Web based shopping assistant system for Singhe Super

By

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(IM/2016/033)

A report submitted in partial fulfillment of the requirements for the degree of Bachelor of Science in Management and Information Technology (B.Sc. MIT)

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2020

DECLARATION

I hereby certify that this project and the all the artifacts associated with it is my own work and it has not been submitted before nor is currently being submitted for any other degree program.

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ACKNOWLEDGEMENT

I express my sincere gratitude to my Project Supervisor, Dr. Chathura Rajapaksha for the continuous support and for being the pillar of strength in succeeding the completion of the Shopping assistant system for Singhe Super.

I thank my Project Coordinator Dr. Janaka Senanayake for the immense helping hand given throughout. I also would like to express thanks to Mr. Siriwardane for providing me with the required information and for the support.

I convey my heartiest gratitude to every individual who helped me in making this project a success.

ABSTRACT

At present with the development of technology and globalization nowadays people are familiar with new technology and technological devices. As a result, people tend to use technology to fulfill their needs and wants easily. Grocery shopping is a major need of the people. The chain of Singhe super supermarkets is the leading supermarket chain in Teldeniya town. Most of the people in Teldeniya satisfy their grocery needs from this chain of supermarkets. But still this supermarket is partially automated and partially manual. Only the billing system is automated and it's also a standalone application which can be used only by the cashier and the administrators within the supermarket. The rest of the processes are performed manually. The customers are not facilitated enough to fulfill their needs as the customers can't get an idea of the product availability without visiting the supermarket, and the customers have to be in queues in busy hours.

The shopping assistant system for Singhe Super supermarket is a simple web-based application which replaces the partially automated system existing in the supermarket while satisfying all the functional and non-functional requirements identified. This system facilitates the customers with online placing orders, online checking availability of products and allows the customers to give their feedback about the customer services and products. And facilitates the management in taking better decisions through effective report generation and forecasts.

The needed modifications are identified and how the goal of designing a better approach of system is discussed in this report.

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ABBREVIATIONS

SRS - Software Requirement Specification

BSO - Business System Option

ER diagram- Entity-Relationship diagram

CHAPTER 1 – INTRODUCTION

Outline of the chapter

This chapter outlines the introduction of the company, nature of the business, the current business process and issues. Furthermore, it analyses the objectives and aims of the proposed system, scope and boundaries and the organization of the dissertation.

1.1 Description about the Business Organization and the Business Area Chosen

1.2 Business Process

1.3 Problem Definition

1.4 Aims and Objectives

1.5 Scope with Clear Boundaries

1.6 Organization of the Project

1.1 Description about the Business Organization and the Business Area Chosen

Singhe Super is the leading supermarket chain at Teldeniya town which is established in 1985. As this is the leading supermarket chain in the town most of the people does their grocery shopping here. This supermarket chain consist of nearly 7-8 outlets.

1.2 Business Process

At present, these supermarkets have a computerized billing system. Normally customers get a shopping cart from the entrance and does their shopping by searching the products on their own or sometimes asks from a staff member. The staff member checks in the stores about the availability and the let the customer know. After filling their shopping cart, the customers come to the cashier and then they receive the bill and the customer can pay the bill by cash or debit/credit cards. And products are not sold for debt. Administrators can create basic reports such as daily and monthly sales reports through their existing system.

1.3 Problem Definition

As a part of their high-level strategic review, the management of Singhe Super has identified the following major business problems experienced in their present system.

- Customers find it difficult to find the racks where the preferred products are available.
- Some customers can't fulfil their needs because of lack of products.
- Customers who are busy doesn't have enough time for grocery shopping doesn't have a way to place orders online.
- Customers must stay in queue for billing during busy hours.

- Customers doesn’t have a proper way to get to know about the available offers and discounts
- The management doesn’t have a method to find which are the products that are searched by customers and are not available at their store.
- The management doesn’t have a proper method to get reports on sales which identifies,
    I. What are the products with highest sales?
    II. What are the products with lowest sales?
    III. What are the seasonal products?
    IV. What are the products to be added to the supermarket?
- Administrators can’t advertise new product arrivals.

1.4 Aims and Objectives

The main aims and objectives of the proposed system are to minimize the above-mentioned issues, through automation. This will improve efficiency and productivity in the business process. An online platform will be created through a web-based application, which allows the customers and management to view and place the orders, accurate reports will be generated. Apart from that it is aimed to provide significant support for decision making through the system. Decision making is supported by algorithmic calculations, where the decision would be more reliable and accurate. Decisions such as what are the products to be added. And, this system facilitates the customers to place orders online.

. **Users of the Proposed System –** Customers and administration

1.5 Scope with Clear Boundaries

The system facilitates the customer to search products, place orders online, do online payments, add feedback and to view offers and discounts through the website. And facilitates the management to generate sales reports, profit and loss reports, suggests the management to add products which will have higher sales, notify the customers through emails, advertise new product arrivals and manage the inventory.

1.6 Organization of the Project

This thesis covers the system analysis and design segments of the proposed system for the Singhe super supermarket and the development, implementation, testing and evaluation areas will be elaborated on later.

Chapter 1

Explains the essence of the proposed system's market, current business operation, challenges and objectives. The ranges and limits are clearly defined

Chapter2

Presents a straightforward overview of the existing system and an analysis of the system re quirements. It also analyzes the options available for the business system (BSOs) and this chapter determines the best way to proceed.

Chapter 3

This is a summary of the project's continuation after the review and specification of the specifications. This will provide a better understanding of the behavior of the system and the diagrams used. The functionality, entities and their relationships will be explained in one diagram to another. At the end of the chapter, the tables used in the system will be displayed in the database design.

Chapter 4

This chapter concludes the Degree of the objectives met, Usability, accessibility, reliability and friendliness of the system. User’s response, limitations and drawbacks, Future modifications, improvements and extensions possible in this system.

CHAPTER 2 – SYSTEM ANALYSIS

Outline of the system

This chapter describes the existing system data, using Object Oriented Systems Analysis and Design where the Use Case Diagram and an activity diagram is shown. Business System Options (BSOs) are developed as a result of the study. After further analysis and justification, the best BSO will be selected.

2.1 Overall Use Case Diagram for the Existing System

2.2 Activity Diagram for the current system

2.3 Software Requirement Specification (SRS)

2.4 Complete Business System Options (BSOs

2.5 Evaluation of BSOs

2.6 Summary

2.1 Overall Use Case Diagram for the Existing System

The functionalities of the existing processes are partially performed manually and partially automated. so, an exact definition for the manual process cannot be clearly identified because it is accessible to all users who engage in the process at different levels. Consequently, the method accuracy is very weak. The use case diagram below illustrates the overall reach of the existing process.

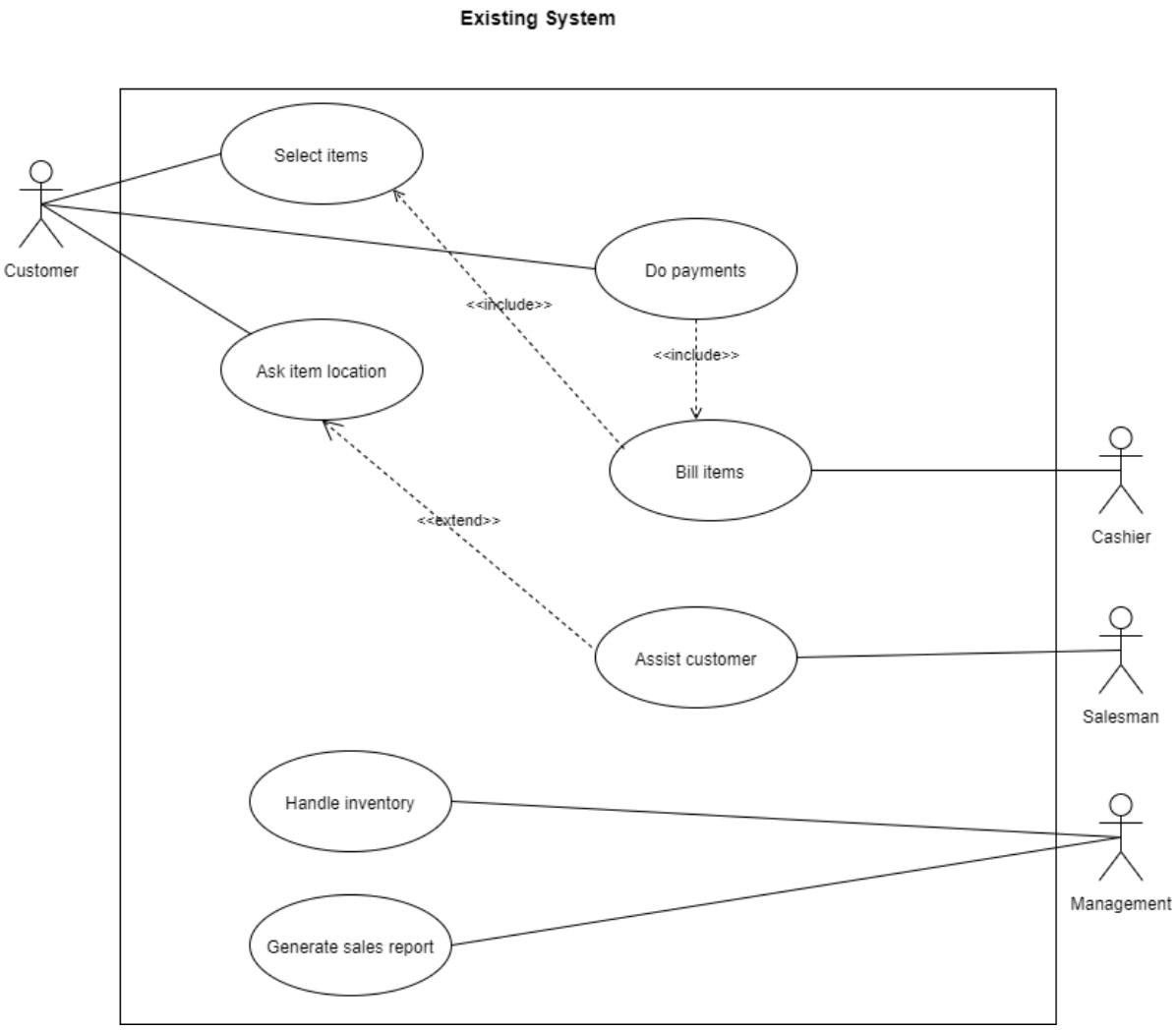

Figure 1 overall use case diagram for existing system

2.2 Activity Diagram of the Current System

This diagram shows the graphical representation of workflows of stepwise activities and actions in the existing system of Singhe Super.

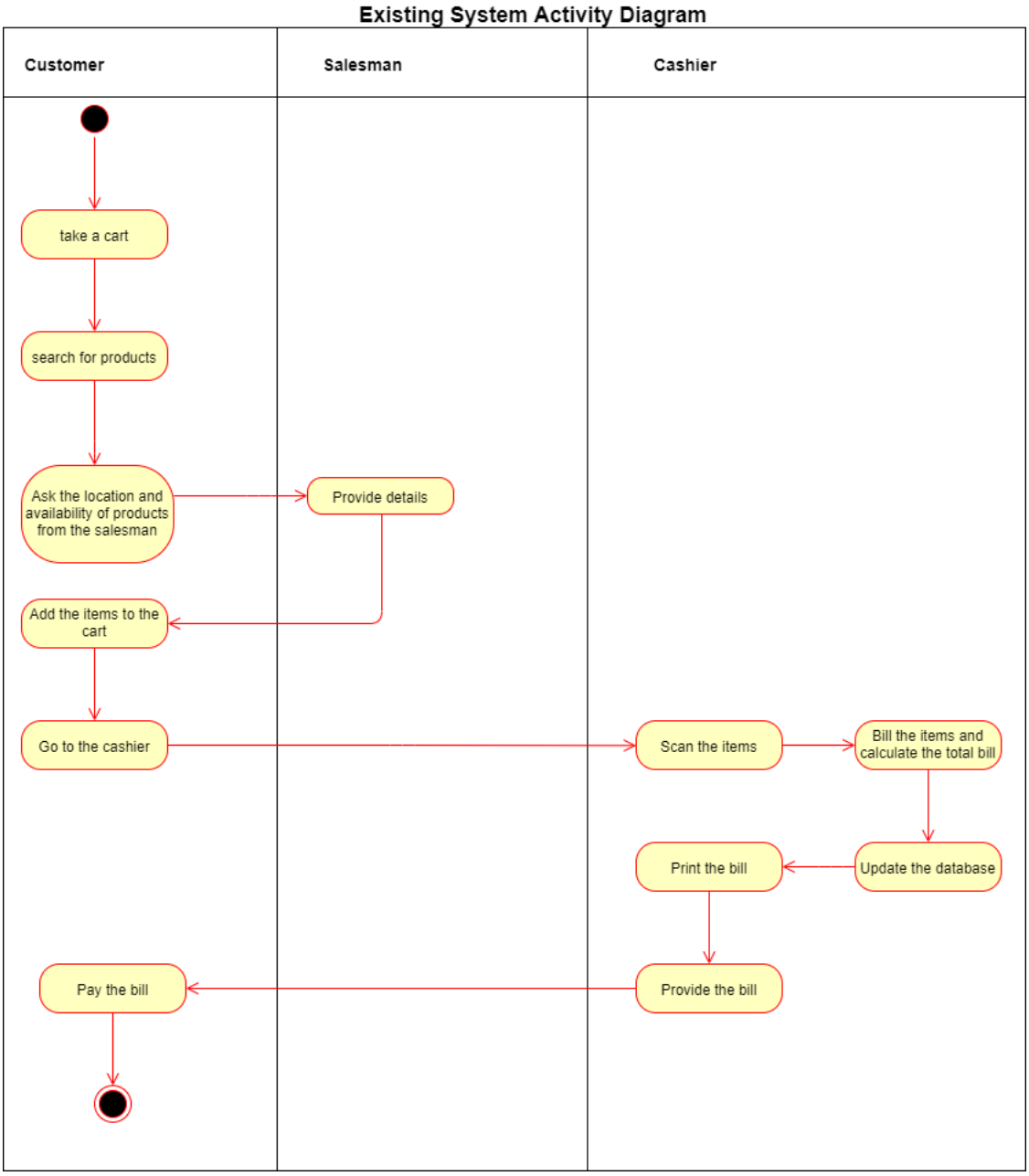

Figure 2 Activity Diagram of the Current System

2.3 System Requirement Specification (SRS)

A. Functional Requirements

Functional specifications define what the program should be able to do to achieve its main aim. Such specifications define mainly the tasks or functions that the program can should be able to perform once implemented

Table 1 Table of Functional Requirements

Requirement		Priority H/M/L	M/O	Weight H/M/L
1. Shall be able to Register to the System		H	M	H
	1.1 Shall be able to facilitate customer registration	H	M	H
	1.2 Shall be able to facilitate staff registration	H	M	H
2. Shall be able to facilitate searching		H	M	H
	2.1 shall be able to search the availability of products	H	M	H
	2.2 shall be able to search the locations of products (rack no)	H	M	H
3.Shall be able to facilitate customers to add feedback		H	M	H
	3.1 Add feedback about products	H	M	H
	3.2 Add feedback about staff	H	M	H
4.Shall be able to facilitate customers to view discounts and offers		H	M	H
5.Shall be able to facilitate customers to place orders online		M	M	M
	5.1 Shall be able to maintain online cart	M	M	M
	5.2 Shall be able to add items to the cart	M	M	M
	5.3 Shall be able to remove items from cart	M	M	M

	5.4 Shall be able to view the bill of the cart	M	M	M
	5.5 shall be able to update the inventory	M	M	M
6. Shall be able to facilitate online payments		M	M	M
7. Shall be able to facilitate the management to identify different products to be added		M	M	M
	7.1 shall be able to identify seasonal products	M	M	M
	7.2 shall be able to identify the products to be added newly	M	M	M
8. should be able to suggest bundles for supplementary goods		M	O	M
9. Shall be able to facilitate the management to notify the customers via emails (when unavailable products searched by the customers are available at the store)		M	M	M
10. shall be able to facilitate the management to advertise		M	M	M
	10.1 Advertise new product arrivals	M	M	M
	10.2 Advertise existing offers	M	M	M
11. Shall be able to generate reports		H	M	H
	11.1 generate sales reports	H	M	H
	11.2 generate reports on profit and losses	H	M	H

B. Non Functional Requirements

Non-functional specifications define the system's behavior other than its key functionalities. Non-functional specifications detail the system's usability, reliability, efficiency, maintenance, and other related aspects. Such specifications may not be directly related to the key functionality but are extremely important for the system to function properly

Table 2 Table of non-functional Requirements

Requirements	**Priority H/M/L**	**M/O**	**Weight H/M/L**
1.Shall be able to provide web interface	H	M	H
2.Shall be able to have user friendly GUI	H	M	H
3.Shall be able to facilitate concurrent access	M	M	M
4.Should be able to provide data security using encryption password	M	O	M
5.Shall be working on any browser platform	H	M	H
6.shall be able to run using existing resources	H	M	H

2.4 Complete Business System Options (BSOs)

Business System Options

Business System Options (BSO) defines the scope of the current implementation and should satisfy the stake holder's requirements. Selection of the BSO based on multiple parameters. They are organizational priorities, budget provided by the company, time and known technical constraints to implement the system and benefits and impact on the organization**.**

2.4.1 BSO 1: Web application which runs on cloud-based server

Description

The system is implemented using open source software, cloud-based web platform. All the functionalities in the system can be accessed anytime from anywhere. The system will be always online.

Benefits

• Can be access from anywhere in the world through the internet.

• Platform independent

• High performance

Issues

• Internet Connection is needed to access System

• High cost for monthly rental of external server

Description	Cost(LKR)
Development cost	00
Domain name	2500
For the hosting	10000
Total cost	12500

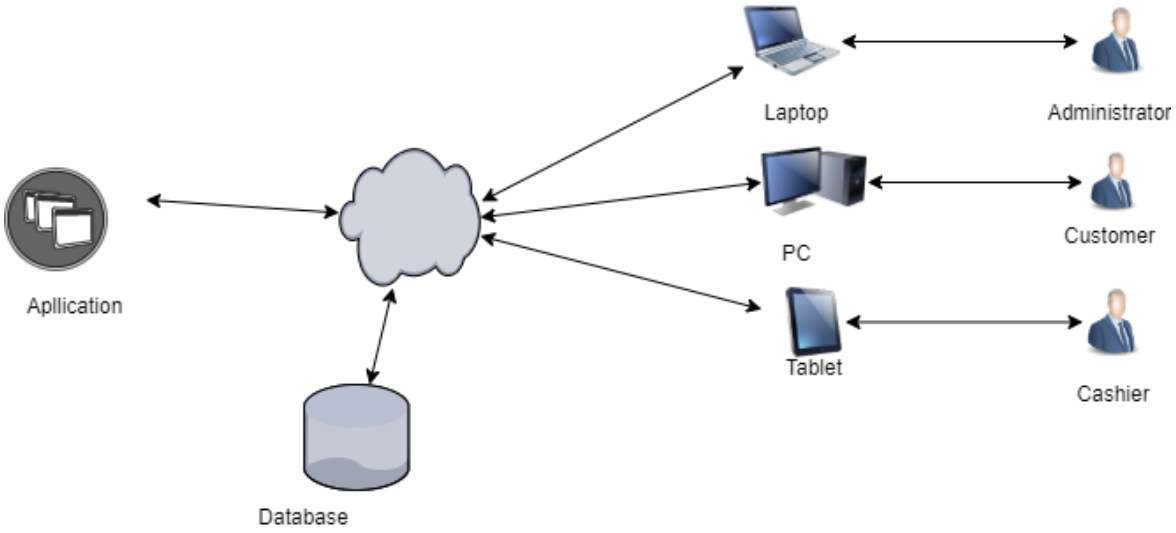

Figure 3 Architecture Diagram for BSO1

2.4.2 BSO 2: Mobile Application

Description

Same features in BSO 1 plus mobile browsing features through a mobile application. (Android, IOS or Windows). In this case customers can access the system through the web site and the mobile application through a hand-held device.

Benefits

• Ease of use

• Give more attractive user interface for uses.

Issues

• Incompatibility

• Difficult in upgrading

• Need to develop at least in 2 OS Apple and Android

• Some customers don't have smart phones

• High maintain cost compare to other options

Description	Cost(LKR)
Development cost	00
For the hosting	22500
Total cost	22500

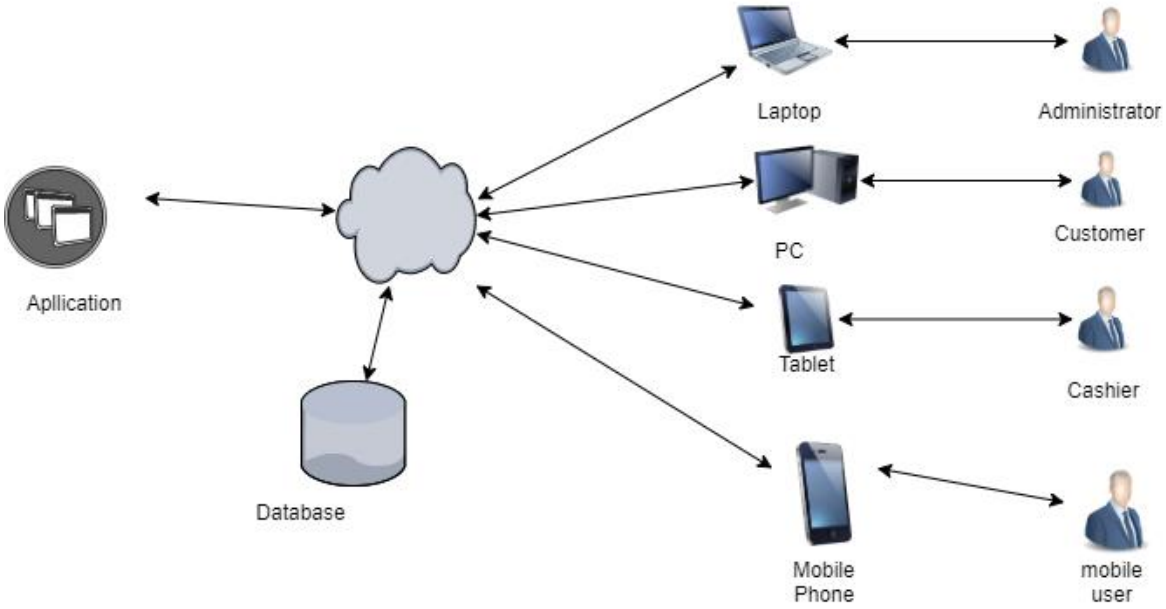

Figure 4 Architecture Diagram for BSO2

2.4.3 BSO3- Mobile app and a kiosk

Description

Same features in both of above BSOs plus ability to access using the kiosk. In this case customers can access the system through the kiosk when the customer is in the supermarket.

Benefits

• Ease of use

• Give more attractive user interface for uses.

Issues

• Incompatibility

• Difficult in upgrading

• customers should visit the supermarket to access the device.

Description	Cost(LKR)
Development cost	00
Device cost(per kiosk)	100000
Router	3000
Total cost	103000

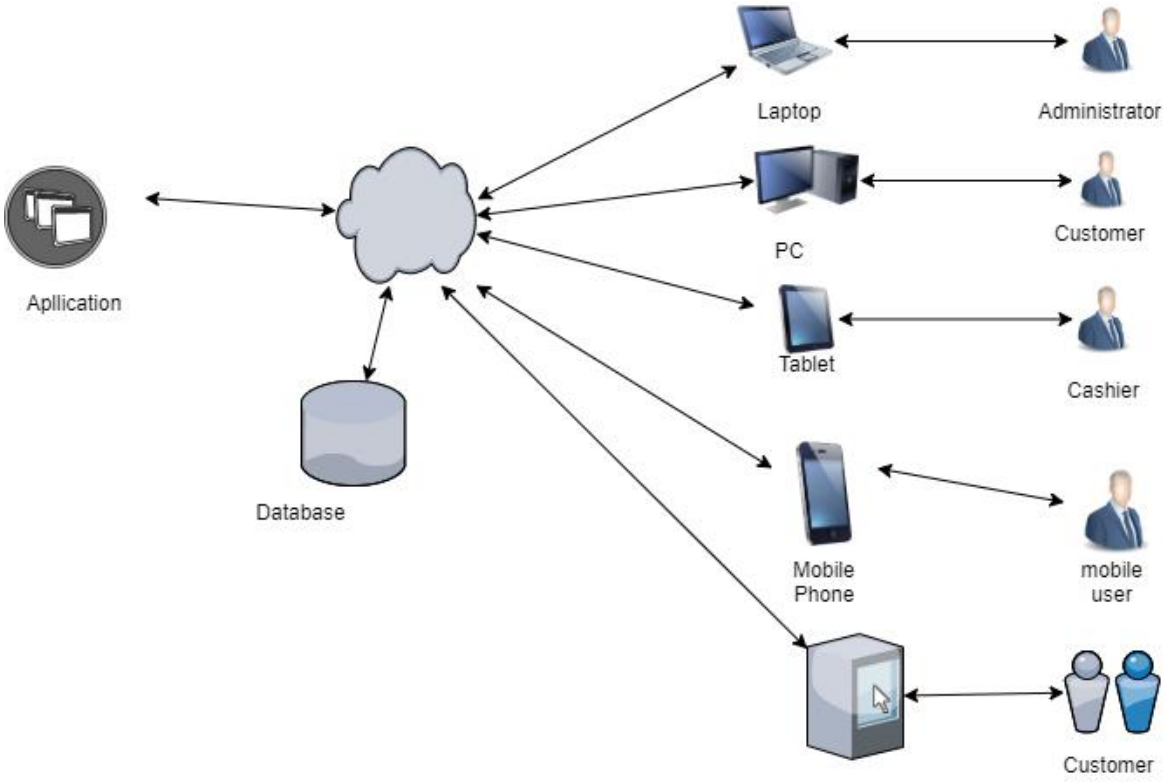

Figure 5 Architecture Diagram for BSO3

2.5 Evaluation of BSOs

2.5.1 Functional Requirements Vs BSO

Table 3 functional requirements vs BSO's

Requirement and description		BSO1	BSO2	BSO3
1. Shall be able to Register to the System		X	X	X
	1.1 Shall be able to facilitate customer registration	X	X	X
	1.2 Shall be able to facilitate staff registration	X	X	X
2. Shall be able to facilitate searching		X	X	X
	2.1 shall be able to search the availability of products	X	X	X
	2.2 shall be able to search the locations of products(rack no)	X	X	X
3.Shall be able to facilitate customers to add feedback		X	X	X
	3.1 Add feedback about products	X	X	X
	3.2 Add feedback about staff	X	X	X
4.Shall be able to facilitate customers to view discounts and offers		X	X	X
5.Shall be able to facilitate customers to place orders online		X	X	X
	5.1 Shall be able to maintain online cart	X	X	X
	5.2 Shall be able to add items to the cart	X	X	X
	5.3 Shall be able to remove items from cart	X	X	X

	5.4 Shall be able to view the bill of the cart	X	X	X
	5.5 shall be able to update the inventory	X	X	X
6. Shall be able to facilitate online payments		X	X	X
7. Shall be able to facilitate the management to identify different products to be added		X	X	X
	7.1 shall be able to identify seasonal products	X	X	X
	7.2 shall be able to identify the products to be added newly	X	X	X
8. should be able to suggest bundles for supplementary goods			X	
9. Shall be able to facilitate the management to notify the customers via emails (when unavailable products searched by the customers are available at the store)		X	X	X
10. shall be able to facilitate the management to advertise		X	X	X
	10.1 Advertise new product arrivals	X	X	X
	10.2 Advertise existing offers	X	X	X
11. Shall be able to generate reports		X	X	X
	11.1 generate sales reports	X	X	X
	11.2 generate reports on profit and losses	X	X	X

2.5.2 Non Functional Requirements Vs BSO

Table 4- non-functional requirements vs BSO's

Requirement and description	BSO1	BSO2	BSO3
1. Shall be able to provide web interface	X	X	X
2. Shall be able to have an user friendly interface	X	X	X
3. Shall be able to facilitate concurrent access	X	X	X
4. Should be able to have secured access to user accounts			X
5. Shall be working on any browser platform	X	X	X
6.shall be able to run in a low cost hardware system	X	X	X

2.5.3 Selected BSO with a sound justification

The selected BSO is the BSO1- Web application which runs on cloud-based server. This BSO is selected after comparing with BSO2 and BSO3 because in this BSO it is easy for the customer as well as the management to use. In BSO2 the user must install the mobile application in his/her mobile to use it(it doesn't seems very useful for a customer to install an application) and in BSO3 the user must visit the supermarket to use the kiosk and it isn't much effective. But anyone can access the website from anywhere if he/she has a device that allows web browsing and a sufficient internet connection. And also when comparing with BSO2 and BSO3 they are highly expensive and less efficient.

2.6 Summary

This chapter examined the process's existing features and laid out the functional and non-functional criteria. Based on the BSOs, the best option was chosen to build a web applicat ion that runs on cloud-based server for Singhe Super

CHAPTER 3 – SYSTEM DESIGN

Outline of the chapter

This chapter demonstrates the design of the system being proposed. By using case diagrams, operation diagrams and sequence diagrams, it explains the proposed system and its implementation in more detail. The Database Architecture and the Graphical User Interfaces are further developed.

3.1 Use Case Diagrams for the Proposed System

A use case diagram at its simplest is a description of a user's interaction with the program that displays the user's relationship with the different use cases in which the user is involved. Use case provides a structured look at the functionality of the system. They are used to gather a system's requirements including internal and external influence. Most of those specifications are specification criteria. Use cases are planned, and actors are identified when a program is examined to collect its functionalities.

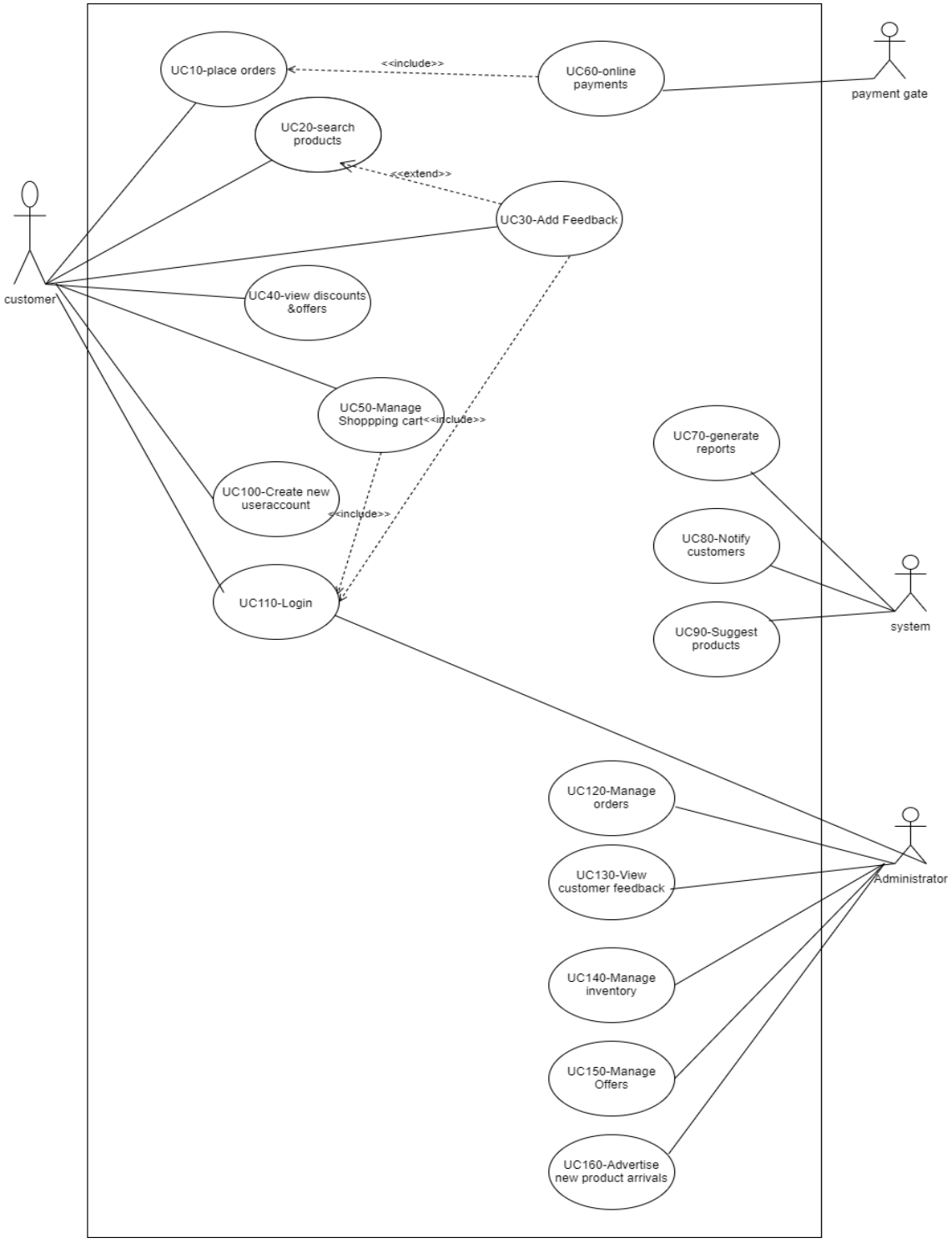

Figure 6 overall use case diagram for the proposed system

3.1.1 Use Case Diagram for the generating reports

This diagram shows how the administrators will generate reports using this system and view reports.

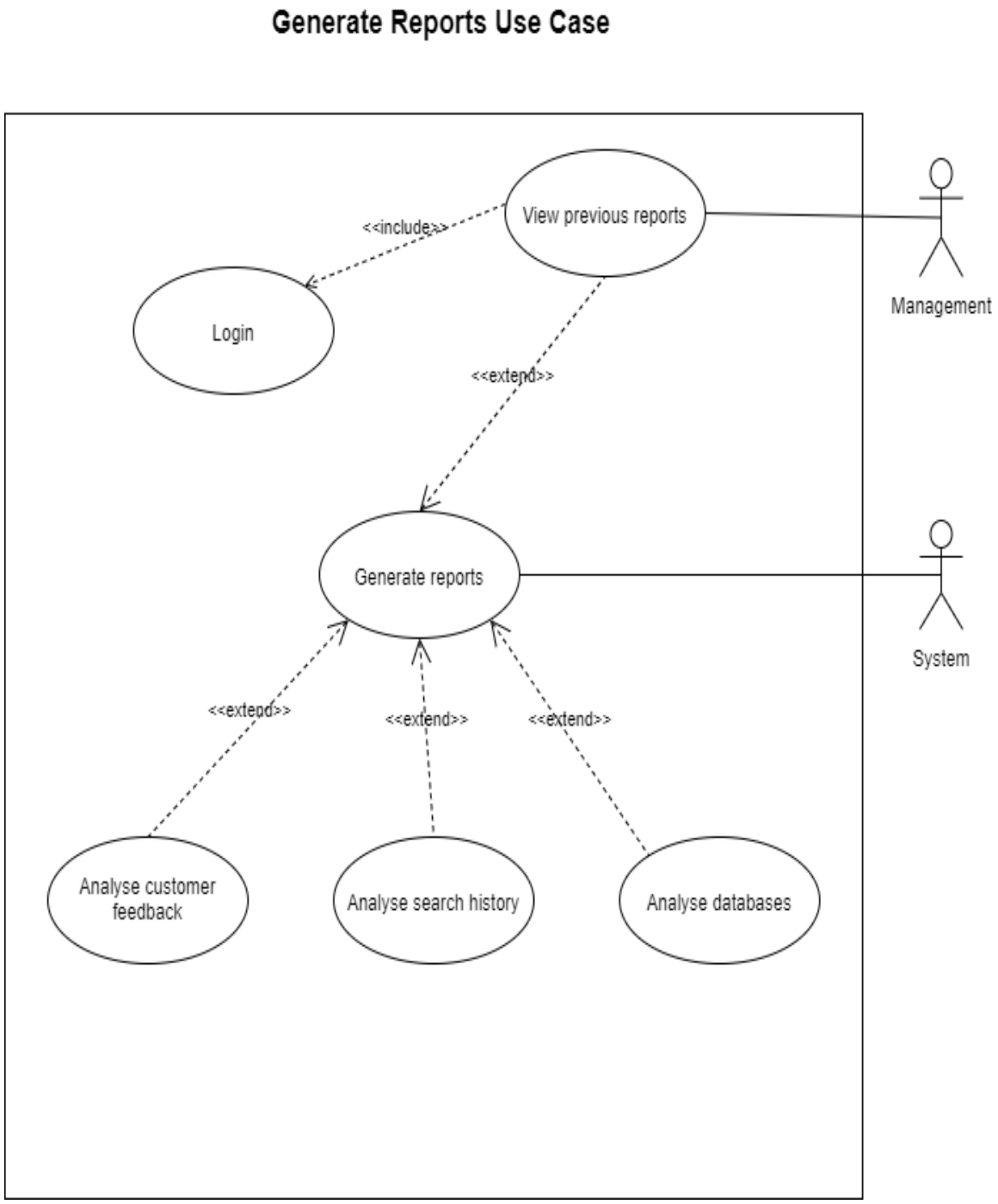

Figure 7-use case diagram for generating reports

3.1.2 Use Case Diagram for the search and buy products

This diagram shows how the users are searching and placing orders online after logging onto the system.

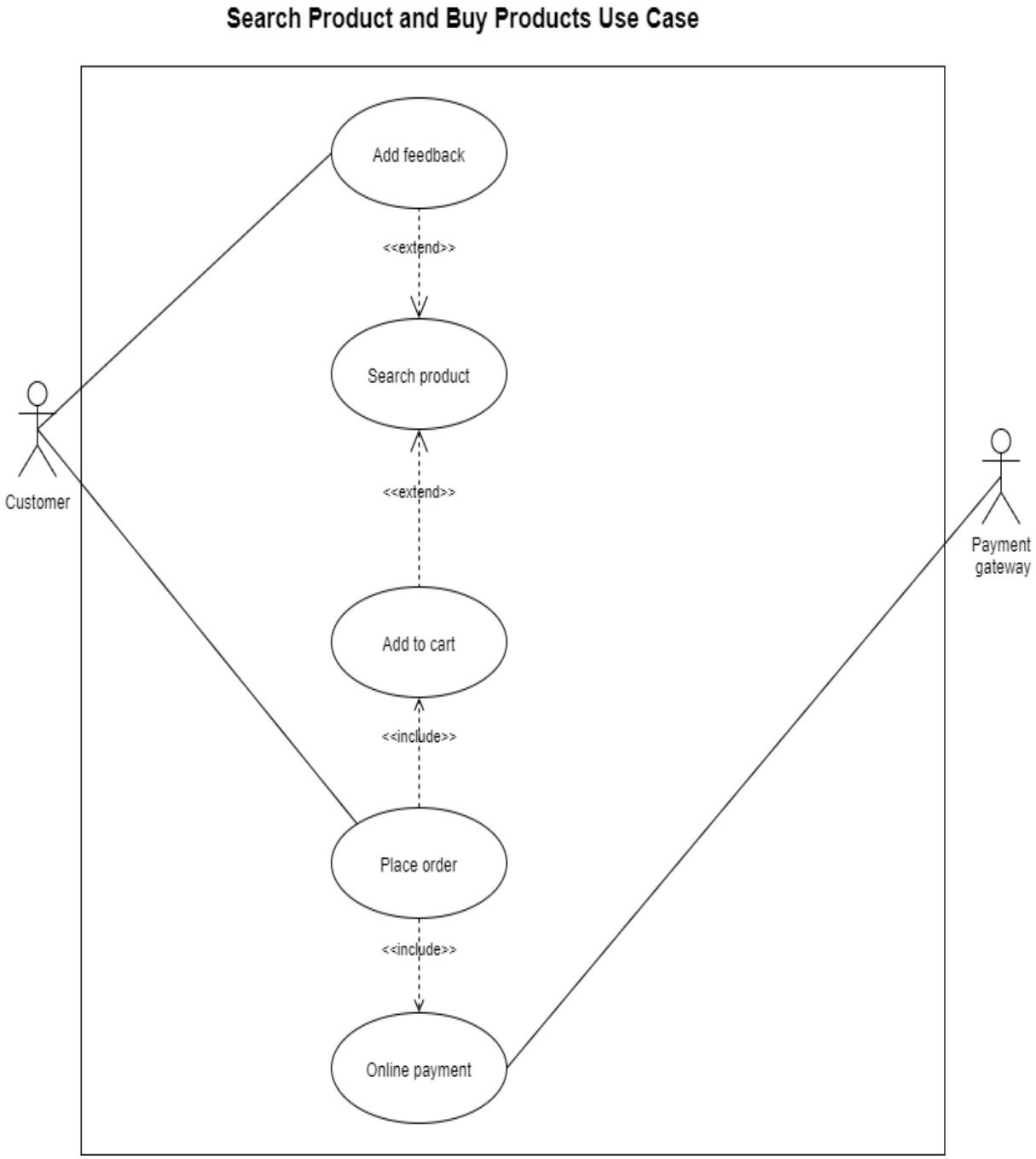

Figure 8-use case description for search and buy products

3.1.3 Use Case Diagram for maintain cart

This diagram shows how the users interact with the shopping cart .

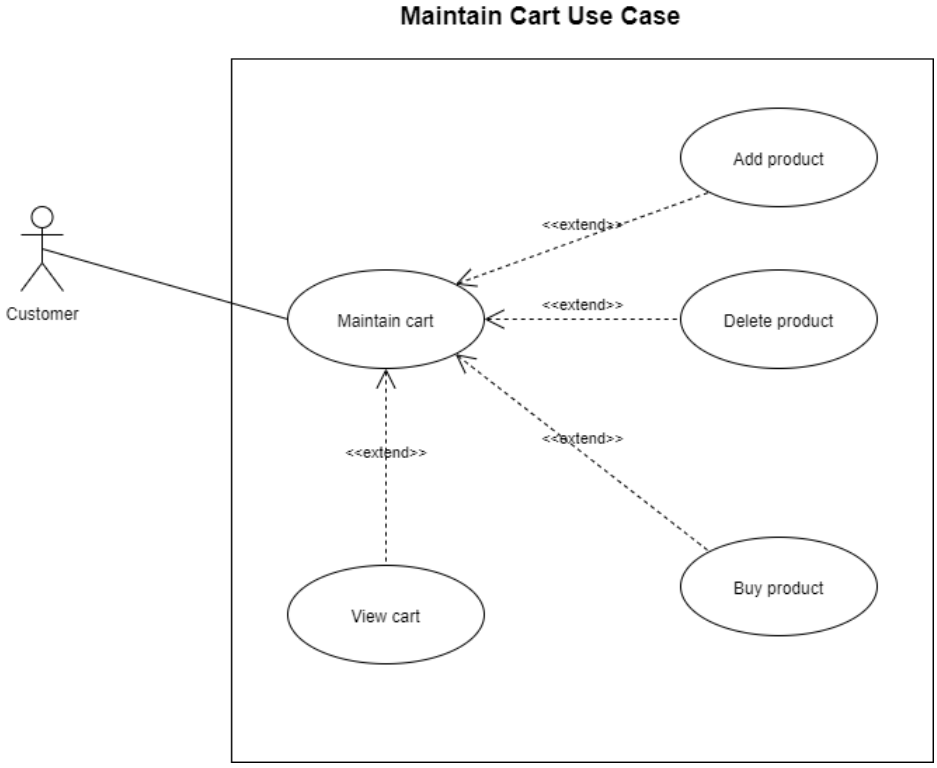

Figure 9-use case diagram for maintain cart

3.1.4 Use Case Diagram for sign in and log in

This diagram shows the use cases related to login and sign in

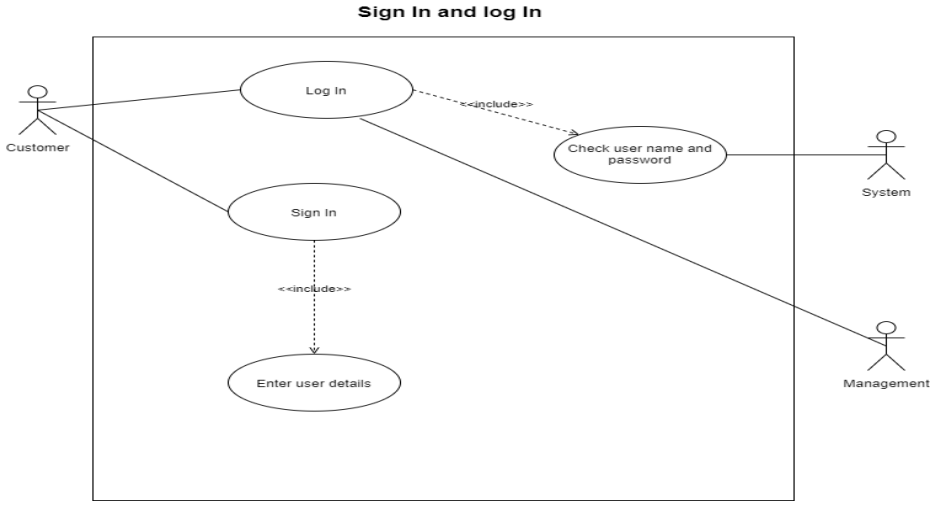

Figure 10-Use Case Diagram for sign in and log in

3.2 Use Case Descriptions for the Proposed System

3.2.1 Use case description for user login

Table 5 Use case description for user login

Use Case ID	UC110
Use Case Name	User Login
Actors	Customer, Administrator
Description	This use case describes the process of logging in to the system
Normal Flow of Events	User request to log in Enters username and password Validate login details [if valid] 3.1 Login [if invalid] 3.2 Don't allow login
Alternate flows/ Exceptions	If in the normal flow of events, the actor enters an invalid username and/or password, the system displays an error message. The actor can choose to either return to the beginning of the normal flow or cancel the login, at which the user case ends
Pre-Condition	User should have created an account in the system
Post-Condition	Successfully Logged in to the system and access the allowed level of access

3.2.2 Use case description for customer Sign in

Table 6 Use case description for customer sign in

Use Case ID	UC 100
Use Case Name	Customer sign in
Actors	Customer
Description	This use case describes the process of signing in to the system
Normal Flow of Events	1.User request to sign in 2.Enters username, password, NIC, email 3.Click on create account button
Alternate flows/ Exceptions	If the user is already registered user will be notified
Pre-Condition	User should visit the web site
Post-Condition	Create user account and data saved in the database

3.2.3 Use case description for search products

Table 7-Use case description for search products

Use Case ID	UC20
Use Case Name	Search products
Actors	customer
Description	This use case describes the process of searching products
Normal Flow of Events	1.Type the product name and search product 2. click search products button
Pre-Condition	User should visit the website
Post-Condition	Displays the rack no if available. If unavailable displays the product is unavailable.

3.2.4 Use case description for customer feedback

Table 8-Use case description for customer feedback

Use Case ID	UC30
Use Case Name	Add feedback
Actors	Customer
Description	This use case describes the process of adding feedback about products, hospitality, and supermarket.
Normal Flow of Events	1. click add feedback 2. type your feedback 3. submit feedback
Pre-Condition	Customer must be logged into the system
Post-Condition	Feedback is added to the database.

3.2.5 Use case description for managing shopping cart

Table 9-Use case description for managing shopping cart

Use Case ID	UC50
Use Case Name	Manage shopping cart
Actors	Customer
Description	This use case describes the process of managing the shopping cart(adding items, deleting items and viewing items)
Normal Flow of Events	1. Add items to the shopping cart 2. Go to the shopping cart 3. View the items 4. Delete unwanted items 5. Buy the items in the cart

Alternate flows/ Exceptions	Previously added items may be unavailable
Pre-Condition	Customer should search the products
Post-Condition	Order is ready for payment

3.2.6 Use case description for online payment

Table 10-Use case description for online payment

Use Case ID	UC60
Use Case Name	Online payment
Actors	Payment gateway
Description	This use case describes the process of how a customer pays for his/her order
Normal Flow of Events	1. When the customer buys the items the system asks for card details 2. The user enters the credit card details 3. System will check whether the card is capable of the payment 4. Accept the payment
Alternate flows/ Exceptions	If the card entered is unable to perform the transaction an error message will be displayed
Pre-Condition	Customer should buy the products in the cart
Post-Condition	Order is confirmed and the database is updated and the customer can collect the order from the outlet.

3.2.7 Use case description for manage orders

Table 11-Use case description for manage orders

Use Case ID	UC120
Use Case Name	Manage orders
Actors	Administrator
Description	This use case describes the process of managing the orders
Normal Flow of Events	1. View the orders made by the customers 2. Prepare the order
Alternate flows/ Exceptions	Previously added items may be unavailable
Pre-Condition	Customers should place orders Administrator should log into the system
Post-Condition	Order is prepared and the database is updated

3.2.8 Use case description for View customer feedback

Table 12-- Use case description for View customer feedback

Use Case ID	UC130
Use Case Name	View customer feedback
Actors	Administrator
Description	This use case describes the process of managing the customer feedback
Normal Flow of Events	1. Click manage customer feedback 2. View customer feedback
Pre-Condition	Customer should add feedback

	Administrator should be logged into the system
Post-Condition	Taking necessary actions to make changes in the process of the supermarket to give a more effective and efficient service to the customers

3.2.9 Use case description for manage offers

Table 13-- Use case description for manage offers

Use Case ID	UC150
Use Case Name	Manage offers
Actors	Administrator
Description	This use case describes the process of managing the offers and discounts
Normal Flow of Events	1. Go to manage offers 2. Add new offers 3. Delete outdated offers
Pre-Condition	Should login as an administrator
Post-Condition	Customers can view existing offers.

3.2.10 Use case description for advertise new product arrivals

Table 14-Use case description for advertise new product arrivals

Use Case ID	UC160
Use Case Name	Advertise new product arrivals
Actors	Administrator
Description	This use case describes the process of advertising new product arrivals

Normal Flow of Events	1. Receive new products from sellers 2. Add details about new products 3. Update the database 4. Publish the details of new product arrivals as advertisements in the website
Alternate flows/ Exceptions	There maybe inaccurate details
Pre-Condition	Should be logged in as an administrator
Post-Condition	Advertisements are displayed in the website

3.2.11 Use case description for manage inventory

Table 15-Use case description for manage inventory

Use Case ID	UC140
Use Case Name	Manage inventory
Actors	Administrator
Description	This use case describes the process of managing the inventory
Normal Flow of Events	1. Go to manage inventory 2. Add product details to the inventory 3. Remove products (the product is expired before selling)
Pre-Condition	Should sign in as an administrator
Post-Condition	Inventory is updated

3.2.12 Use case description for notify customers

Table 16- Use case description for notify customers

Use Case ID	UC80
Use Case Name	Notify customers
Actors	System
Description	This use case describes the process of notifying customers
Normal Flow of Events	1. New products are added to the inventory 2. System checks the status(available or unavailable) of the product search history of customers 3. Identify the searched unavailable products which are now available 4. Find the customer who searched the product 5. Find the email address of the customer. 6. Send and email to the customer saying that “the product you searched previously is now available”.
Alternate flows/ Exceptions	Email address may be incorrect Error message will be displayed
Pre-Condition	Customer’s email address must be in the database
Post-Condition	Customers are notified (when a product searched by them were unavailable at that moment and now added to the shop) via an email

3.2.13 Use case description for suggest products

Table 17-Use case description for suggest products

Use Case ID	UC90
Use Case Name	Suggest products
Actors	System
Description	This use case describes the process of preparing suggestions about the products to be added to the store
Normal Flow of Events	1. View customer search history 2. filter products searched by the customers which were unavailable 3. analyze the unavailable products with higher searching times. 4. Suggest the administrator to add those products
Pre-Condition	Search history should be recorded
Post-Condition	Administrator can get an idea about the products which are better to be added to the shop

3.3 Activity Diagrams for the Proposed System

An activity diagram visually presents a series of actions in a system.

3.3.1Activity diagram for log in

The user login activity diagram illustrates the flow of actions by the relevant actor for user login activity-the users and the system in an elaborate way. To log in to the system, the user must enter his username and password and, if the user is not authorized, the system will display an error message.

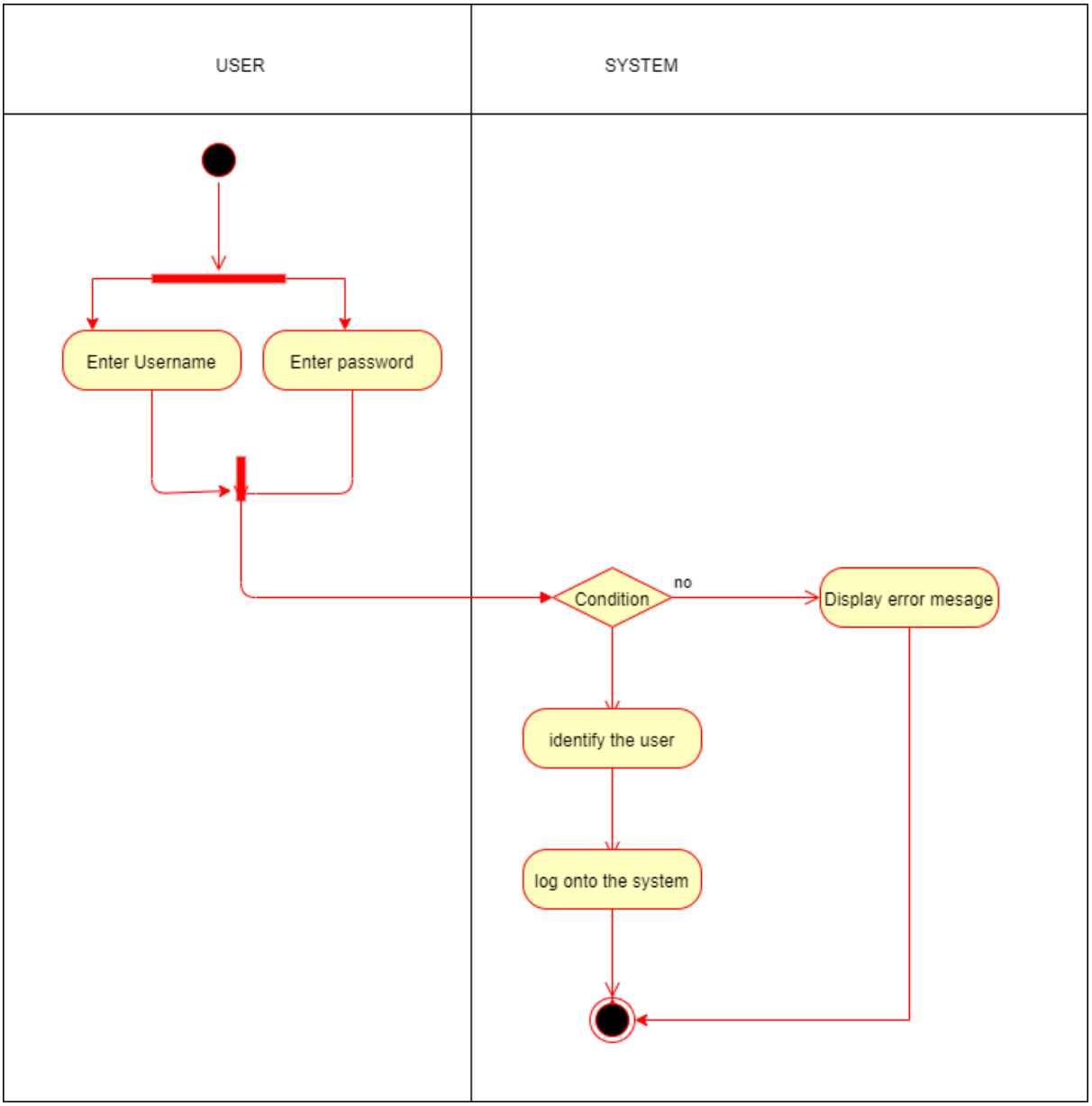

Figure 11 - Activity Diagram for Login

3.3.2 Activity diagram for create user account

The create user account activity diagram illustrates the flow of actions by the relevant actor for create user account activity-the users and the system in an elaborate way. To create an user account, the user must enter the required details, then the system will save the details and create an user account.

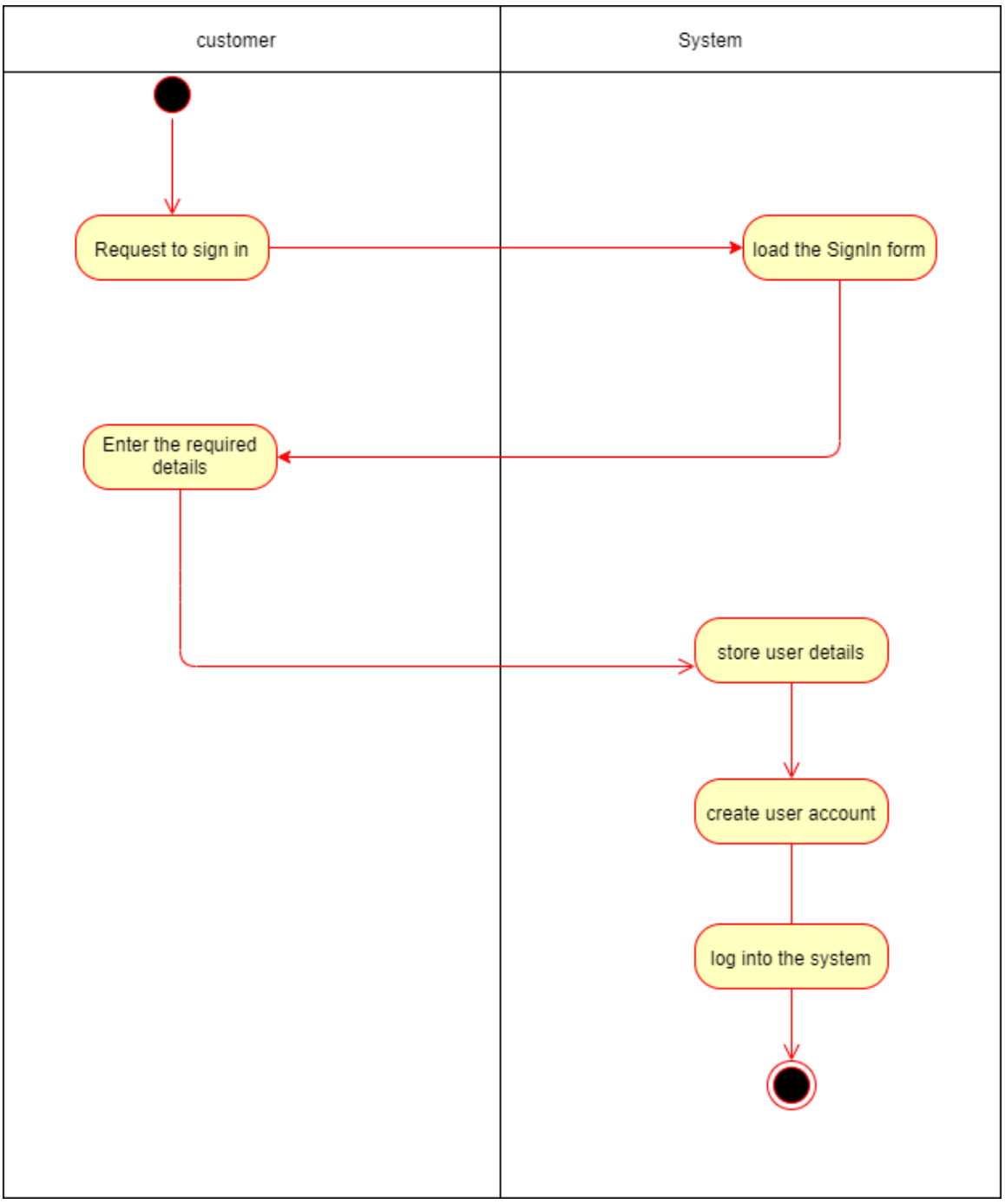

Figure 12- Activity Diagram for create new user account

3.3.3 Activity diagram for product search for non-user account holders

This activity diagram illustrates the flow of actions by the relevant actor (not an user account holder) to search products in an elaborate way. Nonuser account holders can search products directly from the homepage.

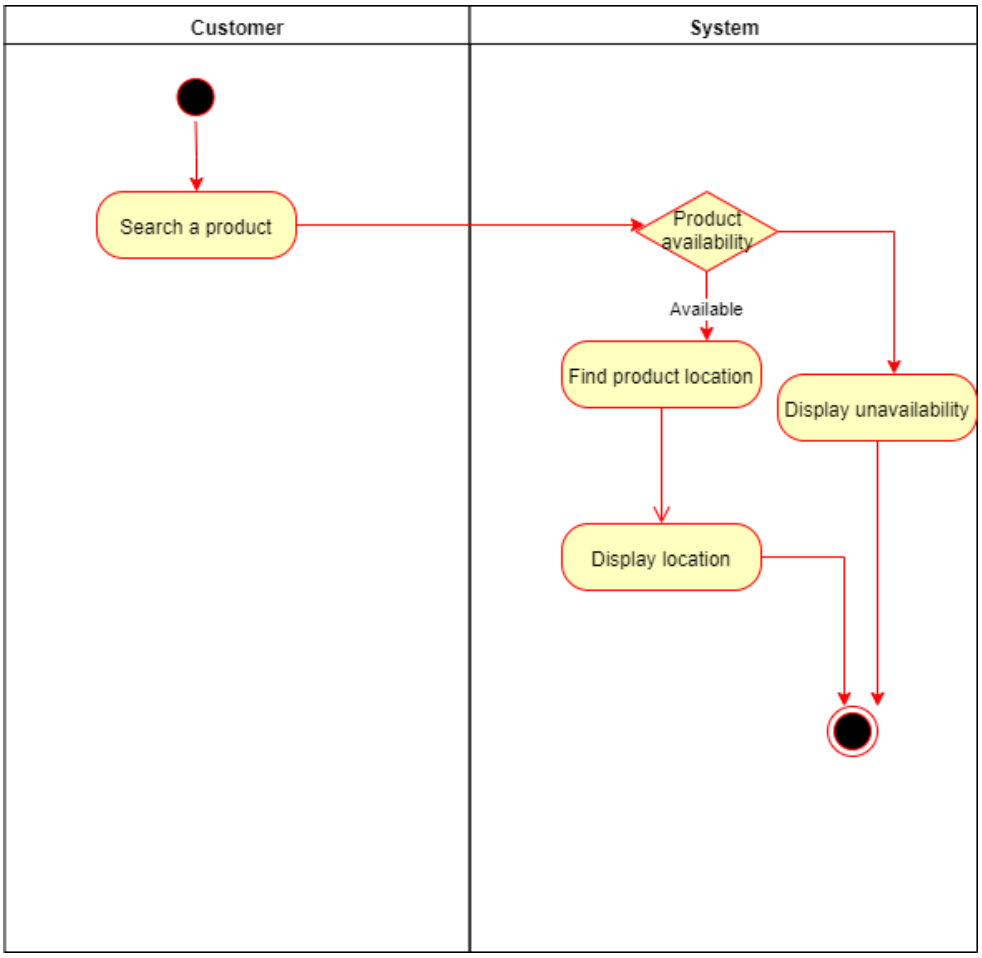

Figure 13-Activity Diagram for product search for non-user account holders

3.3.4 Activity diagram for product search for user account holders

This activity diagram illustrates the flow of actions by the relevant actor for search product activity for user account holders. If the product is available the user account holders can add the items to their shopping cart.

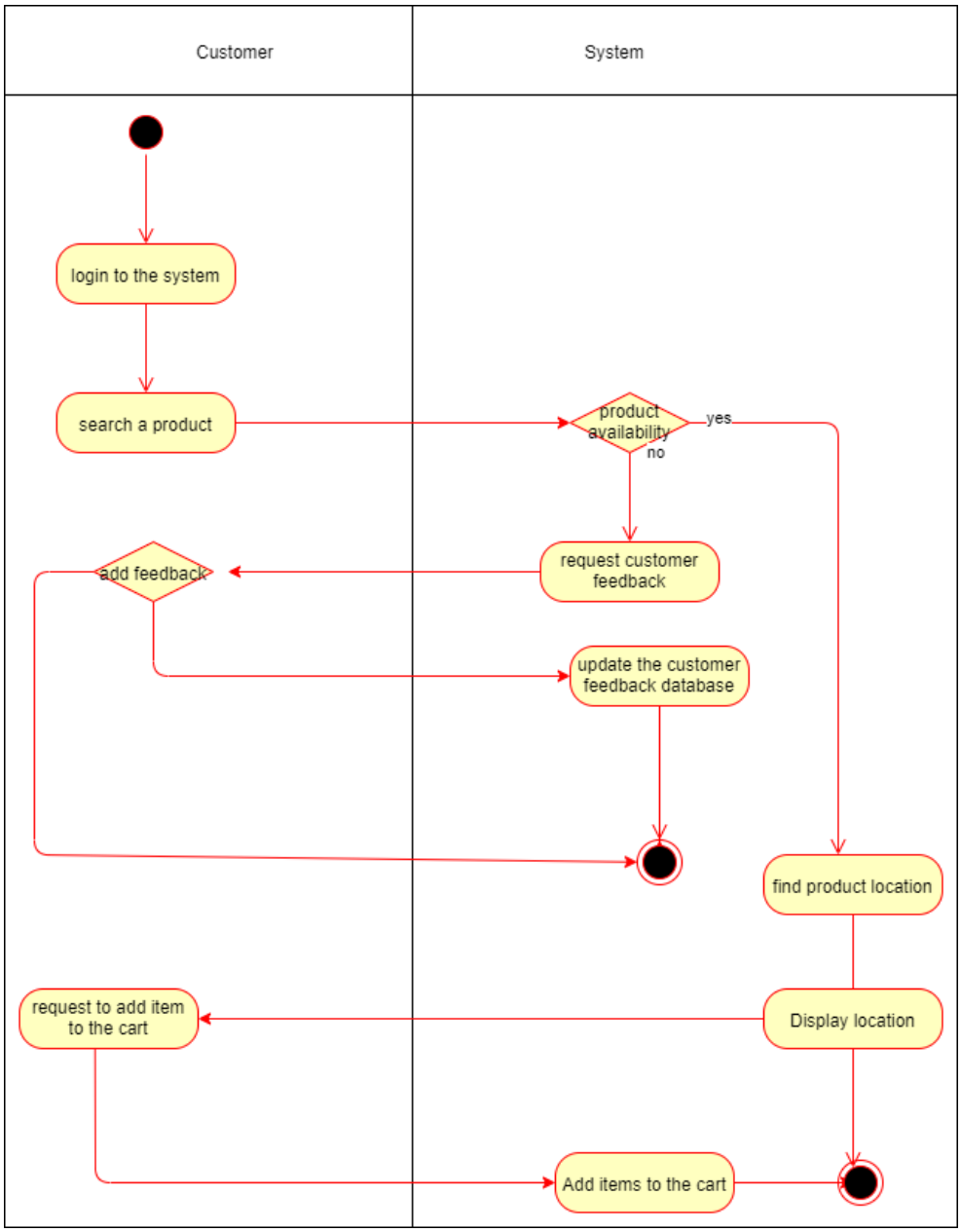

Figure 14- Activity Diagram for product search for user account holders

3.3.5 Activity diagram for place orders

This diagram illustrates the flow of actions o the activity of placing orders online. The customer must be logged into the system to place orders.

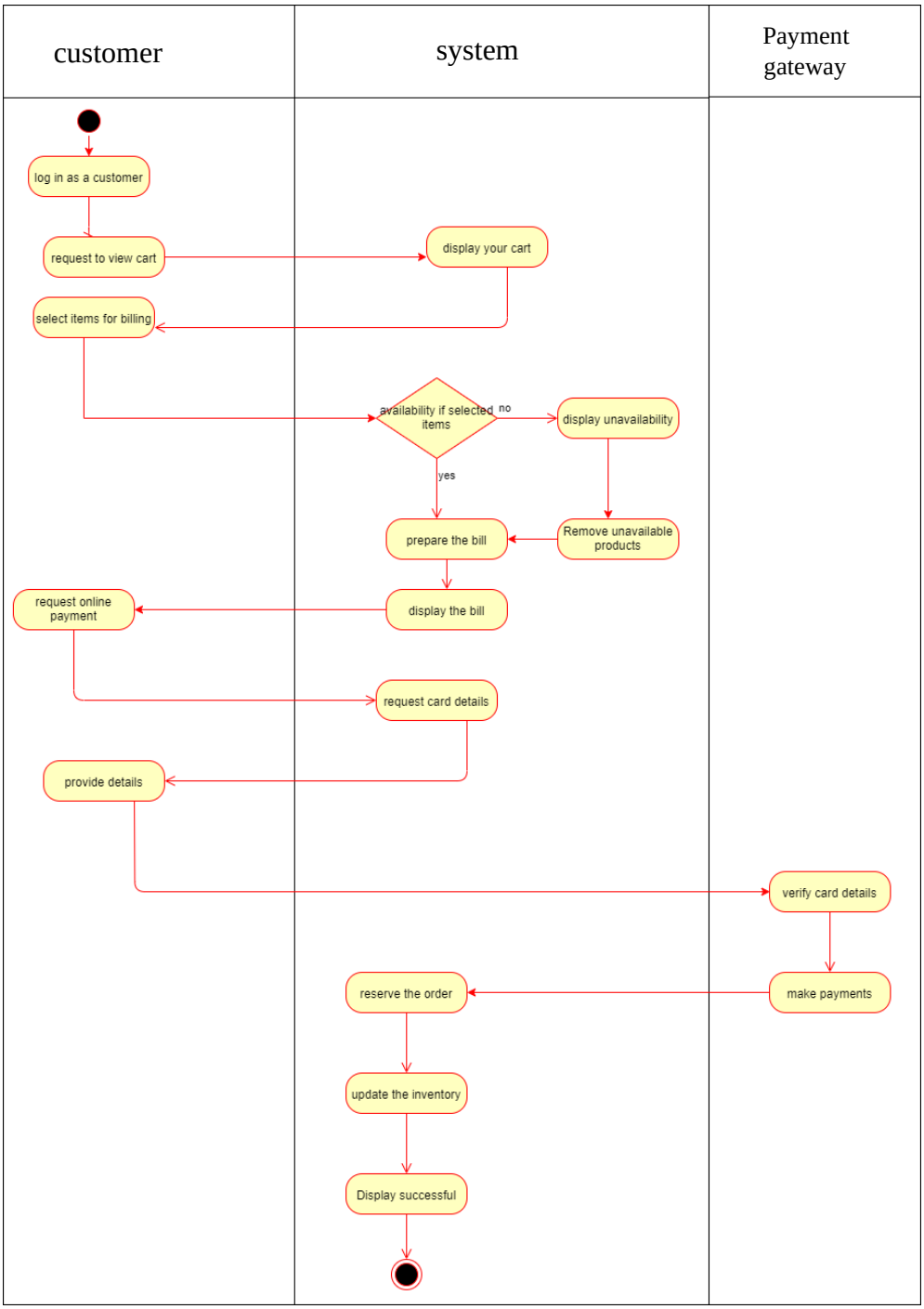

Figure 15- Activity Diagram for place orders

3.3.6 Activity diagram for view discounts and offers

The create user account activity diagram illustrates the flow of actions by the relevant actor for view discounts & offers activity-the users and the system in an elaborate way. To view discounts& offers, the user doesn't need to log in. anyone who access the website can access this feature.

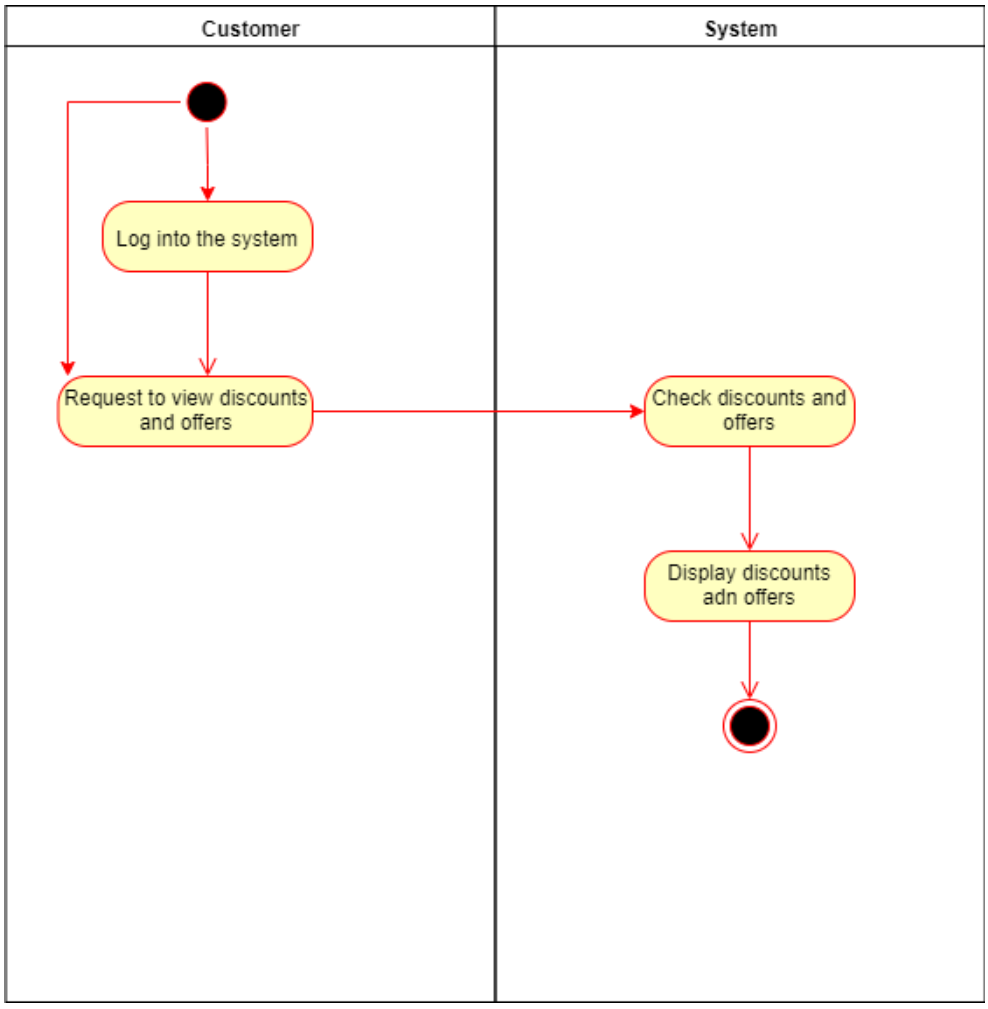

Figure 16- Activity Diagram for view discounts and offers

3.3.7 Activity diagram for view suggestions

The view suggestions activity diagram illustrates the flow of actions by the relevant actor for view suggestions activity-the users and the system in an elaborate way. To view the suggestions the user must log in as an administrator. Only the administrators can view the suggestions.

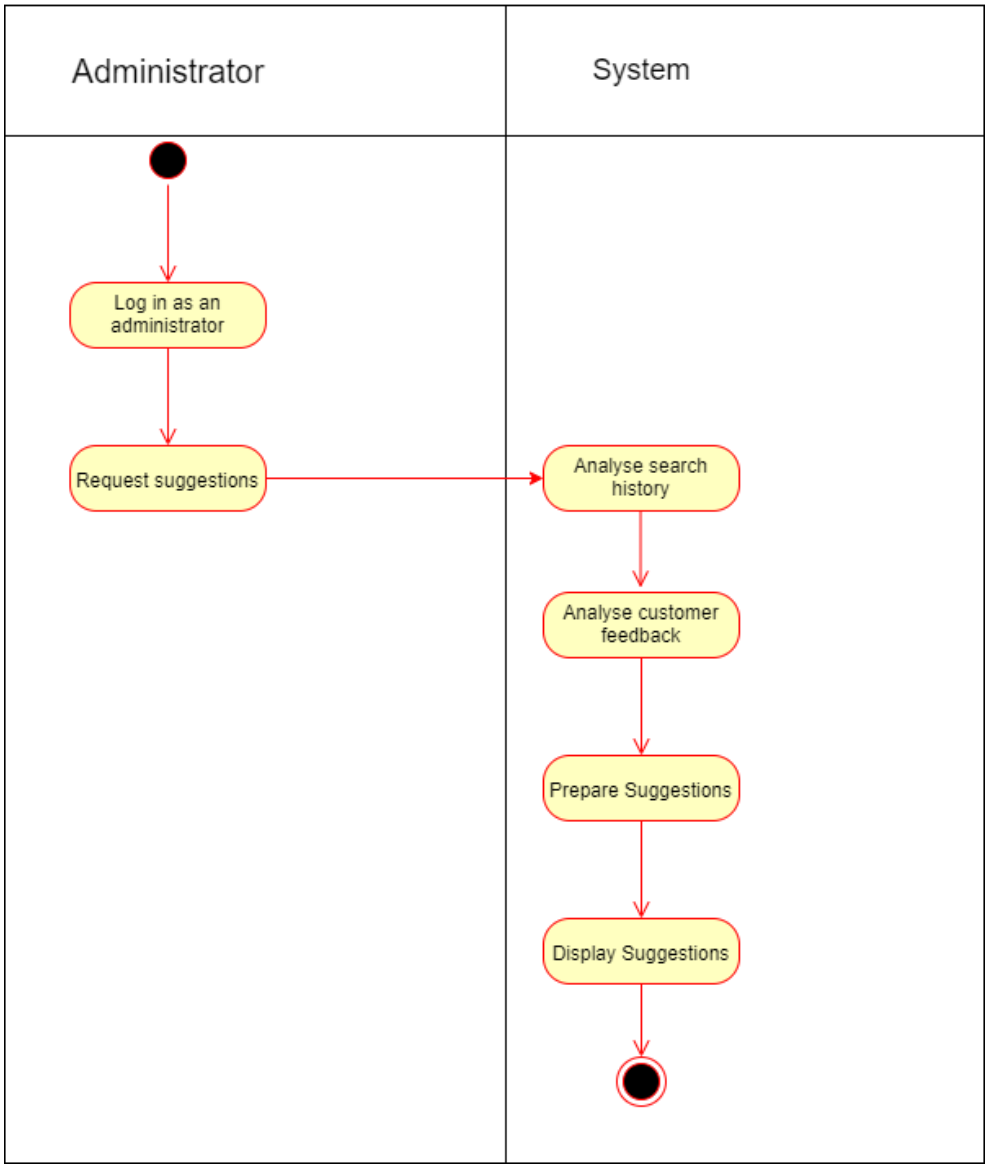

Figure 17- *Activity Diagram for view suggestions*

3.3.8 Activity diagram for view sales report

The view sales report activity diagram illustrates the flow of actions by the relevant actor for view sales report activity-the users and the system in an elaborate way. To view the sales report the user must log in as an administrator. Only the administrators can view the sales report.

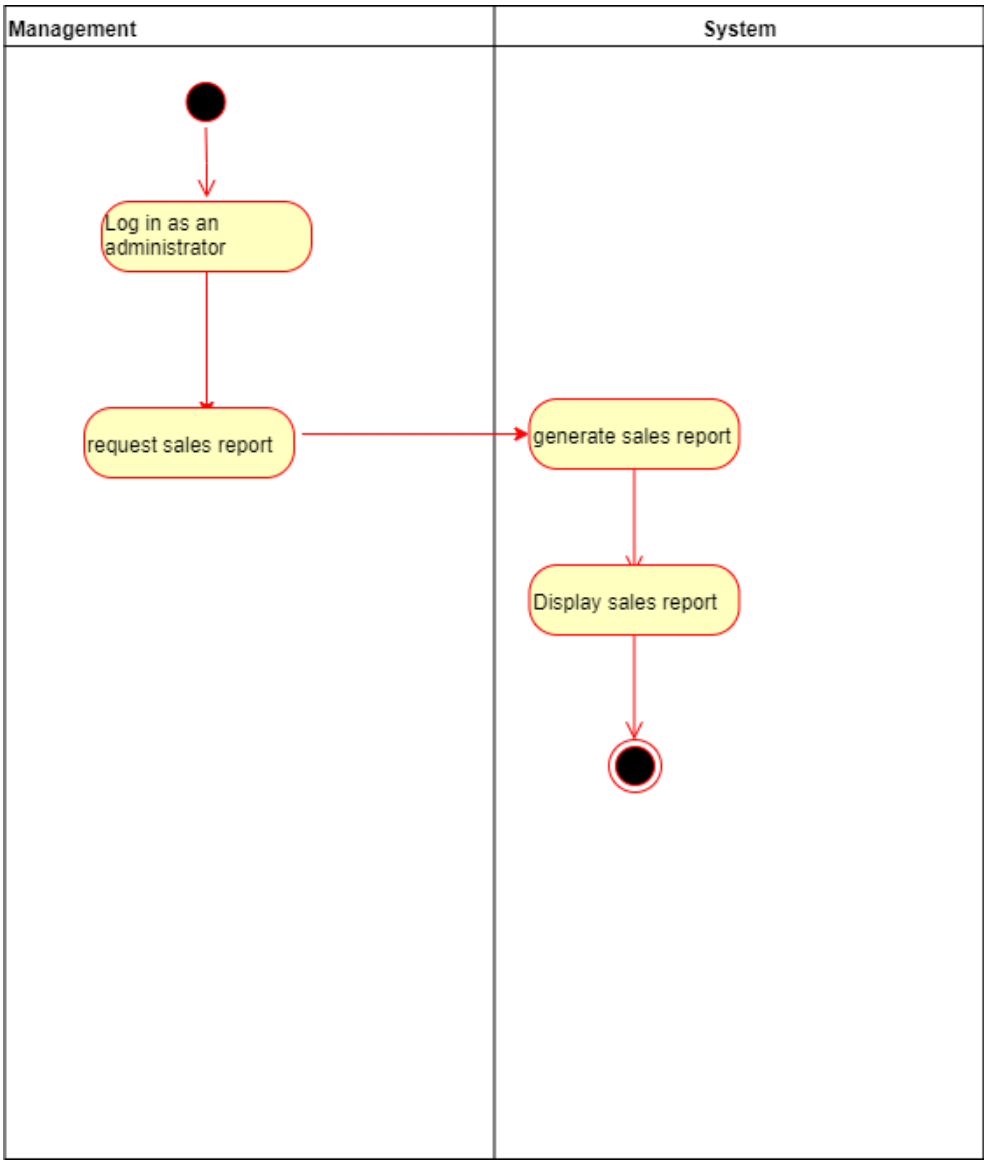

Figure 18- Activity Diagram for view sales report

3.4 Class Diagram

A class diagram is a type of diagram and part of a Unified Modeling Language (UML) thatdescribes and provides a system's overview and structure in terms of classes, attri butes andmethods, and the relationships among different classes. This class diagram shows the structure of the shopping assistant system in terms of classes, attributes, methods and relationships among them.

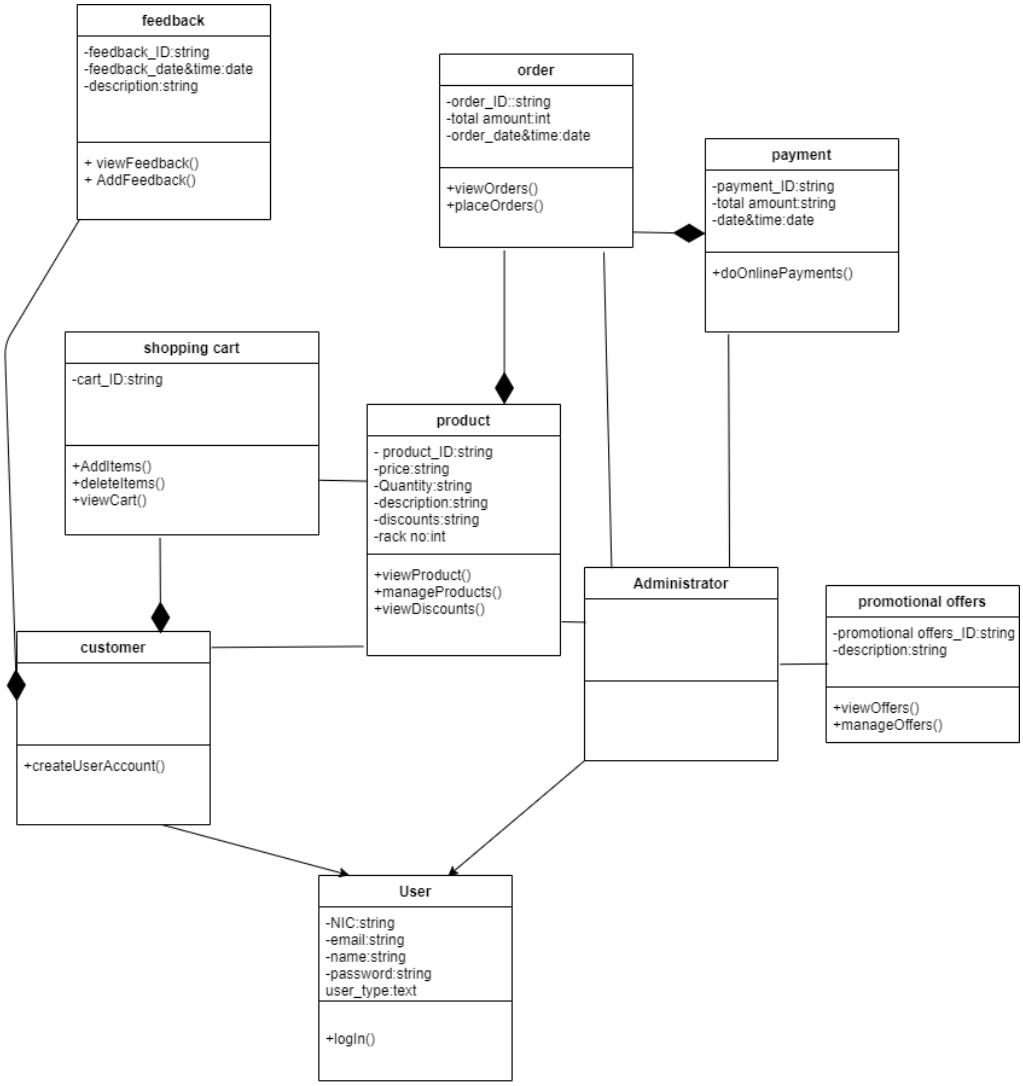

Figure 19 entity class diagram for the proposed system

Control class diagram for the proposed system

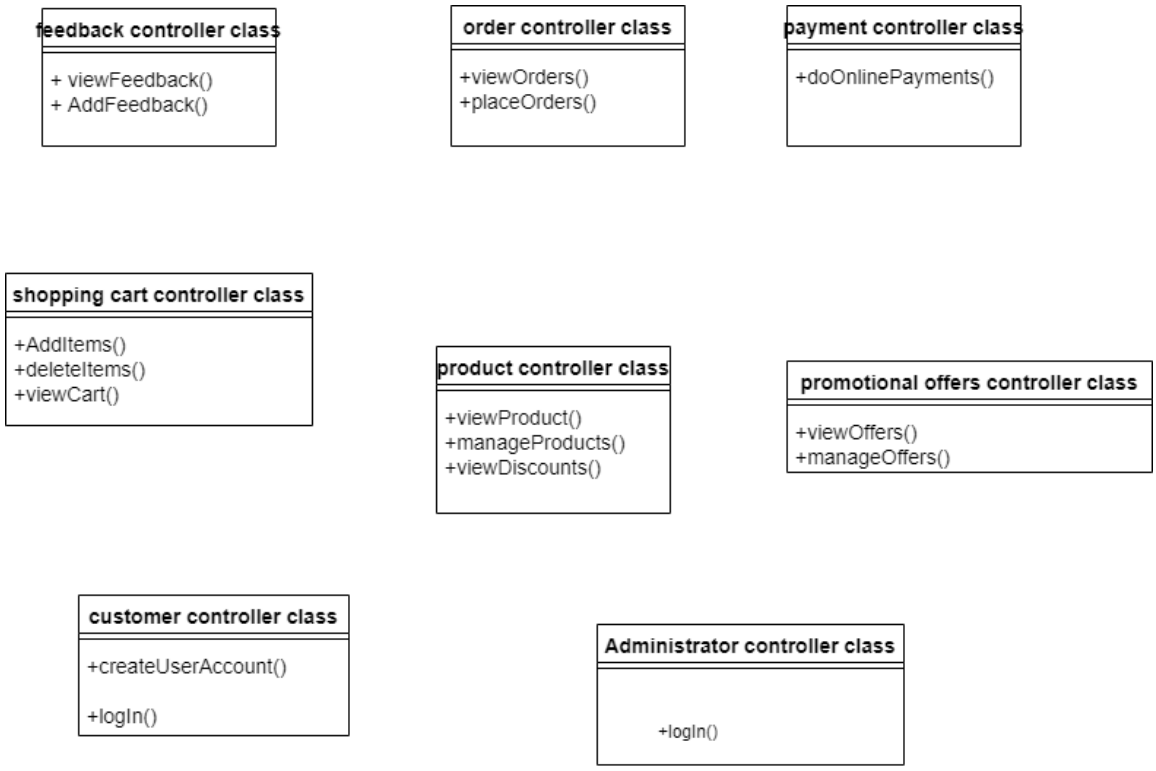

Figure 20 control class diagram for the proposed system

Interface Class diagram for the proposed system

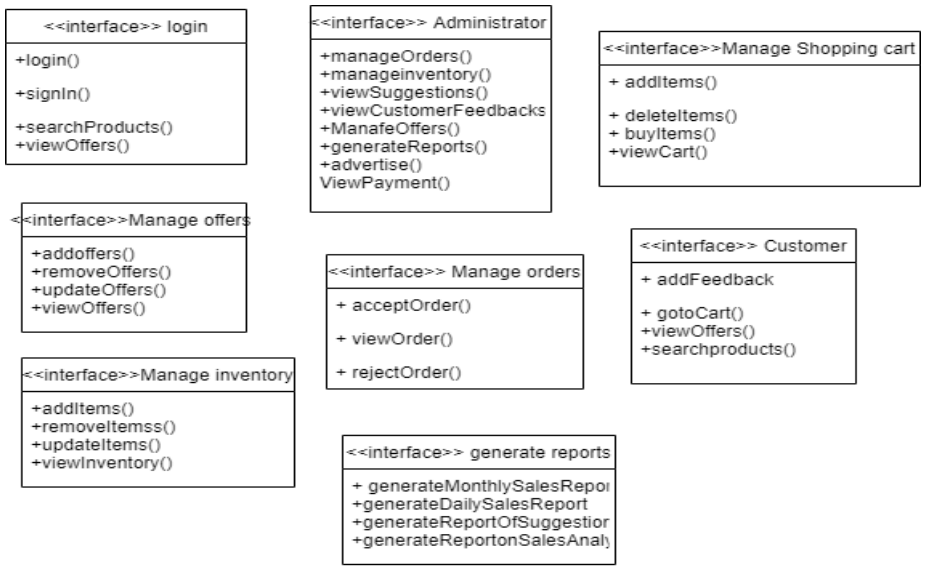

Figure 21 Interface class diagram for the proposed system

3.5 Sequence Diagrams

Sequence diagram shows how the functionality of the system interacts with the actors in a use case. That actor is depicted with a horizontal lifeline and the transactions of the data are drawn from one line of life to another or within one line of life. Following sequence diagrams explain some of the key use cases that are somewhat difficult to understand with use case descriptions only.

3.5.1.Sequence Diagram for create user account

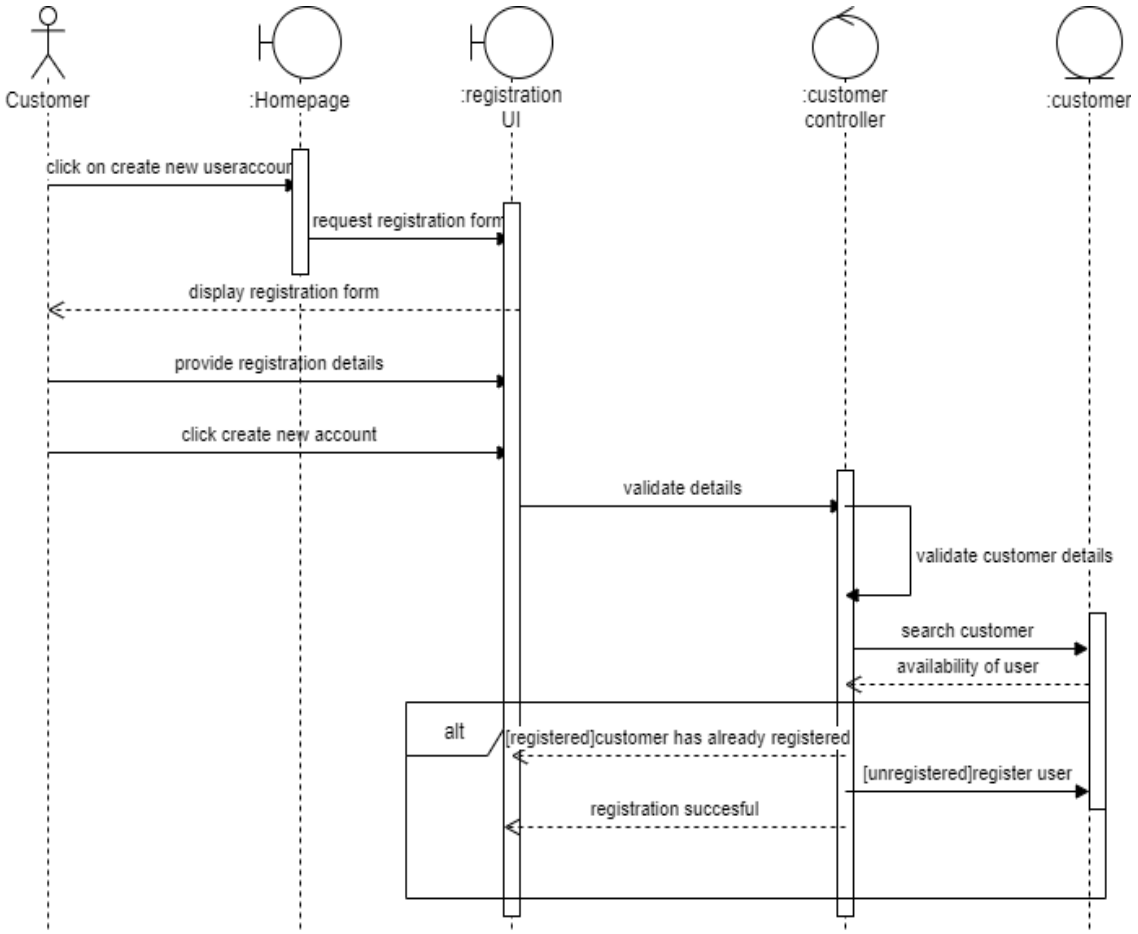

Figure 22- sequence diagram for the create user account

The create user account scenario describes the objects and classes involved in the create user account scenario and the interchange of messages between objects needed to perform the functionality

3.5.2 Sequence Diagram for user log in

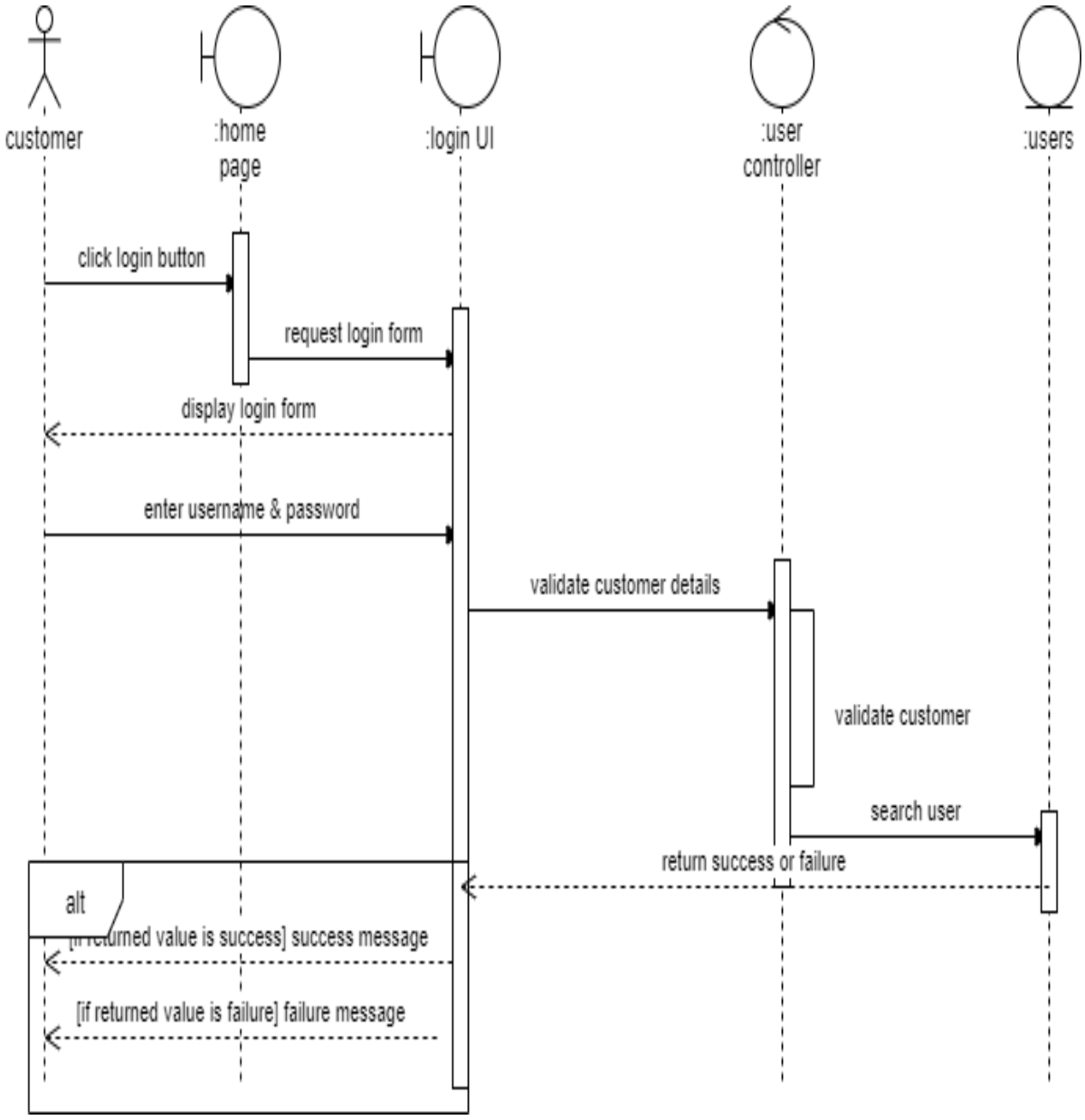

Figure 23- sequence diagram for the log in

The log in scenario describes the objects and classes involved in the log in scenario and the interchange of messages between objects needed to perform the functionality

3.5.3 Sequence Diagram for search products

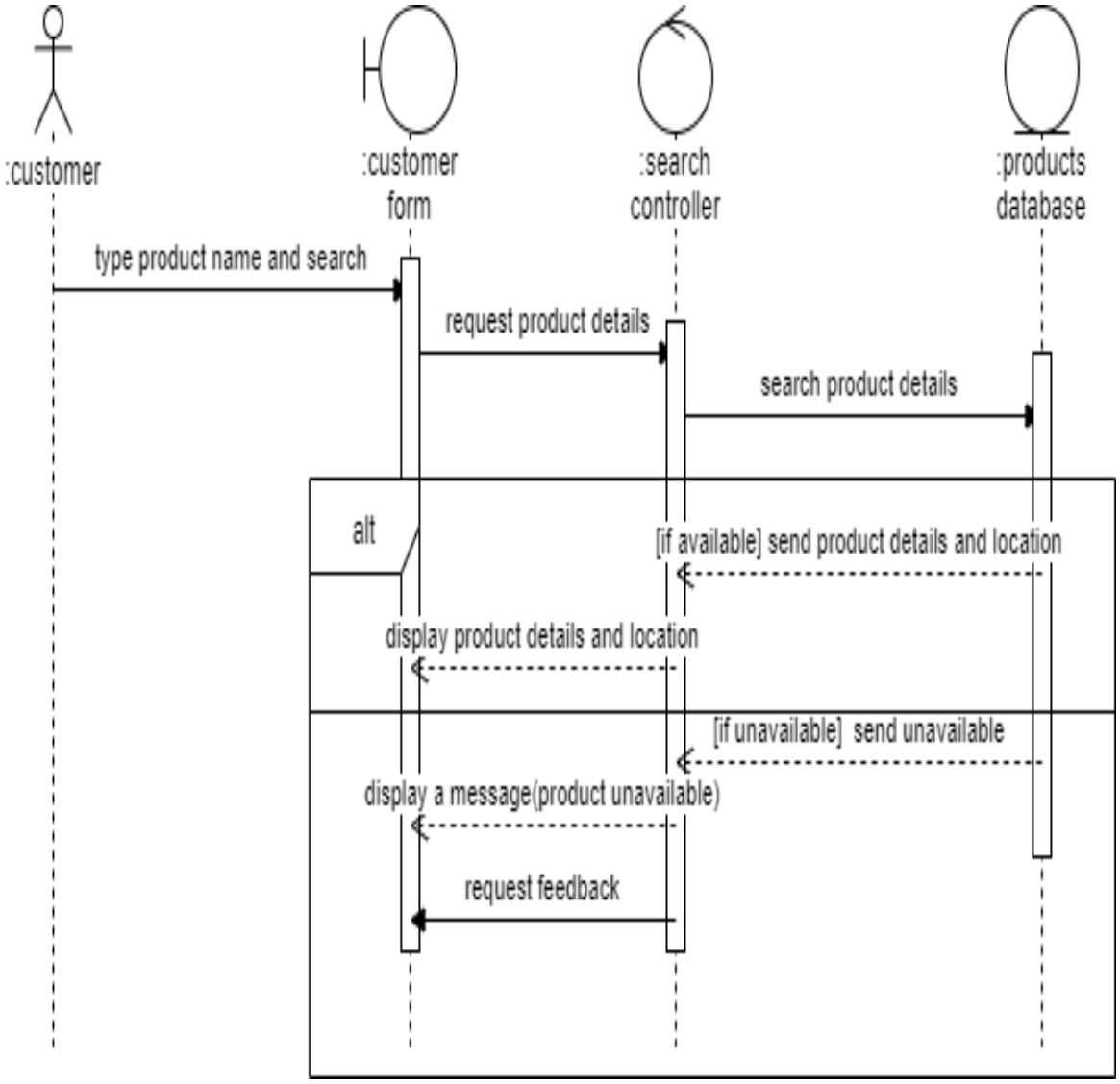

Figure 24- sequence diagram for search products

The search products scenario describes the objects and classes involved in the search products scenario and the interchange of messages between objects needed to perform the functionality

3.5.4 Sequence Diagram for place order

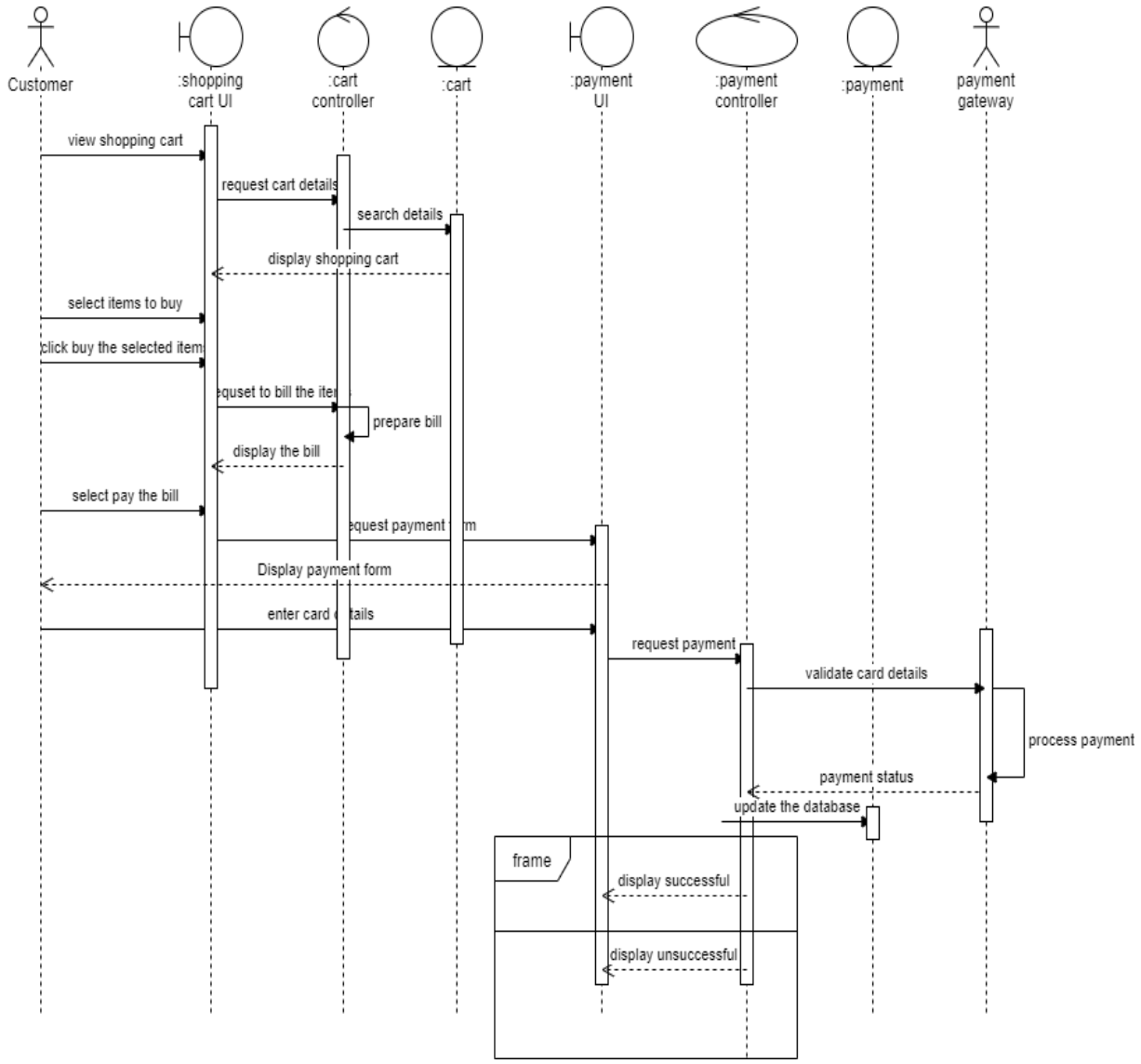

Figure 25- sequence diagram for place order

The place order scenario describes the objects and classes involved in the place order scenario and the interchange of messages between objects needed to perform the functionality

3.5.5 Sequence Diagram for Add feedback

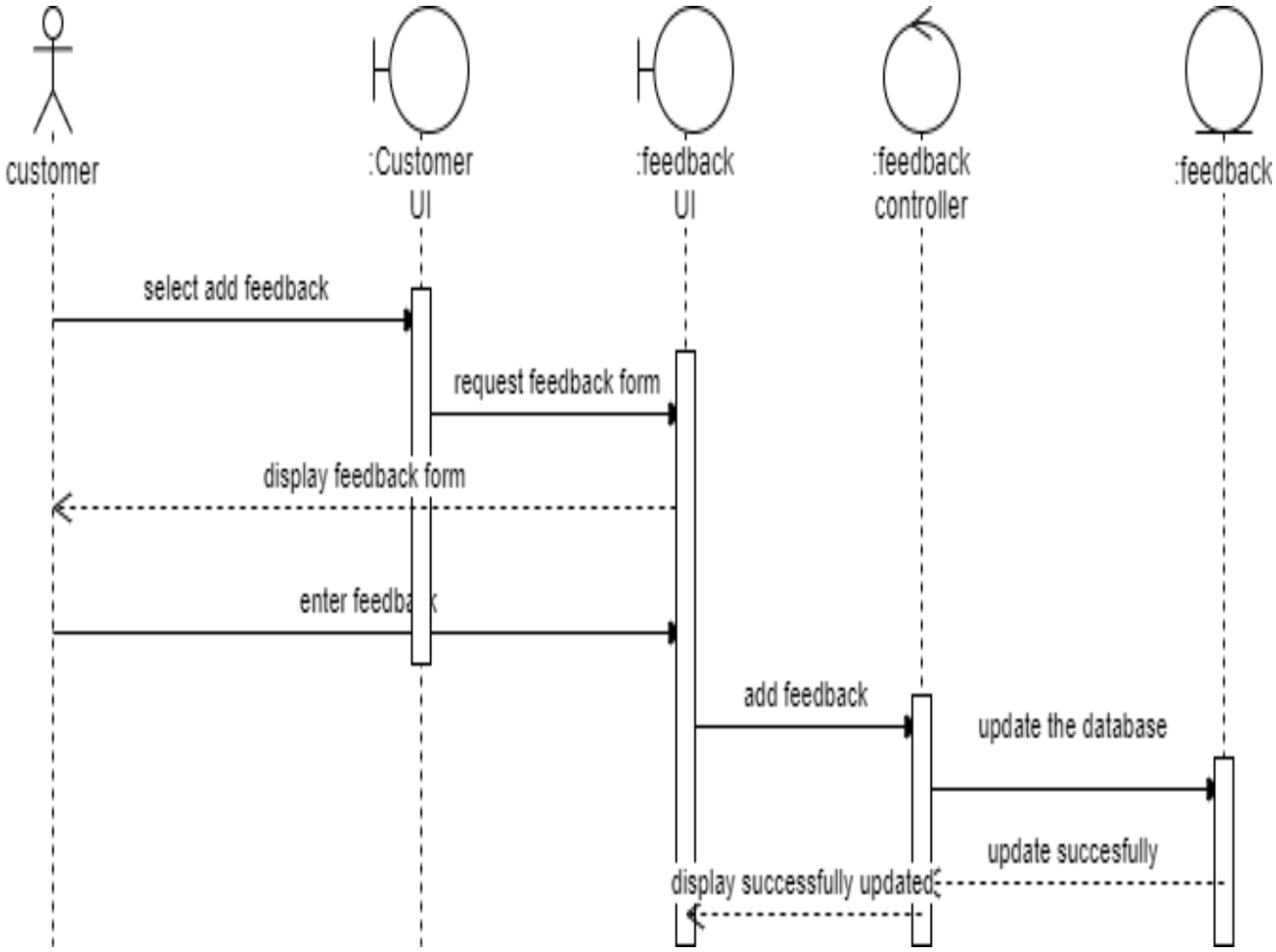

Figure 26- sequence diagram for Add feedback

The add feedback scenario describes the objects and classes involved in the add feedback scenario and the interchange of messages between objects needed to perform the functionality

3.5.6 Sequence Diagram for Manage inventory

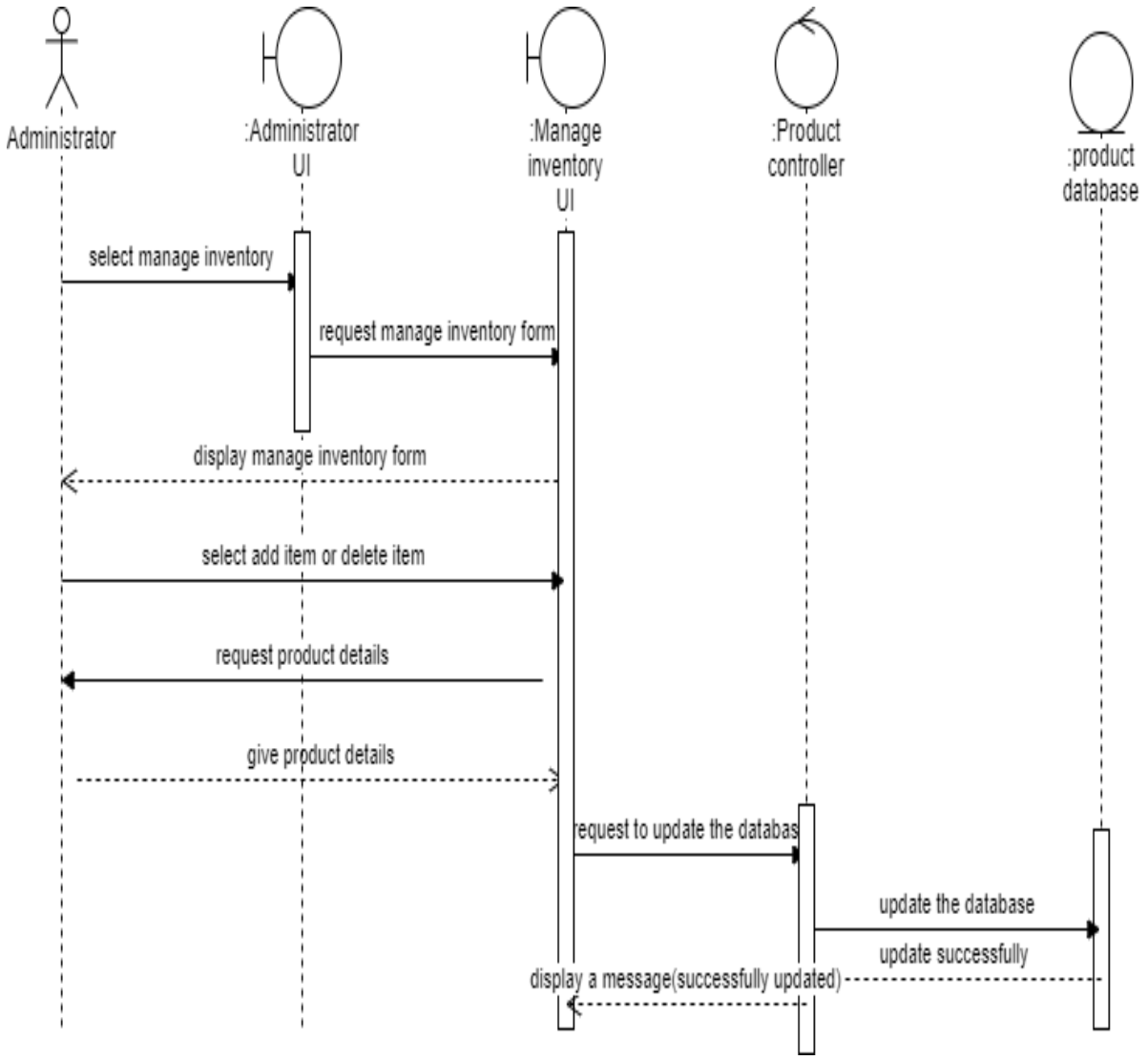

Figure 27- sequence diagram for manage inventory

The manage inventory scenario describes the objects and classes involved in the manage inventory scenario and the interchange of messages between objects needed to perform the functionality

3.5.7 Sequence Diagram for Manage orders

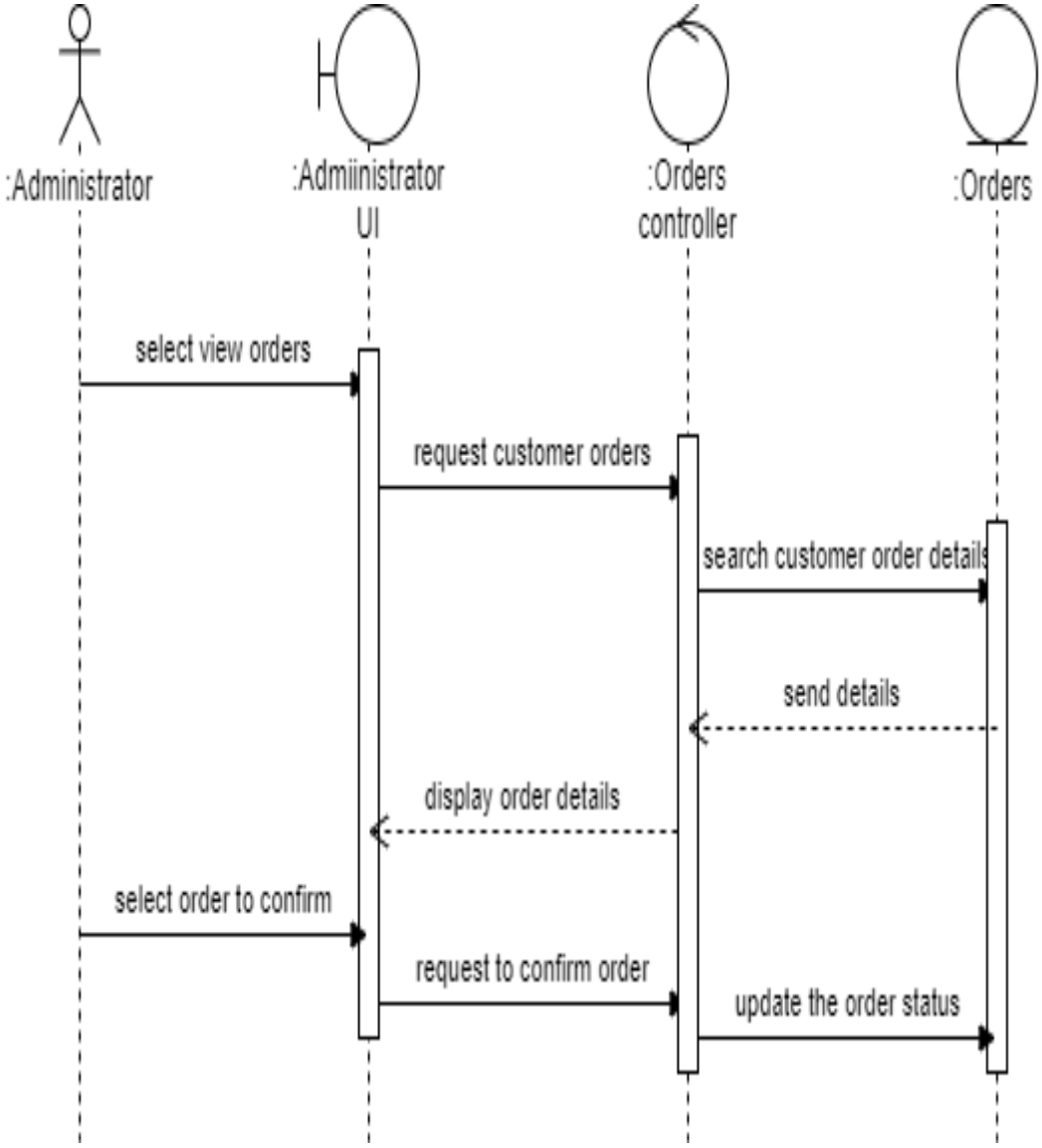

Figure 28- sequence diagram for manage orders

The manage orders scenario describes the objects and classes involved in the manage orders scenario and the interchange of messages between objects needed to perform the functionality

3.5.8 Sequence Diagram for view discounts and offers

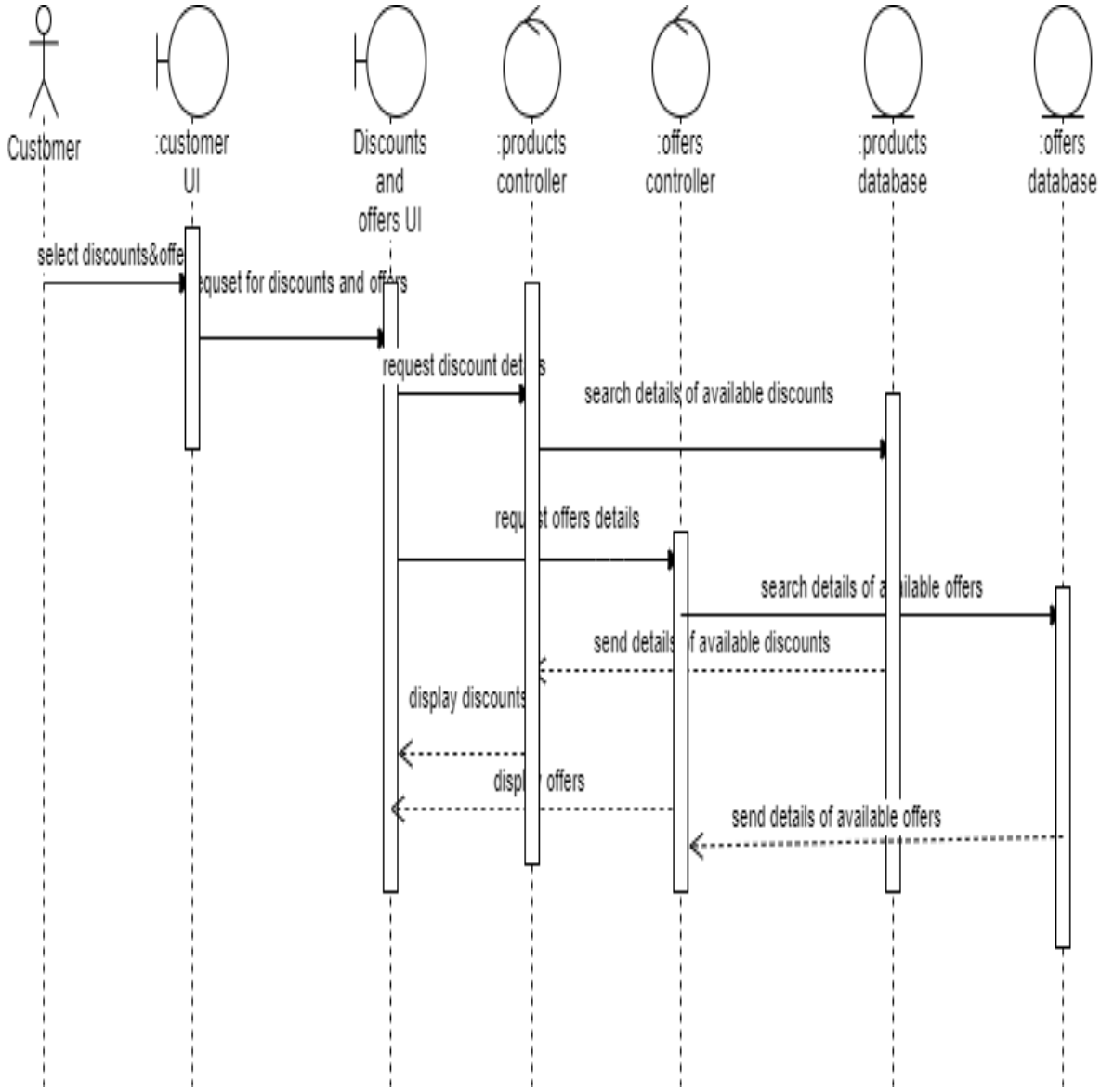

Figure 29- sequence diagram for view discounts and offers

The view discounts and offers scenario describes the objects and classes involved in the view discounts and offers scenario and the interchange of messages between objects needed to perform the functionality

3.5.9 Sequence Diagram for view feedback

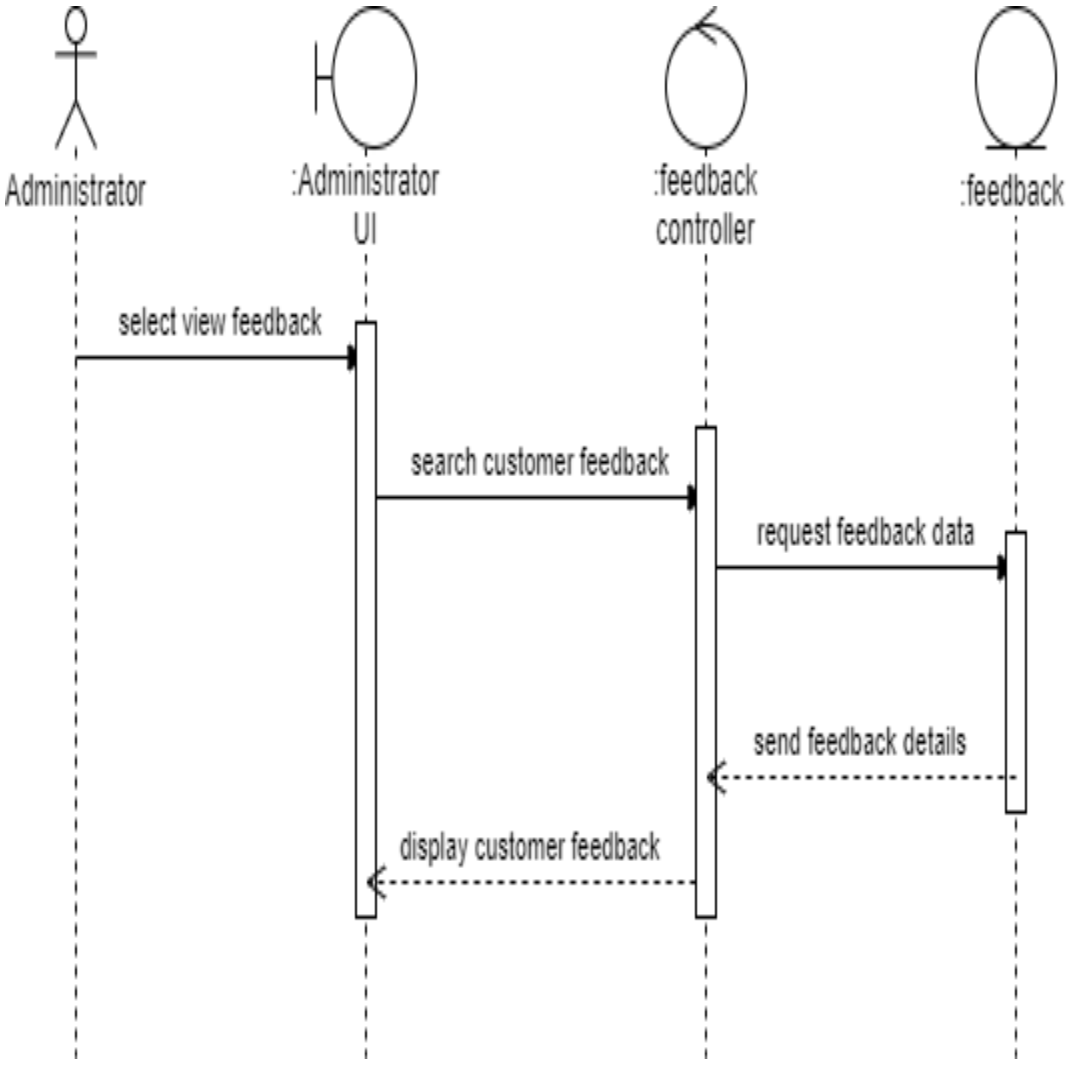

Figure 30- sequence diagram for view feedback

The view feedback scenario describes the objects and classes involved in the view feedback scenario and the interchange of messages between objects needed to perform the functionality

3.6 Entity Relationship Diagram

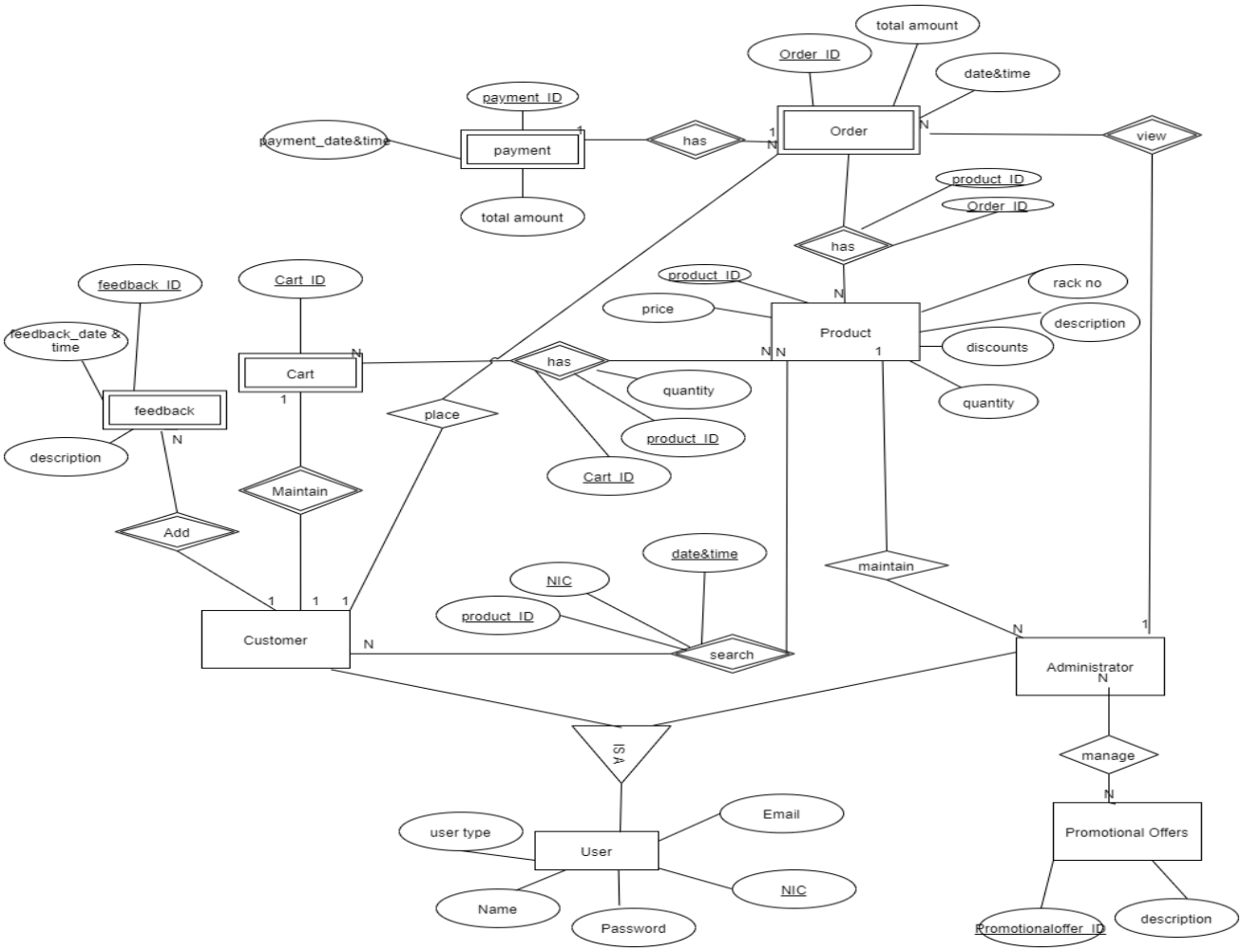

Figure 31- Entity Relationship diagram for the Proposed System

An entity relationship diagram, also called entity relationship model, is a graphical representation of entities and their relationships to each other, typically used in computing regarding the organization of data within databases or information systems. An entity relationship diagram is a specialized graphic that illustrates the relationships between entities in a database. This ER diagram represents the entities and the relationships in the shopping assistant system. The identified entities in the system are payment, order, product, cart, customer, administrator and promotional offers. The weak entities and weak relationships are clearly shown using relevant symbols.

3.7 Normalized Database Design

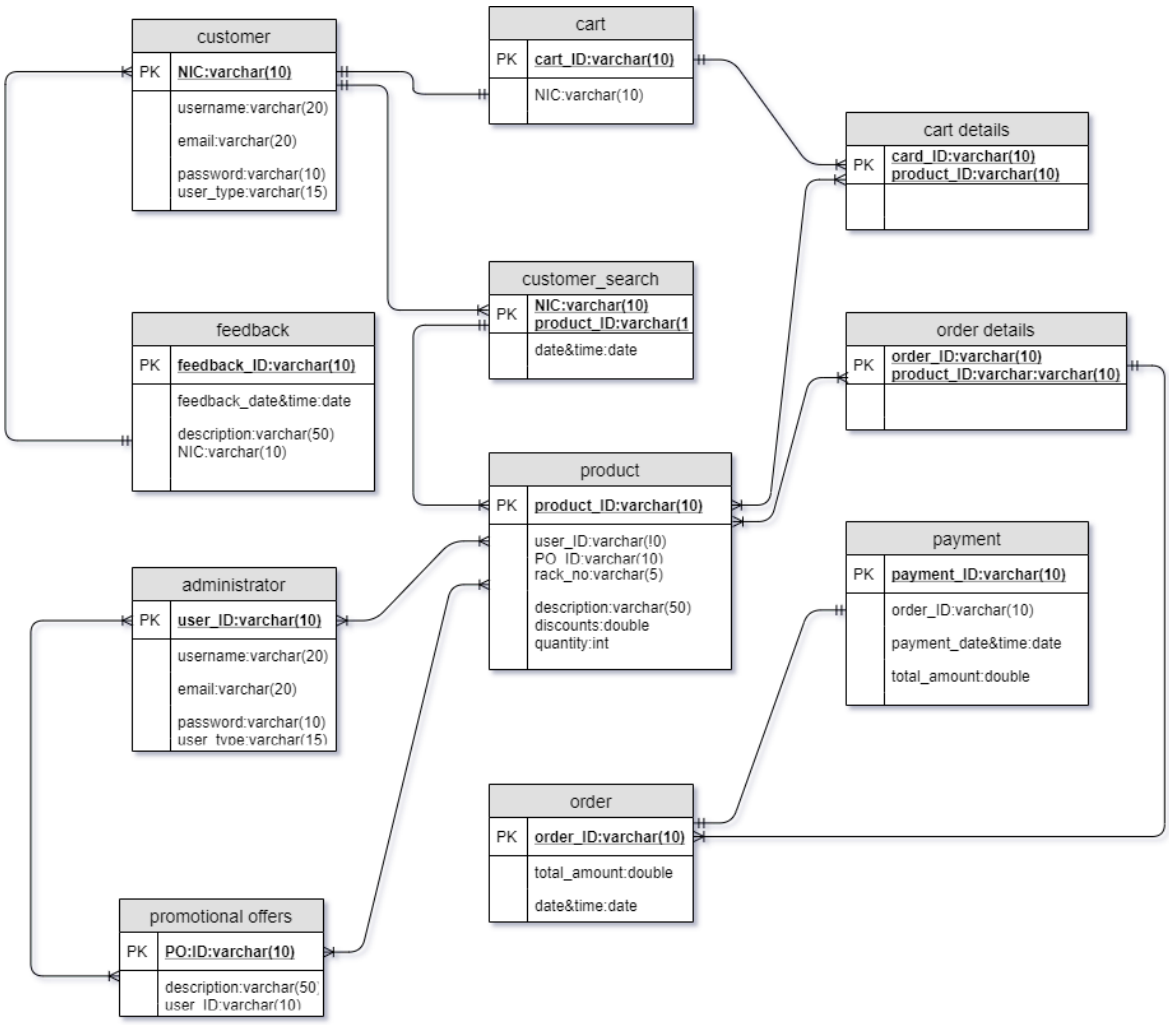

Figure 32- Normalized database design

A normalized database design is one that is designed to reduce data duplications and create tiny well-structured relationships, usually via linked tables.

3.8.GUI Design

Graphical User Interface (GUI) is one of the key components in a web site that communicate with the users of the system. User friendly GUI is the one of the major non – functional requirements of this system.

Following are the wireframe diagrams for the GUIs

3.8.1 Homepage GUI

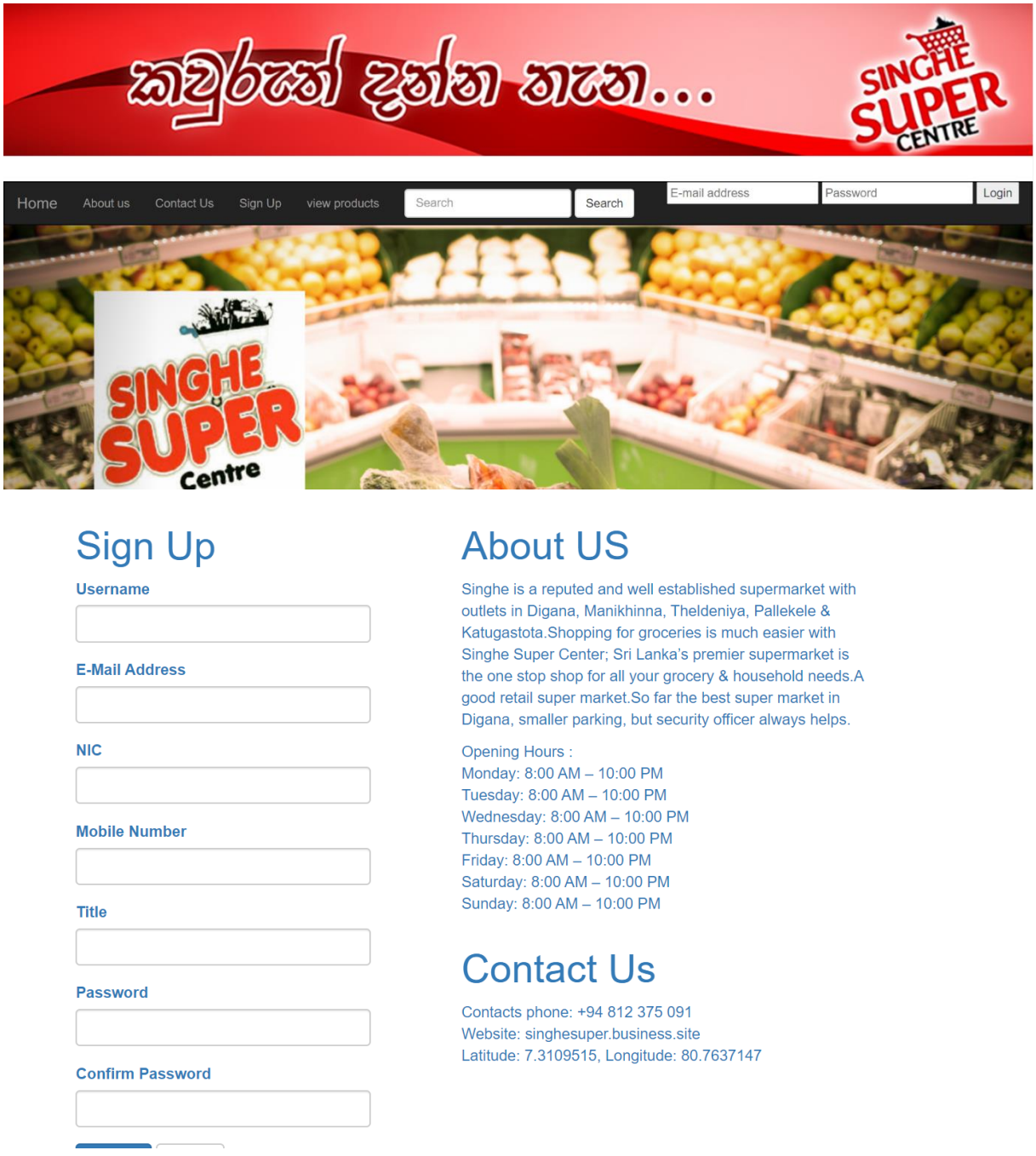

Figure 33- GUI of the homepage

Above GUI shows the homepage of the web-based system which is displayed when an user visits the website. There are 4 different options the users can access.

3.8.2 Create new user account GUI

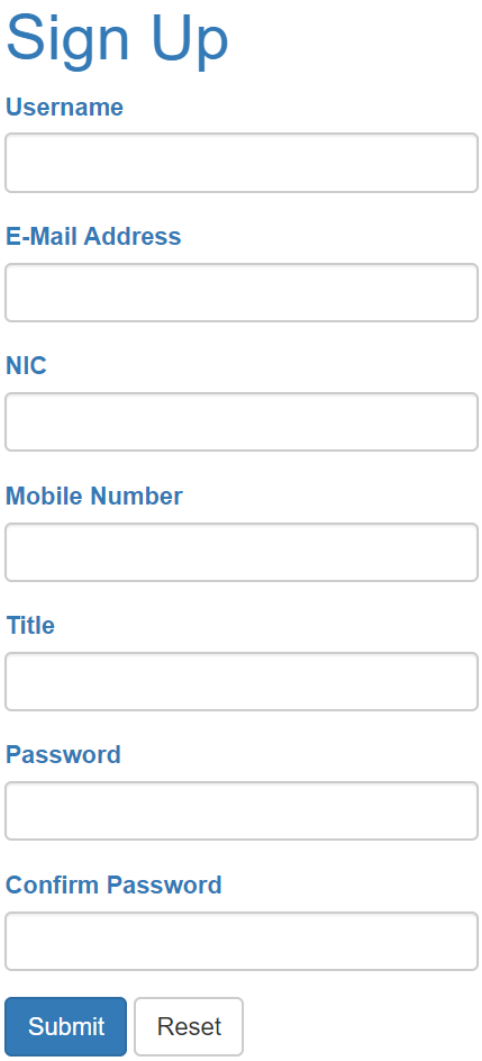

Figure 34 Create new user account GUI

Above GUI shows the create user account interface of the web-based system which is displayed when an user selects signup option from the homepage of the website.

3.8.3 Customer homepage GUI

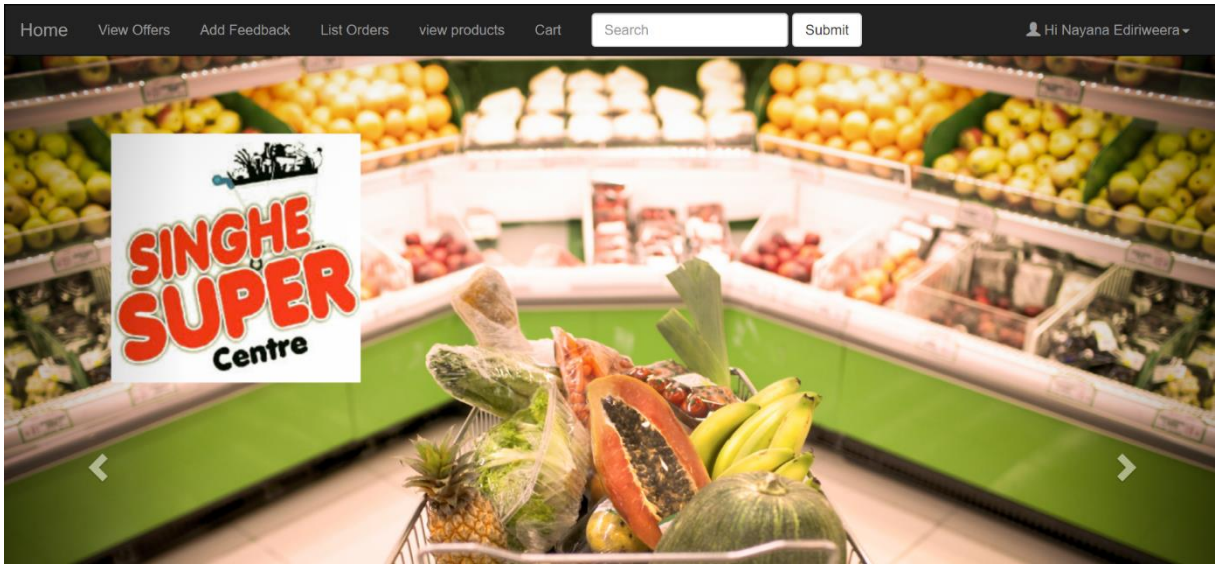

Figure 35- customer homepage

Above GUI shows the customer homepage of the web-based system which is displayed when an user logs into the system as a customer. There are 4 different options the customers can access or can return to the previous page.

3.8.4 Manage inventory GUI

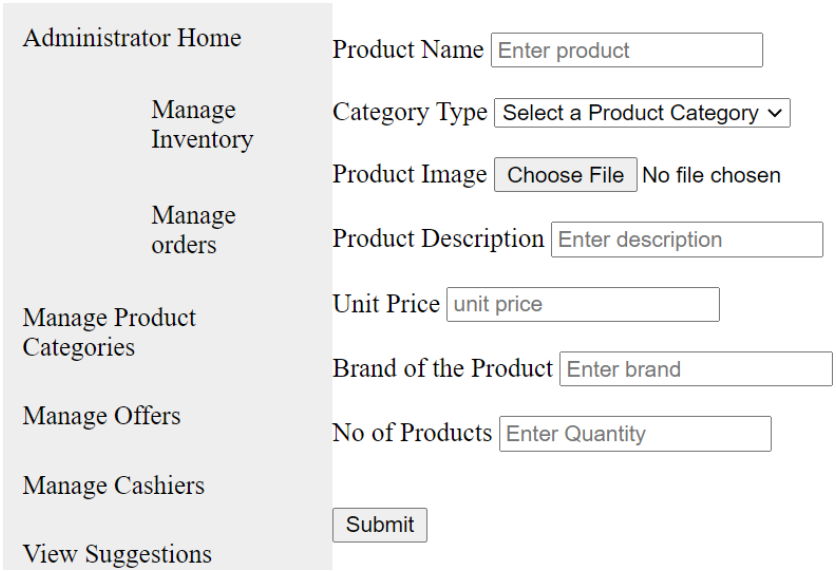

Figure 36- manage inventory GUI

Above diagram show the interface for the administrator to perform the manage inventory function. In the left side of the interface the functionalities the administrator can perform are seen.

3.8.5 Generate Reports GUI

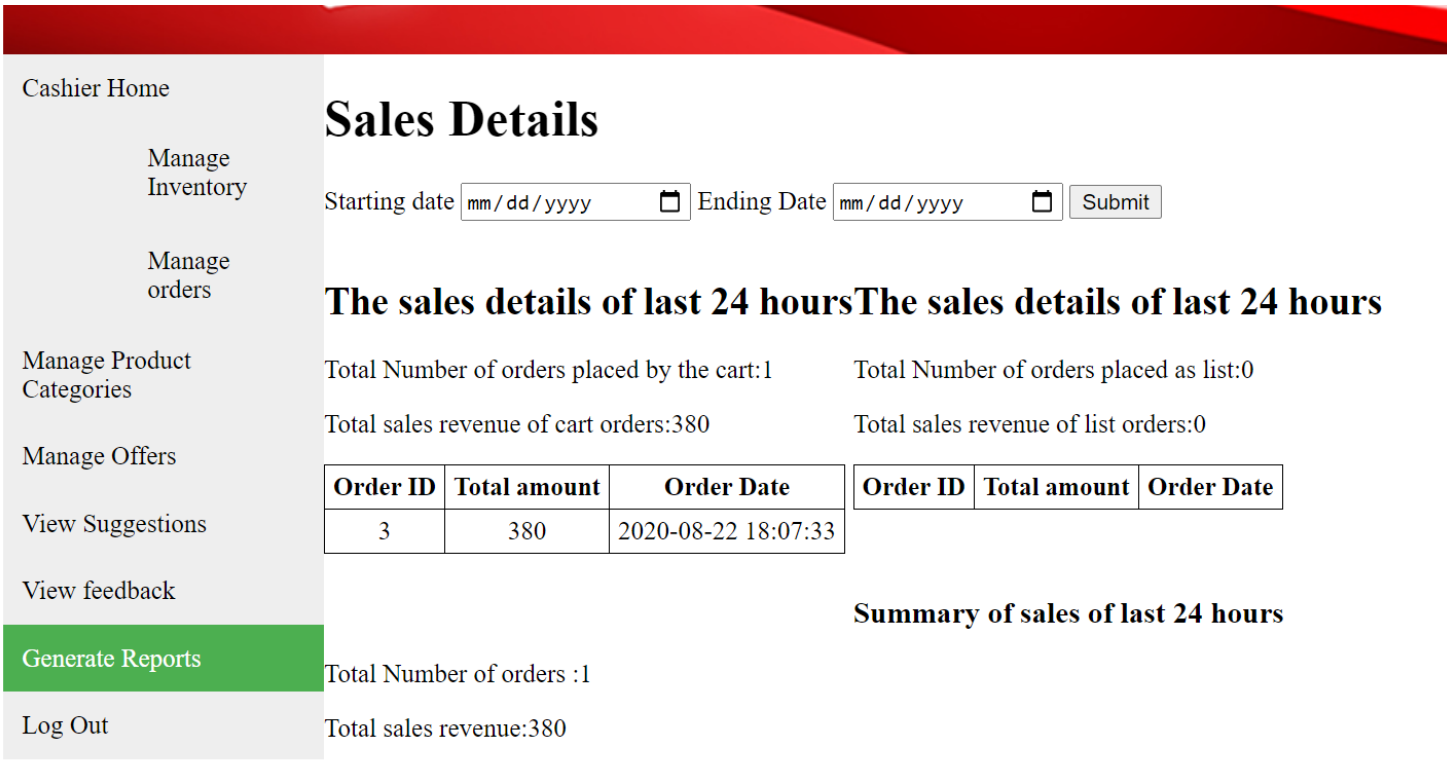

Figure 37-generation of reports interface

Above interface depicts the user interface for the generation of reports function. The administrator can select the needed report to be generated.

3.8.6 View Offers GUI

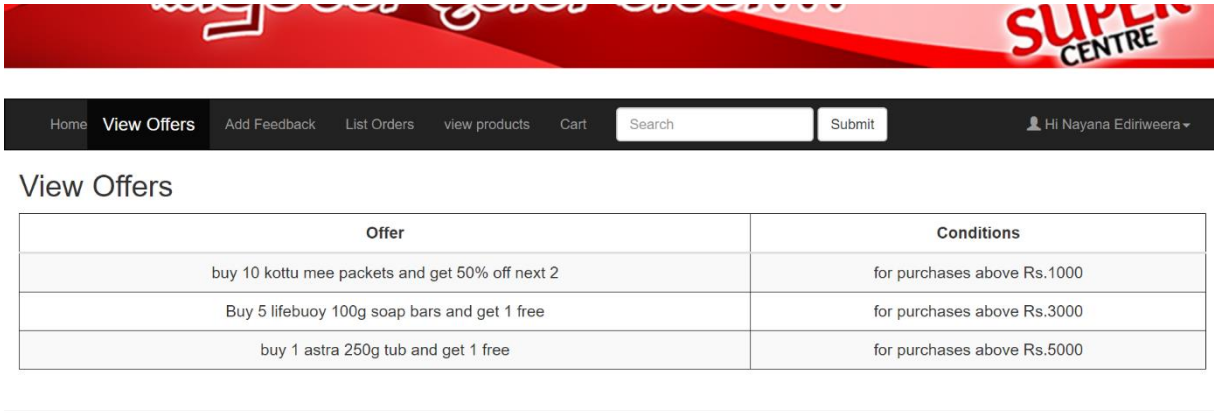

Figure 38- view offers and discounts interface

The above interface shows how the system displays the available discounts and offers to the customer. Any user to the system can access this feature.

3.8.7 Manage Shopping Cart GUI

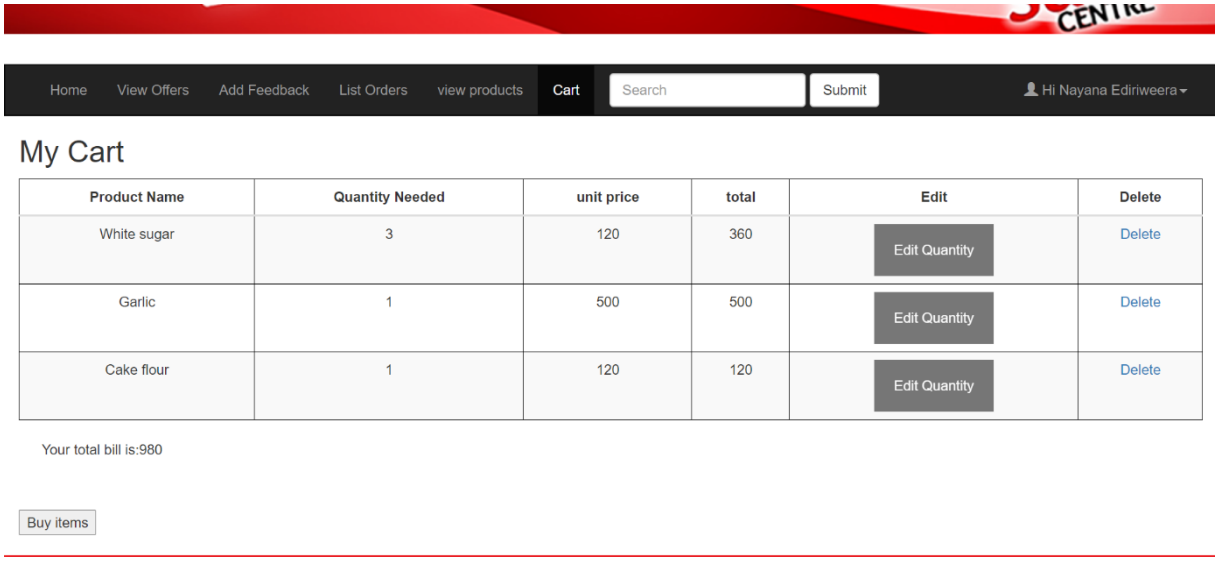

Figure 39- manage shopping cart user interface

This figure shows the interface of manage the shopping cart. The customer can manage his/her shopping cart by accessing through this interface.

3.8.8 Manage orders GUI

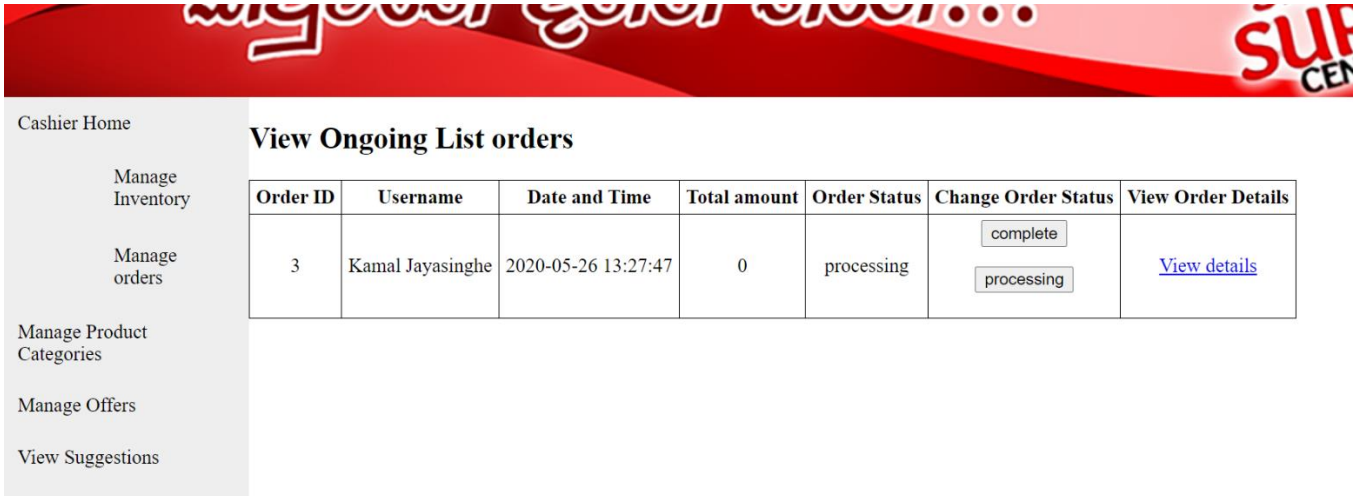

Figure 40 manage orders GUI

This figure shows the interface of managing the orders. the administrator can view the ongoing orders and accept or reject the orders. And also, the manager can view the past orders.

3.9 Summary

This chapter depicted the system design where it showed how the functionality is achieved. This was depicted through Objected Oriented Approach. Furthermore, the Database Design and the Graphical User Interfaces were elaborated.

CHAPTER FOUR- SYSTEM DEVELOPMENT

Outline of the chapter

This chapter explains the details relevant to project creation. It offers a brief introduction to the technologies and the programming language properties used to implement the shopping assistant system called "singhesuper.lk." This chapter also includes a brief overview of the components / libraries used

4.1 Programming Languages
4.2 Development tools and technologies
4.3 Third party components/ libraries

4.1 Programming languages

"Singhesuper.lk" is a website running on the internet. Compatibility with existing resources such as software, hardware, human and organizational skills has become more oriented when choosing the programming languages and development technologies. Additionally , we found support for attractive graphical user interface design.

4.1.1 HTML

HTML (HyperText Markup Language) is the Web's most basic building block. This describes the definition of web content and its structure. In general, other technologies besides HTML are used to define the appearance / presentation (CSS) or functionality / behavior of a web page (JavaScript)

4.1.2 PHP

PHP is a server-side scripting language mainly intended for web creation but often used as a programming language for general use. PHP originally stood for Personal Home Page, but instead stands for the recursive acronym PHP: Preprocessor Hypertext. PHP technology can be incorporated into HTML code, or combined with different web design systems, web content management systems , and software frameworks can be used. Normally PHP code is interpreted by a PHP interpreter that is implemented as a module on the web server or as an executable Common Gateway Interface (CGI). The web server combines the results of the interpreted and executed PHP code with the created web page, which can be any form of data, including images. PHP code can also be implemented with a command-line interface (CLI) and used for the implementation of standalone graphical applications.

4.1.3 JS

JavaScript (JS) is a compiled programming language with first-class functions which is lightweight, interpreted or just-in-time. While it is best known as the scripting language for Web sites, it is also used by other non-browser environments, such as Node.js, Apache CouchDB and Adobe Acrobat.

4.1.4 CSS

Cascading Style Sheets (CSS) is a programming language that allows web pages to be stylized. The style of fonts, colors, pictures, layout designs etc. can be treated. CSS is easy to learn, to understand and to make more presentable web sites. Combining CSS and HTML

4.2 Development Tools and Technologies

4.2.1 MySQL

It is an open source data base management system relational to database. This is based on the query language structure (SQL), which is used in the database to add, delete, and change information. MySQL Server runs in either client / server or embedded systems. The MySQL Database Server is very fast , reliable and user friendly.

4.2.2 WAMP

Stands for "Windows, Apache, MySQL , and PHP." WAMP for Windows systems is a modification of LAMP and is mostly built as a package of applications (Apache, MySQL, and PHP). It is mostly used to build web and check internally, but can also be used to support live websites.

4.3 Third Party Components/Libraries

4.3.1 Bootstrap

Bootstrap is a front-end framework for HTML, CSS and JavaScript. Bootstrap provides premade templates to create forms, tables, models etc.

CHAPTER FIVE- SYSTEM TESTING

Outline of the chapter

Aspects of "singhesuper.lk" software testing are addressed under this chapter. It addressed the methods, forms of testing used, and why and how important it was to test the program. In addition, this chapter discusses the sample test cases, followed by system test reports and results that illustrate the severity of the identified bugs and possible solutions.

5.1 Test Plan and Test Strategy

5.2 Test cases

5.3 Test report

5.1 Test Plan and Test Strategy

Evaluation helps to ensure the new framework is compatible with consumer requirements. For the functions which need to be tested, a test plan is created. Study results are portable developed according to descriptions of the use cases. This improves the quality and maintains that from the commodity.

5.2 Test Cases

A test case is a collection of test inputs, conditions of execution and anticipated results produced for a different goal, such as following a particular plan direction or testing compliance has a particular requirement.

5.2.1 Test Case 01 – login

Table 18 Test case 01-Login

1.Login				
ID	Test Case Description	Input Data	Expected Output	Status
1.1	Steps 1.Input email-address 2.Input password	Email address Password	Authenticate the user, check the user type and direct the user to the homepage	Pass
1.2	Validation of email address and Password	Incorrect email address or password	Displaying an error message	Pass

5.2.2 Test Case 02- Adding products to the inventory

Table 19 Test Case 02- Adding products to the inventory

2.Adding products to the inventory				
ID	Test Case Description	Input Data	Expected Output	Status
2.1	Steps Open the add product form Enter the product details And click on submit	Product name Category Product image Product description Unit price	Message displaying indicating the product is added successfully	Pass

		Brand of the product No of products		
2.2	Product detail Validation	Empty fields	Warning indicating fields are empty, add details	Pass

5.2.3 Test Case 03- Signup

Table 20 Test Case 03- Signup

3.SignUp				
ID	Test Case Description	Input Data	Expected Output	Status
3.1	Steps 1. Go to the signup form 2. Enter the details 3. Click on submit button	Username E-mail Address NIC Mobile number Title Password	Directs to the login page	Pass
3.2	User detail validation	Empty fields, password not matching the confirm password, mobile number and ID not matching the validations	Displaying error messages	Pass

5.2.4 Test Case 04 Searching products

Table 21 Test Case 04- Searching Products

4. Searching products				
ID	Test Case Description	Input Data	Expected Output	Status
4.1	Steps Typing the product name Click on submit button	Product name	If the product is available display the product If unavailable nothing displays	Pass

5.2.5 Test Case 05: View Products

Table 22 test Case 06- View products

5. View Products				
ID	Test Case Description	Input Data	Expected Output	Status
5.1	Steps 1. click on view products on the navbar 2. Select the needed product category	Product category	Displays the available products in the selected category	Pass

5.2.6 Test Case 06: Add product to the cart

Table 23 Test Case 06- Add Product to the cart

6. Add to the cart				
ID	Test Case Description	Input Data	Expected Output	Status
6.1	Steps Click on add to cart in the product cards displayed Enter the quantity in the popup box Click ok	quantity	Cart is displayed with the added products	Pass

5.2.7 Test Case 07: buy items in the cart

Table 24 Test Case 07- Buy Cart

7. Buy cart				
ID	Test Case Description	Input Data	Expected Output	Status
7.1	Steps Click on buy in the cart	All the details of the product User email address	Cart gets empty And the order is placed as a cart order	Pass

5.2.8 Test case 08: Generate Sales Report

Table 25Test Case 08- Generate Sales Report

	8. Generate Sales report			
ID	Test Case Description	Input Data	Expected Output	Status
8.1	Steps Click on generate reports in the admin menu Select the needed duration And click on submit	Starting date of the preferred duration Ending date of the preferred duration	Displays the total sales revenues of cart orders and list orders separately and as a whole	Pass

5.3Test Report

Testing is an important part of the development process, and must be done
All along the process. If the system is tested at the end of the development phase, large changes in the design and other processes may be required. It takes time, and is expensive. The test cases will identify bugs while conducting the tests, and fixing those bugs is crucial in ensuring system quality. Otherwise it may in a later phase affect the processes in the system. You can do unit testing, integrated testing, functional testing to test the system.

- Concept Testing: Acceptable
- All Units testing: Passed
- All Integrated testing: Passed
- UI testing: Acceptable
- All Functional Testing: Completed
- System Testing: Completed

Concept testing, device testing, standardized testing, functional testing tests the system specifications and it guarantees that the system requirements are met by the functionalities. This means the device is efficient. User Interface monitoring verifies the system's usability. All those tests improve the system 's quality. Errors detected in the research were dealt with and the program was updated accordingly

CHAPTER SIX: SYSTEM INSTALLATION

6.1 Installation guide

Hardware and software requirements of the system has been discussed in this chapter

6.1.1 Hardware requirements

Hardware requirements of the server machine should be as follows.

- Mouse/ keyboard
- 200GB hard drive
- Internet connection
- 400MB to 1 GB per user

6.1.2 Software requirements

Software requirements of the server machine are as follows.

- Operating system – CentOS, Ubuntu server
- Web browser (Chrome, Firefox)
- MySQL
- PHP
- Apache server

6.2 User manual

A User Manual helps to manage the system easily. It explains the functionalities step by step. This user manual explains the users how to use the shopping assistant system
The main functionalities of a customer

- Signup
- Login
- Search products
- View products
- Place orders as a list
- Add products to the cart and buy the cart
- Give feedback
- Logout

The main functionalities of an administrator and a cashier is

- Manage cashiers (only administrators can)
- Login
- Manage Inventory
- Manage Categories

- View customer feedback
- Manage customer orders
- View suggestions
- Generate sales report
- Logout

6.2.1 Login

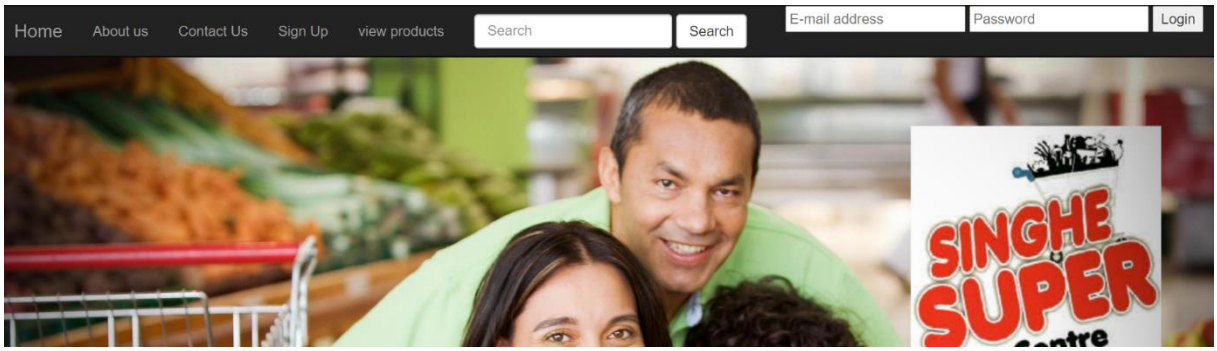

Figure 41 login

Steps for Login

1. Enter the email-address and the password
2. Click on the Login button

6.2.2 Adding a product to the inventory

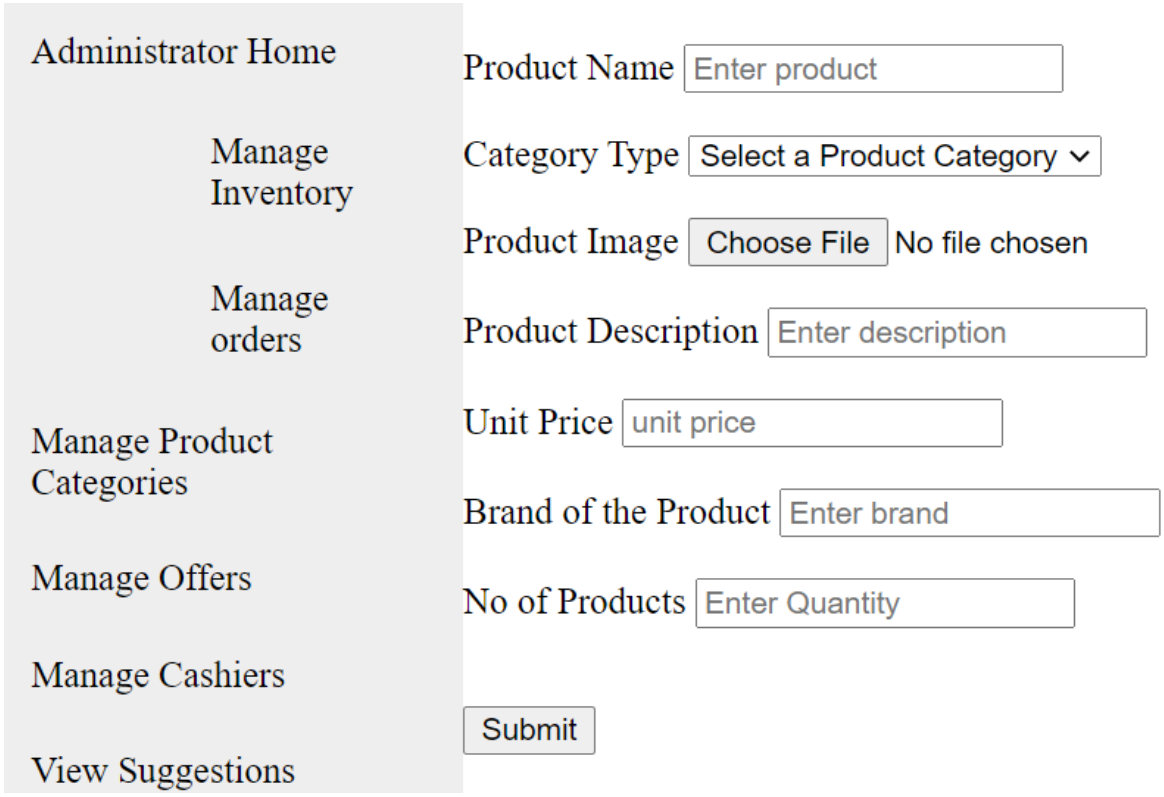

Figure 42 add product to the inventory

Access to this function is given to the administrators and cashiers

1. Click add product from the admin menu
2. Enter the product details
3. Click on add product

6.2.3 View the orders placed by the customer

Figure 43 view ongoing list orders

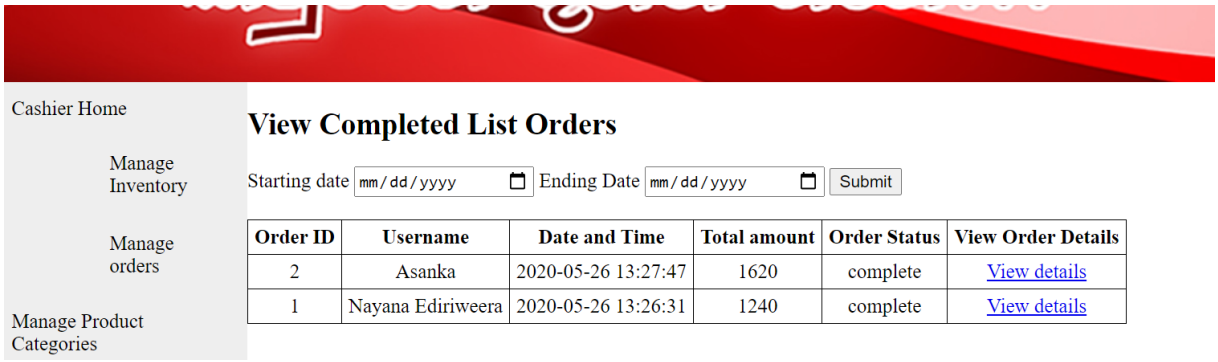

Figure 44 view complete list orders

Figure 45 view ongoing cart orders

The administrators and cashiers can use this function

1. Click on view orders from the admin menu
2. Click on view details to check the order details

6.2.4 Search products

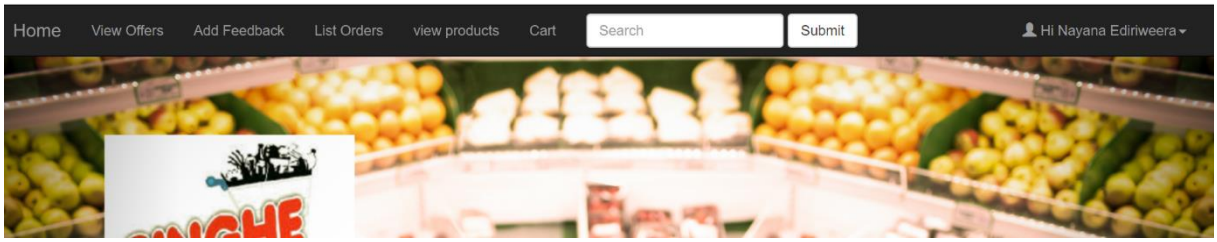

Figure 46 Search Products

Customers and anyone who visits the site can search the products

1. Type the name of the product in the search bar
2. Click on submit

6.2.5 View products

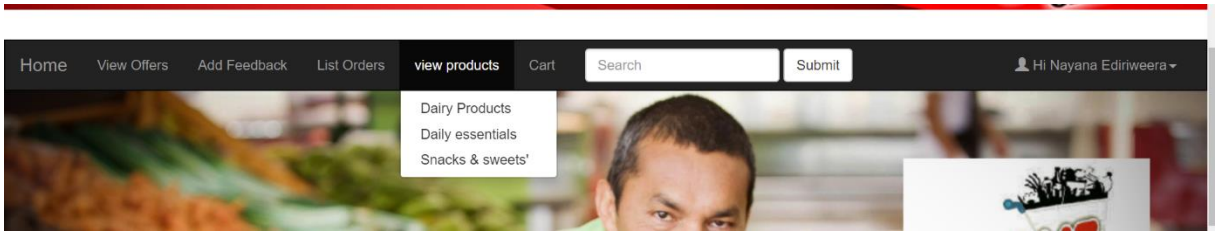

Figure 47 view products

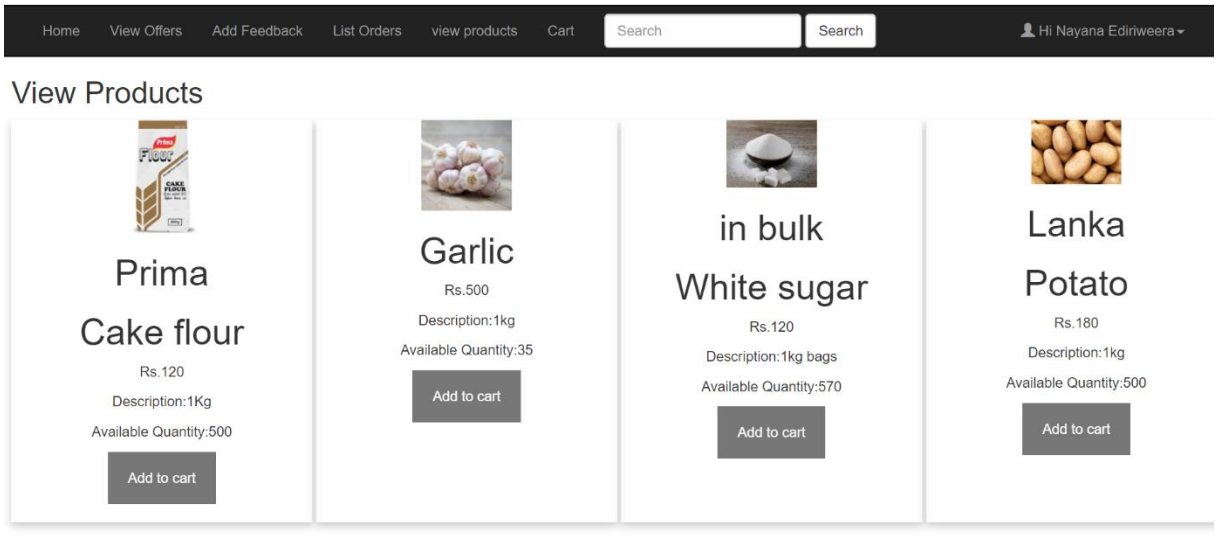

Figure 48 Display of products

1. Click on view products on the navbar
2. Then click on the preferred product category

6.2.6 Add feedback

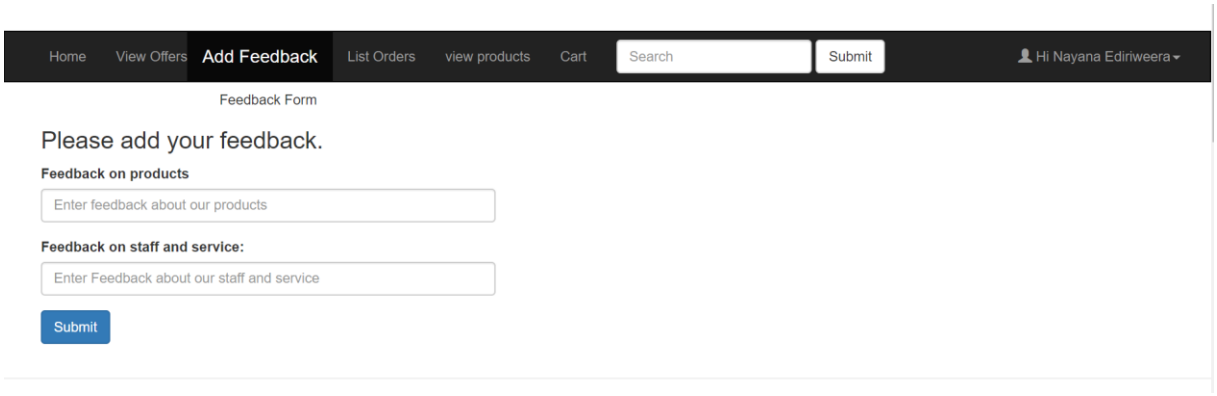

Figure 49 Add Feedback

The customers can add feedback on products and the services after logging in as a customer

1. Click on add feedback on the navbar
2. Enter the feedback on the text boxes
3. Click on submit

6.2.7 View feedbacks

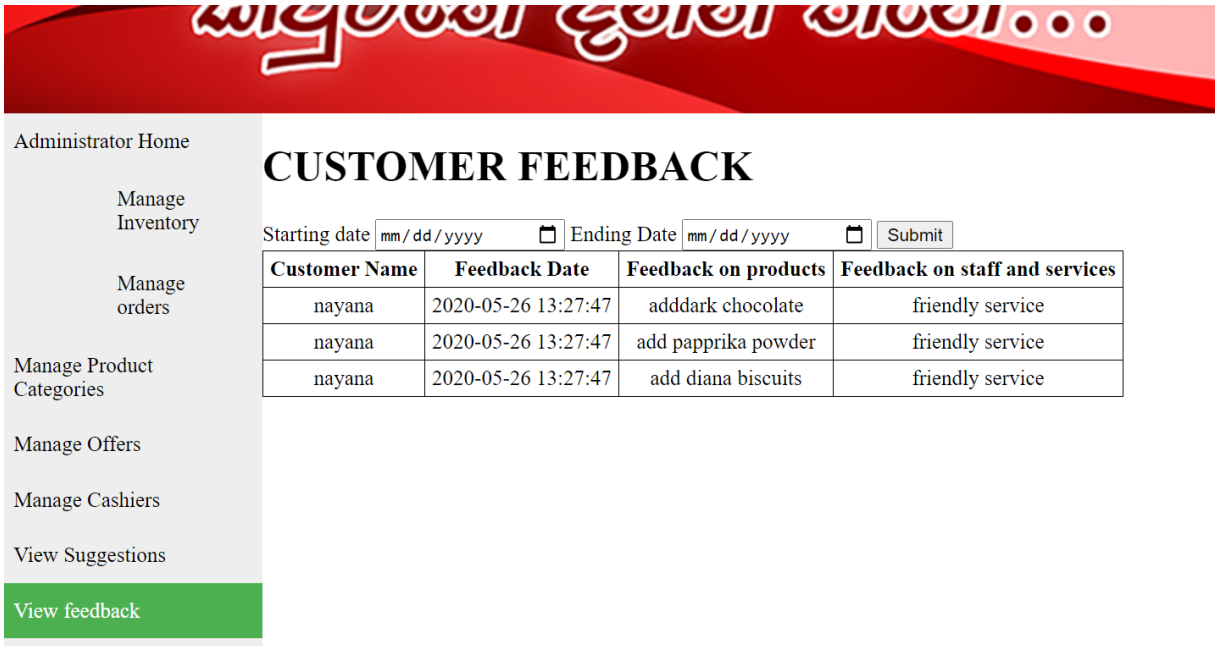

Figure 50 View customer feedback

Administrators and cashiers can view the feedback given by the customers

1. Click on view feedback on the menu
2. Select the duration by selecting starting and ending dates
3. Enter submit

6.2.8 Generate Sales Report

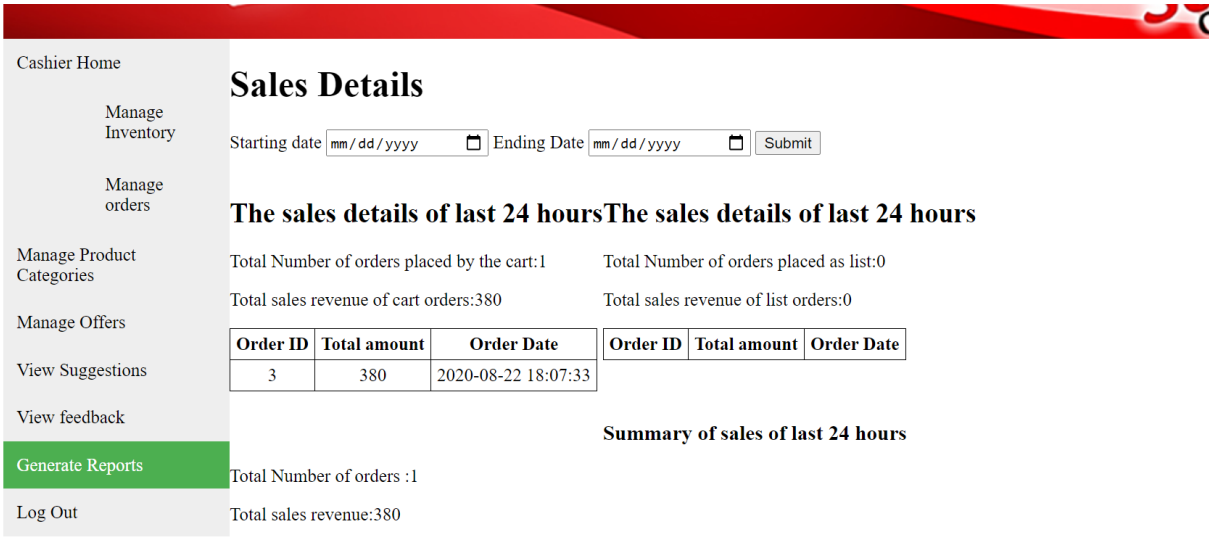

Figure 51 Sales Report

Administrators can view the sales details

1.Click on generate sales reports
2. If needed select a preferred time period and click on Submit

CHAPTER 7 - CONCLUSION

Outline of the chapter

7.1Degree of the objectives met

7.2Usability, accessibility, reliability and friendliness

7.3User’s response

7.4Limitations and drawbacks

7.5Future modifications, improvements and extensions possible

7.6References

7.1 Degree of the objectives met

The functional and non – functional requirements of the proposed system define the satisfactory levels of aims and objectives of the project. It is highly intended to satisfy the general functional aspects such as receiving, storing, retrieving and publishing the relevant data and information. Online placing orders aspect and inventory handling aspect are intended to satisfy too. Different access levels of the users have been taken in to consideration while designing the system. Therefore, it is evident to state that the aims and the objectives defined in the project in relation to the problems identified are clearly addressed by the functional and non – functional requirements identified.

7.2 Usability, accessibility, reliability, and friendliness

When considering the usability, Graphical User Interfaces were designed considering the usability engineering concepts (heuristics). When considering accessibility, necessary privileges are designed to be provided for the relevant user types providing appropriate credentials for different access levels. In order to achieve reliability goals, various validation techniques are designed to be used throughout the system. Early understandable and simple user interfaces, functionalities and real time responsiveness are the main features which are to be provided to enhance the user friendliness of the system.

7.3 user's response

Customers can access the website anytime and get details about the products and place online orders. management can access the website anywhere, anytime and evaluate the position of the business, view the sales reports.

7.4 Limitations and Drawbacks

Proposed web – based platform does not provide online delivery feature

7.5 Future modifications, improvements and extensions possible

A mobile application to perform all these functionalities parallel to the web-based platform could be implemented as an extension to this system.

7.6 References

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