

**Customer Relationship Management (CRM) System**

By

Chew Zhen Yong

A REPORT

SUBMITTED TO

Universiti Tunku Abdul Rahman

In partial fulfillment of the requirements

For the degree of

BACHELOR OF INFORMATION TECHNOLOGY (HONS)

INFORMATION SYSTEM ENGINEERING

Faculty of Information and Communication Technology

(PERAK CAMPUS)

JANUARY 2014

UNIVERSITI TUNKU ABDUL RAHMAN

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## **DECLARATION OF ORIGINALITY**

I declare that this report entitled “**Customer Relationship Management (CRM) 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.

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Name : \_\_\_\_\_

Date : \_\_\_\_\_

## **Acknowledgement**

First, I would like to convey thanks to supervisor, Mr Tan Teik Boon, through the duration of completing this Project II would not be done perfectly without his guidance and assistance. The project also helps me to understand more about the Customer Relationship Management (CRM) system.

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### **Abstract**

This is a project to develop a Customer Relationship Management (CRM) system. CRM is one of the systems included in Enterprise Resource Planning (ERP) System. The main purpose of CRM is to improve the relationship with the customers by using different module like analysis, customer service and others. The objective to do this project is to develop a system which can help the organizations to decrease their defection rate of customers. Because the lower defection rate means the bigger customer base, which lead to more profit for the organization.

CRM in this project is included few modules. The modules included are customer filtering, customer profiling and promotion tools. Customer filtering allows the user filter out a customer list from the customer database by using customer's demographic information. Customer profiling to makes each customer is having a profile; the user may see the customer's profile included analysis of customer. Promotion Tools allows the user can create new promotion base on the product, and filter list of customer to promote the promotion. After that, the user can see the analysis of the performance of the promotion. The tools used to develop this CRM included PHP, Web server, Mysql, javascript, HTML, CSS, jquery and jquery's plugin.

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### List of Abbreviations

|     |                                  |
|-----|----------------------------------|
| CRM | Customer Relationship Management |
|-----|----------------------------------|



## **Chapter 1 Introduction**

### **1-1 Motivation and Problem Statement**

“Top Indian telecoms carrier Bharti Airtel lost almost 1 million mobile customers in September, data released by an industry body showed, as carriers in the world's second-biggest wireless services market continue to disconnect inactive users in a clean-up drive.” (Airtel, Vodafone Idea Lose Cell Users,2012)

Losing customer is a problem facing by every organization. Why customer was turnover? There are many reasons for a customer to turnover such as wrong product pricing, poor store atmosphere, lack of product knowledge, terrible customer service and other. One of the fundamental reasons of customer to turnover is weak relationship with the customer. A weak relationship with customers is impossible to have high loyalty customers. Customer will always like the company make them feel better, and they will be loyal to those company. All of the companies having the customer defection rate, they must have a solution to decrease their customer defection rate. The tool to decrease the customer defection rate is customer relationship management (CRM). CRM can help the company to identified, acquire, satisfy and retain profitable customers from existing customer base.

Why the problem of losing customer is important? The losing of customer also means that the profit of the company was decrease. In other words, decrease the customer defection will increase company's profit at all.

### **1-2 Project Scope**

Scope of this project is to deliver a customer relationship management (CRM) system to track the customers' status. This CRM system will include the module such as analysis, emailing, user control, promotion management. This CRM system will be a web base application which the user can access through most of the internet browser available in the market.

By using the analysis module, marketer is able to analyze the market easier. After analyzed the market, the marketer was able to generate a list customers by selecting parameters. For examples, the marketer user can generate a list of customer who was continuous decreasing their monthly purchase amount.

### **1-3 Project Objectives**

The project's product will let user to create a simple analysis. For example, the user should able to create an analysis of the ratio of male customers to females customer or a bar graph to show that the differences of number of customers at different states.

The CRM system shall provide the page permission control. The user only can access to the pages which they are permitted. The permission control is based on user group management.

The CRM system shall provide single customer profile. In the customer profile, it should include the information such as customer's demographic data, purchase history, habit analysis and others. The habit analysis is included customer feature product, average monthly purchase amount and others.

The CRM shall provide the promotion management. The promotion management should include create, modify and deliver the promotion to customers. Beside this, the promotion management also should be able to detect the respond of customer based on the promotion and analyze the respond.

#### **1-4 Impact, Significant and Contribution**

By having this customer software, the organization will be able to track the customers fulfill their parameter. The organization can easily find out the customer by filtering their data. For example, if the organization is promoting a new product and target the customer who was female, single state and having income between RM3,000 and RM5,000, this system would it to target the possible buyer even the best location which having the largest number of possible buyer. With this customer filtering module, the marketer may also find out the customer who was decreasing their monthly purchase month by month, then they may carry out the strategy to increase the loyalty of these possible leave customer.

Beside the customer filtering system, this system may also let the user to see the relationship between the customer and the organization. So the employee can respond the customer as soon as possible because they can get the customer information in one page.

## **1-5 Background Information**

### **1-5-1 Customer**

A customer is a person or organization that a marketer believes will earn benefit from the goods and service offered by the marketer's organization. A customer is not necessary to be currently buying something, and it may differentiate into 3 types. The 3 types of customer are existing customer, former customer and potential customer. Existing customer is the customer who purchasing the goods and services within a period till now. Former customer is customer who purchased goods services before, but not continues for a period time. Potential customer is the customer who hasn't purchase, buy they may purchase.

### **1-5-2 Customer Relationship**

A relationship is composed of a series of interactive episodes between dyadic parties over time. (Buttle 2008,p27)

What is an interactive episode? Episode is activity that having a start time and end time, and it is nameable. There is possibility a series of episode in a sales representative and customer relationship. For example, making a sales call, making a purchase, dealing with a complaint and others. If there is only one-off transaction, such as buying a coffee from the coffee shop, it will not call as a relationship. But, if a customer frequently going to enjoy the coffee of the same coffee because the waitress's service of the coffee shop is nice, then it might a customer relation. A customer relationship should be in long period interaction but not once transaction.

### **1-5-3 Customer Relationship Management (CRM)**

Customer Relationship Management (CRM) is the core business strategy that integrates internal processes and functions, and external networks, to create and deliver value to targeted customers at a profit. It is grounded on high quality customer-related data and enabled by information technology. (Buttle 2008,p15)

### **1-5-4 Important of Customer Relationship Management (CRM)**

The fundamental reason for an organization wants to have relationship with customer is economic. The main objectives of CRM are identified, acquire, satisfy and retain profitable customers. Companies can do better when they achieved the objectives of CRM. Improve customer retention rate or decrease customer defection rate will affect the increasing of the size of customer base. Base on the Table 1-5-4 T1, company A with lower defection rate will obtain bigger size of customer base in future.

| Year | Company A (5% defection rate) |               |                     | Company B (10% defection rate) |              |                     |
|------|-------------------------------|---------------|---------------------|--------------------------------|--------------|---------------------|
|      | Existing customer             | New customers | Total customer base | Existing customer              | New customer | Total customer base |
| 2001 | 1000                          | 100           | 1100                | 1000                           | 100          | 1100                |
| 2002 | 1045                          | 100           | 1145                | 990                            | 100          | 1090                |
| 2003 | 1088                          | 100           | 1188                | 981                            | 100          | 1081                |
| 2004 | 1129                          | 100           | 1229                | 973                            | 100          | 1073                |
| 2005 | 1168                          | 100           | 1268                | 966                            | 100          | 1066                |

**Table 1-5-4 T1 Customer Defection Rate and Customer Base**

## **Chapter 2 Literature Review**

### **2-1 Introduction**

In this literature review, This project going to review on the article, book and internet resources to study about the customer relationship management (CRM), customer segmentation and also the solution provided by others.



## **2-2 Customer Relationship Management (CRM)**

### **2-2-1 Definition of CRM**

The expression of Customer Relationship Management (CRM) was being started to use since early 1990s. According to Customer Relationship Management: Concepts and Technologies (Buttle 2008), there are many attempts to define the domain of CRM:

CRM is an information industry term for methodologies, software and usually internet capabilities that help an enterprise manage customer relationships in an organized way.

CRM also define as the process of managing all aspects of interaction a company has with its customers, including prospecting, sales and service.

CRM is an integrated approach to identifying, acquiring and retaining customers. By enabling organizations to manage and coordinate customer interactions across multiple channels, departments, lines of business and geographies, CRM helps organizations maximize the value of every customer interaction and drive superior corporate performance.

CRM is an integrated information system that is used to plan, schedule and control the pre-sales and post-sales activities in an organization. CRM embraces all aspects of dealing with prospects and customers, including the call centre, sales-force, marketing, technical support and field service. The primary goal of CRM is to improve long-term growth and profitability through a better understanding of customer behavior. CRM aims to provide more effective feedback and improved integration to better gauge the return on investment (ROI) in these areas.

CRM is a business strategy that maximizes profitability, revenue and customer satisfaction by organizing around customer segments, fostering behavior that satisfies customers and implementing customer centric processes.

### **2-2-2 Types of CRM**

There are 4 types of CRM implemented overall the business. There are Strategic CRM, operational CRM, Analytical CRM, and Collaborative CRM.

Strategic CRM is use to development a business with customer centric culture. This culture is dedicated to winning and keeping customers by creating and delivering better value than the competitors. Customer centricity is compete with 3 others business logic, which is product, production and sales. Product-oriented businesses believe that the product with best quality, performance, design or features will be chosen by customer. Production-oriented businesses believe that customer more likely to choose low cost product. Sales-oriented businesses believe that customer will be persuaded to buy their product if they do enough for advertising, selling and public relation. A customer or market-oriented businesses share a set of belief putting the customer at first. Many managers say that customer centric must be right. However, sometime other orientation may stronger.

Operational CRM use to automate and improves customer-facing and customer-supporting business process. CRM application can make the marketing, selling, and service process to be automated and integrated. There are 3 types of automation, which are Marketing automation, sales-force automation and service automation. Marketing

automation allow marketer to use customer data to develop, execute and evaluate targeted communication and offers. Sales-force automation is use to managing selling activities, product configuration in sales-force automation allow customer to design their product by themselves, one of the example is the web-based laptop setting configuration and orders features offer by the DELL. Service automation is used to automate the serving service of the company, it was used widely by most of the company. For example, when customer call to the customer support centre of the companies, they will first ask us to use voice or keyboard to enter the option customer want, then lead us to the related service provider.

Analytical CRM is concerned with capturing, storing, extracting, integrating, processing, interpreting, distributing, using and reporting customer-related data to enhance both customer and company value. Analytical CRM normally can use to answer the marketing question of the businesses such as who is our most profitable customer? Which customer having the possibility of turnover to the competitor? Which customer have the high possibility to accept our offer? Analytical can help to them to know which customer should give which level of services, and this could increase the possibility of customer to accept the offer.

Collaborative CRM is the term used to describe the strategic and tactical alignment of normally separate enterprises in the supply chain for the more profitable identification, attraction, retention and development of customers. (Buttle 2008,p11)



**Figure 2-2-2 F1 Types of Customer Relationship Management (CRM)**

## **2-3 Customer Segmentation**

### **2-3-1 What is customer segmentation?**

What is customer segmentation? The purpose of segmentation is the concentration of marketing energy and force on the subdivision (or the market segment) to gain a competitive advantage within the segment (Jerry 2007). Marketer can make the company to gain the competitive advantage through the customer segmentation progress. The marketing segmentation is use to segment the customer who sharing something in common which is similarity. There are few types of segmentation which included geographic segmentation, distribution segmentation, media segmentation, price segmentation, demographic segmentation, time segmentation, and psychographic or lifestyle segmentation.

### **2-3-2 How to segment the customers?**

The market segmentation is mentioned as being one of the key elements of modern marketing and is, as mentioned, the process of dividing the market into several groups and/or segment(s) based on factors such as demographic, geographic, psychological and behavioral factors. By doing so the marketers will have a better understanding of their target audience and thereby make their marketing more effective (Gunter and Furnham 1992, p1). Some of the variables used to segment customer will list and explain in following.

**Demographic Segmentation-** The demographic segmentation divides customers into segments based on demographic values such as age, gender, family size, family life cycle,

income, occupation, education, religion, race, generation, social class and nationality (Armstrong and Kotler 2005, p187). Following is some of the example of segmentation based on the demographic values.

1. Age and life-cycle segmentation.
2. Gender segmentation.
3. Income segmentation.
4. Generation segmentation.
5. Social class segmentation.

**Geographic Segmentation-** The geographic segmentation divides customers into segments based on geographical areas such as nations, states, regions, counties, cities or neighborhoods. A company can target one or more areas and must be aware of the fact that data according to geographic segmentation may vary due to population shift (Pickton and Broderick 2005, p376).

**Psychographic Segmentation-** The psychological variables derive from two principal types of customer; personality profiles and lifestyle profiles (psychographics). Psychological profiles are often used as a supplement to geographic and demographics when these does not provide a sufficient view of the customer behaviour. While the traditional geographical and demographical bases (sex, age, income etc.)provide the marketer with accessibility to customer segments, the psychological variables provide additional information about these and enhance the understanding of the behaviour of present and potential target markets (Gunter and Furnham, 1992: 26).

**Behavioral Segmentation-** Behavioural segmentation is based on the customers' attitude toward, use of, or response to a product. Many marketers believe that the behavioural variables such as occasions, benefits, user status, usage rate, buyer-readiness stage, loyalty status and attitude are the best starting points for constructing market segments and thus these variables will be described further in the following (Kotler and Keller, 2009: 263).

### **2-4 Solution by others**

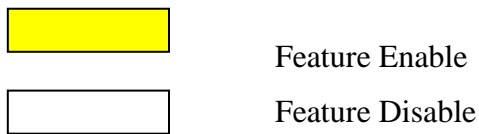
To solve the problem of losing customer, the fundamental way is to increase the retention rate of the customers. SAS Institutes had found some approach to increase the profitability and lower the churn rates of the insurance product. SAS approaches the problem by delivering customer software and service to gain a 360 degree view of the customer, identify those customers likely to lapse or cancel policies and connect the right products to the right customer segments through agents and direct channels. SAS also provides a complete framework of capabilities to help insurer to predict customer lapse and implement successful marketing campaign to increase profit. SAS offered market-leading data management capabilities, analytical data model, advance analytics and proven campaign management to its customer.



**Figure 2-4 F1 Logo of SAS ERP system**



**2-5 Features benchmarking of existing systems**



| Software Name         | Nimble CRM Software | SalesNet CRM Software | HubSpot Basic CRM Software | Zoho CRM Professional Edition CRM Software |
|-----------------------|---------------------|-----------------------|----------------------------|--|
| Industrial Solution   |                     |                       |                            |  |
| Education             |                     |                       |                            |  |
| Financial             |                     |                       |                            |  |
| Hospitality           |                     |                       |                            |  |
| Media                 |                     |                       |                            |  |
| Non-Profit            |                     |                       |                            |  |
| Professional Services |                     |                       |                            |  |
| Retail                |                     |                       |                            |  |
| Other                 |                     |                       |                            |  |

## Chapter 2 Literature Review

| Software Name              | Nimble CRM Software | SalesNet CRM Software | HubSpot Basic CRM Software | Zoho CRM Professional Edition CRM Software |
|----------------------------|---------------------|-----------------------|----------------------------|--|
| Consumer Packaged Goods    |                     |                       |                            |  |
| Health and Social Services |                     |                       |                            |  |
| Manufacturing              |                     |                       |                            |  |
| Healthcare                 |                     |                       |                            |  |
| <b>CRM Functionality</b>   |                     |                       |                            |  |
| Market Automation Features |                     |                       |                            |  |
| Email Marketing            |                     |                       |                            |  |
| Mailing List Management    |                     |                       |                            |  |
| Social Media               |                     |                       |                            |  |
| Product Catalog            |                     |                       |                            |  |

## Chapter 2 Literature Review

| Software Name                    | Nimble CRM Software | SalesNet CRM Software | HubSpot Basic CRM Software | Zoho CRM Professional Edition CRM Software |
|----------------------------------|---------------------|-----------------------|----------------------------|--|
| Integration                      |                     |                       |                            |  |
| Territory Management             |                     |                       |                            |  |
| Security Features                |                     |                       |                            |  |
| Data Encryption                  |                     |                       |                            |  |
| Field-Level Security             |                     |                       |                            |  |
| Group Creation and Management    |                     |                       |                            |  |
| Roles / Organizational Hierarchy |                     |                       |                            |  |
| Security Admin Profiles          |                     |                       |                            |  |
| Analytics Features               |                     |                       |                            |  |
| Forecasting                      |                     |                       |                            |  |

## Chapter 2 Literature Review

| Software Name                    | Nimble CRM Software | SalesNet CRM Software | HubSpot Basic CRM Software | Zoho CRM Professional Edition CRM Software |
|----------------------------------|---------------------|-----------------------|----------------------------|--|
| Dashboards                       |                     |                       |                            |  |
| Reporting                        |                     |                       |                            |  |
| Dashboard Customization          |                     |                       |                            |  |
| Channel Management Features      |                     |                       |                            |  |
| Customizable Features            |                     |                       |                            |  |
| Customizable Forms & Data Fields |                     |                       |                            |  |
| Multi- Language                  |                     |                       |                            |  |
| Template Management              |                     |                       |                            |  |
| Sales Automation                 |                     |                       |                            |  |

## Chapter 2 Literature Review

| Software Name                | Nimble CRM Software | SalesNet CRM Software | HubSpot Basic CRM Software | Zoho CRM Professional Edition CRM Software |
|------------------------------|---------------------|-----------------------|----------------------------|--|
| Features                     |                     |                       |                            |  |
| Billing / Invoicing          |                     |                       |                            |  |
| Contact History              |                     |                       |                            |  |
| Contact Management           |                     |                       |                            |  |
| Contact Scheduler            |                     |                       |                            |  |
| Customer Database            |                     |                       |                            |  |
| Lead Management              |                     |                       |                            |  |
| Lead Tracking                |                     |                       |                            |  |
| Customer Service             |                     |                       |                            |  |
| Customer Service Integration |                     |                       |                            |  |
| Customer Support Tracking    |                     |                       |                            |  |

## Chapter 2 Literature Review

| Software Name                 | Nimble CRM Software | SalesNet CRM Software | HubSpot Basic CRM Software | Zoho CRM Professional Edition CRM Software |
|-------------------------------|---------------------|-----------------------|----------------------------|--|
| User Interface Customization  |                     |                       |                            |  |
| Collaboration Features        |                     |                       |                            |  |
| Mail Merge                    |                     |                       |                            |  |
| Mobile Access                 |                     |                       |                            |  |
| Remote Access                 |                     |                       |                            |  |
| Remote Tracking               |                     |                       |                            |  |
| Workflow Rules and Management |                     |                       |                            |  |
| Integration                   |                     |                       |                            |  |
| Data Import/ Export           |                     |                       |                            |  |
| Support Features              |                     |                       |                            |  |

## Chapter 2 Literature Review

| Software Name         | Nimble CRM Software | SalesNet CRM Software | HubSpot Basic CRM Software | Zoho CRM Professional Edition CRM Software |
|-----------------------|---------------------|-----------------------|----------------------------|--|
| Blog                  |                     |                       |                            |  |
| Email                 |                     |                       |                            |  |
| FAQ                   |                     |                       |                            |  |
| Instructional Videos  |                     |                       |                            |  |
| Knowledge base        |                     |                       |                            |  |
| Live Chat             |                     |                       |                            |  |
| Normal business hours |                     |                       |                            |  |
| Phone                 |                     |                       |                            |  |
| Tips and hints        |                     |                       |                            |  |
| Webinars              |                     |                       |                            |  |
| Request Form          |                     |                       |                            |  |

Chapter 2 Literature Review

| Software Name       | Nimble CRM Software | SalesNet CRM Software | HubSpot Basic CRM Software | Zoho CRM Professional Edition CRM Software |
|---------------------|---------------------|-----------------------|----------------------------|--|
| On-site             |                     |                       |                            |  |
| Forums              |                     |                       |                            |  |
| Online Self Serve   |                     |                       |                            |  |
| Recorded Demos      |                     |                       |                            |  |
| Languages Supported |                     |                       |                            |  |
| Chinese             |                     |                       |                            |  |
| Dutch               |                     |                       |                            |  |
| English             |                     |                       |                            |  |
| French              |                     |                       |                            |  |
| German              |                     |                       |                            |  |
| Italian             |                     |                       |                            |  |
| Japanese            |                     |                       |                            |  |



| Software Name | Nimble CRM Software | SalesNet CRM Software | HubSpot Basic CRM Software | Zoho CRM Professional Edition CRM Software |
|---------------|---------------------|-----------------------|----------------------------|--|
| Other         |                     |                       |                            |  |
| Portuguese    |                     |                       |                            |  |
| Russian       |                     |                       |                            |  |
| Spanish       |                     |                       |                            |  |
| Swedish       |                     |                       |                            |  |

**Table 2-5 T1 Benchmarking of different CRM systems**

## Chapter 3 System Development

### 3-1 Methodology

After a lot of consideration and research, the incremental model is the best model to be used to develop this system. In the incremental model, the steps was from initial planning into the planning and specific requirement, after that will develop and deployment, the testing will be conduct concurrently, at the end the collected testing data will be used to enhance the system and start from the planning phase again.

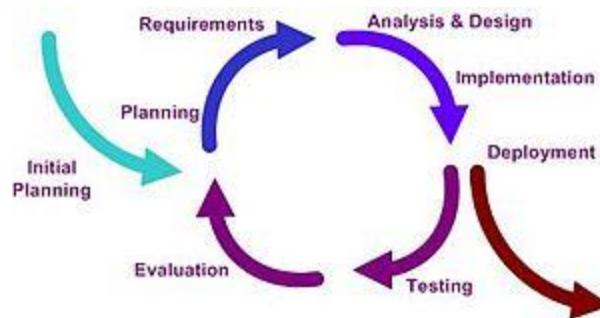


Figure 3-1 F1 Methodology of system development

### 3-2 Tools

The main tools or skill used to develop this project is Hyper Text Markup Language (HTML), Cascading style sheets (CSS), Javascript, PHP: Hypertext Preprocessor (PHP) and the Structured Query Language (SQL). HTML is a markup language and a markup language is a set of markup tags.

HTML documents contain HTML tags and plain text and it also called as a web page. CSS is use to define how to display HTML elements like font color, background color and others. CSS was added to HTML 4.0 and newer version to solve the problem of too many tags in HTML document. An external style sheet can help to save a lot of work and it is stored in CSS files.

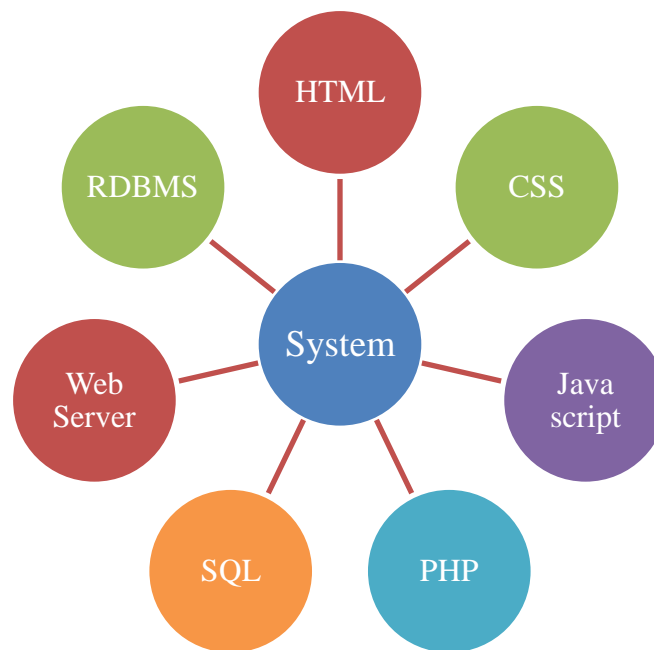
Javascript is programming code that can be inserted into HTML pages and can be executed by modern web browser. Javascript is easy to learn and it's performance was powerful as JAVA and C++ language. PHP is a server side scripting language and executed on server. PHP was supporting many databases like MySQL, Informix, Oracle, Sybase, Generic ODBC and others. PHP can be run on different platform like Windows and Linux, and it is also compatible with almost all servers used today like Apache and IIS.

SQL is a standard language use to accessing and manipulating databases. SQL can use to execute query against databases, retrieve data from databases, insert data to databases and other useful features.

Beside the language, the important technology to develop web application is the web server application. Web server application is application help to deliver the web content

that can be accessed through the internet. The most common use for web is to host websites, but there are also other like enterprise application, databases, and gaming. There are many different existing web servers. The top web server in the world is Apache found by Apache, IIS found by Microsoft, nginx found by NGINX. Inc and GWS found by Google.

Relational Database Management System (RDBMS) is also an important application in develop a web system. Without a RDBMS, the system cannot store the data in good security, sequence and structure. The famous RDBMS are MySQL, Oracle, DB2, Teradata, SQL Server and Microsoft Office Access.



**Figure 3-2 F1 Development tools**

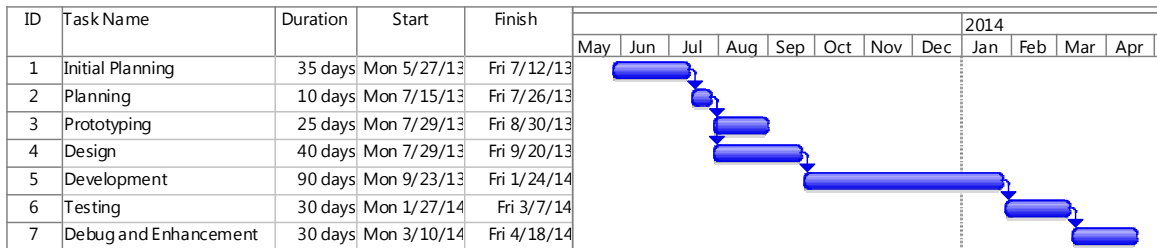
### **3-3 Implementation Issues and Challenges**

In the development of this CRM system, there are 2 issues will be faced. One of the issues is the formula of the customer segmentation and analysis. It was difficult to ensure that the formula of ratios is correct or wrong. Beside this, it is also difficult to figure which type of analysis was helpful to the marketer.

The second issue is volume of testing data. A small amount of sample was difficult to display the actual answer of question. For example, the correctness of 10 samples is very weak, but if a sample of 10000 samples, the actual rate of the condition was more correctly.

**3-4 Timeline**

This project was estimated to be complete in a period of around 1 year. The following gantt chart will show the timeline for each phases of the project. There are seven phases in this project and take different duration to complete. The initial planning will take around 35 days to complete, planning will take 10 days. After planning, the prototyping and design will carry out concurrently which prototyping is estimated to complete in 25 days and design is estimated to complete in 40 days. After design phase will be the development phase which take the longest days estimated as 90days. When the development was done, the testing and debugging will carry out, each of it will use around 30days.



**Table 3-4 T1 Gantt Chart of System Development**

### **3-5 Requirement Specification**

#### **3-5-1 Security Features**

**User Management:** The user system should including add, modify and delete user. The system admin should be able to manage the account of internal user such ask staff. The customers will register the account in the system. Each customer will use a special access code and their IC to bind their user account with their profile.

**User Authentication:** Users need to provide their login ID and password every time they access the system.

**Group Creation and Management:** Each user shall be define and belong to one or more group. Example of user groups is admin, manager, customer and others. The admin shall able to create and maintain the group setting.

**Pages permission:** Different pages shall grant to different user group. For example, admin user is only grant to control the user and system.

**Change Password:** Each of the users should allow updating their user's account password if they feel their password is not secure anymore.

#### **3-5-2 Analysis**

**Customer Filtering:** The system should allow the user to filter a list of customers base on customers' information like demographic information. After filtering, the system should display a simple summary of the list of customer. For example, is should show

what is the total number of customer filtered, what is the ratio of customer from male to female.

**Customer profile:** It shall include a page to view the customer's profile. In the profile, it should show all the customer demographic data, customer's analysis, purchase history, purchase behavior and others.

**Product Analysis:** The system should allow the user to select a product and analyze it. The analysis should show which type of customer is buying the product, which outlet is the hot selling and others.

### **3-5-3 Promotion Tools**

**Promotion Creator:** The system should allow the user to create a new promotion. The promotion should include the promoted product, promotion title, start date, end date and the promotion detail. Beside these, the promotion should also available to select one or more outlet to apply.

**Select Promotion Target:** The system should allow user to filter out a list of target customer for the promotion. The example of filter is the customer information, the customer who never but the promoted before and others.

**Assign Promotion Target:** The system should assign the list of targeted customer to the employee of the outlet where the customer registers as task.



**Send Promotion:** The system should include the plugin to let the user send the promotion detail to the customers. The system should include various methods to send the promotion. The method should include email, phone calling, SMS and other methods as well.

**Detect Customer Respond:** The system should use various methods to detect whether the customer is responding to the sent promotion. The example of method is to detect is the customer buying the product in promotion period.

**Promotion Analysis:** The system should allow the manager to check the promotion's performance. The analysis's purpose is to show the relationship of the promotion effort and the feedback of customer.

## Chapter 4 System and Interface Design

### 4-1 System Design

This CRM is using PHP language as main develop language, it is a web application, therefore it will store in 1 folder and host by the web server application with Apache. The folder is name as CRM and inside the CRM folder containing different files. The different folder is containing the file with different function. The folder system is same as below:

**CRM:** Root folder of the CRM system.

- **CSS:** This folder is containing the CSS file for the CRM.
- **Images:** This folder is containing the image used in the CRM.
- **Js:** This folder is used to store the entire javascript file to be use.
- **Log:** This folder is used to store the log file of the system.
- **Page:** This is used to store the PHP file which generating the content of each page in the CRM.
- **Src:** This folder is used to store the PHP file containing the PHP function used by the application.
- **Template:** This is used to store the template file of the system like header, footer and menu.
- **Widget:** This is used to store the PHP file call by the content PHP file.
- **index.php:** This is the default page when the user visits the website.

This CRM system is using nested include generating the dynamic content web pages. The system is using the index.php to include header, content, and footer. Beside this, the system also using jquery ajax to display some data generated by the PHP inside the Widget folder.

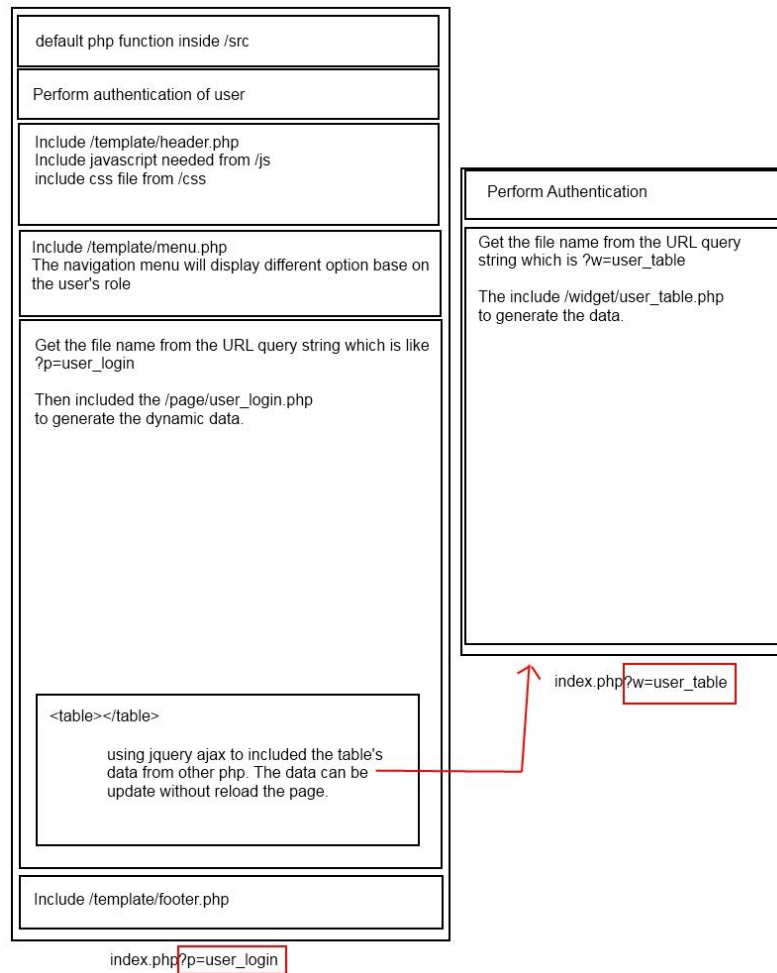
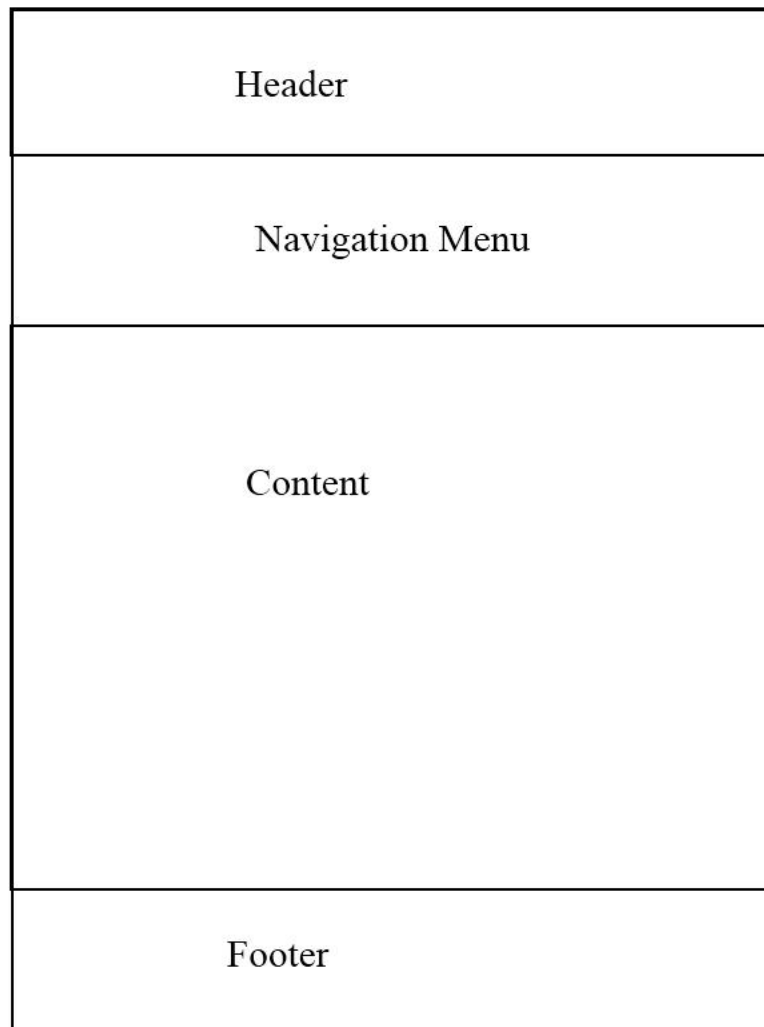


Figure 4-1 F1 System Algorithm

#### 4-2 Interface Design

The output of the index.php is in HTML format. Each of the pages generated will having the same layout but different content. The system interface's layout is shown as below.



**Figure 4-2 F1 Interface Design**

## Header Design



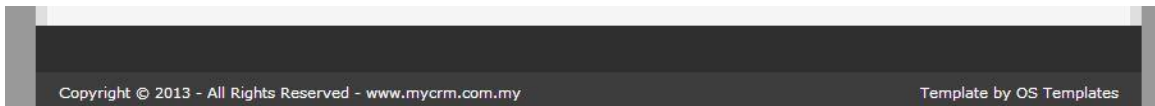
**Figure 4-2 F2 Header design**

Navigation Design: Each user role will have different menu option.



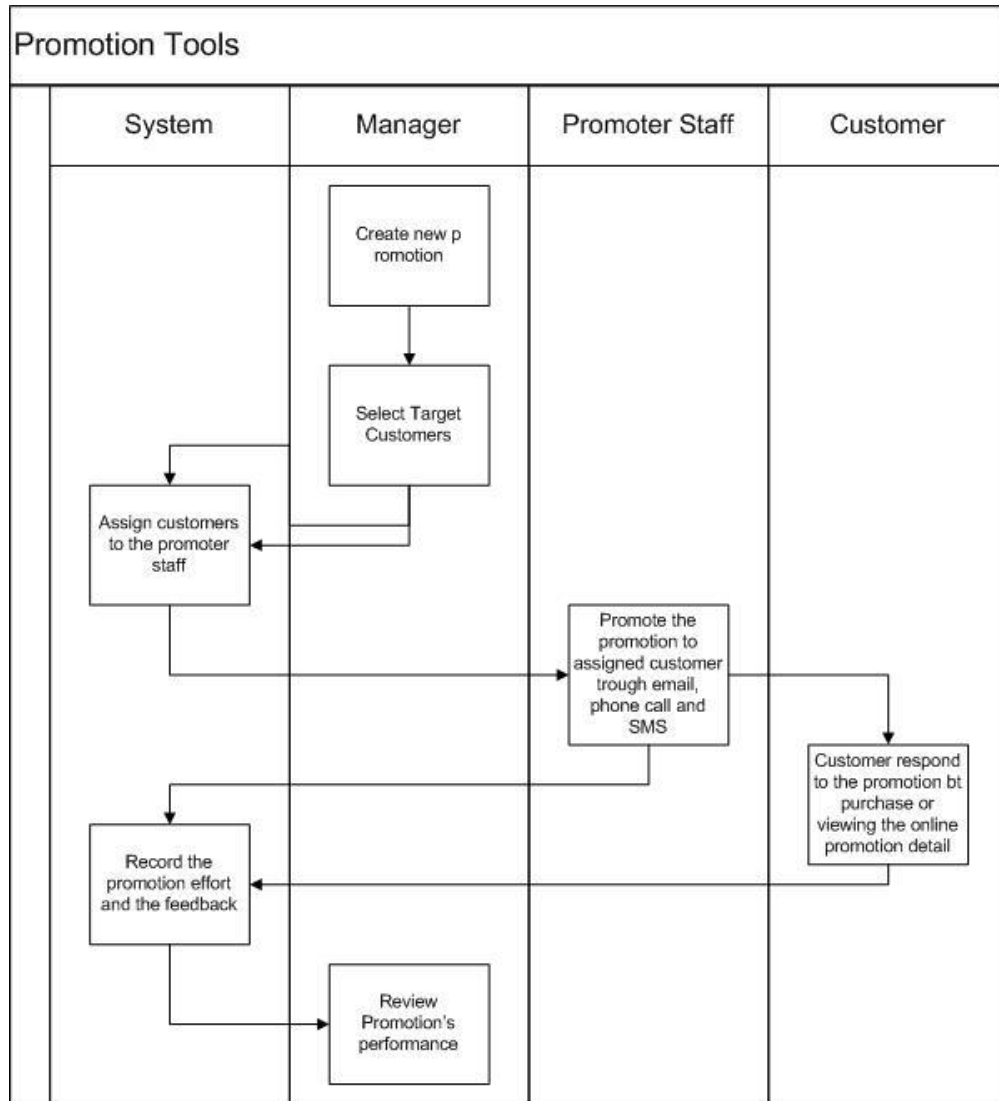
**Figure 4-2 F3 Navigation Bar Design**

## Footer Design



**Figure 4-2 F4 Footer Design**

**4-3 Activity Diagram**



**Figure 4-3 F1 Activity Diagram of Promotion**

#### 4-4 Functional Page Design

Customer Registration Page: This page is containing a form to let customer fill in the username and password to register a user to use the system.

MY CRM  
Customer Relationship Management

Home Register Setting Logout

Register User

Username\*

Password\*

I/C Number\*  xxxxxxx-xx-xx

Access Code\*

Register

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Figure 4-4 F1 Customer Registration Page

Login Page: This page provides a form for user to login and access the system.

MY CRM  
Customer Relationship Management

Home Register Setting Logout

Log in

Username\*

Password\*

Log in

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Figure 4-4 F2 Login Page

Change Password Page: A form let user to update their account's password.

MY CRM  
Customer Relationship Management

Home Users System Setting Logout

Change Password

Current Password\*

New Password\*

Confirm New Password\*

Confirm

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Figure 4-4 F 3 Change Password Page

Role list Page: Display all of the role

MY CRM  
Customer Relationship Management

Home Users System Setting Logout

Role Setting

New Role

Roles

Show 10 entries Search:

| No. | Name of Role   |
|-----|----------------|
| 1   | CUSTOMER       |
| 2   | OPERATION      |
| 3   | HQ_MANAGER     |
| 4   | ADMIN          |
| 5   | PUBLIC         |
| 6   | BRANCH_MANAGER |
| 7   | SERVICE_STAFF  |
| 8   | ADMINZ         |
| 9   | TEST_ROLE2     |

Showing 1 to 9 of 9 entries Previous Next

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Figure 4-4 F4 Role List Page



New Role Page: A form to create new role of users.

MY CRM  
Customer Relationship Management

Home Users System Setting Logout

New Role

Role Name: \*

Pages: \*  All  
 home  
 user\_sign\_up  
 sample

Widgets: \*  All  
 test  
 user\_add  
 user\_login  
 valition\_login\_id  
 role\_table

Add Back

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Figure 4-4 F5 New Role Page

New User Page: A form to create new staff user

MY CRM  
Customer Relationship Management

Home Users System Setting Logout

New User

Username: \*

Password: \*

Role: \* ADMIN

Outlet: \* ALOR GAJAH OUTLET

Add Back

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Figure 4-4 F6 New User Page

Internal User List Page: Display the entire staff user.

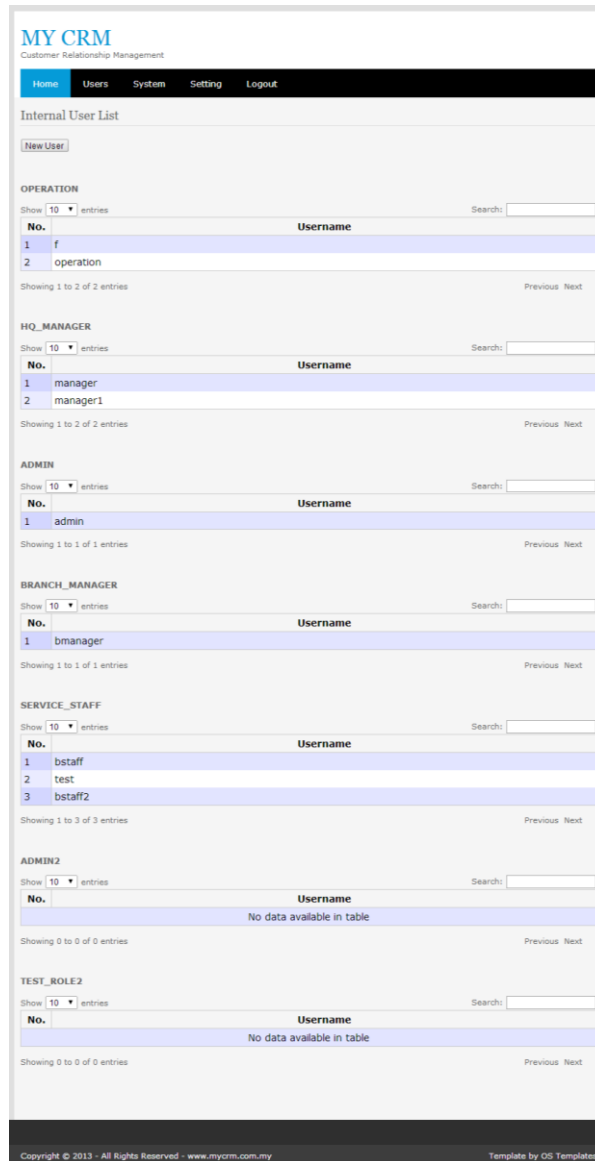


Figure 4-4 F7 Internal User List Page

Page list: Display all of the system's page

The screenshot displays the MY CRM interface. At the top, there is a navigation bar with links for Home, Users, System, Setting, and Logout. Below this is the 'Page Setting' section, which includes a 'New Page' button and a table listing pages. The table has columns for 'No.' and 'Name of Page'. Below the table, it indicates 'Showing 1 to 10 of 48 entries' and provides 'Previous' and 'Next' navigation options. The 'Widget' section follows, also featuring a table with 'No.' and 'Name of Page' columns, and 'Showing 1 to 10 of 23 entries' with 'Previous' and 'Next' options. The footer contains copyright information for 2013 and the website URL www.mycrm.com.my, along with a note that the template is by OS Templates.

| No. | Name of Page |
|-----|--------------|
| 1   | home         |
| 2   | user_sign_up |
| 3   | sample       |
| 4   | sample2      |
| 5   | sample3      |
| 6   | test_session |
| 7   | login        |
| 8   | logout       |
| 9   | role_setting |
| 10  | page_setting |

| No. | Name of Page      |
|-----|-------------------|
| 1   | test              |
| 2   | user_add          |
| 3   | user_login        |
| 4   | valition_login_id |
| 5   | role_table        |
| 6   | role_add          |
| 7   | page_table        |
| 8   | page_add          |
| 9   | page_update       |
| 10  | role_update       |

Figure 4-4 F8 Page List

New Page: A form to create new web page of system

The screenshot shows a web application interface for 'MY CRM' (Customer Relationship Management). At the top, there is a navigation menu with 'Home', 'Users', 'System', 'Setting', and 'Logout'. The main content area is titled 'New Page' and contains the following form elements:

- File name:\***: A text input field.
- Type:\***: A dropdown menu currently showing 'PAGE'.
- Role:\***: A list of roles with checkboxes:
  - All
  - CUSTOMER
  - OPERATION
  - HQ\_MANAGER
  - ADMIN
  - PUBLIC
  - BRANCH\_MANAGER
  - SERVICE\_STAFF
  - ADMIN2
  - TEST\_ROLE2

At the bottom of the form, there are two buttons: 'Add' and 'Back'. The footer of the page contains the text: 'Copyright © 2013 - All Rights Reserved - www.mycrm.com.my' and 'Template by OS Templates'.

**Figure 4-4 F9 New Page Form**

Customer Filter Page: A form with options to filter out a list of customer.

**MY CRM**  
Customer Relationship Management

Home Tools Promotion Tools Setting Logout

Filter Customer

Gender\* All

Age\* to

Race\* All  
CHINESE  
MALAY  
INDIAN  
OTHERS

State\* All  
JOHOR  
KEDAH  
KELANTAN  
KUALA LUMPUR  
LABUAN  
MALACCA  
NEGERI SEMBILAN  
PAHANG  
PENANG

City\* All  
ALOR GAJAH  
ALOR SETAR  
ASAJAYA  
BACHOK  
BALING  
BANDAR BARU SELAYANG  
BANDAR BERA  
BANDAR SERI JEMPOL  
BATU GAJAH

Search

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Figure 4-4 F10 Customer Filter Page

Customer Filter Result Page: List of filtered customer.

**MY CRM**  
Customer Relationship Management

Home Tools Promotion Tools Setting Logout

**Filter Options**

GENDER: FEMALE, MALE  
 AGE: 0 TO 99  
 RACE: CHINESE, INDIAN, MALAY, OTHERS  
 STATE: JOHOR, KEDAH, KELANTAN, KUALA LUMPUR, LABUAN, MALACCA, NEGERI SEMBILAN, PAHANG, PENANG, PERAK, PERLIS, PUTRAJAYA, SABAH, SARAWAK, SELANGOR, TERENGGANU  
 CITY: ALOR GAJAH  
 Total Customer: 29

**SUMMARY**

**Gender Analysis**

Show 10 entries Search:

| Gender | Count of customers |
|--------|--------------------|
| FEMALE | 16                 |
| MALE   | 13                 |

Showing 1 to 2 of 2 entries Previous Next

**Race Analysis**

Show 10 entries Search:

| Race    | Count of customers |
|---------|--------------------|
| CHINESE | 7                  |
| INDIAN  | 8                  |
| MALAY   | 6                  |
| OTHERS  | 8                  |

Showing 1 to 4 of 4 entries Previous Next

**Age Analysis**

Show 10 entries Search:

| Age   | Count of customers |
|-------|--------------------|
| 15-20 | 1                  |
| 20-25 | 6                  |
| 25-30 | 2                  |
| 30-35 | 4                  |
| 35-40 | 4                  |
| 40-45 | 2                  |
| 45-50 | 7                  |
| 50-55 | 3                  |

Showing 1 to 8 of 8 entries Previous Next

**State Analysis**

Show 10 entries Search:

| State   | Count of customers |
|---------|--------------------|
| MALACCA | 29                 |

Showing 1 to 1 of 1 entries Previous Next

**City Analysis**

Show 10 entries Search:

| City       | Count of customers |
|------------|--------------------|
| ALOR GAJAH | 29                 |

Showing 1 to 1 of 1 entries Previous Next

**Customer List**

Show 10 entries Search:

| Name           | IC             | Gender | Age | Race    | City       |
|----------------|----------------|--------|-----|---------|------------|
| Aurora Irena   | 680310-09-8492 | MALE   | 46  | MALAY   | ALOR GAJAH |
| Belva My       | 880223-04-2236 | FEMALE | 26  | MALAY   | ALOR GAJAH |
| Brad Jami      | 630323-01-9329 | MALE   | 51  | CHINESE | ALOR GAJAH |
| Brandie Tama   | 951122-04-4214 | FEMALE | 19  | OTHERS  | ALOR GAJAH |
| Carmna Karlene | 900401-02-7584 | MALE   | 24  | MALAY   | ALOR GAJAH |
| Cela Esta      | 930915-06-7866 | FEMALE | 21  | OTHERS  | ALOR GAJAH |
| Coreen Lavonne | 720311-05-2821 | MALE   | 42  | OTHERS  | ALOR GAJAH |
| Dewey Donnette | 610130-01-9561 | FEMALE | 53  | OTHERS  | ALOR GAJAH |
| Dominique Chau | 760113-01-7564 | FEMALE | 38  | OTHERS  | ALOR GAJAH |
| Elva Esta      | 670823-08-5445 | MALE   | 47  | CHINESE | ALOR GAJAH |

Showing 1 to 10 of 29 entries Previous Next

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Figure 4-4 F11 Customer Filter Result Page

## Chapter 4 System and Interface Design

### Customer Profile Page: Display the customer's profile

**MY CRM**  
Customer Relationship Management

Home Promotion Tools Setting Logout

#### Customer Profile

**Customer's Information**

|               |                  |
|---------------|------------------|
| NAME:         | Angela Angella   |
| IC:           | 731023-07-3940   |
| GENDER:       | MALE             |
| AGE:          | 41               |
| RACE:         | CHINESE          |
| DATE OF BORN: | 1973-10-23       |
| ADDRESS:      | 2397, Lorong 100 |
| POSTCODE:     | 50462            |
| CITY:         | BATU PAHAT       |
| STATE:        | JOHOR            |
| CONTACT:      | 60-13-8665743    |
| Access Code:  | 2728             |

**Customer Behaviour**

#### Most Favourite Items

Show 10 entries Search

| Item Name                         | Purchase Frequency | Total Profit(RM) |
|-----------------------------------|--------------------|------------------|
| Costco Pen                        | 3                  | 140.16           |
| Emel Cutlery                      | 2                  | 331.52           |
| Royal Dutch Doll                  | 2                  | 172.62           |
| Fat Brush                         | 2                  | 45.50            |
| Clanore Sweater                   | 2                  | 125.43           |
| POVSA Birthday Card               | 2                  | 202.46           |
| Carrollour Information Technology | 2                  | 113.28           |
| Emel Short                        | 2                  | 321.68           |
| Samsung Nail and Srew             | 2                  | 8.20             |
| JXH Desk                          | 2                  | 42.56            |

Showing 1 to 10 of 205 entries Previous Next

#### Visit Frequency

Show 10 entries Search

| Index | DAY       | Visit Frequency | Total Spending(RM) |
|-------|-----------|-----------------|--------------------|
| 5     | Thursday  | 10              | 6,467.20           |
| 6     | Friday    | 8               | 3,039.59           |
| 4     | Wednesday | 5               | 1,478.65           |
| 7     | Saturday  | 5               | 1,794.61           |
| 1     | Sunday    | 4               | 956.84             |
| 3     | Tuesday   | 4               | 2,363.73           |
| 2     | Monday    | 2               | 818.37             |

Showing 1 to 7 of 7 entries Previous Next

#### Spent on different Category

Show 10 entries Search

| Category                     | Total Spending(RM) | Total Profit(RM) |
|------------------------------|--------------------|------------------|
| Apparel                      | 5,583.00           | 3,117.93         |
| Linen, Home Decor, Furniture | 5,084.00           | 2,637.38         |
| Housewares and Appliances    | 4,138.00           | 2,207.59         |
| Drugs                        | 3,681.00           | 1,798.34         |
| Cards, Books, Music, Video   | 3,651.00           | 1,829.18         |
| Home Improvement             | 2,476.00           | 1,185.38         |
| Toys and Video Games         | 2,055.00           | 952.45           |
| Computers, Office Supplies   | 1,896.00           | 980.59           |
| Photo And Jewelry            | 1,585.00           | 794.18           |
| Electronics                  | 1,428.00           | 814.60           |

Showing 1 to 10 of 11 entries Previous Next

#### Transaction History

Show 10 entries Search

| ID     | Date       | Payment (RM) | Profit (RM) | Outlet            |
|--------|------------|--------------|-------------|-------------------|
| 145558 | 2013-12-25 | 946.00       | 481.64      | BATU PAHAT OUTLET |
| 140697 | 2013-12-13 | 117.00       | 62.01       | BATU PAHAT OUTLET |
| 140300 | 2013-12-12 | 1,520.00     | 867.78      | BATU PAHAT OUTLET |
| 134224 | 2013-11-27 | 274.00       | 140.40      | BATU PAHAT OUTLET |
| 131360 | 2013-11-20 | 315.00       | 151.89      | BATU PAHAT OUTLET |
| 129751 | 2013-11-16 | 64.00        | 43.52       | BATU PAHAT OUTLET |
| 128917 | 2013-11-14 | 1,700.00     | 846.11      | BATU PAHAT OUTLET |
| 123147 | 2013-10-31 | 733.00       | 457.97      | BATU PAHAT OUTLET |
| 120741 | 2013-10-25 | 1,198.00     | 559.34      | BATU PAHAT OUTLET |
| 118689 | 2013-10-20 | 236.00       | 105.21      | BATU PAHAT OUTLET |

Showing 1 to 10 of 38 entries Previous Next

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Figure 4-4 F12 Customer Profile

Product Selection Page: A form to select products.

**MY CRM**  
Customer Relationship Management

Home Tools Promotion Tools Setting Logout

Summary of Products

Main Category

- Apparel
- Cards, Books, Music, Video
- Computers, Office Supplies
- Drugs
- Electronics**
- Home Improvement
- Housewares and Appliances
- Linens, Home Decor, Furniture
- Photo And Jewellery
- Sports
- Toys and Video Games

Second Category

- Communications Electronics
- Entertainment Electronics**

Third Category

- Car Audio
- CD Player
- DVD Player
- iPod
- MP3 Player**
- Stereo Component
- Television

Products Details

Show 10 entries Search:

| Product Name         | Price (RM) | Profit Per unit(RM) | Manufacturer                 |
|----------------------|------------|---------------------|------------------------------|
| BMW MP3 Player       | 169.00     | 104.78              | BMW                          |
| Costco MP3 Player    | 117.00     | 40.95               | Costco                       |
| Eni MP3 Player       | 124.00     | 75.64               | Eni                          |
| Hewlett MP3 Player   | 145.00     | 71.05               | Hewlett-Packard              |
| Kuwait MP3 Player    | 119.00     | 45.22               | Kuwait Petroleum Corporation |
| NI MP3 Player        | 130.00     | 59.80               | National Iranian             |
| Pemex MP3 Player     | 169.00     | 118.30              | Pemex                        |
| Petrobras MP3 Player | 119.00     | 79.73               | Petrobras                    |
| Samsung MP3 Player   | 148.00     | 90.28               | Samsung Electronics          |
| Valero MP3 Player    | 135.00     | 67.50               | Valero Energy                |

Showing 1 to 10 of 10 entries Previous Next

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Figure 4-4 F 13 Product Selection Page



Product Analysis Page: Display the analysis of the selected product

**MY CRM**  
Customer Relationship Management

Home Tools Promotion Tools Setting Logout

Product Profile

**Product's Information**

|                     |                           |
|---------------------|---------------------------|
| Product's ID:       | 3864                      |
| Product's Name:     | Aramco Refrigerator       |
| Manufacturer:       | Saudi Aramco              |
| Current Price(RM):  | 13.00                     |
| Current Profit(RM): | 4.81                      |
| Main Category:      | Housewares and Appliances |
| Second Category:    | Major Appliances          |
| Third Category:     | Refrigerator              |
| Total Sold Unit:    | 549                       |
| Total Profit(RM):   | 2,640.69                  |

Product Sales Performance

Months Analysis

Show 10 entries Search:

| Index | Month    | Unit Sold | Total Profit(RM) |
|-------|----------|-----------|------------------|
| 12    | December | 60        | 288.60           |
| 11    | November | 57        | 274.17           |
| 07    | July     | 53        | 254.93           |
| 10    | October  | 47        | 226.07           |
| 03    | March    | 46        | 221.26           |
| 04    | April    | 45        | 216.45           |
| 06    | June     | 44        | 211.64           |
| 01    | January  | 42        | 202.02           |
| 08    | August   | 41        | 197.21           |
| 02    | February | 39        | 187.59           |

Showing 1 to 10 of 12 entries Previous Next

Weekday Analysis

Show 10 entries Search:

| Index | DAY       | Unit Sold | Total Profit(RM) |
|-------|-----------|-----------|------------------|
| 4     | Thursday  | 93        | 447.33           |
| 2     | Tuesday   | 85        | 408.85           |
| 3     | Wednesday | 83        | 399.23           |
| 1     | Monday    | 80        | 384.80           |
| 5     | Friday    | 76        | 365.56           |
| 6     | Saturday  | 70        | 336.70           |
| 0     | Sunday    | 62        | 298.22           |

Showing 1 to 7 of 7 entries Previous Next

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Figure 4-4 F 14 Product Analysis Page

New Promotion Page: A form to create new promotion

**MY CRM**  
Customer Relationship Management

Home Tools Promotion Tools Setting Logout

### New Promotion

**Active**  Active

**Promotion Title**

**Main Category** Apparel ▾

**Second Category** Children's Wear ▾

**Third Category** Baby Clothes ▾

**Product** Enel Baby Clothes ▾

**Start Date**

**End Date**

**Promotion Detail**

Normal · It · A · B / U | | x<sub>2</sub> x<sup>2</sup> | | \$ oo op e - ←

**Promotion Outlet**

- ALL

**JOHOR**

- BATU PAHAT OUTLET
- KOTA TINGGI OUTLET
- MUAR OUTLET
- TANGKAK OUTLET
- JOHOR BAHRU OUTLET
- KULAI OUTLET
- PONTIAN KECHIL OUTLET
- KLUANG OUTLET
- MERSING OUTLET
- SEGAMAT OUTLET

**KEDAH**

- ALOR SETAR OUTLET
- KUAH OUTLET
- PFDANG OUTI FT
- SIK OUTLET
- BALING OUTLET
- KUALA NERANG OUTLET
- POKOK SFNA OUTI FT
- SUNGAI PETANI OUTLET
- JITRA OUTLET
- KULIM OUTLET
- SFRDANG OUTI FT
- YAN OUTLET

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Figure 4-4 F15 New Promotion Page

Customer Filter Page (Promotion): Select option to filter list of customer to promote.

The screenshot displays the 'MY CRM' interface for Customer Relationship Management. The top navigation bar includes 'Home', 'Tools', 'Promotion Tools' (highlighted), 'Setting', and 'Logout'. Below this, a 'Customer Filterin' dropdown menu is open, showing 'All Promotion' and 'New Promotion' options. The main form area contains a 'Filter Option' dropdown set to 'Customer buying other products'. A 'Product Information' section includes four dropdown menus: 'Main Category' (Apparel), 'Second Category' (Children's Wear), 'Third Category' (Baby Clothes), and 'Product' (Enel Baby Clothes). A 'Submit' button is located at the bottom left of the form. The footer contains the copyright notice 'Copyright © 2013 - All Rights Reserved - www.mycrm.com.my' and the text 'Template by OS Templates'.

Figure 4-4 F16 Customer Filter Page (Promotion)

Customer Filter Result (Promotion): Display a list of filtered customer.

**MY CRM**  
Customer Relationship Management

Home Tools Promotion Tools Setting Logout

Promotion Filtering Customer

BACK

Filter By: Customer who bought before

Total Customer: 518

Process

Show 10 entries Search:

| ID   | Customer's Name  | Register Outlet    | Phone         | Email               |
|------|------------------|--------------------|---------------|---------------------|
| 1240 | Alba Donnette    | TELUK DATOK OUTLET | 60-13-1780060 | testing@testing.com |
| 2716 | Alba Felicidad   | TELUPID OUTLET     | 60-10-4501121 | testing@testing.com |
| 2804 | Alba Georgina    | KUALA LIPIS OUTLET | 60-15-9602713 | testing@testing.com |
| 3802 | Alba Jarod       | KUCHING OUTLET     | 60-15-5623392 | testing@testing.com |
| 3688 | Alejandro Blaine | SEGAMAT OUTLET     | 60-11-7609810 | testing@testing.com |
| 2262 | Alejandro Joye   | KUCHING OUTLET     | 60-13-7445174 | testing@testing.com |
| 3172 | Alejandro Vanna  | KUALA KLANG OUTLET | 60-19-1750314 | testing@testing.com |
| 550  | Alejandro Vanna  | PEKAN OUTLET       | 60-14-8565706 | testing@testing.com |
| 2180 | Angelita Blaine  | SIMUNJAN OUTLET    | 60-12-1577239 | testing@testing.com |
| 1225 | Angelita Brad    | TANAH MERAH OUTLET | 60-16-3706800 | testing@testing.com |

Showing 1 to 10 of 518 entries Previous Next

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Figure 4-4 F 17 Customer Filter Result (Promotion)

Promotion List Page: Display list of entire promotion created

**MY CRM**  
Customer Relationship Management

Home Tools Promotion Tools Setting Logout

Promotion

Show 10 entries Search:

| ID | Title           | Start Date | End Date   | Performance |
|----|-----------------|------------|------------|-------------|
| 15 | Test Promotion2 | 2014-04-18 | 2014-04-25 | CHECK       |
| 13 | test            | 2014-04-01 | 2014-04-05 | CHECK       |
| 14 | test            | 2014-04-01 | 2014-04-05 | CHECK       |
| 1  |                 | 2014-03-15 | 2014-03-25 | CHECK       |
| 10 | Test3-1         | 2014-03-15 | 2014-03-26 | CHECK       |
| 2  | Test1           | 2014-03-10 | 2014-03-10 | CHECK       |
| 4  | Test2           | 2014-03-10 | 2014-03-10 | CHECK       |
| 7  |                 | 2014-03-10 | 2014-03-10 | CHECK       |
| 11 | Test3           | 2014-03-10 | 2014-03-26 | CHECK       |
| 12 | test4           | 2014-03-10 | 2014-03-29 | CHECK       |

Showing 1 to 10 of 12 entries Previous Next

Feedback Rate among Months

Show 10 entries Search:

| Month   | Total Promotion | Total Feedback | Feedback / Promotion(%) | Total Promoted Customer | Total Feedbacked Customer | Feedback / Promotion(%) |
|---------|-----------------|----------------|-------------------------|-------------------------|---------------------------|-------------------------|
| 00/0000 | 0               | 0              | 0                       | 0                       | 0                         | 0                       |
| 03/2014 | 94              | 91             | 96.81                   | 8                       | 4                         | 50.00                   |
| 04/2014 | 3               | 3              | 100.00                  | 1                       | 1                         | 100.00                  |

Showing 1 to 3 of 3 entries Previous Next

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Figure 4-4 F18 Promotion List Page

Promotion Detail Page (Manager): Display all information of the selected promotion

**MY CRM**  
Customer Relationship Management

Home Promotion Tools Setting Logout

Promotion Detail

Branch: BATU PAHAT OUTLET

|                    |                         |
|--------------------|-------------------------|
| Active             | Activated               |
| Promotion Title    | Test Promotion2         |
| Main Category      | Apparel                 |
| Second Category    | Children's Wear         |
| Third Category     | Baby Clothes            |
| Product            | Enel Baby Clothes       |
| Start Date         | 2014-04-18              |
| End Date           | 2014-04-25              |
| Promotion Detail   | Test Promotion Content2 |
| Promotion's Target | 33                      |
| Promoted Targets   | 1                       |
| Feedbacked Targets | 1                       |

Targeted Customers

Show 10 entries Search:

| ID   | Customer's Name  | Phone         | Email               |
|------|------------------|---------------|---------------------|
| 1921 | Angella Angelita | 60-13-6865743 | testing@testing.com |
| 3714 | Angella Augusta  | 60-18-0214935 | testing@testing.com |
| 3586 | Belva Emily      | 60-12-4926937 | testing@testing.com |
| 1222 | Brandie Ellie    | 60-19-7492254 | testing@testing.com |
| 1506 | Brandie Libby    | 60-18-0007915 | testing@testing.com |
| 1729 | Carleen Roselle  | 60-11-4513797 | testing@testing.com |
| 1442 | Carlos Augusta   | 60-10-2458960 | testing@testing.com |
| 4117 | Esta Brad        | 60-16-6611038 | testing@testing.com |
| 1808 | Esta Vanna       | 60-11-2361835 | testing@testing.com |
| 3443 | Eusebia Tiffani  | 60-14-6793430 | testing@testing.com |

Showing 1 to 10 of 33 entries Previous Next

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Figure 4-4 F19 Promotion Detail Page (Manager)

Promotion Performance Page: Display the analysis of the promotion

**MY CRM**  
Customer Relationship Management

Home Tools Promotion Tools Setting Logout

**Promotion Detail**

|                    |                         |
|--------------------|-------------------------|
| Active             | Activated               |
| Promotion Title    | Test Promotion2         |
| Main Category      | Apparel                 |
| Second Category    | Children's Wear         |
| Third Category     | Baby Clothes            |
| Product            | Enel Baby Clothes       |
| Start Date         | 2014-04-18              |
| End Date           | 2014-04-25              |
| Promotion Detail   | Test Promotion Content2 |
| Promotion's Target | 4124                    |
| Promoted Targets   | 1                       |
| Feedbacked Targets | 1                       |

**Total Promotion Done**

Show 10 entries Search:

| Action Taken | Total Times | Total Customer |
|--------------|-------------|----------------|
| EMAIL        | 1           | 1              |
| PHONE_CALL   | 1           | 1              |
| SMS          | 1           | 1              |

Showing 1 to 3 of 3 entries Previous Next

**Total Feedback Done**

Show 10 entries Search:

| Action Taken         | Total Times | Total Customer |
|----------------------|-------------|----------------|
| VISIT_PROMOTION_PAGE | 1           | 1              |

Showing 1 to 1 of 1 entries Previous Next

**Feedback VS Promotion**

Show 10 entries Search:

| Type       | Total Times | Total Customer |
|------------|-------------|----------------|
| Feedback   | 1           | 1              |
| Promotions | 3           | 1              |

Showing 1 to 2 of 2 entries Previous Next

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Figure 4-4 F20 Promotion Performance Page

Assigned Task Page (Promoter): Display a list of promotion to promote.

The screenshot displays the MY CRM interface for the 'Assigned Task Page (Promoter)'. The page title is 'MY CRM Customer Relationship Management'. The navigation menu includes 'Home', 'Promotion Tools', 'Setting', and 'Logout'. The main content area is titled 'Task' and shows the branch 'Branch: BATU PAHAT OUTLET'. Below this, there is a 'Show 10 entries' dropdown and a search box. A table lists two promotion tasks with columns for ID, Title, Start Date, End Date, Target, Promoted, and Feedbacked. The first row is highlighted in blue.

| ID | Title           | Start Date | End Date   | Target | Promoted | Feedbacked |
|----|-----------------|------------|------------|--------|----------|------------|
| 15 | Test Promotion2 | 2014-04-18 | 2014-04-25 | 3      | 1        | 1          |
| 10 | Test3-1         | 2014-03-15 | 2014-03-26 | 29     | 8        | 3          |

Showing 1 to 2 of 2 entries Previous Next

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Figure 4-4 F 21 Assigned Task Page (Promoter)



Promotion Detail Page (Promoter): Display the work done for the promotion.

**MY CRM**  
Customer Relationship Management

Home Promotion Tools Setting Logout

Promotion Detail

Branch: **BATU PAHAT OUTLET**

|                    |                         |
|--------------------|-------------------------|
| Active             | Activated               |
| Promotion Title    | Test Promotion2         |
| Main Category      | Apparel                 |
| Second Category    | Children's Wear         |
| Third Category     | Baby Clothes            |
| Product            | Enel Baby Clothes       |
| Start Date         | 2014-04-18              |
| End Date           | 2014-04-25              |
| Promotion Detail   | Test Promotion Content2 |
| Promotion's Target | 3                       |
| Promoted Targets   | 1                       |
| Feedbacked Targets | 1                       |

Targeted Customers

Show 10 entries Search:

| ID   | Customer's Name   | Phone         | Email               | Action                   |
|------|-------------------|---------------|---------------------|--------------------------|
| 1222 | Brande Ellie      | 60-19-7492254 | testing@testing.com | EMAIL(1) PHONE(1) SMS(1) |
| 3443 | Eusebia Tiffani   | 60-14-6793430 | testing@testing.com | EMAIL(0) PHONE(0) SMS(0) |
| 420  | Wilhelmina Tyisha | 60-13-5581048 | testing@testing.com | EMAIL(0) PHONE(0) SMS(0) |

Showing 1 to 3 of 3 entries Previous Next

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Figure 4-4 F22 Promotion Detail Page

Email Template: A template to send email to user.

The screenshot displays the 'MY CRM' interface for sending an email. The header includes the logo 'MY CRM' and the text 'Customer Relationship Management'. A navigation bar contains links for 'Home', 'Promotion Tools', 'Setting', and 'Logout'. The main section is titled 'Send Email' and contains a form with the following fields:

- To:** testing@testing.com
- Subject:** Test Promotion2
- Content:** A rich text editor containing:
  - Dear Brande Ellie
  - Outlet: BATU PAHAT OUTLET
  - Product: Enel Baby Clothes
  - Date: 2014-04-18 to 2014-04-25
  - Test Promotion Content2
  - Thank You and Best Regards,  
Marketing Team
  - Company Name
  - Email: [email@company.com](mailto:email@company.com)
  - Phone: 012-3456789

A 'Send' button is located below the content field. The footer contains the text 'Copyright © 2013 - All Rights Reserved - www.mycrm.com.my' and 'Template by OS Templates'.

Figure 4-4 F23 Email Template

Phone Call Template: Display the calling phone information.

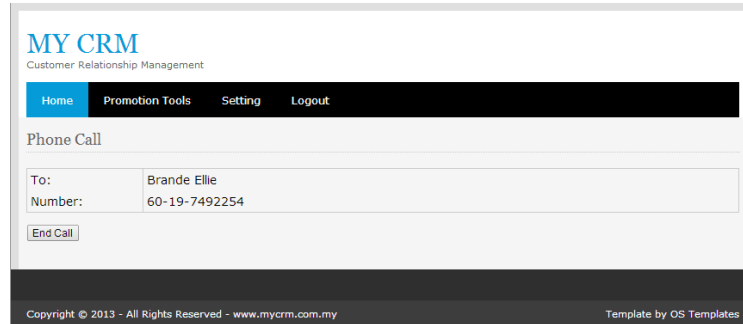


Figure 4-4 F24 Phone Call Template

SMS Template: A template to send SMS to the phone number.

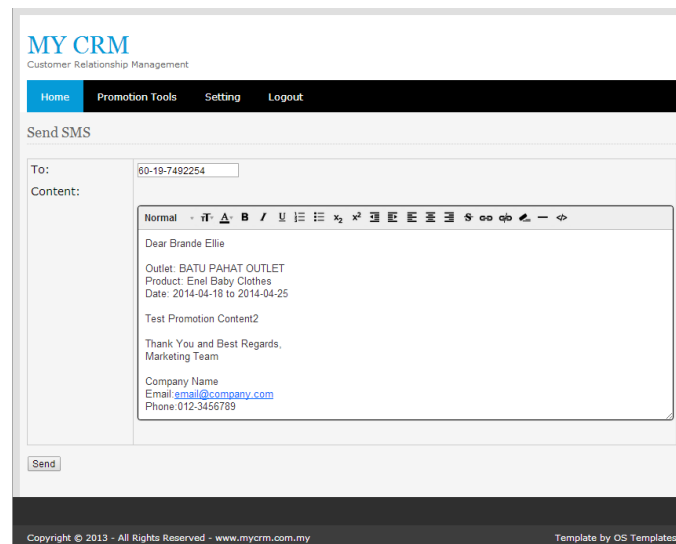


Figure 4-4 F25 SMS Template

Offered Promotion Page (Customer): Display the promotion offer to the user.

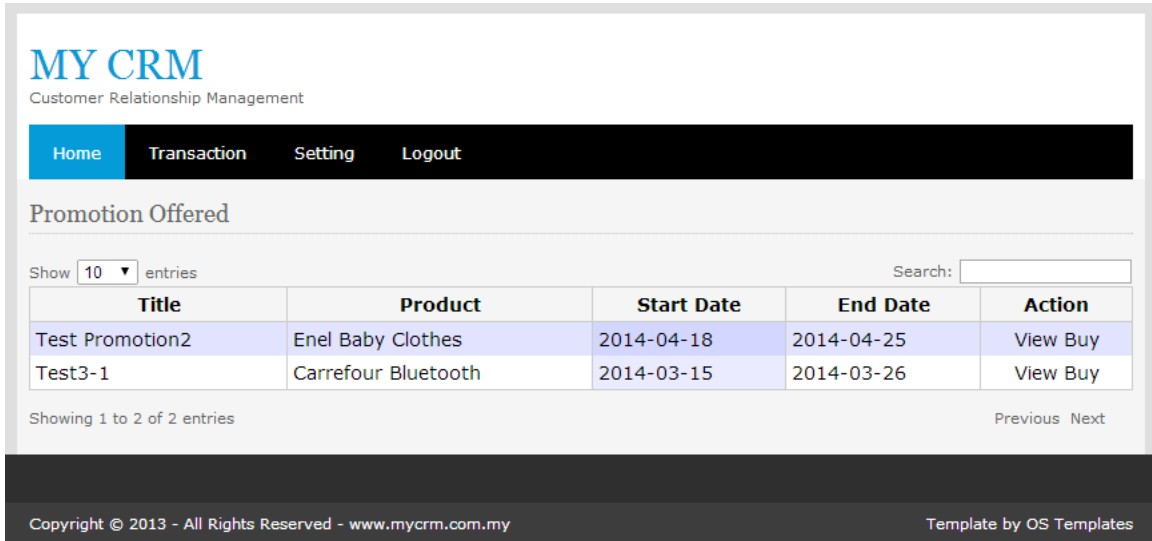
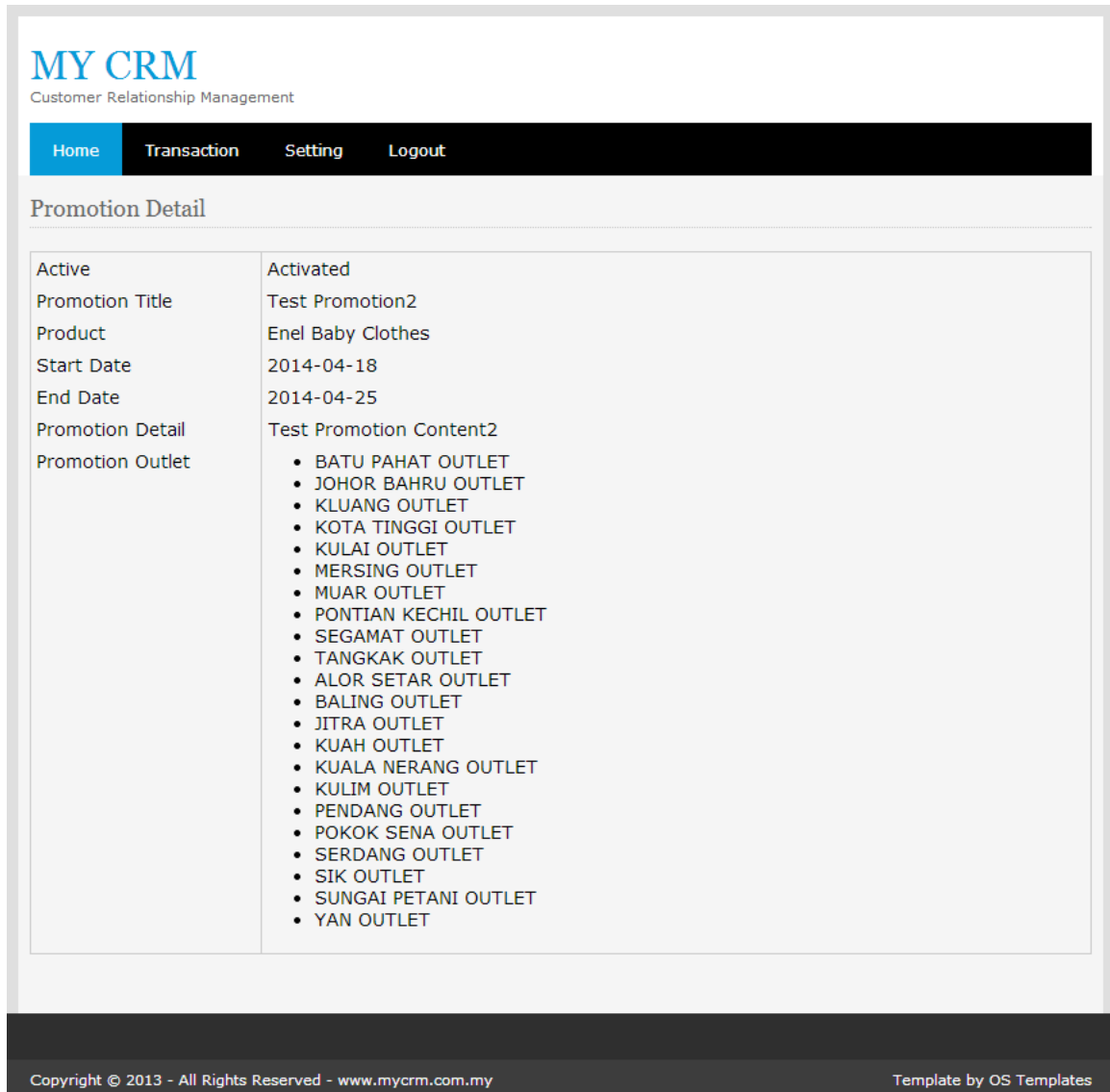


Figure 4-4 F26 Offered Promotion Page

Promotion Detail Page (Customer): Display the selected promotion.



**Figure 4-4 F27 Promotino Detail Page (Customer)**

Transaction History Page (Customer): Display the processed transaction of the user.

**MY CRM**  
Customer Relationship Management

Home Transaction Setting Logout

Transaction History

Show 10 entries Search:

| ID     | Date       | Payment (RM) | Profit (RM) | Outlet            |
|--------|------------|--------------|-------------|-------------------|
| 148385 | 2014-03-15 | 66.00        | 34.32       | BATU PAHAT OUTLET |
| 148384 | 2014-03-15 | 66.00        | 34.32       | BATU PAHAT OUTLET |
| 148383 | 2014-03-15 | 66.00        | 34.32       | BATU PAHAT OUTLET |
| 148382 | 2014-03-15 | 66.00        | 34.32       | BATU PAHAT OUTLET |
| 146760 | 2013-12-28 | 17.00        | 10.20       | BATU PAHAT OUTLET |
| 142762 | 2013-12-18 | 71.00        | 39.76       | BATU PAHAT OUTLET |
| 119503 | 2013-10-22 | 529.00       | 296.24      | BATU PAHAT OUTLET |
| 117049 | 2013-10-16 | 90.00        | 53.10       | BATU PAHAT OUTLET |
| 113027 | 2013-10-06 | 1,257.00     | 676.32      | BATU PAHAT OUTLET |
| 112618 | 2013-10-05 | 540.00       | 356.60      | BATU PAHAT OUTLET |

Showing 1 to 10 of 26 entries Previous Next

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Figure 4-4 F28 Transaction History Page

4-5 Entity Relationship Diagram

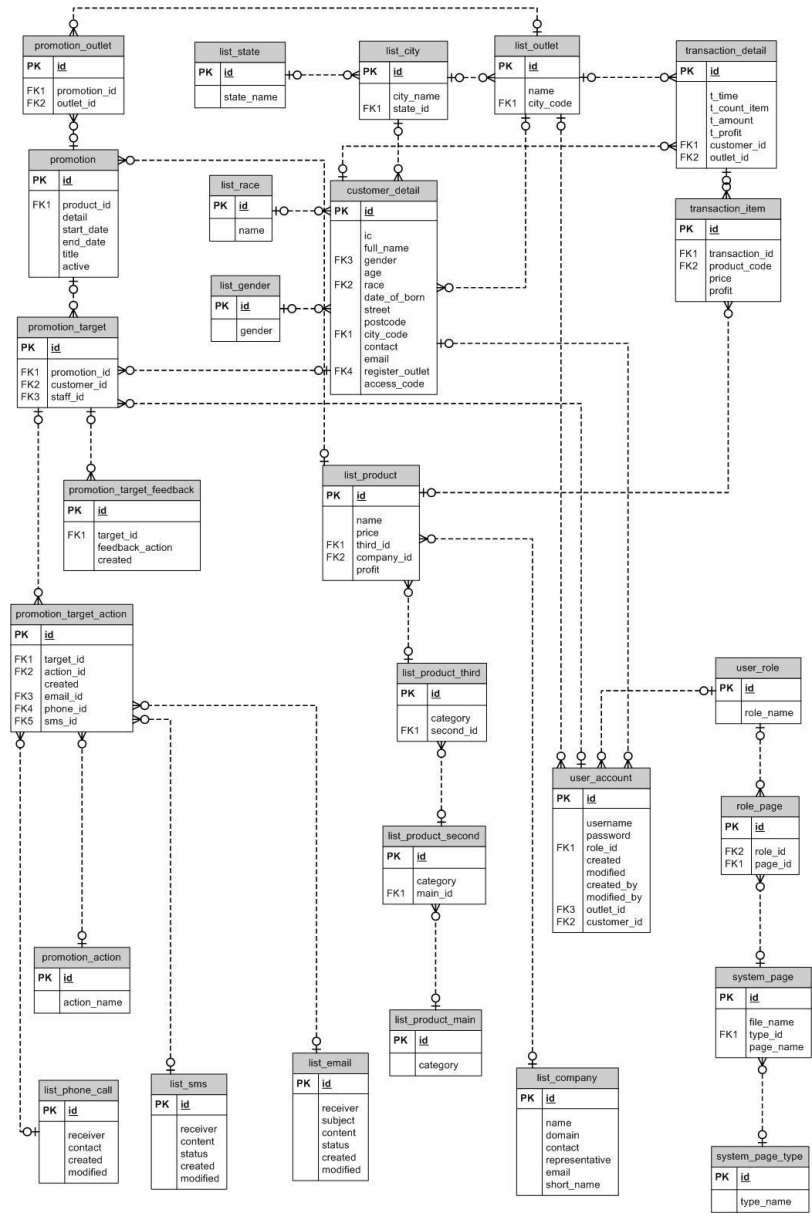


Figure 4-5 F1 Entity Relationship Diagram (ERD)

4-5-1 Customer Detail

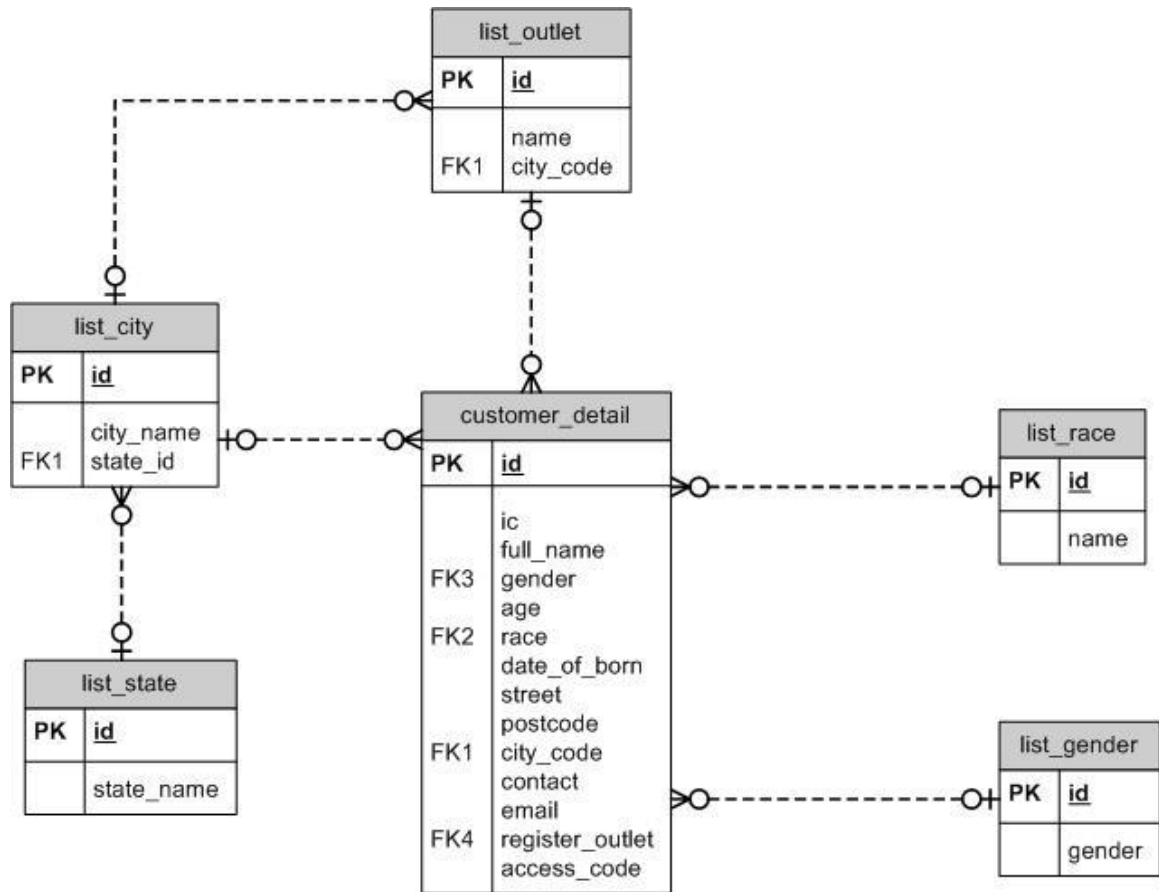


Figure 4-5-1 F1 Customer Detail ERD



4-5-2 User Account

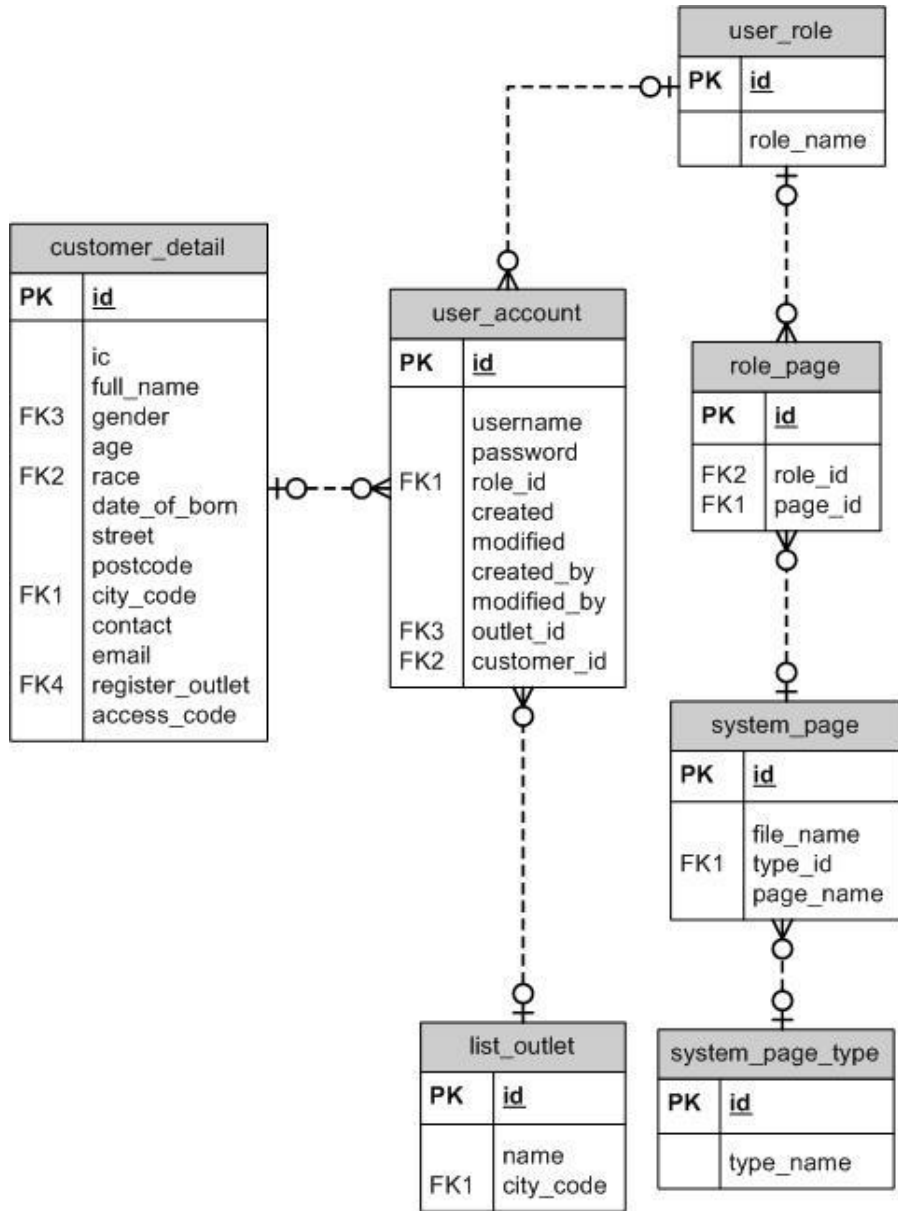


Figure 4-5-2 F1 User Account ERD

4-5-3 Transaction Detail

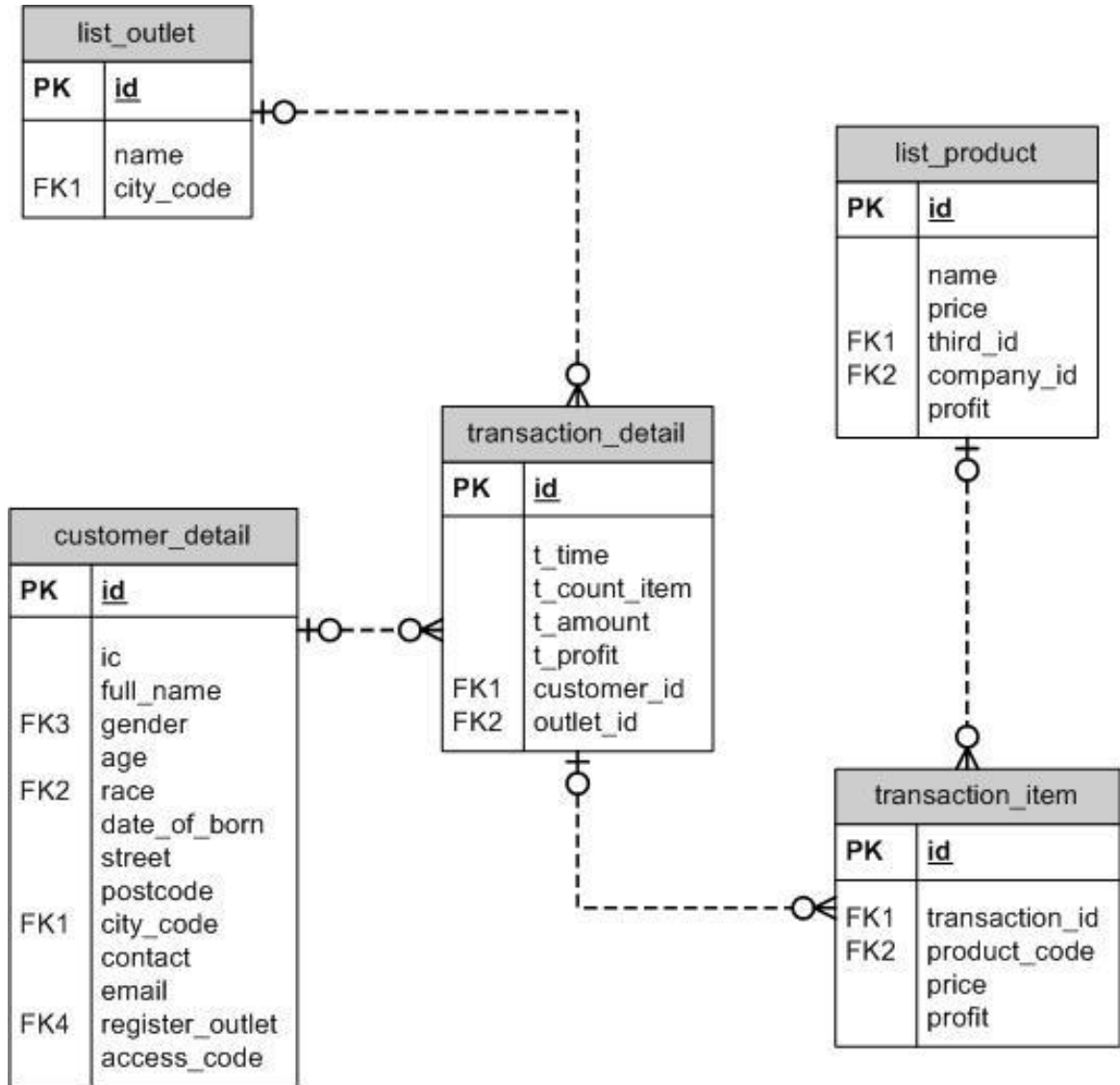


Figure 4-5-3 F1 Transaction Detail ERD

4-5-4 Product Detail

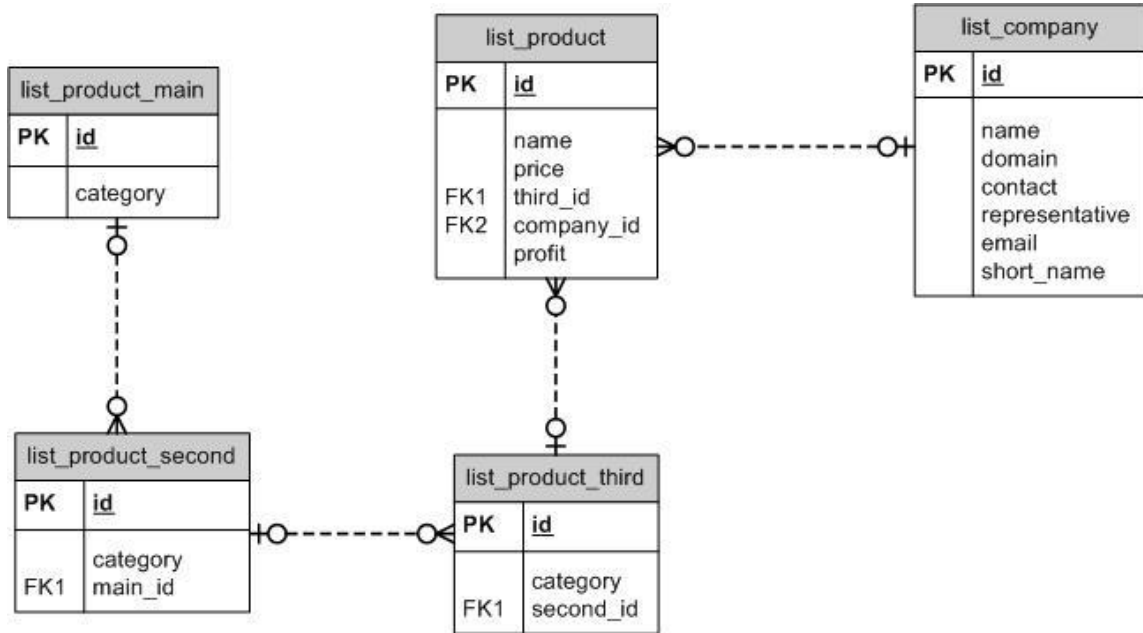


Figure 4-5-4 F1 Product Detail

4-5-5 Promotion

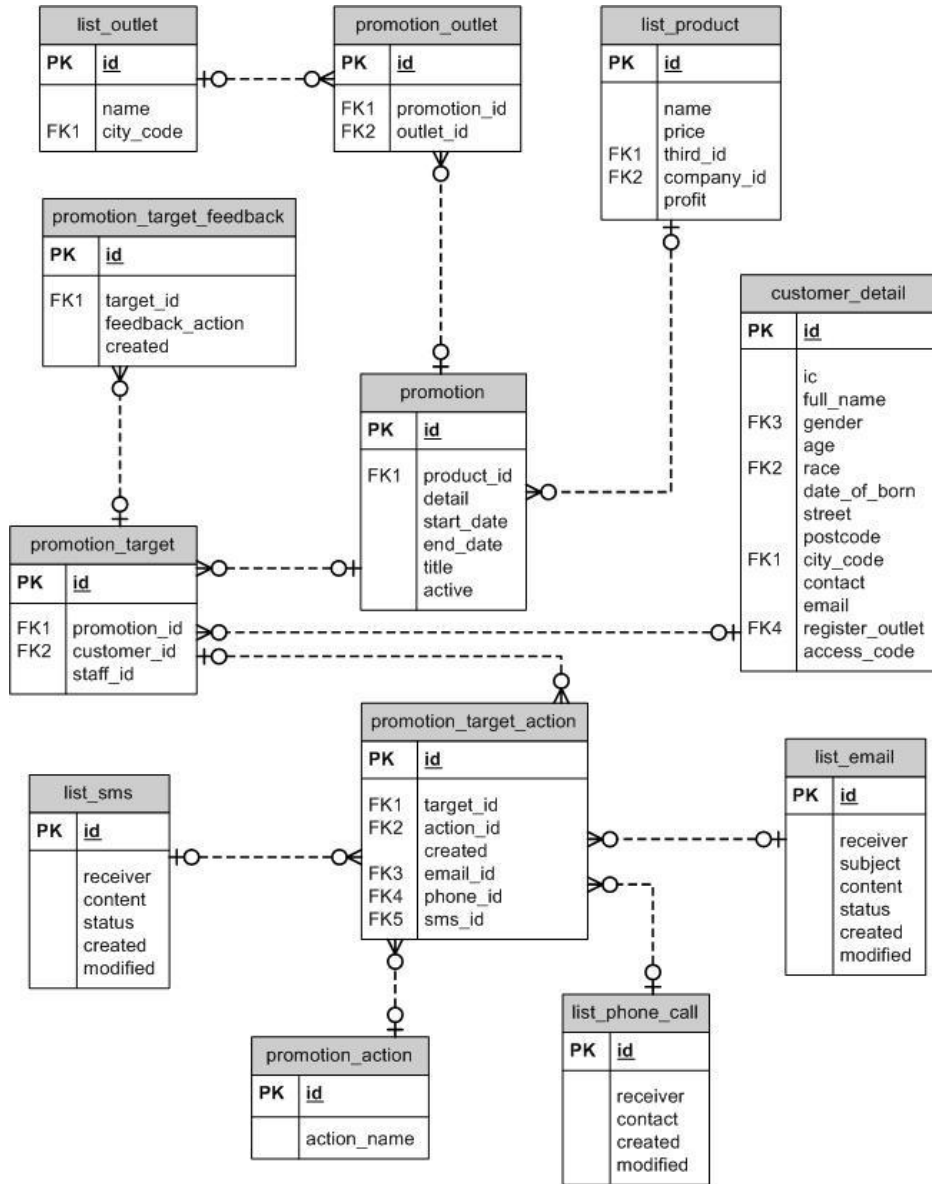


Figure 4-5-5 F1 Promotion ERD

### 4-6 Data Dictionary

**customer\_detail:** Store all customer information.

| Attributes      | Data Type   | Description                        | Nulls |
|-----------------|-------------|------------------------------------|-------|
| id              | INTEGER     | customer's identify number         | No    |
| ic              | VARCHAR(45) | customer's I/C number              | No    |
| full_name       | VARCHAR(45) | customer's name                    | No    |
| gender          | INTEGER     | customer's gender                  | No    |
| age             | INTEGER     | customer's age                     | No    |
| race            | INTEGER     | customer's race                    | No    |
| date_of_born    | DATETIME    | customer's birthday                | No    |
| street          | VARCHAR(45) | customer's address(street no.)     | No    |
| postcode        | VARCHAR(45) | customer's address(postcode)       | No    |
| city_code       | INTEGER     | customer's address(city)           | No    |
| email           | VARCHAR(45) | customer's email address           | No    |
| register_outlet | INTEGER     | outlet of customer register member | No    |
| access_code     | INTEGER     | unique code assigned to customer   | No    |

**Table 4-6 T1 customer\_detail Entity**

**list\_race:** Store the types of race.

| Attributes | Data Type   | Description            | Nulls |
|------------|-------------|------------------------|-------|
| id         | INTEGER     | race's identify number | No    |
| race       | VARCHAR(45) | type of race           | No    |

**Table 4-6 T2 list\_race Entity**

**list\_gender:** Store the types of gender.

| Attributes | Data Type   | Description              | Nulls |
|------------|-------------|--------------------------|-------|
| id         | INTEGER     | gender's identify number | No    |
| gender     | VARCHAR(45) | type of gender           | No    |

**Table 4-6 T3 list\_gender Entity**

**list\_outlet:** Store information of all outlets.

| Attributes | Data Type   | Description              | Nulls |
|------------|-------------|--------------------------|-------|
| id         | INTEGER     | outlet's identify number | No    |
| name       | VARCHAR(45) | outlet's name            | No    |
| city_code  | INTEGER     | outlet's located city    | No    |

**Table 4-6 T4 list\_outlet Entity**

**list\_city:** Store list of cities

| Attributes | Data Type   | Description            | Nulls |
|------------|-------------|------------------------|-------|
| id         | INTEGER     | city's identify number | No    |
| city_name  | VARCHAR(45) | city's name            | No    |
| state_id   | INTEGER     | city's located state   | No    |

**Table 4-6 T5 list\_city Entity**

**list\_state:** Store list of states

| Attributes | Data Type   | Description             | Nulls |
|------------|-------------|-------------------------|-------|
| id         | INTEGER     | state's identify number | No    |
| state_name | VARCHAR(45) | state's name            | No    |

**Table 4-6 T6 list\_state Entity**

**user\_role:** Store the types of role of users

| Attributes | Data Type   | Description            | Nulls |
|------------|-------------|------------------------|-------|
| id         | INTEGER     | role's identify number | No    |
| role_name  | VARCHAR(45) | role's name            | No    |

**Table 4-6 T7 user\_role Entity**

**user\_account:** Store the user account's detail

| Attributes  | Data Type   | Description                | Nulls |
|-------------|-------------|----------------------------|-------|
| id          | INTEGER     | user's identify number     | No    |
| username    | VARCHAR(45) | user's username            | No    |
| password    | VARCHAR(45) | user's password            | No    |
| role_id     | INTEGER     | user's role                | No    |
| created     | DATETIME    | time created user account  | No    |
| modified    | DATETIME    | time modified user account | No    |
| created_by  | VARCHAR(45) | person created user        | No    |
| modified_by | VARCHAR(45) | person modified user       | No    |
| outlet_id   | INTEGER     | staff's outlet             | No    |
| customer_id | INTEGER     | customer's identify number | No    |

**Table 4-6 T8 user\_account Entity**

**role\_page:** Store the pages accessible by different roles.

| Attributes | Data Type | Description                           | Nulls |
|------------|-----------|---------------------------------------|-------|
| id         | INTEGER   | Unique number for each role and page. | No    |
| role_id    | INTEGER   | role's identify number                | No    |
| page_id    | INTEGER   | page's identify number                | No    |

**Table 4-6 T9 role\_page Entity**

**system\_page:** Store all of the pages used by the system

| Attributes | Data Type   | Description                | Nulls |
|------------|-------------|----------------------------|-------|
| id         | INTEGER     | Page's unique number       | No    |
| file_name  | VARCHAR(45) | the file name of the page. | No    |
| type_id    | INTEGER     | the type of the page       | No    |

**Table 4-6 T10 system\_page Entity**

**system\_page\_type:** Store information of all types of pages

| Attributes | Data Type   | Description                 | Nulls |
|------------|-------------|-----------------------------|-------|
| id         | INTEGER     | Unique number for the type  | No    |
| type_name  | VARCHAR(45) | The name of the page's type | No    |

**Table 4-6 T11 system\_page\_type Entity**



**transaction\_detail:** Store the detail of all transactions.

| Attributes   | Data Type     | Description                                  | Nulls |
|--------------|---------------|--|-------|
| id           | INTEGER       | Unique id for each transaction               | No    |
| t_time       | DATETIME      | the time of transaction occur                | No    |
| t_count_item | INTEGER       | the number of items in transaction           | No    |
| t_amount     | DECIMAL(10,2) | the total amount of transaction              | No    |
| t_profit     | DECIMAL(10,2) | the total amount of profit of the trasaction | No    |
| customer_id  | INTEGER       | the customer who transaction with            | No    |
| outlet_id    | INTEGER       | the outlet of the transaction                | No    |

**Table 4-6 T12 transaction\_detail Entity**

**transaction\_item:** Store the items included in the transaction.

| Attributes     | Data Type     | Description                         | Nulls |
|----------------|---------------|-------------------------------------|-------|
| id             | INTEGER       | Unique id for each item             | No    |
| tranasction_id | INTEGER       | The transaction id of the sold item | No    |
| product_code   | INTEGER       | the product sold.                   | No    |
| price          | DECIMAL(10,2) | the price of the product            | No    |
| profit         | DECIMAL(10,2) | the profit get from the product     | No    |

**Table 4-6 T13 transaction\_item Entity**

**list\_product\_main:** Store the main category of product.

| Attributes | Data Type   | Description               | Nulls |
|------------|-------------|---------------------------|-------|
| id         | INTEGER     | Unique id of the category | No    |
| category   | VARCHAR(45) | the name of the category  | No    |

**Table 4-6 T14 list\_product\_main Entity**

**list\_product\_second:** Store the second level category of product.

| Attributes | Data Type   | Description                 | Nulls |
|------------|-------------|-----------------------------|-------|
| id         | INTEGER     | Unique id of the category   | No    |
| category   | VARCHAR(45) | the name of the category    | No    |
| main_id    | INTEGER     | the id of the main category | No    |

**Table 4-6 T15 list\_product\_second Entity**

**list\_product\_third:** Store the third level category of product.

| Attributes | Data Type   | Description                         | Nulls |
|------------|-------------|-------------------------------------|-------|
| id         | INTEGER     | Unique id of the category           | No    |
| category   | VARCHAR(45) | the name of the category            | No    |
| second_id  | INTEGER     | the id of the second level category | No    |

**Table 4-6 T16 list\_product\_third Entity**

**list\_company:** Store the information of producer of the product.

| Attributes     | Data Type   | Description                           | Nulls |
|----------------|-------------|---------------------------------------|-------|
| id             | INTEGER     | Unique id of the company              | No    |
| name           | VARCHAR(45) | name of the company                   | No    |
| domain         | VARCHAR(45) | the website of the company            | No    |
| contact        | VARCHAR(45) | the contact number of the company     | No    |
| representative | VARCHAR(45) | the name of representative of company | No    |
| email          | VARCHAR(45) | the email of the company              | No    |
| short_name     | VARCHAR(45) | the short name of the company         | No    |

**Table 4-6 T17 list\_company Entity**

**list\_product:** Store the information of the products.

| Attributes | Data Type     | Description                         | Nulls |
|------------|---------------|-------------------------------------|-------|
| id         | INTEGER       | Unique id of the product            | No    |
| name       | VARCHAR(45)   | name of the product                 | No    |
| price      | DECIMAL(10,2) | price of the product                | No    |
| third_id   | INTEGER       | third level category of the product | No    |
| company_id | INTEGER       | producer company of the product     | No    |
| profit     | DECIMAL(10,2) | the profit from the product         | No    |

**Table 4-6 T18 list\_product Entity**

**promotion:** Store the information of the promotions.

| Attributes | Data Type   | Description                        | Nulls |
|------------|-------------|------------------------------------|-------|
| id         | INTEGER     | Unique id of the promotion         | No    |
| product_id | INTEGER     | product for the promotion          | No    |
| detail     | LONGTEXT    | the detail of the promotion        | No    |
| start_date | DATETIME    | the start date of promotion        | No    |
| end_date   | DATETIME    | the end date of promotion          | No    |
| title      | VARCHAR(45) | the title of the promotion         | No    |
| active     | INTEGER     | the active status of the promotion | No    |

**Table 4-6 T19 promotion Entity**

**promotion\_outlet:** Store the outlet promoted the promotions

| Attributes   | Data Type | Description  | Nulls |
|--------------|-----------|--|-------|
| id           | INTEGER   | Unique id of for each of the outlet and promotions | No    |
| promotion_id | INTEGER   | the id of the promotion                            | No    |
| outlet_id    | INTEGER   | the id of the outlet selected                      | No    |

**Table 4-6 T20 promotion\_outlet Entity**

**promotion\_target:** Store the information of the customer targeted for the promotions.

| Attributes  | Data Type | Description   | Nulls |
|-------------|-----------|---|-------|
| id          | INTEGER   | Unique id for each targeted customer with different promotion | No    |
| promotion   | INTEGER   | the id of the promotion                                       | No    |
| customer_id | INTEGER   | the id of the customer  | No    |
| staff_id    | INTEGER   | the staff assign to promote the promotion to the customer     | No    |

**Table 4-6 T21 promotion\_target Entity**

**promotion\_target\_feedback:** Store the feedback from customer.

| Attributes      | Data Type   | Description                        | Nulls |
|-----------------|-------------|------------------------------------|-------|
| id              | INTEGER     | Unique id for each of the feedback | No    |
| target_id       | INTEGER     | the target id of the customer      | No    |
| feedback_action | VARCHAR(45) | the action of feedback             | No    |
| created         | DATETIME    | the time of feedback created       | No    |

**Table 4-6 T22 promotion\_target\_feedback Entity**

**promotion\_target\_action:** Store the promotion effort to the customers.

| Attributes | Data Type | Description                              | Nulls |
|------------|-----------|--|-------|
| id         | INTEGER   | Unique id for each of the promotion done | No    |
| target_id  | INTEGER   | the target id of the customer            | No    |
| action_id  | INTEGER   | the method of sending promotion          | No    |
| created    | DATETIME  | the time of promotion done               | No    |
| email_id   | INTEGER   | the email id to check sent email         | Yes   |
| phone_id   | INTEGER   | the phone call id to check called phone  | Yes   |
| sms_id     | INTEGER   | the sms id to check sent SMS             | Yes   |

**Table 4-6 T23 promotion\_target\_action Entity**

**promotion\_action:** Store the method to promote the promotion

| Attributes  | Data Type   | Description                         | Nulls |
|-------------|-------------|-------------------------------------|-------|
| id          | INTEGER     | Unique id of the promotion method   | No    |
| action_name | VARCHAR(45) | the method to promote the promotion | No    |

**Table 4-6 T24 promotion\_action Entity**

**list\_phone\_call:** Store the phone call record of the system

| Attributes | Data Type   | Description                    | Nulls |
|------------|-------------|--------------------------------|-------|
| id         | INTEGER     | Unique id of each phone called | No    |
| receiver   | VARCHAR(45) | the person being called        | No    |
| contact    | VARCHAR(45) | the contact number of the call | No    |
| created    | DATETIME    | start time of the call         | No    |
| modified   | DATETIME    | end time of the call           | No    |

**Table 4-6 T25 list\_phone\_call Entity**

**list\_email:** Store the email sent or pending to send by the system

| Attributes | Data Type   | Description                | Nulls |
|------------|-------------|----------------------------|-------|
| id         | INTEGER     | Unique id for each email   | No    |
| receiver   | VARCHAR(45) | receiver of the email      | No    |
| subject    | VARCHAR(45) | Subject of the email       | No    |
| content    | LONGTEXT    | Content of the email       | No    |
| status     | VARCHAR(45) | status of the email        | No    |
| created    | DATETIME    | the time created the email | No    |
| modified   | DATETIME    | the time updated the email | No    |

**Table 4-6 T26 list\_email Entity**

**list\_sms:** Store the sms sent or pending to send by the system

| Attributes | Data Type   | Description                     | Nulls |
|------------|-------------|---------------------------------|-------|
| id         | INTEGER     | Unique id of each SMS           | No    |
| receiver   | VARCHAR(45) | the number to be send           | No    |
| content    | LONGTEXT    | the content of the SMS          | No    |
| status     | VARCHAR(45) | the status of the SMS           | No    |
| created    | DATETIME    | the time created the sms        | No    |
| modified   | DATETIME    | the time updated the sms status | No    |

**Table 4-6 T27 list\_sms Entity**

### **Chapter 5 System Testing**

After completion of project, testing is needed to confirm the system can handle most of the situation. 2 types of testing were needed to test the system which is unit testing and functional testing. The testing is completed by follow a series of instruction to test the system ability. Before releasing the system, testing must be carried out carefully to increase the quality of system and provides better user experience for the users.

#### **5-1 Unit Testing**

Unit testing is mainly to test the system's individual part of function. The unit test is require to input to the system with all of the possible input such as correct input, empty input, wrong format and others possible input. This is to ensure the system can validate the input as correct input or invalid input. The unit testing will be carrying out included user login system.

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**Unit Test 1:** Login as administrator or users

**Testing Objective:** To ensure the login form working correctly

| No  | Event  | Attributes and values                    | Expected Result  | Result |
|-----|--|--|--|--------|
| 1.1 | Login with correct username and correct password | Username:<br>admin<br>Password:<br>admin | Successfully login to the system and redirect to homepage. | Pass   |
| 1.2 | Login with empty username and empty password     | Username:<br>null<br>Password:<br>null   | Failed to login and turn the require field to red color.   | Pass   |
| 1.3 | Login with correct username and wrong password   | Username:<br>admin<br>Password:<br>abc   | Failed to login and prompt wrong username or password      | Pass   |
| 1.4 | Login with wrong username and correct password   | Username:<br>abc<br>Password:<br>admin   | Failed to login and prompt wrong username or password.     | Pass   |
| 1.5 | Login with correct username and empty password   | Username:<br>admin<br>Password:<br>null  | Failed to login and turn the require field to red color    | Pass   |



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|     |  |   |   |      |
|-----|--|---|---|------|
| 1.6 | Login with empty username and correct password | Username:<br>null<br>Password:<br>admin | Failed to login and turn the require field to red color | Pass |
|-----|--|---|---|------|

**Table 5-1 T1Unit Test 1: Login as administrator or users**

### Unit Test 2: Register Customer

**Testing Objective:** To ensure the registration of customer work correctly.

| No  | Event   | Attributes and values   | Expected Result                               | Result |
|-----|---|---|---|--------|
| 2.1 | Register User with valid username, valid password, Valid I/C Number and Valid Access Code | Username:<br>Cust1<br>Password:<br>a<br>I/C Number:<br>880519-04-4889<br>Access Code:<br>7302 | The web page will redirect to the login page. | Pass   |

|     |   |  |  |      |
|-----|---|--|--|------|
| 2.2 | Register User with duplicate username,valid password,duplicate I/C Number and Valid Access Code | Username:<br>Cust1<br>Password:<br>a<br>I/C Number:<br>880519-04-4889<br>Access Code:<br>7302  | The form will show "This I/C was registered"   | Pass |
| 2.3 | Register User with empty username,empty password,empty I/C Number and empty Access Code         | Username:<br>null<br>Password:<br>null<br>I/C Number:<br>null<br>Access Code:<br>null          | The form will show "<br>Please insert username.<br>Please insert password.<br>Please insert I/C number.<br>Please insert access code.<br>" | Pass |
| 2.4 | Register User with valid username,valid password,valid I/C Number and invalid Access Code       | Username:<br>Cust1<br>Password:<br>a<br>I/C Number:<br>880519-04-4889<br>Access Code:<br>73021 | The form will show "<br>Access code not match with the I/C number<br>"   | Pass |

**Table 5-1 T2 Unit Test 2: Register Customer**

## Chapter 5 System Testing

### Unit Test 3: Change User Password

**Testing Objective:** To ensure user's password update correctly

| No  | Event  | Attributes and values  | Expected Result  | Result |
|-----|--|--|--|--------|
| 3.1 | Update Password with valid current password, valid new password and valid confirm new password     | Current Password: a<br>New Password: b<br>Confirm New Password: b          | The web page will prompt an alert show "Success to Update password"                    | Pass   |
| 3.2 | Update Password with empty current password, empty new password and empty confirm new password     | Current Password: null<br>New Password: null<br>Confirm New Password: null | The form will show "Please fill in the field with red label and *"                     | Pass   |
| 3.3 | Update Password with valid current password, valid new password and different confirm new password | Current Password: a<br>New Password: b<br>Confirm New Password: c          | The form will show "Please insert same password for NEW PASSWORD and CONFIRM PASSWORD" | Pass   |

|     |  |  |  |      |
|-----|--|--|--|------|
| 3.4 | Update Password with valid current password, same new password and same confirm new password with current password | Current Password:<br>a<br>New Password:<br>a<br>Confirm New Password:<br>a | The form will show "Please insert different password for new password" | Pass |
|-----|--|--|--|------|

**Table 5-1 T3 Unit Test 3: Change User Password**

**Unit Test 4:** Insert new role

**Testing Objective:** To test the new role was insert correctly.

| No  | Event                                  | Attributes and values | Expected Result   | Result |
|-----|--|-----------------------|---|--------|
| 4.1 | Insert new role with valid role name   | Role Name:<br>admin2  | The web page will prompt an alert show "New Role:ADMIN2 successfully added" | Pass   |
| 4.2 | Insert new role with empty role name   | Role Name:<br>null    | The form will show "Please fill in the field with red label and *"          | Pass   |
| 4.3 | Insert new role with existed role name | Role Name:<br>admin2  | The form will show "The role:Admin2 was exist."                             | Pass   |

**Table 5-1 T4 Unit Test 4: Insert new role**

**Unit Test 5:** Insert new page

**Testing Objective:** To test the new page is inserting correctly

| No  | Event                                   | Attributes and values     | Expected Result   | Result |
|-----|---|---------------------------|---|--------|
| 5.1 | Insert new page with valid file name    | File Name:<br>test_insert | The web page will prompt an alert show "New Page: test_insert successfully added" | Pass   |
| 5.2 | Insert new page with empty file name    | File Name:<br>null        | The form will show "Please fill in the field with red label and *"                | Pass   |
| 5.3 | Insert new page with repeated file name | File Name:<br>test_insert | The form will show "The file: test_insert was exist."<br>"                        | Pass   |

**Table 5-1 T5 Unit Test 5: Insert new page**

**Unit Test 6:** Add new user

**Testing Objective:** To test the new user is added correctly

| No  | Event   | Attributes and values                   | Expected Result                                     | Result |
|-----|---|---|---|--------|
| 6.1 | Insert new user with valid username, valid password | username:<br>manager1<br>password:<br>a | Prompt alert to show " New user added successfully" | Pass   |

|     |   |   |  |      |
|-----|---|---|--|------|
| 6.2 | Insert new user with empty username, empty password   | username:<br>null<br>password:<br>null  | The form will show "Please fill in the field with red label and *" | Pass |
| 6.3 | Insert new user with existed username, valid password | username:<br>manager1<br>password:<br>a | The form will show "username existed"                              | Pass |

**Table 5-1 T6 Unit Test 6: Add new user**

## Chapter 5 System Testing

### Unit Test 7: Add new Promotion

**Testing Objective:** To ensure the promotion validate correctly

| No  | Event   | Attributes and values   | Expected Result   | Result |
|-----|---|---|---|--------|
| 7.1 | Insert new promotion with valid title, valid start date, valid end date, valid content, select a product and choose some outlet | Promotion Title:<br>test<br>start date:<br>2014-4-1<br>end date;<br>2014-4-5<br>Product detail:<br>testing content<br>Product:<br>Apparel-<br>Children's Wear-<br>Baby Clothes-<br>Enel Baby<br>Clothes<br>Selected Outlet:<br>Johor-<br>Batu Bahat<br>Outlet | The promotion will be created and the page will redirect to customer filtering page | Pass   |

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|     |   |  |   |      |
|-----|---|--|---|------|
| 7.2 | Insert new promotion with empty title, empty start date, empty end date, empty content, select a product and empty outlet | Promotion Title:<br>null<br>start date:<br>null<br>end date;<br>null<br>Product detail:<br>null<br>Product:<br>Apparel-<br>Children's Wear-<br>Baby Clothes-<br>Enel Baby<br>Clothes<br>Selected Outlet:<br>null | Bottom of the form will show "<br>Please insert title.<br>Please select start date.<br>Please select end date.<br>Please insert the promotion's<br>detail." | Pass |
|-----|---|--|---|------|



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|     |   |   |   |      |
|-----|---|---|---|------|
| 7.3 | Insert new promotion with valid title, valid start date, valid end date, valid content, select a product and choose some outlet which are totally same with testing 7.1 | Promotion Title:<br>test<br>start date:<br>2014-4-1<br>end date;<br>2014-4-5<br>Product detail:<br>testing content<br>Product:<br>Apparel-<br>Children's Wear-<br>Baby Clothes-<br>Enel Baby<br>Clothes<br>Selected Outlet:<br>Johor-<br>Batu Bahat<br>Outlet | The page will show "The following outlets is having test for Enel Baby Clothes on 2014-04-01 to 2014-04-05 BATU PAHAT OUTLET" | Pass |
|-----|---|---|---|------|

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|     |  |  |   |      |
|-----|--|--|---|------|
| 7.4 | Insert new promotion with valid title, valid start date, valid end date, valid content, select a product and choose some outlet which are totally same with testing 7.1 except the outlet. This test will choose another outlet. | Promotion Title:<br>test<br>start date:<br>2014-4-1<br>end date;<br>2014-4-5<br>Product detail:<br>testing content<br>Product:<br>Apparel-<br>Children's Wear-<br>Baby Clothes-<br>Enel Baby<br>Clothes<br>Selected Outlet:<br>Kedah-<br>Alor Setar Outlet | The promotion will be created and the page will redirect to customer filtering page | Pass |
|-----|--|--|---|------|

|     |   |  |  |      |
|-----|---|--|--|------|
| 7.5 | Insert new promotion with valid title, invalid start date, invalid end date, valid content, select a product and choose some outlet. The testing is putting the start date later than end date. | Promotion Title:<br>test<br>start date:<br>2014-4-5<br>end date;<br>2014-4-1<br>Product detail:<br>testing content<br>Product:<br>Apparel-<br>Children's Wear-<br>Baby Clothes-<br>Enel Baby<br>Clothes<br>Selected Outlet:<br>Kedah-<br>Alor Setar Outlet | Bottom of the form will show "<br>End date must later than start<br>date." | Pass |
|-----|---|--|--|------|

**Table 5-1 T7 Unit Test 7: Add new Promotion**

### 5-2 Functional Testing

After completing the unit testing, functional testing is require to perform. The purpose of functional testing is to ensure the system is performing as the system requirement stated. This is more on testing the correctness of workflow of the system.

**Functional Test 1:** Login with different roles

**Testing Objective:** To ensure different user’s role log in will display different navigation menu.

| No  | Event                              | Attributes and values                    | Expected Result   | Result |
|-----|------------------------------------|--|---|--------|
| 1.1 | Login with the ADMIN role          | Username:<br>admin<br>Password:<br>admin | The navigation menu having 'Home', 'User', 'System', 'Setting', 'Logout'        | Pass   |
| 1.2 | Login with the HQ_MANAGER role     | Username:<br>manager<br>Password:<br>a   | The navigation menu having 'Home', 'Analysis', 'Promotion', 'Setting', 'Logout' | Pass   |
| 1.3 | Login with the BRANCH_MANAGER role | Username:<br>bmanager<br>Password:<br>a  | The navigation menu having 'Home', 'Promotion', 'Setting', 'Logout'             | Pass   |

|     |                                   |                                       |   |      |
|-----|-----------------------------------|---------------------------------------|---|------|
| 1.4 | Login with the SERVICE_STAFF role | Username:<br>bstaff<br>Password:<br>a | The navigation menu having 'Home', 'Promotion', 'Setting', 'Logout'   | Pass |
| 1.5 | Login with the CUSTOMER role      | Username:<br>custA<br>Password:<br>a  | The navigation menu having 'Home', 'Transaction', 'Setting', 'Logout' | Pass |
| 1.6 | Using PUBLIC role                 |                                       | The navigation menu having 'Home', 'Register', 'Logout'               | Pass |

**Table 5-2 T1 Functional Test 1: Login with different roles**

**Functional Test 2:** Create and Update User

**Testing Objective:** Ensure the management of user is working correctly.

| No  | Event                                   | Attributes and values                    | Expected Result   | Result |
|-----|---|--|---|--------|
| 2.1 | Login with Admin through the login page | username:<br>Admin<br>password:<br>admin | The user login the admin page with admin's navigation bar. Admin's navigation bar should display 'Home', 'User', 'System', 'Setting' and 'Logout' | Pass   |

|     |  |  |  |      |
|-----|--|--|--|------|
| 2.2 | Go to the create user page                               | Menu<br>User List (Internal User)<br><br>Button-><br>New User                                    | -><br>A New User registration form appear in the page.                                       | Pass |
| 2.3 | Fill the new user's detail, then click the 'Add' button. | username:<br>bstaff2<br>password:<br>a<br>Role:<br>SERVICE_STAFF<br>Outlet:<br>ALOR SETAR OUTLET | An alert prompt out and show "Success to add new user. ". Then return to the user list page. | Pass |
| 2.4 | Click the username created in previous event             | Table<br>SERVICE_STAFF<br>bstaff2  | -><br>-><br>The system will go to User-Edit page.  | Pass |
| 2.5 | Insert the updated information and click 'Update' button | password:<br>b<br>Role:<br>BRANCH_MANAGER<br>Outlet:<br>BATU BAHAT OUTLET                        | An alert prompt out and show "Success to update"   | Pass |

**Table 5-2 T2 Functional Test 2: Create and Update User**

**Functional Test 3:** Create and Update Role in System

**Testing Objective:** The ensure the management module of user role working correctly

| No  | Event  | Attributes and values   | Expected Result   | Result |
|-----|--|---|---|--------|
| 3.1 | Login with Admin through the login page                  | username:<br>Admin<br>password:<br>admin                                    | The user login the admin page with admin's navigation bar. Admin's navigation bar should display 'Home', 'User', 'System', 'Setting' and 'Logout' | Pass   |
| 3.2 | Go to the create role page                               | Menu -><br>User -><br>Role<br><br>Button-><br>New Role                      | A New Role creation form appear in the page.  | Pass   |
| 3.3 | Fill in the detail and click the 'Add' button            | Role Name:<br>Test_Role<br><br>Pages:<br>Home<br><br>Widgets:<br>user_login | An alert prompt out and show "New Role: Test_role successfully added. After this, the page will redirect to the user's role list page.            | Pass   |
| 3.4 | Click the role's name in the list to update the details. | Table -><br>Name of Role -><br>TEST_ROLE                                    | The page will redirect to the Role-Edit page.   |        |

|     |  |  |  |
|-----|--|--|--|
| 3.5 | Change the role's detail and click 'Update' button to update the role. | Role Name:<br>Test_Role2<br><br>Pages:<br>All<br><br>Widgets:<br>All | An alert prompt out and show "Role: Test_role successfully updated. After this, the page will redirect to the user's role list page. |
|-----|--|--|--|

**Table 5-2 T3 Functional Test 3: Create and Update Role in System**

**Functional Test 4: Create and Update System Page**

**Testing Objective:** Ensure the page management system working correctly

| No  | Event                                   | Attributes and values                                    | Expected Result   | Result |
|-----|---|--|---|--------|
| 4.1 | Login with Admin through the login page | username:<br>Admin<br><br>password:<br>admin             | The user login the admin page with admin's navigation bar. Admin's navigation bar should display 'Home', 'User', 'System', 'Setting' and 'Logout' | Pass   |
| 4.2 | Go to the create page page              | Menu -><br>System -><br>Page<br><br>Button-><br>New Page | A New Page creation form appear in the page.  | Pass   |



|     |   |   |  |      |
|-----|---|---|--|------|
| 4.3 | Fill in the page detail and click the 'Add' button            | File Name:<br>test_page<br><br>Type:<br>PAGE<br><br>Role:<br>ADMIN  | An alert prompt out and show "New Page: test_page successfully added.". After this, the page will redirect to the page list interface. | Pass |
| 4.4 | Click the page name to update the page detail                 | Table -><br>PAGE -><br>Name of Page-><br>test_page                  | The page will redirect to the Page-Edit form will filled information.  | Pass |
| 4.5 | Change the data and click 'Update' button to update the page. | File Name:<br>test_page2<br><br>Type:<br>WIDGET<br><br>Role:<br>ALL | An alert prompt out and show "Page: test_page2 successfully updated.".   | Pass |

**Table 5-2 T4 Functional Test 4: Create and Update System Page**

**Functional Test 5:** Change user password

**Testing Objective:** To ensure the user of system can change their password

| No  | Event  | Attributes and values  | Expected Result   | Result |
|-----|--|--|---|--------|
| 5.1 | Login with the the user created in <b>Functional Test 2</b> throught the login page                                | username:<br>bstaff2<br>password:<br>b                                     | The user login the admin page with Branch manager's navigation bar. Branch manager's navigation bar. should display 'Home', 'Promotion', 'Setting' and 'Logout' | Pass   |
| 5.2 | Go the change password change by the menu button   | Menu -><br>Setting -><br>Change Password                                   | The system will redirect to the Change Password Form  | Pass   |
| 5.3 | Insert the current password, new password and confirm new password to change the current password to new password. | Current Password:<br>b<br>New Password:<br>a<br>Confirm New Password:<br>a | An alert will prompt out and show " Success to update password ".   | Pass   |
| 5.4 | Logout the user to further test whether the password was change  | Menu -><br>Logout  | The system will go to logout page and redirect to public Home page in 3 seconds.  | Pass   |

|     |   |  |  |      |
|-----|---|--|--|------|
| 5.5 | Click Login button to login the user changed password | Menu -><br>Login                       | The system will go to the login page   | Pass |
| 5.6 | Login the user with the new password                  | username:<br>bstaff2<br>password:<br>a | The user logged into the system and the system will redirect to the user's Home Page | Pass |

**Table 5-2 T5 Functional Test 5: Change user password**

**Functional Test 6:** Customer Filtering and Profiling

**Testing Objective:** To ensure the customer filtering and profile working well.

| No  | Event  | Attributes and values                          | Expected Result   | Result |
|-----|--|--|---|--------|
| 6.1 | Login with HQ_MANAGER through the login page | username:<br>manager<br>password:<br>a         | The user login the HQ Manager's page with HQ Manager's navigation bar. HQ Manager's navigation bar should display 'Home', 'Analysis Tools', 'Promotion Tools', 'Setting' and 'Logout' | Pass   |
| 6.2 | Go to the customer filter page               | Menu -><br>Analysis Tools-><br>Filter Customer | The system will go to the filter customer form.   | Pass   |

|     |   |   |   |      |
|-----|---|---|---|------|
| 6.3 | Select the options to filter customers then click 'Search' button                           | Gender:<br>MALE<br>Age:<br>20 to 30<br>Race:<br>CHINESE<br>State:<br>PERAK<br>City:<br>IPOH | The system will go to a page display many tables. These table included Filter Option, Summary (Gender, race, age, State, City), and a Customer List Table.                | Pass |
| 6.4 | Click on the customer's name in the Customer List table to see the customer's profile       |   | The customer profile page is showing customer's information, Customer behavior (Most Favourite Item, Visit Frequency, Span on Different Category) and Transaction History | Pass |
| 6.5 | Click the ID in the Transaction History table to get the detail of the selected transaction |   | The transaction detail will show in the coloumn beside the transaction table.   | Pass |

**Table 5-2 T6 Functional Test 6: Customer Filtering and Profiling**

**Functional Test 7: Product Analysis Testing**

**Testing Objective:** To ensure the product could be analyze correctly

| No  | Event  | Attributes and values                              | Expected Result   | Result |
|-----|--|--|---|--------|
| 7.1 | Login with HQ_MANAGER through the login page | username: manager<br>password: a                   | The user login the HQ Manager's page with HQ Manager's navigation bar. HQ Manager's navigation bar should display 'Home', 'Analysis Tools', 'Promotion Tools', 'Setting' and 'Logout' | Pass   |
| 7.2 | Go to the product selection page             | Menu -><br>Analysis Tools-><br>Analyze<br>Products | The system will go to the production selection form.  | Pass   |
| 7.3 | Select Main Category                         | Main Category:<br>Apparel                          | A list of second category will be displayed   | Pass   |
| 7.4 | Select Secondary Category                    | Second Category:<br>Children's Wear                | A list of third category will be displayed  | Pass   |
| 7.5 | Select Third Category                        | Third Category:<br>Baby Clothes                    | A list of products will be displayed  | Pass   |

|     |  |  |  |      |
|-----|--|--|--|------|
| 7.6 | Click on the products name in the product detail table to see the analysis of the selected product | Product Detail-><br>Product Name-><br>Enel Baby<br>Clothes | A product profile page will show product's information and Product Sale Perfomance (Month Analysis, Weekday Analysis, Outlet Analysis, Gender, Age, Race, City and State Analysis) | Pass |
|-----|--|--|--|------|

**Table 5-2 T7 Functional Test 7: Product Analysis Testing**

**Functional Test 8: Create and Update Promotion**

**Testing Objective:** To ensure the promotion management tools working correctly

| No  | Event  | Attributes and values                            | Expected Result   | Result |
|-----|--|--|---|--------|
| 8.1 | Login with HQ_MANAGER through the login page | username:<br>manager<br>password:<br>a           | The user login the HQ Manager's page with HQ Manager's navigation bar. HQ Manager's navigation bar should display 'Home', 'Analysis Tools', 'Promotion Tools', 'Setting' and 'Logout' | Pass   |
| 8.2 | Go to the new promotion page                 | Menu -><br>Promotion<br>Tools-><br>New Promotion | The system will go to the new promotion form.   | Pass   |

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|     |   |   |   |      |
|-----|---|---|---|------|
| 8.3 | Insert the promotion detail and click 'Create' button | <p>Active:<br/>Checked</p> <p>Promotion:<br/>Test Promotion</p> <p>Main Category:<br/>Apparel</p> <p>Second<br/>Category:<br/>Children's Wear</p> <p>Third Category:<br/>Baby Clothes</p> <p>Product:<br/>Enel Baby<br/>Clothes</p> <p>Start Date:<br/>2014-4-20</p> <p>End Date:<br/>2014-4-25</p> <p>Promotion<br/>Detail:<br/>Test Promotion<br/>Content</p> | The promotion was created and the system will display Customer Filtering Page | Pass |
|-----|---|---|---|------|

|     |   |  |   |      |
|-----|---|--|---|------|
|     |   | Promotion<br>Outlet:<br>Johor  |   |      |
| 8.4 | Go to promotion list select the promotion created in <b>Testing 8.3</b> to update | Menu -><br>Promotion<br>Tools-><br>All Promotion   | A list of promotion displayed   | Pass |
| 8.5 | Click on the promotion title to update the promotion                              | Table -><br>Promotion -><br>Title -><br>Test Promotion   | Edit Promotion Form displayed   | Pass |
| 8.6 | Change the information of the promotion and click 'Save' button                   | Active:<br>Checked<br><br>Promotion:<br>Test Promotion2<br><br>Main Category:<br>Apparel<br><br>Second<br>Category:<br>Children's Wear<br><br>Thid Category:<br>Baby Clothes | The promotion was updated and the system will display Customer Filtering Page | Pass |



|  |  |   |  |
|--|--|---|--|
|  |  | Product:<br>Enel      Baby<br>Clothes<br><br>Start      Date:<br>2014-4-18<br><br>End      Date:<br>2014-4-25<br><br>Promotion<br>Detail:<br>Test Promotion<br>Content2<br><br>Promotion<br>Outlet:<br>Johor, Kedah |  |
|--|--|---|--|

**Table 5-2 T8 Functional Test 8: Create and Update Promotion**

**Functional Test 9:** Select Promotion Target Customer

**Testing objective:** To ensure the system can filter a list of customer and target them based on the promotion.

| No  | Event   | Attributes and values                                  | Expected Result   | Result |
|-----|---|--|---|--------|
| 9.1 | Login with HQ_MANAGER through the login page                                      | username: manager<br>password: a                       | The user login the HQ Manager's page with HQ Manager's navigation bar. HQ Manager's navigation bar should display 'Home', 'Analysis Tools', 'Promotion Tools', 'Setting' and 'Logout' | Pass   |
| 9.2 | Go to promotion list select the promotion created in <b>Testing 8.3</b> to update | Menu -><br>Promotion Tools-><br>All Promotion          | A list of promotion displayed   | Pass   |
| 9.3 | Click on the promotion title to update the promotion                              | Table -><br>Promotion -><br>Title -><br>Test Promotion | Edit Promotion Form displayed   | Pass   |
| 9.4 | Click the 'Save' button without changing the promotion's detail                   |  | The system will display a customer filter form  | Pass   |
| 9.5 | Select an filter option to filter the customer then click the 'Submit' button     | Filter option: Customer who never purchase before.     | The page will show a list of customer fulfilled the filter option.  | Pass   |

|     |   |  |   |      |
|-----|---|--|---|------|
| 9.6 | Click the 'process' button to confirm the promotion's target customer |  | The system will return to the Home Page | Pass |
|-----|---|--|---|------|

**Table 5-2 T9 Functional Test 9: Select Promotion Target Customer**

**Functional Test 10: Sending promotion to customer and Getting Respond**

**Testing Objective:** To ensure the staff can promote the promotion to the customers assigned to them.

Beside, the customer registered a account also able to respond to the promotion.

| No   | Event   | Attributes and values                                  | Expected Result  | Result |
|------|---|--|--|--------|
| 10.1 | Login with the staff accoun to perform the testing                                    | username:<br>bstaff<br><br>password:<br>a              | The user login the staff page with staff's navigation bar. Staff's navigation bar should display 'Home', 'Promotion Tools', 'Setting' and 'Logout' | Pass   |
| 10.2 | Search the task of the customer.  | Menu -><br>Home  | Task Page will be displayed. Within the page, there are a table of promotions list.  | Pass   |
| 10.3 | Click on the promotion's title to promote the promotion to the customers              | Table -><br>Task -><br>Title -><br>Test Promotion2     | The page will display 2 tables which are promotion detail and targeted customer.   | Pass   |
| 10.4 | Click on the 'EMAIL' link within the customer's row to send the email to the customer | Table -><br>Targeted Customer -><br>Action -><br>EMAIL | A new page with email template will displayed  | Pass   |

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|       |  |  |                |   |      |
|-------|--|--|----------------|---|------|
| 10.5  | Click the 'Send' button to send the email with final content to the customer           |  |                | The page will closed  | Pass |
| 10.6  | Click on the 'PHONE' link within the customer's row to make phone call to the customer | Table<br>Targeted<br>Customer<br>Action<br>PHONE | -><br>-><br>-> | A new page with phone call detail will displayed  | Pass |
| 10.7  | Click the 'End Call' button to end the call with customer                              |  |                | The page will closed  | Pass |
| 10.8  | Click on the 'SMS' link within the customer's row to send the SMS to the customer      | Table<br>Targeted<br>Customer<br>Action<br>SMS   | -><br>-><br>-> | A new page with SMS template will displayed   | Pass |
| 10.9  | Click the 'Send' button to send the SMS with final content to the customer             |  |                | The page will closed  | Pass |
| 10.10 | Click on the refresh button of the browser to see the update information               | Refresh' button<br>OR<br>press 'F5'              |                | The action column of the customer selected in previous testing will become EMAIL(1), PHONE(1), SMS(1) | Pass |

|       |   |   |  |      |
|-------|---|---|--|------|
| 10.11 | Click on customer name to get customer's IC and Access Code   | Table Targeted Customer Customer's Name previous customer -> -> ->  | A new customer profile page will be open   | Pass |
| 10.12 | Open another web browser and open the My CRM web system   | url:<br>localhost/CRM   | public's Home Page displayed   | Pass |
| 10.13 | Go to the customer registration page  | Menu Register ->  | The system will show customer's user register form   | Pass |
| 10.14 | Register a new customer with the I/C number and access code retrieved in <b>Testing 10.11</b> . Then click the 'Register' button to register. | username:<br>Customer1<br><br>password:<br>a<br><br>I/C Number:<br>841016-02-4939<br><br>Access Code:<br>6651 | The user was created and the system will show the login form.  | Pass |
| 10.15 | Login with the customer's user created in <b>Testing 10.14</b> .  | username:<br>Customer1<br><br>password:<br>a  | The system will go to customer Home Page. The navigation bar of this user will display Home, Transaction, Setting and Logout | Pass |

|       |   |   |                |  |      |
|-------|---|---|----------------|--|------|
| 10.16 | Review the detail of the promotion received | Table<br>Promotion<br>Offered<br>Action<br>View | -><br>-><br>-> | The page will display the detail of the selected promotion | Pass |
|-------|---|---|----------------|--|------|

**Table 5-2 T10 Functional Test 10: Sending promotion to customer and Getting Respond**

**Functional Testing 11:** Promotion performance

**Testing Objective:** To ensure the manager user can check the performance of the promotion.

| No   | Event  | Attributes and values   |    | Expected Result   | Result |
|------|--|---|----|---|--------|
| 11.1 | Login with HQ_MANAGER through the login page | username:<br>manager<br>password:<br>a                              |    | The user login the HQ Manager's page with HQ Manager's navigation bar. HQ Manager's navigation bar should display 'Home', 'Analysis Tools', 'Promotion Tools', 'Setting' and 'Logout' | Pass   |
| 11.2 | Go to the promotion list page                | Menu<br>Promotion<br>Tools-><br>All Promotion                       | -> | The system will show the list of promotion  | Pass   |
| 11.3 | Select the promotion to review               | Table<br>Promotion-><br>Performance-><br>CHECK (Test<br>Promotion2) | -> | The page will display the promotion details, Analysis (Total Promotion Done, Total Feedback Done and Feedback VS Promotion)   | Pass   |

**Table 5-2 T11 Functional Testing 11: Promotion performance**

## **Chapter 6 Discussion and Conclusion**

### **6-1 Project Review**

In conclusion, customer leaving is the problem faced by all of the organization. This problem is no method to solve completely because every customer was unique and changing every day. This problem was serious because it will directly affect the profit of the company; the method to decrease the number of customer leaving is increasing customer loyalty. The proposed solution to decrease the customer retention in this project is applying the customer relationship management (CRM) system to the organization. This CRM system will help the company to have a more clearly and critically view to the customer, then increase the current customer's loyalty and stay the customers before they leave.

This project was developed a CRM at the end. This CRM system was achieve the objectives of the project. The objectives were done by different modules of the system. The modules included customer segmentation and filtering, system page management, customer profiling and promotion management tools.

### **6-2 Strength and Limitation**

The Strength of this system is using data mining to discover the history data with more patterns and make it more valuable. This system is using data mining technology to generate the profile of the customer base on the purchase history. The customer profile

included the analysis like which products is most frequent bought by the customer, which category of product customer spend most and others.

The data mining technology also used to find out the potential buyer for the promotion. The system can find out the customer who frequently purchasing the promoted product or the customer who never but the promoted products. After that, the user can send the promotion to these targeted and listed customers.

The Limitation of this CRM system is its complexity for use. New user might not be easy to handle the features in the system since the features include many pages. So the new user might need to be trained before using the system.

### **6-3 Future Enhancement**

There are some enhancements available for this project. The first enhancement is the module of the system. This CRM is not complete and still has a lot of space to expand. The module can be added including Sales Force Automation (SFA), Service Automation, Marketing Automation and others. While the system adds these modules, this CRM will be more complete and more powerful for the organizations.

Beside the modules, this system can be improved to be more merge-able with another Enterprise Resource Planning (ERP) System. The system can add a module to customize the connection with other system's database, and make it adaptable to most of the database design of other ERP system. So this CRM could become more standalone system but adaptable to other systems at the same time.



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## APPENDIX A Turnitin Report

The screenshot displays a Turnitin report for 'Project 2' by Chew Zhen Yong. The document title is 'Customer Relationship Management (CRM) System' and it is submitted to Universiti Tunku Abdul Rahman. The similarity score is 9% (0% similar, 9% out of 0). The report includes a 'Match Overview' table with the following data:

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Figure A-1-F1 Turnitin Report