VIETNAM NATIONAL UNIVERSITY,
HANOI INTERNATIONAL SCHOOL

FINAL PROJECT

Subject: *Programming I*

LIBRARY MANAGEMENT SYSTEM

Class: **INS2020 – 01, Semester 1, 2022-2023**

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Hanoi, 1/2023

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I. Introduction

Library management system is a project created to maintain library records. This software allows readers to view trending books and search books by ID, name, category, author, or price. Meanwhile, administrators can add, edit, search and delete information about books and manage borrowers.

The Library management system helps maintain a useful database for the entry of new books and records of borrowed members, with corresponding submission dates. Moreover, this application also reduces the manual recording burden of management. The Library management system also allows curators to maintain library resources in a more efficient way. As a result, librarians are convenient in managing the process of issuing and paying for books. The Library management system is also useful for students as well as librarians to continuously monitor the availability of all books in the library.

II. Designing

1. Important statements

+ char: declare usernames and passwords

+ scanf: input the information from keyboard

+ printf: display information on screen

+ switch – case: choose option for using functions

+ if - else: perform different based on different conditions

+ break: quit loops

+ strcmp: compare two strings

+ strcpy: copy one string to another

+ atoi: convert string into number

+ fflush(stdin): clear cache

+ system ("cls"): clear screen

+ struct: group several related variables into one place

+ goto: is used to transfer the program control to a predefined label

+ MessageBox: pop up a notification window

+ rb, wb, ab: mode of reading, writing and appending in binary mode

+ fopen: open a file to perform operations

+ fread: read data from a file

+ fwrite: write data into a file

+ fseek: move file pointer associated with a given file to a specific position

+ fclose: close file

2. Overall interface

The Library Management System has two interfaces for administrators and readers. We use the statement switch case to build this section.

a. Administrator interface

The administrator interface allows librarians to manage the information about books in Book Management and records in Borrower Management.

Librarians can choose options 1-4 to use functions for management: add, modify, search and delete.
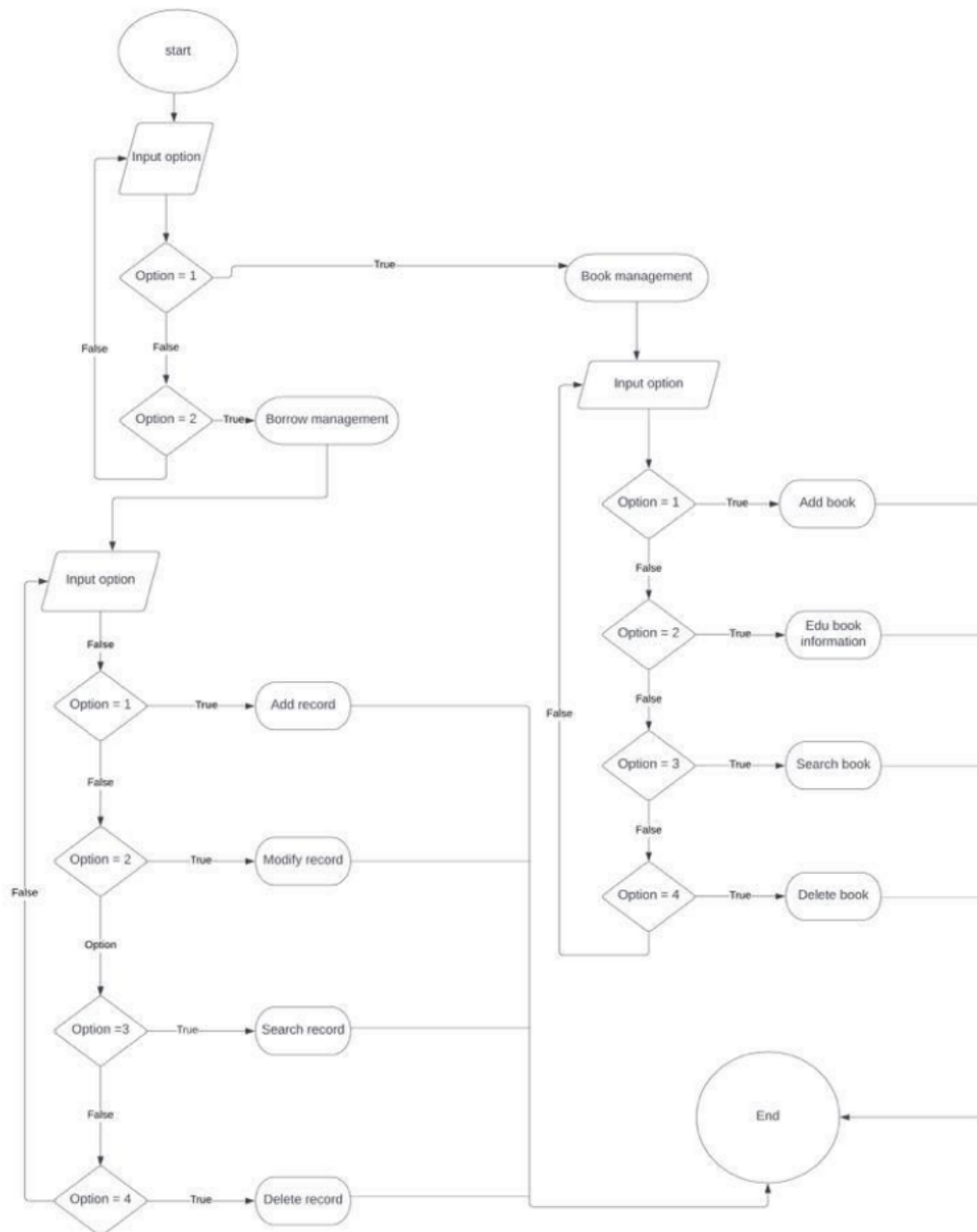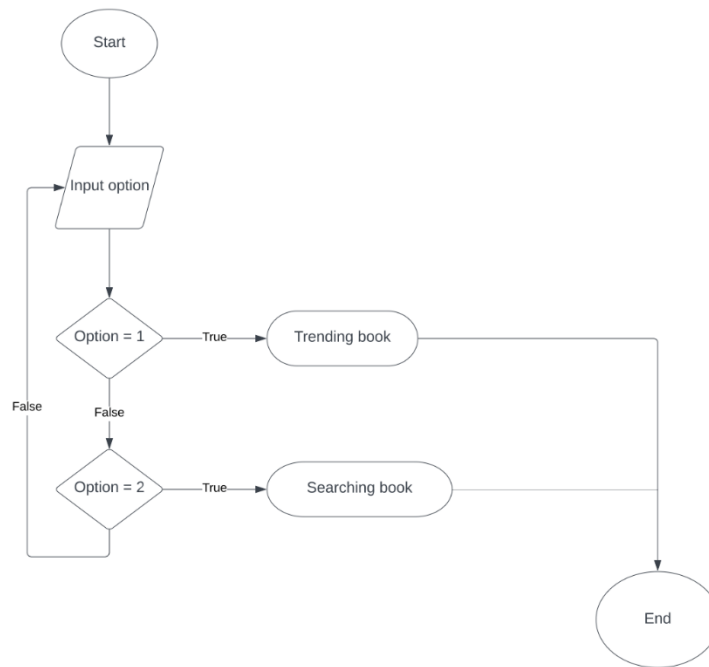
Administrator interface flowchart

b. Reader interface

Reader interface flowchart

In this mode, reader Librarians can choose options 1-2 to use functions for searching book information and finding out trending books that have the highest views to help them borrow suitable books.

2. Login function

This function is created to increase the security of the Library Management System. Users must input the correct account to access the reader or the manager interface. If the username or password is wrong, users have to log in again. Besides that, people can also create new accounts that help us connect to the reader interface.
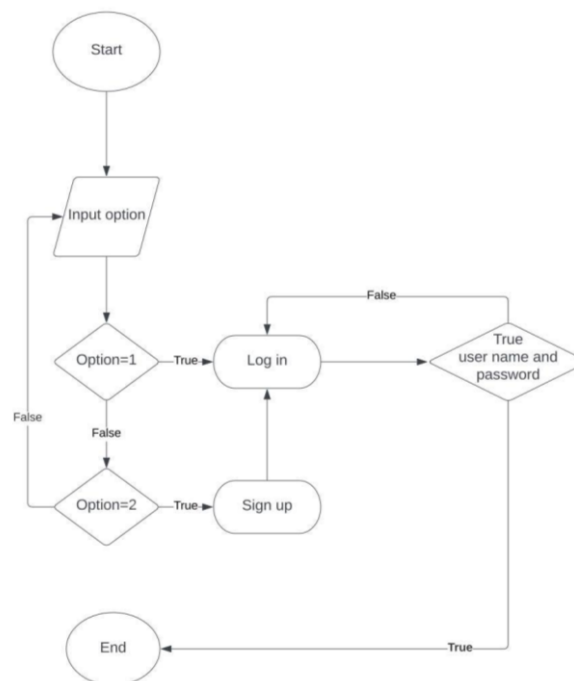
Login flowchart

After opening, users can log in to manipulate data in libraries with functions of this application or sign up to create accounts for reader mode. When people choose option 1, the screen will display "username" and "password" for them to log in. We use switch – case to create options and "if (c==13) break; else printf("*")" to convert character into "*" for creating hidden password.

LMS.exe

```
Friday, 23/12/2022

                *****************************************
                *                                       *
                *                 LOGIN                 *
                *                                       *
                *****************************************

                  1. Log in                 2. Sign up

     Your option: 1


             USERNAME: Vnuis

             PASSWORD: *********
```

When users enter the administrator account (username: "Vnuis" and password: "Vnu.edu.vn"), they will have access to the administrator interface.

C:\Users\ADMIN\Documents\Project3.exe   —   □
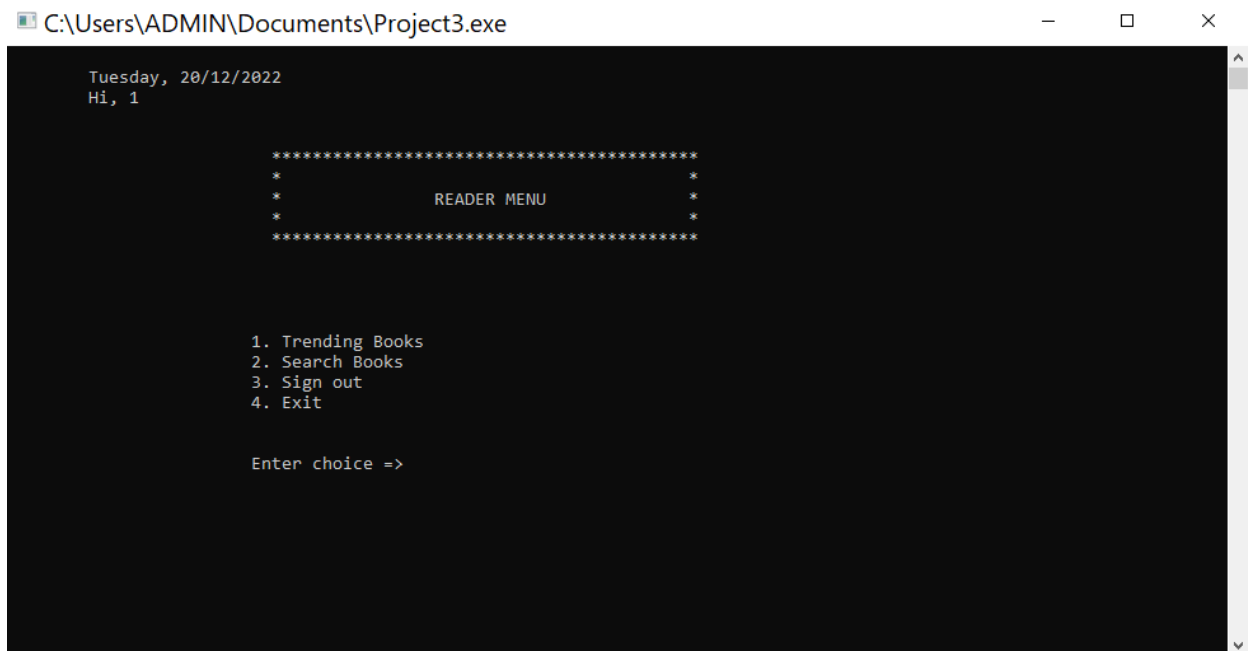
```
  Tuesday, 20/12/2022
  Hello, admin

          *****************************************
          *                                       *
          *        LIBRARY MANAGEMENT SYSTEM      *
          *                                       *
          *****************************************



          1. Book Management
          2. Borrower Management
          3. Sign out
          4. Exit


          Enter choice =>
```

When users enter an account that is different from the administrator account, the computer will compare it with the list of accounts in the file "account.txt". If the account exists, users will have access to the reader interface.

When users enter an account that doesn't exist, the screen will pop up the message "Your username or password is wrong" and users have to log in again.
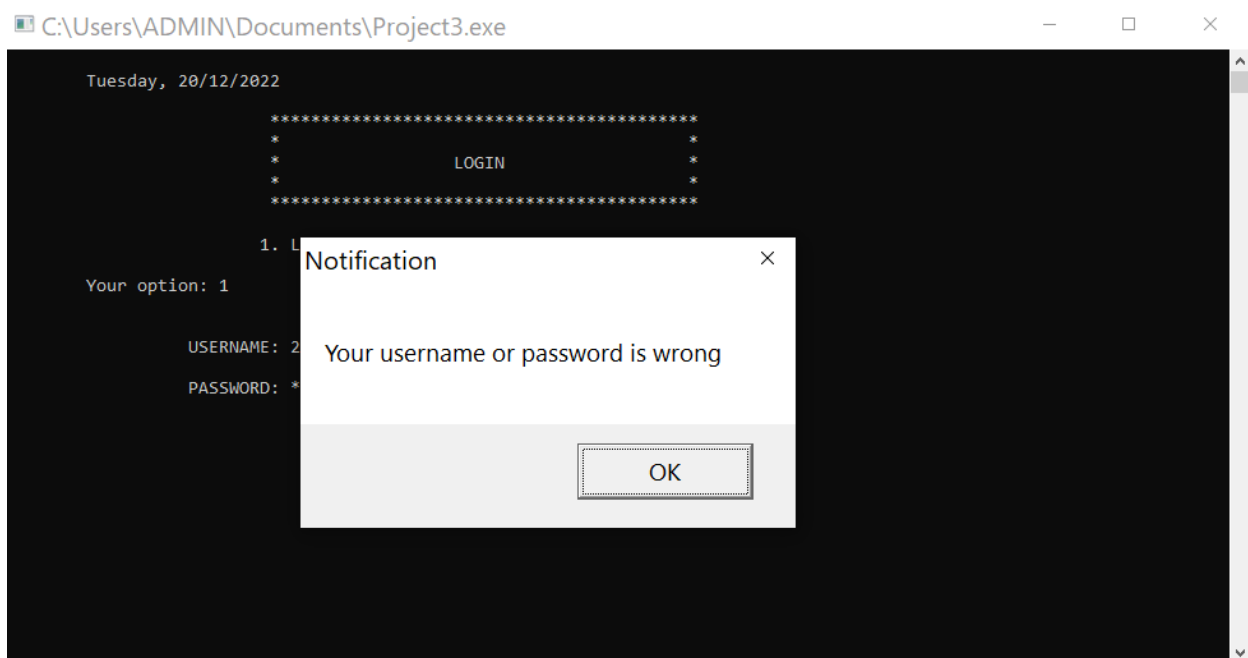
If users choose option 2, the system will create an account for readers and save that account in the file "account.txt".

After creating accounts successfully, users will be moved to the log in interface.

```
C:\Users\ADMIN\Documents\Project3.exe                          —    □

Tuesday, 20/12/2022

              ********************************************
              *                                          *
              *                    LOGIN                 *
              *                                          *
              ********************************************

                   1. Log in                2. Sign up

        Your option: 2

                USERNAME: 1

                PASSWORD: *

        Create account successfully!!!

        Press any keys to login..._
```
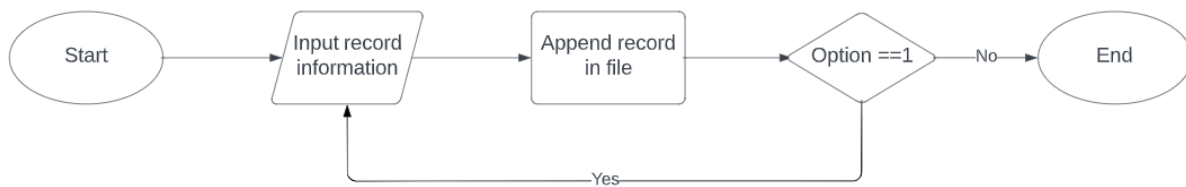
3. Add record

This function help librarians add new books or book borrowing records for the database system of libraries.

For book management, librarians have to add ID, name, author, category, location and the number of available books. When we add a new book, its view will equal zero. Meanwhile, student name, student ID, book name, book ID, borrow date, and return date are required to add borrowing record are required for book borrowing management.

Add_record flowchart

The data of books and borrowing records are respectively saved in files "book.txt" and "record.txt".

After adding a record successfully, librarians can choose option 1 to continue adding records or exit to perform other functions.

```
LMS.exe

        Friday, 23/12/2022
        Hello, admin


                 *****************************************
                 *                                       *
                 *               ADD  RECORD             *
                 *                                       *
                 *****************************************



        Enter student name: Dung

        Enter student ID: 21070509

        Enter book ID: 1

        Enter name of book: Jujutsu Kaisen

        Enter borrow date: 5/12/2022

        Enter return date: 30/12/2022


                   Add record successfully!!

                   1. Countinue adding record
                   2. Exit

        Your option =>
```
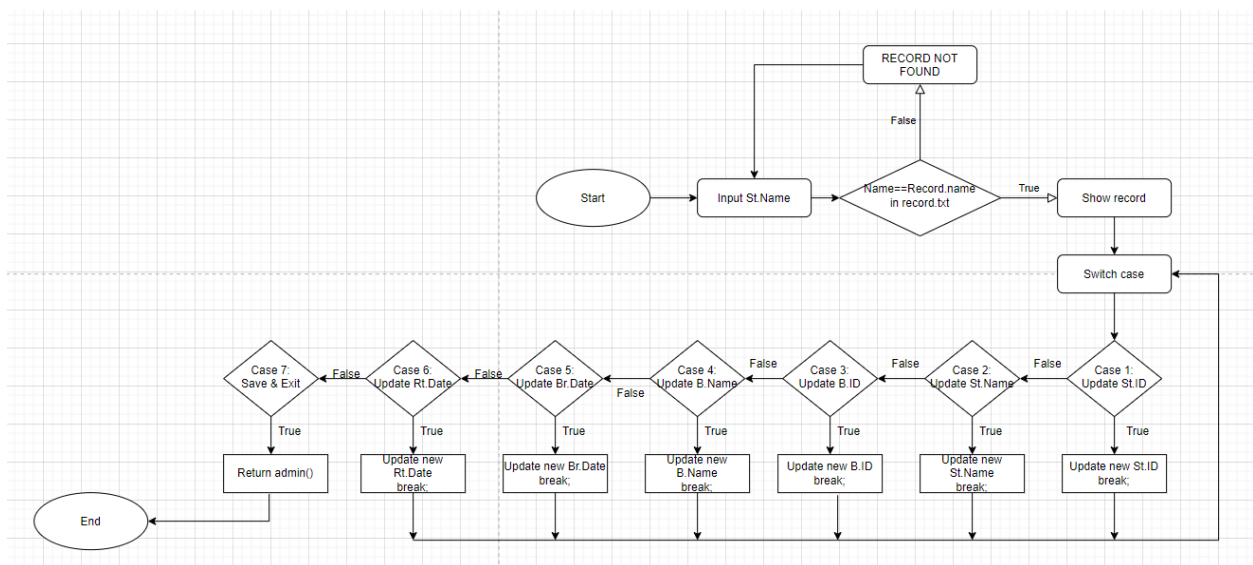
4. Modify record

Modify_record flowchart

This function helps administrators edit the data of books and book borrowing records. We input the name of the book or the record required to modify and use the "fread" statement to load the data in the file "book.txt" for book management and "record.txt" for borrower management.

By using the "strcmp" statement, the system compares the name of books/ name of students that is saved in the file "book.txt"/ "record.txt" with the name of the book/ name of the record that administrators want to modify.

If the data is not found, the system returns to the administrator interface. In contrast, if the data is found, the system shows information about that record and the attributes that librarians want to edit. The new data will be saved by using statements "fwrite" and "fseek" with mode "ab".

5. Search record

The search record technique allows users to find information of records based on their attributes. It is divided into 2 sections: book management and borrowing record management.

The function search book is available for both administrator and reader accounts. Users can input the name, ID, category, author, and price of books for book management to search books. Meanwhile, only the administrator interface can access borrowing record management. Besides finding record with student ID, student name, or book ID, librarians

can also search outdated records to handle violations by comparing the expiration date of the record with the current date.
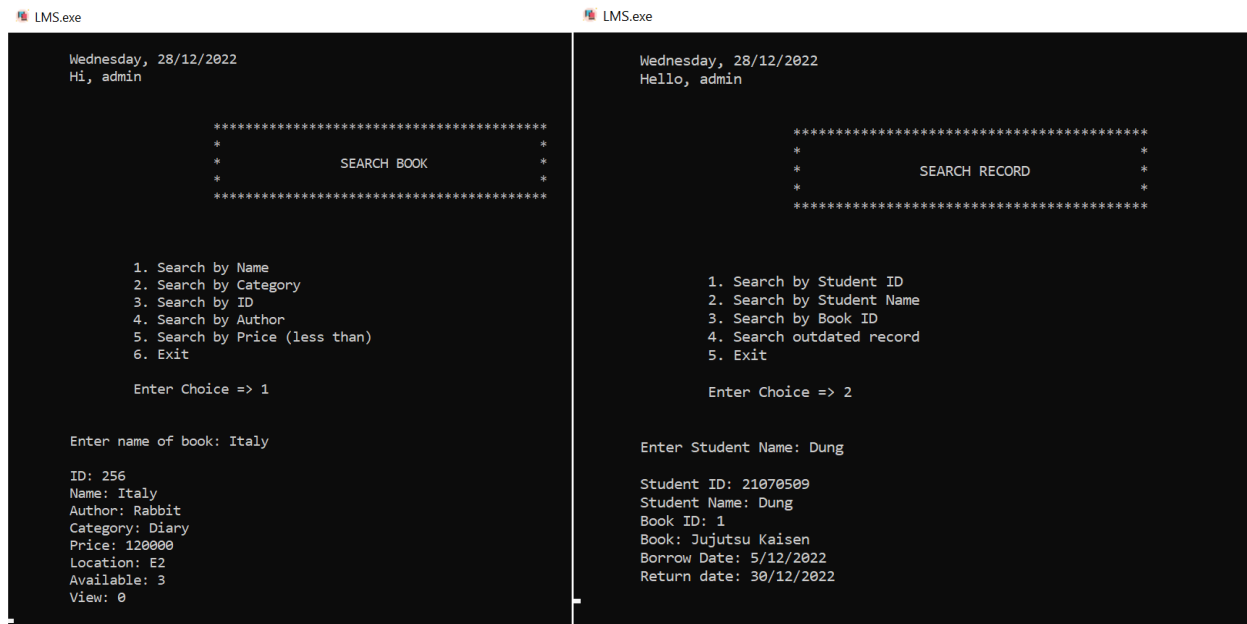
6. Delete record
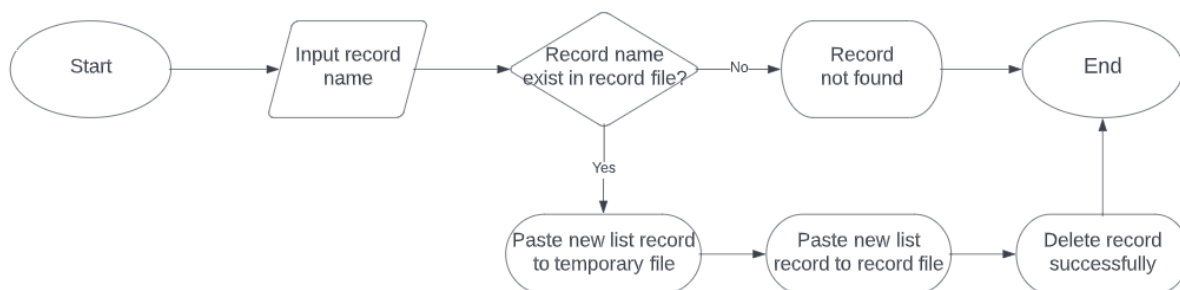
Delete_record flowchart

This function requires the book name for deleting books and student ID for deleting borrowing records. If the input is match with information in record file, the computer will create a temporary file and copy all the data from the existing record file except the book or record which is entered by the administrator. Finally, the list of records will be transferred again to the initial file.

7. Trending book

Trending_book() is a function of the Library Management System that compares the view of each book in file "book.txt" and displays the three highest-view books. To use this function, people have to log-in with reader mode and choose option 1.

III. Discussion

The Library Management System is very useful for librarians to manage their libraries efficiently and for readers to search for interesting books, but it still has some limitations.

Firstly, the login function is not perfect. If users are careless when inputting their password, they have to type this again because they can't use backspace to delete the mistaken character. Another limitation of this application is that the reader interface has few functions, so it may not satisfy users. In the future, we will develop new functions to attract more readers using our application.

IV. Conclusion

Our library management system helps manage effectively data in libraries. The software records all books and reference materials available for reading and lending. Lending details such as students' information, borrow date, ... are also managed by the software.

In this project, we have dived into mastering the basic programming skills for functions, switch case, if else, while, file, etc… Through our code, we combine individual commands to create more complicated code, however, the interface and the code line are still friendly for us. Although the software needs major development and is far from ideal, the project gives us practice with the C programming language. As the project developed, we became better C programmers. Additionally, we may discover how to write a practical program and see the advantages of programming.

V. Member contribution

Member	Contribution
Nguyen Duy Thuc	+ Main code writer + Writing the discussion section + Combine and edit report + Train and evaluate group members + Preparing flowchart, report and slide for function "Trending book"
Nguyen Bich Diep	+ Prepare slide introduction + Preparing flowchart, report and slide for function "Add record"
Nguyen Tien Dat	+ Write introduction + Draw flowchart for Overall interface + Preparing flowchart, report and slide for function "Log in"
Pham Thi My Dung	+ Code writing supporter + Preparing flowchart, report and slide for function "Modify record" + Write the conclusion of the report
Pham The Chien	+ Code writing supporter + Preparing flowchart, report and slide for function "Delete record"
Michael Zenom Marshal	+ Preparing flowchart, report and slide for function "Search record"