Computer Science Project

Library Management System

Yashit Maheshwary

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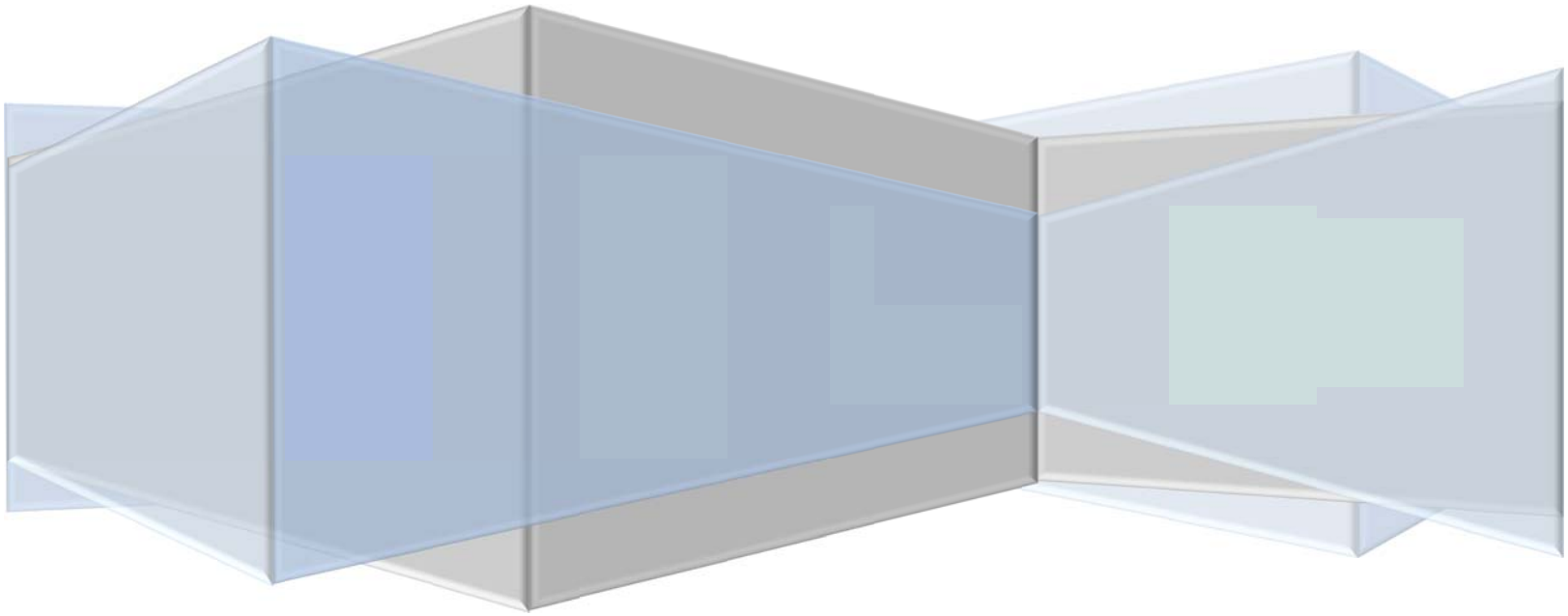

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Aim

To create a program that helps to maintain records in a library.

Acknowledgement

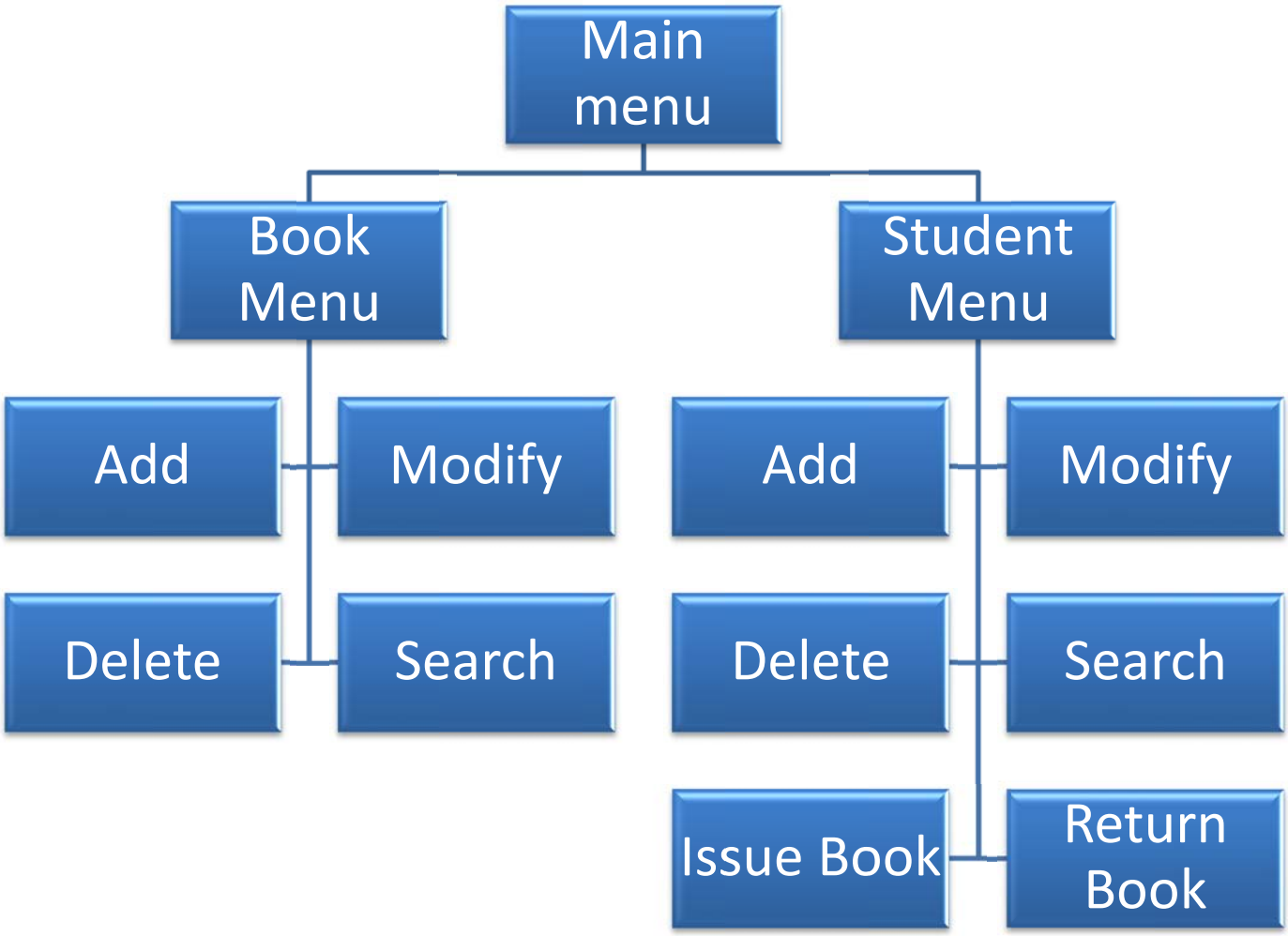
I would like to acknowledge the valuable assistance offered by my Computer Science teacher, Mrs. Nandini Kurmude, without whose expertise this project would not have successfully been completed.

I also thank my parents for their moral support and encouragement in carrying out this project.

Problem Definition

This program enables the user to maintain records of students and books in a library. Further, modification of data is permitted. This program can be used in school libraries to keep a record of the books borrowed and returned by the students. It also supports the deletion and addition of books and students. The program is user friendly and can be used by anyone with or without any knowledge about C++.

Flowchart


Main menu
Book Menu
Student Menu
Add
Modify
Delete
Search
Add
Modify
Delete
Search
Issue Book
Return Book

Technical Documentation

Windows Edition - Windows 10 Pro

Processor – Intel core i5 CPU @3.3GHz

RAM – 6GB

System type – 64 bit Processor

Compiler – Turbo C++

Header Files

- **Stdio.h** – Defines core input and output functions
- **Conio.h** – Declares several useful library fucntions for performing input and output from a statement
- **Fstream.h** – Defines files
- **Stdlib.h** – Defines numeric conversion fucntions, pseudo-random number generation functions etc
- **String.h** – Defines functions involving strings
- **Dos.h** – Defines fucntions that deal with sound, date and time
- **Iomanip.h** – Provides parametric manipulations

Source Code

```
#include<iostream.h>
#include<fstream.h>
#include<conio.h>
#include<stdio.h>
#include<process.h>
#include<string.h>
#include<iomanip.h>
#include<dos.h>
#include<stdlib.h>
class book
{       char bno[6];
        char bname[50];
        char aname[20];
        char bcost[6];
        public: void create_book()
                {       cout<<"NEW BOOK ENTRY"<<endl;
                        cout<<"\nEnter The book number   : ";
                        cin>>bno;
                        cout<<endl;
                        cout<<"Enter The Name of The Book: ";
                        gets(bname);
                        cout<<endl;
                        cout<<"Enter The Author's Name   : ";
                        gets(aname);
                        cout<<endl;
                        cout<<"Enter the cost of the book: ";
                        cin>>bcost;
                        cout<<endl;
                        delay(500);
                        cout<<"\nBook Created";                    }
                void show_book()
                {       cout<<"\nBook no   : "<<bno;
                        cout<<"\nBook Name : ";
                        puts(bname);
                        cout<<"Author Name : ";
                        puts(aname);
                        cout<<"Cost       : "<<bcost;
                }
                void modify_book()
                {       cout<<"\nBook number   : "<<bno;
```

```
                cout<<endl;
                cout<<"Modify Book Name: ";
                gets(bname);
                cout<<endl;
                cout<<"Modify Author's Name of Book: ";
                gets(aname);
                cout<<"Modify the cost of the book: ";
                cin>>bcost;                }
        char* retbno()
        {       return bno;     }
        char* retbname()
        {       return bname;   }
        char* retaname()
        {       return aname;   }
        void data()
        {       cout<<bno<<setw(25)<<bname<<setw(25)<<aname<<setw(17)<<bcost<<endl;   }
        char* retcost()
        {       return bcost;   }
};
class student
{       char admno[6];
        char name[20];
        char stbno[6];
        int token;
        public:  void create_student()
                {       cout<<"NEW STUDENT ENTRY"<<endl;
                        cout<<"\nEnter the Admission Number : ";
                        cin>>admno;
                        cout<<endl;
                        cout<<"Enter The Name of The Student: ";
                        gets(name);
                        cout<<endl;
                        token=0;
                        stbno[0]='/0';
                        cout<<"\nStudent Record Created";                }
                void show_student()
                {       cout<<"\nAdmission no. : "<<admno<<endl;
                        cout<<"Student Name : ";
                        puts(name);
                        cout<<endl;
                        cout<<"No of Book issued : "<<token<<endl;
                        if(token==1)
                                cout<<"Issued Book Number: "<<stbno;            }
```

```
                void modify_student()
                {       cout<<"\nAdmission Number: "<<admno;
                        cout<<endl;
                        cout<<"Modify Student Name: ";
                        gets(name);             }
                char* retstuname()
                {       return name;    }
                char* retadmsnno()
                {       return admno;   }
                char* retstbno()
                {       return stbno;   }
                int rettoken()
                {       return token;   }
                void addtoken()
                {       token=1;        }
                void resettoken()
                {       token=0;        }
                void getstbno(char t[])
                {       strcpy(stbno,t); }
                void data()
                {       cout<<setw(5)<<admno<<setw(30)<<name<<setw(23)<<token<<endl;    }
};
void end();
void sort_book();
void bkmenu();
void stmenu();
fstream f,f1;
book bk;
student st;
void write_book()
{       char ch;
        f.open("book.dat",ios::out|ios::app|ios::in);
        do
        {       bk.create_book();
                f.write((char*)&bk,sizeof(book));
                cout<<"\nDo you want add another book? (y/n): ";
                cin>>ch;
        }while(ch=='y'||ch=='Y');
        f.close();
}
void write_student()
{       char ch;
        f.open("student.dat",ios::out|ios::app);
```

```
        do
        {       st.create_student();
                f.write((char*)&st,sizeof(student));
                cout<<"\nDo you want add another student? (y/n): ";
                cin>>ch;        }while(ch=='y'||ch=='Y');
        f.close();
}
void display_pb_num(char n[])
{       cout<<"BOOK DETAILS\n";
        int flag=0;
        f.open("book.dat",ios::in);
        while(f.read((char*)&bk,sizeof(book)))
        {       if(strcmpi(bk.retbno(),n)==0)
                {       bk.show_book();
                        flag=1;         }       }
        f.close();
        if(flag==0)
        cout<<"\n\nBook does not exist";
        getch();
}
void display_pb_name(char n[])
{       cout<<"BOOK DETAILS\n";
        int flag=0;
        f.open("book.dat",ios::in);
        while(f.read((char*)&bk,sizeof(book)))
        {       if(strcmpi(bk.retbname(),n)==0)
                {       bk.show_book();
                        flag=1;         }       }
        f.close();
        if(flag==0)
        cout<<"\n\nBook does not exist";
        getch();
}
void display_pb_aname(char n[])
{       cout<<"BOOK DETAILS\n";
        int flag=0;
        f.open("book.dat",ios::in);
        while(f.read((char*)&bk,sizeof(book)))
        {       if(strcmpi(bk.retaname(),n)==0)
                {       bk.show_book();
                        cout<<endl;
                        flag=1;         }       }
        f.close();
```

```
        if(flag==0)
        cout<<"\n\nBook does not exist";
        getch();
}
void display_pb_cost(char n[],char n1[])
{       cout<<"BOOK DETAILS\n";
        int flag=0;
        f.open("book.dat",ios::in);
        while(f.read((char*)&bk,sizeof(book)))
        {       if(strcmp(bk.retcost(),n)>0 && strcmp(bk.retcost(),n1)<0)
                {       bk.show_book();
                        cout<<endl;
                        flag=1;         }       }
        f.close();
        if(flag==0)
        cout<<"\n\nBook does not exist";
        getch();
}
void display_ps_num(char n[])
{       int flag=0;
        f.open("student.dat",ios::in);
        while(f.read((char*)&st,sizeof(student)))
        {       if((strcmpi(st.retadmsnno(),n)==0))
                {       cout<<"STUDENT DETAILS: "<<endl;
                        st.show_student();
                        flag=1;         }       }
        f.close();
        if(flag==0)
        cout<<"\n\nStudent does not exist";
        getch();
}
void display_ps_name(char n[])
{       int flag=0;
        f.open("student.dat",ios::in);
        while(f.read((char*)&st,sizeof(student)))
        {       if((strcmpi(st.retstuname(),n)==0))
                {       cout<<"STUDENT DETAILS: "<<endl;
                        st.show_student();
                        flag=1;         }       }
        f.close();
        if(flag==0)
        cout<<"\n\nStudent does not exist";
        getch();
```

```
}
void display_alls()
{       clrscr();
        f.open("student.dat",ios::in);
        cout<<"\n\n\t\tSTUDENT LIST\n\n";
        cout<<"==========================================================\n";
        cout<<"Admission No."<<setw(19)<<"Name"<<setw(33)<<"Book Issued\n";
        cout<<"==========================================================\n";
        while(f.read((char*)&st,sizeof(student)))
        {       st.data();      }
        f.close();
        getch();
}
void display_allb()
{       f.open("book.dat",ios::in);
        cout<<"\n\n\t\tBook LIST\n\n";
        cout<<"================================================================================\n";
        cout<<"Book Number"<<setw(19)<<"Book Name"<<setw(25)<<"Author"<<setw(16)<<"Cost\n";
        cout<<"================================================================================\n";
        while(f.read((char*)&bk,sizeof(book)))
        {       bk.data();      }
        f.close();
        getch();
}
void modify_book()
{       char n[6];
        int found=0;
        clrscr();
        cout<<"\nMODIFY BOOK RECORD "<<endl;
        cout<<"\nEnter The Book Number: ";
        cin>>n;
        f.open("book.dat",ios::in|ios::out);
        while(f.read((char*)&bk,sizeof(book)) && found==0)
        {       if(strcmpi(bk.retbno(),n)==0)
                {       bk.show_book();
                        cout<<"\nEnter The New Details of book: ";
                        bk.modify_book();
                        int pos=-1*sizeof(bk);
                        f.seekp(pos,ios::cur);
                        f.write((char*)&bk,sizeof(book));
                        delay(500);
                        cout<<"\n\nRecord Updated";
                        found=1;        }       }
```

```
        f.close();
        if(found==0)
        cout<<"\n\n Record Not Found ";
        getch();
}
void modify_student()
{       char n[6];
        int found=0;
        clrscr();
        cout<<"\nMODIFY STUDENT RECORD "<<endl;
        cout<<"\nEnter The admission no. of The student: ";
        cin>>n;
        f.open("student.dat",ios::in|ios::out);
        while(f.read((char*)&st,sizeof(student)) && found==0)
        {       if(strcmpi(st.retadmsnno(),n)==0)
                {       st.show_student();
                        cout<<"\nEnter The New Details of student: ";
                        st.modify_student();
                        int pos=-1*sizeof(st);
                        f.seekp(pos,ios::cur);
                        f.write((char*)&st,sizeof(student));
                        delay(500);
                        cout<<"\n\nRecord Updated";
                        found=1;        }       }
        f.close();
        if(found==0)
        cout<<"\n\n Record Not Found ";
        getch();
}
void delete_student()
{       char n[6];
        int flag=0;
        clrscr();
        cout<<"\nDELETE STUDENT..."<<endl;
        cout<<"\nEnter The admission no. of the Student You Want To Delete: ";
        cin>>n;
        f.open("student.dat",ios::in|ios::out);
        fstream f2;
        f2.open("Temp.dat",ios::out);
        f.seekg(0,ios::beg);
        while(f.read((char*)&st,sizeof(student)))
        {       if(strcmpi(st.retadmsnno(),n)!=0)
                        f2.write((char*)&st,sizeof(student));
```

```
                else
                        flag=1;             }
        f2.close();
        f.close();
        remove("student.dat");
        rename("Temp.dat","student.dat");
        if(flag==1)
        {       cout<<"\n\nRecord Deleted ..";      }
        else
                cout<<"\n\nRecord not found";
        getch();
}
void delete_book()
{       char n[6];
        clrscr();
        cout<<"\nDELETE BOOK"<<endl;
        cout<<"\nEnter The Book no. of the Book You Want To Delete: ";
        cin>>n;
        f.open("book.dat",ios::in|ios::out);
        fstream f2;
        f2.open("Temp.dat",ios::out);
        f.seekg(0,ios::beg);
        while(f.read((char*)&bk,sizeof(book)))
        {       if(strcmpi(bk.retbno(),n)!=0)
                {       f2.write((char*)&bk,sizeof(book));        }         }
        f2.close();
        f.close();
        remove("book.dat");
        rename("Temp.dat","book.dat");
        delay(500);
        cout<<"\n\nRecord Deleted.";
        getch();
}
void book_issue()
{       char sn[6],bn[6];
        int found=0,flag=0;
        clrscr();
        cout<<"\nBOOK ISSUE ..."<<endl;
        cout<<"\nEnter Admission no: ";
        cin>>sn;
        f.open("student.dat",ios::in|ios::out);
        f1.open("book.dat",ios::in|ios::out);
        while(f.read((char*)&st,sizeof(student)) && found==0)
```

```
	{	if(strcmpi(st.retadmsnno(),sn)==0)
		{	found=1;
			if(st.rettoken()==0)
			{	cout<<"\nEnter the book no: ";
				cin>>bn;
				while(f1.read((char*)&bk,sizeof(book))&& flag==0)
				{if(strcmpi(bk.retbno(),bn)==0)
				{bk.show_book();
				flag=1;
				st.addtoken();
				st.getstbno(bk.retbno());
				int pos=-1*sizeof(st);
				f.seekp(pos,ios::cur);
				f.write((char*)&st,sizeof(student));
				cout<<"\nBook issued successfully"<<endl;
				cout<<endl;
				cout<<"\n The book has been issued successfully"<<endl;
				cout<<" Please return the book after 15 days ";		}
			if(flag==0)
				cout<<"Book no does not exist";		}
			else
				cout<<"Student has not returned the last book ";	}	}
	if(found==0)
	cout<<"Student record doesn't exist.";
	getch();
	f.close();
	f1.close();
}
void book_deposit()
{	char sn[6],bn[6];
	int found=0,flag=0;
	clrscr();
	cout<<"\n\nBOOK DEPOSIT ...";
	cout<<"\nEnter The student's admission no: ";
	cin>>sn;
	f.open("student.dat",ios::in|ios::out);
	f1.open("book.dat",ios::in|ios::out);
	while(f.read((char*)&st,sizeof(student)) && found==0)
	{	if(strcmpi(st.retadmsnno(),sn)==0)
		{	found=1;
			if(st.rettoken()==1)
			{	while(f1.read((char*)&bk,sizeof(book))&& flag==0)
				{if(strcmpi(bk.retbno(),st.retstbno())==0)
```

```
                                        {       bk.show_book();
                                                flag=1;
                                                st.resettoken();
                                                int pos=-1*sizeof(st);
                                                f.seekp(pos,ios::cur);
                                                f.write((char*)&st,sizeof(student));    }
                                        if(flag==0)
                                                cout<<"Book no does not exist";         }
                                else
                                        cout<<"Student has not issued any book";        }       }
        if(found==0)
        cout<<"Student record does not exist...";
        getch();
        f.close();
        f1.close();
}
void intro()
{       clrscr();
        int u;
        gotoxy(31,5);
        cout <<"Welcome to Project!";
        delay(400);
        textcolor(BLACK+BLINK);
        textbackground(WHITE);
        gotoxy(33,7);
        cprintf(" BOOK LIBRARY ");
        textcolor(LIGHTGRAY);
        textbackground(BLACK);
        gotoxy(15,10);
        delay(400);
        cout<<"This  project has the facility of maintaining records";
        gotoxy(30,11);
        delay(400);
        cout<<"of Books and Members";
        gotoxy(25,14);
        delay(400);
        cout<<"Designed by Yashit Maheshwary"<<endl;
        gotoxy(33,15);
        delay(400);
        cout<<"Class - XII A"<<endl;
        cout<<endl;
        cout<<endl;
        delay(400);
```

```
        cout<<"Press any key to continue"<<endl;
        getch();
}
void admin_menu()
{       clrscr();
        int ch3;
        int found=0;
        char pass[4];
        cout<<"Enter the Administrator Password: ";
        for(int f=0;f<4;f++)
        {       pass[f]=getch();
                cout<<"*";      }
        if(strcmp(pass,"comp")==0)
        {       cout<<"\n\n The password entered is correct"<<endl;
                cout<<"\n\nLoading........."<<endl;
                clrscr();
                cout<<"\n\n ADMINISTRATOR MENU";
                cout<<"\n 1. Students Menu";
                cout<<"\n 2. Books Menu";
                cout<<"\n 3. Return to Main Menu";
                cout<<"\n 4. Exit";
                cout<<"\n\n\tPlease Enter Your Choice: ";
                ch3=getche();
                switch(ch3)
                {       case '1': stmenu();     break;
                        case '2':bkmenu();      break;
                        case '3': return;
                        case '4': end();
                        default:cout<<"\n\n\n\nThere's no such choice!"<<endl;
                        cout<<"Redirecting back to Menu....";
                        cout<<"\a";     }       }
        else if(strcmp(pass,"comp")!=0)
           {    cout<<"\n The password entered is incorrect"<<endl;
                cout<<"\n\n\n\n\n\n\n Redirecting to Main menu...."<<endl;
                delay(1500);
                return;         }
}
void stmenu()
{       clrscr();
        int ch2;
        cout<<"\n\nSTUDENTS MENU!"<<endl;
        cout<<"\n 1. Create a new student record";
        cout<<"\n 2. Display all student records";
```

```
cout<<"\n 3. Search for details of students";
cout<<"\n 4. Modify a student record";
cout<<"\n 5. Delete a record";
cout<<"\n 6. Delete all student records";
cout<<"\n 7. Return to previous Menu";
cout<<"\n 8. Return to Main menu";
cout<<"\n 9. Exit";
cout<<"\n\n\tPlease Enter Your Choice: ";
cin>>ch2;
switch(ch2)
{       case 1: clrscr();
                write_student();    break;
        case 2: display_alls();     break;
        case 3:
        {       char num[6];
                int chc;
                clrscr();
                cout<<"\n\nSEARCH MENU!"<<endl;
                cout<<"\n1. Search using Admission Number";
                cout<<"\n2. Search using Student Name";
                cout<<"\n3. Return to previous Menu";
                cout<<"\n4. Return to Main menu";
                cout<<"\n5. Exit";
                cout<<"\n\n\tPlease enter your choice: ";
                cin>>chc;
                switch(chc)
                {       case 1:
                        {       clrscr();
                                cout<<"\n\n\tPlease Enter The Admission No. ";
                                cin>>num;
                                display_ps_num(num);
                                break;              }
                        case 2:
                        {       clrscr();
                                char stuname[30];
                                cout<<"\n\n\t Please enter the student's name: ";
                                cin>>stuname;
                                display_ps_name(stuname);
                                break;              }
                        case 3: admin_menu();               break;
                        case 4: return;
                        case 5: end();
                }
```

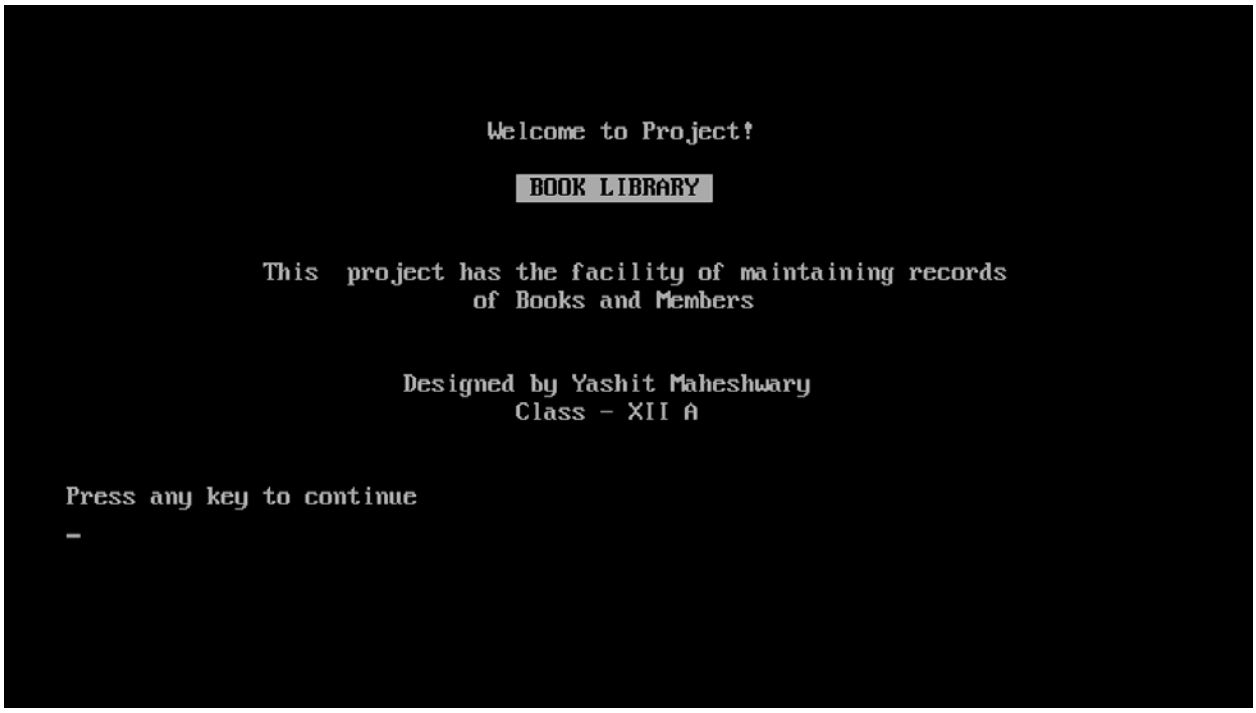
```
                    break;          }
                case 4: modify_student();       break;
                case 5: delete_student();       break;
                case 6:
                {       clrscr();
                        delay(1000);
                        cout<<"\n\nDeletion in Progress"<<endl;
                        f.open("student.dat",ios::out | ios::trunc);
                        f.close();
                        delay(1000);
                        cout<<"\n\n\n\nDeletion Complete"<<endl;
                        delay(1000);
                        break;          }
                case 7: admin_menu();           break;
                case 8: return;
                case 9: end();
                default: cout<<"\a";}
        stmenu();
}

void bkmenu()
{       int bookcount,ch4;
        cout<<"\n\nBOOKS MENU!"<<endl;
        cout<<"\n 1. Create a new book record";
        cout<<"\n 2. Display all book records ";
        cout<<"\n 3. Search for details of books";
        cout<<"\n 4. Modify a book record";
        cout<<"\n 5. Delete a book record";
        cout<<"\n 6. Delete all book records";
        cout<<"\n 7. Return to previous Menu";
        cout<<"\n 8. Return to the main menu";
        cout<<"\n 9. Exit";
        cout<<"\n\n\tPlease Enter Your Choice: ";
        cin>>ch4;
        switch(ch4)
        {       case 1: write_book();   break;
                case 2: display_allb();  break;
                case 3:
                {       char num[6];
                        int chc;
                        clrscr();
                        cout<<"\n\nSEARCH MENU!"<<endl;
                        cout<<"\n1. Search using Book Number";
```

```
cout<<"\n2. Search using Book Name";
cout<<"\n3. Search using Author Name";
cout<<"\n4. Search using cost";
cout<<"\n5. Return to previous Menu";
cout<<"\n6. Return to Main menu";
cout<<"\n7. Exit";
cout<<"\n\n\tPlease enter your choice: ";
cin>>chc;
switch(chc)
{       case 1:
        {       char num[10];
                clrscr();
                cout<<"\n\n\tPlease Enter The Book No. ";
                cin>>num;
                display_pb_num(num);
                break;          }
        case 2:
        {       clrscr();
                char bkname[30];
                cout<<"\n\n\tPlease enter the Book's name: ";
                cin>>bkname;
                display_pb_name(bkname);
                break;          }
        case 3:
        {       clrscr();
                char athname[30];
                cout<<"\n\n\tPlease enter the Author's name: ";
                cin>>athname;
                display_pb_aname(athname);
                break;          }
        case 4:
        {       clrscr();
                char llmt[30],ulmt[30];
                cout<<"\n\n\tPlease enter the lower limit: ";
                cin>>llmt;
                cout<<"\tPlease enter the upper limit: ";
                cin>>ulmt;
                display_pb_cost(llmt,ulmt);
                break;          }
        case 5: admin_menu();
                break;
        case 6: return;
        case 7: end();
```

```
                        }
                        break;
                }
                case 4: modify_book();
                        break;
                case 5: delete_book();
                         break;
                case 6:
                {       clrscr();
                        cout<<"\n\nDeletion in progress"<<endl;
                        f.open("book.dat",ios::out | ios::trunc);
                        f.close();
                        cout<<"\n\n\n\nDeletion Complete"<<endl;
                        break;              }
                case 7: admin_menu();  break;
                case 8: return;
                case 9: end();
                default: cout<<"\a";      }
        bkmenu();
}
void main()
{       char ch;
        intro();
        do
        {       clrscr();
                cout<<"\n\n MAIN MENU";
                cout<<"\n 1. Issue a book";
                cout<<"\n 2. Return a book";
                cout<<"\n 3. Administrator Menu";
                cout<<"\n 4. Exit";
                cout<<"\n\n Please Select Your Option: ";
                ch=getche();
                switch(ch)
                {       case '1': book_issue();    break;
                        case '2': book_deposit(); break;
                        case '3': admin_menu(); break;
                        case '4': end();
                        default :cout<<"\a";
                }
                f.close();
        }while(ch!='4');
}
void end()
```

```
{       clrscr();
        int u;
        textcolor(BLACK+BLINK);
        textbackground(WHITE);
        gotoxy(33,13);
        cprintf(" THANK YOU! ");
        textcolor(LIGHTGRAY);
        textbackground(BLACK);
        cout<<"\n\n\n\n\n\n Press any key to exit"<<endl;
        getch();
        exit(0);            }
```

Screenshots



```
MAIN MENU
1. Issue a book
2. Return a book
3. Administrator Menu
4. Exit

Please Select Your Option: _
```

```
STUDENTS MENU!

 1. Create a new student record
 2. Display all student records
 3. Search for details of students
 4. Modify a student record
 5. Delete a record
 6. Delete all student records
 7. Return to previous Menu
 8. Return to Main menu
 9. Exit

        Please Enter Your Choice:
```

```
BOOKS MENU!

 1. Create a new book record
 2. Display all book records
 3. Search for details of books
 4. Modify a book record
 5. Delete a book record
 6. Delete all book records
 7. Return to previous Menu
 8. Return to the main menu
 9. Exit

        Please Enter Your Choice: _
```

```
                STUDENT LIST

================================================================
Admission No.              Name                    Book Issued
================================================================
    1                      Yashit                      0
    2                        John                      0
    3                      Mathew                      0
    4                       Kumar                      0
```

`

```
NEW BOOK ENTRY

Enter The book number   : 6

Enter The Name of The Book: Harry Potter

Enter The Author's Name   : JK Rowling

Enter the cost of the book: 90


Book Created
Do you want add another book? (y/n): _
```

```
                    THANK YOU!



 Press any key to exit
```

Conclusion

The program is successfully compiled and executed.

Merits:

- Practical and Simple
- Multiple Applications
- Customer Friendly
- Can be used without any knowledge about coding

Demerits:

- Slow at times due to multiple switch statements
- Error handling is at times difficult

Bibliography

- Computer Science C++ TextBook Class 12
- www.cplusplus.com
- Various other websites