E-Commerce Web Site For Coconut Development Authority, Sri Lanka

A dissertation submitted for the Degree of Master of Information Technology

R.M.I.S. Ranasinghe

University of Colombo School of Computing

2019

Abstract

Coconut is one of the key plantation crops that account for roughly 12% of all agricultural turnovers in Sri Lanka. The project titled as e-Commerce website for Coconut Development Authority (CDA), Ministry of Plantation Industries, presupposed to offer associate IT solution to enlarge the native market of coconut business up to a world scale during which the suppliers and therefore the customers might establish an on the spot selling approach wherever presently large profit of merchandising these products for the international consumers is gain by intermediaries. The major objective is to establish a platform within the means that of e commerce website where the coconut and coconut primarily based product sellers and buyers will meet directly and perform businesses whereas enriching awareness concerning the value added coconut products through digital promoting ways to maximize the revenue. The system is deployed as an e commerce website and follows the client — server architecture. User interfaces run on the client side in the two- tier client- server architecture and also the database is stored on the server. The software solution implemented based on the MVC design pattern by considering CDA's own requirements and featured with further functionalities like social media marketing. The system development stage started with system designing using ER diagram, Use case diagram and system architecture then it implemented on PHP Storm IDE using Scripting Language of PHP, JavaScript and HTML, CSS and Bootstrap and used Laravel as the framework. phpMYAdmin on XAMPP server as the database creation and used MySQL languages. The system tested to confirm accuracy and reliability and to test whether it meets its desired objectives. The system finally meets its requirements at a higher level.

Keywords: E commerce, Digital Marketing, Coconut Industry

Declaration

The thesis is my original work and has not been submitted previously for a degree at this or any other university/institute.

To the best of my knowledge it does not contain any material published or written by another person, except as acknowledged in the text.

Student Name: R.M.I.S.Ranasinghe

Registration Number: 2016MIT059

Index Number: 16550592

_____

Signature: Date:

This is to certify that this thesis is based on the work of Ms. R.M.I.S.Ranasinghe under my supervision. The thesis has been prepared according to the format stipulated and is of acceptable standard.

Certified by:

Supervisor Name: Dr. M.G.N.A.S. Fernando

_____

Signature: Date:

Acknowledgement

I would like to express my heartfelt gratitude and appreciation to my project supervisor, Dr. M.G.N.A.S. Fernando who has been tremendously helpful throughout the project for his constant help and expert supervision over the project.

I cannot express enough thanks to Mr. Sampath Samarawickrama Director - Marketing Development and Research, Coconut Development Authority for giving the opportunity to develop such a unique system and especially to Mr. H.M.S.N Ariyadasa, Lecturer, Uva Wellassa University for the tremendous support given from the initial stage of this work.

My completion of this project could not have been successful without the support of my dearest family. I want to dedicate the success of this project to my father, mother, and brother who were very influential at every bit of time.

Table of Contents

List of Figures

List of Tables

List of Abbreviations

CDA	Coconut Development Authority
DBMS	Database Management Systems
ER	Entity Relationship
HTML	Hypertext Mark- up Language
IDE	Integrated Development Environment
MVC	Model View Controller
PHP	Hypertext Pre- processor
SQL	Structured Query Language
XAMPP	Windows/Linux Apache MySQL PHP Perl

Chapter 1

1. Introduction

1.1 Chapter Overview

The first chapter of this dissertation opens with the motivation and background of the study and followed by the project objectives and scope of the project. The chapter concludes with the organization of the dissertation.

1.2 Motivation

“Coconut is one of the major plantation crops which accounts for approximately 12% of all agricultural turn over in Sri Lanka. Total land area under cultivation is 395,000 hectares and about 2,500 million nuts are produced per year”. Coconut Development Authority, Coconut Cultivation Board and Coconut Research Institute are the three major Government Institutions that are responsible for the production & quality improvement, supply development and research respectively.

The proposed project titled under e-Commerce Website for Coconut Development Authority (CDA), Ministry of Plantation Industries, supposed to provide an IT solution to enlarge the local market of coconut industry up to a global scale in which the suppliers and the customers could establish a direct marketing approach where currently huge profit of selling these products for the international buyers is gain by intermediaries.

Furthermore there is a need to enhance the demand for the coconut and coconut based products among the local and international customers by engaging them in to a platform where they can buy products and share service information about the products with other consumers via social media and specially uplift the coconut and coconut based production in order to full fill the demand. Moreover, the current established official website (http://www.cda.gov.lk) of Coconut Development Authority is only facilitating to register manufacturers and exporters and to maintain a directory of them. It does not facilitate for their service side which they wish to reach the customers through. There is no any payment method followed in the current scenario as to sell their products. Also, they need a

mechanism to direct sell their product without intermediaries while earning compensation as a commission for them by delivering the services.

The proposed web based E- commerce system will answer to the above main questions with other facilities to smooth the procedure of CDA business.

1.3 This Project

1.3.1 Objectives

The major objective is to establish a platform in the means of ecommerce website where the coconut and coconut based product sellers and buyers can meet directly and carry out businesses while enriching awareness about the value added coconut products through digital marketing strategies in order to maximize the revenue.

The following sub objectives will drive to achieve the overall objective.

- Implement an ecommerce website which can access, sell, promote, share, buy coconut products, coconut based products and do transactions online with various modes of payment in an interactive way.
- Enrich product and service awareness through digital marketing strategies by engaging social media platforms.
- Make buyers updated with product auto tracking system.
- Calculate compensation for the service provider (CDA) as a commission from each sold product.
- Let users (sellers and buyers) share their voice via the website in order to fine-tune the service being offered by the way of discussion forum.
- Let manufacturers and exporters get the diversified knowledge regarding the products by sharing related information from government agencies to make the CDA service side more productive.

1.3.2 Scope of the Project

Technologically, an electronic commerce web site developed with responsive web design techniques would answer the above scenario with the number of mobile users accessing the web site grow larger and the open stage on the internet for dealings spread wider. Followings are the requirements identified and project boundaries limited with that.

Functional Requirements:

1. Database for manage products and supplier/ manufacturer details (seller is the agent of suppliers/ manufacturers)
2. Web interfaces for display, advertise and sell products.
3. Product price, discount (if any), description, product video demo should be embedded.
4. Online transactions via a payment gateway which supports payment modes like ez cash / m cash, credit card and debit cards (Master/Visa)
5. Discussion forum to support user reviews on the products available and to discuss and comment on the other services provided.
6. Products description should be able to share in a selected Social Media website (Eg: Facebook.com).
7. Automatically track the latest status of delivery updates and send out push notifications via emails or SMS.
8. Compensation calculation from each sold product.

Non Functional Requirements:

1. Performance

The system to be implemented should run under smooth loop & very stunning. High performance of the computer is not compulsory to run the web system. But the standard graphical environment will be required.

2. Security

The system will be designed to meet their maximum efficiency levels. Also, the system will be developed by fixing almost all errors with high security. Databases are encrypted with secured encryptions to make sure the protection of data stored in the system database. Also, users can send bug reports to the admin any time using error report tool. Inactive users will be logged out automatically.

3. Usability

The usability of the proposed system will be very important. According to the design, the website will be designed to be much easier and user friendly. The layouts, short-cuts and overall the interface will be designed with common icons, native actions, etc.

4. Accessibility

The system can be accessed using proper login constraints. It's easy and saves time. Data can be accessed anytime. It is facilitated to update and retrieve data when an internet connection is available

Assumption:

- The number of suppliers and their details which currently exist under the Coconut Development Authority will be catered when testing with real data.

1.3.3 Structure of the Dissertation

Chapter 2 – Background

Describes the existing systems and others approaches to solve similar problems.

Chapter 3 – Methodology

Describes the technologies and the methodologies that adapt to solve the problems are discussed here in detail by clearly pointing out how and why these techniques and procedure are appropriate to solve the problem.

Chapter 4 – Evaluation

Describes how the evaluation has been done and the details about the system testing for the solution.

Chapter 5 – Conclusion

Describes the conclusions of overall achievements quantitatively and discusses the problems encountered, limitations of the developed solution and some further work.

Chapter 2

2. Background

2.1 Chapter Overview

Having defined the problem to be solved in the previous chapter, this section of the dissertation provides a review of similar systems developed for the Sri Lankan main export sectors such as Tea, Rubber and special reference to the coconut and coconut based products as to the proposed system. This chapter also discusses the selection of previous works related to this problem defined in the previous chapter.

2.2 Existing Similar Systems

A single web application or software that provides all or most of the required features and functionalities is not found on the internet. Web applications and software that provide similar features and functionalities of the proposed system were reviewed through a literature review to get a better understanding of similar systems.

This section presents a critique of features of most appropriate recent web based e-commerce and non e-commerce websites developed for Sri Lankan Export sector with respect to the proposed solution.

Official websites of the following organizations taken in to account by considering major export products in Sri Lanka. Thus the literature discusses Coconut, Rubber, and Tea related export companies which practice direct marketing through their websites.

2.2.1 Econutrena

Jaindi Exports (Pvt) Ltd is a well reputed large scale coconut based food and beverage products manufacturer & exporter under the brand name econutrena. Primarily based in Sri Lanka, the company offers an expanding and diversified product portfolio ranging from coconut based products a range of organic spices, fruits, Ayurvedic and beverage products to the global market. Their official website is www.econutrena.com which does not handle direct selling of their products but the website display their product portfolio in a very attractive manner with consist, attractive and user friendly widgets [2].

2.2.2 Lanka Coco Products

Lanka Coco Products is a well-established company operating since 1994 catering to a wide range of an audience. LCP produces products for the erosion control, horticultural and industrial sectors. The official website www.lankacoco.lk of them provide a downloadable product broacher and special feature of this website which it differs from other coconut related websites is they provide service side consultations and information about erosion control and horticulture of coconut production via the website with rich contents. But still, customers or suppliers do not provide a platform to engage with their consultation through the system in the means of FAQs or discussion forum. It intends to solve that problem and fill the gap between them by providing facilities like discussion forum to discuss service related matters by the proposed solution [3].

2.2.3 DSI Foot Candy

DSI is a Ruuber product and major rubber based Export Company in Sri Lanka. DSI Foot Candy is the online footwear store in Sri Lanka provides an attractive array of footwear and accessory designs to buy online. It provides hassle-free order placement and island wide delivery. The official website for their online business is http://www.dsifootcandy.lk/ which provides various functionalities such as display product category, cart, zoom able images of products, price with description, related products, wish list and specially they incorporate product sharing facility through Social media websites such as Facebook and twitter which very popular in Sri Lanka in order to gain huge market potentiality which also a requirement of the proposed solution. But the website is not many users friendly in the means of content display, color imbalance, and images of the product are too large. Also, there are not enough product descriptions and more importantly the system does not have a functionality to handle customer queries and complaints through the system which is provided by the proposed solution [4].

2.2.4 Halpe Tea

Halpe Tea is a Tea export company located in Uva Province of Sri Lanka which does selling their various flavored tea targeting global market through their official website of http://www.halpetea.com/. On the website they have features to sell their products like Option for user registration or guest access, product selection, adding to cart and display tea cart, payment method, checkout progress, display billing, payment, shipping information, and

order review information. Additionally, they posted a downloadable product catalogue on the website and also it contains webpages that display their privacy policy and delivery policy which is very important for the customers and also to the organization. Even though Halpe Tea is one from few other Tea export companies which practice direct marketing over their official websites it is also lacking important features such like after sales service managements strategies, social media engagement and product demo which facilitates from the proposed system. When considering the nonfunctional features of the websites it displays a lack of availability of some features of checkout method panel such as billing, shipping, payment, and order review. When considering the user interface features it displays too small letters size with a light color that not matches with the background in the content [5].

2.2.5 Survey on E-Commerce Implementation in the SME Sector of Sri Lanka Conducted by the SLBDC for the Asia Foundation

The above titled survey conducted by the Sri Lanka Business Development Center over Sri Lankan Small and Medium Enterprise (SME) based companies with the objectives of analyzing the extent to which the business community in Sri Lanka utilizes the World Wide Web (www) to source markets for its inputs and to review existing examples of companies that have succeeded in using the Internet to sell or source products. They tried to understand why companies those are receptive to transforming their traditional relationships in order to participate more effectively in emerging web-based supply networks have not succeeded in doing so [6].

The survey report implies that the level of penetration of the web based selling is very much limited and specially very few companies surveyed by them had used the services of a web portal for selling their goods and services which shows a need of a well established web portal for local business for a smooth run in Sri Lankan context. Also it findings report that the SMEs are not geared up to take up E-Commerce as a serious business concept. They reveal that on-line payments remain an obstacle to carry out purchases since credit card payments are governed by the credit card limit. Normal credit card limit in Sri Lanka is between USD 500/- and USD 1,000/- and therefore it is difficult to purchase high value items or purchase in bulk for re-sale. Here this can be affecting to the CDA since that they also expecting to serve the local market.

2.2.6 Social media for e-commerce amongst small businesses in Saudi Arabia

An investigation of the use of social media for e-commerce amongst small businesses in Saudi Arabia which is carried out by Helal, 2017 interpret some impressive results of proves that the direct relationship between social capital, word of mouth and trust in the context of small businesses in Saudi Arabia that use social media as their main trading platform. The research came up with a developed conceptual model that The Social Capital – Social Commerce Model, 'The SC-SC Model' illustrates the impact of social capital on social commerce in the context of that research. The conceptual model draws on the importance of two major influencing factors that initially caused the evolvement of the social media shopping phenomenon. These two major influencing factors are 1) the drawbacks of traditional e-commerce in Saudi Arabia, and 2) the benefits of using social media as an e-commerce platform. The model also suggests that there is a direct relationship between social capital, word of mouth and trust in the context of small businesses that use social media as their main trading platform in Saudi Arabia [7]. Hence it proves and providing an opportunity to co-op up social media as a marketing strategy to gain huge market platform by integrating it to the e commerce websites which is catering through the proposed solution for CDA.

2.3 Review Summary

By considering and evaluating different types of websites related to Sri Lankan Tea, Rubber and Coconut Export sector above review illustrate that there are plus and minus cases for each and every platform which can be catered as positive functionalities form the proposed solution. The study about the E-Commerce Implementation in the SME Sector of Sri Lanka conducted by the SLBDC for the Asia Foundation reveals that there is an opportunity in Sri Lanka to up lifting e commerce activities through business. Finally from the research based on Social media for e-commerce amongst small businesses in Saudi Arabia also provides an idea about how social media can be incorporated for e commerce business.

Chapter 3

3. Methodology

3.1 Chapter Overview

This chapter describes the strategies used for implementation, database design, Use Case diagrams and interface designs to develop the system.

3.2 Strategy for Implementation

Considering the above mentioned facts and functional and non-functional requirements of the proposed system, it is expected to develop the system using the most suitable combination of strategies.

A web based system solution is proposed against the stand-alone system solution. System is subject to deploy in a web server. Since the development time is constrained, some part of the system has developed from scratch and some were use existing open-source software components as needed. PHP with MySQL database will be used as the development languages of the proposed system.

3.3 System Design

3.3.1 System Architecture

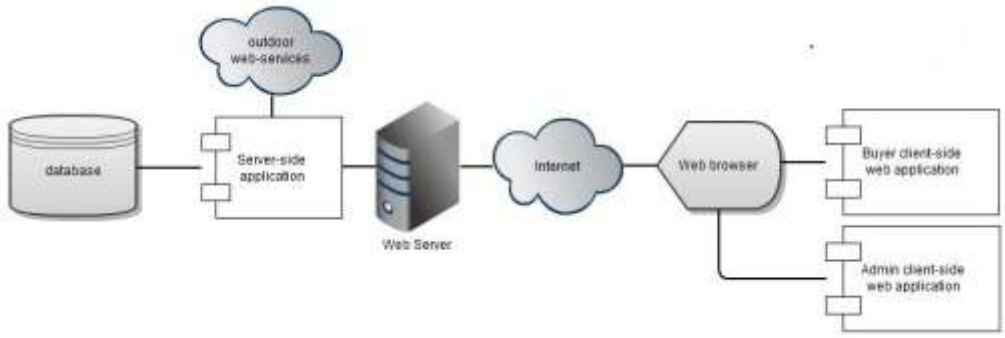


Figure 3.1: Client - Server Architecture of the proposed system

The system is deployed as an ecommerce website and follows the client – server architecture. The user interface runs on the client in the two- tier client- server architecture and the database is stored on the server. It allows client processes to run separately on different computers from server processes. The above Figure 3.1 represents the proposed system architecture.

3.3.2 Database Design

3.3.2.1 ER Diagram

The ER modeling approach is very useful in designing the database scheme because it well maps the relational model and the structures used in the ER model can easily be converted into relational tables. The following Figure 3.2 represents the ER diagram of system.

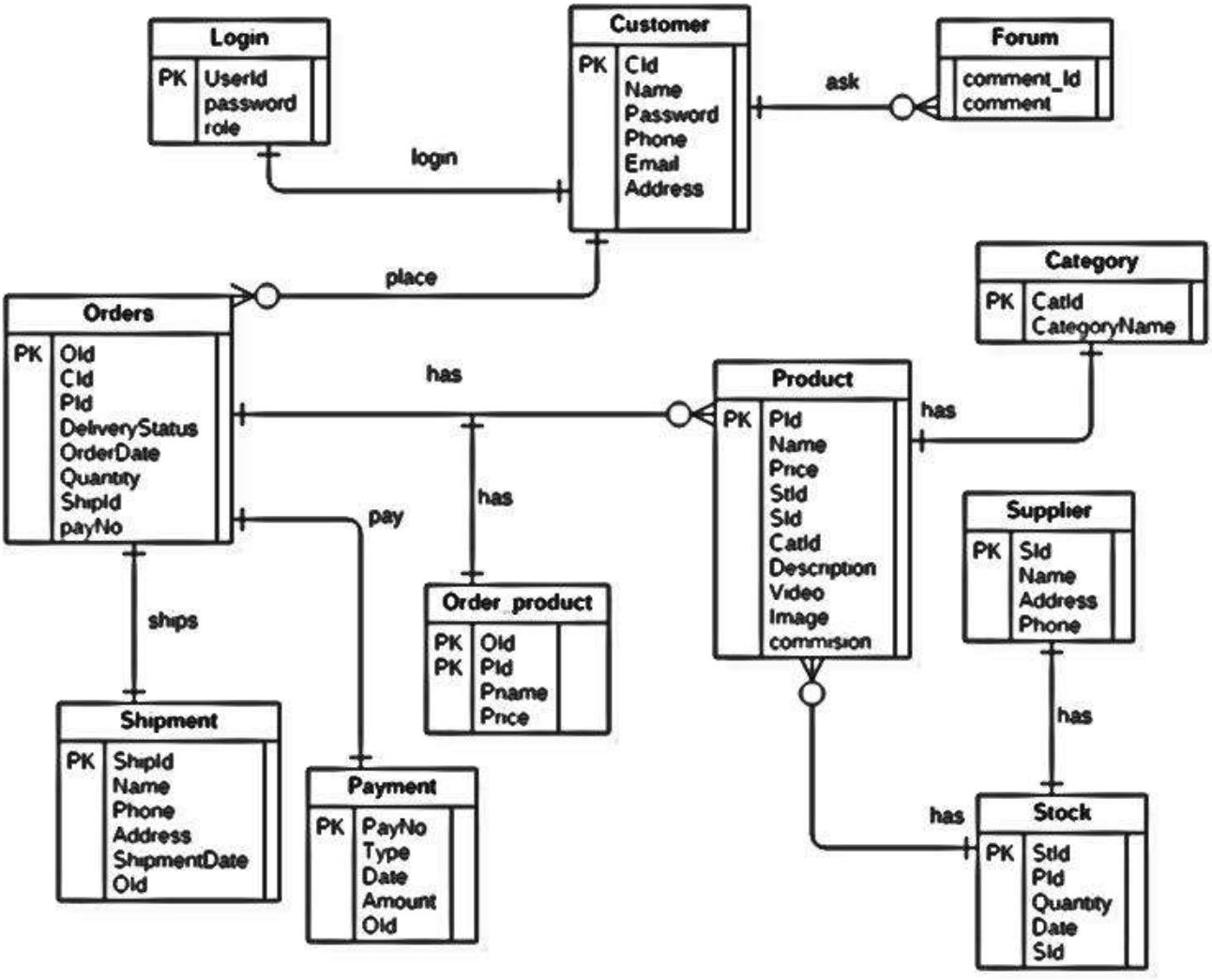


Figure 3.2: ER Diagram

Table Design

Table designs are completed in a few steps:

1. Project Definition
2. Process Definition

    1. PROJECT DEFINITION
        - Product details
        - Stock details
        - Order details
        - Customer details
        - Supplier details
        - Shipment information
        - Payment information
        - Forum discussion management

    2. PROCESS DEFINITION
        - Product
        - Stock
        - Customer
        - Order details
        - Shipment info
        - Payment info
        - Login
        - Forum

3.3.3 Use Case Diagram

The Use Case Diagram is a visualization of a use-case, i.e., the interaction between the E Commerce web system and the users. There are two user roles that interact with the system namely Admin (CDA Agent) and the Customer.

Admin (CDA Agent)

Amin has all the controls of the system technically and generally. Admin is the responsible person to update the system with product details and supplier details, receive and respond to user comments via the discussion forum. Following actions are supposed to perform by the Admin. Figure 3.3 depicts the Use Case diagram for Admin interaction with the CDA website.

- Add, delete and update product and stock attributes and details.
- Update supplier details
- Product Category Management
- Order management
- View Charts

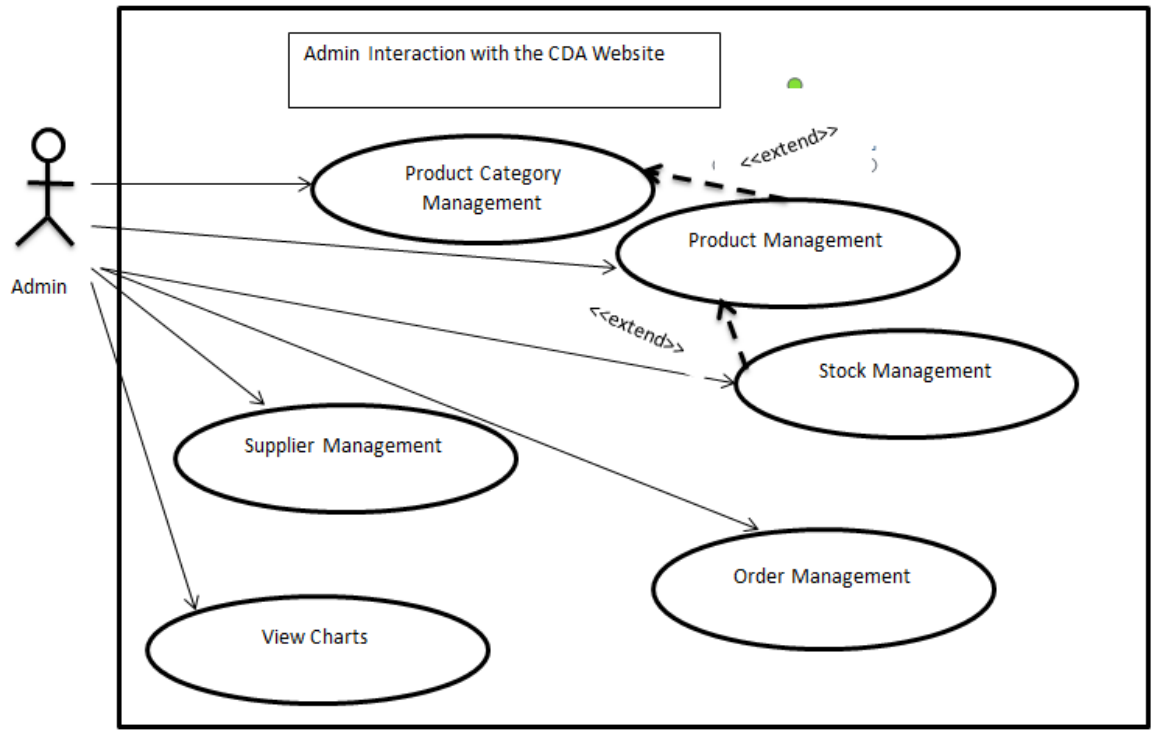


Figure 3.3: Use Case diagram for Admin interaction with the CDA website.

Customer

This user has the maximum accessibility to the platform. A customer can register to the system and get user credentials as authentication to the system. Then the customer can login to the system by using user Id and password. The customer can perform the

following actions in order to interact with the system. Figure 3.4 depicts the Use Case diagram for Customer interaction with the CDA website.

- Update Customer Information – Profile Management
- See products and description
- Add to shopping cart
- View shopping cart
- Buy products using a payment method
- Cancel order
- View orders
- Share product details on Social Media website

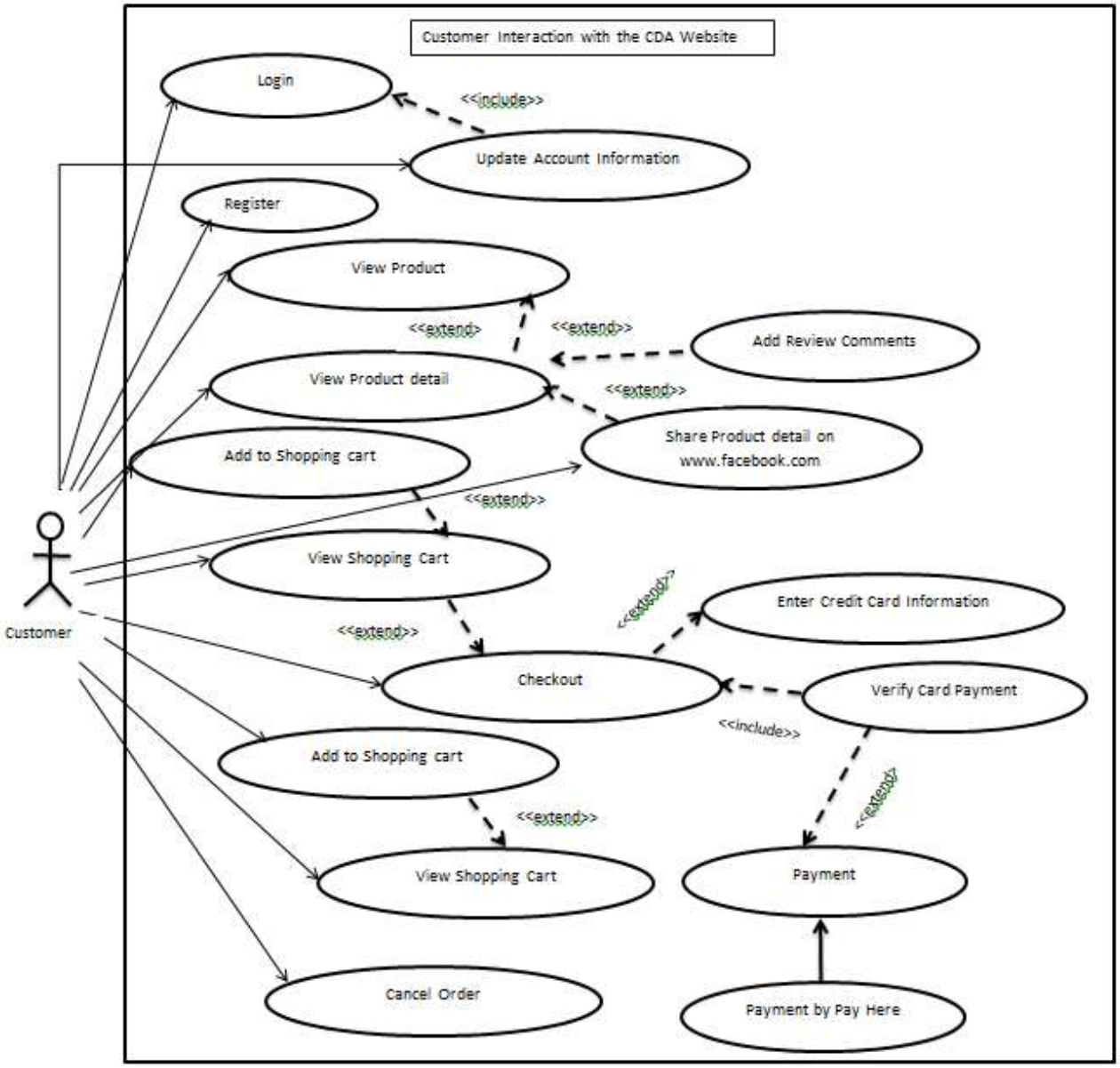


Figure 3. 4: Use Case diagram for Customer interaction with the CDA website.

Figure 3.5 represent the high-level Use Case Diagram for the type of user actions that can perform in the E Commerce Website. Low level use case diagrams along with relevant use case narratives are annexed. (Appendix A). UML diagrams were designed using StarUML.30 software. [8].

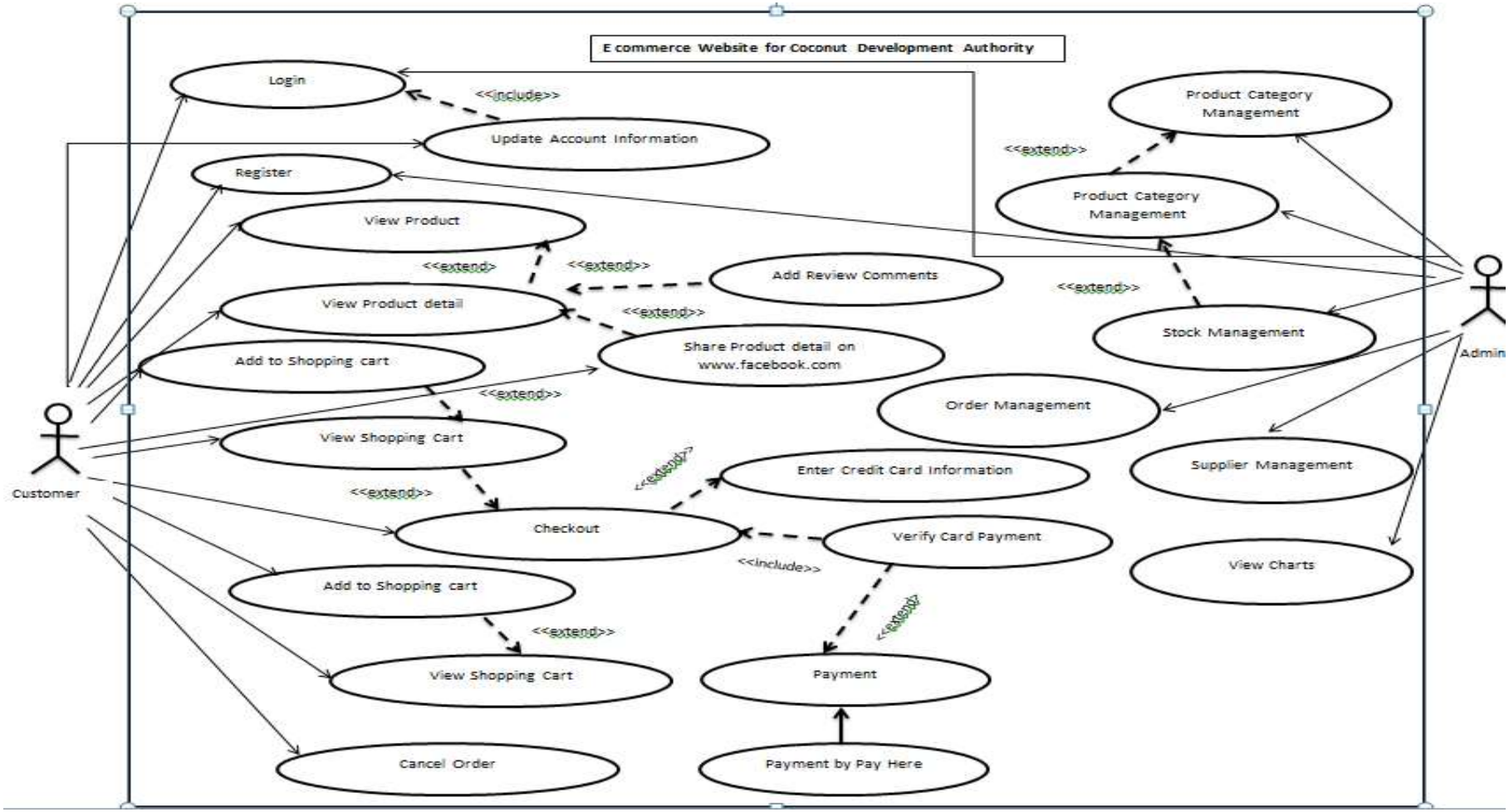


Figure3. 5: High Level Use Case Diagram

UI Design

Implementation is the stage of the project where the theoretical design becomes a working system and gives users the confidence that the new system will work efficiently.

The proposed system has a major concern over providing an attractive and user friendly interfaces. By making the system more attractive, usable, efficient and user friendly; the end users will have the desire to use the system more and will result in bringing a competitive advantage for the CDA.

User Interfaces are designed based on the processes of user roles. Main two modules of the system are Customer Module and Admin Module. According to that Customer Module design is based on the following processes.

- Product Details view
- Customer view
- Order details view
- Payment information
- Login
- Registration
- FAQ
- Discussion Forum

According to the Admin Module, the dashboard is designed based on the following processes.

- Product details view
- Order details view
- Stock management
- General Setting
- Login
- Registration

Some of the sample user interfaces are as follows

Figure 3.6 depicts the interface of Home page where any user will direct through the URL of the Website.

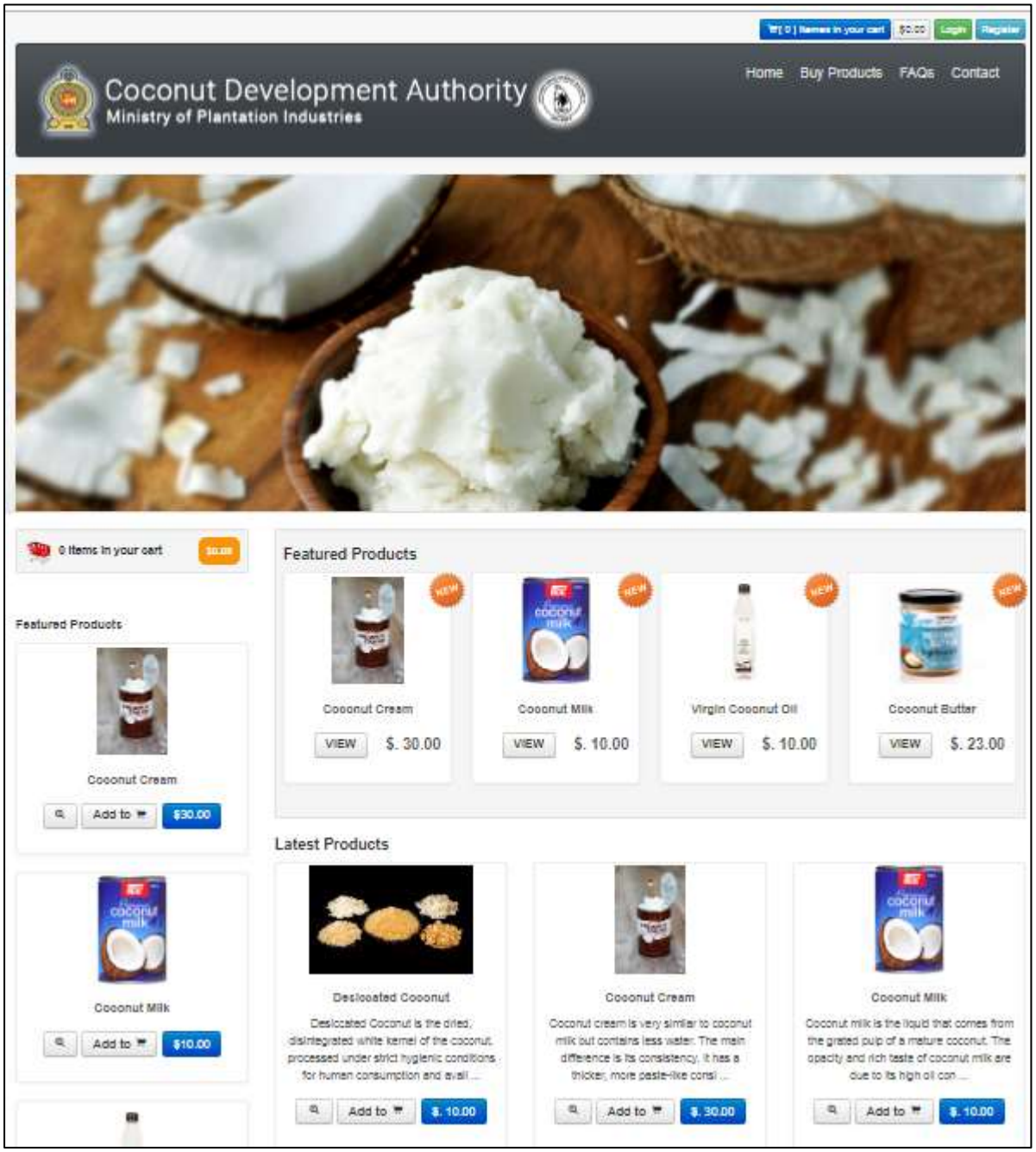


Figure 3.6: Home Page

Following Figure 3.7 depicts the Login Interface of the Website

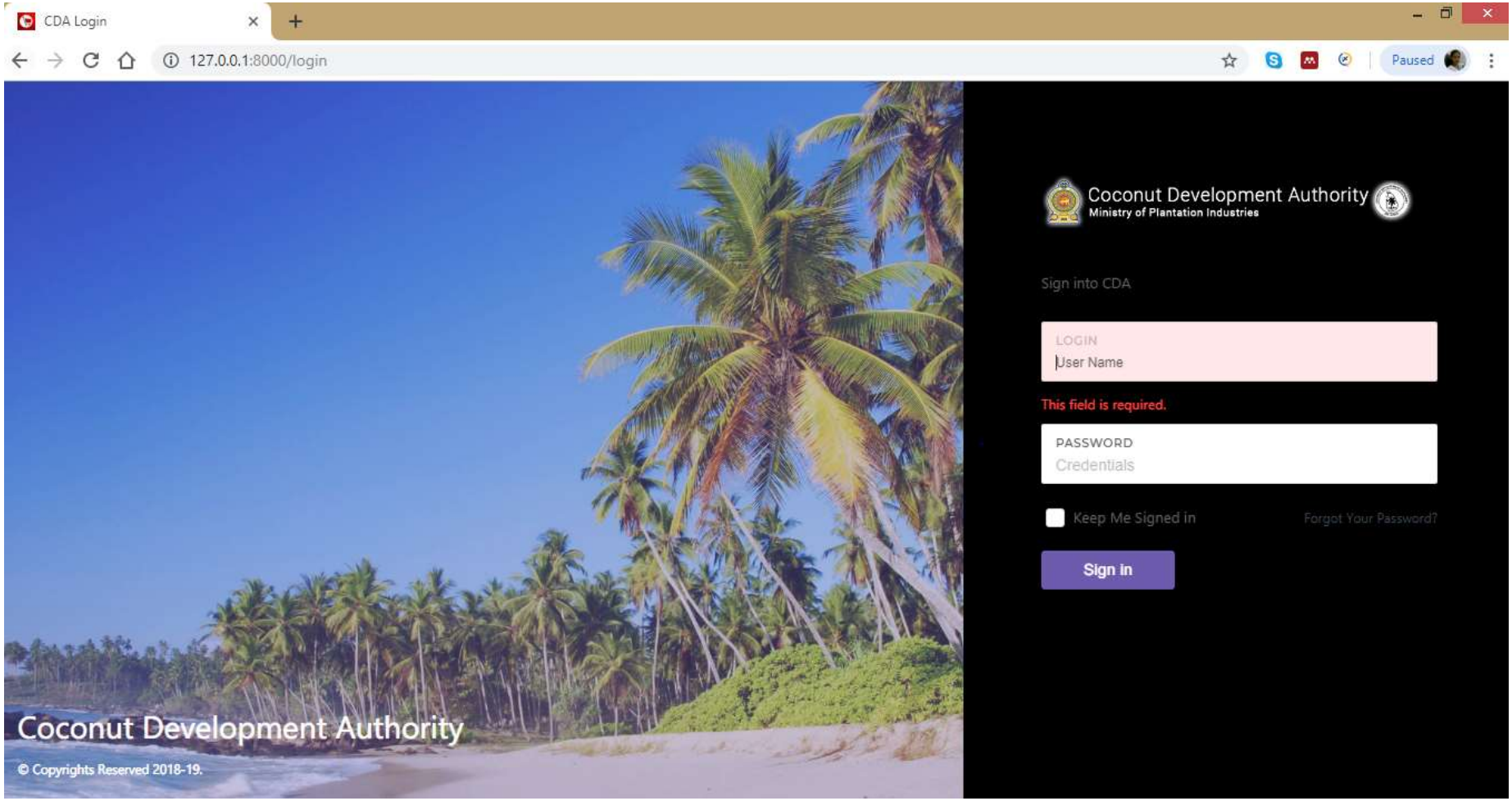


Figure 3. 7: Login page

Figure 3.8 depicts the product details interface of the Website. It consists with function of adding to cart, display image and video of the product and sharing the description via social media page.

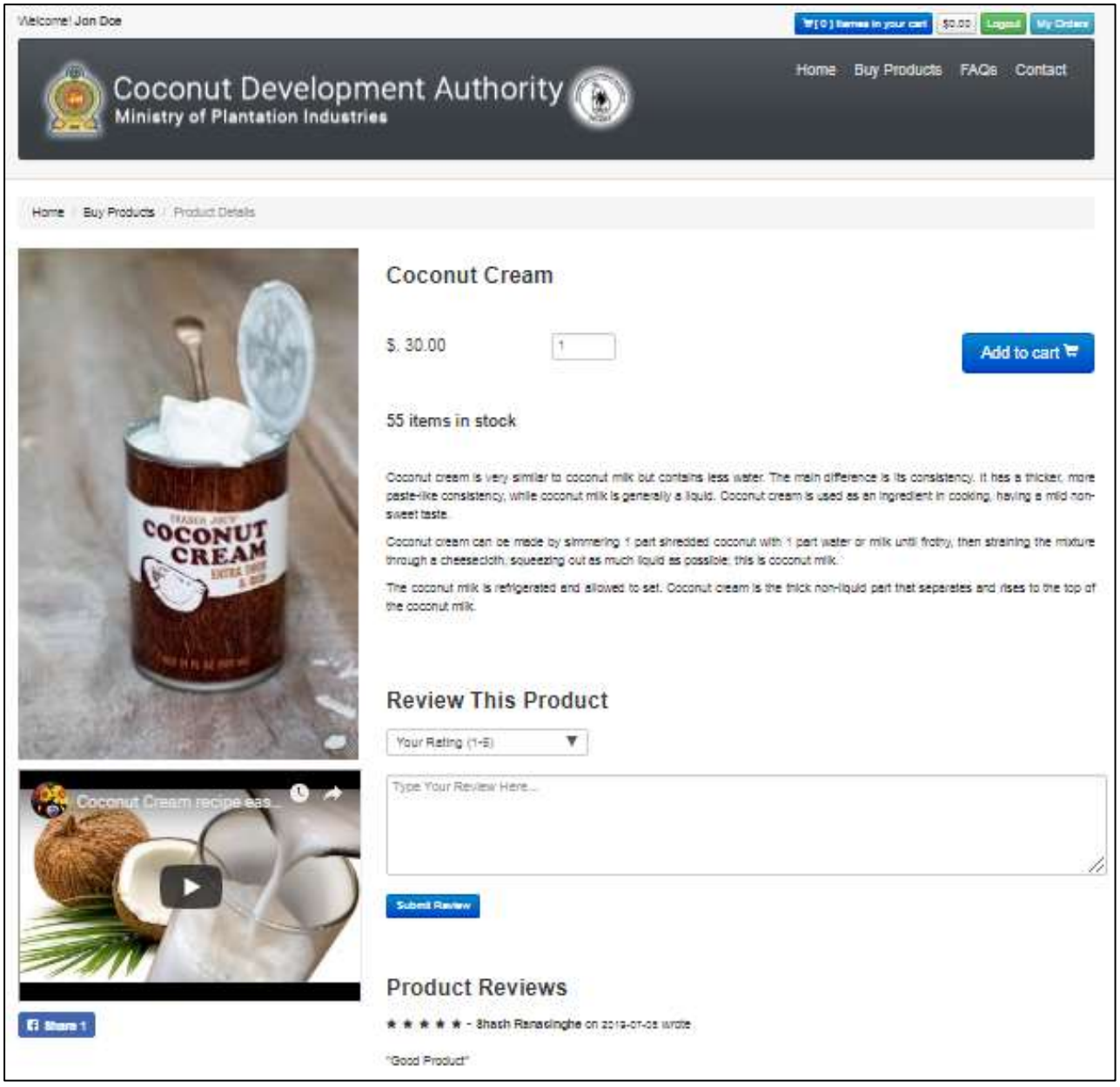


Figure 3. 8: Product Details Page

The following Figure 3.9 depicts the shopping cart when items have been selected to purchase and Figure 3.10 depicts the Contact information interface.

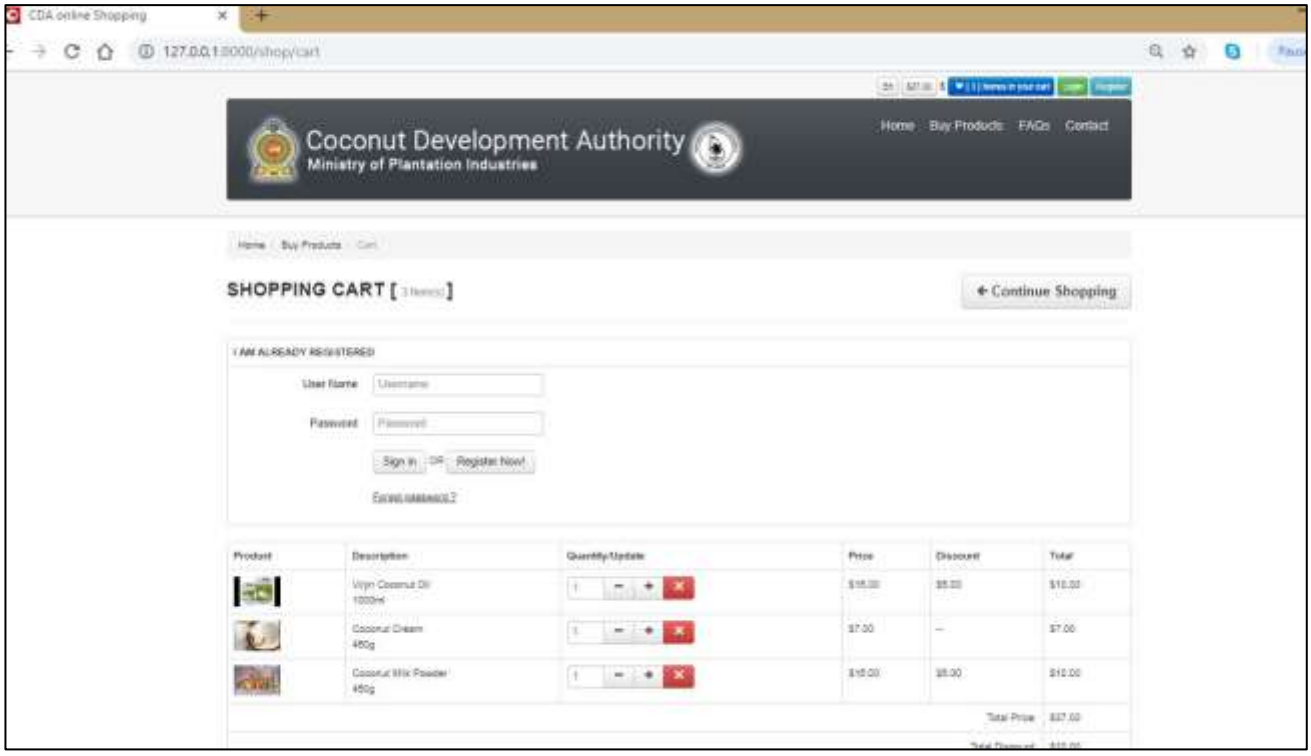


Figure 3.9: Shopping Cart Page

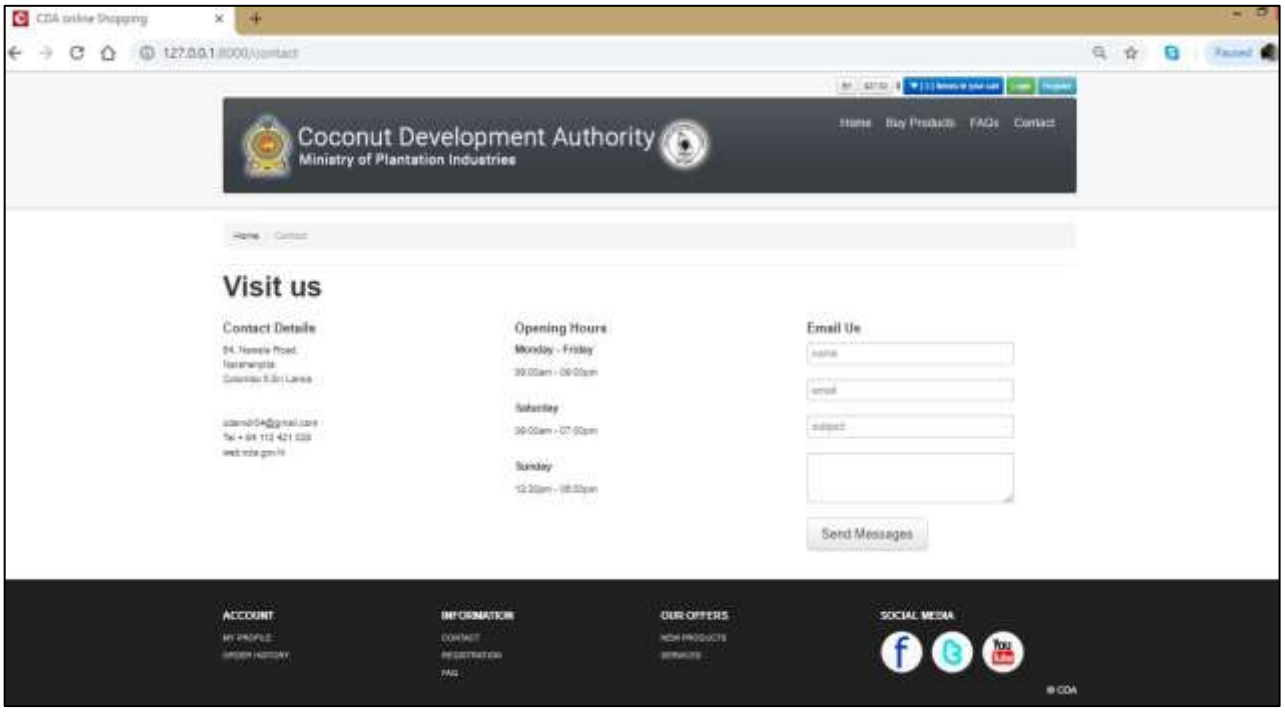


Figure 3.10:Contact Page

Following Figure 3.11 depicts the Order Summary interface.

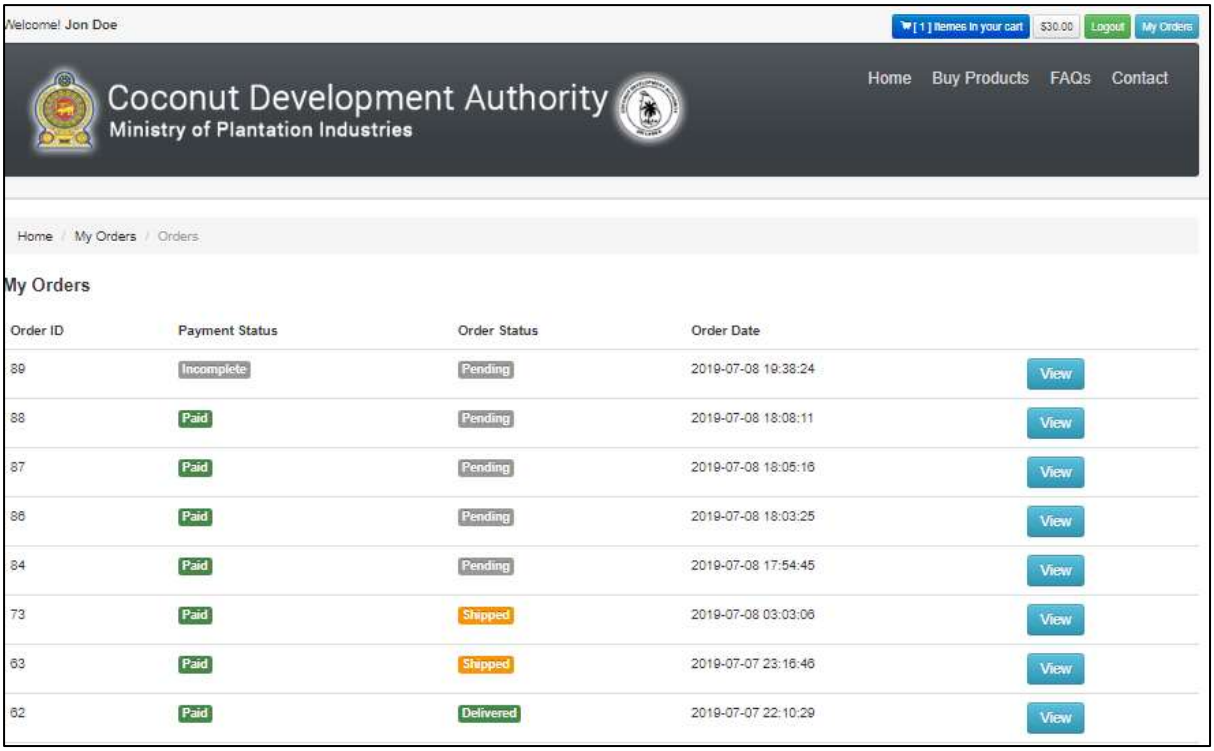


Figure 3.11: Order Summary

Following Figure 3.12 ,3.13 and 3.14 depicts the interface modules of Admin.

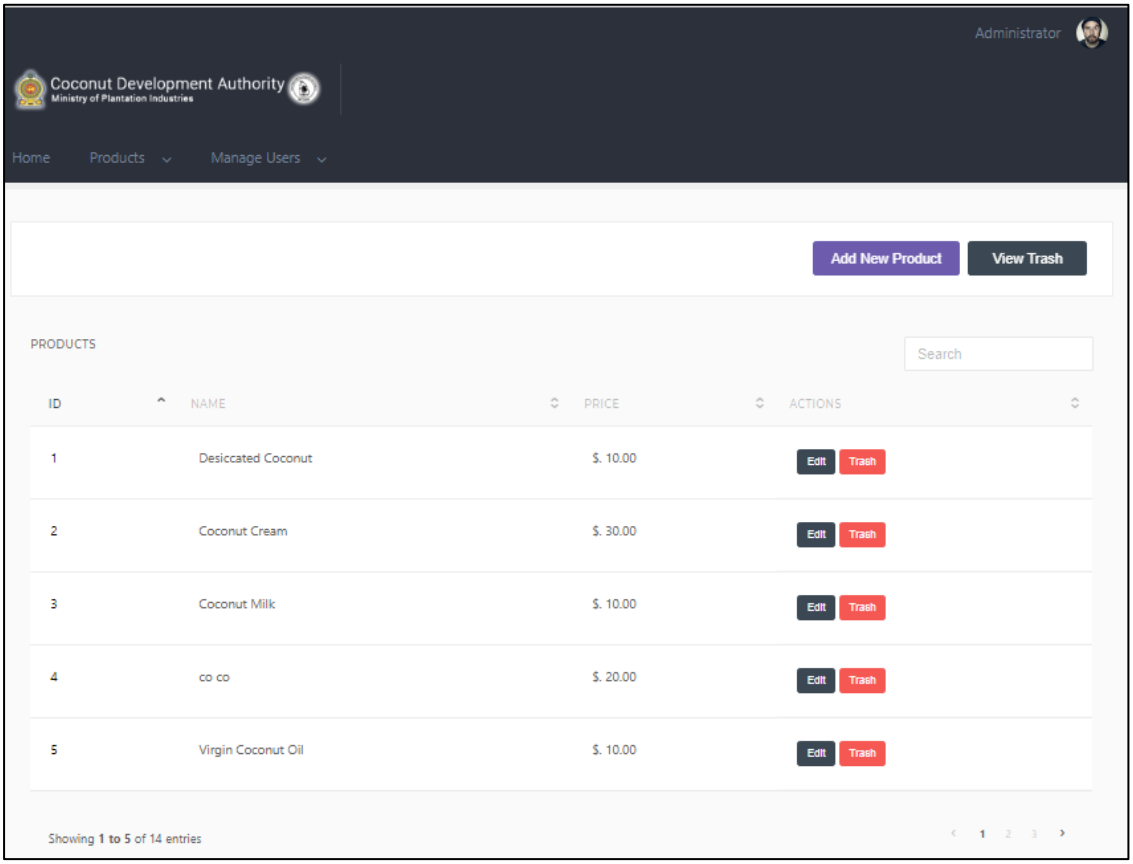


Figure 3. 12: Admin Dashboard: Product Management

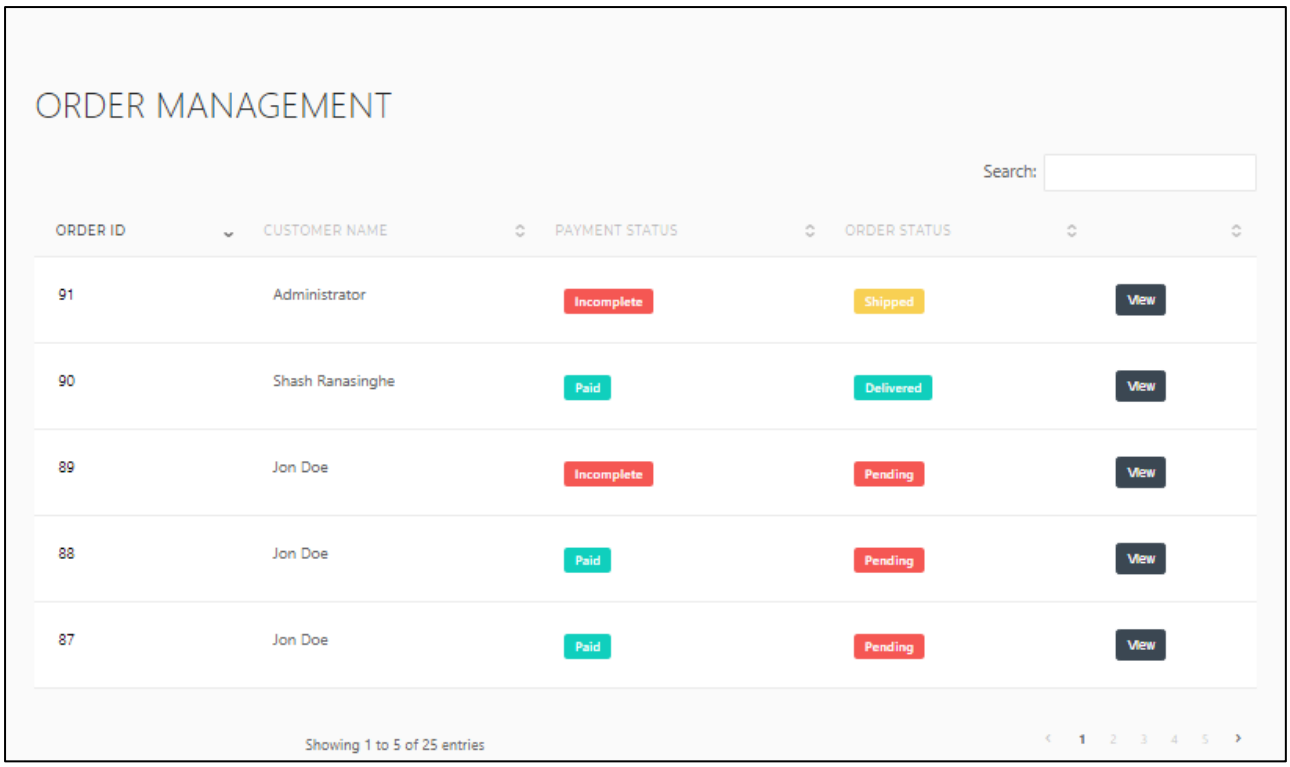


Figure 3.13: Admin Dashboard: Order Management

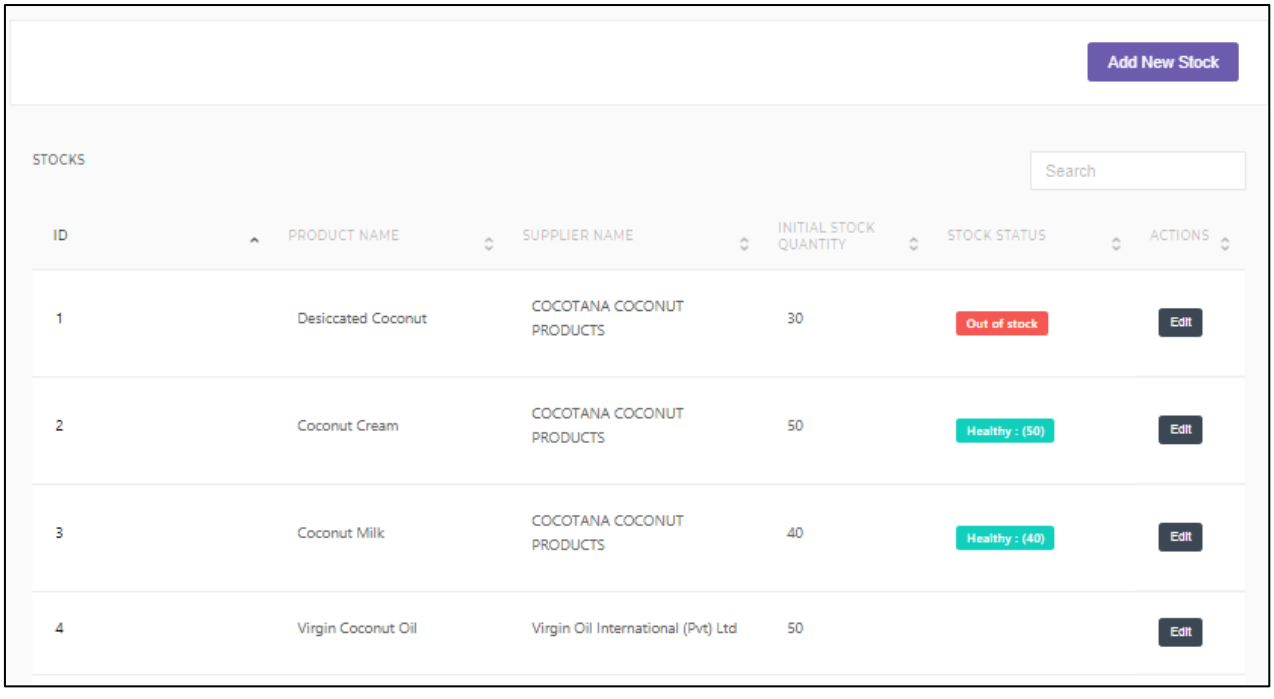


Figure 3.14:Admin Dashboard: Stock Management

Chapter 4

4. Implementation

4.1 Chapter Overview

In the implementation phase, the design of the system is translated in to a machine readable form using programming tools and techniques to make it executable in the desired environment. Objective of this phase is to implement the design in best possible way. Proper coding practices must be used to ensure the understandability, readability, reliability and the reuse of code in order to achieve maintainability, which is one of the most anticipated outcomes of a software product.

This chapter will describe the implementation environment requirements, development tools used, methodology followed as well as the test plan to be executed.

4.2 Implementation Environment Requirements

4.2.1 Software Requirements

Framework – Laravel

Scripting Language – PHP, Java Script

Database Server – Mysql

Web Server – Apachee - XAMPP for Windows

Other Language – HTML, CSS, Bootstrap

IDE – PHP Storm

4.2.2 Hardware Requirements

Processor 2.3GHz

Memory (RAM) 5 GB

4.3 Methodological Approach

The software solution implemented based on the MVC design pattern [9]. The MVC pattern separates an application in 3 modules as presented in Figure 4.1: Model, View, and Controller:

The model is responsible to manage the data; it stores and retrieves entities used by an application, usually from a database, and contains the logic implemented by the application.

The view (presentation) is responsible to display the data provided by the model in a specific format.

The controller handles the model and view layers to work together. The controller receives a request from the client, invokes the model to perform the requested operations and sends the data to the View. The view formats the data to be presented to the user, in a web application as an html output.

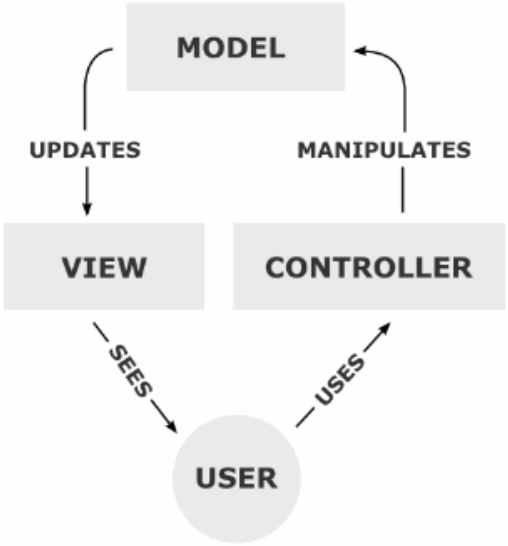


Figure 4.1: MVC Architecture

4.4 Test Plan

Software testing process will be carried out in a few phases. All the modules will be unit tested and then the integration tests will be performed to identify if they are functionally behaving as expected when integrated together. Finally, system testing will be done on the completed system covering both functional and non-functional requirements. The detail test plan discuss under the following chapter 5.

Chapter 5

5. Evaluation

5.1 Chapter Overview

Software testing is the process of executing a program with intension of finding errors in the code. It is a process of evaluation of the system or its parts by manual or automatic means to verify that it is satisfying specified or requirements or not. Generally, no system is perfect due to communication problems between user and developer, time constraints or conceptual mistakes by the developer.

5.2 System Test Plan

Software testing process was carried out in a few phases. All the modules are unit tested and then the integration tests were performed to identify if they are functionally behaving as expected when integrated together. Finally, system testing is done on the completed system covering both functional and non-functional requirements. As a part of system testing, user acceptance testing was carried out at the client's premises to ensure the system works fine and as intended.

By using test data and testing them using the test plans and test cases described below, it has been examined whether the system performs its expected behavior.

5.3 General Test Cases

5.3.1 Test cases for the "User Management" module

- Verify that all the specified fields are present on the registration page
- Verify the page has both submit and cancel/reset buttons at the end
- Verify that clicking cancel/reset button after entering all the required fields, cancels the submit request and resets all the fields
- Verify that not filling the mandatory fields and clicking the submit button will lead to a validation error

- Check validation on numeric fields by entering alphabets and special characters
- Verify that entering blank spaces on mandatory fields lead to a validation error
- Check validation user inputs and check against existing data for password change.

5.3.2 Test cases for Product Buy Flow

- Verify that the user can add to cart one or more products
- Verify that user can buy products added to cart after signing in to the application (or as per the functionality of the website)
- Verify that the user can successfully buy more than one products that were added to his/her cart
- Verify that the user cannot add more than an available inventory of the product
- Verify that the different paying methods of payments are working fine

5.3.3 General Test Cases

- Verify that the user is able to navigate through all the products across different categories
- Verify that all the links and banners are redirecting to correct product/category pages and none of the links are broken
- Verify that the company logo is clearly visible
- Verify that all the text - product, category name, price and product description are clearly visible
- Verify that all the images - product and banner are clearly visible
- Verify that category pages have a relevant product listed specific to the category
- Verify that the correct count of total products are listed on the category pages

Above test cases carried out and verified that functionalities are working properly as required without producing errors in order to meet its specifications. Sample test cases of the User management module and product buy flow are shown in Figure 5.1, 5.2, 5.3 and 5.4.

Project Name: E commerce Website for Coconut Development Authority

Test Case Template

Test Case ID: Fun_1	**Test Designed by:** Iranthi
Test Priority (Lsow/Medium/High): Med	**Test Designed date:** 22/02/2019
Module Name: login screen	**Test Executed by:** Iranthi
Test Title: Verify login with valid username andpassword	**Test Execution date:** 22/02/2019
Description: Test the login page	

Pre-conditions: User has valid username andpassword
Dependencies:

Step	Test Steps	Test Data	Expected Result	Actual Result	Status (Pass/Fail)	Notes
1	Navigate to login page		User should be able to login	User is navigated to	Pass	
2	Provide valid username	Admin@123		dashboard with successful		
3	Provide valid password	Password: 1234		login		
4	Click on Login button					

Post-conditions:
User is validated with database and successfully login to account. The account session details are logged in database.

Figure 5. 15: Test Case for Verify Login Access

Project Name: E commerce Website for Coconut Development Authority

Test Case Template

Test Case ID: Fun_2

Test Priority (Lsow/Medium/High): Med

Module Name: User Registration

Test Title: Validate user inputs

Description: Test user inputs

Test Designed by: Iranthi

Test Designed date: 22/02/2019

Test Executed by: Iranthi

Test Execution date: 22/02/2019

Pre-conditions: User has valid username and password

Dependencies:

Step	Test Steps	Test Data	Expected Result	Actual Result	Status (Pass/Fail)	Notes
1	Submit without entering data to any field		Display Message "Please fill out this field"	Displayed Message "Please fill out this field"	Pass	
2	Submit form by entering an invalid Email Address		Display message "Email is invalid" and highlight the relevant field	Displayed message "Email is invalid" and highlight the relevant field		

Post-conditions:

Figure 5.2: Test Case for Verify User Registration

Project Name: E commerce Website for Coconut Development Authority

Test Case Template

Test Case ID: Fun_3	**Test Designed by:** Iranthi
Test Priority (Lsow/Medium/High): Med	**Test Designed date:** 22/02/2019
Module Name: Changing password	**Test Executed by:** Iranthi
Test Title: Validate user inputs and check against existing data	**Test Execution date:** 22/02/2019
Description: Test user inputs	

Pre-conditions: User has valid username and password
Dependencies:

Step	Test Steps	Test Data	Expected Result	Actual Result	Status (Pass/Fail)	Notes
1	Submitting a wrong password as the current password		Display message "Current Password is not matching"	Display message "Current Password is not matching"	Pass	
2	Submitting two different values for New Password field and Confirm password field		different values for New Password field and Confirm password field Display message "Passwords are not matching."	Displayed message "Passwords are not matching."		
3	Submitting new password with valid entries		Display message "Password changed successfully."	Displayed message "Password changed successfully."		

Post-conditions:

Figure 5.3: Test Case for Validate Changing Password

Project Name: E commerce Website for Coconut Development Authority

Test Case Template

Test Case ID: Fun_4
Test Priority (Lsow/Medium/High): Med
Module Name: Product Buy Flow
Test Title: Validate user inputs and check against existing data
Description: Test user inputs

Test Designed by: Iranthi
Test Designed date: 22/02/2019
Test Executed by: Iranthi
Test Execution date: 22/02/2019

Pre-conditions: User has valid username and password
Dependencies:

Step	Test Steps	Test Data	Expected Result	Actual Result	Status (Pass/Fail)	Notes
1	user can add to cart one or more products		Number of items in the cart should be increased	Number of items in the cart increased	Pass	
2	user can buy products added to cart after signing in to the application		If logged in continue to checkout, if not logged in login screen should be available	Continue to checkout when logged in.	Pass	
3	user can successfully buy more than one products that were added to his/her cart		Display number of items in the cart Display order summary	Display numbers of items with summary	Pass	
4	user cannot add more than an available inventory of the product		Display notification that item is out of stock	Display "Item is out of stock"	Pass	
5	different paying methods of payments are working fine		Display different payment modes in Pay here	Display different modes of payment and let user to select one of them	Pass	

Post-conditions:

Figure 5.4.: Test Case for Product Buy Flow

Chapter 6

6. Discussion

6.1 Discussion

This dissertation describes the development process of e-Commerce Website for Coconut Development Authority. The implemented E commerce website supposed to enlarge the local market of coconut industry up to a global scale in which the suppliers and the customers could establish a direct marketing place where currently huge profit of selling these products for the international buyers is gaining by the intermediaries.

The system was built according to the user requirements explained and constrained in the requirement analysis phase while improving the system by adding more functionalities in the development life cycle as it required to make the system more user friendly.

The system has implemented according to the CDA's own requirements and featured with additional functionalities such as social media marketing. The system development stage started with system designing using ER diagram, Use case diagram and system architecture then it implemented on PHP Storm IDE using Scripting Language of PHP, Java Script and HTML, CSS and Bootstrap and used Laravel as the framework. phpMYAdmin on XAMPP server as the database creation and used MySQL languages. The system tested to ensure accuracy and reliability and to check whether it meets its desired objectives. The system finally meets its requirements at higher level.

6.2 Future Work

Some of the functionalities which are not added to the system due to time constraints and limitation of software accessibility are listed below. By implementing these functionalities the system can be enhanced in the future.

- Payment refund facility
- Bulk products buying and selling
- Enhance Customer Relationship Management (CRM)

References

[1] "Source the best quality Coconut and Coconut based products from Sri Lanka," *Sri Lanka Export Development Board*. [Online]. Available: http://www.srilankabusiness.com/coconut/. [Accessed: 28-May-2018].

[2] "Coconut manufacturers & suppliers | Sri Lanka," *Econutrena*. [Online]. Available: https://www.econutrena.com/organic-coconut-products/. [Accessed: 10-Nov-2018].

[3] "Home," *Home*. [Online]. Available: http://www.lankacoco.lk/. [Accessed: 14-Nov-2018].

[4] "DSI Footcandy - No.01 Online Footwear Store in Sri Lanka," *DSI Footcandy - No.01 Online Footwear Store in Sri Lanka*. [Online]. Available: http://www.dsifootcandy.lk/. [Accessed: 16-Nov-2018].

[5] BenWorldwide, *Halpe Tea*. [Online]. Available: http://www.halpetea.com/. [Accessed: 10-Nov-2018].

[6] no, p. (2002). Sri lanka business development centre survey on e-commerce implementation in the sme sector of sri lanka conducted by the slbdc for the asia foundation, (june).

[7] Helal, M. (2017). An investigation of the use of social media for e-commerce amongst small businesses in Saudi Arabia.

[8] "Star UML Tutorials," Distributed Architectures. [Online]. Available: http://www.cs.sjsu.edu/~pearce/modules/tutorials/uml/index.htm. [Accessed: 02-Jan-2019].

[9] T. Otwell, "Installation," Installation - Laravel - The PHP Framework For Web Artisans. [Online]. Available: https://laravel.com/docs/5.7. [Accessed: 14-Dec-2019].

[10] Stackoverflow.[On-line] Available: http://stackoverflow.com/questions/8903854/check image-width-and-height-before-upload-with-javascript, [Accessed: January. 27, 2019]

Appendix A: Use Case Descriptions`

Appendix A consists of low level use case diagrams with descriptions.

Low level Use Case Diagram for Register and Login, Update account Information to the Module

Following Figure A.1 depicts the use case diagram for Register and Login, Update account Information to the Module.

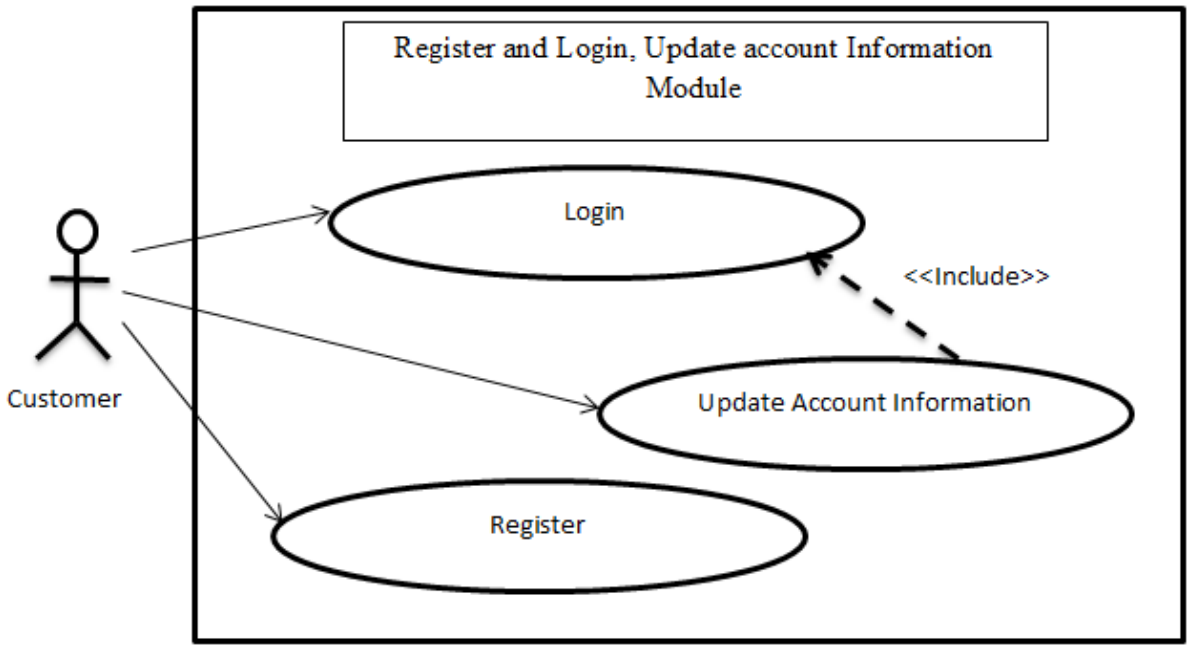


Figure A.1: Use Case for Register and Login, Update account Information to the Module

Above use case is described in Table A.1 and Table A.2

Table A.1: Use Case Description 1: Login/Registration

Use Case ID:	UC1
Use Case Name:	Login/Registration
Actor:	Users (Customers, Administrators)
Description:	This use case describes how users gain access to the CDA e commerce website through the login/registration (account creation) process.
Preconditions:	The user is on the "Sign In" screen.

Postconditions:	the user is either logged in or failed to log in and is appropriately notified
Priority:	High
Frequency of Use:	Users must log in to access their account information, to process a return request, and, optionally, to place an order. The system administrator must log in to administer the system.
Normal Course of Events:	1. The user browses to the "Sign In" page. 2. The user enters his/her username and password in the returning user section of the "Sign In" screen. 3. The system validates the username and password (successfully) and displays the user's account information page.
Alternative Courses:	1. The user browses to the "Sign In" page. 2. The user enters his/her username and password. 3. The system determines that the username or password is invalid and informs the user to try again. **Returning User, Forgotten Username or Password** 1. The user has forgotten his/her username, password, or both, and clicks the "Forgot Username/Password?" link 2. The system resets the users account and sends an e-mail notification with the new information 3. The user utilizes the new username/password information to log in following the basic flow **New User** 1. The user browses to the "Sign In" page. 2. The user chooses the "New User" link on the "Sign In" page. 3. The user enters his/her account information and chooses a username and password 4. The system validates the information entered 5. The user is logged in and his/her account information page is displayed **System Administrator** System administrators follow the basic flow for this use case when logging in to the system.
Exceptions:	
Includes:	
Special Requirements:	• Users may not login from multiple different computers simultaneously. If this condition is detected, the user will be notified with appropriate warning/error messages.
Assumptions:	

Table A.2: Use Case Description 2: Update Account Information

Use Case ID:	UC2
Use Case Name:	Update Account Information
Actor:	Customer
Description:	This use case describes how a User can update his account information with CDA e commerce website
Preconditions:	website main page is loaded
Postconditions:	
Priority:	Medium
Frequency of Use:	Users must log in to access their account information, to process a return request, and, optionally, to place an order. The system administrator must log in to administer the system.
Normal Course of Events:	1. User Clicks on the Sign in Link 2. System displays the sign In screen 3. User enters the Username and Password 4. System displays the Account Information Page. 5. User can click on the "update Account" link 6. User is at Modifiable Account Information Page. 7. User modifies the account information and exits the page by clicking on “Finish”. 8. System displays the confirmation message “Account Information is updated”.
Alternative Courses:	-
Exceptions:	
Includes:	The basic flow of this use case ‘uses’ or ‘includes’ the ‘Login’ use case.
Special Requirements:	
Assumptions:	

Low level Use Case Diagram for Browse product catalog and maintain shopping cart module

The use case diagram for Browse product catalog and maintain shopping cart module is shown in Figure A.2 below.

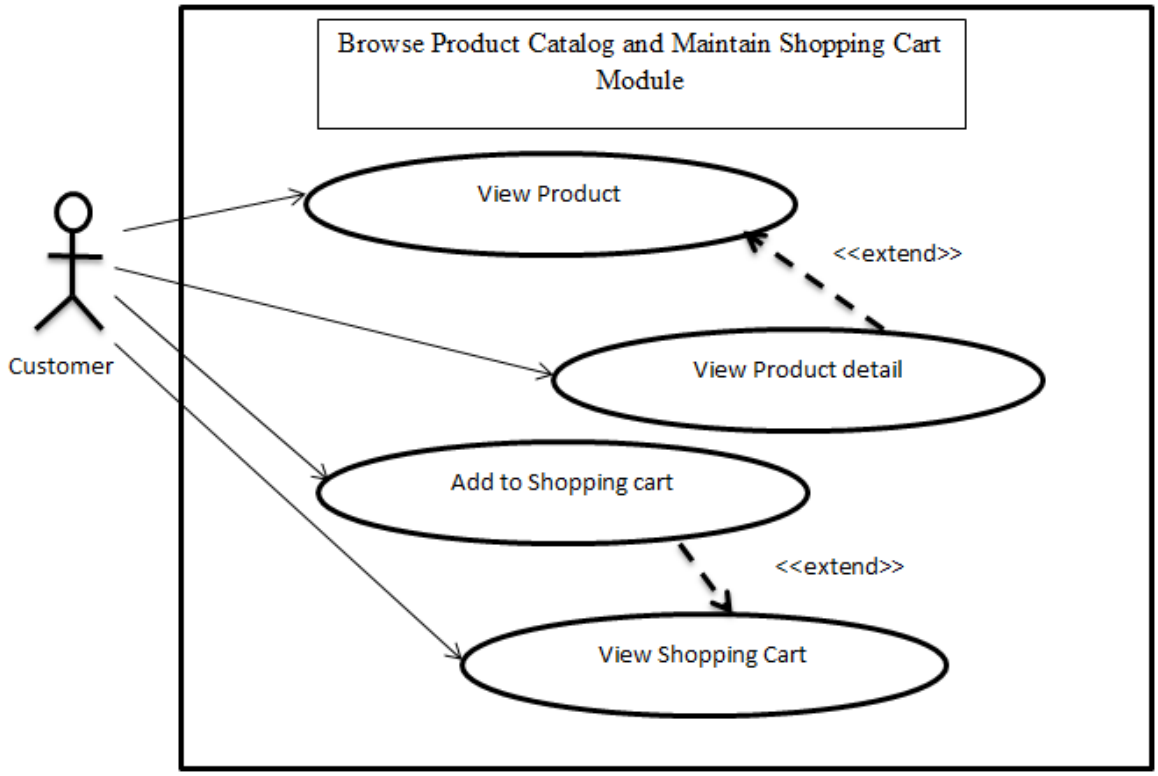


Figure A.2 : Use Case diagram for Browse product catalog and maintain shopping cart module

Description of the above use case diagram is depicted in the following Table A.3 and A.4.

Table A.3: Use Case Description 3: Browse Product Catalog

Use Case ID:	UC3
Use Case Name:	Browse Product Catalog
Actor:	Customer
Description:	This use case describes how the User can search/browse the product catalog.
Preconditions:	-

Postconditions:	1. Product Screen' displays items and corresponding list prices for a chosen product. 2. Item Screen' displays detailed information about an individual item for sale, including a photo, video, review comments if available. 3. 'Cart Screen' displays the various items added to the cart, the quantity and list price of each item and the Subtotal.
Priority:	High
Frequency of Use:	
Normal Course of Events:	1. User opens a web browser, gives the URL for the 'CDA e commerce website 2. System launches the web site. 3. User clicks on any product link in the Home page 4. System displays 'Product Screen' with the price of each item and a link labeled 'Add to Cart' in right column of the list. 5. User clicks on Buy Products link 6. System displays 'Item Screen' for the item chosen in Step 5, including a photo if one is available with description and an 'Add to Cart' link.
Alternative Courses:	1. User navigates to category page of a particular type of product by clicking on any product in the image map located in the center of the page. 2. User views the next few items from the list of all products in category by clicking on 'Next' link in the bottom right corner of product list and then navigates to 'Product Screen' of a particular product by clicking on that product link in 'Products for this Category' list.
Exceptions:	-
Includes:	.-
Special Requirements:	-
Assumptions:	-

Table A.4: Use Case Description 4: Maintain Shopping Cart

Use Case ID:	UC4
Use Case Name:	Maintain Shopping Cart
Actor:	Customer
Description:	This use case describes how an actor can modify items in the shopping cart
Preconditions:	The actor is on the Cart Screen and have already logged in.
Postconditions:	The user successfully modifies existing items in the cart or adds new items to the cart.
Priority:	Medium
Frequency of Use:	There is a possibility that multiple users will add an item to the same cart simultaneously from different locations.
Normal Course of Events:	1. The user clicks on one of the category in the left frame of the screen and navigates to the item he wishes to add to the cart and clicks on the "Add to Cart" link. 2. The system displays the Cart Screen with the all the old items and the newly added item. The subtotal field displays the total cost of the shopping cart. 3. The user repeats steps 3 and 4 for all the items he wants to add to the cart. 4. The user modifies the item quantity for one or multiple items and clicks "Update Cart". 5. The system updates the new quantity and displays the modified line item totals and sub-total to the user. 6. The user clicks the "Remove" link to remove any of the items in the cart. 7. The system deletes the item from the cart and adjusts the sub-total accordingly.
Alternative Courses:	1. User proceeds to adding Items to cart and modifying cart without loggin in. 2. If the user enters a non-positive or non-integer quantity the system displays an appropriate error message
Exceptions:	-
Includes:	.-
Special	1. Multiple users should be able to add items to cart simultaneously.

Requirements:	
Assumptions:	-

Low Level Use Case Diagram for Checkout and Payment Module.

Following Figure A.3 shows the use case diagram for the Checkout and Payment Module.

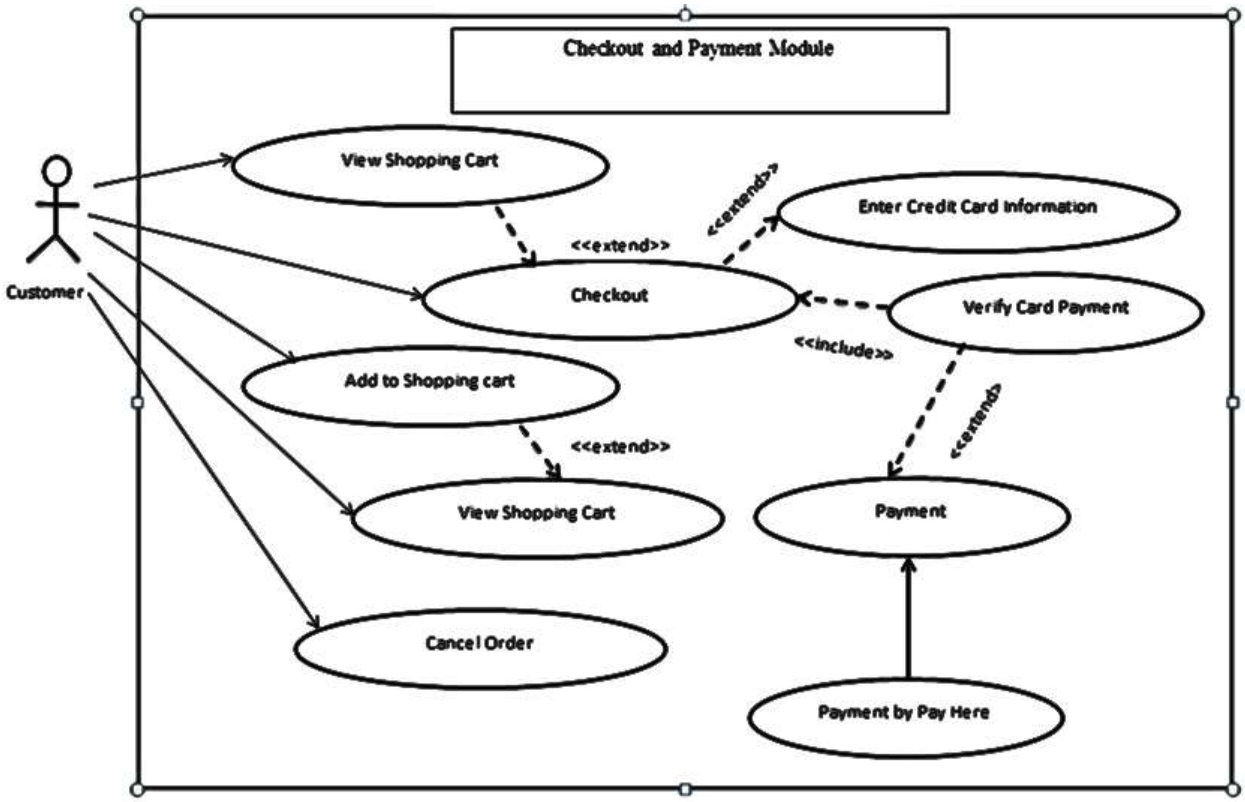


Figure A.3: Use Case Diagram for Checkout and Payment Module

Description of the above use case diagram is depicted in the following Table A.5 and A.6.

Table A.5: Use Case Description 5: Checkout

Use Case ID:	UC5
Use Case Name:	Checkout
Actor:	Customer
Description:	This use case describes how the user of the system can successfully

	checkout after purchasing items in the cart.
Preconditions:	Cart should contains at least 1 item
Postconditions:	The system should display order summery view User is able to pay online successfully. Confirmation e-mail is sent by the system to the User..
Priority:	High
Frequency of Use:	There is a possibility that multiple users will add an item to the same cart simultaneously from different locations.
Normal Course of Events:	1. User clicks on Checkout Button in the shopping cart 2. System display the Order Summary description 3. User enters the following information. First Name Last Name Address Phone number 4. User clicks on 'Make Payments via pay here' link in the Screen. 5. System displays the 'Payment Screen'. 6. User does the payment
Alternative Courses:	1. User proceeds to adding Items to cart and modifying cart without loggin in. 2. If the user enters a non-positive or non-integer quantity the system displays an appropriate error message
Exceptions:	-
Includes:	.-
Special Requirements:	
Assumptions:	-
Notes and Issues:	-

Table A.6: Use Case Description 6: Make Online Payment via multiple payment methods

Use Case ID:	UC6
Use Case Name:	Make Online Payment via multiple payment methods
Actor:	Customer
Description:	This use case describes how the user of the system can make payments for the products in the cart.
Preconditions:	Cart should contains at least 1 item The system should display order summery view
Postconditions:	Order summary with order ID should be sent to the user through an email
Priority:	High
Frequency of Use:	There is a possibility that multiple users will add an item to the same cart simultaneously from different locations.
Normal Course of Events:	1. User clicks on 'Make Payments via Pay here' link in the Screen. 2. System displays the 'Payment Screen' with total amount of payble. 3. User choose the payment mode 4. User clicks on 'Next' button. If mode of payment debit/credit card fill the followings Credit card number Name on the Card Credit expiry Date Card Type 5. User click on the "Pay "Amount"" 6. System displays 'You Made the Payment Successfully' to the User. 7. Direct user to the Buy Products page 8. System sends a confirmation e-mail to the User.
Alternative Courses:	1. User proceeds to adding Items to cart and modifying cart without loggin in. 2. If the user enters a non-positive or non-integer quantity the system displays an appropriate error message
Exceptions:	-

Includes:	.-
Special Requirements:	If payment is done through the credit/debit card, there is a requirement of consulting the credit/debit company for confirming the account and payment.
Assumptions:	-
Notes and Issues:	-

Low Level Use Case Diagram for Share Product Detail and Add Review Comments Module

The use case diagram below shown by Figure A.4 depicts use cases for Share Product Detail and Add Review Comments Module.

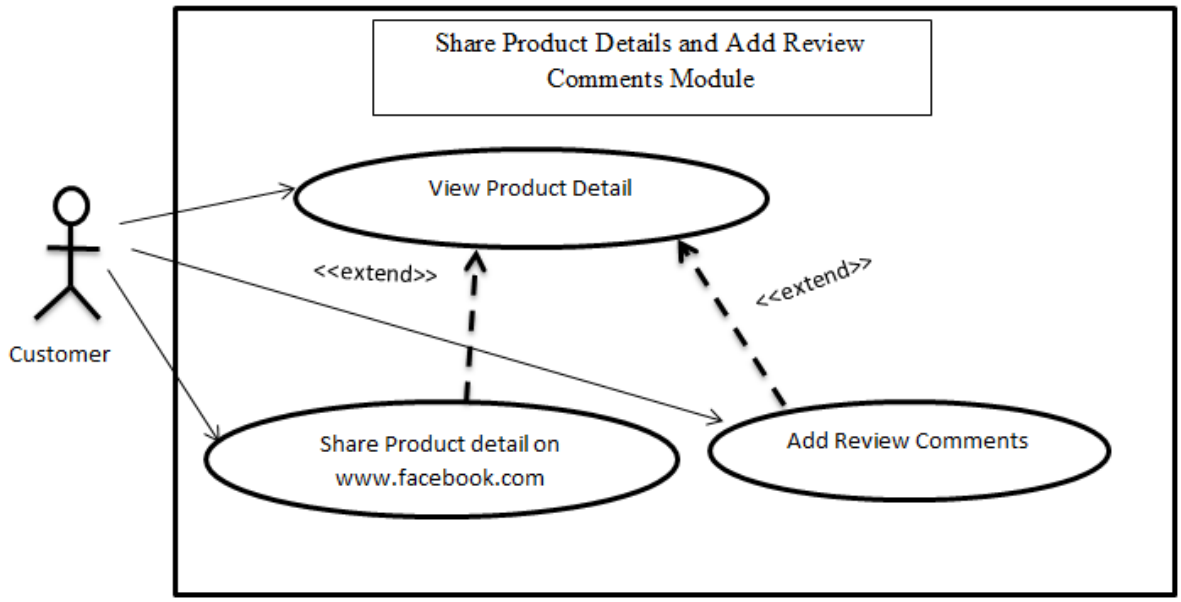


Figure A.4: Use Case Diagram for Share Product Detail and Add Review Comments Module

Description of the above use case diagram is depicted in the following Table A.7 and A.8.

Table A.7: Use Case Description 7: Share Product Detail in Social Media

Use Case ID:	UC7
Use Case Name:	Share Product Detail in Social Media
Actor:	Customer
Description:	This use case describes how the user of the system can share product descriptions on Social Media
Preconditions:	User should have access to www.facebook.com
Postconditions:	
Priority:	low
Frequency of Use:	There is a possibility that multiple users will add comments to the same item simultaneously from different locations.
Normal Course of Events:	1. User direct to Product Detail page 2. User clicks the "Share" button under the video link 3. User will direct to the www.facebook.com and will share the product page 4. Number of shares will be counted and displayed on the product detail page
Alternative Courses:	
Exceptions:	-
Includes:	.-
Special Requirements:	User needs to have an user account in www.facebook.com
Assumptions:	User has logged in to www.facebook.com
Notes and Issues:	-

Table A. 8: Use Case Description 8: Add Review Comments

Use Case ID:	UC8
Use Case Name:	Add Review Comments
Actor:	Customer
Description:	This use case describes how the user of the system can add review comments on the item
Preconditions:	User should be login to the system prior to comment
Postconditions:	Comments will be displayed under the item description in product details page
Priority:	low
Frequency of Use:	
Normal Course of Events:	1. User direct to Product Detail page 2. User clicks the drop down button under the Review This Product label and select a number from the range of 1-5 3. User can type comments about the item in the description box 4. Click on the "Submit Review" button
Alternative Courses:	
Exceptions:	-
Includes:	.-
Special Requirements:	User needs to log in to the system
Assumptions:	
Notes and Issues:	-

Low Level Use Case Diagram for Product Management Module

The use case diagram below shown by Figure A.5 depicts Use Case Diagram for Product Management Module.

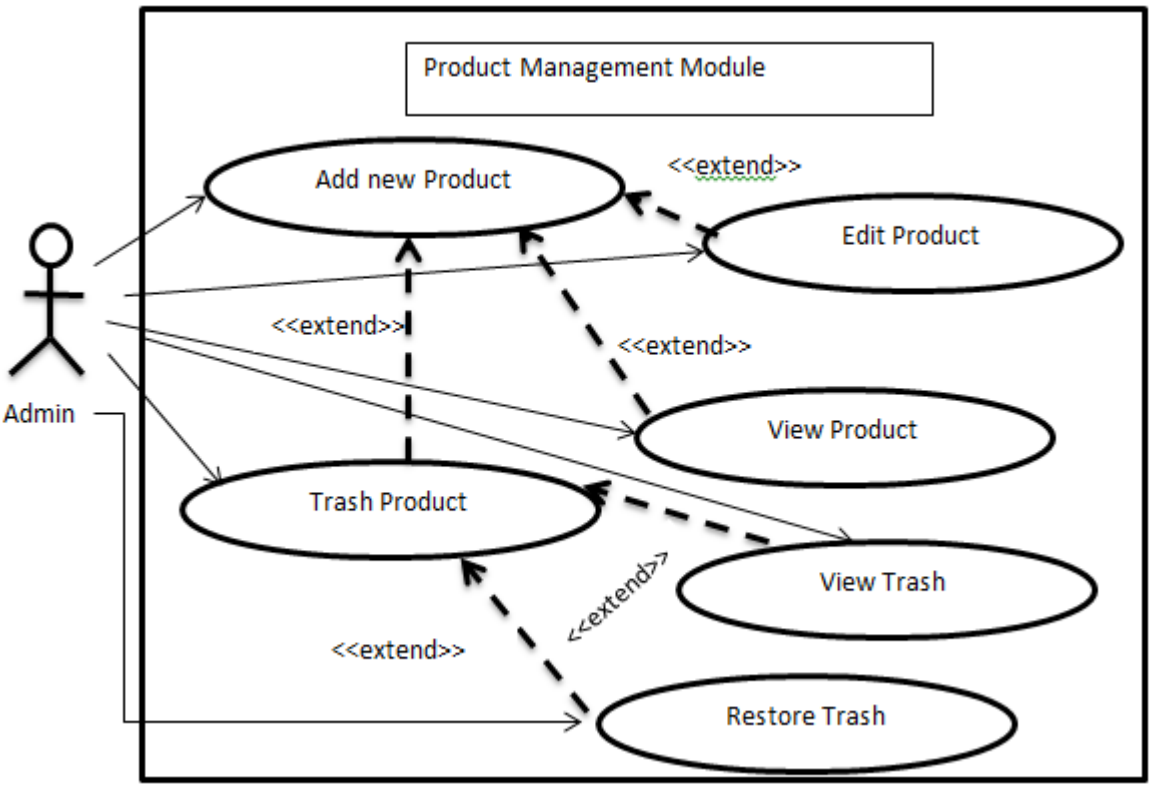


Figure A.5:Use Case Diagram for Product Management Module

Above use case is described in Table A.9.

Table A.9: Use Case Description 9: Product Management

Use Case ID:	UC9
Use Case Name:	Product Management
Actor:	System Administrator
Description:	This use case describes how the user of the system can add , view, edit and trash products
Preconditions:	User should be login to the system using admin credentials
Postconditions:	Product item will be added to the stock
Priority:	High

Frequency of Use:	
Normal Course of Events:	1. User direct to Admin panel 2. User clicks the drop down button labeled as Product and select "show products" **Add new Products** 3. User can click on the "Add New Products" 4. Create new product by filling followings Product Name Price Description 5. Select Product Category 6. Choose an image 7. Add youtube video ID 8. Tick as Yes if it is a featured product 9. Click on "Create a new product" **Edit Product** 10. User can click on the "Edit" Button for the respective product 11. User can update the following fields Product Name Price Description Select Product Category Choose an image Add youtube video ID Tick as Yes if it is a featured product 12. Click on "Update Product" **Trash Product** 13. User can click on the "Trash" Button for the respective product 14. Product will be stored in trash **View Trash** 15. User can click on the "View Trash" Button 16. User able to restore the product **View Product** 17. User can view product details
Alternative Courses:	
Exceptions:	-
Includes:	.-
Special Requirements:	User needs to log in to the system
Assumptions:	

Low Level Use Case Diagram for Stock Management Module.

Following Figure A.6 depicts the use case diagram for Stock Management Module.

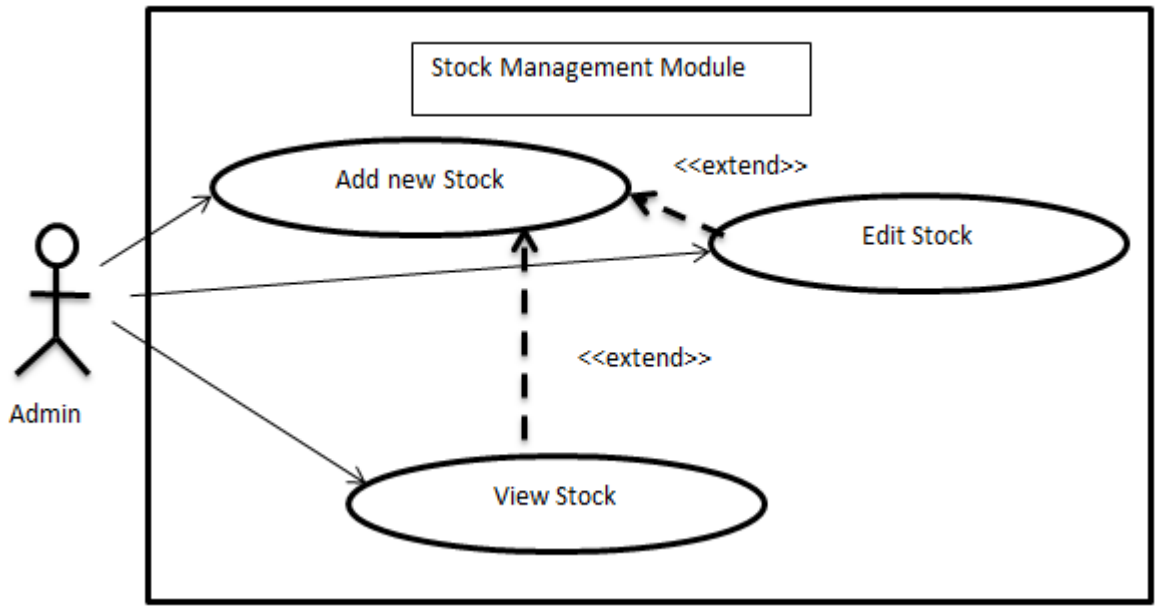


Figure A.6: Use Case Diagram for Stock Management Module

Above use case is described in Table A.10.

Table A. 10: Use Case Description 10: Stock Management

Use Case ID:	UC10
Use Case Name:	Stock Management
Actor:	System Administrator
Description:	This use case describes how the user of the system can add , view and edit stock
Preconditions:	User should be login to the system using admin credentials Product should be added Supplier should be added
Postconditions:	Items will be displayed in Home and Buy Products page
Priority:	High
Frequency of Use:	
Normal Course of Events:	1. User direct to Admin panel 2. User clicks the drop down button labeled as Product and select "Stocks"

	Add new Stock 3. User can click on the "Add New Stock" 4. Select product 5. Select Supplier 6. Set initial Quantity 7. Set reorder level 8. Click on "Create a new stock" **Edit Stock** 9. User can click on the "Edit" Button for the respective product 10. User can update the following fields Select product Select Supplier Set reorder level 11. Click on "Update Stock" **View Stock** 12. User can view Stock details with stock status (Healthy/Out of Stock)
Alternative Courses:	
Exceptions:	-
Includes:	.-
Special Requirements:	User needs to log in to the system Supplier details should be added to the system
Assumptions:	

Low Level Use Case Diagram for Supplier Management Module

Following Figure A.7 depicts the use case diagram for Supplier Management Module.

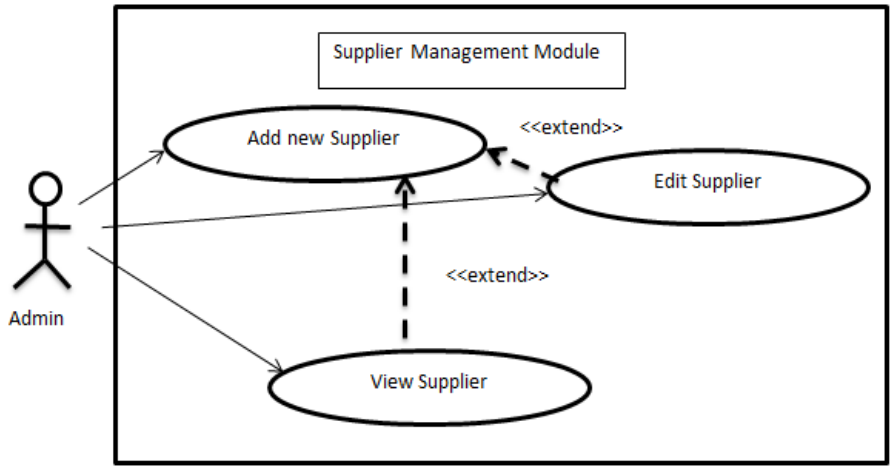


Figure A.7: Use Case Diagram for Supplier Management Module

Above use case is described in Table A.11.

Table A. 11: Use Case Description 11: Supplier Management

Use Case ID:	UC11
Use Case Name:	Supplier Management
Actor:	System Administrator
Description:	This use case describes how the user of the system can add and edit supplier details
Preconditions:	User should be login to the system using admin credentials
Postconditions:	Suppliers will be displayed when adding a new stock
Priority:	High
Frequency of Use:	
Normal Course of Events:	1. User direct to Admin panel 2. User clicks the drop down button labeled as Manage users and select "Suppliers" **Add new Supplier** 3. User can click on the "Add New Supplier" 4. Create new supplier by filling the followings; Company Name First Name Last Name Email Address Phone Number Supplier Image Website URL 5. Select product supplies 6. Click on "Create a new supplier" **Edit Supplier** 7. User can click on the "Edit" Button for the respective product 8. User can update the following fields Company Name First Name Last Name Email Address Phone Number Supplier Image Website URL Products supplies 9. Click on "Update Supplier"

	View Supplier 10. User can view supplier details
Alternative Courses:	
Exceptions:	-
Includes:	.-
Special Requirements:	User needs to log in to the system
Assumptions:	

Low Level Use Case Diagram for Order Management Module

Following Figure A.8 depicts the use case diagram for Order Management Module.

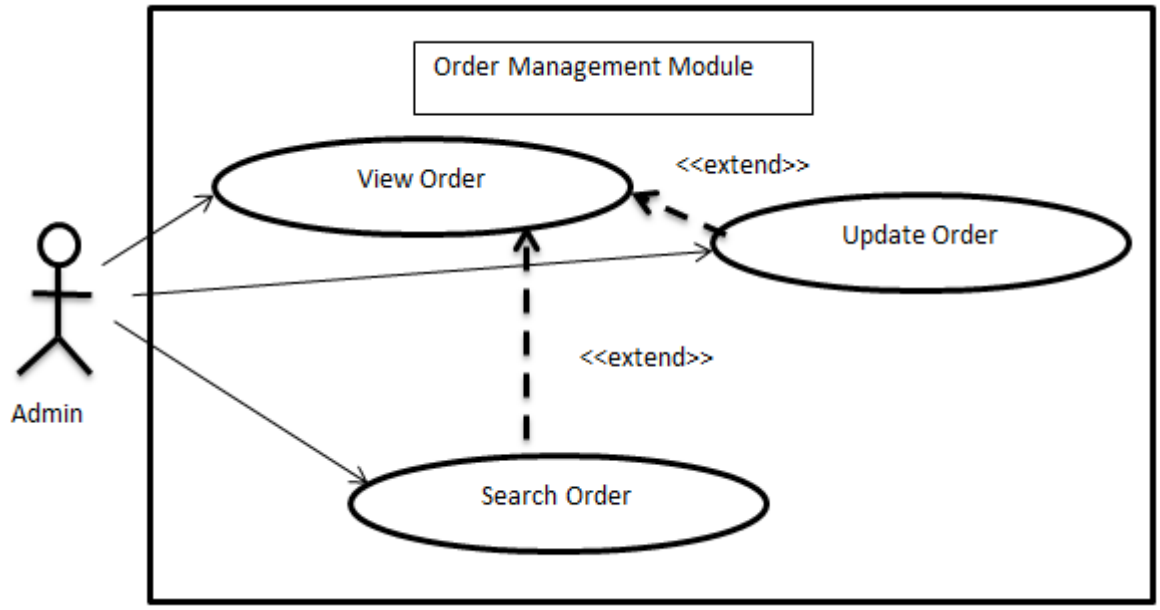


Figure A.8: Use Case Diagram for Order Management Module

Above use case is described in Table A.12.

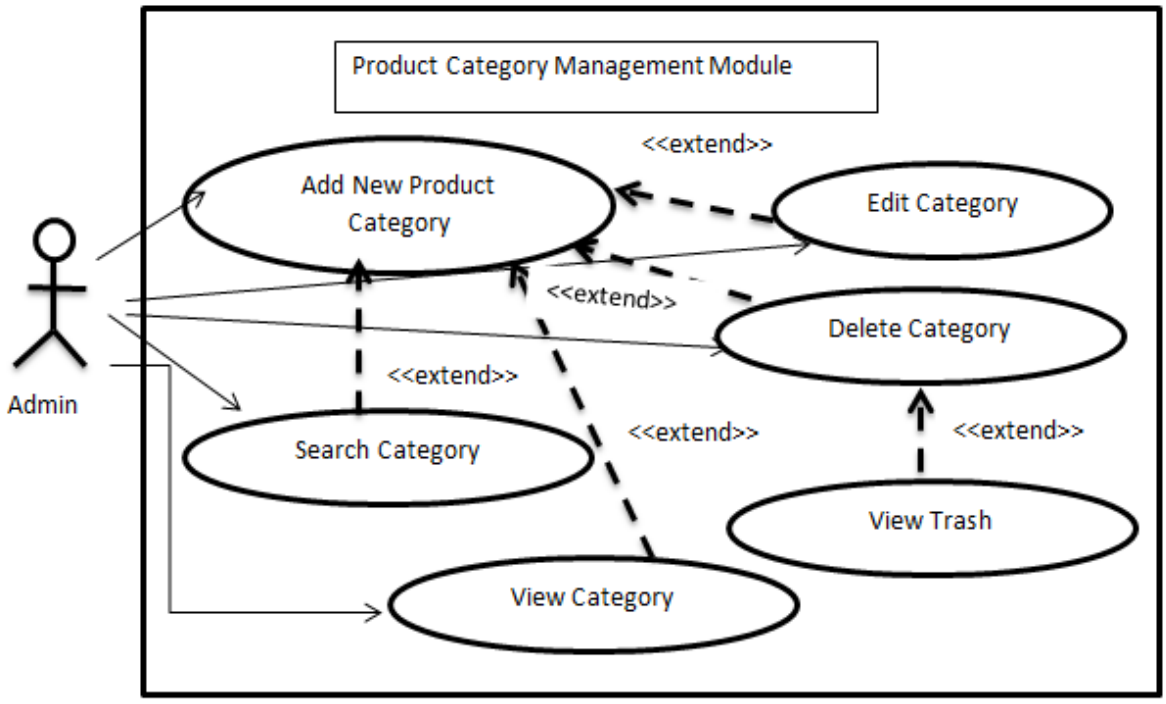
Table A 12: Use Case Description 12: Order Management

Use Case ID:	UC12
Use Case Name:	Order Management
Actor:	System Administrator

Description:	This use case describes how the user of the system can view, search and change action of order status
Preconditions:	User should be login to the system using admin credentials
Postconditions:	Order status email will be sent to the customer email
Priority:	High
Frequency of Use:	
Normal Course of Events:	1. User direct to Admin panel 2. User clicks the drop down button labeled as Products and select "Show Orders" 3. User will be able to see Order Id, Customer name, Payment Status and Order Status **View Orders** 4. User can view order summary details by clicking on view button **Update Status** 5. User can change the order status (Pending /Shipped/Delivered) by clicking on the drop down menu 6. Click on update status **Search Order** 7. User can search for Orders using order id, customer name, payment status or order status.
Alternative Courses:	
Exceptions:	-
Includes:	.-
Special Requirements:	User needs to log in to the system
Assumptions:	
Notes and Issues:	-

Low Level Use Case Diagram for Product Category Management Module

Following Figure A.9 depicts the use case diagram for Product Category Management Module.



FigureA.9: Use Case for Product Category Management Module

Above use case is described in Table A.13.

Table A 13: Use Case Description 13: Product Category Management

Use Case ID:	UC13
Use Case Name:	Product Category Management
Actor:	System Administrator
Description:	This use case describes how the user of the system can add , view, edit and delete product categories
Preconditions:	User should be login to the system using admin credentials
Postconditions:	
Priority:	High
Frequency of	

Use:	
Normal Course of Events:	8. User direct to Admin panel 9. User clicks the drop down button labeled as Product and select "Product Categories" **Add new Product Category** 10. User can click on the "Add New Category" 11. Type a Category name 12. Click on "Store Category" **Edit Product Category** 13. User can click on the "Edit" Button for the respective product category 14. User can update the category name 15. Click on "Update Category" **Delete Product Category** 16. User can click on the "Delete" Button for the respective product category 17. Product category will be deleted **View Trash** 18. User can click on the "View Trash" Button 19. User able to restore the product **View Product Catergory** 20. User can view product category details **Search Product Category** 21. User can search for category using category id or name
Alternative Courses:	
Exceptions:	-
Includes:	.-
Special Requirements:	User needs to log in to the system
Assumptions:	
Notes and Issues:	-

Low Level Use Case Diagram for Report Generation Module

Following Figure A.10 depicts the use case diagram for Report Generation Module.

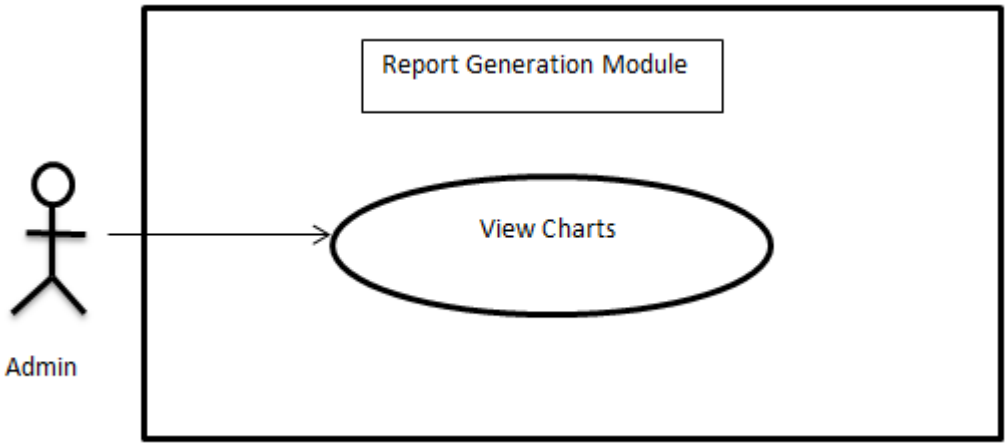


Figure A.10: Use Case Diagram for Report Generation Module

Description of the above use case diagram is depicted in the following Table A.14.

Table A. 14: Use Case Description 14: Report Generation

Use Case ID:	UC14
Use Case Name:	Report Generation
Actor:	System Administrator
Description:	This use case describes how the user of the system can view reports regarding products in higher demand, Income by day, Commission received for orders and reorder level of stocks.
Preconditions:	User should be login to the system using admin credentials
Postconditions:	
Priority:	Low
Frequency of Use:	
Normal Course of Events:	1. User direct to Admin panel home page 2. User will able to see charts of products in higher demand, Income by day, Commission received for orders and reorder level of stocks in for quarters of the home page

Alternative Courses:	
Exceptions:	-
Includes:	.-
Special Requirements:	User needs to log in to the system
Assumptions:	