Green University of Bangladesh
Department of Computer Science and Engineering (CSE)
Faculty of Sciences and Engineering
Semester: (Spring, Year:2022), B.Sc. in CSE (Day/Eve)

Course Title: Data Structure lab
Course Code: CSE 106 Section:DC

Lab Project Name: _ _ Library Management System project in c _ _ _ _ _ _

Student Details

	Name	ID
1.	Meheraj Hossain	213902095

Submission Date: _ _ _ _ _ _ _11-09-2022_ _ _ _ _ _ _ _ _ _ _ _ _ _
Course Teacher's Name: _ _ _ _ _ _ _ MD. Sultanul Islam Ovi _ _ _ _ _ _ _ _ _

[For Teachers use only: Don't Write Anything inside this box]

Lab Project Status

Marks: …… **Signature: .....**

Comments: ..... **Date: .....**

Table of Contents

Chapter 1

Introduction

1.1 Introduction

Project name is library management system in c.Library management systems are designed to manage the movement of books and maintain records of the members in a library. The software solution is designed based on the system requirements, the people involved, the content of the operation and the activity to be performed.

1.2 Design Goals/Objective

A library management system helps librarians and library users work more efficiently.It also makes it simple for librarians to catalog books and maintain track of those that have been added,deleted,and searched.This project is very helfull for library management and for a librerian.

Chapter 2

Design/Development/Implementation of the Project

2.1 Implementation

2.1.1 C source

```
#include <stdio.h>
#include <time.h>
#include <string.h>
#define MAX_YR  9999
#define MIN_YR  1900
#define MAX_SIZE_USER_NAME 30
#define MAX_SIZE_PASSWORD  20
#define FILE_NAME  "BookS.bin"
#define MAX_BOOK_NAME   50
#define MAX_AUTHOR_NAME 50
#define MAX_STUDENT_NAME 50
#define MAX_STUDENT_ADDRESS 300
#define FILE_HEADER_SIZE  sizeof(sFileHeader)
typedef struct
{
   int yyyy;
   int mm;
   int dd;
} Date;
typedef struct
{
   char username[MAX_SIZE_USER_NAME];
   char password[MAX_SIZE_PASSWORD];
} sFileHeader;
typedef struct
{
   unsigned int books_id;
   char bookName[MAX_BOOK_NAME];
   char authorName[MAX_AUTHOR_NAME];
   char studentName[MAX_STUDENT_NAME];
   char studentAddr[MAX_STUDENT_ADDRESS];
   Date bookIssueDate;
} s_BooksInfo;
void printMessageCenter(const char* message)
{
   int len =0;
```

```
    int pos = 0;
    //calculate how many space need to print
    len = (78 - strlen(message))/2;
    printf("\t\t\t");
    for(pos =0 ; pos < len ; pos++)
    {
       //print space
       printf(" ");
    }
    //print message
    printf("%s",message);
}
void headMessage(const char *message)
{
    system("cls");

printf("\t\t\t##############################################################################
#####");
    printf("\n\t\t\t############                                          ############");
    printf("\n\t\t\t############     Library management System Project in C       ############");
    printf("\n\t\t\t############                                          ############");

printf("\n\t\t\t##############################################################################
#######");
    printf("\n\t\t\t-------------------------------------------------------------------------\n");
    printMessageCenter(message);
    printf("\n\t\t\t-------------------------------------------------------------------------");
}
void welcomeMessage()
{

    printf("\n\n\n\n\n");
    printf("\n\t\t\t  **-**-**-**-**-**-**-**-**-**-**-**-**-**-**-**-**-**-**\n");
    printf("\n\t\t\t       =-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=");
    printf("\n\t\t\t       =               WELCOME                 =");
    printf("\n\t\t\t       =                 TO                    =");
    printf("\n\t\t\t       =               LIBRARY                 =");
    printf("\n\t\t\t       =          MANAGEMENT SYSTEM            =");
    printf("\n\t\t\t       =      Green university of Bangladesh         =");
    printf("\n\t\t\t       =-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=");
    printf("\n\t\t\t  **-**-**-**-**-**-**-**-**-**-**-**-**-**-**-**-**-**-**\n");
    printf("\n\n\n\t\t\t Enter any key to continue.....");
    getch();
}
int isNameValid(const char *name)
{
    int validName = 1;
    int len = 0;
    int index = 0;
    len = strlen(name);
```

```
    for(index =0; index <len ; ++index)
    {
       if(!(isalpha(name[index])) && (name[index] != '\n') && (name[index] != ' '))
       {
          validName = 0;
          break;
       }
    }
    return validName;
}
// Function to check leap year.
//Function returns 1 if leap year
int  IsLeapYear(int year)
{
    return (((year % 4 == 0) &&
             (year % 100 != 0)) ||
            (year % 400 == 0));
}
// returns 1 if given date is valid.
int isValidDate(Date *validDate)
{
    //check range of year,month and day
    if (validDate->yyyy > MAX_YR ||
          validDate->yyyy < MIN_YR)
       return 0;
    if (validDate->mm < 1 || validDate->mm > 12)
       return 0;
    if (validDate->dd < 1 || validDate->dd > 31)
       return 0;
    //Handle feb days in leap year
    if (validDate->mm == 2)
    {
       if (IsLeapYear(validDate->yyyy))
          return (validDate->dd <= 29);
       else
          return (validDate->dd <= 28);
    }
    //handle months which has only 30 days
    if (validDate->mm == 4 || validDate->mm == 6 ||
          validDate->mm == 9 || validDate->mm == 11)
       return (validDate->dd <= 30);
    return 1;
}
// Add books in list
void addBookInDataBase()
{
    int days;
    s_BooksInfo addBookInfoInDataBase = {0};
    FILE *fp = NULL;
    int status = 0;
```

```
fp = fopen(FILE_NAME,"ab+");
if(fp == NULL)
{
   printf("File is not opened\n");
   exit(1);
}
headMessage("ADD NEW BOOKS");
printf("\n\n\t\t\tENTER YOUR DETAILS BELOW:");
printf("\n\t\t\t-------------------------------------------------------------------------------\n");
printf("\n\t\t\tBook ID NO  = ");
fflush(stdin);
scanf("%u",&addBookInfoInDataBase.books_id);
do
{
   printf("\n\t\t\tBook Name  = ");
   fflush(stdin);
   fgets(addBookInfoInDataBase.bookName,MAX_BOOK_NAME,stdin);
   status = isNameValid(addBookInfoInDataBase.bookName);
   if (!status)
   {
      printf("\n\t\t\tName contain invalid character. Please enter again.");
   }
}
while(!status);
do
{
   printf("\n\t\t\tAuthor Name  = ");
   fflush(stdin);
   fgets(addBookInfoInDataBase.authorName,MAX_AUTHOR_NAME,stdin);
   status = isNameValid(addBookInfoInDataBase.authorName);
   if (!status)
   {
      printf("\n\t\t\tName contain invalid character. Please enter again.");
   }
}
while(!status);
do
{
   printf("\n\t\t\tStudent Name  = ");
   fflush(stdin);
   fgets(addBookInfoInDataBase.studentName,MAX_STUDENT_NAME,stdin);
   status = isNameValid(addBookInfoInDataBase.studentName);
   if (!status)
   {
      printf("\n\t\t\tName contain invalid character. Please enter again.");
   }
}
while(!status);
do
{
```

```
        //get date year,month and day from user
        printf("\n\t\t\tEnter date in format (day/month/year): ");

scanf("%d/%d/%d",&addBookInfoInDataBase.bookIssueDate.dd,&addBookInfoInDataBase.book
IssueDate.mm,&addBookInfoInDataBase.bookIssueDate.yyyy);
        //check date validity
        status = isValidDate(&addBookInfoInDataBase.bookIssueDate);
        if (!status)
        {
            printf("\n\t\t\tPlease enter a valid date.\n");
        }
    }
    while(!status);
    fwrite(&addBookInfoInDataBase,sizeof(addBookInfoInDataBase), 1, fp);
    fclose(fp);
}
// search books
void searchBooks()
{
    int found = 0;
    char bookName[MAX_BOOK_NAME] = {0};
    s_BooksInfo addBookInfoInDataBase = {0};
    FILE *fp = NULL;
    int status = 0;
    fp = fopen(FILE_NAME,"rb");
    if(fp == NULL)
    {
        printf("\n\t\t\tFile is not opened\n");
        exit(1);
    }
    headMessage("SEARCH BOOKS");
    //put the control on books detail
    if (fseek(fp,FILE_HEADER_SIZE,SEEK_SET) != 0)
    {
        fclose(fp);
        printf("\n\t\t\tFacing issue while reading file\n");
        exit(1);
    }
    printf("\n\n\t\t\tEnter Book Name to search:");
    fflush(stdin);
    fgets(bookName,MAX_BOOK_NAME,stdin);
    while (fread (&addBookInfoInDataBase, sizeof(addBookInfoInDataBase), 1, fp))
    {
        if(!strcmp(addBookInfoInDataBase.bookName, bookName))
        {
            found = 1;
            break;
        }
    }
    if(found)
```

```
    {
        printf("\n\t\t\tBook id = %u\n",addBookInfoInDataBase.books_id);
        printf("\t\t\tBook name = %s",addBookInfoInDataBase.bookName);
        printf("\t\t\tBook authorName = %s",addBookInfoInDataBase.authorName);
        printf("\t\t\tBook issue date(day/month/year) =
(%d/%d/%d)",addBookInfoInDataBase.bookIssueDate.dd,
            addBookInfoInDataBase.bookIssueDate.mm,
addBookInfoInDataBase.bookIssueDate.yyyy);
    }
    else
    {
        printf("\n\t\t\tNo Record");
    }
    fclose(fp);
    printf("\n\n\n\t\t\tPress any key to go to main menu.....");
    getchar();
}
// v books function
void viewBooks()
{
    int found = 0;
    char bookName[MAX_BOOK_NAME] = {0};
    s_BooksInfo addBookInfoInDataBase = {0};
    FILE *fp = NULL;
    int status = 0;
    unsigned int countBook = 1;
    headMessage("VIEW BOOKS DETAILS");
    fp = fopen(FILE_NAME,"rb");
    if(fp == NULL)
    {
        printf("File is not opened\n");
        exit(1);
    }
    if (fseek(fp,FILE_HEADER_SIZE,SEEK_SET) != 0)
    {
        fclose(fp);
        printf("Facing issue while reading file\n");
        exit(1);
    }
    while (fread (&addBookInfoInDataBase, sizeof(addBookInfoInDataBase), 1, fp))
    {
        printf("\n\t\t\tBook Count = %d\n\n",countBook);
        printf("\t\t\tBook id = %u",addBookInfoInDataBase.books_id);
        printf("\n\t\t\tBook name = %s",addBookInfoInDataBase.bookName);
        printf("\t\t\tBook authorName = %s",addBookInfoInDataBase.authorName);
        printf("\t\t\tBook issue date(day/month/year) =
(%d/%d/%d)\n\n",addBookInfoInDataBase.bookIssueDate.dd,
            addBookInfoInDataBase.bookIssueDate.mm,
addBookInfoInDataBase.bookIssueDate.yyyy);
        found = 1;
```

```
        ++countBook;
    }
    fclose(fp);
    if(!found)
    {
        printf("\n\t\t\tNo Record");
    }
    printf("\n\n\t\t\tPress any key to go to main menu.....");
    fflush(stdin);
    getchar();
}
// delete function
void deleteBooks()
{
    int found = 0;
    int bookDelete = 0;
    sFileHeader fileHeaderInfo = {0};
    char bookName[MAX_BOOK_NAME] = {0};
    s_BooksInfo addBookInfoInDataBase = {0};
    FILE *fp = NULL;
    FILE *tmpFp = NULL;
    int status = 0;
    headMessage("Delete Books Details");
    fp = fopen(FILE_NAME,"rb");
    if(fp == NULL)
    {
        printf("File is not opened\n");
        exit(1);
    }
    tmpFp = fopen("tmp.bin","wb");
    if(tmpFp == NULL)
    {
        fclose(fp);
        printf("File is not opened\n");
        exit(1);
    }
    fread (&fileHeaderInfo,FILE_HEADER_SIZE, 1, fp);
    fwrite(&fileHeaderInfo,FILE_HEADER_SIZE, 1, tmpFp);
    printf("\n\t\t\tEnter Book ID NO. for delete:");
    scanf("%d",&bookDelete);
    while (fread (&addBookInfoInDataBase, sizeof(addBookInfoInDataBase), 1, fp))
    {
        if(addBookInfoInDataBase.books_id != bookDelete)
        {
            fwrite(&addBookInfoInDataBase,sizeof(addBookInfoInDataBase), 1, tmpFp);
        }
        else
        {
            found = 1;
        }
```

```
    }
    (found)? printf("\n\t\t\tRecord deleted successfully....."):printf("\n\t\t\tRecord not found");
    fclose(fp);
    fclose(tmpFp);
    remove(FILE_NAME);
    rename("tmp.bin",FILE_NAME);
}

void menu()
{
    int choice = 0;
    do
    {
        headMessage("MAIN MENU");
        printf("\n\n\n\t\t\t1.Add Books");
        printf("\n\t\t\t2.Search Books");
        printf("\n\t\t\t3.View Books");
        printf("\n\t\t\t4.Delete Book");
        printf("\n\t\t\t0.Exit");
        printf("\n\n\n\t\t\tEnter choice => ");
        scanf("%d",&choice);
        switch(choice)
        {
        case 1:
            addBookInDataBase();
            break;
        case 2:
            searchBooks();
            break;
        case 3:
            viewBooks();
            break;
        case 4:
            deleteBooks();
            break;
        case 0:
            printf("\n\n\n\t\t\t\tThank you!!!\n\n\n\n\n");
            exit(1);
            break;
        default:
            printf("\n\n\n\t\t\tINVALID INPUT!!! Try again...");
        }                                   //Switch Ended
    }
    while(choice!=0);                               //Loop Ended
}
//login password
void login()
{
    unsigned char userName[MAX_SIZE_USER_NAME] = {0};
    unsigned char password[MAX_SIZE_PASSWORD] = {0};
```

```
    int L=0;
    sFileHeader fileHeaderInfo = {0};
    FILE *fp = NULL;
    headMessage("Login");
    fp = fopen(FILE_NAME,"rb");
    if(fp == NULL)
    {
       printf("File is not opened\n");
       exit(1);
    }
    fread (&fileHeaderInfo,FILE_HEADER_SIZE, 1, fp);
    fclose(fp);
    do
    {
       printf("\n\n\n\t\t\t\tUsername:");
       fgets(userName,MAX_SIZE_USER_NAME,stdin);
       printf("\n\t\t\t\tPassword:");
       fgets(password,MAX_SIZE_PASSWORD,stdin);
       if((!strcmp(userName,fileHeaderInfo.username)) &&
(!strcmp(password,fileHeaderInfo.password)))
       {
          menu();
       }
       else
       {
          printf("\t\t\t\tLogin Failed Enter Again Username & Password\n\n");
          L++;
       }
    }
    while(L<=3);
    if(L>3)
    {
       headMessage("Login Failed");
       printf("\t\t\t\tSorry,Unknown User.");
       getch();
       system("cls");
    }
}
int isFileExists(const char *path)
{
    // Try to open file
    FILE *fp = fopen(path, "rb");
    int status = 0;
    // If file does not exists
    if (fp != NULL)
    {
       status = 1;
       // File exists hence close file
       fclose(fp);
    }
```

```
    return status;
}
void init()
{
    FILE *fp = NULL;
    int status = 0;
    const char defaultUsername[] ="Meheraj\n";
    const char defaultPassword[] ="Meheraj\n";
    sFileHeader fileHeaderInfo = {0};
    status = isFileExists(FILE_NAME);
    if(!status)
    {
        //create the binary file
        fp = fopen(FILE_NAME,"wb");
        if(fp != NULL)
        {
            //Copy default password
            strncpy(fileHeaderInfo.password,defaultPassword,sizeof(defaultPassword));
            strncpy(fileHeaderInfo.username,defaultUsername,sizeof(defaultUsername));
            fwrite(&fileHeaderInfo,FILE_HEADER_SIZE, 1, fp);
            fclose(fp);
        }
    }
}
int main()
{
    init();
    welcomeMessage();
    login();
    return 0;
}
```

Chapter 3

Performance Evaluation

3.1 Simulation Environment/ Simulation Procedure

figure 1 : welcome message

When the program is run, it first shows a welcome message , and show any key to continue. when you press any key then it wants a password.

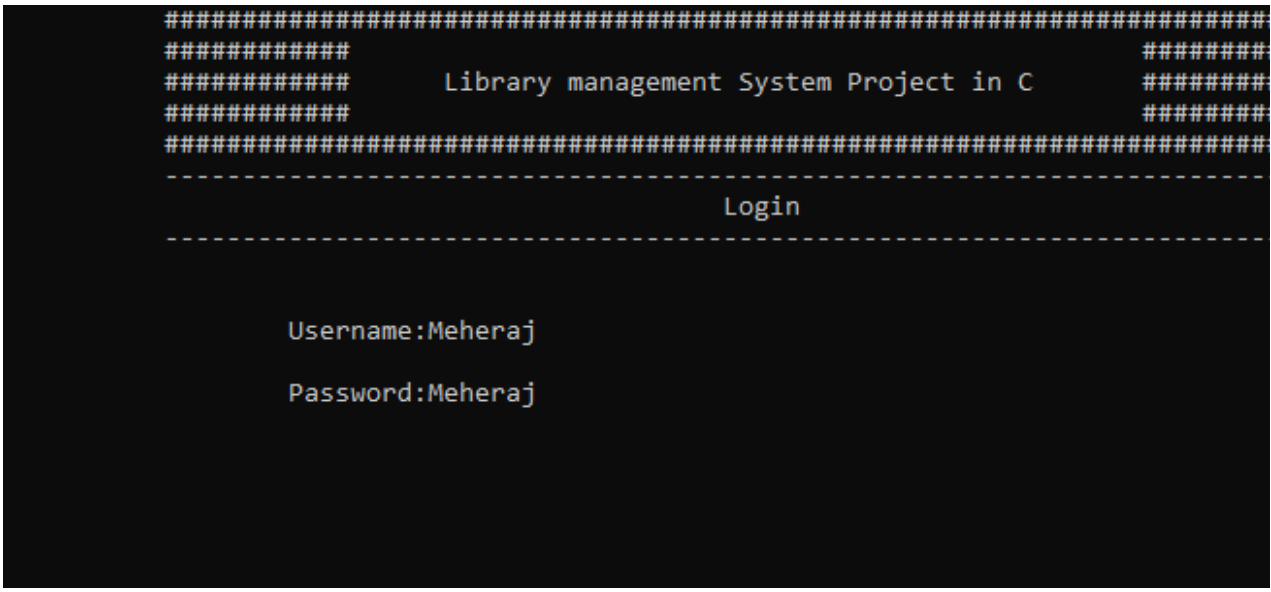

figure : Password massage

when matched password then its go to main menu.Otherwise it wants again password.

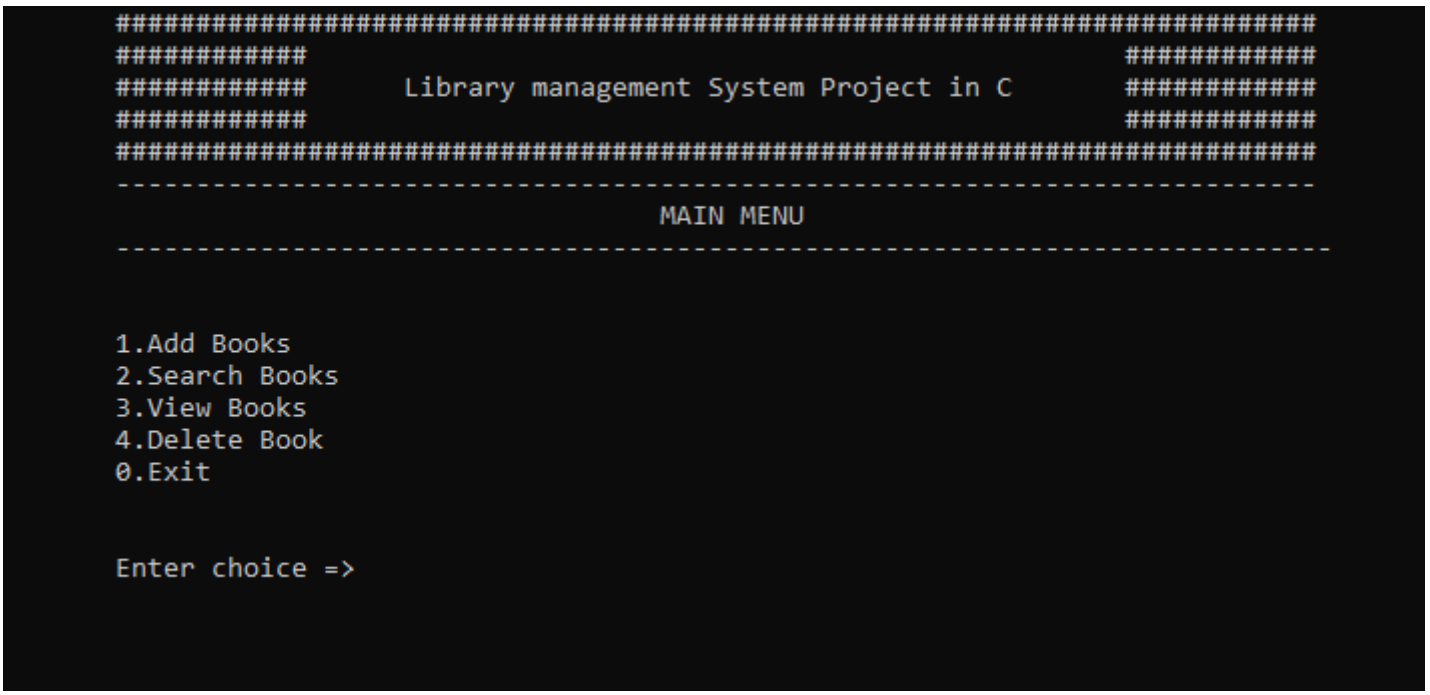

figure 3 : main menu interface

When the program is executed, the user will be directed to the main menu interface. The program is introduced with a few lines of texts. Then five selections are made for the user as the user can choose to add books , delete books, search books,view books or exit the program.

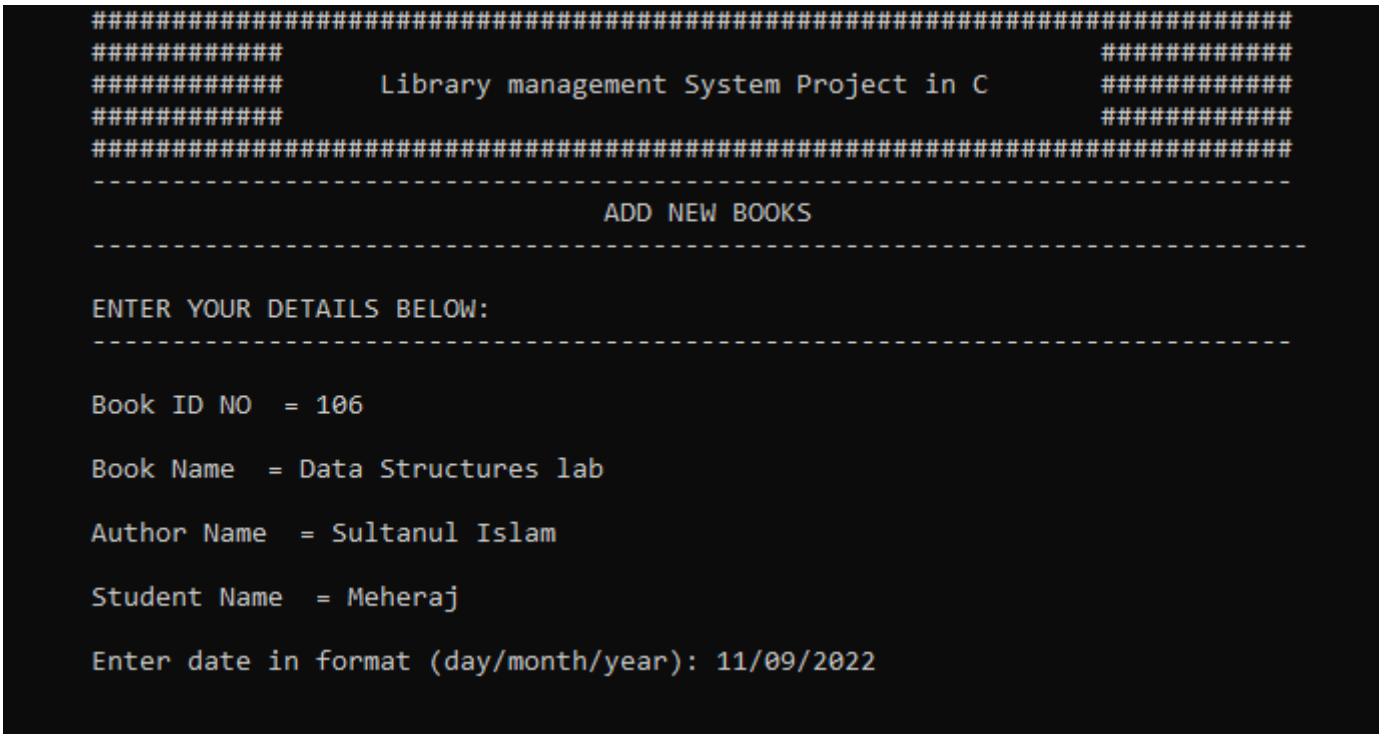

figure 4 : add book inter face

The program is asking the user Book ID NO, Book name , Author Name, Student Name, Enter date in format .

```
################################################################################
############                                                        ############
############      Library management System Project in C            ############
############                                                        ############
################################################################################
--------------------------------------------------------------------------------
                                SEARCH BOOKS
--------------------------------------------------------------------------------

Enter Book Name to search:Physics

Book id = 1001
Book name = Physics
Book authorName = Meheraj
Book issue date(day/month/year) =  (11/10/2022)


Press any key to go to main menu.....
```

figure 5 : Search book interface

when searching for a book .Asking a book name then shows book details.

```
Book authorName = Meheraj
Book issue date(day/month/year) =  (11/12/2021)


Book Count = 2

Book id = 1001
Book name = Physics
Book authorName = Meheraj
Book issue date(day/month/year) =  (11/10/2022)


Book Count = 3

Book id = 105
Book name = Data structure
Book authorName = Hasan mahmud
Book issue date(day/month/year) =  (11/12/2022)


Book Count = 4

Book id = 106
Book name = Data Structures lab
Book authorName = Sultanul Islam
Book issue date(day/month/year) =  (11/9/2022)



Press any key to go to main menu.....
```

figure 6 : view book interface

Here shows all the books and book details.

figure 7 : Delete record

The program requires the user to enter which book number to delete it.

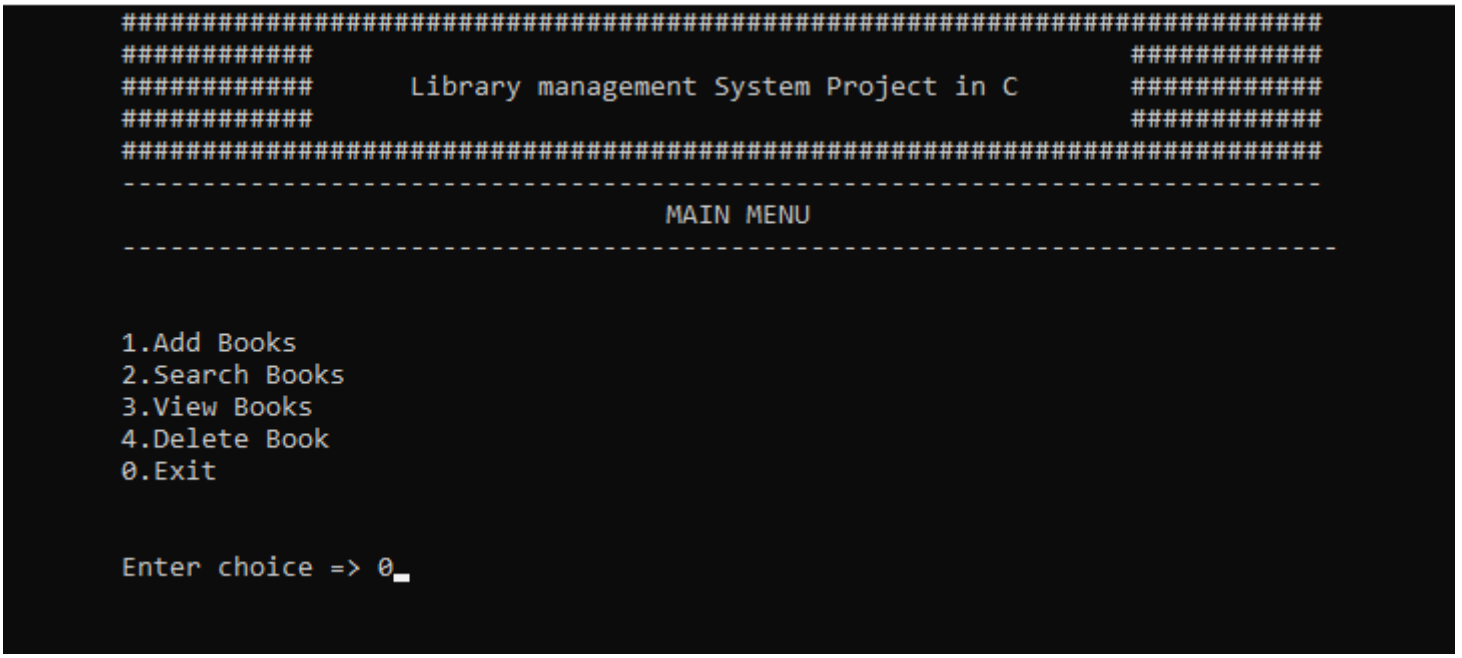

figure 8 : back main menu

when need close program then use zero then this program will close .

3.2 Results and Discussions

3.2.1 Analysis and Outcome

The design and analysis of the library management system is a project which aims to develop a computerized system to maintain all the daily work of the library. This project has many features which are generally not available in normal library management systems like facility of user login and a facility of teachers login.

Chapter 4

Conclusion

4.1 Introduction

The Library Management System is much more user-friendly, faster in operation and easy to

manage than the manual one. Through the use of it, the librarian can manage the whole data of the library in a single database in different tables with a much more security than the traditional way.

4.1 Practical Implications

The library management system is designed for users to add books, delete books, view books and exit the system.A formula is included in the function to calculate the count book.

4.2 Scope of Future Work

We can add a database to our project to issue books , return books , for student information of the library management system.We can use graph theory to include how many students relate with the library ,and how many students take books from the library in this project.
Today our world is modern.Everything has been updated.At a time library management update will be very needed.That time we will need to use software for library management system.where software.