



UTM

UNIVERSITI TEKNOLOGI MALAYSIA

SCHOOL OF COMPUTING

**SECP1513 – TECHNOLOGY & INFORMATION
SYSTEMS**

**ASSIGNMENT
DESIGN THINKING**

SECTION : 08 – SECR
COURSE NAME : BACHELOR OF COMPUTER SCIENCE – COMPUTER
NETWORK SECURITY

Members:

- | | |
|-------------------------------------|-----------|
| 1. AHMAD SAMMAN | A17CS4013 |
| 2. AFIQ NAZRIE RABBANI | A19EC0216 |
| 3. HUDAN ARYAJUDANTA | A19EC0240 |
| 4. MUHAMMAD RAFIQ REDHA BIN RUSHIDI | A19EC0106 |

1.0 Introduction

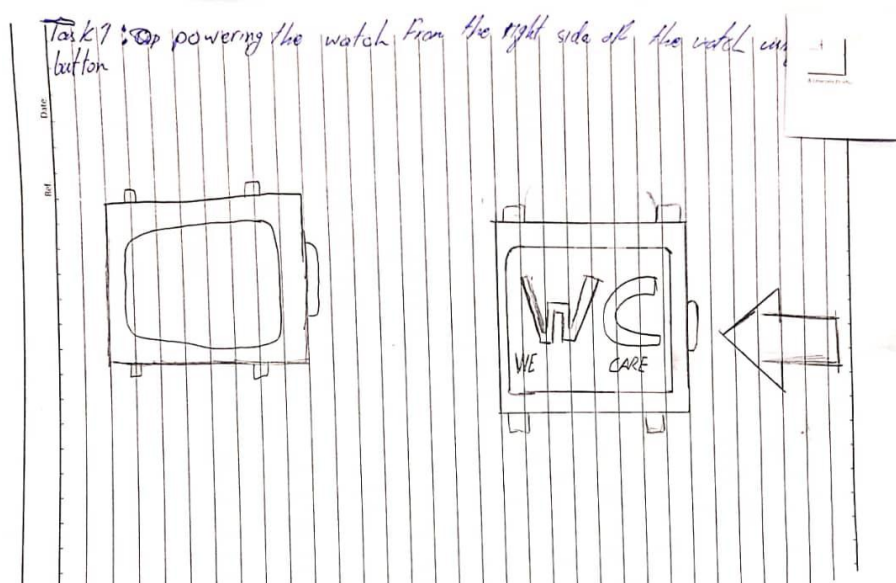
This world we are in is not a perfect world. We will always come across what we call “problems”. Even though the world that we live in keep growing and developing, there will always a new problem that we need to solve. And in this modern world, we can solve those problems by using a method that we called Design Thinking. Design Thinking is a term for a process for creative and innovative problem solving in the modern days. And the main purpose of Design Thinking is fulfilling on what the people needs in these modern days.

By Design Thinking, our team has decided to try to solve one of the problems that we stumble upon nowadays. From many issues that we discovered and during our research, we have decided one problem. One small problem but has a massive effect if it is taken lightly, which is Bad Driving Behavior. There are a lot of Bad Driving Behavior such as speeding up breaking the speed limit and getting sleepy while driving. Our team is encouraged to solve this problem. We have sought the solution of this issue and we have found it. A device, convenient and effective enough to solve this issue. We came up with a practical multifunctional device that we called “WE C@RE”.

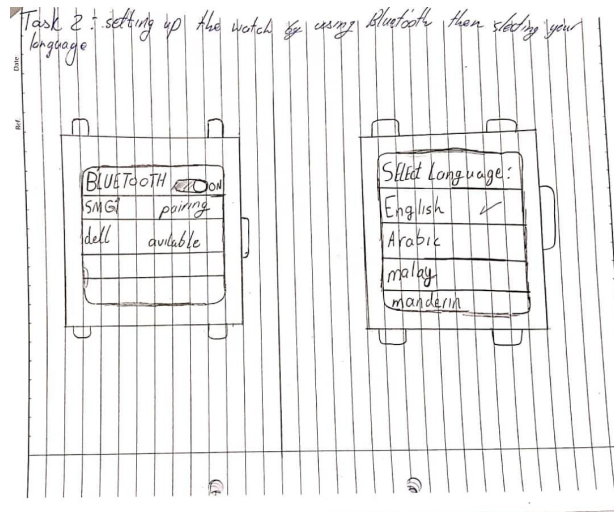
2.0 Detailed Step and Description

2.1 Detailed Step

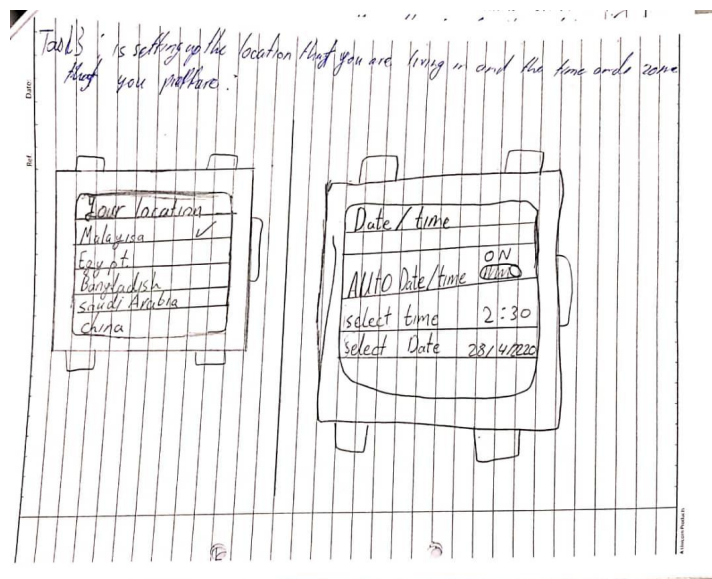
- Step 1: We need to open the prototype by pressing the power button then the default screen will come up which will represent 'WE C@RE'.



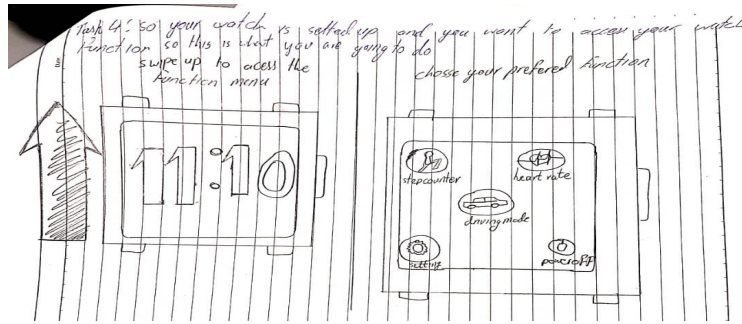
- Step 2: For setup first we need to connect it to an embedded device like smartphone then we can select language as we want.



- Step 3: Then after that the location will come up, it can automatically detect the location or we can set it by manually also same step goes to date and time.



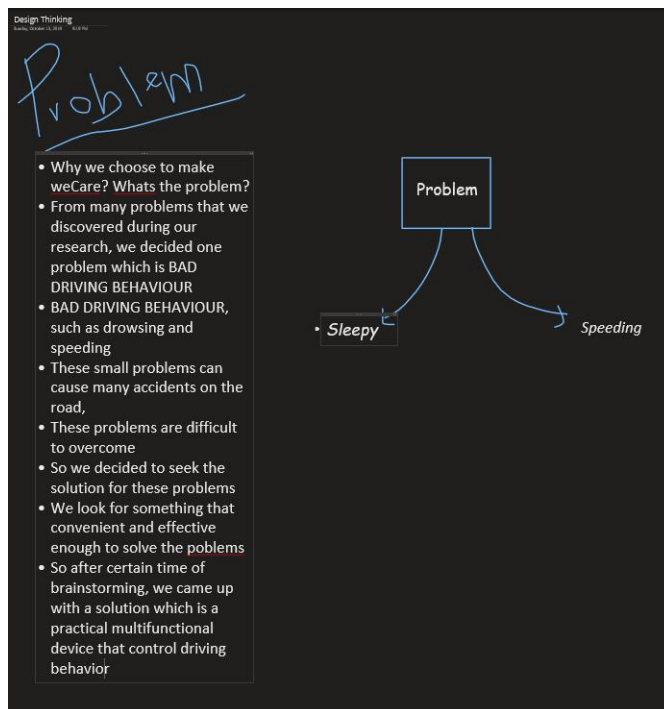
- Step 4: After the setup completion the default screen will come up and it will show the time. Then we need to swipe the screen up to get into the default menu. In the default menu we can see : *stepcounter *heart rate *driving mode *settings *poweroff
- selections.
certain actions after pressing menu : *stepcounter - automatically counts per steps and records it everyday.*driving mode - while driving turning it on can be helpfu if the user sleeps then it will automatically check sleeping heart rate then gives shocks. *settings - for manual synchronization of menu icons. * heart rate- for checking heart bit in BPS by optical retina. *poweroff- to shut down.



2.2 Team Progress

- Ahmad Samman: Designing interface, interviewing
- Rafiq: Making prototype
- Afiq: Video editing
- Hudan: Narrator

2.3 Brainstorm



3.0 Detailed Description

In this section, we will define more detailed about our project.

3.1 Problem

Our group chose drowsy driving as the main problem to solve. Drowsy driving is a major problem in the road. The risk, danger, and often tragic results of drowsy driving are alarming. Drowsy driving is the dangerous combination of driving and sleepiness or fatigue. This usually happens when a driver has not slept enough, but it can also happen due to untreated sleep disorders, medications, drinking alcohol, or shift work. According to the National Sleep Foundation, about half of US adult driver admit to consistently getting behind the wheel while feeling drowsy. About 20% admit to falling asleep behind at some point in the past year – with more than 40% admitting this has happened at least once in their driving careers.

These startling figures show how prevalent drowsy driving is. What drivers may not realize is how much drowsy driving puts themselves – and others – at risk. In fact, an estimated 5000 people died in 2015 in crashes involving drowsy driving, according to a Governors Highway Safety Association report.

According to the National Highway Traffic Safety Administration, every year about 100,000 police-reported crashes involve drowsy driving. These crashes result in more than 1,550 fatalities and 71,000 injuries. The real number may be much higher, however, as it is difficult to determine whether a driver was drowsy at the time of a crash.

A study by the AAA Foundation for Traffic Safety estimated that 328,000 drowsy driving crashes occur annually. That's more than three times the police-reported number. The same study found that 109,000 of those drowsy driving crashes resulted in an injury and about 6,400 were fatal. The researchers suggest the prevalence of drowsy driving fatalities is more than 350% greater than reported.

Beyond the human toll is the economic one. NHTSA estimates fatigue-related crashes resulting in injury or death cost society \$109 billion annually, not including property damage.

3.2 Solution

The solution for those problems needs to be something that convenient. It must be small, lightweight enough so it can be brought easily. And also, it has to be effective hence the problem could be solved entirely.

After certain time of brainstorming, our group came up with a solution which is practical, multifunctional device that can control driving behavior. We call it “We C@re”. This smartwatch-like device is equipped with GPS and heartrate sensor. It has some features, with the main feature is Driving Mode. In Driving Mode, the device will continuously read the user’s heartrate. If the user starts feeling sleep or drowsy, the heartrate will be getting low. The smartwatch will detect this change and it will shock the user. So, the user will not get sleepy or drowsy. Aside from the main feature, the smartwatch has several other features too, like Sport Mode and Sleep Tracker.

3.3 Team working

Our team work together, by splitting tasks for each member so every team member has their own parts. For Ahmad Samman responsible for product information, taking video for product review, and writing report part 2 (Detailed Steps and Description) and part 6 (Reflections). Muhammad Rafiq did Prototype Making and writing report part 5 (Design Thinking Evidence). Afiq Nazrie did Video Editing, Animation Making, and writing report part 3 (Detailed Description) and part 4 (Design Thinking Assessment Points). And Hudan Aryajudanta did Narration and writing report part 1 (Introduction) and part 7 (Members and Task).

4.0 Design Thinking Assessment Points

As we work together in team, we are susceptible to the term called “groupthink”. Groupthink occurs when a group of well-intentioned people make irrational or non-optimal decisions that are encouraged to conform or the discouragement of dissent. This problem may be caused by something or simply because group members value harmony and coherence above thinking clearly.

Within group thinking situation, group members refrain from expressing doubts and opinion or disagreeing others. In the interest of making a decision that furthers their group cause, members may ignore any ethical or moral consequences.

In order to avoid groupthink, we always express our opinion every part of design thinking. We fully discussed it every time we are done talking about our project. When dissent is encouraged, groupthink is less likely to occur.

As stated above, our group always examine every decision made during our design thinking work. Throughout the ideate phase, we screen every idea each of us has so the ideas is relevant to the theme we got (Input and Output). During the prototype phase, assessment point was carried out to verify the prototype, whether our prototype works or not. Afterwards, the prototype was then modified to better fit our expectation and fulfill the objective.

The conclusion is, assessment point is crucial in our design thinking project as it serves as a guideline for us to make sure we are not lost.

5.0 Design Thinking Evidence

There are 5 phases in design thinking which are empathy, define, ideate, prototype and finally testing. In this project we are required to test our product so the detailed descriptions and evidences of what we do in the 5 phases are explained below. We also filmed our design thinking process.

5.1 Empathy

We use interview method to collect information based on our topic. We had interviewed one UTM international student, Rubayet Hyder in figure below. He is a Bachelor Degree of Software Engineering student who is in his second year.



Figure 1 Rafiq and Samman interviewing Rubayet Hyder.

Q: What is purpose for the user to use this prototype?

A: Ease our daily life because we can access the phone through the prototype, also can track health progress and many more.

Q: Why you need this prototype?

A: I need it because it helps me by telling my heartbeat and how many steps have I taken so that I can track my health care.

Next, we had interviewed a UTM local student, Ahmad Ramadhan in figure below. He is a Bachelor Degree of Computer and Network Security student who is in his first year. He from Kuantan, Pahang and come to UTM Johor Bahru for study and get degree.



Figure 2 Rafiq is interviewing Ahmad Ramadhan

Q: Do you encounter any problem when try to look at your phone?

A: Yes. Sometimes when my hand is full, I cannot bring my phone out of my pocket if there is notification.

Q: Is it easy for you to keep track your time when you are working out?

A: For now, it is so hard to keep track your time when you are jogging, because my phone is not waterproof. When I am jogging, I sweat a lot and that may damage my phone.

Q: Do you have any other problems?

A: When I am driving alone for a long time, I might have been half asleep or lose focus. That will be dangerous for me and other road users.

Q: What is different if you use or not use this prototype?

A: I think it is easier now to use your prototype rather than just use my Iphone 11 pro max. Instead of taking my phone of my pocket to check my notification, I just need to look at my hand to read it.

Q: What other benefit that u can see?

A: This prototype comes with other features like keep track with your steps and also can help you when you are exercising. These features are a modern solution to help people maintain their healthy lifestyle

Q: Does this prototype solve any of your problem?

A: Yes, it does. As I drive for a long period of time, I usually half asleep and that would be dangerous for me and other road users. This prototype will vibrate strongly when I lose focus even for a split second. That will make me instantly awake so that I continue to focus on my driving.

5.2 Define

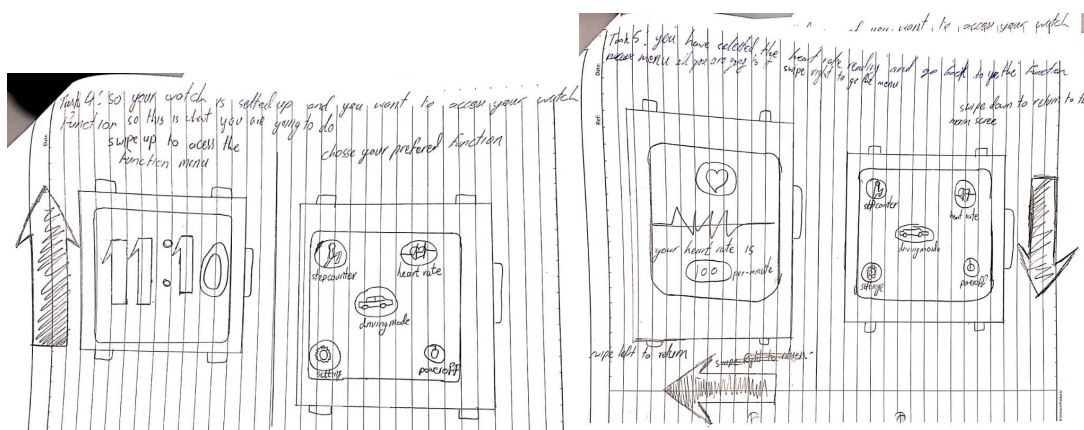
We sat together like in Figure below to gather all the information from the interview and analyze them to identify the problems, user's needs and feedback. We also suggested possible problems faced by users that are not mentioned in the interview. This phase is vital as it enables the team to identify the goal and work towards it.



-We define the problems and feedback that is issued from the user and try to determine.

5.3 Ideate

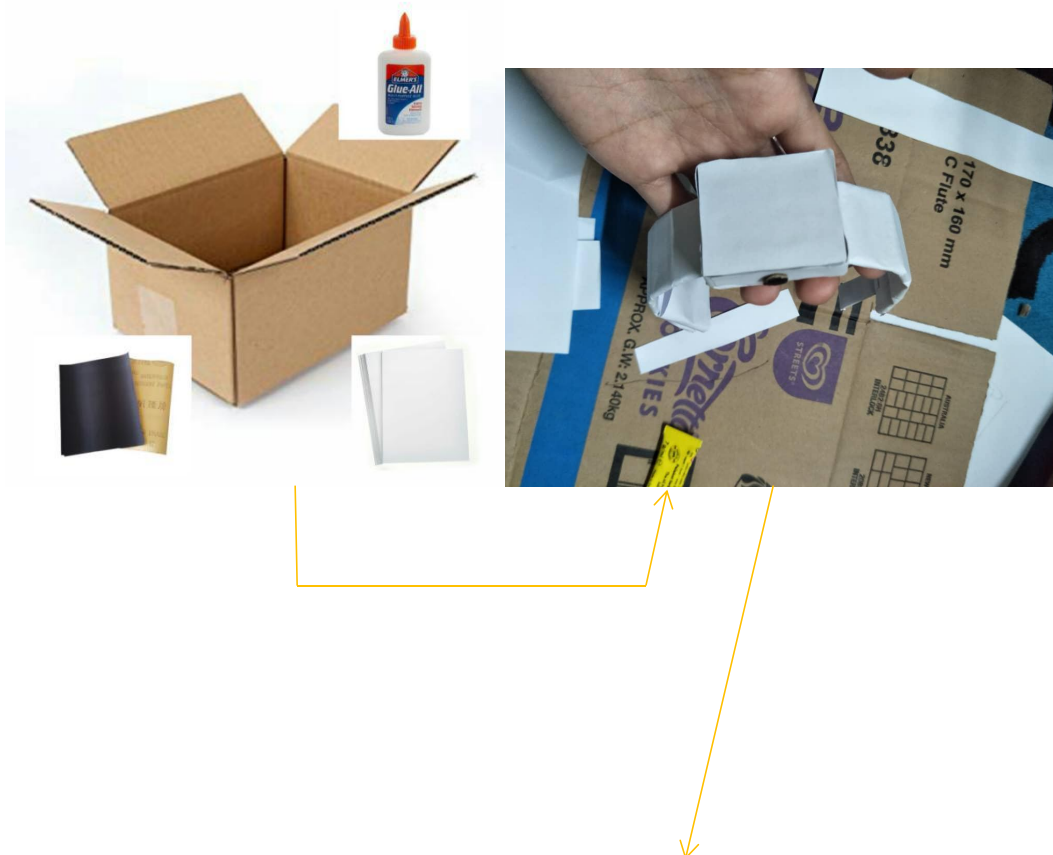
In this phase, we utilize the by-product of the define phase which was the problems identifications to come up with ideas to solve the problems. There were numerous ideas from each group members which was then filtered based on user requirements, economic feasibility, technical and operational feasibility. Our group used the sticky notes method to present our ideas. This step is vital because the functionality of the idea could solve each and every problem identified. Through Ideation, we tried to generate ideas for every problem identified in order to solve them as a whole. Therefore, we put in all our efforts to come up with a prototype that go along with every problem.



5.4 Prototype

In this phase, we create a prototype that can carry out all the phase. From all the phase, we compile all the ideas together and managed to create a technology that can fulfil all the criteria given by the user. The user wants a technology that can be functional in health care industry which is a device that managed to calculate step counter for each day and can calculate our heartbeat regularly. They also want a device that can easily tell them if they are any incoming notification. The devices also must be easy to carry everywhere. Some of the user also want a technology that can easily send output after detecting something is wrong in our body. From all of this, we concluded that the hardware for our new invented technology must be small and easy to carry while the software can carry out many possible tasks at one time. Thus, we use watch as our reference technology as it is small and easy to carry everywhere. So, we intended to upgrade the uses of the original watch that only uses to notify us about the time into something more complex and can carry many tasks at one time. We called it smart watch cause it's basically a watch but can be used into many things such as calculate heartbeat and steps and can be upgrade into more function in the future. We create the smart watch by using cardboard boxes glue and sand paper.

When the prototype is done, we test it out to make sure it fulfills all the requirements.





5.5 Test

After finished prepared for the prototype, we must test either the prototype can be functional or not. The prototype must be able to fulfil all the requirement given by the user so we test all the function of the smart watch multiple time.



As you can see the prototype are able to calculate the heart rate, calculate steps and so on.



6.0 Reflections

6.1 What is your goal/dream with regard to your course/program?

The difference between information systems and information technology is that information systems incorporates the technology, people and processes involved with

information. Information technology is the design and implementation of information, or data, within the information system. From this perspective i can easily came up a mind that my contribution for this subject will be the implementation of the data, information's design into the technology which can be embedded into software-based prototype. My goal for this program is to make something legally which will be in the help of humanity. Without having a positive ethics i am afraid my invention can be misused for the distraction of human. Alhamdulillah my goal is to look in future with such a positive motive which makes our life at ease. Also, our respective lecturer taught us this.

6.2 How does this design thinking impact on your goal/dream with regard to your program?

I am very optimistic guy with ethics mixed in my project work. Previously I mentioned that I would like to work in the purpose of helping humanity. Our prototype "WE C@RE" is all about helping people. we are focused into two major parts of this design: riskless driving and fitness awareness (for all types of ages expect infant). This also indicates that we also putting impressing on safety and security of people.

Any kind of accident caused by sleeping is uncertain. our device has a powerful optical retina which can detect the blood pressure and heart of a sleeping people so fast that it does not need a delay of seconds for giving the user instant minor shock which is enough to make awake the user. All types of ages people can maintain a highly nice fitness schedule by this watch (which is briefly described in q:2).

6.3 What is the action/improvement/plan necessary for you to improve your potential in the industry?

General Road Accident Data in Malaysia (1995 – 2010)

Year	Population	Vehicles Registered	Vehicle Involved	Road Length	Road Accidents	Road Casualties	Road Deaths	Vehicle Ownership (Person per vehicle)
1995	20,096,700	6,802,375	275,430	62,221	162,491	52,152	5,712	3.0
1996	21,169,000	7,686,684	325,915	64,511	189,109	53,475	6,304	2.8
1997	21,665,600	8,550,469	373,526	66,108	215,632	56,574	6,302	2.5
1998	22,179,500	9,141,357	366,932	66,741	211,037	55,704	5,740	2.4
1999	22,711,900	9,929,951	390,674	67,069	223,166	52,937	5,794	2.3
2000	23,263,600	10,598,804	441,386	68,770	250,429	50,200	6,035	2.2
2001	23,795,300	11,302,545	483,351	74,217	265,175	50,473	5,849	2.1
2002	24,526,500	12,068,144	507,995	74,641	279,711	49,552	5,891	2.0
2003	25,048,300	12,819,248	555,634	79,667	298,653	52,741	6,286	2.0
2004	25,580,000	13,828,889	596,533	71,814	326,815	54,091	6,228	1.8
2005	26,130,000	15,026,660	581,136	71,814	328,264	47,012	6,200	1.7
2006	26,640,000	15,790,732	635,024	72,781	341,252	35,425	6,287	1.7
2007	27,170,000	16,813,943	668,173	73,032	363,319	33,999	6,282	1.6
2008	27,730,000	17,971,901	671,078	73,419	373,071	32,274	6,527	1.5
2009	28,310,000	19,016,782	705,623	100,002	397,330	31,417	6,745	1.5
2010	28,910,000	20,188,565	760,433	111,378	414,421	28,269	6,872	1.4

Figure 3 Table of Survey General Road Accident Data in Malaysia from 1995 to 2010

From the survey above as this is precisely shows the road deaths and road accidents are increasing at a noticeable point in Malaysia. We are looking forward to make a big team consists of 100 people and we will distribute them in every state of Malaysia so that the device can go to every well-known technical company and do the publicity there. We are also considering dealership but our price range is not fixed yet and we are working on it. Insha Allah under the Malaysian ICT law we think we can produce our project to our users so professionally where both sides of the hand will have benefits.

7.0 Members and Task

1. Ahmad Samman:
 - Leader
 - Design Thinking product introduction
 - Product Interview
 - Writing Report:
 - Detailed Steps and Descriptions

- Reflections
- 2. Rafiq:
 - Member
 - Prototype Making
 - Writing Report:
 - Design Thinking Evidence
- 3. Afiq:
 - Member
 - Video Editing
 - Animation Making
 - Writing Report:
 - Detailed Descriptions
 - Detailed Thinking Assessment Points
- 4. Hudan:
 - Member
 - Narration
 - Writing Report:
 - Introduction
 - Members and Tasks