

Anudip Foundation

PROJECT REPORT ON

“LIBRARY MANAGEMENT SYSTEM”

SUBMITTED BY

Student Id:

AF04957978

Student Name: KISHAN MAKWANA

UNDER GUIDENCE

MISS.RAJSHRI C. THETE

ACKNOWLEDGMENT

I would like to thank the people who helped me in completion of this project and with deep content and pleasure I express my gratitude toward those people who have given me their precious time and guidance in developing project. It's my privilege to express my sincere thanks and demonstrate sense of gratitude to my guide Miss. Rajshri Thete for imparting me valuable guidance during the preparation of these papers. She helped me by suggesting me many references of emerge out with a perfect presentation.

Thanking You.

Sincerely

Kishan Makwana

INDEX

Sr. No.	Particular	Page No
1	Introduction	6
2	Objectives	7
3	Proposed System	8
4	Feasibility study	9
5	Hardware & Software requirements	10
6	System Design	
	6.1ER Diagram	11
	6.2UML Diagrams 6.2.1 Class Diagram 6.2.2 Use Case Diagram 6.2.3 Sequence Diagram 6.2.4 Activity Diagram 6.2.5 Deployment Diagram	12-17
7	Database	18
8	I/O screens	19-23
9	Benefits	24
10	Future enhancement	25
11	Conclusion	26
12	Bibliography	27

INTRODUCTION

The Library Management System is a web-based application. The Library Management System is a software application designed to automate the routine tasks of a library. The system enables administrators to manage users, books, and branches, while also handling book transactions like borrowing and returning in a smooth and error-free manner. In this system, **users** can register and access the library facilities. Each user has a unique account and can borrow or return books, with their transactions being recorded. **Administrators** play a key role in managing the overall system. They handle the registration of users, maintain the database of books, and manage multiple branches of the library. Each **branch** contains details such as its location, contact number, and the collection of books it manages.

OBJECTIVES

- The main objective of the Library Management System is to automate and simplify the process of managing library resources, users, and transactions. The system is designed to maintain accurate records of books, members, and administrators while ensuring smooth borrowing and returning of books.
- To reduce manual work and paperwork in managing the library.
- Administrators maintain a catalogue of books with details like type, language, availability status, and quantity.
- To provide users with easy access to library services.

PROPOSED SYSTEM

The proposed Library Management System is designed to replace the traditional manual system with a computerized, efficient, and reliable solution. Each user has a unique account in the system. Their borrowing and returning activities are recorded through the transaction entity.

Administrators control the overall system. They can add, update, or delete book records, manage branches, and register users. Every borrow and return process is recorded with details such as transaction ID, type (borrow/return), date, and time.

FEASIBILITY STUDY

Feasibility study is conducted once the beauty salon problem is clearly understood. Feasibility study is a high-level capsule version of the beauty parlour entire system analysis and design process. The objective is to beauty parlour management system in Java determine quickly at a minimum expense how to solve a problem. The purpose of feasibility is not to solve the beauty salon problem but to determine if the beauty parlour problem is worth solving. The system has been tested for feasibility in the beauty centre following points

1. **Technical feasibility:** The proposed system can be developed using existing technology or not. It is planned to implement the proposed system using PHP and MySQL Server. It is evident that the necessary hardware and software are available for development and implementation of the beauty parlour proposed system
2. **Economic feasibility:** It is an evaluation of development cost weighed against the ultimate income or benefit derived from the skin care developed system. Economic justification includes a board range of concerns that includes cost-benefit analysis, long-term corporate income strategies, cost of resources needed for development.
3. **Operational feasibility:** This test of feasibility asks if the beauty parlour system will work with least difficulties when it is developed and installed. The technical staff has sufficient knowledge of the beauty parlour tools being used and the users need just to know how to access and browse the beauty salon site.

HARDWARE AND SOFTWARE REQUIREMENTS

- **HARDWARE :**

- Operating System: Windows11 and Linux
- CPU: Pentium III (700MHz) and above
- Memory: 128 MB and above
- Capacity: 4GB of hard drive

Others: Network interface card, mouse, keyboard, and monitor

- **SOFTWARE :**

- JAVA, Hibernate
- MySQL
- Eclipse IDE
- Web Browser: Microsoft Internet Explorer, Google

SYSTEM DESIGN

1. ER Diagram

Database Design:

TABLE : USER

<u>Sr. No</u>	<u>ATTRIBUTES</u>	<u>TYPE</u>	<u>KEY</u>
1.	User_id	Integer	Primarykey
2.	User_name	Varchar	
3.	Admin_id	Varchar	Foreignkey
4.	Admin_name	Varchar	
5.	Password	Varchar	
6.	Email	Varchar	

TABLE : ADMIN

<u>Sr. No</u>	<u>ATTRIBUTES</u>	<u>TYPE</u>	<u>KEY</u>
1.	Admin_id	Integer	Primarykey
2.	Username	Varchar	
3.	Password	Varchar	
4.	First_name	Varchar	
5.	Last_name	Varchar	
6.	Email	Varchar	
7.	Contact_no	Varchar	

TABLE : BRANCH

<u>Sr. No</u>	<u>ATTRIBUTES</u>	<u>TYPE</u>	<u>KEY</u>
1.	Admin_id	Integer	Foreignkey
2.	Branch_id	Integer	Primarykey
3.	Branch_Name	Varchar	
4.	Location	Varchar	

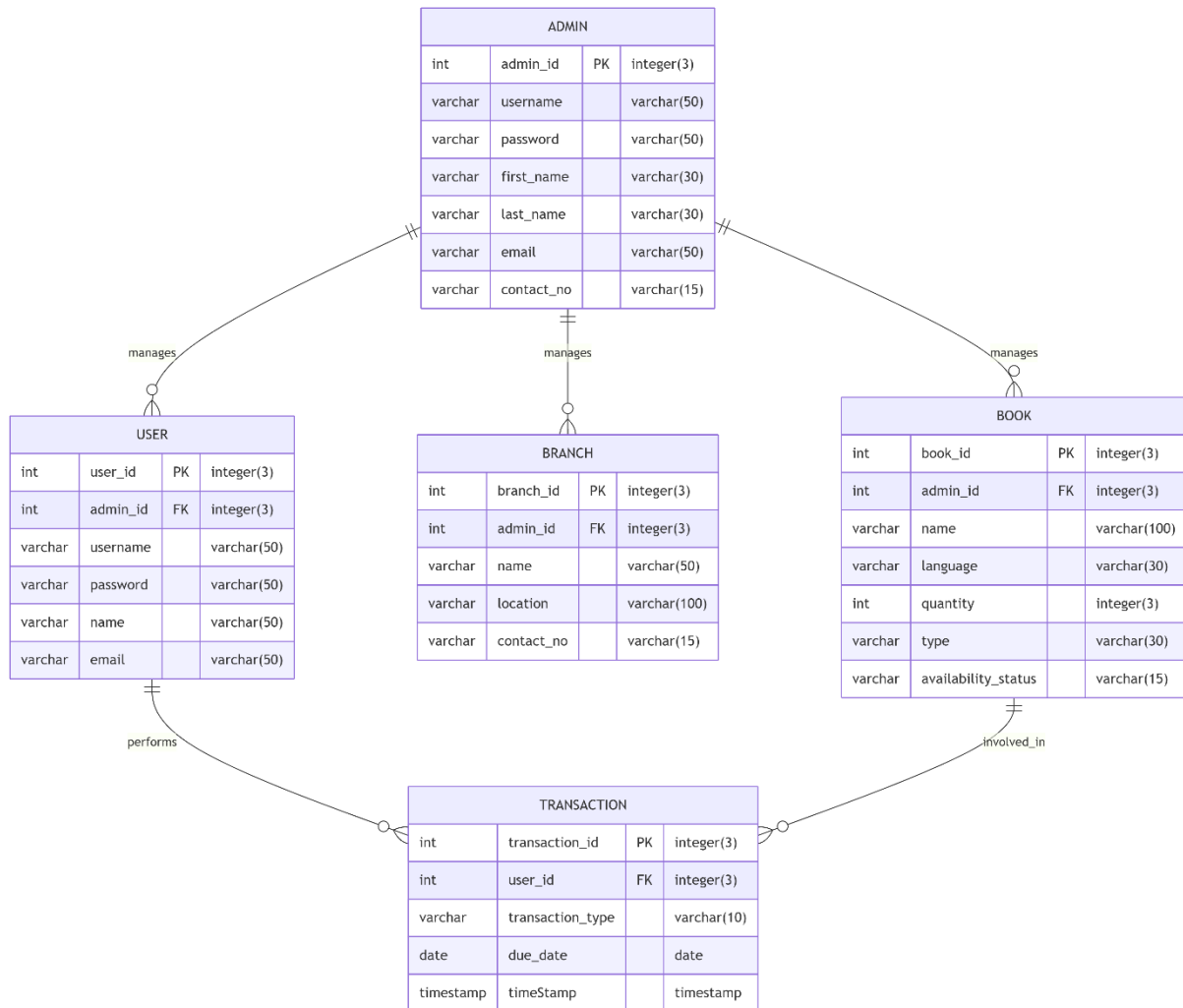
TABLE : TRANSACTION

<u>Sr. No</u>	<u>ATTRIBUTES</u>	<u>TYPE</u>	<u>KEY</u>
1.	Transaction_id	Integer	Primarykey
2.	Transaction_type	Varchar	
3.	User_id	Integer	Foreignkey
4.	Due_date	Date	
5.	Timestamp	Date	
6.	Book_id	Integer	Foreignkey

TABLE :- BOOK

<u>Sr. No</u>	<u>ATTRIBUTES</u>	<u>TYPE</u>	<u>KEY</u>
1.	Book_id	Integer	Primarykey
2.	Book_type	Varchar	
3.	Quantity	Integer	
4.	Language	Varchar	
5.	Name	Varchar	
6.	Availibility_status	Varchar	
7.	Admin_id	Integer	Foreignkey

ER DIAGRAM :



SCREENSHOTS

ADD ADMIN :

```
===== ADMIN MENU =====
1. Add Admin
2. Retrieve All Admin
3. Retrieve Admin By Id
4. Update Admin
5. Delete Admin
6. Back
1
ENTER ADMIN ID:
104
ENTER USERNAME :
Admin104
ENTER USER PASSWORD :
admin104
ENTER USER FIRST NAME :
Dhruvin
ENTER USER LAST NAME :
kanani
ENTER USER EMAIL :
dhruvin@gmail.com
ENTER USER CONTACT NUMBER :
9089789809
☒ Saved: Admin [adminId=104, username=Admin104, password=*****, firstName=Dhruvin, lastName=kanani, email=dhruvin@gmail.com, contactNo=9089789809]
```

ALL ADMIN :

```
Problems Javadoc Declaration Console X Error Log
MainOperation (1) [Java Application] C:\Users\DELL\p2\pool\plugins\org.eclipse.justi.openjdk.hotspot.jre.full.win32.x86_64_21.0.7.v20250502-0916\jre\bin\javaw.exe (10-Sept-2025, 8:51:45 am elapsed: 0:02:00) [pid:
Enter your choice: 1

===== ADMIN MENU =====
1. Add Admin
2. Retrieve All Admin
3. Retrieve Admin By Id
4. Update Admin
5. Delete Admin
6. Back
2
Sept 10, 2025 8:52:59 AM org.hibernate.Version logVersion
INFO: HHH0000412: Hibernate ORM core version 5.6.15.Final
Sept 10, 2025 8:52:59 AM org.hibernate.annotations.common.reflection.java.JavaReflectionManager <clinit>
INFO: HCAWW000001: Hibernate Commons Annotations {5.1.2.Final}
Sept 10, 2025 8:52:59 AM org.hibernate.engine.jdbc.connections.internal.DriverManagerConnectionProviderImpl configure
WARN: HHH10001002: Using Hibernate built-in connection pool (not for production use!)
Sept 10, 2025 8:52:59 AM org.hibernate.engine.jdbc.connections.internal.DriverManagerConnectionProviderImpl buildCreator
INFO: HHH10001005: using driver [com.mysql.cj.jdbc.Driver] at URL [jdbc:mysql://localhost:3306/Library]
Sept 10, 2025 8:52:59 AM org.hibernate.engine.jdbc.connections.internal.DriverManagerConnectionProviderImpl buildCreator
INFO: HHH10001001: Connection properties: {password=****, user=root}
Sept 10, 2025 8:52:59 AM org.hibernate.engine.jdbc.connections.internal.DriverManagerConnectionProviderImpl buildCreator
INFO: HHH10001003: Autocommit mode: false
Sept 10, 2025 8:52:59 AM org.hibernate.engine.jdbc.connections.internal.DriverManagerConnectionProviderImpl$PooledConnections <init>
INFO: HHH000115: Hibernate connection pool size: 20 (min=1)
Sept 10, 2025 8:53:00 AM org.hibernate.dialect.Dialect <init>
INFO: HHH000400: Using dialect: org.hibernate.dialect.MySQL8Dialect
Sept 10, 2025 8:53:01 AM org.hibernate.resource.transaction.backend.jdbc.internal.DdlTransactionIsolatorNonJtaImpl getIsolatedConnection
INFO: HHH10001501: Connection obtained from JdbcConnectionAccess [org.hibernate.engine.jdbc.env.internal.JdbcEnvironmentInitiator$ConnectionProviderJdbcConn
Sept 10, 2025 8:53:01 AM org.hibernate.engine.transaction.jta.platform.internal.JtaPlatformInitiator initiateService
INFO: HHH000490: Using JtaPlatform implementation: [org.hibernate.engine.transaction.jta.platform.internal.NoJtaPlatform]
Admin [adminId=101, username=Admin1001, password=*****, firstName=Kaval, lastName=Dudhat, email=keval@gmail.com, contactNo=9987766544]
Admin [adminId=102, username=Admin102, password=*****, firstName=Kishan, lastName=Makwana, email=kishan@gmail.com, contactNo=8079896857]
Admin [adminId=103, username=Admin12, password=*****, firstName=Jenil, lastName=Shah, email=jenil@gmail.com, contactNo=9980986745]
```

ADD BOOK :

```
===== ✨ Main Menu =====
Press 1. Admin Details
Press 2. Book Details
Press 3. Branch Details
Press 4. Transaction Details
Press 5. User Details
Press 6. Quit
Enter your choice: 2

===== BOOK MENU =====
1. Add Book
2. Get Book By Id
3. Update Book
4. Delete Book
5. View All Books
6. Search Books by Name
7. Back
1.
ENTER BOOK ID:
1004
ENTER BOOK NAME:
Mahabharat
ENTER BOOK LANGUAGE:
Gujarati
ENTER BOOK QUANTITY:
23
ENTER BOOK TYPE:
Event
ENTER BOOK AVAILABILITY STATUS (Available/Not Available):
Available
ENTER ADMIN ID WHO IS ADDING THIS BOOK:
102
☑ Saved: Book [bookId=1004, name=Mahabharat, language=Gujarati, quantity=23, type=Event, availabilityStatus=Available, adminId=102]
```

GET BOOK BY ID & VIEW ALL BOOK :

```
===== BOOK MENU =====
1. Add Book
2. Get Book By Id
3. Update Book
4. Delete Book
5. View All Books
6. Search Books by Name
7. Back
2
Enter Book ID: 1003
Book [bookId=1003, name=Ramayan, language=Gujrati,Hindi, quantity=99, type=Event, availabilityStatus=Available, adminId=102]

===== BOOK MENU =====
1. Add Book
2. Get Book By Id
3. Update Book
4. Delete Book
5. View All Books
6. Search Books by Name
7. Back
5
Book [bookId=1001, name=Child(1-10), language=English, quantity=25, type=Story, availabilityStatus=Available, adminId=101]
Book [bookId=1002, name=Young, language=Hindi, quantity=20, type=Health, availabilityStatus=Available, adminId=101]
Book [bookId=1003, name=Ramayan, language=Gujrati,Hindi, quantity=99, type=Event, availabilityStatus=Available, adminId=102]
Book [bookId=1004, name=Mahabharat, language=Gujarati, quantity=23, type=Event, availabilityStatus=Available, adminId=102]
Book [bookId=1006, name=Forest, language=Hindi, quantity=12, type=Story, availabilityStatus=Available, adminId=103]
```

UPDATE BOOK :

```
===== BOOK MENU =====
1. Add Book
2. Get Book By Id
3. Update Book
4. Delete Book
5. View All Books
6. Search Books by Name
7. Back
8
Enter Book ID to update: 1006
ENTER BOOK ID:
1006
ENTER BOOK NAME:
Forest-Gir
ENTER BOOK LANGUAGE:
Hindi
ENTER BOOK QUANTITY:
12
ENTER BOOK TYPE:
Story
ENTER BOOK AVAILABILITY STATUS (Available/Not Available):
Available
ENTER ADMIN ID WHO IS ADDING THIS BOOK:
103
[✓] Updated: Book [bookId=1006, name=Forest-Gir, language=Hindi, quantity=12, type=Story, availabilityStatus=Available, adminId=103]
```

DELETE BOOK :

```
===== BOOK MENU =====
1. Add Book
2. Get Book By Id
3. Update Book
4. Delete Book
5. View All Books
6. Search Books by Name
7. Back
4
Enter Book ID to delete: 1006
Are you sure you want to delete this book? (yes/no)
yes
Book deleted successfully!
[✓] Deleted: Book [bookId=1006, name=Forest-Gir, language=Hindi, quantity=12, type=Story, availabilityStatus=Available, adminId=103]
```


SEARCH BOOK BY NAME :

```
===== BOOK MENU =====
1. Add Book
2. Get Book By Id
3. Update Book
4. Delete Book
5. View All Books
6. Search Books by Name
7. Back
8. Exit

Enter Book Name to Search (Press Enter to view all books): Ramayan
Book [bookId=1003, name=Ramayan, language=Gujrati,Hindi, quantity=99, type=Event, availabilityStatus=Available, adminId=102]
```

ADD BRANCH :

```
===== BRANCH MENU =====
1. Add Branch
2. Get Branch
3. Update Branch
4. Delete Branch
5. View All Branches
6. Back
7. Exit

ENTER BRANCH ID:
303

ENTER BRANCH NAME:
Branch003

ENTER BRANCH LOCATION:
Navarangpura,Ahm

ENTER BRANCH CONTACT NUMBER:
8999876567

ENTER ADMIN ID FOR THIS BRANCH:
103

[✓] Saved: Branch [branchId=303, adminId=103, name=Branch003, location=Navarangpura,Ahm, contactNo=8999876567]
```

GET BRANCH BY ID :

```
===== BRANCH MENU =====
1. Add Branch
2. Get Branch
3. Update Branch
4. Delete Branch
5. View All Branches
6. Back
2
Enter Branch ID: 301
Branch [branchId=301, adminId=101, name=Branch001, location=Paladi,Ahemadabad, contactNo=9974452105]
```

UPDATE BRANCH :

```
2
Enter Branch ID: 301
Branch [branchId=301, adminId=101, name=Branch001, location=Paladi,Ahemadabad, contactNo=9974452105]

===== BRANCH MENU =====
1. Add Branch
2. Get Branch
3. Update Branch
4. Delete Branch
5. View All Branches
6. Back
3
Enter Branch ID to update: 301
ENTER BRANCH ID:
301
ENTER BRANCH NAME:
Branch001
ENTER BRANCH LOCATION:
Paladi,Ahm
ENTER BRANCH CONTACT NUMBER:
9045563429
ENTER ADMIN ID FOR THIS BRANCH:
101
☒ Updated: Branch [branchId=301, adminId=101, name=Branch001, location=Paladi,Ahm, contactNo=9045563429]
```

DELETE BRANCH :

```
===== BRANCH MENU =====
1. Add Branch
2. Get Branch
3. Update Branch
4. Delete Branch
5. View All Branches
6. Back
4
Enter Branch ID to delete: 303
Branch deleted successfully!
Deleted: Branch [branchId=303, adminId=103, name=Branch003, location=Navarangpura,Ahm, contactNo=8999876567]
```

VIEW ALL BRANCH :

```
===== BRANCH MENU =====
1. Add Branch
2. Get Branch
3. Update Branch
4. Delete Branch
5. View All Branches
6. Back
5
Branch [branchId=301, adminId=101, name=Branch001, location=Paladi,Ahm, contactNo=9045563429]
Branch [branchId=302, adminId=102, name=Branch002, location=Iscon,Ahmedabad, contactNo=9664676666]
----- BRANCH MENU -----
```

ADD TRANSACTION :

```
===== > Main Menu =====
Press 1. Admin Details
Press 2. Book Details
Press 3. Branch Details
Press 4. Transaction Details
Press 5. User Details
Press 6. Quit
Enter your choice: 4

===== TRANSACTION MENU =====
1. Add Transaction
2. Get Transaction By Id
3. Update Transaction
4. Delete Transaction
5. View All Transactions
6. View Transactions By User ID
7. Back
1
ENTER TRANSACTION ID:
403
ENTER TRANSACTION TYPE (ISSUE/RETURN):
Return
ENTER DUE DATE (yyyy-mm-dd):
2025-03-08
ENTER USER ID FOR THIS TRANSACTION:
502
ENTER BOOK ID FOR THIS TRANSACTION:
1003
1
```

GET TRANSACTION BY ID :

```
===== TRANSACTION MENU =====
1. Add Transaction
2. Get Transaction By Id
3. Update Transaction
4. Delete Transaction
5. View All Transactions
6. View Transactions By User ID
7. Back
2
Enter Transaction ID: 403
Transaction [transactionId=403, transactionType=Return, dueDate=2025-03-08, timestamp=2025-09-10T11:25:13.781154, userId=502, bookId=1003]
```

UPDATE TRANSACTION :

```
Welcome Library Management System:

===== ✨ Main Menu =====
Press 1. Admin Details
Press 2. Book Details
Press 3. Branch Details
Press 4. Transaction Details
Press 5. User Details
Press 6. Quit
Enter your choice: 4

===== TRANSACTION MENU =====
1. Add Transaction
2. Get Transaction By Id
3. Update Transaction
4. Delete Transaction
5. View All Transactions
6. View Transactions By User ID
7. Back
3
Enter Transaction ID to update: 401
ENTER TRANSACTION ID:
401
ENTER TRANSACTION TYPE (ISSUE/RETURN):
Return
ENTER DUE DATE (yyyy-mm-dd):
2025-07-09
ENTER USER ID FOR THIS TRANSACTION:
501
ENTER BOOK ID FOR THIS TRANSACTION:
1001
☑ Updated: Transaction [transactionId=401, transactionType=Return, dueDate=2025-07-09, timestamp=2025-09-10T09:02:16.687679500, userId=501, bookId=1001]
```

DELETE TRANSACTION :

```
===== TRANSACTION MENU =====
1. Add Transaction
2. Get Transaction By Id
3. Update Transaction
4. Delete Transaction
5. View All Transactions
6. View Transactions By User ID
7. Back
4
Enter Transaction ID to delete: 403
Are you sure you want to delete this transaction? (yes/no)
yes
Transaction deleted successfully!
☑ Deleted: Transaction [transactionId=403, transactionType=Return, dueDate=2025-03-08, timestamp=2025-09-10T11:25:13.781154, userId=502, bookId=1003]
```

VIEW TRANSACTION & VIEW BY USER ID :

```
===== TRANSACTION MENU =====
1. Add Transaction
2. Get Transaction By Id
3. Update Transaction
4. Delete Transaction
5. View All Transactions
6. View Transactions By User ID
7. Back
5
Transaction [transactionId=401, transactionType=Return, dueDate=2025-07-09, timestamp=2025-09-10T09:02:16.687680, userId=501, bookId=1001]
Transaction [transactionId=402, transactionType=Issue, dueDate=2025-04-08, timestamp=2025-09-08T16:06:28.287278, userId=501, bookId=1002]

===== TRANSACTION MENU =====
1. Add Transaction
2. Get Transaction By Id
3. Update Transaction
4. Delete Transaction
5. View All Transactions
6. View Transactions By User ID
7. Back
6
Enter User ID to view transactions: 502
✕ No transactions found for user ID: 502
```

ADD USER :

```
===== USER MENU =====
1. Add User
2. Get User
3. Update User
4. Delete User
5. View All Users
6. Back
1
ENTER USER ID:
504
ENTER USERNAME:
jink
ENTER PASSWORD:
jink123
ENTER NAME:
jinu
ENTER EMAIL:
jinu@gmail.com
ENTER CONTACT NUMBER:
9089785643
ENTER ADMIN ID WHO IS ADDING THIS USER:
102
☑ Saved: User [userId=504, adminId=102, username=jink, password=****, name=jinu, email=jinu@gmail.com, contactNo=9089785643]
```

GET USER :

```
===== USER MENU =====
1. Add User
2. Get User
3. Update User
4. Delete User
5. View All Users
6. Back
2
Enter User ID: 504
User [userId=504, adminId=102, username=jink, password=****, name=jinu, email=jinu@gmail.com, contactNo=9089785643]
```

UPDATE USER :

```
Enter User ID: 504
User [userId=504, adminId=102, username=jink, password=****, name=jinu, email=jinu@gmail.com, contactNo=9089785643]

===== USER MENU =====
1. Add User
2. Get User
3. Update User
4. Delete User
5. View All Users
6. Back
3
Enter User ID to update: 504
ENTER USER ID:
504
ENTER USERNAME:
jinki
ENTER PASSWORD:
jink123
ENTER NAME:
jini
ENTER EMAIL:
jini@gmail.com
ENTER CONTACT NUMBER:
9089785643
ENTER ADMIN ID WHO IS ADDING THIS USER:
102
☑ Updated: User [userId=504, adminId=102, username=jinki, password=****, name=jini, email=jini@gmail.com, contactNo=9089785643]
```

DELETE USER & VIEW USER :

```
===== > Main Menu =====
Press 1. Admin Details
Press 2. Book Details
Press 3. Branch Details
Press 4. Transaction Details
Press 5. User Details
Press 6. Quit
Enter your choice: 5

===== USER MENU =====
1. Add User
2. Get User
3. Update User
4. Delete User
5. View All Users
6. Back
4
Enter User ID to delete: 504
Are you sure you want to delete?
yes
Object is deleted

===== USER MENU =====
1. Add User
2. Get User
3. Update User
4. Delete User
5. View All Users
6. Back
5
User [userId=501, adminId=101, username=jay, password=*****, name=Jayesh shah, email=jayesh@gmail.com, contactNo=null]
User [userId=502, adminId=102, username=Takla, password=*****, name=Vicky, email=vicky@gmail.com, contactNo=null]
User [userId=503, adminId=102, username=pintoo, password=*****, name=Pinaki, email=pinaki@gmail.com, contactNo=3498708767]
```


BENEFITS OF SYSTEM

1. **Time Saving** – Automates book issue, return, and search processes, reducing manual work.
2. **Accuracy** – Maintains precise records of books, members, and transactions, minimizing errors.
3. **Easy Book Tracking** – Helps locate available books, issued books, and overdue books quickly.
4. **Improved Efficiency** – Streamlines day-to-day operations for librarians and staff.
5. **Better User Experience** – Students and members can easily search and access library resources.
6. **Data Security** – Keeps all records safe in a digital database, reducing the risk of data loss.
7. **Cost-Effective** – Reduces the need for paper-based registers and manual record keeping.
8. **Scalability** – Can be expanded with features like online reservation, e-library integration, and digital notifications.
9. **Report Generation** – Provides quick reports on issued books, fines, member details, and stock availability.
10. **Eco-Friendly** – Minimizes the use of paper, supporting digital and sustainable practices.

FUTURE ENHANCEMENT

1. **Cloud Integration** – Store data on cloud servers for remote access and backup.
2. **Mobile Application** – Provide an Android/iOS app for students and staff.
3. **AI-based Book Recommendation** – Suggest books based on user interests and borrowing history.
4. **Automated Notifications** – Send reminders for due dates, new arrivals, or fines via SMS/Email.
5. **Data Analytics Dashboard** – Track most borrowed books, active users, and trends.
6. **Voice Search Integration** – Allow users to search books using voice commands.

CONCLUSION

The Library Management System successfully demonstrates how technology can simplify and enhance the management of library resources. By automating tasks such as book cataloguing, member registration, issue and return tracking, and fine calculation, the system reduces manual work and improves efficiency. It ensures accurate record keeping, quick information retrieval, and better user experience for both librarians and students

This project highlights the effective use of **Java programming concepts** along with database connectivity to build a practical, real-world application. The system can be further extended in the future by adding features like online book reservation, SMS/email notifications, and integration with digital libraries.

In conclusion, the Library Management System provides a reliable, user-friendly, and scalable solution for managing library operations, proving the importance of software applications in modern education and resource management.

BIBLIOGRAPHY

- Java Reference Book :
 - Effective Java : Joshua Bloch, 3rd Edition, Addison-Wesley, 2018.
 - *Java* : Herbert Schildt : *The Complete Reference*, 11th Edition, McGraw-Hill, 2018.
 - Core Java : Cay S. Horstmann
- Google
- <https://www.w3schools.com/java/>
- <https://www.geeksforgeeks.org/>