

Club Management System for Dhaka University Club

Software Requirements Specification and Analysis

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Letter of Transmittal

17th December, 2016
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Subject: Submission of term report on “Dhaka University Club Management System.”

Sir, We, the team on which the project on Dhaka University Club Management System was assigned, are submitting our report with due respect. We have tried our best for the report. However, it might lack perfection. So, may I therefore, hope that you would be kind enough to accept our report and oblige thereby.

Yours sincerely
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Abstract

The study is made for the total management of Dhaka University Club. The scope of study is to analyze the management system of Dhaka University Club and to know the drawbacks of it. Also, enable to design SRS of this system. The object of this study is to develop a SRS (software requirements and specification) of the management system of Dhaka University Club.

Contents

Chapter 1: Introduction	1
1.1 Purpose	1
1.2 Intendment Audience	1
Chapter 2: Inception of DU Club Management System.....	2
2.1 Introduction	2
2.1.1 List of Stakeholders	2
2.1.2 Recognizing multiple view point.....	3
2.1.3 Working towards collaboration.....	4
2.1.4 Requirements questionnaire	5
2.2 Conclusion.....	5
Chapter 3: Elicitation of DU Club Management System	6
3.1 Introduction	6
3.2 Eliciting Requirements.....	6
3.2.1 Collaborative Requirement Gathering	6
3.2.2 Quality Function Deployment.....	7
3.3 Usage Scenarios	7
Chapter 4: Scenario Based Modeling of DU Club Management System	14
4.1 Definition of Use case.....	14
4.2 Use Case Diagrams.....	14
4.2.1 System Description from Level-0 use case:.....	14
4.2.2 Level-0 Use Case Diagram:.....	15
4.2.3 Level-1 Use Case Diagram:.....	16
4.3 Activity Diagram	31
4.3.1 Authentication System:	31
4.3.2 Account Management System:	36
4.3.3 Cafeteria Management System:.....	37
4.3.4 Transaction Management System:	38
4.3.5 Hall Reservation System:.....	39
4.3.6 Virtual Helpline Management:	43

4.3.7 Library Stack Management System:.....	44
4.3.8 E-Library Facilities:	45
4.4 Swimlane Diagram.....	46
4.4.1 Authentication System:.....	46
4.4.2 Account Management System:	51
4.4.3 Cafeteria Management System:.....	52
4.4.4 Transaction Management System:	53
4.4.5 Hall Reservation Management System:	54
4.4.6 Virtual Helpline Management:	58
4.4.7 Library Stack Management:.....	59
4.4.8 E-Library Facilities:	63
Chapter 5: Data Based Modeling of DU Club Management System	65
5.1 Noun Identification.....	65
5.1.1 Authentication System	65
5.1.2 Cafeteria Management.....	67
5.1.3 Transaction Management and Report Generation System	69
5.1.4 Hall Reservation System.....	72
5.1.5 Virtual Helpline	74
5.1.6 Library Stack Management System	75
5.1.7 E-Library Facilities.....	77
5.2 Data Object Relation.....	79
5.2.1 Club Management System for Dhaka University Club	79
5.3 ER Diagram	80
5.3.1 Club Management System for Dhaka University Club	80
5.4 Relational Tables	81
5.5 Schema Tables	82
5.5.1 Registration System.....	82
5.5.2 Cafeteria System	83
5.5.3 Transaction Management and Report Generation System	84
5.5.4 Hall Reservation System.....	85

5.5.5 Virtual Helpline	86
5.5.6 Library Stack Management System	87
5.5.7 E-Library Facilities.....	88
Chapter 6: Class Based Modeling of DU Club Management System	89
6.1 General Classification	89
6.2 Coad and Yourdon's Six Selection Criteria	93
6.3 Noun-Verb Affiliation of Classes.....	95
6.4 Class Attributes and Class Methods	100
6.5 Class Cards	103
6.6 Class Responsibility Collaborator Diagram.....	109
Chapter 7: Behavioral Modeling of DU Club Management System	110
7.1 Event Initiator and Collaborators Identification.....	110
7.1.1 Club Management System for Dhaka University Club	110
7.2 State Transition Diagrams	113
7.2.1 Club Management System for Dhaka University Club	113
7.3 Sequence Diagrams	122
7.3.1 Authentication System	122
7.3.2 Account Management System.....	123
7.3.3 Cafeteria Management System.....	124
7.3.4 Transaction Management System.....	125
7.3.5 Hall Reservation System.....	126
7.3.6 Virtual Helpline	127
7.3.7 Library Stack Management.....	128
7.3.8 E-Library Facilities.....	129
Chapter 8: Conclusion	130
Group meetings.....	131
References	133

Chapter 1: Introduction

This chapter is intended to specify the purpose of this document and the intended audiences of it.

1.1 Purpose

This document is the Software Requirement Specification (SRS) for the Club Management System (CMS) of University of Dhaka. It contains functional, non-functional and support requirements and establishes a requirements baseline for the development of the system. The requirements contained in the SRS are independent, uniquely numbered, and organized by topic. The SRS serves as official means of communicating user requirements to the developer and provides a common reference point for both the developer team and stakeholder community. The SRS will evolve over time as users and developers work together to validate, clarify and expand its contents.

1.2 Intendment Audience

This SRS is intended for several audiences including the customers as well as the project managers, designers, developers, and testers.

- The customer will use this SRS to verify that the developer team has created a product that is acceptable to the customer.
- The project managers of the developer team will use this SRS to plan milestones and a delivery date, and ensure that the developing team is on track during development of the system.
- The designers will use this SRS as a basis for creating the system's design. The designers will continually refer back to this SRS to ensure that the system they are designing will fulfill the customer's needs.
- The developers will use this SRS as a basis for developing the system's functionality. The developers will link the requirements defined in this SRS to the software they create to ensure that they have created software that will fulfill all of the customer's documented requirements.
- The testers will use this SRS to derive test plans and test cases for each documented requirement. When portions of the software are complete, the testers will run their tests on that software to ensure that the software fulfills the requirements documented in this SRS. The testers will again run their tests on the entire system when it is complete and ensure that all requirements documented in this SRS have been fulfilled.

Chapter 2: Inception of DU Club Management System

In this chapter, the Inception part of the SRS will be discussed briefly.

2.1 Introduction

Inception is the beginning phase of requirements engineering. It defines how does a software project get started and what is the scope and nature of the problem to be solved. The main goal of the inception phase is to identify concurrence needs and conflict requirements among the stakeholders of a software project. At project inception, we establish a basic understanding of the problem, the people who want a solution, the nature of the solution that is desired, and the effectiveness of preliminary communication and collaborations between the other stakeholders and the software team.

To establish the groundwork we have worked with the following factors related to the inception phases:

- List of stakeholders
- Recognizing multiple viewpoints
- Working towards collaboration
- Requirements questionnaire

2.1.1 List of Stakeholders

Stakeholder refers to any person or group who will be affected by the system directly or indirectly. Stakeholders include end-users who interact with the system and everyone else in an organization that may be affected by its installation. At inception, a list of people who will contribute input as requirements is elicited. The initial list will grow as stakeholders are contacted because every stakeholder will be asked: "Whom else do you think I should talk to?"

To identify the stakeholders we consulted with General Manager and asked her following questions:

- Who is paying for the project?
- Who will be using the project outcomes?
- Who gets to make the decisions about the project (if this is different from the money source)?

- Who has resources I need to get the project done?
- Whose work will my project affect? (During the project and also once the project is completed).

Concluding thoughts on Stakeholders thoughts we identified the following stakeholders for our automated club management system of Dhaka University.

Club Manager: A manager is selected for the Dhaka University Club. He has the administrative power all over the system. Almost all decisions are taken by the club manager.

Executive Committee: A committee is formed with 15 members. There are one president, two vice-presidents, one treasurer, one secretary, two additional secretaries and eight general members. Associate members are selected based on their application by the executive committee in a meeting. This committee is elected in the annual meeting.

General Member: General members are the faculty member or the officer of the university. They can also be the recommender for outsider who wants to join the club.

Associate Member: Associate members are the outsider who wants to join the club. There can be a maximum number of 50 associate members in a certain period of time. They need a recommendation from a general member of the club. Their application is finally approved by the executive committee.

Developers: Developers are one of the stakeholders because they are also affected by this system. They develop this system and work for further development. If any system interruption occurs, they will find the problem and try to solve it.

University: Dhaka University will finance the project and it has some rules and regulation to maintain our system. We have to follow them strictly. They will also be affected by this system so we consider it as one of our stakeholder.

Testers: Testers are one of the stakeholders of this project because they will be testing the effectiveness and efficiency of the software project. If there are any problems in the system, they will be the ones to identify and report the problem.

Others: Other stakeholders of the project are the club accountant, librarian etc.

2.1.2 Recognizing multiple view point

Different stakeholders achieve different benefits from the system. Consequently, each of them has a different view of the system. So we have to recognize the requirements from multiple points of view, as well as multiple views of requirements. Assumptions are given below:

Club Manager's view point:

- User friendly and efficient system
- Error free system
- Easy to operate

- Minimum maintenance cost
- Availability of expected requirements within budget
- Store member related information
- Generate annual report for expenses and incomes.

General Member's view point:

- Easy to access
- Strong authentication
- User friendly
- Notification for expenses
- High security of member's information

Associate Member's view point:

- Easy to access
- Strong authentication
- User friendly
- Online guidance

Developer's view point:

- Easy to develop
- No ambiguous requirement

University's view point:

- User friendly
- Efficient system
- Error free system
- Cost within budget
- Less maintenance cost
- No disruption of rules and regulations

Tester's view point:

- Easy to test project is useful for acquiring effective test results
- Clearly defined test cases

2.1.3 Working towards collaboration

Every stakeholder has their own requirements. There are some common and conflicting requirements of our stakeholder. That's why we followed the following steps to merge these requirements-

- Find the common and conflicting requirements
- Categorize them
- List the requirements based on stakeholder's priority points
- Make final decision about requirements

Common requirements:

- User friendly
- Efficient system
- Error free system
- Strong authentication

Conflicting requirements:

- Limited budget
- Cost within budget.
- High security of the system
- Easy access (Different stakeholder wants different type of access)

Final requirements: We finalize the following requirements based on stakeholder's priority point:

- User friendly system
- Strong authentication
- Maximum error free system. (5%-10% error is considerable)
- Restrict access to functionality of the system based upon user roles
- High security of member's information
- Automated submission of application

2.1.4 Requirements questionnaire

We first ask the stakeholder some context free questions to understand the project's overall performance and goals. These questions are mentioned in section 2.1.1. These questions help us to identify the stakeholders of the project. Then we ask our next set of questions to better understand the problem and take stakeholder's opinion about the solution. The final set of question focused on the effectiveness of the communication activity itself.

2.2 Conclusion

Inception phase helped us to establish basic understanding about the club management system of Dhaka University, identify the stakeholders who will be benefited if this system becomes automated, define the nature of the system and the tasks done by the system and establish a preliminary communication with our stakeholders.

In our project, we have established a basic understanding of the problem, the nature of the solution that is desired and the effectiveness of preliminary communication and collaboration between the stake-holders and the software team. More studies and communication will help both side (developer and client) to understand the future prospect of the project. Our team believes that the full functioning document will help us to define that future prospect.

Chapter 3: Elicitation of DU Club Management System

The purpose of this chapter is to specify the elicitation part.

3.1 Introduction

To complete the elicitation step we face many problems like problems of scope, problems of volatility and problems of understanding. However, this is not an easy task. To help overcome these problems, we have worked with the Eliciting requirements activity in an organized and systematic manner.

3.2 Eliciting Requirements

Inception where Question and Answer approach is used; elicitation makes use of a requirements elicitation format that combines the elements of problem solving, elaboration, negotiation, and specification. It requires the cooperation of a group of end-users and developers to elicit requirements. To elicit requirements we completed following four works.

1. Collaborative Requirements Gathering
2. Quality Function Deployment
3. Usage Scenarios
4. Elicitation work products

3.2.1 Collaborative Requirement Gathering

Many different approaches to collaborative requirements gathering have been proposed. Each makes use of a slightly different scenario. We completed following steps. The meetings were conducted with the manager of Dhaka University Club, the club accountant and some of the general club members; they were questioned about their requirements and expectations from the automated “Club Management System”. They were asked about the problems they were facing with the current manual system. At last we selected our final requirement list from the meetings.

3.2.2 Quality Function Deployment

Normal Requirements: Normal requirements consist of objectives and goals that are stated during the meeting with the customers. Normal requirements of the project are:

1. User friendly interface and secured system
2. Registration facilities for new members
3. Keeping record of food sold per day
4. Showing a list of available food items everyday
5. Reservation of the club's hall room for an event
6. Maintaining library stack management system
7. Keeping track of income sources and expenditures

Expected Requirements: These requirements are implicit to the system and may be so fundamental that the customer does not explicitly state those. These requirements will play important role in automated system. Expected requirements of the project are:

1. Providing registration and authentication services
2. Updating served member's account information after serving an order
3. Sending notification to users if necessary
4. Allowing members to update their own profile and personal information
5. Allowing members to view detailed expenses
6. Providing an interactive calendar in the section of renting space for events

Exciting Requirements: These requirements are for features that go beyond the customer's expectation and prove to be very satisfying when present. Exciting requirements of the project are:

1. Providing facility for ordering food from anywhere
2. Providing e-library facilities with option to read and/or download books.
3. A virtual helpline for asking questions and submitting complaints.

3.3 Usage Scenarios

A Club Management System for Dhaka University Club (CMSDU)

Club Management System (CMS) will be an automated system for registering members, cafeteria management, Club Reservation and management, library stack management and also keeping track of income source and expenditure.

Types of Member

There are three types of member in Dhaka University Club (DUC) – Honorary Member, Associate Member and General Member. Honorary members are those who are selected to be a member by honor. Associate members are those who apply to be a member in the club and club executive committee allows them to offer membership. General members are those who are teachers or officers in DU and also registered themselves in DUC.

There are also some employees who serve DUC. They are manager, librarian, accountant, network administrator, cooks, and waiters.

Registration

For becoming a general member of DUC, one must be a teacher or officer of DU. He/She has to submit an application for requesting membership including the his/her registration number, department name to the manager of DUC. Manager and Administrator check the validity of the data and gather the necessary information from Registrar Building (RB). The information consists of name, father's name, mother's name, permanent address, phone number, present address, department, email, joining year, designation.

(For becoming an honorary member or an associate member or employee, he/she fills a registration form provided by DUC. Manager verifies information provided by him/her.) The manager saves the collected information of associate member or honorary member or employee in database.

The manager gives a member ID to the new member/employee (and sends a document of new general member with his/her ID to RB). Member ID contains 10 digits starting from 1000000001. ID increases by 1 with each new member/employee. Member/employee is asked to generate a password for his/her ID. This password is needed for authentication. Password must contain at least 8 characters including minimum two letters and three digits. Member/employee can change his/her password. If password is forgotten, he/she has to give an application requesting a new password for his/her ID to manager. Then after verification, manager allows his/her to generate a new password.

Member Accounts Managements System

The members of the club will be allowed to update their own profile and personal information. In case of change in designation or other personal information i.e. address, contact number the system will allow the member to change the information.

Cafeteria Management System

A member can order foods from DUC cafeteria. In the cafeteria, there are many foods available varying from different days of the week. Some food items are – rumali roti, beef curry, vegetable, chitoi pitha, dal, dalpuri, alupuri, tea, lassi, coffee, soup, bombay toast, butter toast, chop. Everyday a list of available foods for the day will be updated by manager.

When a member needs to order, he/she will authenticate himself/herself with his/her id and password. Then he/she will enter the desired items along with quantity. The member will then confirm his/her choice. The data of the order is sent to the kitchen where the Cook selects approximate time for food delivery and sends to respective member. Member is notified with approximate delivery time and his/her ordered items. (After that, the Cook cooks the selected food items and notifies waiter if it is finished. The waiter serves food to member.) The data of the order is also sent to the database. The accountant is notified with the order information. The cost of the food items are enqueued in member's account along with date. At the end of the month, the monthly cost for the general member is calculated and sent to RB by the accountant. (RB deducts the amount spent by each member from their salary.)

Transaction Management and Report Generation

CMSDU will entertain the purpose of generating reports. The system will generate a monthly report of the club's expenses and earnings on the request of the manager. The report will hold record of the fields of expenses and earnings and will also report the total income and expenditure of the month.

(Permanent savings of CMSDU are kept in the club's account at Bank. Teachers pay club subscription fees to become general club member.) Regular subscription fees and expenses of other services are saved on the member's name and ID. At the end of a month, the club manager will send a list to the Registrar Building containing general member's name, ID and monthly expense. The amount will be deposited to the club's account. Except this, any regular addition on different categories will be added to the database by the manager.

Whenever any transaction is held, the club accountant will add the cost on database on specific categories. Monthly and annual earnings and expenditure will be calculated accordingly which will generate financial report at the end of each month and year.

Lists of annual earning and expense categories of the club are given below-

List of Annual Earning Categories:

- 1. Opening Cash in Hand**
- 2. Opening Cash at Bank: (Savings A/C, Current A/C)**
- 3. Subscription Fee (General/Associate Members)**
- 4. University Grants**
- 5. Donation**
- 6. Club Space/Premises Rent**
- 7. Catering Service**
- 8. Miscellaneous Receipts**
- 9. Interest on Savings Bank Account**
- 10. Raffle Draw**

- 11. Advanced Club Rent**
- 12. Security Deposit (Associate Member/Club Shop)**
- 13. Souvenir Contribution (Advertisement)**

List of Annual Expenses Categories:

- 1. Staff Salaries and Benefits**
- 2. Catering Expenses**
- 3. Repairing and Maintenance**
- 4. Cleaning Supplies**
- 5. Stationary, Newspaper Expenses**
- 6. Recreational Expenses**
- 7. AGM Expenses**
- 8. Bank Charge**
- 9. Servicing Charge**
- 10. Audit Fees**
- 11. Club Booking Returns**
- 12. Fixed Assets**
- 13. Machine Purchase**
- 14. Renovation, Decoration, Beautification, Paintings**
- 15. GYM instrument**
- 16. Club Website**
- 17. Employee Fund**
- 18. Closing Cash at Bank: (Savings A/C, Current A/C)**

The system will also provide member wise report generation which will hold the record of a member's orders in the cafeteria upto a month. A member can log into his/her account and view details of his/her orders for the month so far. She/he can also view his/her expenses of all the previous months in the year.

Hall Reservation System

The hall room of the club can be hired for any occasion on Friday from 9 AM to 4 PM. Any club member or any person referred by a member can hire the room. One can apply for hiring the total hall room or the frontal space of the hall. The rent fee for hiring depends on this type.

To hire the hall room or frontal space, one needs to select the booking date. He/she will be able to select the date if the date is available for booking on this date. After selection, he/she will fill the application form where he/she will give necessary information containing Name, Father's name, National ID number, Present address, Hiring date, Referred by [for non-member applicants], Purpose of hiring, Contact number. After he/she fills the application form, the club manager will be notified. Manager will forward the

application to the member who has been referenced. The member will approve/disapprove the application (This step is necessary for non-member applicants). After the approval from the member, the manager will notify the applicant to pay caution money (at least half of the total hiring fee). The applicant will collect the payment slip from the manager and complete the payment procedure. Then manager will book the hall room for the applicant on that requested date and give her/him a booking-confirmation paper containing Booking ID, Name of applicant, National ID number, Referred by, Type of rent, Hiring date, Date of payment, Caution money, Purpose of hiring, Contact number.

The person, who has already booked the hall room, may cancel the reservation of the room up to the requested date. In this case, he/she needs to apply for cancellation. For cancellation, he/she needs to fill up a form containing information - Booking ID, Name, Date of application, Hiring date, Referred by, Caution money (If an applicant forgets these information, he/she can recover these information from manager by giving contact number). Manager will return him/her a certain amount. If he/she applies for cancellation a month (30 days) before the reservation day, he/she will collect total caution money from manager. If it happens a week (7 days) before the reservation day, manager will return his/her money after deducting 17% of the hiring fee from caution money. Otherwise, manager will deduct 33% of the hiring fee from caution money and pay him/her back rest of the caution money. In this situation, manager will unmark the date from being reserved. On/before the day of the event, the person who reserves the hall room will complete the total payment procedure by depositing rest of the money.

Virtual Helpline

CMSDU will provide a virtual helpline for all members. Members will be able to submit complaints and/or ask questions regarding the services of the club. For this, the user would have to enter his/her complaint/question into the system. Afterwards, the manager will read the complaint/question and reply with a response to the question/complaint.

Library Stack Management System

The Library Stack Management System will provide searching, borrowing and returning of books in quick time and reliably. The manager/Library manager will be permitted to use this system. When a member joins DUC, a library membership card is also given. The member wishing to use the facilities would present the library card to the manager/Library manager. The manager/Library manager will verify the card and ask for the desired service.

The functionalities of the library stack management system can be divided into two perspectives: Member's perspective and the manager/Library manager's perspective.

. A member of the club is provided searching, borrowing and returning of books.

To search for a book, the user must first tell the system by which category they want to search. The following categories will be provided: subject, author name, book name,

publisher name, accession number and year. Upon submitting, the queried entry or a list of entries will be displayed. Afterwards, the user will select the desired entry and the system will display result. The section number, shelf number and row number will be displayed as "Location" while number of borrowable copies currently available in the library, accession number, book name, subject of the book, author's name, publisher's name and edition number will be displayed as "Book Information".

To borrow a book, the user would have to enter the desired accession number, member ID and a return date (return date must not be more than two weeks from borrowing date). The system will then check how many borrowable copies of the desired book are currently available in the library. If the number is zero, the system will report the unavailability of the book and ask the user if he/she would like to borrow a different book. Otherwise, the current accession number along with the provided return date will be appended into the member's borrow list/cart with necessary borrowing information containing borrowing ID, book name, accession number, borrowing date, return date. The number of borrowable copies of the book will be decremented in the database. The new entry will be marked as borrowed. The system will allow a member to borrow at most five books at a time.

To return a book, the user would be prompted to provide the borrowing ID. The system will then check the total fine charged associated with the borrowing ID and ask the member to complete payment of the fines (if any). The user will then give his fines and await for approval. After the acceptance of payment, the entry with the borrowing ID in the borrow list/cart will be marked as returned and the number of borrowable copies of the returned book will be incremented in the database. The member's fine will be automatically updated by the system every day after exceeding the return date. For a delay of every working day, 5 taka per book will be charged as late fine. If the delay exceeds one month, the member will be notified about the delay including the total amount charged.

Upon collecting the fines, the manager will update the fines charged and signal the system to update the borrowing ID and database.

Only the manager/Library manager will be permitted to add a new entry to the system. To do that, the manager will have to provide the accession number, book name, subject of the book, author's name, publisher's name, edition number and number of copies of the new book. Since, the books in the library are organized lexicographically, the system will analyze the name of the book and then generate the section number, shelf number and row number for the new book. After the manager confirms the provided information, a new entry with the given details will be added to the database.

E-library Facilities

The club will provide e-library facilities to all of its members. There will be some books uploaded in the club's web server. Members can enjoy these facilities after being logged in. Members can search for books online. The searching procedure is similar to that in the Library stack management system. Only difference is that, the final results will not provide details regarding the location of the book. Instead, a link to the pdf version of the book will be provided. If the book is available in the club server, a member can read or download the book. Otherwise, he/she will receive a message saying "*Not Available*". If the queried book is available in the server, the user can follow the link to the pdf. Library manager/Network administrator will maintain the e-library. The Library manager will invoke a request to add or remove a book. The network administrator will add or remove the requested book from the server.

Chapter 4: Scenario Based Modeling of DU Club Management System

4.1 Definition of Use case

A use case captures a contract that describes the system behavior under various conditions as the system responds to a request from one of its stakeholders. In essence, a use case tells a stylized story about how an end user interacts with the system under a specific set of circumstances. A use case diagram simply describes a story using corresponding actors, who perform important role in the story and makes the story understandable for the users. The first step in writing a use case is to define that set of “actors” that will be involved in the story. Actors are the different people that use the system or product within the context of the function and behavior that is to be described. Actors represent the roles that people play as the system operators.¹

Primary Actor: Primary actors interact directly to achieve required system function and derive the intended benefit from the system. They work directly and frequently with the software.

Secondary Actor: Secondary actors support the system so that primary actors can do their work. They either produce or consume information.

4.2 Use Case Diagrams

Use case diagrams give the non-technical view of overall system.

4.2.1 System Description from Level-0 use case:

After analyzing the user story we found six actors who will directly use the system as a system operator. Primary actors are those who will play action and get a reply from the system whereas secondary actors only produce or consume information.

Following are the actors of DU Club Management System –

4.2.2 Level-0 Use Case Diagram:

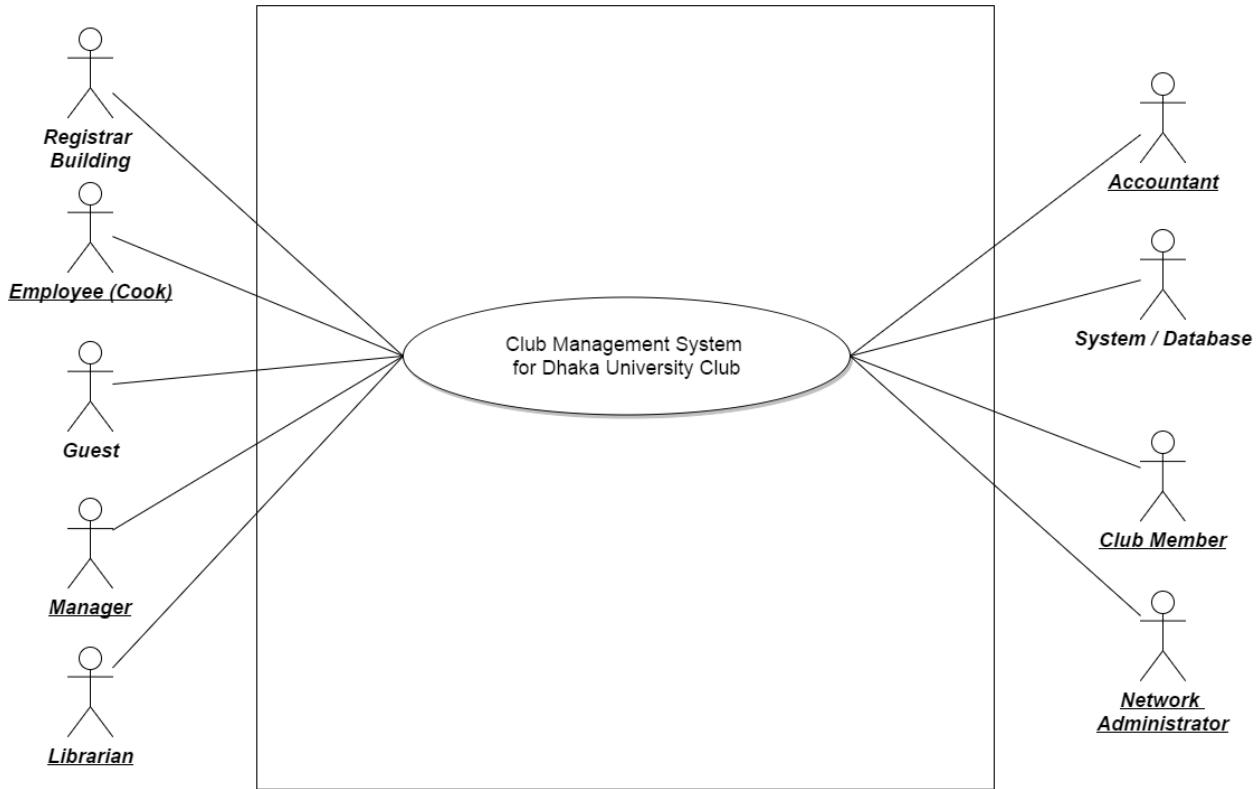


Figure 4.2.0: Level-0 Use case diagram

- **Primary Actors:** Manager, Accountant, Employee (Cook), Club Member, Network Administrator, Librarian.
- **Secondary Actors:** Guest, Registrar Building, System.
- It is level - 0 figure of the total system, club management system.

4.2.3 Level-1 Use Case Diagram:

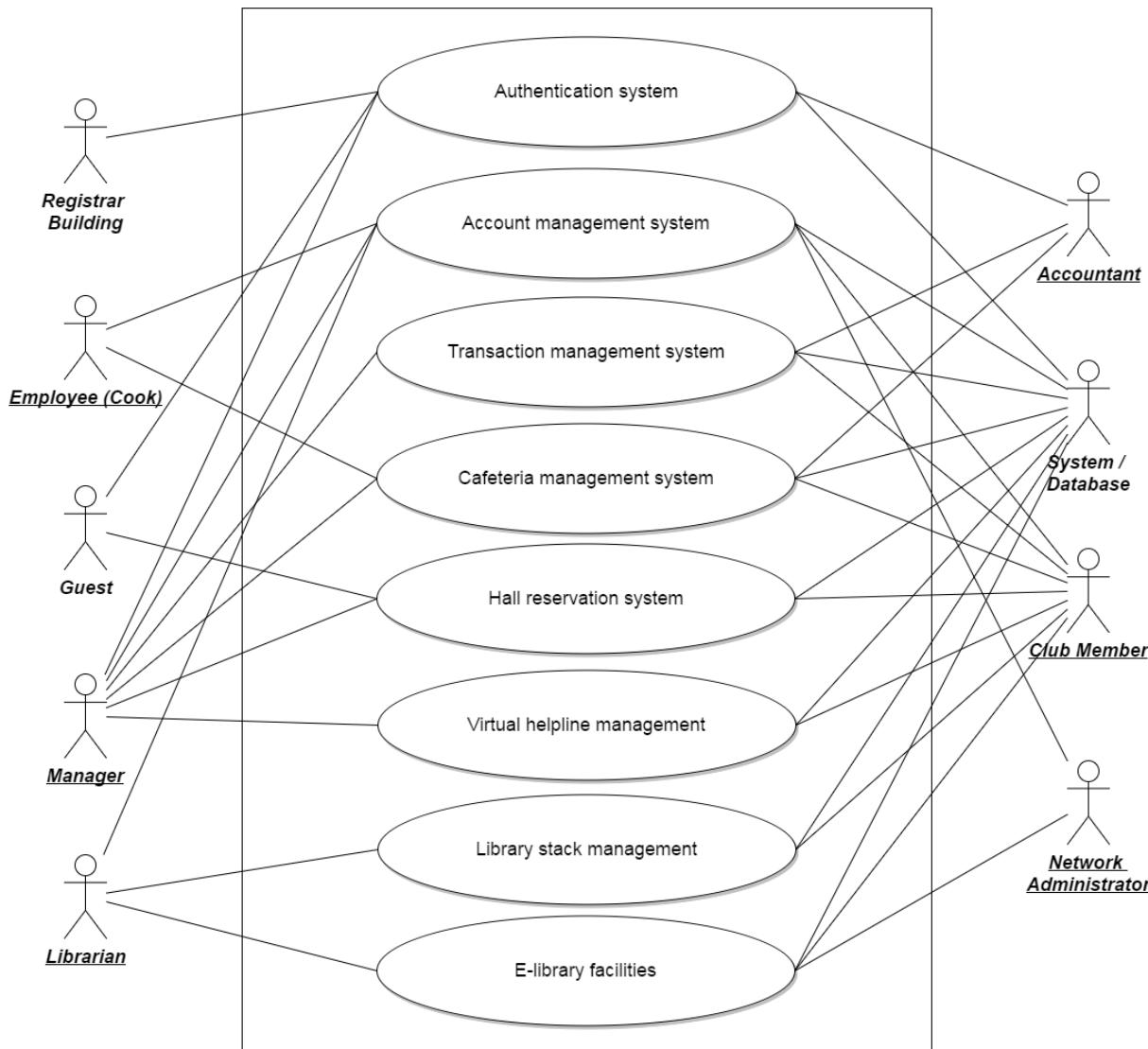


Figure 4.2.3: Level-1 Use case diagram

- **Primary Actors:** Manager, Accountant, Employee (Cook), Club Member, Network Administrator, Librarian.
- **Secondary Actors:** Guest, Registrar Building, System.
- It is level - 1 figure derived from Level-0 figure.
- In this figure, total subsystem is divided into seven subsystems. They are: Registration and authentication process, Transaction management system, Cafeteria management system, Hall reservation system, Virtual helpline management, Library stack management and E-library facilities.
- Actors related with corresponding subsystems are shown in this figure.

4.2.3.1 Authentication System:

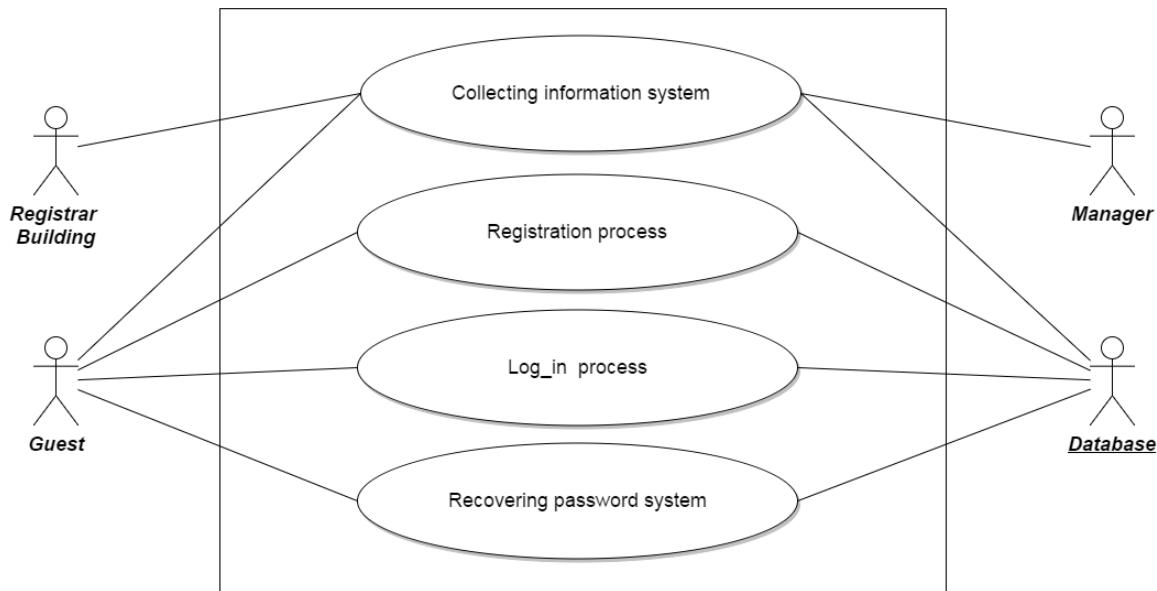


Figure 4.2.3.1: Level-1.1 Use case diagram

- Primary Actors: Database
- Secondary Actors: Guest, Registrar Building, Manager
- This diagram is level 1.1 of the use case model
- This level is derived from level 1

Description:

This level represents the Authentication subsystem. The action-reply sequence of the use case is given below:

Action-Reply Sequence:

Manager:

Action: Please give me all information about general members.
Reply: information sends successfully.

Guest:

Action: Wants to sign up.
Reply: Enter your information.

Action: Wants to sign in.
Reply: Enter your ID and password.

Action: Wants to change personal information or password
Reply: Information update successfully.

Database:

Action: provide or store data
Reply: receive notification

RB:

Action: provide information
Reply: receive notification

4.2.3.2 Account Management System:

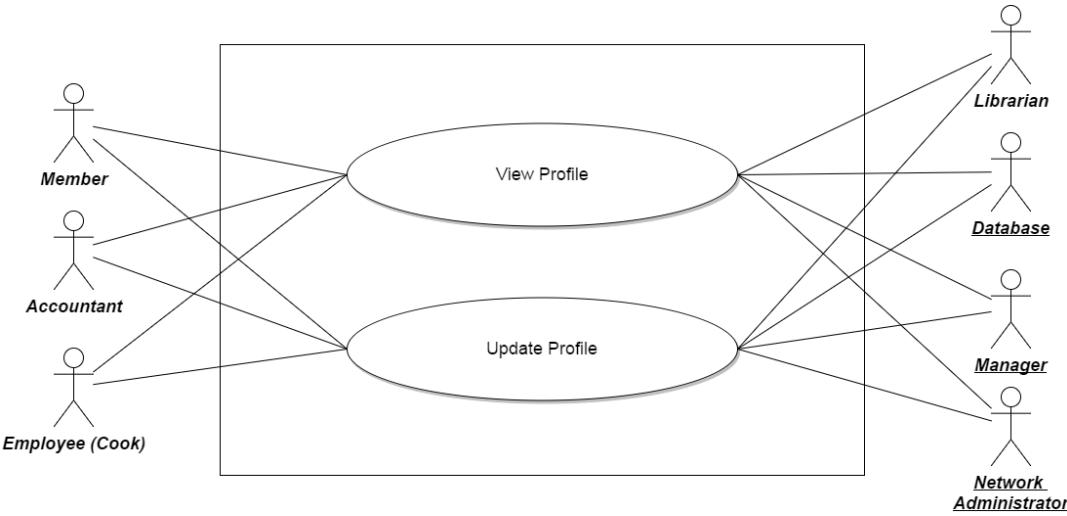


Figure 4.2.3.2: Level-1.2 Use case diagram

- Use case name: Account Management System
- Use Case Level: 1.2
- Primary Actors: Database, Manager, Network Administrator
- Secondary Actors: Librarian, Accountant, Employee(Cook), Member

Description: The members of the club will be allowed to update their own profile and personal information. In case of changing designation or other personal information, the system will allow the member to change the information. The action-reply sequence of the use case is given below:

Action-Reply Sequence:

Member:

Action: Provide update information option
Reply: Display interface for updating information.

Action: Update information
Reply: Display Updated information

Employee(Cook):

Action: Provide update information option
Reply: Display interface for updating information.

Action: Update information
Reply: Display Updated information

Accountant:

Action: Provide update information option
Reply: Display interface for updating information.

Action: Update information
Reply: Display Updated information

Librarian:

Action: Provide update information option
Reply: Display interface for updating information.

Action: Update information
Reply: Display Updated information

Manager:

Action: Provide update information option
Reply: Display interface for updating information.

Action: Update information
Reply: Display Updated information

Network Administrator:

Action: Provide update information option
Reply: Display interface for updating information.

Action: Update information
Reply: Display Updated information

Database:

Action: Generated profile info
Reply: Display profile info

Action: Updated profile info
Reply: Display success message

4.2.3.3 Cafeteria Management System:

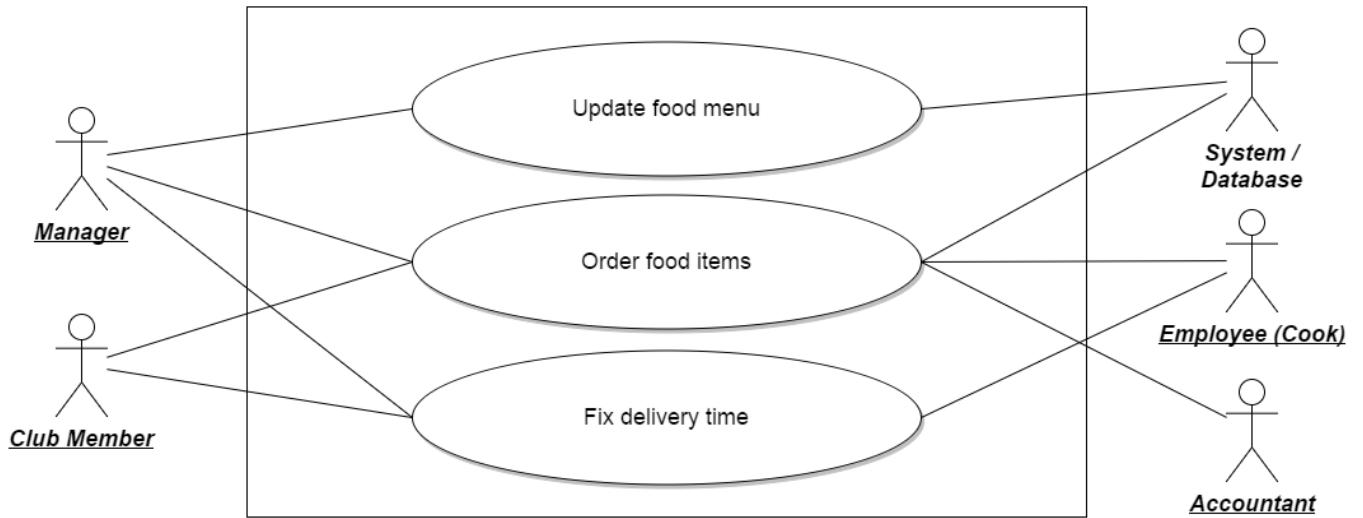


Figure 4.2.3.3: Level-1.3 Use case diagram

- Use case name Cafeteria Management System
- Use Case Level 1.3
- Primary Actors: Manager, Accountant, Employee(Cook), Club Member
- Secondary Actors: System

Description:

The Cafeteria Management System provides the updating of available of food Items, ordering of food and saving monthly spent money in their profile. Everyday a list of available foods for the day will be updated by manager. Club Member can order food. The Cook selects approximate time for food delivery. The cost of the food items are enqueued in member's account along with date. The roles for the actors of the system are given below:

Action-Reply Sequence:

Manager:

For updating food menu

Action: provide updated food menu

Reply: food menu updated

Club Member:

For ordering food

Action: choose food item with quantity

Reply: get food delivery time

Cook:

For sending delivery time

Action: see order information and choose delivery time

Reply: delivery time sent

Accountant:

For sending monthly cost to RB

Action: verify orders of member and send

Reply: get notified of amount sent

System/Database:

For updating food menu

Action: update food menu information

Reply: get notification of successful update

For ordering food

Action: record order information

Reply: notify about successful recording

4.2.3.4 Transaction Management System:

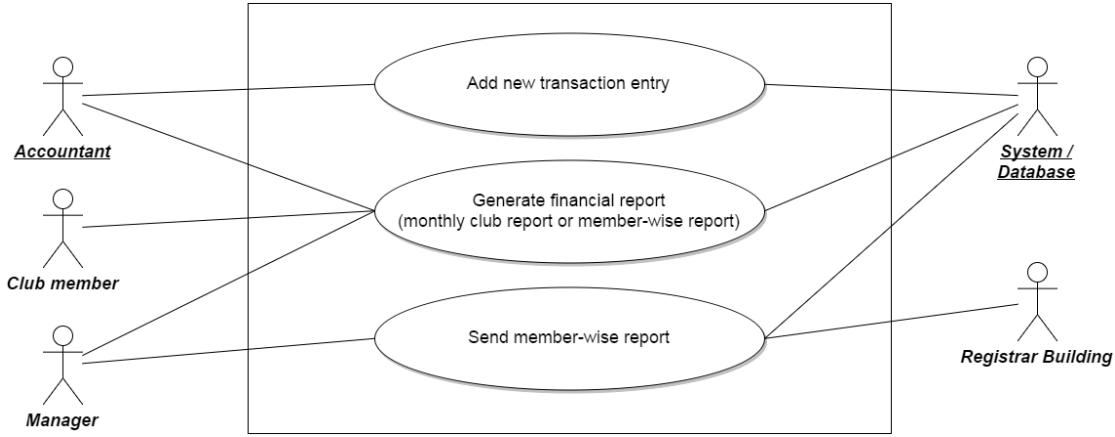


Figure 4.2.3.4: Level-1.4 Use case diagram

- Primary Actors: Accountant, Database
- Secondary Actors: Manager, Club Member, Registrar Building
- This diagram is level 1.4 of the use case model
- This level is derived from level 1

Description:

This level represents the Transaction Management subsystem. The action-reply sequence of the use case is given below:

Action-Reply Sequence:

Manager:

Action: Receive list of expense made by general members
Reply: Send notification

Action: Ask for financial reports
Reply: Generate a report and display to the manager

Accountant:

Action: Add transaction cost to each user
Reply: Add and notify

Action: Ask for financial reports
Reply: Generate a report and display to the accountant

Club Member:

Action: View member-wise report
Reply: Display the member's report

System/Database:

Action: provide or store data

Reply: receive notification

RB:

Action: receive transaction information

Reply: get notification

4.2.3.5 Hall Reservation System:

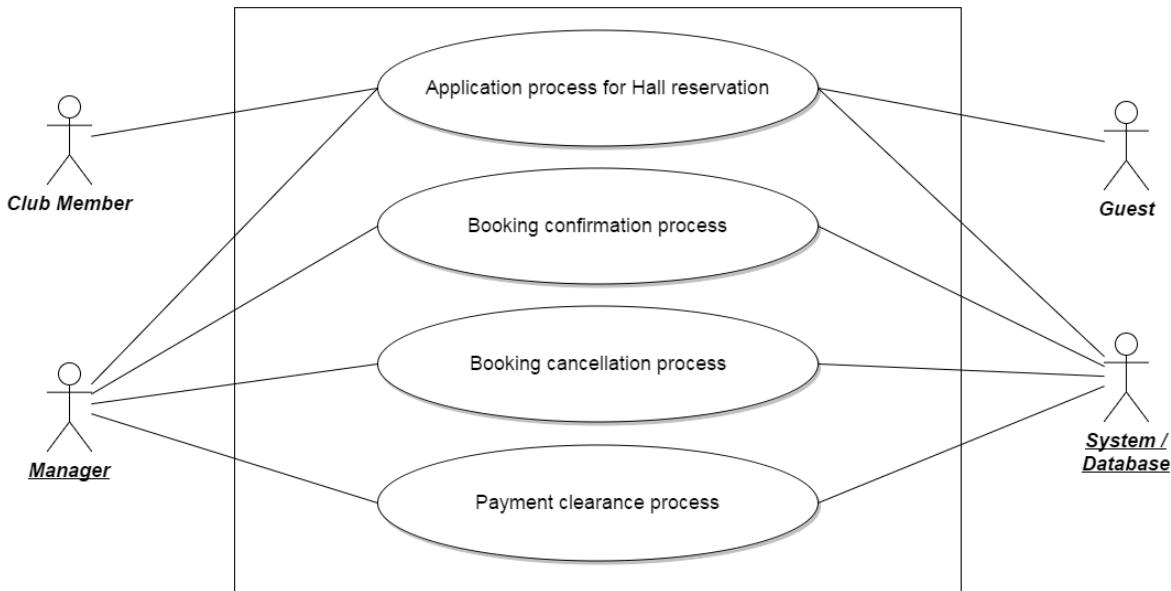


Figure 4.2.3.5: Level-1.5 Use case diagram

- Use case name: Hall Reservation System
- Use Case Level: 1.5
- Primary Actors: Database, Manager
- Secondary Actors: Club Member, Guest

Description:

The hall reservation system is divided into the following subsystems: Application process for Hall reservation, booking confirmation process, booking cancellation process, payment clearance process each representing a facility required to reserve the club's hall.

To hire the hall room or frontal space, one needs to select the booking date. After selection, he/she will fill the application form where he/she will give necessary information. After he/she fills the application form, the club manager will be notified. Manager will forward the application to the member for validation who has been referenced. After the approval from the member, the manager will notify the applicant to pay caution money. The applicant will collect the payment slip from the manager and complete the payment procedure. Then manager will book the hall room for the applicant on that requested date and give her/him a booking-confirmation paper.

The applicant may cancel the reservation of the room up to the requested date. In this case, he/she needs to apply for cancellation. Then manager will return him/her a certain amount. The action-reply sequence of the use case is given below:

Action-Reply Sequence:

Club Member:

Action: Approve/Validate the booking application
Reply: Change/Update the application status

Guest:

Action: Apply to reserve the hall room
Reply: Send notification to manager and member who has been referred

Manager:

Action: Notify member who has been referred
Reply: Send message to the applicant

Action: Cancel booking or reservation
Reply: Update the booking status and unmark the date from being reserved

System/Database:

Action: provide or store data
Reply: receive notification

4.2.3.6 Virtual Helpline Management:

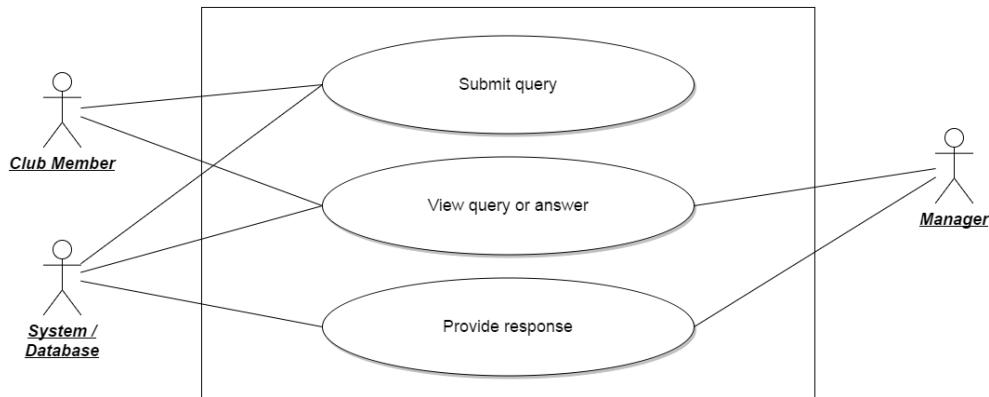


Figure 4.2.3.6: Level-1.6 Use case diagram

- Primary Actors: Club Member, Manager, Database
- This diagram is level 1.6 of the use case model
- This level is derived from level 1

Description:

This level represents the Virtual Helpline Management subsystem. The system is divided into the subsystems required for this system to function properly. Members will be able to submit complaints and/or ask questions regarding the services of the club. For this, the user would have to enter his/her complaint/question into the system. Afterwards, the manager will read the complaint/question and reply with a response to the question/complaint. The action-reply sequence of the use case is given below:

Action-Reply Sequence:

Club Member:

Action: Choose view query
Reply: Display query with response (if response provided)

Action: Choose submit query
Reply: Display text field for entry

Manager:

Action: Choose query to response
Reply: Display text field for response

System/Database:

Action: provide or store data
Reply: receive notification

4.2.3.7 Library Stack Management System:

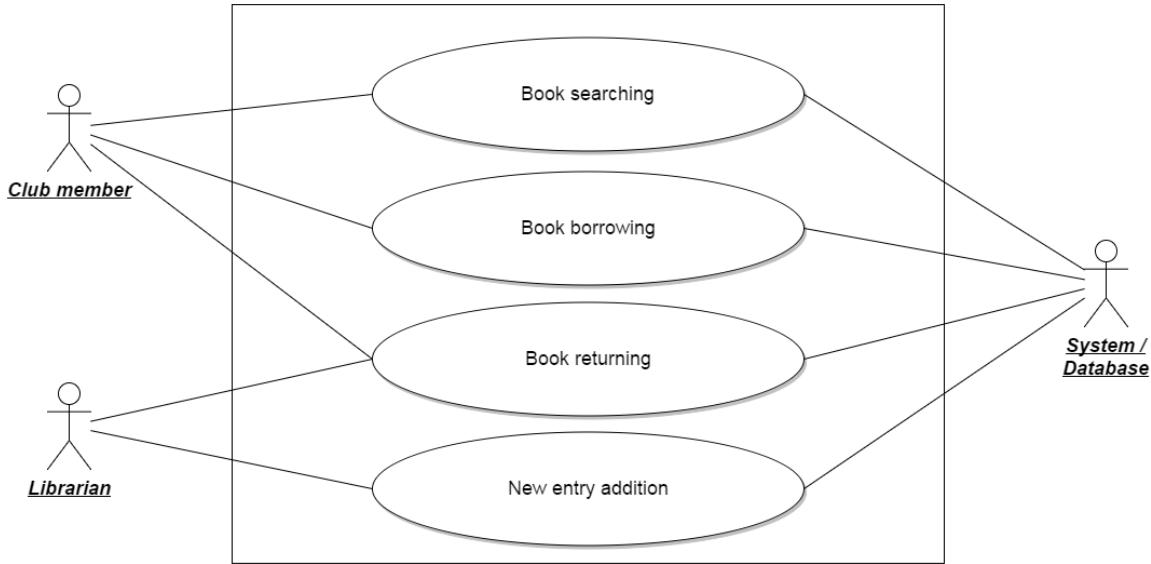


Figure 4.2.3.7: Level-1.7 Use case diagram

- Use case name Library Stack Management
- Use Case Level 1.7
- Primary Actors: Club Member, Librarian, System

Description:

The library stack management system provides the searching, borrowing and returning of books efficiently and reliably. While the club members will be able to search, borrow and return books, the librarian will be able to add a new entry into the system as well. The system will provide decisions based on the inputs provided by the user (i.e. Club member, Librarian). The roles for the actors of the system are given below:

Action-Reply Sequence:

Club Member:

For searching a book,

Action: Provide search category

Reply: Display interface for entering query

Action: Enter query

Reply: Display list of entries as search result

Action: Select desired entry

Reply: Display details of the entry

For borrowing a book,

Action: Provide borrowing details

Reply: Report unavailability of book and ask if a different will be requested if book unavailable. Otherwise, add borrowing details to member cart.

For returning a book,

Action: Provide borrowing ID

Reply: Request completion of payment (if any)

Librarian:

When a member returns a book,

Action: Collects payment from member (if any) and informs the system about the money received

Reply: Reports if payment is sufficient

For adding an entry,

Action: Provides necessary details about new entry

Reply: Generates location of new book

Action: Provides confirmation about the given and generated details

Reply: Adds new entry to database

System/Database:

Action: provide or store data

Reply: receive notification

4.2.3.8 E-Library Facilities:

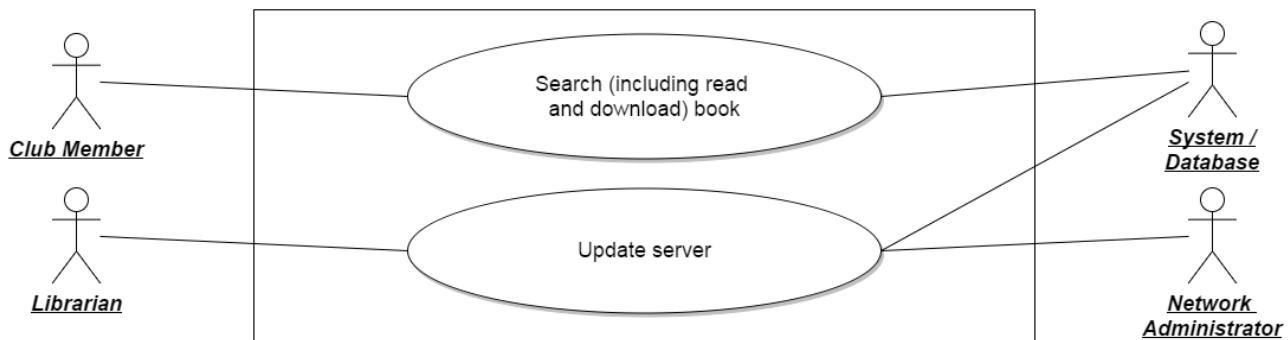


Figure 4.2.3.8: Level-1.8 Use case diagram

- **Primary Actors:** Club Member, Librarian, Network Administrator, Database
- This Diagram is Level 1.8 of the Use-Case Model
- It is derived from Level 1

Description:

This level is for E-library facilities which include the subsystems: search for book and update server. The roles for the actors of the system are given below:

Action-Reply Sequence:

Club Member:

For searching a book,

Action: Provide search category

Reply: Display interface for entering query

Action: Enter query

Reply: Display list of entries as search result

Action: Select desired entry

Reply: Display details of the entry

Librarian:

For updating server,

Action: Request for update

Reply: Notification sends to network manager.

Network Administrator:

For updating server,

Action: Update server

Reply: Display updated information

System/Database:

Action: provide or store data

Reply: receive notification

4.3 Activity Diagram

4.3.1 Authentication System:

4.3.1.1 Collecting Information System:

Refers Use Case figure 4.2.3.1:

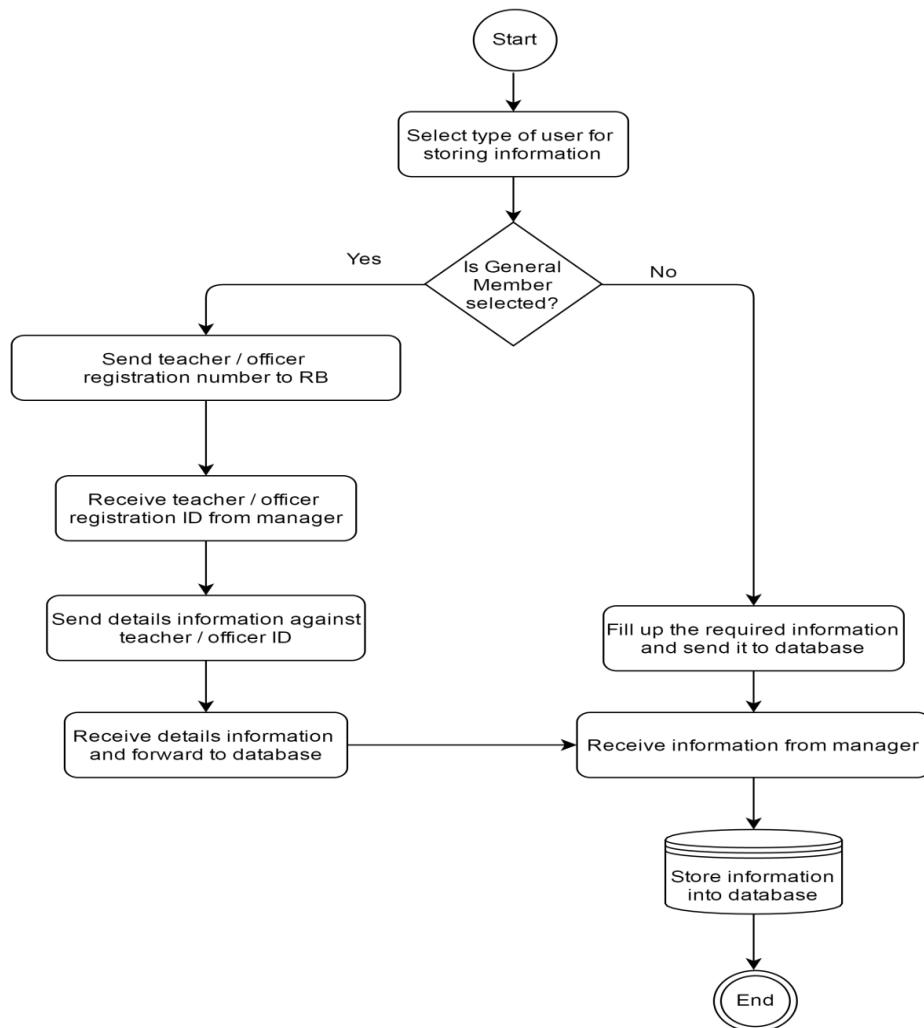


Figure 4.3.1.1: Activity diagram for Collecting Information System in Authentication System

4.3.1.2 Registration System:

Refers Use Case figure 4.2.3.1:

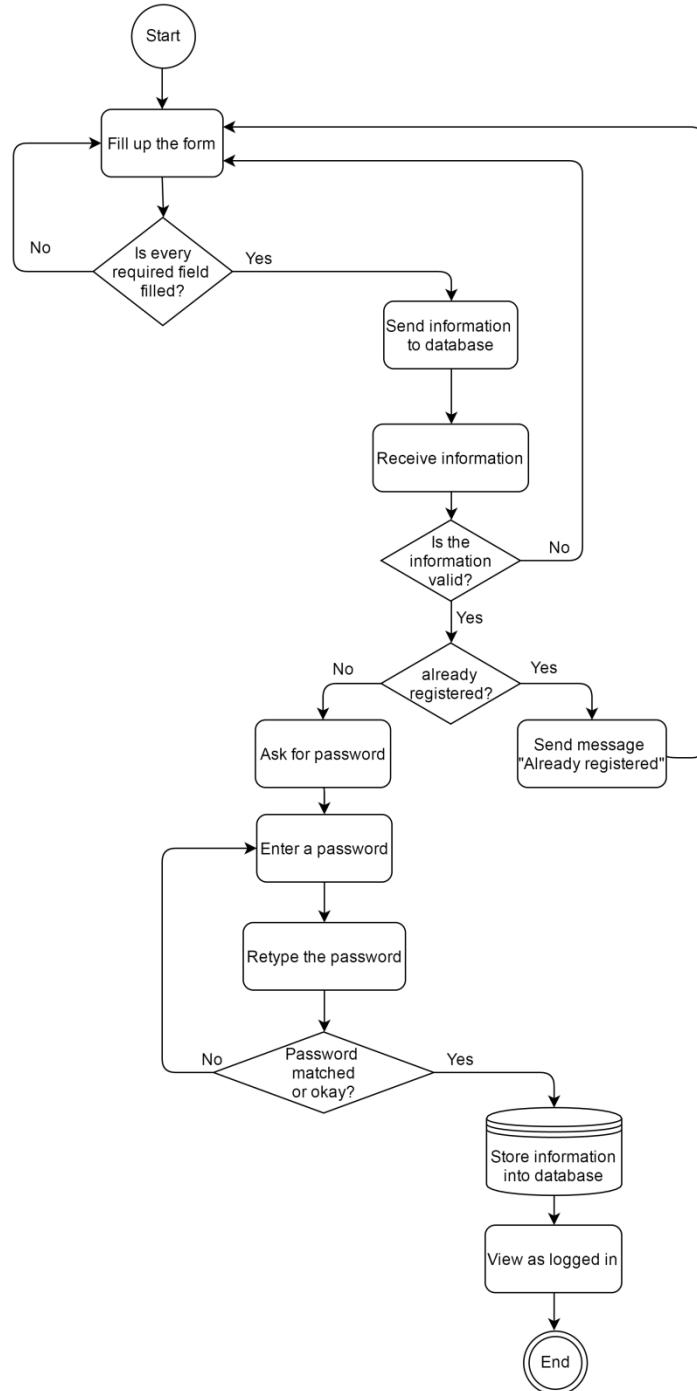


Figure 4.3.1.2: Activity diagram for Registration System in Authentication System

4.3.1.3 Login System:

Refers Use Case figure 4.2.3.1:

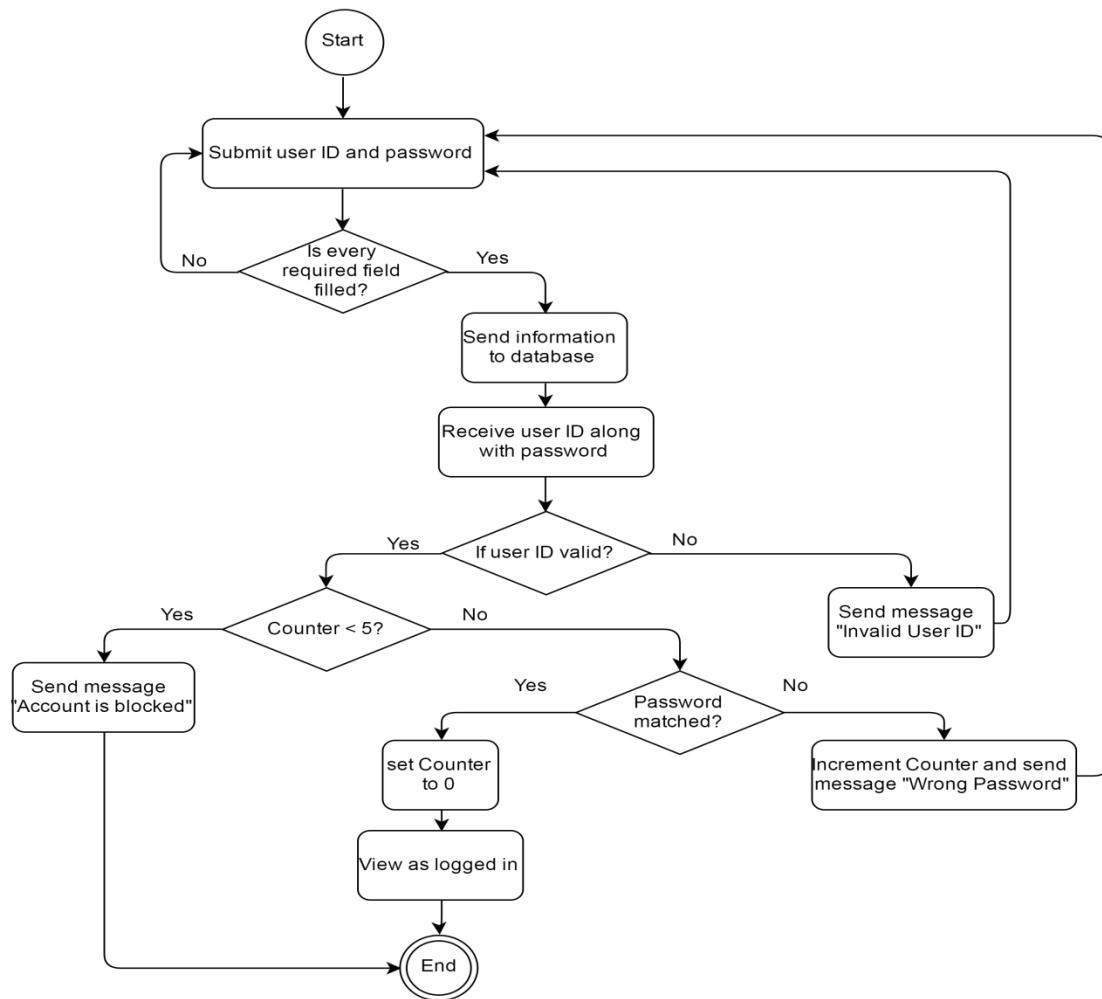
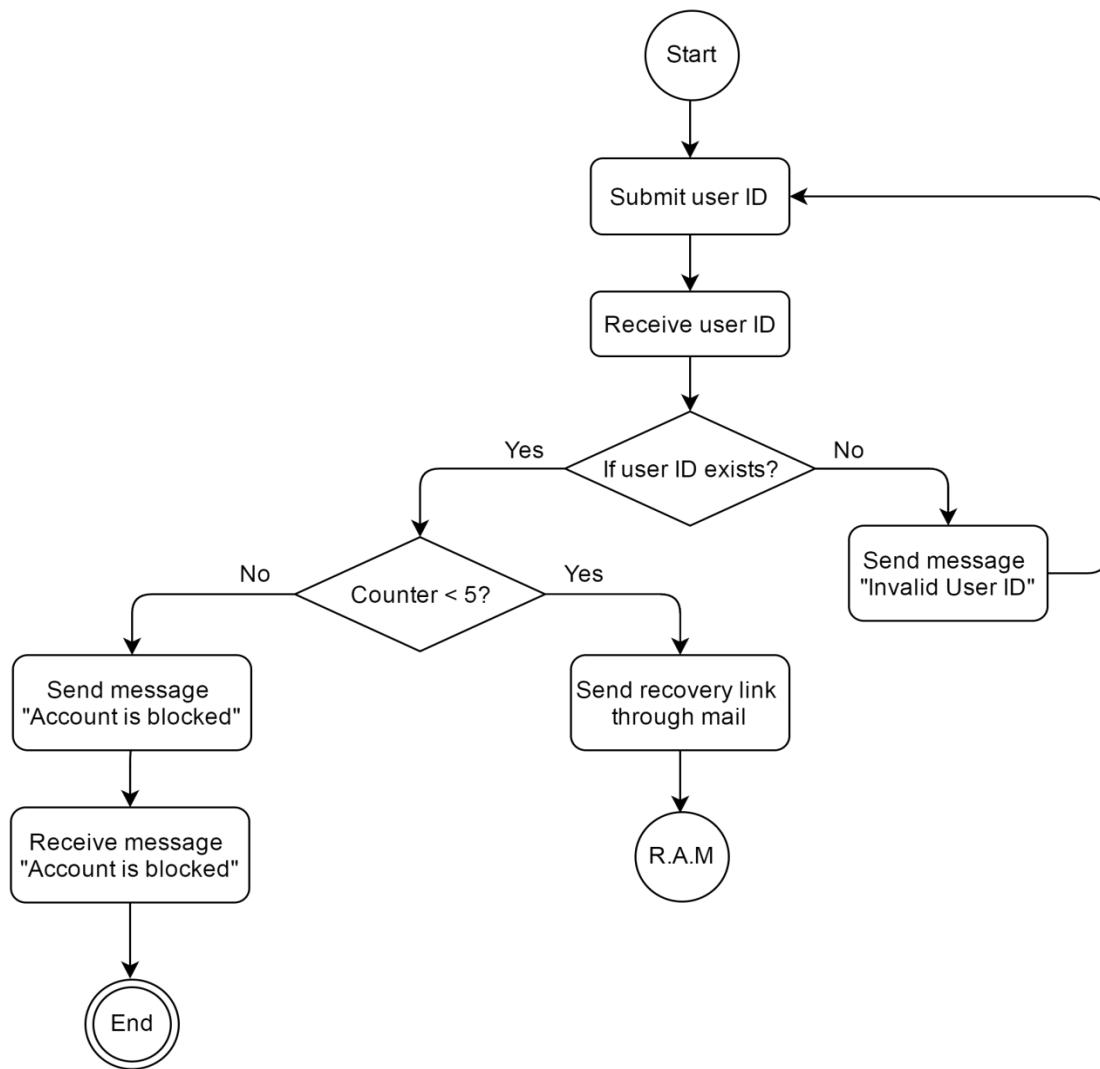


Figure 4.3.1.3: Activity diagram for Login System in Authentication System

4.3.1.4 Recovering Password System:

Refers Use Case figure 4.2.3.1:



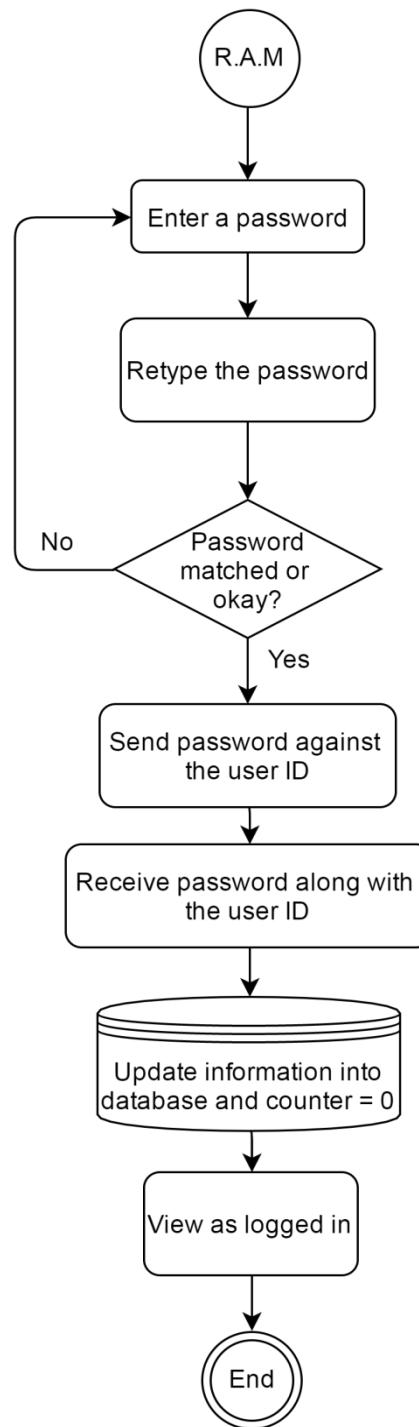


Figure 4.3.1.4: Activity diagram for Recovering Password System in Authentication System

4.3.2 Account Management System:

Refers Use Case figure 4.2.3.2:

The activities of account management system are divided into the following processes:

4.3.2.1 Update Profile:

Refers Use Case figure 4.2.3.2:

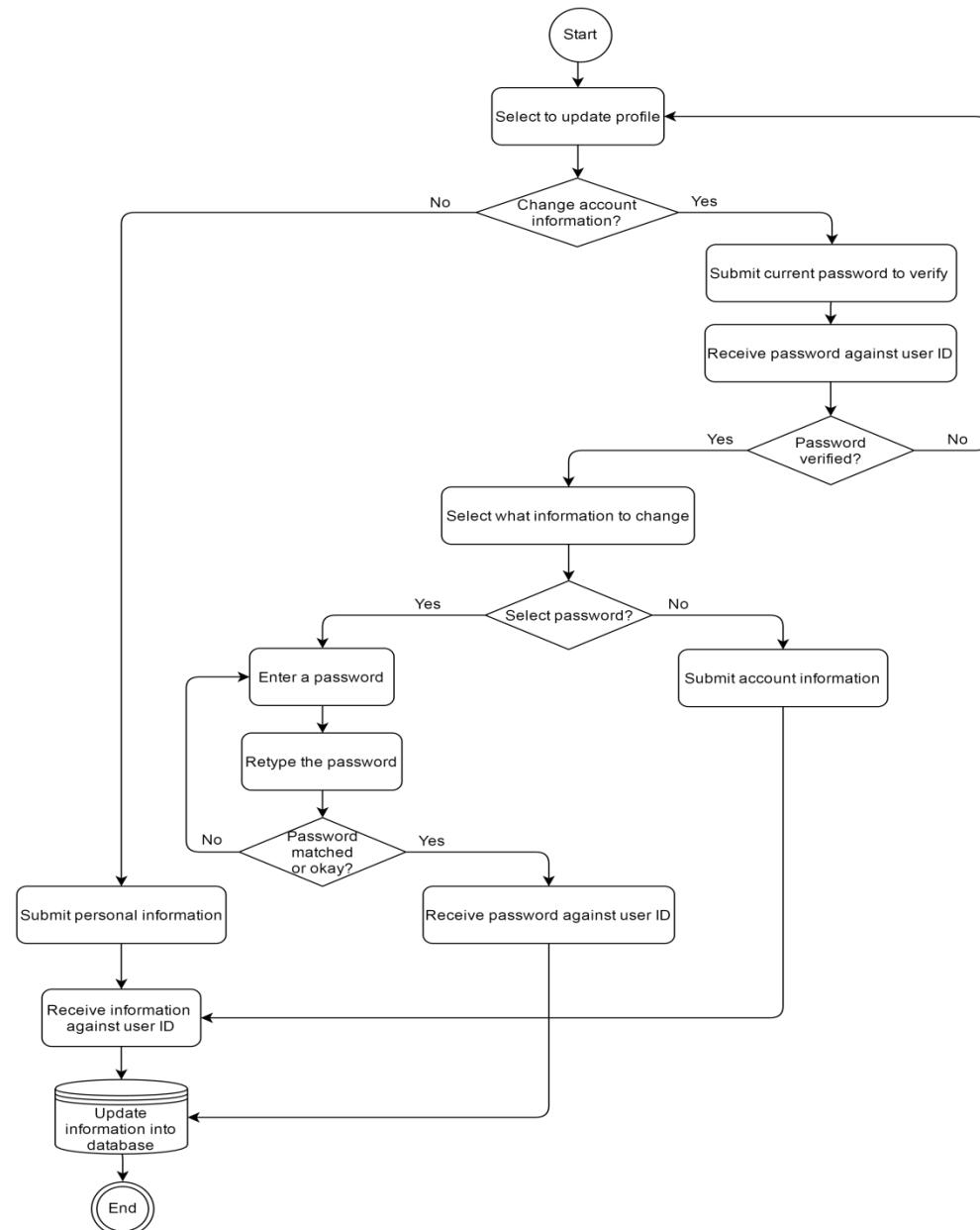


Figure 4.3.2.1: Activity diagram for Updating Profile in Account Management System

4.3.3 Cafeteria Management System:

Refers Use Case figure 4.2.3.3:

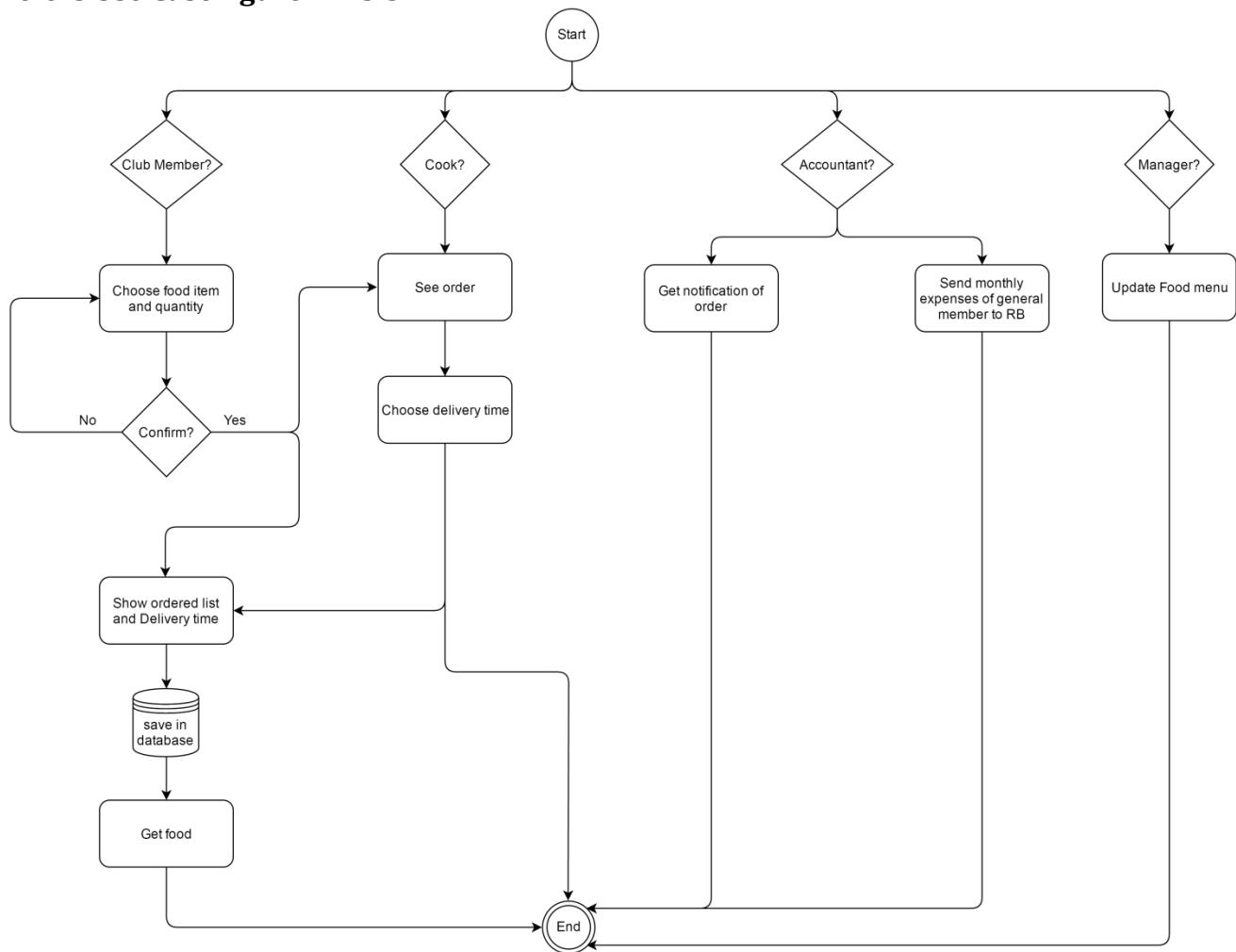


Figure 4.3.3.A: Activity diagram for Cafeteria Management System

4.3.4 Transaction Management System:

Refers Use Case figure 4.2.3.4:

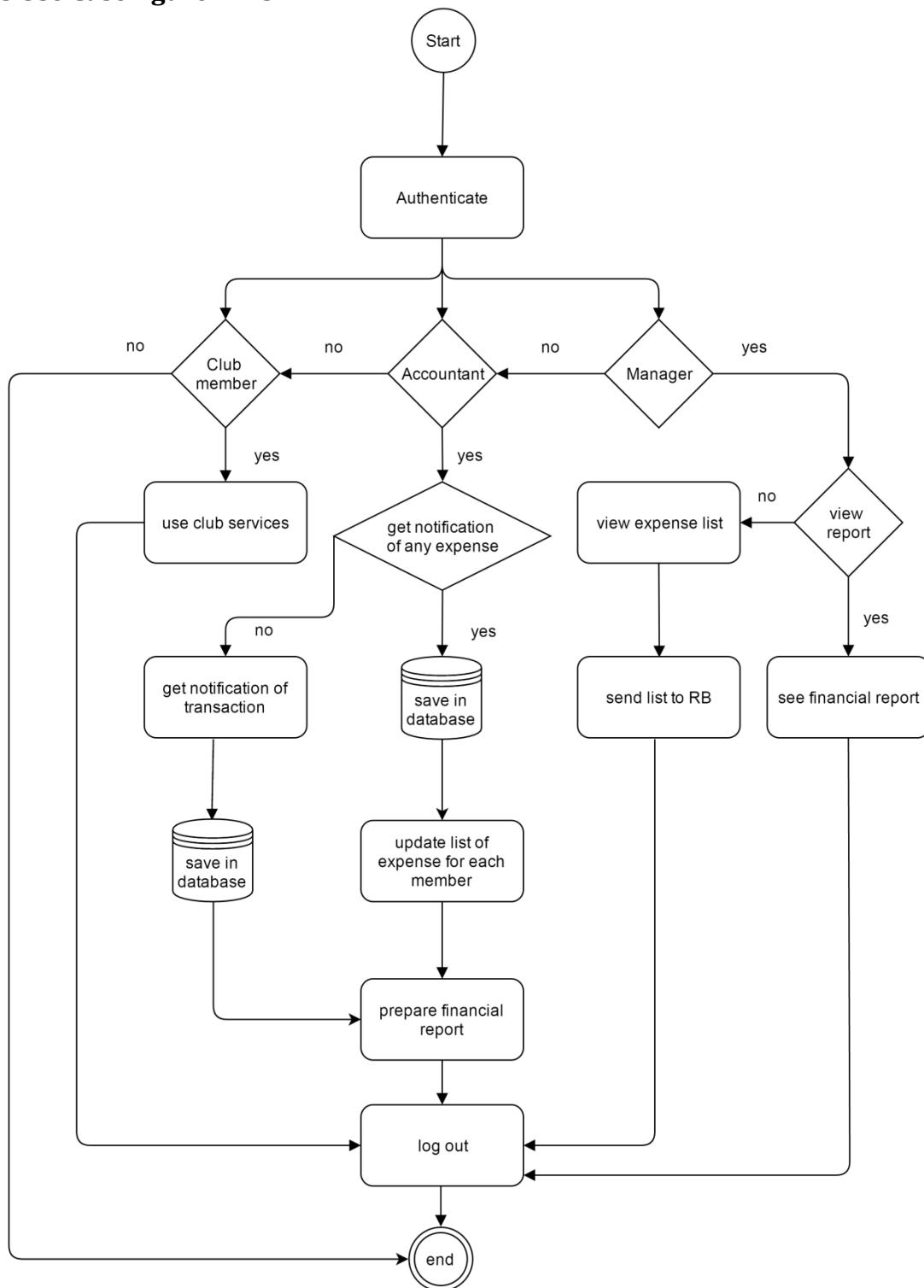


Figure 4.3.4.A: Activity diagram for Transaction Management System

4.3.5 Hall Reservation System:

Refers Use Case figure 4.2.3.5:

The activities of hall reservation system are divided into the following processes:

4.3.5.2 Application Process:

Refers Use Case figure 4.2.3.5:

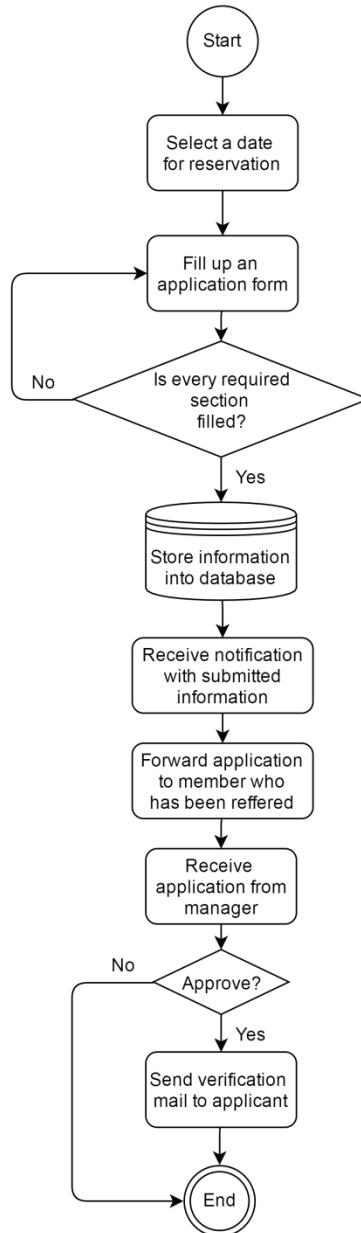


Figure 4.3.5.1: Activity diagram for Application Process in Hall Reservation System

4.3.5.3 Confirmation Process:

Refers Use Case figure 4.2.3.5:

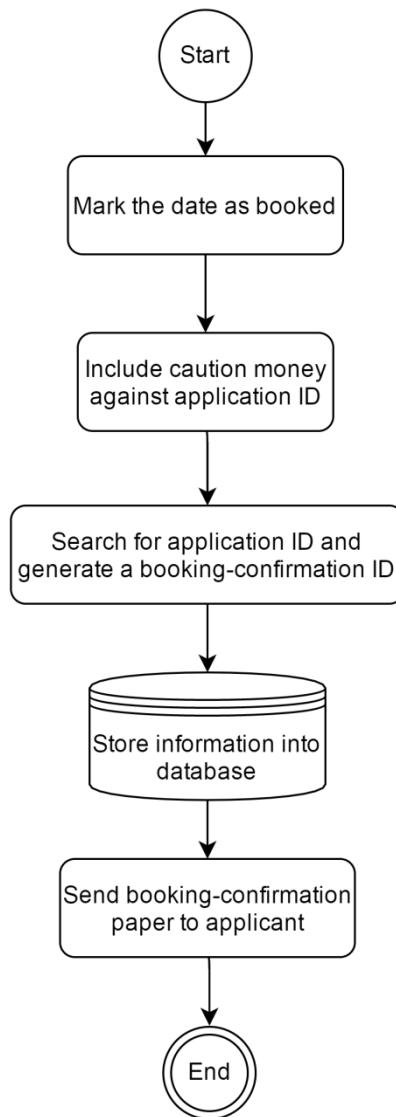


Figure 4.3.5.2: Activity diagram for Confirmation Process in Hall Reservation System

4.3.5.4 Cancellation Process:

Refers Use Case figure 4.2.3.5:

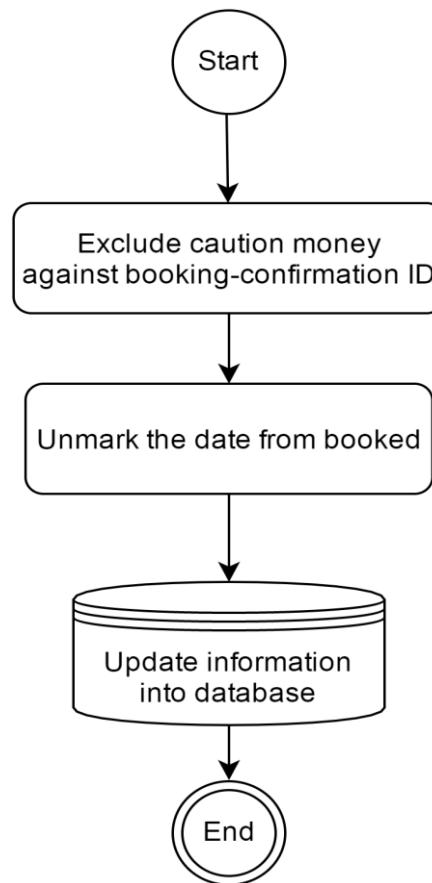


Figure 4.3.5.3: Activity diagram for Cancellation Process in Hall Reservation System

4.3.5.5 Payment Clearance Process:

Refers Use Case figure 4.2.3.5:

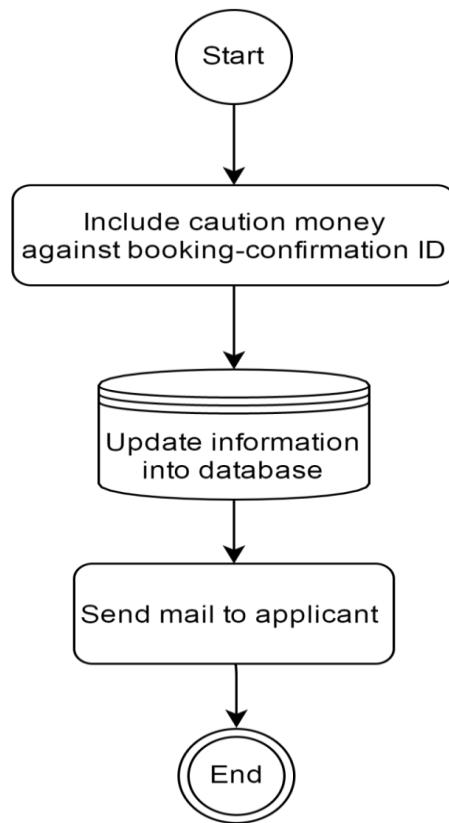


Figure 4.3.5.4: Activity diagram for Payment Clearance Process in Hall Reservation System

4.3.6 Virtual Helpline Management:

Refers Use Case figure 4.2.3.6:

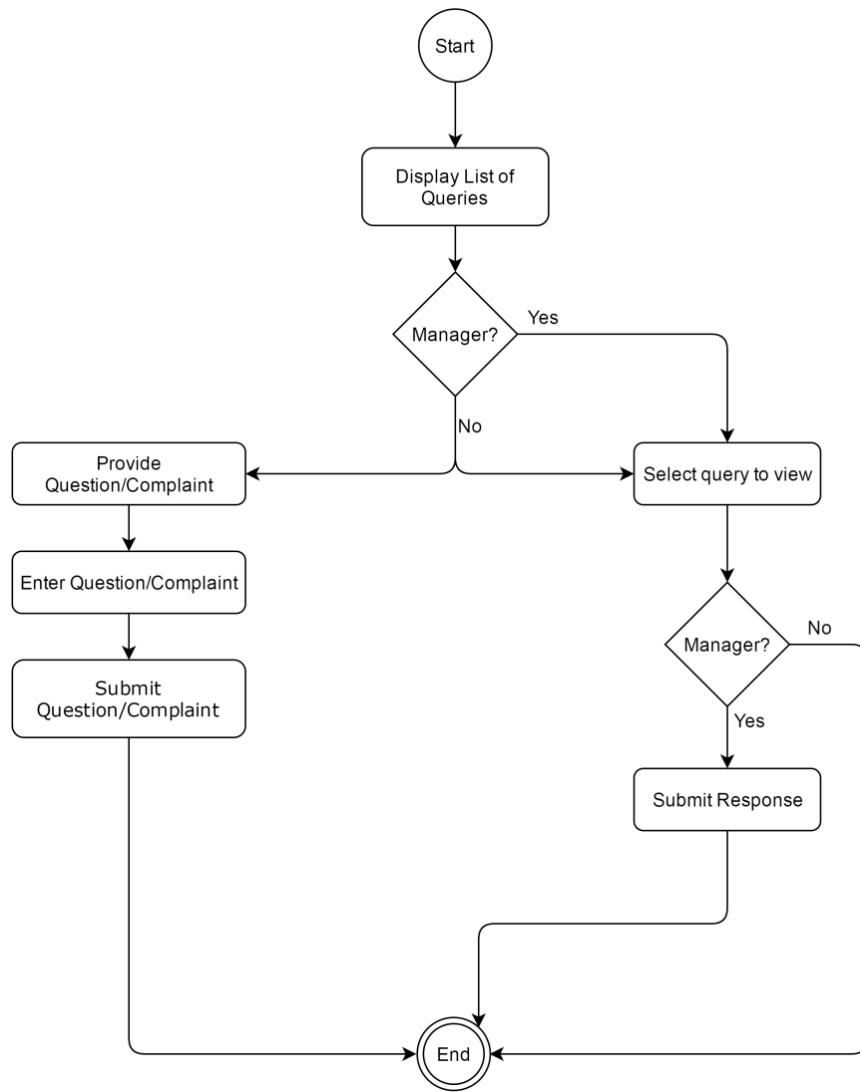


Figure 4.3.6.A: Activity diagram for Virtual Helpline Management

4.3.7 Library Stack Management System:

Refers Use Case figure 4.2.3.7:

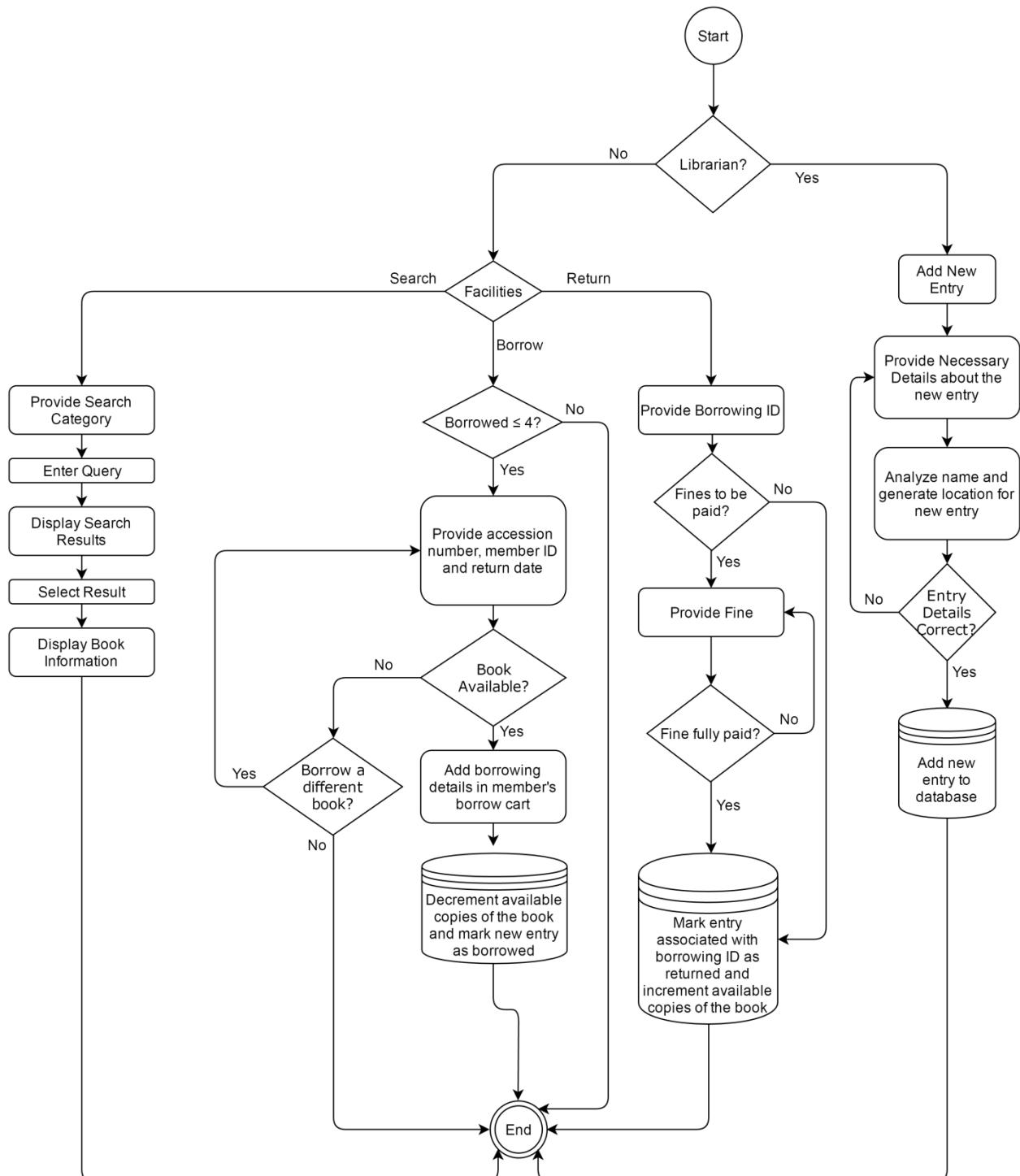


Figure 4.3.7.A: Activity Diagram for Library Stack Management

4.3.8 E-Library Facilities:

Refers Use Case figure 4.2.3.8:

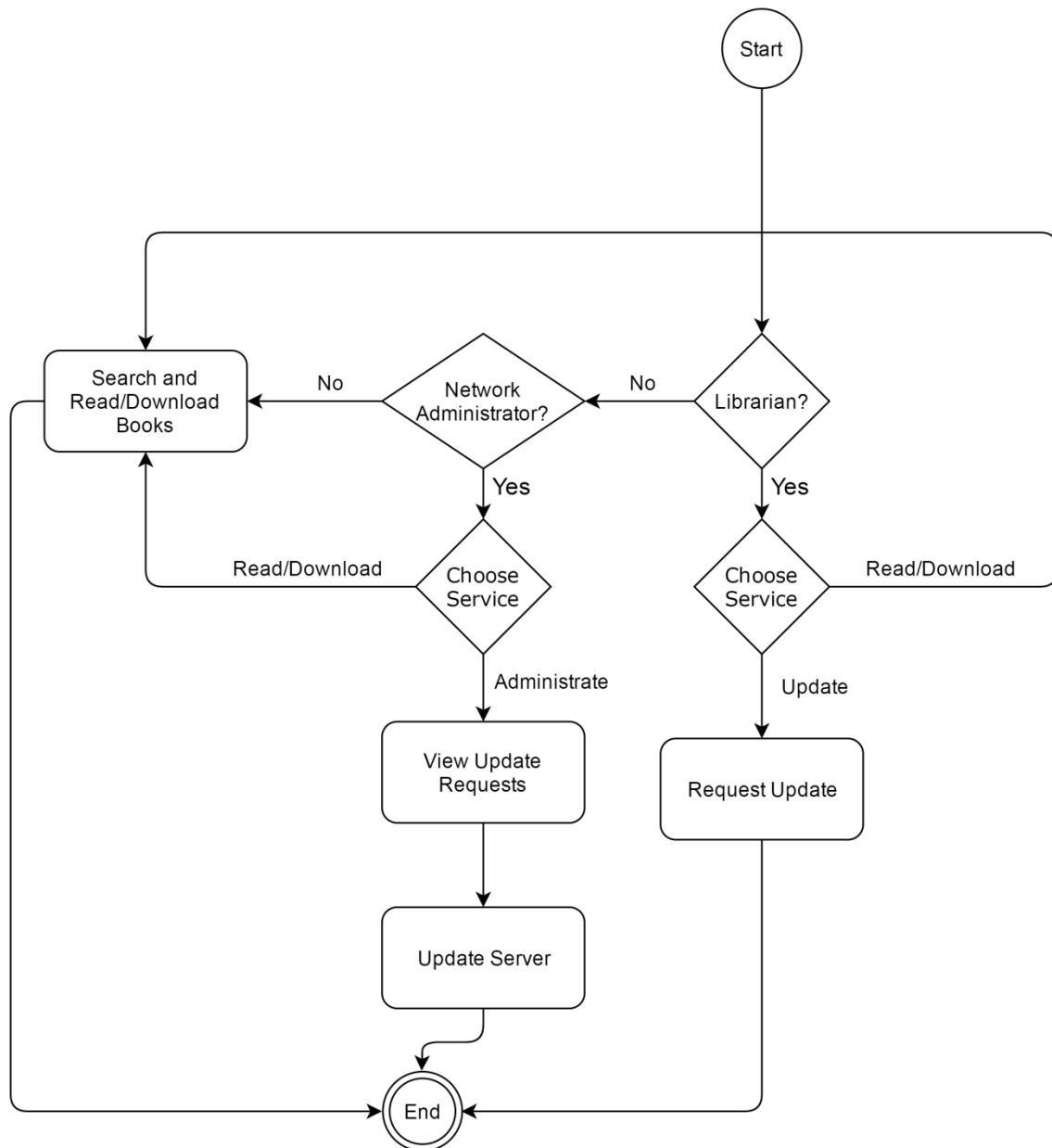


Figure 4.3.8.A: Activity diagram for E-Library Facilities

4.4 Swimlane Diagram

4.4.1 Authentication System:

4.4.1.1 Collecting Information System:

Refers Use Case figure 4.2.3.1:

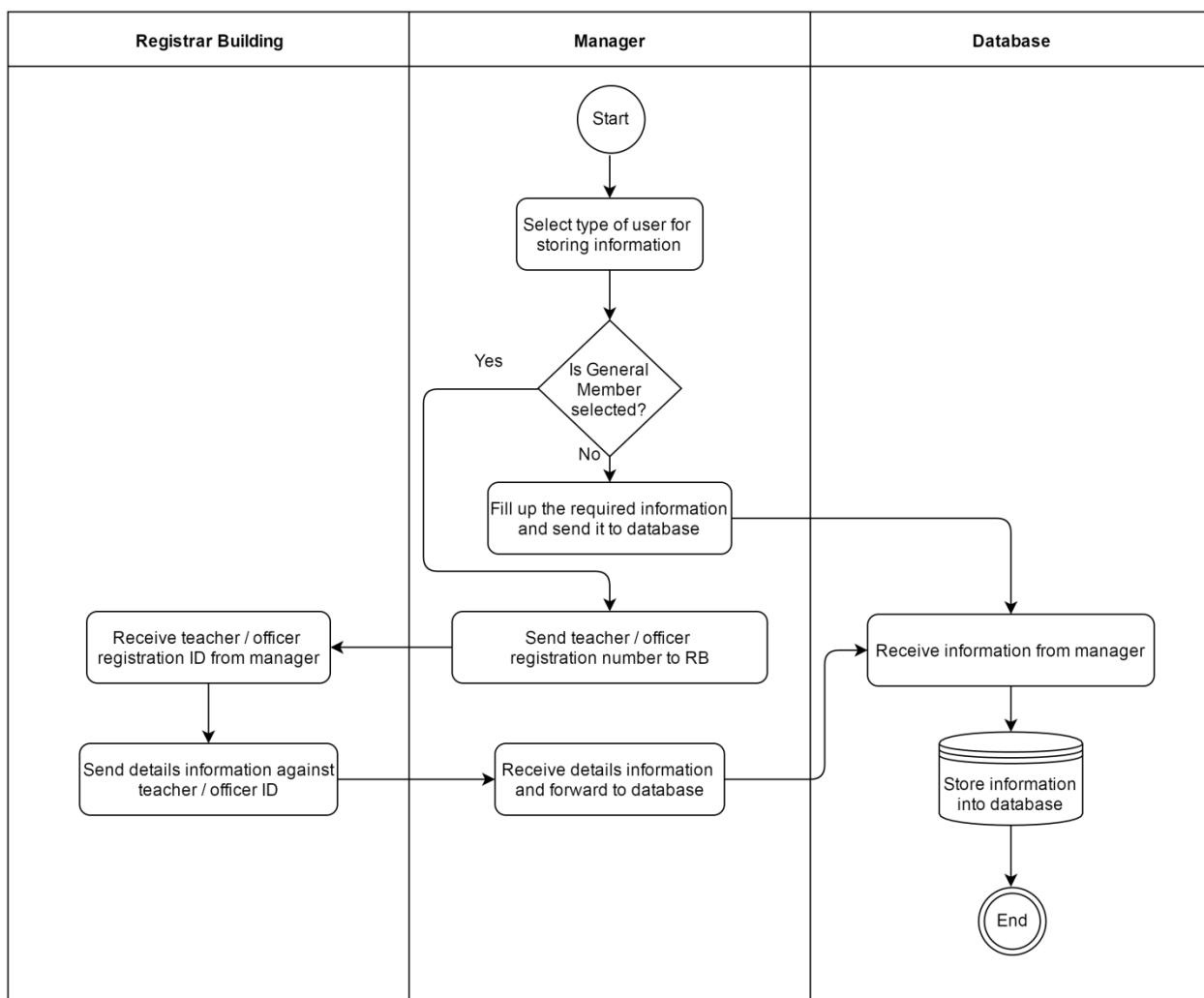


Figure 4.4.1.1: Swimlane diagram for Collecting Information System in Authentication System

4.4.1.2 Registration System:

Refers Use Case figure 4.2.3.1:

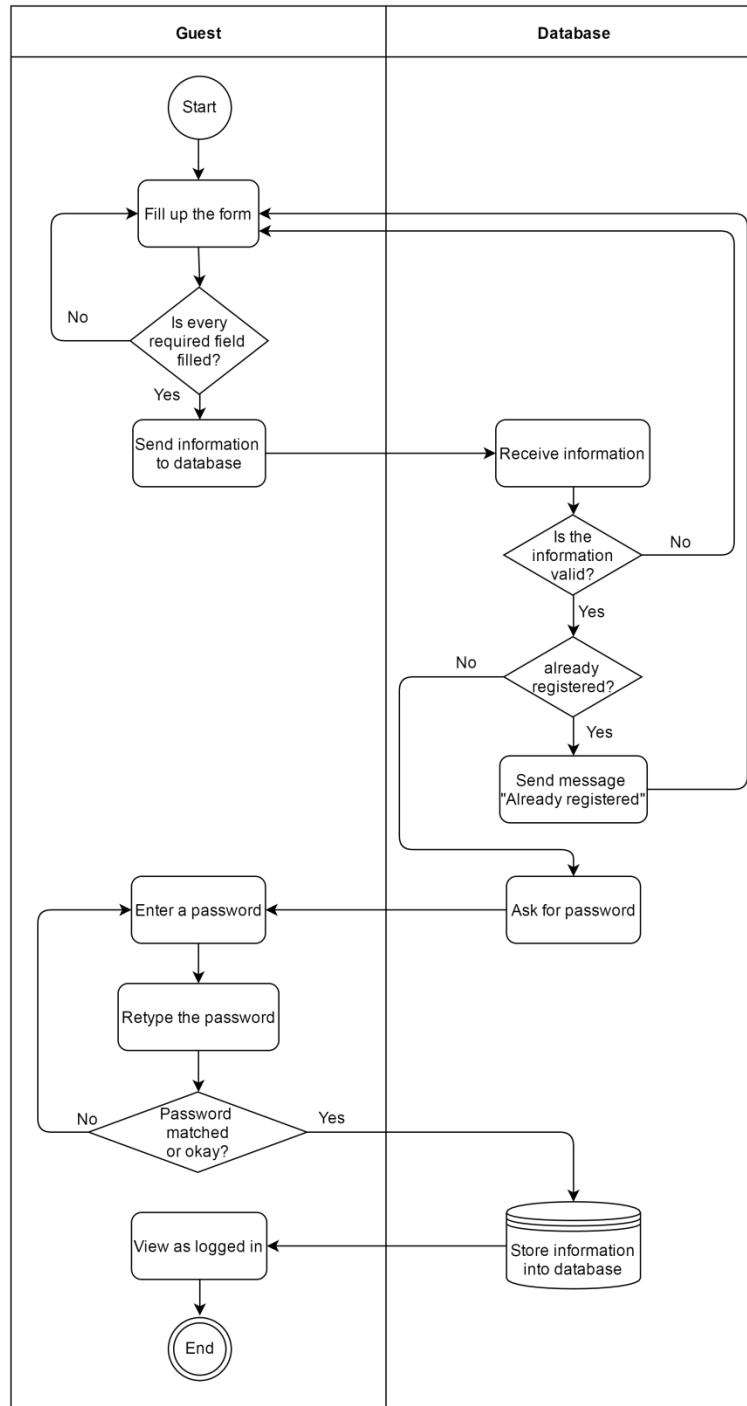


Figure 4.4.1.2: Swimlane diagram for Registration System in Authentication System

4.4.1.3 Login System:

Refers Use Case figure 4.2.3.1:

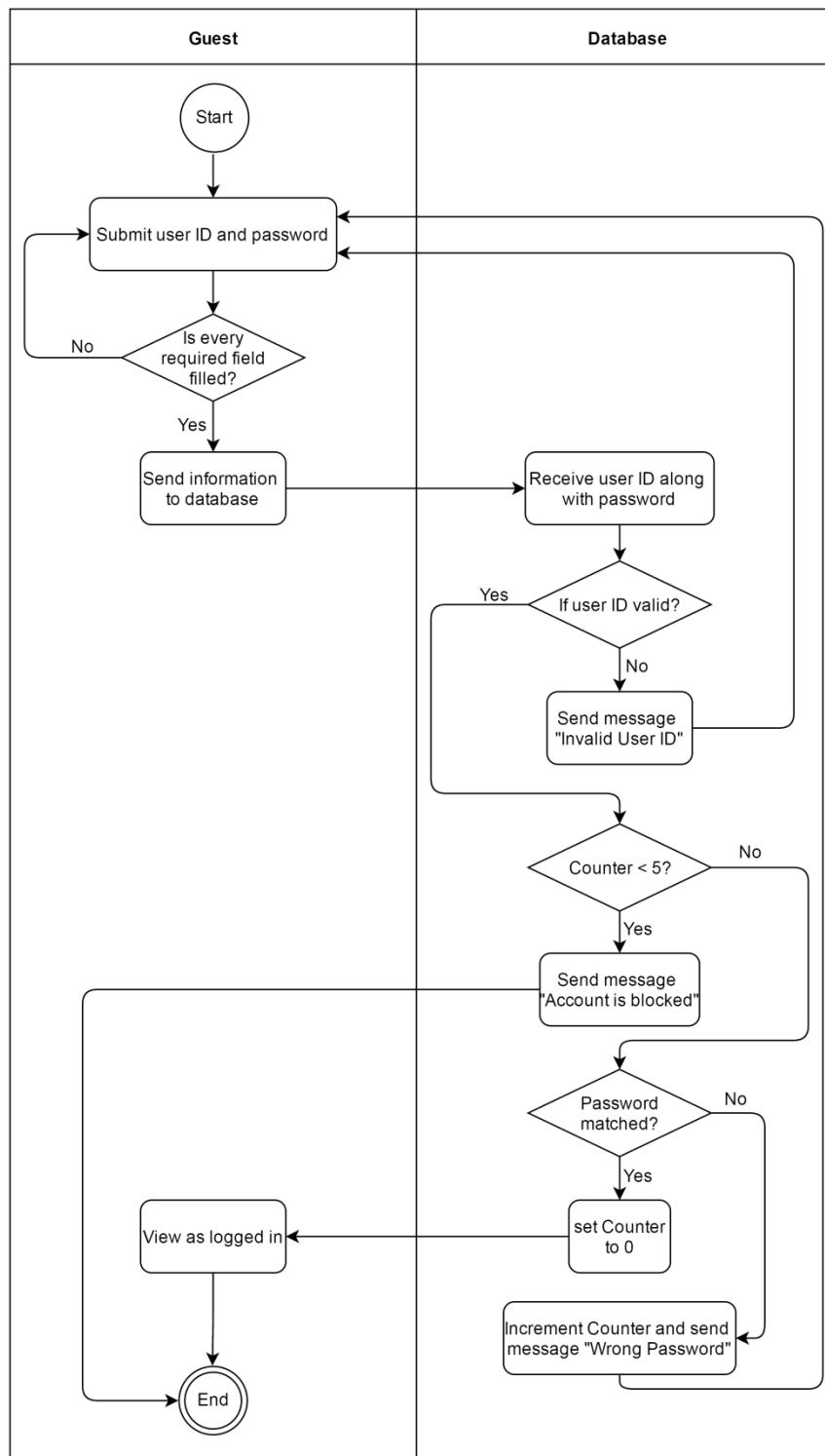
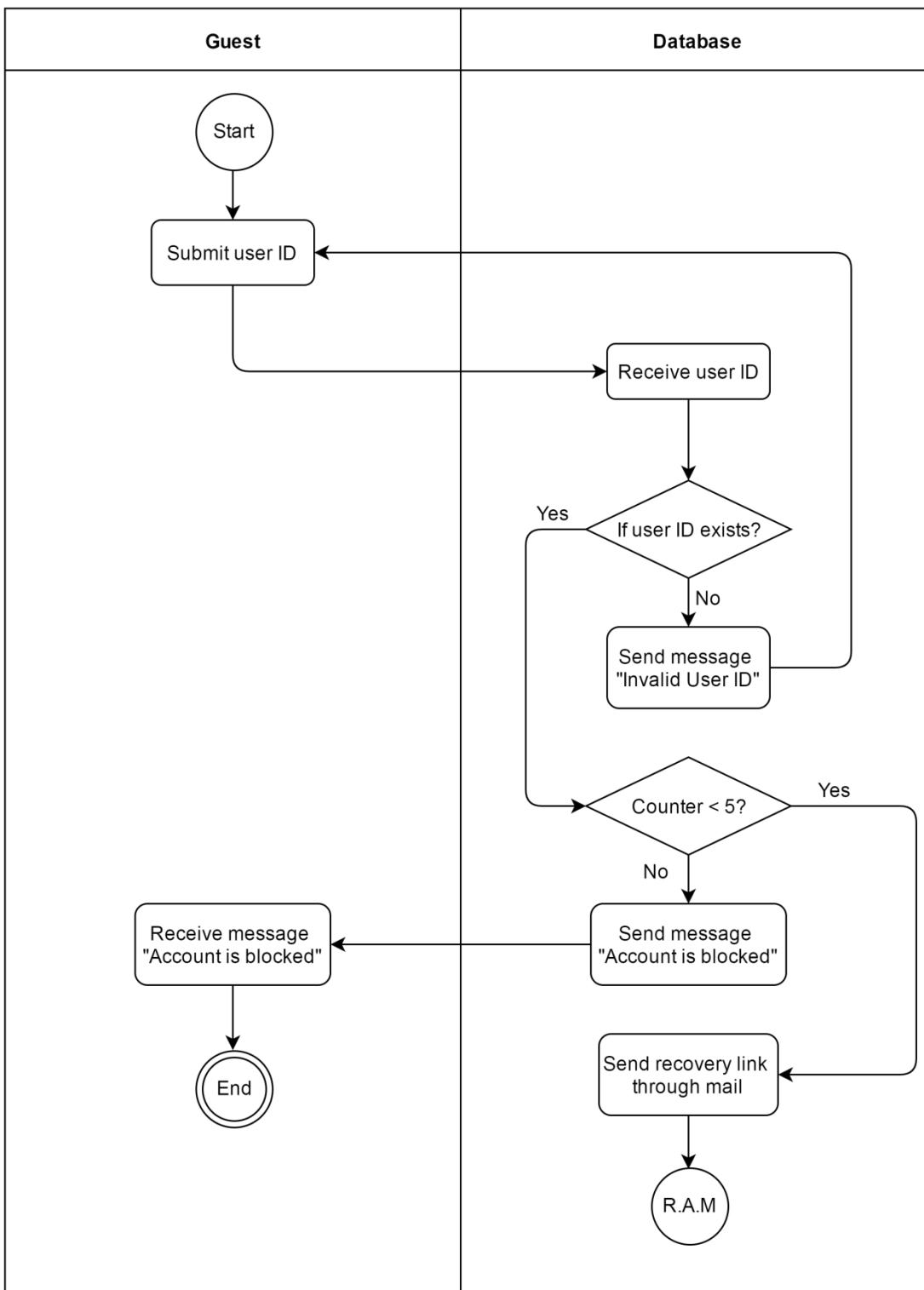


Figure 4.4.1.3: Swimlane diagram for Login System in Authentication System

4.4.1.4 Recovering Password System:

Refers Use Case figure 4.2.3.1:



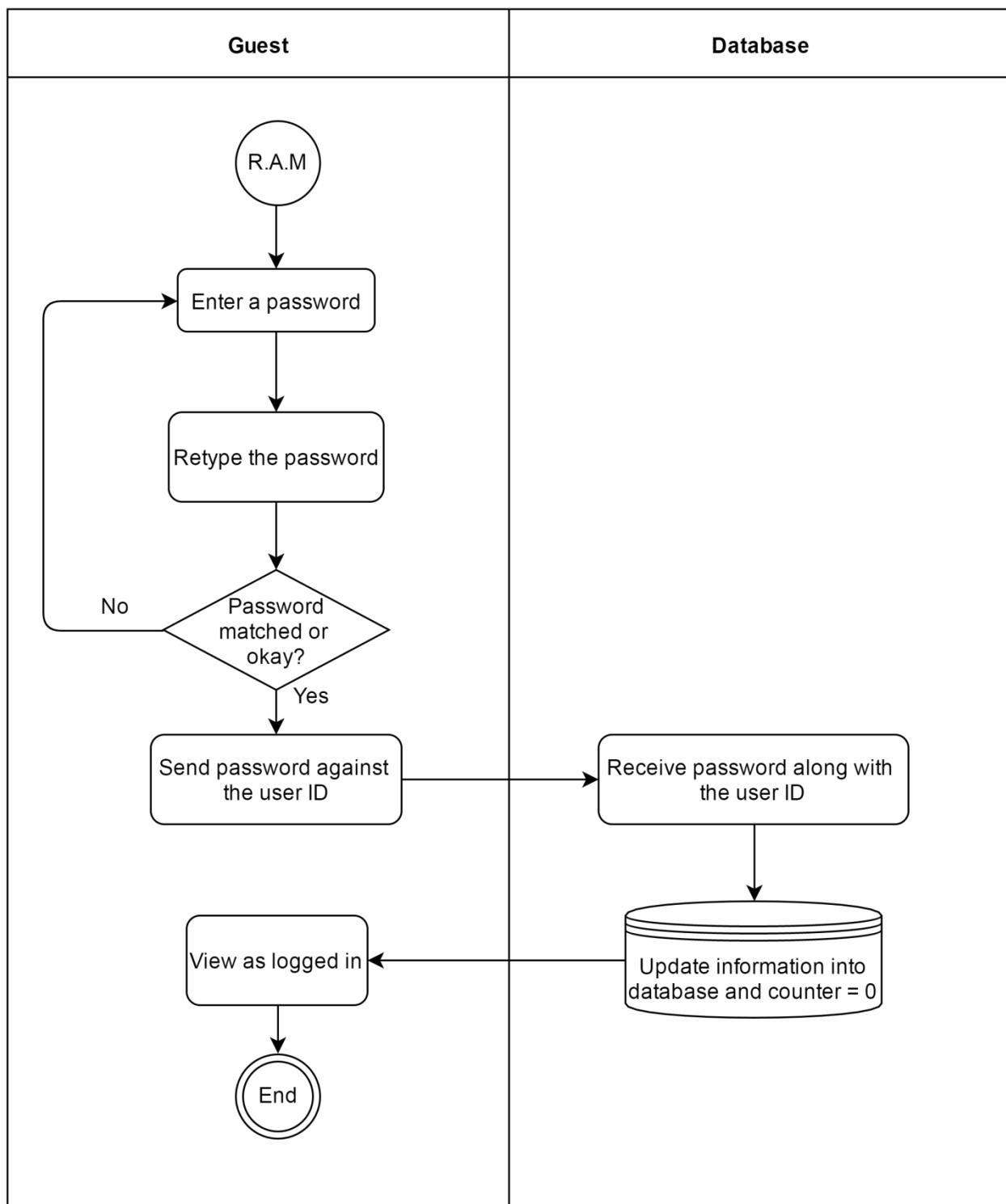


Figure 4.4.1.4: Swimlane diagram for Recovering Password System in Authentication System

4.4.2 Account Management System:

Refers Use Case figure 4.2.3.2:

The swimlane diagram for Account Management System has been divided into the following modules:

4.4.2.1 Update Profile:

Refers Use Case figure 4.2.3.2:

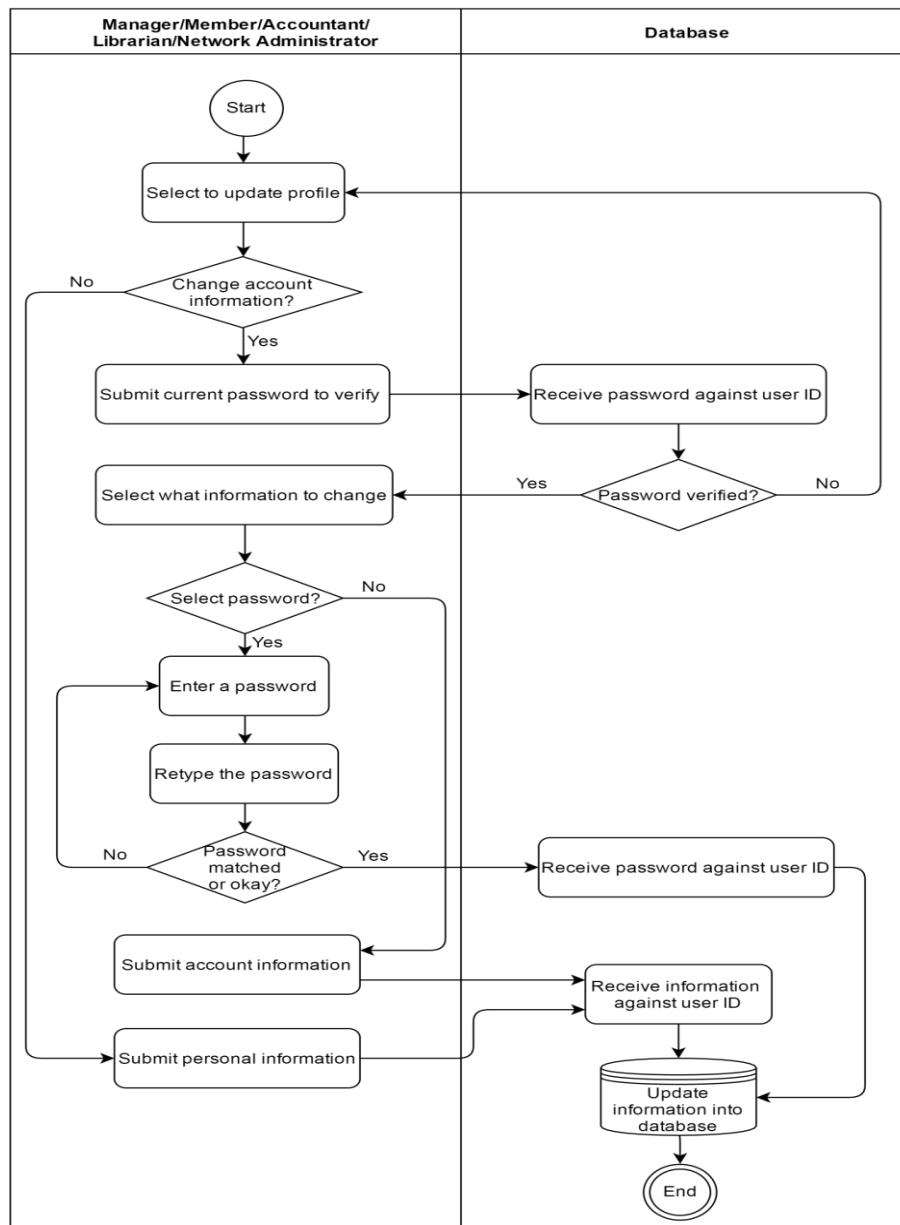


Figure 4.4.2.1: Swimlane diagram for Updating Profile in Account Management System

4.4.3 Cafeteria Management System:

Refers Use Case figure 4.2.3.3:

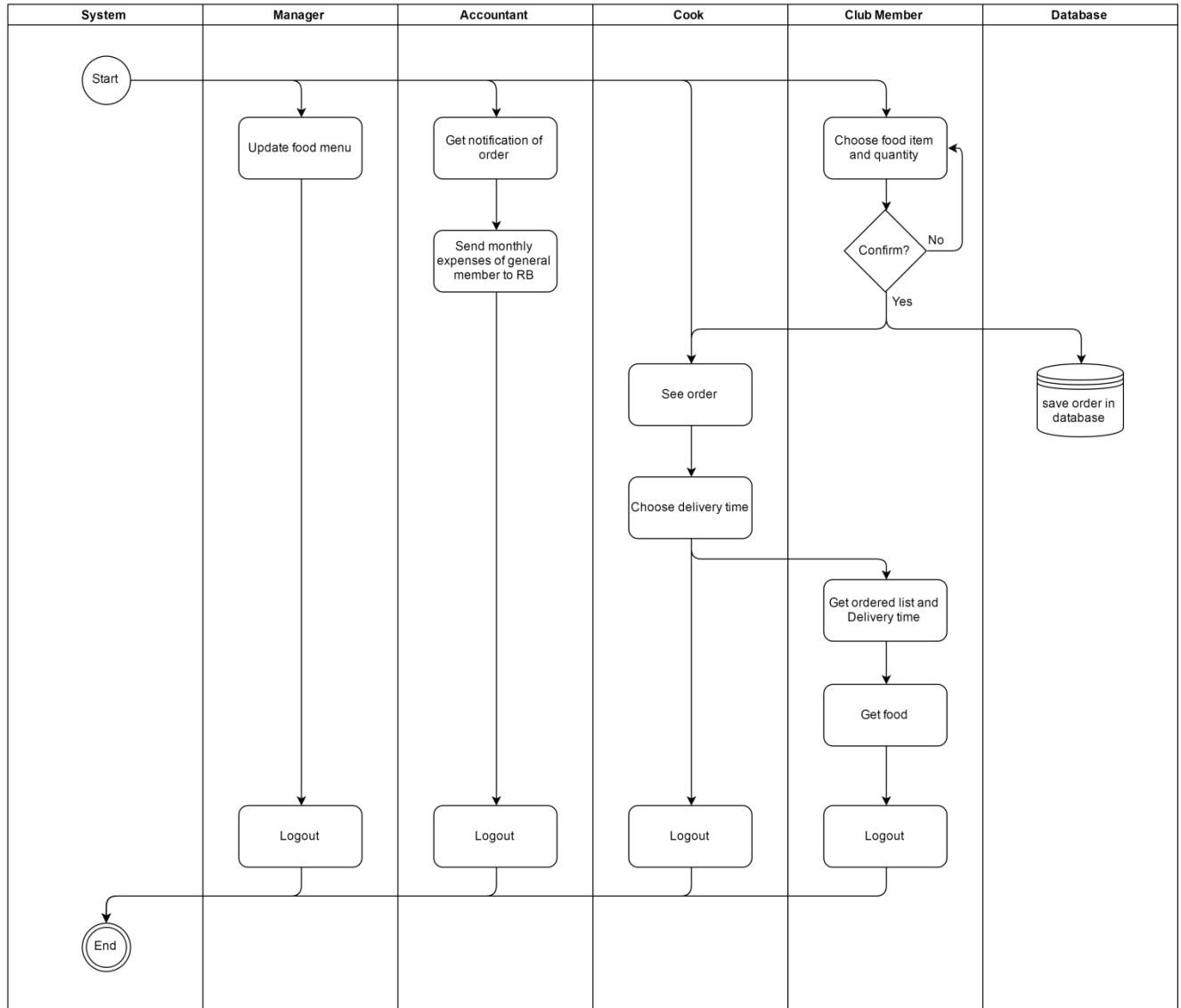


Figure 4.4.3.S: Swimlane diagram for Cafeteria Management System

4.4.4 Transaction Management System:

Refers Use Case figure 4.2.3.4:

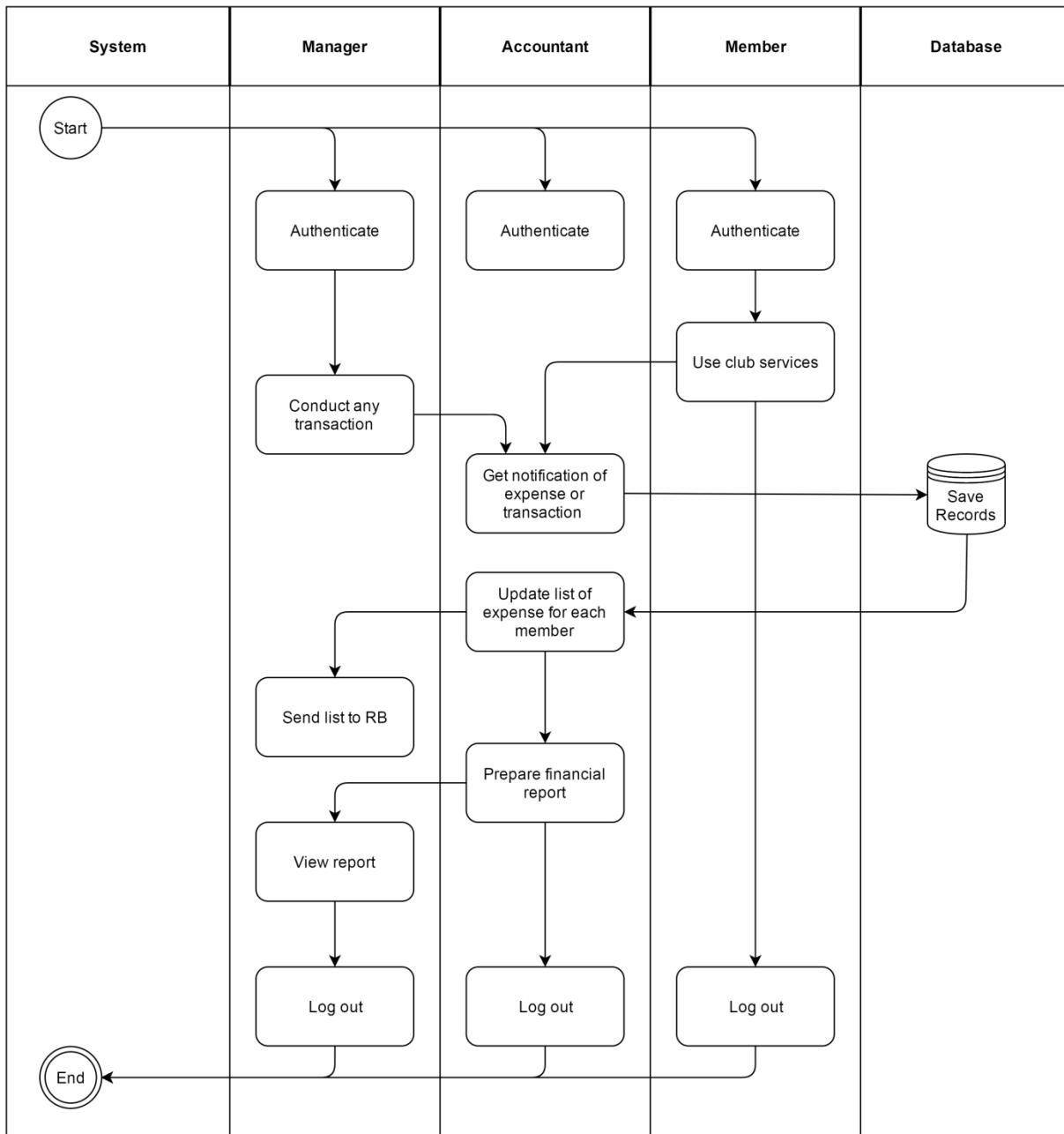


Figure 4.4.4.S: Swimlane diagram for Transaction Management System

4.4.5 Hall Reservation Management System:

The swimlane diagram for Library Stack Management has been divided into the following modules:

4.4.5.1 Application Process:

Refers Use Case figure 4.2.3.5:

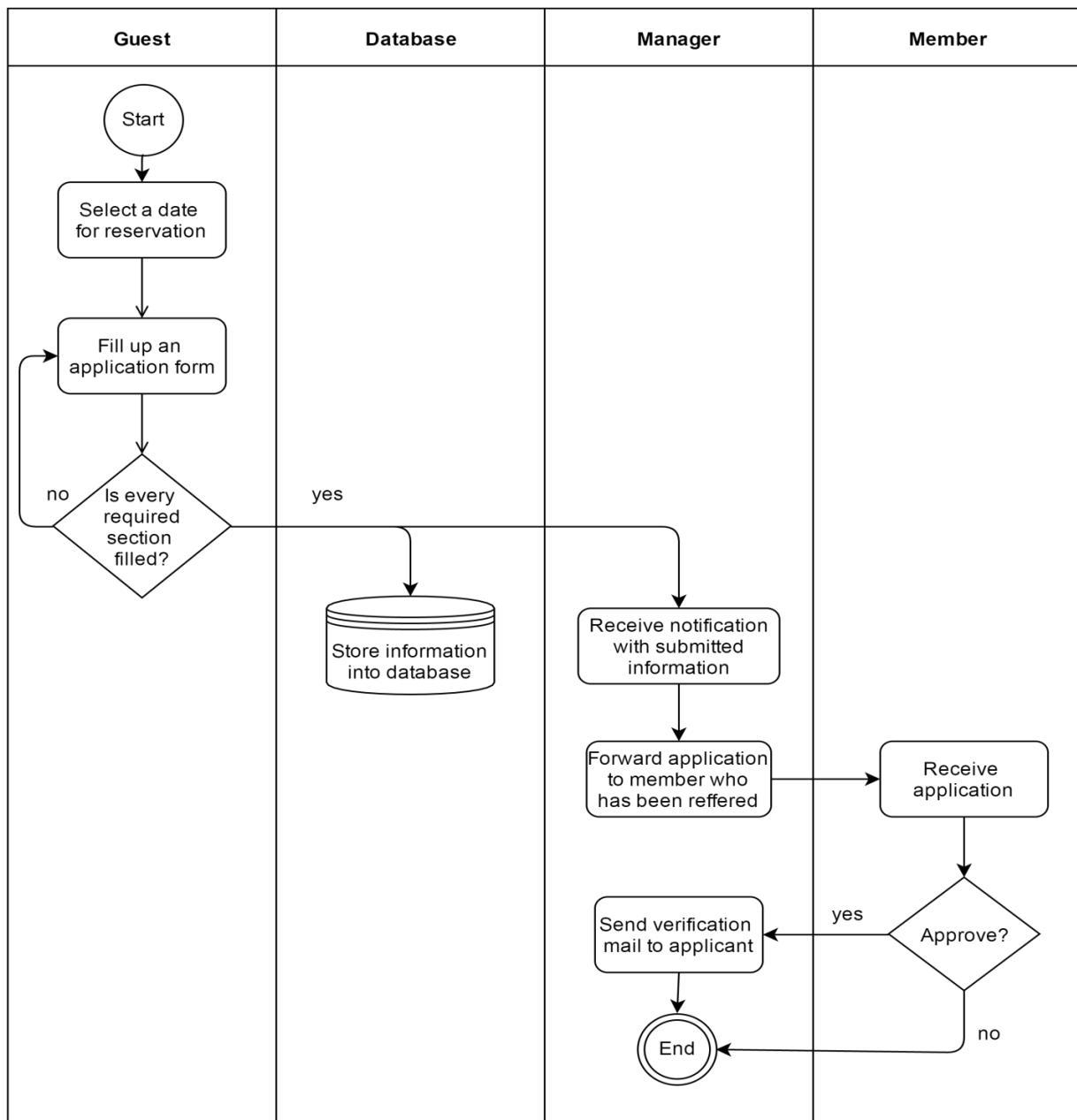


Figure 4.4.5.1: Swimlane diagram for Application Process in Hall Reservation Management System

4.4.5.2 Confirmation Process:

Refers Use Case figure 4.2.3.5:

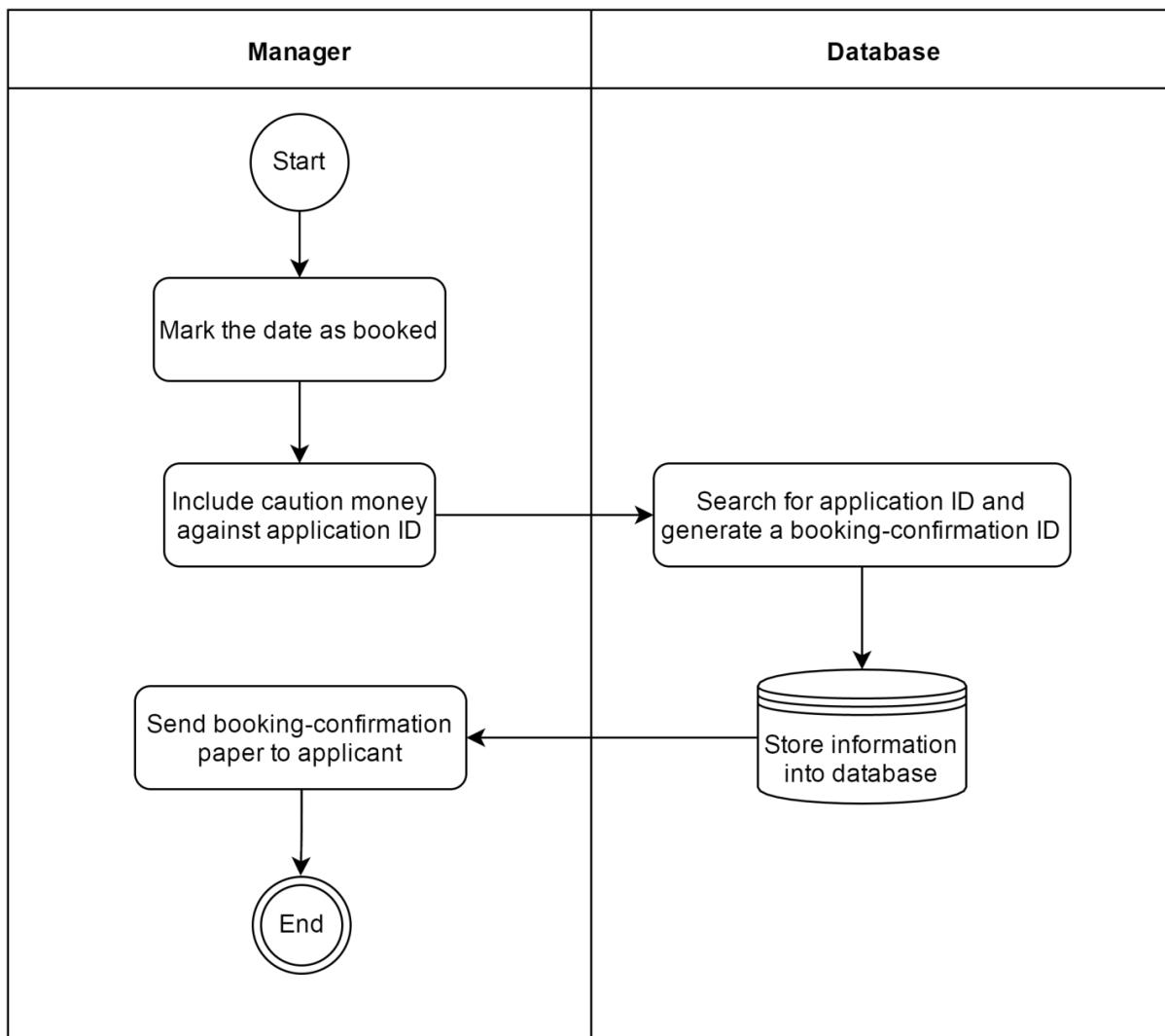


Figure 4.4.5.2: Swimlane diagram for Confirmation Process in Hall Reservation Management System

4.4.5.3 Cancellation Process:

Refers Use Case figure 4.2.3.5:

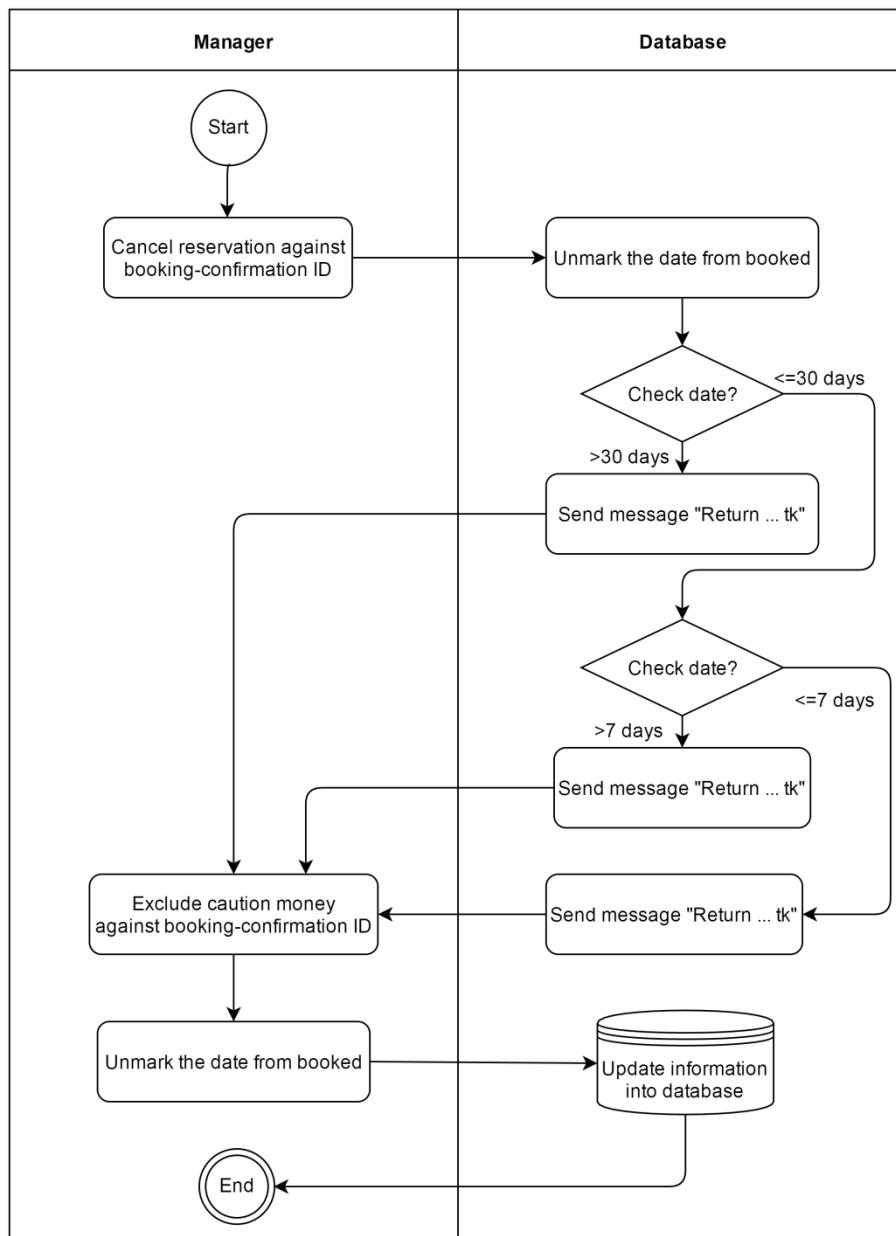


Figure 4.4.5.3: Swimlane diagram for Cancellation Process in Hall Reservation Management System

4.4.5.4 Payment Clearance Process:

Refers Use Case figure 4.2.3.5:

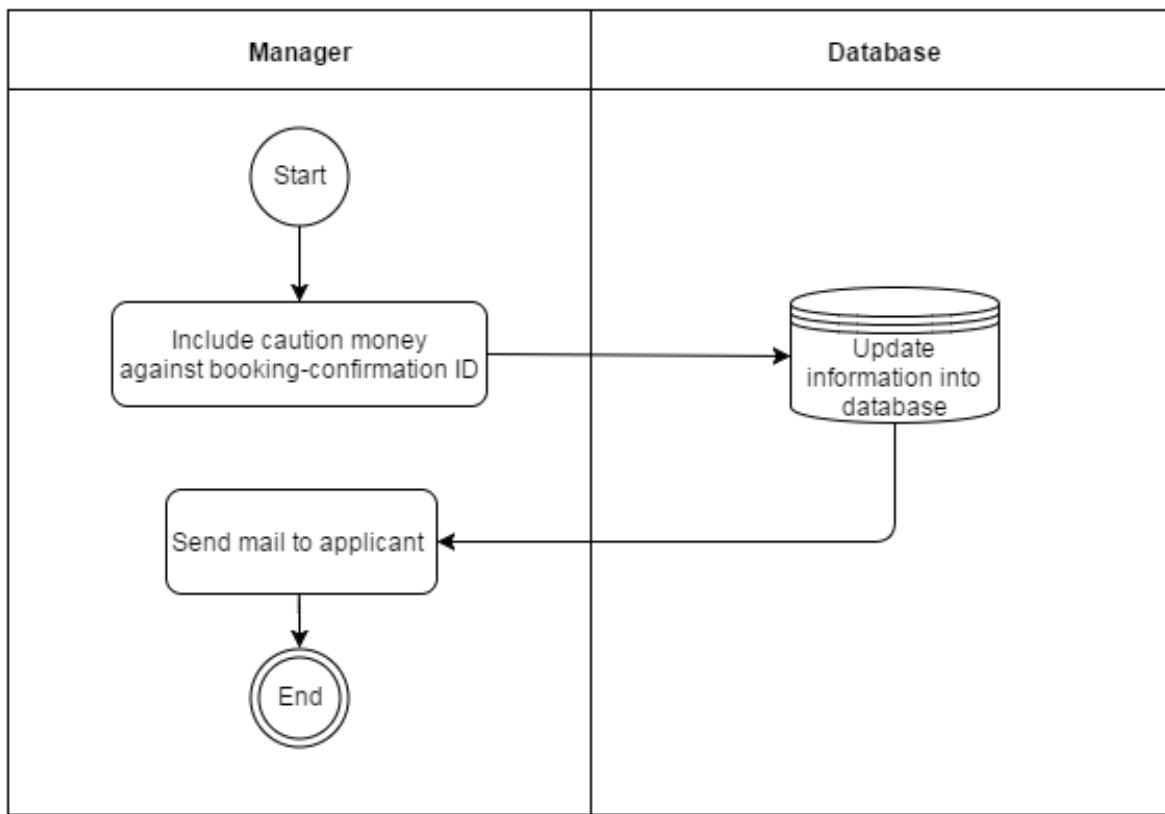


Figure 4.4.5.4: Swimlane diagram for Payment Clearance Process in Hall Reservation Management System

4.4.6 Virtual Helpline Management:

Refers Use Case figure 4.2.3.6:

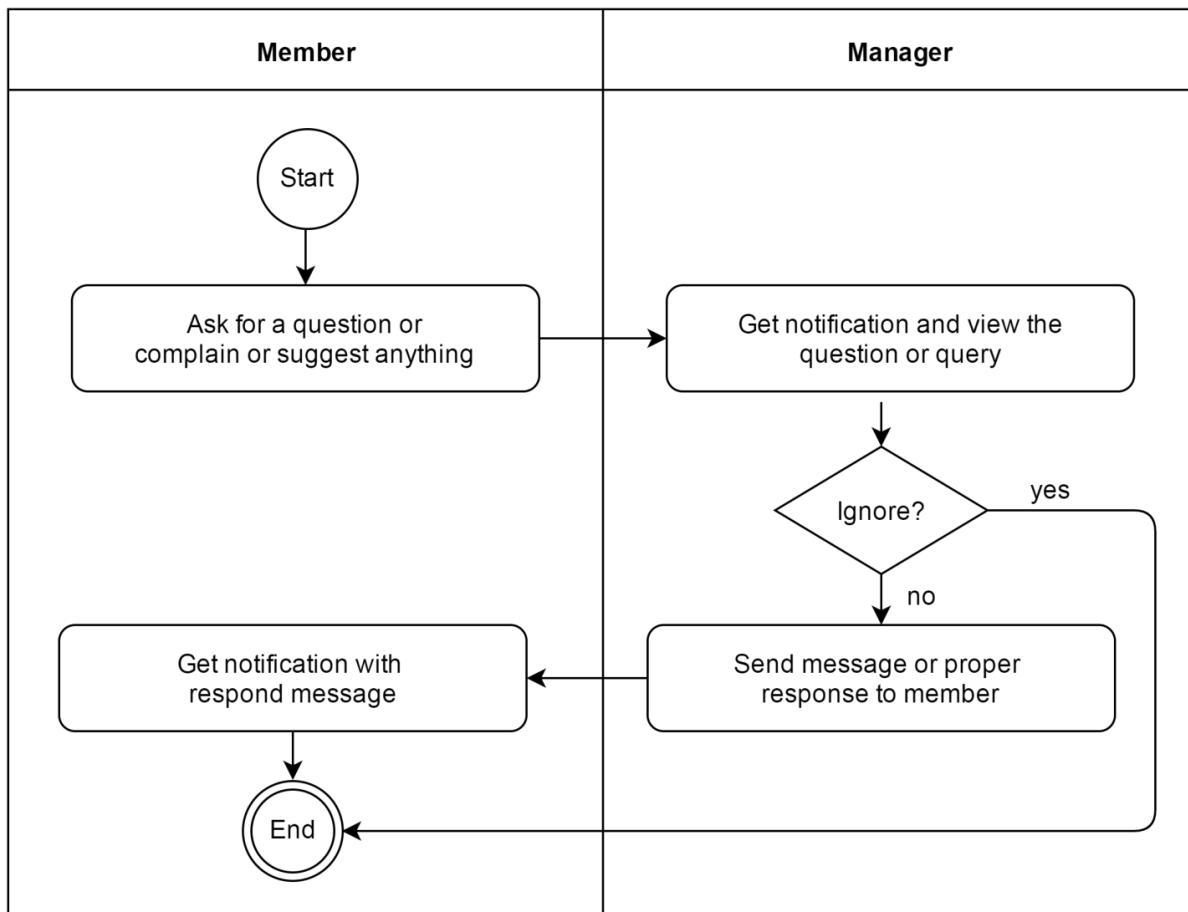


Figure 4.4.6.S: Swimlane diagram for Virtual Helpline Management

4.4.7 Library Stack Management:

The swimlane diagram for Library Stack Management has been divided into the following modules:

4.4.7.1 Search Book:

Refers Use Case figure 4.2.3.7:

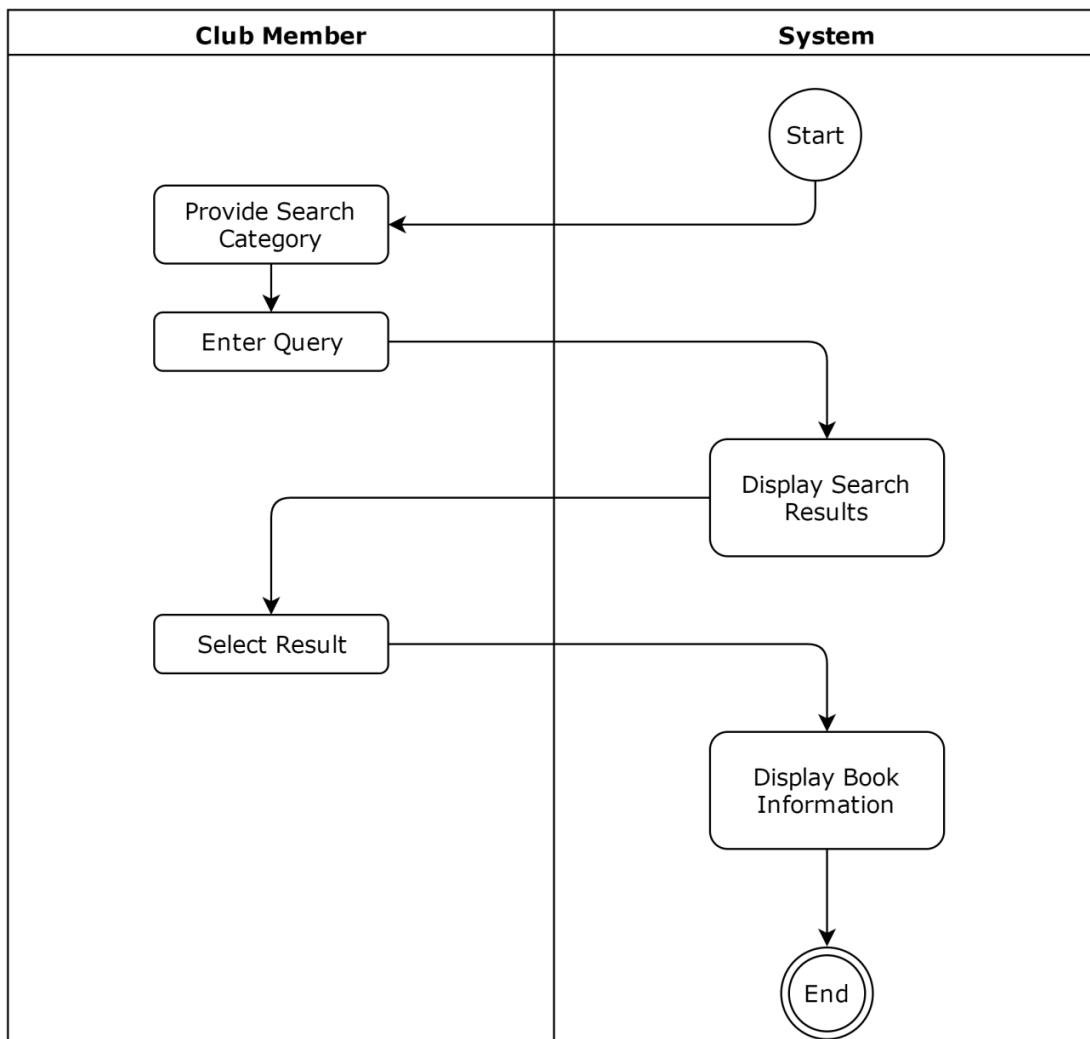


Figure 4.4.7.1: Swimlane diagram for searching books in Library Stack Management

4.4.7.2 Borrow Book:

Refers Use Case figure 4.2.3.7:

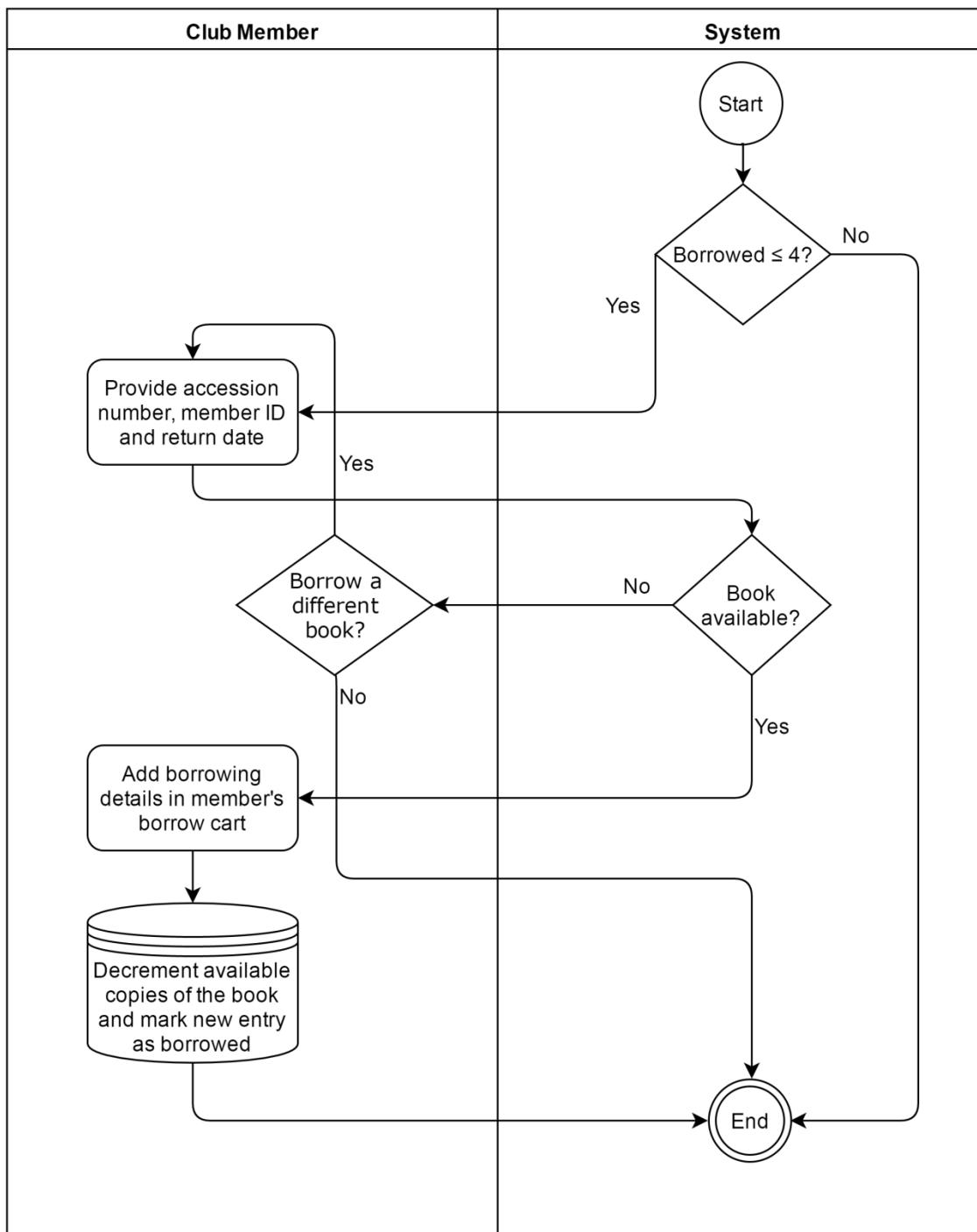


Figure 4.4.7.2: Swimlane diagram for borrowing books in Library Stack Management

4.4.7.3 Return Book:

Refers Use Case figure 4.2.3.7:

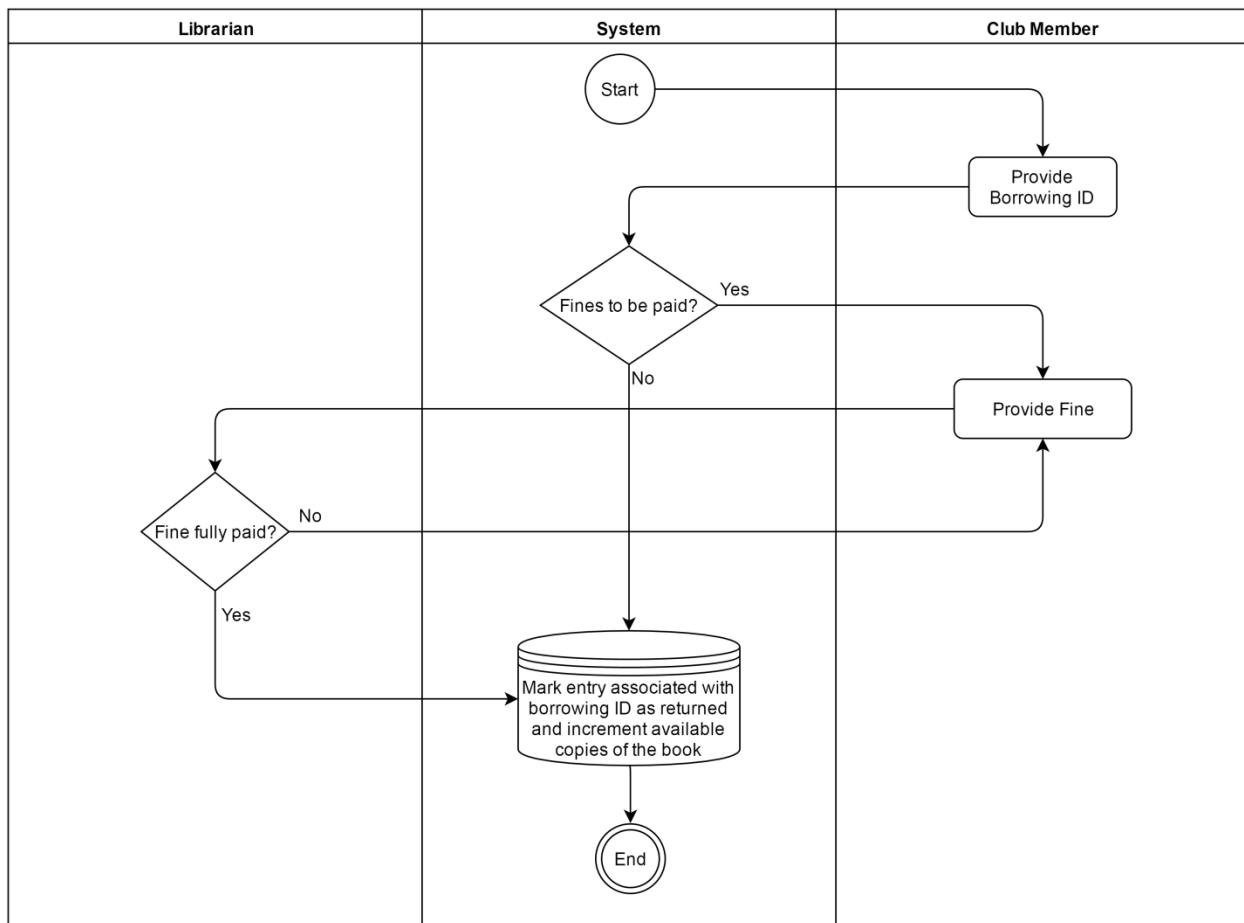


Figure 4.4.7.3: Swimlane diagram for returning books in Library Stack Management

4.4.7.4 Add New Entry:

Refers Use Case figure 4.2.3.7:

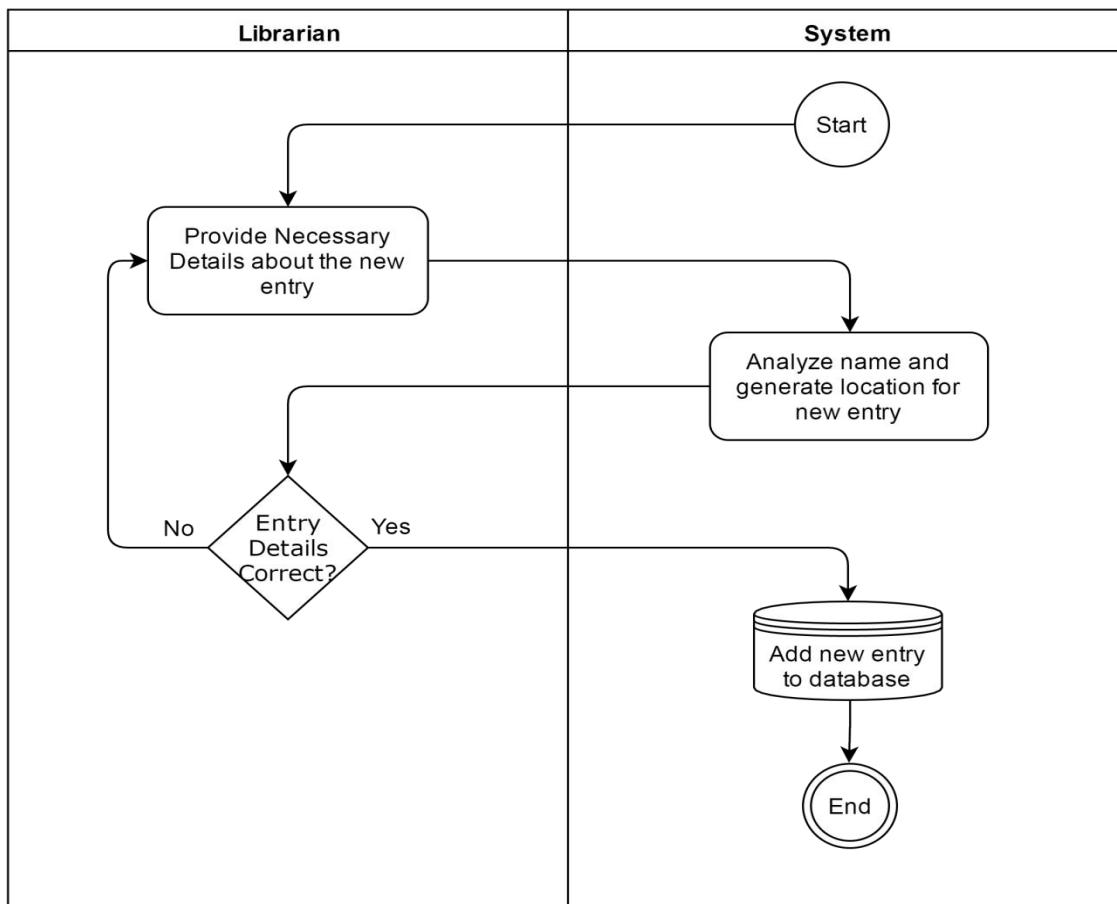


Figure 4.4.7.4: Swimlane diagram for adding a new entry in Library Stack Management

4.4.8 E-Library Facilities:

The swimlane diagram for E-Library facilities has been divided into the following modules:

4.4.8.1 Read/Download Book:

Refers Use Case figure 4.2.3.8:

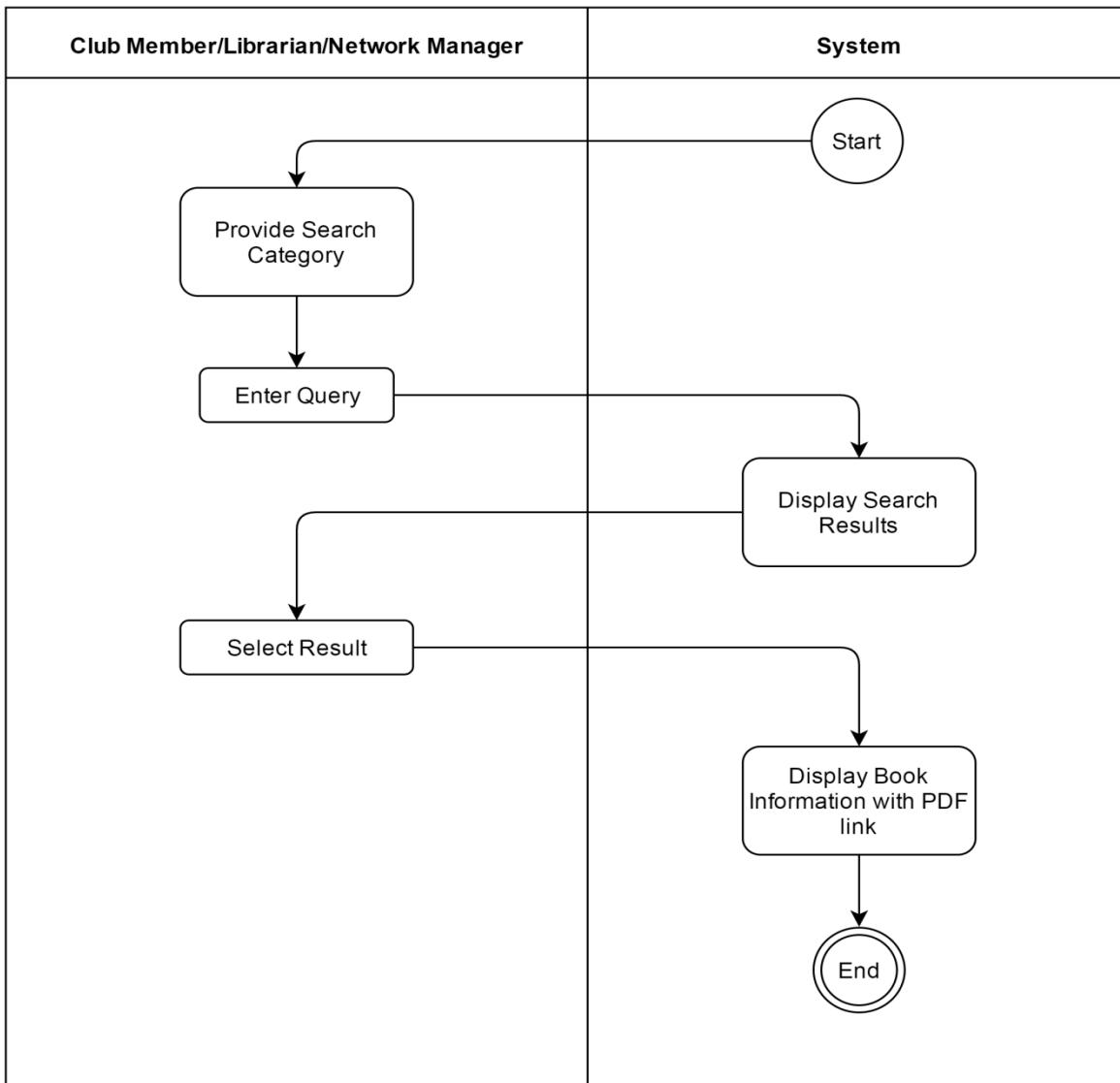


Figure 4.4.8.1: Swimlane diagram for reading/downloading books in E-Library Facilities

4.4.8.2 Update Server:

Refers Use Case figure 4.2.3.8:

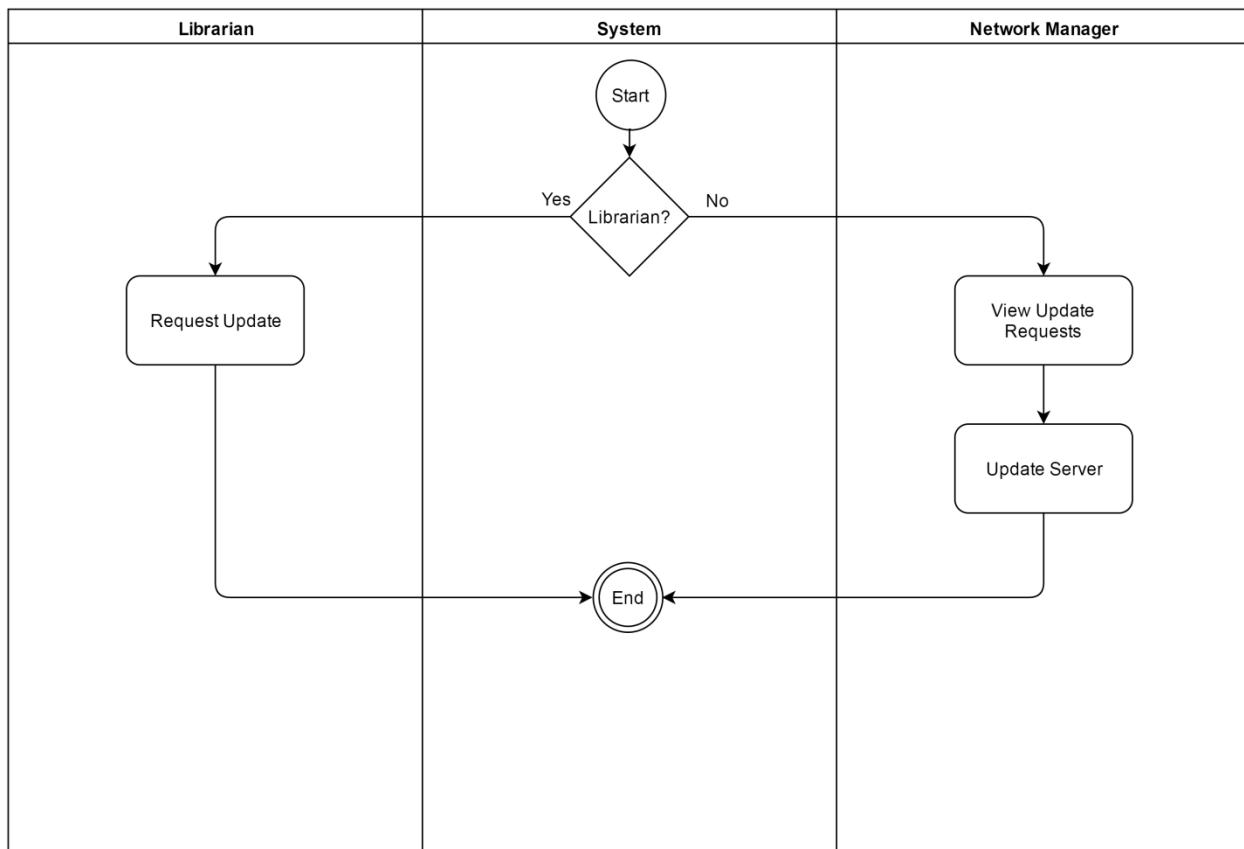


Figure 4.4.8.2: Swimlane diagram for updating server in E-Library Facilities

Chapter 5: Data Based Modeling of DU Club Management System

5.1 Noun Identification

5.1.1 Authentication System

No.	Noun/Noun Phrases	P/S	Attributes
1.	Application	P	
2.	Registration Number	S	
3.	Department Name	S	
4.	RB	P	
5.	Member	S	17,2,6,7,8,9,10,11,12,13,14,15,24
6.	Name	S	
7.	Father's Name	S	
8.	Mother's Name	S	
9.	Phone Number	S	
10.	Permanent Address	S	
11.	Present Address	S	
12.	Department	S	
13.	Email	S	
14.	Joining Year	S	
15.	Designation	S	
16.	Registration Form	P	
17.	Member ID	S	

18.	Document of new Member/Employee	P	
19.	Password	S	
20.	New Password	S	
21.	Account	S	17,6,11,12,15,19,24
22.	Address	S	
23.	Contact Number	S	
24.	Category	S	

Table 5.1.1: Noun Identification Table for Registration

Prospective Data Objects:

- ★ **Member:** Member ID, Registration Number, Name, Father's Name, Mother's Name, Phone Number, Permanent Address, Present Address, Department, Email, Joining Year, Designation, Category
- ★ **Account:** Member ID, Name, Present Address, Department, Designation, Password, Category

Analysis on Prospective Data Objects:

Due to sharing some common attributes with “Member” we will be removing the attributes Name, Present Address, Department and Designation from “Account”.

Actual Data Objects:

- ★ **Member:** Member ID, Registration Number, Name, Father's Name, Mother's Name, Phone Number, Permanent Address, Present Address, Department, Email, Joining Year, Designation
- ★ **Account:** Member ID, Password, Description

5.1.2 Cafeteria Management

No.	Nouns/Noun Phrases	P/S	Attributes
1.	Food Information	S	5,18,23
2.	Cafeteria	P	
3.	Days of Week	P	
4.	Rumali Roti	P	
5.	Food Item	S	
6.	Vegetable	P	
7.	Chitoi Pitha	P	
8.	Dal	P	
9.	Dal Puri	P	
10.	Alupuri	P	
11.	Tea	P	
12.	Lassi	P	
13.	Coffee	P	
14.	Soup	P	
15.	Bombay Toast	P	
16.	Butter Toast	P	
17.	Chop	P	
18.	Availability of Food	S	
19.	Desired Items	P	
20.	Kitchen	P	
21.	Approximate Delivery Time	P	
22.	Accountant	S	27,30,31
23.	Cost of Food item	S	

24.	Member's Account	S	27,30,31
25.	Date	S	
26.	End of Month	P	
27.	Monthly Cost	S	
28.	Amount Spent	S	
29.	Salary	P	
30.	Member ID	S	
31.	Password	S	
32.	Manager	S	27,30,31
33.	Club Member	S	27,30,31
34.	Cook	S	27,30,31

Table 5.1.2: Noun Identification Table for Cafeteria Management

Prospective Data Objects:

- ★ **Food Information:** Food Item, Availability of Food, Cost of Food item
- ★ **Accountant:** Member ID, Password, Monthly Cost
- ★ **Member's Account:** Member ID, Password, Monthly Cost
- ★ **Manager:** Member ID, Password, Monthly Cost
- ★ **Club Member:** Member ID, Password, Monthly Cost
- ★ **Cook:** Member ID, Password, Monthly Cost

Analysis on Prospective Data Objects:

Accountant, Member's Account, Manager, Club Member and Cook has same attributes. So, we can merge it into one data object 'Club Member Profile' with these attributes.

Actual Data Objects:

- ★ **Food Information:** Food Item, Availability of Food, Cost of Food item
- ★ **Club Member Profile:** Member ID, Password, Monthly Cost, Designation

5.1.3 Transaction Management and Report Generation System

No.	Nouns/Noun Phrases	P/S	Attributes
1.	Club Report	P	
2.	Member's Expenses	S	
3.	Monthly Earnings	S	13
4.	Monthly Expenditure	S	26
5.	Bank	P	
6.	Club Subscription Fee	P	
7.	Regular Subscription Fee	P	
8.	Monthly Expense	P	
9.	Categories	S	13, 26
10.	Transaction	S	9, 47
11.	Annual Earnings	S	
12.	Annual Expenditure	S	
13.	List of Earning Categories	S	14-25
14.	Opening Cash in Hand	S	
15.	Opening Cash at Bank	S	
16.	University Grants	S	
17.	Donation	S	
18.	Club Space/Premises Rent	S	
19.	Catering Service	S	
20.	Miscellaneous Receipts	S	
21.	Interest on Savings Bank Account	S	

22.	Raffle Draw	S	
23.	Advanced Club Rent	S	
24.	Security Deposit	S	
25.	Souvenir Contribution (Advertisement)	S	
26.	List of Expense Categories	S	27-44
27.	Staff Salaries and Benefits	S	
28.	Catering Expenses	S	
29.	Repairing and Maintenance	S	
30.	Cleaning Supplies	S	
31.	Stationary, Newspaper Expenses	S	
32.	Recreational Expenses	S	
33.	AGM Expenses	S	
34.	Bank Charge	S	
35.	Service Charge	S	
36.	Audit Fees	S	
37.	Club Booking Returns	S	
38.	Fixed Assets	S	
39.	Machine Purchase	S	
40.	Renovation, Beautification(Decoration/Paintings)	S	
41.	GYM Instruments	S	
42.	Club Website	S	
43.	Employee Fund	S	
44.	Closing Cash at Bank	S	
45.	Member wise Report	P	

46.	Manager	S	1,49,50,52
47.	Member	S	49, 50, 52,2,6,7
48.	RB	S	
49.	Name	P	
50.	Member ID	P	
51.	Accountant	S	49, 50, 52
52.	Password	P	

Table 5.1.3: Noun Identification Table for Transaction Management and Report Generation

Prospective Data Objects:

- ★ **Transaction:** Transaction ID, Type of transaction, Member ID, Date of transaction, Amount, Category
- ★ **Club Member:** Member ID, Name, Password
- ★ **Accountant:** Member ID, Name, Password
- ★ **Manager:** Member ID, Name, Password

Analysis on Prospective Data Objects:

Member, Account, Manager Tables are already introduced in the previous sections. In this section, Transaction table will be introduced.

Actual Data Objects:

- ★ **Transaction:** Transaction ID, Type of transaction, Member ID, Date of transaction, Amount, Category

5.1.4 Hall Reservation System

No.	Nouns/Noun Phrases	P/S	Attributes
1.	Hall Room	P	
2.	Occasion	P	
3.	Frontal Space	P	
4.	Application	S	5, 7, 9, 10, 11, 12, 19, 20, 24, 21, 26, 27
5.	Application ID	S	
6.	Rent Fee	S	
7.	Booking Date	S	
8.	Selection	P	
9.	National ID	S	
10.	Hiring Date	S	
11.	Referred By	S	
12.	Purpose of Hiring	S	
13.	Non-member Application	P	
14.	Caution Money	S	
15.	Payment Slip	P	
16.	Payment Procedure	P	
17.	Booking Confirmation Paper	S	5, 6, 7, 9, 10, 11, 12, 14, 18, 19, 20, 21, 26, 27
18.	Booking ID	S	
19.	Name of Applicant	S	
20.	Father's Name	S	
21.	Type of Rent	S	
22.	Reservation	P	

23.	Cancellation Application	S	
24.	Date of Application	S	
25.	Returned amount	S	
26.	Contact number	S	
27.	Present address	S	

Table 5.1.4: Noun Identification Table for Hall Reservation System

Prospective Data Objects:

We have the following prospective data objects:

- ★ **Application:** Application ID, Booking Date, National ID, Hiring Date, Referred By, Purpose of Hiring, Name of Applicant, Father's Name, Type of Rent, Contact number, Present Address
- ★ **Booking Confirmation Paper:** Booking ID, Application ID, Rent Fee, Booking Date, National ID, Hiring Date, Referred By, Purpose of Hiring, Caution Money, Name of Applicant, Father's Name, Type of Rent

Analysis on Prospective Data Objects:

Due to sharing some common attributes with “Application” we will be removing the attributes Booking date, National ID, Hiring Date, Referred By, Purpose of Hiring, Name of Applicant, Father's Name and Type of Rent from “Booking Confirmation Paper”.

Actual Data Objects:

We have the following data objects:

- ★ **Application:** Application ID, Booking Date, National ID, Hiring Date, Referred By, Purpose of Hiring, Name of Applicant, Father's Name, Type of Rent, Contact number, Present Address, Application status
- ★ **Booking Confirmation Paper:** Booking ID, Application ID, Rent Fee, Caution Money, Booking status, Booking transaction ID, Payment transaction ID, Cancellation transaction ID, Paid amount, Total money

5.1.5 Virtual Helpline

No.	Nouns/Noun Phrases	P/S	Attributes
1.	Virtual Helpline	S	
2.	Text	S	
3.	Complaint	S	6,2,5
4.	Question	S	6,2,5
5.	Response	S	
6.	Complaint/Question ID	S	

Table 5.1.5: Noun Identification Table for Virtual Helpline

Prospective Data Objects:

We have the following prospective data objects:

- ★ **Complaint:** Complaint/Question ID, Text, Response
- ★ **Question:** Complaint/Question ID, Text, Response

Analysis on Prospective Data Objects:

As the attributes of the data objects Complaint and Question are the same, we will merge them and make them into one data object Complaint and set its primary key to Complaint ID.

Actual Data Objects:

We have the following data objects:

- ★ **Complaint:** Complaint ID, Text, Response

5.1.6 Library Stack Management System

No.	Nouns/Noun Phrases	P/S	Attributes
1.	Member ID	S	
2.	Searching	S	
3.	Borrowing	S	
4.	Returning of Books	S	
5.	Library Membership Card	P	
6.	Librarian	S	
7.	Subject	S	
8.	Author Name	S	
9.	Book Name	S	
10.	Publisher Name	S	
11.	Accession Number	S	
12.	Year	S	
13.	List of Entries	S	
14.	Location	S	
15.	Section Number	S	

16.	Shelf Number	S	
17.	Row Number	S	
18.	Number of Available Borrowable Copies	S	
19.	Book Information	S	7,8,9,10,11,12,15,16,17,18,20
20.	Edition Number	S	
21.	Return Date	S	
22.	Different Book	P	
23.	Borrowing ID	S	
24.	Fine Charged	S	
25.	New Book	P	

Table 5.1.6: Noun Identification Table for Library Stack Management

Prospective Data Objects:

We have the following prospective data objects:

- ★ **Book Information:** Accession Number, Subject, Author Name, Book Name, Publisher Name, Year, Section Number, Shelf Number, Row Number, Number of Available Borrowable Copies

Actual Data Objects:

We have the following data objects:

- ★ **Book Information:** Accession Number, Subject, Author Name, Book Name, Publisher Name, Year, Section Number, Shelf Number, Row Number, Number of Available Borrowable Copies

5.1.7 E-Library Facilities

No.	Nouns/Noun Phrases	P/S	Attributes
1.	E-Library	S	
2.	Club's Web Server	S	7,11
3.	Subject	S	
4.	Author Name	S	
5.	Book Name	S	
6.	Publisher Name	S	
7.	Link to PDF version of Book	S	
8.	Year	S	
9.	Edition Number	S	
10.	Queried Book	P	
11.	Accession Number	S	
12.	Online Book Information	S	3-9,11

Table 5.1.7: Noun Identification Table for E-Library Facilities

Prospective Data Objects:

We have the following prospective data objects:

- ★ **Club's Web Server:** Accession Number, Link to PDF version of Book
- ★ **Online Book Information:** Accession Number, Subject, Author Name, Book Name, Publisher Name, Link to PDF version of Book, Year, Edition Number

Analysis on Prospective Data Objects:

As the attributes of the data objects Web Server and Online Book Information are the same, we will merge them and make them into one data object Online Book Information.

Actual Data Objects:

We have the following data objects:

- ★ **Online Book Information:** Accession Number, Subject, Author Name, Book Name, Publisher Name, Link to PDF version of Book, Year, Edition Number

So, finally we have the following data objects:

1. **Member:** Member ID, Registration Number, Name, Father's Name, Mother's Name, Phone Number, Permanent Address, Present Address, Department, Email, Joining Year, Designation
2. **Account:** Member ID, Password, Description
3. **Food Information:** Food Item, Availability of Food, Cost of Food item
4. **Club Member Profile:** Member ID, Password, Monthly Cost, Designation
5. **Transaction:** Transaction ID, Type of transaction, Member ID, Date of transaction, Amount, Category
6. **Application:** Application ID, Booking Date, National ID, Hiring Date, Referred By, Purpose of Hiring, Name of Applicant, Father's Name, Type of Rent, Contact number, Present Address, Application status
7. **Booking Confirmation Paper:** Booking ID, Application ID, Rent Fee, Caution Money, Booking status, Booking transaction ID, Payment transaction ID, Cancellation transaction ID, Paid amount, Total money
8. **Complaint:** Complaint ID, Member ID, Text, Response
9. **Book Information:** Accession Number, Subject, Author Name, Book Name, Publisher Name, Year, Section Number, Shelf Number, Row Number, Number of Available Borrowable Copies
10. **Online Book Information:** Accession Number, Subject, Author Name, Book Name, Publisher Name, Link to PDF version of Book, Year, Edition Number

5.2 Data Object Relation

5.2.1 Club Management System for Dhaka University Club

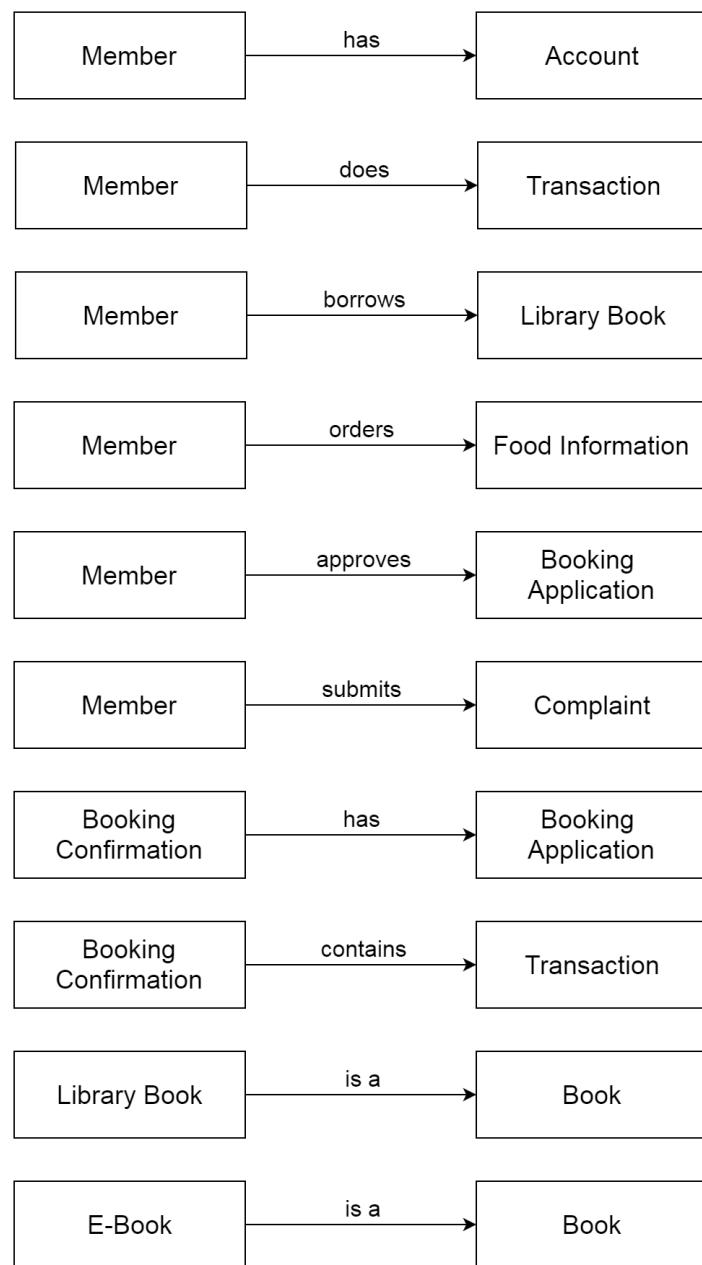


Figure 5.2.1: Data Object Relationship Diagram

5.3 ER Diagram

5.3.1 Club Management System for Dhaka University Club

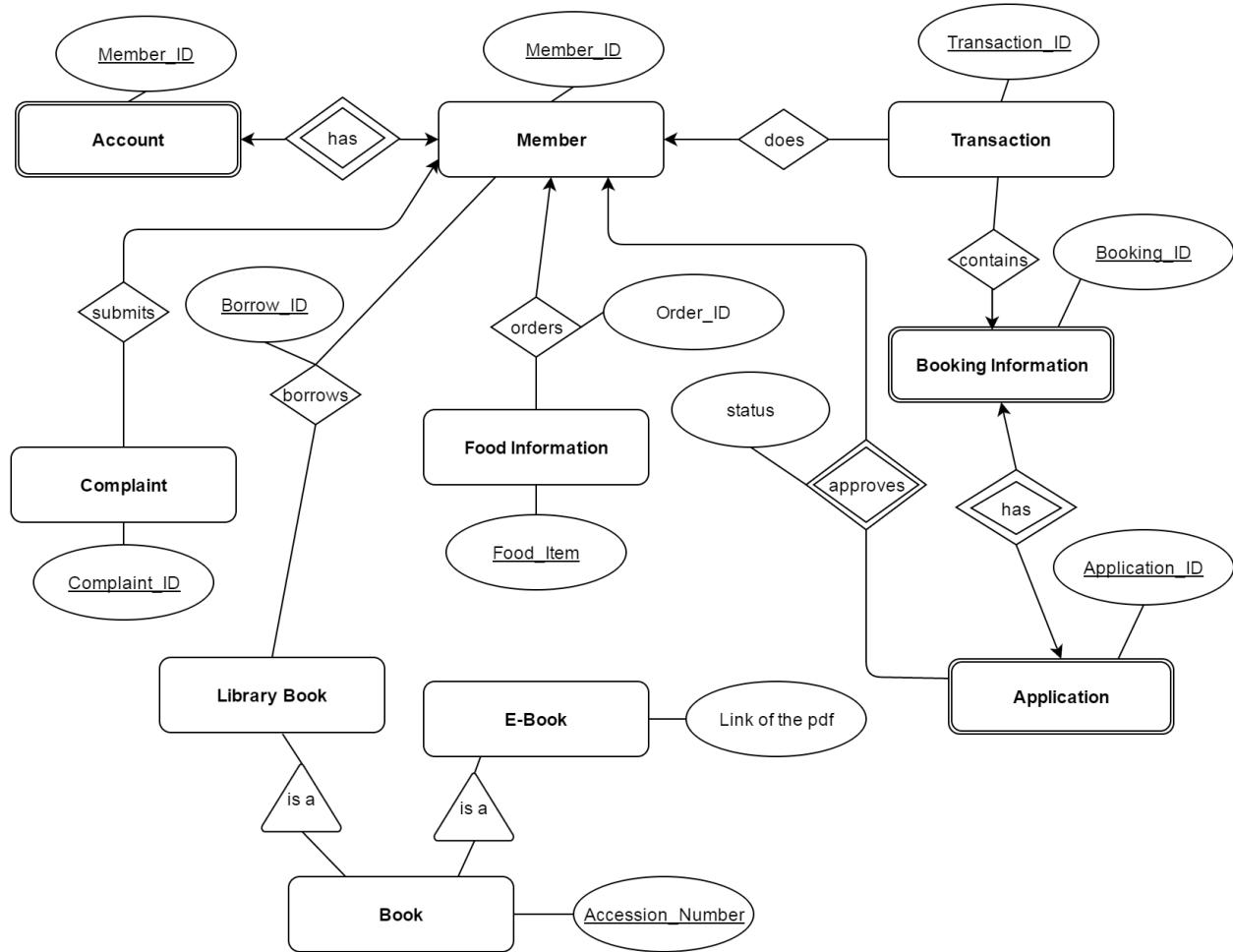


Figure 5.3.1: Entity Relationship Diagram

5.4 Relational Tables

The following tables will be introduced in order to store the data of the relations of the data object:

- ★ **Order Information:** Order ID, Amount Spent, Date, Member ID
- ★ **Borrowing Information:** Borrowing ID, Member ID, Accession Number, Borrowing Date, Fine Charged

5.5 Schema Tables

5.5.1 Registration System

Member		
Column	Type	Size
<u>Member ID</u>	Number	20
Name	Varchar2	28
Father's Name	Varchar2	28
Mother's Name	Varchar2	28
Phone Number	Number	20
Permanent Address	Varchar2	120
Present Address	Varchar2	120
Email	Varchar2	20
Joining Year	Date	
Designation	Varchar2	12
Contact Number	Number	11
Type of member	Varchar2	10
Registration ID*	Varchar2	20
Monthly Cost	Number	25

Table 5.5.1.1: Schema Table for table Member

Account		
Column	Type	Size
<u>Member ID</u>	Number	20
Password	Varchar2	20
Counter	Number	2
Description	Varchar2	500

Table 5.5.1.2: Schema Table for table Account

5.5.2 Cafeteria System

Food Information		
Column	Type	Size
<u>Food item</u>	Varchar2	25
Availability of Food	Number	5
Cost of Food item	Number	5

Table 5.5.2.1: Schema Table for table Food Information

Order Information		
Column	Type	Size
<u>Order ID</u>	Number	8
Member ID	Number	8
Amount Spent	Number	10
Date of order	Date	

Table 5.5.2.2: Schema Table for table Order Information

Item Order Information		
Column	Type	Size
<u>Food item</u>	Varchar2	25
<u>Order ID</u>	Number	8

Table 5.5.2.3: Schema Table for table Item Order Information

5.5.3 Transaction Management and Report Generation System

Transaction		
Column	Type	Size
<u>Transaction ID</u>	Number	30
Date of transaction	Date	
Member ID*	Number	10
Type	Varchar2	10
Category*	Varchar2	20

Table 5.5.3.1: Schema Table for table Transaction

5.5.4 Hall Reservation System

Booking Application		
Column	Type	Size
<u>Application ID</u>	Number	10
Applicant's name	Varchar2	28
Father's name	Varchar2	28
National ID	Number	20
Present address	Varchar2	120
Date of hiring	Date	
Referred by	Number	20
Type of Rent	Varchar2	20
Purpose	Varchar2	120
Contact number	Number	12
Contact mail	Varchar2	30
Application status	Varchar2	10

Table 5.5.4.1: Schema Table for table Booking Application

Booking Confirmation		
Column	Type	Size
<u>Booking ID</u>	Number	10
Application ID	Number	10
Booking status	Varchar2	10
Booking transaction ID*	Number	30
Payment transaction ID	Number	30
Cancellation transaction ID*	Number	30
Caution money	Number	8
Paid amount	Number	8
Returned money	Number	8
Total money	Number	8

Table 5.5.4.2: Schema Table for table Booking Confirmation

5.5.5 Virtual Helpline

Complaint		
Column	Type	Size
<u>Complaint ID</u>	Number	10
Member ID	Number	20
Text	Varchar2	1000
Response	Varchar2	1000

Table 5.5.5.1: Schema Table for table Complaint

5.5.6 Library Stack Management System

Book Information		
Column	Type	Size
Accession Number	Number	10
Subject	Varchar2	20
Author Name	Varchar2	50
Book Name	Varchar2	50
Publisher Name	Varchar2	50
Year	Number	4
Section Number	Number	2
Shelf Number	Number	2
Row Number	Number	2
Number of Available Borrowable Copies	Number	2
Edition Number	Number	2

Table 5.5.6.1: Schema Table for table Book Information

Borrowing Information		
Column	Type	Size
Borrowing ID	Number	10
Member ID	Number	10
Accession Number	Number	10
Borrowing Date	Date	
Fine Charged	Number	8

Table 5.5.6.2: Schema Table for table Borrowing Information

5.5.7 E-Library Facilities

Online Book Information		
Column	Type	Size
<u>Accession Number</u>	Number	10
Subject	Varchar2	20
Author Name	Varchar2	50
Book Name	Varchar2	50
Publisher Name	Varchar2	50
Link to PDF version of Book	Varchar2	500
Year	Number	4
Edition Number	Number	2

Table 5.5.7.1: Schema Table for table Online Book Information

Chapter 6: Class Based Modeling of DU Club Management System

6.1 General Classification

1. **External Entities** (e.g., other systems, devices, people) that produce or consume information to be used by a computer-based system.
2. **Things** (e.g., reports, displays, letters, signals) that are part of the information domain for the problem.
3. **Occurrence or events** (e.g., a property transfer or the completion of a series of robot movements) that occur within the context of system operation.
4. **Roles** (e.g., manager, engineer, salesperson) played by people who interact with the system.
5. **Organizational units** (e.g., division, group, team) that are relevant to an application.
6. **Places** (e.g., manufacturing floor or loading dock) that establish the context of the problem and the overall function of the system.
7. **Structure** (e.g., sensors, four-wheeled vehicles, or computers) that define a class of objects or related classes of objects.

No.	Noun/Noun Phrases	General Classification	Remarks
1.	Registration Application	2	✓
2.	Registration Number		
3.	Department Name		
4.	General Member	4,7	✓
5.	Honorary Member	4,7	✓
6.	Employee	4,7	✓
7.	Associate Member	4,7	✓
8.	Manager	4,7	✓
9.	Accountant	4,7	✓
10.	Name		
11.	Father's Name		
12.	Mother's Name		
13.	Phone Number		
14.	Permanent Address		

15.	Present Address		
16.	Department		
17.	Email		
18.	Joining Year		
19.	Designation		
20.	Registration Form		
21.	Member ID		
22.	Document of new Member/Employee		
23.	Password		
24.	Guest	4	✓
25.	Contact Number		
26.	Food Information	2,7	✓
27.	Food Item		
28.	Availability of Food		
29.	Cost of Food item		
30.	Order Date		
31.	Monthly Cost		
32.	Amount Spent		
33.	Cook	4,7	✓
34.	Order Information	2,7	✓
35.	Club Report	2,7	✓
36.	Member's Expenses		
37.	Monthly Earnings		
38.	Monthly Expenditure		
39.	Bank	1,4,5,6,7	✓
40.	Club Subscription Fee		
41.	Regular Subscription Fee		
42.	Monthly Expense		
43.	Categories		
44.	Transaction	3	✓
45.	Annual Earnings		
46.	Annual Expenditure		
47.	List of Earning Categories	2,4,7	✓
48.	Opening Cash in Hand		
49.	Opening Cash at Bank		
50.	University Grants		
51.	Donation		
52.	Club Space/Premises Rent		
53.	Catering Service		
54.	Miscellaneous Receipts		
55.	Interest on Savings Bank Account		
56.	Raffle Draw		

57.	Advanced Club Rent		
58.	Security Deposit (Associate Member/Club Shop)		
59.	Souvenir Contribution (Advertisement)		
60.	List of Expense Categories		
61.	Staff Salaries and Benefits		
62.	Catering Expenses		
63.	Repairing and Maintenance		
64.	Cleaning Supplies		
65.	Stationary, Newspaper Expenses		
66.	Recreational Expenses		
67.	AGM Expenses		
68.	Bank Charge		
69.	Service Charge		
70.	Audit Fees		
71.	Club Booking Returns		
72.	Fixed Assets	2,7	✓
73.	Machine Purchase		
74.	Renovation, Beautification, Decoration, Paintings	2,7	✓
75.	GYM Instruments	2,7	✓
76.	Club Website		
77.	Employee Fund		
78.	Closing Cash at Bank (Savings AC, Current AC)		
79.	Member wise Report	2,7	✓
80.	RB	1,5,6	✓
81.	Hall Booking Application	2	✓
82.	Application ID		
83.	Rent Fee		
84.	Booking Date		
85.	National ID Number		
86.	Hiring Date		
87.	Referred By		
88.	Purpose of Hiring		
89.	Caution Money		
90.	Booking Confirmation Paper	2	✓
91.	Booking ID		
92.	Name of Applicant		
93.	Type of Rent		
94.	Cancellation Application	2	✓

95.	Date of Application		
96.	Returned amount		
97.	Database	4, 7	✓
98.	Searching		
99.	Borrowing		
100.	Returning of Books		
101.	Membership Card	2	✓
102.	Librarian	4,7	✓
103.	Subject		
104.	Author Name		
105.	Book Name		
106.	Publisher Name		
107.	Accession Number		
108.	Year		
109.	List of Entries	2	✓
110.	Location		
111.	Section Number		
112.	Shelf Number		
113.	Row Number		
114.	Number of Available Borrowable Copies		
115.	Book	2	✓
116.	Edition Number		
117.	Return Date		
118.	Different Book	2	✓
119.	Fine Charged		
120.	New Book	2	✓
121.	Borrowing		
122.	E-Library	4	✓
123.	Server	4,7	✓
124.	Link to PDF version of Book	2	✓
125.	Book	2	✓
126.	Accession Number		
127.	Online Book Information		
128.	Network Manager	4,7	✓
129.	Virtual Helpline	4	✓
130.	Text		
131.	Complaint		
132.	Question		
133.	Response		
134.	Complaint/Question ID	4	✓

Table 6.1: General Classification Table for CMSDU

6.2 Coad and Yourdon's Six Selection Criteria

Coad and Yourdon's six selection criteria are:²

1. **Retained Information:** Will the system need to remember information about this class of objects?
2. **Needed Services:** Do objects in this class have identifiable operations that change the values of their attributes?
3. **Multiple Attributes:** If the class only has one attribute, it may be better represented as an attribute of another class.
4. **Common Attributes:** Does the class have attributes that are shared with all instances of its objects?
5. **Common Operations:** Does the class have operations that are shared with all instances of its objects?
6. **Essential Requirements:** External entities that produce or consume information essential to the system should be included as classes.

No.	Potential Classes	Selection Criteria	Remarks
1.	Registration Application	4,5	
2.	RB	2,6	✓
3.	General Member	1,2,3,4,5	✓
4.	Honorary Member	1,2,3,4,5	✓
5.	Employee	1,2,3,4,5	✓
6.	Associate Member	1,2,3,4,5	✓
7.	Manager	1,2,3	✓
8.	Guest	1,2,4	✓
9.	Accountant	1,2,3	✓
10.	Database Operator	1,2,3	✓
11.	Guest		
12.	Food Information	1,3,4	✓
13.	Cook	1,2,3	✓
14.	Order Information	1,3,4	✓
15.	Club Report	3,4	
16.	Bank	6	
17.	Transaction	1,2,3,4,5	✓
18.	List of Earning Categories		
19.	Fixed Assets	3,4	
20.	Renovation, Beautification, Decoration, Paintings		
21.	GYM Instruments	3,4	
22.	Member wise Report	3,4	

23.	Application	1, 3, 4, 5	✓
24.	Booking Confirmation Paper	1, 3, 4	✓
25.	Cancellation Application	1	
26.	Database	1, 2	
27.	Membership Card	1,2,3,4,5	✓
28.	Librarian	1,2,3	✓
29.	List of Entries	3,4	
30.	Book	3,4,5	
31.	Different Book	1,2,3,4,5	
32.	New Book	1,2,3,4,5	
33.	E-Library		
34.	Server	1,2,3,4,5	✓
35.	Link to PDF version of Book		
36.	Book		
37.	Network Manager	1,2,3	✓
38.	Virtual Helpline		
39.	Complaint/Question	1,2,3,4,5	✓

Table 6.2: Selection Criteria Table for CMSDU

Selected Classes:

1. RB
2. GeneralMember
3. HonoraryMember
4. Employee
5. AssociateMember
6. Manager
7. Guest
8. Accountant
9. DatabaseOperator
10. FoodInformation
11. Cook
12. OrderInformation
13. Transaction
14. Application
15. BookingConfirmationPaper
16. MembershipCard
17. Librarian
18. Server
19. NetworkManager
20. Complaint

6.3 Noun-Verb Affiliation of Classes

No.	Selected Class	Noun	Verb
1.	GeneralMember	Name Father's Name Mother's Name Phone Number Permanent Address Present Address Department Email Joining Year Designation Teacher ID Member ID Monthly Cost Amount spent Date of Order	Change password Store retrieve info update log out Order Food Enter Desired Item Confirm Order Get Delivery Time
2.	AssociateMember	Name Father's Name Mother's Name Phone Number Permanent Address Present Address Email Joining Year Designation Member ID Monthly Cost Amount spent Date of Order	Change Password Store Retrieve Info Update Log Out Order Food Enter Desired Item Confirm Order Get Delivery Time
3.	HonoraryMember	Name Father's Name Mother's Name Phone Number Permanent Address Present Address Email Joining Year Designation Member ID Monthly Cost Amount spent Date of Order	Change Password Store Retrieve Info Update Log Out Order Food Enter Desired Item Confirm Order Get Delivery Time

4.	Manager	Name Father's Name Mother's Name Phone Number Permanent Address Present Address Email Joining Year Designation Member ID Monthly Cost Amount spent Date of Order	Change Password Store Retrieve Info Update Log Out Order Food Enter Desired Item Confirm Order Get Delivery Time Update Food Items
5.	Accountant	Name Father's Name Mother's Name Phone Number Permanent Address Present Address Email Joining Year Designation Member ID Monthly Cost Amount spent Date List of Transactions	Change Password Store Retrieve Info Update Log Out Order Food Enter Desired Item Confirm Order Get Delivery Time AddTransaction
6.	Employee	Name Father's Name Mother's Name Phone Number Permanent Address Present Address Email Joining Year Designation Member ID Monthly Cost Amount spent Date	Change Password Store Retrieve Info Update Log Out Order Food Enter Desired Item Confirm Order Get Delivery Time
7.	Guest	name Father's Name Mother's Name Phone Number Permanent Address	View Log In Sign Up

		Present Address email Joining Year Designation Member ID Password	
8.	DatabaseOperator	JDBC Connector, Statement, Query, Result Set	Add To Database Update Database
9.	FoodInformation	Food Item Availability of Food Cost of Food item	Display Menu Change Availability
10.	Cook	Name Father's Name Mother's Name Phone Number Permanent Address Present Address Email Joining Year Designation Member ID Monthly Cost Amount spent Date of Order	Change Password Store Retrieve Info Update Log Out Order Food Enter Desired Item Confirm Order Get Delivery Time Select Delivery Time Send
11.	OrderInformation	Amount spent Date	Store
12.	Transaction	Transaction ID Date of transaction Amount Type Member ID Category	Store information
13.	Application	Application ID Referred by (Member ID) Name National ID Hiring Date Type of Rent Contact Number Contact Mail Purpose	Apply for hiring Fills up application form Notify manager & member Approve Application
14.	BookingConfirmationPaper	Booking ID Application ID Caution Money	Update booking status Confirm Booking Clear Payment

		Paid Amount Transaction ID Booking Status	Cancel Booking
15.	MembershipCard	Member ID Name List of Borrow ID Total Fine Payable	update verify
16.	Librarian	Name Father's Name Mother's Name Phone Number Permanent Address Present Address Email Joining Year Designation Member ID Monthly Cost Amount spent Date of Order Active	Change Password Store Retrieve Info Update Log Out Order Food Enter Desired Item Confirm Order Get Delivery Time verify get fine update database add book update card
17.	Server	List of Accession Numbers List of links	add display
18.	NetworkManager	Name Father's Name Mother's Name Phone Number Permanent Address Present Address Email Joining Year Designation Member ID Monthly Cost Amount spent Date of Order Active	Change Password Store Retrieve Info Update Log Out Order Food Enter Desired Item Confirm Order Get Delivery Time add
19.	Complaint	Complaint/Question ID Question Text Response Text	view add response take question
20.	RB		receive send

Table 6.3: Noun-Verb Affiliation of Classes Table for CMSDU

Analysis of Selected Classes:

- Merging into ClubMember Super Class:
 - GeneralMember, AssociateMember, HonoraryMember classes have same attributes and methods. These three classes are merged into one class named *GeneralMember* class.
 - Accountant, Manager, Network Manager, Cook, Librarian and GeneralMember classes have some common attributes and methods. These classes are merged into one class named *ClubMember* which contains common attributes and methods. Accountant, Manager, Network Manager, Cook, Librarian and GeneralMember are subclasses of ClubMember class.
 - Attributes and methods of Employee class are subset of ClubMember Class. So, we merged Employee class with ClubMember class.
 - Club Member class has attributes of Order Information class. We can store OrderInformation class's information in ClubMember class.
- Merging into BookingApplication Class:
 - Application and Booking Confirmation Paper both contain Application ID. The two classes can be merged. After merging the two classes, the new class named *BookingApplication* contains all the responsibilities of the two classes.

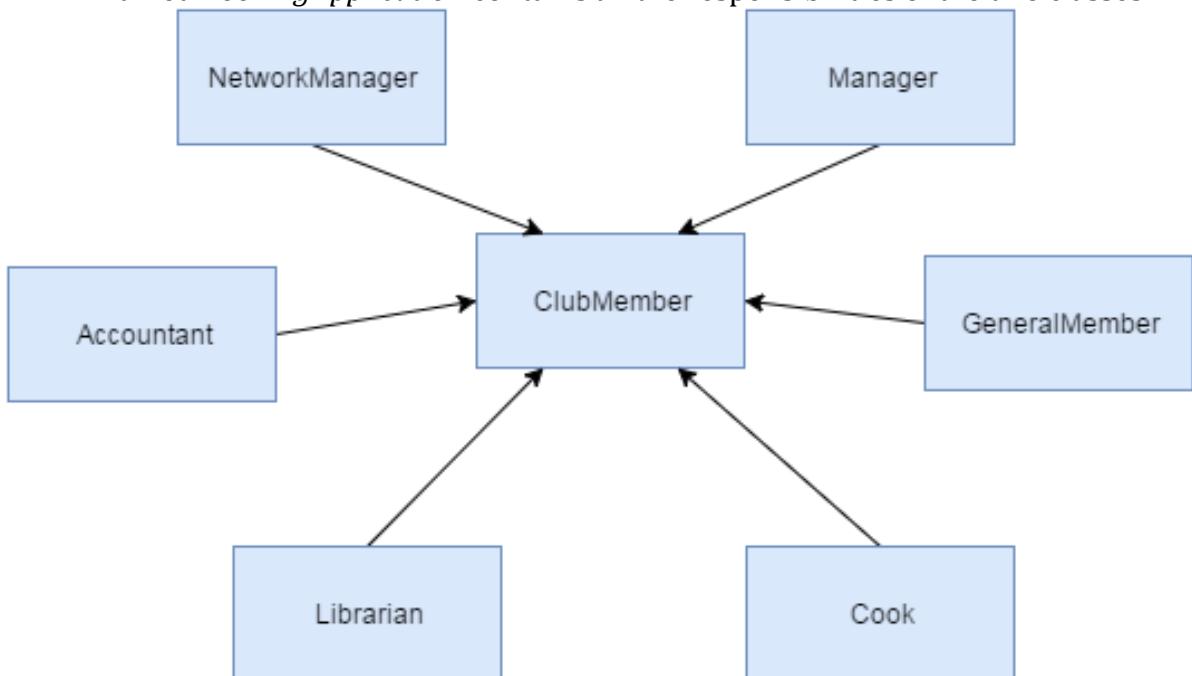


Figure 6.3: Club Member Super Class

6.4 Class Attributes and Class Methods

After analysis, we get following classes, their attributes and methods:

No.	Final Class	Attributes	Methods
1.	ClubMember	name fatherName motherName phoneNumber permanentAddress presentAddress email joiningYear designation category memberID monthlyCost amountSpent date of order	changePassword() updateInformation() retrieveInformation() storeOrderInformation() searchBook() provideBorrowingInfo() updateBorrowingInfo() viewMonthlyCost() getReport() submitComplaint()
2.	Accountant (extends ClubMember)		getNotifiedOfOrder() sendMonthlyCostPerMember() addTransaction() receiveEarnings()
3.	Manager (extends ClubMember)		getNotification() respondToComplaint() sendMsgThroughMail() notify() generateReport() confirmBooking() cancelBooking() updateFoodItems()
4.	Cook (extends ClubMember)		selectDeliveryTime() send()
5.	NetworkManager (extends ClubMember)	active	verify() add()
6.	Librarian (extends ClubMember)	active	verify() getInfo() checkfine() requestUpdate() updateDatabase(MembershipCard) add()

			updateCard(MembershipCard)
7.	GeneralMember (extends ClubMember)	registrationID department	view() validate() orderFood() enterDesiredItem() confirmOrder() getNotifiedOfDeliveryTime()
8.	Guest	name fatherName motherName phoneNumber permanentAddress presentAddress email joiningYear designation member ID password	view() logIn() signUp() generateBookingApplication() applyForHallReservation()
9.	Complaint	complaintID question Text response Text	view() addResponse() takeQuestion()
10.	Server	list <accessionNumber> list<link>	add() display()
11.	MembershipCard	memberID name list<borrowID> totalFinePayable	update() verify()
12.	FoodInformation	foodItem availabilityOfFood costOfFoodItem	displayMenuAndAvailability() changeAvailabilityOfFood() store()
13.	DatabaseOperator	jDBCConnector statement query resultSet	addToDatabase() updateDatabase() sendReport() verifyInformation() sendMsgThroughMail() getInfo()
14.	BookingApplication	applicationID referencedID name nationalID hiringDate typeOfRent contactNumber	setStatus() setTransaction() getReturnedAmount(Date)

		contactMail purpose bookingID applicationID cautionMoney paidAmount transactionID bookingStatus	
15.	Transaction	transactionID dateOfTransaction amount type memberID category	store()
16.	RB		receiveNotification() sendInformation() receiveTransaction() sendEarnings()

Table 6.4: Class Attributes and Methods Table for CMSDU

6.5 Class Cards

ClubMember	
Responsibilities	Collaborators
Updating profile	DatabaseOperator
Searching books	DatabaseOperator
Borrowing books	DatabaseOperator
Returning books	DatabaseOperator, Librarian
Viewing monthly cost	DatabaseOperator
Receiving Monthly Report	DatabaseOperator
Searching Online Book	Server
Making Complaints	Complaint, Server

Class Card 1: Class Card for Class ClubMember

Accountant	
Responsibilities	Collaborators
Storing Order	ClubMember
Sending Monthly Cost	RB
Receiving earnings	RB
Adding transaction	ClubMember

Class Card 2: Class Card for Class Accountant

Manager	
Responsibilities	Collaborators
Forwarding application	GeneralMember
Confirming booking	DatabaseOperator
Cancelling booking	DatabaseOperator
Updating food menu	FoodInformation
Verifying member's information	GeneralMember
Generating Report	DatabaseOperator
Responding to Complaint	Complaint

Class Card 3: Class Card for Class Manager

Cook	
Responsibilities	Collaborators
Selecting Delivery time	ClubMember

Class Card 4: Class Card for Class Cook

NetworkManager	
Responsibilities	Collaborators
Adding book	Server

Class Card 5: Class Card for Class NetworkManager

Librarian	
Responsibilities	Collaborators
Verifying membership card	GeneralMember, MembershipCard
Checking fine	GeneralMember, MembershipCard, DatabaseOperator
Receiving information	DatabaseOperator
Adding new entry	DatabaseOperator
Requesting update	NetworkManager

Class Card 6: Class Card for Class Librarian

GeneralMember	
Responsibilities	Collaborators
Viewing food menu	FoodInformation
Ordering food	Cook
Getting delivery time	Cook
Updating profile	DatabaseOperator
Validating Application	DatabaseOperator

Class Card 7: Class Card for Class GeneralMember

Guest	
Responsibilities	Collaborators
Applying for booking	BookingApplication, DatabaseOperator, Manager
Registering	DatabaseOperator
Logging in	DatabaseOperator

Class Card 8: Class Card for Class Guest

Complaint	
Responsibilities	Collaborators
Taking complaints/questions	Taking complaints/questions
Responding to complaints/questions	Responding to complaints/questions

Class Card 9: Class Card for Class Complaint

Server	
Responsibilities	Responsibilities
Showing PDF version of book	Showing PDF version of book
Adding new books	Adding new books

Class Card 10: Class Card for Class Server

MembershipCard	
Responsibilities	Collaborators
Getting verified	Librarian, GeneralMember

Class Card 11: Class Card for Class MembershipCard

FoodInformation	
Responsibilities	Collaborators
Storing Updated Food Menu	Manager
Changing availability per order	ClubMember
Displaying menu	ClubMember

Class Card 12: Class Card for Class FoodInformation

DatabaseOperator	
Responsibilities	Collaborators
Updating database	
Generating report	BookingApplication, ClubMember
Verifying information	ClubMember
Generating search result	ClubMember
Retrieving Information	Librarian

Class Card 13: Class Card for Class DatabaseOperator

BookingApplication	
Responsibilities	Collaborators
Updating information	DatabaseOperator
Viewing information	DatabaseOperator, Manager

Class Card 14: Class Card for Class BookingApplication

Transaction	
Responsibilities	Collaborators
Storing Data	Accountant

Class Card 15: Class Card for Class Transaction

RB	
Responsibilities	Collaborators
Sending user information	Manager
Sending earning status	Accountant, Manager
Receiving transactions	Accountant

Class Card 16: Class Card for Class RB

6.6 Class Responsibility Collaborator Diagram for CMSDU

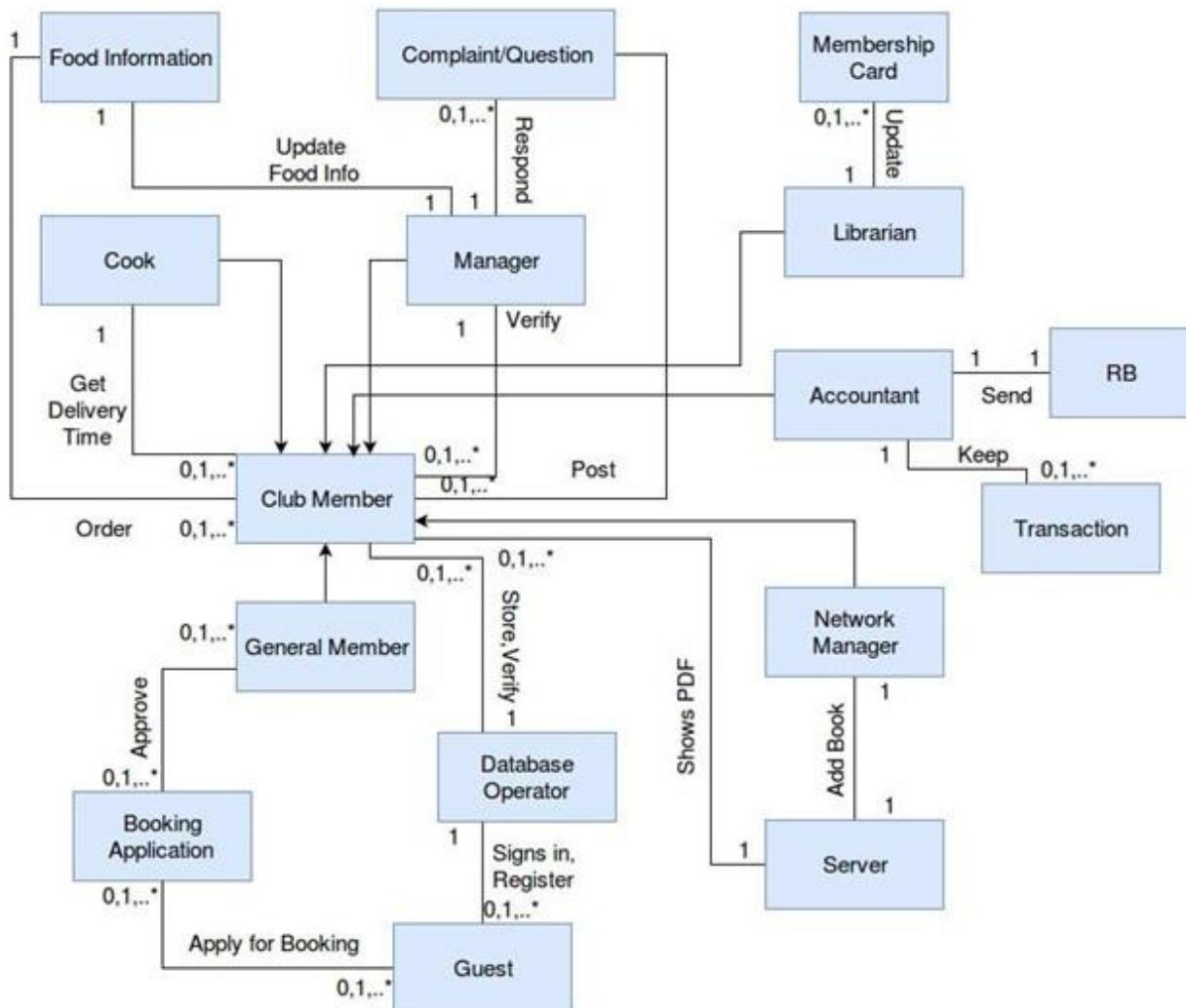


Figure 6.6: Class Responsibility Collaborator Diagram for CMSDU

Chapter 7: Behavioral Modeling of DU Club Management System

7.1 Event Initiator and Collaborators Identification

7.1.1 Club Management System for Dhaka University Club

Events	Initiator	Collaborators
Chose to display menu	ClubMember	FoodInformation
ordered	ClubMember	FoodInformation
Updated food menu	Manager	FoodInformation
Stored food information	FoodInformation	DatabaseOperator
Food availability changed	FoodInformation	
New order arrived	ClubMember	Cook, Accountant
Sent delivery time	Cook	ClubMember
Order stored	Accountant	DatabaseOperator
One month passed	Accountant	RB,ClubMember
Sent Earnings	RB	Accountant
Earnings received	Accountant	RB
New transaction made	Club Member	Accountant,Transaction
Transaction added	Accountant	DatabaseOperator,Transaction
Chose to order food	ClubMember	FoodInformation
Got delivery time	ClubMember	Cook
Chose to update profile/password	ClubMember	DatabaseOperator
Password/profile updated	DatabaseOperator	ClubMember
Question submitted	Member	Complaint_Question, Server
Response provided	Manager	Complaint_Question, Server

Search category provided	Club_Member	Database_Operator
Query provided	Club_Member	Database_Operator
Details for borrowing book provided	Club_Member	Database_Operator
Details for returning book provided	Club_Member	Database_Operator, Librarian
Details for new entry provided	Librarian	Database_Operator
Search category provided	Club_Member	Server
Query provided	Club_Member	Server
Details for new entry provided	Librarian	Server, Network Manager
Transaction made	Transaction	Club Member, Accountant
Signed up	Guest	DatabaseOperator
Generated booking application	Guest	DatabaseOperator, Booking Application
Applied for booking	Guest	BookingApplication
Update Information	BookingApplication	DatabaseOperator
Returned Information	BookingApplication	DatabaseOperator
Chose to add new entry	ClubMember	DatabaseOperator
Added new entry	DatabaseOperator	
Updated database	DatabaseOperator	
Chose to view report	Manager	DatabaseOperator
Send report successfully	DatabaseOperator	
Chose to authenticate	Club Member	DatabaseOperator
Confirmed Verification	DatabaseOperator	
Chosen member authorization	Manager	DatabaseOperator
Chosen food menu	Manager	DatabaseOperator, FoodInformation
Chosen application forwarding	Manager	ClubMember, DatabaseOperator
Chosen booking confirmation	Manager	DatabaseOperator, Guest, ClubMember
Chosen booking cancellation	Manager	DatabaseOperator, Guest, ClubMember
Cancelled booking	Manager	DatabaseOperator, Guest, ClubMember
Confirmed booking	Manager	DatabaseOperator, Guest, ClubMember

Application forwarded	Manager	ClubMember,Guest
Updated food menu	Manager	FoodInformation
Checked Information	Manager	DatabaseOperator
Chose to registration	Guest	RB
Sent information successfully	RB	DatabaseOperator
Chose to transaction	Accountant	RB
Received member wise transaction ID	RB	
Sent earning status	RB	Accountant,Manager,DatabaseOperator

Table 7.1.1.1: Event Initiator, Collaborator table for Club Management System for Dhaka University Club

7.2 State Transition Diagrams

7.2.1 Club Management System for Dhaka University Club

Class 1: ClubMember

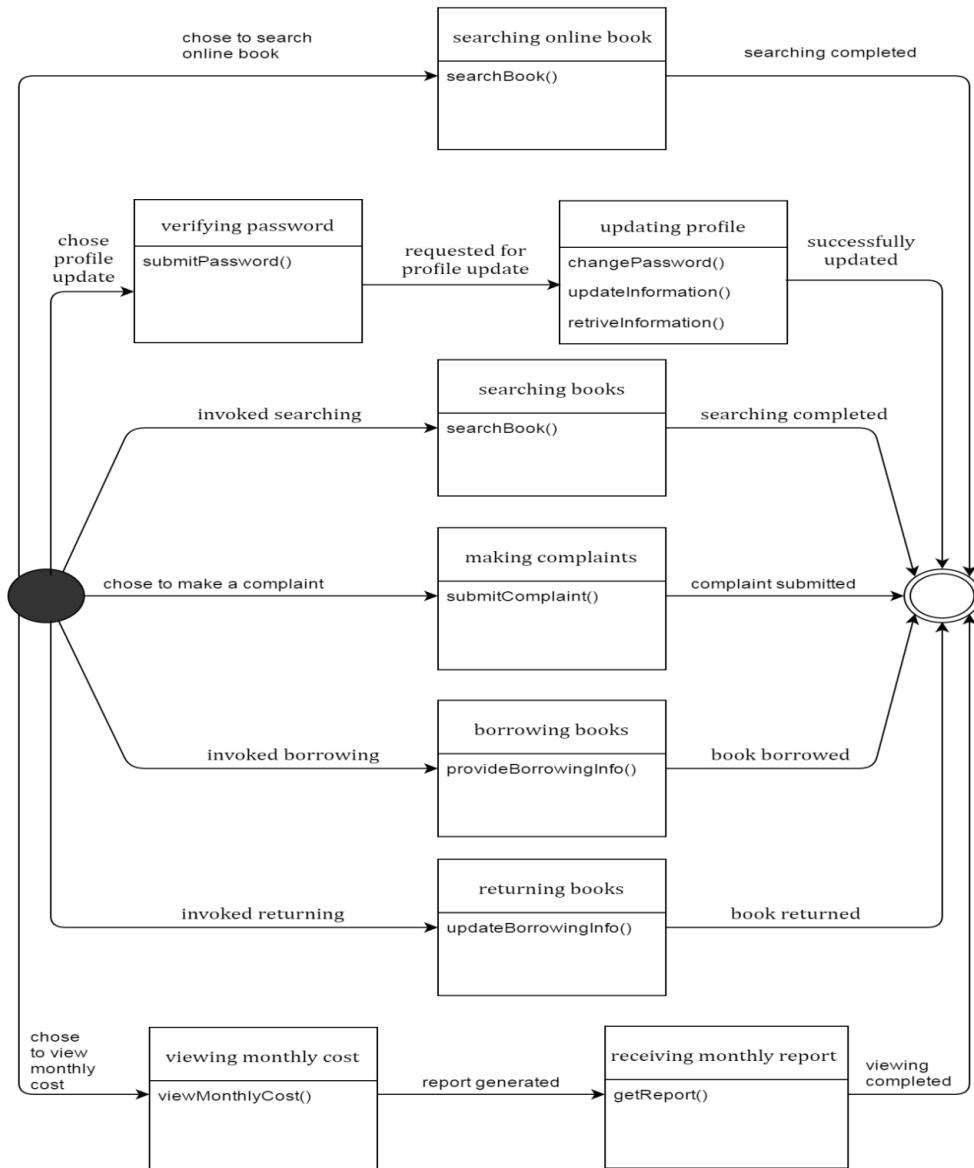


Figure 7.2.1.1: State Transition Diagram for class ClubMember

Class 2: Accountant

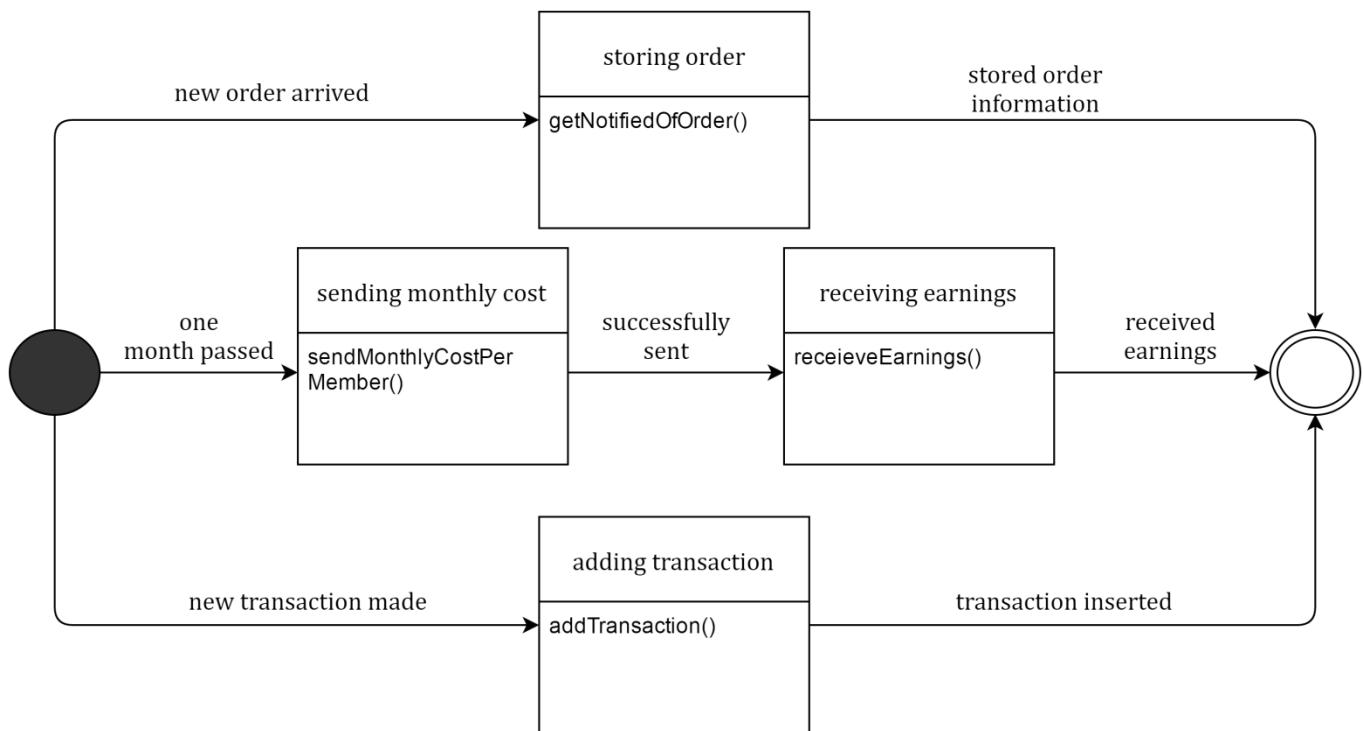


Figure 7.2.1.2: State Transition Diagram for class Accountant

Class 3: Manager

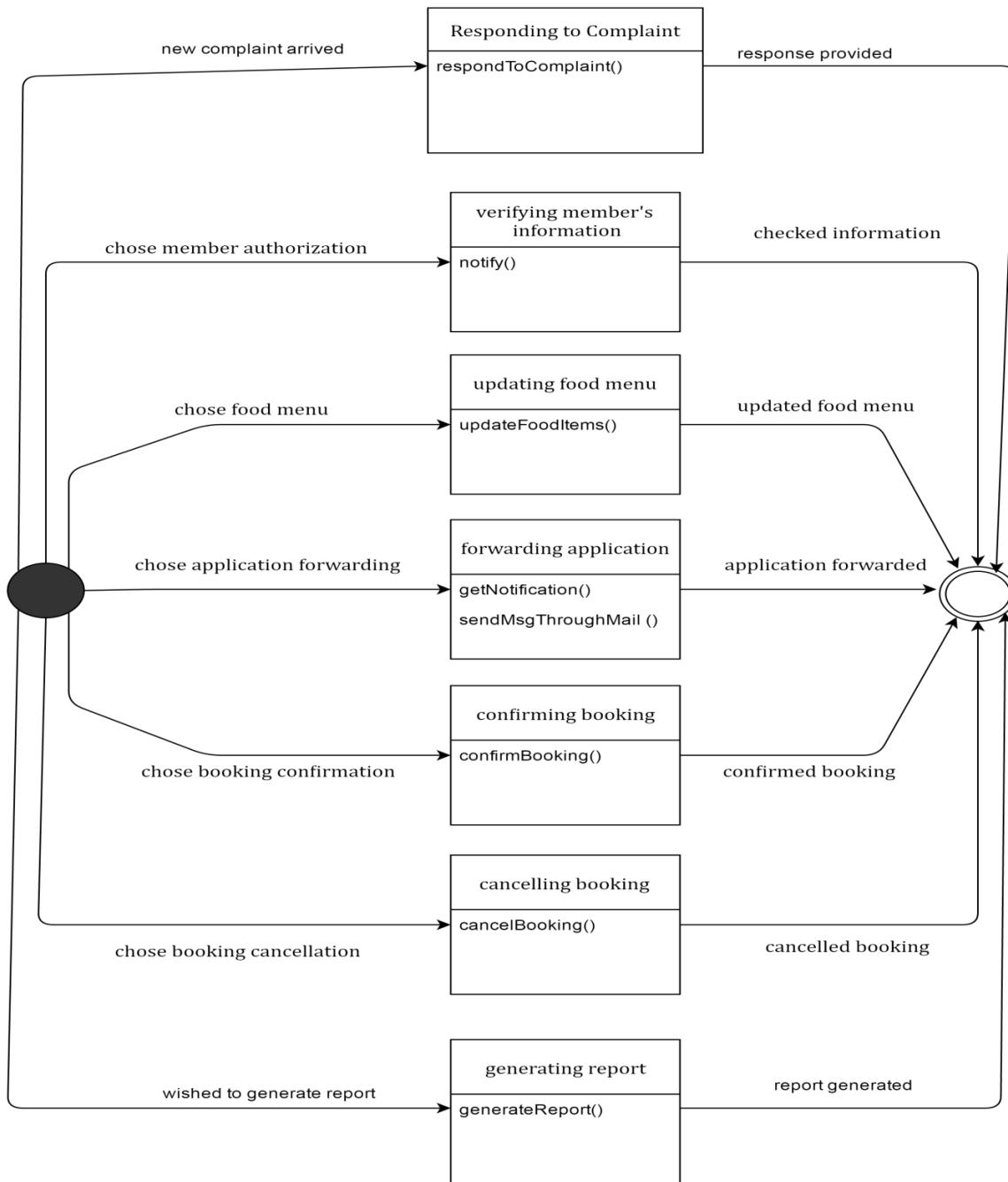


Figure 7.2.1.3: State Transition Diagram for class Manager

Class 4: Cook

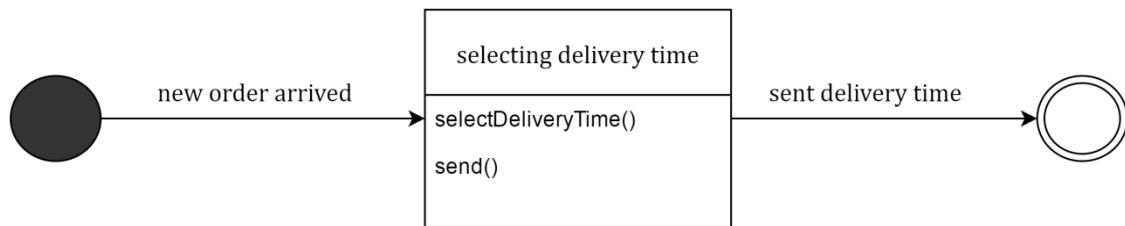


Figure 7.2.1.4: State Transition Diagram for class Cook

Class 5: NetworkManager

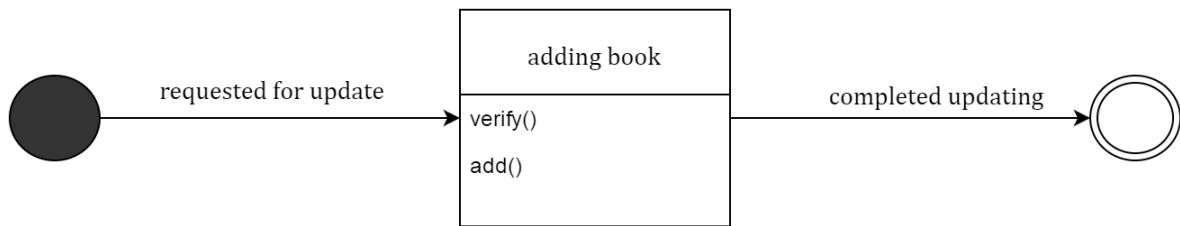


Figure 7.2.1.5: State Transition Diagram for class NetworkManager

Class 6: Librarian

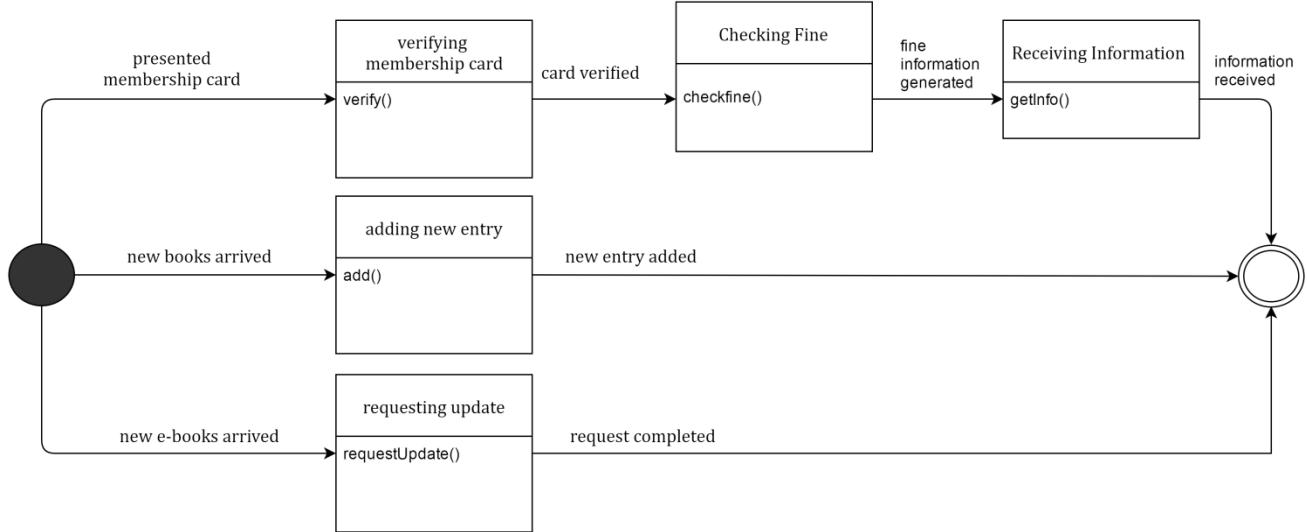


Figure 7.2.1.6: State Transition Diagram for class Librarian

Class 7: GeneralMember

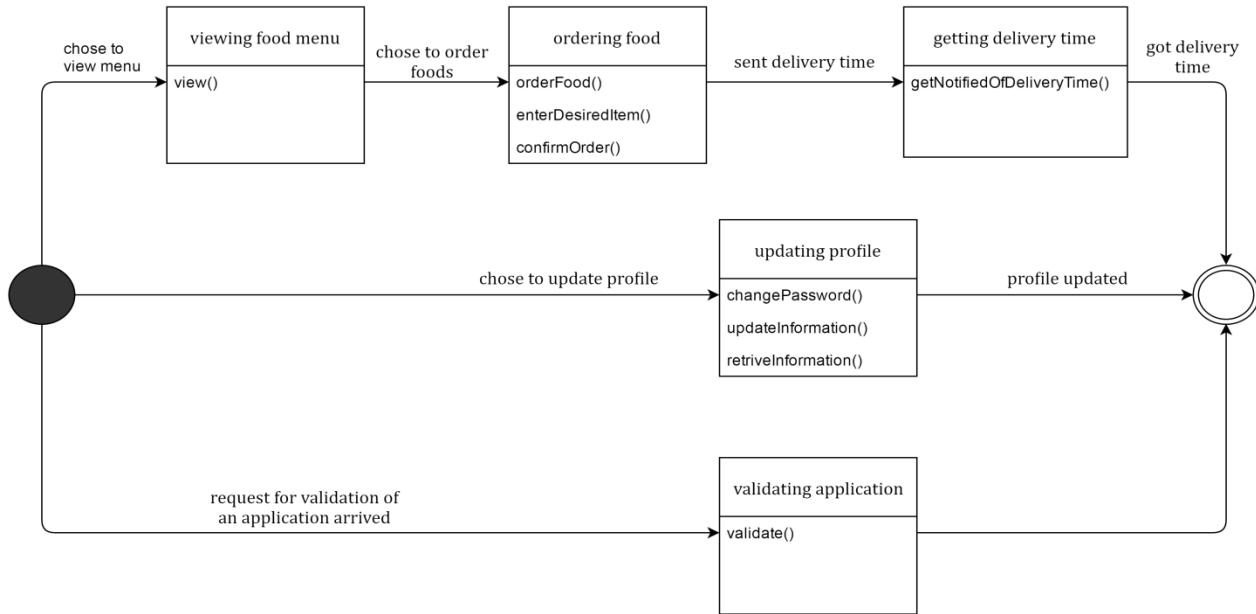


Figure 7.2.1.7: State Transition Diagram for class GeneralMember

Class 8: Guest

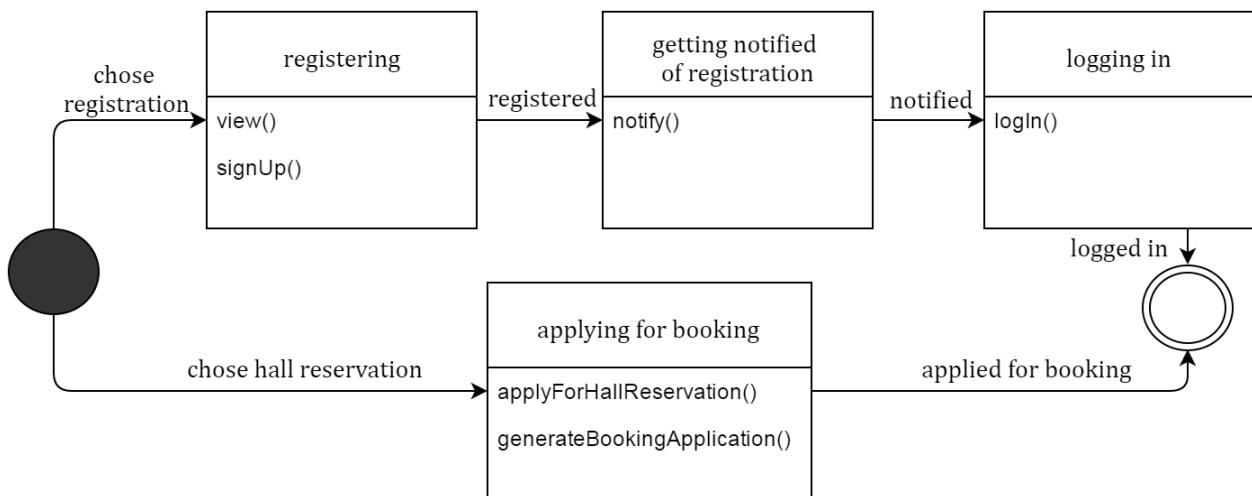


Figure 7.2.1.8: State Transition Diagram for class Guest

Class 9: Complaint

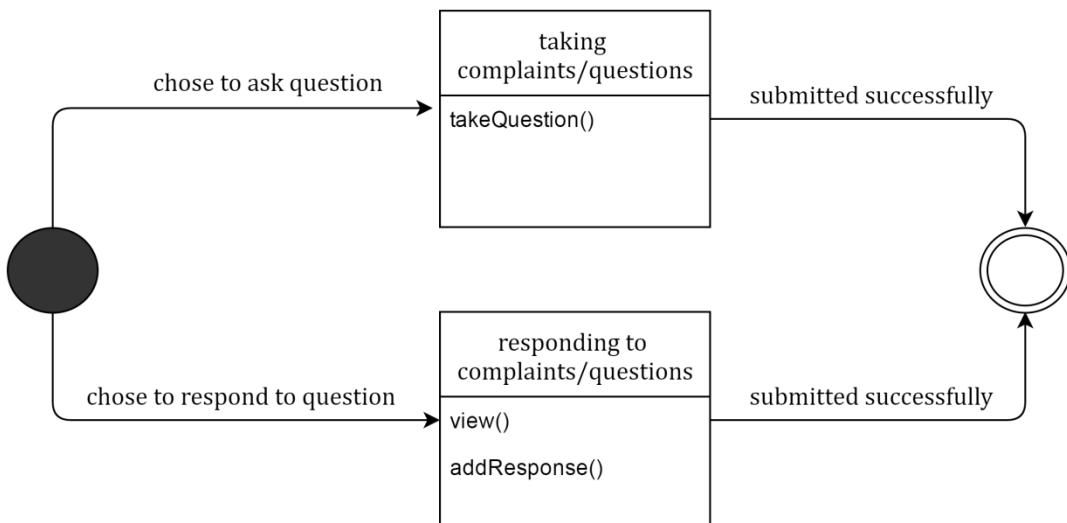


Figure 7.2.1.9: State Transition Diagram for class Complaint

Class 10: Server

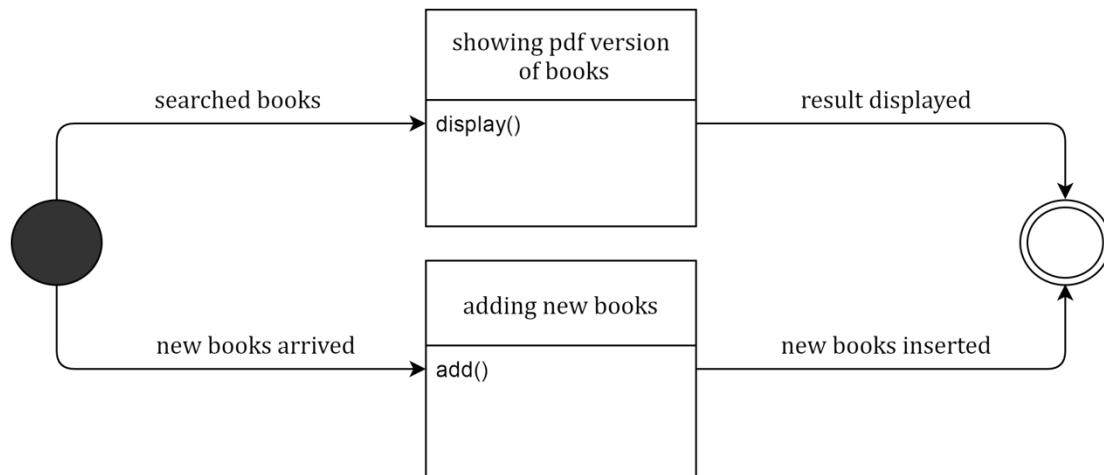


Figure 7.2.1.10: State Transition Diagram for class Server

Class 11: MembershipCard

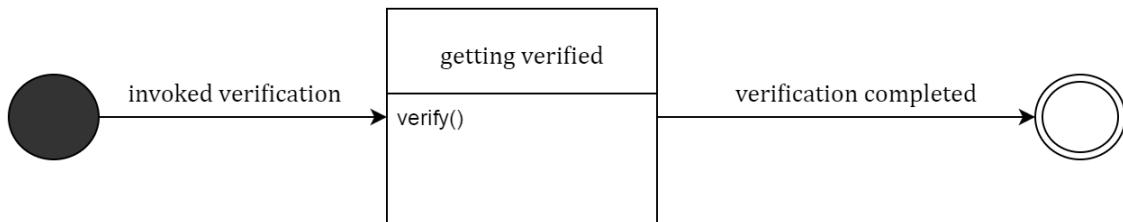


Figure 7.2.1.11: State Transition Diagram for class MembershipCard

Class 12: FoodInformation

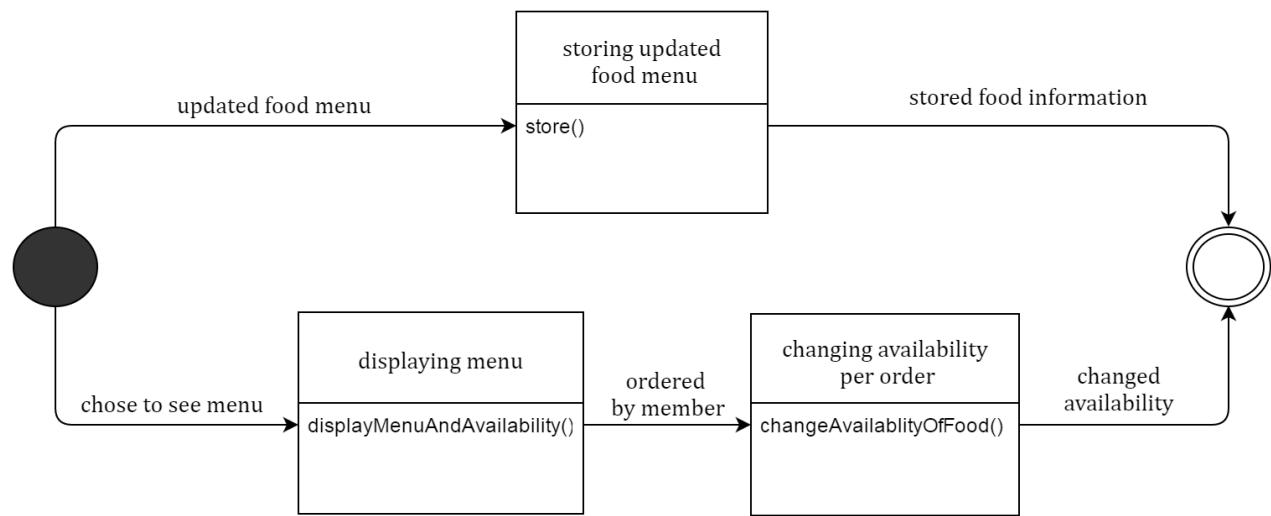


Figure 7.2.1.12: State Transition Diagram for class FoodInformation

Class 13: DatabaseOperator

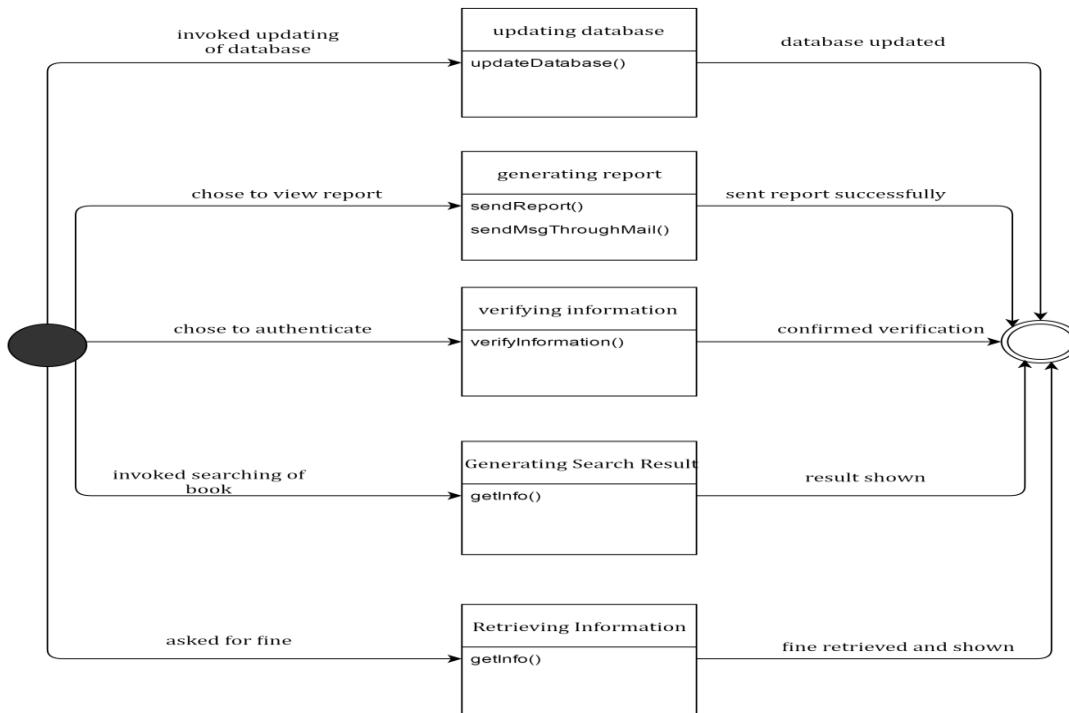


Figure 7.2.1.13: State Transition Diagram for class DatabaseOperator

Class 14: BookingApplication

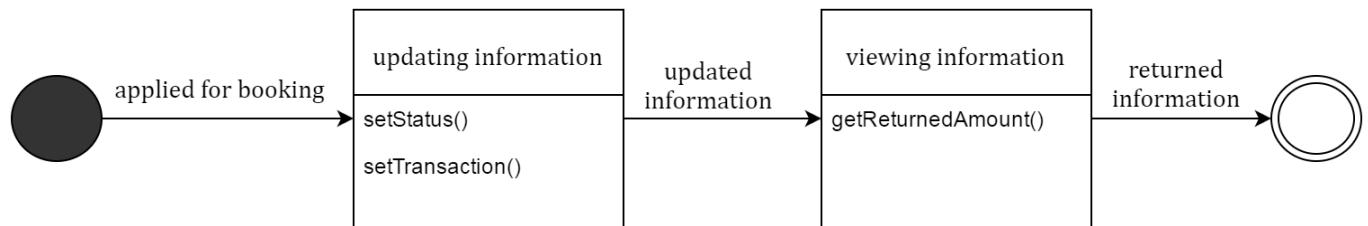


Figure 7.2.1.14: State Transition Diagram for class BookingApplication

Class 15: Transaction

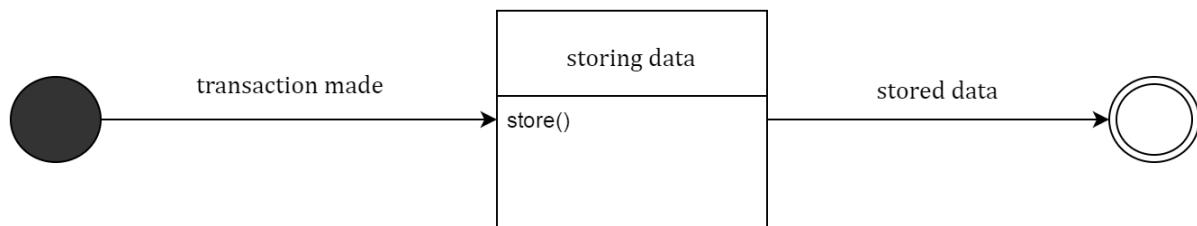


Figure 7.2.1.15: State Transition Diagram for class Transaction

Class 16: RB

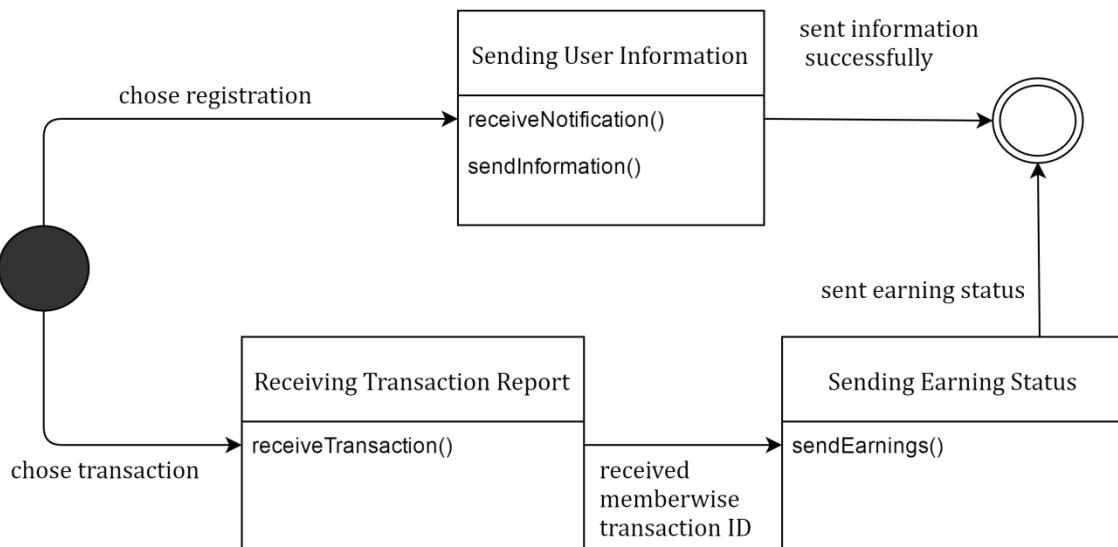


Figure 7.2.1.16: State Transition Diagram for class RB

7.3 Sequence Diagrams

7.3.1 Authentication System

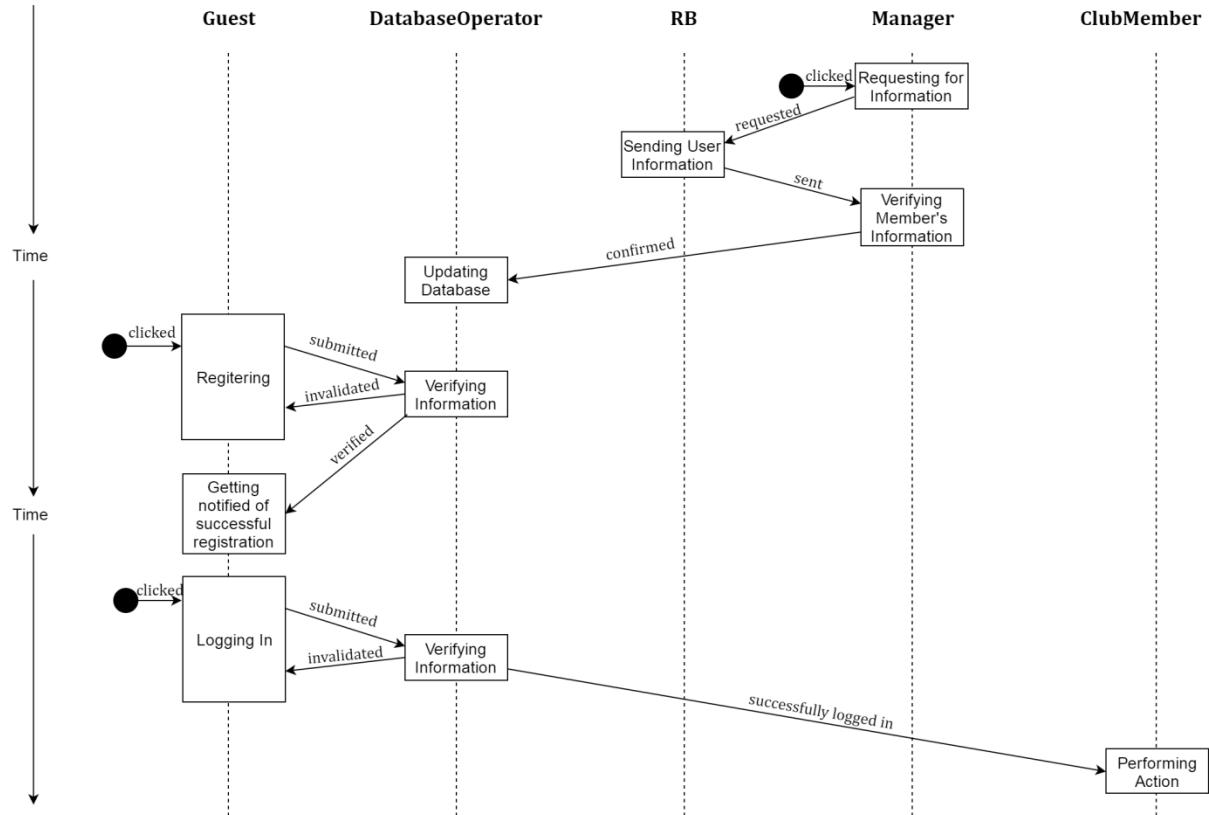


Figure 7.3.1: Sequence Diagram for Authentication System

7.3.2 Account Management System

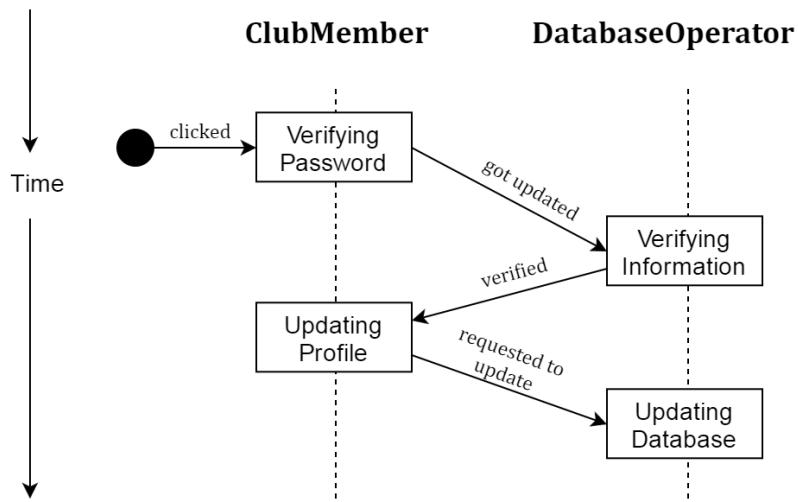


Figure 7.3.2: Sequence Diagram for Account Management System

7.3.3 Cafeteria Management System

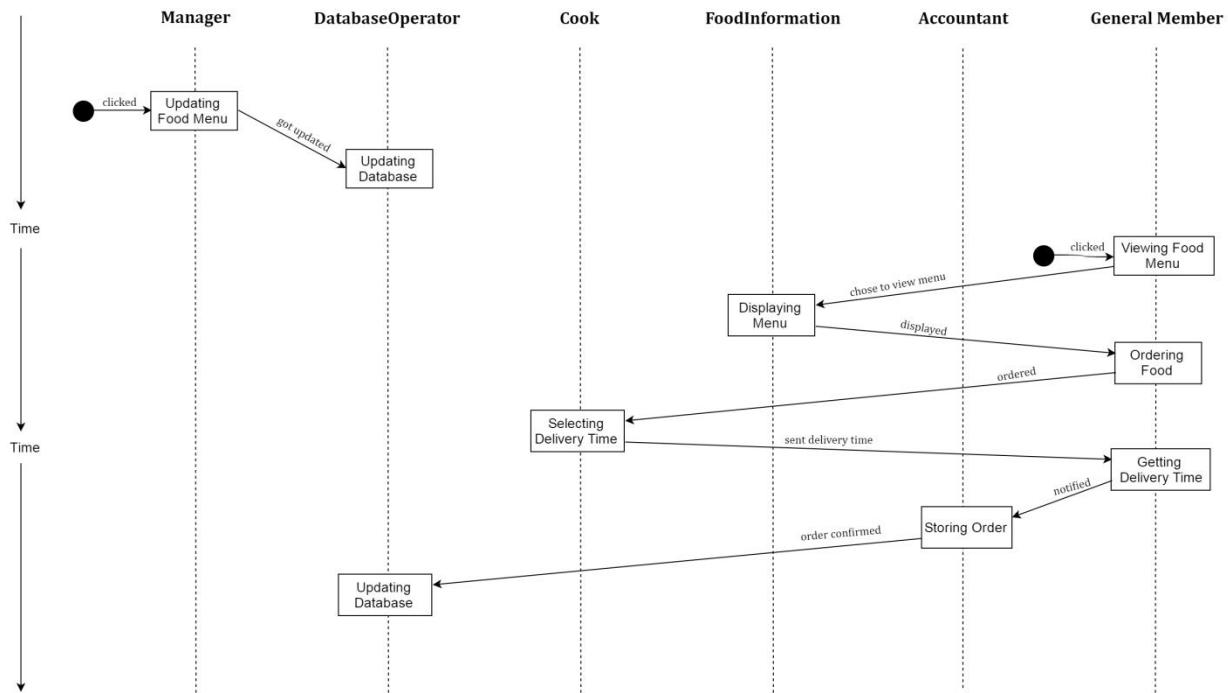


Figure 7.3.3: Sequence Diagram for Cafeteria Management System

7.3.4 Transaction Management System

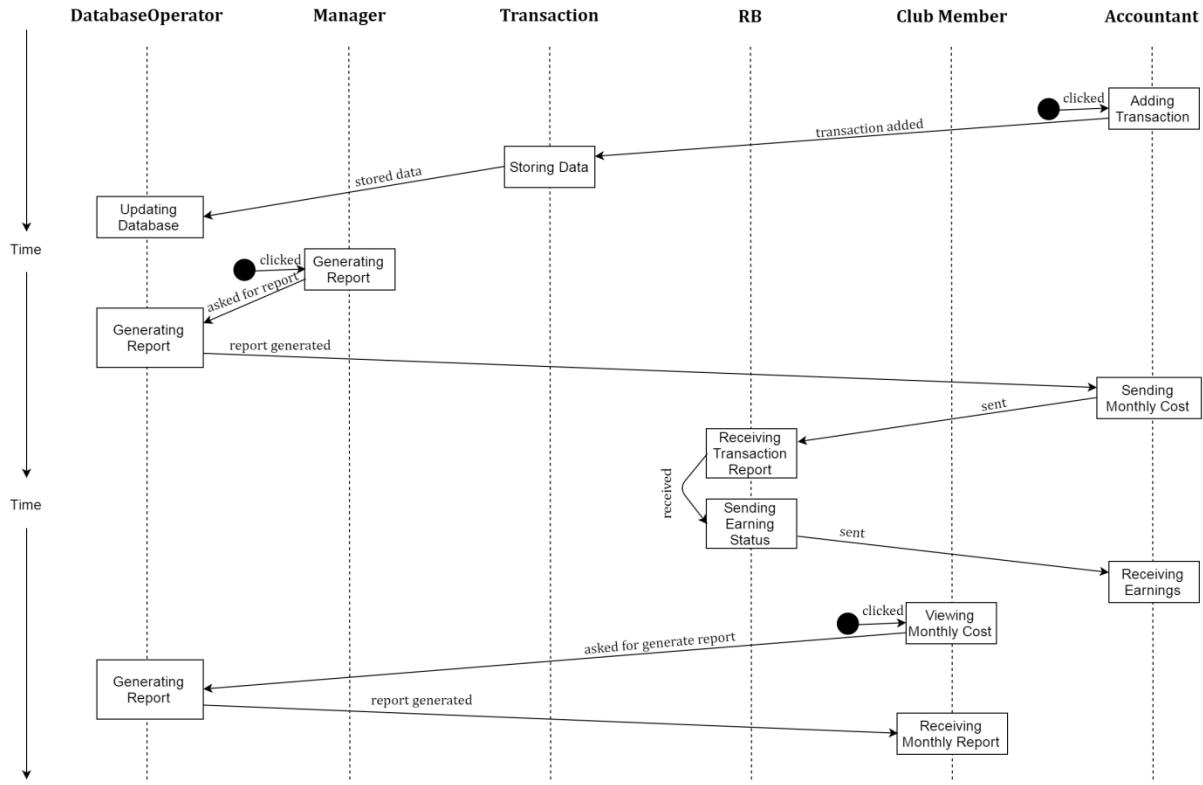


Figure 7.3.4: Sequence Diagram for Transaction Management System

7.3.5 Hall Reservation System

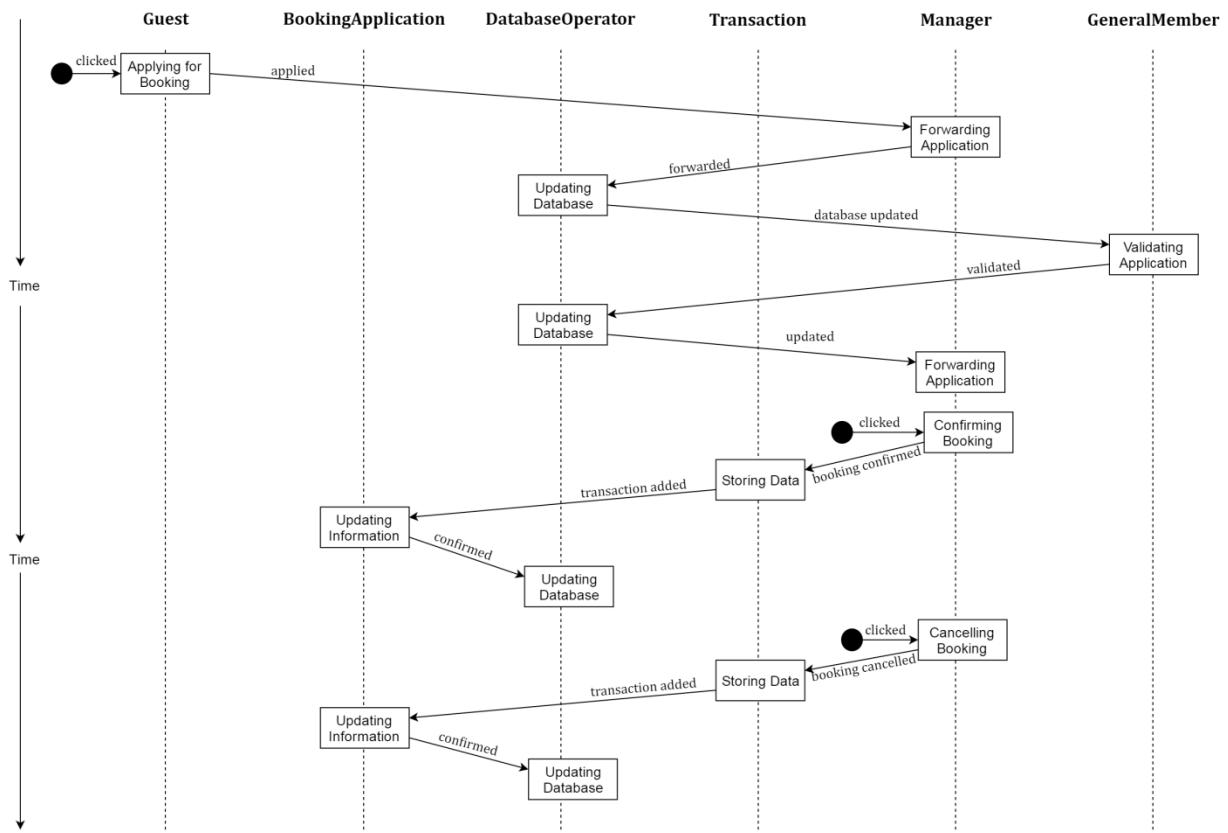


Figure 7.3.5: Sequence Diagram for Hall Reservation System

7.3.6 Virtual Helpline

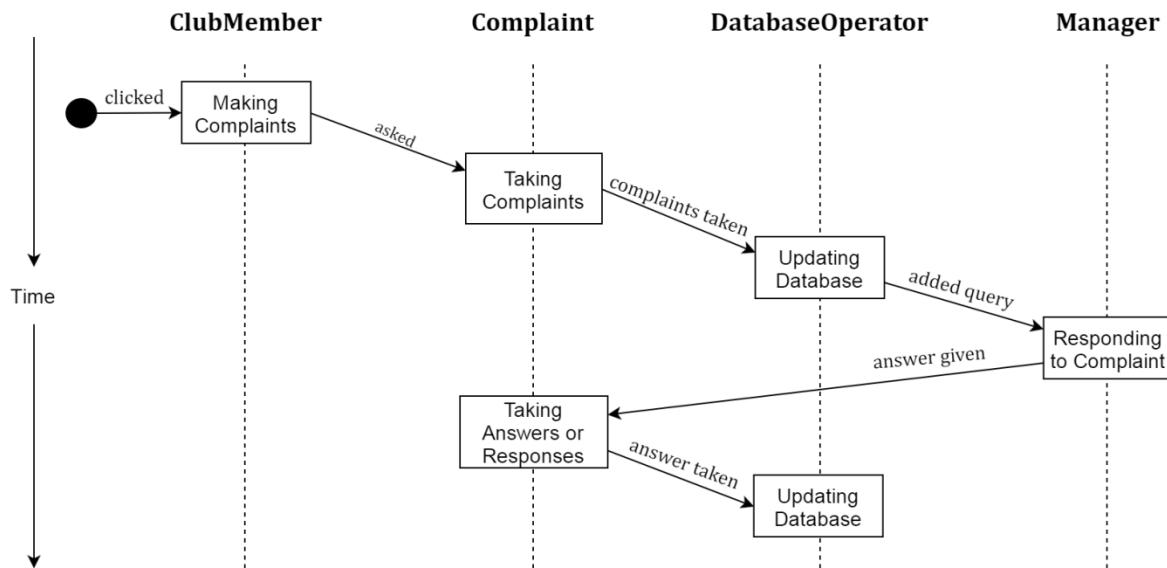


Figure 7.3.6: Sequence Diagram for Virtual Helpline

7.3.7 Library Stack Management

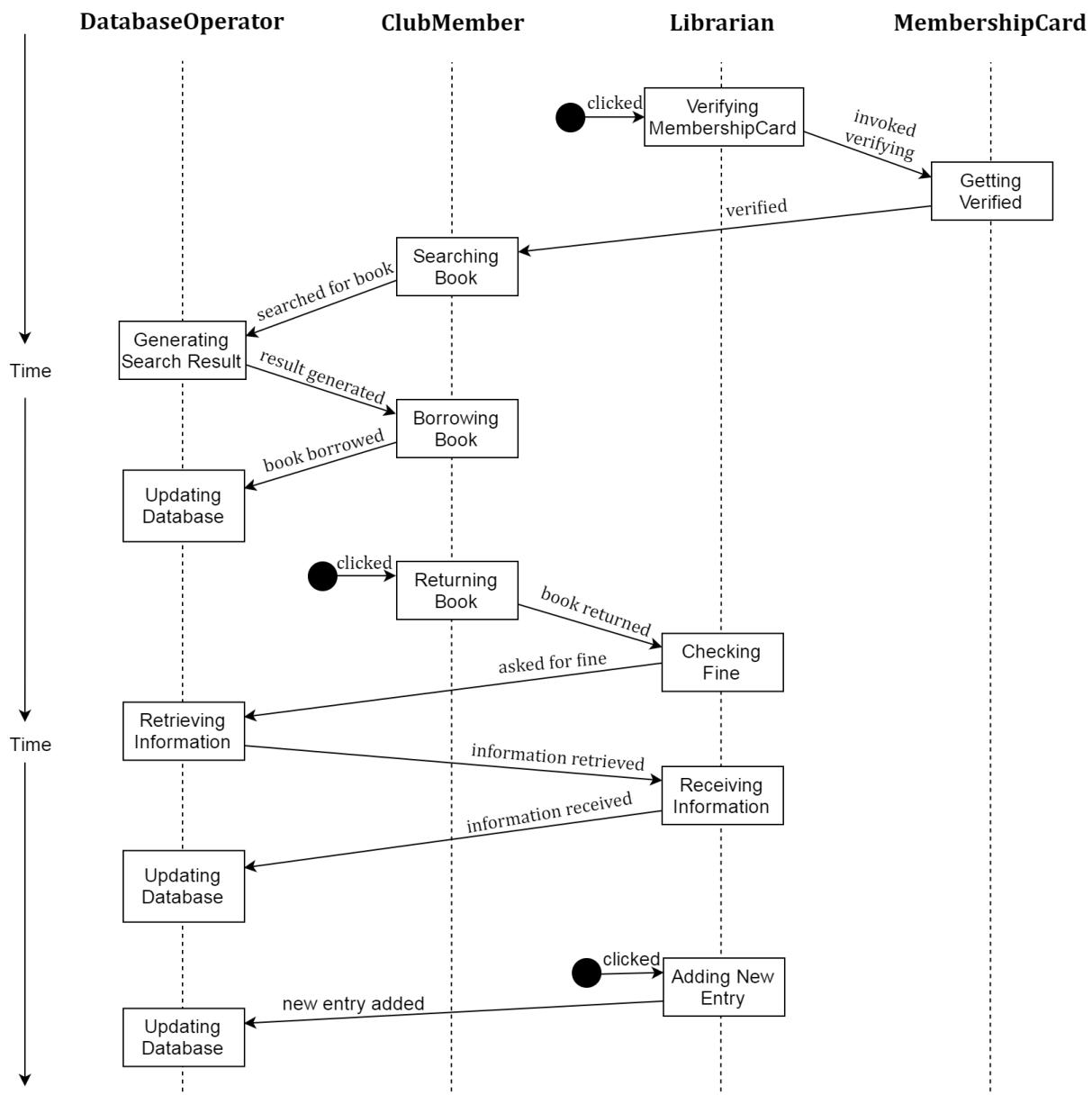


Figure 7.3.7: Sequence Diagram for Library Stack Management

7.3.8 E-Library Facilities

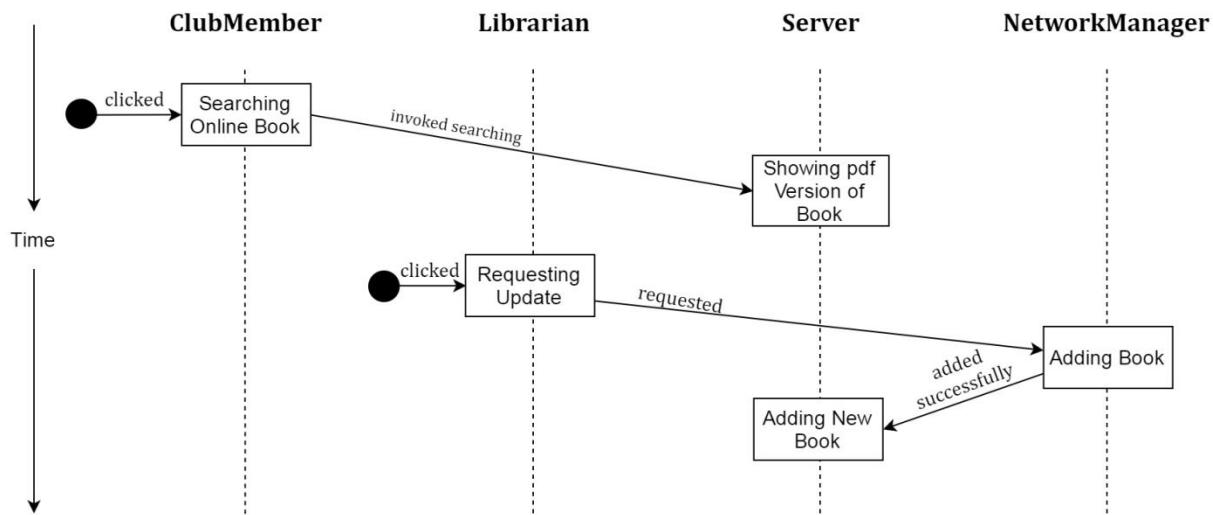


Figure 7.3.8: Sequence Diagram for E-Library Facilities

Chapter 8: Conclusion

We are pleased to submit the final SRS report on Club Management System of Dhaka University Club. From this report, the readers will get a clear and easy view of club management system. This Software Requirement Specification document can be used effectively to maintain software development cycle. It will be very easy to conduct the whole project using this SRS. Hopefully, this document can also help our junior BSSE batch students. We tried our best to remove all dependencies and make effective and fully designed SRS. We believe that reader will find it in order.

Group meetings

Date	Topic of Discussion	Place	702	708	713	720	724	728	735
7 August, 2016	Discussing about the given task	IIT, University of Dhaka Room no: 406	✓	✓	✓	✓	✓	✓	✓
14 August, 2016	Identify Stack Holders	IIT, University of Dhaka Room no: 406	✓	✓	✓	✓	✓	✓	✓
20 August, 2016	Collecting requirements from Stack Holder	Dhaka University Club	✓	✓	✓	✓	✓	✓	✓
25 August, 2016	Discussion on requirements	Via online communication		✓	✓	✓	✓	✓	✓
4 September, 2016	Discussion on scenario	IIT, University of Dhaka	✓	✓	✓	✓	✓	✓	✓
18 September, 2016	Modularize overall scenario	IIT, University of Dhaka Room no: 406	✓	✓	✓	✓	✓	✓	✓
21 September, 2016	Discussion on use case modeling	IIT, University of Dhaka Room no: 406	✓	✓	✓	✓	✓	✓	✓
28 September 2016	Discussion on Activity diagram	IIT, University of Dhaka Room no: 406	✓	✓	✓	✓	✓	✓	✓
25 October, 2016	Discussion on swim lane diagram	IIT, University of Dhaka Room no: 406	✓	✓	✓	✓		✓	✓
27 October, 2016	Merging all Activity and swim lane diagram	IIT, University of Dhaka Room no: 406	✓	✓	✓	✓	✓	✓	
31 October, 2016	Discussion on Data modeling	IIT, University of Dhaka Room no: 406	✓	✓	✓	✓	✓	✓	✓
4 November, 2016	Discussion on Data modeling	IIT, University of Dhaka Room no: 406		✓	✓	✓	✓	✓	✓
8	Discussion on	IIT, University	✓	✓	✓	✓	✓	✓	✓

November, 2016	Class based modeling	of Dhaka Room no: 406						
14 November, 2016	Discussion on CRC modeling	IIT, University of Dhaka Room no: 406	✓	✓	✓	✓	✓	✓
17 November, 2016	Discussion on behavioral modeling	IIT, University of Dhaka Room no: 406	✓	✓	✓	✓	✓	✓
19 November, 2016	Merging all model	IIT, University of Dhaka Room no: 406	✓	✓	✓	✓	✓	✓
20 November, 2016	Prepare presentation slide	IIT, University of Dhaka	✓	✓	✓	✓	✓	✓
11 December, 2016	Discussion on errors of previous report	IIT, University of Dhaka	✓	✓	✓	✓	✓	✓
15 December, 2016	Finalize the report	IIT, University of Dhaka	✓	✓	✓	✓	✓	✓

Table I: Group Meetings Table

References

1. Software Engineering: A Practitioner's Approach - Eighth Edition (Roger S. Pressman & Bruce R. Maxim): Chapter-8, Page-149
2. Software Engineering: A Practitioner's Approach - Eighth Edition (Roger S. Pressman & Bruce R. Maxim): Chapter-10, Page-182