HOME FITNESS
MOBILE APPLICATION

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MOBILE APPLICATION

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Thesis submitted in fulfillment of the requirements
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ABSTRAK

Memandangkan wabak COVID-19 merebak secara liar di seluruh dunia. Disebabkan situasi ini, kerajaan Malaysia, yang diketuai oleh Perdana Menteri Muhyiddin Yassin, telah menggubal perintah berkurung di seluruh negeri yang dikenali sebagai Perintah Kawalan Pergerakan (PKP) pada 18 Mac 2020, sebagai reaksi terhadap peningkatan kejadian. Semua aktiviti luar dan senaman adalah dilarang sepanjang tempoh PKP. Jadi, akan timbul isu bagi mereka yang ingin bersenam dan pergi ke gym tetapi tidak mempunyai pengetahuan dan peralatan untuk bersenam. Projek ini bertujuan untuk menyediakan video senaman senaman di rumah sebagai panduan untuk mereka bersenam di rumah. Oleh itu, mereka boleh berada di rumah dalam tempoh ini. Selepas meneliti beberapa aplikasi sedia ada, batasan aplikasi ini ditemui kerana video senaman aplikasi mereka memerlukan peralatan seperti dumbbell, barbel atau mesin penekan kaki. Selain itu, aplikasi ini sama ada khusus untuk lelaki atau khusus untuk wanita. Oleh itu, aplikasi yang dicadangkan ini akan menyediakan video senaman kecergasan tanpa sebarang peralatan kepada lelaki dan wanita. Terdapat platform untuk pengguna berkongsi perasaan mereka tentang senaman mereka di atasnya. Pengguna boleh berkomunikasi antara satu sama lain dalam tempoh ini. Metodologi tangkas yang terdiri daripada fasa Pelan, Fasa Reka Bentuk, Fasa Pembangunan, Fasa Ujian dan fasa Deployment akan dilaksanakan dalam pembangunan aplikasi. Selepas fasa pembangunan, Ujian Penerimaan Pengguna (UAT) dijalankan untuk mengesan kecacatan dan ralat dalam aplikasi. Aplikasi itu kemudiannya akan dikeluarkan dan mengumpul maklum balas daripada pengguna.

ABSTRACT

As the pandemic COVID-19 spread wildly all over the world. Due to this situation, the Malaysian government, led by Prime Minister Muhyiddin Yassin, enacted a statewide lockdown known as the Movement Control Order (MCO) on March 18, 2020, in reaction to the increase in instances. All outdoor activities and exercise are prohibited during the MCO period. So, there will be an issue for those who want to exercise and go to the gym workout but don't have any knowledge and equipment to workout. This project aims to provide the home workout exercise video as a guide for them to workout at home. Hence, they could have at home during this period. After researching some existing applications, the limitations of these applications are discovered as their application's workout videos are required equipment such as dumbbells, barbells or leg press machines. Besides, these applications are either specific for men or specific for women. Therefore, this proposed application will provide fitness exercise videos without any equipment to men and women. There is a platform for users to share their feelings about their workout on it. Users can communicate with each other posts during this period. Agile methodology consisting of Plan phase, Design phase, Development phase, Test phase, Deployment phase and Review phase will be implemented in the development of the application. After the development phase, User Acceptance Test (UAT) is conducted to detect defects and errors in the application. The application will then be released and collect feedback from users.

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LIST OF ABBREVIATIONS

SRS	Software Requirement Specification
SDD	Software Design Document
UAT	User Acceptance Test
HFA	Home Fitness Application
V1	Version 1

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Mobile phone plays an important role in our daily life. People using it to communicate with their family and friends and also spend their free time on it. There is a research showing that the number of people that own a smart and feature phone is 7.26 Billion, making up 91.54% of the world's population. Based on this research, it proofs that nowadays almost everyone will own a mobile phone. Our life will become easier with the help of the mobile application.

In 2019, our mother earth had facing a pandemic which is Covid-19. Covid-19 pandemic has brought a lot of problems to our life. Covid-19 is a spreading virus and can cause death to human being. It causes all of us needs to avoid all the outdoor activities in order to reduce the spreading of covid-19. Hence, a fitness application will help people that want to workout or exercise at home to solve their needs. Fitness application provide workout tutorial video for user to workout or exercise. User will guide by the tutorial video to workout. Furthermore, this application provides selection of the workout's level to the user. User can base on their level to select the workout program which more suitable for them. User can select the type of workout to do. Home fitness application will based on the workout done to calculate the calories burnt during the workout. This application will record down the date of the user workout. It will record the user workout progress. So, user can be easily trace back their progress.

1.2 PROBLEM STATEMENTS

In 2019, there is a pandemic happen around the world which is COVID-19. The first COVID-19 case is happened in Wuhan, Hubei, China. Director-General of Health Noor Hisham Abdullah has been overseeing the medical response and readiness to the outbreak in Malaysia from January 2020, under the Health Ministry of three successive governments led by the Mahathir, Muhyiddin, and Ismail Sabri ministries. The initial cases in Malaysia were confirmed on January 25, 2020, among Chinese travelers arriving in Johor via Singapore, and remained limited to a few imported cases until March 2020, when many local clusters surfaced. The most significant was a Tablighi Jamaat religious gathering in Sri Petaling, Kuala Lumpur, which resulted in a massive increase in local cases as well as those imported from other nations. By the end of March, the total number of active cases had climbed from under 30 to over 2,000 across the country's states and territories (Elengoe, Covid-19 outbreak in Malaysia). The Malaysian government, led by Prime Minister Muhyiddin Yassin, enacted a statewide lockdown known as the Movement Control Order (MCO) on March 18, 2020, in reaction to the increase in instances. The MCO, which was supposed to terminate on March 31, 2020, has been extended until early May 2020. The MCO has led to a modest decrease in daily infections by early May. The government gradually eased lockdown restrictions, beginning on 4 May 2020 with the "Conditional Movement Control Order" (CMCO), which allows most business sectors to reopen under strict standard operating procedures (SOPs), and ending on 10 June 2020 with the "Recovery Movement Control Order" (RMCO). The government intended to cease RMCO at the end of August 2020, but due to the continued detection of imported cases, the measures were prolonged until the end of the year, with several sectors remaining restricted and strong travel restrictions in place from a number of countries.

In the existing fitness mobile application, there is problem existed in it. Some of the fitness mobile application has the workout routine plan for the user but it is not suitable for home workout. Their fitness mobile application needs the equipment to finish the workout. For example, the application required user to have dumbbell or barbell in order to finish the upper body workout. So, it is not friendly to the user that wants to home workout. Besides that, existing fitness mobile application is more focus on men’s

fitness only or women's fitness only. User will confuse on the fitness application workout program is that really suitable for them. A fitness mobile application that include all men and women home workout program will be needed in this current situation.

This pandemic COVID-19 still haven't end yet until today. Any crowded outdoor activities were avoided by following standard operating procedures (SOPs). Fitness application could solve this problem. People could download the application on their phone and follow the workout in the application. Hence, outdoor activities and gym room can be replaced to home workout for those who want to have an exercise or gym. Apart from these, a fitness mobile application that contain both gender home workout program is needed to solve the problem. Therefore, user don't have to confuse on the workout program in the application. User can base on the category to select the workout routine plan that is more suitable for them.

1.3 OBJECTIVES

Based on the problem statements, the objectives of the project are:

a) To study the existing Fitness mobile application.

b) To design and develop a Fitness mobile application using android studio software for those who want to exercise at home in this pandemic COVID-19 situation.

c) To evaluate the functionality of the developed Fitness mobile application.

1.4 SCOPE

The scope of the project are:

User Scope:

a) People in age at least 14 to 15 age.
b) People that want to work out at home.

System Scope:

a) Covered workout tutorial, record gym progress and calories burned from the workout.

Development Scope:

a) Store multimedia elements such as workout and text in database.
b) Using android studio.

1.5 SIGNIFICANT

a) User

User can gain the home workout knowledge from the mobile application. Besides, they can have an interactive way in learning the workout knowledge. So, they will guide by the application and learn the best way to workout at home.

1.6 REPORT ORGANIZATION

This thesis contains of five chapters. Chapter 1 explain about the overview of the project including the Introduction, Problem Statements, Objective of the project, Scope and Thesis Organization.

Chapter 2 briefly explain about the literature review on Fitness mobile application for those who want to workout at home.

Chapter 3 explains about the methodology used in this project. The stages that used in this project are Analysis, Design, Develop, Implementation and Evaluation.

Chapter 4 explains about result and discussion based on development and testing of this project. In this chapter, all the results and output of the project were briefly discuss. These include the software development, application testing, collecting data and result of the project.

Chapter 5 conclude and summarize the final result on this project. The limitation and further works were discussed thoroughly in this chapter.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

Chapter 2 is about the review of the available application of mobile in the field of fitness. The comparison will focus on the Mobile Operating System (OS), Graphical User Interface (GUI), the language provided, size of the application, a function provided, advantages and disadvantages of the mobile application. A comparison of this existing application recommends the strength and effectiveness of the existing application, so that a better version of the mobile application will be produced in this project.

2.2 REVIEW OF EXISTING SYSTEMS

Three existing fitness mobile applications will be reviewed in this section. These three applications are Map My Fitness, Seven and Nüli. Each fitness application has a different function of fitness.

2.2.1 Application 1 – Map My Fitness

Map My Fitness is a fitness mobile application developed by Under Armour, Inc. MapMyFitness has a variety of workouts for both beginners and advanced users. Users can select from a number of Under Armour-designed programmes that focus on specific muscle groups. The software can also design customized training plans based on your goals and fitness levels. Under Armour's MapMyFitness app connects to the company's wearables and other devices to provide better workout tracking and analytics. MapMyFitness app is available on the Apple App Store and Google Play store. Map My

Fitness, like its competitors, has a monthly subscription cost, but it's significantly less than comparable applications. If user wish to unlock more features and plan on this apps. User's account will be debited at the time of purchase confirmation if they upgrade to a premium MVP subscription. Monthly subscriptions are $5.99 per month, and annual subscriptions are $29.99 per year or $2.50 per month.

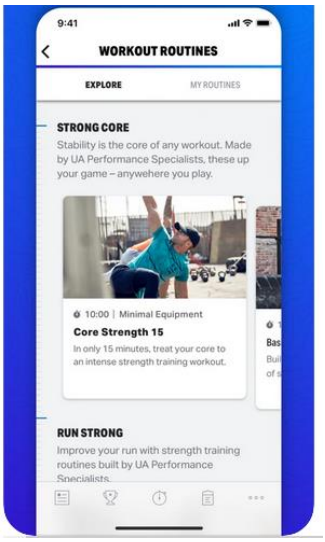

Figure 2. 1 Workout Routine explore in the MapMyFitness application

Figure 2.1 is showing the workout routine description and time of workout. Users can explore different types of workouts that they are interested in.

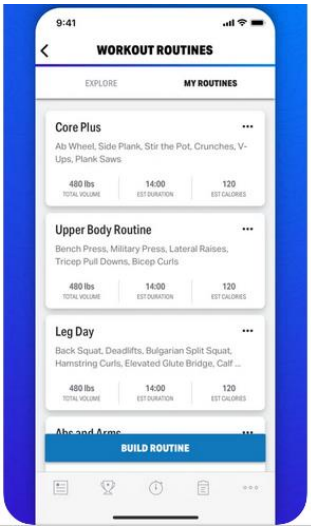

Figure 2. 2 Type of workout routine in the MapMyFitness application

Figure 2.2 is the interface for user to have a more detailed workout plan to view with. They can view the workout plan routine. For example, the core plus plan has 6 sets of workouts that need to be finished. The total volume, time duration and calories lose have been stated on the plan.

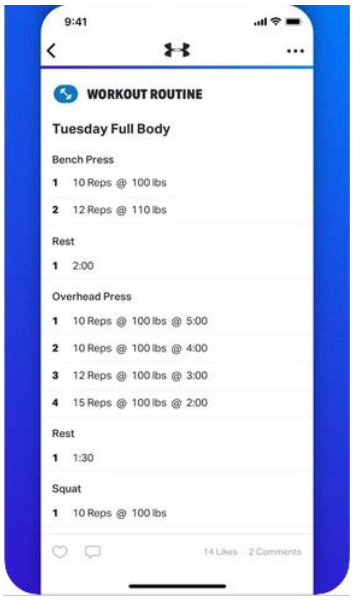

Figure 2. 3 Progress of the workout routine in the MapMyFitness application

Figure 2.3 is the progress of the workout routine that have be done by the user. User can view the progress of that day's workout or the previous day's workout routine. Hence, user can trackback their workout routine easily. They can manage the volume of the next workout routine.

2.2.2 Application 2 – Seven

Seven app is a fitness start-up based in Sweden that was created in 2012.Since then, it has evolved into a popular exercise software that has received positive feedback from both users and critics. Their objective on making this app is clear: make fitness simple and enjoyable so that people would adopt it as a daily habit. This app can be download from Apps Store and Google Play Store. User can pay subscription cost to unlock more workout program. It costs $9.99 USD per month or $59.99 USD per year, although there is a seven-day free trial available with the Seven app.

The Seven app (also known as the 7 Program by Perigee) is a popular fitness app known for its high-intensity, no-equipment exercises in which every minute counts. All workouts may be done from home because the Seven app is bodyweight only. Naturally, as the name implies, the 7 Minute app guides you through an excellent workout that lasts 7 minutes (albeit it lasts somewhat longer due to the rests in between). The Seven app uses a high-intensity interval training (HIIT) strategy, with 30-second active and 10-second rest periods in between. So, you're looking at a total of 12 exercises in this section. There are more than 200 routines to choose from. Seven app has its creativity on their workout program. They included everything from mobility to specific body areas, as well as unique routines such as early wake-ups and office chair workouts. All of these tasks were completed in less than eight minutes. One of the most creative part is there are

different types of instructors. During the workout, user have the option of working with a standard announcer, who is essentially a countdown timer, or one of their teachers. Instructors are on hand to provide motivation and encouragement. Just pay attention to these instructors: Angry Mom, Cheerleader, Drill Sergeant, and others (Putnina, 2021). The Seven app makes every effort to make exercising enjoyable and habit-forming.

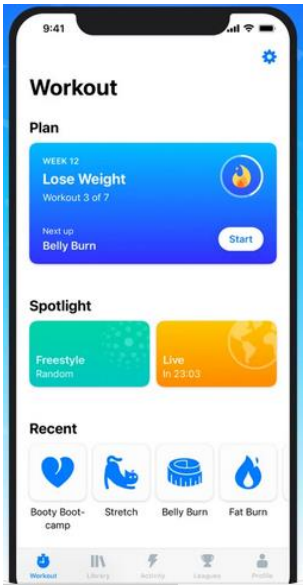

Figure 2. 4 Workout plan page for Seven App

Figure 2.4 is for user to view the workout plan, spotlight, and recent workout. User can start the workout on this page.

Figure 2. 5 In the progress of the workout plan in Seven App

Figure 2.5 is the workout interface for user. This interface displays the workout move to the user. There is a time count down for the workout. User needs to finish the workout by the time end.

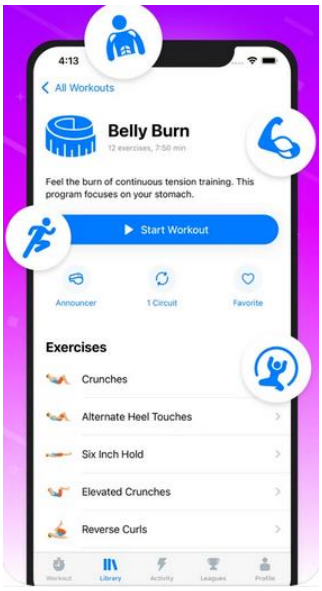

Figure 2. 6 different types of workout exercises in Seven app

Figure 2.6 provide more than 200 workout exercise to the user. User can choose to do which exercise they are interested in. Then, press the button <<Start Workout>> to start the workout exercise.

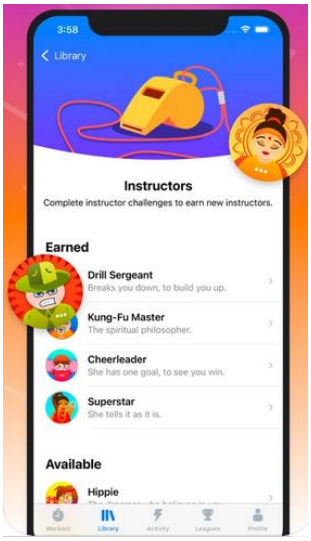

Figure 2. 7 Types of instructors in Seven App

Figure 2.7 is the interface for user to choose the instructor during workout. There are many instructors such as Angry Mom, Cheerleader, Drill Sergeant, Super Star, Hippie and others. User can choose the instructor they want and workout with it.

2.2.3 Application 3 – Nüli

Nüli is a fitness app developed by Nüli, LLC in 2020. It offers various training programs and health-related resources. Nüli has been awarded number 1 award-winning home workout app for women. This app provide video demonstrations of workout step by step and voiceover to help user achieve their fitness goal effectively. Nüli is committed to assisting all women who are afraid of going to the gym or are unsure where to begin their fitness journey. User can build confidence from the inside out to achieve their fitness goal with step-by-step training regimens and healthy recipes. User can get their first 7 days free to start their fitness journey with Nüli.

Below is the price of the Nüli membership subscription:

1. Monthly (7-day free trial) $13.49
2. Quarterly (7-day free trial) $29.99

3. Nüli Membership $87.99
4. Quarterly $29.99
5. Monthly $13.49
6. Annually $87.99

In the Nüli app, user will find home and gym workouts for beginners to advanced athletes, as well as nutritious meals with step-by-step directions. There is more than 400 workout for user to workout. Nüli will find the programs that fit your goal. They have home and gym workout plans from beginners to advanced level. The app has quick workout, targeted workouts, weekly challenges and yoga. Quick workout will get user to finish the workout in 15-20 minutes. Targeted workouts are focused on any specific body parts that user want to work on like upper-body training, lower-body training or abs training. For weekly challenge, there will be a different new challenge coming in every week. Thus, user could find out more fun and exciting in fitness. Yoga program in this app is to help user stretch their muscles and relax their minds after a long busy day.

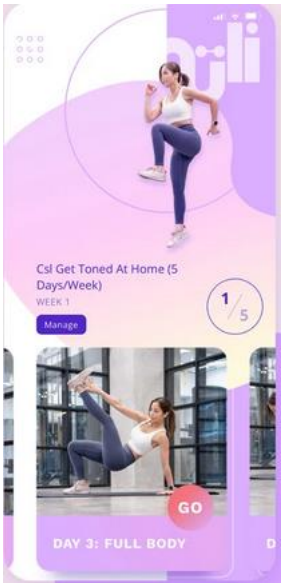

Figure 2. 8 Type of workout plan in Nüli App

Figure 2.8 shows more than 400 home and workout plans for user to choose their own.

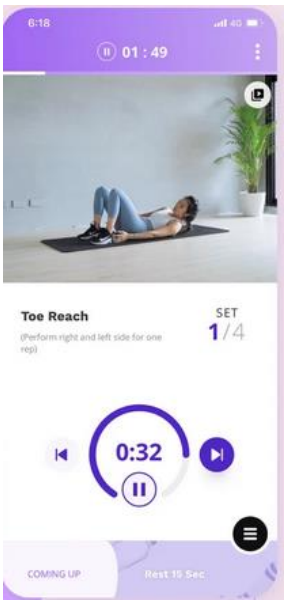

Figure 2. 9 workout interface in Nüli App

Figure 2.9 is the interface of workout plan ongoing. There is workout video and name display on the interface. The time taken will be shown at the bottom of the interface. The user needs to do the workout until the time end.

Figure 2. 10 Progress of gym workout in Nüli App

Figure 2.10 help user track their workout progress and weight. It will record all the workout reps, sets, and weight. Thus, user can trackback to the previous workout. Nüli will based on the previous plan and up the workout level for the user.

2.3 COMPARISON OF THREE EXISTING SYSTEMS

Application Name	**Map My Fitness**	**Seven**	**Nüli**
Graphical user interface	The interface is dull but it is simple and well organized	The interface is attractive and has a bright background	The interface is very attractive, colourful and well organized
Mobile OS	Android, IOS	Android, IOS	Android, IOS
Language	English, French, German, Italian, Portuguese, Russian, Simplified Chinese, Spanish	English, Danish, French, German, Indonesian, Italian, Japanese, Korean, Polish, Portuguese, Russian, Simplified Chinese, Spanish, Traditional Chinese	English, Traditional Chinese

Size	264.2 MB	233.7 MB	44.3 MB
Main function	• Provide different types of workouts for beginner and experienced individuals • Provide designed workout program for specific muscle groups • Provide enhanced metrics and workout tracking • Track your nutrition and hydration levels within a dedicated section	• Provide an effective workout which 7-minute-long (slightly longer than 7 minutes due to the break in between.) • Provide more than 200 workout routine • Ranged from mobility to specific body parts and even special workouts like morning wakeup or office chair workouts • Different types of voice instructor	• Provide workouts step by step with video demonstrations and voiceover for women • Provide programs that fit user goal – home and gym workout plan from beginners to advanced level • Set quick workout and targeted workouts for women • Provide Yoga class for women
Advantages	• Using the built-in GPS on device, track workouts in real time. • Retrospectively track your workouts.	• Contains a wide library of exercises. • It's quite simple to follow — user-friendly and error-free	• Contains a wide library of exercises. • User friendly and error-free

	• Create pre-planned itineraries for walking, jogging, cycling, and other activities using GPS. • A dedicated section allows you to track your diet and hydration levels. • Enter your height and weight to find out how many calories you need and how many you burn when doing various types of exercise.	• Time-saving quick workout for user • User may participate in challenges, get badges, compete with your friends, and share your progress with them; it also has a lot of features. • Provides basic statistics such as total time spent exercising and estimated calorie burn. • User may remember their favourite workouts and create custom programmes based on our preferences (for example, selecting moves that do not need hopping). • Register outside activities like as walking, as well as connect it	• In-app progress photo feature to track your transformation • Time-saving quick workout for user • Provide and suggest the best plan for user based on their requirement. • Dedicated to helping all women who are scared to go to the gym or don't know how to start their fitness journey

		to Google Fit/Apple Health for a more seamless experience.	
Disadvantages	• Need to purchase monthly or annually membership to unlock more features. • Interface is simple but dull compare to other fitness apps. • This app is not designed for women.	• Don’t include a meal plan • No warm-up or cool-down exercise. • When compared to other fitness applications, it's somewhat pricey • This workout software also loves to throw in some moves that require furniture, leaving you scrambling to find anything in order to complete the set.	• Need to purchase monthly or annually membership to unlock more features. • This app only available for women workout.

Table 2. 1 COMPARISON OF THREE EXISTING SYSTEMS

2.4 DETAILED FUNCTION COMPARISON

Function	Map My Fitness	Seven	Nüli
Provided men workout routine	✓	✓	✗
Provided women workout routine	✗	✓	✓
Provided number of workout plan:	✓	✓	✓
1. More than 200	✓	✓	✓
2. More than 400	✓	✗	✓
3. More than 800	✓	✗	✗
Type of workout:			
1. Beginner level workout	✓	✗	✓
2. Experienced individual workout	✓	✗	✓
3. Specific muscle group workout	✓	✗	✓
4. Customized workout for user	✗	✗	✓
5. Home workout	✓	✓	✓
6. Cardio workout	✓	✓	✓
7. Effective 7-minute workout / Quick workout	✗	✓	✓
8. Morning wakeup or office chair workouts	✗	✓	✗
9. Yoga class	✗	✗	✓
Workout with video demonstration and voiceover	✓	✓	✓
Provided enhanced metrics and workout tracking	✓	✗	✗
Track nutrition and hydration levels within a dedicated section	✓	✗	✗
Provided types of voice instructor	✗	✓	✗

Table 2. 2DETAILED FUNCTION COMPARISON

2.5 SUMMARY

Based on the comparison of three applications which are Map My Fitness, Seven and Nüli, each fitness application has its unique function and some may have a lot of space to improve. Overall, all the existing application have their advantages and disadvantages. The main function of the fitness apps is to provide a workout plan to the user to workout in any place. From the studies done, the proposed fitness application should have some unique features that make it special to the users such as being able to comment on their feeling on the workout program. If they are interested on the video trainer teaching, user can straight contact the trainer for a one-to-one online lesson.

CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

In chapter 3, methodology of developing for this project will be discussed. In software engineering, there are a few different types of methodology development models, each with its own set of advantages and disadvantages depending on the situation. However, for the development of this project, only one methodology will be adopted. After studying the methodology, the agile development model was picked as the project's development mode because it is the most appropriate. Further explanations will be discussed in this chapter.

3.2 PROJECT MANAGEMENT FRAMEWORK

Fitness mobile application will be agile methodology to develop. Although, there are many software development methodologies such as waterfall development, rapid application development, agile development and DevOps development. However, agile methodology is most suitable to develop this application. Agile methodology is a way of planning and development that emphasizes flexibility. This method is incremental and iterative, allowing for more flexible implementation of changes. Due to the sequential nature of the waterfall development model, which is a linear and sequential approach, it is difficult to modify during the development process. It is claimed to be flexible to make changes by adopting agile method throughout development since changes can be implemented easily and modifications can be made according to the needs of the customer, resulting in more adaptability. Figure 3.1 below shows the process of agile development model.

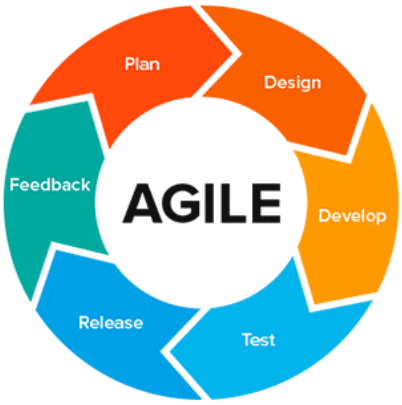

Figure 3. 1 Agile Development Model

i. Phase 1: Plan

Planning phase is the first phase of the Agile development model. All the requirement will be collected and gathered in this phase. There are two types of requirements which are functional requirements and non-functional requirements. The functions or features of the system that must be accomplished are referred to as functional requirements. It also explains the system's behavior. The functional requirements define what the product does and assist in the verification of the software's functionality, whereas the non-functional requirements describe how the product operates and help in the verification of the software's performance.

ii. Phase 2: Design

The design phase is after the planning phase, and it entails designing software based on the requirements established during the planning phase. The frameworks and how the system operate are designed in this phase using user flow diagrams. For continued project development, the programming language and system architecture will be selected.

iii. Phase 3: Development

Development phase includes of implementation of code for developing code. The code will be written to develop the user interface based on the structures and flows designed according to requirements gathered. This phase is the most time-consuming stage of the SDLC as this phase will convert all the documentations made into actual product.

iv. Phase 4: Test

This phase will be executed once the development stage is fully completed. Testing phase is vital to ensure that the application is bug-free and fits the requirements as described in the document. During this phase, any bugs will be fixed, and any serious issues will be resolved. The machine learning model and the application's basic function will be tested in testing phase.

v. Phase 5: Deployment

A complete and finalized application will be released and launched to end users with no critical issues in this phase. Customers will be shown how the system works and how to utilize it by the development team.

vi. Phase 6: Review

After all previous stages have been completed, this phase will discuss the progress made toward satisfying the requirements. Developer will present the ideas for correcting the issues that appeared during the previous phases. Following that, the phases of the software development lifecycle are restarted with a new iteration.

3.3 PROJECT REQUIREMENT

3.3.1 Functional Requirements

Functional requirement are product features or functions that developers must implement in order for users to complete their tasks. For the functional requirement in this application will be stated at below:

i. System must provide workout routine to the user.
ii. System able to register and login in the application.
iii. System should be able to record the progress of workout.
iv. User should be able to choose the type of workout that he/she wants to do.
v. User should be able to view their own profile.
vi. System must provide video demonstration for user.
vii. System must provide calendar for user to view their workout date.
viii. System must display the duration and calories burnt that user's workout.
ix. System must display the list of workout check-in.
x. System must display total duration of workout and total calories burnt.
xi. System must have time clock when user starts to workout.
xii. User should be able to stop the workout whenever he/she wants during the workout.
xiii. User should be able to edit the details in their profile.
xiv. System should allow user to fill in username.
xv. System should allow user to fill in password.
xvi. System should allow user to fill in first name.
xvii. System should allow user to fill in last name.
xviii. System should allow user to fill in email.

xix. System should allow user to fill in age.
xx. System should allow user to fill in height.
xxi. System should allow user to fill in weight.

3.3.2 Non-functional Requirements

Nonfunctional Requirements define system attributes such as reliability, security, performance, maintainability, usability, and scalability. The non-functional requirement in this application will be stated at below:

i. User's database should be fully secure.
ii. User should login to their account within 20 seconds.
iii. User should be able to view the demonstration video in a fluence flow.
iv. All the workout routine that done by user should record in their own profile.
v. When user start a workout, the system should not terminate the workout until the workout is completed or user terminated.

3.3.3 Constraints

Constraints of the system are listed below:

i. User needs to connect to the Wi-Fi/ mobile data before using this application.
ii. User must have a smart phone in order to use this application.

3.3.4 Limitations

Limitations of the system are listed below:

i. The resulted application can only be installed and used in android devices since the project is implemented using Android Studio.
ii. In order to use this application, user needs to register an account in the beginning.

3.3.5 Context Diagram

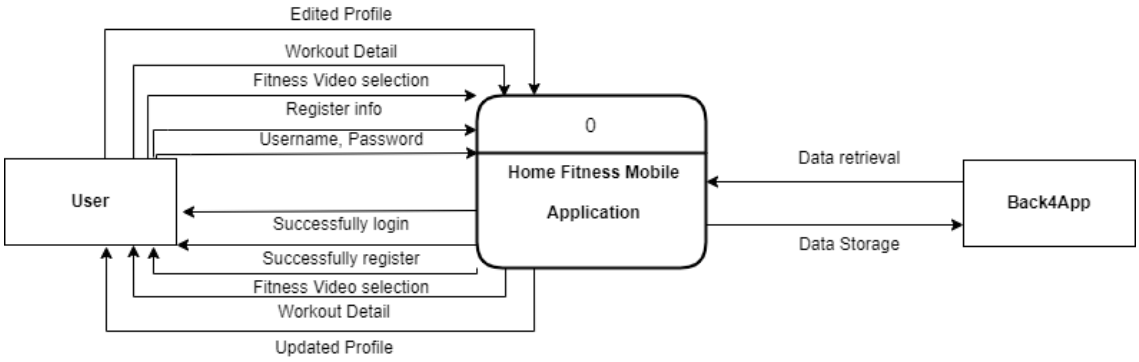

Figure 3. 2 Context Diagram of Home Fitness Application

Figure 3.2 shows the context diagram of the application. Context diagram refers to a data flow diagram that makes the details and boundaries of the designed application clearer that is makes the project's scope simpler. Context diagram also show necessary activities needed for an application. In this context diagram consists of two entities who are user and Back4App. First of all, user needs to insert correct username and password to access the application and it will retrieve data from Back4App. A message will display to the user once the user successfully login. If user don't have an account, he/she needs to fill in the register info and application will store it in Back4App. Application will send the message successfully register to user. User select the fitness video in the application. Application will retrieve data from the Back4App. It will send and display the fitness video to the user. Application will store the workout in the Back4App. Besides, workout details are retrieve from Back4App and display to user. Edited profile details by user is sends to the application and application will store the data in Back4App. The updated profile is retrieved from Back4App to user.

3.3.6 Use Case Diagram and Description

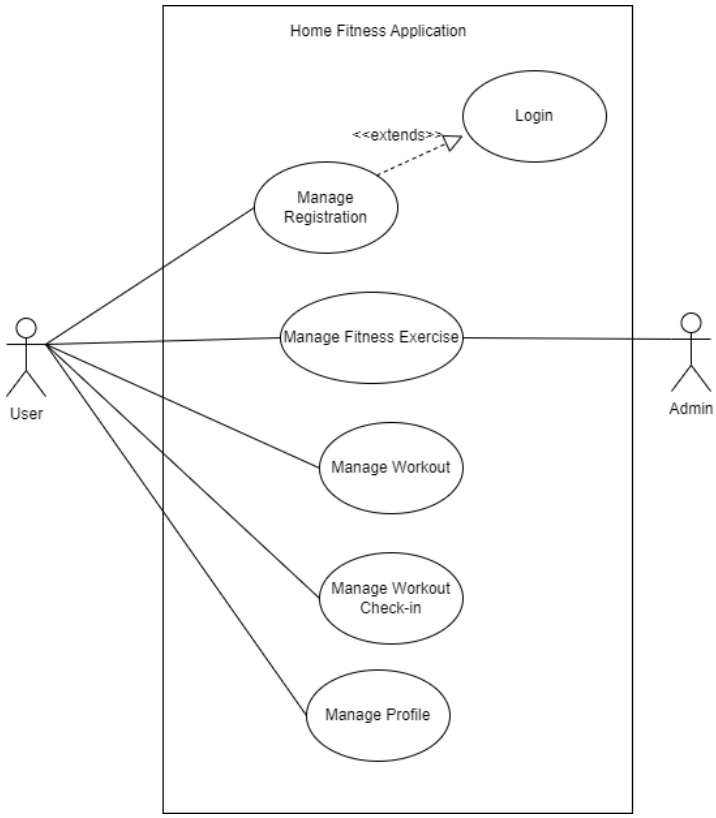

Figure 3. 3 Use Case Diagram of Home Fitness Application

The following are the list for the use case description:

- Manage Registration – This use case allows user to register a new account and log into the home fitness mobile application.
- Manage Fitness Exercise – This use case allows user to select the fitness exercise video that he/she wants to play.
- Manage Workout – This use case allows user to choose the workout type that they want to do. User also can select multi workout type and do it in one round.
- Manage Workout Check-in – This user case allows user to record their workout details.

- Manage Profile – This use case allows user to view and edit their profile details.

3.3.6.1 Manage Registration

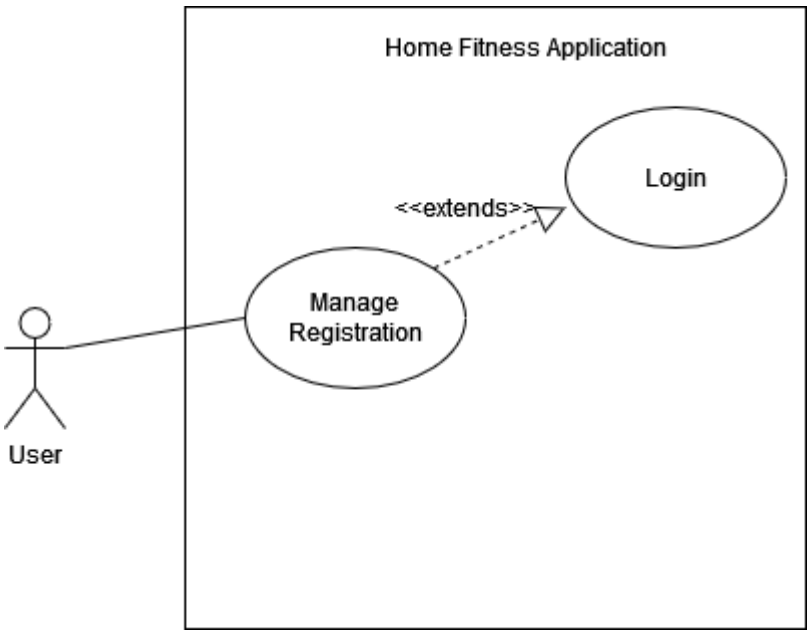

Figure 3. 4 Use Case Diagram of Manage Registration

Table 3. 1 Use Case Description of Manage Registration

Use Case ID	HFA_UC_100
Brief Description	This use case describes the process of registration in Home Fitness Application. Both register and login can be done through the application.
Actor	User
Pre-conditions	User must download and open the Home Fitness Application.

Basic Flow	1. Use case begins when user in the login interface. 2. User click “Register a new account”. 3. User will be redirected to registration interface. 4. User needs to fill in the details on the register interface. 5. After all the details is filled, user clicks on “Register” button. **6.** Application will send the data to the firebase and verify the data. **[A1: Username already registered before]** 7. Data will be store in the firebase and redirect user to login interface. 8. Use case ends.
Alternative Flow	**A1: Username already registered before** 1. Firebase detected the existed username in firebase. 2. Application displays “Username registered! Please use another username!” 3. Application will redirect user to register interface. 4. The flow continues in step 8 of basic flow.
Exception Flow	None
Post-Conditions	User can login to the application
Rules	None
Constraints	Every personal information details is required

3.3.6.2 Manage Fitness Exercise

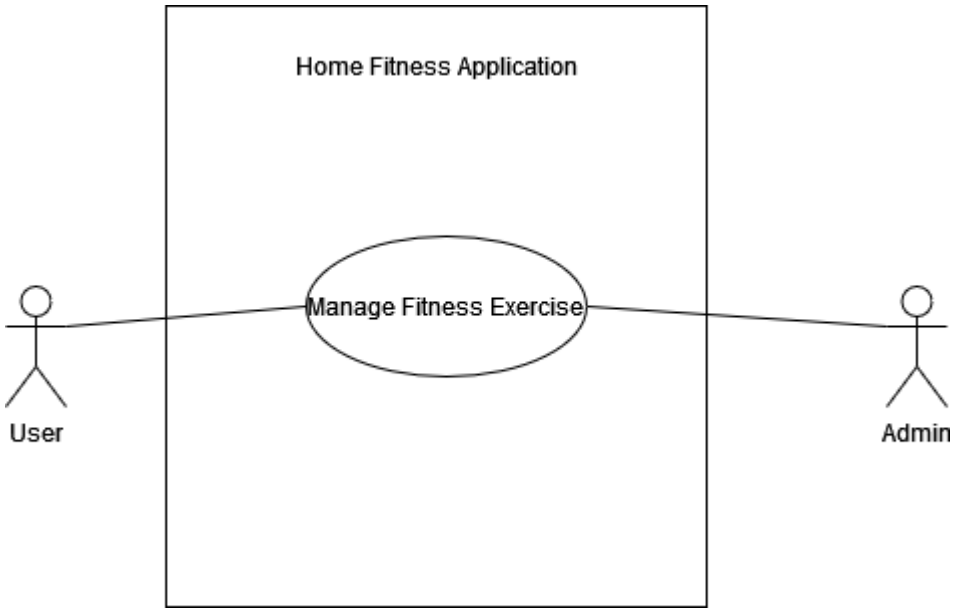

Figure 3. 5 Use Case Diagram of Manage Fitness Exercise

Table 3. 2 Use Case Description of Manage Fitness Exercise

Use Case ID	HFA_UC_200
Brief Description	This use case describes the process of user view and select the fitness exercise video that user wants to do. Admin uploads the video into firebase.
Actor	User and Admin

Pre-conditions	User is log into the application successfully.
Basic Flow	1. Use case begins when: a. Admin upload fitness video into firebase. b. User goes to the <<Learn Workout>> interface. 2. User view different home fitness exercise. 3. User select the home fitness exercise that he/she wants. 4. Application will display the fitness exercise video to the user. **[E1: Failed to display video]** 5. User can follow the fitness exercise video to exercise. 6. Use case ends.
Alternative Flow	None
Exception Flow	**E1: Failed to display video** 1. Application can't display the fitness exercise video. 2. Application display a message "Video play fail". 3. User will bring back to <<Learn Workout>> interface. 4. The flow continues in step 2 of basic flow.
Post-Conditions	User view the fitness exercise video successfully and follow the video exercise together.
Rules	None
Constraints	None

3.3.6.3 Manage Workout

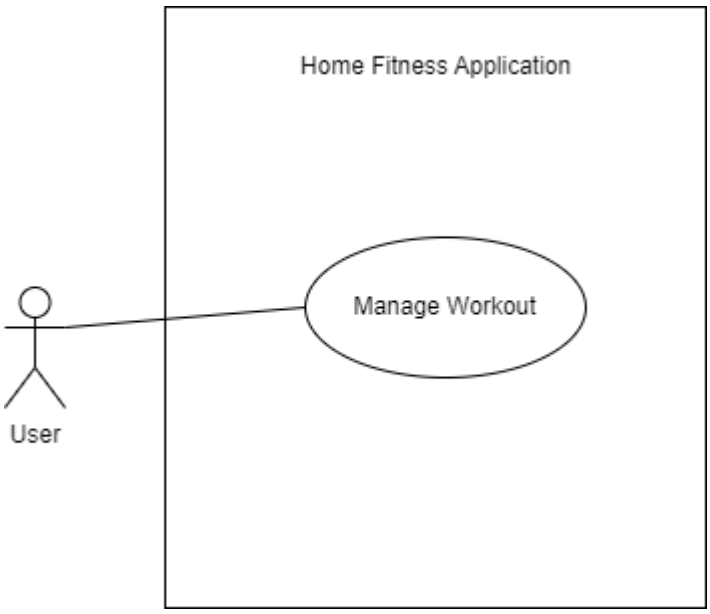

Figure 3. 6 Use Case Diagram of Manage Workout

Table 3. 3 Use Case Description of Manage Workout

Use Case ID	HFA_UC_300
Brief Description	This use case describes the process of user select type of workout. User can know the duration of workout and calories burnt from workout

Actor	User
Pre-conditions	User is log into the application successfully.
Basic Flow	1. Use case begins when user goes to the <<Learn Workout>> interface. 2. User can view different workout type in << Learn Workout >> interface. 3. User can select one or more type of workout to do. 4. User click “Start” button to start the workout. 5. User can a. Click “Stop” button to stop the workout. [**A1: Stop workout**] b. Click “Reset” button to start over the workout. [**A2: Reset workout**] 6. User click on “Finish Workout” button to end the workout. 7. All the workout details will be store in the Back4App database. 8. Display workout summary for user. 9. Use case ends.
Alternative Flow	**A1: Stop workout** 1. Click on “Stop” button. 2. Application will display the stopping time of workout. 3. The flow continues in step 4 of basic flow. **A2: Reset workout** 1. Click on the “Stop” button.

	2. Display the time to zero. 3. The flow continues in step 4 of basic flow.
Exception Flow	None
Post-Conditions	Workout details will be display to user.
Rules	None
Constraints	None

3.3.6.4 Manage Workout Check-in

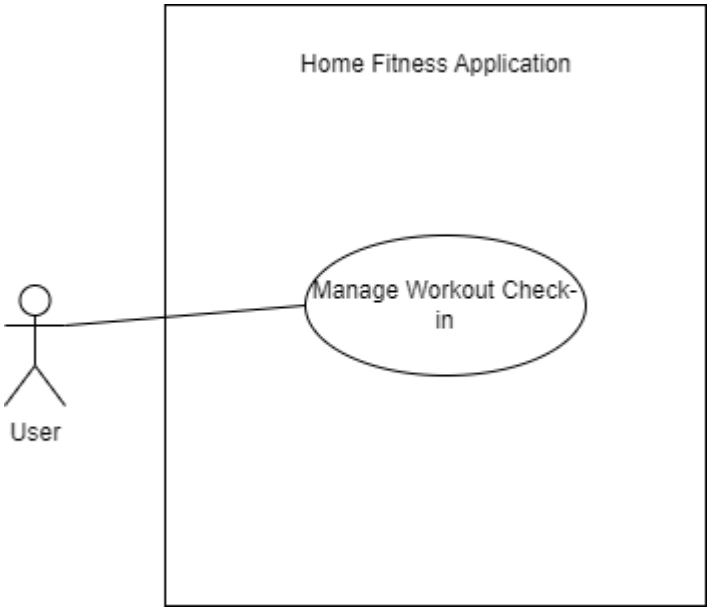

Figure 3. 7 Use Case Diagram of Manage Workout Check-in

Table 3. 4 Use Case Description of Manage Workout Check-in

Use Case ID	HFA_UC_400
Brief Description	This use case describes the process of user's workout check-in.
Actor	User
Pre-conditions	User is log into the application successfully.
Basic Flow	1. Use case begins when user press "Home" fragment button. 2. It will redirect the user to <<Home >> interface. 3. Display the list of user's workouts. 4. User can view the workout details such as calories burnt and duration. 5. Use case ends.
Alternative Flow	None
Exception Flow	None
Post-Conditions	User can view calories burnt from the workout and duration of workout.
Rules	None
Constraints	None

3.3.6.5 Manage Profile

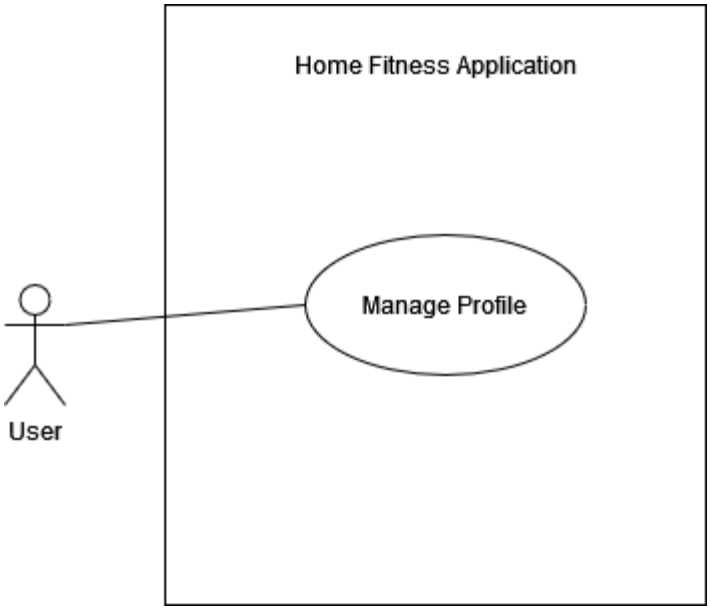

Figure 3. 8 Use Case Diagram of Manage Profile

Table 3. 5 Use Case Description of Manage Profile

Use Case ID	HFA_UC_500
Brief Description	This use case describes the process of user view their profile and edit their profile details.
Actor	User
Pre-conditions	User is log into the application successfully.
Basic Flow	1. Use case begins when user clicks on the profile icon.

	2. <<Profile>> interface will display user profile details. 3. User can click on edit icon. [**A1: Edit own profile**] 4. <<Edit Profile>> interface will update the profile details and display it. 5. Use case ends.
Alternative Flow	**A1: Edit own profile** 1. User edits the profile details. 2. After editing, click “Update” button. 3. The flow continues in step 4 of basic flow.
Exception Flow	None
Post-Conditions	User can view on the updated profile details.
Rules	None
Constraints	None

3.3.7 Activity Diagram

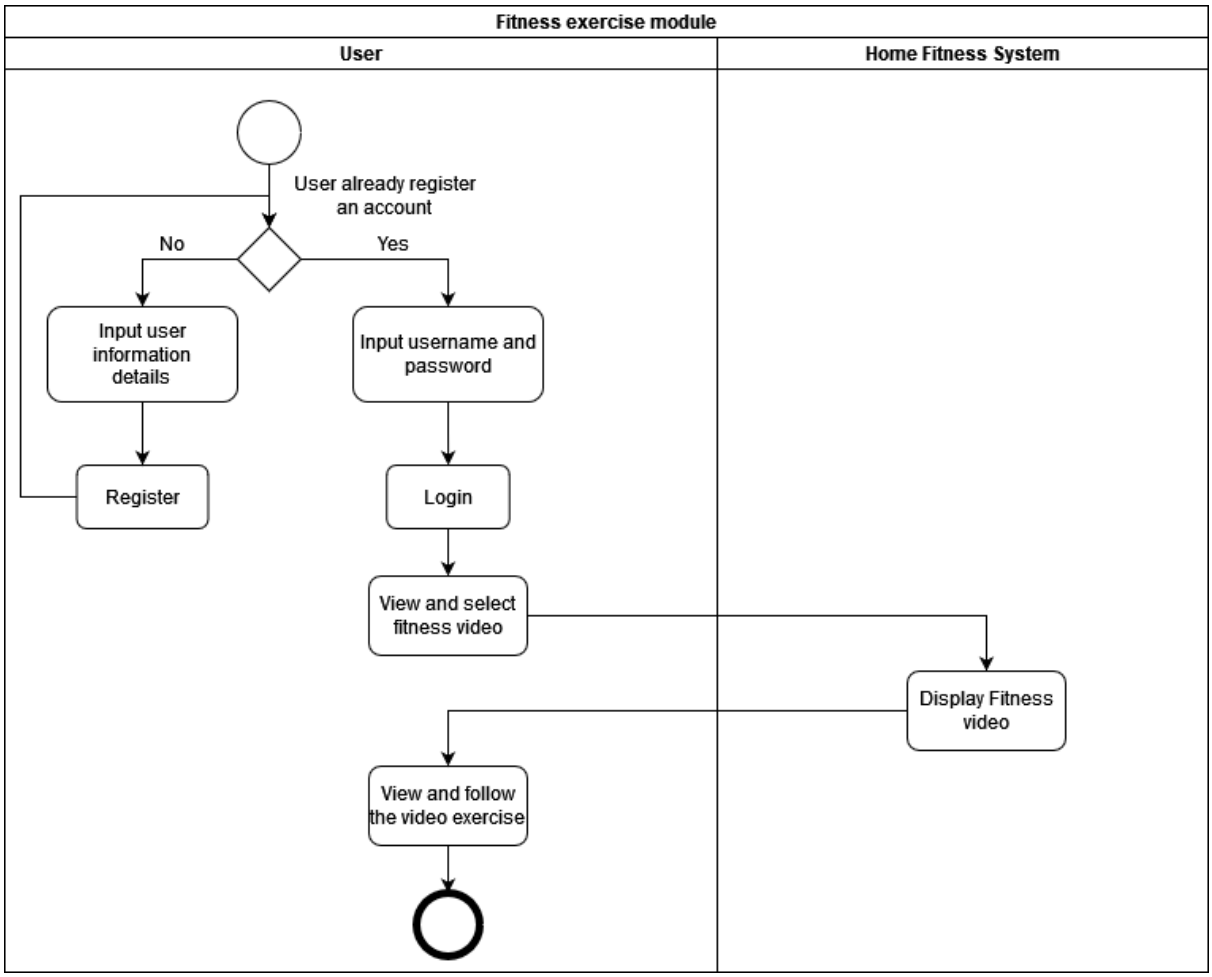

Figure 3. 9 Activity Diagram of Fitness Exercise Module

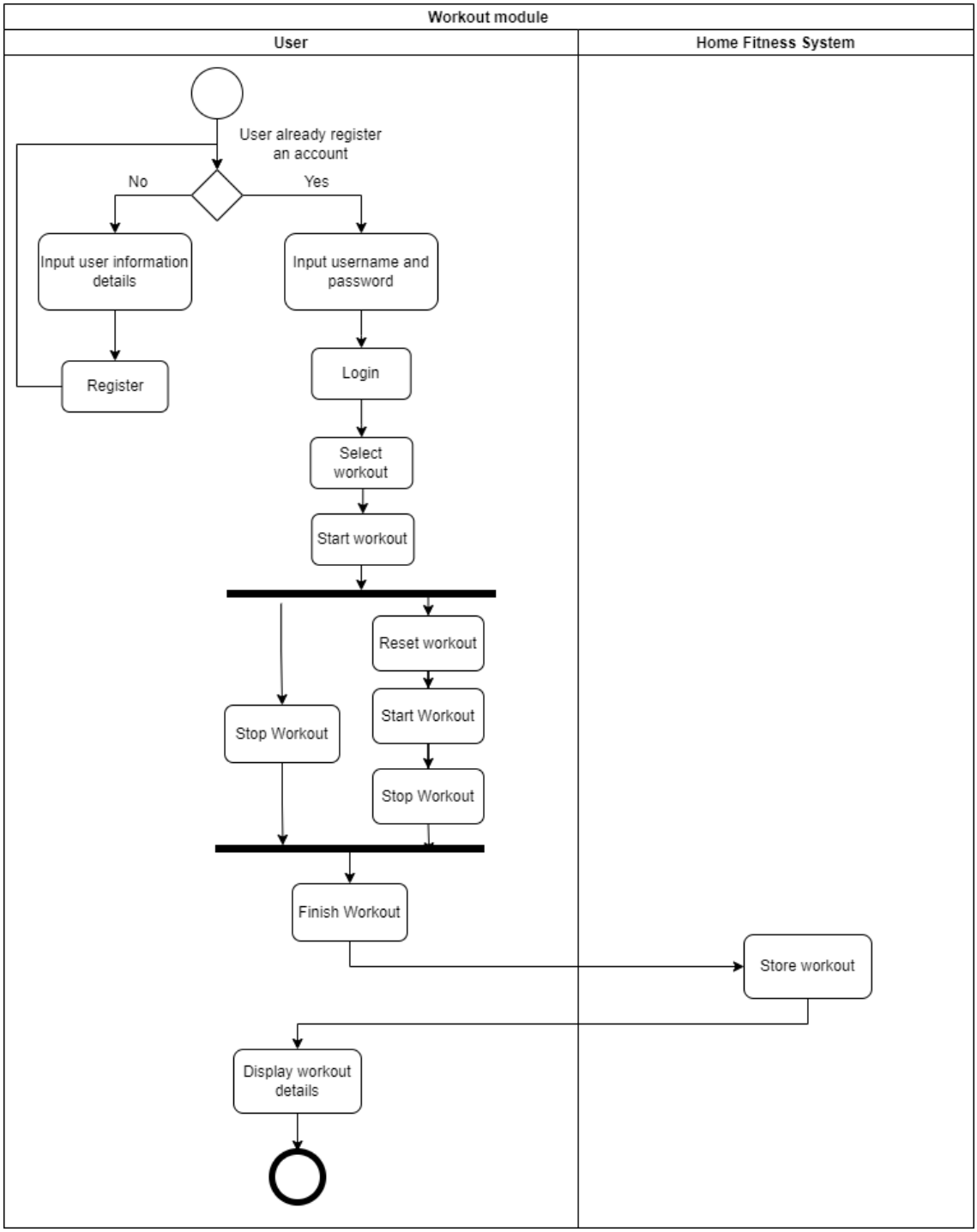

Figure 3. 10 Activity Diagram of Workout Module

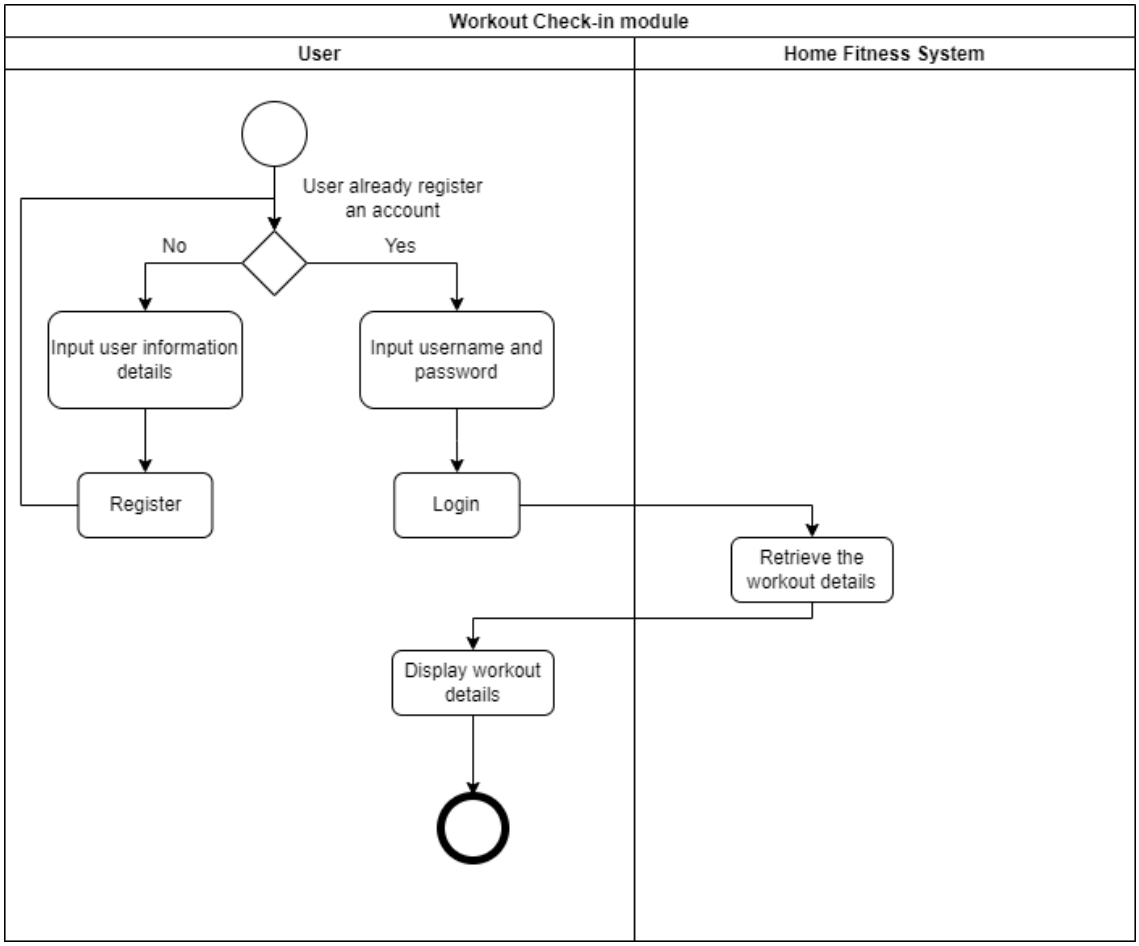

Figure 3. 11 Activity Diagram of Workout Check-in Module

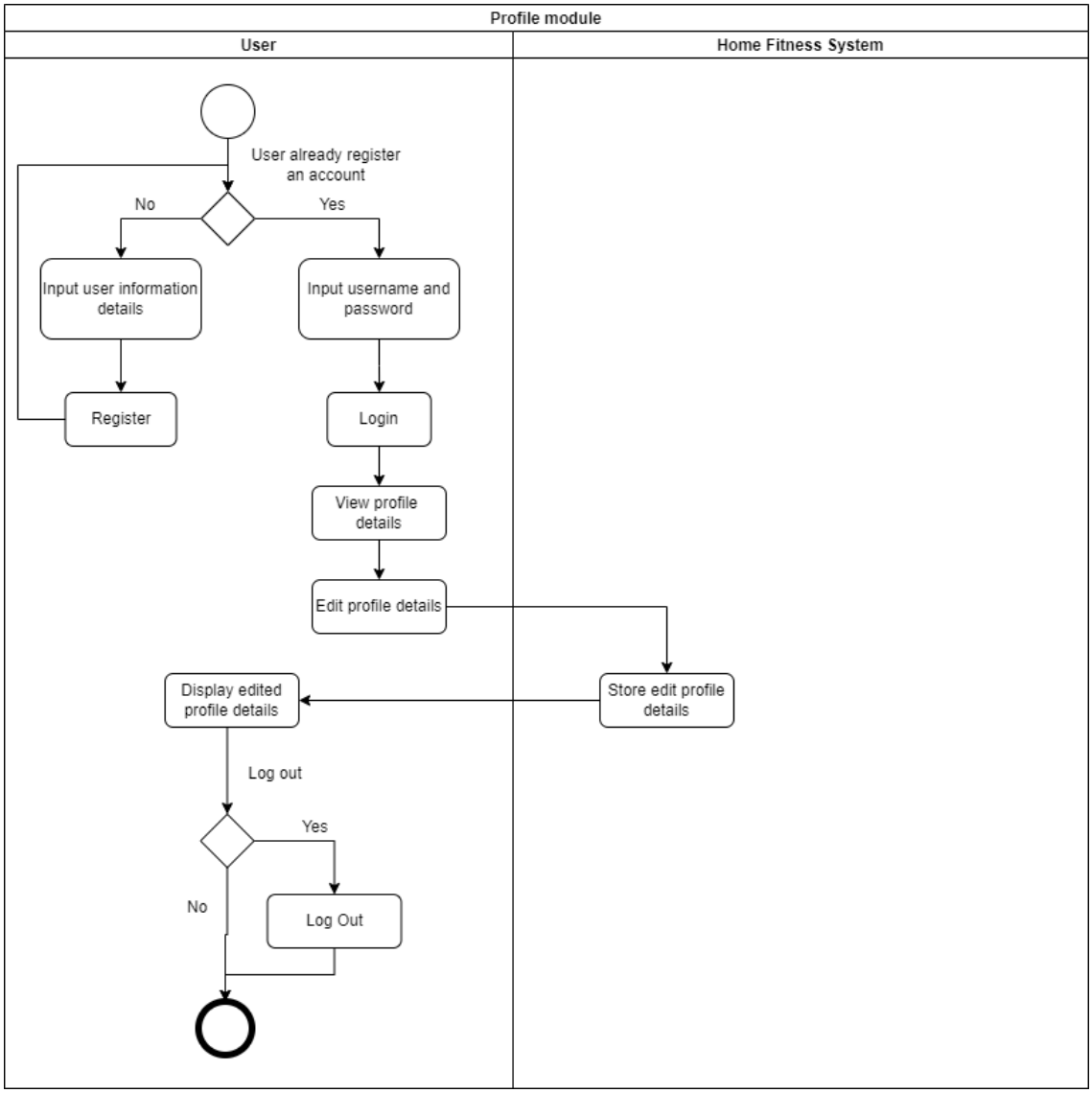

Figure 3. 12 Activity Diagram of Profile Module

3.4 DATA DESIGN

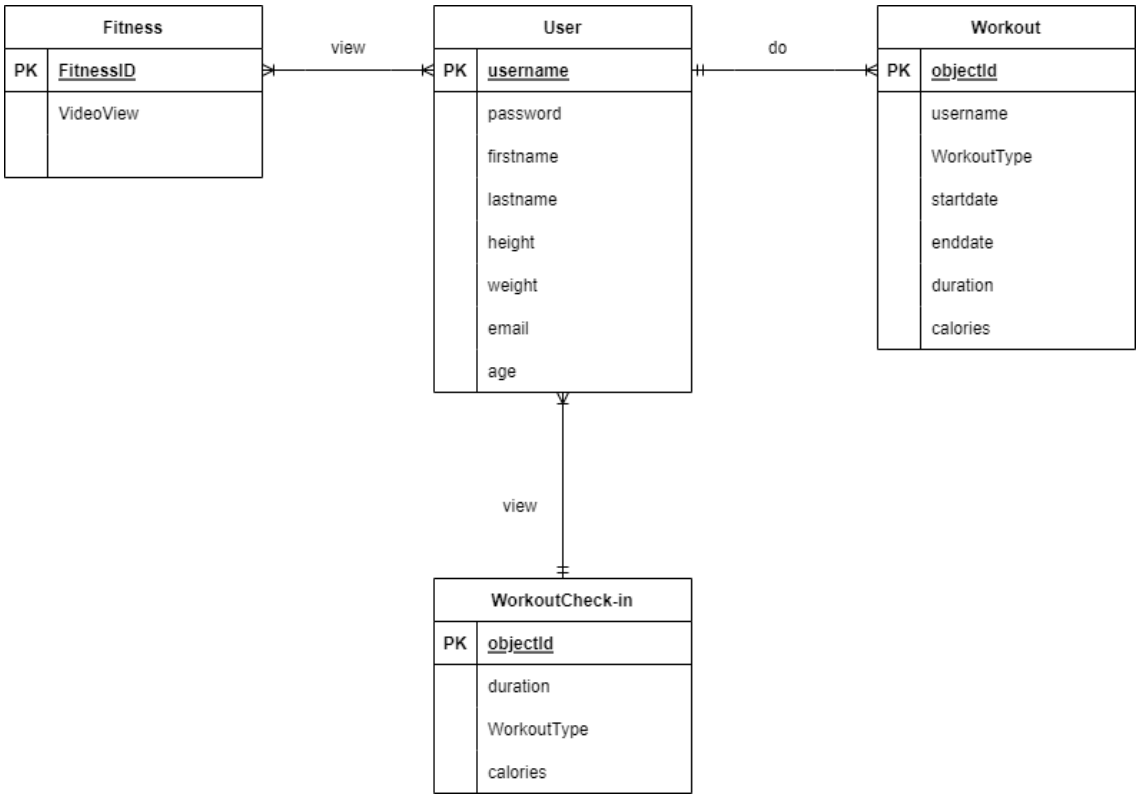

Figure 3. 13 Entity Relationship Diagram

Table 3. 6 Description of Entity Relationship Diagram

ENTITY	RELATIONSHIP TYPE	ENTITY	BUSINESS RULES
User	M:N	Fitness	One user may view one or more fitness video. One or more fitness video can view by one user.
User	1:M	Workout	One user do one or more workouts. One or more workouts can only do by one user.

User	1:M	Workout Check-in	One user may view one or more workout check-in. One workout check-in may view by one user.

Table 3. 7 Data Dictionary for User

Field Name	Description	Data Type	Constraints
username	Username	VARCHAR (255)	PK
password	Password	VARCHAR (255)	
firstname	First name	VARCHAR (255)	
lastname	Last name	VARCHAR (255)	
height	Height	Int	
weight	Weight	Int	
email	Email address	VARCHAR (255)	
age	Age	Int	

Table 3. 8 Data Dictionary for Fitness

Field Name	Description	Data Type	Constraints
FitnessID	Fitness video ID	Int	PK
VideoVIew	Fitness video	VARBINARY(MAX)	

Table 3. 9 Data Dictionary for Workout

Field Name	Description	Data Type	Constraints
objectId	workoutId	VARCHAR (255)	PK
username	Username	VARCHAR (255)	
WorkoutType	Type of workout	VARCHAR (255)	
startdate	Time and date of start workout	Date	
enddate	Time and date of end workout	Date	

duration	Duration of workout done	Date	
calories	Calories burnt from workout	Int	

Table 3. 10 Data Dictionary for Workout Check-in

Field Name	Description	Data Type	Constraints
objectId	workoutId	VARCHAR (255)	PK
duration	Duration of workout done	Date	
WorkoutType	Type of workout	VARCHAR (255)	
calories	Calories burnt from workout	Int	

3.5 PROOF OF INITIAL CONCEPT

Figure below is the Home Fitness Application design prototype. Each of the module interface will be shown in below.

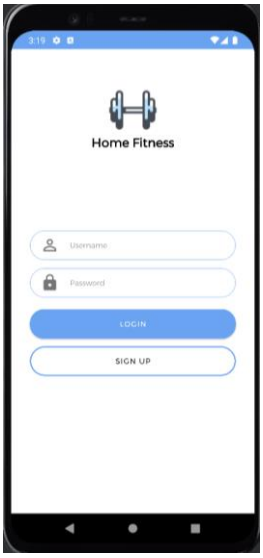

Figure 3. 14 Login Interface

Figure 3.14 is an interface allows user to login to the application by username and password.

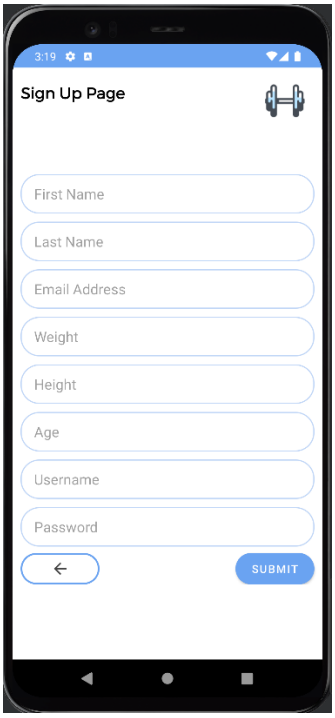

Figure 3. 15 Register Interface

Figure 3.15 is an interface allow users that don't have account to register a new account for this application User needs to fill in their information such as First Name, Last Name, Email Address, Weight, Height, Age, Username and Password. After all the information are fill in, click <<Submit>> button and it will redirect user to the login page. Hence, user had been successfully registering an account.

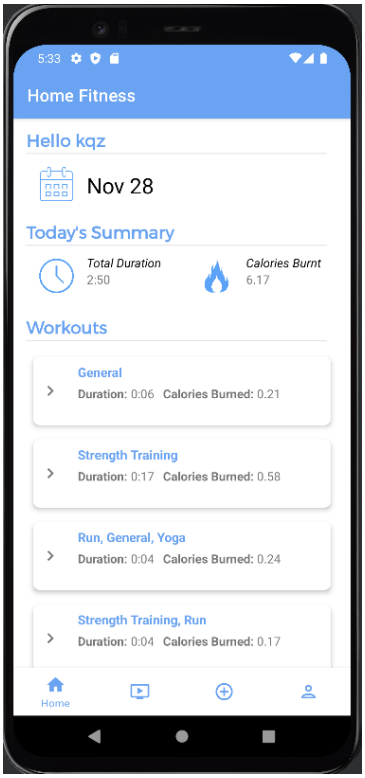

Figure 3. 16 Home Page interface

Figure 3.16 is Home Page interface. When user login to the Home Fitness application, user will redirect to the home page of the apps. In home page, it will display the date and summary of workout. The summary shows the duration of user's workout and calories burnt. It also displays the workout that user done.

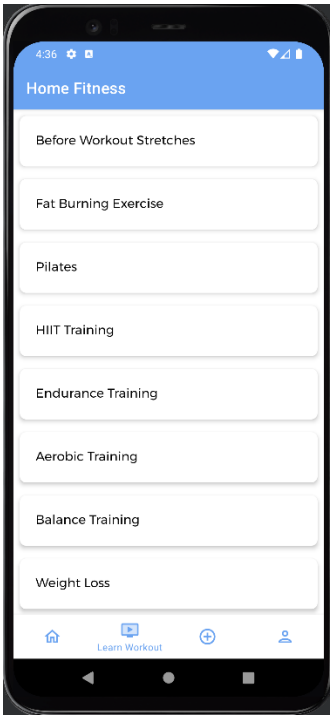

Figure 3. 17 Learn Workout interface

Figure 3.17 is an interface that display different types of fitness videos. This interface is for user to choose the video that they want to learn. There are many types of home fitness for user to choose. User can select which type of fitness that they interested with and click on it.

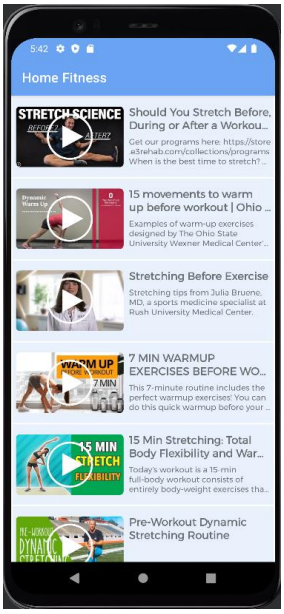

Figure 3. 18 Display selected video category list interface

Figure 3.18 allows user to view and select the videos that he/she interested with.

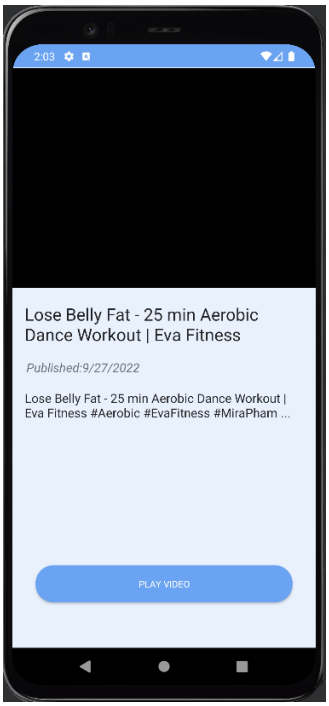

Figure 3. 19 Play selected video Interface

Figure 3.19 is the play selected video page. This interface is for user to play the video that selected. By click on the “Play Video” button, the video will be display to user.

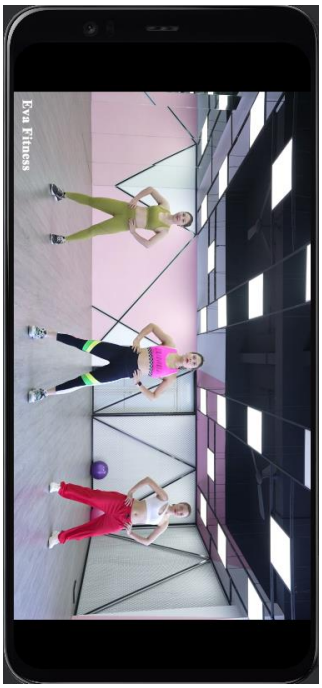

Figure 3. 20 Video interface

Figure 3.20 is video page. Once user clicks on the “Play Video” button. User will be redirect to this video page. User can learn about the fitness from the video. There will be a guidance for user about how to exercise.

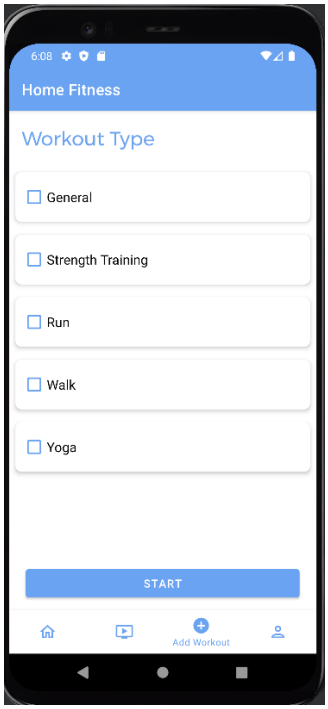

Figure 3. 21 Add Workout Interface

Figure 3.21 is the Add Workout page. This interface is for user to select which type of workout that he/she is going to do. There are 5 types of workout which are General, Strength Training, Run, Walk and Yoga. User can select more than one workout to do. For example, user wants to have a run before Strength training. He/she can select both of them to start the workout.

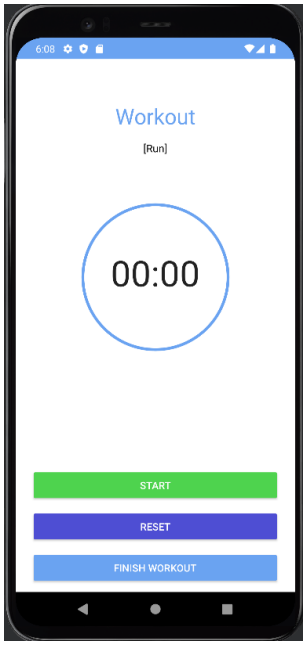

Figure 3. 22 Workout interface

Figure 3.22 allows user to start the workout that selected. After user select the workout that he/she going to do, it will redirect user to this interface. User can click <<Start>> button to start the workout and the time will start to count. If user click <<Reset>> button, the interface will return the time to zero.

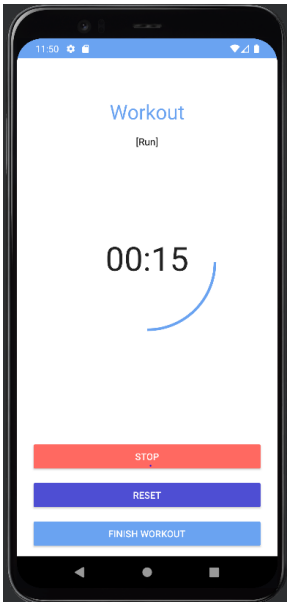

Figure 3. 23 Workout in progress page

Figure 3.23 is the interface of workout in progress. When user clicks <<Start>> button, the time is running. If user want to rest a while, he/she can click on the <<Stop>> button to stop the workout. Once the workout is finished, user can click on <<Finish Workout>>.

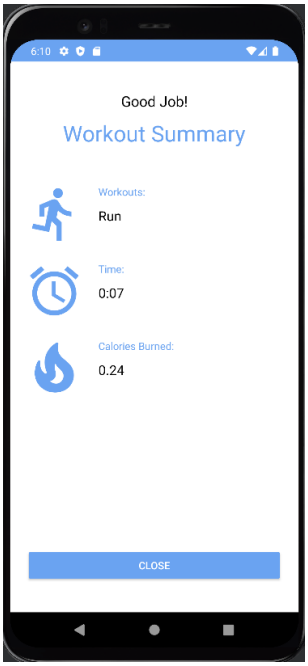

Figure 3. 24 Workout summary page

Figure 3.24 is the interface of workout summary. Once user finish the workout, it will show the summary of user's workout. The summary of workout will display type of workout, time of workout and calories burnt from the workout. User clicks on <<Close>> button and it will redirect user to home page.

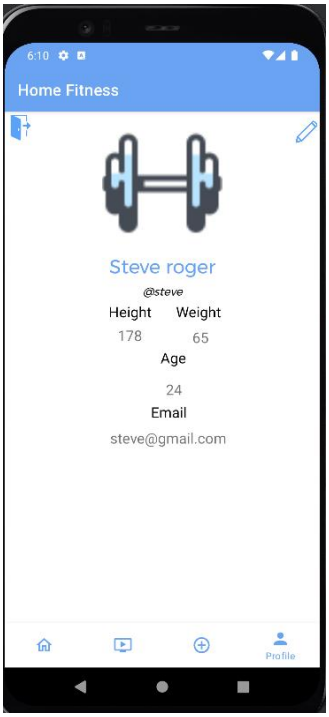

Figure 3. 25 Profile page

Figure 3.25 is profile page. User can view the profile data. If user wants to edit the profile, click on the top right of pen icon to edit the profile. However, if user wants to log out, click on the log out icon on the top left side. Then, user will be redirect to login page.

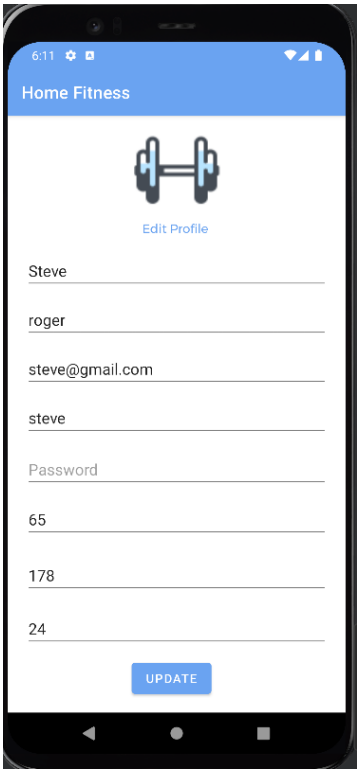

Figure 3. 26 Edit Profile page

Figure 3.26 is the edit profile page. User can fill in the data that want to edit. Once the data is filled, click on the “UPDATE” button. The profile details will be update and display in user’s account.

STORYBOARD

Figure 3. 27 Storyboard

3.6 TESTING PLAN

The user acceptance test (UAT) for the system is designed to ensure that the system is acceptable to the end user. This testing plan is based on requirements in SRS document to test the user acceptance. User acceptance test (UAT) will test on the input, processes of function and output according to the system.

No.	Module	Activities	Status		Comments
			Yes	No	
1.	Manage Register	User register			
2.		User login			
3.	Manage Fitness Exercise	Select Fitness video			
4.		Play fitness video			
5.		Pause fitness video			
6.		Stop video fitness			
7.	Manage Workout	Select type of workouts			
8.		Start Workout			
9.		Stop Workout			
10.		Reset Workout			
11.		Finish Workout			

12.		Display workout summary			
13.	Manage Workout Check-in	Record workout check-in			
14..		Record duration of workout			
15.		Record calories burned of workout			
16.		Record type of workout finish			
17.	Manage profile	Edit profile details			
18.		View profile details			
19.		Log out			

This test has been performed by:

Name :

Signature :

Date :

3.7 POTENTIAL USE OF PROPOSED SOLUTION

Home fitness application is for the user to workout at home whenever they want. Due to the pandemic COVID-19, all the crowded activities have the risk of spreading the COVID-19. Hence, a home fitness application could help in this situation. Besides, users that don't want to go out to exercise due to the pandemic COVID-19 and still hope to exercise. This problem can be solved by home fitness application. Besides, most beginners don't have any knowledge about workout and the risk of injury during the workout will increase because of this. So, they will have trouble on workout at home. Thus, this application can guide them to workout at home.

Home fitness application provides the fitness exercise video to the user. This application provides different levels of workout videos such as beginner, intermediate and professional. Users can choose the video according to their level. Users can experience a different type of workout at home without going to the gym. Furthermore, users that don't have any gym equipment or gym facilities could help a lot with this application. All the fitness exercise video doesn't require any gym equipment or facilities. Users can have a great workout by following the fitness exercise video in this application. Users can workout at home without worrying that they don't have the equipment. Thus, Home Fitness Application could help those who don't have any gym equipment and facilities to workout at home.

CHAPTER 4

IMPLEMENTATION, RESULT AND DISCUSSION

4.1 Introduction

This chapter will discuss about the implemented interfaces and functions in the Home Fitness Application. The detailed and accurate information of the application will be show by figures and explaination as the solution to the problem stated in Chapter 1. All of the function that developed in this project are satisfied the objectives stated for this project. User able to register a new account , view the fitness video, record the time of workout, share experience with other user and manage profile.

Lastly, the testing strategy of Home Fitness Application is the User Acceptance Test (UAT) report which stated in the previous chapter. A testing form will be given to user to fill in the feedback on the Home Fitness Application.

4.2 Implementation Process

4.2.1 Application User Interface

Home Fitness Application is using android studio to develop. All the function will be developed such as register a new account, view the fitness video, select type of workout to workout, record check-in workout and manage profile. The data of user will store in Back4App. Below is the figure of the Home Fitness Application interface.

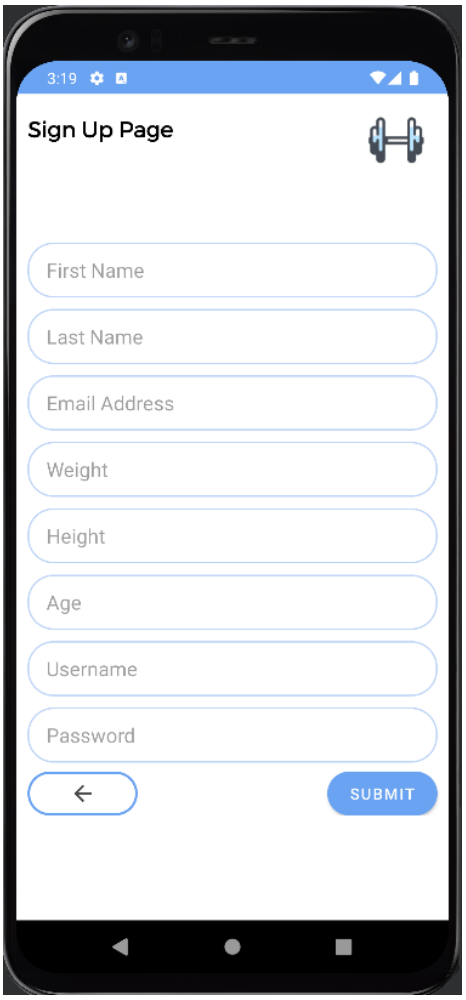

Figure 4. 1 Sign Up page

Figure 4.1 is the Sign Up interface of Home Fitness Application. User needs to fill in their information such as First Name, Last Name, Email Address, Weight, Height, Age, Username and Password. After all the information are fill in, click <<Submit>> button and it will redirect user to the login page. Hence, user had been successfully registering an account.

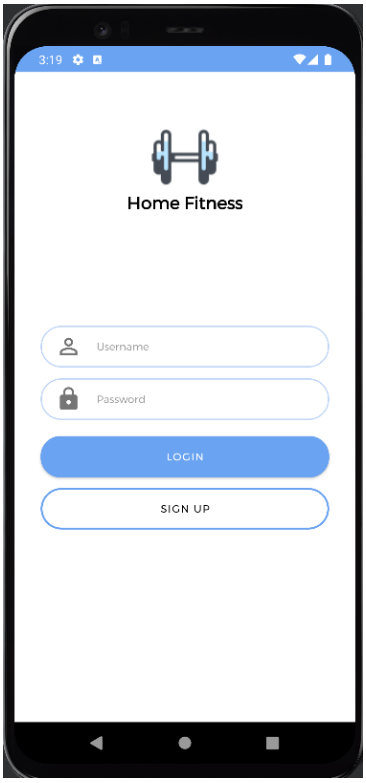

Figure 4. 2 Login page

Figure 4.2 is the login interface of Home Fitness Application. If user don't have any account in this application, he/she can click on <<Sign Up>> button to register a new account. Once user registered an account, he/she can fill in the Username and Password that just registered and click on <<Login>> button. User can access to the function of Home Fitness Application.

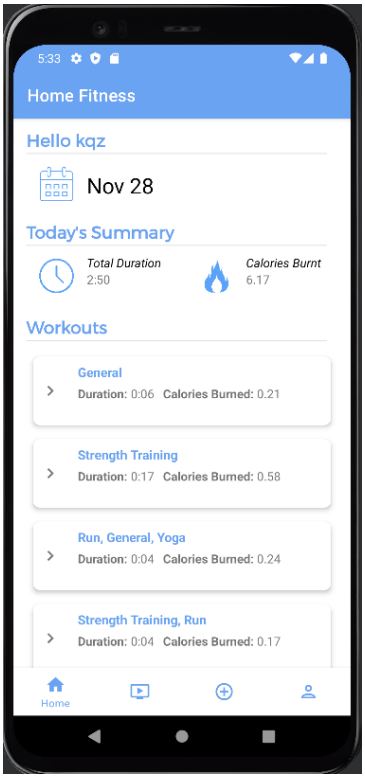

Figure 4. 3 Home Page

Figure 4.3 is a home page. When user login to the Home Fitness application, user will redirect to the home page of the apps. In home page, it will display the date and summary of workout. The summary shows the duration of user's workout and calories burnt. It also displays the workout that user done.

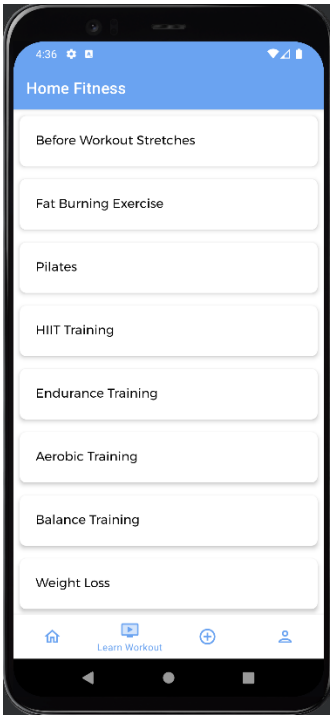

Figure 4. 4 Learn Workout Page

Figure 4.4 is the Learn Workout interface. This interface is for user to choose the video that they want to learn. There are many types of home fitness for user to choose. User can select which type of fitness that they interested with and click on it.

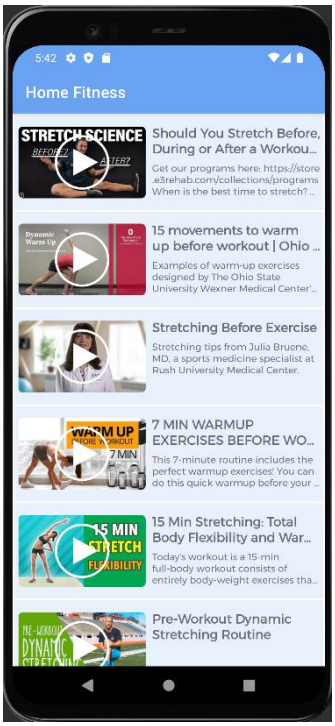

Figure 4. 5 Before Workout Stretches Video page

Figure 4.5 is the Before Workout Stretches videos interface. There are many videos for this type of workout. User can view and select from the list.

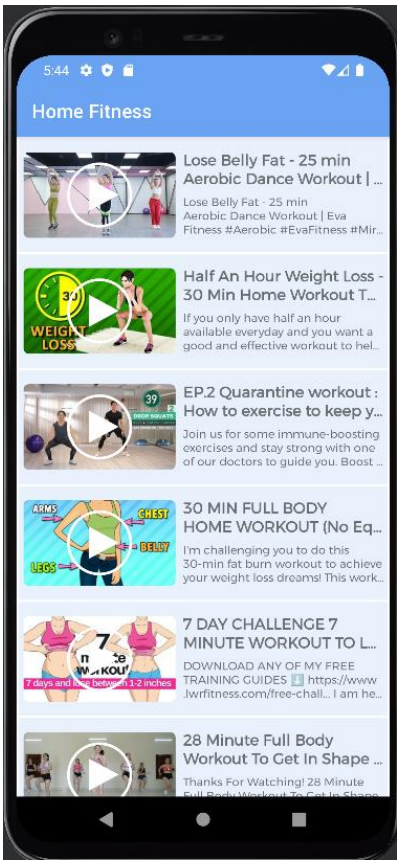

Figure 4. 6 Fat Burning Exercise video page

Figure 4.6 is the Fat Burning Exercise videos interface. There are many videos for this type of workout. User can view and select from the list.

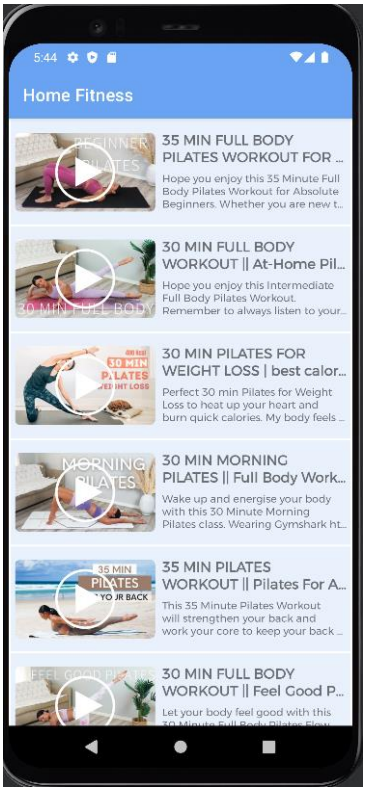

Figure 4. 7 Pilates Video page

Figure 4.7 is the Pilates videos interface. There are many videos for this type of workout. User can view and select from the list.

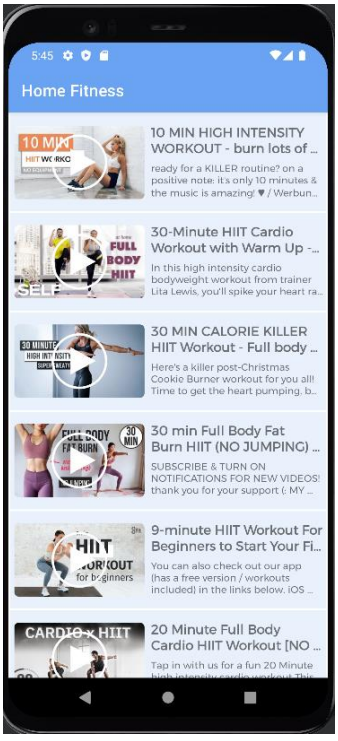

Figure 4. 8 HIIT training video page

Figure 4.8 is the HIIT training videos interface. There are many videos for this type of workout. User can view and select from the list.

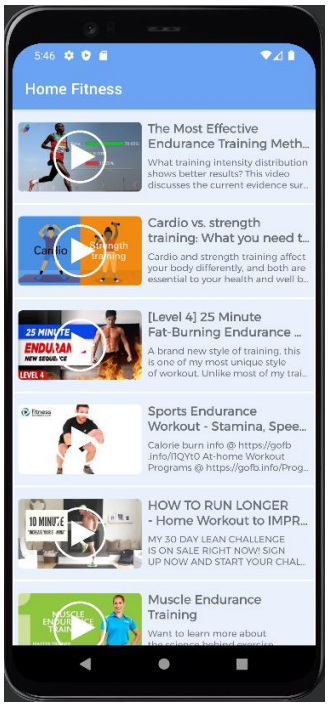

Figure 4. 9 Endurance Training Video page

Figure 4.9 is the Endurance training videos interface. There are many videos for this type of workout. User can view and select from the list.

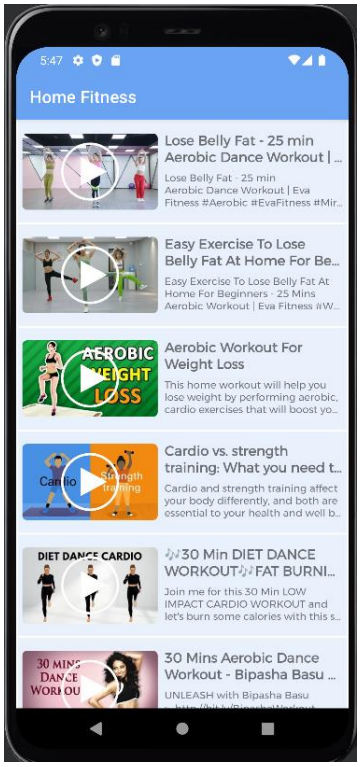

Figure 4. 10 Aerobic Video page

Figure 4.10 is the Aerobic videos interface. There are many videos for this type of workout. User can view and select from the list.

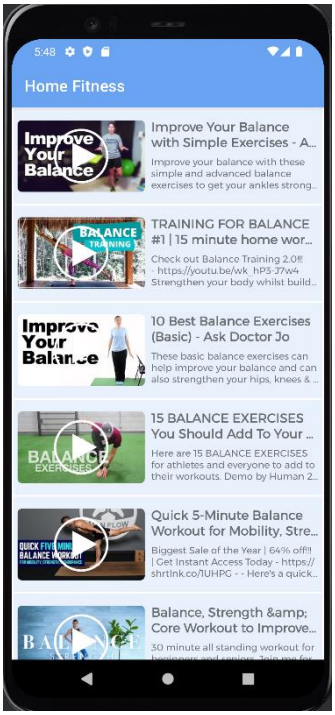

Figure 4. 11 Balance Training Video page

Figure 4.11 is the Balance training videos interface. There are many videos for this type of workout. User can view and select from the list.

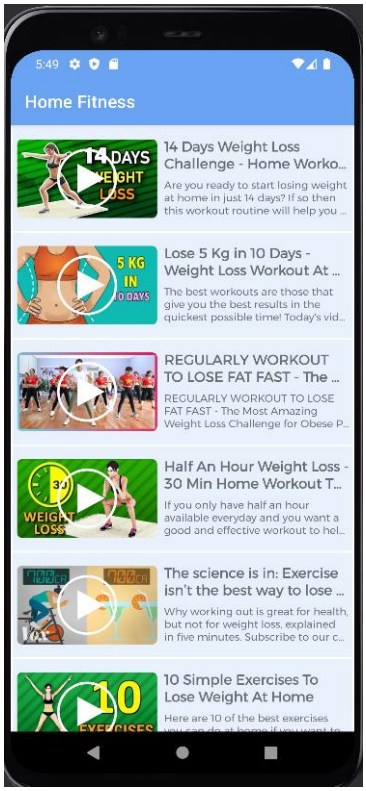

Figure 4. 12 Weight Loss video page

Figure 4.12 is the Weight Loss videos interface. There are many videos for this type of workout. User can view and select from the list.

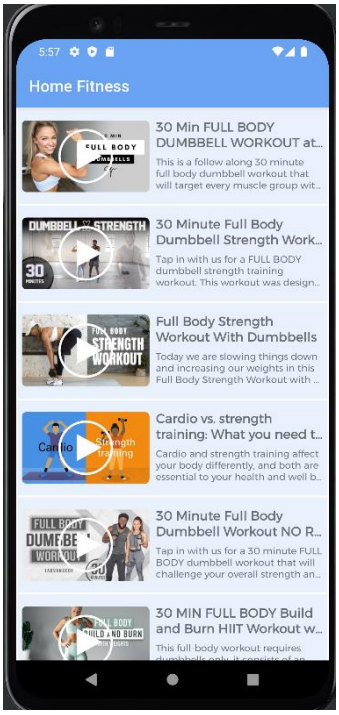

Figure 4. 13 Weight Training Video page

Figure 4.13 is the Weight training videos interface. There are many videos for this type of workout. User can view and select from the list.

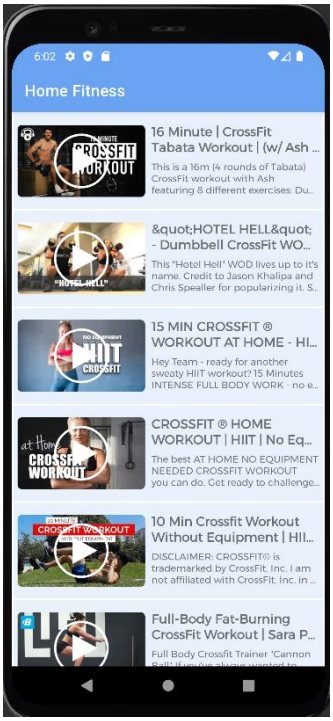

Figure 4. 14 Crossfit Video page

Figure 4.14 is the Crossfit videos interface. There are many videos for this type of workout. User can view and select from the list.

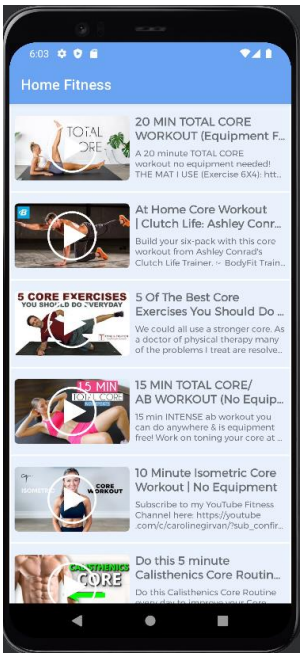

Figure 4. 15 Core Training video page

Figure 4.15 is the Core training videos interface. There are many videos for this type of workout. User can view and select from the list.

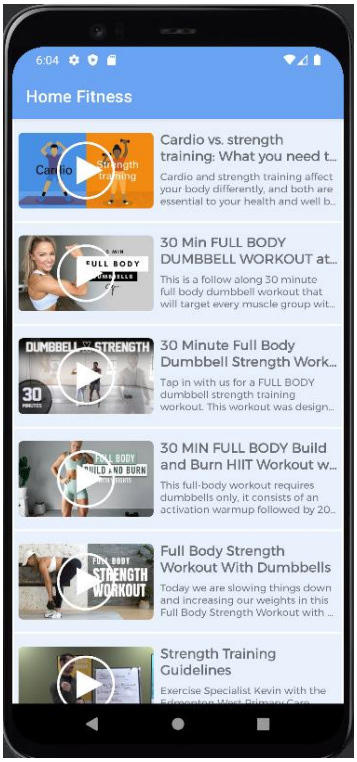

Figure 4. 16 Strength training video page

Figure 4.16 is the Strength training videos interface. There are many videos for this type of workout. User can view and select from the list.

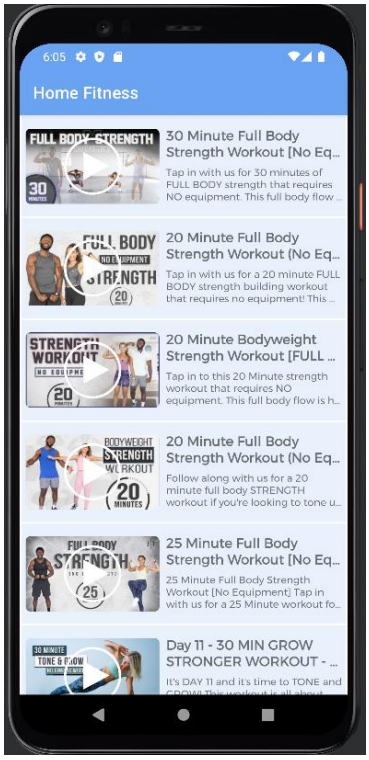

Figure 4. 17 No Equipment Strength Training video page

Figure 4.17 is the No Equipment Strength Training videos interface. There are many videos for this type of workout. User can view and select from the list.

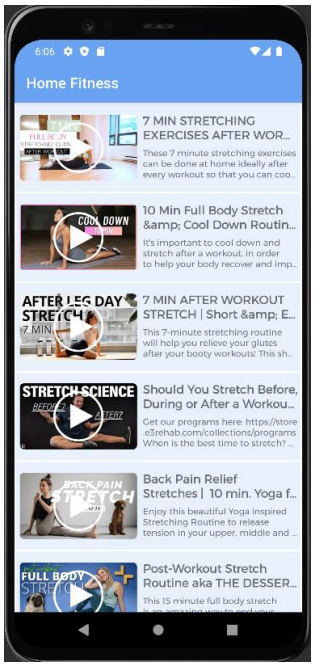

Figure 4. 18 After Workout Stretches Video page

Figure 4.18 is the After Workout Stretches videos interface. There are many videos for this type of workout. User can view and select from the list.

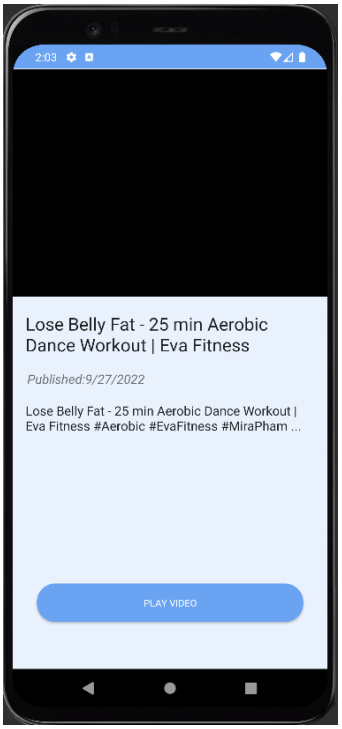

Figure 4. 19 Play selected video page

Figure 4.19 is the play selected video page. This interface is for user to play the video that selected. By click on the “Play Video” button, the video will be display to user.

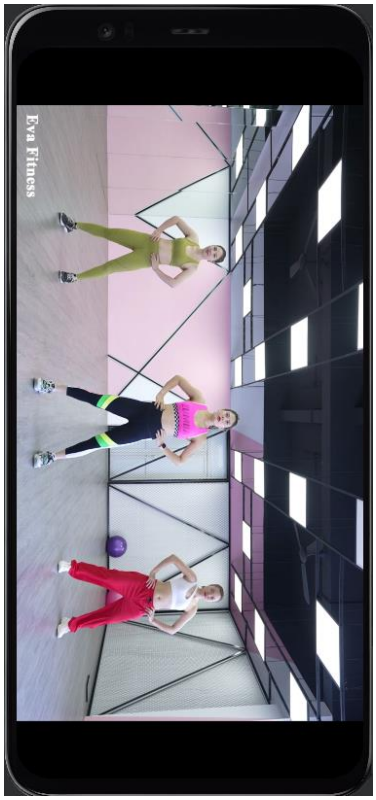

Figure 4. 20 Video page

Figure 4.20 is video page. Once user clicks on the “Play Video” button. User will be redirect to this video page. User can learn about the fitness from the video. There will be a guidance for user about how to exercise.

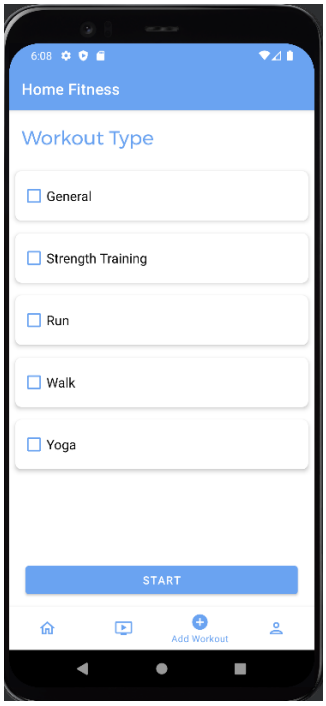

Figure 4. 21 Add Workout page

Figure 4.21 is the Add Workout page. This interface is for user to select which type of workout that he/she is going to do. User can select more than one workout to do. For example, user wants to have a run before Strength training. He/she can select both of them to start the workout.

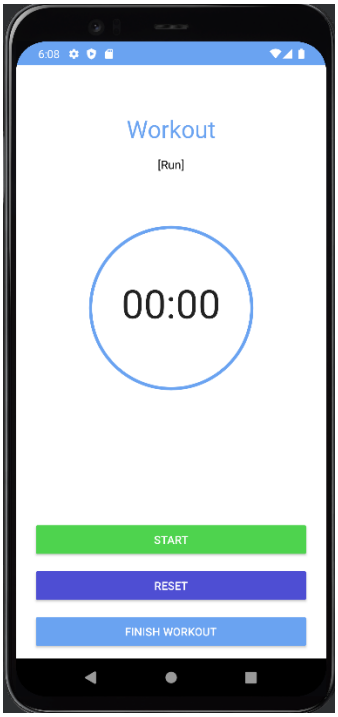

Figure 4. 22 Workout page

Figure 4.22 is the Workout interface for user. After user select the workout that he/she going to do, it will redirect user to this interface. User can click <<Start>> button to start the workout and the time will start to count. If user click <<Reset>> button, the interface will return the time to zero.

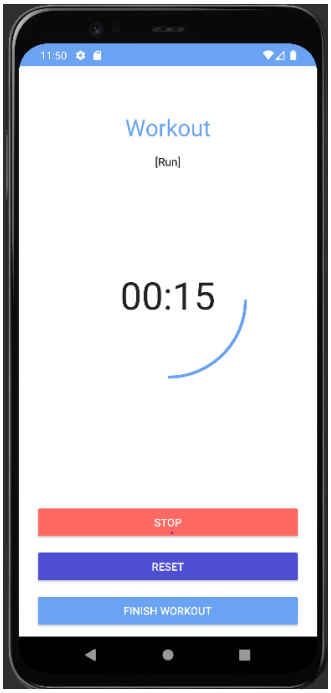

Figure 4. 23 Workout in progress page

Figure 4.23 is the interface of workout in progress. When user clicks <<Start>> button, the time is running. If user want to rest a while, he/she can click on the <<Stop>> button to stop the workout. Once the workout is finished, user can click on <<Finish Workout>>.

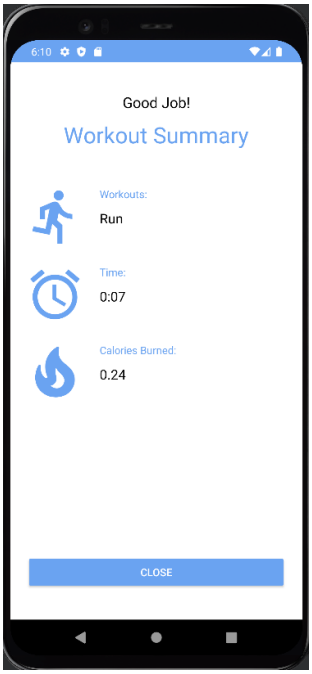

Figure 4. 24 Workout summary page

Figure 4.24 is the interface of workout summary. Once user finish the workout, it will show the summary of user's workout. The summary of workout will display type of workout, time of workout and calories burnt from the workout. User clicks on <<Close>> button and it will redirect user to home page.

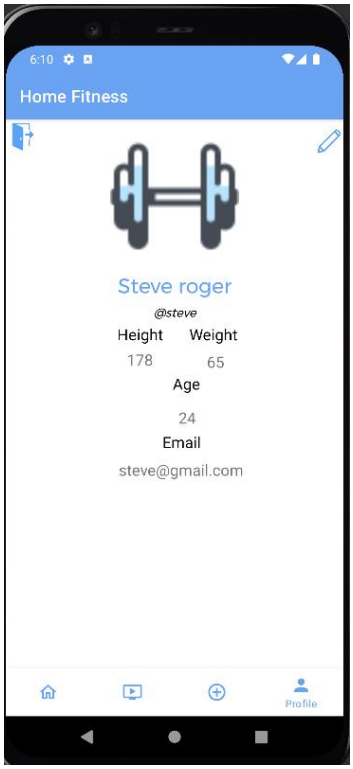

Figure 4. 25 Profile page

Figure 4.25 is profile page. User can view the profile data. If user wants to edit the profile, click on the top right of pen icon to edit the profile. However, if user wants to log out, click on the log out icon on the top left side. Then, user will be redirect to login page.

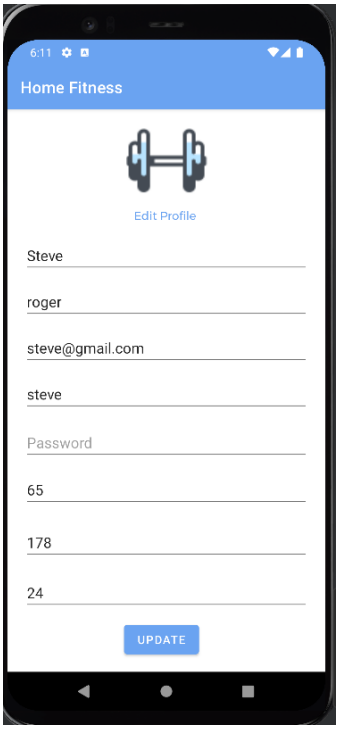

Figure 4. 26 Edit Profile page

Figure 4.26 is the edit profile page. User can fill in the data that want to edit. Once the data is filled, click on the “UPDATE” button. The profile details will be update and display in user’s account.

4.2.2 Implemented works behind the application

In this software development. Android studio and back4app database are used.

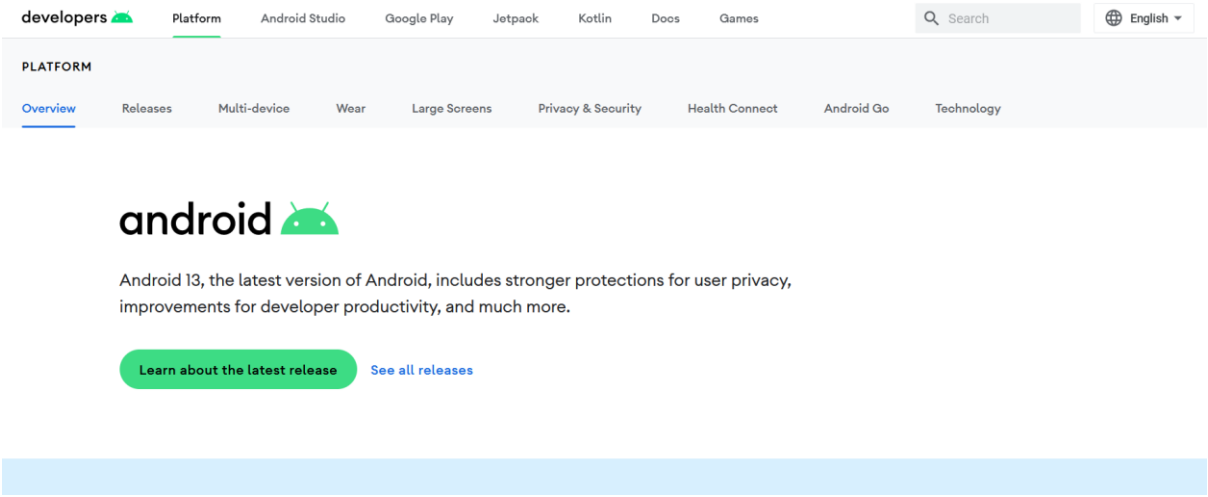

Figure 4. 27 Android Studio

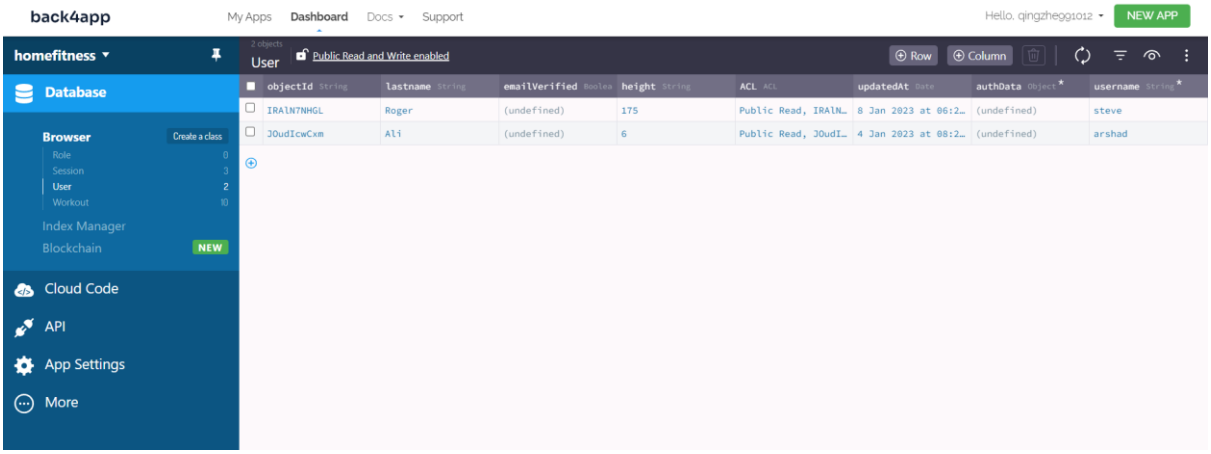

Figure 4. 28 User of Home Fitness

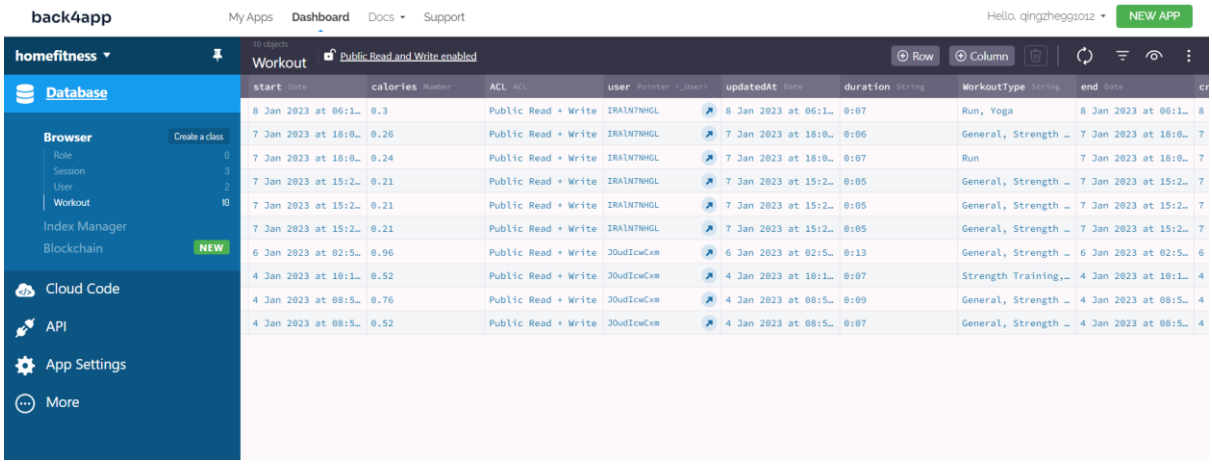

Figure 4. 29 Workout of Home Fitness

```
private double calculateCalories(int finalTime, int numOfActivities){

    ParseUser user = ParseUser.getCurrentUser();
    String w_str = user.get("weight").toString();
    Integer w = Integer.parseInt(w_str);


    double cal = 0.0;
    int MET = 0;    //MET = metabolic equivalent for task
    switch (numOfActivities){
        case 1:
            MET =  4;
            break;
        case 2:
            MET = 5;
            break;
        case 3:
            MET = 7;
            break;
        case 4:
            MET = 8;
            break;
        case 5:
            MET = 8;
            break;
        default:
            return 0;
    }
```

Figure 4. 30 Metabolic equivalent for workout

```
    double time = ((double) finalTime) / ((double) 60);
    //kg --> pounds formula: lb/2.2046
    double kgConv = ((double) w/2.2046);  //kilogram conversion from weight
    //Log.i(TAG, String.valueOf(kgConv));

    cal = (time)*((double) MET*3.5*kgConv)/200; //calculates the calories burned
                                                //this will be using users weight, and MET which will determine
                                                //the amount of work done during workout



    BigDecimal bd = new BigDecimal(cal).setScale( newScale: 2, RoundingMode.HALF_UP);
    cal = bd.doubleValue();

    return cal;
}
```

Figure 4. 31 Calculation of calories burnt

Figure 4.30 and 4.31 are use in calculate the calories burnt from the workout. It will based on the type of workout, user's weight and workout duration to calculate user's calories burnt from the workout. All the weight will be converted from kg to pounds to use in calculate the calories burnt.

4.3 Testing and Result Discussion

Based on the Agile methodology, testing will be done once the application is developed to detect any defect or error in the application. User Acceptance Test (UAT) will be used to test the Home Fitness Application. The purpose of conducting this UAT is to ensure the developed system meets the requirements as stated in Software Requirement Specification (SRS) which in the Appendix A.

Each test case is designed and implemented based on the interfaces in the Home Fitness Application. All the function and elements such as button, text fields, data display had been tested in each interface. Test Cases are show as below.

Table 4. 1 Test Case Login and Register Interface

Test ID	Test Cases	Test Data	Expected Result	Actual Result	Pass/Fail	Comment
TC01-01	Login into own account	Log in with correct username, password	Redirect to home page	Redirect to home page	Pass	-
TC01-02	Login with unregistered username	Unregistered username	Display error message	Display error message	Pass	-
TC01-03	Go to register account interface	Click “Sign Up” button	Redirect to Sign Up page	Redirect to Sign Up page	Pass	-
TC01-04	Register a new account	First Name, Last Name, Email Address, Height, Weight, Age Username, Password and	Successfully register a new account and redirect to login page	Successfully register a new account and redirect to login page	Pass	-

		click "Submit" button				
TC01-05	Input empty data in the form	No input	Display error message	Display error message	Pass	-
TC01-06	Return to Login page	Click Back icon button	Redirect to Login page	Redirect to Login page	Pass	-

Table 4. 2 Test Case Home Interface and workout check-in

Test ID	Test Cases	Test Data	Expected Result	Actual Result	Pass/Fail	Comment
TC02-01	Display current date	No input	Successfully display correct current date	Successfully display correct current date	Pass	-
TC02-02	Display the total workout duration	All workout duration added	Successfully display correct workout duration	Successfully display correct workout duration	Pass	-
TC02-03	Display the total	All workout	Successfully display	Successfully display	Pass	-

	Calories burned	calories added	correct total Calories burnt	correct total Calories burnt		
TC02-04	Display the Calories burned correct based on time workout and weight of user	Workout with duration 5:14	Successfully display correct Calories burnt which is 13.5	Successfully display correct Calories burnt is 13.5	Pass	-
TC02-05	Display the list of workout done	No input	Successfully display correct list of workout done	Successfully display correct list of workout done	Pass	-
TC02-06	Display the type of workout in list of workout check-in	Select “Run” and “Strength Training” on type of workout	Successfully display “Run” and “Strength Training” on type of workout in Workout Check-in	Successfully display “Run” and “Strength Training” on type of workout in Workout Check-in	Pass	-

TC02-07	Display correct of duration workout in list of workout check-in	Workout with a duration 2 minutes	Successfully display time of 2:00 on duration in Workout Check-in	Successfully display time of 2:00 on duration in Workout Check-in	Pass	-

Table 4. 3 Test Case Learn Workout Interface

Test ID	Test Cases	Test Data	Expected Result	Actual Result	Pass/Fail	Comment
TC03-01	View list of fitness	Click "Learn Workout" fragment icon	Successfully view different types of fitness	Successfully view different types of fitness	Pass	-
TC03-02	Select type of fitness	Click HIIT training	Successfully view HIIT training video list	Successfully view HIIT training video list	Pass	-
TC03-03	Select videos to play	Click HIIT training video	Successfully view HIIT training video page	Successfully view HIIT training video page	Pass	-

TC03-04	Play video	Click “Play Video” button	Successfully view HIIT training video	Successfully view HIIT training video	Pass	-
TC03-05	Select different type of fitness	Click Balance training	Successfully view Balance training video list	Successfully view Balance training video list	Pass	-
TC03-06	View and select Balance training video to play	Click one of the Balance training videos	Successfully view Balance training video page	Successfully view Balance training video page	Pass	-
TC03-07	View description of video	Select Balance training video to view	Successfully view the description of video	Successfully view the description of video	Pass	-

Table 4. 4 Test Case Add Workout Interface

Test ID	Test Cases	Test Data	Expected Result	Actual Result	Pass/Fail	Comment
TC04-01	Select one type of workout	Click General workout	Successfully display General workout type in workout page	Successfully display General workout type in workout page	Pass	-
TC04-02	Select more than one type of workout	Click Run and Strength Training workout	Successfully display Run and Strength Training workout type in workout page	Successfully display Run and Strength Training workout type in workout page	Pass	-
TC04-03	No select any workout to start	Click “Start” button	Display error message “NO Workout Selected”	Display error message “NO Workout Selected”	Pass	-
TC04-04	Start workout	Click “Start” button	Display the time is running	Display the time is running	Pass	-

TC04-05	Stop workout	Click “Stop” button	Stop the time	Stop the time	Pass	-
TC04-06	Reset workout	Click “Reset” button	Display the time to 0:00	Display the time to 0:00	Pass	-
TC04-07	Finish workout	Click “Finish Workout” button	Redirect user to Workout summary page and display details of workout that done	Redirect user to Workout summary page and display details of workout that done	Pass	-
TC04-08	Display correct data of workout in Workout Summary	Workout duration “10:00”, type of workout “Strength training”, weight “65kg”. Click “Finish Workout” button	Display “Strength Training”, “10:00”, “26.00” in workout summary	Display “Strength Training”, “10:00”, “26.00” in workout summary	Pass	-

Table 4. 5 Test Case Profile and Edit profile Interface

Test ID	Test Cases	Test Data	Expected Result	Actual Result	Pass/Fail	Comment
TC05-01	View profile details	Click Profile fragment icon	Successfully display profile details in profile page	Successfully display profile details in profile page	Pass	
TC05-02	Logout	Click Logout icon	Successfully logout and redirect user to Login page	Successfully logout and redirect user to Login page	Pass	-
TC05-03	Redirect to Edit profile page	Click Edit icon	Redirect user to Edit profile page	Redirect user to Edit profile page	Pass	-
TC05-04	Edit Profile	Edit height from 160 to 175	Able to change height to 175	Able to change height to 175	Pass	-
TC05-05	Update profile	Click “Update” button	Update the edited profile details to database and display to user	Update the edited profile details to database and display to user	Pass	-

TC05-06	View updated profile	Login again and click on Profile fragment icon	Redirect user to profile page and display details of profile data	Redirect user to profile page and display details of profile data	Pass	-

4.4 Chapter Summary

After the application is developed based on the methodology chosen, User Acceptance Test (UAT) is being conducted to identify defects and error in the application. This UAT is being conducted to make sure the developed system complies with the specifications given in the software requirement specifications (SRS). All the function are test to fulfil the objectives in chapter 1. Appendix C will show the result of user's feedback after their testing.

CHAPTER 5

CONCLUSION

5.1 Introduction

This thesis consists of five chapters. Chapter 1 discuss on the proposed system based on the objectives, scope and problems that lead to the proposed system. Chapter 2 is discussed about the comparisons of three existing system with their advantages and disadvantages. Based on the comparison of three existing system with their advantages and disadvantages. The chapter 3 discuss on the methodology, application structure and architecture with diagrams. In chapter 3, Agile methodology is implemented for developing this application and diagrams of application are discussed here. Chapter 4 is the output of the developed application such as User Interfaces, database and coding. After the development phase, testing and discussion of the proposed application are tested to ensure the application meets the requirements proposed in SRS. In conclusion, the proposed application does have constraints and limitations. Therefore, future efforts to improve the situation could be achievable.

5.2 Research Constraint

The limitations of Home Fitness Application can only be installed in Android device because it uses android studio to develop. IOS device user couldn’t download and use in their device. Besides, I am still a beginner in developing mobile application. When developing this application, there are some bugs on it. I spend a lot of time on learning and solving the bugs.

5.3 Future Work

There are various improvements that can be made to the Home Fitness Application in the future.

i. Develop the Home Fitness Application in Swift Language. So that, IOS device user can download and use the application.

ii. Adding a social platform for user to share their experience of workout and communicate with other users.

iii. Applying the IOT into the application. User can use the application to display the workout on the mirror. User could follow the workout in the mirror. In the same time, user can have a comparison their move with workout in the mirror to ensure the correct move.

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APPENDIX A
SOFTWARE REQUIREMENT SPECIFICATION

2022

SOFTWARE REQUIREMENT SPECIFICATION (SRS)

[Home Fitness Application]

DOCUMENT APPROVAL

	Name	**Date**
Authenticated by: _____ Name		
Approved by: _____		

Client		

Software :

Archiving Place :

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CHAPTER 1

1.1 PROJECT DESCRIPTION

Fitness mobile application is an application to guide user's workout at home. Due to COVID-19 pandemic, outdoor activities are reduced in order to diminish the risk of spreading COVID-19. As a result, home workout is the only choice for those who want to do exercise. However, there are many people don't have the knowledge of workout. So, they might get injured when they workout alone at home. Fitness mobile application provide video tutorial to the user and guide them to workout at home. Hence, it could prevent the user injured when they workout at home. This application consists five main modules which are manage registration module, manage fitness exercise module, manage moments module, manage daily check-in module and manage profile module. The manage registration module enables the user to sign up and login to the application. Fitness exercise module is for user to select and view the workout tutorial. Furthermore, manage workout module is for user to workout and record it. User can be based on workout that finished to calculate the duration of workout and calories burnt from the workout. Workout check-in module enables user to record and track their workout details. All the workout details can be record in the home page. Manage profile is for user to edit and view their own profile details.

1.2 SYSTEM IDENTIFICATION

System Name: Home Fitness Application

System Abbreviation: HFA

System ID: HFA_SRS_2022_V1

HFA	Home Fitness Application
SRS	Software Requirements Specification
2022	Year 2022
V1	Version 1

1.3 CONTEXT DIAGRAM

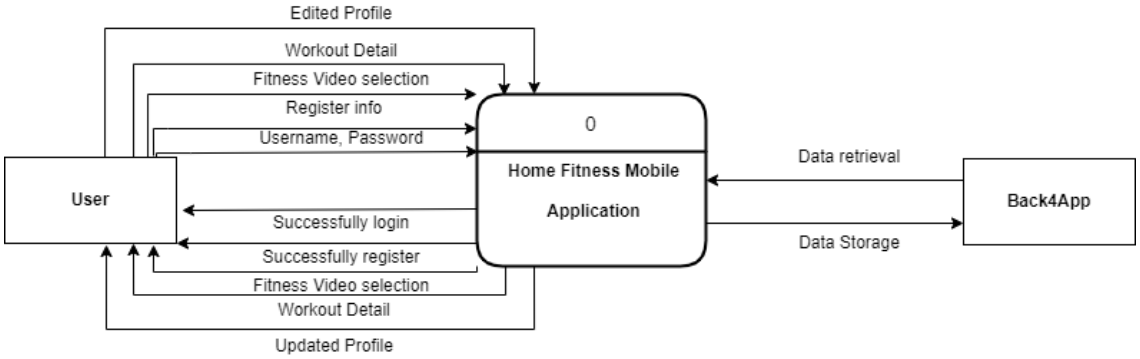

Figure 1. 1 Context Diagram of Home Fitness Application

Figure 1.1 shows the context diagram of the application. Context diagram refers to a data flow diagram that makes the details and boundaries of the designed application clearer that is makes the project's scope simpler. Context diagram also show necessary activities needed for an application. In this context diagram consists of two entities who are user and Back4App. First of all, user needs to insert correct username and password to access the application and it will retrieve data from Back4App. A message will display to the user once the user successfully login. If user don't have an account, he/she needs to fill in the register info and application will store it in Back4App. Application will send the message successfully register to user. User select the fitness video in the application. Application will retrieve data from the Back4App. It will send and display the fitness video to the user. Application will store the workout in the Back4App. Besides, workout details are retrieved from Back4App and display to user. Edited profile details by user are sends to the application and application will store the data in Back4App. The updated profile is retrieved from Back4App to user.

1.4 DATA FLOW DIAGRAM

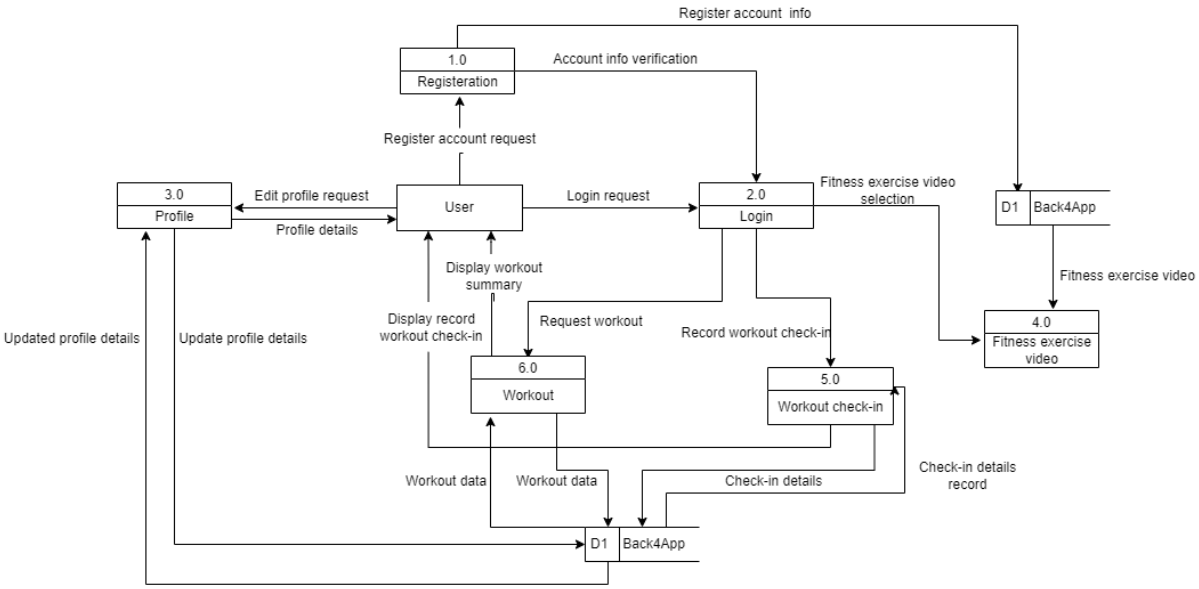

Figure 1. 2 Data Flow Diagram of Home Fitness Application

CHAPTER 2

2.1 USE CASE DIAGRAM AND DESCRIPTION

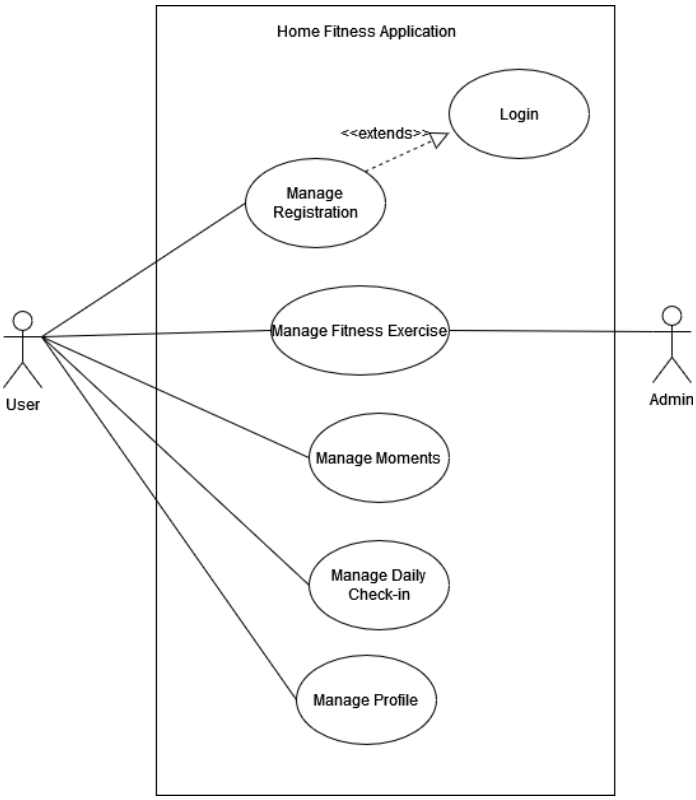

Figure 2. 11 Use Case Diagram of Home Fitness Application

The following are the list for the use case description:

- Manage Registration – This use case allows user to register a new account and log into the home fitness mobile application.

- Manage Fitness Exercise – This use case allows user to select the fitness exercise video that he/she wants to play.
- Manage Workout – This use case allows user to choose the workout type that they want to do. User also can select multi workout type and do it in one round.
- Manage Workout Check-in – This user case allows user to record their workout details.
- Manage Profile – This use case allows user to view and edit their profile details.

3.3.6.6 Manage Registration

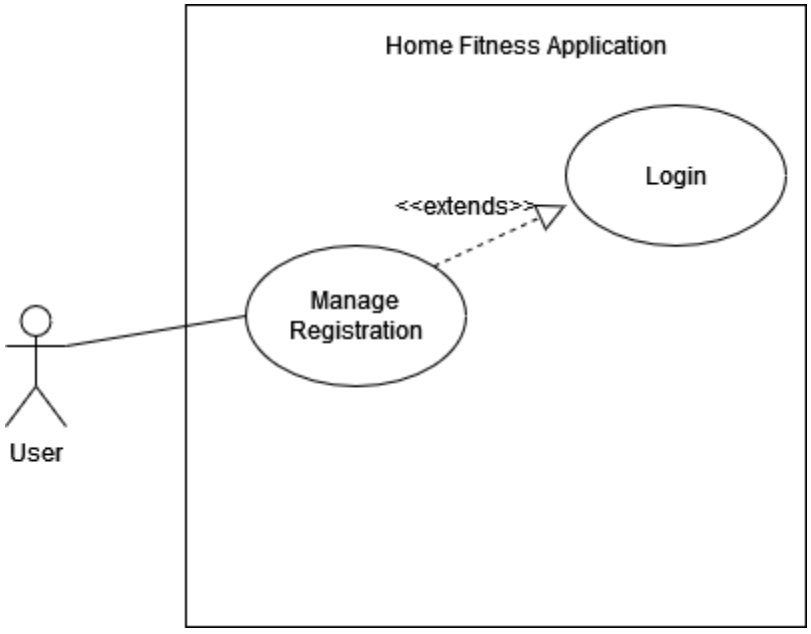

Figure 2. 12 Use Case Diagram of Manage Registration

Table 2. 3 Use Case Description of Manage Registration

Use Case ID	HFA_UC_100
Brief Description	This use case describes the process of registration in Home Fitness Application. Both register and login can be done through the application.
Actor	User
Pre-conditions	User must download and open the Home Fitness Application.
Basic Flow	9. Use case begins when user in the login interface. 10. User click "Register a new account". 11. User will be redirected to registration interface. 12. User needs to fill in the details on the register interface. 13. After all the details is filled, user clicks on "Register" button. **14.** Application will send the data to the firebase and verify the data. **[A1: Username already registered before]** 15. Data will be store in the firebase and redirect user to login interface. 16. Use case ends.
Alternative Flow	**A1: Username already registered before** 5. Firebase detected the existed username in firebase. 6. Application displays "Username registered! Please use another username!"

	7. Application will redirect user to register interface. 8. The flow continues in step 8 of basic flow.
Exception Flow	None
Post-Conditions	User can login to the application
Rules	None
Constraints	Every personal information details is required

3.3.6.7 Manage Fitness Exercise

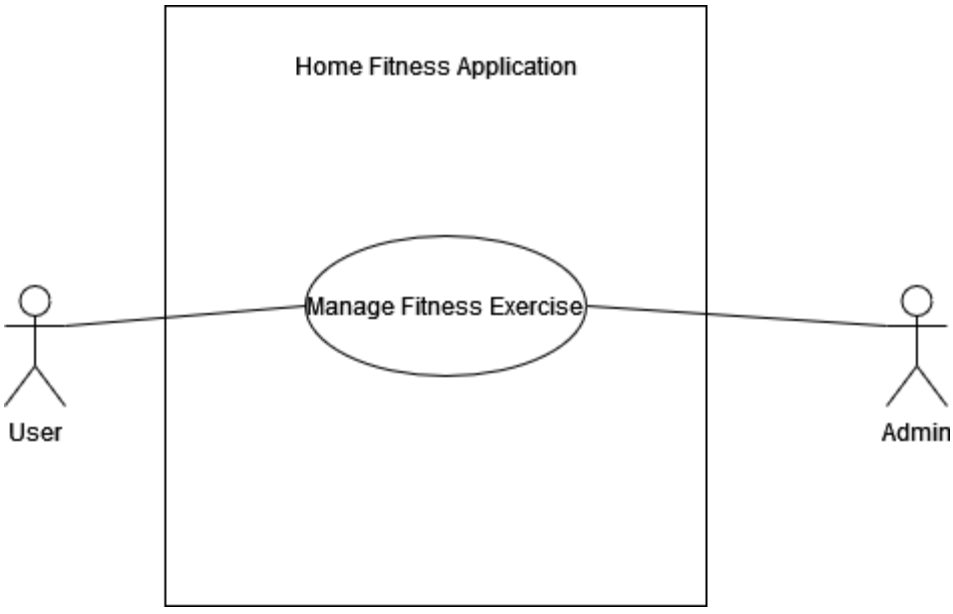

Figure 2. 13 Use Case Diagram of Manage Fitness Exercise

Table 2. 4 Use Case Description of Manage Fitness Exercise

Use Case ID	HFA_UC_200
Brief Description	This use case describes the process of user view and select the fitness exercise video that user wants to do. Admin uploads the video into firebase.
Actor	User and Admin
Pre-conditions	User is log into the application successfully.
Basic Flow	7. Use case begins when: c. Admin upload fitness video into firebase. d. User goes to the <<Fitness>> interface. 8. User view different home fitness exercise. 9. User select the home fitness exercise that he/she wants. 10. Application will display the fitness exercise video to the user. **[E1: Failed to display video]** 11. User can follow the fitness exercise video to exercise. 12. Use case ends.
Alternative Flow	None
Exception Flow	**E1: Failed to display video** 5. Application can't display the fitness exercise video. 6. Application display a message "Video play fail". 7. User will bring back to <<Fitness>> interface. 8. The flow continues in step 2 of basic flow.

Post-Conditions	User view the fitness exercise video successfully and follow the video exercise together.
Rules	None
Constraints	None

3.3.6.8 Manage Workout

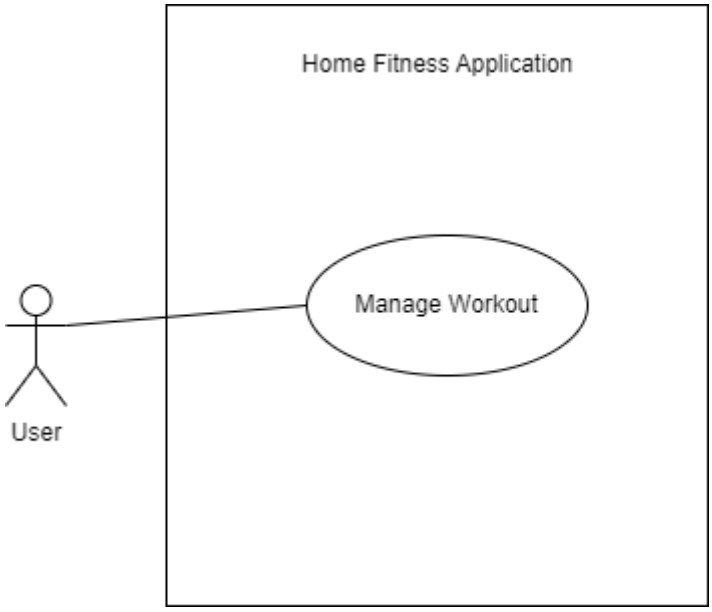

Figure 2. 14 Use Case Diagram of Manage Workout

Table 2. 5 Use Case Description of Manage Workout

Use Case ID	HFA_UC_300

Brief Description	This use case describes the process of user select type of workout. User can know the duration of workout and calories burnt from workout
Actor	User
Pre-conditions	User is log into the application successfully.
Basic Flow	10. Use case begins when user goes to the <<Learn Workout>> interface. 11. User can view different workout type in << Learn Workout >> interface. 12. User can select one or more type of workout to do. 13. User click "Start" button to start the workout. 14. User can c. Click "Stop" button to stop the workout. [**A1: Stop workout**] d. Click "Reset" button to start over the workout. [**A2: Reset workout**] 15. User click on "Finish Workout" button to end the workout. 16. All the workout details will be store in the Back4App database. 17. Display workout summary for user. 18. Use case ends.
Alternative Flow	**A1: Stop workout** 4. Click on "Stop" button. 5. Application will display the stopping time of workout.

	6. The flow continues in step 4 of basic flow. **A2: Reset workout** 4. Click on the "Stop" button. 5. Display the time to zero. The flow continues in step 4 of basic flow.
Exception Flow	1. None
Post-Conditions	Workout details will be display to user.
Rules	None
Constraints	None

3.3.6.9 Manage Workout Check-in

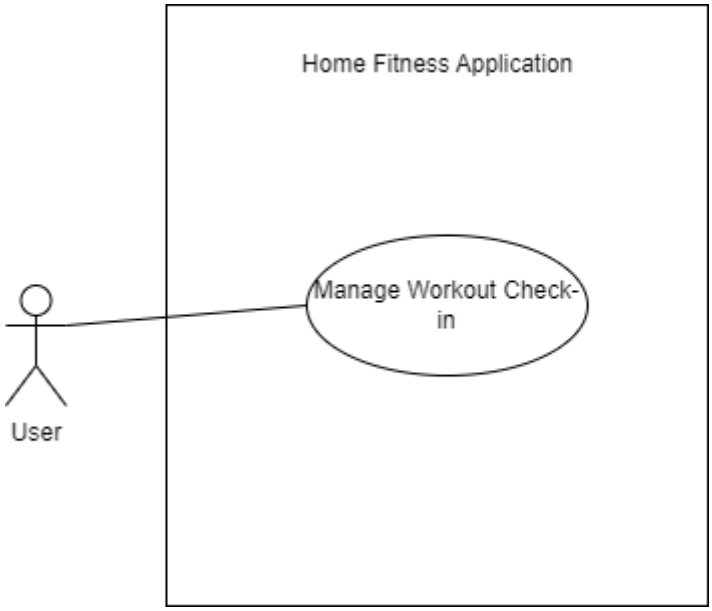

Figure 2. 15 Use Case Diagram of Manage Workout Check-in

Table 2. 6 Use Case Description of Manage Workout Check-in

Use Case ID	HFA_UC_400
Brief Description	This use case describes the process of user's workout check-in.
Actor	User
Pre-conditions	User is log into the application successfully.
Basic Flow	6. Use case begins when user press "Home" fragment button.

	7. It will redirect the user to <<Home >> interface. 8. Display the list of user's workouts. 9. User can view the workout details such as calories burnt and duration. 10. Use case ends.
Alternative Flow	None
Exception Flow	None
Post-Conditions	User can view calories burnt from the workout and duration of workout.
Rules	None
Constraints	None

3.3.6.10 Manage Profile

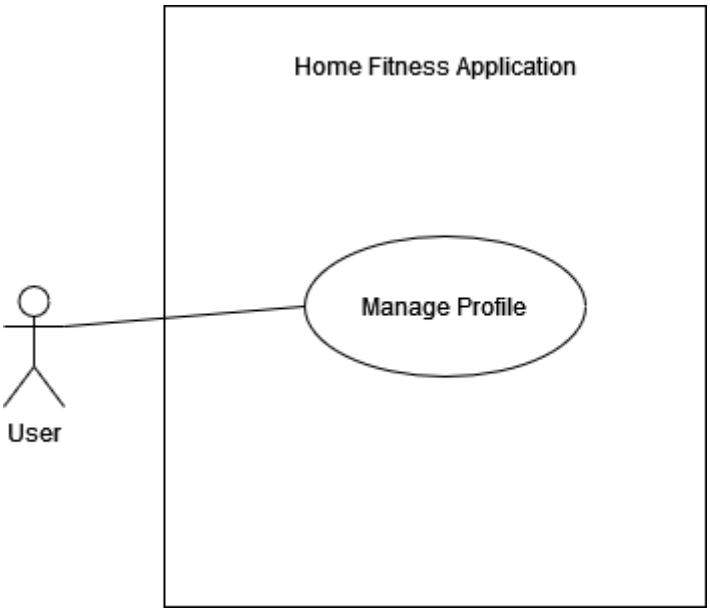

Figure 2. 16 Use Case Diagram of Manage Profile

Table 2. 7 Use Case Description of Manage Profile

Use Case ID	HFA_UC_500
Brief Description	This use case describes the process of user view their profile and edit their profile details.
Actor	User
Pre-conditions	User is log into the application successfully.
Basic Flow	6. Use case begins when user clicks on the profile icon. 7. <<Profile>> interface will display user profile details.

	8. User can click on edit icon. [**A1: Edit own profile**] 9. <<Edit Profile>> interface will update the profile details and display it. 10. Use case ends.
Alternative Flow	**A1: Edit own profile** 4. User can edit the profile details. 5. After editing, click "Update" button. 6. The flow continues in step 4 of basic flow.
Exception Flow	None
Post-Conditions	User can view on the updated profile details.
Rules	None
Constraints	None

2.2 SEQUENCE DIAGRAM

2.2.1 Manage Registration

Basic flow:

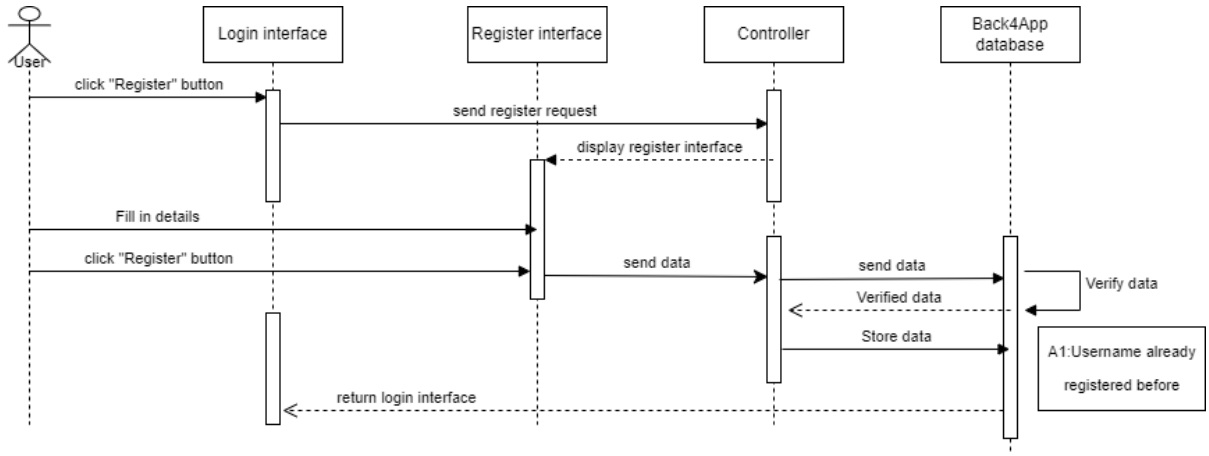

Figure 2. 17 Basic flow for Manage Registration

Based on figure 2.7, user clicks “Register” button in login interface. Next, the application will send the register request to controller. Then, it will return and display the <<Register>> interface to the user. User can fill in the profile details to <<Register>> interface. After finish fill in details, click on the “Register” button. The <<Register>> interface send data to the controller. Controller send the data to Back4App. Back4App will verify the data and return back the data to controller. If the username hasn’t registered before, the controller will send the data back to Back4App and store. The application will redirect user to the <<Login>> interface.

Alternative flow:

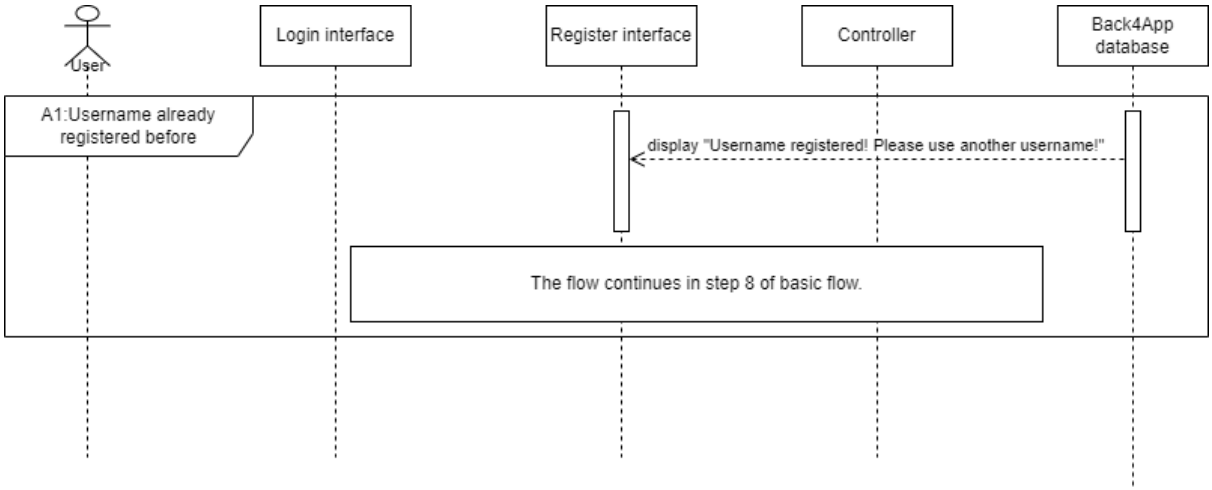

Figure 2. 18 Alternative flow for Manage Registration

Figure 2.8 is the alternative flow for manage registration. This happens when the username already registered before. When the Back4App detected the username already registered, it will display “Username registered! Please use another username!” in the <<register>> interface. It will continue in step 8 of basic flow. After that, it will redirect user to <<login>> interface.

2.2.2 Manage Fitness Exercise

Basic flow:

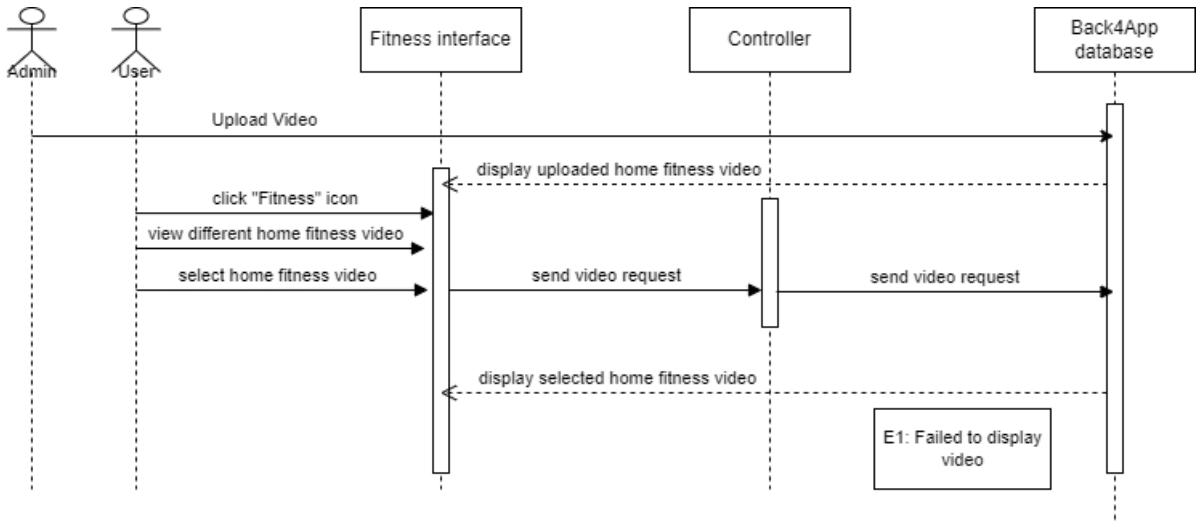

Figure 2. 19 Basic flow for Manage Fitness Exercise

Figure 2.9 is the basic flow of Manage Fitness Exercise. First of all, admin uploads fitness video to Back4App. Back4App displays uploaded home fitness video to <<Fitness>> interface. Furthermore, user clicks on the “Fitness” icon. User can view the different home fitness video at <<Fitness>> interface. After viewing, user selects the home fitness video. The video request sends from <<Fitness>> interface to Controller. Controller sends the video request to Back4App. Back4App base on the request then display selected home fitness video at <<Fitness>> interface. User can view and follow the fitness exercise.

Exception flow:

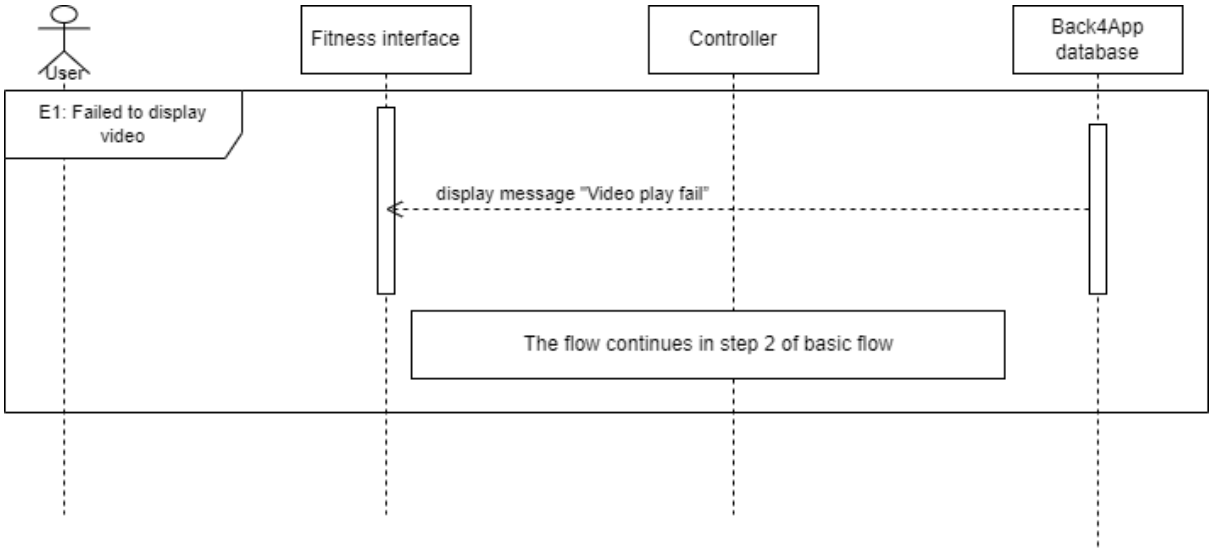

Figure 2. 20 Exception flow for Manage Fitness Exercise

Figure 2.10 is the exception flow is the exception flow for manage fitness exercise. This happens when the Back4App can't detect the selected video. Back4App will send a message "Video play fail". User need to continue on step 2 of basic flow.

2.2.3 Manage Workout

Basic flow:

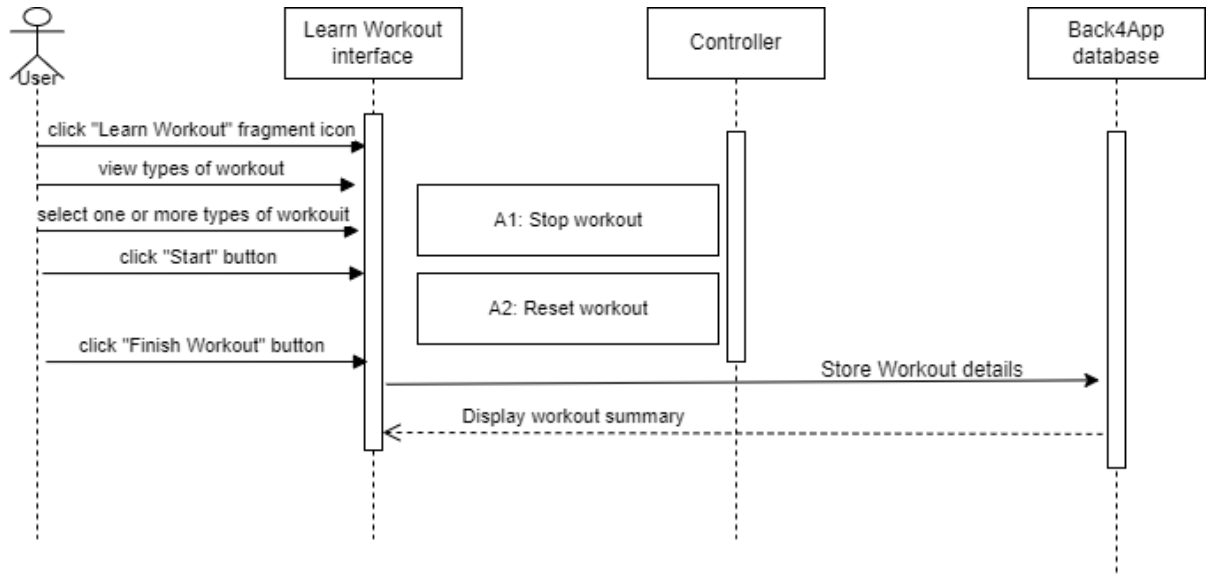

Figure 2. 21 Basic flow for Manage Workout

Figure 2.11 is the basic flow for manage workout. User click the “Learn Workout” icon and it will redirect user to the <<Learn Workout>> interface. User can view types of workouts. User click “Start” button and it will start the time clock of workout. When user wants to end the workout, click on “Finish Workout” button to end. It will be store in the Back4App database. Back4App will display workout summary to the <<Learn Workout>> interface.

Alternative flow:

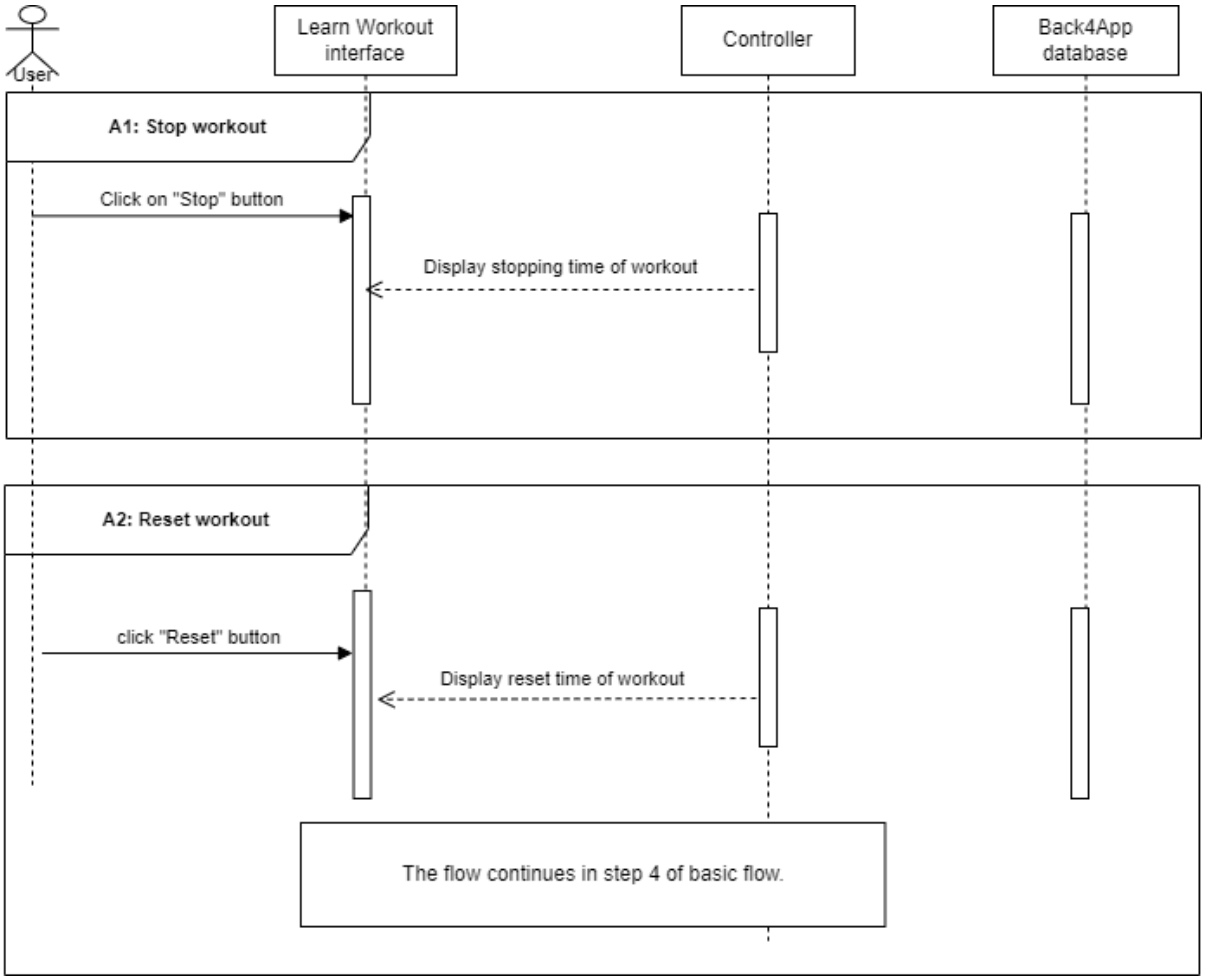

Figure 2. 22 Alternative flow for Manage Workout

Figure 2.12 is the alternative flow of Manage workout. The first alternative flow is Stop workout. User click on “Stop” button at <<Learn Workout>> interface. Controller will stop the time of workout and display the stopping time to user.

The second alternative flow is Reset workout. User clicks on “Reset” button at <<Learn Workout>> interface. Controller will reset the time of workout and display the reset time to user. Both of the alternative flow will continue in step 4 of basic flow.

2.2.4 Manage Workout Check-in

Basic flow:

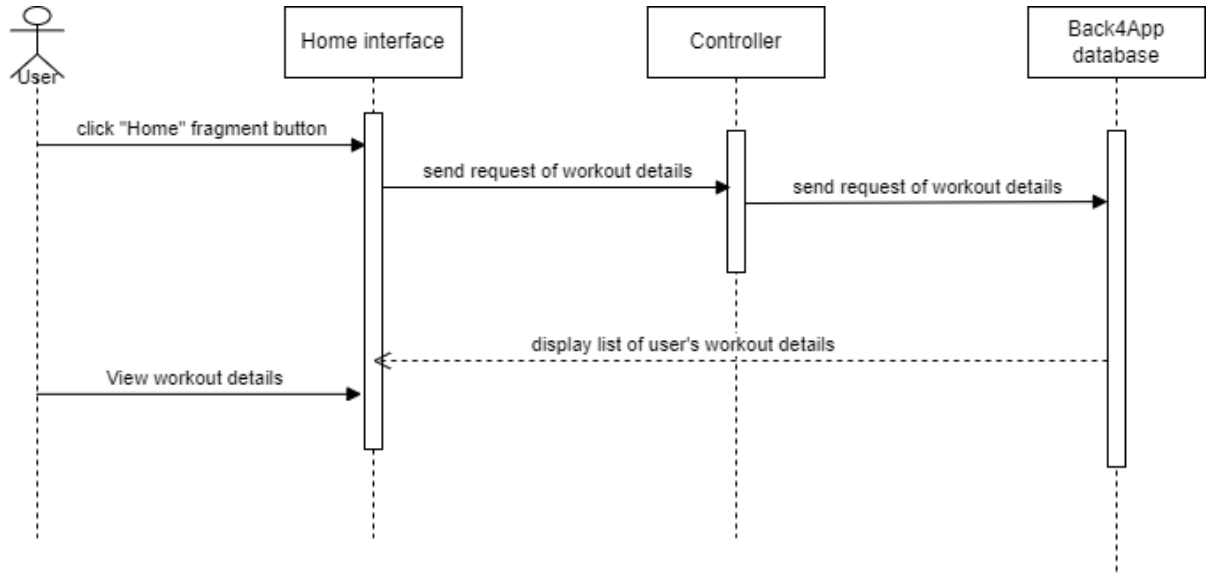

Figure 2. 23 Basic flow for Manage Workout Check-in

Figure 2.13 is a basic flow for Manage Workout Check-in. First of all, user click “Home” fragment button. The request of workout details will send to the controller. Controller sends the request of workout details to Back4App and save it. Back4App will display list of user’s workout details in <<Home>> interface. User can view the details of workout that he/she done.

2.2.5 Manage Profile

Basic flow:

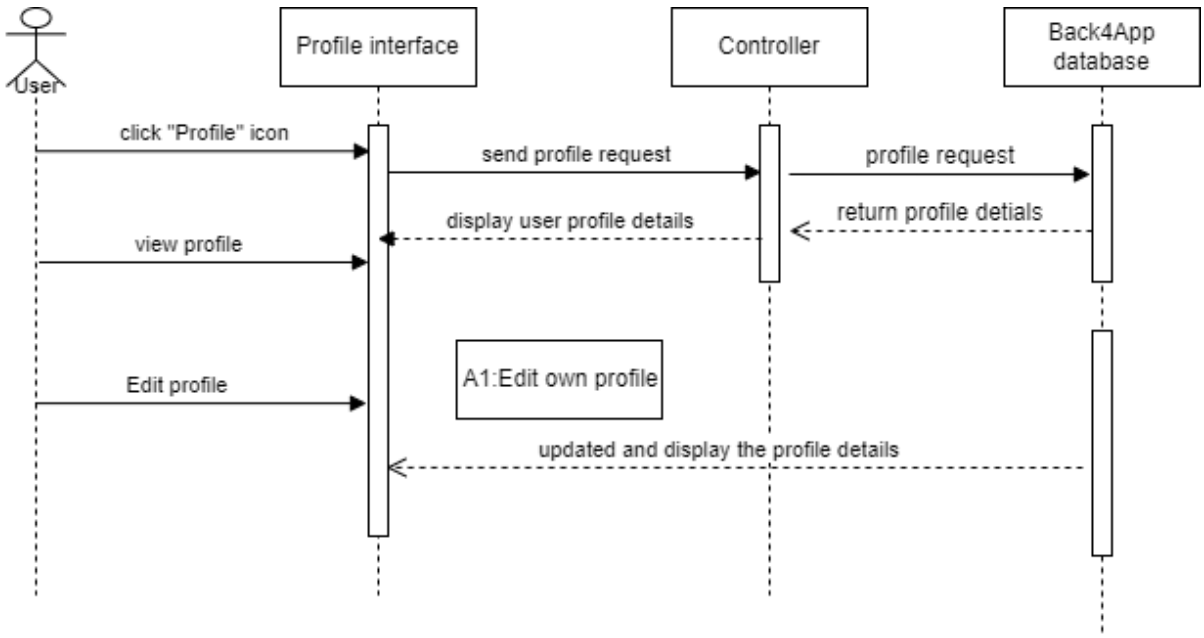

Figure 2. 24 Basic flow for Manage Profile

Figure 2.14 is basic flow for Manage Profile. User click “Profile” icon. Controller accept the profile request and send to Back4App. Back4App return the profile details that requested. Controller display user profile details at <<Profile>> interface. User can view their profile details in this interface.

Alternative flow:

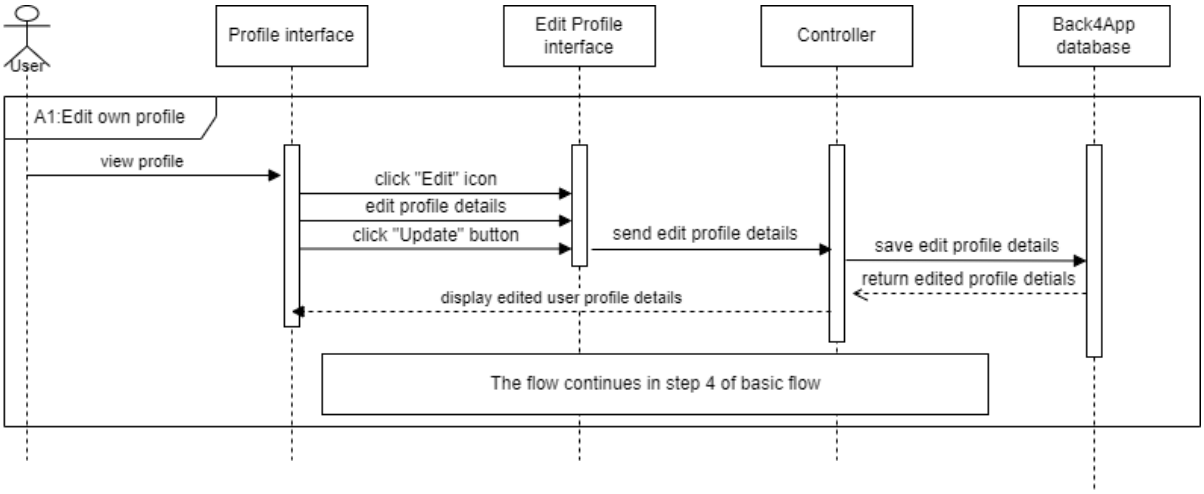

Figure 2. 25 Alternative flow for Manage Profile

Figure 2.15 is alternative flow for Manage Profile. This alternative flow is edit own profile. User view on their profile. User will redirect to the <<Edit Profile>> interface when click “Edit” icon. All the profile details can edit in this interface. Once the profile details are finish edit, click “Update” button. <<Edit Profile>> interface sends edit profile details to controller. Controller will send to Back4App and save the edit profile details. Furthermore, Back4App return the edited profile details to controller and controller display the edited user profile details on <<Profile>> interface.

CHAPTER 3

3.1 INTERFACE DESIGN

Figure below is the Home Fitness Application design prototype. Each of the module interface will be shown in below.

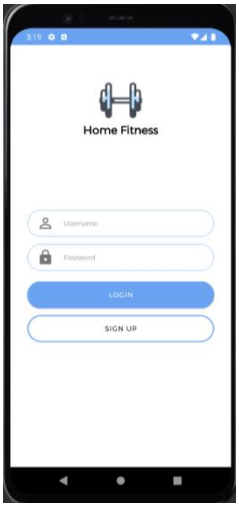

Figure 3. 28 Login Interface

Figure 3.1 is an interface allows user to login to the application by username and password.

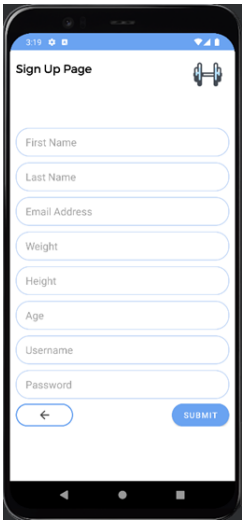

Figure 3. 29 Register Interface

Figure 3.2 is an interface allow users that don't have account to register a new account for this application User needs to fill in their information such as First Name, Last Name, Email Address, Weight, Height, Age, Username and Password. After all the information are fill in, click <<Submit>> button and it will redirect user to the login page. Hence, user had been successfully registering an account.

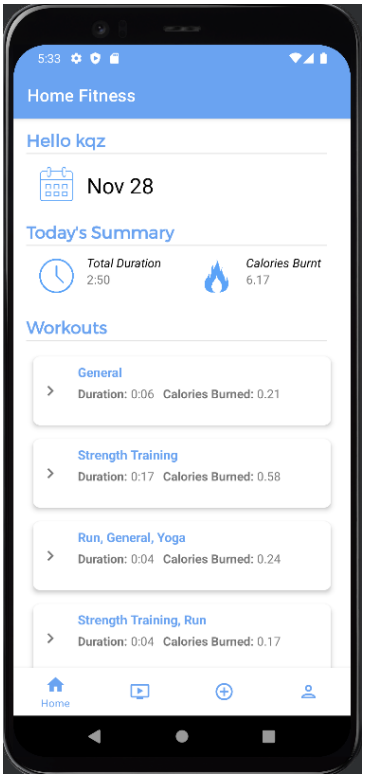

Figure 3. 30 Home Page interface

Figure 3.3 is Home Page interface. When user login to the Home Fitness application, user will redirect to the home page of the apps. In home page, it will display the date and summary of workout. The summary shows the duration of user's workout and calories burnt. It also displays the workout that user done.

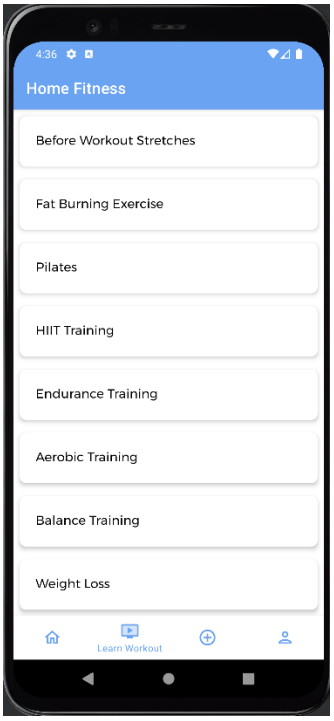

Figure 3. 31 Learn Workout interface

Figure 3.4 is an interface that display different types of fitness videos. This interface is for user to choose the video that they want to learn. There are many types of home fitness for user to choose. User can select which type of fitness that they interested with and click on it.

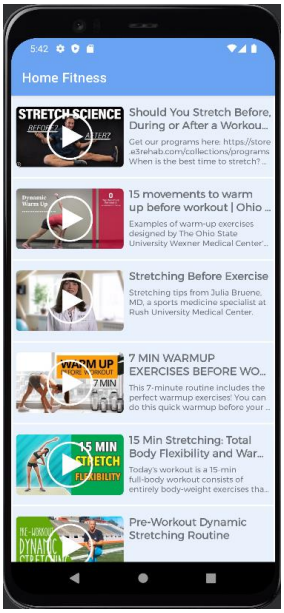

Figure 3. 32 Display selected video category list interface

Figure 3.5 allows user to view and select the videos that he/she interested with.

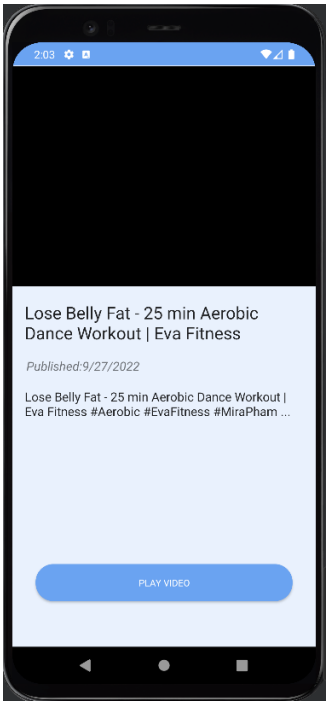

Figure 3. 33 Play selected video Interface

Figure 3.6 is the play selected video page. This interface is for user to play the video that selected. By click on the “Play Video” button, the video will be display to user.

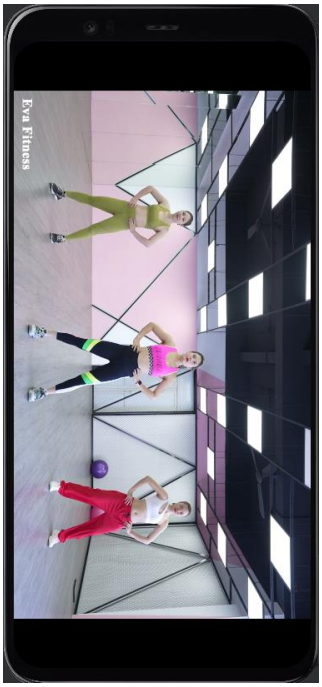

Figure 3. 34 Video interface

Figure 3.7 is video page. Once user clicks on the “Play Video” button. User will be redirect to this video page. User can learn about the fitness from the video. There will be a guidance for user about how to exercise.

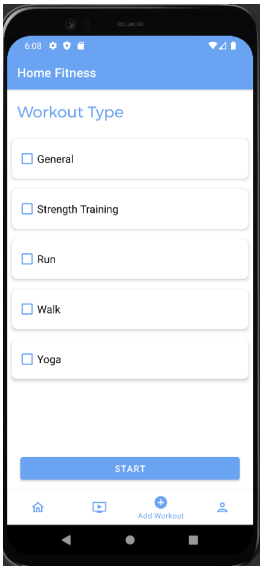

Figure 3. 35 Add Workout Interface

Figure 3.8 is the Add Workout page. This interface is for user to select which type of workout that he/she is going to do. There are 5 types of workout which are General, Strength Training, Run, Walk and Yoga. User can select more than one workout to do. For example, user wants to have a run before Strength training. He/she can select both of them to start the workout.

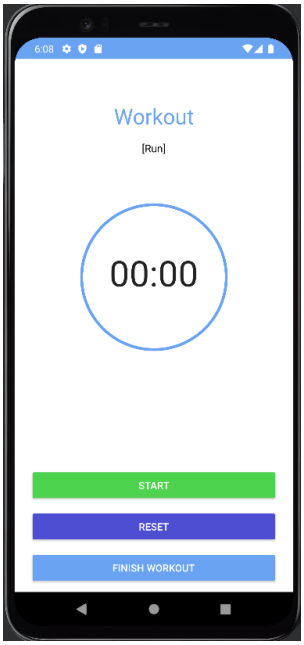

Figure 3. 36 Workout interface

Figure 3.9 allows user to start the workout that selected. After user select the workout that he/she going to do, it will redirect user to this interface. User can click <<Start>> button to start the workout and the time will start to count. If user click <<Reset>> button, the interface will return the time to zero.

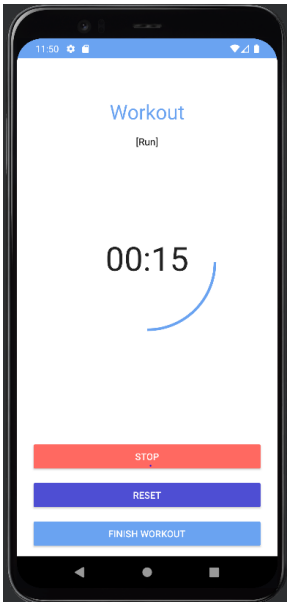

Figure 3. 37 Workout in progress Page

Figure 3.10 is the interface of workout in progress. When user clicks <<Start>> button, the time is running. If user want to rest a while, he/she can click on the <<Stop>> button to stop the workout. Once the workout is finished, user can click on <<Finish Workout>>.

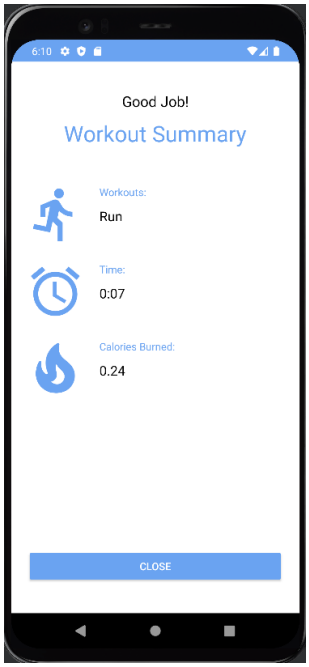

Figure 3. 38 Workout summary page

Figure 3.11 is the interface of workout summary. Once user finish the workout, it will show the summary of user's workout. The summary of workout will display type of workout, time of workout and calories burnt from the workout. User clicks on <<Close>> button and it will redirect user to home page.

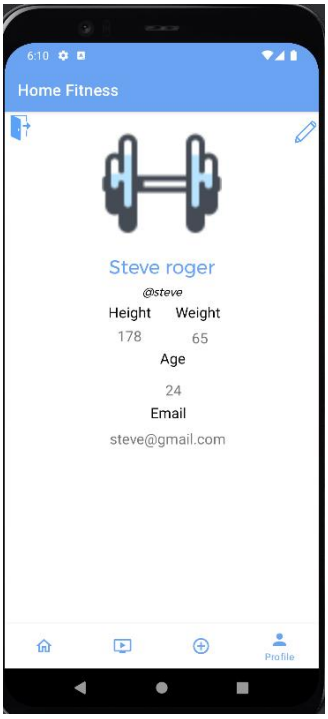

Figure 3. 39 Profile page

Figure 3.12 is profile page. User can view the profile data. If user wants to edit the profile, click on the top right of pen icon to edit the profile. However, if user wants to log out, click on the log out icon on the top left side. Then, user will be redirect to login page.

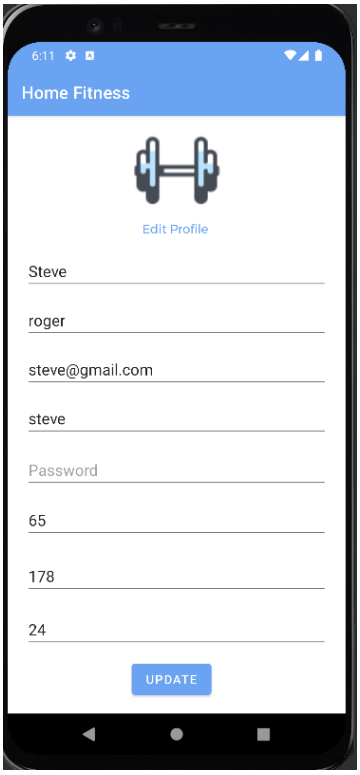

Figure 3. 40 Edit Profile page

Figure 3.13 26 is the edit profile page. User can fill in the data that want to edit. Once the data is filled, click on the “UPDATE” button. The profile details will be update and display in user’s account.

3.2 HARDWARE AND SOFTWARE SPECIFICATION

Hardware	Specification	Description
Laptop	- 8GB RAM or more - 8 GB of available disk space - 64-bit Microsoft Windows 10	- To develop the application - To prepare the software documentation
Smartphone	- Quad Core 1.2GHZ - 2 GB RAM	- To run the application

Table 3. 11 Hardware Specification

Software	Specification	Description
Microsoft Office Word 2019	Version 2019	To create documentations.
Draw.io	Version 14.6.13	To design and create all the diagrams in the documentations.

Window 10	Windows 10 Home Version 21H1	Platform to run all the other software required.
Android Studio	Version 4.1	An integrated development environment designed for Android app development using Java language.
Back4App	Version 3.7.2	A mobile and web application development platform that enable cloud syncing of data.

Table 3. 12 Software Specification

2022

SOFTWARE DESIGN DESCRIPTION (SDD)

[Home Fitness Application]

DOCUMENT APPROVAL

	Name	**Date**
Authenticated by: _____ Name		
Approved by: _____		

Client		

Software :

Archiving Place :

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CHAPTER 1

1.1 PROJECT DESCRIPTION

Fitness mobile application is an application to guide user's workout at home. Due to COVID-19 pandemic, outdoor activities are reduced in order to diminish the risk of spreading COVID-19. As a result, home workout is the only choice for those who want to do exercise. However, there are many people don't have the knowledge of workout. So, they might get injured when they workout alone at home. Fitness mobile application provide video tutorial to the user and guide them to workout at home. Hence, it could prevent the user injured when they workout at home.

This application consists five main modules which are manage registration module, manage fitness exercise module, manage workout module, manage workout check-in module and manage profile module. The manage registration module enables the user to sign up and login to the application. Fitness exercise module is for user to select and view the workout tutorial. Furthermore, manage workout module is for user to workout and record it. User can be based on workout that finished to calculate the duration of workout and calories burnt from the workout. Workout check-in module enables user to record and track their workout details. All the workout details can be record in the home page. Manage profile is for user to edit and view their own profile details.

1.2 SYSTEM IDENTIFICATION

System Name: Home Fitness Application

System Abbreviation: HFA

System ID: HFA_SRS_2022_V1

HFA	Home Fitness Application
SRS	Software Requirements Specification
2022	Year 2022
V1	Version 1

1.3 ARCHITECTURE / BLUE PRINT

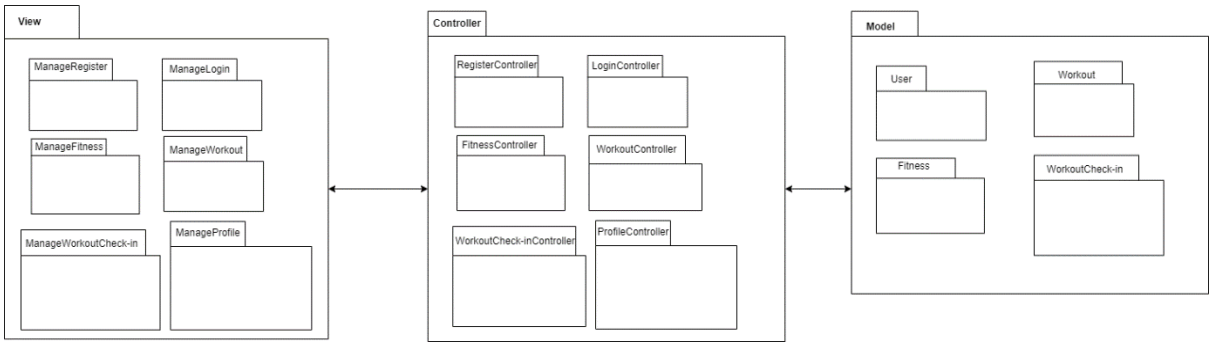

Figure 1. 3 MVC Diagram

This application uses MVC architecture where it consists of three layers, M stands for Model, V stands for Views and C stands for controllers. There are 6 interfaces in view which are RegisterInterface, LoginInterface, FitnessInterface, WorkoutInterface, WorkoutCheck-inInterface and ProfileInterface. They are all control by each of its own controller. All the data is manipulated and retrieve by model which are User, Fitness, Workout and WorkoutCheck-in.

1.4 ARCHITECTURE / BLUEPRINT DESCRIPTION

1.4.1 Application Layer

1.4.1.1 ManageRegister

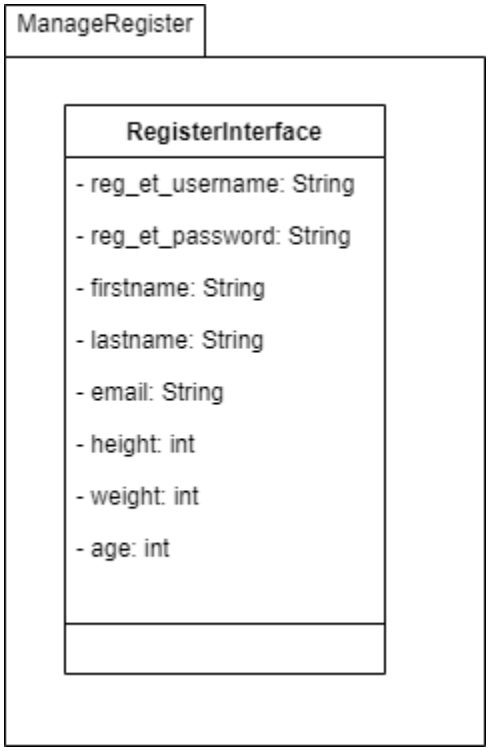

Figure 1. 4 Application layer for ManageRegister

Class name	Description
RegisterInterface	This interface for user to register an account in this application. User needs to enter username, password, firstname, lastname, email, height, weight and age to register a new account.

Table 1. 1 Application layer for ManageRegister

1.4.1.2 ManageLogin

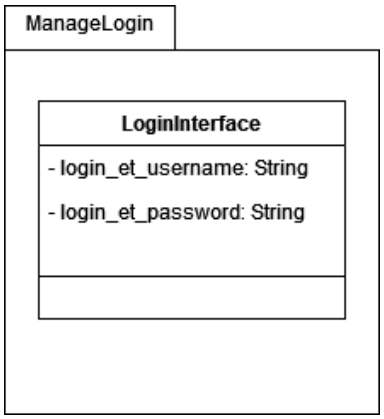

Figure 1. 5 Application layer for ManageLogin

Class name	Description
LoginInterface	This interface for user to login their account by username and password.

Table 1. 2 Application layer for ManageLogin

1.4.1.3 ManageFitness

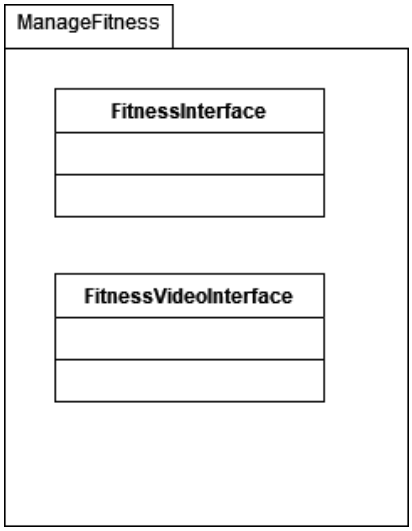

Figure 1. 6 Application layer for ManageFitness

Class name	Description
FitnessInterface	This interface for user to select the fitness video that want to exercise.
FitnessVideoInterface	This interface displays the fitness video that selected by the user. User can view and exercise together with the fitness video tutorial.

Table 1. 3 Application layer for ManageFitness

1.4.1.4 ManageWorkout

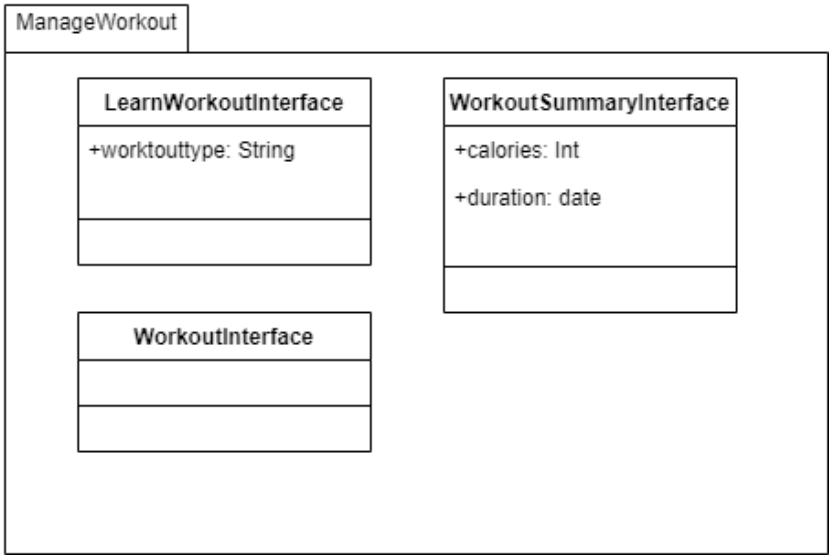

Figure 1. 7 Application layer for ManageWorkout

Class name	Description
LearnWorkoutInterface	This interface for user to select the type of workouts to do.
WorkoutInterface	This interface displays the time clock. When user start workout. It will record the time of user's workout.

WorkoutSummaryInterface	This interface for user to view the workout details that just finished.

Table 1. 4 Application layer for ManageWorkout

1.4.1.5 ManageWorkoutCheck-in

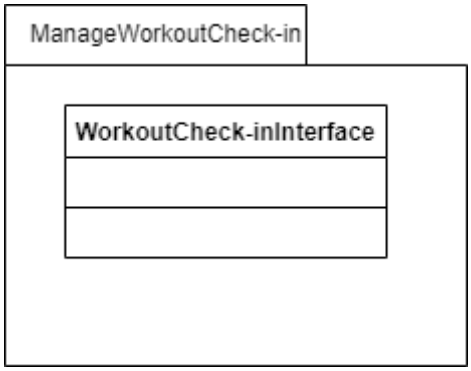

Figure 1. 8 Application layer for ManageWorkoutCheck-in

Class name	**Description**
WorkoutCheck-inInterface	This interface for user to view the workout details that he/she finished.

Table 1. 5 Application layer for ManageWorkoutCheck-in

1.4.1.6 ManageProfile

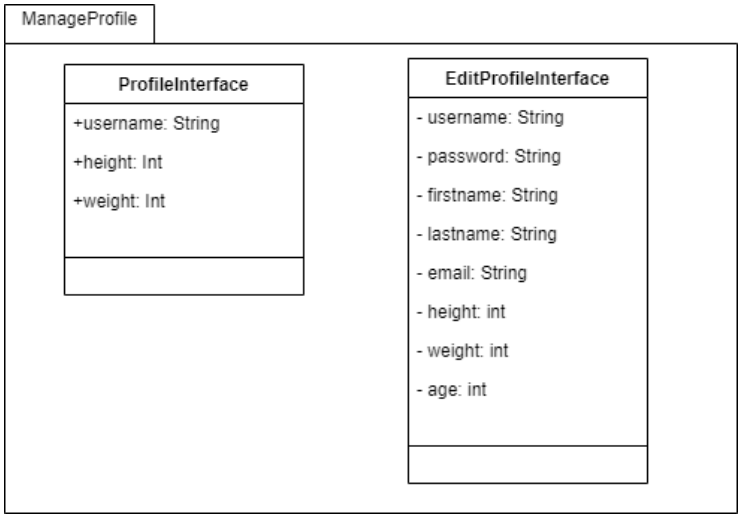

Figure 1. 9 Application layer for ManageProfile

Class name	**Description**
ProfileInterface	This interface for user to view their profile details.
EditProfileInterface	This interface for user to edit their profile details such as username, password, firstname, lastname, email, height, weight and age.

Table 1. 6 Application layer for ManageProfile

1.4.2 Business Services Layer

1.4.2.1 RegisterController

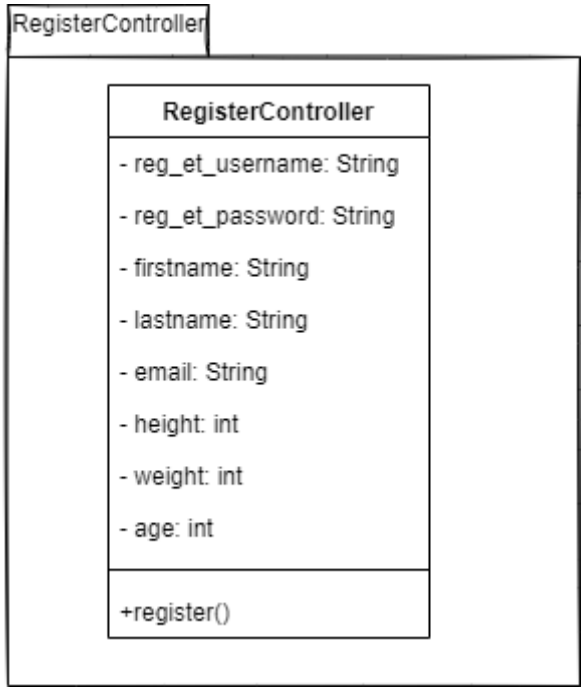

Figure 1. 10 RegisterController

Class name	Description
RegisterController	To manage and process the register data

Table 1. 7 RegisterController

1.4.2.2 LoginController

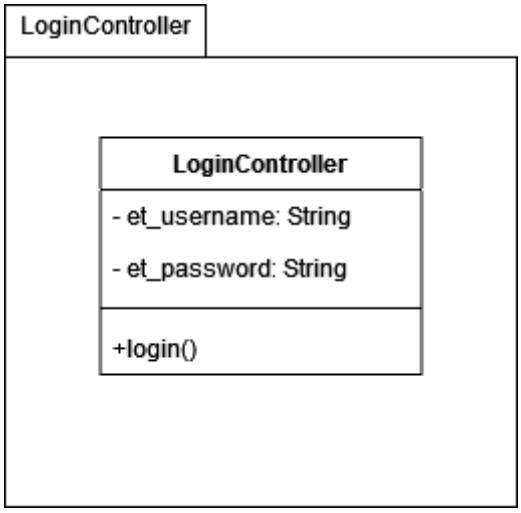

Figure 1. 11 LoginController

Class name	Description
LoginController	To validate the user's login data

Table 1. 8 LoginController

1.4.2.3 FitnessController

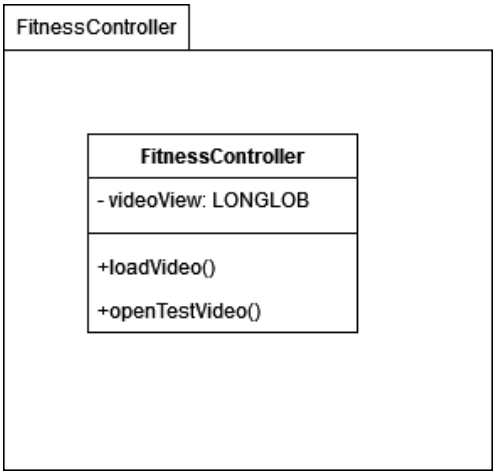

Figure 1. 12 FitnessController

Class name	Description
FitnessController	This class is responsible for processing SQL query and manage the fitness video in the database.

Table 1. 9 FitnessController

1.4.2.4 WorkoutController

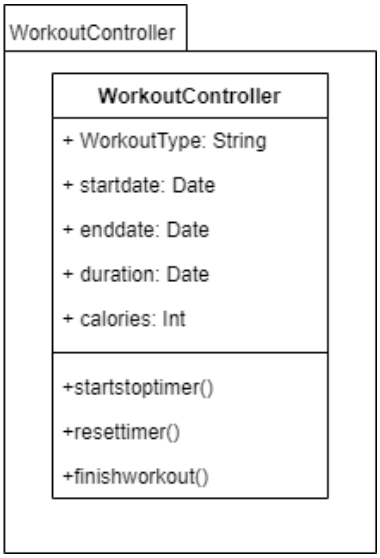

Figure 1. 13 WorkoutController

Class name	**Description**
WorkoutController	This class is responsible for processing the workout begin and end. It also calculate the duration of workout and calories burnt.

Table 1. 10 WorkoutController

1.4.2.5 WorkoutCheck-inController

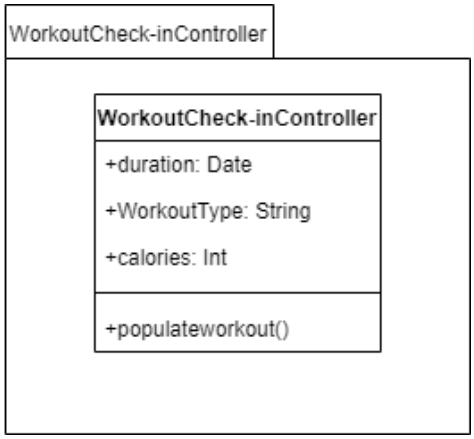

Figure 1. 14 WorkoutCheck-inController

Class name	**Description**
WorkoutCheck-inController	Controller that manage and process the workout check-in.

Table 1. 11 WorkoutCheck-inController

1.4.2.6 ProfileController

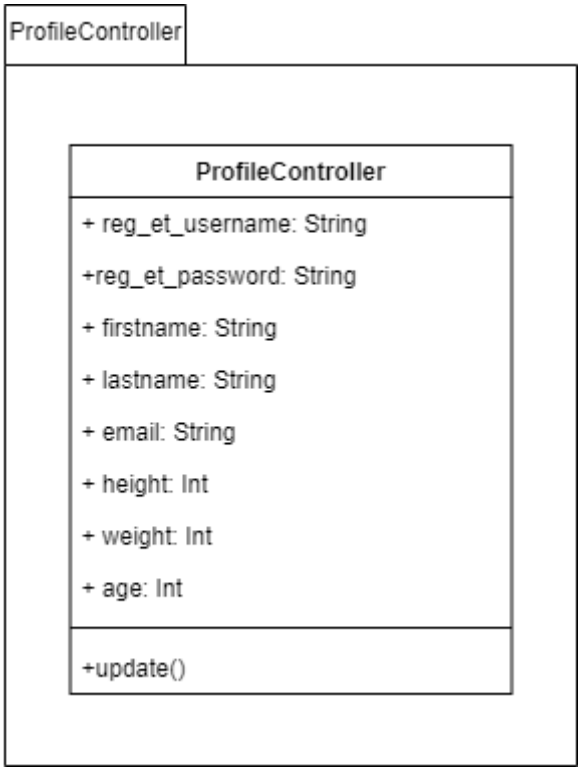

Figure 1. 15 ProfileController

Class name	Description
ProfileController	This class is responsible for processing SQL query and manage the profile data edit in the database.

Table 1. 12 ProfileController

1.4.3 Model Layer

1.4.3.1 User Model

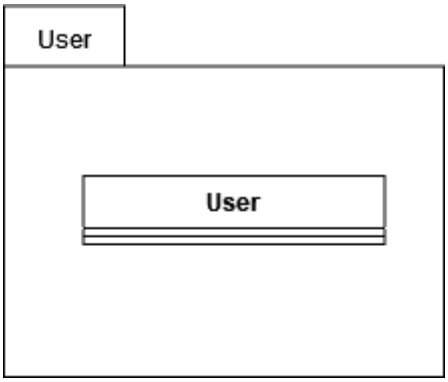

Figure 1. 16 User Model

Class name	Description
User	Database that used to store and retrieve username, password, profile details and updated profile details.

Table 1. 13 User Model

1.4.3.2 Fitness Model

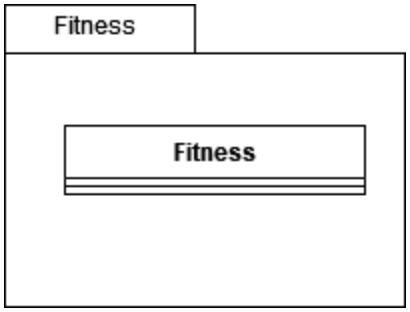

Figure 1. 17 Fitness Model

Class name	Description
Fitness	Database that used to store and retrieve fitness exercise video.

Table 1. 14 Fitness Model

1.4.3.3 Workout Model

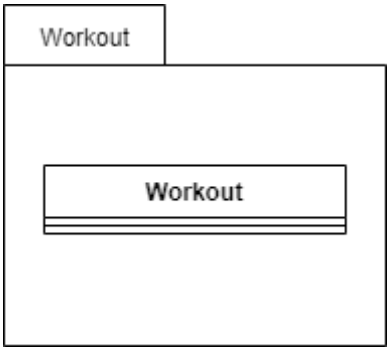

Figure 1. 18 Workout Model

Class name	Description
Workout	Database that used to store workout details from the user's workout.

Table 1. 15 Workout Model

1.4.3.4 Workout Check-in Model

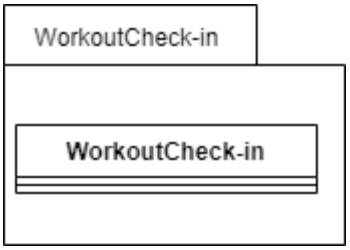

Figure 1. 19 Workout Check-in Model

Class name	Description
Workout Check-in	Database that used to retrieve workout check-in of user.

Table 1. 16 Workout Check-in Model

CHAPTER 2

2.1 DETAILED DESCRIPTION

2.1.1 ManageRegister

2.1.1.1 RegisterInterface

Class Type	Boundary Class	
Responsibility	This interface allows user to register an account and fill in profile details.	
Attributes	**Attribures Name**	**Attributes Type**
	reg_et_username	String
	reg_et_password	String
	firstname	String
	lastname	String
	email	String
	height	Int
	weight	Int

	age	Int
Methods	**Methods Name**	**Description**
	Not Applicable	Not Applicable
Algorithm	Not Applicable	

Table 2. 8 RegisterInterface

2.1.1.2 RegisterController

Class Type	Controller Class	
Responsibility	This controller is to receive and process the register data.	
Attributes	**Attribures Name**	**Attributes Type**
	reg_et_username	String
	reg_et_password	String
	firstname	String
	lastname	String
	email	String
	height	Int
	weight	Int

	age	Int
Methods	**Methods Name**	**Description**
	register()	To register a new account

Algorithm	**register()**
	
	BEGIN
	
	IF (click= “Register”) at “Login” Interface
	
	THEN RETURN to “Register” Interface
	
	ENTER reg_et_username
	
	ENTER reg_et_password
	
	ENTER gender
	
	ENTER height
	
	ENTER weight
	
	IF (click= “Register”) at “Register” Interface
	
	THEN send entered reg_et_username,
	
	reg_et_password, gender,
	
	height,weight to UserModel.	

	RETURN to “login” interface END

Table 2. 9 RegisterController

2.1.1.3 UserModel

Class Type	Model Class	
Responsibility	This model class store user profile details into database and retreive data from database.	
Attributes	**Attribures Name**	**Attributes Type**
	Not Applicable	Not Applicable
Methods	**Methods Name**	**Description**
	Not Applicable	Not Applicable
Algorithm	Not Applicable	

Table 2. 10 UserModel

2.1.2 ManageLogin

2.1.2.1 LoginInterface

Class Type	Boundary class	
Responsibility	This interface allows user enters their username and password to login to the application	
Attributes	**Attribures Name**	**Attributes Type**
	login_et_username login_et_password	String String
Methods	**Methods Name**	**Description**
	Not Applicable	Not Applicable
Algorithm	Not Applicable	

Table 2. 11 LoginInterface

2.1.2.2 LoginController

Class Type	Controller Class	
Responsibility	This controller is to receive and process the data to login.	
Attributes	**Attribures Name**	**Attributes Type**
	et_username et_password	String String
Methods	**Methods Name**	**Description**
	login()	To login to this application

Algorithm	login()
	
	BEGIN
	
	ENTER et_username
	
	ENTER et_ password
	
	IF (click= “Login”) at “Login” Interface
	
	THEN RETURN to “Home” interface.
	
	END	

Table 2. 12 LoginController

2.1.3 ManageFitness

2.1.3.1 FitnessInterface

Class Type	Boundary Class	
Responsibility	This interface allows user view and select the fitness exercise videos.	
Attributes	**Attribures Name**	**Attributes Type**
	Not Applicable	Not Applicable
Methods	**Methods Name**	**Description**
	Not Applicable	Not Applicable
Algorithm	Not Applicable	

Table 2. 13 FitnessInterface

2.1.3.2 FitnessVideoInterface

Class Type	Boundary Class	
Responsibility	This interface allows user to view the fitness exercise video that selected in Fitness interface.	
Attributes	**Attribures Name**	**Attributes Type**

	Not Applicable	Not Applicable
Methods	**Methods Name**	**Description**
	Not Applicable	Not Applicable
Algorithm	Not Applicable	

Table 2. 14 FitnessVideoInterface

2.1.3.3 FitnessController

Class Type	Controller Class	
Responsibility	This controller is to receive and process the data of fitness interface.	
Attributes	**Attribures Name**	**Attributes Type**
	videoView	LONGLOB
Methods	**Methods Name**	**Description**
	loadVideo()	Load the video to interface
	openTestVideo()	Allow user to open and view full fitness exercise video.
Algorithm	**loadVideo()** BEGIN	

	IF loadVideo() is called
	
	THEN RETRIEVE video from the FitnessModel
	
	DISPLAY video to “Fitness” Interface
	
	END
	
	openTestVideo()
	
	BEGIN
	
	IF (click on video)
	
	THEN READ FitnessModel
	
	RETRIEVE data
	
	DISPLAY fitness exercise video
	
	END

Table 2. 15 FitnessController

2.1.3.4 FitnessModel

Class Type	Model Class
Responsibility	This model class store fitness data into database and retreive data from database.

Attributes	Attribures Name	Attributes Type
	Not applicable	Not applicable
Methods	**Methods Name**	**Description**
	Not applicable	Not applicable
Algorithm	Not applicable	

Table 2. 16 FitnessModel

2.1.4 ManageWorkout

2.1.4.1 LearnWorkoutInterface

Class Type	Boundary Class	
Responsibility	This interface display the type of workouts to user	
Attributes	**Attribures Name**	**Attributes Type**
	workouttype	String
Methods	**Methods Name**	**Description**
	Not applicable	Not applicable
Algorithm	Not applicable	

Table 2. 17 LearnWorkoutInterface

2.1.4.2 WorkoutInterface

Class Type	Boundary Class	
Responsibility	This interface allows user to workout	
Attributes	**Attribures Name**	**Attributes Type**
	Not applicable	Not applicable
Methods	**Methods Name**	**Description**
	Not applicable	Not applicable
Algorithm	Not applicable	

Table 2. 18 WorkoutInterface

2.1.4.3 WorkoutSummaryInterface

Class Type	Boundary Class	
Responsibility	This interface is for user to view the summary of workout that just finished.	
Attributes	**Attribures Name**	**Attributes Type**
	calories duration	Int Date
Methods	**Methods Name**	**Description**
	Not applicable	Not applicable

Algorithm	Not applicable

Table 2. 19 WorkoutSummaryInterface

2.1.4.4 WorkoutController

Class Type	Controller Class	
Responsibility	This controller is to receive and process the data of workout interface.	
Attributes	**Attribures Name**	**Attributes Type**
	WorkoutType startdate enddate duration calories	String Date Date Date Int
Methods	**Methods Name**	**Description**
	startstoptimer()	Begin and stop the workout
	resettimer()	Reset the time of workout
	finishworkout()	End the workout.
Algorithm	**startstoptimer()**	

	BEGIN
	
	IF startstoptimer() is called
	
	IF (!running && !started)
	
	THEN Start workout
	
	ELSE
	
	THEN Stop workout
	
	END
	
	resettimer()
	
	BEGIN
	
	IF resettimer() is called
	
	EXECUTE setBase()
	
	DISPLAY time clock TO 0:00
	
	END
	
	finishworkout()

	BEGIN
	IF startstoptimer() is called
	IF (!running)
	THEN Finish Workout
	Calculate duration, calories
	END

Table 2. 20 WorkoutController

2.1.4.5 WorkoutModel

Class Type	Model Class	
Responsibility	This model class store all workout details into database	
Attributes	**Attribures Name**	**Attributes Type**
	Not Applicable	Not Applicable
Methods	**Methods Name**	**Description**
	Not Applicable	Not Applicable
Algorithm	Not Applicable	

Table 2. 21 WorkoutModel

2.1.5 ManageWorkoutCheck-in

2.1.5.1 WorkoutCheck-inInterface

Class Type	Boundary Class	
Responsibility	This interface allows user to view the workout check-in that they already workout.	
Attributes	**Attribures Name**	**Attributes Type**
	Not Applicable	Not Applicable
Methods	**Methods Name**	**Description**
	Not Applicable	Not Applicable
Algorithm	Not Applicable	

Table 2. 22 WorkoutCheck-inInterface

2.1.5.2 WorkoutCheck-inController

Class Type	Controller Class
Responsibility	This controller is to receive and process the data of Workout Check-in interface.

Attributes	**Attribures Name**	**Attributes Type**
	duration WorkoutType calories	Date String Int
Methods	**Methods Name**	**Description**
	populateworkout()	Allow application to get workout Check-in data

Algorithm	**populateworkout()**
	
	BEGIN
	
	IF (click= “Home”)
	
	EXECUTE getCurrentUser()
	
	Retreive the workout check-in details from WorkoutCheck-inModel
	
	populate()
	
	END	

Table 2. 23 WorkoutCheck-inController

2.1.5.3 WorkoutCheck-inModel

Class Type	Model Class	
Responsibility	This model class retreive workout details from database.	
Attributes	**Attribures Name**	**Attributes Type**
	Not Applicable	Not Applicable
Methods	**Methods Name**	**Description**
	Not Applicable	Not Applicable
Algorithm	Not Applicable	

Table 2. 24 WorkoutCheck-inModel

2.1.6 ManageProfile

2.1.6.1 ProfileInterface

Class Type	Boundary Class	
Responsibility	This interface display the user profile details.	
Attributes	**Attribures Name**	**Attributes Type**
	username height weight	String Int Int
Methods	**Methods Name**	**Description**
	Not Applicable	Not Applicable
Algorithm	Not Applicable	

Table 2. 25 ProfileInterface

2.1.6.2 EditProfileInterface

Class Type	Boundary Class	
Responsibility	This interface allows user to edit their profile details	
Attributes	**Attribures Name**	**Attributes Type**

	username	String
	password	String
	firstname	String
	lastname	String
	email	String
	height	Int
	weight	Int
	age	Int
Methods	**Methods Name**	**Description**
	Not Applicable	Not Applicable
Algorithm	Not Applicable	

Table 2. 26 EditProfileInterface

2.1.6.3 ProfileController

Class Type	Controller Class
Responsibility	This controller is to receive and process the data of profile details.

Attributes	**Attribures Name**	**Attributes Type**
	reg_et_username	String
	reg_et_password	String
	firstname	String
	lastname	String
	email	String
	height	Int
	weight	Int
	age	Int
Methods	**Methods Name**	**Description**
	update()	Update the edited profile details

Algorithm	**update()**
	BEGIN
	IF (click = “Edit” icon)
	THEN RETURN to “Edit Profile” interface
	ENTER username	

	ENTER password ENTER firstname ENTER lastname ENTER email ENTER height ENTER weight ENTER age Send username, password, firstname, lastname, email, height , weight and age to UserModel STORE username, password, firstname, lastname, email, height , weight and age RETRIEVE all data from UserModel DISPLAY profile details in “Profile” Interface END

Table 2. 27 ProfileController

2.2 DATA DICTIONARY

2.2.1 Data dictionary of Users

Field Name	Description	Data Type	Constraints
username	Username	VARCHAR (255)	PK
password	Password	VARCHAR (255)	
firstname	First name	VARCHAR (255)	
lastname	Last name	VARCHAR (255)	
height	Height	Int	
weight	Weight	Int	
email	Email address	VARCHAR (255)	
age	Age	Int	

Table 2. 28 Data dictionary of Users

2.2.2 Data Dictionary for Fitness

Field Name	Description	Data Type	Constraints
FitnessID	Fitness video ID	Int	PK
VideoVIew	Fitness video	VARBINARY(MAX)	

Table 2. 29 Data Dictionary for Fitness

2.2.3 Data Dictionary for Workout

Field Name	Description	Data Type	Constraints
objectId	workoutId	VARCHAR (255)	PK
username	Username	VARCHAR (255)	
WorkoutType	Type of workout	VARCHAR (255)	
startdate	Time and date of start workout	Date	
enddate	Time and date of end workout	Date	
duration	Duration of workout done	Date	

Table 2. 30 Data Dictionary for Workout

2.2.4 Data Dictionary for Workout Check-in

Field Name	Description	Data Type	Constraints
objectId	workoutId	VARCHAR (255)	PK
duration	Duration of workout done	Date	
WorkoutType	Type of workout	VARCHAR (255)	
calories	Calories burnt from workout	Int	

Table 2. 31 Data Dictionary for Workout Check-in

APPENDIX C TESTING REPORT

No.	Module	Activities	Status		Comments
			Yes	No	
1.	Manage Register	User register	✓		
2.		User login	✓		
3.	Manage Fitness Exercise	Select Fitness video	✓		
4.		Play fitness video	✓		
5.		Pause fitness video	✓		
6.		Stop video fitness	✓		
7.	Manage Workout	Select type of workouts	✓		
8.		Start Workout	✓		
9.		Stop Workout	✓		
10.		Reset Workout	✓		
11.		Finish Workout	✓		
12.		Display workout summary	✓		
13.	Manage Workout Check-in	Record workout check-in	✓		

14..		Record duration of workout	✓		
15.		Record calories burned of workout	✓		
16.		Record type of workout finish	✓		
17.	Manage profile	Edit profile details	✓		
18.		View profile details	✓		
19.		Log out	✓		

This test has been performed by:

Name : Kong Kei

Signature : 

Date : 4/1/2023

No.	Module	Activities	Status		Comments
			Yes	No	
1.	Manage Register	User register	✓		
2.		User login	✓		
3.	Manage Fitness Exercise	Select Fitness video	✓		
4.		Play fitness video	✓		
5.		Pause fitness video	✓		
6.		Stop video fitness	✓		
7.	Manage Workout	Select type of workouts	✓		
8.		Start Workout	✓		
9.		Stop Workout	✓		
10.		Reset Workout	✓		
11.		Finish Workout	✓		
12.		Display workout summary	✓		
13.	Manage Workout Check-in	Record workout check-in	✓		

14..		Record duration of workout	✓		
15.		Record calories burned of workout	✓		
16.		Record type of workout finish	✓		
17.	Manage profile	Edit profile details	✓		
18.		View profile details	✓		
19.		Log out	✓		

This test has been performed by:

Name : Ang Suzanne

Signature : 

Date : 4/1/2023

No.	Module	Activities	Status		Comments
			Yes	No	
1.	Manage Register	User register	✓		
2.		User login	✓		
3.	Manage Fitness Exercise	Select Fitness video	✓		
4.		Play fitness video	✓		
5.		Pause fitness video	✓		
6.		Stop video fitness	✓		
7.	Manage Workout	Select type of workouts	✓		
8.		Start Workout	✓		
9.		Stop Workout	✓		
10.		Reset Workout	✓		
11.		Finish Workout	✓		
12.		Display workout summary	✓		
13.	Manage Workout Check-in	Record workout check-in	✓		
14..		Record duration of workout	✓		

15.		Record calories burned of workout	✓		
16.		Record type of workout finish	✓		
17.	Manage profile	Edit profile details	✓		
18.		View profile details	✓		
19.		Log out	✓		

This test has been performed by:

Name : Koh Huey Min

Signature : KHM.

Date : 6/1/2023.

No.	Module	Activities	Status		Comments
			Yes	No	
1.	Manage Register	User register	✓		
2.		User login	✓		
3.	Manage Fitness Exercise	Select Fitness video	✓		
4.		Play fitness video	✓		
5.		Pause fitness video	✓		
6.		Stop video fitness	✓		
7.	Manage Workout	Select type of workouts	✓		
8.		Start Workout	✓		
9.		Stop Workout	✓		
10.		Reset Workout	✓		
11.		Finish Workout	✓		
12.		Display workout summary	✓		
13.	Manage Workout Check-in	Record workout check-in	✓		
14..		Record duration of workout	✓		

15.		Record calories burned of workout	✓		
16.		Record type of workout finish	✓		
17.	Manage profile	Edit profile details	✓		
18.		View profile details	✓		
19.		Log out	✓		

This test has been performed by:

Name : Koh Soon Kiat

Signature : 許順杰

Date : 6/1/2023.

No.	Module	Activities	Status		Comments
			Yes	No	
1.	Manage Register	User register	✓		
2.		User login	✓		
3.	Manage Fitness Exercise	Select Fitness video	✓		
4.		Play fitness video	✓		
5.		Pause fitness video	✓		
6.		Stop video fitness	✓		
7.	Manage Workout	Select type of workouts	✓		
8.		Start Workout	✓		
9.		Stop Workout	✓		
10.		Reset Workout	✓		
11.		Finish Workout	✓		
12.		Display workout summary	✓		
13.	Manage Workout Check-in	Record workout check-in	✓		
14..		Record duration of workout	✓		

15.		Record calories burned of workout	✓		
16.		Record type of workout finish	✓		
17.	Manage profile	Edit profile details	✓		
18.		View profile details	✓		
19.		Log out	✓		

This test has been performed by:

Name : YEO SIOK CHIN

Signature :

Date : 6/1/2023