LastMilev2.0

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Problem statement-

IIT Bombay is proposing to provide 200 new bicycles to all campus residents. Your job is to help IITB to decide where to distribute the locations of these 200 bikes (e.g. 30 bikes per location) spread optimally all over the campus so that maximum number of residents can use them. Also, select locations (i.e. leave the bicycles so that they can be collected every evening) where the bicycles can be left after a person rides it.

Requirements

Hardware:-

NodeMCU : for further info visit http://www.nodemcu.com/index_en.html

For tutorials of this project visit: https://youtu.be/fcmb_3aBfH4 , http://www.techiesms.com

Softwares:-

Arduino - https://www.arduino.cc/en/Main/Software

Android Studio- https://developer.android.com/studio/

Bike sharing App-

Instructions

- Open the App
- Sign Up and create your profile
- Login to your account
- Map is displayed showing cycles near you
- Scan the QR code on the bike to unlock it

The app was built using Android Studio and Google maps API was used to use google maps, live tracking of user location and cycle positions.

WE have different sent of activities in the app and each activity have its own significance.

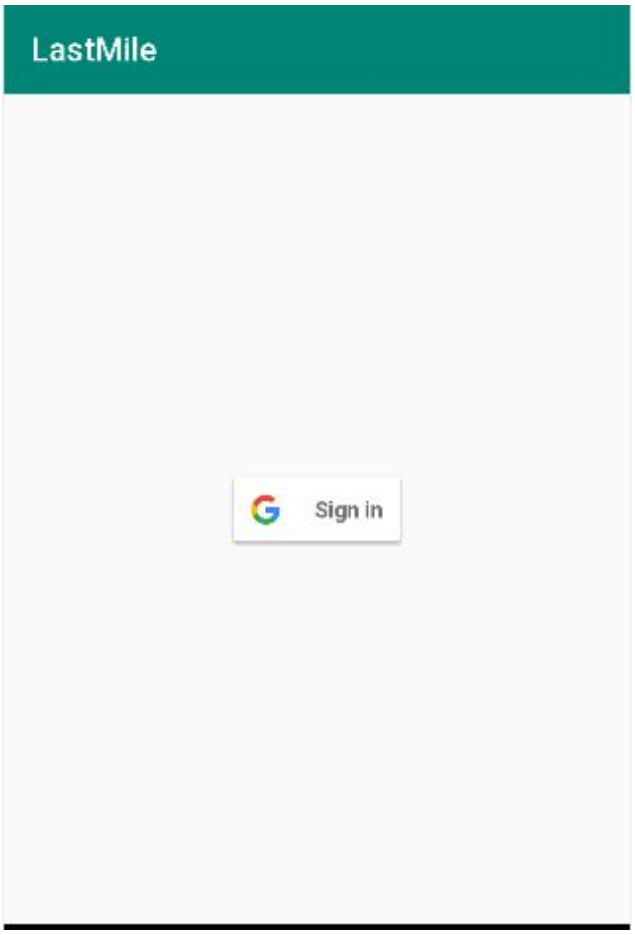
Some methods were added in build.gradle file about maven class to show animation

First activity

First Activity is an animation developed using gif and was using a delay time of 5 seconds.

The xml file for this is activity_main.xml in the source code. The code for the file is written in the MianActivity.java.

Second Activity

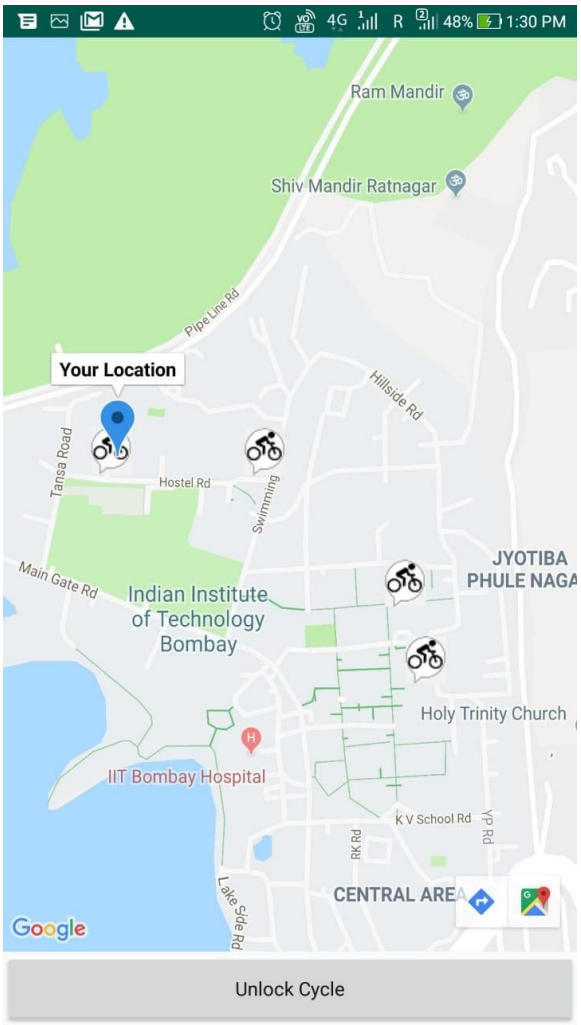


Simple sign in with google method of Firebase database is used.
Firebase database have built in Authentication methods out of that we Added login with google module in the app in the Login.java file.

For this we added some code to build.gradle file of app and build.gradle file of the project. The compliled file are firebase authentication files.

```
implementation 'com.google.firebase:firebase-auth:16.0.1'
implementation 'com.google.android.gms:play-services-auth:15.0.1'
```

Third Activity



This activity contains the google map details it will first look into the database and get all the location of cycle . Presently we considered 4 cycle in the app so it will load all cycle database get its latitude and longitude and store it into Latlng class object and then while creating markers we will put that on the map. The code presently works for 4 cycle but can be easily scaled to any number of cycles by saving all latlong into one array and the running an for loop for marking the cycles on map.

The java file also contains code to access location of the user. The LocationManager gets location of user and then we use method onLocationchanged to update marker. WE will clear the map before plotting the changed location as otherwise it will look as a trace of the users location. The map will be replotted will all cycle location and user location after every 1 seconds and will be moved to user location with focus of 17.2f zoom to user location.

When user will load all cycle location we will see the cstatus variable and then load only those cycle whose status is 1 other will be ignored as when we book cycle it status will update to 0.

This complete code is in the Map.java file and simple.xml file . Various files were added to the manifest file and build.gradle file.

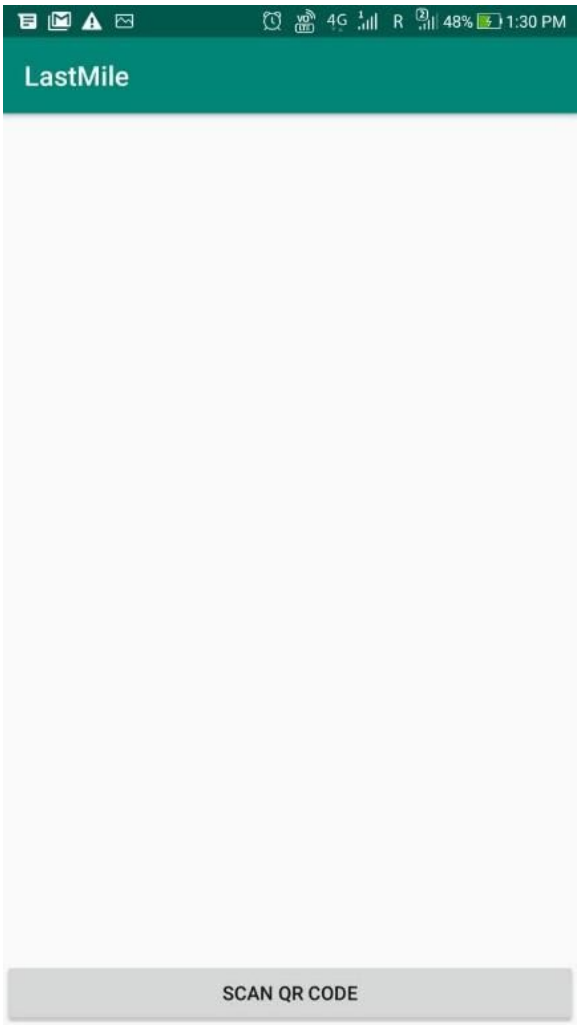
```
implementation 'com.google.android.gms:play-services-maps:15.0.1'
```

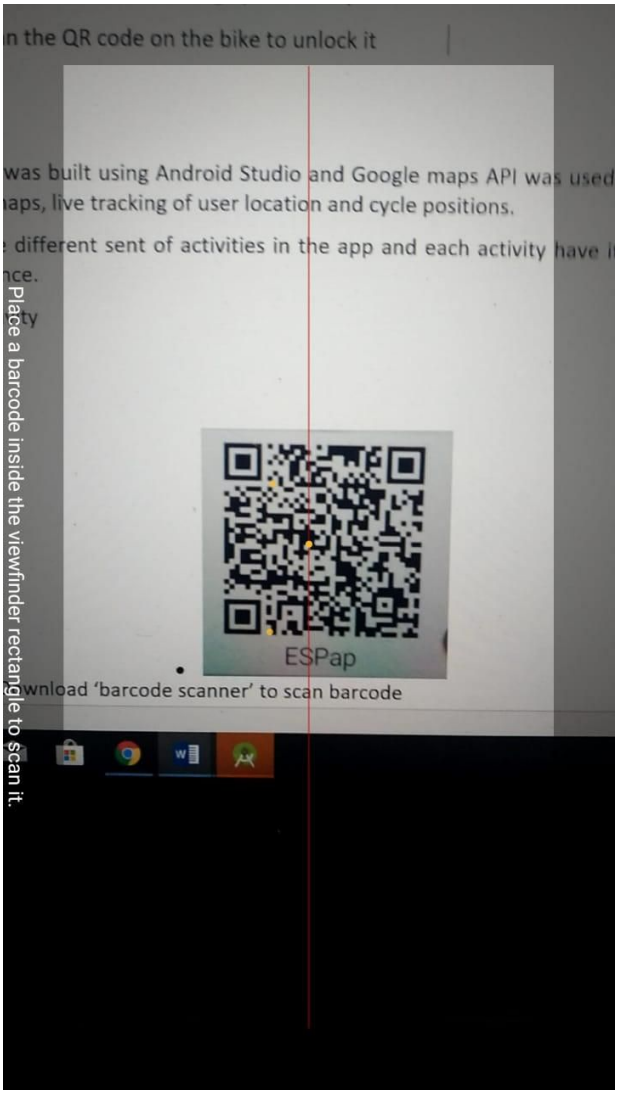
For firebase database connectivity

```
implementation 'com.google.firebase:firebase-core:16.0.1'
implementation 'com.google.firebase:firebase-database:16.0.1'
```

To book a cycle when we reach to any cycle location we can click on the button to unlock cycle and will take you to next page.

Fourth Activity:


48%
1:30 PM
LastMile
SCAN QR CODE



This activity contains only one button to scan QR code. The activity is scanner.xml and the java file is Qrscanner.java. The code written in this file opens up the camera app and scan QRcode containg name of cycle in database, Wifi name and Wifi password of the Node MCU.

The code will scan the code create tokens and split into parts then it will set cycle name we will book and change its status to 0 that is booked and will update latitude longitude of cycle with users latitude and longitude.

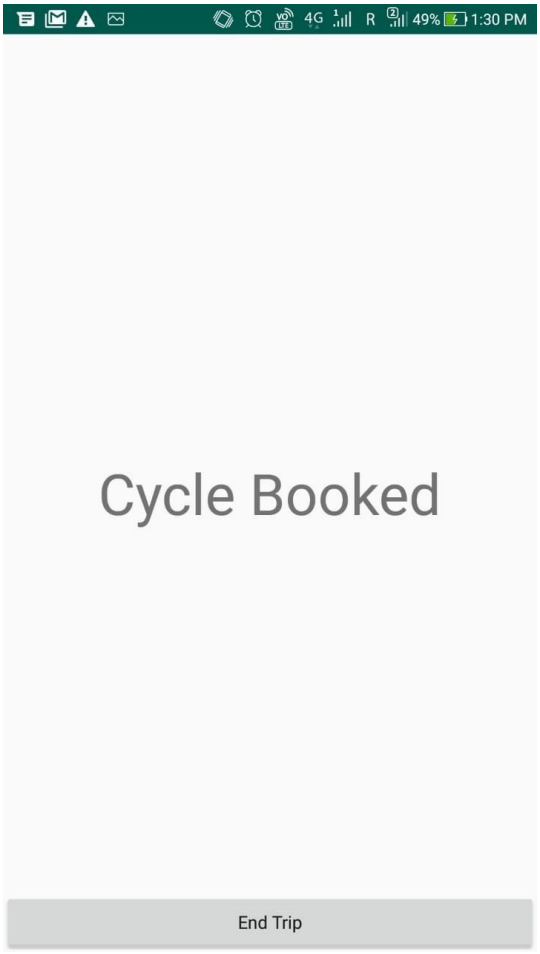
For scanner we have used two libraries and camera acess permission in Manifest File.

```
implementation 'com.google.zxing:core:3.2.1'
implementation 'com.journeyapps:zxing-android-embedded:3.5.0'
```

Along with this it will connect to named hotspot created by the NodeMCU and then open the link to unlock cycle which will change the loght status on NodeMCU.

Then will open up new activity showing cycle booked.

Fifth Activity:



This will continuously take user location form its phone using network provider. Once the user presses the End Trip button the data will be updated on the cycle location of latitude and longitude and user will be sent to the Map window where cycles can be booked.

Again in this file we added the firebase database reference to update location of the cycle and status so that other booking cycle will get the new location of cycle where it was dropped.

The code is in Booked.java file and the activity UI is in booked.xml file.

Working of QR code scanner and connetion to NodeMCU hotspot can be better understood by this section:

Download ‘barcode scanner’ to scan barcode
https://play.google.com/store/apps/details?id=com.google.zxing.client.android&hl=en

- Open in your browser following link to access your Arduino after burning “wifiorig.ino” program : 192.168.4.1
- To turn on /lock cycle access link:- 192.168.4.1/ON
- To turn off/unlock cycle access link:- 192.168.4.1/OFF
- App connects to the online database where it stores User_ID and the coordinates of the bike.
- Ride to your destination
- Cycle is tracked by the user’s GPS enabled smartphone
- Coordinates are updated on the database every second

- After reaching destination park sensibly , lock the bike and press End Trip

Scanning App part:-

- Scan the QR code on the bike to unlock it

Download ‘barcode scanner’ to scan barcode
https://play.google.com/store/apps/details?id=com.google.zxing.client.android&hl=en

- Allow wifi to automatically connect to hotspot of NodeMCU ie ESPap. Wifi password and name will be automatically retrieved by scanning above code by the App given above.
- Open in your browser following link to access your NodeMCU after burning “wifiorig.ino” program : 192.168.4.1
- To turn on /lock cycle access link:- 192.168.4.1/ON
- To turn off/unlock cycle access link:- 192.168.4.1/OFF