City University of Hong Kong
Department of Electronic Engineering

EE4990

Mobile Product Design Final Report
2014/2015(Summer Camp)

[Go Riding]

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ABSTRACT

This report records detailed information of an Android app named Go Riding. The objective of Go Ridingis to provide tourists and fans of bike tours in HK with some bike tour routes and a platform where they can share their experience of biking. To develop this app, a two-week project was built and this project required two programmers, one UI designer and one clerical staff. Preparation of this project included market research, competitive analysis and roadmap. The development took ten days and coding, polish of user interface and data colleting were main work during those ten days.

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Chapter 1

Introduction

1.1 Market Research

Bike is an important role in HK people's daily life. According to a report published by Transport Department of HK [1], bikes were used about 62000 times per day as means of transportation in 2002, and entertainment and exercise were purpose for 70% of users whose age were elder than 15. All these number indicates that bike is not only a means of transportation in HK, but also a method for entertainment. One important way of entertainment with bike is bike tour and it seems bike tour is getting more popular nowadays.

Besides local people in HK, some tourists from other areas also want to have a HK bike tour. Since it is more relaxed and free comparing to traditional way of visiting. However, because of lack of accurate guidance software for bike tour and inconvenience of using Google map for bike tour, the uncertainty of route is a problem for those people who want a bike tour. For those people who are not familiar with HK, the problem is much worse as they have no idea how to start a bike tour.

All these problems can be solved by using our guidance app – Go Riding. The app collects some bike tour routes in HK from internet and provides guidance of these routes with high accuracy. It also gives users locations of restaurants and beautiful sceneries along the routes. The best thing of this app is that it gives users chances to share their experiences and photos.

1.2 App summary

1.2.1 App Name and Summary of the proposed App

In this project, a bike tour guidance app named “Go Riding” is being designed. Three main functions are location, show the route and some basic information for biking and share with friends. This app have this three main function. It can help people who like biking more enjoy their trips and have a better experience during biking.

1.2.2 Target User Group

The target users are fans of bike tours in HK and tourists from other areas who want to have a bike tour in HK. Go Riding can provides them guidance of some great bike tour routes, save time wasted for seek right direction.

1.2.3 Competitive Analysis

In order to find out competitive ability of our app, a search on Google Play Store for similar apps was done at the beginning of this project. With key words such as “bike”, “riding”, about sixteen apps was found. However, after testing them one by one, we found most of them was designed for exercise and did not have functions like guidance. The only one provided such function was called “Bike2World”. By comparing to this app, we found advantages and disadvantages of Go Riding.

First advantage of Go Riding was high accuracy. The routes Bike2World had was provided by amateurs while Go Riding had routes collected by project members. Because of sources, accuracy of Go Riding was much higher than Bike2World.

Second advantage of Go Riding was better user interface. Although Bike2World was an app, it was more like a browser to a specified website. The change between interfaces of Bike2World needed time and it was very slow. The size of font of Bike2World was also not designed well. Comparing to Bike2World, the operation of Go Riding was smooth.

Third advantage was Go Riding could share photos through social network apps while Bike2World could not. Bike2World may have considered function for social purpose, but it did not achieve it.

Of course Go Riding had some disadvantage comparing to Bike2World. The most significant one was that Bike2World was linked to a bike association website, therefore users could get news about bike tour from Bike2World immediately and they could also form activities of bike tour easily.

Based on the analysis above, it turns out Go Riding is a app with great competitive power in Google app store, and have great effect in target market.

1.2.4 Target Platforms and Device Configurations

An Android mobile phone with GPS, Internet functions.

Android min SDK version: API15 (android 4.0.3)

HTC Butterfly

Android version 4.4.2

HTC SDK API 5.69.

Chapter 2

App Design and Analysis

2.1 User Scenarios

Background:

Dave is big fan of bike tour and just came to HK to spend his vacation. In his vacation plan, he will take a bike tour in HK to make this trip more interesting.

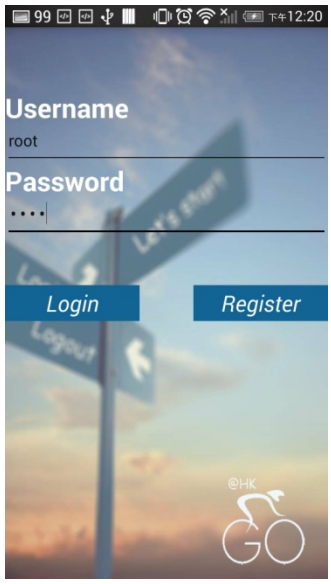
Scenario:

After checking in to hotel, Dave wants to start his bike tour immediately. However, it is impossible for a tourist to find a great bike tour route in such a short time. Dave feels very upset.

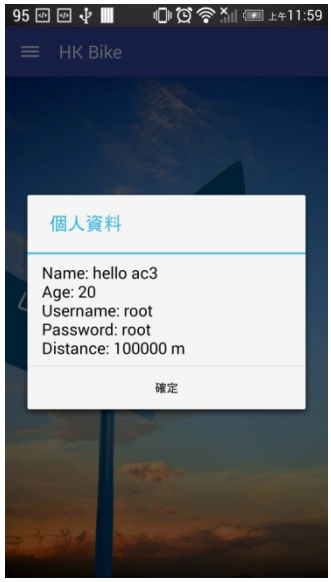
Since the traffic net is complex, and the number of famous sceneries in HK is a lot. It is a big work for a tourist to find a bike tour route cover a lot of sceneries. If Dave wants to find the route by his own, his vacation will ruin. One day, Dave finds this app, Go Riding. By looking at routes provided by this app, he immediately knows which route is best for him. With the guidance of the app, he never misses any good scenery along the route and can also find place like restaurant easily.

2.2 Screen and Interactivity Design

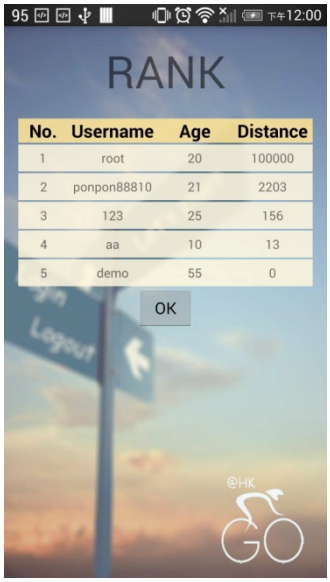
Main Activity(Peng Yu-Shao)

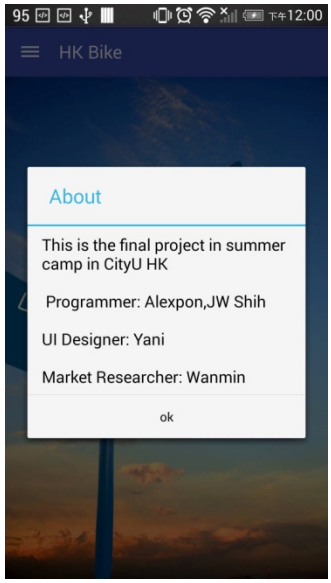


This is the home screen (MainActivity.java). There are two buttons on it. One is “Login/Logout”; another is “Let’s start”. If user click Login/Logout and he/she is not login yet, he/she will move to Login page (Login.java). If user click Login/Logout and he/she is already login, he/she will logout and get a succeed message. In the login page, the user needs to enter username and password to login. As soon as the user click “Login”. APP will call ServerRequest Class to start Http connection. After connect to the server we can use PHP files to check data sent by user. If match to the database, login success. If not, fail to login. If the user doesn’t have account, he/she can register one.



In home screen, the user can open a drawer on the left side. In this drawer layout there are four items. If the user clicks first one, it will show the user data. If the user clicks second one, it will move to another activity. (Change User Data) The user can modify data and update to





the database there. If the user clicks third, it will call ServerRequest Class to fetch data from the database and show it on the new activity. (Rank Activity) If the user clicks the last one, if will show some information about developers.

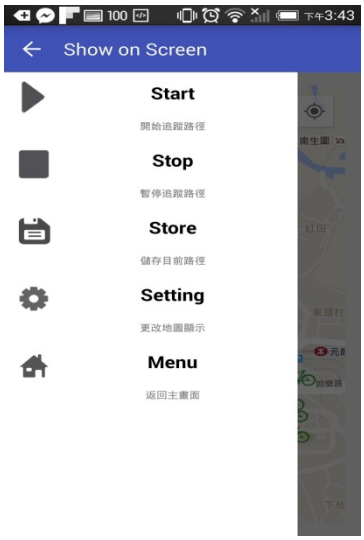
There are all functions in this activity. The user can click “Let’s start” to start his/her trip.

Choose Tour(Peng Yu-Shao)

In this screen, we can see some information about bike route. The drawer layout is designed for user to change the bike route. There are many routes list on the drawer layout. We overwrite the adapter to put some small icon on it. This can make user more convenient to choose a bike route.

Maps Activity (Shih Jhih-Wei)

We have a Google map on the screen. When we choose the navigation bar, we can have several options you can do on your maps. First start to locate, after you choose this option , as you change your location on the map, the system will automatic draw the purple line for you. You can know what route you ride. Second stop to locate, after you click, the system will stop drawing the purple line. Third store, you can store the route in your mobile. Next time when you open GOBIKING again, you can see the new route be add in your route. Fourth is setting, when you choose this, you will see another list on the screen. It shows you that you can choose what you want to see in the map, like food, bike borrower and scenery. Five is menu, back to the map. When you click the photo button, we will transfer the screenshot of Google map into next activity.



This is the function we can draw what you ride

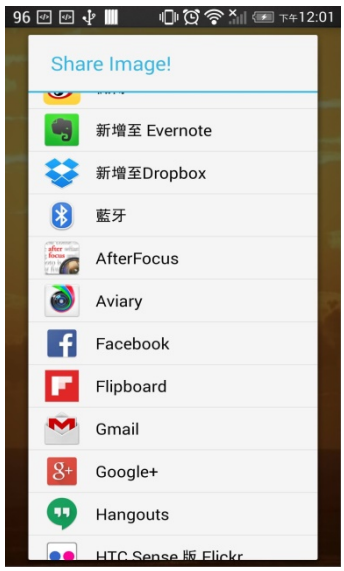
```
@Override
 public void onLocationChanged(Location location) {
     latitude = location.getLatitude();
     longitude = location.getLongitude();
     if (is_path_on) {
         if (Pathnewlat.isEmpty()|| stop) {
             Pathnewlat.add(latitude);
             Pathnewlog.add(longitude);
             pre_lat = latitude;
             pre_log = longitude;
             stop = false;
         } else {
             Pathnewlat.add(latitude);
             Pathnewlog.add(longitude);
             mMap.addPolyline(new PolylineOptions().geodesic(true)
                     .add(new LatLng(pre_lat, pre_log))
                     .add(new LatLng(latitude, longitude))
                     .color(R.color.wallet_holo_blue_light));

             dis_sum = dis_sum + (int)Distance(pre_log, pre_lat, longitude, latitude);
             distance.setText("Distance " + dis_sum + " m");

             pre_lat = latitude;
             pre_log = longitude;
         }
     }
     else {
         stop = true;
     }
 }
```

This is the function we got a screenshot from a map, and how we transfer the map into next activity.

```
public void CaptureMapScreen() {
    GoogleMap.SnapshotReadyCallback callback = new GoogleMap.SnapshotReadyCallback() {
        Bitmap bitmap;

        @Override
        public void onSnapshotReady(Bitmap snapshot) {
            // TODO Auto-generated method stub
            bitmap = snapshot;
            ByteArrayOutputStream baos = new ByteArrayOutputStream();
            bitmap.compress(Bitmap.CompressFormat.JPEG, 100, baos);
            byte[] bitmapByte = baos.toByteArray();
            Intent intent1 = new Intent(MapsActivity.this, PictureShare.class);
            intent1.putExtra("image", bitmapByte);
            startActivity(intent1);
        }
    };

    mMap.snapshot(callback);
}
```

Picture Share (Shih Jhih-Wei)

We got the screenshot from the MapsActivity.java. If you want to share picture to your friends, you can click the share button. A list will show ,and choose the club you want to share.

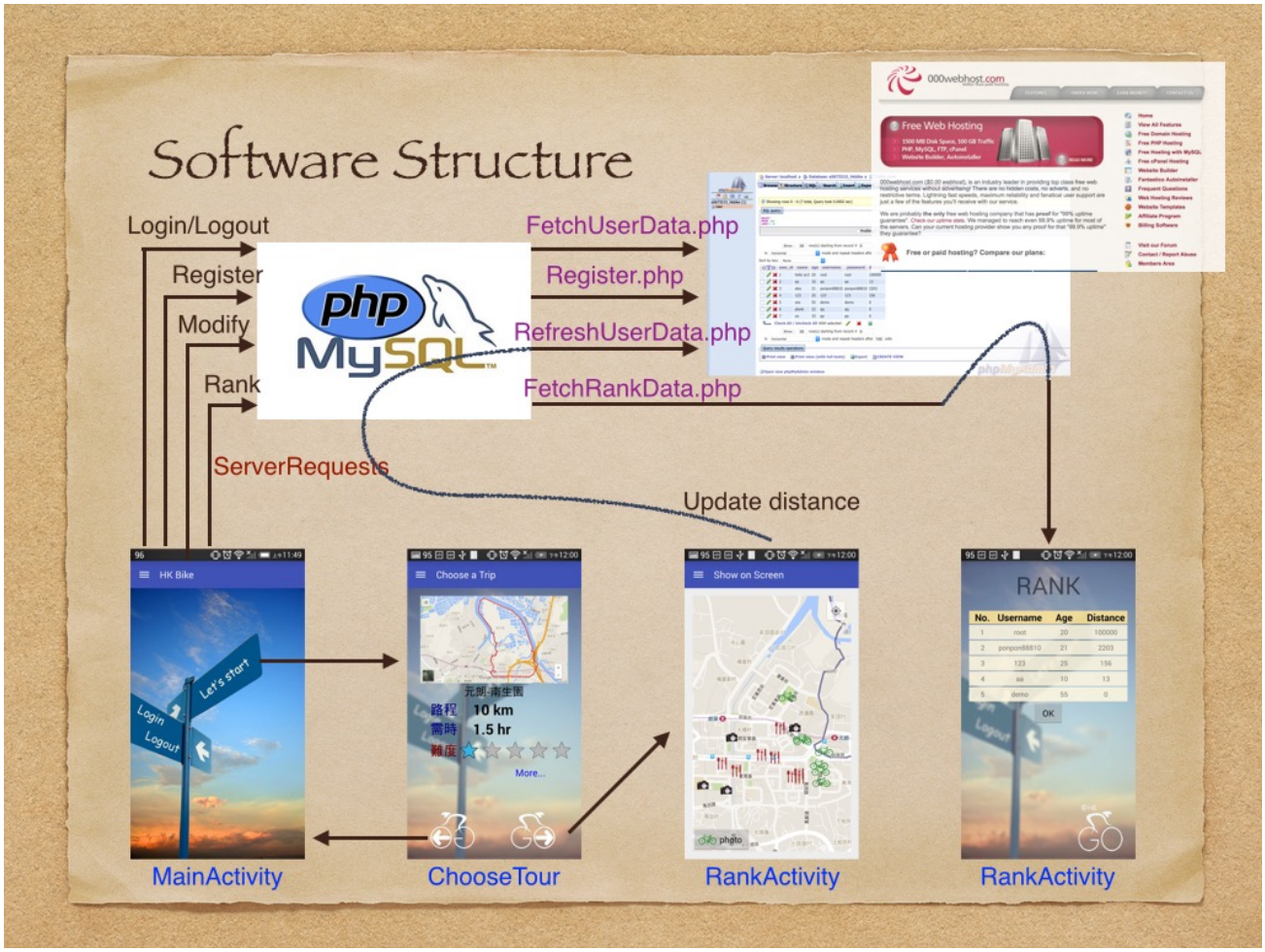


2.3 Architectural Design

2.3.1(Peng Yu-Shao)

This is our software structure

We have four main activities. You can press different component to go to different activity. There are four functions need to use the database. The database we used is PHPMyAdmin, and it is establish on the free web service. We can connect android and database via PHP files. Because our database was not established on localhost, we can fetch data anywhere if we have internet.



2.3.2(Peng Yu-Shao)

There are all our files. We list them and give a brief introduction

Screen

Activity	Layout	Other Screen Tool
MainActivity.java	activity_main.xml	main_drawerlayout.xml / toolbar.xml
ChangeUserData	activity_change_user_data	
Login	activity_login.xml	
Register	activity_register.xml	
RankActivity	activity_rank.xml	
ChooseTour	activity_choose_tour.xml	drawerlayout.xml / toolbar.xml
MapActivity	activity_maps.xml	map_drawerlayout.xml / toolbar.xml
PictureShare	activity_picture_share.xml	

Others

Preference	Intro
PreferenceActivity	store setting data in MapActivity
PreferencesFragment	

Connect to Database	Intro
User	define and initialize users' data
UserLocalStore	handle users data (get data, set data, etc…)
ServerRequest	http connection code was written in here
StoreRank	fetch users' distance order by desc

Interface	Intro
GetUserCallBack	return User type data

Interface	Intro
GetUserCallBacks	return User-array type data

PHP	Intro
Register.php	receive user's data from android and set it to the database
FetchUserData.php	receive username, password from android and check it with data from the database. If it match, get user data and return to android
FetchRankData.php	get the data from database in order of distance
RefreshUserData.php	get new user data from android and update to the database

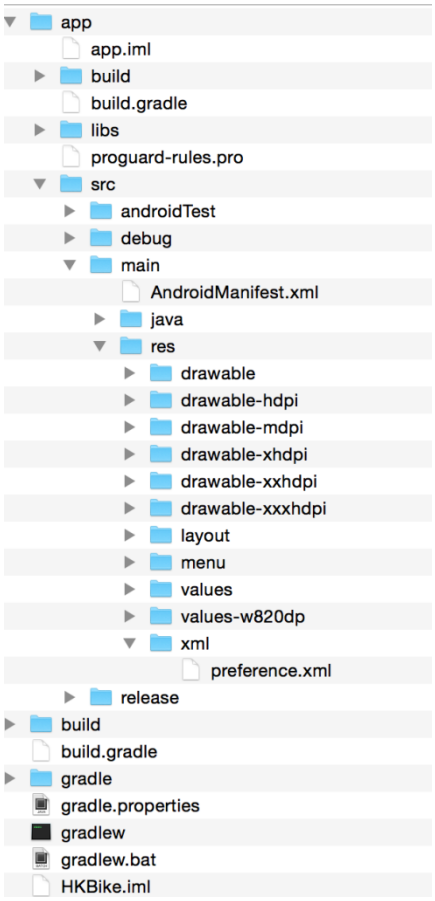
Server	Intro
Free Web Hosting	http://www.000webhost.com
DataBase	phpMyAdmin

Chapter 3

Configuration

3.1 Configuration (Peng Yu-Shao)

Most of the file is described in 2.3.2., so we just give you some file path and we focus on Database and Google Map API.



3.1.1 Where to find the files?

All java file are put in app/main/java folder (java, class)

All layout file are put in app/main/res/layout folder

Preference is put in app/main/res/xml

All PHP files are uploaded to the free server

3.1.2 Database

Our database is set up on the free web service. Here is there website. (http://www.000webhost.com)

How to get a free service? We only need to register a new account, then we will get a free web service. After get the service, we can set our database, tables, or other elements. Then, we can fetch data via php files.

3.1.3 Google Map API

According to that we have some functions which need to use google map, we need to use google map API. If you want to use google map API, you need to login to your google account, enter the key you see in the google_maps_api.xml, then you will get a KEY. After put the key to the assigned area, you can use google map API.

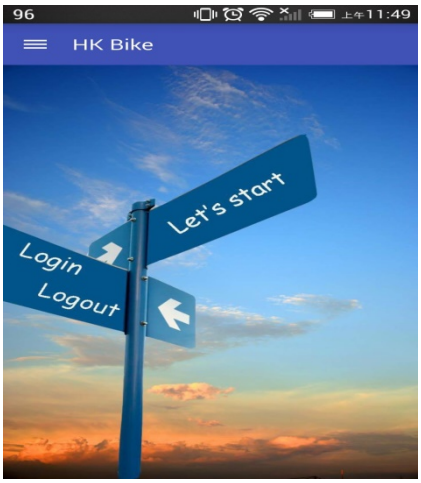
```
<?xml version="1.0" encoding="utf-8"?>
<resources>

    <string name="google_maps_key_instructions">
        <!--
    TODO: Before you run your application, you need a Google Maps API key.

    To get one, follow this link, follow the directions and press "Create" at the end:

https://console.developers.google.com/flows/enableapi?apiid=maps_android_backend&keyType=CLIENT_SIDE_ANDROID&r=10:BC:63:53:C2

    You can also add your credentials to an existing key, using this line:
    10:BC:63:53:C2:A0:71:01:32:F8:63:89:F8:D5:CC:20:01:43:19:0A;mbp.alexpon.com.hkbike

    Once you have your key (it starts with "AIza"), replace the "google_maps_key"
    string in this file.
        -->
    </string>
    <string name="google_maps_key" templateMergeStrategy="preserve">YOUR_KEY_HERE</string>

</resources>
```

3.2 Known Issues (Shih Jhih-Wei)

We don't have enough function of our personal part. Now we only have the account, distance and some basic information. I think we can update the route for each of user , so each user can have their own route, not just the routes we provide. In the future, we can download the personal route from the database , and provide a ranking of most popular route. We want to make the app more sociable, if user want to ride with other , you can choose the route and record when you ride and leave your basic information. If someone wants to join you, he can use this app to connect. The app will become not only the route provider but the biking lover club.

3.3 User Manual

When you open GOBIKING app, you will see the picture on your screen on the bottom side. If you have an account, you can login, or you can just click let's start. (1)



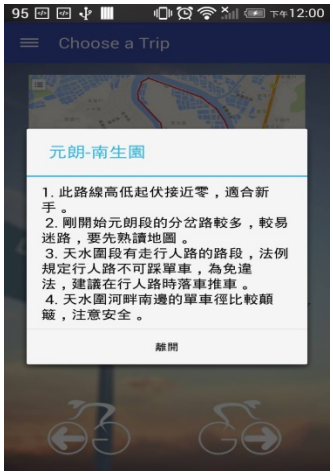
(1)

After you click start, you will see the picture on your screen on the bottom side. You can see some information from the screen, like how hard the route is, how long the trip is and how many time you need. (2)

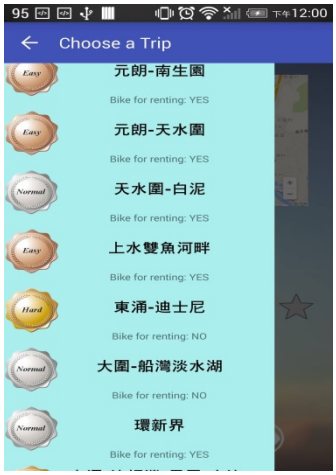
If you want to need more detail, you can click more. (3)

If you don't like the route show on the screen, you can touch choose a trip navigation bar. It will show you more route options to choose, and when you choose a route in the navigation menu, you can easily get some information of the route, like have a bike borrower or how hard it is.(4)

(2)



(3)



(4)

After you choose the route you like, and click next picture which is a person ride right.

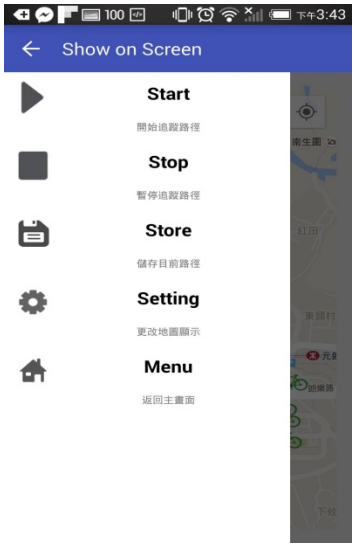
You will see this on your screen. (5)

Again click the navigation bar, you can do a lot of thing of your map, like location, store map and especially the setting. (6)

You can change the map view for what you want; you can show famous food, beautiful scenery and most important thing bike borrower. (7)

If you use the location option, it can draw the line you ride.(8)

(5)



(6)

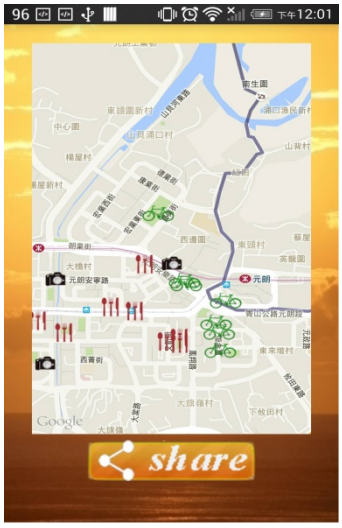
(7)

(8)

After you finish your bike, you can click the photo bottom.

You will see this on your screen.(9)

If you feel really comfortable of the route you ride the bike, you can share the route picture on you facebook, twitter and all of your communication club.(10)



(9)

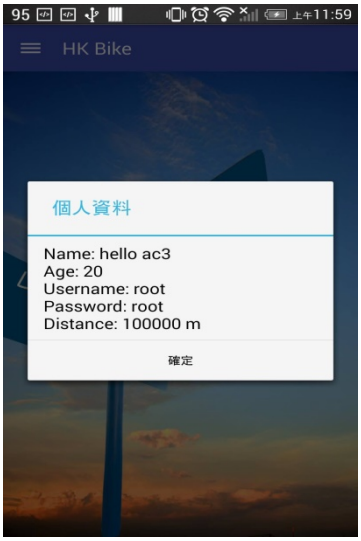
(10)

If you want some personal data in Go Biking app. You can register an account.

You can have more information, like the distance you have ride and your ranking of distance.

(11)(12)

(11)



(12)

Chapter 4

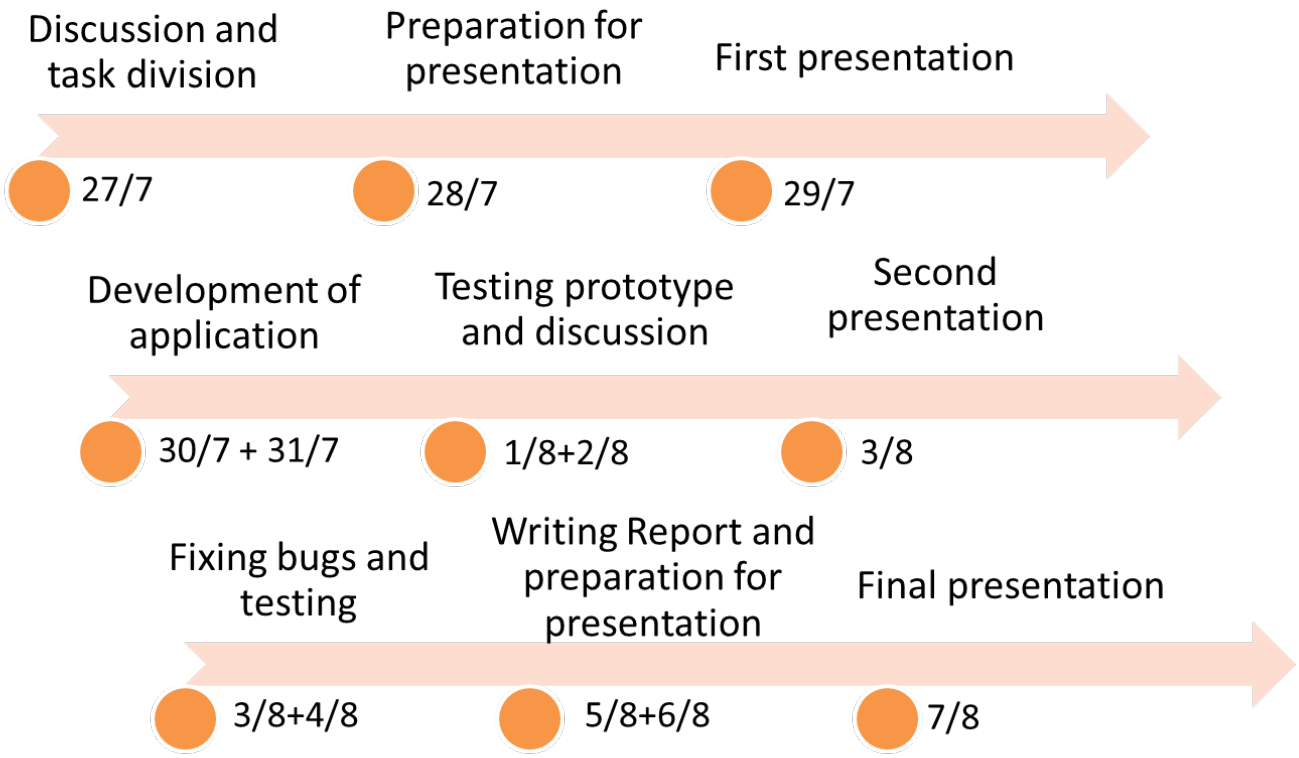
Timeline and Management

4.1 Tasks Division and Role Management (Wu Wanmin)

Our group includes four members and is divided into two subgroups, technical and non-technical. The leader is in the technical subgroup. Each subgroup have certain aim and tasks.

- Technical are responsible for Android programming, testing and guiding technical documentation,
- Non-technical are responsible for UI design, help technical subgroup search and collet data on internet, do presentation and report.
- Leader is responsible to assign tasks to subgroups, be a link between two subgroups.

4.2 Roadmap (Wu Wanmin)



Chapter 5

Conclusion

5.1 Evaluation (Sun Yani)

This two-week project proceeded smoothly according to the working plan, and app was produced successfully. All proposed functions were accomplished. Although we cannot have enough users to test this app and get feedback because of time limit, the app still can be said as competitive app based on information we have for now.

References

[1] 騎單車研究最終報告 - 運輸署

http://www.td.gov.hk/filemanager/tc/publication/cyclingstudy-chinese.pdf