



Department of
COMPUTER AND INFORMATION SYSTEMS
ENGINEERING

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<u>Course Title</u>	<u>Data Structures and Algorithms</u>

SUBMITTED TO:

Miss Ibshar Ishrat

CEP PROJECT TITLE:

Library Management System

Problem Description:

Implement a library management system having the following functionalities:

- Add/Remove/Edit book: To add, remove or modify a book or book item.
 - Search catalogue: To search books by title, author, subject or publication date.
 - Register new account/cancel membership: To add a new member or cancel the membership of an existing member.
 - Check-out book: To borrow a book from the library.
 - Reserve book: To reserve a book which is not currently available.
 - Renew a book: To reborrow an already checked-out book.
 - Return a book: To return a book to the library which was issued to a member
- a. Implement and use any sorting algorithm to sort the books on the basis of any attribute (e.g. book ID, no. of books, author, title etc.).
- b. Prepare the complete software (in Python)
- I. Insert at least 15 records in the system
 - II. Implement the feature to display the whole collection of books

Features of Project

This project consists of the following distinguish features:

- File Handling (using text file)
- In this program, text files (Member.txt,Book_data.txt,Reserved_book.txt,Borrowed_book.txt) are used to store different records.
- A Number of book can be added.
- If a book is not available, you can also reserved the book.
- Book can be searched by any of the following attributes:
 - 1. Book ID
 - 2. Book Name

3. Book's Author
4. Book's Subject
5. Book's Publication Date

NOTE: all these are case sensitive, therefore write the above attributes as it is saved in text file while searching.

STUDY OF THE APPLICATION

1. Functions

The application after careful analysis has been identified to be presented with the following functions:

- mergeSort
- arr_id
- save_records
- register_member
- cancel_membership
- Add_book
- Delete_book
- Modify_book
- Search
- Checkout
- Reserved_book
- Renew_book
- Return_book
- Display_book
- Display_bookcollection

1.1 Detailed Information

<u>Function Name</u>	<u>Brief Description</u>
mergeSort()	This method takes an array or list and returns a sorted list.
Arr_id()	This function makes an array or list of All the IDs of books.
Save_record()	This function is used in the program to store data (Member or Book) into a text file.
Register_member()	This function enters and store data of a new member.
Cancel_membership()	This function cancel the membership of an existing library member and removes its data from the Member.txt file
Add_book()	As name suggested, this function adds a new book to our book collection i.e in Book_data.txt.
Delete_book()	As name suggested, this function deletes a book from our book collection i.e in Book_data.txt.
Modify_book()	As name suggested, this function modifies an existing book in terms of its id or name or author or subject or Publication date, to our book collection i.e in Book_data.txt.
Search()	As name mentioned in name, this function helps us to search a book by its name or id or author's name or subject or Publication date.
Checkout()	This function let a member to borrow book from library
Reserved_book()	This function let a member to reserve a book if it is currently not available in stock.
Renew_book()	This function let a member to renew the book if its due date has come.
Return_book()	This function will simply return a borrowed book back to the stock.
Display_book()	This function displays book in a sorted manner.
Display_bookcollection()	This function displays the whole collection of book which is present in Book_data.txt file.

Future Expansions

In future, we want to extend our project. Following are the ideas we want to implement in our project:

- Want to extend this project in a way that it uses a better searching algorithm to save time.
- To design a better user interface so that it becomes user friendly.
- To convert this CLI based program in to a GUI based program.

Flow of Program with ScreenShots

- starting Library Management program:

MENU

1. Add Book
2. Remove Book
3. Modify or Edit Book
4. search
5. Register Member
6. Cancel Membership
7. Check_Out Book
8. Reserve book
9. Renew book
10. Return book
11. Display all books in sorted order
12. Display whole collection of book
13. Exit

Enter your Choice: |

- if you choose 1, then you can add book to the book collection.

MENU

1. Add Book
2. Remove Book
3. Modify or Edit Book
4. search
5. Register Member
6. Cancel Membership
7. Check_Out Book
8. Reserve book
9. Renew book
10. Return book
11. Display all books in sorted order
12. Display whole collection of book
13. Exit

Enter your Choice: 1

Enter Book ID: 304

Enter Book Name: Krayon

Enter Author name: Terence james

Enter Subject: Art

Enter Publication date (as date/month/year) :3-4-55

Enter Status (reserved ,available,not available) :Available

Press y or Y to continue adding books: e

- **Similarly,** By selecting different options following outputs are obtained

And changes occurs in the respective text files as programmed in the code:

MENU

1. Add Book
2. Remove Book
3. Modify or Edit Book
4. search
5. Register Member
6. Cancel Membership
7. Check_Out Book
8. Reserve book
9. Renew book
10. Return book
11. Display all books in sorted order
12. Display whole collection of book
13. Exit

Enter your Choice: 3

Enter book id which is to by modify: 304

Enter Book Name: Harry Potter

Enter Author name: Wren Tyl

Enter Subject: Novel

Enter Publication date (as date/month/year) :3-4-90

Enter Status (reserved ,available,not available) :Available

```
3. Add Book
4. search
5. Register Member
6. Cancel Membership
7. Check_Out Book
8. Reserve book
9. Renew book
10. Return book
11. Display all books in sorted order
12. Display whole collection of book
13. Exit
Enter your Choice: 4
By Which field you want to search:
1. Book id
2. Book Name
3. Author
4. Subject
5. Publication date

Enter: 1
Write book id/name/author/subject/Publication date: 304
Enter valid information
Enter valid information
BOOK ID: 304
BOOK NAME: Harry Potter
BOOK AUTHOR: Wren Tyl
SUBJECT: Novel
PUBLICATION DATE: 3-4-90
STATUS: Available
```

MENU

```
1. Add Book
2. Remove Book
3. Modify or Edit Book
4. search
5. Register Member
6. Cancel Membership
7. Check_Out Book
8. Reserve book
9. Renew book
10. Return book
11. Display all books in sorted order
12. Display whole collection of book
13. Exit
Enter your Choice: 5
Enter ID: 3456
Enter the Member name: Alaina
Enter address: Malir
What is the your email_address: alaina@gmail.com
Enter password: 123455
```

MENU

1. Add Book
2. Remove Book
3. Modify or Edit Book
4. search
5. Register Member
6. Cancel Membership
7. Check_Out Book
8. Reserve book
9. Renew book
10. Return book
11. Display all books in sorted order
12. Display whole collection of book
13. Exit

Enter your Choice: 6

Enter Member ID whose membership is to be cancelled: 3456

Member ship of ID no. 3456 has been cancelled!!!

MENU

1. Add Book
2. Remove Book
3. Modify or Edit Book
4. search
5. Register Member
6. Cancel Membership
7. Check_Out Book
8. Reserve book
9. Renew book
10. Return book
11. Display all books in sorted order
12. Display whole collection of book
13. Exit

Enter your Choice: 7

Enter book name which you want to borrow: Harry Potter
Book is borrowed to the requested member!!!!

Enter Issue Date: 3-4-2022

Enter Due Date: 2-8-2022

Enter number of days the book can be borrowed: 10

MENU

1. Add Book
2. Remove Book
3. Modify or Edit Book
4. search
5. Register Member
6. Cancel Membership
7. Check_Out Book
8. Reserve book
9. Renew book
10. Return book
11. Display all books in sorted order
12. Display whole collection of book
13. Exit

Enter your Choice: 8

Enter book name which you want to reserved: Ulysses

MENU

1. Add Book
2. Remove Book
3. Modify or Edit Book
4. search
5. Register Member
6. Cancel Membership
7. Check_Out Book
8. Reserve book
9. Renew book
10. Return book
11. Display all books in sorted order
12. Display whole collection of book
13. Exit

Enter your Choice: 9

Enter book ID: 304

Enter number of days for the book is renewed: 23

Book is renewed to further 23 days

MENU

1. Add Book
2. Remove Book
3. Modify or Edit Book
4. search
5. Register Member
6. Cancel Membership
7. Check_Out Book
8. Reserve book
9. Renew book
10. Return book
11. Display all books in sorted order
12. Display whole collection of book
13. Exit

Enter your Choice: 10

Enter book id which you want to returned: 304

The book is already returned!!!

Do you want to check_out this book? (yes/no): no

5. Register Member
6. Cancel Membership
7. Check_Out Book
8. Reserve book
9. Renew book
10. Return book
11. Display all books in sorted order
12. Display whole collection of book
13. Exit

Enter your Choice: 12

BOOK ID: 301

BOOK NAME: Python

BOOK AUTHOR: Morris mano

SUBJECT: Computer

PUBLICATION DATE: 2-4-90

STATUS: Available

BOOK ID: 302

BOOK NAME: In Search of Lost Time

BOOK AUTHOR: Marcel

SUBJECT: Novel

PUBLICATION DATE: 3-5-2002

STATUS: Available

BOOK ID: 304

BOOK NAME: Harry Potter

BOOK AUTHOR: Wren Tyl

SUBJECT: Novel

PUBLICATION DATE: 3-4-90

STATUS: Available

Conclusion

This project enhances programming skills to a much greater extent. While working with this project, the concept of more perfect programming is understood.