AGRICULTURE AND LOGISTIC MANAGEMENT SYSTEM

By

WONG JIE SHIN

A REPORT

SUBMMITTED TO

Universiti Tunku Abdul Rahman

in partial fulfilment of the requirements

for the degree of

BACHELOR OF INFORMATION SYSTEM (HONS)

BUSINESS INFORMATION SYSTEM

Faculty of Information and Communication Technology

(Perak Campus)

AUGUST 2016

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DECLARATION OF ORIGINALITY

I declare that this report entitled "**Agriculture and Logistic Management System** " is my own work except as cited in the references. The report has not been accepted for any degree and is not being submitted concurrently in candidature for any degree or other award.

Signature   :   _____

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ACKNOWLEDGEMENTS

ABSTRACT

The purpose of this project is to develop an Agriculture and logistics system to manage and control the whole supply chain in agriculture industry. Cameron Highlands in Pahang state is the main location of this project side.

The main purpose of this purpose system is to replace the manually/ paper-based management by using systematic management. It is to develop an online system that combines of both farms' harvests control features and agricultures' logistic management features. This system will calculate the probability of farms' harvest every day; able user to manage their stock and delivery control. Moreover, this system allow supplier and customer communicate in the same platform with a single system. Supplier can set vegetables' price every day by using system and sharing with customer; customer can place order and make transaction via online system. Furthermore, system provide reporting module that allows user to review or print the summery report. Report can generate according to the time period and the time period can customize by user. Hence, most of the work can be operating by system itself so, labor can be reduced. Reducing paper work is equivalent to reduce manual labour.

In order to understand the concepts of the systems and find out the solution to handle the challenges, it is essential to study of related work about the supply chain management system and inventory management system. The development of the project will guide by using the Rapid Application Development model as the development methodology to ensure the project is construct in systematic way.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS

GDP   Gross Domestic Product

SCM   Supply Chain Management

ERP   Enterprise Resource Planning

SCP   Supply Chain Planning

VMI   Vendor Managed Inventory

SDLC   Systems Development Life Cycle

RAD   Rapid Application Development

DBMS   Database Management System

MRP   Material Requirements Planning

BOM   Bill of Material

SO   Sales Order

DO   Delivery Note

PO   Purchase Order

CHAPTER 1: INTRODUCTION

1.1 Project Inspiration

Most of the agricultures' logistics industry now a day, not only provides transportation services for those farmer to deliver their stocks to difference location, they also having their own farm for harvest, therefore this industry may earning two way of income. For this industry they collect stocks from difference farmers and their own harvest of their farm for transport it to retailers or those who made contract between suppliers from difference location.

Currently, most of the suppliers and farmers are using fax to communicate about the stock incoming and outgoing; they do not have any advance system to manage their stocks and harvests in once. Farmers send out the delivery order by using fax for suppliers to know their total stock that owned in their inventory and for distribute it to difference retailers. Suppliers need to make sure them having enough stock in inventory every days for distributing propose, especially for those who made contract with the supplier. Moreover, suppliers also need to make sure their do not have too much overstocks, it may case to reduce their profit value every days.

This project is to develop an online system that combines of both farms' harvests control features and agricultures' logistic management features. This project will having connectivity from online system to database server, this system can be connect to internet as an online system; as an offline system when the system disconnect to the internet. This proposed project is mainly focus on how farmers to predict the probability of their own farms' harvest every day; suppliers to manage their stock and delivery control.

The main propose to develop this project is to make those agricultures' logistics industry who having their own farm(s). This system support them to manage their stock by using calculate the probability of the harvest in the farm every days. Therefore, system will compare with the contract that input before with those item needed, quality and quantities. Supplier may know how much needed and what type of item they should collect from difference farmer to ensure they have enough stock for delivery without overstock. System is allows supplier to make sales order and send it to farmer when they have extra stock needed. Moreover, supplier is able to adjust the price every day, every minute or even every second. This system allows customer or retailer to

1

view the price via online and make order. A better result can often be obtained by treating operation of the system.

1.2 Project Background

Agriculture is the largest economic sector in many parts of the world. Agriculture in Malaysia makes up Twelve percent of the nation's Gross domestic product (GDP). Sixteen percent of the population of Malaysia is employed through some sort of agriculture. Nearly twenty four percent of Malaysia's land area is composed of land dedicated to agriculture alone. There are around 43,000 different agricultural machines and tractors. Malaysia contains 7,605,000 hectares of arable and permanent cropland. (NationMaster,2015) However, Malaysia is responsible for one third of the world's rubber export. (Wikipedia,2015) Cameron Highlands in Pahang state is the main location of this project side. Cameron Highlands is the mountainous area (above 900 m) has a relatively cool climate (14–24°C) suitable for the production of subtropical and temperate vegetables in high demand on local and overseas markets. (Mohd Shahrul Nizam,2015)

On the others hand, transportation should be provided to collect and deliver all the stock to difference state, city or event country. Most of the suppliers will sign contract with others retailer company, for example Tesco Sdn.bhd, Jusco AEON CO.bhd, Econsave and so on, to make sure everyday have enough stock to customer.

Majority farmers in Cameron Highlands now days are still using handwriting as a copy of delivery note (Figure1.1 is showing the real delivery note that used in Cameron Highlands). Supplier will collect delivery note or via fax machine when supplier collect stock from difference farmers. Afterwards, supplier calculates all stocks that collected by using traditional calculator and record the items, qualities and quantities by using paper-based as a reference. Therefore, it will always make mistake in calculation. Furthermore, supplier always in a high probability to collect overstock cause to loss, they may discard or lower price the stock. In agriculture industry, price of vegetables are difference every day. Price will set by supplier base on the harvest of the day and they will also compare items price with other suppliers.
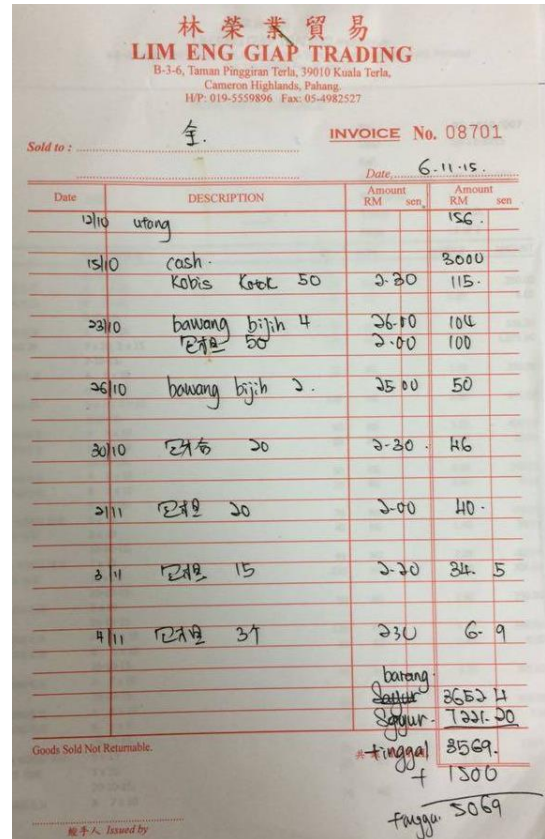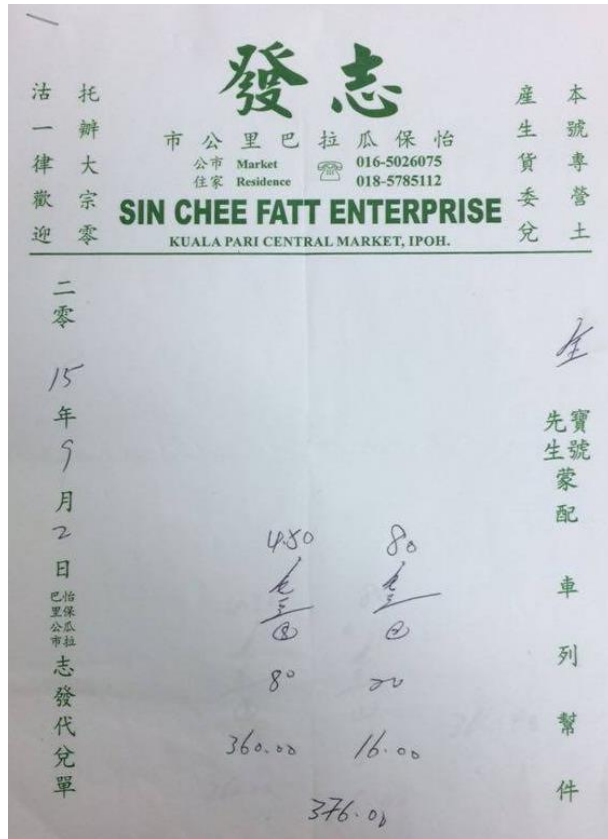
Figure1.1 Hand writing delivery note used in Cameron Highlands

Hence, to solve this problem, an agriculture logistics system is proposed which is able to manage the supply chain by using a single system. System is able to provide probability of the harvest in the farm every day and compare with the summery of the contract. Therefore, supplier may know which types of item and quantities need to collect from other farmers. Moreover, supplier may able to adjusting or updating the selling price. This online system makes the whole agricultures' logistics systematically.

The agriculture logistics management system project will combine the feature from both farms' harvests control and agricultures' logistic management so, the investor can get both features while only require using one system. Moreover this system is connected the business partners in once platform, so they are able to make order-to-purchasing in a single system.

1.3 Motivation & Problem statement

Nowadays, most of the agriculture in Cameron highlands is still using hardcopy as a document. They keep information in a physical document for example, delivery note, sales order and purchase order. Even daily report and summery report also recorded in the paper. It makes most of the information duplicate and not accurate. They are the problem that faced by logistics company in Cameron highlands:

- **Human Error and mistake**

  Human tend to make mistake because we are not always 100% focus on what we are doing. For example, supplier calculates their total stock every day by using calculator. It may be input wrong value for calculation, it need second confirmation. Monthly report may cause error if the total value in one of the day was incorrect.

- **Difficult to manage summery report**

  Paper based management is difficult for supplier to search and generate summery report, for example, monthly report and annul summery report. Using system is flexible for supplier to choose difference view of the report – descending or ascending can be generated.

- **Cause overstock and under stock issue**

  Supplier have no idea how much stock they need to collect from farmers; they collect the stock base on how much the farmer giving to them. It is because; they do not have an intelligence system to provide value of daily needed. Therefore, supplier may face on overstock or under stock issue. It is the main issue that makes the industry loss.

- **The benchmarking system does not unite agriculture supplier chain as once**

  System not allows intermediaries using a single system to communicate with supplier and customer. It separate difference feature to difference software system. For example, stock control for warehouse using inventory management system; online purchase order need

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others web base purchasing system to support customer purchasing. Therefore, an industry may request to purchase many difference set of system to operate their business.

- **The benchmarking inventory management system does not allow user to adjust items price**

  Most of the inventory management system is not allows warehouses' employee to change items price, because they using bar code scanner to read information. It may not suit with the boxes that contain of vegetable, it is because price of vegetable are flexible, it can be change every day base on the harvest, therefore agricultures' inventory management should allow the employee to change items price.

- **Privacy issue**

  The main problem of the paper based management is privacy issue. Those peoples who can easy to get data and information without permission, copy by using phone capture or may be photocopy. It makes the data insecure. Moreover, report may easy been stole or loss.

1.4 Project Objective

A. To enhance the stock management by harvesting calculation

This objective can be achieved by ensure the system can support supplier to well manage and control their stock and distribution control, it will eliminate the problem of over stock and under stock. Most of the supplier nowadays will make contract with customer, so system will combine all the item and quality needed in the same day. Also, calculate the harvest in own farm every day. Therefore, supplier will know what item needed in the current situation and make order to the farmer. Hence, supplier will not having over stock and under stock problem.

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B. **To optimize the business process time**

Most of the work can be operating by system itself so, labor can be reduced. User able to use system to record business information rather than record in paper, it is because system can automatically generate report, make calculation, and the transaction document can generate by system. It can reduce human work to copy it again and again. Reducing paper work is equivalent to reduce manual labor.

- **To enable supplier can set real time monitor the price changes**
  In agriculture industry, price for vegetable is not stable; it will be change day by day. User is available to set stock price every day by using this system and share with the whole connected customer. All the data price will be save in database, user can access by using their own identity number to view the current updated stock price. Moreover, it can set difference price for difference customer, for example, loyalty customer can get discount price.

- **To enable user summarize document and report**
  The database will store all the data and information that about each of the transaction. To search for what information they need, user able to access the system with their own user ID and password. 'Reporting module' is provided for user to view current business situation. User can use sort function to choose whether ascending or descending their report. For example, user can get the probability of the daily harvest calculate by the system, so they can predict for how much needed to order from the farmer. System always provides accurate information for user to make decision.

C. **To sharing the same platform between business partners**

User is able login to the system by entering the correct user name, password and position is identified. User is able to communicate and make transaction within the same system. In agriculture business transaction, customer is able to view current price via online system and place order by send the purchase order to the supplier.

Supplier can view the document that send by difference customer and confirm them with a sales order. This objective can make the current agriculture business transaction more efficient, and reduce their transactional error.

- **To classify important document hide from unauthorized user**

    To achieve this objective is to ensure the security of the system managed time to time. This system only gives an authorization to authorize person who is responsible. It allows the responsible person to make changes of data into the system. Moreover, it also allows manager to set which information is allows for who to view or update. This objective can prevent other peoples steal or view company's important data.

1.5 Project Scope

The project scope is to develop agriculture and logistics management systems that can addresses the problem stated in the problem statements and enhance the current situation by using advance software system to make the business process systematically. This proposed project will enhance supplier business process. Also, provide innovative ideas to this project.

The proposed system will involve those following modules to generate a unite system to support the business process.

1. **Authentication module**
    This module is for user to login to the system, it may require user identification number and password to be confirmed. Also, difference user has difference authority to use difference module(s). For example, customers are not allowing for price adjusting module.

2. **Contract management module**
    This module is for user to input all information about the purchasing contract between supplier and customer. This module will summary out all the total requirement of the

contracts. For example, 800kg of Grade 'A' Cabbages; 1000kg of Grade 'A' Radish; 500kg of Grade 'B' Radish

3. **Harvest calculation module**

   This module will calculate the probability of the farm's harvest every day. It will base on the previous harvest experience to calculate the probability. For example, 300kg of Grade 'A' Cabbages; 500kg of Grade 'A' Beans; 500kg of Grade 'A' Tomatoes.

4. **Stock management module**

   This module will match with the contracts needs, and farms' harvest, purchase order, sales order and yesterday leftover. System will provide summarize table for user, therefore, user may know the accurate value to collect stock from others farmers; it is to make sure every customer have enough stock. For example, supplier may collect 500kg of Grade 'A' Cabbages; 500kg of Grade 'A' Radish from others farmer. This module helps logistic industry to prevent overstock and under stock issue.

5. **Price adjusting module**

   Hence, price of vegetable is very flexible, therefore this module is provided for user to adjusting the price every day or even every minute. So, customer can view the product price via online. They are two types of price can be view by difference customer:
   - ✓ Price for loyalty customer (for those who with contract but request extra order)
   - ✓ Price for others retailers

6. **Purchase order module**

   This module is support buying and selling feature between supplier and customer. Customers are allowed to place order via online; suppliers are allowed to approve or reject the transaction. For example, When the customer send the purchase order to supplier, system will alert, therefore supplier can easily reply sales order to the customer.

8

7. **Transaction documentary module**

    This module use to generate or print transaction document, for example, delivery note for billing.

8. **Reporting module**

    This module is allows user to review or print the summery report. Report can generate according to the time period and the time period can customize by user. This reporting module is for customer to view report by using a single click. User can sort the report by time.

1.6 Impact, Significance and Contribution

As the agriculture and logistics management system is an efficiency tool to manage the supply chain of agriculture. However, most of the agriculture logistics in Cameron Highlands are still using traditional method to control and manage the supply chain. Famer and supplier will manage their farm and stock base on their previous experience. Therefore, the proposed project system is use to replace the whole supply chain from farmer to customer.

Besides that, the proposed project can let user to know the probability harvest of their farm. System will base on their previous harvest to calculate the probability in coming days' harvest. Therefore, farmer can manage their cash flow for next investment.

On the other hand, the manually calculation of sales status or supply status can be eliminate as the system is integrate of this function. This function can reduce the human error, and reduce the time taken for manually input data. Moreover, system will provide more accurate and reliability information for user. User can base on the information provided to decide how much stock needed or any stock over.

Furthermore, this proposed system is provided online feature, to allow supplier and customer communicate at the same platform. System is able users to share their information, stock pricing and transaction making. It makes all information process in real time. Lastly, agriculture and

logistics management system is to make sure the whole agriculture supply chain work effectively and timely without error.

1.7 Chapter Summary

This chapter discuss about the problems found in the current situation. Also, the inconveniences that bring to the supplier and the whole agriculture business transaction have been emphasized. Lastly, the project objective and project scope have been listed and discussed. The overall structure of the proposed system has been justified and project contribution is stated. Since, agriculture inventory control system has not been found. Next chapter will be further discusses the feature about others inventory management system that can use to fulfill the agriculture transportation and stocks policy.

Chapters 2 is focusing on review each existing system of Supply chain management system, Inventory management system and also feature of price control. Each strength and weakness have been analyzed and pointed out. Proposed solution is provided to solve the limitation and weaknesses of the existing system and combine it all as once system. A conclusion is to made for the proposed system. I will discuss the strength and weaknesses for some existing system which related to the proposed project such as MEX Maintenance Software, SCP Management System, ASAP Inventory Management System, Fishbowl Inventory Management Software and Syncron Price Management System.

Chapter 3 will be discussing and Justify about the methodology and technology for this proposed project. In this chapter will discuss about the methodology for the proposed system have been chosen, Each phase of SDLC for the system development for the proposed system will be clearly explain and discuss. User requirement, hardware and software requirement will state in this chapter. UML diagram is drawn out to provide a better understanding for the proposed system. The system design such as use case diagram, class diagram and data dictionary will discuss on this chapter. Next, in chapter4 will discuss about system design, it will discuss the proposed method, tool and technology to develop the project, requirement specification and the timeline of the project. Moreover, user interface designs also clarify and stated in this chapter.

In chapter 5 is discuss about agriculture and logistics management system testing, it will test the system make sure the final system is achieved all objective mentioned in chapter1. For chapter 6 it will talk about the system evaluation and discussion such as strength and limitation of the system and also future enhancement.

Lastly, a conclusion for this proposed system will state on Chapter 7.

Chapter 1: Introduction

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

The Agriculture and logistic system project is a new idea that combine of Supply chain management system, Inventory management system and also involve feature of price control and management system. To integrate those features in one new system, they are no other people study before within this area. Therefore, the understating of Supply chain management system, Inventory management system, and feature of price control is necessary before the project start. Thus, the study of those existing systems is important to understand the necessary features, functions and process must be involve in the new system. Besides that, study of those different existing system, to found out the problem in the existing system and make improvement and enhance in the new system. In other word, we can carry out the opportunity through the existing problem.

2.2 Supply Chain Management System

Supply chain management (SCM) is the oversight of materials, information, and finances as they move in a process from supplier to manufacturer to wholesaler to retailer to consumer. Supply chain management involves coordinating and integrating these flows both within and among companies (Margaret Rouse, 2015). Supply chain management systems, simply defined, are a network of businesses linked together to provide materials and services to an end user. The goal of these systems is to coordinate functions and strategies, throughout a company, and across businesses, to improve the performance of all parties involved. Because supply chain management systems link several different branches of an organization, each of these systems is different, and requires fine tuning to work and give integrity to a supply chain's operations (Worldwide Business Research, 2015).

MEX Maintenance Software is a supply chain management system will discuss and study in following sub-section.

2.2.1 MEX Maintenance Software

MEX is a simplicity and functionality for management of the supply chain for supplier and customer and also maintenance the inventory needs. They are the features of MEX maintenance software:

Figure 2.1 Main feature of MEX

This software allow for register asset to manage of all the assets contained within the company. It able to maintain the workers within the company by using Requests, Work Order, Inspections, Preventative Maintenance and History features. All the work is managed comprehensively by MEX, for example provide a schedule of work to do and who going to perform. Moreover, any sort of reading can be recorded and managed in MEX (MEX, 2015). System will automatically generate invoices and bill to customer when the process done. Furthermore, system will manage of the entire requisition and purchasing process. User is able to select priority time to read the specific period of report.

Strength:

- **Invoice generation**

  System will automatically generate invoice when all the process is done. For example, stock is match with customer purchase order and distribute it to the customer, customer match with the delivery note and confirmed with supplier, system will generate the invoice and bill it to customer.

- **Integrate stock control in supply chain management system**
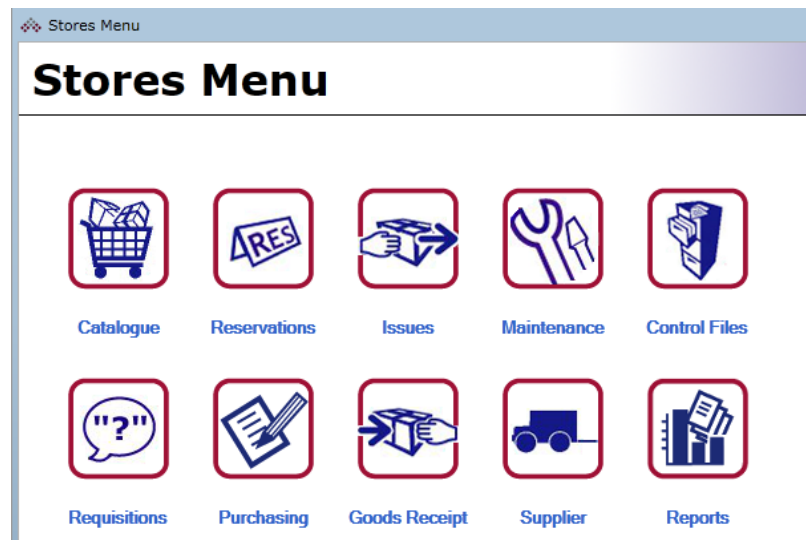
Figure 2.2 Stock control interface of MEX

  System will manage of the entire requisition and purchasing process. Also, calculate the stock in inventory and make sure they have enough stock. It will give notification if the inventory stock is low.

- **Accurate performance measurement**

  With the vast amount of equipment information stored against equipment, reports for auditing and analytic purposes are readily available (MEX, 2015).

- **Specific period report provided**

  System allows user to review or print the summery report. Report can generate according to the time period and the time period can customize by user.

14
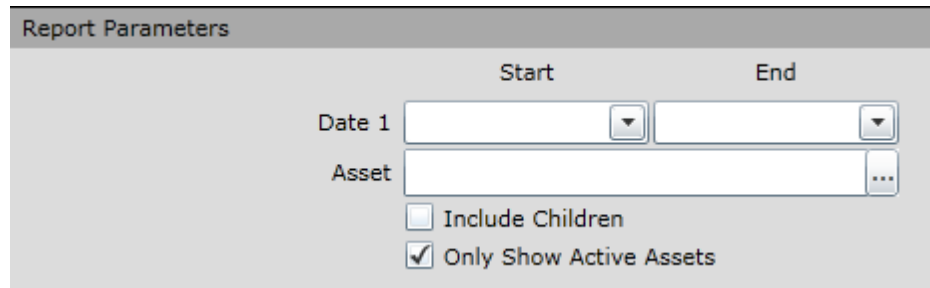
Figure 2.3 Interface of select report parameters

Weaknesses:

- **Cannot share data to specific customer**

  MEX system is not allows user to share specific data to customer, it will share all to customer who connected in the same platform.

- **Not provide user to check customer credit balance**

  MEX system does not provide credit balance checking feature to user. For customer purchasing process, when customer place order, user need not only check for stock level, they may also check customer credit balance to decide whether approve or reject the order.

Recommendation:

MEX system can add a feature for user to check customers' credit balance when customer place order. Moreover, MEX system can enhance the feature of share difference data to specific customer. For example, customer need only specific items, therefore customer can view only the specific item description and price.

2.2.2 SCP Management System

SCP management system is a supply chain system. SCP provides materials managers and planners with a tool to control inventory. SCP recommends what to make, how much to make, and when to make it in order to fulfill demand and maintain, but not exceed, desirable inventory levels. SCP includes forecasting, time-phased demand planning, Material requirement planning,

constraint planning, and optimized scheduling. Use SCP to plan your supply chain and for Vendor Managed Inventory (VMI) partnerships. (Jada management system, 2015)

Strength:

- **Support business process with documentation**

  System will automatic generate business document, for example, when the inventory is under stock it will provide alert and make purchase order to vendor; customer make order system will generate sales order, delivery note and also invoice and send it to customer.

- **Helpful reporting tools**

  User is an able to view details by week or month report base on what their requirement. This system has ability to export the information to reports and the ability to manage certain data in multiple databases. Moreover user can customize own report, system will automatically email report and alerts as PDF, HTML, Excel attachment.
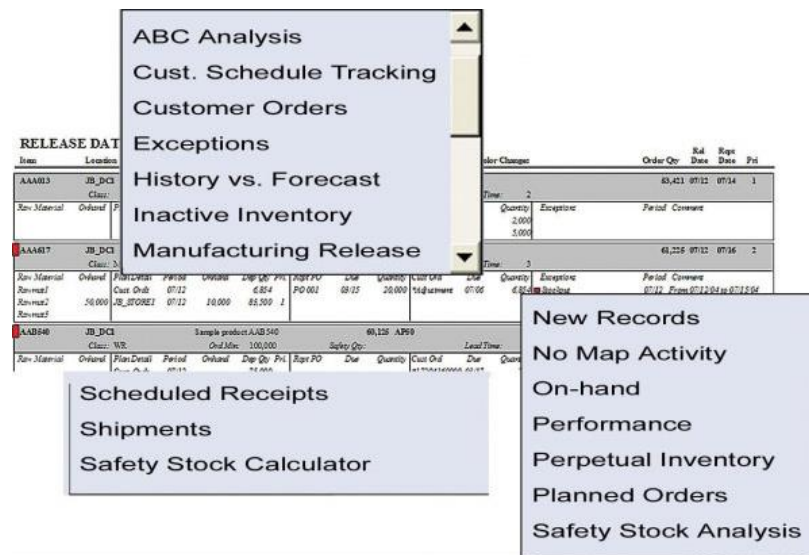
Figure 2.4: Features of SCP management system reporting

- **It is a customizable software**

  System is able to integrate with other supply chain or ERP software suites to complement pre-existing system. For example, user can purchase different module from difference vendors in order to obtain a best of breed software.

16

Weaknesses:

- **System does not provide executive summary or dashboard immediately**

  Although system is provided informative report to user, but user cannot immediately to see their current situation and some detail by provides executive summary and dashboard. Reports handle information, but users still have to run them or waiting emailed to receive.

Recommendation:

System should provide informative report immediately to user, therefore user can know current situation in the process.

2.2.3 Comparison table between MEX Maintenance Software and SCP Management System

Functions	MEX Maintenance Software	SCP Management System
Business document generator	✓ Purchase order ✓ Sales order ✓ Delivery note ✓ Invoice	✓ Purchase order ✓ Sales order ✓ Delivery note ✓ Invoice
Stock management feature	Yes	No
Customization	Limited	Yes
Reporting	Detail, customizable	Detail, difficult to retrieve report

Table 2.1: Supply Chain Management System Comparison

Table 2.1 shows the comparison of system functionality between 2 existing supply chain management systems, there are MEX Maintenance Software and SCP Management System which are proposed system in this project. MEX maintenance software and SCP management system will automatically help user to generate business document, there are purchase order, sales order, delivery note and invoice. All of these business documents are importance for every transaction. In my proposed system I will take both of the system's documents as a reference, to

17

make sure will not eliminate the importance column for user input data. MEX maintenance software is able for user to manage their stock in inventory by using a system with supply chain management, but SCP management system does not provide stock management feature.

Moreover, SCP management system provide features of customize system, to make their system operate fit to their own business operation. For MEX maintenance software, it provide same feature too, but it limited. Both system provide repot generator, MEX maintenance software' reports are detail and able to customize by user. SCP management system's report detail but difficult to retrieve by every user, it only for specific user to view their report.

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2.3 Inventory Management System

Inventory management software is a computer-based system for tracking inventory levels, orders, sales and deliveries. It can also be used in the manufacturing industry to create a work order, bill of materials and other production-related documents. Companies use inventory management software to avoid product overstock and outages (Wikipedia, 2015).

ASAP Inventory Management System and Fishbowl Inventory Management System are inventory management system that will discuss and study in the following sub-section.

2.3.1 ASAP Inventory Management System

ASAP inventory management system combines the use of desktop software, barcode scanners, barcode printers, and mobile devices to streamline the management of inventory (e.g. goods, consumables, supplies, stock, etc.). It able to track inventory used to perform a service or sold to customers, using an inventory system provides staff accountability and minimizes inventory stock outs and shrinkage (ASAP system, 2015).
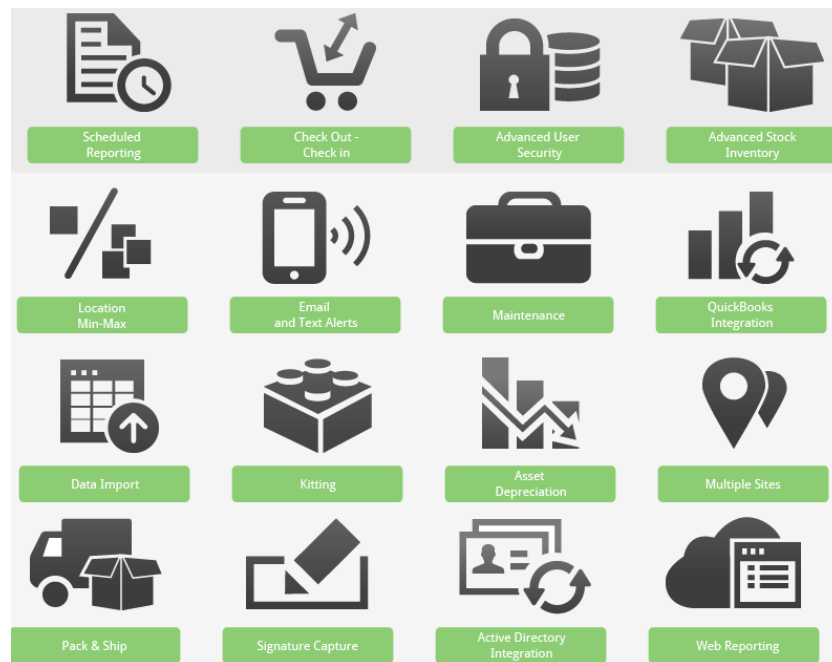
Figure2.5 Feature of ASAP inventory management system

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Strength:

- **Stock Check out and Check in**

  ASAP System is able user to tracking of the assets with due dates. User may know when employees, clients or team members have checked out an asset and when it is due. This feature to make sure inventory has enough asset when it is needed.
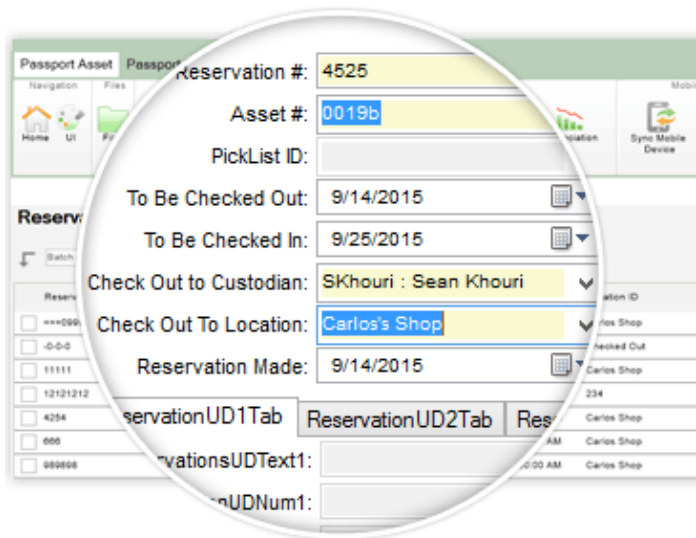
Figure2.6 Interface of ASAP system equipment reservations

- **Stock Inventory traceability**

  System support more complex inventory such as batch-lot and serialized inventory. User can control the quantity and quality of the asset by using this system, system will automatic assign a batch with the item throughout the inventory lifecycle. It can improve the record-keeping, and prevents inventory wastage.

- **Pick and ship feature**

  System will compare customer purchase order with inventory picked out items, to reduce the shipping mistakes. System will alert when the particular inventory item is over packed.

- **Web reporting features**

  System provided reporting generation, web reporting feature is an advance feature in this system. Browser- based access to inventory data and other information. Web Reporting allows access to stock information online via a web browser on computer.

Weaknesses:

- **Do not have feature to manage customer contract**

  MEX system do not have feature that can compare customer contract with existing stock level to ensure stock in inventory are enough.

Recommendation:

ASAP software system can add a feature that can summary all contract needed from all customer and compare with stock level in inventory. Therefore user can know whether they need to purchase more stock or not. It can prevent overstock and under stock problem.

2.3.2 Fishbowl Inventory Management Software

Fishbowl inventory is designed for meet the needs of companies that require more streamlined inventory control, material requirements planning (MRP) and job shop floor control/manufacturing execution. It takes an inventory-centric approach, providing features for bar-coding, asset management, raw materials management, cycle counting and customized reporting. The system also automates the quoting, ordering and purchasing processes (Software Advice, 2015).
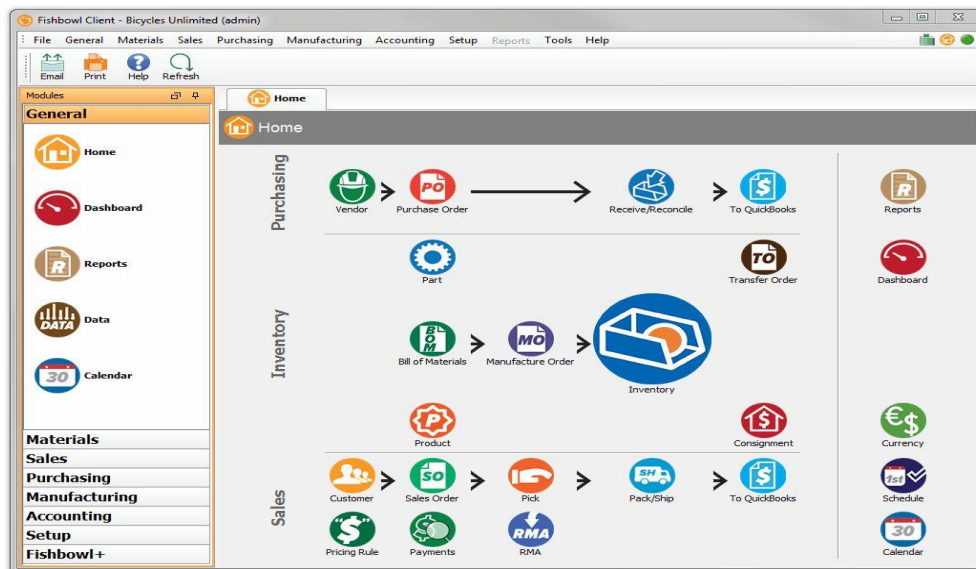
Figure 2.7: Home page for Fishbowl Inventory software

Strength:

- **System support warehouse ordering and purchasing process**

  This system is integrated with vendor in a same platform. System provides sales order and purchase order feature in inventory management system. For example, when the warehouse in certain levels it will alert vendor and make purchasing.

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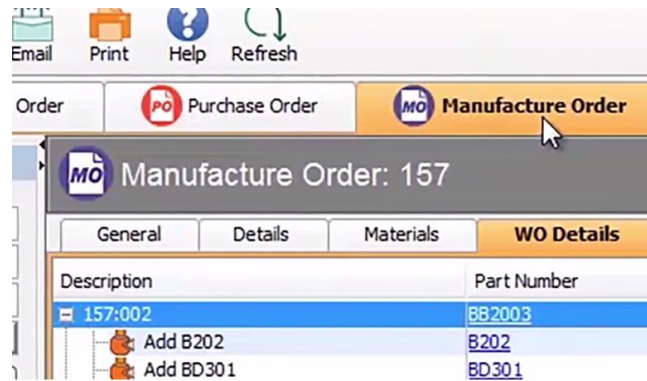
Figure 2.8: Example of manufacture order interface

- **Fishbowl is provide visibility of the process**

  System has allowed having great visibility into all aspects of the inventory from the moment raw materials arrive to the moment finished goods ship out the door.

- **This system integrate manufacturing as once**

  Using this system can easy to know the current inventory situation. User of manufacturing can check the stock level in inventory directly. Therefore, user may know what BOM's should work for.
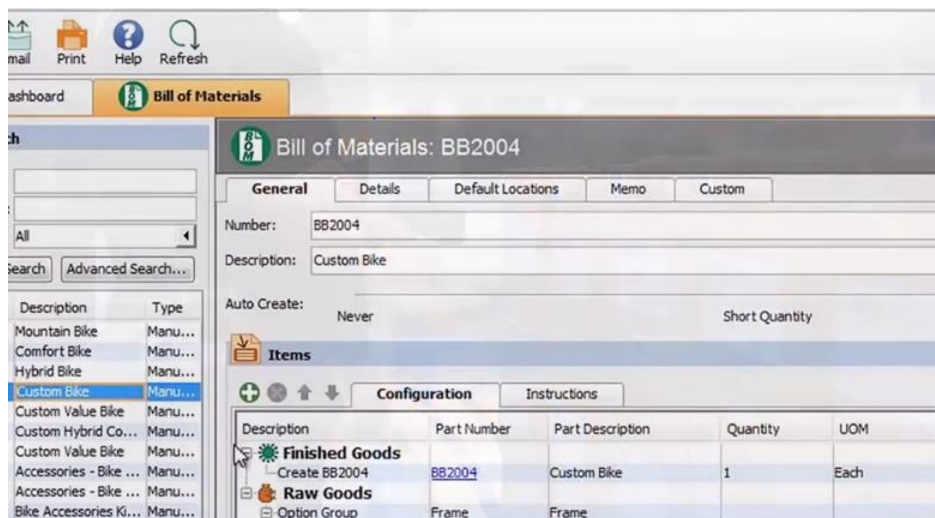
Figure 2.9: Bill of Material interface in Fishbowl inventory

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Weaknesses:

- **Does not recheck inventory levels and BOM's status**

  When the sales order estimate is issued, system does not recheck the inventory levels and BOMs' status. It only looks at inventory and BOMs' status when first adding items to sales order. Record won't update automatically.

- **This system does not provide user a good report generator**

  This system to generate report is limited, it need extra pay to customization own reports. For example, it will hard to find sales information on certain customers without having a huge list of purchasing.

Recommendation:

For this Fishbowl inventory system, it should improve the interaction between Sales orders and Manufacturer order. Therefore, user can decide whether the manufacturer order should have on or not. Moreover, system need to expand the report tab to include more detailed information on product margin/cost of goods sold. Also, include some reports that will help to keep inventory at a certain level.

2.3.3 Comparison table between ASAP Inventory Management System and Fishbowl Inventory system

Functions	ASAP Inventory Management System	Fishbowl Inventory system
Inventory control	✓ Stock check out and check in feature ✓ Stock inventory traceability ✓ Inventory pick and ship feature	✓ Stock inventory traceability ✓ Inventory pick and ship feature

Integrate with Manufacturer	No	Yes
Integrate with customer	Yes	Yes
Customization	Yes	Limited
Summary report	Detail, customizable	Simple, not detail, need extra pay for customize

Table2.2: Inventory Management System Comparison

In Table 2.2 shows the comparison of system functionality between 2 existing Inventory Management System, there are ASAP Inventory management system and Fishbowl Inventory system. For ASAP inventory management system that control Stock check out and check in feature, stock inventory traceability and inventory pick and ship feature; but for Fishbowl inventory system that do not provide Stock inventory traceability feature. Fishbowl inventory system that integrate with manufacturer control, it allow user to know which type of raw materials needed to order from supplier to make the stock available. ASAP Inventory management system does not integrate with manufacturer. Moreover, both inventory management system are integrated with customer side, system allow customer make order by using system. Both Inventory management systems is allow for customization; but Fishbowl inventory system is limited for customize compare to ASAP Inventory management system. Furthermore, ASAP Inventory management system provide detail and customizable report; Fishbowl inventory system is simple, not detail, and need extra pay for customization report.

2.4 Price Management System

Price management system is software that use to innovator of price and revenue management solutions. Moreover, it use to supports pricing consistency across the channels; Integration to online order capture and order management systems; Automates and streamlines pricing strategy execution; Provides one central place for price execution across the business and also provides ability to meet competitive pricing targets (Oracle, 2015).

Price management in agriculture industry is very important, since the price of difference vegetable will change in everyday base on the harvest of the current economic. Syncron Price Management System is price management system that will discuss and study in the following sub-section.

2.4.1 Syncron Price Management System

This software is design to help company make more informed pricing decisions. Price Management from Syncron automates and optimizes prices so it can improve revenue and margin. Price management software focuses on three key areas of price improvement – execution, optimization, and analytics. This powerful tool groups products, applies value drivers, models the business impact, and implements the new prices over time (syncron.com, 2015). This system helps to find the right price level, with advanced business intelligence tools.

Strength:

- **Ensure the correct forecasting algorithm to set pricing**
  System will study the current economic in the industry, to determine Demand types in this current situation by using an intelligence tools. Therefore, it can provide more accurate price range for user to make decision.

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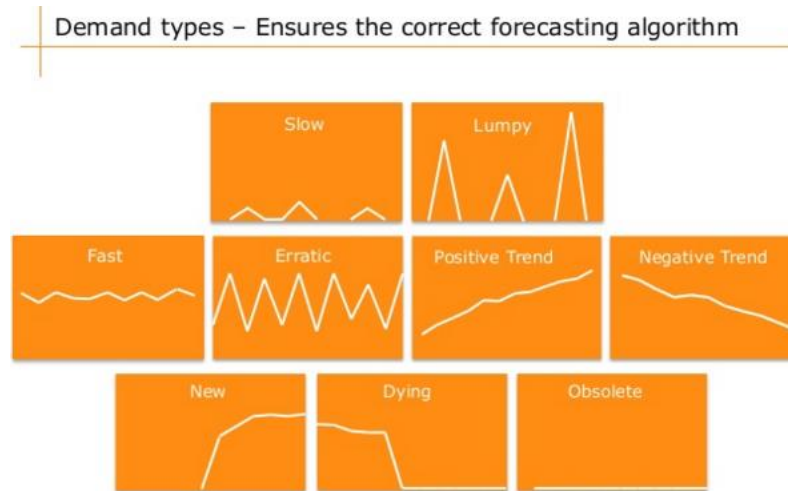
Figure2.10: Difference demand types in the situation

- **System will set the price base on the stock level**

  System will provide an idea for the price range base on the stock level in inventory. Therefore, user can take it as reference to set the price for the item. Figure is an example of the Syncon price management system that set price range base on the stock level.
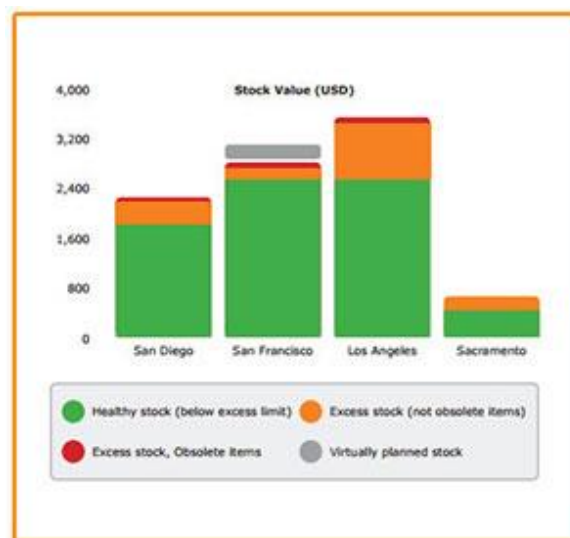
Figure2.11: Stock level against stock range

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- **Graphical view provided**

  This system provides graphical view for user to make more understanding about the current economic situation and also the price for the inventory. Moreover, report will also generated by graphical view.

Figure2.12: Summary report generated by Syncron price management system

Weaknesses:

- **Unable to share item price with customer**

  This system is not allows user to share item price online with customer. Therefore, customer cannot know the user current item price in real time.

- **Difference price range for difference customer**

  Syncron price management system provide the price range base on difference demand but it do not provide price range base on difference customer such as, long-term customer, customer who with contract or customer not always place order.

Recommendation:

Make the system able to connect with their customers; therefore, customers can easy to know current item price in current situation. Moreover, difference types of customer can view

difference item price, for example, long team customer can get more discounted price compare with those customer not always place order.

2.5 Summary

After all, the proposed solution to eliminate the weaknesses and limitations of each system is to combine the strength of each system. All the strength will be take it as an idea to combine in the proposed system; limitation will be taking as an improvement for the proposed system. There are three main parts for the proposed system, it involve Supply chain management system, inventory management system, and price management system. Therefore, in this chapter, I reviewed the related existing system to get more knowledge and idea. The existing system which related to the proposed project such as MEX Maintenance Software, SCP Management System, ASAP Inventory Management System, Fishbowl Inventory Management Software and Syncron Price Management System.

CHAPTER 3: METHODOLOGY ON AGRICULTURE AND LOGISTICS MANAGEMENT SYSTEM

3.1 Chapter Overview

In This chapter, will be discussing and Justify about the methodology and technology for this proposed project. Each steps of system development for the proposed system will be clearly explain and discuss. User requirement, hardware and software requirement will state in this chapter.

3.2 System Development on Agriculture and Logistics Management System

The systems development life cycle (SDLC) is a conceptual model used in project management that describes the stages involved in an information system development project, from an initial feasibility study through maintenance of the completed application (Margaret Rouse,2015). SDLC include 6 phases, which are planning, analysis, design, development, testing and deployment. There are many SDLC models that available for different project size and project duration.

In this proposed project, the **Rapid Application Development (RAD) model** is selected to be the development methodology of this project. Rapid Application Development model is suitable to use when the development time of the system is limited (Ramesh & Rajesh, 2014).

The RAD model will separate the functional modules and developed in parallel using prototype methodology. If the individual functional module is complete, they will integrated to make the complete system so it can save the time compare to build the functional module one then follow the other one. The other advantage of RAD model is during the development process the development model can easier to make changes if developer wants to add in additional requirement or withdraw the unnecessary requirement of the project (Ramesh & Rajesh, 2014).

The RAD model can separate project to multiple functional modules in the whole development cycle (Ramesh & Rajesh, 2014). The development life cycle are includes: requirement planning phase, prototyping and system design phase, developing, evaluated and testing phase, and cutover phase.

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Diagram below shows the Agriculture logistics management system development cycle.

Figure3.1: RAD diagram for agriculture and logistics management system

Requirement Planning

The first activity for requirement planning is conducting research. At the beginning of the project, need to do some research before go into the development phase. First, to do researches make more understanding about the whole business process about the agriculture industry. For example, what business documentation needs, and how their business flows from farmer to vendor and so on. Then, base on the research, will analysis the problem the existing process face. Next, do the research from the farmer about the harvest for difference vegetables bases on difference location, difference type of farm and soil for the plantation. After that, analyze other existing system to see what other people are doing in the market. Next one will be discussing with supervisor. Supervisor will point out the strength and weaknesses of the idea.

Prototyping

Fist, database is a very important in prototyping phase, the beginning of the project is to work on database. This is because without database, it cannot let other part of the project function. Next is to design each of the system interface and construction for difference module. After then, discuss the process and design with supervisor and get some idea from supervisor.

Developing

After prototyping phase, connect the application will database, then coding will start for the project, to make those user interface works with the back end code. During the development phase, supervisor gives a lot of suggestion and other ideas for more efficient coding.

Evaluate and Testing

Testing and evaluation will be run after a module is developed and make sure it does not have any bugs and error. Then, continue for develop the system. To make the prototyping, developing and testing phases as a cycle to ensure the system's function is complete. After completed the system, will be try out the error and solve the bugs then, evaluate the system is able to achieve the objective of this project.

Implementation

The last phase is implementation the system and ensures the application is connected to the database.

3.3 Project Timeline and Gantt chart

In this phase, proposed project planning development time requirement is planned; it will use 32week (18/1/2016 – 26/8/2016) to develop this project. The planning for whole project is separate in two timeline. The development timeline is show in the figure below:

ID	Task Name	Start	Finish	Duration	Jan 2016			Feb 2016				Mar 2016				Apr 2016	
					1/12	1/19	1/26	2/2	2/9	2/16	2/23	3/2	3/9	3/16	3/23	3/30	4/6
1	Review Project Proposal	1/13/2016	1/17/2016	1w													
2	Research and Literature Review	1/20/2016	2/5/2016	2w 3d													
3	Analyze System Requirement	2/6/2016	2/21/2016	2w 2d													
4	Finalize Report	2/21/2016	2/28/2016	1w 1d													
5	Project 1 Submission	3/3/2016	3/3/2014	1d													
6	First Prototype Implementation	3/4/2016	3/21/2016	2w 4d													
7	Testing and Debugging of Prototype	3/21/2016	4/1/2016	1w 3d													
8	Finalize Prototype	4/1/2016	4/9/2016	1w 2d													
9	Poster Preparation	4/10/2016	4/11/2016	2d													
10	Project 1 Demostration	4/14/2016	4/14/2016	1d													
11	Poster Submission	4/14/2016	4/14/2016	1d													

Figure 3.2: Timeline for Project 1

ID	Task Name	Start	Finish	Duration		Jun 2016				Jul 2016				Aug 2016		
					5/25	6/1	6/8	6/15	6/22	6/29	7/6	7/13	7/20	7/27	8/3	8/10	8/17
1	Review Project 1	5/26/2016	5/30/2016	1w													
2	Design Prototype 2	6/2/2016	6/6/2016	1w													
3	Prototype 2 Development	6/9/2016	6/20/2016	2w													
4	Testing and Debugging on Prototype	6/23/2016	6/26/2016	4d													
5	Review Prototype 2	6/27/2016	7/1/2016	3d													
6	Design Final Prototype	7/2/2016	7/11/2016	1w 3d													
7	Final Prototype Development	7/14/2016	7/18/2016	1w													
8	Testing and Debugging on Prototype	7/21/2016	7/25/2016	1w													
9	Full System Development	7/28/2016	8/1/2016	1w													
10	Testing and Debugging on Final System	8/4/2016	8/7/2016	4d													
11	Benchmarking and Evaluation System Performance	8/7/2016	8/11/2016	3d													
12	Finalize Report	8/11/2016	8/15/2016	1w													
13	Project Submission and Presentation	8/18/2016	8/18/2016	1d													

Figure 3.3: Timeline for Project 2

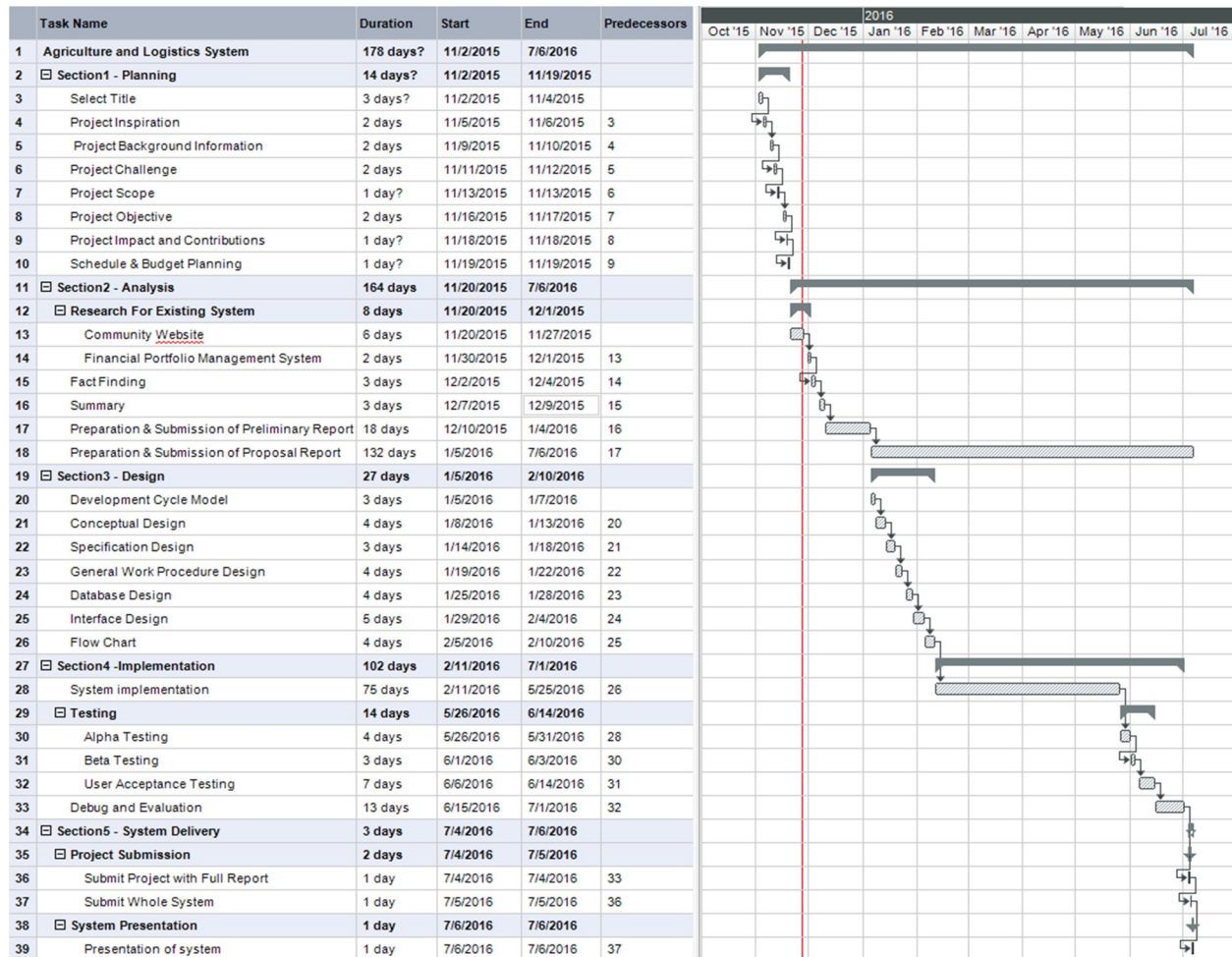|	Task Name	Duration	Start	End	Predecessors
1	Agriculture and Logistics System	178 days?	11/2/2015	7/6/2016	
2	Section1 - Planning	14 days?	11/2/2015	11/19/2015	
3	Select Title	3 days?	11/2/2015	11/4/2015	
4	Project Inspiration	2 days	11/5/2015	11/6/2015	3
5	Project Background Information	2 days	11/9/2015	11/10/2015	4
6	Project Challenge	2 days	11/11/2015	11/12/2015	5
7	Project Scope	1 day?	11/13/2015	11/13/2015	6
8	Project Objective	2 days	11/16/2015	11/17/2015	7
9	Project Impact and Contributions	1 day?	11/18/2015	11/18/2015	8
10	Schedule & Budget Planning	1 day?	11/19/2015	11/19/2015	9
11	Section2 - Analysis	164 days	11/20/2015	7/6/2016	
12	Research For Existing System	8 days	11/20/2015	12/1/2015	
13	Community Website	6 days	11/20/2015	11/27/2015	
14	Financial Portfolio Management System	2 days	11/30/2015	12/1/2015	13
15	Fact Finding	3 days	12/2/2015	12/4/2015	14
16	Summary	3 days	12/7/2015	12/9/2015	15
17	Preparation & Submission of Preliminary Report	18 days	12/10/2015	1/4/2016	16
18	Preparation & Submission of Proposal Report	132 days	1/5/2016	7/6/2016	17
19	Section3 - Design	27 days	1/5/2016	2/10/2016	
20	Development Cycle Model	3 days	1/5/2016	1/7/2016	
21	Conceptual Design	4 days	1/8/2016	1/13/2016	20
22	Specification Design	3 days	1/14/2016	1/18/2016	21
23	General Work Procedure Design	4 days	1/19/2016	1/22/2016	22
24	Database Design	4 days	1/25/2016	1/28/2016	23
25	Interface Design	5 days	1/29/2016	2/4/2016	24
26	Flow Chart	4 days	2/5/2016	2/10/2016	25
27	Section4 -Implementation	102 days	2/11/2016	7/1/2016	
28	System implementation	75 days	2/11/2016	5/25/2016	26
29	Testing	14 days	5/26/2016	6/14/2016	
30	Alpha Testing	4 days	5/26/2016	5/31/2016	28
31	Beta Testing	3 days	6/1/2016	6/3/2016	30
32	User Acceptance Testing	7 days	6/6/2016	6/14/2016	31
33	Debug and Evaluation	13 days	6/15/2016	7/1/2016	32
34	Section5 - System Delivery	3 days	7/4/2016	7/6/2016	
35	Project Submission	2 days	7/4/2016	7/5/2016	
36	Submit Project with Full Report	1 day	7/4/2016	7/4/2016	33
37	Submit Whole System	1 day	7/5/2016	7/5/2016	36
38	System Presentation	1 day	7/6/2016	7/6/2016	
39	Presentation of system	1 day	7/6/2016	7/6/2016	37

Figure 3.4: Agriculture and logistic system development timeline

In this long semester, the Documentation of Final Year Project I will be done within seven week. The Documentation involved of the idea and design of the system, this is to make the prototype of the proposed project develop more efficiency. The prototype of the proposed project will start from week 8.

In the next semester, the full project development will start from week 1 and continue until the testing phase. The system will being test and the system will be debug if getting any error. The feedback get from the system tester will collect and use as the future function in the system.

3.4 Gathering Requirement

The basic requirement of this proposed project is to research and understand the whole current agriculture supply chain work in Cameron Highlands. To fully understand the whole business process from farmer to retailer, I used face to face interview method to interview my father, Wong Chen Choon and my uncle, Wong Chan Ming to get more information and knowledge about the whole agriculture process. Furthermore, they also show me there current business documentation and report in Cameron Highlands. Figure 3.1 – figure 3. show the business documentation and report below:
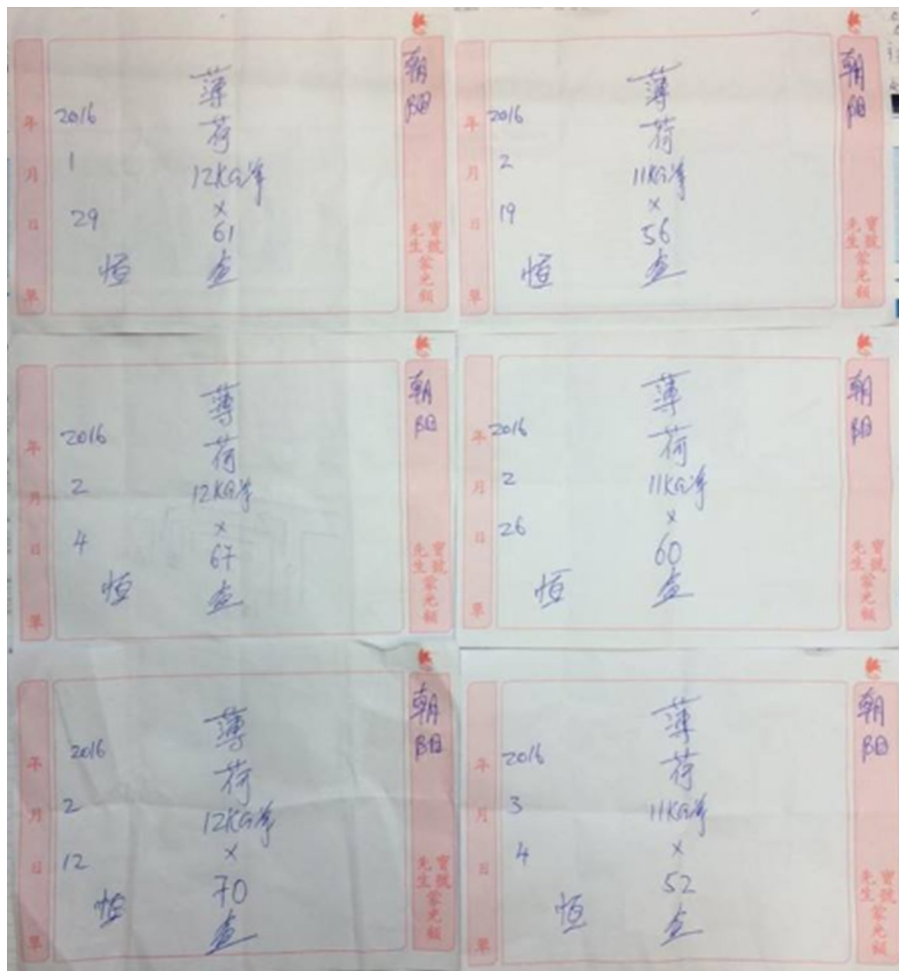

Figure3.5: Daily stock order documentation

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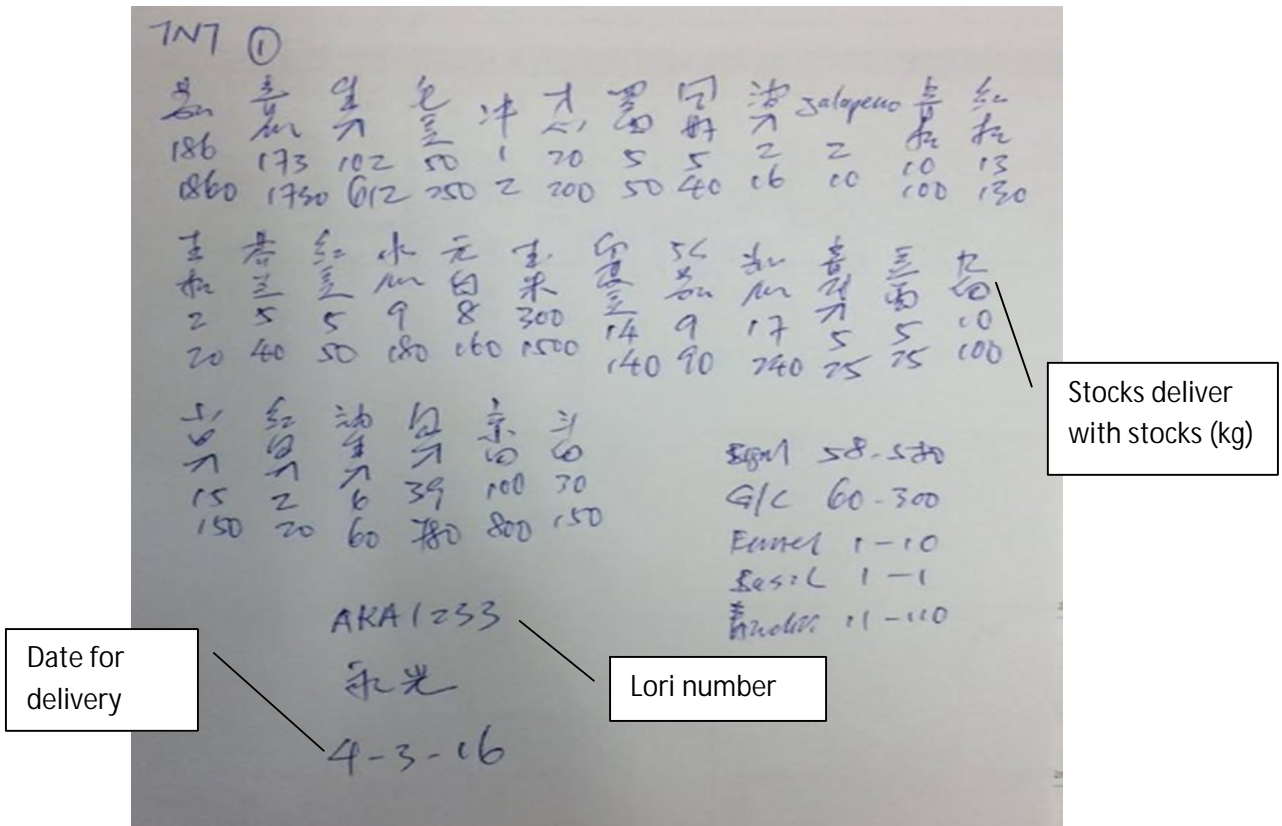Faculty of Information and Communication Technology (Perak Campus), UTAR

Figure 3.6: Delivery Note

Figure 3.7 Monthly Report

Moreover, I spend my time follow my father to his farm. Propose is to let him more clearly explain and give me experience the real planting process and strategies. In this way, it made me more easily to finding out the current agriculture supply chain process in Cameron Highlands.

Moreover, SWOT analysis technique will use to interpret the Strength, Weakness, Opportunities and Threat of the basic requirement for this system.

For agriculture and logistics management system, they must have in order to success not to be doomed to fail, which is sensible and comprehensive collection of both functional and non-functional requirement. A functional requirement describes how the current system should do or provide function, while non-functional requirement place constraints on how the current system will do so.

3.5 System analysis

Functional Requirements

The official definition of 'functional requirement' is that it essentially specifies something the system should do. Typically, functional requirements will specify a behavior or function. (Ulf Eriksson, 2012). They are some typical functional requirement for the proposed system:

- **User Login**

  The system shall let user login to the system by entering correct user name and password. System shall validate the user name and password and drive the user login to the authorization area. To ensure the particular user has permission to perform the particular activity.

- **Forgot Password**

  The system shall let user link to the "forget password page" to retrieve the password. The system will request user key in the user id and user phone number that they requested. After authentication, system will retrieve password for user.

- **Change Password**

  The system shall allow user to change password. System will request the user enter the current password to ensure they are particular user. Then, allow user to key in new password.

- **Contract Management**

  The system able to collect all the data and information of contractors' detail that enters by user. System shall summarize the total stock needed from contractor every day. For example, 800kg of Grade 'A' Cabbages; 1000kg of Grade 'A' Radish; 500kg of Grade 'B' Radish.

- **Harvest Calculation**

  This system shall calculate the probability of the farm's harvest every day. It will base on the previous harvest experience to calculate the harvest every day in farm. Base on difference type of farm, difference type of soil for crop will get difference harvest value. The system will provide a figure that the system calculated to user.

- **Stock Management**

  The system will know the exact value that the stock available in the warehouse. System able to match the contract needs and purchase order from customer with the farms' harvest value, to make sure user having enough stock for supply. After matching, system will provide user a exact figure to let user know how much stock needed, and what type of vegetable needed to order from famer.

- **Pricing Management**

  The system shall support user to make change of the vegetable price and also support difference vegetable price for difference customer. System will store all the price value in the database, therefore user able to retrieve and view the current updated price.

- **Purchase Order Management**

  System able to support buying and selling feature between supplier and customer. Customers are allowed to place order via online; suppliers are allowed to approve or reject the transaction. Moreover, system shall provide the entire business transaction document for each of the process. For example, purchase order, sell order, and delivery note. All entire documents shall store permanently in database.

- **Report Management**

  The system shall let the user choose the type of report need to be generated. The system shall retrieve information from database and generate the report to the user. Report generator is able to support the report generate according to the time period that customize by user.

Non Functional Requirements

The definition for a non-functional requirement is that it essentially specifies how the system should behave and that it is a constraint upon the systems behavior. One could also think of non-functional requirements as quality attributes for of a system. (Ulf Eriksson, 2012).

- **Interface**

  The user interface must be user friendly to navigate the system, and the Graphic User Interface should be appropriate color which can attract user easily. Interface is very important for user to play around the module, therefore the system should using appropriate navigate tools and color.

- **Performance**

  The performance of the system is base on the response time and resources used. Make sure the system is able to use a short response time for a given piece of work. A high speed computerizes system provide a quality work can improve the efficiency of the

business process. For example, we can get a data from the system database with few second. Therefore, manager can get the accurate report from the system.

- **Operational**

  The system should operate in Windows environment and automatically back up at the end of each day. Moreover, the system should use cache memory and session technology to reduce the waste of RAM memory.

- **Accessibility**

  The system can controlling access to the facilities and its assets is fundamental for a safe and secure environment. The access control meets the most stringent security requirements. For example, all the user login to the system must with user name and password, difference staff position have difference module can control. The systems provide encryption and authentication to enable communications between controllers and workstations. The control of accessibility includes:

  - ✓ Easy control of access points, such as database centers, research, module
  - ✓ Flexible access scheduling
  - ✓ Only administrator is permit for setting
  - ✓ Permissions based access to designated security zones
  - ✓ Effective identification of user login

- **Reliability**

  The system is able to provide real data without any error. The data of the system will not be lost, however the power shut down or any unpredictable happened. For example, the system are make sure all the data is store permanently, therefore when manager request for last few years for evaluation, it still available. Moreover, make sure the system can run properly without any programming run time error during operation. If yes, make sure the technical can solve the problem immediately.

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3.6 Hardware & Software Requirements

Hardware and software is a must needed when implement the Agriculture and Logistics management system. Before install the system, technical need to make sure all the hardware and software can be support the Agriculture and Logistics management system.

Hardware environment is use for user input or output the data or information. For example, monitor, keyboard and mouse are basic hardware technology that need for user to input the data, navigate the system. Moreover, printer is also important for Agriculture and Logistics management system, it is because user can convert all the data show in the system to black and white paper, such as printing the report to the manager or print business documentation of the transaction to customer.

Software environment is the term commonly used to refer to support the Agriculture and Logistics management system. A software environment for a particular application could include the operating system, the database system, specific development tools that related to the system.

The technology involved in developing agriculture and logistic system will be using Microsoft C# in constructing the programming part whereas the MySQL will be used in storing databases collected from daily transactions in the system.

Hardware and Software requirement for this proposed system:

Hardware	Software
Processor: Intel (R) Core (TM) i3-2350M CPU, 2.30 GHz	Operating System: Windows 7 Professional
RAM: 2 GB for developer and evaluation use	DBMS Software: MySQL
Hard disk: 50GB for installation	Antivirus: AVG Antivirus 2015
Graphic Card: Intel (R) HD Graphics 3000	Language: C# programming language

PC screen size: 14.0" HD LED LCD	XAMMP Server 3.2.1

Table 3.1 Hardware and software requirement

User needed:

Figure3.8: User Desktop

Desktop for user

- Intel Dual Core Processor (Recommended)

- 2GB RAM

- 350GB HDD

- Monitor

- Keyboard

- Mouse

- Printer

3.7 Agriculture and logistics management system process

After requirement planning phases, this proposed system will separate in several modules to start the prototyping for each module.

- **User Design**

  For user design, all the system requirements, process, inputs and outputs will be analyzed carefully. UML diagrams will used to clarify the logical flow for each of the module, for example, use-case diagram, activity diagram; sequence diagram will be design for each of the modules.

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Moreover, system design will defined what are the hardware and system requirements needed to support the developing of new system. Besides that, the system architecture of the proposed system needed to be defined in order to pass to the next phase for constructing codes.

The next sub-topic will shows all the UML diagrams, to clarify the logical flow for each of the module are showing below:

3.7.1 Block Diagram

Figure 3.9: Block Diagram for Agriculture and logistics management system

Figure 3.8 show the block diagram for agriculture and logistics management system. It shows overall how the system performs. Moreover, diagram 3.9 below shows more detail about the Agriculture and logistics management system process.

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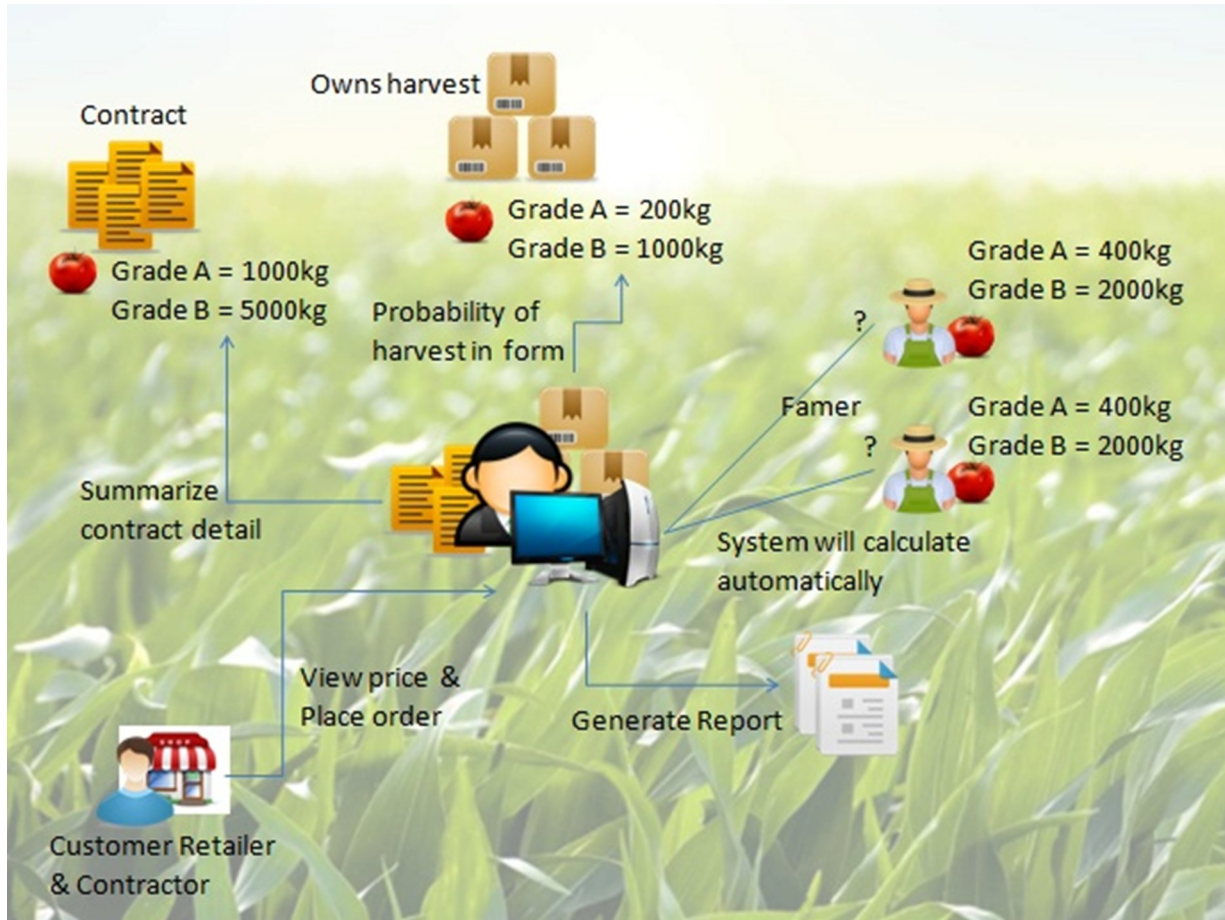
Figure3.10: Block Diagram for Agriculture and logistics management system with more detail information.

3.7.2 Use Case Diagram
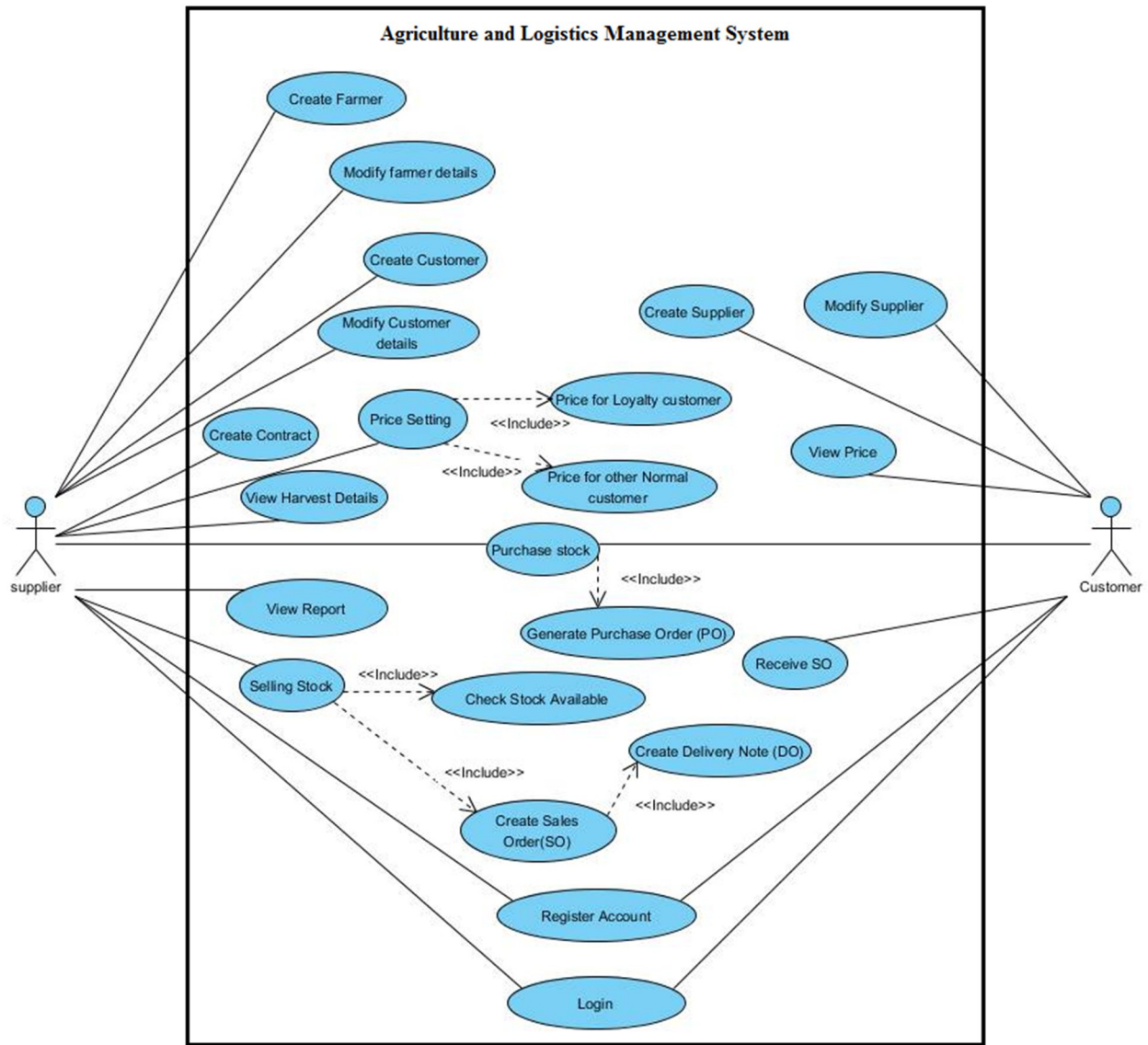
Figure 3.11: Use-case diagram for agriculture and logistics management system

This diagram shows which action that the user is able to perform in the system. Figure 3.11 shows that the logistics firms' user able to create contract base on the contracted need, create sales order after receive purchase order generate by the customer also, send the print delivery note to customer. Only supplier is allow to set price for customer user to view the current updated price, Before perform action, user must register and login to the system.

45

3.7.3 Activity Diagram

Create Contract Information

START

Enter Contractor Personal Information

Enter item detail

[Add More item]

[No More item]

Confirm Contract Detail

Save Contract Detail to Database

END
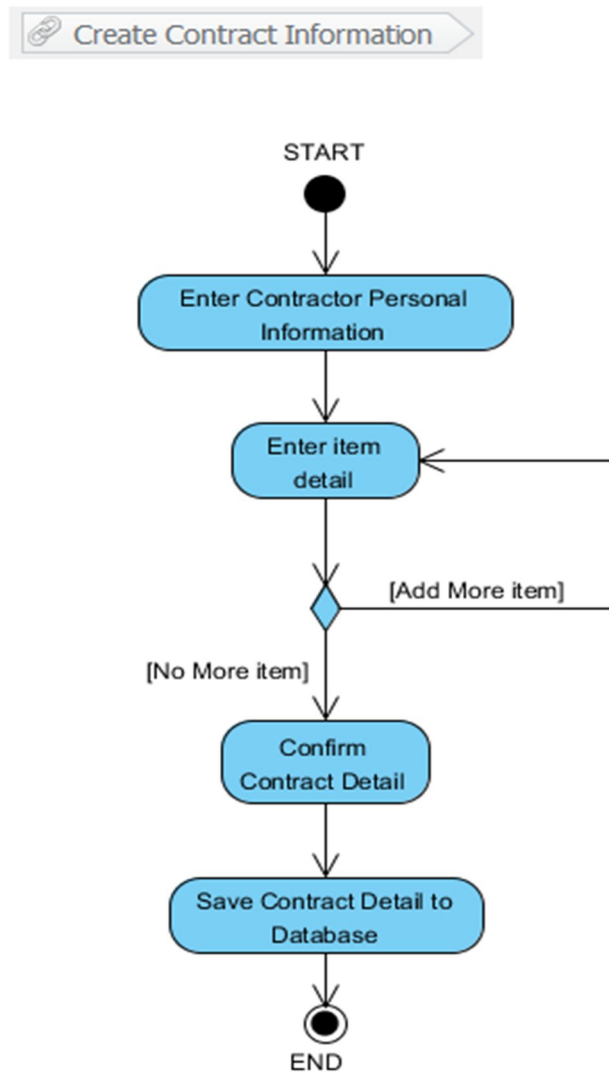
Figure3.12: Activity diagram of create contract information

This diagram show the whole process of create contract. First user need to enter the personal information about the contractor, for example, company id, company name, contact detail and etc. the contract id will automatic generate by system. Next, select the type of vegetable, the quality of the vegetable and enter the value need that confirm by the contractor. Moreover, save the contact detail into the database.
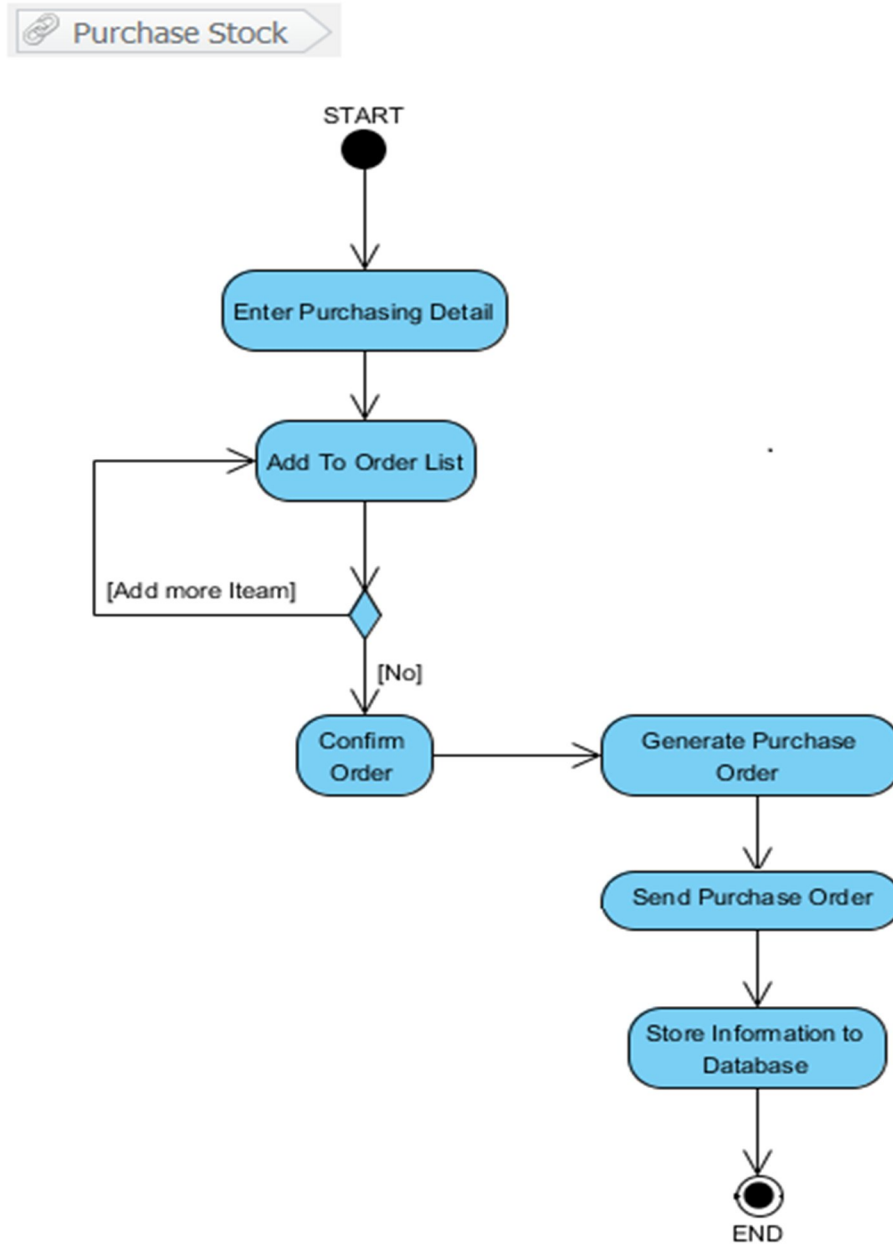
Figure 3.13: Activity diagram of purchase stock

This diagram shows the process of purchase stock by using Agriculture and logistics management system. After confirm add the stock item into the item list, system will automatic generate purchase order. Purchase order will be sent to supplier and store the information into the database.
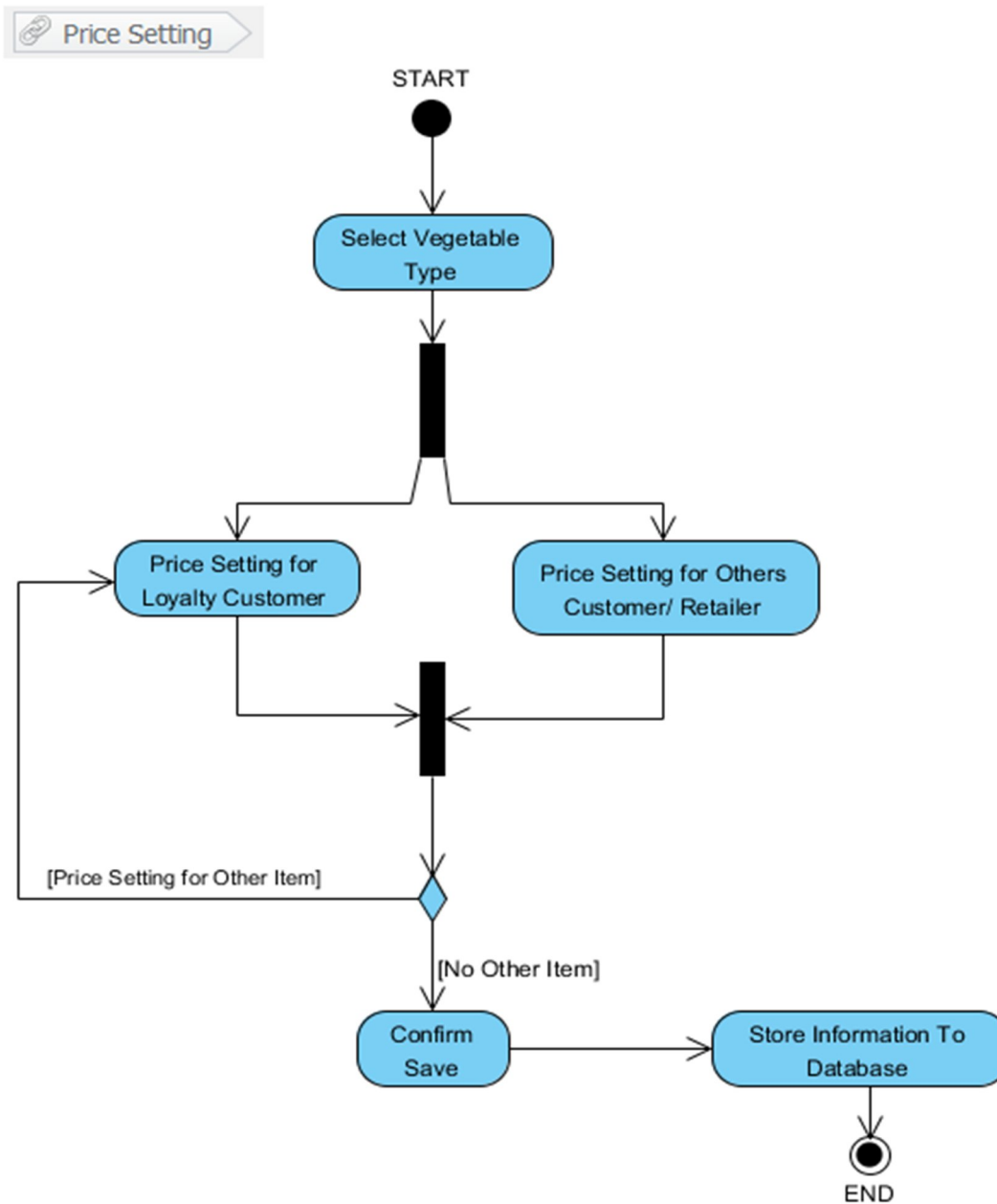
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Figure 3.14: Activity diagram of price setting

Figure3.12 shows the process of user setting price for vegetable. User able to set two type of price simultaneously, there are price for loyalty customer and other customer and retailer. After set all the price, user conforms save the data into the database.
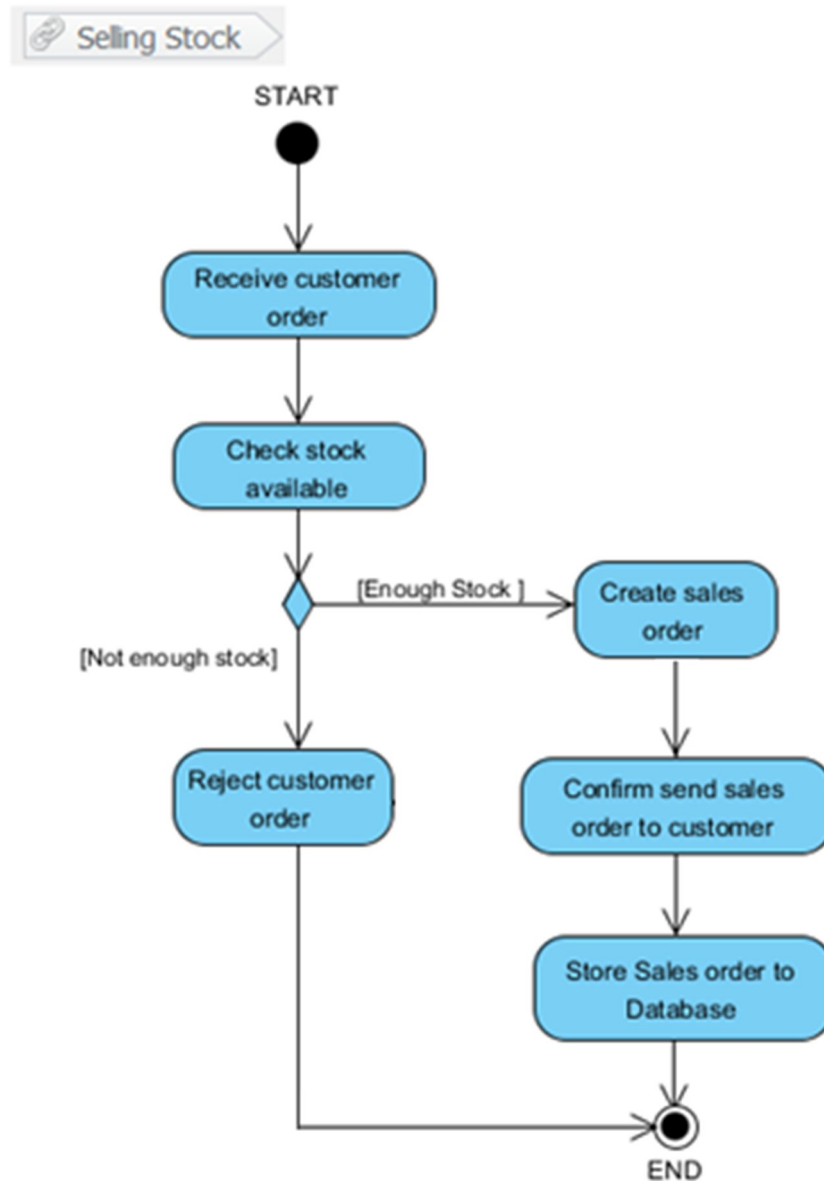
Figure 3.15 Activity diagram of selling stock

First, user will receive order from customer, then user need to check their stock available in inventory. Before, continue the process of sell order, user need to check the customer credit balance. If the stocks are not enough or the customer credit balance is not approved the selling process will be stop or reject. If not, sell order will be generate and send to the customer. Lastly, save sale order information to the database.

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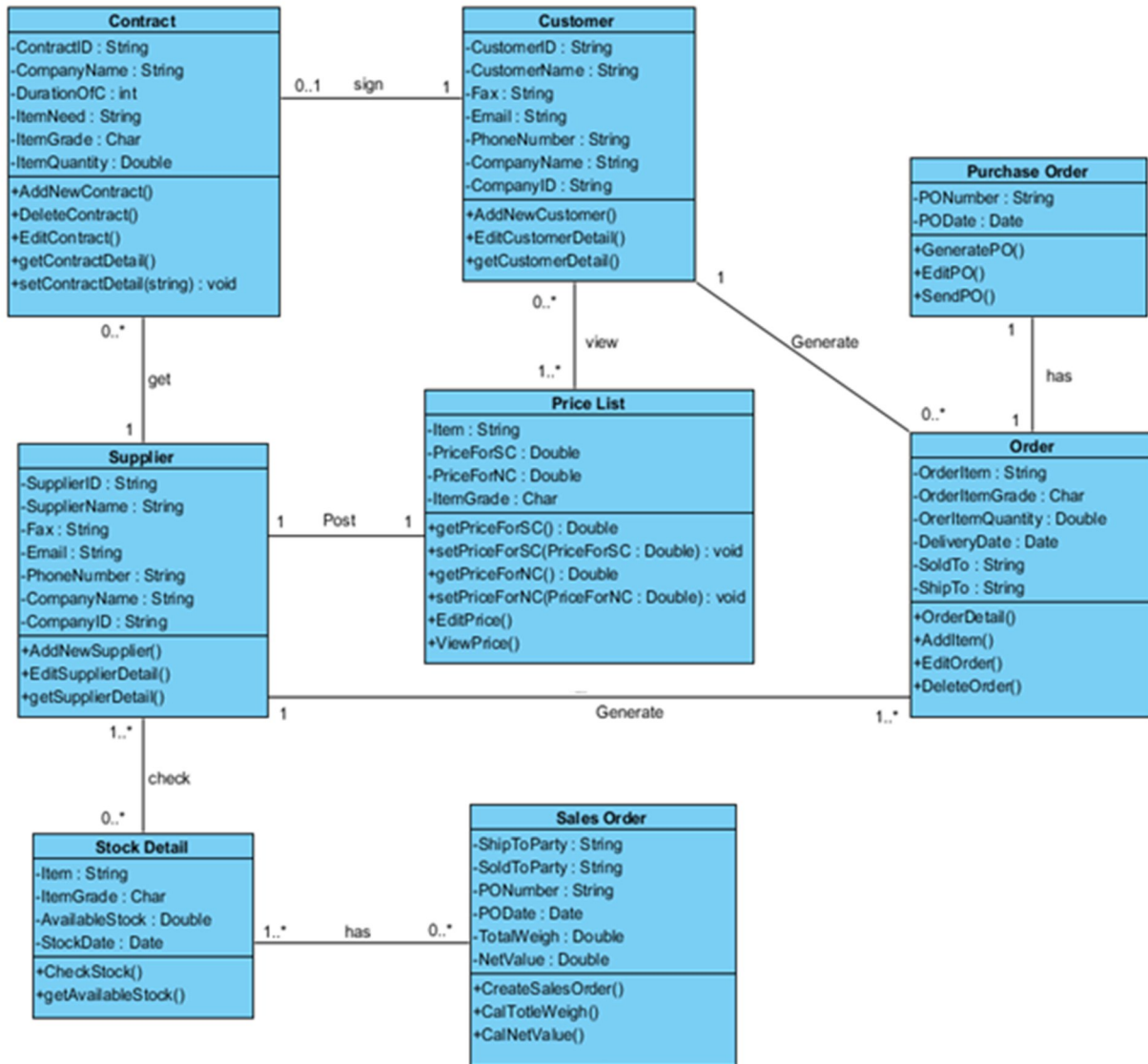
3.7.4 Class Diagram

Figure 3.16 Class diagram for Agriculture and Logistics management system

In figure 3.17 shows that, each customer may sign one or zero contract, but one contract must be sign by a customer. Each of the contracts must get from one supplier, a supplier get zero or more contract. Price list is posted by supplier; one supplier can post one price list a day. Customer can view one or more price list to make price comparison. Customer and supplier can generate one or more order; an order must be generated by one and only one customer or supplier. An order has

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one and only one purchase order to ensure the purchase order process. Moreover, supplier may check the stock detail available in stock before generate the sales order. Supplier may check zero or more item in the inventory. Sales order must have at least one or more item in the sales order. Before send out the sales order, supplier needs to check the customer credit balance to approve the following transaction.

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CHAPTER 4: SYSTEM DESIGN ON AGRICULTURE AND LOGISTICS MANAGEMENT SYSTEM

4.1 Graphical User Interface Design

After gathering all the information needed for this project, some design of the agriculture logistics management system interface has designed. Following will show some Graphical User Interface of the system.

Figure4.1: User registration interface

4.1.1 User Registration Interface Design

After user buy the Agriculture and Logistics Management system, our system admin will register one account for the particular company.

Admin will key in all the information about the particular company, Company name, Position for the particular company, User Name, Fax number, Mobile number, Email address, and user Company address. After that, system will generate a user login identity number and request a new password from user that user prefer Last, click the **save button** to save the new user information to the database.
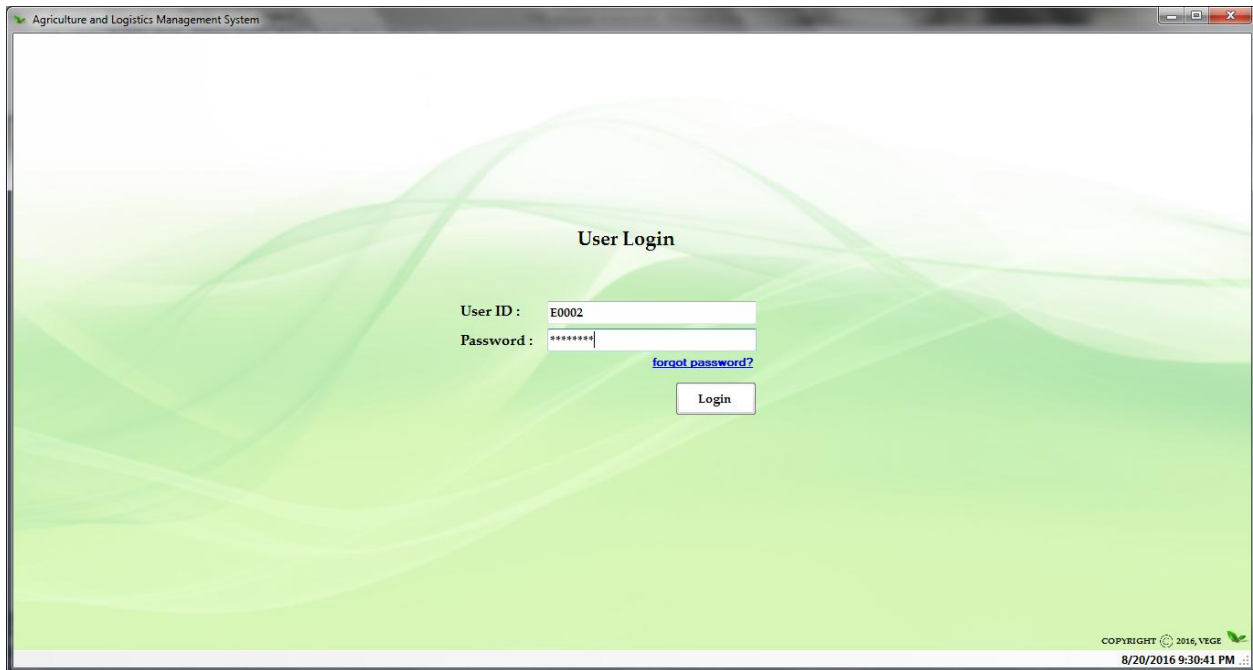
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Figure4.2: User Login Interface

4.1.2 User Login Interface Design

This user interface is used to validate the user is the authorized user.

User need to key in their User ID and Password they registered. Then, click the Login button login to the menu page. If the User ID or Password is wrong message box will show out to the user and not allow for the user login to the menu page.

Blue color forgot password link is allowing users to click and link the user to forgot password page to retrieve the password.

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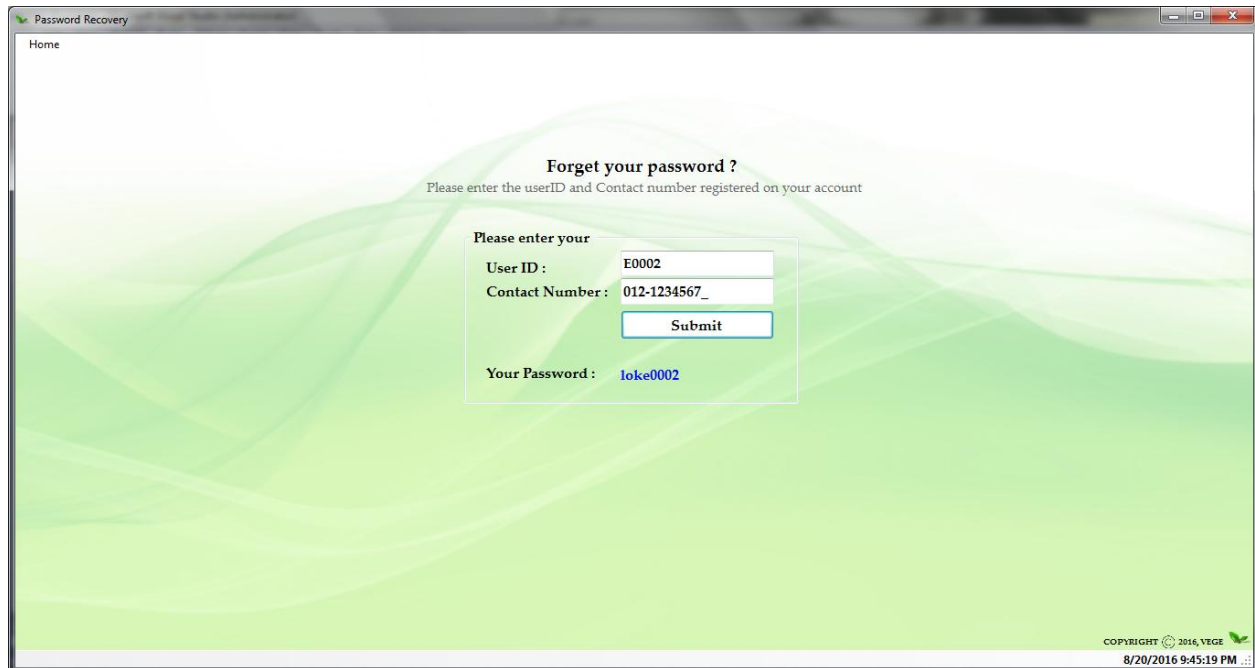
Figure4.3: Forgot Password Interface

4.1.3 Forgot Password Interface Design

This user interface is allow user to retrieve password by using the user ID and contact number that during user registration.

User need to key in their one User ID and contact number that during user registration, then click the submit button to retrieve password. System will check the validation by using contact number and user ID to make sure it is a particular user. The password retrieved will show out with blue color text.

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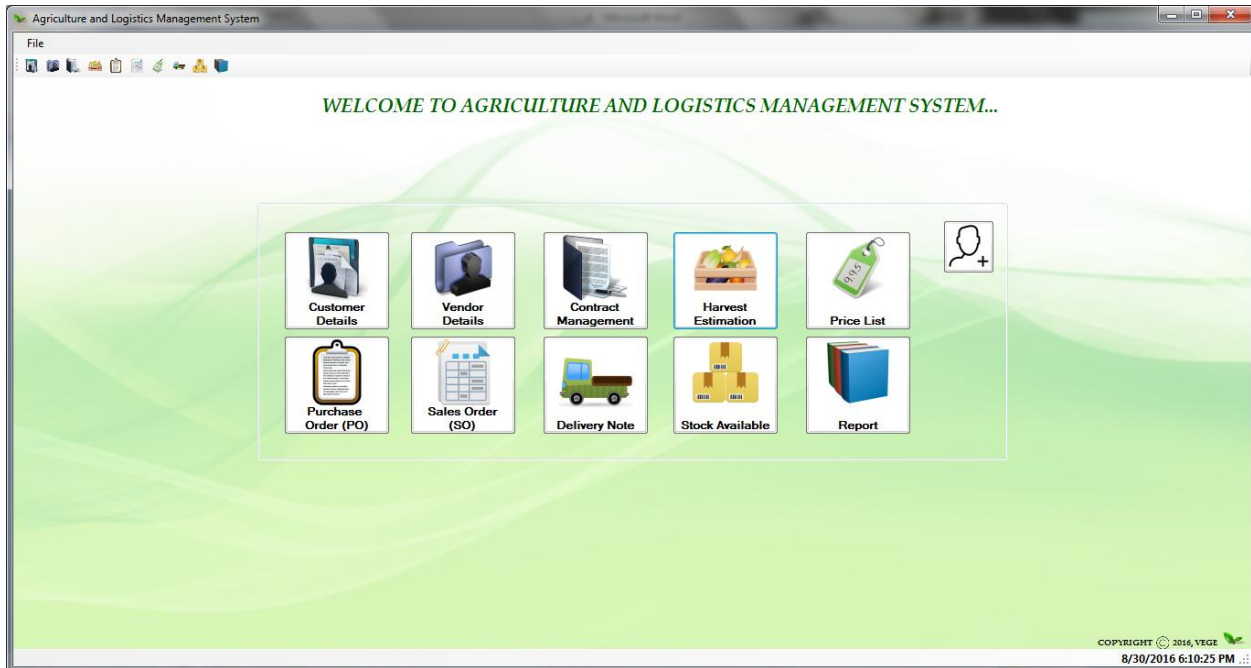
Figure4.4: Menu page (Supplier) Interface Design

4.1.4 Menu page (Supplier) Interface Design

This user interface is a main page that allow user to navigate from one function to another function. The top right button in the menu is for user to confirm vendor to approve or deny them to view price list. In the tool strip bar in the top of the page is also having the same function for the button. First icon is navigate user to **Customer Details**, second is to **Vendor Details**, third icon is to **Contract Management**, fourth is to **Harvest Estimation**, fifth is to **Purchase order(PO)**, sixth is to **Sales order(SO)**, next will navigate to **Price List**, then to **Stock Available** and the last icon is navigate to **Report**.
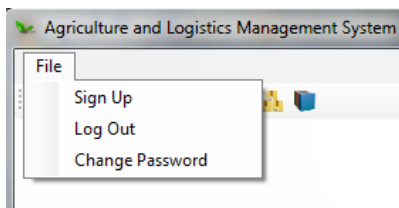

Figure4.5: Top right menu strip

The **top right menu strip** is navigate user to the sign up, log out and change password page.
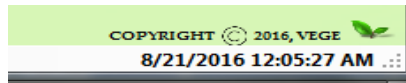
55

Figure4.6: Tool strip for date time

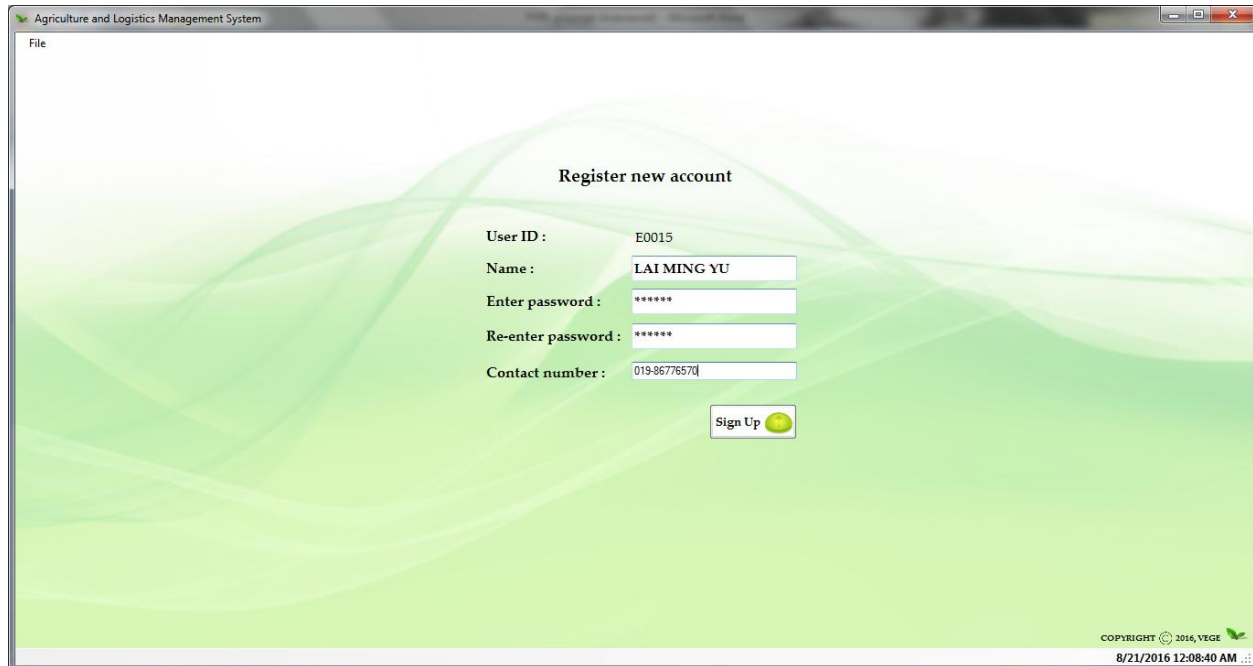The bottom right of the menu page will show the date and time.

Figure4.7: Register new account Interface Design

4.1.5 Register new account Interface Design

This user interface is allows the user register new account for their workers that work in the same company.

Fist, the **User ID** is provided by the system, after that, user need to enter the Name of the user, password and contract number to sign up new account. The enter password and Re-enter password will be validate to make sure user enter the same password. Also, the password must be containing alphabets and characters. Else, it will be show the 🛑 error provider beside the text box. Last, click the **Sign Up button** to sign up new user for the company.
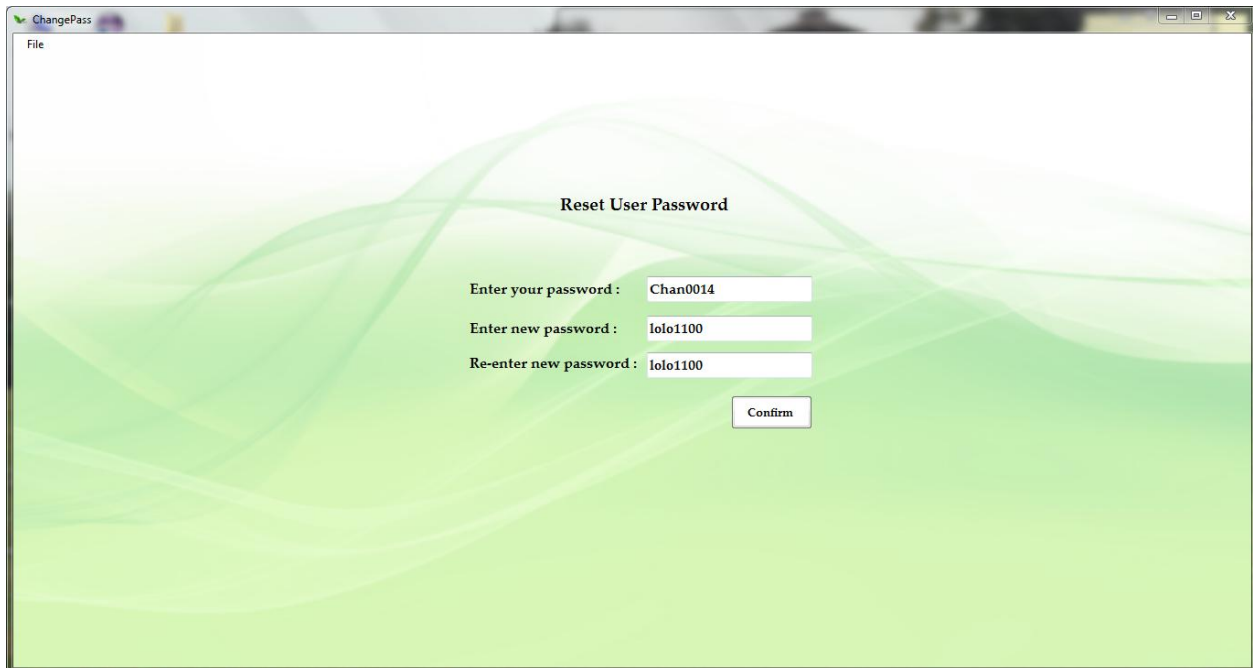
56

Figure4.8: Reset User Password Interface Design

4.1.6 Reset User Password Interface Design

This user interface is for users to reset their own password.

User need to type in their resisted password first then enter the new password they want. After then click the **Confirm button** to submit the requirement.
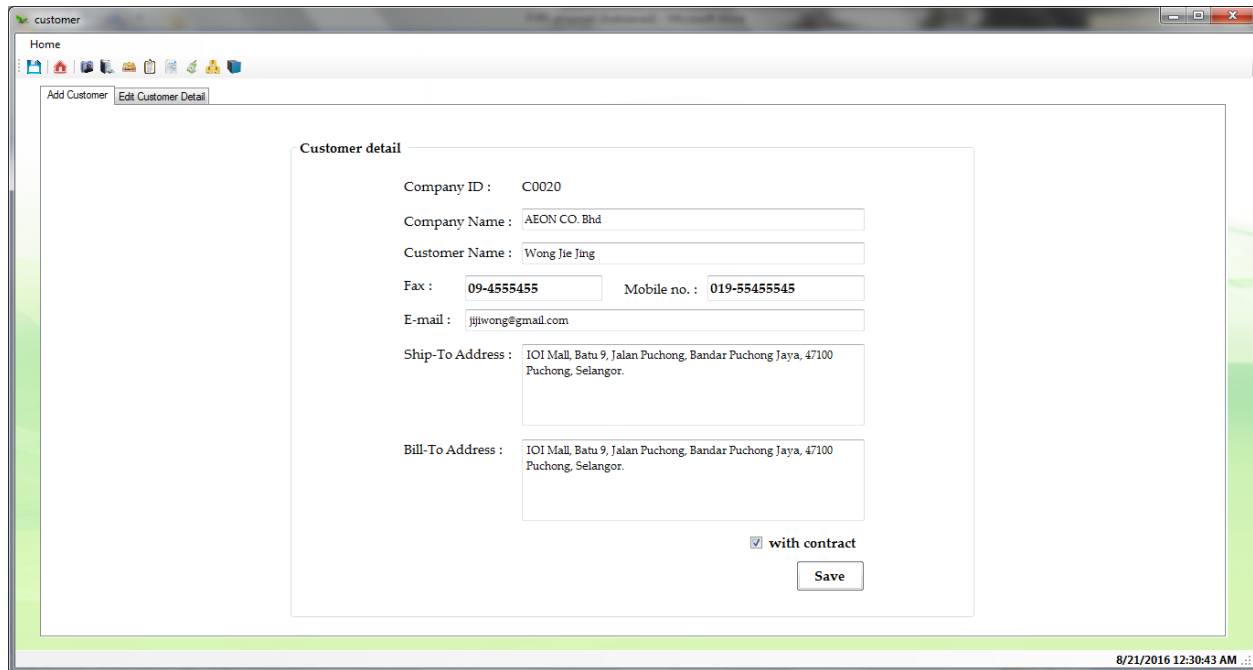
Figure4.9: Customer details management Interface Design (First Tab)

4.1.7 Customer details management Interface Design

This user interface is for user to register new customer for their company. Also, able to edit or delete the customer details.

First Tab: allow user to key in customer details. First, the company id for the customer will auto generate by the system. **Ship-to address** is the address to receive the stock. **Bill-to address** is the address to make payment. For the **check box** above the save button ☑ **with contract** , if the check box is checked that means this customer will make contract will supplier. After that system will drive the user to the contract page.
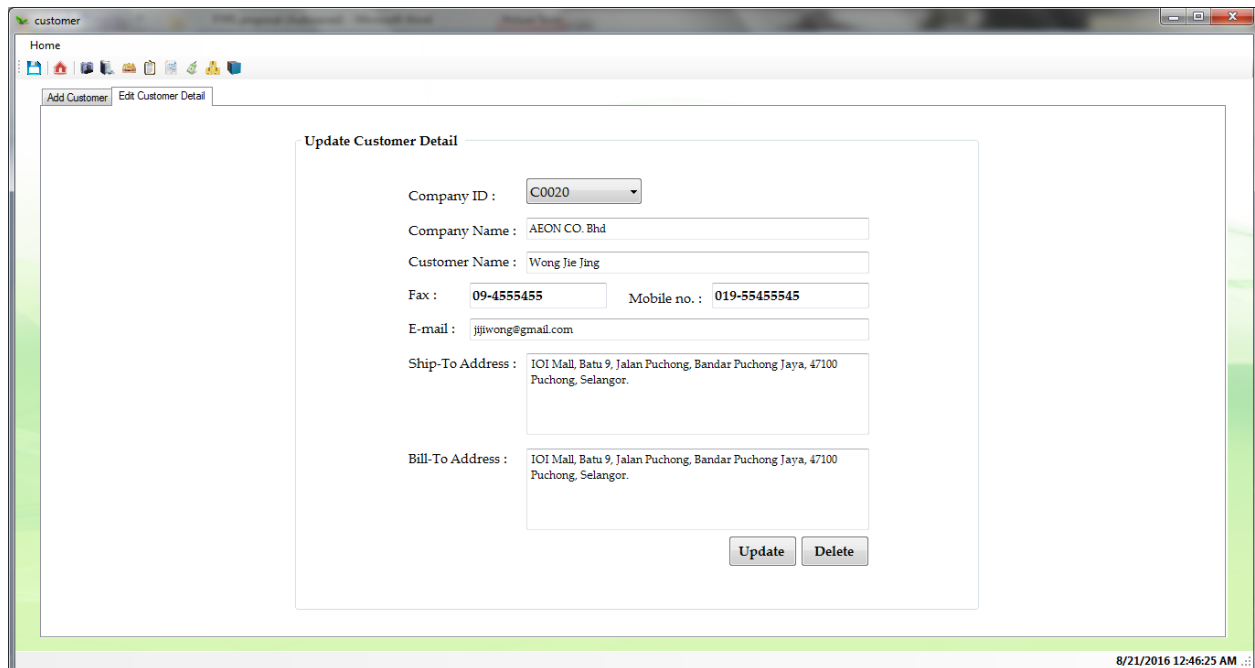
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Figure4.10: Customer details management Interface Design (Second Tab)

Second Tab: allow user to edit customer detail.

First user need to select the specific customer in the **combo box** provided by the system. After, user can choose to delete it by click the **Delete button** or edit the details about the customer and click on **Update button**.

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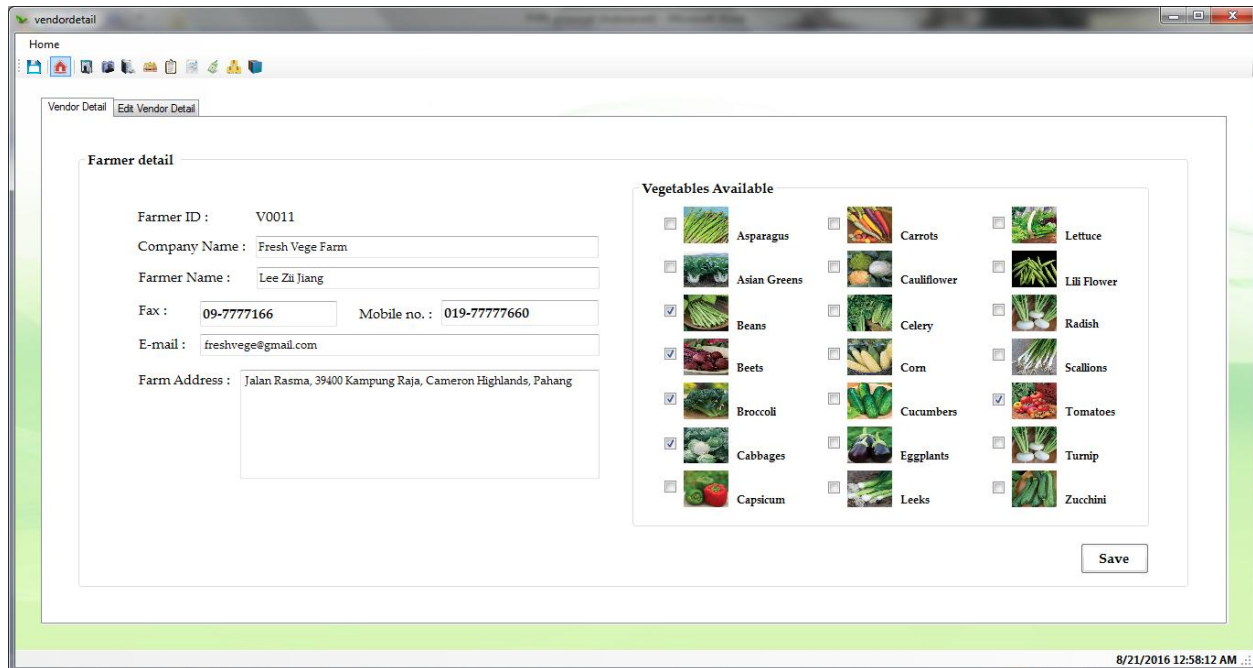Faculty of Information and Communication Technology (Perak Campus), UTAR

Figure4.11: Farmer details Interface Design (First Tab)

4.1.8 Farmer details Interface Design

This user interface is for user to register new farmer that cooperate and supplier vegetable with their company. Also, able to edit or delete the farmer details.

First Tab: allow user to key in farmer details. First, the farmer id for the customer will auto generate by the system. User need to key in information about the particular farmer, and select what vegetable available from the farmer. Detail will be save after click the **Save button**.
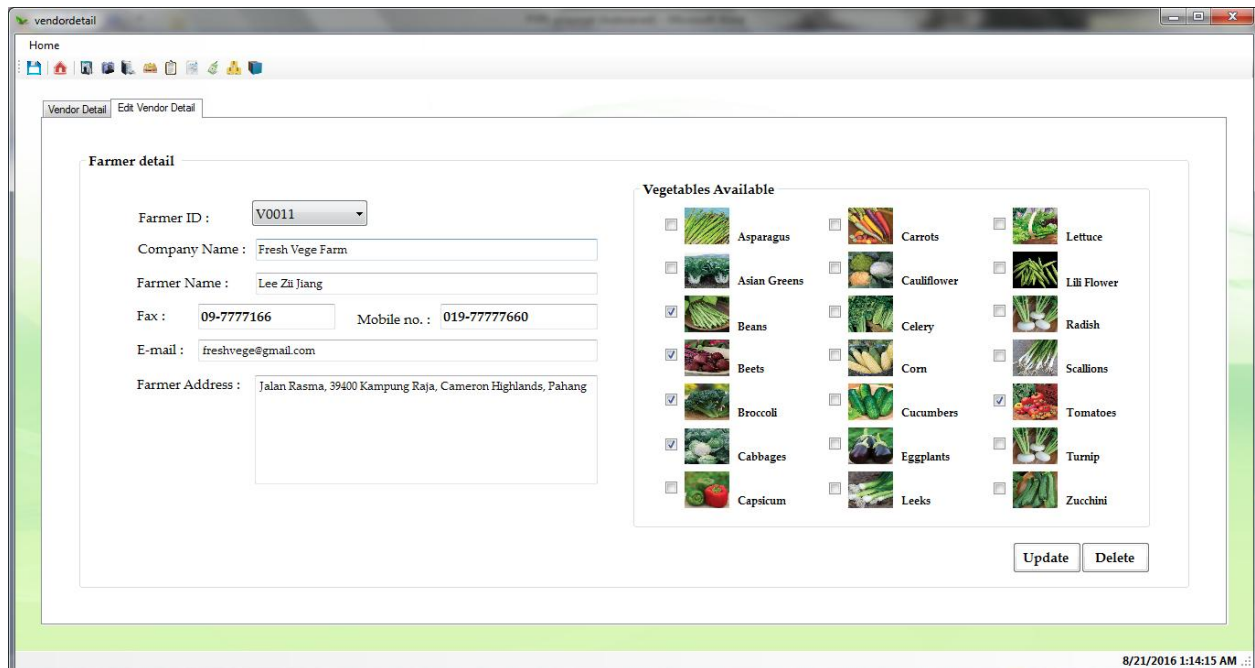
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Figure4.12: Farmer details Interface Design (Second Tab)

Second Tab: allow user to edit farmer detail.

First user need to select the specific farmer in the **combo box** provided by the system. After, user can choose to delete it by click the **Delete button** or edit the details about the farmer and click on **Update button**.
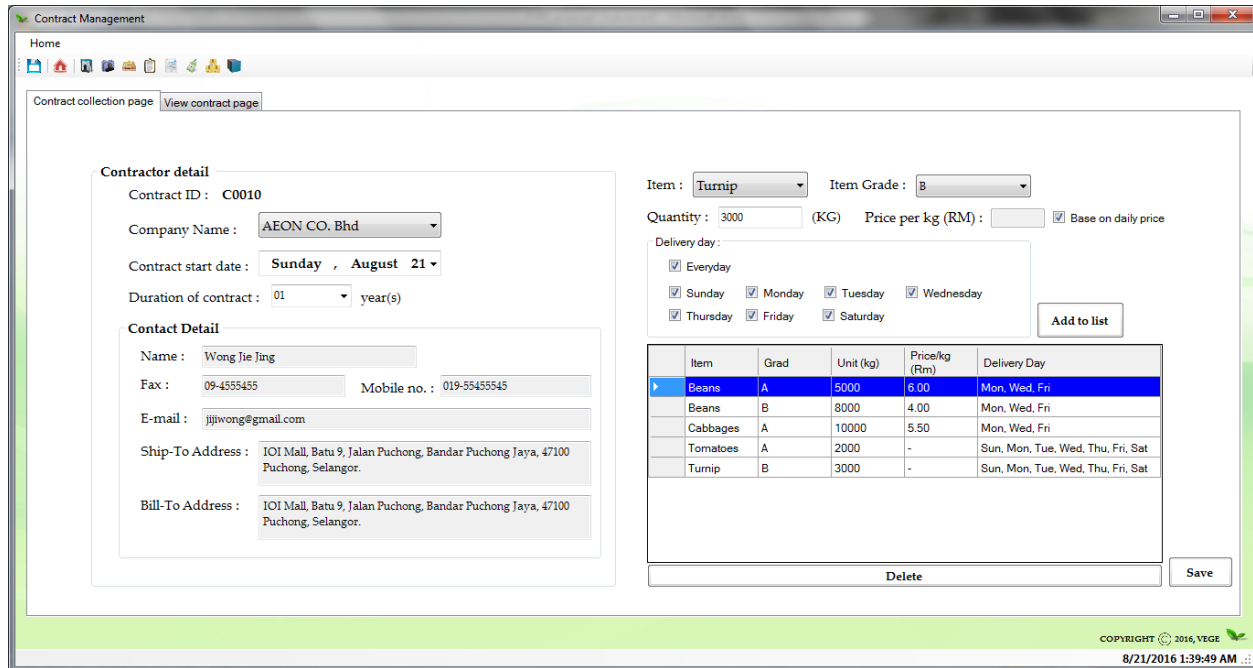
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Figure4.13: Contract Management Interface Design (First Tab)

4.1.9 Contract Management Interface Design

This user interface is for user to make enter the information about the contract detail within the contractor. Also, it able for user to view the overall vegetables needed for the particular contractor.

First Tab: In the user interface, system will provide user **Contract ID** for the particular contract detail. After that user able to select the **company Name** from the combo box that signed up in Customer Details page. Select the select box for specific **contract start date** and **contract duration** for the contract.

Next, user need to select the **vegetables** from the combo box, select the **vegetable grade** and enter the **quantity** needed. After then, user need to choose for **price** is follow the daily price or fixed price base on their deal with the contractor Price per kg (RM) : ☐ Base on daily price .Then, select the **ship day(s)** of the particular product base on their deal with the contractor. Click the **Add to list button** to add item to the list.

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If, user entered wrong value, user is allow to select the row in the datagridview and click the **Delete button** to delete the record. And, using the **Save button** to save the contract information to the database.
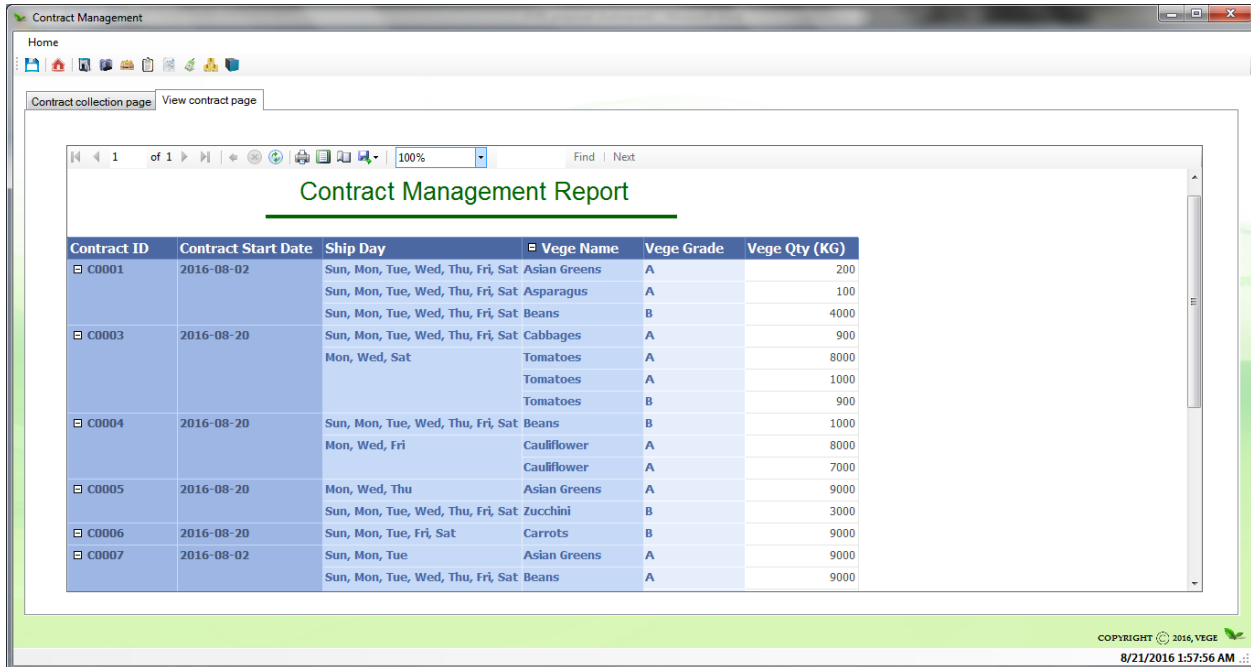

Figure4.14: Contract Management Interface Design (second Tab)

Second Tab: for user to view the overall and summarized table for the vegetables needed for the particular contractor.

Users are allows to click on the **plus button** to expend the view of the report.

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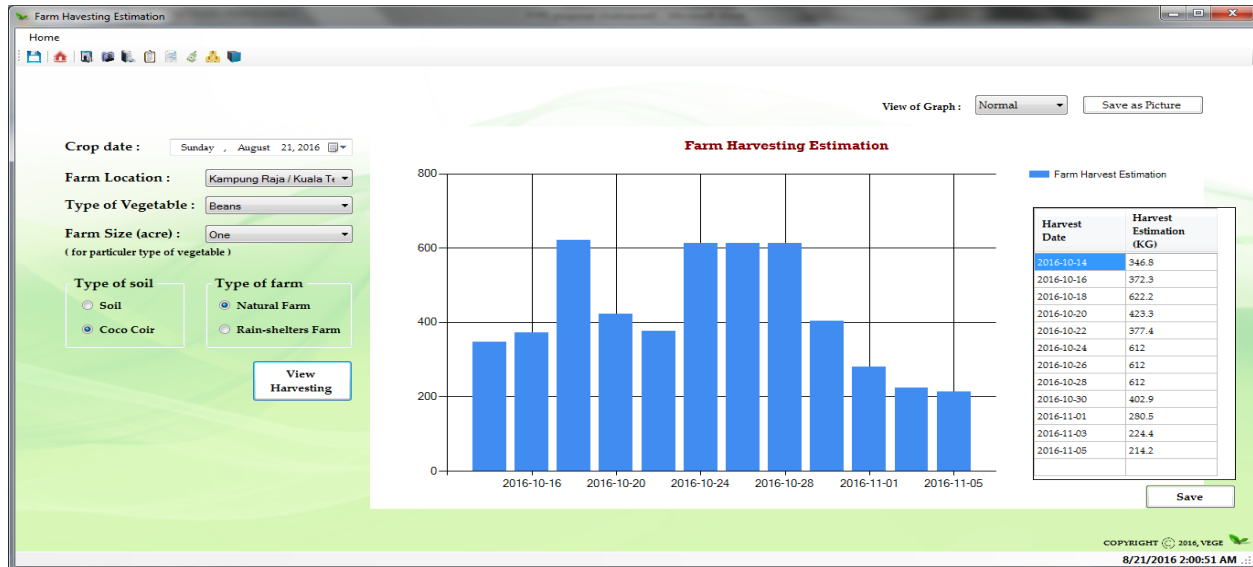Faculty of Information and Communication Technology (Perak Campus), UTAR

Figure4.15: Farm Harvest Estimation Interface Design

4.1.10 Farm Harvest Estimation Interface Design

This user interface is for user to enter when their crop date is and crop details in to the system to calculate the harvest estimation in the specific date.

First, user need to select the **Crop date** from the date time picker base on when is the farmer start their crop. User need to select the **farm location** in the combo box, it is because difference location have difference weather so it will affect the harvesting. The location in Cameron highlands will separate to three part: Kampung Raja / Kuala Terla, KeaFarm / Brinchang / Tanah Rata, and Ringlet / Bertam Valley. After, select the **type of vegetable** that farmer crop. Then, select the **farm size (acre)** base on the size that farmer crop. And, click the radio button to select the **type of soil** and **type of farm** for the particular crop, and click the **view harvest button** to calculate the harvesting. And show the detail in the graph.

This combo box is allow user to view difference type of graph, it include Normal, Line, Splint and Bubble. Then, beside the view of the graph is a button **to save as picture** – to save the graph as a picture for refers purpose.

The **Data grid view** show beside the graph is include the information of harvest date and harvest estimation.
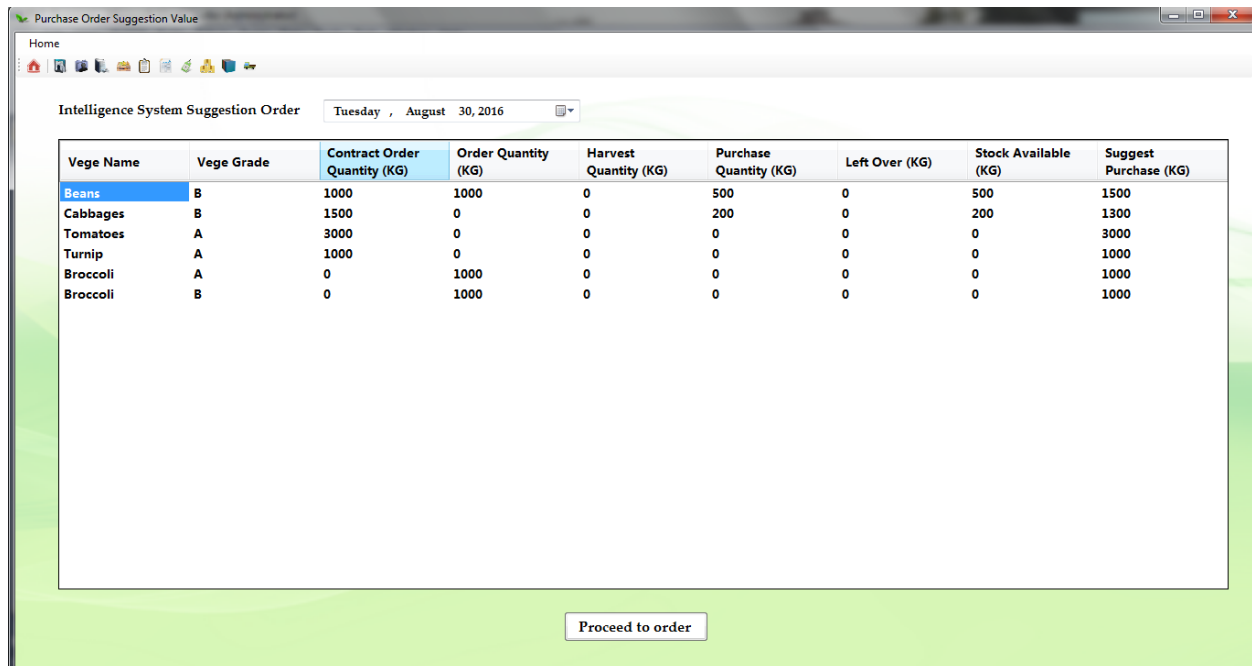
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Figure4.16: Suggesting of purchase order Interface Design

4.1.11 Purchase Order (PO) Interface Design

This user interface is for user to make purchase order, before users make order, system will show a list of suggestion of purchase order to user.

In figure4.16 show user the suggestion of purchase order, user can use the **date time picker** to choose the specific date to view the suggestion. After, user can click on the **Proceed to order** button to purchase order page show in figure 4.17.

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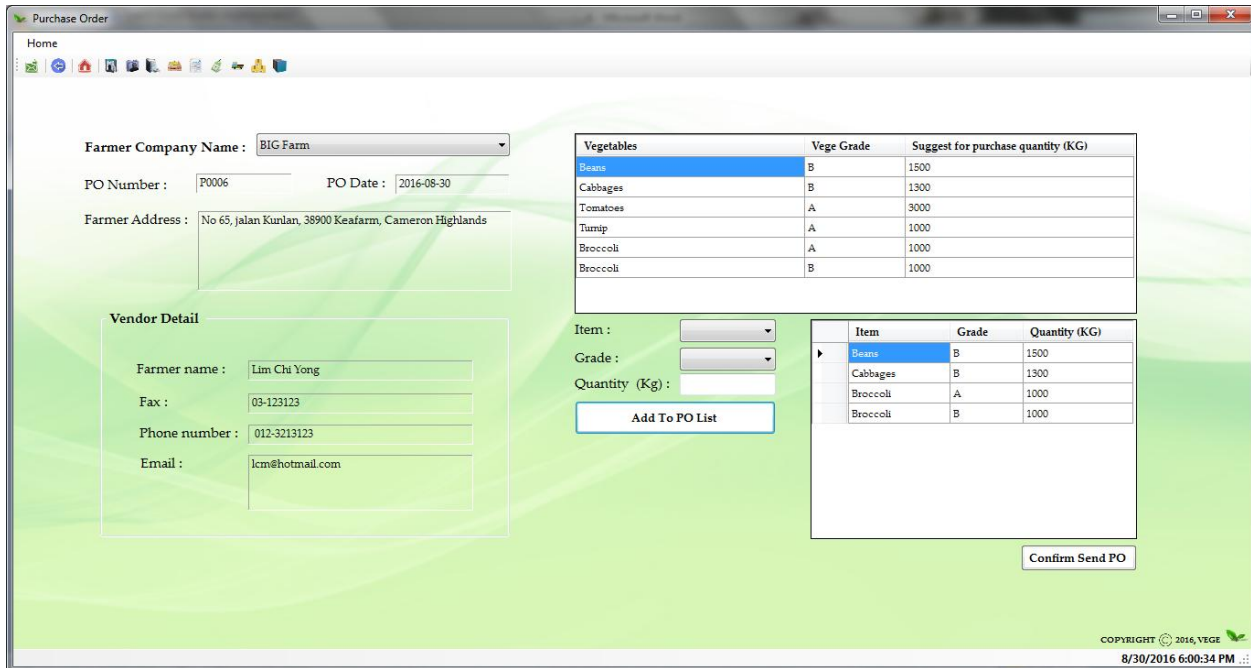Faculty of Information and Communication Technology (Perak Campus), UTAR

Figure4.17: Purchase Order (PO) Interface Design

This page is for user to make order. First user need to select the **Farmer company name** in the combo box. The **purchase order and purchase number** will generated by system. User able to follow the data grid view suggestion for purchase to select the **item**, **item grade** and enter the **quantity value** add click **add to PO list** button to add information into the data. Last, click on the **confirm send PO** button to send PO to the farmer.
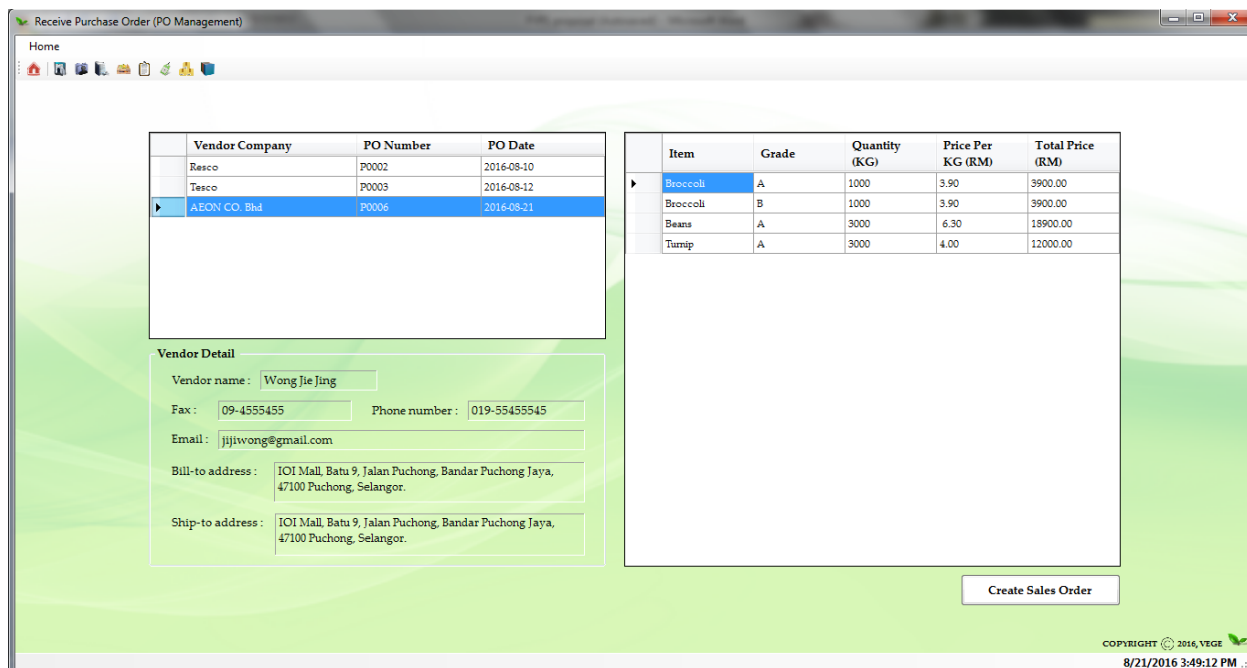
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Figure4.18: Sales order (SO) Interface Design (First page)

4.1.12 Sales order (SO) Interface Design

This user interface is for user to manage the purchase order send by the customers. Also, reply the customers with sales order.

First, user need to select the specific PO that send from the customer in the **first Data grid view** show in the top right in the page. Then, all the details about the PO will be show out in the screen. The **second data grid view** in the right hand side of the page is shows what vegetables, vegetable grade and quantity they want. After, click the **Create sales order** button link to the page show below:

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Figure4.19: Sales order (SO) Interface Design

User can review the stock available in this page, and enter the **quantity approve to sales**, the **total price** for each of the vegetables will be calculated by system after user enter the quantity. The **total weight** and **net value** will be calculated automatically by system. The Sales order will be send after user click on the **Confirm Send button**.

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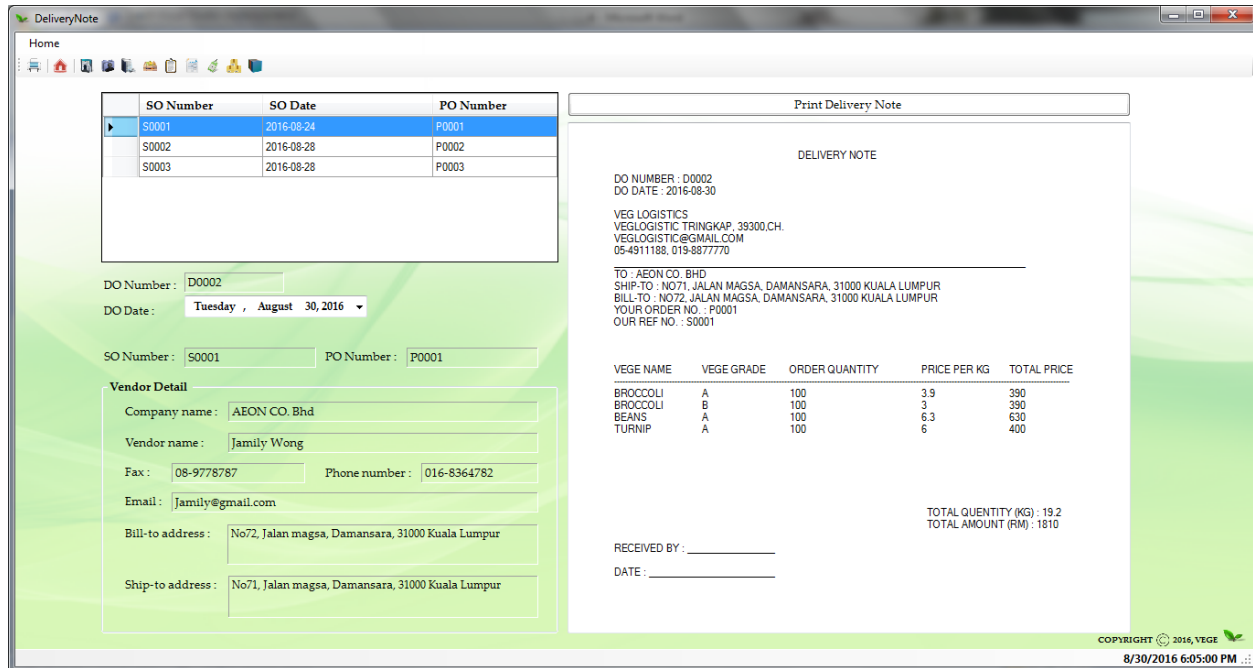
Figure4.20: Delivery Note (DO) Interface Design

4.1.13 Delivery Note Interface Design

This User interface for user to generate and print the delivery note. User **can select the data geid view** information to specify which delivery note need to print. Then click on the **print delivery note** button to print out the report.
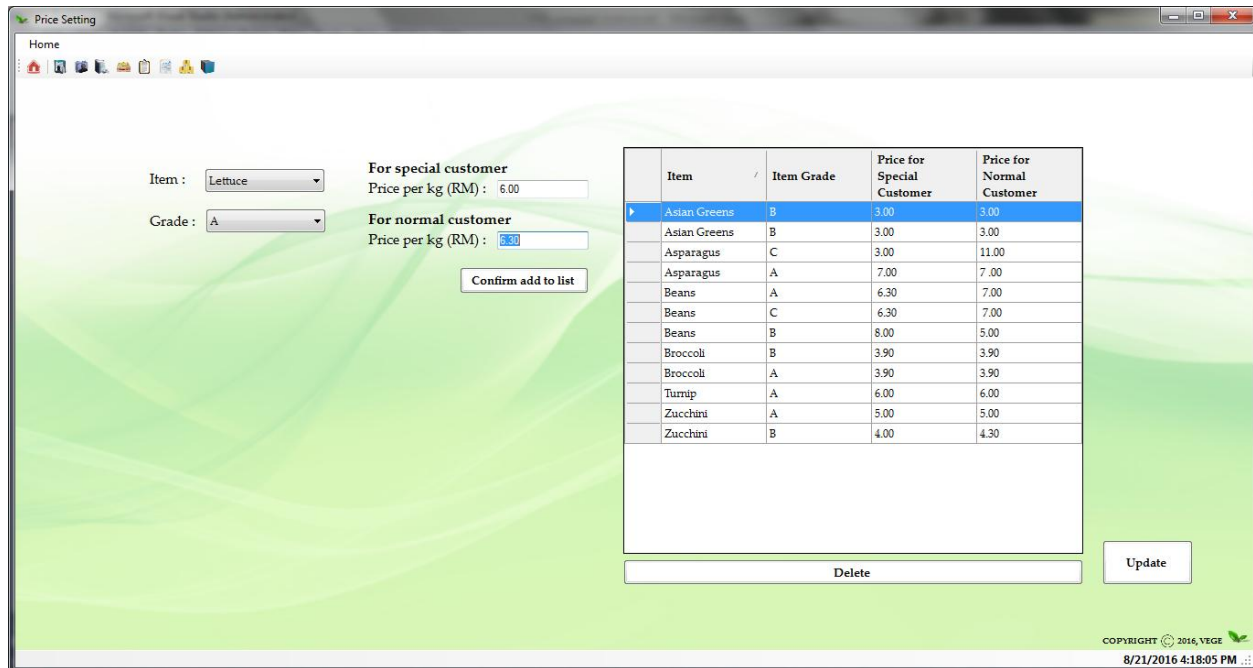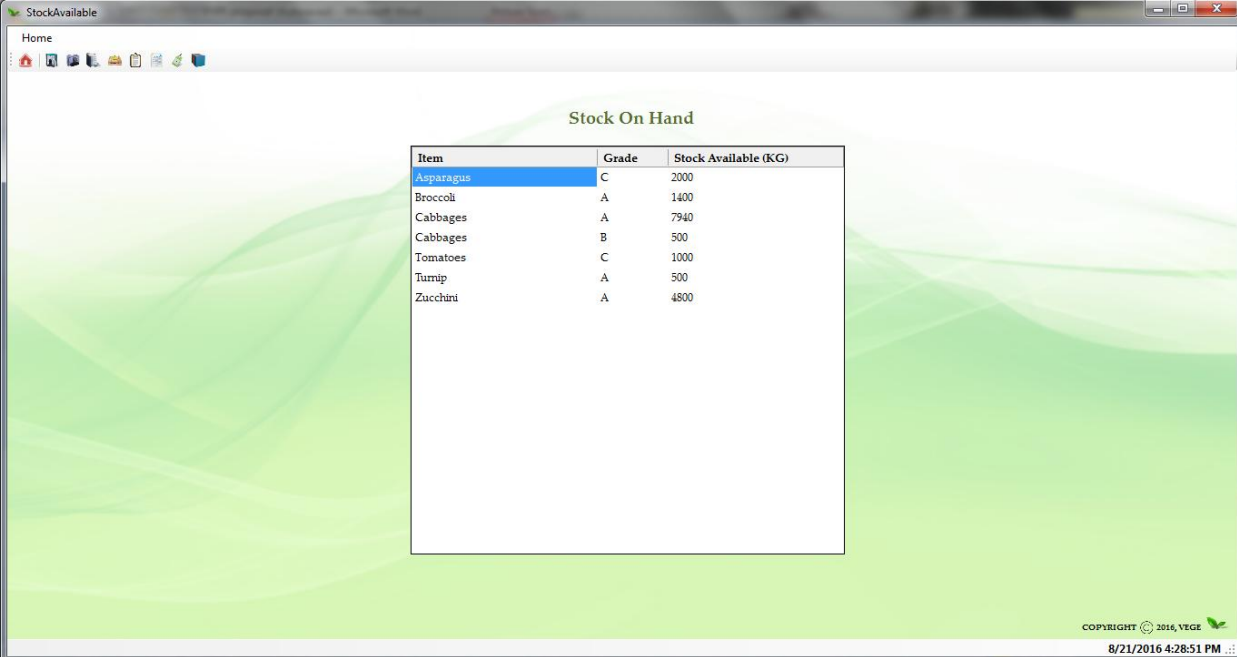
Figure4.21: Price List Interface Design

4.1.14 Price List Interface Design

This page is for supplier to set the price, edit the price for vegetable every day. Therefore, customer can easy view the price.

After load in to this page, system will retrieve back the latest information from database; therefore, user can easily change the price without click the item, grade. Also, user can be selecting the row and click **delete button** to delete it, if the supplier do not have the particular vegetable. But, if user need to add need vegetables, user need to select the **item combo box** and **grade combo box** then, click **confirm add to list button** add vegetable in to the list. Lastly, users need to click **Update button** to update the items price.

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Figure4.22: Stock Available Interface Design

4.1.15 Stock Available Interface Design

This user interface is for user to view back the stock available in the warehouse with the specific vegetables, vegetables grade and stock available (KG).

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4.1.16 Report Interface Design
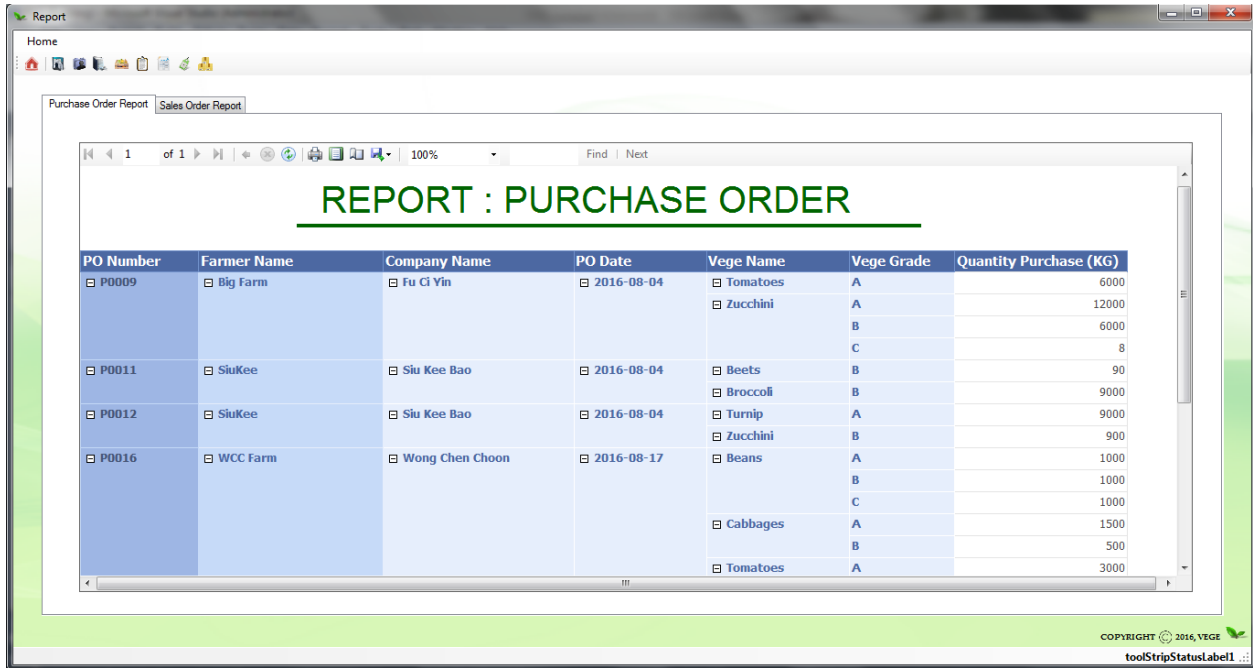
Figure4.23: Purchase order report interface design
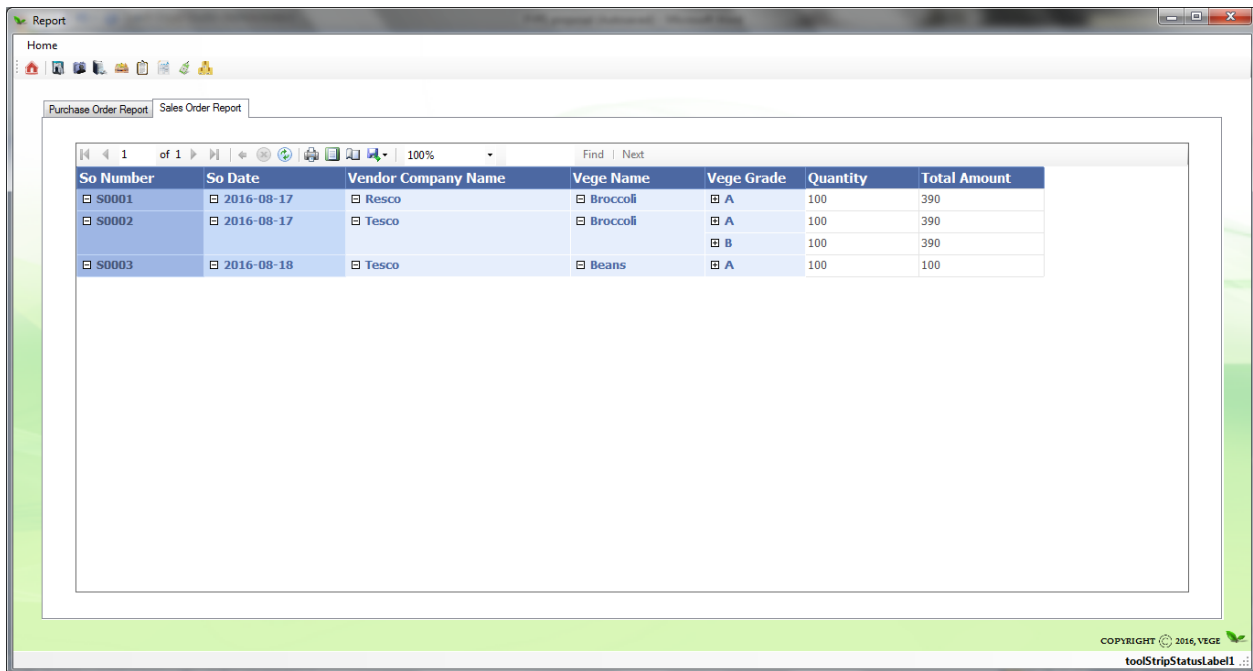
Figure4.24: Sales order report interface design

This user interface shows the report of purchase order and sales order, user able to select the small icon to expend the report detail.

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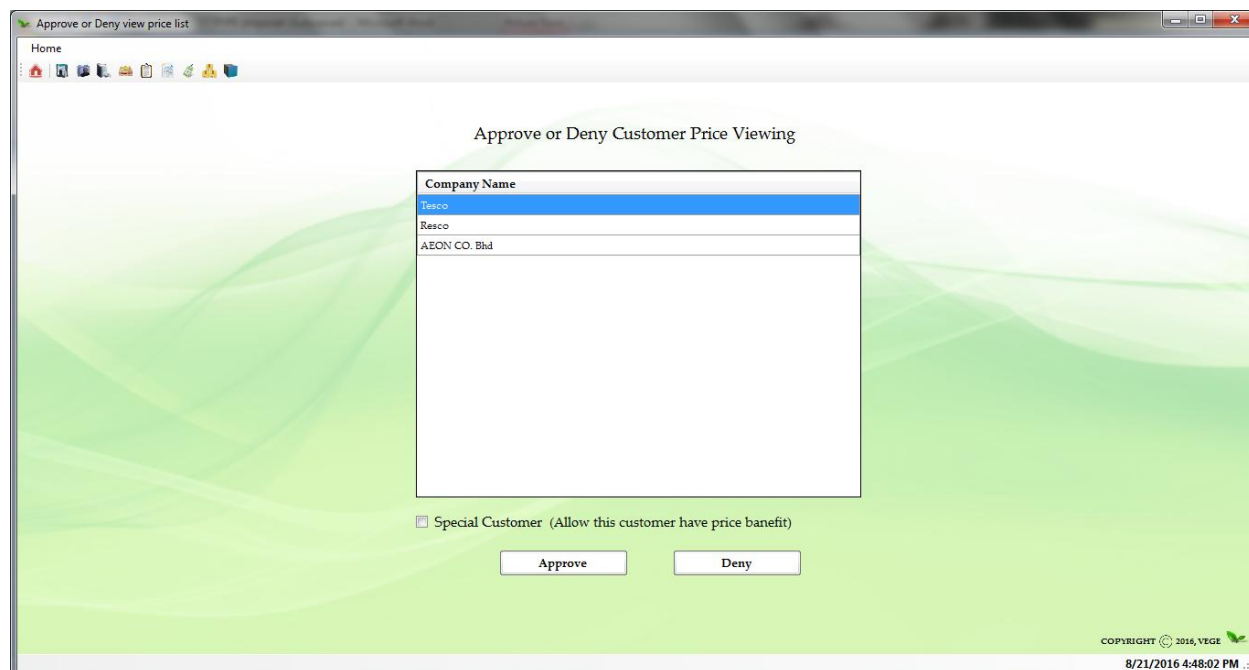
Figure4.25: Approve or Deny customer price Viewing Interface Design

4.1.17 Approve or Deny customer price Viewing Interface Design

This user interface is for supplier to approve or deny the specific customer to view the vegetables price every day.

User need to select the company name in the list and choose to **Approve** or **Deny** by using the button. The **check box** ☑ Special Customer is for supplier to give the price benefits for the specific customer.

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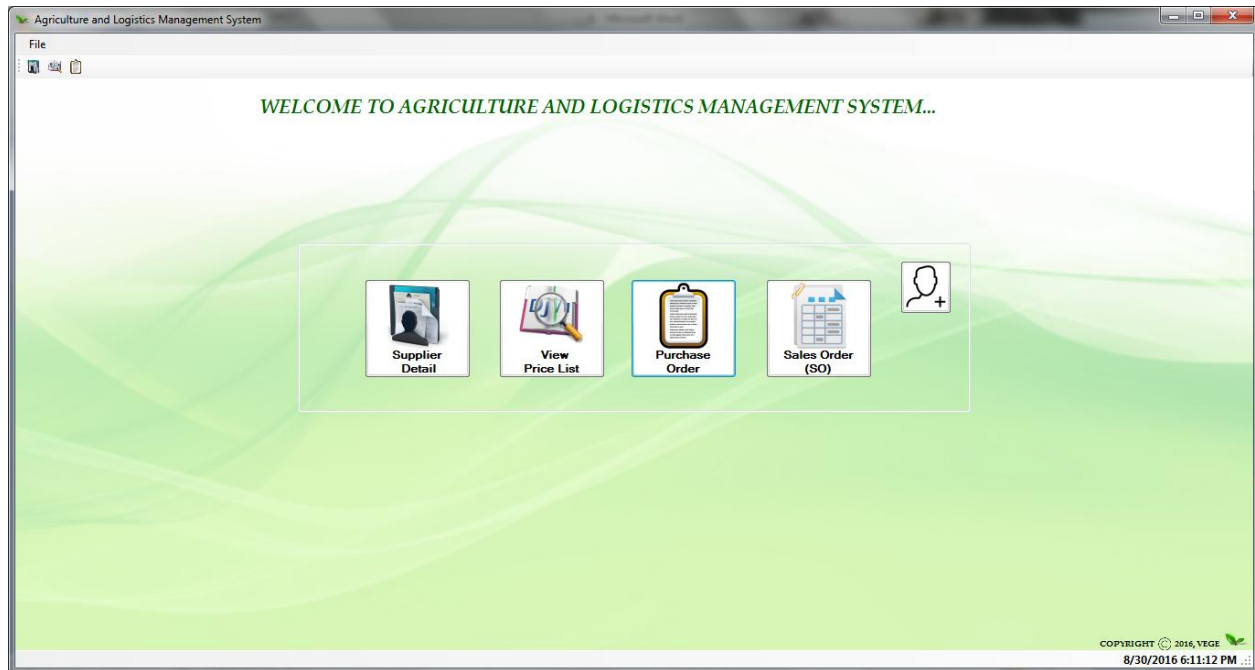
Figure4.26: Menu page (Customer) Interface Design

4.1.18 Menu page (Customer) Interface Design

This is the user interface that for user to navigate from one function to another function. First, icon is for user to **Supplier Details**, next is to **View Price List**, and then is to **Purchase order (PO)**, the last one is receive sales order from supplier. A small icon in the right icon is for customer to **send view price requires** to supplier.

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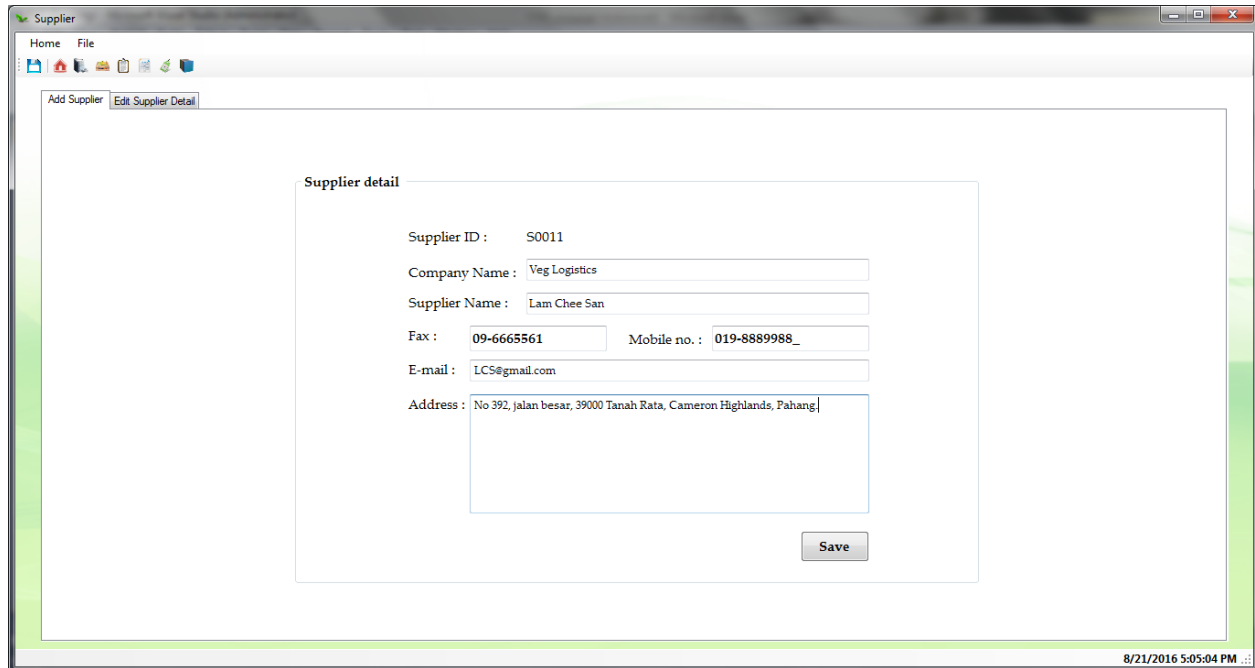
Figure4.27: Supplier Details Interface Design (First tab)

4.1.19 Supplier Details Interface Design

This user interface is for user to register new supplier for their company. Also, able to edit or delete the supplier details.

First Tab: allow user to key in supplier details. First, the company id for the supplier will auto generate by the system. After then, click the **Save button** to save supplier detail and send the request to view to price list to supplier.

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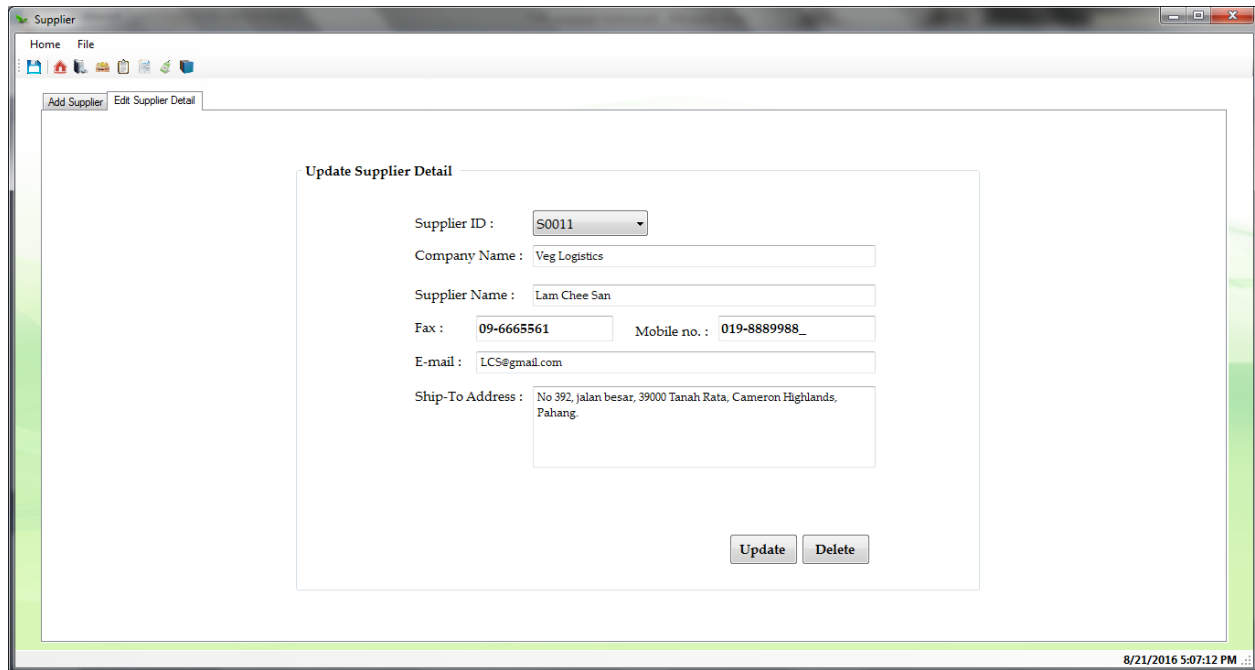
Figure4.28: Supplier Details Interface Design (Second tab)

Second Tab: allow user to edit supplier detail.

First user need to select the specific supplier in the **combo box** provided by the system. After, user can choose to delete it by click the **Delete button** or edit the details about the supplier and click on **Update button**.

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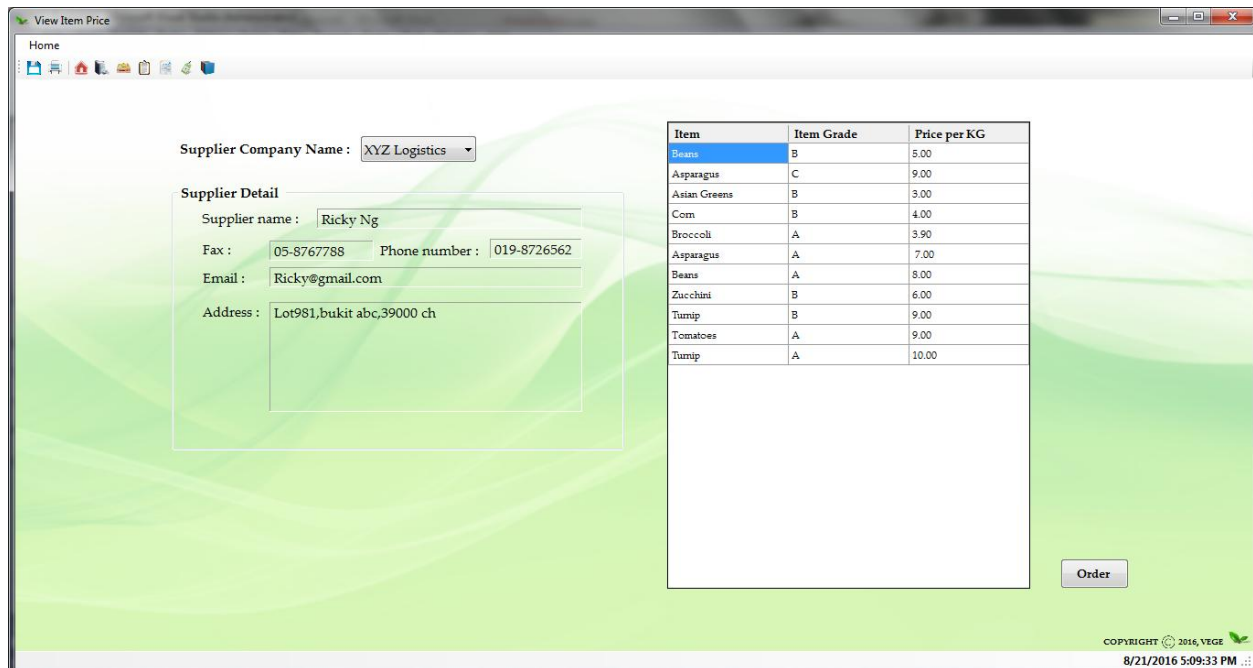
Figure4.29: View Price List Interface Design

4.1.20 View Price List Interface Design

This user interface is for user to view supplier item price every day.

First user need to select the **supplier company name** from the combo box, then, the details about the supplier and the price list will show in this screen. The **order button** is to navigate user to the order page.
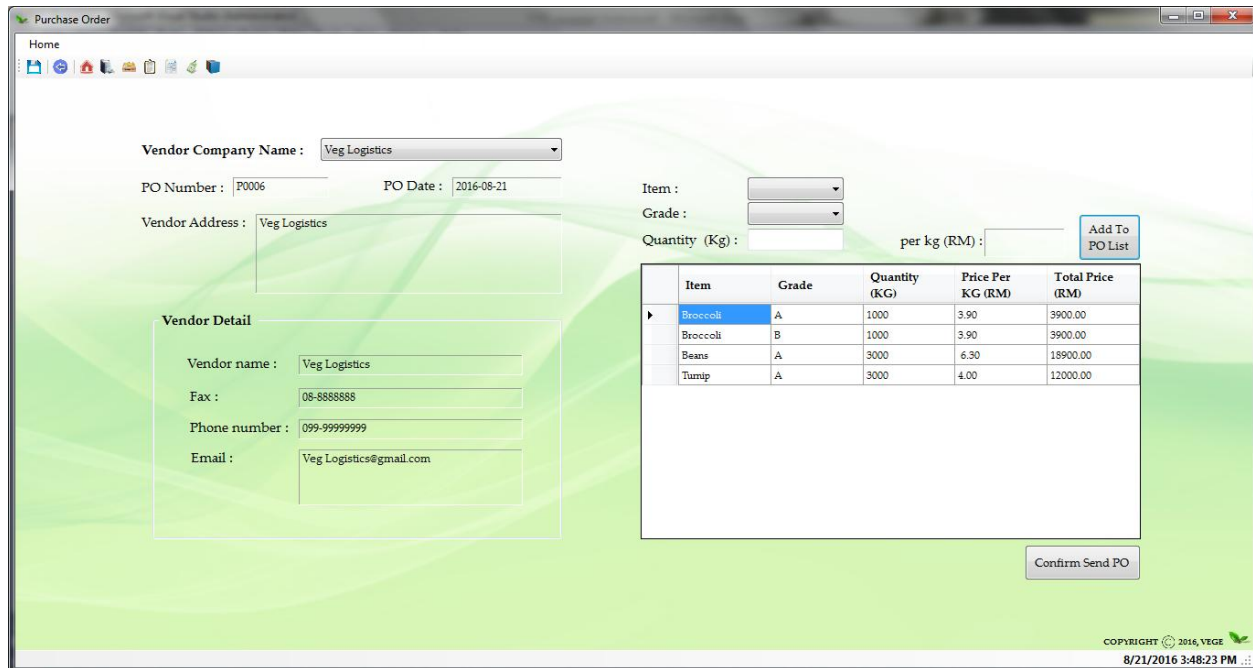
Figure4.30: Purchase order (PO) Interface Design

4.1.21 Purchase order (PO) Interface Design

This user interface is for user to create purchase order and send it to supplier.

First, user need to select the **Company name** from the combo box, and then select the **vegetables** needed from the item combo box, and the **grade**, also, type in the **quantity** needed in the text box. The **price per KG** will base on the supplier price show in the label, and the **total price** will be added automatically by the system. Lastly, user needs to click on the **Confirm send PO** button to send PO to the supplier.

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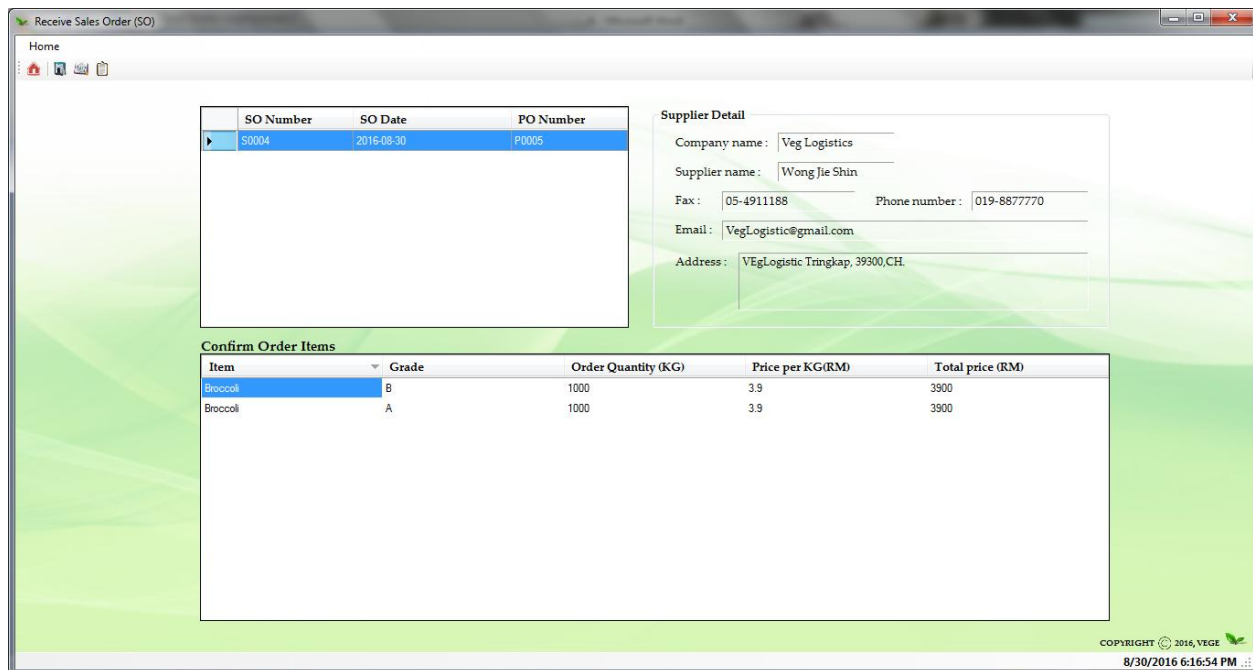
Figure4.31: Receive Sale order (SO) Interface Design

4.1.22 Receive Sale order (SO)

This interface is for user to view the sales order confirmed by the supplier. In the **first data grid view** top left for user to select and the details about the sales order confirmed by the supplier will show out in the **second data grid view**, supplier information will show to user also.
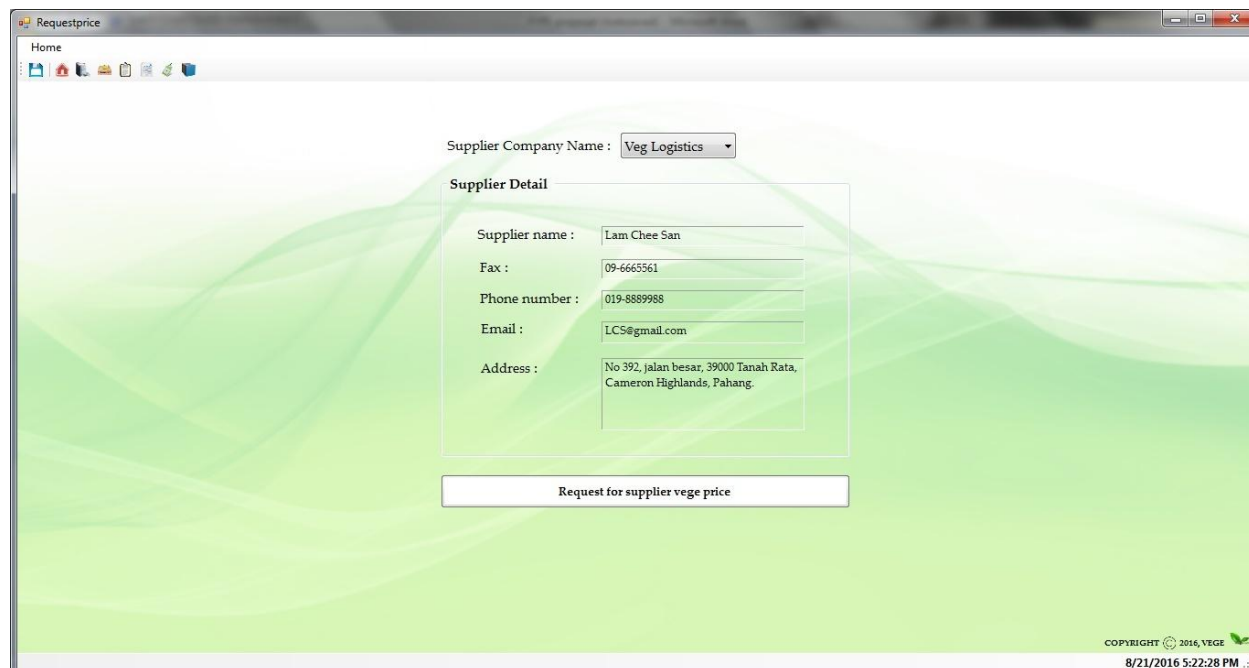
Figure4.32: Request price list Interface Design

4.1.23 Request price list Interface Design

This user interface is for user to send again the request for price list to the supplier, if the suppliers deny the price list when first request send.

First, the user needs to select the **supplier company name** from the combo box to view the supplier details. Then click on the **Request for supplier vegetables price list** button to send the request to the particular supplier.

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4.2 Entity Relationship Diagram

Figure 4.33 Entity Relationship Diagram

4.3 System Architecture Design

System architecture is the conceptual model that defines the structure, behavior, and more views of Agriculture and logistics management system. An architecture description is a formal description and representation of a system, organized in a way that supports reasoning about the structures and behaviors of the Agriculture and logistics management system.

The system architecture is allowed to comprise the system's component, the externally visible properties of those components, and the relationships such as behavior between them. It can provide a plan from which products can be procured, and systems developed, that will work together to implement the overall Agriculture and logistics management system.

Figure4.34: System Architecture

This diagram shows the architecture the agriculture logistics management system. User is request to use computer as their input device and retrieve information from the database. All the result will be return to user when retrieved data and show/ display in the users' computer screen. User is required to sign up for a rules and regulations policy to prevent misuse of the application and information.

Chapter 5: Agriculture and logistics management system testing

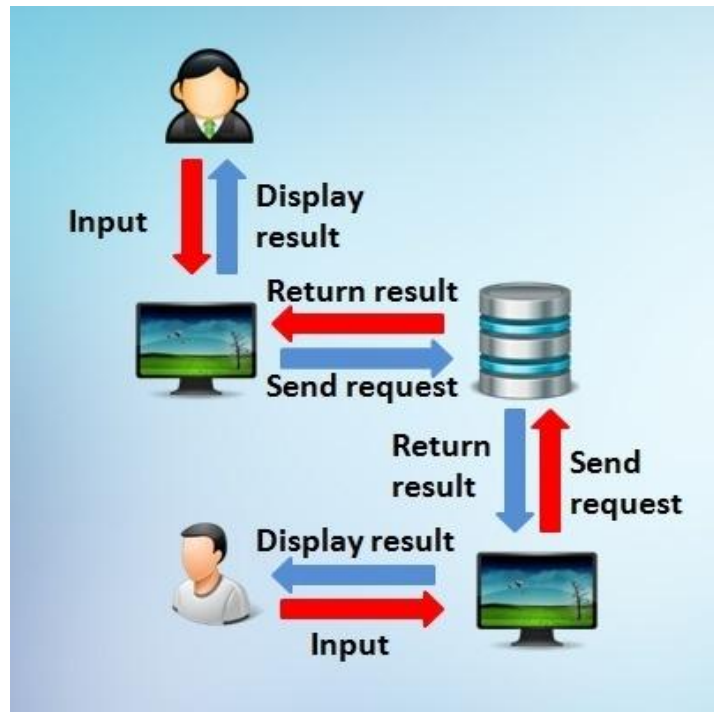### 5.1 Project Implementation & Testing

After design phase, implementation phase is start. System will install to the computer and connect to the database for data transfer. In this chapter, the system will be tested by unit testing with several test cases. The importance of unit testing is to make sure all module are implemented correctly.After that, all modules will integrate together to evaluate the effective integration among all modules. Next, system testing will then test on the full integration system to work as one unit and integrated way. Finally, once the all evaluation of the system is satisfied, users will be invited to evaluate on the system on whether fulfil their requirements and needs they expected to.

5.2 Implementation Issues and challenges

Implementation phase is very important in the project development process. The implementation phase develops the product and involve user to use it in real situation. However, there are several challenges in this phase.

Database Connection

This is the biggest concern in developing system because without connection, user are unable to retrieve data and access to database.

5.3 Development tools

System development tool

Agriculture and logistics management system is a system that developed by Microsoft visual studio 2010. It uses C# programming language as a back end code to operate the system.

Database environment

This project requires a database to store all user data such as user information, vegetables detail and other transaction information. This project is use Mysql database because it is easy to use, user friendly with Mysql workbench, easy to retrieve and access data from visual studio to database.

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5.4 Test Plan

Unit test plan is used here to test the system performance.

Test case 1

Test case module: Harvest calculation

Test case code: HC

Test Priority: HIGH

Description: Test harvest calculation function

Test data:

Crop date: 01July2016

Farm Location: Kampung Raja/ Kuala Terla

Type of vegetables: Beans

Farm size: One

Type of soil: Coco coir
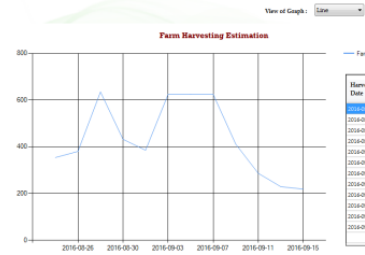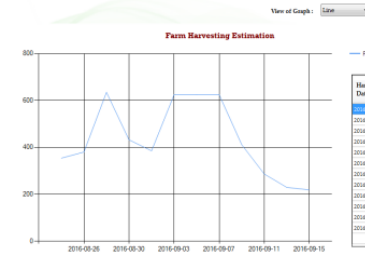
Type of farm: Rain-shelters farm

View of graph: Normal

Proven of test case1:

Figure 5.1 Test Case 1

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Test Case ID	Steps(Description)	Expected Results	Actual Results
HC 001	Check the effect of crop date.	2016-08-24 2016-08-26 2016-08-28 2016-08-30 2016-09-01 2016-09-03 2016-09-05 2016-09-07 2016-09-09 2016-09-11 2016-09-13 2016-09-15	2016-08-24 2016-08-26 2016-08-28 2016-08-30 2016-09-01 2016-09-03 2016-09-05 2016-09-07 2016-09-09 2016-09-11 2016-09-13 2016-09-15
HC 002	Check the harvest value.	2016-08-24 353.74 2016-08-26 379.75 2016-08-28 634.64 2016-08-30 431.77 2016-09-01 384.95 2016-09-03 624.24 2016-09-05 624.24 2016-09-07 624.24 2016-09-09 410.96 2016-09-11 286.11 2016-09-13 228.89 2016-09-15 218.48	2016-08-24 353.74 2016-08-26 379.75 2016-08-28 634.64 2016-08-30 431.77 2016-09-01 384.95 2016-09-03 624.24 2016-09-05 624.24 2016-09-07 624.24 2016-09-09 410.96 2016-09-11 286.11 2016-09-13 228.89 2016-09-15 218.48
HC 003	The difference view of the graph, eg Line view.		
HC 004	Press on "Save as Picture" button to save picture.	Able to save the graph as a picture.	Save the graph as a picture.
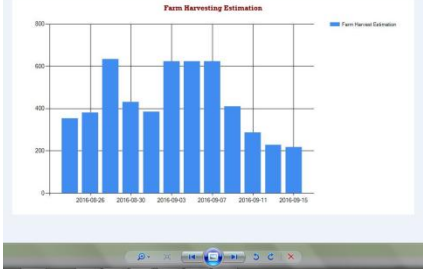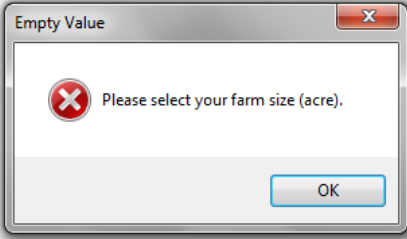
HC 005	Test the message box. Not to select farm location. Not to select size of farm. Not to select type of vegetables. Not to select type of farm. Not to select type of soil.	Show message box, and error message.	Show message box, and error message.

Table 5.1: Test harvest calculation function

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Test case 2

Test case module: Stock Available

Test case code: SA

Test Priority: HIGH

Description: Test the calculation of stock available

Test data:

Date: 24August 2016

Harvest estimation: Beans A 353.74, Cabbage A 500.00

Purchase order: Beans A 2800, Beans B 2500, Broccoli A 2000, Corn A 1000

Contract Needed: Beans A 2000, Beans B 2000, Broccoli A 2000, Corn A 1000

Sales Order: Beans A 1000, Cabbages A 200

Left Over: Beans A 100, Turnip A 800, Zucchini A 4700
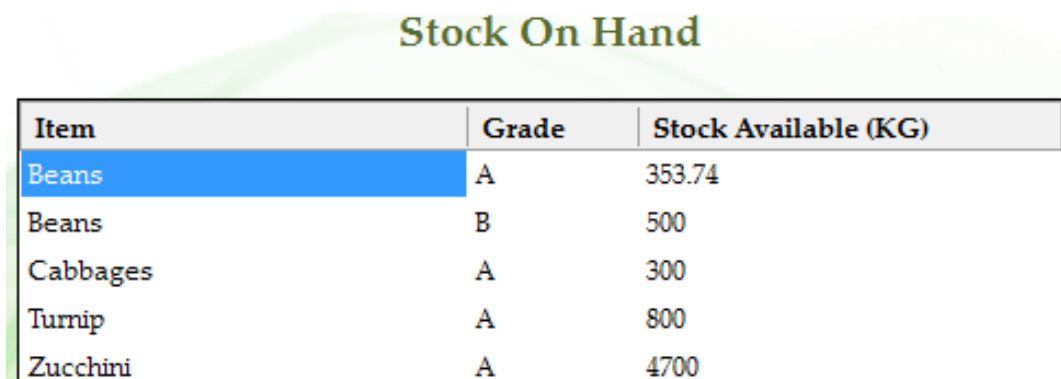
Proven of test case 2:

Stock left oven on 25 August 2016

Stock On Hand

Item	Grade	Stock Available (KG)
Beans	A	100
Turnip	A	800
Zucchini	A	4700

Figure5.2 Yesterday Stock Left Over

Stock On Hand

Item	Grade	Stock Available (KG)
Beans	A	353.74
Beans	B	500
Cabbages	A	300
Turnip	A	800
Zucchini	A	4700

Figure 5.3 test case2

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Test Case ID	Steps(Description)	Expected Results	Actual Results
SA 001	Navigate the system to stock available user interface	Beans A 253.74 Beans B 500 Cabbage A 300 Turnip A 800 Zucchini A 4700	Beans A 253.74 Beans B 500 Cabbage A 300 Turnip A 800 Zucchini A 4700

Table 5.2: Test the calculation of stock available

Test case 3

Test case module: Purchase suggestion

Test case code: PS

Test Priority: HIGH

Description: Test the calculation of Purchase order

Test data:

Date: 24August 2016

Harvest estimation: Beans A 353.74, Cabbage A 500.00
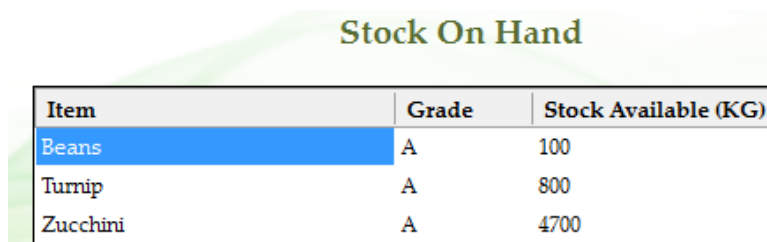
Left Over: Beans A 100, Turnip A 800, Zucchini A 4700

Contract Needed: Beans A 2000, Beans B 2000, Broccoli A 2000, Corn A 1000

Sales Order: Beans A 1000, Cabbages A 200

Proven of test case 3

Intelligence System Suggestion Order   Monday , August 29, 2016

Vege Name	Vege Grade	Contract Order Quantity (KG)	Order Quantity (KG)	Harvest Quantity (KG)	Purchase Quantity (KG)	Left Over (KG)	Stock Available (KG)	Suggest Purchase (KG)
Beans	A	2000	0	353.74	0	100	-546.26	2546.26
Beans	B	2000	0	0	0	0	0	2000
Broccoli	A	2000	0	0	0	0	0	2000
Corn	A	1000	0	0	0	0	0	1000

Figure 5.4 Test Case3

Test Case ID	Steps(Description)	Expected Results	Actual Results
PS 0001	Navigate the system to the purchase order page, before make order system will suggest user how much need to make order.	Beans A 2546.26 Beans B 2000 Broccoli A 2000 Corn A 1000	Beans A 2546.26 Beans B 2000 Broccoli A 2000 Corn A 1000
PS 0002	Select the time in the purchase order suggestion page. System will show the information base on the date selected.	Beans A 2546.26 Beans B 2000 Broccoli A 2000 Corn A 1000	Beans A 2546.26 Beans B 2000 Broccoli A 2000 Corn A 1000

Table 5.3: Test the calculation of purchase order

Test case 4

Test case module: Contract Management

Test case code: CM

Test Priority: MED

Description: Test the management of the contract

Test data:
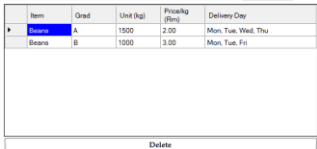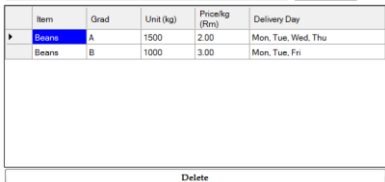
Customer A: Beans A 1500, Beans B 1000, Corn A 1000

Customer B: Beans A 500, Beans B 1000, Broccoli A 2000

Proven of test case 4

Figure 5.5 Test case4

Test Case ID	Steps(Description)	Expected Results	Actual Results
CM 0001	Enter the contract needed of all the contractor	System will summarize the data base on the vegetables and vegetable grade.	System will summarize the data base on the vegetables and vegetable grade.
CM 0002	Enter the vegetable, vegetable grade, quantity, price, and delivery day and add it to the list, check the last row of customer A, click delete. For example, Corn A 1000.	Delete the selected row.	Delete the selected row.

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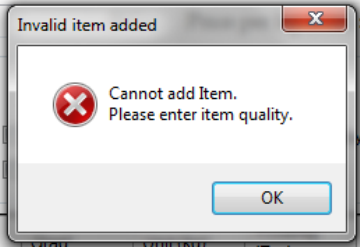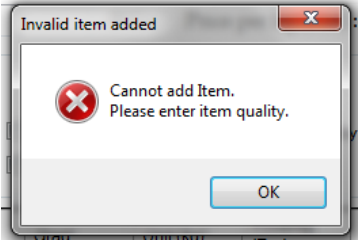
CM 0003	After insert all the information, click on the save button.	All information able to store in database and view back in record.	All information able to store in database and view back in record.
CM 0004	Test the message box. Not to enter price per kg Not to enter quantity needed	Show message box, and error message.	Show message box, and error message.

Table 5.4: Test the management of the contract

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Test case 5

Test case module: Purchase Order

Test case code: PO

Test Priority: MED

Description: Test the transaction of purchase order

Test data:

XYZ Enterprise send Purchase order to JILL Logistics:

Order Item: Beans A 1000, Cabbages A 200

Proven of test case 5
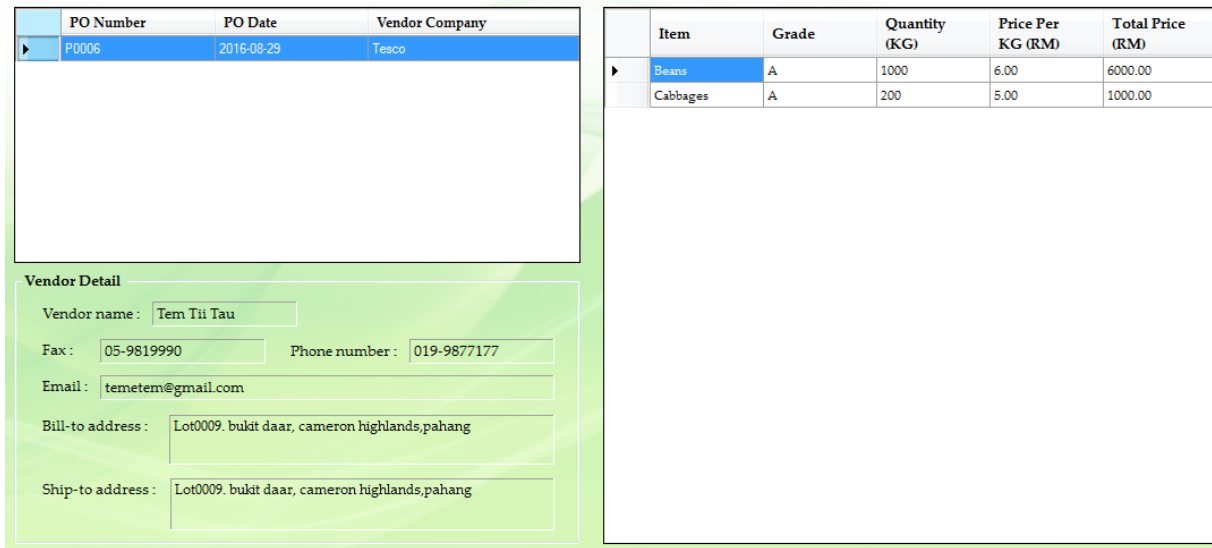
Figure 5.6 Test case5

Test Case ID	Steps(Description)	Expected Results	Actual Results
PO 0001	Select the company name in the combo box.	The company names in the combo box are registered.	Names in the combo box are registered.
PO 0002	Enter all the purchase order item and click on the send button	The specific company will receive the purchase order. And send back the sales order.	Company receives the purchase order from their customer. And send back the sales order.

Table 5.5: Test the transaction of purchase order

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Test case 6

Test case module: Sales Order

Test case code: SO

Test Priority: HIGH

Description: Test the transaction of sales order

Test data:

XYZ Enterprise send Purchase order to JILL Logistics:

Order Item: Beans A 1000, Cabbages A 200

JILL Logistics confirmed the order and send back Sales order.

Confirm Item: Beans A 1000, Cabbages A 200

Proven of test case 6
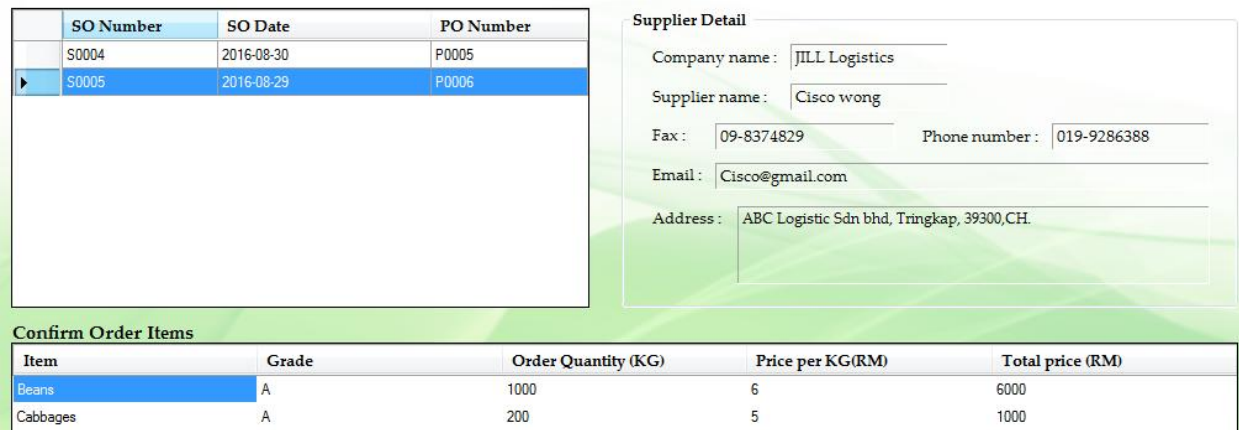
Figure 5.7 Test case5

Test Case ID	Steps(Description)	Expected Results	Actual Results
SO 0001	Navigate the system to sales order interface	Show the purchase order send by the customer.	Receive Purchase order from customer.
SO 0002	Select the specific customer name.	Purchase order detail about the particular customer needed will show in the screen.	Purchase order detail about the particular customer needed will show in the screen.

SO 0003	Before confirm the sales order.	System will show user stock available on hand.	System will show user stock available on hand.
SO 0004	Enter conform send button to send back the sales order to the particular customer.	The particular customer able to receive sales order.	The particular customer able to receive sales order.

Table 5.6: Test the transaction of sales order

Test case 7

Test case module: Price list setting

Test case code: PLS

Test Priority: MED

Description: Test the price list setting

Test data:

Update Price for Beans B.

Before : Price for Special customer 5.00, Price for Normal customer 5.30

After : Price for Special customer 6.00, Price for Normal customer 6.30

Proven of test case 7

	Item	Item Grade	Price for Special Customer	Price for Normal Customer
▶	Beans	A	6.00	6.30
	Beans	B	6.00	6.00

Figure 5.8 Test case 7

Test Case ID	Steps(Description)	Expected Results	Actual Results
PLS 0001	Navigate the system to the price list setting interface. Update the price for existing vegetables.	System will show out the latest vegetables price updated by the user.	Show out the latest vegetables price.
PLS 0002	Select the vegetable, vegetable grade and enter the price for special customer and normal customer, then, click on the update button to update the vegetables price	System able to update the vegetables price and store it in the database.	Update the vegetables price and store it in the database.

Table 5.7: Test the price list setting

95

Test case 8

Test case module: View price list

Test case code: VPL

Test Priority: MED

Description: Test the View price list

Test data:

As a special customer to view JILL Logistics updated price.

Proven of test case 8
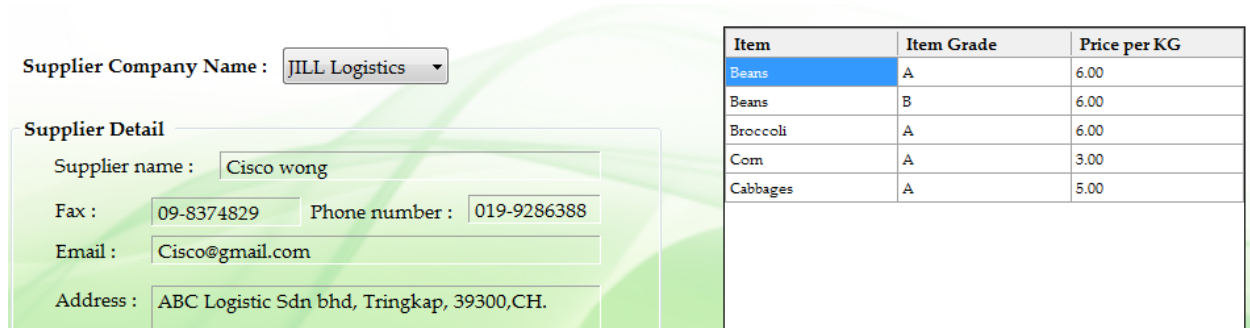
Figure 5.9 Test case8

Test Case ID	Steps(Description)	Expected Results	Actual Results	Status
VPL 0001	The combo box selection of the supplier company name may be approved by the supplier.	Show a list of approved supplier company name.	Show a list of approved supplier company name.	Pass
VPL 0002	Select the combo box of supplier company number.	System will show out the latest vegetables price updated by the supplier.	Show out the latest vegetables price.	Pass

Table 5.8: Test the View price list

Test case 9

Test case module: Register new account

Test case code: PA

Test Priority: MED

Description: To classify important document hide from unauthorized user

Test data:

Register First user

Company Name: Veg Logistics

Register Customer information: C0001, C0002, C0003, C0004, C0005, C0006, C0014

Register Second user

Company Name: XYZ Logistics

Register Customer information: C0007, C0008, C0009, C00010

Proven of test case 9
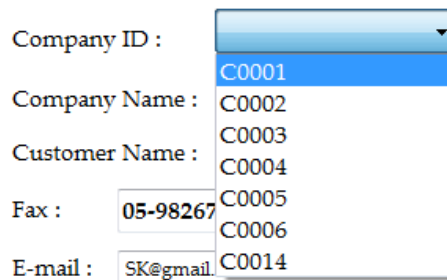
Figure 5.10 Test case9

Test Case ID	Steps(Description)	Expected Results	Actual Results
PA 0001	Login to Veg Logistics account	Show only the information about customer C0001, C0002, C0003, C0004, C0005, C0006,and C0014	Show only the information about customer C0001, C0002, C0003, C0004, C0005, C0006,and C0014

Table 5.9: Register new account

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Test case 10

Test case module: Report

Test case code: R

Test Priority: MED

Description: Test the View report

Test data:

Select 28 Aug 2016 for purchase order.

Proven of test case 10
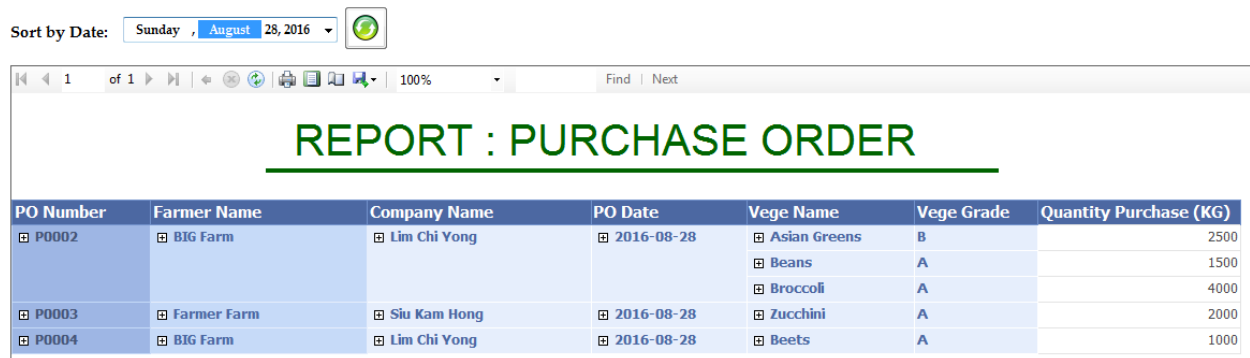
Figure5.11 Test Case10

Test Case ID	Steps(Description)	Expected Results	Actual Results
R 0001	Select the specific report and show the report detail.	Show the specific report.	Show the specific report.

Table 5.10: Test the View report

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Test case 11

Test case module: Delivery Note

Test case code: R

Test Priority: MED

Description: Print Delivery Note

Test data:

Select S0001.

Proven of test case 11

DELIVERY NOTE

DO NUMBER : D0003
DO DATE : 2016-08-29

VEG LOGISTICS
VEGLOGISTIC TRINGKAP, 39300,CH.
VEGLOGISTIC@GMAIL.COM
05-4911188, 019-8877770

TO : AEON CO. BHD
SHIP-TO : NO71, JALAN MAGSA, DAMANSARA, 31000 KUALA LUMPUR
BILL-TO : NO72, JALAN MAGSA, DAMANSARA, 31000 KUALA LUMPUR
YOUR ORDER NO. : P0001
OUR REF NO. : S0001

VEGE NAME	VEGE GRADE	ORDER QUANTITY	PRICE PER KG	TOTAL PRICE
BROCCOLI	A	100	3.9	390
BROCCOLI	B	100	3	390
BEANS	A	100	6.3	630
TURNIP	A	100	6	400

TOTAL QUENTITY (KG) : 19.2
TOTAL AMOUNT (RM) : 1810

RECEIVED BY : _____

DATE : _____

Figure5.12 Test Case11

Test Case ID	Steps(Description)	Expected Results	Actual Results
R 0001	Select the specific SO and click print report	Print the report	Print the report.

Table 5.11: Test the Print Report

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5.5 Test result

This unit testing is based on testing all the modules one by one. So here is a result after testing all the units.

Test Case	Module	Status
1	Harvest calculation	Pass
2	Stock available	Pass
3	Purchase suggestion	Pass
4	Contract management	Pass
5	Purchase Order	Pass
6	Sales Order	Pass
7	Price list setting	Pass
8	View price list	Pass
9	Register new account	Pass
10	Report	Pass
11	Print Delivery Note	Pass

Table 5.11: Test result

CHAPTER 6 SYSTEM EVALUATION AND DISCUSSION

This chapter is about how did this project solve the problems in problem domain and how does the final product fulfill the project aim and objective. Here is how the problem has been solved.

6.1 Proposed system completion

The Agriculture and logistics management system is able to calculate the farm harvesting for difference vegetables base on difference crop plan. The objective A. **to enhance the stock management** has achieved. The test result is show in Test case 1 in chapter5.4 test plan. Moreover, Agriculture and logistics management system have feature that show user the quantity on hand and also provide suggestion to user, what types of vegetable, which grad and how much they need to order. Therefore, it can reduce the cause of overstock and under stock issue.

Next, Agriculture and logistics management system have feature that allow user to make business transaction throw the system such as, send purchase order, send sales order, request for price list, approve or deny vendor to view updated price list and so on. Test case 5,6,7 and 8 have tested the result for send purchase order on Test Case5; receive purchase order, create sales order on Test case6, also, Test case 6 and 7 show the result of request for price list, approve or deny vendor to view updated price list. Moreover, Agriculture and logistics management system is allows user to view the report by click into the report page, the test case show in Test case10. System will retrieve the specific data from the database to show in a screen. In the report, user can also click on the expend icon to view more specific information. For the proof of the test plan in chapter5.4 system is **able to optimize the business process time and to sharing the same platform between business partners.**

Furthermore, for the objective of **classify important document hide from unauthorized user** is proofed in Test Plan 9, it does not allow unauthorized user to view others company's information. The company only can view their own data although they are sharing the same database.

Lastly, the completion of this system is proof all the objectives mentioned for Agriculture and logistics management system has achieved.

6.2 System strength and limitation

Agriculture and logistics management system is a new system and it is not perfect. It has its own strengths and limitation.

Strength

- **Combination of business process with harvest estimation and stock management**

  In this system, user able to send the purchase order to the supplier. Supplier will receive the purchase order and create a sales order send back to the vendor. During managing the sales order, system will show out the price available in the warehouse to supplier to ensure the supplier have enough stock. On the other hands, supplier able to view their own farm harvesting on the specific date.

- **Suggestion for purchase order**

  Before create the purchase order, system will base on the contract needed to give a suggestion to supplier what vegetables, which grade, and how many quantity need to make order.

- **Get agreement before viewing updated vegetables price list**

  When the vendor registers new supplier detail, system will automatically send the price list request to the particular supplier. Supplier need to approve or deny the requirement from the vendor. At the same time, supplier has opportunity to give the vendor price benefits. Which means the particular vendor can get discount price from the supplier base on their negotiation.

Limitation

- Less vegetable have harvest calculation, system have only three vegetable can calculate harvesting value.
- For the harvesting calculation, the system only can calculate grade A vegetables, but grade B and C cannot be calculate.
- No notification when the users send purchase order or sales order.
- System does not include payment function; for example, check customer credit and debit balances. System can just calculate the total price and print it out as a delivery note.
- Not a Multilanguage system.

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6.3 Future enhancement

- **More specific harvesting calculation**

  Currently the harvesting calculation function is not good enough. It can just calculate the difference location in Cameron highlands, difference soil and difference type of farm. But, it does not include the affect of difference month the weather in Cameron Highlands. Also, the system only can calculate grade A vegetables, but grade B and C cannot be calculate.

- **Harvest calculation for more vegetables**

  Currently the system only can calculate three types of vegetables, there are beans, tomatoes, and cabbages. For the future enhancement, system may need to calculate more harvesting for difference vegetables,

- **Notification**

  Currently the system only can show user message box if there are no receive any document and no any requirement. For future enhancement the system will notify the user by icon with number or notification sound.

- **Feature for payment**

  Currently the system only involves the front parts of business transaction, it does not involve the payment part but, it just calculates the total price. For the future enhancement, system may involve the credit/debit check and make payment between the parties.

- **Involve feature to track lorry location**

  Currently they are no feature to let user to track the lorry location when the lorries are out going to delivering the vegetables.

CHAPTER 7: CONCLUSION

In a nutshell, technology makes everything run efficiency and convenience; management system make all data store in a consistence way and make business parties communicate in a same platform. The Agriculture logistics management system can easily replace the human task by only click on the function module that the system performs. User able to save a lot of time in order to manually calculate total value, and save time to manually collect the data to generate report.

Obviously, Agriculture and logistics management system can increase the productivity of agriculture sector in Cameron highlands. By using this system, the manual labor can reduce rapidly and improving quality of the product. User can know the probability of farms' harvest every day. Moreover, this system allow supplier and customer communicate in the same platform in a single system. The whole business transaction in the agriculture platform will be operate by the system, for example, place order to supplier by generate purchase order and sell product to customer by generate sell order.

Furthermore, supplier can set vegetables' price every day by using system and sharing with customer. Furthermore, system provide reporting module that allows user to review or print the summery report. Report can generate according to the time period and the time period can customize by the user. So, most of the unnecessary human error can be reduce.

In order to fulfill these all requirements, the proposed system combines the supply chain management system, inventory management system and price setting feature. The integration of these feature the whole agriculture business transaction can be easily managed and user able to know the current updated information and real time price for the vegetable by the system.

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APPENDIX

POSTER

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Appendix

turnitin **Turnitin Originality Report**

FYP2 by Jie Shin wong

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FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY

Full Name(s)of Candidate(s)	WONG JIE SHIN
ID Number(s)	14ACB05420
Programme /Course	BIS (HONS) BUSINESS INFORMATION SYSTEM
Title of Final Year Project	AGRICULTURE AND LOGISTIC MANAGEMENT SYSTEM

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