

100+ Years of Glorious history inscribed in the
yeomen service to the field of education

Centenary Celebrated Sharnbasveshwar Vidya Vardhak Sangha's

Estd. 2017
ಸ್ಥಾಪನೆ : 2017



Pooja Dr. Sharnbasappa Appaji
Nahatachhi Prathasigadhi
Sharnbasveshwar Sanstha
President, Sharnbasveshwar Vidya Vardhak Sangha
Chancellor, Sharnbasva University



Pooja Maheshi Dr. Subhrajini S. Appa
Chalpersan,
Sharnbasveshwar Vidya Vardhak Sangha
Member of BOD, Sharnbasva University



Pooja Chiranjeevi Daddappa Appa
Mahatachhi 9th Prathasigadhi
Sharnbasveshwar Sanstha, Kalaburagi

ಶರಣಬಸವ
Sharnbasva



ವಿಶ್ವವಿದ್ಯಾಲಯ
University



Pooja Maheshi Godutai Aivaji



Pooja Daddappa Appa
Founder President
Sharnbasveshwar Vidya Vardhak Sangha

Kalaburagi - 585103, Karnataka - India
ಕಲಬುರಗಿ 585 103 ಕರ್ನಾಟಕ - ಭಾರತ

Phone / Fax No. 08472-277852, 277853, 277854, 277855 www.sharnbasvauniversity.edu.in - email : Sharnbasvauniversity@gmail.com

UGC Status: Letter No. F.8-29/2017(CPP-I/PU), Dated 20 Dec. 2017. Enlisted by the University Grants Commission, New Delhi, in the list of Private Universities in India.
A Private University enacted by Govt. of Karnataka as "Sharnbasva University Act. 2012" Karnataka Act No. 17 of 2013. Notification No. ED 144 URC 2016 dated 29/07/2017

A PROJECT REPORT ON

"DIGITAL LIBRARY SYSTEM"

Submitted to
Computer Science and Engineering
Faculty of Engineering and Technology (Co-Education)
In partial fulfillment of the semester project

Submitted By

ABDULLAH OSAID	[SG19CSE001]
BOGAR AKASH	[SG19CSE040]
GIRISH	[SG19CSE053]
BHARATH	[SG19CSE037]

Under the guidance of
PROF. ANIL DANGI

2022-2023

100+ Years of Glorious history inscribed in the
yeomen service to the field of education

Centenary Celebrated Sharnbasveshwar Vidya Vardhak Sangha's

Estd. 2017
ಸ್ಥಾಪನೆ : 2017



Pooja Dr. Sharnbasappa Appaji
Mahatashri Puthalugoddi
Sharnbasveshwar Vardhak Sangha
President, Sharnbasveshwar Vidya Vardhak Sangha
Chancellor, Sharnbasva University



Pooja Mahesh Dr. Dinkalagiri S. Appa
Chargeman,
Sharnbasveshwar Vidya Vardhak Sangha
Member of BGC, Sharnbasva University



Pooja Chiranjeevi Daddappa Appa
Mahatashri 9th Puthalugoddi
Sharnbasveshwar Vardhak Sangha
Member of BGC, Sharnbasva University

ಶರಣಬಸವ
Sharnbasva



ವಿಶ್ವವಿದ್ಯಾಲಯ
University



Pooja Maheshri Godutal Arvaji
Founder President
Sharnbasveshwar Vidya Vardhak Sangha



Pooja Daddappa Appa
Founder President
Sharnbasveshwar Vidya Vardhak Sangha

Kalaburagi - 585103, Karnataka - India
ಕಲಬುರಗಿ 585 103 ಕರ್ನಾಟಕ - ಭಾರತ

Phone / Fax No. 08472-277852, 277853, 277854, 277855 www.sharnbasvauniversity.edu.in - email : Sharnbasvauniversity@gmail.com

UGC Status: Letter No. F.8-29/2017(CPP-I/PU), Dated 20 Dec. 2017. Enlisted by the University Grants Commission, New Delhi, in the list of Private Universities in India.
A Private University enacted by Govt. of Karnataka as "Sharnbasva University Act. 2012" Karnataka Act No. 17 of 2013. Notification No. ED 144 URC 2016 dated 29/07/2017

CERTIFICATE

This is to certify that the project work entitled **"DIGITAL LIBRARY SYSTEM"** is Bonafede work carried out by **ABDULLAH OSAID (SG19CSE001), BOGAR AKASH (SG19CSE040), BHARATH (SG19CSE037) and GIRISH (SG19CSE053)** in partial fulfillment of **B.Tech 8th Semester in Computer Science and Engineering** of the Faculty of Engineering and Technology (Co-Education), **SHARNBASVA UNIVERSITY, Kalaburagi** during the year 2022-2023. It is certified that, she/he has completed the project satisfactorily.

Marks Details

SL. NO	Name of the Student	USN	Maximum Marks	Marks Obtained
1	ABDULLAH OSAID	SG19CSE001		
2	BOGAR AKASH	SG19CSE040		
3	GIRISH	SG19CSE053		
4	BHARATH	SG19CSE037		

Guide

Chairman

Dean

Name of the Examiners

Signature with Date

1.

2.

ACKNOWLEDGEMENT

We express our deep sense of gratitude to our esteemed **“SHARNBASVA UNIVERSITY” KALABURAGI** which has provided us an opportunity to fulfil the most cherished desire to reach our goal.

We also extend our sincere thanks to **Dr. ANILKUMAR BIDVE**, Registrar, Sharnbasva University, for his constant encouragement.

We would like to express our sense of gratitude to our beloved **Dr. SHIVAKUMAR JAWALGI** Dean for providing the right academic climate at this university that has made this entire task appreciable.

We are thankful to **Prof. S.A.MADIVAL** Chairman, department of Computer Science & Engineering, for giving permission to carry out this project in the university.

We wish to place our grateful thanks to our project guide **Prof. ANIL DANGI** without their help and guidance, it would not have been possible to complete this project work.

Finally we express our heartily thanks to all of our staff members of our department, who helped us a lot in the completion of project directly and indirectly within the schedule period.

ABDULLAH OSAID	[SG19CSE001]
BOGAR AKASH	[SG19CSE040]
GIRISH	[SG19CSE053]
BHARATH	[SG19CSE037]

ABSTRACT

The Digital Library System (DLS) is an online platform designed to efficiently manage and facilitate book-related activities in a library. The system offers users a user-friendly interface to browse, search, and borrow books, while also providing administrators with tools to manage the library's inventory and track borrowing records. Users can create accounts, log in, and access personalized services such as tracking borrowed books and receiving notifications for overdue items. The system provides a comprehensive book catalog with detailed information and real-time availability updates. Administrators can add and update books, generate reports, and monitor library performance. The DLS leverages modern technologies for scalability, reliability, and security, making it accessible through web browsers for easy access from any device. It revolutionizes traditional library operations, simplifying book management and enhancing the overall library experience.

CONTENTES

SL.NO	TITLE	PAGE NO
	CHAPTER 1: INTRODUCTION	1-3
1.1	OBJECTIVE AND SCOPE OF THE PROJECT	
1.2	LITERATURE SURVEY	
	CHAPTER 2: SYSTEM ANALYSIS	4-7
2.1	PROBLEM DEFINITION	
2.2	EXISTING SYSTEM	
2.3	PROPOSED SYSTEM	
2.4	FEASIBILITY STUDY	
	CHAPTER 3: SOFTWARE REQUIREMENT SPECIFICATION	5-11
3.1	HARDWARE AND SOFTWARE REQUIREMENTS	
3.2	DESCRIPTION ABOUT THE TOOLS	
	CHAPTER 4: SYSTEM DESIGN	12-19
4.1	CLASS DIAGRAM	
4.2	SEQUENCE DIAGRAM	
4.3	USE CASE DIAGRAM	
4.4	DATA FLOW DIAGRAM	
4.5	ENTITY RELATIONSHIP DIAGRAM	
	CHAPTER 5: SYSTEM IMPLEMENTATION	20-27
5.1	SYSTEM ARCHITECTURE	
5.2	SCREENSHOTS OF THE PROJECT	
	CHAPTER 6: SAMPLE CODE	28-34
	CHAPTER 7: SYSTEM TESTING	35-38
	CHAPTER 8: CONCLUSION	39
	BIBLIOGRAPHY	40

Chapter 1

Introduction

The Digital Library System (DLS) is a modern and innovative solution that aims to transform the way users interact with libraries and access digital resources. Unlike traditional libraries, which rely on physical collections and manual processes, the DLS harnesses the power of technology to streamline library operations and provide a seamless digital experience to users.

At its core, the DLS focuses on two primary aspects: efficient resource management and enhanced user experience. By digitizing library collections and automating key processes, the system simplifies the tasks of librarians and empowers users to explore, borrow, and interact with digital resources in a convenient and intuitive manner.

The DLS employs a robust infrastructure and advanced algorithms to organize and categorize digital resources, such as e-books, research papers, articles, and multimedia content. Librarians can easily upload and catalog these resources, assigning appropriate metadata and tags to ensure accurate indexing and searchability. This systematic organization enables users to quickly locate relevant resources based on various criteria, such as title, author, subject, or keywords.

1.1 Objective and Scope of the Project

The objective of the Digital Library System (DLS) project is to develop a comprehensive and user-friendly web-based platform that simplifies the management of digital resources in a library setting. The project aims to achieve the following goals:

Automation of Library Management: The DLS aims to automate various tasks performed by a library manager, such as book cataloging, record-keeping, and due date management. By implementing an efficient system, the project simplifies the administrative work involved in managing a library.

User Registration and Authentication: The project enables users to register and create personal accounts. Upon registration, users can log in to the system using their credentials, which allows them to access their borrowing history and due dates.

Borrowing Management: The DLS provides functionalities for users to borrow books from the library. Users can search for available books, select the ones they want to borrow, and complete the borrowing process online. The system keeps track of borrowed books and due dates.

Due Date Notifications: The project includes a notification system that sends reminders to users about upcoming due dates. Users will receive timely notifications informing them of the books they need to return, helping them avoid late returns and associated penalties.

Scope:

User Registration and Login: Implement a user registration and login system for users to create accounts and securely access their information.

Book Cataloging and Management: Develop a system for library managers to add and update book records, including details such as title, author, genre, and availability status.

1.2 Literature Survey

Identify Existing Solutions: Explore and examine existing library management systems and digital library platforms to understand their features, functionalities, and technologies employed. This helps in identifying best practices and potential areas for improvement in the DLS project.

Understand User Requirements: Analyze literature to identify common user requirements and expectations from a library management system. This provides insights into user needs, preferences, and challenges faced in existing systems, which can be incorporated into the design and development of the DLS.

Explore Technical Considerations: Investigate the technical aspects of library management systems, including database design, user interfaces, security measures, and integration with external systems. This helps in selecting appropriate technologies and frameworks for the development of the DLS.

Review Research and Innovations: Examine research papers, academic articles, and publications related to library management and digital libraries. This allows for the exploration of emerging trends, innovative approaches, and potential areas of improvement that can be incorporated into the DLS project.

Analyze Success Stories and Case Studies: Study successful implementations of library management systems and digital libraries in real-world scenarios. This helps in understanding the challenges faced during implementation, lessons learned, and strategies for effective system deployment and user adoption.

Chapter 2

System Analysis

2.1 Problem Definition

The problem that the Digital Library System (DLS) project aims to address is the inefficiency and lack of transparency in traditional library management systems. Traditional library systems often involve manual processes, limited access to information, and difficulty in tracking borrowed books and due dates. These challenges can lead to user dissatisfaction, delayed returns, and increased administrative burden.

Users often face difficulties in accessing information about their borrowed books, due dates, and availability. The project intends to provide users with a user-friendly interface where they can easily view their borrowed books, due dates, and receive notifications for upcoming returns.

Library administrators often lack comprehensive tools for managing book inventory, generating reports, and monitoring user activity. The project aims to provide administrators with a dashboard or administrative interface to track book availability, generate reports, and manage user accounts efficiently.

2.1 Existing System

The existing system refers to the current state of library management processes and technologies that are in place before the implementation of the Digital Library System (DLS) project. The existing system may vary depending on the specific library or institution being considered. However, common characteristics of traditional library management systems include:

Manual Book Cataloging: Books are manually cataloged and organized using physical methods such as card catalogs or manual entry into a database. This process can be time-consuming and prone to human errors.

Manual Borrowing and Return Process: Users typically interact with library staff to borrow and return books. Transactions are recorded manually, and due dates may be

tracked using manual methods such as due date stamps on physical books or paper-based borrowing records.

Limited Accessibility: Users may have limited access to their borrowing history, due dates, and availability of books. They often need to visit the library in person to inquire about their borrowing status or check book availability.

Lack of Advanced Search Capabilities: The search functionality in traditional library systems may be limited to basic parameters such as book titles or author names. Advanced search features, such as filtering by genre, keyword search, or sorting options, may be absent or limited.

Manual Record-Keeping: Library staff maintains manual records of book inventory, user borrowing records, and overdue fines. This process can be labor-intensive and susceptible to errors or inconsistencies.

Limited Reporting and Analytics: Generating reports or obtaining insights from library data may require manual compilation and analysis of information. This can be time-consuming and may not provide comprehensive data analysis or visualization capabilities.

2.4 Proposed System

The proposed system, the Digital Library System (DLS), aims to revolutionize library management by introducing a comprehensive and user-friendly digital solution. The key features and improvements of the proposed system include:

Online Book Catalog: The DLS will provide an online catalog of books, allowing users to browse and search for books based on various criteria such as title, author, genre, and keywords. This digital catalog will offer a more efficient and convenient way for users to discover and explore the library's collection.

User Accounts and Borrowing Management: Users will have personalized accounts where they can view their borrowing history, due dates, and receive notifications for upcoming returns. The DLS will automate the borrowing and return process, allowing users to manage their borrowing activities online without the need for manual interactions

with library staff.

Advanced Search Functionality: The proposed system will include advanced search capabilities, enabling users to perform complex searches and refine their results based on specific criteria. This will make it easier for users to find relevant books and enhance their overall search experience.

Automated Record-Keeping: The DLS will automate the record-keeping process, eliminating the need for manual paper-based records. Information such as book inventory, borrowing records, and fines will be stored and managed digitally, ensuring accuracy and ease of access for both users and administrators.

Administrative Tools and Reports: The proposed system will provide administrators with a dedicated dashboard or administrative interface. This interface will enable administrators to manage book inventory, track borrowing activities, generate reports, and monitor user accounts more efficiently. The system will offer comprehensive reporting and analytics capabilities, allowing administrators to gain insights into library usage and make data-driven decisions.

2.3 Feasibility Study

2.3.1 Technical Feasibility:

Technical feasibility study is concerned with specifying equipment and software that will successfully satisfy the user requirement; the technical needs of the system may vary considerably. The facility to produce outputs in a given time. Evaluate the hardware components necessary to support the DLS, such as servers, computers, storage devices, and networking equipment. Ensure that the existing hardware infrastructure can handle the anticipated workload and storage requirements of the system.

2.4.1 Economical Feasibility:

Economical feasibility is the measure to determine the cost and benefit of the proposed system. A project is economical feasible which is under the estimated cost for its

development. These benefits and costs may be tangible or intangible. Determine the initial and ongoing costs associated with the development, implementation, and maintenance of the DLS. This includes costs for hardware and software acquisition, infrastructure setup, licensing fees, development resources, training, and ongoing support and maintenance

2.4.2 Operational Feasibility:

Operation feasibility is used to check whether the project is operationally feasible or not. Our project is mainly different from the other system because of its web-support feature. so the measure for operational feasibility is something different from other system.

Evaluate the willingness and readiness of library staff, administrators, and users to adopt and adapt to the DLS. Assess their comfort level with technology, their ability to learn new systems, and their willingness to embrace changes in workflow and processes.

Chapter 3

Software Requirement Specification

3.1 Hardware and Software Requirements

3.1.1 Hardware

The system requires the following hardware

- RAM : 1 GB (further increase that as per requirement.)
- Hard Disk : 80 GB (further increase that as per requirement.)
- Display : 1024 * 768, True Type Color-32 Bit
- Mouse : Any Normal Mouse.
- Keyboard : Any OS Supported Keyboard.
- Any operating system (Windows, Linux, MAC, etc..).

3.1.2 Software

- Database Server : PHP MyAdmin
- Web Server : XAMPP
- Technologies : P H P , HTML, CSS, JavaScript.
- The operating system should support HTTPS (Hyper Text Transfer Protocol Secured) protocols.

3.2 Description about the tools

FRONT END:

This Web application is developed with HTML, CSS and JavaScript as front end, and the frontend is user friendly and easy to understand for any user.

- **HTML (Hyper Text Markup Language):**

HTML is a markup language used by the browser to manipulate text, images, and other content, in order to display it in the required format. HTML was created by Tim Berners-Lee in 1991.

HTML stands for Hyper Text Markup Language. It is used to design web pages using a markup language. HTML is the combination of Hypertext and Markup language. Hypertext defines the link between the web pages. A markup language is used to define the text document within tag which defines the structure of web pages.

- **CSS (Cascading Style Sheets) :**

CSS (Cascading Style Sheets) is a stylesheet language used to design the webpage to make it attractive. The reason for using this is to simplify the process of making web pages presentable. It allows you to apply styles to web pages. More importantly, it enables you to do this independent of the HTML that makes up each web page.

- **JAVA-SCRIPT :**

JavaScript is the world most popular lightweight, interpreted compiled programming language. It is also known as scripting language for web pages. It is well-known for the development of web pages, many non-browser environments also use it. JavaScript can be used for Client-side developments as well as Server-side developments.

BACK END

- **PHP**
- **MYSQL**

We used Php Program for backend and MySQL do calculation and processing in our web application, and to connect it with database to get data, post data, delete data, and modify data.

PHP (Hypertext Preprocessor)

PHP is an open-source, interpreted, and object-oriented scripting language that can be executed at the server-side. PHP is well suited for web development. Therefore, it is used to develop web applications

MySQL (My Structured Query Language)

- MySQL is a widely used relational database management system (RDBMS).
- MySQL is free and open-source.
- MySQL is ideal for both small and large applications.

Introduction to Bootstrap Framework

1. Bootstrap Framework

- Bootstrap is the most popular HTML, CSS and JavaScript framework for developing a responsive and mobile friendly website.
- It is absolutely free to download and use.
- It is a front-end framework used for easier and faster web development.
- It includes HTML and CSS based design templates for typography, forms, buttons, tables, navigation, modals, image carousels and many others.
- It can also use JavaScript plug-ins.
- It facilitates you to create responsive designs.

2. PHP MY ADMIN (Database)

phpMyAdmin is the most trusted and user-friendly database managers and mostly used for web-based applications or programs. In the following article, we will be learning about the importance of the phpMyAdmin tool in the web world.

- **Web Browser:** You need a web browser interface to run the tool.
- **Apache Web server:** You need a web server to store phpMyAdmin files.
- **MySQL:** You need a database to manage application data.

Chapter 4

System Design

4.1 Class Diagram

Class: Represents a blueprint for creating objects. In a DLS, classes can include entities such as Book, Member, Librarian, Library, etc. Each class is depicted as a rectangle with three compartments: class name, attributes, and methods.

Attributes: Represent the characteristics or properties of a class. For example, the Book class may have attributes like bookID, title, author, publicationDate, etc. Attributes are listed within the class rectangle.

Methods: Represent the operations or behaviors that can be performed on a class. For instance, the Book class may have methods like borrowBook(), returnBook(), checkAvailability(), etc. Methods are also listed within the class rectangle.

Associations: Depict the relationships between classes. Associations represent how classes are connected or interact with each other. For example, there could be an association between the Member class and the Book class, indicating that a member can borrow multiple books.

Multiplicity: Indicates the cardinality of the association, specifying how many instances of one class are related to instances of another class. For instance, a Member can have a multiplicity of "0..*" with Book, meaning that a member can borrow zero or more books.

4.1 Class Diagram

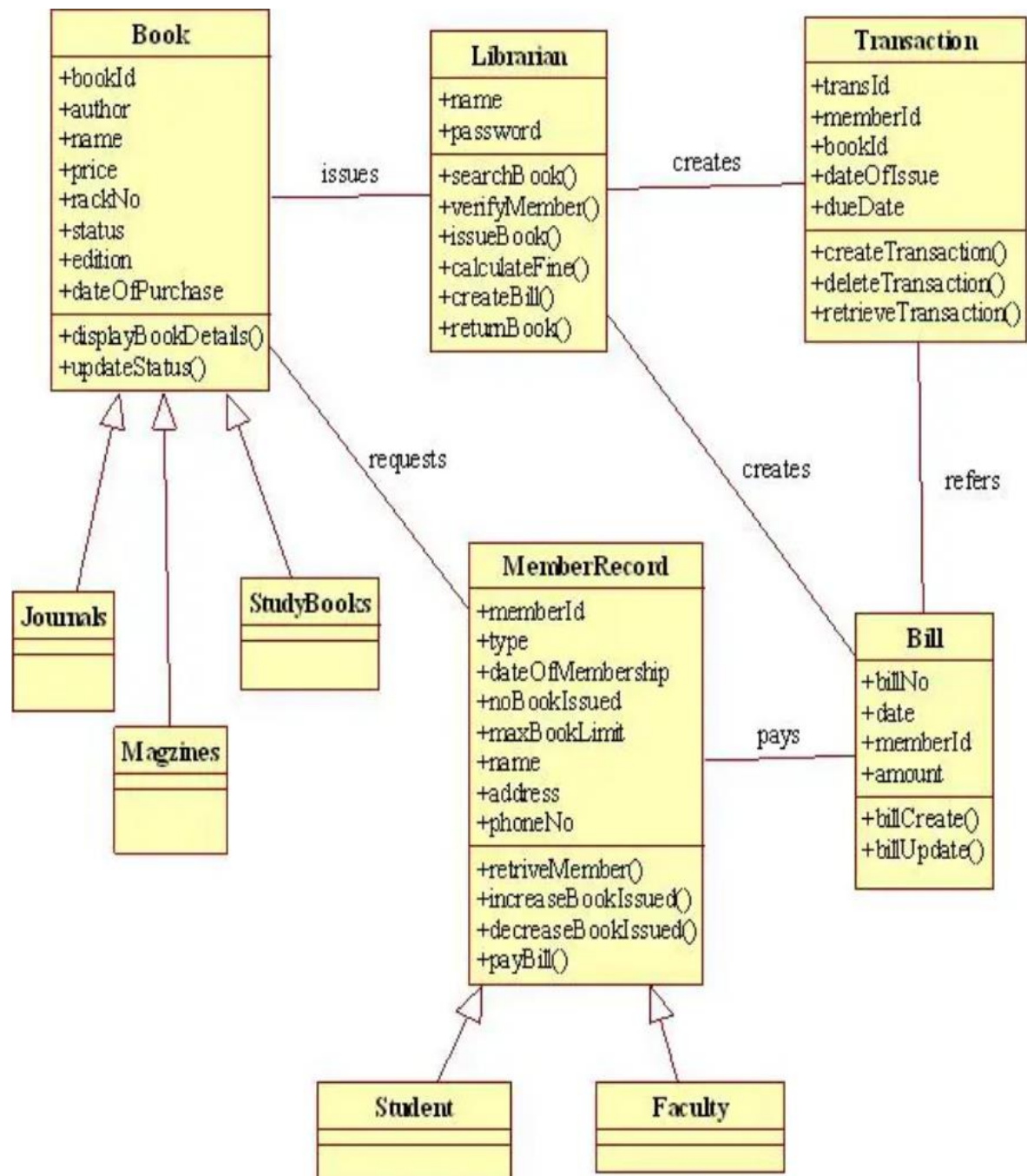


Fig:4.1.1 Class Diagram

4.2 Sequence Diagram

Actor: Represents the user or external system interacting with the DLS. In this case, the actor can be a "User" who wants to borrow a book or check their borrowed books.

Objects: Represent the key components or objects within the DLS. These objects can include "User," "Book," "Library," "Database," etc.

Lifelines: Depict the lifespan of an object during the interaction. Each object participating in the sequence diagram has a lifeline, represented as a vertical line beneath the object's name.

Activation Boxes: Show the period of time during which an object is actively processing a message. When an object is processing a message, an activation box is displayed on its lifeline.

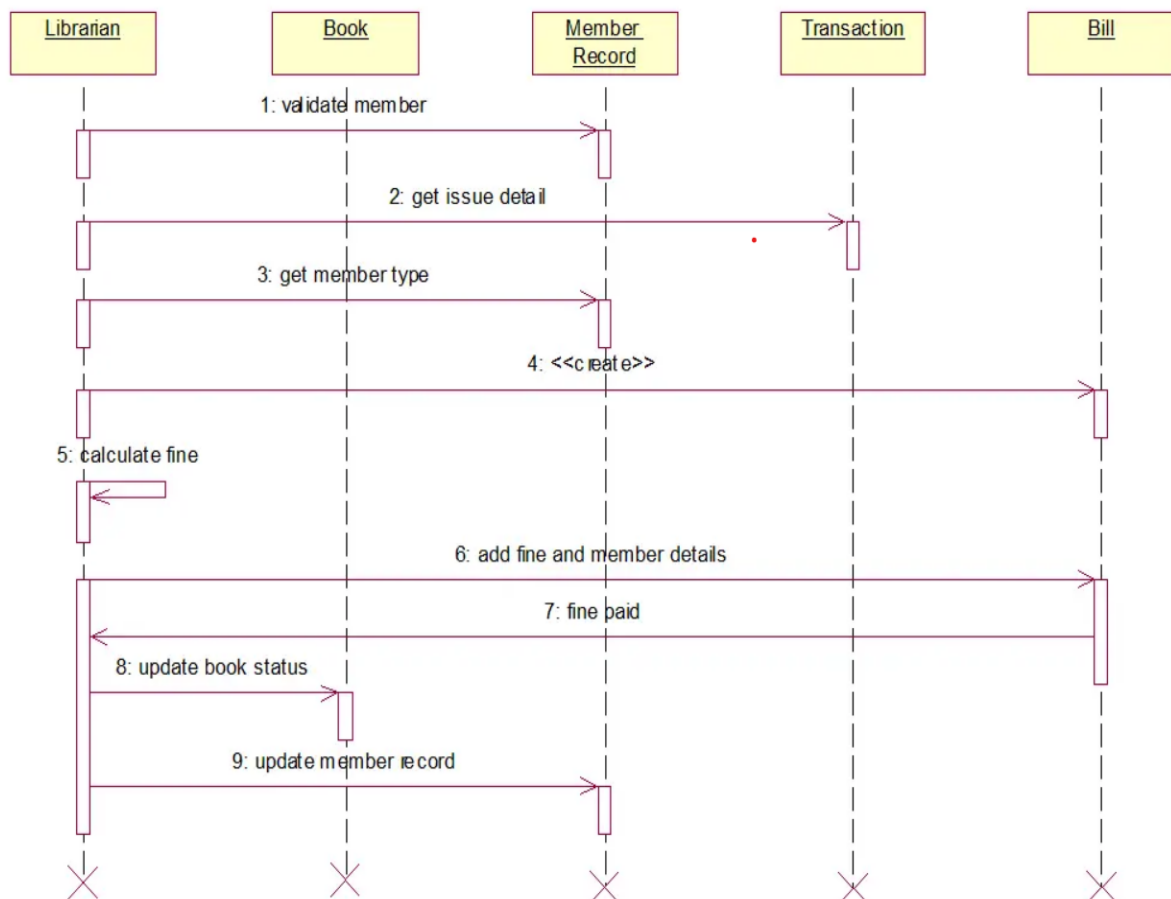


Fig: 4.2.1 Sequence Diagram

4.3 USE CASE DAIGRAM

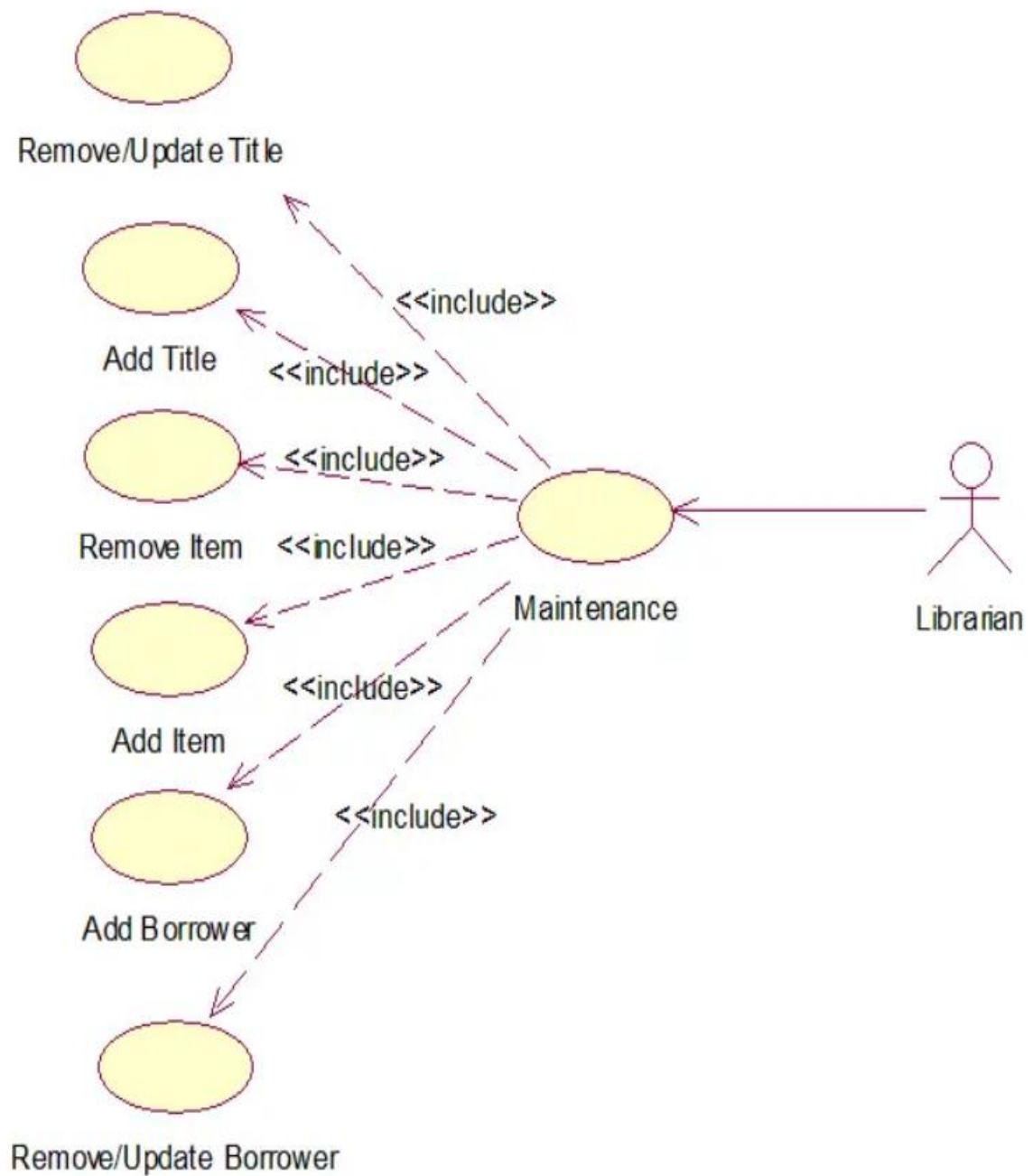
The use case diagram provides an overview of the system's functionality and the interactions between the users and the system. It helps to identify the different actions that users can perform and the roles of various actors in the system. This diagram serves as a communication tool between stakeholders, allowing them to understand the system's features and its alignment with user requirements.

User: Represents the primary actor in the system, which is the library user. The User interacts with the system to perform different actions.

Admin: Represents the secondary actor, which is the system administrator or librarian. The Admin has additional privileges and responsibilities compared to regular users.

Requirements.

- **U User Registration:** The system should allow users to register for an account by providing necessary details such as name, email, and password.
- **User Login:** Registered users should be able to log in to the system using their credentials.
- **Search Books:** Users should be able to search for books based on various criteria such as title, author, or genre.
- **View Book Details:** Users should be able to view detailed information about a selected book, including its title, author, description, and availability.
- **Borrow Book:** Users should be able to borrow books from the library by selecting the desired book and completing the necessary borrowing process.
- **Return Book:** Users should be able to return borrowed books to the library, updating their borrowing records accordingly.

**Fig: 4.3.1 Use Case Diagram**

4.4 Data Flow Diagram:

External Entities: These represent external entities that interact with the system. In the case of DLS, external entities can include users, administrators, and the library database.

Processes: Processes in the DFD represent the activities or transformations that occur within the system. In DLS, processes can include user registration, book search, book borrowing, book return, and report generation.

Data Flows: Data flows represent the movement of data between external entities, processes, and data stores. In DLS, data flows can include user information, book details, borrowing requests, return requests, and generated reports.

Data Stores: Data stores represent the storage or repositories of data within the system. In DLS, the data store can be the library database where information about users, books, and borrowing records are stored.

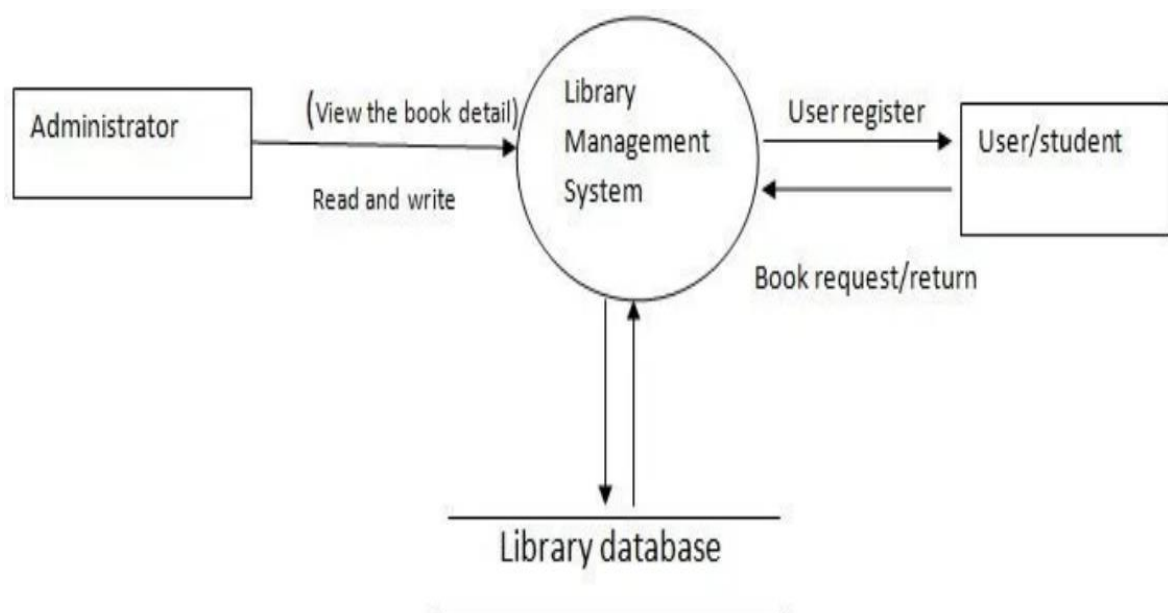


Fig: 4.4.1 Data flow diagram

Entity Relationship daigram

Attributes in ER diagrams are usually modelled as an oval with the name of the attribute, linked to the entity or relationship that contains the attribute. Within the relational model the final step can generally be broken down into two further steps that of determining the grouping of information within the system, Generally determining what are the basic objects about which information is being stored, and then determining the relationships between these groups of information, or objects. This step is not necessary with an Object database.

- **Entity:** A data entity is anything real or abstract about which we want to store data.
- **Relationship:** A data relationship is a natural association that exists between one or more entities. Cardinality defines the number of occurrences of one entity for a single occurrence of the related entity.
- **Attribute:** A data attribute is a characteristic common to all or most instances of a particular entity. An attribute or combination of attributes that uniquely identifies one and only instance of an entity is called a primary key.
- **Degree of Relationship:** Is the number of entities associated with the relationship.
- **Connectivity and Cardinality:** The connectivity of relationship describes the mapping of associated entity instances in the relationship.
- **Entities:** Entities represent the major objects or concepts within the system. In DLS, entities can include User, Book, Author, and Borrowing.
- **Relationships:** Relationships define the associations between entities. In DLS, relationships can include "Borrowed by" between User and Book, "Written by" between Author and Book, and "Has" between User and Borrowing.
- **Attributes:** Attributes are the properties or characteristics of entities. In DLS, attributes can include User ID, Name, Email, and Password for the User entity, Book ID, Title, Description, and Availability for the Book entity, and Author ID and Name for the Author entity.

- **Cardinality and Modality:** Cardinality represents the number of instances of one entity that can be associated with another entity in a relationship. Modality represents whether the participation in a relationship is mandatory (denoted by a solid line) or optional (denoted by a dashed line). For example, a User can borrow multiple Books, and a Book can be borrowed by multiple Users, indicating a many-to-many relationship with a cardinality of "many" on both sides.

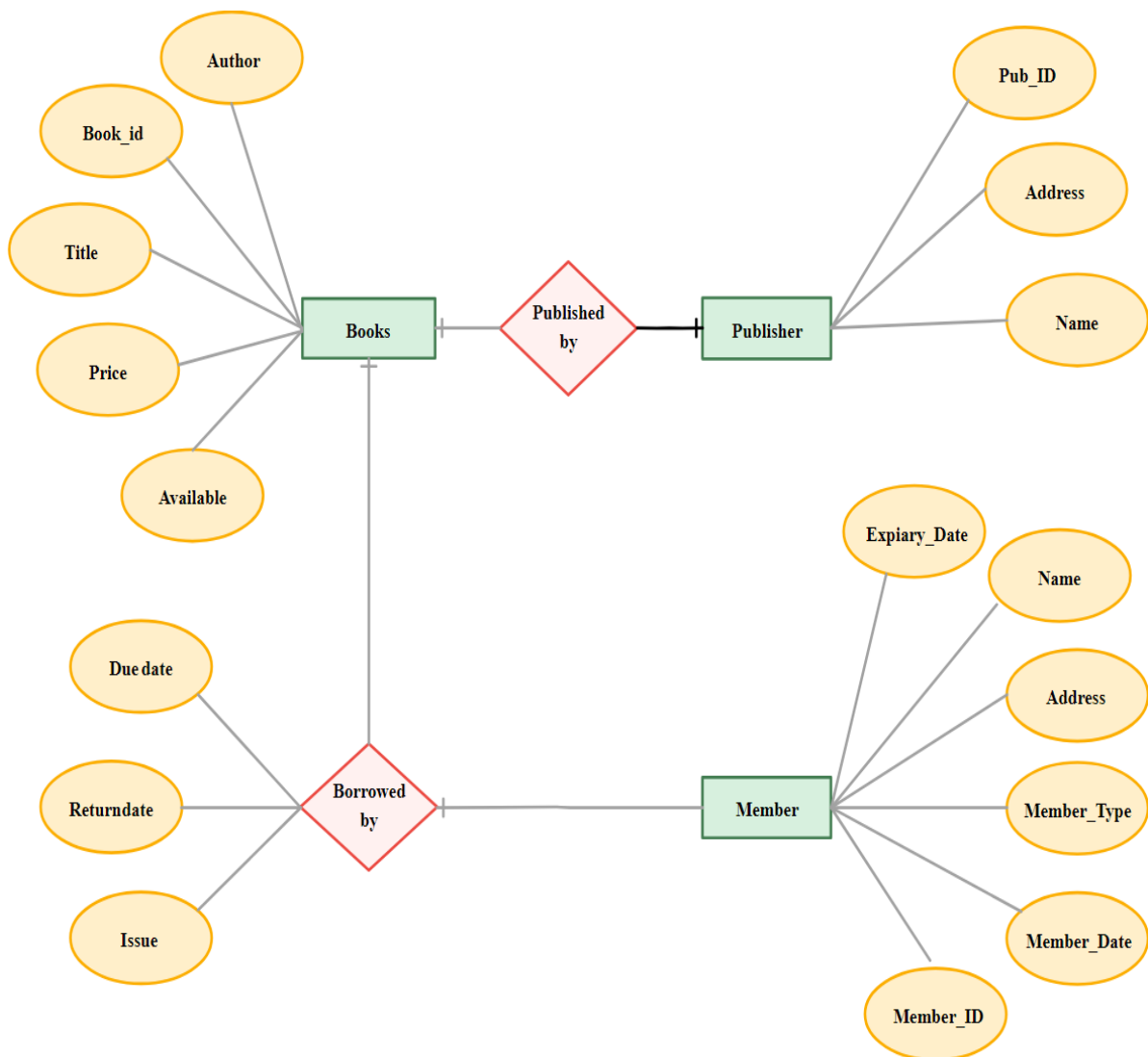


Fig: 4.4.2 Entity Relationship Diagram

Chapter 5

System Implementation

5.1 System Architecture

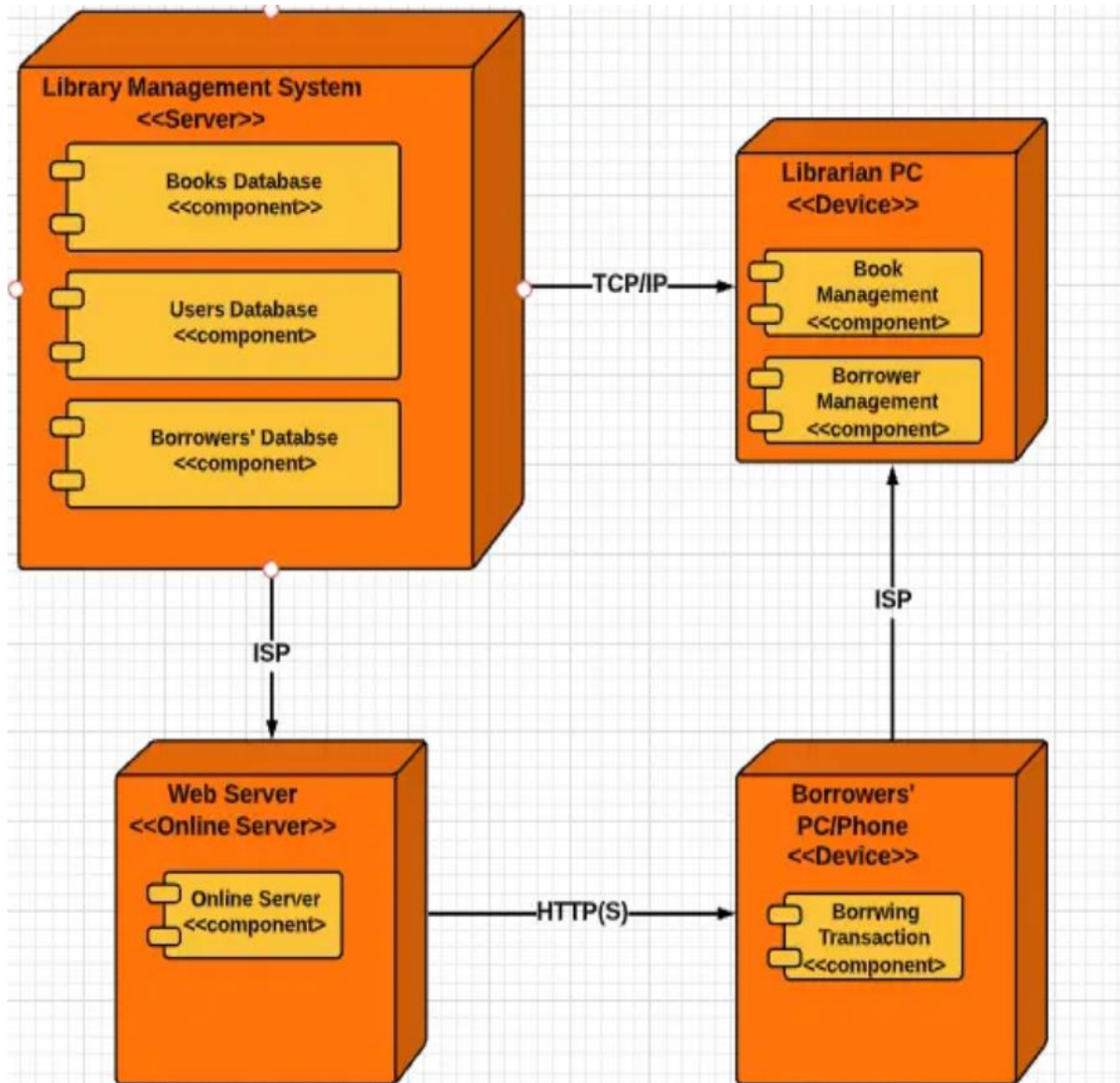


Fig:5.1.1: System Architecture

5.2 SCREEN SHOTS OF THE PROJECT:

Home page

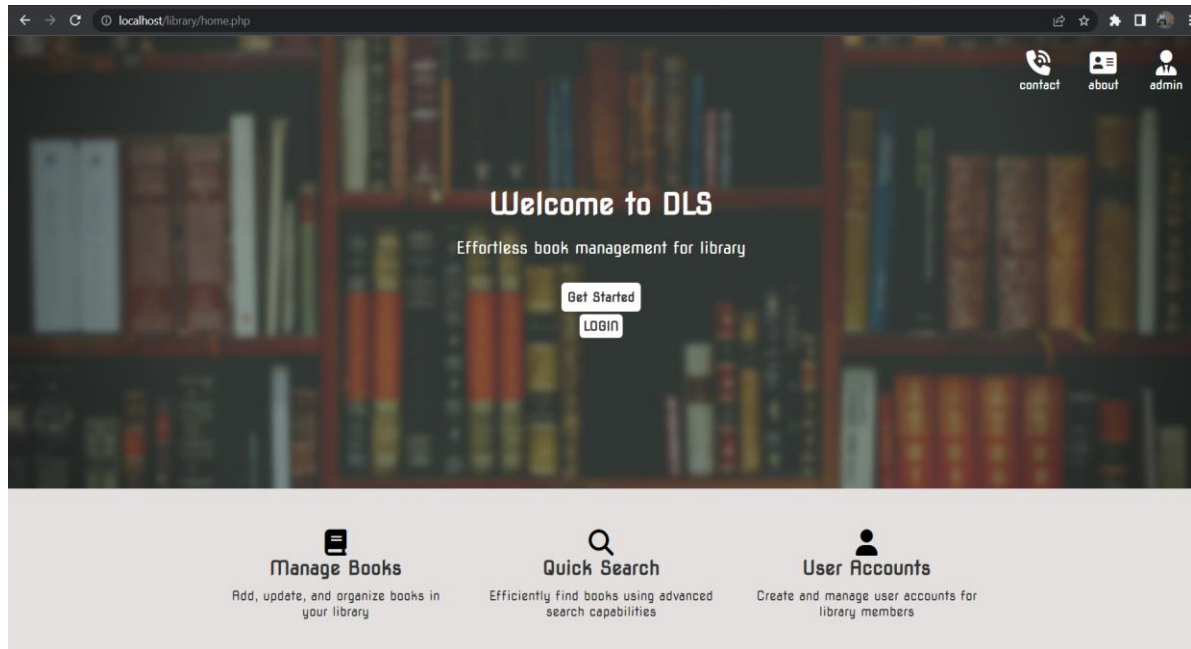


Fig:5.2.1: Home Page

Login Page

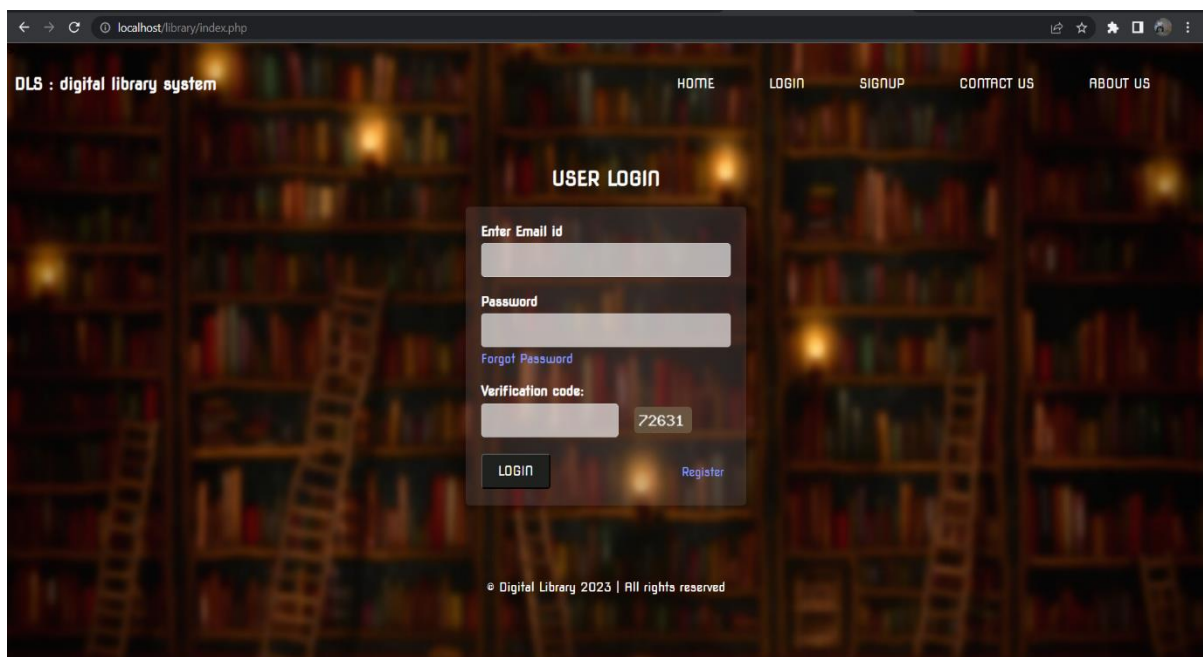
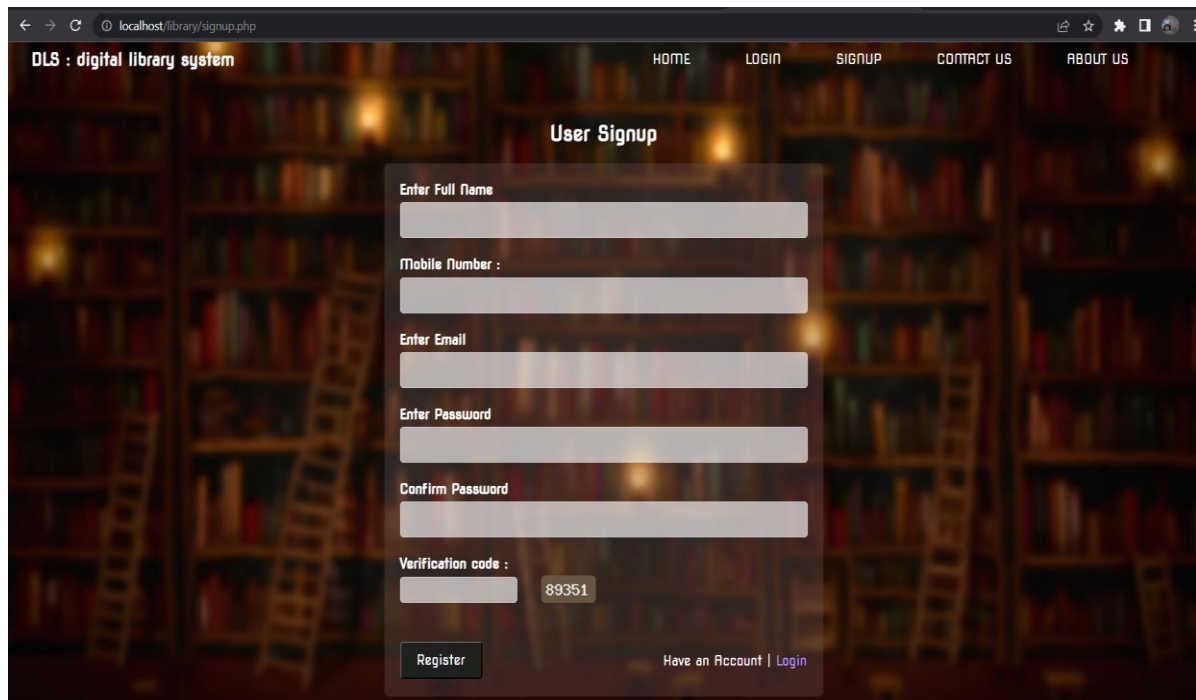


Fig:5.2.2: User Login

Sign Up Page



The screenshot shows the 'User Signup' page of the 'DLS: digital library system'. The page has a dark background with a blurred image of bookshelves. A central white form contains the following fields: 'Enter Full Name', 'Mobile Number:', 'Enter Email', 'Enter Password', 'Confirm Password', and 'Verification code:'. The verification code '89351' is displayed in a small box. Below the form is a 'Register' button and a link 'Have an Account | Login'. The top navigation bar includes 'HOME', 'LOGIN', 'SIGNUP', 'CONTACT US', and 'ABOUT US'.

Fig:5.2.3: User Sign Up

User Dashboard

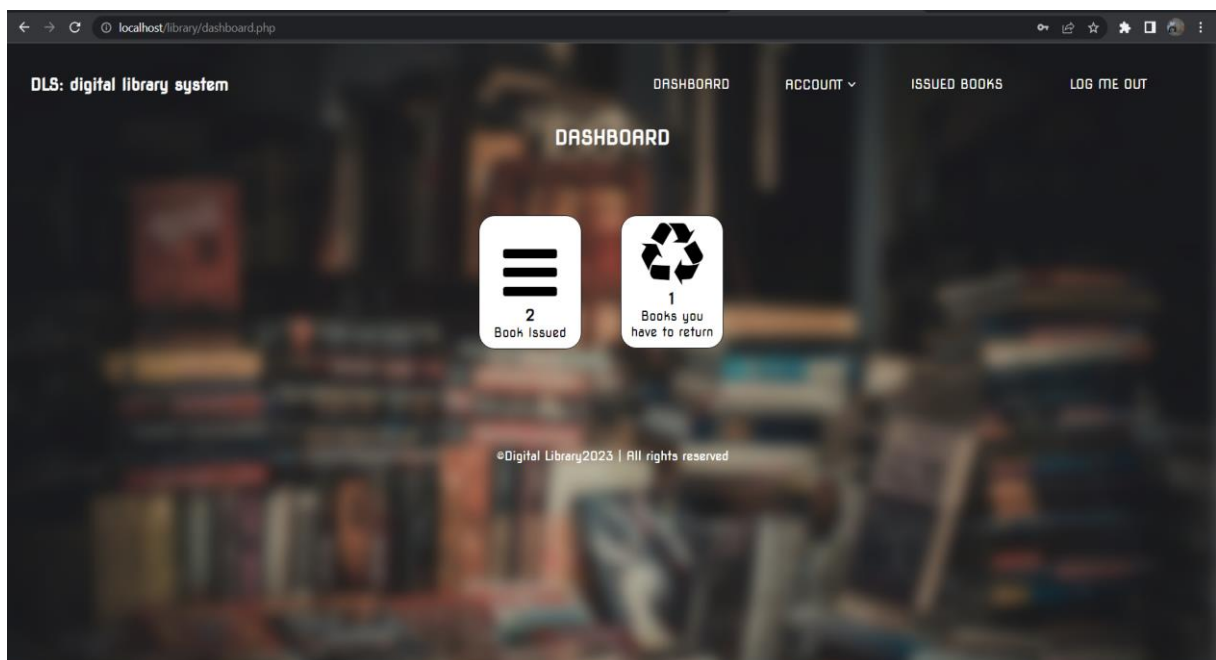


Fig:5.2.4: User Dashboard

Borrowed Books Data

#	Book Name	ISBN	Issued Date	Return Date	Fine in(INR)
1	PHP And MySQL programming	222333	2023-06-25 11:52:47	Not Return Yet	
2	physics	1111	2023-06-15 23:01:00	2023-06-17 15:20:43	20

Showing 1 to 2 of 2 entries

Previous 1 Next

Fig:5.2.5: Borrowed Books Data

User Profile

PROFILE

Student ID :
9

Reg Date :
2023-06-14 00:40:04

Last Updation Date :
2023-06-14 19:40:36

Profile Status :
Active

Enter Full Name
Girish Patil

Mobile Number :
9845852810

Enter Email
gmp.kerur@gmail.com

Update Now

Fig:5.2.6: User Profile

Admin Login

DLS : digital library system

HOME LOGIN SIGNUP CONTACT US ABOUT US

ADMIN LOGIN FORM

Enter Username

Password

Verification code : 87836

LOGIN

© Digital Library 2023 | All rights reserved

Fig:5.2.7: Admin Login

Admin Dashboard

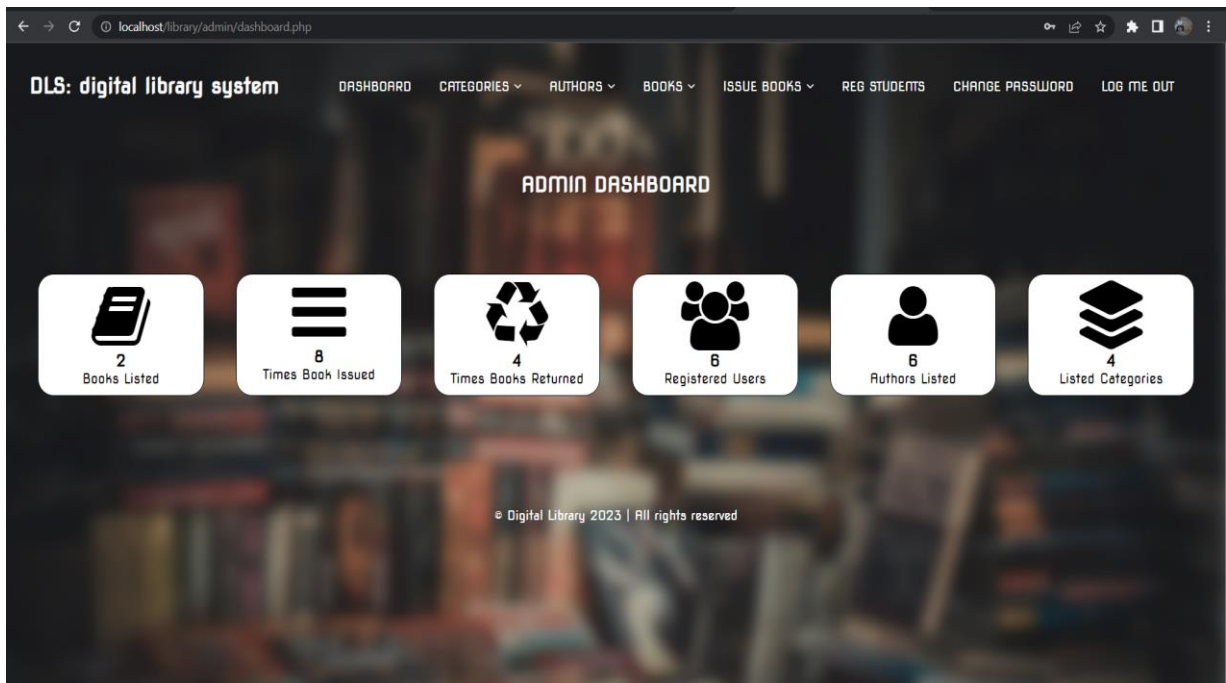
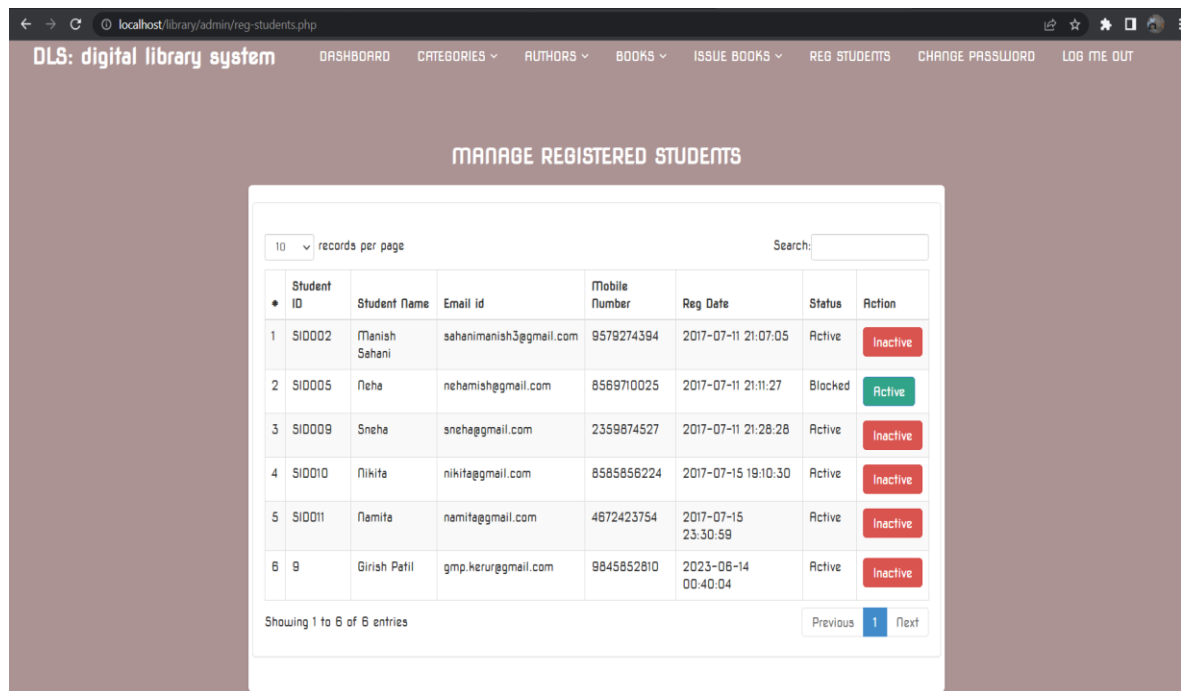


Fig:5.2.8: Admin Dashboard

Registered Students



DLS: digital library system DASHBOARD CATEGORIES ▾ AUTHORS ▾ BOOKS ▾ ISSUE BOOKS ▾ REG STUDENTS CHANGE PASSWORD LOG ME OUT

MANAGE REGISTERED STUDENTS

10 records per page Search:

Student ID	Student Name	Email id	Mobile Number	Reg Date	Status	Action
1 SI0002	Manish Sahani	sehanimanish3@gmail.com	9579274394	2017-07-11 21:07:05	Active	Inactive
2 SI0005	Neha	nehamish@gmail.com	8569710025	2017-07-11 21:11:27	Blocked	Active
3 SI0009	Sneha	snehag@gmail.com	2359874527	2017-07-11 21:28:28	Active	Inactive
4 SI0010	Nikita	nikitag@gmail.com	8585858224	2017-07-15 19:10:30	Active	Inactive
5 SI0011	Namita	namitag@gmail.com	4672423754	2017-07-15 23:30:59	Active	Inactive
6 9	Girish Patil	gmp.kerurg@gmail.com	9845852810	2023-06-14 00:40:04	Active	Inactive

Showing 1 to 6 of 6 entries Previous 1 Next

Fig:5.2.9: Registered Students

Database Page

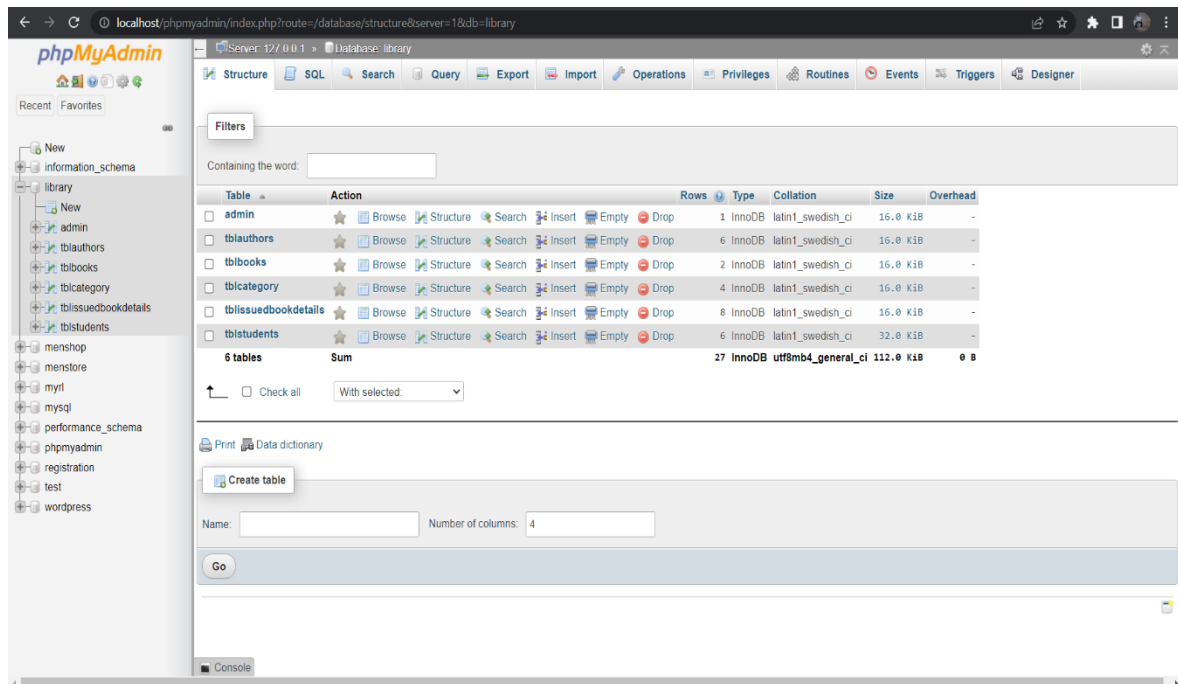


Fig:5.2.10: Database & Tables

Table Authors

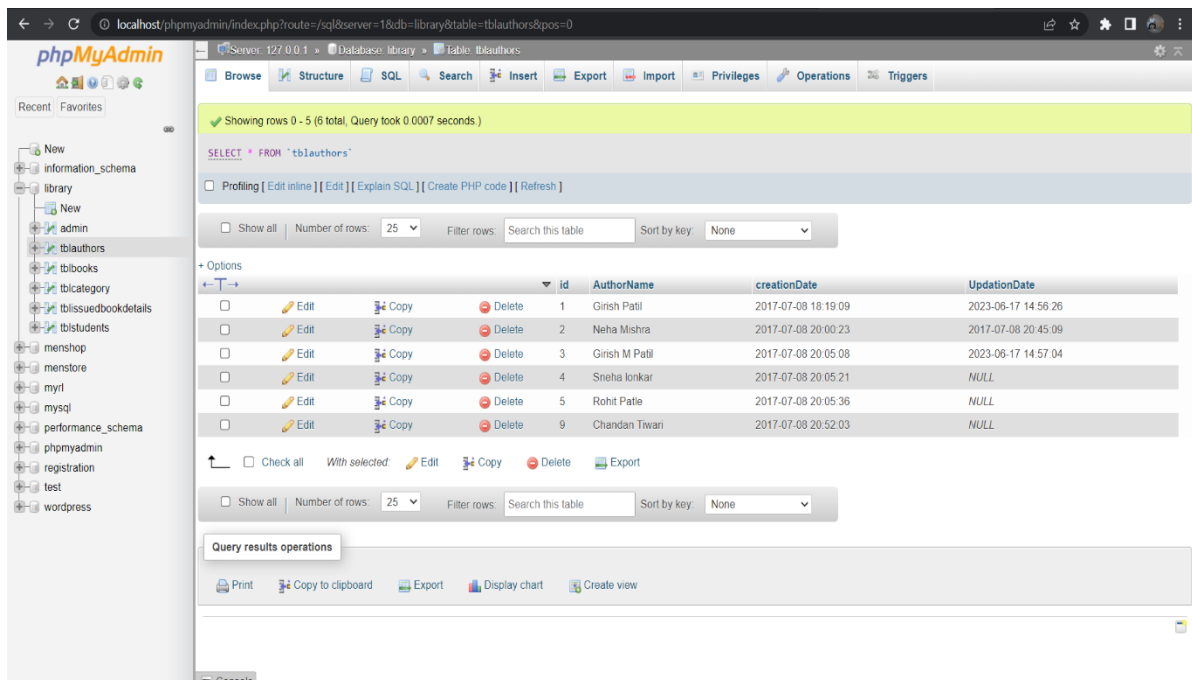


Fig:5.2.11: Authors Table

Table Registered Students

The screenshot shows the phpMyAdmin interface for the 'tblstudents' table. The table structure is as follows:

id	Studentid	FullName	Emailid	MobileNumber	Password	Status	RegDate	UpdateDate
1	SID002	Manish Sahani	sahanimanish3@gmail.com	9579274394	f925916e2754e5e03f75dd58a5733251	1	2017-07-11 21:07:05	2017-07-15 23:56:21
4	SID005	Neha	nehamish@gmail.com	8569710025	92228410fc8b872914e023160c44ae8f	0	2017-07-11 21:11:27	2023-06-17 14:41:41
8	SID009	Sneha	sneha@gmail.com	2359874527	f925916e2754e5e03f75dd58a5733251	1	2017-07-11 21:28:28	2017-07-15 19:12:44
9	SID010	Nikita	nikita@gmail.com	8585856224	f925916e2754e5e03f75dd58a5733251	1	2017-07-15 19:10:30	NULL
10	SID011	Namita	namita@gmail.com	4672423754	f925916e2754e5e03f75dd58a5733251	1	2017-07-15 23:30:59	NULL
11	9	Garish Patil	gmp.kerun@gmail.com	9845852810	e10adc3949ba59abbe56e05720f883e	1	2023-06-14 00:40:04	2023-06-14 19:40:36

Fig:5.2.12: Registered Student Table

Table Issued Books

The screenshot shows the phpMyAdmin interface for the 'tblissuedbookdetails' table. The table structure is as follows:

id	Bookid	StudentID	IssuesDate	ReturnDate	RetrunStatus	fine
1	1	SID002	2017-07-15 11:39:47	2017-07-15 16:45:20	1	0
2	1	SID002	2017-07-15 11:42:27	2017-07-15 16:45:23	1	5
3	3	SID002	2017-07-15 11:43:40	NULL	0	NULL
4	3	SID002	2017-07-15 11:53:23	2017-07-15 16:52:29	1	2
5	1	SID009	2017-07-15 16:29:26	NULL	0	NULL
6	3	SID011	2017-07-15 23:32:55	NULL	0	NULL
7	3	9	2023-06-15 23:01:00	2023-06-17 15:20:43	1	20
8	1	9	2023-06-25 11:52:47	NULL	0	NULL

Fig:5.2.13: Issued Books Table

Chapter 6

Sample code

Home.php

```
<!DOCTYPE html>
<html lang="en">

<head>
  <meta charset="UTF-8">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <title>Digital Library System</title>
  <link rel="stylesheet" href="assets/css/home.css">
  <link rel="icon" type="image/png" href="assets/img/icon.png">
  <link href="https://fonts.googleapis.com/css?family=Nova Square" rel="stylesheet">
  <script src="https://kit.fontawesome.com/2f4be6bad1.js" crossorigin="anonymous"></script>
</head>
</head>

<body>
  <header class="hero-section">
    <div class="hero-content">
      <a href="contactus.php" class="contact-icon"><i class="fa-sharp fa-solid fa-phone-volume"></i></a>
      <span class="contact">contact</span>
      <a href="aboutus.php" class="about-icon"><i class="fa-solid fa-address-card "></i></a>
      <span class="about">about</span>
      <a href="adminlogin.php" class="admin-icon"><i class="fa-solid fa-user-tie "></i></a>
      <span class="admin">admin</span>
      <h1>Welcome to DLS</h1>
      <p>Effortless book management for library</p>
      <a href="signup.php" class="cta-button">Get Started</a>
      <div style="margin-top: 3px;"><a href="index.php" class="login-button">LOGIN</a></div>
    </div>
  </header>

  <section class="features-section">
    <div class="feature">
      <i class="fa-solid fa-book fa-2x"></i>
      <h2>Manage Books</h2>
      <p>Add, update, and organize books in your library</p>
    </div>
    <div class="feature">
      <i class="fas fa-search fa-2x"></i>
      <h2>Quick Search</h2>
      <p>Efficiently find books using advanced search capabilities</p>
    </div>
    <div class="feature">
```

```
<i class="fas fa-user fa-2x"></i>
<h2>User Accounts</h2>
<p>Create and manage user accounts for library members</p>
</div>
</section>

<section class="latest-updates-section">
  <h2>Latest Updates</h2>
  <div class="latest-updates-container">
    <div class="latest-updates-container">
      <div class="latest-update">
        <h3>New Feature: Online Book Reservations</h3>
        <p>We are excited to announce the launch of our new online book reservation system.
Now, library members can easily reserve books through our website or mobile app.</p>
      </div>
      <div class="latest-update">
        <h3>Library Closure Notice</h3>
        <p>Please note that the library will be closed for maintenance from June 20th to June
25th. We apologize for any inconvenience caused.</p>
      </div>
    </div>
  </div>
</section>

<section class="new-arrivals-section">
  <h2>New Arrivals</h2>
  <div class="new-arrivals-container">
    <div class="new-arrival">
      <h3>Big Data For Beginners</h3>
      <p>by Vince Reynolds</p>
    </div>
    <div class="new-arrival">
      <h3>Introduction to Machine Learning with Python</h3>
      <p>by Andreas C. Müller, Sarah Guido</p>
    </div>
  </div>
</section>

<?php include('includes/footer.php'); ?>
</body>

</html>
```

Home.css

```
* {
  font-family: "Nova Square", sans-serif;
  box-sizing: border-box;
  margin: 0;
  padding: 0;
}
```

```
/* Hero section styles */
```

```
.hero-section {  
  background-image: url('../img/hero.png');  
  background-size: cover;  
  background-position: center;  
  height: 550px;  
  display: flex;  
  align-items: center;  
  justify-content: center;  
  text-align: center;  
  color: #fff;  
}
```

```
.hero-content {  
  max-width: 800px;  
  margin: 0 auto;  
}
```

```
.admin-icon {  
  position: absolute;  
  top: 15px;  
  right: 23px;  
  color: #fff;  
  font-size: 30px;  
  text-decoration: none;  
}
```

```
.about-icon {  
  position: absolute;  
  top: 15px;  
  right: 100px;  
  color: #fff;  
  font-size: 30px;  
  text-decoration: none;  
}
```

```
.contact-icon {  
  position: absolute;  
  top: 15px;  
  right: 185px;  
  color: #fff;  
  font-size: 30px;  
  text-decoration: none;  
}
```

```
.admin {  
  position: absolute;  
  top: 50px;
```

```
right: 15px;
color: #fff;
font-size: 15px;
text-decoration: none;
}

.about {
  position: absolute;
  top: 50px;
  right: 97px;
  color: #fff;
  font-size: 15px;
  text-decoration: none;
}

.contact {
  position: absolute;
  top: 50px;
  right: 172px;
  color: #fff;
  font-size: 15px;
  text-decoration: none;
}

h1 {
  font-size: 36px;
  margin-bottom: 20px;
  color: #fff;
}

p {
  font-size: 20px;
  margin-bottom: 30px;
  color: #fff;
}

.cta-button {
  display: inline-block;
  padding: 8px;
  background-color: #fff;
  color: #333;
  text-decoration: none;
  font-weight: bold;
  border-radius: 5px;
  transition: background-color 0.3s ease;
}

.cta-button:hover {
  background-color: #8562629c;
}
```

```
.login-button {  
  display: inline-block;  
  padding: 5px;  
  background-color: #fff;  
  color: #333;  
  text-decoration: none;  
  font-weight: bold;  
  border-radius: 5px;  
  transition: background-color 0.3s ease;  
}
```

```
.login-button:hover {  
  background-color: #8562629c;  
}
```

```
/* Features section styles */
```

```
.features-section {  
  background-color: #beb8b86e;  
  padding: 50px 0;  
  display: flex;  
  justify-content: center;  
}
```

```
.feature {  
  text-align: center;  
  max-width: 300px;  
  margin: 0 20px;  
}
```

```
.feature img {  
  width: 100px;  
  margin-bottom: 20px;  
}
```

```
.feature h2 {  
  font-size: 24px;  
  margin-bottom: 10px;  
  color: #333;  
}
```

```
.feature p {  
  font-size: 16px;  
  color: #333;  
}
```

```
/* new arrival and telest updates*/
```

```
.latest-updates-section {
```

```
padding: 50px 0;
background-color: #c1c1c1de;
}
```

```
.latest-updates-section h2 {
  text-align: center;
  font-size: 24px;
  margin-bottom: 20px;
}
```

```
.latest-updates-container {
  display: flex;
  justify-content: center;
}
```

```
.latest-update {
  text-align: center;
  max-width: 300px;
  margin: 0 20px;
}
```

```
.latest-update h3 {
  font-size: 20px;
  margin-bottom: 10px;
  color: #333;
}
```

```
.latest-update p {
  font-size: 16px;
  color: #333;
}
```

```
.new-arrivals-section {
  padding: 50px 0;
  background-color: #b3afacde;
}
```

```
.new-arrivals-section h2 {
  text-align: center;
  font-size: 24px;
  margin-bottom: 20px;
}
```

```
.new-arrivals-container {
  display: flex;
  justify-content: center;
}
```

```
.new-arrival {
  text-align: center;
  max-width: 300px;
}
```

```
margin: 0 20px;
}

.new-arrival h3 {
  font-size: 20px;
  margin-bottom: 10px;
  color: #333;
}

.new-arrival p {
  font-size: 16px;
  color: #333;
}

/* Footer styles */

.footer-section {
  padding: 7px;
  color: #000;
  font-size: 15px;
  text-align: center;
  background-color: #a49f9f;
}

.footer-section a {
  text-decoration: none;
  color: #000;
}

.footer-section a:hover {
  color: #ffffffed;
}

.social-icons a {
  margin-left: 10px;
}

.social-icons img {
  width: 20px;
}
```

Chapter 7

System Testing

Introduction:

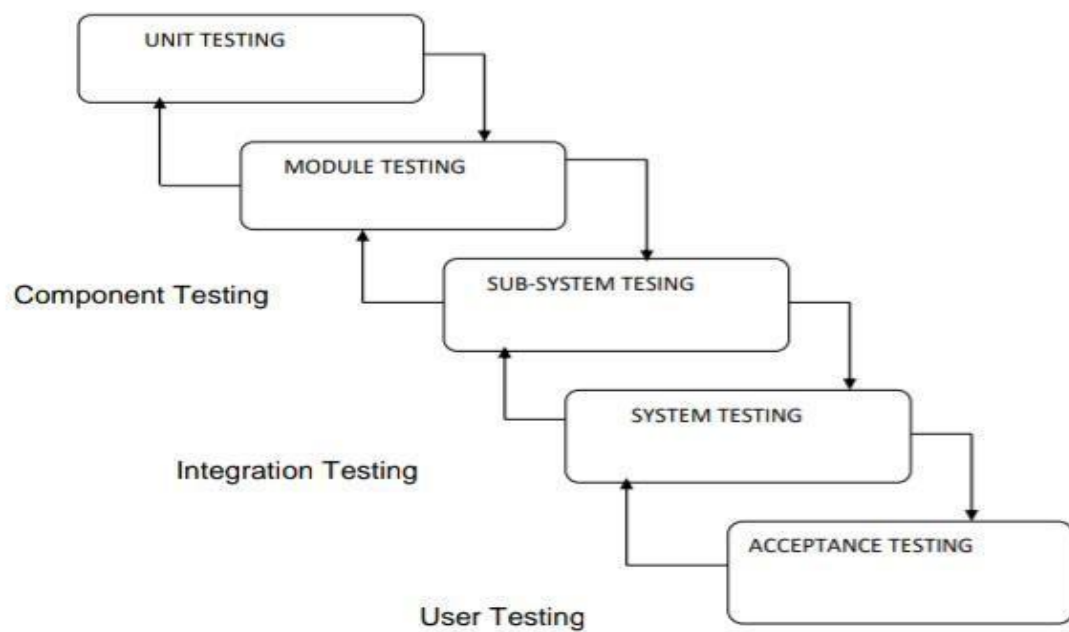
Software testing is a critical element of software quality assurance and represents the ultimate review of specification, design and coding. In fact, testing is the one step in the software engineering process that could be viewed as destructive rather than constructive.

A strategy for software testing integrates software test case design methods into a well-planned series of steps that result in the successful construction of software. Testing is the set of activities that can be planned in advance and conducted systematically. The underlying motivation of program testing is to affirm software quality with methods that can economically and effectively apply to both strategic to both large and small-scale systems.

STRATEGIC APPROACH TO SOFTWARE TESTING

The software engineering process can be viewed as a spiral. Initially system engineering defines the role of software and leads to software requirement analysis where the information domain, functions, behavior, performance, constraints and validation criteria for software are established. Moving inward along the spiral, we come to design and finally to coding. To develop computer software we spiral in along streamlines that decrease the level of abstraction on each turn.

A strategy for software testing may also be viewed in the context of the spiral. Unit testing begins at the vertex of the spiral and concentrates on each unit of the software as implemented in source code. Testing progress by moving outward along the spiral to integration testing, where the focus is on the design and the construction of the software architecture. Talking another turn on outward on the spiral we encounter validation testing where requirements established as part of software requirements analysis are validated against the software that has been constructed. Finally we arrive at system testing, where the software and other system elements are tested as a whole.



UNIT TESTING

Unit testing focuses verification effort on the smallest unit of software design, the module. The unit testing we have is white box oriented and some modules the steps are conducted in parallel.

1. WHITE BOX TESTING

This type of testing ensures that

- All independent paths have been exercised at least once
- All logical decisions have been exercised on their true and false sides
- All loops are executed at their boundaries and within their operational bounds
- All internal data structures have been exercised to assure their validity.

To follow the concept of white box testing we have tested each form. we have created independently to verify that Data flow is correct, All conditions are exercised to check their validity, All loops are executed on their boundaries.

2. BASIC PATH TESTING

Established technique of flow graph with Cyclomatic complexity was used to derive testcases for all the functions. The main steps in deriving test cases were:

Use the design of the code and draw correspondent flow graph.

Determine the Cyclomatic complexity of resultant flow graph, using formula: $V(G)=E-N+2$ or $V(G)=P+1$ or

$V(G) = \text{Number Of Regions}$

Where $V(G)$ is Cyclomatic complexity, E is the number of edges,

N is the number of flow graph nodes, P is the number of predicate no

3. CONDITIONAL TESTING

In this part of the testing each of the conditions were tested to both true and false aspects. And all the resulting paths were tested. So that each path that may be generate on particular condition is traced to uncover any possible errors.

1. DATA FLOW TESTING

This type of testing selects the path of the program according to the location of definition and use of variables. This kind of testing was used only when some local variable were declared. The *definition-use chain* method was used in this type of testing. These were particularly useful in nested statements.

2. LOOP TESTING

In this type of testing all the loops are tested to all the limits possible. The following exercise was adopted for all loops:

- All the loops were tested at their limits, just above them and just below them.
- All the loops were skipped at least once.
- For nested loops test the inner most loop first and then work outwards.
- For concatenated loops the values of dependent loops were set with the help of connected loop.

- **Test Cases and Result:**

MODULE	TEST CASE	EXPECTE DRESULT	OBSERVED RESULT
DLS	New candidate tries to login	Username does not exist	PASS
DLS	Provides wrongpassword	Username/password does not exist	PASS
DLS	Provides invalid username	Username/password does not exist	PASS
DLS	Registers to the portal	Registration Successful	PASS
DLS	Registers with existing credential	User /email already exists	PASS
DLS	Click login	User Homepage with all books he borrowed and returned	PASS

Chapter 8

Conclusion

the Digital Library System (DLS) is a comprehensive solution that aims to automate and streamline library management processes. The system provides a user-friendly interface for both library staff and members, enabling efficient book management, user account management, and borrowing operations. By leveraging technology and automation, DLS eliminates manual paperwork, reduces administrative overhead, and enhances the overall user experience.

Throughout the development of the DLS, various aspects were considered, such as the functional requirements, usability, security, and performance. The system offers features like book search, reservation, due date tracking, and notifications to ensure a seamless borrowing experience for library members. It also facilitates efficient book inventory management, enabling library staff to track available books, monitor borrowing patterns, and generate reports for informed decision-making.

The implementation of the DLS brings numerous benefits to both the library and its members. Library staff can streamline their operations, improve resource utilization, and deliver enhanced services to library members. Users, on the other hand, can conveniently browse the book collection, check availability, and manage their borrowed items. By offering a digital platform, the DLS extends the reach of the library beyond physical boundaries, allowing users to access library services anytime, anywhere.

In conclusion, the Digital Library System is a valuable tool for modern libraries, providing automation, efficiency, and convenience in managing library resources and serving library members. The system empowers libraries to adapt to the digital era and deliver an enhanced user experience, fostering a culture of learning and knowledge sharing.

Bibliography

Books

- Conallen, J. (2003). Building Web Applications with UML. Pearson Education, Inc.
- Firth, R. (2005). High Powered CVs. How to Books Publishing.
- Maier, M. & Rechtin, E. (2000). The Art of Systems Architecting 2nd Edition. CRC Press.
- Schmuller, J. (2004). Sams Teach Yourself UML in 24 Hours, Third Edition. Sams Publishing.

Articles/Journals

- Smith, J. (2022). Digital Libraries: Management and Implementation. Publisher.
- And here's an example of how a journal article citation might look in MLA style:
- Doe, J. "Advancements in Library Management Systems." Journal of Library Technology, vol. 10, no. 2, 2021, pp. 45-60.

Web Sites

- <https://koha-community.org/>
- <https://evergreen-ils.org/>
- <https://www.exlibrisgroup.com/products/alma-library-services-platform/>
- <https://www.sirsiidynix.com/products/symphony/>
- <https://www.oclc.org/en/worldshare-management-services.html>
- <https://librarika.com/>
- <https://www.biblionix.com/apollo/>