

**Mobile Application for Emergency Services By Using Location Tracking**

by

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## DECLARATION OF ORIGINALITY

I declare that this report entitled “**Mobile Application for Emergency Services By Using Location Tracking**” is my own work except as cited in the references. The report has not been accepted for any degree and is not being submitted concurrently in candidature for any degree or other award.

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Date : 9 APRIL 2018

## **ACKNOWLEDGEMENTS**

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Last but not least, I would like to express my thanks to my friend as well. They have help me to overcome the difficulties face on this project. Most importantly, my family, they give their support and encouragement throughout my final year project.

## **ABSTRACT**

This project is about a mobile application for location Tracking Service and Emergency which works in Android platform. It is a combination of existing application and enhancement to this project. This application is uses the gps-service to track users' travelling status and allow them to use whistle when they are in danger. This application also features with identity authentication to verify their identity.

The main focus in this project is to protect and improve personal safety. Hence, the goal of this project is to let user to get help in fastest and convenient way. Besides that, secure pin is used to make sure the identity and prevent anonymous or malicious attack.

Agile methodology is used in this project to ensure testing is conducted in every module. It provides opportunity to reassess throughout the development lifecycle to make sure the entire project meets the expected outcome and operate well. The final system is said to be bugless after few times of refining and debugging.

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## LIST OF AVVREVIATIONS

etc

et cetera

TM

Telekom Malaysia

## CHAPTER 1: INTRODUCTION

### 1.1 BACKGROUND

In this era of crime, personal safety problem is getting worst and worst. There are many cases happened such as robbery, burglary, snatching, rapping and *etc.* These cases will seriously affect social stability and could reduce people step out their door. Furthermore, everyone is worrying about their personal safety and also their love one, especially their family and beloved partner. For some of the people, they tend to worry other people safety more than themselves.

According to New Straits Time Online (SHAHRUDIN, 2016), it stated that in the first quarter of 2016, Malaysia's crime index has increased 4.6% as compared to the previous year but the crime index came down by 40% over the last five years (KHAN, 2015). Although, there was a huge drop of percentage in crime, but The Malaysian Crime Prevention Foundation (MCPF) vice-chairman (Anon., 2016) said that public fear of crime had increased from 70% last year to 80%. The public fear of crime is referring to the fear that citizens scaring they will be one of the victim of crime.

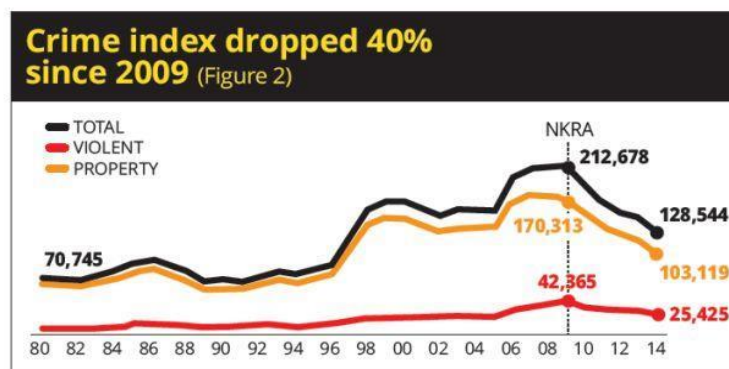


Figure 1-6-1-F1: Crime index from year 1980 to 2014. (KHAN, 2015)

On the other hand, India government has work with IT firm to develop an application that can help especially woman citizen. This application can help their citizens request for help immediately and the government has set up a police control room to process this case to reduce their criminal cases. The police receive 3416 complains immediately after the app launch (Bhattacharya, 2016).

Next, we all have friends, and normally gathering at night. When gathering dismiss, every member might be worried about their friend have reach their destination or not. It need to tell everyone that I have reach home and safe, but we all fail to tell or even forget to tell the

others members every time we have reach home or destination. The application can track and show their status, display approximate arrival time and 1 click to notify all members.

Last but not least, no matter older generation or younger generation, they may face some emergency case sometimes, for example, accidently fall down, heart attack, kids get kidnap and *etc.* By using application, they can request for instant help immediately.

## **1.2 PROBLEM STATEMENT**

According to the official data (Anon., 2016) and (SHAHRUDIN, 2016), crime index and public fear both shows an upward trend. Public fear of crime is referring to the fear that citizens scaring as they will be one of the next victim of crime. Hence, some family or parent has limit their children or old people steps out the door. Besides that, when people wants to hangout for gathering or to the garden to release stress and relax, they have to worry about their personal safety including their friends.

There are a lot of applications available throughout many countries but only a few in Malaysia. This application is to reduce the criminal cases and improve personal safety purpose, but there is still some dissatisfaction and imperfection to the user.

### **Troublesome or forget to notify friends or members.**

It is troublesome to type and then send the message to everyone who hangs out together when someone reached home safety especially when person is tired. Sometimes, the person may be tired until fall asleep before user is able to notify their friends. Their friends will be getting worry while not receiving any notification from the user.

### **High failure rate of sensitivity**

Most of the similar application use shake or vibrate to detect emergency alert, but there are some problems for that, once phone accidently fall down or get knocked, vibration is detected and it will trigger emergency alert and sent SMS to emergency list. It's quite troublesome to notify emergency contact list that is just a mistake. Furthermore, some application may need several shake patterns to trigger that emergency alert. This may lead to failure when user unfortunately meet robber and they point their gun to user's head.

## **Request help with only 1 step, fast and immediate**

In normal practices, when someone is in trouble or emergency, they only able to contact at most one people at one time and also need more than 1 step to request for help. For instance, when someone is involved in a terrible accident (may has severe injuries) on the way, and need emergency help from friends, what the person can do is contact a friend for help at that time.

### **1.3 MOTIVATION**

The purpose of develop this application is to solve the personal safety against public fear problem in Malaysia. Though there are several existing applications in market, but all of them have unsatisfied problems. This project would improve and make some innovation to help those users to prevent unhappy case happen and reduce their public fear when they hang out with friends or family.

### **1.4 PROJECT OBJECTIVE**

1. To protect personal safety and get emergency helpline with instant help by using the application through one S.O.S. button when they need help on their way home.
  - 1.1 To enable user get help faster. User can get help faster than previous time by using this application, user can broadcast their situation now to their friends in the emergency contact list on the spot.
2. To check and track their gathering member's status, approximately arrival time to get to their destination or home.
3. To remind user to notify friends or family in convenient, easier and fastest way. User can notify friends or family using the pre-set message when they reached home safety with one click of button or pop out dialog.
4. To authenticate user by using secure pin to verify the identity and prevent anonymous or malicious attack.

## 1.5 IMPACT AND CONTRIBUTION

Although there are numerous of emergency application, but majority of them need purchase to enjoy more features. For example, rapidSOS+, it need purchase \$49.99 US dollar annually enjoy the family packet or \$29.99 US dollar to enjoy individual packet. By using this application, user can get help immediately when they faced problem or in troublesome. As mention in earlier chapter, nowadays people working in the daytime, they only tend to gathering at night. When gathering dismiss, people might be worried about their member's safety when they have on the way home. With the features of this application, users can track their members traveling status, this features also can notify user when their members arrive on estimate time.

Not only for tracking purpose, this application also features with SOS emergency alert. Miss out the golden time to get instant help might affect someone loses their life. This emergency alert can help user to escape from worst situation or even can prevent sad or unhappy cases happened.

Next is identity verification. User need to key their secure pin to authenticate their identity. As compare to existing application in the market, none of them are using authentication method to prevent anonymous or malicious attack. By having this feature, user can now use this application more securely.

This application is suitable for all ages no matter old or young generation. For some family, parent can reduce their worries when their child or parent is outside. With using this application, people can rest assured with their family. Public fear will also decrease at the same time.



## **1.6 PROJECT SCOPE**

This location tracking and emergency system is a mobile application which is in android platform. User may use to send their emergency alert including current GPS location to their pre-set urgent contact person. Other than that, user also can track their friend list status whether they have reach destination and their approximate arrival time. Furthermore, in order to make sure user identity, user need to key their secure pin to check in to prevent someone with malicious to cheat their member.

### **Secure Pin Authentication**

Pin authentication is a method used for identity verification. With this authentication, user can prevent unauthorize and malicious of using this application. User need to use their secure pin to stop some certain function in this application.

### **Widget and SOS button**

When user is in emergency, they can trigger the SOS button display on the interface, or widget to instant request for help in fastest and convenient way. This emergency function will send an SMS that contain victim's current location to their pre-set emergency contact list.

### **Video recording**

When emergency button trigger, video recording will automatic start record the current situation in background. To stop this recording, user need to key their secure pin. This is to prevent someone with malicious try to stop the recording with simple click.

### **Alarm Whistle**

When facing someone try to snatch, robbery, kidnap and etc. Victim can use this application and trigger whistle, so everyone nearby can hear alert sound, and come for help. Once the alarm is triggered, secure pin is needed to unlock to prevent to turn off the alert sound. Also, if mobile phone is in silent or vibrate mode, it will still launch the whistle with the largest sound and volume.

## **Location Tracking**

It is a feature that use gps-services to track user's current location. When user dismiss their gathering, they can use this feature to track their gathering member's status while they return to their home. In that case, user can rest assured about their member's safety. While one of the member reach destination, user can update their status with just one click to let others know they have reach destination.

## 1.7 STRUCTURE OF THE REPORT

Chapter 1 provides a brief idea of problem statement, project scope, background, impact and contribution, objective and lastly motivation. In problem statement, it explained what the existing problem people faced and its reason. In project scope, it outlines what are the things and area should cover in this propose application. While in background, it provides general introduction for reader to have some idea on it. Impact and contribution mention that how this propose application would impact to the society. Lastly, there are several points lists in the objective section. It helps proposer to have clear objective in order to complete the project.

Chapter 2 covers the literature review of existing system. There are 5 existing application is chosen for review. It helps to screen out what are the weakness and strengths of existing application. There are also include some existing product screenshot that show how it looks like. Furthermore, a comparison table is also including in this section.

Chapter 3 describes the methodology method use in this application. It shows different stage of development phases and explain in details of each process. Figure 3-1-1-F1 show the phases and how it sprints at each cycle. Other than that, a simple interviews and questionnaires are surveyed, and results of the data are collected and further analysis.

Chapter 4 is system design. It provides and explain how this propose application flow. Reader can get understand easily through this system flow chart and use case diagram instead on reading everything in document.

Chapter 5 is implementation and testing. It involves the tool and software used to develop this propose application. It lists out the details of software and hardware needed. Installation steps are also attach in this section and problem encounter in each software are mention and describe. Algorithm involve in this application are explain in this section. In Graphical User Interface, it shows the propose application layout and the navigation between the pages. Lastly is testing method. All the test method and test cases are taken to be test. It used to the actual and expected outcome of the system.

## CHAPTER 2: LITERATURE REVIEW

### 2.1. EXISTING EMERGENCY APPLICATION

There are many similar emergency applications available in today's market, each of them only has 1 common objective which is personal safety. Each of them have their own uniqueness, functionality, features and the competitive advantages. There are several applications that will use for comparison below which are: -

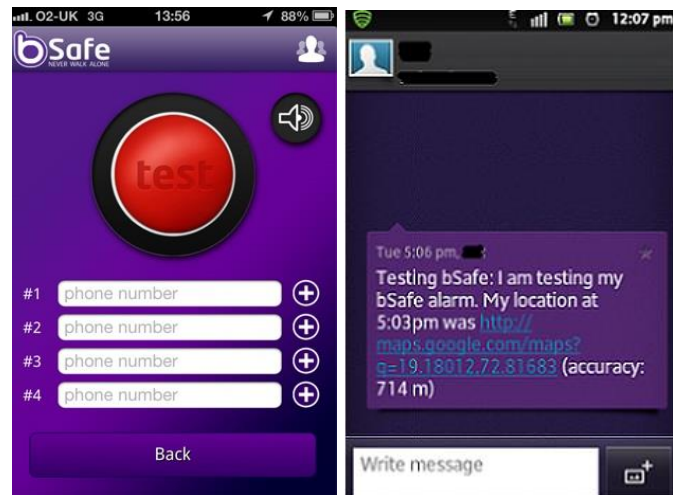
- I. bSafe
- II. SOS StayFafe!
- III. RapidSOS+
- IV. SaveME 999
- V. SOS Siren/Whistle

#### 2.1.1 bSafe

Application that can invite friends to walk with user to get home to prevent alone. It allows user to set an automated alarm to notify user so that if user fail to check in after a set amount of time and also will notify your friends where you've been and where you currently are. A 10-second video will start recording when the SOS alarm is on. Besides that, bSafe come with 1 interesting features that other application doesn't have, a Fake Call. This fake call function will trigger a fake call to user itself, in case of such a ruse makes it easier for user to extricate themselves from an uncomfortable or unsafe situation (Satapathy, 2012). However, it also can be an interesting feature to play around with kids, or to prank their friends.



Figure 2-1-1-F1: bSafe main interface and setting fake call (Richards, 2013).



*Figure 2-1-1-F2: Setting emergency contact list and sample of SOS message (Richards, 2013).*

**Strengths:** trigger a fake call function that will trigger a fake call to user itself, this fake call can extricate user from an uncomfortable or unsafe situation.

**Weakness:** Invite friends to walk with user. Although this option is to find nearby friends to accompany or walk with user, but it may bring user to trouble when other people hacks user's friends account.

### 2.1.2 SOS - Stay Safe!

Application that use shaking to trigger the SOS alert to customize contact list. It sends a message to the pre-set contact list that contain victim's mobile phone battery life, current location, time trigger, and recorded sound clip of the user's situation. This app need to create a pin passcode, this passcode is use to verify user and stop the SOS. Also, a shaking pattern is record and recognize (iXtentia, n.d.) to trigger to SOS, except shaking, SOS also can be trigger by pressing the Power button 3 times.

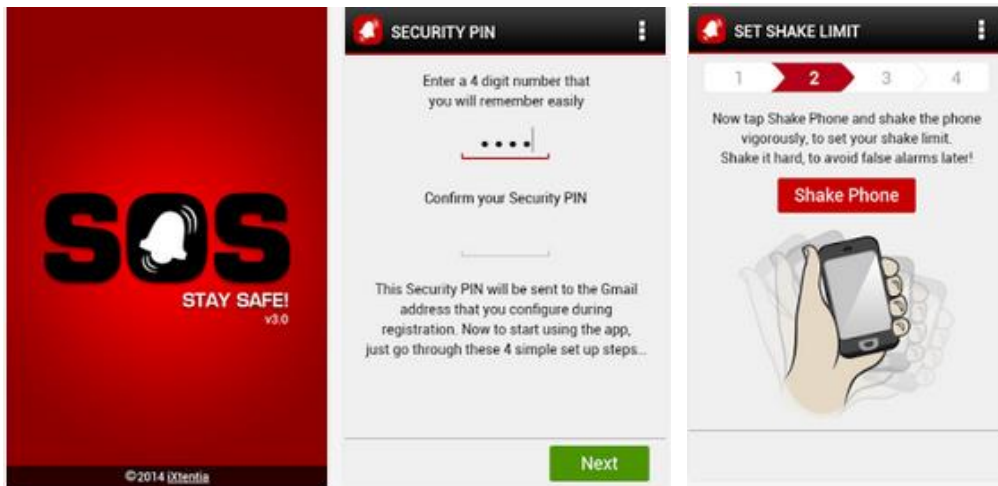


Figure 2-1-2-F1: Screenshot of setting passcode and shaking pattern (Thiek, 2014).

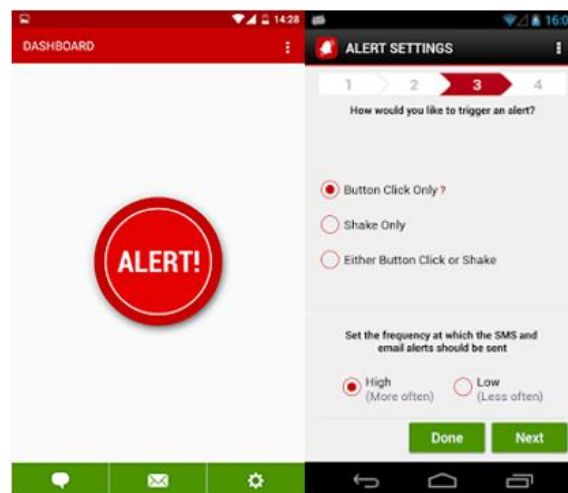


Figure 2-1-2-F2: Screenshot of Panic Button and trigger options (Thiek, 2014).

**Strengths:** There have many ways to trigger SOS alert, including power button, clicking button or shaking. Passcode is required to stop SOS.

**Weakness:** Shake the device to trigger SOS alert. Application will detect the shaking pattern per-set my user. This may lead to false-positives, error shaking detection while in emergency.

### 2.1.3 RapidSOS+

A power full emergency application that founded by three Harvard MBA students (TechCocktail, 2015). As for the same as 2 other application mention above, this application also provides SOS alert with 1 touch, but more interestingly, it can call 9-1-1 on behalf of a loved one and sending their current location and information to the dispatcher center closest to them. Thus, their request can be dispatched if needed (RapidSOS, n.d.) Besides that, its allow user to ensure their family members is on safe by using GPS, and can check in when user arrive destination.

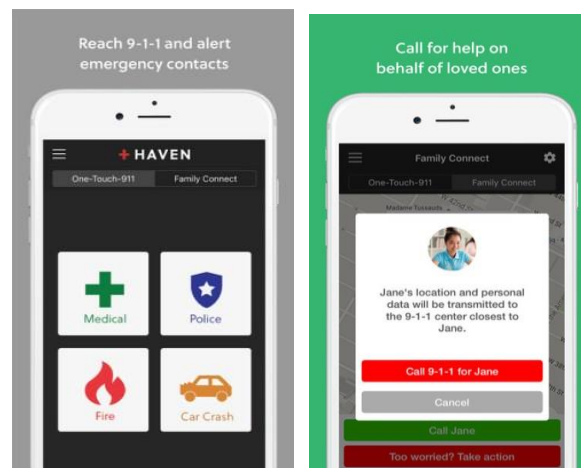


Figure 2-1-3-F1: Main screen of RapidSOS and helping friend request emergency help (Nikki, 2016).

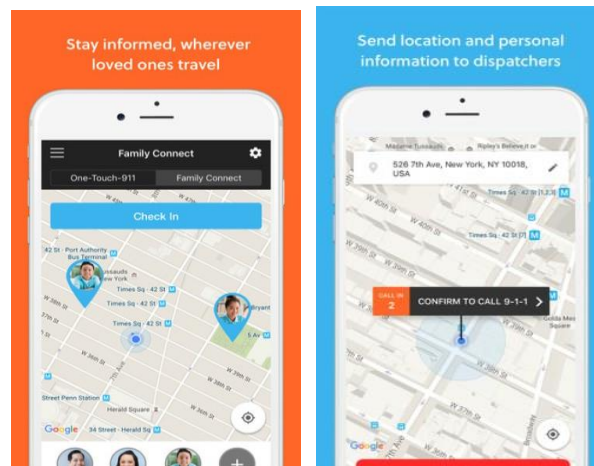


Figure 2-1-3-F2: Check in to inform user's family and detect current location to request help (Nikki, 2016).

**Strengths:** Transmit relevant data to 9-1-1 dispatchers and provide emergency contacts with key information about victim's emergency, keeping victim's family stay connected and updated.

**Weakness:** Application is only available for 90 days free trial. User need to purchase after trial version.

#### 2.1.4 SaveME 999

This application is cooperation between Telekom Malaysia (TM) and the Royal Malaysian Police (PDRM) and available for Malaysian citizens with allow the victims to seek for help with a panic button.

When panic button triggered, current location and victim's information will be sent to MERS 999 Response Centre (MERS 999 RC), if there is any additional information, it can be added together with the emergency message and sent to MERS 999 RC (thecinnaboy, 2016). With detected location, user can access helpline agencies to get information and details of nearby emergencies.

\*MERS 999 is an integrated emergency response system managed by TM.

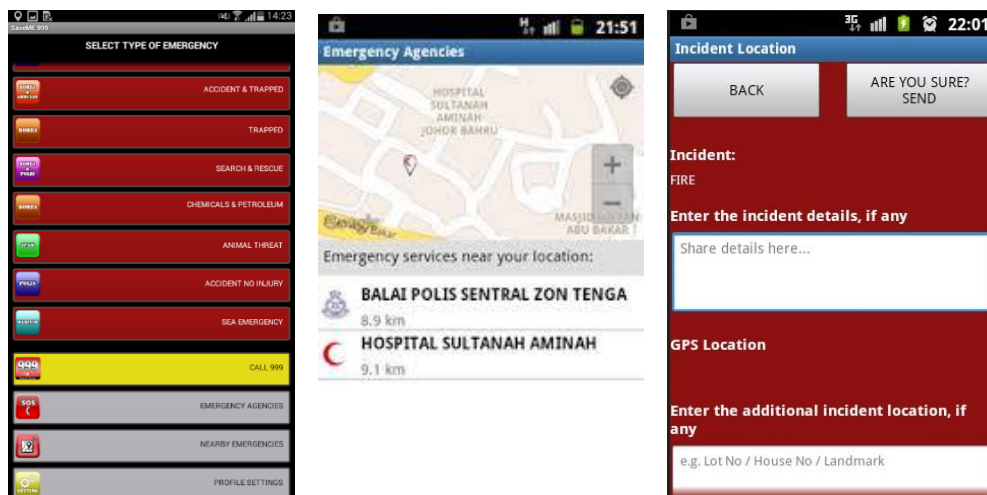


Figure 2-1-4-F1: Option for type of emergency when request as shown in left, nearby agencies as shown in middle, and request SOS as shown in right (AndroidApps.Biz, 2016).

**Strength:** Emergency agencies information is provided. Emergency request is processed immediately after MERS 999 RC receive the message.

**Weakness:** Require many steps to request emergency help, while in emergency situation, user need to choose type of emergency then only can request for help. For example, Bomba, Ambulance, Police and etc.



### 2.1.5 SOS Siren/Whistle

An application use to trigger SOS whistle while is emergency situation. Of course, as same as the application name suggests, the app has a simple button to trigger a whistle. In fact, it can trigger a whistle sound even if the phone is in silent or vibration mode. Thus, it is a great app when user is in danger and to tell other passersby of your situation. User need to stop the whistle by clicking the screen, and there is no other setting and function.



*Figure 2-1-5-F1: Interface of SOS Siren/Whistle, whistle is triggered or stop by tapping the green area (APKMonk, n.d.).*

**Strengths:** It works while victim's mobile phone is in silent mode.

**Weakness:** There is no other extra features except whistle

## 2.2 COMPARISON OF EXISTING APPLICATION

Table 2-2-1: Comparison of several existing application with some features.

<i>Functions</i>	<b>bSafe</b>	<b>SOS StaySafe!</b>	<b>RapidSOS+</b>	<b>SaveMe 999</b>	<b>SOS Siren/Whistle</b>	<b>Propose App</b>
<i>Free for all</i>	★	★	★	✓	✓	✓
<i>GPS Tracking</i>	✓	✓	✓	✓		✓
<i>Video recording</i>	✓	✓				✓
<i>Alarm Sound</i>					✓	✓
<i>One Step Help</i>		✓	✓			✓
<i>Status Notification</i>	✓	✓	✓			✓
<i>Pin Authentication</i>						✓

Note: ★ symbol represent purchase for more features.

## CHAPTER 3: METHODOLOGY AND TECHNOLOGY

### 3.1 METHODOLOGY

#### INCREMENTAL METHODOLOGY

uSafe? Mobile Application is applying Incremental Methodology process to develop the application. As it is a process that software development where all the requirements are broken into various standalone modules of software development cycle.

Likewise, each process development of this proposed application is based on each repeated authorization of starting from requirements, design, coding and testing phases. Each of these subsequent releases of the mobile application add function in to the previous publication till all of the designed has been implemented.

The mobile application is put into production after the first incremental is delivered. Usually, the first incremental release is often a core product where all user basic requirements are attended. And some of the supplementary features of the mobile applications will be added into the next incremental. Once the first core product has been done and analyzed by the user. If the user is not satisfied on the core product, the next incremental is needed to fulfill user final product.

#### 3.1.1 PHASES IN METHODOLOGY

The model of incremental methodology is shown in Figure 3-1-1-F1 below:

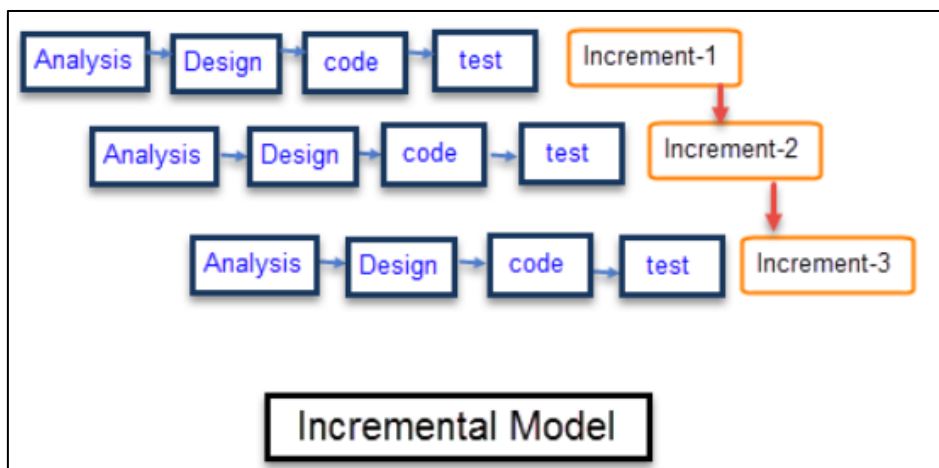


Figure 3-1-1-F1: Phases in agile methodology

Incremental Phases	Activities performed in incremental phases
Requirement Analysis	<ul style="list-style-type: none"> <li>Requirement and specification of the software are collected</li> </ul>
Design	<ul style="list-style-type: none"> <li>Some high-end function are designed during this stage</li> </ul>
Code	<ul style="list-style-type: none"> <li>Coding of software is done during this stage</li> </ul>
Test	<ul style="list-style-type: none"> <li>Once the system is deployed, it goes through the testing phase</li> </ul>

*Figure 3-1-1-F2: requirements gather and steps*

Each of the incremental phases, all the information about the related field is gather, user's feedback regarding to the current existing emergency application is important to conclude the problem statement. After the review and study the existing weakness and problem, some solution will be explored to overcome and improve the existing feature to further proceed to next phases.

During design phases, the data gather and solution from requirement phases would be carried out for better understanding the problem and clearly define the objective. Each module of the application is clearly defined and design. There will be one or more prototypes will be created in order to choose the best and appropriate prototype to suit the application.

The development phases will begin after the design phases. At this phase, each module porotype will be used to create and develop actual functional application. A complete version of application will proceed to final phases which is testing.

Lastly, the final phases which will perform a final test about the functionality of the application, the purpose of this testing is to test there is no bugs and error occur. This is to make sure that all the features and function perform in the best situation before publish to market or user.

Each iteration status will repeat this life cycle continuously until complete application is build and fully develop.

## 3.2 USER REQUIREMENT

### 3.2.1 STATISTICS FOR THE ANALYSIS

There are 13 questionnaires distribute to 50 interviewees to collected and gather requirement to be analysis which will help to improve the effectives and efficiency of the propose application.

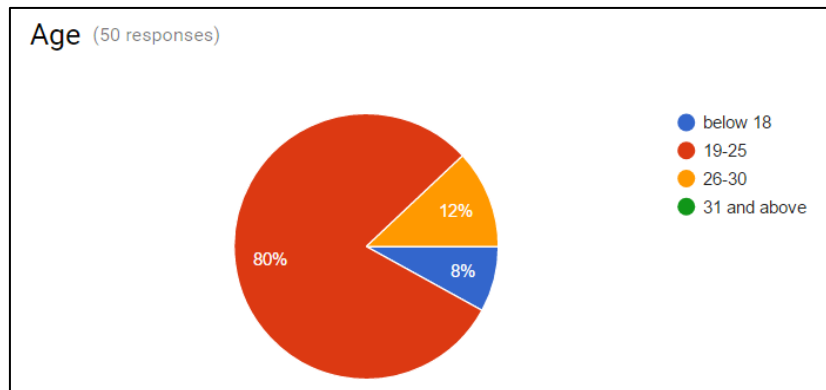


Figure 3-2-1-F1: Survey Question 1

From 50 responders, 80% of them are age between 19-25, 12% of them between 26-30, and 8% of them are below 18.

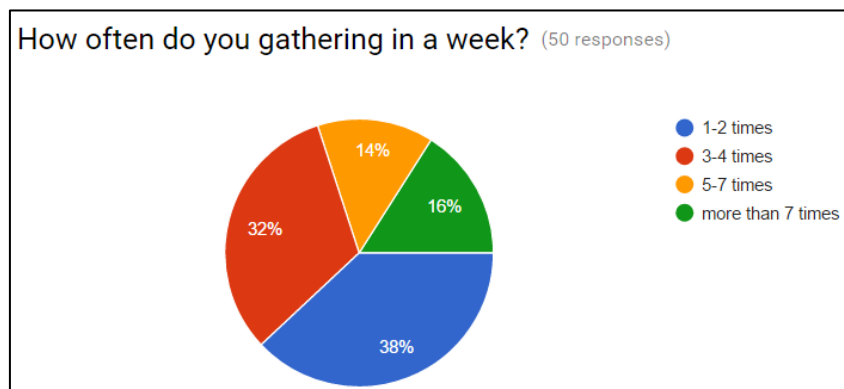


Figure 3-2-1-F2: Survey Question 2

From 50 responders, 38% of them are range between 1-2 times, 32% of them are 3-4 times, 16% of them are more than 7 times, and the rest 14% of them are range between 5-7 times.

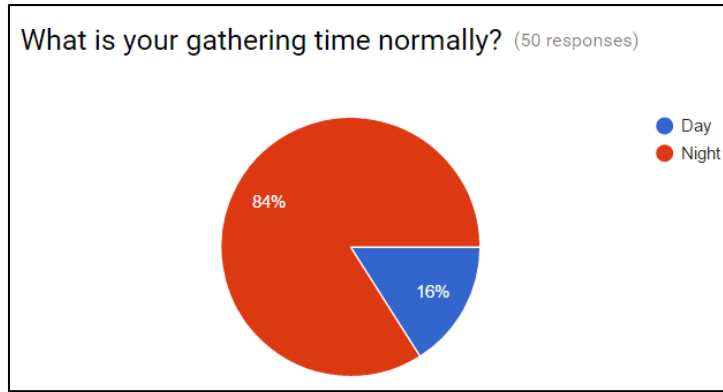


Figure 3-2-1-F3: Survey Question 3

From 50 responders, 84% of them gathering at nighttime while the rest 16% of them gathering at day time.

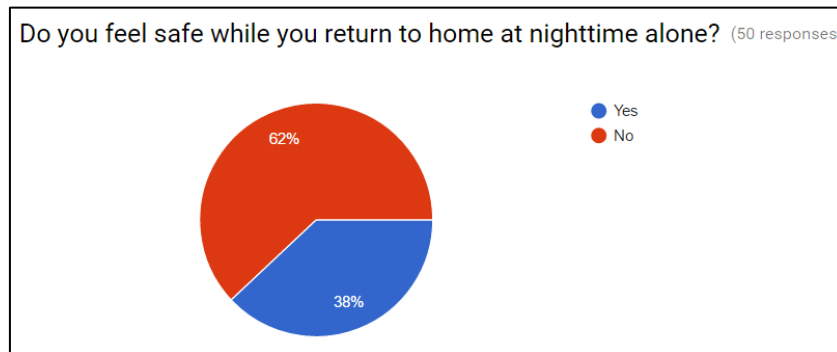


Figure 3-2-1-F4: Survey Question 4

From 50 responders, 62% of them does not feel safe while they return to home at night time while the rest 38% of them feel safe.

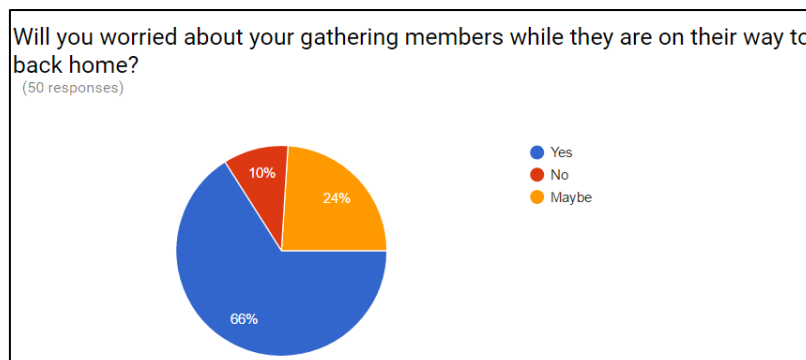


Figure 3-2-1-F5: Survey Question 5

Among 50 responders, 66% of them worried about their gathering members while they return to home, 24% of them maybe and the rest 10% does not worried.

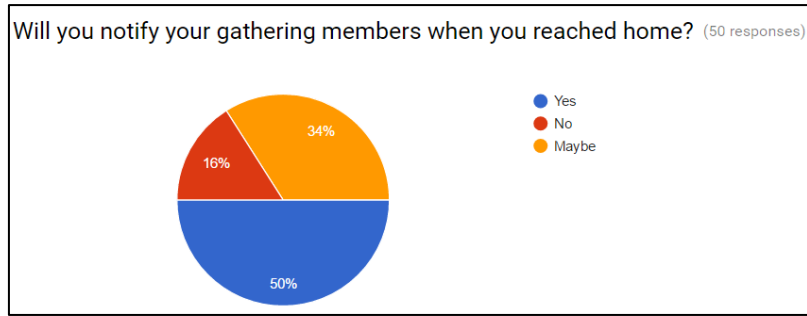


Figure 3-2-1-F6: Survey Question 6

Among 50 responders, 50% of them will notify their gathering members, 34% of them maybe and the rest 16% of them does not notify.

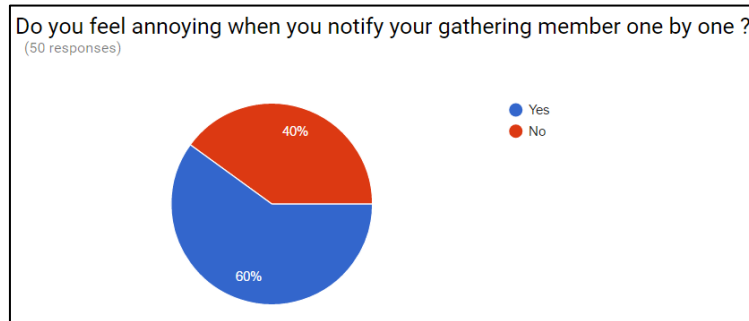


Figure 3-2-1-F7: Survey Question 7

Among 50 responders, 60% of them feel annoying to notify one by one while the rest 40% does not.

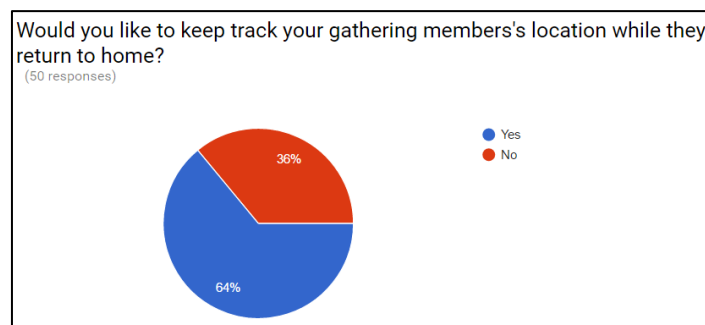


Figure 3-2-1-F8: Survey Question 8

Among 50 responders, 64% of them would like to keep track their member's location while 36% of them does not like to keep track.

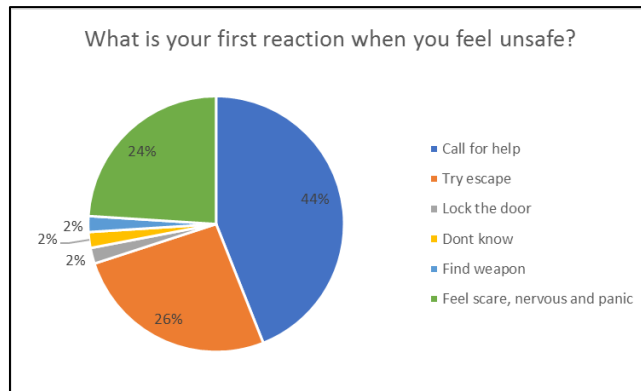


Figure 3-2-1-F9: Survey Question 9

Among 50 respondents, 44% of them will call their friends or parent for help, 26% of them will try their best to escape the situation, 24% of them feel scare, nervous and panic, 2% of them does not know how to do, 2% of them will find weapon to protect themselves, 2% of them will lock the door.

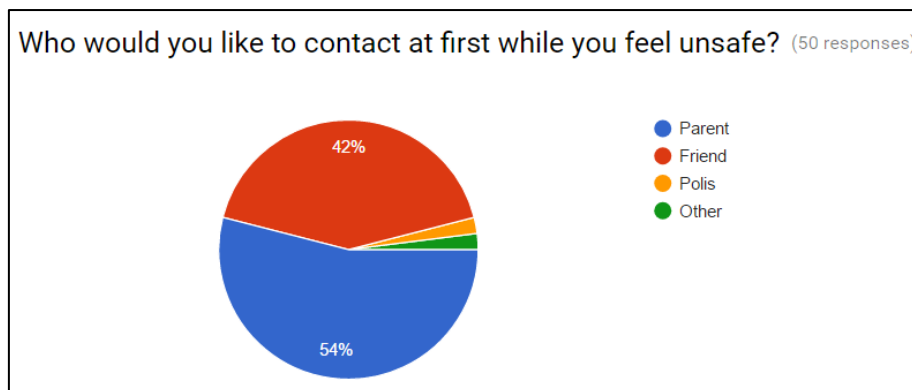


Figure 3-2-1-F10: Survey Question 10

Among 50 responders, 54% of them would call parent at first, 42 % of them will call friend, 1% of them choose to call police or other.



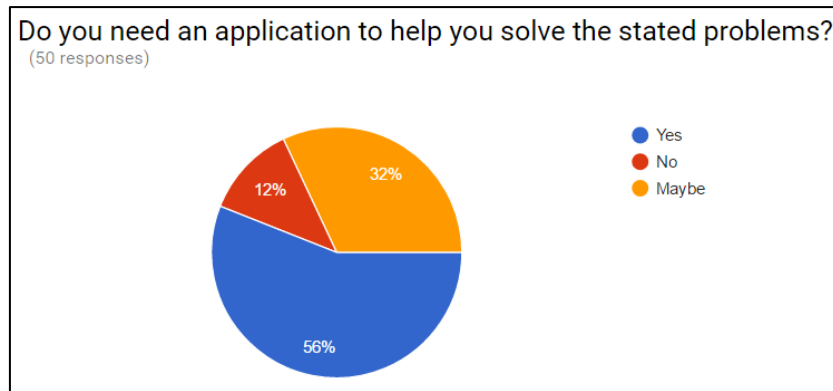


Figure 3-2-1-F11: Survey Question 11

There are 56% of 50 respondents are need an application for help, 32% of them are choose either need or not for the application help, and 12% of them reject for application help.

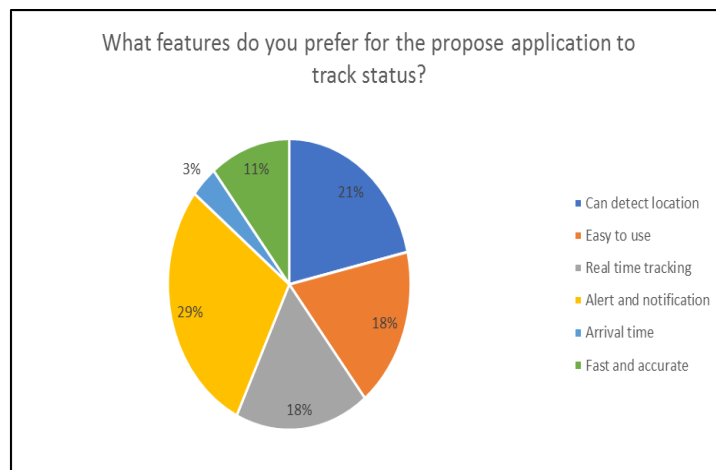
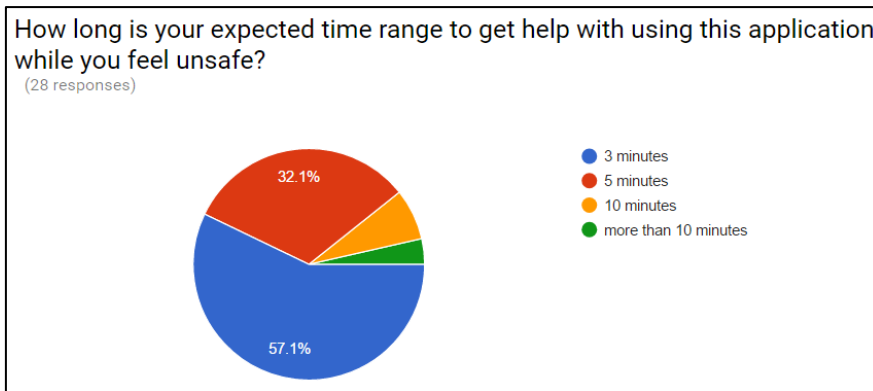


Figure 3-2-1-F12: Survey Question 12

With the response from previous question at Figure 20, 29% of them prefer alert and notification, 21% of them wish to detect location, 18% of them prefer real time tracking, 18% of them prefer easy to use, 11% of them prefer fast and accurate and the rest 3 % wish to know the arrival time.



*Figure 3-2-1-F13: Survey Question 13*

With the response from previous question at Figure 20, 57.1% is expect the application will respond at 3 minutes, 32.1% of them is expect the application will respond at 5 minutes, 7.1% of them is expect the application will respond at 10 minutes, and 3.6% of them will expect the respond time of application is more than 10 minutes.

# CHAPTER 4 SYSTEM DESIGN

## 4.1 USE CASE DIAGRAM

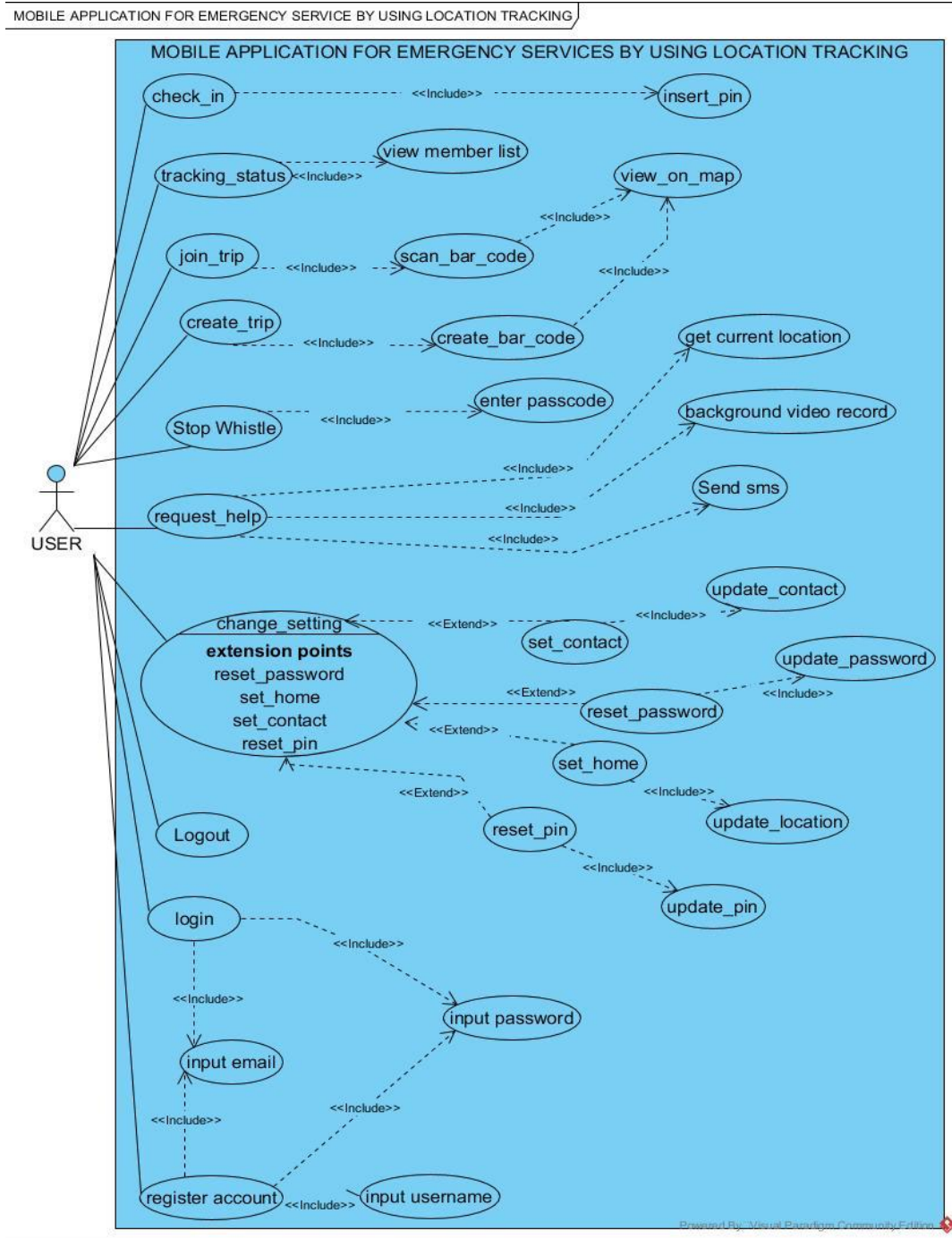


Figure 4-1-F1: Use case of location tracking and personal safety application

The use case diagram shows how an actor interact with the system. It also shows the expected behavior that the system performs. In the use case above, user can perform many functions such as Figure 4-1-F1. Some of the function may have extend and include relationship. In include relationship, it means user must perform that action if using that function, however, in extends, it means it is not necessary.

## 4.2 ACTIVITY DIAGRAM

### LOGIN ACTIVITY DIAGRAM

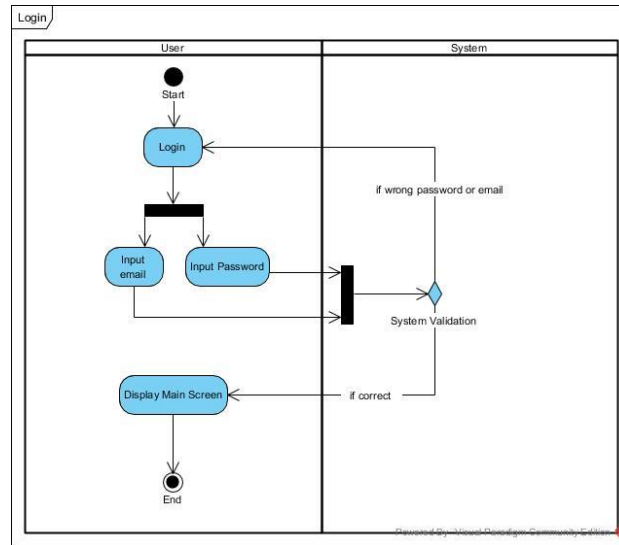


Figure 4-2-F1: Login Activity Diagram

In login activity diagram, after click login, user must enter their email and password and further for system to validate. If there is wrong password or email, it will redirect to login screen again, else, it will redirect to main screen of the application.

### REGISTER ACTIVITY DIAGRAM

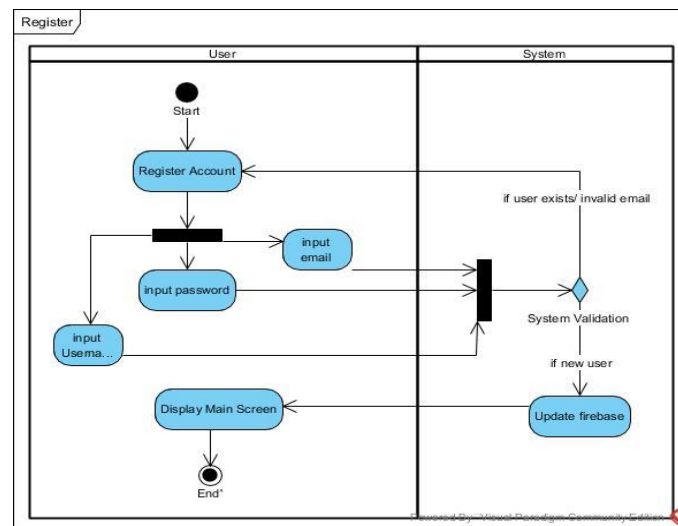


Figure 4-2-F2: Register Activity Diagram

In register activity diagram, if user is not existing member, it requires to sign up an account. User need to key their password, username, and email for register. System will validate if user is exist, then it will redirect to register account again, else, it will update firebase and redirect user to main screen.

## REQUEST SOS ACTIVITY DIAGRAM

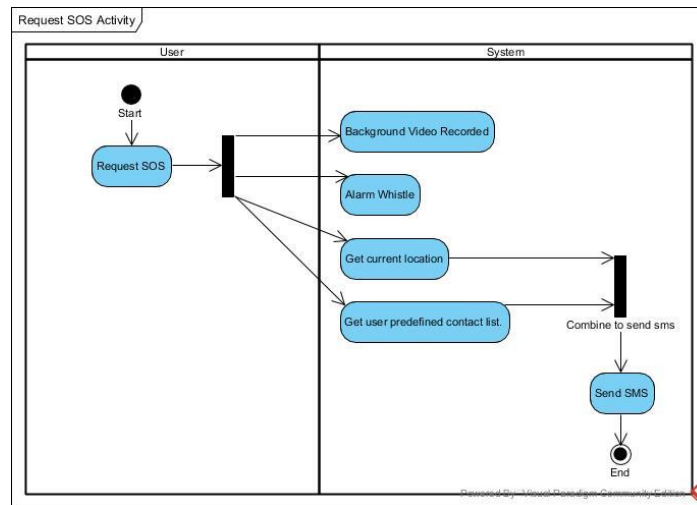


Figure 4-2-F3: Request SOS Activity Diagram

In request SOS activity diagram, when user request SOS, the system will start video recording in background, alarm whistle will trigger, at the same time, device will get current location and user predefine emergency contact list. With all this information, system will broadcast a sms to their predefine contact list.

## STOP ALARM ACTIVITY DIAGRAM

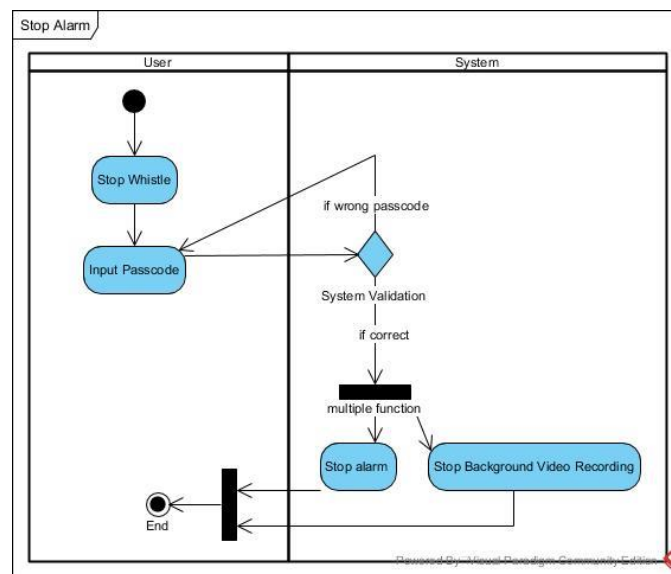


Figure 4-2-F4: Stop Alarm Activity Diagram

In stop whistle activity, when user need to stop their whistle, they need to enter their passcode, system will validate their passcode, if the passcode wrong, user need to reenter again, else, system will stop the whistle, and also stop the background video recording.

## VIEW RECORDED VIDEO ACTIVITY DIAGRAM

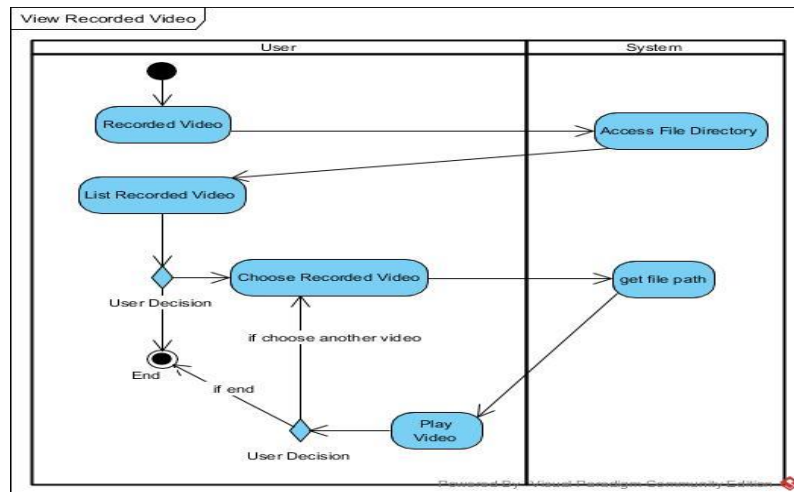


Figure 4-2-F5: View Recorded Video Activity Diagram

In view recorded activity diagram, user can find their recorded video in the system. After click recorded video, system will access the file directory and display a list of recorded videos. If user choose recorded video, system will get the file path and play the video that user selected. Else, system terminate.

## CREATE TRIP ACTIVITY DIAGRAM

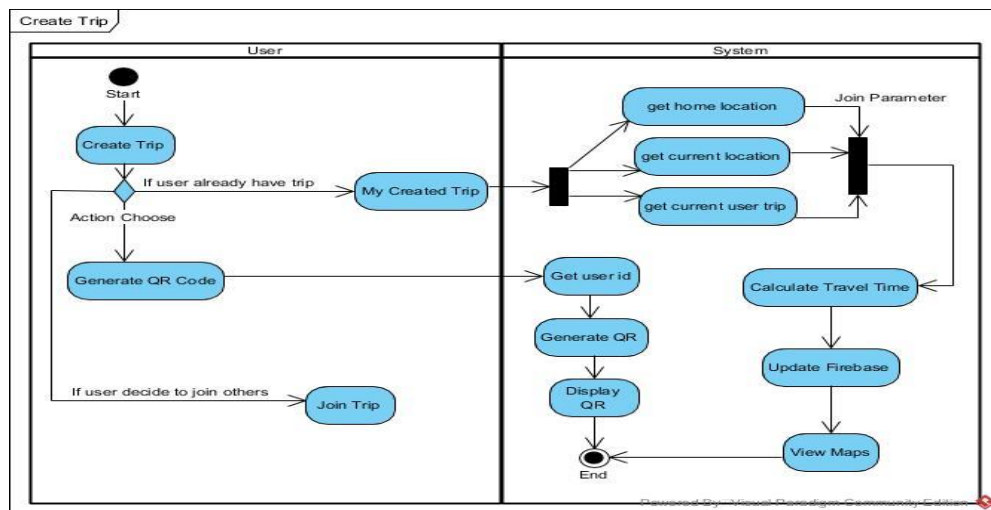


Figure 4-2-F6: Create Trip Activity Diagram

In create trip activity diagram, when user wants to create a group trip, user need to generate their QR for other to join. System will get their user id and then generate their QR code. If a group trip already exists, system will get their current location, home location and calculate their travel time. After that, system update their travel status to firebase and display to them.

## JOIN TRIP ACTIVITY DIAGRAM

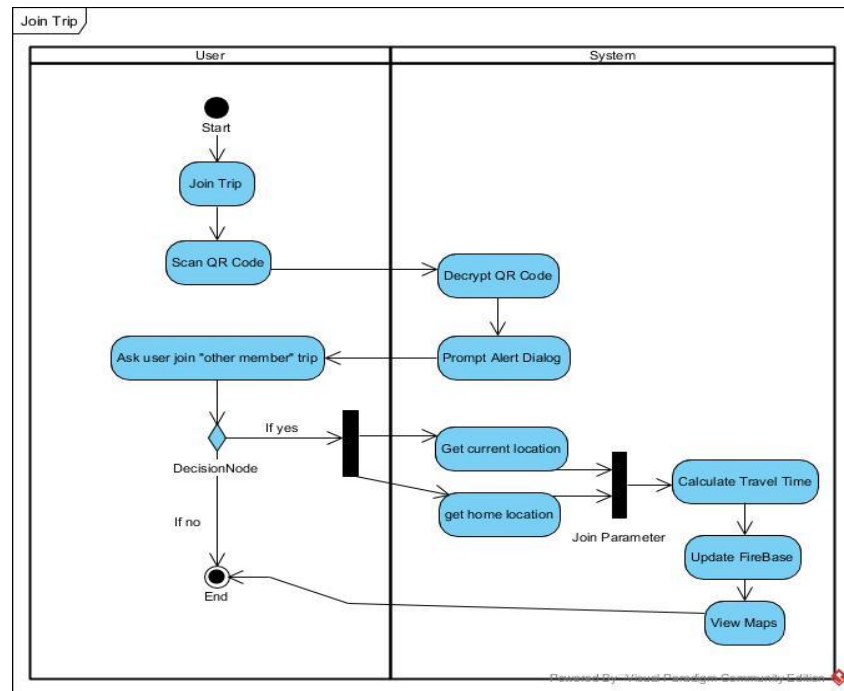


Figure 4-2-F7: Join Trip Activity Diagram

In join trip activity diagram, when user wants to join a trip, they need to go join trip, after that scanned others QR code, system will decrypt the QR code and display to user whether there are joined the right team. After join, system will get user current location and home location to further calculate their travel time. Update firebase is necessary after calculate travel time. Then, display to user to view their maps.

## TRACKING ACTIVITY DIAGRAM

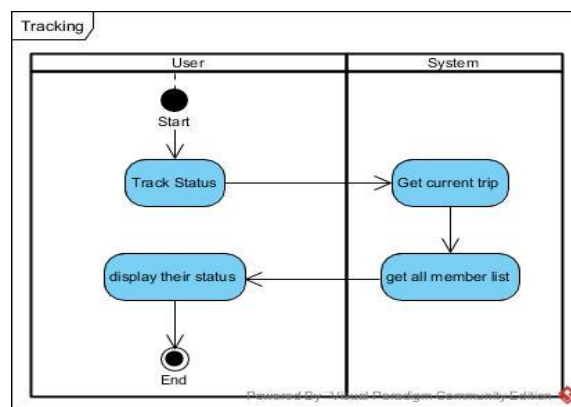


Figure 4-2-F8: Tracking Activity Diagram

In tracking activity diagram, when user click on track status, system will get their current group trip, after that get their member list and then display to user.

## CHECK IN ACTIVITY DIAGRAM

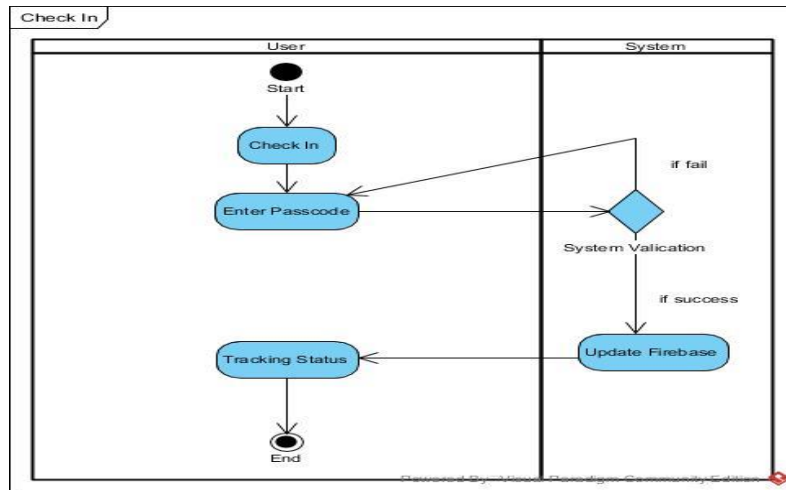


Figure 4-2-F9: Check In Activity Diagram

In check in activity, when user reach home, they need to check in to the system. User need to click check in, they are required to enter their passcode, system will further validate, if wrong passcode entered, user need to reenter again, else, system will update their status and redirect user to tracking status activity.

## SETTING ACTIVITY DIAGRAM

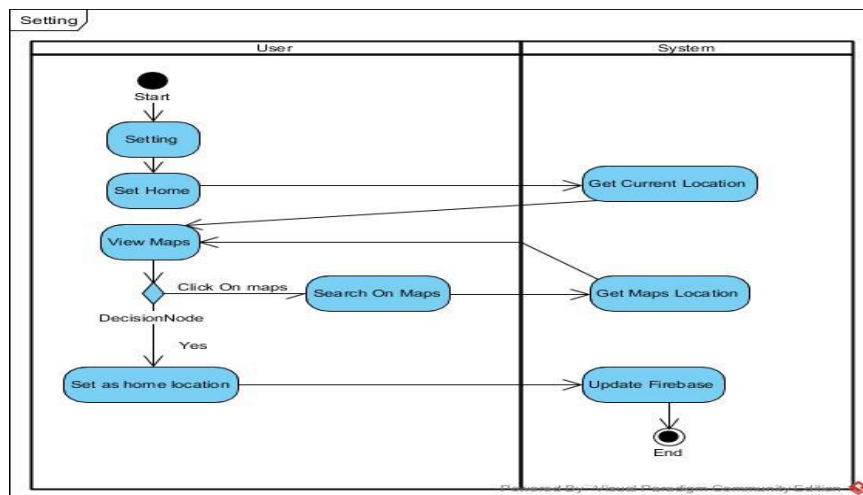


Figure 4-2-F10: Setting Activity Diagram

In set home activity diagram, when new user registered to the system, they need to set their home location as their base. In setting, user click on set home, after that, system will get current location and display on maps to user. If user want to search specific location, they can enter their location and system will get the location and display to user. After that, user need to save their home location. System will then update to firebase.



## SET PIN ACTIVITY DIAGRAM

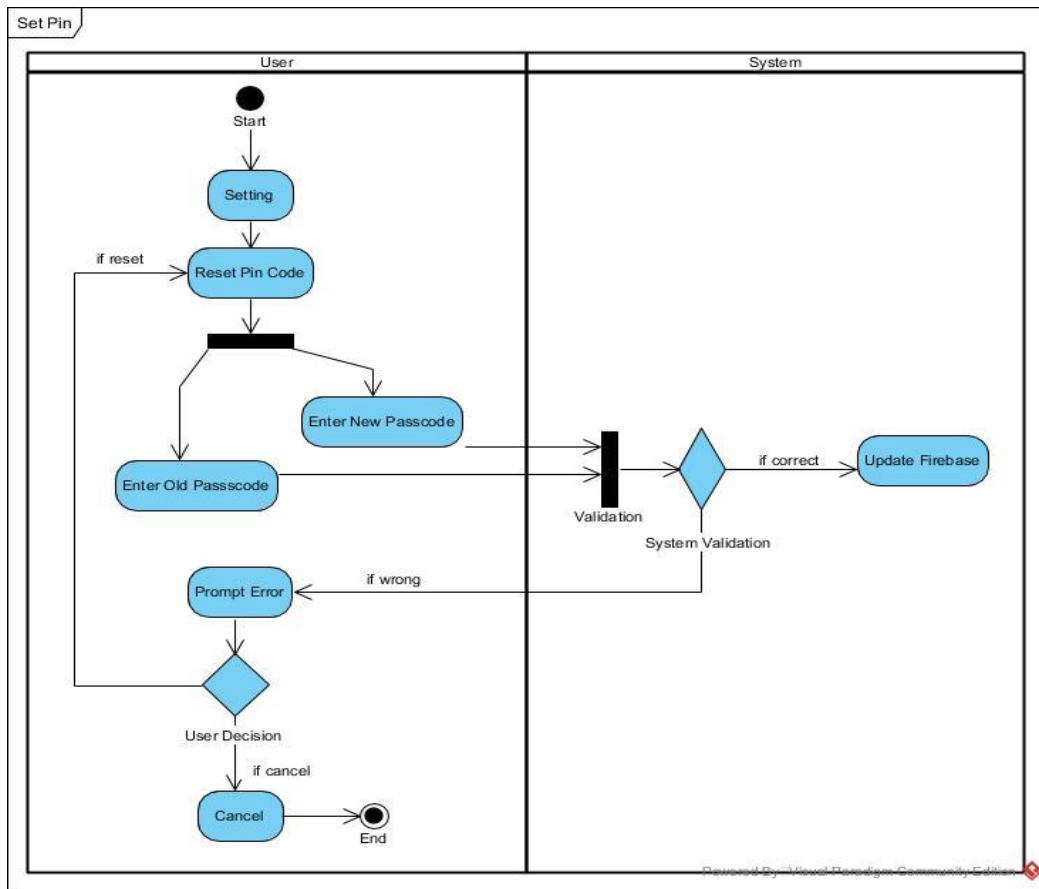


Figure 4-2-F11: Set Pin Activity Diagram

In set pin activity diagram, when user want to reset their passcode, they are required to enter old passcode and new passcode, system will further validate user passcode, if passcode is wrong, system will prompt an error. If user click on cancel on the dialog box, system will terminate, else, user need to reenter again.

## RESET PASSWORD ACTIVITY DIAGRAM

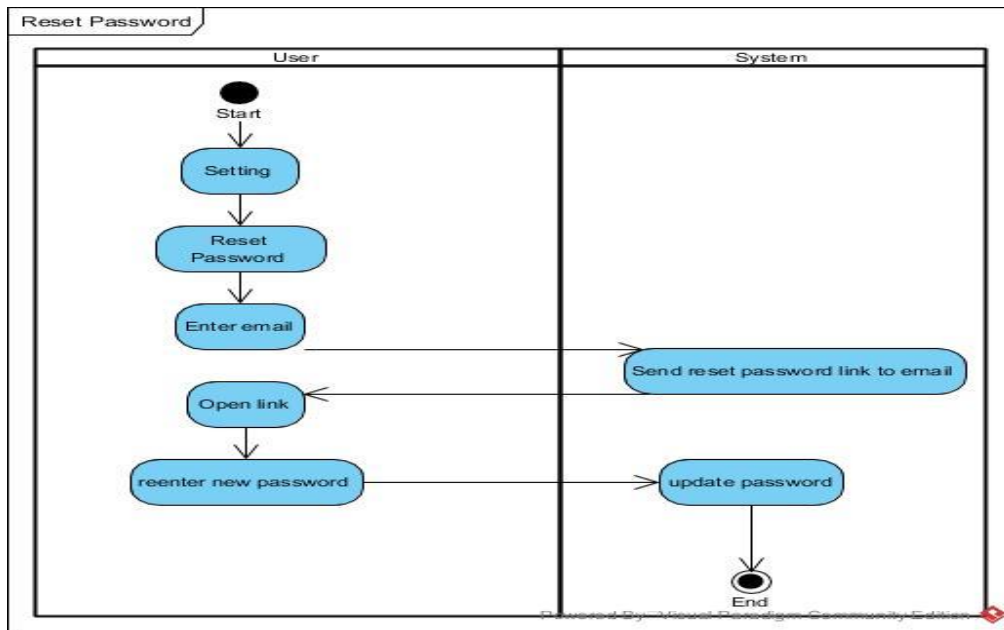


Figure 4-2-F12: Reset Password Activity Diagram

In reset password activity diagram, when user click on reset password, they need to enter their email, system will send a reset password link to the particular account, user need to open the link provided, and reenter their new password. After that, system will update their password to firebase.

## SET CONTACT ACTIVITY DIAGRAM

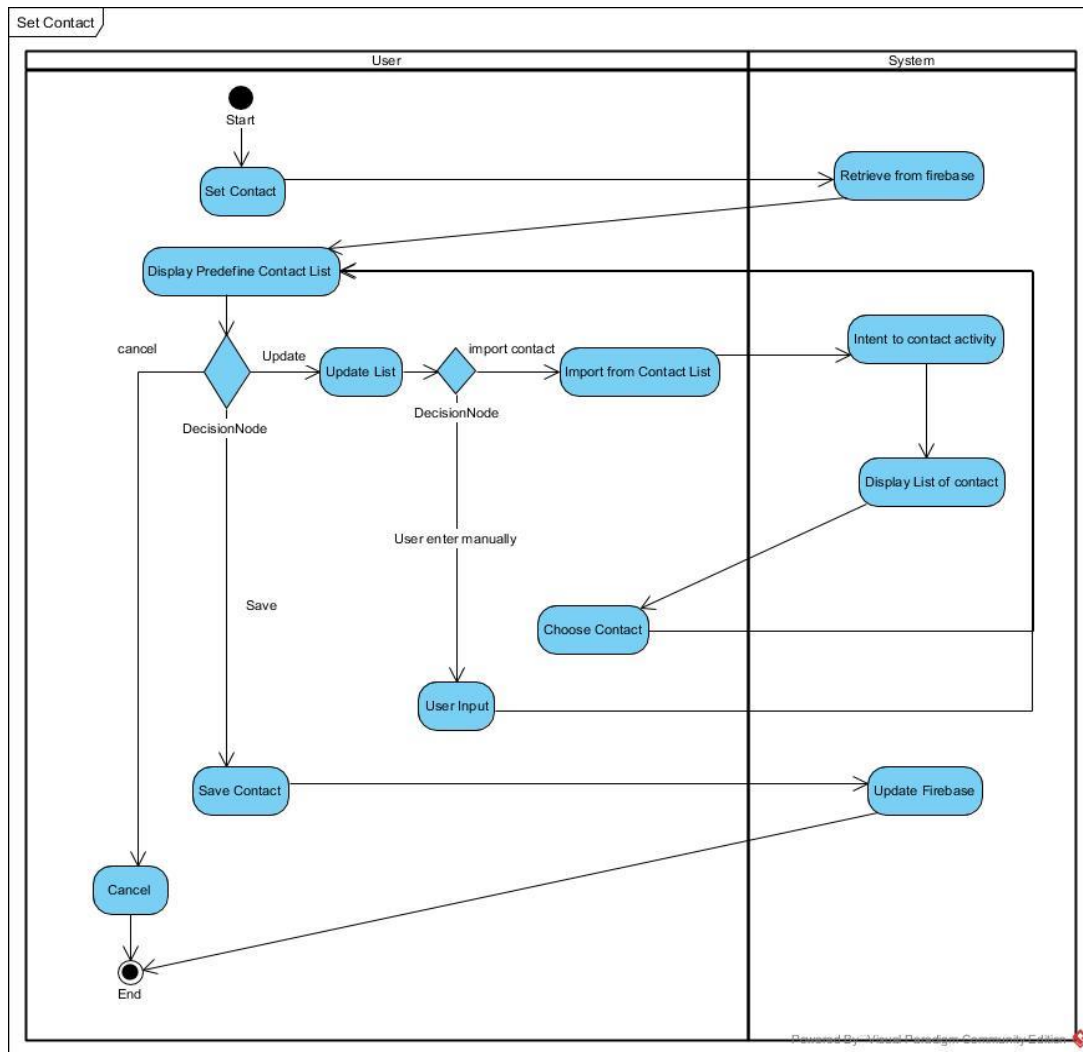


Figure 4-2-F13: Set Contact Activity Diagram

In set contact activity, when user want to set their contact list, system will retrieve data from firebase and display the list of predefine contact to user. If user wants to update, they can choose from contact phonebook or manually enter contact number, after that, user save the contact list. System will update to firebase accordingly.

### 4.3 FIREBASE STRUCTURE DESIGN

Google firebase structure is different with traditional SQL method. All data is stored in Json tree format. With this structure design, an object class is used to create the attribute in firebase. For example, User.class, In User.class, all user attribute is refined in this class. When new user is registered, this user class will use to create a structure in firebase. A sample structure is shown in Figure 4-3-F1.



Figure 4-3-F1: Firebase structure diagram

```
package com.example.heng.fyp_recompile;

/**
 * Created by hEnG on 3/13/2018.
 */

public class User {
    private String userKey;
    private Double homelat;
    private Double homelng;
    private String contact1;
    private String contact2;
    private String contact3;
    private String contact4;
    private String contact5;
    private String pssCode;
    private String imagePath;
    private String myContactNum;
    private String emailadd;
    private String currentTeam;

    public User(String userKey, String contact1, String contact2, String contact3, String contact4,
    public User() {...}
    public String getCurrentTeam() { return currentTeam; }
    public void setCurrentTeam(String currentTeam) { this.currentTeam = currentTeam; }
    public String getImagePath() { return imagePath; }
    public void setImagePath(String imagePath) { this.imagePath = imagePath; }
    public String getMyContactNum() { return myContactNum; }
    public void setMyContactNum(String myContactNum) { this.myContactNum = myContactNum; }
    public String getEmailadd() { return emailadd; }
    public void setEmailadd(String emailadd) { this.emailadd = emailadd; }
    public String getUserKey() { return userKey; }
    public void setUserKey(String userKey) { this.userKey = userKey; }
    public Double getHomelat() { return homelat; }
    public void setHomelat(Double homelat) { this.homelat = homelat; }
    public Double getHomelng() { return homelng; }
```

Figure 4-3-F2: User.class used to create firebase structure

## **CHAPTER 5: IMPLEMENTATION AND TESTING**

### **5.1 SOFTWARE USE**

#### **5.1.1 ANDROID STUDIO**

It is an official IDE for Android application development based on IntelliJ IDEA (Anon., n.d.). It is also an open source software for developer use as a platform to developing and debugging. It also features with IntelliSense that can help developer coding in faster in development and correct their syntax error. Besides that, it provides drag and drop function to enable developer layout their GUI(Graphical User Interface) easily.

#### **System Requirements for installing Android Studio for Windows platform**

Microsoft® Windows® 7/8/10 (32- or 64-bit)

- 3 GB RAM minimum, 8 GB RAM recommended;
- 1 GB for the Android Emulator
- 2 GB of available disk space minimum
- 4 GB Recommended (500 MB for IDE + 1.5 GB for Android SDK and emulator system image)
- 1280 x 800 minimum screen resolution
- For accelerated emulator: Intel® processor with support for Intel® VT-x, Intel® EM64T (Intel® 64), and Execute Disable (XD) Bit functionality

#### **Problem Encountered**

The problem was found that although it provides convenient tools and environment for developer to develop their apps, but when develop make a small change to it, it needs time to rebuild the apps and display the results to developer. Sometimes, it spent few minutes to rebuild the application in order to see the result.

### **5.1.2 ANDROID SDK**

Android SDK is a comprehensive set of developments that supports all versions of Android platforms (Anon., n.d.). It used to develop Android application through Android IDE, Eclipse IDE, Android Studio and others. Android SDK allows developer to develop the applications in specified Virtual Android devices. This virtual emulator provides developer to view the result in faster and convenient way.

#### **Problem Encountered**

The problem found in this android SDK is, when the developer switches their work environment or multiple developer work on 1 project, they have to manually download require platform in order to run their apps successfully.

### **5.1.3 ANDROID EMULATOR**

It is a virtual android device that allow developer to run their apps on the android emulator. This emulator supports tablet, android wear, android phone, and android TV devices. Developer can launch this emulator to test their prototype, test and develop application without using hardware device.

#### **Problem Encountered**

The problems encounter in this emulator was although it is convenient and best for developer that does not have a physical device, but, create a virtual environment in pc will slow down the performance of the apps, for example, this emulator require large size of ram and memory space to run in pc, it will extremely slow down the overall pc performance, other than that, this virtual environment may not perform as well as physical device, for example, testing in virtual device vs testing in physical device, the results may differ. Such as, take more time to response.

#### **5.1.4 VISUAL PARADIGM COMMUNITY EDITION**

It is a platform that provide UML design tool in design diagram and available free for non-commercial use only. It offers a complete tool-set software that need for requirements collection, software planning, test planning, class modeling, data modeling and others (Anon., n.d.).

##### **System requirement for Installing Visual Paradigm**

- Intel Pentium 4 at 2.0 GHz or higher.
- Minimum 2.0 GB RAM, but 4.0 GB is recommended.
- Minimum 4GB disk space (NOT include project space).
- Microsoft Windows (XP/Vista/7/8/10)
- Microsoft Windows Server (2000/2003/2008/2012)

#### **5.1.5 MICROSOFT PROJECT 2013**

It is a project management tools from Microsoft that provide the features to assist user to take control of a project. Besides, it also helps in arranging resources, creating work plan, and tracking the project process.

##### **System Requirement for Installing Microsoft Project 2013**

- 1 Ghz or greater x86/x64 Processor with SSE2 instruction set
- 1 GB RAM (32 Bit) /2 GB RAM (64 Bit)
- 2.0 GB disk space available
- Windows 7, Windows 8, Windows 10, Windows 2008R2 with .Net 3.5 or greater
- Graphics hardware acceleration requires DirectX10 graphics card
- 1024x576 resolution

## 5.2 PLATFORM AND TOOLS

### 5.2.1 GOOGLE FIREBASE

Firestore is a web and mobile application platform with tools and infrastructure designed to help developers build high-quality apps. It provides cloud functions and other features such as uploads data to Cloud Storage, changes of data in Real-time Database, new user sign ups via Authentication, and Analytics.

#### Firestore Data Architecture

All data is stored as JSON tree. It has different structure with SQL database. When user add data to the database, it creates a node in the existing structure. It can have many child node under the root node. For example, in Figure 5-2-1-F1, contact1, contact2 are one of the child node of testing.

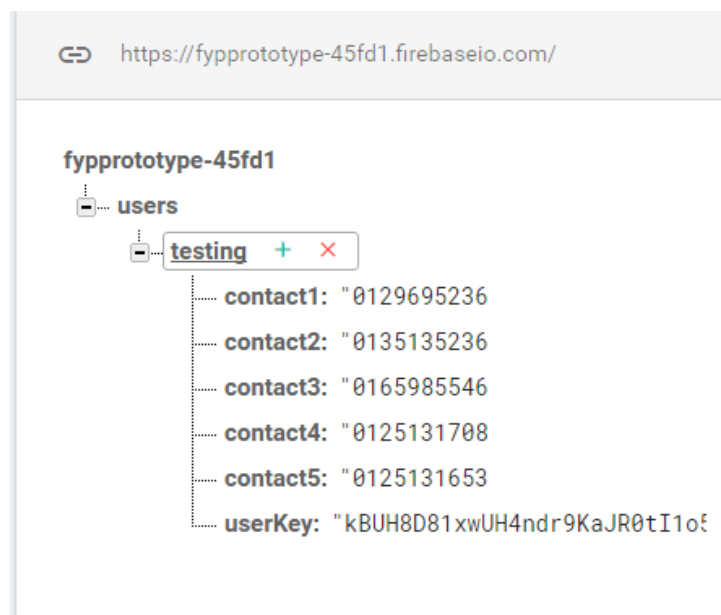


Figure 5-2-1-F1: Firestore Database Sample Structure.

These are the sample database that store in google firestore database.

#### Problem Encountered

The problem encountered in this firestore was the supportive version. Firestore has keep their framework up to date and maintenance. Thus, developer have to update their firestore version too. Lower version of firestore may conflict with the google service version that may lead to the apps failure.



### 5.3 HARDWARE INVOLVED

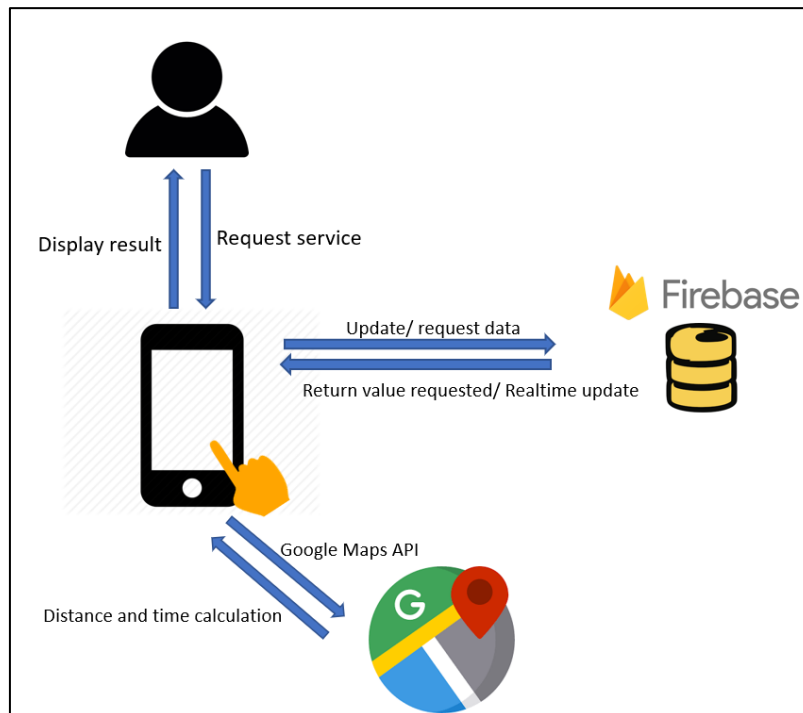
An Android mobile smartphone is needed to test and develop the application for this entire project. Hardware specification is shown Table 5-3-1-T1 below: -

#### 5.3.1 HARDWARE SPECIFICATION

*Table 5-3-1-T1: Hardware Specification.*

<b>Hardware</b>	<b>Requirements</b>
Android Smartphone	Require
Android OS	Minimum 5.0 and above
Memory	1.00 GB and above
Ram	1.00 GB and above
Display Size	4.0 inch and above
GPS	Require
Loud Speaker	Require

## 5.4 SYSTEM ARCHITECTURE



*Figure 5-4-F1: System Architecture Diagram*

This diagram illustrates an overview conceptual model of the system structure. The system architecture of the proposed application is linked to the Google Firebase (User Authentication, Realtime database). Any changes of user update, it will update immediately to firebase database. In Google Maps API, it used to calculate the distance and time taken between two locations. Every time user requests a service, it will call google maps api, and then update to google firebase database.

## 5.5 BLOCK DIAGRAM

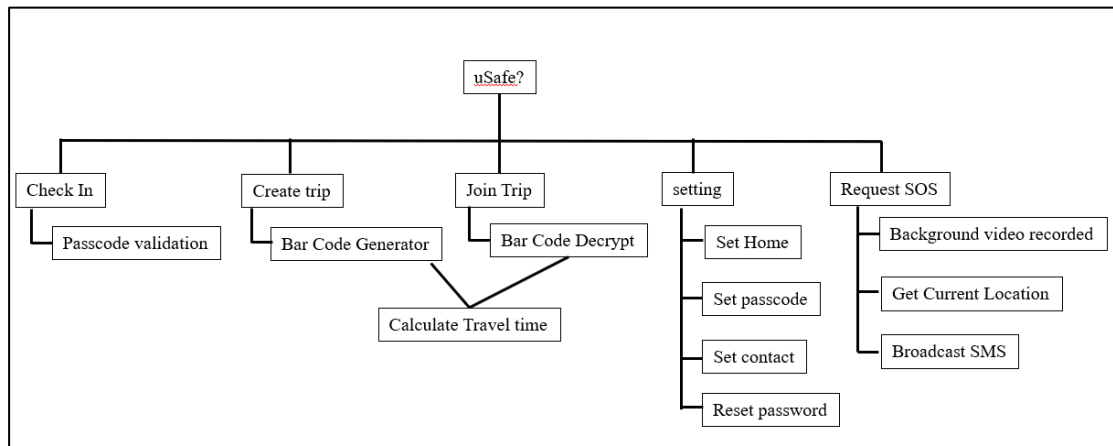


Figure 5-5-F1: Block Diagram

Based on the block diagram shown in Figure 5-5-F1. The entire system is defined in top down approach. Each module is clearly stated and will be develop through life cycle in incremental methodology.

In this block diagram, developer can have a fresh idea what where should they start and better design for coding. Interaction between Some of the module, they have share functions and class. It can reuse in another module. For example, bar code generator and decrypt, calculate travel time, get location. This several functions can be reuse always to prevent duplicate function and class created. Furthermore, efficiency and effectiveness of the program can be improve.

## 5.6 SYSTEM FLOW CHART

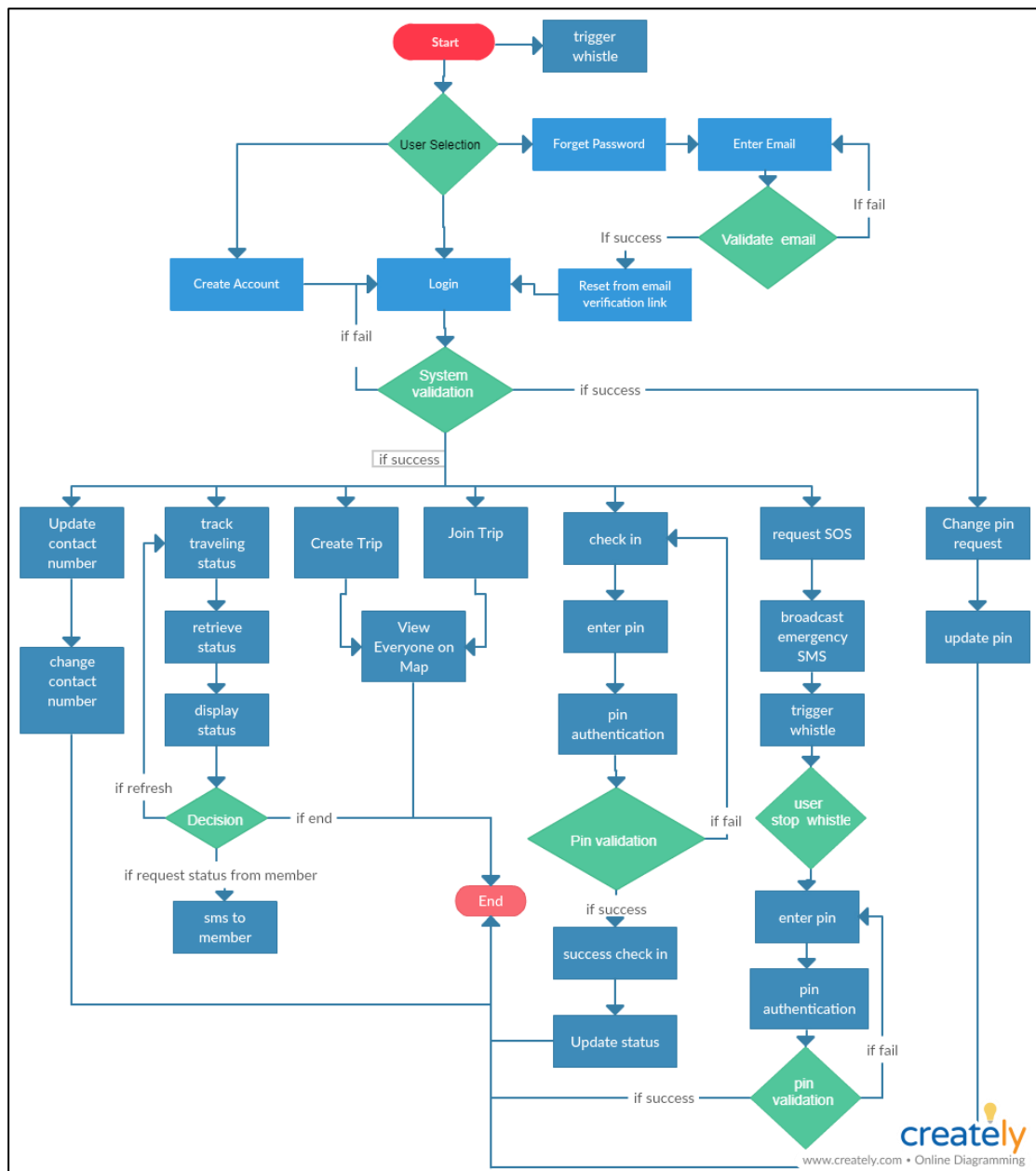


Figure 5-6-F1: Flow chart of location tracking and personal safety application

At first, when the user is not in login status, user can use the only function which is whistle, but for this function, user does not require to enter passcode to stop the whistle.

In the first state, user need to create an account if they are new to it, otherwise user need to login with their valid email. If user forgot their password, they can request to reset their password using their email. A reset password link will send to their linked email account and reset it. After successful login, user can choose their action such as update their contact number, track travelling status, request SOS and check in.

In track travelling status, if user just finished gathering, it will display a list of member's statuses, user can send a SMS to particular member to ask for status.

In request SOS, it will direct retrieve pre-set emergency contact list and broadcast to them.

In check in function, user can check in their status when user reach destination. For prevent anonymous attack, user need to enter their pin to check in status, if pin in incorrect, user is not able to check in their status. If user is success check in, system will update the status and other member's will know current user is reached and safe.

User can also create or join their member's trip, after that, system will redirect them to view everyone location on Map.

## 5.7 ALGORITHMS INVOLVE

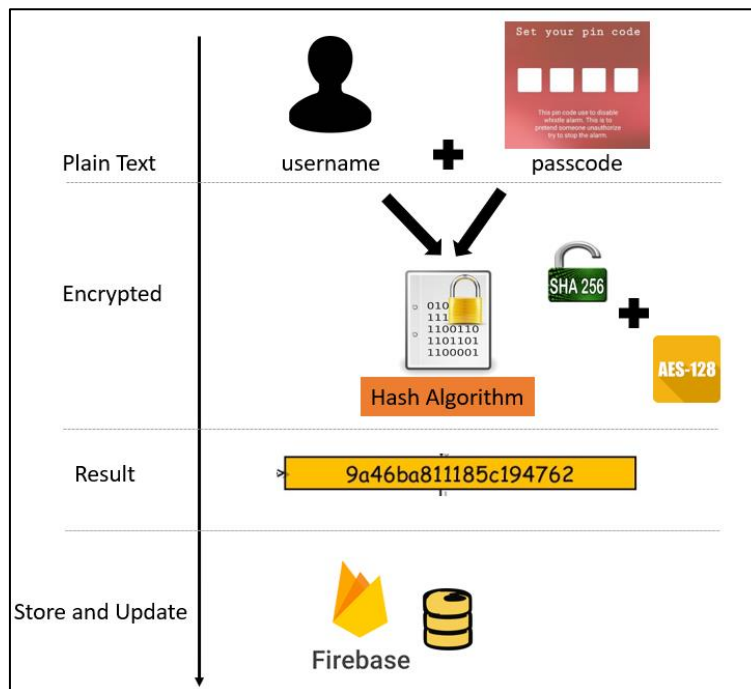


Figure 5-7-F1: Flow of encryption

In order to provide user data in more secure way, encryption method is used to make sure their data is securely encrypted to a series of not readable text between data transmitted. A hash function is used within this application. SHA-256 (secure hash algorithm) is using 256 bits digest length to hash a text.

In this propose application, the current username is used to generate the hash text. While AES (Advanced Encryption Standard) is one of the most used encryption method to encrypt the information. This application used SHA-256 hashing to hash the username and further act as a key for AES encryption to generate the secret key. After that, the generated secret key is used to encrypt the pin code that user input.

When the application prompt user to input the pin code, the program uses its username as secret key and encrypt the pin code to become a series of unreadable text. Then it stores into database to prevent someone easily read and hacked.

## 5.8 GUI (GRAPHICAL USER INTERFACE)

### LOGIN SCREEN

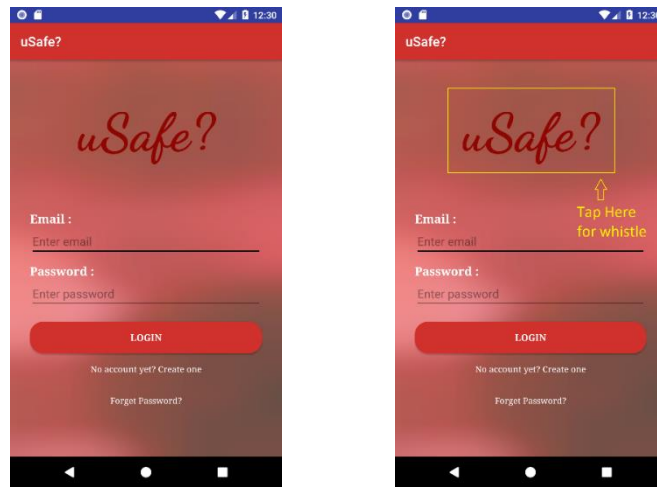


Figure 5-8-F1: Screenshot of Login Screen

In Figure 5-8-F1 show the Login page of propose application. There is a feature that user can click on the app logo to trigger the whistle. At this stage, there is no needed pin authenticated to disable the alarm.

### REGISTER PAGE

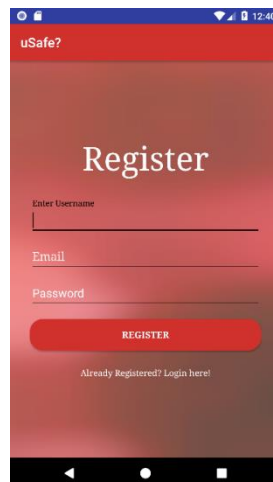
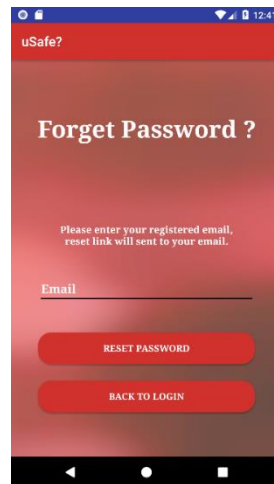


Figure 5-8-F2: Screenshot of Register Page

In Figure 5-8-F2, if user is not existing user, user need to create an account in order to use this application. It provides more feature including send SMS to your phone list, track user's member location.

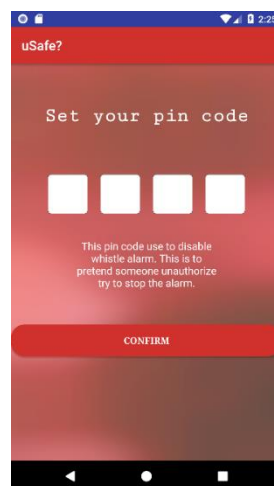
## FORGET PASSWORD PAGE



*Figure 5-8-F3: Screenshot of Forget Password Page*

In Figure 5-8-F3, if user forget their password, they can request to reset in this page. User need to input their email that linked to this account. User need to access their email in order to reset their password.

## SET PIN CODE



*Figure 5-8-F4: Screenshot of Set Pin Code Page*

In Figure 5-8-F4, When the user is first created an account, it will require user to set their pin code, this used to stop the whistle, check in and etc. It used to prevent anonymous or malicious check in. If user forget their pin code, they can reset afterwards with using their email address.



## MAIN PAGE

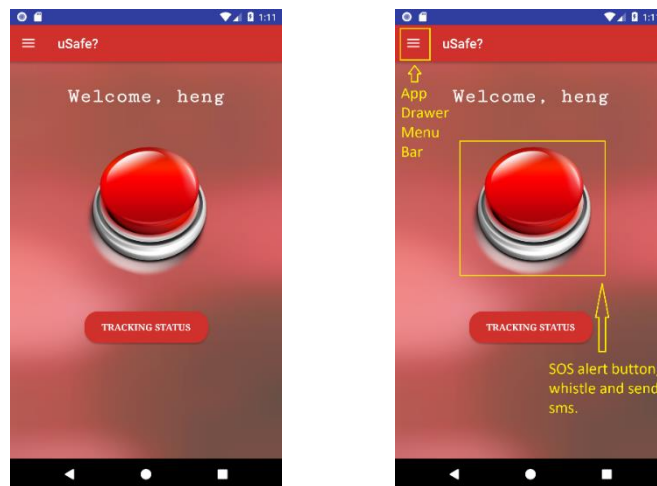


Figure 5-8-F5: Screenshot of Main Page

In Figure 5-8-F5, it shows the Main page of the application, the middle of the button, it used to request help. When user tap it, it will trigger large sound of whistle to get attraction of surrounding and send SMS to your phone list. Besides, user can navigate their application by using the app drawer at the top left as shown in figure above.

## APP DRAWER NAVIGATION MENU BAR

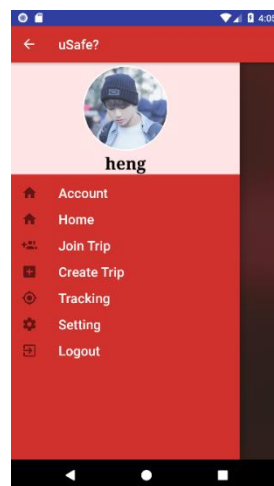
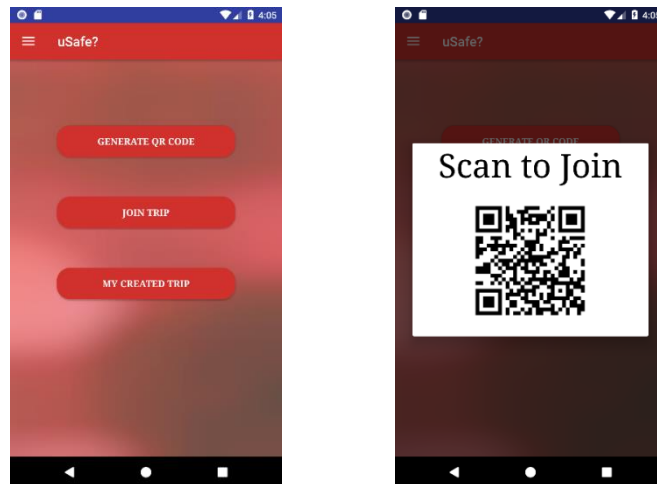


Figure 5-8-F6: Screenshot of App Drawer Navigation Menu Bar

In Figure 5-8-F6, when the app drawer is clicked, it will swipe from left and display a list of option. User can navigate the application with the options selected. It will also show the current user profile picture and their username.

## CREATE TRIP PAGE



*Figure 5-8-F7: Screenshot of Create Trip Page*

In Figure 5-8-F7 shows Create trip page, user have to select their options for example generated QR Code, this used to provide convenience for another user to join the trip. Other member can user Join Trip to scan this QR Code to join the trip.

## JOIN TRIP PAGE



*Figure 5-8-F8: Screenshot of Join Trip Page*

In Figure 5-8-F8 shows the maps page. After join the trip, the user can view everyone on the Maps with their current location. For example, two people is in the friend list, there will be two markers on the Maps.

## Setting Page

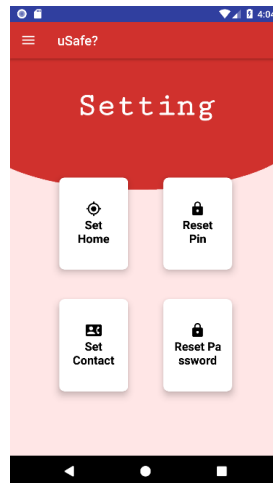


Figure 5-8-F9: Screenshot of Setting Page

In Figure 5-8-F9 shows the setting page, user can through navigation app drawer as shown in Figure 5-8-F6 to modify their preferences at here.

## Reset Pin Page

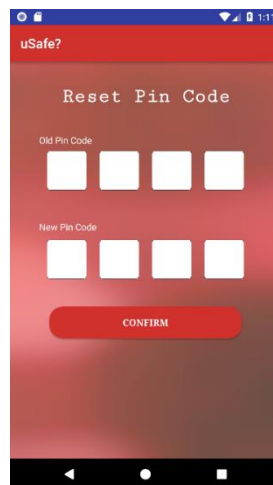


Figure 5-8-F10: Screenshot of Reset Pin Page

In Figure 5-8-F10 shows reset pin code page. User need to input their old pin code and then new pin code, if old pin code is not correct, user is not allowed to reset their pin code.

## Add Contact Page

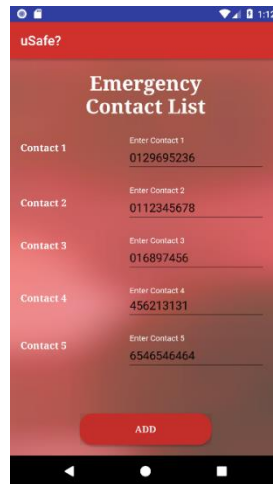


Figure 5-8-F11: Screenshot of Add Contact Page

In Figure 5-8-F11 shows add contact page. User can set and modified the emergency contact list at this page, so that when they are in emergency cases, a SMS will send to this immediately.

## Tracking Status

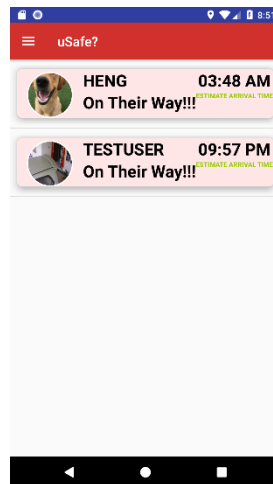


Figure 5-8-F12: Screenshot of Tracking Page

In Figure 5-8-F12 shows tracking page. User can find their members status at this page. When another user is reach home safe and done check in their status, this tracking page will update immediately and shown to user.

## **5.9 TESTING METHOD**

Testing is one of the important step in development. It used to make sure the application is well function and meets the requirement. It is also one of the phases in life cycle of development method. Each of every module is done developed, testing is conducted at this session. Functional Testing methodology is applied in this entire project. They are few testing components which are listed below: -

- Unit Testing
- Integration Testing
- Acceptance Testing

### **BLACK BOX TESTING**

In black box testing, testers aren't concerned with the internal mechanisms. They only check the developed software does what it's supposed to, thus, this method focuses on only output of the result. Test cases are design and prepare to be test on that particular module. Testers will make test on the system based on the test cases prepared. When each of every test is conducted, they will record and mark down their actual output and result. This method also will be used in every phases of functional testing which are unit testing, integration testing, and also acceptance testing.

## 5.9.1 UNIT TESTING

In unit testing, it is take on every module when each module function is done test to make sure there are well-functioning. Each module in this will be taken for testing at this stage.

### i. LOGIN PAGE

Table 5-9-1-F1: Test Case Table for Login Page (Unit Testing)

Test Case	Function Name & Description	Inputs	Expected Output	Actual Output
UserLogin	auth.getCurrentUser() //check current user	Get from user input	Success Login	Success Login
tglbtnWhistle	tglbtnWhistle.setOnCheckedChangeListener() //use to trigger whistle	Tap button	Whistle on	Whistle on
Volume down	onKeyDown() //disable to volume function key	Press Volume key down	Alert message	Alert Message appear

### ii. MAIN PAGE

Table 5-9-1-F2: Test Case Table for Main Page (Unit Testing)

Test Case	Function Name & Description	Inputs	Expected Output	Actual Output
Volume down	onKeyDown() //disable to volume function key	Press Volume key down	Alert message	Alert Message appear
tglbtnWhistle	tglbtnWhistle.setOnCheckedChangeListener() //use to trigger whistle	Tap button	Whistle on	Whistle on
btnHelpMe	btnHelpMe.setOnClickListener() //request sos	Button clicked	Sending sms to preset contact	Sending sms to preset contact

### iii. SIGNUP PAGE

Table 5-9-1-F3: Test Case Table for Sign Up Page (Unit Testing)

Test Case	Function Name & Description	Inputs	Expected Output	Actual Output
btnSignUp	btnSignUp.setOnClickListener() //sign up new user in firebase, on click listener	Button click	Signup new user	Signup new user
Createuser in database	auth.createUserWithEmailAndPassword(email,password) //sign up new user method	User name, user password	Create new user in firebase	New user created with expected.

### iv. SET PIN PAGE

Table 5-9-1-F4: Test Case Table for Set Pin Page (Unit Testing)

Test Case	Function Name & Description	Inputs	Expected Output	Actual Output
btnSetPin	btnSetPin.setOnClickListener() //set pin button clicked, encrypt data and store to firebase database.	Button Click	Set pin success	Set pin success
encrypt()	encrypt(String, String) //encrypt function, first param is pin number that user input, second param is use current username. //generate own hash and encrypted data	User input and username	Generate encrypted data	Encrypted data as expected
Retrieve from firebase	dataRef.child(username). setValue(encryptedData)	Current username and generate data	Encrypted data and store to firebase	Encrypted data stored

**v. CREATE TRIP PAGE**

*Table 5-9-1-F5: Test Case Table for Create Trip (Unit Testing)*

Test Case	Function Name & Description	Inputs	Expected Output	Actual Output
createdtripbtn	createdtripbtn.setOnClickListener() //user current username and id to create a special code.	Button Click	Generated special code and generate QR Code	Display QR Code
generateQRbtn	generateQRbtn.setOnClickListener() //get current user id and username to generate QR Code	username and user id	Generated QR Code	Generated QR Code

**vi. JOIN TRIP PAGE**

*Table 5-9-1-F6: Test Case Table for Join Trip Page (Unit Testing)*

Test Case	Function Name & Description	Inputs	Expected Output	Actual Output
barcodescanner()	barcodescanner() //open camera and allow user to scan others barcode.	Button Click	Generated special code and generate QR Code	Display QR Code
AlertBuilder	AlertDialog.Builder() //prompt user scanned result and ask user to make decision.	Scanned QR from camera	Scanned and prompt dialog to user	Alert Prompt
	AlertDialog.Builder().setPositiveButton() //prompt selection //user decide ok or decline	Ok button clicked	Join others trip successfully	Success join others trip
	AlertDialog.Builder().setNegativeButton() //prompt selection //user decide ok or decline	Cancel button clicked	Join cancel and return to main page	Return to main page.



**vii. VIEW MAPS PAGE**

*Table 5-9-1-F7: Test Case Table for View Everyone on Maps Trip (Unit Testing)*

<b>Test Case</b>	<b>Function Name &amp; Description</b>	<b>Inputs</b>	<b>Expected Output</b>	<b>Actual Output</b>
Get user current location	getCurrentLocation() //get user current location and draw on Maps.	Function call onCreate	Get user current location	User current location.
Calculate travel time	sendRequest(LatLng latLng) //send request to api to calculate	User current location	Travel time calculated	Travel time calculated.
Update to firebase	dataRef.child("timeremaining").setValue(arrivalTime)	Travel time calculated by api	Update to firebase	Firestore updated

**viii. TRACKING PAGE**

*Table 5-9-1-F7: Test Case Table for View Everyone on Maps Trip (Unit Testing)*

<b>Test Case</b>	<b>Function Name &amp; Description</b>	<b>Inputs</b>	<b>Expected Output</b>	<b>Actual Output</b>
Get user data	GetDataFirestore() //get user current path and all member list	Username, userpath	Group member list return	Group member list return

## 5.9.2 INTEGRATION TESTING

Integration testing is testing in different module that had been successful in unit testing and combine together to perform specific function. With combined modules above, integration test is to apply in this stage. Combined modules will be test consequently until there is no error to perform specific function.

### i. LOGIN PAGE

*Table 5-9-2-F1: Test Case Table for Login Page (Integration Testing)*

<b>Test Case</b>	<b>Function Name &amp; Description</b>	<b>Inputs</b>	<b>Expected Output</b>	<b>Actual Output</b>
UserLogin	auth.getCurrentUser() //check current user	Get from user input	Success Login	Success Login
Redirect to main page	btnLogin.setOnClickListener() //redirect user to main page	Button click	Redirect to main page	Redirect to main page

**ii. MAIN PAGE**

*Table 5-9-2-F2: Test Case Table for Main Page (Integration Testing)*

<b>Test Case</b>	<b>Function Name &amp; Description</b>	<b>Inputs</b>	<b>Expected Output</b>	<b>Actual Output</b>
btnHelpMe	btnHelpMe.setOnClickListener() //request sos	Button clicked	Sending sms to preset contact	Sending sms to preset contact
Switch between page	Intent=new Intent(MainActivity.this, MyAccountActivity.class) intent.putExtra("user_name", userName); //intent include pass value	Username, button click	Pass username value and redirect to Account page.	Pass username value and redirect to Account page.
	Intent=new Intent(MainActivity.this, TrackingActivity.class) intent.putExtra("user_name", userName); //intent include pass value	Username, button click	Pass username value and redirect to Tracking page.	Pass username value and redirect to Tracking page.

	Intent=new Intent(MainActivity.this, Create TripActivity.class) intent.putExtra("user_name", userName); //intent include pass value	Username, button click	Pass username value and redirect to Create Trip page.	Pass username value and redirect to Create Trip page.
	Intent=new Intent(MainActivity.this, JoinTripActivity.class) intent.putExtra("user_name", userName); //intent include pass value	Username, button click	Pass username value and redirect to Join Trip page.	Pass username value and redirect to Join Trip page.
	Intent=new Intent(MainActivity.this, SettingActivity.class) intent.putExtra("user_name", userName); //intent include pass value	Username, button click	Pass username value and redirect to Setting page.	Pass username value and redirect to Setting page.

Table 5-9-2-F2: Test Case Table for Main Page(continue)

### iii. CREATE TRIP PAGE

Table 5-9-2-F3: Test Case Table for Create Trip (Integration Testing)

Test Case	Function Name & Description	Inputs	Expected Output	Actual Output
Get username from previous activity	username=getIntent().getStringExtra("user_name") //get user name from previous activity	Variable from previous page.		
generateQRbtn	generateQRbtn.setOnClickListener() //get current user id and username to generate QR Code	username and user id	Generated QR Code	Generated QR Code
jointripBtn	jointripBtn.setOnClickListener() //direct intent user to jointrip page. //if user wish to join others trip, this will user to scan others barcode	Scanned QR Dode	Scanned and join others trip successfully	Scanned and join others trip successfully

### iv. JOIN TRIP PAGE

Table 5-9-2-F4: Test Case Table for Join Trip

Test Case	Function Name & Description	Inputs	Expected Output	Actual Output
barcodescanner()	barcodescanner() //open camera and allow user to scan others barcode. //direct user to maps page.	Button Click	Generated special code and generate QR Code	Display QR Code

### 5.9.3 ACCEPTANCE TESTING

In accepted testing, it tests with respect to user requirements, and business processes conducted to determine whether or not a system satisfies the acceptance criteria and to enable the user, customers or other authorized entity to determine whether or not to accept the system. There are few test cases to be tested.

#### i. REQUEST SOS

Table 5-9-3-F1: Test Case Table for Request SOS (Acceptance Testing)

Test Case	Description	Inputs	Expected Output	Actual Output
Request SOS	User press sos button request for help.	Button Click	Sms send include current location	Sms send include current location
		Record function trigger	Video start recording	Video recorded
		Get current location	Coordination longitude and latitude.	Get value successfully.

**ii. CREATE TRIP**

*Table 5-9-3-F2: Test Case Table for Create Trip (Acceptance Testing)*

<b>Test Case</b>	<b>Description</b>	<b>Inputs</b>	<b>Expected Output</b>	<b>Actual Output</b>
User create trip	User create their trip	Button Click	Go to create trip page and user choose action	Go to create trip page.
Generate QR Code	User click Generate QR to generate their own QR Code.	Button Click	QR Code generated	QR Code Display

**iii. JOIN TRIP**

*Table 5-9-3-F3: Test Case Table for Join Trip (Acceptance Testing)*

<b>Test Case</b>	<b>Description</b>	<b>Inputs</b>	<b>Expected Output</b>	<b>Actual Output</b>
User join trip	User join others trip	Button Click	Camera open and automatic scanned QR Code	Display whose trip to join correctly.
Create their own trip	User plan to create their own trip instead of join	Button Click	Go to create trip page.	Redirect to create trip page

**iv. WHISTLE MODE**

*Table 5-9-3-F4: Test Case Table for Whistle Mode (Acceptance Testing)*

<b>Test Case</b>	<b>Description</b>	<b>Inputs</b>	<b>Expected Output</b>	<b>Actual Output</b>
Whistle function	User trigger whistle	Button Click	Alarm sound ring	Alarm sound ring
Volume down	User click volume down	Volume down	Alert Dialog box	Alert dialog pop out.
Silent Mode	Trigger whistle is silent mode	Button Click	Loudest volume alarm sound	Loudest volume alarm sound



## **CHATER 6: CONCLUSION**

### **6.1 CONCLUSION**

In conclusion, although the crime index in Malaysia is decreasing, but the rate of public fear of crime has an inverse of it. Nowadays, many people like to hang out at night, as the result of increasing in public fear, they tend to worry about their personal safety including their friends. When they reach home, one of the thing they forget always is to send a safe message to inform their gathering members.

In literature review, most of the application have their strength and weakness. For example, user need to spend few steps only can request for help. Therefore, user might lose a chance to get help. Other than that, some of them need pay an annual fee to enjoy the application.

This project basically a combination and enhancement of existing application. User tends to use this application to tracking user's member travelling status and allow user to use whistle when they are in emergency cases. This propose application also features with identity authentication to make sure user's identity to prevent anonymous check in.

### **6.2 DISCUSSTION**

There are some problems encountered in the current proposed system. One of the problem is maintain and control the real-time database. Developer might found any problem in creating the database in firebase while development, because it's has different structure compare to SQL database and it is using tree dimension structure. Although there are some tutorial guidelines available online, but, different compilation config might have different environment to program the system.

Other than these, the problem might found on user section. This proposed system is target all the generation such as teenagers, generation x and generation y. Ease of use of the application must be user friendly to all the generation but some of the user who are not familiar with android knowledge might face problem with it. Thus, they might feel complicated while using it.

Last but not least, there is a conflict between whistle and audio recording. When user trigger whistle, the audio recording will start record. But unfortunately, in the recorded audio, whistle

sound also be recorded as well. Thus, the surround audio condition is messed with the whistle, so it couldn't work at here.

### **6.3 FUTURE WORK**

The future work will be going to continuing maintain the usability of the application. Besides that, improve and enhance the security with latest smart device built in technology, such as finger print authentication and NFC (Near Field Communication) will be the upcoming plan. User are allowed use their finger print or specified NFC tag to check in with more fast and convenient way. Other than that, forum or discussion room will provide in the application. User can now post warning cases, latest emergency tip in the application to let other user take care of it.

Besides that, user friendly of the interface, page navigation steps can be improved and refresh to make user more feel interesting always.

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## APPENDIX

### APPENDIX A

#### SURVEY QUESTIONS

QUESTIONS    RESPONSES    50

## Mobile Application for Location Tracking Service and Emergency

Description: This is a mobile application that provide gps-services to track user's travelling status and allowance the use of whistle to extricate from unsafe situation.

Remarks: The purpose of this survey is to gather user requirement for this application. Kindly answer all the questions below. Your participation is highly appreciated. Thank you.

Age \*

below 18

19-25

26-30

31 and above

How often do you gathering in a week? \*

1-2 times

3-4 times

5-7 times

more than 7 times

What is your gathering time normally? \*

- Day
- Night

Do you feel safe while you return to home at nighttime alone? \*

- Yes
- No

Will you worried about your gathering members while they are on their way to back home? \*

- Yes
- No
- Maybe

Will you notify your gathering members when you reached home? \*

- Yes
- No
- Maybe



Do you feel annoying when you notify your gathering member one by one ? \*

Yes

No

Would you like to keep track your gathering members's location while they return to home? \*

Yes

No

What is your first reaction when you feel unsafe? \*

Short answer text

Who would you like to contact at first while you feel unsafe? \*

Parent

Friend

Polis

Other...



Do you need an application to help you solve the stated problems? \*

- Yes
- No
- Maybe

After section 1 Continue to next section



Section 2 of 2



## Mobile Application for Location Tracking Service and Emergency

Description (optional)

What features do you prefer for the propose application to track status? \*

Short answer text

.....



How long is your expected time range to get help with using this application while you feel unsafe? \*

- 3 minutes
- 5 minutes
- 10 minutes
- more than 10 minutes

## APPENDIX B

### B.1 ANDROID STUDIO INSTALLATION STEP



Figure B-1-1: Android Studio Installation Step 1.

Step 1.

Go to <https://developer.android.com/studio/index.html> and download the installer.

Step 1.1

Launch the installer, a setup dialog will pop out as shown as Figure B-1-1

Step 1.2

Click next to continue the installation.

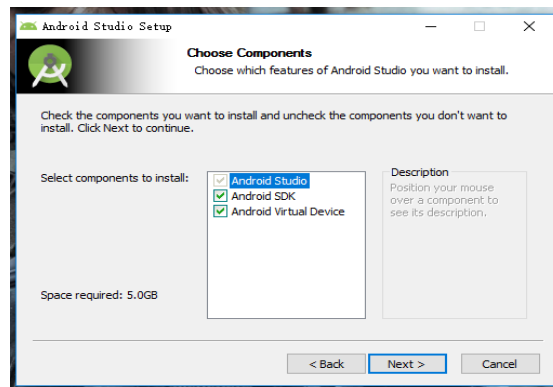
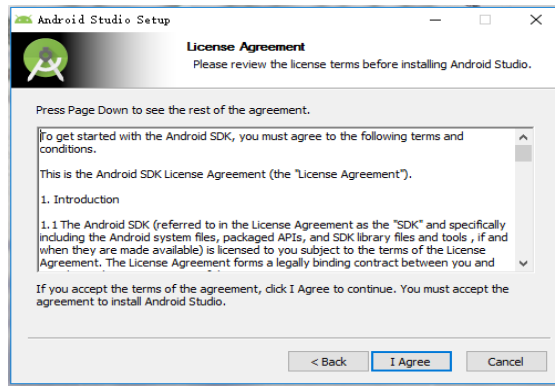


Figure B-1-2: Android Studio Installation Step 2.

Step 2.

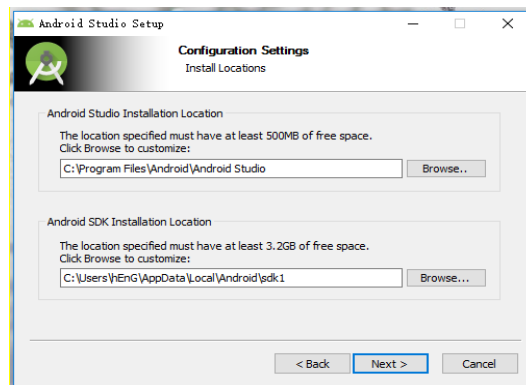
Checkbox is ticked by default, click next to continue. This will include installing the Android SDK and Android Virtual Device that needed to use in development later.



*Figure B-1-3: Android Studio Installation Step 3.*

Step 3.

Click 'I Agree' to continue.



*Figure B-1-4: Android Studio Installation Step 4*

Step 4.

Specify the file location. By default, system will automatic specify for you.

Step 5.

Click Next to continue.

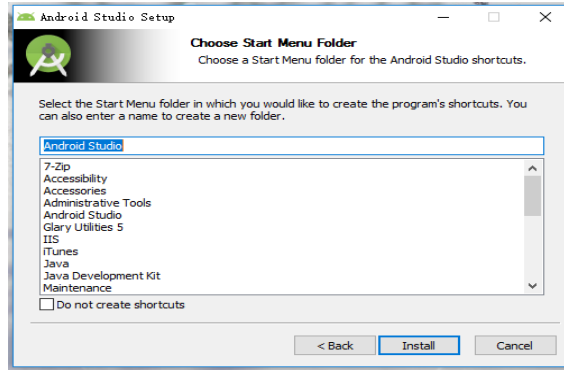


Figure B-1-5: Android Studio Installation Step 5

Step 5.

Click 'Install' to continue.

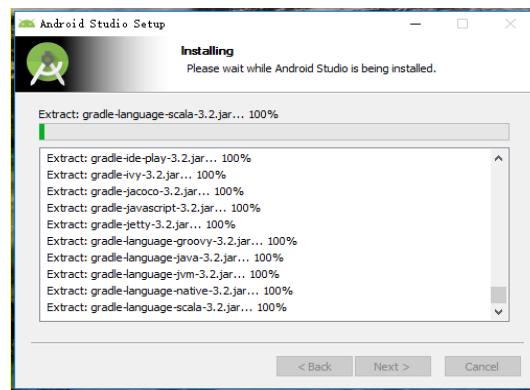


Figure B-1-6: Android Studio Installation Step 6

Step 6.

Wait while the installation is process. It might take a long time to install.

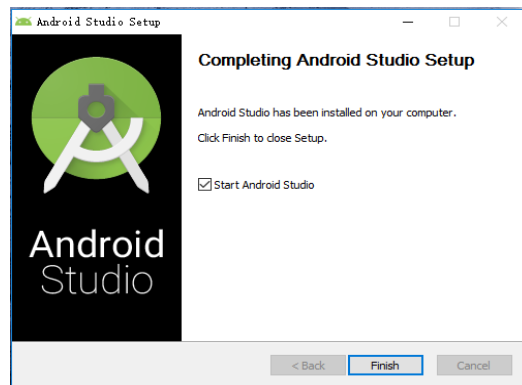


Figure B-1-7: Android Studio Installation Step 7

Step 7.

After the installation is complete. Click start to start create the project.

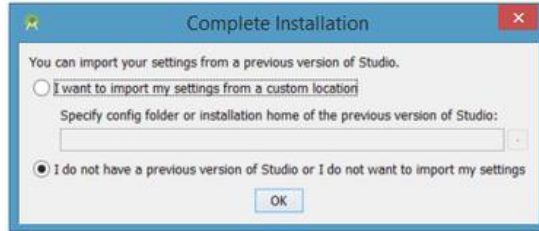


Figure B-1-8: Android Studio Installation Step 8

Step 8.

After done start android studio software, pop out dialog will ask you for import an existing project. Click on ‘no previous project to import’ and click ok.

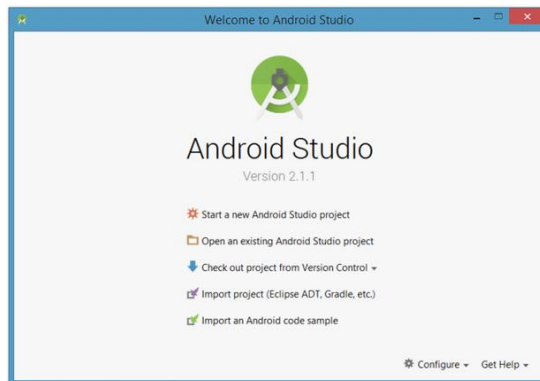


Figure B-1-9: Android Studio Installation Step 9

Step 9.

Click on start a new Android Studio Project to start the development.

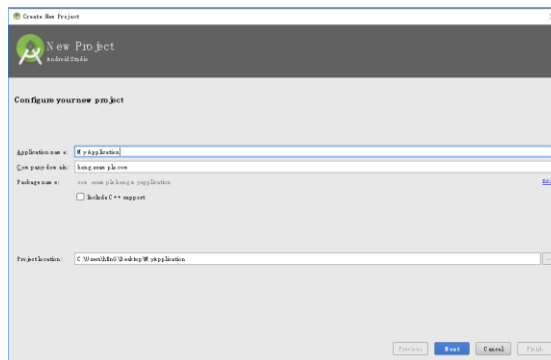


Figure B-1-10: Android Studio Installation Step 10.

Step 10.

Enter the project name and click next.

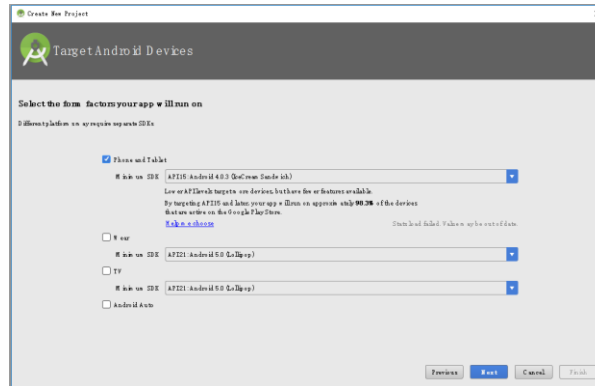


Figure B-1-11: Android Studio Installation Step 11.

Step 11.

Choose the minimum target SDK version and click next.

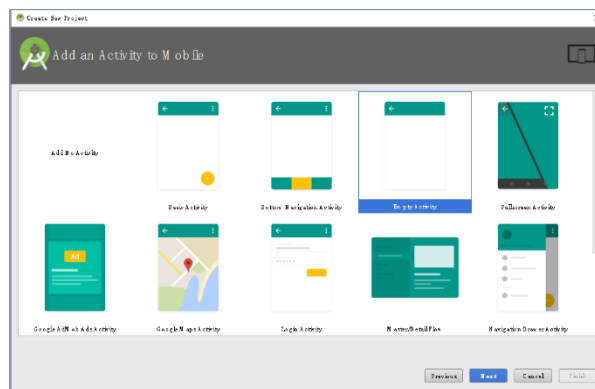


Figure B-1-12: Android Studio Installation Step 12.

Step 12.

Choose the preferable layout template and click next.

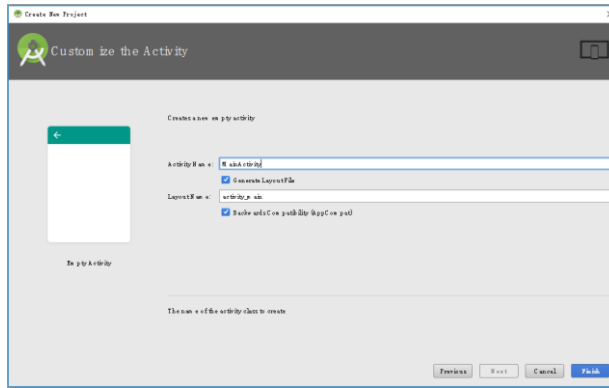


Figure B-1-13: Android Studio Installation Step 13

Step 13.

Enter the activity name and click finish.

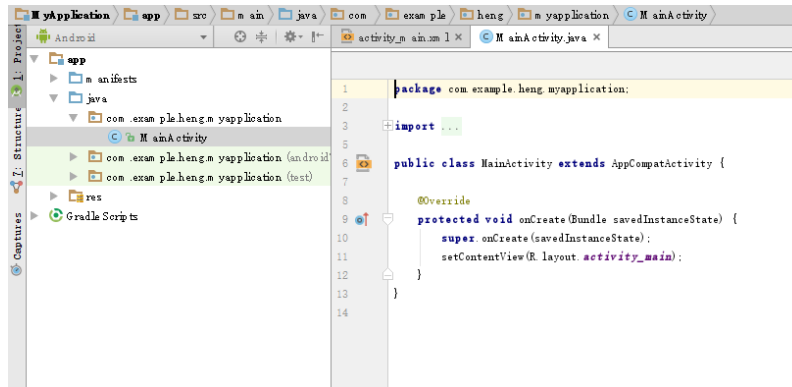


Figure B-1-14: Android Studio Installation Step 14

Step 14.

Now, you may start the development.

## B.2 VISUAL PARADIGM COMMUNITY EDITION INSTALLATION STEP.

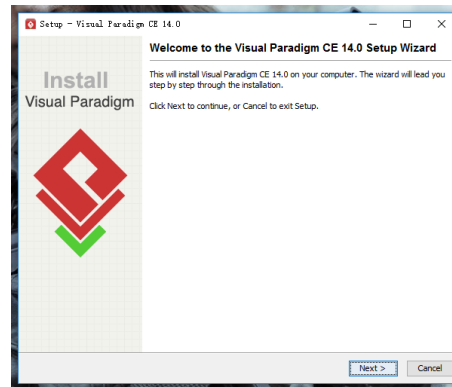


Figure B-2-1: Visual Paradigm CE installation guide step1.

Step1.

Download installer from <https://www.visual-paradigm.com/download/community.jsp>

Step 1.1

Run the installer and you will see the setup dialog box as shown in Figure B-2-1. Then click next to continue the step.

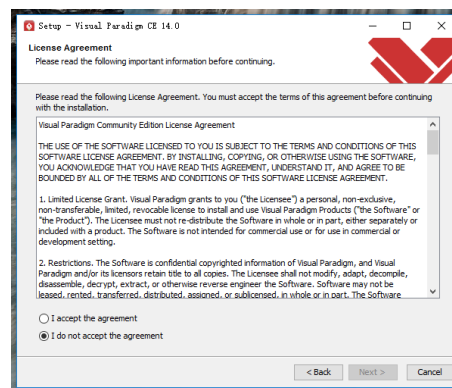


Figure B-2-2: Visual Paradigm CE installation guide step2.

Step 2.

Click accept the agreement and next to continue installation.



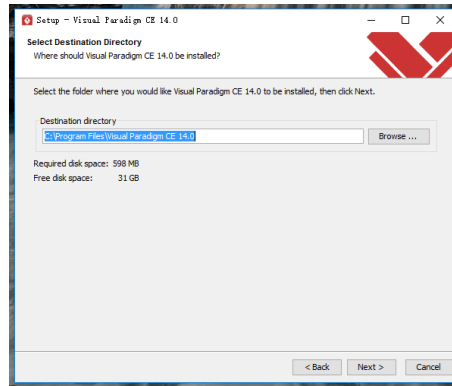


Figure B-2-3: Visual Paradigm CE installation guide step3.

Step3. Specify the directory to save the file or ignore to store in default place and next to continue.

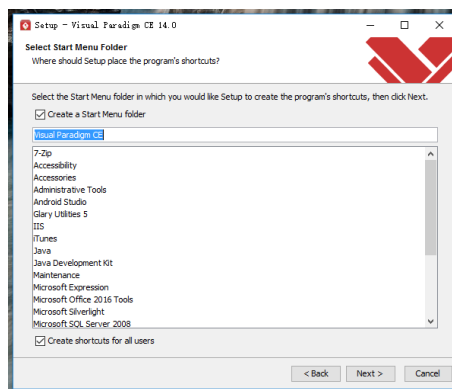


Figure B-2-4: Visual Paradigm CE installation guide step4.

Step 4.

Click next to continue to installation.

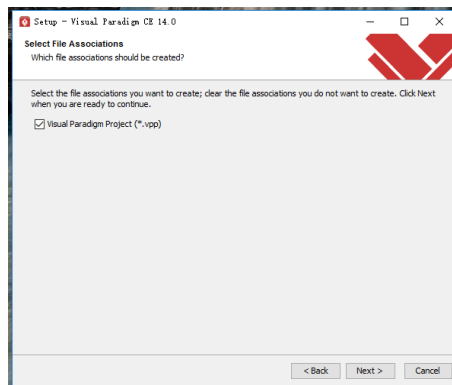


Figure B-2-5: Visual Paradigm CE installation guide step5.

Step 5.

Click next for continue installation, the 'vpp' project association is ticked by default.

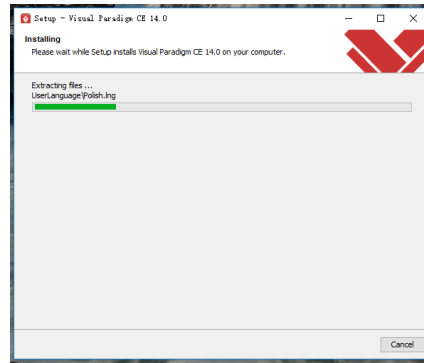


Figure B-2-6: Visual Paradigm CE installation guide step6.

Step 6.

Waiting for the installation process, once the process done, a setup dialog box will show as Figure B-2-6.

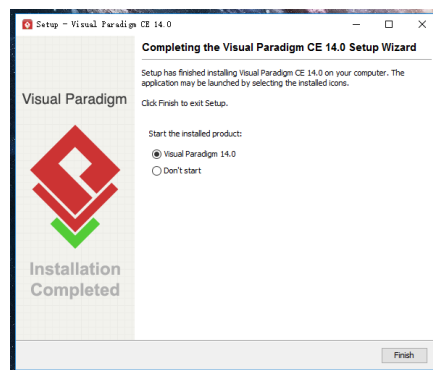


Figure B-2-7: Visual Paradigm CE installation guide step7.

Step 7.

Tick the visual paradigm 14.0 in checkbox, and finish to start the software.

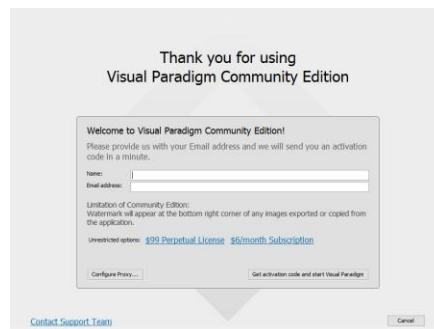


Figure B-2-8: Visual Paradigm CE installation guide step8.

Step 8. To continue, enter your name and email address to receive activation code to use this software.

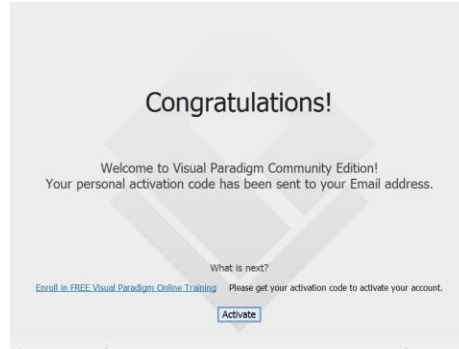


Figure B-2-9: Visual Paradigm CE installation guide step9.

Step 9.

Once success enter name and email address, click active to continue.

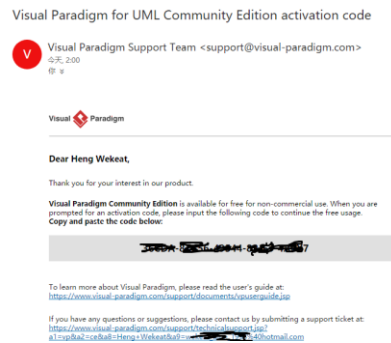


Figure B-2-10: Visual Paradigm CE installation guide step10.

Step 10

Go to your email address and get the activation code that visual paradigm sent to you as shown in Figure B-2-10.

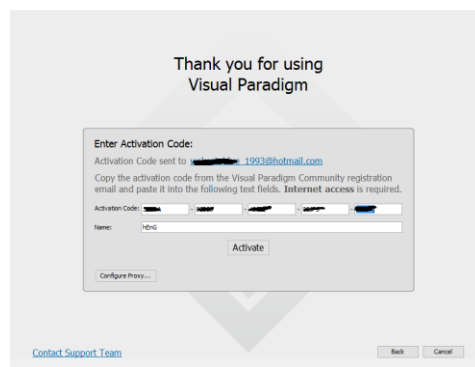
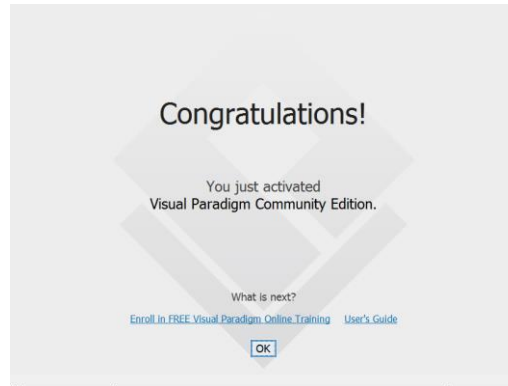


Figure B-2-11: Visual Paradigm CE installation guide step11.

Step 11.

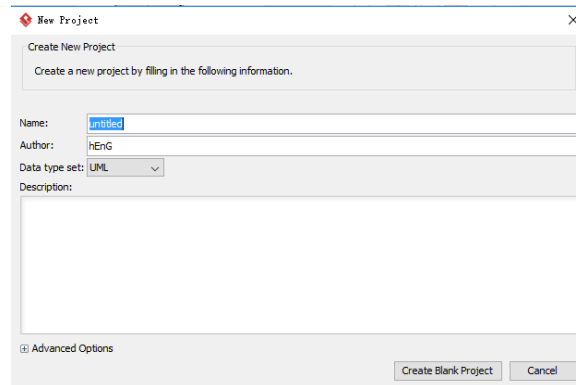
Key in the activation code and activate the software.



*Figure B-2-12: Visual Paradigm CE installation guide step12.*

Step 12.

Click on to continue.



*Figure B-2-13: Visual Paradigm CE installation guide step13.*

Step 13.

Now, visual paradigm is already installed and now you can start your projects.



## B.4 ANDROID EMULATOR INSTALLATION STEP

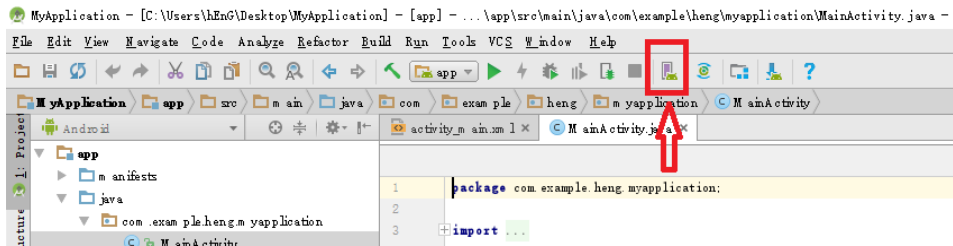


Figure B-4-1: Creating AVD device Step1.

Step 1. Click on the AVD manager icon as shown in Figure B-4-1



Figure B-4-2: Creating AVD device Step2.

Step 2.

Click on create virtual device.

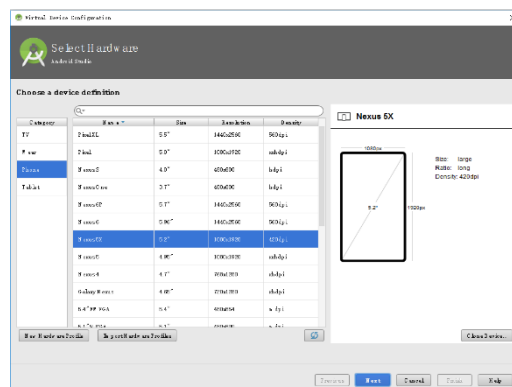


Figure B-4-3: Creating AVD device Step3.

Step 3.

Select your preferable device and click next.

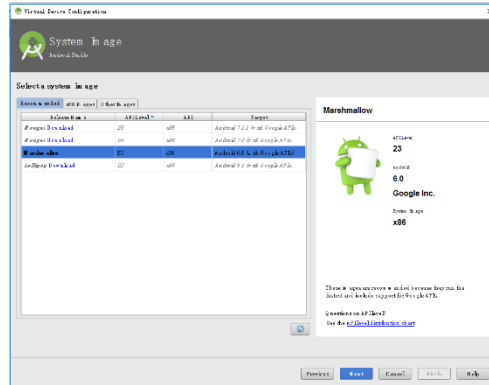


Figure B-4-4: Creating AVD device Step4.

Step 3.

Select a system image that need to run on your virtual device. Then click next.

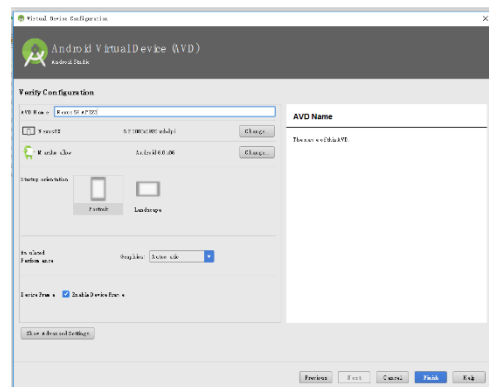


Figure B-4-5: Creating AVD device Step5.

Step 4.

Name your virtual device and then click finish.

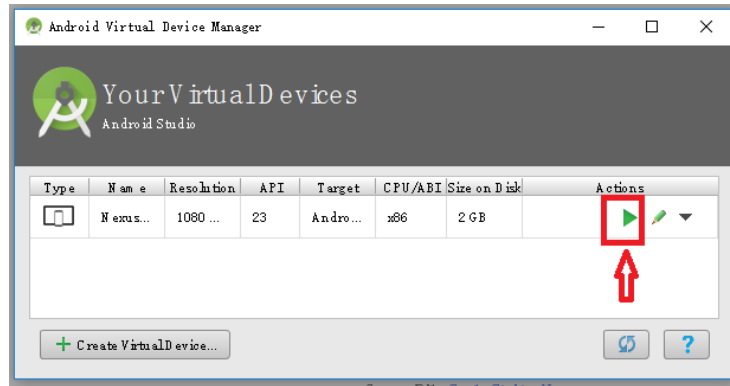


Figure B-4-6: Creating AVD device Step6.

Step 5.

Click on the play icon to launch the virtual device as shown in Figure B-4-6.

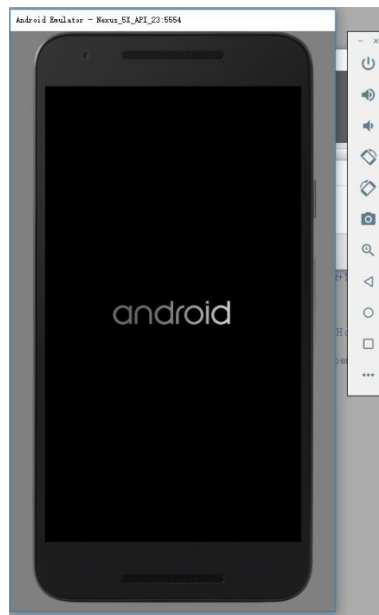


Figure B-4-7: Launching virtual device.

Step 6.

A virtual android device is now staring, developer can now use this virtual device to run and test their application.



## B.5 INSTRUCTION TO ADD FIREBASE INTO ANDROID PROJECT

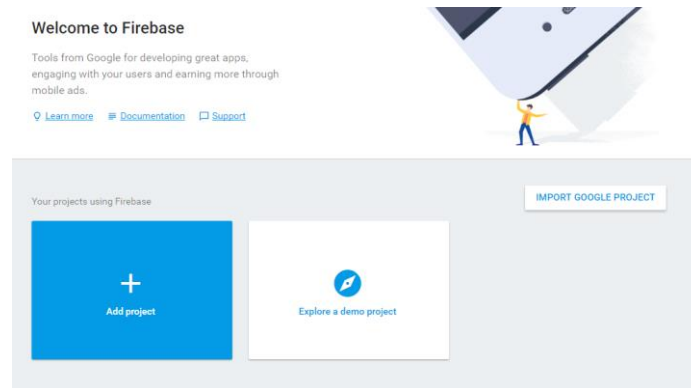


Figure B-5-1: Firebase connection instruction

Step 1.

Go to <https://console.firebase.google.com>, and login to console.

After login, click add project to add android project as shown in Figure B-5-1

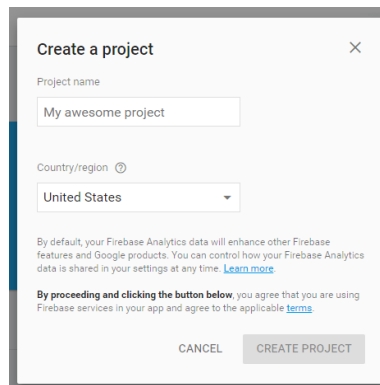


Figure B-5-2: Firebase connection instruction.

Step 2. Enter the project name and click create project.



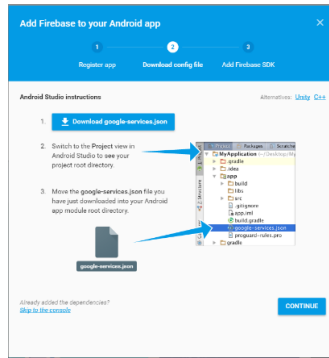


Figure B-5-5: Firebase connection instruction

Step 5.

Click download google-services.json file.

Switch to the project view in android studio root directory

Copy and paste the google-services.json you had downloaded just now and paste it.

Then click continue.

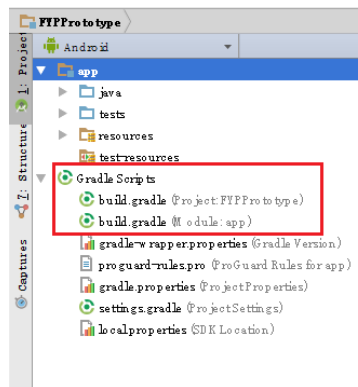


Figure B-5-6: Android Studio Project Level

Step 6.

Go to android studio project level, gradle scripts

Open both build.gradle

- Project level gradle
- App level gradle

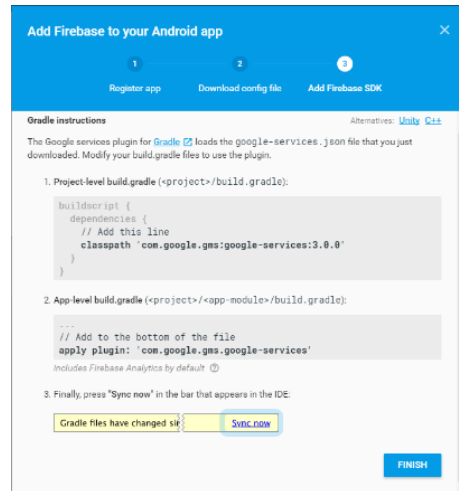


Figure B-5-7: Firebase connection instruction

Step 6.

Add 'com.google.gms:google-services:3.0.0' to project-level build.gradle

Add 'apply plugin: 'com.google.gms.google-services'' to App-level build.gradle.

Lastly, click sync now to sync the build gradle for both level.

## Appendix C

# FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

<b>Trimester, Year: T1Y5</b>	<b>Study week no.:1-2</b>
<b>Student Name &amp; ID: HENG WEKEAT 12ACB00521</b>	
<b>Supervisor: MS. SAW SEOW HUI</b>	
<b>Project Title: MOBILE APPLICATION FOR EMERGENCY SERVICE BY USING LOCATION TRACKING</b>	

<b>1. WORK DONE</b> [Please write the details of the work done in the last fortnight.] Previously done work on FYP 1. Planning and allocated time for upcoming task
<b>2. WORK TO BE DONE</b> Research some tutorial.
<b>3. PROBLEMS ENCOUNTERED</b> No
<b>4. SELF EVALUATION OF THE PROGRESS</b> Normal

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Supervisor's signature

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Student's signature

# FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

<b>Trimester, Year: T1Y5</b>	<b>Study week no.:3-4</b>
<b>Student Name &amp; ID: HENG WEKEAT 12ACB00521</b>	
<b>Supervisor: MS. SAW SEOW HUI</b>	
<b>Project Title: MOBILE APPLICATION FOR EMERGENCY SERVICE BY USING LOCATION TRACKING</b>	

<b>1. WORK DONE</b> [Please write the details of the work done in the last fortnight.] Planning and allocated time for upcoming task.
<b>2. WORK TO BE DONE</b> Done planned for the schedule and research some tutorial in GPS.
<b>3. PROBLEMS ENCOUNTERED</b> No
<b>4. SELF EVALUATION OF THE PROGRESS</b> Continue research some tutorial.

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Supervisor's signature

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Student's signature

# FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

<b>Trimester, Year: T1Y5</b>	<b>Study week no.:4-6</b>
<b>Student Name &amp; ID: HENG WEKEAT 12ACB00521</b>	
<b>Supervisor: MS. SAW SEOW HUI</b>	
<b>Project Title: MOBILE APPLICATION FOR EMERGENCY SERVICE BY USING LOCATION TRACKING</b>	

<b>1. WORK DONE</b> [Please write the details of the work done in the last fortnight.] Done research GPS on android platform.
<b>2. WORK TO BE DONE</b> Start Development
<b>3. PROBLEMS ENCOUNTERED</b> No
<b>4. SELF EVALUATION OF THE PROGRESS</b> Normal

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Supervisor's signature

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Student's signature

# FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

<b>Trimester, Year: T1Y5</b>	<b>Study week no.:6-8</b>
<b>Student Name &amp; ID: HENG WEKEAT 12ACB00521</b>	
<b>Supervisor: MS. SAW SEOW HUI</b>	
<b>Project Title: MOBILE APPLICATION FOR EMERGENCY SERVICE BY USING LOCATION TRACKING</b>	

<b>1. WORK DONE</b> [Please write the details of the work done in the last fortnight.] Done some part of the development.
<b>2. WORK TO BE DONE</b> Continue development and testing the results.
<b>3. PROBLEMS ENCOUNTERED</b> Yes, some of the tutorial are not best suitable for my application.
<b>4. SELF EVALUATION OF THE PROGRESS</b> Slow progress, spend time on fixing bugs and dependencies problem.

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Supervisor's signature

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Student's signature



# FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

<b>Trimester, Year: T1Y5</b>	<b>Study week no.:8-10</b>
<b>Student Name &amp; ID: HENG WEKEAT 12ACB00521</b>	
<b>Supervisor: MS. SAW SEOW HUI</b>	
<b>Project Title: MOBILE APPLICATION FOR EMERGENCY SERVICE BY USING LOCATION TRACKING</b>	

<b>1. WORK DONE</b> [Please write the details of the work done in the last fortnight.] Fixed some bugs and problems, continue develop further function.
<b>2. WORK TO BE DONE</b> Fixed bugs, research more tutorial and continue develop.
<b>3. PROBLEMS ENCOUNTERED</b> Yes, some of the bugs still cannot solve.
<b>4. SELF EVALUATION OF THE PROGRESS</b> Normal

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Supervisor's signature

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Student's signature

# FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

<b>Trimester, Year: T1Y5</b>	<b>Study week no.:10-12</b>
<b>Student Name &amp; ID: HENG WEKEAT 12ACB00521</b>	
<b>Supervisor: MS. SAW SEOW HUI</b>	
<b>Project Title: MOBILE APPLICATION FOR EMERGENCY SERVICE BY USING LOCATION TRACKING</b>	

<b>1. WORK DONE</b> [Please write the details of the work done in the last fortnight.] Continue develop application and redesign some interface.
<b>2. WORK TO BE DONE</b> Prepare documentation and continue development. Application testing.
<b>3. PROBLEMS ENCOUNTERED</b> No
<b>4. SELF EVALUATION OF THE PROGRESS</b> Slow progress in development due to spend more time in fixing bugs.

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Student's signature

# FINAL YEAR PROJECT WEEKLY REPORT

(Project II)


<b>Trimester, Year: T1Y5</b>	<b>Study week no.:12-14</b>
<b>Student Name &amp; ID: HENG WEKEAT 12ACB00521</b>	
<b>Supervisor: MS. SAW SEOW HUI</b>	
<b>Project Title: MOBILE APPLICATION FOR EMERGENCY SERVICE BY USING LOCATION TRACKING</b>	

<b>1. WORK DONE</b> [Please write the details of the work done in the last fortnight.] Majority problem bug fixed and testing.
<b>2. WORK TO BE DONE</b> Finalize application, presentation preparation.
<b>3. PROBLEMS ENCOUNTERED</b> Some of the features still crashing
<b>4. SELF EVALUATION OF THE PROGRESS</b> Normal

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Supervisor's signature

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Student's signature

## APPENDIX D



**UNIVERSITY  
TUNKU ABDUL  
RAHMAN**

# MOBILE APPLICATION FOR EMERGENCY SERVICE BY USING LOCATION TRACKING

**BY: HENG WEKEAT**

**STUDENT ID: 1200521**

**SUPERVISOR: MS. SAW SEOW HUI**

**FACULTY, COURSE: FICT-IA**

**ACADEMIC YEAR: JAN 2018**

BACKGROUND

In this era of crime, personal safety problem is getting worst and worst. There are many cases happened such as robbery, burglary, snatching, rapping and *etc.* These cases will seriously affect social stability and could reduce people step out their door

PROBLEM STATEMENT

- 📌 Troublesome of forget to notify friends or members
- 📌 High failures rate of sensitivity
- 📌 Request help for more than 1 step

OBJECTIVE

- 📌 To protect personal safety and get emergency helpline with instant help by using the application through one S.O.S. button when they need help on their way home. High failures rate of sensitivity
- 📌 To check and track their gathering member's status, approximately arrival time to get to their destination or home.
- 📌 To remind user to notify friends or family in convenient, easier and fastest way. User can notify friends or family using the pre-set message when they reached home safety with one click of button or pop out dialog.

IMPACT AND CONTRIBUTION

- 📌 By using this application, user can get help immediately when they faced problem or in troublesome.
- 📌 Not only for tracking purpose, this application also features with SOS emergency alert.
- 📌 Next is identity verification. User need to key their secure pin to authenticate their identity.
- 📌 This application is suitable for all ages no matter old or young generation

SYSTEM DESIGN

PRINT SCREENS

METHODOLOGY

## APPENDIX E

### Mobile Application for Emergency Service by using Location Tracking

#### ORIGINALITY REPORT

<b>7</b> %	<b>5</b> %	<b>1</b> %	<b>5</b> %
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

#### PRIMARY SOURCES

<b>1</b>	<b>Submitted to Universiti Tunku Abdul Rahman</b> Student Paper	<b>2</b> %
<b>2</b>	<b>androidclarified.wordpress.com</b> Internet Source	<b>1</b> %
<b>3</b>	<b>www.mypcsurgeon.ca</b> Internet Source	<b>1</b> %
<b>4</b>	<b>www.rapidsos.com</b> Internet Source	<b>1</b> %
<b>5</b>	<b>Submitted to University of South Australia</b> Student Paper	<b>&lt;1</b> %
<b>6</b>	<b>www.rediff.com</b> Internet Source	<b>&lt;1</b> %
<b>7</b>	<b>Submitted to Harrisburg University of Science and Technology</b> Student Paper	<b>&lt;1</b> %
<b>8</b>	<b>www.tm.com.my</b> Internet Source	<b>&lt;1</b> %

<b>Universiti Tunku Abdul Rahman</b>			
<b>Form Title : Supervisor's Comments on Originality Report Generated by Turnitin for Submission of Final Year Project Report (for Undergraduate Programmes)</b>			
Form Number: FM-IAD-005	Rev No.: 0	Effective Date: 01/10/2013	Page No.: 1 of 1



**FACULTY OF INFORMATION AND COMMUNICATION  
TECHNOLOGY**

<b>Full Name(s) of Candidate(s)</b>	HENG WEKEAT
<b>ID Number(s)</b>	1200521
<b>Programme / Course</b>	BACHELOR OF INFORMATION SYSTEMS (HONS) INFORMATION SYSTEMS ENGINEERING
<b>Title of Final Year Project</b>	MOBILE APPLICATION FOR EMERGENCY SERVICES BY USING LOCATION TRACKING

Similarity	Supervisor's Comments (Compulsory if parameters of originality exceeds the limits approved by UTAR)
<b>Overall similarity index: <u>  7  </u> %</b>  <b>Similarity by source</b> Internet Sources: <u>  5  </u> % Publications: <u>  1  </u> % Student Papers: <u>  5  </u> %	
<b>Number of individual sources listed of more than 3% similarity: _____</b>	
<b>Parameters of originality required and limits approved by UTAR are as follows:</b> (i) Overall similarity index is 20% and below, and (ii) Matching of individual sources listed must be less than 3% each, and (iii) Matching texts in continuous block must not exceed 8 words <i>Note: Parameters (i) – (ii) shall exclude quotes, bibliography and text matches which are less than 8 words.</i>	

Note Supervisor/Candidate(s) is/are required to provide softcopy of full set of the originality report to Faculty/Institute

***Based on the above results, I hereby declare that I am satisfied with the originality of the Final Year Project Report submitted by my student(s) as named above.***

\_\_\_\_\_  
 Signature of Supervisor  
 Name:  
 Date:

\_\_\_\_\_  
 Signature of Co-Supervisor  
 Name:  
 Date:

**APPENDIX F**

**UNIVERSITI TUNKU ABDUL RAHMAN**

**FACULTY OF INFORMATION & COMMUNICATION TECHNOLOGY  
(PERAK CAMPUS)**

**CHECKLIST FOR FYP2 THESIS SUBMISSION**

Student Id	12ACB00521
Student Name	HENG WEKEAT
Supervisor Name	MS. SAW SEOW HUI

<b>TICK (√)</b>	<b>DOCUMENT ITEMS</b>
	Your report must include all the items below. Put a tick on the left column after you have checked your report with respect to the corresponding item.
√	Front Cover
√	Signed Report Status Declaration Form
√	Title Page
√	Signed form of the Declaration of Originality
√	Acknowledgement
√	Abstract
√	Table of Contents
√	List of Figures (if applicable)
√	List of Tables (if applicable)
	List of Symbols (if applicable)
√	List of Abbreviations (if applicable)
√	Chapters / Content
√	Bibliography (or References)
√	All references in bibliography are cited in the thesis, especially in the chapter of literature review
√	Appendices (if applicable)
√	Poster
√	Signed Turnitin Report (Plagiarism Check Result - Form Number: FM-IAD-005)

\*Include this form (checklist) in the thesis (Bind together as the last page)

<p>I, the author, have checked and confirmed all the items listed in the table are included in my report.</p>  <p>_____</p> <p>(Signature of Student)</p> <p>Date:</p>	<p>Supervisor verification. Report with incorrect format can get 5 mark (1 grade) reduction.</p>  <p>_____</p> <p>(Signature of Supervisor)</p> <p>Date:</p>
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