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UNIVERSITY OF TEESSIDE

MIDDLESBROUGH

TS1 3BA

<Rapid Sharing Business Card App>

<BSc (Hons) Computing>

<Wai Chin Keat>

<07/04/2014>

Supervisor: So Yong Quay

Second Reader: Tan Sheau Ling

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ABSTRACT

Business card is most people used to introduce individual information and enterprise. Although it is widely used by people, it still has several weaknesses such as business card is too small to put more of business information and also easier missing and damage. After that, business card also cannot achieve real publicity. There have some business card apps in existing market. User can create business card through these business card apps. However, it is only can share to specific people via Bluetooth, QR code and email. There are not provides a space of business directory to allow user share their business card. Even though Yellow Pages provide a complete directory search need, it is lack of function which provided by business card app.

Due to the popularity of smartphone and the problem mentioned, the project aim is to develop a business sharing app with an Android application to make user can more flexible to share business information to business directory and provide more efficiency way in directory search.

The report covers all project development stage which includes problem research, legality issue, planning, design, development technology, implementation, evaluation and conclusion phase.

ACKNOWLEDGEMENT

I would like to thank all of my classmate and lecturer who helped me and assisted me with creation with this project in Southern University College. Especially I would like to appreciate my project supervisor Mr. So Yong Quay, he always give suggestion for me by his professional perspective and also provide some appropriate idea to my project. Lastly, I would like to thank Guang Zhen and Kai Teck who help me to perform system testing during the testing phase.

CONTENTS

1 INTRODUCTION

Business card is the most common tool that user is used to introduce the business or individual information. Usually a business card will contains name of the card holder, title, company name, location and also include the contact information such as address, email, telephone [1].

According to article, Malaysia has about 7.7 million smartphone user in the end year 2012 [2]. This situation will be considered that mobile app is another good way to share the business card to other and easier than use the real business card. It can help user to organize business card on hand. In currently, most of the business card app can only share the business card to specific people via Bluetooth, QR code scanning or email. “CamCard” is an example of mobile app that only can share the business card via Bluetooth, email and QR code. Although yellow page can help to share the business card to everyone, the problem of the yellow page is not provides to update business information instantly because it was run for an entire year.

Therefore, the idea of rapid sharing business card application (due to the project title name is too long, the following section will use “business sharing app” to instead of project name) was sprout. This mobile app allows user to share business information to directory and also allow user to search other business information in business directory. People may depend on difference requirement to search and download different services type of business cards to their mobile devices through mobile app. When businesses update their business information to server, user can get the latest information during searching business directory.

In order to achieve this, a mobile app will be created. The graphic of application will be designed by using Adobe Photoshop. The mobile application will be constructed by using java and XML language. For the backend system, it will be constructed by PHP as server side programming language. The efficiency and

accuracy of sharing and searching business information will become the important issue of the project.

Lastly, the documentation of the project such as research, development and testing will be included. Report will also discuss about key element of mobile application during the development. Several methodologies will be investigated and select a most suitable strategy in this project to ensure that mobile application will be produced successfully.

2 METHODOLOGY

Although develop a mobile application is very commonly, it is still a newly programming technology. There are many failing project occurs in the world, the reason of failing project that might be run over budget and also development time is underestimated. Therefore, decide a most suitable methodology for the project was very important. Because it can help the developer minimize the risk of the project and getting fast to complete the task.

There are many methods in operation in this world. The waterfall model was first Process Model to be introduced. In a waterfall model, each phase must be completed fully before the next phase can begin [3]. The problem of this model comes in relative to its requirements for phase artifacts and the strict order in which the phases must be accomplished. The waterfall methodology is more suited to classes of software development requiring document-driven processes such as compilers or secure operating system is not user-focused as much as process focused and an integral component of the end product is thorough documentation.

Addition, iterative and incremental methodology is any combination of both iterative design or iterative method and incremental build model for development [4]. The basic idea behind this method is to develop a system through repeated cycles and in smaller portions at a time, allowing software developers to take advantage of what was learned during development of earlier parts or version of the system [5]. By using this methodology, project can be slice into small parts or function, time is still lessened as in the testing evolves. In addition, since component of project split as small part, it can help developer to ensure that all of the project parts are fulfill the user requirement and fully tested. After that, developer can through the feedback from tester to enhance each part of the project. Developer can easier test and debug by using this methodology. However, developer should be very clear about the whole system before it can break down and incremental.

Below is show the process and sub-process required to meet the project requirements.

Table 2.1: The main project processes

- Initiating
  - Identify project purpose and target market
  - Research subject areas
  - Prepare project specification

- Planning
  - Define project scope.
  - Gather research information.
  - Define system overview.
  - Identify system architecture.
  - Planning and develop data model.
  - Identify programming technology.

- Design and implementation
  - Configure the backend system, including the server and database connections.
  - Build the business card script in mobile apps.
  - Create an online sharing business card process.
  - Create a rating business card process.
  - Create a download business card process.
  - Implement backend code and mobile app integration.
  - Build the business card search engine in mobile apps.
  - Build the back end simple administrator system.
  - Build the business card recover function in mobile apps.
  - Integrate the business card apps with the database.

- Test and evaluate
  - Perform functionality testing and performance testing.
  - Collecting the feedback from use for further enhancement.

- Finalise and closing project
  - Perform final modifications
  - Launch the business sharing system
  - Rearrange and complete documentation

3 KEY OBJECTIVES AND REQUIREMENTS

All of the projects are require a good objective. A good objective can provide developer a clear path when develop a project. Developer can follow the objective to estimate how much time is require to spend and also can identify the main process in the project. Usually requirements are specified and explain more in details throughout the report. The project objective and deliverables will be shown in below:

3.1 PROJECT OBJECTIVES

- Enhance the current business card mobile apps to provide the people more efficient way to sharing the business card.
- Improve business directory search engine to convenient people to search the latest business information.
- Increase more details of business information in directory to help the people more understand the business service of enterprise.
- Decrease the workload to share and collect the business card.

3.2 PROJECT DELIVERABLES

- An Android app which acts as business card collector to collect and share business card.
- A mobile app to help the people to recover data and calculate the rating of the business card.
- A project report will clearly deliver the design concept of the project and also the methodology that how are used in this project.

4 TIME ALLOCATION

Due to this project have a due date to submit, so time will become the most important to allocate with using in this project. There are many failure project occurs in the world due to the problem of development time is underestimate. Therefore, a good time management plans can help developer to complete the task in the time. Scheduling is a good way to help the developer to manage project time. By using scheduling, the developer must analyze the details of the system and requirement to determine the priority and allocate time for each of tasks. Figure 4.1 is show the Gantt chart is used for current project schedule. Through the Gantt chart in Figure 4.1, it is demonstrate the start and due date for each of project tasks. It is clearly to show the estimate time of each task to help developer easier to understand.

4.1 THE ITERATIVE AND INCREMENTAL DEVELOPMENT METHOD

The software development models are the methodologies or various processes that can help developer to achieve the project's goal and aim. With using software development model, it usually will specify as the various phase of process according from the system development life cycle (SDLC). SDLC model usually includes five steps which include systems planning, system analysis, system design, system implementation and system support [6]. The iterative and incremental development method (IID) is a method that develops a system through separate several components of the system and each component is repeated cycles of planning, executing and monitoring. By using IID, it can help developer to ensure that all of the project parts are fulfill the user requirement and fully tested. After that, developer can through the feedback from the test of system to enhance each part of the project. It can reduce the risk of project from testing each part of system rather than the whole system. So IID will be used to complete in this project. The iterative and incremental development method will be shown in the Figure 4.2 to describe how the method is process until complete the system.

ID	Task Name	Duration	Start
1	**1 Initiating**	**12 days**	**Thu 9/26/13**
2	1.1 Research project title	3 days	Thu 9/26/13
3	1.2 Prepare project specification	10 days	Mon 9/30/13
4	**2 Planning**	**27 days**	**Sat 10/12/13**
5	2.1 Define Project Scope	2 days	Sat 10/12/13
6	2.2 Gather research information	5 days	Tue 10/15/13
7	2.3 Define System overview	5 days	Tue 10/22/13
8	2.4 Develop UML diagram	5 days	Tue 10/29/13
9	2.5 Develop ER diagram	3 days	Tue 11/5/13
10	2.6 Prepare Report Planning	7 days	Fri 11/8/13
11	**3 Executing**	**102 days**	**Sun 11/17/13**
12	3.1 Prepare install development software and tools	3 days	Sun 11/17/13
13	3.2 Design project logo	2 days	Wed 11/20/13
14	3.3 Develop back end system	15 days	Fri 11/22/13
15	3.4 Develop app interface design	15 days	Fri 12/13/13
16	**3.5 Develop app function**	**60 days**	**Fri 1/3/14**
21	3.6 Prepare Report Implementation	6 days	Thu 3/27/14
22	**4 Monitoring**	**147 days**	**Thu 9/26/13**
23	4.1Testing system and debug	85 days	Sun 11/17/13
24	4.2 Meeting with supervisor weekly	147 days	Thu 9/26/13
25	4.3 Prepare report testing	3 days	Tue 4/1/14
26	**5 Closing**	**11 days**	**Fri 4/4/14**
27	5.1 Develop User Guide	3 days	Sun 4/6/14
28	5.2 Combine and Prepare Project Report	6 days	Wed 4/9/14
29	5.3 Prepare presentation slide	2 days	Thu 4/17/14

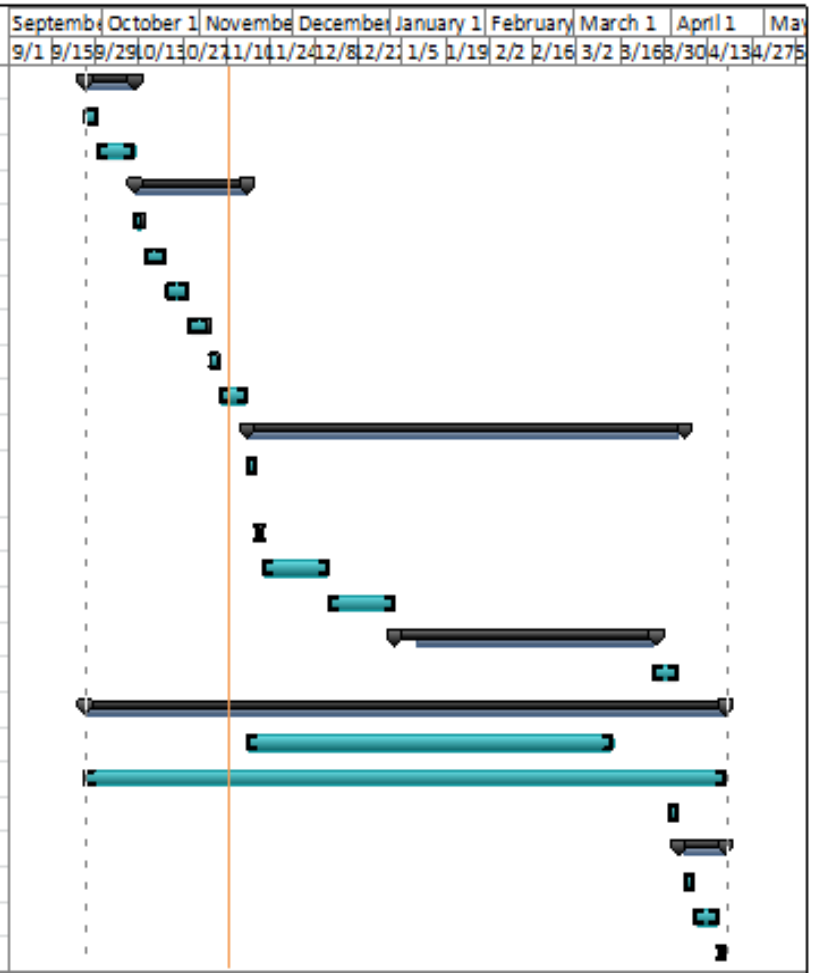

Figure 4.1: Gantt chart for Rapid sharing business card project development

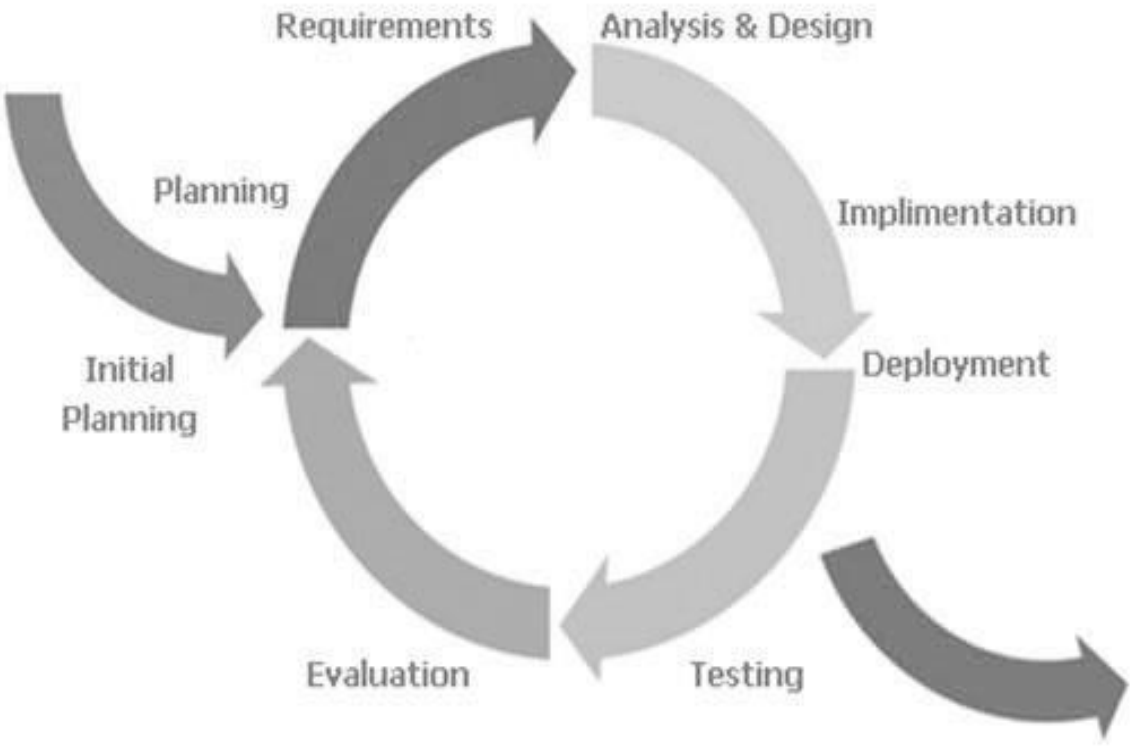

Figure 4.2 Iterative and incremental method for Rapid Sharing Business Card project [A].

5 RESEARCH

Mobile application will be the main function for the business sharing app. The research section will focus discuss several aspects which is related in this project such as feasibility of the project and technologies of mobile app.

5.1 MARKET RESEARCH

This section is aim to research the population of smartphone and mobile app to make sure that enough of market user for the project.

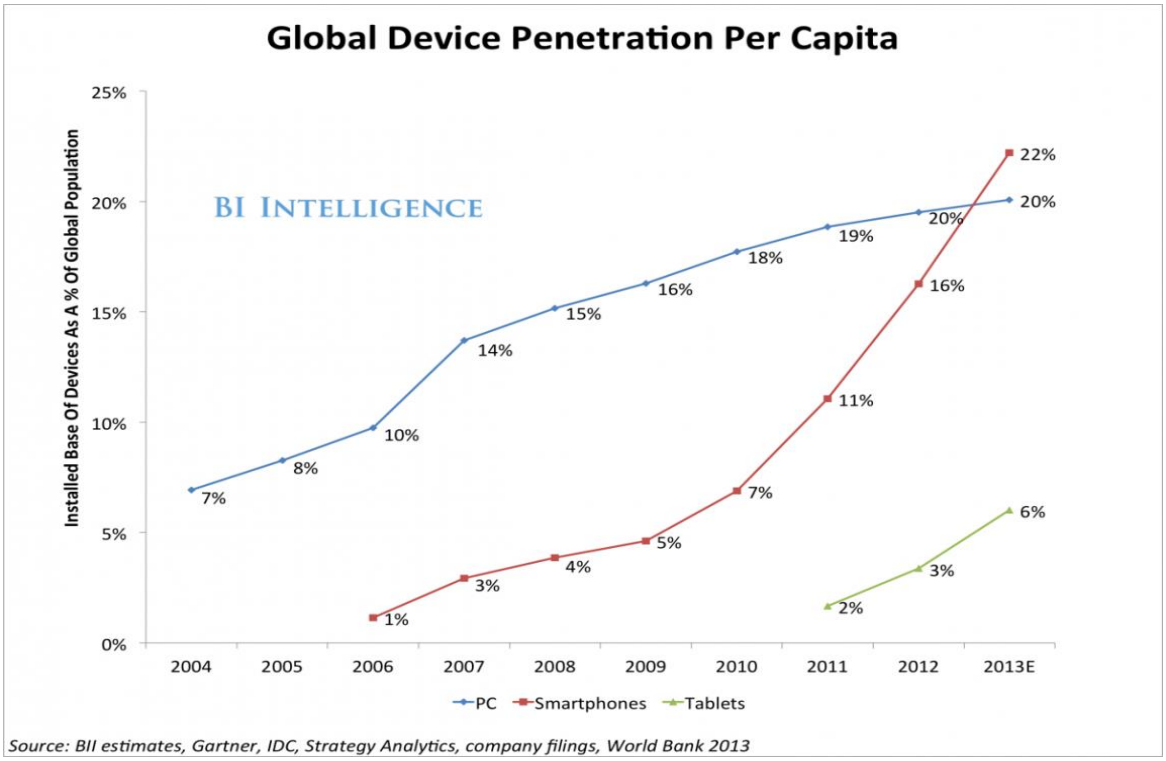

Figure 5.1: Diagram of the global device penetration per capita [B].

Figure 5.1 above shows the global device penetration per capita from year 2004 until year 2013. From the diagram above, we can know that 22% of the global population will own a smartphones by the end of year 2013. So that's means one in every 5 people in the world will own a smartphone [7].

Top Six Smartphone Operating Systems, Shipments, and Market Share, 2012 Q1 (Units in Millions)

Mobile Operating System	1Q12 Unit Shipments	1Q12 Market Share	1Q11 Unit Shipments	1Q11 Market Share	Year-over-Year Change
Android	89.9	59.0%	36.7	36.1%	145.0%
iOS	35.1	23.0%	18.6	18.3%	88.7%
Symbian	10.4	6.8%	26.4	26.0%	-60.6%
BlackBerry OS	9.7	6.4%	13.8	13.6%	-29.7%
Linux	3.5	2.3%	3.2	3.1%	9.4%
Windows Phone 7/Windows Mobile	3.3	2.2%	2.6	2.6%	26.9%
Other	0.4	0.3%	0.3	0.3%	33.3%
Total	152.3	100.0%	101.6	100.0%	49.9%

Source: IDC Worldwide Mobile Phone Tracker, May 24, 2012

Figure 5.2: Smartphone operating systems shipments and market share [C].

Figure 5.2 show the table about the market share of each smartphone OS (operating system). From the table we can know that android has control the 59% of the world's smartphone market share by Q1 of 2012. Compare with Q1 of 2011, android has increasing the market share of 23% in one year [8]. It is also show that android has the best platform performance and android will be the first choice of most people.

Combination of the data above can be judged that Smartphones will be the necessary device for the people in the future and Android will be the lead of the Smartphone OS platform in the future mobile development. These reasons are what Android will be the target as main platform to use within project.

5.2 PROJECT TOOLS

Different project will involve the various development tools and skills. It is very important to choose the right tools for the developer because it will affect the progress of project. In business sharing app development, it is required several tools to develop app, backend system, graphic design and create preparation of the project proposal. Table 5.1 represents the main software and tools required in the project.

Table 5.1: The main software and tool required to develop business sharing app.

Software / Tool	Language / Format	Usage
PhpMyAdmin	MySQL	Manage and integrate database
Notepad++	PHP / HTML 5 / JavaScript	Develop Administrator system
Adobe Photoshop	JPG / PNG	Graphic Design
Android developer tools (ADT)	Java	Develop Android application
Android SDK	Java	Android's API library
Microsoft Office 2010	-	Develop report and documentation

Android developer tools will be used to develop the business sharing app. Android developer tools are based on Eclipse IDE. It is a set of components (plug-ins), which extends the Eclipse IDE with Android development capabilities [9]. Android studio also supports IDE but this IDE is based on the IntelliJ IDE. Both IDE also have the same functionality such as create, compile, debug and also allows developer to create virtual Android devices to test run the application. Although both tools are similar, but eclipse is the preferred and highest recommended tool by Google because it is the fastest way to get started for android developer. Because it will provide tools integration, debug output pane and custom XML editors. ADT also will provide an incredible boost while develop

Android applications. Android Software Development Kit (Android SDK) that provide the sample projects with sources code, necessary tools, emulator and also required libraries for developer to create the application in the android platform.

5.3 DEVELOPMENT AND TECHNOLOGY

This section is aim to discuss the development and technology that will involve in the business card sharing app. Business sharing app is a mobile application that allow the user to create a business card and sharing to public by using cloud server. Administrator system is a web based system to handle the whole information of all business cards. This project will be involved both client side and server side technology. Android application will be the client side and it is developed by using Java-Android language and administrator system is developed by using HTML 5 and JavaScript. For provide the data access between two platforms, PHP will acts as the bridge that retrieve data from MySQL and display on the client side application. Figure 5.3 show the architecture of business sharing system.

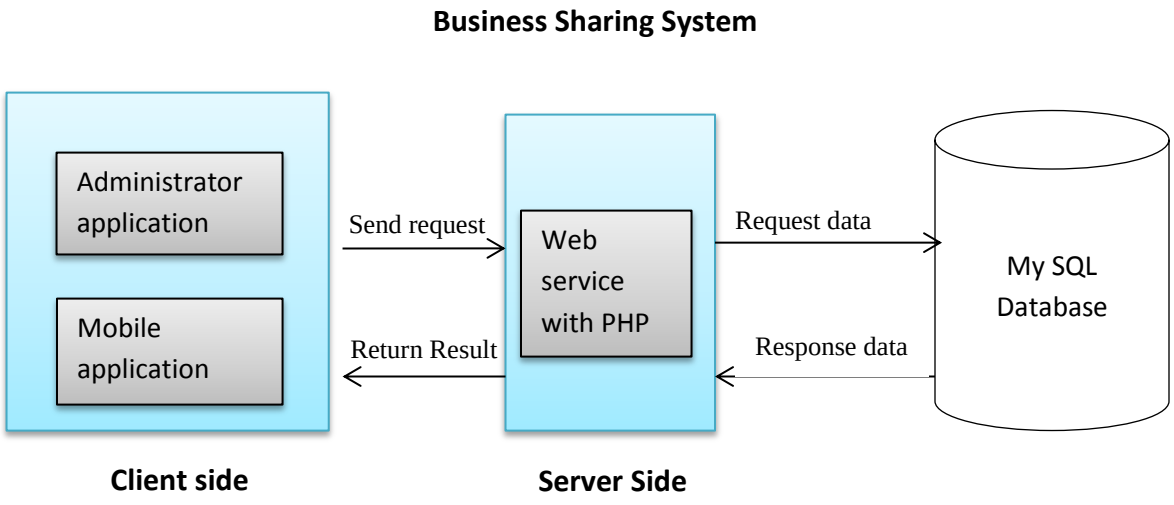

Figure 5.3: Architecture of Business Sharing system

5.3.1 Android Application Programming Technology

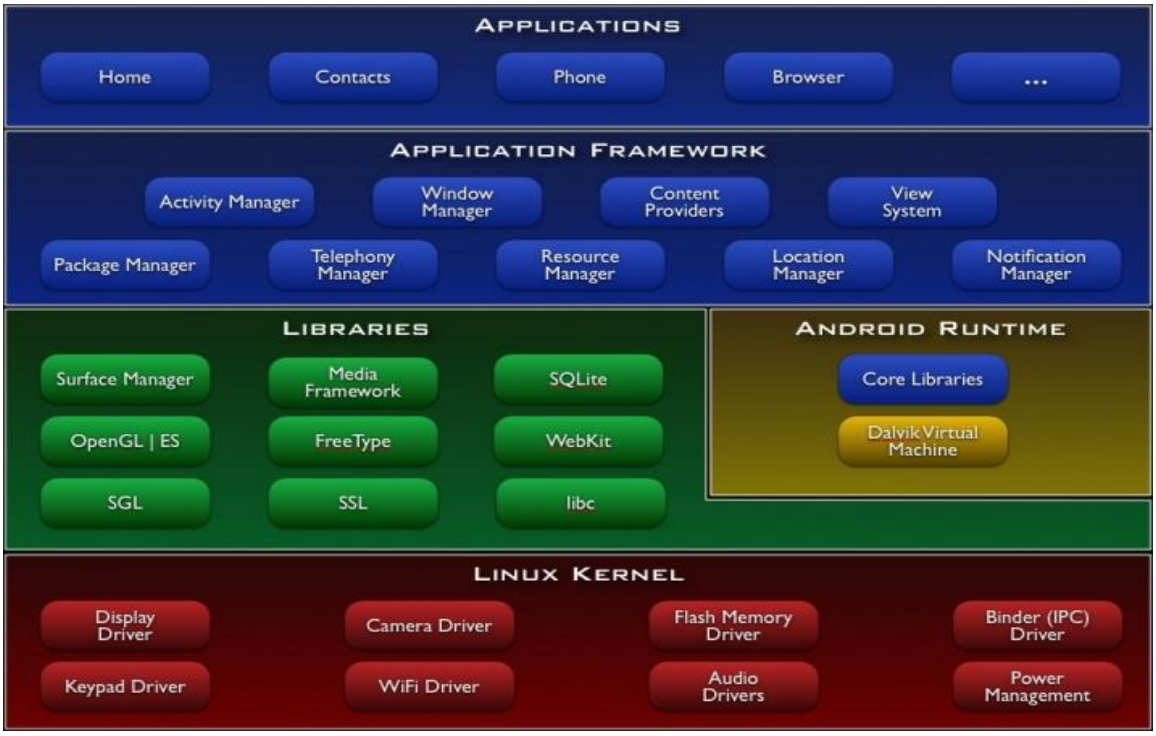

Figure 5.4: Android system architecture [D]

Figure 5.4 is shows the Android system architecture, we can know that Android OS can be referred as software stack of several layer. According to Android-App-Market.com, the following will describe each layer in architecture will provide the different services: [11]

1. Linux Kernel Layer

The basic layer on the software stack is Linux Kernel. It is provide core services for Android. Android uses the Linux for all its core functionality such as hardware driver, memory management, networking, security setting and etc. [11]

2. Libraries Layer

The next layer is Libraries layer. It is enables the device to handle the different types of data in this layer. There are some of important native libraries such as surface manager, media framework, SQLite, WebKit and Open GL. [11]

3. Runtime Layer

Android Runtime layer consists of Core Java libraries and Dalvik Virtual machine. Core Java libraries provide the most of functionality which define in the Java SE libraries. Dalvik Virtual machine is used in android device to run the mobile apps and it is optimized for low processing and low memory environments. [11]

4. Application Framework Layer and Application Layer

Lastly, the top two layers in the Android architecture are applications and applications framework. Applications are created by using the application framework and it will be run within Dalvik VM. As a developer, this is what should be considered there are some of tools with used in business sharing application.

5.3.2 Web programming technologies

There are two independent parts within web programming in client side that include Markup languages and programming. HTML 5 and CSS 3 will be used as the markup language in the administrator system for the layout display. HTML 5 is a markup language that used for structure and presents the web page content. CSS 3 is responsible to control how the web pages will be displayed and separation of presentation from structure and content [12]. After that, JavaScript will be the client side language that used in administrator system. It will help the operation such as data validation within the Administrator system. That can increase the efficiency for admin to handle the administrator system.

5.3.3 Server side technologies

Selecting a suitable server side technology to use is very important. Mostly server side technologies such as Active Server Pages (ASP), PHP and Python also can be used as the several main ways such as to build web pages with HTML, to process the user input data and update the content of database [13].

The server side programming often can build the dynamic web page which enable to interact with database. When necessary, it can make the different queries to the database and uses the result to build the HTML code and sent back to the browser. By using HTML-base pages, it can use the user input and sent it to insert the information in database. By the same taken, it also can update or delete existing information in database. Server side technologies can be a vital security role that validating user input before it is used [13].

PHP is a server-side scripting language that allows the developer can create the dynamic web content that communicates with database [13]. It is scripting language that suitable to integrate with a range of database. Figure 5.5 presents the PHP architecture between client and server side.

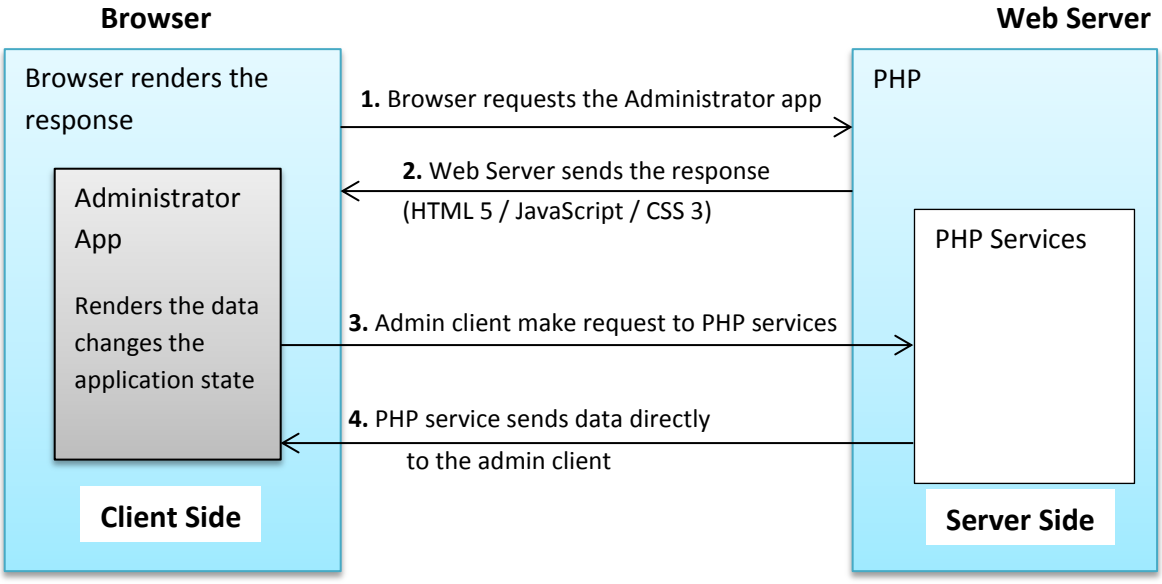

Figure 5.5: represents the administrator application and PHP architecture

There have a several benefits with using PHP and the primary is efficiency performance. PHP can make to be efficient web language to use but it is depend on how developer code. PHP also provide security. It is offer security to prevent the malicious attacks. Lastly, PHP provides high compatibility with leading OS and web servers such as there are enabling it to be easily deployed across the different platforms [14]. This is a one of reason that PHP will used in business sharing application.

PhpMyAdmin is one of most popular tools that written in PHP. It can manage a whole MySQL server as well as a single database. As similar as other database service, it also can perform the various tasks such as creating, updating, deleting the database and executing the SQL statements. The advantage of using phpMyAdmin is it has the interface and user can run the queries within SQL. User can enter their any queries to test the output result. It is very helpful for developer to check the queries error.

5.3.3 Connecting Android client to PHP

This section aim will discuss the structure connecting Android client to PHP.

Figure 5.6: Android – PHP – MySQL Scheme [E]

Figure 5.6 is shows about client-server architecture between Android and PHP. PHP represents as scripting language of server side because it can offer to interaction with databases. Android device is act as client and server side is PHP script and MYSQL. When Android wish making connection to PHP script, it should be used the HTTP protocol from the android system. JSON web service will be used for connect device to PHP script because it is a lightweight text-based open standard designed for human-readable data interchange. After establish connection success, PHP script will fetch data from the database and it will encode the data into JSON format and response to the Android device [15]. Lastly, Android application will receive those encoded data and it will parse data and display on Android device [15]. Thus, PHP can be known as agent to help the Android device to fetch data required from database and send the data to it.

5.4 RESEARCHING METHOD OF SHARING BUSINESS CARD

This section will aim to describe a summary for existing method of sharing business card and the requirements which business sharing app should provide to the user.

5.4.1 History of Business Card and Yellow Pages

Business card is the most common that user is used to introduce the business or individual information. The business card was begun on the 17th century in Europe, the purpose was used to announce that prosperous or aristocratic people were upcoming arrive to their town or home [1].

In 18th and 19th centuries, these ‘social cards’ were taken from each lady upon her first visit to a house. People were offered the card tray upon the opening of the door to the door and had to place their card in it as a matter of etiquette. After that, the card will be delivered to the lady of household who would examine it [1]. Such behavior is to give the first impression of the people.

In modern day, these cards should have the name of the card holder, title, company name, location and also include the contact information such as address, email, telephone and anything else that card holder feel to add [1]. There has a variety of business card app to digitize the business card and store on mobile phone.

Besides that, the first appearance of Yellow Pages is on the year 1883. It was used the yellow paper to instead of white paper to print a regular directory because a belief that reading print on yellow background was easier on the eye made the substitution permanent [16]. In 1886, Reuben H. Donnelly was produced the first Yellow Pages directory that also featuring business names, phone numbers and categorized by the types of products and services provided [17].

The purpose of Yellow Pages is satisfies a need. The usage of Yellow Pages directories depends highly on major life events instead of entertainment. For example, when user buy or sell home, move to new city, get married even though change jobs, the Yellow Pages are there to help [18]. Similarly, business card has the same function with Yellow Pages but Yellow Pages can represent as grouping all business card together to provide directories to user.

5.4.2 Why sharing business card by using mobile application?

Even though there has various methods to share the business card to public, it still has several weaknesses that cannot solve completely. The paper based business card has the problem that card is easily missing and damage. The cost of advertising to disseminate business card such as Yellow Pages, magazine and newspaper is extremely high and it is also not an efficient way to disseminate business. These advertising methods can cost until thousands per month for half or full page display. The drawback of the Yellow Pages advertising is that business company only have the once chance of selecting the right type of

advertising such as company details and placing in the right category because book is only published once in entire year [19]. Similarly, even though newspaper and magazine can change advertising content in next edition, it also lack of flexibility to update content instantly.

With popularity of smartphone, it has becomes an important device of people in daily life. According a research by Gartner, they estimate that total mobile apps download will be growth to 269 billion when to the year 2017. In comparison, it has been increased over 100% when compared with year 2013 total mobile apps download is 102 billion [20]. Smartphone has become a necessary device that can assists people in many aspects such as social network, entertainment even office helper.

Collect business card and flexibility to share business card are the two main problems in existing advertising method. Smartphone will be the best way to collect business card. It is also become more flexible way to share business card. By using mobile app, user can create own business card and fill in any detail which related to their business and sharing it to public people through cloud server. It also can more flexible to update the content of business card to share the latest details to other user. This can help other user to search the latest details about their business. Besides that, user can search any service from directory and store on the mobile phone. It has a cloud server to back up all business card which user was collected from business directories.

5.4.3 Existing business sharing mobile app

Due to the popularity of smartphone, some of the IT companies also have develops a mobile app to digitize business card and provide business card sharing to other. There are several business card apps that can be found in market. Below are the examples of existing business card app and directory search app.

1. CamCard

CamCard is an app which allow user to convert their business card into digital contacts. User only snaps a photo of business card and app will orients it, read the text and transcribe it to user contact list. CamCard Optical Character Recognition (OCR) is good at reading text, but it has the problem that it often gets the company name and person's title mixed up, because layout of business card is different. Although it can collecting all other paper based business card to convert as digital and store in mobile device, it is not provide the directories to the user to search the required service contact. After that, it can only share business card to specific people via Bluetooth, email and QR code.

2. POPWings

POPWings is a mobile app that user can share their business card with anyone who has Near Field Communication (NFC) capable device. User can add a QR code in their POPCard, so people who didn't have the NFC device can scanning the QR code to download the digital business info of user. Besides that, it can't disseminate business card to widely people because it can only share the business card to nearer people who user meets.

3. Yellow Pages Malaysia app

By contrast, Yellow Pages Malaysia is different with business card app. It is a mobile app that provides the complete directory search need. User can search the businesses quickly by category. However, it is lack of function which provided by business card app. User can't create and manage their business card in the app. After that, user can't store the business info on the mobile device which was found in directory.

Although there are several mobile apps that user can digitize business card and search directory needs in market, these apps still can't accepted by widely people because it contains different deficiencies and required to improve.

5.4.4 The requirement of business sharing app

When it comes to what information should include in the paper based business card, unfortunately it is not enough to put too much of information to it. The size of paper based business card only has a few of inches. Due to most people only has a personal business card, each user only can create a single card within business sharing app. According to research, below are the elements that should include in the business sharing app [21].

1. Name of Individual

It's a nice personalized touch to have a name of individual in business card. It can help the recipient have the name of specific person in contact.

2. Name of Business or Organization

Usually name of business or organization is the most important in business card. It can make the higher recognition to the people by de-emphasize the business name.

3. Address

Had a business address that can help to increase the trust of customer. Customer may have to go the business address for more information.

4. Phone number (s)

Had multiple phone number for business is very ordinary. Usually the business has a variety of phone number such as mobile phone, fixed line number and fax number.

5. Email Address

Email is not usually necessary element for other business or organization, but it is important for the Web-based business.

6. Web Page Address

It is essential element for Web-based businesses but increasingly important for any type of business.

7. Tagline or Description Business

Tagline or descriptions of business are very important for customer to know what type of business of user.

8. Graphic Image

Graphic image allow the business user to upload image which is related to their business. It will attract customer when upload suitable image for their business.

Business sharing app will be developed according the requirement of mentioned above. Due to the problem of existing business sharing app, function of sharing business card to directory will be included. After that, searching directory function such as search by nearby business service, category business service and high rating service will be included in the application to the user. The extra function such as save contact number to the mobile phone also will be included in the application.

5.5 TARGET AUDIENCE AND POSSIBLE SCENARIOS

This section is aim to discuss and analysis the potential audience and scenarios for Business Sharing app.

5.5.1 Target Audience

A start up entrepreneur or small entrepreneur will depends on many factors for the survival. They know that make money is the only way to survive. Many of small business fall into the traps of costly advertising campaign [24]. Due to lack of knowledge in technology, usually they have Yellow Pages, newspaper ads and

fliers as their advertising. After that, they will sure to carry business cards and leave one behind whenever you deliver a message (Katina, 2006: 219) [22]. '*According to article, Malaysia started with 47 percent smartphone penetration in 2012 among daily internet users. Even as ownership already registered 16 percent increase to 63 percent for 2013, an additional 17 percent of the respondents surveyed indicated that they would buy a smartphone in the next six months*' [23]. This is sufficient percentage of people use the apps and sharing their business card to widely people in cloud server. In addition, the popularity of smartphone also contains enough people as customer to search business directory with using app.

5.5.2 Clients and Scenarios

Due to the restriction of project timescale and environment, it may not to include too much extra feature within system. The development of business sharing app will only designed in the focal point of requirement from different scenario. After that, to handle the different scenario, the function of disseminate a business card, searching directory and store business info on mobile device through mobile app also will include in the system. The following will list out the possible client and scenario for business sharing app.

<u>Potential client 1: Small and start up enterprise in Malaysia</u>

According to article, one of the challenges facing by Malaysian Small and Medium Enterprise is lack of financial [25]. Due to the financial problem, usually small enterprise will more difficult to spent too much of money to the advertisement. Besides that, the field of marketing also one of the major problem faced by small entrepreneur. They are usually can't get the first hand information about the market information such as satisfaction of consumer [26]. Business sharing app will help them to save the cost in advertisement and provide the rating function to help each business can know the satisfaction of their consumer.

Potential client 2: Worker and family holder in Malaysia

Worker and family holder will be one of potential client of the application. Usually these kinds of people will require to search service such as insurance, buying a house, healthcare and else. Usage of business sharing app also satisfy a need. It will provide a directory by following on the major life events rather than interest group. This application can help them to get a variety of services and products without waste the time to browsing the search engines for few hours.

5.6 LEGALITY ISSUE AND SECURITY

This section will aim to discuss about the privacy issue and law which will related to business sharing app.

5.6.1 Privacy Policy

According to businessdisctionary.com, privacy policy is a statement that declares a firm's or website's policy on collecting and releasing information about a visitor [27]. Business sharing app should set out how it will use any information that given by user when user use this application. In 2012, California sues Delta Airlines for lack of mobile app privacy policy [28]. The application collects information such as a person's name, phone number, geo-location and else personal data. It is alleged in the lawsuit that Delta customer do not know how their data collected or used by airline [28]. Due to the issue, Delta could face a penalty of $2500 for each time of its application has been downloaded [28]. Therefore, mobile app developer provides a readable, understandable and easily accessible privacy policy is very important. The following is list out which at a minimum informs users about [29]:

- To provide the identity and contact details about company or developer.
- To describe what precise categories of personal data is app will be collected and process also.

- To describe why the data processing is necessary and what is the purpose of process.
- To specific describe to whom the data will disclosed and whether data will be shared to third parties.
- To describe what rights users have, in terms of withdrawal of consent and deletion of data

5.6.2 Related Laws and Regulations

This section is aim to discuss several privacy law and regulation apply to App Developer. Below are the privacy laws that apply to App Developers.

1. Sector Specific Privacy Laws

The Children's Online Privacy Protection Act (COPPA) covering data collected by children under 13 [30]. It was put in place to protect kid's personal information on website and online service that including mobile application. COPPA requires those sites and mobile app to notify parents directly and get their approval before they collect, use or disclose a child's personal information [31].

2. Malaysian Data Privacy Laws

Malaysia's Personal Data Protection Act (PDPA) is the law that applies to the processing of "personal data" by entities operating in Malaysia but generally does not apply to data processed entirely outside of Malaysia. It is an Act that regulates the processing of personal data regards to commercial transaction [32]. The following are 7 principles that structure by PDPA:

"1. General Principle: Data user shall not process personal data about an individual unless the individual has given his consent to the processing of the data.
2. Notice and Choice Principle: Data user shall inform as individual by written notice that his personal data is being processed or on behalf of the individual and

shall provide a description of that personal data including the information about the purpose of data usage.

3. Disclosure Principle: No personal data shall be disclosed without the consent of the individual.

4. Security Principle: Data user shall take practical steps to safeguard the personal data from any loss, misuse, modification, unauthorized or accidental disclosure, alteration or destruction.

5. Retention Principle: The personal data processes for any purpose shall not be kept longer than is necessary for the fulfillment of that purpose.

6. Data Integrity Principle: Data user shall take responsible to make sure that the personal data is latest and accurate.

7. Access Principle: An individual shall be given access to his personal data held by a data user and be able to correct it." [33]

3. Copyright Act 1987 in Malaysia

Copyright is the exclusive right given to the owner of a copyright for a specific period [34]. There are no system is require to register for copyright. The works will automatically to be protected by copyright when they are fulfills the condition in below:

"1. To make the work original and it is the result by person's own skill and effort.

2. The work has been written down, recorded or reduced to a material form.

3. The author is qualified work is made in Malaysia either work is first published in Malaysia." [34]

To apply Copyright Act, project will contain "Copyright 2014 Rapid Sharing Business Card. All Rights Reserved."

5.6.3 Security

The purpose of the business sharing app is provides various information to the widely people. To apply PDPA, business sharing app will not collect not related information from user. To avoid user information will be disclosed, business sharing app will not disseminate user information without their agreement. In business sharing app, user may through click a toggle button to turn on the sharing mode when they are agree to share their business information to widely people. To protect all information of user, user id and password is required when access to business sharing administrator system. It will not store any additional data in the user device.

6.0 DESIGN FUNCTIONALITY

The following section will be described about the intended system and also will provide diagram to demonstrate the expected functionality.

6.1 THE THREE-TIER ARCHITECTURE

According to techopedia.com, three-tier architecture is a client-server architecture in which the functional process logic, data access, computer data storage and user interface are developed and maintained as independent modules on separate platforms [35]. It is a software design pattern that widely used by developer to develop in a variety of application. The general architecture in the current project is three-tier also. By using three-tier architecture, developer can easier to maintain the application in the future because it is enable parallel development of the different layer of the application. Three-tier architecture general organized by three major part. Each part handles the different responsible in three-tier architecture.

Presentation layer

Presentation layer has responsible to display the related information to the user on application interface. It is contains the programming that provide the different graphic user interface (GUI) to user. This layer will sending results to the browser by communicates with other layer.

Business logic layer

Business logic layer has responsible to handle the any validations or calculation which related to the data. Usually it is located on the local area network (LAN) server. This layer acts as a middleman that interaction between Presentation layer and Data access layer.

Data access layer

Data access layer has responsible to manage read and write data which require accessing database. It is contains the method such as insert, update, delete and etc to help the business logic connecting with the data and execute required task.

By using this architecture, it can easy to implement change the fewer of business logic. It has contains many of business logic in business sharing app. By using three-tier architecture, business sharing app is able to make changes in the future enhancement which is required by user and without affect user interface. Figure 6.1 is shows that architecture pattern of three-tier architecture.

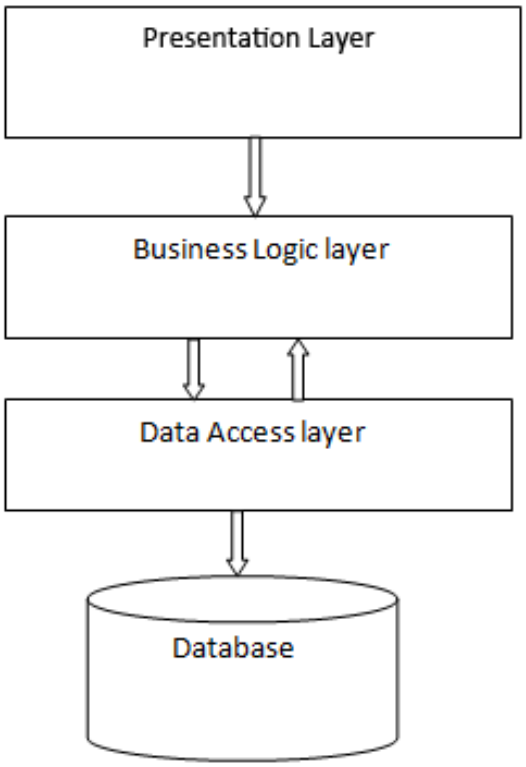

Figure 6.1: The architecture pattern of three-tier

6.2 USE CASE MODEL

In the software development, use case model can be described as the proposed functionality of a new system [36]. By using use case model, it can help developer to identify the relationship of user and function. In the figure 6.2, it will show the use case model of the business sharing app. The user and function will be listed as below.

Users

- Administrator
- Registered user
- Non-registered user

Functions

- Login / Logout
- Change Password
- Create business card
- Update business info
- Synchronize business info to server
- Restore business info
- Sharing business info to public
- Searching business directory
- Save contact to mobile phone
- Give rating of business service
- View rating of business service
- Add business service as favourite
- View user business detail
- Disable user business detail

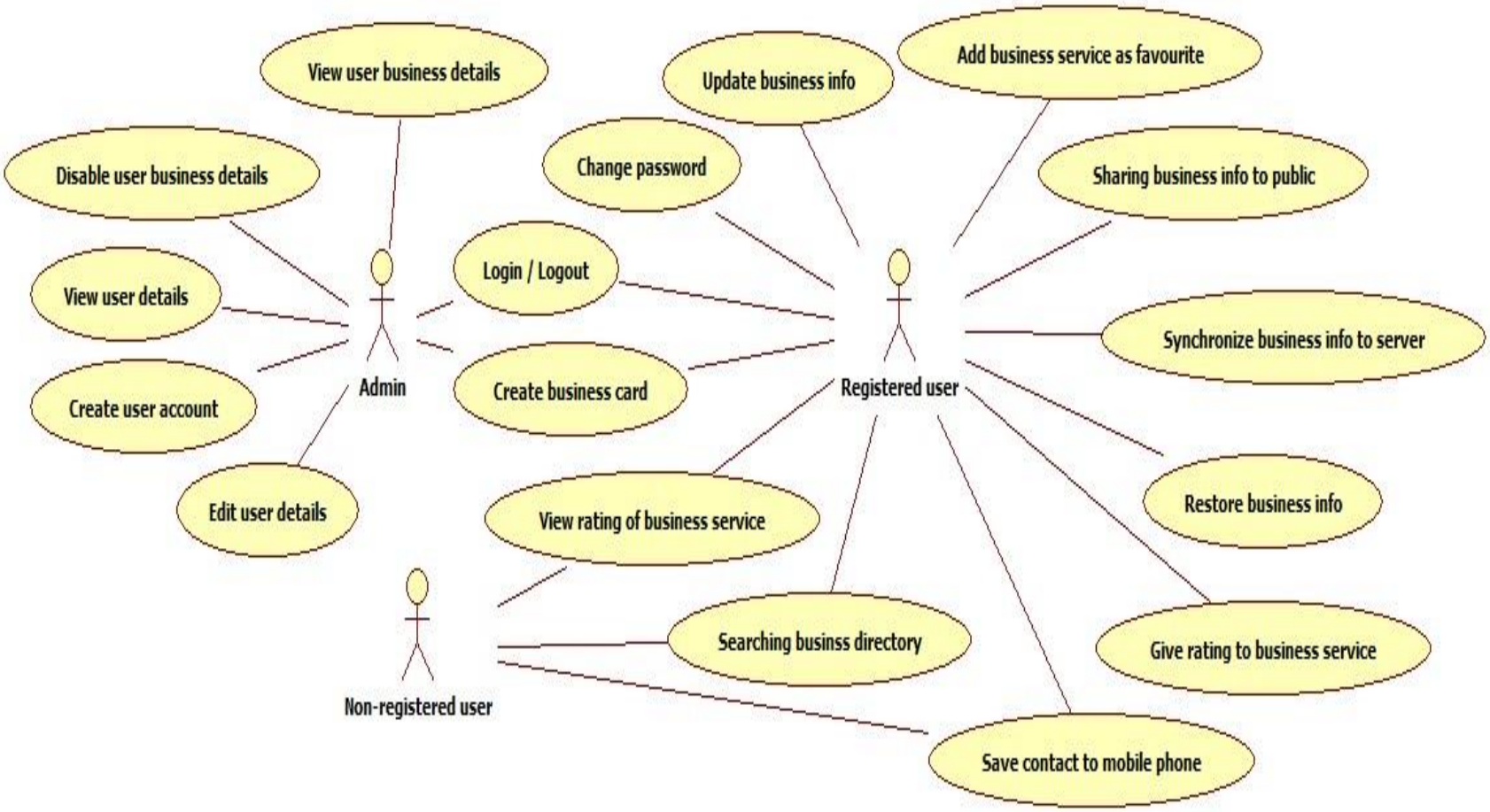

Figure 6.2: Use case model of Business Sharing app

6.3 ENTITY RELATIONSHIP DIAGRAM

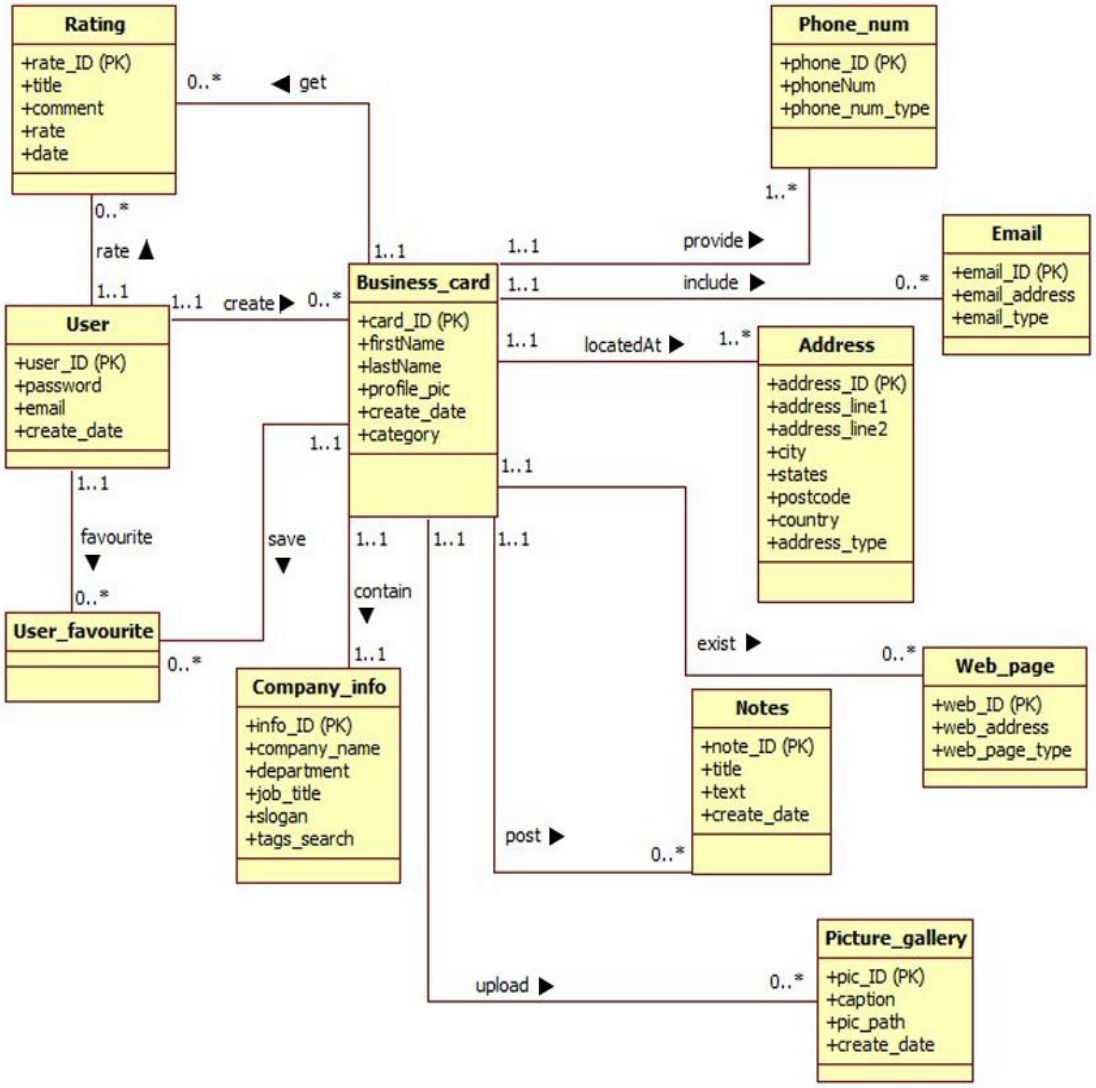

Figure 6.3: Entity Relationship Diagram of Business Sharing app

7.0 IMPLEMENTATION

This section is aim to describe the process of developing business sharing app.

7.1 INTERFACE DESIGN

The best interface design can impress user. Even though how function is powerful, the poor interface design will make user frustrated. User interface act as a middleman that interaction between user and mobile device. Designing the mobile device is quite different with designing for mainstream device such as PC that contains a big size of screen. The following is the mobile design technique that applied in business sharing app [37].

1. Important Content

Whole genre of goodies can be contained in the website. However, it is different to bring everything to the mobile platform. When designing user interface of mobile device, developer should simplify the content to make the application load quicker. Therefore, only display the important content to the interface which users are mainly visiting.

2. Offer a simple navigation

Many mobile applications do not offers too many of navigational features such as a back button. Therefore, it is a good idea to simplify the navigational feature within the mobile app. Offer a simple navigation to let user can find the function easily and also to avoid slow down the loading time significantly.

To provide user friendly with better user interface, designing of business sharing app has been modified several time during development. The following will describe the design progress when developing the interface.

7.1.1 Mobile app interface design

Development Stage 1

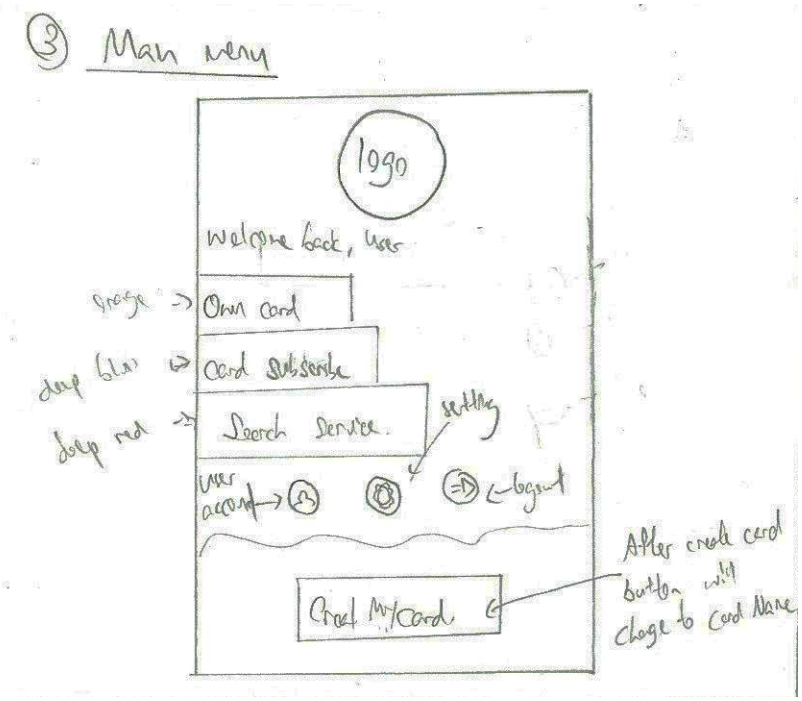

Figure 7.1: Android Development Stage 1

The limitation space of mobile application device is one of challenge during interface design. Figure 7.1 is shows the primary concept design of the sharing business's mobile app. The above main menu design is best suited for the limited content. All elements will be positioned by using xml. The main menu will contain logo icon, text view and navigational button. There are three design of navigational button to separate the different type of function. First design button will be middle size and use the darker colour. Second design button will be small size and use the plain colour. Third design button will be bigger size and use the lightning colour. These different graphic will help user to distinguish the main function from the main menu.

Development Stage 2

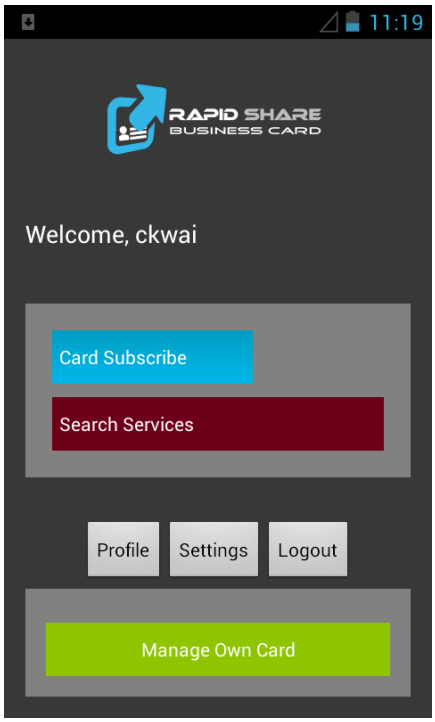

Figure 7.2: Android Development Stage 2

Grey (#383838) will be used to become the background of main menu interface. To provide clear navigational to user, two different main functions will be highlighted by using light grey (#828281). For more contrasting between two different main functions, individual setting such as profile, setting and logout will be placed between two main functions. The navigational button is developed by using Android Button elements. To offer the simple navigation to user, there would be no extra element should contain in the main menu.

Development stage 3

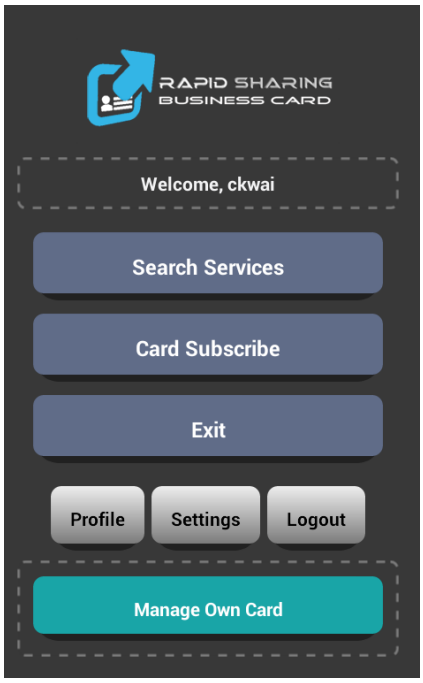

Figure 7.3: Android Development Stage 3

To provide the more attractive user interface, the use of colour will be controlled with less than 6 colours. By using too many colours in interface design, it will confuse the user while they are using the application. Use the dashed border to replace the highlight colour of main function is to present a simple view to user. The shadow and border radius will be used to design button, it can make the interface more user friendly and it can also make the comfortable feel to the user. Align all layout elements to the center to make interface become tidier.

7.1.2 Administrator System Interface Design

Development Stage 1

Minimal Style UI will be applied in the interface design of administrator system. Minimal style UI relies heavily on type, symbols, and white space to create a clear and simple user experience. Since graphics are used sparingly, the layout of the elements is extremely important [38].

It will separate into two part, header and content. Header will display the system logo and setting button to user for change individual details such as password, username and email. Content have a menu bar which will display in the top of content. Menu bar will display main function button to user. The corresponding page will display in content block when function button is clicked. Date table or form will be displayed in content block when function button is clicked.

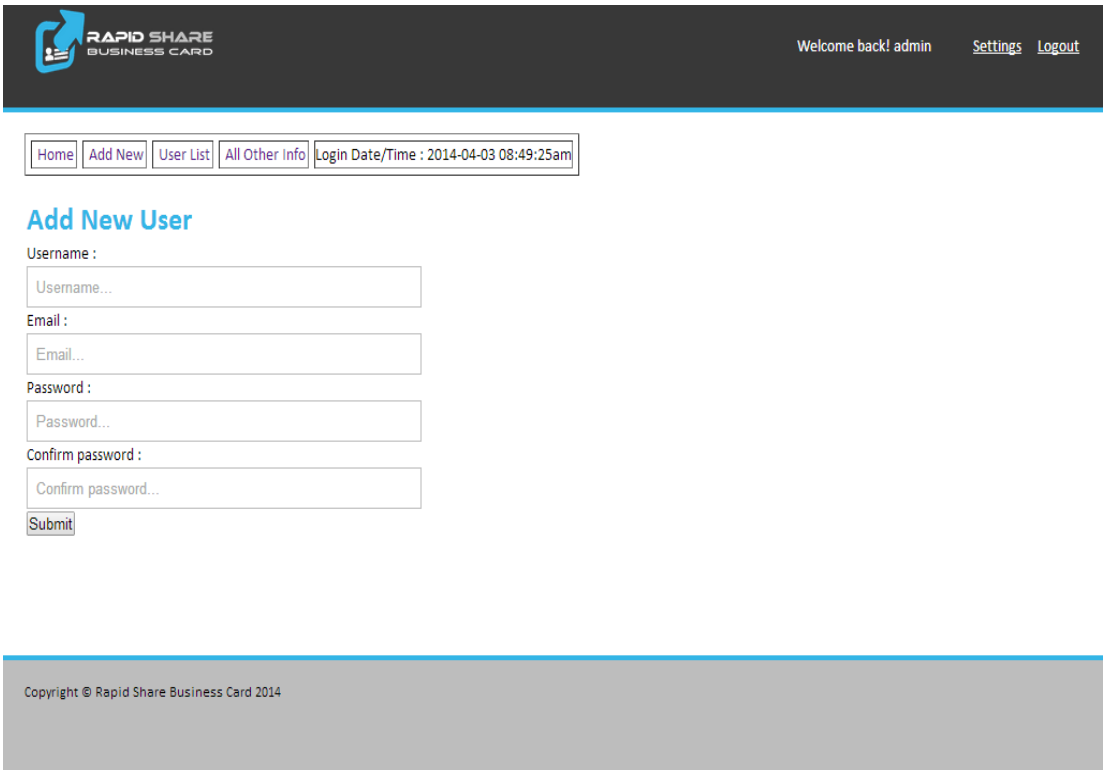

Figure 7.4: Administrator System Development Stage 1

Development Stage 2

Plain color such as grey (#bdbdbd) and light grey (#f3f3f4) will be theme color of system to allow administrator can more comfort when using the system. Several icons will be added to represent each function to make the interface more attractive and easier to use.

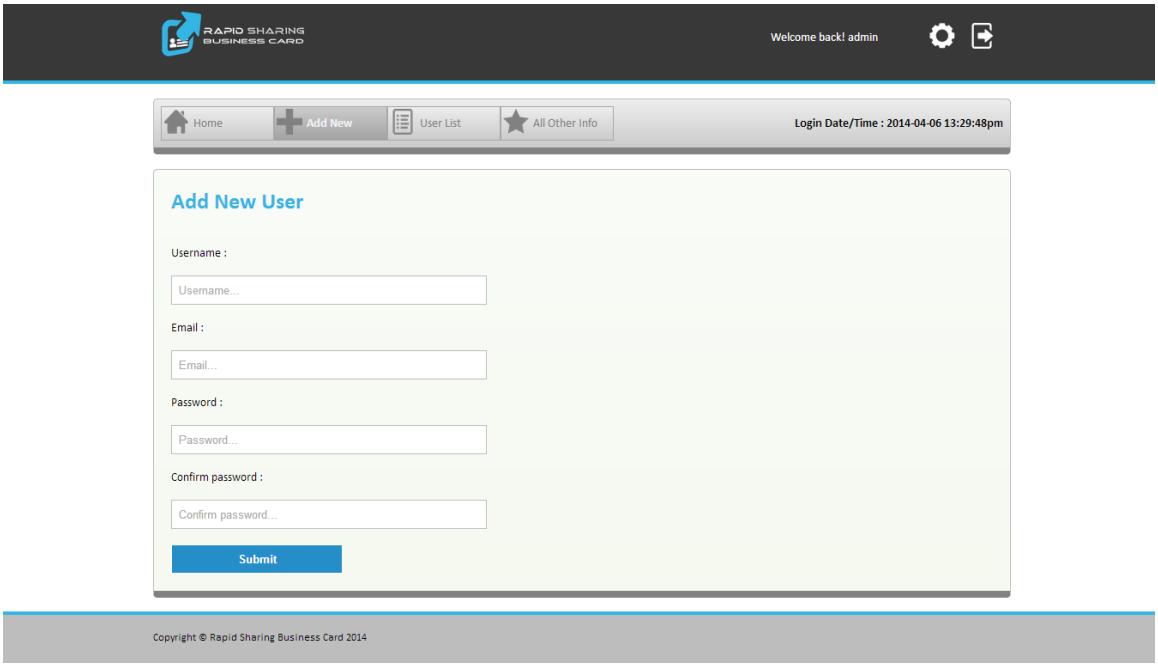

Figure 7.5: Administrator System Development Stage 2

7.2 COMMUNICATE WITH WEB SERVICE

JavaScript Object Notation (JSON) is a web service that provides lightweight text-based open standard design for human-readable data interchange [15]. The structure about JSON has been discussed in research section. Figure 7.6 is the sample code to use JSON in Android application. It is demonstrate that make HTTP request to specific URL by using JSON.

```
1  import org.json.JSONException;
2  import org.json.JSONObject;
3  //User json communicate with web service in PHP
4  JSONObject json = jsonParser.makeHttpRequest(url_create_acc,
5                                    "POST", params);
```

Figure 7.6: Use JSON to communicate with web service in Android application

After that, it is allow retrieving data by using JSON. Figure 7.7 is the sample code that retrieves data from web service by using JSON.

```
1     String url = "http://www.let2talk.com/sharing_business/android/signUp.php";
2     String username = "user123";
3
4     // Building Parameters
5     List<NameValuePair> params = new ArrayList<NameValuePair>();
6     params.add(new BasicNameValuePair("username", username));
7
8     // getting JSON Object
9     // Note that create url accepts POST method
10    JSONObject json = jsonParser.makeHttpRequest(url,
11                                    "POST", params);
12
13    try
14    {
15        //retrieve data that get from web service
16        success = json.getInt("success");
17        msg = json.getString("message");
18
19    }catch(JSONException e){
20        e.printStackTrace();
21    }
```

Figure 7.7: Retrieve data from web service

7.3 USER LOGIN

7.3.1 Login through Mobile App

Business sharing app will require user to login before create a business card within the application. It can help user to back up their business info while they are synchronize to the server. After login success, user detail will be cached on the mobile device. Below is the coding to perform login process.

```
String username = inputUser.getText().toString();
String password = inputPassword.getText().toString();

// Building Parameters
List<NameValuePair> params = new ArrayList<NameValuePair>();
    params.add(new BasicNameValuePair("username2", username));
    params.add(new BasicNameValuePair("password2", password));

// getting JSON Object
// Note that create product url accepts POST method
JSONObject json = jsonParser.makeHttpRequest("http://www.let2talk.com/sharing_business/android/logging.php",
                "POST", params);

try{
    success = json.getInt(TAG_SUCCESS2);
    msg = json.getString(TAG_MESSAGE2);

    if(success == 1){
        userID = json.getString(TAG_USER);
        userEmail = json.getString(TAG_EMAIL);
        userJoin = json.getString(TAG_JOINDATE);
        cardStatus = json.getInt(TAG_CARDSTATUS);
        String card = json.getString("cardID");
        String type = json.getString("type");

        sharedpreferences=getSharedPreferences(MyPREFERENCES,
                Context.MODE_PRIVATE);

        Editor editor = sharedpreferences.edit();
        editor.putString(name, userID);
        editor.putString(email, userEmail);
        editor.putString(join, userJoin);
        editor.putString(category, type);
        editor.putString("cardKey", card);
        editor.putInt(cardStatusK, cardStatus);
        editor.commit();

        Intent i = new Intent(getApplicationContext(), UserMainActivity.class);
        startActivity(i);

        finish();
    }
}catch(JSONException e){
```

Figure 7.8: User login algorithm

7.3.2 Login through Administrator System

Business sharing administrator system is a web application. It is an application that allow administrator to handle all information of system. It is require username and password when admin require to login in the system. Only the user type “admin” will allow to access in the administrator system. Login date time will be recorded as history to trace who are login before. Figure 7.9 is algorithm that admin login to the administrator system.

```
include("db_connect.php");
$username = $_POST["username"];
$password = $_POST["password"];
$ip=$_SERVER['REMOTE_ADDR'];
// connecting to db
$db = new DB_CONNECT();
$check_user = mysql_query("select * from user where user_name='$username' and user_type='admin'");
$check_email = mysql_query("select * from user where email='$username' and user_type='admin'");

date_default_timezone_set ("Singapore");
    $ldate=date("Y-m-d", time());
    $ltime=date("H:i:sa", time());
$_SESSION["loginDate"] = $ldate." ".$ltime;
if(mysql_num_rows($check_user)==1){
    $result = mysql_query("select * from user where user_name='$username' and password='$password'");
    $display = mysql_fetch_array($result);
    $_SESSION["useremail"] = $display['email'];
    $_SESSION["username"] = $display['user_name'];
    $_SESSION["userid"] = $display['user_ID'];
    $_SESSION["usertype"] = "userid";
}else{
    $result = mysql_query("select * from user where email='$username' and password='$password'");
    $display = mysql_fetch_array($result);
    $_SESSION["useremail"] = $display['email'];
    $_SESSION["username"] = $display['user_name'];
    $_SESSION["userid"] = $display['user_ID'];
    $_SESSION["usertype"] = "email";
}
$num = mysql_num_rows($result);
if($num){
    mysql_query("INSERT INTO loginhistory (ip, date, user)
                VALUES ('$ip','$ldate $ltime','admin')");
    echo "<script>window.location='main.php'</script>";
}else{
    echo "<script>window.location='index.php?status=fail';</script>";
```

Figure 7.9: Algorithm of login administrator system

7.4 BUSINESS SHARING FUNCTION

Solve the main problem of flexibility of sharing business card is primary task within the project. By using business sharing app, user may sharing business card to business directory after creates their card. User can easier to share their business detail to business directory by using toggle button.

Figure 7.10 is a screenshot that businesses can decide whether share their business detail to the business directory. Figure 7.11 is the algorithm of change sharing mode.

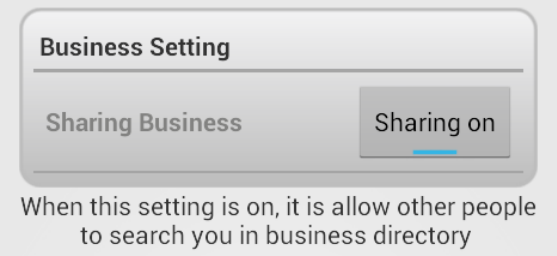

Figure 7.10: Screenshot of business settings in business sharing app

```
private ToggleButton.OnClickListener toggleChange = new ToggleButton.OnClickListener() {
        public void onClick(View v) {

            //Toggle Button on
            if (toggle.isChecked()==true) {
                //Display message to inform user sharing mode is on
                Toast.makeText(ManageOwnInfo.this, "Sharing Business On", Toast.LENGTH_LONG).show();

                //change sharing status; 2 equals sharing mode on
                new SwitchStatus().execute("1");

                // allow user to set category of their business in dirctory search
                ln_category.setVisibility(LinearLayout.VISIBLE);

            //Toggle button off
            } else {

                //Display message to inform user sharing mode is off
                Toast.makeText(ManageOwnInfo.this, "Sharing Business Off", Toast.LENGTH_LONG).show();

                //change sharing status; 2 equals sharing mode off
                new SwitchStatus().execute("2");

                // not allow user to set category of their business in dirctory search
                ln_category.setVisibility(LinearLayout.GONE);
```

Figure 7.11: Algorithm to change sharing mode of business card

After sharing mode was on, it will allow user to select an appropriate category to make other search them easily. Other user will be found them in their selected category. Figure 7.12 is a screenshot that user can select an appropriate category for them in business directory. Figure 7.13 is the algorithm of change business category.

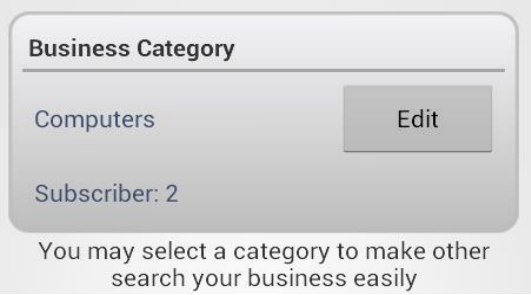

Figure 7.12: Screenshot of select category in business sharing app

```
sharedpreferences=getSharedPreferences(MyPREFERENCES_User, Context.MODE_PRIVATE);
String card_value = sharedpreferences.getString("cardKey", "");

        // Building Parameters
        List<NameValuePair> params2 = new ArrayList<NameValuePair>();
        params2.add(new BasicNameValuePair("cardID", card_value));
        params2.add(new BasicNameValuePair("type", typeValue));

         JSONObject json = jsonParser.makeHttpRequest(switchCategoryPath,
                    "POST", params2);
         try {
            // Checking for SUCCESS TAG
            int success = json.getInt("status");

            if(success==1){
                msg = "Success update category";

                sharedpreferences=getSharedPreferences(MyPREFERENCES_User,
                            Context.MODE_PRIVATE);
                Editor editor = sharedpreferences.edit();
                editor.putString(categoryK, typeValue);
                editor.commit();

                Intent i = new Intent(getApplicationContext(), ManageOwnInfo.class);
                startActivity(i);
                finish();
            }
        }catch (JSONException e) {
            e.printStackTrace();
        }
```

Figure 7.13: Algorithm to change category of business card

7.5 SEARCH BUSINESS DIRECTORY

There are several conditions should be considered while perform the search business directory process:

1. User current position – To get user current position.
2. Category – To check which category is selected by user.
3. Product service – To check which service or product is required by user.
4. Location – To check what location is required by user.
5. High rating – To check whether user search by high rating.

User can search the business directory by click the “Search” button in business sharing app. Business sharing app will check user current position before retrieve the search result to user. Because to check the user current location, it will require user to turn on their GPS satellites before process the search function. After that, it will base on the requirement of user to retrieve the business list result to the user. The SQL syntax “LIKE” and “%” will be used to perform in search function and display matching data from data table. The estimate distance between each businesses and user will be calculated when user searching business directory. List view is sorted by distance to list out the business directory when user is not selects the high rating business within search form. However, it will also sorted by high rating to list out the business directory when user is select high rating business within search form. Below are the algorithms that will be used in the search function. Figure 7.20 and figure 7.21 are shows the screenshot of sample search result.

```
// check whether user turn on GPS of mobile device
if(!alm.isProviderEnabled(android.location.LocationManager.GPS_PROVIDER)){  //if GPS off

    Toast.makeText(SearchMain.this, "Please Turn on your GPS", Toast.LENGTH_SHORT).show();

    Intent intent = new Intent(Settings.ACTION_LOCATION_SOURCE_SETTINGS);
    startActivityForResult(intent,0); //open location access setting of mobile device
    return;
}
```

Figure 7.14: Check whether GPS is on

```
//method to get user current location
void getMyCurrentLocation() {
        LocationManager locManager = (LocationManager) getSystemService(Context.LOCATION_SERVICE);
        LocationListener locListener = new MyLocationListener();

        try{gps_enabled=locManager.isProviderEnabled(LocationManager.GPS_PROVIDER);}catch(Exception ex){}
          try{network_enabled=locManager.isProviderEnabled(LocationManager.NETWORK_PROVIDER);}catch(Exception ex){}
           if(gps_enabled){
               locManager.requestLocationUpdates(LocationManager.GPS_PROVIDER, 0, 0, locListener);
           }
           if(gps_enabled){
               location=locManager.getLastKnownLocation(LocationManager.GPS_PROVIDER);
           }
           if(network_enabled && location==null || location!=null ){
               locManager.requestLocationUpdates(LocationManager.NETWORK_PROVIDER, 0, 0, locListener);
           }
           if(network_enabled && location==null)    {
               location=locManager.getLastKnownLocation(LocationManager.NETWORK_PROVIDER);
           }
           if (location != null) {
               MyLat = location.getLatitude();
               MyLong = location.getLongitude();
           } else {
               Location loc= getLastKnownLocation(this);
               if (loc != null) {
                   MyLat = loc.getLatitude();
                   MyLong = loc.getLongitude();
               }
           }

           Criteria criteria = new Criteria();
           criteria.setAccuracy(Criteria.ACCURACY_FINE); //
           criteria.setAltitudeRequired(false);
           criteria.setBearingRequired(false);
           criteria.setCostAllowed(true);
           criteria.setPowerRequirement(Criteria.POWER_HIGH); //
           String provider = locManager.getBestProvider(criteria, true);
        //removes the periodic updates from location listener to //avoid battery drainage.
        //If you want to get location at the periodic intervals call this method using //pending intent.
        LocationListener locationListener = new LocationListener() {
           @Override
           public void onLocationChanged(Location location) {
            updateToNewLocation(location);
           }
```

Figure 7.15: Algorithm of get user current location

```
//check whether user search by high rating
if(chk_rate.isChecked()==true){
    rate = "yes";
}else{
    rate = "no";
}
```

Figure 7.16: Check whether user search by high rating

```
/*********************function distance*************************/
 function distance($lat1, $lon1, $lat2, $lon2, $unit) {

 $theta = $lon1 - $lon2;
 $dist = sin(deg2rad($lat1)) * sin(deg2rad($lat2)) +  cos(deg2rad($lat1)) * cos(deg2rad($lat2)) * cos(deg2rad($theta));
 $dist = acos($dist);
 $dist = rad2deg($dist);
 $miles = $dist * 60 * 1.1515;
 $unit = strtoupper($unit);

 if ($unit == "K") {
   return ($miles * 1.609344);

 } else if ($unit == "N") {
     return ($miles * 0.8684);

 } else {
      return $miles;
 }
}//end function
```

Figure 7.17: Formula of calculate distance between enterprise and user

```
    //sorting business directory list
    Collections.sort(rowItems, new Comparator<RowItem>() {

            double date1 = 0,date2 = 0;
            int asc = 1;
            @Override
            public int compare(RowItem arg0,
                    RowItem arg1) {
                // TODO Auto-generated method stub

                if(check.equals("no")){ // sort by distance
                    date1 = arg0.getDistance();
                    date2 = arg1.getDistance();
                }else{ //sort by high rating
                    date1 = Double.parseDouble(arg0.getRate());
                    date2 = Double.parseDouble(arg1.getRate());
                    asc = (-1);
                }
                return Double.compare(date1, date2) * asc;
            }
        });
```

Figure 7.18: Algorithm of sorting business directory list

```
 SELECT * FROM business_card INNER JOIN company_info ON business_card.card_ID = company_info.card_ID
 INNER JOIN address ON business_card.card_ID = address.card_ID
 WHERE business_card.category_ID = '$type' and business_card.status_ID='1' AND business_card.disable=''
 AND company_info.product_service like '%$service%'
 AND (address.address_line1 like '%$where%' OR address.address_line2 like '%$where%' OR address.city like '%$where%'
 OR address.states like '%$where%' OR address.postcode like '%$where%' OR address.country like '%$where%')
 limit $start,$per_page;
```

Figure 7.19: SQL code which perform search action with multiple parameters

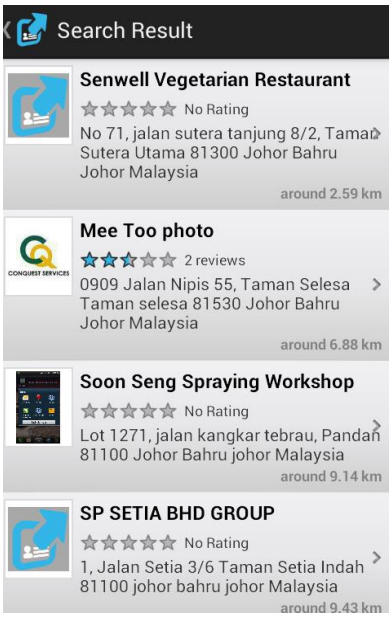

Figure 7.20: Screenshot of sample search result sorted by short distance

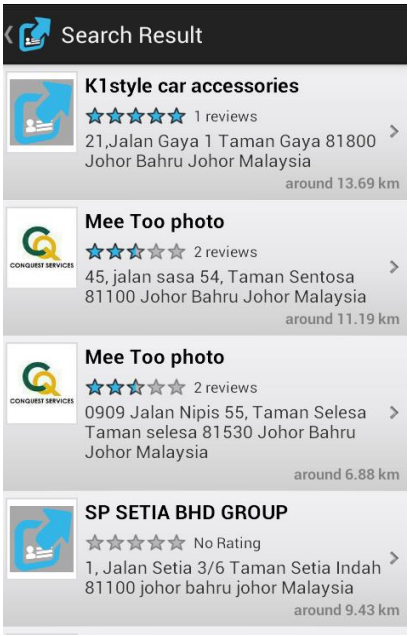

Figure 7.21: Screenshot of sample search result sorted by high rating

7.6 SAVE CONTACT NUMBER TO MOBILE PHONE

Save contact detail to mobile phone is an important function for business sharing app. It usually will allow user can save the contact number which search from the business directory. Without the save contact function, user may easier forgot the contact number of businesses and it will waste their time to find out the contact number when user is required to use.

Before save contact number of enterprise into mobile contact, user can edit the name of enterprise and select the contact number which they required. It can help user easier to remember which contact number is saved. Below is the algorithm that will use for function of save contact number from directory.

```
ArrayList<ContentProviderOperation> ops =
        new ArrayList<ContentProviderOperation>();

ops.add(ContentProviderOperation.newInsert(
        ContactsContract.RawContacts.CONTENT_URI)
        .withValue(ContactsContract.RawContacts.ACCOUNT_TYPE, null)
        .withValue(ContactsContract.RawContacts.ACCOUNT_NAME, null)
        .build()
    );

//save contact name
ops.add(ContentProviderOperation.newInsert(
        ContactsContract.Data.CONTENT_URI)
        .withValueBackReference(ContactsContract.Data.RAW_CONTACT_ID, 0)
        .withValue(ContactsContract.Data.MIMETYPE,
            ContactsContract.CommonDataKinds.StructuredName.CONTENT_ITEM_TYPE)
        .withValue(
            ContactsContract.CommonDataKinds.StructuredName.DISPLAY_NAME,
            et_name.getText().toString()).build()
    );

//Save contact number into mobile device
ops.add(ContentProviderOperation.
        newInsert(ContactsContract.Data.CONTENT_URI)
        .withValueBackReference(ContactsContract.Data.RAW_CONTACT_ID, 0)
        .withValue(ContactsContract.Data.MIMETYPE,
        ContactsContract.CommonDataKinds.Phone.CONTENT_ITEM_TYPE)
        .withValue(ContactsContract.CommonDataKinds.Phone.NUMBER, num_value)
        .withValue(ContactsContract.CommonDataKinds.Phone.TYPE,
         ContactsContract.CommonDataKinds.Phone.TYPE_MOBILE)
          .build()
    );
```

Figure 7.22: Algorithm of save contact number to mobile device

7.7 RESIZE PICTURE FOR BUSINESS GALLERY

Due to the large quality of image will affect the performance during business directory search, quality of image which is uploaded by user will be reduced. All image size will be reduced as the standard size of 640 x 480 dimensions which is suitable to display in mobile device and not affect the performance of mobile application. Below is the algorithm that uses to resize the picture.

```
int DESIREDWIDTH = 640; //set desire image size width
int DESIREDHEIGHT = 640; //set desire image size height

Bitmap bmp = ScalingUtilities.decodeFile(imgPath,
DESIREDWIDTH, DESIREDHEIGHT, ScalingLogic.FIT);

if (!(bmp.getWidth() <= DESIREDWIDTH && bmp.getHeight() <= DESIREDHEIGHT)) {
    scaledBitmap = ScalingUtilities.createScaledBitmap(bmp, DESIREDWIDTH, DESIREDHEIGHT, ScalingLogic.FIT);
}else{
    scaledBitmap = bmp;
}
```

Figure 7.23: Algorithm of resize image

7.8 STORE DATA ON MOBILE PHONE

To convenient user can review the business information at any time and without using network. User may save business information which is search from business directory to their mobile device. When in the situation without network, user still can review their favourite business detail. Figure 7.24 is a part of algorithm to save business information to the mobile device.

```
sharedprefer_subscribe=getSharedPreferences(MyPREFERENCES_Subscribe,
        Context.MODE_PRIVATE);
List<NameValuePair> params = new ArrayList<NameValuePair>();
    params.add(new BasicNameValuePair("userID", userID));

    //make connection request
    JSONObject json = jsonParser.makeHttpRequest(resSubscribePath,
        "POST", params);

    try {
    int success = json.getInt("success"); // success get info

    if(success==1){
        int countCard = json.getInt("countCard");
        editor_s.putInt("countSKey", countCard);
        JSONArray card = json.getJSONArray("card");
        for(int i=0;i<card.length();i++){
            int count = i + 1 ;
            JSONObject cc = card.getJSONObject(i); //download business info from server
            int cardID = cc.getInt("cardID");


            String listK = "FavorList"+count;
            String cName = cc.getString("cName");
            String dpm = cc.getString("dpm");
            String job = cc.getString("job");
            String slogan = cc.getString("slogan");
            String bshr = cc.getString("bshr");
            String product = cc.getString("product");

            editor_s.putString(listK, Integer.toString(cardID)); //save business info to the mobile phone by using session
            editor_s.putString("dpm"+cardID, dpm);
            editor_s.putString("job"+cardID, job);
            editor_s.putString("bshr"+cardID, bshr);
            editor_s.putString("product"+cardID, product);
            editor_s.putString("slogan"+cardID, slogan);
            editor_s.commit();
        }
    }catch (JSONException e) {
        e.printStackTrace();
    }
```

Figure 7.24: A part of algorithm to save business info to mobile device

8 TESTING

Testing is very important part of software development. It is an activity that evaluating the program or system that it is meet its required results. It is very vital to find the error and any bugs from the system or application before it is released into public user. Testing should be run after any changes of the source code. Iterative and incremental methodology is a methodology that will apply in this project. To coordinate with this methodology, testing will be performed to each component when it is complete implementation. There are varieties of testing method to apply during system development. These methods can help developer to improve the application. The following below will discuss some of testing method that will be applied in this project.

8.1 ANDROID MONKEY TOOL

Android Monkey tool is a simple tool that can test the stability of android applications. It is a command-line tool that developer can run on any emulator instance either on a device. Basically it is sends out a set of random key events and clicks to the device or emulator [39]. Developer can use this tool to test any possible bug or error may occur in their android application. When the Monkey tool is discover any error contain in the application, it will be stopped automatic and give a report to developer about errors encountered during the testing.

The figure 8.1 is show a command that should be used for first monkey test in a command line window. The command is show that it will send 10000 number of random event before testing end. Figure 8.2 is show a result of monkey test; there are not any errors were found during the test.

```
D:\adt-bundle-windows-x86-20130522\sdk\platform-tools>adb -s 0123456789ABCDEF sh
ell monkey -v -p com.example.rapidsharebusinesscard
```

Figure 8.1: Monkey test command

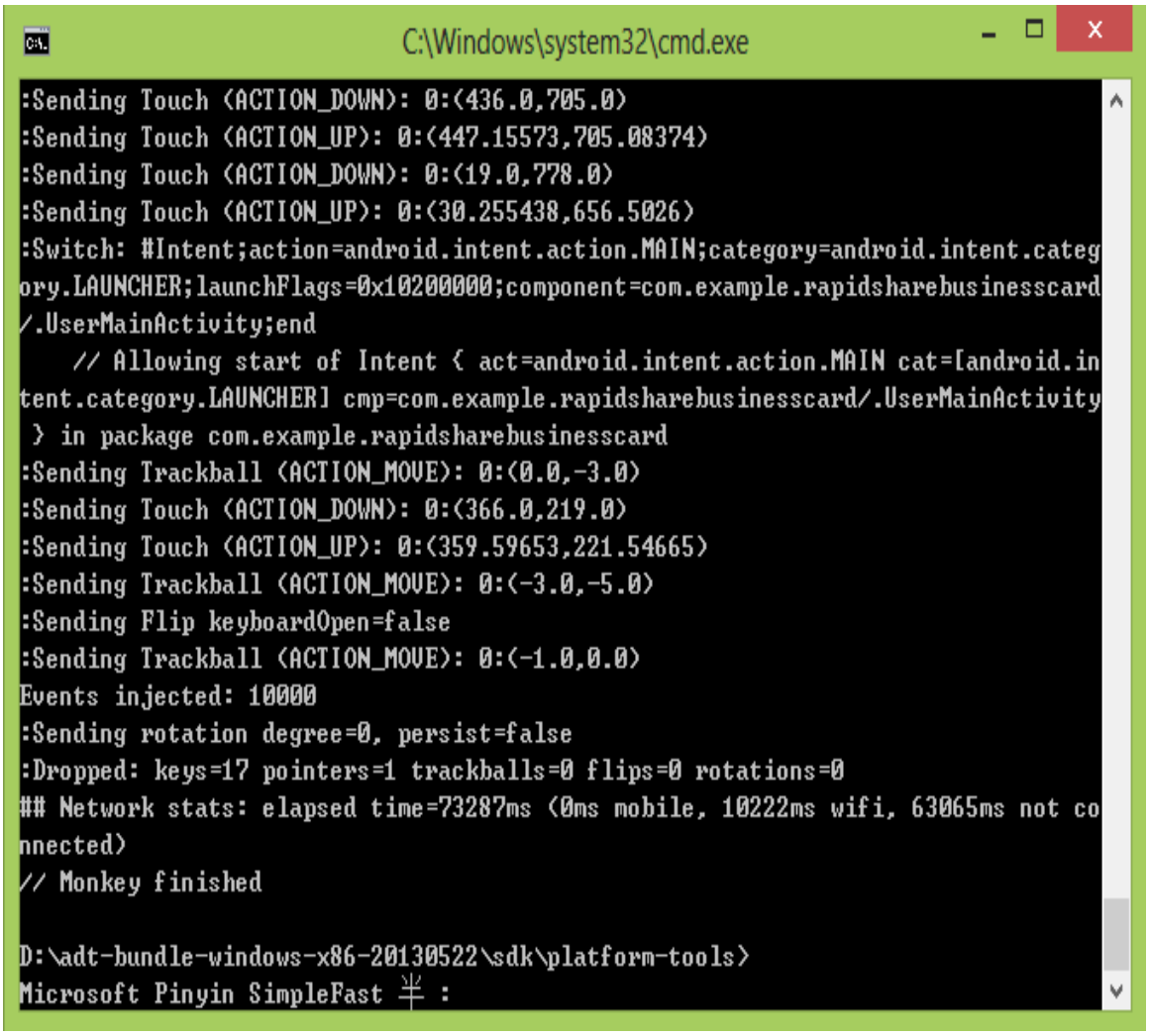

Figure 8.2: Monkey Testing Result, testing was completed on 31 March 2014.

8.2 SYSTEM TESTING

According to businessdictionary.com, system testing is the process of performing a variety of tests on a system to explore functionality or to identify problems [40]. The purpose of system testing is to validate the system accuracy and completeness of function [41]. System testing can help developer to discover any possible mistake of the system which can't be found by individual. It is usually will be tested by other people who are not familiar with the system.

System testing is differentiate if compare with unit testing, it is not to test each small component of the system. It is require the tester to test whole component to discover any possible mistake in the system. To perform system testing in this project, two clients will be invited to complete the testing of the system. During the system testing, any errors which are found by client will be corrected in the latest version of business sharing app. The result of system testing will be shown in Appendix B.

9 EVALUATION

According to main objective within the project, business sharing app is require to provide more efficient way to share the business details. It is not only can share the business details and also provide function of search business directory. During the research section, due to business card mobile app and business directory search of Yellow Page Malaysia also lack of complete feature of each other, the idea that combine the concept of these two mobile applications was sprout. After that, during the discussion with supervisor, the extra function such as rating and business gallery is added to business sharing app to complete the weakness of existing business directory app. Finally, the system has been completed and meets the initial perspective of the project.

The function of capturing photo is very useful in this project. With include this function, it can allow businesses to taking photo to save into gallery and share to their potential customer. Business gallery provides a new user experience within the business directory search. User not only can read the businesses details and also more understand the business service through the business gallery which provided by businesses. However, quality of picture which uploaded by businesses will be reduced to increase the performance when users search them. In addition, the view of gallery should be more attractive to increase the user to use this app.

Furthermore, the selected methodology that used within the project is also helpful for progress of project. The system will easier to manage while using iterative and incremental methodology. It is very useful to find out the problem immediately by testing each part of project. Due to this methodology, developer can solve the problem as fast as possible and it will not delay progress.

Besides that, this project should be enhanced in the future to reach the requirement of realistic market. Due to the limitation of project time scale, this

project has not to test within the real market. In the future, it should be tested in the real market and collect all client requirement which might be applied for the further enhancement.

Overall, this project has still complete successfully. It has been fulfill all requirements and met the objective that mentioned before. In future, business sharing app should be continued to enhance, it is not only fulfill the perspective of project but also improve the competitiveness with other related competitor.

10 RECOMMENTATIONS

This section is aim to discuss about future enhancement of business sharing app.

1. Develop for other mobile OS

Smartphone has become the popularity devices of people, there are still have many different mobile operating systems such as apple iOS and windows phone OS. These mobile OS also have contains a certain amount of market share in mobile device market. Develop a mobile app that compatible to all mobile device can increase the number of user and becoming more popular.

2. Increasing sharing method

Currently business sharing app only provides to share the business card in cloud server to other user. It is possible to increase other sharing method such as Bluetooth, email, QR code even share to social media. With increase of sharing method, user can select any sharing method depends on their different situation.

3. Provide business card template

Currently business sharing app didn’t provide any business card template to user. Provide the business card design template that can attract more users to use the application. After that, regularly launch the different design template of business card that can maintain the user based of application. It is possible to provide the business card design template to enhance competitiveness with other business card application.

4. Improve the administration system

Due to the restriction of project timescale, it is constraint the development of administrator system. For future improvement, the administrator system enables to generate more of report about user action. It is more efficiency to help the administrator to handle all information of user. When discover any improper

content in the service directory, administrator can disable the related information immediately.

5. Improve security

Security should be improved when passing the data between mobile app and server. For future improvement, data passed between mobile apps and server should be encrypted. Besides that, data should be encrypted before store in database. Even though database was hacked, all user information also will not be stolen by third party. In addition, validation should be increased to process the new registration application via online.

11 CONCLUSION

Business sharing application is a quite large project for me. It is cover to two different platforms which are mobile application and desktop application. I need to complete this project within the time constraint is quite challenging.

Before touch in this project, I had never experience in the field of mobile application in previously. This meant that many of the unknown situations will be meet during development of project. Fortunately, java programming is a main development language in the android application. Java programming which learned in previous module can be used during develop in this project. After complete system, it helps me to improve myself with the ability of programming skills.

The most challenge period during the project is in research part. As a developer, my strength is programming. Besides that, this project will require to research about the privacy law related to the software. I had never any experience in the field of law. After complete this part, I just know that there are many laws and regulation to protect the privacy of user. When any software require to release in the market, it should have the clearly privacy policy within the software. The clearly privacy policy can protect developer from offend law.

Furthermore, I always have the problem during the software development in previously. I spend too much of time with do the modifying in coding. After do the research of architecture pattern, I decided to apply three-tier architecture in my system. Because it can easy to implement change the business logic without affect to user interfaces. Therefore, it can help to save more of time for enhancement of the system.

Overall the whole project, the arrangement of the time schedule of project is most important part before start doing this project. It could be a critical issue when

developer cannot make a good arrangement of time schedule. Selecting a suitable methodology within the project also can help easier to manage the time of project. By following iterative and incremental methodology, the system will be separated into a smaller part. It can quickly to complete the each component and reduce the risk of project.

In conclusion, I am satisfied with my project even though there are a lot of aspects which should be enhanced and improved in the future. This is my first system that has implements with methodology and architecture pattern. To apply the suitable software structure in the system, it can provide the more efficient and flexibility to modify and also future enhancement. I have learnt many things through this project. This project will help me not only in planning skill and programing skill but also on the writing skill. I have become more confidence to face my future working career with having these skills. These skills can make me become a more professional IT developer with develop a system.

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APPENDIX A – PROJECT SPECIFICATION

Project Specification

Name: Wai Chin Keat Student ID: M2295928

1. **Working Title:** Rapid Sharing Business Card App
2. **Broad indication of project type:** Smart Phone App
3. **Project outline description**

Develop a rapid sharing business card app will be the title of my final year project. There are many business card apps that can share the business card via different method such as email, SMS and QR code in currently, but most of the business card apps that can only share the business card to specific people via Bluetooth, QR code scanning or email. These business card apps only can share their business card to certain people who have email address or phone number. Rapid sharing business card app allows instant sharing business card or business information to public that are allows other people searching business card anytime and anywhere. People are allows based on their difference requirement to search and download different service type of business cards to their mobile devices through the mobile app. When some of card information was changed, app would also help to update the service number or business information instantly so that people can get the accurate information immediately.

4. **Objectives**

The objectives of this project are:

1. To solve the problem that found in current business card app with help the businessman can quickly to share their business card to public.
2. To help the people search the latest business information or services.
3. To enhance my programming skills and help to became more competitive in my future job career.

5. **Technical description**

There are several tools will be used to develop the whole project.

1. Eclipse and Android SDK: Use to develop instance sharing business card app for Android platform.
2. Microsoft Visual Studio 2012: Use to develop backend system of rapid sharing business card app with using C# language.

3. Microsoft SQL Server Management: Use to develop database of the project.
4. Adobe Photoshop CS3: Use to design and edit the image and logo of the project.
5. Microsoft office 2010: Use to create preparation of the project proposal, user manual and presentation slide.

6. Description of the intended product

- Allow user to create few of business card and share their business information and picture as business card to the public online by click the agreement with the button in mobile app.
- Allow user to search the service contact and information which is nearer area.
- Allow user to view the latest business picture from each of business card.
- Allow user to give the rating service performance for each business card and download the business card they want to phonebook.
- The documentation that include user manual, project plan, project, schedule, design document and presentation slide for present the project idea and system.

7. Outline Schedule

	Task Name	Duration	Start	Finish
1	**Initiating**	**12 days**	**Thu 9/26/13**	**Fri 10/11/13**
2	Research project title	3 days	Thu 9/26/13	Sun 9/29/13
3	Prepare project specification	10 days	Mon 9/30/13	Fri 10/11/13
4	**Planning**	**27 days**	**Sat 10/12/13**	**Sat 11/16/13**
5	Define Project Scope	2 days	Sat 10/12/13	Mon 10/14/13
6	Gather research information	5 days	Tue 10/15/13	Mon 10/21/13
7	Define System overview	5 days	Tue 10/22/13	Mon 10/28/13
8	Develop UML diagram	5 days	Tue 10/29/13	Mon 11/4/13
9	Develop ER diagram	3 days	Tue 11/5/13	Thu 11/7/13
10	Prepare Report Planning	7 days	Fri 11/8/13	Sat 11/16/13
11	**Executing**	**102 days**	**Sun 11/17/13**	**Sat 4/5/14**
12	Prepare install development software and tools	3 days	Sun 11/17/13	Tue 11/19/13
13	Design project logo	2 days	Wed 11/20/13	Thu 11/21/13
14	Develop back end system	15 days	Fri 11/22/13	Thu 12/12/13
15	Develop app interface design	15 days	Fri 12/13/13	Thu 1/2/14
16	**Develop app function**	**60 days**	**Fri 1/3/14**	**Thu 3/27/14**
17	Function create business card	15 days	Fri 1/10/14	Thu 1/30/14
18	Function sharing business information to public	15 days	Fri 1/31/14	Thu 2/20/14
19	Function searching business card	12 days	Fri 2/21/14	Mon 3/10/14
20	Function rating business card	12 days	Tue 3/11/14	Wed 3/26/14
21	Prepare Report Implementation	6 days	Thu 3/27/14	Thu 4/3/14
22	**Monitoring**	**147 days**	**Thu 9/26/13**	**Fri 4/18/14**
23	Testing system and debug	85 days	Sun 11/17/13	Thu 3/13/14
24	Meeting with supervisor weekly	147 days	Thu 9/26/13	Fri 4/18/14
25	Prepare report testing	3 days	Tue 4/1/14	Thu 4/3/14
26	**Closing**	**11 days**	**Fri 4/4/14**	**Fri 4/18/14**
27	Develop User Guide	3 days	Sun 4/6/14	Tue 4/8/14
28	Combine and Prepare Project Report	6 days	Wed 4/9/14	Wed 4/16/14
29	Prepare presentation slide	2 days	Thu 4/17/14	Fri 4/18/14

APPENDIX B – SYSTEM TESTING REPORT

B1 Section Review

This section is the system test report of the Rapid Sharing Business Card App development project. It contains the result of tests, which were executed during the testing phase.

Business sharing app was tested on the mobile device and the administrator system was tested on the desktop computer or laptop, from the date of 2014/02/10 to the 2014/03/31. Table B1.1 will show the testing result of mobile app function and Table B1.2 will show the testing result of Administrator system.

Testers where:

- Guang Zhen
- Kai Teck

Table B1.1: Testing function of Mobile application on the mobile device

System Testing of Mobile application						
ID	**Test action / Case of testing**	**Date Tested**	**Tester**	**Expected Result**	**Pass / Fail**	**Comments**
1	Sign Up from mobile app	2014/02/10	Guang Zhen	Store User data into database and enter to main menu of application after successful sign up.	Pass	-

ID	Test action / Case of testing	Date Tested	Tester	Expected Result	Pass / Fail	Comments
2	Sign Up from mobile app	2014/02/10	Kai Teck	Store User data into database and enter to main menu of application after successful sign up.	Pass	-
3	Login from mobile app	2014/02/12	Guang Zhen	Login to user account after successful login.	Pass	-
4	Login from mobile app	2014/02/13	Kai Teck	Login to user account after successful login.	Pass	-
5	Create a business card from mobile app	2014/02/20	Guang Zhen	Store business card detail into database and enter to manage card interface after successful created business card	Fail	Create a business card successful but some of inserted business card details were missing.
6	Create a business card from mobile app	2014/02/22	Kai Teck	Store business card detail into database and enter to manage card interface after successful created business card	Pass	-

ID	Test action / Case of testing	Date Tested	Tester	Expected Result	Pass / Fail	Comments
7	Taking photo and add into picture gallery	2014/02/25	Guang Zhen	Store the capture photo and display on the gallery list view.	Fail	It was appear error when save photo to the gallery.
8	Capture photo and add into picture gallery	2014/02/28	Kai Teck	Store the capture photo and display on the gallery list view.	Pass	-
9	Add news into news list	2014/03/01	Guang Zhen	Store news into news list after user successful added news.	Pass	-
10	Add news into news list	2014/03/01	Kai Teck	Store news into news list after user successful added news.	Pass	-
11	Change Password	2014/03/02	Guang Zhen	Store new password into database and user can login by using new password on next time login.	Pass	-
12	Change Password	2014/03/02	Kai Teck	Store new password into database and user can login by using new password on next time login.	Pass	-

ID	Test action / Case of testing	Date Tested	Tester	Expected Result	Pass / Fail	Comments
13	Search business directory by category	2014/03/04	Guang Zhen	Retrieve the result of related category of business directory in the list view after click the search button.	Pass	-
14	Search business directory by category	2014/03/04	Kai Teck	Retrieve the result of related category of business directory in the list view after click the search button.	Pass	-
15	Search business directory by location	2014/03/04	Guang Zhen	Retrieve the result of related location of business directory in the list view after click the search button.	Fail	Some of not related location of business directory also display on the list view.
16	Search business directory by location	2014/03/06	Kai Teck	Retrieve the result of related location of business directory in the list view after click the search button.	Pass	-

ID	Test action / Case of testing	Date Tested	Tester	Expected Result	Pass / Fail	Comments
17	Search business directory by service description of business	2014/03/07	Guang Zhen	Retrieve the result of related service description of business directory in the list view after click the search button.	Fail	Not any search result was related to the key service description.
18	Search business directory by service description of business	2014/03/07	Kai Teck	Retrieve the result of related service description of business directory in the list view after click the search button.	Fail	Not any search result was related to the key service description.
19	Search business directory by high rating	2014/03/08	Guang Zhen	Retrieve the result of high rating business directory in the list view after click the search button.	Fail	Not any result was displayed in list view.
20	Search business directory by high rating	2014/03/10	Kai Teck	Retrieve the result of high rating business directory in the list view after click the search button.	Pass	-

ID	Test action / Case of testing	Date Tested	Tester	Expected Result	Pass / Fail	Comments
21	Search business directory and subscribe a business from the search result	2014/03/12	Guang Zhen	Business detail which subscribed will be stored on mobile device and it will display on card subscribe list view after click “subscribe card” button.	Pass	-
22	Search business directory and subscribe a business from the search result	2014/03/12	Kai Teck	Business detail which subscribed will be stored on mobile device and it will display on card subscribe list view after click “subscribe card” button.	Pass	-
23	Unsubscribe a business from card subscribe list view	2014/03/12	Guang Zhen	Business detail which unsubscribed from card subscribe will disappear after click “unsubscribe card” button.	Pass	-

ID	Test action / Case of testing	Date Tested	Tester	Expected Result	Pass / Fail	Comments
24	Unsubscribe a business from card subscribe list view	2014/03/12	Kai Teck	Business detail which unsubscribed from card subscribe will disappear after click “unsubscribe card” button.	Pass	-
25	Search business directory and save a business contact number from the search result	2014/03/15	Guang Zhen	Business contact number which saved will be stored on the contact list of mobile device.	Pass	-
26	Search business directory and save a business contact number from the search result	2014/03/15	Kai Teck	Business contact number which saved will be stored on the contact list of mobile device.	Pass	-
27	Give rating and comment to a business from business directory	2014/03/20	Guang Zhen	Rating and comment will be stored on database and comment will display in the rating review list.	Fail	It was appear error while submit the review from mobile app.

ID	Test action / Case of testing	Date Tested	Tester	Expected Result	Pass / Fail	Comments
28	Give rating and comment to a business from business directory	2014/03/22	Kai Teck	Rating and comment will be stored on database and comment will display in the rating review list.	Pass	-
29	Turn on the sharing mode to share business card in directory	2014/03/25	Guang Zhen	Business card will be found on the business directory after turn on the sharing mode.	Pass	-
30	Turn on the sharing mode to share business card in directory	2014/03/25	Kai Teck	Business card will be found on the business directory after turn on the sharing mode.	Pass	-
31	Select a category of business card	2014/03/25	Guang Zhen	Business card will be found within a selected category in business directory.	Pass	-
32	Select a category of business card	2014/03/25	Kai Teck	Business card will be found within a selected category in business directory.	Pass	-

ID	Test action / Case of testing	Date Tested	Tester	Expected Result	Pass / Fail	Comments
33	Synchronize business card detail to the server	2014/03/26	Guang Zhen	Business card details will be stored on the database and it will prompt out a message when synchronize successfully.	Pass	-
34	Synchronize business card detail to the server	2014/03/26	Kai Teck	Business card details will be stored on the database and it will prompt out a message when synchronize successfully.	Pass	-
35	Restore business card detail from server	2014/03/26	Guang Zhen	The complete business card details of user will be restored from the server and it will prompt out a message when restore successfully.	Fail	Some business card details were unable to restore.

ID	Test action / Case of testing	Date Tested	Tester	Expected Result	Pass / Fail	Comments
36	Restore business card detail from server	2014/03/28	Kai Teck	The complete business card details of user will be restored from the server and it will prompt out a message when restore successfully.	Pass	-
37	Logout from mobile app	2014/03/29	Guang Zhen	Cannot return back to system menu after logout from user account to the login page.	Pass	-
38	Logout from mobile app	2014/03/29	Kai Teck	Cannot return back to system menu after logout from user account to the login page.	Pass	-

Table B1.2: Testing function of Administrator System on the desktop computer

System Testing of Administrator System						
ID	**Test action / Case of testing**	**Date Tested**	**Tester**	**Expected Result**	**Pass / Fail**	**Comments**
1	Login to administrator through desktop computer	2014/02/10	Guang Zhen	Login to administrator account and store the login date time in the database after successful login.	Pass	-
2	Login to administrator through desktop computer	2014/02/10	Kai Teck	Login to administrator account and store the login date time in the database after successful login.	Pass	-
3	Change admin password	2014/02/12	Guang Zhen	New password will be stored in to database and it will enable login with new password next time.	Pass	-
4	Change admin password	2014/02/12	Kai Teck	New password will be stored in to database and it will enable login with new password next time.	Pass	-

ID	Test action / Case of testing	Date Tested	Tester	Expected Result	Pass / Fail	Comments
5	Create new user	2014/02/15	Guang Zhen	Store User data into database after successful create new user.	Pass	-
6	Create new user	2014/02/15	Kai Teck	Store User data into database after successful create new user.	Pass	-
7	Search user	2014/02/15	Guang Zhen	Shows result after a specific username had been entered by admin.	Pass	-
8	Search user	2014/02/15	Kai Teck	Shows result after a specific username had been entered by admin.	Pass	-
9	Search business card	2014/02/24	Guang Zhen	Shows result after a specific business name had been entered by admin.	Pass	-

ID	Test action / Case of testing	Date Tested	Tester	Expected Result	Pass / Fail	Comments
10	Search business card	2014/03/24	Kai Teck	Shows result after a specific business name had been entered by admin.	Pass	-
11	View gallery of all business card	2014/03/25	Guang Zhen	Display all gallery detail of the business card.	Pass	-
12	View gallery of all business card	2014/03/25	Kai Teck	Display all gallery detail of the business card.	Pass	-
13	View news of all business card	2014/03/25	Guang Zhen	Display all news detail of the business card.	Pass	-
14	View news of all business card	2014/03/25	Kai Teck	Display all news detail of the business card.	Pass	-
15	View rating of all business card	2014/03/25	Guang Zhen	Display all rating detail of the business card	Fail	Some rating details were missing.
16	View rating of all business card	2014/03/27	Kai Teck	Display all rating detail of the business card	Pass	-

ID	Test action / Case of testing	Date Tested	Tester	Expected Result	Pass / Fail	Comments
17	Disable a business card	2014/03/28	Guang Zhen	After click disable button, business card will change status to disable and it is unable found on the business directory from mobile app.	Fail	Button was unable to click.
18	Disable a business card	2014/03/30	Kai Teck	After click disable button, business card will change status to disable and it is unable found on the business directory from mobile app.	Pass	-
19	Give rating and comment to business card	2014/03/31	Guang Zhen	Rating and comment will be stored on database and comment will display in the rating review list.	Pass	-
20	Give rating and comment to business card	2014/03/31	Kai Teck	Rating and comment will be stored on database and comment will display in the rating review list.	Pass	-

APPENDIX C – USER GUIDE

C1 SYSTEM OVERVIEW

Rapid Sharing Business Card App is a mobile application, which allows user to create a business card and share to the business directory. User also can search the business information from the business directory. Rapid Sharing Business Card App is satisfying a need, user can share own business information to other and also can get business information from other. Application operates on mobile device with Android operating system.

C2 SYSTEM SUMMARY

This section provides a general overview of the system. The summary outlines which include uses of the system's hardware and software requirements, system's configuration and user access levels.

C2.1 System Configuration

Rapid Sharing Business Card App operates on mobile devices with Android operating system. It is compatible with Android 4.1 and higher version. Internet connection is required in order to save data to databases and also retrieve data from database. After complete install on the device, Rapid Sharing Business Card App can be used immediately.

C2.2 User Access Levels

Rapid Sharing Business Card app can be used by everyone, but only registered users are able to create business card, give rating, subscribe card and save data to database.

C3 GETTING STARTED

Getting Started section explains how to get Rapid Sharing Business Card app and install it on the device. The section also presents briefly system menu.

C3.1 Installation

The business sharing app is available can be downloaded from http://www.let2talk.com/sharing_business/rapidShareBusinessCard.apk. It is an .apk file, which should be installed on the device.

C3.2 Login Page

After install apk to mobile device, user may start to use the application. The figure C3.1 is the screenshot of login page of application. User may login to the application by insert their username and password. Even though user didn't have user account, they can also enter to search service to use the business directory search engine and also enter to sign up form to register a new account.

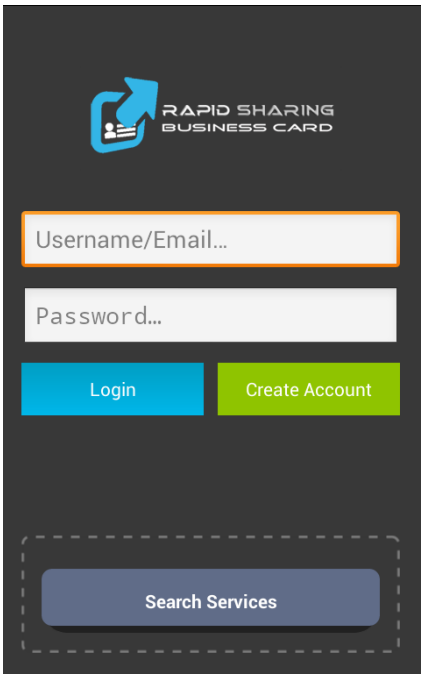

Figure C3.1: Login Page

C3.3 Sign Up

User may sign up an account from application. The sign up form (Figure C3.2) consists of 4 input fields containing basic information about user, such as username, email and password and confirm password. User only can sign up by filling all input fields. Validation will be used for verify whether username and email has been used by other.

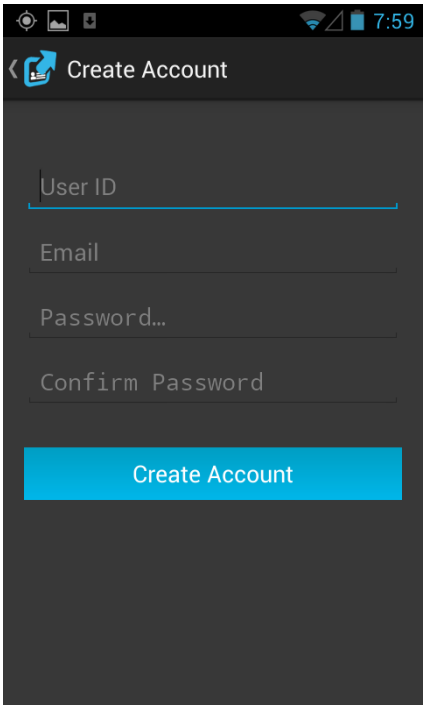

Figure C3.2: Sign up form

C3.4 System Menu

User can access to system menu of application after login successfully. System menu was consists of 7 buttons which containing different function about application, such as search services, card subscribe, user profile, setting, create/manage business card, logout and exit. Major control button of the program are located in system menu.

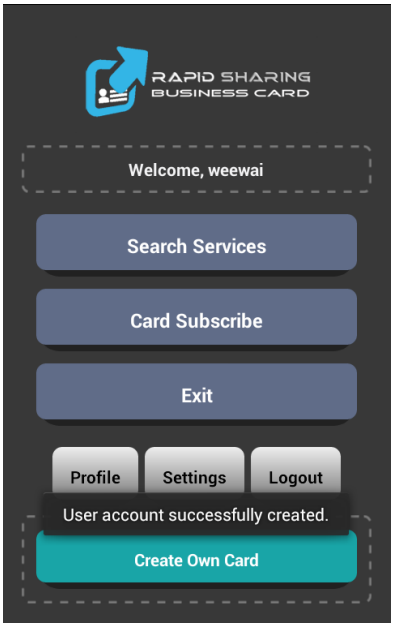

Figure C3.3: System menu

C3.5 Create business card

The form of business card (Figure C3.4 and Figure C3.5) consists of seven elements which containing information about business card, such as profile picture, card holder name, phone number, email, web address, company address and company info. It will allow add more than one data of phone number, email, web address and address. After complete the form, user may create business card by click the save button.

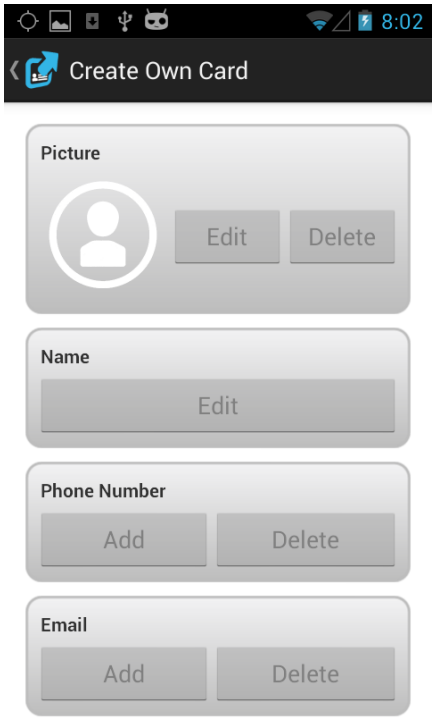

Figure C3.4: Business Card form (upper part)

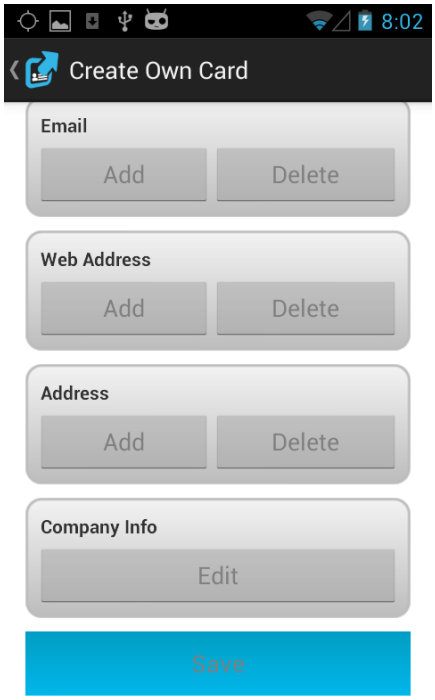

Figure C3.5: Business Card form (lower part)

C3.6 Manage card

After create business card, user may manage own business card with extra info which include gallery and news. The function of manage card is consists of four tabs (Figure C3.6). These tabs represent form for business card data. One tab handles business card info. The second tab handles taking photo of the gallery. The third tab has adds news about enterprise, while the last tabs display the rating of business card.

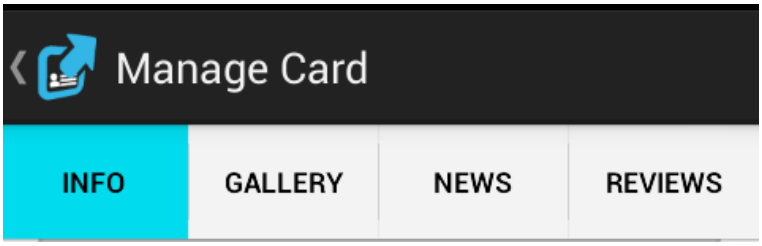

Figure C3.6: Tabs of manage card

C3.6.1 Info tab of manage card

The info tab of manage card consists of seven elements which containing information about business card, such as profile picture, card holder name, phone number, email, web address, company address and company info. It has the same interface as create business card (Figure C3.4 and C3.5) to allow user to update the business info.

C3.6.2 Picture gallery tab of manage card

The picture gallery tab (Figure C3.7) of manage card handles photo-taking functionality. It allows user choose photo on mobile storage or taking photo to save in gallery list. User may decide whether to synchronize the gallery list to the server. It is possible from here to add the new gallery, edit gallery saved locally, and delete gallery.

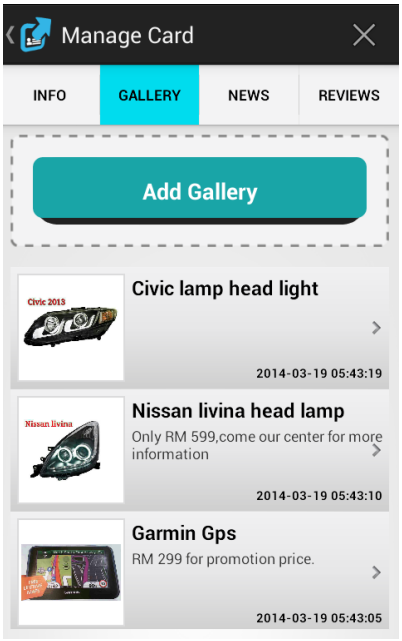

Figure C3.7: Picture gallery tab of manage card

C3.6.3 News tab of manage card

The news tab of manage card allows inputting news about the enterprise. It allows user to put some news and share it to the business directory. It is possible from here to add the news, edit news saved locally, and delete news.

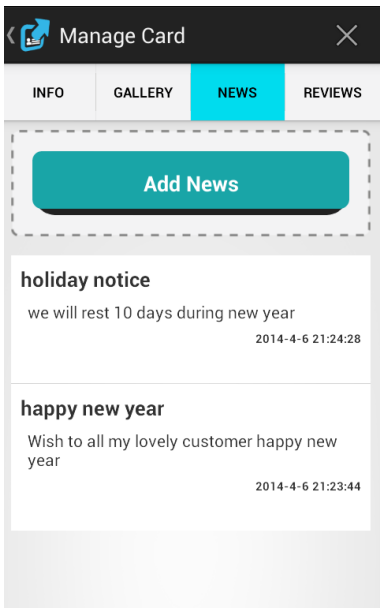

Figure C3.8: News tab of manage card

C3.6.4 Reviews tab of manage card

The reviews tab of manage card allows user to review the rating and comment from other for the satisfaction of their enterprise.

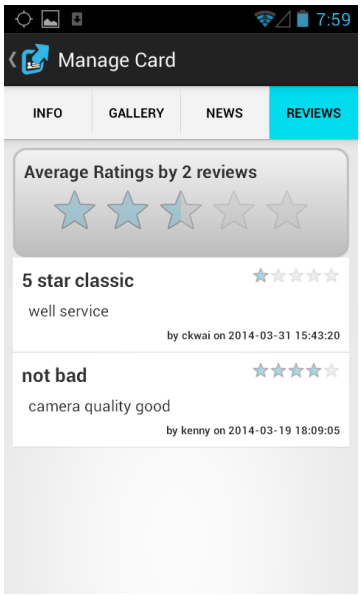

Figure C3.9: Reviews tab of card manage

C3.7 Profile setting

The profile setting tab (Figure C3.10 and C3.11) allows entering login information as well as changing some application setting such as username, password or email when necessary. To avoid third party easier change the setting, user should insert the correct password before changing those username, password and email.

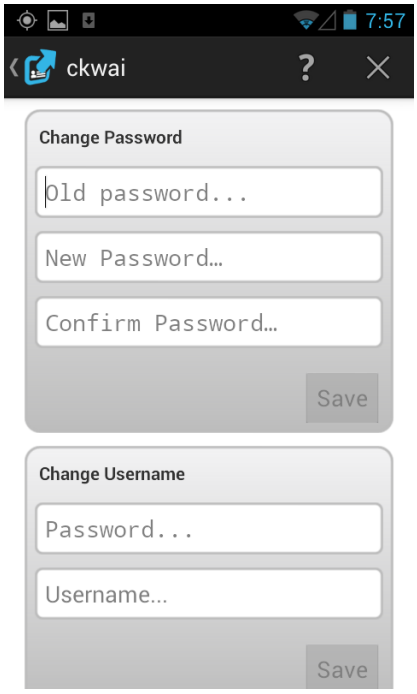

Figure C3.10: Profile setting (Upper part)

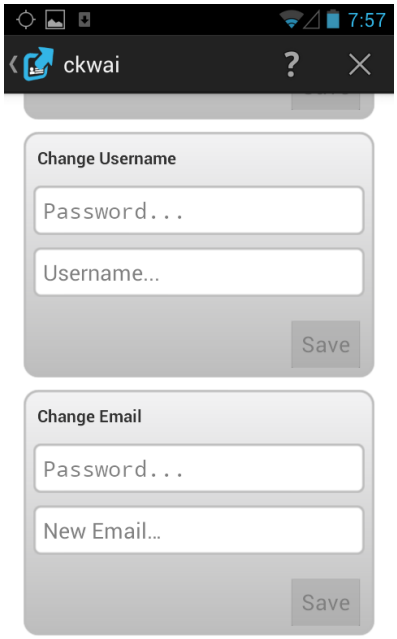

Figure C3.11: Profile setting (Lower part)

C3.8 Settings

The settings tab (Figure C3.12 and C3.13) allows user decide whether turn on the sharing mode to share their business card to directory. Settings tab also include the function such as synchronize business info, synchronize business gallery, synchronize business news, restore business info, restore business gallery, restore business news and restore card subscribe.

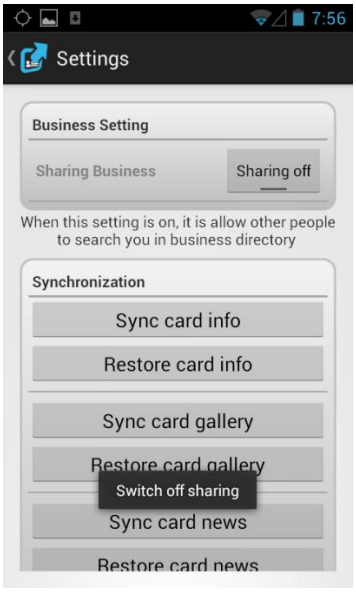

Figure C3.12: Setting tabs (upper part)

Figure C3.13: Settings tab (Lower part)

When the sharing mode is turn on, component of business category will be visible. User will allow selecting a category (Figure C3.14) for their business in directory search. It also will display the number of subscriber who subscribes user business.

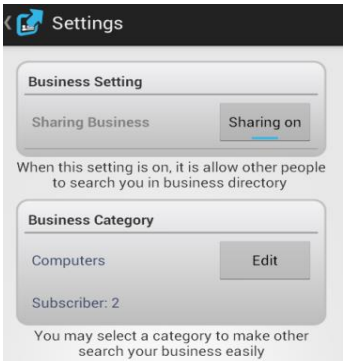

Figure C3.14: Setting tabs with business category

C3.9 Search services

The search services tab (Figure C3.15) allow user to search services in business directory. User may depends on different condition such as category, high rating, nearer services, location and service key name to search require service in directory. Search result of directory will be displayed in list view (Figure C3.16) after user clicks the search button.

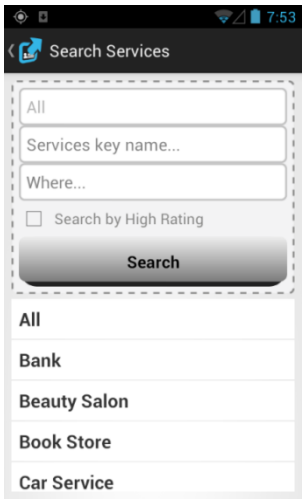

Figure C3.15: Search services tab

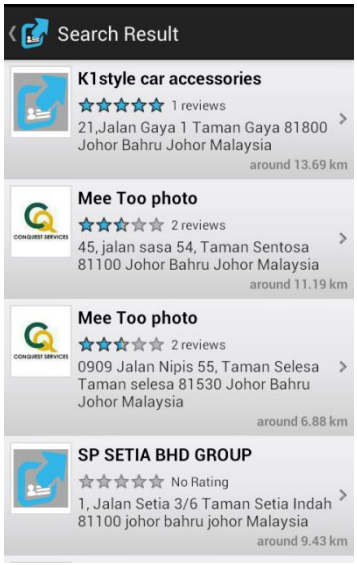

Figure C3.16: Sample search result

C3.10 Business Detail tab

After the search result was displayed as list view, user may click any interest service to view the business detail of enterprise. Business detail is consists of four tabs (Figure C3.17). These tabs have the same content that describe in C3.6. The different is user only can view the detail but unable to edit them. User can view the business info, picture gallery, news and rating of business.

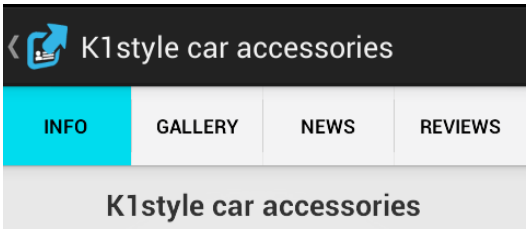

Figure C3.17: Business Details tab

C3.10.1 Save contact to mobile device

In the business detail info tab (Figure C3.18), user can save contacts number to mobile device. Save contact tab (Figure C3.19) allow user edit the name of company or select a contact number before save to mobile device.

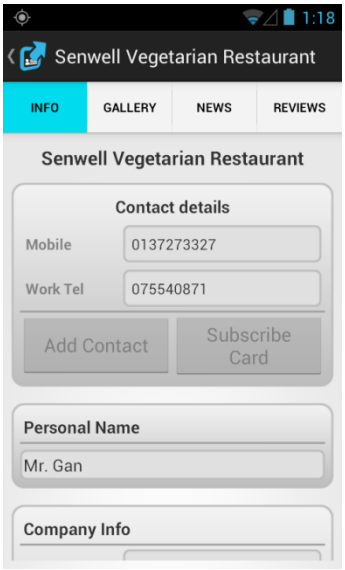

Figure C3.18: Info tab of business detail

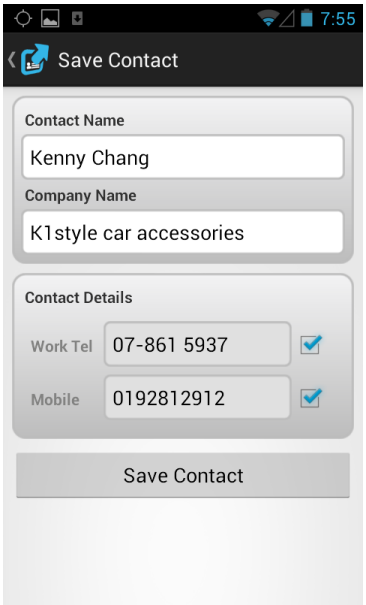

Figure C3.19: Save Contact tab

C3.10.2 Subscribe business

In the business detail info tab (Figure C3.18), user can subscribe business by click the subscribe card button. After subscribe card, “Subscribe Card” button will change to “Unsubscribe Card” button (Figure C3.20) to represent user subscribe card successful. It will also save the subscribed business info to mobile device for user review later.

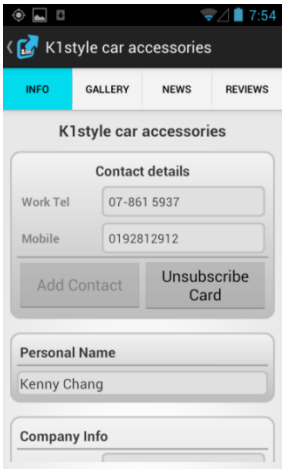

Figure C3.20: Sample of user subscribe the business

C3.10.3 Give rating to business service

In review tab (Figure C3.21), user may read the rating and comment of business performance or give rating to business performance. However, users are only can give rating to business service which has been subscribed by them. Each user only can give one rating and comment (Figure C3.22) to business performance.

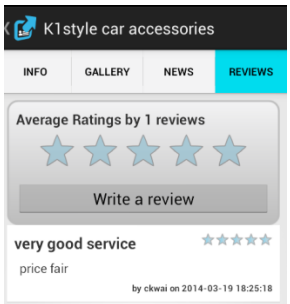

Figure C3.21: Review tabs of business detail

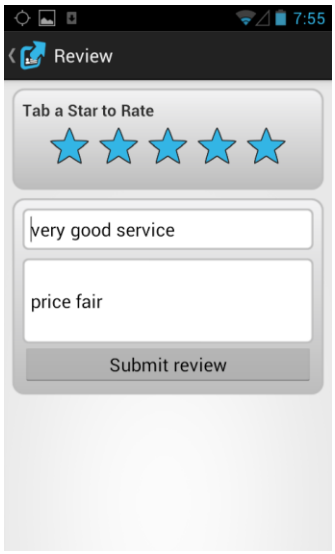

Figure C3.22: Business Rating Form

C3.11 Card Subscribe Tab

In the card subscribe tab (Figure C3.22), it will store all business service which are subscribed by user. User may view business detail without connecting network in this tab.

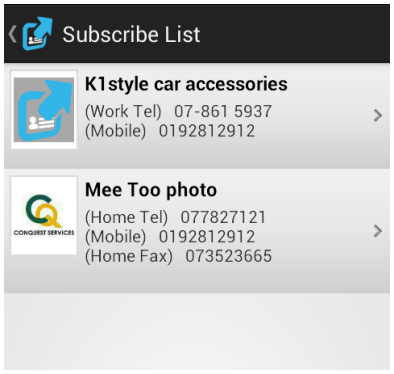

Figure C3.22: Card Subscribe Tab

C3.12 Exit System

Rapid Sharing Business Card App can be closed by selecting Back action on the device. User can also exit system by click the “Exit” button on system menu.

APPENDIX D – PROJECT DAILIES

Project Diary & Supervisor Feedback

Student Name: WAI CHIN KEAT

Supervisor: SO YONG QUAY

Meeting Date: 26 SEPTEMBER 2013

Issues identified in previous meeting (including personal development goals):

- This is the first meeting with supervisor Mr. So Yong Quay, therefore don't have any precious meeting discussion issues.

Feedback received in previous meeting:

- None

Action taken on feedback:

- None

Matters to discuss:

1. **Project Planning assessment feedback.**

- The research question is still not very clear.
- For the background research of project title, it should have discusses the potential market and trend reasonable to support the project.
- The unique selling point is not very clear.
- Lack of discuss of the benefits and drawbacks of methodology.
- The research ethics is not in details and only discuss the protection of data user.
- It should discuss how the student will act ethically as researcher.
- It should provide the Gantt chart in the project plan.

References Consulted:

- Supervisor & Lecturer: Mr. So Yong Quay

Student's Signature: ________ **Date:** _____

Supervisor's Signature:_____ **Date:** _____

Project Diary & Supervisor Feedback

Student Name: WAI CHIN KEAT

Supervisor: SO YONG QUAY

Meeting Date: 10 OCTOBER 2013

Issues identified in previous meeting (including personal development goals):

- Research question is vague.
- Background research can be improved.
- Unique selling point of the project is too vague.
- Research ethics are too simple.
- Project plan is not complete enough.

Feedback received in previous meeting:

- Research question should be clear.
- Background research is lack of discussion of potential market and trend reasonable.
- Should be more deeply to discuss the USP of project.
- Methodology does not discuss of the drawback and benefits.
- Research ethics can be discussed deeply as a researcher.
- Gantt chart should be included in the project plan.

Action taken on feedback:

- Online research to get the more appropriate research question.
- Online surfing for other solution.
- Follow the guide line of research ethics from Teesside University.
- Discuss with other classmate.

Matters to discuss:

1. **Project Specification assessment discussion**

- Project title is not suitable and it should be related to the USP of project.
- Project content is not attractive enough, it should add on some of features to make different with other.
- Require to do the correction of grammar of report.

References Consulted:

- Supervisor & Lecturer: Mr. So Yong Quay

Student's Signature: ________ **Date:** _____

Supervisor's Signature:_____ **Date:** _____

Project Diary & Supervisor Feedback

Student Name: WAI CHIN KEAT

Supervisor: SO YONG QUAY

Meeting Date: 17 OCTOBER 2013

Issues identified in previous meeting (including personal development goals):

- Project title is not suitable.
- Project content is not attractive.
- Some grammar error mistakes need for correction.

Feedback received in previous meeting:

- Project title should be related to the content of project.
- Project content should add on some features to make the project more useful and attractive.

Action taken on feedback:

- Online surfing to make suitable project title.
- Online research to get some useful feature to add on in the current project.
- Make discussion with classmates.

Matters to discuss:

1. **Require prepare action plan**

- Require to prepare action plan for the project. This simple approach to planning helps to completes project effectively and without missing key steps.
- Specify each task and estimated the due date of each task.

- An action plan should include the content of action, start date, due date and remarks.

References Consulted:

- Supervisor & Lecturer: Mr. So Yong Quay

Student's Signature: ________ **Date:** _____

Supervisor's Signature:_____ **Date:** _____

Project Diary & Supervisor Feedback

Student Name: WAI CHIN KEAT

Supervisor: SO YONG QUAY

Meeting Date: 24 OCTOBER 2013

Issues identified in previous meeting (including personal development goals):

- The action plan is required to prepare for planning each task of the project and estimate of the due date of each task.
- The action plan table should include
    - Number
    - Action of the tasks
    - Start date
    - Due date
    - Remarks

Feedback received in previous meeting:

- None.

Action taken on feedback:

- None.

Matters to discuss:

1. **Action Plan discussion**

- All task of action should have verb sentence.
- Some mistakes of the task description.

References Consulted:

- Supervisor & Lecturer: Mr. So Yong Quay

Student's Signature: ________ **Date:** _____

Supervisor's Signature:_____ **Date:** _____

Project Diary & Supervisor Feedback

Student Name: WAI CHIN KEAT

Supervisor: SO YONG QUAY

Meeting Date: 07 November 2013

Issues identified in previous meeting (including personal development goals):

- Action plan has some mistake of task description.
- The introduction of report is required to prepare to introduce about the project title.
- The methodology is discussed and need to decide which development model will be used in project.

Feedback received in previous meeting:

- All task description should be used the “verb sentence”.

Action taken on feedback:

- Change all task description by using “verb sentence”.

Matters to discuss:

1. **Writing report part 1 - Introduction**

- At the head of introduction, definition of the business card should be simplified.
- All citation should be included in the report.
- If the sentence is taken by others article, there should include the author of article in the report and also should write out the year of article.
- All of report should use present tense.

2. **Writing report part 2 – Methodology**

- It should compare different development model and decide one development model.
- Correct the grammar mistake.

References Consulted:

- Supervisor & Lecturer: Mr. So Yong Quay

Student's Signature: ________ **Date:** _____

Supervisor's Signature:_____ **Date:** _____

Project Diary & Supervisor Feedback

Student Name: WAI CHIN KEAT

Supervisor: SO YONG QUAY

Meeting Date: 14 November 2013

Issues identified in previous meeting (including personal development goals):

- For writing report introduction, definition of title is too complicated.
- Lack of citation when sentences are used from other article.
- Some grammar mistake

Feedback received in previous meeting:

- Definition should be simplified
- All citation should be included.

Action taken on feedback:

- Simplified the sentence of definition.
- Make citation for all sentences which from other article.

Matters to discuss:

1. **Writing report part 3 – Key objective and requirement**

- Key objective is vague, it should be more clearly.
- No require to have personal objectives within the report.
- All of report should using present tense.

2. **Writing report part 4 – Time allocation**

- Should specify which method will be used in project.

- Diagram also should be given citation when it is takes from other website.
- Correct the grammar mistake.

References Consulted:

- Supervisor & Lecturer: Mr. So Yong Quay

Student's Signature: ________ **Date:** _____

Supervisor's Signature:_____ **Date:** _____

Project Diary & Supervisor Feedback

Student Name: WAI CHIN KEAT

Supervisor: SO YONG QUAY

Meeting Date: 27 February 2014

Issues identified in previous meeting (including personal development goals):

- The Entity Relationship Diagram is required to develop for planning to implement the database of system.

Feedback received in previous meeting:

- None

Action taken on feedback:

- None.

Matters to discuss:

1. **System design – Entity Relationship model**

- Some relationships of table are not correct.
- The notation of ER model should be consistent.
- Name of relationship cannot be repeated to use.

2. **Research phase**

- To identify a unique selling price of product to attract user to use the business sharing app.

3. **Schedule Delay**

- The progress of the project has been slow down.

References Consulted:

- Supervisor & Lecturer: Mr. So Yong Quay

Student's Signature: _____ **Date:** _____

Supervisor's Signature:_____ **Date:** _____

Project Diary & Supervisor Feedback

Student Name: WAI CHIN KEAT

Supervisor: SO YONG QUAY

Meeting Date: 3 March 2014

Issues identified in previous meeting (including personal development goals):

- Some mistakes were found in the ER diagram.
- Lack of features to attract user to use the system.
- Progress of project is delay.

Feedback received in previous meeting:

- Notation should be consistent and correct the mistake of relationship of ER diagram.
- Add more features such as gallery and rating function to the business sharing app.
- Give more effort to catch up schedule.

Action taken on feedback:

- To correct all notation of ER diagram become consistent.
- To analysis system deeply to correct the relationship table of ER diagram.
- More time to spend to catch up the schedule.

Matters to discuss:

1. **Business sharing application**

- Add more features to allow user to save contact number to the mobile device.

- In business directory search function, it should be searched by address of businesses and result will display each address of business.

2. Administrator system

- Allow administrator to disable the business card of user when there are not appropriate content of business detail.

References Consulted:

- Supervisor & Lecturer: Mr. So Yong Quay

Student's Signature: ________ **Date:** _____

Supervisor's Signature:_____ **Date:** _____

Project Diary & Supervisor Feedback

Student Name: WAI CHIN KEAT

Supervisor: SO YONG QUAY

Meeting Date: 17 Match 2013

Issues identified in previous meeting (including personal development goals):

- Some suggestion was given by Mr. So to improve the system.

Feedback received in previous meeting:

- Add more features to allow user to save contact number to the mobile device.
- In business directory search function, it should be searched by address of businesses and result will also display each address of businesses.
- In administrator system, allow administrator to disable the business card of user when discover any not appropriate content of business detail.

Action taken on feedback:

- Function of saving contact number of business is added; user can edit name and select the contact number of company before saving contact number to the mobile device.
- Business directory should be searched by address of businesses.
- In administrator system, provide the button to allow admin to disable the business card in the business directory.

Matters to discuss:

1. **Business sharing application**

- Even though business directory can know the distance between user and businesses, to perform the better business directory search, search result of directory can also be sorted by distance. To display the nearer distance of businesses to user.
- Provide another search option to allow user to search the high rating of businesses in directory.
- After complete mobile app, try to upload to the market for testing.

References Consulted:

- Supervisor & Lecturer: Mr. So Yong Quay

Student's Signature: ________ **Date:** _____

Supervisor's Signature:_____ **Date:** _____

APPENDIX E – Plagiarism / Originality Report

Final Project Report

ORIGINALITY REPORT

11%	9%	2%	5%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

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2	www.designer-daily.com Internet Source	1%
3	ency.cl Internet Source	1%
4	Submitted to University of Edinburgh Student Paper	1%
5	www.cso.com.au Internet Source	1%
6	www.imconsultants.com.my Internet Source	<1%
7	desktoppub.about.com Internet Source	<1%
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EXCLUDE	OFF		