SECP 1513 – Sect. 04
TECHNOLOGY AND INFORMATION SYSTEM

PROJECT: Low Fidelity Prototype (Part 2)

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1. INTRODUCTION

The world as we know it keeps on moving ahead and progresses especially from the aspect of technology. Thus, humanity had witnessed how the improvements of technology had caused tremendous impacts to the economy as a whole, thus resulting in what we call as Industrial Revolution. From the innovation and mass implementation of steam power in many sectors of industries to the computer automation and electronics, we have been through plethora of innovations and upgrade, and now, we are shifting to a new era, Industrial Revolution 4.0. Internet of Things (IoT) is said to be one of the leading technology that will trigger or perhaps even boost the pace of this latest industrial revolution. Hence, we chose to create a system based on the Internet of Things technology. The system that we chose for this project is Home Security System that revolves around the IoT technology. This system aims to provide top notch security to the houses from dangers and threats with the fastest response possible and the best steps taken immediately. Hence, we came up with House Knight, the ideal security system for every house owner. This system covers three problems often faced by house owners, which are difficult to determine who rings the doorbell before letting them in, hard to identify and alert any intrusion into the house, and difficult to track where the personal belongings are located. Thus, House Knight provides three main functionality, which are video doorbell, motion sensor, and gadget tracker. Video doorbell allows house owners to view the person ringing their doorbell through the House Knight application in the phone via front view or aerial view. Next, motion sensors are fixed surrounding the house especially at windows and doors, which can be accessed via House Knight apps to turn off the sensor alert or even view the camera connected to each sensors to view what causes the sensor to trigger alert. Thirdly, valuable belongings such as handphone, laptop, or even wallet can be fixed with House Knight gadget tracker chip, which will alert the house owner if the belongings are moved while also provide the locations of the belongings via House Knight apps.

## 2.   DETAIL STEPS AND DESCRIPTIONS
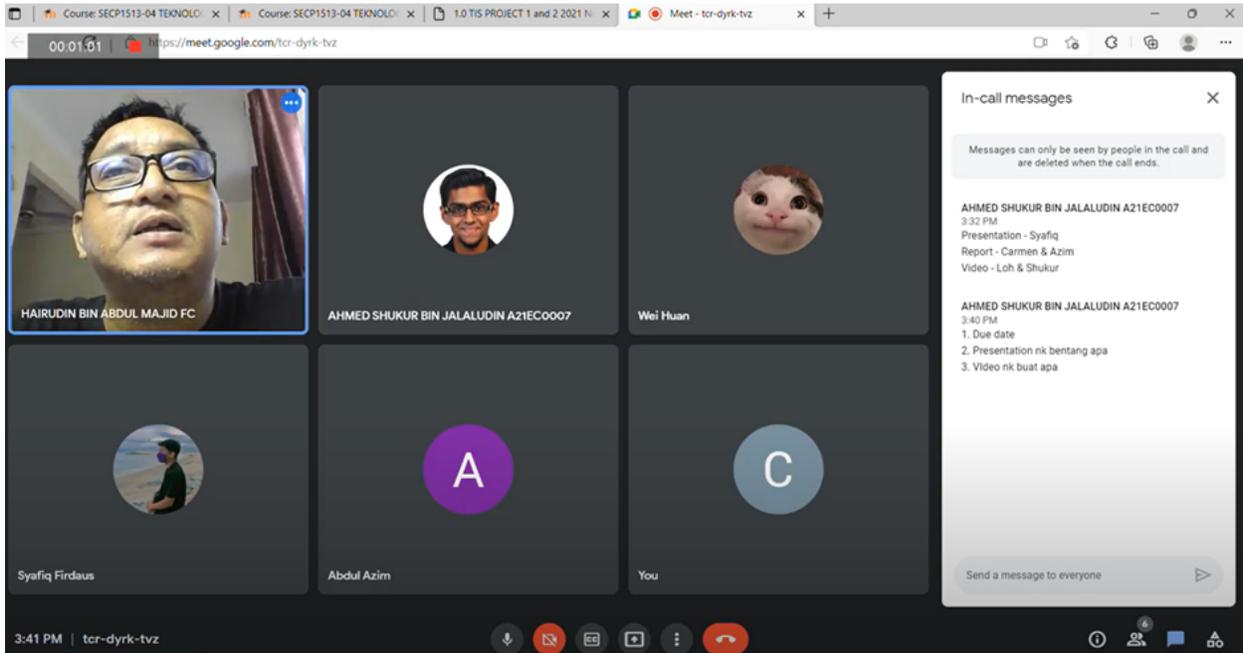
We had some discussion with our lecturer to get more information. We also did the work distribution via a few online meetings by Google Meet. We also did some small meetings in our WhatsApp group.
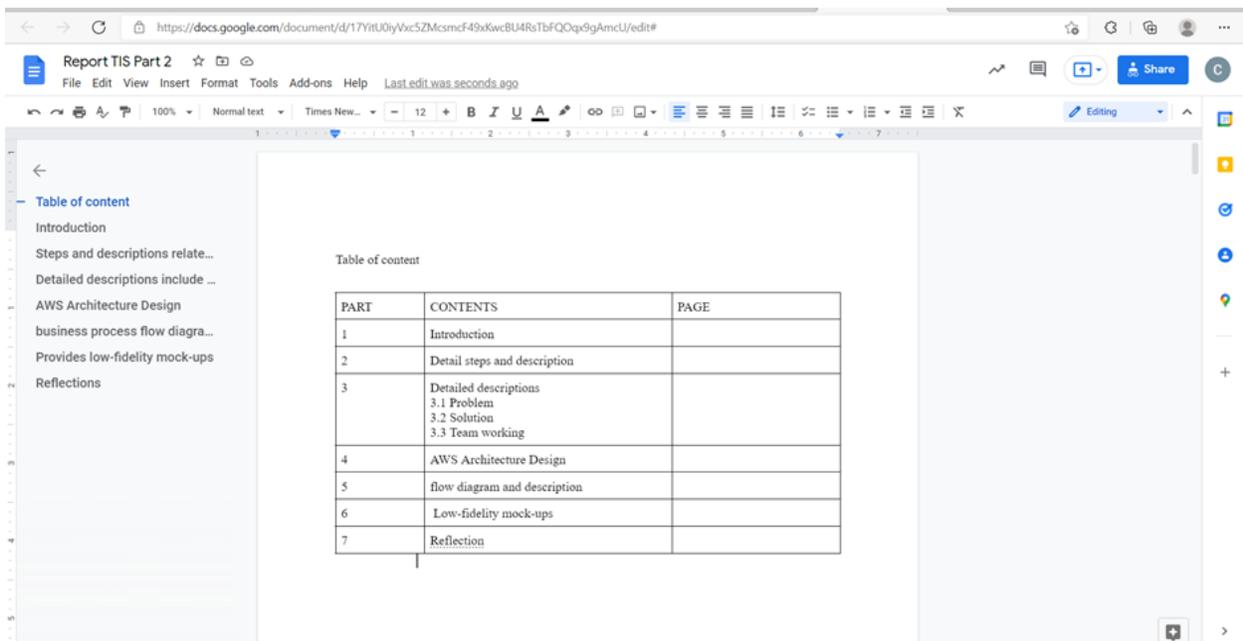
We also created a Google Docs for us to make us do the report together. The reason for using Google Docs is to ensure that we can correct each other's mistakes easily.
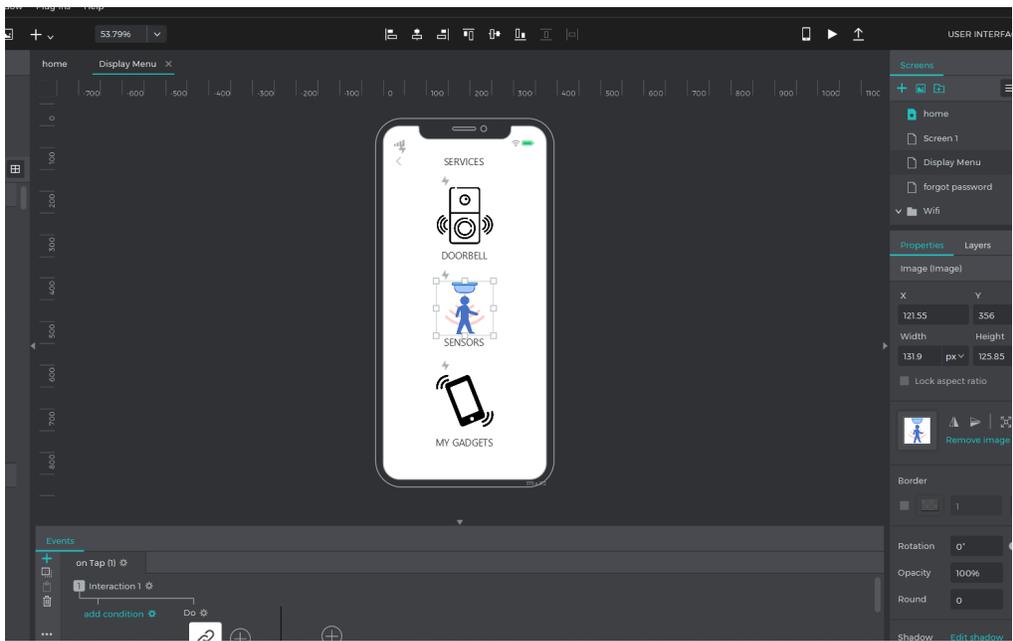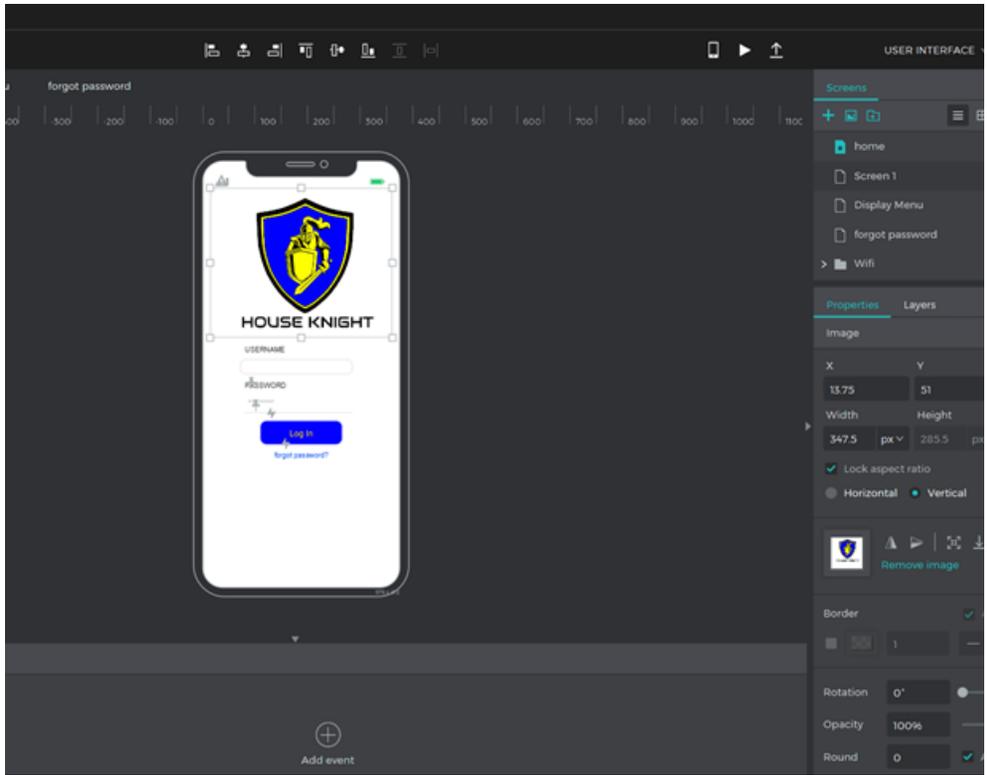
Process of creating the design of the low-fidelity mock-ups.
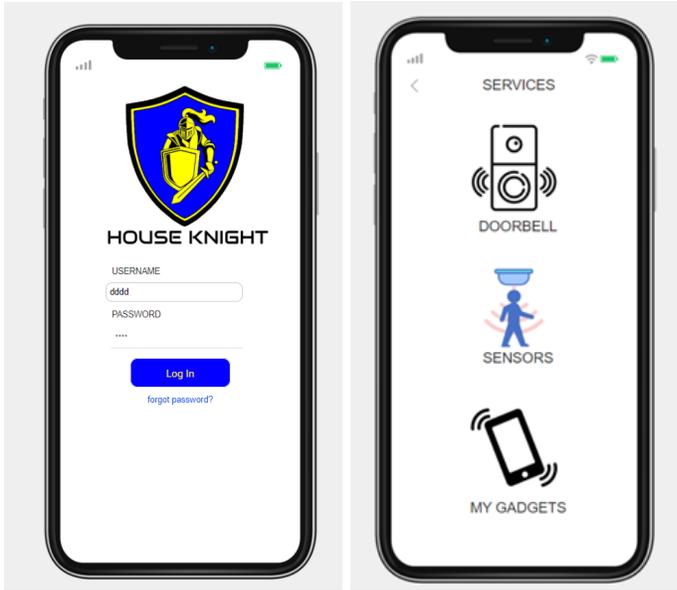
The trial for our low-fidelity mock-ups.

3. DETAILED DESCRIPTIONS

3.1 Problems

Throughout the finishing of the project there were a lot of difficulties faced by us to be able to complete the project on time. One of the main problems that we face would be lack of knowledge and understanding on the project. Without any detailed and perfect knowledge on the topic, we weren't able to move forward with the project. There were a number of topics to be understood in order to be able to complete the project, such as network architecture, Internet of Things and many more. This surely was a big obstacle to be overcome by us throughout the process of finishing the project.

Beside, knowledge we also had some problems on not knowing what software to use to certain things that are required in the project. For example, we were having trouble on finding a good software to build our network architecture. Moreover, after finding the right software it was also a challenge to get used and learn how to use the tools in the software.

Due to the pandemic situation, all of us are far apart from each other and unable to communicate well as some of them faced technical difficulties with their internet connections. We weren't able to discuss as well as face to face group discussion. Besides that, some of them were not able to use some of the softwares as it required a big storage capacity as their computer or laptop were outdated.

These were some of the problems that we encountered throughout the journey on finishing the project together. There were a number of solutions that helped us with the completion of the project.

3.2   Solutions

As the saying goes, every problem has its own solution, our group also found and worked out the solutions for the problems we faced during the process of finishing the project. As per our first problem, not having enough knowledge on the topic of the project, every member of the group decided to do research and find more knowledge on the project we were doing. Our team also organized a number of google meets in order to exchange knowledge and ideas after we have done our own research. Therefore, we were able to find a lot of solutions for the problems and also gain a lot of new ideas on what to do on the project. Moreover, not to forget, industrial talk that was organized was also helpful to every single one of us to gain more knowledge on the topics of the project. There were seven industrial talks conducted and all of them gave us information on certain parts of the project.

Discussing our project to our lecturer, sit Hairudin was surely helpful in every way possible. For example, as we were clueless of what software to use to create our low fidelity prototype project, sir Hairudin was surely a savior as he provided us with some recommendations of software that are not only user friendly but also beginner friendly. We were able to use the software recommended by sir Hairudin, Just In Mind, as it does not take much storage and is very beginner friendly. As for getting used to the softwares, our team members invested their time to make sure they understood the software before jumping in and creating the prototype. Each of us will be on the google meet while exploring the softwares and explaining to each other the tools that are available. With that, we were able to create our own low fidelity prototype.

Lastly, even though communication was an issue, the team members did not give up. Each of the team members sacrifice their time and money in order for them to be able to join the google meets. We also will ask a lot of questions to each other in order to make sure everyone is on the same page and moving together. Each of us will be given their own task in order to complete the project so that there won't be any crash or overwritten works. This enabled us to do the assignments without disruption even though there is less communication.

3.3   Team Working

Team working is the one of the best traits to have when it comes to finishing a group project. Every member of this group contributed equally and fairly for the project. As already mentioned, there were a lot of problems that we faced in order to finish the project. Each one of us had to play their part in order for us to finish the project within the given time period. The team work in our group is unbeatable, everyone will be playing part in every part of the project from the beginning until the end. Everyone will be given their own task to finish within a certain period of time. Even Though, we are given our own task, each member of the group would not hesitate to give a hand to those who are stuck with their part of the assignment. The reason behind why we were able to complete the project on time is because of the contribution and teamwork put in by every member of the group. Not only that, but the members of the groups also have great leadership skills. Every one of them won't be afraid of taking the lead on guiding other team members regarding the project. To conclude, our teamwork was really good to the point not only that we became good team members but also became close friends.

4.   AWS ARCHITECTURE DESIGN
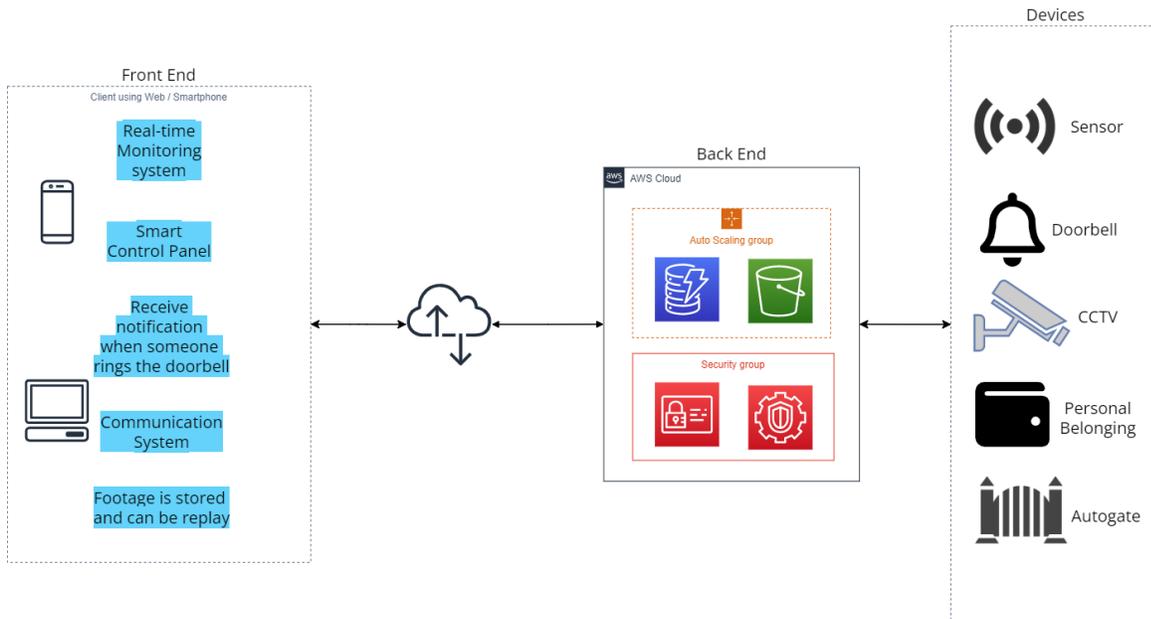
4.1   Amazon Simple Service and Amazon DynamoDB

Amazon Simple Storage Services (S3) and Amazon DynamoDB are placed in the auto-scaling group. This means that users can be scaled up or down the storage capacity based on users' requirements. For the Amazon Simple Storage Service (S3) the data such as images and videos can be stored and collected as objects in buckets securely. It provides low latency access to the data over the internet, can easily access the data anytime and anywhere. Secondly, Amazon DynamoDB is a fast and flexible NoSQL database service. It partitions the data into the table and performs the data backup for safety purposes. In our home security management system, the video footage that is recorded will be stored into the Amazon Simple Storage Services (S3) whereas the Amazon DynamoDB will perform data backup and classify the video footage into different timelines like years, months and days. If we accidentally lost our data, we are still able to retrieve the data back. Besides, if there is an intruder detected or our personal gadgets are moving away, a notification will send to the user through the database.

4.2   Security Identity & Access Management and Amazon Guard Duty

Furthermore, we also have Security Identity & Access Management and Amazon Guard Duty in the security group. We placed the security group in our backend is to prevent computer security threats such as malware, hackers, virus, and so on in order to shield our data from malicious activities. Security Identity & Access Management provides a high level of data protection, the developer can grant different permissions like view only, view and create only to certain people or groups for specific resources only. It also provides multi-factor authentication (MFA), the user not only provides a password but also a special code from the configured device when the user wants to log in to their own account. This will protect the data from being stolen or theft by someone else. Second, the Amazon Guard Duty is a threat detection service to guard the stored data. It will guard against threats, malicious activity, and unusual data access. The video footage and personal information of the user will be protected from being stolen or hacked by an unknown person. In our home security management system, we use these two resources, Security Identity & Access Management and Amazon Guard Duty to strengthen the security of our application and prevent cybersecurity threats.

5. BUSINESS FLOW DIAGRAM AND DESCRIPTION
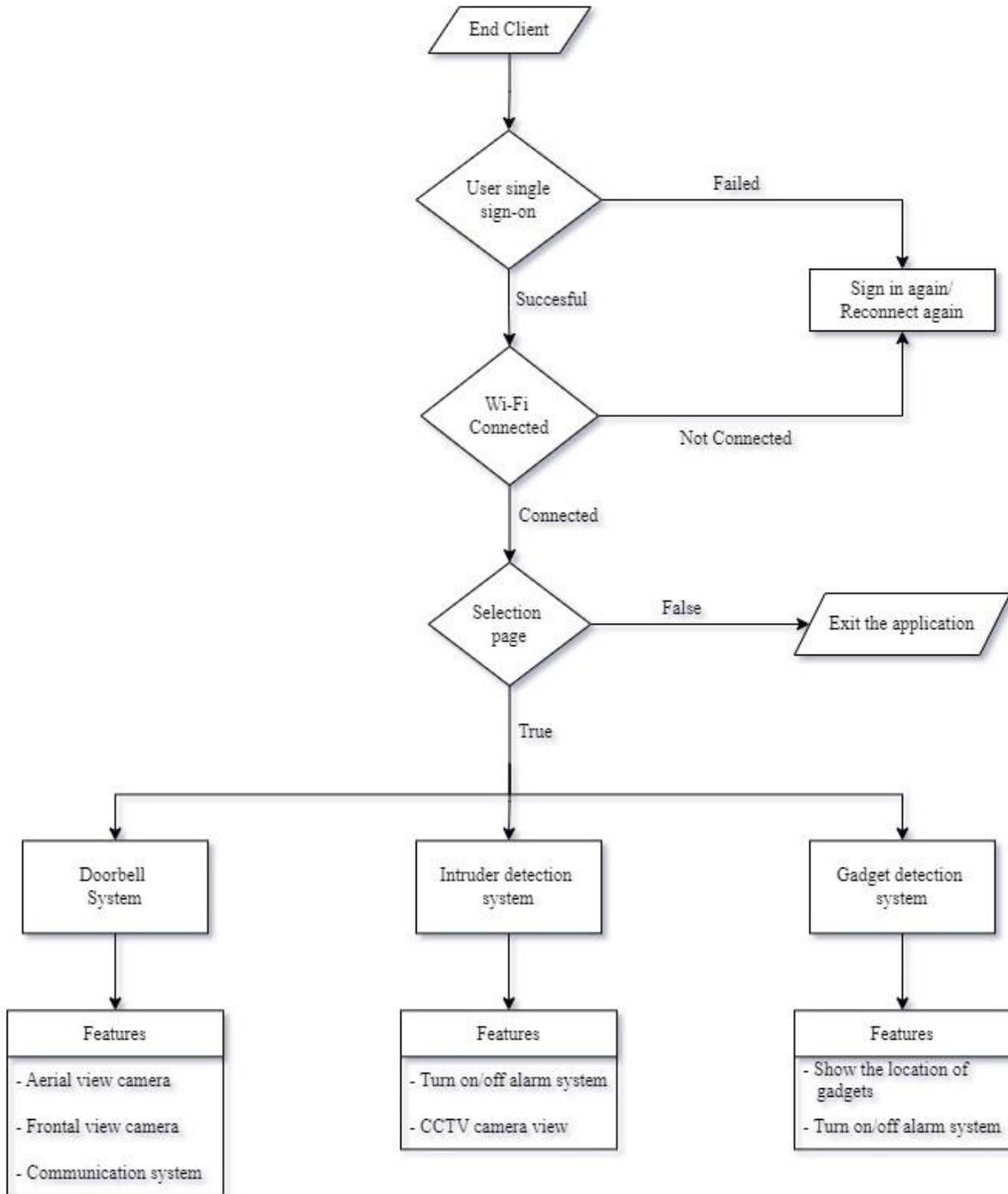
When the end client clicks into our home security application, a login page will appear for the client to enter his username and passwords to use the services in the application. If the client enters incorrect passwords or usernames, it will be required to re-enter again. After the login page, the clients need to connect to our system's Wi-Fi so that they can continue using our application's services. After that, the client will reach the selection page for the services of our application. There are three services provided in this application that are the doorbell system, intruder detection system and gadget detection system. In the doorbell system, the client can watch the live video, either aerial view from CCTV or frontal view from the doorbell's camera. The client can tap the microphone icon to communicate directly with the person in front of the house. In the intruder detection system, there is a camera view from CCTV and a button to switch on or off the alarm system when an intruder is detected. The third system is the gadget detection system. The features of this system are that the clients are able to see the location of their gadgets such as computers or mobile phones and also have the switch to turn on or off for the alarm system.

6.   LOW-FIDELITY MOCK-UPS

1. Press one 'House Knight' icon to access the application.

2. Enter your username and password.

3. Press on the 'Connect Wifi'.

4. Connect to the Wifi.

5. Wait for the Wifi to be connected.

6. Choose the type of service you would like to inquire about.

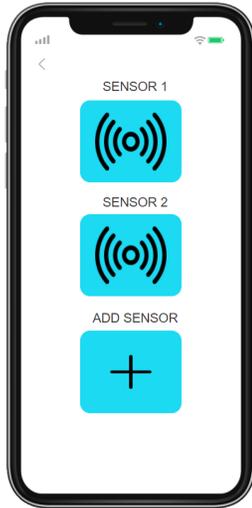## 6.1   Doorbell Interface

1. Once you click on the 'DOORBELL' service, you will be able to see the Aerial
    view camera on your screen. You can press on the '>' arrow button on the top
    right corner to see the frontal view.

2. This is the frontal view interface.

6.2   Sensors Interface

1. Once you chose the 'SENSORS' service, you will be able to see the above interface. You can choose the sensors that you would like to observe on. You can press on the '+' button to add the number of sensors.

2.   Once you press on the sensor you want to observe on, you can view the live cctv footage attached to the sensors. You can switch off the alarm by swiping on the green button on the top right corner.

6.3   My Gadgets Interface

1. Once you press on the 'MY GADGETS' service, you will be able to see the gadgets that are connected to the application. You can press on any gadget that you would like to inquire about. You can press on the '+' button to add the number of gadgets.

2. Once you press on any gadgets you chose to inquire, you can swipe on the button on the top right corner to view the location on the gadgets around the parameter.

7. REFLECTIONS

7.1 Carmen Tey Ye Yao

I had learnt about how the IoT makes the system connected to each device by using Wi-Fi connection. The motivation that makes me complete this project is the increment of the case of intruder break-in during this more technology era. The issues that our group faced is we cannot find a suitable time for us to discuss the project. The solution is I try to deal with each other and get a suitable time for us to discuss. After completing this project, I would like to make this project can be connected to the database for collecting the data. The improvement necessary for me to improve my potential in the industry is that I need to get more creative ideas to develop a more interactive system.

7.2 Ahmed Shukur

I learned a lot of things during the making of this project. For instance, I managed to learn how to use softwares such as JustInMind to create a user interface for our application. What motivates me to finish this project is to look, review and be proud of the last product of the project so that I can be satisfied with the time and energy that I have spent to complete this project. The issue that we face would be the lack of knowledge regarding how to actually use the softwares related to this project, but the solution that we opt for is by watching tutorials online on how to do certain features in the software that were hard to find. My direction after completing this project is to produce a fully usable application that can connect the IoT devices such as sensors and cameras to create a full prototype that is fully functional. Lastly, in my opinion, necessary improvements for me to improve my potential would be to learn about how to use various softwares that are fundamental to the industry so that I will be able to easily put myself at the top of the market with multiple soft skills in my dispense.

7.3   Abdul Azim

By doing this project I have learned a lot regarding IoT and how it works. Besides that I also have learnt how to build an application prototype by using softwares such as JustInMind. My motivation to complete this project is firstly, my friends. I would like to see the final product of this project with the amount of effort that was put by all of the team members in completing it. The issue that I faced doing this project is not having enough knowledge on the topic of IoT. Therefore, as a solution, I started discovering and learning about IoT in order for me to be able to do the tasks given to me. My vision after completing this project is to find myself a new project where I have to build a fully functional application that can be used by others. In my opinion, the necessary improvements need to be made by me to learn more about how to create applications, how to use different softwares to create applications, learn more about cloud computing and IoT and learn many more things.

7.4   Loh Wei Huan

I have learnt numerous things while doing this project. For example, I learnt about how to design an AWS architecture by using different AWS components. The motivation to let me complete this project is when designing the prototype of our application. I feel very cool and interesting while doing the prototype. In this project, I realize that I do not have enough knowledge about AWS architecture and I have to learn by myself via the internet. Plus, I also have some misunderstanding and different opinions with my group members but lastly we come out with a comprehensive solution. After we finish this project, I think we can continue this project by implementing database, storage and security into our project and become a real application in Google Play Store or Apple App Store. I think the necessary improvement that I need is to keep continue learning related to this sector, be more active in group project, provide more ideas to group project and so on.

7.5   Syafiq Firdaus

In Conclusion, through this project, we can figure out where we need to work on our performance or personal development skills to become a better employee in the future. We've learned how to schedule tasks, figure out how long each task will take, and put the project's goals first, so we can be more efficient with our applications and activities, as well as avoid miscommunication in the team. Furthermore, being able to solve problems is important because it helps us make strategic and tactical plans to deal with difficult or unexpected situations. People who are good at solving problems say that when they face problems, they should stay calm and look at all of their options to find the best way out. Finally, we hope that our mobile app will be easier to use and provide better service.