Green University of Bangladesh
Department of Computer Science and Engineering (CSE)

Faculty of Sciences and Engineering
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Course Title: STRUCTURE PROGRAMMING LAB
Course Code: 104 Section: DA

Lab Project Name: Library Management system.

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

Lab Project Status
Marks: …… Signature:.....
Comments:..... Date:.....

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Chapter 01
Introduction

Introduction

This project is concerned with developing a Library Management system for Agape Youth Library in order to make library management more efficient and easy to handle .The library management system enables a fully automated library service. It has the ability to display the details of the books available in various departments, the transactions of books and about the book holders.

Objective

The goals of this project are to provide simplicity as well as security and efficiency to the management of the library and also reduce managing personnel in the library.

Chapter 02

Design/Development /Implementation

ALGORITHM:

step 1:start

step 2:This function verifies that a file has been created or not. If the file exists, the function return 1 otherwise returns 0

step 3:This function creates the file if it does not exist and copies the default password (“213902113”) in file header structure.

step 4:This function creates the file if it does not exist and copies the default password (“213902113”) in file header structure.

step 5:This function prints the message in the middle of the head massage. I have passed the message in this function as per the operation.

step 6:It prints the message on the top of the console and prints the message as per operation.

step 7:It validates the user name, author name ..etc. I have permitted this function to take the space in names.

step 8: This function read the date in the format of dd/mm/yyyy also it validates the entered date.

step 9: This function displays the library menu and asks the user to select the option. If the user selects 0, then the application will close.

step 10: This function opens the binary file in append mode and writes the book and the details.

step 11: This function opens the binary file in reading mode and asks the user to enter the book name which wants to search. If the book is not available in the list, it shows the message book not found in records.

step 12: It opens the file in reading mode and reads and displays all the stored book details. If there is no book available in the records, then it displays the message record is empty.

step 13: This function asks the book id from the user for the book they want to delete. In this function, I am creating a temporary binary file and copying all the data from the existing file except the book whose book is entered by the user. In the end, I renamed the temporary bin file with an existing binary file.

step 14: This function opens the file in rb+ mode (reading and writing). It asks the user for the new username and password. After taking the password and username it closes the application. Now users can use the application with a new password and username.

step 15:END

CODE

```
#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  "sayeb.bin"
// Macro related to the books info
#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)
//structure to store date
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// to call in program
{
   unsigned int books_id; // declare the integer data type
   char bookName[MAX_BOOK_NAME];// declare the character data
type
```

```
   char authorName[MAX_AUTHOR_NAME];// declare the charecter data
type
   char studentName[MAX_STUDENT_NAME];// declare the character
data type
   char studentAddr[MAX_STUDENT_ADDRESS];// declare the
character data type
   Date bookIssueDate;// declare the integer data type
} 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()
{
    headMessage("SAYEB");
    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              =");
    printf("\n\t\t\t       =              SYSTEM                =");
    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_NAM
E,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.bookIssueDate.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 updateCredential(void)
{
    sFileHeader fileHeaderInfo = {0};
    FILE *fp = NULL;
    unsigned char userName[MAX_SIZE_USER_NAME] = {0};
    unsigned char password[MAX_SIZE_PASSWORD] = {0};
    headMessage("Update Credential");
    fp = fopen(FILE_NAME,"rb+");
    if(fp == NULL)
    {
        printf("File is not opened\n");
        exit(1);
    }
    fread (&fileHeaderInfo,FILE_HEADER_SIZE, 1, fp);
    if (fseek(fp,0,SEEK_SET) != 0)
    {
        fclose(fp);
        printf("\n\t\t\tFacing issue while updating password\n");
        exit(1);
    }
    printf("\n\n\t\t\tNew Username:");
    fflush(stdin);
    fgets(userName,MAX_SIZE_USER_NAME,stdin);
```

```
    printf("\n\n\t\t\tNew Password:");
    fflush(stdin);
    fgets(password,MAX_SIZE_PASSWORD,stdin);
    strncpy(fileHeaderInfo.username,userName,sizeof(userName));
    strncpy(fileHeaderInfo.password,password,sizeof(password));
    fwrite(&fileHeaderInfo,FILE_HEADER_SIZE, 1, fp);
    fclose(fp);
    printf("\n\t\t\tYour Password has been changed successfully");
    printf("\n\t\t\ttLogin Again:");
    fflush(stdin);
    getchar();
    exit(1);
}
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\t5.Update Password");
        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 5:
            updateCredential();
            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
```

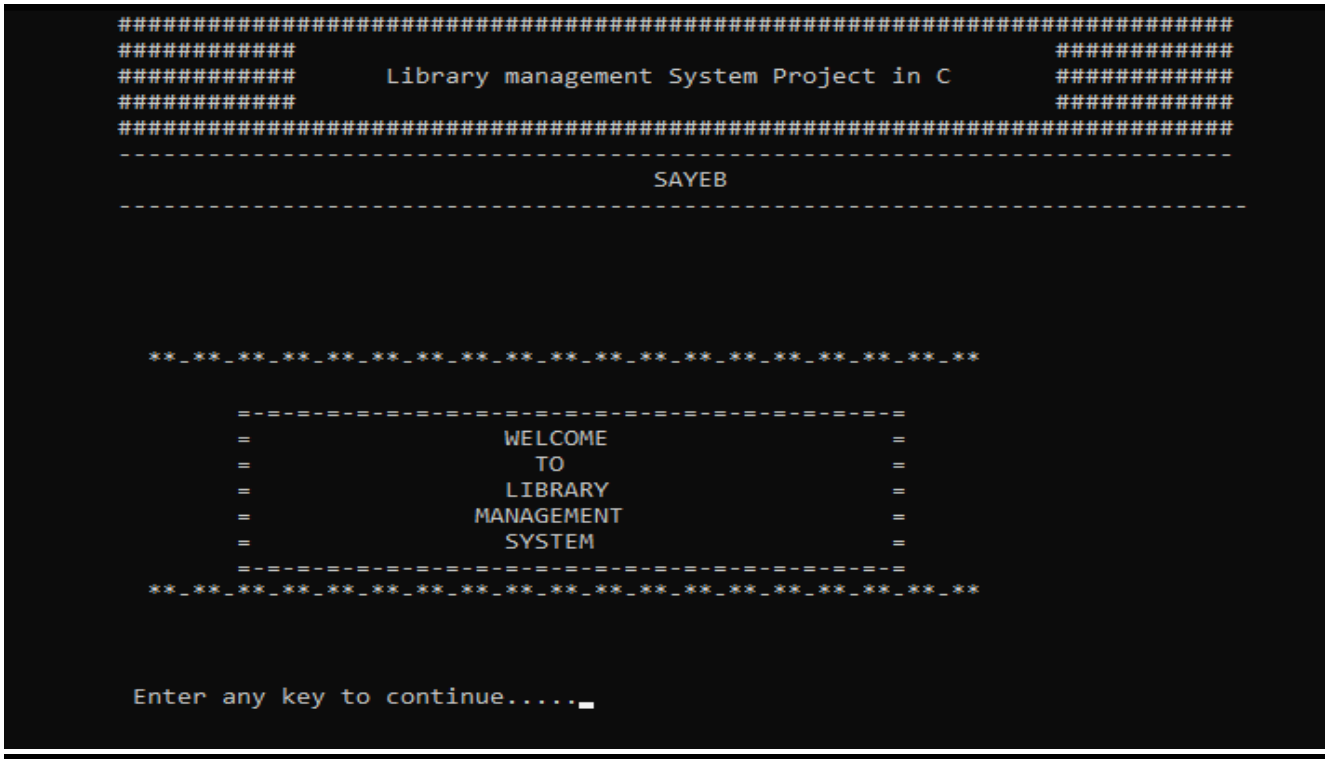
```
   {
      printf("\n\n\n\t\t\t\tUsername:");
      fgets(userName,MAX_SIZE_USER_NAME,stdin);
      printf("\n\t\t\t\tPassword:");
      fgets(password,MAX_SIZE_PASSWORD,stdin);
      if((!strcmp(userName,fileHeaderInfo.username))
||(!strcmp(password,fileHeaderInfo.password)))
      {
         menu();
      }
      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[] ="sayeb\n";
    const char defaultPassword[] ="sayeb\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(default
Password));
            strncpy(fileHeaderInfo.username,defaultUsername,sizeof(default
Username));
            fwrite(&fileHeaderInfo,FILE_HEADER_SIZE, 1, fp);
            fclose(fp);
        }
    }
}
int main()
{
    init();
    welcomeMessage();
    login();
    return 0;
}
```

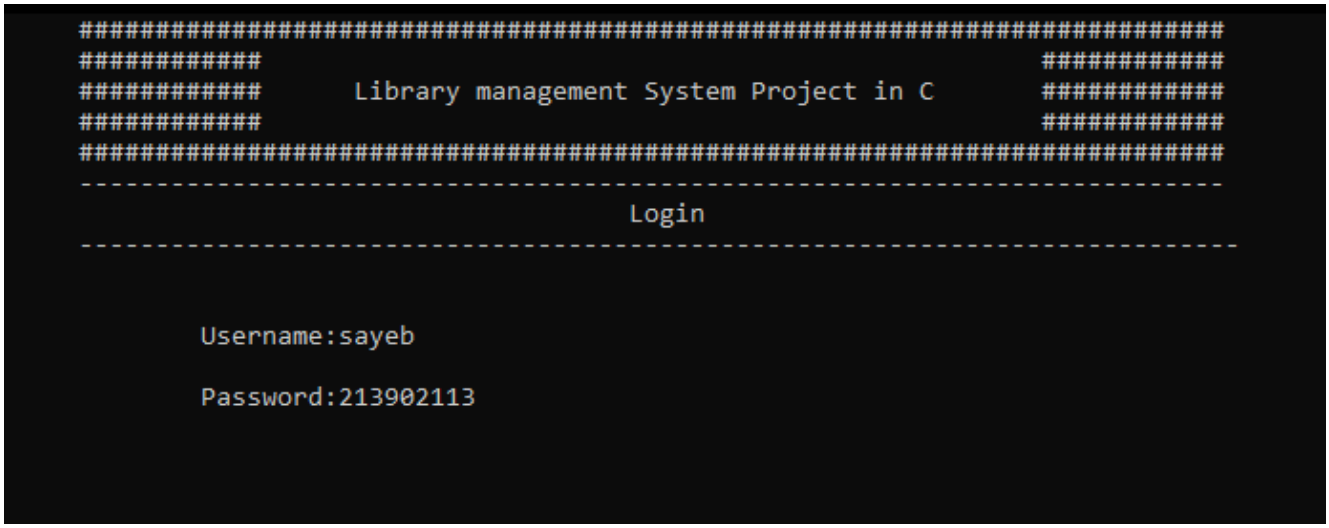
Chapter 03

Performance Evaluation

Welcome Note:

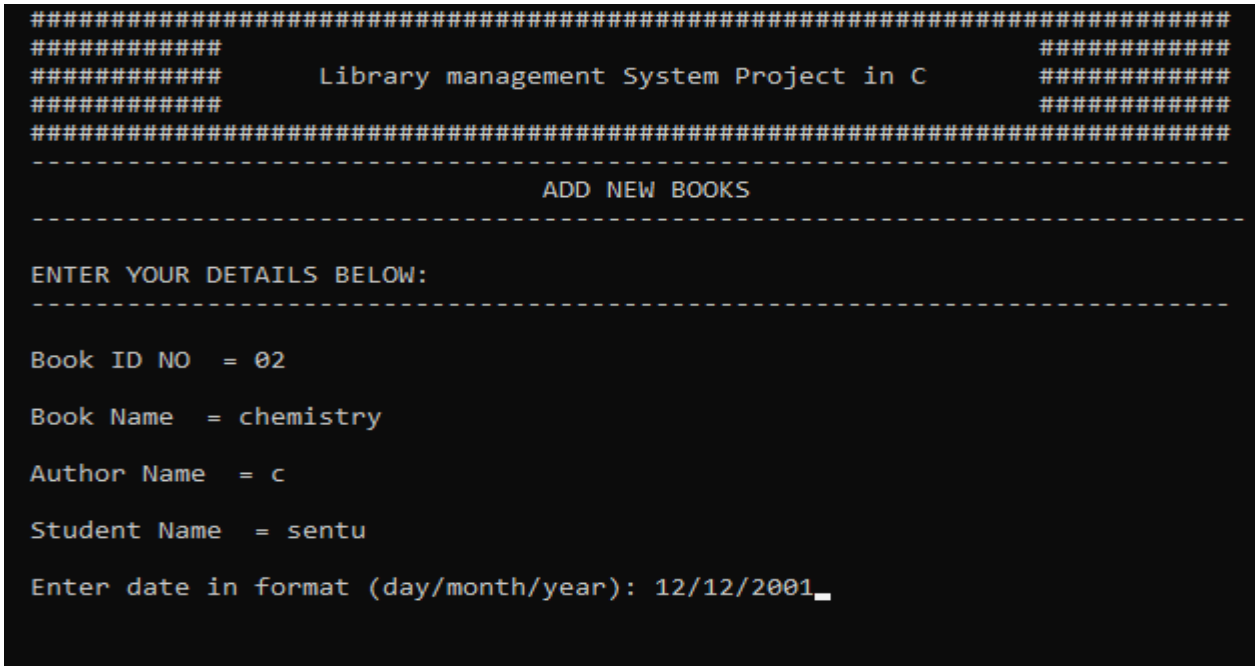


LOG IN SCREEN:

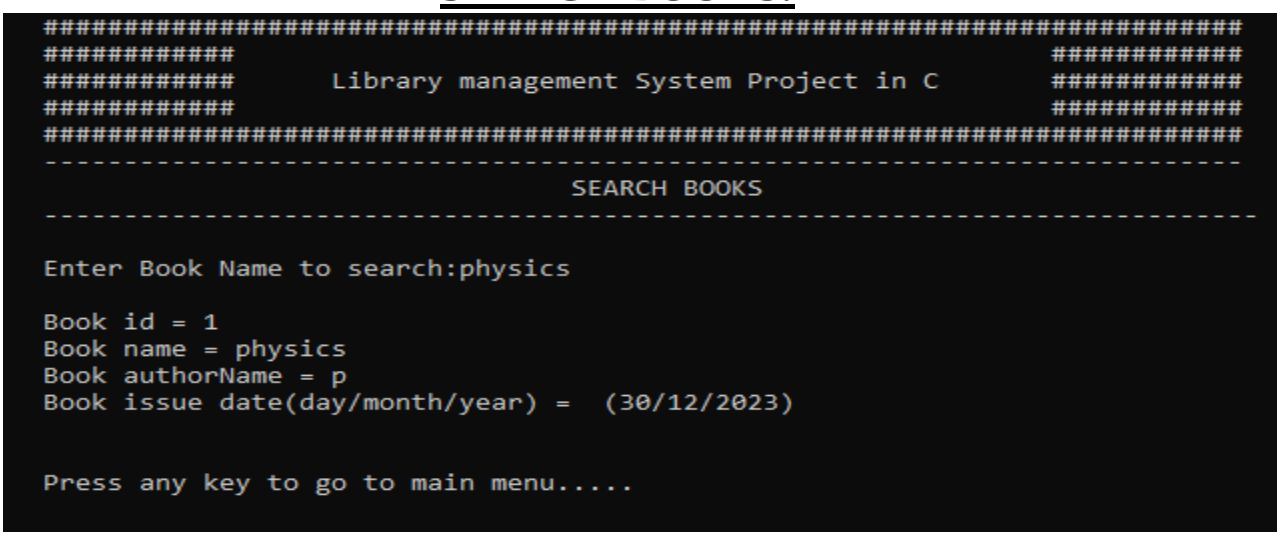


MAIN MENU:

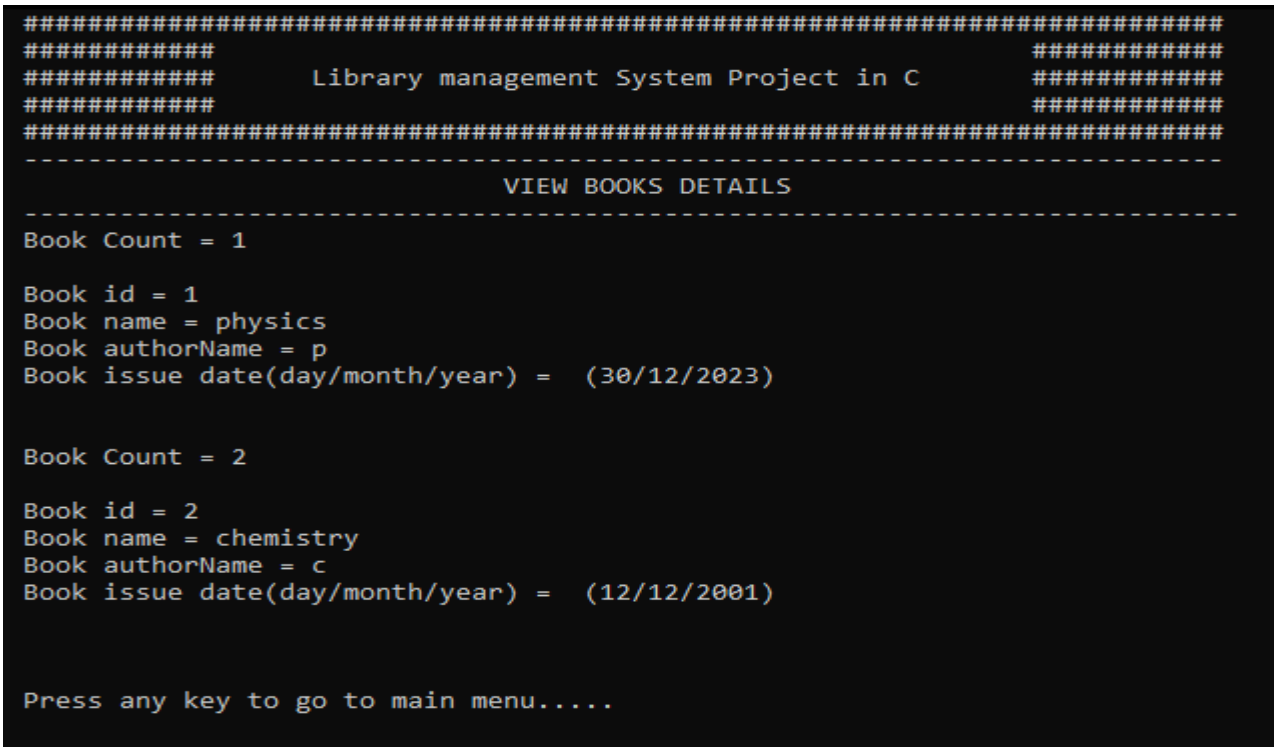
ADD NEW BOOKS:



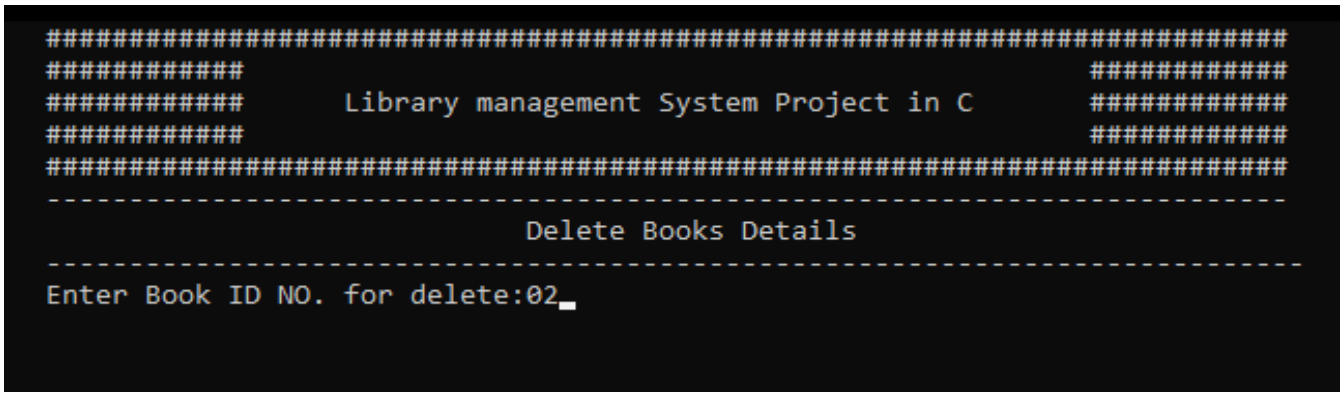
SEARCH BOOKS:



VIEW ALL BOOK RECORDS:



DELETE BOOK DETAILS:



Chapter 04

Conclusion

Practical implementation\Scope for future

The library management system needs to be computerized to reduce human errors and to increase efficiency. The proposed library management system in this proposal will be a computerized management system developed to maintain all the daily work of the library. Library Management Systems are designed to store all the information about books and members. The main focus of this project is to lessen human effort

and encourage efficient record keeping.