Once librarian’s work finishes, he/she must be able to logout.

4.2) Upload books

* Librarian uploads books and their details to the books table.
* He / She update the count of books in the books count table.

4.3) Update publishers

* The book publisher’s data is maintained by the librarian.

4.4) Maintain student details

* Librarian on searching the student’s name, should be able to see all the books issued by the student with its date.

4.5) Maintain fine table

* The librarian will check if there’s a student needs to be fined or not and whether he/she has paid the fine.

**Data Flow Diagram**

**Diagram

Description automatically generated**

*Fig 1- DFD for LMS*

The overall system is represented and described using input, processing, and output in the DFD.

**ER Diagram Diagram

Description automatically generated**

N

1

N

*Fig-2 ER Diagram for LMS*

This Library ER diagram tells key information about the Library, including entities such as teachers, students, books, publishers, papers, reports, and authentication system. It gives the relationships between entities.  
  
  
**Entities and their Attributes –**

* **Librarian Entity:** It has LibrarianId, name as attributes. LibrarianId is the primary key.
* **Book Entity:**It has authno, isbn number, title, edition, category, count, price. ISBN is the Primary Key for Book Entity.
* **Student Entity:**It has UserId, Email, address, phone no, name. Name is composite attribute of firstname and lastname. Phone no is multi valued attribute. UserId is the Primary Key for Readers entity.
* **Publisher Entity:**It has PublisherId, Year of publication, name. PublisherId is the Primary Key.
* **Authentication System Entity:**It has LoginId and password with LoginID as Primary Key.
* **Reports Entity:**It has UserId, Reg\_no, Book\_no, Issue/Return date, fine, Reg\_no is the Primary Key of reports entity.
* **Teachers Entity:**It has name, department, and teacher\_id with teacher\_id as Primary Key.
* **Paper Entity:** It has exam, year, and subject attributes.
* **GuestUser Entity:** It has name and email\_id attributes.
* **Reserve/Return Relationship Set:**It has three attributes: Reserve date, Due date, Return date.

[**Relationships**](https://www.geeksforgeeks.org/attributes-to-relationships-in-er-model/)**between Entities –**

* A student can reserve N books, but one book can be reserved by only one student. The relationship 1: N.
* A publisher can publish many books, but a book is published by only one publisher. The relationship 1: N.
* Librarian keeps track of students. The relationship is 1: N.
* Librarian maintains multiple reports. The relationship 1: N.
* Librarian maintains multiple Books. The relationship 1: N.
* Authentication system provides login to multiple librarians. The relation is 1: N.
* A teacher can upload multiple papers. The relationship is 1: N.
* There can be multiple guest users hence the relationship is 1: N.