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POLYTECHNIC UNIVERSITY OF THE PHILIPPINES
TAGUIG BRANCH
General Santos Avenue, Bicutan Taguig City

ONLINE LIBRARY MANAGEMENT SYSTEM

A Research Proposal
presented to the faculty of
Polytechnic University of the Philippines – Taguig Branch

In Partial Fulfillment of the Requirements
for the degree Diploma in Information Communication Technology

By

Bangga, Christian Elvin R.

Seroje, Aldrin I.

Cortes, Ken Zedric C.

Gabito, Raymond

Prof. Clifford Togonon

Adviser

CERTIFICATION-AND-APPROVAL SHEET

This capstone project, **ONLINE LIBRARY MANAGEMENT SYSTEM** is prepared and submitted by CHRISTIAN ELVIN R. BANGGA, ALDRIN I. SEROJE, KEN ZEDRIC C. CORTES, and RAYMOND GABITO in partial fulfilment of the requirements for the degree, DIPLOMA IN INFORMATION COMMUNICATION TECHNOLOGY has been examined and recommended for Oral Examination.

PROF. CLIFFORD S. TOGONON
Adviser

APPROVAL

APPROVED by the Panel on Oral Examination on July 29, 2021 with the grade of PASSED.

PROF. GECILIE C. ALMIRAÑEZ
Chair

MS. INNAH A. R MADRID
Member

MS. STEPH D. ZAMORA
Member

MR. IVAN KESTER MARCALA
Member

MR. KARL HENREICH POTENCIANO
Member

ACCEPTED in partial fulfilment of the requirements for the degree of Diploma in Information Communication Technology.

DR. MARISSA B. FERRER
Director, PUP Taguig

CERTIFICATION OF ORIGINALITY

This is to certify that the capstone work presented in this thesis, Online Library Management System. It is also for the degree Diploma in Information Communication Technology at the Polytechnic University of the Philippines – Taguig Branch that embodies the result of original and scholarly work carried out by the undersigned. This dissertation does not contain words or ideas taken from published sources or written works that have been accepted as basis for the award of a degree from any other higher education institution, except where proper referencing and acknowledgement were made.

Bangga, Christian Elvin R.
Researcher

Seroje, Aldrin I.
Researcher

Cortes, Ken Zedric C.
Researcher

Gabito, Raymond
Researcher

Date Signed

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ABSTRACT

Title : Online Library Management System

Researchers : Bangga, Christian Elvin R.
Seroje, Aldrin I.
Cortes, Ken Zedric C.
Gabito, Raymond

Degree : Diploma in Information Communication Technology

Institution : Polytechnic University of the Philippines – Taguig Branch

Year : September 2018

Adviser : Prof. Clifford S. Togonon

It is an automated system that will help the admin of the library to do an inventory of the materials, to monitor the students, and to generate reports. The Polytechnic University of the Philippines Library is an educational institution located in Taguig City which uses manual inputting of data in library transactions. The project aims to ease the workload of the librarian and make the library transaction more efficient for future use. The following points of the current system should be automated.

- Make the time-in and out process more secure and efficient.
- More effective on monitoring the library premises.

Librarian or the person in charge is certain that the users are already timed in before they use the facility.

- Maintainable in finding penalty prices.

The system will automatically provide the penalty amount for the user.

- Monitor the materials efficiently

Reduce the chance of having missing items.

- Generate reports.

 Generate reports on the activity log of users.

 Generate lists of books with their status.

 Inventory of materials.

 Generate a list of issued and borrowed books.

Based on the data and processes that the researchers have gathered, the system will be used by the Organization as an Online Library Management System. This system will handle all the client information and transactions made by the organization. The use cases aided the developers in determining the system's requirements. It illustrates how each subsystem interacts with each other, as well as the essential transaction flow and brief explanations of the system's main functions.

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CHAPTER I

THE PROBLEM AND ITS SETTING

1.1 Introduction:

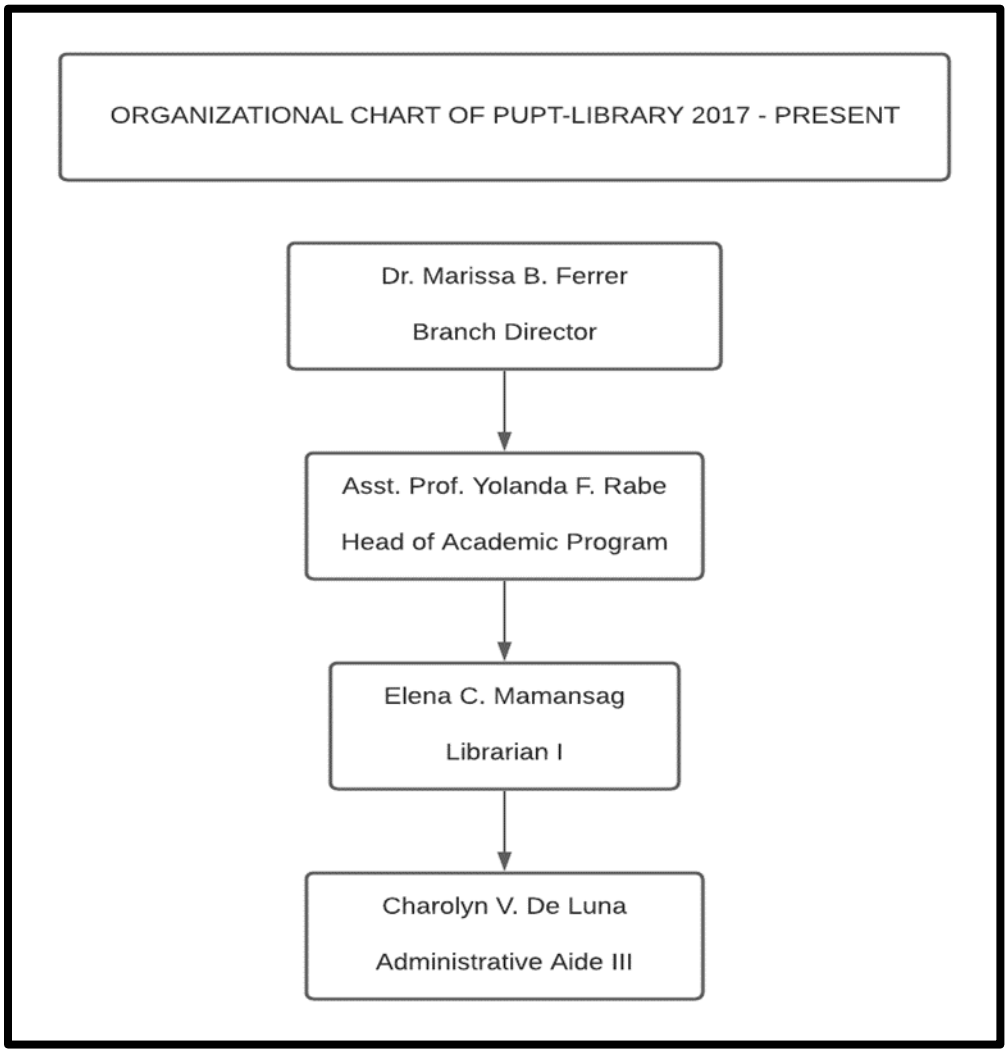
A library provides a pool of sources of information. Similar resources had made a well-defined community including readers and students to refer or to borrow the book more conveniently. The Library Management System Software for Library Management is used to find books and access journals easily. The library automation system automates the typical procedures of libraries and reduces the workload for library staff. It makes the consistency of the record and the standard quality. When people value information more and more, the information industry got developed and technology changed the expectations of libraries.

In the current library management system, the librarian is having a hard time generating the reports from the manual records of borrowed and returned books, and doing the manual inventories from all the records within the library, even the time-in and timeout of the students. Through the use of this new proposed library system, the user and the library staff will have easy access and will let the system be effective and efficient to use.

The researchers chose to set the location of the study in Polytechnic University of the Philippines-Taguig Branch located at General Santos Avenue in Taguig City. The said university is acknowledged for its academic excellence. It is headed by the Branch Director, Dr. Marissa B. Ferrer along with the branch

officials. This research will focus mainly on storing and managing all the inventories of the materials and monitoring of the student's time-in and time-out records. Generating reports and charging penalties for the users.

1.2. Organizational Structure



1.3 Theoretical Framework

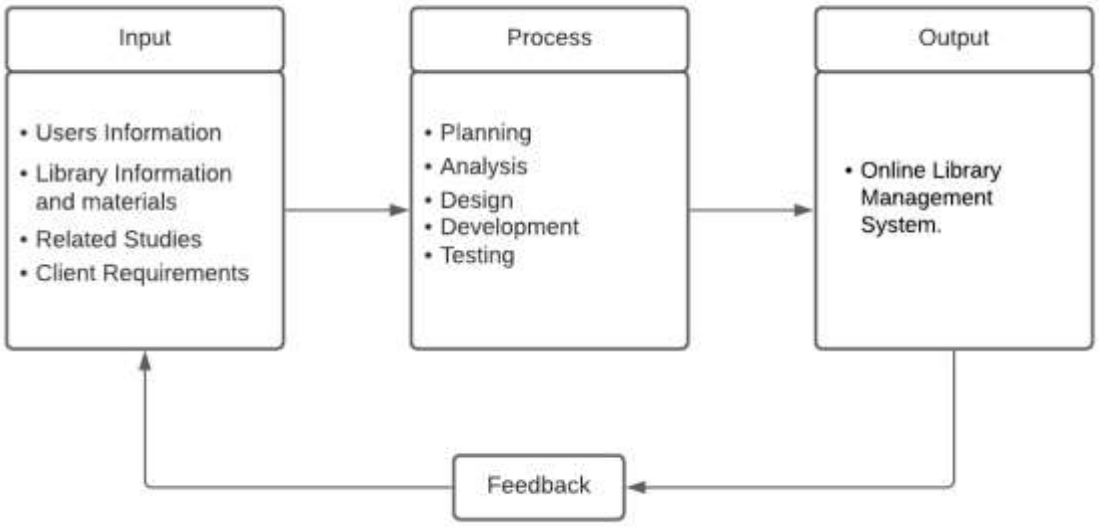
This research study was based on the study of the Library System at CSIBER. This research examined the usability of the library system by using a QR code. In this digital age, with the advances in communication technology, data and information are no longer tied to a physical location. The current generation of students are often adept at “multiprocessing” and make abundant use of internet resources rather than offline library resources. This can be attributed to the ease of finding information on one click rather than spending time searching the book in the library. But in recent years, the library system has become technologically advanced providing new services such as Online Public Access Catalogue (OPAC) interfaces, virtual cataloging and referencing automated current awareness, and downloadable media which are accessible from personal computers and/or mobile devices.

The advanced features of QR codes provide a great opportunity for users to link libraries from the physical to the virtual as QR codes can be created online and printed in a matter of minutes, without any special equipment. Though QR code is characterized by high-speed scanning, dirt, and damage-resistant with huge storage capacity and ability to store any kind of information, the education field is still way behind in the use of QR codes. Therefore, the purpose of this research is to investigate a way to find a single platform approach with the integration of a third-party library system with an educational institute website using QR code to provide library services with seamless workflows to increase efficiency.

1.4 Conceptual Framework

Based on the statement of the problem, the researchers came up with a conceptual framework. The figure below shows how the proposed system works.

Figure 1.1 Input-Output Process Diagram



The input focuses on the raw data in developing the system. It will serve as a reference for developing the library management system. The input data will be validated and processed by a different stage of system development. The output is the outcome of the processed input data such as reports, and as well as the Online Library Management System.

1.5 Statement of the Problem

The manual library system from the PUP-Taguig has been functioning for a long time. Thus, the technology that has been used to develop the library management system is outdated. Due to the large amount of data that the system has been handling, the system is having a hard time and takes some time to process it.

Does the new system maintain the effectiveness and efficiency of the system?

- Function sustainability?
- Security?
- Usability?
- Reliability?
- Performance sustainability?
- Maintainability?

- Did the system ease the manual process of adding books?
- Did the system meet the system requirement of the client and the user?

1.6 Project Assumptions

Project Name:

Online Library Management System for the Library facility in Polytechnic University of the Philippines, Taguig Branch.

Project Definition:

It is an automated system that will help the admin of the library to ease its workload and hard time in doing an inventory of the materials, monitoring the students, and generating reports.

1.7 Project Overview

1.7.1 Objective

The Polytechnic University of the Philippines Library is an educational institution located in Taguig City which uses manual inputting of data in library transactions. The project aims to ease the workload of the librarian and make the library transaction more efficient for future use.

Goals and Objective:

General Objective:

To help the facility to respond to the client's needs and to keep the organization more efficient and reliable as a source of knowledge.

Specific Objective:

The current system of the PUPT library is having a malfunction due to the technology used and then it cannot be used normally. Inventory and displaying of the materials consume a lot of time. And the monitoring of the students by the librarian is not well displayed. The researchers aim to develop a system that is accessible online so that the students can check on the materials. The following points of the current system should be automated.

- Make the time-in and out process more secure and efficient.
- More effective on monitoring the library premises.

  Librarian or the person in charge is certain that the users are already timed in before they use the facility.
- Maintainable in fining penalty price.

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- Monitor the materials efficiently

  Reduce the chance of having missing items.
- Generate reports.

- Generate reports on the activity log of users.
- Generate lists of books with their status.
- Inventory of materials.
- Generate a list of issued and borrowed books.

1.7.2 Scope and Limitations of the Study

Project Scope:

This Capstone development will focus on the following:

1. **Issuing and Borrowing System.**

   This function of the system is allowing the librarian/administrator to issue or lend a book to a user in the library and to record all the transactions that have been made.

2. **Time-In and Time-Out.**

   This function of the system tracks or records the time and day of entry and exit of the user in the facility.

3. **Inventory of the materials.**

   This function of the system helps the librarian to organize the book and other materials inside the library.

4. **Generate Penalty Receipt.**

This function of the system generates a receipt for the user who has penalties for not returning the book in its scheduled time.

5. **Generate reports**

This function of the system is for generating reports for system admin.

Project Limitation:

Scope:

The librarian can only issue three books per user and it has maintainable extension time for each book. Moreover, the system does not process the payment after generating the receipt to the user who has a penalty and the user cannot reserve a book.

Time:

The development duration may consume 4 months from analysis up to the final installation of the system which covers the whole second semester,

Members:

The project study team is composed of (4) DICT students. Each member has an assigned task to accomplish.

1.7.3 Significance of the Study

The proposed system will have great help to the following:

Librarian – This study will benefit its staff to maintain the library well and to make it a good place for the students to gather information and study.

Students and Alumni – This study will benefit the students and alumni if they need reliable information through books and research materials found in the library.

Future Researchers - This study will be used by the future researchers as a source and guide for developing successful projects. It will aid in the development of their research and ideas.

1.8 Definition of terms

Library - a building or room containing collections of books, periodicals, and sometimes films and recorded music for people to read, borrow, or refer to.

Inventory - a complete list of items such as property, goods in stock, or the contents of a building.

Management - the process of dealing with or controlling things or people.

Manual - relating to or done with the hands.

Records - a thing constituting a piece of evidence about the past, especially an account kept in writing or some other permanent form.

Qr Code - a machine-readable code consisting of an array of black and white squares, typically used for storing URLs or other information for reading by the

camera on a smartphone.

Ebook - an electronic version of a printed book that can be read on a computer or handheld device designed specifically for this purpose.

OPAC - is an online bibliography of a library collection that is available to the public.

Digital Age - also called the information **age**, is defined as the period starting in the 1970s with the introduction of the personal computer with subsequent technology introduced providing the ability to transfer information freely and quickly.

Dynamic - (of a process or system) characterized by constant change, activity, or progress.

Reinforce - strengthen or support (an object or substance), especially with additional material.

Chapter 2

Review Related Literature

2.1 Review of Related Literature and Studies

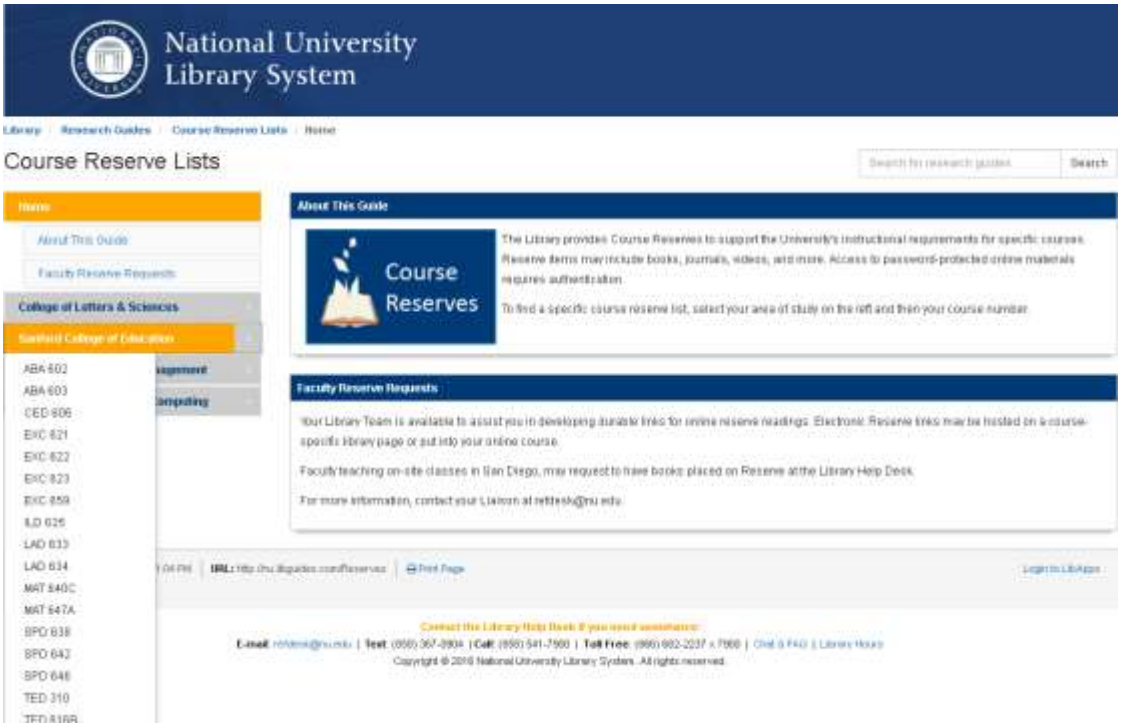


Figure 2.1 Screenshot from National University Integrated Library System

The Integrated Library System (ILS) is the academic library that helps with collecting and acquiring library materials. ILS is designed for acquisition, cataloging, and circulation of print collections and selection. ILS continues to develop, as the system is upgraded by taking advantage of the network advancements and cloud computing. Its main purpose is to provide and allow the library to share data with users or other libraries. In this study Yabut, Fabito and Jamis (2016), the National University Library System (NULS) will cover all of the

processes and integrate both web and mobile software to support all library staff and user needs. The web application will produce reports regarding the statistics of the library. While many web and mobile libraries already exist, the National University Library System (NULS) web and mobile apps have a search by topic feature where the library user can search material in Online Public Access Catalog (OPAC) based on the keyword they had given. The mobile application would have prompts for the library users which notify them about library incoming due date or penalties of the borrowed material, as well as announcements.

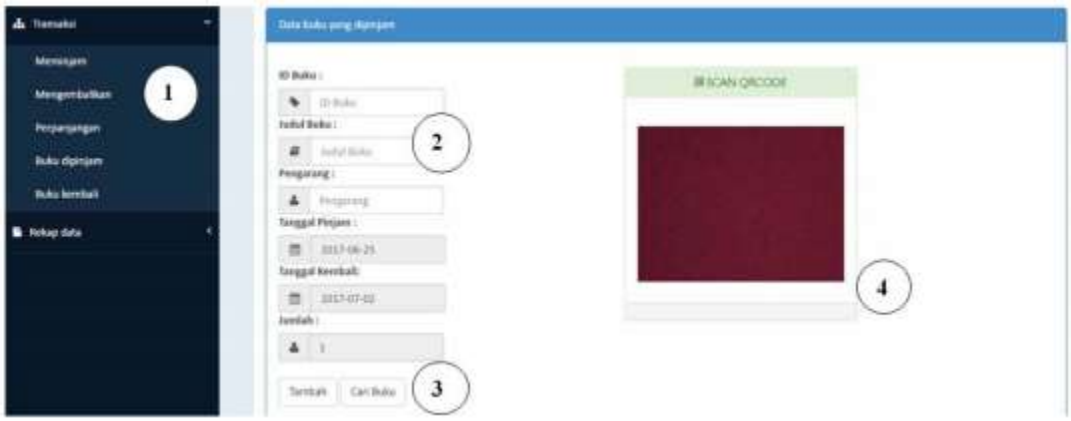


Figure 2.2 Screenshot from actual display of borrowing menu page of information system.

QR Code-based Library Management System is an information system that was implemented in a web-based environment on an existing local area network. Some software tools were needed throughout the development process involving: XAMPP version 3.2.1 as a web server and a database server with MySQL serving as the database management systems (DBMS), web browser to display the web-

based information system, Sublime Text 3 as the text editor, Bootstrap framework, webcodecamjs plugin for QR code encoding and decoding, data table for displaying data, datepicker for inputting date, qrcodegen for encrypting primary key code of the QR code, PHP programming language.

Managing a library manually is common practice in many libraries including school libraries. Based on the empirical observation at two private schools in Surakarta City, Indonesia, it can be noted that the problems usually arise in manual process in the library are the following: (1) the time spent for borrowing, extension, and returning transaction, (2) the difficulty of tracking the books and other loanable resources, (3) the time spent for compiling the report, (4) the time spent for checking whether the student has returned the book, and although not significant, (5) the security of the book from the thief. Computer-based information systems have benefits to be explored to solve these problems.

The purpose of this study was to provide a library management system to manage a library using a computer-based information system that enables library staff to record and track its collection as well as to compile a report. In more advanced development, a library management system, when implemented in the architecture of cloud computing, offers advantages such as it enables sharing a collection with other institutions so that students from other institutions are able to access the catalog. Their goal is to use QR code technology to encoded the information or identity of the book. The information was initiated by the administrator using the information system set up in the computer and then stored

in the database, and at the same time, the system generated the QR code. QR code is unique for every book. Every book, even with the same title, has a different QR code. The QR code was then printed on the piece of paper and tagged to the targeted book. To decode the information of the book firstly the information system will read the QR code using a camera and then the system will match the QR code read versus the QR code in the system after that the code is matched the system will display information or identity of the book.

The proposed system using QR code was successfully implemented to store library collection data in the form of a tag that can be attached to the library collection. The developed information system able to read the data stored in the QR code using a camera and using it in the transaction process with an optimum distance between 15 and 30 centimeters, the user acceptance test results showed that the system has high acceptance on its easiness to use, functions and features provided has met the requirement and able to increase the quality of service to the students. All in all, respondents have a positive attitude towards the system and they would like to implement the system at their school libraries. This would be extended for example using mobile-based technology.

Figure 2.3 Sample of QR-code and Linear Barcode

Rahaman (2016) stated that in the last two decades, libraries are facing tremendous changes as modern tools and technologies have grown rapidly. Library materials are also changing quickly to the various digital formats from the traditional print formats Information/knowledge has been creating and publishing from every sector of humankind. Document types are also not limited to books and periodicals. Various types of materials out there like- image, audio, video, painting, artifacts, three-dimensional, software, and much more. These materials are also available in various file formats so that one information can be used in many ways. Lastly, the internet has opened the door to reach anything or anybody from anywhere with just a single click. So, managing this huge amount of resources becomes more challenging day by day. Implementing various software is becoming a way to maintain these resources like automation, digitization, content management, e-resource management, and much more. This software is handling as well as managing all types of housekeeping works in the library like- procuring materials, acquisition, cataloging, circulation, controlling serials, digitizing, archiving-retrieving, providing service to the users‘ and so on. Barcode, QR Code, and RFID are some technologies by which storage and retrieval of resources are easier and also very important for the security purpose of the resources. The purpose of this study is to create awareness about the latest library technologies, create and develop a new designing method and process to create awareness of

the working mechanism of these technologies and to know the advantages and disadvantages of using these technologies. Finally, modern technologies are transforming very quickly. Today‘s latest technology may be obsolete tomorrow or maybe the day after tomorrow. So, it is very difficult to decide whether we should go for the new technology initiatives or not, if so, which is/are better? There are a lot of things to think of before making the decision, for example, is there any need for these technologies, is budget permits, purchased or open-source, types of users, types of resources.

Figure 2.4 Screenshot from the Library Management System of Xi'an University

Students from Xi'an University of Architecture & Technology studied the maintenance and the development of their institutional library management system. The Library Management system (LMS) acts as the tool to transform the manual inventories of libraries into digital libraries. It is an automatic system that reduces the work burden of the staff/librarians through a single click. It will manage,

organize, and orient the library task. The LMS supports the librarian to add/view/delete/update details from the library stock. Here we integrate all the library data into the SQL server. Preliminarily the librarian has to add student and book details into the database. After that he/she can view/delete/update those details through the Library Management system. On account of this, the user can access the library at any time. The librarians can assist the data without any confusion. Each data is retrieved from the database. if he/she accesses any user details then it shows username, id, book details, and penalty details. They no need to write it on paper for any references. By editing the data they can change the parameter in it. Despite working on the manual, the librarian can easily handle the automatic system. It has more additional features such as the librarian can maintain library records, student's history of penalties, and issues. It always tracks the count of the book in the library and issues book details. This causes a flexible service for librarians and students. It is a user-friendly interface, so basic computer knowledge is enough to access the LMS. The system is a customizable and user-configurable one which causes it to be used in different organizations. The LMS represents the Admin module and the LMS was built in Net Technology which is considered as one of the upcoming technologies in the IT industries. By the integration of all the modules, it will be presented on the desktop of your computer. As aforementioned, the data are stored and secured in the database. The related data are stored together and maintained properly. It allows the user to create their database as per the requirement. The database gets manipulated by the programs

which provide an interface between the databases.

The hindrance and issues of the traditional library are identified and promote easy access to the libraries. In the Library Management system, the librarian can add/update/remove the student and book details into the database. The students have a Unique ID for accessing any book from the library. Through the ID, the librarian can check the user details, fine payment, and book details. The LMS reduces labor work and makes the system efficient. In future work, we planned to enhance the LMS by integrating the LMS with the Local area Network (LAN) which increases the efficiency of the system.

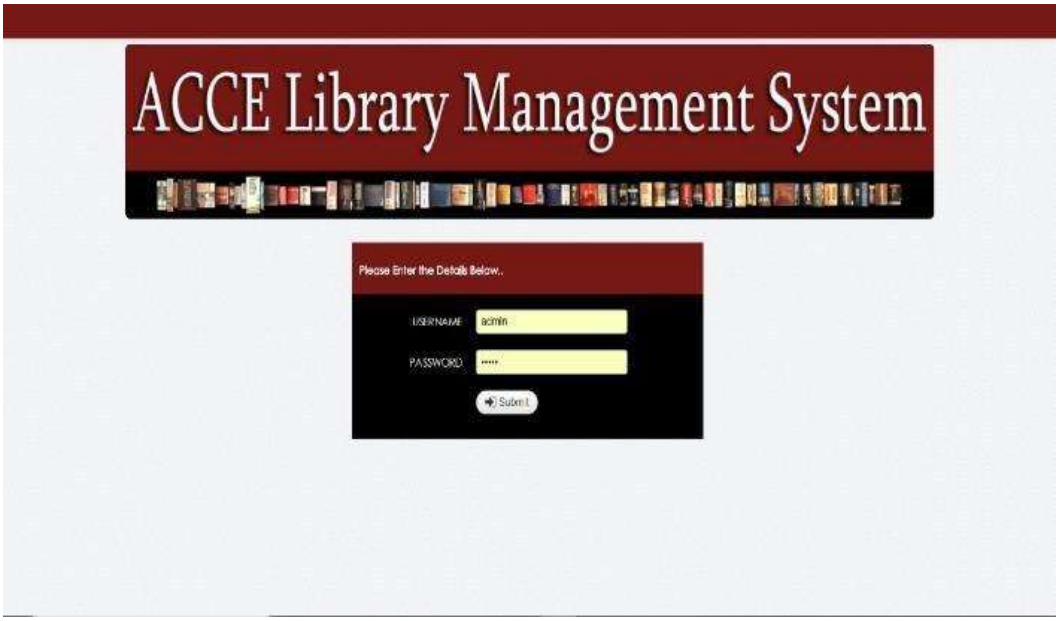


Figure 2.5 Screenshot from ACCE Library Management System

One of the colleges in Eritrea is the ACCE (Asmara Community College of Education). The ACCE library system manually provides regular operations that record data in a paper database. In most developing countries, such as Eritrea, LMS is an integral part of the prompt and successful recording of books and members' detailed information.

The main objective is to establish a computerized system that can carry out activities at Asmara Community College of Education (ACCE) by providing librarians and library users with convenient access to the use of the library. Although this framework contains electronic documents such as magazines, newspapers, books, and other valuable files that can allow users access without any restriction and help librarians keep track of information about libraries. This will include services in a different format for all residents of the country without

restricting the time limit. This study aims to build a framework that can easily and efficiently handle and control the actions involved in the ACCE library, which can be a help for all users to access at their convenient time.

As modern people start to embrace and take an interest in these innovations, web and mobile apps are rising. For various types of business and establishment, it becomes productive and useful as it increases the efficiency and success of the work. Applications are constantly trying to invent various ways to make people's lives healthier, comfortable and efficient.

CHAPTER 3

Research Methodology

3.1 Research Design

This study is a quantitative type of research. The researchers used questionnaires as a method to gather, to analyze, and to collect data. The research design of this study is an experimental method, wherein the researchers assess the system and the study through surveys and interview process.

3.2 Sources of Data

The sources of the researcher's data were collected from PUP Taguig's book inventories, students, librarians, and faculty members. The respondents were issued with survey questionnaires while the client had an interview with the researchers. The researchers provided evaluation for the software by the use of ISO 9126.

3.3 Description of Respondents

The study aims to survey the students, faculty, and alumni from one of the branches of Polytechnic University of the Philippines, which is the PUP-Taguig branch. The research focuses on the students, professors, librarians and other faculty members who use the library. The respondents were given survey questionnaires to be able to study the efficiency of using LMS in the university.

3.4 Research Instrument

The research instrument that was used in the study was the online survey or questionnaire and interview. To be able to test the system, the researchers used the alpha testing and the user's acceptance testing. The basis of the survey for alpha testing was the ISO 9126, which serves as the guideline standards for the study that creates the quality software product. ISO 9126 characteristics that were considered are the following:

- Functionality;
- Reliability;
- Usability;
- Efficiency;
- Maintainability; and
- Portability

3.5 Data Gathering Procedure

The survey contains a question in line with a study. Due to the pandemic situation, the researchers aim to have a survey through the use of an online survey platform. The tool needed for the survey questionnaire was the Google Form. The researchers used MS Teams or Zoom as a platform for the interview with the client.

3.6 Ethical Considerations

The researchers conducted surveys and client interviews in the study. Since the survey and interview were held by the use of online platforms, the consent form was also digitized. The researchers attached consent letter before the survey questionnaires. Before the interview session, researchers send consent letter to the client.

3.7 Current IT Environment / Infrastructure

The PUP – Taguig Branch Library Facility has a current system platform for borrowing books and time in / out inside the facility. The users needed to time in before going inside the library and must also time out after doing transactions. The user also can borrow a book by giving the user's information and manually logging by the admin or librarian.

3.7.1 Hardware Specifications

The server or components must meet the following minimum hardware requirements:

Web Application

Requirement	Recommended
Processor	Intel® Core i3 or better
Memory	4 Gigabyte RAM
Hard Disk	150 Gigabyte
Screen Resolution	1024 x 768
Monitor Display	Dual monitor needed

3.7.2 Software Specifications

The server or components must meet the following minimum hardware requirements:

Software Interface

CLIENT ON INTERNET	Any Web Browser, Windows 7,8 & 10
WEB SERVER	W A S C E, Operating System
DATABASE SERVER	Any MySQL Database
DEVELOPMENT END	Laravel, PHP, HTML, Windows Operating System

3.1.3 Network Specifications

The facility must have at least 25 Mbps of internet connection.

3.1.4 Manpower

All the transactions are handled by the admin or the librarian. From monitoring the books borrowed, inventory of the materials up to generating reports and statistics.

3.1.5 Back-up and recovery

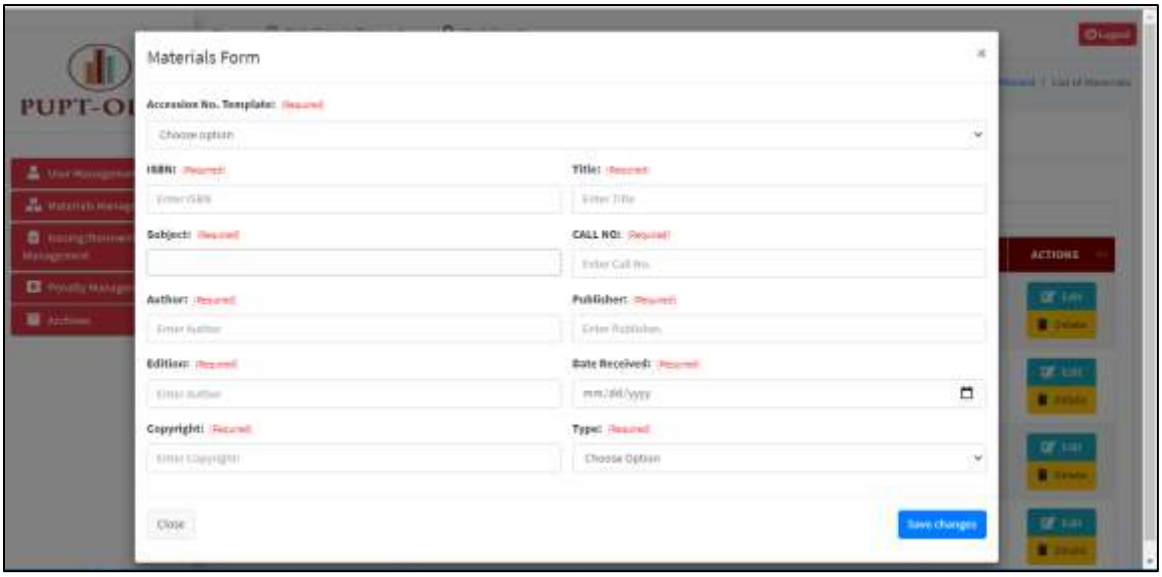
In our system we have a function that imports and exports data.

3.2 Data Requirements

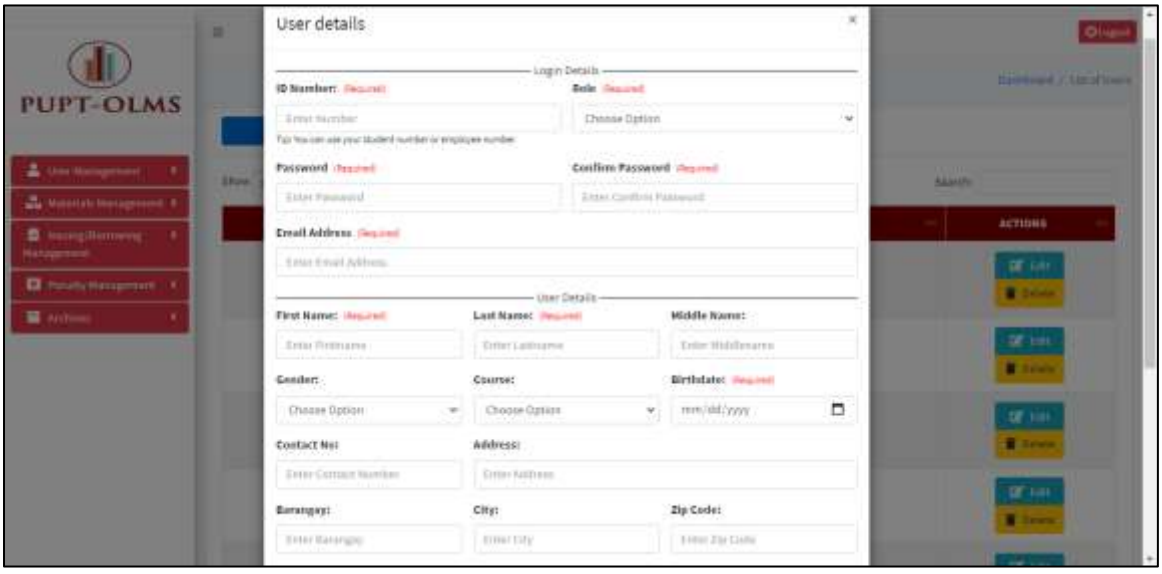
The forms and reports related to the proposed system are displayed in this section. All of the forms and reports that we collected from the organization were shown. These data requirements' contents and data dictionaries are also shown.

3.2.1 Forms

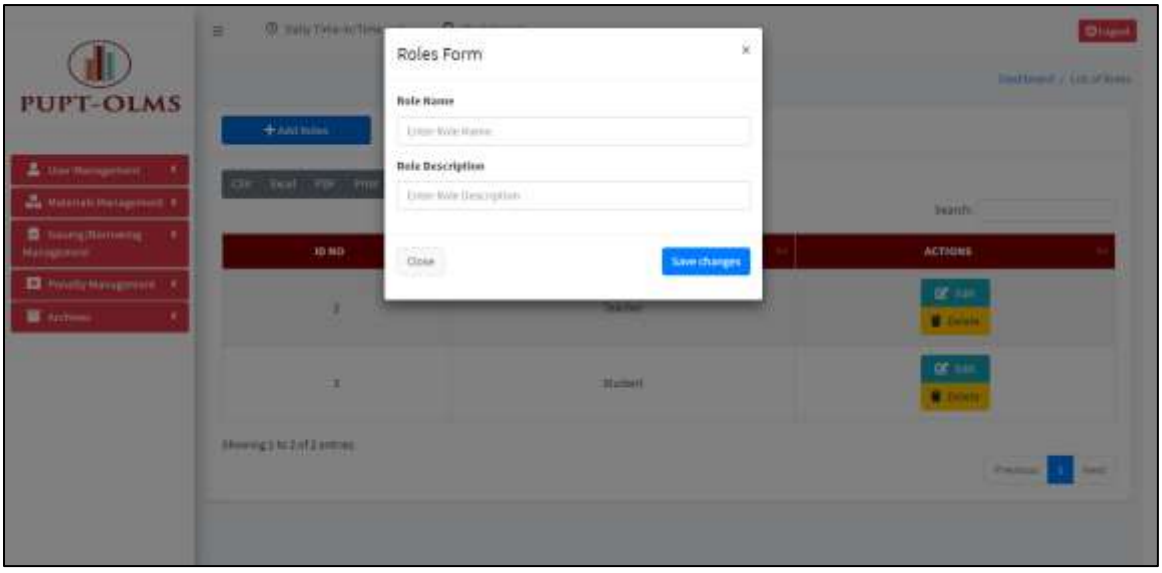
Adding Materials



User Details Form



Roles Form



3.2.2 Reports

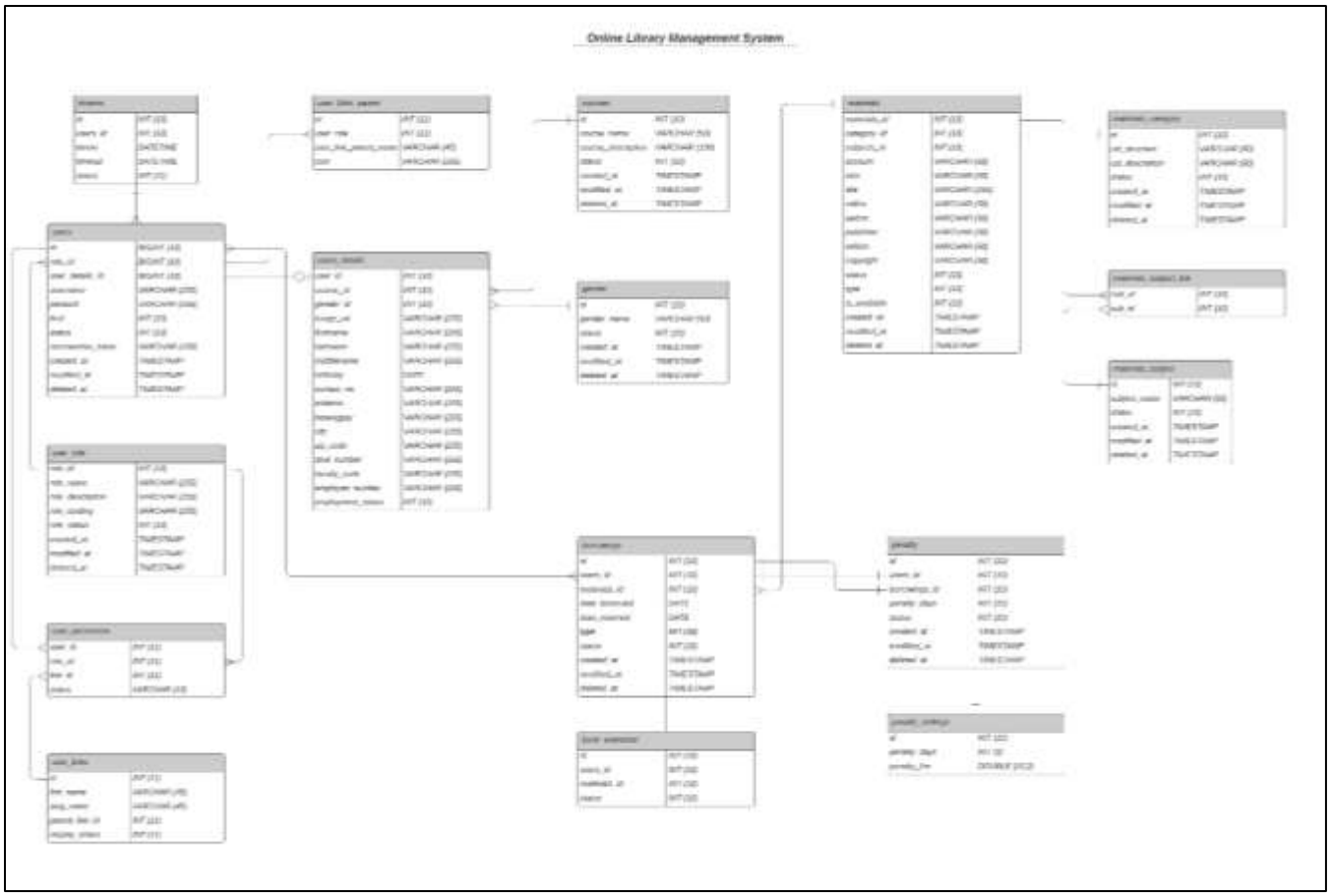
Materials Report

Exported data

ID NO	ACC NUM	ISBN	TITLE	TYPE	ACTIONS
1	PUP-BOOK-1	SAMPLE EDIT	SAMPLE EDIT	ISSUING	Edit Delete
2	SCIENCE-BOOK-2	SAMPLE SCIENCE	SAMPLE SCIENCE	BORROWING	Edit Delete
3	PUPT FIL-3	FIL1234	FILIPINA	ISSUING	Edit Delete
4	PUPT ENG-4	ENG12	ENGLISH	BORROWING	Edit Delete
5	PUP-BOOK-5	1000	1000	ISSUING	Edit Delete

3.2.3 Logical Data Structure

Entity Relationship Diagram

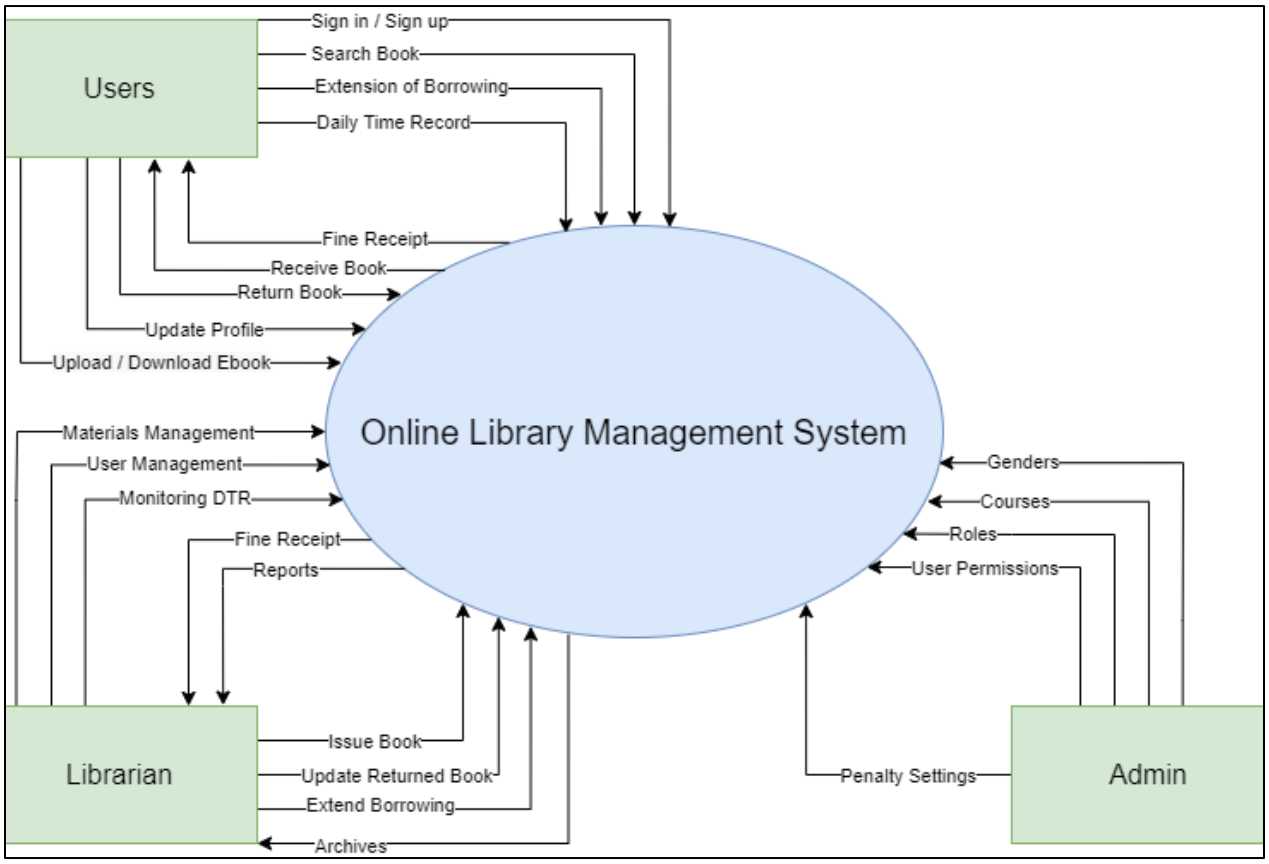


3.3 Policies and Procedures

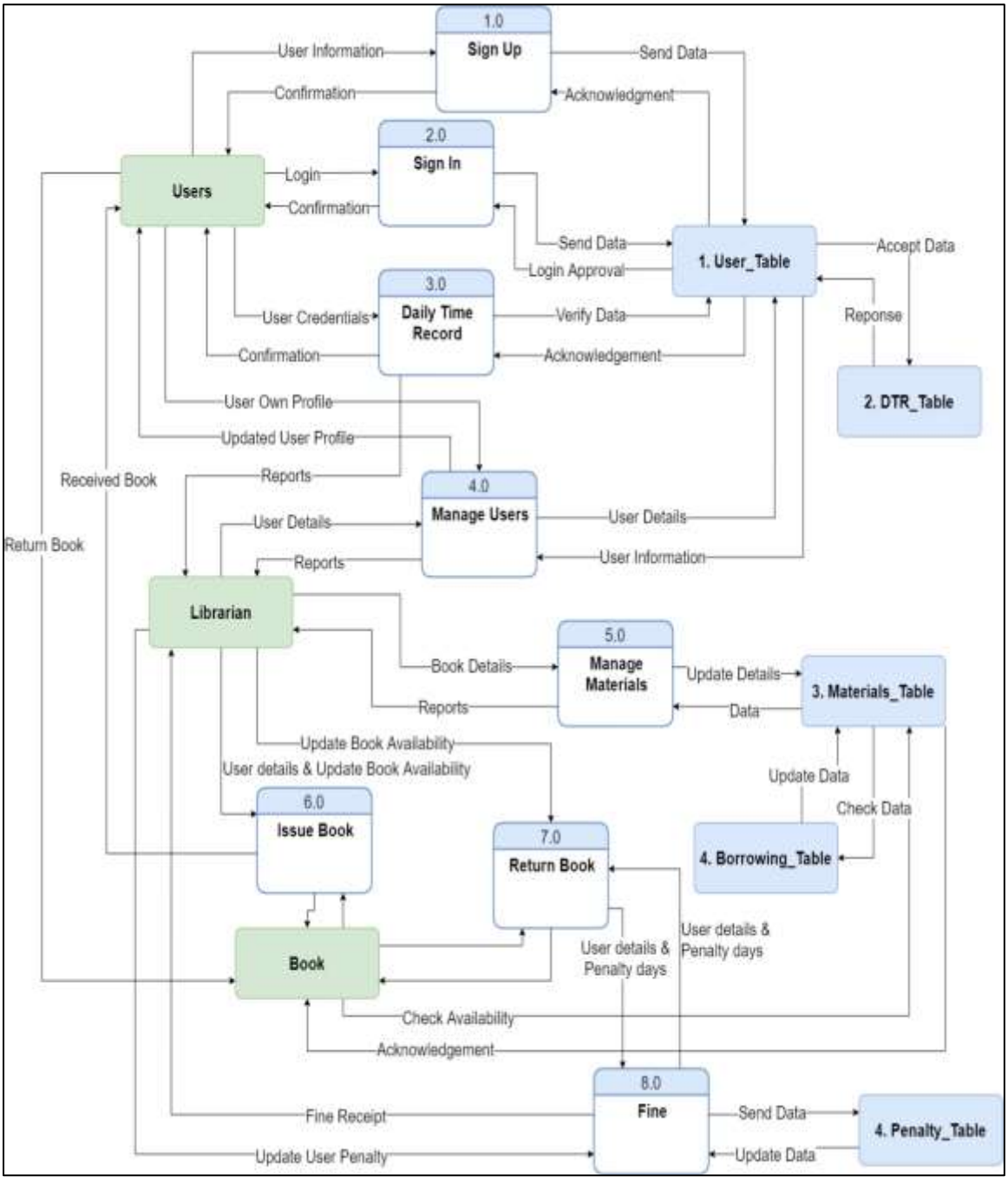
This section provides the policies and procedures of the organization which includes the Context Diagram. Data Flow Diagram (DFD) and the System's Process Flow Diagram.

3.3.1 Procedures

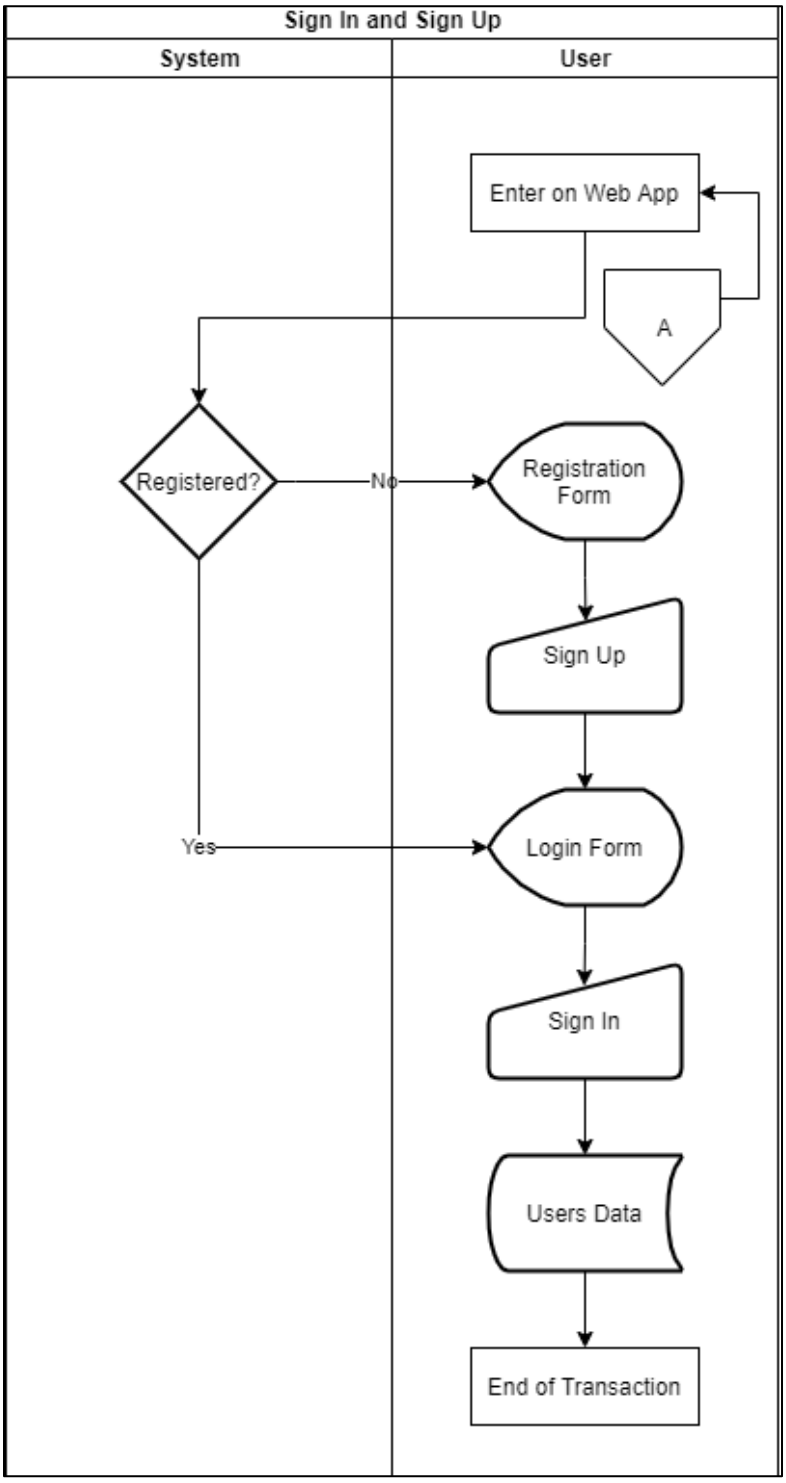
3.3.1.1 Context Diagram

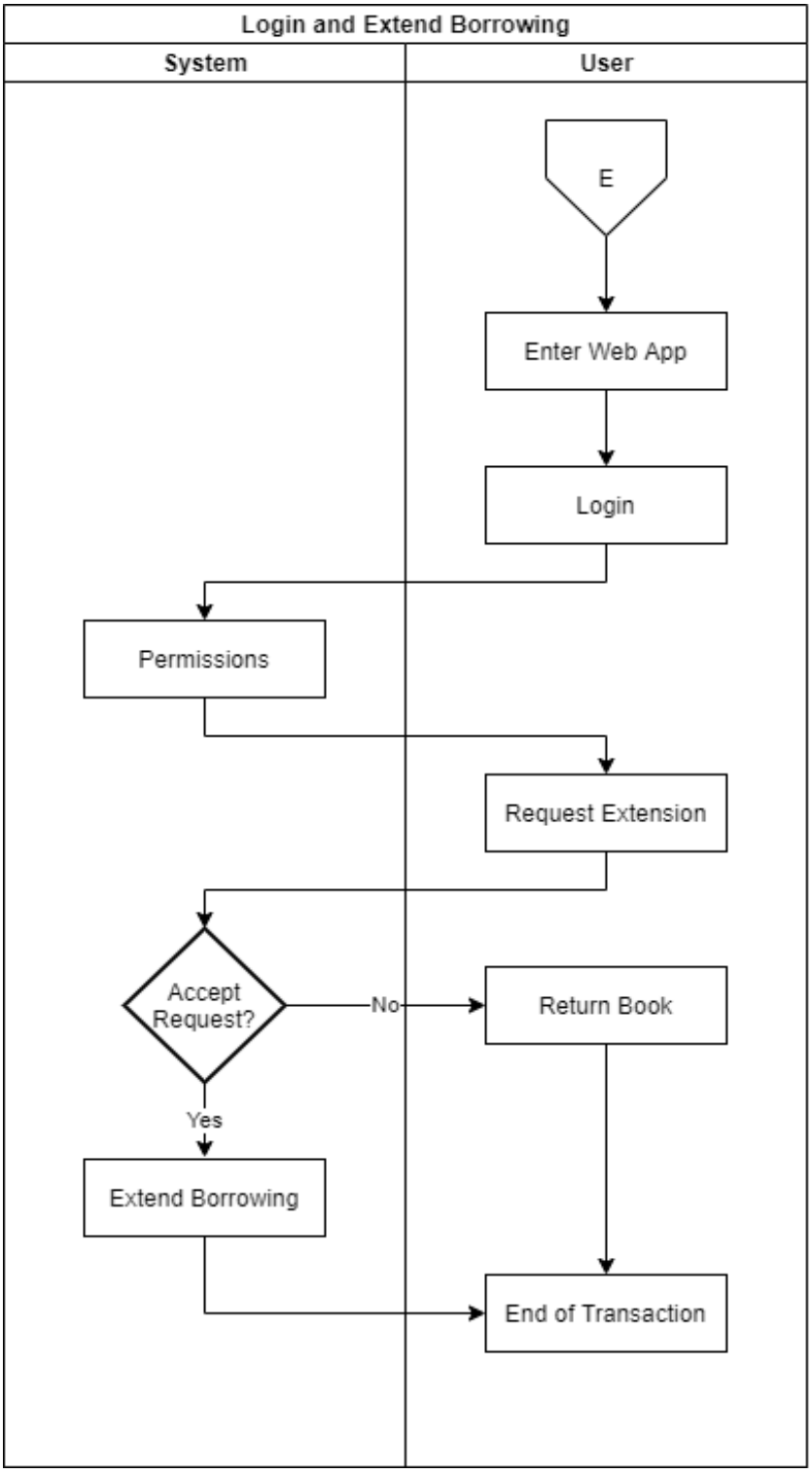


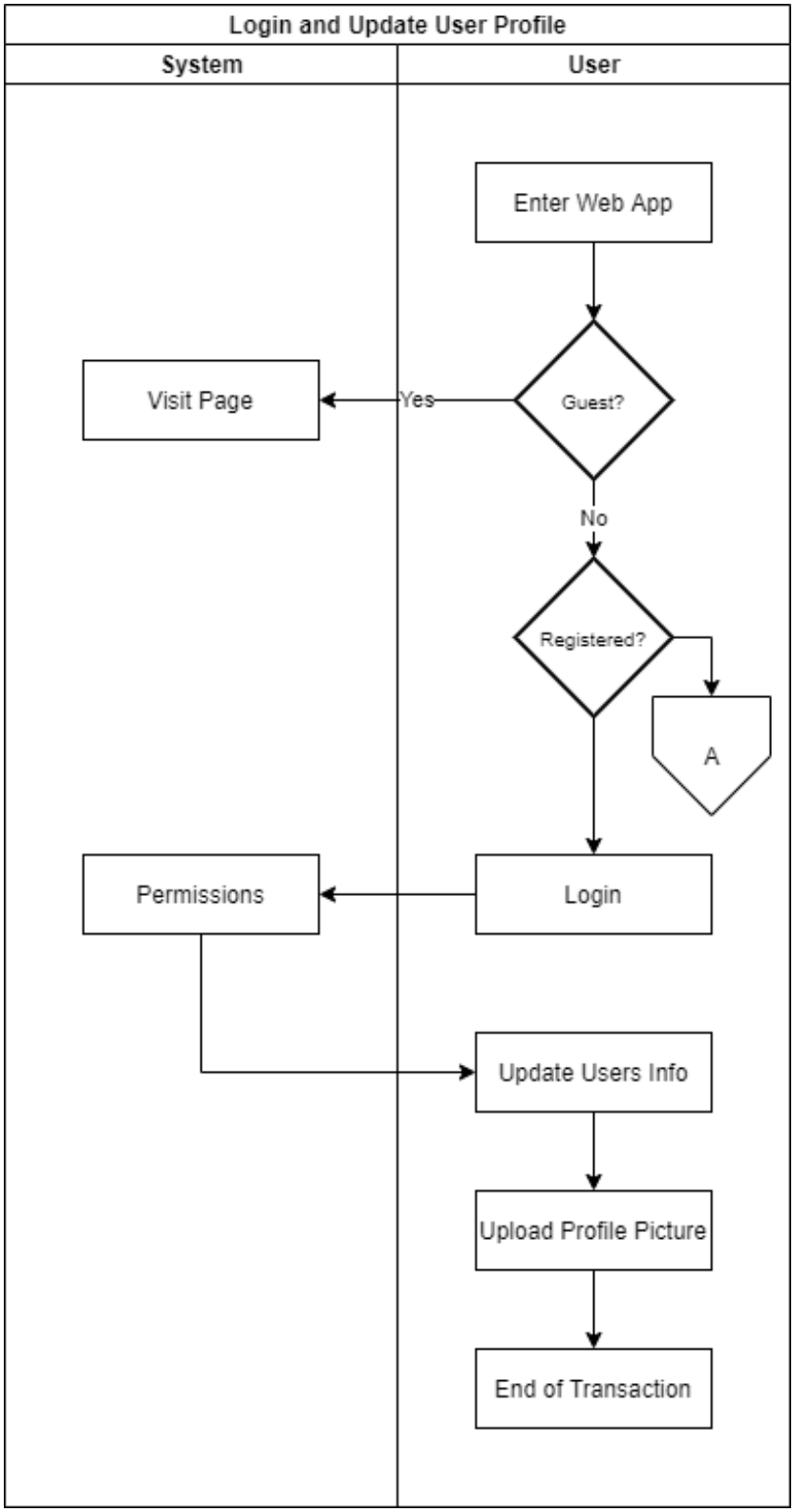
3.3.1.2 Data Flow Diagram

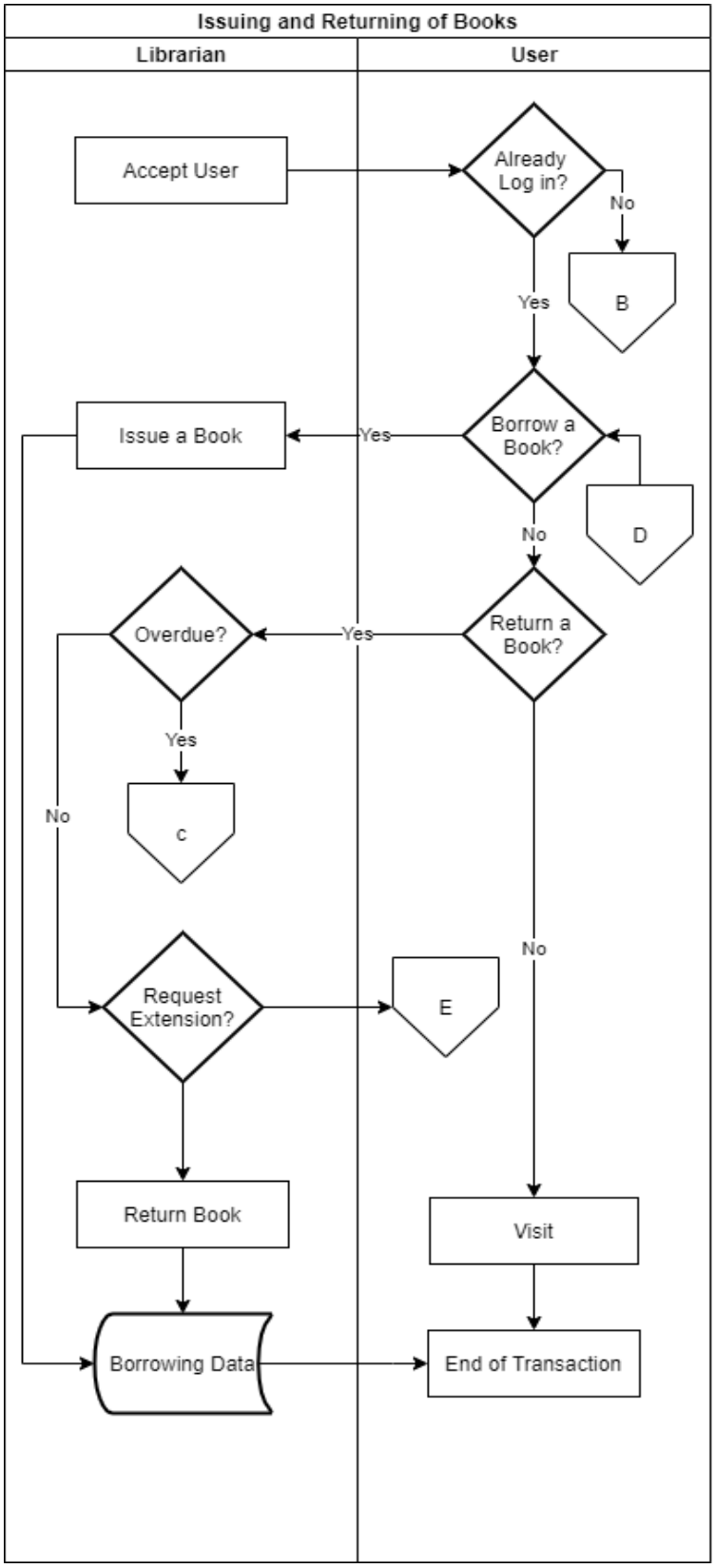


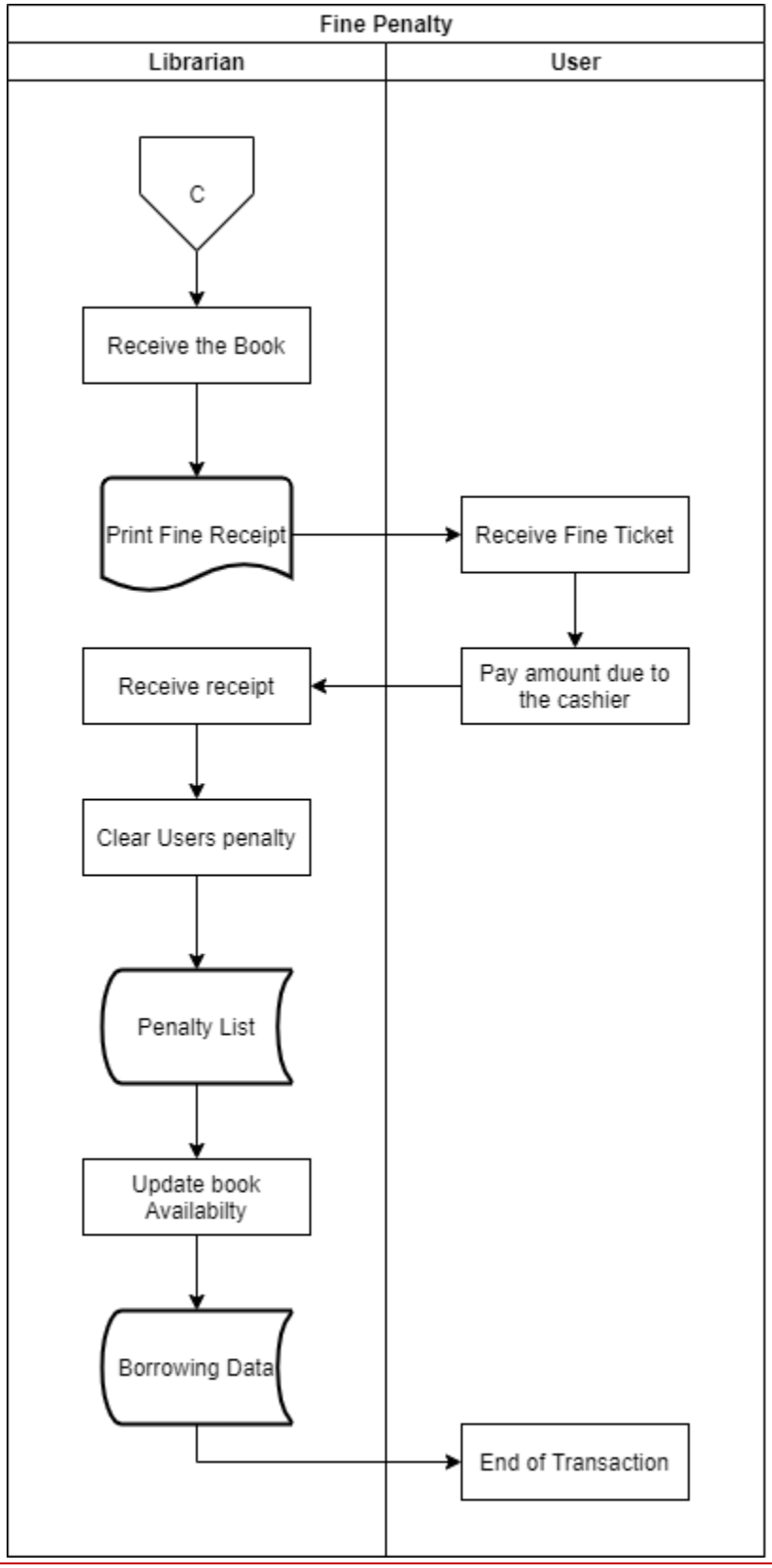
3.3.1.3 Process Flow Diagram

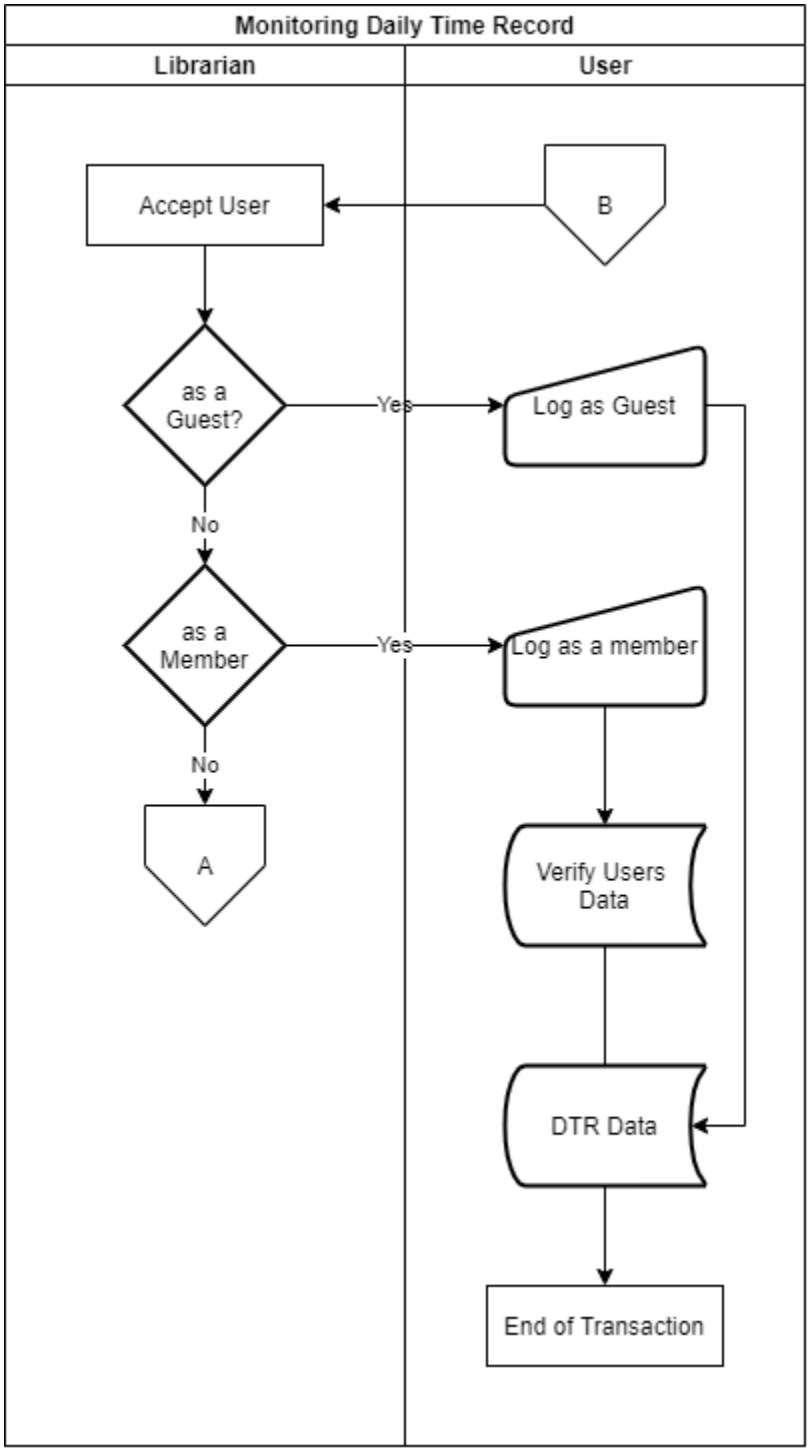



Login and Extend Borrowing
System
User
E
Enter Web App
Login
Permissions
Request Extension
Accept Request?
No
Return Book
Yes
Extend Borrowing
End of Transaction


Login and Update User Profile
System
User
Enter Web App
Guest?
Yes
Visit Page
No
Registered?
A
Permissions
Login
Update Users Info
Upload Profile Picture
End of Transaction


Issuing and Returning of Books
Librarian
User
Accept User
Already Log in?
No
B
Yes
Borrow a Book?
Yes
Issue a Book
D
No
Return a Book?
Yes
Overdue?
Yes
C
No
Request Extension?
E
No
Return Book
Visit
Borrowing Data
End of Transaction


Fine Penalty
Librarian
User
C
Receive the Book
Print Fine Receipt
Receive Fine Ticket
Pay amount due to the cashier
Receive receipt
Clear Users penalty
Penalty List
Update book Availabilty
Borrowing Data
End of Transaction


Monitoring Daily Time Record
Librarian
User
Accept User
B
as a Guest?
Yes
Log as Guest
No
as a Member
Yes
Log as a member
No
A
Verify Users Data
DTR Data
End of Transaction

3.3.2 Policies

The term **"Online Library Management System,"** or "us," or "we," refers to the website's owner, Polytechnic University of the Philippines-Taguig. The user or visitor of our website is referred to as "you."

These terms shall be fully implemented and will apply to your use of this Website. You agreed to accept all of the terms and conditions mentioned on this website by using it. If you disagree with any of these Website Standard Terms and Conditions, you must not use this Website.

The terms and conditions may address several topics such as:

• Definitions of website “content” and what is protected

• A copyright statement

• A public domain statement

• Ownership of text and data content

• Ownership of metadata

• Permissions (or not) for reuse, including for commercial or non-commercial purposes

• Conditions for permitted reuse

• Contact information for licensing of website content

• Disclaimers, waivers, and indemnification procedures

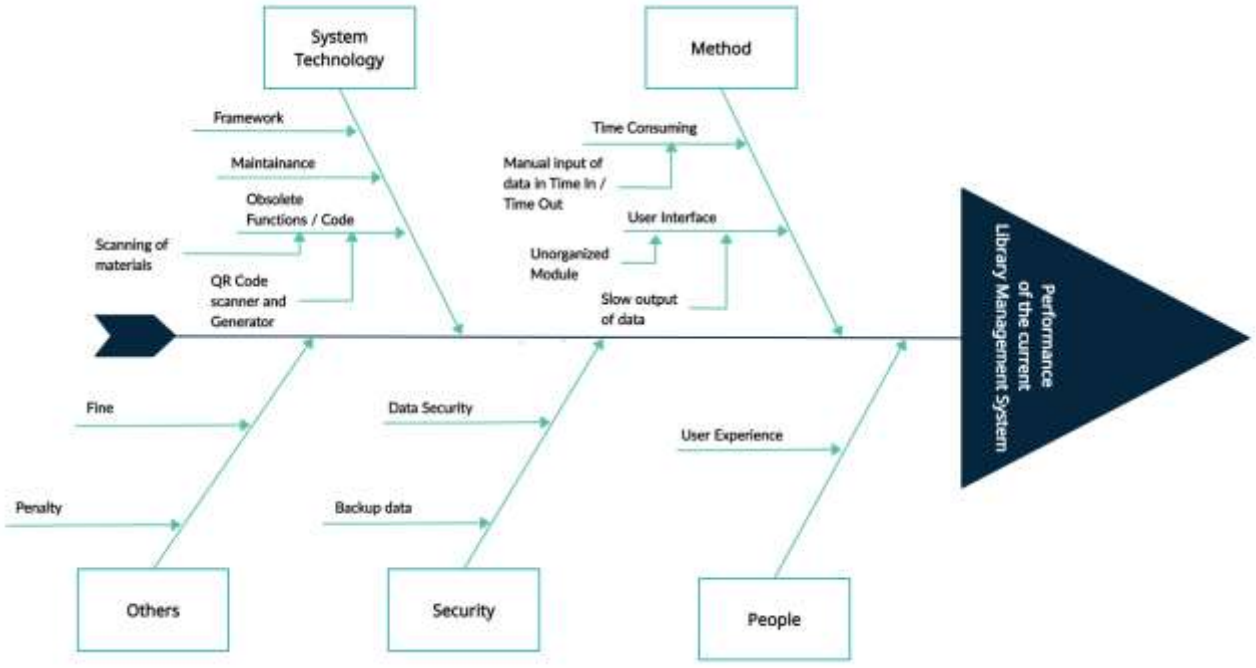
• Enforcement policies in the case of infringement

• Privacy and cookies policies.

3.4 Problem Analysis

This problem analysis identifies the problems occurring in this project. This also indicates the project's cause and the main problem of the project or key difficulty. The Fishbone Diagram, Requirements-Feature Matrix, and Problem Requirements are the three (3) sections of this part.

3.4.1 Fishbone Diagram



3.4.2 Problem Requirements

PROBLEM	REQUIREMENTS
Current Technology	The current system has obsolete codes and system modules/functions.
Framework	The current system uses a native php programming language that causes the other functions.
System Process	The current system has difficulty in collecting/gathering data.
Data	The database was not normalized, meaning there are fields that are not necessary.
Backup and Recovery	There are no backup and recovery methods for all of the records.
Archiving method / Soft deletion	The deletion of records in the current system is using a hard delete method. There is no backup or soft deletion.
Maintenances	Some maintenance of the system is not maintainable.
Permissions	There is no specific permission for the users so that they can only access the intended module for them.

3.4.3 Requirements-Feature Matrix

Requirement / Features	The system must be able to record all transactions.	The system must be able to organize users' records.	The system must be able to manage users' permission.	The system must be able to monitor materials	The system must generate accurate report
Monitoring of users.	✔	✔	✔		✔
Add new materials and categories.				✔	
Generate attendance report.					✔

Proposed System Definition

3.5 Functional Specifications

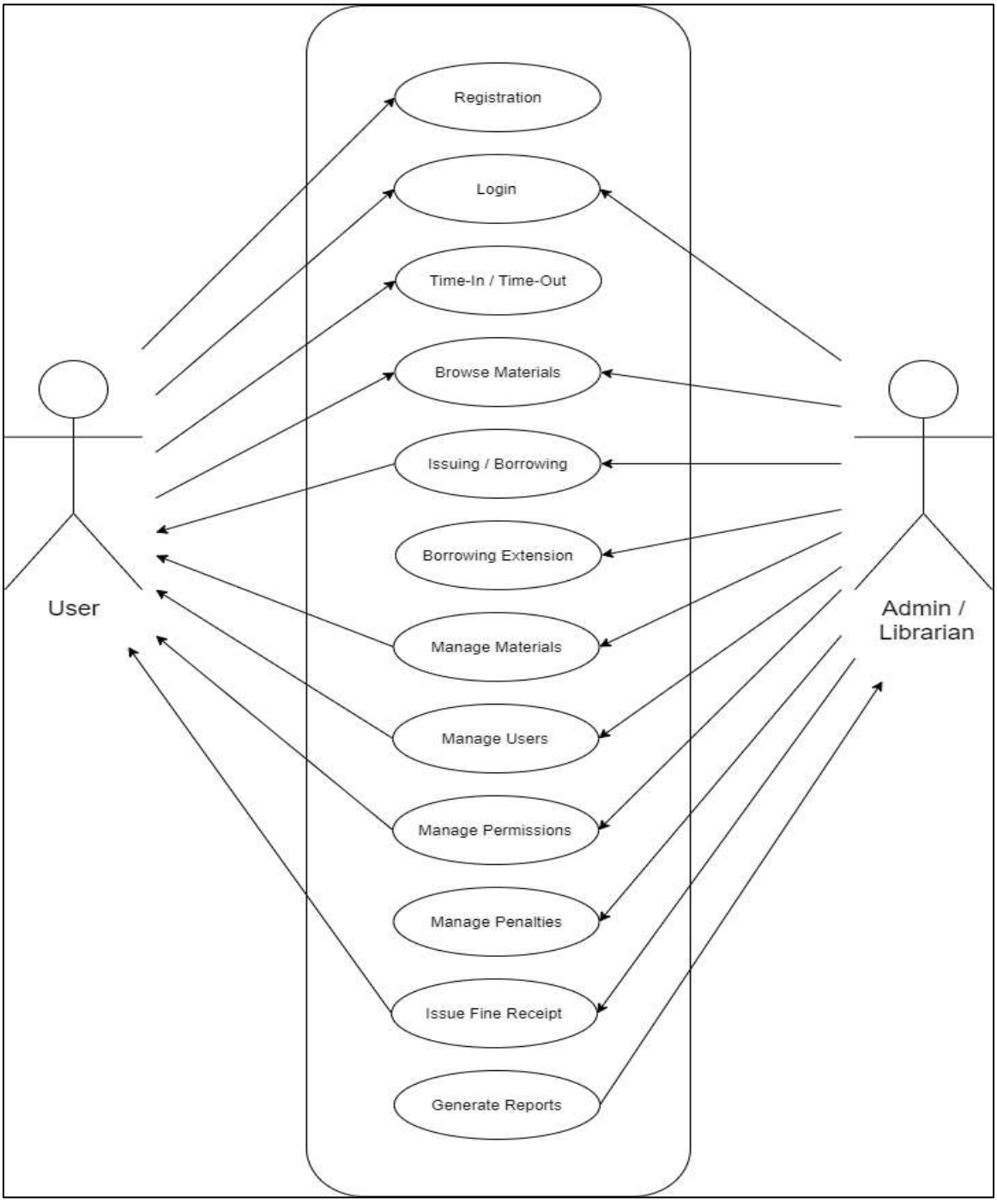
This part identifies the system boundaries of the newly-developed and proposed system which illustrates by use case diagram, detailed use case diagram and the activity diagrams.

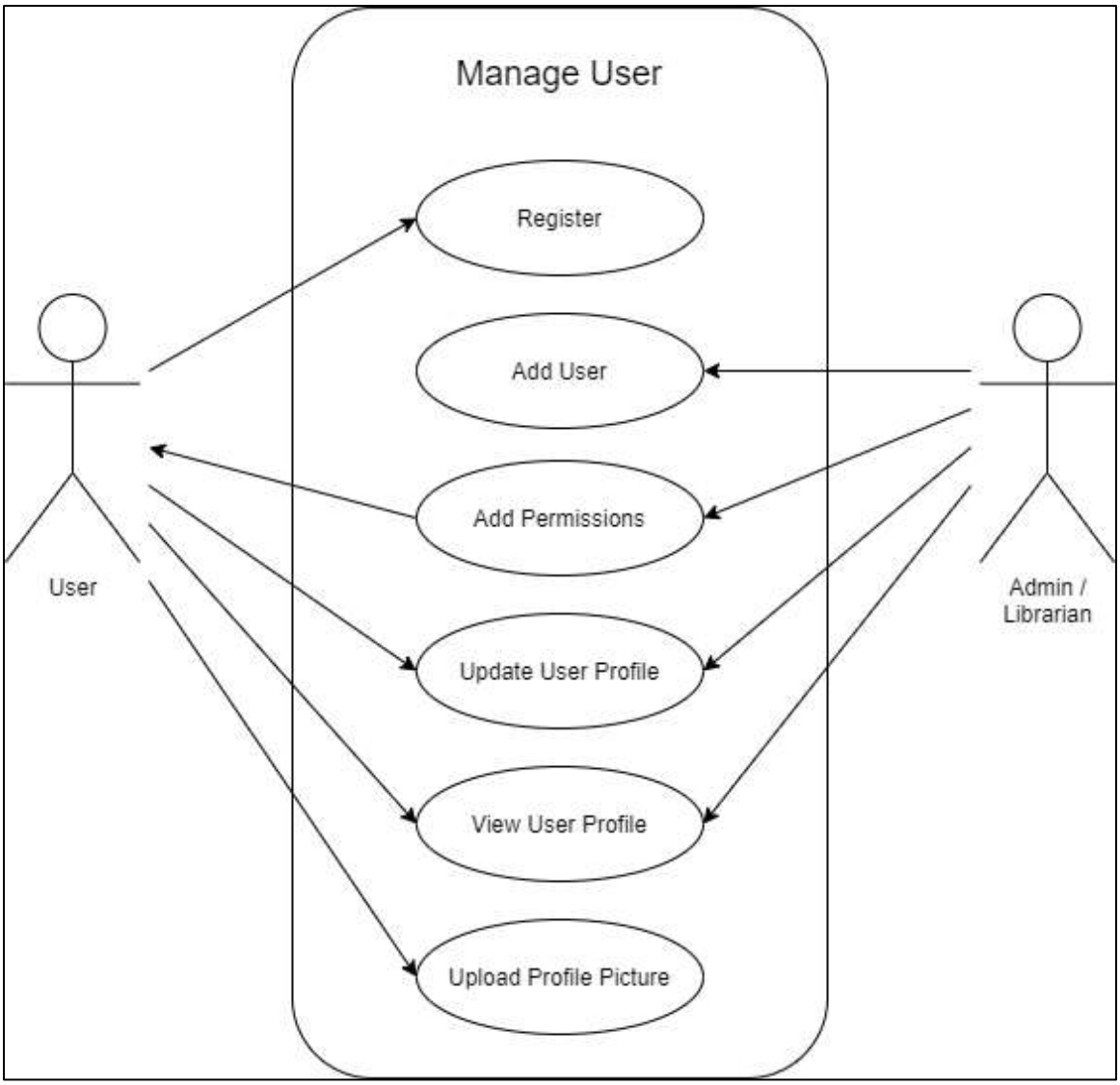
3.5.1 System Boundaries

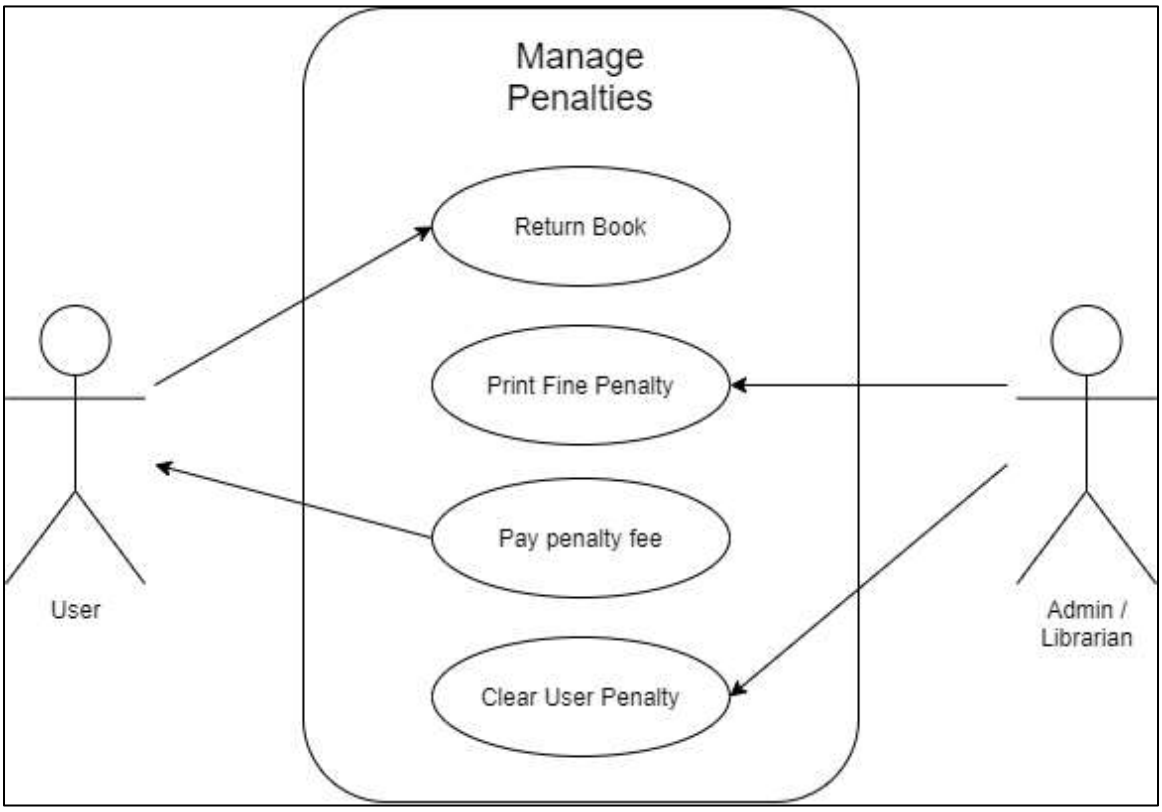
Based on the data and processes that the researchers has gathered, the system will be used by the Organization as an Online Library Management System. This system will handle all the client information and transactions made by the organization. The use cases aided the developers in determining the system's requirements. It illustrates how each subsystem interacts with each other, as well as the essential transaction flow and brief explanations of the system's main functions.

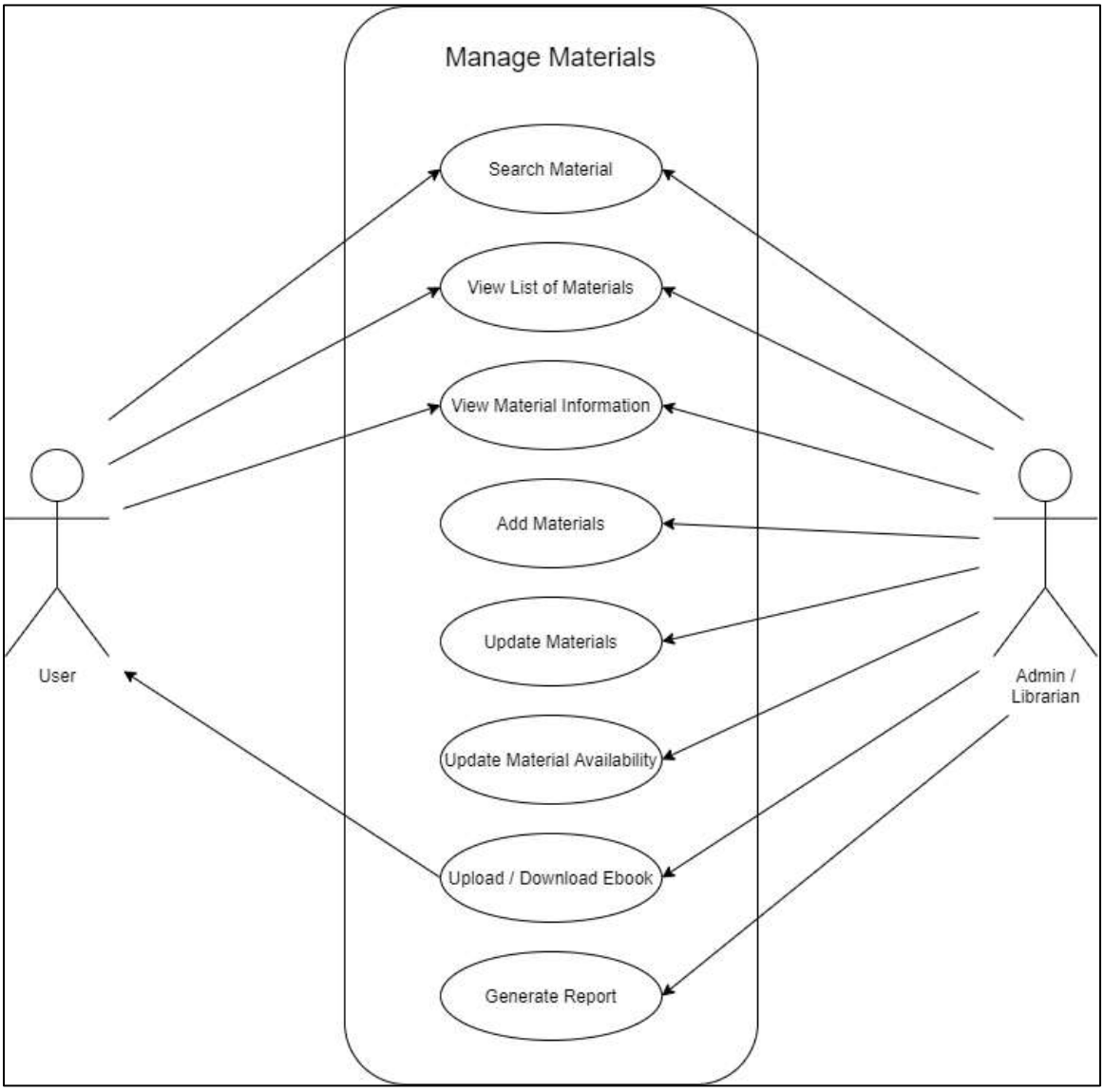
3.5.2 Use case Diagram

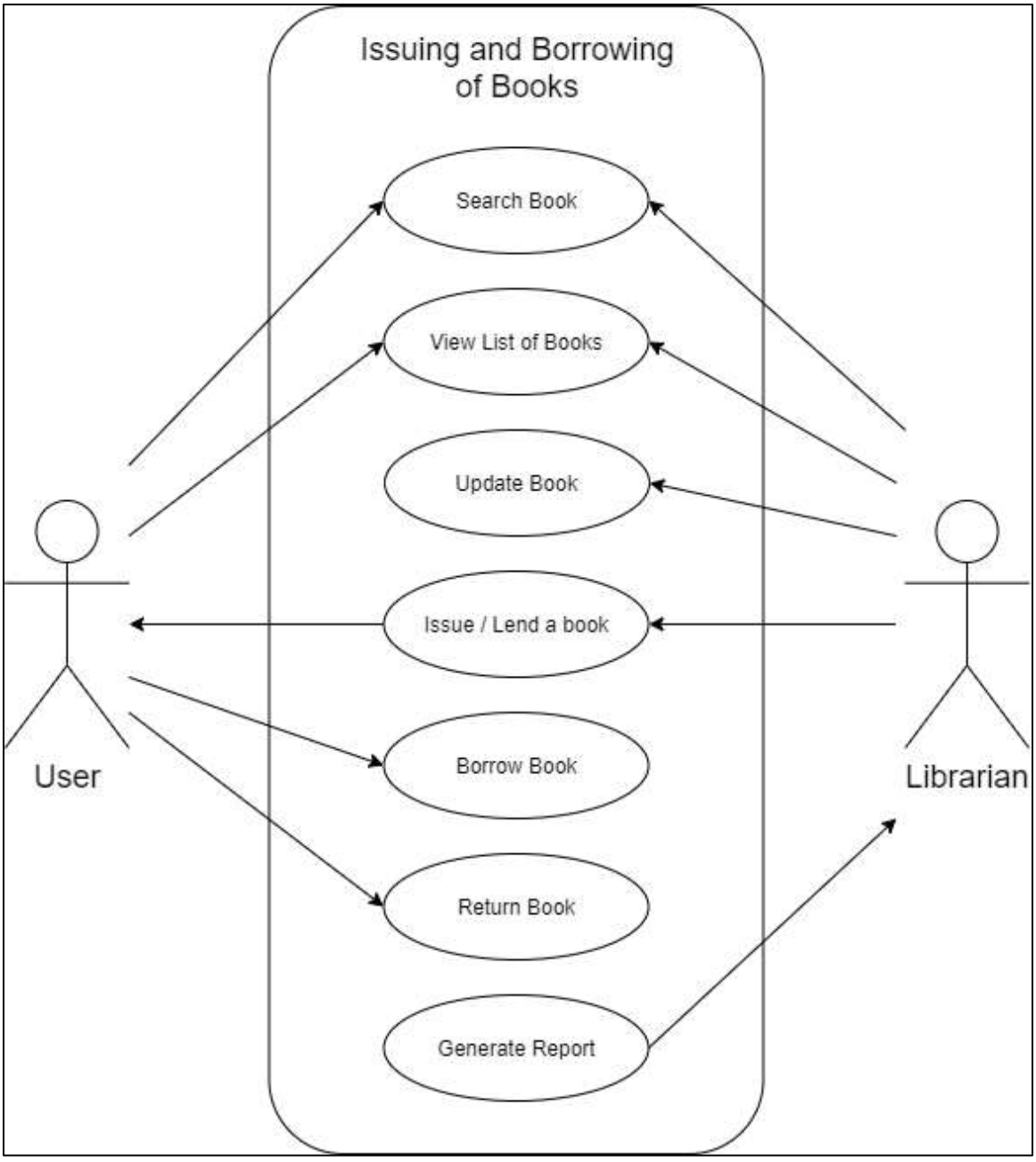
System Use Case

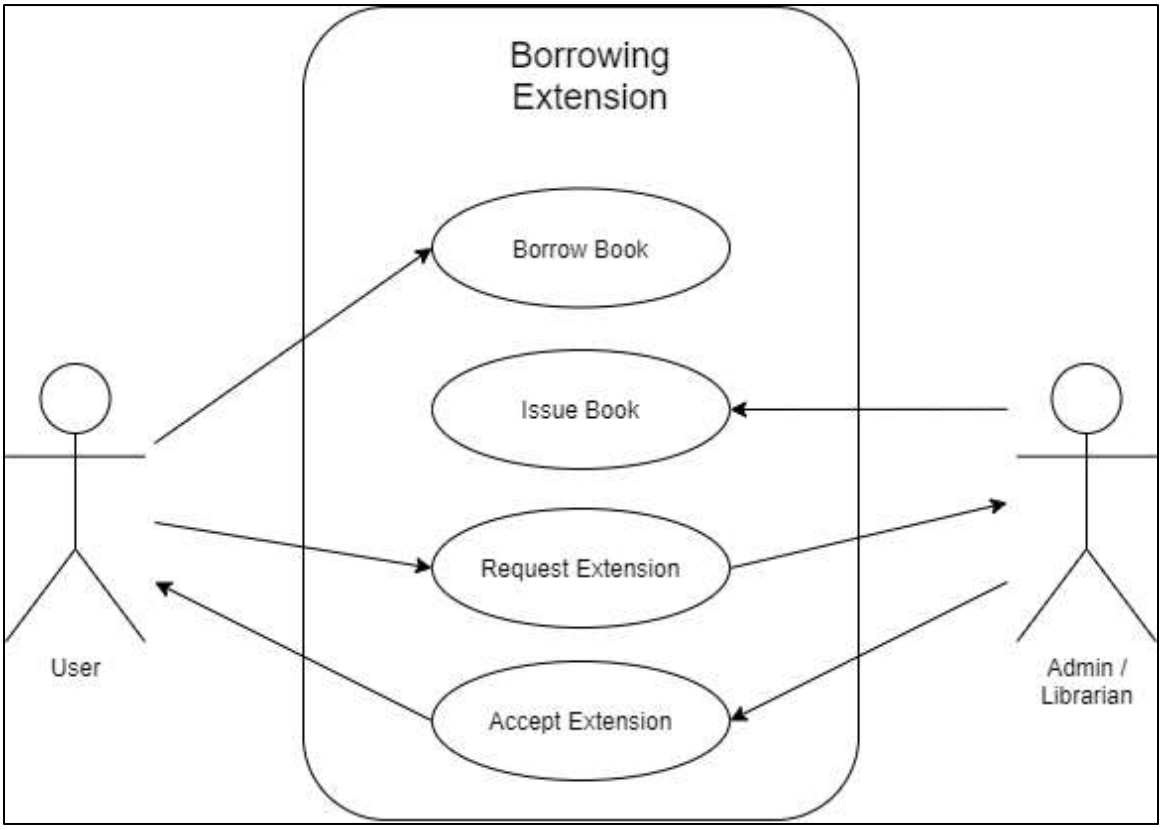


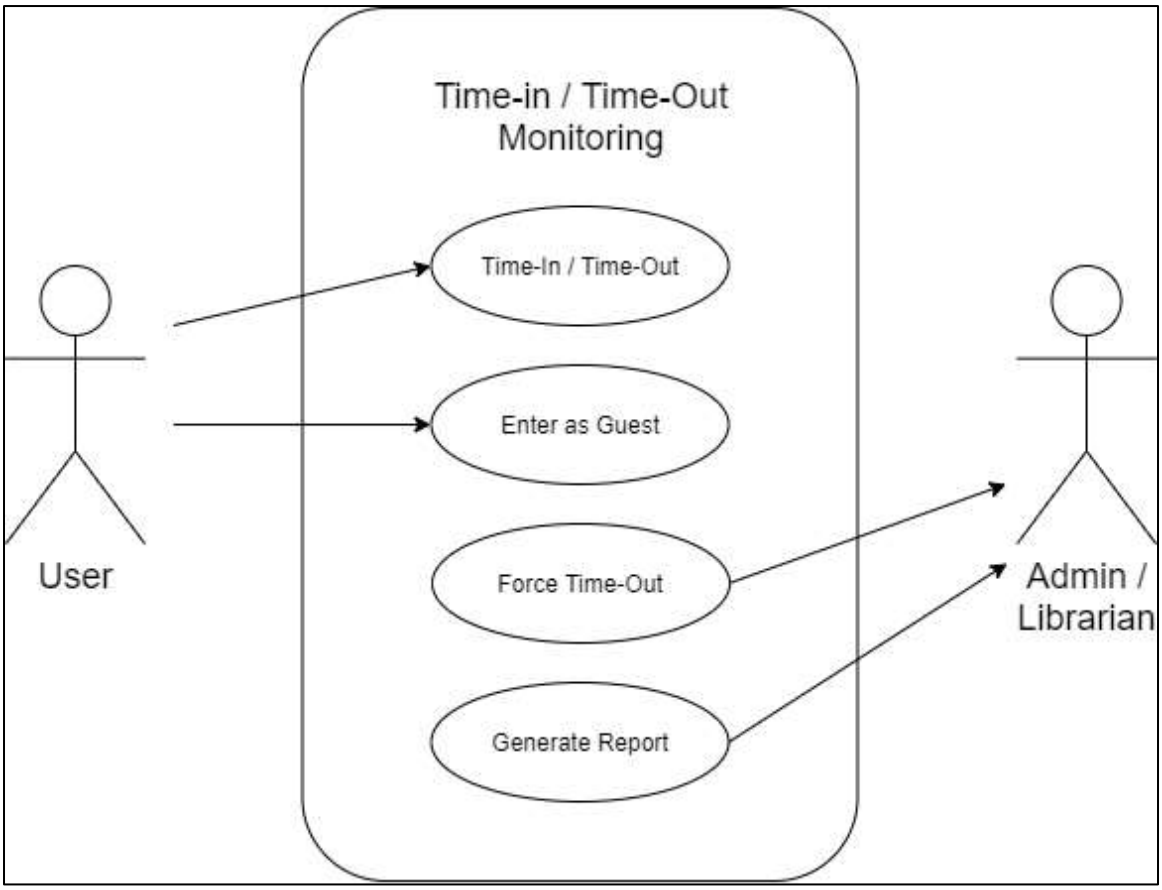

Manage User
Register
Add User
Add Permissions
Update User Profile
View User Profile
Upload Profile Picture
User
Admin /
Librarian

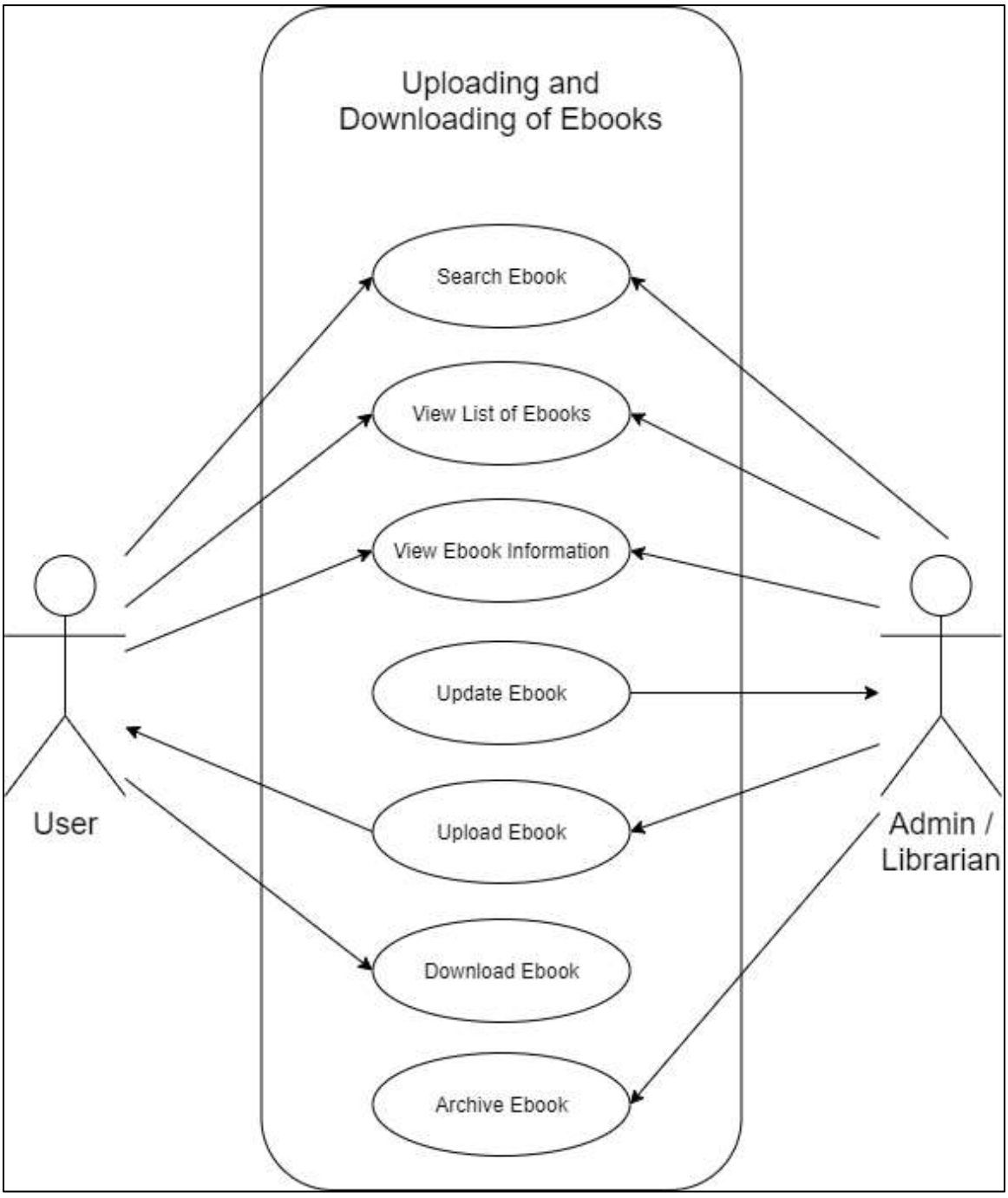

Manage Penalties
Return Book
Print Fine Penalty
Pay penalty fee
Clear User Penalty
User
Admin / Librarian


Manage Materials
Search Material
View List of Materials
View Material Information
Add Materials
Update Materials
Update Material Availability
Upload / Download Ebook
Generate Report
User
Admin / Librarian


Issuing and Borrowing of Books
Search Book
View List of Books
Update Book
Issue / Lend a book
Borrow Book
Return Book
Generate Report
User
Librarian

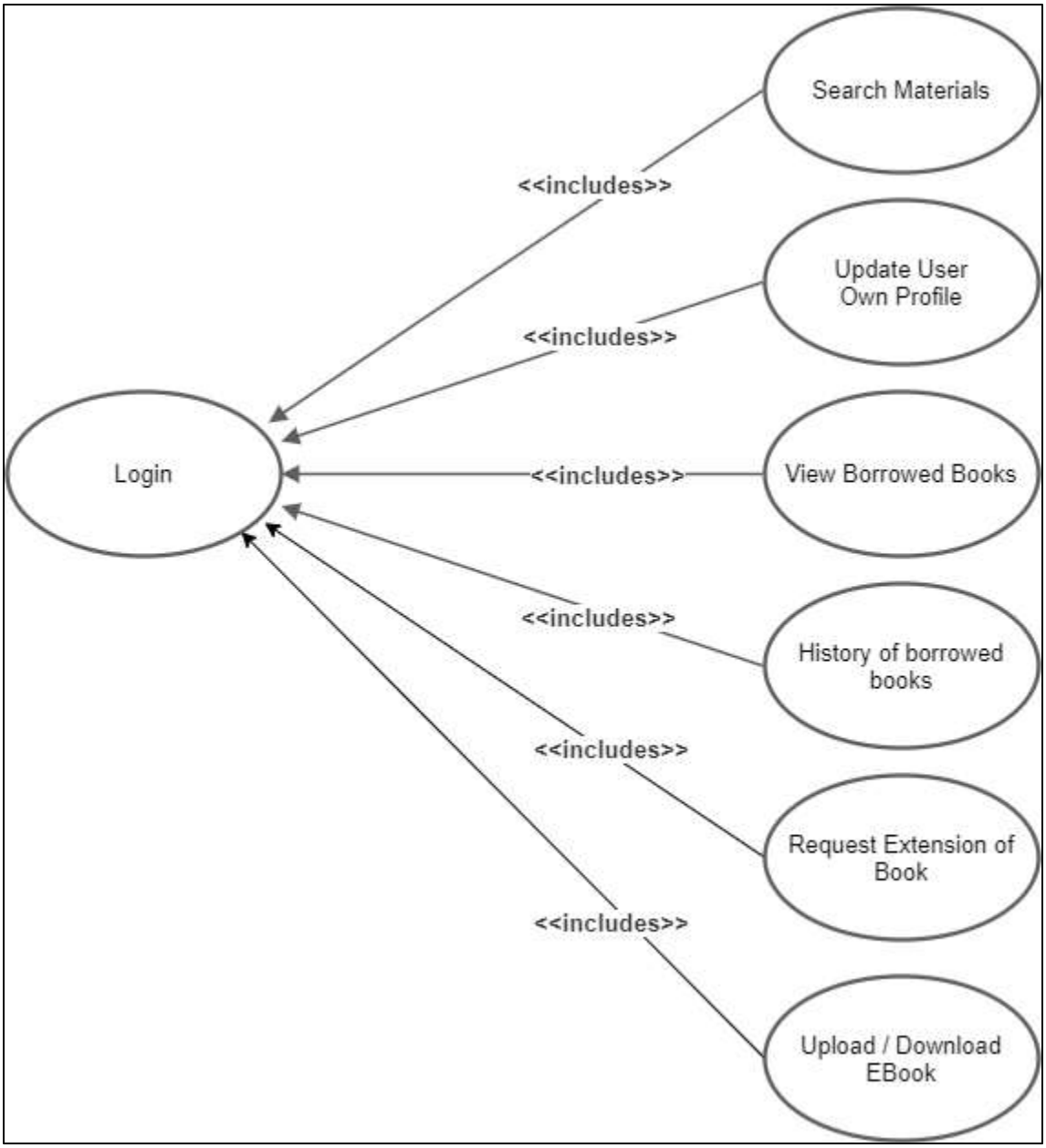

Borrowing Extension
Borrow Book
Issue Book
Request Extension
Accept Extension
User
Admin / Librarian


Time-in / Time-Out Monitoring
Time-In / Time-Out
Enter as Guest
Force Time-Out
Generate Report
User
Admin / Librarian

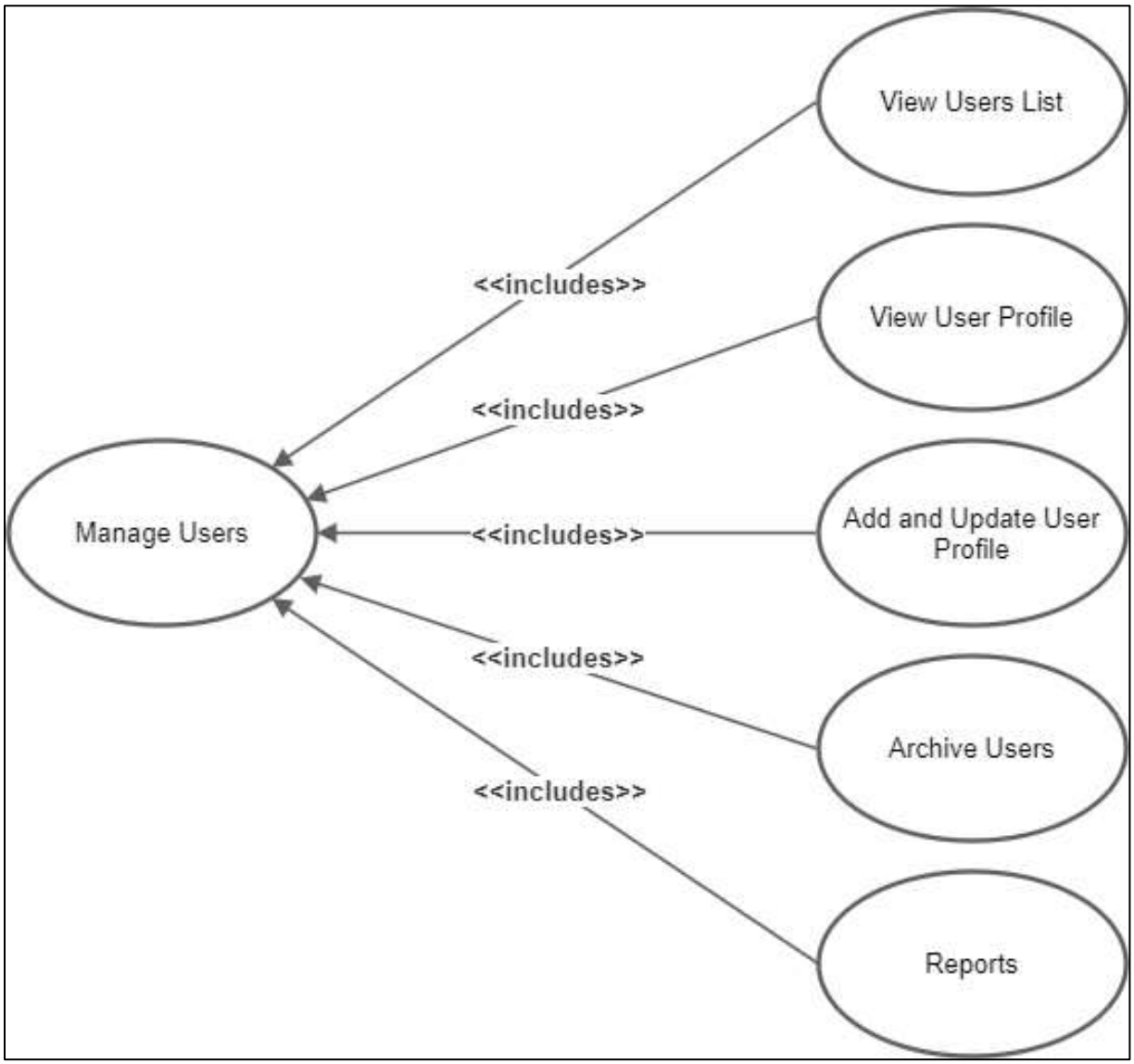

Uploading and
Downloading of Ebooks
Search Ebook
View List of Ebooks
View Ebook Information
Update Ebook
Upload Ebook
Download Ebook
Archive Ebook
User
Admin /
Librarian

3.5.3 Detailed Use Case

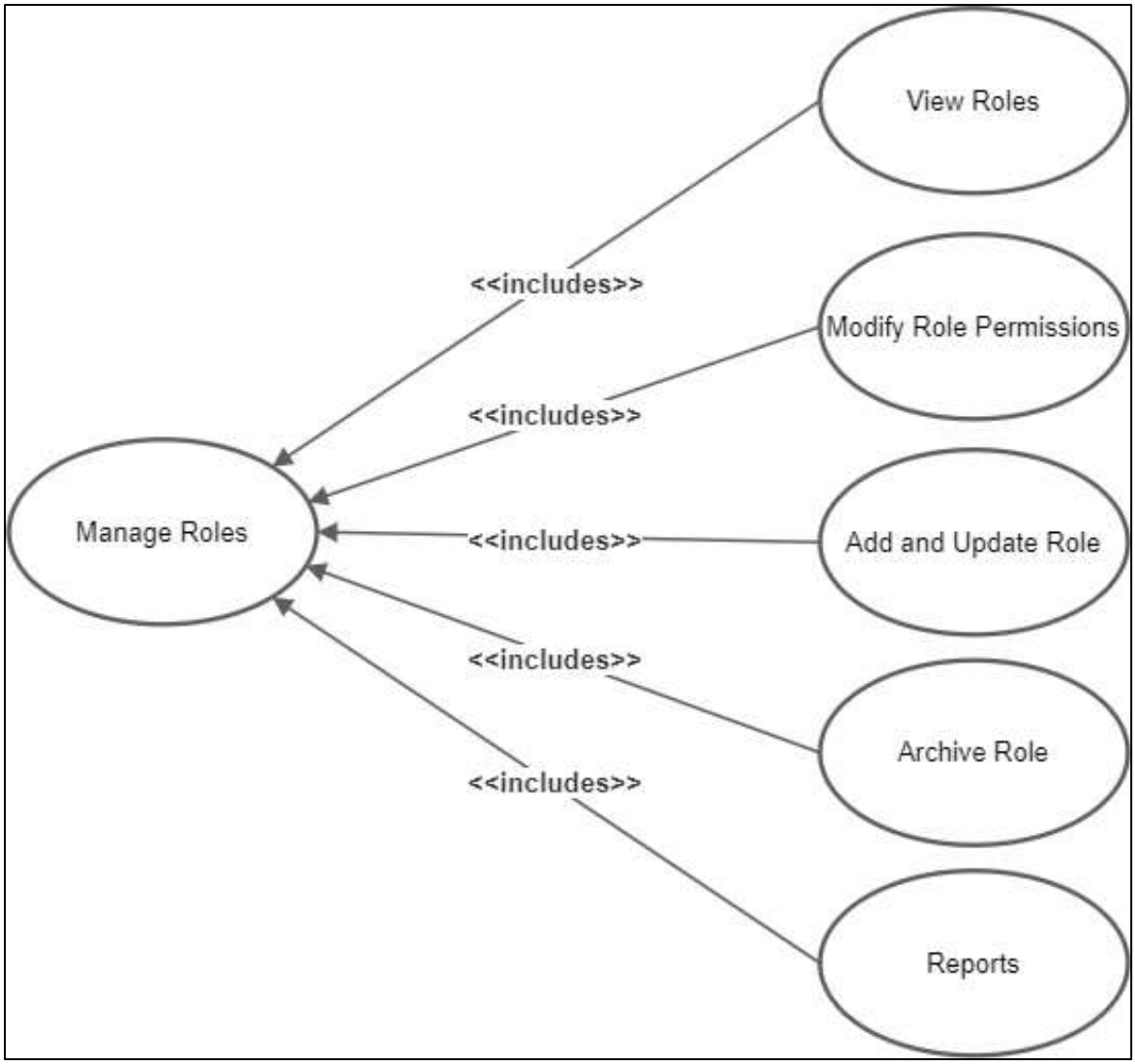
Login



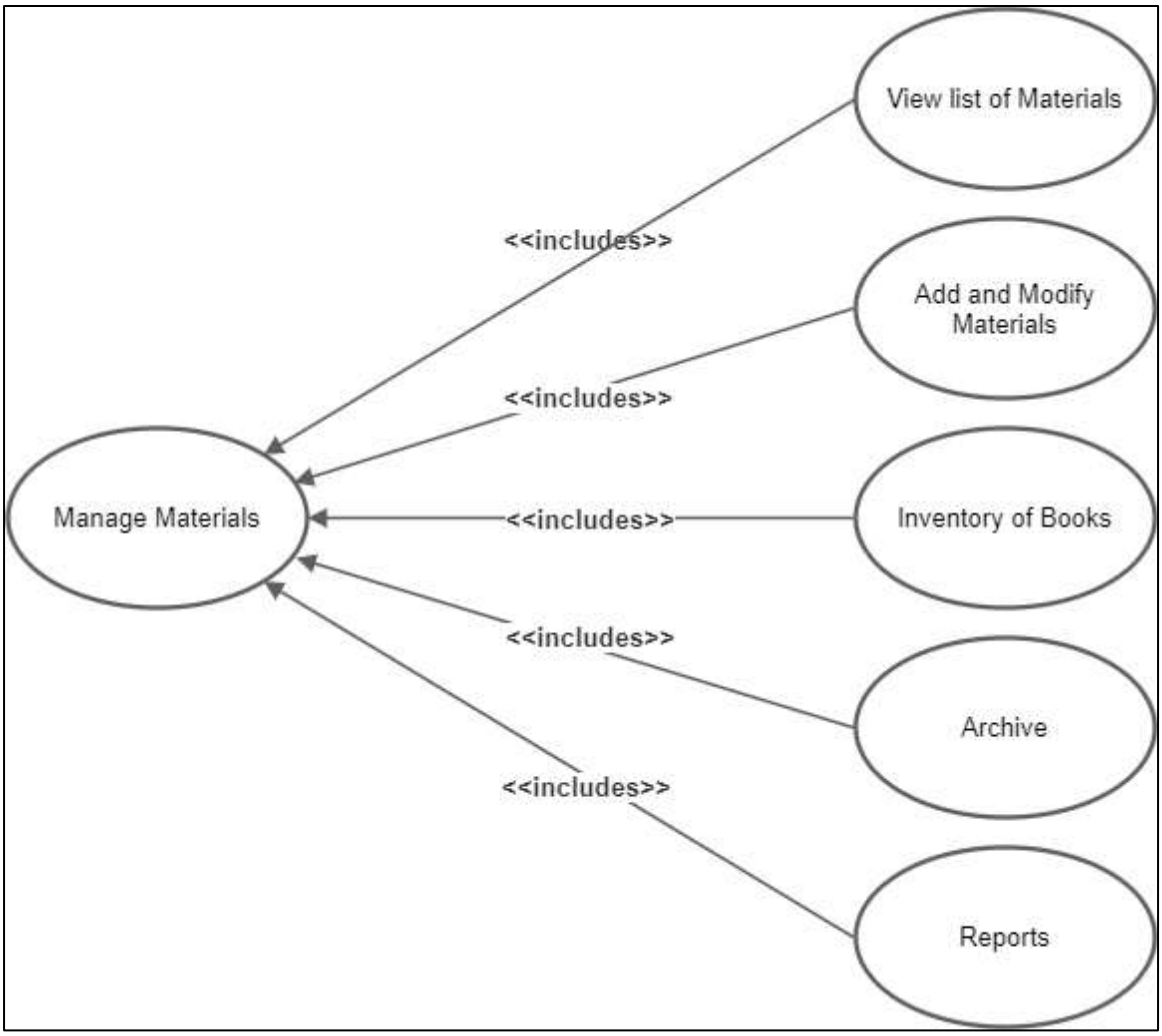
Manage Users



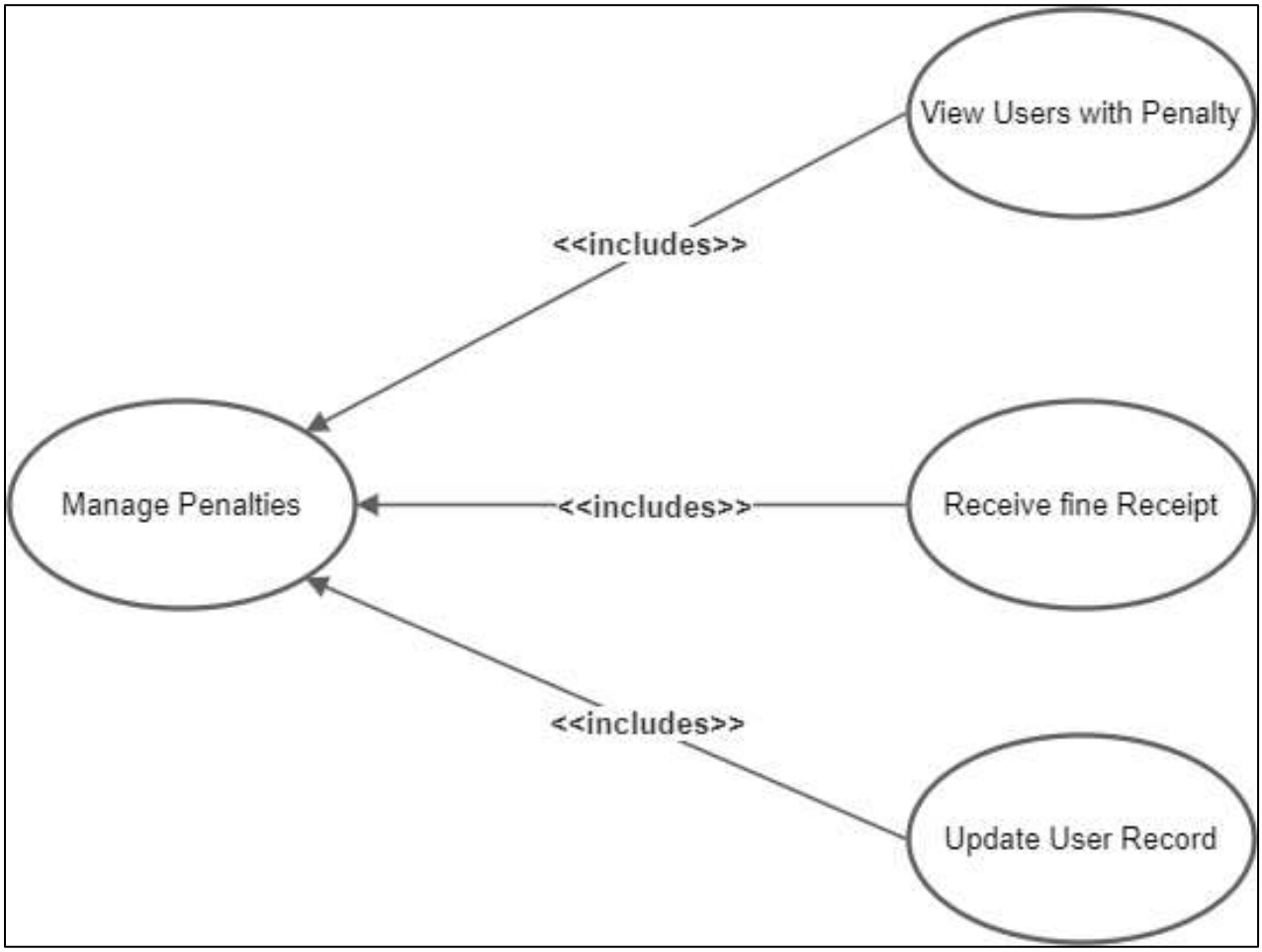
Manage Roles



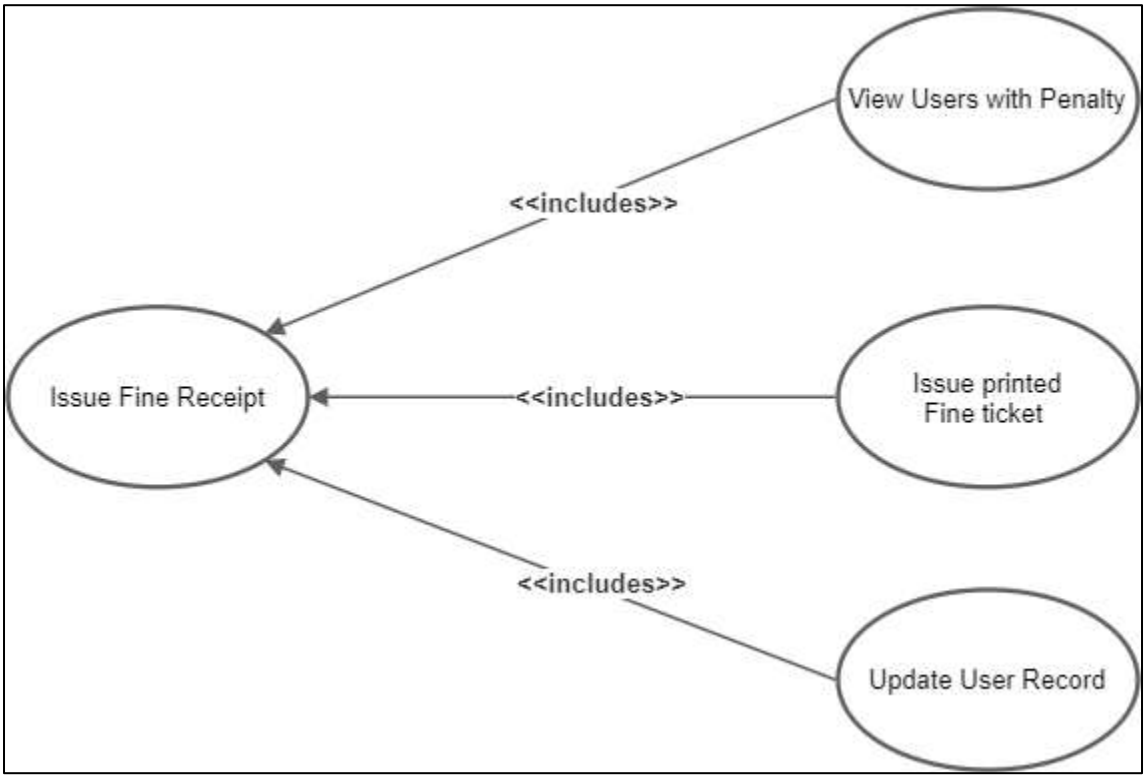
Manage Materials



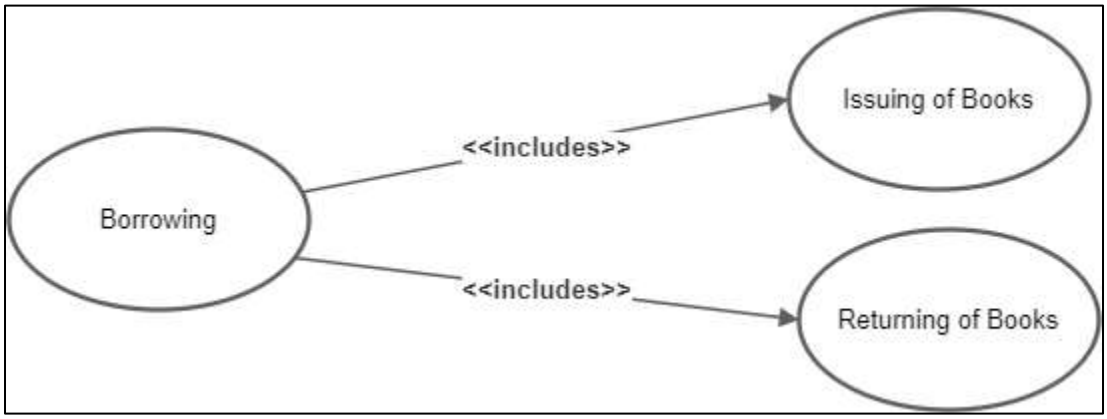
Manage Penalties



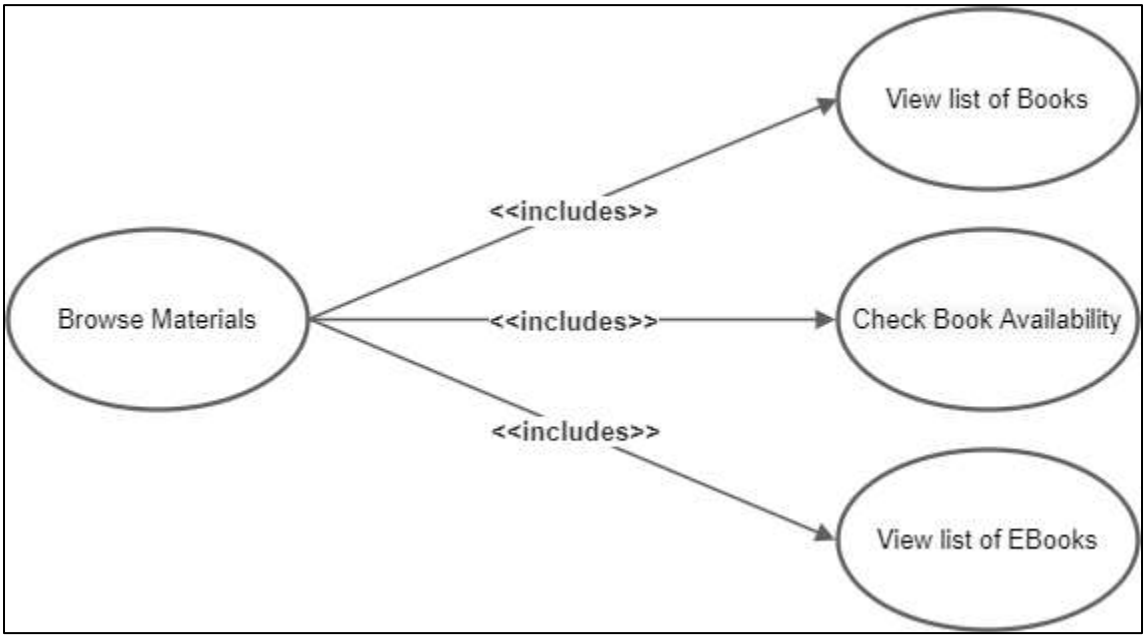
Issue Fine Receipt



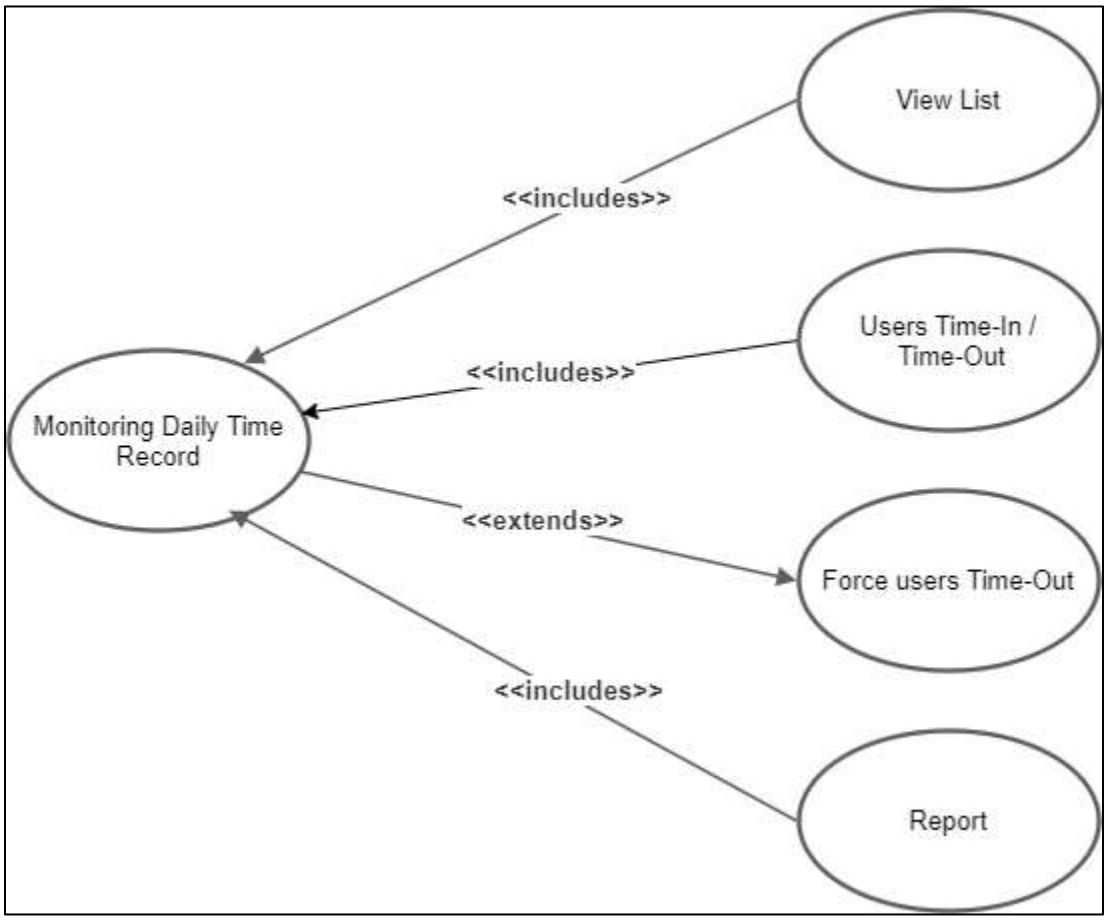
Borrowing



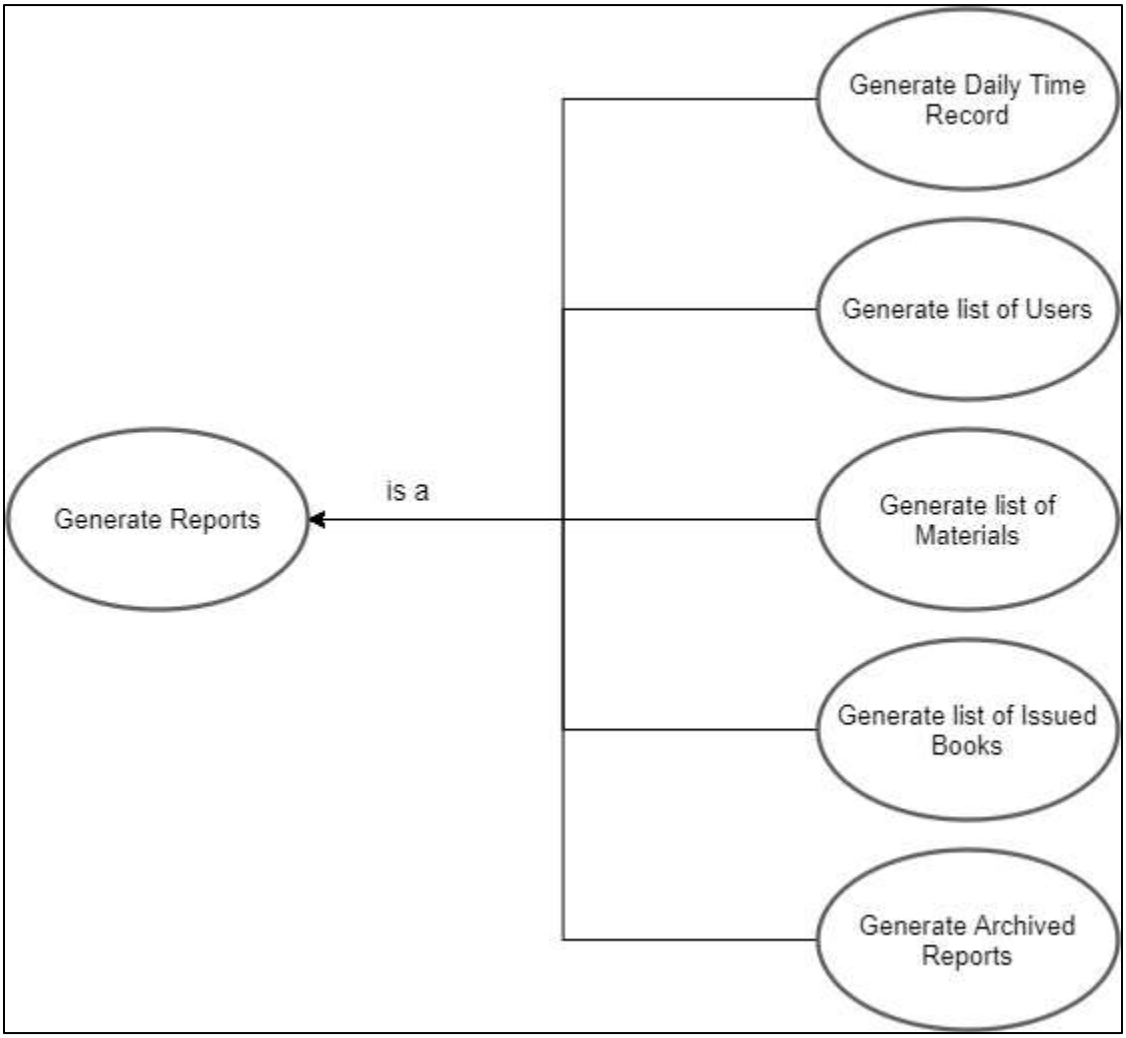
Browse Materials



Monitoring DTR



Generate Reports



3.6 System Requirements

3.6.1 Hardware/ Software/ Network/ Peopleware

3.6.1.1 Hardware Requirements

CLIENT SIDE			
	Processor	**RAM**	**Disk Space**
Desktop PC	Intel Core I3 or Higher Version	2 GB	250 GB

Server Side			
	Processor	**RAM**	**Disk Space**
RAD	All Intel or AMD – 2ghz	2 GB	3.5 GB

CLIENT SIDE			
	Processor	**RAM**	**Disk Space**
Android Phone	Higher Version of the android processor	1 GB	100 MB

Table 1.1 Hardware Requirements

3.6.1.2 Software Requirements

Clients Devices

- Cross-platform Web Browser

Web Server

- Hostinger

Development End

- Any text editor—Browser Interface
- MySQL

3.6.1.3 Peopleware

P-1: Student/ Professor/Librarian

Chapter 4

Results and Discussion

4.1 Physical Design

4.1.1 System Prototype (insert Photo)
4.1.2 User Interface (insert Photo)

4.2 Results

The findings of the study show the outcome of the user acceptance testing of the system. The user acceptance testing survey was based on the ISO 25010 and used Likert Scale which was mentioned in the methodology. Likert Scale rate ranges from one (1) to five (5). Five (5) is the highest and one (1) is the lowest and was shown in the figure below.

Likert Scale

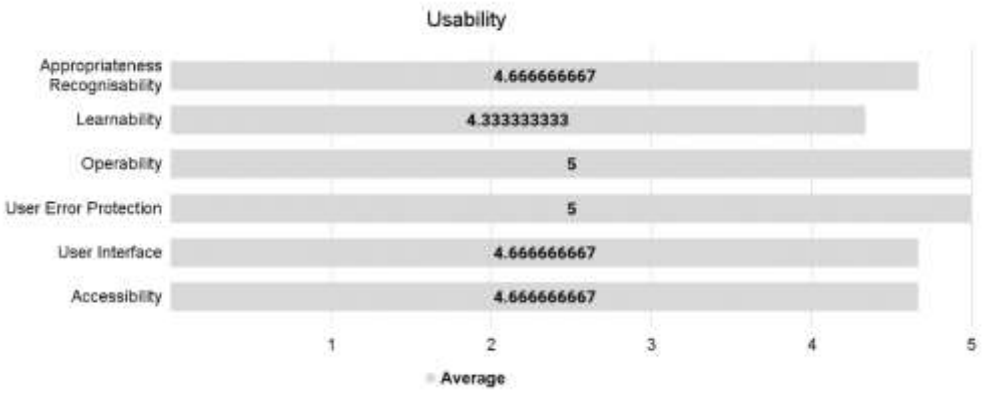
Numerical Rating	Interpretation
5.1-6	Strongly Agree
4.51-5	Agree
3.51-4.5	Slightly Agree
2.51-3.5	Slightly Disagree
1.51-2.5	Disagree
1-1.5	Strongly Disagree

Table 1

The ISO 25010 includes the following categories, and the results are

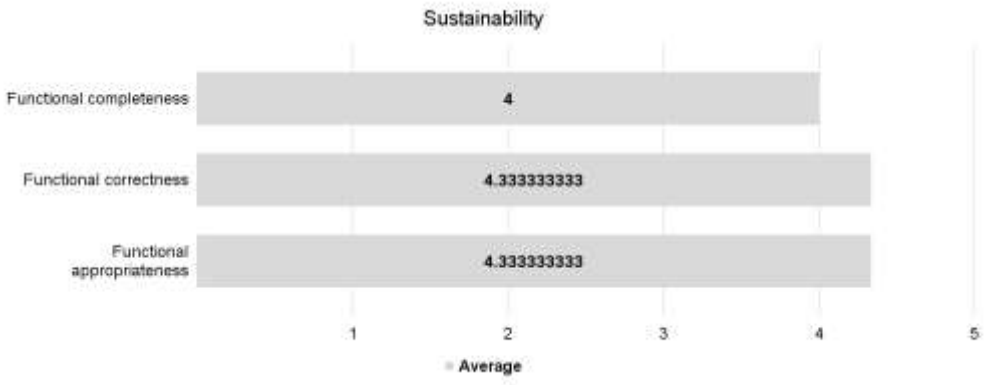
displayed in the figures.

Figure 1. Usability (With Computation)



$$\frac{4.67 + 4.33 + 5 + 5 + 4.67 + 4.67}{3} = 7.89$$

Figure 1. Sustainability (With Computation)

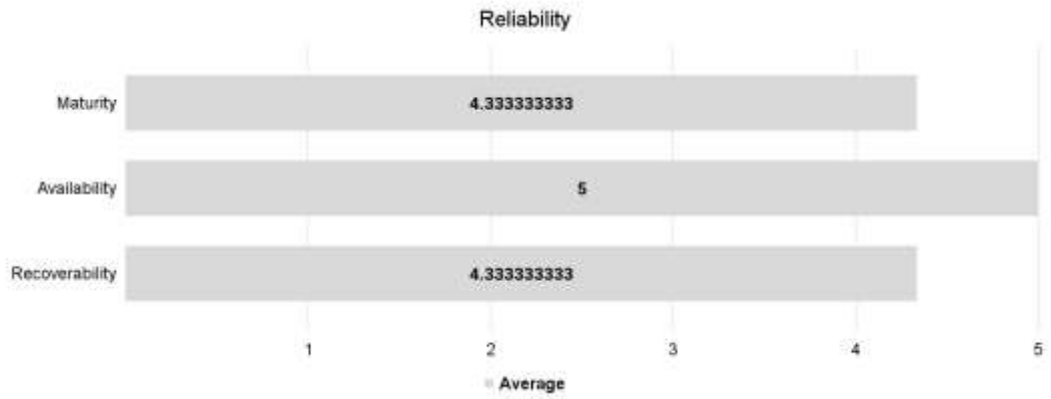


$$\frac{4 + 4.33 + 4.33}{3} = 2.78$$

Figure 1. Efficiency (With Computation)

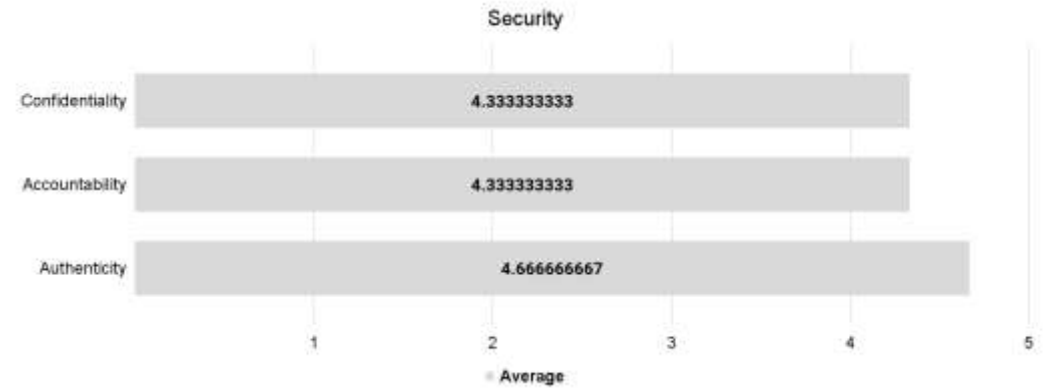
$$\frac{4 + 4.33 + 4.33}{3} = 2.78$$

Figure 1. Reliability (With Computation)



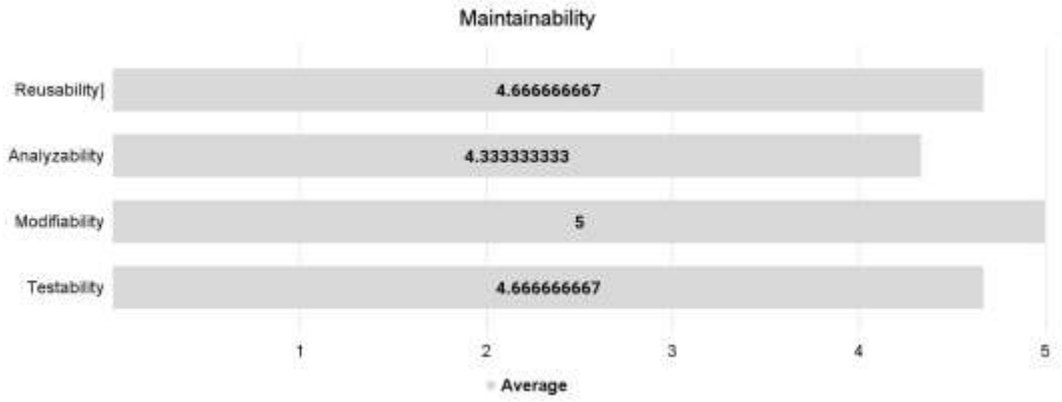
$$\frac{4.33 + 5 + 4.33}{3} = 4.55$$

Figure 1. Security (With Computation)



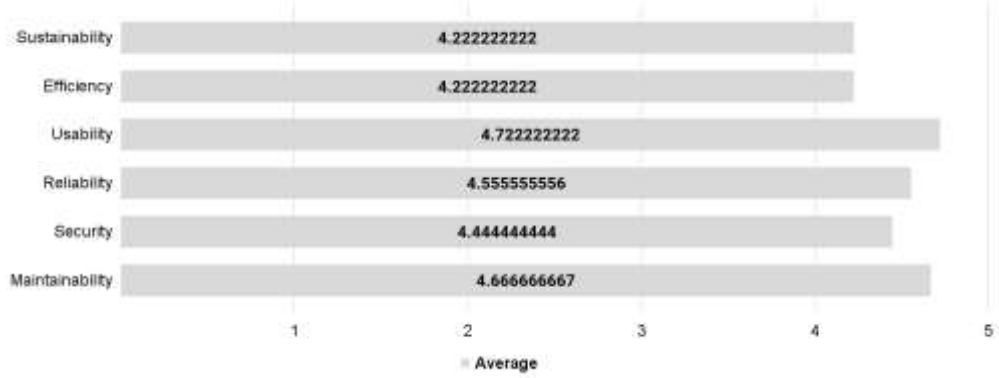
$$\frac{4.33 + 4.33 + 4.67}{3} = 4.44$$

Figure 1. Maintainability (With Computation)



$$\frac{4.67 + 4.33 + 5 + 4.67}{3} = 6.22$$

Figure 2. Summary of Findings for All Categories



The final rating is obtained by summing the averages of each category and dividing it by the number of categories contained in the criteria. The formula is as follows below:

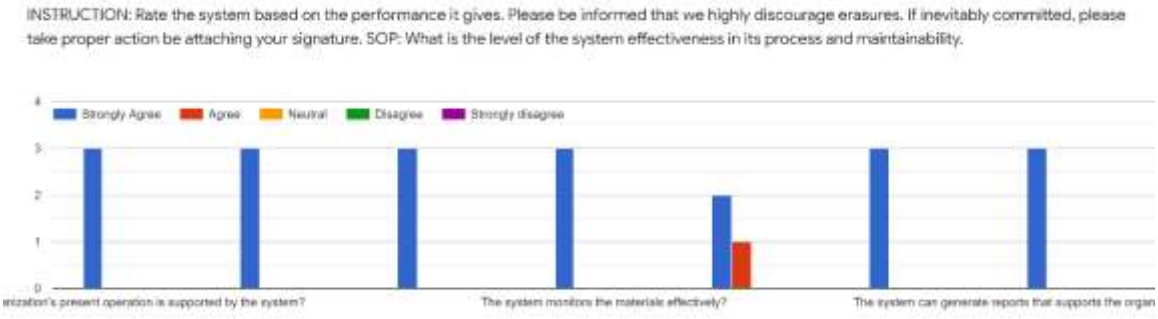
Figure 28. Computation for Final Rating (ISO)

$$\frac{4.22 + 4.22 + 4.72 + 4.55 + 4.44 + 4.66}{6} = 4.46$$

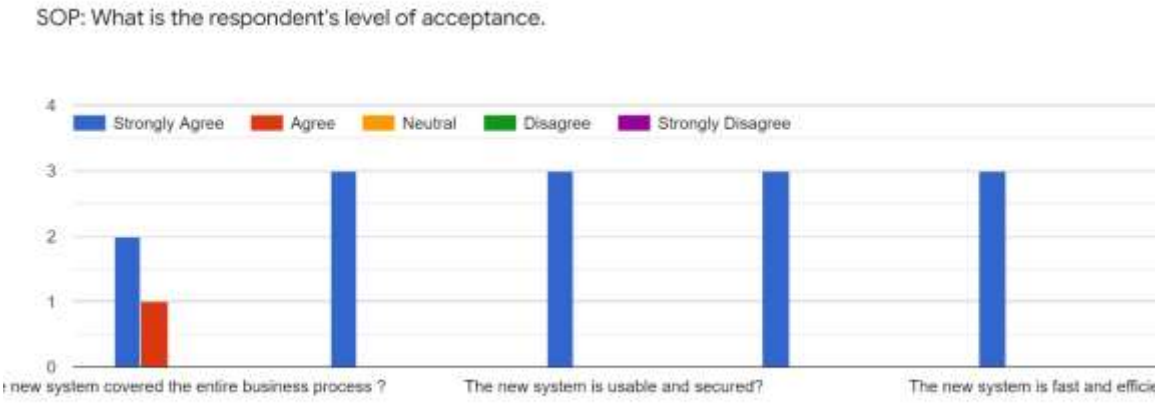
Therefore, the final rating for the ISO is 4.46, which is determined as “Agree” in the Likert Scale of the ISO.

Researchers conducted a survey for obtaining the user’s acceptance testing result and to prove the efficiency of the system. After evaluating the system, three (3) respondents responded to the survey questionnaires: two users and one client.

UAT – WEB APPLICATION



The graph shows that the user strongly agrees in the following that answers the level of the effectiveness of its process and maintainability of the system in terms of organization’s present operation is supported by the system, monitoring the materials of the system, and generating the reports that support the organization.



The graph shows that most of the respondents have voted ‘strongly agree’ in favor of the system’s level of acceptance. Hence, the newly-developed system covers the entire business process, has been usable and secured by the developer, and is fast and efficient when it comes to accessing.

Chapter 5

Summary of Findings, Conclusion, and Recommendations

5.1 Summary of Findings

The outcomes of the findings shows that the final rating of the ISO got 4.46, wherein recognized as “Agree” in the Likert Scale. The graph shows that the user strongly agrees with the level of the system's effectiveness and maintainability in terms of the organization's current operations being supported by the system, monitoring the system's materials, and generating reports that support the

organization. Also, the graph demonstrates that the majority of respondents highly agree with the system's acceptance level. As a result, the newly built system covered the whole business process, was usable and secure by the developer, and provided quick and efficient access.

5.2 Conclusion

The *Online Library Management System* allows the user to keep track of both the book and the person. This program allows the users to save all of the information about their library. The system's deployment will speed up data entry and give easily computed reports. The advancements in OLMS have made it feasible for all libraries, including those at a specific university, to have a decent system.

5.3 Recommendation

An information system is a system that represents things in a physical system, such as information resources in a library collection, whether it is computerized or not. Students might have a large number of information resources. On the other hand, the cost of time and the complexity of getting the right information rises. The researchers recommend to implement the development of the system into an updated version of the system. It is also recommended to gather more information and data when collecting for the analysis of improving the system. Moreover, it is advised to extend the editorial board

technique employed in agriculture and mathematics to pick essential material in other areas in order to construct cohesive collections. Analyze how and by whom digitized collections, both particular and general, are used. It is also good to create a Website that is visually appealing and easy to navigate, and update it as needed. Obtain funds for and perform user evaluations of digitized collections, and make the results of these evaluations available to the library community.

References.

Dass S, Singh A. Barcode technology applications in libraries and information control. Technology at its applications.html. Accessed on: Oct 10, 2016.

Campbell A. QR Codes, Barcodes and RFID: What's the Difference? Available from: http://smallbiztrends.com/2011/02/qr-codes-barcodes-rfid-difference.html. Accessed on: Sep 24, 2016.

Shahid S. Uses of Library technology in libraries: a new approach to circulation,tracking, inventorying and security of materials. Library Philosophy and Practice 2005; 8(1).

Kumar KG, Chikkamanju, Nayak MS.Applications of QR Codes in Library and Information Centers for Providing Effective Library Service. E-Library Science Research Journal 2014; 2(9): 1-4.

Trupti L, Kankapurkar R, Parekar A et al.Comparative study of Barcode, QR-code and RFID System. Int J Computer Technology & Applications 2013; 4(5): 81721.

Firoozeh Z. F., Nayere S. S., Quick Response Code Applications in Library and Information Centers, Jentashapir Journal oh Health Res, 5(2), 2014, 73-78.

https://www.researchgate.net/publication/344728543_Designing_Web-based_Library_Management_System