American International University-Bangladesh (AIUB)

Department of Computer Science

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CSC 2210 Object Oriented Analysis and Design (OOAD)

Section: [K] Group No: 01

PROJECT TITLE

Library Management System

Object-Oriented Analysis and Design (OOAD) project

Supervised By

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Abstract:

With this project, a library can be managed without any hesitation or having to worry about books go missing. With this library management system, there will be records of users and librarians both. Librarians or users can easily access to books or remember their accessed books history with this application project which might be helpful

Background Information

The library management system is a software system that issues books and magazines to registered users only. User has to login after getting registered to the system. Users must have a card. The Borrow history will also be shown to the user. The borrower of the book can perform various functions such as searching for desired book, get the issued book and return the book. Library management system helps libraries keep track of the books and their checkouts, as well as student profiles.

Library management system also includes maintaining database for entering new books and keeps record of the books that have been borrowed or bought with their respective due dates.

Library Management System can be a good use for Libraries because of various reasons. Some library owners often complaint that some people steal books from them or don't return books by the due time. It becomes difficult to keep record of each and everyone.

Problem Statement:

Library is a place where all kinds book, magazines are displayed and people can easily access to these items and can borrow books if they have membership. Because library is an open space for book readers and students, there are some problems which can't be resolved without having software based system. One of the most unavoidable problems librarians face is books getting stolen from library. Some people borrow books but don't return it in due time. A library management system-based application can resolve the problem that is faced by the librarians. This system will be able to keep records of all users. In this case, if someone doesn't return book in due time, he or

she will have to pay fine. This system will keep record of books too. So, in any case if books go missing, librarian can check records and will be able to identify who stole or didn't return the book.

Objectives :

The main objective of creating the document about the software is to know about the list of the requirement in the software project part of the project to be developed. It specifies the requirement to develop a processing software part that completes the set of requirements. The cores of objectives of the project are followings:

1.Access to all sorts of books.
2. Keeping track of orders and fines.
3. Storing book borrow/buy history

Proposed Solution:

To deal with the problem some solutions are given below :

1. Any student will have access to search books by the title, author, subject category.
2. Each book will have a unique identification number which will ease locating books.

3. There could be more than one copy of a book, and library members should be able to check-out and reserve any copy.

4. There should be a maximum limit on how many books a student can check-out.

5. If any student doesn't return a book after due date, system should be able to keep record of the student and collect fines.

6. Members should be able to reserve books that are not currently available.
7. The System should be able to retrieve information like who took a particular book or what are the books checked-out by a specific library member.

This might be a proper solution to solve the problem as librarians can easily keep book records and borrow history of each member and it can also help managing a library easily because of technology.

Here the software which is being specified is Library Management System. In this project we've illustrated that how Library Management System Works and its process step by step through Use Case diagram, Class diagram, Sequence diagram, State chart diagram and Activity diagram.

Now the purpose, including relevant benefits and goals is given below:

Purpose: The purpose of this project is to develop an object-oriented model for Library Management System

Benefits:

1.This project will portray the Library Management System 2.It will have a user interface that can easily be used by user to borrow or buy books.

3.The borrowed or bought books record will be kept.

4.User level interface.

Goals: Library Management System is an interface between the users and a database that can be use It targets at improving the overall management section of a library and ease the complexities

UML Diagram :

Here, we will understand the designing uml diagram for the library management system. Some scenarios of the system are as follows :

1. User who registers himself as a new user initially is regarded as staff or student for the library system.

For the user to get registered as a new user, registration forms are available that is needed to be fulfilled by the user.

After registration, a library card is issued to the user by the librarian. On the library card, an ID is assigned to cardholder or user.

2. After getting the library card, a new book is requested by the user as per there requirement.

3. After, requesting, the desired book or the requested book is reserved by the user that means no other user can request for that book.

4. Now, the user can renew a book that means the user can get a new due date for the desired book if the user has renewed them.

5. If the user somehow forgets to return the book before the due date, then the user pays fine. Or if the user forgets to renew the book till the due date, then the book will be overdue and the user pays fine.

6. User can fill the feedback form available if they want to.

7. Librarian has a key role in this system. Librarian adds the records in the library database about each student or user every time issuing the book or returning the book, or paying fine.

8. Librarian also deletes the record of a particular student if the student leaves the college or passed out from the college. If the book no longer exists in the library, then the record of the particular book is also deleted.

9. Updating database is the important role of Librarian.

In Object-Oriented modeling, the main building block generally represents different objects in a system, their attributes, their different functions, and relationships among objects. These building blocks are known as Diagram.

Diagrams are generally used for conceptual modeling of static view of a software application, and for modeling translating models into programming code in a detailed manner. At time of developing or construction software systems, an uml diagram is widely used. They are also used for data modeling. It is used to show classes, relationships among them, interface, association, etc. Class in a class diagram simply is a blueprint of an object. It simply describes and explains different type of objects in system, and different types of relationships that exist between them.

Use Case Diagram :

Use case is a list of actions or events. Steps typically defining the interactions between a role and a system to achieve a goal. The use case diagram consists of various functionality performed by actors like librarian and user.

Case Study :

A user first login into his account. He can renew his borrowed books. besides he can search books. A librarian can also do the

above works. A user can Return his books. But a librarian can add book, he can also delete some books. Moreover, he can edit book tag name.

A librarian can buy books via e commerce sites to add library. He can payment via bkash or Card. After all activities user and librarian can logout form the portal

Fig : Use Case Diagram

Use Case Specification :

Login

Use Case Name:	Log in	
Actor(s):	User, Librarian	
Description:	The use case is about the library management system. The use case is for the librarian and user. They enter to the account with User ID and Password.	
Reference ID:	LMS-1	
Typical course of events:	**Actor Action** **Step 1:** Initiate the login process. **Step 2:** Enter user name and password. **Step 5:** User and Librarian had logged into the system.	**System Response** **Step 3:** The system will check if the member is registered or not **Step 4:** The system will send the notification to the user.
Alternative course of events:	**Step 3a:** If account is not existing the system will return the error massage to user. The system may reminder user to sign up an account or ask them 'forgot password.'	
Precondition:	User should have sign up any account in the system previously.	
Postcondition:	User/Librarian has logged into the system.	

Table: Login

Add Books

Use Case Name:	Add Books	
Actor(s):	Librarian	
Description:	This use case describes the process of Adding books	
Reference ID:	**LMS-2**	
Typical course of events:	**Actor Action** **Step 1:** This use case is initiated that librarian can add books as his choice **Step 2:** Choose Books Name, author name, publication name and edition	**System Response** **Step 3: System will Add Books**
Alternative course of events:		
Precondition:	The Librarian must have the registered account.	
Postcondition:		

Table: Add Books

Delete Books

Use Case Name:	Delete Book	
Actor(s):	Librarian	
Description:	This use case describes the process of Deleting books	
Reference ID:	**LMS-03**	
Typical course of events:	**Actor Action System** **Step 1:** This use case is initiated that librarian can delete books as his choice **Step 2:** Choose Books Name Step 3 : Delete Books	**Response** **Step 4: System Will Delete Books**
Alternative course of events:		
Precondition:	The Librarian must have the registered account.	
Postcondition:		

Table : Delete Books

Buy Books

Use Case Name:	Buy Book	
Actor(s):	Librarian	
Description:	This use case describes the process of Buying books	
Reference ID:	**LMS-03**	
Typical course of events:	**Actor Action** **Step 1:** This use case is initiated that librarian can duy books as his choice **Step 2:** Choose Books Name Step 3 : Choose Payment method Step 4: Order Books	**System Response** **Step 5:** System will transfer to the payment system. <<include payment>>
Alternative course of events:		
Precondition:	The Librarian must have the registered account.	
Postcondition:		

Table : Buy Books

Payment

Use Case Name:	Payment	
Actor(s):	Librarian	
Description:	This use case describes the process of Payment Method	
Reference ID:	**LMS-04**	
Typical course of events:	**Actor Action System** **Step 1:** This use case is initiated that librarian can Choose payment method **Step 2:** Choose Payment Step 3 : Payment will be done	**Response** Step 4: System will confirm the payment
Alternative course of events:		
Precondition:	The Librarian must have the registered account.	
Postcondition:		

Table : Payment

Borrow Book

Use Case Name:	Borrow Book	
Actor(s):	User	
Description:	This use case describes the process of Borrow Book	
Reference ID:	**LMS-05**	
Typical course of events:	**Actor Action System** **Step 1:** This use case is initiated that librarian can Choose and select books to borrow book to Borrow Book	**Response** Step 3: System will add borrow **Step 2:**
Alternative course of events:		
Precondition:	The Librarian must have the registered account.	
Postcondition:		

Table : Borrow Books

Return Book

Use Case Name:	Return Book	
Actor(s):	User	
Description:	This use case describes the process of Return Book	
Reference ID:	**LMS-06**	
Typical course of events:	**Actor Action System** **Step 1:** This use case is initiated that librarian can Choose and select books to return **Step 2:** Return Book	**Response** Step 3: System will confirm return
Alternative course of events:	If books are not returned in due time, user will be fined from the system	
Precondition:	The User must have the registered account.	
Postcondition:		

Table :Return Book

History

Use Case Name:	History	
Actor(s):	Student	
Description:	This use case describes the process of Borrow Book	
Reference ID:	**LMS-07**	
Typical course of events:	**Actor Action System Response** **Step 1:** This use case is initiated that user can see borrow history **Step 3:** System will Show **Step 2:** Show History History	
Alternative course of events:		
Precondition:	The User must have the registered account.	
Postcondition:		

Table : History

Class Diagram :

A class diagram in the unified modeling language is a type of static structure diagram that describes the structure of a system by showing the system's classes, their attributes, operations and the relationships among objects.

Case Study :

A library has many kinds of books. User login into their account and borrow books. User has two part, Staff and students. One user have one account. in the account section users see the history. A library has one or more librarian. A library has a central database. database have add, delete, update features. A librarian has permission to access database. User and librarian

both search books. Books are organized by Tittle and Unique code. User can borrow and refund books. A Librarian verify Users before issue books.

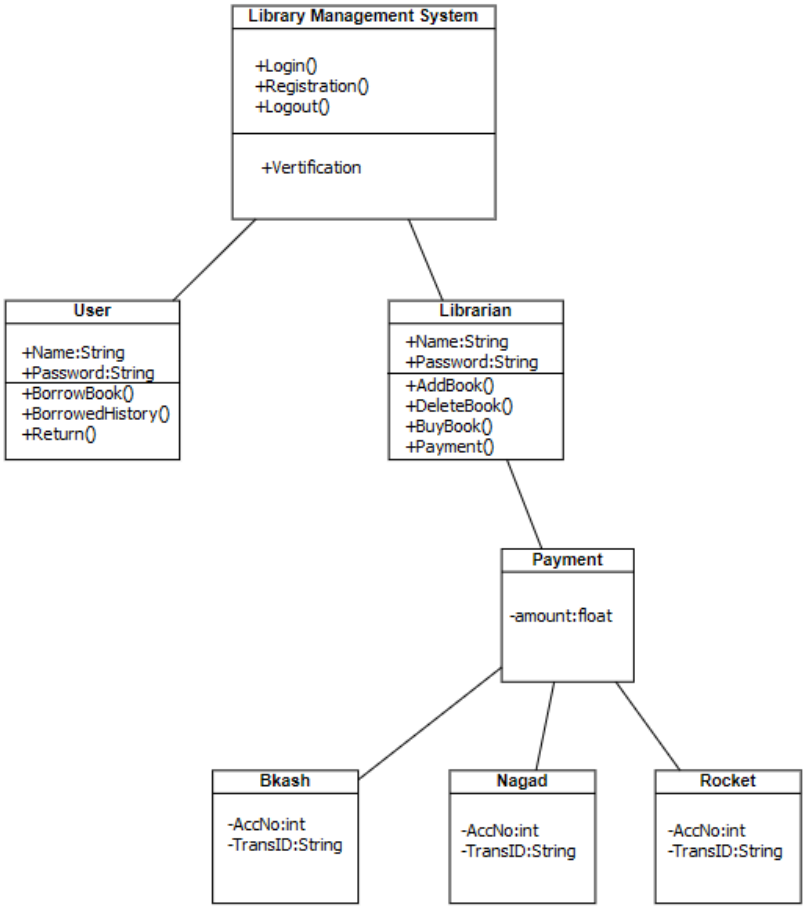


Fig : Class Diagram

Sequence Diagram :

A sequence diagram represent the sequence and interactions of a given use case or scenario. Sequence diagram capture most of the information about the system. It is also represented in order by which they occur and have the object in the system send message to one another. Here the sequence starts with interaction between user and the system followed by database.

Case Study :

In a management system of a university a member can place a request to book a journal to the librarian. Before the librarian can complete the booking that member has to be verified of his status whether he is allowed to borrow journals or not. The journal then has to be located whether it is in the campus where

the request was made or it is in a different campus. If the journal is in a different campus the librarian makes a request for the journal to be sent at the requested campus. The librarian then informs the member about the time required for the journal to reach and completes the booking.

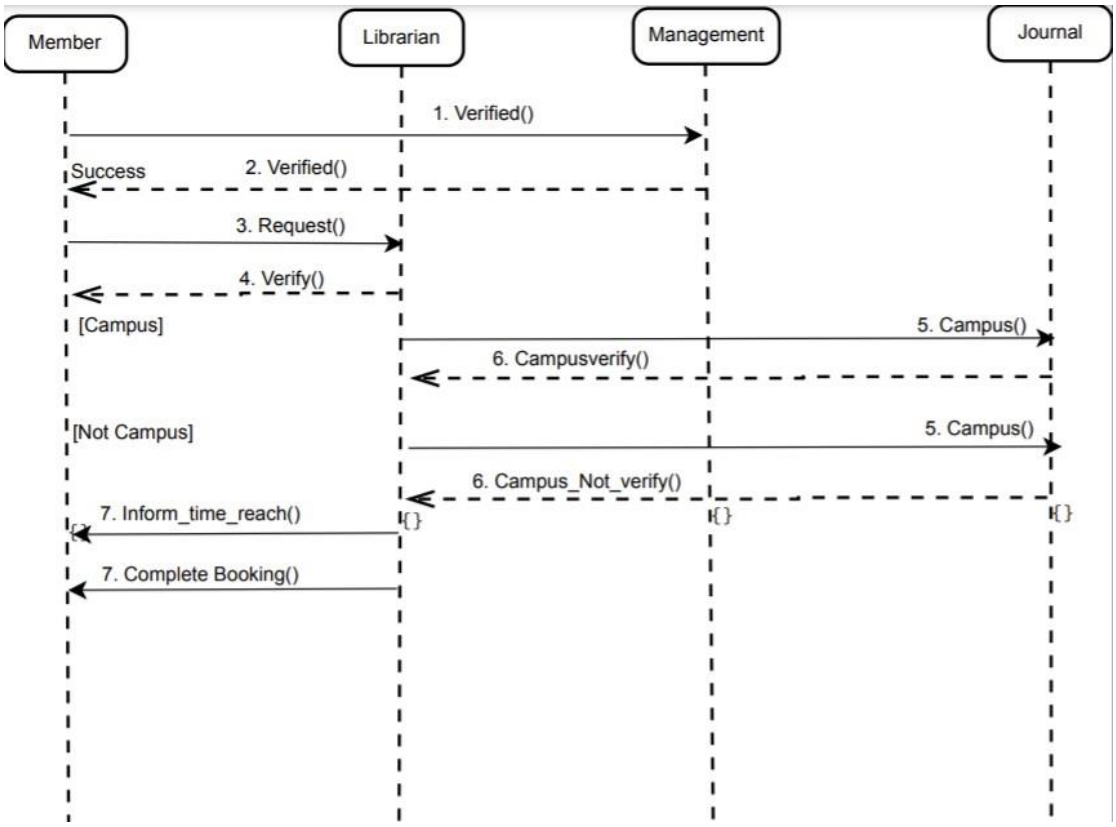


Fig : Sequence Diagram

State Chart Diagram :

State chart diagram is also called as state machine diagram. The state chart diagram contains states in the rectangular boxes and the states are indicated by the dot enclosed. The state chart diagram describes the behavior of the system.

Case Study :

To use the library system at first, reader have to login with his pin. After entering, it will be verified by matching with system records. If it's verified, if the reader previously borrowed books, he can return it and then he can check book or only can check books. If the reader find his searched book then can borrow the book. He also gain membership by paying 3 Dollars. Then he will be a regular member of a library.

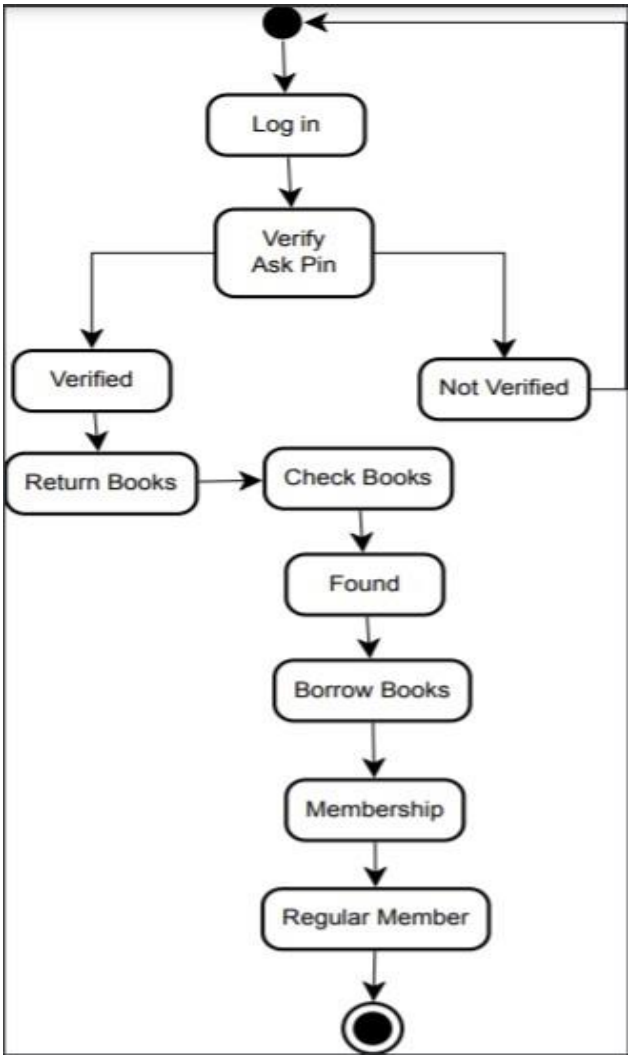


Fig : State Chart Diagram

Activity Diagram :

Activity diagram are graphical representation of workflows of stepwise activities and actions with support for choice, iteration and concurrency. Here in the activity diagram the user login to the system and perform some main activity which is the main key element to the system.

Case Study :

User first log in his account. System can verify his id card . User request to check borrowed history. Then system shows borrowed history. Then user return previous borrowed books. Then check books. Besides System show books. He can borrow 1 or more books. Then he will logout from this system.

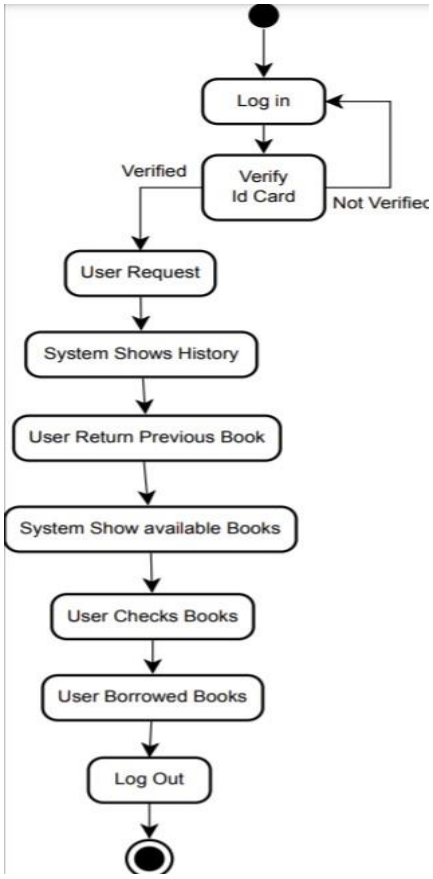
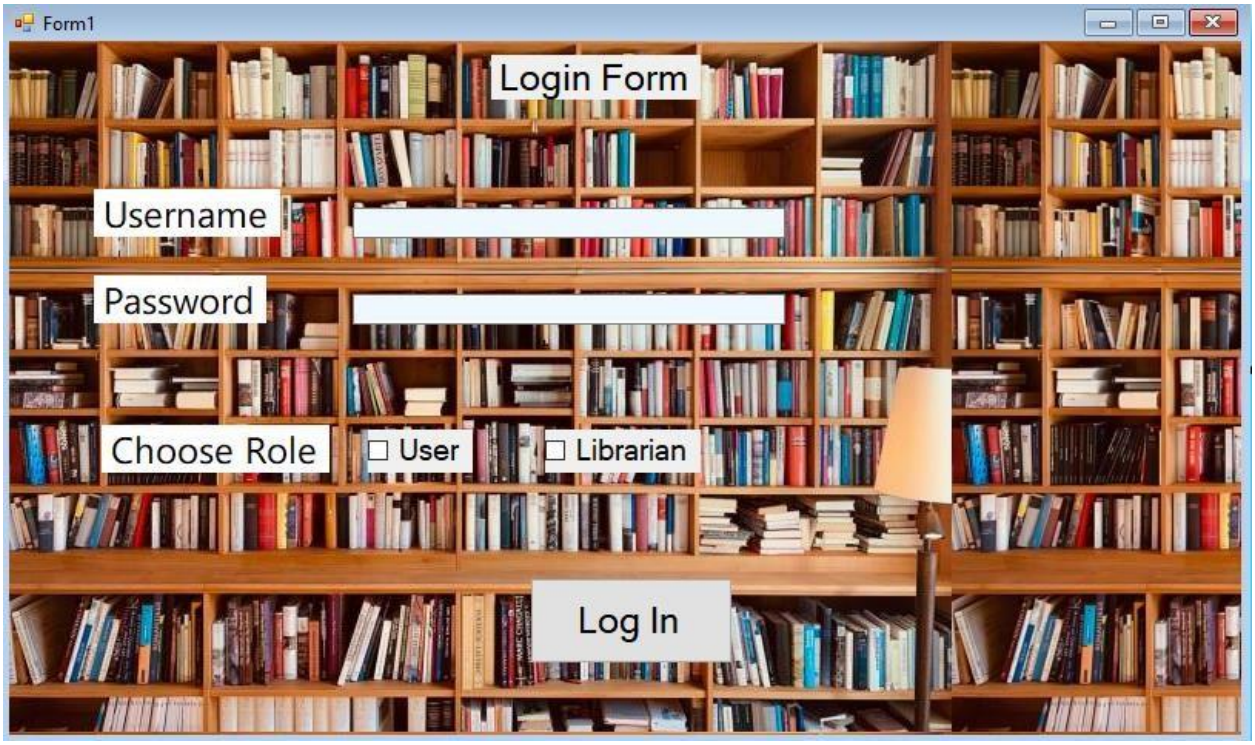


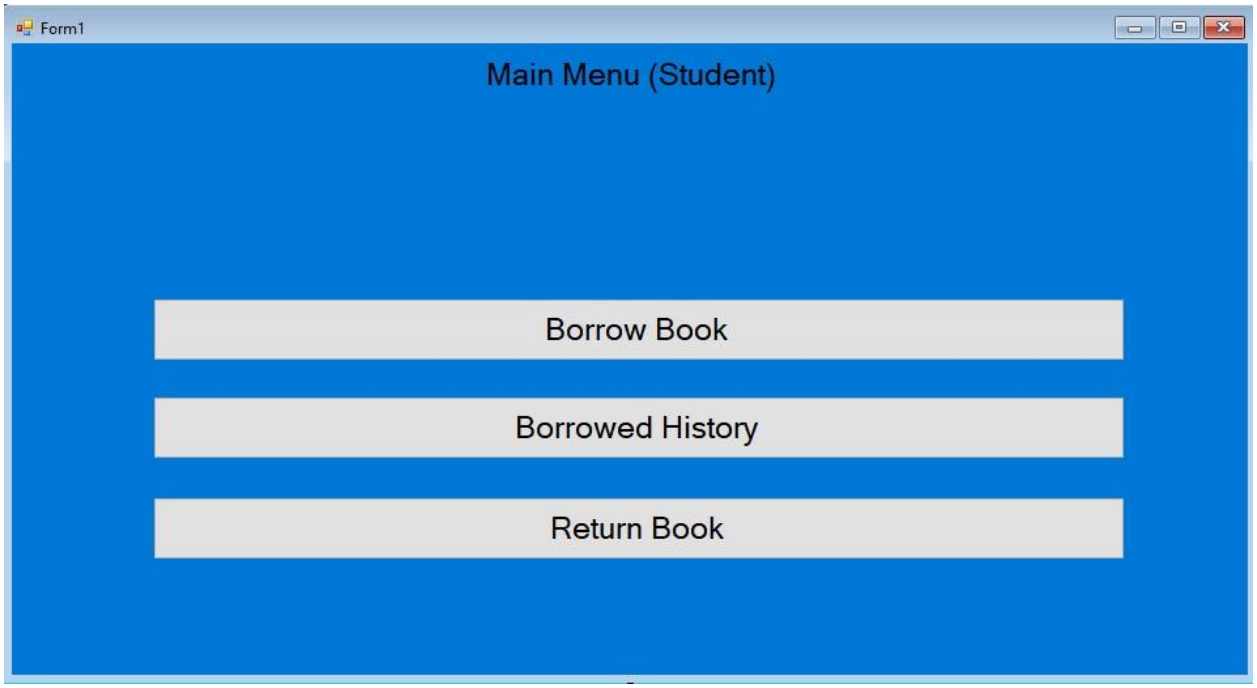
Fig : Activity Diagram

Prototype

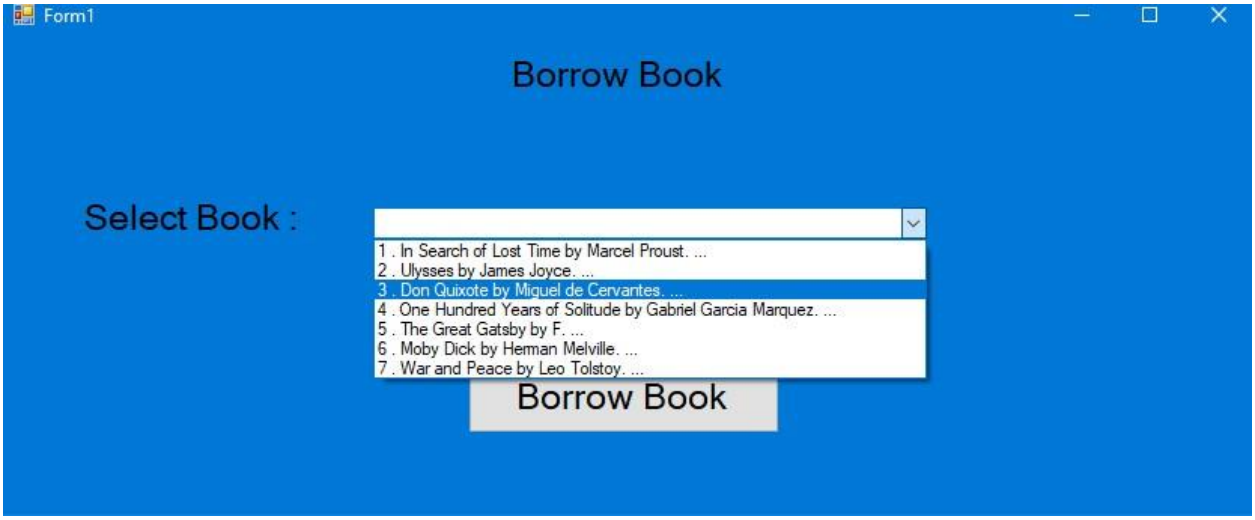
Login Form :


Form1
Login Form
Username
Password
Choose Role
User
Librarian
Log In

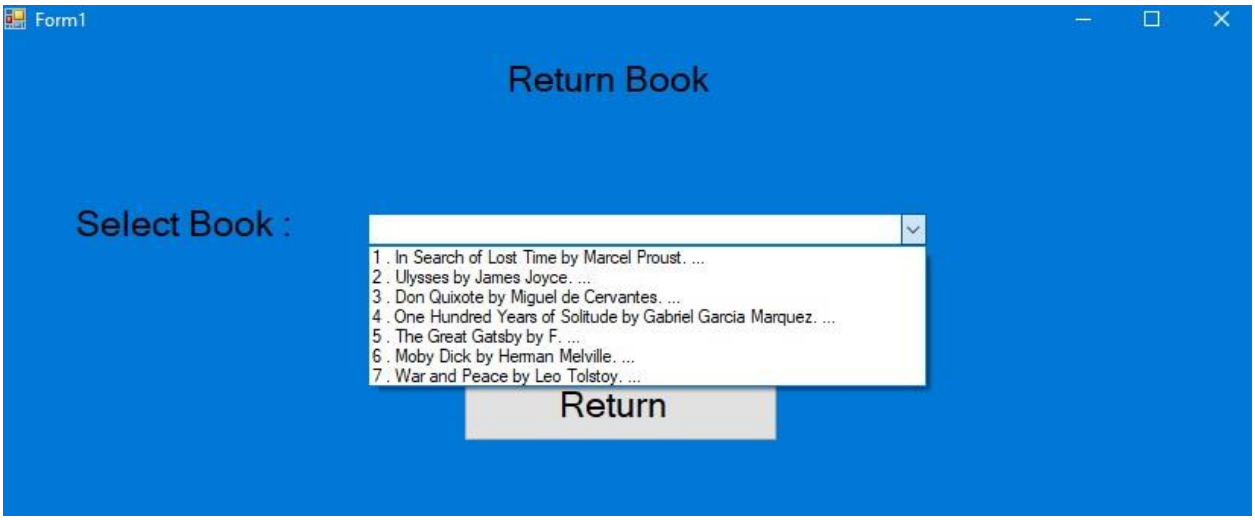
Student Menu :



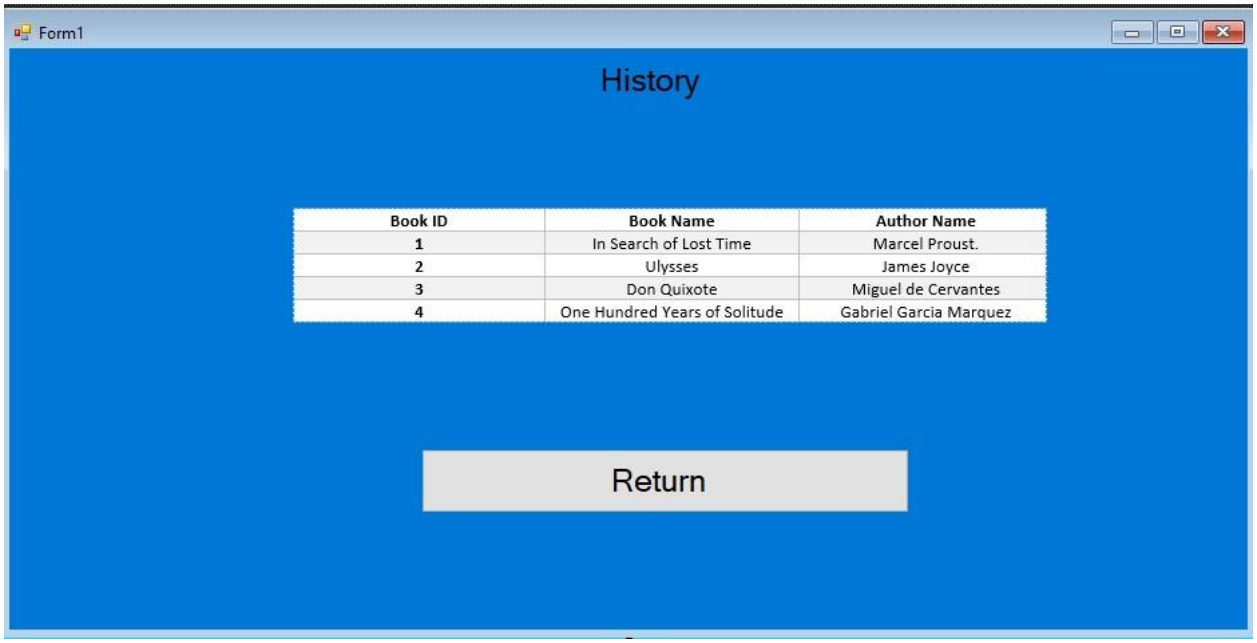
Student Borrow Book Menu :-



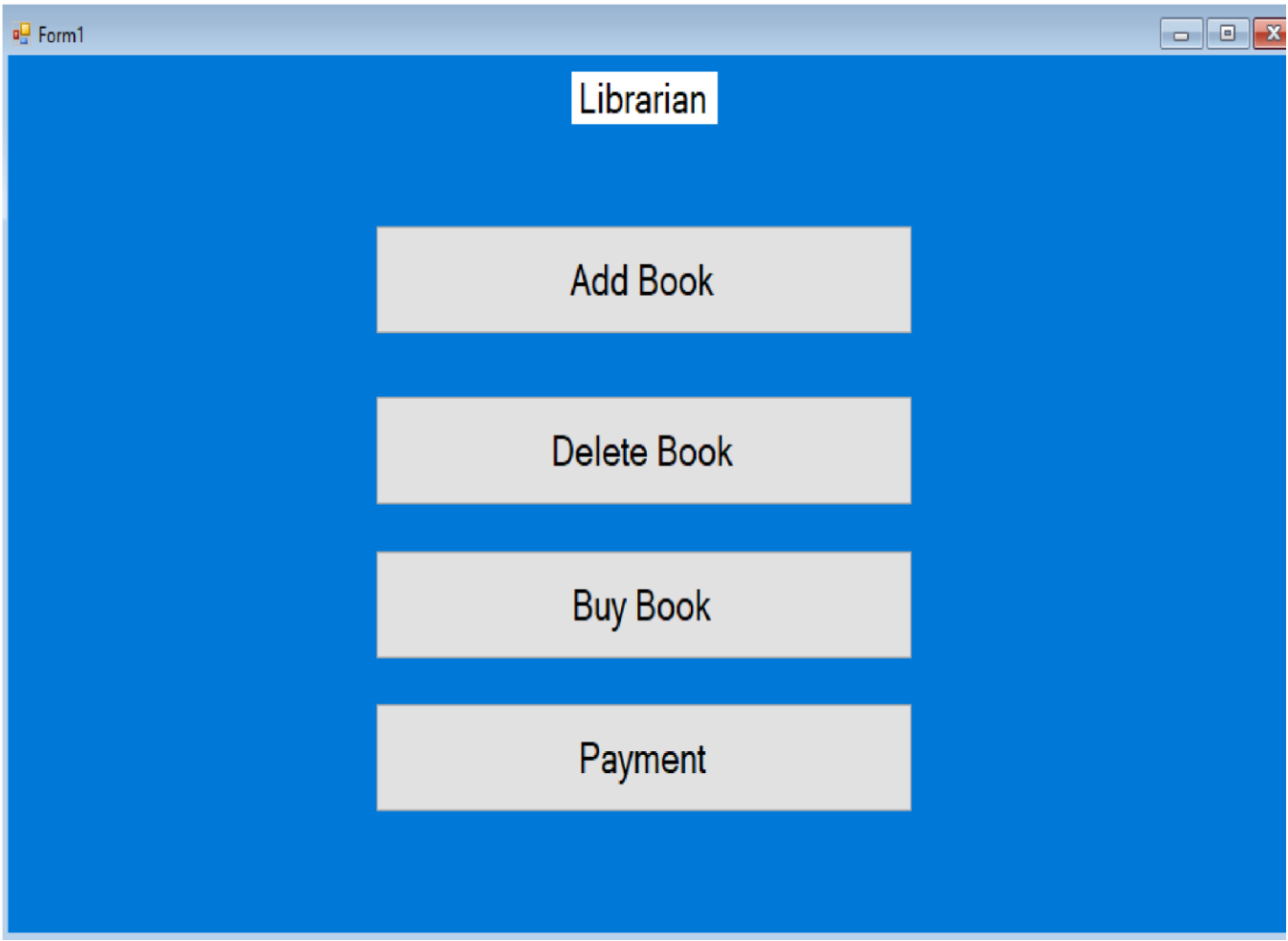
Student Return Book Menu :-



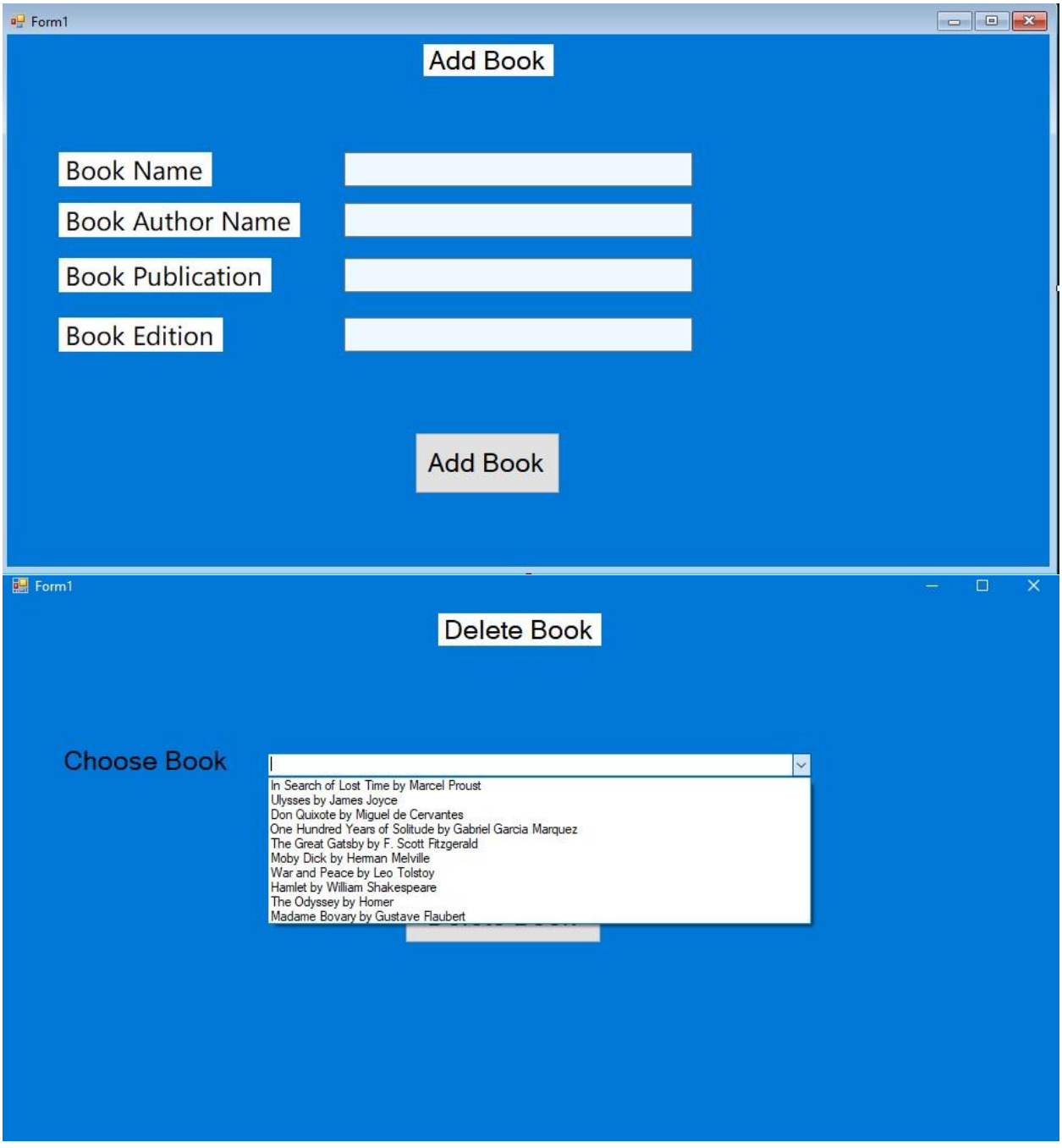
Student Books Borrow History:-



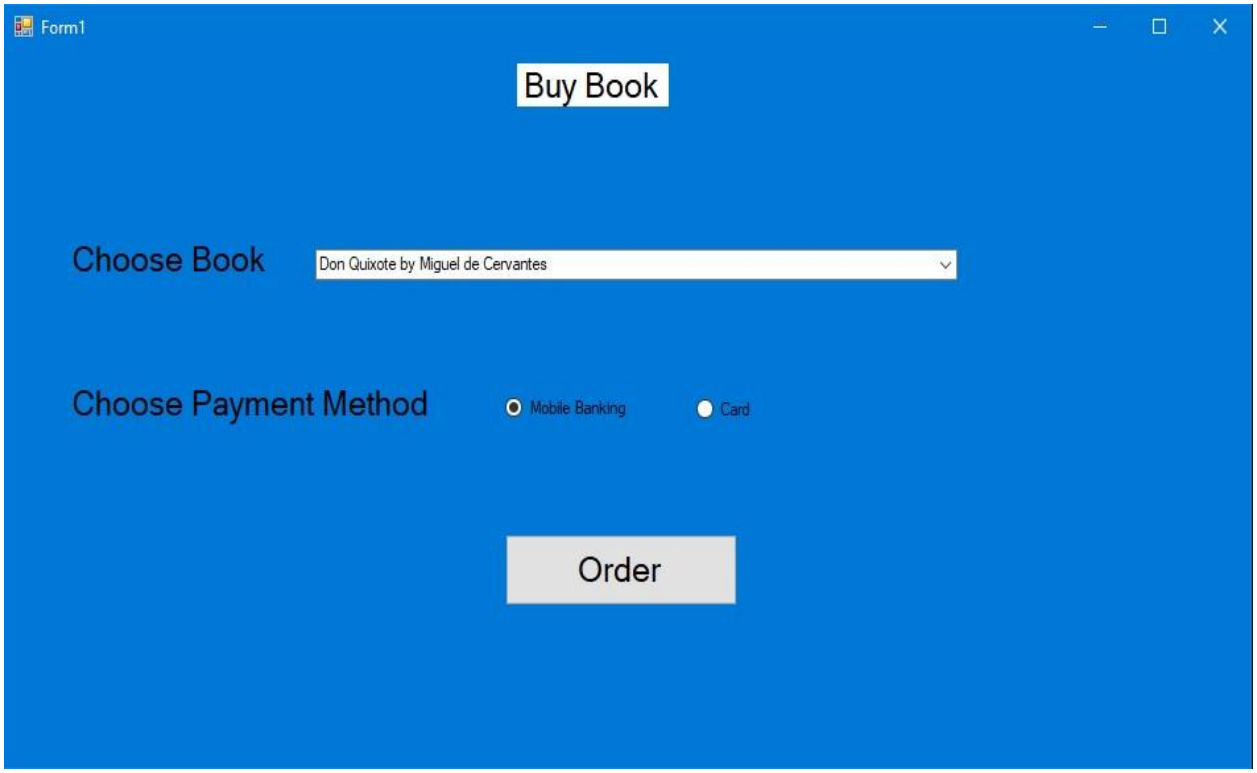
Logged In As Librarian:-



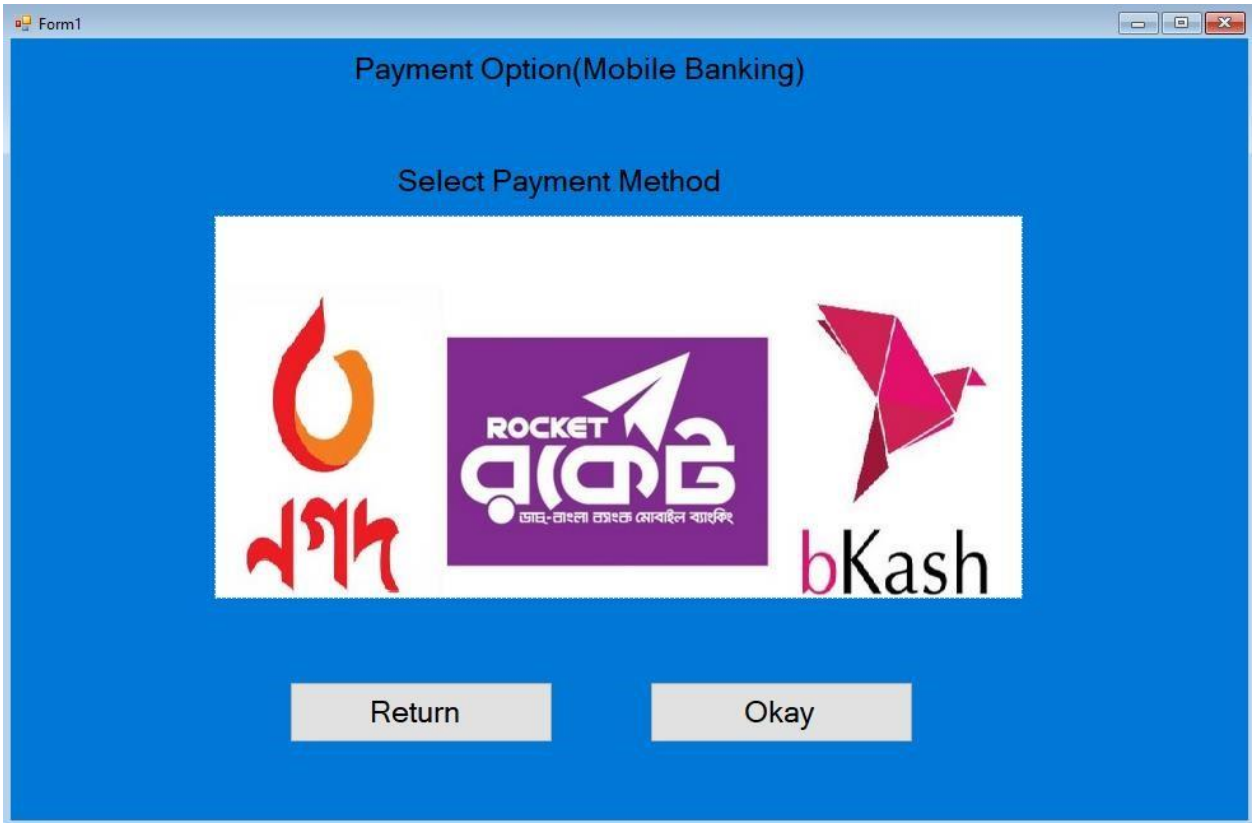
Librarian Add/Delete Book Menu :-



Librarian Buy Book Menu :-



Librarian Payment Method :-



Conclusion:

In this report, the design phase of development of the Library Management System is included by gathering user requirement and UML modeling. This report demonstrates an approachable solution to solve existing problems of library management.