

**MOBIBIKE APPLICATION FOR ANDROID**

**NUR SYAFIKAH NABILLA BINTI ZAHARUDIN**

**BACHELOR OF COMPUTER SCIENCE  
(SOFTWARE ENGINEERING) WITH HONOURS**

**UNIVERSITY MALAYSIA PAHANG**



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MOBIBIKE APPLICATION FOR ANDROID

NUR SYAFIKAH NABILLA BINTI ZAHARUDIN

A thesis submitted in fulfillment of the requirements for  
the award of the degree of Computer Science  
(Software Engineering)

Faculty of Computer Systems & Software Engineering  
Universiti Malaysia Pahang

May, 2015

## STUDENT DECLARATION

I hereby declare that the work in this thesis entitled “MobiBike Application for Android” is the result of my own research except as cited in the references. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

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Student : Nur Syafikah Nabilla Binti Zaharudin

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## SUPERVISOR DECLARATION

I hereby declare that I have read this thesis and in my opinion this thesis/report is sufficient in terms of scope and quality for the award of the degree of Bachelor of Computer Science (Software Engineering)

Signature : .....

Supervisor's name : Dr. Mohamed Ariff Ameen

Date : .....

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**“Imagine. Believe. Achieve”**

## ABSTRACT

Third world countries have witnessed many technologies development and achievement which leads to competition among many countries to adapt with this kind of trend. In Malaysia, majority of road users are those who have a four-wheel drive. Thus, technology implemented and enhanced is more on ensuring their comfort during using the road without acknowledging the rights of minority user which are the cyclist. MobiBike is an application that use smart phone device that works as a medium of turning on and turning off the signal lamp, view the bike's speed and distance traveled by user. This application is being developed in order to maximize the sense of security among cyclist, to pay more attention to the rights of cyclist and to add more facilities and equipment for cyclists. In future, this application is expected to be expanded and fully utilized by cyclists especially. The study use Extreme Programming method because it focuses on customer satisfaction where the developers are capable on responding to frequent changes on user requirement and easy to fix any issues for each version. Finally, the application is tested and the result confirms that the proposed system is capable to comply with the research objectives.

## ABSTRAK

Negara dunia ketiga telah memperlihatkan pelbagai pembangunan teknologi dan pencapaian yang membawa kepada persaingan di kalangan negara-negara untuk menyesuaikan diri dengan trend yang di bawa oleh Negara-negara maju yang lain. Di Malaysia, majoriti pengguna jalan raya adalah mereka yang mempunyai pacuan empat roda. Teknologi yang dilaksanakan dan dipertingkatkan lebih kepada memastikan keselesaan mereka semasa menggunakan jalan raya tanpa mengakui hak-hak pengguna minoriti iaitu si penunggang basikal. MobiBike dibangunkan untuk memaksimumkan rasa selamat di kalangan penunggang basikal, untuk memberi perhatian yang lebih kepada hak-hak penunggang basikal dan untuk menambah lebih banyak kemudahan dan kelengkapan untuk penunggang basikal. Pada masa akan datang, aplikasi ini dijangka akan berkembang dan digunakan sepenuhnya oleh penunggang basikal terutamanya. Kaedah kajian menggunakan Pengaturcaraan Extreme kerana ia memberi tumpuan kepada kepuasan pelanggan di mana pemaju perisian mampu untuk bertindak balas terhadap perubahan keperluan pengguna yang kerap dan mudah untuk membaikpulih apa-apa isu-isu bagi setiap versi. Akhirnya, aplikasi ini telah diuji dan hasilnya mengesahkan bahawa sistem yang dicadangkan mampu mematuhi objektif penyelidikan.



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## LIST OF ABBREVIATIONS

IDE	-	Integrated Development Environment
GPS	-	Global Positioning System
LED	-	Light Emitting Diode
MobiBike	-	Mobile Bike Application
SDK	-	Software Development Kit

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## **CHAPTER 1**

### **INTRODUCTION**

#### **1.0 Introduction**

MobiBike is made for casual cyclist and enthusiast cyclist in Malaysia. It is an application that use smart phone device as a medium of turning on and turning off the signal lamp and view their bike's speed. Besides, this application also help user to display and monitor their speed so they will not exceed the speed limit that can cause danger to them. Traditionally, the cyclist needs to raise their hand in certain rules according to cyclist language in order to make a turn. By pointing out their hand, this could lead to danger to them and may cause an accident. Moreover, less attention is paid to them as we did not provide a special road space for the cyclist on the road. This application is available for the cyclist only when they are cycling. This will give them a sense of secure.



## 1.1 Problem Statement

Problem statements are list why there is the need of developing MobiBike Application for Android. This does also mean that the existing application is less in functionality. Problems that arise in the exist application are:

- i. There is no functionality to turn on the signal lamp
- ii. Unable to display current bike speed
- iii. Not user friendly to certain types of cyclist.

## 1.2 Objectives

Objective are what will the new system have that will overcome constraints and problems in the exist application. It will be the goal for designing MobiBike Application for Android. The objectives are:

- i. To develop a mobile application that creates a turn signal for cyclist.
- ii. To present a speedometer for cyclist to see how fast they are moving.
- iii. To show mileage on how far the user has cycled.

### 1.3 Scopes

Scope is the range for the system. Scope that this document highlights is the target user and project boundaries of MobiBike Application.

The scopes are:

- i. Target user
  - a) Android user
  - b) Junior cyclist, senior cyclist, amateur cyclist
  
- ii. Project boundaries are :
  - a) Develop a mobile application
  - b) Turn on and turn off the signal lamp
  - c) View and monitor bicycle's speed
  - d) View mileage or distance on how far the user has cycled

## **1.4 OUTLINE OF MATERIAL PRESENTED**

This thesis consists of six (6) chapters.

### **Chapter 1 : Introduction**

The purpose of this chapter is to introduce to the readers about the project that will be developed later. This chapter contains introduction, problem statement, objective, and scope and thesis organization.

### **Chapter 2 : Literature Review**

This chapter explains about the existing application and the one that is going to be developed. This chapter describes in details about user requirements, product perspectives, theory, storyboard and flowchart of the system. Other than that, Chapter 2 also describes methods and material used for the system.

### **Chapter 3: Methodology**

This chapter explains about development of the project. This chapter describes in detail about phases of project development starting with Planning, Requirement Analysis, Designing, Building and also Testing.

#### **Chapter 4 : Implementation**

This chapter explains in details about the implementation of the project. This chapter also explains in detail about the interface of the system, wiring, datasheet and many other things that required in this project.

#### **Chapter 5 : Results and Discussions**

The purpose of this system is to explain about the results and data analysis that had been acquired. Result analysis, project limitation and suggestion and project enhancement are contents for the chapter.

#### **Chapter 6: Conclusion**

This chapter explains briefly and summarizes the developed project.

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.0 Introduction**

In this chapter, it will discuss on the existing systems used and brief description on methodology that will be used on this project. This chapter also will discuss on the technology such as the programming language, software and also hardware that will be used throughout the project development.

## 2.1 Existing Application

### 2.1.1 MapMyRide

Figure below shows one of an existing application for a cyclist. MapMyRide is one of MapMyFitness product and it is a mobile application. This application is a fitness tracking application that enables user to use the built-in GPS of their mobile device to track all of user fitness activities. The cyclist can store their personal information such as their work out details, calories burned, and route traveled on an interactive map. They also can view their route workout data by saving and uploading their workout data using this application.

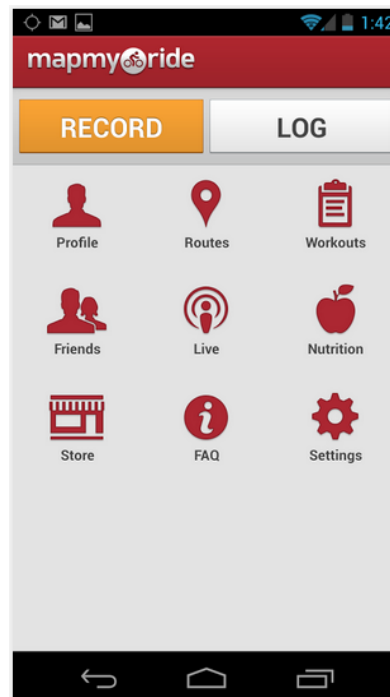


Figure 2.1 Main Page of mapmyride

This kind of application is a bit same with what I am going to develop for my current project. But this existing application did not provide user or the cyclist with the ability on turning on the signal lamp which will help them a lot when they wish to make changes at a junction.

Other than that, this application may suites professional rider and athletic user but not for a family kind of user. There is tutorial provided but it seems complicated and there are so many features in one application. It may make it harder for certain level of user such as junior rider or senior rider to learn all the stuff at one time.

Besides, there are some features in this application which is limited to certain level of age. For example, if there is any record about someone under the age of 13, the team will remove all information related from their records.

## **2.2 Interactive Development Tools**

### **2.2.1 Eclipse**

Eclipse is an integrated development environment (IDE) that can be used to develop applications and it is written mostly in Java. This tool comes with a bunch of plugins and this make it totally customizable. The Eclipse software development kit (SDK) is meant for Java developers. The SDK also includes the Java development tools.

Besides, Eclipse is capable to integrate with the Java Compiler. It compiles code in the background and show errors in red lines. Perspective feature is used to manage and organize the IDE and it define a view for each task. Example of the tasks are such as editing source code or debugging. The strengths of this tool lie in its debugging system and its variety of available plugins. In fact, Eclipse also becomes top choice for large projects



### 2.2.2 MIT App Inventor

Another interactive tool to design and create software applications for the Android operating system. App Inventor includes several main items which are the designer window, the blocks editor window, a compiler and also an application for real-time debugging on a connected Android device.

It provides a high-level blocks-based language for specifying behaviors. To call or invoke a function means to carry out the function or to make it happen. We call an event and the set of functions performed in response to it as an event handler. We begin defining a behavior by dragging out an event block, which has the form, “*When <event> do.*”

Table 2.1 lists up the comparison between Eclipse and MIT App Inventor.

**Table 2.1** Comparisons between Eclipse and MIT App Inventor

<b>Eclipse</b>	<b>MIT APP Inventor</b>
Offers 1,276 plugins	Offers collections of methods, properties and event, , and build server
Able to open multiple projects in the same window	May have multiple screens, only one of which is active at any time
Allows combinations of multiple languages	Programming language is in blocks or drag-and-drop editor
Default code completion but assistance is slower	Live programming, live development and live debugging capability
A bit slower but still can be handle	Editing and compiling is faster and can be executed on a real or emulated Android device

## **2.3 Software Development Methodology**

A software development methodology in software engineering is a framework that used to structure, plan and control the process of developing an information system. There is various software development approaches defined and designed which are used during the development process of software. In this review there are two (2) well known software process model to discuss and compare which are Waterfall Model, and Agile Model. However the discussion is limited to the important characteristic of the process model.

### **2.3.1 Waterfall Approach**

The Waterfall Model or also known as “linear-sequential life cycle model” is very simple to understand and use. In a waterfall model, the concept applied is that each phase must be fully completed before the next phase can begin. To determine whether the project is on the right path or the team is developing the wrong product, a review will be made at the end of each phase. Besides, any decision whether the team want to proceed with the project or not will happens at each phase. Other than that, using this model, phases do not overlap. Figure 2.2 below shows the waterfall model.

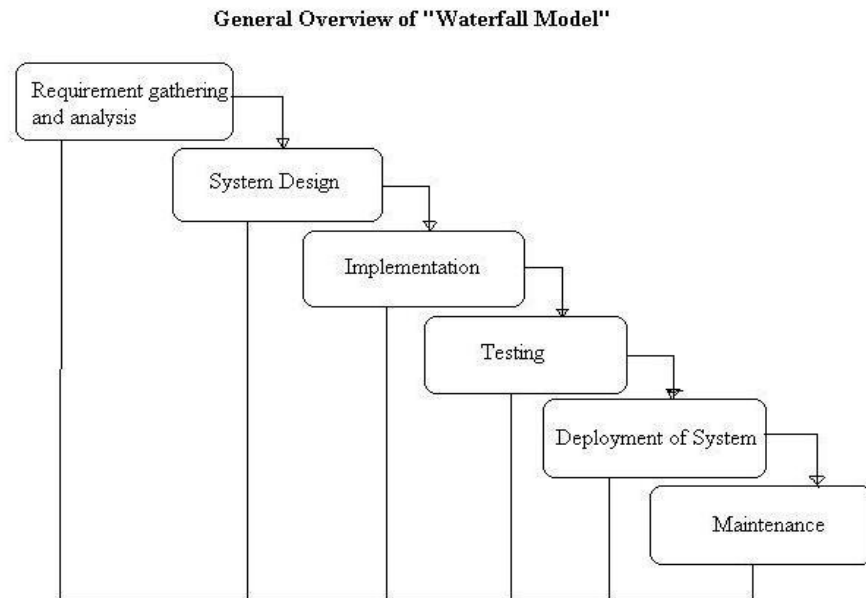


Figure 2.2 Waterfall Model

### 2.3.2 Agile Approach

Agile approach is one of the approaches used just like Waterfall Model. This approach is based on iterative and incremental development with rapid cycles and flexible response to change. This results in small incremental releases and each release is thoroughly tested to ensure software quality is maintained. This type of approach is usually used and become a choice for time critical applications. Figure 2.3 below shows the Agile Model Life Cycle.

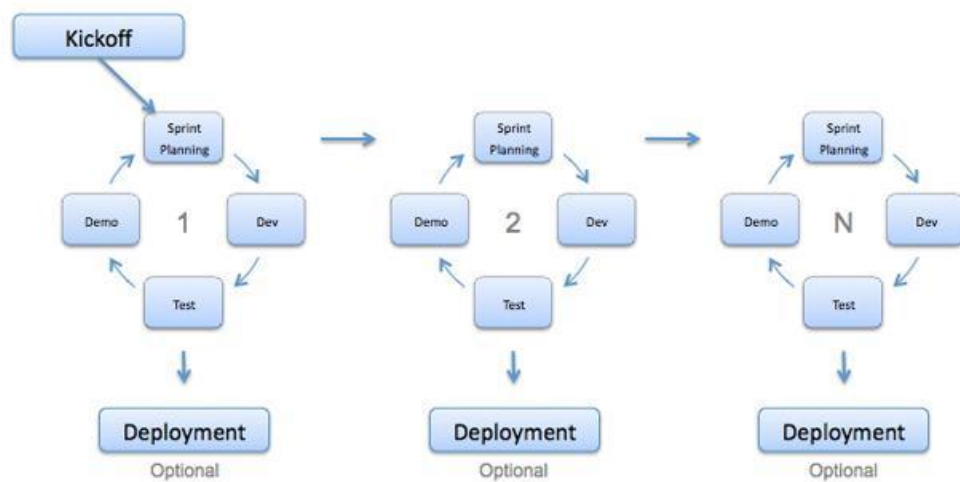


Figure 2.3 Agile Model Life Cycles

### 2.3.3 Difference between Waterfall and Agile Model

**Table 2.2** Comparisons between Waterfall and Agile Model

<b>Waterfall Model</b>	<b>Agile Model</b>
Progression is structured and sequential	Progression is iterative and incremental
Documentation is heavy	Documentation is light
Plan oriented so it more secure	Do not have structure
Able to accurately estimate timetables and budget	Hard to predict timelines and budgets
Nearly impossible to make changes to it once the stage has been completed	Able to respond to changes in requirement effectively and rapidly
Process-oriented where user specify requirement at early stages	People-oriented and requires high customer collaboration and interaction
Best choice for static long-term project	Better options for smaller projects

## **2.5 Proposed System**

### **2.5.1 MobiBike Application Definition**

MobiBike is defines as the application that enhance efficiency in the turning the bike signal using mobile android via Bluetooth. This application will enhance efficiency by provides an application to turn on the signal. The application targets on Android user.

### **2.5.2 MobiBike Functions**

- i. Provide turn right and turn left signal by using smartphones via Bluetooth
- ii. Provide speedometer to view the bike's speed
- iii. Provide an odometer to measure distance travelled by the cyclist

### **2.5.3 Expected MobiBike Effects**

- i. The cyclist able to turn on the right and left signal without need to raise they hands
- ii. Priority and attention will be given more to cyclist to make a turn

#### **2.5.4 Basic Principle of MobiBike**

Main principle of MobiBike is that it must be as similar and easy as to motorcycle signaling as possible, not compliant with driving regulations and the lamp needs to flash in order to effectively serve the purpose of a turn signal. Therefore, the interface of MobiBike must be simple and easy to learn and understand by the user and able to serves as signal lamp.



### 2.5.5 Differences between Existing Application and Proposed Application

**Table 2.3** Comparison between mapmyride and MobiBike

<b>mapmyride</b>	<b>MobiBike</b>
Provide routes to enable cyclist to track their cycled routes	No routes is available
No signaling features	Provide signaling features
No speedometer available	Provide Speedometer
Odometer and duration cycled is available	Provide Odometer only
Limited to kids under 13 years old	Can be used for wide range of user
Need to have an account and internet connection to use most of the features	No account is needed
May takes time to learn and get used to the features available	The flow of interface is simple and easy to be used by anyone
Unable to work offline, features is useless if no internet connection is available	Can work offline
Able to record and store cycling activities	No database feature

## **CHAPTER 3**

### **METHODOLOGY**

#### **3.0 Methodology**

In the previous chapter, discussion is made on literature review related to MobiBike application. This chapter will elaborate more on the research methodology which is adapted to this project. Overview of this methodology is discussed more in section 3.1

### 3.1 Agile Methodology

To develop this project, the methodology for this study is based on the general in agile methodology as proposed by Beck and Andres, 2005, for a systematic development of mobile applications. Agile is known based on their principles outlined together among the “The Agile Alliance” team member and the manifesto are:

- i. Individuals and interactions over processes and tools
- ii. Working software over comprehensive documentation
- iii. Customer collaboration over contract negotiation
- iv. Responding to change over following a plan

Agile approach consists of several methods. The methods are Rational Unified Process (1994), Scrum (1995), Crystal Clear, Extreme Programming (1996), Adaptive Software Development, Feature Driven Development, and Dynamic Systems Development Method (DSDM) (1995).

Each of the method serves slightly different from each other but still have the same goal as these methodologies share a lot of common characteristics with the Agile manifesto. When we are about to choose what kind of approach that we are going to use is not depends on how good the approach can be but it closely related to how well we know the methodology, how big the development team is, and how that team is organized.

Agile approach is one of the approaches used just like Waterfall Model. This approach is based on iterative and incremental development with rapid cycles and flexible response to change. This results in small incremental releases and each release is thoroughly tested to ensure software quality is maintained. This type of approach is usually used and become a choice for time critical applications. The methodology consists of five main phases which will be repeated if new features are added as follows:

- i. Planning
- ii. Requirement Analysis
- iii. Designing
- iv. Building
- v. Testing

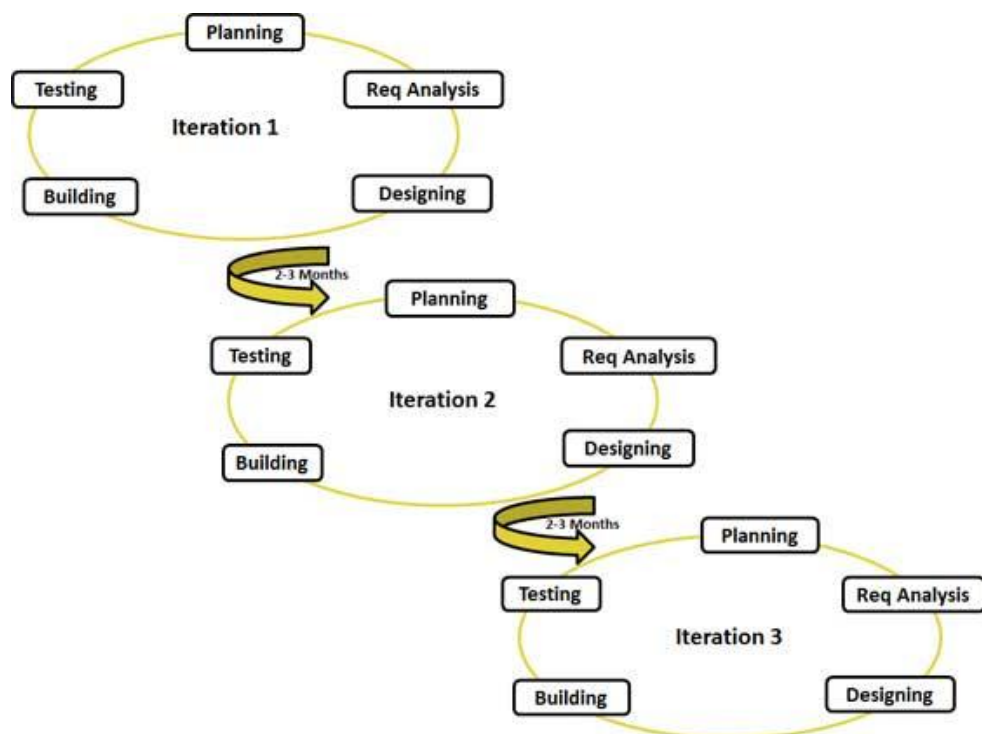


Figure 3.1 Agile Model Life Cycles

### **3.1.1 Planning**

The first stage of this methodology is initial planning. Examples of plans that are worked out for this application are discussed below:

i. **Project Timeline**

Project Timeline is a set of timeline that list up a project schedule. I use Gantt charts in order to illustrate the start and finish dates of the terminal elements and summary elements of this project. The project timeline can refer to Appendix A.

ii. **Budget Involved**

Budget specified resources involved and it is important so that all request and clarified and justified. Budget can be referred to Appendix B.

iii. Theory of Manual Signaling

Theory of giving a signal manually is discussed as below:

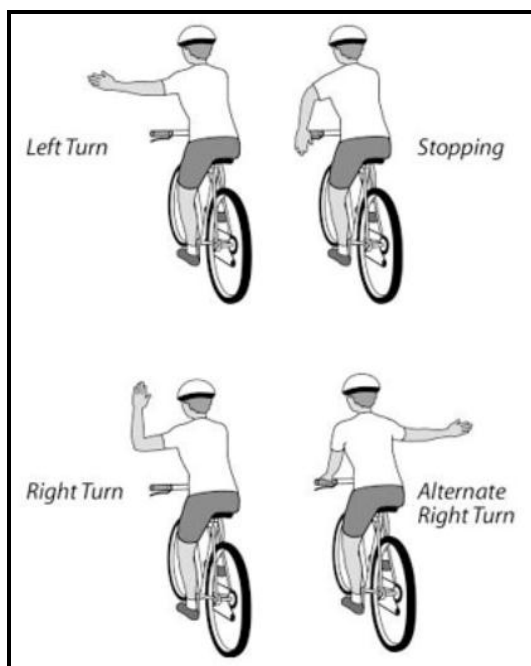


Figure 3.2 Manual Hand Signal

Cycling hand signals are given by cyclist to indicate their intentions to other road users. To ride safely in traffic, cyclists is require to use one side of their arm and hand to give a signals and another hand on the handlebar to control the bike. Number of hand signals that should be used is different depending on whether the cyclist is riding individually or in a group. Figure 3.2 shows that most important hand signals for both individual and group cyclist.

Even though bikes these days are becoming more and more high-tech and come with cool gadgets and gears, they still are not equipped with turning signals like cars. Some of the cyclist depends on horns and bells while some of other vehicle drivers might not even knows the meaning of these hand signals. So, turning indicator will give benefit to the cyclists.

### 3.1.2 Requirement Analysis

At this phase, the requirement is gathered so participation from stakeholders is a must in order to initially model the scope of the system. This is important so that the team will have a better understanding about the problem and can come up with a good solution.

The development team and the client or users meet in order to create 'user stories' or defining requirements needed. Before developing the system, the following items discussed and found out to be needed are listed as below:

- i. User Requirements

The client has defined the requirement into three (3) features which are:

- a. Signal lamp that are able to be turned on and off
- b. View the bike's speed
- c. Display distance traveled by user or cyclist.

The plan, time, and costs of carrying out the iterations are prepared and the developer which is me will make an agreement for iterations.



## ii. Software Requirement

**Table 3.1** List of Software used

<b>Software</b>	<b>Functions</b>
a. Android 4.1.2 JellyBean	Version of Android mobile OS
b. Arduino IDE	IDE environment tools to program Arduino board. This tool will be used to program the connection between android device, MIT App Inventor and also the LED matrix panel.
c. MIT App Inventor	IDE environment tools to develop the applications. The interface for the application will be design using this tool.
d. MAX7219 Library for Arduino	Library that supports cascaded MAX7219's and some basic matrix functions
e. Microsoft Office Word and Visio	word processor to perform word processing functions developed by Microsoft
f. Windows 7 Professional Operating System	Personal computer operating system

## iii. Hardware Requirement

**Table 3.2** List of Hardware used

<b>Hardware</b>	<b>Functions</b>
a. Android Smartphone Samsung S3 Mini	As an environment for running, debugging, and testing the application.
a. Arduino Uno R3 Microcontroller Board	To control an attached input or output device
b. Bluetooth Module HC-06	As module to transmits and receive signal wirelessly via Bluetooth
c. USB B Type Cable	To connect Arduino microprocessors
d. Jumper wires	To transfer electrical signals between Arduino board and LED matrix panel
e. LED Display Driver	To provides the circuitry necessary to interface Arduino board and to an LED display
f. LED matrix 8x8 panel	Used as form of electronic display panels, for the purpose of turning indicators.
g. Lenovo G400s Series	As medium used to develop the project, run the codes and prepare the report

### 3.1.3 Designing

At this point, the selected schematic design and any requested modifications is taken and revise. Designing is important because it summarized up what the user's need from the system to be complement with them.

#### 3.1.3.1 Storyboard

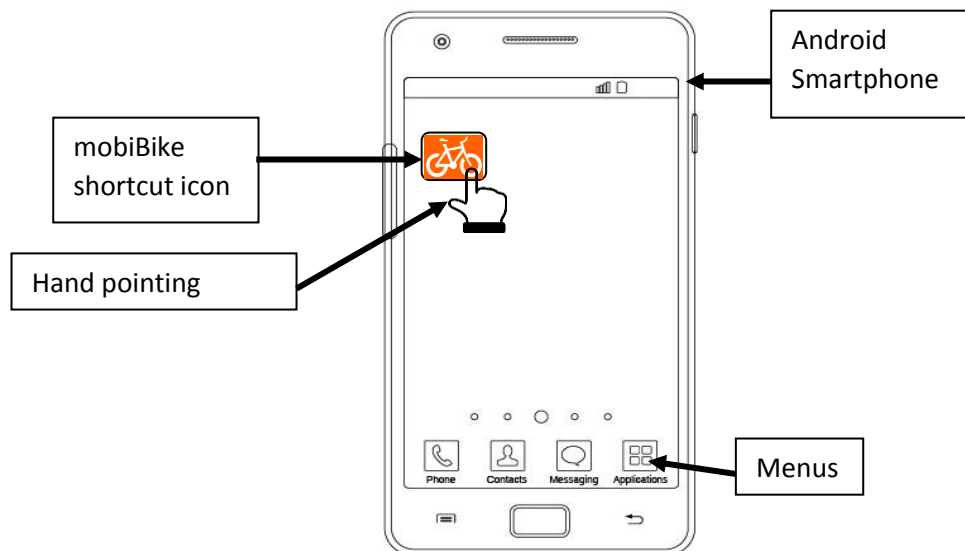


Figure 3.3 MobiBike Shortcut page

User is requires to click on the MobiBike icon in order to launch the application just like in Figure 3.3 .User can create a short cut to launch the application or simply search it on the Applications or Menu list.

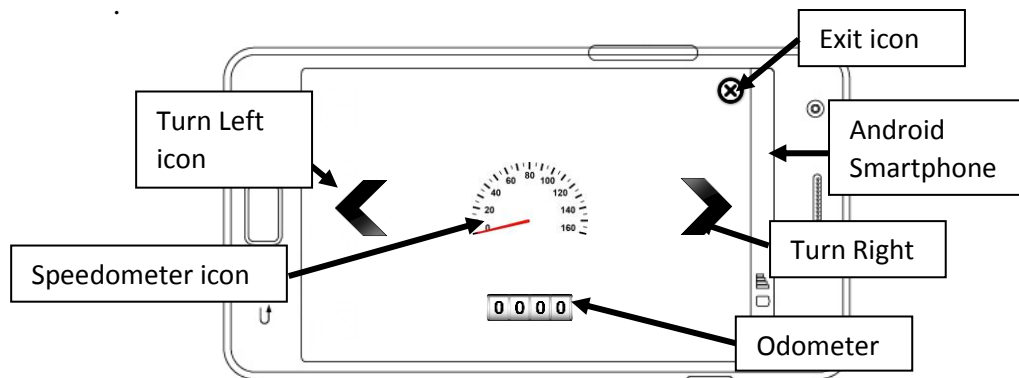


Figure 3.4 MobiBike Application Home page

Once the application has finished loading, user is displayed with MobiBike Home page just like in Figure 3.4. In that figure, there are Turn Right icon, Turn Left icon, Speedometer icon, Odometer icon and also Exit Application icon. Currently, this is the view that user will see and there is no icon is active yet.

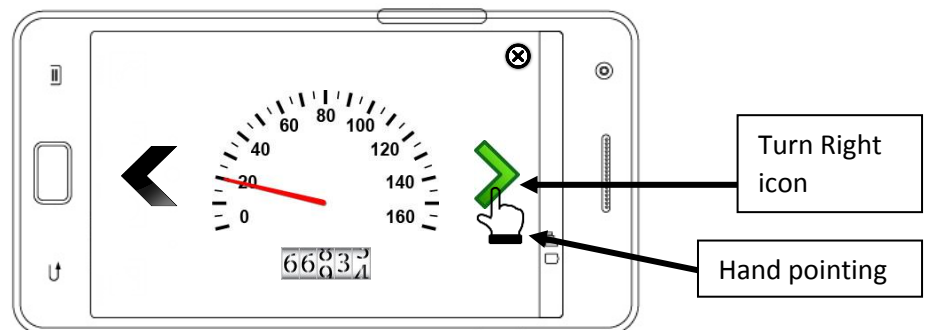


Figure 3.5 User click Turn Right Signal icon Page

Figure 3.5 shows what will happen if user click Turn Right Signal icon. They can activate the icon when they wish to make a right turn at a junction.

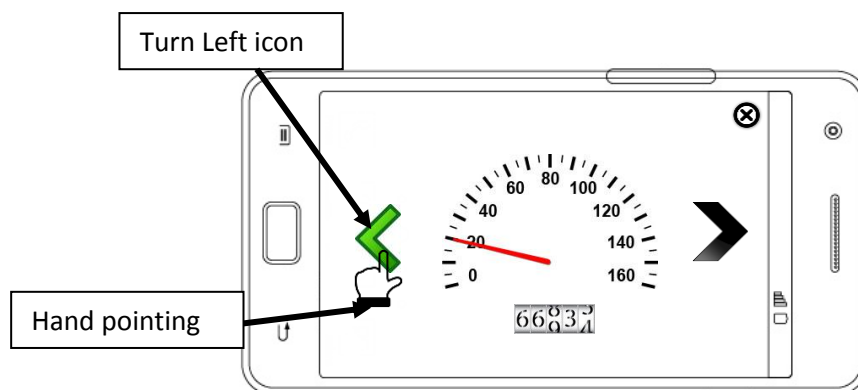


Figure 3.6 User click Turn Left signal icon Page

Figure 3.6 shows what will happen if user click Turn Left Signal icon. They can activate the icon when they wish to make a left turn at a junction.

### 3.1.4 Building

After designing the system, this methodology proceeds with the development or building of the application. At this stage, coding is involved in order to program the connection between Bluetooth Module and the application together with the Arduino microcontroller board. At this phase, the functionality of the signal lamp to be able to turn on is coded. So does with the bike speed and distance travelled.

### 3.1.5 Testing

The testing stage marks the end of application development effort. This phase is important in order to ensure the application fulfill user's requirement. If the customer remains satisfied with the test results of MobiBike features, the iteration will ends there and the design for the new iteration starts.

### **3.2 Summary**

Agile methodology can be particularly advantageous for developing mobile application. Since mobile apps are not expected to be perfect when they are first released, the expectation for the software product fits the iterative and incremental strategy that drives Agile software development.

## **CHAPTER 4**

### **IMPLEMENTATION**

#### **4.0 Introduction**

Implementation phase is an important phase where a system is developed based on planning and requirement that has been discussed in previous chapters. For the system development, C++ was used to code the MobiBike Application. The system was completely developed in MIT App Inventor software. Arduino IDE was used as tools to program the Arduino microcontroller. The functional requirement that have been mentioned in Chapter 3 has been developed to reach the proposed mobile application. This chapter will recall the development of these functions which are combined with each other to give a successful result.

## 4.1 Software Development

### 4.1.1 Homepage Interface

Homepage of MobiBike consists of Bluetooth setting, signaling functions, speedometer, odometer and the reset functions.

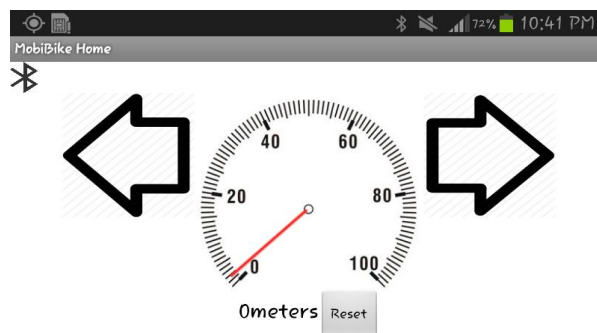


Figure 4.1 MobiBike Homepage

### 4.1.2 Bluetooth Connection

User must be connected with HC-06 Bluetooth Module in order to enable the signaling functions.

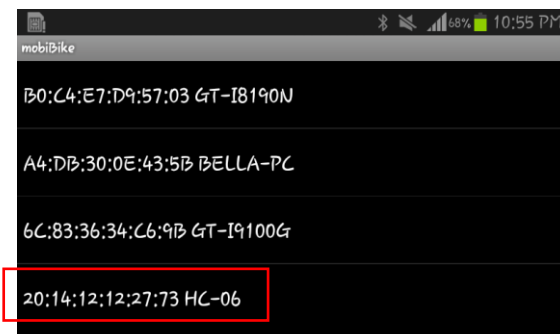


Figure 4.2 List of Bluetooth Available



### 4.1.3 Left Signal Interface

To be able to click on both signal buttons, user must connect to the Bluetooth first. Figure 4.3 shows how the interfaces will look like when left signal is clicked.

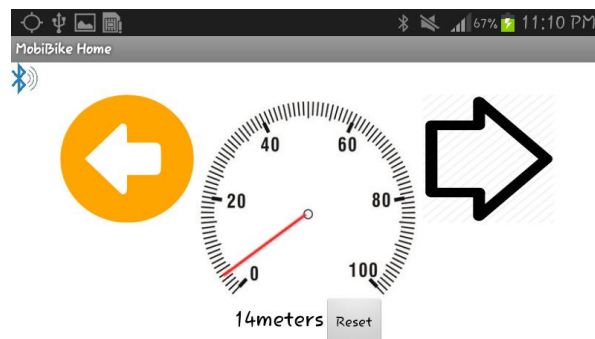


Figure 4.3 Left Signal Interface

```
void loop()
{
  while (Serial.available()){
    delay(3);
    char c = Serial.read();
    readString += c;
  }
  if (readString.length() >0){
    if (readString == "onkiri"){
      printString(msgLeft);
      delay(500);
      printString(msg);
      delay(500);
    }
  }
}
```

Figure 4.4 Coding for Activate Left Signal

#### 4.1.4 Right Signal Interface

Figure 4.5 shows how the interfaces will look like when right signal is clicked.

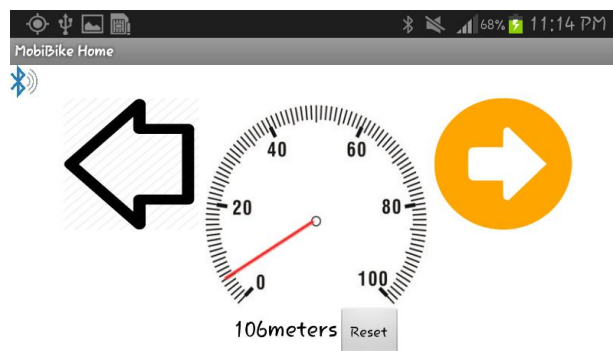


Figure 4.5 Right Signal Interface

```

if (readString == "onkanan"){
  printString(msgRight);

  delay(500);
  printString(msg);
  delay(500);
  printString(msgRight);
  delay(500);
}

```

Figure 4.6 Coding for Activate Right Signal

#### 4.1.5 Speedometer

Speedometer is used to display speed of the cyclist. The average speed is measured in meter per second or M/S. The speedometer does not need an internet connection to work. It requires a signal from 4 GPS satellites to calculate the geographic coordinates.

The satellites will send timing information such as the cyclist location and the current time and the coordinates is calculated based on the synchronized information received.

Speedometer is activated by turning the GPS setting on android and it will automatically moves the needle based on the calculation.

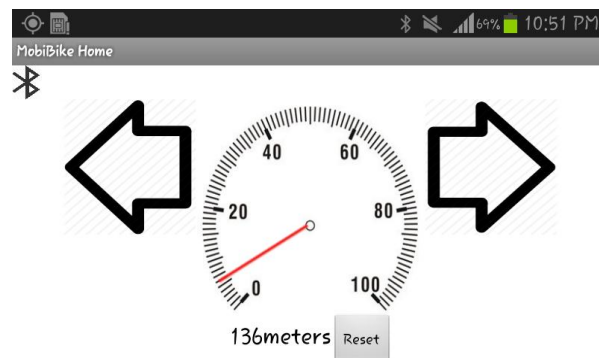


Figure 4.7 Speedometer Activated by GPS

#### 4.1.6 Odometer

Odometer is used to display mileage or distance travelled by cyclist. They can estimate and measure the distance they cycled from one location to another. They can restart the odometer to restart the calculation of distance by clicking on Reset button.

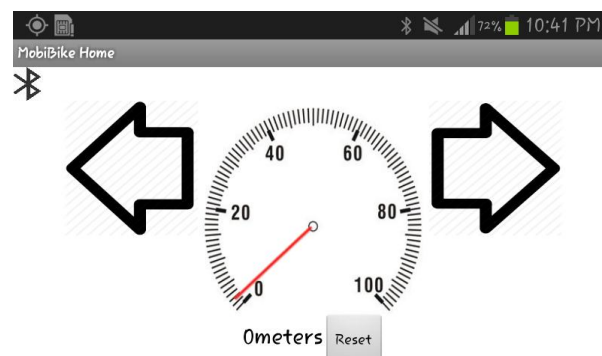


Figure 4.8 Odometer Before Activated

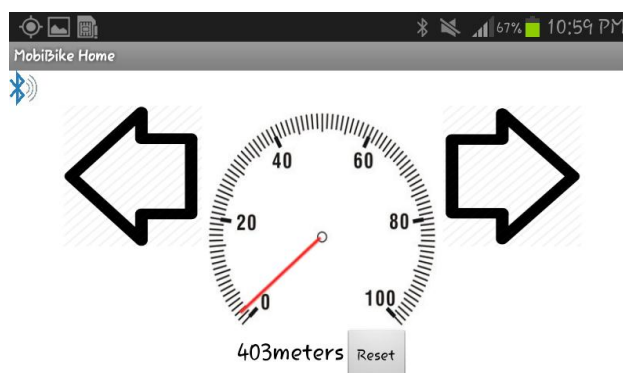


Figure 4.9 Odometer After Activated

## 4.2 Hardware Setup

### 4.2.1 Arduino Uno Microcontroller Board

As mentioned before, this project will use Bluetooth Module HC-06 to transmit the signal from Arduino board and to be able to receive the signal on the mobile device. TX or 1 and RX or 0 is the pin that will receive and transmit the data in serial.

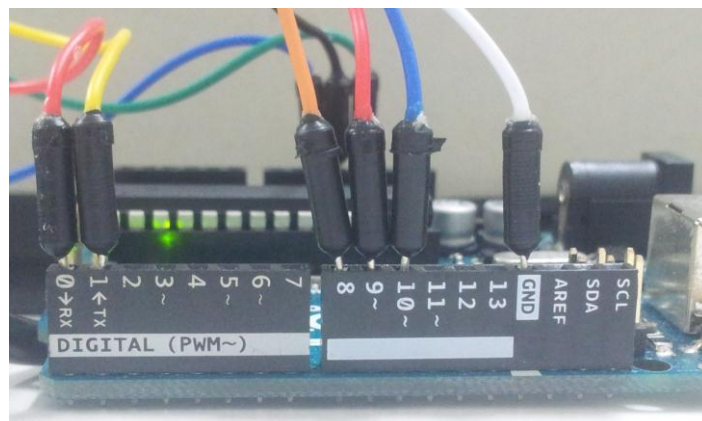


Figure 4.10 Pin connections on Arduino Uno Board

#### 4.2.2 Bluetooth Module HC-06

To test the connection, we can click on the Bluetooth icon on the upper left corner of MobiBike homepage interface. If the module stops blinking then the connection is successful.

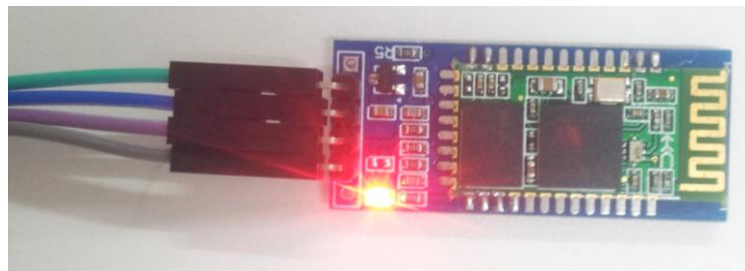


Figure 4.11 Establishment of Bluetooth Connection

### 4.2.3 LED Matrix MAX7219

There are two styles of presenting the output using Led Matrix. We can use scrolling to scroll the text or blinking to blink the text. For MobiBike, the output will blink to indicate left or right signal.

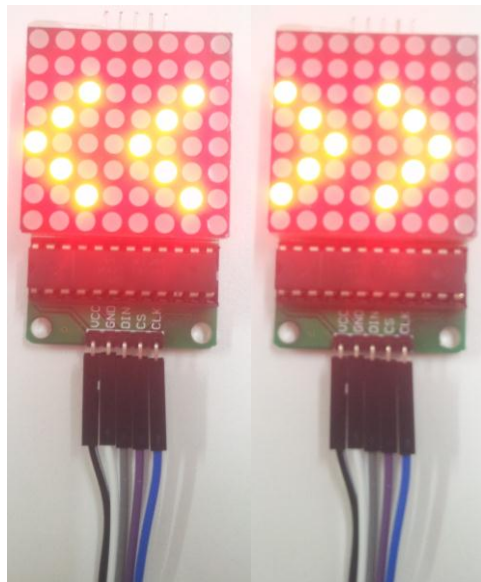


Figure 4.12 LED Matrix Output

## **CHAPTER 5**

### **RESULT AND DISCUSSION**

#### **5.0 Introduction**

In this chapter, all the output of the system will be discussed. Detail about the outcome, assumption and further research about this system also discussed in this chapter. Hopefully, the discussion can bring ideas and more benefits to the future developer in order to upgrade and enhance the performance and functionality of the system in the future.



## **5.1 Result analysis**

The developed application, MobiBike Application has met all the objectives of this project, which are:

- i. To develop a mobile application for android user.
- ii. To provide turn right and turn left signal by using smartphones via Bluetooth
- iii. To provide speedometer to view the bike's speed
- iv. To provide an odometer to measure distance travelled by the cyclist

## **5.2 System Constraint**

This application has a several constraint but does not affect the whole of the modules of the project. The list of constraint is listed below:

### **5.2.1 Android Device**

The application can only be used for a user that owns an android device. The interface is been created and developed to works only on a device that have an android platform.

### **5.2.2 Consumption of Battery**

The application consumes quite a lot of phone battery since the application need to use Bluetooth for the signaling purpose and GPS for the speedometer and odometer purposes.

### **5.2.3 Additional Power Supply**

The application requires additional power supply to support the board and lightning up the matrix.

## **5.3 Suggestion and Future Discussion of the System**

There are several future enhancements that can be implemented to this system in future:

- i. Viewing user current locations via maps
- ii. Signaling based on movement sensor
- iii. Record and store information about locations, speed and distance travelled

## **CHAPTER 6**

### **CONCLUSION AND FUTURE WORKS**

#### **6.0 Conclusion**

This chapter briefly describes about the overall of the conclusion of the project. In this chapter, it will generally explain what had been proposed so far, including developer's hope and opinions on this project and also the contribution that can be done after the project is finished.

## 6.1 Objective Achievement

The main achievements in the application are:

- i. To develop mobile application that creates a turn signal for cyclist.
- ii. To present a speedometer for cyclist to see how fast they are moving.
- iii. To show mileage on how far the user has cycled.

## 6.2 Contributions of Study

The major contributions of this project are summarized as follows:

- i. The proposed method for this system; I use agile approach because it has been a vital approach used by other company that developing mobile application. Besides I am applying that approach to develop my project.
- ii. The existence of this application will helps user or the cyclist when they want to overtaking and passing another vehicle or when turning or entering an intersection by turning on the signal.
- iii. The existence of this application also helps cyclist monitoring their bike speed by to see how fast they are moving. This can educate them to obey the speed limit while on the road
- iv. The existence of this application also helps cyclist by displaying information on how far the distance travelled by them.

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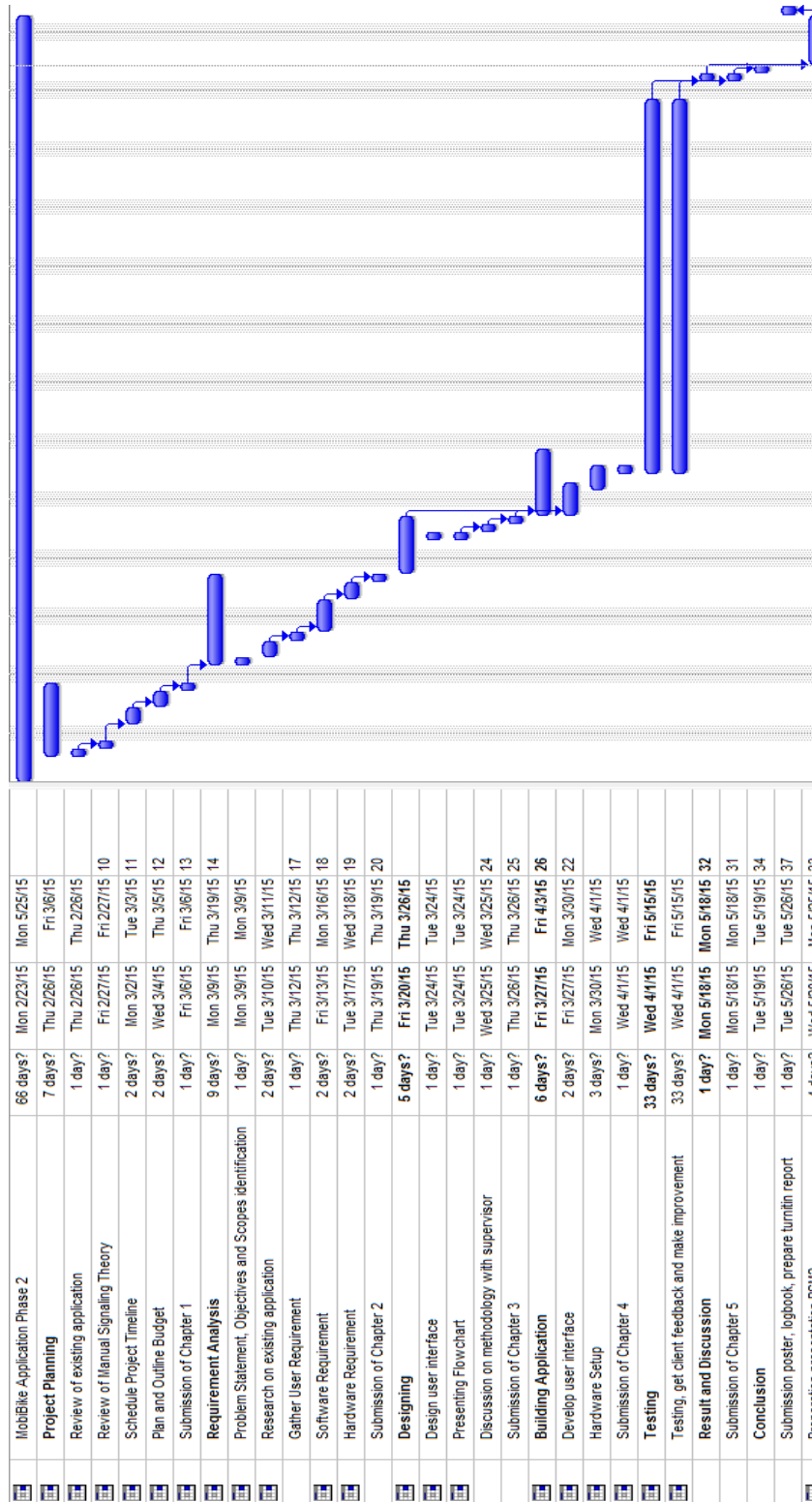
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APPENDICES

## Appendix A

### Project Timeline



## Appendix B: Budget

Budget as estimated and reviewed over few trusted website.

Table 7.1 Budget planning for hardware needed

<b>Items</b>	<b>Quantity</b>	<b>RM</b>
<b>Arduino Uno</b> <ul style="list-style-type: none"> <li>• <b>Arduino R3 Board</b></li> <li>• <b>Jumper wires</b></li> <li>• <b>USB B Type Cable</b></li> </ul>	1	64
<b>Bluetooth module HC-06</b>	1	31
<b>LED matrix 8x8 panel</b>	1	25
<b>TOTAL</b>		<b>121</b>

Appendix C

Letter of Intent

## MobiBike Application Development Project

13 February 2014

Nur Syafikah Nabilla Zaharudin  
Universiti Malaysia Pahang  
Lebuhraya Tun Razak  
26300 Gambang Kuantan  
Pahang Darul Makmur

RE: MADP Letter of Intent

Dear Ms Nur Syafikah Nabilla:

I submit this Letter of Intent to notify that I, Dr. Mohamed Ariff Bin Ameen intend to submit a proposal for the MobiBike Application Development Project.

I would like to request a project development in order to maximize the sense of security among cyclist so that they will feel safer when they make a turn at a junction. Besides, I want people to pay more attention to the rights of cyclist and add more facilities and equipment for cyclists.

The project should be able to use Android as the main platform and the use of smartphones as a medium device. The user of this application should be able to:

- Turn the signal lamp on and off
- View and monitor speed of the bicycle
- View the mileage or distance on how far they have travelled

I will be our main point of contact for the purposes of the application process and can be reached at mohamedariff@ump.edu.my

Thank you for this opportunity to participate in the MADP and I wish you all the best.

Sincerely,

Mohamed Ariff Bin Ameen  
Senior Lecturer