A MOBILE APPLICATION OF DIET AND FITNESS

BY

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A REPORT

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It is hereby certified that **FOO WAI KIN** (ID No: **19ACB04430**) has completed this final year project/ dissertation/ thesis* entitled "**A MOBILE APPLICATION OF DIET AND FITNESS**" under the supervision of **DR CHAI MEEI TYNG** (Supervisor) from the Department of Computer Science, Faculty of Information and Communication Technology.

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I would like to express my deep and sincere gratitude to my supervisor, Dr Chai Meei Tyng and my moderator, Ts Dr Lim Seng Poh who have given me the golden opportunity to do this project on the topic “A Mobile Application of Diet and Fitness”. They have given me their guidance and advice through the stages of developing my project. I was a great honour to work under their guidance. I am grateful for what they have offered me. Again, a million thanks to my supervisor and moderator.

ABSTRACT

Health-related topic is the most essential issue concerned by most people. There are quite a lot of mobile applications which are related to health in the market. Users can launch the app at the touch of button. Health-related mobile application will be getting more and more essential in the future. However, most of the mobile applications that available in the market are mainly focusing on either diet or fitness. In this project, a mobile application of diet and fitness will be developed to improve the health condition of the users. Users can take advantage of diet and fitness features within this mobile application. By using this application, users can develop a healthy lifestyle by tracking their diet and learning some simple exercise.

In order to accomplish the goal of the application, there will be a diet tracking which allows users to record down their diet on a daily basis. Apart from this, a fitness feature will be implemented in the application that allows users to learn some basic workout. At the end of the project, a simple mobile application will be delivered so users can access to the application effortlessly.

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Chapter 1 Introduction

1.1 Problem Statement and Motivation

According to research, the World Health Organization (WHO) has indicated that the phenomenon of people who have obesity has greatly increased compared to those people who are underweight. In our daily life, it is very common to see someone who is overweight. Since 1975, the worldwide obesity rate has almost tripled and it is still increasing at an alarming rate right now. Even the statistic showed the problem of obesity, people are not aware of the severity of obesity. In year 2016, there are more than 1.9 billion of people were overweight. From these 1.9 billion of people, over 650 million of people had obesity. In year 2019, there are 38 million children who are below 5 years old were overweight.

Obesity and overweight can make huge impact to our health. People who have obesity will have higher possibility of developing numerous health issues. These health issues affect our body organs such as heart, kidney, lungs, blood vessels and bones. Affecting body organs consequence to deteriorate respiratory system, nervous system, cardiovascular system and other essential systems. Excess weight and obesity are major risk factors for several of chronic diseases including diabetes, cardiovascular disease, musculoskeletal disorders and even some cancers.

The motivation of this project is to reduce the main health issue which are obesity and overweight. The most effective way to achieve the goal is having a balanced diet and developed a regular exercise routine. However, most of the mobile applications available in the market are usually focusing on either diet feature or workout feature. In this project, a mobile application will be developed with the combination of diet feature and workout feature.

A health-related app is a mobile application that can be installed on smartphone. Most of the health-related apps were released on the iOS and Android platform. Users can use these app to get fit. For instance, running app allows user to track how far they have run, wellness app allows them to know information related to health and workout app allows people to learn workout.

According to the newer report, the health-related app market is having a steady growth, there are more than 300,000 health apps in the app market, it is almost doubled compared to past few years. Today, there are more digital technologies and wearable device integrated to people daily lives. Those were integrated with powerful and useful features that can allow people to monitor their health condition.

The most common wearable device nowadays is smartwatch. Besides the primary function of watch, which is telling time, smartwatch can monitor heart rate, blood pressure and even tracking sleep. Undoubtedly, health-related apps will continue to trend upwards in the future.

1.1.1 Obesity and Overweight

Obesity and overweight can affect our health severely as they are defined as the excessive fat accumulation of a person. In fact, there are different methods to measure the problem of obesity and overweight between children and adults.

The standard measurement to determine the obesity and overweight of children should consider the age of the children. Most of the people do not have the knowledge of what obesity and overweight are, the World Health Organization (WHO) has a standard definition of obesity and overweight by body mass index (BMI). Body mass index is a method to measure the body fat of an adult by using his or her height and weight.

	Overweight	**Obesity**
Body Mass Index	≥ 25	≥ 30

Table 1-1 The Body Mass Index of Overweight and Obesity for Adult

According to table 1.1, people who is overweight will have a BMI greater than or equal to 25, while people who have obesity will have a BMI greater than or equal to 30. By using BMI, it is powerful enough to determine the measure of obesity and overweight without the consideration of both sexes and ages of adults.

1.1.2 The Causes of Obesity and Overweight

The problem of obesity and overweight are not existed on people in a day, it is related to our daily routine. One of the most common causes is having poor diet. People who are working in the office will usually have their lunch at the nearby restaurant and some will even choose fast food as their lunch in order to save time. However, with this diet routine, they may not be able to control their calories intake; as a consequence, it will have a cumulative effect which is obesity on one's body. Moreover, some people enjoy drinking carbonated beverages such as 100 plus, coke , Coca-Cola, Fanta and others. For those people who often consume carbonated beverages, their weight will be increased sharply. This is because the carbonated beverages are high in sugars, meaning to say the carbonated beverages are high-calories drinks. Consuming too many calories is considered as unbalanced diet which will drive to obesity.

Another cause for obesity is lack of exercise. Not only consuming too many calories will cause obesity but burning too few calories also can cause obesity. Nowadays, people are unlikely to exercise regularly because they think exercise is time-consuming activity. They would prefer to take good rest rather than exercise during leisure time. Also, people are living in the era of technology, they all are surrounding with technologies and it is very common for everyone including children to have their own smartphones. Without controlling the time for children to use the smartphone, they may develop a bad habit of smartphone addiction. This can be a reason why children nowadays seldom exercise.

Last but not least, changes of physical activity patterns like the sedentary nature of working form, mode of transportation and urbanization will affect one's health condition and the most common symptom is obesity. Some of the people who are working in office spending 8 hours sitting in front of the computer to complete their job. This working form has significantly reduced the physical activity level of the person and it will also reduce the calories burn of the person.

1.1.3 The Effects of Obesity and Overweight

Obesity and overweight can make huge impact to our health. People who have obesity will have higher possibility of developing numerous health issues. These health issues affect our body organs such as heart, kidney, lungs, blood vessels and bones. Affecting body organs consequence to deteriorate respiratory system, nervous system, cardiovascular system and other essential systems. Excess weight and obesity are major risk factors for several of chronic diseases including diabetes, cardiovascular disease, musculoskeletal disorders and even some cancers.

People who are obese have higher risk of developing type 2 diabetes. This is because obesity can cause the increasing of fatty acids and inflammation, it will make the body resistant to insulin and lead to high level of blood sugar. Moreover, obesity leads to high blood pressure which can cause less blood from flowing to the brain. As a result, this will obviously increase the risk of stroke.

People living with obesity may lead to cardiovascular diseases which is mainly heart attack. Heart attack is a severe disease which leading to death. Obese people are more likely to have musculoskeletal pain. Those who suffer from this disease may affect their normal lifestyle. If this kind of people do not make any changes and concern on their routine, these diseases can even cause cancer in their body so it will be too late to notice the seriousness of the matter.

In conclude, obesity and overweight do not bring any positive effects to people, but it brings several preventable negative consequences which is harmful to life.

1.2 Objectives

In this project, the main objective is to develop a diet and fitness mobile application by integrating the diet app with fitness app. The sub-objective is to develop food log feature and statistic feature, then integrate them to the app. In the app, there are essential modules which are calorie and macronutrients calculation module, workout module, food log module and statistic module. All of these modules are important to users who would like to develop a healthy lifestyle. They can record down every meal they have in a day. Most basic workouts are contained in the app. They can choose any of the available workouts in the option bar. Those workouts enable users to do exercises at home without any equipment.

The app will be designed as simple as possible. People can access to it effortlessly even without a proper tutorial as keeping the app simple is an efficient way to keep their interest to use it. The proposed simple app would encourage users to develop a healthy lifestyle by having a balanced diet and regular exercise routine.

1.3 Project Scope and Direction

It is very common people nowadays will have their own smartphone. For this project, a diet and fitness mobile application for smartphone will be developed. An app for Android based system will be delivered at the end of the project. This app will provide the users some tips to have a balanced diet and propose some ideas on exercise to them. The mobile application will be designed as simple as possible in order to maintain users' interest when using it. There will be four main modules in this mobile application which are calorie and macronutrients calculation module, food log module, workout module and statistic module.

For the calorie and macronutrients calculation module, the system will calculate the calorie and macronutrients needed for a day based on the users' information, then a daily calorie intake plan will be generated. Users can utilize the caloric intake plan as daily quota of calorie intake. With the food log feature, it can allow users to record the calorie intake by adding the meal from food library they have in a day. It will remind users once the calorie intake is exceeded. Moreover, users can learn some simple and basic workout by utilizing the workout feature. For example, there will be Sweaty Jump Workout, Full Body Workout, Hiit Workout and Build Muscle Workout. The details of the workouts will be displayed in the application. Lastly, users can generate a graph report on based on their food log, so they can refer back how much calories and macronutrients they have consumed in a day.

1.4 Contribution

There are many health-related mobile applications in the market letting people to download and use. After reviewing the apps, most of the apps can let users to calculate the calorie, allocate macronutrients distribution and record food log. According to survey, users preferred to have workout feature when they are using a diet app. Besides, there are many apps which allow users to learn how to exercise but do not propose them a proper workout plan, randomly choosing an exercise to do will not make great impact on health. Moreover, people who are using a fitness app may not have an idea on how to develop exercise routine especially for those who are totally new to start workout.

The proposed app in this project will solve the above-mentioned issue. There will be diet feature and fitness feature within the app, users can do food log in the app. Also, there will be some common workout sets within the app. The workout sets are suitable for most user, users can choose among the different sets of workouts and learn them. All the workout sets are from professionals. In order to achieve the maximum healthy lifestyle, diet and exercise are both essential. The innovation of this project is the features of diet and exercise will be integrated into an app, so the users can utilize the features for both diet and exercise without switching between diet app and fitness app, this will generally maintain their desire to keep on using this app.

1.5 Report Organization

This report consisted of 7 chapters: Chapter 1 Introduction, Chapter 2 Literature Review, Chapter 3 System Methodology, Chapter 4 System Design, Chapter 5 System Implementation, Chapter 6 System Evaluation and Discussion, Chapter 7 Conclusion and Recommendation. The first chapter is mainly about the introduction of this project which includes problem statement and motivation, objectives, project scope, contributions and report organization. For the second chapter, the literature was carried out on three existing health-related mobile applications in the market in order to analyse the strengths and weaknesses of each mobile applications. The third chapter is about the overall design of the system. Moreover, the fourth chapter is the details of the design of the system. The fifth chapter is discussing the details on how to implement the design of the whole system. The sixth chapter is regarding to the evaluation and discussion over the developed application. The last chapter is reporting the project.

Chapter 2 Literature Review

2.1 Review of the Technologies

2.1.1 Hardware Platform

Description	Specifications
Model	Asus S510U series
Processor	Intel® Core(TM) i7-7500U
Operating System	Windows 10
Graphic	NVIDIA GeForce 940MX
Hard Drive (ROM)	128 GB SSD
Memory (RAM)	12 GB

Table 2-1-1-1 Specifications of laptop

2.1.2 Database

Google's Firebase is a platform for developing mobile and web applications. It has real time database called Firebase Realtime Database which is a cloud-hosted NoSQL database. It allows developers to achieve real-time data storage and data synchronization between users.

2.1.3 Programming Language and Platform

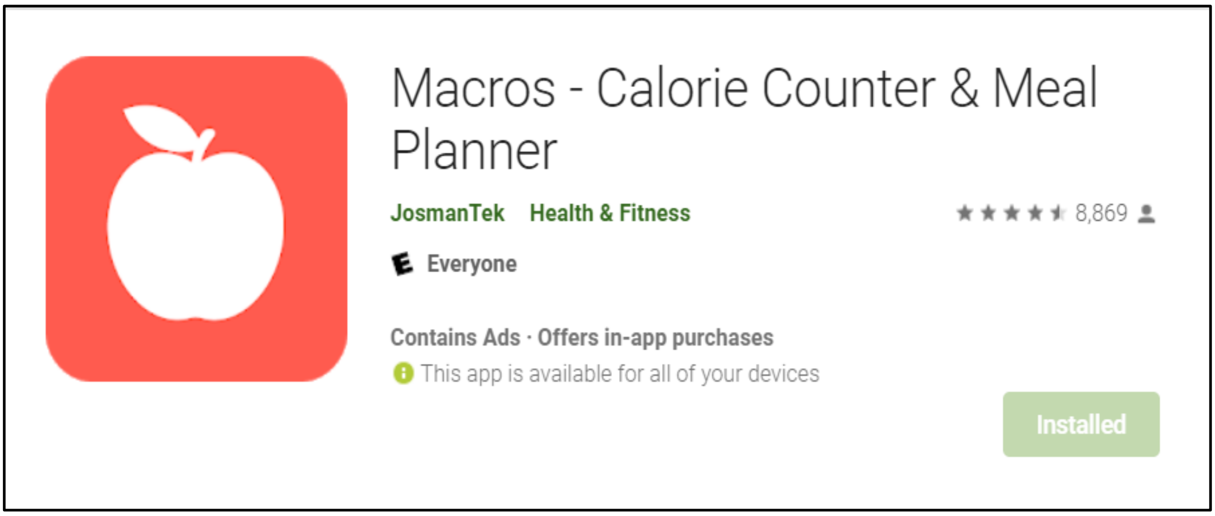
Dart is a programming language developed by Google. It can be used for the development of desktop, server, web and mobile applications. The platform of Flutter was required to develop the applications with Dart language. Moreover, Dart is easier to learn as it is really flexible. Using Dart language can avoid the need of coding the separate declarative layout like xml as Dart's declarative and programmatic layout is much easier to comprehend and visualize. Apart from this, it is easy and timesaving to code a better UI as Flutter UI is just a tree that containing stateful and stateless widgets. Taking the advantage of Flutter's Hot Reload, every single piece of changes in source code to run the Dart virtual machine is instant which means the result of each change was showed instantly without running the whole code instead.

2.1.4 Summary of the Technologies Review

The hardware that was introduced previously is the laptop that used to develop the system. Moreover, Firebase Realtime Database and Dart programming language is suitable to develop this project.

2.2 Review of the Existing Applications

2.2.1 Macros – Calorie Counter & Meal Planner



Macros - Calorie Counter & Meal Planner

JosmanTek Health & Fitness

★★★★★ 8,869

Everyone

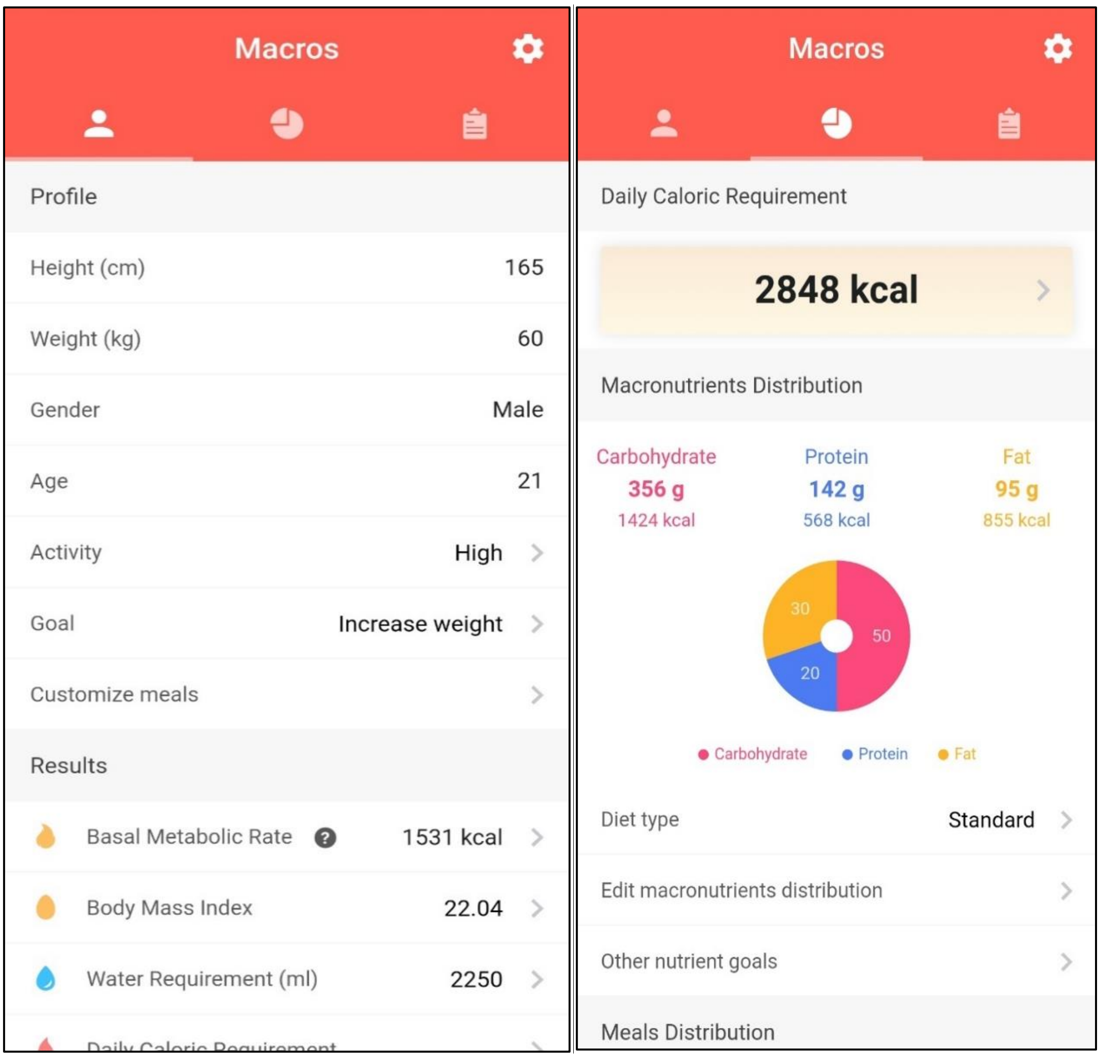
Contains Ads · Offers in-app purchases

This app is available for all of your devices

Figure 2-2-1-1 Macros Mobile Application

Macros is a mobile application that can be downloaded from Google Play Store and Apple App Store. This mobile application is totally free for normal user and it is a health and fitness related mobile application. With this mobile application, the user can use it as a calorie counter to calculate the calorie that a person needs, and it can be used as a meal planner which allows users plan their meal properly. The developer introduced this mobile application to let users to have a balance diet by calculating the calorie for every meal in order to reduce the problem of obesity and overweight. People would like to have a balanced diet shall utilize this mobile application to plan their diet properly and keep track of their calorie intake.

There are several main features in this mobile application. Users can calculate their caloric need and their macronutrients based on their weight and height. They can choose their goal whether they would like to lose weight, maintain weight it or build muscle. Moreover, they can access the public food library or create personal food library to plan their diet.



Macros

Profile

Height (cm) 165

Weight (kg) 60

Gender Male

Age 21

Activity High

Goal Increase weight

Customize meals

Results

Basal Metabolic Rate 1531 kcal

Body Mass Index 22.04

Water Requirement (ml) 2250

Daily Caloric Requirement

Macros

Daily Caloric Requirement

2848 kcal

Macronutrients Distribution

Carbohydrate	Protein	Fat
356 g	142 g	95 g
1424 kcal	568 kcal	855 kcal

Diet type Standard

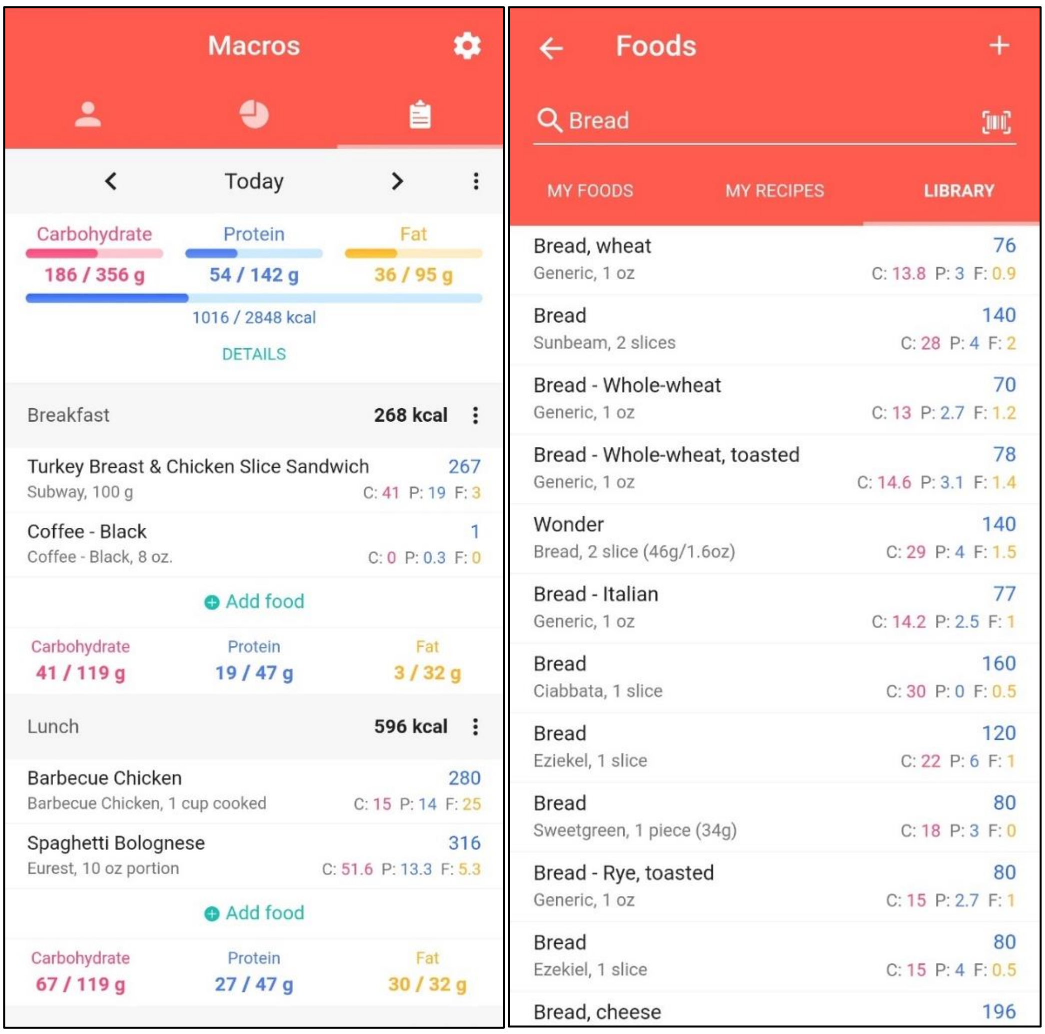
Edit macronutrients distribution

Other nutrient goals

Meals Distribution

Figure 2-2-1-2 Screenshots of Macros

People can calculate their calorie needs and macronutrients. Macronutrients can be divided into 3 main classes which are carbohydrate, protein and fat. These three classes of nutrients provide calories that we required to maintain our body functions and provide people the main energy to carry out all the activities in a day. Basically, people do not really understand about the calculation of macronutrients, so they can rely on this mobile application. They are required to input their height, weight, gender, age, activity level and goal when they start the apps. After entering the information, the apps will calculate the daily caloric requirement and macronutrients distribution, assign the standard diet type for the user. For those advanced users, they can choose to have different diet type like low fat diet, high protein diet, ketogenic diet and they can even customize their diet type.



Carbohydrate	Protein	Fat
186 / 356 g	54 / 142 g	36 / 95 g

1016 / 2848 kcal

Breakfast 268 kcal

Turkey Breast & Chicken Slice Sandwich 267
Subway, 100 g C: 41 P: 19 F: 3

Coffee - Black 1
Coffee - Black, 8 oz. C: 0 P: 0.3 F: 0

Carbohydrate	Protein	Fat
41 / 119 g	19 / 47 g	3 / 32 g

Lunch 596 kcal

Barbecue Chicken 280
Barbecue Chicken, 1 cup cooked C: 15 P: 14 F: 25

Spaghetti Bolognese 316
Eurest, 10 oz portion C: 51.6 P: 13.3 F: 5.3

Carbohydrate	Protein	Fat
67 / 119 g	27 / 47 g	30 / 32 g

Bread, wheat Generic, 1 oz	76 C: 13.8 P: 3 F: 0.9
Bread Sunbeam, 2 slices	140 C: 28 P: 4 F: 2
Bread - Whole-wheat Generic, 1 oz	70 C: 13 P: 2.7 F: 1.2
Bread - Whole-wheat, toasted Generic, 1 oz	78 C: 14.6 P: 3.1 F: 1.4
Wonder Bread, 2 slice (46g/1.6oz)	140 C: 29 P: 4 F: 1.5
Bread - Italian Generic, 1 oz	77 C: 14.2 P: 2.5 F: 1
Bread Ciabbata, 1 slice	160 C: 30 P: 0 F: 0.5
Bread Eziekel, 1 slice	120 C: 22 P: 6 F: 1
Bread Sweetgreen, 1 piece (34g)	80 C: 18 P: 3 F: 0
Bread - Rye, toasted Generic, 1 oz	80 C: 15 P: 2.7 F: 1
Bread Ezekiel, 1 slice	80 C: 15 P: 4 F: 0.5
Bread, cheese	196

Figure 2-2-1-3 Screenshot of Macros

The system will calculate the macronutrients distribution after users entering the information. Users can utilize the meal planner function to keep track of their calorie intake. The meal planner function enables the users to design their meal by "add food" function from the public food library. In case they could not find the food from the public food library, they can create a new food and add in to their personal food library. On the other hand, users can also record down what they have consumed for their breakfast, lunch, dinner and supper. The system will help the users to calculate the total macronutrients intake in a day and show it to users. This can inform users whether they have achieved their daily macronutrients target.

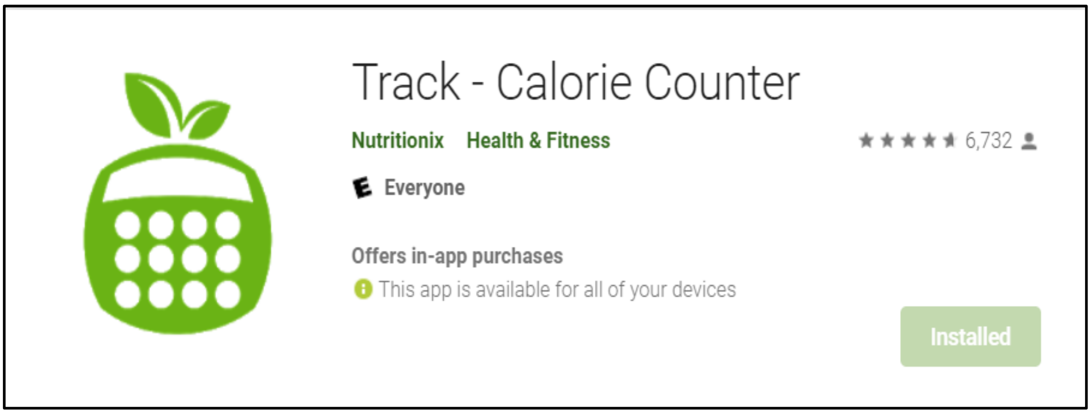
Although this mobile application can let users to keep track on their daily meal, but it has limitation to those users who want to follow a balanced diet since the apps only let the users to customize their meal. Users may not have knowledge on how to customize a balanced diet, they will find the app not useful at all. It would be better if the app can propose variety balanced diet plans for users to follow.

For the obese people, using this mobile application may not be able to achieve the maximum effect on losing weight. Controlling diet can overcome the problem of obesity and overweight, but with the help of exercise, it can drive significant weight loss. In this mobile application, it does not provide any features about exercise. Users may find it tedious if they need to use several apps to lose weight.

As a suggestion, a feature which can provide variety of diet plan can be developed. As an illustration, the developer can seek for nutritionists' advice to prepare some balanced diet plans based on different situation, so the developer can adopt it to develop a feature that is useful for users who do not have any idea on meal planning.

It is recommended to integrate an exercise feature into the mobile application as users would prefer to use only an application rather than use multiple applications. Developing a complete exercise feature will make the mobile application more useful to solve users' problems.

2.2.2 Track – Calorie Counter

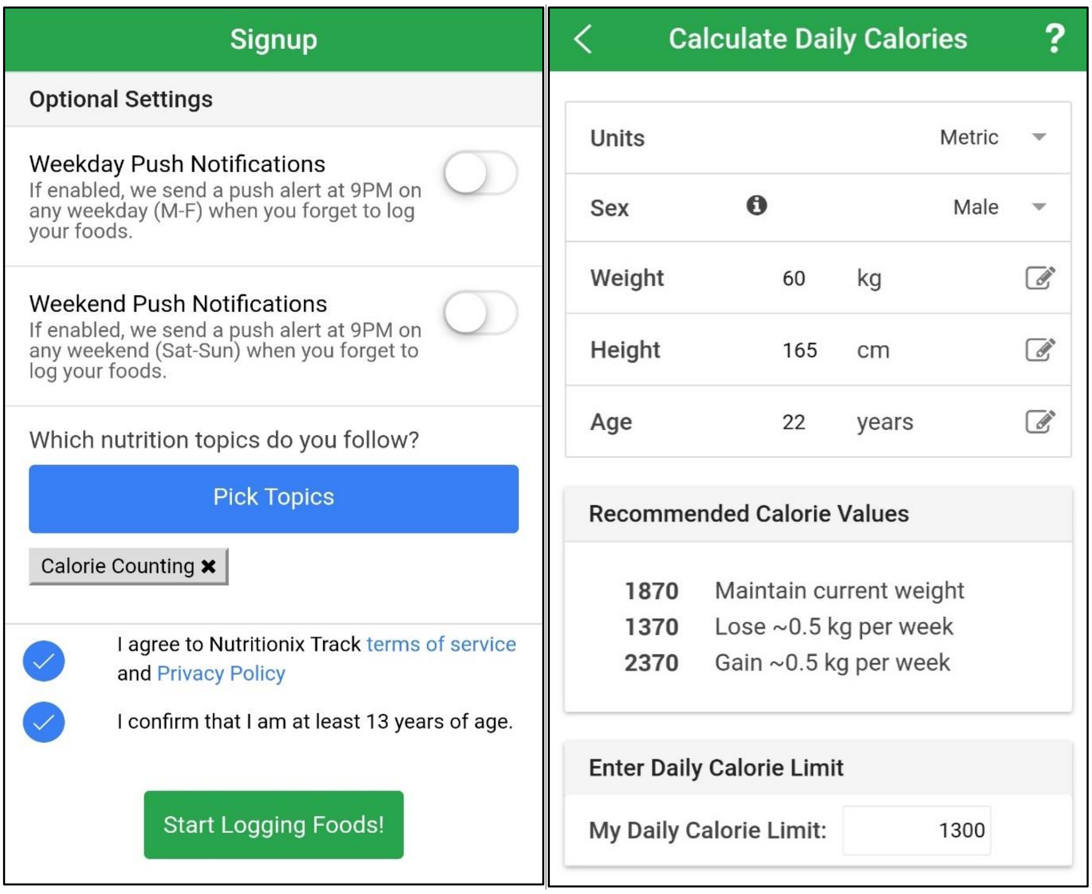


This app is available for all of your devices

Figure 2-2-2-1 Track Mobile Application

Track is a fitness tracking mobile application that can be downloaded from Google Play Store and Apple App Store. This app is developed by a team of registered dietitians and is maintained by them. With this app, users can track their food log as a daily habit in order to work towards their health goals. This mobile application makes the tracking process as simple as possible so that the users will find it convenient to use it. The development team introduced the app will be user-friendly since users just require spending about 60 seconds per day to complete their food log. The reason why users can log all their food as little as 60 seconds is because the development team has integrated the predictive search, state-of-the-art natural language processing technology and instant barcode scanner into the app.

By using this mobile application, users can track their food intake, nutrients intake, exercises, weight progress, calorie intake, macro goals and water intake. The database of this app offers more than 800 thousand of unique foods. It covers up to 95% of grocery items in the US and Canada. Besides, it has more than 760 US restaurant chain menus which allows users to track their food log at the touch of a button. They will update and put in more foods information in the database every day.



Signup

Optional Settings

Weekday Push Notifications ○
If enabled, we send a push alert at 9PM on any weekday (M-F) when you forget to log your foods.

Weekend Push Notifications ○
If enabled, we send a push alert at 9PM on any weekend (Sat-Sun) when you forget to log your foods.

Which nutrition topics do you follow?

Pick Topics

Calorie Counting ✖

☑ I agree to Nutritionix Track terms of service and Privacy Policy

☑ I confirm that I am at least 13 years of age.

Start Logging Foods!

Calculate Daily Calories

Units		Metric
Sex		Male
Weight	60	kg
Height	165	cm
Age	22	years

Recommended Calorie Values

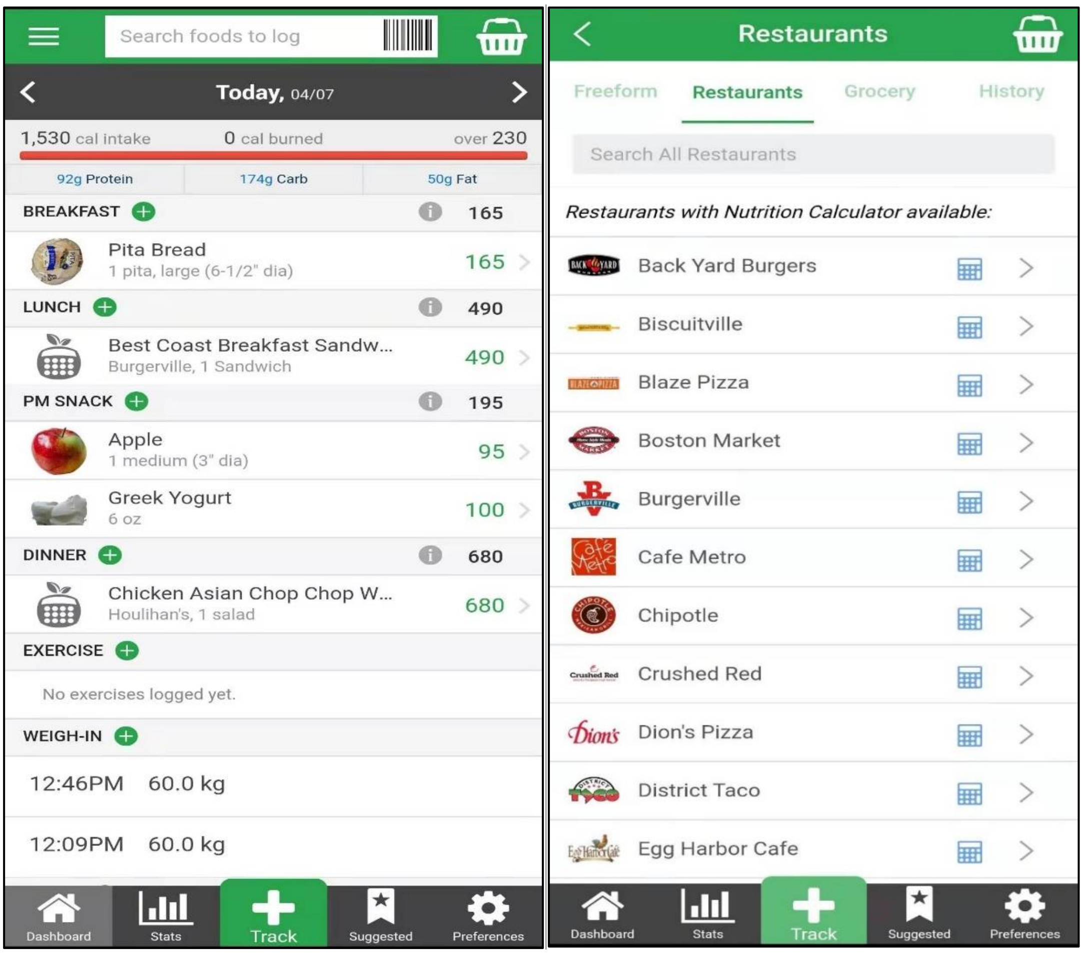
1870	Maintain current weight
1370	Lose ~0.5 kg per week
2370	Gain ~0.5 kg per week

Enter Daily Calorie Limit

My Daily Calorie Limit: 1300

Figure 2-2-2-2 Screenshots of Track

When users start the app, they are required to choose a nutrition topic based on the users' demand. For those users always forgot to record their food log, the system supports push notifications feature, they may switch on the feature to remind them. Then, they need to fill in their basic information such as gender, weight, height and age. The system will automatically calculate the recommended calorie values for the users, so the users do not need to be worried if they have insufficient knowledge on how to calculate the calorie intake. As an illustration, the system will provide 3 recommended calorie values to users after they have entered the basic information. The users can utilize the 3 suggestions to determine their daily calorie limit.



Search foods to log

Today, 04/07

1,530 cal intake 0 cal burned over 230

92g Protein 174g Carb 50g Fat

BREAKFAST	165
Pita Bread 1 pita, large (6-1/2" dia)	165
LUNCH	490
Best Coast Breakfast Sandw... Burgerville, 1 Sandwich	490
PM SNACK	195
Apple 1 medium (3" dia)	95
Greek Yogurt 6 oz	100
DINNER	680
Chicken Asian Chop Chop W... Houlihan's, 1 salad	680

EXERCISE

No exercises logged yet.

WEIGH-IN

12:46PM	60.0 kg
12:09PM	60.0 kg

Restaurants

Freeform Restaurants Grocery History

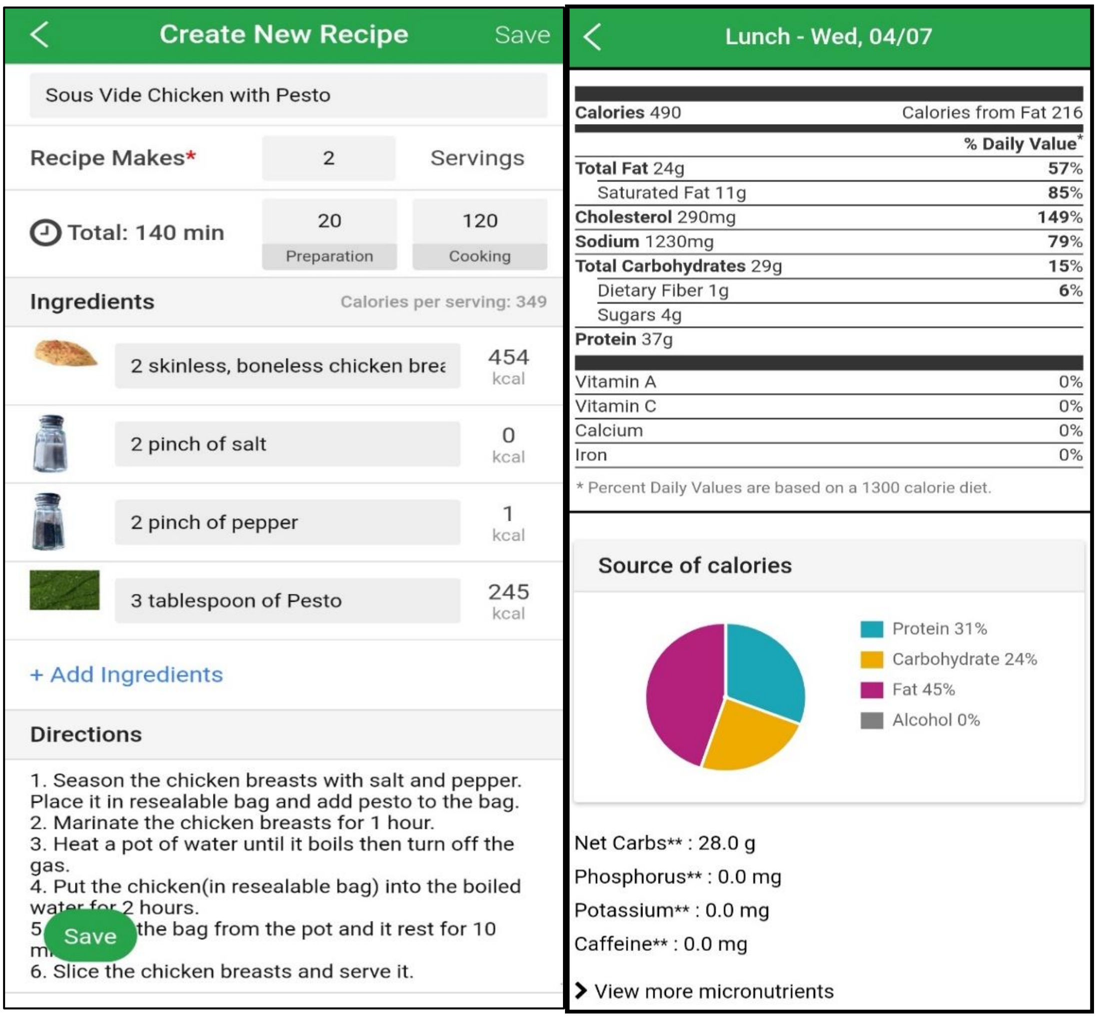
Search All Restaurants

Restaurants with Nutrition Calculator available:

- Back Yard Burgers
- Biscuitville
- Blaze Pizza
- Boston Market
- Burgerville
- Cafe Metro
- Chipotle
- Crushed Red
- Dion's Pizza
- District Taco
- Egg Harbor Cafe

Figure 2-2-2-3 Screenshots of Track

Users can add food to the food log by using the restaurant menu and grocery foods which provided in the app. All the restaurant's menu and grocery foods have their nutrition facts, this is really convenient for users to record what they have eaten for their breakfast, lunch and dinner. They do not to refers to any resources to check the nutrition fact of the food and add the food manually to their food log because adding food manually can be labour intensive and time-consuming. Users tend to do the food log in an easy and relax manner, so they will not give up easily when making food tracking process. After completing the food log, the app will indicate the users whether they have exceeded their calorie limit.



Sous Vide Chicken with Pesto

Recipe Makes* 2 Servings

Total: 140 min — 20 Preparation — 120 Cooking

Ingredients — Calories per serving: 349

2 skinless, boneless chicken brea	454 kcal
2 pinch of salt	0 kcal
2 pinch of pepper	1 kcal
3 tablespoon of Pesto	245 kcal

Directions

1. Season the chicken breasts with salt and pepper. Place it in resealable bag and add pesto to the bag.
2. Marinate the chicken breasts for 1 hour.
3. Heat a pot of water until it boils then turn off the gas.
4. Put the chicken(in resealable bag) into the boiled water for 2 hours.
5 the bag from the pot and it rest for 10 m
6. Slice the chicken breasts and serve it.

Calories 490	Calories from Fat 216
	% Daily Value*
Total Fat 24g	**57%**
Saturated Fat 11g	**85%**
Cholesterol 290mg	**149%**
Sodium 1230mg	**79%**
Total Carbohydrates 29g	**15%**
Dietary Fiber 1g	**6%**
Sugars 4g	
Protein 37g	
Vitamin A	0%
Vitamin C	0%
Calcium	0%
Iron	0%

* Percent Daily Values are based on a 1300 calorie diet.

Source of calories

Net Carbs** : 28.0 g
Phosphorus** : 0.0 mg
Potassium** : 0.0 mg
Caffeine** : 0.0 mg

Figure 2-2-2-4 Screenshots of Track

With this mobile application, users can create their custom recipes by filling in the preparation time, cooking time, ingredients and directions. The system will automatically calculate the calories per serving by the ingredients entered by users. This feature enables users saving a lot of time to complete the food log without doing research works. Apart from this, the users can keep track their food logging calendar. They can check back what they have consumed in the previous day. The nutrition statistic will be showed to the users, so they may be able to do adjustment on their diet.

Although the app provides powerful features, but it may not be useful for those people who required advice on losing weight. Of course, the people can list down everything they ate in a day, but still cannot solve the problem of obesity and overweight directly. Using this app could not be an effective way for people who want to cut down their weight.

Apart from this, only users from US can take the full advantage of the library of the restaurants’ menu and grocery food. Users from other country still need to do some research works and add the food manually to their food library, so they will find it cumbersome to spend time on research works.

To solve the obesity problem of people, counting calorie may not effective enough to them. If the apps can propose some simple diet plan for the people to follow based on their situation, it will be more attractive for them to use the app. Since the users not from US are not able to make use of the library of the restaurants’ menu and grocery food, I would recommend developing a sharing feature to allow users upload their food menu and share it to everyone, so users from different countries can utilize other’s food menu to do their food log.

2.2.3 Home Workout – No Equipment

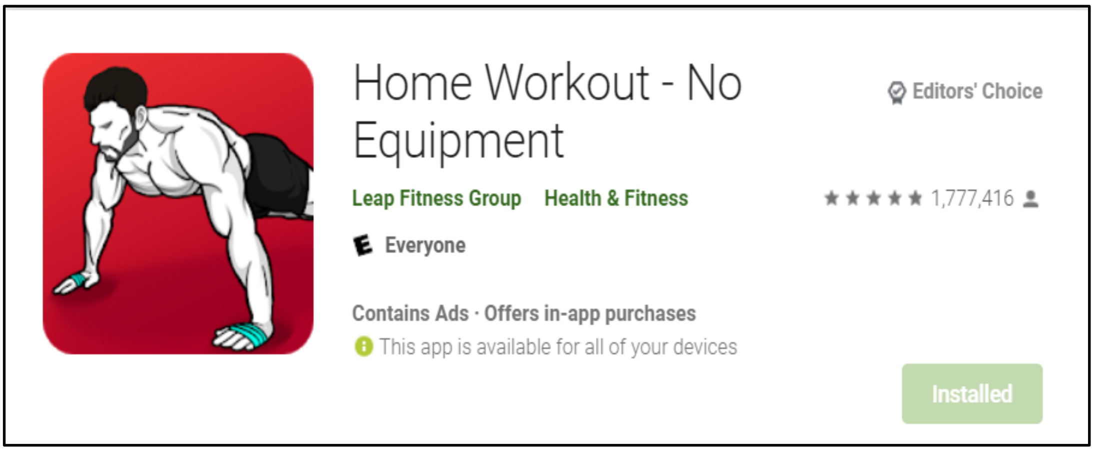
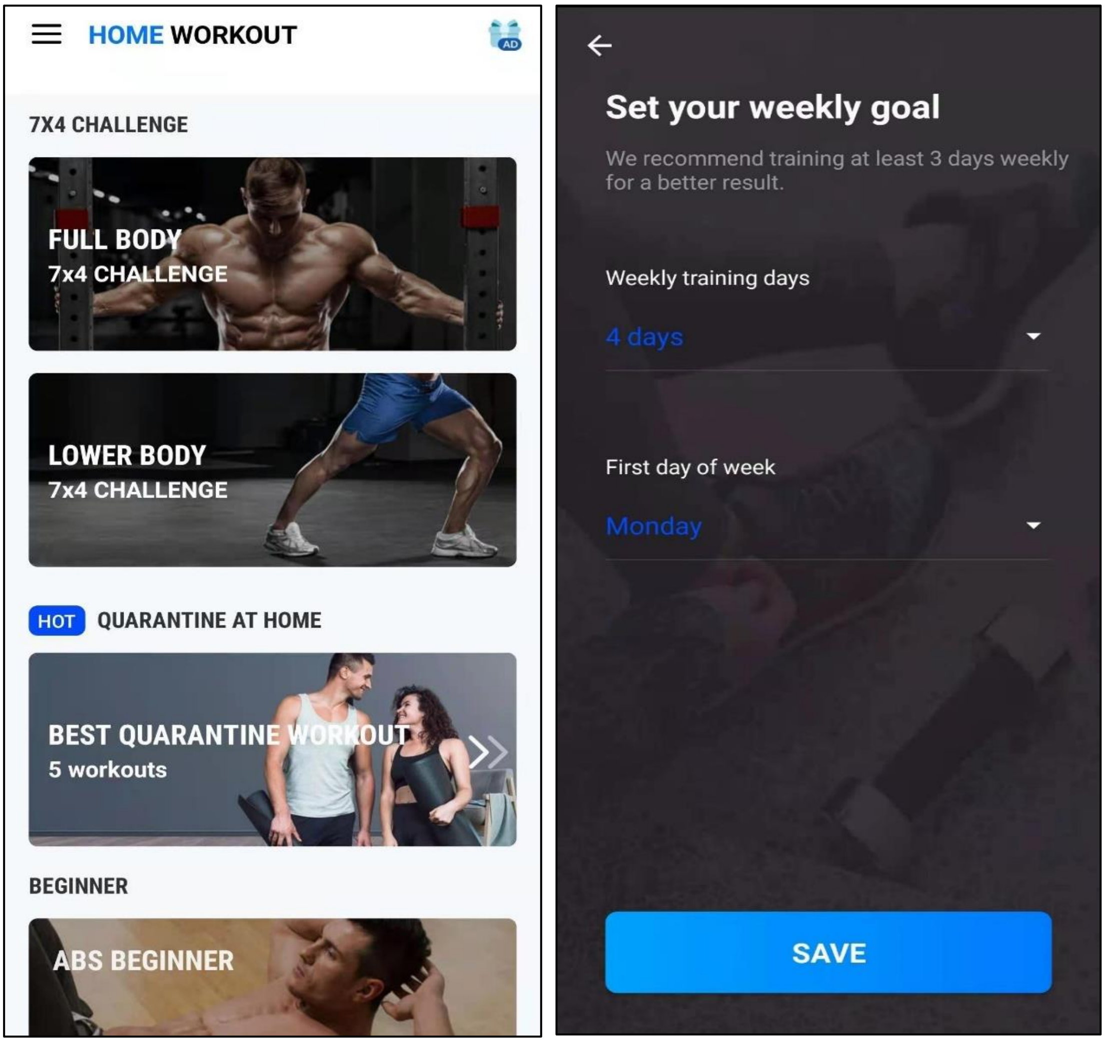

Home Workout - No Equipment
Editors' Choice
Leap Fitness Group
Health & Fitness
★★★★★ 1,777,416
Everyone
Contains Ads · Offers in-app purchases
This app is available for all of your devices
Installed

Figure 2-2-3-1 Home Workout Mobile Application

Home Workout is a mobile application which is available on Google Play Store and Apple App Store. People with no equipment but wish to do some workout at home can download this app from the stores. There are numerous workouts for all main muscle groups on this app so that users can have different daily workout routines to be done. It contains abs workout, chest workout, legs workout, arms workout and butt workout. All of the workouts are planned by trainers. Users may use this app if they do not want to go to gym, they just need to learn from the app without purchasing any equipment. To prevent users getting injury, warm-up exercise for pre-workout and stretching for post-workout are provided in the app. With the help of this app, users can perform the workout in a scientific way.

Also, there are several features for users to enjoy using this app. The app will automatically record the training progress once the users complete the workout. Users can set up workout reminder to remind them in case they forget to workout. There are videos and animation guide to be watched by users. Furthermore, chart is provided to track user weight trends and they can even share it with their friends on social media.



Set your weekly goal

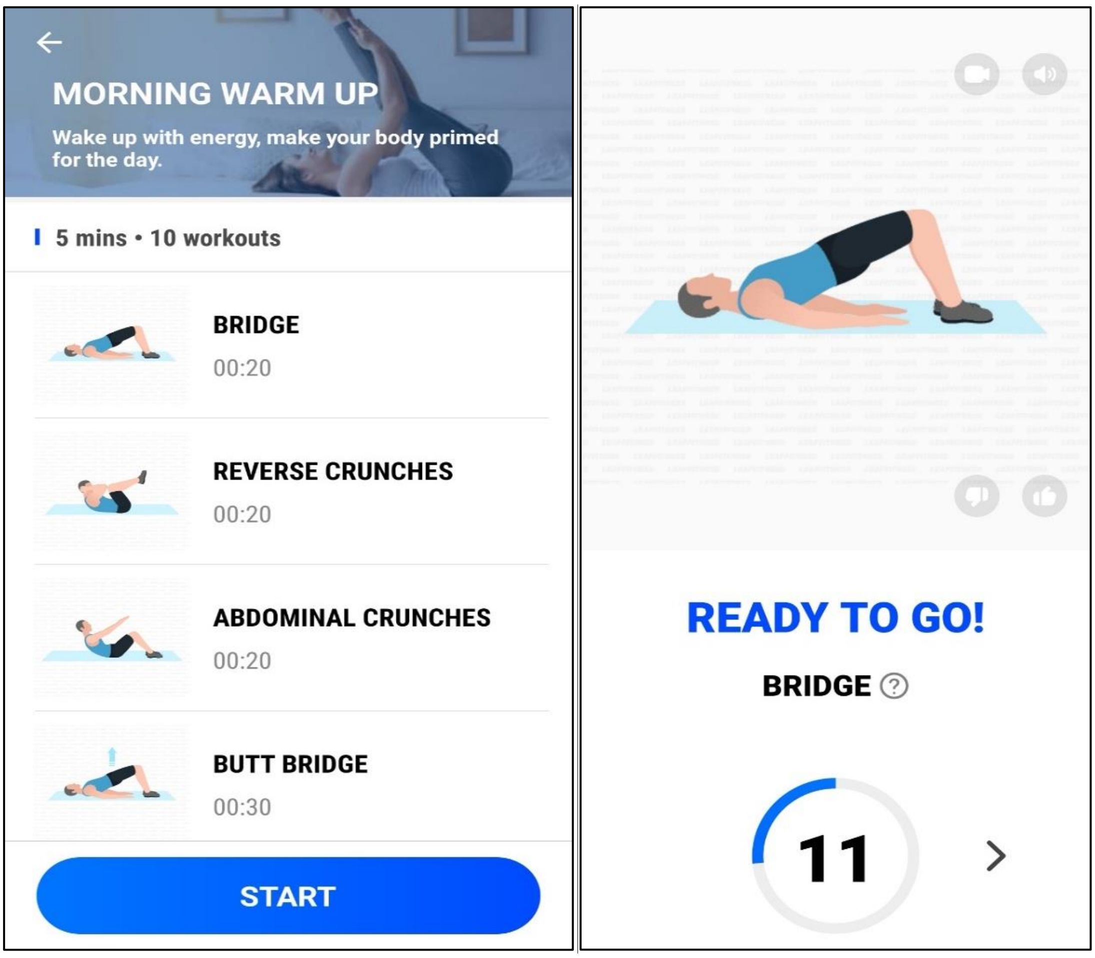
We recommend training at least 3 days weekly for a better result.

Weekly training days: 4 days

First day of week: Monday

Figure 2-2-3-2 Screenshots of Home Workout

Home Workout provides variety kinds of workouts such as fat burning workouts, Hiit workouts, push ups, squats, sit ups, plank, crunch, wall sit, jumping and others. For users who want to burn calories, they may choose fat burning workouts. If users want to have better body shape, they may try the Hiit workouts. It enables users to have fun on performing these workouts. However, it is challenging for users to maintain interest to workout. This app allows users setting up a weekly goal, so that they can achieve it and reach toward their goal.



MORNING WARM UP

Wake up with energy, make your body primed for the day.

5 mins • 10 workouts

BRIDGE 00:20

REVERSE CRUNCHES 00:20

ABDOMINAL CRUNCHES 00:20

BUTT BRIDGE 00:30

Figure 2-2-3-3 Screenshots of Home Workout

There are several workouts in each session. Each of the workout will be showed in the animation. By watching the animation, users are able to follow exactly from the animation. There is time duration for each workout, when users start the workout, the timer will start counting down. Then, it will proceed to next workout automatically until all workouts in the session has completed by users. Of course, there will be rest time for users to relax between each workout. The workouts have different levels to let users choose, so that they can choose the suitable level workout based on their ability. Users will have fun when using this app to do workout.

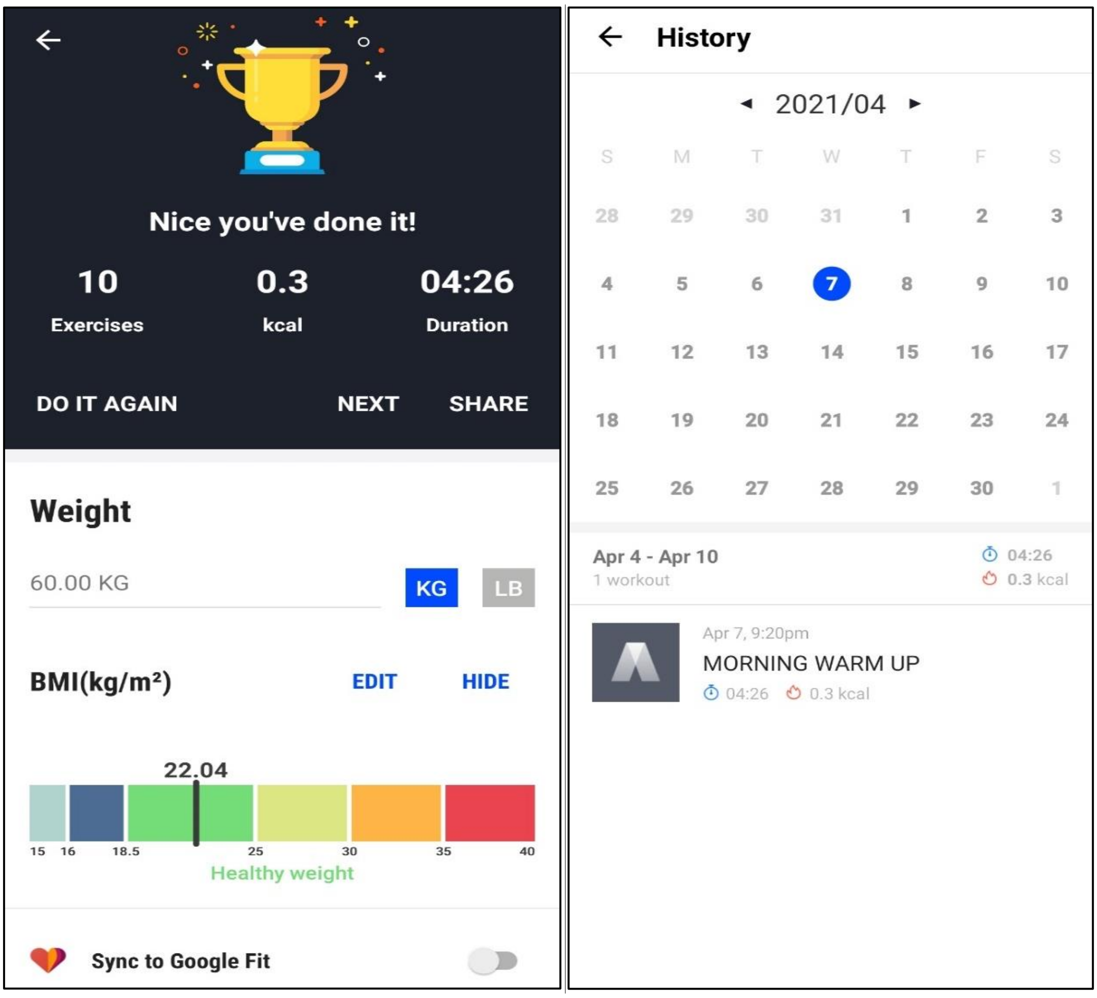


Figure 2-2-3-4 Screenshots of Home Workout

When the users complete all workout in a session, the app will indicate how many calories burned. They can even share it to their social media and invite others to use the app, so they will not be boring while doing workout. Users who use this app for few days or months can keep track on all the workouts they have done. They able to calculate the accumulate amount of exercise for further use.

People can use this Home Workout mobile application to learn and do some exercises at home. Although the app provides several workouts for user, but for those who do not have a proper direction on exercise, they may not be able to achieve the desired results for weight loss. Therefore, it is only useful to those people who have proper knowledge on weight loss. Moreover, exercise cannot drive significant weight loss. Meaning to say people only use this app may not be able to tackle the problem of obesity and overweight. Besides, diet is important too, but there is no feature about diet on this app.

It will be more desirable if the app can provide some professional advice on the workout plan. For instance, users' basic information such as gender, weight, height and goal are required when they start using the app first time, so the system can process the user's information to propose a pre-arranged workout plan which is suitable for him or her. Additionally, it is preferred to develop some features about diet into the mobile application since it acts as an essential role to achieve healthy lifestyle, so users can develop balanced diet and proper exercise routine by using only this app.

2.2.4 Summary of the Existing Applications

	Macros Mobile App	**Track Mobile App**	**Home Workout Mobile App**	**Proposed Mobile App**
Provide diet features	Yes.	Yes.	No.	Yes.
Provide exercise features	No.	No.	Yes.	Yes.

Table 2-2-4-1 Comparison of The Existing Apps and The Proposed App

Chapter 3 System Methodology

3.1 Methodology

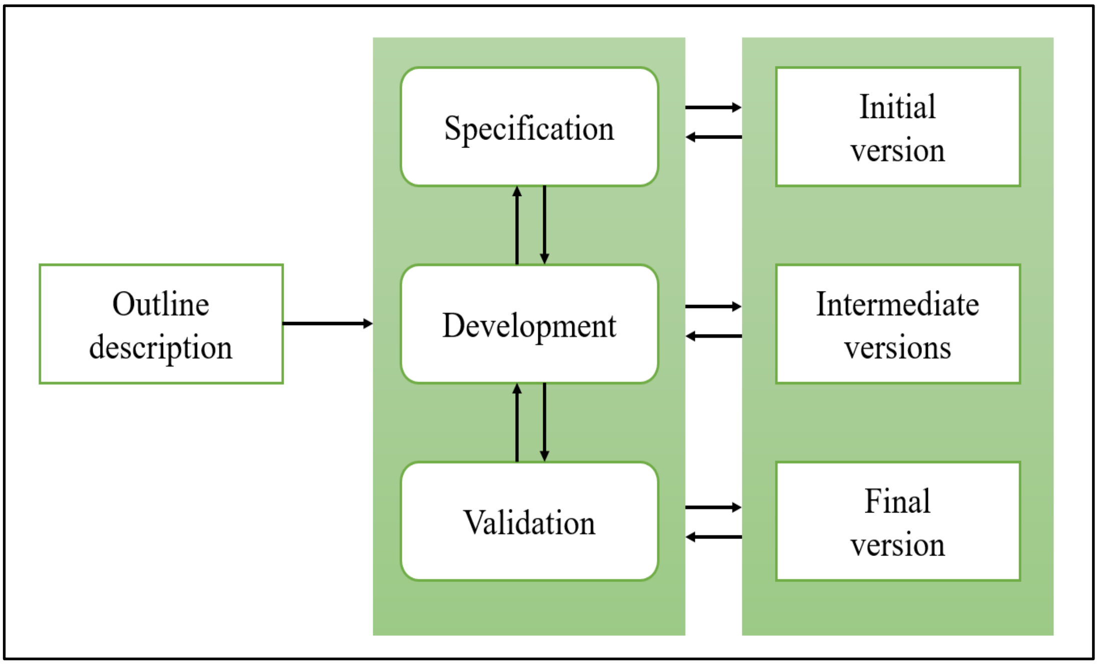


Figure 3-1-1 Agile Development Approach

For this project, the agile development approach was used to develop the app. The phases of specification, development and validation are interleaved. By using this approach, the initial version of the app was developed first once the specification, development and validation activities are done. Agile development approach will have minimal documentation as it more focuses on the development phase rather than the design phase. With this approach, specification, development and validation activities will be repeated multiple times, so several intermediate versions were developed. Then, the app will be evolved through several versions until the final version has been developed.

The reason of using agile development approach for this project is because the time to develop the app is limited, so this approach is more suitable to complete this project within schedule. Moreover, the approach is beneficial for the project as the app requires getting feedback from users in order to produce a better version of app.

3.1.1 Outline Description

In this phase, the documentation of this project was written. Since this project will take 2 semesters to accomplish, the details and the documentation of this project were identified.

3.1.2 Specification Phase

In this specification phase, the hardware and software used to complete this project were determined. Moreover, the system requirements specification is produced during this phase.

3.1.3 Development Phase

In this phase, the proposed modules in this project will be gradually developed. The coding of the mobile application will be written during this phase.

3.1.4 Validation Phase

During this phase, the developed modules will be tested whether it can function properly. This is mainly to evaluate the functionalities of the developed modules so that the developed modules can be further improved through several version in order to deliver a complete final prototype.

3.2 System Design Diagram

3.2.1 System Architecture Diagram

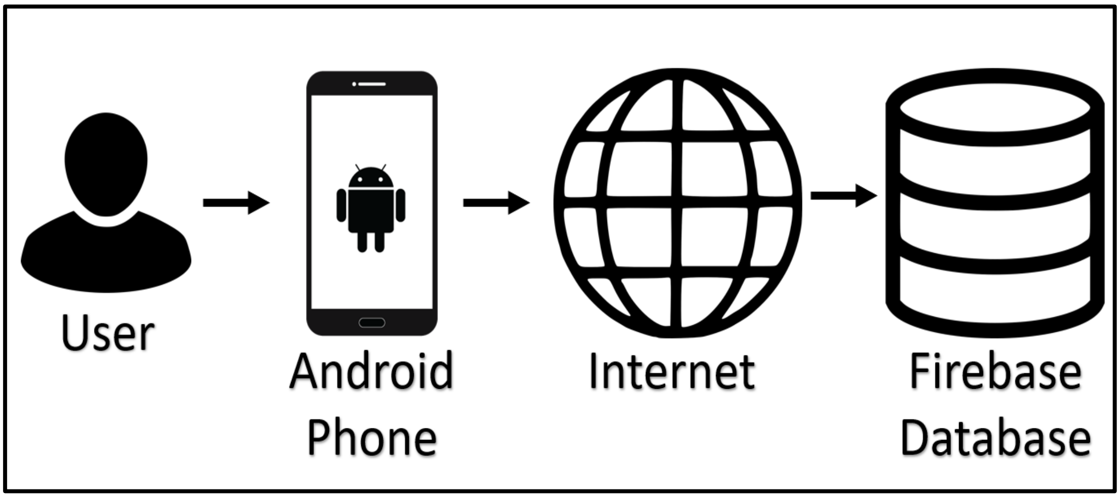


Figure 3-2-1-1 System Architecture Diagram

Figure 3-2-1-1 illustrates the system architecture of this project. The database server used in this project is Firebase Realtime Database. User can edit personal information. After user editing his or her information, the information will be saved and updated in firebase. The information stored in firebase can be retrieved so that user can view the workout video and do food log based on the food library provided.

3.2.2 Use Case Diagram

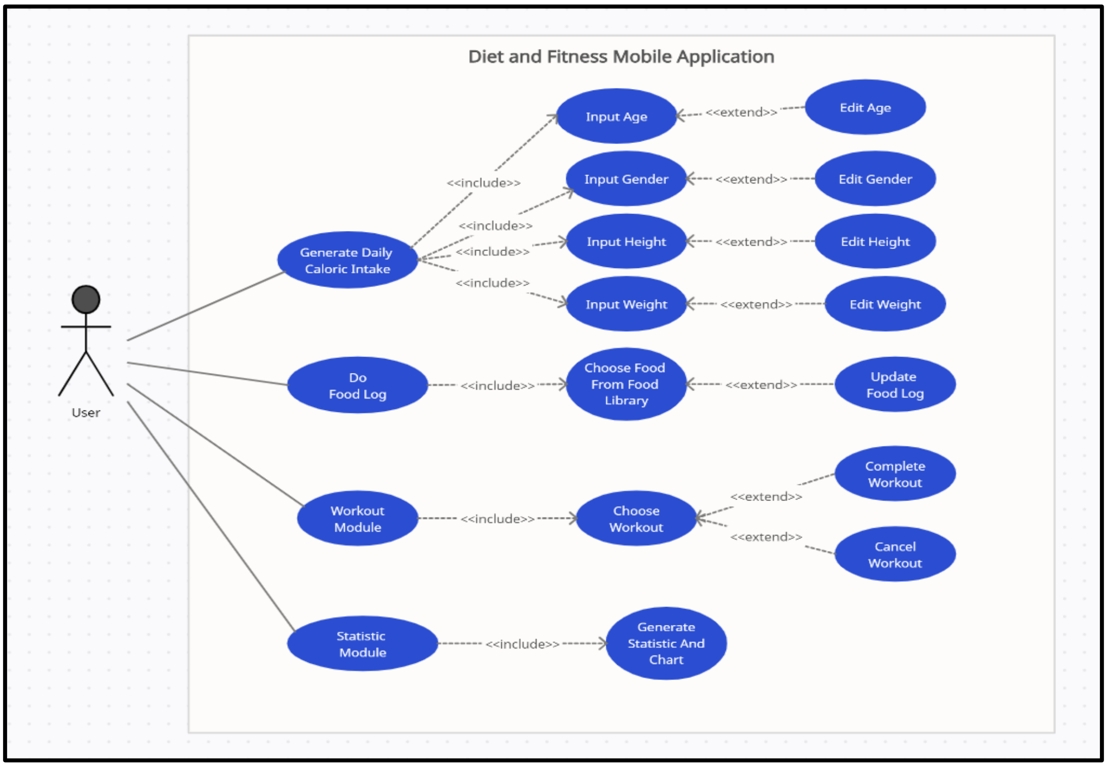


Figure 3-2-2-1 Use Case Diagram of the system

Figure 3-2-2-1 showed the use case diagram of the system. There are four main use cases in total which is Generate Daily Caloric Intake use case, Do Food Log use case, Workout Module use case and Statistic Module use case. The Generate Daily Caloric Intake use case has include relationship between four use cases: “Input Age”, “Input Gender”, “Input Height” and “Input Weight”. Each of the use case has extend relationship with other use cases, respectively. For Do Food Log use case, it has an include relationship with “Choose Food from Food Library” use case, while “Choose Food from Food Library” use case has an extend relationship with “Update Food Log” use case. Furthermore, the Workout Module use case has a include relationship between “Choose Workout” use case, while “Choose Workout” use case has two extend relationship: “Complete Workout” and “Cancel Workout”. For “Statistic Module” use case, it has an include relationship with “Generate Statistic and Chart” use case. The description of the use case diagram of the system will be briefly discussed in the on-going chapter.

Chapter 4 System Design

4.1 System Requirements

4.1.1 Functional Requirements

Home Page

- The system shall show the progress of caloric intake and micronutrients intake under Macronutrients section.
- The system shall show the food log for four sessions: breakfast, lunch, dinner and snack under Food Logger section.
- The system shall show the basal metabolic rate, weight, height, BMI and body fat percentage under Body Measurement section.

Calorie And Macronutrients Calculation Module

- The system shall allow users to input information such as name, age, gender, height and weight.
- The system shall allow users to update information such as name, age, gender, height and weight.
- The system shall be able to generate daily calorie intake plan based on user's information.
- The system shall only generate daily calorie intake plan after all the required information is filled.
- The system shall be able to calculate BMI and show the body condition of user.
- The system shall be able to calculate body fat percentage of the user.

Food Log Module

- The system shall allow users to do food log for four sessions: breakfast, lunch, dinner and snack.
- The system shall allow users to add food to food log from food library.
- The system shall allow users to scale the serving of the selected food.
- The system shall allow users to update the food log.
- The system shall allow users to view the food log.

- The system shall allow users to view all foods in the food library.

Workout Module

- The system shall display all types of workouts from the database.
- The system shall allow users to choose the workout.
- The system shall allow users to pause the workout.
- The system shall allow users to stop the workout.
- The system shall allow users to complete the workout.
- The system shall be able to update the calories burned to home page.

Statistic Module

- The system shall generate a statistic graph that conclude the caloric intake and calories burned.
- The system shall generate a macronutrients distribution chart that conclude the carbs consumed, protein consumed and fat consumed in a day.
- The system shall show the macronutrients distribution chart of selected date.

4.1.2 Non-Functional Requirements

Operational Requirements

- The system should operate on Android device.
- The system shall perform without internet connection.

Performance Requirements

- The system shall let users to do their food log in a fast manner.
- The system shall give users an effective performance.
- The system should be available for every day.

Usability Requirements

- The system should be user friendly to user.

4.2 Description of Use Case Diagram

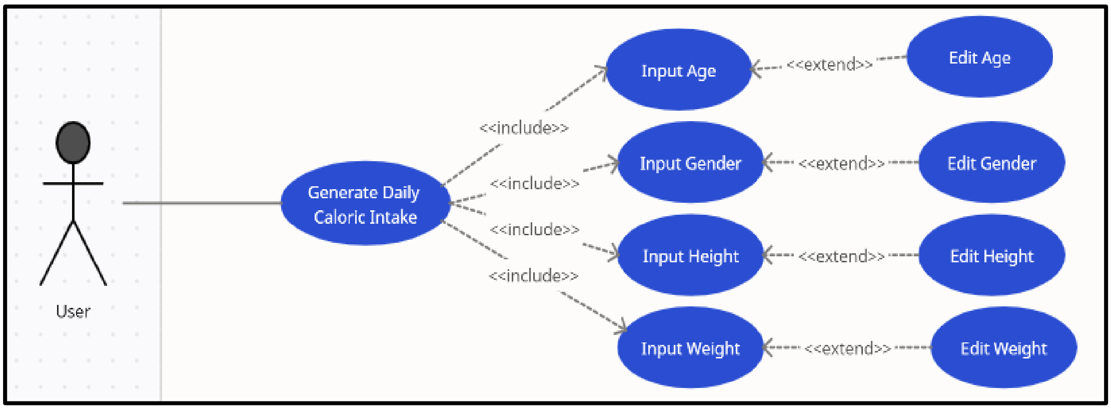


Figure 4-2-1 Partial Use Case Diagram

Use Case Name: Generate Daily Caloric Intake	**ID:** 01	**Primary Actor:** User
Include Use Case: Input Age, Input Gender, Input Height, Input Weight		
Extend Use Case: Edit Age, Edit Gender, Edit Height, Edit Weight		
Brief Description: User wants to generate daily caloric intake based on his / her personal information.		
Trigger: User clicks "EDIT" button in Profile page.		
Normal Flow of Events: 1. User inputs age, gender, height and weight. 2. System validate whether the age, gender, height and weight are valid. 3. User clicks "SAVE" button. 4. System save the all the information. 5. System calculate the basal metabolic rate of user based on his / her information. 6. System calculate the BMI of user based on his / her information. 7. System determine whether user body condition based on the calculated BMI. 8. System calculate the body fat percentage of user based on his / her information. 9. System show the basal metabolic rate, weight, height, BMI and body fat percentage in home page under the "Body Measurement" section.		
Sub Flow: Not applicable.		
Alternative Flow: 1a. User clicks "Edit" to update age, gender, height and weight. 2a. System do not allow user to click "SAVE" button.		

Table 4-2-1 Generate Daily Caloric Intake Use Case

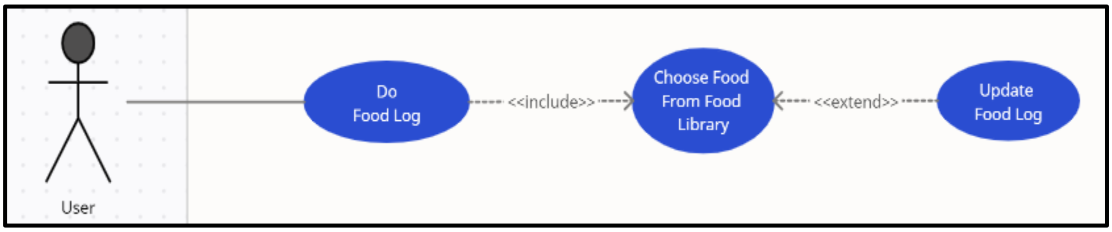


Figure 4-2-2 Partial Use Case Diagram

Use Case Name: Do Food Log	**ID:** 02	**Primary Actor:** User
Include Use Case: Choose Food from Food Library		
Extend Use Case: Update Food Log		
Brief Description: User wants to do food log to record what he / she consumed in a day.		
Trigger: User clicks either "Breakfast", "Lunch", "Dinner" or "Snack" in Home page under Food Logger section.		
Normal Flow of Events: 1. System display the food list from food library. 2. User chooses the food from the food list. 3. User scales up the serving of the selected food. 4. User clicks "DONE" button. 5. System calculate the total consumed calories, carbs, protein and fats. 6. System update the calculated information. 7. System display the calculated information in the home page under Macronutrients section.		
Sub Flow: Not applicable.		
Alternative Flow: 2a. System do not allow user to click "SAVE" button. 3a. User scales down the serving of the selected food to remove the food.		

Table 4-2-2 Do Food Log Use Case

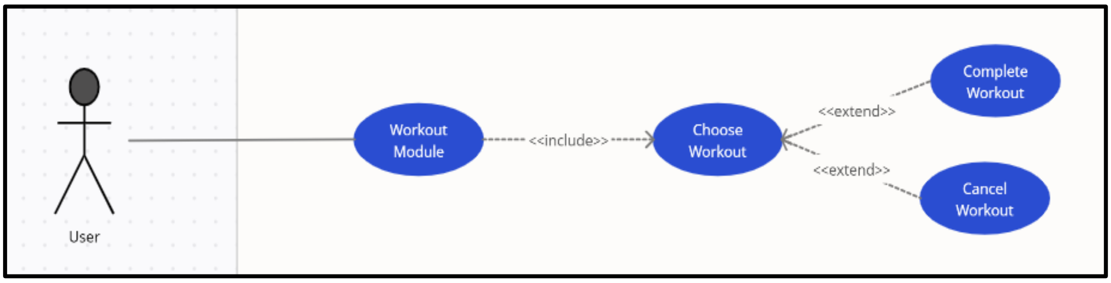


Figure 4-2-3 Partial Use Case Diagram

Use Case Name: Workout Module	**ID:** 03	**Primary Actor:** User
Include Use Case: Choose Workout		
Extend Use Case: Complete Workout, Cancel Workout		
Brief Description: User wants to learn and do workout from the application.		
Trigger: User clicks the “Workout” icon on the bottom navigation bar.		
Normal Flow of Events: 1. System display the motivation quote in the Workout page. 2. System display four types of workouts and details of workouts for user to select. 3. User chooses a type of workout to work on. 4. System stream the selected workout in the Workout page. 5. System calculate the calories burned once the selected workout is completed by the user. 6. System update the calories burned. 7. System display the calories burned in the home page under Macronutrients section.		
Sub Flow: Not applicable.		
Alternative Flow: 5a. User stop the workout. 1. System shows stop workout confirmation message. 2. System will not calculate the calories burned. 3. System will not update the calories burned.		

Table 4-2-3 Workout Module Use Case

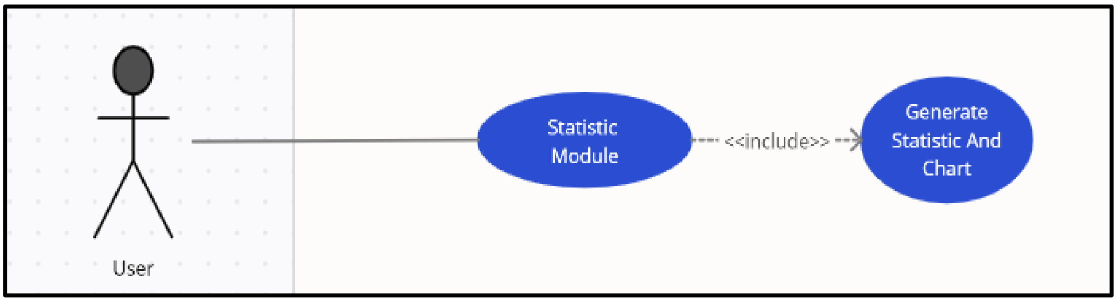


Figure 4-2-4 Partial Use Case Diagram

Use Case Name: Statistic Module	**ID:** 04	**Primary Actor:** User
Include Use Case: Generate Statistic and Chart		
Extend Use Case: -		
Brief Description: User wants to display the statistic graph and chart of the food log.		
Trigger: User clicks the "Statistic" icon on the bottom navigation bar.		
Normal Flow of Events: 1. System display the statistic graph of 10-day food log. 2. System display the macronutrients distribution chart of the day. 3. User chooses and clicks a date from the statistic graph. 4. System display the macronutrients distribution chart of the selected date.		
Sub Flow: Not applicable.		
Alternative Flow: Not applicable.		

Table 4-2-4 Statistic Module Use Case

4.3 Functionalities

Calorie And Macronutrients Calculation Module

This module utilized the details of user to calculate the Basal Metabolic Rate (BMR) of the user. Basal Metabolic Rate means the quantity of calories that the user burns to conduct the necessary life-sustaining function. The system will take the Basal Metabolic Rate as a caloric intake plan of user. If the calories consumed of user in a day is more than the Basal Metabolic Rate, the user is likely to gain weight. If the calories consumed of user in a day is less than the Basal Metabolic Rate, the user is likely to lose weight. The calculation of Basal Metabolic Rate takes consideration of the age, gender, height and weight of user. Here is the formula to calculate the Basal Metabolic Rate:

$$BMR\ for\ males = 66.47 + (13.75 \times Weight\ in\ Kg) + (5.003 \times Height\ in\ Cm) - (6.755 \times Age)$$

$$BMR\ for\ females = 655.1 + (9.563 \times Weight\ in\ Kg) + (1.85 \times Height\ in\ Cm) - (4.676 \times Age)$$

Apart from Basal Metabolic Rate, this module shall calculate the Body Mass Index (BMI) of the user. Body Mass Index is a measurement to measure the body fat of adult men and women based on their height and weight. Here is the formula to calculate the Body Mass Index:

$$Body\ Mass\ Index = Weight(Kg) \div Height^2(m^2)$$

To interpret the Body Mass Index for adults, there is a table to categorize whether a person is underweight, healthy, overweight or obese. Here is the table:

BMI Range	**Category**
BMI < 18.5	Underweight
18.5 ≤ BMI ≤ 24.9	Healthy
25.0 ≤ BMI ≤ 29.9	Overweight
BMI > 30	Obesity

Table 4-3-1 BMI Table

This module shall be able to calculate the body fat percentage of the user. It required the Body Mass Index to complete the calculation. Here is the formula to calculate the body fat percentage:

$$Body\ Fat\ Percentage\ for\ males = (1.2 \times BMI) + (0.23 \times Age) - 16.2$$

$$Body\ Fat\ Percentage\ for\ females = (1.2 \times BMI) + (0.23 \times Age) - 5.4$$

Food Log Module

This module consists of two section which are food logger and food library. For food logger, it enables users to do food log. It allows users to log what they have consumed for breakfast, lunch, dinner and snack. In order to log what they have consumed, there are 30 foods in the food library. The details of food such as calories, carbs, protein and fat were defined in the database. User can do food log by choosing the food from the food library. Users can add or remove the food from the food logger if they record the food wrongly. Furthermore, they can view the food logger to know what they have consumed in a day.

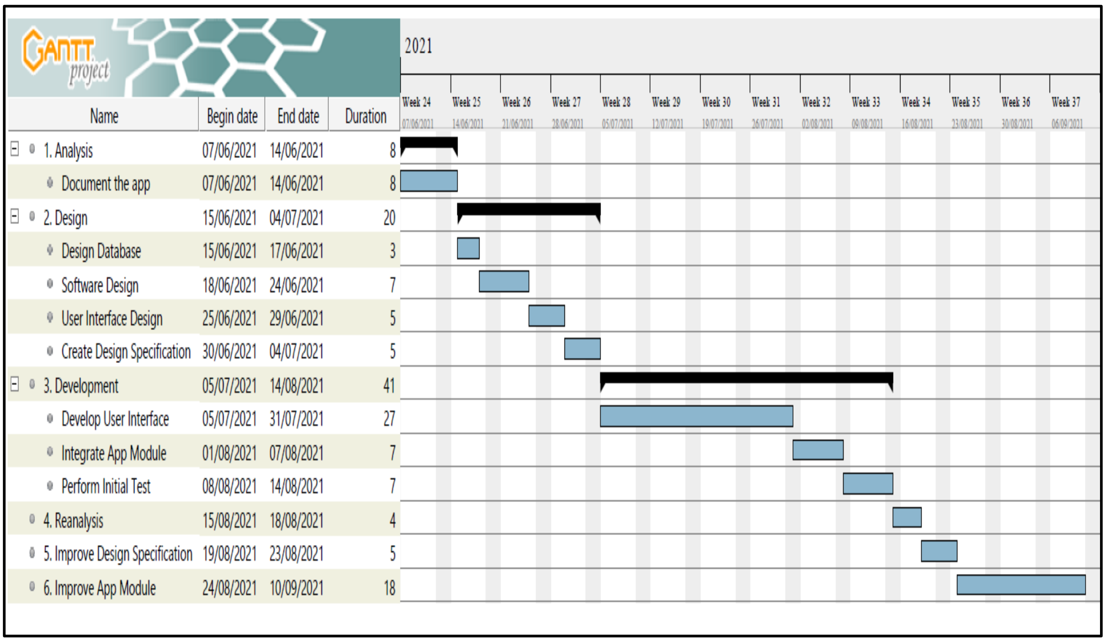
Workout Module

This module is mainly to allow user to do workout or learn the workout tutorial. There are 4 types of workouts in the database: sweaty jump workout, full body workout, Hiit workout and build muscle workout. Each workout has different duration. Each workout contributed to certain calories burned. The calories burned of user will be recorded if only the user complete the workout. The calories burned will be updated to the progress of daily caloric intake of the user.

Statistic Module

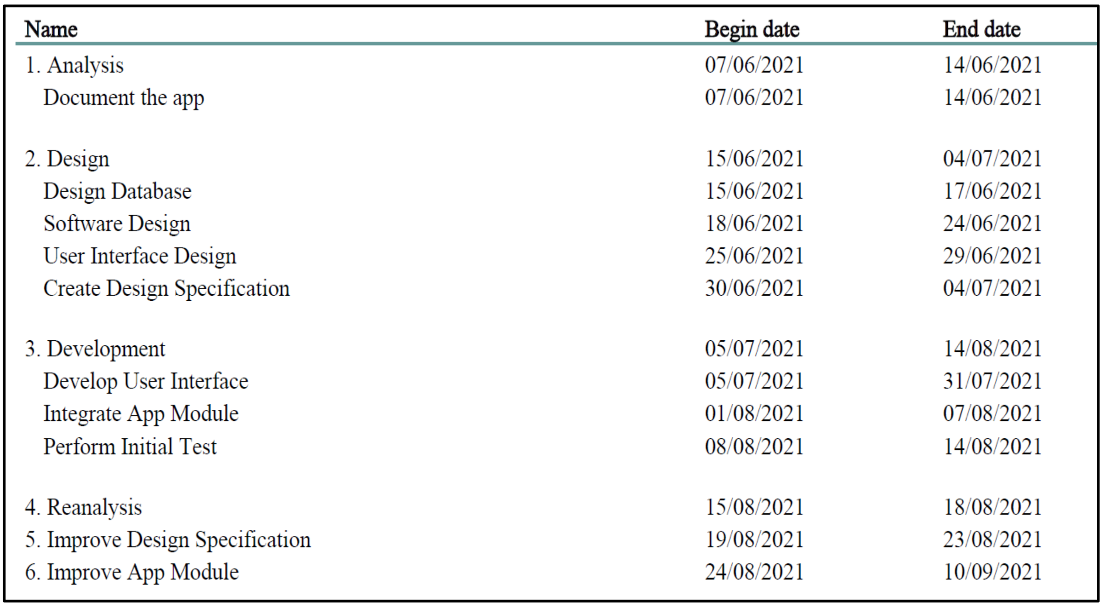
This module generates the statistic graph and chart that allows users to visualize their meal behaviour. The statistic graph illustrates how much calories the user consumed and burned for the recent 10 days, while the chart shows the macronutrients distribution of the user consumed in a day. Users are allowed to refer back the macronutrients distribution of the recent 10 days by clicking on the date that show in statistic graph.

4.4 Timeline



Name	Begin date	End date	Duration
1. Analysis	07/06/2021	14/06/2021	8
Document the app	07/06/2021	14/06/2021	8
2. Design	15/06/2021	04/07/2021	20
Design Database	15/06/2021	17/06/2021	3
Software Design	18/06/2021	24/06/2021	7
User Interface Design	25/06/2021	29/06/2021	5
Create Design Specification	30/06/2021	04/07/2021	5
3. Development	05/07/2021	14/08/2021	41
Develop User Interface	05/07/2021	31/07/2021	27
Integrate App Module	01/08/2021	07/08/2021	7
Perform Initial Test	08/08/2021	14/08/2021	7
4. Reanalysis	15/08/2021	18/08/2021	4
5. Improve Design Specification	19/08/2021	23/08/2021	5
6. Improve App Module	24/08/2021	10/09/2021	18

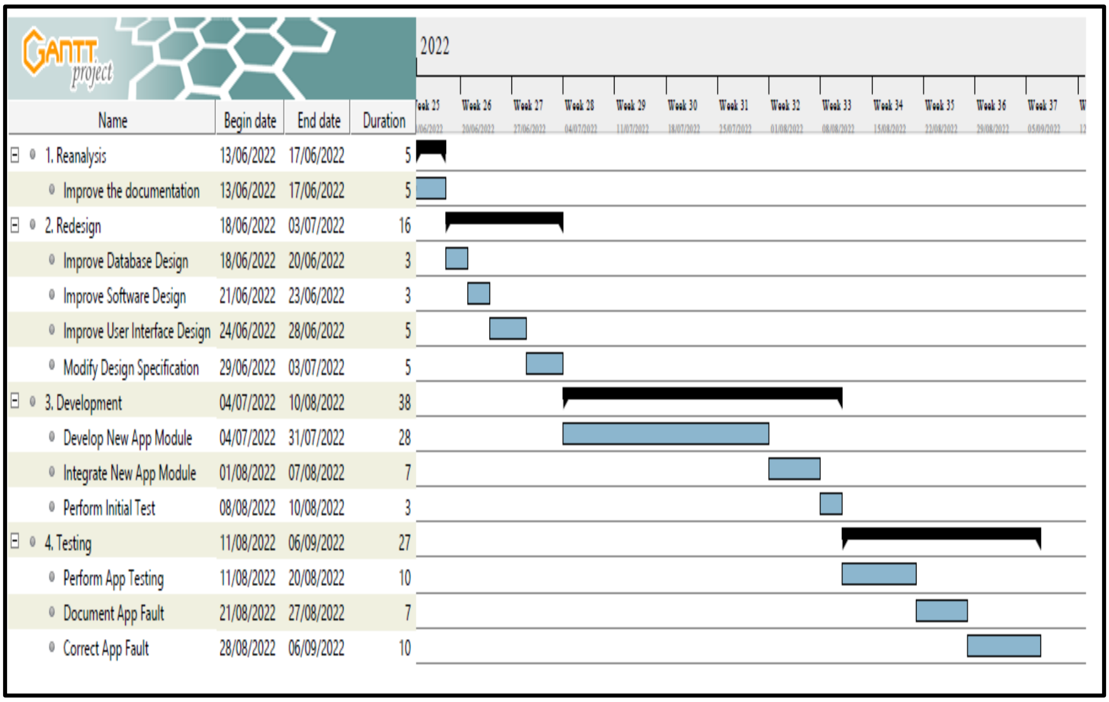
Figure 4-4-1 Gantt Chart for FYP1



Name	Begin date	End date
1. Analysis	07/06/2021	14/06/2021
Document the app	07/06/2021	14/06/2021
2. Design	15/06/2021	04/07/2021
Design Database	15/06/2021	17/06/2021
Software Design	18/06/2021	24/06/2021
User Interface Design	25/06/2021	29/06/2021
Create Design Specification	30/06/2021	04/07/2021
3. Development	05/07/2021	14/08/2021
Develop User Interface	05/07/2021	31/07/2021
Integrate App Module	01/08/2021	07/08/2021
Perform Initial Test	08/08/2021	14/08/2021
4. Reanalysis	15/08/2021	18/08/2021
5. Improve Design Specification	19/08/2021	23/08/2021
6. Improve App Module	24/08/2021	10/09/2021

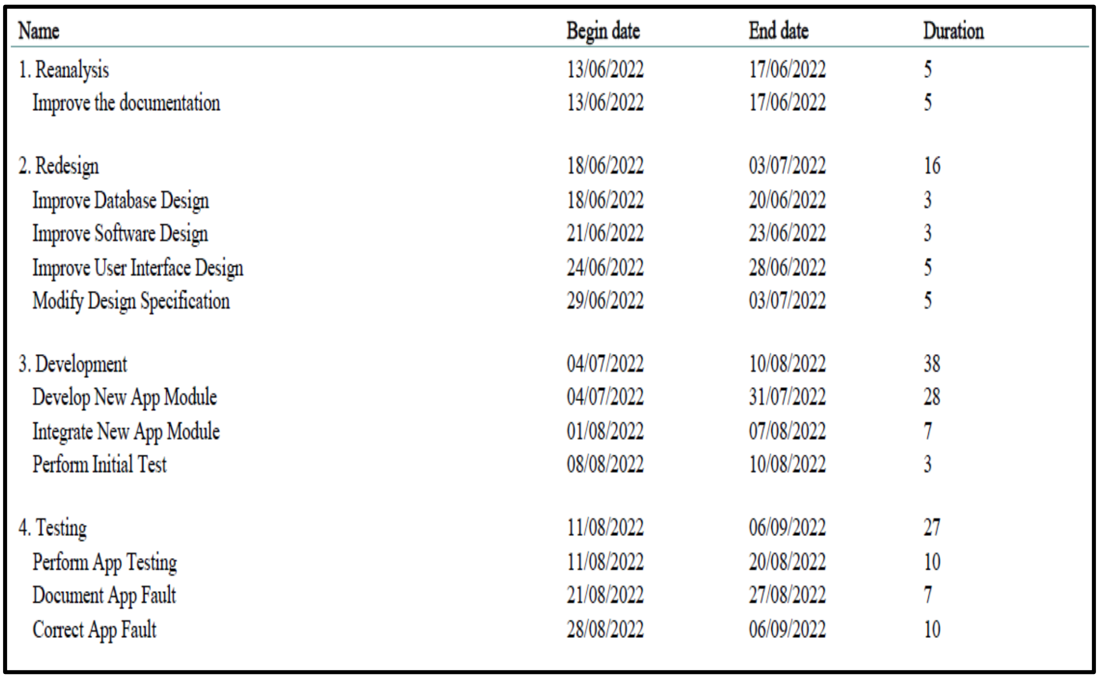
Figure 4-4-2 Tasks for FYP1

Figure 4-4-1 is the gantt chart for FYP 1 in previous semester. Figure 4-4-2 is the task allocation in the gantt chart for FYP1.



Name	Begin date	End date	Duration
1. Reanalysis	13/06/2022	17/06/2022	5
Improve the documentation	13/06/2022	17/06/2022	5
2. Redesign	18/06/2022	03/07/2022	16
Improve Database Design	18/06/2022	20/06/2022	3
Improve Software Design	21/06/2022	23/06/2022	3
Improve User Interface Design	24/06/2022	28/06/2022	5
Modify Design Specification	29/06/2022	03/07/2022	5
3. Development	04/07/2022	10/08/2022	38
Develop New App Module	04/07/2022	31/07/2022	28
Integrate New App Module	01/08/2022	07/08/2022	7
Perform Initial Test	08/08/2022	10/08/2022	3
4. Testing	11/08/2022	06/09/2022	27
Perform App Testing	11/08/2022	20/08/2022	10
Document App Fault	21/08/2022	27/08/2022	7
Correct App Fault	28/08/2022	06/09/2022	10

Figure 4-4-3 Gantt Chart for FYP2



Name	Begin date	End date	Duration
1. Reanalysis	13/06/2022	17/06/2022	5
Improve the documentation	13/06/2022	17/06/2022	5
2. Redesign	18/06/2022	03/07/2022	16
Improve Database Design	18/06/2022	20/06/2022	3
Improve Software Design	21/06/2022	23/06/2022	3
Improve User Interface Design	24/06/2022	28/06/2022	5
Modify Design Specification	29/06/2022	03/07/2022	5
3. Development	04/07/2022	10/08/2022	38
Develop New App Module	04/07/2022	31/07/2022	28
Integrate New App Module	01/08/2022	07/08/2022	7
Perform Initial Test	08/08/2022	10/08/2022	3
4. Testing	11/08/2022	06/09/2022	27
Perform App Testing	11/08/2022	20/08/2022	10
Document App Fault	21/08/2022	27/08/2022	7
Correct App Fault	28/08/2022	06/09/2022	10

Figure 4-4-4 Tasks for FYP2

Figure 4-4-3 is the gantt chart for FYP 2 in this semester. Figure 4-4-4 is the task allocation in the gantt chart for FYP2.

Chapter 5 System Implementation

5.1 Hardware Setup

The table below showed the requirement of hardware required to develop the system.

Description	**Requirement**
Processor	Intel® Core(TM) i7-7500U CPU @ 2.70GHz 2.90GHz
Graphic	NVIDIA GeForce 940MX
Hard Drive (ROM)	128 GB SSD
Memory (RAM)	12 GB
Device	An Android smartphone

Table 5-1-1: Hardware requirements to develop the system

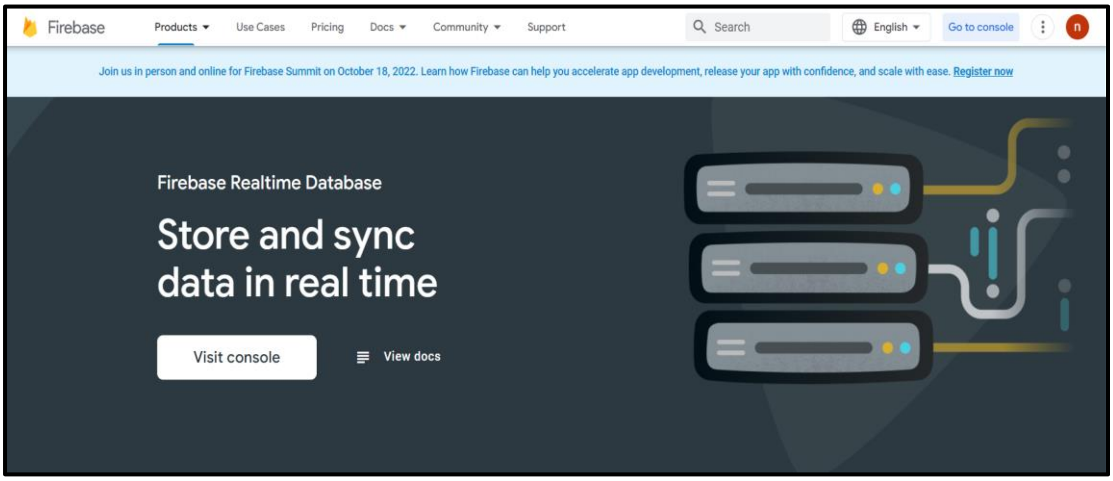
5.2 Software Setup

The table below showed the requirement of software required to develop the app.

Description	**Requirement**
Operating system	Windows 10
System type	64-bit operating system, x64-based processor
Software	Android Studio, Flutter, Visual Studio Code
Programming language	Dart

Table 5-2-2: Software requirements to develop the system

5.3 Setting and Configuration



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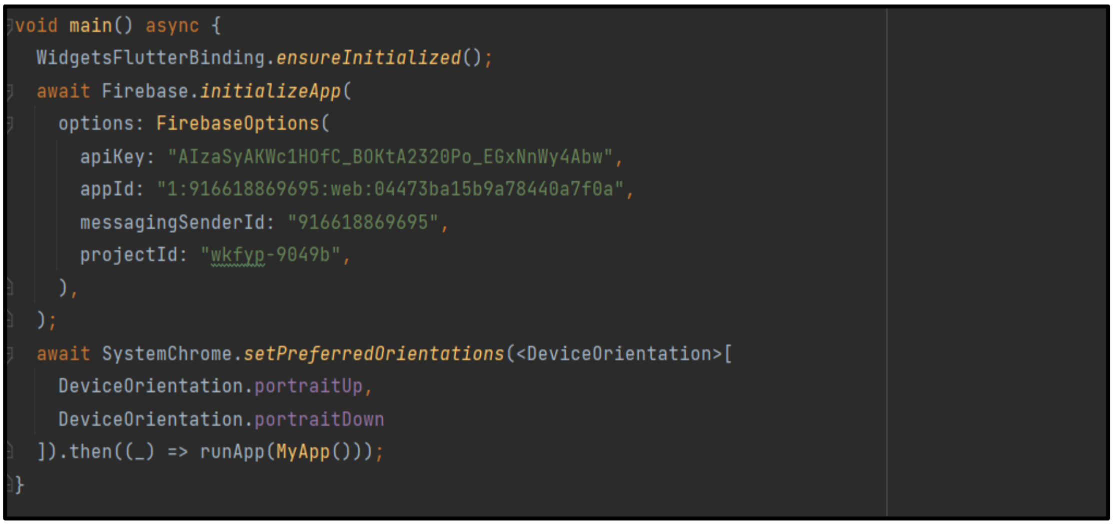
Firebase Realtime Database

Store and sync data in real time

Figure 5-3-1 Firebase Realtime Database

Before coding the modules of the system, a Google account is a must in order to utilize the service of Firebase Realtime Database.

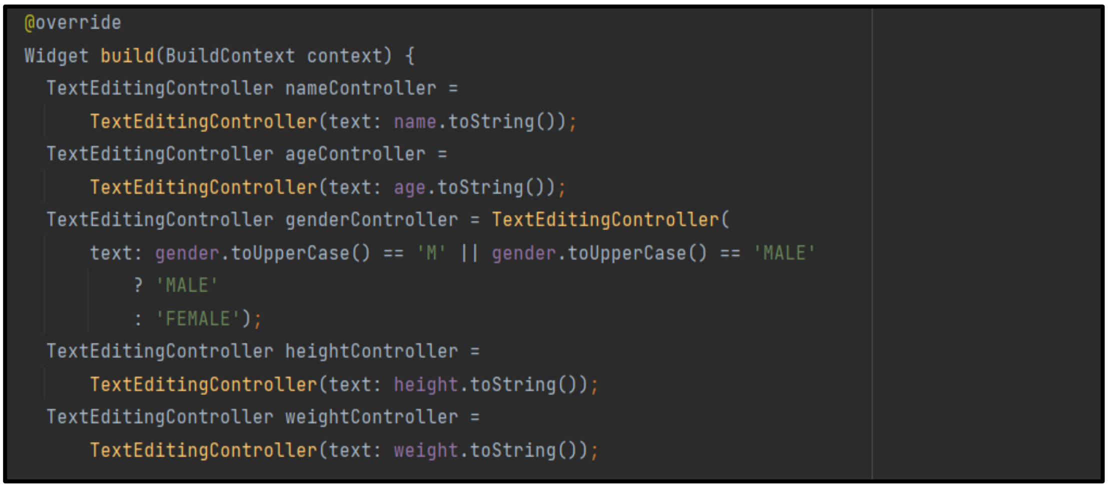


```
void main() async {
  WidgetsFlutterBinding.ensureInitialized();
  await Firebase.initializeApp(
    options: FirebaseOptions(
      apiKey: "AIzaSyAKWc1HOfC_BOKtA2320Po_EGxNnWy4Abw",
      appId: "1:916618869695:web:04473ba15b9a78440a7f0a",
      messagingSenderId: "916618869695",
      projectId: "wkfyp-9049b",
    ),
  );
  await SystemChrome.setPreferredOrientations(<DeviceOrientation>[
    DeviceOrientation.portraitUp,
    DeviceOrientation.portraitDown
  ]).then((_) => runApp(MyApp()));
}
```

Figure 5-3-2 Code Snippet of Firebase Configuration

After creating the google account, create a project in Firebase. Getting the API key, app ID, messaging Sender ID and project ID in order the complete the configuration and utilize the service of real-time database.

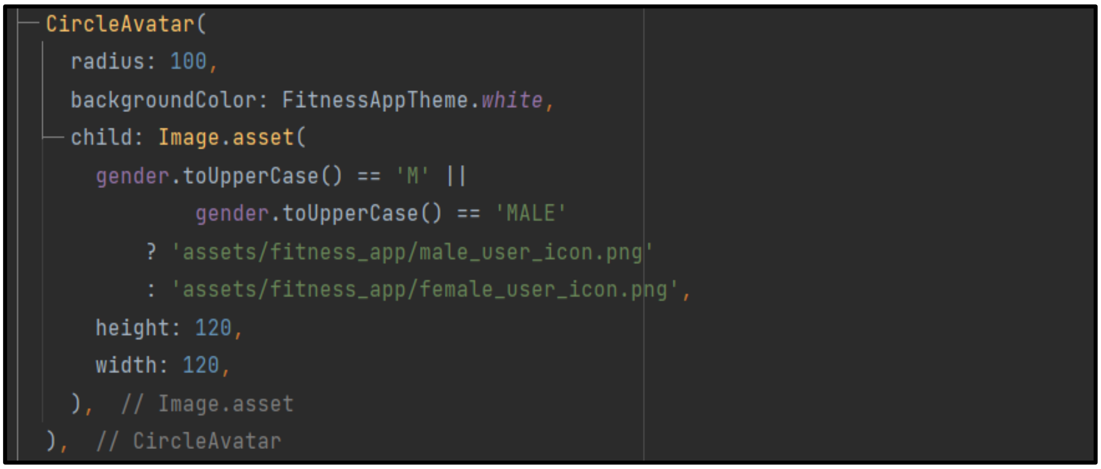
Profile Page



```
@override
Widget build(BuildContext context) {
  TextEditingController nameController =
      TextEditingController(text: name.toString());
  TextEditingController ageController =
      TextEditingController(text: age.toString());
  TextEditingController genderController = TextEditingController(
      text: gender.toUpperCase() == 'M' || gender.toUpperCase() == 'MALE'
          ? 'MALE'
          : 'FEMALE');
  TextEditingController heightController =
      TextEditingController(text: height.toString());
  TextEditingController weightController =
      TextEditingController(text: weight.toString());
```

Figure 5-3-3 Code Snippet of Profile Page (1/3)

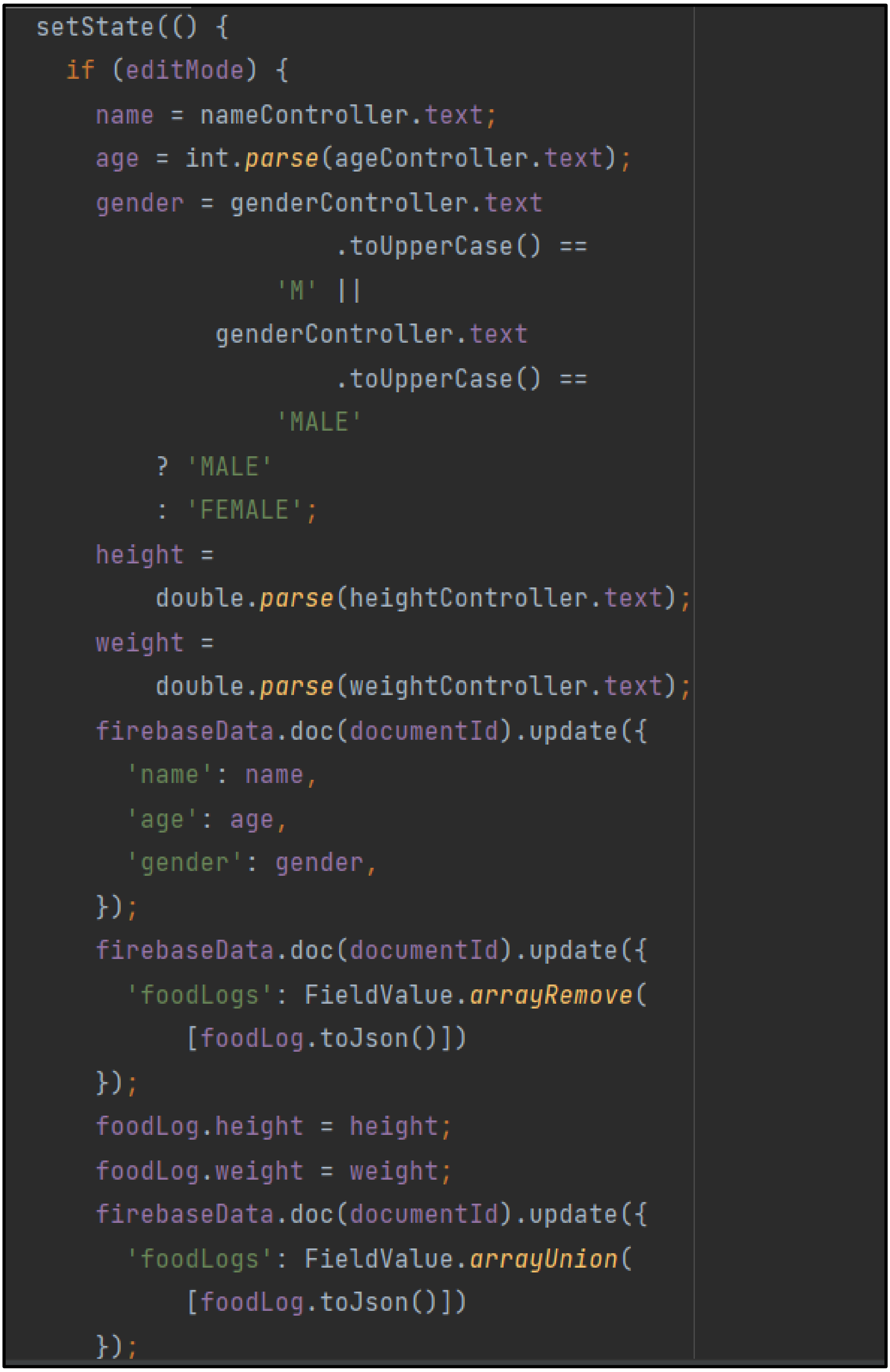
The figure 5-3-3 is the code that system read the input data from user. The system gets the user’s inputs and convert them to string.



```
CircleAvatar(
  radius: 100,
  backgroundColor: FitnessAppTheme.white,
  child: Image.asset(
    gender.toUpperCase() == 'M' ||
            gender.toUpperCase() == 'MALE'
        ? 'assets/fitness_app/male_user_icon.png'
        : 'assets/fitness_app/female_user_icon.png',
    height: 120,
    width: 120,
  ), // Image.asset
), // CircleAvatar
```

Figure 5-3-4 Code Snippet of Profile Page (2/3)

The figure 5-3-4 is the code that how system detect and display the gender icon in the profile page. The system read the gender from user’s input and show the correct gender icon in the profile page.

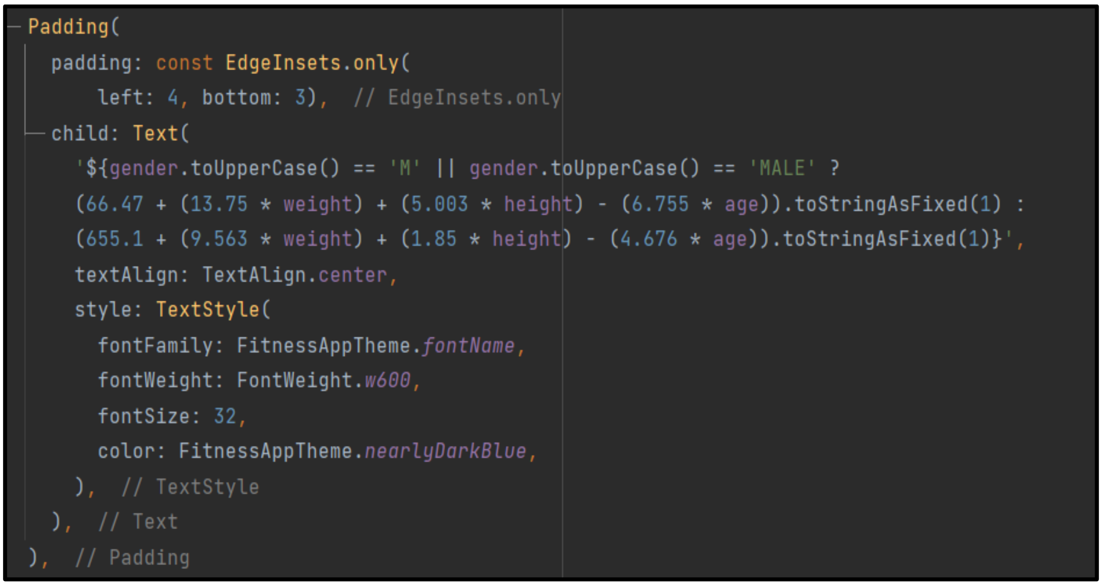


```
setState(() {
  if (editMode) {
    name = nameController.text;
    age = int.parse(ageController.text);
    gender = genderController.text
                    .toUpperCase() ==
                'M' ||
            genderController.text
                    .toUpperCase() ==
                'MALE'
        ? 'MALE'
        : 'FEMALE';
    height =
        double.parse(heightController.text);
    weight =
        double.parse(weightController.text);
    firebaseData.doc(documentId).update({
      'name': name,
      'age': age,
      'gender': gender,
    });
    firebaseData.doc(documentId).update({
      'foodLogs': FieldValue.arrayRemove(
          [foodLog.toJson()])
    });
    foodLog.height = height;
    foodLog.weight = weight;
    firebaseData.doc(documentId).update({
      'foodLogs': FieldValue.arrayUnion(
          [foodLog.toJson()])
    });
```

Figure 5-3-4 Code Snippet of Profile Page (3/3)

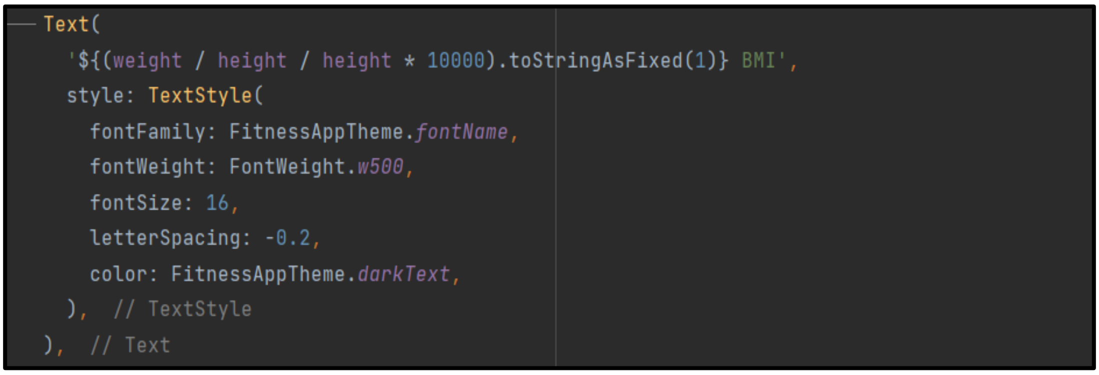
The figure 5-3-4 is the code of how system sync the data to the Firebase database. After user editing, the edited information will be updated to the database.

Calorie And Macronutrients Calculation Module



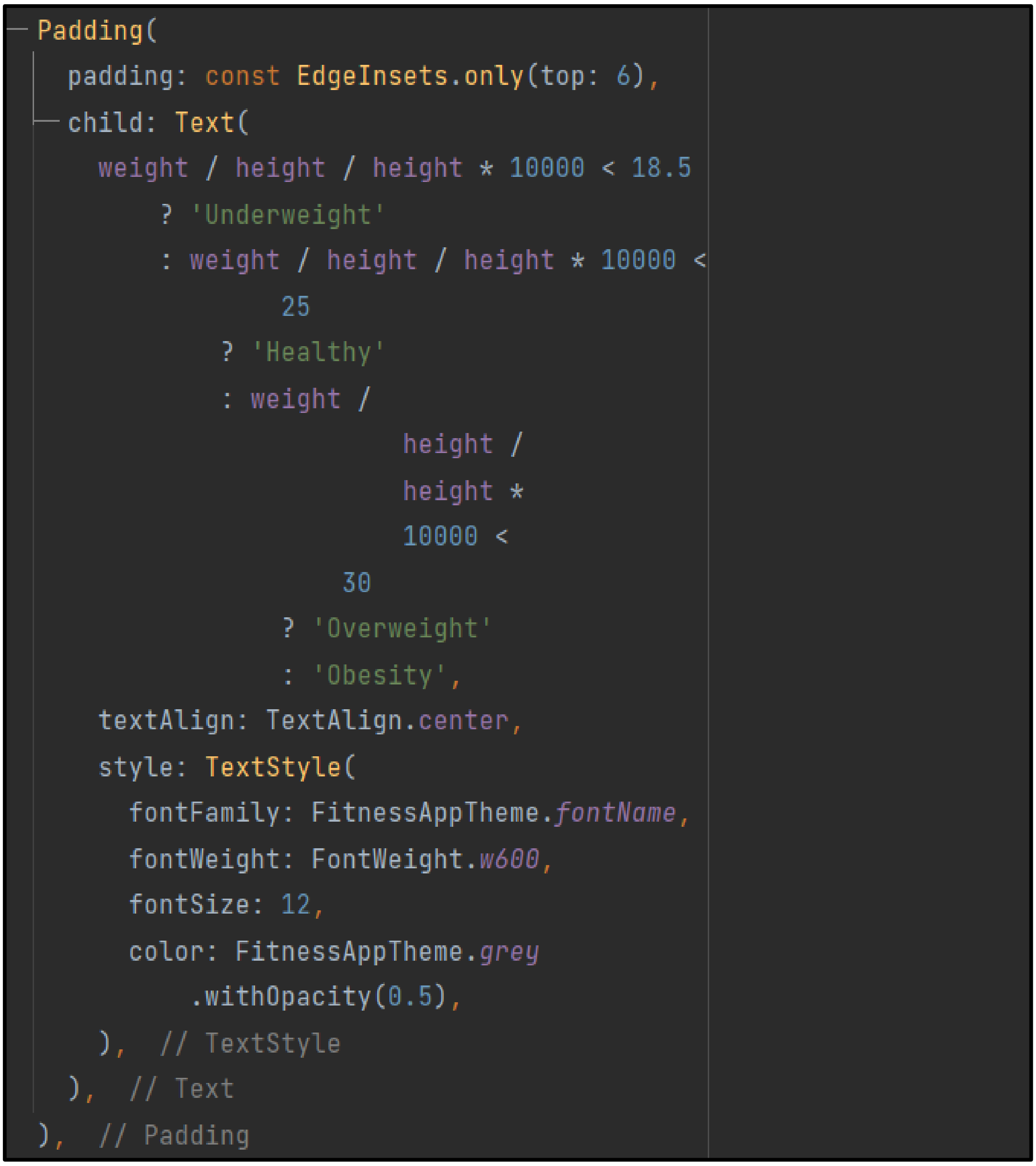
```
Padding(
  padding: const EdgeInsets.only(
      left: 4, bottom: 3),  // EdgeInsets.only
  child: Text(
    '${gender.toUpperCase() == 'M' || gender.toUpperCase() == 'MALE' ?
    (66.47 + (13.75 * weight) + (5.003 * height) - (6.755 * age)).toStringAsFixed(1) :
    (655.1 + (9.563 * weight) + (1.85 * height) - (4.676 * age)).toStringAsFixed(1)}',
    textAlign: TextAlign.center,
    style: TextStyle(
      fontFamily: FitnessAppTheme.fontName,
      fontWeight: FontWeight.w600,
      fontSize: 32,
      color: FitnessAppTheme.nearlyDarkBlue,
    ),  // TextStyle
  ),  // Text
),  // Padding
```

Figure 5-3-5 Code Snippet of Calorie and Macronutrients Calculation Module (1/7)



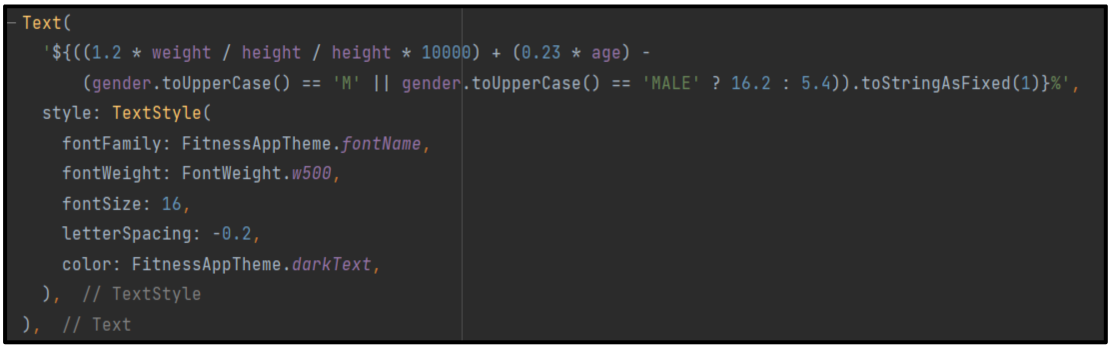
```
Text(
  '${(weight / height / height * 10000).toStringAsFixed(1)} BMI',
  style: TextStyle(
    fontFamily: FitnessAppTheme.fontName,
    fontWeight: FontWeight.w500,
    fontSize: 16,
    letterSpacing: -0.2,
    color: FitnessAppTheme.darkText,
  ),  // TextStyle
),  // Text
```

Figure 5-3-6 Code Snippet of Calorie and Macronutrients Calculation Module (2/7)



```
Padding(
  padding: const EdgeInsets.only(top: 6),
  child: Text(
    weight / height / height * 10000 < 18.5
        ? 'Underweight'
        : weight / height / height * 10000 <
                25
            ? 'Healthy'
            : weight /
                        height /
                        height *
                        10000 <
                    30
                ? 'Overweight'
                : 'Obesity',
    textAlign: TextAlign.center,
    style: TextStyle(
      fontFamily: FitnessAppTheme.fontName,
      fontWeight: FontWeight.w600,
      fontSize: 12,
      color: FitnessAppTheme.grey
          .withOpacity(0.5),
    ), // TextStyle
  ), // Text
), // Padding
```

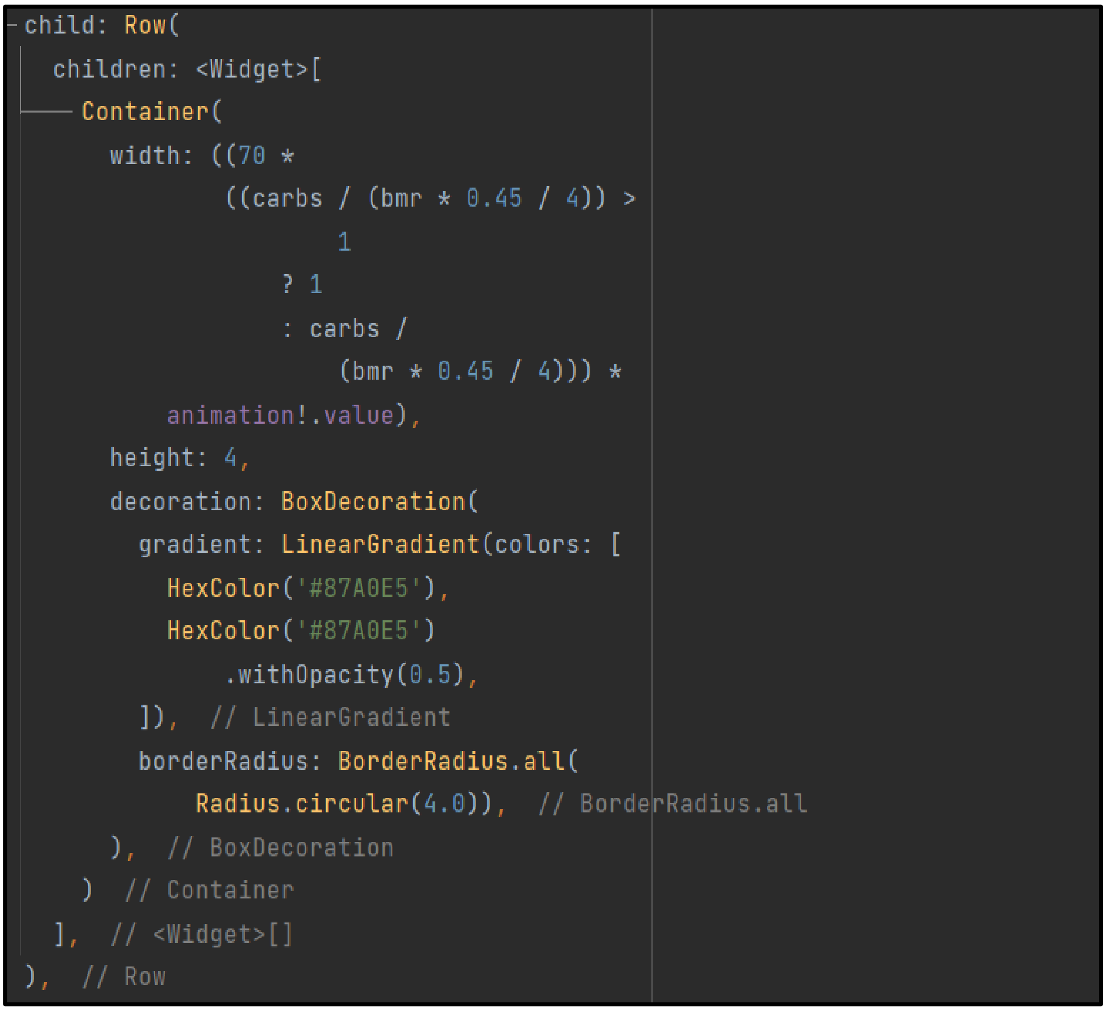
Figure 5-3-7 Code Snippet of Calorie and Macronutrients Calculation Module (3/7)



```
Text(
  '${((1.2 * weight / height / height * 10000) + (0.23 * age) -
      (gender.toUpperCase() == 'M' || gender.toUpperCase() == 'MALE' ? 16.2 : 5.4)).toStringAsFixed(1)}%',
  style: TextStyle(
    fontFamily: FitnessAppTheme.fontName,
    fontWeight: FontWeight.w500,
    fontSize: 16,
    letterSpacing: -0.2,
    color: FitnessAppTheme.darkText,
  ), // TextStyle
), // Text
```

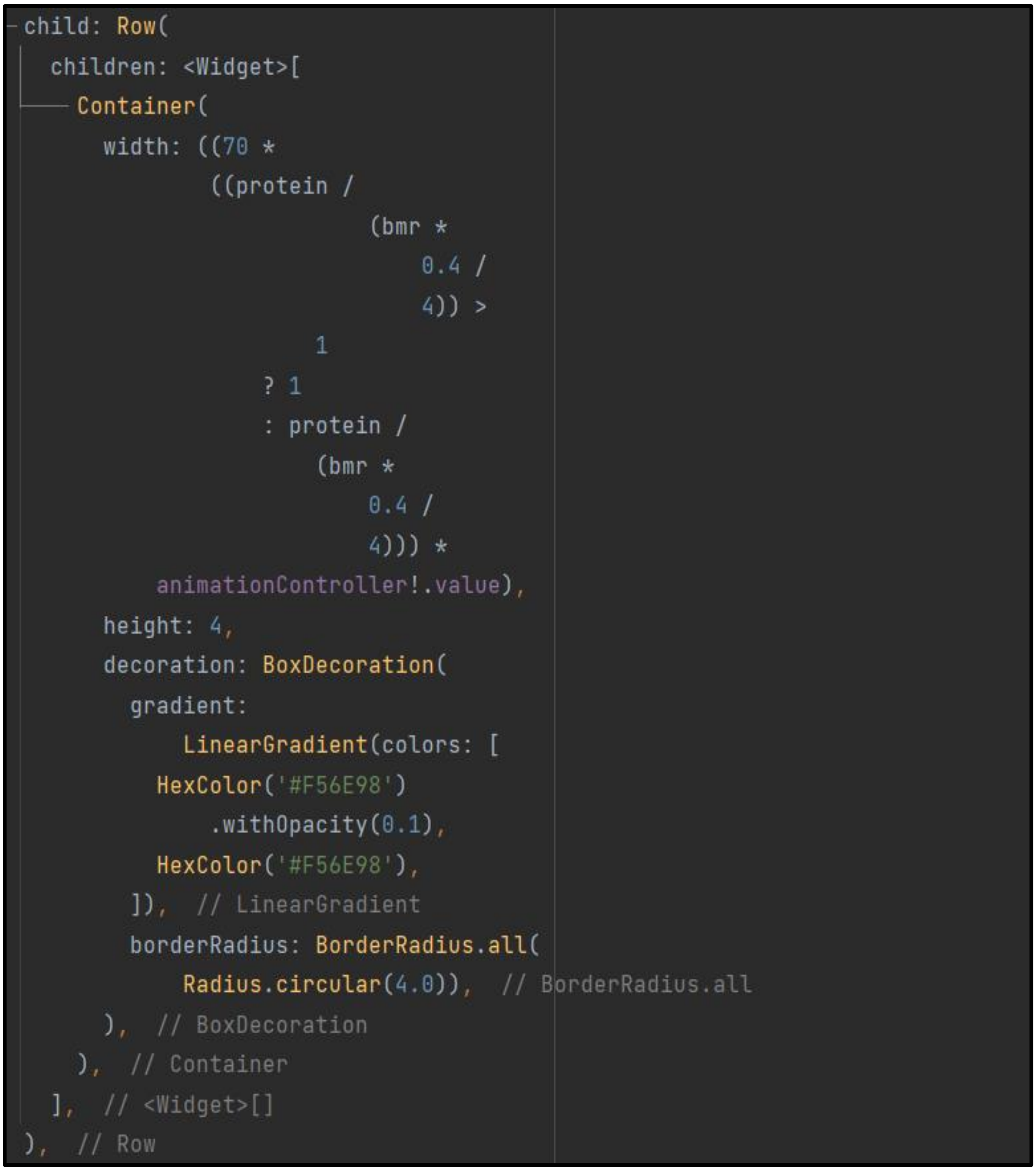
Figure 5-3-8 Code Snippet of Calorie and Macronutrients Calculation Module (4/7)

Figure 5-3-5, figure 5-3-6, figure 5-3-7 and figure 5-3-8 showed the code of how the system calculate the Basal Metabolic Rate, Body Mass Index and body fat percentage of user based on user's information. Moreover, the system will indicate the body condition of user according to the calculated Body Mass Index.



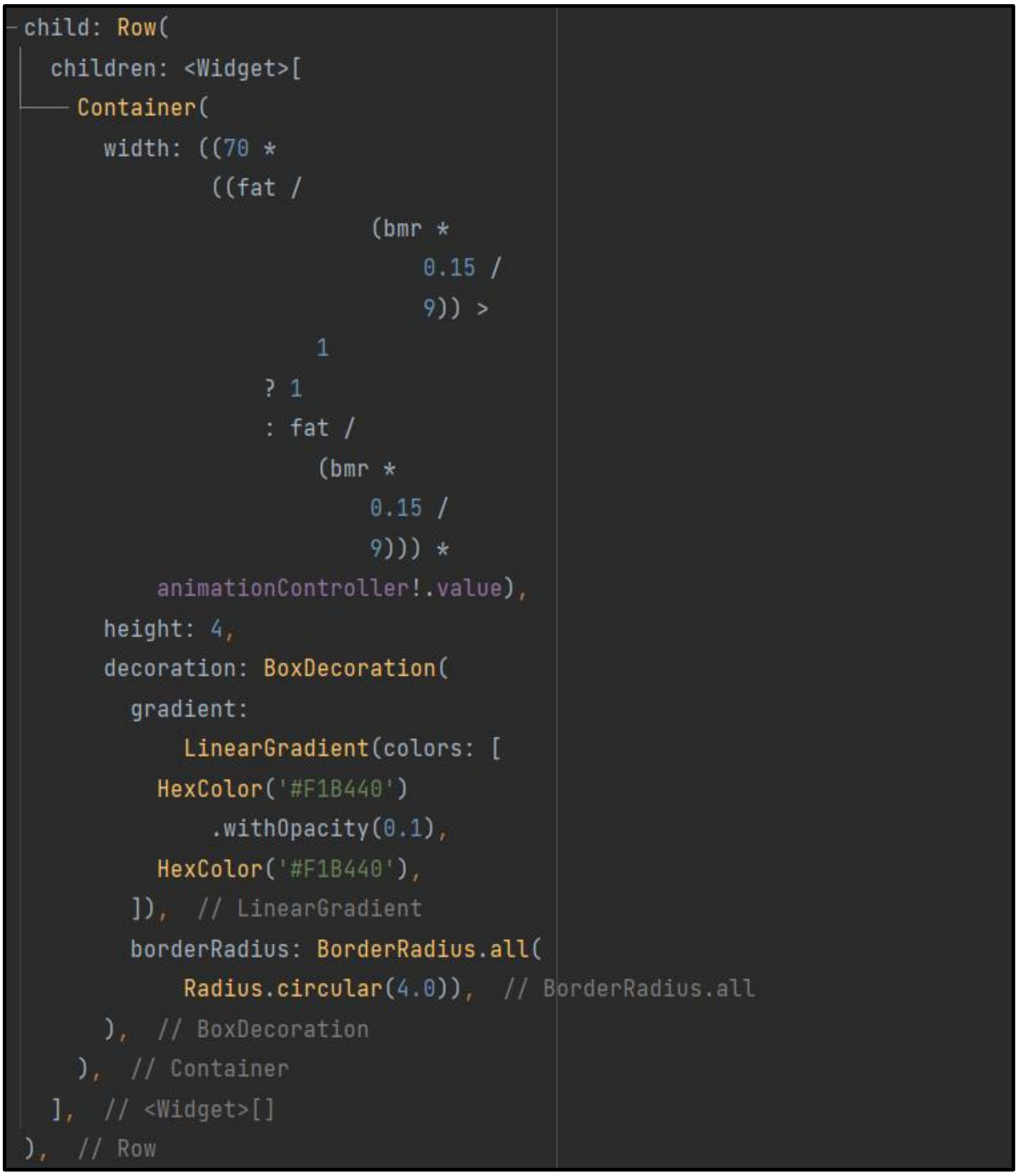
```
child: Row(
  children: <Widget>[
    Container(
      width: ((70 *
              ((carbs / (bmr * 0.45 / 4)) >
                      1
                  ? 1
                  : carbs /
                      (bmr * 0.45 / 4))) *
          animation!.value),
      height: 4,
      decoration: BoxDecoration(
        gradient: LinearGradient(colors: [
          HexColor('#87A0E5'),
          HexColor('#87A0E5')
              .withOpacity(0.5),
        ]),  // LinearGradient
        borderRadius: BorderRadius.all(
            Radius.circular(4.0)),  // BorderRadius.all
      ),  // BoxDecoration
    )  // Container
  ],  // <Widget>[]
),  // Row
```

Figure 5-3-9 Code Snippet of Calorie and Macronutrients Calculation Module (5/7)



```
child: Row(
 children: <Widget>[
  Container(
   width: ((70 *
       ((protein /
             (bmr *
               0.4 /
               4)) >
           1
         ? 1
         : protein /
           (bmr *
             0.4 /
             4))) *
     animationController!.value),
   height: 4,
   decoration: BoxDecoration(
    gradient:
      LinearGradient(colors: [
     HexColor('#F56E98')
       .withOpacity(0.1),
     HexColor('#F56E98'),
    ]),  // LinearGradient
    borderRadius: BorderRadius.all(
      Radius.circular(4.0)),  // BorderRadius.all
   ),  // BoxDecoration
  ),  // Container
 ],  // <Widget>[]
),  // Row
```

Figure 5-3-10 Code Snippet of Calorie and Macronutrients Calculation Module (6/7)

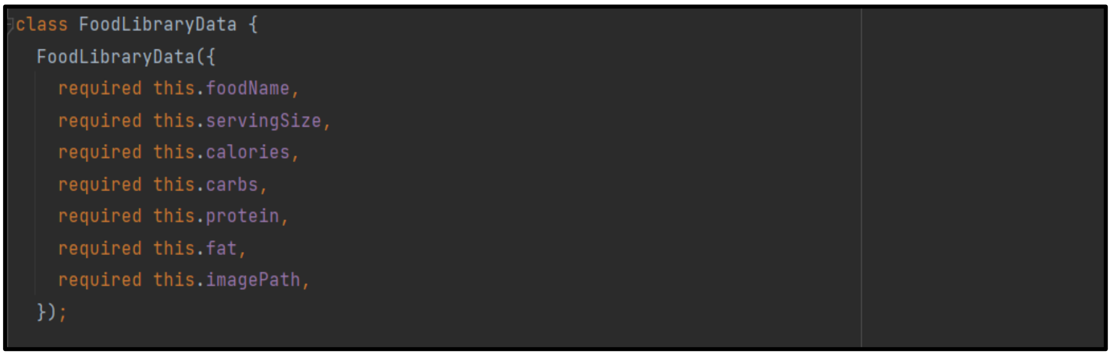


```
child: Row(
 children: <Widget>[
  Container(
   width: ((70 *
       ((fat /
             (bmr *
               0.15 /
               9)) >
           1
         ? 1
         : fat /
           (bmr *
             0.15 /
             9))) *
     animationController!.value),
   height: 4,
   decoration: BoxDecoration(
    gradient:
      LinearGradient(colors: [
     HexColor('#F1B440')
       .withOpacity(0.1),
     HexColor('#F1B440'),
    ]),  // LinearGradient
    borderRadius: BorderRadius.all(
      Radius.circular(4.0)),  // BorderRadius.all
   ),  // BoxDecoration
  ),  // Container
 ],  // <Widget>[]
),  // Row
```

Figure 5-3-11 Code Snippet of Calorie and Macronutrients Calculation Module (7/7)

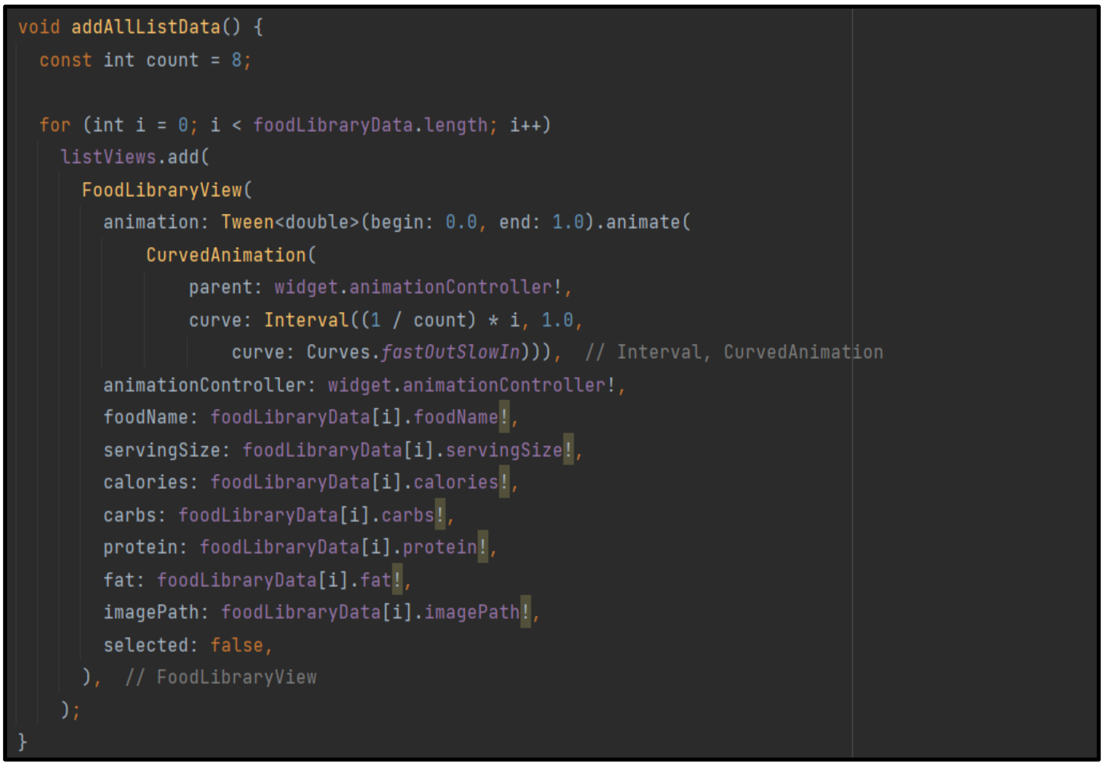
Figure 5-3-9, figure 5-3-10 and figure 5-3-11 are the code on how system calculate and display the carbs, protein and fat consumed in the view of progress bar.

Food Log Module



```
class FoodLibraryData {
  FoodLibraryData({
    required this.foodName,
    required this.servingSize,
    required this.calories,
    required this.carbs,
    required this.protein,
    required this.fat,
    required this.imagePath,
  });
```

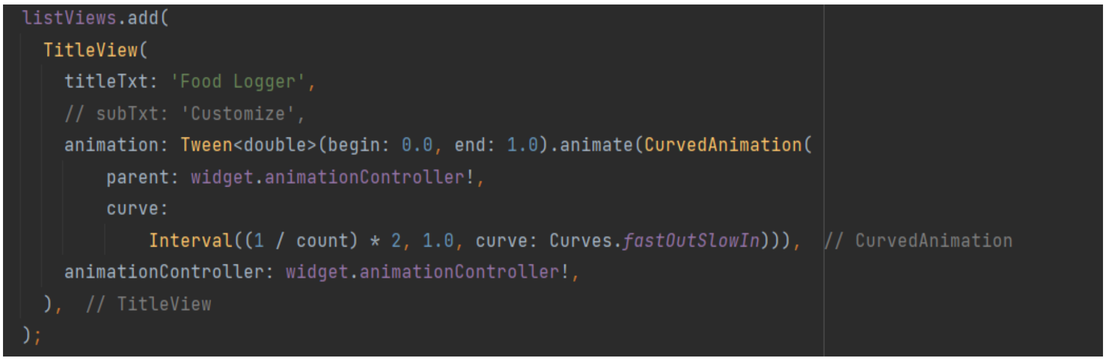
Figure 5-3-12 Code Snippet of Food Library (1/2)



```
void addAllListData() {
  const int count = 8;

  for (int i = 0; i < foodLibraryData.length; i++)
    listViews.add(
      FoodLibraryView(
        animation: Tween<double>(begin: 0.0, end: 1.0).animate(
            CurvedAnimation(
                parent: widget.animationController!,
                curve: Interval((1 / count) * i, 1.0,
                    curve: Curves.fastOutSlowIn))),  // Interval, CurvedAnimation
        animationController: widget.animationController!,
        foodName: foodLibraryData[i].foodName!,
        servingSize: foodLibraryData[i].servingSize!,
        calories: foodLibraryData[i].calories!,
        carbs: foodLibraryData[i].carbs!,
        protein: foodLibraryData[i].protein!,
        fat: foodLibraryData[i].fat!,
        imagePath: foodLibraryData[i].imagePath!,
        selected: false,
      ),  // FoodLibraryView
    );
}
```

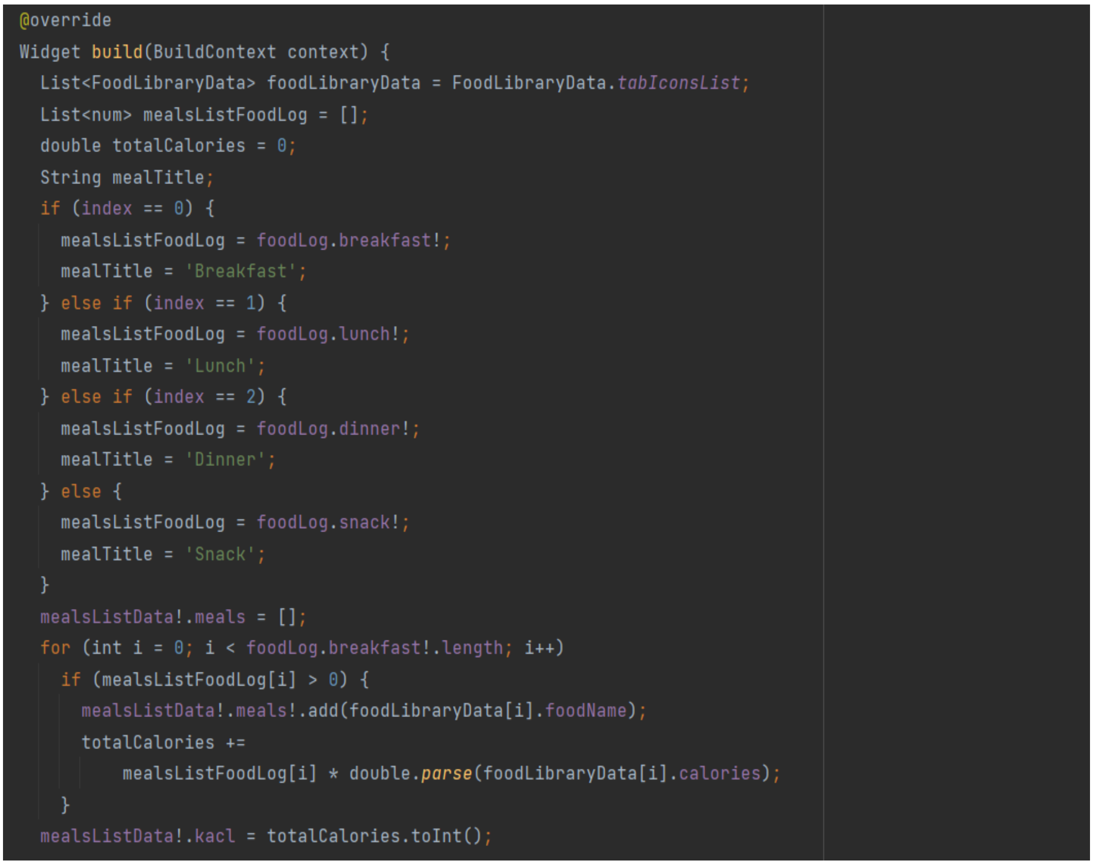
Figure 5-3-13 Code Snippet of Food Library (2/2)

Figure 5-3-12 and figure 5-3-13 are the code of how system read the food library data from the FoodLibraryData class and display them in food library page.



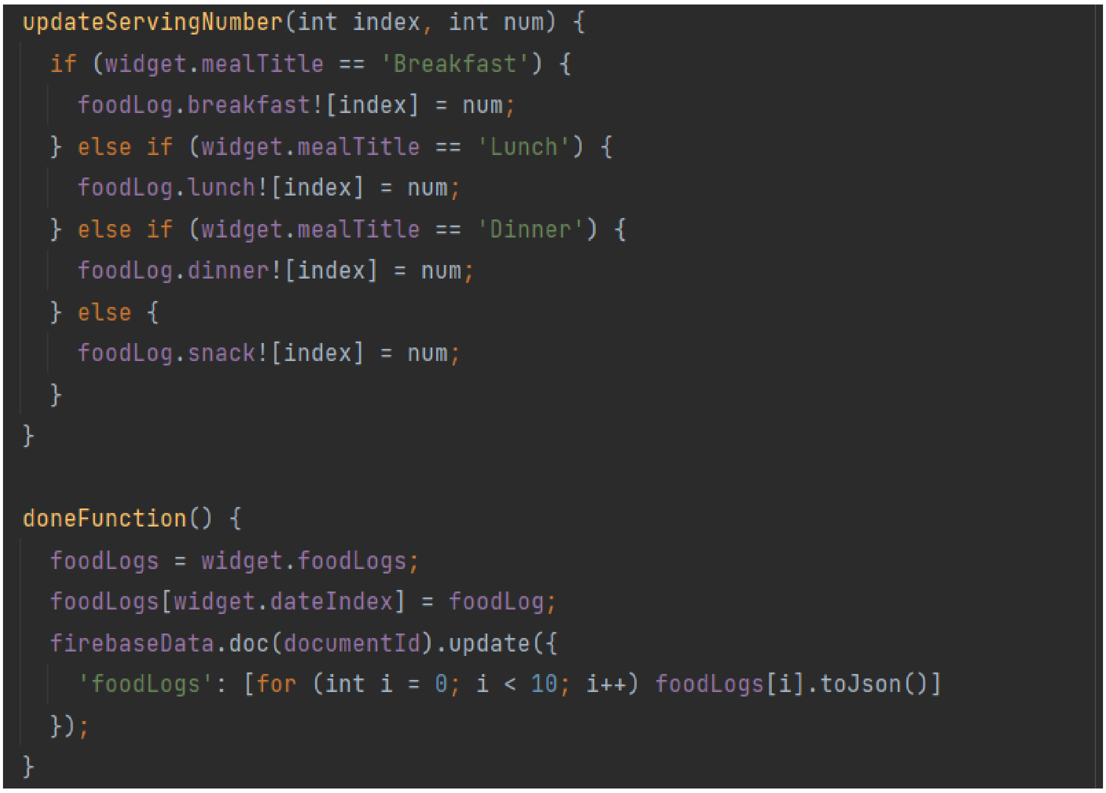
```
listViews.add(
  TitleView(
    titleTxt: 'Food Logger',
    // subTxt: 'Customize',
    animation: Tween<double>(begin: 0.0, end: 1.0).animate(CurvedAnimation(
        parent: widget.animationController!,
        curve:
            Interval((1 / count) * 2, 1.0, curve: Curves.fastOutSlowIn))),  // CurvedAnimation
    animationController: widget.animationController!,
  ),  // TitleView
);
```

Figure 5-3-14 Code Snippet of Food Logger (1/3)



```
@override
Widget build(BuildContext context) {
  List<FoodLibraryData> foodLibraryData = FoodLibraryData.tabIconsList;
  List<num> mealsListFoodLog = [];
  double totalCalories = 0;
  String mealTitle;
  if (index == 0) {
    mealsListFoodLog = foodLog.breakfast!;
    mealTitle = 'Breakfast';
  } else if (index == 1) {
    mealsListFoodLog = foodLog.lunch!;
    mealTitle = 'Lunch';
  } else if (index == 2) {
    mealsListFoodLog = foodLog.dinner!;
    mealTitle = 'Dinner';
  } else {
    mealsListFoodLog = foodLog.snack!;
    mealTitle = 'Snack';
  }
  mealsListData!.meals = [];
  for (int i = 0; i < foodLog.breakfast!.length; i++)
    if (mealsListFoodLog[i] > 0) {
      mealsListData!.meals!.add(foodLibraryData[i].foodName);
      totalCalories +=
          mealsListFoodLog[i] * double.parse(foodLibraryData[i].calories);
    }
  mealsListData!.kacl = totalCalories.toInt();
```

Figure 5-3-15 Code Snippet of Food Logger (2/3)

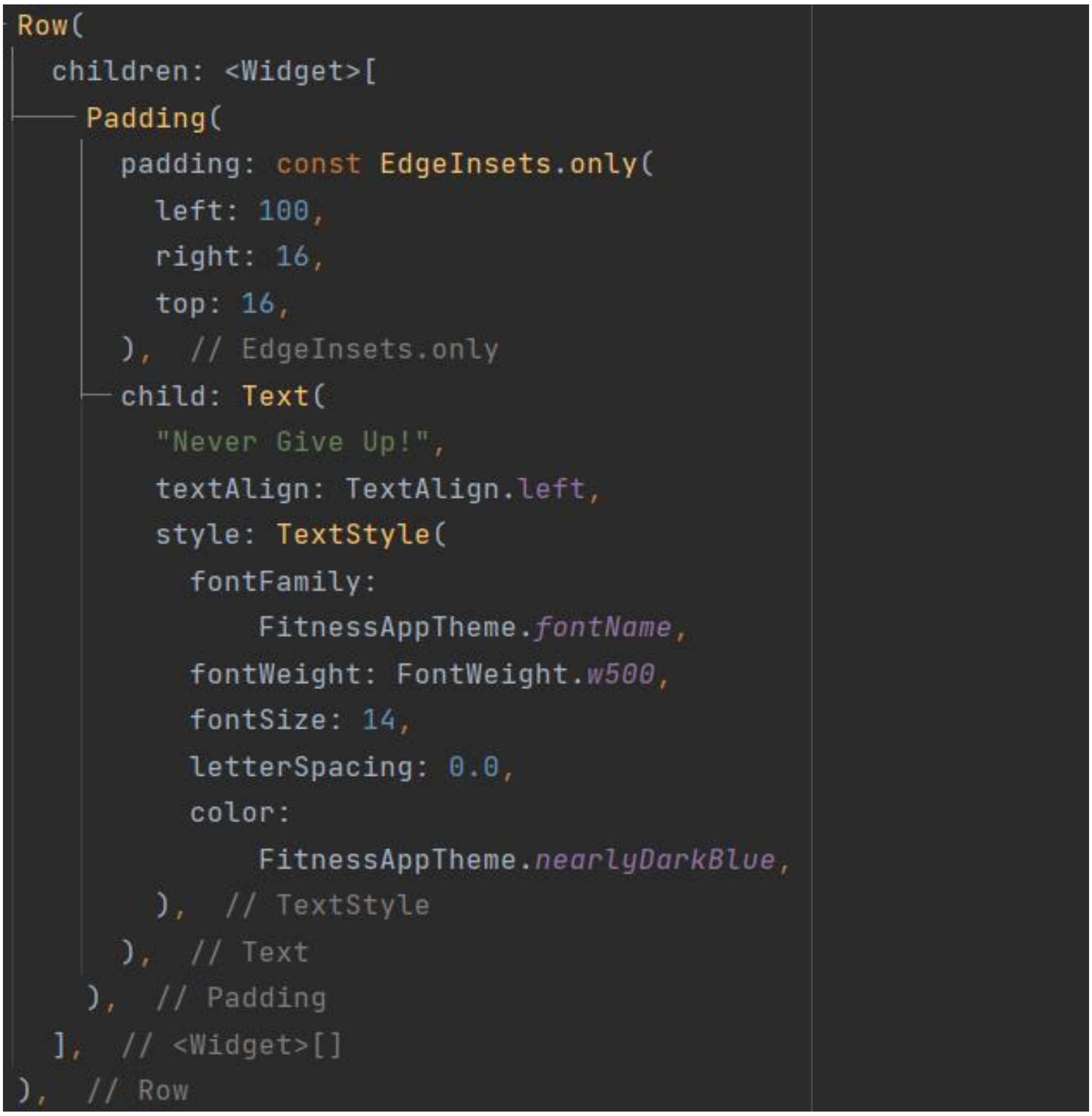


```
updateServingNumber(int index, int num) {
  if (widget.mealTitle == 'Breakfast') {
    foodLog.breakfast![index] = num;
  } else if (widget.mealTitle == 'Lunch') {
    foodLog.lunch![index] = num;
  } else if (widget.mealTitle == 'Dinner') {
    foodLog.dinner![index] = num;
  } else {
    foodLog.snack![index] = num;
  }
}

doneFunction() {
  foodLogs = widget.foodLogs;
  foodLogs[widget.dateIndex] = foodLog;
  firebaseData.doc(documentId).update({
    'foodLogs': [for (int i = 0; i < 10; i++) foodLogs[i].toJson()]
  });
}
```

Figure 5-3-16 Code Snippet of Food Logger (3/3)

Figure 5-3-14, figure 5-3-15 and figure 5-3-16 showed the code of the food logger. The system will retrieve the food list data from food library and display it to user when user clicks on either “Breakfast”, “Lunch”, “Dinner” or “Snack” icon. Moreover, user can also scale the serving size of the selected food. Once the user done adding the food, the user can click “Done” button to update the food to the food logger. The data will also be updated to the firebase.

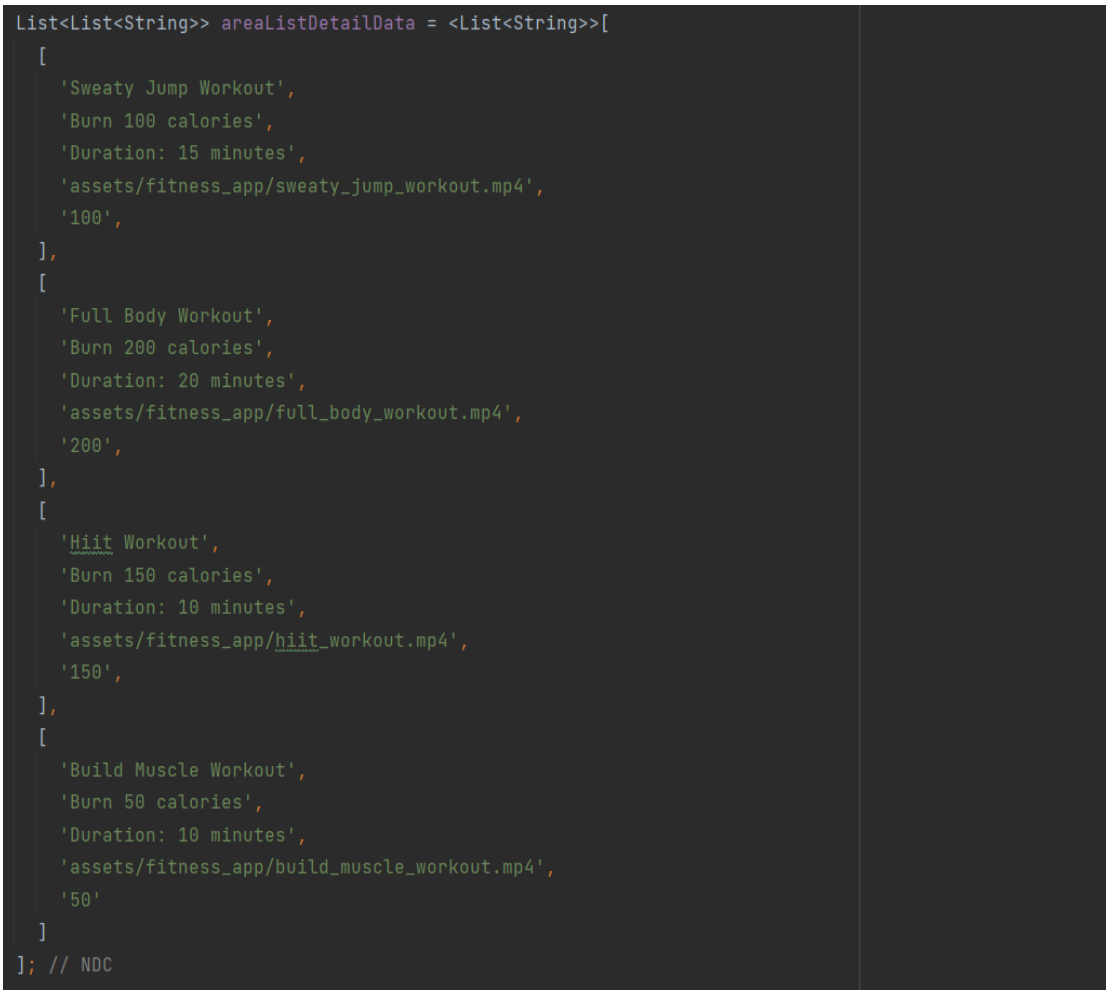
Workout Module



```
Row(
  children: <Widget>[
    Padding(
      padding: const EdgeInsets.only(
        left: 100,
        right: 16,
        top: 16,
      ),  // EdgeInsets.only
      child: Text(
        "Never Give Up!",
        textAlign: TextAlign.left,
        style: TextStyle(
          fontFamily:
              FitnessAppTheme.fontName,
          fontWeight: FontWeight.w500,
          fontSize: 14,
          letterSpacing: 0.0,
          color:
              FitnessAppTheme.nearlyDarkBlue,
        ),  // TextStyle
      ),  // Text
    ),  // Padding
  ],  // <Widget>[]
),  // Row
```

Figure 5-3-17 Code Snippet of Motivation Quote (1/1)

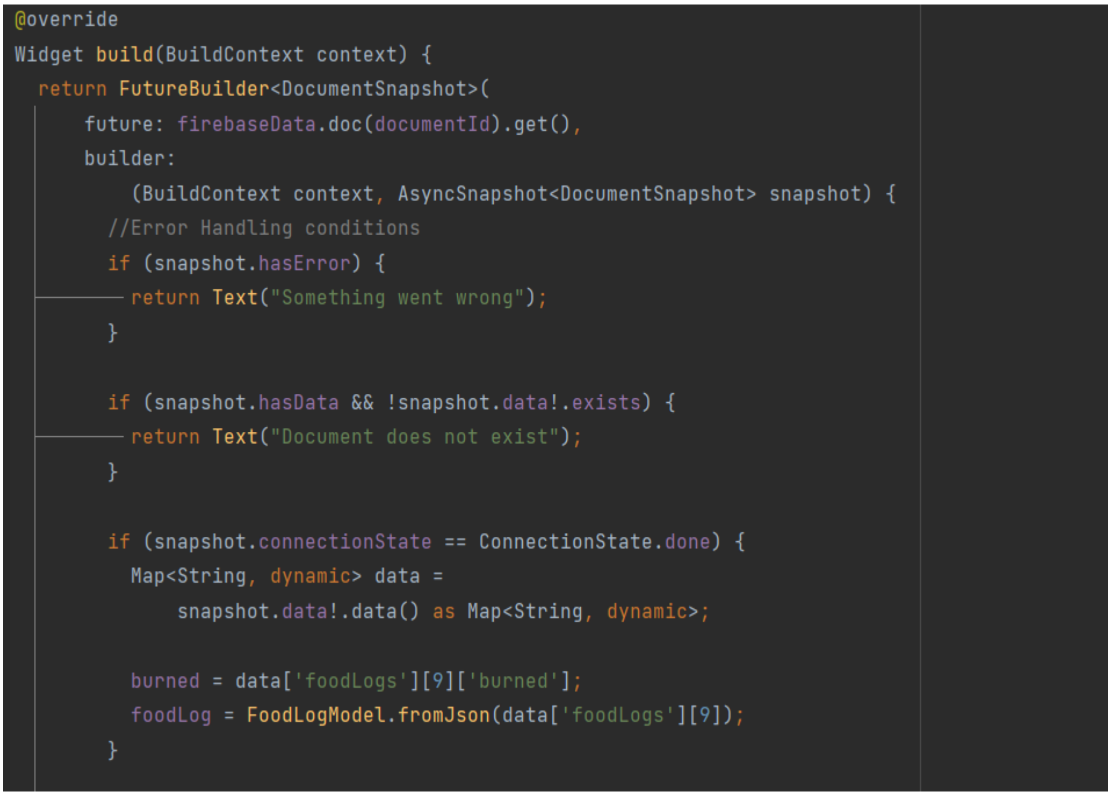
The figure 5-3-17 is the code that showed the motivation quote at top of the workout page.



```
List<List<String>> areaListDetailData = <List<String>>[
  [
    'Sweaty Jump Workout',
    'Burn 100 calories',
    'Duration: 15 minutes',
    'assets/fitness_app/sweaty_jump_workout.mp4',
    '100',
  ],
  [
    'Full Body Workout',
    'Burn 200 calories',
    'Duration: 20 minutes',
    'assets/fitness_app/full_body_workout.mp4',
    '200',
  ],
  [
    'Hiit Workout',
    'Burn 150 calories',
    'Duration: 10 minutes',
    'assets/fitness_app/hiit_workout.mp4',
    '150',
  ],
  [
    'Build Muscle Workout',
    'Burn 50 calories',
    'Duration: 10 minutes',
    'assets/fitness_app/build_muscle_workout.mp4',
    '50'
  ]
]; // NDC
```

Figure 5-3-18 Code Snippet of Workout Module (1/4)

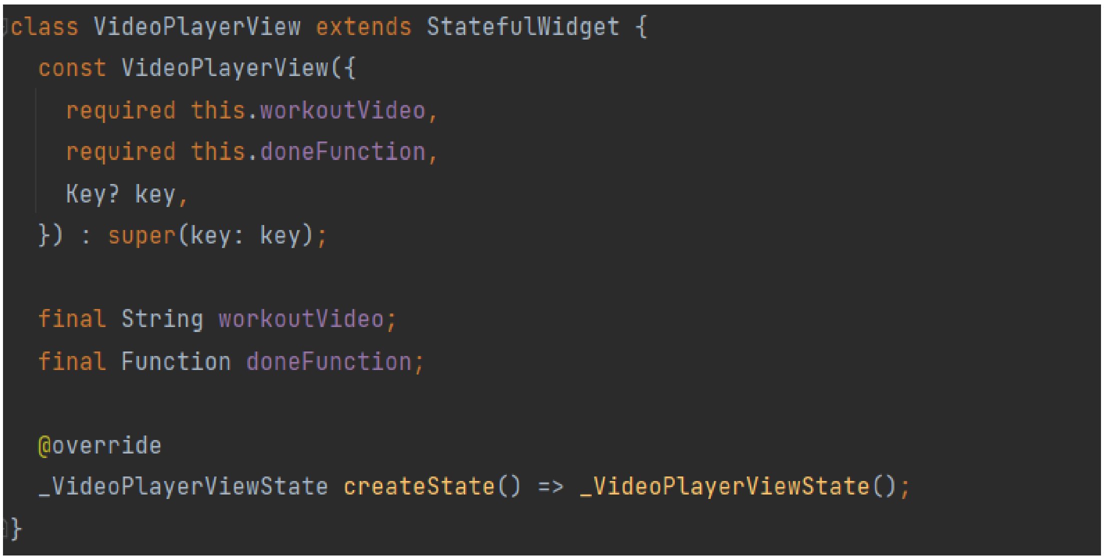
Figure 5-3-18 is the code snippet of all types of workouts. In the workout page, there will be four choices of workouts that allows user to learn and complete.



```
@override
Widget build(BuildContext context) {
  return FutureBuilder<DocumentSnapshot>(
      future: firebaseData.doc(documentId).get(),
      builder:
          (BuildContext context, AsyncSnapshot<DocumentSnapshot> snapshot) {
        //Error Handling conditions
        if (snapshot.hasError) {
          return Text("Something went wrong");
        }

        if (snapshot.hasData && !snapshot.data!.exists) {
          return Text("Document does not exist");
        }

        if (snapshot.connectionState == ConnectionState.done) {
          Map<String, dynamic> data =
              snapshot.data!.data() as Map<String, dynamic>;

          burned = data['foodLogs'][9]['burned'];
          foodLog = FoodLogModel.fromJson(data['foodLogs'][9]);
        }
```

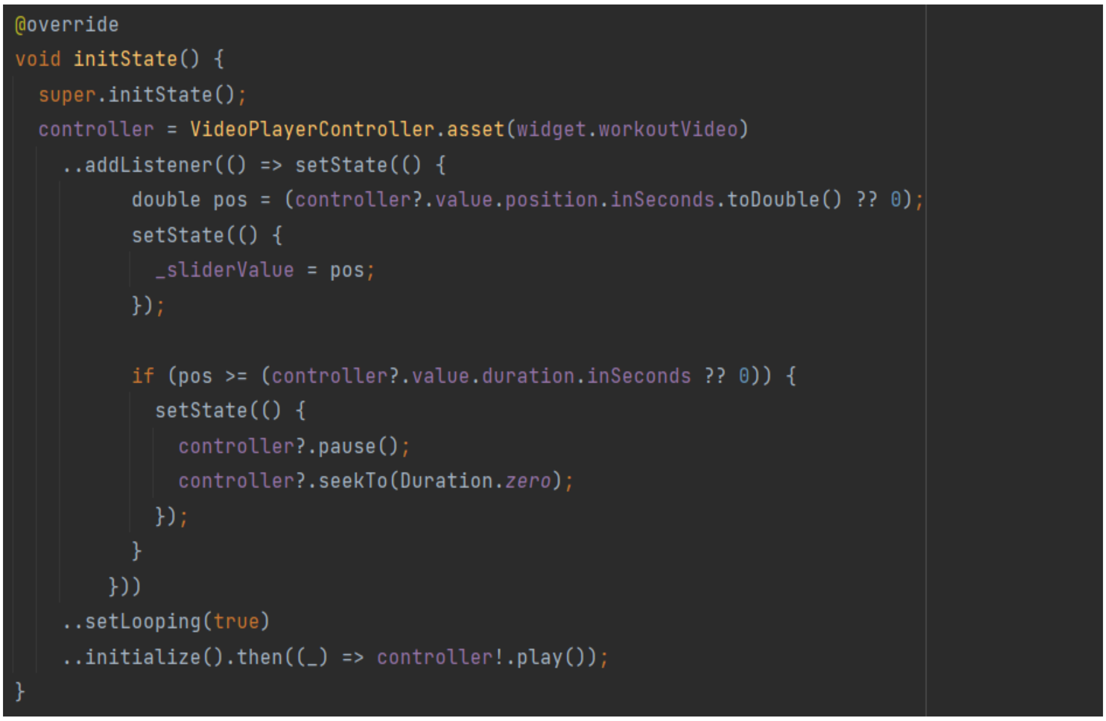
Figure 5-3-19 Code Snippet of Workout Module (2/4)

In figure 5-3-19, if the user completed the workout, the burned calories will be recorded. Furthermore, it will be updated to the Firebase database and to the caloric intake progress of the day.



```
class VideoPlayerView extends StatefulWidget {
  const VideoPlayerView({
    required this.workoutVideo,
    required this.doneFunction,
    Key? key,
  }) : super(key: key);

  final String workoutVideo;
  final Function doneFunction;

  @override
  _VideoPlayerViewState createState() => _VideoPlayerViewState();
}
```

Figure 5-3-20 Code Snippet of Workout Module (3/4)

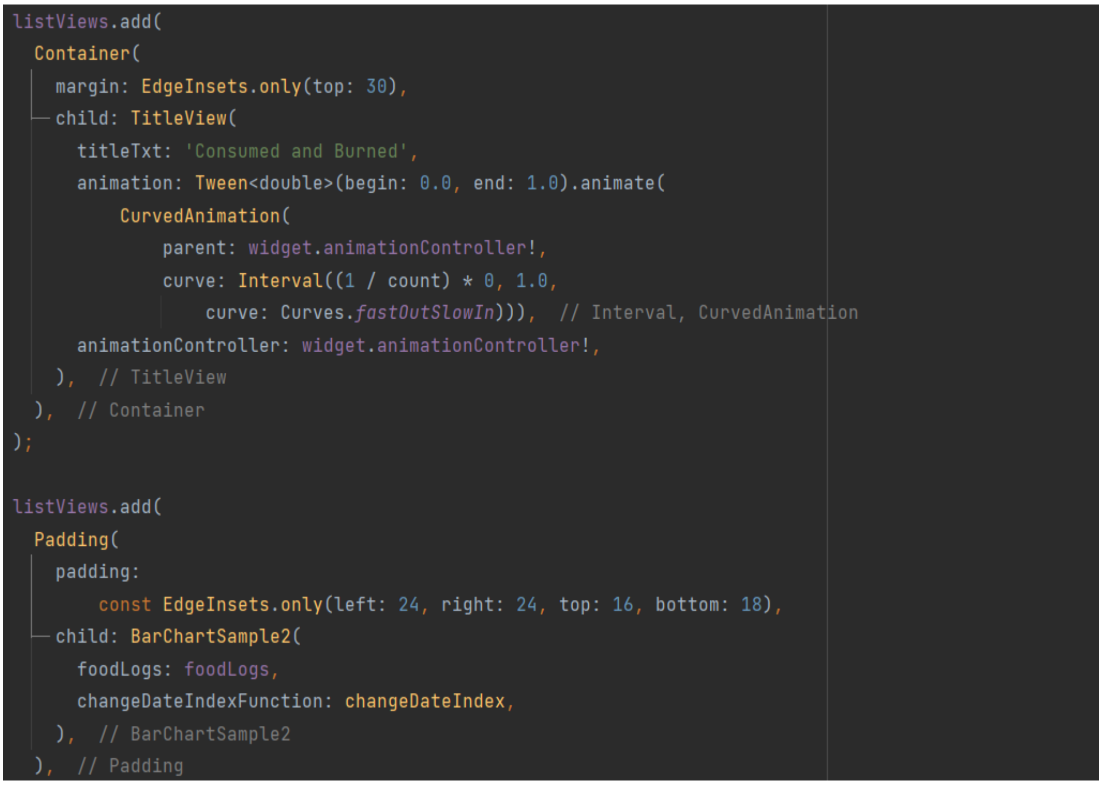


```
@override
void initState() {
  super.initState();
  controller = VideoPlayerController.asset(widget.workoutVideo)
    ..addListener(() => setState(() {
          double pos = (controller?.value.position.inSeconds.toDouble() ?? 0);
          setState(() {
            _sliderValue = pos;
          });

          if (pos >= (controller?.value.duration.inSeconds ?? 0)) {
            setState(() {
              controller?.pause();
              controller?.seekTo(Duration.zero);
            });
          }
        }))
    ..setLooping(true)
    ..initialize().then((_) => controller!.play());
}
```

Figure 5-3-21 Code Snippet of Workout Module (4/4)

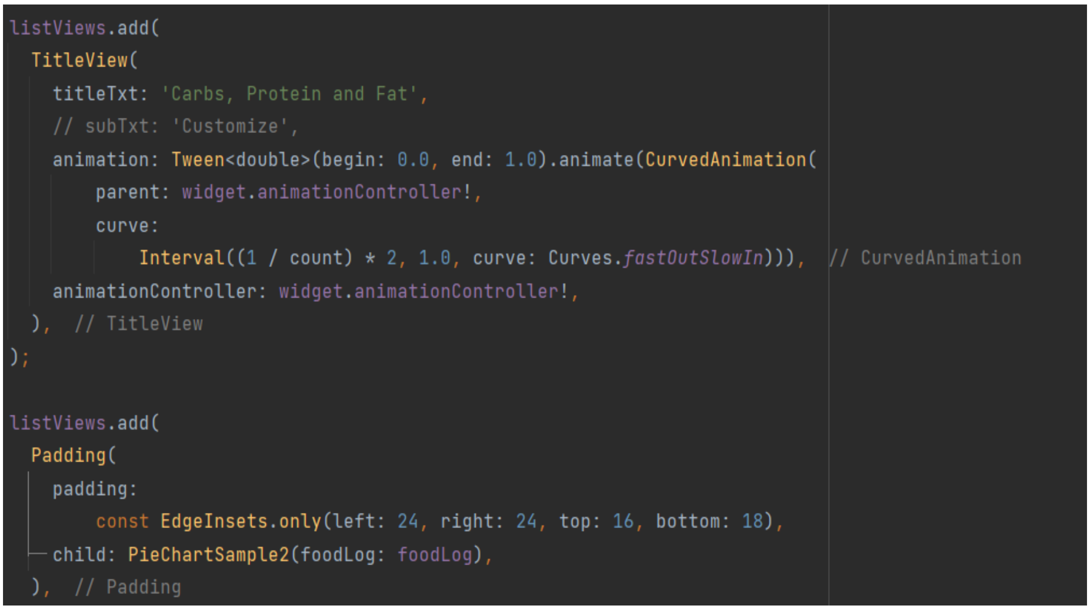
Figure 5-3-20 and figure 5-3-21 showed the code of video player controller. The system allows user to pause workout, scale volume, cancel workout and complete workout. This can improve the interactivity and user friendliness of the system.

Statistic Module



```
listViews.add(
  Container(
    margin: EdgeInsets.only(top: 30),
    child: TitleView(
      titleTxt: 'Consumed and Burned',
      animation: Tween<double>(begin: 0.0, end: 1.0).animate(
          CurvedAnimation(
              parent: widget.animationController!,
              curve: Interval((1 / count) * 0, 1.0,
                  curve: Curves.fastOutSlowIn))),  // Interval, CurvedAnimation
      animationController: widget.animationController!,
    ),  // TitleView
  ),  // Container
);

listViews.add(
  Padding(
    padding:
        const EdgeInsets.only(left: 24, right: 24, top: 16, bottom: 18),
    child: BarChartSample2(
      foodLogs: foodLogs,
      changeDateIndexFunction: changeDateIndex,
    ),  // BarChartSample2
  ),  // Padding
```

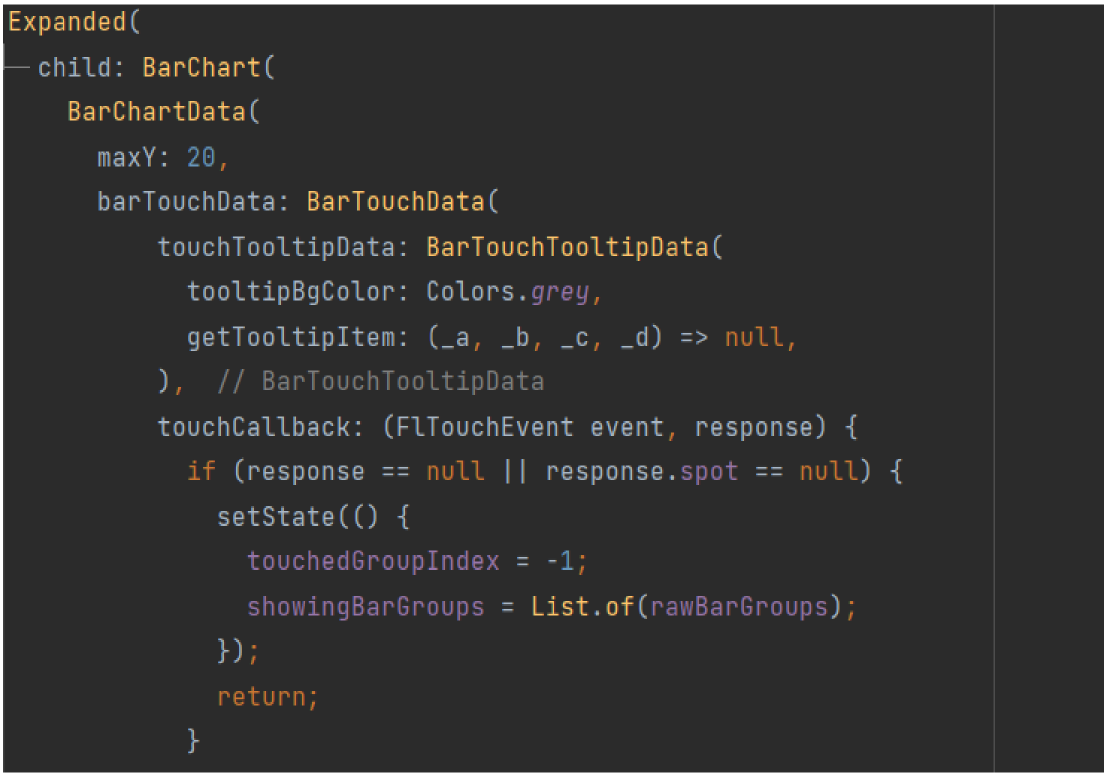
Figure 5-3-22 Code Snippet of Statistic Module (1/4)



```
listViews.add(
  TitleView(
    titleTxt: 'Carbs, Protein and Fat',
    // subTxt: 'Customize',
    animation: Tween<double>(begin: 0.0, end: 1.0).animate(CurvedAnimation(
        parent: widget.animationController!,
        curve:
            Interval((1 / count) * 2, 1.0, curve: Curves.fastOutSlowIn))),  // CurvedAnimation
    animationController: widget.animationController!,
  ),  // TitleView
);

listViews.add(
  Padding(
    padding:
        const EdgeInsets.only(left: 24, right: 24, top: 16, bottom: 18),
    child: PieChartSample2(foodLog: foodLog),
  ),  // Padding
```

Figure 5-3-23 Code Snippet of Statistic Module (2/4)

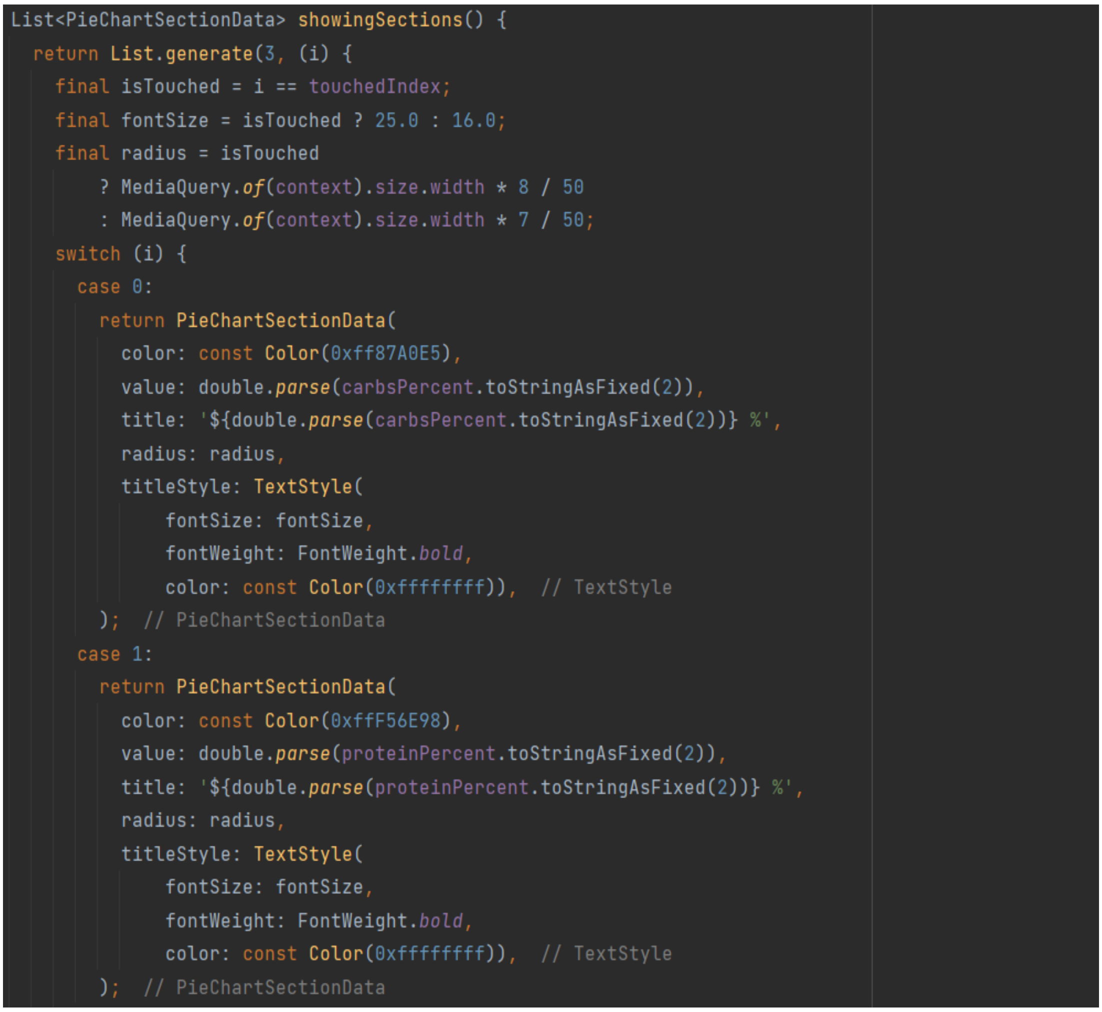
Figure 5-3-24 and figure 5-3-25 are the code of statistic graph view and chart view.



```
Expanded(
  child: BarChart(
    BarChartData(
      maxY: 20,
      barTouchData: BarTouchData(
          touchTooltipData: BarTouchTooltipData(
            tooltipBgColor: Colors.grey,
            getTooltipItem: (_a, _b, _c, _d) => null,
          ),  // BarTouchTooltipData
          touchCallback: (FlTouchEvent event, response) {
            if (response == null || response.spot == null) {
              setState(() {
                touchedGroupIndex = -1;
                showingBarGroups = List.of(rawBarGroups);
              });
              return;
            }
```

Figure 5-3-24 Code Snippet of Statistic Module (3/4)

Figure 5-3-24 is the code of statistic graph feature. User can click on the date of the statistic graph and display the macronutrients distribution chart of the date.



```
List<PieChartSectionData> showingSections() {
  return List.generate(3, (i) {
    final isTouched = i == touchedIndex;
    final fontSize = isTouched ? 25.0 : 16.0;
    final radius = isTouched
        ? MediaQuery.of(context).size.width * 8 / 50
        : MediaQuery.of(context).size.width * 7 / 50;
    switch (i) {
      case 0:
        return PieChartSectionData(
          color: const Color(0xff87A0E5),
          value: double.parse(carbsPercent.toStringAsFixed(2)),
          title: '${double.parse(carbsPercent.toStringAsFixed(2))} %',
          radius: radius,
          titleStyle: TextStyle(
              fontSize: fontSize,
              fontWeight: FontWeight.bold,
              color: const Color(0xffffffff)),  // TextStyle
        );  // PieChartSectionData
      case 1:
        return PieChartSectionData(
          color: const Color(0xffF56E98),
          value: double.parse(proteinPercent.toStringAsFixed(2)),
          title: '${double.parse(proteinPercent.toStringAsFixed(2))} %',
          radius: radius,
          titleStyle: TextStyle(
              fontSize: fontSize,
              fontWeight: FontWeight.bold,
              color: const Color(0xffffffff)),  // TextStyle
        );  // PieChartSectionData
```

Figure 5-3-25 Code Snippet of Statistic Module (4/4)

Figure 5-3-25 showed the code of the chart graph. The chart indicates the macronutrients distribution of a day. User is allowed to visualize the portion of carbs, protein and fat consumed.

5.4 Verification Plan

Calorie and Macronutrients Calculation Module

Test Item	Test Data	Expected Outcome
Edit Personal Information	User's age, gender, height and weight	The information is successfully updated.
Generate Daily Caloric Intake	User's age, gender, height and weight	The Basal Metabolic Rate, Body Mass Index,

		Body Condition and body fat percentage are successfully calculated.
Display the macronutrients distribution and daily caloric intake in home page	Click home page icon	The macronutrients distribution and daily caloric intake are successfully displayed in home page.

Table 5-4-1 Verification Plan of Calorie and Macronutrients Calculation Module

Food Log Module

Test Item	**Test Data**	**Expected Outcome**
Add food to food logger	Select food from food library.	The food is successfully added to food logger.
Update food to food logger	Remove or add food to food logger.	The food is successfully updated to food logger.
View food logger	Scroll to Food Logger section in home page.	The food is displayed at Food Logger section in home page.

Table 5-4-2 Verification Plan of Food Log Module

Workout Module

Test Item	**Test Data**	**Expected Outcome**
Display motivation quote and all workouts in workout page	Click workout page icon.	Motivation quote and all workouts are displayed in workout page.
Play the workout tutorial	Click any one of the workouts tutorials.	The workout tutorial is played.
Complete the workout tutorial	Click the Tick Icon button.	The burned calories are updated to the home page

		under Macronutrients section.
Cancel the workout tutorial	Click the Cross Icon button.	The workout tutorial is stopped.

Table 5-4-3 Verification Plan of Workout Module

Statistic Module

Test Item	**Test Data**	**Expected Outcome**
Display statistic graph and chart	Click the statistic icon on the bottom navigation bar.	The statistic graph and chart are generated and displayed.

Table 5-4-4 Verification Plan of Statistic Module

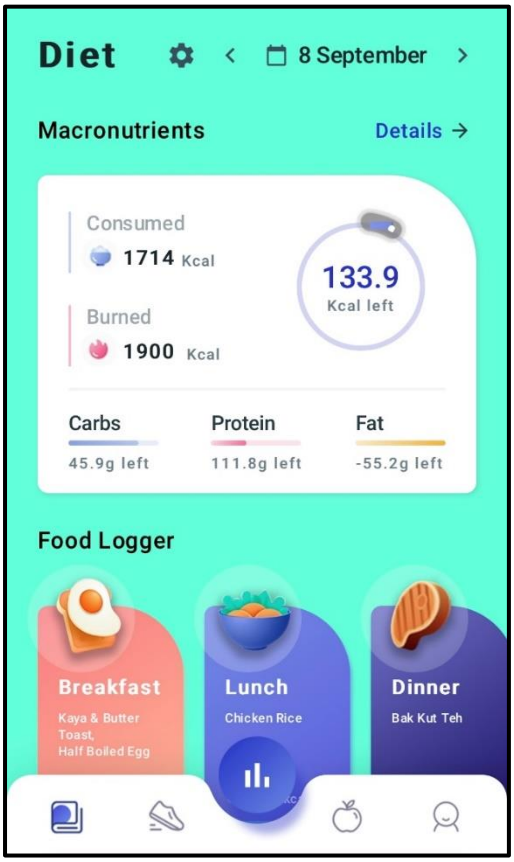
5.5 Implementation of Issues and Challenges

In Malaysia, Android and iOS are the operating systems mostly use in the mobile device. Flutter was chosen to develop the app in this project. It is an open-source and cross-platform SDK that can be used to create apps for both Android and iOS using the same source. Furthermore, Flutter is quite new in the market, the first Flutter SDK was published in 2017, so there are lacking third-party libraries to be implemented to the mobile application development. Moreover, the programming language used in Flutter is Dart, since the programming language is quite new, it is unlikely to be taught in the class. Thus, it required some time to learn this language before developing the app. Besides that, third party API such as Firebase Realtime Database was used to enhance the functionality and interaction with user. It took time to study and learn the configuration of the Firebase database.

Chapter 6 System Evaluation and Discussion

6.1 Screenshots of Developed Prototype

Home Page



Consumed 1714 Kcal

Burned 1900 Kcal

133.9 Kcal left

Carbs 45.9g left

Protein 111.8g left

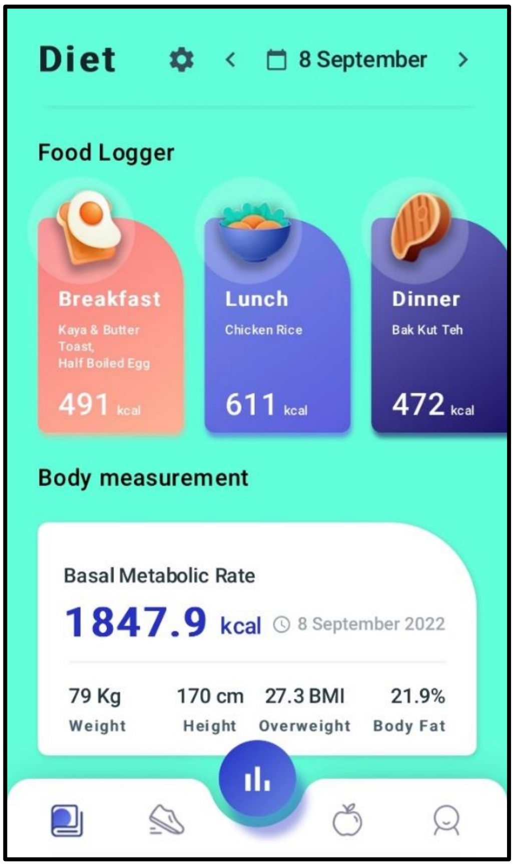
Fat -55.2g left

Breakfast: Kaya & Butter Toast, Half Boiled Egg

Lunch: Chicken Rice

Dinner: Bak Kut Teh

Figure 6-1-1 Screenshot of Home Page (1/2)



Breakfast: Kaya & Butter Toast, Half Boiled Egg — 491 kcal

Lunch: Chicken Rice — 611 kcal

Dinner: Bak Kut Teh — 472 kcal

Basal Metabolic Rate 1847.9 kcal — 8 September 2022

79 Kg Weight

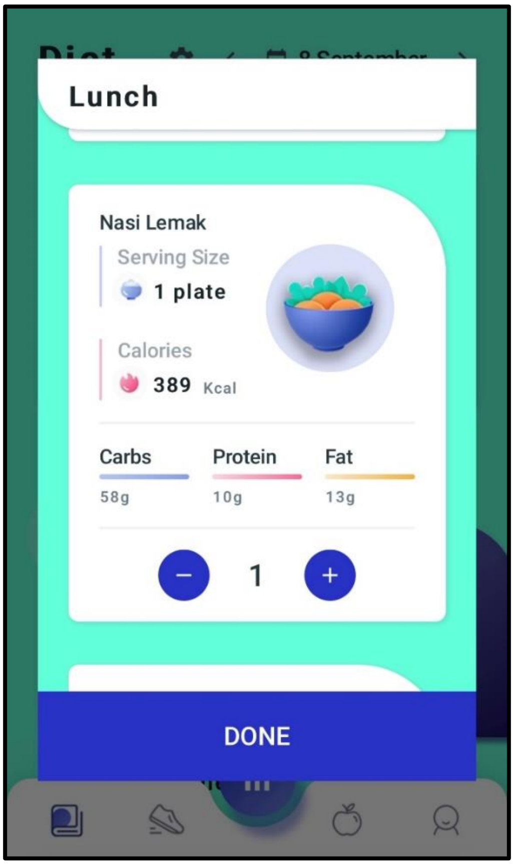
170 cm Height

27.3 BMI Overweight

21.9% Body Fat

Figure 6-1-2 Screenshot of Home Page (2/2)

Figure 6-1-1 and figure 6-1-2 are the screenshots of home page. In the home page, there are three sections: Macronutrients, Food Logger and Body Measurement. In the Macronutrients section, the calories consumed, calories burned, carbs consumed, protein consumed and fat consumed of user will be updated every time the user do his or her food log or complete workout.



Lunch

Nasi Lemak

Serving Size
1 plate

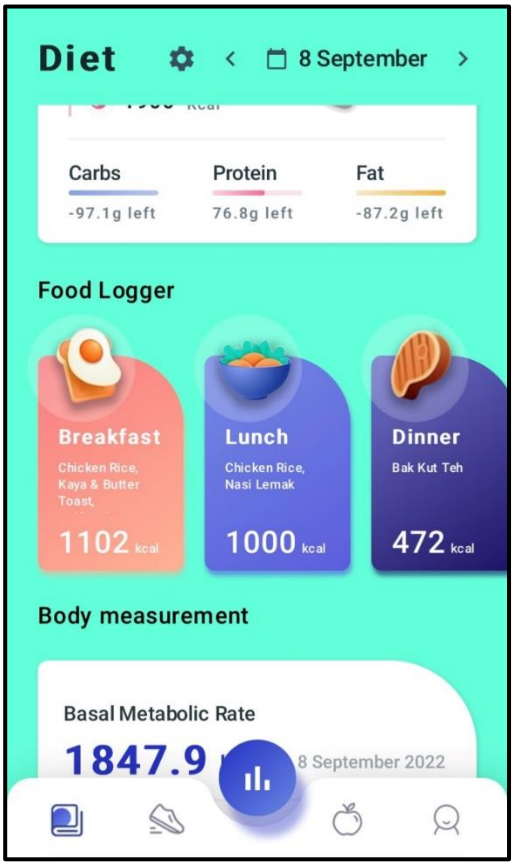
Calories
389 Kcal

Carbs 58g
Protein 10g
Fat 13g

− 1 +

DONE

Figure 6-1-3 Screenshot of Food Logger (1/2)



Diet ⚙ < 8 September >

Carbs -97.1g left
Protein 76.8g left
Fat -87.2g left

Food Logger

Breakfast
Chicken Rice, Kaya & Butter Toast,
1102 kcal

Lunch
Chicken Rice, Nasi Lemak
1000 kcal

Dinner
Bak Kut Teh
472 kcal

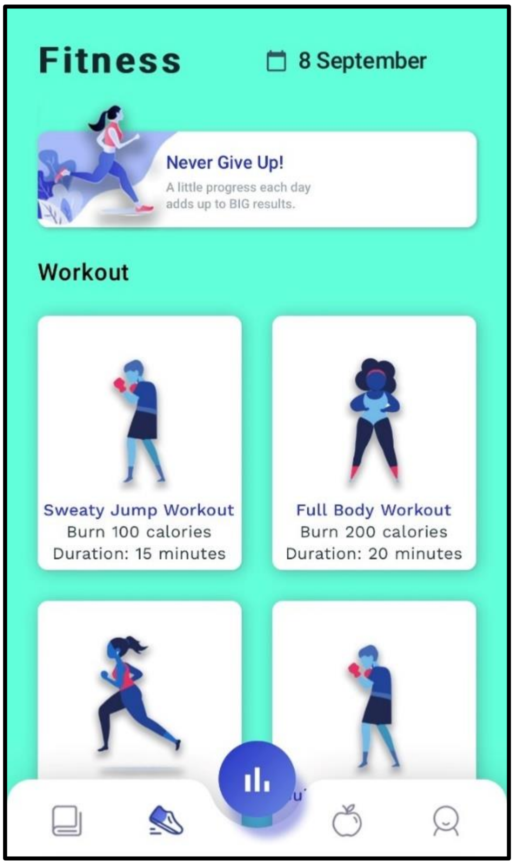
Body measurement

Basal Metabolic Rate
1847.9
8 September 2022

Figure 6-1-4 Screenshot of Food Logger (2/2)

Figure 6-1-3 and figure 6-1-4 are the screenshots of food logger. User can do food log by clicking either “Breakfast”, “Lunch”, “Dinner” or “Snack” icon in the Food Logger section. A food list from food library will be popped up. User can select the food from the food list and scale the portion of food. After adding the food, the food will be displayed in the Food Logger section and the calories consumed will be updated.

Workout Page



Fitness

8 September

Never Give Up!

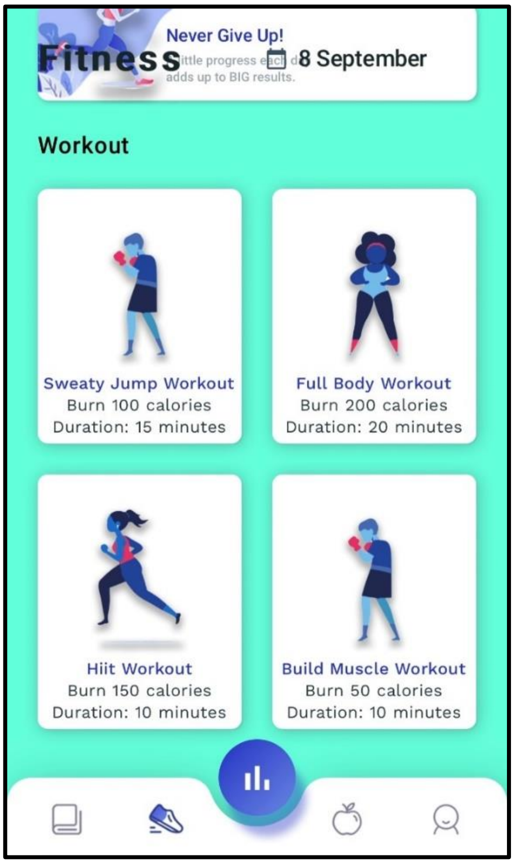
A little progress each day adds up to BIG results.

Workout

Sweaty Jump Workout
Burn 100 calories
Duration: 15 minutes

Full Body Workout
Burn 200 calories
Duration: 20 minutes

Figure 6-1-5 Screenshot of Workout Page (1/4)



Never Give Up!

Fitness

ittle progress each d

adds up to BIG results.

8 September

Workout

Sweaty Jump Workout
Burn 100 calories
Duration: 15 minutes

Full Body Workout
Burn 200 calories
Duration: 20 minutes

Hiit Workout
Burn 150 calories
Duration: 10 minutes

Build Muscle Workout
Burn 50 calories
Duration: 10 minutes

Figure 6-1-6 Screenshot of Workout Page (2/4)

Figure 6-1-5 and figure 6-1-6 are the screenshots of workout page. At the top of workout page, there is a motivation quote section. Below the motivation quote section, there is workout section. In workout section, there are four types of workouts which users can choose to learn.

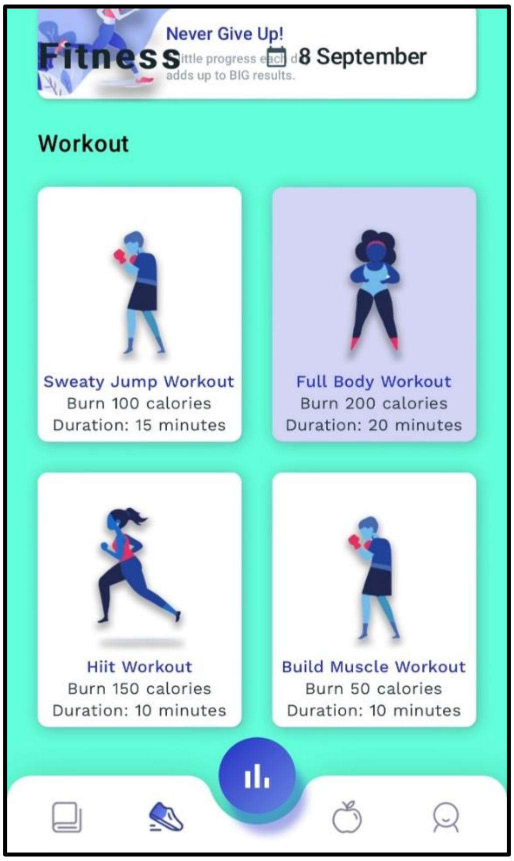


Figure 6-1-7 Screenshot of Workout Page (3/4)

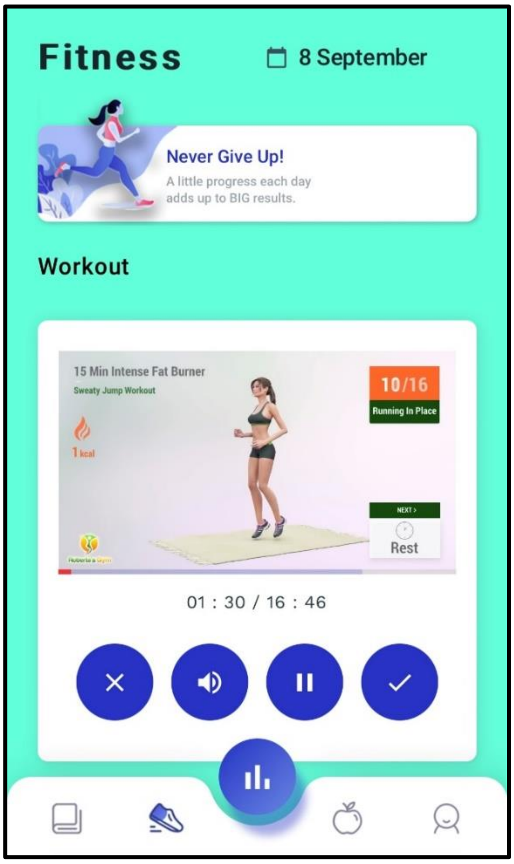
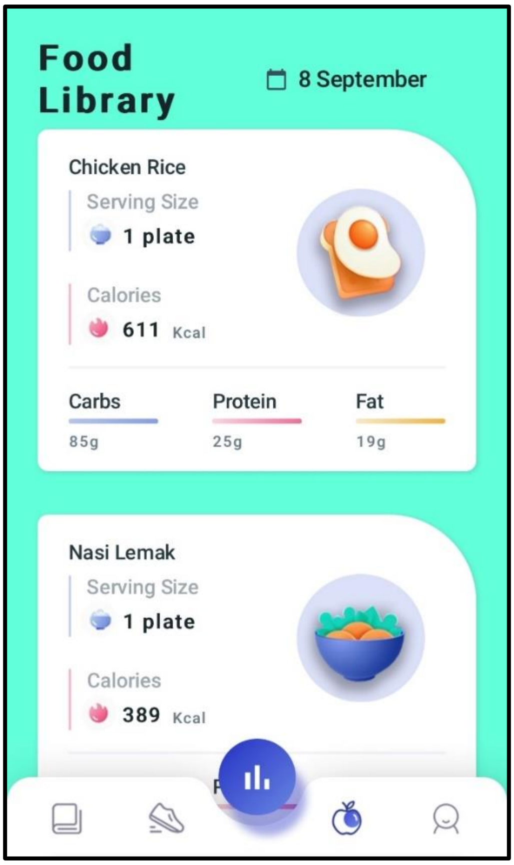


Figure 6-1-8 Screenshot of Workout Page (4/4)

Figure 6-1-7 and figure 6-1-8 are the screenshots of workout page. User can click either one workout to start in the workout section. After clicking, the selected workout tutorial will be played. User can click "CROSS" icon button if user would like to stop the workout. If the user completes the workout, user can click "TICK" icon button to complete the workout. After clicking the "TICK" icon button, the calories burned will be updated to the Macronutrients section in the home page.

Food Library Page



Food Library

8 September

Chicken Rice

Serving Size

1 plate

Calories

611 Kcal

Carbs	Protein	Fat
85g	25g	19g

Nasi Lemak

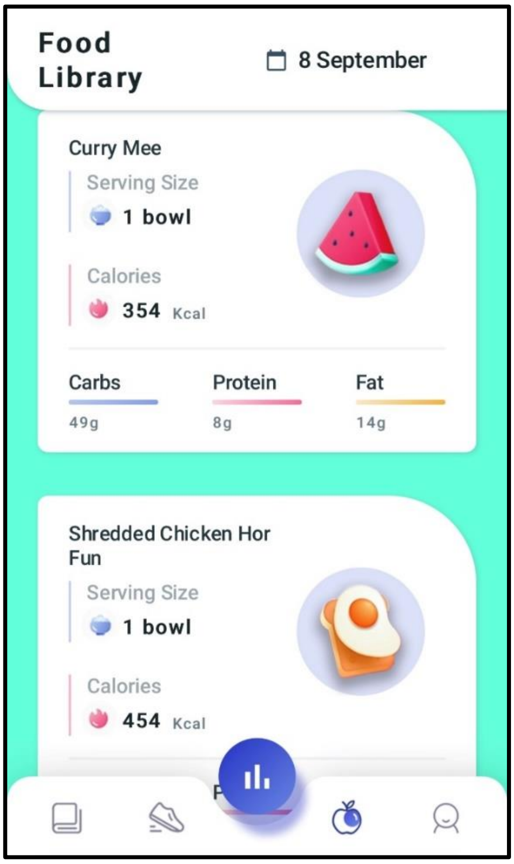
Serving Size

1 plate

Calories

389 Kcal

Figure 6-1-9 Screenshot of Food Library Page (1/2)



Food Library

8 September

Curry Mee

Serving Size

1 bowl

Calories

354 Kcal

Carbs	Protein	Fat
49g	8g	14g

Shredded Chicken Hor Fun

Serving Size

1 bowl

Calories

454 Kcal

Figure 6-1-10 Screenshot of Food Library Page (2/2)

Figure 6-1-9 and figure 6-1-10 are the screenshots of food library page. There are 30 foods in the food library. The details of food such as serving size, calories, carbs, protein and fat were defined. When the users do their food log, they can choose the food from food library, then add it to food logger.

Statistic Page

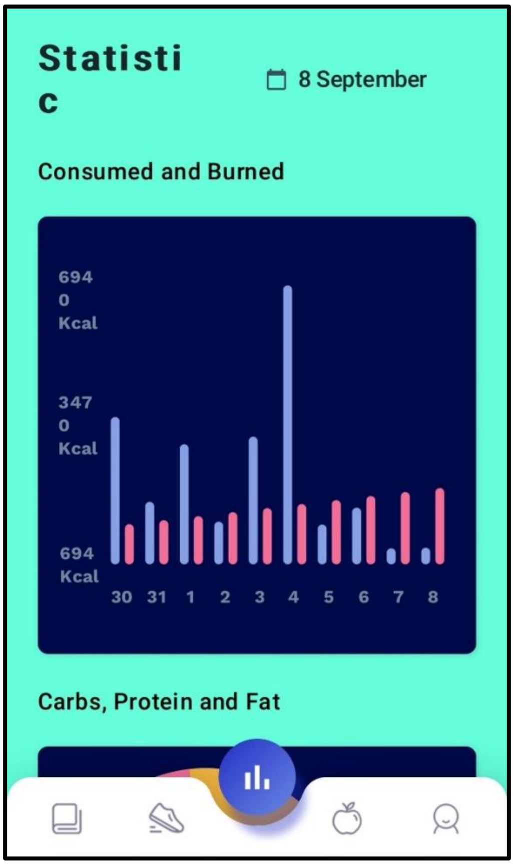


Figure 6-1-11 Screenshot of Statistic Page (1/2)

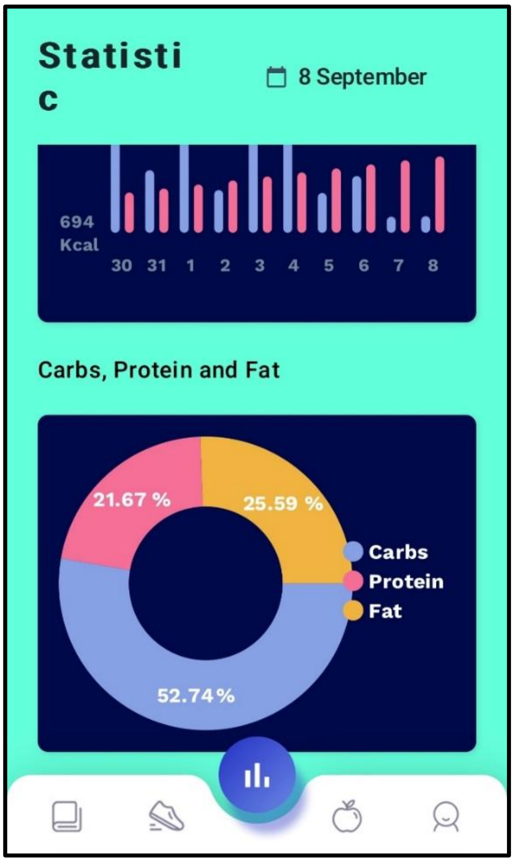
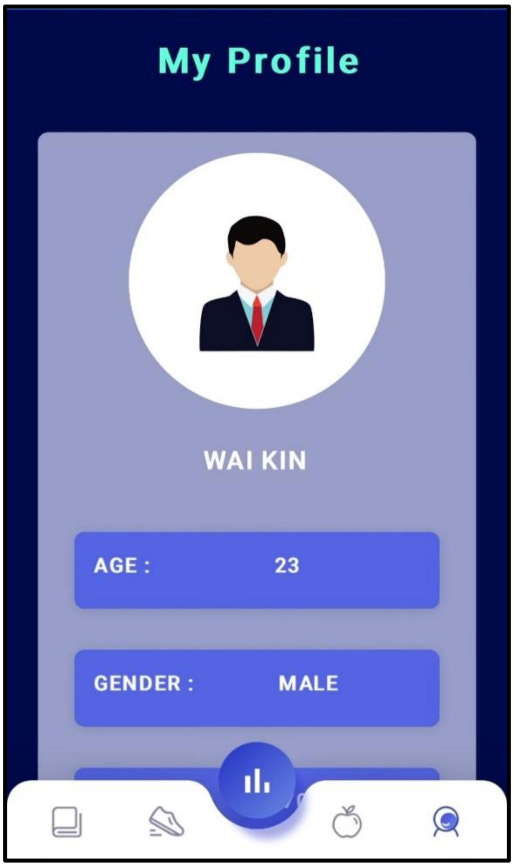


Figure 6-1-12 Screenshot of Statistic Page (2/2)

Figure 6-1-11 and figure 6-1-12 are the screenshots of statistic page. There are two sections in statistic page: Consumed and Burned, Carbs, Protein and Fat. In the consumed and burned section, a statistic graph will be generated. The statistic concludes the calories consumed and calories burned in a day and 10-day of records will be showed. Moreover, in the Carbs, Protein and Fat section, a pie chart will be generated. It concludes the carbs, protein and fat consumed in a day.

Profile Page



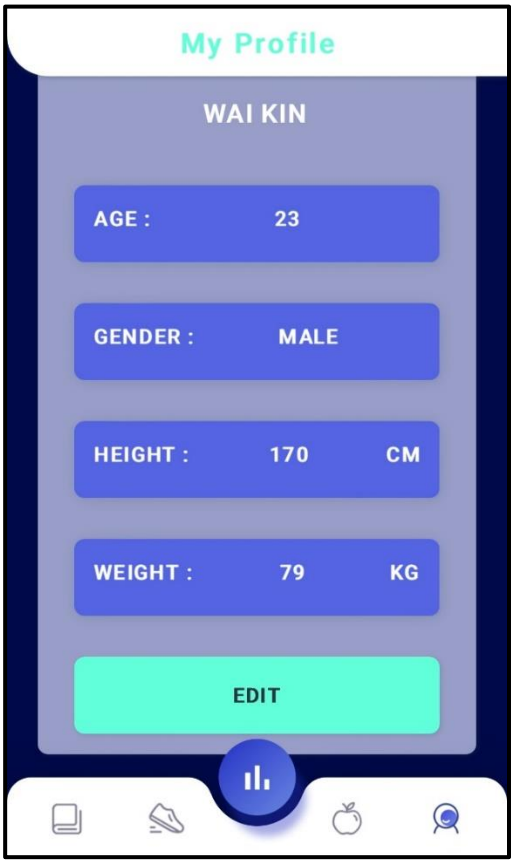
My Profile

WAI KIN

AGE : 23

GENDER : MALE

Figure 6-1-13 Screenshot of Profile Page (1/2)



My Profile

WAI KIN

AGE : 23

GENDER : MALE

HEIGHT : 170 CM

WEIGHT : 79 KG

Figure 6-1-14 Screenshot of Profile Page (2/2)

Figure 6-1-13 and figure 6-1-14 are the screenshots of profile page. The name, age, gender, height and weight will be displayed in profile page. User can click “EDIT” button to edit the personal information of user. The changes of information will update the data of Body Measurement in the home page.

6.2 Verification Result

Calorie and Macronutrients Calculation Module

Test Item	**Test Data**	**Expected Outcome**	**Actual Outcome**	**Result (Pass/Fail)**
Edit Personal Information	User’s age, gender, height and weight	The information is successfully updated.	The information is successfully updated.	Pass
Generate Daily Caloric Intake	User’s age, gender, height and weight	The Basal Metabolic Rate, Body Mass Index, Body Condition and body fat percentage are successfully calculated.	The Basal Metabolic Rate, Body Mass Index, Body Condition and body fat percentage are successfully calculated.	Pass
Display the macronutrients distribution and daily caloric intake in home page	Click home page icon	The macronutrients distribution and daily caloric intake are successfully displayed in home page.	The macronutrients distribution and daily caloric intake are successfully displayed in home page.	Pass

Table 6-2-1 Verification Result of Calorie and Macronutrients Calculation Module

Food Log Module

Test Item	**Test Data**	**Expected Outcome**	**Actual Outcome**	**Result (Pass/Fail)**
Add food to food logger	Select food from food library.	The food is successfully added to food logger.	The food is successfully added to food logger.	Pass
Update food to food logger	Remove or add food to food logger.	The food is successfully updated to food logger.	The food is successfully updated to food logger.	Pass
View food logger	Scroll to Food Logger section in home page.	The food is displayed at Food Logger section in home page.	The food is displayed at Food Logger section in home page.	Pass

Table 6-2-2 Verification Result of Food Log Module

Workout Module

Test Item	**Test Data**	**Expected Outcome**	**Actual Outcome**	**Result (Pass/Fail)**
Display motivation quote and all workouts in workout page	Click workout page icon.	Motivation quote and all workouts are displayed in workout page.	Motivation quote and all workouts are displayed in workout page.	Pass
Play the workout tutorial	Click any one of the workouts tutorials.	The workout tutorial is played.	The workout tutorial is played.	Pass

Complete the workout tutorial	Click the Tick Icon button.	The burned calories are updated to the home page under Macronutrients section.	The burned calories are updated to the home page under Macronutrients section.	Pass
Cancel the workout tutorial	Click the Cross Icon button.	The workout tutorial is stopped.	The workout tutorial is stopped.	Pass

Table 6-2-3 Verification Result of Workout Module

Statistic Module

Test Item	**Test Data**	**Expected Outcome**	**Actual Outcome**	**Result (Pass/Fail)**
Display statistic graph and chart	Click the statistic icon on the bottom navigation bar.	The statistic graph and chart are generated and displayed.	The statistic graph and chart are generated and displayed.	Pass

Table 6-2-4 Verification Result of Statistic Module

6.3 Objectives Evaluation

In this project, the main objective of developing a diet and fitness mobile application by integrating the diet app with fitness app was achieved. The sub-objective was achieved too. The developed app was integrated with food log feature and statistic feature. The final developed app consists of calorie and macronutrients calculation module, workout module, food log module and statistic module. With the help of this mobile application, users should be able to develop a healthy lifestyle.

Chapter 7 Conclusion

7.1 Work Done in FYP2

In the semester of FYP1, partial of the user interfaces were developed but without any functionality. In this semester, new user interfaces were added into the mobile application. During the previous semester break, several Flutter and Dart courses were attended to learn about these platform and programming language. In order to code all the proposed modules, more than a month was taken to do research and practice. All modules such as Calorie and Macronutrients Calculation, Food Log, Workout and Statistic Modules were successfully developed. During the development stage, several versions were developed to make sure the functionalities and user friendliness shall be able to satisfy the users. At the end of this project, a mobile of diet and fitness was delivered. Users can enjoy both of diet and fitness feature in a mobile application instead of switching two different applications. Furthermore, the mobile application is very easy to use, the user interfaces are simple and nice. Users should be able to explore and use it.

7.2 Limitations of the Proposed Application

There are limitations of the proposed application. User can only add the food to the food logger from the food library. However, there are only 30 foods in the food library. If the user would like to add the food which is not in the food library, user may not be able to record it.

7.3 Future Work

Due to time restriction and insufficient resource, the food logger feature is not so ideal. For further improvement, the food library can be integrated with third party resource. For instance, the third-party recourse could be a food library which consists of foods from all around the world, so that user can add the food to the food logger by searching the food from the food library.

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FINAL YEAR PROJECT BIWEEKLY REPORT

(Project II)

Trimester, Year: Trimester 1, Year 4	**Study week no.: 3**
Student Name & ID: FOO WAI KIN 19ACB04430	
Supervisor: DR CHAI MEEI TYNG	
Project Title: A Mobile Application of Diet and Fitness	

1. WORK DONE

Do research on Flutter and Dart.

2. WORK TO BE DONE

Be familiar with Flutter and Dart

3. PROBLEMS ENCOUNTERED

-

4. SELF EVALUATION OF THE PROGRESS

Fair

tyng

Supervisor's signature

Student's signature

FINAL YEAR PROJECT BIWEEKLY REPORT

(Project II)

Trimester, Year: Trimester 1, Year 4	**Study week no.: 5**
Student Name & ID: FOO WAI KIN 19ACB04430	
Supervisor: DR CHAI MEEI TYNG	
Project Title: A Mobile Application of Diet and Fitness	

1. WORK DONE

Modify user interface and code new user interfaces.

2. WORK TO BE DONE

Code the function in profile page

3. PROBLEMS ENCOUNTERED

-

4. SELF EVALUATION OF THE PROGRESS

Fair

tyng

Supervisor's signature

Student's signature

FINAL YEAR PROJECT BIWEEKLY REPORT

(Project II)

Trimester, Year: Trimester 1, Year 4	**Study week no.: 7**
Student Name & ID: FOO WAI KIN 19ACB04430	
Supervisor: DR CHAI MEEI TYNG	
Project Title: A Mobile Application of Diet and Fitness	

1. WORK DONE

Code function in profile page.

2. WORK TO BE DONE

Code function of food logger module.

3. PROBLEMS ENCOUNTERED

Did not get sufficient resources.

4. SELF EVALUATION OF THE PROGRESS

Fair

tyng

Supervisor's signature

Student's signature

FINAL YEAR PROJECT BIWEEKLY REPORT

(Project II)

Trimester, Year: Trimester 1, Year 4	**Study week no.: 9**
Student Name & ID: FOO WAI KIN 19ACB04430	
Supervisor: DR CHAI MEEI TYNG	
Project Title: A Mobile Application of Diet and Fitness	

1. WORK DONE

Code function of food logger module.

2. WORK TO BE DONE

Code function of workout module.

3. PROBLEMS ENCOUNTERED

-

4. SELF EVALUATION OF THE PROGRESS

Quite satisfied

tyng

Supervisor’s signature

Student’s signature

FINAL YEAR PROJECT BIWEEKLY REPORT

(Project II)

Trimester, Year: Trimester 1, Year 4	**Study week no.: 11**
Student Name & ID: FOO WAI KIN 19ACB04430	
Supervisor: DR CHAI MEEI TYNG	
Project Title: A Mobile Application of Diet and Fitness	

1. WORK DONE

Code function of workout module.

2. WORK TO BE DONE

Code all the function of home page and statistic page. Prepare report.

3. PROBLEMS ENCOUNTERED

-

4. SELF EVALUATION OF THE PROGRESS

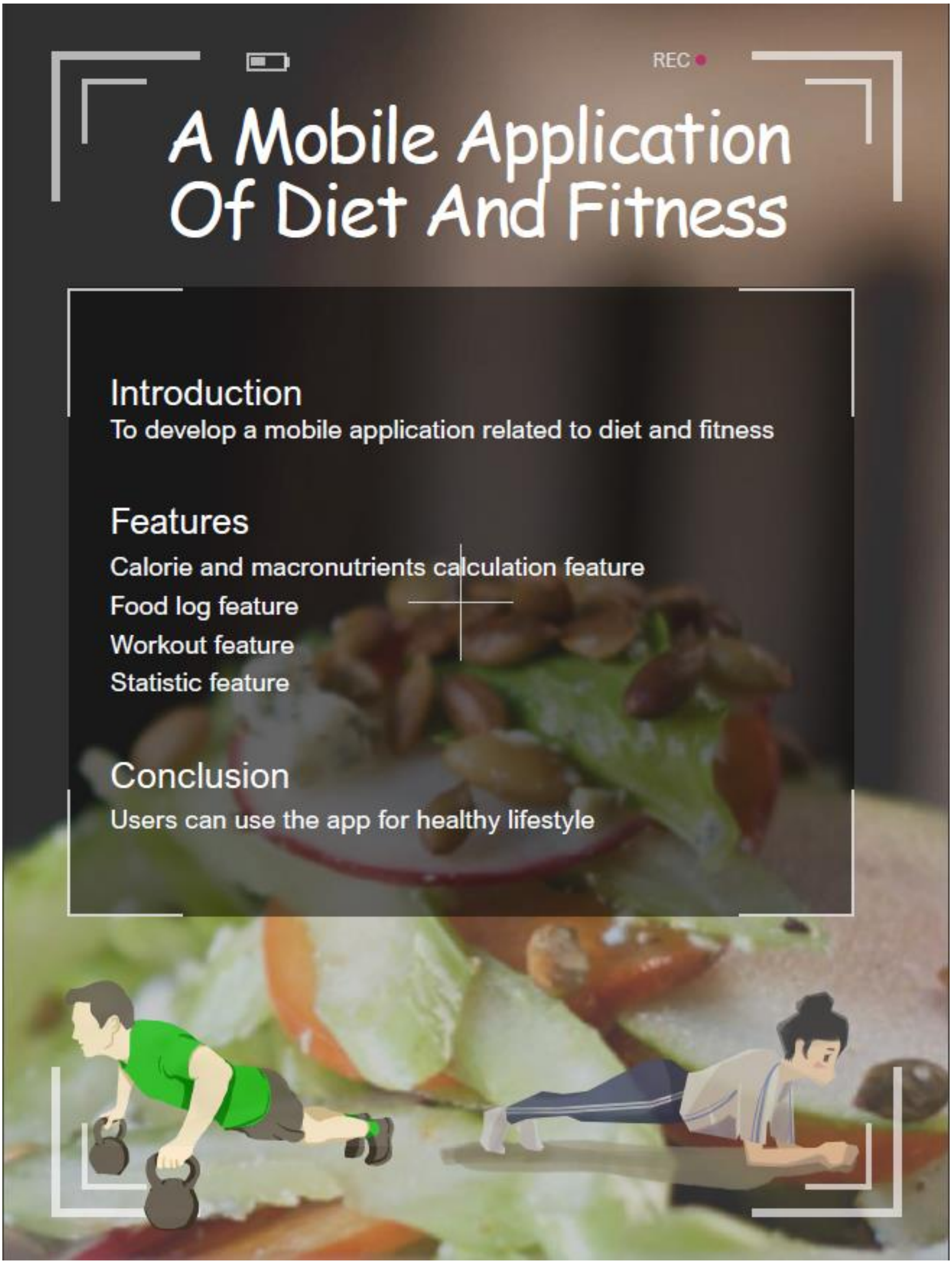
Quite satisfied

tyng

Supervisor's signature

Student's signature

Poster



A Mobile Application Of Diet And Fitness

Introduction

To develop a mobile application related to diet and fitness

Features

Calorie and macronutrients calculation feature

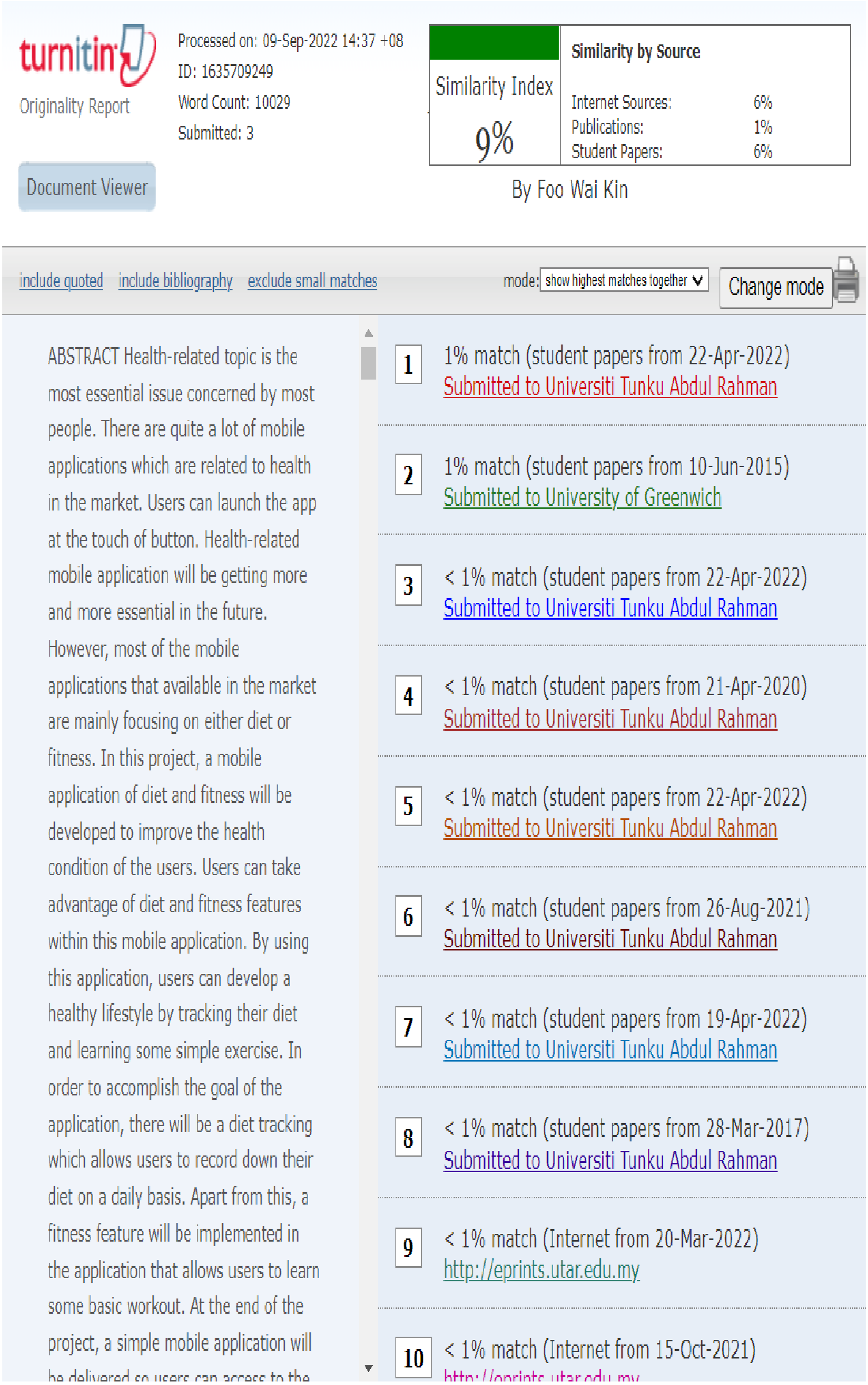
Food log feature

Workout feature

Statistic feature

Conclusion

Users can use the app for healthy lifestyle



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ABSTRACT Health-related topic is the most essential issue concerned by most people. There are quite a lot of mobile applications which are related to health in the market. Users can launch the app at the touch of button. Health-related mobile application will be getting more and more essential in the future. However, most of the mobile applications that available in the market are mainly focusing on either diet or fitness. In this project, a mobile application of diet and fitness will be developed to improve the health condition of the users. Users can take advantage of diet and fitness features within this mobile application. By using this application, users can develop a healthy lifestyle by tracking their diet and learning some simple exercise. In order to accomplish the goal of the application, there will be a diet tracking which allows users to record down their diet on a daily basis. Apart from this, a fitness feature will be implemented in the application that allows users to learn some basic workout. At the end of the project, a simple mobile application will be delivered so users can access to the

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Programme / Course	CS
Title of Final Year Project	A Mobile Application of Diet and Fitness

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