Adama science and Technology University

SCHOOL OF ELECTRICAL ENGINEERING AND COMPUTING

Department of computer science and engineering

Course Title: Fundamentals of Software Engineering

Course code: CSE3205

Project Title: Agricultural Market

Section 1

Team composition

	Name	ID
1.	Solome Yemane …….....	UGR/19516/12
2.	Yemisrach Assefa ……	UGR /19892/12
3.	Flagot mulugeta ……	UGR /19655/12
4.	Duresa wata ……	UGR /19772/12

Software Requirement Specification (SRS) Document

Acknowledgement

The success and final outcome of this project required a lot of guidance and assistance from many people and we are extremely privileged to have got this all along the completion of our project. All that we have done is only due to such supervision and assistance and we would not forget to thank them.We respect and thank Mr. Mengistu, our adviser, for providing us an opportunity to do this project and giving us all support and guidance which made us complete the project duly. We are extremely thankful to him for providing such a nice support and guidance, although he had busy schedule.

Finally, we would like to thank our CSE department for all support.

Team Members

Table of Contents

Chapter One

1.1) Introduction

Ethiopia has a large domestic market of over 110 million people, making it the second most populous country in Africa after Nigeria. Over the last decade, Ethiopia has had one of the fastest growing economies in the world, with average annual growth rate of 9.4%. In 2019/ 2020, Ethiopia's real Gross Domestic Product (GDP) slowed down to 6.1% due to COVID-19, and growth is expected to remain close to 6.4 % in 2021 due to Covid-19, according to the World Bank.

The agriculture sector has historically been the engine of the Ethiopian economy, but it has recently given way to the expansion of the service sector. The National Bank of Ethiopia (NBE) notes agriculture, industry and services have contributed 32.7%, 29% and 39.5% to GDP respectively during the 2019/20 Ethiopian fiscal year. The agriculture sector's share of GDP shrank by more than 25% between 2005 and 2020, while the service sector's share grew by 28% during the same period. Industry and the manufacturing sectors' share gradually rose, expanding their share of GDP over the past ten years.(https://www.trade.gov/country-commercial-guides/ethiopia-market-overview)

Agriculture is one of the best prospect sectors for growth in Ethiopia. Even though agriculture is the backbone of our economy it is not being properly managed and the farmers are not benefiting fairly from their effort. The current system is totally old fashioned. There is no organized and automated way for the farmers, merchants and consumers to conduct fair, fast and modern market transaction. The current system is backward and is difficult to manage the market price, the farmers are limited to sell their products to local merchants and most of the time receive very small price , products are concentrated in one place and are very scarce in others and a lot of other problems are associated with the current system. Our system eases lots of these problems by providing organized information and providing he platform for all users to interact and see their options. And also for customers to see the current market price, give comment and also complain whatever they want to regarding the price, product that are available on the system This online trade market will provide products with quality, quantity and fair price to the farmers and customers.

1.2) Background of the organization

The Ministry of Trade was re-established in August 1995 under the proclamation No 4/1995 issued to provide for the definition of powers and duties of the executive organs of the Federal Democratic Republic of Ethiopia (FDRE). The Ministry was again reorganized with a proclamation No 411/2004 issued to amend the reorganization of the executive organs of the Federal Democratic Republic Ethiopia Proclamation No 256/2001. With this proclamation and

by other laws, the Ministry has been given the power to supervise and coordinate five government institutions that are involved in the promotion & development of trade, industry and investment activities. The Ministry is organized under one minister, implementing departments, five support services, one Civil Service Reform office and trade branch office that enable the ministry to effectively perform its duties and responsibilities vested with it.

1.2.1) Mission of the organization

1. Establishing a business in Ethiopia, the legal and procedural requirements
2. Addressing questions from customers in the all areas of law
3. Advise on arbitration or judicial disputes facing client businesses (but excluding legal representation)
4. The legal implications of proposed measures by a company's management or other decision making department
5. Reviewing contracts and other agreements
6. Advise on Ethiopian tax law
7. Updating new directives and other legislations that affect businesses
8. Summarizing new legislations and explaining their implications for business

1.2.2) Vision of the organization

· To become bridge for the seller and buyer

· To modernize agriculture sector

· To make a market a fair place

1.3) Background of the project

The existing system that support the agriculture market management system is traditional way of selling product to a cajoler or other people they know. The weakness of this system is a product may be scared in one area and rich in other part of the country ,this may result price inflation and unequal distribution of a product and also the merchant is in charge of making a price and this will make the farmers poor .we hope the system will be solution to the current problems listed above.

Now a day's technology become backbone of every business that support management as well as day-to-day activities. among those, information technology is the one of the Leading. I don't know if there are projects have been done before but this platform will support our country in enormous ways. we proposed the system that is fully controlled by computerized system, which allows us to communicate the farmers and customers. The proposed system will provide valuable

opportunities for profitable expense for the customers, low time consumption and Intermediate price for the customers …etc.

1.4) Statement of the problem

The current system is not computerized and has a lot of drawbacks that could be minimized a lot with implementation of web based system .

The following are the major problems of the current system:

1.Absence of organized information

2.Absence of quality and price regulation

3.Absence of a system to balance the gap between the demand and supply

4.Absence of a platform to reach for vast customer

5.Absence of platform for communication between the merchants and the farmers

6.Waste of food in the process

7.Demographic challenges or concentration of products in one area

8.Lower income for farmers due to less opportunities to reach out for more customers

9.Price inflation

1.5) Justification of the project

This system would help lot in the process of digitizing our local market system, in saving so much wasting products and in controlling the price inflation. Besides this it would not take much cost to build, and the users could easily access it through the internet. Nowadays with the availability of mobile phones and the internet throughout the country it would be easy for anyone to access and use.

1.6) Objectives of the project

1.6.1) General objectives

The general objective of this project is to build a web-based application that helps in agricultural market management system that helps farmers reach the customers.

1.6.2) Specific objectives

To achieve the main objective, we have developed the following specific objectives:

- Studying about problem of the existing market.
- Gathering required information for proposed system
- Analyzing the gathered information.
- Considering applicability of proposed system for the market.
- Designing the proposed system
- Implementing the system
- Testing the system

1.7) Scope and limitation

1.7.1) Scope of the study

The scope of this project is clearly stated below because of what the system is expected to

perform. The proposed system focuses on the control over the trading activity between farmers, merchants, and customers. Its scope includes register farmers based on their kebele, register merchants authorizing based on their trading permission, allow farmer to sell their product, allow merchants or customers to buy/sell products, record and generate report of sell or buying activity, restricting(limiting) extra price increase, allow direct farmer-merchant or farmer-customer communication, post notices through time, allow customers to complain or give comment on products.

1.7.2) Limitation of the project

- it does not include every product i.e., major products are included
- it may not be accessible to remote areas where the technology is not accessible
- Since it is a web-based system the service given by the system is not accessed by users if there is no connection.

1.8) Feasibility study

Feasibility study is a study to evaluate feasibility of proposed project or system. Feasibility study is the feasibility analysis, or it is a measure of the software product in terms of how much beneficial product development will be for the organization in a practical point of view.

Feasibility Study gives a conclusion of whether to go ahead with proposed project as it is practically feasible or to stop proposed project here as it is not feasible to develop or to analyze about proposed project again

Feasibility study helps in identifying risk factors involved in developing and deploying system and planning for risk analysis also narrows the business alternatives and enhance success rate analyzing different parameters associated with proposed project development andThe following are major feasibly concerns.

1.8.1) Technical feasibility

Technical Feasibility study is about evaluating if the current technology has a potential to develop or unable to support our proposed system. Implementation of the proposed system will use windows operating system scripting programming language. The project members also have knowledge about HTML, CSS, JavaScript and MySQL database and Enterprise architect to design the system and can develop this system without any difficulty since the team has studied the required methodologies and tools Besides, the group members have enough capability to develop the project. The proposed system can use software and hardware tools and other resources that are accessible by low cost and available for the development and implementation of proposed system. Therefore, the system is technically feasible.

1.8.2) Operational feasibility

Operational feasibility test is making sure if the system works with less difficulties when developed and installed. Operational feasibility is mainly concerned with issues like whether the system will be used if it is developed and implemented. During the installation of the system, it is easy, likely that the installer can easily install to the environment of the system. This project is surely operationally feasible because the proposed web system is a good solution maker of the existing problem or specific solution will work in the existing system and create a good environment towards the user.

Usually, the main inputs from the users are simple and easy. So, users and the system won't have the difficulty of processing. The system will benefit anybody who uses it. Implementation will be simple because all resource from inside and outside will be available will low cost and miner energy. the system will be available only on mobile and laptop computer system therefor users able to run the system on their devices. Users won't need much time to adapt the system because the system is much user friendly and adaptable. And finally, the project is operationally feasible.

1.8.3) Economic feasibility

Economic feasibility evaluates the cost of the system development against the ultimate income, or a benefit gets from the developed system. For any system if the expected benefits equal or exceed the expected costs, the system can be judged to be economically feasible. In economic feasibility, cost benefit analysis is done in which expected costs and benefits are evaluated.

This is to determine the benefits and savings that are expected from a proposed system and compare them with costs. If benefits outweigh costs, then the decision is made to design and implement the system. The proposed system is economically feasible because the proposed system uses software and hardware tools that are available by low cost and open source software except for few major hardware components of the central system like the central data server on but that's not a problem because the hosting organization that is going to implement the system is a big governmental organization that can obtain such hardware components easily and it is going to get by implementing the system that will eliminate the time and cost consuming process

So, the project is economically feasible because the proposed system can use software and hardware tools that are accessible by low cost with a limited time.

1.9) Significance of the project

Significance of Ethiopian Agricultural market management system is/are:

- help farmers to check the price of certain products.
- help farmers find best deal.
- help farmers interact with merchants or directly with consumer.
- help merchants to have options and much supply.
- help consumers get information and interact with providers.
- help consumers to get information about price and supply of a product.
- Increase coalition between farmers, market, consumers, and merchants
- Protect farmers from poor market price for their agricultural production
- Reduce elimination of commodities from market due to high price caused by merchants
- Assure customers (stake holders) from exposing to high market price
- Ease control over market individuals for specified authority.
- Reduce abuse of rule and regulation specified by trade bureau over market
- Play role in stabilizing a market.

1.10) Beneficiaries of the project

Beneficiaries of this system include farmers, consumers (people), authority bureaus and government.

- ➔ The authority bureaus(organization) can get every notifications(comment ,complains) from the customer and also connect client (farmers and merchants by posting the available product)
- ➔ The customer can contact and get the service when ever they want to trade their products
- ➔ The admin has an official powers to control the flow of data of the customers and any other person who want to view the page.

1.11. Methodology

1.11.1 Data collection methodology

To propose this project we have used the following data collection method.

a. Interview

We have made an interview with peoples working for ministry of trade and also with farmers Unit to get an overview of the current

system and the problem of the existing system

b. Observation

we have observed the market system by taking a tour around the town.

c. Document analysis

we have analyzed document which is stored in the ministries website that shows the overview of the existing system.

System analysis and system design methodology

In this project the team will use object oriented system development methodology (OOSD).

This has two phases.

a. Object Oriented Analysis (OOA)

During this phase the team used 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.

b. Object Oriented Design (OOD)

During this phase the team uses enterprise architect software and draw io website to refine the use case model, and to reflect the implantation environment, model object interactions and behavior that support the use case scenario, and finally update object model to reflect the implementation environment.

1.11.2Deployment/ implementation methodology

Implementation is coding of all functions specified by requirement analysis and design. To perform this we will use client server architecture. The server provides service to the client and the client requests service from server. So we will have servers and clients (computers) on the system will be hosted.

System development methodology

Since the system requirement is well known, we will use water fall model for the system development. i.e. starting from requirement analysis till testing of the project.

We choose water model, because of the following reason:-

- It is very simple to understand and use.
- In a waterfall model, each phase must be completed fully before the next phase can
- begin.
- Requirements are well known, clear and fixed.
- There are no ambiguous requirements.
- The project is short.

1.10.3 Software Development Methodology

We have a limited time so we planned to use Agile software development methodology because it helps us to test and find errors at the lower stage of development and it reduces risk and also welcome changing requirements even at late in development. It also helps us deliver working software frequently from a couple of weeks to a couple of months with a preference to the shorter timescale. Agile software development methodology which is centered around the idea of iterative development, where requirements and solutions evolve through collaboration between self-organizing cross-functional teams.The reason we choose agile development methodology is because:

★ Features are developed more quickly with short cycles
★ Change to requirements can be handled easily

1.12) Development tools

We use various development tool that help us develop the project as well as document the project.

1.12.1- Hardware and Software tools

1.1.1.1- Software tools

Activity	**Tools/programs/language**	**Purpose**
Coding	Django web framework python html CSS Javascript Bootstrap mysql xampp phpmyadmin apache web server	Back end Front end Database engine Web server
Diagram tools	Enterprise Architect	To develop UML diagram of the Project
Editors	VS Code	Vs Code:-web development
Documentation	Microsoft Office and google doc	Application software we used to Document our project.
communication	Telegram	To communicate
browse	chrome	For browsing document in an output form

Table 1 Software tools

1.12.1.2- Hardware tools

Hardware tools	Purpose
Personal computer(PC) /Laptop	almost alltasks of our project are performed on computer.
Flash drive / Disk (CD,DVD)	necessary for the movement of relevant data and for backup and Recovery
Stationery(pen paper,notebook)	for writing all necessary documentations associated with the project ,to take notes during data collection and for other documentations

Table 2 Hardware tools

1.13Required resources with cost

Types of cost	**Materials**	**Amount**	**Price per Unit**	**Total price**
Hardware Cost	Paper	½ packet	125	125
	Pen	4	10	40
	Notebook	1	60	60
	Flash disk	1	250	250
	WPS Office	1	free	free
Software Cost	Enterprise Architect	1	Open source	free
	Visual Studio Code	1	Open source	free
	MYSQL Workbench	1	Open source	free
Total Cost				450

Table 3 Resources with cost

1.14)Task and schedule

RNo	Phase	Required time	Required tool	Function
1	Data collection and gathering	Oct 28 -Nov 5	Pen,Paper,Paper,WPSWriter,Computes,Computers,Flash	Used to get good information about existing system structure and develop proposed system
2	Requirement elicitation and analysis	Nov 6-Nov 16	Pen,Paper,Flash,WPS Writer	Identify requirements functionalities of the project (elicitation). Analyze, validate and understand the requirement (analysis).
3	Design	Nov 30-Dec 25	PenPaperFlash SQL server	Transform user requirement into implementation suitable form. implementation suitable form. implementation suitable form .implementation suitable form.To identify and understand the class in order to reuse, refine and remove vague classes.
4	Prototype Design	Feb 1-Mar 10	Adobe XD	Used to design the prototype of the system UI & UX of web and android app.
5	Coding and	Mar 10–May 30	VS Code,MYSQL Workbench,Postman,XAMPP,Chrome, Android Studio	I. Implement database design
6	Testing	June 1-June 20	Browsers,VS	We will identify and

			Code Debugger	fix bugs and faults from the system by performing unit testing,Integration testing and System Testing.

1.14 Team Composition

No	Full name	ID number	Email	responsibility
1	Salome yemane	ugr/19516/12	solomeyamane53@gmail.com	Requirement gathering,Designing, Testing,Coordinating
2	Duresa wata	UGR /19772/12	duresakorroso2019@gmail.com	implementation, Design,Analysis, Testing
3	Flagot mulugeta	UGR /19655/12	mefikr@gmail.com	Requirement gathering,Testing, Designing, Web
4	Yemisrach Assefa	UGR /19892/12	yemisrachassfa@gmail.com	implementation, UI Design,Database Design

CHAPTER 2

Description of the existing system

Currently the agricultural product management system is not organized and entirely depends on old non-automated system.

It's necessary to know the existing system to build a better new system especially when its developing from scratch.

According to the information collected from the authority of trade the process of buying and selling of agricultural is led by the market. This means that the process of the trade depends on verbal communication between the participating organs.

For this reason, we can take the local market as the existing system.

2.1)Major functions of the current system

The major function of the existing system includes the following:

- ➢ Maintaining the price information
- ➢ Regulating the selling and buying of products
- ➢ Supervise the overall trade activity
- ➢ Controlling the quality

2.2)Users of the existing system

1. Farmers even though its manual the farmers are the main users of this system. Farmers do the following activities: Sell their products, provide the agricultural products,

2. Merchants the merchants as the active participant do the following activities: buying products, sells them to the consumer

3. Consumers they are the buyers of those products

4. The bureau of trade or the ministry of trade they supervise the whole activity

2.3)Drawbacks of the existing system

The current system has the following drawbacks:

- ❖ There is no organized information about the products, the price, the supply, and demand.

- The is no means for both the farmers and merchants to reach for much bigger customer that would limit them to local markets only
- Due to the small options farmers are not getting what they deserve
- It is more prone to inflation
- Its old way of doing business

2.4) Business rule

The following are business rule of the system:

1. The admin is the one that updates and posts product related information for the consumer to view
2. The admin is the only user allowed to manage users and any activity related with the system
3. The user should have an internet connection and a computer or smart phone
4. The merchants and the farmers should be registered to access the system
5. Merchants need valid trade warrant to register
6. The farmers need to have a kebele id card
7. The seller and buyer could perform the transaction, but we don't provide any shipping service
8. The project status is validated based on the standard

CHAPTER 3

PROPOSED SYSTEM

3.1 Overview

The proposed system is designed with the aim of solving the some of the problems that exist in the current agriculture market system in Ethiopia.Farmers can give information about different agriculture products and their address for the website and connect with business vendor also can share a different type of information and resources as well. Customers will get them registered in this application and then will be able to access the website by logging into the system .The proposed system have the following advantages, time saving, provide information, and provide address to customers and farmers to access They can view/search the list of items , also able to update it as per requirement, view the feedback and reviews of other customers regarding any product and share their contact and address. The admin will be able to view customer profile, feedback, reviews generate reports on monthly basis.

3.1) Function requirement

A. Administrator Login: Login process to allow the authentic user to access the admin panel.

B. Admin Manage account (create, update, delete and view account).

C. Farmer's login:farmers will be able to register and log in to the system.

D. User 's login: users will be able to register and then will be able to access the website by logging into the system.

E. Farmers post products, the product price and their address.

F. Customer will be able to review products.

G. Free tour as a guest and as a user.

H. Registered members can update their profiles, addresses and payment options

I. Customer will be able to search/view product by its name, keyword or code and farmer's address.

J. Sellers will be able to upload photos of products that they intend to sell.

K. Customer's Feedback/review: The Customer can view the feedbacks, and reviews of other customers regarding any product and give feedback.

L. Admin check its status and trade license.

M. Customer feedback: Admin will be able to view customer's profile, feedback, and reviews

N. Generate report about the project.

3.3 Nonfunctional requirement

A.Users interface requirement

User interface should be menu driven and attractive.

The interface should be user friendly.

The system should support error-handling mechanism that display graphic approach and the system guide the user what will be the next action.

B. Authentication Requirement

The system support username and password to authentic.

The system has different privilege to protect intruding.

C.Robustness (Error handling requirement):

When the users interact with the system there's a possibility that errors may occur or appear. To control these in accuracy the system will generate different messages.

The system has error handling mechanisms that is, as errors occur it will not stop functioning rather provide user friendly error manages and back to the previous page to give chance to reenter data and process the task by beyond the error.

D.Well documented:

The document of this project is processed in well manner. every activity of the entire development, design and other process will be documented for future reference. There will also be a documentation of how to use the system and how the administrations manipulate data to database.

E. Resources:

The system is compatible with specified hardware and software environment

F. Usability

The extent to which this system can be used is mainly by the farmers and costumers(consumer) of the country. The usability of the system is determined by considering the following issues:

The new system provides web application user interfaces that are compatible with any browsers.

The system shall provide the easy access

The system is easy to deal with.

The system should be easy to understand.

Unauthorized person should not use the system; rather just view the main page.

G.Hardware consideration:

The following sub -sections discuss the various aspect of hardware requirement.

Smart phone: an android running smart phone, desktop computer, laptop or tablet .

Device capabilities: network connectivity, includes CD ROM device etc.

H.Software consideration:

Platform: our system supports any operating system and all browsers.Ø

I. Performance requirement

The system performs its task within a user acceptable time and space. The system should respond to any user request as soon as possible and must handle many concurrent requests simultaneously.

Response time: - depending on the strength of available network the system should be response in short period of time.

J. Reliability:

The system should be reliable. The system should be released after testing thoroughly Appropriate error messages will be provided to users whenever incorrect information is inserted and handle the occurrence of that error.

3.4) System Model

3.4.1 Scenario

Scenario is a real-life example of how the system can be used. It should include scenario name, flow of event, what can go wrong and how it is handled. Based on this the following scenarios for our project are listed below.

1. Name of Scenario: manage account

Participating actors: admin.

Entry condition:Internet condition should be available.

They have to navigate to agricultural market url

Flow event:

a.Admin open and login to the system.

b.Admin select manage account tab.

c.The form is displayed to the admin page.

d.He/she fills user detail.

e.Click create button

f.The detail displayed at this page with deletes and edit tab.

g.He /she select edit tab.

h.Edit form with previous data

i.Change the detail he/she want to update

j.Click update button

k.Select delete tab, if he/she wants to delete the user's detail.

l.The system displays successful message

Exceptional flow: if he/she enters wrong data, the system displays a message to enter correct data.

2.Name of Scenario: - register

Participating actor: - Farmer,Merchant

Flow event:-

a.The Merchant or Farmer open and login to the system

b.Users page displayed to the user

c.He/She select register tab.

d.Registration form is displayed.

e.He/she fills the correct value to the form

f.Click register button.

g.The system display successful message

Exceptional flow: - If the He/ she does not enter correct information in to the form, the system notifies to enter the correct data.

3. Name of Scenario: login

Participating actor: - Farmers,Admin,Merchants

Flow event:-

a.The user opens the system.

b.The user enters a valid username and password.

c.The login form is displayed to the user.

d.The user clicks the login button.

e.The user display user page

Exceptional flow:-

a.If the user does not fill the correct username and password, the system notifies to enter correct username and password.

b.The system does not work when the connection is not available/

4.Name of scenario:post product

Participating actor:Merchant,Farmer

Flow of event:

A.He/she open and login to the system.

B.He/she select dashboard tab.

c. He /she select post product.

d. The form is displayed to the post page.

E.He/she fills product detail.

F.Click post button

G.The product would be posted to his page

5.name of scenario:Resetting password

Participating instance actor: Farmer,Merchant

Entry condition: User should have account that is previously used in the system

User forget or lost his/her password

Flow of events:

A.User go to password recovery form

B.User insert email to recover password

C.System send recovery link

D.User uses the link sent to him to reset new password

Exception: user enters invalid recovery email system will generate error or show message that show its invalid email.

6.name of scenario:search product

Participating actor: All users

Entry condition: internet connection

A.Event flow:User uses search field to insert product name, keyword or product code

B.User presses search button and query the product in the store

7.scenario name:complain and suggestion

Entry condition:must have internet connection

Participating actor:All users

Flow of event:

A.user browses into the agricultural market ur

B.User fills the comment form

C.User clicks the submit button

D.The comment will be reviewed

8.scenario name : update

Entry condition: User must have account

Participating actors:Merchant,Farmer

Flow of event:

A.Login to the system

B.Go to profile section

C.Display full profile information

D.Select edit profile

E.Edit required form and update information

F.Click ‘update profile’ to update

H.Show updated profile

9.scenario name:Delete

Entry condition:User must have an existing account

Participating actor:Admin,Merchant,Farmer

Event flow:

A.user login into his/her account

B.user clicks delete

C.user confirms to delete account

3.4.2) Use Case model

Admin :A person who controls the system at the top

- Login
- View the market status
- update the price
- Delete unavailable products
- Receive comment from the customers, farmers, and merchants
- Logout

Farmers:A person who uses the system to post a product

- Register
- Post the available product they have
- View the current price
- Make connection to the merchants
- Give comment in the comment section
- Logout
- Change password

Merchants:A person who uses the system to see and post a product

· Register for new account

· Sign in if they have account

· Post what they want to buy and with their price

· Give comment for the admins

· Logout

· Change password

Guest:A person who browses the system

Browse product catalog,

Sead news and announcement,

Search items

Read product description and review

Use case identification

Our system includes the following use cases:

- Login
- Registration of farmers
- Registration of merchants
- Update the price
- Generate the overall reports
- Giving comments
- Change password
- View detail: used to view all information included under the system, such as: View the current balance
    - View comments
    - View the farmers info
    - View merchants' info
- Update details: used to update the required information in the system such as:
    - Update the price
    - Update account and password
- Delete details: use to delete all irrelevant information in the system, such as:

- Delete account
- Delete unavailable products

- Logout

Use Case Diagram

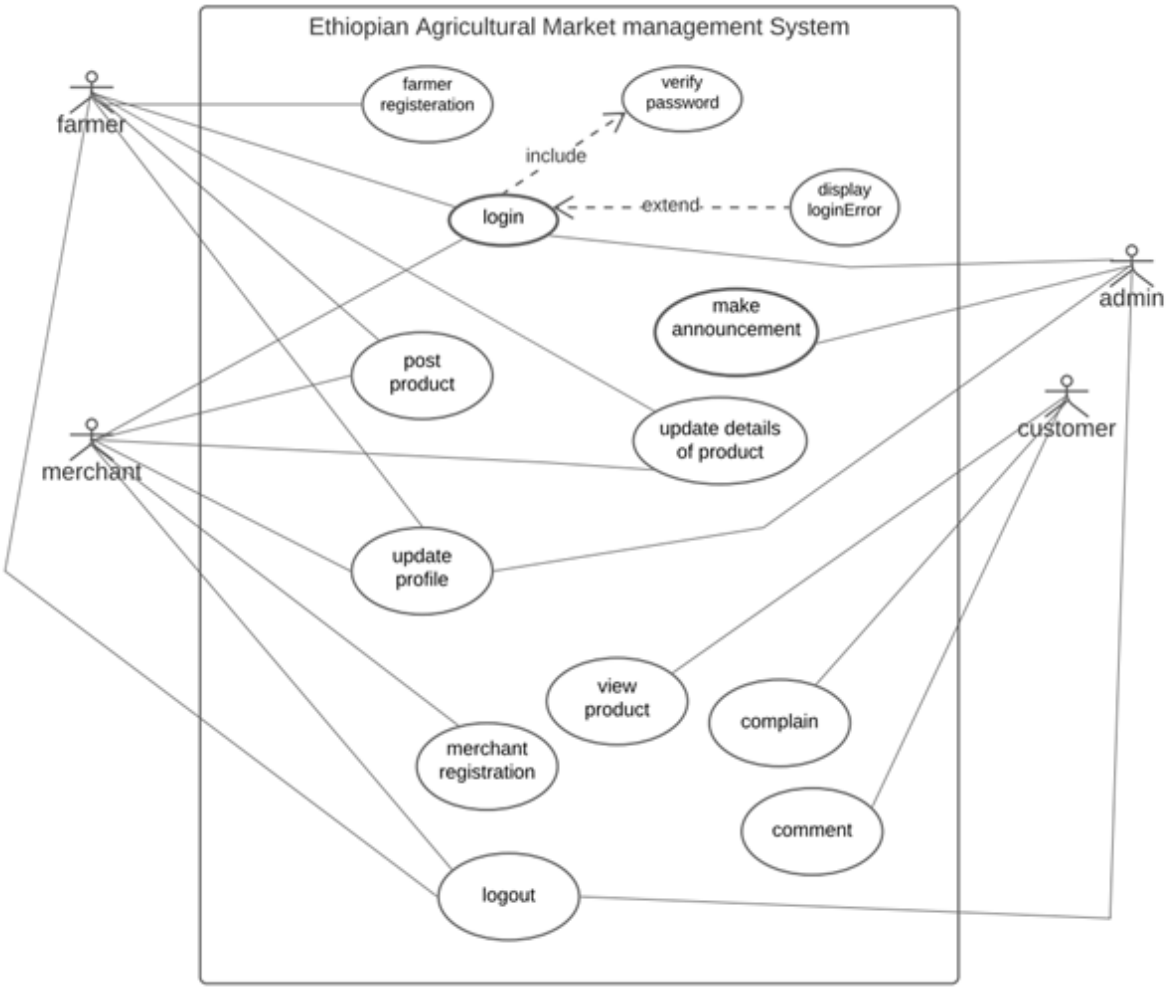


Figure: use case diagram

3.5) Object model

3.5.1) Data dictionary

Classes	Attributes	Operations	Descriptions
Admin	Name Age Sex phone	Register() login() manage Report() give Complain Feedback()	done
Users	Login Details Login Status Password User ID	Login Credentials(), login Verfication()	Done
Farmers	First name Last name Phone Age Sex Address	Login(), register() post Product() update Details()	done
Merchants	First name Last name Phone Age Sex Address License	Login() Post Product() register() update Details()	done

Customers	Name Email Phone	Comment(), complain() view Announcement(), view Post()	done
Account	Account Type Age Email First name Last name password phone sex username	Login(), Create Account()	done
Products	Category Name Type	Post Product() update product()	done
Posts	Name Category Date Amount Price Type	Post Product(), view Product()	done

Comment	Product name Category Detail	giveComment()	done
Complains	Contact Date Issue Name Phone	Give Complain()	done
Announcement	Date Details Title	Make Announcement ()	done

3.5.2) Class Diagram

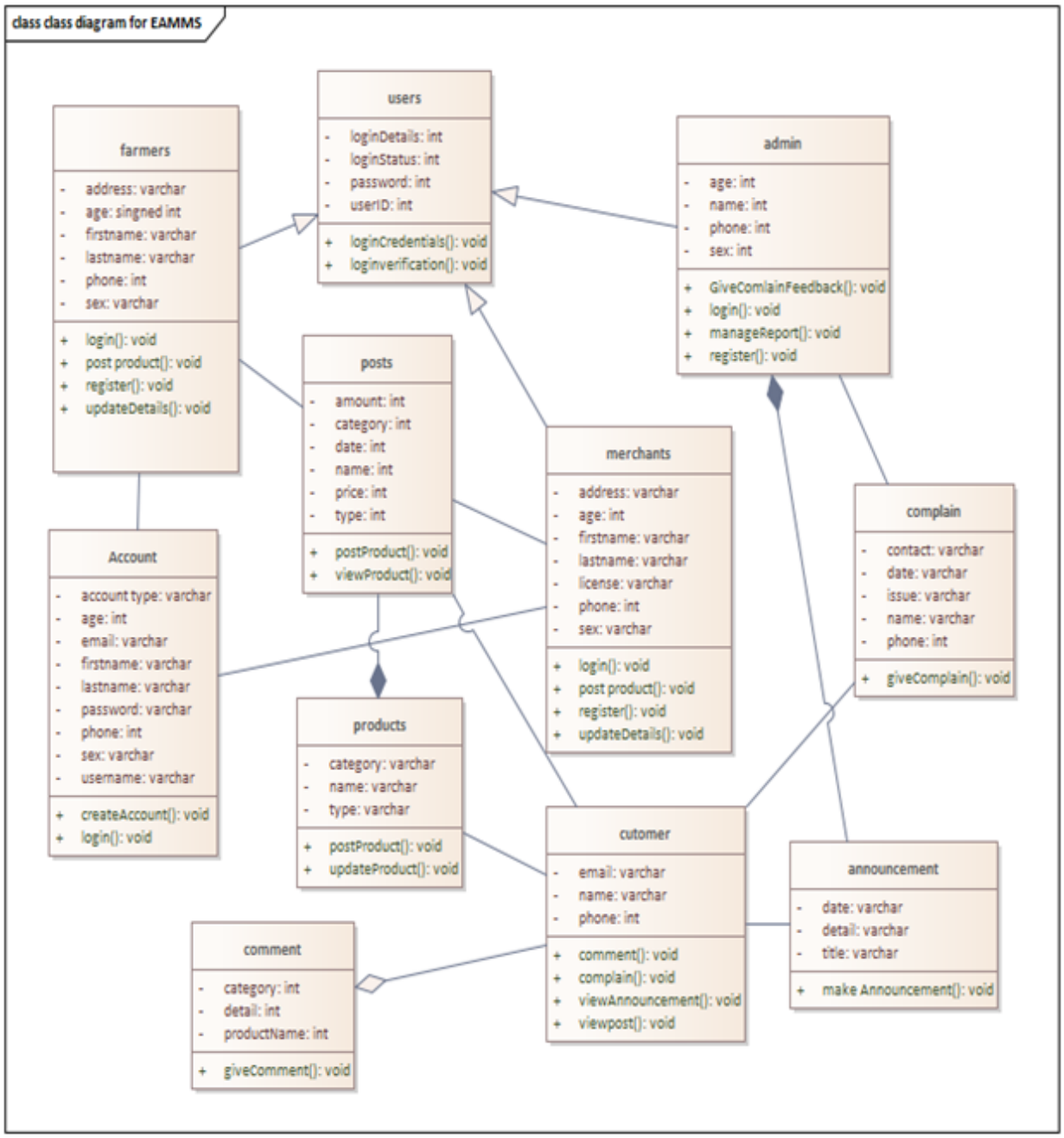
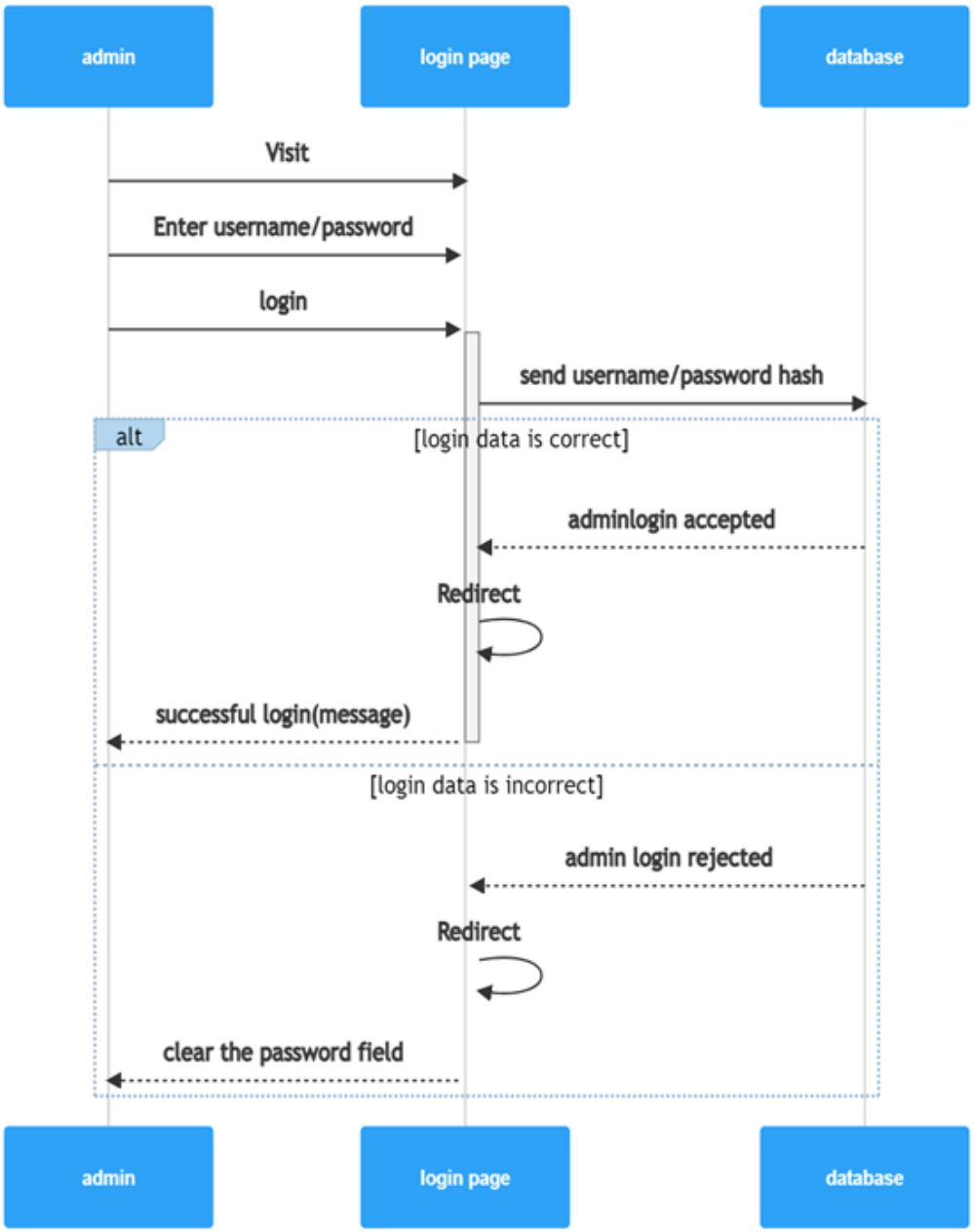


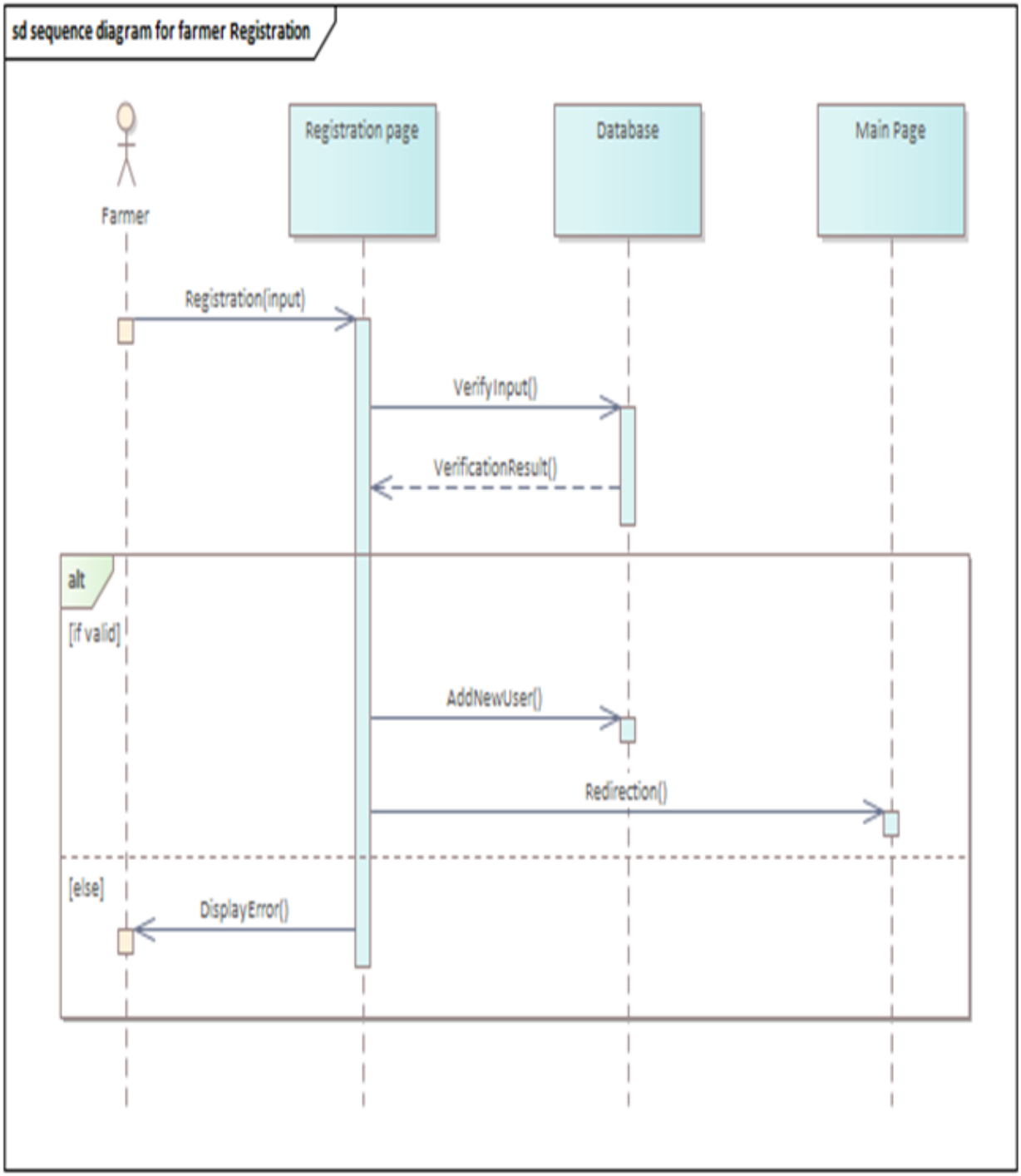
Figure: class diagram

3.5.3) Sequence Diagram

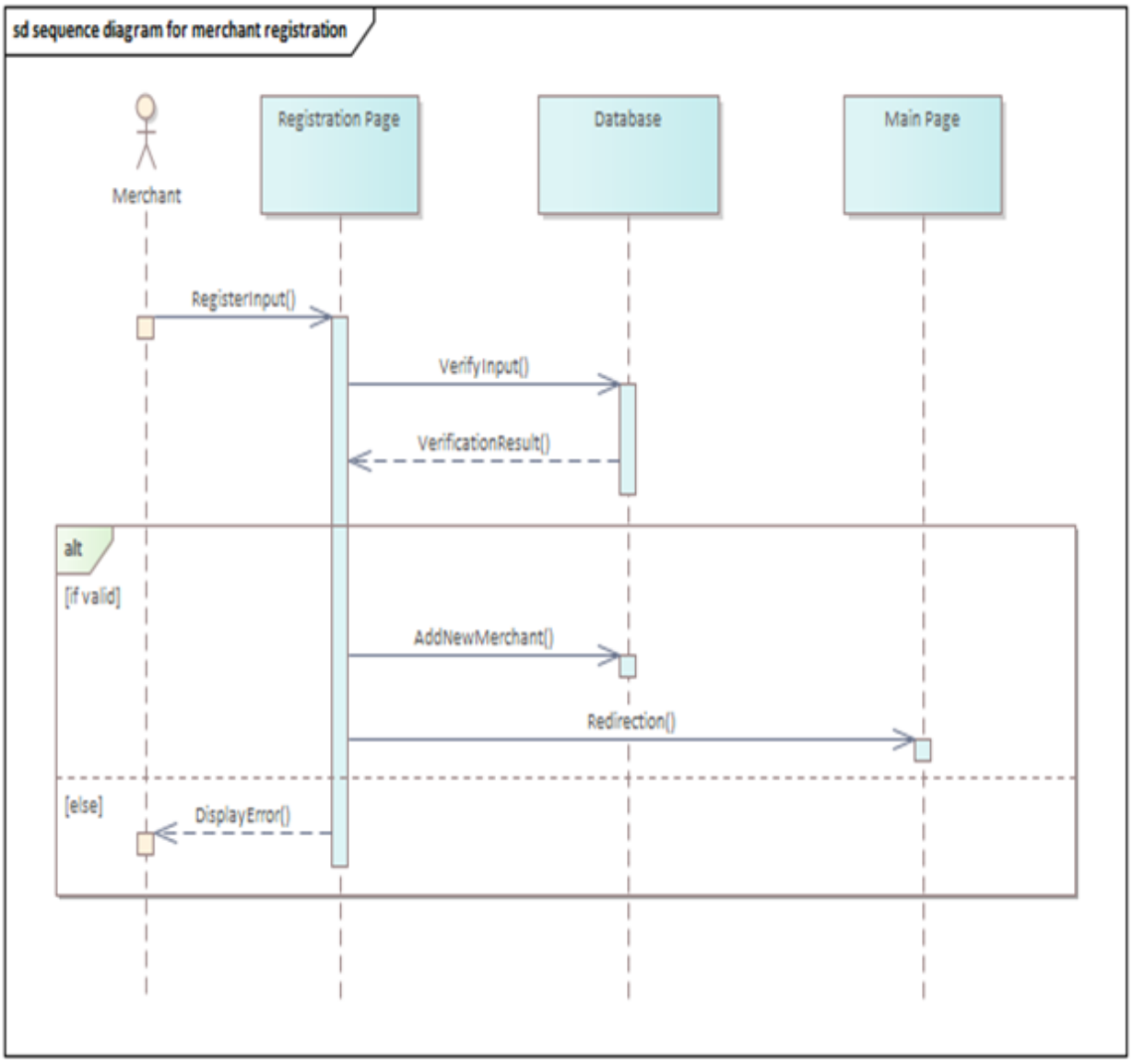
1) Admin Login



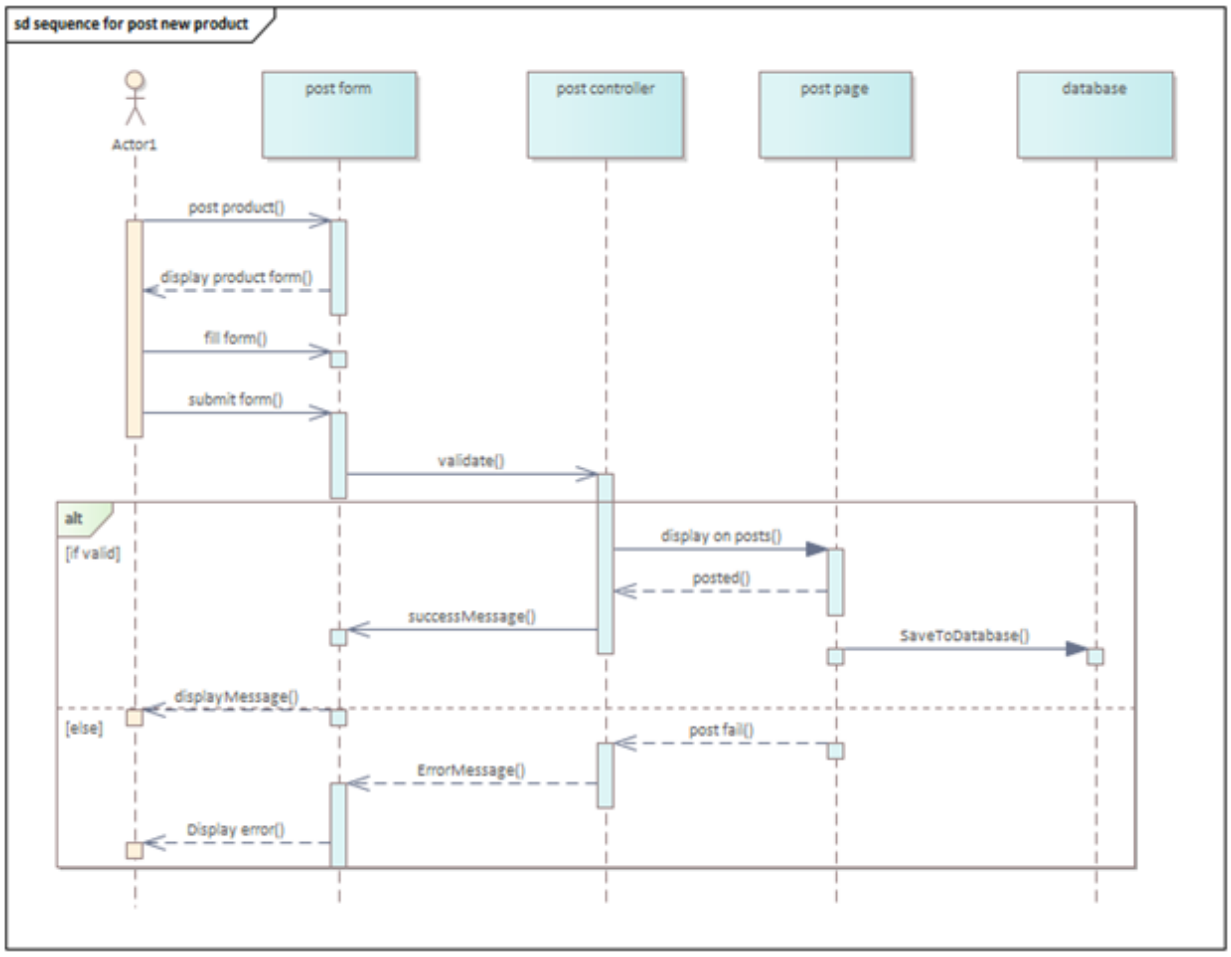
2) farmer Registration



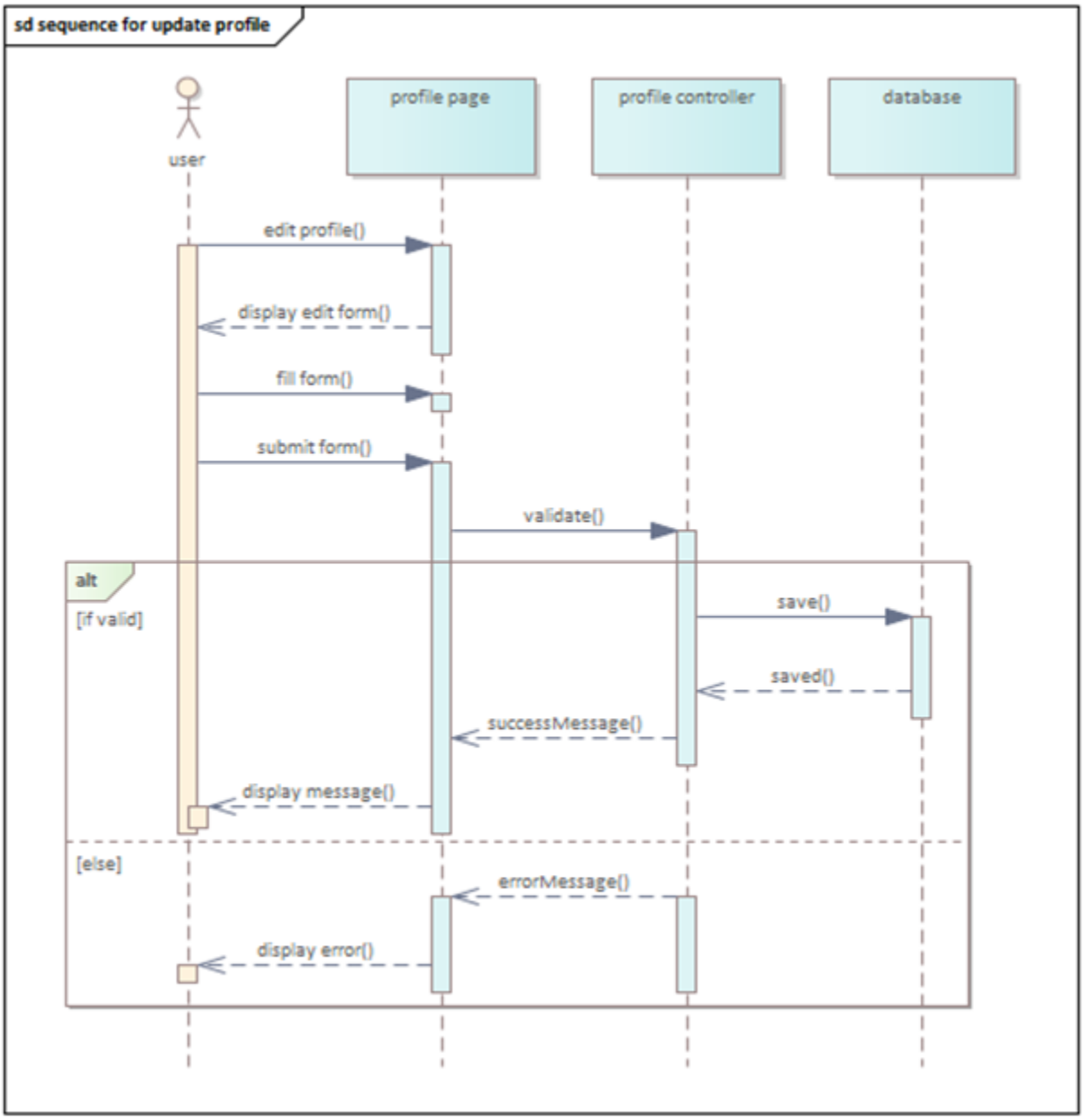
3) merchant registration



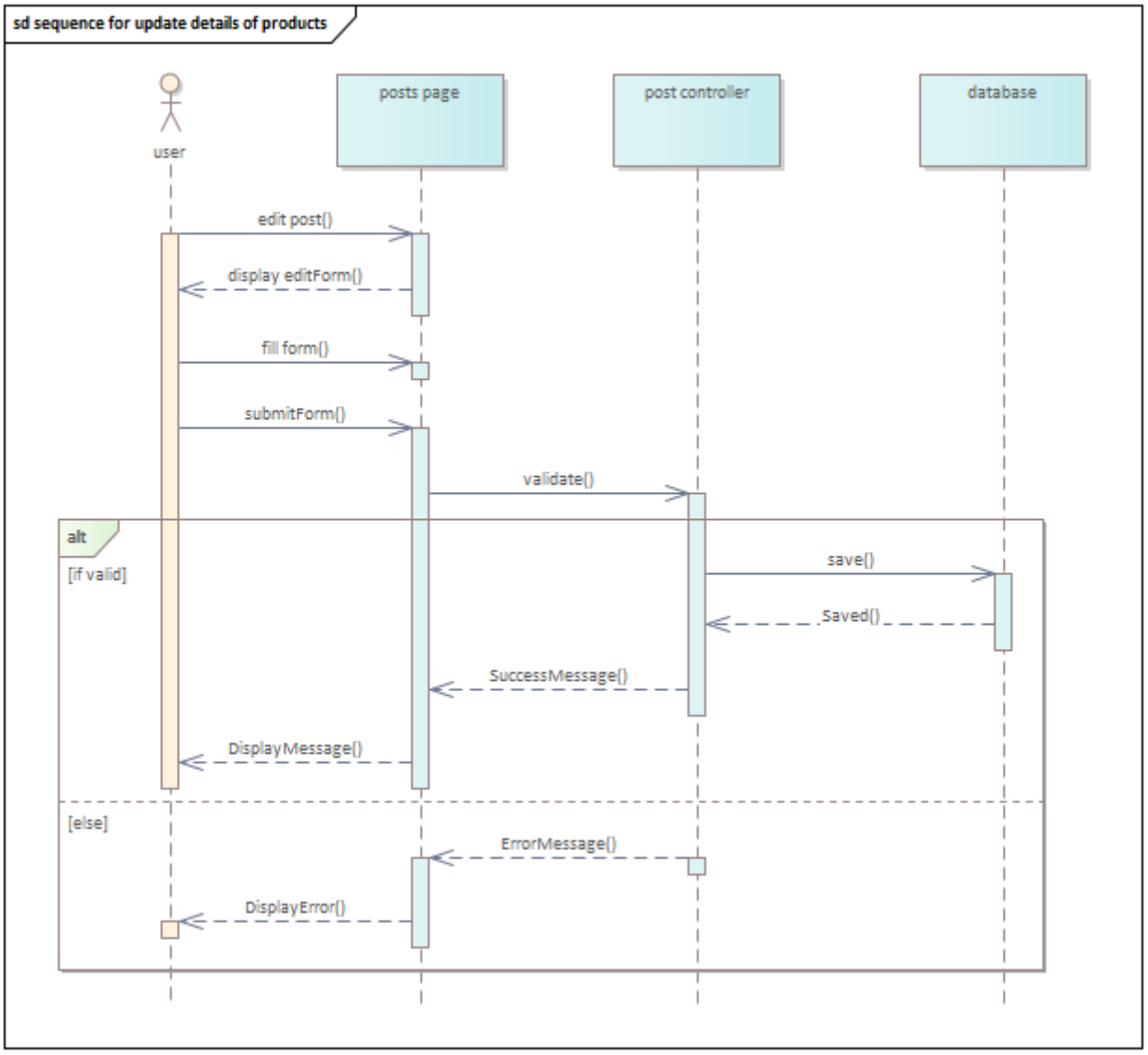
4) post new product



6) update profile



5) update details of products



3.5.4) Activity Diagram

An activity diagram is used to understand the flow of work that an object or component performs. It can also be used to visualize the interaction between different use cases. One of the strengths of activity diagrams is the representation of concurrent activities. Some of the activity diagrams of our system are listed below

1.registration of farmers

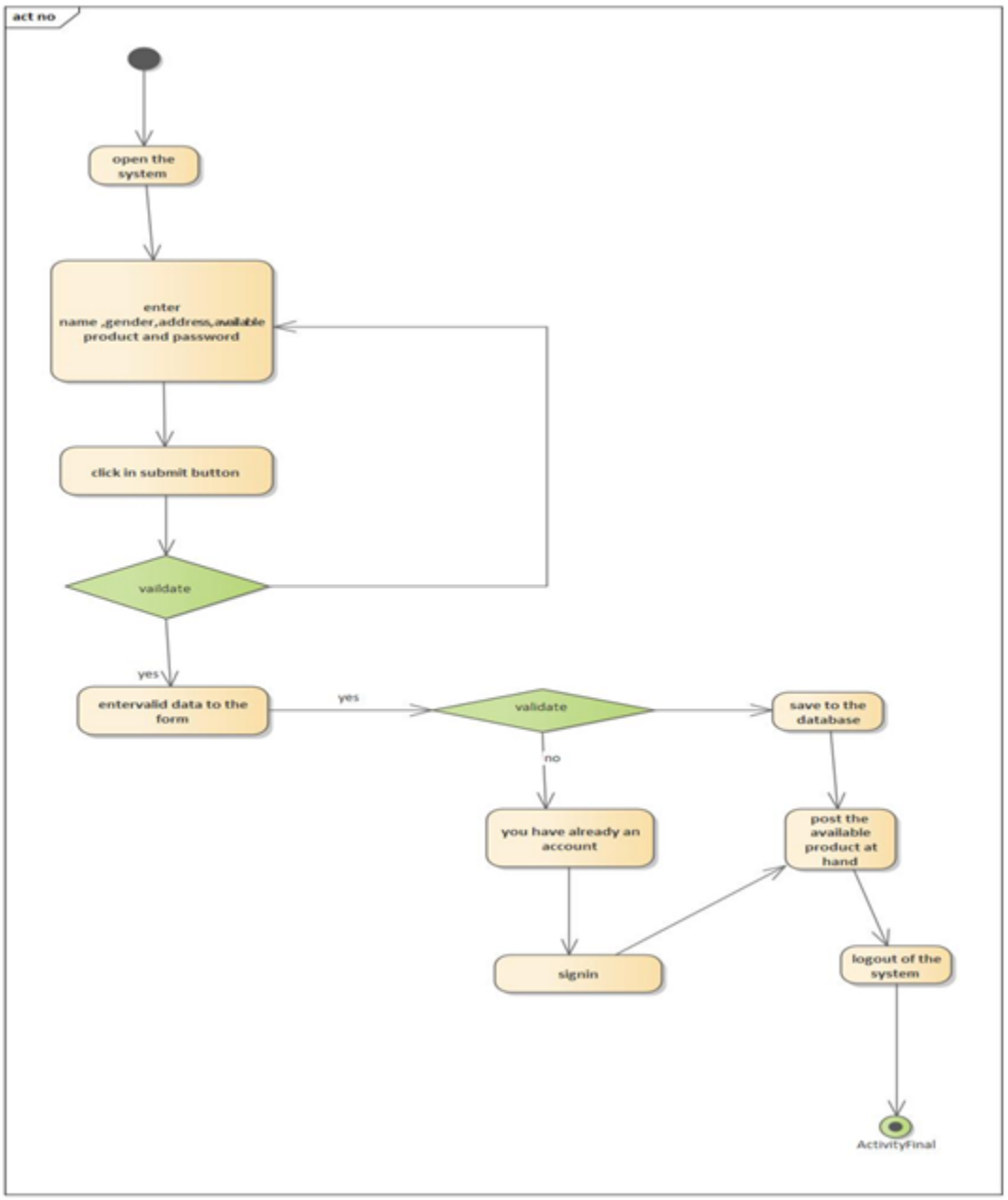


Figure activity diagram for farmers login

2.registration of merchant

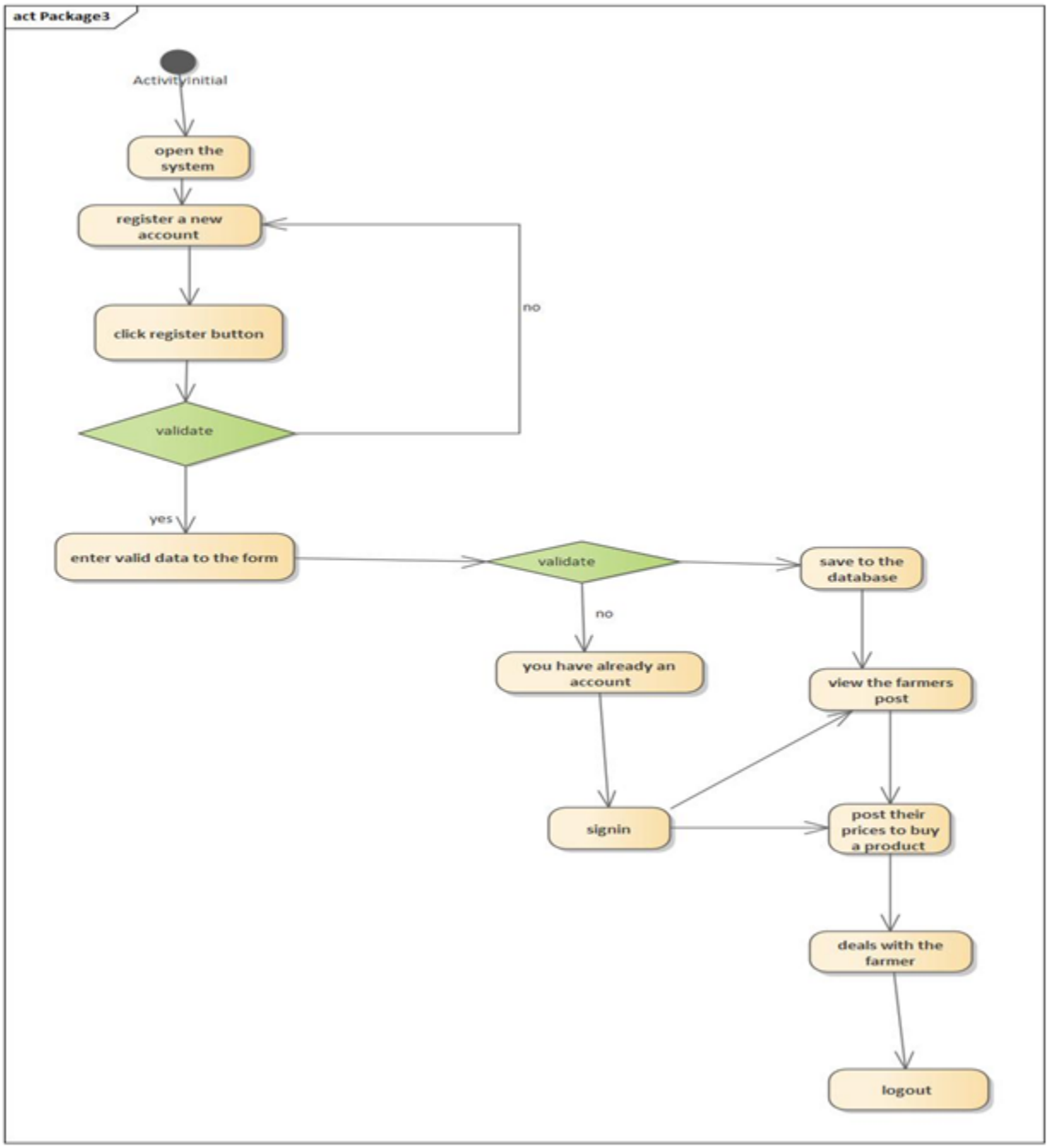
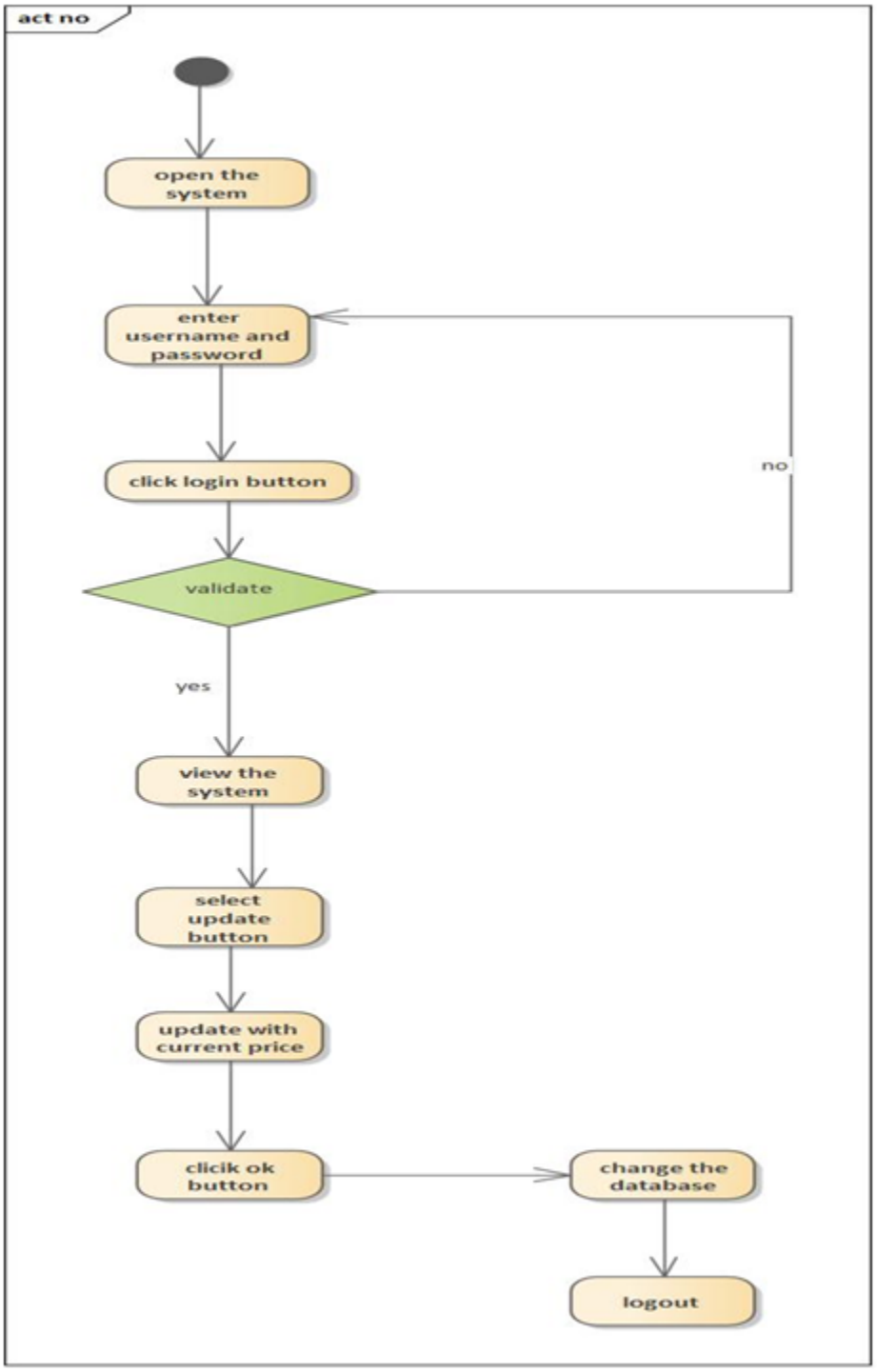


Figure activity diagram for merchants logi

3.update by the admin page



Activity diagram for admin login

4.anyone can view the system

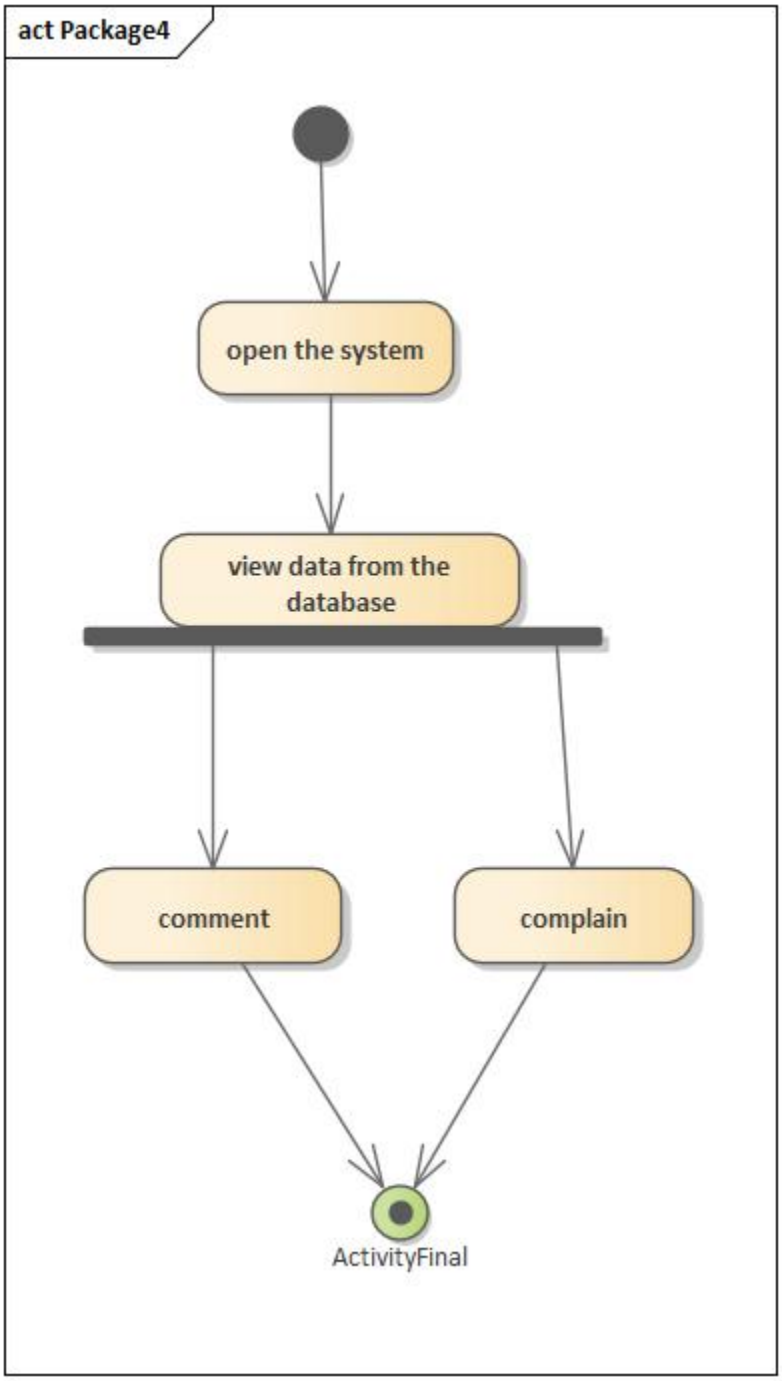
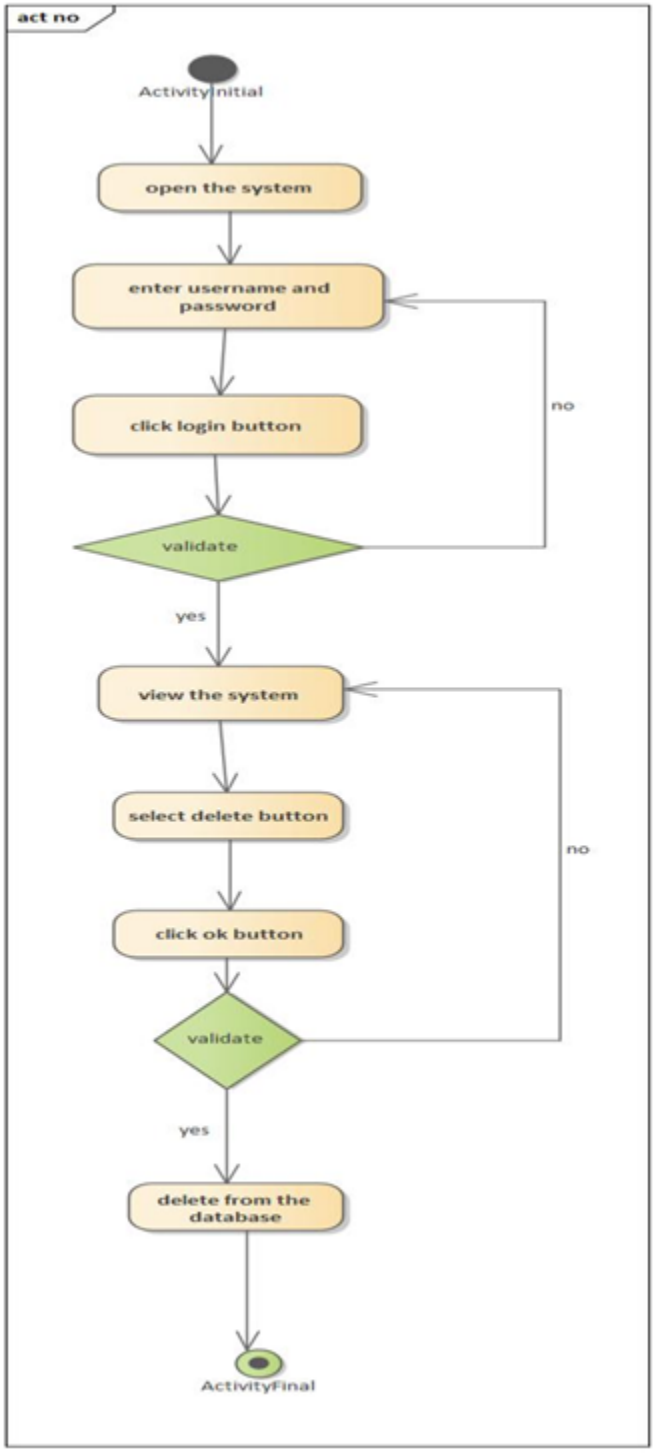


Figure customers service

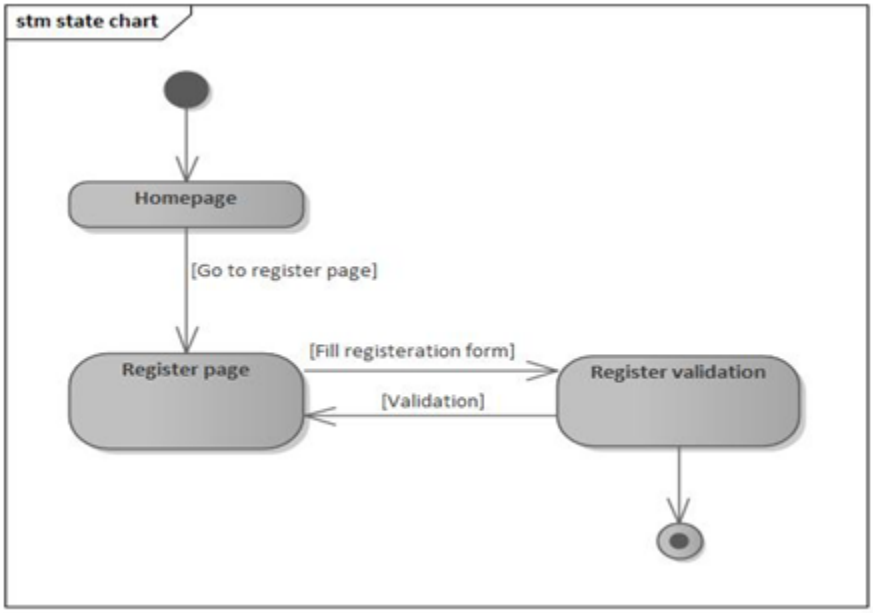
5 delete from the page



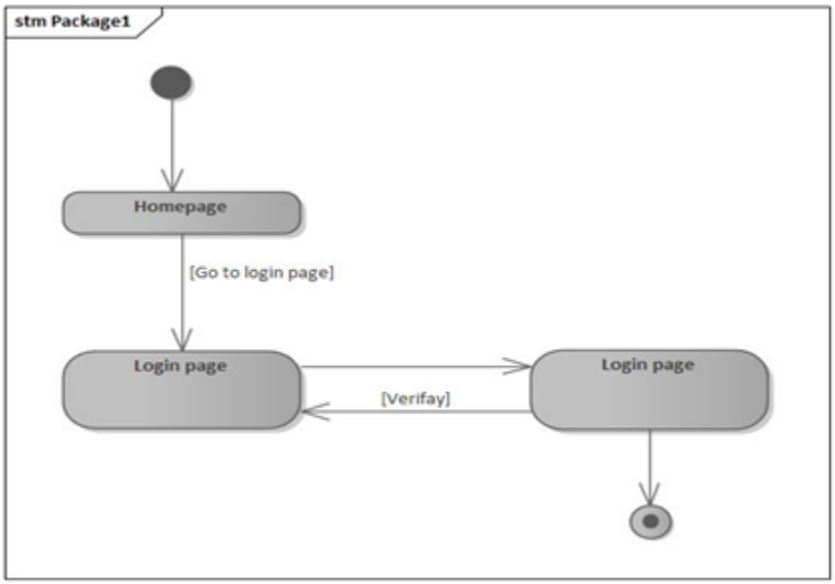
3.5.5. State chart Diagram

It is used to describe the externally visible behavior of a system or of an individual object. Some of the state chart diagrams of our system are Register ,Login ,post product ,view product ,update profile , delete described below.

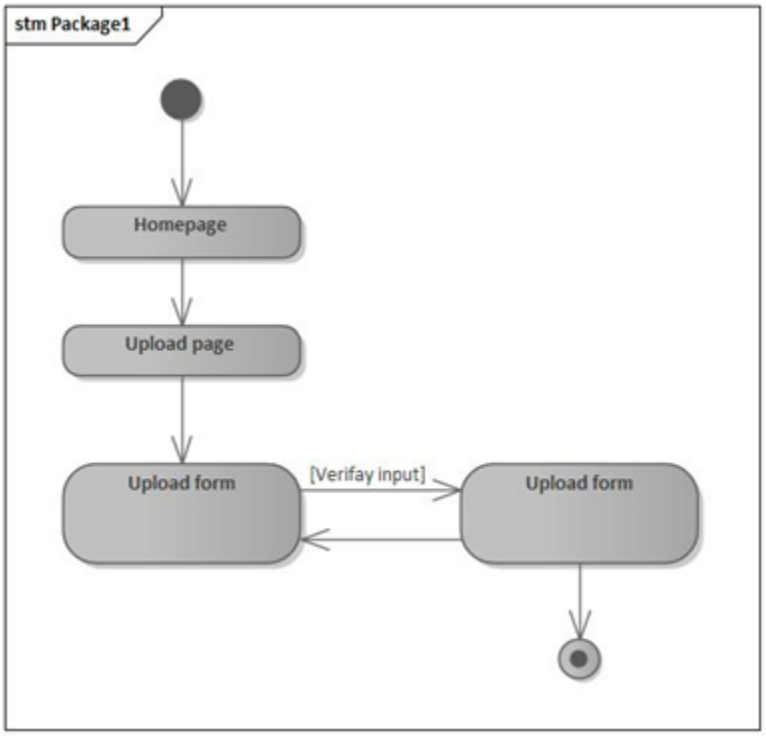
1.Register



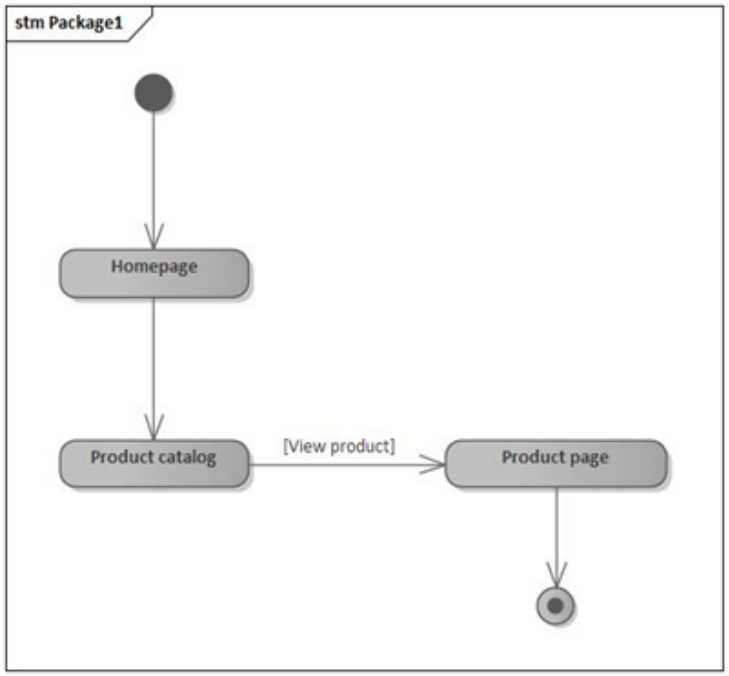
2. Login



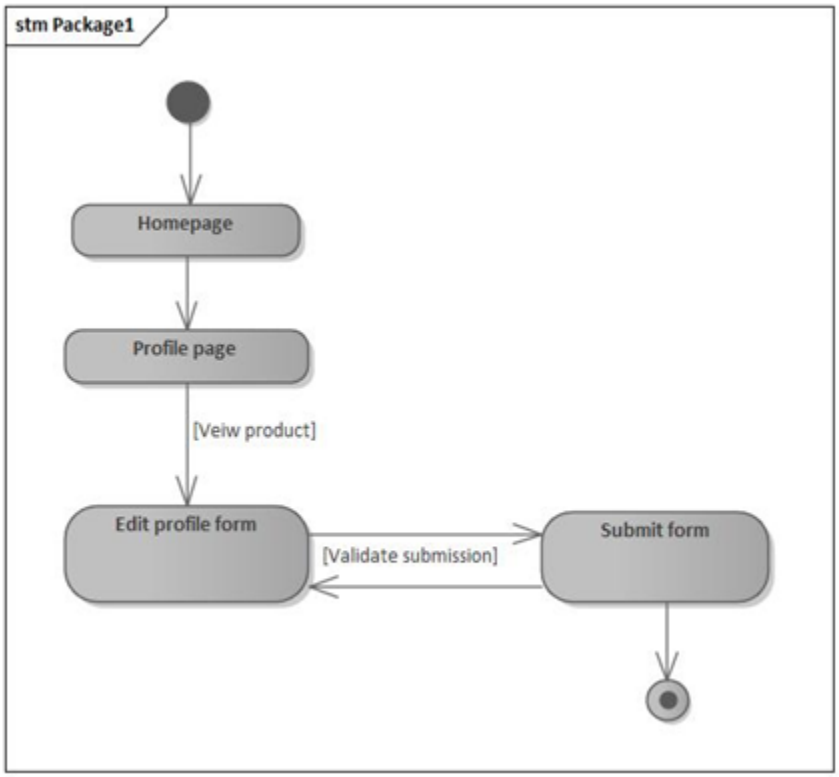
1. post product



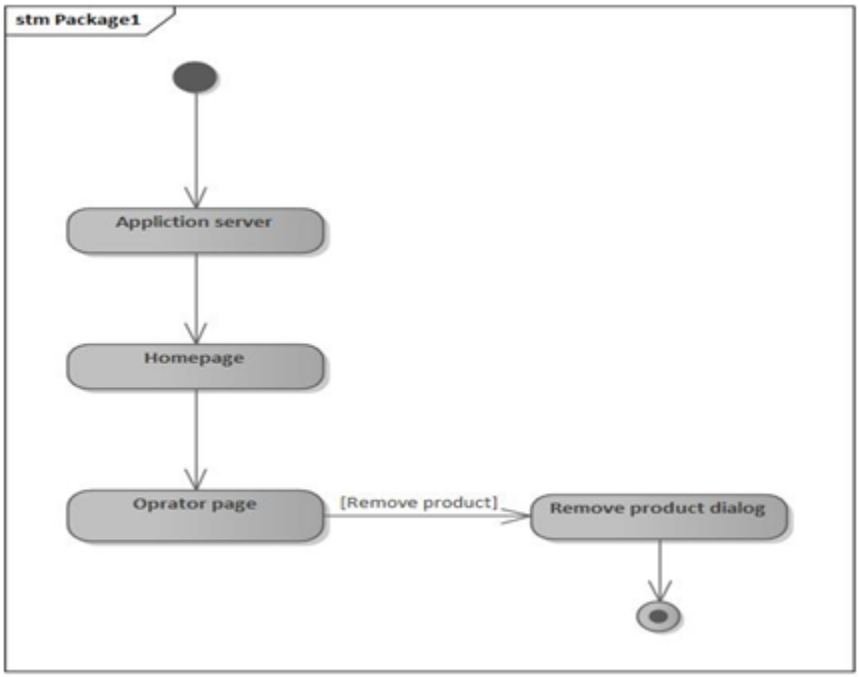
1. view product



1. **update profile**



1. **delete**



Chapter 4

4.System design

4.1. Overview of system design

Overview of system design System design part of the system is the transformation of the analysis model into a system design model. Up to now, we were in the problem domain. System design is the first part to get into the solution domain in a software development. This chapter focuses on transforming the analysis model into the design model that takes into account the non-functional requirements and constraints described in the problem statement and requirement analysis sections discussed earlier. This document describes the design issues of the overall system, such as design goal, subsystem decomposition, hardware/software mapping, and persistent data management. It provides the complete architectural overview of the proposed system. It is intended to capture and express the significant architectural decisions, which have been made, on the system

4.1.1.Purpose of the system design

The purpose of designing is to show the direction how the system is built and to obtain clear and enough information needed to drive the actual implementation of the system. It is based on understanding of the model the software built on. The objectives of design are to model the system with high quality. Implementing of high quality system depend on the nature of design created by the designer. If one wants to change to the system after it has been put in to operation depends on the quality of the system design. So if the system is design effetely, it will be easy to make changes to it.

4.1.2 Design goal

The objectives of design are to model the system with high quality. The design goals are derived from nonfunctional requirements that means non-functional requirement is the description of the feature characteristics and attribute of the system as well as any constraints that may limit the boundary of the proposed solution. Design goals describe the qualities of the system that the developers should consider.

· Performance

· Dependability

· Maintenance

· End user

Performance

The system should respond fast with high throughput, i.e. it should perform the task quickly possible as possible such as generating report and receiving, viewing project status and also employee and material information etc. The system performs its task within a user acceptable time and space. This includes the following:-

Response time: - depending on the strength of available network the system should be response in short period of time.

Storage space:-to do work efficiently the processor to be more than 2GB RAM andHD storage to be more than 20MB

Dependability

Our system includes the following dependability criteria's:-

Reliability: system should be reliable.

Fault Tolerance: - should be fault tolerant to loss of connectivity with the service.

Security: - should be secured, i.e., not allow other users or unauthorized users to access data that has no the right to access it.

Availability: - as long as there is an internet connection and system failure the system will be available 24 hours a day

Maintainability

To be maintainable the system should meet the following maintenance criteria:-

Modifiability: EAMM system should be modifiable for further modification and enhancement of the system.

Portability: - the system is developed to be viewed and retrieved from any web browser regardless of their version and platform it resides in it.

Extensibility: - if it is needed to add new functionality to the system, this must be achieved by only making a separate page and integrate this page with the existing system.

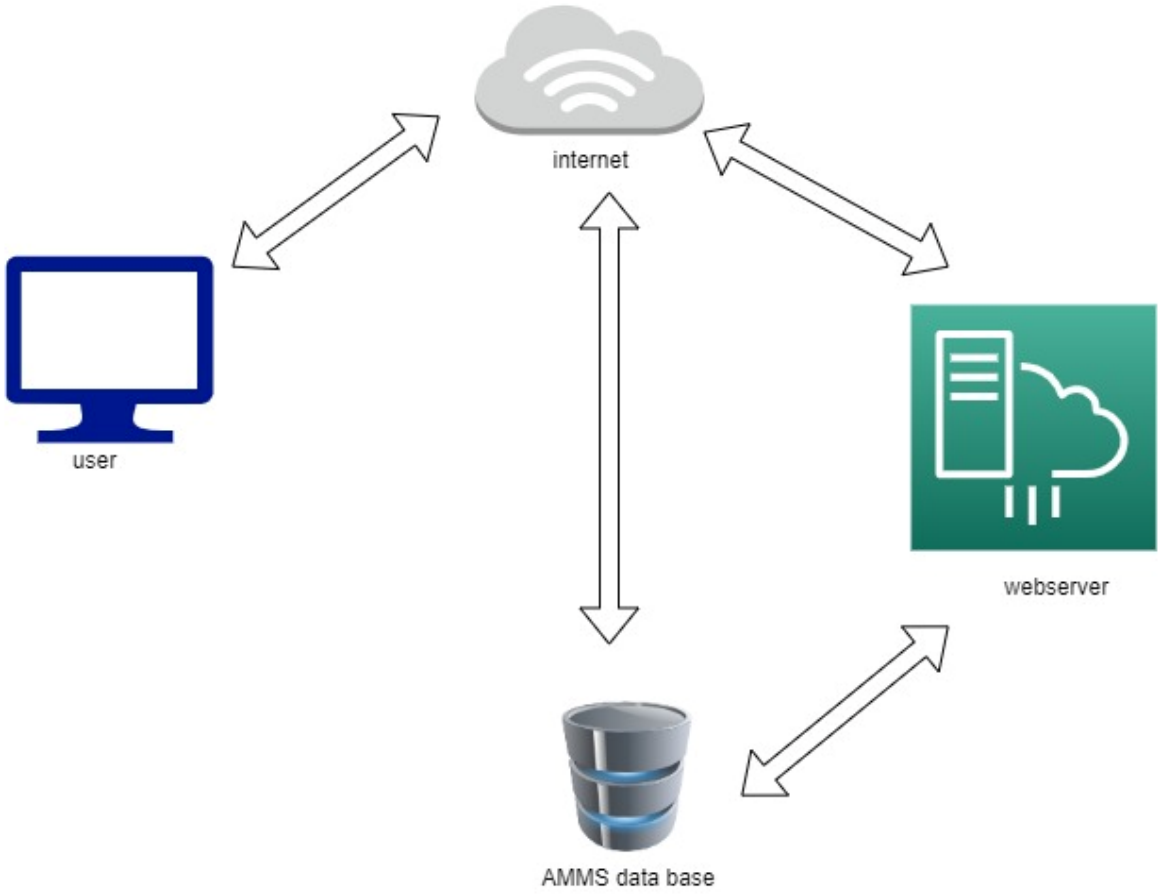
Readability: - the system code can be viewed by clicking on the current web page and choose "view the source code" option

End User Criteria The system should have simple and understandable graphical user interface such as forms and buttons, which have descriptive names. It should give reliable response for each user comment.

All the interfaces, forms and buttons are written or designed in a simple language or common language so that the user can access it without any difficult

4.2. Proposed system architecture

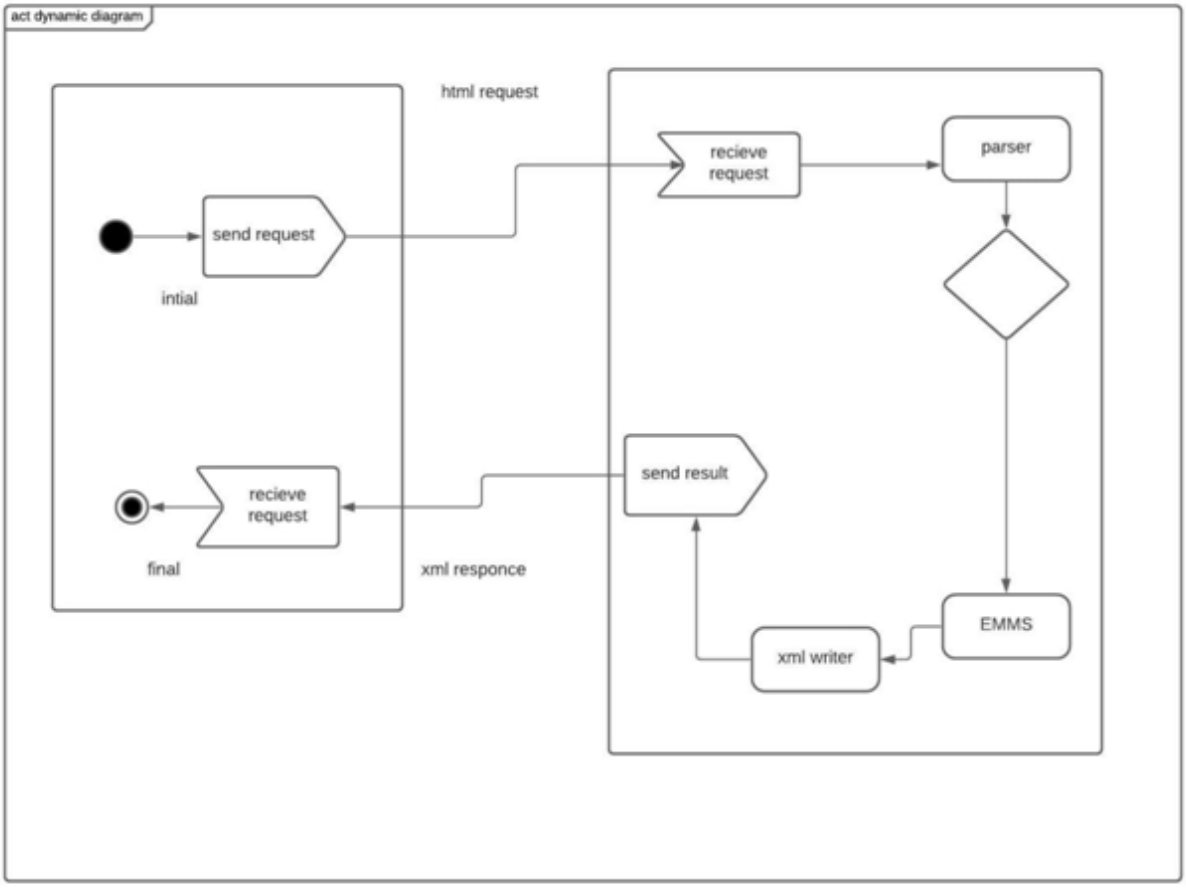
In this project, the team uses a three-tier architecture, which has three layers. These three layers are the Application or Presentation layer, the business layer and the data access layer. Application or presentation layer is the form, which provides the user interface to either programmer or end user. The business layer is the class, which the team uses to write the function, which works as a mediator to transfer data from application layer or presentation layer to data layer. This layer also has a property layer which is a class where variables are declared corresponding to the fields of the database which can be required for the application and make the properties so that the team can get or set the data using these properties into the variables. The third tire is the data access layer which is also a class to get or set data to the database queries back and forth. This layer only interacts with the database. The database queries or stored procedures will be written here to access the data from the database or to perform any operation to the database.



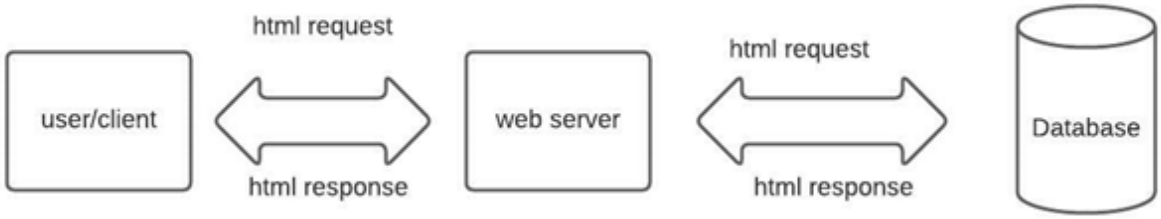
Figure

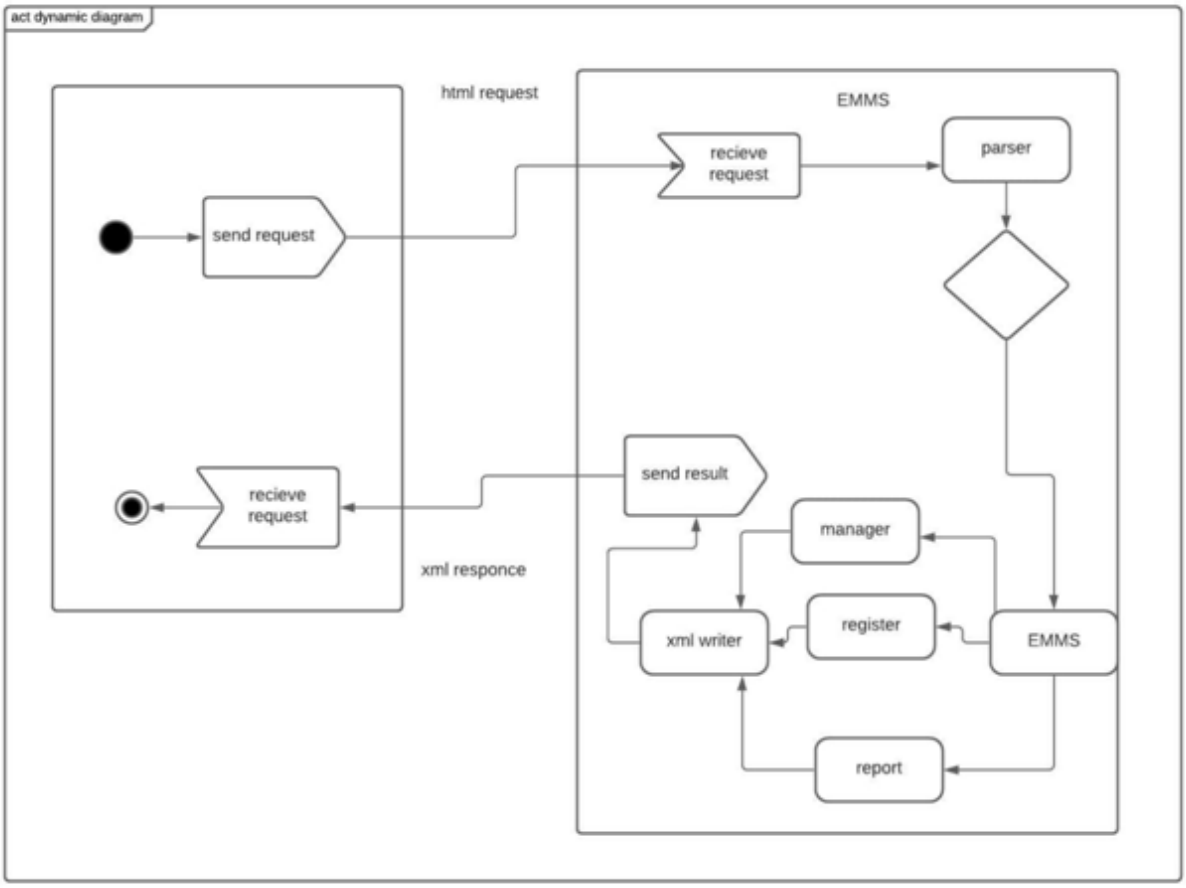
4.2.1. System process

Overall system of the service is depicted below.



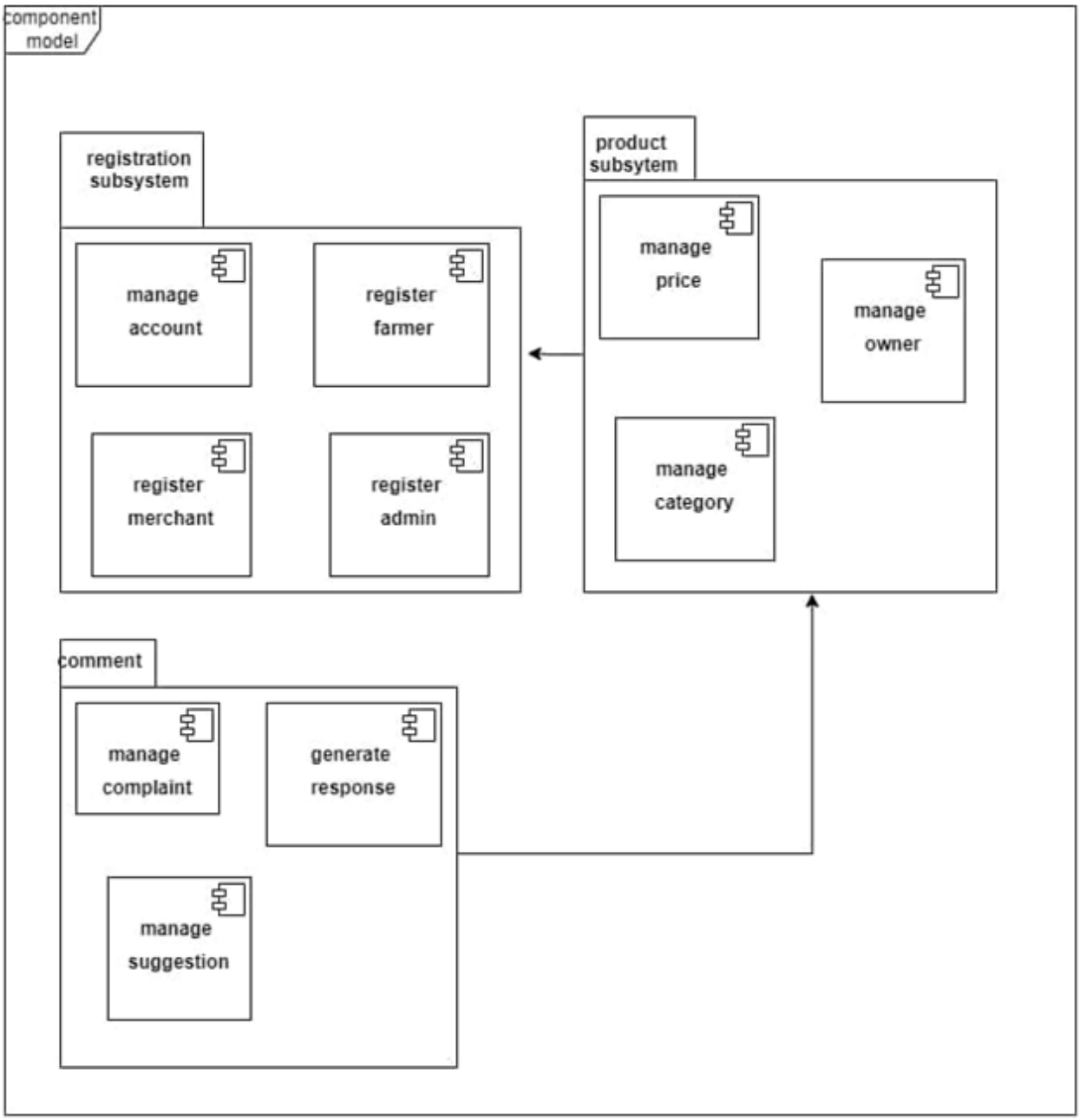
FigureSystem activity diagram





4.2.2. Subsystem decomposition

To reduce the complexity of the solution domain, we decompose a system into simpler parts, called subsystems. The main need of this portion is to design the external part of the system. In this project, there are seven sub system decompositions


component model
registration subsystem
manage account
register farmer
register merchant
register admin
product subsytem
manage price
manage owner
manage category
comment
manage complaint
generate response
manage suggestion

Subsystem	**purpose**	Class
registration	To manage farmers and merchants supply and demand And standard agreement made by them selves and approved by agriculture bureau	Project, standard,farmers and merchants,account
Admin (manager of agricultural bureau)	Responsible for managing the registered products that are posted by the farmer , and provide connection with merchants interested with the farmers product . and responsible for updating the new posts like registering the current price	Product price ,schedule
response	Responsible for giving the appropriate comment and complain given by the customer	Comment ,complain, product status

4.2.3. Hardware/ software Mapping

When we say hardware/software mapping for the system, it describes how subsystems are assigned to hardware and off-the-shelf components. It also lists the issues introduced by multiple nodes and software reuse. In this system design mainly there are three hardware components. The client side, server side and database side. When the team applies the system, necessary software will be loaded to each side hardware components. Network should be installed between each side. Then each sub system software will be assigned and configured to the mapped hardware. Then the local area network will be connected to the internet and the system will be functional. But now it is a design phase. The hardware software mapping of the system is described below with a simple diagram

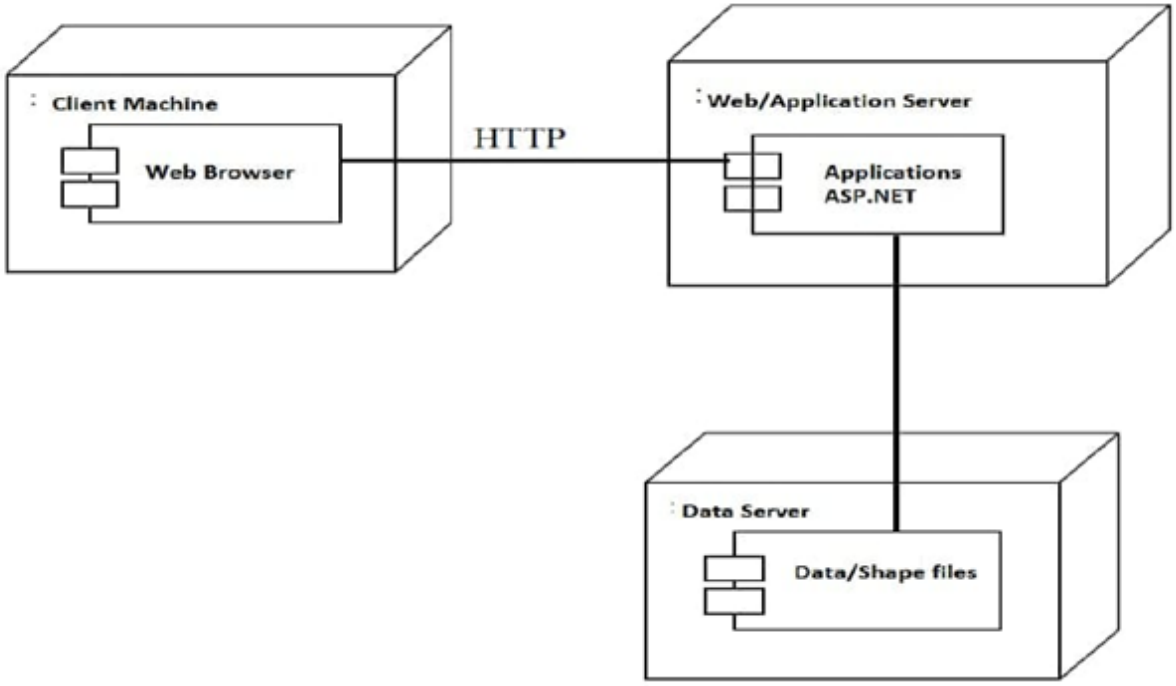
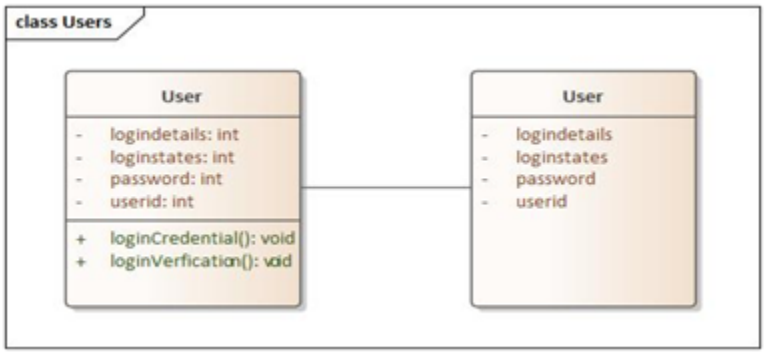


Figure 41 hardware/software mapping

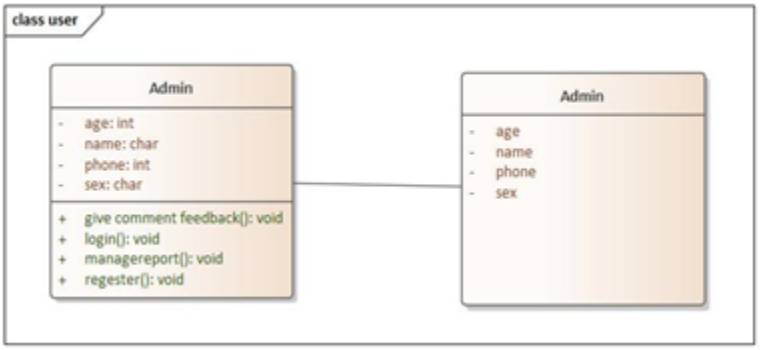
4.2.4 Persistent Data Management

The purpose of this section is to show the mapping of the objects/classes of the system, identified during the analysis stage, into the corresponding relational database.

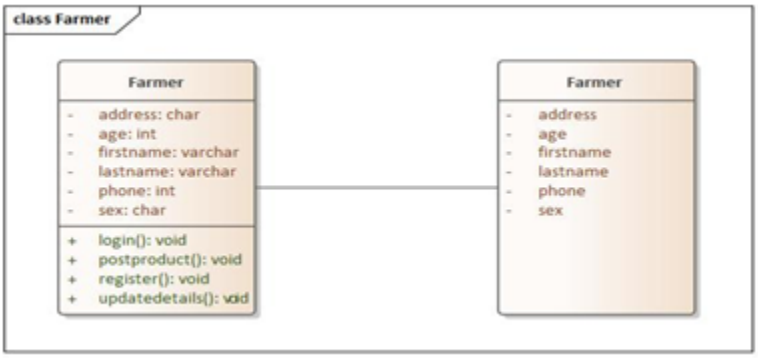
User mapping



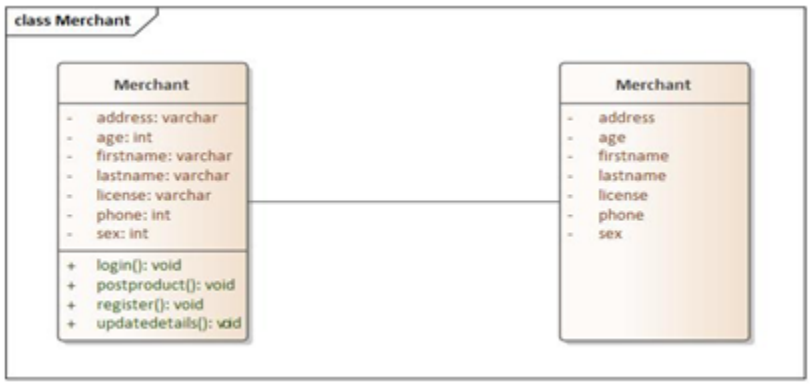
Admin mapping



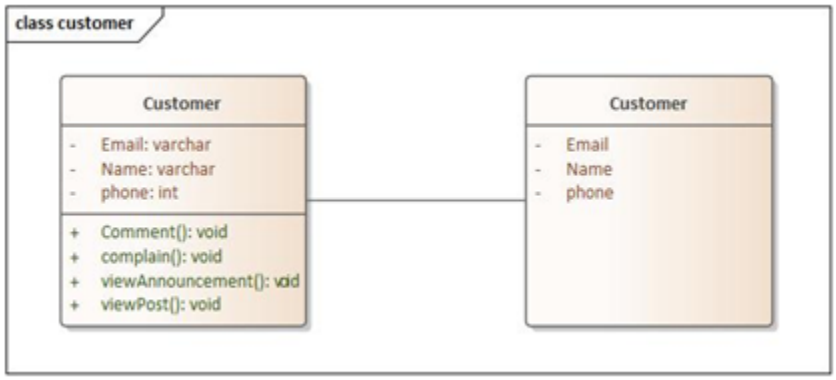
Farmer mapping



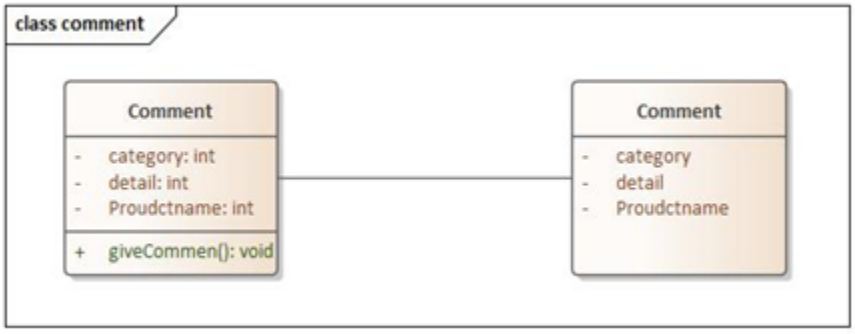
Merchant mapping



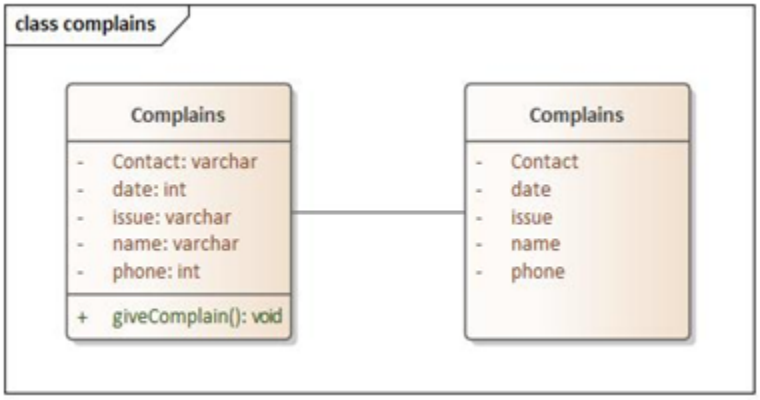
Customer mapping



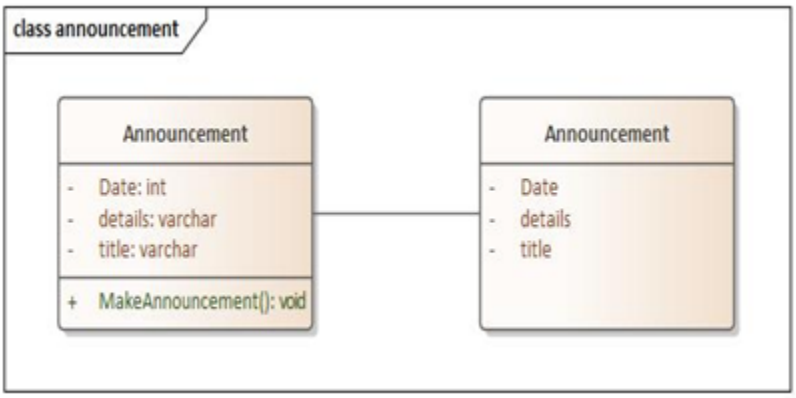
Comment mapping



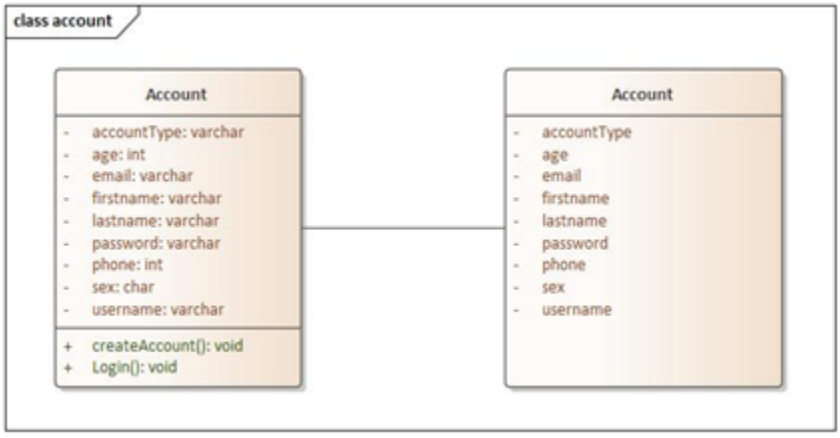
Complains mapping



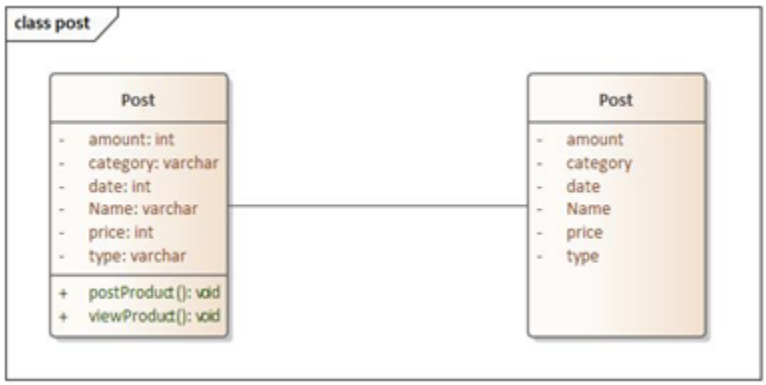
Announcement mapping



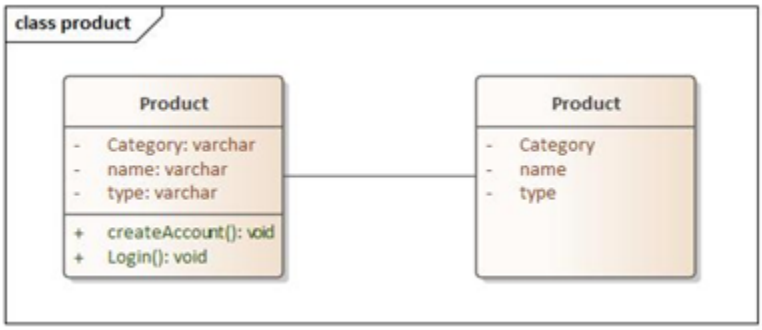
Account mapping



Post mapping

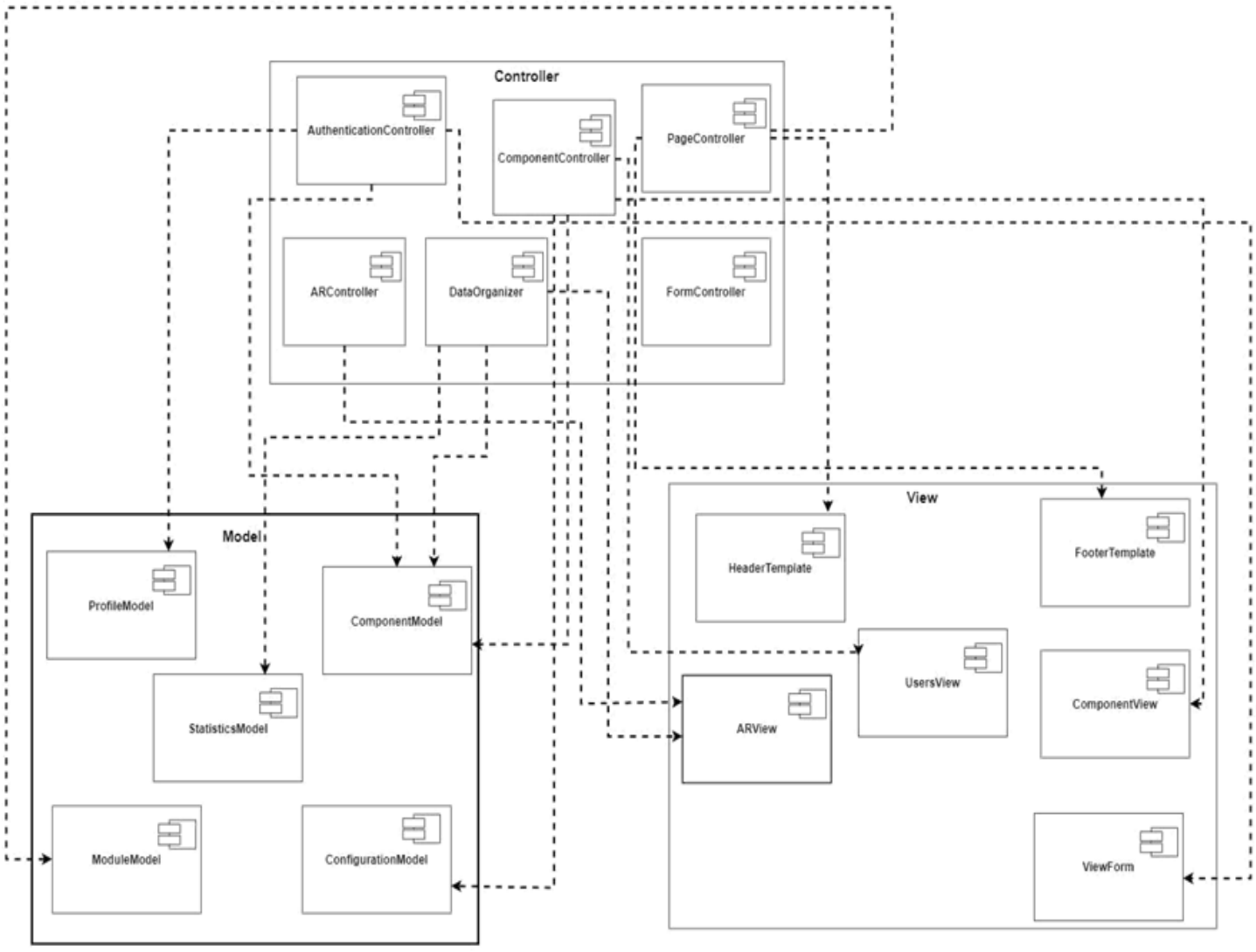


Product mapping



4.2.5) Component diagram

The following component diagram represents a group of graph of components connected by dependency relationship and dependencies are shown as arrows from the client components to the supplier component.



Component Description

Authentication controller

Description: This is a class responsible to authenticate a user

Role: it is responsible to check if the validity of a user trying to login to the system

Page controller

Description: This is a route class which will route to each pages as needed

Role: it is responsible to route each page requests in the system.

Data organizer

Description: the base component which is directly linked to the users of the system

Role: is responsible for tracking session and displaying the appropriate dash board and log activities of a user.

Component controller

Description: this is a class which extends the base controller class responsible to look for components.

Role: this class is responsible to control all the components in the system.

Form controller

Description: the base form controller class in which governs the form submission in the system and sends back to the view called view form.

Role: this class is responsible for controlling of form submission before further process

Profile model

Description: this is a class which is linked with the profile table in the database.

Role: responsible for the extraction of record from and to the table.

Component model

Description: this is a class which is linked with the database table in which used to determine the component to display to the user.

Role: responsible for the getting record from the database in order to display the appropriate component to the user.

Module model

Description: this is a class which is connected with the module table in the database and linked with the pages controller for further process.

Role: this class will be used to retrieve info from and to the module table and deliver to the pages controller class.

Configuration model

Description: it is a class which is used to connect he component controller and the database table for data exchange.

Role: is responsible to get access to the database table and return the data to the component controller for further process.

Header template

Description: this is the basic tinplating engine which is the Node.js layout

Role: this is used to customize the code so that it would be easier to debug

Navigation template

Description: this is the html file used to create the common navigation bar

Role: is used to create a common navigation bar

View form

Description: this is the form viewer class using blade template and connected to the form controller class

Role: is used to create the basic form views that will be displayed to the user

Usage statistics view

Description: this is the view class used to preview the statistical records to the user connected to data organizer class

Role: is used to the view to the user

User view

Description: this is the view class using the blade template engine connected to the component controller class

Role: used to create the user view to the user

Footer template

Description: the view class using the base template and connected to the footer controller class

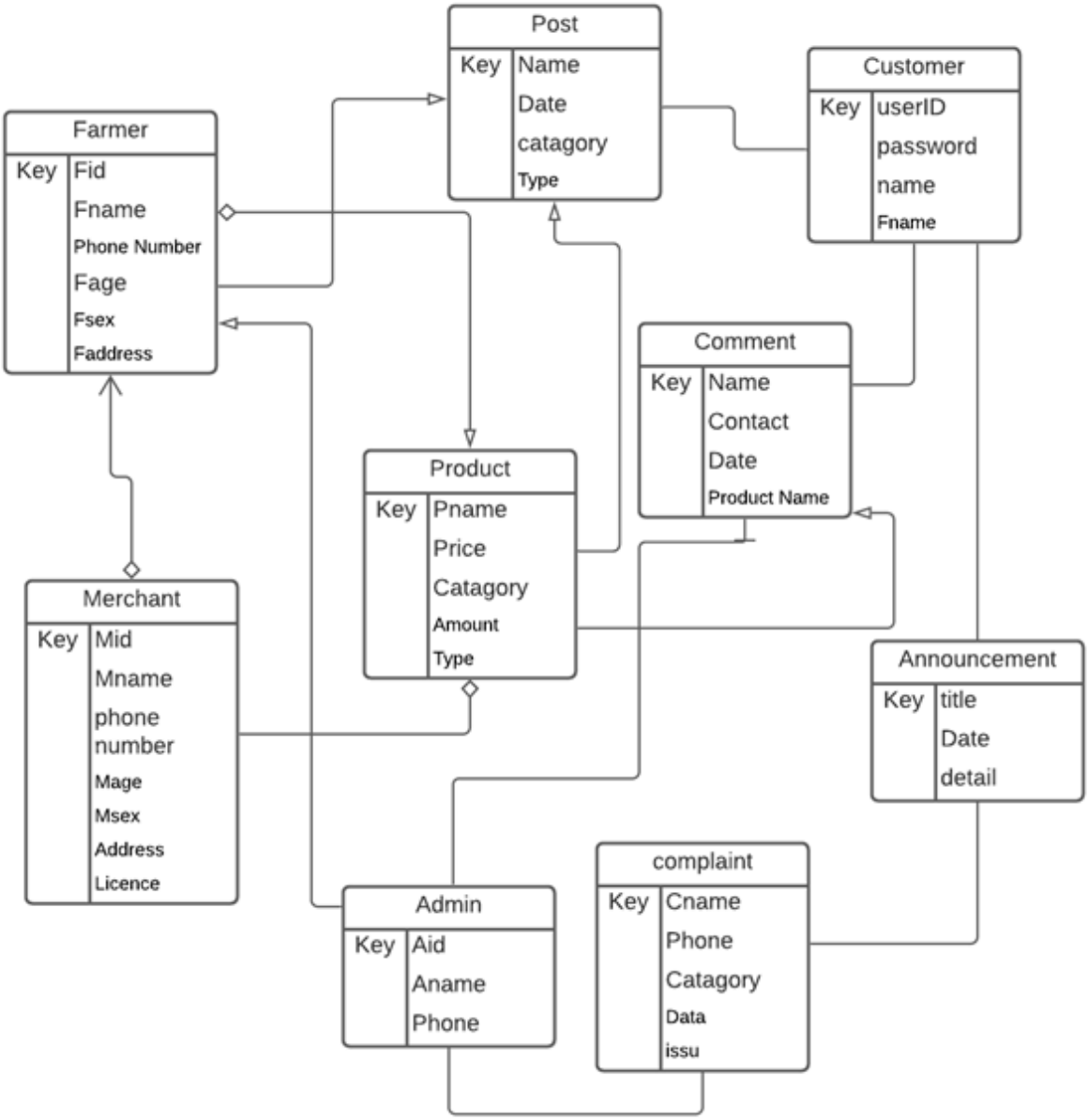
Role: is used to view the footer to the user

Component view

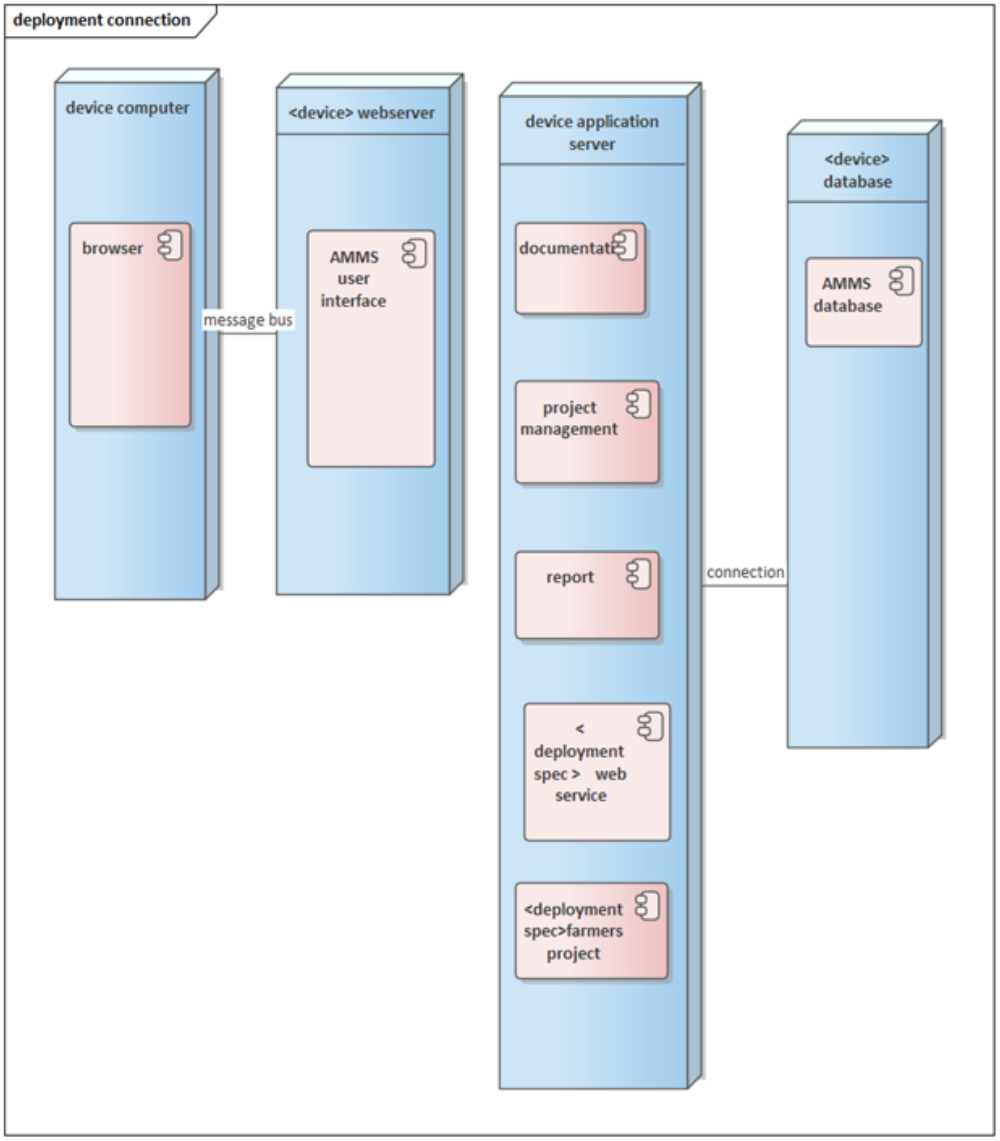
Description: the view class using the Node.js templating engine and connected to the component controller

Role: used to create the component view to the use

4.2.6 Database Design



4.2.6) Deployment diagram



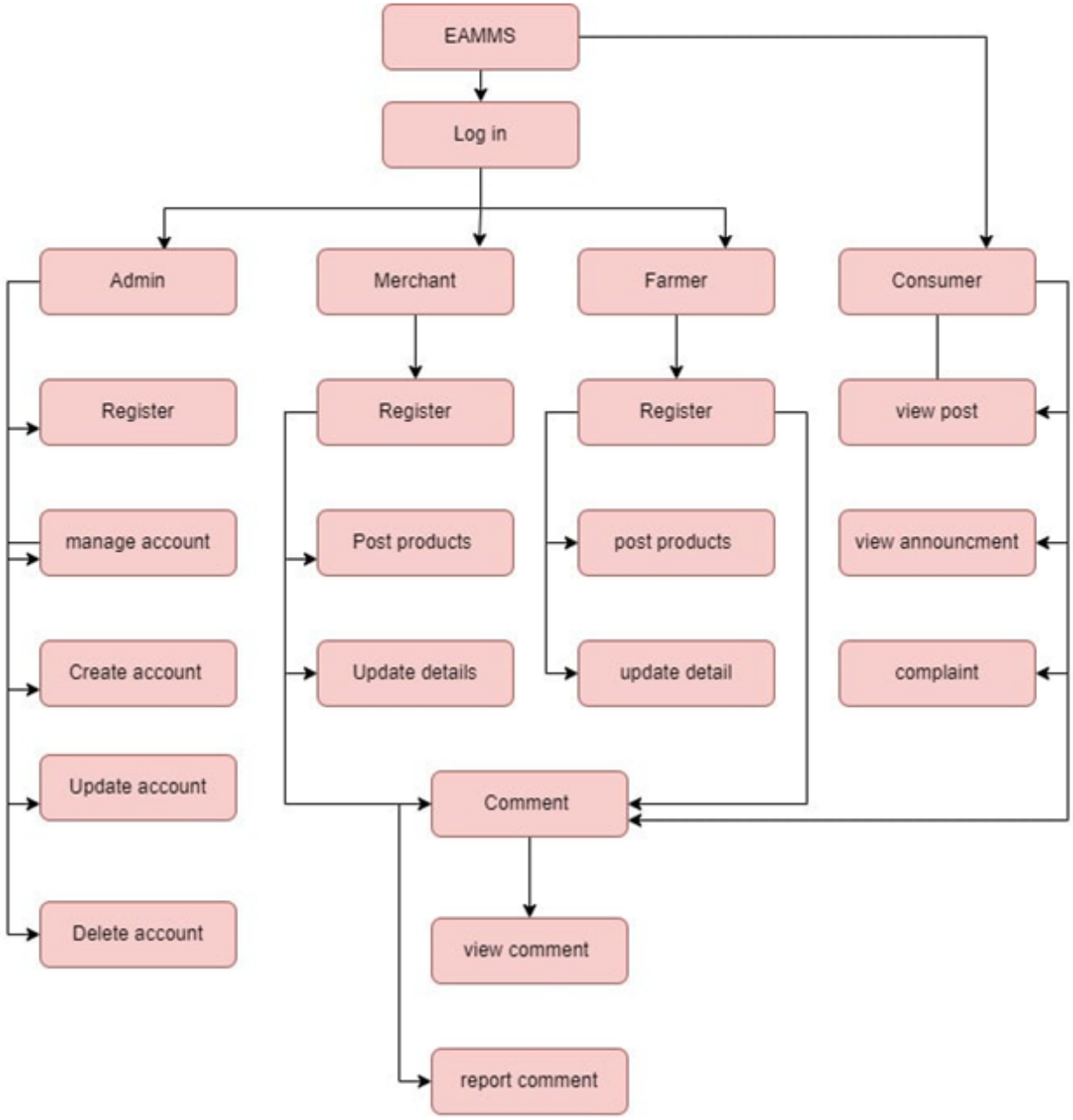
4.2.8) Access Control

The information which registered in the system we bulled have to be secure. In our system, different actors have access to different functionality and data. Therefore these privileges put off unauthorized users from accessing data's which they don't have privilege to access.The table below shows the global access table, describing the access relation between the actors, objects and operations in the system:

Actor	Account	Products	Posts	Comment	Complain	Announcement
Admin	Create account() Update account() Delete account()			View comment()	view complaint() Give feedback to complaint()	Make announcement()
Farmer	Create account() Update account() Delete account()	Post products() View products()	View post() Update post()	Give comment() View comment()	Report complaint()	View announcement()
Marchant	Create account() Update account() Delete account()	Post products() View products()	View post() Update post()	Give comment() View comment()	Report complaint()	View announcement()
Consumer		View products()	View post()	Give comment()	Report complaint()	

4.2.9 User interface design

Navigational paths



Chapter Five

Implementation

5.1 Overview

Implementation is the process of integrating the system functionality. Our project implements the functional and non-functional requirements of the system. Generally our implementation is the focus on whatever functions of the developed system.

5.2 Coding standard

In this section we have documented how we will write the code.

5.2.1 Indentation

In order to make our code easy to read, we will use a minimum of three spaces to indent by. And this standard will be used through out the project.

Examples:

```
//indentation used for loops
    for ( i = 0;  i< 3;    i++ ) {
print('hello world');
    }
//indentation used for functions
    void sayHello( String name ) {
print( 'Hello $name' );
    }
```

5.2.2 Comments

Comments will be used to make the code more clear. Both inline comments and block comments swill be used whenever necessary.

5.2.3 Classes

Classes should have only one job. We will avoid classes that are very big and that do multiple jobs.

5.2.4 Functions and Methods

Functions and method names will have verbs in them and are written using camel case coding standard.

Examples:

sayHello, printNumbers

5.2.5 Variable Names

Variable names should have meaningful names that could be understood by casual observers. Variables should be initialized prior to their use.

5.2.6 Use of braces

For braces we will use the Kernighan and Ritchie style. It is more readable and neat.

Examples:

```
for ( i = 0;  i< 3;    i++ ) {

    print(‘hello world’);

}
```

5.2.7 Line Length

It is considered good practice to use lines that has at most 80 characters. We will use this standard for this project.

5.2.8 Spacing

In a line, a space should appear before after every equal sign, parenthesis, comma, arithmetical operators and logical operators.

5.2.9 Error messages

Error messages should be meaningful so that users will understand what goes wrong and what to do next.

5.3 Development Tools

We will use different tools and technologies for client side and server side development based on their performance and efficiency to develop our system. Our project will be developed mainly using Javascript and Node.js framework with node package manager(npm) for installing and managing project modules.

The client side tools includ:

l React framework for rendering

l Bootstrap CSS framework for styling the user interface

l React Router for client side routing

l Webpack for bundling css and js files

l And also as an option we will use either Axios or AppoloGraphql for rest api data exchange.

For mobile app development tools include Android framework and Google ARCore for handling AR functionality.

For the server side, tools include :

l Express framework for routing and managing process and sessions,

l Sequelize for Object relational mapping and database management,

l Passport for authentication

l Mysql2 for connection and sessions of database.

For both client and server side development we will use nodemon for local server monitoring.

5.4 Prototype

Web browser: Setup installed at the client side:

Client side programming has mostly to do with the user interface, with which the user interacts. In web development it's the browser, in the user's machine, that runs the code, and it's mainly done in JavaScript, css, etc. This code must run in a variety of browsers.

Components

l Browsers

Setup installed at the server side:

Server side programming has to do with generating dynamic content. It runs on servers. Many of these servers are "headless". Most web pages are not static, they search a database in order to show the user updated personalized information. This sides interacts with the back end, like say, the database.

Components of server-side

l Node.Js

l MySQl

The client and the server will communicate with restful API.

5.5 Implementation Detail

Authentication Controller

It will be implemented in javascript using Node.js's Passport Middleware, which will Perform authentication and authorization when the user needs to register and login, and to check user's permission to access a certain page.Main features of passport middleware include persistent session and many authentication strategies which include facebook, google, twitter …… for users preference.

Content Controller

This controller is collection of many content controller classes which handle all content request routes to each page and send response by retrieving the necessary content from the database

Object Relational Mapper

This package of classes handles conversion of object attributes to database table elements for creation and alteration of database table.

Data Modeling

This class organizes retrieving, creating, updating and deleting of data using object method and mapping of retrieved database results to object class.

Profile Model

This class extends functionality of Data Modeling class which is connected to profile table in the database and used for manipulating records from and to the table.

Layout View

This package consists of header and footer layouts of the user interface which will be implemented using React framework so that it can be included by all the view class.

Error Controller

This class will be responsible for displaying appropriate and useful error messages for server side error and also client side errors like *page not found , invalid request andinternal errors.*

Augment controller

This class handles retrieving the 3d model to augment the model into users mobile by using the camera. This class will be implemented using java for android by using Google's ARCore platform.