The mini-project “Library management system project in C” is a console application using the C programming language. This project compiled in Code Blocks with the GCC compiler. In this console application, you can do basic library management task like adding the book, view the added book, search the books, ..etc.

This application based on file handling in C, where I have used a file-related function like **fopen**, **fread**, **fwrite**, ..etc. Good thing is that “Library management system project” is password-protected, so only authorized person able to login in this application.

Also to increase the redabilty I have broken the application in different function. Each function of the project extensively use the **file handing function**, so it is also a great project to understand file handling.

Note: Don’t copy and paste the code for your project. Use the code to learn and do the project yourself.

List of a function used in “Library management system project in C”

isFileExists():

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

```
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;
}
```

init():

This function creates the file if not exist and copies the default password (“aticleworld”) in file header structure.

```
void init()
{
FILE *fp = NULL;
int status = 0;
const char defaultUsername[] ="aticleworld\n";
const char defaultPassword[] ="aticleworld\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);
}
}
}
```

printMessageCenter():

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

```
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);
}
```

headMessage():

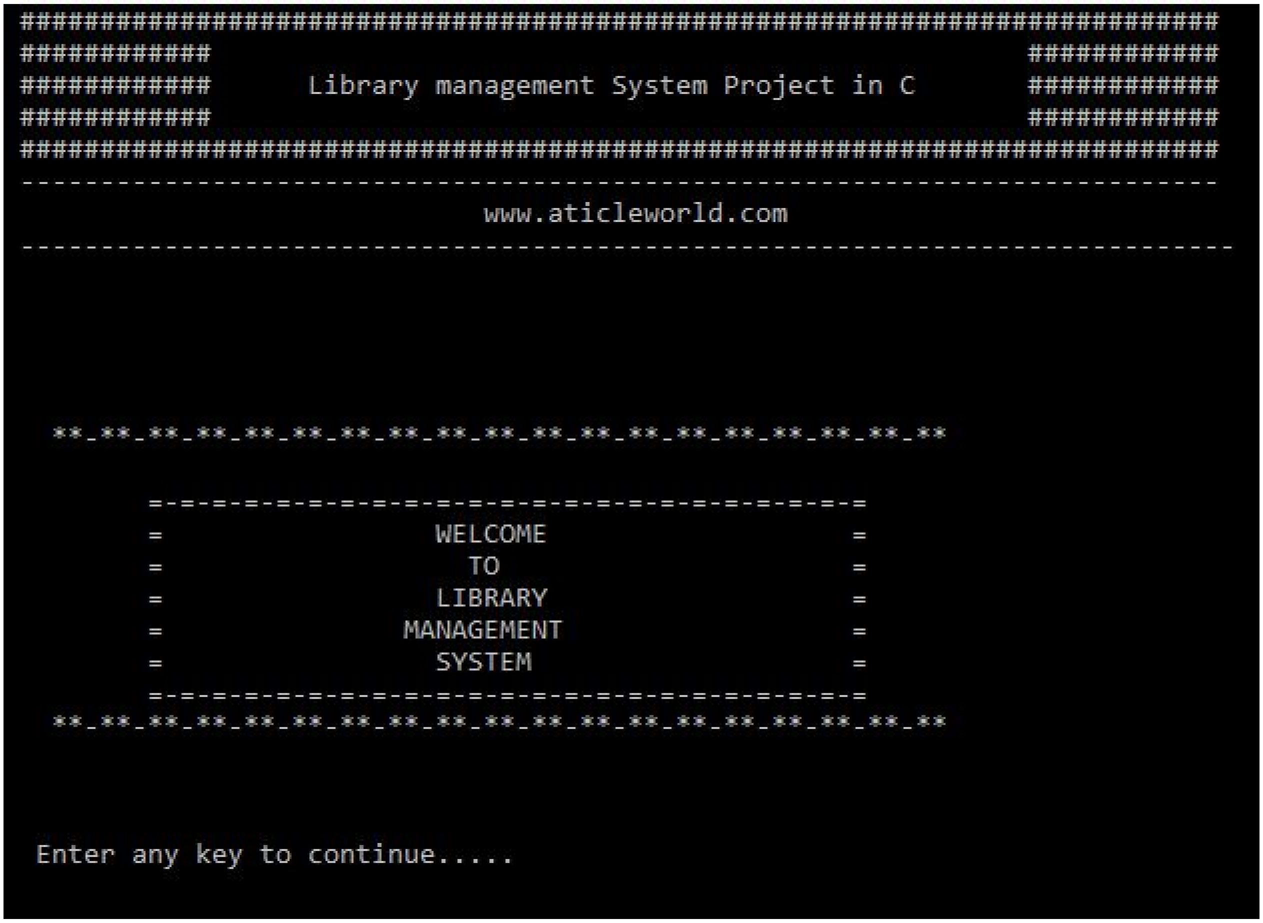
It prints the message on the top of the console and prints the message as per operation.

```
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-------------------------------------------------------------------------");
}
```

welcomeMessage():

This function displays the first welcomes screen of the “Library management system project” and asks the user to press any key to access the library application.

```
void welcomeMessage()
{
headMessage("www.aticleworld.com");
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();
}
```



```
############################################################################
############                                                    ############
############      Library management System Project in C        ############
############                                                    ############
############################################################################
----------------------------------------------------------------------------
                             www.aticleworld.com
-----------------------------------------------------------------------------




  **_**_**_**_**_**_**_**_**_**_**_**_**_**_**_**_**_**_**


        =-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
        =                 WELCOME                   =
        =                   TO                      =
        =                 LIBRARY                   =
        =               MANAGEMENT                  =
        =                 SYSTEM                    =
        =-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
  **_**_**_**_**_**_**_**_**_**_**_**_**_**_**_**_**_**_**



 Enter any key to continue.....
```

isNameValid():

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

```
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;
}
```

isValidDate():

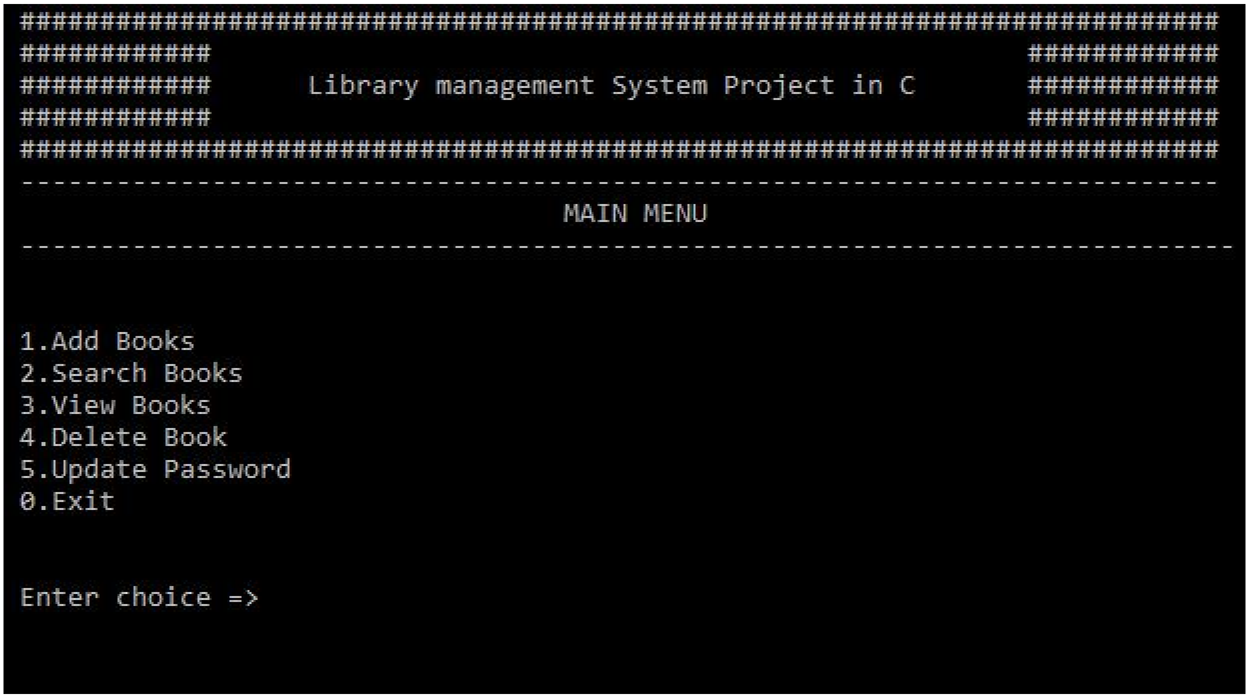
This function read the date in the format of dd/mm/yyyy also it validates the entered date.

```
// 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;
}
```

menu():

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

```
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\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
}
```



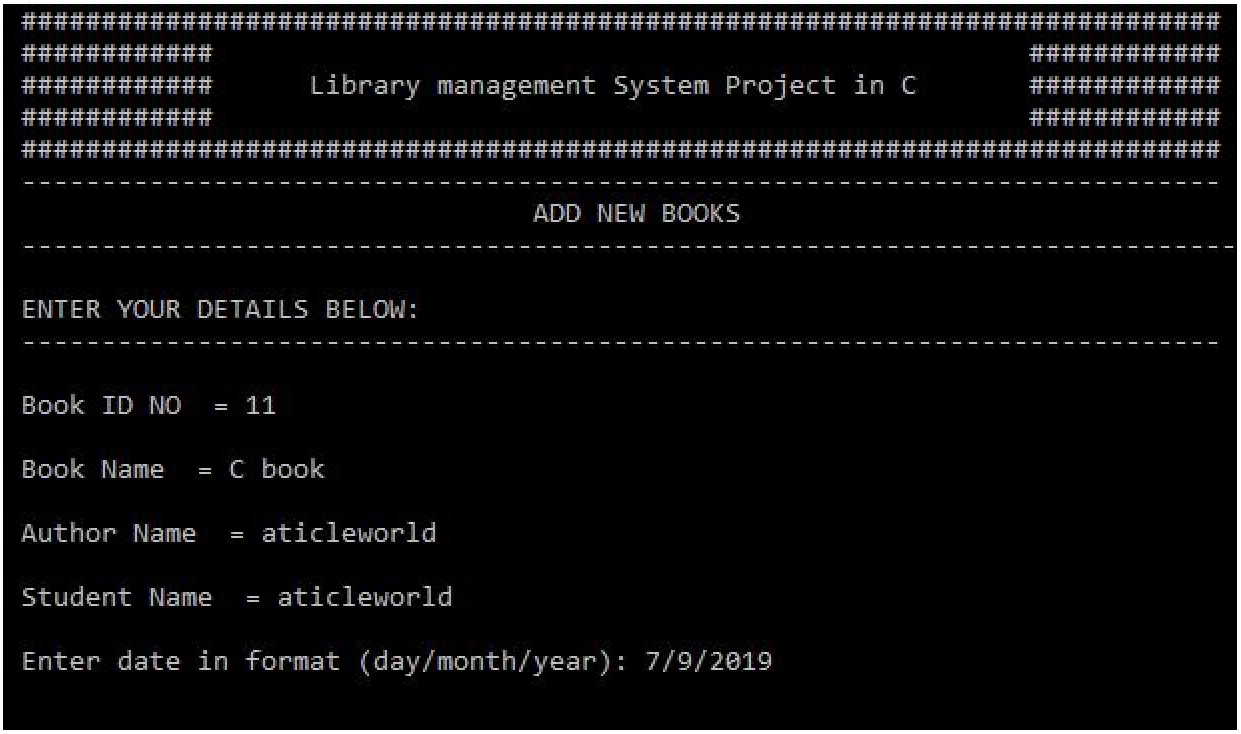
```
############################################################################
############                                                    ############
############      Library management System Project in C        ############
############                                                    ############
############################################################################
----------------------------------------------------------------------------
                                  MAIN MENU
-----------------------------------------------------------------------------


1.Add Books
2.Search Books
3.View Books
4.Delete Book
5.Update Password
0.Exit


Enter choice =>
```

addBookInDataBase():

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

```
// 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.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);
}
```

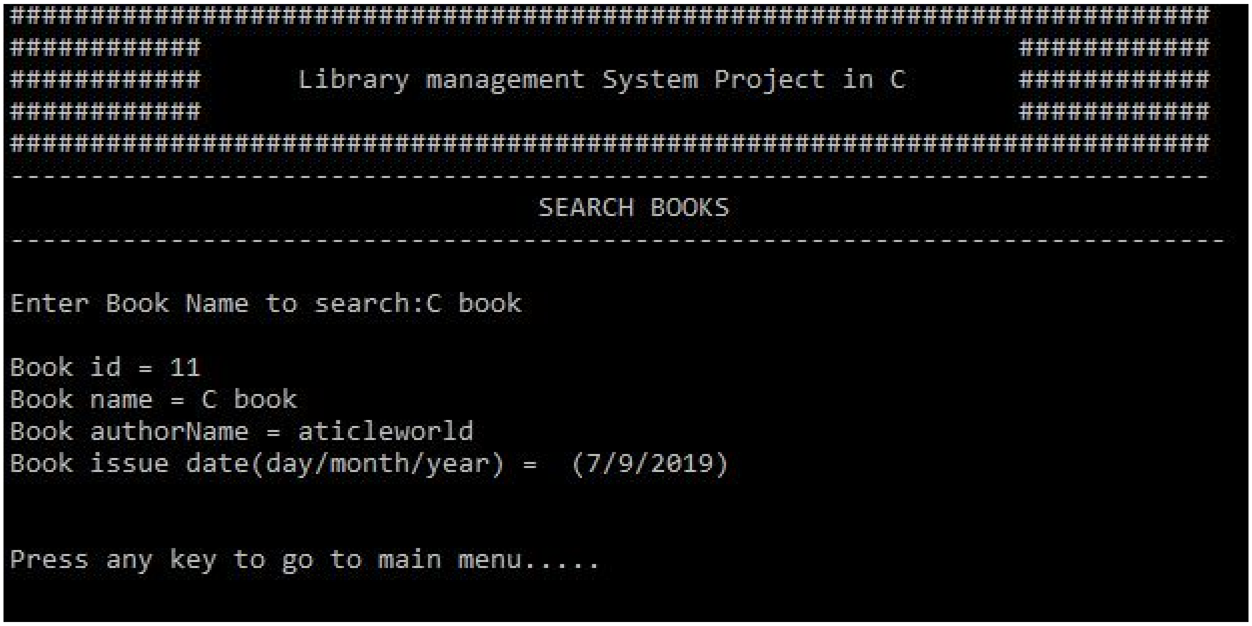


```
############################################################################
############                                                    ############
############      Library management System Project in C        ############
############                                                    ############
############################################################################
----------------------------------------------------------------------------
                              ADD NEW BOOKS
-----------------------------------------------------------------------------

ENTER YOUR DETAILS BELOW:
----------------------------------------------------------------------------

Book ID NO  = 11

Book Name  = C book

Author Name  = aticleworld

Student Name  = aticleworld

Enter date in format (day/month/year): 7/9/2019
```

searchBooks():

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 find in records.

```
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();
}
```

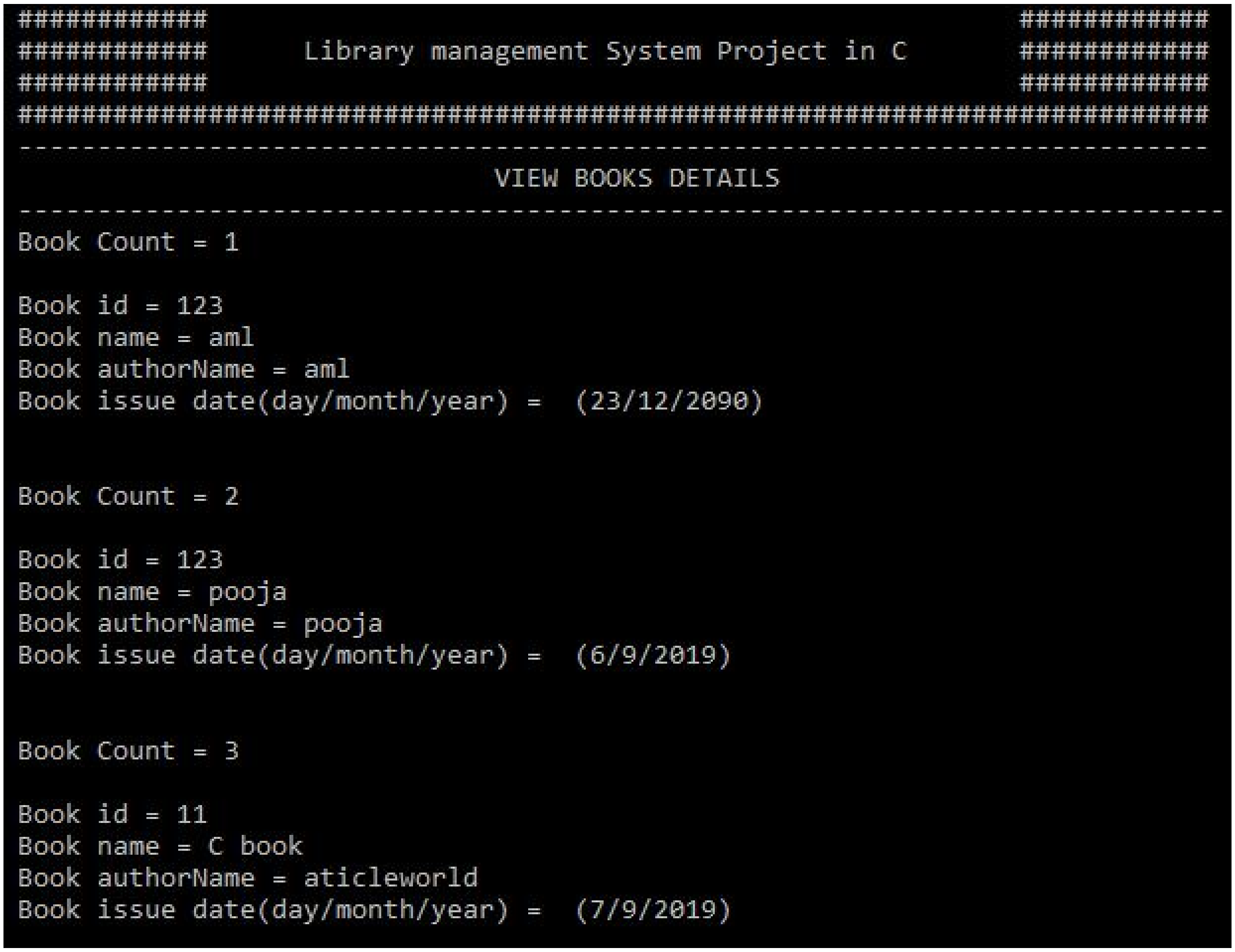


```
###########################################################################
############                                                   ############
############      Library management System Project in C      ############
############                                                   ############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

Enter Book Name to search:C book

Book id = 11
Book name = C book
Book authorName = aticleworld
Book issue date(day/month/year) =  (7/9/2019)


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

viewBooks():

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

```
// view all 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)",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();
}
```



```
############                                                    ############
############      Library management System Project in C      ############
############                                                    ############
##########################################################################
---------------------------------------------------------------------------
                              VIEW BOOKS DETAILS
----------------------------------------------------------------------------
Book Count = 1

Book id = 123
Book name = aml
Book authorName = aml
Book issue date(day/month/year) =  (23/12/2090)


Book Count = 2

Book id = 123
Book name = pooja
Book authorName = pooja
Book issue date(day/month/year) =  (6/9/2019)


Book Count = 3

Book id = 11
Book name = C book
Book authorName = aticleworld
Book issue date(day/month/year) =  (7/9/2019)
```

deleteBooks():

This function asks the book id from the user for the book want to delete. In this function, I am creating a temporary binary file and copy all the data from the existing file except the book whose book id entered by the user. In the last renamed the temporary bin file with an existing binary file.

```
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);
}
```

updateCredential():

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 user can use the application with a new password and username.

```
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);
}
```