
# Addis Ababa Institute of Technology
# Center of Information Technology and Scientific Computing
# Department of ITSC.

# Library Management System

# Software Requirements Specification

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| | | | |

# Document Approval

The following Software Requirements Specification has been accepted and approved by the following:

| Signature | Printed Name | Title | Date |
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## Acronyms

ILMS – Integrated Library Management System

SRS – Software Requirements Specification

AAiT – Addis Ababa Institute of Technology

OOP – Object Oriented Programming

QR – Quick Response

ISBN – International Standard Book Number

FTP – File Transfer Protocol

TCP/IP – Transmission Control Protocol/ Internet Protocol

LAN – Local Area Network

HDD – Hard Disk Drive

RAM – Random Access Memory

IBM – International Business Machine

FR – Functional Requirement

# DECLARATION

We declare that this SRS document reflects the idea of our team in our own words. If there are words or any other form of information included from other sources we assure that it has been mentioned in the Reference section of the SRS document. We also declare that our team have prepared this document under the principle of AAiT and that our team has not made any effort of cheating or illegal action that may violate any rules and regulations of the campus. All statements in this document are written as clear as possible to avoid any ambiguity and all statements are not falsified or untrue as well.

**Group 11 Team Date:** 18-04-2016

# 1. Introduction

## 1.1 Purpose

The purpose of this SRS document is to give readers a detailed information about the project structure which includes descriptions and requirements of the project. After reading this document it is expected that the reader has a clear understanding of what the project is about as a whole, the purpose of the project and how the delivered software is supposed to meet its requirement.

## 1.2 Scope

ILMS is a Library Management System that works as a desktop application and uses a web platform to facilitate the AAiT Library. The general goal of the project is to deliver a simple and effective management system.

Goals of the system's desktop component includes:

- Give the authorized person the ability to control book transactions such as lending books for both short term and long term
- Give the authorized person the ability to search books, access records and generate report
- Give the authorized person the ability to search members, add members and remove members
- Use an authentication method to assure only authorized personals are accessing the desktop application.

Goals of the system's Website platform includes:

- Help students make a book reservation if available
- Enable students to search for a book they want to reserve
- Provide students with a user account
- Suggest related books for the student while he/she searches for a book
- Notify students with important information such as time left to return a book if they have borrowed it for a long term
- Give students the ability to review books they have read

## 1.3 Overview

As mentioned above the purpose of the document is to give readers a detailed information about the project structure, to achieve that the document is structured so that readers can go through the sections without difficulty.

The next section of this document is about the General Description of the project which includes product perspective, product functions, user characteristics and general constraints. This is followed by the Specific Requirements section where external interface requirements, use cases, non-functional requirements and other sub-sections are discussed. Change Management Process of the project is also reflected. Readers can find References and Appendices at the end of the document.

A detailed structure of this document is also clearly stated on the table of contents, where readers can find any sections and sub-sections in this document with its respective page number. Readers can also use Appendices to find specific sections.

# 2. General Description

## 2.1 Product Perspective

An integrated library management system (ILMS), also known as a library management system (LMS), is an enterprise resource planning system for a library used to track items owned, orders made and patrons who have borrowed.

Koha, an open source integrated library system (ILMS) that was created in 1999 by Katipo Communication for the Horowhenua Library Trust in New Zealand. The first installation went live in January 2000.The system is being used in many counties.

Koha is the currently used system in the AAIT library, for managing online operations. This is somehow helpful for the user in communication that is made between the library and the user.

Even though this is a great resource to be used, the online part of our system is an equal alternative with additional features that will include rating books and suggesting a book if the searched book could not be accessible and generates a report.

## 2.2 Product Functions

### 2.2.1 Functionality of the Desktop component

This component is intended to work on a given database that is updated with the contemporary transaction. It will be updated when a book is reserved, lent and when available and organize its current condition. The component also comes in handy when students want to be a permanent member of the library.

### 2.2.2 Functionality of the web component

This component is intended for the secondary user, which is the patron. This will keep the user posted about the state of the library. It will allow a user to reserve a book. A user can search for books, with a search bar, based on a category or name of the book. The system's web subsidiary also helps fellow to communicate and share on what to refer on a given topic using (the rating system that includes a comment section if needed. There is also a suggestion section that is integrated with a search. The rating system aids users to refer books that are deemed helpful by other students.

## 2.3 User Characteristics

There are two types of users that interact with the system: the desktop component user and the web platform user. Each of the users have a different approach to use the system so they each have different requirement of their own to fulfill.

The desktop application user can use the system to record the libraries work. This user should be familiar of how to work with a large scale database. But in order for this process to be achieved the user must be authorized.

The web platform users or the student on the other hand, can use the system to find out what the current status of the library is and make a preferred request. This user should have the basic knowledge on how to surf the web in order to search and see updates of the library.

## 2.4 General Constraints

One of the major constraints that face us today is that concerning the time available.Since the time available is limited. Another constraint might be that of man power,that is providing support to the system to run efficiently for 24 hours a day and 365 days a year.

The system will only be able to run in windows operating system limiting it's accessability in other platforms such as linux or mac os.

## 2.5 Assumptions and Dependencies

It is assumed that the book data and student data will be provided upon completion. Until then, we will be using sample data for presentation.

To run the ILMS system hardware and a software applications are needed. The system will be able to run in any windows operating systems that are after windows XP.

The user will be able to use the system only after a short and simple training by assuming that the person has previously used a computer system. For the web component however, it is assumed that the user is familiar with an internet browser and also with handling basic computer hardware.

The system shall function on a computer that satisfies the computer hardware specification mentioned in the previous sections. For the web based there will be a need of an internet a browser and it is assumed that the user has access to decent internet connection.

# 3. Specific Requirements

This section will try to clearly state and specify the library management systems' requirements and specifications in detail for the purposes of successfully implementing the system with the specified requirements and specifications intact. This section of the documentation will focus on specifying and laying down the basics of the systems implementation guide lines that are based on the definite requirements which include: -

- Giving insight on the systems interfaces, that is external interfaces of the system in detail.
- Clearly stating the functional and Non-functional requirements of the library management system.
- Showing and Describing use case diagrams and scenarios.
- Specifying requirements such as inverse requirements, logical database requirements and other requirements.
- Clearly identifying the Design constraints on the system.

## 3.1 External Interface Requirements

### 3.1.1 User Interfaces

There shall be two aspects to the systems user interface, one is the user interface intended for the library administrators and librarians and the other for the students or the library patrons. The first aspect which is intended for the librarians is a desktop application user interface which is a full Graphical user interface (GUI) and shall provide access to a platform were by the user (librarian) logs in providing the user name and password and have access to perform all the necessary functionalities that the user wishes to accomplish such as lend or issue a book register a library patron and so on right on the screen where it is fairly visible. The UI shall be interactive and should also be able to correctly display the types of error messages and measures which may have caused it to correctly inform the user the technicalities of the problem. The librarians, which have experience in using other management systems before, should be able to interact with the systems UI fairly easily to perform the task they require. This part of system UI has no other special requirements.

The Second part of the UI is the user interface intended for the library patron (students and teachers) which is a web based user interface which is fully Graphical. This part of the systems UI shall provide access to the library catalog from a web interface, make trending books and relevant information as well as book browsing options in front and in plain sight, provide page to log in with library provided user name and password to make book reservations and also it shall contain suggesting as well as reviewing areas under each books for fellow students to see when viewing a book. The web UI should be able to have area to display library announcements and notifications. A person who is fairly comfortable in browsing the web and using social media apps like Facebook and the like should be able to comfortably use the systems UI well enough. Here also system UI has no other special requirements.

### *3.1.1.1 User Interface Flow Diagram*

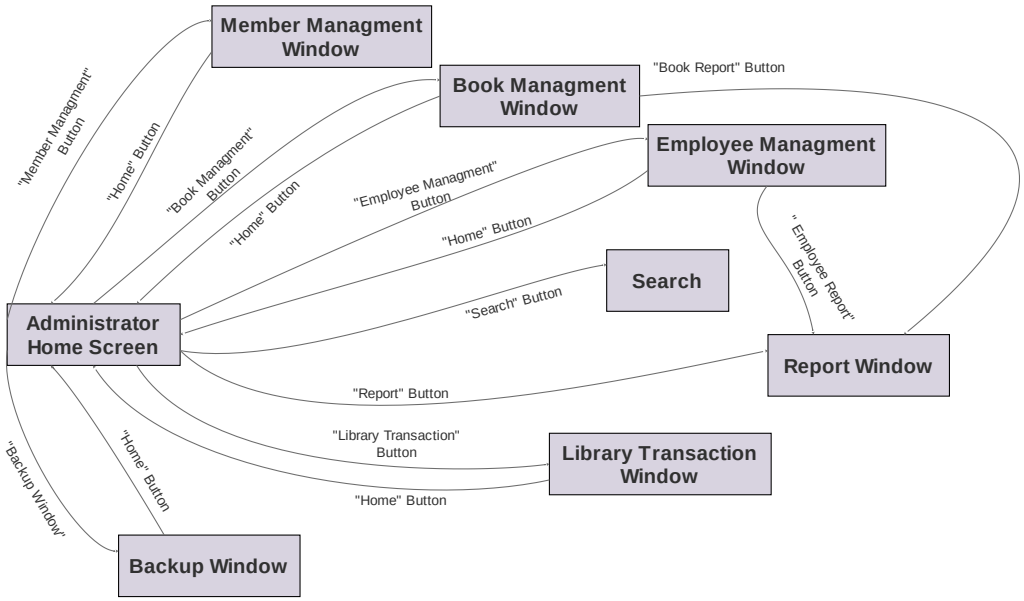


**Figure 1: User Interface Flow Diagram**

### *3.1.1.2 User Interface Prototype*

## The System's Desktop User Interface

#### *3.1.1.2.1 Sign in Page for Librarian or Administrator*

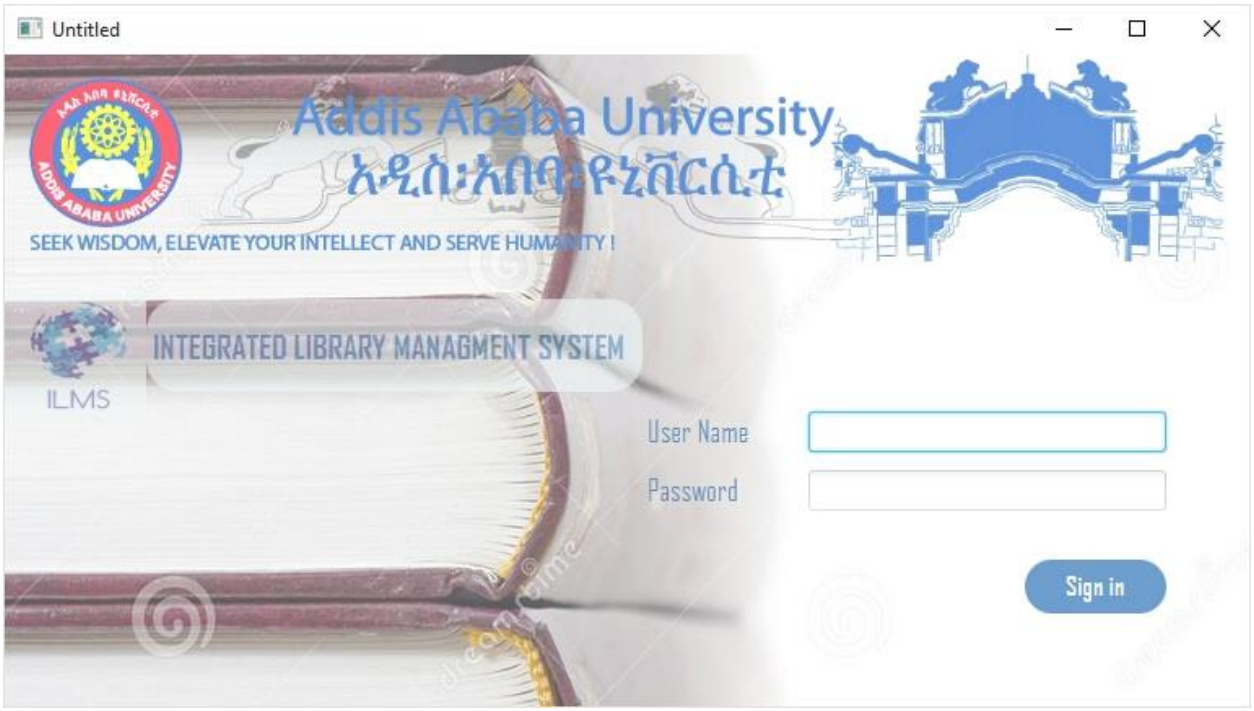


**Figure 2: Sign in Page for Librarian or Administrator**

### *3.1.1.2.2 Home Page for Librarian*

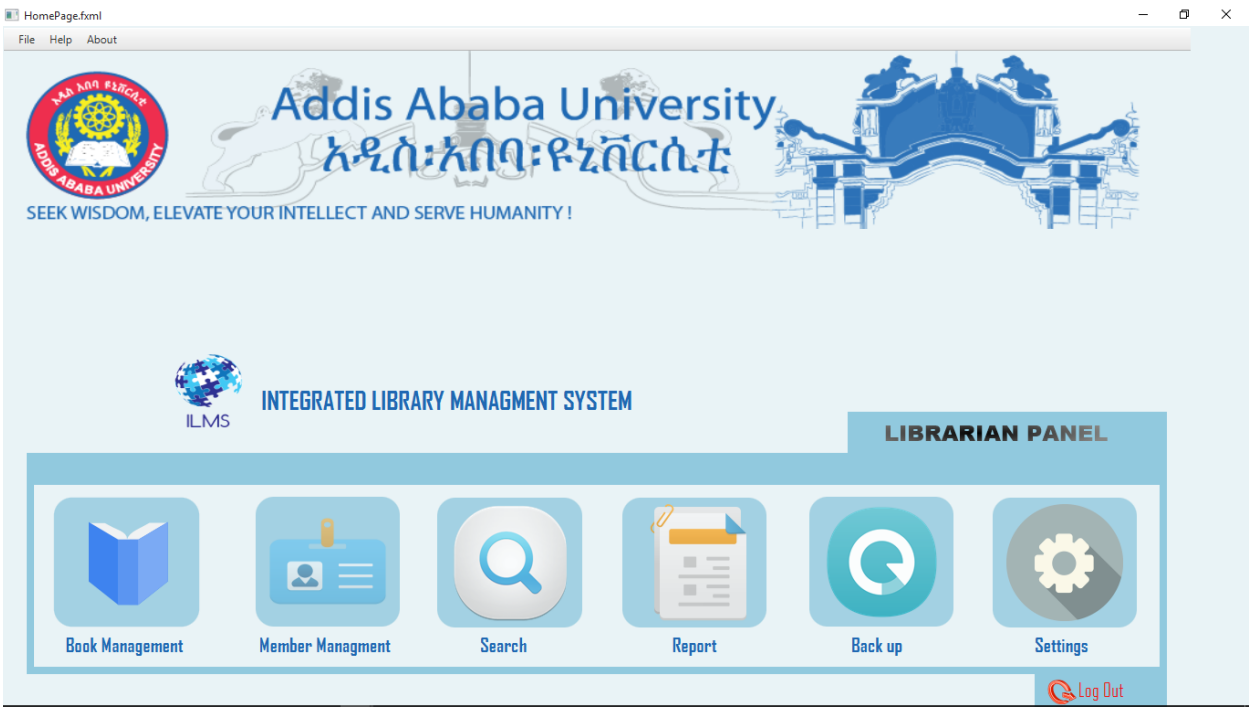


**Figure 3: Home Page for Librarian**

***3.1.1.2.3 Administrator Home Page***

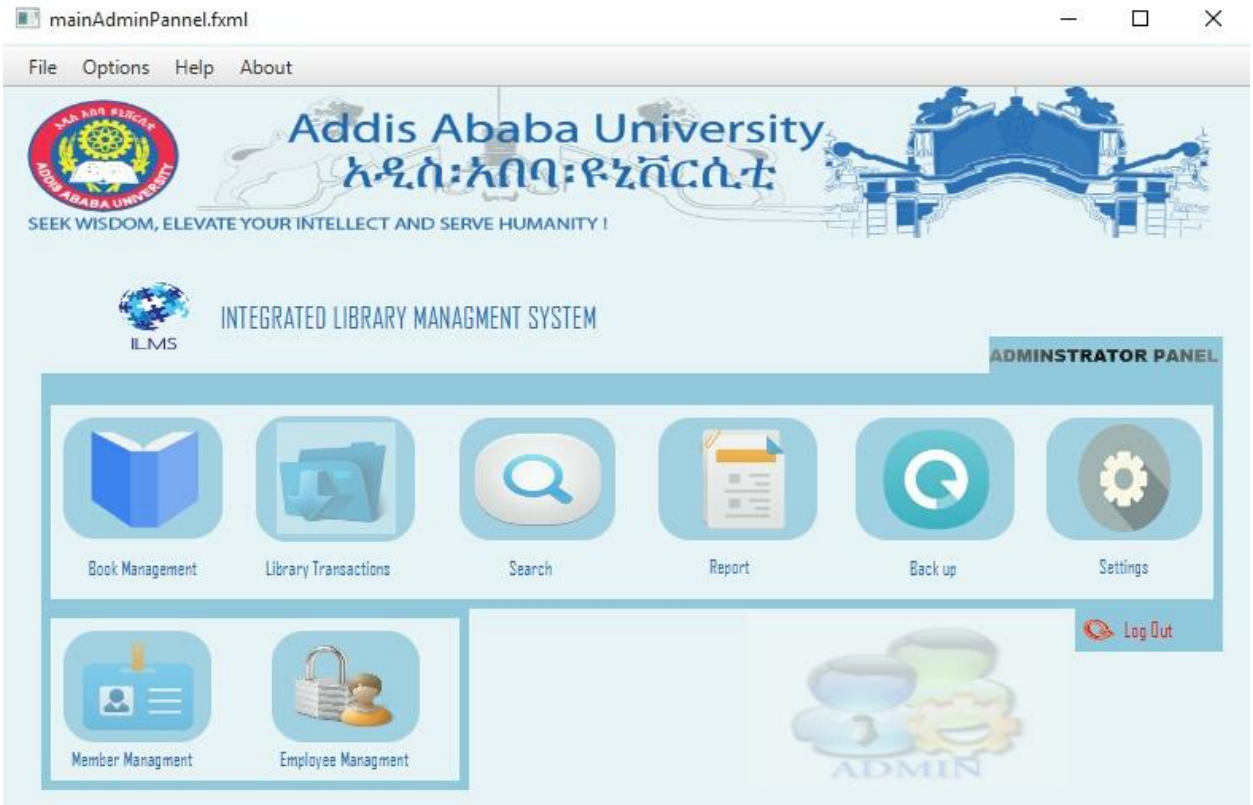


**Figure 4: Administrator Home Page**

***3.1.1.2.4 Book Management Page for Administrator***

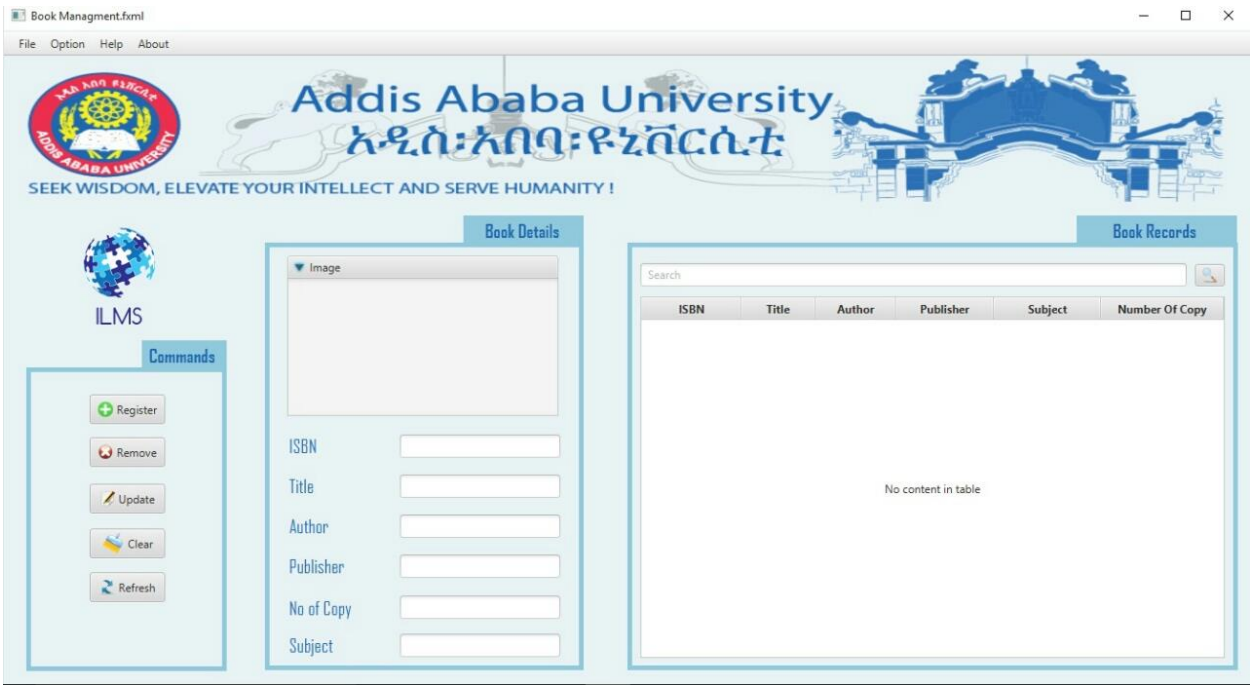


**Figure 5: Book Management Page for Administrator**

***3.1.1.2.5 Member Management Page for Administrator***

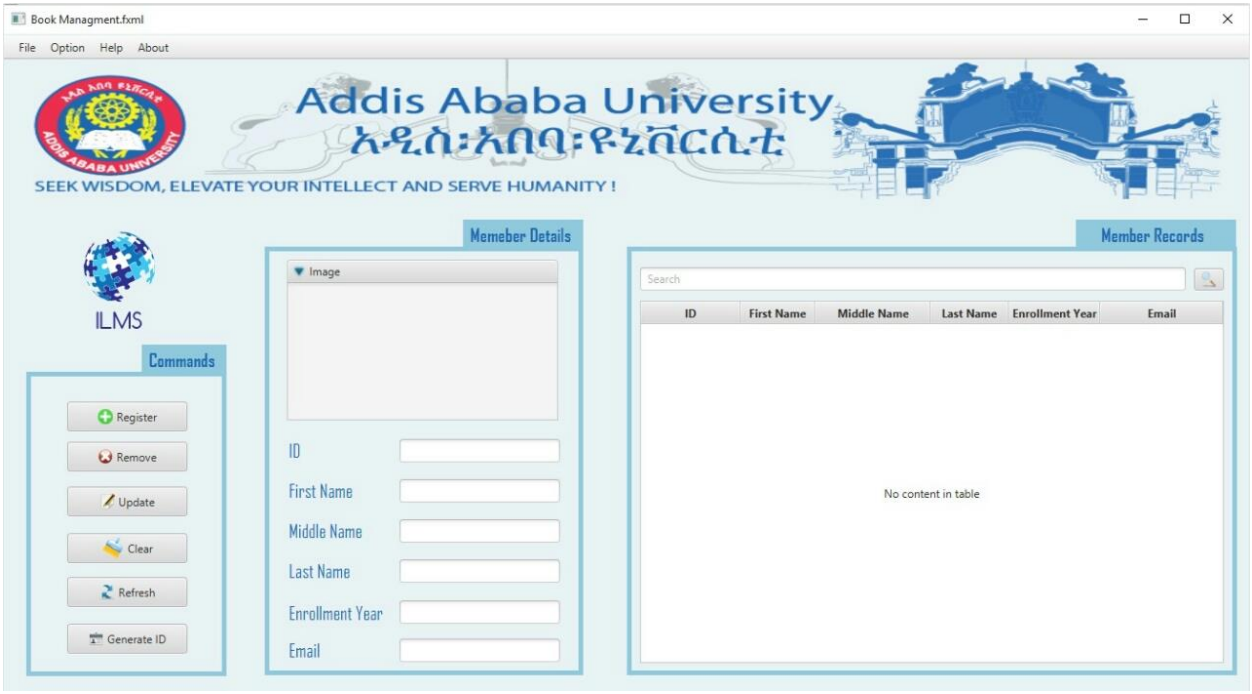


**Figure 6: Member Management Page for Administrator**

***3.1.1.2.6 Rent Book page for Librarian***


**Figure 7: Rent Book page for Librarian**

***3.1.1.2.7 Return Book page for Librarian***

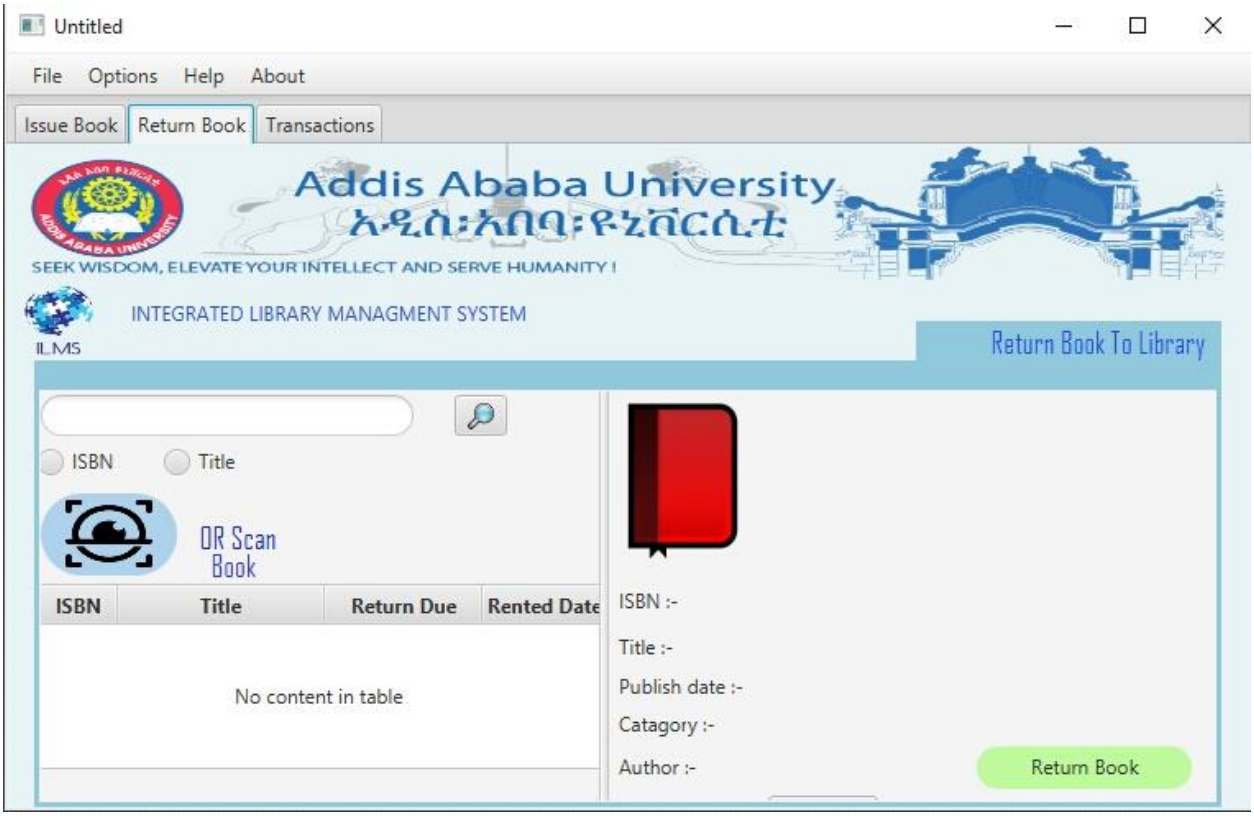


**Figure 8: Return Book page for Librarian**

***3.1.1.2.8 Search Window for Librarian or Administrator***

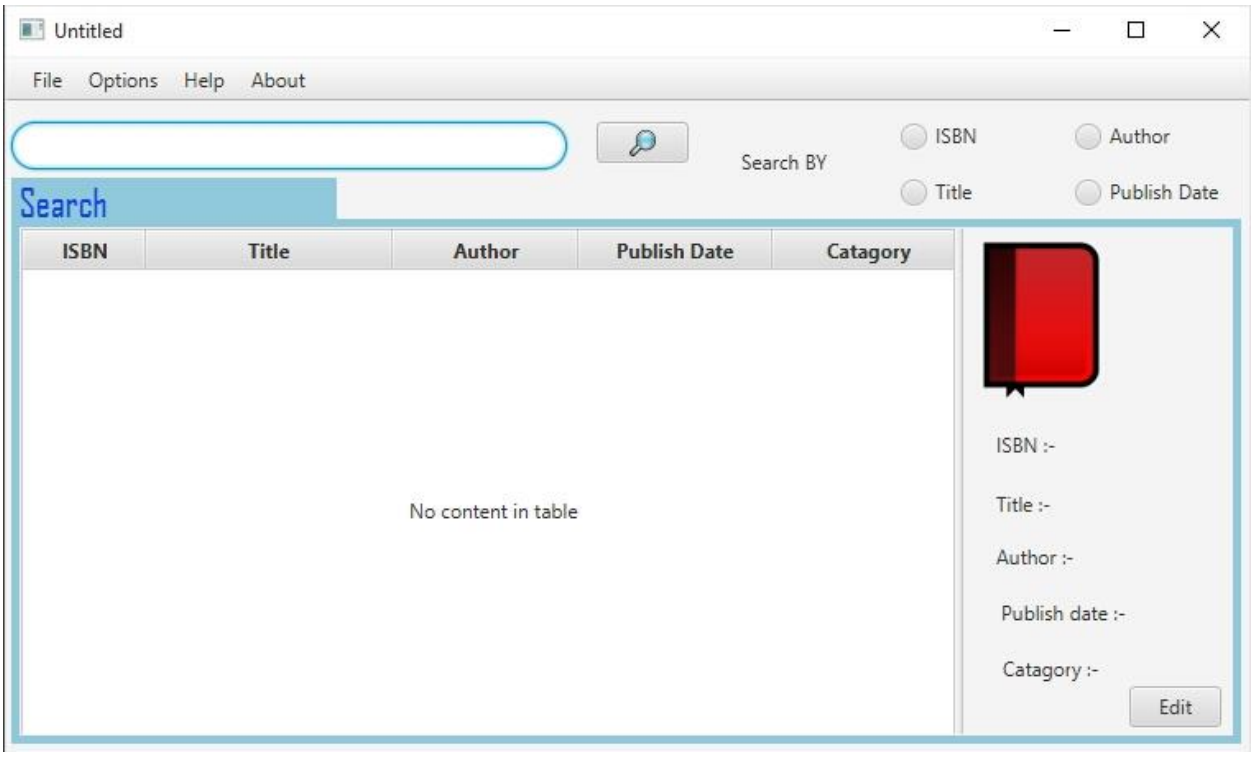


**Figure 9: Search Window for Librarian or Administrator**

## Web Platform User Interface

***3.1.1.2.9 Log in Page for Library Patron***

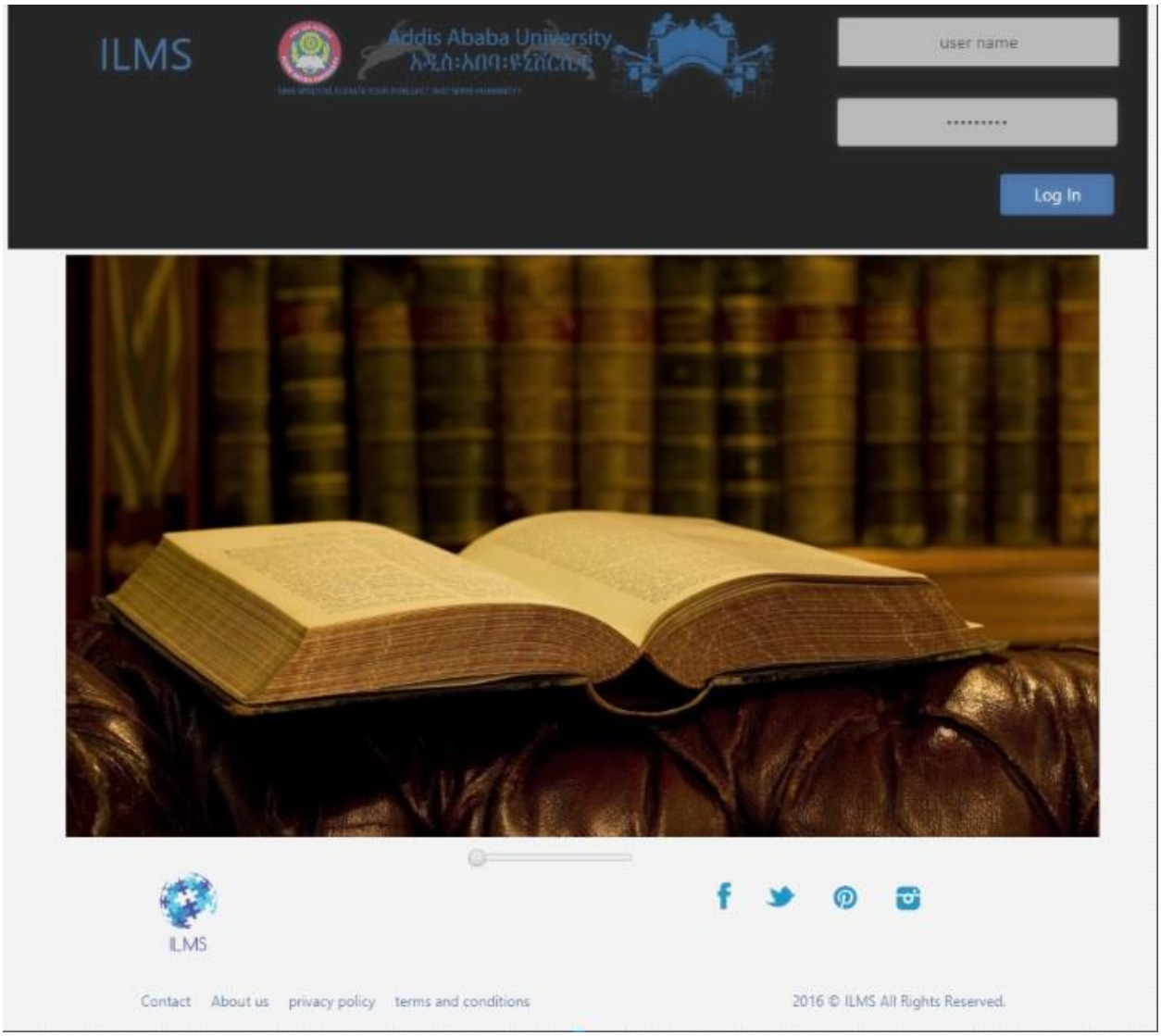


**Figure 10: Log in Page for Library Patron**

***3.1.1.2.10 Home Page for Library Patron***

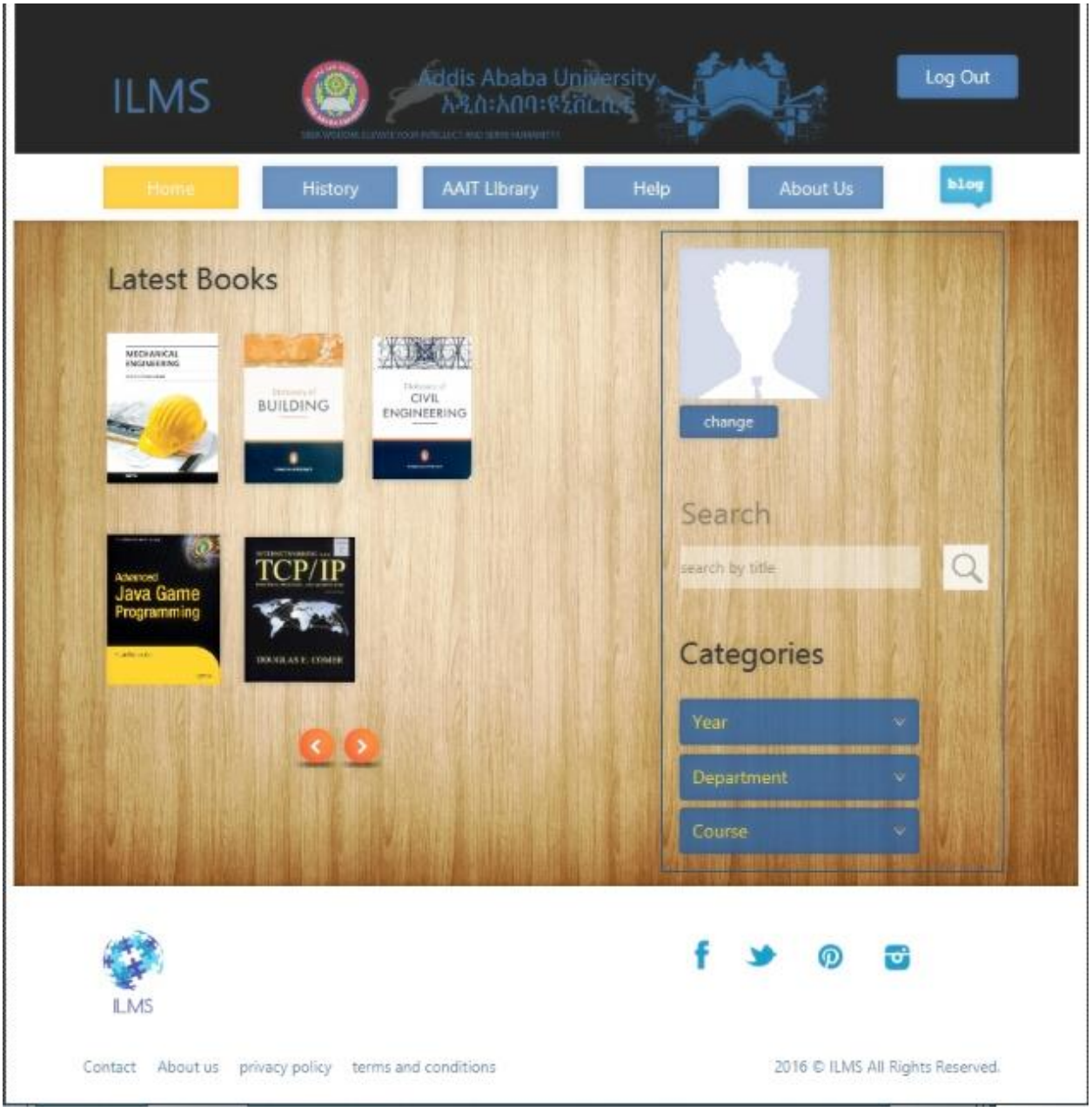


**Figure 11: Home Page for Library Patron**

***3.1.1.2.11 Search Result for Library Patron***

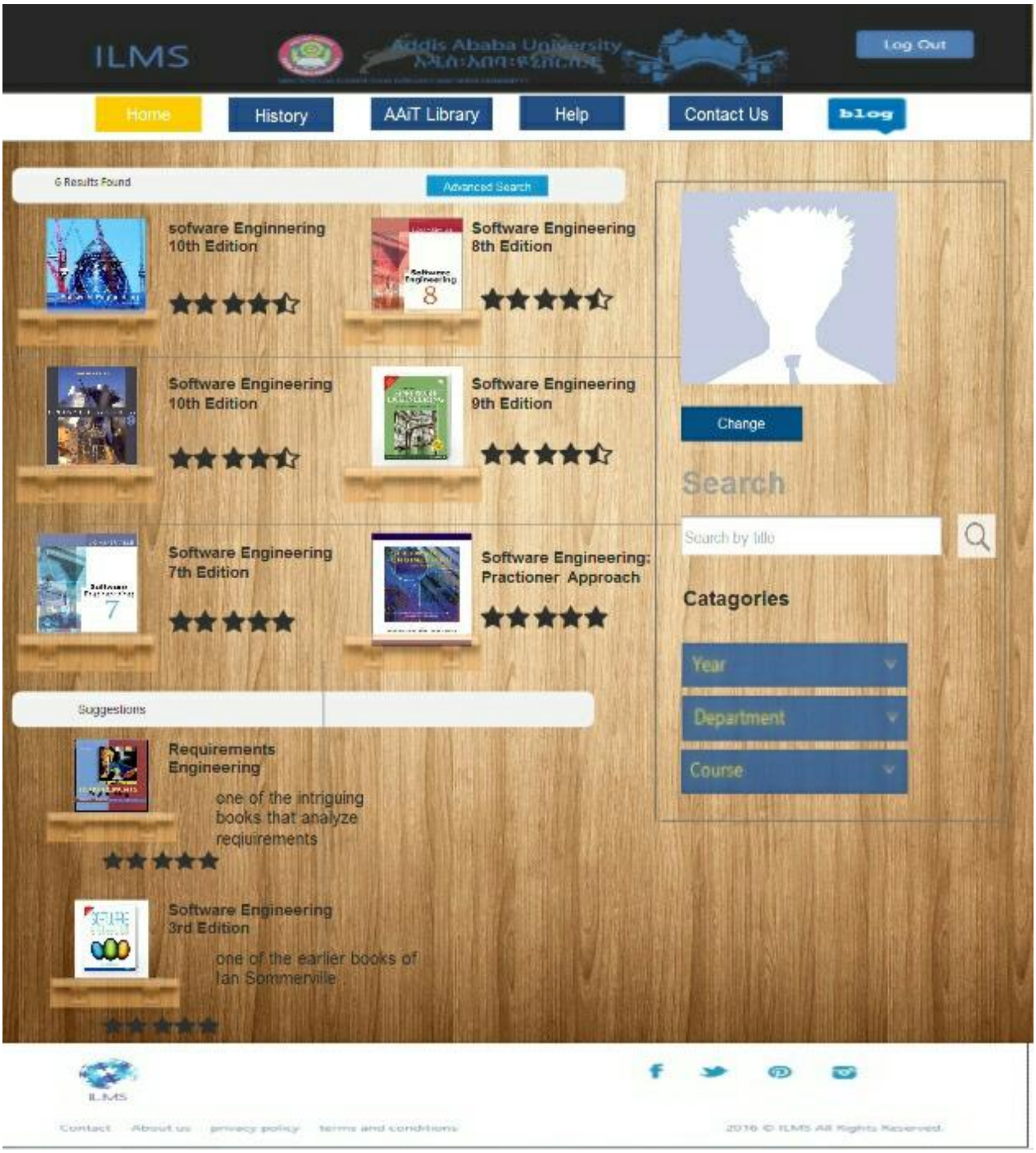


**Figure 12: Search Result for Library Patron**

***3.1.1.2.12 History Page for Library Patron***

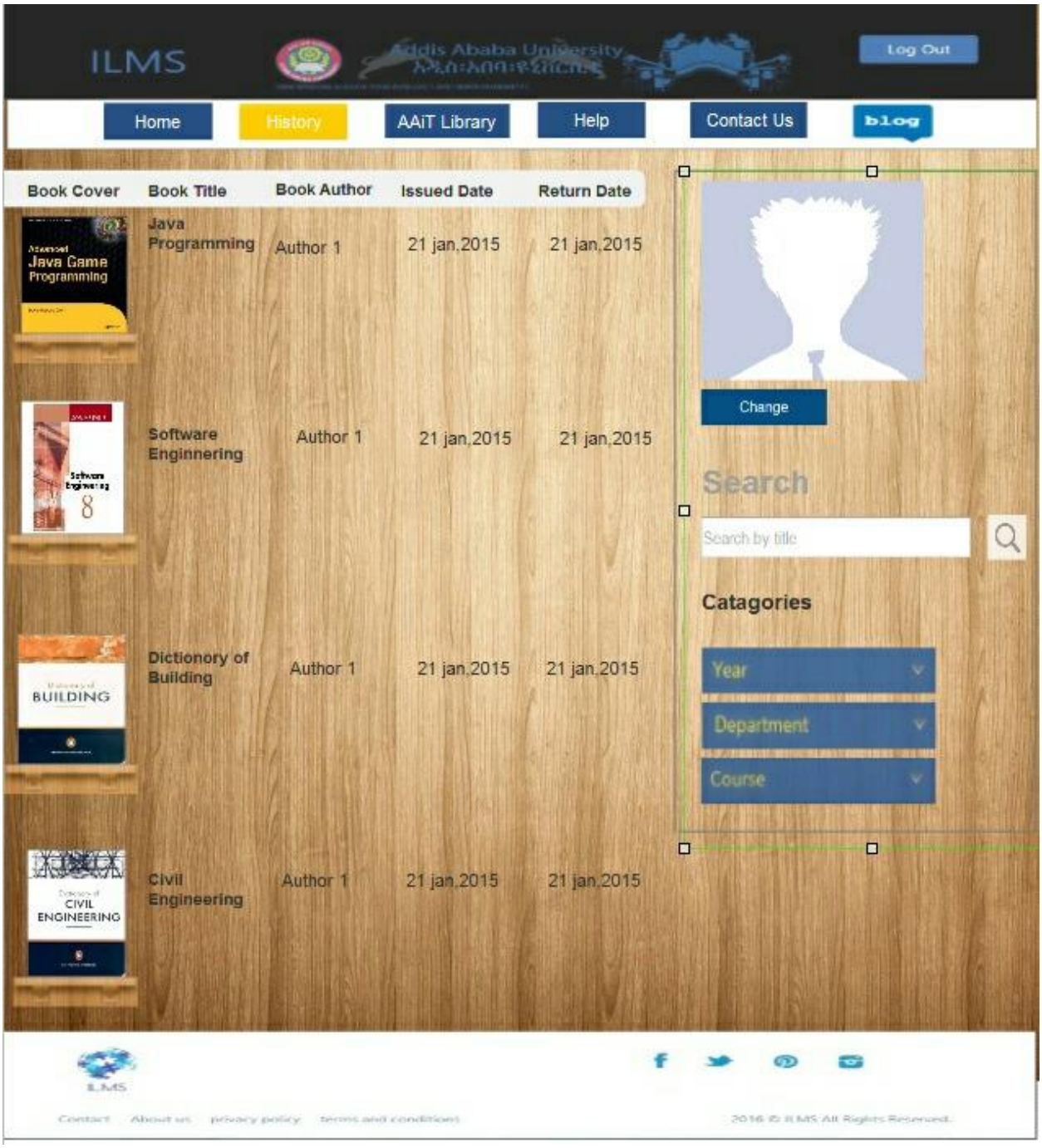


**Figure 13: History Page for Library Patron**

***3.1.1.2.13 Book Detail UI for Library Patron***

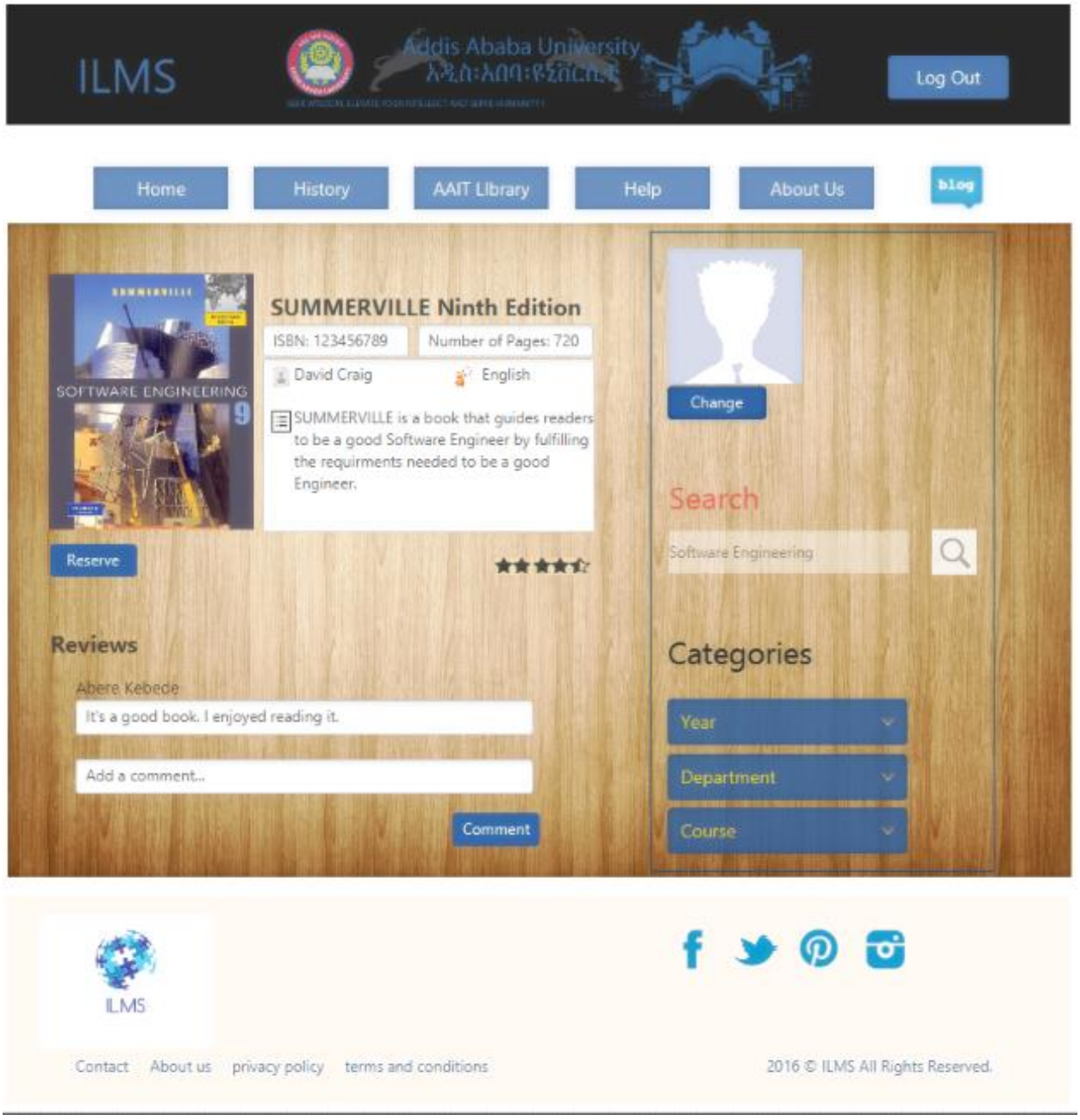


**Figure 14: Book Detail UI for Library Patron**

### 3.1.2 Hardware Interfaces

The hardware components the system interacts with and controls include:

- Network systems which is an existing LAN network system in the library for the purposes of accessing database shall be interfaced.
- The system should interface with Standard Camera to scan QR codes on the library patrons' library member card provided by the system, to quickly and easily identify each member automatically.
- The system shall also interface with the standard input devices, keyboard and mouse to interact with this software. In addition, it also uses output devices such as Display screen to display the Graphical User Interface by which the user interacts with the system.
- Hard disk: The database connectivity requires a hardware configuration that is LAN connected. This makes it necessary to have a fast database system running on high rpm hard disk permitting complete data redundancy and back-up systems to support the primary goal of reliability.
- The shall also interface with printers, this is necessary for printing out Library member ID cards with QR codes and also printing out generated student and book reports.

The above are the main and most basic hardware interfaces of the library management system which and shall be provided and considered for a smooth function of the system.

### 3.1.3 Software Interfaces

The System has no Specific Software interface requirement. The system has no Specified software interface requirement rather it has design choices.

### 3.1.4 Communications Interfaces

The Library management system will require to connect with LAN network to communicate with the database on servers and also connect all the librarians accessing the system and modifying as well as accessing the same database simultaneously. This uses a standard FTP as well as TCP/IP protocols to access the servers with the database which the system operates on.

The library management system has also a web component which the library patron accesses. This require a connection to the internet and World Wide Web where the interface is accessed from and uses http protocol.

## 3.2 Functional Requirements

### 3.2.1 FR-01 Rent a Book

| ***NAME*** | ***FR-01 RENT A BOOK*** |
|---|---|
| ***INTRODUCTION*** | The system shall allow the user to issue books. |
| ***INPUT*** | Library patrons' ID<br>Book ID(ISBN), Book Title |
| ***DESCRIPTION*** | The Integrated Library management system (ILMS) shall provide a platform for an authorized library personnel to issue books to library patrons by showing the availability of the book/s needed and checking the patrons ID to perform a successful transaction. |
| ***OUTPUT*** | Successful transaction and renal of the specify book to the patron.<br>Update the database record |
| ***ERROR HANDLING*** | Display the cause of the Error in familiar terms. |

**Table 1: Rent a Book**

### 3.2.2 FR-02 Return a Book

| ***NAME*** | ***FR-02 RETURN A BOOK*** |
|---|---|
| ***INTRODUCTION*** | The system shall recognize when the user returns a book. |
| ***INPUT*** | Library patrons' ID<br>Book ID(ISBN) |
| ***DESCRIPTION*** | The Integrated Library management system (ILMS) shall provide a platform for authorized library personnel to update the library records when a patron returns a book. The system shall recognize if the user has returned a book when he/she does |
| ***OUTPUT*** | Successful return transaction.<br>Update the database record. |
| ***ERROR HANDLING*** | Display the cause of the Error in familiar terms. |

**Table 2: Return a Book**

### 3.2.3 FR-03 Book Management

| *NAME* | *FR-03 BOOK MANAGMENT* |
|---|---|
| ***INTRODUCTION*** | The system shall allow the management of Books. |
| ***INPUT*** | Book ID(ISBN), Book Title, Book author, publish date, Book subject |
| ***DESCRIPTION*** | The system shall allow Book management options such as book addition, book removal and book modify options for authorized library personnel. |
| ***OUTPUT*** | Successful addition, removal or modification of Book items.<br>Successful update of the database. |
| ***ERROR HANDLING*** | Display the cause of the Error in familiar terms. |

**Table 3: Book Management**

### 3.2.4 FR-04 Manage Members (Library Patron)

| *NAME* | *FR-04 MANAGE MEMBERS (LIBRARY PATRON)* |
|---|---|
| ***INTRODUCTION*** | The system shall allow an authorized library personnel to add/remove library members |
| ***INPUT*** | Library patron information<br>ID, Name, department … |
| ***DESCRIPTION*** | The system shall allow management of library members including addition of new library members and removal of existing members by authorized library personnel (administrator). |
| ***OUTPUT*** | Successfully add a new library member or remove existing member<br>Update the database with the relevant information. |
| ***ERROR HANDLING*** | Display the cause of the Error in familiar terms. |

**Table 4: Manage Members**

### 3.2.5 FR-05 Allocation of Persistent Storage

| *NAME* | *FR-05 ALLOCATION OF PERSISTENT STORAGE* |
|---|---|
| ***INTRODUCTION*** | The system shall store library related data on persistent storage. |
| ***INPUT*** | All Transaction records, Patron information, Book Information, librarians login information |
| ***DESCRIPTION*** | The system shall also store book item, library patrons' record, records about librarians and library patrons including user names and access keys in separate database on a persistent storage located at a remote database server. |
| ***OUTPUT*** | Successful storage of All library records. |
| ***ERROR HANDLING*** | Display the cause of the Error in familiar terms. |

**Table 5: Allocation of Persistent Storage**

### 3.2.6 FR-06 Searching a Book

| *NAME* | *FR-06 SEARCH A BOOK* |
|---|---|
| ***INTRODUCTION*** | The system shall allow the user to search for specific books. |
| ***INPUT*** | Book Title, Book ID(ISBN), Book Author, publish date or Subject |
| ***DESCRIPTION*** | The system shall allow searching of the database to find desired book by key word, book ID(ISBN), book author, publisher date or book subject. The system should also have advanced searching options for searching with specific categories, author, publish date and version. |
| ***OUTPUT*** | Successfully view the searched book for the user(librarian or library patron) |
| ***ERROR HANDLING*** | Display the cause of the Error in familiar terms. |

**Table 6: Search a Book**

### 3.2.7 FR-07 Searching a Library Patron

| *NAME* | *FR-07 SEARCH A LIBRARY PATRON* |
|---|---|
| ***INTRODUCTION*** | The system shall allow the user to search for specific member/Library patron. |
| ***INPUT*** | Library patron ID |
| ***DESCRIPTION*** | The system shall allow searching of the database to find a specific member by member/patron ID. |
| ***OUTPUT*** | Successfully view the searched member/patron for the user(librarian or Administrator) |
| ***ERROR HANDLING*** | Display the cause of the Error in familiar terms. |

**Table 7: Search a Library Patron**

### 3.2.8 FR-08 Report Generation

| *NAME* | *FR-08 REPORT GENERATION* |
|---|---|
| ***INTRODUCTION*** | The system shall generate member as well as book reports when required. |
| ***INPUT*** | All Library patron information and data<br>All Book information and Data<br>All transactions made in the system |
| ***DESCRIPTION*** | The system shall generate specific reports such as member/patron records as well as reports on books and Transactions when required automatically. |
| ***OUTPUT*** | Successful generation of reports and a print option for generated reports |
| ***ERROR HANDLING*** | Display the cause of the Error in familiar terms. |

**Table 8: Report Generation**

### 3.2.9 FR-09 Book Reservation

| *NAME* | *FR-9 BOOK RESERVATION* |
|---|---|
| ***INTRODUCTION*** | The system should able members to remotely make a reservation of the book they want to borrow without having to come to the library. |
| ***INPUT*** | Book ID(ISBN), Library member ID |
| ***DESCRIPTION*** | The system should enable members to remotely make book reservations through an online web platform. Members can make the reservation a book for certain amount of time through the system remotely. |
| ***OUTPUT*** | Successfully reserve a book for certain period of time<br>Update the database associated. |
| ***ERROR HANDLING*** | Display the cause of the Error in familiar terms. |

**Table 9: Book Reservation**

### 3.2.10 FR-10 Book Review/ Feed back

| *NAME* | *FR-10 BOOK REVIEW/ FEED BACK* |
|---|---|
| ***INTRODUCTION*** | The system should provide a platform for the library members to review books. Including rating and leaving suggestions. And display those reviews. |
| ***INPUT*** | Library member comment, rate rank |
| ***DESCRIPTION*** | The system provides a remote platform online to review each books that is to rate each book as well as leave comments about each book for suggestion. And store each comment and rating on remote database associating with a specific book and display those reviews when other members view the specific book. |
| ***OUTPUT*** | Successfully review books that is rate and suggest specific books and update the database associated with the specific book with the included reviews to be viewed. |
| ***ERROR HANDLING*** | Display the cause of the Error in familiar terms. |

**Table 10: Book Review/ Feed Back**

## 3.3 Use Cases

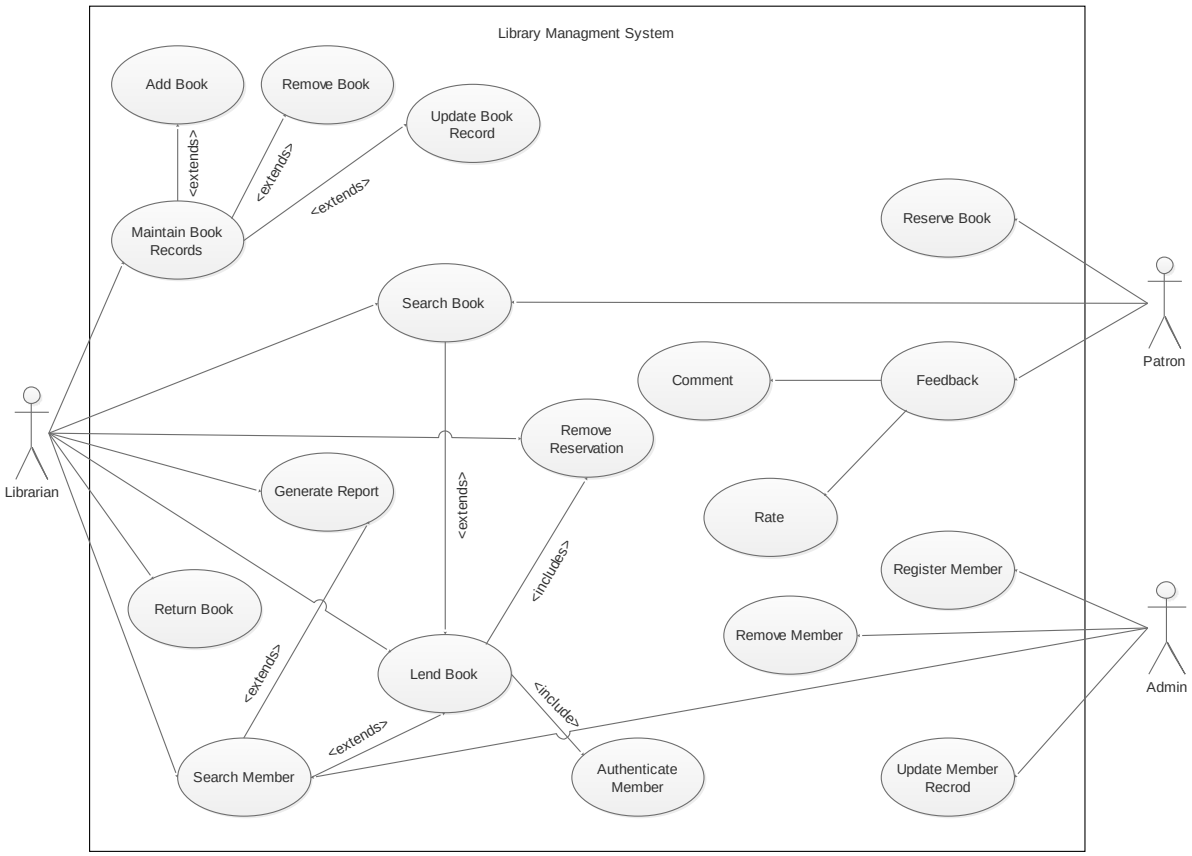


**Figure 15: Use Case Diagram**

### 3.3.1 Use Case #1

**Use Case: Add Book**
**Goal:** Add a book to the Library Management System
**Primary Actor**: Librarian
**Precondition**: The librarian is logged in.
**Post condition**: A new book is appended to the book database.
**Failure**: The system fails to add new book(s)
**Trigger**: The librarian has a need to add new book(s)
**Main Success Scenario**

1. The librarian selects the Maintain Books option
2. The system displays the Book maintenance window
3. The system prompt information regarding the new book
4. The librarian enters the required information
5. The librarian clicks on the Add Book Button
6. The system displays a confirmation message and add the record into the database.

**Extension**

7a. Requested Book already exist in the databases.

7.a.1 The system notifies the librarian that the book already exists.

### 3.3.2 Use Case #2

**Use Case: Edit Book**
**Goal:** Edit existing book in the Library Management System
**Primary Actor**: Librarian
**Precondition**: The librarian is logged in.
**Post condition**: Information concerning a book record is updated/edited.
**Failure**: The system fails to edit existing book
**Trigger**: The librarian has a need to edit a book(s) information.
**Main Success Scenario**

1. The librarian selects the Maintain Book option
2. The system displays the Book maintenance window
3. The system prompt the name
4. The librarian enters the name the book he/she desires to amend
5. The system exhibits information related to the selected book
6. The librarian edits the book details and confirm change
7. The system revises details about the book

**Extension**

6.a The book doesn't exist in the system.
6.a.1 The system provides an option to insert the book into the database.
8.a The librarian enters an ambiguous Input
8.a.1 The system displays a warning message with the proper description about the cause.

**Variation**

5.a The librarian enter the ISBN of the book he/she wants to edit.

### 3.3.3 Use Case #3

**Use Case: Remove Book**
**Goal:** Remove unwanted book from the Library Management System
**Primary Actor**: Librarian
**Precondition**: The librarian is logged in.
**Post condition**: A new book is appended to the book database.
**Failure**: The librarian fails to remove book(s)
**Trigger**: The librarian requires to delete a book(s).
**Main Success Scenario**

1. The librarian selects the Manage Book option.
2. The system displays the Book maintenance window.
3. The system prompt the name.
4. The librarian enter the name.
5. The system displays books related to the searched text.
6. The librarian selects the book he/she needs to remove and clicks on Remove Book option.
7. The system notifies the librarian that the operation is successful.

**Extension**

7a. The requested book doesn't exist in the database.

**Variation**

4. The librarian enter the ISBN of the book he/she wants to remove**.**

### 3.3.4 Use Case #4

**Use Case: Register Members**
**Goal:** Register a new Member to the Library Management System
**Primary Actor**: Administrator
**Precondition:** The client requesting membership is an AAiT Student.
**Post Condition**: Student is a member of ILMS
**Failure:** Student Recorded is rejected by the database.
**Trigger:** Authorized Personnel Chooses to Add Member Information.
**Main Success Scenario**

1. The administrator selects the option to register members
2. The system prompt mandatory information concerning the client.
3. The administrator enters the required information about the client
4. The administrator chooses the save option to register the client.
5. The system validates whether the client is a student at AAiT and his/her record doesn't already exist.
6. The system enrolls the client as a member

**Extension**

5.a The client's record already exists in the database.

5.a.1 The system displays an Error message indicating the newly entered record already exists in the database.

5.a.2 The system provides an option to access the existing account.

5.a.3 The administrator selects the option to view the account.

5.a.4 The system displays the profile information regarding the selected account

### 3.3.5 Use Case #5

**Use Case: Reserve Book**
**Goal:** Reserving a requested Book for later use
**Primary Actor**: Student
**Precondition:** The student is logged in.
The Book is available.
**Post Condition:** The student reserves a book for a specific date and time.
**Failure:** Student fails to reserve a book.
**Trigger:** The student has a need to reserve book(s) that is/are available at that particular time.
**Main Success Scenario**

1. The student enters data and information such as title, author's name etc. about the book in the search section
2. The system displays the search result
3. The student selects the reserve book option
4. The system inquire about the date and time the student plans to issue the book.
5. The student enter the required information and selects the Reserve option
6. The system puts the book on hold until the given date.

**Extension**

2.a The book searched doesn't exist in the database.

6.b The selected book is unavailable.

### 3.3.6 Use Case #6

**Use Case: Return Book**
**Goal:** Return a used book to the Library
**Primary Actor:** Librarian
**Supporting Actor**: Student
**Precondition**: The librarian is logged in.
**Post Condition:** The system confirms the book is returned.
**Failure:** The student fails to return a book.
**Trigger:** The student has a need to return a book he/she rented.

**Main Success Scenario**

1. The librarian selects the Return book option
2. The system prompt the credential of the student who rented the book and the ISBN or the name of the book
3. The librarian enters required information about the student and the name of the book that is about to be returned
4. The librarian selects the Return option
5. The system displays a confirmation message.

**Extensions**

5.a The book hasn't been rented by the student mentioned.

5.a.1 The system displays an error message indicating that the student hasn't rented the provided book

**Variation**

3. The librarian enters the ISBN of the book instead of its name

### 3.3.7 Use Case #7

**User Case: Lend a Book**
**Goal:** Lend an available book to the patron
**Primary Actor**: Librarian
**Secondary Actor**: Patrol
**Pre-condition**: The librarian is logged in.
**Post condition**: Book is lent to the patron
Book availability is altered
**Trigger**: Patron asked the Librarian for a book
**Main Success Scenario**:

1. Librarian goes to the rent section
2. System opens the verification bars
3. Librarian enters patron's name and ID
4. System validates patron's information
5. Librarian proceeds to the rent section
6. System opens a list of sections
7. Librarian searches for the required book
8. System displays the book based on the search
9. Librarian selects the book and clicks on the Rent Button

**Extensions**:

4.a System doesn't validate the students' information

4.a.1 System displays an alert that shows the patron's name and ID is not valid

8.a Required book is not available

8.a.1 System shows that the book is not available and time left

8.b Required book does not exist

8.b.1 System shows that the book does not exist in the Library

### 3.3.8 Use Case #8

**Use case: Review a Book**
**Goal:** Give comment or rate a Book
**Primary Actor**: Patron
**Pre-condition**: Patron has an internet connection
Patron opened ILMS web address
Patron is logged in.
**Post-condition**: Patron reviewed a book
**Trigger**: Patron wants to give a feedback about a book using the web platform
**Main Success Scenario**:

1. Patron searches for a book he/she wants to review
2. System displays list of books based on the search
3. Patron selects the book he/she wants to review
4. System shows up the review section of the book
5. Patron reviews the book based on a rating system or by adding a comment

**Extensions**:
2.a Required book doesn't exist
2.a.1 System shows that the book does not exist in the Library

### 3.3.9 Use Case #9

**Use case: Search a book**
**Goal:** Search for a desired book
**Primary actor**: Student, Librarian
**Pre-condition**: User is logged into the homepage
**Post-condition**: Searched book has appeared
**Trigger**: User wants to search a book

**Main Success Scenario**:

1. User goes to the search bar and searches for a book
2. System shows the searched book

**Variations**:

2. System shows the searched book does not exist

### 3.3.10 Use Case #10

**Use Case: Remove Members**
**Goal:** To remove unwanted members from the library management system
**Primary Actor**: Administrator
**Precondition:** The administrator is logged in.
**Post Condition**: Student is a no longer a member of ILMS.
**Failure:** Student Recorded is unsuccessfully removed from the member's database.

**Trigger:** Authorized Personnel Chooses to remove a Member.
**Main Success Scenario**

1. The administrator selects the option to remove members
2. The system prompt mandatory information concerning the client.
3. The administrator enters the required information about the client
4. The administrator chooses the save option to register the client.
5. The system validates whether the client is a student at AAiT and his/her record doesn't already exist.
6. The system enrolls the client as a member

**Extension**

5.b The client's record already exists in the database.

5.a.5 The system displays an Error message indicating the newly entered record already exists in the database.
5.a.6 The system provides an option to access the existing account.
5.a.7 The administrator selects the option to view the account.
5.a.8 The system displays the profile information regarding the selected account

### 3.3.11 Use Case #11

**User Case: Sign In**
**Goal:** Signing into his/her respective account
**Primary Actor:** Student, Administrator, Librarian
**Precondition:** Actor must be registered in the database.
**Post condition:** The system give the actor clearance to his/her level.
**Trigger:** The actor needs to log into the system**.**

**Main Scenario**

1. The system requests that the actor enters his/her name and password
2. The actor enters his/her username and password
3. The system verifies the entered username and password and logs the actor into the system

**Extension**

3.a Wrong username or password entered

3.a.1 The system instructs the actor to try again.

### 3.3.12 Use Case #12

**Use Case: Change Password**
**Primary Actor:** Student, Administrator, Librarian
**Goal:** Changing the existing password by a new one
**Precondition:** Actor is logged in.
**Post condition:** The system replaces the password of the actor

**Trigger:** The actor has a need to change the existing password
**Main Scenario**

1. Actor selects the change password option
2. The system prompt the current password and the new password
3. The actor enters both his/her current and new password
4. The system request the actor to re-enter the new password
5. The system matches the password and display confirmation message

**Extension**

5.a The re-entered password doesn't match with the earlier password
5.a.1 The system notifies the actor to re-enter his/her new password again.

### 3.3.13 Use Case #13

**Use Case: Edit Member Profile**
**Primary Actor**: Administrator
**Goal:** Editing the profile of an existing user
**Precondition**: The administrator is logged in.
**Post condition**: The member account is updated.
**Failure**: The member's account is not updated.
**Trigger**: The administrator has a need to edit a member(s) information.
**Main Success Scenario**

1. The administrator selects the option to Edit Member Profile
2. The system prompt the ID of the member
3. The administrator enters the ID of the member he/she desires to edit.
4. The system exhibits information related to the searched member
5. The administrator edits the profile information of the member and confirm change
6. . The system revises the member's profile

**Extension**

6.c The member doesn't exist in the system.
6.a.2 The system provides an option to register the member
8.c The administrator enters an ambiguous Input
8.a.2 The system displays a warning message with the proper description about the cause.

### 3.3.14 Use Case #14

**Use case: Authenticate Member**
**Primary Actor:** Librarian
**Precondition:** Librarian is logged in
**Post condition:** The librarian authenticates a member's account.
**Trigger:** The librarian needs to authenticate a member before lending him/her a book**.**

**Main Scenario**

1. The system requests the librarian to  enters the members name and ID
2. The librarian enters the member's name and ID
3. The system verifies the  entered name and ID

**Extension**

3.b Wrong name or ID entered

3.a.2 The system instructs the librarian to try again.

**Activity Flow Diagram**

**Add Book**

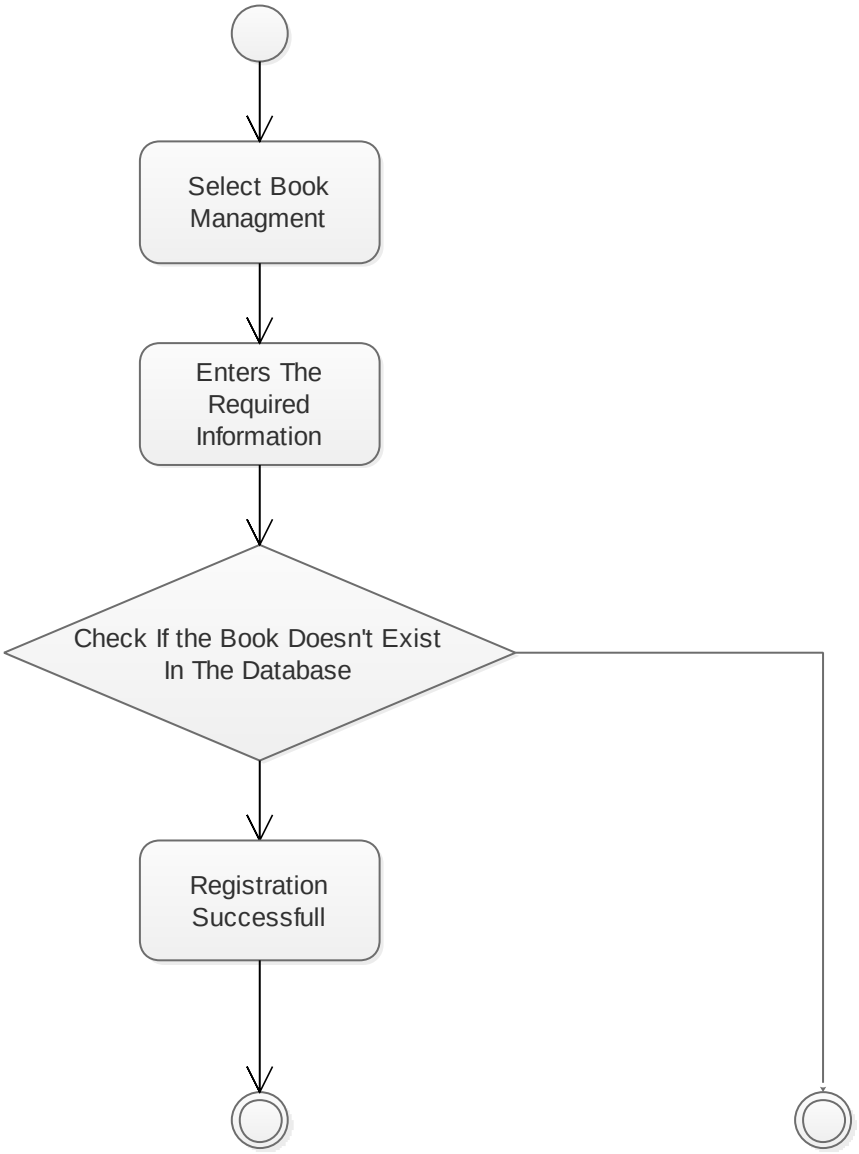


**Figure 16: Add a Book – Flow Diagram**

**Edit Book Record**

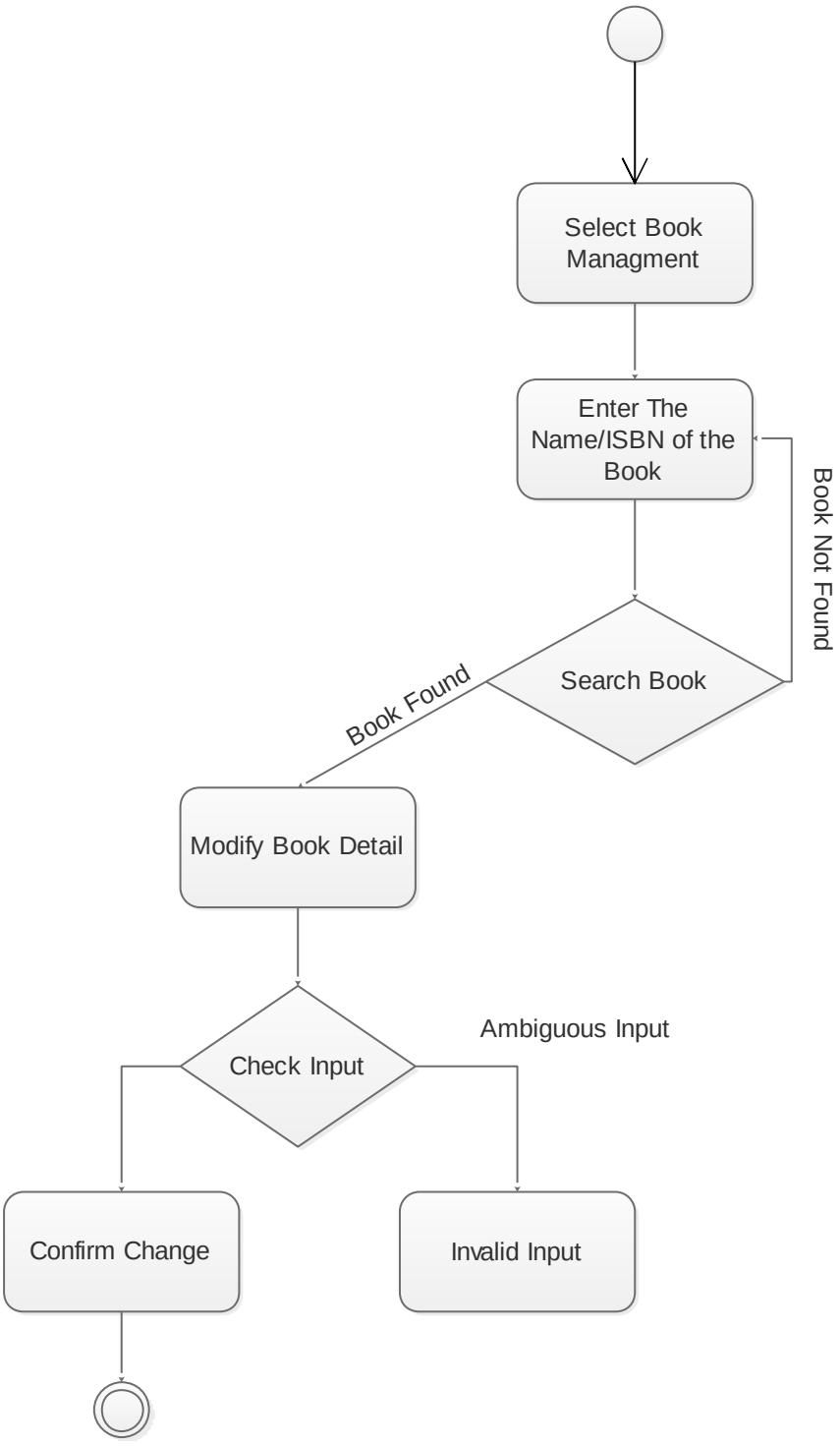


**Figure 17: Edit Book Record – Flow Diagram**

**Remove Book**

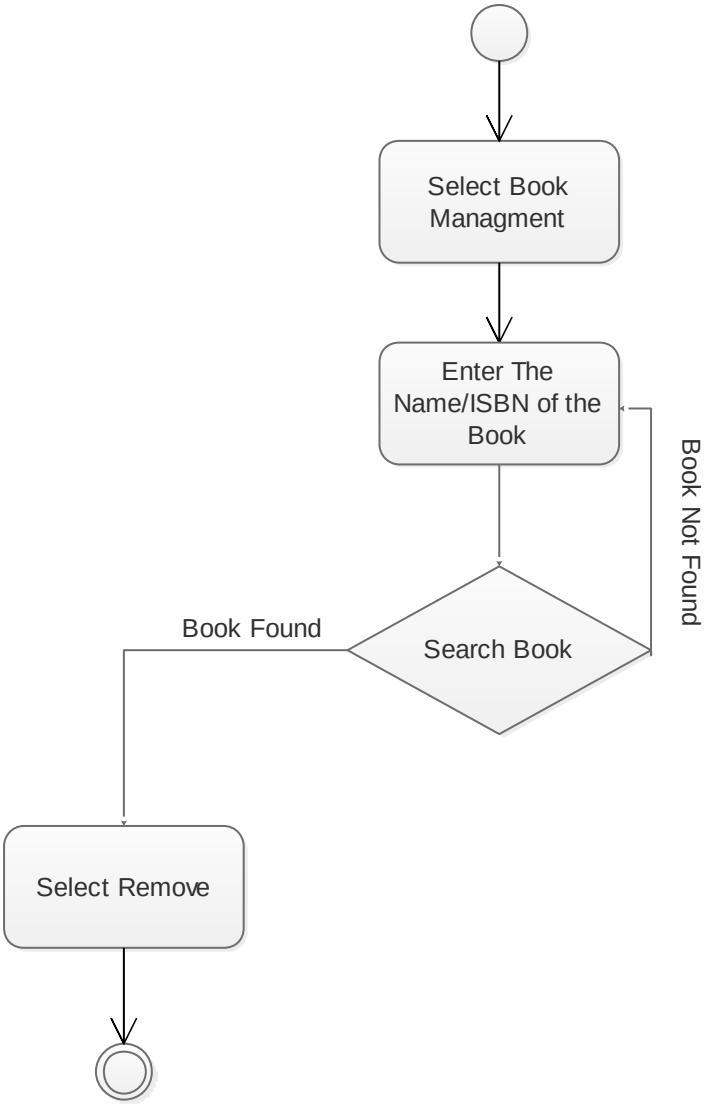


**Figure 18: Remove Book – Flow Diagram**

**Register Member**

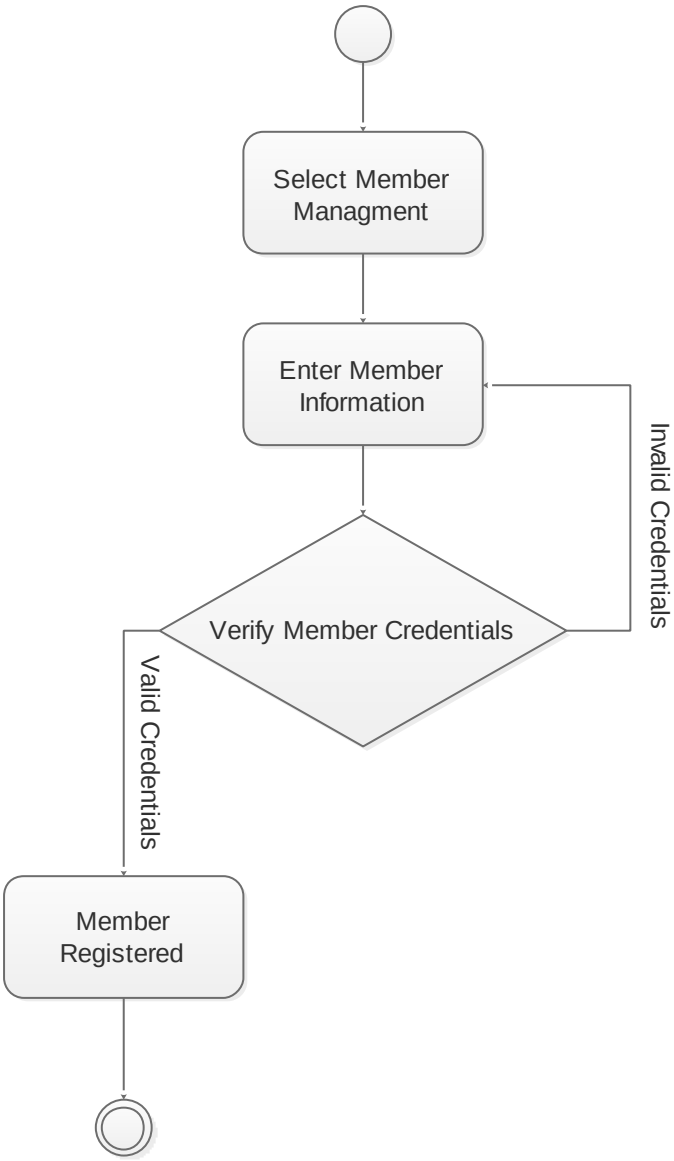


**Figure 19: Register Member – Flow Diagram**

**Reserve Book**

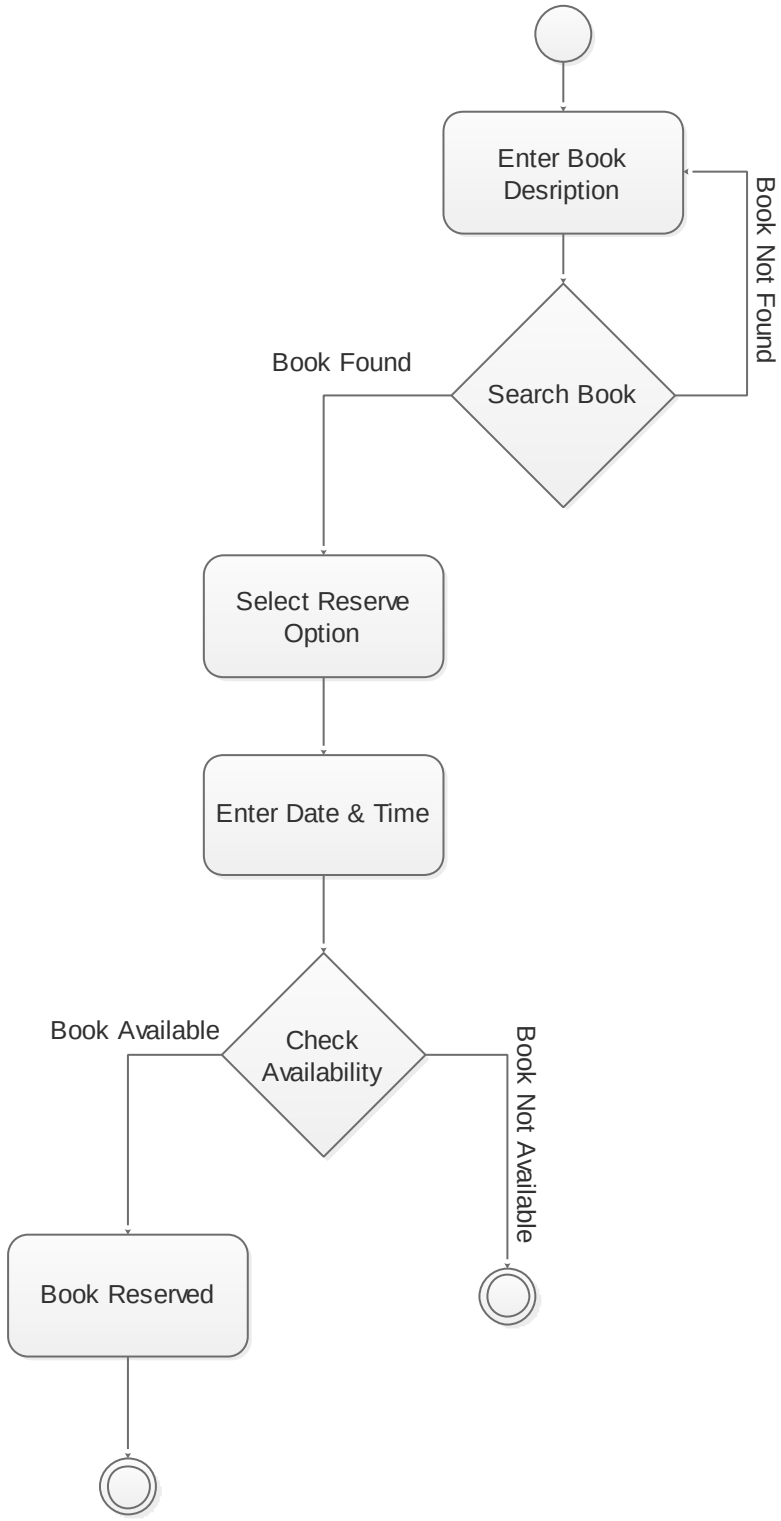


**Figure 20: Reserve Book – Flow Diagram**

**Return Book**

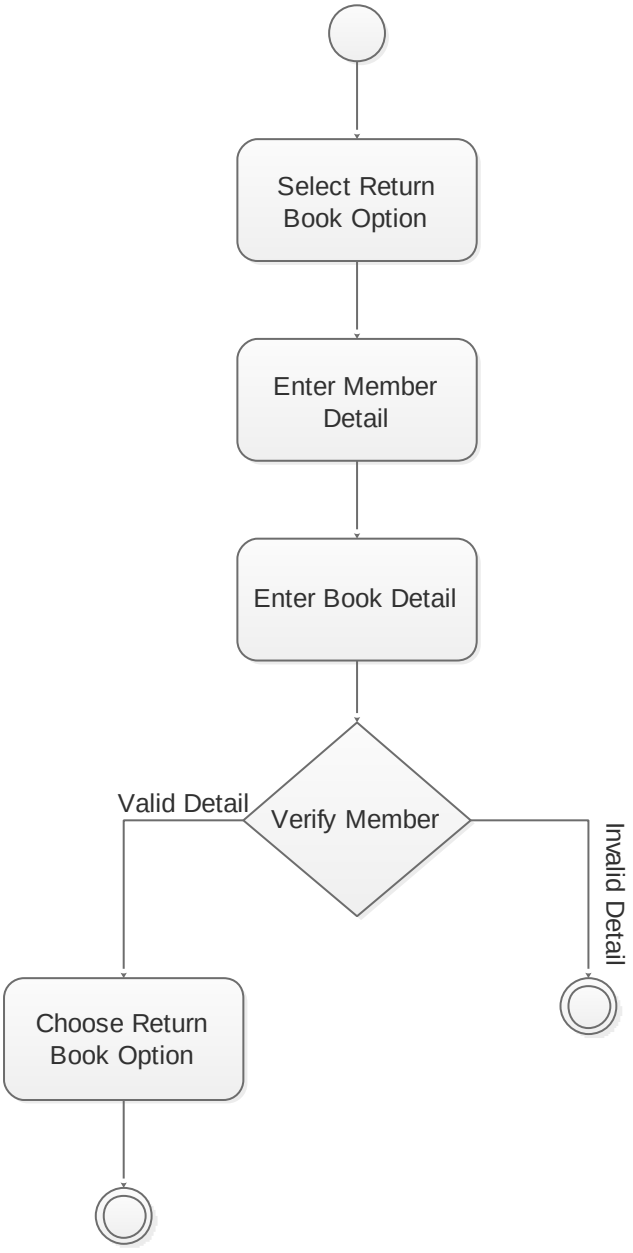


**Figure 21: Return Book – Flow Diagram**

**Rent Book**

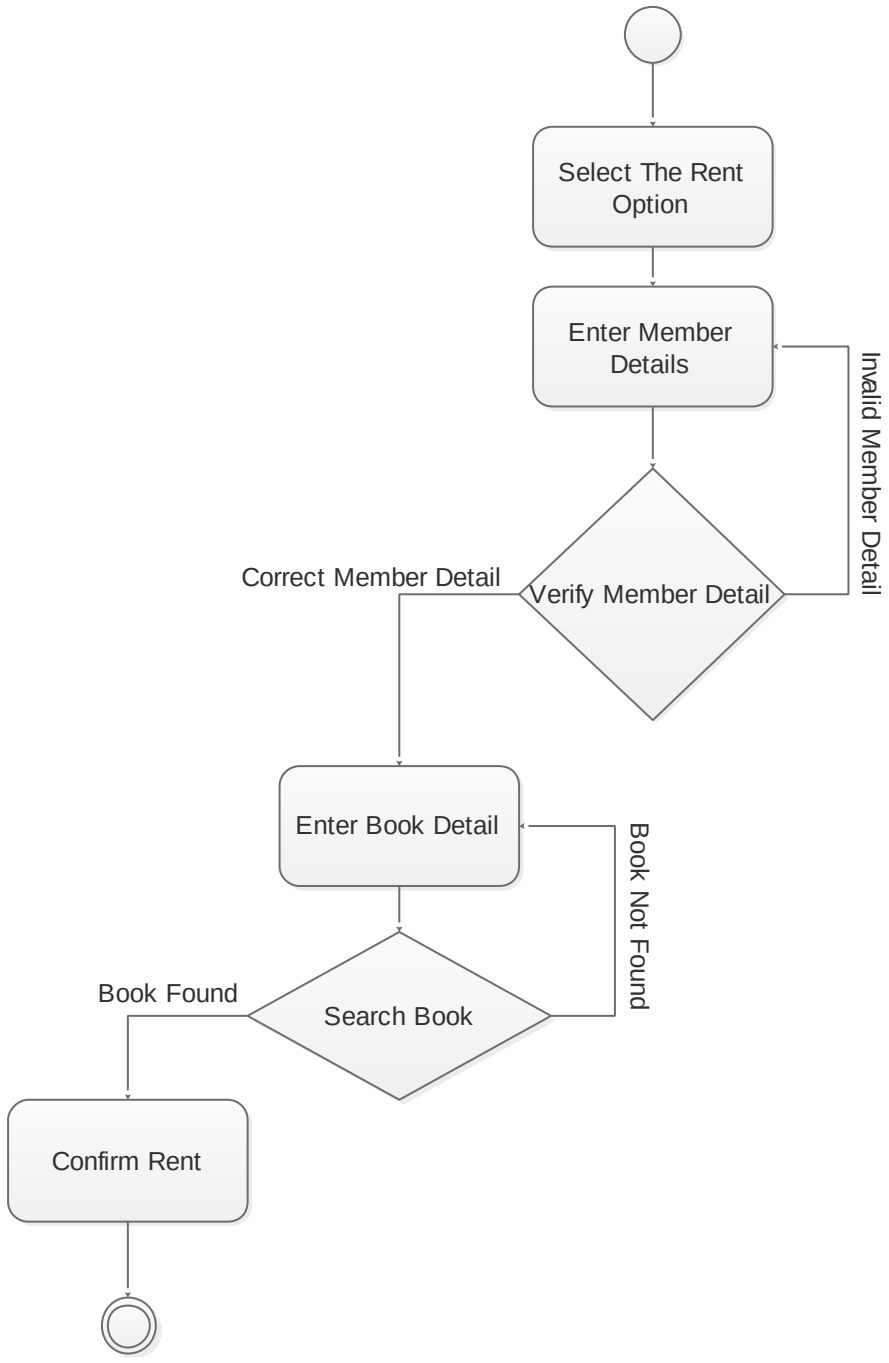


**Figure 22: Rent Book – Flow Diagram**

## 3.4 Non-Functional Requirements

### 3.4.1 Performance

- Any interface between a user and ILMS should have as minimum as possible response time.
- The system should be able to respond fast enough so as to avoid and response collision.
- The ILMS should be available for use 24 hours per day, 365 days per year.
- The ILMS should provide a reliable service for multiple users instantaneously

### 3.4.2 Reliability

- The system should be able to backup any database in case of any failure that may occur.
- The system should be able to update its database instantaneously as any change occurs.

### 3.4.3 Look and Feel Requirements

According to the Customer requirements, the College ILMS should include following interfaces:

- Application. Differences will depend on users' functions. Patrons will have simple version of ILMS without add, remove and modify possibilities.
- The ILMS interface for system administrator will include C++/Java application, Command Line, System files
- Web interface. This interface will provide search, request and renew procedures, connection with other online databases. Web interface should work correctly in different browsers.

### 3.4.4 Security

- In case the client forgets his/her password, the system offers a reset mechanism which requires the client's E-mail address.
- The ILMS should provide databases' modification only for librarians and system administrator after authorization procedures

### 3.4.5 Maintainability and Portability Requirements

- Changes that may occur must be verified instantly
- The ILMS is expected to run under MS Windows XP/vista/7/8/10 or higher.
- Access to the ILMS is permitted only for College student and staff after authorization procedures

### 3.4.6 Usability Requirements

As it was mentioned above, product's users are people greater than the age of 16, that's why there are no special requirements to the simplicity of system.

- The System should have a consistent user friendly User interface and be self-explanatory.
- It shall have an easy navigation to major components of the system with options to traverse backward.
- The interface should contain prompts and help to avoid making mistakes
- The product should be used by people with minimum amount of training.
- For the web component, since most users are familiar with the general usage of browsers, no specific training is required.

### 3.4.7 Operational Requirements

- The LMS should be used on IBM-compatible workstations with 50Mbytes free space on HDD for library workstations (80Gbytes for server) and 32Mbytes RAM for library workstations (256Mbytes for server)
- The LMS should be correctly implemented in different Internet browsers
- The LMS should correctly interface if MS Access applications and MS SQL Server

## 3.4 Inverse Requirements

The library management system doesn't provide a digital library. The system also lacks a cloud-based web platform for the librarian to manage books and members within the database. Instead it provides a desktop application that is accessible only within the library. In addition, the library management system is not capable of interacting with other similar system via network to share information and other materials. It is designed to serve the AAiT library meaning the members are obliged to be an AAiT student. It won't accept students from other college or institutes as a valid member.

## 3.6 Design Constraints

The design constraint of a system is something that will hold back a system, preventing it from achieving its full capacity. The following are the design constraints of the system:

- Since the library works almost 24 hours a day (from 1:00 in the morning to 12:00 in the morning) it is required to run it has to be available almost all the time.
- The data accumulated by the system (transaction records, student records, and catalogue of books) will need more storage space as time passes.
- The administrator for the system should be someone with proper clearance, possibly provided by the university.
- When new materials are added to the library contents on the web component must be updated as well.

## 3.7 Logical Database Requirements

A logical database is the collected information stored on multiple physical disk files and hard drives within a computer. This database provides a structure to house all the accumulated information within the device and determines the relationships between different types of files and programs. A logical database determines these relationships through a series of structured tables designed to categorize information into groups for easier accessibility.

The system stores all the user account information as well as the recorded transaction between a user and the system. All the data shall be stored in text-based flat files. For each user account, the Login ID, name, password and email address (optional) shall be stored in one file. All the entries shall be sorted alphabetically by the AAIT student ID. Furthermore, for each user account, there shall be a transaction report file which contains a record of books borrowed by a user and date and time of loan.

| *Data* | *Attributes* | *Use* |
|---|---|---|
| *Catalog data* | • *Book ISBN*<br>• *Book title*<br>• *Authors name*<br>• *Subject*<br>• *Date of publication* | *This data is used to identify a particular book which makes it easy for access and convenient for search.* |
| *User data* | • *User id*<br>• *User name*<br>• *Enrollment year*<br>• *Department* | *This data is used to identify the end user of the services provided by the AAIT library. It is also an input in LMS.* |
| *Transaction data* | • *Book ISBN*<br>• *Book title*<br>• *User id*<br>• *Date*<br>• *Time* | *Transaction data is used to cache which user borrowed which book and when the user borrowed it. This recorded data is constructive as it is the core part of the later generated report.* |
| *Rating data* | • *Book title*<br>• *Number rate( 1 – 5)* | *Rating data is data scraped from the subsidiary website. It aids fellow users find a book deemed useful by others.* |
| *Membership data* | • *Username*<br>• *Password*<br>• *User id* | *Membership data is used to identify online users. Having an account is expedient since online book reservation is possible.* |

**Table 11: Database Structure**

**Data Retention**

An organization may retain data for several different reasons. One reason is to comply with state and federal regulations. Another is to provide the organization with the ability to recover critical data in the event of a site-wide data loss, such as a fire or flood.

A data retention policy is a recognized and proven protocol within an organization for retaining information for operational use while ensuring adherence to the laws and regulations concerning them. The objectives of a data retention policy are to keep important information for future use or reference, to organize information so it can be searched and accessed at a later date and to dispose of information that is no longer needed. (Wikipedia, Data Retention, *November 2014*).

The policy of data retention under The Data Retention (EC Directive) Regulations 2009 applies to a wide range of method that data is acquired, how the data is stored, and came into force on 6 April 2009. It is usually enforced by a government in order to make provision, about the retention of certain data. Yet we could find any data retention policy required by Ethiopian government pertaining to electronic data.

**Data Entity Relationships**

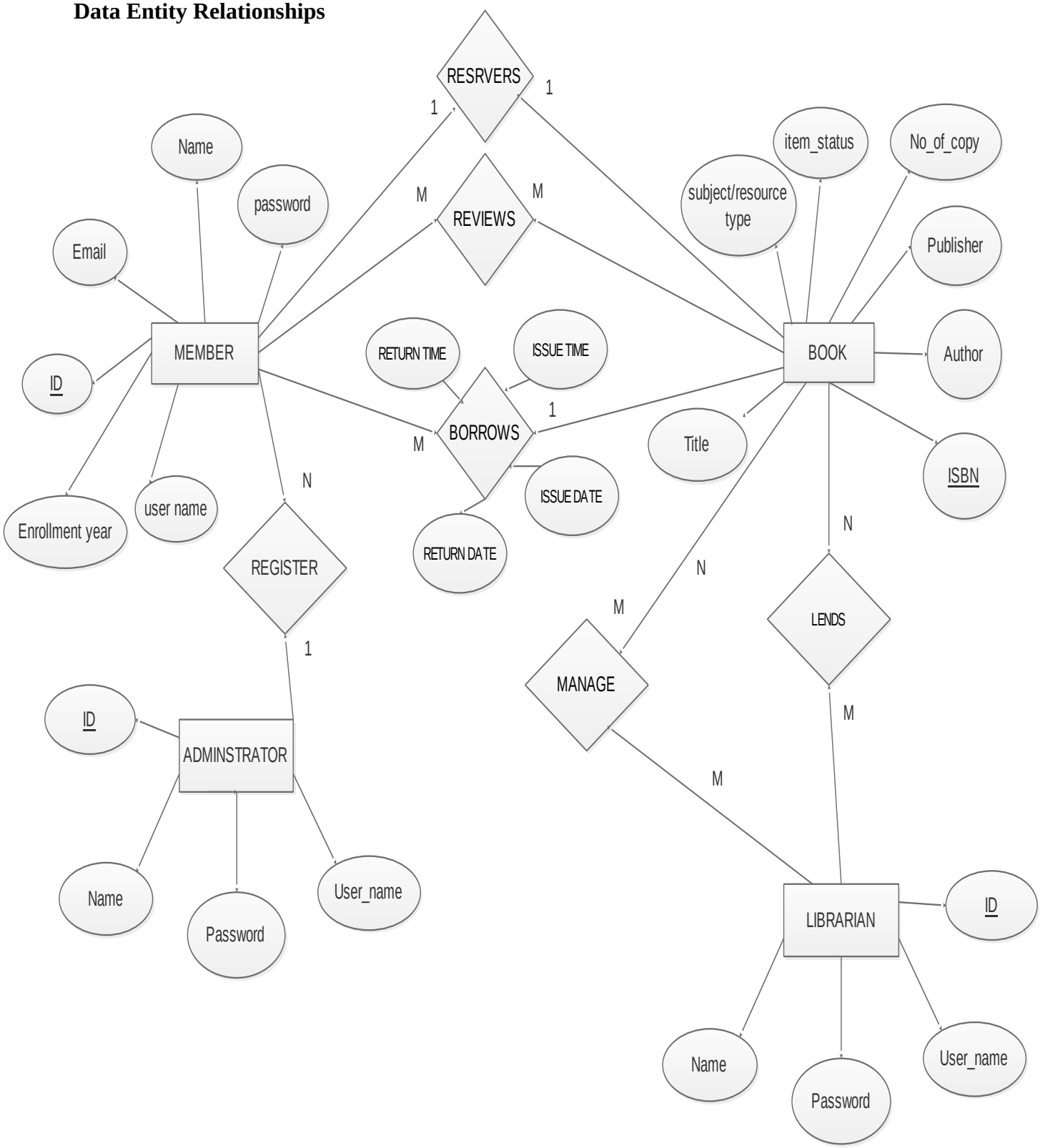


**Figure 23: ER Diagram**

**UML Diagram**

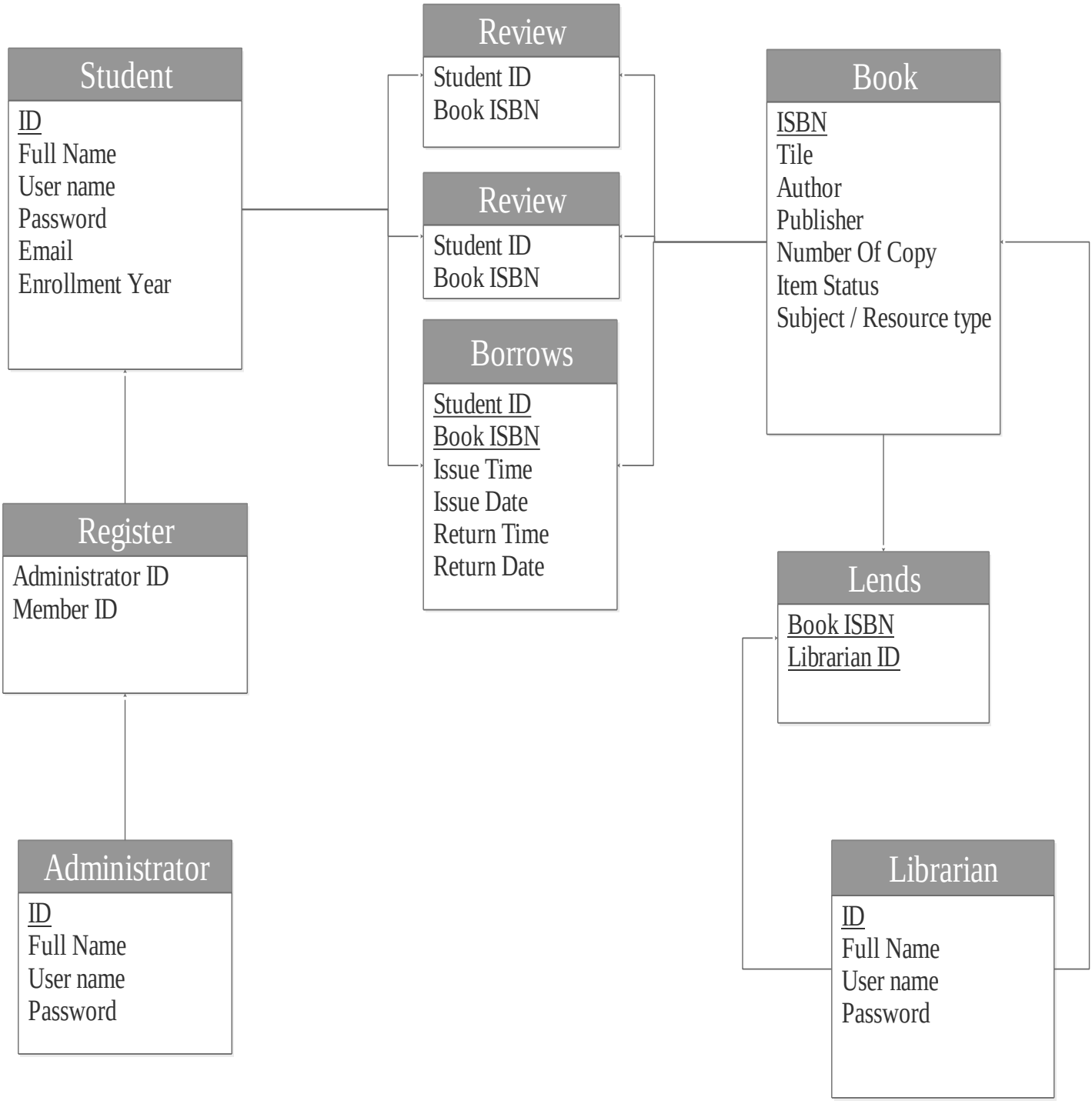


**Figure 24: UML Diagram**

## 3.8 Other Requirements

### 3.8.1 Legal Requirements

- Personal information should be protected
- The ILMS should comply with quality assurance standards

# 4. Change Management Process

Since this SRS document states the specifications of ILMS as clear as possible we are solid that clients will be on the same side as our team, if that is not the case they will have a clear understanding and will be able to address any questions regarding requirements or any other specifications.

During this project our team is trying to follow the water fall model which makes it harder to be flexible regarding requirements but to make sure there will not be a lot of change after this we have tried to understand the requirements as much as possible and since we ourselves are students of AAiT we can easily understand the problem at hand and know what should be done to solve the problem, but since there could be better choices than what we thought change is expected in the SRS document.

Pros and cons of any change that should be made is discussed among teammates and then applied.

# References

Websites

MVC architecture. “Understanding MVC architecture". 16 July 2013.MVCarch.web .15 May 2016< http://www.understandingMVC.com >.

Wiki . "Detail Design". 15 July 2012. Wikipedia. 19 May 2016.<http://wikipeida.com/detailDesignDescription.html >.

WikiHow. "Object oriented programming".2013. WikiHow, Inc.Web. 11 May 2016. < http:// m.wikihow.com/OOP >.

Worcester polytechnic institute. "How to draw state chart diagram".2014. Worcester polytechnic. 10 March 2016. <http:// https://www.wpi.edu/academics/ugradstudies/statechart.html >.

Prakash Dhanasekar. "Software Design Specification". March 21, 2007. Linkedln corporation.13 March 2016.< https://www.slideshare.net/mobile/ramPrakash1989/sds-explanation >

Programmers stack exchange. "". 11 April 2012.websphere(r). 18 May 2016. < https://stackexchange.com/whyMVC >

Sensi . "Sample design document". 17 March 2009 . Sensi org. 15 May 2016.<http:// www. sensi . org /.../LUT_LS_RDv1_1.doc >.