Operations Management System

for

One Prepay Lanka

L. I. Fernando

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DECLARATION

I certify that this dissertation does not incorporate, without acknowledgement, any material previously submitted for a degree or diploma in any university and to the best of my knowledge and belief, it does not contain any material previously published or written by another person or myself except where due reference is made in the text. I also hereby give consent for my dissertation, if accepted, to be made available for photocopying and for interlibrary loans, and for the title and abstract to be made available to outside organizations.

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Name of Supervisor/Advisor: Mr. S. Suseendran

ABSTRACT

In today's technological world mobile devices play a major role in communication, thus making mobile top-up an important aspect. This demand has been the cause for the rise of many companies which provide facility for mobile top-up. One Prepay Lanka (Pvt) Ltd. is a company which has entered this market recently amidst heavy competition. The company is currently using a manual system to manage their day-to-day operations, which is an obstacle in the growth of the company.

As a result of the manual system the organization has come to face problems such as data inaccuracy, redundancy and delay in decision making due to unavailability of timely reports. Thus the need to update their systems to increase productivity and accuracy of the information recorded, has become a vital part of the organization's development in today's competitive market. As a solution they have decided to adopt a computer based system.

The operations management system is developed using Rational Unified Process (RUP) framework and Object Oriented method was used for designing. PHP was chosen for coding the system and Netbeans was used as the IDE. Database for the system was designed using MySQL. Bootstrap was the tool selected for designing the user interface.

The Operations Management System is built and customized in order to overcome the challenges. The system is designed to eliminate manual paper work involved in activities such as purchase, sales and inventory control. It also facilitates report generation. Thus providing the organization with ready reference data, that will be accurate, that will aid the decision making process. The system will reduce redundancy and save time by reducing the manual work.

ACKNOWLEDGEMENT

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I would also like to express my profound gratitude to Mr.S.B.T.A.Fernando, Manager - Operations, One Prepay Lanka (Pvt) Ltd. for giving me an opportunity to develop a system for the company. I am also thankful to all staff for providing me the necessary information and sharing their valuable time.

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS

BIT   - Bachelor of Information Technology

UML   - Unified Modelling Language

PHP   - Hypertext pre Processor

SQL   - Structured Query Language

RUP   - Rational Unified Process

RAD   - Rapid Application Development

JAD   - Joint Application Development

OOD   - Object Oriented Design

SHA1 - Secure Hash Algorithm 1

CSS   - Cascading Style Sheet

URL   - Uniform Resource Locator

CHAPTER 1 INTRODUCTION

1.1 INTRODUCTION

Information and communication technology plays a vital role in today's business development process. The initial steps force organizations to adopt computerized systems and digitalize any or all functions of the business that were once done manually. These systems propose to safeguard reliability and efficiency and thereby increase the productivity of the business.

In the case of organizations that involve in large number of transactions daily, that have to manually record the inflows and outflows that occur during transactions in order to identify current stock level, tend to require an automated system.

Though most small and medium enterprises use the more generic systems offered in the market, the larger organizations tend to create customized versions that suit the exact combination of variables unique to their organization.

One Prepay Lanka (Pvt) Ltd is one of the companies which started recently in providing solution for mobile top-up. The ability to top-up mobile accounts of all five network service providers through a single gateway is considered as the key feature of the product. The main functionalities of the company include purchasing and storing of devices and distribution after installing necessary software. Maintaining records are currently done manually.

An Operations Control system for One Prepay Lanka is proposed as a key contribution towards the enhancement of the business.

1.2   MOTIVATION

The client organization is currently using a manual system which is time consuming and prone to errors. Such a manual data system can lead to a threat in the accessibility of confidential information by unauthorized users. Also making it difficult to store and maintain the manual data that could include decades of information. Manual data also delays the process of decision making due to the time spent on reference.

To meet the needs of today's competitive world, the organization will need to have an accurate, secure and efficient computerized operations management system.

The organization's need for system that fulfils their unique combinations of requirements motivated me for the proposed project.

1.3   OBJECTIVES OF THE PROJECT

The main goal of the project is to build an efficient system which provides an automated solution for the administration of the client company. This can further be broken down into a number of primary objectives:

- Provide facility to store records of purchase and sales for easy reference
- Avoid stock outs by notifying the user when stock quantities are at low level
- Maintain details of suppliers and customers to enable smooth running of the business
- Facilitate effective decision making through generation of timely reports
- Grant different access privileges to different levels of staff to ensure security

1.4 SCOPE OF THE PROJECT

Scope of any project is defined based on the requirements of the stakeholders of the client company. The scope of the proposed system could be listed as follows,

- Login Management
    - o Provide users with individual user login and establish individual or group access rights to prevent unauthorized access to the system.
- Staff Management
    - o Add details of a new staff member and update details of an existing staff member.
- Supplier Management
    - o Add a new supplier and update details of an existing supplier.
- Device Management
    - o Add a new type of device and edit any information of an existing type of device.
- Quotation Management
    - o Sending a request to supplier for quotation for devices.
    - o Receiving quotation details from supplier.
- Order Management
    - o Place an order to purchase required number of device.
- Stock Management
    - o Maintain details of stock available on each type of device.
- Goods received note
    - o Prepare a goods received note against the order. If any device is found with a defect, obtain a replacement immediately and update stock details.
- Payment Management
    - o Store details regarding the payment made to supplier to purchase devices.
    - o Store details regarding the payment received from customer when a terminal is sold.
- Terminal Management

- o Add the terminal id and relevant details of the device after installing necessary software and update terminal details.
- Terminal Stock Management
  - o Maintain details regarding terminal stock available and ready for sale.
- Sales Management
  - o When a sales person brings a new order, check the availability of terminal. Add a dispatch note for the terminal and update stock details.
- Invoice Management
  - o Create an invoice with relevant details at the time of sales.
- Report Management
  - o Generate weekly and monthly reports to support managers in decision making process.

1.5   OUTLINE OF THE REMAINING CHAPTERS

The dissertation contains five chapters following the introduction chapter.

Analysis Chapter

The analysis chapter describes the existing system and requirements of the new system along with the methods used to gather the requirements.

Design Chapter

The design chapter explains the design approach of the system design using diagrams. It further describes designing of database and user interface.

Implementation Chapter

The implementation chapter includes main code segments and hardware and software environment used to implement the system.

Evaluation Chapter

The test plan and test cases are described along with the expected test results in the evaluation chapter.

Conclusion Chapter

The conclusion being the final chapter of the dissertation includes the lessons learnt and explains how the system could be further developed in the future.

Following the main chapters, the reference section lists all materials referred to write the dissertation. Further the appendices include the system documentation, design documentation and user documentation.

CHAPTER 2 ANALYSIS

2.1 INTRODUCTION

System analysis is the study on the existing system. This also consist domain understanding and requirements gathering. Analysis phase is vital for building a system as it lays the foundation for the system.

Analysis chapter describes the process of requirements gathering and gives an overview of the existing system. It also lists the functional and non-functional requirements identified. This chapter further gives brief summary of existing similar systems.

2.2 REQUIREMENTS GATHERING

Gathering information about the client requirements is vital in building a successful system. Amongst numerous requirements gathering techniques following techniques were used to capture the requirements of different stakeholders.

- Interviews
- Observation
- Document review

Interviews were conducted among stakeholders of the company and questions were raised related to current manual system. Mainly staffs of the organization were selected for the interviews to gather details about the day to day work and managers were chosen, to get an idea about the managerial reports. Interviews helped to create an idea of the problems faced by the stakeholders and expectations of the client.

Observation was carried out to gather facts about the work procedure. Daily work flow of the staff was observed. This helped to identify features that could be included into the system which would make the user's daily tasks easy. Document review includes going through the records documented. This gave a clear picture of what data should be gathered and stored.

2.3   ANALYSIS OF THE EXISTING SYSTEM

The use case diagram shown in Figure 2.1 depicts the activities carried out in the current manual system.
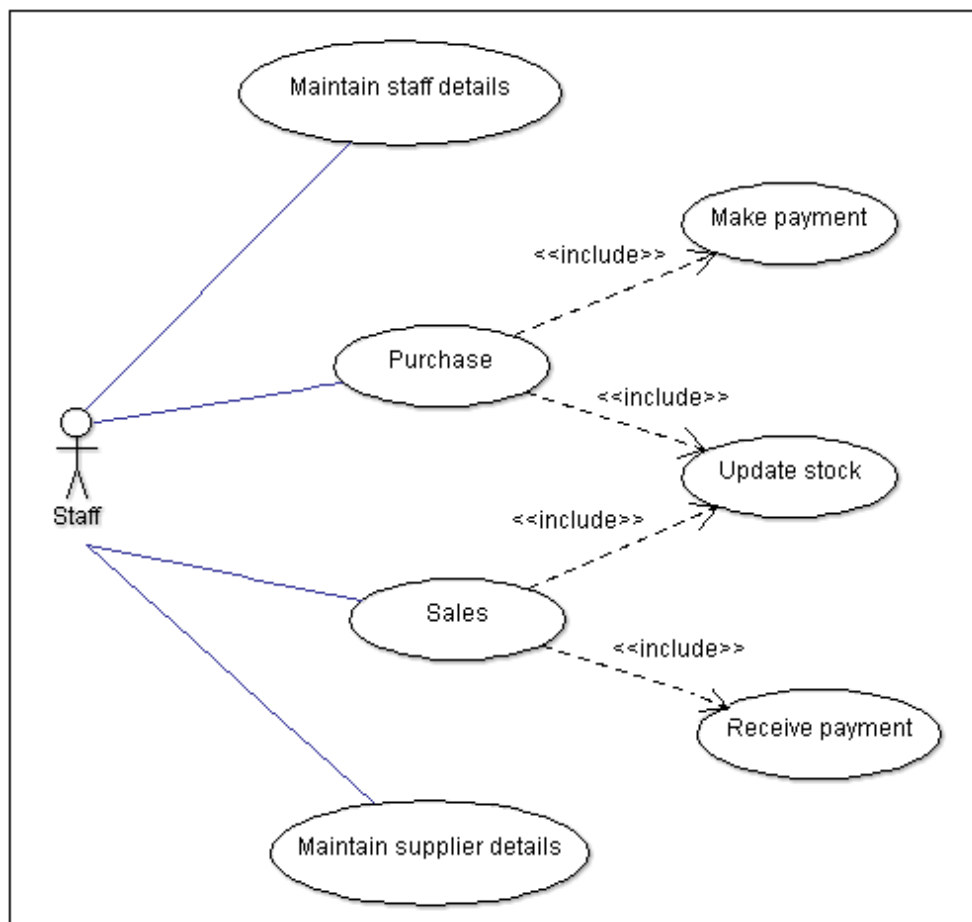
Figure 2.1 Use case diagram for Existing System

The major activities of One Prepay Lanka (Pvt) Ltd consist of purchasing POS devices and necessary materials such as paper rolls. These goods are purchased from different suppliers who are registered with the company. Payments are made to supplier on purchase and all the details regarding the purchase are recorded manually and the goods are stored.

After the purchase, different combinations of required software are installed for a certain batch of devices from each type depending on the frequency of sales. These terminals are stored separately.

When a new order is placed through a sales person, the terminal is dispatched along with an invoice. Then the stock details are updated. Details regarding the payments received at the time of sales are recorded manually.

2.4 AN OVERVIEW OF SIMILAR SYSTEMS

NetSuite

NetSuite is engineered to scale with businesses as they grow and to streamline mission-critical processes. From advanced financials to supply chain management to billing and beyond, NetSuite ERP gives companies the tools they need to accelerate growth and drive innovation. This facilitates inventory management, quoting, order management, marketing, sales order management and payment management. [1]

Key features of NetSuite
- Analytics
- Audit trails
- CRM
- Multi-Language, Multi-Currency
- Data Import/Export
- Mobile Access

- Role-based security
- Developer API
- Integration with Microsoft Office & Outlook

Contalog

Contalog is a multi-channel selling platform which can get B2B and B2C businesses into a variety of web and mobile selling channels instantly. Contalog offers centralized inventory, order and product information management across multiple sales channels thus reducing the management tasks by a mile. Contalog supports third-party integrations and also supports barcoding. [2]

More features of the system
- Custom Pricing Models
- Inventory Forecasting
- Inventory Overview
- Order Entry
- Purchase Order Management
- Reorder Management
- Serialized Inventory Tracking
- Supplier Management

Primaseller

Primaseller Inventory management software is ideal for online and offline retailers. It provides inventory and order synchronization between all offline and online sales channels, along with features like purchase planning, QuickBooks integration, shipper management, B2B order management, etc. It supports third party integration and easily manage orders. Primaseller simplifies inventory, eCommerce order processing and purchase order management across multiple online channels and retail stores. [3]

Other features of the system

- Barcoding / RFID
- Custom Pricing Models
- Inventory Optimization
- Multi-Location
- Order Entry
- Purchase Order Management
- Reorder Management
- Search / Filter
- Shipping Management
- Supplier Management
- Transfer Management

Available open-source softwares such as mentioned above offer wide range of features of which only few are useful and some of the features necessary for the client company are not available. The client company is a start-up company and it is not affordable to purchase costly off-the-shelf software and customize according to client's requirements. Therefore it was decided to develop customized software which meets the client's expectations.

2.5 FUNCTIONAL REQUIREMENTS

Functional requirements are the operations delivered by the system. The functional requirement of the system which are identified can be summarised as follows,

- Login Management
  - Provide users with individual user login and establish individual or group access rights to prevent unauthorized access to the system.

- Staff Management
  - Add details of a new staff member and update details of an existing staff member.
- Supplier Management
  - Add a new supplier and update details of an existing supplier.
- Device Management
  - Add a new type of device and edit any information of an existing type of device.
- Quotation Management
  - Sending a request to supplier for quotation for devices.
  - Receiving quotation details from supplier.
- Order Management
  - Place an order to purchase required number of device.
- Stock Management
  - Maintain details of stock available on each type of device.
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  - Maintain details regarding terminal stock available and ready for sale.
- Sales Management
  - When a sales person brings a new order, check the availability of terminal. Add a dispatch note for the terminal and update stock details.
- Invoice Management
  - Create an invoice with relevant details at the time of sales.
- Report Management
  - Generate weekly and monthly reports to support managers in decision making   process.

2.6   NON-FUNCTIONAL REQUIREMENTS

Non-functional requirements are the facts which have indirect impact on the system. The non-functional requirements identified can be listed as follows,

- Accuracy - The system should ensure correctness of the data.
- Consistency - The uniformity of the data should be maintained throughout the system.
- Security - The system should be safe from unauthorised access.
- Reliability - The system should be dependable.
- User friendly - The system interface should be simple and easy to use.
- Timeliness - Processing and response time should be minimised.
- Maintainability - Any modification to the system in future should not be a challenging task.

CHAPTER 3 **DESIGN**

3.1 INTRODUCTION

Design phase is an iterative process in which the requirements gathered in the analysis phase are converted into specifications of a detailed computer-based solution. System design emphasizes on the technical or implementation concerns of the system.

Design chapter gives an overview of the process models and briefly describes Rational Unified Process (RUP) which is chosen for the proposed system. This chapter also focuses on designing of inputs, outputs, database and interface with the use of design diagrams.

3.2 SOFTWARE PROCESS MODELS

A software process model is a standardized format for planning, organizing and running a development project [4]. A process model covers the entire life cycle of a software development project. Some of the process models are briefly described below, [5]

3.2.1 WATERFALL MODEL

Waterfall model is a classic process model which is widely used. This model is known as the "waterfall model" due to the cascade from one phase to another. In this model each stage is shut off before proceeding to the next stage and no phase will be repeated. Some deliverables from each stage are passed to the subsequent stages, therefore those outputs should be error free. This approach is more suitable for projects where the requirements are clearly defined.

3.2.2 SPIRAL MODEL

The most important distinction between the spiral model and the other process models is the explicit consideration of risk in the spiral model. There are no fixed phases in this model. Management must decide how to structure the process into phases. Each loop in the spiral represents a phase as defined by the management and is split into four sectors such as,

- Objective setting
- Risk assessment and reduction
- Development and validation
- Planning

3.2.3 RAPID APPLICATION DEVELOPMENT (RAD)

Rapid application development is used for developing applications that are data-intensive. In RAD, using structured techniques, the developer first builds the preliminary data and process models of the business requirements. Prototypes then help the analyst and users to verify those requirements and to formally refine the data and process models. It is usually organised as a set of tools that allow data to be created, searched, displayed and presented in reports.

3.3 METHODOLOGY FOR THE SYSTEM

Among the number of process models which exist RUP (Rational Unified Process) was chosen to develop the system. Main reason that powered the decision was that RUP is an adaptable process framework, where the elements of the project can be altered according to the user's requirements.

3.3.1 RATIONAL UNIFIED PROCESS

Rational Unified Process is a hybrid iterative software process model. It provides a specific plan for each step of the development process and thereby helps prevent wastage of resource and reduces unexpected development costs [6].

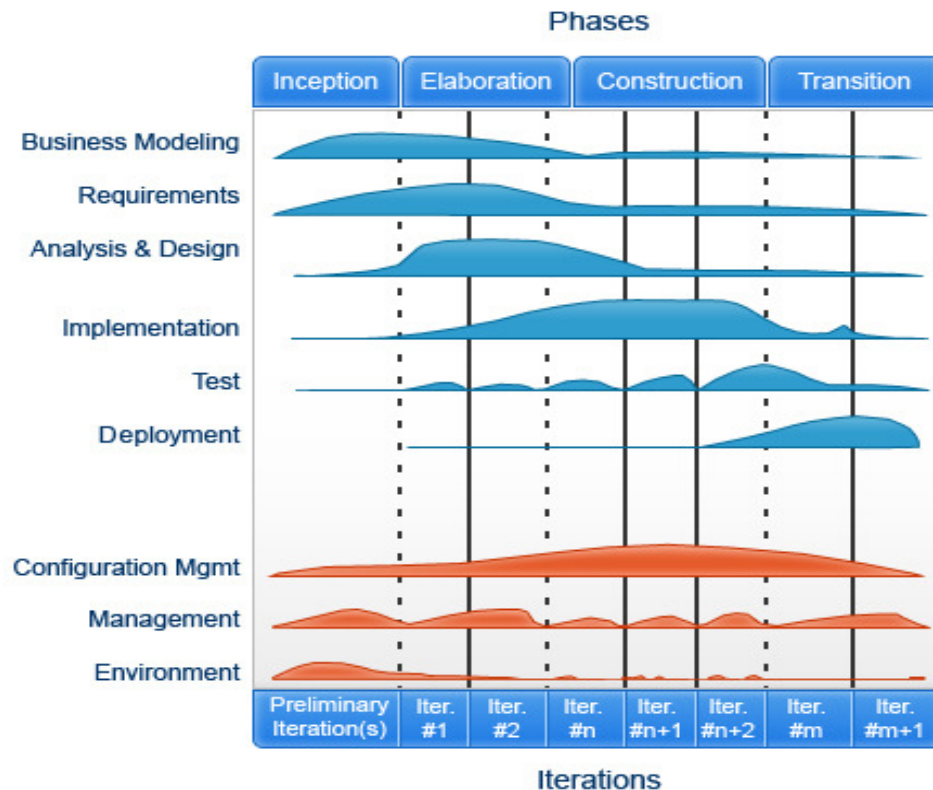The graph in figure 3.1 [7] shows how the RUP model is structured.

Figure 3.1 Rational Unified Process Model

RUP consist of four phases such as,

- Inception – Establish the business case and determine the resources required.
- Elaboration – Analyse the problem domain and define the architecture of the system.
- Construction – Design the system, write the source code and test the developed system.
- Transition - The software is released and updated based on user feedback.

15

3.4 ALTERNATE SOLUTIONS

The alternate solutions for the stand-alone operations management system are, developing a web-based system or continue using the traditional manual system.

3.4.1 WEB-BASED SYSTEM

A web-based system is an information system that is accessed over a network connection and uses web technology to deliver information and services, to users or other information systems or applications. It is a software system that uses hypertext-based principles to maintain data rather than existing within a device's memory.

3.4.2 MOBILE SYSTEM

A mobile application is a software application developed specifically to run on a mobile device, such as a smart phone or tablet computer. Mobile applications are generally small, individual software units with limited functions. They can be categorized according to whether they are web-based or native apps, which are created specifically for a given platform.

3.4.3 REASON FOR SELECTING STAND ALONE SYSTEM

Below mentioned are the facts which caused to select the stand alone system over web-based system or mobile system.

- By using a stand-alone system, the threat of losing access to your data is eliminated compared to web based system where access to critical data might be affected due to internet outage and vendor downtime.

- Access to internet is not required for stand-alone systems, whereas web based software systems cannot be used without internet connection.
- Stand-alone systems can be customized to meet specific requirements
- Stand-alone system is comparatively secured as security of a web based system is of great concern for an organization that makes its database accessible on the web.
- Stand-alone systems are less expensive over time. In contrary web based system is expensive and it also includes hosting cost. The cost of developing mobile applications is high as well.
- Data entry and reporting are faster than web based systems

3.5   DESIGN TECHNIQUES

System design is defined as those tasks that focus on the specifications of a detailed computer-based solution. There are many techniques for performing system design. They can be listed as follows,

- Modern structured design – It is a system design technique that decomposes the system's processes into manageable components / modules that are highly cohesive, loosely coupled, adaptable and understandable.
- Information engineering – Model driven and data centred, but process sensitive technique for planning, analysing and designing information systems.
- Prototyping – The prototyping approach is an iterative process involving a close working relationship between the designer and the users.
- Joint Application Development (JAD) – JAD emphasize participative development among system owners, users, designers and builders.
- Object-oriented design (OOD) – Object-oriented design is the process of defining the objects and their interactions to solve a problem that was identified during analysis.

Among the above mentioned design techniques Object-oriented approach was chosen to design the project. Object-oriented design techniques are used to refine the object requirements definitions identified earlier during analysis and to define design-specific objects. Unified Modelling Language is one of the popular methods which are used to design systems in Object-oriented concept. UML consist object models such as Use case diagram, Class diagram, Sequence diagram, etc.

3.5.1 USE CASE DIAGRAM FOR THE OPERATIONS MANAGEMENT SYSTEM

Figure 3.2 describes the overall use case diagram for the proposed system.
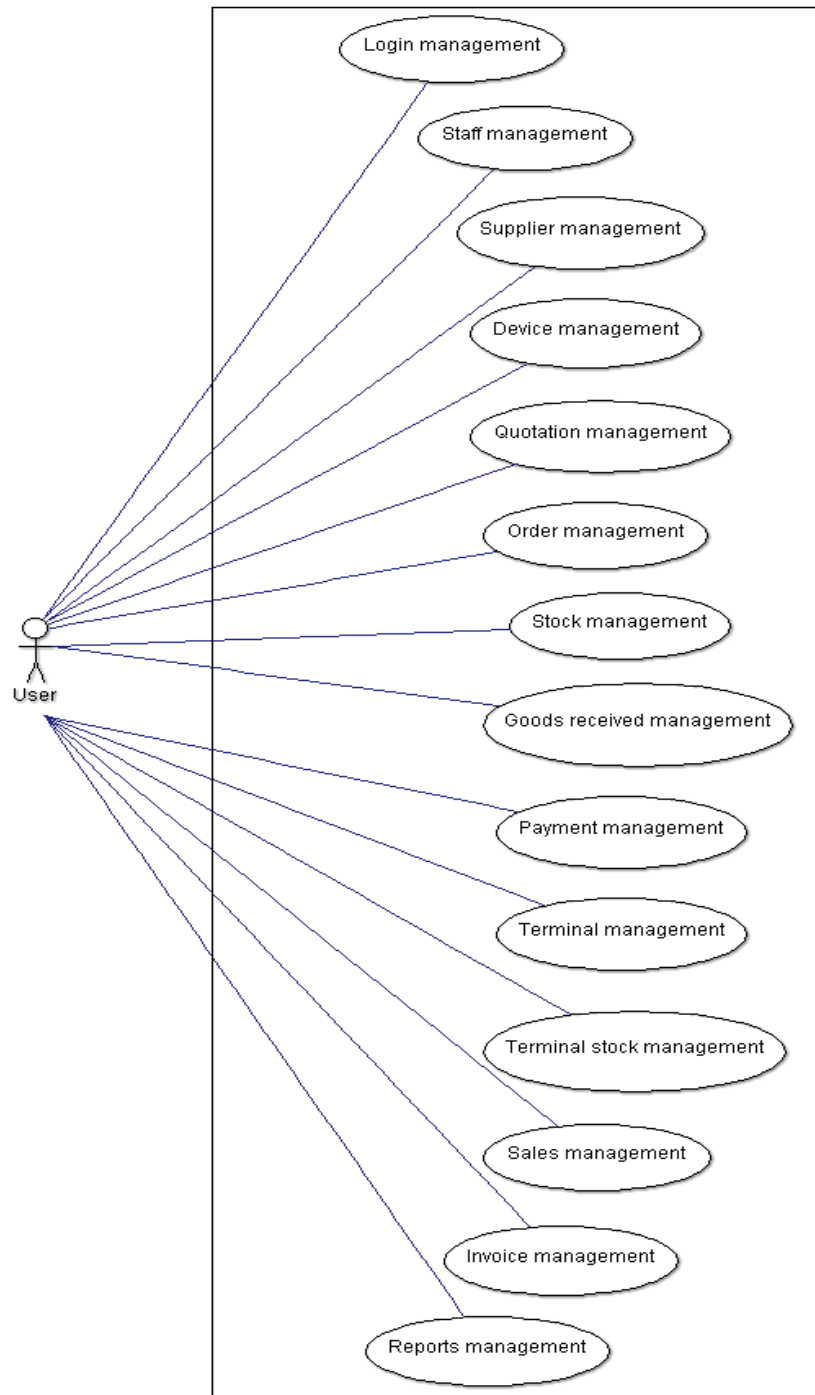
Figure 3.2 Use case diagram for the Operations Management System

3.5.2 LOGIN MANAGEMENT MODULE

Login module prevents unauthorised access to the system. This is where the user is identified and the privileges are controlled. Figure 3.3 and Table 3.1 clarifies the login management module.
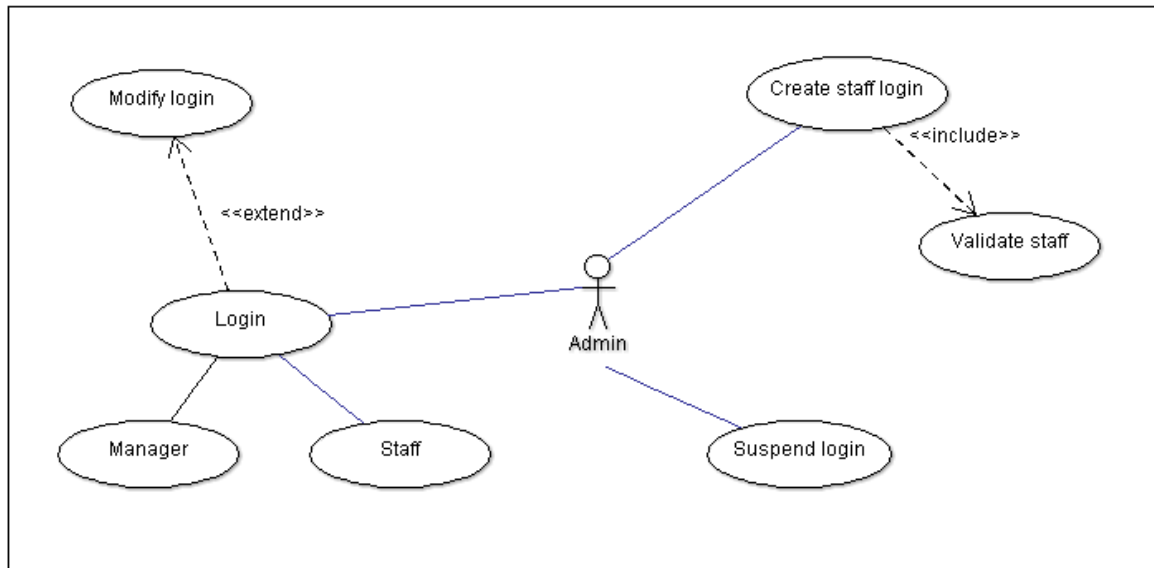
Figure 3.3 Use case diagram for Login Management Module

Use Case Name	Login Management
Actors	• Administrator • Manager • Staff
Overview	Each user has to first login to the system
Pre-Conditions	User should have valid username, password and login should be enabled.
Flow of Events	• Administrator creates login accounts for users. • User types the username and password. • System authenticates username and password. • If login is valid, grant access to system and if login is invalid throw error message.
Post-Conditions	User can access the system

Table 3.1 Use Case Description – Login Management

3.5.3 STAFF MANAGEMENT MODULE

This module handles the information regarding staff and makes easy for the user to update details. Figure 3.4 and Table 3.2 describes the staff management module.
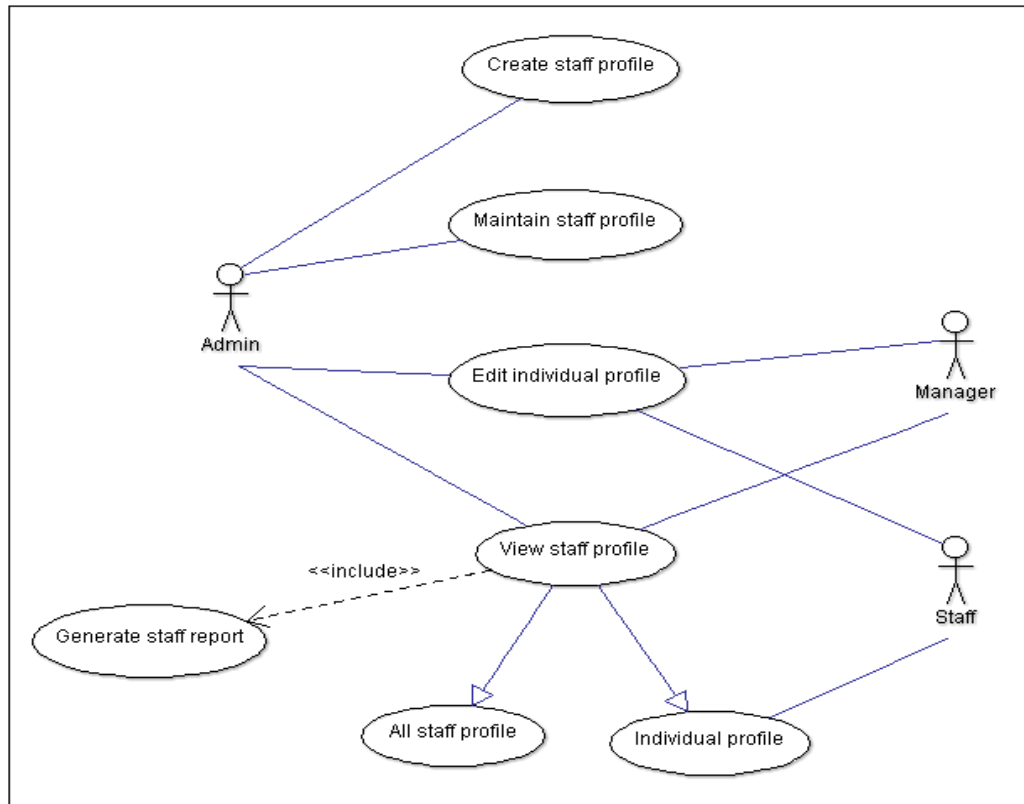
Figure 3.4 Use case diagram for Staff Management Module

Use Case Name	Staff Management
Actors	- Administrator - Manager - Staff
Overview	Users can view staff details
Pre-Conditions	Users should login to the system
Flow of Events	- Administrator creates profile for staff. - Other users can view staff profile and modify individual profile.
Post-Conditions	User has an updated profile

Table 3.2 Use Case Description – Staff Management

21

3.5.4 ORDER MANAGEMENT MODULE

Order management module helps in placing an order and recording details regarding the purchase order. Figure 3.5 and Table 3.3 explains the order management module.
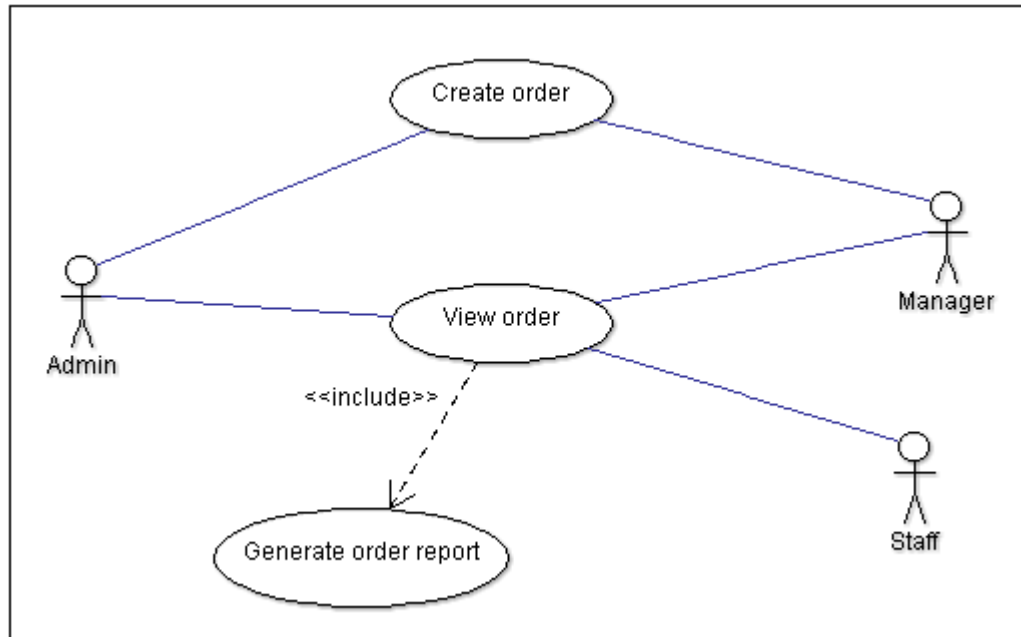
Figure 3.5 Use case diagram for Order Management Module

Use Case Name	Order Management
Actors	• Administrator • Manager • Staff
Overview	Users can manage purchase order details
Pre-Conditions	Users should login to the system
Flow of Events	• Manager creates new order. • Users can view purchase order details.
Post-Conditions	Order details are recorded in the system

Table 3.3 Use Case Description – Order Management

Please refer Appendix B for the use case diagrams of remaining modules, activity diagrams and sequence diagrams.

3.5.5 CLASS DIAGRAM FOR THE OPERATIONS MANAGEMENT SYSTEM

Figure 3.6 depicts the class diagram of the operations management system.
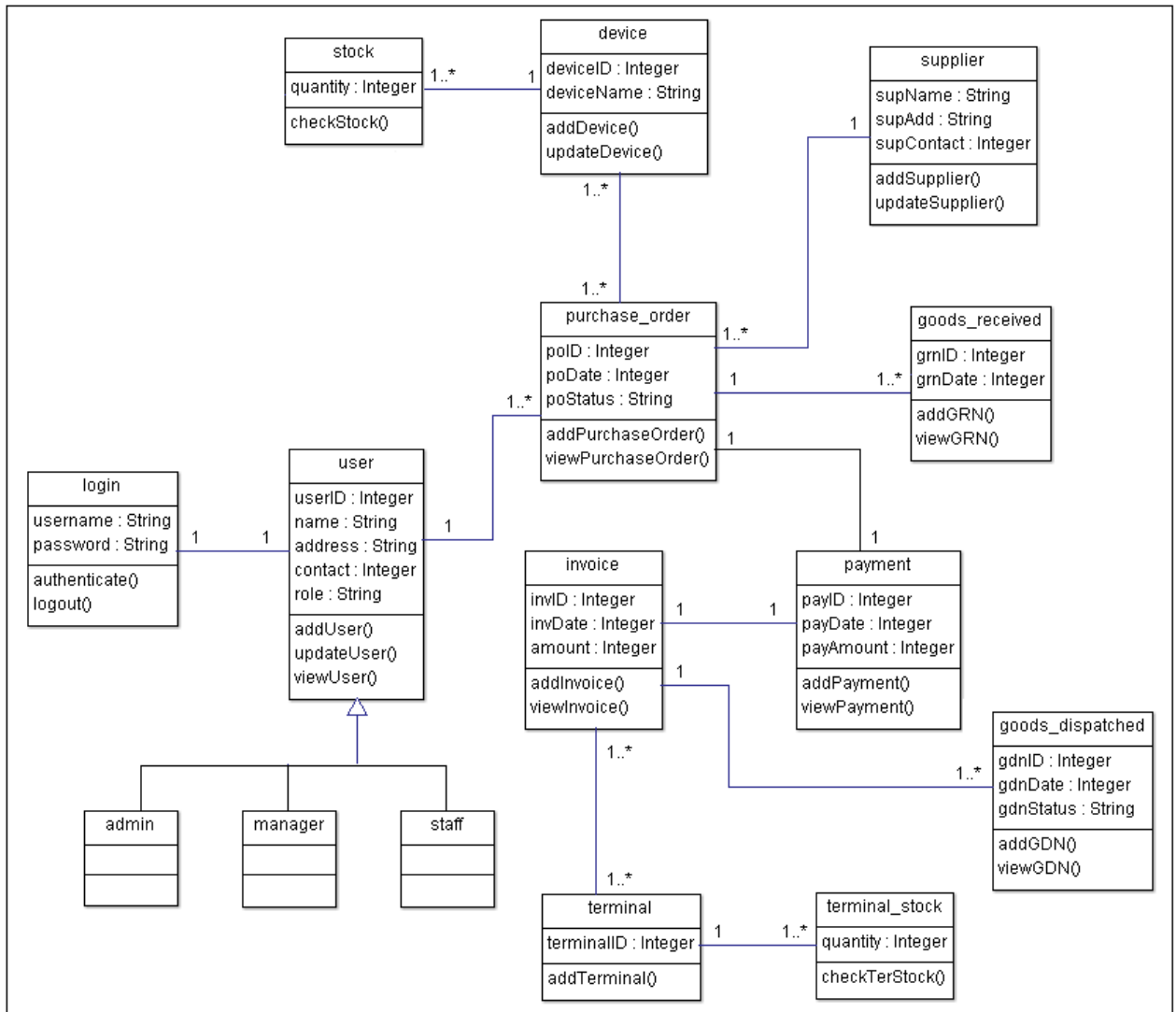
Figure 3.6 Class Diagram for the Operations Management System

3.6 DATABASE DESIGN

A good database design helps efficient usage of available data. Storage, update, and retrieval of data are considered to be the primary functionalities of the database.

The expected database should be reliable. Data reliability is achieved through reducing redundancy which wastes space and leads to inconsistencies. Reliability is crucial because reports are generated based on the database and therefore inconsistencies in the database would affect the decisions made. Figure 3.7 illustrates the design of the database.

Figure 3.7 Database Design for the Operations Management System

3.7   USER INTERFACE DESIGNING

User interface is the interaction point between the user and the system. It hides the underlying complicated architecture from the user and provides a simple way of executing tasks. Interface should be easy to use and pleasant to view.

Some qualities which a good user interface would have are listed below,

1. Interface should be user-friendly.

2. Each interface screen, icons and controls should be consistent.

3. Unambiguous language, appropriate font style, size and background colour should be used to ensure that the text is clear and readable.

4. Navigation through pages should be easy.

5. Useful feedback like meaningful error messages and confirmation messages should be provided.

6. Well aligned fields and buttons should be used.

Above mentioned qualities are taken into consideration when designing the operations management system.

It was decided to design the home page as displaying links to all modules of the system in a grid structure instead of a list. The reason was to make the user aware of all available modules at a glance and provide easy access to the modules. The result page when selecting a certain module was designed to show the available records along with buttons for viewing and updating each record. In addition a button was provided for adding a new record. The colours used for the buttons were result of not only attractiveness but also maintaining consistency throughout the modules to ensure user-friendliness. Considering the navigation pane, the decision was made to display the cascading structure of the particular page, providing links at each level instead of displaying a direct link to the home page. The reason for the decision was to ensure easy navigation.

Few main interfaces of the system have been illustrated below,

Login Page

The figure 3.8 shows the login page of the system. This is the interface where an authorised user can enter the valid username and password to log onto the system. If an incorrect username or password is entered or user's login status is disabled, the system will output an error message.
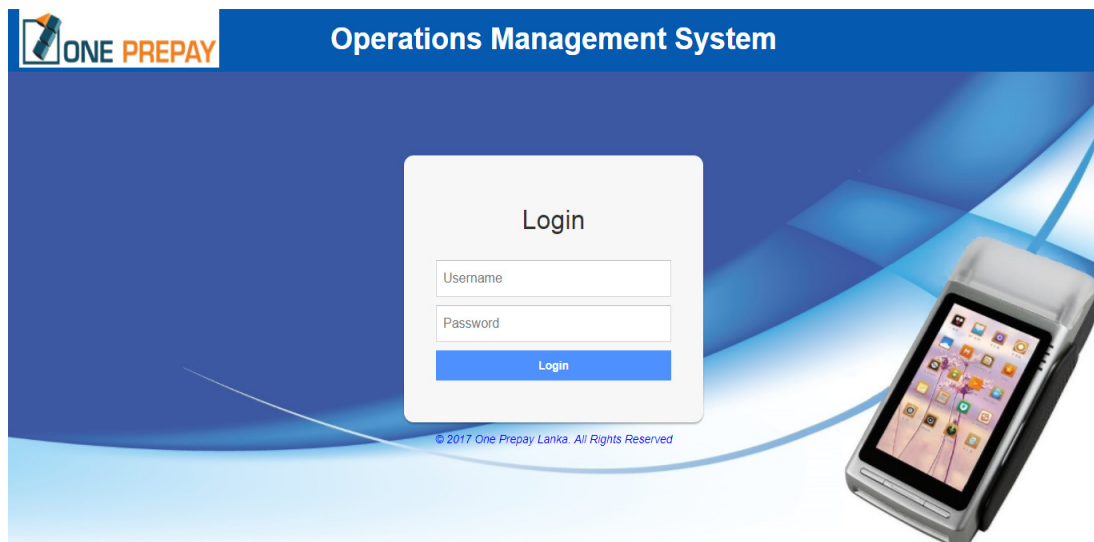
Figure 3.8 Login Screen

Home Page

An authorised user who has logged onto the system is directed to the home page. The home page provides necessary links to navigate easily to other pages of the system. The administrator's home page is shown in Figure 3.9.

Figure 3.9 Home Page

Staff Management Page

Figure 3.10 illustrates the staff management page of the administrator. This interface allows administrator to manage staff details and their logins.
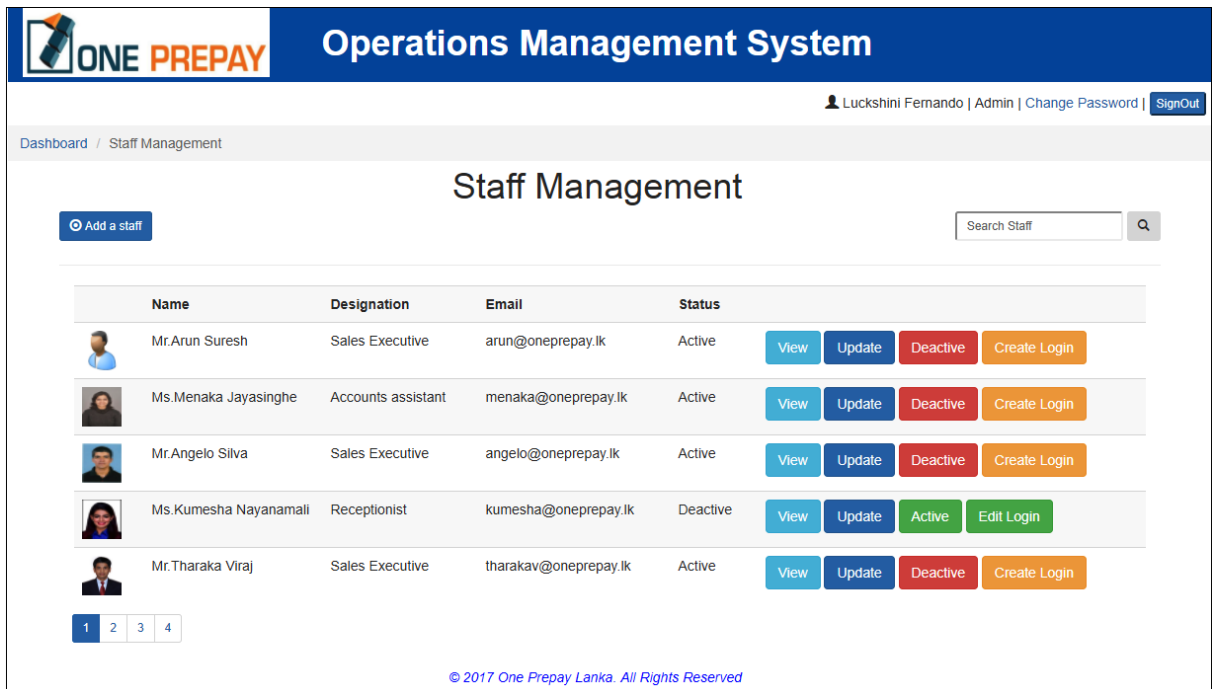
Figure 3.10 Staff Management Page

27

Add Supplier Page

Figure 3.11 shows the interface which is used to add new supplier to the system.

Figure 3.11 Add Supplier Page

Update Device Page

The interface for modifying device details is depicted in Figure 3.12. This shows the selected device's details in editable format.

Figure 3.12 Update Device Page

CHAPTER 4 **IMPLEMENTATION**

4.1 INTRODUCTION

Implementation phase is where the usable system gets its shape. In this phase the design is converted into an executable form. The system is implemented based on specifications identified though analysis phase.

Appropriate language and tools were used to develop the system. Maintainability is crucial for any system as the future users also should be able to understand the system in order to use it and modify it. This aspect was taken into consideration when writing the codes. Implementation chapter gives an overview of the implementation environment, module structure and also provides the main code segments.

4.2 IMPLEMENTATION ENVIRONMENT

4.2.1 SOFTWARE ENVIRONMENT

- Windows 8
- XAMPP version 1.8.3 which includes
    - PHP 5.5.11
    - Apache 2.4.9
    - phpMyAdmin 4.1.12
    - MySQL 5.6

4.2.2 HARDWARE ENVIRONMENT

- Intel Dual core CPU 2.20GHz
- 2GB RAM
- Hard drive 320GB

4.2.3 DEVELOPMENT TOOLS AND TECHNOLOGIES

- NetBeans IDE was used as the IDE for coding the system.
- Bootstrap was used as the framework to design the user interface of the system.
- PHP (Hypertext Pre Processor) was used as the main development language in the system.
- HTML (Hyper Text Markup Language)
- MySQL was used to build the database of the system.
- CSS was used to make the interface more attractive.
- JavaScript was used to code the client-side validation.
- JQuery which is Java Script library was also used for client-side validation.
- Ajax was used for client-side validation.

4.3   MODULE STRUCTURE

The operations management system is developed based on MVC framework. The Model is used to interact with the database; The Controller is used to send requests and responses back and forth between model and view; The View contains the user interfaces. Images, style sheets, JavaScript and Bootstrap files are separated from the MVC core components. The directory structure of the system is shown in Figure 4.1.
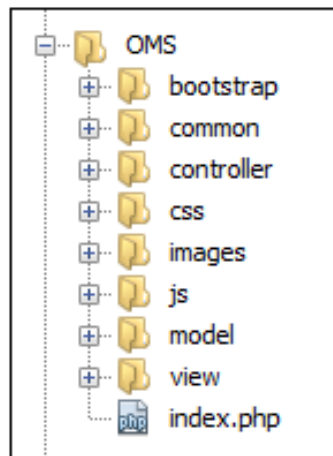
Figure 4.1 Directory structure

4.4 MAJOR CODE SEGMENTS

Here are some common codes of the system. Please refer Appendix F for code listing.

Accessing the database

```php
<?php
class dbconnection{
public $host="localhost";
public $user="root";
public $password="";
public $db="oms";


public function connection(){
  //connection string
  $con=new mysqli($this->host,$this->user,$this->password,$this->db);
  return $con;
}
}
?>
```

Login

```php
loginmodel.php
<?php
class login{
  public function loginvalidate($uname,$pass){
      $con=$GLOBALS['con'];
  //sql query
  $sql="SELECT * FROM login l, staff s, role r WHERE l.username='$uname' AND
l.password='$pass'     AND     l.staff_id=s.staff_id     AND     l.role_id=r.role_id     AND
l.login_status='Enable'";
  //Execute a query
  $result=$con->query($sql);
```

```php
    return $result;
  }
}
?>
```

logincontroller.php

```php
if($_POST['uname']=="" || $_POST['pass']==""){
        //Pass error message through url
        $msg=base64_encode("Empty Username or Password");
        header("Location:../view/login.php?msg=$msg");
        exit();
    }
    include '../common/dbconnection.php';
    $ob=new dbconnection();
    $con=$ob->connection();


    $uname=trim($_POST['uname']);
    //To encrypt the password and check with table field
    $pass= sha1(trim($_POST['pass']));
    include '../model/loginmodel.php';
    $obj=new login();
    $result=$obj->loginvalidate($uname, $pass);
    if($result->num_rows==1){
      //If there is a matching record, redirect to home page
      $row=$result->fetch_array();
      $_SESSION['user_info']=$row;
      $staff_id=$row['staff_id'];
      header("Location:../view/dashboard.php");
    }else{
      //If no matching records, display error mesaage
      $msg=base64_encode("Invalid Username or Password");
      header("Location:../view/login.php?msg=$msg");
    }
    ?>
```

Create a session

```php
<?php
//Start session if a session is not already created
if(!isset($_SESSION)){
   session_start();
}
//To get count from session array
$count=count($_SESSION['user_info']);
//Redirect to login page if there is no session
if ($count==0){
   $msg="Please Login...";
   $msg= base64_encode($msg);
   header("Location:../view/login.php?msg=$msg");
   exit();
}
?>
```

Logout

```php
<?php
if(!isset($_SESSION)){
   session_start();  }
$user_info=$_SESSION['user_info'];
unset($_SESSION['user_info']); //To remove session by session
header("refresh:5;url=../view/login.php"); // To redirect within 5 seconds
?>
```

4.5   REUSED MODULES

- SHA1 JavaScript function [8]

  This function is used for encrypting passwords securely.

- JQuery 1.8.3.min.js [9]

  This is used for client-side validation.

- Code for checking username [10]

  This JavaScript code is used for validating and displaying error message in the respective page.

```javascript
function checkUname(str)
{
var xmlhttp;
if (str=="") {
 document.getElementById("show").innerHTML="";
 return;
 }
if (window.XMLHttpRequest) {  // code for IE7+, Firefox, Chrome, Opera, Safari
 xmlhttp=new XMLHttpRequest();
 }
else {  // code for IE6, IE5
 xmlhttp=new ActiveXObject("Microsoft.XMLHTTP");
 }
xmlhttp.onreadystatechange=function() {
 if (xmlhttp.readyState==4 && xmlhttp.status==200) {
  document.getElementById("show").innerHTML=xmlhttp.responseText;
  }
 }
xmlhttp.open("GET","getuname.php?q="+str,true);
xmlhttp.send();
}
```

- Code for restricting only integers [11]

  This JavaScript code allows entering only integers in form fields.

```
function onlyNos1(e, t) {

      try {
      if (window.event) {
      var charCode = window.event.keyCode;
      }
      else if (e) {
      var charCode = e.which;
      }
      else { return true; }


      if (charCode > 31 && (charCode < 48 || charCode > 57))
      return false;
      }
      return true;
      }


      catch (err) {
         alert(err.Description);
      }
   }
```

CHAPTER 5 EVALUATION

5.1 INTRODUCTION

This phase is considered to be crucial for a system as it evaluates the system and helps us to identify the errors and fix them. Testing also ensures the reliability of the software.

Evaluation chapter gives an overview of software testing and test cases. The system was initially tested with dummy data and then actual users evaluated the system.

5.2 TESTING

Software testing includes verification and validation. Verification is the method of evaluating whether the system meets the functional requirements while validation is the method of evaluating whether the system satisfies all the customer requirements. Therefore a good software test should be planned and carried in order to deliver a system with fewer errors.

5.3 TEST PLAN

The operations management system has been tested according to a test plan. The test plan was designed considering the resources, strategies and results. Test cases are the crucial contents of a test plan. According to the test plan, a unit testing was carried out for each function after coding. This testing was done to make sure that each function works as it was intended.

An integration testing was done after integrating the units of code. This test was carried out to ensure that the functions are working properly as a module after incorporating different types of technologies.

After completing the system development the entire system was tested at a similar environment where the operations management system would be actually used. The system test was carried out to make sure that the system as a whole gives the anticipated output.

Testing methodologies consist of black box testing and white box testing. Black box testing does not require any knowledge on the internal structure of the system as it only focuses on testing the input and output of data. White box testing is a code level testing method and it emphasises on the internal structure of the system.

Some test cases which are used in this phase are mentioned below in Tables 5.1 and 5.2.

5.3.1 TEST CASES FOR USER LOGIN

Test No	Test description	Steps to test	Expected results
1	Empty username and password	Click Login button without entering any values for username and password fields.	Display error message as 'Both username and password are empty'
2	Enter only username	Enter username and leave password field blank. Click Login button.	Display error message as 'Empty Password'
3	Enter only password	Leave username field blank and enter valid password. Click Login button.	Display error message as 'Empty Username'

4	Invalid username and password	Enter invalid username and invalid password. Click Login button.	Display error message as 'Invalid Username or Password'
5	Valid username and password	Enter valid username and valid password. Click Login button.	Display home page of the system
6	Enter inactive user's username and password	Enter username and password of an inactive user. Click Login button.	Display error message as 'Invalid Username or Password'
7	Logout	Click SignOut button.	Logout user and redirect to login page.

Table 5.1 Test cases for User Login

5.3.2 COMMON TEST CASES

Test No	Test description	Steps to test	Expected results
1	Add a record	Click Add button.	Display the form for entering data
2	View a record	Click View button.	Display details of selected record.
3	Update a record	Click Update button.	Display details of selected record in editable format.
4	Change status	Click Active or Deactive button.	Display confirm message and change status as active or deactive accordingly.

5	Search a record	Type a keyword and click Search button.	Display records relevant to the keyword.
6	Clear all fields	Click Clear button.	Clear all fields that are filled.
7	Validate required fields	Leave required fields blank and click Add button.	Display error message stating to fill the field.
8	Validate input format	Enter data in incorrect format.	Display error message.
9	Save data	Click Save button.	Display message stating the record has been saved.
10	Navigate between pages	Click link on navigation pane.	Redirect to chosen page.

Table 5.2 Common Test cases

Please refer Appendix E for results of tests carried out.

5.4   ACCEPTANCE TESTING

The operations management system was tested after implementing in the client's office. The user acceptance test was carried out in the actual working environment to verify whether the system functionalities satisfy the operational needs of the company. Selected employees from each user role were asked to use the system and their activities were monitored. Then, a questionnaire was given to those employees to get their feedback.

The ultimate results proved that the system is user friendly and easy to handle. It also showed that the system helped them to carry out their day to day work in an efficient manner. Feedback given by the users helped to improve the system. Finally, the overall results showed that the project satisfied the scope and objectives. The questionnaire used to assess user feedback is given in Appendix E and the client certificate is added to Appendix G.

CHAPTER 6 CONCLUSION

6.1 INTRODUCTION

Client requirements were taken into consideration throughout various phases of the project to ensure the system caters to the needs of the client organisation.

This chapter gives a critical analysis of the operations management system. It also points out the lessons learnt throughout the process of system development and the features which could be added to the system in future.

6.2 CRITICAL ANALYSIS OF THE SYSTEM

One Prepay Lanka (Pvt) Ltd is a start-up company that introduced digital recharge vouchers to the market and provides solution for mobile top-up. They started their business with a traditional manual system. Due to the heavy competition in the market, the client organisation realised that they need to switch to an automated system to speed up the operations, reduce errors and make maximum use of resources available.

The requirements of the client were gathered early during the analysis phase of the system development. These functional and non-functional requirements were taken into consideration when designing and implementing each module of the system.

The developed system supports the major functions of the organisation. It provides facility to store details of suppliers and devices. The system also allows user to view the stock status at a glance and thereby help managing the stock efficiently. Details regarding quotations for purchasing devices could be recorded in the system and a purchase order could be created using the system referring to the details of a quotation. Information on

goods received could be entered against a particular purchase order. Similarly, at the time of sales, the system enables user to create invoice and record details regarding goods dispatched. This supports the efficient work flow of the business and ensures reliability.

The system is built in a secured manner to maintain confidentiality through the implementation of user logins protected by passwords. It also enforces access privileges according to the role of user. The added feature to generate reports assists the management to analyse the status of business and helps in making timely decisions.

These salient features make the system a valuable resolution for the organisation One Prepay Lanka (Pvt) Ltd. and results of the user acceptance test ensure that the system satisfies the expectations of the client.

6.3 LESSONS LEARNT

The software development process not only fulfils the requirement of BIT degree program, it also gave the opportunity to apply the knowledge practically. Working according to a given schedule helped improve effective time management and planning skills which are considered to be essential for a project. Vital experience was gained regarding timely interaction and communication with the client.

The process of developing the system helped acquire knowledge in PHP coding and MySQL environment. It also facilitated in getting to know new technologies as Javascript and JQuery. The project also gave the opportunity to improve the knowledge on designing a system using diagrams. Better awareness was acquired regarding MVC framework. Writing the dissertation helped to develop my skills and experience on professional writing.

Moreover working on the project helped to improve technical skills as well as intellectual skills by collaborating with many individuals from collective fields.

6.4   FUTURE ENHANCEMENTS

The system could be improved by adding new features mentioned below,

- Add sales return module to record any fault that is reported regarding a terminal after sales and manage replacement of the terminal.
- Add bar charts and pie charts in reports module to support top management in decision making.
- Add an attendance and payroll module to allow managers to monitor staff attendance and calculate wages.

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APPENDIX A – SYSTEM DOCUMENTATION

The system documentation provides necessary guidelines for system administrator and manager on how to install the system appropriately. This consists of minimum hardware and software requirements needed to run the system. The system documentation can be referred in future, if there is any amendment to be done to the operations management system.

Hardware and software requirements for the system are cited below

HARDWARE REQUIREMENTS

- Intel dual core, 1 GHz processor or greater
- 256 MB RAM
- 1 GB free hard disk space
- 1366 x 768 screen resolution

SOFTWARE REQUIREMENTS

- Windows 8
- XAMPP version 1.8.3 which includes
    - PHP 5.5.11
    - Apache 2.4.9
    - phpMyAdmin 4.1.12
    - MySQL 5.6
- Web browser

INSTALLING THE OPERATIONS MANAGEMENT SYSTEM

INSTALLING XAMPP

- Download XAMPP Windows version from www.apachefriends.org and install it to the C: drive of the computer.

DATABASE SETUP

- Open your web browser and type the URL http://localhost/phpmyadmin in the address bar.

- In phpMyAdmin window, click on 'Databases' tab and create a new database called 'oms'.
- Click on 'Import' tab and browse 'oms.sql' from the supplementary CD through the path X:\Operations Management System\Database\oms.sql (Note: X: is your CD drive).
- Click on the 'Go' button to import the database tables.

SYSTEM SETUP

- Copy the 'OMS' folder from the supplementary CD and paste it in the following location, C:\xampp\htdocs

LAUNCHING THE SYSTEM

- Go to 'XAMPP control panel' in start menu and start running Apache and MySQL.
- Open your web browser and type the URL http://localhost/OMS in the address bar.
- Login to gain access to the system by providing valid username and password.

APPENDIX B – DESIGN DOCUMENTATION

USECASE DIAGRAMS

Device Management Module

Device management module facilitates adding new device and updating existing devices. This module is further described in Figure B.1 and Table B.1.
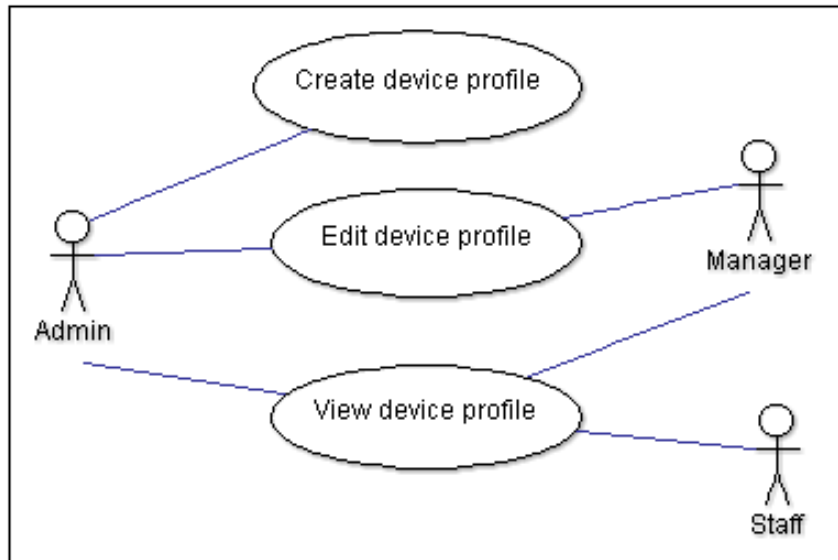
Figure B.1 Use case diagram for Device Management Module

Use Case Name	Device Management
Actors	• Administrator • Manager • Staff
Overview	Manage details regarding the devices
Pre-Conditions	Users should login to the system
Flow of Events	• Administrator creates profile for new device • Manager updates the device details • Staff can view the details
Post-Conditions	Available deice details are recorded in the system

Table B.1 Use Case Description – Device Management

Supplier Management Module

Supplier management module helps users to manage supplier details effectively. Figure B.2 and Table B.2 explains the supplier management module.
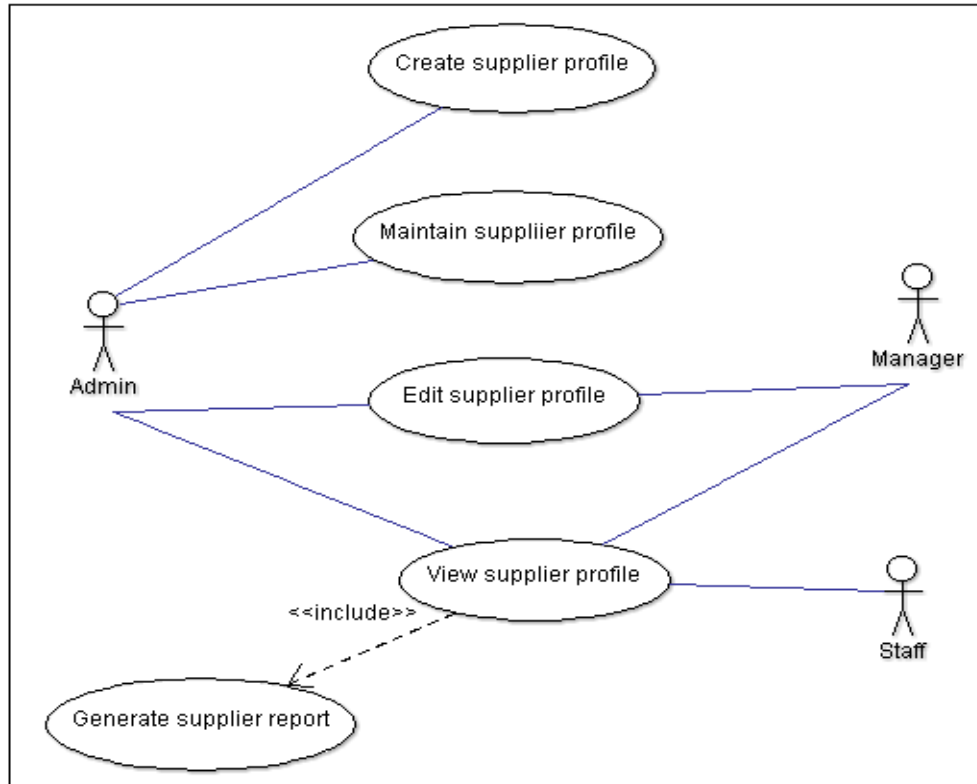
Figure B.2 Use case diagram for Supplier Management Module

Use Case Name	Supplier Management
Actors	• Administrator • Manager • Staff
Overview	Users can view supplier details
Pre-Conditions	Users should login to the system
Flow of Events	• Administrator creates profile for supplier and modifies. • Other users can view supplier profile.
Post-Conditions	Supplier details are updated

Table B.2 Use Case Description – Supplier Management

Quotation Management Module

This module facilitates users to easily manage quotations. Quotation management module is further described in Figure B.3 and Table B.3.
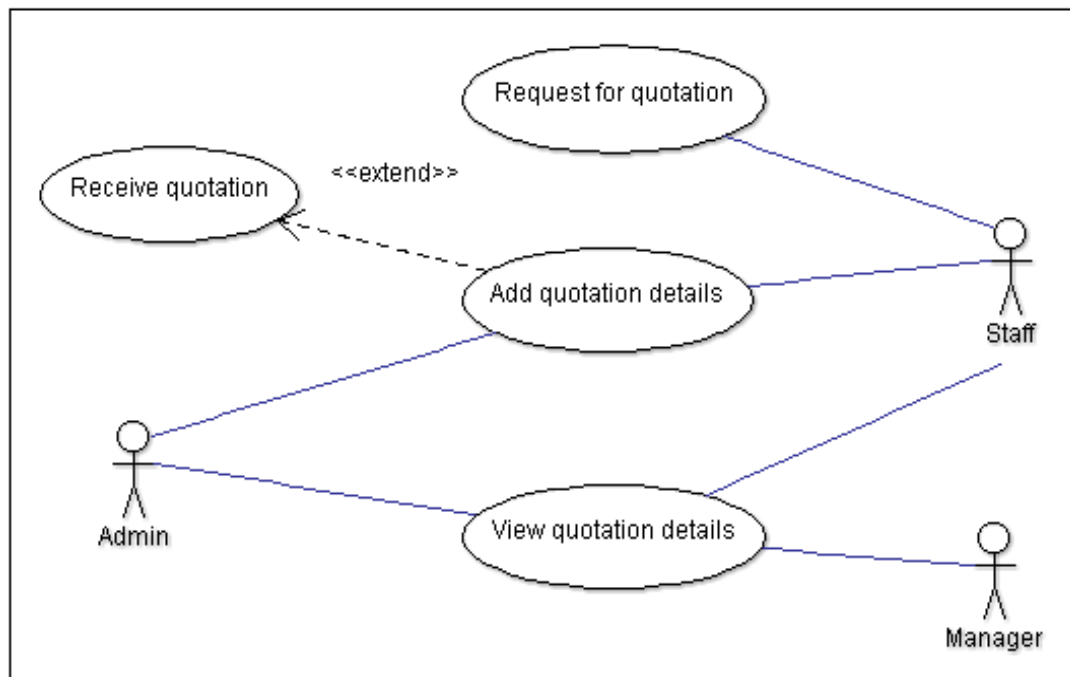
Figure B.3 Use case diagram for Quotation Management Module

Use Case Name	Quotation Management
Actors	• Administrator • Manager • Staff
Overview	Users can manage quotation details
Pre-Conditions	Users should login to the system
Flow of Events	• Staff adds new quotation. • Users can view quotation details.
Post-Conditions	Quotation details are recorded in the system

Table B.3 Use Case Description – Quotation Management

Stock Management Module

Users can manage the stock of items using stock management module. This module is further clarified in Figure B.4 and Table B.4.
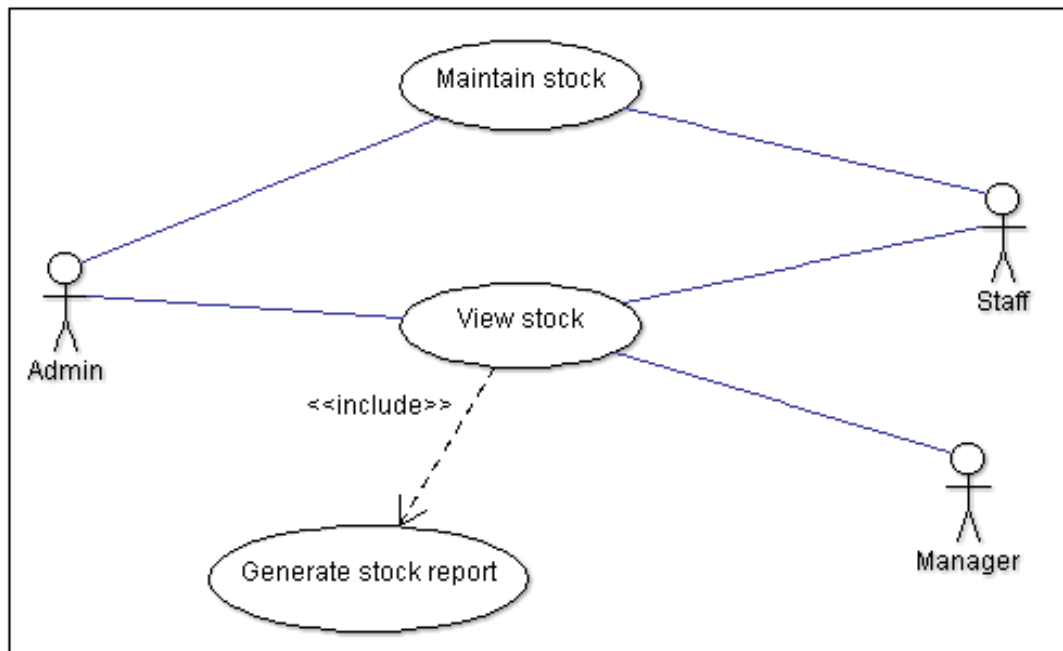
Figure B.4 Use case diagram for Stock Management Module

Use Case Name	Stock Management
Actors	- Administrator - Manager - Staff
Overview	Users can manage stock of items
Pre-Conditions	Users should login to the system
Flow of Events	• User can view stock status of each item
Post-Conditions	Managers can make decision on purchasing.

Table B.4 Use Case Description – Stock Management

Goods Received Module

Goods received module helps to keep track of details regarding goods received. This module is further explained in Figure B.5 and Table B.5.
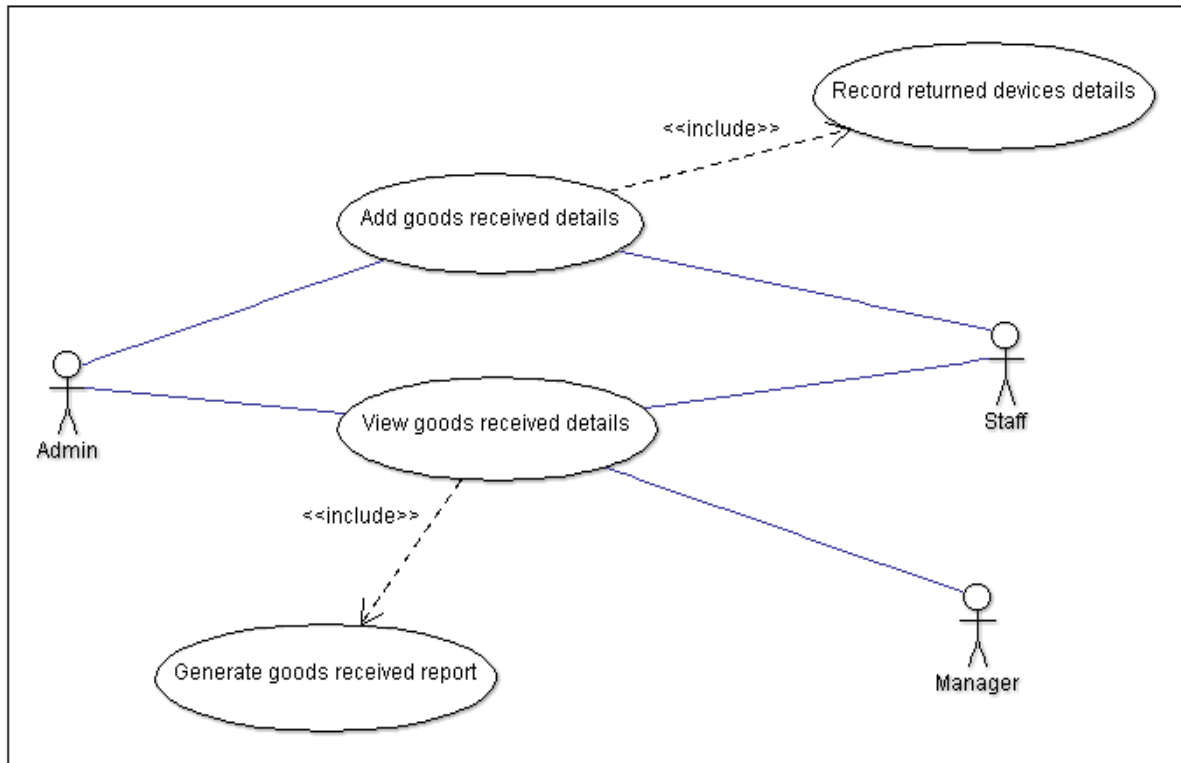
Figure B.5 Use case diagram for Goods Received Module

Use Case Name	Goods Received
Actors	• Administrator • Manager • Staff
Overview	Add and view details of goods received
Pre-Conditions	Users should login to the system
Flow of Events	• User creates goods received note • User can view GRN details
Post-Conditions	Stock is updated

Table B.5 Use Case Description – Goods Received

Payment Management Module

Details regarding payments made and received are managed using this module. Payment management module is described more in Figure B.6 and Table B.6.
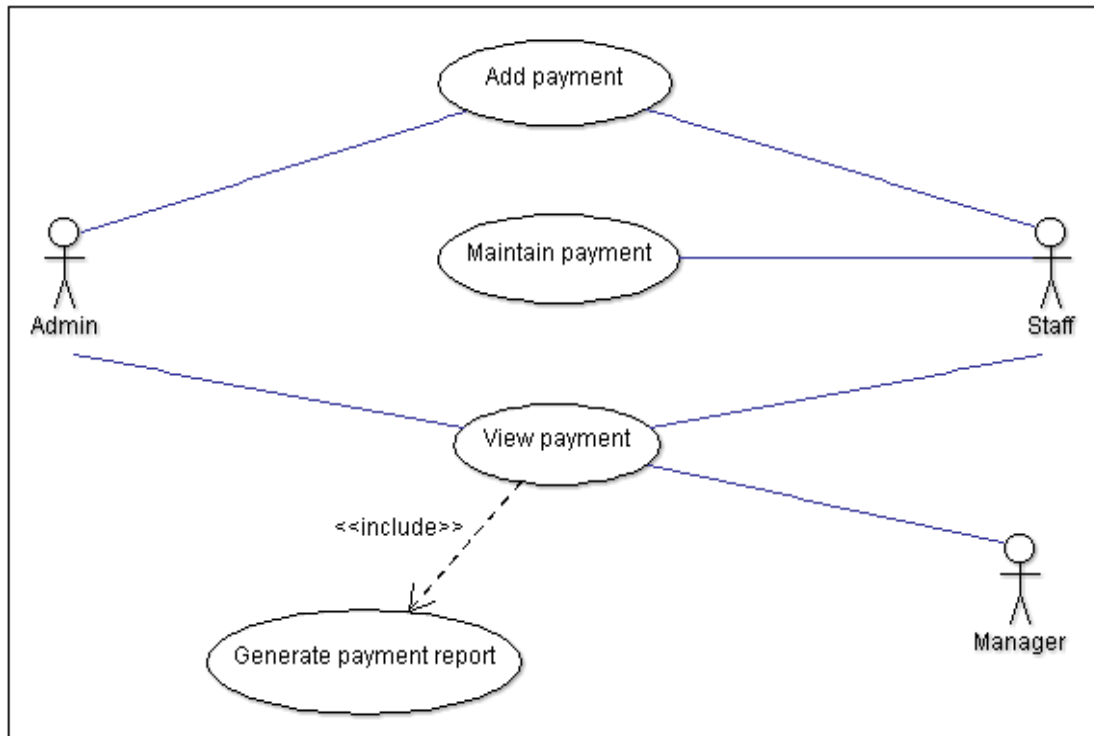
Figure B.6 Use case diagram for Payment Management Module

Use Case Name	Payment Management
Actors	• Administrator • Manager • Staff
Overview	Add and view payment details
Pre-Conditions	Users should login to the system
Flow of Events	• User adds details of payment made and received • View and update payment details
Post-Conditions	Payment details are recorded in the system

Table B.6 Use Case Description – Payment Management

Terminal Management Module

This module helps users to easily handle information of terminals. Terminal management module is detailed more in Figure B.7 and Table B.7.
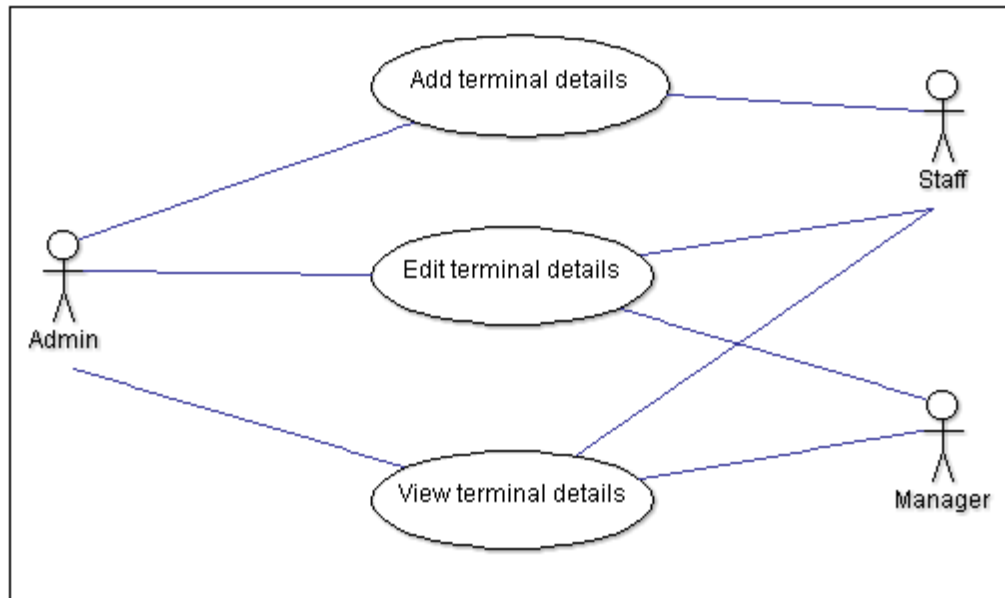
Figure B.7 Use case diagram for Terminal Management Module

Use Case Name	Terminal Management
Actors	• Administrator • Manager • Staff
Overview	Manage details regarding terminals
Pre-Conditions	Users should login to the system
Flow of Events	• Staff adds new terminal to the system • Users can view and update terminal details
Post-Conditions	Terminal details are updated in the system

Table B.7 Use Case Description – Terminal Management

Terminal Stock Management Module

Handling the stock of terminals is done using terminal stock management module. This module is further described in Figure B.8 and Table B.8.
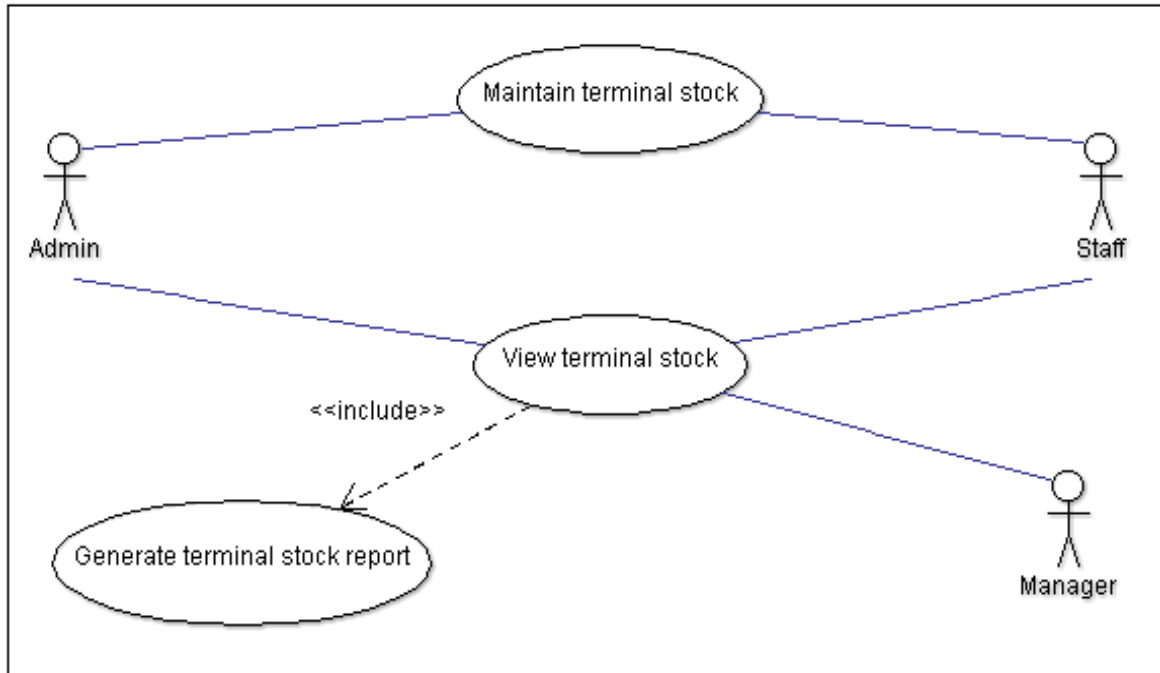
Figure B.8 Use case diagram for Terminal Stock Management Module

Use Case Name	Terminal Stock Management
Actors	• Administrator • Manager • Staff
Overview	Users can manage stock of terminals
Pre-Conditions	Users should login to the system
Flow of Events	• User can view available stock of terminal under each category
Post-Conditions	User can decide on adding more terminals

Table B.8 Use Case Description – Terminal Stock Management

Invoice Management Module

Invoice management module helps create invoice and record details at the time of sale. Figure B.9 and Table B.9 explains the invoice management module.
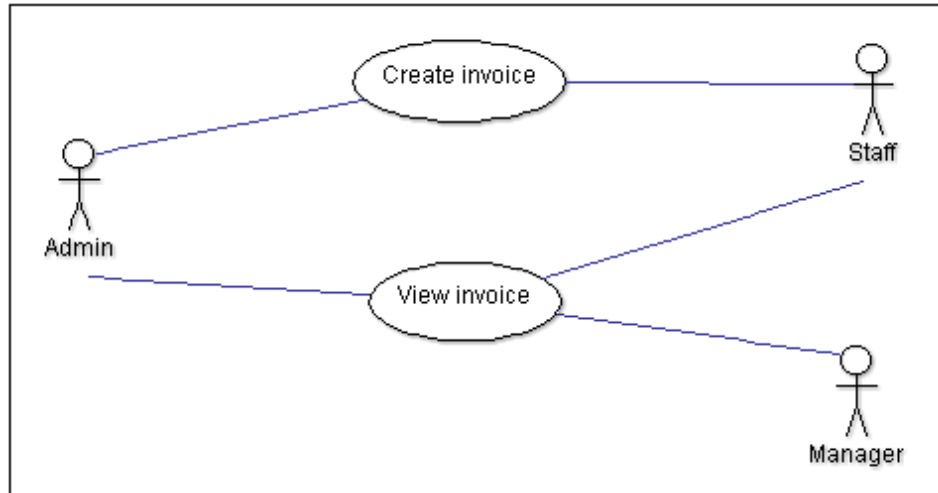
Figure B.9 Use case diagram for Invoice Management Module

Use Case Name	Invoice Management
Actors	• Administrator • Manager • Staff
Overview	Users can create invoice and record sales
Pre-Conditions	Users should login to the system
Flow of Events	• Staff creates new invoice • Users can view invoices
Post-Conditions	Sales details are recorded in the system

Table B.9 Use Case Description – Invoice Management

Sales Management Module

This module helps to manage details regarding sales and goods dispatched. Sales management module is further described in Figure B.10 and Table B.10.
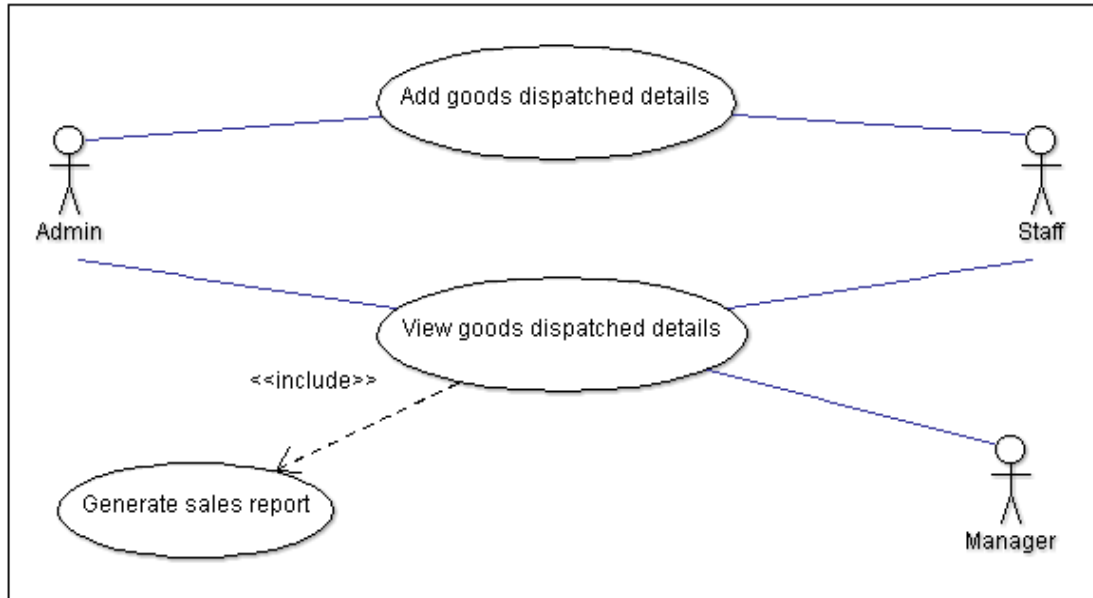
Figure B.10 Use case diagram for Sales Management Module

Use Case Name	Sales Management
Actors	• Administrator • Manager • Staff
Overview	Manage details of goods dispatched
Pre-Conditions	Users should login to the system
Flow of Events	• Staff creates goods dispatched note • Users can view goods dispatch note
Post-Conditions	Details of goods dispatched are recorded and stock is updated

Table B.10 Use Case Description – Sales Management

SEQUENCE DIAGRAMS

Login
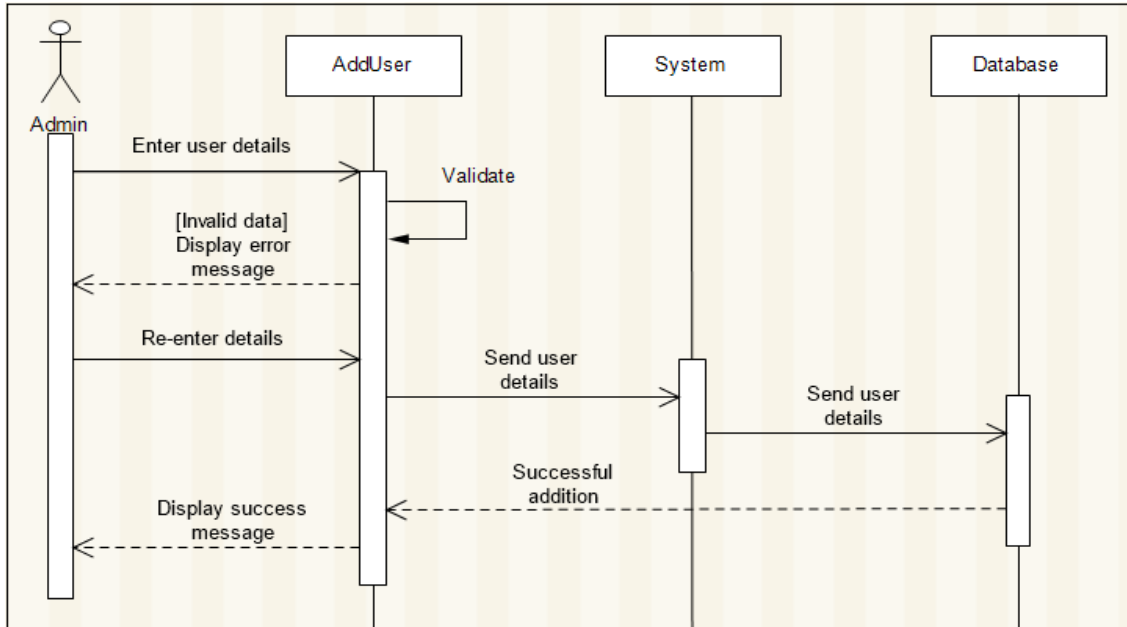
Figure B.11 Sequence diagram for Login
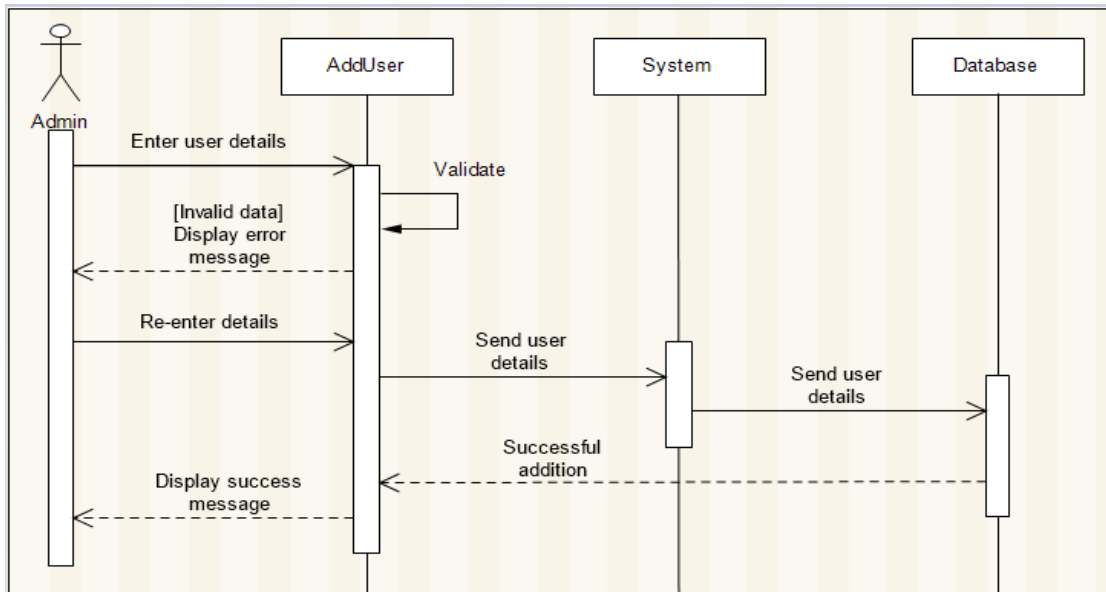
Add User

Figure B.12 Sequence diagram for Add user

Update User
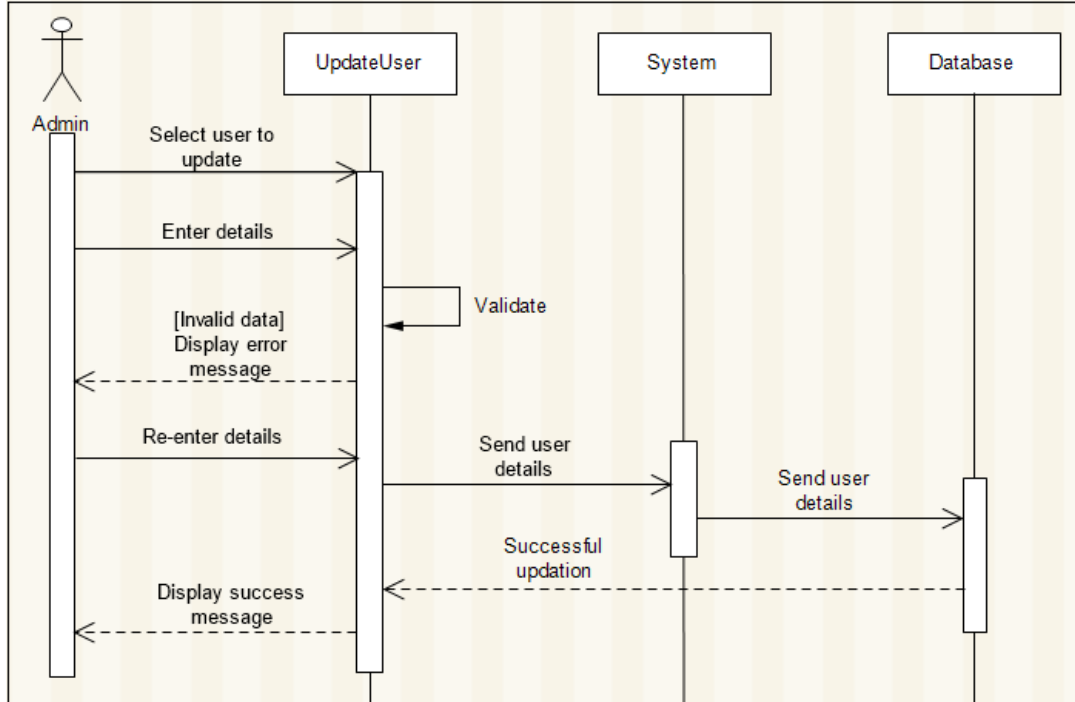
Figure B.13 Sequence diagram for Update user

Suspend User
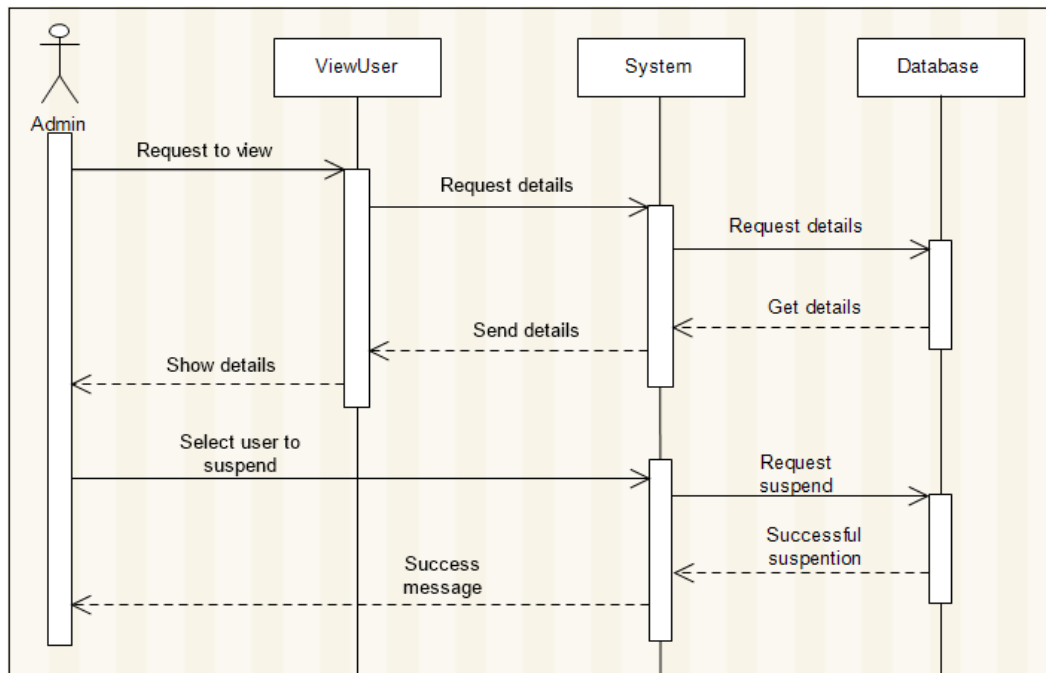
Figure B.14 Sequence diagram for Suspend user

ACTIVITY DIAGRAMS

Login
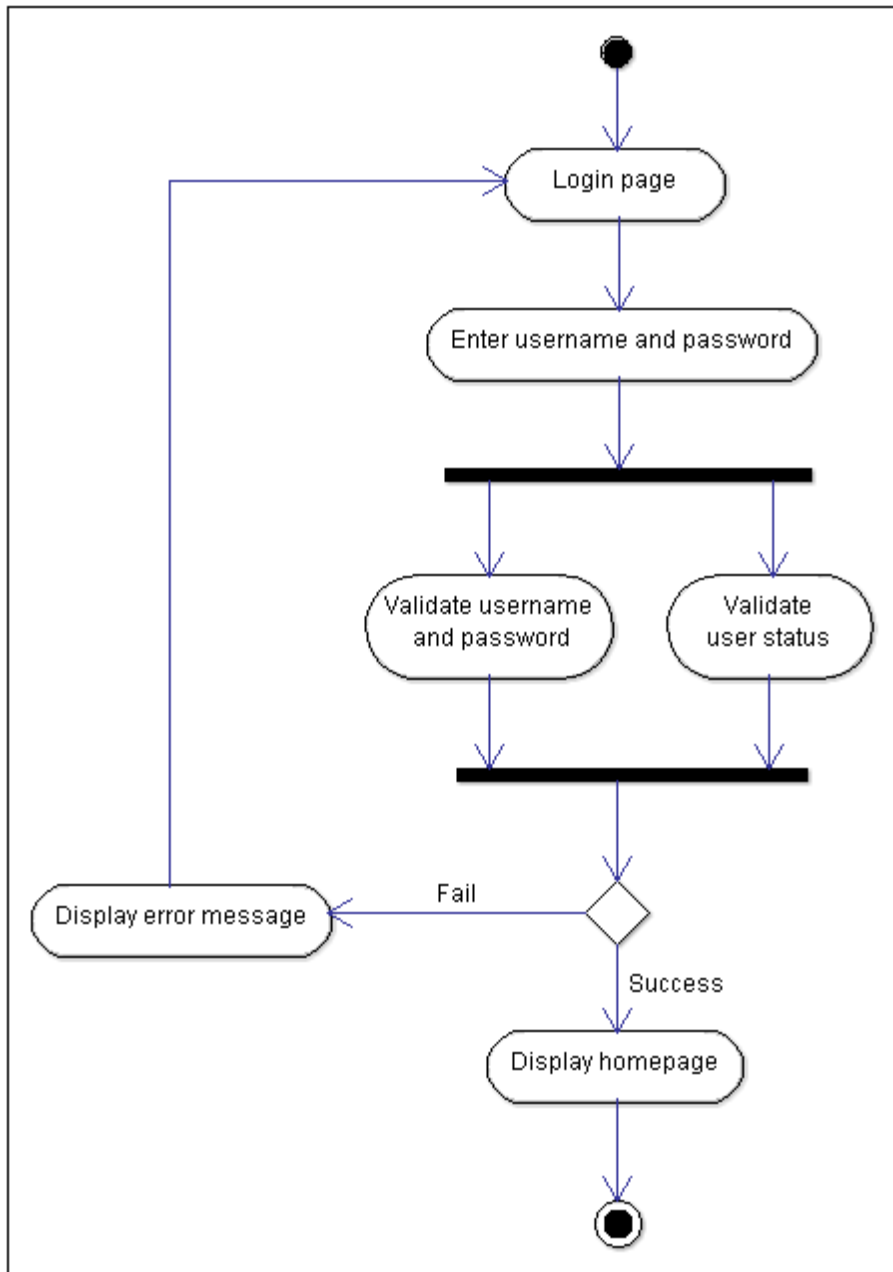
Figure B.15 Activity diagram for Login
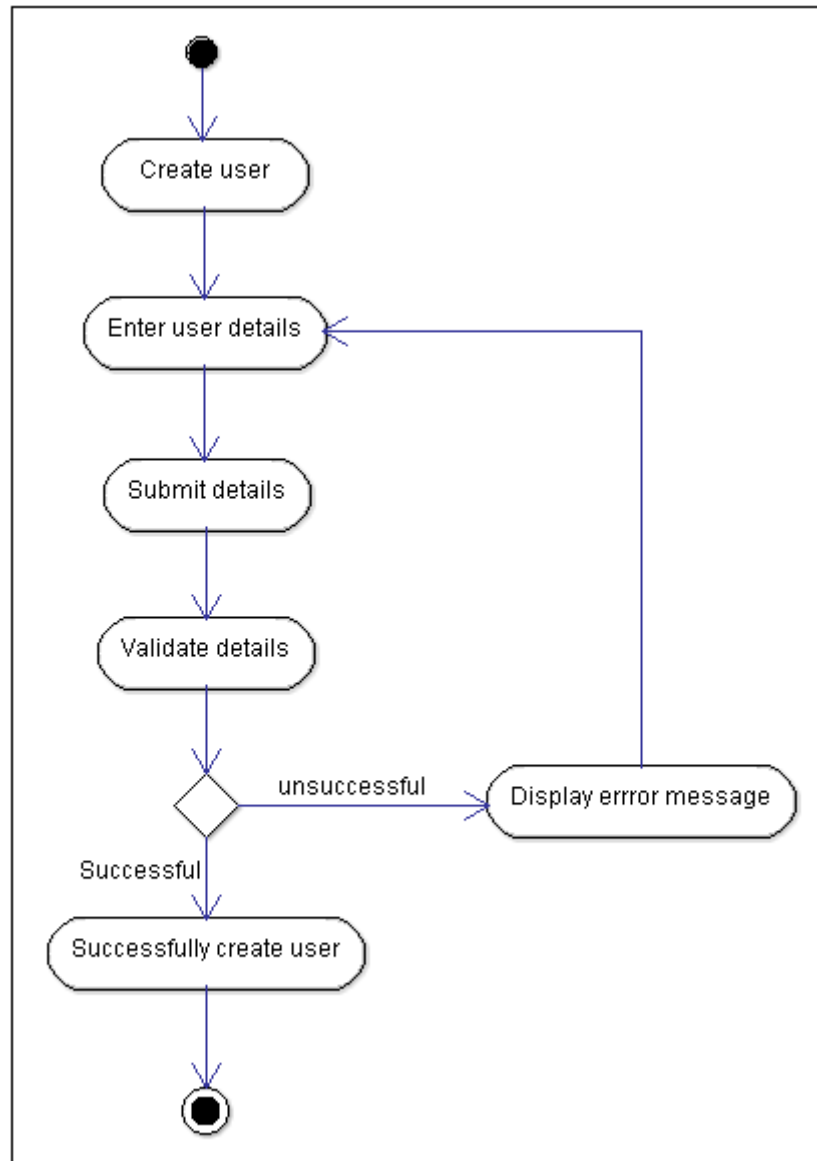
Add User

Figure B.16 Activity diagram for Add user

APPENDIX C –
USER DOCUMENTATION

The operations management system is developed with features which could make their day to day tasks run smoothly. The user documentation helps the user to identify the functions of the system. It also guides the user to utilize the system in an efficient manner.

SYSTEM LOGIN

Access the Login page which is shown in Figure C.1 by typing the URL 'http://localhost/OMS/' in the address bar of the browser.
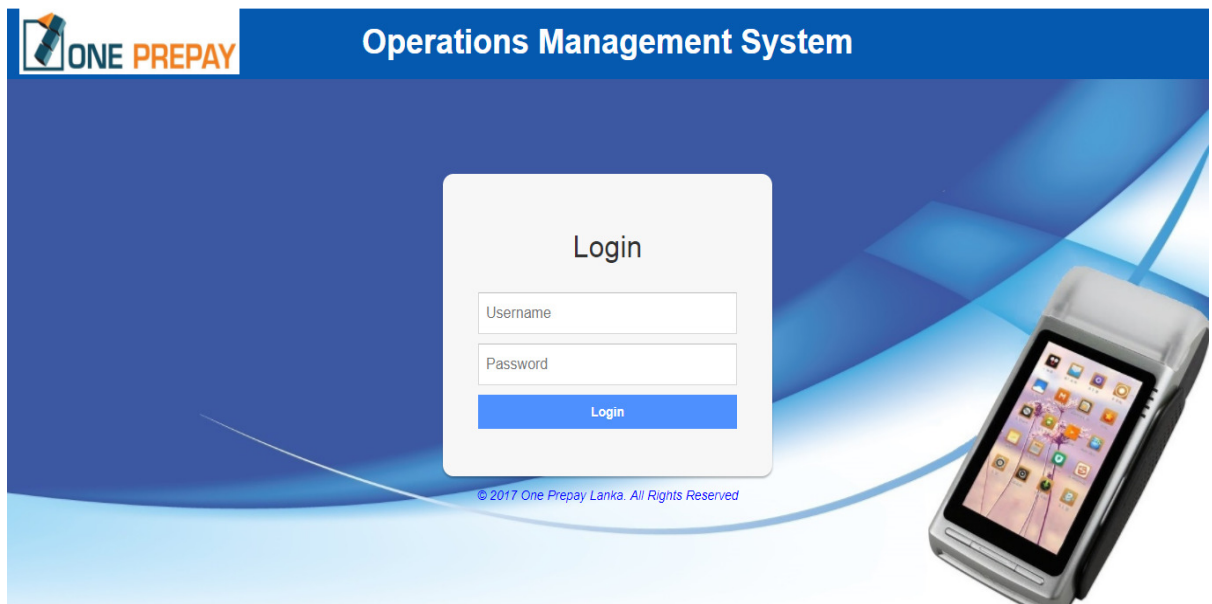
Figure C.1 Login page

An authorised user could login to the system by entering a valid username and password and clicking on 'Login' button. If any user enters incorrect username or password or if a user whose login is disabled tries to login, the system will throw an error message and deny access to the system. For a valid username and password, the system will redirect the user to the Home page shown in Figure C.2.

Figure C.2 Home page

GENERAL GUIDELINES

- By clicking on the 'SignOut' button, the user can logout from the system
- The user can change their password by clicking on 'Change Password' link. This will lead to another page where the user is required to enter the old password, new password and confirm new password in order to change the password.
- User can navigate to home page by clicking on the 'Dashboard' link located in the navigation pane shown in Figure C.3.

Figure C.3 Navigation pane

STAFF MANAGEMENT

Browse: Dashboard > Staff Management

Figure C.4 shows the staff management page. This interface displays the names of all staff and provides options to navigate to other pages relating to staff management.

Figure C.4 Staff Management Page

Add new staff (Only for Admin)

- Click ![Add a staff] button on 'Staff Management' page. System will redirect you to 'Add a staff' page which is shown in Figure C.5.
- Fill in the form and click 'Save' button.
- To clear the contents of the field click 'Clear' button.

Figure C.5 Add staff page

Search staff

- Enter a keyword in the search field and click on [Q] button.
- System will display the list of staff names which relate to the keyword.

View staff details

- Click on [View] button which is in front of the particular staff's name.
- System will redirect you to 'View staff' page shown in Figure C.6.

Figure C.6 View staff page
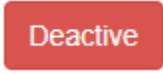
Update staff details (Only for Admin)

- Click on [Update] button which is in front of the particular staff's name.
- System will redirect you to 'Update staff' page shown in Figure C.7.
- Modify necessary data and click 'Update' button.

Figure C.7 Update staff page

Change status of staff (Only for Admin)

- For staffs that are active, the system displays the button . Simply by clicking the button you can deactivate the staff.

- For staffs that are inactive, the system displays the button . Staff status could be activated by clicking the button.

Create / Edit login of staff (Only for Admin)

- For staff those who does not have login, the system displays the button .
- By clicking the button, you will be redirected to 'Create login' page shown in Figure C.8.
- Enter username, password in given fields and select a role for the staff and then click 'Save' button to create a login.

Figure C.8 Create login page

- For staff those who already have a login, the system displays the button **Edit Login**.
- By clicking the button, you will be redirected to 'Edit login' page shown in Figure C.9.
- If you want to reset password, click on **Reset** button and password will be reset to relevant username.
- If you want to change the role, select a role from drop down and click **Change** button.
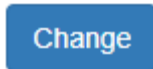
Figure C.9 Edit login page

- If login status is enabled, the system will display the button **Disable**. By clicking the button, login can be disabled.

- If login status is disabled, the system will display the button **Enable**. Login can be enabled by clicking the button.

SUPPLIER MANAGEMENT

Browse: Dashboard > Supplier Management
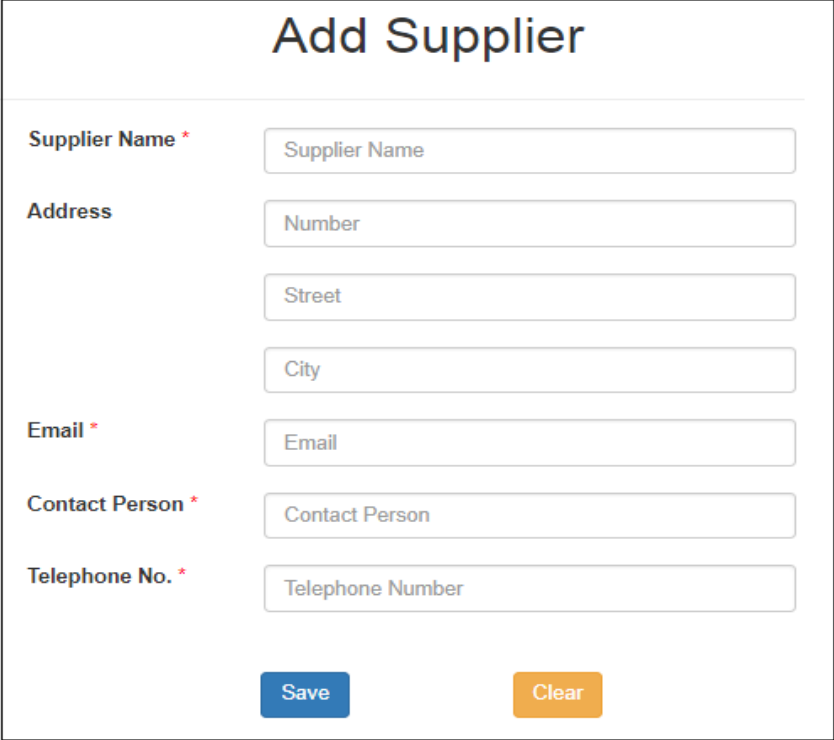
Figure C.10 Supplier management page

Figure C.10 illustrates the supplier management page.

Add supplier (Only for Admin)

- Click [⊙ Add a supplier] button on 'Supplier Management' page. System will redirect you to 'Add a supplier' page which is shown in Figure C.11.
- Fill in the form and click 'Save' button.

Add Supplier

Supplier Name *	Supplier Name
Address	Number
	Street
	City
Email *	Email
Contact Person *	Contact Person
Telephone No. *	Telephone Number

[Save] [Clear]

Figure C.11 Add supplier page

Search supplier

- Enter a keyword in the search field and click on [🔍] button.
- System will display the list of supplier names which relate to the keyword.

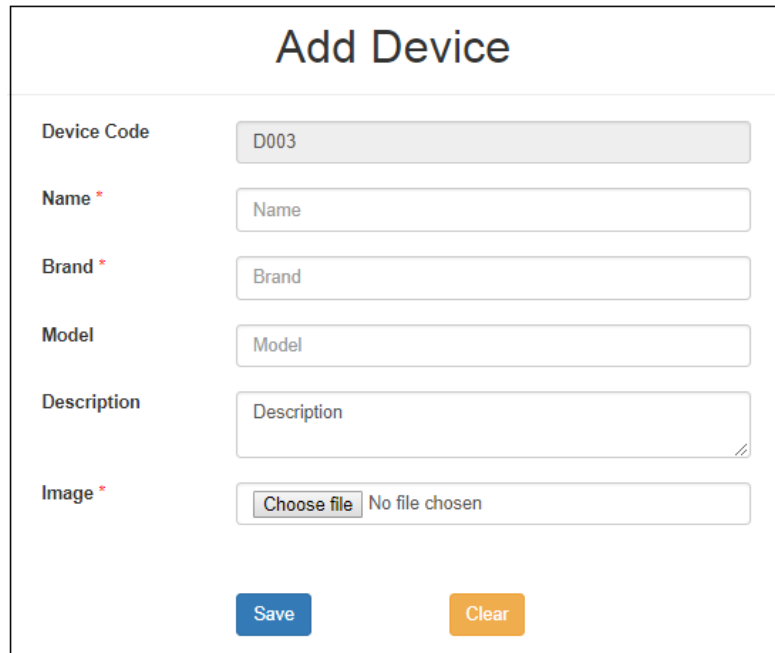**View supplier details**

- Click on [View] button which is in front of the particular supplier's name.
- System will redirect you to 'View supplier' page shown in Figure C.12.

67

Figure C.12 View supplier page

Update supplier details (Only for Admin)

- Click on [Update] button which is in front of the particular supplier's name.
- System will redirect you to 'Update supplier' page shown in Figure C.13.
- Modify necessary data and click 'Update' button.

Figure C.13 Update supplier page

Change status of supplier (Only for Admin)

- For suppliers that are active, the system displays the button Deactive. Simply by clicking the button you can deactivate the supplier.

- For suppliers that are inactive, the system displays the button Active. Supplier status could be activated by clicking the button.

DEVICE MANAGEMENT

Browse: Dashboard > Device Management

Device management page is demonstrated in Figure C.14.
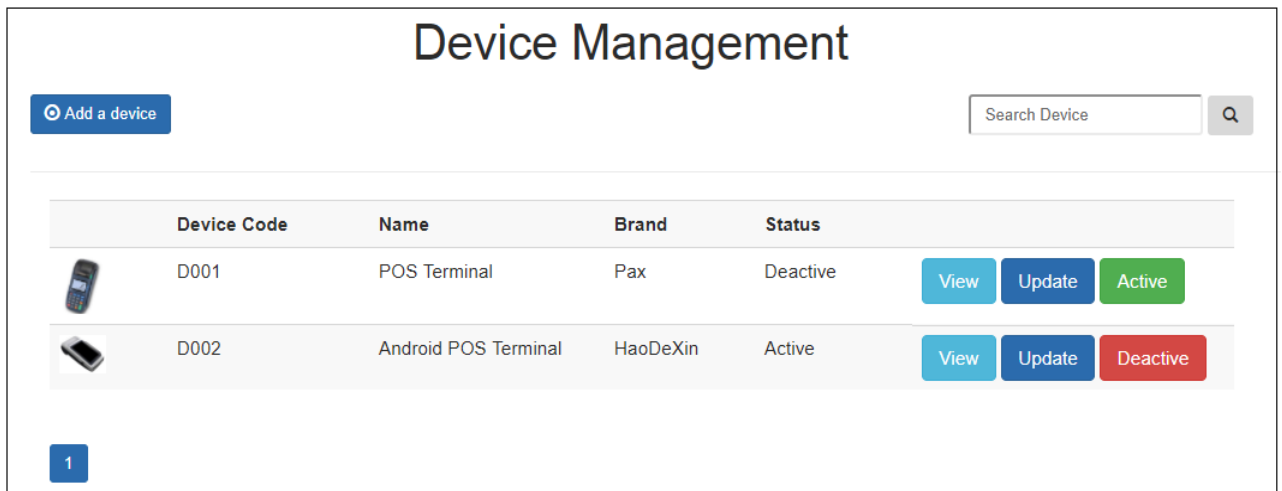
Figure C.14 Device management page

Search device

- Enter a keyword in the search field and click on [Q] button.
- System will display the list of device names which relate to the keyword.

View device details

- Click on View button which is in front of the particular device name.
- System will redirect you to 'View device' page and display details of the device.

69

Update device details (Only for Admin)

- Click on **Update** button which is in front of the particular device name.
- System will redirect you to 'Update device' page.
- Modify necessary data and click 'Update' button.

Add device (Only for Admin)

Figure C.15 Add device page

- Click **⊕ Add a device** button on 'Device Management' page. System will redirect you to 'Add a device' page which is shown in Figure C.15.
- Fill in the form and click 'Save' button.

QUOTATION MANAGEMENT

Browse: Dashboard > Quotation Management

Figure C.16 shows the quotation management page.

Figure C.16 Quotation management page

Add quotation

- Click ⊙ Add a quotation button on 'Quotation Management' page. System will redirect you to 'Add a quotation' page which is shown in Figure C.17.
- Fill in the form and click 'Save' button.

Figure C.17 Add quotation page

Search quotation

- Enter a keyword in the search field and click on [Q] button.
- System will display the list of quotations which relate to the keyword.

View quotation details

- Click on [View] button which is in front of the particular quotation.
- System will redirect you to 'View quotation' page and display details of the quotation.

Update quotation details

- Click on [Update] button which is in front of the particular quotation.
- System will redirect you to 'Update quotation' page.
- Modify necessary data and click 'Update' button.

Place order

Add Purchase Order

Purchase Order No.	PO-OPL-0018	Date *	mm/dd/yyyy
Quotation Reference	QA7925842	Deliver to	One Prepay Lanka (Pvt) Ltd.
Supplier Name	Xiomia (Pvt) Ltd	Delivery Address	No.77, C.W.W. Kannangara Mw, Colombo 07.

| Description | | Unit Price (Rs.) | | Quantity * | | Value (Rs.) * | |
POS Terminal		40,000.00		5		200,000.00	
				Discount	0	0.00	
				VAT *	15	30,000.00	
				Total Amount (Rs.) *		230,000.00	

Note

[Save] [Clear]

Figure C.18 Add purchase order

72

- System will display **Place Order** button active for every quotation that is valid as at current date.
- To create an order pertaining to a particular quotation, click on 'Place Order' button in front of that quotation and system will redirect you to 'Add Purchase Order' page shown in Figure C.18.
- Fill in the form and click 'Save' button.

ORDER MANAGEMENT

Browse: Dashboard > Order Management

Figure C.19 illustrates the Order management page.

Figure C.19 Order management page

Search purchase order

- Enter a keyword in the search field and click on **Q** button.
- System will display the list of orders which relate to the keyword.

View purchase order details

- Click on [View] button which is in front of the particular purchase order.
- System will redirect you to 'View purchase order' page and display details of the purchase order.

Update purchase order details

- Click on [Update] button which is in front of the particular purchase order.
- System will redirect you to 'Update purchase order' page.
- Modify necessary data and click 'Update' button.

Goods received note

- System will display [GRN] button active for purchase orders of which goods have not yet been received as at current date.
- To create a goods received note pertaining to a particular purchase order, click on 'GRN' button in front of that order and system will redirect you to 'Add Goods Received Note' page shown in Figure C.20.
- Fill in the form and click 'Save' button.

Add Goods Received Note

GRN No.	GR-OPL-0021	Goods Received Date *	mm/dd/yyyy
Purchase Order No.	PO-OPL-0016	PO Date	10/29/2017
Supplier Name	Shenzhen Hao Dexin Electronic (Pvt) Ltd		

Description	Unit Price (Rs.)	Quantity *
Android POS Terminal	34,000.00	2

Note

[   ]

[Save]   [Clear]

Figure C.20 Add goods received Note page

STOCK MANAGEMENT

Browse: Dashboard > Stock Management

Figure C.21 depicts the stock management page of the system. It displays the stock status of available type of devices.

Figure C.21 Stock management page

View stock

- To view more information on a particular device, click ![View] button that is in front of the device name.

GOODS RECEIVED NOTE

Browse: Dashboard > Goods Received Note

Figure C.22 Goods received note page

Goods received note interface is portrayed in Figure C.22.

Search goods received note

- Enter a keyword in the search field and click on [🔍] button.
- System will display the list of goods received note which relate to the keyword.

View goods received note

- Click on [View] button which is in front of the particular goods received note.
- System will redirect you to 'View goods received note' page and display details of the goods received.

Update goods received note

- Click on [Update] button which is in front of the particular goods received note.
- System will redirect you to 'Update goods received note' page.
- Modify necessary data and click 'Update' button.

PAYMENT MANAGEMENT

Browse: Dashboard > Payment Management
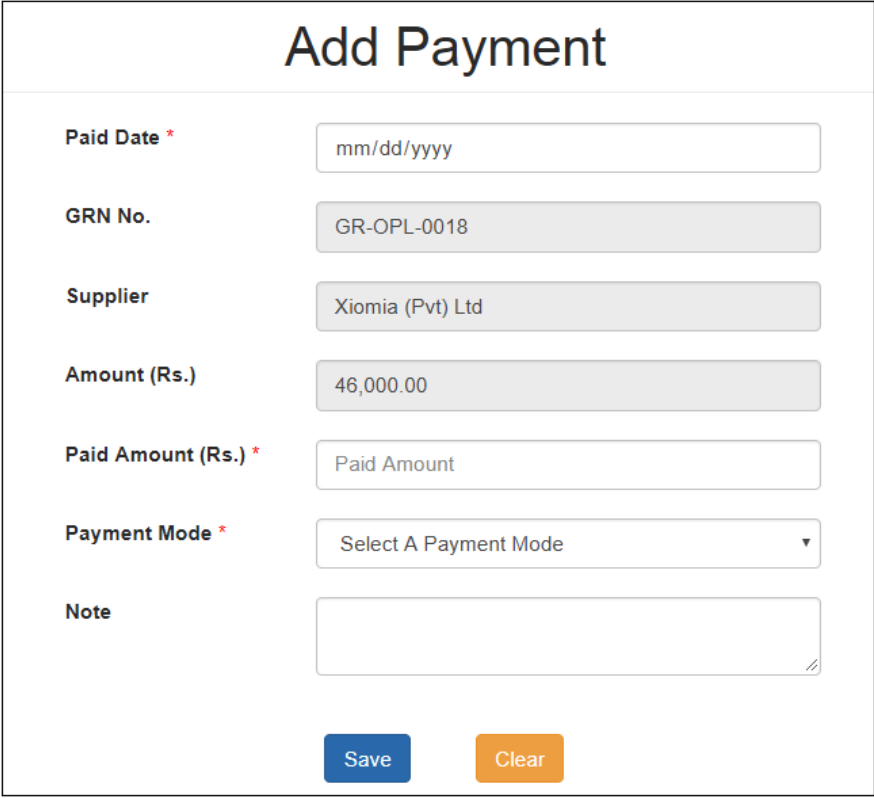
Figure C.23 Payment management page

Figure C.23 shows the payment management page. It displays details of pending payments to be made and received as at date.

Add payment details

- To add payment details, click on **Add payment** button which is in front of the particular payment.
- System will redirect you to 'Add payment' page shown in Figure C.24.
- Fill in the form and click 'Save' button.

Add Payment

Paid Date *	mm/dd/yyyy
GRN No.	GR-OPL-0018
Supplier	Xiomia (Pvt) Ltd
Amount (Rs.)	46,000.00
Paid Amount (Rs.) *	Paid Amount
Payment Mode *	Select A Payment Mode ▾
Note	

Save   Clear

Figure C.24 Add payment page

View all payments made

- Click on **View all payments made** button under the section 'Payable'.
- System will redirect you to 'All payments made' page which is depicted in Figure C.25.

Figure C.25 All payments made page

View all payments received

- Click on [View all payments received] button under the section 'Receivable'.
- System will redirect you to 'All payments received' page which is depicted in Figure C.26.

Figure C.26 All payments received page

Search payment

- Enter a keyword in the search field and click on [Q] button.
- System will display the list of payments which relate to the keyword.

View payment details

- Click on [View] button which is in front of the particular payment.
- System will redirect you to 'View payment' page and display details of the payment.

Update payment details

- Click on [Update] button which is in front of the particular payment.
- System will redirect you to 'Update payment' page.
- Modify necessary data and click 'Update' button.

TERMINAL MANAGEMENT

Browse: Dashboard > Terminal Management
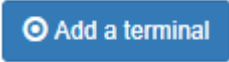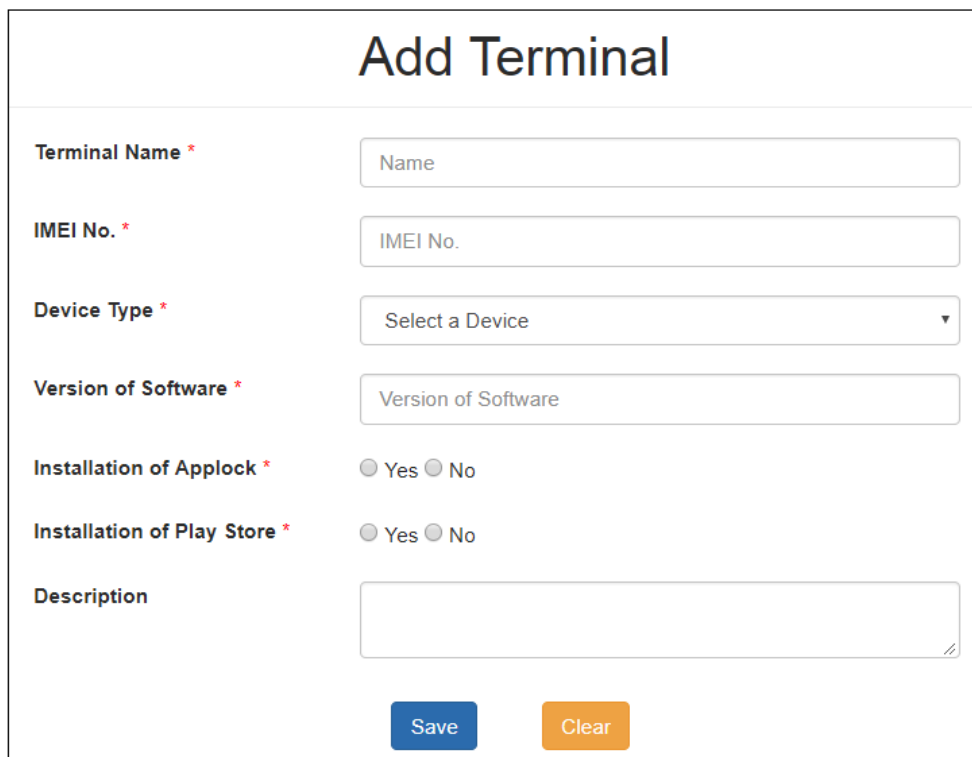
Figure C.27 Terminal management page

Terminal management page is illustrated in Figure C.27.

Add a terminal

- Click button on 'Terminal Management' page. System will redirect you to 'Add a terminal' page which is shown in Figure C.28.
- Fill in the form and click 'Save' button.

Add Terminal

Terminal Name *	Name
IMEI No. *	IMEI No.
Device Type *	Select a Device ▾
Version of Software *	Version of Software
Installation of Applock *	○ Yes ○ No
Installation of Play Store *	○ Yes ○ No
Description	

Save   Clear

Figure C.28 Add a terminal page

Search terminal

- Enter a keyword in the search field and click on [🔍] button.
- System will display the list of terminals which relate to the keyword.

View terminal details
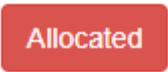
- Click on [View] button which is in front of the particular terminal.

- System will redirect you to 'View terminal' page and display details of the terminal.

Update terminal details

- Click on **Update** button which is in front of the particular terminal.
- System will redirect you to 'Update terminal' page.
- Modify necessary data and click 'Update' button.

Change status of terminal

- System will display **Allocated** button in front of terminals that are available. If the terminal is sold to a customer, you can change the status as allocated by clicking the button.
- System will display **Available** button in front of terminals that are allocated. If the terminal is returned by a customer, you can change the status as available by clicking the button.

TERMINAL STOCK MANAGEMENT

Browse: Dashboard > Terminal Stock Management

Figure C.29 Terminal stock management page

81

Terminal stock management page is depicted in Figure C.29. It displays the total number of terminals with different combination of software and applications installed.

View terminal stock details

- Click on **View** button which is in front of the particular terminal stock item.
- System will redirect you to 'View terminal stock' page and display details of the terminals available under particular category.
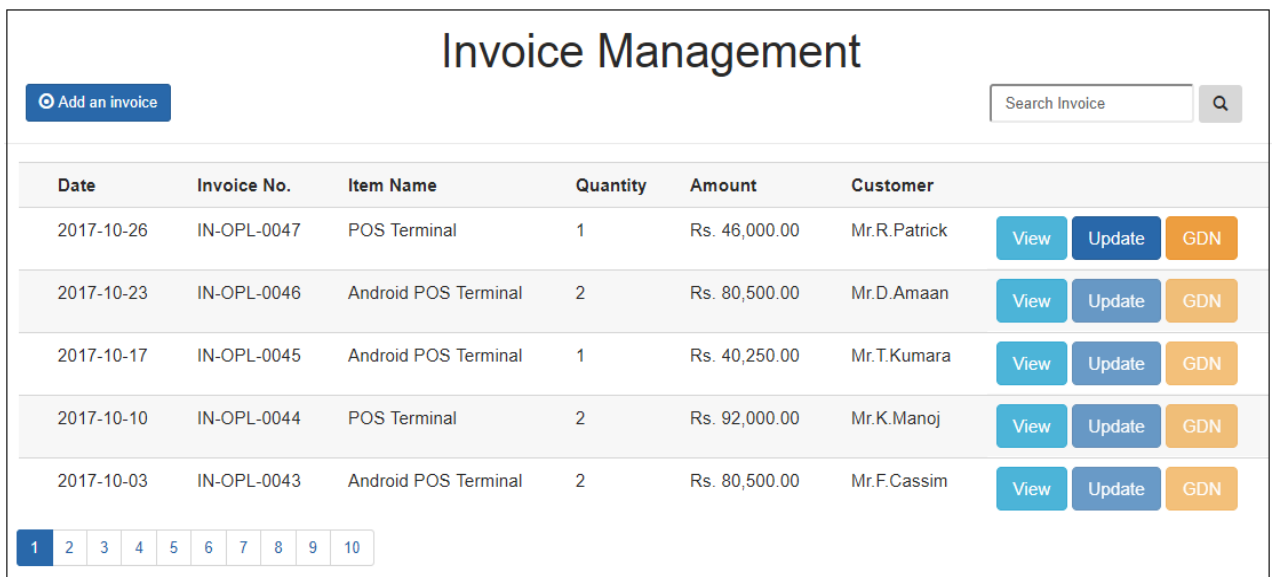
Search terminal

- Enter a keyword in the search field and click on 🔍 button.
- System will display the list of terminal stock which relate to the keyword.

INVOICE MANAGEMENT
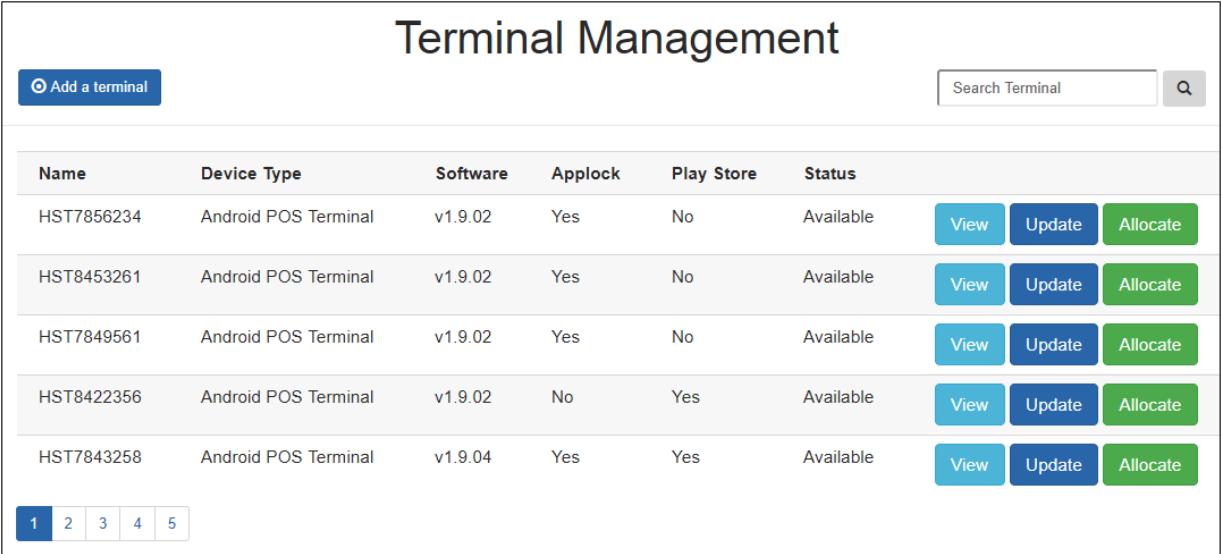
Browse: Dashboard > Invoice Management
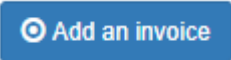
Figure C.30 shows the invoice management page of the system.
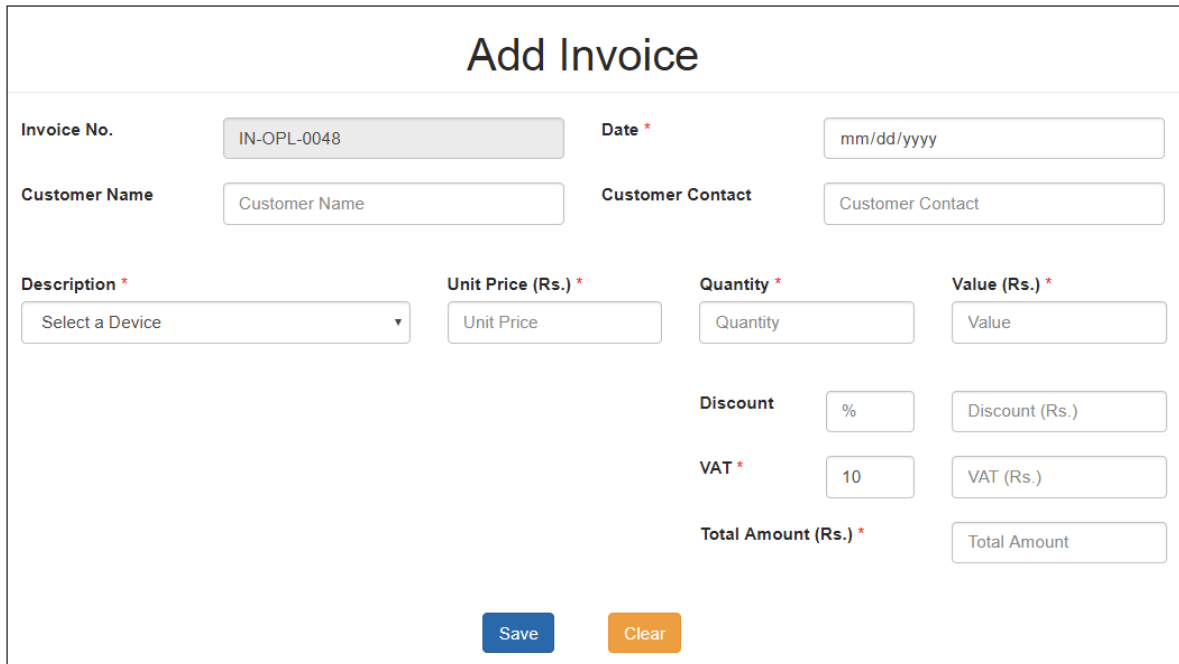
Date	Invoice No.	Item Name	Quantity	Amount	Customer			
2017-10-26	IN-OPL-0047	POS Terminal	1	Rs. 46,000.00	Mr.R.Patrick	View	Update	GDN
2017-10-23	IN-OPL-0046	Android POS Terminal	2	Rs. 80,500.00	Mr.D.Amaan	View	Update	GDN
2017-10-17	IN-OPL-0045	Android POS Terminal	1	Rs. 40,250.00	Mr.T.Kumara	View	Update	GDN
2017-10-10	IN-OPL-0044	POS Terminal	2	Rs. 92,000.00	Mr.K.Manoj	View	Update	GDN
2017-10-03	IN-OPL-0043	Android POS Terminal	2	Rs. 80,500.00	Mr.F.Cassim	View	Update	GDN

Figure C.30 Invoice management page

Add an invoice

- Click [⊙ Add an invoice] button on 'Invoice Management' page. System will redirect you to 'Add an invoice' page which is shown in Figure C.31.
- Fill in the form and click 'Save' button.

Add Invoice

Invoice No.	IN-OPL-0048	**Date** *	mm/dd/yyyy
Customer Name	Customer Name	**Customer Contact**	Customer Contact

Description *	**Unit Price (Rs.)** *	**Quantity** *	**Value (Rs.)** *
Select a Device ▾	Unit Price	Quantity	Value

Discount   %   Discount (Rs.)

VAT *   10   VAT (Rs.)

Total Amount (Rs.) *   Total Amount

[Save]   [Clear]

Figure C.31 Add an invoice page

Search invoice

- Enter a keyword in the search field and click on [🔍] button.
- System will display the list of invoice which relate to the keyword.

View invoice
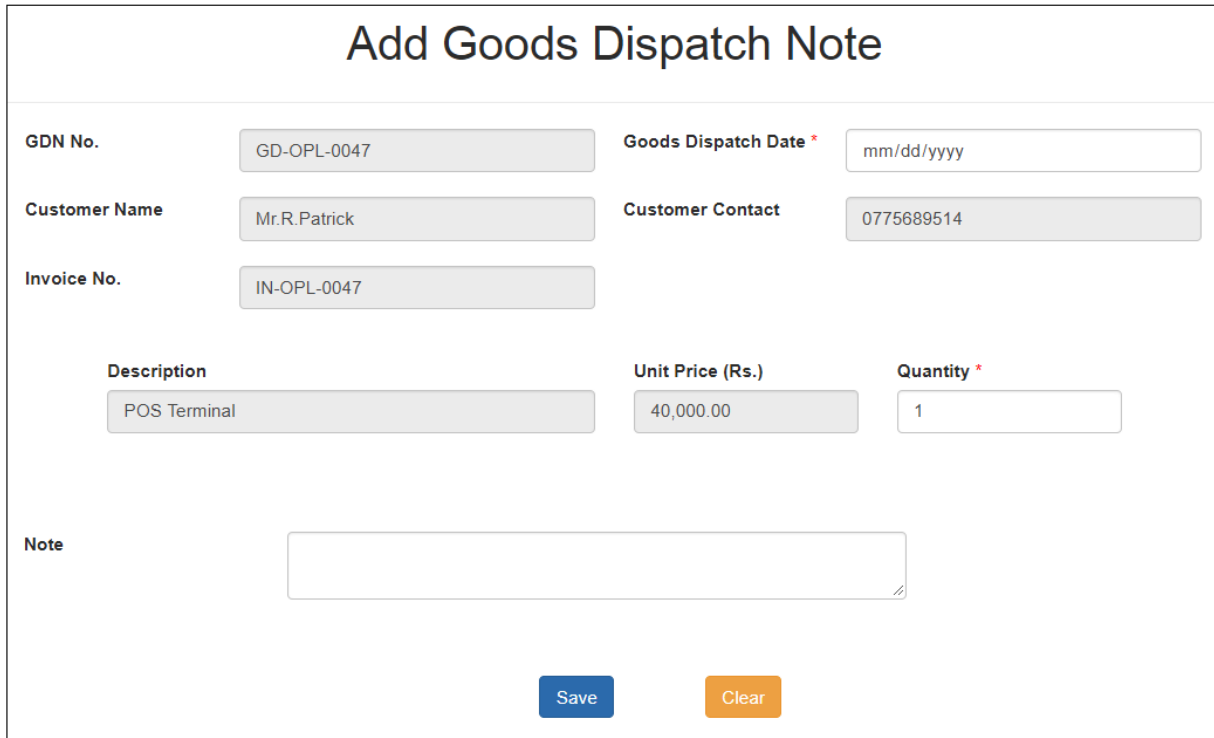
- Click on [View] button which is in front of the particular invoice.
- System will redirect you to 'View invoice' page and display details of the invoice.

Update invoice

- Click on [Update] button which is in front of the particular invoice.
- System will redirect you to 'Update invoice' page.
- Modify necessary data and click 'Update' button.

83

Goods dispatch note

- System will display [GDN] button active for invoices of which goods have not yet been dispatched as at current date.
- To create a goods dispatch note pertaining to a particular invoice, click on 'GDN' button in front of that invoice and system will redirect you to 'Add Goods Dispatch Note' page shown in Figure C.32.
- Fill in the form and click 'Save' button.

Add Goods Dispatch Note

GDN No.	GD-OPL-0047	Goods Dispatch Date *	mm/dd/yyyy
Customer Name	Mr.R.Patrick	Customer Contact	0775689514
Invoice No.	IN-OPL-0047		

Description	Unit Price (Rs.)	Quantity *
POS Terminal	40,000.00	1

Note

Save   Clear

Figure C.32 Add goods dispatch note page

SALES MANAGEMENT

Browse: Dashboard > Sales Management

Sales management page is portrayed in Figure C.33.

Figure C.33 Sales management page

Search sales

- Enter a keyword in the search field and click on button.
- System will display the list of sales which relate to the keyword.

View sales

- Click on button which is in front of the particular sale.
- System will redirect you to 'View sale' page and display details of the sale.

Update sales

- Click on button which is in front of the particular sale.
- System will redirect you to 'Update sale' page.
- Modify necessary data and click 'Update' button.

REPORT MANAGEMENT

Browse: Dashboard > Report Management

Report management page is shown in Figure C.34.

Figure C.34 Report management page

- Click on the required report link.
- Select the device for order, purchase and sales reports.
- Select the date range for which you need the report.

- Click on **View Report** button.

APPENDIX D – MANAGEMENT REPORTS

TERMINAL STOCK REPORT

Terminal stock status as at current date is displayed in the terminal stock report. Figure D.1 shows the terminal stock report.

Terminal Stock Report

🖨 Print

Device Name	Software	Applock	Play Store	Quantity
POS Terminal	v1.9.01	No	No	6
POS Terminal	v1.9.03	No	No	3
Android POS Terminal	v1.9.02	No	Yes	3
Android POS Terminal	v1.9.02	Yes	No	3
Android POS Terminal	v1.9.02	Yes	Yes	2
Android POS Terminal	v1.9.04	Yes	No	3
Android POS Terminal	v1.9.04	Yes	Yes	3

Figure D.1 Terminal stock report

PURCHASE REPORT

Purchases made within a selected time period for a given device are displayed in the purchase report. Figure D.2 depicts the purchase report.

Purchase Report

Device: Android POS Terminal   From: 08/01/2017   To: 10/31/2017   🖨 Print

Date	GRN No.	Item Name	Quantity	Order No.
2017-08-28	GR-OPL-0013	Android POS Terminal	5	PO-OPL-0012
2017-09-29	GR-OPL-0015	Android POS Terminal	3	PO-OPL-0014
2017-10-02	GR-OPL-0016	Android POS Terminal	2	PO-OPL-0014

Figure D.2 Purchase report

PAYMENTS MADE REPORT

Payments made within a selected time period are displayed in the payments made report. Figure D.3 shows the payments made report.

Payments Made Report

From: 07/01/2017		**To:** 10/31/2017		🖨 Print

Date	GRN No.	Supplier	Amount	Payment Mode
2017-07-12	GR-OPL-0011	Shenzhen Hao Dexin Electronic (Pvt) Ltd	Rs. 201,250.00	Cash
2017-08-30	GR-OPL-0013	Shenzhen Hao Dexin Electronic (Pvt) Ltd	Rs. 201,250.00	Cash
2017-10-03	GR-OPL-0015	Shenzhen Hao Dexin Electronic (Pvt) Ltd	Rs. 113,850.00	Cash
2017-10-04	GR-OPL-0016	Shenzhen Hao Dexin Electronic (Pvt) Ltd	Rs. 75,900.00	Cash
2017-08-17	GR-OPL-0012	Xiomia (Pvt) Ltd	Rs. 235,750.00	Cash
2017-09-22	GR-OPL-0014	Xiomia (Pvt) Ltd	Rs. 230,000.00	Cash

Figure D.3 Payments made report

SALES REPORT

Sales made within a selected time period for a given device are displayed in the sales report. Figure D.4 illustrates the sales report.

Sales Report

Device: Android POS Terminal	**From:** 09/01/2017	**To:** 10/31/2017		🖨 Print

Date	GDN No.	Item Name	Quantity	Invoice No.
2017-09-04	GD-OPL-0037	Android POS Terminal	1	IN-OPL-0037
2017-09-18	GD-OPL-0040	Android POS Terminal	1	IN-OPL-0040
2017-09-20	GD-OPL-0041	Android POS Terminal	2	IN-OPL-0041
2017-10-03	GD-OPL-0043	Android POS Terminal	2	IN-OPL-0043
2017-10-17	GD-OPL-0045	Android POS Terminal	1	IN-OPL-0045
2017-10-23	GD-OPL-0046	Android POS Terminal	2	IN-OPL-0046

Figure D.4 Sales report

APPENDIX E – TEST RESULTS
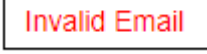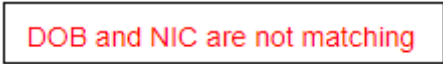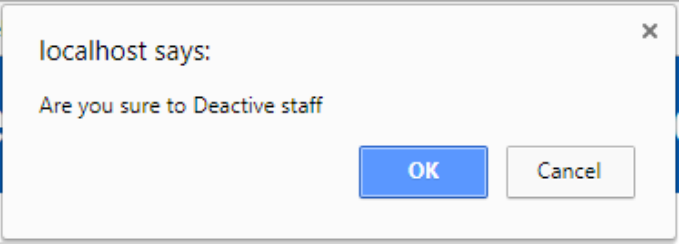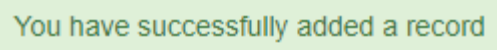
Tables E.1 and E.2 shows the test results of the system.

USER LOGIN

Test No	Test Case	Result	Status
1	Empty username and password	Both Username and Password are Empty	✓
2	Enter only username	Empty Password	✓
3	Enter only password	Empty Username	✓
4	Invalid username and password	Invalid Username or Password	✓
5	Valid username and password	Redirect to home page	✓
6	Enter inactive user's username and password	Invalid Username or Password	✓
7	Logout	You have successfully Signed Out	✓

Table E.1 Test results of user login

COMMON FUNCTIONS

Test No	Test Case	Result	Status
1	Leave required name field blank	Empty First Name	✔
2	Leave required email field blank	Empty Email	✔
3	Type email address in an invalid format	Invalid Email	✔
4	Enter date of birth and NIC number that does not match	DOB and NIC are not matching	✔
5	Leave gender radio button without selecting	Please select a gender	✔
6	Click 'Clear' button	Clear all data entered in fields	✔
7	Click 'Deactive' button	localhost says: Are you sure to Deactive staff OK Cancel	✔
8	Click 'View' button	Display relevant records	✔
9	Click 'Save' button	You have successfully added a record	✔

10	Click 'Update' button	You have successfully updated a record	✔
11	Enter a parameter and click 'Search' button	Display relevant records	✔
12	Search for a record that does not exist	No records	✔

Table E.2 Test results of common functions

USER ACCEPTANCE TEST RESULTS

Figures E.1, E.2 and E.3 depict the result of user acceptance test.

User Evaluation Form for Operations Management System

Name: Mr. H. Panegoda

Role: Admin

Evaluating aspect	Very Good	Good	Average	Bad
Overall attractiveness of the system		✓		
Consistency of navigation menus and forms	✓			
Search function		✓		
Understandability of error messages	✓			
User friendliness of interfaces		✓		
Response time		✓		
Coverage of required functionalities		✓		
Satisfaction of login management	✓			
Satisfaction of staff management	✓			
Satisfaction of supplier management	✓			
Satisfaction of device management	✓			
Satisfaction of quotation management		✓		
Satisfaction of order management	✓			
Satisfaction of stock management	✓			
Satisfaction of goods received note	✓			
Satisfaction of payment management	✓			
Satisfaction of terminal management	✓			
Satisfaction of terminal stock management	✓			
Satisfaction of sales management	✓			
Satisfaction of invoice management	✓			
Satisfaction of report management		✓		

Figure E.1 User Evaluation Form – Admin

User Evaluation Form for Operations Management System

Name: ...Mr. S.B.T.A. Fernando...............

Role: ......Manager.................................

Evaluating aspect	Very Good	Good	Average	Bad
Overall attractiveness of the system		✓		
Consistency of navigation menus and forms	✓			
Search function	✓			
Understandability of error messages	✓			
User friendliness of interfaces		✓		
Response time		✓		
Coverage of required functionalities		✓		
Satisfaction of login management		✓		
Satisfaction of staff management	✓			
Satisfaction of supplier management	✓			
Satisfaction of device management	✓			
Satisfaction of quotation management		✓		
Satisfaction of order management	✓			
Satisfaction of stock management		✓		
Satisfaction of goods received note	✓			
Satisfaction of payment management	✓			
Satisfaction of terminal management	✓			
Satisfaction of terminal stock management	✓			
Satisfaction of sales management	✓			
Satisfaction of invoice management	✓			
Satisfaction of report management		✓		

Figure E.2 User Evaluation Form – Manager

93

User Evaluation Form for Operations Management System

Name: Mr. Muddassir

Role: Staff

Evaluating aspect	Very Good	Good	Average	Bad
Overall attractiveness of the system		✓		
Consistency of navigation menus and forms	✓			
Search function	✓			
Understandability of error messages	✓			
User friendliness of interfaces		✓		
Response time		✓		
Coverage of required functionalities		✓		
Satisfaction of login management		✓		
Satisfaction of staff management	✓			
Satisfaction of supplier management	✓			
Satisfaction of device management	✓			
Satisfaction of quotation management		✓		
Satisfaction of order management	✓			
Satisfaction of stock management	✓			
Satisfaction of goods received note	✓			
Satisfaction of payment management	✓			
Satisfaction of terminal management	✓			
Satisfaction of terminal stock management	✓			
Satisfaction of sales management	✓			
Satisfaction of invoice management	✓			
Satisfaction of report management	✓			

Figure E.3 User Evaluation Form – Staff

APPENDIX F – CODE LISTING

This document consists of some code segments used to develop the system. Please refer the supplementary CD for entire system coding.

ADD A STAFF

staffcontroller.php

```php
<?php
include '../common/dbconnection.php'; //Include database connection
     $ob=new dbconnection();
     $con=$ob->connection();

include '../model/staffmodel.php'; //Call staff model
$obj=new user();                    //Create user object

$status= strtolower($_REQUEST['status']);

switch ($status){
   case "add":
     $arr=$_POST;

     if($_FILES['staff_image']['name']!=""){   //If there is an image uploaded
        $iname=$_FILES['staff_image']['name'];  //Image Name
        $tmp_loc=$_FILES['staff_image']['tmp_name']; //Temp location
     }else{
        $iname="";
        $tmp_loc="";
     }

     $staff_id=$obj->addUser($arr,$iname,$tmp_loc); //Call addUser function

     header("Location:../view/staff.php?staff_id=$staff_id");

     break;
        }
?>
```

staffmodel.php

```php
<?php
class user{
function addUser($arr,$iname,$tmp_loc){
     $staff_epf=$arr['staff_epf'];
     $staff_title=$arr['staff_title'];
     $staff_fname=$arr['staff_fname'];
     $staff_lname=$arr['staff_lname'];
     $staff_email=$arr['staff_email'];
     $staff_dob=$arr['staff_dob'];
     $staff_nic=$arr['staff_nic'];
     $staff_tel=$arr['staff_tel'];
     $staff_add1=$arr['staff_add1'];
     $staff_add2=$arr['staff_add2'];
     $staff_add3=$arr['staff_add3'];
     $staff_gender=$arr['staff_gender'];
     $staff_des=$arr['staff_des'];

     $con=$GLOBALS['con'];
         //Insert data into staff table
     $sql="INSERT INTO staff
(staff_title,staff_fname,staff_lname,staff_dob,staff_nic,staff_tel,staff_email,staff_add1,staff_add2,
staff_add3,staff_gender,staff_des,staff_epf,staff_status)
VALUES('$staff_title','$staff_fname','$staff_lname','$staff_dob','$staff_nic','$staff_tel','$staff_emai
l','$staff_add1','$staff_add2','$staff_add3','$staff_gender','$staff_des','$staff_epf','Active')";

     $result=$con->query($sql) or die($con->error);
     $staff_id=$con->insert_id;     //Last inserted ID using auto increment

     if($iname!=""){
       $inewname=$staff_id."_".$iname;   //Rename the image

        //insert image into staff_image table
       $update="UPDATE staff SET staff_image='$inewname' WHERE staff_id='$staff_id'";
       $con->query($update) or die($con->error);
       $new_path="../images/user_images/".$inewname;
       //move image from temp loc to new path
       move_uploaded_file($tmp_loc,$new_path);
     }

     return $staff_id;

   }
}
?>
```

JavaScript validation for adding staff

```
$(document).ready(function(){
  $('form').submit(function(){
    var staff_epf=$('#staff_epf').val();
    var staff_fname=$('#staff_fname').val();
    var staff_lname=$('#staff_lname').val();
    var staff_email=$('#staff_email').val();
    var email=/^([a-zA-Z0-9_\.\-])+\@(([a-zA-Z0-9\-])+\.)+([a-zA-Z]{2,6})+$/;
    var staff_dob=$('#staff_dob').val();
    var staff_des=$('#staff_des').val();

    if(staff_epf=="")   {
      $('#msg').text("Empty Employee No");
      $('#staff_epf').focus();
      return false; }

    if(staff_fname=="")   {
      $('#msg').text("Empty First Name");
      $('#staff_fname').focus();
      return false; }

    if(staff_lname=="")   {
      $('#msg').text("Empty Last Name");
      $('#staff_lname').focus();
      return false; }

    if(staff_des=="")   {
      $('#msg').text("Empty Designation");
      $('#staff_des').focus();
      return false; }

    if(staff_email=="") {
      $('#msg').text("Empty Email");
      $('#staff_email').focus();
      return false; }

    if(!staff_email.match(email)){
      $('#msg').text("Invalid Email");
      $('#staff_email').focus();
      $('#staff_email').select();
      return false; }

    if(!($('#male').is(':checked') || $('#female').is(':checked'))){
      $('#msg').text("Please select your gender");
      return false; }

    var nicpat=/^[0-9]{9}[vVxX]$/;
    var staff_nic=$('#staff_nic').val();
    if(staff_nic!=""){
      if(!staff_nic.match(nicpat)){
```

```
            $('#msg').text("Invalid NIC");
            $('#staff_nic').focus();
            $('#staff_nic').select();
            return false; }
    }

    if(staff_dob!="" && staff_nic!=""){
        var ypat1=staff_dob.substring(2,4);
        var ypat2=staff_nic.substring(0,2);
        if(ypat1!=ypat2){
            $('#msg').text("DOB and NIC are not matching");
            $('#staff_nic').focus();
            $('#staff_nic').select();
            return false; }
    }

    var telpat1=/^[0][0-9]{9}$/;
    var telpat2=/^\+94[0-9]{9}$/;
    var staff_tel=$('#staff_tel').val();
    if (staff_tel!=""){
        if(!(staff_tel.match(telpat1) || staff_tel.match(telpat2))){
            $('#msg').text("Invalid Telephone Number");
            $('#staff_tel').focus();
            $('#staff_tel').select();
            return false}
    }

    var staff_image=$('#staff_image').val();
    if(staff_image!=""){
        var ext=staff_image.split(".");
        var len=ext.length;
        var e=ext[len-1];
        var ex=e.toLowerCase();
        var arr=['jpg','png','gif','jpeg','bmp'];
        if($.inArray(ex,arr)==-1){
            $('#msg').text("Invalid Image Extension");
            $('#staff_image').focus();
            return false; }
    }

  });

});
```

UPDATE STAFF

staffcontroller.php

```php
<?php
include '../common/dbconnection.php';  //Include database connection
    $ob=new dbconnection();
    $con=$ob->connection();

include '../model/staffmodel.php';  //Call staff model
$obj=new user();                    //Create user object

$status= strtolower($_REQUEST['status']);

switch ($status){

case "update":
    $arr=$_POST;
    $staff_id=$_REQUEST['staff_id'];
    $p=$_REQUEST['p'];

    $result=$obj->viewUser($staff_id);
    $row=$result->fetch_assoc();
    $staff_image=$row['staff_image'];  //Getting the id of last inserted image for user

    if($_FILES['staff_image']['name']!=""){   //If there is an image uploaded
       $iname=$_FILES['staff_image']['name'];  //Image Name
       $tmp_loc=$_FILES['staff_image']['tmp_name']; //Temp location
       $path="../images/user_images/$staff_image";
       unlink($path); // To delete an image
    }else{
       $iname="";
       $tmp_loc="";
    }

    $obj->updateUser($staff_id, $arr, $iname, $tmp_loc); //Call function updateUser

    header("Location:../view/staff.php?staff_id=$staff_id&page=$p");

    break;
    }
?>
```

staffmodel.php

```php
<?php
class user{
function updateUser($staff_id,$arr,$iname,$tmp_loc){
     $staff_epf=$arr['staff_epf'];
     $staff_title=$arr['staff_title'];
     $staff_fname=$arr['staff_fname'];
     $staff_lname=$arr['staff_lname'];
     $staff_email=$arr['staff_email'];
     $staff_dob=$arr['staff_dob'];
     $staff_nic=$arr['staff_nic'];
     $staff_tel=$arr['staff_tel'];
     $staff_add1=$arr['staff_add1'];
     $staff_add2=$arr['staff_add2'];
     $staff_add3=$arr['staff_add3'];
     $staff_gender=$arr['staff_gender'];
     $staff_des=$arr['staff_des'];

     $con=$GLOBALS['con'];
         //Insert data into staff table
     $sql="UPDATE staff SET
staff_title='$staff_title',staff_fname='$staff_fname',staff_lname='$staff_lname',staff_email='$staff_
email',staff_dob='$staff_dob',staff_nic='$staff_nic',staff_tel='$staff_tel',staff_add1='$staff_add1',st
aff_add2='$staff_add2',staff_add3='$staff_add3',staff_gender='$staff_gender',staff_des='$staff_des
',staff_epf='$staff_epf' WHERE staff_id='$staff_id'";

     $result=$con->query($sql) or die($con->error);

     if($iname!=""){
        $inewname=$staff_id."_".$iname;  //Rename image

         //insert image into staff_image table
        $update="UPDATE staff SET staff_image='$inewname' WHERE staff_id='$staff_id'";
        $con->query($update) or die($con->error);
        $new_path="../images/user_images/".$inewname;
        //move image from temp loc to new path
        move_uploaded_file($tmp_loc,$new_path);
     }
         return $staff_id;
   }
}
?>
```

VIEW STAFF

staffmodel.php

```php
<?php
class user{

    public function viewUser($staff_id){
        $con=$GLOBALS['con'];
    //sql query
    $sql="SELECT * FROM staff WHERE staff_id='$staff_id'";
    //Execute a query
    $result=$con->query($sql);
    return $result;
    }
}
?>
```

viewstaff.php

```php
<?php
include '../common/session.php'; //To get session info

include '../common/dbconnection.php'; //To get connection string
$ob=new dbconnection();
$con=$ob->connection();

//To get user info
$staff_id=$_REQUEST['staff_id'];
include '../model/staffmodel.php';          //Include staff model
$obu=new user();
$resultu=$obu->viewUser($staff_id);
$rowu=$resultu->fetch_array();

if($rowu['staff_image']==""){
    $path="../images/user.png";
  }
  else {
    $path="../images/user_images/".$rowu['staff_image'];
  }
?>

/*Some code here*/

<div class="col-md-2 col-sm-6 col-xs-12"><label>Employee No</label></div>
<div class="col-md-4 col-sm-6 col-xs-12"><input type="text" value="<?php echo
$rowu['staff_epf']; ?>" readonly />

/*Some code here*/
```

SEARCH STAFF

staffmodel.php

```php
<?php
class user{
public function searchAllUser($key){
        $con=$GLOBALS['con'];
   //sql query
   $sql="SELECT * FROM staff WHERE staff_fname LIKE '%$key%' OR staff_lname LIKE
'%$key%' OR staff_id LIKE '%$key%' OR staff_email LIKE '%$key%' OR staff_des LIKE
'%$key%' OR staff_status LIKE '%$key%' ORDER BY staff_id DESC";
   //Execute a query
   $result=$con->query($sql);
   return $result;
   }
}
?>
```

searchstaff.php

```php
<?php
include '../common/session.php'; //To get session info

include '../common/dbconnection.php'; //To get connection string
$ob=new dbconnection();
$con=$ob->connection();
$key=$_REQUEST['searchkey'];

include '../model/staffmodel.php'; //To call staff model
$obj=new user(); //To create an object using usr class
$result=$obj->searchPageUser($start,$key);
?>

/*Some code here */

<form action="searchstaff.php" method="post">
<input type="text" class="input-sm" required="" name="searchkey" placeholder="Search Staff" />
 <button type="submit" name="search" class="btn btn-sm">
    <i class="glyphicon glyphicon-search"></i>
 </button>
 </form>

/*Some code here */

<table>
<tr>
                <th>Name</th>
                <th>Designation</th>
                <th>Email</th>
```

```
                    <th>Status</th>
                </tr>

 <?php while($row=$result->fetch_array()) { ?>
                <tr>
                  <td>
                    <?php echo $row['staff_title'].$row['staff_fname']." ".$row['staff_lname']; ?>
                     </td>
                  <td>
                    <?php echo $row['staff_des']; ?>
                     </td>
                  <td>
                    <?php echo $row['staff_email']; ?>
                     </td>
                  <td>
                    <?php echo $row['staff_status']; ?>
                     </td>
                </tr>
<?php } ?>
</table>
```

DEACTIVATE STAFF

staffcontroller.php

```
<?php
include '../common/dbconnection.php';  //Include database connection
     $ob=new dbconnection();
     $con=$ob->connection();

include '../model/staffmodel.php';  //Include staff model
$obj=new user();

$status= strtolower($_REQUEST['status']);  //Get value passed through url

switch ($status){
case "deactive":
     $staff_id=$_GET['staff_id'];
     $page=$_GET['page'];
     $obj->deactiveUser($staff_id);      //Call deactiveUser function
     header("Location:../view/staff.php?page=$page");
     break;
}

?>
```

staffmodel.php

```php
<?php
class user{
function deactiveUser($staff_id){
    $con=$GLOBALS['con'];
    $sql="UPDATE staff SET staff_status='Deactive' WHERE staff_id='$staff_id'";
    $result=$con->query($sql);
  }
}
?>
```

JavaScript de-active confirmation

```javascript
<script type="text/javascript">
    function confMessage(str){
        var r=confirm("Are you sure to "+str+" staff");
        if(!r){
            return false;
        }
    }
</script>
```

APPENDIX G - CLIENT CERTIFICATE

ONE PREPAY LANKA (Pvt) Ltd

MEMBER OF KBBO GROUP UAE

Company Reg. No PV107883

31st October, 2017

Coordinator,
BIT External Degrees Centre,
University of Colombo School of Computing,
No.17, Swarna Road,
Colombo 06.

Dear Sir,

CERTIFICATION OF THE OPERATIONS MANAGEMENT SYSTEM

This is to certify that Ms. L. I. Fernando (Index No: 1000837) who is reading for the BIT degree at your university has successfully delivered the operations management system for our company. This system was developed by her to fulfill the requirements for the completion of the degree.

We strongly believe that this system will support us to carry out our business activities efficiently by enhancing the accuracy of the operations management process and providing sufficient information for decision making.

Thank you.

Yours Faithfully,

Mr. S. B.T. A. Fernando

Manager - Operations

No. 77. C.W.W. Kannangara Mawatha, Colombo - 07, Sri Lanka.
Tel: 011-2686301/2   E-mail: opplanka@sltnet.lk   Website: www.oneprepay.lk

105

GLOSSARY

Ajax (Asynchronous JavaScript and XML) – A collection of technologies used to update the parts of a web page without reloading the whole page.

Apache – An open source web server.

CSS (Cascading Style Sheet) – A language used to format contents of web pages.

Database – An organized collection of tables consisting data.

JavaScript – An object-oriented scripting language used in client-side.

MySQL – A relational database management system.

PHP (Hypertext Pre Processor) – A server-side programming language.

SHA1 (Secure Hash Algorithm 1) – An encryption method used to convert plain text into a hash value.

URL (Uniform Resource Locator) – An address used to identify the location of a file.

Use Case – A behaviourally related sequence of steps for completing a single business task.

XAMPP – An open source cross platform web server package.

INDEX