

ACS575 - DATABASE SYSTEMS

PROJECT REPORT

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PROJECT TITLE:

LIBRARY MANAGEMENT SYSTEM

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ABSTRACT

A Library Management System is a software application designed to help librarians efficiently manage the various tasks involved in running a library. With this system, librarians can organize and manage the books, media, and other materials in the library's collection, facilitate lending, borrowing, and returning of materials, and maintain accurate records of student data. The manual procedures of maintaining student data, book records, account information, and employee management can be highly challenging, time-consuming, and prone to errors. The Library Management System is developed to overcome these challenges and to provide a more efficient and streamlined process for managing library resources. The system allows librarians to add students to the library's records, including their name, address, student ID, phone number, and email address. The system also provides the capability to edit and remove student records as needed. This functionality makes it easier for librarians to keep track of their patrons and to communicate with them when necessary. In addition to managing student data, the Library Management System also provides tools for adding books to the library catalog, maintaining records of the number of books available for issue, and recording the issued date and time of the book students have taken. This information is helpful in tracking and penalizing students who do not return books on time.

Overall, the Library Management System provides a comprehensive solution for managing library operations and resources. By automating many of the manual processes involved in managing a library, the system helps librarians save time and reduce errors, while also improving the overall experience for library patrons.

INTRODUCTION

The motivation behind our project is to develop a modern and efficient Library Management System that can replace the traditional manual procedures of managing library resources. Our goal is to provide a user-friendly system that allows librarians to easily manage the various tasks involved in running a library, while also providing an excellent experience for library patrons.

The primary objective of our project is to provide a comprehensive solution for managing library operations and resources. This includes organizing and managing the books, media, and other materials in the library's collection, facilitating lending, borrowing, and returning of materials, and maintaining accurate records of student data.

Our project scope includes developing a web-based Library Management System using the Django framework. The system will include features such as a user-friendly interface for librarians to add and manage books, a catalog system to keep track of the books available for lending, a record of borrowed books and due dates, and an option for patrons to reserve books online. Additionally, the system will provide a means to keep track of student data such as name, address, student ID, phone number, and email address.

The system will also include advanced features such as data warehousing Systems and OLAP to enable librarians to generate various analytical reports and insights into library usage. We developed a Dashboard where all the Analytical Reports such as Pending Transactions, Total Transactions, Active Students, Number of books available, Number of categories and sub-categories available will be displayed to the Librarian and the admin in their dashboard. Also, user can store their profile image into the database while accounts get created by the admin.

Overall, our project aims to provide an innovative and efficient solution to the challenges involved in managing library operations and resources, while also providing a user-friendly and intuitive experience for library patrons.

Related works:

1. https://www.researchgate.net/publication/347245735_Library_Management_System
2. <https://www.ijraset.com/research-paper/library-management-system>
3. <https://www.ijert.org/research/designing-web-based-library-management-system-IJERTV9IS100131.pdf>

Application functionalities of our system:

Core functionalities of the System:

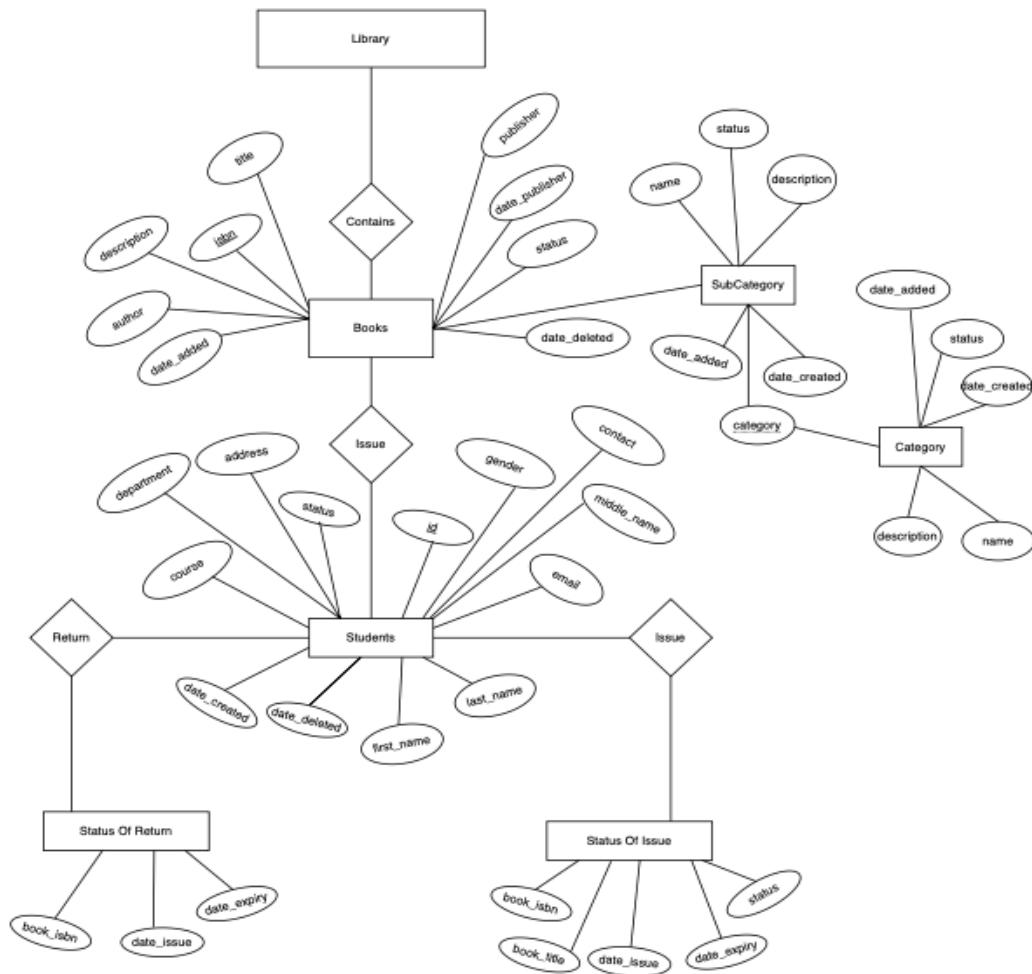
- Dashboard that displays all the Analytical Reports of Library Management System to the Librarian.
- Librarian can track the books issued by a particular student.
- Librarian can add/remove any member(student).
- Librarian can read information about any student.
- Librarian can add/delete books.
- Librarian can add category to the Application.
- Librarian can add sub-category to the Application.
- Librarian can update the availability status of the books.
- System can track Issuing and returning books by the student.
- Admin can add users to the Application.

Additional functionalities of the System:

- Displaying all students' records
- Displaying all books records.
- Update Book Records.
- Delete Book Records
- Add Book Records
- Add Member/Student Records
- Delete Member/Student Records
- User can update his profile like name, Contact Number, add profile picture etc. in the Application by himself after the Credentials are verified
- Update Member/Student Records.

Conceptual database schema for Library Management System:

1. ER Diagram for Library Management System:

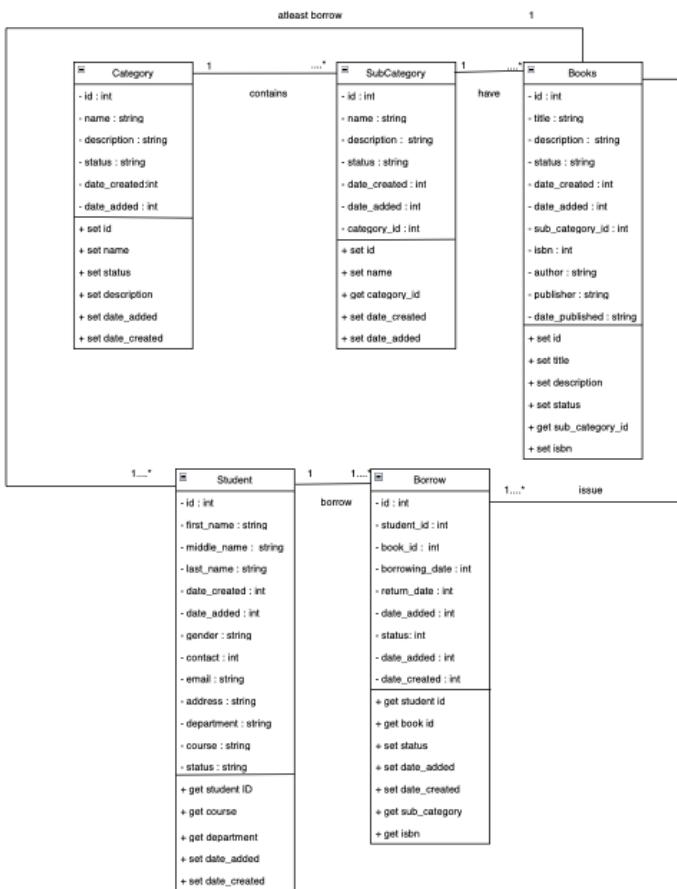


- There are four entities: Category, SubCategory, Books, and Students.
- Category has attributes: name, description, status, date_added, and date_created.
- SubCategory has attributes: category (as a foreign key), name, description, status, date_added, and date_created.
- Books has attributes: sub_category (as a foreign key), ISBN, title, description, author, publisher, date_published, status, date_added, and date_created.

- Students has attributes: code, first_name, middle_name, last name, gender, contact, email, address, department, course, status, date_added, and date_created.
- There is a one-to-many relationship between Category and SubCategory, with Category being the parent and SubCategory being the child.
- There is a one-to-many relationship between SubCategory and Books, with SubCategory being the parent and Books being the child.
- There is no direct relationship between Category and Books or between Category and Students.
- There is a many-to-many relationship between Books and Students, where Books can be issued to multiple Students, and a student can issue multiple Books. However, this relationship is not represented in the current code.

2. UML Class Diagram

UML Diagram



- The UML diagram for this database schema would consist of several boxes representing the different tables in the schema, with lines connecting them to show the relationships between the tables. The "Category" table would be at the top of the diagram, with lines connecting it to the "SubCategory" table, which would be below it. The "Book" table would be at the bottom of the diagram, with lines connecting it to the "SubCategory" table.
- The "Student" table would be on a separate branch of the diagram, with lines connecting it to the "Borrow" table. The "Borrow" table would have lines connecting it to both the "Student" and "Book" tables to show the relationship between students, books, and borrowing.
- Each box in the UML diagram would have the name of the table at the top, with the columns listed below it. The primary keys for each table would be highlighted in some way, such as with a bold font or underline. The foreign keys would be listed as attributes of the tables and connected to the appropriate table with a line.
- Overall, the UML diagram would provide a visual representation of the database schema and the relationships between the different tables.

Logical database schema for Library Management System:

LOGICAL DATA MODELING

Category

ID	name	description	status	date_added	date_created
----	------	-------------	--------	------------	--------------

PK : ID

SubCategory

ID	category_id	name	description	status	date-added	date-created
----	-------------	------	-------------	--------	------------	--------------

PK : ID
FK:category_id

Book

id	sub_category_id	ISBN	title	description	author	Publisher	date_published	status	date-added	date-created
----	-----------------	------	-------	-------------	--------	-----------	----------------	--------	------------	--------------

PK : ISBN
FK:sub_category_id

Student

ID	first_name	middle_name	last_name	gender	contact	email	address	department	course	status	date-added	date-created
----	------------	-------------	-----------	--------	---------	-------	---------	------------	--------	--------	------------	--------------

Borrow

ID	student_id	book_id	borrowing_date	return_date	status	date-added	date-created
----	------------	---------	----------------	-------------	--------	------------	--------------

PK : ID
FK1:student_id
FK2:book_id

In above diagram the relationships between the tables are:

- Category has a one-to-many relationship with SubCategory. One category can have many subcategories, but a subcategory can only belong to one category. The foreign key is category_id in SubCategory, which refers to the primary key id in Category.
- SubCategory has a one-to-many relationship with Book. One subcategory can have many books, but a book can only belong to one subcategory. The foreign key is sub_category_id in Book, which refers to the primary key id in SubCategory.
- Student has a one-to-many relationship with Borrow. One student can borrow many books, but a book can only be borrowed by one student at a time. The foreign key is student_id in Borrow, which refers to the primary key id in Student.
- Book has a one-to-many relationship with Borrow. One book can be borrowed by many students, but a student can only borrow one book at a time. The foreign key is book_id in Borrow, which refers to the primary key id in Book.

Physical database schema:

Table: Category

sno	Column name	Datatype	Length	Description
1	<u>Id</u>	int	1000	Unique identification number
2	Name	Varchar	255	Name of the category
3	Description	Varchar	255	Description of the category
4	Status	Varchar	2	To keep track of (active/inactive)
5	Date_added	Date/Time		Date of registration
6	Date_created	Date/Time		Date of issue

Table: SubCategory

sno	Column name	Datatype	Length	Description
1	<u>Id</u>	int	1000	Unique identification number
2	Name	Varchar	255	Name of the category
3	Description	Varchar	255	Description of the category
4	Status	Varchar	2	To keep track of (active/inactive)
5	Date_added	Date/Time		Date of registration
6	Date_created	Date/Time		Date of issue
7	Category_id	Int	1000	Keep track of category_id

Table: Book

sno	Column name	Datatype	Length	Description
1	Id	int	1000	Unique identification number
2	Sub category id	int	255	Keep track of the sub category
3	<u>ISBN</u>	int	255	Unique number to keep track
4	Status	Varchar	2	To keep track of (active/inactive)
5	Date added	Date/Time		Date of registration
6	Date created	Date/Time		Date of issue
7	Title	Varchar	255	Title of the book
8	Author	Varchar	255	Author of the book
9	Publisher	Varchar	255	Book publisher name
10	Description	Varchar	255	Description of the Book
11	Date published	Varchar	255	Date the book published

Table: Student

sno	Column name	Datatype	Length	Description
1	Id	int	1000	Unique identification number
2	First name	Varchar	255	First name of the student
3	<u>Middle name</u>	Varchar	255	Middle name of the student
4	Last name	Varchar	2	Last name of the student
5	Date added	Date/Time		Date of registration
6	Date created	Date/Time		Date of issue
7	gender	Varchar	255	Save gender of the student
8	contact	int	255	Contact number of the student
9	email	Varchar	255	Email of the student
10	address	Varchar	255	Address of the student
11	Department	Varchar	255	Student department name
12	Course	Varchar	255	Course registered by student
13	Status	Varchar	20	To keep track of Active/inactive student

Table: Borrow

sno	Column name	Datatype	Length	Description
1	<u>Id</u>	int	1000	Unique identification number
2	Student_id	int	255	Student id to fetch all details of student
3	Book_id	int	255	Book id to get all the details of book
4	Status	Varchar	2	To keep track of (active/inactive) transaction
5	Date_added	Date/Time		Date of registration
6	Date_created	Date/Time		Date of issue
7	Borrowing_date	Date/Time		Keep track of borrowing transaction
8	Return_date	Date/Time		Due date to return book transaction

SQL Code for Table Creation:

SQL Code for Category Table:

```
CREATE TABLE Category (
    id INT NOT NULL AUTO_INCREMENT,
    name VARCHAR (255) NOT NULL,
    description VARCHAR(255),
    status VARCHAR(2) NOT NULL,
    delete_flag INT NOT NULL DEFAULT 0,
    date_added DATETIME NOT NULL DEFAULT CURRENT_TIMESTAMP,
    date_created DATETIME NOT NULL DEFAULT CURRENT_TIMESTAMP,
    PRIMARY KEY (id)
);
```

SQL Code for Subcategory Table:

```
CREATE TABLE SubCategory (
    id INT NOT NULL AUTO_INCREMENT,
    category_id INT NOT NULL,
    name VARCHAR(255) NOT NULL,
    description VARCHAR(255),
    status VARCHAR(2) NOT NULL,
    delete_flag INT NOT NULL DEFAULT 0,
```

```

date_added DATETIME NOT NULL DEFAULT CURRENT_TIMESTAMP,
date_created DATETIME NOT NULL DEFAULT CURRENT_TIMESTAMP,
PRIMARY KEY (id),
FOREIGN KEY (category_id) REFERENCES Category (id)
);

```

SQL Code for Book Table:

```

CREATE TABLE Book (
id INT NOT NULL AUTO_INCREMENT,
sub_category_id INT NOT NULL,
isbn VARCHAR(255) NOT NULL,
title VARCHAR(255) NOT NULL,
description VARCHAR(255),
author VARCHAR(255),
publisher VARCHAR(255),
date_published DATETIME NOT NULL,
status VARCHAR(2) NOT NULL,
delete_flag INT NOT NULL DEFAULT 0,
date_added DATETIME NOT NULL DEFAULT CURRENT_TIMESTAMP,
date_created DATETIME NOT NULL DEFAULT CURRENT_TIMESTAMP,
PRIMARY KEY (id),
FOREIGN KEY (sub_category_id) REFERENCES SubCategory (id)
);

```

SQL Code for Student Table:

```

CREATE TABLE Student (
id INT NOT NULL AUTO_INCREMENT,
code VARCHAR(255) NOT NULL,
first_name VARCHAR(255) NOT NULL,
middle_name VARCHAR(255),
last_name VARCHAR(255) NOT NULL,
gender VARCHAR(20) NOT NULL,
contact VARCHAR(255),
email VARCHAR(255),
address VARCHAR(255),
department VARCHAR(255),
course VARCHAR(255),
status VARCHAR(2) NOT NULL,
delete_flag INT NOT NULL DEFAULT 0,
date_added DATETIME NOT NULL DEFAULT CURRENT_TIMESTAMP,
date_created DATETIME NOT NULL DEFAULT CURRENT_TIMESTAMP,

```

```
    PRIMARY KEY (id)
);
```

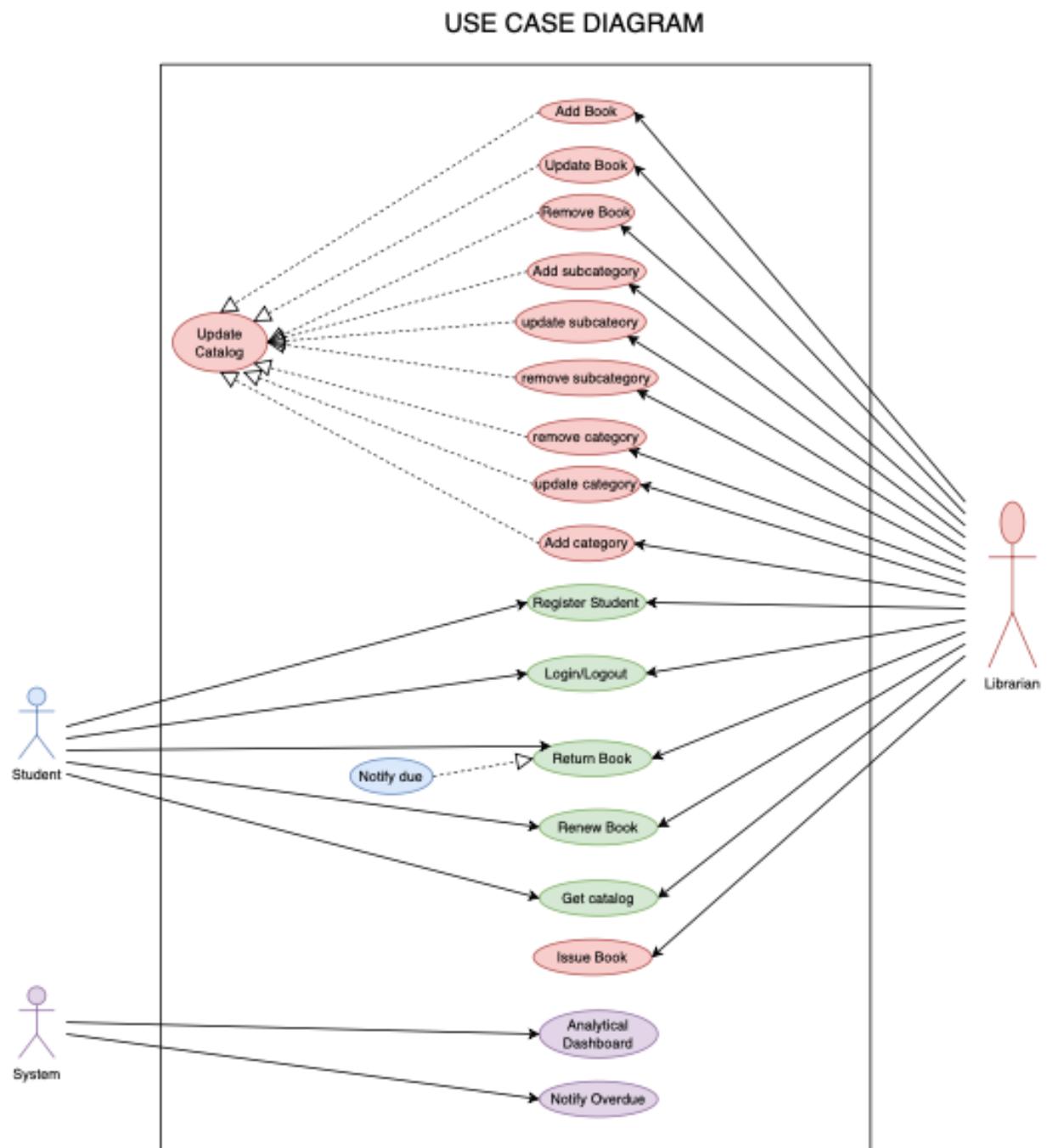
SQL Code for Borrow Table:

```
CREATE TABLE Borrow (
    id INT NOT NULL AUTO_INCREMENT,
    student_id INT NOT NULL,
    book_id INT NOT NULL,
    borrowing_date DATETIME NOT NULL,
    return_date DATETIME,
    status VARCHAR(2) NOT NULL,
    date_added DATETIME NOT NULL DEFAULT CURRENT_TIMESTAMP,
    date_created DATETIME NOT NULL DEFAULT CURRENT_TIMESTAMP,
    PRIMARY KEY (id),
    FOREIGN KEY (student_id) REFERENCES Student (id),
    FOREIGN KEY (book_id) REFERENCES Book (id)
);
```

Database technology Used:

- We have used Sqlite3 for our project as it is a popular RDBMS (Relational Database Management System) technology used for lightweight and embedded applications. It's a file-based database system, meaning that the entire database is contained in a single file, making it easy to transport and deploy.
- SQLite is a lightweight and self-contained SQL database engine that is used for many small to medium-sized applications. Django is a high-level Python web framework that supports multiple databases, including SQLite.
- Django has built-in support for SQLite3 and makes it easy to use with our Django project. When we create a new Django project, the default settings use SQLite as the database engine. Also, we can change the database settings to use a different database engine like MySQL or PostgreSQL.
- To use SQLite with our Django project, we have to install the SQLite3 package. SQLite3 comes preinstalled with Python, so you don't need to install it separately. Once you have SQLite3 installed, we can create a new Django project and specify the database engine to be used.
- In all aspects it is similar to MySQL Database. The reason to choose sqlite3 is its tightly coupled and easy to integrate with Django Framework.

USE CASE DIAGRAM:



Description of the prototype system:

The library management system prototype is designed to manage the various aspects of a library, including books, categories, subcategories, and borrowers. The system will consist of several modules to handle different functionalities.

- The Main Module displays all the Analytical Reports of the System like the Number of transactions, Pending transactions, Number of books, Categories, Students, and Sub-categories.
- One module would be responsible for managing the library's catalog, including the ability to add, edit, and delete books. This module would interact with the database schema's Book, SubCategory, and Category tables. The Category table would store the different types of books available, such as fiction, non-fiction, etc., while the SubCategory table would store subcategories, such as mystery, romance, etc. The Book table would store information on individual books, such as their ISBN, title, author, publisher, and publication date.
- Another module would manage student accounts and their borrowing activities. This module would interact with the database schema's Student and Borrow tables. The Student table would store student information, including their name, contact details, and department, while the Borrow table would record each student's borrowing activities, including which book they borrowed, the date they borrowed it, and the date they returned it.
- A third module could handle generating reports on the library's activities, such as the number of books borrowed, the most popular books, and the students who borrow the most books. This module would also interact with the database schema's tables to retrieve the necessary data for generating these reports.

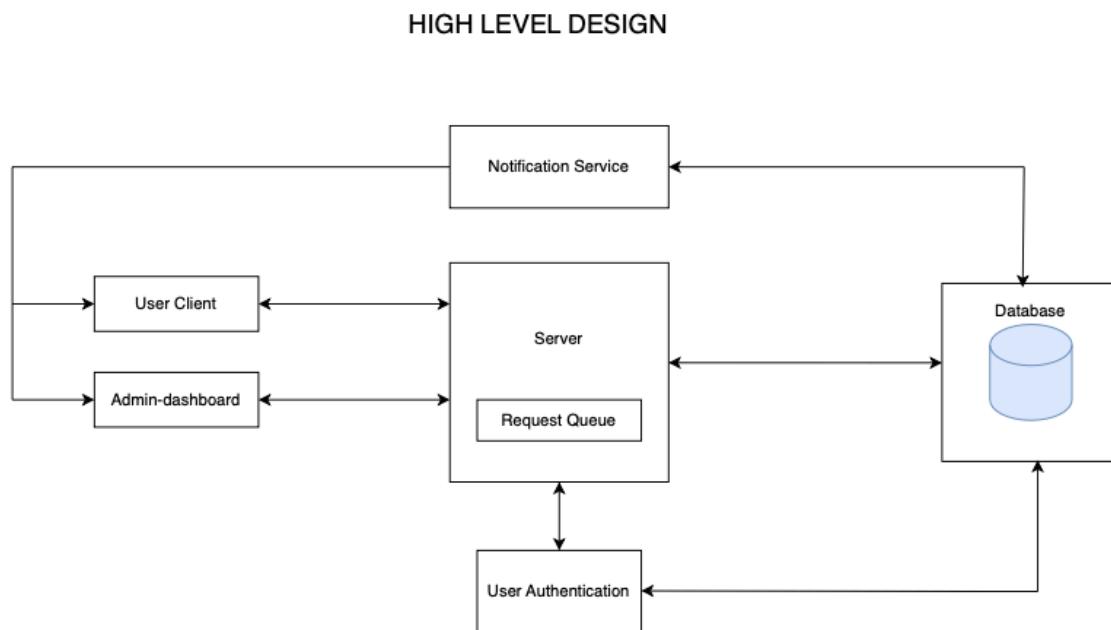
Overall, the prototype system would enable the library to manage its operations more efficiently, including managing the catalog, tracking student borrowing activities, and generating reports to improve decision-making.

Note: All these modules are clearly explained in detail with screenshots in prototype screenshots.

System architecture:

We have used Django framework with Python as Backend (Server) and JavaScript, HTML and CSS in the Frontend (Client) and SQL Database(sqlite3).

Below is the High- level Design of Three-tier with web Server Architecture for our project:



- The client tier includes the client devices, which could be web browsers for our application. The client tier sends requests to the web server and displays the results received from the server.
- The application tier consists of the web server and the application server. The web server handles HTTP requests and serves static content such as HTML, CSS, and JavaScript files. It also interacts with the application server to process dynamic requests and returns the response to the client.

- The application server manages the business logic of the system. It receives requests from the web server, processes the requests, and retrieves the necessary data from the database. It then performs the required operations on the data and sends the results back to the webserver to be sent back to the client.
- The data tier consists of the database server that stores all the data required by the system. It receives requests from the application server, performs the necessary database operations, and returns the results back to the application server.
- In this architecture, the client does not communicate directly with the database server. All communication between the client and the database server is handled by the application server. This ensures that the security of the database is not compromised and provides better control over the data.

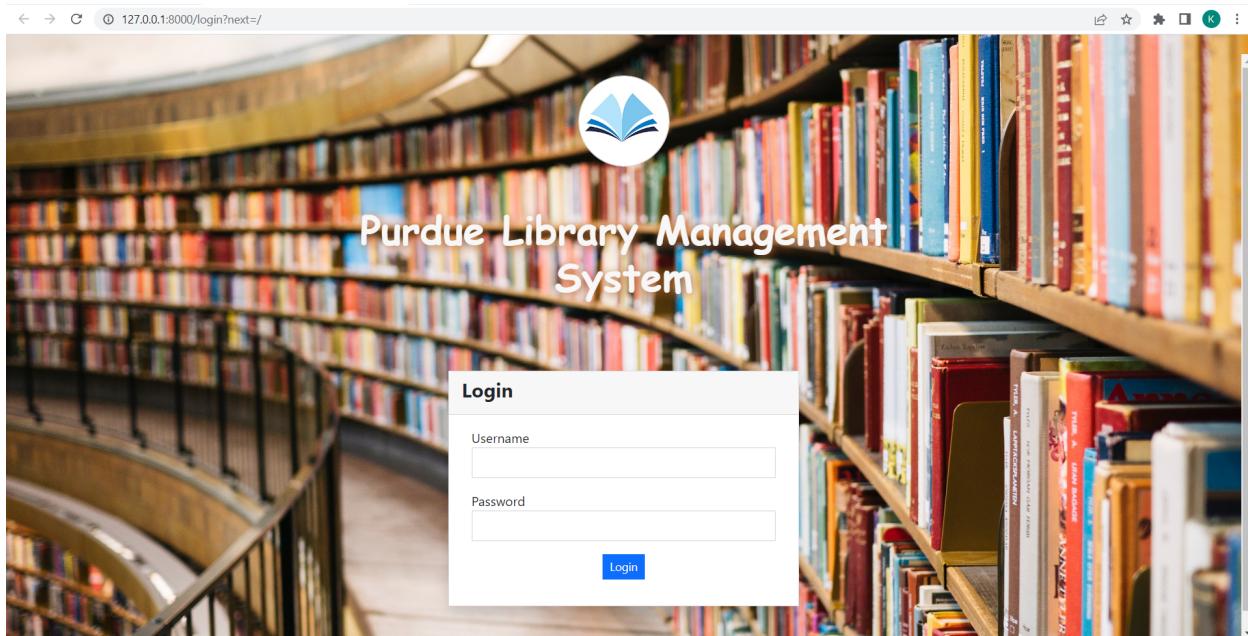
Development environment:

The development environment we have used for our library management system are:

- Programming languages: Python.
- Relational databases: MySQL Server(sqlite3).
- Database APIs: SQLAlchemy for Python.
- Web frameworks: Django Framework.
- Front-end technologies: HTML, CSS, JavaScript.
- IDEs: Visual Studio and PyCharm.

Prototype running example figures:

Landing page of application:



Administrators Dashboard:

A screenshot of the "Purdue Library Management System" dashboard. The top navigation bar includes links for Home, Categories, Sub Categories, Books, Students, Borrowing Transactions, Users, and Logout. The "Users" link is highlighted with a red circle and an arrow pointing to it from the text above. A message box states: "Admin can view and add new users to the application." Below the navigation, a welcome message "Welcome, Vedhan Reddy!" is displayed. The main content area features a grid of six cards with statistics: Active Categories (9), Active Sub Categories (12), Active Students (4), Active Books (4), Pending Transactions (2), and Total Transactions (5). The bottom of the page includes a copyright notice: "© 2023 Copyright: [Purdue University](#)".

- Data warehousing is a process of collecting, managing, and storing large amounts of data from various sources and organizing it in a way that enables efficient querying and

analysis. The purpose of data warehousing is to provide a centralized repository of data that can be used for decision-making and reporting purposes.

- In our project, we are collecting and storing various data points such as transaction details, student information, and book availability information, and organizing it in a way that allows for efficient querying and analysis. **The dashboard that displays the analytical reports is an example of how this organized data can be used for decision-making and reporting purposes.**

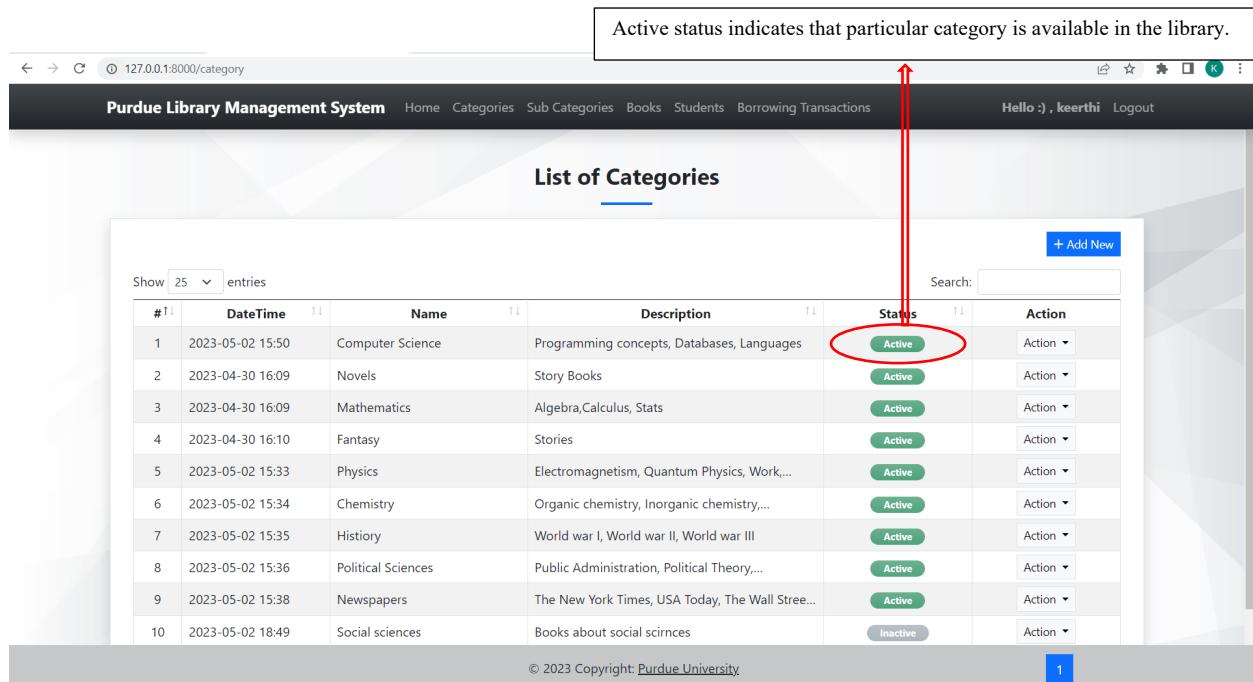
Other users dashboard:

The screenshot shows a web-based dashboard for the "Purdue Library Management System". At the top, there is a header bar with links for Home, Categories, Sub Categories, Books, Students, Borrowing Transactions, and a user greeting "Hello :) , keerthi" along with a Logout button. Below the header is a welcome message "Welcome, Keerthi k!". The main area features a grid of six colored boxes displaying statistical data:

Category	Value	Description
Active Categories	9	
Active Sub Categories	12	
Active Students	4	
Active Books	4	
Pending Transactions	2	
Total Transactions	5	

At the bottom of the dashboard, there is a footer bar with the copyright notice "© 2023 Copyright: Purdue University".

List of all categories of books that the library is keeping:



Active status indicates that particular category is available in the library.

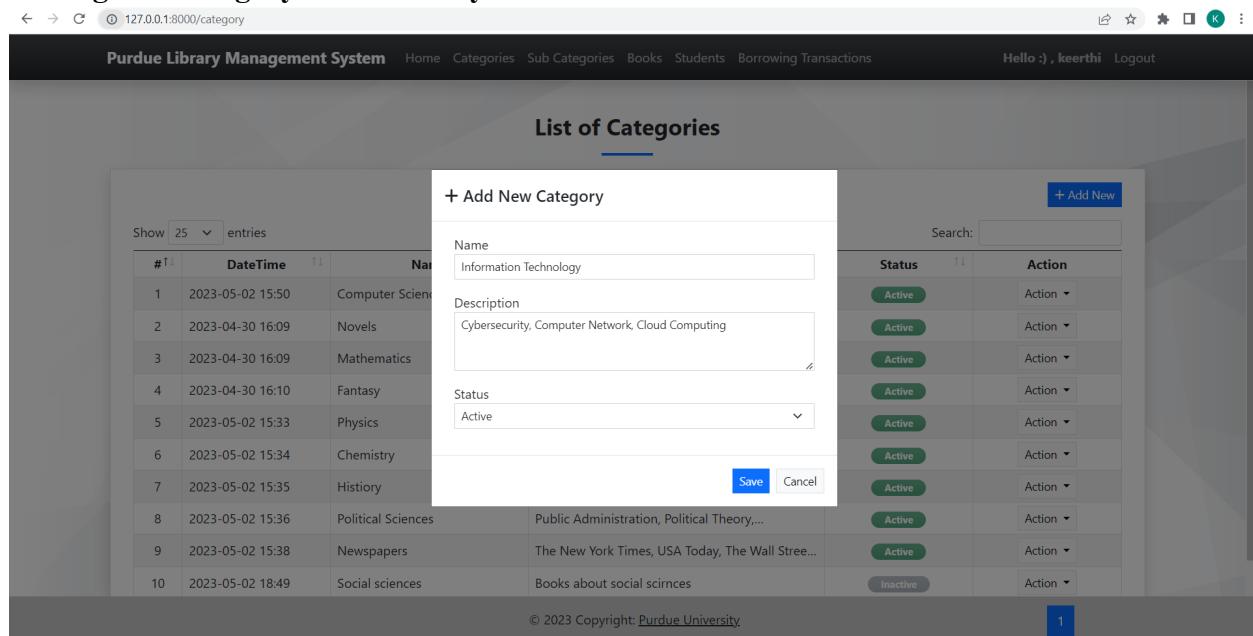
Purdue Library Management System Home Categories Sub Categories Books Students Borrowing Transactions Hello :, keerthi Logout

List of Categories

#	Date Time	Name	Description	Status	Action
1	2023-05-02 15:50	Computer Science	Programming concepts, Databases, Languages	Active	Action ▾
2	2023-04-30 16:09	Novels	Story Books	Active	Action ▾
3	2023-04-30 16:09	Mathematics	Algebra, Calculus, Stats	Active	Action ▾
4	2023-04-30 16:10	Fantasy	Stories	Active	Action ▾
5	2023-05-02 15:33	Physics	Electromagnetism, Quantum Physics, Work,...	Active	Action ▾
6	2023-05-02 15:34	Chemistry	Organic chemistry, Inorganic chemistry,....	Active	Action ▾
7	2023-05-02 15:35	Histiory	World war I, World war II, World war III	Active	Action ▾
8	2023-05-02 15:36	Political Sciences	Public Administration, Political Theory,...	Active	Action ▾
9	2023-05-02 15:38	Newspapers	The New York Times, USA Today, The Wall Street...	Active	Action ▾
10	2023-05-02 18:49	Social sciences	Books about social sciences	Inactive	Action ▾

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Adding new category to the library:



Purdue Library Management System Home Categories Sub Categories Books Students Borrowing Transactions Hello :, keerthi Logout

List of Categories

+ Add New Category

#	Date Time	Name	Description	Status	Action
1	2023-05-02 15:50	Computer Science	Programming concepts, Databases, Languages	Active	Action ▾
2	2023-04-30 16:09	Novels	Story Books	Active	Action ▾
3	2023-04-30 16:09	Mathematics	Algebra, Calculus, Stats	Active	Action ▾
4	2023-04-30 16:10	Fantasy	Stories	Active	Action ▾
5	2023-05-02 15:33	Physics	Electromagnetism, Quantum Physics, Work,...	Active	Action ▾
6	2023-05-02 15:34	Chemistry	Organic chemistry, Inorganic chemistry,....	Active	Action ▾
7	2023-05-02 15:35	Histiory	World war I, World war II, World war III	Active	Action ▾
8	2023-05-02 15:36	Political Sciences	Public Administration, Political Theory,...	Active	Action ▾
9	2023-05-02 15:38	Newspapers	The New York Times, USA Today, The Wall Street...	Active	Action ▾
10	2023-05-02 18:49	Social sciences	Books about social sciences	Inactive	Action ▾

+ Add New

Name: Information Technology

Description: Cybersecurity, Computer Network, Cloud Computing

Status: Active

Save Cancel

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List of Subcategories for the category that the library is keeping:

The screenshot shows a table of subcategories:

#	Date/Time	Category/Sub Category	Description	Status	Action
7	2023-05-02 15:43	Chemistry Organic Chemistry	Books related to organic chemistry	Active	Action
1	2023-05-02 15:40	Computer Science Data Science	Books related to data science	Active	Action
10	2023-05-02 15:51	Computer Science Database concepts	Books related to Database concepts	Active	Action
4	2023-05-02 15:41	Computer Science Operating Systems	Books related to operating systems	Active	Action
2	2023-05-02 15:40	Computer Science Programming Books	Books related to programming languages	Active	Action
13	2023-05-02 18:50	Mathematics Algebra	Books related to algebra	Active	Action
3	2023-05-02 15:42	Mathematics Calculus	Books related to statistics	Active	Action
5	2023-05-02 15:42	Mathematics Geometry	Books related to Geometry	Active	Action
8	2023-05-02 15:44	Newspapers The New York Times	Newspapers available after Jan, 2015	Active	Action
9	2023-05-02 15:45	Newspapers	Newspapers available after Jan, 2013	Inactive	Action

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- **Description:** Computer science category has different subcategories like Data Science, Database Concepts, Operating Systems, Programming books as shown in the above image. Users can add new subcategory only for the active categories.

Adding new subcategory to the library:

The screenshot shows a modal dialog for adding a new subcategory:

+ Add New Sub Category

Category: Computer Science

Name: Data Structures and Algorithms

Description: A data structure is a named location that can be used to store and organize data. And, an algorithm is a collection of steps to solve a particular problem.

Status: Active

Save Cancel

List of books shows all the books that the library is keeping:

The screenshot shows a web application titled "Purdue Library Management System". The main title bar includes links for Home, Categories, Sub Categories, Books, Students, and Borrowing Transactions. A user profile "Hello :) , keerthi" and a Logout link are also present. The main content area is titled "List of Books". It features a table with columns: #, Date Added, Category/Sub Category, ISBN, Title, Status, and Action. The table contains 7 rows of book data. At the top right of the table is a blue button labeled "+ Add New". Below the table, there is a search bar and a copyright notice: "© 2023 Copyright: Purdue University".

#	Date Added	Category/Sub Category	ISBN	Title	Status	Action
1	2023-04-30 07:06 AM	Computer Science Data Science	9001524	Data Science for Business: What You Need to Know about Data Mining and Data-Analytic Thinking	Active	Action
2	2023-04-30 04:12 PM	Computer Science Programming Books	9003584	C programming	Active	Action
3	2023-04-30 05:33 PM	Computer Science Programming Books	9003577	Intro to C++	Active	Action
4	2023-05-02 01:22 AM	Mathematics Calculus	7009036	Calculus: Early Transcendentals	Active	Action
5	2023-05-02 03:54 PM	Computer Science Data Science	9001876	Fundamentals of Database systems	Active	Action
6	2023-05-02 04:57 PM	Chemistry Organic Chemistry	3001579	Organic Chemistry	Active	Action
7	2023-05-02 05:01 PM	Political Sciences Political Theory	4001765	Why Politics Matters: An Introduction to Political Science	Active	Action

Adding new book to the library:

The screenshot shows a modal dialog box titled "+ Add New Book" overlaid on the main "List of Books" page. The modal contains fields for ISBN (9002887), Category (Computer Science - Data Structures and Algorithms), Title (Introduction to Algorithms), Description (a detailed text about the book's content and purpose), Author/s (Thomas H.Cormen), Publisher (The MIT Press), and Date Published (07/31/2009). At the bottom of the modal are "Save" and "Cancel" buttons.

ISBN is a unique number that the library will assign to identify a particular book.

Search Functionality:

User can search for the particular book from all the available books.

127.0.0.1:8000/books

Purdue Library Management System Home Categories Sub Categories Books Students Borrowing Transactions Hello :) , keerthi Logout

List of Books

#	Date Added	Category/Sub Category	ISBN	Title	Status	Action
11	2023-05-03 01:13 AM	Computer Science Data Structures and Algorithms	9002887	Introduction to Algorithms	Active	Action ▾

Show 25 entries Search: Algo

Showing 1 to 1 of 1 entries (filtered from 11 total entries) Previous 1 Next

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Action drop-down functionality:

127.0.0.1:8000/books

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List of Books

#	Date Added	Category/Sub Category	ISBN	Title	Status	Action
1	2023-04-30 07:06 AM	Computer Science Data Science	9001524	Data Science for Business: What You Need to Know about Data Mining and Data-Analytic Thinking	Active	Action ▾
2	2023-04-30 04:12 PM	Computer Science Programming Books	9003584	C programming	Active	Action ▾
3	2023-04-30 05:33 PM	Computer Science Programming Books	9003577	Intro to C++	Active	Action ▾
4	2023-05-02 01:22 AM	Mathematics Calculus	7009036	Calculus: Early Transcendentals	Active	Action ▾
5	2023-05-02 03:54 PM	Computer Science Data Science	9001876	Fundamentals of Database systems	Active	Action ▾
6	2023-05-02 04:57 PM	Chemistry Organic Chemistry	3001579	Organic Chemistry	Active	Action ▾
7	2023-05-02 05:01 PM	Political Sciences Political Theory	4001765	Why Politics Matters: An Introduction to Political Science	Active	Action ▾

Show 25 entries Search:

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User can view, edit, or delete the book details by clicking on the Action dropdown button.

List of students registered with the library:

#	Date Added	School ID	Name	Status	Action
1	2023-04-30 07:05 AM	6859621	Vedhan Reddy Gaddam	Active	Action
2	2023-04-30 04:13 PM	90038512	Keerthi kumar reddy Kancham Reddy	Active	Action
3	2023-04-30 05:30 PM	90038526	Ramayan Chand Mani	Active	Action
4	2023-05-02 01:24 AM	75467	Ramayan K Achari	Active	Action

Showing 1 to 4 of 4 entries

Search:

+ Add New

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Registering new student with the library:

+ Add New Student

School ID 8709	Gender Male
First Name Shah	Contact # 2605647897
Middle Name rukh	Email shahrukh@gmail.com
Last Name Khan	Address Fort wayne
Department Computer science	Course Masters
Status Active	<input type="button" value="Save"/> <input type="button" value="Cancel"/>

Showing 1 to 4 of 4 entries

Search:

+ Add New

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List of Borrowing transactions displays all the book borrowing transactions:

List of Borrowing Transactions

#	Date Added	Student	Book	Status	Action
1	2023-05-02 01:26 AM	90038512 Keerthi kumar reddy Kancham Reddy	7009036 Calculus: Early Transcendentals	Pending	Action ▾
2	2023-05-02 05:04 PM	90038526 Ramayan Chand Mani	9003584 C programming	Pending	Action ▾
3	2022-05-13 02:30 AM	6859621 Vedhan Reddy Gaddam	9001524 Data Science for Business: What You Need to Know about Data Mining and Data-Analytic Thinking	Returned	Action ▾
4	2023-04-30 04:37 PM	90038512 Keerthi kumar reddy Kancham Reddy	9003584 C programming	Returned	Action ▾
5	2023-05-02 06:55 PM	90038512 Keerthi kumar reddy Kancham Reddy	4001765 Why Politics Matters: An Introduction to Political Science	Returned	Action ▾

Showing 1 to 5 of 5 entries

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Books that are returned can be marked as **Returned**.

Book borrowing transaction functionality:

List of Borrowing Transactions

+ Add New Transaction

#	Date Added	Book	Student	Action
1	2023-05-02 01:26 A	9002887 - Introduction to Algorithms	8709 - Shah rukh Khan	Action ▾
2	2023-05-02 05:04 P			Action ▾
3	2022-05-13 02:30 A			Action ▾
4	2023-04-30 04:37 P			Action ▾
5	2023-05-02 06:55 P			Action ▾

Show 25 entries

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- **Description:** The status field in the new transaction by default is set to Pending as the student is borrowing the book from the library.

User Profile screen:

My Profile

Fullname
Keerthi k

Email
kanck@pfw.edu

Username
keerthi

Update Password | Update Profile

Update Password functionality:

Update Password

Old Password:

New Password:

Confirm New Password:

Update

- **Description:** User can update the password by entering his old password. Only if the old password is entered correctly, user will be able to update the password. System will throw an error if the old password is incorrect while updating the password.

User authentication and security:

127.0.0.1:8000/update_password

Purdue Library Management System Home Categories Sub Categories Books Students Borrowing Transactions Hello :) , keerthi Logout

Update Password

Your old password was entered incorrectly. Please enter it again.

Old Password:

New Password:

Confirm New Password:

Update

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Update profile screen:

127.0.0.1:8000/update_profile

Purdue Library Management System Home Categories Sub Categories Books Students Borrowing Transactions Hello :) , keerthi Logout

Update Account Details

First Name
Keerthi kumar reddy

Last Name
kancham reddy

Username
keerthi

Email
kanck01@pfw.edu

Enter Password

Save

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- **Description:** User must enter his password to update his profile information. Only if the password is correct, User can update his profile information. System will throw an error message if the password entered is incorrect.

User authentication and security:

The screenshot shows a web browser window for the "Purdue Library Management System". The URL is 127.0.0.1:8000/update_profile. The page title is "Update Account Details". It contains input fields for First Name (Keerthi kumar reddy), Last Name (kancham reddy), Username (keerthi), Email (kanck01@pfw.edu), and Enter Password. Below the password field is a red box containing the text "Password is Incorrect". At the bottom is a blue "Save" button. The top navigation bar includes links for Home, Categories, Sub Categories, Books, Students, Borrowing Transactions, and a user greeting "Hello :), keerthi" with a Logout link.

Conclusion and possible future works:

In conclusion, the computerized version of the library management system offers numerous benefits to the library staff. The system digitizes the entire process, allowing librarians to easily search for books and monitor their status. With a systematic and structured database for newly issued, old books, librarians can efficiently manage the library's inventory. Additionally, the system allows for the management of student databases, reducing the need for paper-based record-keeping. Overall, this system provides a more streamlined and efficient approach to library management.

Future work:

- We can develop student login portal, where student can see their own transactions like renew the books, view due dates and search for the available books from library catalog.
- We can implement late due Penalty feature for late returned books if the library wants to charge.
- We can implement discussion forum where students can collaboratively discuss on which book to pick for particular subject.