**User menu for library system\**

TLDR: To test penalty system, you can change your windows time and then borrow a book, then return to the current time to return the book borrowed.

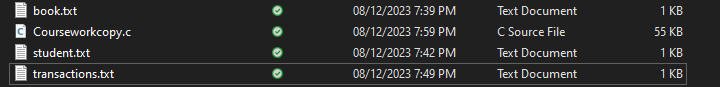
\*Program needs to be relaunched after changing your time setting

\*Warning: DO NOT DELETE any of the following .txt file.

If deleted, please re-create an empty file with the corresponding name for addstudent and addbook function to work.

\*transaction.txt file should generally not be modified and was left empty when handing in coursework.

**Ensure that you have the following files in the folder:**



When the program is launched it will prompt the user to enter their student ID

A screenshot of a computer

Description automatically generated

\*Note this is important as different student ID can lead to different result as student ID are categorised into librarian and normal student.

**CASE 1: Librarian**

A screenshot of a computer

Description automatically generated

**Case 2: Student**

A screenshot of a computer

Description automatically generated

Please follow the instructions below to use the system:

1. Enter your student ID or 'exit' to quit:

- If you are a librarian, enter 'librarian' to access librarian functions.

If you are a student:

2. Select from the following functions:

- 1. Search Books: You can search for books by ISBN or title.

- 2. Borrow Books: You can borrow a book by entering its ISBN.

- 3. Return Books: You can return a book by entering its ISBN.

- 4. Display All Books: You can view all the books in the library.

- 5. Log off: You can log off from the system.

If you are a librarian:

3. Select from the following functions:

- 1. Search Books: You can search for books by ISBN or title.

- 2. Borrow Books: You can borrow a book by entering its ISBN.

- 3. Return Books: You can return a book by entering its ISBN.

- 4. Display All Books: You can view all the books in the library.

- 5. Generate Monthly Report: You can generate a monthly report of transactions.

- 6. Borrow & Return Information: You can view borrow and return information for a specific student or book.

- 7. Modify File: You can add new books, modify the number of copies of a book, or add new students.

- 8. Log off: You can log off from the system.

**\*note different student ID will lead to different access level.**

**How to use all the functions available:**

**For Students:**

1. Search Books:

- Select option 1 from the menu.

- If you choose to search by ISBN, enter the ISBN of the book.

- If you choose to search by title, enter the title of the book.

- The system will display the book(s) that match your search.

**\*note : Search by title is case sensitive**

**\*note: Search by ISBN requires user to enter the ISBN in its exact form including the dashes (-)**

**Eg: 978-xx-xxxxx-xx-x**

2. Borrow Books:

- Select option 2 from the menu.

- Enter the ISBN of the book you want to borrow.

- The system will update the book's status to borrowed.

**\*Book file is updated by creating a new temp file and copying the original file until the modified line is reached. Then the rest of the file are copied then the file. The original file is then deleted and tempfile is renamed to book.txt and the**

**\*Length of line being copied is determined by MAX\_COPY in the code**

3. Return Books:

- Select option 3 from the menu.

- Enter the ISBN of the book you want to return.

- The system will update the book's status to available.

**\*Book file is updated by creating a new temp file and copying the original file until the modified line is reached. Then the rest of the file are copied then the file. The original file is then deleted and tempfile is renamed to book.txt and the**

**\*Length of line being copied is determined by MAX\_COPY in the code**

**\*Time limit for borrow can be changed by modifying the variable MAX\_DAYS**

4. Display All Books:

- Select option 4 from the menu.

- The system will display all the books in the library.

5. Log off:

- Select option 5 from the menu to log off from the system.

**For Librarians:**

1. Search Books:

- This works the same way as the student's Search Books function.

2. Borrow Books:

- This works the same way as the student's Borrow Books function.

3. Return Books:

- This works the same way as the student's Return Books function.

4. Display All Books:

- This works the same way as the student's Display All Books function.

5. Generate Monthly Report:

- Select option 5 from the menu.

- Enter the month and year for which you want to generate the report.

- The system will display a report of all transactions for that month.

**\*Note: Ensure that the month and year you enter are valid. Entering a future date or a date for which there is no data will return an empty report.**

**Ensure date entered is in the form m yyyy**

6. Borrow & Return Information:

- Select option 6 from the menu.

- Enter the month and year for which you want to view the information.

- Choose whether to view information for a specific student or book.

- Enter the student ID or book ISBN.

- The system will display the borrow and return information for the selected student or book.

\*Function will also display book that are not returned

7. Modify File:

- Select option 7 from the menu.

- Choose whether to add new books, modify the number of copies of a book, or add new students.

- Follow the prompts to enter the necessary information.

- The system will update the file accordingly.

**\*Note:**

**Be careful when modifying the file. Incorrect modifications can lead to data inconsistencies. Always double-check your inputs before confirming the modifications.**

**- When adding new books or students, ensure that the ISBN or student ID is unique and does not already exist in the system.**

**- When modifying the number of copies of a book, ensure that the new number is not less than the number of copies currently borrowed**.

8. Log off:

- Select option 8 from the menu to log off from the system.

**HANDLING FILE SYSTEM**

**book.txt**

A screenshot of a computer

Description automatically generated

The txt file book.txt stores the elements separated by a pipe delimiter (|). The elements are as follows:

ISBN|TITLE|AUTHOR\_NAME|PUBLICATION\_DATE|NUMBER\_OF\_COPIES\_AVAILABLE|COPIES\_BORROWED

**\*Note: Ensure file I-BEAM pointer is always on a newline whenever you modify the file**

**student.txt**

A screen shot of a computer screen

Description automatically generated

The book.txt also stores the elements separated by a pipe delimiter (|). The elements are as follows:

StudentID|Name|Num\_Book\_Borrowed|Array,AccessLevel|

**\*Note: the array stores the ISBN of book borrowed and time since borrowed which are separated by comma.**

**The last element in array and the accessRight element are also separated by a comma instead of a pipe delimeter.**

**\*Note: Time stored in this array uses Epoach time format (LocalTime):**

**Eg: 1702010341 = Friday, 8 December 2023 04:39:01**

**\*Note: Ensure file I-BEAM pointer is always on a newline whenever you modify the file**

**transaction.txt**

**A screen shot of a computer

Description automatically generated**

The transaction.txt file stores the elements separated by a pipe delimiter (|). The elements are as follows:

TYPE\_OF\_TRANSACTION|ISBN|STUDENT\_ID|TIME\_OF\_TRANSACTION|FINE\_RECIVED|

This file should generally not be modified and was left empty when handing in coursework.

**\*Note: Ensure file I-BEAM pointer is always on a newline whenever you modify the file**

**TEST CASE**

**Borrowing:**

**A screenshot of a computer

Description automatically generated**

**Borrowing book in different time to test for penalty.**

\*NOTE: This is done by changing windows’s date and time. Program need to be relaunched after changing time

A black background with white numbers

Description automatically generated

**This is the corresponding transaction file**

A screen shot of a computer

Description automatically generated

Book.txt file also show 2 book borrowed

A screen shot of a computer

Description automatically generated

Student file shows 2 book added into student file with the respective dates.

A screenshot of a computer error

Description automatically generated

This is the output when the function for borrow and return information is called.

\*Warning: Since this function only displays all result in a month, the records from past month will not be displayed. Therefore, the book which has yet to be returned since last month is not displayed.

**Returning book:**

**A screenshot of a computer

Description automatically generated**

When returning 2 identical books, the one **borrowed first** will be **returned first**. Here it also shows the penalty system working.

A screenshot of a computer screen

Description automatically generated

Corresponding transaction file

**A screen shot of a computer

Description automatically generated**

Book file is also updated.