GROUP 10

DATA STRUCTURES AND ALGORITHMS

PROJECT DONE BY:

I) ARUN T D - CB.EN.U4AIE22004
II) GADILA SIRI REDDY - CB.EN.U4AIE22019
III) KOTA VENKATA VAMSHIDHAR REDDY - CB.EN.U4AIE22028
IV) MADHAV M - CB.EN.U4AIE22034

22AIE212

DATA STRUCTURES AND ALGORITHMS

A THESIS SUBMITTED BY

ARUN T D (CB.EN.U4AIE22004)

GADILA SIRI REDDY (CB.EN.U4AIE22019)

KOTA VENKATA VAMSHIDHAR REDDY (CB.EN.U4AIE22028)

MADHAV M (CB.EN.U4AIE22034)

in partial fulfilment for the award of the degree of

BACHELOR OF TECHNOLOGY

IN

CSE(AI)

Centre for Computational Engineering and Networking

AMRITA SCHOOL OF ARTIFICIAL INTELLIGENCE

AMRITA VISHWA VIDYAPEETHAM

COIMBATORE – 641 112 (INDIA)

JULY – 2023

AMRITA VISHWA VIDYAPEETHAM
DEEMED TO BE UNIVERSITY UNDER SECTION 3 OF THE UGC ACT, 1956

BONAFIDE CERTIFICATE

This is to certify that the thesis entitled “Library Management System” submitted by **Arun T D (CB.EN.U4AIE22004), Gadila Siri Reddy (CB.EN.U4AIE22019), Kota Venkata Vamshidhar Reddy (CB.EN.U4AIE22028), Madhav M (CB.EN.U4AIE22034)** for the award of the Degree of Bachelor of Technology in the “CSE(AI) ” is a bonafide record of the work carried out by his/her under our guidance and supervision at Amrita School of Artificial Intelligence, Coimbatore.

Dr. Pratiti Bhadra

Project Guide

Dr. K.P. Soman

Professor and Head CEN

Submitted for the university examination held on Tuesday 13 July 2023

AMRITA SCHOOL OF ARTIFICIAL INTELLIGENCE

AMRITA VISHWA VIDYAPEETHAM

COIMBATORE - 641 112

DECLARATION

We, Arun T D (CB.EN.U4AIE22004), Gadila Siri Reddy (CB.EN.U4AIE22019), Kota Venkata Vamshidhar Reddy (CB.EN.U4AIE22028), Madhav M (CB.EN.U4AIE22034), hereby declare that this thesis entitled "Library Management System", is the record of the original workdone by us under the guidance of Dr. Pratiti Bhadra, Assistant Professor (SG), Centre for Computational Engineering and Networking, Amrita School of Artificial Intelligence, Coimbatore. To the best of my knowledge, this work has not formed the basis for the award of any degree/diploma/ associateship/fellowship/or a similar award to any candidate in any University.

Place: Coimbatore

Date:16-06-2023 **Signature of the Student**

ACKNOWLEDGEMENT

We are deeply thankful to the Center for Excellence in Computational Engineering and Networking (CEN) at Amrita Vishwa Vidyapeetham, Coimbatore for providing us with such a wonderful environment to peruse our research. We would like to express our sincere gratitude to Dr. Pratiti Bhadra, Assistant Professor (SG), Department of Center for Excellence in CEN, Amrita Vishwa Vidyapeetham. We have completed our research under her guidance. We found the research area, topic, and problem with her suggestions. She guided us with our study and supplied us with many research papers and academic resources in this area. She is patient and responsible. When we had questions and needed her help, she would always find time to meet and discuss with us no matter how busy she was.

Contents

LIBRARY MANAGEMENT SYSTEM

1. PROBLEM STATEMENT:

The library management system that we have implemented solves the problem of efficiently managing books and readers in a library setting. This library management system solves the challenges faced in manual library management by providing a digital platform that automates various tasks. It enhances the efficiency, and user experience for both user and admin by helping them in managing library resources, contributing to an organized and effective library environment.

Why is this library management system beneficial:

1.1. Efficient Management: This system allows librarians/users to exclusive features like the library's collection, search for books by ID, name, or author, and view the availability status of each book. It makes it easier to keep track of the library's inventory.

1.2. Book Issuing: This system facilitates the smooth issuing and submission of books.

1.3. Efficient Search Functionality: The quick search functionality saves time for both librarians and readers, enabling them to find the desired books on various basis like BookId, BookName etc. more efficiently.

2. METHODOLOGY:

We used primarily two data structures:

i) Arrays.
ii) Structures.

2.1. Arrays:

Efficient Data Storage for Books and Readers

Advantages:

i) **Random Access**: Quick retrieval and modification of data elements using indices.

ii) **Efficient Memory Utilization**: Arrays utilize contiguous memory, resulting in efficient memory usage.

iii) **Simplicity**: Arrays are simple to understand and implement, being a built-in data structure in most programming languages.

Disadvantages:

i) **Fixed Size**: Arrays have a predetermined size, limiting flexibility in dynamically changing the size.
ii) **Complex Insertions and Deletions**: Inserting or deleting elements in the middle of an array can be challenging due to the need for shifting elements.

2.2. Structures:

Organizing Data Models for Books and Readers

Advantages:

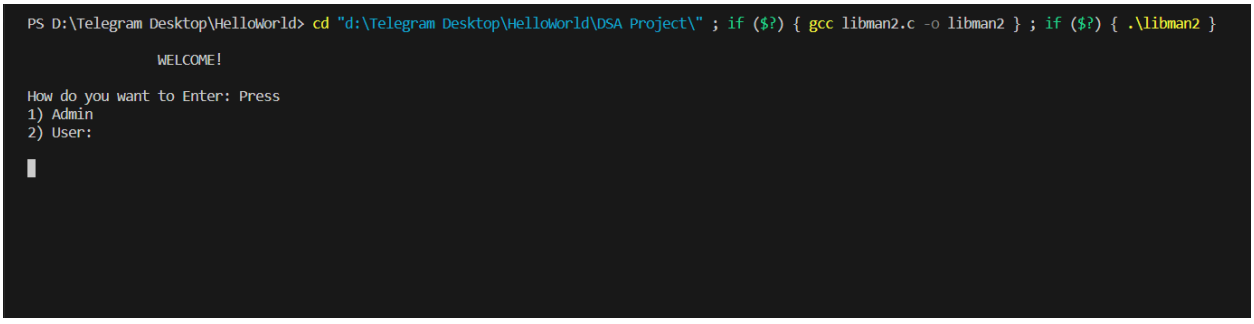
i) **Organization of related data**: Structures provide a way to organize data attributes into a single unit, improving code readability and maintainability.
ii) **Flexibility in defining data models**: Structures allow for defining custom data types with different attributes, enabling a more comprehensive representation of books and readers.

Disadvantages:

i) **Lack of Inheritance:** Unlike classes, structures do not support inheritance, limiting the ability to create hierarchical relationships.
ii) **Slower:** Excessive use of structures makes programs slower and increases the time complexity.

3. RESULT:

3.1. ADMIN VIEW:



```
PS D:\Telegram Desktop\HelloWorld> cd "d:\Telegram Desktop\HelloWorld\DSA Project\" ; if ($?) { gcc libman2.c -o libman2 } ; if ($?) { .\libman2 }

               WELCOME!

How do you want to Enter: Press
1) Admin
2) User:

1
You have requested to enter the page as Admin.  Please Enter the Password to continue: 123
Your Password is Incorrect! Please try again..
PS D:\Telegram Desktop\HelloWorld\DSA Project>
```

```
PS D:\Telegram Desktop\HelloWorld\DSA Project> cd "d:\Telegram Desktop\HelloWorld\DSA Project\" ; if ($?) { gcc libman2.c -o libman2 } ; if ($?) { .
\libman2 }

               WELCOME!

How do you want to Enter: Press
1) Admin
2) User:

1
You have requested to enter the page as Admin.  Please Enter the Password to continue: 3112

Welcome Admin!

        Library Management System for Admins
        ------------------------------------
1. Add new book         2. Search book
3. Add new reader       4. Search reader
5. Issue book           6. Submit book
7. Delete book          8. Delete reader
9. List of books        10. Exit

Enter your choice:
```

```
Enter your choice: 9

               List of Books

ID    Book Name                     Author Name          Available  Reader ID
-------------------------------------------------------------------------------------------
1     TheIndiaWay                   ljtl                 Yes        0
2     Book2Title                    Author2              Yes        0
3     Book3Title                    Author3              Yes        0
4     Book4Title                    Author4              Yes        0


        Library Management System for Admins
        ------------------------------------
1. Add new book         2. Search book
3. Add new reader       4. Search reader
5. Issue book           6. Submit book
7. Delete book          8. Delete reader
9. List of books        10. Exit

Enter your choice:
```

```
        Library Management System for Admins
        ------------------------------------
1. Add new book         2. Search book
3. Add new reader       4. Search reader
5. Issue book           6. Submit book
7. Delete book          8. Delete reader
9. List of books        10. Exit

Enter your choice: 1
Enter the Book ID(Only Numerical): 3
Book ID already exists. Please enter a different ID.
```

```
        Library Management System for Admins
        ------------------------------------
1. Add new book         2. Search book
3. Add new reader       4. Search reader
5. Issue book           6. Submit book
7. Delete book          8. Delete reader
9. List of books        10. Exit

Enter your choice: 1
Enter the Book ID(Only Numerical): 5
Enter the name of the book(Space Not accepted): TheWaterFall
Enter the name of the author(Space Not accepted): Hethgk
Book added successfully.


        Library Management System for Admins
        ------------------------------------
1. Add new book         2. Search book
3. Add new reader       4. Search reader
5. Issue book           6. Submit book
7. Delete book          8. Delete reader
9. List of books        10. Exit

Enter your choice: 9

               List of Books

ID    Book Name                   Author Name         Available  Reader ID
-------------------------------------------------------------------------------------------
1     TheIndiaWay                 ljtl                Yes        0
2     Book2Title                  Author2             Yes        0
3     Book3Title                  Author3             Yes        0
4     Book4Title                  Author4             Yes        0
5     TheWaterFall                Hethgk              Yes        0
```

```
        Library Management System for Admins
        ------------------------------------
 1. Add new book         2. Search book
 3. Add new reader       4. Search reader
 5. Issue book           6. Submit book
 7. Delete book          8. Delete reader
 9. List of books        10. Exit

 Enter your choice: 2

 Enter
 1)Search via Book ID
 2)search via Book Name
 3)Search via Author name: 1
 Enter book ID(Only Numerical): 5

        Book Information
 Book ID: 5      Book Name: TheWaterFall
 Author Name: Hethgk
 Available: Yes  Due by Reader ID: 0
```

```
        Library Management System for Admins
        ------------------------------------
1. Add new book         2. Search book
3. Add new reader       4. Search reader
5. Issue book           6. Submit book
7. Delete book          8. Delete reader
9. List of books        10. Exit

Enter your choice: 2

Enter
1)Search via Book ID
2)search via Book Name
3)Search via Author name: 2
Enter the book name(Space not Accepted): TheIndiaWay

        Book Information
Book ID: 1      Book Name: TheIndiaWay
Author Name: ljtl
Available: Yes  Due by Reader ID: 0
```

```
        Library Management System for Admins
        ------------------------------------
1. Add new book         2. Search book
3. Add new reader       4. Search reader
5. Issue book           6. Submit book
7. Delete book          8. Delete reader
9. List of books        10. Exit

Enter your choice: 2

Enter
1)Search via Book ID
2)search via Book Name
3)Search via Author name: 3
Enter the author name(Space not Accepted): Madhav
Author name not matching.
```

```
        Library Management System for Admins
        ------------------------------------
1. Add new book         2. Search book
3. Add new reader       4. Search reader
5. Issue book           6. Submit book
7. Delete book          8. Delete reader
9. List of books        10. Exit

Enter your choice: 3
Enter Reader's name(Space not accepted): Madhav
Enter Reader id(Only numerical): 1
Reader added successfully.
```

```
        Library Management System for Admins
        ------------------------------------
1. Add new book         2. Search book
3. Add new reader       4. Search reader
5. Issue book           6. Submit book
7. Delete book          8. Delete reader
9. List of books        10. Exit

Enter your choice: 4
Enter Reader ID(Only Numerical): 4

        Reader Information
Reader ID: 4    Reader Name: Arun
Due: n          Due book ID: 0
```

```
        Library Management System for Admins
        ------------------------------------
1. Add new book         2. Search book
3. Add new reader       4. Search reader
5. Issue book           6. Submit book
7. Delete book          8. Delete reader
9. List of books        10. Exit

Enter your choice: 5
Enter book ID: 4
Enter reader ID: 3
Book issued successfully.
```

```
        Library Management System for Admins
        ------------------------------------
1. Add new book         2. Search book
3. Add new reader       4. Search reader
5. Issue book           6. Submit book
7. Delete book          8. Delete reader
9. List of books        10. Exit

Enter your choice: 4
Enter Reader ID(Only Numerical): 3

        Reader Information
Reader ID: 3    Reader Name: Siri
Due: y          Due book ID: 4
```

```
        Library Management System for Admins
        ------------------------------------
1. Add new book         2. Search book
3. Add new reader       4. Search reader
5. Issue book           6. Submit book
7. Delete book          8. Delete reader
9. List of books        10. Exit

Enter your choice: 5
Enter book ID: 3
Enter reader ID: 3
Book not issued.
Reader has a due book.
```

```
        Library Management System for Admins
        ------------------------------------
1. Add new book         2. Search book
3. Add new reader       4. Search reader
5. Issue book           6. Submit book
7. Delete book          8. Delete reader
9. List of books        10. Exit

Enter your choice: 6
Enter book ID: 4
Book submitted successfully.
```

```
        Library Management System for Admins
        ------------------------------------
1. Add new book         2. Search book
3. Add new reader       4. Search reader
5. Issue book           6. Submit book
7. Delete book          8. Delete reader
9. List of books        10. Exit

Enter your choice: 5
Enter book ID: 3
Enter reader ID: 4
Book issued successfully.


        Library Management System for Admins
        ------------------------------------
1. Add new book         2. Search book
3. Add new reader       4. Search reader
5. Issue book           6. Submit book
7. Delete book          8. Delete reader
9. List of books        10. Exit

Enter your choice: 9

               List of Books

ID    Book Name                 Author Name         Available  Reader ID
-----------------------------------------------------------------------------------------
1     TheIndiaWay               ljtl                Yes        0
2     Book2Title                Author2             Yes        0
3     Book3Title                Author3             No         4
4     Book4Title                Author4             Yes        0
```

```
        Library Management System for Admins
        ------------------------------------
1. Add new book         2. Search book
3. Add new reader       4. Search reader
5. Issue book           6. Submit book
7. Delete book          8. Delete reader
9. List of books        10. Exit

Enter your choice: 6
Enter book ID: 3
Book submitted successfully.


        Library Management System for Admins
        ------------------------------------
1. Add new book         2. Search book
3. Add new reader       4. Search reader
5. Issue book           6. Submit book
7. Delete book          8. Delete reader
9. List of books        10. Exit

Enter your choice: 9

               List of Books

ID    Book Name                   Author Name         Available  Reader ID
-------------------------------------------------------------------------------------
1     TheIndiaWay                 ljtl                Yes        0
2     Book2Title                  Author2             Yes        0
3     Book3Title                  Author3             Yes        0
4     Book4Title                  Author4             Yes        0
```

```
        Library Management System for Admins
        ------------------------------------
1. Add new book         2. Search book
3. Add new reader       4. Search reader
5. Issue book           6. Submit book
7. Delete book          8. Delete reader
9. List of books        10. Exit

Enter your choice: 1
Enter the Book ID(Only Numerical): 5
Enter the name of the book(Space Not accepted): TheRailways
Enter the name of the author(Space Not accepted): Gowri
Book added successfully.


        Library Management System for Admins
        ------------------------------------
1. Add new book         2. Search book
3. Add new reader       4. Search reader
5. Issue book           6. Submit book
7. Delete book          8. Delete reader
9. List of books        10. Exit

Enter your choice: 7
Enter book ID: 5
Book deleted successfully.
```

```
        Library Management System for Admins
        ------------------------------------
1. Add new book         2. Search book
3. Add new reader       4. Search reader
5. Issue book           6. Submit book
7. Delete book          8. Delete reader
9. List of books        10. Exit

Enter your choice: 9

               List of Books

ID    Book Name                   Author Name         Available  Reader ID
-------------------------------------------------------------------------------------
1     TheIndiaWay                 ljtl                Yes        0
2     Book2Title                  Author2             Yes        0
3     Book3Title                  Author3             Yes        0
4     Book4Title                  Author4             Yes        0
```

```
        Library Management System for Admins
        ------------------------------------
1. Add new book         2. Search book
3. Add new reader       4. Search reader
5. Issue book           6. Submit book
7. Delete book          8. Delete reader
9. List of books        10. Exit

Enter your choice: 7
Enter book ID: 8
Book not found.
```

```
        Library Management System for Admins
        ------------------------------------
1. Add new book         2. Search book
3. Add new reader       4. Search reader
5. Issue book           6. Submit book
7. Delete book          8. Delete reader
9. List of books        10. Exit

Enter your choice: 8
Enter Reader ID: 2
Reader deleted successfully.


        Library Management System for Admins
        ------------------------------------
1. Add new book         2. Search book
3. Add new reader       4. Search reader
5. Issue book           6. Submit book
7. Delete book          8. Delete reader
9. List of books        10. Exit

Enter your choice: 4
Enter Reader ID(Only Numerical): 2
Reader not found.
```

```
        Library Management System for Admins
        ------------------------------------
1. Add new book         2. Search book
3. Add new reader       4. Search reader
5. Issue book           6. Submit book
7. Delete book          8. Delete reader
9. List of books        10. Exit

Enter your choice: 10

               Goodbye!
PS D:\Telegram Desktop\HelloWorld\DSA Project>
```

3.2.USER VIEW:

```
PS D:\Telegram Desktop\HelloWorld> cd "d:\Telegram Desktop\HelloWorld\DSA Project\" ; if ($?) { gcc libman2.c -o libman2 } ; if ($?) { .\libman2 }

               WELCOME!

How do you want to Enter: Press
1) Admin
2) User:

2
Welcome to the Library! You have entered the library as a user.
Please add yourself as a reader before continuing...

        Library Management System for Users
        -----------------------------------
1. Search book
2. Add new reader
3. Submit the book
4. List of books
5. Exit

Enter your choice: 2
Enter Reader's name: Roy
Enter Reader id: 1
Reader added successfully.
```

```
Enter your choice: 4

               List of Books

ID    Book Name                   Author Name          Available  Reader ID
-------------------------------------------------------------------------------------------
1     TheIndiaWay                 ljtl                 Yes        0
2     Book2Title                  Author2              Yes        0
3     Book3Title                  Author3              Yes        0
4     Book4Title                  Author4              Yes        0


        Library Management System for Users
        -----------------------------------
1. Search book
2. Add new reader
3. Submit the book
4. List of books
5. Exit

Enter your choice:
```

```
        Library Management System for Users
        -----------------------------------
1. Search book
2. Add new reader
3. Submit the book
4. List of books
5. Exit

Enter your choice: 1

Enter
1)Search via Book ID
2)search via Book Name
3)Search via Author name: 1
Enter book ID(Only Numerical): 1

        Book Information
Book ID: 1      Book Name: TheIndiaWay
Author Name: ljtl
Available: Yes  Due by Reader ID: 0
```

```
        Library Management System for Users
        -----------------------------------
1. Search book
2. Add new reader
3. Submit the book
4. List of books
5. Exit

Enter your choice: 1

Enter
1)Search via Book ID
2)search via Book Name
3)Search via Author name: 1
Enter book ID(Only Numerical): 6
Book not found.
```

```
        Library Management System for Users
        -----------------------------------
1. Search book
2. Add new reader
3. Submit the book
4. List of books
5. Exit

Enter your choice: 5

               Goodbye!
PS D:\Telegram Desktop\HelloWorld\DSA Project>
```

```
               WELCOME!

How do you want to Enter: Press
1) Admin
2) User:

3
You have pressed a different number. Press between 1 and 2.
PS D:\Telegram Desktop\HelloWorld\DSA Project>
```

```
How do you want to Enter: Press
1) Admin
2) User:

1
You have requested to enter the page as Admin.  Please Enter the Password to continue: 3112

Welcome Admin!

        Library Management System for Admins
        ------------------------------------
1. Add new book         2. Search book
3. Add new reader       4. Search reader
5. Issue book           6. Submit book
7. Delete book          8. Delete reader
9. List of books        10. Exit

Enter your choice: 13
Invalid choice.
```

4. ANALYSIS AND DISCUSSION:

4.1. Time Complexity:

The overall time complexity of the program is O(n), where n represents the size of the book and reader arrays being processed. The program primarily involves linear search operations, which require iterating over the arrays to find specific books, readers, or empty slots.

Although we have implemented all our knowledge and learnings here, there is always room for improvement and limitations.

Here are the limitations of the program:

4.2. Limitations:

i) **Lack of Dynamic Memory Management**: The code does not use dynamic memory allocation as we have given the fixed size of the array, so it cannot handle a variable number of books or readers beyond the defined array sizes.

ii) **Lack of Backend:** The data is not stored persistently, so any changes made during program execution will not persist after the program terminates. That is, once the program is terminated all the data included stored will be lost.

iii) **Lack of Data Validation:** The code assumes that the user will always enter valid inputs, like numerical values for IDs and string inputs for names, authors, and availability.

4.3. Conversion to a Better Version:

When transitioning the project to an enhanced version, it is important to consider that there is always room for improvement in terms of enhancing the overall quality of the product. By striving for continuous improvement, the project can be elevated to a better version that offers enhanced performance, usability, reliability, and scalability.

Some suggestions from our side include:

i) **Dynamic Memory Management:** Implement dynamic memory allocation using data structures like linked lists or Array List to handle a variable number of books and readers.

ii) **Database Integration**: Integrate a database system to store and retrieve data consistently, allowing for better data management and scalability.

iii) **User Interface Environment**: Develop a user-friendly graphical user interface (GUI) to improve the user experience and ease of interaction with the system.

iv) **Reservation System:** This would allow users to make reservations for books they are interested in and get them issued next.

v) **User Account System:** This includes all the info about the user – their history, interests, books renewed, due date etc. This would enable to recommend users to new authors and books in the genres they might enjoy reading.

vi) **Additional Features:** Consider adding features like advanced search options, due date management, user authentication and integration with E-book Platforms.

5. APPENDIX:

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>

struct reader {
    int id;
    char name[50];
    char due;
    int bid;
};

struct book {
    int id;
    char name[50];
    char author[20];
    char avbl[10];
    int rdid;
```

```
};

int main() {
    struct reader rdr[10] = {0};
    struct book bok[20] = {0};

    int choice, searchid, searchid1, n, m, password, ch, newBookId, serch;
    char str2[6];
    char searchname[50];

    // Adding some sample books
    bok[0].id = 1;
    strcpy(bok[0].name, "TheIndiaWay");
    strcpy(bok[0].author, "ljtl");
    strcpy(bok[0].avbl, "Yes");
    bok[0].rdid = 0;

    bok[1].id = 2;
    strcpy(bok[1].name, "Book2Title");
    strcpy(bok[1].author, "Author2");
    strcpy(bok[1].avbl, "Yes");
    bok[1].rdid = 0;

    bok[2].id = 3;
    strcpy(bok[2].name, "Book3Title");
    strcpy(bok[2].author, "Author3");
    strcpy(bok[2].avbl, "Yes");
    bok[2].rdid = 0;

    bok[3].id = 4;
    strcpy(bok[3].name, "Book4Title");
    strcpy(bok[3].author, "Author4");
    strcpy(bok[3].avbl, "Yes");
    bok[3].rdid = 0;

    printf("\n\t\tWELCOME!\n\n");

    printf("How do you want to Enter: Press\n1) Admin\n2) User:\n\n");
    scanf("%d", &ch);

    if (ch == 1) {
        printf("You have requested to enter the page as Admin.\t");
        printf("Please Enter the Password to continue: ");
        scanf("%d", &password);
```

```
        if (password == 3112) {
            printf("\nWelcome Admin!\n");

            do {
                printf("\n\tLibrary Management System for Admins\n\t---------
------------------------\n1. Add new book\t\t2. Search book\n3. Add new
reader\t4. Search reader\n5. Issue book\t\t6. Submit book\n7. Delete
book\t\t8. Delete reader\n9. List of books\t10. Exit\n\nEnter your choice:
");
                scanf("%d", &choice);

                switch (choice) {
                    case 1:
                        printf("Enter the Book ID(Only Numerical): ");
                        scanf("%d", &newBookId);

                        for (int i = 4; i < 20; i++) {
                            if (bok[i].id == newBookId || newBookId == 1 ||
newBookId == 2 || newBookId == 3 || newBookId == 4) {
                                printf("Book ID already exists. Please enter
a different ID.\n\n");
                                break;
                            }

                            if (bok[i].id == 0) {
                                printf("Enter the name of the book(Space Not
accepted): ");
                                scanf("%s", bok[i].name);
                                printf("Enter the name of the author(Space
Not accepted): ");
                                scanf("%s", bok[i].author);
                                bok[i].id = newBookId;
                                strcpy(bok[i].avbl, "Yes");
                                bok[i].rdid = 0;
                                printf("Book added successfully.\n\n");
                                break;
                            }
                        }
                        break;

                    case 2:
                        // Search book
                        printf("\nEnter\n1)Search via Book ID \n2)search via
Book Name \n3)Search via Author name: ");
                        scanf("%d", &serch);
```

```
                    switch (serch) {
                        case 1:
                            printf("Enter book ID(Only Numerical): ");
                            scanf("%d", &searchid);
                            n = 0;

                            for (int i = 0; i < 20; i++) {
                                if (searchid == bok[i].id) {
                                    printf("\n\tBook Information\nBook
ID: %d\tBook Name: %s\nAuthor Name: %s\nAvailable: %s\tDue by Reader ID:
%d\n",
                                           bok[i].id, bok[i].name,
bok[i].author, bok[i].avbl, bok[i].rdid);
                                    n++;
                                }
                                else{
                                    printf("Book Id not matching.\n");
                                }
                            }
                            break;

                        case 2:
                            printf("Enter the book name(Space not
Accepted): ");
                            scanf("%s", &searchname);

                            for (int i = 0; i < 20; i++) {
                                if (strcmp(bok[i].name, searchname) == 0)
{
                                    printf("\n\tBook Information\nBook
ID: %d\tBook Name: %s\nAuthor Name: %s\nAvailable: %s\tDue by Reader ID:
%d\n",
                                           bok[i].id, bok[i].name,
bok[i].author, bok[i].avbl, bok[i].rdid);
                                    n++;
                                }
                                else{
                                    printf("Book name not matching.\n");
                                    break;
                                }

                            }
                            break;
```

```
                            case 3:
                                printf("Enter the author name(Space not
Accepted): ");
                                scanf("%s", &searchname);

                                for (int i = 0; i < 20; i++) {
                                    if (strcmp(bok[i].author, searchname) ==
0) {
                                        printf("\n\tBook Information\nBook
ID: %d\tBook Name: %s\nAuthor Name: %s\nAvailable: %s\tDue by Reader ID:
%d\n",
                                            bok[i].id, bok[i].name,
bok[i].author, bok[i].avbl, bok[i].rdid);
                                        n++;
                                    }
                                    else{
                                        printf("Author name not
matching.\n");
                                        break;
                                    }

                                }
                                break;

                            default:
                                printf("Invalid choice.\n\n");
                                break;
                        }

                        if (n == 0) {
                            printf("Book not found");
                        }
                        break;

                    case 3:
                        // Add new reader
                        for (int i = 0; i < 10; i++) {
                            if (rdr[i].id == 0) {
                                printf("Enter Reader's name(Space not
accepted): ");
                                scanf("%s", rdr[i].name);
                                printf("Enter Reader id(Only numerical): ");
                                scanf("%d", &rdr[i].id);
                                rdr[i].due = 'n';
                                rdr[i].bid = 0;
```

```
                                i = 10;
                                printf("Reader added successfully.\n\n");
                            }
                        }
                        break;

                    case 4:
                        // Search reader
                        printf("Enter Reader ID(Only Numerical): ");
                        scanf("%d", &searchid);
                        n = 0;

                        for (int i = 0; i < 10; i++) {
                            if (searchid == rdr[i].id) {
                                printf("\n\tReader Information\nReader ID:
%d\tReader Name: %s\nDue: %c\t\tDue book ID: %d\n",
                                       rdr[i].id, rdr[i].name, rdr[i].due,
rdr[i].bid);
                                n++;
                            }
                        }

                        if (n == 0) {
                            printf("Reader not found.\n\n");
                        }
                        break;

                    case 5:
                        // Issue book
                        printf("Enter book ID: ");
                        scanf("%d", &searchid);
                        printf("Enter reader ID: ");
                        scanf("%d", &searchid1);
                        n = 0;
                        m = 0;

                        for (int i = 0; i < 20; i++) {
                            if (searchid == bok[i].id && strcmp(bok[i].avbl,
"Yes") == 0) {
                                strcpy(bok[i].avbl, "No");
                                bok[i].rdid = searchid1;
                                n++;
                                break;
                            }
                        }
```

```
                    for (int i = 0; i < 10; i++) {
                        if (searchid1 == rdr[i].id && rdr[i].due == 'n')
{
                            rdr[i].due = 'y';
                            rdr[i].bid = searchid;
                            m++;
                            break;
                        }
                    }

                    if (n == 1 && m == 1) {
                        printf("Book issued successfully.\n\n");
                    } else if (n == 1 && m == 0) {
                        for (int i = 0; i < 20; i++) {
                            if (searchid == bok[i].id) {
                                strcpy(bok[i].avbl, "Yes");
                                bok[i].rdid = 0;
                                break;
                            }
                        }
                        printf("Book not issued.\nReader has a due
book.\n\n");
                    } else {
                        printf("Book or Reader not found.\n\n");
                    }
                    break;

                case 6:
                    // Submit book
                    printf("Enter book ID: ");
                    scanf("%d", &searchid);

                    for (int i = 0; i < 20; i++) {
                        if (searchid == bok[i].id) {
                            strcpy(bok[i].avbl, "Yes");
                            searchid1 = bok[i].rdid;
                            bok[i].rdid = 0;
                            break;
                        }
                    }

                    for (int i = 0; i < 10; i++) {
                        if (searchid1 == rdr[i].id) {
                            rdr[i].due = 'n';
```

```
                        rdr[i].bid = 0;
                        break;
                    }
                }

                printf("Book submitted successfully.\n\n");
                break;

            case 7:
                // Delete book
                printf("Enter book ID: ");
                scanf("%d", &searchid);
                n = 0;

                for (int i = 0; i < 20; i++) {
                    if (searchid == bok[i].id) {
                        bok[i].id = 0;
                        strcpy(bok[i].name, "");
                        strcpy(bok[i].author, "");
                        strcpy(bok[i].avbl, "");
                        bok[i].rdid = 0;
                        n++;
                        printf("Book deleted successfully.\n\n");
                        break;
                    }
                }

                if (n == 0) {
                    printf("Book not found.\n\n");
                }
                break;

            case 8:
                // Delete reader
                printf("Enter Reader ID: ");
                scanf("%d", &searchid);
                n = 0;

                for (int i = 0; i < 10; i++) {
                    if (searchid == rdr[i].id) {
                        rdr[i].id = 0;
                        strcpy(rdr[i].name, "");
                        rdr[i].due = 'n';
                        rdr[i].bid = 0;
                        n++;
```

```
                            printf("Reader deleted successfully.\n\n");
                            break;
                        }
                    }

                    if (n == 0) {
                        printf("Reader not found.\n\n");
                    }
                    break;

                case 9:
                    // List of books
                    printf("\n\t\tList of Books\n\n");
                    printf("%-5s %-30s %-20s %-10s %-15s\n", "ID", "Book
Name", "Author Name", "Available", "Reader ID");
                    printf("-----------------------------------------
-----------------------------------------\n");

                    for (int i = 0; i < 20; i++) {
                        if (bok[i].id != 0) {
                            printf("%-5d %-30s %-20s %-10s %-15d\n",
bok[i].id, bok[i].name, bok[i].author, bok[i].avbl, bok[i].rdid);
                        }
                    }

                    printf("\n");
                    break;

                case 10:
                    printf("\n\t\tGoodbye!\n");
                    exit(0);

                default:
                    printf("Invalid choice.\n\n");
                    break;
            }
        } while (choice != 10);
    } else {
        printf("Your Password is Incorrect! Please try again..\n");
    }
} else if (ch == 2) {
    printf("Welcome to the Library! You have entered the library as a
user.\n");
    printf("Please add yourself as a reader before continuing...\n");
```

```
        do {
            printf("\n\tLibrary Management System for Users\n\t--------------
-----------------------\n1. Search book\n2. Add new reader\n3. Submit the
book\n4. List of books\n5. Exit\n\nEnter your choice: ");
            scanf("%d", &choice);

            switch (choice) {
                case 1:
                        // Search book
                        printf("\nEnter\n1)Search via Book ID \n2)search via
Book Name \n3)Search via Author name: ");
                        scanf("%d", &serch);

                        switch (serch) {
                            case 1:
                                printf("Enter book ID(Only Numerical): ");
                                scanf("%d", &searchid);
                                n = 0;

                                for (int i = 0; i < 20; i++) {
                                    if (searchid == bok[i].id) {
                                        printf("\n\tBook Information\nBook
ID: %d\tBook Name: %s\nAuthor Name: %s\nAvailable: %s\tDue by Reader ID:
%d\n",
                                               bok[i].id, bok[i].name,
bok[i].author, bok[i].avbl, bok[i].rdid);
                                        n++;
                                    }
                                }
                                break;

                            case 2:
                                printf("Enter the book name(Space not
Accepted): ");
                                scanf("%s", &searchname);

                                for (int i = 0; i < 20; i++) {
                                    if (strcmp(bok[i].name, searchname) == 0)
{
                                        printf("\n\tBook Information\nBook
ID: %d\tBook Name: %s\nAuthor Name: %s\nAvailable: %s\tDue by Reader ID:
%d\n",
                                               bok[i].id, bok[i].name,
bok[i].author, bok[i].avbl, bok[i].rdid);
                                        n++;
```

```
                                    }
                                    else{
                                        printf("Book name not matching.\n");
                                        break;
                                    }

                                }
                                break;

                            case 3:
                                printf("Enter the author name(Space not
Accepted): ");
                                scanf("%s", &searchname);

                                for (int i = 0; i < 20; i++) {
                                    if (strcmp(bok[i].author, searchname) ==
0) {
                                        printf("\n\tBook Information\nBook
ID: %d\tBook Name: %s\nAuthor Name: %s\nAvailable: %s\tDue by Reader ID:
%d\n",
                                               bok[i].id, bok[i].name,
bok[i].author, bok[i].avbl, bok[i].rdid);
                                        n++;
                                    }
                                    else{
                                        printf("Author name not
matching.\n");
                                        break;
                                    }

                                }
                                break;

                            default:
                                printf("Invalid choice.\n\n");
                                break;
                        }

                        if (n == 0) {
                            printf("Book not found.\n");
                        }
                        break;


                case 2:
```

```
                    // Add new reader
                    for (int i = 0; i < 10; i++) {
                        if (rdr[i].id == 0) {
                            printf("Enter Reader's name: ");
                            scanf("%s", rdr[i].name);
                            printf("Enter Reader id: ");
                            scanf("%d", &rdr[i].id);
                            rdr[i].due = 'n';
                            rdr[i].bid = 0;
                            i = 10;
                            printf("Reader added successfully.\n\n");
                        }
                    }
                    break;

                case 3:
                    // Submit book
                    printf("Enter book ID: ");
                    scanf("%d", &searchid);

                    for (int i = 0; i < 20; i++) {
                        if (searchid == bok[i].id) {
                            strcpy(bok[i].avbl, "Yes");
                            searchid1 = bok[i].rdid;
                            bok[i].rdid = 0;
                            break;
                        }
                    }

                    for (int i = 0; i < 10; i++) {
                        if (searchid1 == rdr[i].id) {
                            rdr[i].due = 'n';
                            rdr[i].bid = 0;
                            break;
                        }
                    }

                    printf("Book submitted successfully.\n\n");
                    break;

                case 4:
                    // List of books
                    printf("\n\t\tList of Books\n\n");
                    printf("%-5s %-30s %-20s %-10s %-15s\n", "ID", "Book
Name", "Author Name", "Available", "Reader ID");
```

```
                    printf("----------------------------------------------------
-----------------------------------------\n");

                    for (int i = 0; i < 20; i++) {
                        if (bok[i].id != 0) {
                            printf("%-5d %-30s %-20s %-10s %-15d\n",
bok[i].id, bok[i].name, bok[i].author, bok[i].avbl, bok[i].rdid);
                        }
                    }

                    printf("\n");
                    break;

                case 5:
                    printf("\n\t\tGoodbye!\n");
                    exit(0);

                default:
                    printf("Invalid choice.\n\n");
                    break;
            }
        } while (choice != 5);
    } else {
        printf("You have pressed a different number. Press between 1 and
2.\n");
    }

    return 0;
}
```