Name : Hiba Khan

Roll Number : CS-018

Data Structures Algorithm (CS-218)

Open Ended Lab

Library Management System

Submitted To : Miss Ibshar Ishrat

Date : 1/2/2022

SE (CS)　　　　　　　**Batch: 2020**　　　　　　　**Date: 17-01-2022**

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

NOTE

　i. OEL is on individual basis
　ii. Last date of submission: SUN 6th Feb, 2022
　iii. Deliverables: **1.** Program code **2.** List of books **3.** Report
　iv. Total marks: 10 (see the rubrics below)

S.N.	Rubrics	Max Marks	Marks Obtained
1	*Implement* sorting algorithm	2	
2	*Prepare* the complete software	4	
3	*Prepare* the final report	4	

Ibshar Ishrat
Lecturer (CIS)

Task Assigned To Us:

A library management system was required to be made which had the functionalities to add, remove, edit, search, reserve, renew and to return books present at a library using accounts that had to be made and saved in files.

We also had to sort the books present using any attribute which seemed like the trickiest part out of all the parts present.

How I dealt with the problem:

Having done object oriented programming and computer programming in the previous semesters I decided to make functions before anything else one by one joining together pieces to a puzzle in the limited time window that I had.

I had to revise my concepts when it came to filing and I had to use google and a couple of friends help at a lot of places where I felt stuck, for instance in filing and in particular in sorting the books.

Slowly as the functions came together the code compiled itself and I was able to create what has been sent or given to you.

Due to the lack of time, I was unable to add complete functionalities in some places where I feel I could have added more but it is what it is.

The functionality is such that a admin is always present at the PC with this program.

Books That We Had To Mention As Asked:

The dummy book name is self explanatory but the list has 15 real books that are actually classics from the 21st Century
This image shows a little bit of context on how we have used sorting as well, because we have used for loops and the hyphens as separators to separate The Title Of The Book, The Name Of The Author and The Number Of Copies Present.

```
dummybookname-dummyauthor-dummyquantity
In Search of Lost Time-Marcel Proust-2
Ulysses-James Joyce-4
Don Quixote-Miguel de Cervantes-5
The Great Gatsby-F. Scott Fitzgerald-6
Moby Dick-Herman Melville-7
Hamlet-William Shakespeare-3
The Odyssey-Homer-5
The Divine Comedy-Dante Alighieri-2
Crime and Punishment-Fyodor Dostoyevsky-7
Wuthering Heights-Emily Brontë-3
Pride and Prejudice-Jane Austen-2
Anna Karenina-Leo Tolstoy-3
Heart of Darkness-Joseph Conrad-5
Great Expectations-Charles Dickens-22
To Kill a Mockingbird-Harper Lee-2
The Trial-Franz Kafka-8
```

Driver Code:

The driver code is placed in a while loop that goes round and round until option 12 is pressed and we exit the code.
As it can be seen from the code.

All the options present here are connected or calling functions that I have mentioned ahead.

Each option calls a individual function, and the names are basically obvious to what they represent.

```
it is said then when you are in doubt go to the library, so i know why you are here *winks*
Welcome To The Library, May your nights be long and Covers be hard
You can do the following things heree:
                1.) You can display books
                2.) You can search in books
                3.) You can create account
                4.) You can delete your account
                5.) Admin can add a book
                6.) Admin can delete/remove a book
                7.) Admin can edit a book
                8.) You can renew a book
                9.) You can reserve a book
                10.) You can return a book
                11.) You can borrow a book
                12.) You can Exit
Enter option: |
```

Functions That Were Used And Their Purpose:

1. displayBooks

This function displays all the books present in the books file using book name book author and quantity. This calls the sort function to display a sorted list of books

```
Book Name:  Anna Karenina
Book Author:  Leo Tolstoy
Quantity:  3
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Book Name:  Crime and Punishment
Book Author:  Fyodor Dostoyevsky
Quantity:  7
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Book Name:  Don Quixote
Book Author:  Miguel de Cervantes
Quantity:  5
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Book Name:  Great Expectations
Book Author:  Charles Dickens
Quantity:  22
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Book Name:  Hamlet
Book Author:  William Shakespeare
Quantity:  3
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Book Name:  Heart of Darkness
Book Author:  Joseph Conrad
Quantity:  5
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Book Name:  In Search of Lost Time
Book Author:  Marcel Proust
Quantity:  2
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Book Name:  Moby Dick
Book Author:  Herman Melville
Quantity:  7
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Book Name:  Pride and Prejudice
Book Author:  Jane Austen
Quantity:  2
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Book Name:  The Divine Comedy
Book Author:  Dante Alighieri
Quantity:  2
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
```

2. Search

This function searches for the book using its name or the authors name and tells the user if the book is present in the library or not.

```
You can search using the following things:
                 1.) Book Name
                 2.) Book Author
                 3.) Exit
Choose What You Would Like To Do: 1
Please Enter
The Title You Want To Search With: Ulysses
You can search using the following things:
                 1.) Book Name
                 2.) Book Author
                 3.) Exit
Choose What You Would Like To Do: 3
[['Ulysses', 'James Joyce', '4']]
```

3. addBook

This function is used to add books to the file that keeps all the books by taking in their name, authors name and the number of copies of books available in the library.

```
Since you want to add a book, you'll have to add the following details of the book
Title Of The Book: Hiba Khan's OEL
Name Of The Author: Hiba Khan
Number Of Copies Of Books Available: 1
The book is now added, thankyou
```

```
Heart of Darkness-Joseph Conrad-5
Great Expectations-Charles Dickens-22
To Kill a Mockingbird-Harper Lee-2
The Trial-Franz Kafka-8
Hiba Khan's OEL-Hiba Khan-1
```

4. editBook

This function is used to edit the details of the book that is its name, its authors name or the number of copies available at the library in case copies go missing or something happens. What this function does is that it separates the total entries of books using a for loop and the user can choose the list of book entries of a specific book using a number that is assigned to that book in particular.

5. removeBook

This function displays the books present at the library and gives the user the choice to remove the books present using their name and then inputting the number of books they want to remove.

6. Signup_user

This function is used to add a user to the file which is saved for users, what it does is that it takes input of the user's email and password and saves it to the file.

```
Enter option: 3
Well You are new here, come into the unknown
Hello Mister/Missus You'll Have To Fill The Following To Create A New Account:
Enter your lovely email: newacc1
Enter your lovely password: newpass1
Your Account Has Been Created Wallahi
```

```
dummyusername-dummypassword
newacc1-newpass1
```

7. login_user

This function takes input from the user for their email and password and checks if the user has already made a account before or if the account exists in the file. If the account is present it logs him in and presents a logged in message.

```
Please Enter Your Login Details
Hello Mister/Missus You'll Have To Fill The Following To Login:
Enter your lovely email: newacc1
Enter your lovely password: newpass1
You have logged in yay
```

8. delete_account

This function is for those people who have accounts already and want to cancel their membership at the library, what this function does is that it removes their account from the file completely.

```
You Have Reached The Leaving Screen, Thankyou for being here while you were
Please Enter Your Account Details
Your Lovely Email: newacc1
Your password: newpass1
Your account has been deleted, so long partner
```

```
dummyusername-dummypassword
```

9. Borrow

This function basically allows the user to borrow the book the user wants and removes the book from the present list of books in the file. It prints checkout next to book, in the list of present books. This calls the login function and logins the account of whoever is borrowing the book.
This subtracts one from the total number of copies of that book.

```
You Have Come To The Checkout Page
Please Login To Continue
Hello Mister/Missus You'll Have To Fill The Following To Login:
Enter your lovely email: newacc1
Enter your lovely password: newpass1
You have logged in yay
We Have these books for you hehe:
Book Number:  1
                dummybookname
Author Of The Book:
                dummyauthor
Quantity Of The Book:
                dummyquantity
--------------------------------------------------
```

10. Reserve

This function allows the user to reserve the book of their liking by printing a reserve next to the book they want to reserve in the file. This calls the login function and logins the account of whoever is reserving the book.

11. Renew

This function allows the user to renew their checkout when the time comes to return or basically extend their period with the book. This calls the login function and logins the account of whoever is renewing the book.

12. Returnn

This function returns the book from the user to the library and basically once the book is returned its details are readded to the file. This calls the login function and logins the account of whoever is returning the book.

This adds a one to the number of copies if the book is or was present in the list of books.

```
You Have Come To The Return Page.
Please Enter Your Login Details
Hello Mister/Missus You'll Have To Fill The Following To Login:
Enter your lovely email: newacc1
Enter your lovely password: newpass1
You have logged in yay
Since you would like to return your book, please enter
The Name Of The Book You Would Like To Return: Hiba Khan's OEL
The Book Has Been Returned, Thankyouu
```

13. Sort

      This is the main deal, this is the sorting function that was required in the OEL.
We used Bubble Sort algorithm which repeatedly swaps elements if they are in the wrong order.

The simple reason for using this algorithm was that it is the simplest sorting algorithm.

This function Is called in the display function so that the displayed list of books are sorted.

This is the code we used.

```python
def sort(self):
    with open("allbooks.txt", "a+") as f:
        f.seek(0)
        data = f.readlines()
        list = []
        for item in data:
            item = item.split("-")
            last = item.pop()
            editedLast = ""
            for chr in last:
                if chr == "\n":
                    continue
                else:
                    editedLast = editedLast + chr
            item.append(editedLast)
            list.append(item)
    lengthList = len(list)
    for i in range(lengthList - 1):
        for j in range(lengthList - i - 1):
            if list[j] > list[j + 1]:
                list[j], list[j + 1] = list[j + 1], list[j]
    return list
```