WOLKITE UNIVERSITY

COLLEGE OF COMPUTING AND INFORMATICS

DEPARTMENT OF INFORMATION TECHNOLOGY

TITLE: WEB BASED COST SHARING MANAGEMENT SYSTEM FOR WOLKITE UNIVERSITY

SUBMITTED TO WOLKITE UNIVERSITY

IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

BY

Name	ID Number
1. ZEMENU TAYE	NSR/1607/12
2. MUNIR MIFTA	NSR/1101/12
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PROJECT ADVISOR NAME: - MR. ASFAW KIROS

Wolkite University, Wolkite, Ethiopia

February 24, 2023

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Project Advisor: Mr.Asfaw Kiros

Wolkite University, Wolkite, Ethiopia

February 24, 2023

DECLARATION

This is to declare that this project work is done under the supervision of Mr. Asfaw Kiros. And having the title web based Cost Sharing Management system for Wolkite University is the sole contribution of:

1. ZEMENU
2. MUNIR MIFTA
3. MUNEWER ALIYI

There is no part of our project work has been reproduced illegally (Direct copy and paste). because Direct copy and paste which can be considered as Plagiarism. So our work All referenced parts have been used to argue the idea and have been cited properly. We will be responsible and liable for any consequence if a violation of this declaration is proven.

Date: ----------

Group Members:

Full Name	Signature
ZEMENU TAYE	_____
MUNIR MIFTA	_____
MUNEWER ALIYI	_____

APPROVAL

This senior group project is titled web based Cost Sharing Management system for Wolkite University. The documentation has been read and approved as meeting senior group project requirements of the Department of Information Technology in partial fulfillment for the award of the degree of Bachelor in the collage of computing and informatics at Wolkite University, Wolkite, Ethiopia. This senior Group project has been approved with the signature of the advisor and the Department of Information Technology.

Student Team Approval Form

Name	Signature	Date
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Advisor Approval Form

Name	Signature	Date
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Department head Approval Form

Name	Signature	Date
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Examiner Approval Form

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ACKNOWLEDGMENTS

First of all, we would like to thank Almighty God for the strength, he has given us throughout our life and this project; nothing could happen without the help of our God. Secondly, we would like to express our gratitude to our advisors, Mr. Asifaw Kiros abundantly helpful and offered invaluable assistance, support and guidance. Special thanks also to all our graduate friends, especially group members; for sharing the literature and invaluable assistance. Not forgetting to our best friends who always been there. We would also like to convey thanks to the School of computing and informatics for providing the computer laboratory facilitie.

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LIST OF ABBREVIATION

CSS	Cascading style sheet
DBMS	Database management system
DVD	Digital Video Disk
HTML	Hypertext markup language
HTTP	Hypertext transfer protocol
ID	Identification number
MS	Micro soft
MYSQL	My structural query language
OOSAD	object oriented system analysis and design
PHP	Hypertext pre-processor
RAM	Random access memory
SDLC	System development life cycle
UC	Use case
UML	Unified modeling language
WKU	Wolkite University
WWW	World Wide Web
CSMS	Cost Sharing Management System
CD	Compact Disc
GUI	Graphical User Interface
BR	Business Rule
CPU	Central processing unit
Md5	Message Digest Method 5

CHAPTER ONE

1. INTRODUCTION

Wolkite University, which is the home of technology It is one of the recently established public University working towards the implementation of the government's strategy of expanding quality of higher education in the country. Wolkite University campus provides services like student's registration, library servicing, student cafeteria, store system, management servicing and cost sharing system etc. but our project does Web Based cost sharing management system.

Cost sharing is considers as a government loan program for higher education students to cover partial cost of services like health care, food, education and dormitory. Any student who has either graduated or under graduated from higher education of the public institution is required to share the cost sharing of his/her education, training and other Services based on cost sharing principle.

Wolkite University cost sharing management system works manually/Paper based up to this time. Since the system is manual, customers face different problems related to waste time, resource and consume manpower. By observing the overall problems of Wolkite University cost sharing based problem, to resolve this problem our team member and me will be developing Web based cost sharing management system. In our project developing Web based cost sharing management system is better than that of the existing manual system in different ways relates to the customer obtain information online ,to minimize power, wastage of time and money in addition to this Web based cost sharing system is more reliable than that of the existing system.

1.1. Background of the organization

Wolkite University (WKU) is the emerging public higher education institution of Ethiopia established in 2004 EC. It is situated in the outskirts of Wolkite town, the capital town of Gurage zone, which is located 158 km west of Addis Ababa. Regardless of its young age, it is flourishing and growing fast in academic programs' diversity, research activities, community engagement, infrastructure development, and accessibility of facilities. Currently, WKU is running with more than 10,000 enrolled students in different modalities. Number of experienced and qualified employees in different academic ranks is showing dramatic increment.Wolkite university is still

operates manual based cost share management system. It operates all functions manually like filling cost share form, searching cost sharing document, generating report, editing cost amount, adding student details of information of the registrar office. So this manual system face various types problems like cost sharing document stolen by someone, data not secure, the form may be fill twice etc. Therefore, it is necessary to develop Web Based Cost Sharing Management system to make a more computerized service provision by giving priority to the functionality of data validating, storing, updating, deleting and generating report.

1.2. Statement of the problem

In Wolkite University campus there are many students those who are enrolled in different fields of study. Those students are expected to share the cost of living in the university related to food, shelter, education and materials. Now a day's Wolkite University cost sharing management system is very tedious since the system is manual. Due to these there are many problems in manual way of recording and reporting student's data. now a day students fill cost share manual based so student difficult to fill form and other workers lose many resource like paper, pen and manpower and difficult to manage student cost share file and after graduated all Student not get correct cost share data/ difficult because work based on manual based. And also Problems associates with the current manual system are: -

- It takes a lot of time to record, retrieve and view student cost share information.
- Wasting resource like paper, pen and manpower.
- It is not possible to recover files which are lost in different way.
- Difficulty of locating & finding files depending on each other.
- All user /Students do not get clear cost share information and notice at that time when there is change cost share amount.
- Lack of security means that all information is stored on paper for this reason the paper may damage and stole all the cost sharing information is lost.
- Inefficient way of managing records.
- Student does not get chance to Commenting if any Confusion/unclear based on cost share.

1.3. Objectives of the Project

1.3.1. General Objective

The general objective of our project is to developing Web Based Cost Sharing Management System for Wolkite University.

1.3.2. Specific Objectives

We can achieve the general objective by fulfilling the specific objectives listed below:-

- Gather requirements.
- System analysis and object design.
- Design user friendly and attractive user interface.
- Constructing an efficient database that store Beneficiaries cost share file.
- Implement the proposed system.
- Test and deployment the system.

1.4. Feasibility Analysis

1.4.1. Technical Feasibility

It is the process of evaluating the organization ability to construct a proposed system. Our project well technically feasible, because it can generate outputs in a given time, easy to communicate and generally it satisfies the end-user's requirement. And also our new system can work the current technology and our focus well to develop well organized dynamic website that well technically efficient and effective for managing the cost share.

1.4.2. Operational feasibility

It Measures how the proposed system to solve the problem of the existing system. The new cost share management system well operationally feasible and it doesn't affect the organization structure. Our system well operationally feasible in terms of:-

- reliability
- maintainability
- supportability
- usability and

- Flexibility.

1.4.3. Schedule feasibility

Schedule feasibility concerned with analyzing the expected completion date of the project and the constraints that may bring change to this date. We have so many fixed Schedules to work together. Concerning the project scheduling, it bounded by strict and separated timing, so it must be delivered within the time bound given in the schedule of project and activity with in a project meet deadline. Our intention is to finalize with hopefully before May 31, 2023. Therefore, our project satisfies schedule feasible.

1.4.4. Economic Feasibility

Our system will be economically feasible it can minimize the cost that spent for manual work. Let analyze the manual costs, there is around so many higher colleges in WKU and in each colleges there are many students which fill the cost sharing agreement in each year, So, too store their data need a huge amount of paper and also there is other material cost, WKU also need a large file cabinet to handle and store these students cost share file the point is here these costs spent with every 1st, 2nd, 3rd, ...Years, it will be a high cost for future. But if the system is automated it is develops once, the cost of server, computers, network installation and other costs spent once then the system give services through the life time of the business, so this project is economically feasible.

1.5. Scope and Limitation of the project

1.5.1. Scope of the project

- Our project is Web Based Cost Sharing Management System focuses for Wolkite University, but our project should be flexible (can apply for all university). But the system will be launch for the internal server of the Wolkite University in local area network for security purpose. It will cover most of the functions is fill out cost sharing form, view different information, View different notification, upload student information and Manage(payment, feedback, notice, cost share and account).

Limitations of our Project

- Does not connect with bank.
- User interface is support only English language.

1.6. Significance of the project

Wolkite University Web Based Cost Sharing Management System provides many advantages for the students and other Workers .This means, anywhere (in WKU) and anytime students are authorized to use this system effectively through internet accesses. The Students easily fill out cost share form, Send unclear idea and see different notice and other worker work easily and effectively quickly and lose small time Thus, it will document the student information in an organized manner. Among this main significance some of them are listed below:-

- Eliminate paper based recording.
- Minimize errors in human in paper based error.
- Reduce resource wastage like paper, pen and manpower.
- Minimize work load.
- The system can be accessed by multiple users concurrently.
- Accessing/extract all user information's as we wish.
- Increased the speed to perform activities.

1.7. Beneficiary of our Project

- For students:-Allow to fill out the cost share form easily and see different notice and also send unclear idea .
- For registrar: - to manage, view and store the data and also to facilitate the daily work easily and fastly.
- For University:- This system reduce the resource like paper, easily extraction of use full information, create well organized cost share data and handle student cost share file easily.
- Developers
  - Get Satisfaction.
  - Expanding our experience on how to solve environmental problem.
  - To share our experience and practice to the others and to get Score good grade.

1.8. Methodology of the project

The methods that facilitate us to capture information about requests system is called Methodology. Starting from proposed system we gathered information and data through different mechanisms.

1.8.1. Data collection Tools/Techniques

We develop Web Based cost sharing management system the primary task is collecting required data from different sources to perform further tasks.

Our project data was gathered by using the following techniques: -

Observation: - : To get additional information about the current system, we observed important information to look and examine the current manual working system of Wolkite University cost sharing.

Interview: - This data gathering method helps us as a major, because the most problems of the organization are find out through this technique. We tried to contact with Wolkite University CCI Collage Registrar office and some students. We got some initial information by using this kind of data gathering technique.

We asked different questions: -

- What is the current problem of the manual system?
- How do you work currently?
- How to process the current system?

Document analysis: -to get more information related to our project we analyzed different documents from Registrar office. Not only that but also we tried to review other relevant documents to develop our project Documentation.

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1.8.2. System Analysis and Design

In the system analysis and design phase of a project, we will use the **OOSAD** (Object Oriented System Analysis and Design) approach. Because it is a better way to construct, manage and assemble objects that are implemented in our system.

- Object oriented analysis (OOA): - During this phase our team use to model the function of the system (use case modeling), find and identify the business objects, organize the objects and identify the relationship between them and finally model the behavior of the objects in detail.
- Object oriented design (OOD): - During this phase use draw.io to refine the use case model and those for designing the class, sequence, collaboration, activity, state diagram and to model object interactions and behavior that support the use case scenario.

The reason why we have selected OOSAD (Object Oriented System Analysis and Design) method specifically UML (Unified Modeling Language) model is because of the following advantages: -

- To enable a high degree of reusability of designs. To decrease the cost of software maintenance.
- To reduce maintenance burden.
- To Increased consistency among analysis, design, and programming activities. Improved communication among users, analysis, design, and programming.

1.8.3. System Development Model

System development method is a frame work that is used to structure, plan and control the process of developing a system so to develop this project we have selected iterative system development method. The reason why we select this model.

It is unusual to design a complete project once. Therefore, to design this project we required to review and redesign in each phase iteratively to meet user requirements.

1.8.4. System Testing Methodology

We will use unit testing, integration testing and System testing

- **Unit testing**

Since the designed system is in an object-oriented method the team firstly teste the system at the individual class level. To check each module (API) we will test the modules using postman.

- **Integration Test**

To check whether the unit test working together correctly we will do Integration testing using postman.

- **System testing**

  After all the testing is performed, the system will be tested by a user who we be invited by the team. Especially at this level of testing the team seriously tests the system

1.8.5. Development tools and technologies

1.8.5.1. Frontend Technologies

The first use of programming language these are:-

- HTML
- CSS
- JQUERY
- BOOTSRAP

1.8.5.2. Backend Technologies

- PHP
- MySQL (for Database)

1.8.5.3. Documentation and Modeling Tools

Documentation and modeling tools are:-

- **Software tools:-**

- Client side: JavaScript, CSS, HTML.
- Server side:-PHP
- Draw.io:- for UML modeling and diagram
- Visual studio or Sublime:- to write implementation or code
- Microsoft word 2016 for documentation.
- Microsoft power point 2010 for presentation.

- Apache: web server
- MYSQL-database:-for storing data in the database.
- PHP engine :-for running PHP scripts
- Web browser :-to run our program or code from the server side

Hard ware tools:-

- Personal computer(PC)
- desktop
- Flash disk(32GB)
- Hard disk(500GB)
- Paper and pen
- Printer

Modeling Tools

- Adobe Photoshop (CS5): - used to edit photos.
- Draw.io: we use to draw use case diagrams, pie charts etc.

Deployment Environment

For deployment environment we must have

- Desktop and personal computer.
- Internet Connection.
- Storage devices like hard disk, flash disk.

1.9. Budget and Time Schedule of the Project

1.9.1. Budget of the Project

Table 1. 1 :Budget

Item	Quantity of item	Cost per item	Total cost
PC(Personal computer)	1	40000.00	40000.00
Desktop	1	Free for	free

		university	
Flashcard (32GB)	1	300.00	300.00
pen	2 Pieces	20.00	40.00
Pencil	3	10.00	30
Mobile card	4	25.00	200.00
Printing price	100sheet	4.00	400.00
Contiguous	----------	275.00	275.00
Total cost			41,245

1.9.2. Time Schedule of the Project

Table 1. 2: Time Schedule of the Project

Time Schedule of the Project					
	Time				
Phases	Nov 30–Dec 18, 2022	Dec 19-Feb 1, 2022/2023	Feb 2-Apr 25, 2023	Apr 26-May 15, 2023	May 16-May 31, 2023
Requirement Analysis					
System Design					
Implementation and Coding					
Testing					
Final Project Submission					

CHAPTER TWO

2. DESCRIPTION OF THE EXISTING SYSTEM

2.1. Introduction of Existing System

The current cost sharing management in Wolkite University work in manually based management system. This system mainly focuses on the students fill form their biography and cost share file per each year. The latter is the student dean search a file to identify those students who want cash payment. Registrar or college registrar approve the form which fill by students and store the student cost share file by using file cabinet and give one copy for students per each year. Students fill the form and send to College Registrar and each college Registrar collect the student cost share date send to University Registrar

The registrar of Wolkite University also send the overall graduated students cost share file including the total calculated unpaid cost of each graduated students to Ethiopian inland revenue officer. Ethiopian Inland Revenue officer stores them students cost share file which sent from Wolkite University by using file cabinet.

When a student completely repays their cost share Ethiopian inland revenue officer prepare a letter that allow to take their original document to student and the university registrar give the original document to student by checking the letter that sent from Ethiopian inland revenue officer.

Why describe the existing system? The main reason we describing the existing system is:-

- To know the background of the existing system.
- To identify problem of the existing system.
- To identify which of these problems could be solved by our project.
- To know the statement of the problem and challenge of the system and to come up with the perfect solution.

2.2. Users of Existing System

- **Students**

- Receiving the cost share form from collage registrar and fill out their biography and the cost share for current academic year.
- Finally return back the cost share form to college registrar.
- Complete/graduated year Take temporal card and see total cost share
- Finally take their original document from learned university, if they are fully pay the cost share. By sees the letter prepared by Ethiopian Inland Revenue officer.

College Registrar

- Providing cost share form to the students on each year
- Collecting the form while students are registered
- Putting signature while students return the cost share on submitted date
- Calculate the total unpaid cost of each graduated students.
- Generate those unpaid cost.
- Generate report all unpaid cost each student and give university registrar

University Registrar

- Collecting cost sharing form from the whole collage while students are graduate.
- Finally give their original document to student, if they are fully pay cost.

Inland revenue officer

- Post the information to university registrar and college registrar
- View the all over student information uploaded by the University registrar

2.3. Existing System Workflow structure

The work flow in the existing system is performed starting from the students to the registrar office.

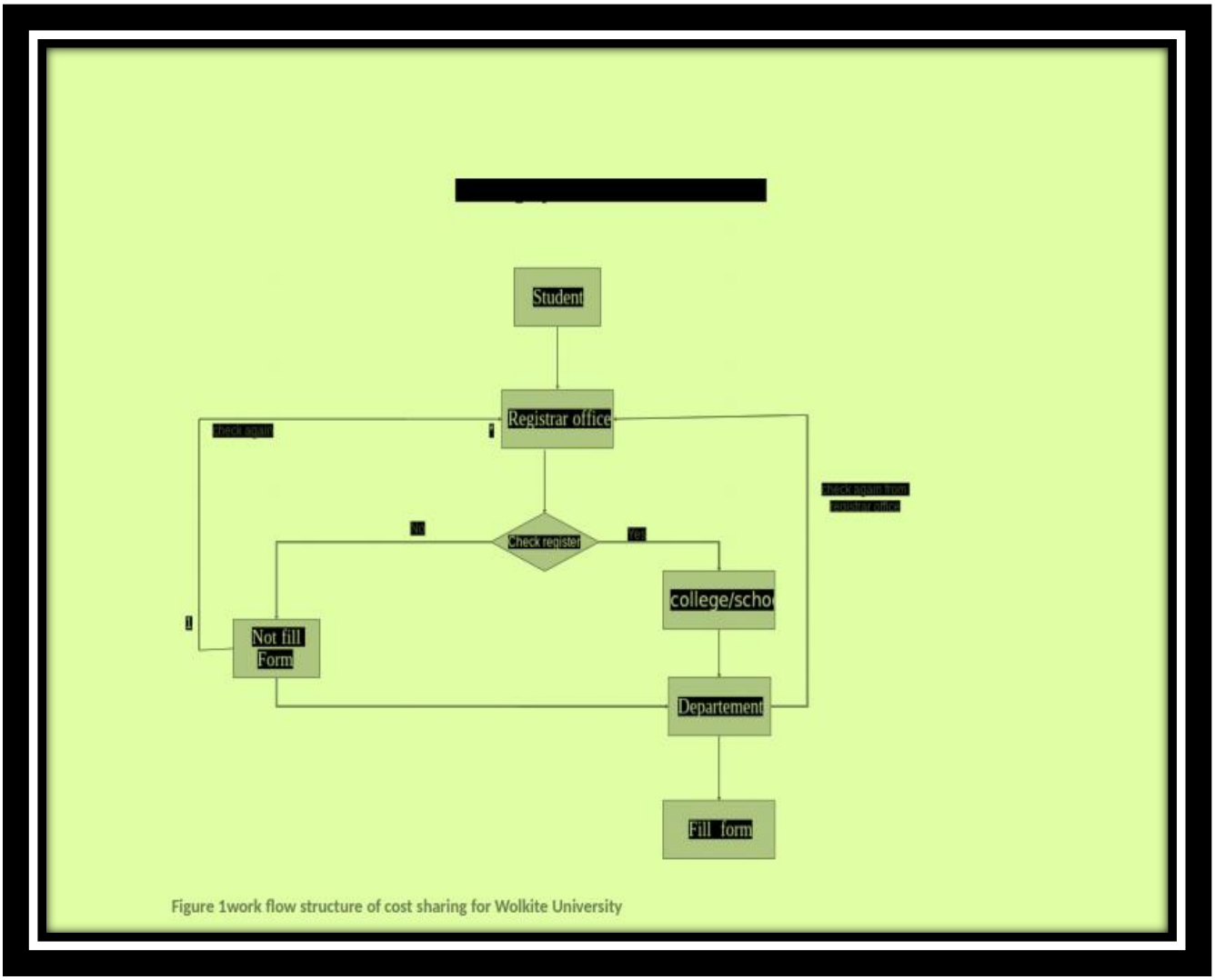


Figure 2. 1 work flow structure of cost sharing form.

2.3.1. Report generated in the existing system

Manual report employees whenever the information is needed from the university.

- Statically fill the form
- Statistical report of existing employees.
- Statistical report of leave withdrawal.
- Statistical report of current students not fills the cost share request form.
- Statistical report of how many student's present in the university and how many student's dismissal.

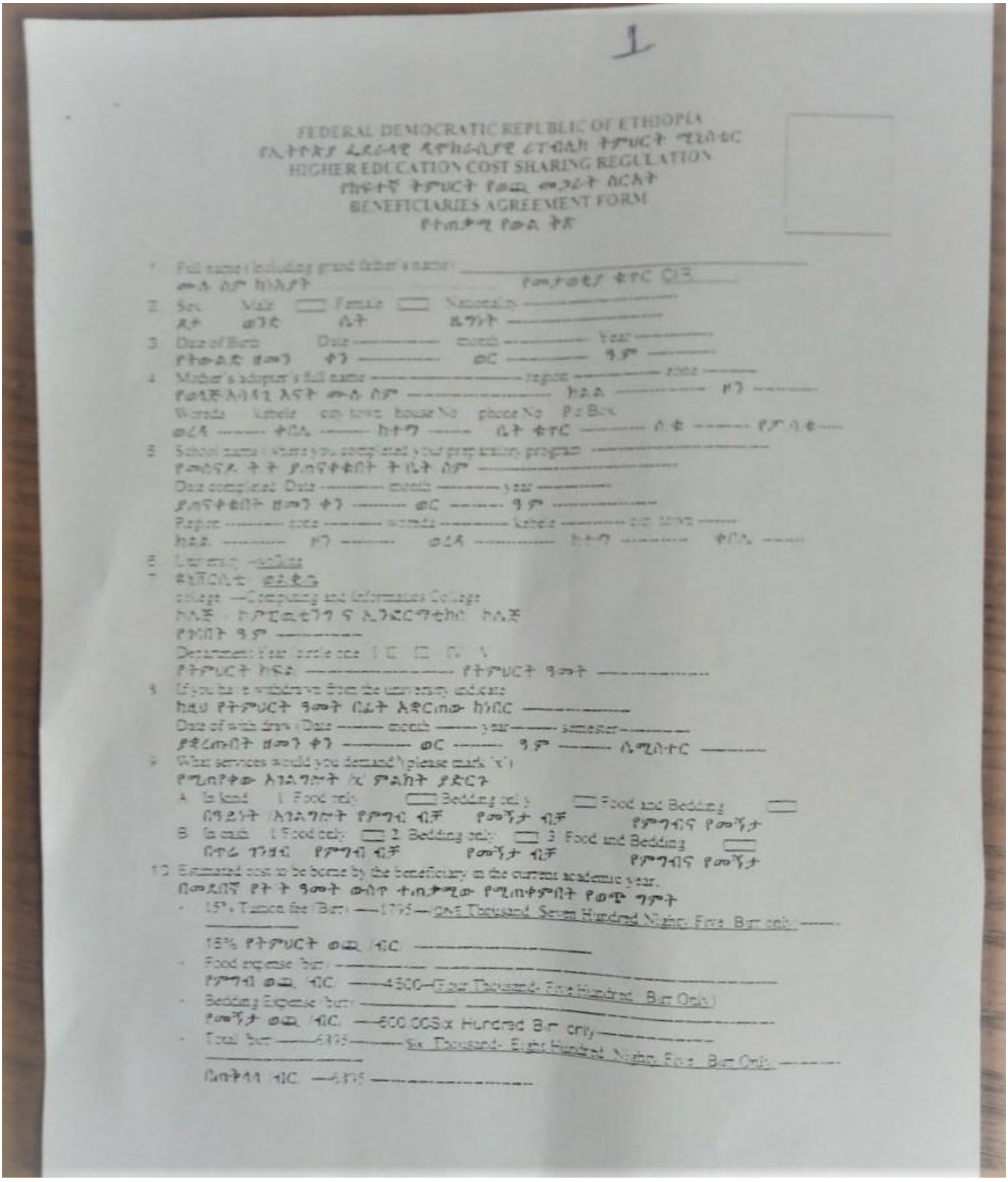
2.4. Major Functions of the Existing System

The major function of cost sharing is university students make an agreement per each year to accomplish their academic education process until they will be graduated.

The major function of Existing Cost sharing in Wolkite university is:-

- University of Registrar or cost sharing office distributes cost sharing regulation to each Collage Registrar and Collage Registrar student.
- Students fill out an agreement and put their photo on it then back to registrar.
- Registrar approved an agreement which fill out by each student.
- Registrar to calculate the total cost of each graduated students.
- Registrar generates those cost to give the student.
- Universities student dean identifies which student is requiring the service in cash.
- Finally, students get their original document after totally paid the cost share.

2.5. Forms and Other Documents of the Existing Systems



1

FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA
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HIGHER EDUCATION COST SHARING REGULATION
የከፍተኛ ትምህርት የወጪ መጋራት ስርአት
BENEFICIARIES AGREEMENT FORM
የተጠቃሚ የውል ቅጽ

1 Full name (including grand father's name) _____
ሙሉ ስም ከነአያት የመታወቂያ ቁጥር QR

2 Sex Male ☐ Female ☐ Nationality _____
ጾታ ወንድ ሴት ዜግነት _____

3 Date of Birth Date _____ month _____ Year _____
የትውልድ ዘመን ቀን _____ ወር _____ ዓ.ም _____

4 Mother's adoptor's full name _____ region _____ zone _____
የወላጅ/አሳዳጊ እናት ሙሉ ስም _____ ክ/ከ _____ ዞን _____
Woreda Kebele city town house No place No P.o.Box
ወረዳ _____ ቀበሌ _____ ከተማ _____ ቤት ቁጥር _____ ሰ.ቁ _____ የ.ሳ.ቁ _____

5 School name (where you comp etad y our prep aratory program) _____
የመሰናዶ ት ት ያጠናቀቁበት ትቤት ስም _____
Date completed Date _____ month _____ year _____
ያጠናቀቁበት ዘመን ቀን _____ ወር _____ ዓ.ም _____
Region _____ zone _____ woreda _____ Kebele _____ city town _____
ክ/ከ _____ ዞን _____ ወረዳ _____ ከተማ _____ ቀበሌ _____

6 University college
ዩኒቨርሲቲ ወይም ኮሌጅ
college Computing and Informatics College
ኮሌጅ ኮምፒዩቲንግ ና ኢንፎርማቲክስ ኮሌጅ
የገባበት ዓ.ም _____
Department Year Cycle ICE ☐ ☐ ☐ ☐
የትምህርት ክፍል _____ የትምህርት ዓመት _____

7 If you be a withdrawn from the university college
ከዚህ የትምህርት ዓመት ቤሌት እዳርጠው ከነበር _____
Date of withdrawn Date _____ month _____ year _____ semester _____
ያቋረጡበት ዘመን ቀን _____ ወር _____ ዓ.ም _____ ሴሚስተር _____

8 What services would you demand \ please mark 'x'
የሚጠየቅው አገልግሎት /ሂ ምልክት ያድርጉ
A In kind 1 Food only ☐ Bedding only ☐ Food and Bedding ☐
በዓይነት አገልግሎት የምግብ ብቻ የመኝታ ብቻ የምግብና የመኝታ
B In cash 1 Food only ☐ 2 Bedding only ☐ 3 Food and Bedding ☐
በጥሬ ገንዘብ የምግብ ብቻ የመኝታ ብቻ የምግብና የመኝታ

10 Estimated cost to be borne by the beneficiary in the current academic year.
በመደበኛ የት ት ዓመት ውስጥ ተጠቃሚው የሚከፍለበት የወጭ ግምት
- 15% Tuition fee Birr —1795— One Thousand Seven Hundred Ninety Five Birr only _____
15% የትምህርት ወጪ ብር _____
- Food expense birr _____
የምግብ ወጪ ብር —4500— Four Thousand- Five Hundred Birr Only
- Bedding Expense birr _____
የመኝታ ወጪ ብር —600 OOS x Hundred Birr only
- Total birr —6795— Six Thousand- Eight Hundred Ninety Five Birr Only _____
ጠቅላላ ብር —6795—

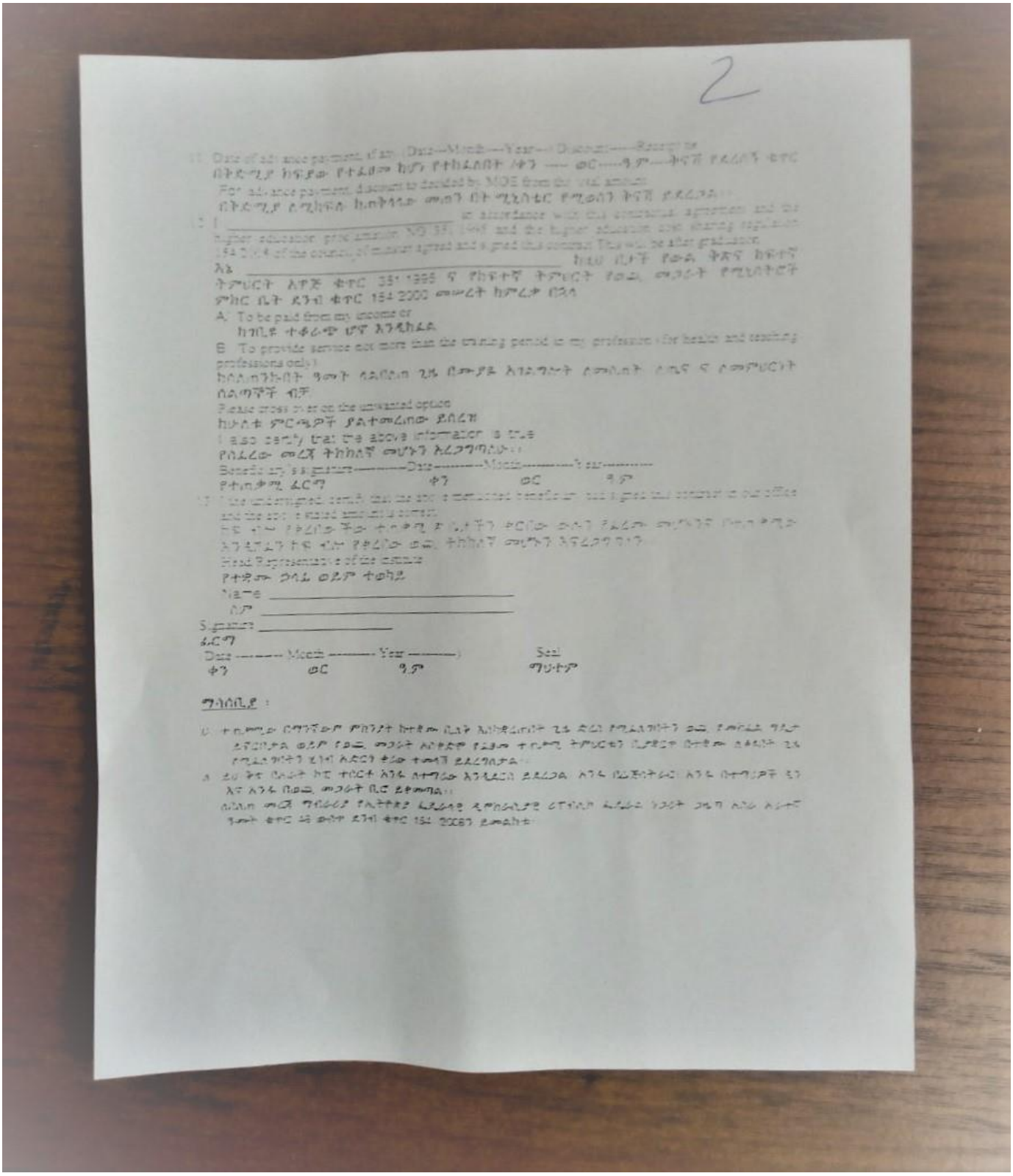

Figure 2. 2: Student cost sharing form

2.6. Drawbacks of the Existing System

Due to the existing system work manually it has it is own the following drawback:-

- The organizations spent much more cost for need of material (like, paper, pen…) So this means economically infeasible.
- Time consuming, when processing of cost sharing the performance is impossible.
- Lack of centralized data source.
- Easily attack by human or natural disasters like fire, theft the system is not secure.
- Difficult to handle students cost sharing file and Loss of vital document.
- Make an error during calculating cost, so it does not give true result.
- Difficult to easily generate report and extracting useful information.

2.7. Business Rules of the Existing System

The organization has many rules and regulations that should be performed when they give a service for students. Those are:-

BR1: All enrolled students are eligible to enter into an agreement for cost sharing and future repayments.

BR2: Every student should fill out cost sharing for his/her partial cost of education, dormitory, and meal services once per each year.

BR3: When the students incoming from the other university, they expected to fill out cost sharing form for total year stayed even one year fill half annual cost sharing.

BR4: When students dismissed from the university by academic, discipline, other cases; he/she doesn't expected to fill cost sharing at that year.

BR5: Any beneficiary students who complete his education shall be given a document stating the amount owed in cost sharing.

BR6: Every graduated student should fill out cost sharing for all years unless he/she can't get Temporary degree.

BR7: Every alumnus person to finish the payment he/she get the official transcript otherwise he/she can't get.

CHAPTER THREE

3.PROPOSED SYSTEM

By Observing the overall problem of the manual system seen in chapter two, our team and me we develop Web Based Cost Sharing Management System. Web Based Cost sharing Management System is better than that of the existing system in different aspects. Web Based Cost Sharing Management System for WKU is basically designed to access easily different level of Users. In this system, the actors are performing their regular duties in less time and easily. Our system/The proposed system uses the functionality of existing system to advance speed, performance, security and reliability of the system. Our proposed system will eliminate or improve the weaknesses of the existing system by providing online service.

Requirement is the feature use the system must have or a constraint that it must satisfy to be accepted by the cost sharing officer. It determines the needs of everyone who will be the user of the proposed system of our project such as students, Registrar officer and Inland Revenue officers.

Generally the requirement of the new system can be viewed as:-

- Functional requirement and
- Nonfunctional requirement

3.1. Functional Requirements

Functional requirements are drive the application architecture of system. The functional requirement is the study of what a system should be able to do, the functions it should perform and describes the interactions between the system and its environment. Our system/The proposed system has the following functional requirements: -

- **Login:-**all users to access the system you must be login and All Users access the system must be passed login authentication.
- **Manage account statues: -** means

- **Create account**:-The University Registrar admin can Create Account for All users to access our system.
- **Update account**:-The University Registrar admin can update Account for All user
- **Disable account:**-The University Registrar admin Disable Account for All users.
- **Enable account: -** The University Registrar admin can Enable Account for All user.

❖ **manage cost share status:-means**

- **Update cost :-**The system allow to updating the beneficiaries cost share.
- **Register Actual cost :-** the University Registrar allow register the actual cost per each year.
- **Calculate Cost:-**Calculating the cost that spent for bedding, food and tuition with respective percentage.
- **Generate cost share:-**the College Registrar to calculate , generate and Send to the Student.
- **Fill form:-**all student fill cost sharing form
- **View cost share:-**the user to allow viewing the calculated cost.

❖ **Manage student information :-means**

- **Upload student information:-**the university registrar to uploaded total graduated student give to inland revenue officer.
- **View student information:-**the user should allow viewing the all over student information and costs.

❖ **Manage notice:-**the system view and post notifies the user if new messages are entering into the system.

- **Manage feedback:-**all student and College Registrar can be send and view the notification (message or comment).
- **Logout:** All user logout from the system after accomplish /finished their task.

3.2. Non-functional Requirements

Non-functional requirements drive the technical architecture of our system. Non-functional requirements describe how the system works and our system to improve quality. They specify Criteria that judge the operation of system qualities to capture the required properties of the system. Then our team is going to develop its own non-functional requirements, such as:-

- **Security:-** all user does not access our system, by using authorization protocol this protocol use authentication (deals with identifying a user and what a user is allowed to do respectively) such as Username and Encryption passwords. Our system is considers these security risks.
- **Performance:**

  Our system many users use concurrently without challenging and also response time of the system to user in process, query and retrieve cost sharing data and information from database. That means it takes at least 4-second response time and the worse response time is 10-second for a given piece of work. The designed system will use low utilization of system resource in terms of space and time. Many tasks can be performed on the same time that in turns provide time and cost effective services.
- **Usability:**
  - ✓ our system will be easy to used by user
    - **Understandable: -** The system shall use consistent graphical user

      Interface that attract users of the system.
    - **User friendly:** -The system directs users by producing responsive outputs.
- **Efficiency:**

The proposed system has moderate response time and fast. The system can also support concurrent users to access, retrieve from the central database.

3.2.1. User Interface and Human Factors

In order to make high level proposed system more attractive, user friendly and also easy to use we use different front end technologies like JavaScript, CSS, HTML and Bootstrap. Due to this we can minimize the training cost.

3.2.2. Hardware Consideration

The hard ware required to run the system in the server (php), network cable and laptop/desktop computer. The system will be developed by considering hardware requirements. The system will

Support computers and secondary memory to store all databases to provide the services for the users.

Table 3.1.Hardware Consideration of the Project

No.	Items	Specification
1	Computer/desktop	Apple, or Hp, Dell
2	Processor	Core(i5, or i7) and 2.5 GHz
3	RAM	2GB-8GB
4	System type	64-bit OS
5	Deployment Server	WKU's Server + Hard Disk

3.2.3. Security Issues

Our system is protected from external /unauthorized and malicious users:-

- The system is secured i.e. user must be able to give rights or deny for all users based on his/her position by the administrator of the system.
- Use md5 algorithm to encrypt the password.
- The password is strong (6-8) character string.
- Any change in the structure of the database is shall done by admin.

3.2.4. Performance Consideration

- This system develops by using PHP server side scripting language which can increase a system performance and also MySQL query optimization using indexes the query response time is very fast.

- **Response Time**- response time of the system to user in process, query and retrieve cost sharing data and information from database. That means it takes at least 10-second response time and the worse response time is 1 minute for a given piece of work
- **Processing Time**- Since the system is developing with efficient programming language and database upon request for user's Activities the system under normal condition should `process the request as quickly as possible by using multi-tier architectures.
- **Concurrent** - Processing the system can support multiple users at a time/concurrently use of the system.

❖ **Efficiency**:

- The system gives appropriate output based on the expected lists of inputs.
- The system must ensure allocation and use of services being requested for the users by using minimum memory storage, cost, time and human power.

❖ **Accuracy**:

- Proposed system will be better due to reduction of error. All operation can be done correctly and it ensures that whatever information is coming from the data base is accurate.

3.2.5. Error Handling and Validation

- **Incorrect input**: the system handles many exceptions like inserting empty string to the database, filing the form with incorrect value display an appropriate message for each error.
- **Login error**: the system shall handle an attempt to login with incorrect Username and password and display appropriate alerts.

3.2.6. Quality Issues

- **Reliability**: the system should not fail if there is access of internet.
- **Usability**: the system that we developed to learn and operate. It will need only little training to use the system.

- The interface actions and elements should be consistent
- Error messages should explain how to recover from the error
- Undo should be available for most actions

- **Availability**: the system will be available for all working day.

3.2.7. Backup and Recovery

To reduce data loss and other risk there we use a frequent and full back up mechanism to avoid any information loss using copy of the system to restore when hardware and software failure is occur. Our team member and me to develop a system they must have to put uses backup mechanism by using cloud storage and removable flash disks, In addition to this we use different storage devices like Hard Disk, CD, and DVD to duplicate the data.

3.2.8. Physical Environment

This web-based cost sharing management system deployed to Wolkite University. Without the internet and electric light there is no another external factor that affect our system service.

3.2.9. Resource Issues

The resource that help for our system (our system consume) are internet, computer or electronic internet based device this resources are must be needed. AS our system is a web-based application it should use less resource.

3.2.10. Documentation

The proposed system provides required full documentation, help contents and tips to allow further maintainability and to support and guide user how to use the system. The system documentation will provide information about how to use it and all the essential information about the system.

CHAPTER FOUR

4. SYSTEM ANALYSIS

This chapter deals with analyzing the proposed system by using different UML analysis modeling techniques such as use case diagrams, the use case descriptions (scenarios), sequence diagrams, activity diagrams, stat chart diagrams and analysis class diagram.

After we identifying the actors and use cases, the use cases are develops and textual descriptions (scenarios) are stating. The Sequence diagram is depict based on the use cases, which are developed for the proposed system. The activity diagrams will represent activities.

Use case: It's the identification and representation of a sequence of actions that the user (Actors) takes for a system to get particular target. It can be identified and represented by ellipses with a respective descriptive name.

An actor is a person, system, or real object that plays a role in one or more interactions with the system.

We are Select four major actors in the current proposed system those are:-

- Student.
- College Registrar.
- University Registrar.
- Inland Revenue Officer.

4.1. System Model

A system model is composed of a use case diagram and accompanying documentation describing the use cases, actors and associations. It helps to analysts to understand the functionality of the system and models are used to communicate with the customer.

4.1.1. Use Case Model

The Use Case Model describes the proposed functionality of the new system. A Use Case represents a discrete unit of interaction between a user (human or machine) and the system. Use Cases are typically related to 'actors'. An actor is a human or machine entity that interacts with the system to perform meaningful work.

4.1.1.1. Use Case Diagram

Use case diagram is one of the unified modeling language which represents user's interaction with the system and depicting the specifications of a use case. The purposes of use case diagrams can be as follows:-

- ❖ Used to gather requirements of a system.
- ❖ Used to get an outside view of a system.
- ❖ Identify external and internal factors influencing the system.

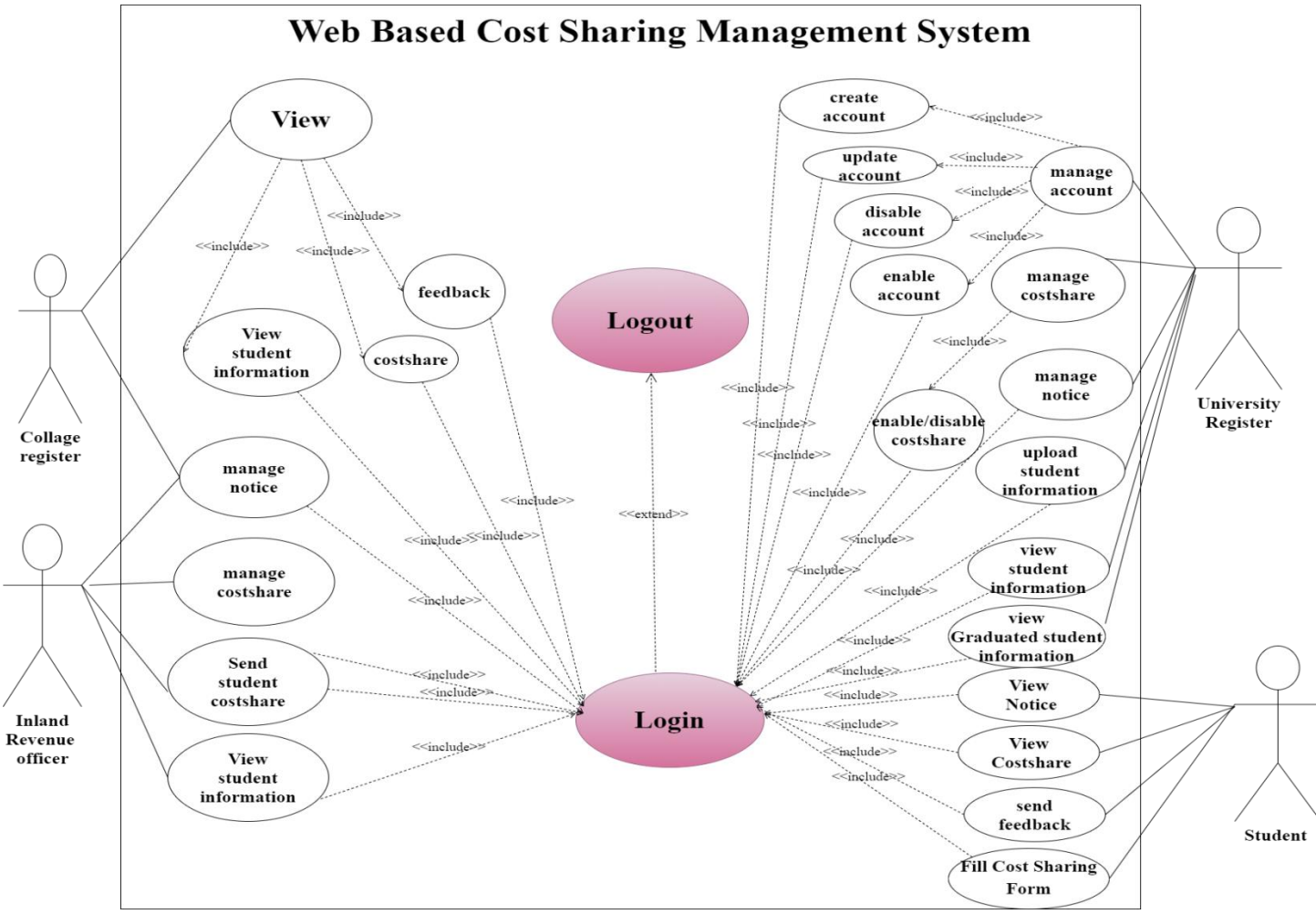

Figure4. 1: Use Case diagram for CSMS

4.1.1.2. Use Case Description

ID: Give an identification number that enables you to make the use case traceable.

Name: The name that you have used in the use case model.

Actor: who interacts with the system?

Pre-condition: what is the expected situation before the use case can be started.

Main scenario (Basic flow of event): which use case performs when it is started?

Alternative scenario (alternative course of action): it is optional but it is the activity done when basic course of actions failed.

Post-condition: what is expected?

Table 4. 1: Use Case Description for Login

Name	Login	
Use case ID	UC01	
Brief description	When the user Enter Username, password and select user type, it checks the input from database, if it is valid the user can access, Other ways it displays Re-enter message and error message.	
Actors	College Registrar, Student ,University Registrar and Inland Revenue officer	
Pre condition	User must be authorized user who has Username and password.	
Post condition	The user is authenticated and the system displays all features available for the role for the user is associated.	
Basic flow of events	User action	System response
	Step1: Users Open the System web page. Step3: User Click login button on the home page. Step5: User Enter Username and password and select user type then Step6. User clicks on login button Step9: system display Successful logged in and User page.	Step2. The system display Homage page. Step4: The System Display Login Page Step7: System Check Validity Username and password Step8. The system check User name and password in

		Database 10. Use case ends.
Alternate Flow of events		
Title	Description	
A. The Users filled invalid Required data	A1. The system display message "invalid Username or password or User type" A2. The system backs prompt the User go to step 5 Re-Enter the correct Username and password again. B1. The system display message "user does not exit" B2. The system backs prompt the User go to step 5 the User try again	

Table4. 2: Use case Description for Create Account

Name	Create account	
Use case id	UC02	
Brief description	the University Registrar Create account for users	
Actor(s)	University Registrar	
Pre-condition	they must be authorized	
Post condition	Create account for users	
Basic flow of events	User action	System response
	Step1. The University Registrar login to system Step2.The University Registrar Click to Create account Step4.The University Registrar fill information that included ID, full name, sex, phone, Username and select user type. Step5.the University Registrar Click to create	Step3. The system display create account Form Step6. The system validates the input data. Step7. The system stores data into database Step8. The system display message "account created

	account	successfully” Step9. use case ends
Alternate flow of events		
Title	Description	
A. The University Registrar inserts invalid User account information B. If University Registrar entered already existing user name and password.	A1. The system display message “account not successfully created” A2. The system prompts the user to Re-Enter the valid information A3. Use case continues with step 4 B4. system displays “User name and password already exist.”. B5. The use case continues at step 4 in the basic course of action.	

Table 4. 3: Use case Description for Update Account

Name	Update account	
Use case id	UC03	
Brief description	The University Registrar update their account Created because of security	
Actor(s)	University Registrar	
Pre-condition	They must be authenticated	
Post condition	The authenticated users able to update their account	
Basic flow of events	User actions	System response

	Step1. The University Registrar login to system **Step2**. the University Registrar with the system Click update account **Step4**. the university registrar Entered the required information that include 4.1 user name 4.2 old password 4.3 new password 4.4 confirm new password 5. then Click to update	**Step3**. the system display update form **Step6**. the system validate the Entered data **Step7**. the system display message ”successfully Account updated” **Step8**.use case ends
Alternate flow of event		
Title	description	
A. Enter invalid String data entry	A1. The system display Entered data is invalid A2. The system prompts the user to Re-Enter the valid data A3 .Go to step 4.	

Table 4. 4:Use case Description for Disable or Enable Account

Name	Disable account or Enable account
Use case id	UC04
Brief description	User may graduate or stop because of some problems so user account will be disable.
Actor(s)	University Registrar
Pre-condition	The account should be created
Post condition	the account is enable or disable
Basic flow of events	

Include:- Disable account Enable account	User action	System response
	Step1. The University Registrar login to system Step2. the University Registrar Click to enable or disable user account Step4.The University Registrar search any user account he/she wants using ID Step5. University Registrar Click to enable or disable the searched account	Step3.the system display the form Step6.the system validate the existence of the account and display searched account Step7. the system display "successful" message. Step8. use case ends

Alternate flow of events	
Title	Description
A. The University Registrar searched invalid account.	A1.system display Account does not exit message A2.the system prompts to Re-Search Valid account. A1.use case continues with step 4

Table 4. 5: Use case Description for Fill Cost Sharing Information

Use case Name	Fill Cost Sharing Form
Use case id	UC05
Brief description	The Students fill cost sharing information based on cost sharing information principles.
Actor(s)	Student
Pre-condition	Student wants to fill cost share agreement form
Post condition	Store the cost sharing Information into database

Basic flow of events	User actions	System response
	Step1:The Students login to system Step2:.Students Click to fill cost share Step4. Student fills all Required information Step5. choose photo if any Step6. Student Click submit button after filling the form	Step3. the system displays cost share form Step7. The system make sure all inputs are filled (check the input is valid or not) Step8. The system saves the input data to DB Step9. The system display" fill successfully" message Step10. Use case ends
Alternate flow of events		
Title	Description	
A. Enter invalid Fill Cost Sharing Form and not fully fill the form.	A1. The system display the incorrect input/not fill correctly A2. the system prompts to Re-Enter all Required information A3. Go to step 4	

Table 4. 6: Use case Description for Send Actual Cost

Name	Send Actual Cost
Use case id	UC06
Brief description	the Inland Revenue register or check the cost of food, dormitory, education base on the year and department
Actor(s)	Inland Revenue
Pre-condition	the Inland Revenue must login successfully

Post condition	The cost data has been registered	
Basic flow of events	User action	System response
	Step1. The Inland Revenue login to system Step2. The Inland Revenue Click to register cost or enable the cost. Step4. The Inland Revenue click enable check box.	Step3.The system displays Register cost. Step5. The system validates the enable box data and then display the enabled text. Step7.Use case ends
Alternate flow of event		
Title	Description	
A. If Submit without fill. B. If enter invalid cost sharing data.	A1. System display not fill the actual cost message. A2. Use case continues with step 2 B1. System display the entered data is incorrect please white correct data. B2. Use case continues with step 2.	

Table 4. 7: Use case Description for Update Cost share

Name	Update Cost share	
Use case id	UC07	
Brief description	It allows the Inland Revenue to update the cost share	
Actor(s)	Inland Revenue	
Pre-condition	the Inland Revenue must login successfully	
Post condition	The cost of food, education, dormitory data has been updated	
Basic flow of events	User action	System response

	Step1.The Inland Revenue login to system Step2.The Inland Revenue Click update cost share Step4. the Inland Revenue fills all Required information to the form such as:- 4.1. Select department 4.2. Select year Enter price for:- 4.3. Education 4.4.Food 4.5.Dormitory Step5.then Click to update	Step3.The system displays update form Step6. the system validate the input data and then display ”successfully updated Cost ” message Step7.Use case ends
Alternate flow of event		
Title	Description	
A. Enter and select invalid data	A1. System display error message A2. Use case continues with step4	

Table 4. 8: Use case Description for Send Feedback

Name	Send Feedback	
Use case id	UC09	
Brief description	Describing about strength and weakness of the system	
Actor(s)	Student	
Pre-condition	The Student successfully login	
Post condition	Give comment	
Basic flow of events	User action	System response

	Step1.The Student login to system Step2.the Student Click to Feedback Step4. the Student write comment and then Click to Submit	Step3. The system display the Text area form Step5. the system validate the input data Step6. The system save input comments Step7. The system display "successfully sent" message Step8. The use case ends
Alternate flow of events		
Title		Description
A. if the text area form is empty B. if not select role /user		A1. The system displays "please Re-write comment" message B1. The system displays "please select role to comment "message B2. Go-to step 4

Table 4. 9: Use case Description for View Feedback

Name	View Feedback
Use case id	UC10
Brief description	the college registrar can view the feedback sent by students
Actor(s)	College Registrar
Pre condition	The feedback requested from the student
Post condition	To view the feedback

	User actions	System response
Basic flow of events	Step1.The College Registrar login to system Step2.The College Registrar Click to view feedback Step4.The College Registrar view feedback and then give response	Step3.The system displays the requested feedback Step5.Use case ends

Table 4. 10: Use case Description for Manage Notice

Name	Manage Notice	
Use case id	UC11	
Brief description	The College Registrar, University Registrar and inland revenue officer can be view and post notice	
Actor(s)	College Registrar, University Registrar and inland revenue officer	
Pre-condition	They are successfully login	
Post condition	view and post notice they required	
Basic flow of events for post notice	User action	System response
	Step1.The College Registrar, University Registrar and inland revenue officer login to system Step2. College Registrar, University Registrar and inland revenue officer Click to post notice Step4. College Registrar, University Registrar and inland revenue officer Enter	Step3.the system displays notice form Step6. the system validate the input data Step7.the system display “post notice is successfully” Step8.use case ends

	the Required data such as:- 4.1. Notice number 4.2. body 4.3. Date Step5.The College Registrar, University Registrar and inland revenue officer Submit to post	
Alternate flow of events		
Title	Description	
The user click to submit without notice	A1. The system display “please write post Notice ” message A2. go to step 4	
Basic flow of events for view notice	User action	System response
	Step1. The User login to the system Step2. The User Click View notice button Step4. The User views the posted notice	Step3.the system display the posted notice Step4. Use case ends.
Alternate flow of events	If no information found the system will display the warning message like” no information are posted”	

Table 4. 11: Use case Description for View Student information

Name	View Student information
Use case id	UC15
Brief description	The College Registrar, University Registrar and Inland Revenue view student information

Actor(s)	College Registrar, University Registrar and Inland Revenue	
Per condition	They must be login successfully	
Post condition	To view students	
Basic flow of events	User action	System
	Step1.The College Registrar, University Registrar and Inland Revenue login to system Step2. The College Registrar, University Registrar and Inland Revenue Click to view student information Step4. The Registrars select the Student from the given list Step5. the Registrars Click to view	Step3.the system display the Students List Step6.the system validate the Selected data display Student information Step7.use case ends

Table4. 12: Use case Description for View Student Cost Share

Name	View cost share	
Use case id	UC17	
Brief description	The cost share must be filled by students	
Actor(s)	University Registrar ,Student, College Registrar	
Pre-condition	The cost share must be filled by student	
Post condition	View student cost share	
Basic flow of events	User action	System response
	Step1.The User login to system Step2. The User Click to View student cost share Step4.The User Enter required information and Click view cost share button.	Step3.The system display the form Step5.the system validate the input cost sharing data and display it Step6.use case ends

Alternate flow of events	
Title	Description
A. User Enter invalid input B. If not date is entered	A1. The system display error message and A2. allow to Re-enter the valid input data B1. The system displays" there is not fill form data please try again" The last go to step 4

4.1.1.3. Use case scenario

The following describes scenario of how the user use the systems to perform operations.

Scenario name: login

Participant actor: All users

1. The User Open the web page

2. The system displays the home page

3. User clicks the login button on the home page.

4. The system displays the login page.

5. The User inputs his/her Username and password and Select Users role

6. The User click login Button

7. The system check validity of the input

8. The User logged to the system and displays the user page

Extension

9. Incorrect Username and password or User role

10. Resume at step 5 of basic flow

After Entering a valid Username and password he/she can do his/her operation and finally logout from the system

Scenario Name: Student Fill cost share form

Actor: Student

1. Student opens the web page.
2. The system displays the home page
3. The Students click fills cost share button
4. The system displays the form
5. The Students fill the cost sharing form
6. The Students click submit button
7. The system validate the input
8. The Students fill the cost sharing successfully and the input data store in database

Extension

Invalid cost sharing information

Resume at step 5 of basic flow

Scenario name: update cost share

Actor: Inland Revenue

1. Inland Revenue opens the web page.

2. The system displays the home page

3. The Inland Revenue click update cost sharing button

4. The system displays the form

5. The Inland Revenue fill the cost sharing update information

6. The system validate the input

8. The Inland Revenue Click send button

9. The system display success full information and the input data store in database

Extension

Invalid cost sharing (request) information

Resume at step 5 of basic flow

Scenario name: Send notice

Actor: inland revenue officer

1. Inland Revenue officer opens the web page.
2. The system displays the home page
3. Inland Revenue officer Click to manage notice
4. the system displays notice form
5. Inland Revenue officer Enter the Required data such as:-
   5.1. Notice number
   5.2. Body
   5.3. Date
6. inland revenue officer Submit to send
7. the system validates the input data
8. the system displays "send notice is successfully "and the input data store in database

   Extension

   Invalid input request Data/empty?

   Resume at step 5 of basic flow

Scenario name: Create account

Actor: University registrar

1. University Registrar opens the web page.
2. The system displays the home page
3. University Registrar click create account button
4. The system display create account form
5. The University Registrar fill the request Account data
6. Click send button

7. The system validate the input
8. The system display account created successfully message and the input data store in database

Extension

Invalid input request Account data?

Resume at step 7 of basic flow

4.2. Object Model

An object model is a description of an object-oriented architecture, including the details of the object structure, and interfaces between objects. It identifies the attributes and functions of each class. In this section, we will write the object model of class diagram and data dictionary.

4.2.1 Class Diagram

The class diagram is the main building block of object-oriented modeling. It is used for general conceptual modeling of the structure of the System, and for detailed modeling translating the models into programming code. Class diagrams can also be used for data modeling. The classes in a class diagram represent both the main elements, interactions in the System, and the classes to be programmed. Class diagrams are the blueprints of our system or subsystem. We can use class diagrams to model the objects that make up the system, to display the relationships between the objects, and to describe what those objects do and the services that they provide. We can use class diagrams to visualize, specify, and document structural features in our models.

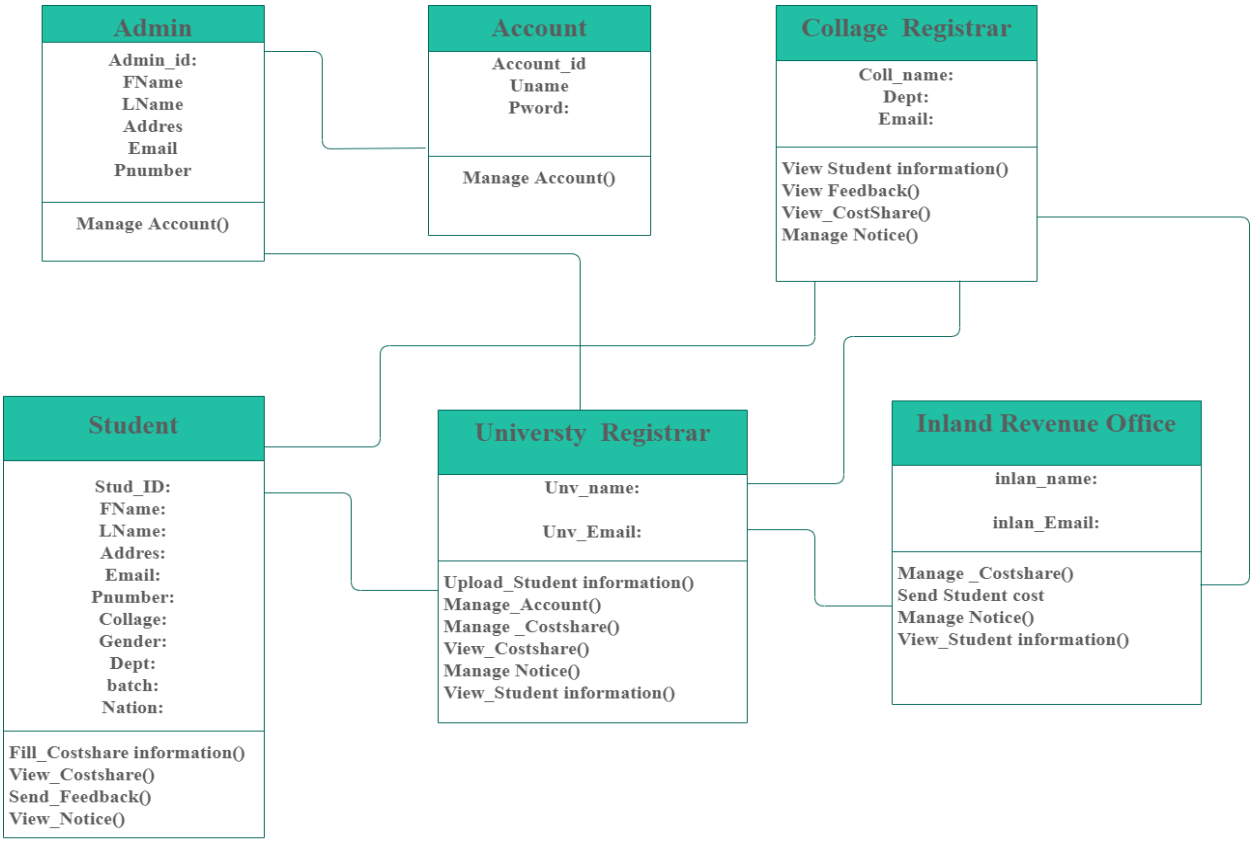

Figure4. 2: Normal Class diagram for CSMS

4.2.2. Class diagram description

Table 4.13: Data Dictionary for Admin

Attribute	Description	Constraint	Data type	Data size

Admin-id	Identification number of Admin	Primary key	Varchar	30
FName	First name of Admin	Not Null	Varchar	30
LName	Admin last Name	Not Null	Varchar	30
Address	Admin address	Not Null	Varchar	30
Email	Admin email	Not Null	Varchar	30
Pnumber	Admin phone number	Unique	int	30

Table 4. 14: Data Dictionary for Account

Attribute	**Description**	**Constraint**	**Data type**	Data size
Role_id	Identification number of account	Primary key	Varchar	30
Uname	Username of account holder	Not Null	Varchar	30
Pword	Password of account	Unique	Varchar	30

Table 4. 15: Data Dictionary for University of Registrar

Attribute	**Description**	**Constraint**	**Data type**	Data size
Unv-name	Name of the university	Not NULL	Varchar	30
Unv_Email	university Email	Not NULL	Varchar	30

Table 4. 16: Data Dictionary for Inland revenue officer

Attribute	**Description**	**Constraint**	**Data type**	Data size
inlan_name	Name of the Inland revenue officer	Not NULL	Varchar	30
inlan_Email	Inland revenue officer Email	Not NULL	Varchar	30

Table 4. 17: Data Dictionary for Student

Attribute	**Description**	**Constraint**	**Data type**	Data size

Stud_ID	Identification of students	Primary key	Varchar	15
Fname	First name of the student	Not null	Varchar	30
LName	The student last name	Not null	Varchar	30
Gender	The gender of student	Not null	Varchar	10
Nation	nationality of student	Not null	Varchar	20
College	College of student	Not null	Varchar	20
Dept	Department of student	Not null	Varchar	25
Email	Email of student	Not null	Varchar	30
PNumber	phonenumber of student	Not null	int	15
Address	Address of student	Not null	Varchar	20
batch	Batch of student	Not null	Varchar	20

Table 4. 18: Data Dictionary for collage of registrar

Attribute	**Description**	**Constraint**	**Data Type**	Data size
Coll_name	Name of collage	Not Null	Varchar	25
Dept	Name of department	Not Null	Varchar	25
Email	Collage Email	Not Null	Varchar	30

4.3. Dynamic model

Dynamic Modeling describes those aspects of the system that are concerned with time and sequencing of the operations. It is used to specify and implement the control aspect of the system.

4.3.1. Sequence Diagram

A Sequence diagram is an interaction diagram that shows how objects operate with one another and in what order. A sequence diagram shows object interactions arranged in time sequence. Sequence diagrams are sometimes called event diagrams or event scenarios.

- Represent the details of a UML use case
- Model the logic of a sophisticated procedure, function, or operation
- See how tasks are moved between objects or components of a process
- Plan and understand the detailed functionality of an existing or future scenario

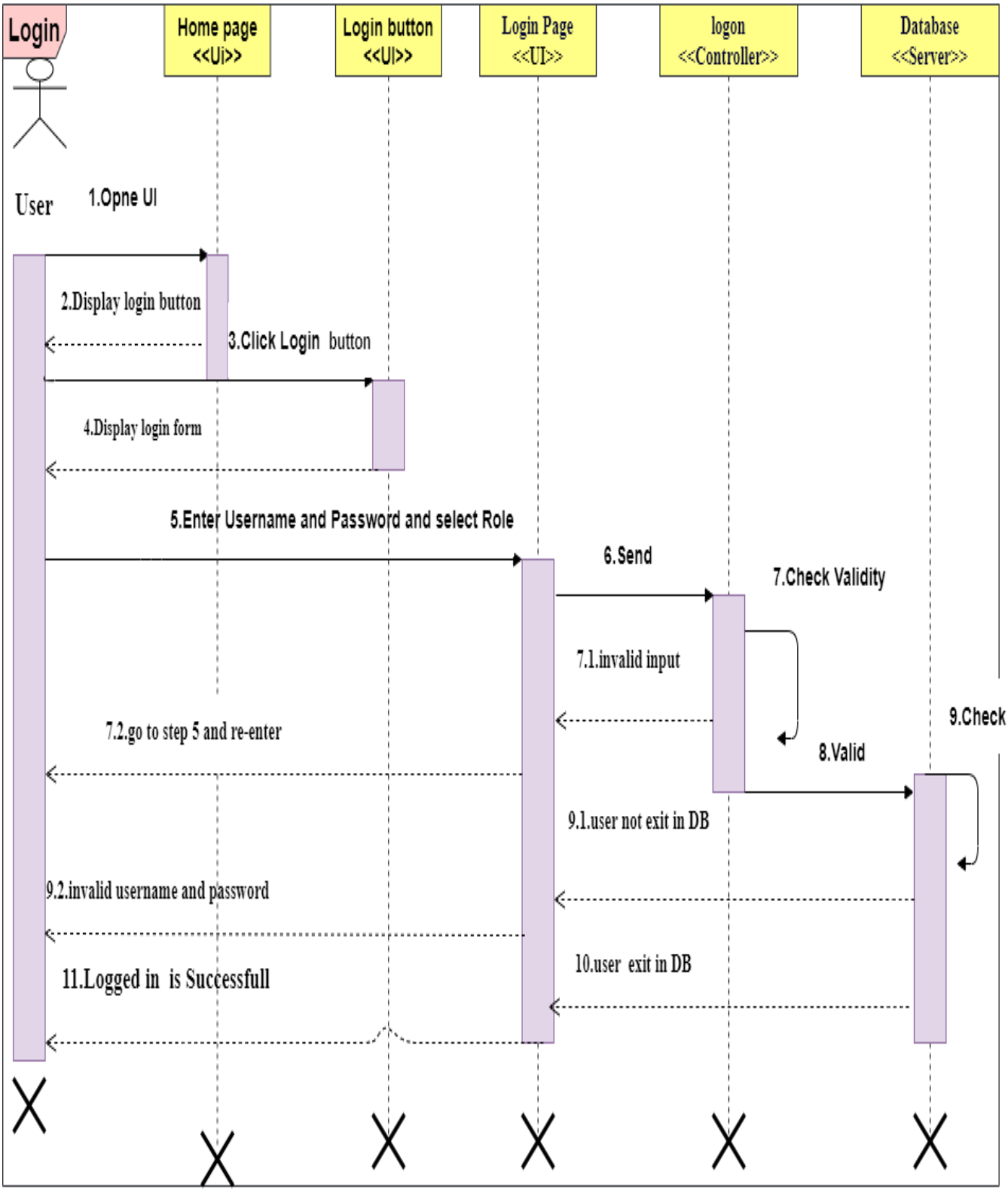

Figure4. 3: Sequence diagram for login

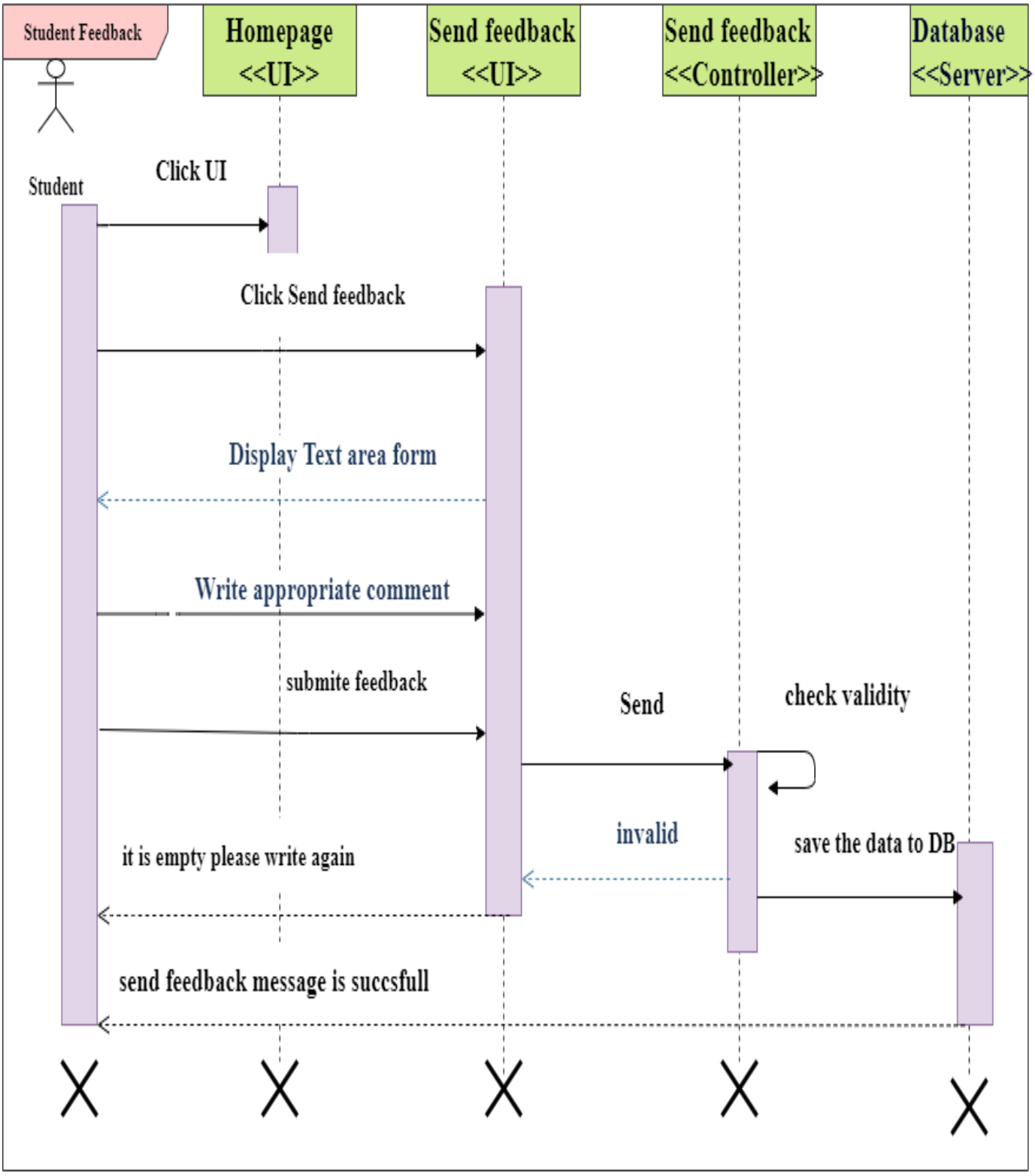

Figure4. 4:Sequence diagram for send Feedback

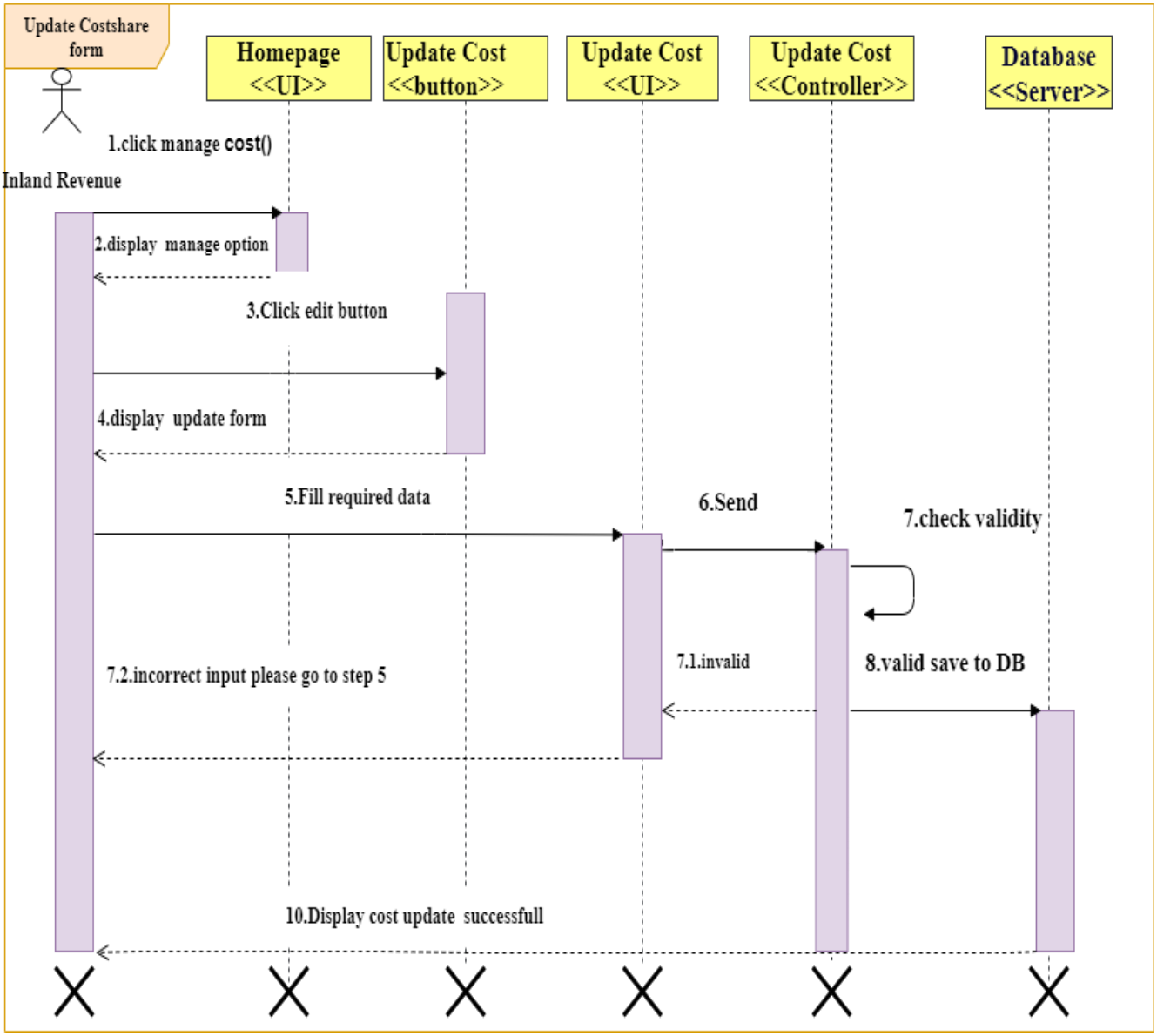

Figure4. 5: Sequence diagram for update cost sharing

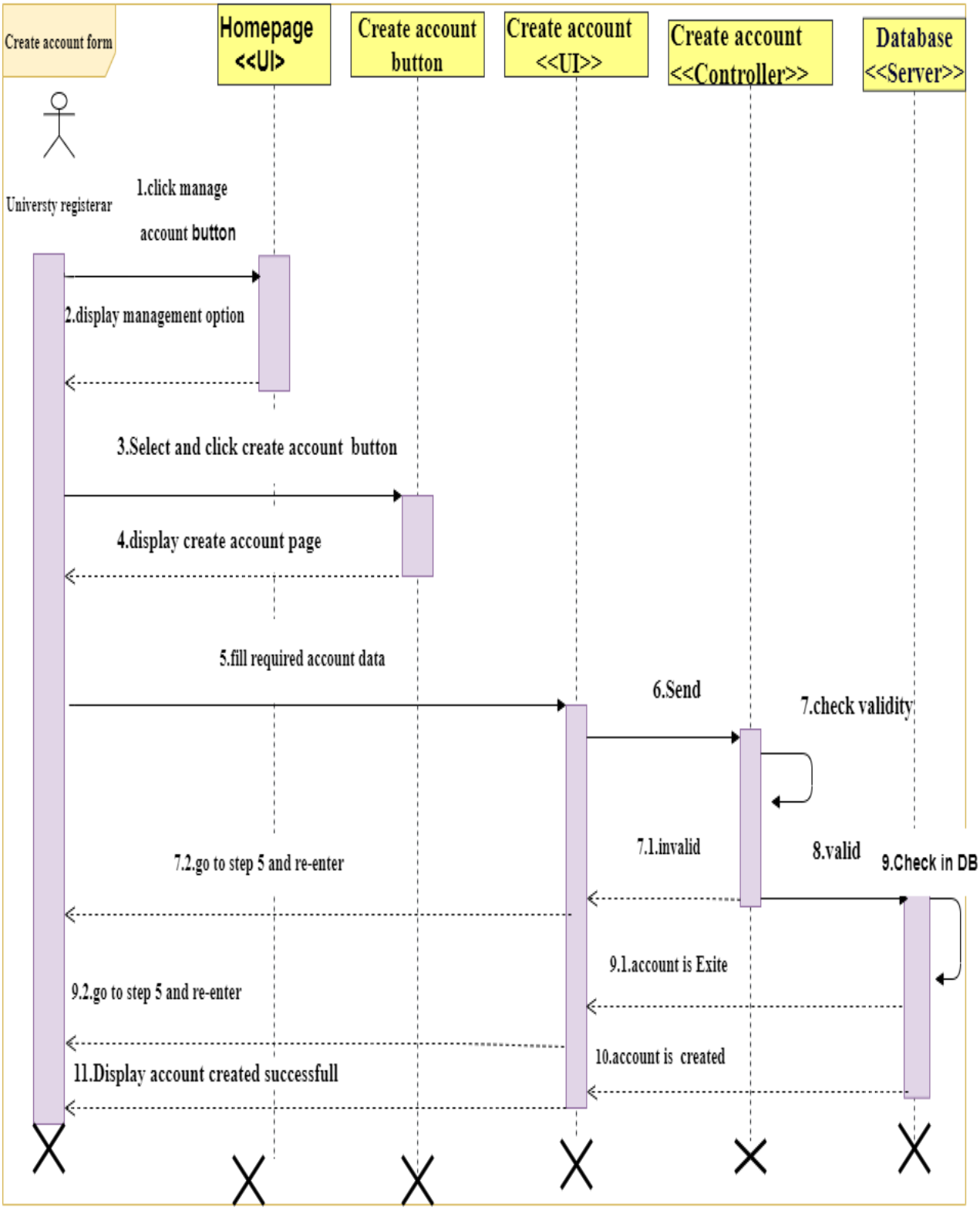

Figure4. 6: Sequence diagram for Create Account

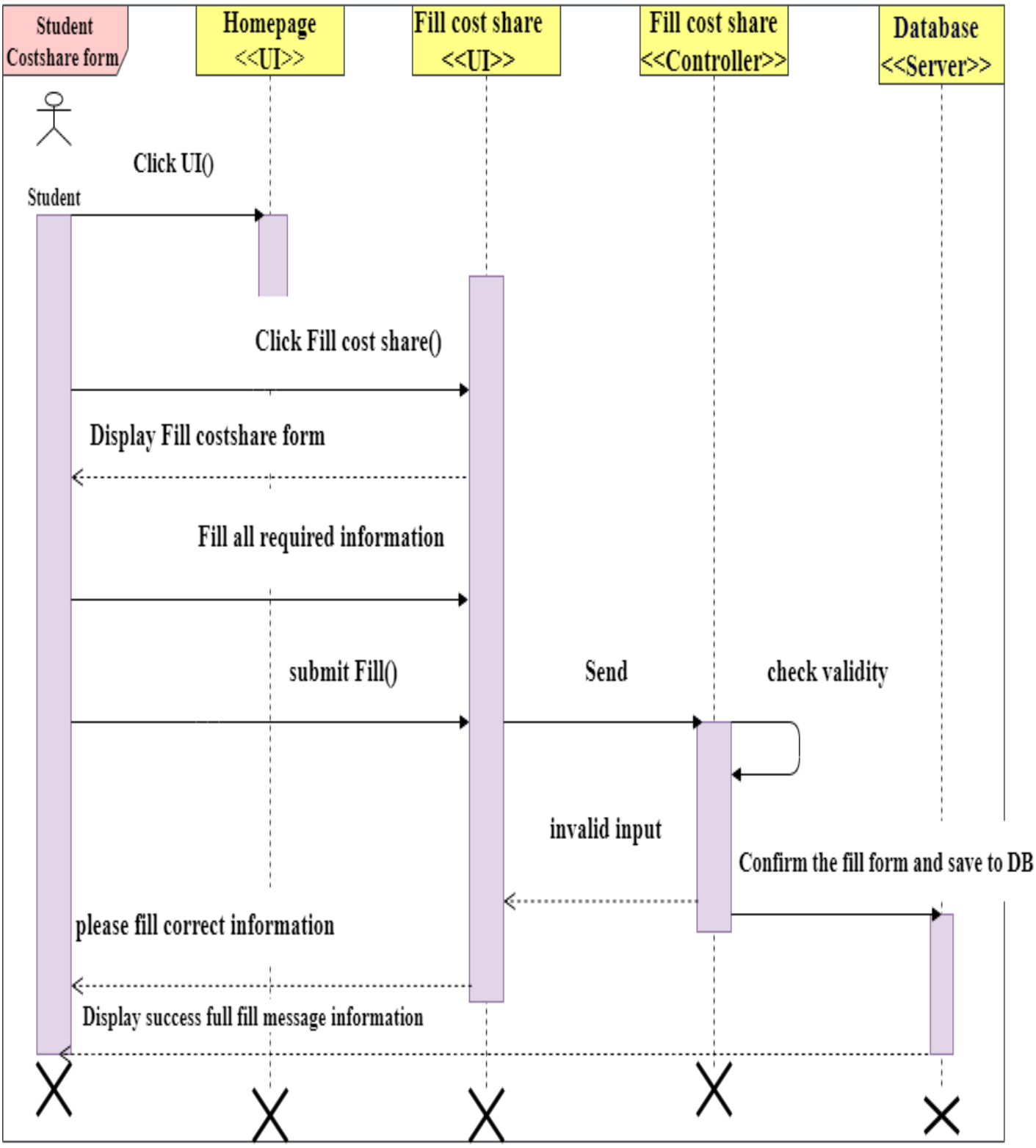

Figure4. 7: Sequence diagram for Student fill cost sharing form

4.3.2. Activity Diagram

Activity diagrams are graphical representations of workflows of stepwise activities and actions with support for choice, iteration, and concurrency. So, use to describe the flow of activities and a series of actions in a system similar to a flowchart or a data flow diagram to represent the flow form one activity to another activity. In the context of a web-based cost sharing management system, an activity diagram could be used to model the various steps involved in the process of tracking and managing shared expenses. The purposes of activity diagram can be described as:

- Demonstrate the logic of an algorithm
- Illustrate a business process or work flow between users and the system
- Simplify and improve any process by clarifying complicated use cases

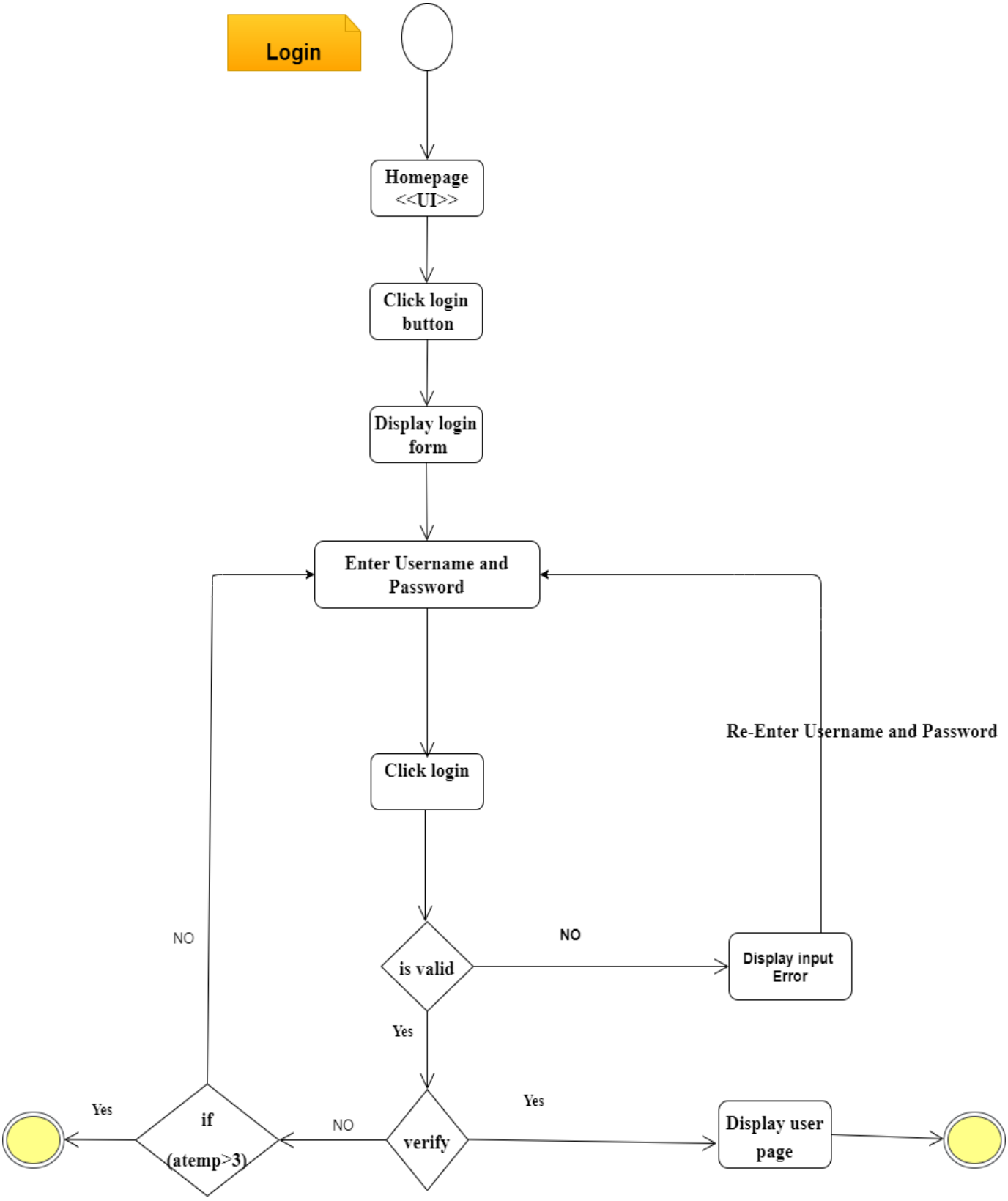

Figure4. 8: Activity diagram for login

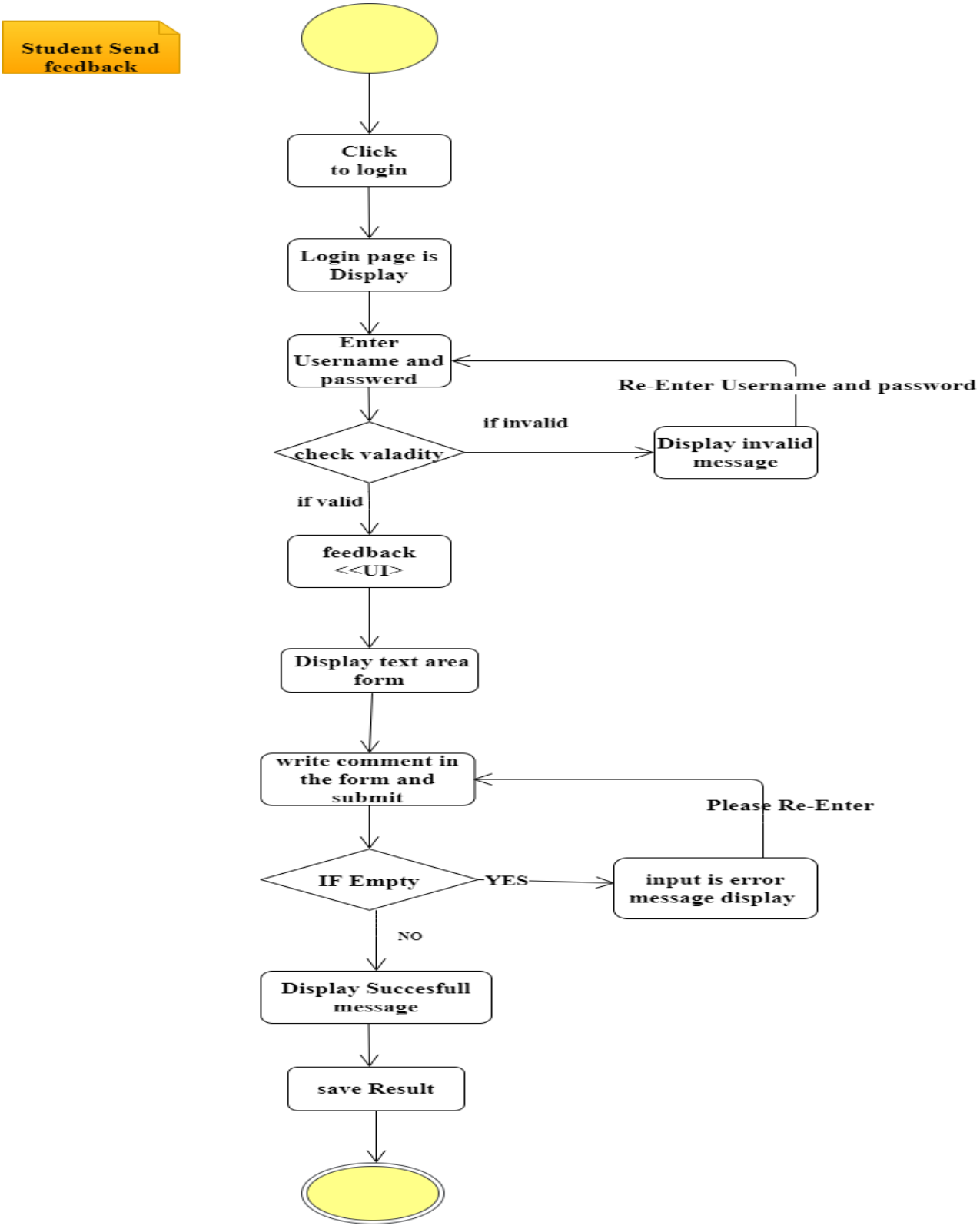

Figure4. 9: Activity diagram for Send feedback

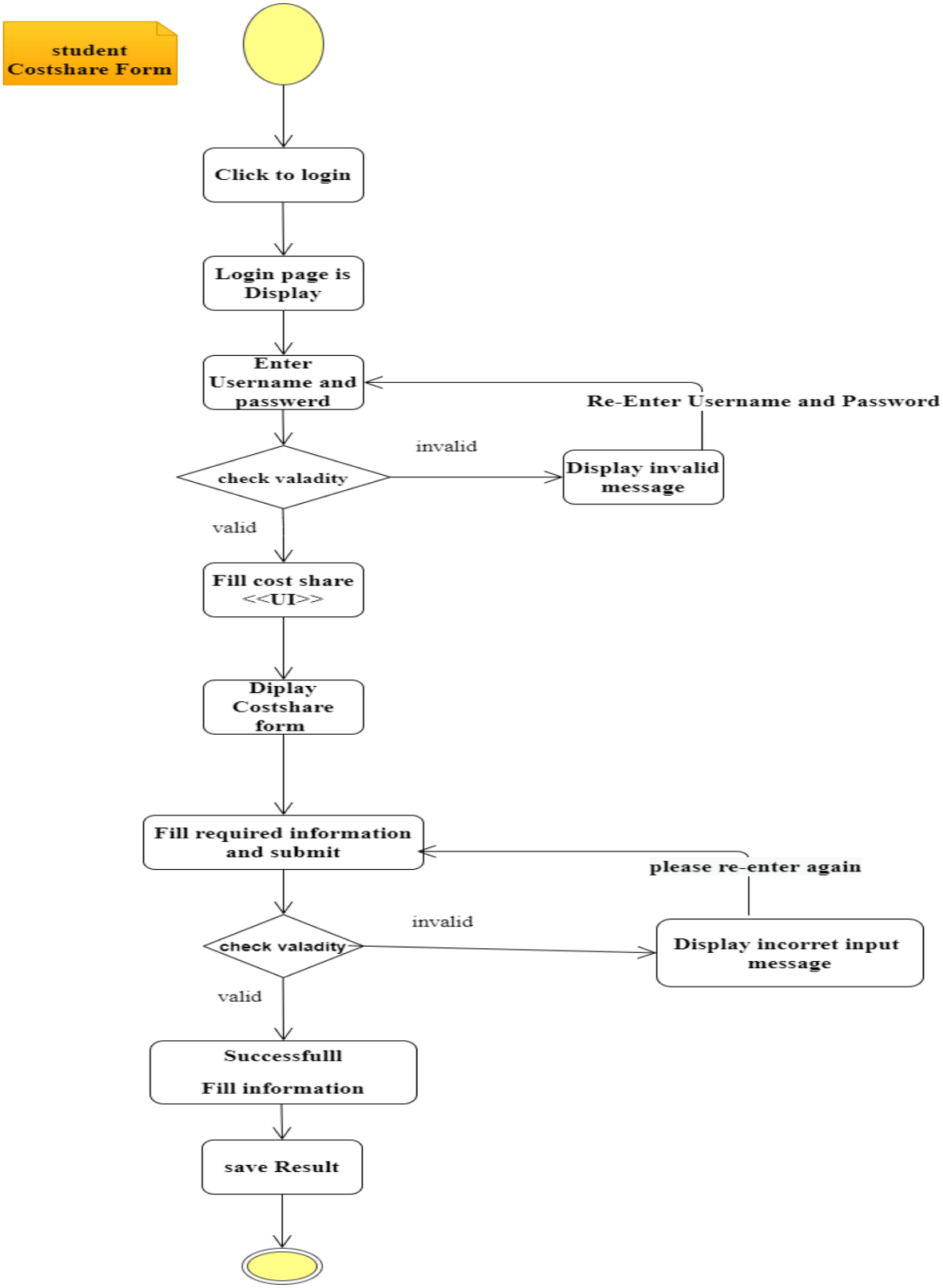

Figure4. 10: Activity diagram for Student fill cost share form

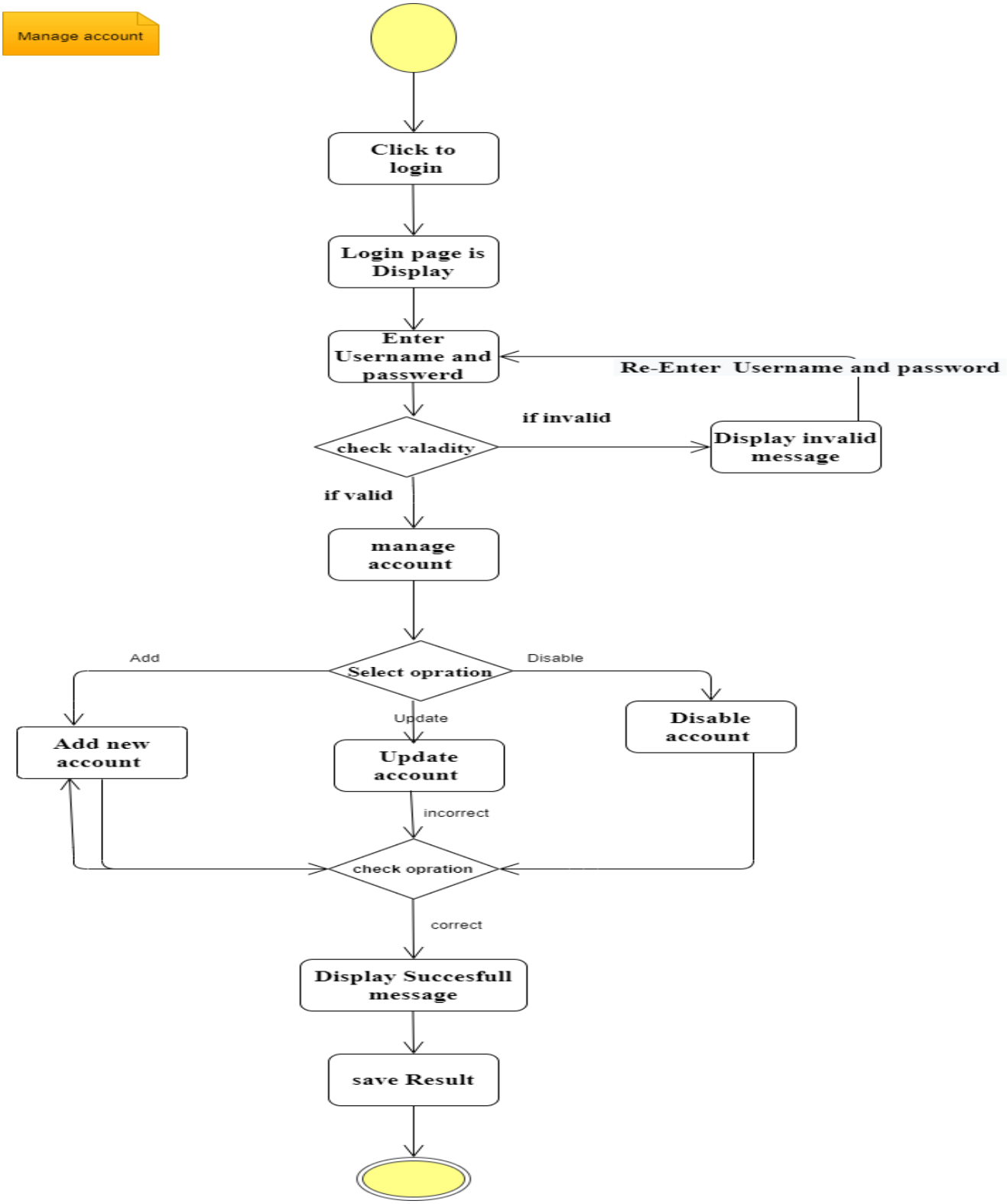

Figure4. 11: Activity diagram for Manage Account

4.3.3. State Chart Diagram

A state diagram is used to represent the condition of the system or part of the system at finite instances of time. It's a behavioral diagram and it represents the behavior using finite state transitions.The State chart diagram describes the flow of control from one state to another state. States are defined as a condition in which an object exists and it changes when some event is triggered. State chart diagrams show the various states that an object goes through, as well as the events that cause a transition from one state to another. The common model elements that state chart diagrams contain are States, Start, end states and Transitions .The followings are stated chart diagram of our system:

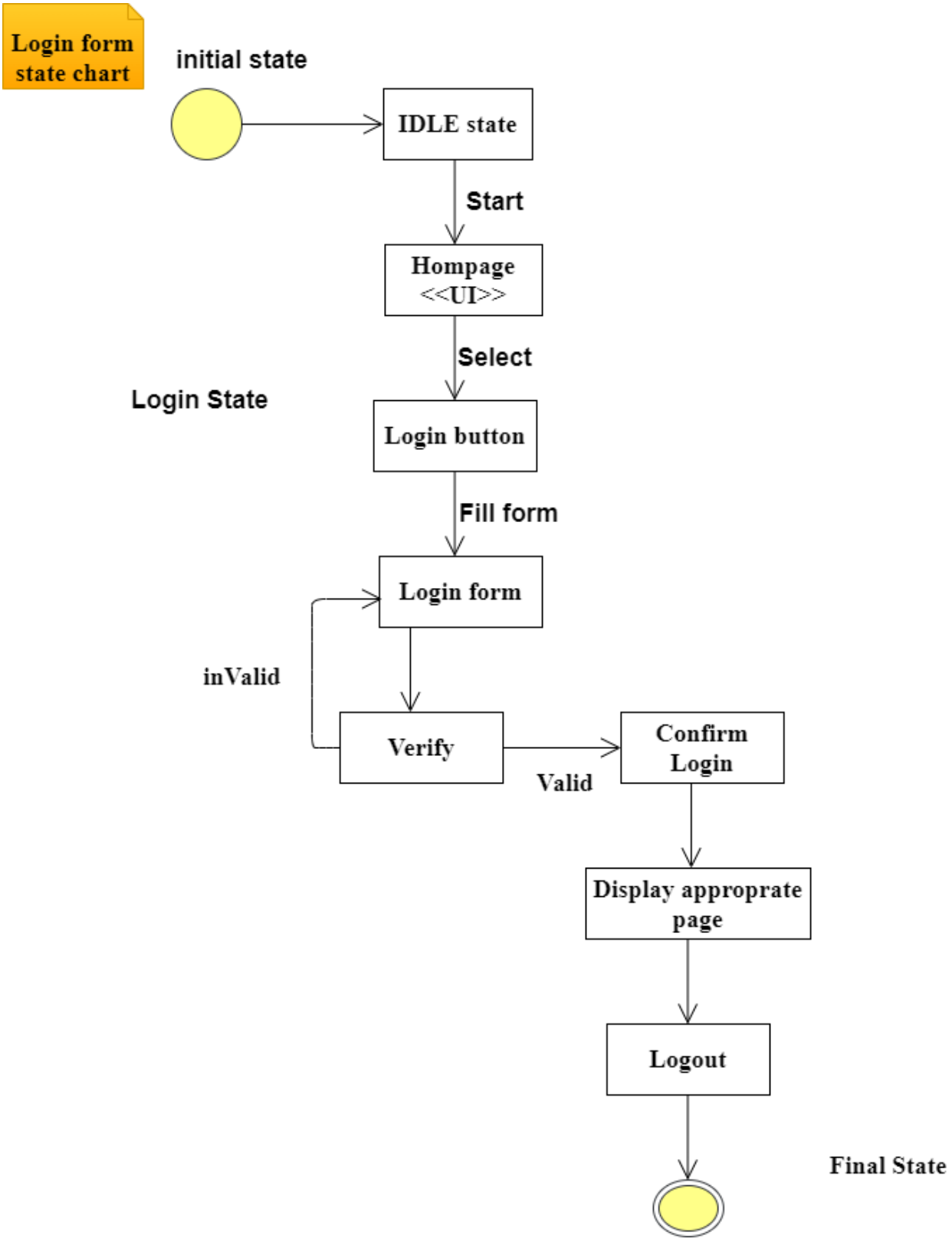

Figure4. 12: State chart diagram for Login

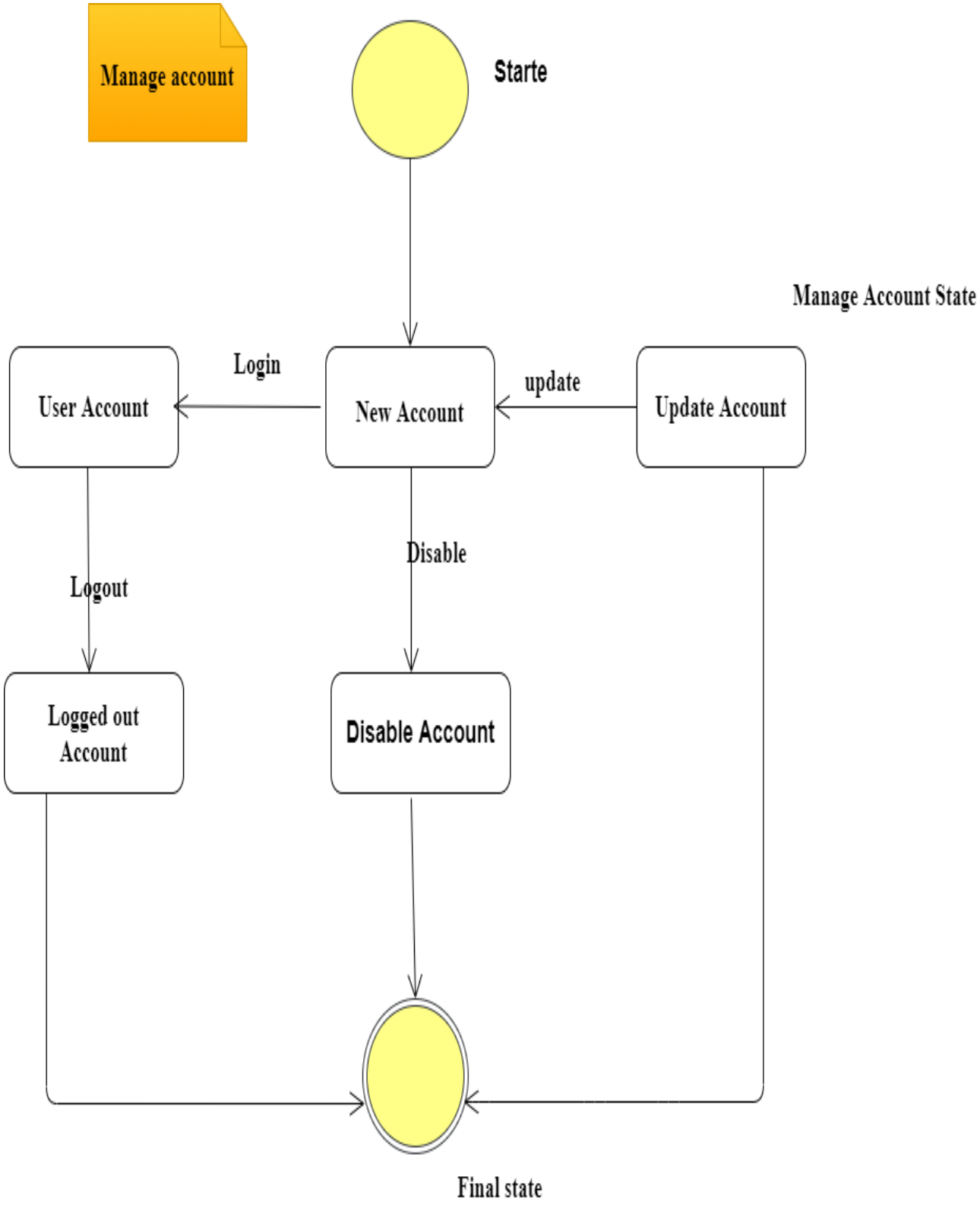

Figure4. 13: State chart diagram for Manage Account

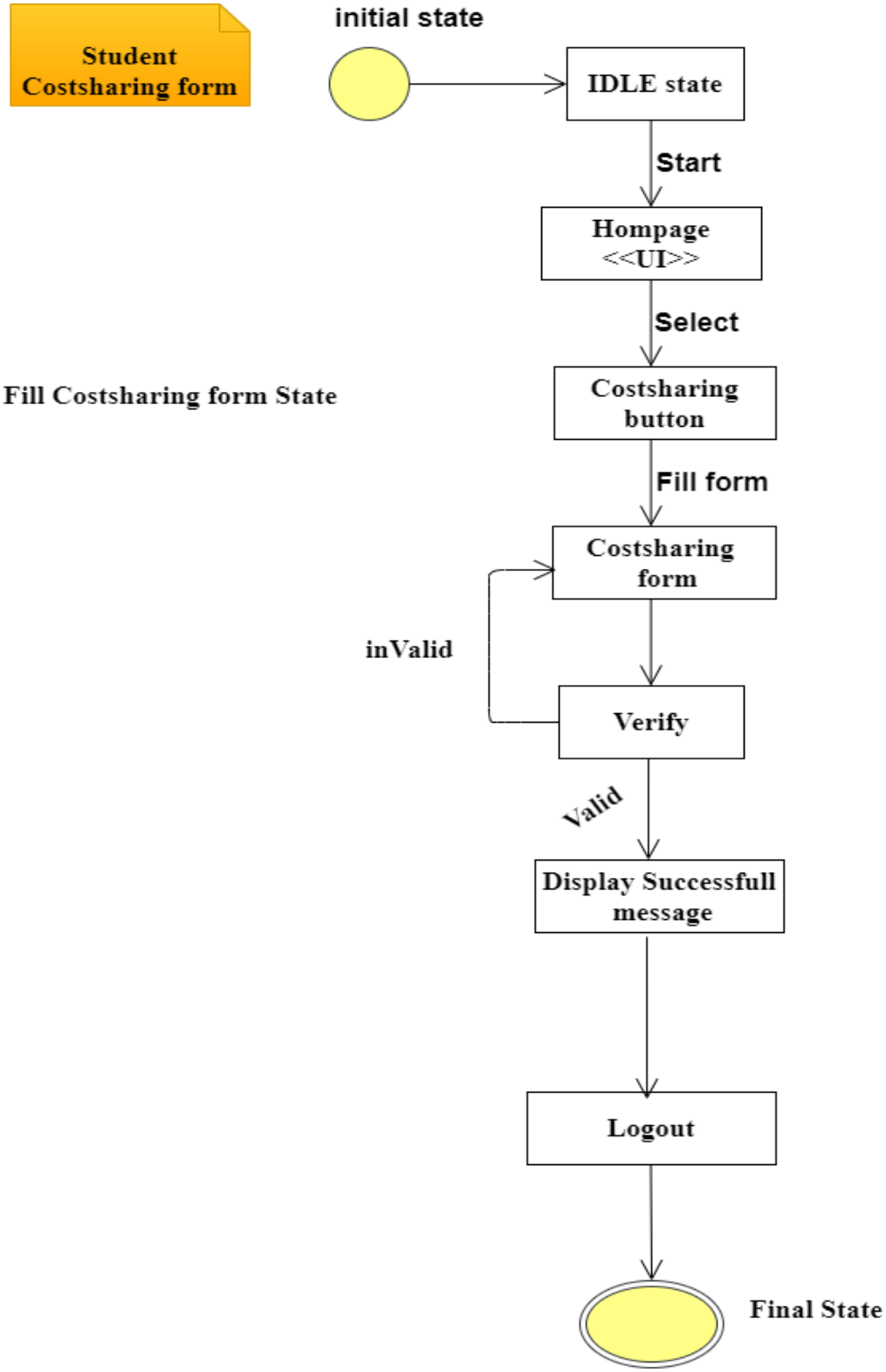

Figure4. 14: State chart diagram Student for fill cost share form

CHAPTER FIVE

5. SYSTEM DESIGN

This chapter focuses on transforming the analysis model into the design model that takes into account the non-functional requirements and constraints describes in the problem statement and requirement analysis sections discussed earlier. In addition to this, we describes a brief overview of the Design goals, deployed software architecture, Hardware/software mapping, Persistent data management, Access control, and security, Packages, Algorithm Design, and User Interface Design.

5.1. Design Goal

Design goal primarily emerged from non-functional requirement of the system and the objectives of the design goal are to model a system with high quality that should achieved, and addressed during the design of the system. The designer creates the nature of the design and it is more important for the programmer to implement a high quality and error free system. The goal of system design is to manage and decrease complexity by dividing the system into smaller and manageable pieces.

5.1.1. User interface and human factors

The User interface: we develop a user-friendly and easily accessible interface to interact with users easily without any confusion. our system user interface is more appealing to users and interactive to use, in addition to being straightforward and obvious in usage. We will use bootstrap temples to interact well to users.

The human factor: The User of the system should at least know the basics of computer. When we completed the necessary activity, our system provides users with a straightforward and obvious advice on where to click or what to select.

5.1.2. Hardware Consideration

Our system's hardware requirements are remarkably accessible and affordable. The system will make use of deployment servers and computing devices. These gadgets are currently accessible. No need for sophisticated electronics or a supercomputer.

5.1.3. Security issue

In Our system not all user access it, but access our system is to when get Permission. This Permission is get from in University Registrar admin. This Permission got by created user account. User access to any data or the system itself controlled. To handle security issue we used password encryption technique to our system. Our system should be secured, i.e., not allow unauthorized users to access the database system.

5.1.4. Performance Consideration

our system operates its function relatively in small amount of time which is less than one second and can be accessed and used by Student and other User who can access the internet to get the information (they must have or use desktop, laptop and others, that have the application to able to access the internet (For example: Mozilla Firefox, Internet explorer, Chrome and so on)) at the same time or concurrently. To perform well we used code optimization technique and our system should be meet the following performance criteria;

Response time: The speed imposed on the system. The system should responsive maximum number of tasks with minimum times;

Throughput: number of tasks accomplished in a fixed period of times;

Memory: memory space available for speed optimizations should use efficiently. These performance issues should have to be meeting in our system.

5.1.5. Error Handling and Validation

- Data input validation is performed in order to notify each and specific errors that occur during a User is filling forms.
- When a system faces a crush or some extreme condition, there must be a way to notify about the condition to the user.
- The system is asking the user to verify the action during delete or update the information in order to control sudden mistakes.

5.1.6. Quality Issues

Our system will be dependable if it regularly carries out its intended function and handles exceptions when used as intended by the User. Users will be participating in the quality assessment through a feedback mechanism where they can provide feedback on the system.

5.1.7. Backup and Recovery

The device will employ physical (copy of physical database files that stores database information in another location and forms the foundation of the database recovery mechanism).

5.1.8. Physical Environment

The system is deployed on the university's main server and any authorized user can access the system on the computer by using a web browser.

5.1.9. Resource Issues

Users can access the system using a computer, and as it will be deployed on the university's main server, there won't be any resource constraints when implementing and utilizing the system.

5.1.10. Documentation

For a system, the user-level document is provided that the user can read the document to know how to use the system and what functionality should the system support the user. And also, the development process is provided that users can read to know about the process and what type of model the developer uses to develop the system.

5.2. Current Software Architecture

The existing system of cost sharing management system is manual system and there is no exist/currently work software architecture. As a result we only describe the software architecture of newly proposed system.

5.3. Proposed System Architecture

For the web based Cost sharing management system (CSMS) for Wolkite University, we are preferred three-tier system architecture because Three-tier architecture allows any one of the three tiers to be upgraded or replaced independently.

The following points show the reason why we select three-tier architecture: -

- It gives us the ability to update the technology stack of one tier, without impacting other areas of the application.
- It allows for different development teams to each work on their areas of expertise.
- **Scalability**: We can scale the application up and out. A separate back-end tier, for example, allows us to deploy to a variety of databases instead of being locked into one particular technology
- **Reliability**: It adds reliability and more independence to the underlying servers or services.
- **Maintainability**: It provides an ease of maintenance.

For CSMS for Wolkite university's architecture has the following architecture:

1. **The Client Side:** A client (the computer, laptop, mobile, etc.), which requests the request, over the internet with a web browser for exhibition purposes. Includes admin side which requests the request, over the internet with a web browser for creating, updating, Enable and Disable information.
2. **The Application Server:** The application server is to provide the requested resources, but by calling on another server. PHP works closely with the Web server to interpret the requests made from the World Wide Web (WWW), process these requests, interact with other programs on the server to fulfill the requests, and then pass to the webserver exactly what to serve to the client's browser.
3. **The Web Server:** A web server is responsible for authentication, authorization, and secure communication channel with the browser.
4. **Database side:** A relational database server is the backend architecture that stores whatever information the application requires. It receives the query from the application server, processes the query, and responds to the request back to the application server.

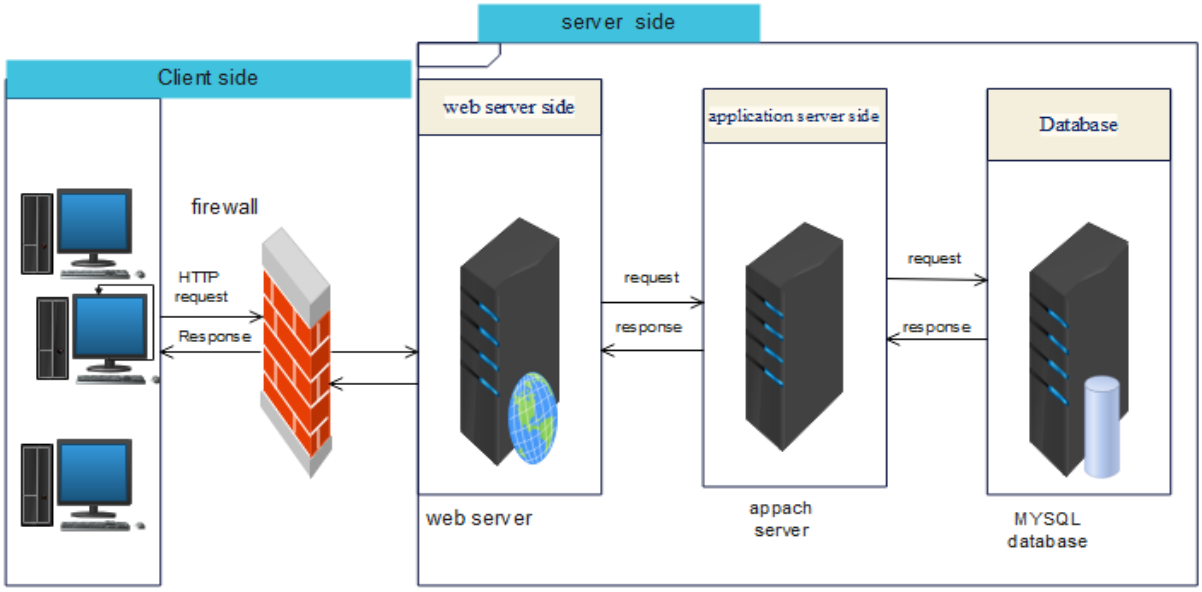

Figure5. 1: Proposed System Architecture

5.3.1. Subsystem Decomposition and Description

Subsystem decomposition refers to the process by which a complex is broken down into parts that are easier to conceive, understand, program, and maintain. To reduce the complexity of the solution domain, we decompose our system into simpler parts, called subsystems, we recursively apply this principle and decompose a sub-system into simpler subsystems. We decompose Web based cost sharing management System(CSMS) into the subsystem. Those are: -

- **Manage account subsystem**: - in this subsystem, Managing of information regard to to account and perform.
  - Update account.
  - Create account.
  - Enable and disable account.
- **Manage feedback Subsystem: -** this subsystem allows for managing feedback information and performs this operation.
  - Send feedback
  - View feedback

- **Manage Notice Subsystem: -** this subsystem allows for managing Notification information and performs this operation.
  - Send notice
  - View notice
- **Manage cost subsystem: -** this subsystem allows for managing cost and performs this operation.
  - Register actual cost
  - Update cost
  - generate cost
- **Database connection subsystem:-**this subsystem used for established connection between business class and database management system.

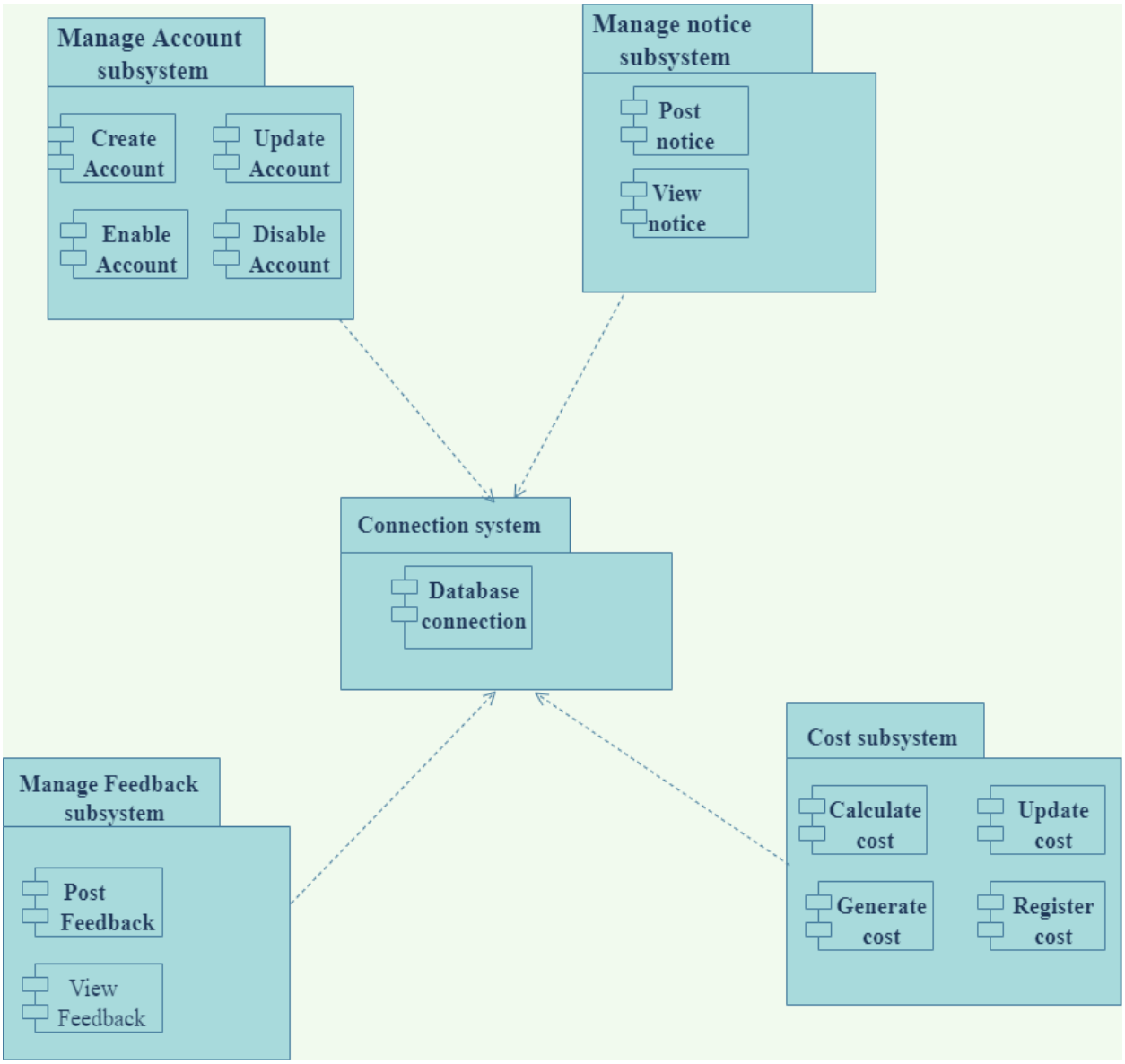

Figure5. 2: Subsystems Diagram for CSMS

5.3.2. Hardware/software Mapping

Hardware or software mapping describes how subsystems are assigned to hardware and customized components. We use a UML deployment diagram to diagrammatically illustrate our proposed system's hardware/software mapping. Deployment diagrams consist of nodes and their relationships. We have the following deployment diagram with three components like client application, database server, and application server.

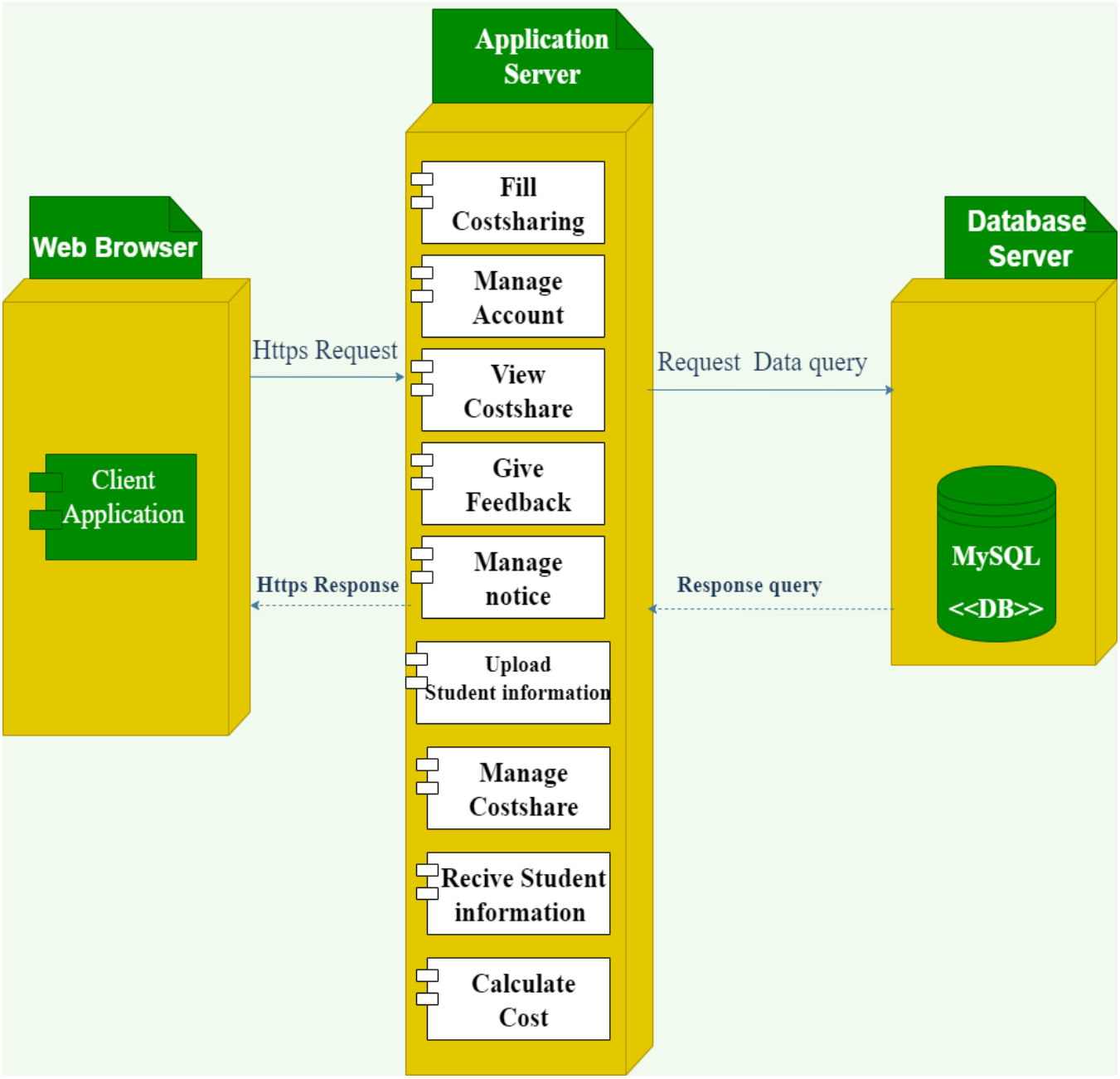

Figure5. 3: Deployment Diagram for CSMS

5.3.3. Detail class diagram

The detail class diagram is the main building block of object-oriented modeling. It is used for general conceptual modeling of the structure of the application, and for detailed modeling translating the models into programming code. Class diagrams can also be used for data modeling.

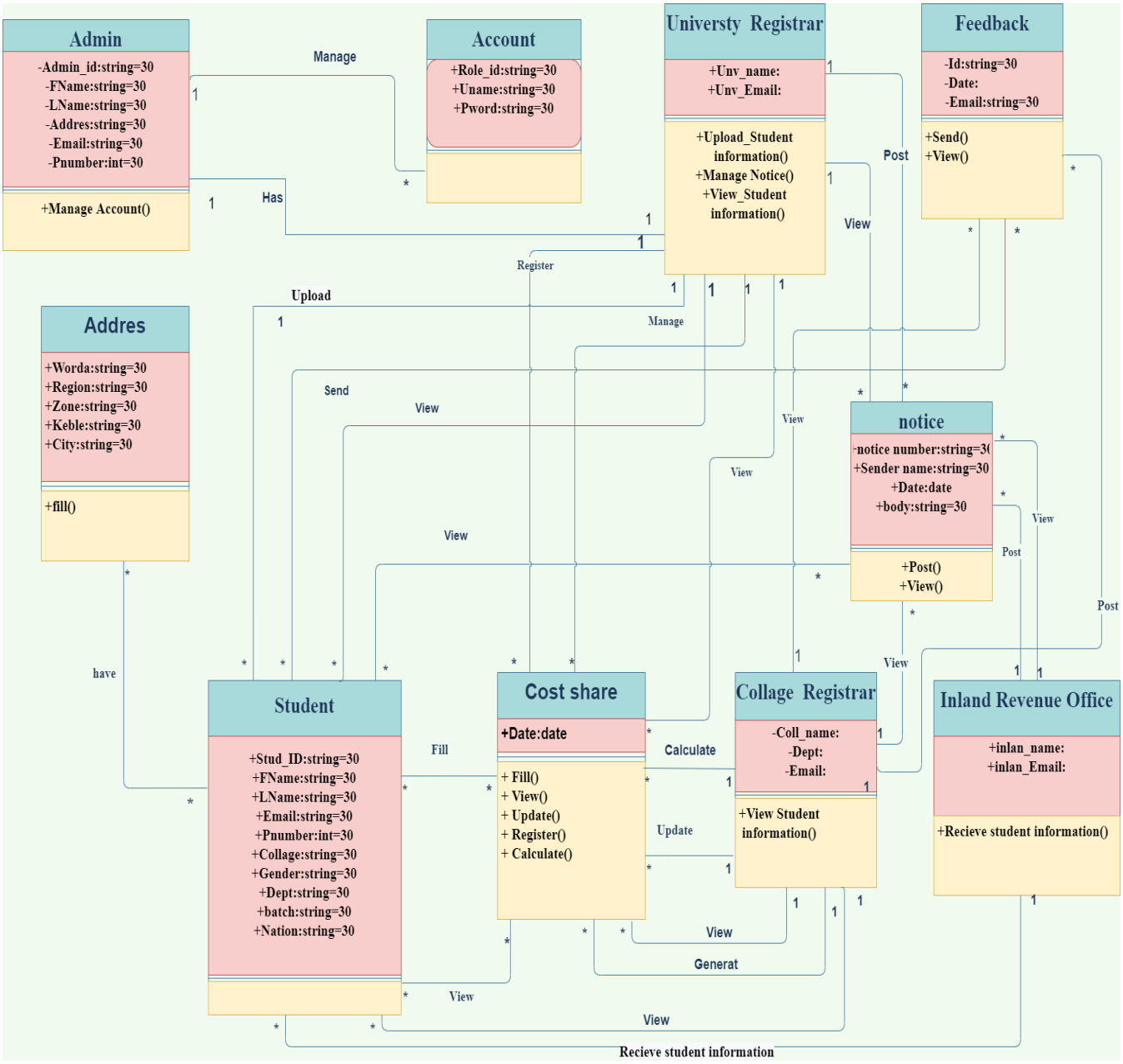

Figure5. 4: Detail Class Diagram for CSMS

5.3.4. Persistence Modeling For Relational Database

Persistent data are the data that are stored in a database permanently. Our system will use MYSQL with relational databases management system. The purpose of persistence modeling required to stored data persistently. Information related to user, account, notice, feedback, cost share, Student profile are persistent data, which should be stored in database. Moreover, storing data in a database enables the system to perform complex queries on a large data set.

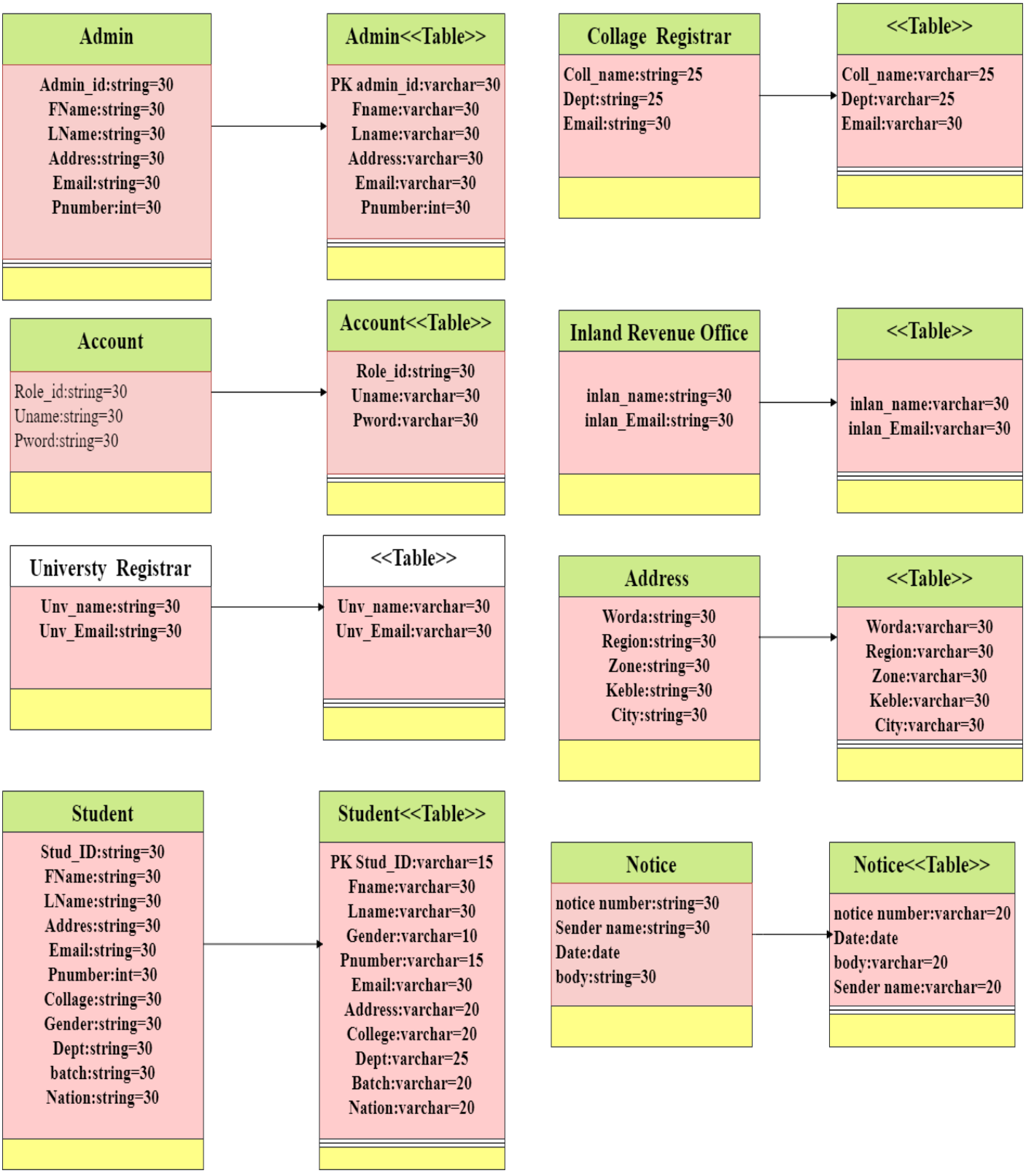

Figure5. 5: Persistence Data Management for CSMS

5.3.5. Access control and security

Access control is a security technique that regulates who or what can view or use resources in a computing environment. Access control is a security feature that controls accessibility to a system and even minimizes security risks.

Table5. 1: Access control and security

Activity	**University Registrar**	**College Register**	**Inland revenue officer**	**Student**
Login	✓	✓	✓	✓
Manage Account	✓			
Fill cost sharing Form				✓
Manage cost	✓		✓	
View cost	✓	✓	✓	✓
View notice	✓	✓	✓	✓
View feedback		✓		
Send feedback				✓
View student information	✓	✓	✓	
View cost share	✓	✓		✓
Post notice	✓	✓	✓	
Calculate cost share		✓		
Search Student	✓	✓		✓
Upload student information	✓			
	✓			

5.4. Packages

A package is a grouping of model elements which means that a package can contain model elements of different kinds, including other packages to create hierarchies. A package diagram is a type of structural diagram that demonstrates how model pieces are arranged and organized within the system. It can display a system's numerous perspectives as well as its structure and connections between modules or subsystems. We divided the huge system into smaller modules and used a package diagram to manage high-level system components.

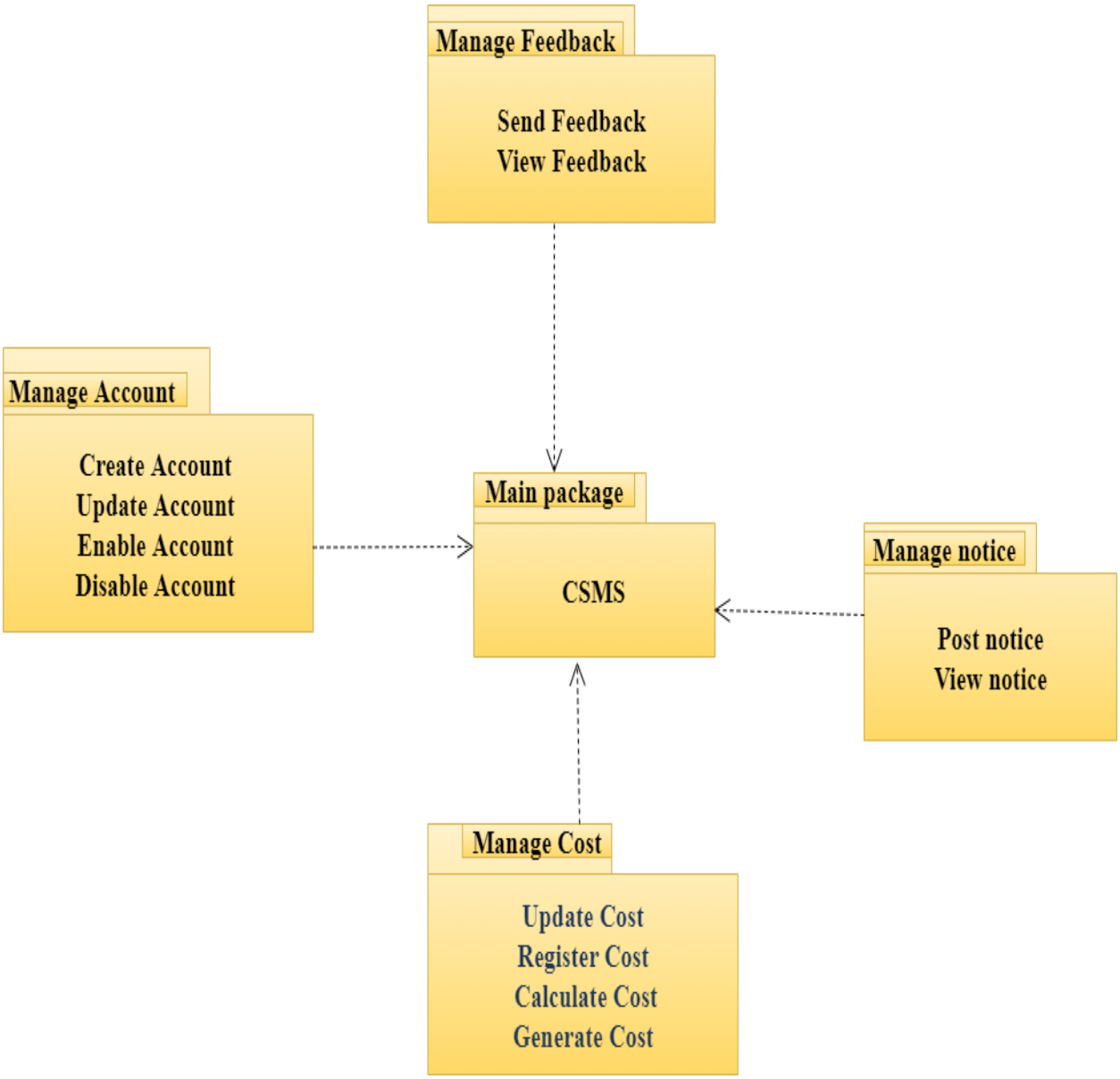

Figure5. 6: Packages Diagram for CSMS

5.5. Algorithm Design

An algorithm is a procedure or formula for solving a problem, based on conducting a sequence of specified actions. It is a step by step process carried out to solve the given problem. The purpose of using pseudo code is that it is easier for humans to understand than conventional programming language code and that it is a compact and environment independent description of the key principles of an algorithm.

Algorithm 1: Login

```
BEGIN
    Login (Username, password)
    INPUT: Username and Password
    IF (User exist)
        READ Password FROM database
        IF (Password == Entered Password)
            Login successful
            Redirect to an authenticated page
        ELSE
            PRINT “incorrect password “
        END IF
    ELSE
        PRINT “incorrect Username or password “
    END IF
END
```

Algorithm 2: Create User Account

BEGIN

Create User Account (User ID, first Name, last Name, Username, Password)

INPUT: User ID, First Name, Last Name, Username and Password

IF (User Account exist)

PRINT “The User Account is already exist in the database.”

ELSE

PRINT “User Account created successfully!”

END IF

END

Algorithm 3. Student fill cost sharing form

BEGIN

Student fill cost sharing**(**(Stud-ID, FName, LName, Gender, Address, Nation, Dept, Pnumber, Batch, College, Email, Username, password)

INPUT: Student ID, First Name, Last Name, Gender, Address, Department, nationality phone number, Batch, College, Email, Username, Password

IF (User not exist)

PRINT “The User does not exist in the database.”

ELSE

PRINT “**Student fill cost sharing form is** successfully!”

END IF

PRINT “the fill in input is incorrect/ error!”

END

5.6. User Interface Design

The proposed system has a graphic user interface to interact with the user. Below the home page is visible to all users of the system. In addition, can get information notified and different links to other pages.

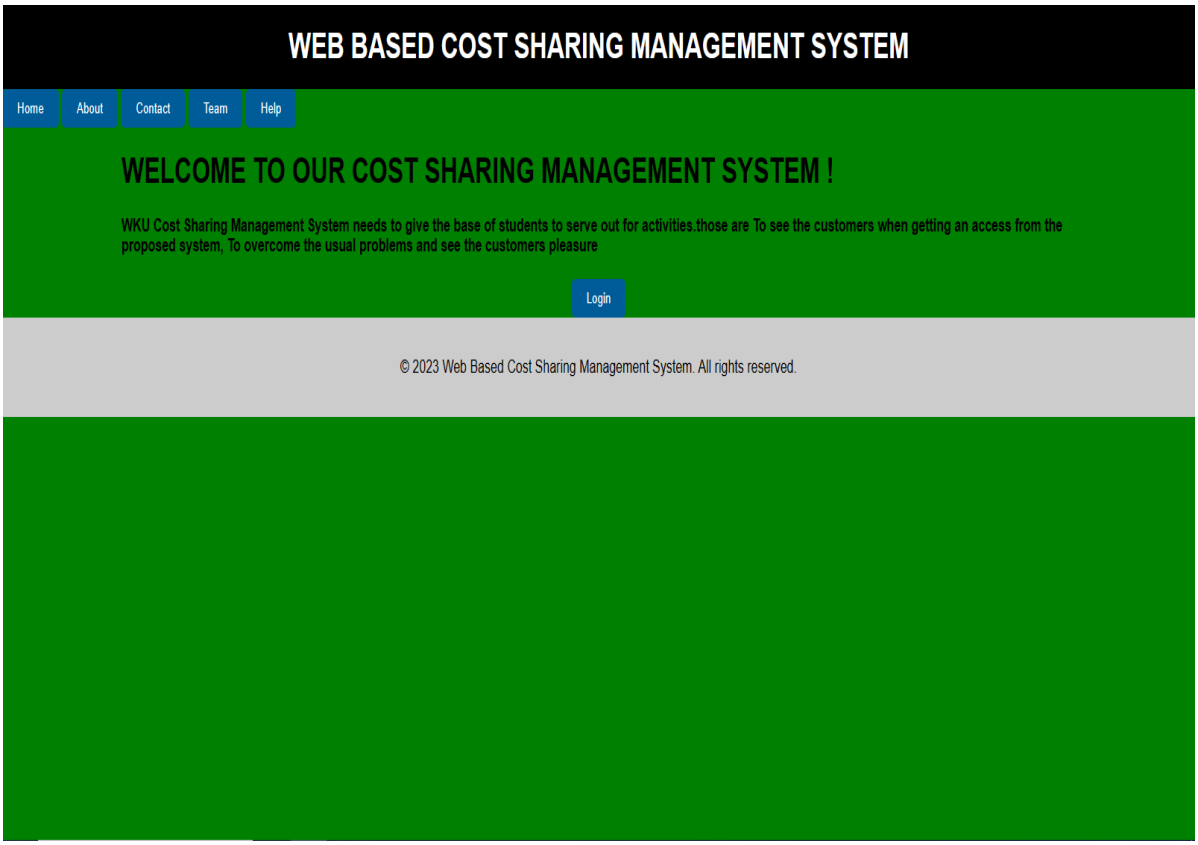

Figure5. 7: Homepage user interface.

CHAPTER SIX

6. IMPLEMENTATION AND TESTING

6.1. Introduction

Implementation is one of parts of the project development phase where project inputs are converted to project outputs. In implementation phase, the main task is coding. In implementation; we tried to put into practice what was proposed in the project document i.e., transforming the project proposal into the actual project.

6.2. Implementation of the Database

We have use MySQL database management system for the implementation of the data base. Because MySQL is most stable, secure, reliable and higher performance; it takes lower time for transactions (accessing and processing) data in a database. Which means it is faster to process transactions.

We have coded the implementation of database model in the php language as follow:

```
-- Database: `cost_share`

CREATE TABLE `admin` (

  `id` int (11) DEFAULT NULL,

  `adminImage` varchar(150) NOT NULL,

  `fullName` varchar(100) NOT NULL,

  `userName` varchar(50) NOT NULL,

  `password` varchar(30) NOT NULL

) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4;

CREATE TABLE `category` (

  `id` int(11) NOT NULL,
```

```
  `categoryName` varchar(50) NOT NULL
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4;
CREATE TABLE `costshareform` (
  `id` int(11) NOT NULL,
  `collegeName` varchar(150) NOT NULL,
  `tuitionFee` int(11) NOT NULL,
  `foodExpenseFee` int(11) NOT NULL,
  `beddingExpenseFee` int(11) NOT NULL,
  `userId` int(11) NOT NULL,
  `total` varchar(50) NOT NULL,
  `year` varchar(10) NOT NULL,
  `status` varchar(50) NOT NULL DEFAULT 'disable',
  `action` varchar(50) NOT NULL DEFAULT 'waiting '
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4;
CREATE TABLE `notice` (
  `id` int(11) NOT NULL,
  `user_id` int(11) NOT NULL,
  `send_to` varchar(50) NOT NULL,
  `title` varchar(200) NOT NULL,
  `message` text NOT NULL,
  `date` datetime NOT NULL
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4;
```

```
CREATE TABLE `studentcostfill` (
  `id` int(11) NOT NULL,
  `user_id` int(11) NOT NULL,
  `userPhoto` varchar(200) NOT NULL,
  `parentFullName` varchar(150) NOT NULL,
  `parentRegion` varchar(50) NOT NULL DEFAULT 'none',
  `parentZone` varchar(50) NOT NULL DEFAULT 'none',
  `parentWoreda` varchar(50) NOT NULL DEFAULT 'none',
  `parentCity` varchar(50) NOT NULL,
  `parentHouseNumber` int(11) NOT NULL,
  `parentPostalBox` int(11) NOT NULL,
  `schoolName` varchar(150) NOT NULL,
  `schoolRegion` varchar(50) NOT NULL DEFAULT 'none',
  `schoolKebele` varchar(50) NOT NULL DEFAULT 'none',
  `schoolWoreda` varchar(50) NOT NULL DEFAULT 'none',
  `schoolCity` varchar(50) NOT NULL,
  `schoolCompletedDate` date NOT NULL,
  `departmentType` varchar(100) NOT NULL,
  `departmentName` varchar(100) NOT NULL,
  `departmentYear` varchar(100) NOT NULL,
  `collegeStartDate` date NOT NULL,
  `studentStatus` varchar(100) NOT NULL DEFAULT 'active',
```

```
  `servicesInKind` varchar(60) NOT NULL,
  `servicesInCash` varchar(60) NOT NULL,
  `withDrawDate` date DEFAULT NULL,
  `cost_stat` varchar(10) NOT NULL DEFAULT 'on',
  `graduated` varchar(50) NOT NULL DEFAULT 'no',
  `cost_dep_name` varchar(200) DEFAULT NULL,
  `send_graduate` varchar(200) NOT NULL DEFAULT 'no',
  `numRow` varchar(100) NOT NULL DEFAULT 'no',
  `numRow1` varchar(50) NOT NULL DEFAULT 'no',
  `subcategory` varchar(100) NOT NULL
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4;
```

6.3. Implementation of the Class Diagram

Methods implemented in our system:

University Registrar

-createAccount();

-manageAccount();

-manageNotice();

-manageCostshare()

-viewStudentInformation()

-viewgraduatestudent()

-uploadStudentInformation()

Student

-fillCostInformation()

-viewNotice()

-viewCostsShare ()

-Send Feedback ()

Inland Revenue

-manageNotice()

-viewStudentInformation()

-sendStudentCost()

-manageStudentCost()

College Registrar

-viewFeedback()

-viewStudentInformation()

-manageNotice()

-viewCostShare()

Variables and class implemented in our system

Student class

+ stud_id

+studFName

+studLName

+studUserName

+studPassword

+StudGender

+parentRegion

+parentZone

+parentWoreda

+parentCity

+parentHouseNumber

+parentPostalBox

+schoolName

6.4. Configuration of Application Server

We have been used XAMPP as application server because it is a simple, lightweight Apache distribution that is extremely easy for us to create a local web server for testing and deployment purposes. Since the basic job of all web servers is to accept requests from clients (visitor of web browser) and then send the response to that request (the components of the page that a visitor wants to see). And a web server is an essential part of any website, since our developed system is web-based system, we had used Apache web Server which is open-source software

- ✓ In the configuration process its installation is straightforward and simple then set upped and run the configuration to start, stop, and configure the services by opening the dashboard.
- ✓ It is integrated with most popular operating systems. We use XAMPP for windows.
- ✓ It is automatically installed on our computer as we install it.

It is free web server and supports many operating systems.

- ✓ It is used to easily run and test websites and web applications locally.

6.5. Configuration of Application Security

we were able to achieve the following security issues.

MD5

MD5 is a cryptographic hash function that takes an input (which can be a message of any length) and produces a fixed-size output of 128 bits. The input is processed in 512-bit blocks, and the output is a 128-bit message digest. The algorithm consists of four rounds of processing, each round consisting of 16 operations. Each operation uses a non-linear function, which is applied to the data in a highly unstructured way. The result of each round is added to the result of the previous round, and the final result is the message digest. MD5 can be used as a checksum to verify data integrity against unintentional corruption

6.6. Implementation of User Interface

We built user interface for our project which allow user to interact friendly with the system.

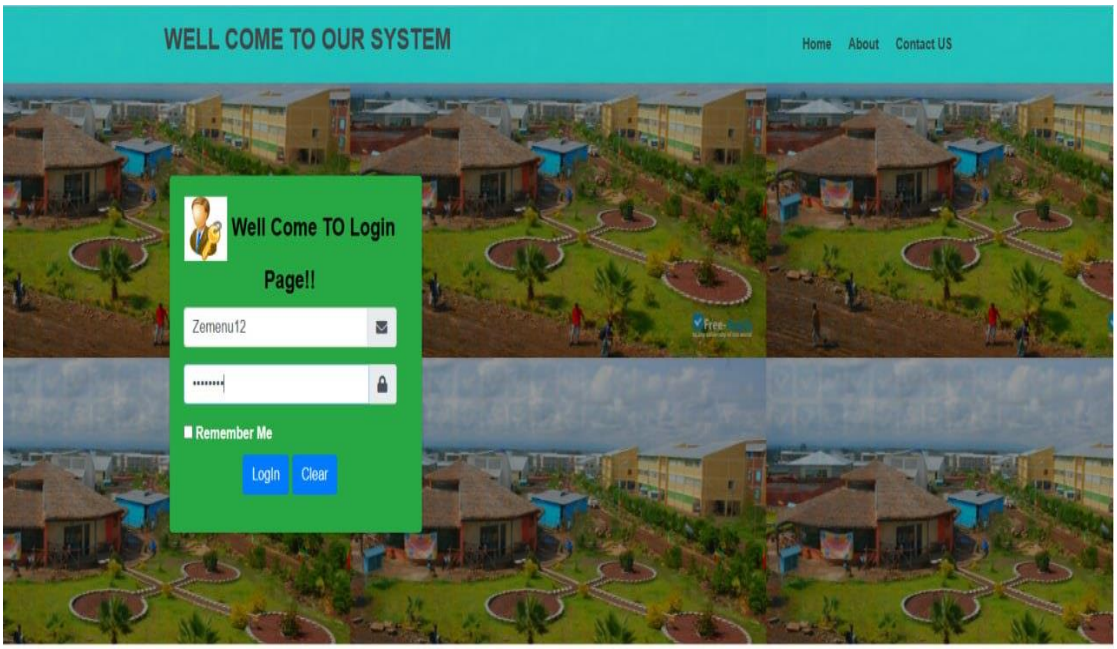

Figure 6. 1. Login User Interface

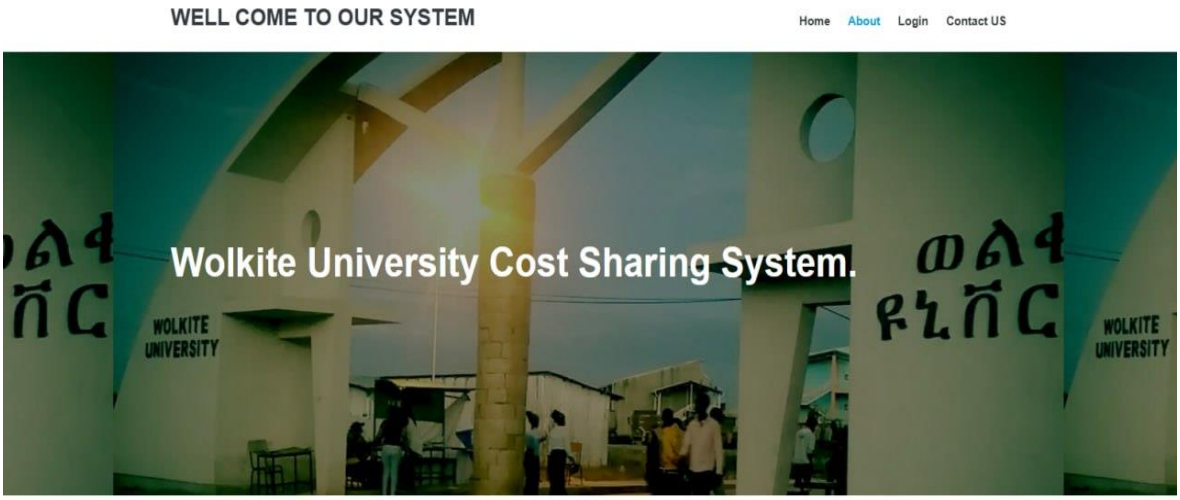

Figure 6. 2. Home page of our system

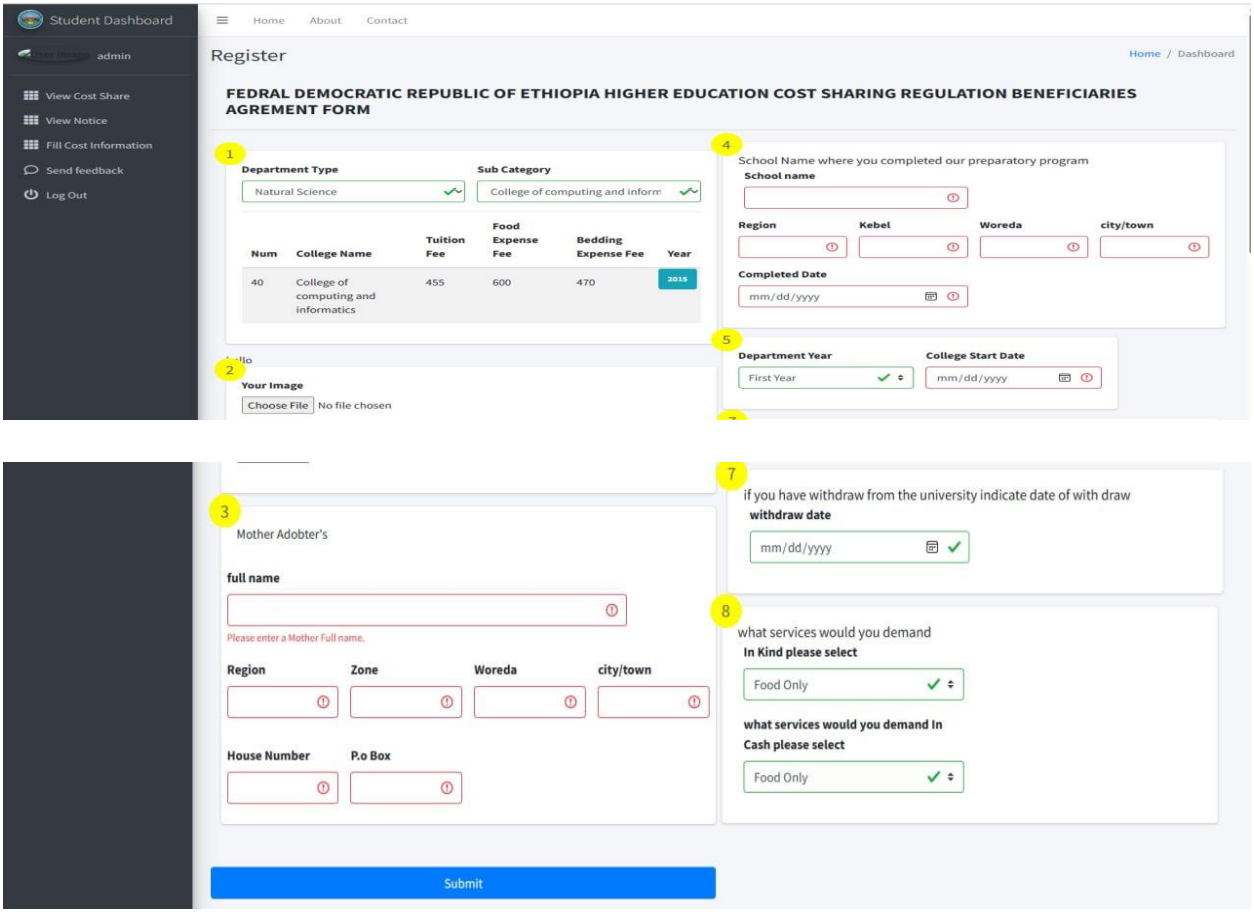

Figure 6. 3. StudentCostSharingForm

6.7. Testing

6.7.1. Test Case

Testing is the final step in which the entire system as a whole with all forms, code, and modules are tested. It is the process of evaluating a system or its component(s) with the intent to find whether it satisfies the specified requirements or not. Testing is executing a system in order to identify any gaps, errors, or missing requirements in contrary to the actual requirements. In this procedure we have tested all the functionalities of the System. All errors in the forms, functions, Modules have been tested. Finally, System testing ensures that the entire integrated software system meets the desired requirements. It tests a configuration to ensure known and predictable results.

Features to be tested

When we test our project, we perform following testing.

- ✓ **Input output functions**. Checking what type of our system should be taken as input and produce as output and checking input is produce expected output.
- ✓ **Graphical user interface**.in case we consider standard position of interface, standard of interface by comparing with previously performed system and criteria written for graphical user interface.
- ✓ **Sub system communication.** Our system is decomposed into different module because of module system easily managed and error easily detected and fixed. But communication between them should be tested.
- ✓ **Data base transaction.** Ensuring transaction of our system database.
- ✓ **Security**. Identifying security of our system by identifying only identified user allowed access our system and ensuring password of each individual user not seen by another. This thing is the thing we consider on login capability.
- ✓ **User interface and database interaction**. Database is one that store data and user interface one that user data is entered, so during our test we try to identify data entered on user interface stored in database and another crud.

6.7.2. Testing Tools and Environment

Hardware testing tools

- ✓ Computer with windows platform
- ✓ Data cable
- ✓ Web browser

Software's testing tools

- ✓ Operating system
- ✓ Windows 10

6.7.3. Unit Testing

Unit testing: - is a software testing method by which individual units of source code are tested to determine whether they are fit for use or not. In this phase of testing, every module of the System is separately tested. It is done at the source or code level for language-specific programming errors such as bad syntax, logic errors or to test particular functions or code modules. It is a way of testing each of the system functionality independently

6.7.4. Integration Testing

In this level of testing, we have examined how the different procedures work together to achieve the goal of the system. Integration testing takes as its input modules that have been unit tested, groups them in larger aggregates, applies tests defined in an integration test plan to those aggregates and delivers as its output the integrated system ready for system testing.

6.7.5. System Testing

System testing: -It is the final step of testing. In this system tested the entire system as a whole with all forms, code, modules. In this we tested all the functionalities in the System. All errors in the forms, functions, modules have been tested. Finally, System testing ensures that the entire integrated software system meets the desired requirements. It tests a configuration to ensure known and predictable results.

6.7.6. Acceptance Testing

Acceptance testing is a level of the software testing where a system is tested for acceptability. The processes whereby actual users are test a completed information system. The purpose of this test is to evaluate the system's compliance with the business requirements and assess whether it is acceptable for delivery.

CHAPTER SEVEN

7. CONCLUSION AND RECOMMENDATION

7.1. Conclusion

Currently Wolkite University is using manual based cost sharing management system. Due to this many problems are there. By analyzing this problem, the group team proposed, analyze, design, and implement this web based cost sharing management system for Wolkite University. This system will provide more efficiency, and accuracy than the manual based system. This system will solve many problems that the organization face. It will reduce work load of employee. The new system can retrieve data in real time. From this we conclude that the project is very important for Wolkite University after implementation.

7.2. Recommendation

While doing this system the team has faced different types of challenges. But by the cooperation of all the group members and the advisor, the team is now able to reach to the final result. All the group members strongly fought these challenge and take the turn to the front. We would like to recommend some of the extra features add to this System which we could not do due to shortage of time and unavoidable reasons and challenges. As a result we recommended for futurity if anyone who has intention to develop this system the following will be the future work:

- ✓ Online payment.
- ✓ Cannot control the mobility of beneficiaries outside of the Wolkite University
- ✓ Changing this web application to mobile application for customer use easily anywhere using their phone.

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