Library Management System

Siddhesh Ballal
S.Y. B.Tech (I.T.)
PCCOE, Pune.
Pune, Maharashtra.
siddhesh.ballal20@pccoepune.org

Anuj Birhade
S.Y. B.Tech (I.T.)
PCCOE, Pune.
Pune, Maharashtra.
anuj.birhade20@pccoepune.org

Yash Chandre
S.Y. B.Tech (I.T.)
PCCOE, Pune.
Pune, Maharashtra.
yash.chandre20@pccoepune.org

Madhur Kharche
S.Y. B.Tech (I.T.)
PCCOE, Pune.
Pune, Maharashtra.
madhur.kharche@pccoepune.org

Prof. Bhakti Ratnaparakhi
Assistant Professor
Dept. of Information Technology
PCCOE, Pune.
bhakti.ratnaparkhi@pccoepune.org

ABSTRACT

Nowadays everything is advanced like advanced technology, advanced apps, advanced systems and many more.

As a result, Library Management should be transformed into a Digital Library Management System in today's advanced digital environment.

In traditional libraries, students or users must search for books, which is a time-consuming procedure, and databases about concerns are not properly maintained. The general pace of work is slow, making it impossible to produce a timely report. Librarians must put in a lot of effort to organise and categorise books according to their titles and alphabets. As a result, it is a time-consuming and complex task. At the same time, they must review and monitor the details of the lend/borrow book, including the fine. Working in multiple areas at the same time is a time-consuming task.

As a result, the Library Management System (LMS) functions as a machine or tool that converts traditional libraries into digital libraries. LMS will make librarians' jobs easier, and the largest benefit of LMS is that customers won't have to wait in line for extended periods of time to exchange or borrow books from the library. Librarians may readily find any book in less time using the LMS. The C programming language is used throughout the Library Management System project.

General Terms

Management System.

Keywords

Linked List, Library Management System (LMS), Library.

1. INTRODUCTION

A library is a free location where individuals of all kinds can go to improve their knowledge, their studies, and a variety of other things. A library is also a location where people can find a large collection of books and information that are conveniently accessible. It serves as a brain for organisations. It encourages kids to consider many points of view in a good manner. This understanding allows the student to obtain superior academic and personal skill development results. Technology advancements necessitate the creation of a method for converting a traditional library setup to a digital one. To undertake any kind of activity in a traditional library, you must always have a register or handbook.

Librarians usually needed a notebook and pen when counting books. Each piece of information is saved in the notebook for future reference. They must always look in a notebook to review data. At the same time, they must put the book id, distribution and renewal dates, and student id into the notebook while giving the books to the pupils. Each book must be given a tag and an identifier by the librarians or employees. They must align, arrange, and label the books on the shelves. Theft or disappearance of a book is a severe problem for librarians. It will take a long time to complete all of that job. For that purpose, to evoke the library into the technological era, we presented a system called the Library Management System (LMS).

It is an automated method that, with a single click, decreases the workload of workers and librarians. The book will be sorted by their id or alphabets. The library task will be managed, organized, and oriented by it. The librarian can use the Library Management System to add, view, issue, and delete details from the library stock. Library management is a project that manages and preserves electronic book data based on the demands of students. The system assists library administrators in maintaining a consistent inventory of all available books in the library. It allows the administrator to look for a specific book.

2. MOTIVATION, PURPOSE AND SCOPE OF PROJECT

Because the number of individuals buying and reading books has expanded so dramatically in today's society, maintaining book data manually has become increasingly complex and

time-consuming. To avoid this, the identical activity can be readily completed with the assistance of a book database.

We propose to use a Singly Linked List to hold the Book Records (SLL). The book records are kept in the Singly Linked List as nodes, with each node linking to the next node. As a result, it is quite simple to navigate through the book records, search for a specific book, and so on.

We can also sort the books based on the ID of the book or the names of the books in alphabetical order. We may also keep track of how long a book has been in print, starting from the date it was first published. If a book is not returned within a certain length of time, the person who issued the book may be penalized by the library, based on how late the book was returned.

3. OBJECTIVES OF THE PROJECT

1. Provide an easy way to maintain the Book Records.
2. Storing the Records of the books in Sorted manner.
3. Making the process of issuing and returning books very easy for both Librarian as well as the consumers.
4. Keeping track of the Dates of issuing and returning books.
5. Fining the person issuing the book, if in case the person has failed to return the book in given time.

4. DETAILS OF THE DESIGN

The project is designed using the C programming language. Various aspects of the C programming language are used to make the design more efficient and less time consuming.

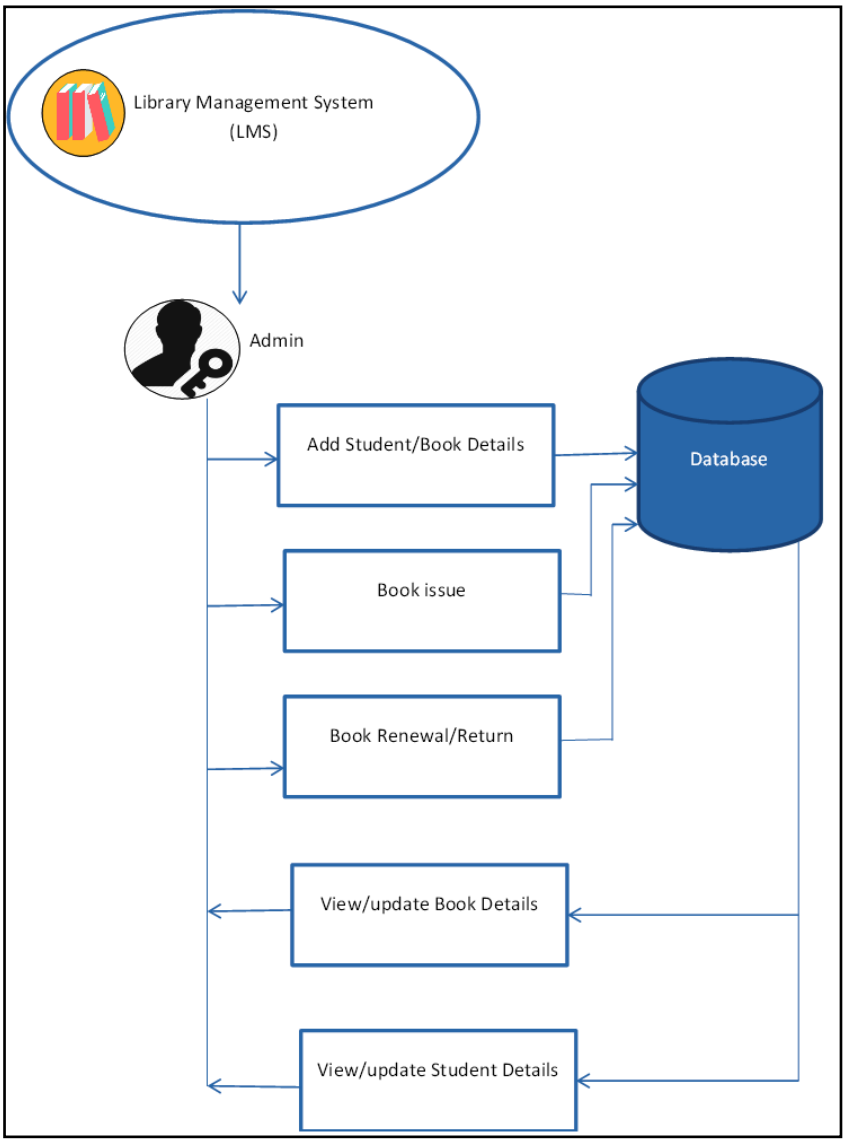

Fig 1: If necessary, the images can be extended both columns

The design focuses on the administrator and can be only accessed by the administrator to manage the database of the books. After starting the program admin needs to login to the system using the correct login id and password. There are 3 attempts given for entering the right id and password. If the person fails to enter the right login id or password in the 3 attempts the program shuts down. The person will need to run the code once again to try for the next time.

The design uses two different linked lists to create the dataset of the books. Each linked list stores the data of the books in three fields, name of book, name of author and id of the book. One of the linked lists stores the books that are available in the library and the second list stores the books which are issued to students. Administrators can issue books from the available books to students. The issued book gets deleted from the available books list and is added to the issued books list.

There are various functions built according to the need of the administrator to manage the books in two different linked lists. The functions used to manage the two lists are as follows.

- Create_Available (): This function creates a linked list of available books by taking input from the user about the first book.
- Add_Book (): This function is used to add books in the linked list of available books by taking input from the user.
- delete (): This function is used to delete a specific book from the list of choice.
- create_list (): This function is used to create a linked list while reading the data from previously available dataset stored in binary files.
- add_to_list() : This function is used to add books to a specific list after issuing or returning the book.
- search (): This function is used to check if a specific list contains the given book or not.
- Display (): This function is used to display all the books in the list of choice.

While the code is being executed the data of the books is stored in two linked lists for performing various operations as required on the data. But it is necessary to store the data somewhere so that it can be used next time without inputting all the data again to the program. The design makes use of file handling for this purpose. All the data of the two lists is stored in two binary files using file handling. This data can be accessed by the program anytime. When the program is commanded to read the data from the binary files, two linked lists are created and the data is stored in them. Thus, making it possible for all the functions to edit the data as per requirement. The data can again be written in the binary files after editing and thus making the design more efficient and reliable.

5. EXPERIEMENTAL WORK

The screenshots captured while testing the code are attached below:

```
> ./main

  **-**-**-**-**-**-**-**-**-**-**-**-**-**-**-**-**-**-**-**-**-**-**-**

        =-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
        =                    WELCOME                                    =
        =                      TO                                       =
        =                    LIBRARY                                    =
        =                  MANAGEMENT                                   =
        =                    SYSTEM                                     =
        =-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
  **-**-**-**-**-**-**-**-**-**-**-**-**-**-**-**-**-**-**-**-**-**-**-**

Enter your id: admin
Id is correct
Enter your password: admin1122
You have successly logged in
```

Fig. 2

```
1) Donate Books
2) Issue New Book
3) Return Issued Book
4) Display Available Books
5) Display Issued Books
6) Write in file
7) Read Data
8) Exit
Enter your choice : 1

 Enter number of Books you want to donate : 2

 Enter Data for the Book
 Enter Book ID : 101

 Enter Book Name : Animal_Farm

 Enter Book Author: George_Orwell
```

Fig. 3

```
 Enter Data for the Book
 Enter Book ID : 102

 Enter Book Name : Sherlock_Holmes

 Enter Book Author: Arthur_Doyle

Do you want to Continue?
Enter 0 for NO
Enter 1 for YES
Enter your Choice : 1
```

Fig. 4

```
Enter your choice : 4

ID       Name        Author
101      Animal_Farm     George_Orwell
102      Sherlock_Holmes     Arthur_Doyle
Do you want to Continue?
Enter 0 for NO
Enter 1 for YES
Enter your Choice : 1

1) Donate Books
2) Issue New Book
3) Return Issued Book
4) Display Available Books
5) Display Issued Books
6) Write in file
7) Read Data
8) Exit
Enter your choice : 6
Writing:Animal_Farm to file
Writing:Sherlock_Holmes to file
```

Fig. 5

```
Do you want to Continue?
Enter 0 for NO
Enter 1 for YES
Enter your Choice : 1

1) Donate Books
2) Issue New Book
3) Return Issued Book
4) Display Available Books
5) Display Issued Books
6) Write in file
7) Read Data
8) Exit
Enter your choice : 1

 Enter number of Books you want to donate : 3

 Enter Data for the Book
 Enter Book ID : 103

 Enter Book Name : Mein_Kampf

 Enter Book Author: Adolf_Hitler
```

Fig. 6

```
 Enter Data for the Book
 Enter Book ID : 104

 Enter Book Name : Origin_Of_Species

 Enter Book Author: Charles_Darwin

 Enter Data for the Book
 Enter Book ID : 105

 Enter Book Name : Ikigai

 Enter Book Author: Hector_Garcia
```

Fig. 7

```
1) Donate Books
2) Issue New Book
3) Return Issued Book
4) Display Available Books
5) Display Issued Books
6) Write in file
7) Read Data
8) Exit
Enter your choice : 4

ID      Name        Author
101     Animal_Farm     George_Orwell
102     Sherlock_Holmes     Arthur_Doyle
103     Mein_Kampf  Adolf_Hitler
104     Origin_Of_Species   Charles_Darwin
105     Ikigai  Hector_Garcia
```

Fig. 8

```
1) Donate Books
2) Issue New Book
3) Return Issued Book
4) Display Available Books
5) Display Issued Books
6) Write in file
7) Read Data
8) Exit
Enter your choice : 2

Enter the Id of the Book you want to issue : 102
Search Complete
```

Fig. 9

```

Enter the Id of the Book you want to issue : 102
Search Complete
List created
Delete Done

Do you want to Continue?
Enter 0 for NO
Enter 1 for YES
Enter your Choice : 1

1) Donate Books
2) Issue New Book
3) Return Issued Book
4) Display Available Books
5) Display Issued Books
6) Write in file
7) Read Data
8) Exit
Enter your choice : 2

Enter the Id of the Book you want to issue : 104
Search Complete
```

Fig. 10

```

Enter the Id of the Book you want to issue : 104
Search Complete
Delete Done

Do you want to Continue?
Enter 0 for NO
Enter 1 for YES
Enter your Choice : 1
```

Fig. 11

```
1) Donate Books
2) Issue New Book
3) Return Issued Book
4) Display Available Books
5) Display Issued Books
6) Write in file
7) Read Data
8) Exit
Enter your choice : 4

ID      Name        Author
101     Animal_Farm     George_Orwell
103     Mein_Kampf  Adolf_Hitler
105     Ikigai  Hector_Garcia
Do you want to Continue?
Enter 0 for NO
Enter 1 for YES
Enter your Choice : 1
```

Fig. 12

```

1) Donate Books
2) Issue New Book
3) Return Issued Book
4) Display Available Books
5) Display Issued Books
6) Write in file
7) Read Data
8) Exit
Enter your choice : 5

ID      Name        Author
102     Sherlock_Holmes     Arthur_Doyle
104     Origin_Of_Species   Charles_Darwin
Do you want to Continue?
Enter 0 for NO
Enter 1 for YES
Enter your Choice : 1
```

Fig. 13

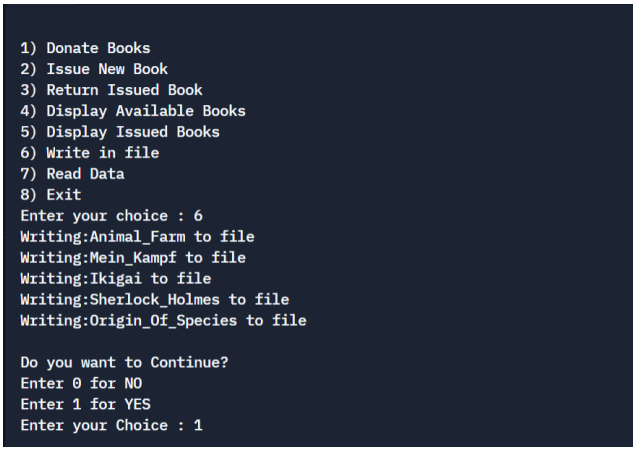

Fig. 14

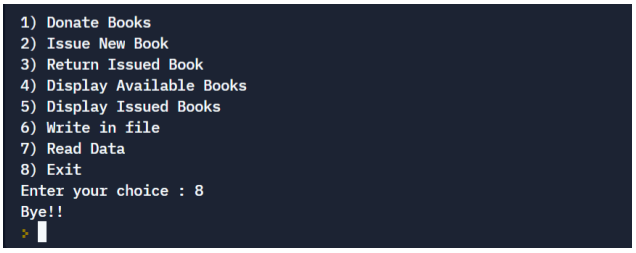

Fig. 15

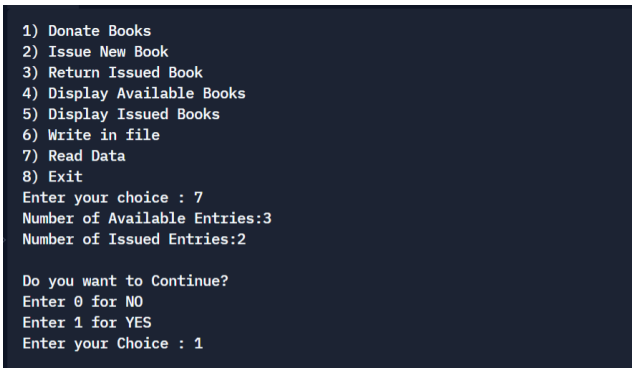

Fig. 16

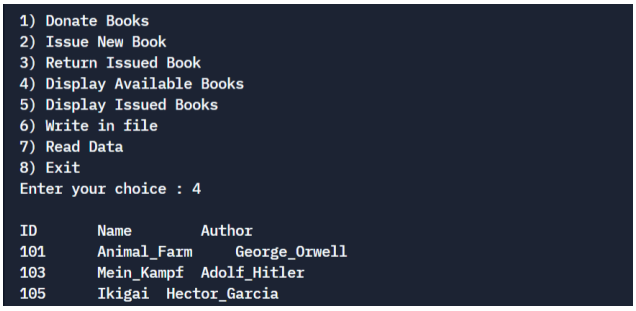

Fig. 17

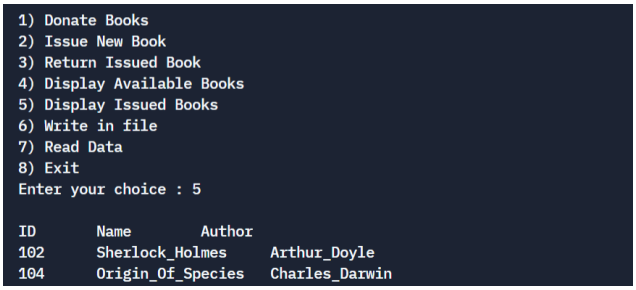

Fig. 18

6. RESULT

The working model of a library management system is constructed making use of various concepts of C programming language and data structures. This model is able to store the data of the books as required by the library and also able to edit the data as per the need. This makes the task of library management easier than the manual method.

The design provides an easier way to deal with the various problems faced while working in a library, both for administrators as well as the students.

7. CONCLUSION

This project of the Library Management System will be beneficial for students as well as staff of the library. This will make the entire process being online where librarians can issue, return, delete, search book details into the database. The Library Management System reduces the work of librarians compared to traditional libraries. It will also consume the time of students and librarians.

8. ACKNOWLEDGMENTS

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9. REFERENCES

[1] HonghaiKan,Zhimin Yang, Yue Wang, Nana Qi, “Research on Library Management System for CDs Attached to Books Based on Cloud Computing”, in Proceedings of the 14th International Conference on Computer Supported Cooperative Work in Design 2010.

[2] Bao Sun, Jiangwei Feng and Ling Liu, “A Study on How to Construct the Prediction Model of Library Lending of University Library”, International Conference on Information Science and Technology March 26-28, 2011 Nanjing, Jiangsu, China.

[3] Erxiang Chen,Minghui Liu,“Research and Design on Library Management System Based on Struts and Hibernate Framework ", WASE International Conference on Information Engineering2009.

[4] Jianhu Zheng, Yunqing Feng, Yun Zhao, “A Unified Modeling Language-Based Design and Application for a Library Management Information System”, in cybernetics and information technologies.

[5] Michael Hitchens, Andrew Firmage, “The Design of a Flexible Class LibraryManagement System”, in IEEE conference 1998.

[6] WeihongYang, “Design and Implementation of Library Management System”,International Conference on Management Science and Innovative Education(MSIE 2015).

[7] Bretthauer, D. “Open-source software in libraries. Library Hi Tech News, 18 (5),8-9(2001).

[8] Barve, S., &Dahibhate, N. B.,“Open source software for library services”,DESIDOC Journal of Library & Information Technology, 32(5)(2012).