

**Smart phone usage Parental Monitoring & Control**

BY

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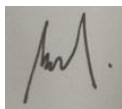
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I declare that this report entitled “**METHODOLOGY, CONCEPT AND DESIGN OF A 2-MICRON CMOS DIGITAL BASED TEACHING CHIP USING FULL-CUSTOM DESIGN STYLE**” is my own work except as cited in the references. The report has not been accepted for any degree and is not being submitted concurrently in candidature for any degree or other award.



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## ABSTRACT

This project is a parental monitoring application for parent monitor children purpose. Therefore our target user is for the parent, the expected outcome of this project is to let the parent can have a tools or way more easier to monitoring and control their children by using the features functionality of this application such as screen time management, call log history and others. The methodology that has applied in this project is Agile Development Methodology because it is more suitable to mobile application development and it can have a further communication with client during the middle of progress. Therefore, we can have the correction or improvement immediately after receiving the feedback of client. Besides, the development tools that will be use in this project is the Android Studio for the coding purpose using the Java language. Firebase will be the tools of online database of this project and all the data will be store in Firebase. Adobe XD will be use to design the user interface (UI) design and it not involving the coding part.

## TABLE OF CONTENTS

<b>DECLARATION OF ORIGINALITY .....</b>	<b>4</b>
<b>ACKNOWLEDGEMENTS .....</b>	<b>5</b>
<b>ABSTRACT .....</b>	<b>6</b>
<b>TABLE OF CONTENTS .....</b>	<b>7</b>
<b>LIST OF FIGURES .....</b>	<b>12</b>
<b>LIST OF TABLES .....</b>	<b>14</b>
<b>LIST OF ABBREVIATIONS .....</b>	<b>15</b>
<b>CHAPTER 1 : INTRODUCTION .....</b>	<b>1</b>
1.1 Problem Statement and Motivation .....	1
1.2 Objectives .....	2
1.2.1 Design a mobile application for multi level user management access .....	2
1.2.2 Implement parental monitoring features for mobile usage .....	2
1.4.3 To enable location tracking feature of mobile device .....	2
1.3 Project Scope.....	3
1.4 Contributes .....	3
1.5 Report Organization .....	4
<b>CHAPTER 2 : LITERATURE REVIEW .....</b>	<b>5</b>
2.1 Qustodio Parental Control App .....	5
2.2 Net Nanny Parental Control App .....	7

2.3 Parental Control & Kids GPS: Kaspersky SafeKids .....	8
2.4 Boomerang Parental Control - Screen Time app .....	9
2.5 Bark .....	10
2.6 Comparison Between Existing Apps with Proposed Project .....	11
2.7 Summary of Reviewed Application .....	12
<b>CHAPTER 3: SYSTEM METHODOLOGY/APPROACH .....</b>	<b>13</b>
3.1 System Architecture Diagram .....	13
3.2 Use Case Diagram and Description .....	16
3.3 Activity Diagram .....	18
<b>CHAPTER 4 : SYSTEM DESIGN .....</b>	<b>19</b>
4.1 System Block Diagram .....	19
4.2 System Components Specification .....	21
4.2.1 Login screen (Parent & Child) .....	21
4.2.2 Register Screen .....	22
4.2.3 Join circle (Parent & Child) .....	23
4.2.4 Family Group (Parent only) .....	24
4.2.5 Home screen (Parent & Child) .....	25
4.2.6 Call log history (Parent) .....	26
4.2.7 Call log history (Child) .....	27
4.2.8 SMS history (Parent) .....	28
4.2.9 SMS history (Child) .....	29
4.2.10 GPS tracking (Parent & Child) .....	30
4.2.11 Screen Time (Parent & Child) .....	31
4.3 Circuit and Components Design .....	32
4.3.1 Register blank warning .....	32
4.3.2 Register check email format .....	33



4.3.3 Double checking of the password .....	34
4.3.4 Register success toast message .....	35
4.3.5 Account checking .....	36
4.3.6 Detect child and not allow join circle .....	37
4.3.7 Invalid join code .....	38
4.3.8 Join circle successfully .....	39
4.3.9 Database data checking (four function (parent)) .....	40
4.4 System Components Interaction Operations .....	41
4.4.1 Step 1 .....	41
4.4.2 Step 2 .....	42
4.4.3 Step 3 .....	44
4.4.4 Step 4 .....	46
4.4.5 Step 5 .....	48
4.4.6 Step 6 .....	49
<b>CHAPTER 5 : SYSTEM IMPLEMENTATION .....</b>	<b>50</b>
5.1 Hardware Setup .....	50
5.2 Software Setup .....	51
5.2.1 Android Studio .....	51
5.2.2 Firebase .....	52
5.3 Setting and Configuration .....	53
5.4 System Operations .....	54
5.4.1 Login screen .....	54
5.4.2 Register screen .....	55
5.4.3 Join Circle .....	56
5.4.4 Family Group (Parent) .....	57
5.4.5 Home screen .....	58
5.4.6 Drawer Menu .....	59
<b>CHAPTER 6 :SYSTEM EVALUATION AND DISCUSSION .....</b>	<b>60</b>

6.1 System Testing and Performance Metrics .....	60
6.2 Testing Setup and Result .....	61
6.2.1 Alpha testing .....	61
6.2.1.1 Login screen .....	61
6.2.1.2 Register screen .....	61
6.2.1.3 Forget Password screen .....	61
6.2.1.4 Join circle screen .....	62
6.2.1.5 Home screen .....	62
6.2.1.6 Call Detect screen .....	62
6.2.1.7 SMS detect screen .....	63
6.2.1.8 GPS tracking screen .....	63
6.2.1.9 Screen Time screen .....	63
6.2.2 Beta testing .....	64
6.2.2.1 Login screen .....	64
6.2.2.2 Register screen .....	64
6.2.2.3 Forget Password screen .....	65
6.2.2.4 Join circle screen .....	65
6.2.2.5 Home screen .....	66
6.2.2.6 Call Detect screen .....	66
6.2.2.7 SMS Detect screen .....	66
6.2.2.8 GPS tracking screen .....	67
6.2.2.4 Screen Time screen .....	67
6.3 Project Challenges .....	68
6.4 Objectives Evaluation .....	69
6.4.1 Design a mobile application for multi level user management access .....	69
6.4.2 Implement parental monitoring features for mobile usage .....	70
6.4.3 To enable location tracking feature of mobile device .....	70
<b>CHAPTER 7: CONCLUSION AND RECOMMENDATION .....</b>	<b>71</b>
7.1 Conclusion .....	71

7.2 Recommendation .....	72
<b>REFERENCES .....</b>	<b>73</b>
<b>FINAL YEAR PROJECT WEEKLY REPORT .....</b>	<b>75</b>
<b>FINAL YEAR PROJECT WEEKLY REPORT .....</b>	<b>76</b>
<b>FINAL YEAR PROJECT WEEKLY REPORT .....</b>	<b>77</b>
<b>FINAL YEAR PROJECT WEEKLY REPORT .....</b>	<b>78</b>
<b>POSTER .....</b>	<b>79</b>
<b>PLAGIARISM CHECK RESULT .....</b>	<b>80</b>
<b>CHECKLIST FOR FYP2 THESIS SUBMISSION .....</b>	<b>84</b>

## LIST OF FIGURES

Figure 1	Qustodio	5
Figure 2	Net Nanny	7
Figure 3	Kaspersky	8
Figure 4	<i>Boomerang</i>	9
Figure 5	<i>Bark</i>	10
Figure 6	Agile development	13
Figure 7	Use case diagram	16
Figure 8	Activity Diagram	18
Figure 9	Block Diagram	19
Figure 10	Login screen	21
Figure 11	Register Screen	22
Figure 12	Join circle	23
Figure 13	Family Group (Parent only)	24
Figure 14	Home Screen	25
Figure 15	Call log history (Parent)	26
Figure 16	Call log history (child)	27
Figure 17	SMS history (Parent)	28
Figure 18	SMS history (Child)	29
Figure 19	GPS tracking	30
Figure 20	Screen Time	31
Figure 21	Register blank warning	32
Figure 22	Check email format	33
Figure 23	Double checking password	34
Figure 24	Register success toast message	35
Figure 25	Account check	36
Figure 26	Not allow join circle (child)	37
Figure 27	Invalid join code	38
Figure 28	Join circle success	39
Figure 29	Database empty	40
Figure 30	Register new account	41
Figure 31	Family - Home	42

Figure 32 Home screen .....	43
Figure 33 Call log history (Parent) .....	44
Figure 34 Call log history (children) .....	45
Figure 35 SMS history (Parent) .....	46
Figure 36 SMS history (child) .....	47
Figure 37 GPS tracking (Parent & Child) .....	48
Figure 38 Screen time (Parent & Child) .....	49
Figure 39 One of the coding from Android Studio .....	51
Figure 40 Firebase .....	52
Figure 41 Login screen .....	54
Figure 42 Register screen .....	55
Figure 43 Join circle .....	56
Figure 44 Family Group .....	57
Figure 45 Home screen .....	58
Figure 46 Drawer menu .....	59

## LIST OF TABLES

Table 1 Comparison between existing application .....	11
Table 2 Hardware Specification .....	50
Table 3 Alpha testing .....	61
Table 4 Alpha testing .....	62
Table 5 Alpha testing .....	63
Table 6 Beta testing .....	64
Table 7 Beta testing .....	65
Table 8 Beta testing .....	66
Table 9 Beta testing .....	67
Table 10 Objective evaluation .....	69
Table 11 Objective evaluation .....	70

## **LIST OF ABBREVIATIONS**

Integrated Development Environment (IDE)

User Interface (UI)

Final Year Project 2 (FYP2)

## **Chapter 1 : Introduction**

### **1.1 Problem Statement and Motivation**

Due to the advancement of technology ,the most children in this era have their own smart phones since they were young, but they are still young and they have no experience to control their replacement of smart phones. In addition, smart phones have become the most important tool for most people to connect to the Internet. With the widespread use of smart phones, more and more wrong behaviors have also begun to occur. For example, young people commit suicide because of cyber bullying. The most direct evidence is that media violence is one of the causes of violence and aggression in real life . Besides , many parents buy smart phones for teenagers in this name in order to be able to urgently contact and promote the relationship with their children. However, if the parents do not have a good education, it will cause the teenagers to rely on and use smart phones excessively (Solecki, S.M. (n.d.)) . So , here is the solution to overcome the problem of teenagers over rely the smart phones which is the technology of smart phone usage parental monitoring and control . This technology can help parents efficiency to restrict the time of children to use the smart phone and can track the location of their children .

Besides , parents play an important role in modelling, tracking and overseeing the use of smart devices to ensure that they are carried out in an acceptable manner. However, parental monitoring research has so far focused more on techniques that parents can use to track, restrict and control online behaviour (Topper, C. , 2017) and less on how parental monitoring influences psycho social outcomes. So in this project , we will study how to create a mobile application with the function of monitoring and control the smart phones of children or teenagers to help parents to control their children efficiency .



## **1.2 Objectives**

### **1.2.1 Design a mobile application for multi level user management access**

The first objective is to design and develop a mobile application which can allow a multi level user management access and control such as children is restrict to do something in their smart phone device due to their parents authorized to block those application and something else . So , the parent can add the child to family group but child cannot add parent to family group .

### **1.2.2 Implement parental monitoring features for mobile usage**

The second objective is to implement the parental monitoring feature for mobile usage in our project because this is one of the main function that required in my project . This parental monitoring features can allow the parent to find out their children's daily browsing behaviour and find out the potential harmful message such as cyberbully message , sexual content and others .

### **1.4.3 To enable location tracking feature of mobile device**

The last objective in this project is to enable the location tracking system feature of mobile device . This feature can allow parents to find out the current location of their children's smart phone device and this is very useful feature because if unfortunately their children are missing they can use this feature to track their last location which can raise up the probability to find the missing children .

## **Chapter 1 : Introduction**

### **1.3 Project Scope**

The expected outcome of this project is to create a mobile application that is suitable and easily for parents to use as monitoring and control the children usage of smart phone to solve the problem of children are addicted and over rely on smart phone . We hope that this mobile application can help most of the parents to overcome the tackle of the problem that children are addicted and over rely to the smart phones .

### **1.4 Contributes**

This kind of smart phone usage Parental Monitoring & Control mobile application is benefit for those parent which has the problem of their children are addicted in smart phone and spend most of the time on smart phone . The features of this mobile application is it included two-way communication function to let the parents can communicate with their children through this application . Besides , this application got the GPS tracking system which can show the location of your children's smart phone. This function is very good because as the parents can know where did their children go and sometime unfortunately their children are missing , the function of tracking system can provide the important clue to find out their children.

Furthermore , the route history tracking function can provide parents to track which website did their children browse before and this function can find out the potential unhealthy website that their children already browsed . After using the route history tracking to find out the potential unhealthy website , parents can use the function of blocking certain website which is included in our application to avoid their children to browse those website again.

## **Chapter 1 : Introduction**

### **1.5 Report Organization**

This Final Year Project 2 (FYP2) report is organized into 6 chapter which are Chapter 1 Introduction included problem statement and motivation , objectives , project scope , contribute and report organization . The Chapter 2 Literature review to show the several existing similar parental control application to combine and find out the strengths and weakness of the applications . After that , the Chapter 3 System Methodology/Approach will present the system methodology that will be applied in this FYP2 and some flow about the application . The Chapter 4 System Design is about the process of system from thinking , planning until developing . The Chapter 5 System Implementation which is included about the hardware , software setup system operation and others. Besides, the Chapter 6 System Evaluation and Discussion is about the system testing and evaluation . Lastly , the Chapter 7 Conclusion and Recommendation is about the overall of the system and do some suggestion about the system .

## Chapter 2 : Literature Review

## Chapter 2 : Literature Review

### 2.1 Qustodio Parental Control App

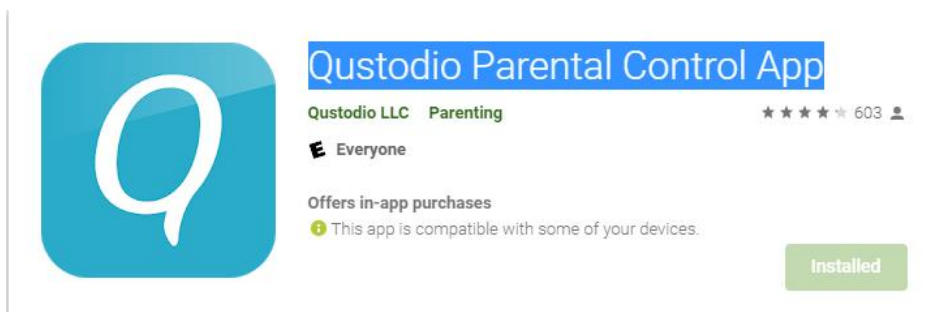


Figure 1 Qustodio

Qustodio is one of the most robust parental control apps available, and we like you to choose between a free basic edition or pay for accessing extra features. You can try all the premium features for a three-day period, which is good but also the shortest trial period we have seen. Besides, it is also easy-to-use application to keep track of your child's behaviour on IOS, Window, Mac and Android devices that comes with a premium and it is best for the excellent of capabilities.

The strength of this application is it has a panic button features which is surprising people. If the children who are in danger situation or other situation, the children can press the panic button which are located inside the application. When the children press the button, the parent can get an automatic distress alert—and, thanks to location monitoring, parent can locate precisely where your children is when they call for help. Besides, it also has the website blocker features which can automatically block the children to access those selected types of websites and get warnings if children has access to other dangerous sites (such as chat rooms) that might not be on a blocked list SafeWise. (2020).

The weakness of this application is incompatibility with older devices because many parents will give their children their second-hand smart phone due to updating their smart

## **Chapter 2 : Literature Review**

phone to another latest and more function smart phone . Here is the problem that Qustodio parental control software may not operate on those old device due to the version of system and others . Besides , it has not geofencing because this software can only show the GPS location of children's device but there is not choice to apply rules to individual locations so that we cannot automatically block the specific application while their children are in specific location such as school SafeWise. (2020).

## Chapter 2 : Literature Review

### 2.2 Net Nanny Parental Control App

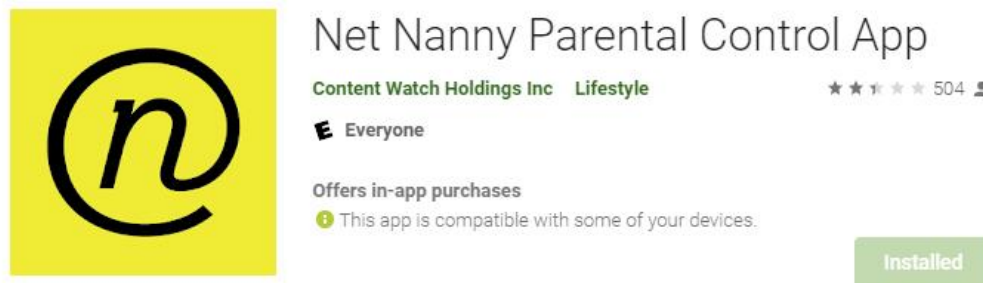


Figure 2 Net Nanny

Net Nanny has a nice intuitive design and excellent web-filtering function and it is a good fit for homes with younger children where you're more concerned about time on screen and unintentional run-ins with dubious content. If your kid's actively searching for freaky stuff, I don't think Net Nanny's going to deter them. It can track the location of children , display the location history of children and it can set the limited usage time of the smart phone which mean it can control the time of children using the smart phone .This application is best for the custom web filtering.

The strengthen of this application is it has a remote time out function which allow the parents can pause or block the children to access to internet . Besides , it still got the pornography blocker features to help children block all of the website which content is accidental exposure to adult content in the internet SafeWise. (2020).

The weakness of this application is it does not include the function of call and text monitoring . That means parent cannot block the certain harmful message or call from other people to protect their children as avoid all of the risky information . Besides , the set up of this software is too complicated will not get the attraction of user and the price of subscription is quite expensive SafeWise. (2020).

## Chapter 2 : Literature Review

### 2.3 Parental Control & Kids GPS: Kaspersky SafeKids



Figure 3 Kaspersky

Kaspersky Safe kids is perform more standard parental control and try to make parenting more easier . In addition to block all of the harmful content , manage the smart phone device , restrict the application usage and find out the behaviour of the children browse the internet . After that , it also allow parent to locate their children on a map and set it as a safe area for them to stay . This is a software that included all of the functional features which almost can fulfill all the requirement of parent and it is more suitable for the large families user group .

The strengthen of this application is it has the geofencing function that can set up the safe area for their children and it will alert parents that if their children is going out of the boundary . Besides , this software also has a very meaningful feature which is low battery alerts function that the system will automatically detect the battery status of children's smart phone and it is in low battery status it will alert the parent . So , parents can warn their children to charge their smart phone and it will never lose touch with their children again SafeWise. (2020).

The weakness of this application is the choice of content filtering is limited because it only support those specific browser only and the social media monitoring is only for Facebook and VK . So , it cannot monitor other social medias such as Instagram , Whatsapp and other social media application . This does not user friendly with the parents because the choice of social media monitoring is too less for parents to monitor and control SafeWise. (2020).

## Chapter 2 : Literature Review

### 2.4 Boomerang Parental Control - Screen Time app

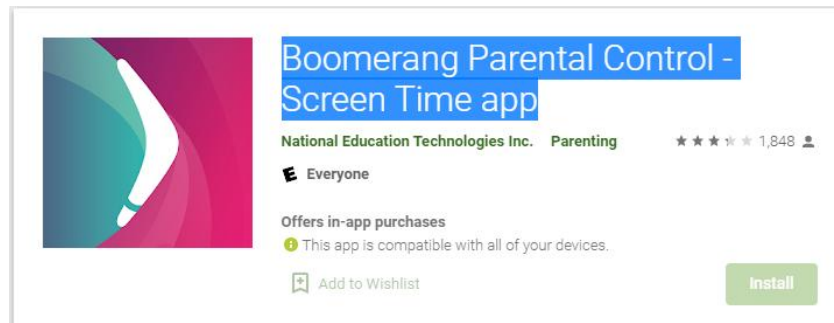


Figure 4 *Boomerang*

Bumerang is a robust android and ios parental control software that helps parents monitor their children's site, app, and device behaviour. It is mobile-only so you can't use it to track Macs or PCs. This application also required most of the function compare with other existing application which already republished in internet . However , this application is more suitable for those parent want to set a safe area for their children and monitor their children in that certain boundary due to the function geofencing of this application .

The strengthen of this application is it support the call and SMS supervision on Android . It can monitor the text message with detecting the bully text , stranger danger text or over text after the bedtime .If the system is found that the inappropriate text , it will send the alerts and the children to receive the harmful message . Besides , parents also can collect all of the SMS content and call history for the last 30 days and it can export these data into the CSV file SafeWise. (2020).

The weakness of this application is it only support to monitor the mobile device not support to monitor the PC and Mac . So , this is the limitation choice of the parent to monitor their children because only can monitor the mobile device . Besides , the single-device plan is expensive and it lack of support for Mac (limitation IOS support also ) and PC are the important weakness of this application SafeWise. (2020).



## Chapter 2 : Literature Review

### 2.5 Bark

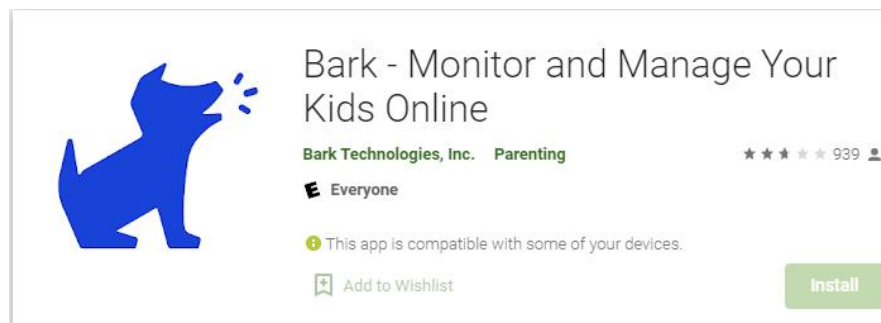


Figure 5 Bark

Bark is one of the simplest parental monitoring and control application but bring the powerful features and protections . It is good in text , social media and email monitoring because it is track a large amount of platform such as Facebook , Gmail , Whatsapp and others . Besides , it has a easy understanding activity report in its interface and this is benefit those parent who are annoying to analysis their children is stay safe in the internet or not .

The strengthen of this application is it can monitor at least 24 social media platform including Facebook , Whatsapp , Gmail , Instagram and others . This means that this application can provide the parent more choice to monitor the social media application that their children are browsing . Besides , this application is compatibility with most of the devices such as Iphone and Android phone as the problem of the some existing application will not occur SafeWise. (2020).

The weakness of this application is the alerts notification is too many because the concern about the suspicious activity of Bark is too many such as cyberbullying ,sexual content ,weapons and others . So , there is a big chance to prompt out many alert by email or text to the parent because it can support up to 24 social media platform SafeWise. (2020).

## Chapter 2 : Literature Review

### 2.6 Comparison Between Existing Apps with Proposed Project

Features	Qustodio	Net Nanny	Kaspersky	Boomerang	Bark	Proposed Project
Call logging	Yes	No	Yes	Yes	No	Yes
SMS logging	Yes	No	Yes	Yes	Yes	Yes
Geofencing	Yes	No	Yes	Yes	No	No
Location Tracking	Yes	Yes	Yes	Yes	No	Yes
Web Filtering	Yes	Yes	Yes	Yes	Yes	No
Screen Time Management	Yes	Yes	Yes	Yes	Yes	Yes

Table 1 Comparison between existing application

Table 2.1 shows that the strengthen and weakness of each application's functionality . After compare the strengthen of existing application , the few function features will be considered into the proposed project development which is call logging , SMS logging , location tracking and screen time management to develop a complete functional Parental Monitoring Application .

## **Chapter 2 : Literature Review**

### **2.7 Summary of Reviewed Application**

In a nutshell , the proposed application will have some different compare to the existing application . So I have doing the comparison among the existing application and find out their strengthen and weakness to combine all of the strengthen into the proposed application . I think this proposed application will have better competitive advantage against with other existing application .

## Chapter 3 : Proposed Method/Approach

### Chapter 3 : System Methodology/Approach

#### 3.1 System Architecture Diagram

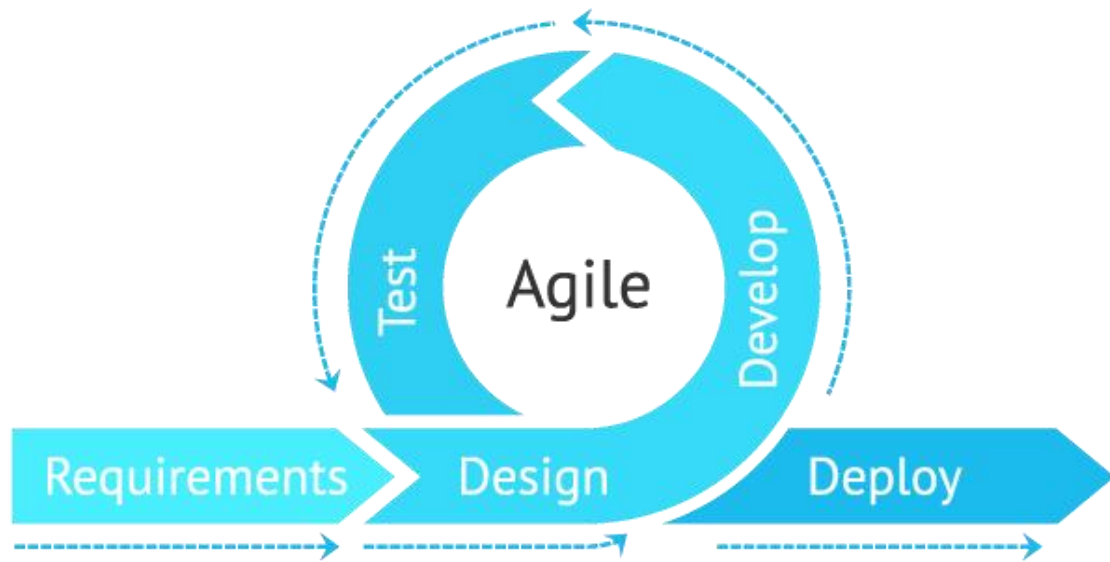


Figure 6 Agile development

The methodology that I choose to apply in my project is the Agile Development Methodology . The reason that I chose agile development methodology because it is one of the most effective ways and applied by most of the mobile application developer . It can provide a effective and proper ways of communication between client and the developer during the executing the task . Agile development methodology allow us to do the fast changes within the execution of the development and it allow the developer can have a communication with the client to get the further accurate information and make sure the things that they develop is fully satisfy the requirement of client . Agile methodology is applied in this project because this project is a small project and it does not required a lot of precise analysis before doing the development compare to Waterfall Methodology . Agile methodology allow us to have a change during the middle of implementation phase . Agile methodology totally divided into six major phases which are requirements , design , develop , test ,deploy and review .

## **Chapter 3 : Proposed Method/Approach**

### Stage 1 : Requirements

Since our topic of project is Parental Monitoring Application , we need to use a development IDE tools which is Android Studio . When using this IDE tool , the computer specifications requirements 8gb RAM and above will be better . Besides , the operating system that required is Windows 10-64bit and i5 processor or above .

Deliverable : Problem statements , project objectives and project scope

### Stage 2 : Design

In this stage , the user interface of the application should be created . For this application total have 7 main UI design which is homepage , call log , SMS detect , GPS tracking , Geofencing , screen time management and web filtering . Before implement the coding part of design , I will use the tool called Adobe XD to sketch out the UI design first .

Deliverable : User Interface Design

### Stage 3 : Development

This stage is for the implementation part and coding part . In this part , it required the Java coding language skill and it need to implement all of the function such as web filtering , screen time management and others by Java coding . Since it is agile methodology , the user can test the application in the middle of implementation and give the feedback of the application to the developer for the improving purpose .

Deliverable : Prototype coding of application

### Stage 4 : Testing

In this stage , the testing action will be applied after the development stage is finished . The testing method that I choose is black box testing , during this black box the tester does not know about the design , implementation of the project . The reason that I choose this black box testing is I want to get the real feedback from the user's perspective . The functionality test will be tested in this stage also .

Deliverable : Functionality testing

### **Chapter 3 : Proposed Method/Approach**

#### Stage 5 : Deployment

In this stage , after finishing the testing stage and make sure the application is in good situation it will be deployed to the internet or Google Play application platform . After that , it will also have new version of application that improve something will also be update on the platform .

Deliverable : Deploy to internet of platform

#### Stage 6 : Review

The purpose of this stage is to check whether the response after deploy to internet is same as expected or not . The user also can give the feedback about the application . So , the new function or improvement will be added after the user feedback to meet their satisfaction .

Deliverable : Improve the application and receive feedback

## Chapter 3 : Proposed Method/Approach

### 3.2 Use Case Diagram and Description

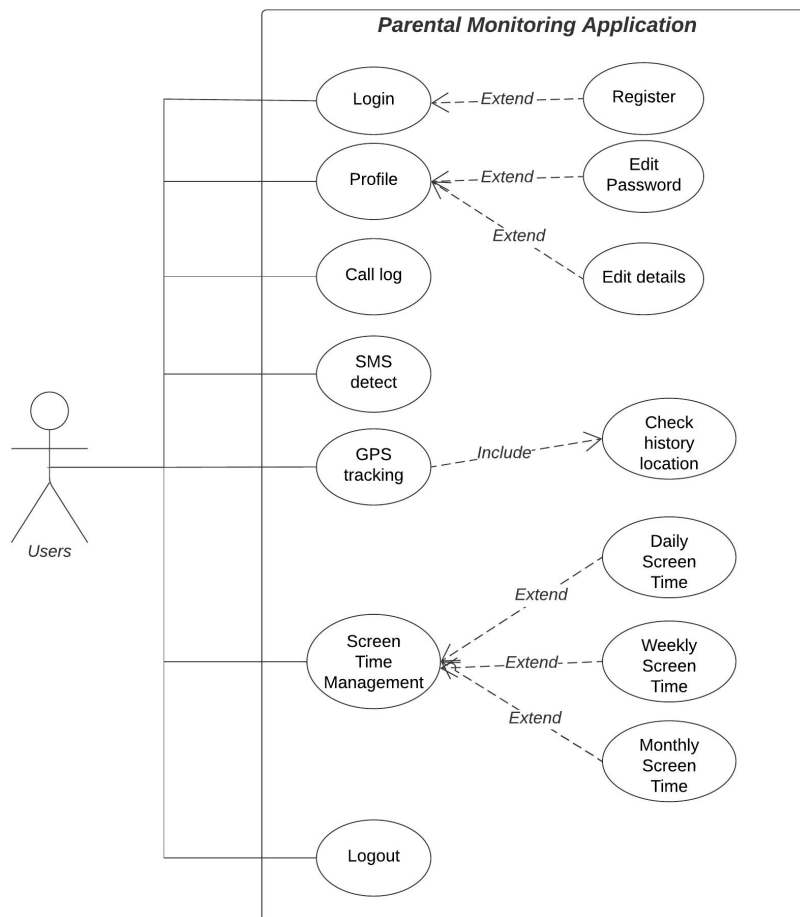


Figure 7 Use case diagram

The image shown as above is the use case diagram of Parental Monitoring Application . At the first , user is required to login into their account but if user does not have account yet they can go to register page and required to fill in a series of personal details for register purpose . After that , they can watch their personal details that filled in the register stage in the profile page . In profile page , the user can edit the information and the password of account . Besides , there has a series of menu which are call log , SMS detect , GPS tracking , Geofencing , Screen Time Management and web filtering . The call log and SMS detect is check the child's phone call history and SMS history respectively. The GPS tracking

### **Chapter 3 : Proposed Method/Approach**

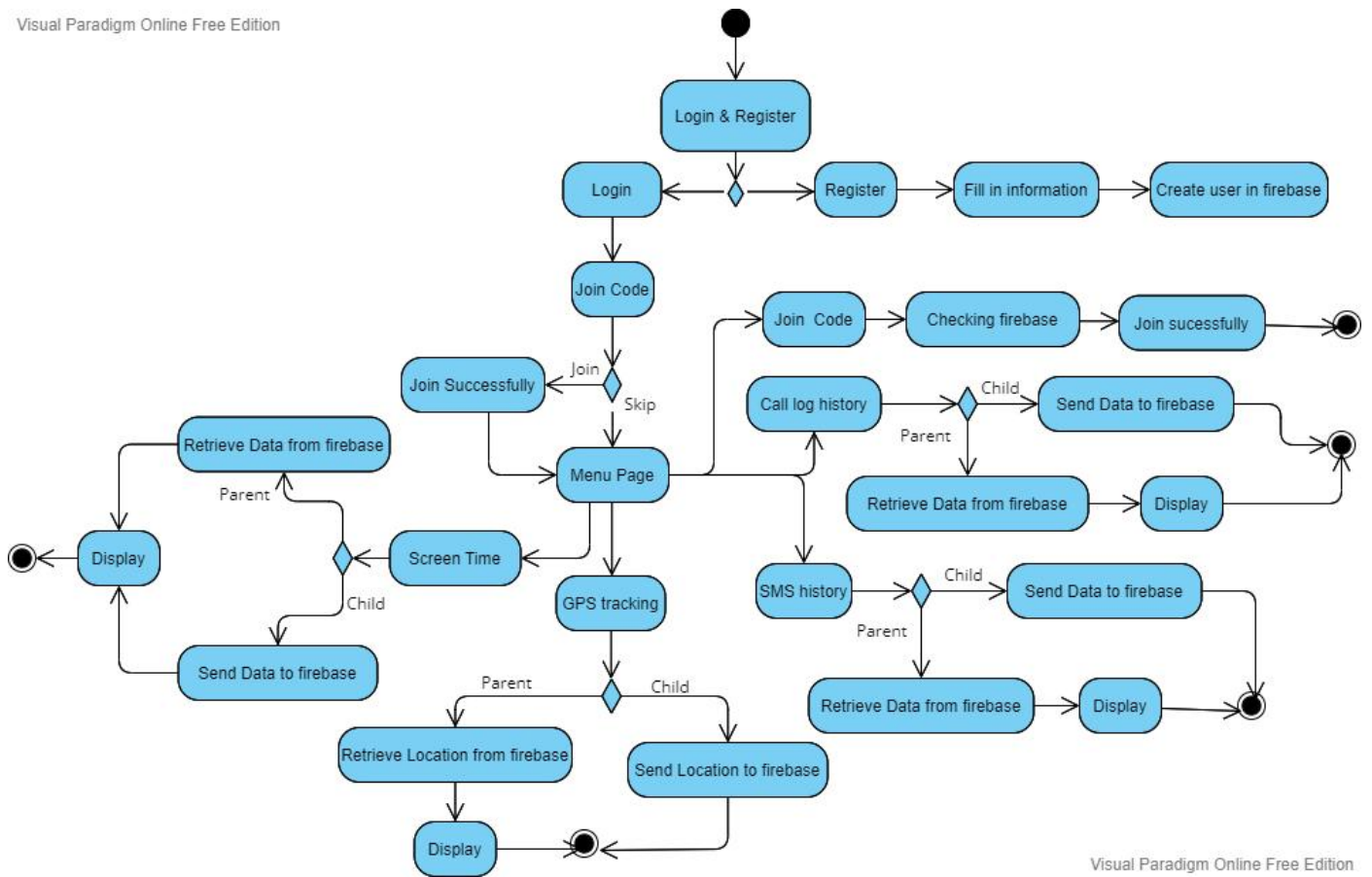
is to track the location of children and the Geofencing is to set limit on their child's smartphone at specific location that set by parent . Besides , the screen time management is detect the daily use , weekly use or monthly use of child's handphone . At the last function is web filtering which is allowed parent to filter some website that maybe harmful on their children such as pornography , vandalism , cyber bullying and others. Lastly , the user can logout the application when they are finishing the application .



# Chapter 3 : Proposed Method/Approach

## 3.3 Activity Diagram

Visual Paradigm Online Free Edition



Visual Paradigm Online Free Edition

Figure 8 Activity Diagram

## Chapter 4 : System Design

## Chapter 4 : System Design

### 4.1 System Block Diagram

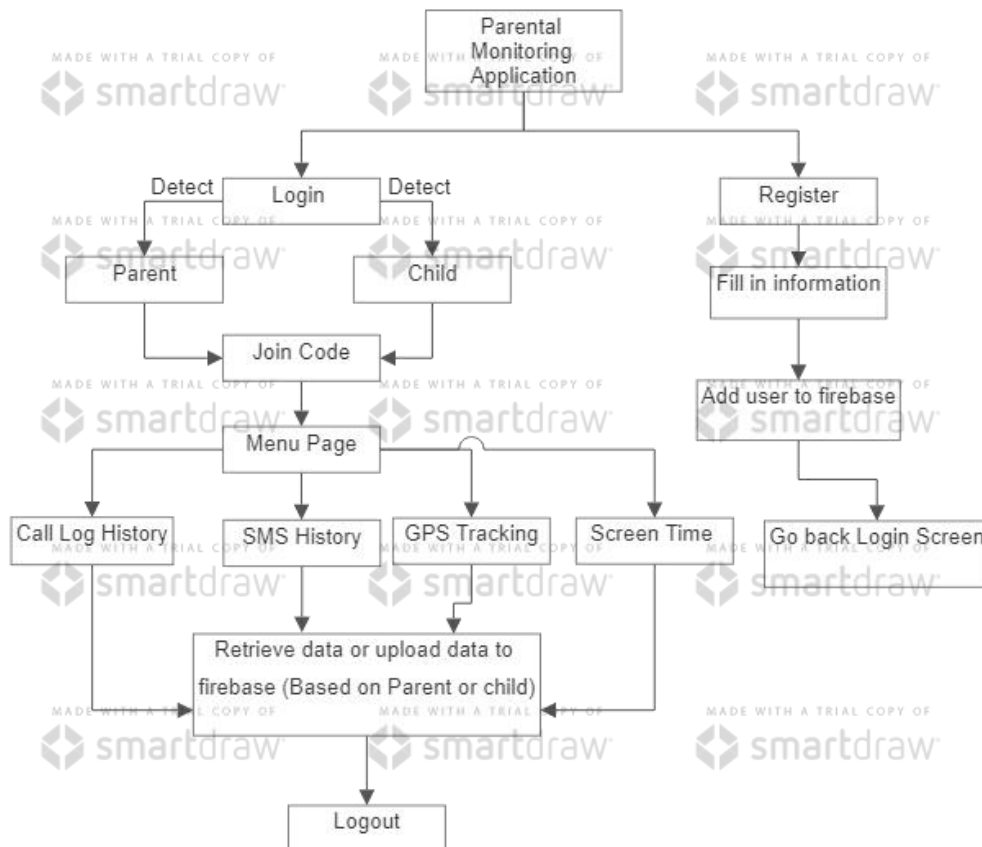


Figure 9 Block Diagram

The Figure 4.1 block diagram show how the overall application system will going on . Firstly , our application will give the user two option when opening the application which are login and register . The login is for the user who are already have register the account of our application and the register is for the new user to create the account of our application. As register , user will lead to a new screen which is required the user to fill in some information for register purpose and after fill in all of the blank the system will send the information to the Firebase and store as a data in our database . Besides , after login will lead the user to the

## Chapter 4 : System Design

join code screen which is allow the parent or child for join circle purpose and this screen is available to skip it .

After that , the next page is our main menu page which having the 4 function which is “call log history” , “SMS history” , “GPS tracking” and “Screen Time”. Each of the function will lead to different screen and show the different output. All of the data will retrieve from the Firebase (Parent) or send the data to the Firebase (Child) . Finally we can logout the application .

## Chapter 4 : System Design

### 4.2 System Components Specification

#### 4.2.1 Login screen (Parent & Child)



Figure 10 Login screen

This is the login screen (parent & child) for the login , forget password and register purpose.

## Chapter 4 : System Design

### 4.2.2 Register Screen



Figure 11 Register Screen

The register screen (parent & child) is used to create a new user account and store into Firebase.

## Chapter 4 : System Design

### 4.2.3 Join circle (Parent & Child)

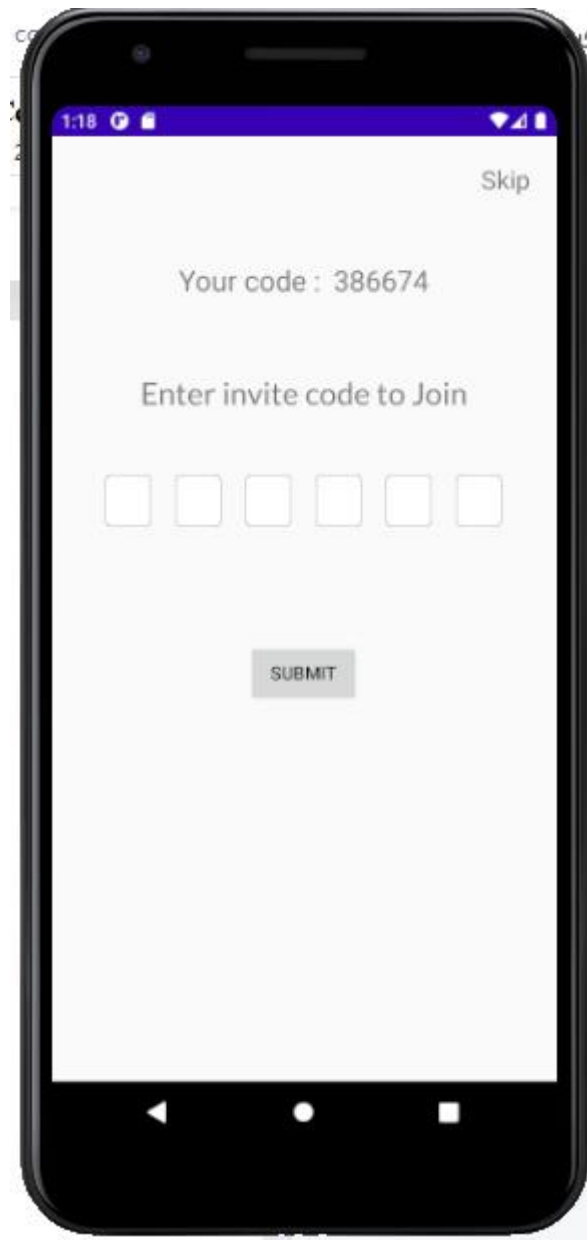


Figure 12 Join circle

The join circle screen is for the parent join circle with children and the children cannot join the circle with parent.

## Chapter 4 : System Design

### 4.2.4 Family Group (Parent only)

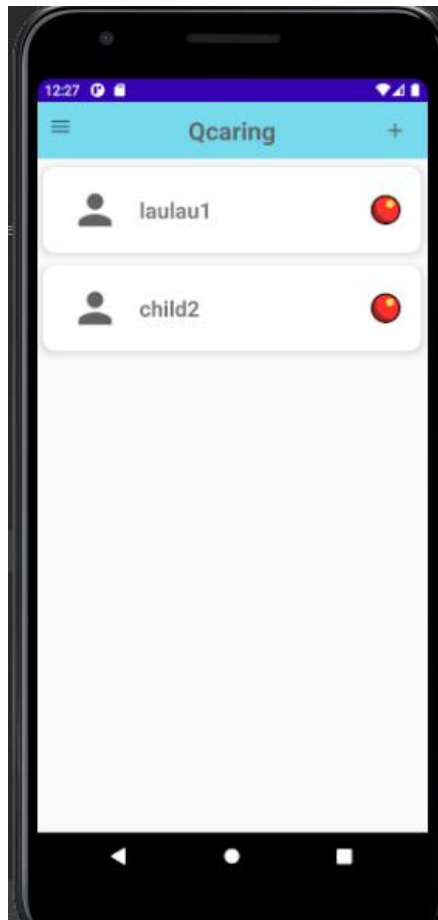
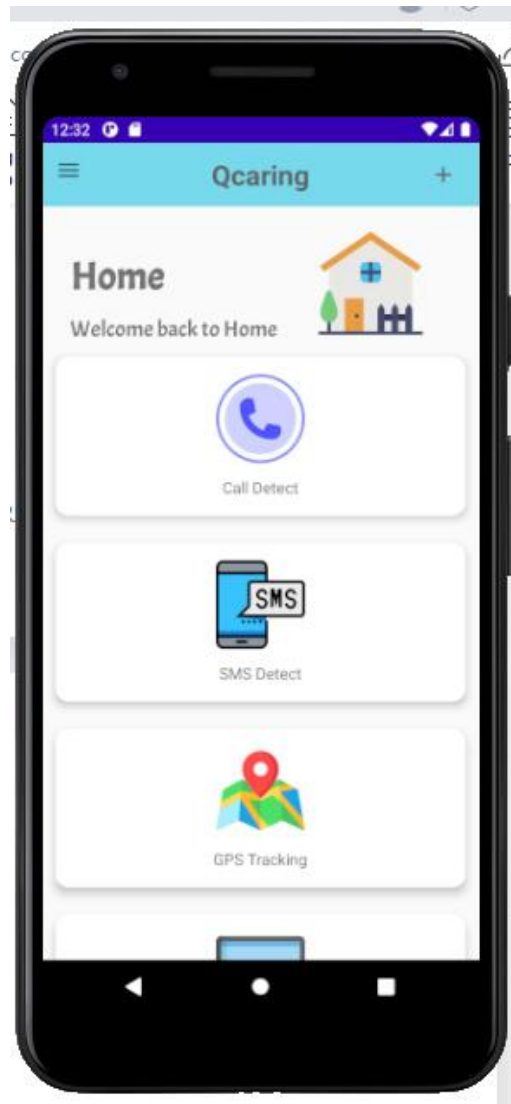


Figure 13 Family Group (Parent only)

This is the family group screen which will only occur in parent . Each of children will lead the parent go to different children's data displaying.

## Chapter 4 : System Design

### 4.2.5 Home screen (Parent & Child)



**Figure 14 Home Screen**

The home screen will provide the parent or children total 4 function such as call detect , SMS detect , GPS tracking and Screen time . The parent can go to monitor their children through this home screen.



## Chapter 4 : System Design

### 4.2.6 Call log history (Parent)

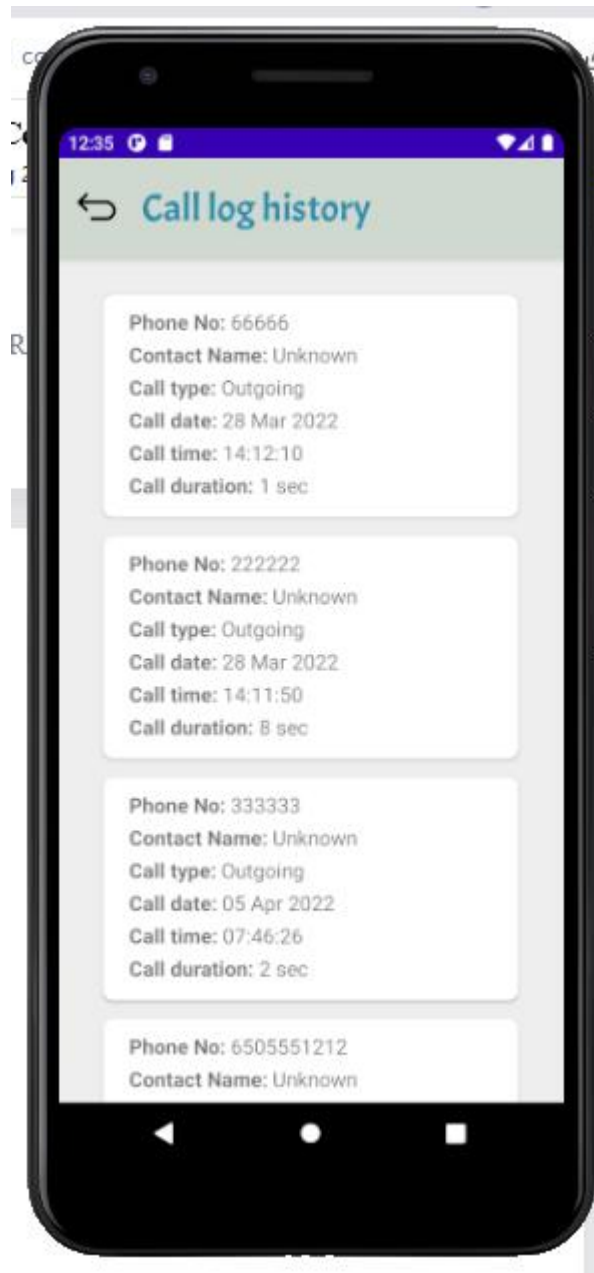


Figure 15 Call log history (Parent)

This is the display of the call log history of children's smartphone which is displayed on parent smartphone only .

## Chapter 4 : System Design

### 4.2.7 Call log history (Child)

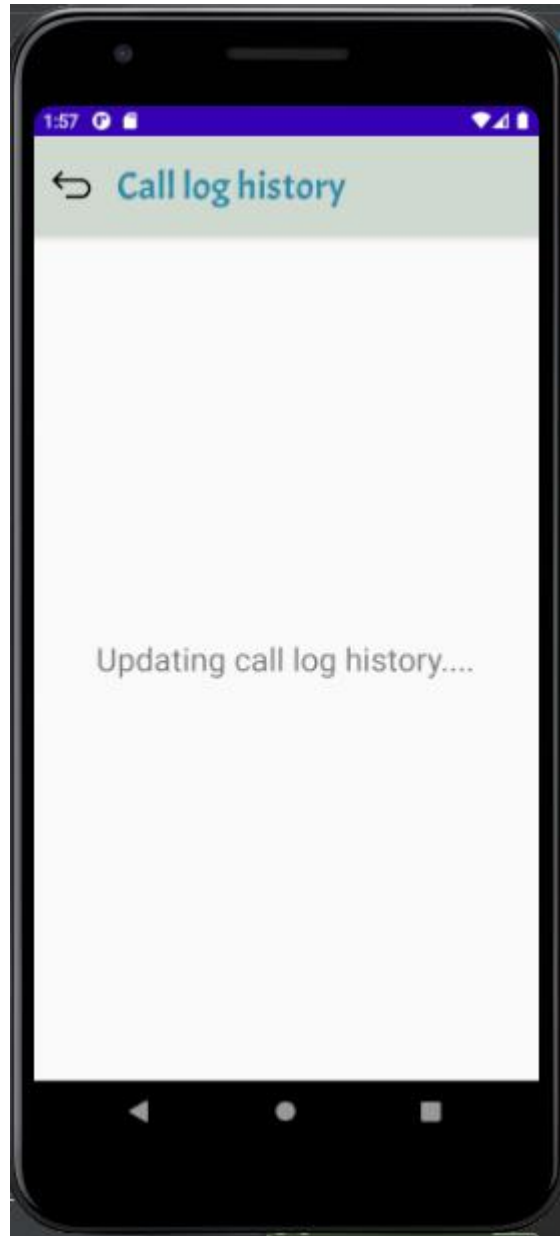


Figure 16 Call log history (child)

This is for update the data to Firebase .

## Chapter 4 : System Design

### 4.2.8 SMS history (Parent)

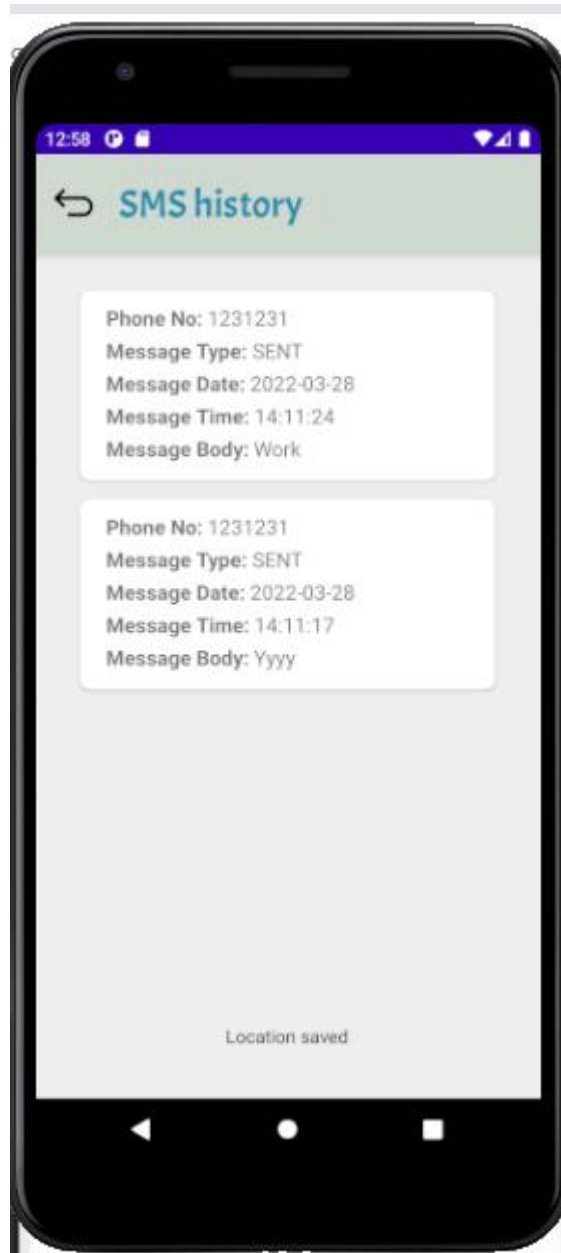


Figure 17 SMS history (Parent)

This is the screen for parent to watch the SMS history of their children's smartphone.

## Chapter 4 : System Design

### 4.2.9 SMS history (Child)

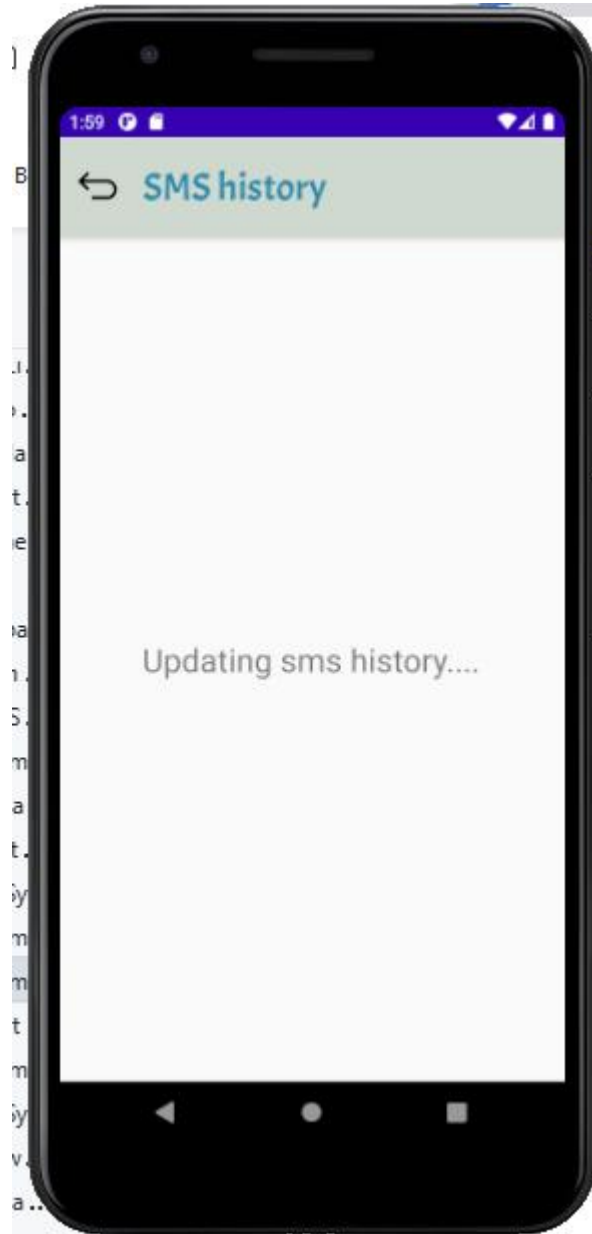


Figure 18 SMS history (Child)

This is for update the data to Firebase .

## Chapter 4 : System Design

### 4.2.10 GPS tracking (Parent & Child)

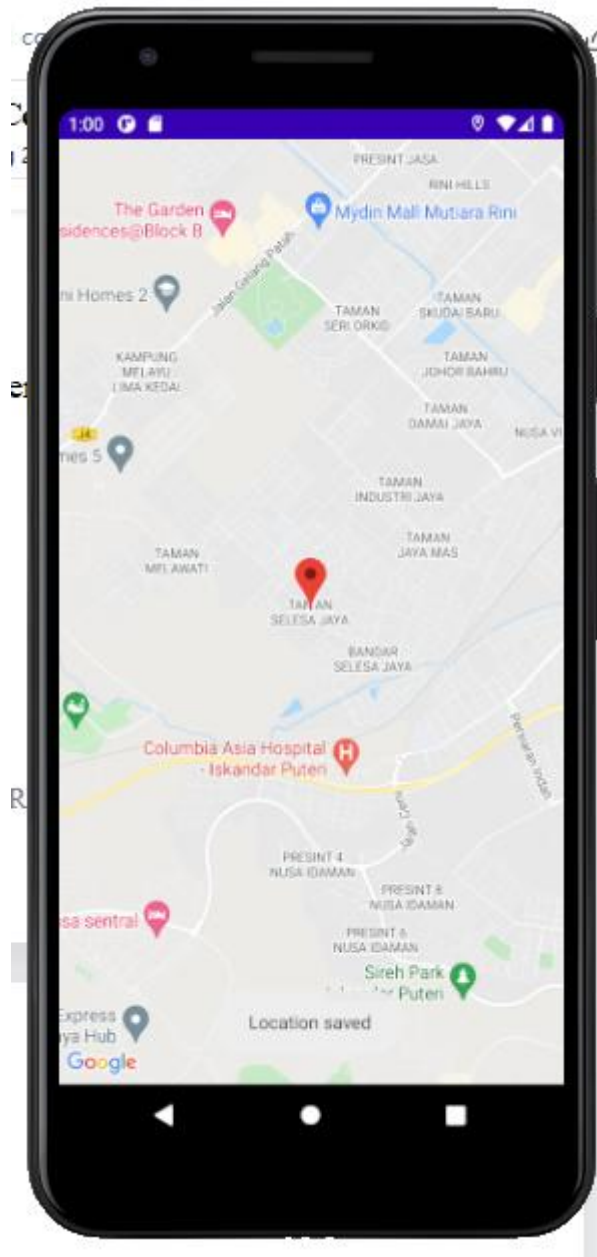


Figure 19 GPS tracking

The GPS tracking is to show the location of children's smartphone . Parent's side will show the children's smartphone location and children's side will show the children's smartphone location .

## Chapter 4 : System Design

### 4.2.11 Screen Time (Parent & Child)

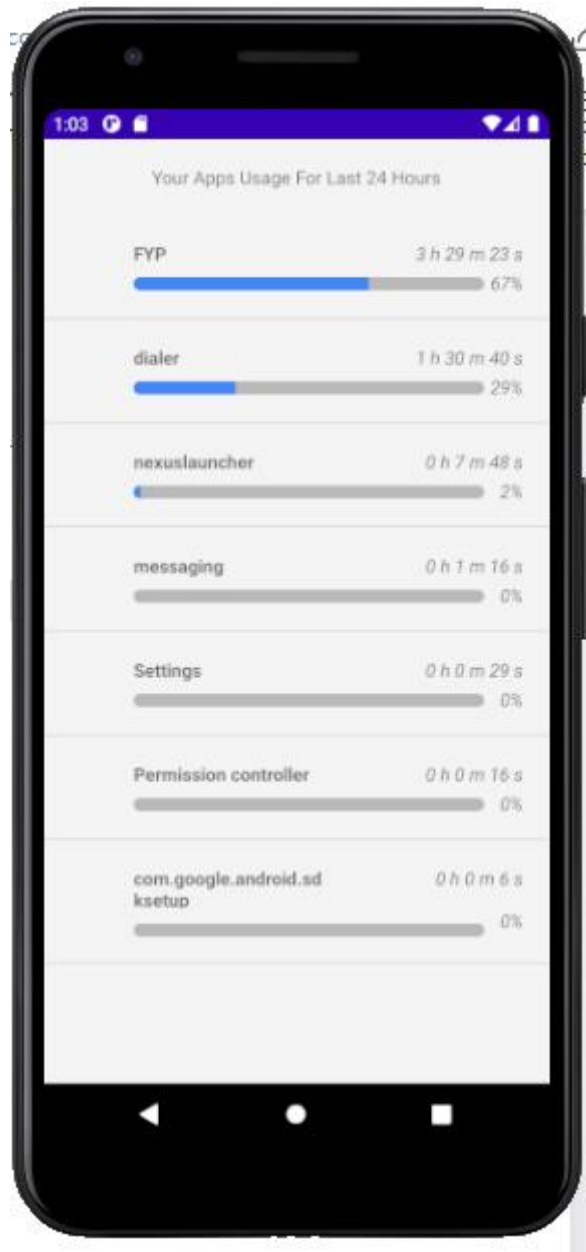


Figure 20 Screen Time

The screen time is show the smartphone 24 hour usage record for both parent and children . Parent's side will show the children's screen time 24 hour usage record and the children's side will show the children's screen time 24 hour usage record

## Chapter 4 : System Design

### 4.3 Circuit and Components Design

#### 4.3.1 Register blank warning



Figure 21 Register blank warning

At the register screen if one of the Text input field is blank it will prompt the warning and remain the same and will not go to the next screen .

## Chapter 4 : System Design

### 4.3.2 Register check email format



Figure 22 Check email format

The system will check whether the email format is correct or not . If not it will prompt a warning to the user.



## Chapter 4 : System Design

### 4.3.3 Double checking of the password

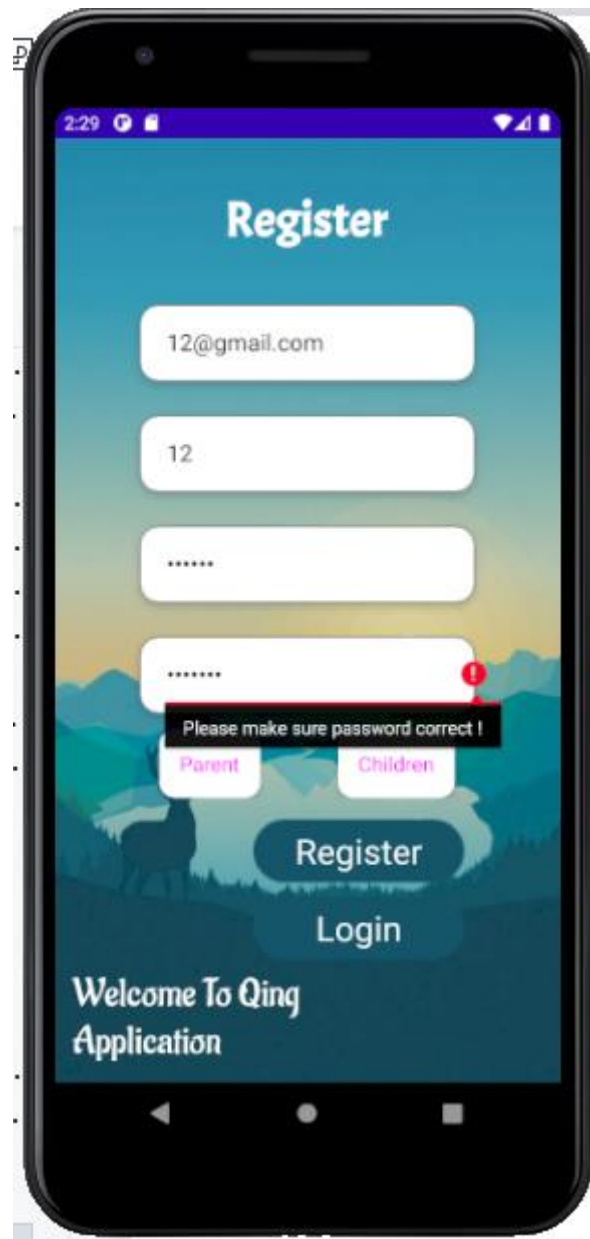


Figure 23 Double checking password

The system will do the checking is the second time password input is same with the previous password . If not it will prompt the warning .

## Chapter 4 : System Design

### 4.3.4 Register success toast message

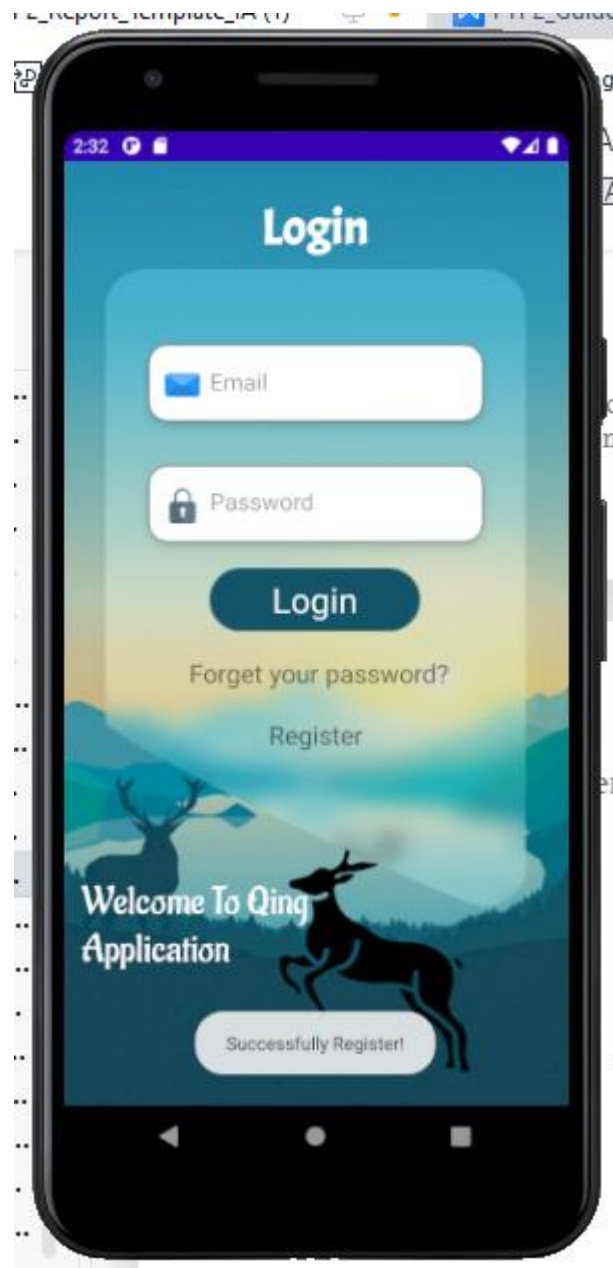


Figure 24 Register success toast message

After click the register button will prompt the “Successfully Register!” message mention the account is created successfully and jump back to the login screen.

## Chapter 4 : System Design

### 4.3.5 Account checking



Figure 25 Account check

The system will check the email and password is match with the account stored inside our database or not. If not it will prompt the toast message “The password is invalid or the user does not have a password.”

## Chapter 4 : System Design

### 4.3.6 Detect child and not allow join circle

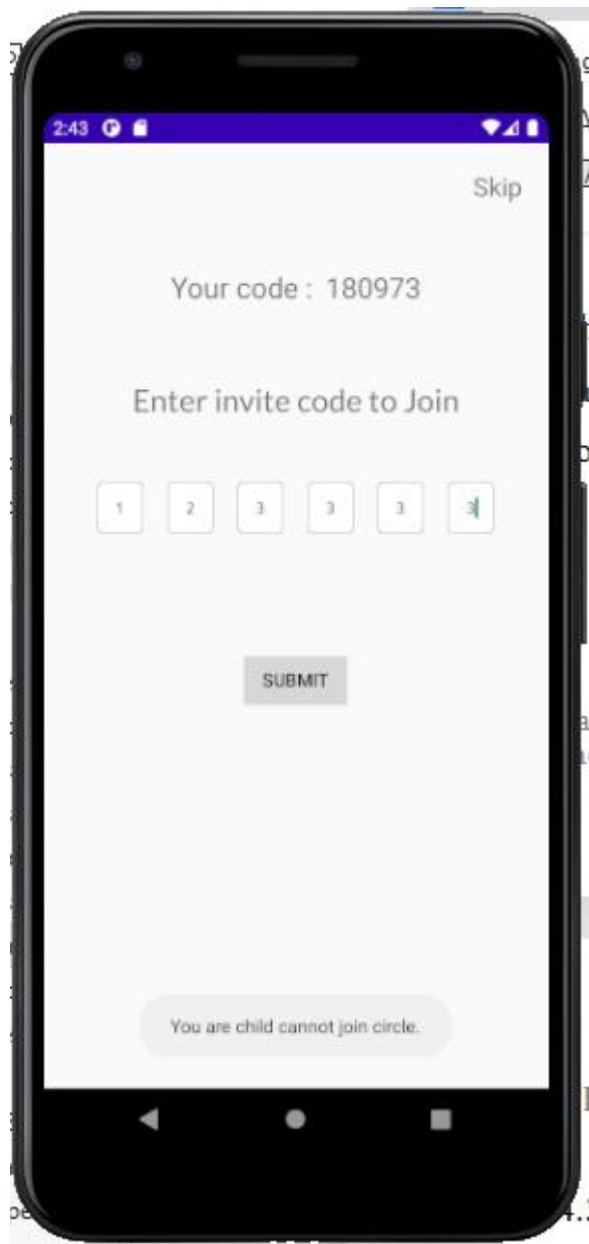


Figure 26 Not allow join circle (child)

The system will detect the account that you have login is parent or child . If child , it does not allow to join the circle and prompt the toast message “You are child cannot join circle .”

## Chapter 4 : System Design

### 4.3.7 Invalid join code

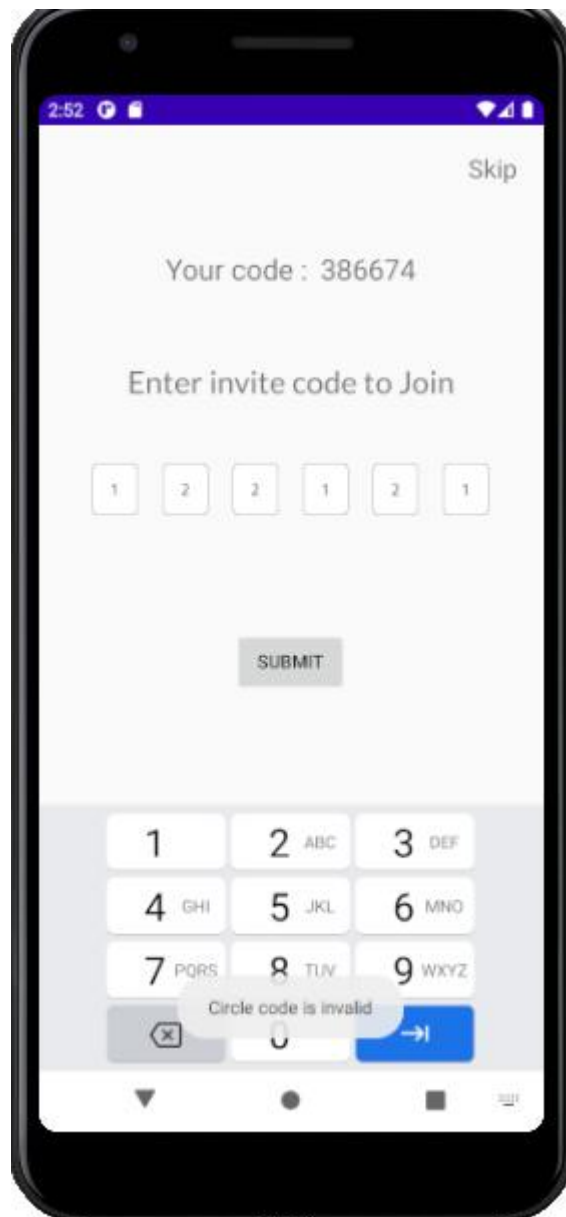


Figure 27 Invalid join code

The system will check the join code is exist in our database or not . If not it will prompt “Circle code is invalid” and require user fill in again.

## Chapter 4 : System Design

### 4.3.8 Join circle successfully



Figure 28 Join circle success

The system will prompt the message to mention join circle successfully.

## Chapter 4 : System Design

### 4.3.9 Database data checking (four function (parent))

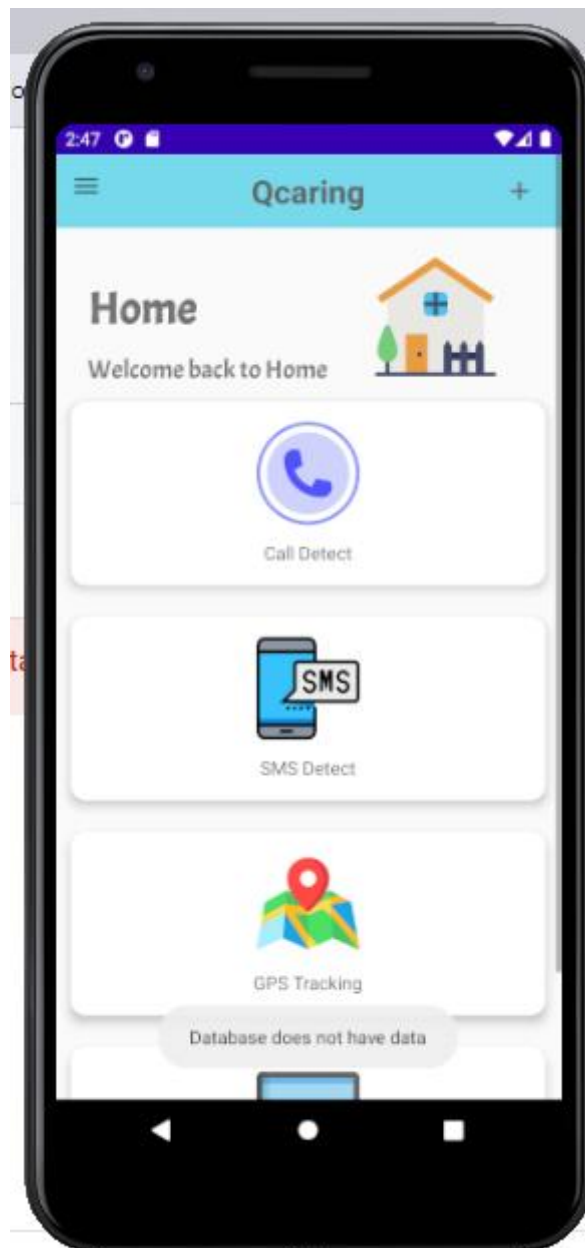


Figure 29 Database empty

The system will detect the database is empty data or not when every time entry . If empty it will go back the main page and prompt the toast message “Database does not have data”.This feature is applied on all of the function in the application .

## Chapter 4 : System Design

### 4.4 System Components Interaction Operations

#### 4.4.1 Step 1

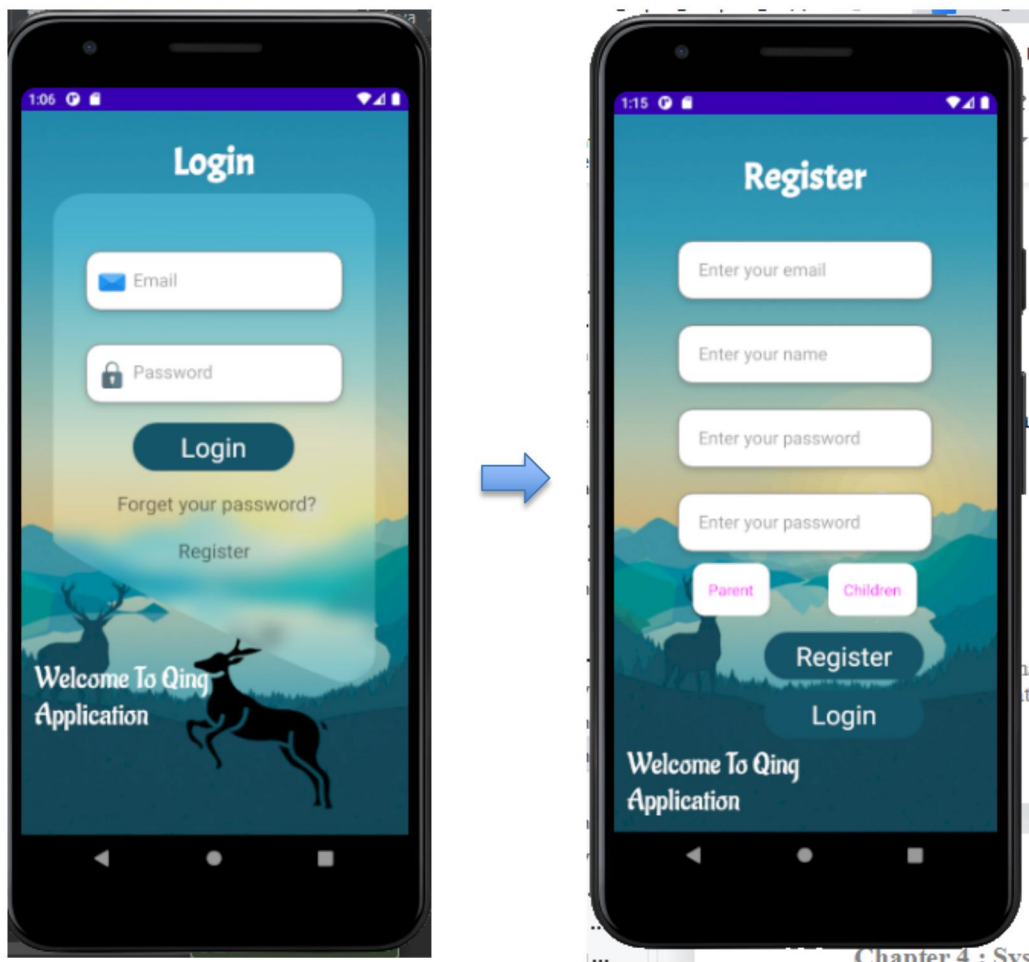


Figure 30 Register new account

The first step is create a new account and in the register screen we must fill in all of the input field and make sure you have chose the parent or children .



## Chapter 4 : System Design

### 4.4.2 Step 2

#### Parent

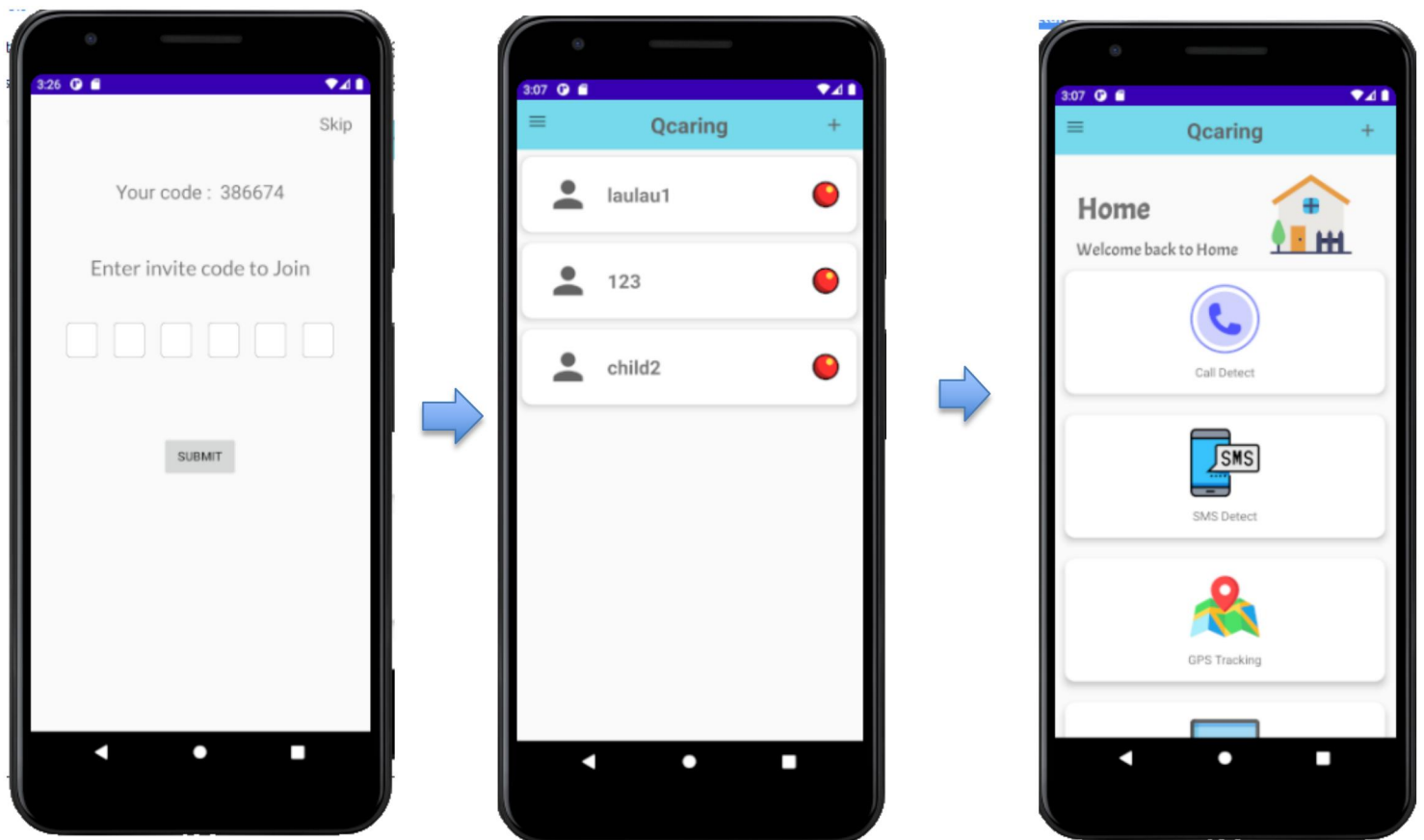


Figure 31 Family - Home

For parent , after the login successfully it will lead the parent join code screen and allow the parent to add the child by the join code .After join circle successfully it will jump to family screen and can click one of the children to use the function of our application in the home screen .

## Chapter 4 : System Design

### Children

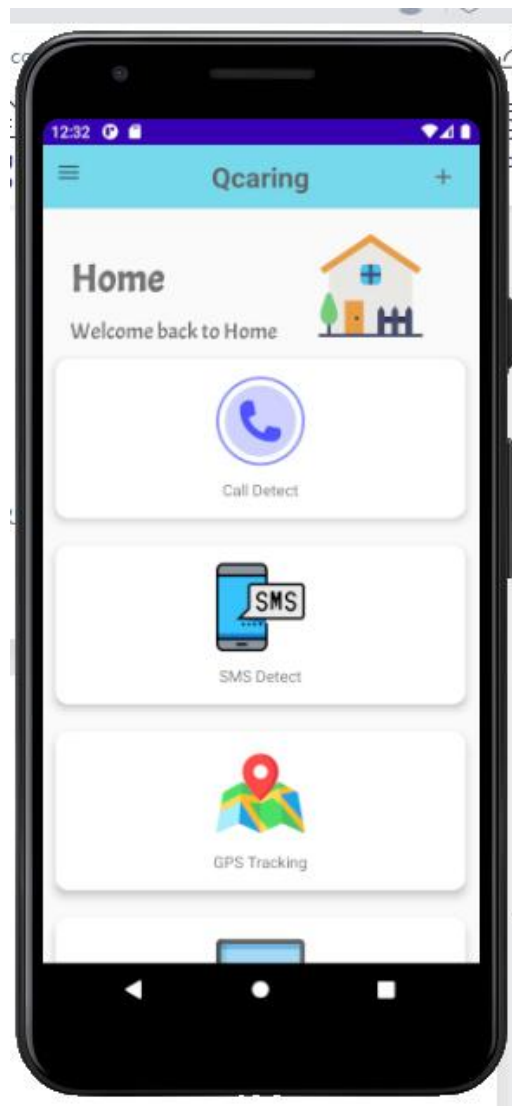


Figure 32 Home screen

For children , after login successfully it will directly go to the home screen and each of the function can be clicked.

## Chapter 4 : System Design

### 4.4.3 Step 3

#### Parent (Call log history)

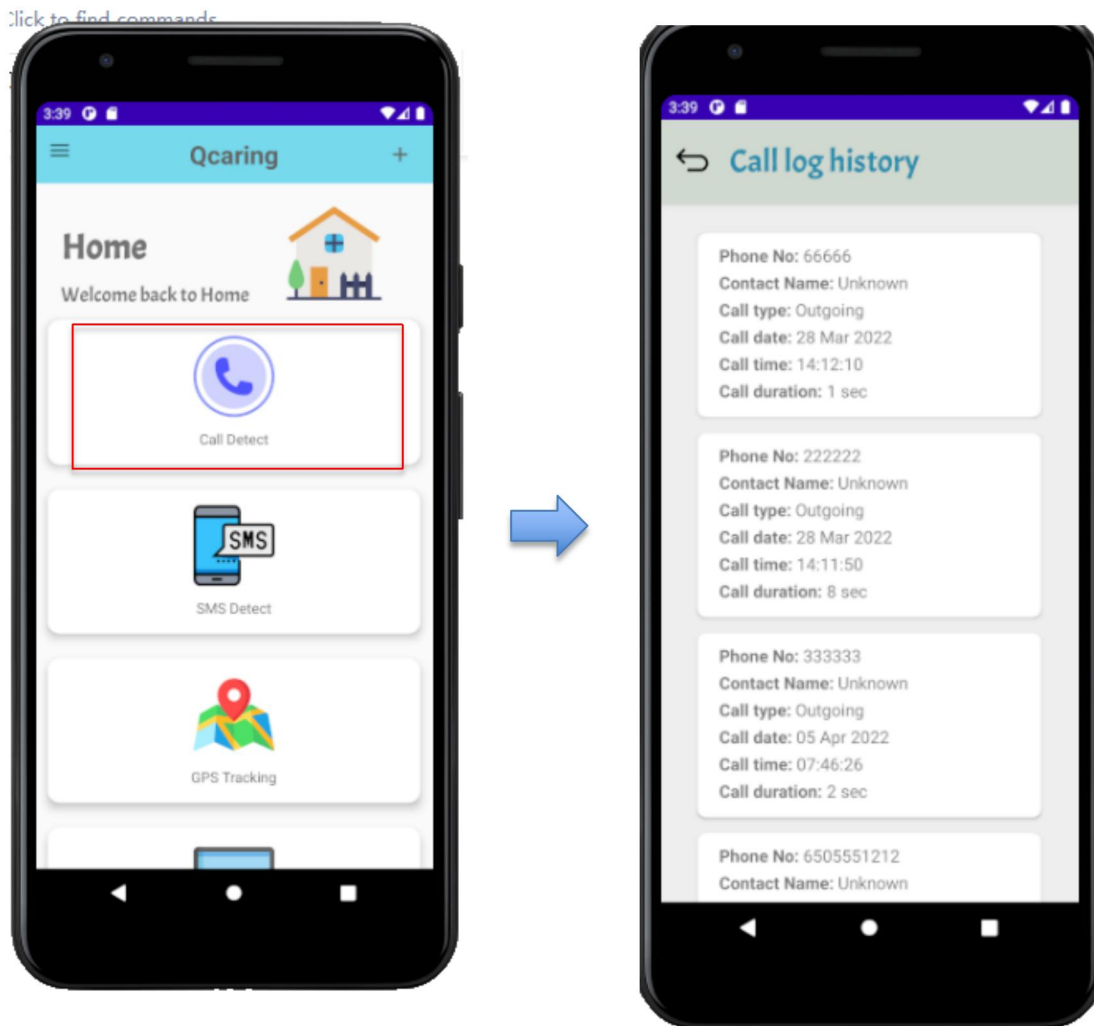


Figure 33 Call log history (Parent)

From the home screen click the first function called “Call Detect” will jump to the call log history screen which will show the phone number , contact name , call type , call date , call time and the call duration

## Chapter 4 : System Design

### Children (Call log history)

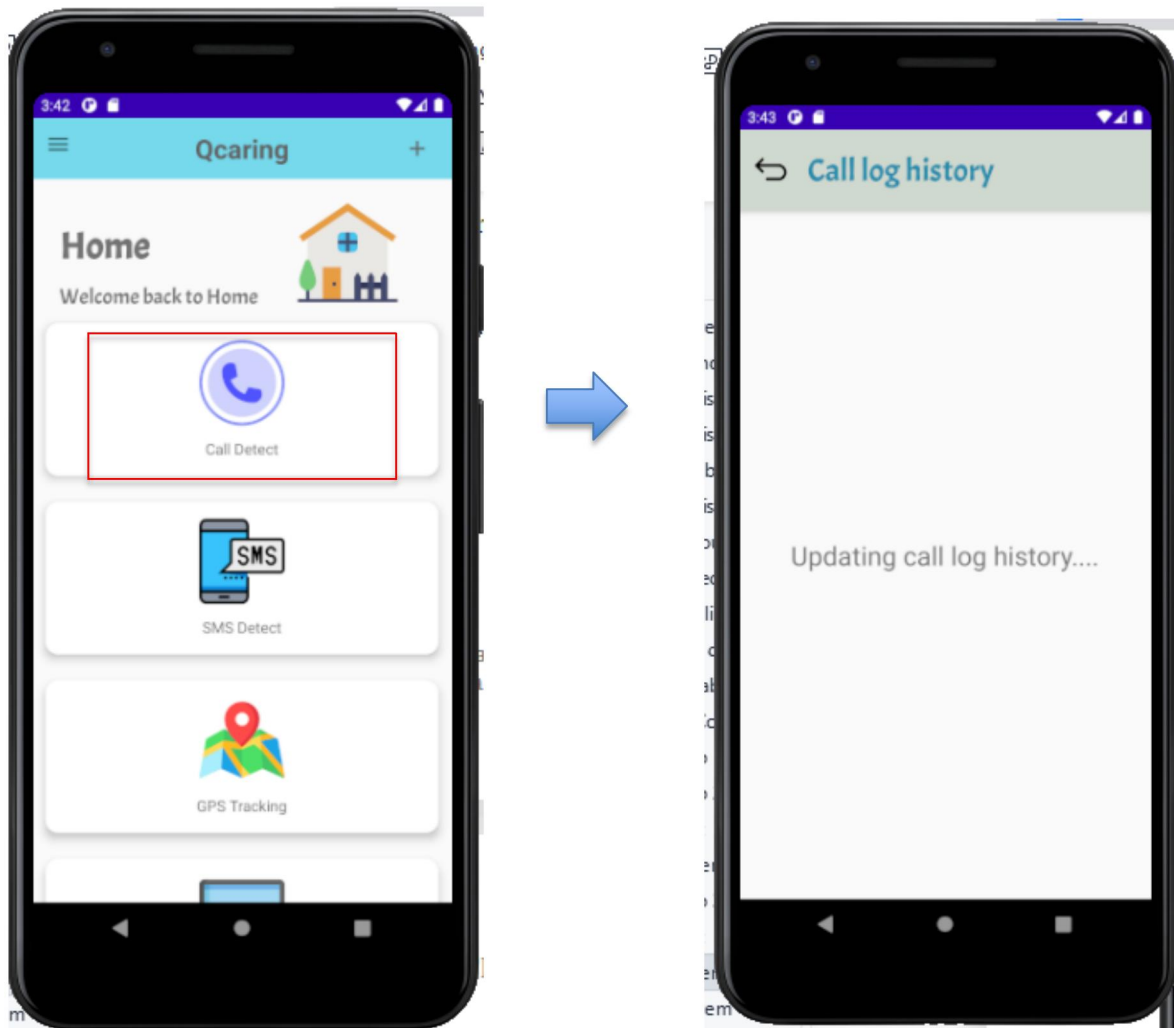


Figure 34 Call log history (children)

From the home screen , the child can click the first function called “Call detect” and it will lead to the update call log screen to update the call log history to Firebase.

## Chapter 4 : System Design

### 4.4.4 Step 4

#### Parent (SMS history)

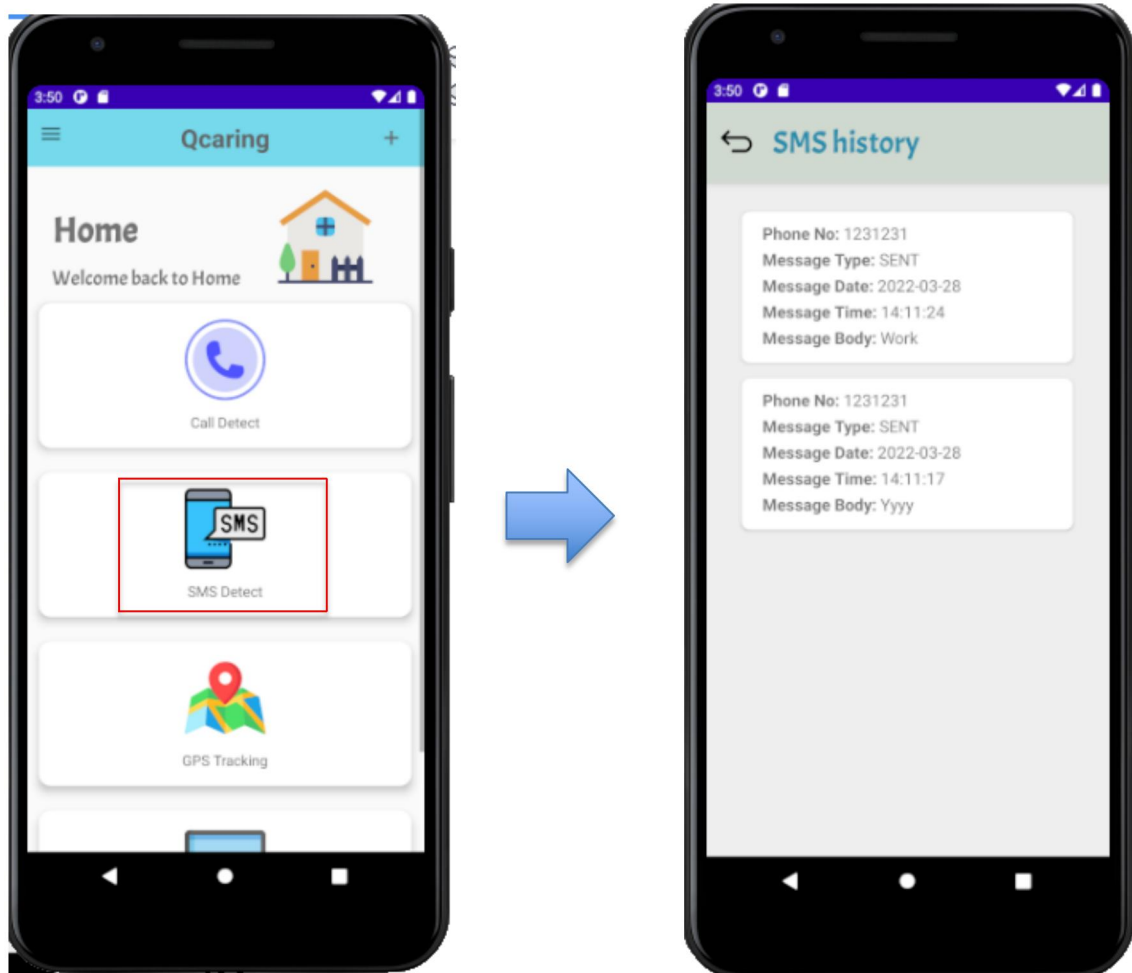


Figure 35 SMS history (Parent)

From the home screen click the second function called “SMS Detect” will jump to the SMS history screen which will show the phone number , message type , message date , message time and the message body.

## Chapter 4 : System Design

### Child (SMS history)

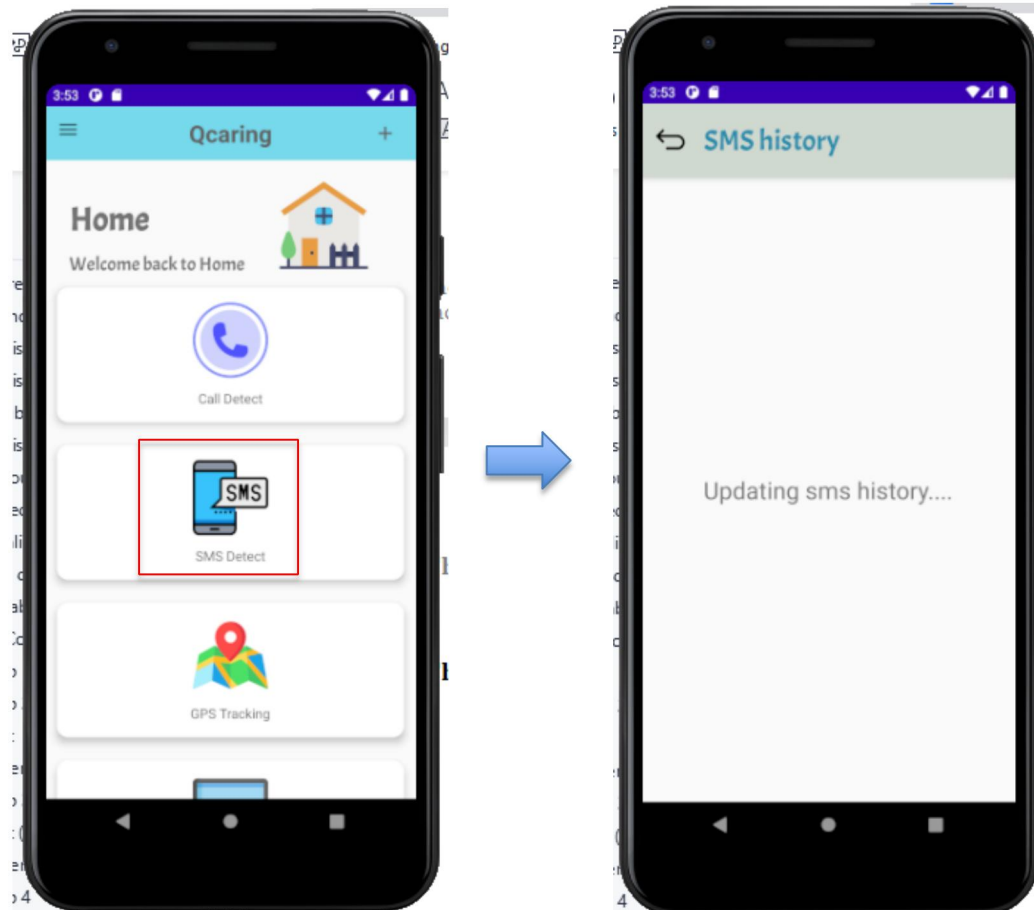


Figure 36 SMS history (child)

From the home screen , the child can click the second function called “SMS detect” and it will lead to the update SMS screen to update the SMS history to Firebase.

## Chapter 4 : System Design

### 4.4.5 Step 5

#### Parent & Child

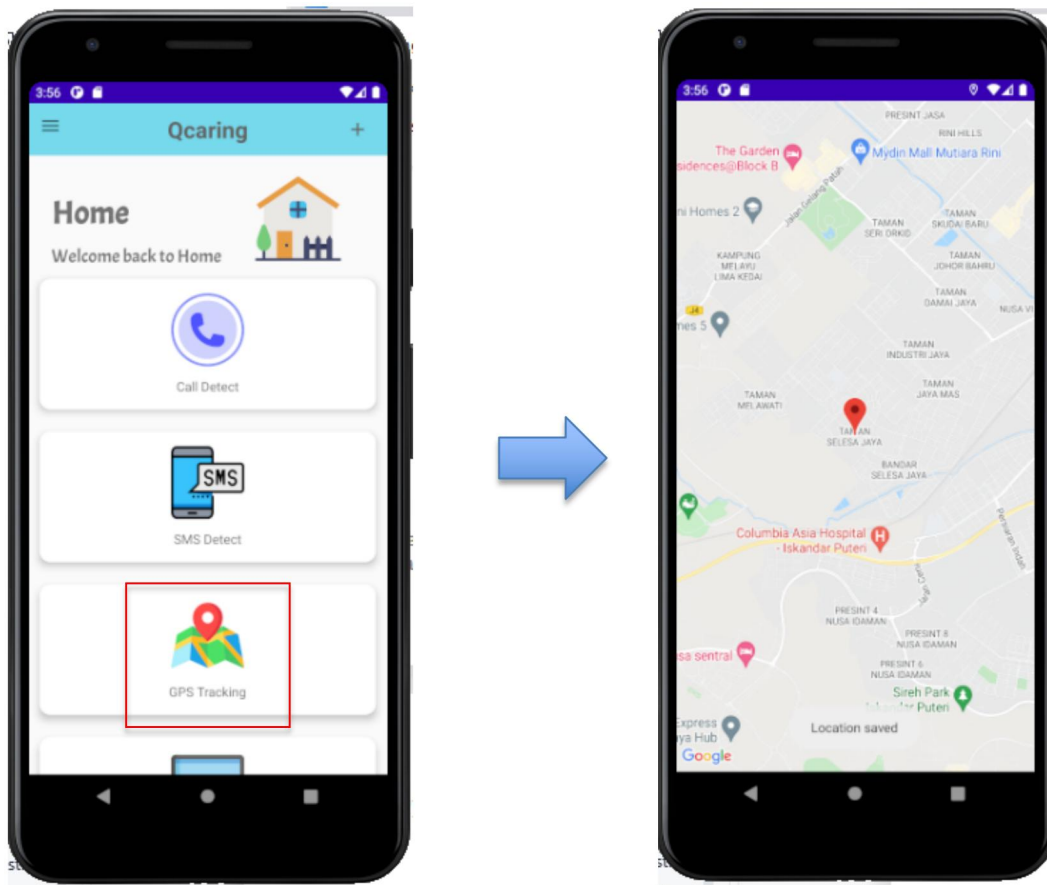


Figure 37 GPS tracking (Parent & Child)

The third function called “GPS tracking” will jump to the google map and show the location of children . For parent , it will show the child’s location and for child it will show the child’s location also .

## Chapter 4 : System Design

### 4.4.6 Step 6

#### Parent & Child

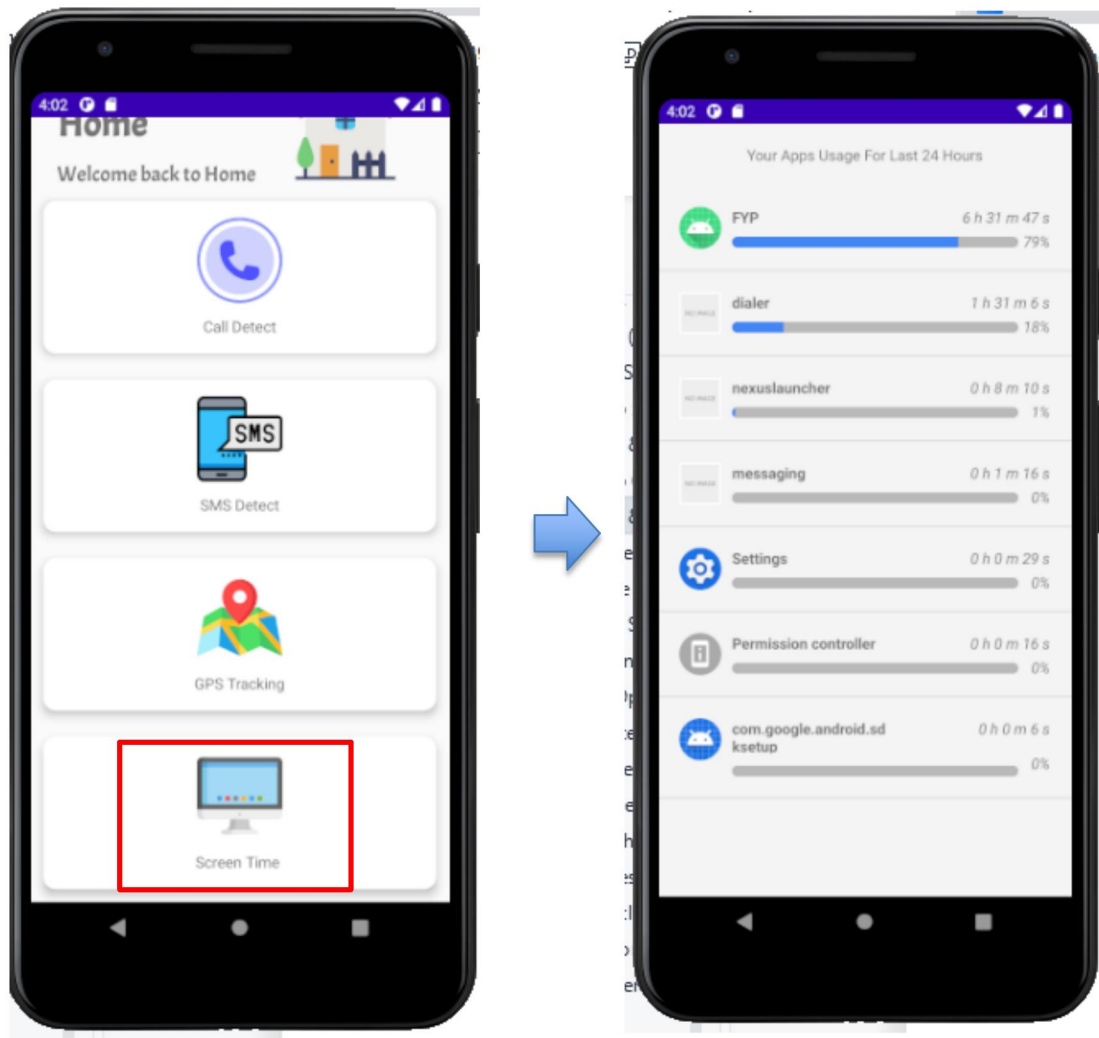


Figure 38 Screen time (Parent & Child)

From the home screen , the forth function called “Screen Time” will jump to the usage record screen and show all the application that have used within 24 hours . It will show the name of application , duration and the percentage . For parent , it will show the child’s usage record and for child will show the child’s usage record.



## Chapter 5 : System Implementation

## Chapter 5 : System Implementation

### 5.1 Hardware Setup

Type of Hardware	Specification
Processor	Intel ® Core™ i5-6200U CPU @ 1.6GHz
RAM	8 GB
Storage	256 SSD
System	x64-based processor
Operating System	Windows 10
Display & Graphic	NVIDIA® GeForce® MX150 with 2 GB Dedicated VRAM
Extension Ports	2 USB 2.0/3.0 ports

**Table 2 Hardware Specification**

## Chapter 5 : System Implementation

### 5.2 Software Setup

#### 5.2.1 Android Studio

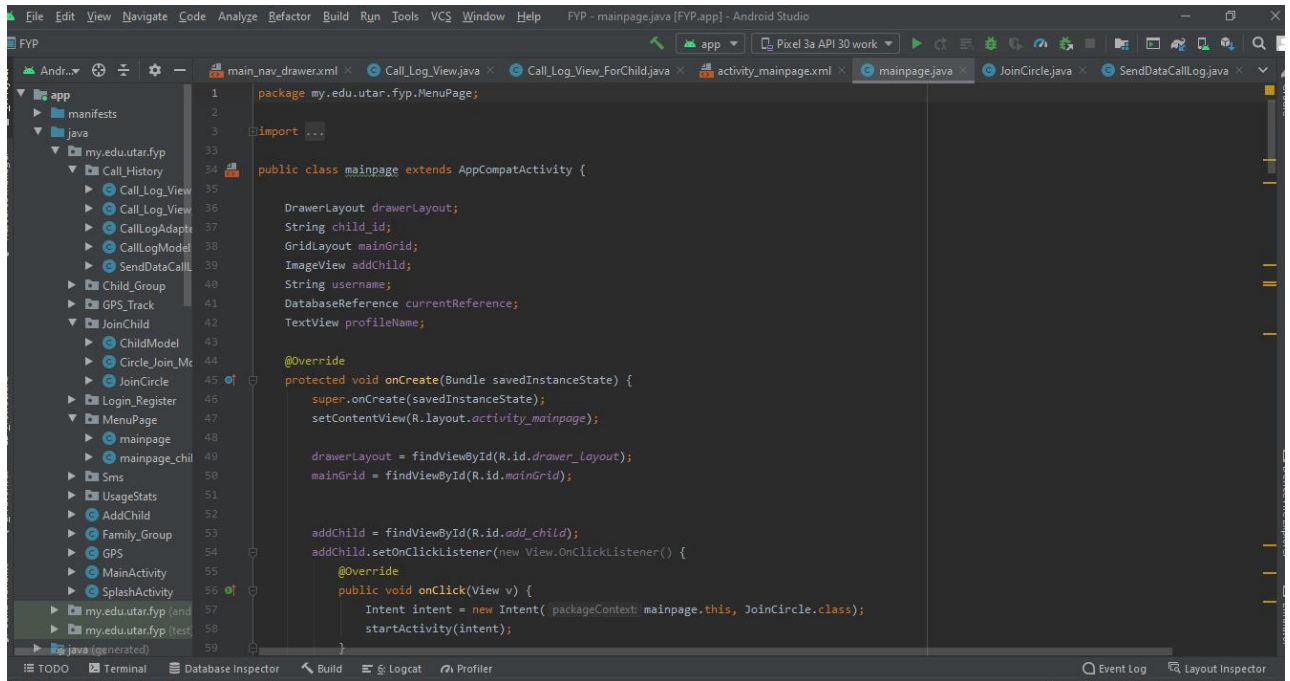


Figure 39 One of the coding from Android Studio

The main IDE that I have used in this mobile development is Android Studio which is using the java language as the programming language . The Android Studio can run the emulator to let us to test our application workable or not .

## Chapter 5 : System Implementation

### 5.2.2 Firebase



Figure 40 Firebase

The Firebase is the online database used to store my data and it is a real time database which can allow the data retrieve and upload in anywhere and anytime . I use the Firebase retrieving and storing data in the whole project.

## Chapter 5 : System Implementation

### 5.3 Setting and Configuration

There is a hardware setup before I start to implement the coding of the mobile application development . My hardware is the laptop and the hardware specification with a Intel ® Core™ i5-6200U CPU @ 1.6GHz processor , 8gb RAM as the minimum requirement of running the Android Studio , 256 SSD for faster data exchanging and reading , Windows 10 x64-based , NVIDIA® GeForce® MX150 with 2 GB Dedicated VRAM of display graphics and the 2 USB 2.0/3.0 extension ports.

The software setup that I have used in this project are Android studio for the coding part and the Firebase for the realtime database system. For the Android studio , I use the JAVA programming language as the main language to do the implementation work. I use the Android studio emulator to show the output of this project and use the XML file to edit the design of my application user interface . For the Firebase , I use it as my online realtime database system means that my application will always upload and retrieve the data from the internet do done the function or display synchronizely .

## Chapter 5 : System Implementation

### 5.4 System Operations

#### 5.4.1 Login screen

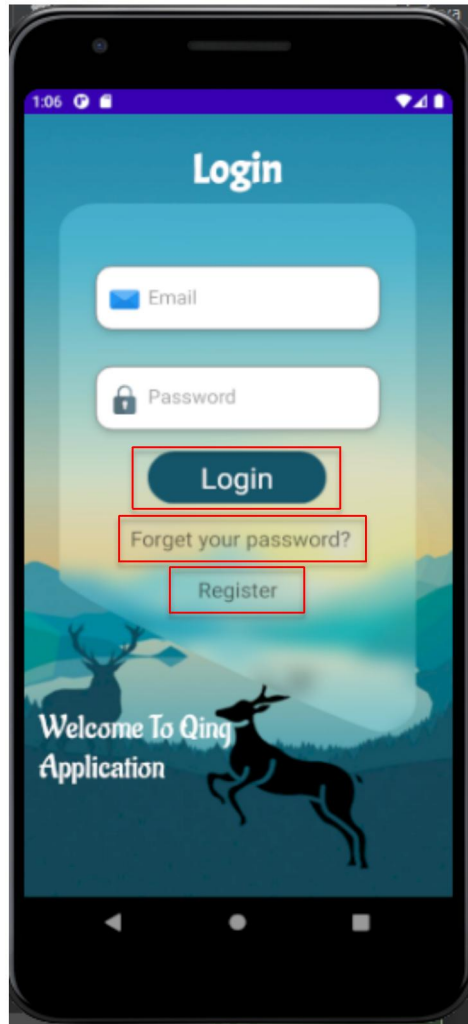


Figure 41 Login screen

**Login button** : The login button clicked will check the email and password is match with the account in Firebase or not . If yes it will lead the user go to Join code screen .

**Forget your password button** : This button is for the user who are forget the password and want to renew the password through email address.

**Register button** : This button is for the new user want to create an account and it will jump to the register screen after clicked .

## Chapter 5 : System Implementation

### 5.4.2 Register screen

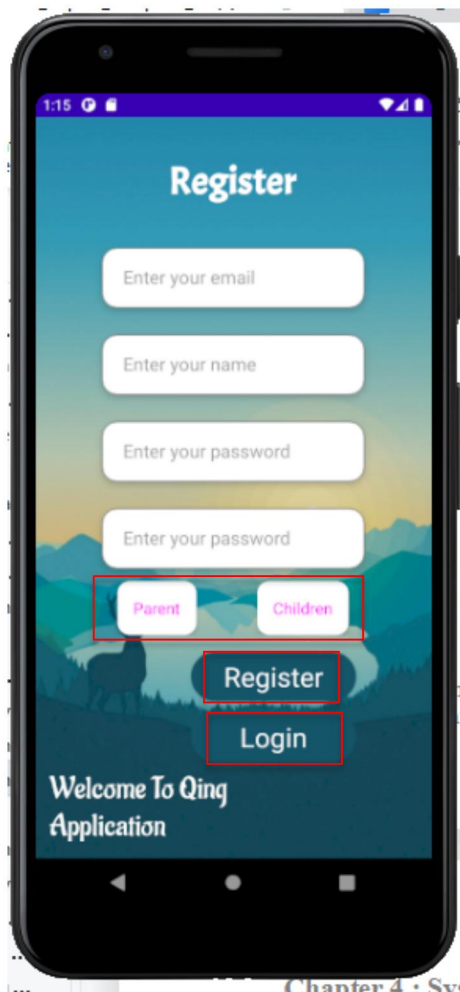


Figure 42 Register screen

**Parent & Children button** : The button is one feature of our application , it can let the user to chose the role of the user for example parent is used for monitoring children’s phone.

**Register button** : The button clicked will check whether all the input field is filled or not . If not it will prompt warning to user and if yes it will prompt message to mention register successfully and jump back to login screen .

**Login button** : The button clicked will go back the login screen .

## Chapter 5 : System Implementation

### 5.4.3 Join Circle

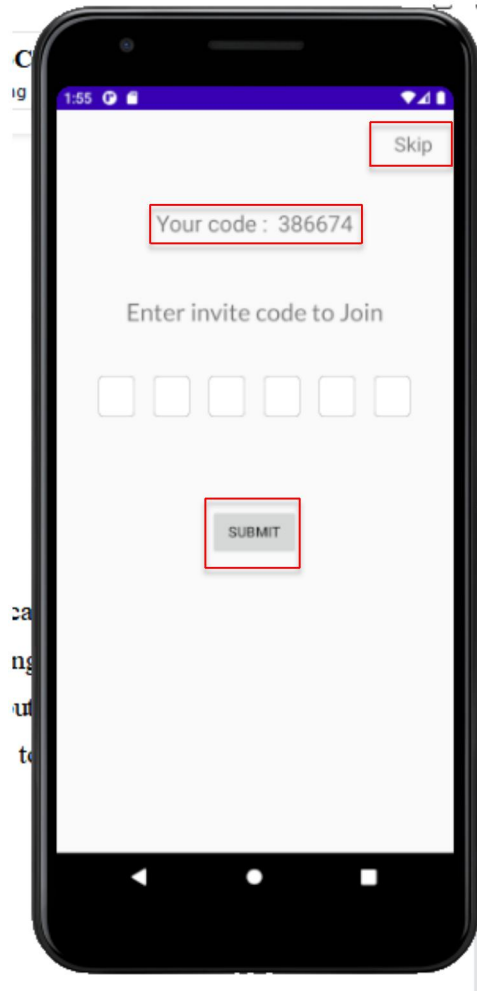


Figure 43 Join circle

**Skip button** : The button will skip the join circle screen and jump to the home screen.

**Your code** : The join code display is based on the user account and all of the code is unique and different with other account.

**Submit button** : The button clicked will check the role is parent or child. If child , it will prompt toast message and not allow child to add the parent . If parent , it will check the join code is available in the Firebase or not .

## Chapter 5 : System Implementation

### 5.4.4 Family Group (Parent)

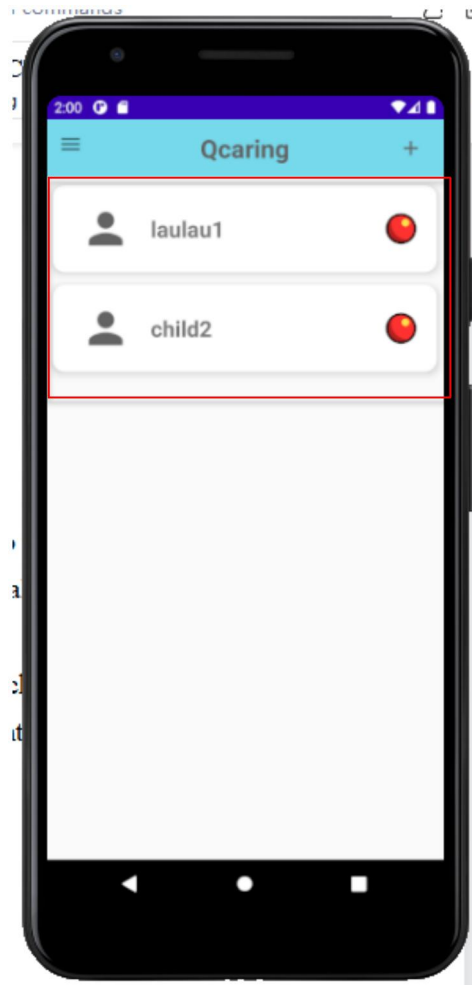


Figure 44 Family Group

The family group only will be shown in parent role .

**Child list** : The child list will show all of the children that parent have added by the join code.



## Chapter 5 : System Implementation

### 5.4.5 Home screen

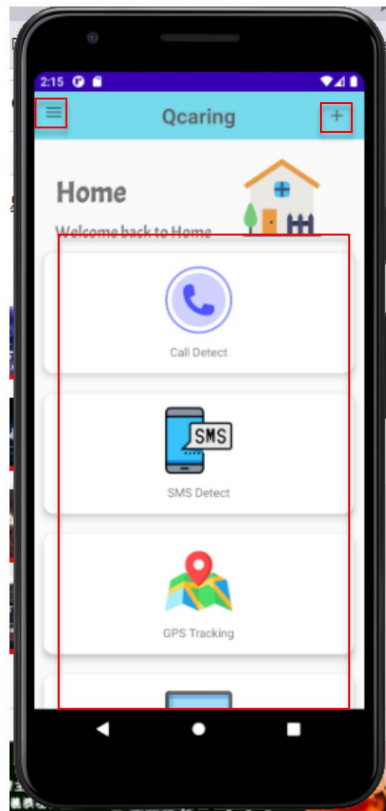


Figure 45 Home screen

**Plus button** : This button at the top right corner will lead the user go to join circle screen.

**Menu button** : This button will open the drawer menu .

**Function list** : This is the list of all the function inside the application .

## Chapter 5 : System Implementation

### 5.4.6 Drawer Menu

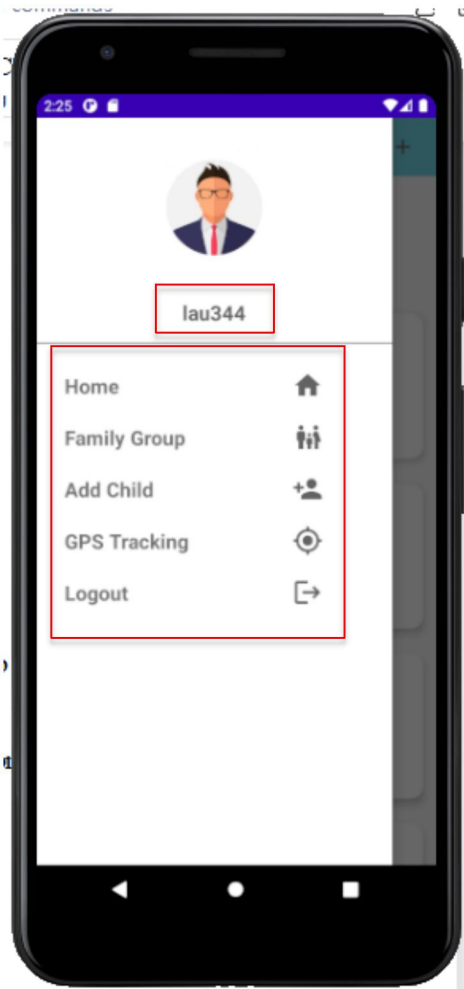


Figure 46 Drawer menu

**Profile name :** The profile name will change based on the user account data inside the Firebase.

**Menu list :** The menu list show somewhere to navigate .

## **Chapter 6 :System Evaluation And Discussion**

### **Chapter 6 :System Evaluation And Discussion**

#### **6.1 System Testing and Performance Metrics**

The system testing is one of crucial part that must be done after the implementation of coding is done . System testing must be done before the whole completed system is pass to the client for final product or the end user . The program developer must to test the application and find out is that any bug is existing and solve it as soon as possible to provide a high quality of project to the client or end user by improving their impression and loyalty of our project . During the debugging or testing , the developer maybe will come out some new idea or better solution for the function and this also a way that can improve the quality of our project system . The purpose that we must do the testing is hope to provide a high quality and interactive application to the client and end-user. The testing method that I have used in this project is Alpha and Beta testing.

## Chapter 6 :System Evaluation And Discussion

### 6.2 Testing Setup and Result

#### 6.2.1 Alpha testing

The Alpha testing is one of the software testing that is used to find defects in a project system before it is released to end users or the client and testing the user acceptability .

<b>6.2.1.1 Login screen</b>		
<b>Testing action</b>	<b>Bug encounter</b>	<b>Status</b>
<ul style="list-style-type: none"><li>Email and password input</li></ul>	<ul style="list-style-type: none"><li>After press login , the progression bar keep loading</li><li>The password is wrong but still can jump to next screen</li></ul>	Fixed
<b>6.2.1.2 Register screen</b>		
<b>Testing action</b>	<b>Bug encounter</b>	<b>Status</b>
<ul style="list-style-type: none"><li>Data input checking</li><li>Input field is empty</li><li>Double checking password</li></ul>	<ul style="list-style-type: none"><li>Email format checking is not work</li><li>Input field empty but alert message not shown</li></ul>	Fixed
<b>6.2.1.3 Forget Password screen</b>		
<b>Testing action</b>	<b>Bug encounter</b>	<b>Status</b>
<ul style="list-style-type: none"><li>Email format is correct</li></ul>	<ul style="list-style-type: none"><li>Email format checking is not work</li></ul>	Fixed

Table 3 Alpha testing

## Chapter 6 :System Evaluation And Discussion

<b>6.2.1.4 Join circle screen</b>		
<b>Testing action</b>	<b>Bug encounter</b>	<b>Status</b>
<ul style="list-style-type: none"> <li>● Parent role can join circle</li> <li>● Child role cannot join circle</li> <li>● Join code availability</li> </ul>	<ul style="list-style-type: none"> <li>● Parent and child role both can join</li> <li>● Press the button of submit keep loading</li> </ul>	Fixed
<b>6.2.1.5 Home screen</b>		
<b>Testing action</b>	<b>Bug encounter</b>	<b>Status</b>
<ul style="list-style-type: none"> <li>● Home drawer menu is workable</li> <li>● Top right corner “plus” join circle button is workable</li> </ul>	<ul style="list-style-type: none"> <li>● Home drawer menu cannot call</li> <li>● The “plus” join circle button is not obvious after clicked</li> </ul>	Fixed
<b>6.2.1.6 Call Detect screen</b>		
<b>Testing action</b>	<b>Bug encounter</b>	<b>Status</b>
<ul style="list-style-type: none"> <li>● Parent and child role will get different screen</li> <li>● Data sending to Firebase</li> <li>● Data retrieving from Firebase</li> </ul>	<ul style="list-style-type: none"> <li>● Data cannot sending to Firebase</li> <li>● Data cannot retrieve from Firebase</li> </ul>	Fixed

**Table 4 Alpha testing**

## Chapter 6 :System Evaluation And Discussion

<b>6.2.1.7 SMS detect screen</b>		
<b>Testing action</b>	<b>Bug encounter</b>	<b>Status</b>
<ul style="list-style-type: none"> <li>• Parent and child role will get different screen</li> <li>• Data sending to Firebase</li> <li>• Data retrieving from Firebase</li> </ul>	<ul style="list-style-type: none"> <li>• Data cannot sending to Firebase</li> <li>• Data cannot retrieve from Firebase</li> </ul>	Fixed
<b>6.2.1.8 GPS tracking screen</b>		
<b>Testing action</b>	<b>Bug encounter</b>	<b>Status</b>
<ul style="list-style-type: none"> <li>• Show the exactly child's location</li> <li>• Change the location of child</li> </ul>	<ul style="list-style-type: none"> <li>• Parent role cannot show the exactly child's location</li> <li>• Location of child change cannot be detected</li> </ul>	Fixed
<b>6.2.1.9 Screen Time screen</b>		
<b>Testing action</b>	<b>Bug encounter</b>	<b>Status</b>
<ul style="list-style-type: none"> <li>• Parent role will see the screen time record of child</li> </ul>	<ul style="list-style-type: none"> <li>• Parent role cannot see the screen time record of child</li> </ul>	Fixed

Table 5 Alpha testing

## Chapter 6 :System Evaluation And Discussion

### 6.2.2 Beta testing

Beta testing is carried out in a genuine setting by real users of the software application. The testing developer will act an end user to go through the testing .

<b>6.2.2.1 Login screen</b>		
<b>Test case</b>	<b>Expected Result</b>	<b>Same with expected Result</b>
<ul style="list-style-type: none"><li>• User can login and go the next screen</li></ul>	<ul style="list-style-type: none"><li>• If the email and password is match with account in Firebase will go to next screen</li><li>• If the email and password not match with account in Firebase will prompt message and stay remain the screen</li></ul>	Yes
<b>6.2.2.2 Register screen</b>		
<b>Test case</b>	<b>Expected Result</b>	<b>Same with expected Result</b>
<ul style="list-style-type: none"><li>• User can register successfully</li></ul>	<ul style="list-style-type: none"><li>• If the email format is wrong prompt alert message</li><li>• If the input text field is empty prompt alert message</li><li>• Prompt toast message after successful register</li></ul>	Yes

Table 6 Beta testing

## Chapter 6 :System Evaluation And Discussion

<b>6.2.2.3 Forget Password screen</b>		
<b>Test case</b>	<b>Expected Result</b>	<b>Same with expected Result</b>
<ul style="list-style-type: none"> <li>User can renew the password by email if they are forgotten the password .</li> </ul>	<ul style="list-style-type: none"> <li>If the email format is wrong prompt alert message</li> <li>Send an renew password email to the email key in</li> </ul>	Yes
<b>6.2.2.4 Join circle screen</b>		
<b>Test case</b>	<b>Expected Result</b>	<b>Same with expected Result</b>
<ul style="list-style-type: none"> <li>Parent role can add child successfully</li> <li>Child role cannot join circle with parent</li> </ul>	<ul style="list-style-type: none"> <li>If detect as child role will prompt toast message and stay remain screen</li> <li>If the code is match with Firebase then prompt message successfully join circle.</li> </ul>	Yes

Table 7 Beta testing



## Chapter 6 :System Evaluation And Discussion

<b>6.2.2.5 Home screen</b>		
<b>Test case</b>	<b>Expected Result</b>	<b>Same with expected Result</b>
<ul style="list-style-type: none"> <li>User can click all of the function inside home screen</li> </ul>	<ul style="list-style-type: none"> <li>It will jump to specific function screen that by following the function you have clicked</li> </ul>	Yes
<b>6.2.2.6 Call Detect screen</b>		
<b>Test case</b>	<b>Expected Result</b>	<b>Same with expected Result</b>
<ul style="list-style-type: none"> <li>Go different screen by detected role (parent or child)</li> </ul>	<ul style="list-style-type: none"> <li>Parent role will display the child's call log history</li> <li>Child role will updating call log history to Firebase</li> </ul>	Yes
<b>6.2.2.7 SMS Detect screen</b>		
<b>Test case</b>	<b>Expected Result</b>	<b>Same with expected Result</b>
<ul style="list-style-type: none"> <li>Go different screen by detected role (parent or child)</li> </ul>	<ul style="list-style-type: none"> <li>Parent role will display the child's SMS history</li> <li>Child role will updating SMS history to Firebase</li> </ul>	Yes

Table 8 Beta testing

## Chapter 6 :System Evaluation And Discussion

<b>6.2.2.8 GPS tracking screen</b>		
<b>Test case</b>	<b>Expected Result</b>	<b>Same with expected Result</b>
<ul style="list-style-type: none"> <li>Parent and child will see the location of child</li> </ul>	<ul style="list-style-type: none"> <li>Parent role will display the child's GPS location</li> <li>Child role will updating GPS location to Firebase and display at the screen</li> </ul>	Yes
<b>6.2.2.4 Screen Time screen</b>		
<b>Test case</b>	<b>Expected Result</b>	<b>Same with expected Result</b>
<ul style="list-style-type: none"> <li>Parent and child will see the screen time of child</li> </ul>	<ul style="list-style-type: none"> <li>Parent role will display the child's Screen Time</li> <li>Child role will updating Screen Time to Firebase and display at the screen</li> </ul>	Yes

Table 9 Beta testing

## Chapter 6 :System Evaluation And Discussion

### 6.3 Project Challenges

The first challenges is doing research in internet and Youtube because even I have taken the subject “Mobile Application Development” offered by UTAR but the things learned from the lecture and practice is only can cover around 30% of the whole project . Therefore , the 70% left I need to learn from internet or Youtube but not the everything found from internet or Youtube are suitable for my project and I need to try understanding those coding and make some modify to meet the requirement of my project . This is the most challenging thing for me because the process of researching and learning occupied me a lot of time and there is a probability that I cannot find the material that I want .

The second challenges is the hardware specifications because the development tools Android Studio that I use require more than 8 gb RAM to run smoothly but my laptop only has 8gb RAM . There has a lagging issue on my laptop while I am opening the Android Studio and also opening the chrome to do some multi-task jobs . Although I does not open the multi-task jobs , sometimes the emulator of android studio will also automatically crashed and it required me to close and reopen again . This process occupied me sometimes .

The third challenges is how to plan the system flow to make sure give the user have better user experience . The whole project concept is quite a lot of restriction like child cannot see the display of parents , some button cannot be clicked by child and others . All of these restriction is for better user experiences . In this phase is quite challenge for me because all of the flow and all of the logic how to work I need to figure out .

## Chapter 6 :System Evaluation And Discussion

### 6.4 Objectives Evaluation

6.4.1 Design a mobile application for multi level user management access		
Issue	Solution	Achieved?
<ul style="list-style-type: none"><li>• Connect the relationship between parent role and children role</li><li>• Parent role retrieve data of child</li></ul>	<ul style="list-style-type: none"><li>• Using a join code to match the user id of the child and do the matching</li><li>• Create a family group and assign the child's user id inside the family group . When parent retrieving the data of child can go to family group find the child's user id and use the child's user id to retrieve the child's data</li></ul>	✓

Table 10 Objective evaluation

## Chapter 6 :System Evaluation And Discussion

<b>6.4.2 Implement parental monitoring features for mobile usage</b>		
<b>Issue</b>	<b>Solution</b>	<b>Achieved?</b>
<ul style="list-style-type: none"> <li>• Display the child's call log history</li> <li>• Display the child's SMS history</li> <li>• Display the child's screen time record</li> </ul>	<ul style="list-style-type: none"> <li>• Retrieve the child's call log , SMS , screen time record by coding and send to Firebase as storing data</li> <li>• Parent role can retrieve the child's call log , SMS , screen time record from Firebase through the child's user id</li> </ul>	✓
<b>6.4.3 To enable location tracking feature of mobile device</b>		
<b>Issue</b>	<b>Solution</b>	<b>Achieved?</b>
<ul style="list-style-type: none"> <li>• Display the child's GPS location on Google Map</li> </ul>	<ul style="list-style-type: none"> <li>• Retrieve the child's GPS location and send to Firebase as storing data</li> <li>• Parent role can retrieve the child's GPS location from Firebase through the child's user id and display it on the Google Map</li> </ul>	✓

**Table 11 Objective evaluation**

## **Chapter 7: Conclusion and Recommendation**

### **Chapter 7: Conclusion and Recommendation**

#### **7.1 Conclusion**

The expected outcome of this project is to develop an Parental Monitoring Application that can help the parent to monitor their children's handphone . This is the way to control the issue of children are addicted in using handphone or over rely on handphone . Therefore , the main purpose of this project is help the parents can more easier to monitor or control their children on using the handphone . Before going to the implementation stage , I have do some comparison among with the existed similar application .After doing the comparison , the functionality of the proposed project that I have decided are Call log history , SMS detect , GPS tracking and Screen time management.

The Call log history can help parent to track their children's outgoing and ingoing calls and the SMS detect also can help parent to track their children SMS history . These way can let the parents have a further understanding about their children's behavior and find out the potential risky that might harmful on their children . Besides , the GPS tracking is let the parent know the actual location of their children and this is a good functionality because if unfortunately their children are in risky or missing their parent can find out their location by this features.

The Screen time management can help the parent to know the daily usage , weekly usage , monthly usage of their children . It can know which application their children spent more time and according the usage graph can let the parents can more specific to restrict their children's usage time on those application .

In a nutshell , the purpose to do this project is hope to resolve the problem of child over relying on the smartphone and give them have a better healthy body liked do not wear spectacles and others .

## **Chapter 7: Conclusion and Recommendation**

### **7.2 Recommendation**

The solution of the first challenge is try to ask the opinion the people who are experienced and expert in the similar area . We also can ask for help by the people who are expert to solve the tackle that we faced . This is the most effective ways to solve the problem of the first challenge.

The solution of the second challenge is to update the hardware specification . Firstly , We can chose the less budget way which is only upgrade the RAM specification and the more budget way can upgrade both of the RAM and SSD .

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## REFERENCES

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# FINAL YEAR PROJECT WEEKLY REPORT

## FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

<b>Trimester, Year:</b> Jan , 2022	<b>Study week no.:</b> 3
<b>Student Name &amp; ID:</b> Lau Wei Qing , 1901325	
<b>Supervisor:</b> Ts Dr Gan Ming Lee	
<b>Project Title:</b> Smart phone usage Parental Monitoring & Control	

### 1. WORK DONE

[Please write the details of the work done in the last fortnight.]

- Review the FYP1 report and do a plan about the time table

### 2. WORK TO BE DONE

- Start to do the fyp2 report

### 3. PROBLEMS ENCOUNTERED

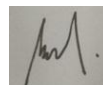
- Not familiar with the whole project

### 4. SELF EVALUATION OF THE PROGRESS

- Good



Supervisor's signature



Student's signature

# FINAL YEAR PROJECT WEEKLY REPORT

## FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

<b>Trimester, Year:</b> Jan , 2022	<b>Study week no.:</b> 6
<b>Student Name &amp; ID:</b> Lau Wei Qing , 1901325	
<b>Supervisor:</b> Ts Dr Gan Ming Lee	
<b>Project Title:</b> Smart phone usage Parental Monitoring & Control	

### 1. WORK DONE

[Please write the details of the work done in the last fortnight.]

- Finish the fyp2 chapter 1 , 2 , 3

### 2. WORK TO BE DONE

- Start to do the implementation of coding

### 3. PROBLEMS ENCOUNTERED

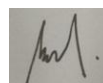
- Always facing bug need to solve it

### 4. SELF EVALUATION OF THE PROGRESS

- So Far So Good



Supervisor's signature



Student's signature

# FINAL YEAR PROJECT WEEKLY REPORT

## FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

<b>Trimester, Year:</b> Jan , 2022	<b>Study week no.:</b> 9
<b>Student Name &amp; ID:</b> Lau Wei Qing , 1901325	
<b>Supervisor:</b> Ts Dr Gan Ming Lee	
<b>Project Title:</b> Smart phone usage Parental Monitoring & Control	

### 1. WORK DONE

[Please write the details of the work done in the last fortnight.]

- Finish Call log history and SMS history implementation

### 2. WORK TO BE DONE

- Start to do the implementation of GPS tracking and screen time

### 3. PROBLEMS ENCOUNTERED

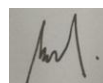
- Always facing bug need to solve it

### 4. SELF EVALUATION OF THE PROGRESS

- So Far So Good



Supervisor's signature



Student's signature

# FINAL YEAR PROJECT WEEKLY REPORT

## FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

<b>Trimester, Year:</b> Jan , 2022	<b>Study week no.:</b> 13
<b>Student Name &amp; ID:</b> Lau Wei Qing , 1901325	
<b>Supervisor:</b> Ts Dr Gan Ming Lee	
<b>Project Title:</b> Smart phone usage Parental Monitoring & Control	

### 1. WORK DONE

[Please write the details of the work done in the last fortnight.]

- Finish all implementation of function

### 2. WORK TO BE DONE

- Start to do the testing and check the format of report

### 3. PROBLEMS ENCOUNTERED

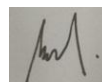
- Report need to check carefully

### 4. SELF EVALUATION OF THE PROGRESS

- So Far So Good



Supervisor's signature



Student's signature

## SMARTPHONE USAGE PARENTAL MONITORING APP

**Name :** Lau Wei Qing  
**Student ID :** 1901325  
**Course :** Information System Engineering  
**Supervisor :** Ts Dr Gan Ming Lee



---

### INTRODUCTION

A application that developed for the purpose of helping parent to monitoring their children behavior and the time spent on the handphone . This application can help parent to track the location of children , call history , SMS history , web filtering and screen time management



### RESULTS



### OBJECTIVE & SCOPE

- Easily to control and monitoring children
- Parent can restrict the children's handphone
- To solve the problem of children over rely on handphone
- Prevent the potential harmful website

---

### METHODOLOGY



Using Agile Methodology to apply on this project



Using Adobe XD to sketch the User Interface design

---

### CONCLUSION

- Easier parent control children
- Try the best to prevent anything that possible harmful to children
- Overcome the problem of children over rely on smartphone

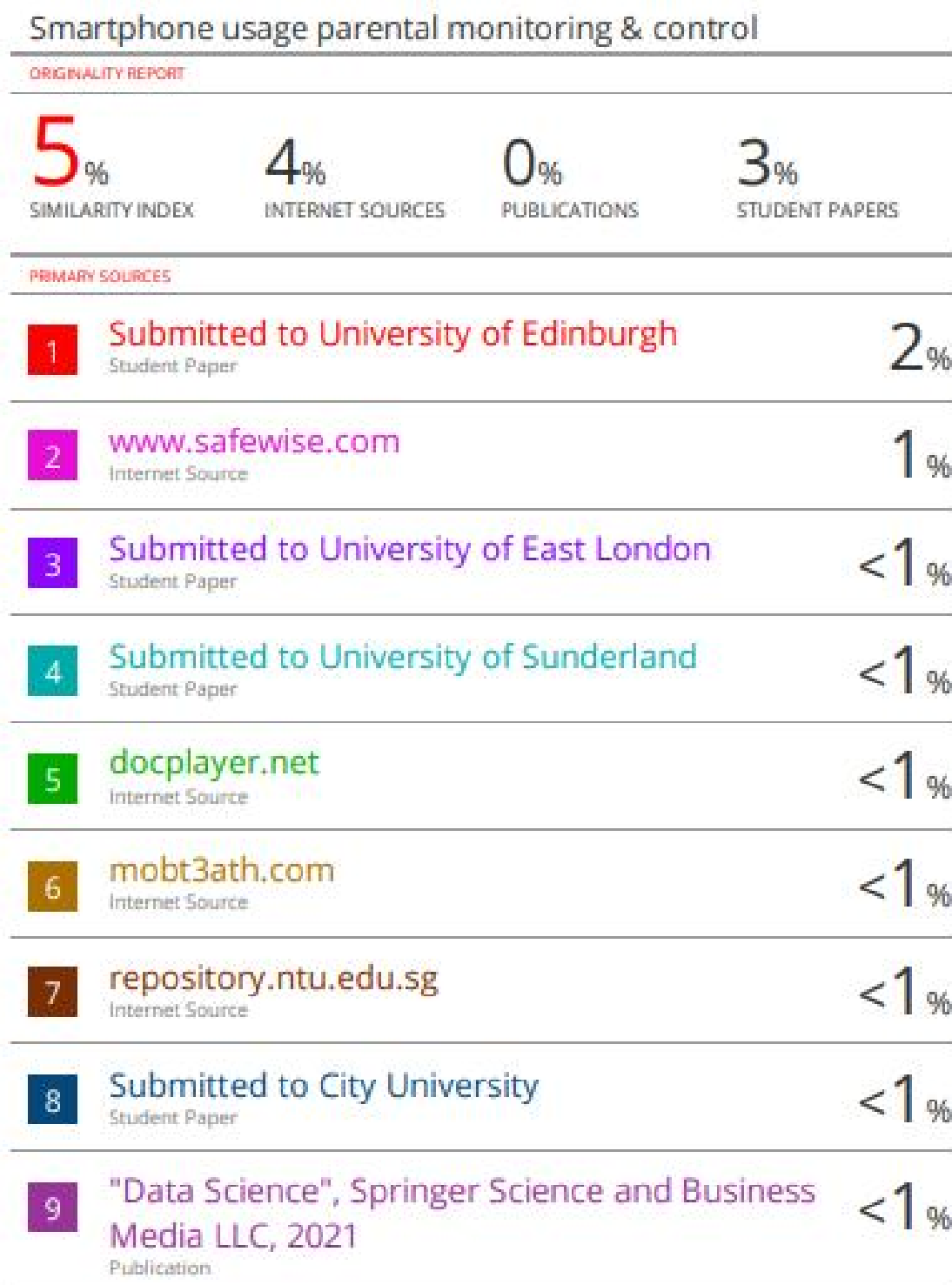




Final Year Project

## PLAGIARISM CHECK RESULT

## PLAGIARISM CHECK RESULT



## PLAGIARISM CHECK RESULT

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Exclude quotes  On

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PLAGIARISM CHECK RESULT

<b>Form Title: Supervisor's Comments on Originality Report Generated by Turnitin for Submission of Final Year Project Report (for Undergraduate Programmes)</b>			
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**FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY**

<b>Full Name(s) of Candidate(s)</b>	LAU WEI QING
<b>ID Number(s)</b>	1901325
<b>Programme / Course</b>	BACHELOR OF INFORMATION SYSTEMS (HONS) INFORMATION SYSTEM ENGINEERING
<b>Title of Final Year Project</b>	Smart phone usage Parental Monitoring & Control

<b>Similarity</b>	<b>Supervisor's Comments (Compulsory if parameters of originality exceed the limits approved by UTAR)</b>
<b>Overall similarity index: <u>  5  </u> %</b>  <b>Similarity by source</b> Internet Sources: <u>  4  </u> % Publications: <u>  0  </u> % Student Papers: <u>  3  </u> %	
<b>Number of individual sources listed of more than 3% similarity: <u>  0  </u></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.***

*GML*

\_\_\_\_\_  
Signature of Supervisor

\_\_\_\_\_  
Signature of Co-Supervisor

## PLAGIARISM CHECK RESULT

Name: Gan Ming Lee

Date: 21/4/2022

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

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

# CHECKLIST



**UNIVERSITI TUNKU ABDUL RAHMAN**  
**FACULTY OF INFORMATION & COMMUNICATION TECHNOLOGY**  
**(KAMPAR CAMPUS)**

## CHECKLIST FOR FYP2 THESIS SUBMISSION

Student Id	1901325
Student Name	Lau Wei Qing
Supervisor Name	Ts Dr Gan Ming Lee

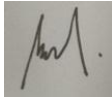
TICK (✓)	DOCUMENT ITEMS
	Your report must include all the items below. Put a tick on the left column after you have checked your report with respect to the corresponding item.
✓	Front Plastic Cover (for hardcopy)
✓	Title Page
✓	Signed Report Status Declaration Form
✓	Signed FYP Thesis Submission Form
✓	Signed form of the Declaration of Originality
✓	Acknowledgement
✓	Abstract
✓	Table of Contents
✓	List of Figures (if applicable)
✓	List of Tables (if applicable)
N/A	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)
✓	Weekly Log

## CHECKLIST

✓	Poster
✓	Signed Turnitin Report (Plagiarism Check Result - Form Number: FM-IAD-005)
✓	I agree 5 marks will be deducted due to incorrect format, declare wrongly the ticked of these items, and/or any dispute happening for these items in this report.

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

I, the author, have checked and confirmed all the items listed in the table are included in my report.



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(Signature of Student)

Date: 22/4/22