Library Management System

A CS814 Course Project Report

Submitted by

Aakriti Thawre (202IS001)
Vashung Muilung (202IS028)

Department of Computer Science and Engineering
National Institute of Technology Karnataka
P.O. Srinivasnagar, Surathkal, Mangalore-575025
Karnataka, India
January 2021

Contents

1 Introduction

A Library management system is a software that uses to maintain the record of the library. It contains work like the number of available books in the library, the number of books are issued or returning or renewing a book or late fine charge record, etc. Library Management Systems is software that helps to maintain a database that is useful to enter new books and record books borrowed by the members, with the respective submission dates. Moreover, it also reduces the manual record burden of the librarian.

Library management system allows the librarian to maintain library resources in a more operative manner that will help to save their time. It is also convenient for the librarian to manage the process of books allotting and making payment. Library management system is also useful for students as well as a librarian to keep the constant track of the availability of all books in a store.

1.1 Importance of library management system

- A library management system is the most proficient and easy to use system for managing all the processes involved in a library in the most effective ways.
- This system will reduce all the manual work and the whole process can be managed just through single clicks and edits.
- There will be no headache and doubtfulness of storing the data securely and searching the records of any individual afterward.
- The staff can also facilitate themselves with some extra authorizations and privileges.
- Only, one person is required to take care of the whole system, without any chances of mistakes.

1.2 Advantage of the library management system

- It reduces the manual paperwork through it and gives proper information of books has been recorded automatically.

- Librarian can update the information of books and manage availability and arrive record of the books.
- It saves human efforts and time.
- With the help of library management software, the customer can easily search and find the books.

subsection*Who can use the library management system The library management system is nowadays essential for schools, colleges, private libraries, and other organizations. They can use this software as the purpose of books issuing and returning for renewal. Moreover, this software helps the librarian to maintain information about book issuing and returning the book before the last date.

Library management system are useful for such organization:

- School libraries
- College libraries
- Private libraries
- Reference libraries
- National libraries
- Public libraries
- Modern Public libraries
- Public leading libraries

2 System Requirements

2.1 Non Functional Requirements

- Efficiency requirement: When a library management system will be implemented librarian and user will easily acess library as searching and book issuing will be very faster.

- Reliability requirement: The system should accurately performs member registration, member validation, report generation, book issue and list of books available and list of issued book to user.
- Usability requirement: The system is designed for a user friendly environment so that student and staff of library can perform the various tasks easily and in an effective way.
- Implementation requirements: In implementing whole system is uses HTML in front end with CSS for styling, Python for back end and for server django and for database django uses SQLite to store table.

2.2 Functional requirements

- User login: This feature used by user to login into system. They are required to enter username and password before they are allowed to enter the system. The username and password will be verified and if invalid id is there user is not allowed to enter the system.
  -username is entered by user during registration.
  -The system must only allow user with valid id and password to enter the system.
  -The system perform authorization process which decides what user level can access to.
  -The user must be able to logout after they finished using system.
- Register new user: This feature can be performed by all users to register new user to create account.
  -System must be able to verify information.
  -System must be able to enter number of copies into table.
  -System must be able to not allow two books having same book id.

2.3 Software and Hardware requirements

Software requirements:

- Operating system: any operating system
- Database: SQLite is used as database as it easy to maintain and retrieve records by simple queries which are in English language which is easy to understand and easy to write.

- Programming language: HTML, CSS for front end
- Back end: Python, Django

Hardware requirements

- intel core
- RAM 1GB

Existing System

- Early days Libraries are managed manually. It required lot to record or to retrieve the details. The employees who have to record the details must perform their job very carefully. Even a small mistake would create a lot of problems. Security of information is very less. Report generations of all the information is very tough task.
- Maintenance of Library catalogue and arrangement of the books to the catalogue is very complex task. In addition to its maintenance of the library with out any degradation which may finally result in the failure of the entire system.

2.4 Software Tools used

The whole project is divided in two parts the front end and the back end.
Front end

- HTML: Html or hyper text markup language is the main markuplanguage for creating web pages and other information that can be displayed in a web browser. HTML is written in the form of HTML elements consisting of tags enclosed in angle brackets, within the web page content. The purpose of a web browser is to read HTML documents and compose them into visible or audible web pages. The browser does not display the HTML tags, but uses the tags to interpret the content of the page.HTML elements form the building blocks of all websites. HTML allows images and objects to be embedded and can be used to create interactive forms. It provides a means to create structured documents by denoting structural semantics for text such as headings, paragraphs, lists, links, quotes and other items. It can embed scripts written in languages such as JavaScript which affect the behavior of HTML web pages.

- CSS: is used for styling web pages.
- Python: for backend which gives interation with django and make easier to create database and validate users.
- SQLite is also used in many high-profile, large-scale websites.

3 Authorization

RBAC: Role-based access control (RBAC) systems assign access and actions according to a person's role within the system. Everyone who holds that role has the same set of rights. Those who hold different roles have different rights.

3.1 Need of RBAC based authorization

Every company has sensitive documents, programs, and records. Protect them too strictly, and company's work grinds to a halt. Leave them open, and catastrophic security issues can arise.
Using RBAC we can grant access to those who need it while blocking those who don't need access. Make changes based on a person's role rather than individual attributes. We can make these changes quickly by altering access by role.

3.1.1 What is RBAC

All role-based control systems share core elements, such as:

- **Administrators**: They identify roles, grant permissions, and otherwise maintain security systems.
- **Roles**: Workers are grouped together based on the tasks they perform.

- **Permissions**: Access and actions attach to each role, and they outline what people can and cannot do.

RBAC systems do not require:

- **Differentiation of individual freedoms**: Access is defined by a person's role, not that person's preferences or wishes. This makes it easy to manage permissions.

- **Intensive maintenance**: Permissions follow roles. A new job function becomes a new role applied to dozens (or hundreds or thousands) of employees with only a small amount of work for the administrator. Promotions involve changing roles, not editing permissions as line items.

3.1.2 Roles withing RBAC

Roles dictate authorization within an RBAC system. It's critical to define them properly. Otherwise, large groups of people withing company can't do their work.
Roles can be defined by:

- **Authority**: Senior management needs access to flies interns should never see.

- **Responsibility**: A board member and a CEO might hold similar authority within a company, but they are each responsible for different core functions.

- **Competence**: A skilled worker can be trusted to work within sensitive documents without errors, while a novice could make catastrophic mistakes. It's important to tailor access accordingly.

3.1.3 Role-Based Access Control Permissions

Permissions specify what people can access and what they can do in the system. Think of permissions as the rules people follow per the roles have outlined. Permissions should involve:

- **Access**: Who can open a specific drive, program, file, or record? Who shouldn't even know these things exist? Access will limit what people can see.

- **Reading**: Who can scan through these documents, even if they can't change anything inside of them? Some roles may have the ability to reference materials but not make changes to them.

- **Writing**: Who can change documents? Does someone else have to approve the changes, or are they permanent? This will define permissions.

- **Sharing**: Who can download a document or send it as an email attachment? As with the other permissions, some users will not be able to share materials even if they can reference them.

- **Finances**: Who can charge money? Who can offer refunds? Permissions could involve the ability to deal with charges and refunds, set up credit accounts, or cancel payments.

3.1.4 Role-Based Access Control Benefits

Security options abound, and it's not always easy to make the right choice for company. RBAC comes with plenty of tried-and-true benefits that set it apart from the competition. An RBAC system can:

- **Reduce complexity**: New employees gain access based on their roles, not on long lists of server and document requirements. This simplifies creating, maintaining, and auditing policies.

- **Allow global administration**: Change access for many employees all at once by altering permissions associated with a role.

- **Ease on boarding**: As people join, move withing, or are promoted within organizations, and we don't have to worry about the individual's permissions, just that they're in the right place. The roles take care of the rest.

- **Reduce Blunders**: Traditional security administration is error-prone. Adding permissions for individuals gives us plenty of options to make a mistake. Change a role's access, and you're less likely to give someone too much (or too little) power.

- **Lower overall costs**: When admin duties shrink, comanies save on security administration. This saves our organization time and money.

3.2 Components of RBAC in our application

Library management system has following components:

Admin

- Create Admin account and Login.
- Can Add, View, Book
- Can Issue Book (added by Admin) to registered student.
- Can view Issued book with issued date and expiry date.
- Can view Fine (10 rupees for each day after expiry date).
- Can View students that are registered into system.

Student

- Create account and Login.
- Can view their issued book only with expiry data and fine (if there any otherwise 0).
- Can contact administrator by filling out form in the contact us page.

3.3 Components of administrative model

To ensure better funtioning and smooth running of an organization, these are following components in our project:

- **Planning**: In this project the admin have to create a database such it will store all the information about books in the library and will be plan how to identify book, here we have unique ISBN number for book which allow us to uniquely identify book for storing and issuing.
- **Organization**: In the library management system the decision is taken as to what kind of authority is to be provided for an area of service.

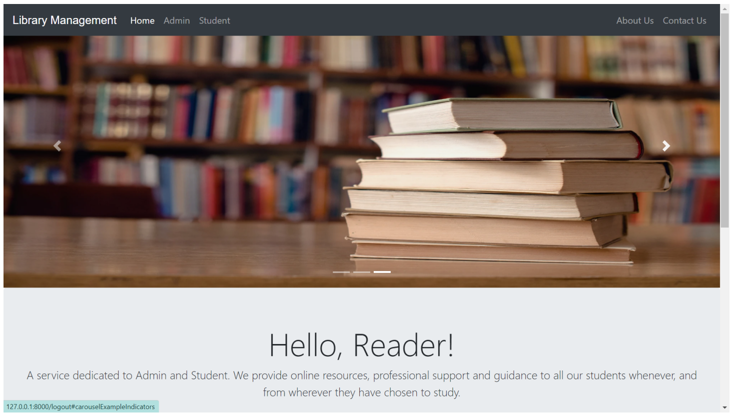
- **Directing**: The efficiency of the staff depends upon the personal qualities of the Chief Librarian. He should be capable of performing his duties as a leader. Besides, possessing knowledge, he should be able to infuse confidence amongst the staff-members. He should prove an ideal leader by din of his hard work, sincerity for the welfare of the staff. Directing includes continuous decision making and translate them in order and instructions.

- **Coordinating**: It is essential to inter-relate various part of an organization in a harmonious way. The co-ordination can be achieved if the head knows about all the jobs and effect such as administrative machinery that he feels practically on necessary to interfere. It depends upon the kind of organization has been brought in to being, as to whether is line type or line and staff type of structure or functional type of organization. There should be delegation of power or proper functioning, but they should be answerable to the chief only.

- **Reporting**: It means keeping the library authorities well informed about the progress or regress of the work. The chief of the library has to submit an annual report to executive authority concerned. This practice keeps the Chief Librarian vigilant about his activities. Various section Heads of the Library may maintain proper records and statistics of the work performed for the purpose.

4 Screenshots

Homepage



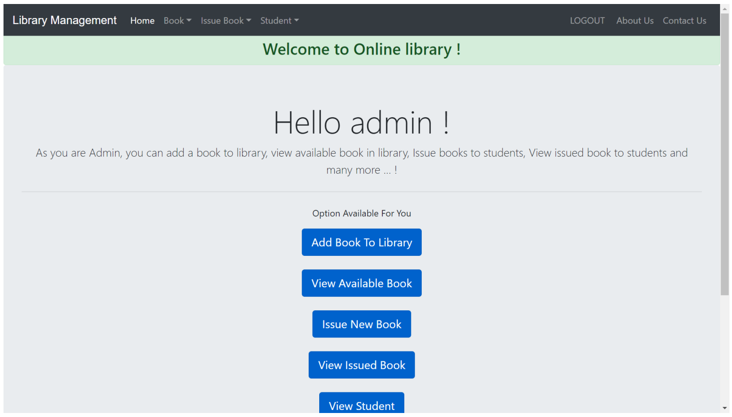
Hello, Reader!

A service dedicated to Admin and Student. We provide online resources, professional support and guidance to all our students whenever, and from wherever they have chosen to study.

127.0.0.1:8000/logout#carouselExampleIndicators

Figure 1: Homepage

Admin Dashboard



Welcome to Online library !

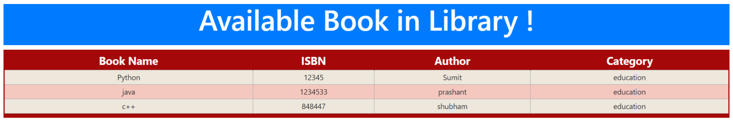
Hello admin !

As you are Admin, you can add a book to library, view available book in library, Issue books to students, View issued book to students and many more ... !

Option Available For You

Figure 2: Admin Homepage

Available Book

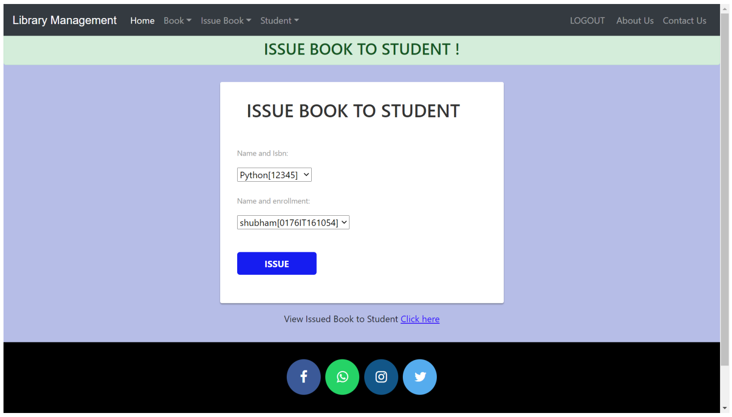


Available Book in Library !

Book Name	ISBN	Author	Category
Python	12345	Sumit	education
java	1234533	prashant	education
c++	848447	shubham	education

Figure 3: Available Book

Issue Book



ISSUE BOOK TO STUDENT !

ISSUE BOOK TO STUDENT

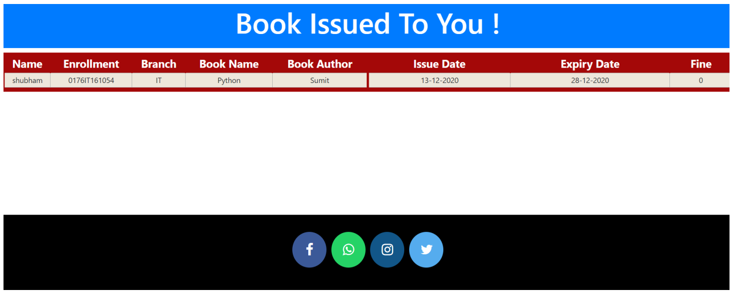
Name and Isbn: Python[12345]

Name and enrollment: shubham[0176IT161054]

View Issued Book to Student Click here

Figure 4: Issue Book

Issued Book



Book Issued To You !

Name	Enrollment	Branch	Book Name	Book Author	Issue Date	Expiry Date	Fine
shubham	0176IT161054	IT	Python	Sumit	13-12-2020	28-12-2020	0

Figure 5: Issued Book

5 Conclusion

The project library management system is for computerizing the working in a library. The software takes care of all the requirements of a library and is capable to provide easy and effective storage of information related to books and users. Library management system follows RBAC policy for authorization which makes sure that roles as assigned properly with the permission and no permissions should overlap.

References

[1] https://www.okta.com/identity-101/what-is-role-based-access-control-rbac/

[2] https://www.myschoolr.com/blog/why-need-a-library-management-system.html

[3] https://pypi.org/project/django-rbac/

[4] https://django-role-permissions.readthedocs.io/en/stable/roles.html

[5] https://en.wikipedia.org/wiki/Role-based$_{a}ccess_{c}ontrol$