

**SSN COLLEGE OF ENGINEERING
KALAVAKKAM -603110**

Department of Computer Science and Engineering

UCS2312-OBJECT ORIENTED PROGRAMMING LAB

PROJECT DOCUMENTATION

LIBRARY MANAGEMENT SYSTEM

REPORT

Submitted by:

Rakshith Subramanian -3122 21 5001 078

Rohit Ram -3122 2 1 5001 086

Staff In-charge:

Dr.S.Rajalakshmi

PROBLEM STATEMENT

PROBLEM DEFINITION:

Libraries are always changing and evolving in order to stay up with the changes and give the best possible experience for its users. Librarians are in charge of several responsibilities to ensure that everything runs well.

The Library Management System (LMS) increases efficiency by addressing holes in a library's struggles. The LMS can reduce the amount of time spent on administrative chores such as searching for books, updating available books, fine-tuning computation and presentation, and so on.

Libraries may undertake smart work instead of hard effort to increase patron happiness through good services.

Because we employ object-oriented programming, such a solution would increase overall data security.

INPUT:

- Admin's Registration details (Name,Username>Password)
- Choice selection for Admin and User module
- INPUT FOR ADMIN MODULE
 - Name
 - Username
 - Password
 - Choice selection for Admin module operations
 - Book details(Name,Author name,Book-id,No of copies)
- INPUT FOR USER MODULE
 - Name
 - Username
 - Password,
 - UserId
 - Student's ID

OUTPUT:

- Books added and deleted
- Book details display
- Fine display
- List of all books issued
- List of books yet to be issue
- Defaulters list

MOTIVATION FOR THE PROBLEM:

Library Management system is always one of the difficult tasks to maintain as it involves lot of details

To store, update, delete etc.

In lot of libraries, it is usually done manually as the existing work so far is not very effective in maintaining records and updating properly.

Further accessing the library website by multiple users at the same time always results In bandwidth problem and hence we devised a solution to poke these difficulties into creating a user friendly module

SCOPE AND LIMITATIONS

SCOPE

The following are the functionalities delivered in this project, and it's scope extends to ;

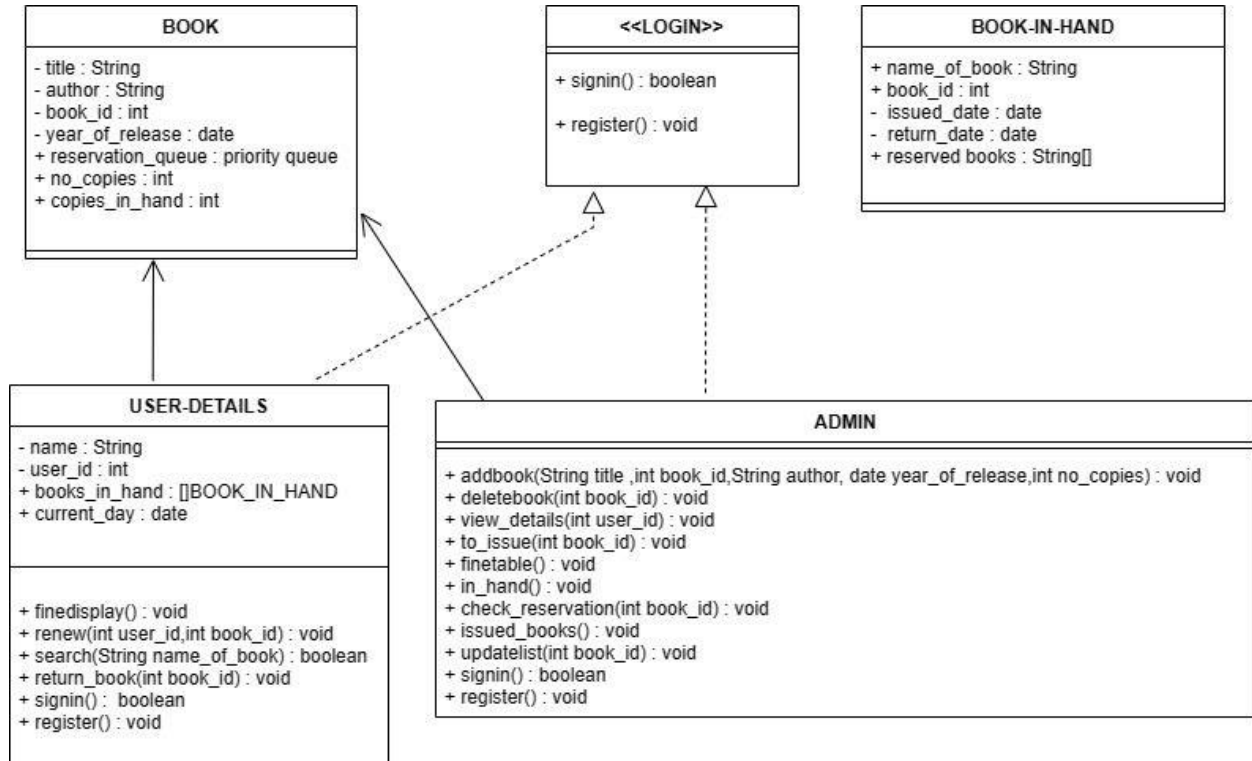
- (i) Addition/Deletion of book records
- (ii) Displaying existing user details
- (iii) Displaying the fine details of each user
- (iv) Search, Request,Renew a book
- (v) View Reservation queue of a book
- (vi) Return a book
- (vii) View the details of all the books of library
- (viii) View the list of all books lent along with the details of the users to whom the book(s) were lent and also their prior pending fines against their name

LIMITATIONS

The following are the limitations of the project:

- (i) Since file handling is not used in this project, every input has to be entered manually

DESIGN OF THE SOLUTION (CLASS DIAGRAM)



MODULES SPLIT-UP

To Solve the problem of college allocation , we divide the solution into various modules in a chronological order , as follows:

The 2 Major classes used are

a) Class UserDetails extends Book implements Login

It is created for every new user and stores

- Name
- Username
- Password
- User-Id
- List of books borrowed and its details
- Fines

b) Class Admin extends Book implements Login

It stores the details of the Admin(created only once and it is used through

It stores

- a) Name
- b) Admin Username
- c) Admin Password

- d) All Books details
- e) All user details

IMPLEMENTATION AND OUTPUT

Implementation of Module 1 :

The idea of this module is to perform the methods / functions available to each User

1. `signin()`: This method is used to sign in to the library management system. It takes the user's name, username, and password as input, and checks if they match with the existing data. If they match, the user is signed in, otherwise, they are prompted to try again.
2. `register()`: This method is used to register a new user in the library management system. It takes the user's name, username, password, and ID as input, and stores them in the `all_user_details` array.
3. `finedisplay()`: This method is used to calculate and display fines for a user. It iterates over the `all_book_in_hand` array and calculates fines for each book that is overdue. It then displays the total fines for the user.
4. `renew(int user_id, int book_id)`: This method is used to renew a book that has been borrowed by a user. It takes the user's ID and the book's ID as input, and looks for the book in the `all_book_in_hand` array. If it finds the book, it checks if the book is overdue. If it is not overdue, it renews the book and updates the return date.
5. `return_book(int book_id)`: This method is used to return a book to the library. It takes the book's ID as input, and looks for the book in the `all_book_in_hand` array. If it finds the book, it removes it from the array, and adds it to the `all_books` array.

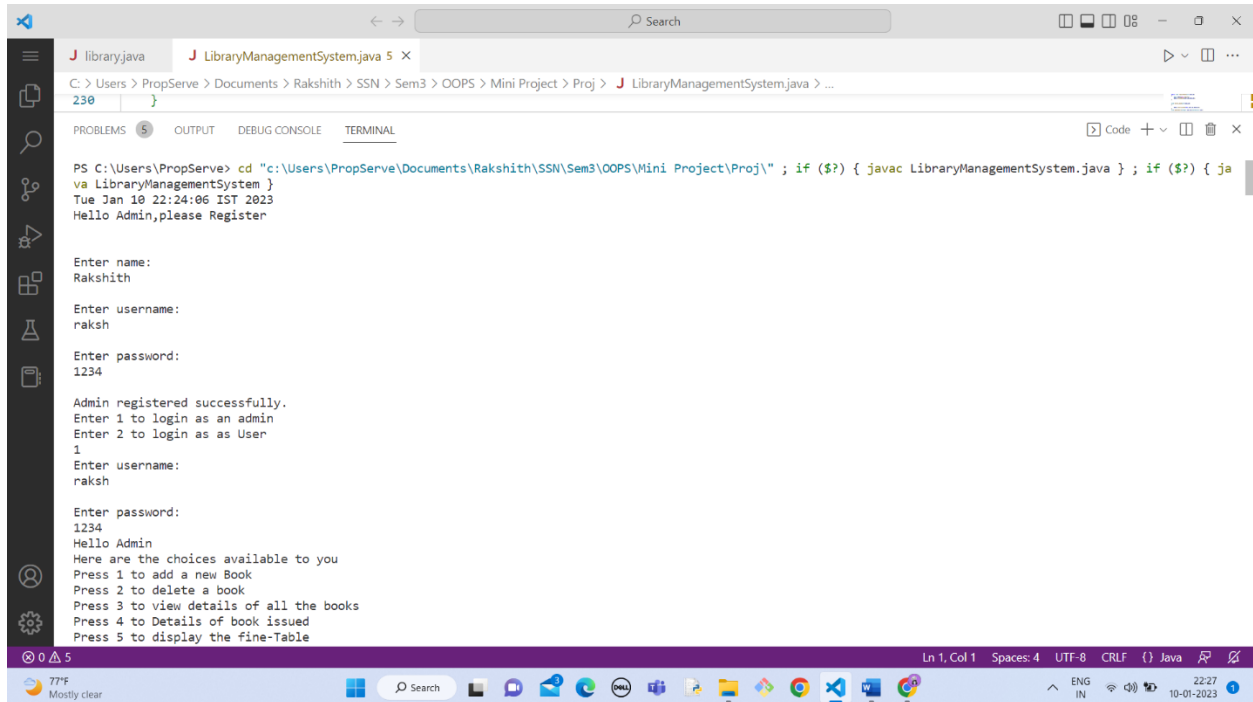
Implementation of Module-2:

The basic idea behind this module is to store and perform Admin details and Admin's functions

1. `addbook()`: This method is used to add a new book to the library's collection. It takes input from the user such as the book's title, author, and other details, and adds this information to the library's collection of books.
2. `deletebook()`: This method is used to delete a book from the library's collection. It takes the book's ISBN number as input and removes the corresponding book from the collection.
3. `viewdetails()`: This method is used to view the details of a book in the library's collection. It takes the book's Id number as input and displays information such as the title, author, and other details of the book.

4. `issuebook()`: This method is used to issue a book to a user. It takes the book's ID number and the user's ID as input, and records that the user has borrowed the book.
5. `finetable()`: This method is used to view the fines of all users. It displays the fines that each user has accumulated for overdue books.
6. `inhand()`: This method is used to view the books that are currently borrowed by users.
7. `checkreservation()` : This method is used to check the reservation details for a book that has been requested for reservation by user.
8. `updatelist()` : This method is used to update list of books in the library.
9. `signin()`: This method is used for signing into the admin account. It prompts the user for their username and password, and authenticates them if the entered credentials are valid.
10. `register()`: This method is used for registering new admin into the system. It prompts the user for their details, it creates a new admin account with the entered details and adding the same to the system.

OUTPUT:



```
C:\Users\PropServe> cd "C:\Users\PropServe\Documents\Rakshith\SSN\Sem3\OOPS\Mini Project\Proj\" ; if ($?) { javac LibraryManagementSystem.java } ; if ($?) { java LibraryManagementSystem }
Tue Jan 10 22:24:06 IST 2023
Hello Admin, please Register

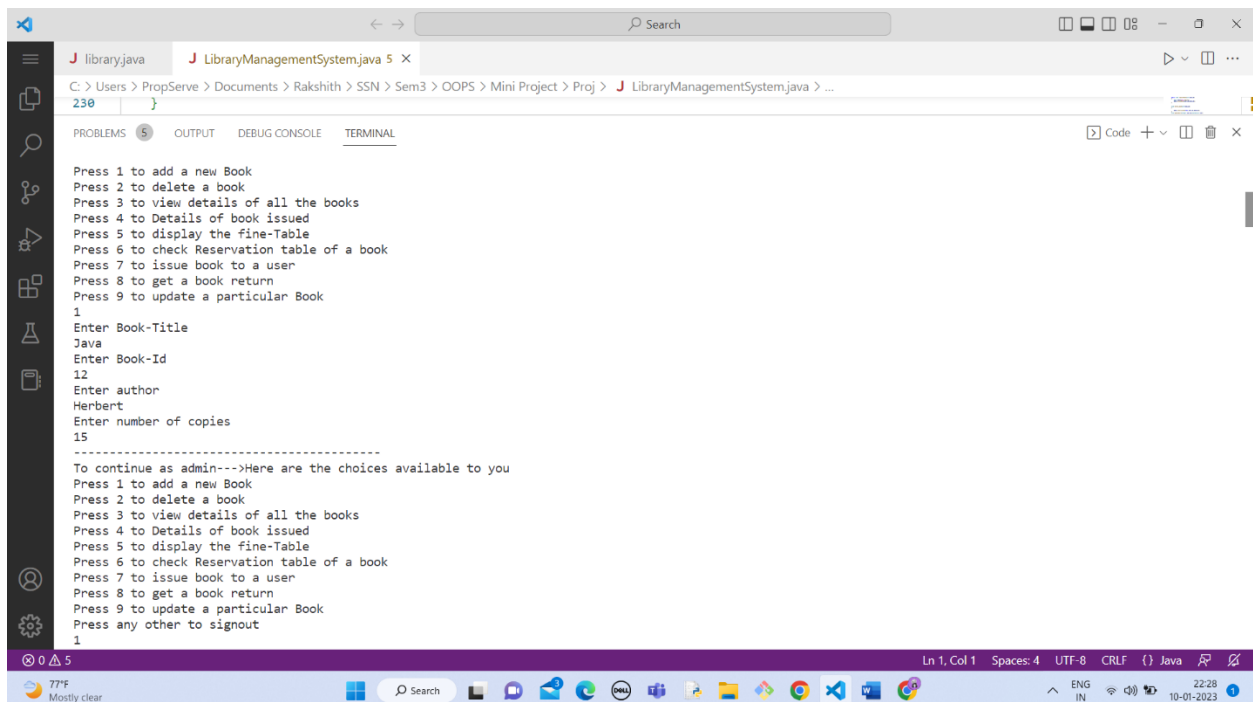
Enter name:
Rakshith

Enter username:
raksh

Enter password:
1234

Admin registered successfully.
Enter 1 to login as an admin
Enter 2 to login as as User
1
Enter username:
raksh

Enter password:
1234
Hello Admin
Here are the choices available to you
Press 1 to add a new Book
Press 2 to delete a book
Press 3 to view details of all the books
Press 4 to Details of book issued
Press 5 to display the fine-Table
```



```
Press 1 to add a new Book
Press 2 to delete a book
Press 3 to view details of all the books
Press 4 to Details of book issued
Press 5 to display the fine-Table
Press 6 to check Reservation table of a book
Press 7 to issue book to a user
Press 8 to get a book return
Press 9 to update a particular Book
1
Enter Book-Title
Java
Enter Book-Id
12
Enter author
Herbert
Enter number of copies
15
-----
To continue as admin--->Here are the choices available to you
Press 1 to add a new Book
Press 2 to delete a book
Press 3 to view details of all the books
Press 4 to Details of book issued
Press 5 to display the fine-Table
Press 6 to check Reservation table of a book
Press 7 to issue book to a user
Press 8 to get a book return
Press 9 to update a particular Book
Press any other to signout
1
```

```

J library.java J LibraryManagementSystem.java 5 X
C:\Users\PropServe> Documents > Rakshith > SSN > Sem3 > OOPS > Mini Project > Proj > J LibraryManagementSystem.java > ...
230 }

PROBLEMS 5 OUTPUT DEBUG CONSOLE TERMINAL
Press 8 to get a book return
Press 9 to update a particular Book
Press any other to signout
1
Enter Book-Title
Python
Enter Book-Id
13
Enter author
Charles
Enter number of copies
10
-----
To continue as admin--->Here are the choices available to you
Press 1 to add a new Book
Press 2 to delete a book
Press 3 to view details of all the books
Press 4 to Details of book issued
Press 5 to display the fine-Table
Press 6 to check Reservation table of a book
Press 7 to issue book to a user
Press 8 to get a book return
Press 9 to update a particular Book
Press any other to signout
1
Enter Book-Title
Mathematics
Enter Book-Id
14
Enter author
Ramanujam

```

```

J library.java J LibraryManagementSystem.java 5 X
C:\Users\PropServe> Documents > Rakshith > SSN > Sem3 > OOPS > Mini Project > Proj > J LibraryManagementSystem.java > ...
230 }

PROBLEMS 5 OUTPUT DEBUG CONSOLE TERMINAL
14
Enter author
Ramanujam
Enter number of copies
12
-----
To continue as admin--->Here are the choices available to you
Press 1 to add a new Book
Press 2 to delete a book
Press 3 to view details of all the books
Press 4 to Details of book issued
Press 5 to display the fine-Table
Press 6 to check Reservation table of a book
Press 7 to issue book to a user
Press 8 to get a book return
Press 9 to update a particular Book
Press any other to signout
3
Java: 0 copies checked out, 15 copies available.
Python: 0 copies checked out, 10 copies available.
Mathematics: 0 copies checked out, 12 copies available.
-----
To continue as admin--->Here are the choices available to you
Press 1 to add a new Book
Press 2 to delete a book
Press 3 to view details of all the books
Press 4 to Details of book issued
Press 5 to display the fine-Table
Press 6 to check Reservation table of a book
Press 7 to issue book to a user
Press 8 to get a book return

```



```
J library.java J LibraryManagementSystem.java 5 X
C:\Users\PropServe>Documents>Rakshith>SSN>Sem3>OOPS>Mini Project>Proj> J LibraryManagementSystem.java > ...
230 }

PROBLEMS 5 OUTPUT DEBUG CONSOLE TERMINAL
Press 4 to Details of book issued
Press 5 to display the fine-Table
Press 6 to check Reservation table of a book
Press 7 to issue book to a user
Press 8 to get a book return
Press 9 to update a particular Book
Press any other to signout
6
Enter book_id for which reservation status has to be checked
12
Reservation queue for Java:
-----
To continue as admin--->Here are the choices available to you
Press 1 to add a new Book
Press 2 to delete a book
Press 3 to view details of all the books
Press 4 to Details of book issued
Press 5 to display the fine-Table
Press 6 to check Reservation table of a book
Press 7 to issue book to a user
Press 8 to get a book return
Press 9 to update a particular Book
Press any other to signout
6
Enter book_id for which reservation status has to be checked
13
Reservation queue for Python:
-----
To continue as admin--->Here are the choices available to you
Press 1 to add a new Book
Press 2 to delete a book

Ln 1, Col 1 Spaces: 4 UTF-8 CRLF {} Java
77°F Mostly clear 22:28 10-01-2023

J library.java J LibraryManagementSystem.java 5 X
C:\Users\PropServe>Documents>Rakshith>SSN>Sem3>OOPS>Mini Project>Proj> J LibraryManagementSystem.java > ...
230 }

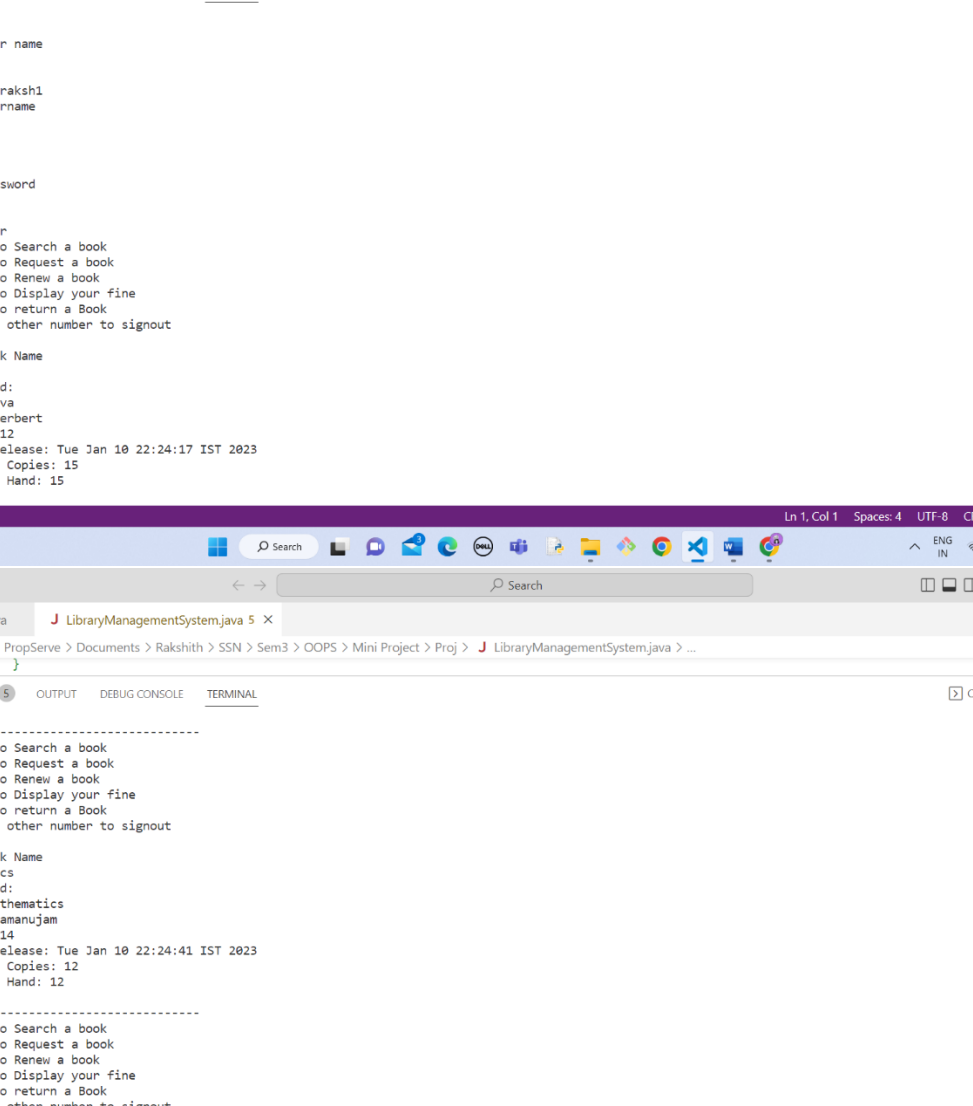
PROBLEMS 5 OUTPUT DEBUG CONSOLE TERMINAL
Press 8 to get a book return
Press 9 to update a particular Book
Press any other to signout
0
-----
Enter 1 to login as an admin
Enter 2 to login as User
Press any other number to Exit program
2
You have selected USER-MODE
If you are new user, press 1, else 0
1
Kindly Register now
Enter your name
Rakshith1

Enter your user name
raksh1

Enter your password
1234

Enter your User-Id
100
You have registered successfully
Now please sign
Enter your User id

Ln 1, Col 1 Spaces: 4 UTF-8 CRLF {} Java
77°F Mostly clear 22:28 10-01-2023
```



```

C:\> Users > PropServe > Documents > Rakshith > SSN > Sem3 > OOPS > Mini Project > Proj > J LibraryManagementSystem.java > ...
230 | }

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL
Enter your name
raksh1

WELCOME, raksh1
Enter username
raksh1

Enter password
1234

Hello User
Press 1 to Search a book
Press 2 to Request a book
Press 3 to Renew a book
Press 4 to Display your fine
Press 5 to return a Book
Press any other number to signout
1
Enter Book Name
Java
Book found:
Title: Java
Author: Herbert
Book ID: 12
Year of Release: Tue Jan 10 22:24:17 IST 2023
Number of Copies: 15
Copies in Hand: 15
updated

Press 1 to Search a book
Press 2 to Request a book
Press 3 to Renew a book
Press 4 to Display your fine
Press 5 to return a Book
Press any other number to signout
1
Enter Book Name
Mathematics
Book found:
Title: Mathematics
Author: Ramanujam
Book ID: 14
Year of Release: Tue Jan 10 22:24:41 IST 2023
Number of Copies: 12
Copies in Hand: 12
updated

Press 1 to Search a book
Press 2 to Request a book
Press 3 to Renew a book
Press 4 to Display your fine
Press 5 to return a Book
Press any other number to signout
2
Enter Book-id to Request
12
Book successfully checked out.
updated

```

```
J library.java J LibraryManagementSystem.java 5 X
C:\Users\PropServe> Documents > Rakshith > SSN > Sem3 > OOPS > Mini Project > Proj > J LibraryManagementSystem.java > ...
230 }

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL
Press 1 to Search a book
Press 2 to Request a book
Press 3 to Renew a book
Press 4 to Display your fine
Press 5 to return a Book
Press any other number to signout
2
Enter Book-id to Request
13
Book successfully checked out.
updated
-----
Press 1 to Search a book
Press 2 to Request a book
Press 3 to Renew a book
Press 4 to Display your fine
Press 5 to return a Book
Press any other number to signout
1
Enter Book Name
Java
Book found:
Title: Java
Author: Herbert
Book ID: 12
Year of Release: Tue Jan 10 22:24:17 IST 2023
Number of Copies: 15
Copies in Hand: 14
updated
-----
Press 1 to Search a book

Ln 1, Col 1 Spaces: 4 UTF-8 CRLF Java 22:28 10-01-2023
77°F Mostly clear
```

```
J library.java J LibraryManagementSystem.java 5 X
C:\Users\PropServe> Documents > Rakshith > SSN > Sem3 > OOPS > Mini Project > Proj > J LibraryManagementSystem.java > ...
230 }

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL
1
Enter Book Name
Python
Book found:
Title: Python
Author: Charles
Book ID: 13
Year of Release: Tue Jan 10 22:24:27 IST 2023
Number of Copies: 10
Copies in Hand: 9
updated
-----
Press 1 to Search a book
Press 2 to Request a book
Press 3 to Renew a book
Press 4 to Display your fine
Press 5 to return a Book
Press any other number to signout
5
PLEASE CALL THE ADMIN TO RETURN A BOOK
updated
-----
Press 1 to Search a book
Press 2 to Request a book
Press 3 to Renew a book
Press 4 to Display your fine
Press 5 to return a Book
Press any other number to signout
0
-----
Enter 1 to login as an admin

Ln 1, Col 1 Spaces: 4 UTF-8 CRLF Java 22:28 10-01-2023
77°F Mostly clear
```

```
J library.java J LibraryManagementSystem.java 5 X
C:\Users\PropServe> Documents > Rakshith > SSN > Sem3 > OOPS > Mini Project > Proj > J LibraryManagementSystem.java > ...
230 }

PROBLEMS 5 OUTPUT DEBUG CONSOLE TERMINAL
Enter username:
raksh

Enter password:
1234
Hello Admin
Here are the choices available to you
Press 1 to add a new Book
Press 2 to delete a book
Press 3 to view details of all the books
Press 4 to Details of book issued
Press 5 to display the fine-Table
Press 6 to check Reservation table of a book
Press 7 to issue book to a user
Press 8 to get a book return
Press 9 to update a particular Book
3
Java: 1 copies checked out, 14 copies available.
Python: 1 copies checked out, 9 copies available.
Mathematics: 0 copies checked out, 12 copies available.
-----
To continue as admin--->Here are the choices available to you
Press 1 to add a new Book
Press 2 to delete a book
Press 3 to view details of all the books
Press 4 to Details of book issued
Press 5 to display the fine-Table
Press 6 to check Reservation table of a book
Press 7 to issue book to a user
Press 8 to get a book return
Press 9 to update a particular Book
```

```
J library.java J LibraryManagementSystem.java 5 X
C:\Users\PropServe> Documents > Rakshith > SSN > Sem3 > OOPS > Mini Project > Proj > J LibraryManagementSystem.java > ...
230 }

PROBLEMS 5 OUTPUT DEBUG CONSOLE TERMINAL
4
Issued Books:
Book Name: Java
Book ID: 12
Issue Date: Tue Jan 10 22:25:15 IST 2023
Return Date: Tue Jan 24 22:26:03 IST 2023
No fine.
Book Name: Python
Book ID: 13
Issue Date: Tue Jan 10 22:25:15 IST 2023
Return Date: Tue Jan 24 22:26:19 IST 2023
No fine.
-----
To continue as admin--->Here are the choices available to you
Press 1 to add a new Book
Press 2 to delete a book
Press 3 to view details of all the books
Press 4 to Details of book issued
Press 5 to display the fine-Table
Press 6 to check Reservation table of a book
Press 7 to issue book to a user
Press 8 to get a book return
Press 9 to update a particular Book
Press any other to signout
7
Enter the User-id
100
Enter book-id
14
Book successfully checked out.
-----
```

```
C:\Users\PropServe> Documents > Rakshith > SSN > Sem3 > OOPS > Mini Project > Proj > J LibraryManagementSystem.java > ...  
230 }  
PROBLEMS 5 OUTPUT DEBUG CONSOLE TERMINAL  
Press 2 to delete a book  
Press 3 to view details of all the books  
Press 4 to Details of book issued  
Press 5 to display the fine-Table  
Press 6 to check Reservation table of a book  
Press 7 to issue book to a user  
Press 8 to get a book return  
Press 9 to update a particular Book  
Press any other to signout  
3  
Java: 1 copies checked out, 14 copies available.  
Python: 1 copies checked out, 9 copies available.  
Mathematics: 1 copies checked out, 11 copies available.  
-----  
To continue as admin--->Here are the choices available to you  
Press 1 to add a new Book  
Press 2 to delete a book  
Press 3 to view details of all the books  
Press 4 to Details of book issued  
Press 5 to display the fine-Table  
Press 6 to check Reservation table of a book  
Press 7 to issue book to a user  
Press 8 to get a book return  
Press 9 to update a particular Book  
Press any other to signout  
8  
Enter the User-id  
100  
Enter book-id to be returned  
12  
Book successfully returned.  
Ln 1, Col 1 Spaces: 4 UTF-8 CRLF {} Java
```

```
C:\Users\PropServe> Documents > Rakshith > SSN > Sem3 > OOPS > Mini Project > Proj > J LibraryManagementSystem.java > ...  
230 }  
PROBLEMS 5 OUTPUT DEBUG CONSOLE TERMINAL  
12  
Book successfully returned.  
-----  
To continue as admin--->Here are the choices available to you  
Press 1 to add a new Book  
Press 2 to delete a book  
Press 3 to view details of all the books  
Press 4 to Details of book issued  
Press 5 to display the fine-Table  
Press 6 to check Reservation table of a book  
Press 7 to issue book to a user  
Press 8 to get a book return  
Press 9 to update a particular Book  
Press any other to signout  
3  
Java: 0 copies checked out, 15 copies available.  
Python: 1 copies checked out, 9 copies available.  
Mathematics: 1 copies checked out, 11 copies available.  
-----  
To continue as admin--->Here are the choices available to you  
Press 1 to add a new Book  
Press 2 to delete a book  
Press 3 to view details of all the books  
Press 4 to Details of book issued  
Press 5 to display the fine-Table  
Press 6 to check Reservation table of a book  
Press 7 to issue book to a user  
Press 8 to get a book return  
Press 9 to update a particular Book  
Press any other to signout  
Ln 1, Col 1 Spaces: 4 UTF-8 CRLF {} Java
```

OBJECT ORIENTED FEATURES USED

The following Object Oriented features have been used in this project:

- 1) Exception Handling
- 2) Collection Frameworks
- 3) Inheritance
- 4) Interfaces
- 5) Abstraction
- 6) Polymorphism
- 7) Overriding
- 8) Encapsulation
- 9) Classes
- 10) Objects
- 11) Message Passing
- 12) Generics

INFERENCE AND FUTURE EXTENSIONS

With the help of GUI and Back End Development using DBMS and ReactJS with flutter the project can be extended to a real time application App based End result suitable for easy usage