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Final Report

Fitness App

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I confirm that I understand my coursework needs to be submitted online via Google Classroom under the relevant module page before the deadline in order for my assignment to be accepted and marked. I am fully aware that late submissions will be treated as non-submission and a mark of zero.

ABSTRACT

Brain function generally declines with age after the fifth decade. EEG Studies generally report that low- frequency EEG activity decreases with age while high-frequency EEG increases, the latter possibly for compensatory reasons. Because the exercise has been reported to improve brain neurobiology such as cerebral metabolism and neurotransmitter function. It was expected that exercise would attenuate the age-related changes in the human activity. (Walden, 2003)

The popularity of fitness application has presented an interesting topic to mobile application developers. Fitness application are designed to assists users in pursuing a healthy lifestyle by encouraging to be more active and follow the fitness routine. According to a survey, users tend to seek proper workouts guides and techniques provided by the instructor on their mobile application. People want the exact proper guidelines and instructions provided by the instructor when they are away from the gym or they cannot go to gym. This need of the people can be taken into consideration for the development of this project. This Android application incorporates step tracking algorithms with workout and diet plan method description. User can track their steps, time and complete their workout session using this app.

Developing an Android application is considered as a difficult task which requires a lot of hard work and dedication. Various research on similar application were carried out in order to find out the missing features of the applications. After getting knowledge about the missing features of the various applications, the missing features could be implemented in this project. For the project (Get-Fit Fitness Application) to complete on the specified time period a Gantt chart was developed. Use case was developed in order to defines actors and the roles of the actors that they play in the android application. Then moving on to the methodology portion, for the selection of a right methodology for the project various research were carried out in different methodology in order to identify advantages and dis-advantages of various methodology. Finally, for the completion of this project SCRUM was used as software methodology which falls under the Agile Methodology of Software Development Life Cycle.

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Chapter 1: Introduction

1.1. Introduction to topic

In today's digital world, there is very little that gets done without a smartphone. While phones are getting smarter and slimmer, the people using them are getting lazier and heavier day by day. However, with the help of health and fitness apps, one can lose inches and get fit as well. These kinds of mobile apps are designed to promote healthier living.

At present, the interest in fitness aiding technologies is also on the rise, especially wearable devices such as smartwatches. To aid these smart devices in becoming companions for individual's fitness and health-related activities, mobile applications are needed. Health and fitness applications can include – fitness tracking, data storage and management, nutrition and diet guide, fitness activity, medical and general health companion etc. As per a recent research by Flurry Analytics, demand for the health and fitness apps has grown by 330% in 3 years, with 25% users accessing their fitness apps more than 10 times a week.

For the fitness enthusiast, it would not be far-fetched to be saying that they are addicted to their fitness applications. Also, for those who are using health companion guides to keep track of their diet or medication, they rely on these applications to send them reminders and to enable them to make healthy choices. The demand for studio and fitness apps is highest and users have voiced their need for using their mobile application through their workout session. Due to this preference, gyms and studios are offering an application that users can use during their workout sessions. Gym-goers are no longer content with simple information such as their weight. What they are curious to know more about is their progress, from body fat percentage to sleep quality. Hence there is substantial scope for health and fitness application growth. (Rich, 2019)

1.2. Current Scenario

Keeping the current scenario in mind, I urged to develop such health and fitness application which would cover most of the fitness features such as activity tracking, healthy diet plan, workouts and exercises, calorie measurement, etc. This application helps people struggling with obesity to adopt a healthy workout routine. Many apps have already been created to help out people who want to have a better diet or to be able to track calories but, none of them teach users where to start. MyFitnessPal is a popular app that calculates calories and recommends daily calorie intake based on one's weight and height. Fooducate, a similar food app, gives nutritional value of the food that one searches up by barcode. All these apps are very helpful. Nevertheless, I think it would be great to have a single platform for all these features with better design. The app certainly creates positive impact on its users: The fitness routines can be more affordable and accessible; one can set realistic fitness goals and monitor their workout routines. (IBIS World, 2020)

Due to rapid growth of health-conscious people over the past few years the fitness mobile application industry has also flourished. In this age of mobile computing every fitness freak tends to track their activities through a type of mobile application. Moreover, such apps can help one to stay connected with people having same fitness goals.

1.3. Problem Domain and Project as Solution

In the current context of Nepal there are limited number of android fitness application in the market. And this situation acts as an advantage for this project. This project can be regarded valuable for filling the need of fitness application in the current Nepali market. In distinction to my survey regarding the development of this app, I found out that people want to get healthier. However, are not motivated to start working out and eating healthy because they feel like they have to get mentally prepared and clean up their schedule. Although, there are a group of people that have already started their exercise routine and are loving it so far.

According to survey and interview, these were the main problems people faced while maintaining their fitness.

- Improper Workout Plans
- Improper Step Tracking
- Time Management
- No information on exact calorie burned and gain, etc.

The project is aimed to develop a fitness application which shall provide a clear and efficient user interface that helps to promote a healthy life style for the people of all ages. This app is able to track time, distance, calories burn, pace during a running session, and record information within its internal files. Users are primarily allowed to know the important and necessary information about the types of exercises, meal plans, their progress and many more. Suggesting the fitness routine according to gender, different types of workouts according to muscles, instructions for movements according to targeted muscle workouts, comparing performance and progress by generating BMI (Body Mass Index), planning personalized exercise routine, tracking steps, distance, time, counting calories etc. can be stated as the salient features of the application.

1.4. Aims and Objectives

The project is aimed to develop a fitness application which will provide a clear, usable and efficient user interface which will promote a healthy life style for the people of all ages. This android app will be able to track time, distance, calories burn and will be able to record information within its internal files.

- Get information about what the users need and what functionally is going to be useful.
- Collect various information through similar systems
- Evaluate several user interfaces through other systems based on user interface principles.
- Creating a user-friendly fitness application for the main objective of keeping users fit and in shape.
- Implementing pedometer feature for the users so that they can track their step data.
- Create a section called Workouts where user can train themselves with the help of detailed workouts sessions displayed
- Categorizing Exercises according to body parts
- Categorizing Workouts is in different categories
- Create a timer which helps the users to track time during workouts
- Create a section called Nutrition where user can get diet plans
- Implementing BMI feature so that the users can indicate whether they are underweight or if they have a healthy weight, excess weight, or obesity
- Implementing a progress feature in which users can update their height and weight and check BMI
- Create a section where the daily workout done is recorded which helps the users to know the number of exercises, total workout time and calories burned
- Design a database and connect it to the application for the security purposes.
- To develop the complete system within time.

1.5. Structure of Report

The following format below showcases how the structuring of the report is organized.

1.5.1. Chapter 1: Introduction

This part of the section discusses about the subject matter of the project. Furthermore, it gives us a brief history and developments on the specific field and also showcasing the problems, its solutions and aims and objectives of the project.

1.5.2. Chapter 2: Background

This part of the section showcases the context and background that are interrelated to the project. It consists of information about understanding the solution for problem, review of similar apps, comparison of those apps and review of various technical aspects of application and features of the application. It gives an insight view regarding the technology used for the development phase of the project.

1.5.3. Chapter 3: Development

This chapter consists the information about the methodology, choice of methodology and different phases of methodology.

1.5.4. Chapter 4: Testing/Analysis

This chapter consists of the information which are related to optimal solution of the projects, evaluation of the system, operations of the system etc.

1.5.5. Chapter 5: Conclusion

This chapter consists of information related to supposition of the report, review of wider implications and future improvements for the project etc.

Chapter 2: Background

2.1. Understanding the Solution

The Android operating system is a Linux based operating system developed for mobile devices. Unlike Apple's iOS, it is open source, meaning that the developers can modify and customize the OS for each phone. Thus, different Android-based phones often have different graphical user interfaces GUIs even though they use the same OS. (Tech Terms, 2016)

Android is Google's mobile operating system which was launched in September 2008. Although its history technically began in November 2007 with the release of the Android alpha. (9T05Google, 2020)

2.1.1. Android

Figure 1: Android Versions (Falana, 2019)

2.2.2. Fitness Application

A type of software or application which is used to provide the user with a wide variety of specific different types of fitness steps that can be followed, rated, played and viewed which gives the instruction in a physical exercise class by a qualified instructor/application that is accessible and affordable to each and every member of the society and some available for free.

In simple human understanding a fitness app is an application which can be downloaded on any mobile devices which can be used anywhere to be fit.

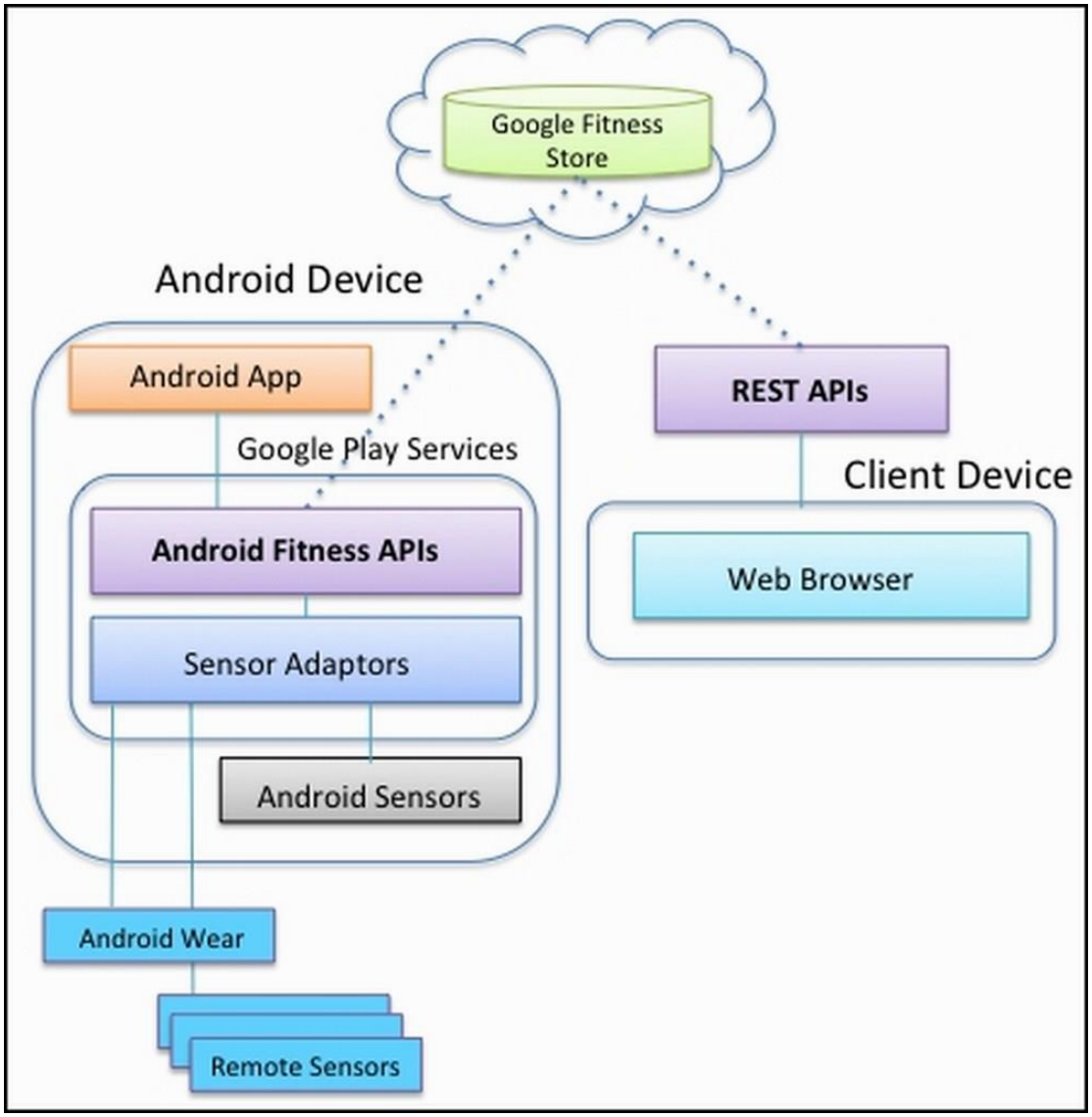


Figure 2: Google Fitness Store (Packt, 2020)

2.2.3. Functions and Features of Exercises

The functions and features listed in the application are based on the requirements given by the client. The feature required are as follows:

2.2.3.1. List of Exercises

Defined as an activity requiring physical effort, carried out to sustain or improve health and fitness.

Exercises is separated into 8 categories according to muscles parts in this project:

- Upper Body Exercises
- Lower Body Exercises
- Abs Exercises
- Full Body Exercises
- Strong Back Exercises
- Full Body Stretching
- Upper Body Stretching
- Lower Body Stretching

2.2.3.2. Workout Plan

Defined as a session of vigorous physical exercise or training.

Workout is separated into four major categories in the project:

1. Full Body Gainer: Workouts related to whole body parts for bulking.
2. Muscle & Strength: Workouts related to the muscles for increasing the Strength or Power in a person are present in this section.
3. Fit Life Starter: Workouts related to cardio, yoga for a healthy lifestyle.
4. Insane Six Packs: Workouts related to the abdominal region of the body are present in this section.

5. Weight Loss Starter: Workouts related to burning the unwanted body fat is present in this section.

2.2.3.3. Nutrition

A healthy eating plan gives your body the nutrients it needs every day while staying within your daily calorie goal for weight loss. A healthy eating plan: Emphasizes vegetables, fruits, whole grains, and fat-free or low-fat dairy products. It includes lean meats, fish, poultry, beans, eggs, and nuts. (NHLBI, 2020)

There is a 7-day diet plan with proper recipe and calories for breakfast, lunch and dinner.

2.2.3.4. Pedometer

Pedometer is an instrument which records the distance a person covers on foot by responding to the body motion at each step. (Merriam-Webster, 2020)

2.2.3.5. BMI (Body Mass Index)

BMI is a person's weight in kilograms divided by height in meters squared. NIH (National Institutes of Health) defines normal weight, overweight, and obesity according to BMI rather than the traditional height/weight charts.

- Overweight is a BMI of 27.3 or more for women and 27.8 or more for men.
- Obesity is a BMI of 30 or more for either sex (about 30 pounds overweight).
- A very muscular person might have a high BMI without health risks.

The things listed above are the contents that will be included in this project. These contents are the requirements for the development of the Get-Fit Fitness application.

2.3.4. Overview

The system is an Android fitness application which will be called as “Get-Fit Fitness App”. The main objective of this application is to make user active, fit and fine in some extent.

The fitness application needs to be well organized and simple to operate. Even if a new user uses the application, he/she should not face any difficulty in finding the desired content.

The workouts should be done in a systematic and proper way. The user can choose their desired workout session in the workout section of the application. The user will be able to complete the workout session one at a time for maximum gain and also track time while doing the exercises. The users can follow the diet plan which proper nutrients it needs every day while staying within daily calorie goal. The users can calculate BMI so that the users can indicate whether they are underweight or if they have a healthy weight, excess weight, or obesity.

The user will be able to track their step with the help of the pedometer feature in the application.

2.3.5. System Architecture

The diagram below represents the actual architecture design of my project Get-Fit android fitness application. At first, all the data of the user will be stored in the database, after the installation of the app by the user in their device then the data is stored in their local database. After that the data is sent to the UI of the application which shows the output to the end user. UI acts as the bridge between end user and database.

Figure 3: First Phase System Architecture of Get-Fit Fitness Application.

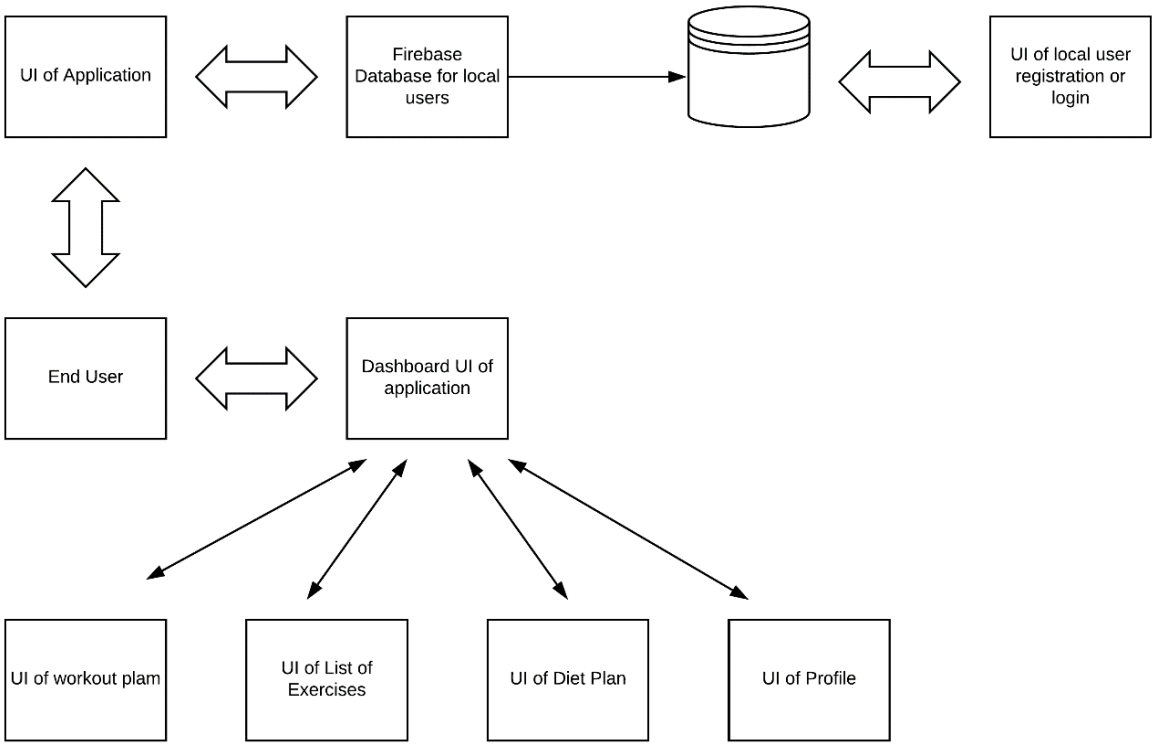


Figure 4: Final Phase System Architecture of Get-Fit Fitness Application.

2.2. Similar System Comparison and Analysis

- Fitness Buddy

Fitness Buddy is one of the best health and fitness which has more then 400+ unique exercises at your disposal, Fitness Buddy will revolutionize your training regimen. It has comprehensive exercises for all major equipment's including barbell, ez curl bar, dumbbells, kettlebells, resistance bands, medicine ball, machines, and stability balls. With this app, you will find the workout tracking process simple and easy in order to sustain your motivation and enforce your commitment to your fitness goals. (azumio, 2020)

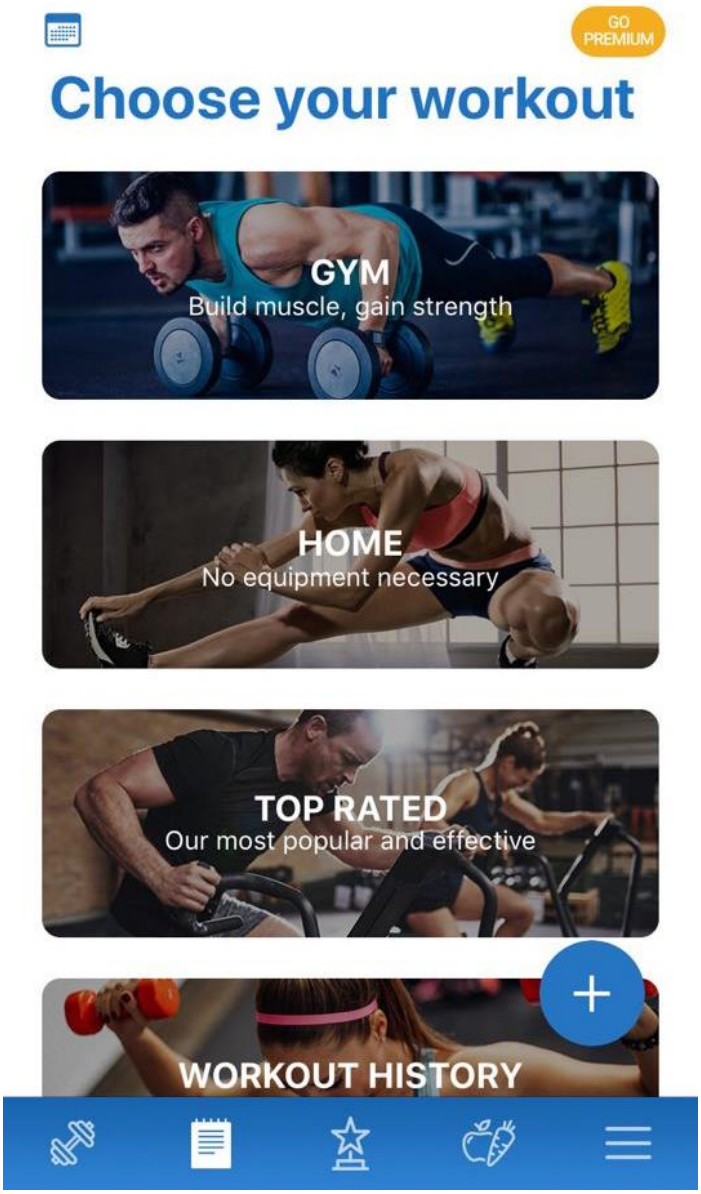


Figure 5 : Fitness Buddy Workout Page

Features:

- 100+ gym workouts for all fitness goals (big chest, shredded abs, butt toning, weight loss, etc.)
- 8 meal plans to choose from (Muscle Building, Clean Eating, Keto, etc.)
- 4000+ exercises, animations, Step-by-step photos, videos, and instructions for all equipment
- Tracking system such as Heart Rate tracking, Sleep tracking, Calorie Tracking, Cardio tracking, Bodyweight and body metrics tracker
- Comprehensive workout history

Drawbacks:

- Fonts are too small, cannot edit a workout if you have already made it.
- Not been updated since 2015
- App crashes continuously and becomes slow to use
- You cannot use without paying
- Too many ads.

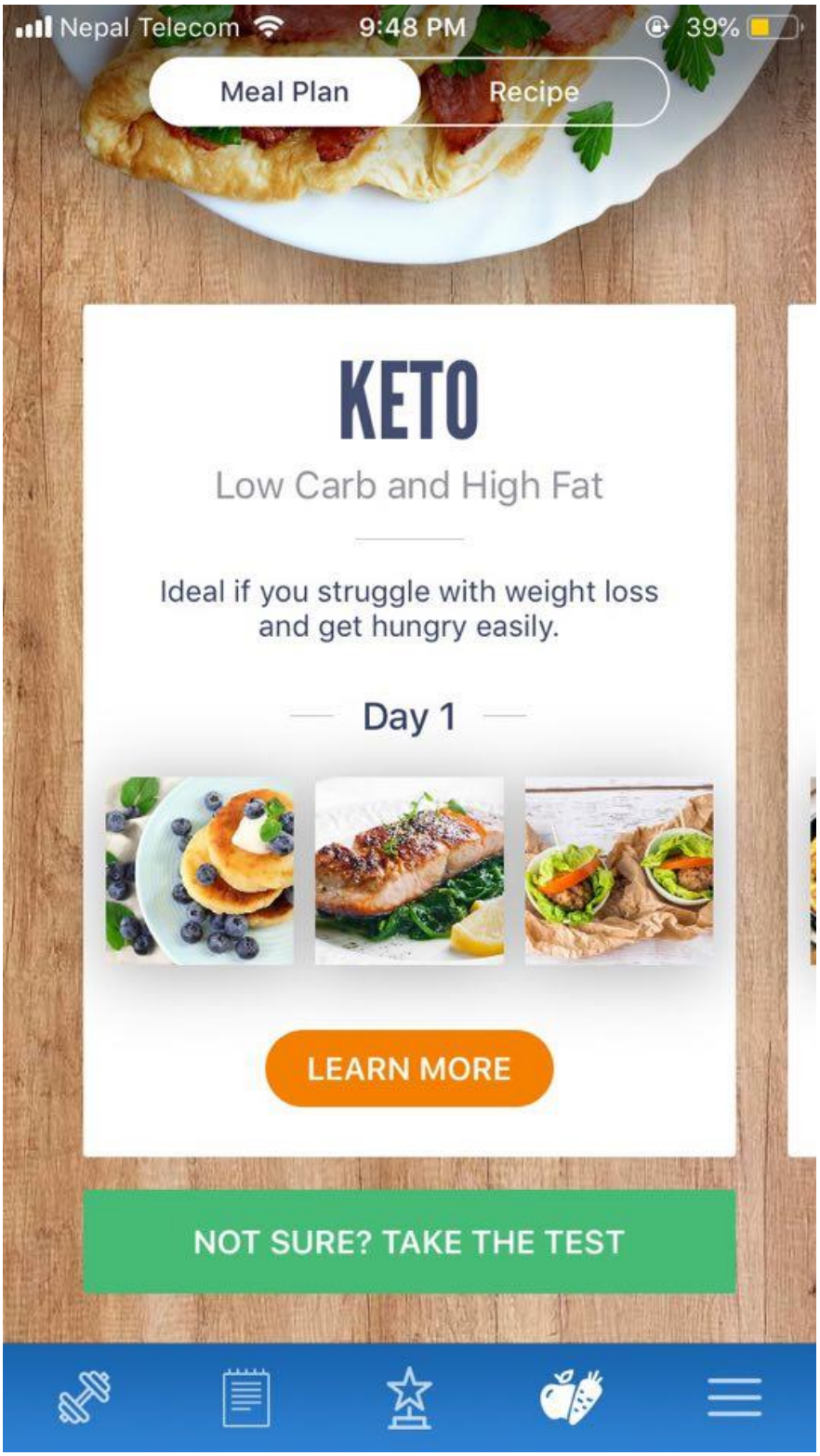


Figure 6 : Fitness Buddy Diet plan page

- JEFIT

JEFIT provides free fitness program database to help you stay fit, make progress and get the most out of your gym or home fitness sessions. From beginner programs like 5x5, 531, strong lifts, 3- or 4-day splits, starting strength to advanced bodybuilding, weightlifting, powerlifting or kettlebell routines to programs using bodyweight, limited space or specialized equipment. (Jefit, 2020)

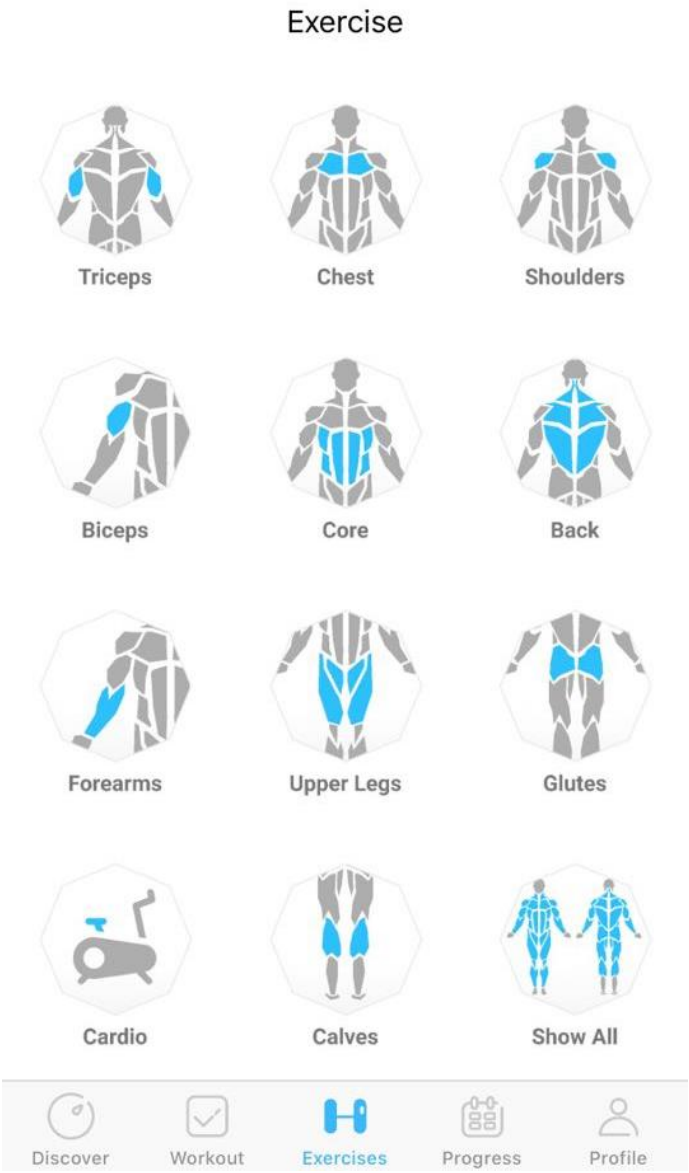


Figure 7: JEFIT Exercises page

If you've logged your workouts in a journal, planner or just love training at the gym on your own schedule, JEFIT will help you reach your strength, weight and fat loss, and training goals from beginners to advanced lifters. We've made the app to motivate you by rewarding you for consistency, pushing yourself to new personal records and committing to challenges with the community.

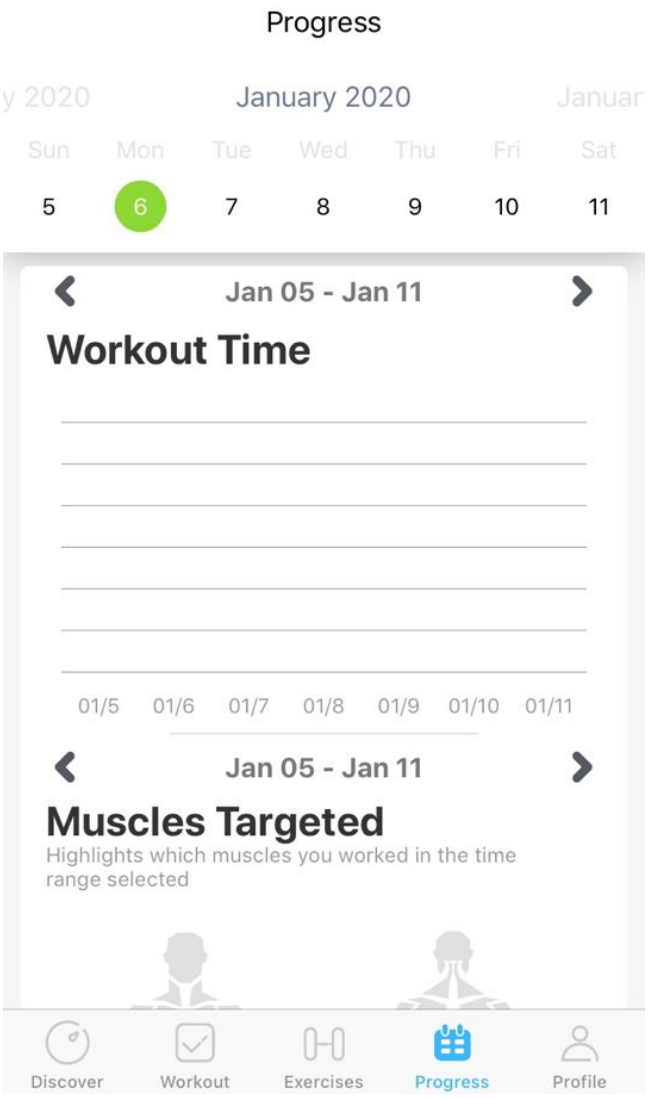


Figure 8 JEFIT Progress page

Features:

- Access from Desktop and Web
- Rest Timer - Set custom times to remind when to lift
- Supersets and circuit training routines supported
- Interval Timer, Set Notes and 1 Rep Max Calculator
- Body Measurements and Weekly Planner for Scheduling
- Social Feed and Community Contest
- Store Workouts in the Cloud and share with your personal trainer

Drawbacks:

- Custom workouts could not be created.
- Difficult to use and time consuming.
- App is slow on android devices.
- Even though it's a free workout app, you have to pay for most of the workout programs.
- Don't have the features of tracking steps, distance, time, speed, counting calories etc.
- Too many ads.

- **Home Workout**

Home Workouts provides daily workout routines for all your main muscle groups. In just a few minutes a day, you can build muscles and keep fitness at home without having to go to the gym. No equipment or coach needed, all exercises can be performed with just your body weight. (abishkking, 2020)

Figure 9: Home Workout Workouts page

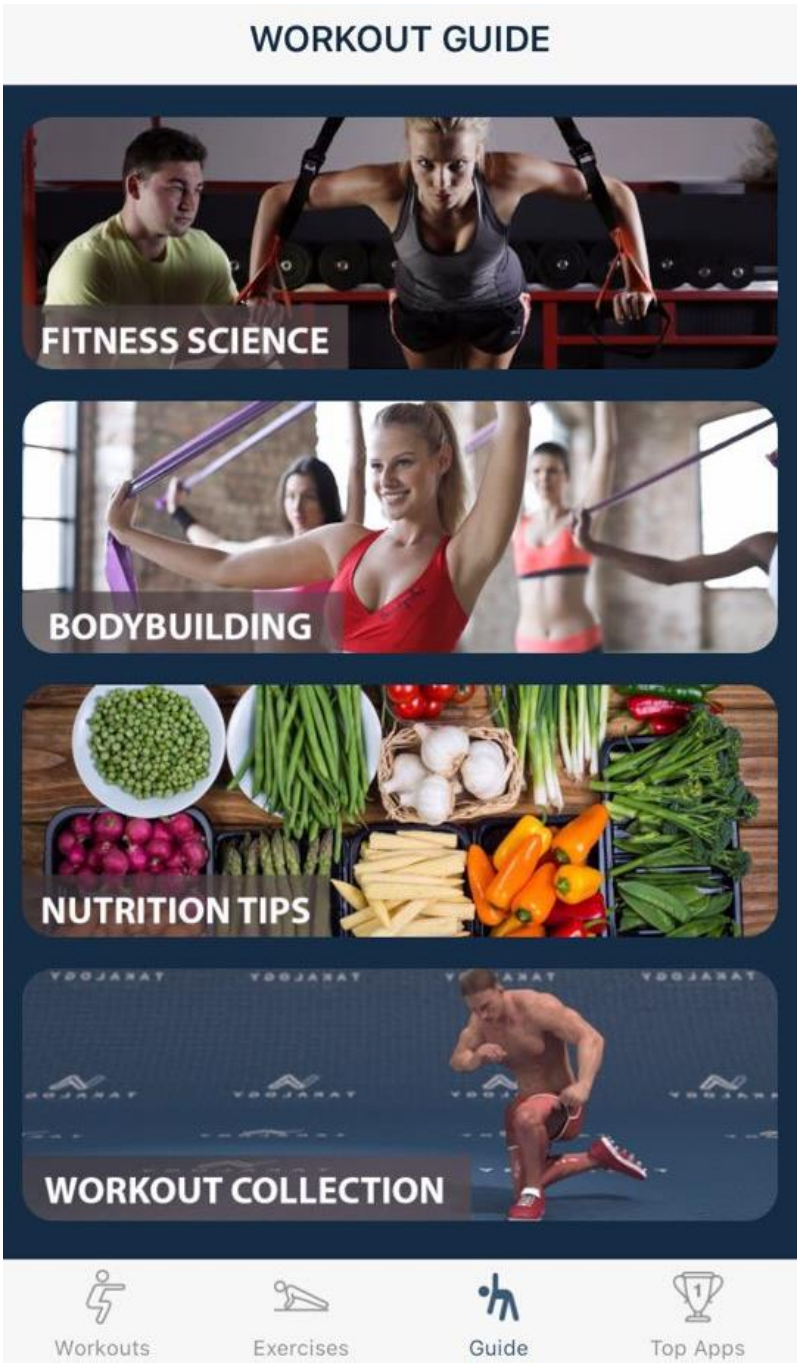


Figure 10 Home Workout Workout Guide page

The app has workouts for your abs, chest, legs, arms and butt as well as full body workouts. All the workouts are designed by experts. None of them need equipment, so there's no need to go to the gym. Even though it just takes a few minutes a day, it can effectively tone your muscles and help you get six pack abs at home.

The warm-up and stretching routines are designed to make sure you exercise in a scientific way. With animations and video guidance for each exercise, you can make sure you use the right form during each exercise.

Features:

- Warm-up and stretching routines
- Records training progress automatically
- The chart tracks your weight trends
- Customize your workout reminders
- Detailed video and animation guides
- Lose weight with a personal trainer
- Share with your friends on social media

Drawbacks:

- Lack of balance in workouts (for e.g. In the full body workout by day 10 there is still no sign of leg workout.
- Even though it's a free workout app, you have to pay for most of the workout programs.
- It does not take into consideration if someone has health issues or is handicapped.
- Don't have the features of tracking steps, distance, time, speed, counting calories etc.
- Too many ads.

2.3. Comparison of similar system with my system

Features	My System	Fitness Buddy	JEFIT	Home Workout
List of workout plan	Available	Available	Available	Available
Pedometer	Available	Available	Not Available	Not Available
Timer	Available	Not Available	Not Available	Not Available
Diet Plan	Available	Available	Not Available	Available
Daily workout tracker	Available	Available	Available	Not Available
BMI Calculator	Available	Not Available	Not Available	Not Available
Video playback	Will be available on future updates	Not Available	Not Available	Available

Table 1: Comparison of similar system with my system

Conclusion

The similar application taken into review had their strong points in their own places. Most of the fitness application did not consider the step tracking feature, BMI calculator, timer as required and workouts and diet plans were not categorized properly. Therefore, the categorization of workouts and diet plan and proper implantation of pedometer, BMI and timer feature is included in this project.

2.4. Review of Technical Aspects

2.4.1. Programming Language (Dart)

Dart

Dart is a new programming language which is becoming very popular day by day. Dart is a scalable language which can be used to write simple scripts or full-featured apps. Whether you are creating a web app, mobile app, command-line script, you can do it with Dart. It is a simple, fast, productive and portable language which uses a fully object-oriented approach and C-style syntax to make it easy and approachable. (Rao, 2019)

2.4.2. Flutter

Flutter is a mobile app SDK which is used for building high-fidelity, high-performance, apps for iOS and Android, from a single codebase.

The main purpose is to enable developers to deliver high-performance apps which feel natural on various platforms. We embrace differences in scrolling behaviors, icons, typography, and many more.

There is no need of mobile development experience to get started. The apps are written in Dart, which looks familiar if you have used a language like JavaScript or Java. Experience with object-oriented languages is certainly helpful, but even non-programmers have made Flutter apps! (mobio solutions, 2019)

2.4.3. IDE (Visual Studio Code)

Visual Studio Code is a lightweight but powerful source code editor which runs on your desktop and is available for Windows, macOS and Linux. It comes with built-in support for JavaScript, TypeScript and Node.js and has a rich ecosystem of extensions for other languages (such as C++, C#, Java, Python, PHP, Go) and runtimes (such as .NET and Unity). Begin your journey with VS Code with these introductory videos. (Visual Studio Code, 2020)

2.4.4. Database (Firebase Realtime Database)

Firebase Realtime Database is a cloud hosted database which supports multiple platforms like Android, iOS and web. The data in Firebase Realtime Database is stored in JSON format, the changes in the data of the database is immediately synced across all the platforms and devices which allows us to build more flexible Realtime application easily with minimal efforts. (Tamada, 2017)

2.4.5. Project Management & Design Tool

2.4.5.1. Lucidchart

Lucidchart is an ultimate diagramming tool which provides businesses and professional individuals with a web-based, user friendly flowchart platform loaded with various features and capabilities which help them with their diagramming needs. It allows one to create flow and organization wireframes, charts and UML, among many others. Lucidchart is an ideal diagram tool for managing projects and brainstorming. It also works smoothly with business systems and popular web applications, including Google Apps. It is so intuitive that it is used in so many industries which includes engineering, web design and development, and various other business sectors. (Finance Online, 2020)

2.4.5.2. Balsamiq Mockups 3

Balsamiq Mockups is a graphics and design tools that offer quick solutions for drawing and sketching the user interface of a software development project. This software will be used for creating the wireframe designs. (Masterize, 2019)

Chapter 3: Development

3.1. Considered Methodologies

3.1.1. Waterfall Model

The Waterfall Model was the first Process Model to be introduced. It is also referred to as a linear-sequential life cycle model. It is very simple to understand and use. In a waterfall model, each phase must be completed before the next phase can begin and there is no overlapping in the phases. The waterfall Model illustrates the software development process in a linear sequential flow. This means that any phase in the development process begins only if the previous phase is complete. In this waterfall model, the phases do not overlap. The waterfall Model illustrates the software development process in a linear sequential flow. This means that any phase in the development process begins only if the previous phase is complete. In this waterfall model, the phases do not overlap. (tutorialspoint, 2020)

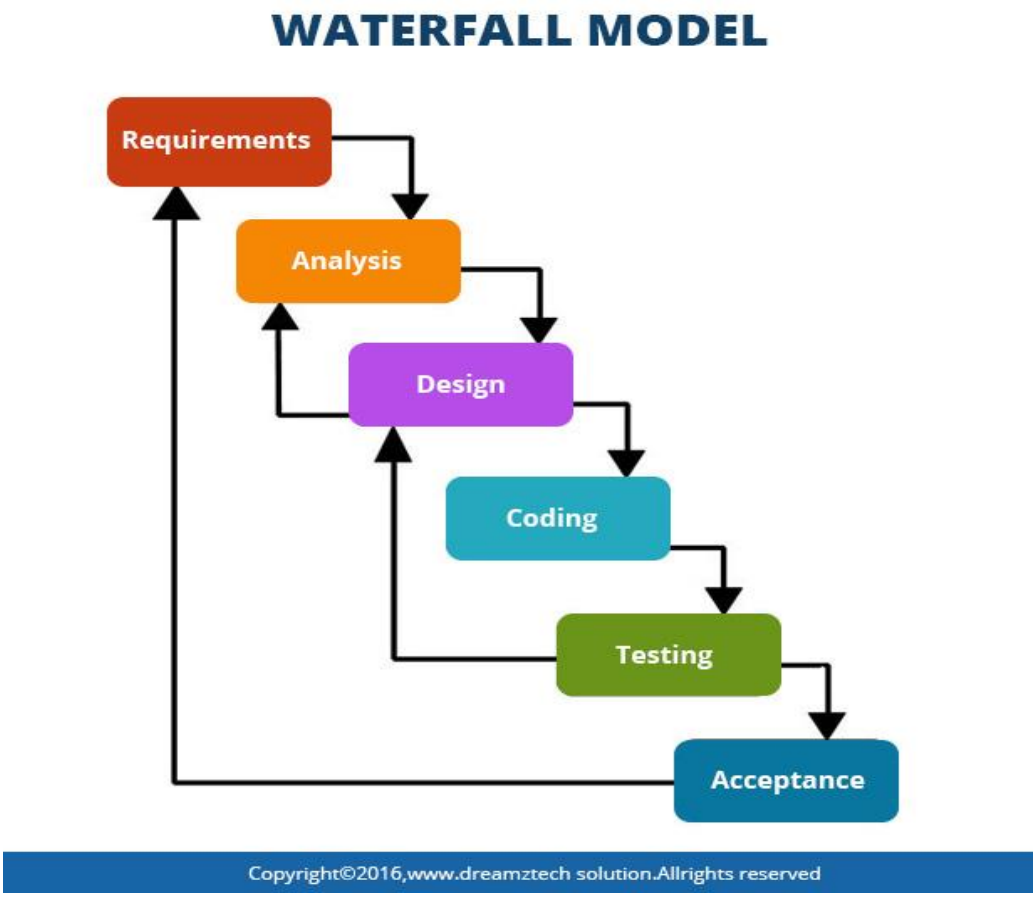


Figure 11: Waterfall Methodology (Preedy, 2016)

It is a traditional method of software development process where each process is clarified into a linear flow which basically means that any phase in this development process begins only of the earlier phase is completed. There is no such definition on going back to previous phase to handle changes in requirements in this development approach.

This methodology was considered due to following reason:

- Easy to understand as after each stage is finished the next starts
- Each phase is planned in detail and requires elaborated documentation
- Very effective for small projects where requirements are unchangeable and well understood
- Significant amount of time is saved as each phase are processed and completed at once in a time

Reason for not using this methodology

There is no such definition on going back to previous phase to handle changes in requirements in this development approach. My project has a client and there is no guarantee of a fixed requirement. There are initial requirements gathered by conducting meetings, interviews and surveys. There can arise a condition where client would want to add or remove some features so if I had opted to develop project following this methodology then it would arise many problems.

As the user would demand some progress during the development phase and if I had followed this methodology then there would be nothing to show because the working software is created only at the end in this methodology.

3.1.2. Prototype Methodology

The prototyping model is a systems development method in which a prototype is built, tested and then reworked as necessary until an acceptable outcome is achieved from which the complete system or product can be developed. This model works best in scenarios where not all of the project requirements are known in detail ahead of time. It is an iterative, trial-and-error process that takes place between the developers and the users. (Rouse, 2019)

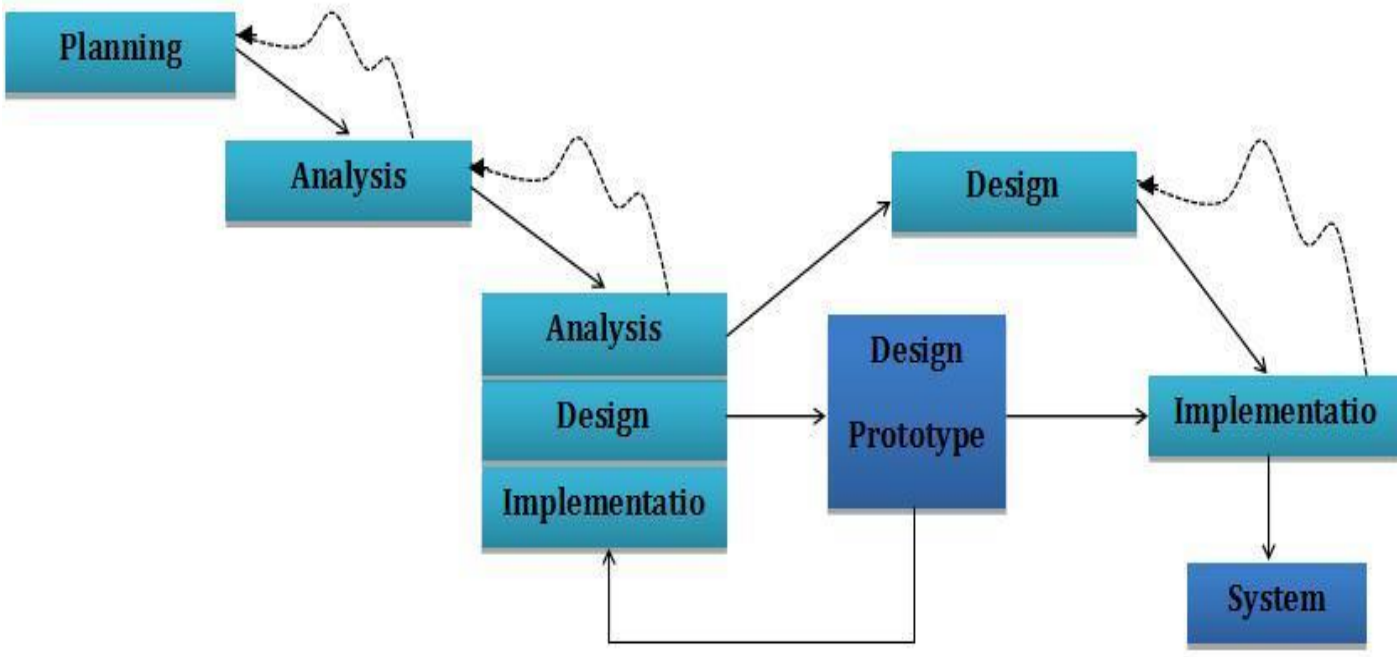


Figure 12 Prototype Model (Rodrigo, 2012)

This software development process initiates developers to make only the sample of the resolution to validate the customer's functional essence and make essential changes before the authentic final solution is created. This methodology was considered to be used as the methodology for following reasons:

- When a prototype is shown to the clients, they get a clear understanding of the functionality of the software and a complete sense of it.
- This methodology gives clear idea about the software's functional process.
- This method reduces the risk of failure significantly, because potential risks can be identified early on and moderation steps can be taken quickly.

Reason for not using this methodology

This methodology requires significantly more involvement of client and which may affect the flow of development process of my project. The requirement given by client can be changed and may result in many modifications, which ultimately disturbs the workflow of entire project.

3.1.3. Feature Driven Methodology

Feature-driven design (FDD) is an iterative and incremental software development process that follows the principles of the agile manifesto. The idea is to develop the high-level features, scope and domain object model and then use that to plan, design, develop and test the specific requirements and tasks based on the overarching feature that they belong to. (Inflectra, 2020)

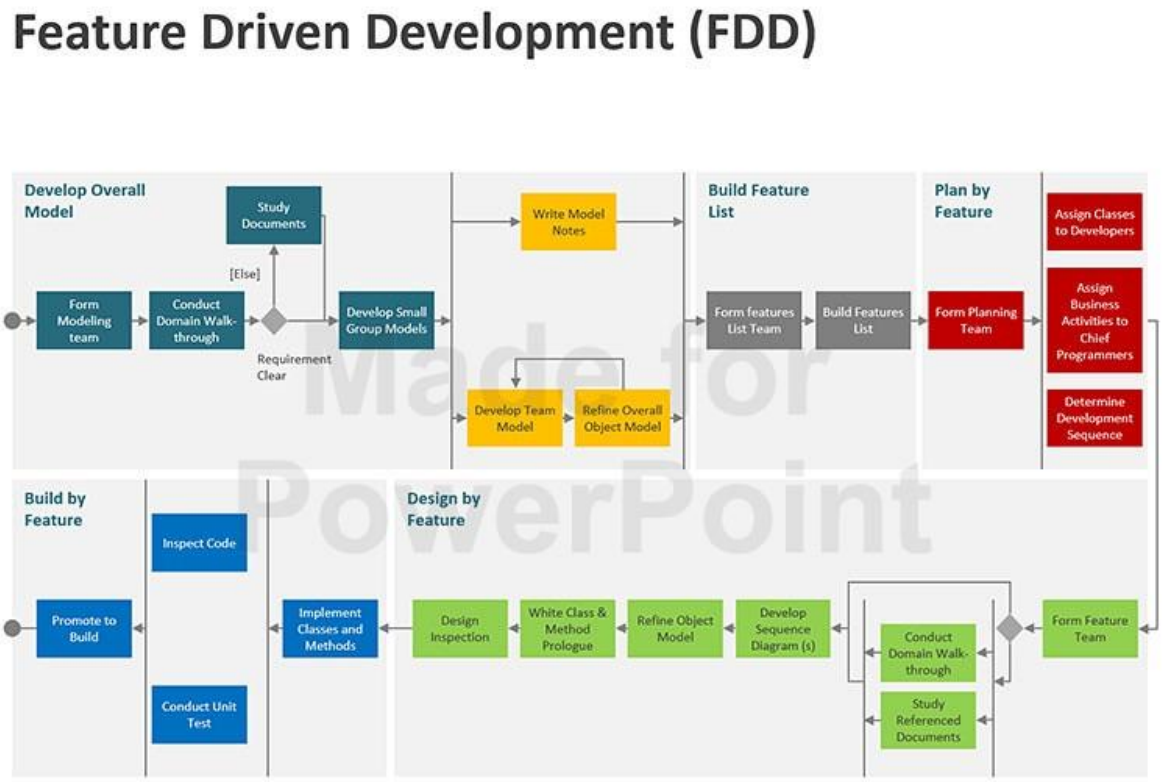


Figure 13: Feature Driven Methodology

This iterative software development methodology is mostly used for big projects and serves a large number of teams working on project based on object-oriented technology.

This methodology was considered to be used as the methodology for following reasons:

- This methodology consists of simple five processes to bring the work done in a short time and easiest manner
- Very beneficial for projects that requires continuous updates.
- The output results always outshine the inputs in this methodology.

Reason for not using this methodology

This current project is not a huge industrial grade project and do not consist of huge number of members so this project is no suitable to be built under feature driven methodology. Another reason is that in this methodology the documentation is weak and is not enough to get a proof of software.

3.2. Selected Methodology

3.2.1. Agile Scrum Methodology

The Agile software development methodology is iterative and incremental in which the processes need to be personalized to suit the specific project requirements of the customer. In Agile methodology, there is an incremental delivery of the tasks. This process always allows the companies to adapt smoothly to the changing requirements.

Scrum is a software development methodology which is based on agile methodology where task is broken down into different sprints and achieved one after another.

This methodology was considered to be used as the methodology for the following reasons:

- Scrum is a lightweight, simple-to-implement way to manage the software development projects within small team-based setting.
- For every sprint, testing is done for deployment issues.
- The Agile framework for managing the process yields a high quality of software, customized to the needs of the product owner.

Reason for choosing this methodology

Considering above reasons and nature of my project Scrum stands out to be the best choice for my project.

The Advantages and Disadvantages of Agile and Scrum Methodologies

Let us take a look at the advantages and the limitations of Agile and Scrum methodologies.

Advantages:

The reasons why Agile is being adopted by the organizations are listed below:

- High flexibility and adaptability
- Faster implementation of changes
- Incremental updates of the software
- Faster time-to-market
- More rapid development and delivery of high-value features within short cycles
- Evolution of product design as per customer requirements
- Higher product owner/customer satisfaction
- Promotes innovation and creativity
- Higher productivity of teams
- Lower project costs due to focus on high-value features
- High visibility of daily progress, supports management strategies and decision making

Disadvantages:

- The absence of detailed documentation may lead to communication gaps.
- If there is any change in customer vision, integration becomes cumbersome, making it difficult to estimate the time and quality of the end product
- In-team conflicts and competition is routine, requiring extra vigilance and management
- Add-on training may be required in some cases
- Complete organizational transformation is necessary
- Difficult to assess the time and resources required
- Users are required to test almost on a daily basis
- Results may differ from that expected in terms of product features, delivery, quality, implementation, etc.
- Inconsistency in project integration

3.3. Phases of Methodology

3.3.1. Product Backlog Creation

Product backlog is a list which consists of new features, bug fixes, changes to existing features, changes to technology or other tasks that can be performed by a team to achieve a specific result which should be implemented during the process of development. It is ordered by priority and its every item is known as a **User story**. All user story gets a unique ID. (Gurendo, 2015)

3.3.2. Sprint Planning and Sprint Backlog Creation:

Sprint Planning is time-boxed to a maximum of 8 hours for a one-month Sprint. The event is usually shorter for shorter Sprints. The Scrum Master confirms that the event takes place and that attendants understand its purpose. The Scrum Master the teaches the Scrum Team to keep it within the time-box. (scrum, 2020)

The sprint backlog is a list of different tasks which are identified by the Scrum team to be completed during the Scrum sprint. During the sprint planning meeting, the team chooses some number of product backlog items which are usually in the form of user stories, and identifies the tasks that are necessary to complete each user story. Most of the teams also estimate how many hours each task will take someone on the team to complete. (Mountain Goat, 2020)

3.3.3. Working on the Sprint (Scrum meeting):

Scrum meetings are an integral component of a work environment that adopts the Scrum methodology. Scrum Meetings are considered to be an invaluable source of collecting the information and feedback from the development team and also help in keeping the team aligned with the Sprint goals. (Wilson, 2018)

3.3.4. Testing and product demonstration:

Since the perfect result of each sprint is a working product , the full life-cycle testing process is really important. There are various methods to minimize the value of the test period. For example, you can reduce overall number of user stories. The number of possible bugs will be reduced in result. The other direction is to include the QA engineers in the scrum team.

Product demonstration the result of every sprint. The Scrum team creates a review and then demonstrates the results of their work and on this basis, the stakeholders take a decision about further changes of the project. (Gurendo, 2015)

3.3.5. Retrospective and Next Sprint Planning

After the Sprint Review and the Sprint Retrospective occurs and prior to the next Sprint Planning. For a one-month Sprints this is at most a three-hour meeting. The event is usually shorter for shorter sprints. The Scrum Master ensures which the event takes place and which attendants understand its purpose. This is the opportunity for the Scrum Team to progress and all member should be in the attendance. (scrum, 2020)

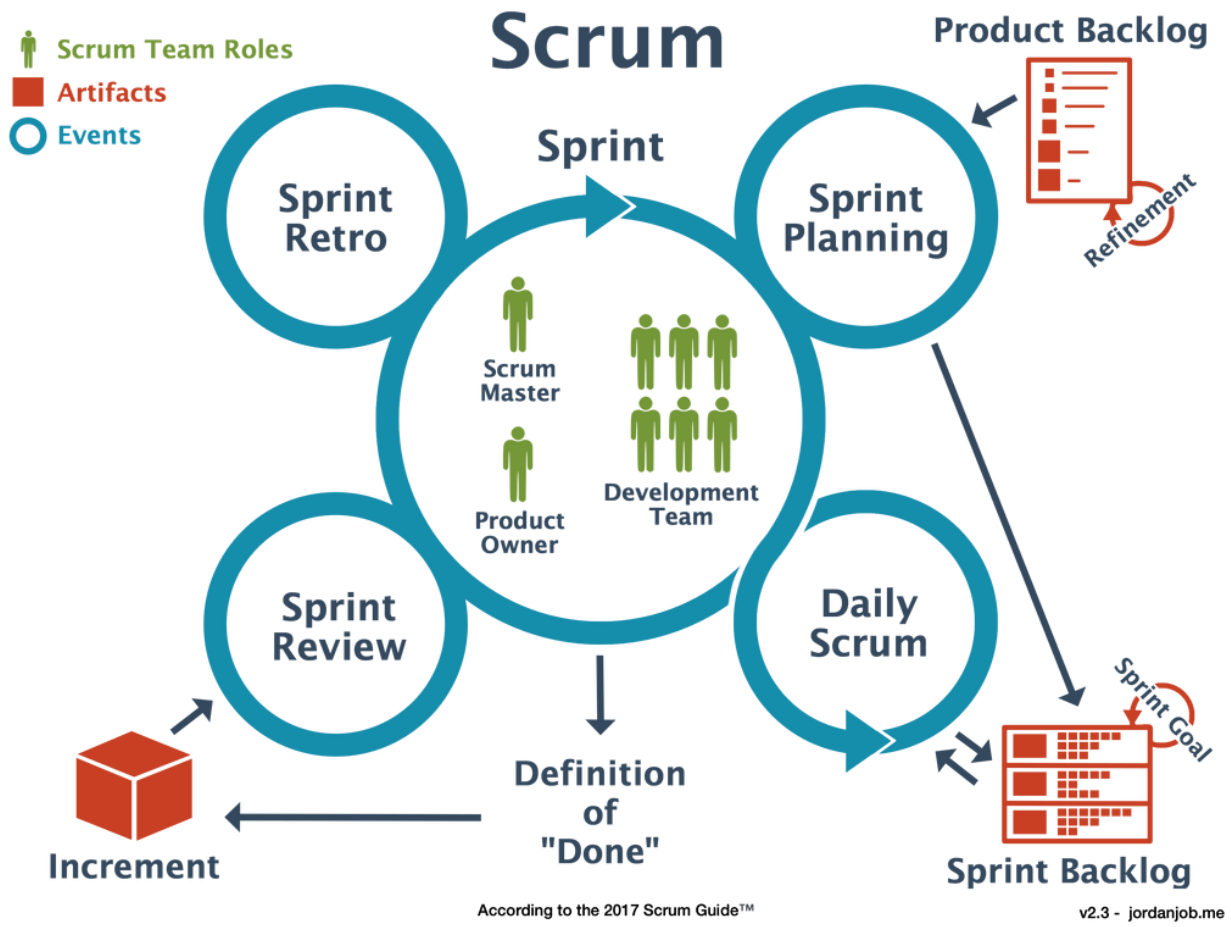


Figure 14: Structure of Scrum Methodology (Job, 2015)

3.4. Survey Results

3.4.1. Pre-Survey Results

Talking from the data collected of 1st phase of survey.

According to the survey, about 70.3% of smartphone users used Android Powered Device and only 29.7% used IOS Powered Device. Therefore, my main target at the moment is Android devices.

Only 16% people went to gym and fitness centers regularly, 40 % of people were not interested in fitness and 44% of the people were not regular. From this survey it was found that, the main reason people were not interested in fitness was eating proper diet and time management. 65.6 % of the have not used any kind of health and fitness app. 47.7 % of the people think this app would be very fruitful to the users as they think this app will save time and money also.

An encouraging data was recorded in which 91% of people were willing to be more active if the gym and fitness center would provide the basis services with a fitness application on their smartphone to use side by side.

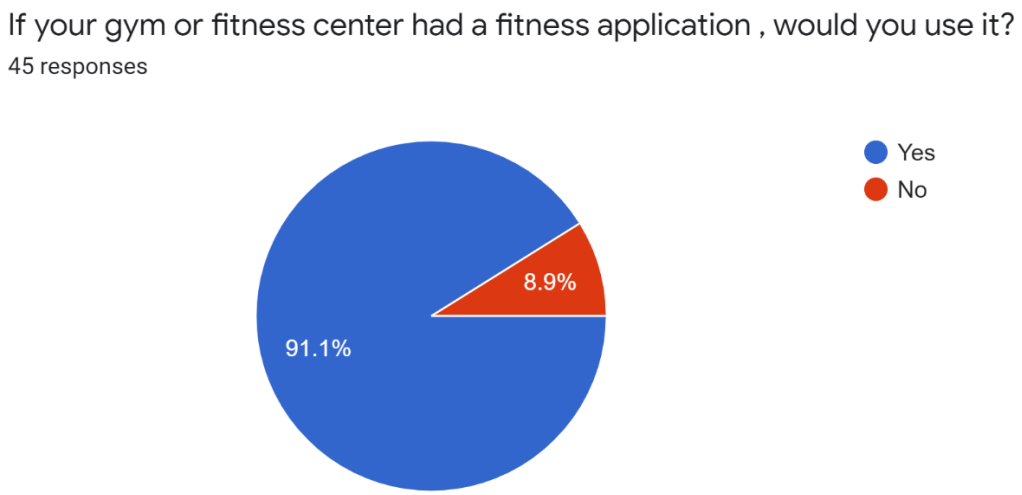


Figure 15: Survey of using fitness app phase 1

3.4.2. Post Survey Results

Talking from the data collected of 2st phase of survey.

According to the survey, about 70.7% of smartphone users used Android Powered Device and only 29.3% used IOS Powered Device. Therefore, my main target at the moment is Android devices.

Only 30% people went to gym and fitness centers regularly, 32% of people were not interested in fitness and 38% of the people were not regular. From this survey it was found that, the main reason people were not interested in fitness was eating proper diet and time management. 54 % of the people think this app would be very fruitful to the users as they think this app will save time and money also.

Lose Weight, Build Muscle, Tone, Build Stamina, Endurance, Making better nutrition choices. Etc. are the major goals of the users. The survey also shows that the users think the pedometer feature which tracks steps while working out as a good feature.

An encouraging data was recorded in which 92% of people were willing to be more active if the gym and fitness center would provide the basis services with a fitness application on their smartphone to use side by side.

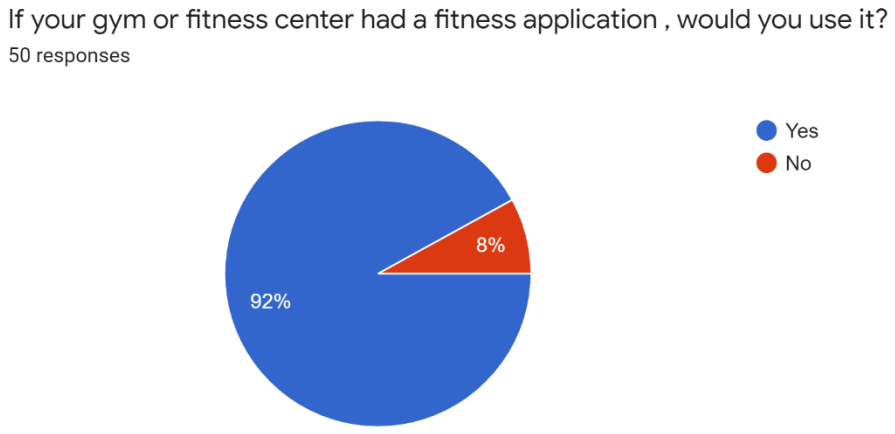


Figure 16: Survey of using fitness app phase 2

3.5. Requirement Analysis

3.5.1. Functional

1. Users can use the timer function (Start, Stop, Reset) in the workouts section.
2. Users can calculate their BMI.
3. Users can count their steps while working out.
4. Users can update their progress
5. Users get their daily activity (number of workouts, calorie, time) record.

3.5.2. Non-Functional

1. Users can view all pages of application.
2. Users can get the idea of workout through the images provided.
3. Users can see the categorization of the workouts.
4. Users can view the diet plan

Plan of action for requirement analysis

The further process of development can only be started after the collection of the requirements are finalized. An initial data was collected in the early stages but according to the evolutionary development, the required data and requirements were analyzed.

Objective	**Fact Finding Technique**	**Resources/Subject**	**Category of data**
Knowledge on how workouts are normally carried out	Research on similar system	Internet	Primary
Get idea on how the workouts routines are categorized	Survey	Local people	Primary
Identify users view on the project and their requirement	Survey	Local People	Primary

3.6. Design

3.6.1. Login and Registration

- Use Case Diagram

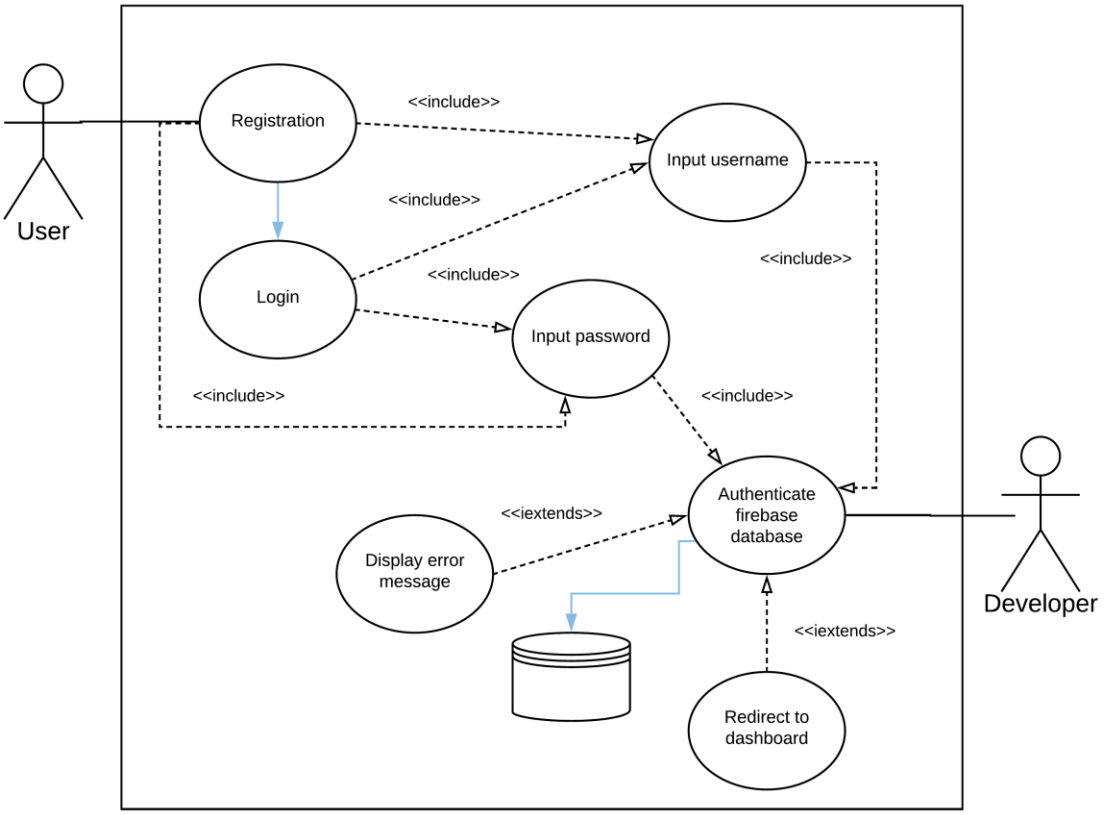


Figure 17: Use Case Diagram of Login Page and Registration Page

- **High Level Use case**

Use Case: Login and Registration Page

Actor: Local user

Description: The user is allowed to log in to the system after the registration process is finished. The system should provide an interface to enter the username and password for both login process and registration process. After the actor has completes the login and registration process then the user is greeted with the main dashboard page. Similarly the owner logins and registers from web.

- **Extended use case diagram**

Login

Fitness User	**System**
1. Enter user details.	
	2. Verify username and password.
	3. Registration.
	4. Redirect to front page.

Table 2: Expanded Use Case of Login

Register

Fitness User	**System**
1. Enter user details.	
	2. Verify username and password.
	3. Login successful.
	4. Redirect to front page.

Table 3: Expanded Use Case of Register

- Sequence Diagram

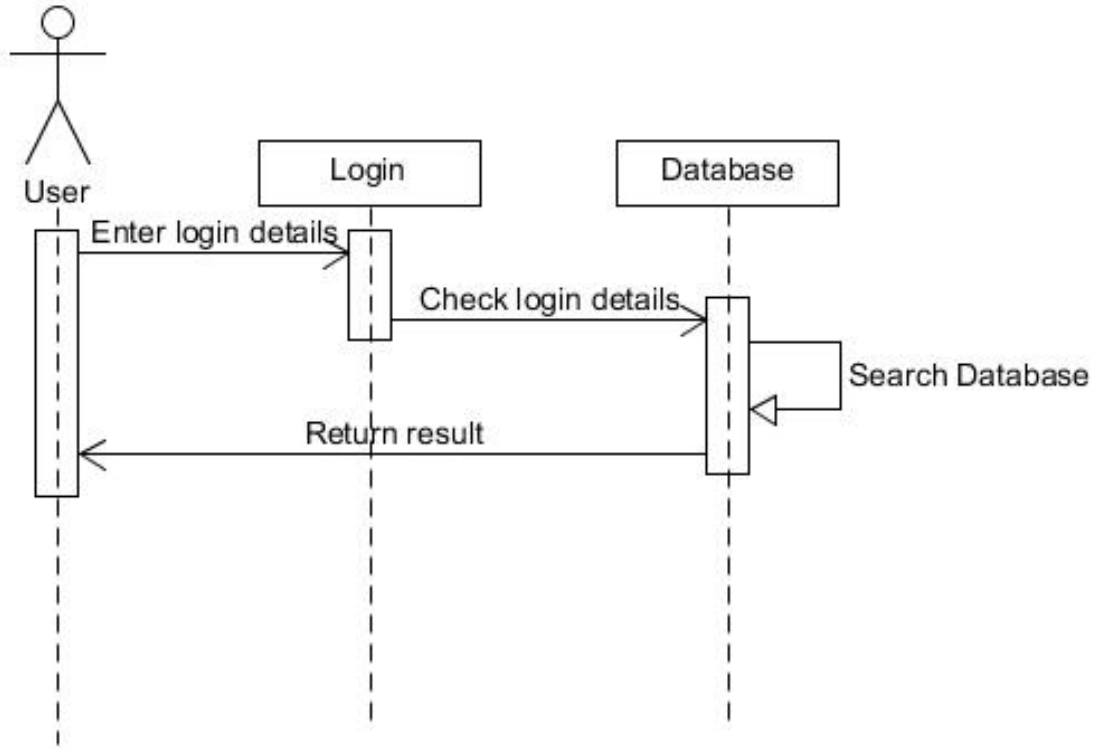


Figure 18: Sequence Diagram of Login User Page

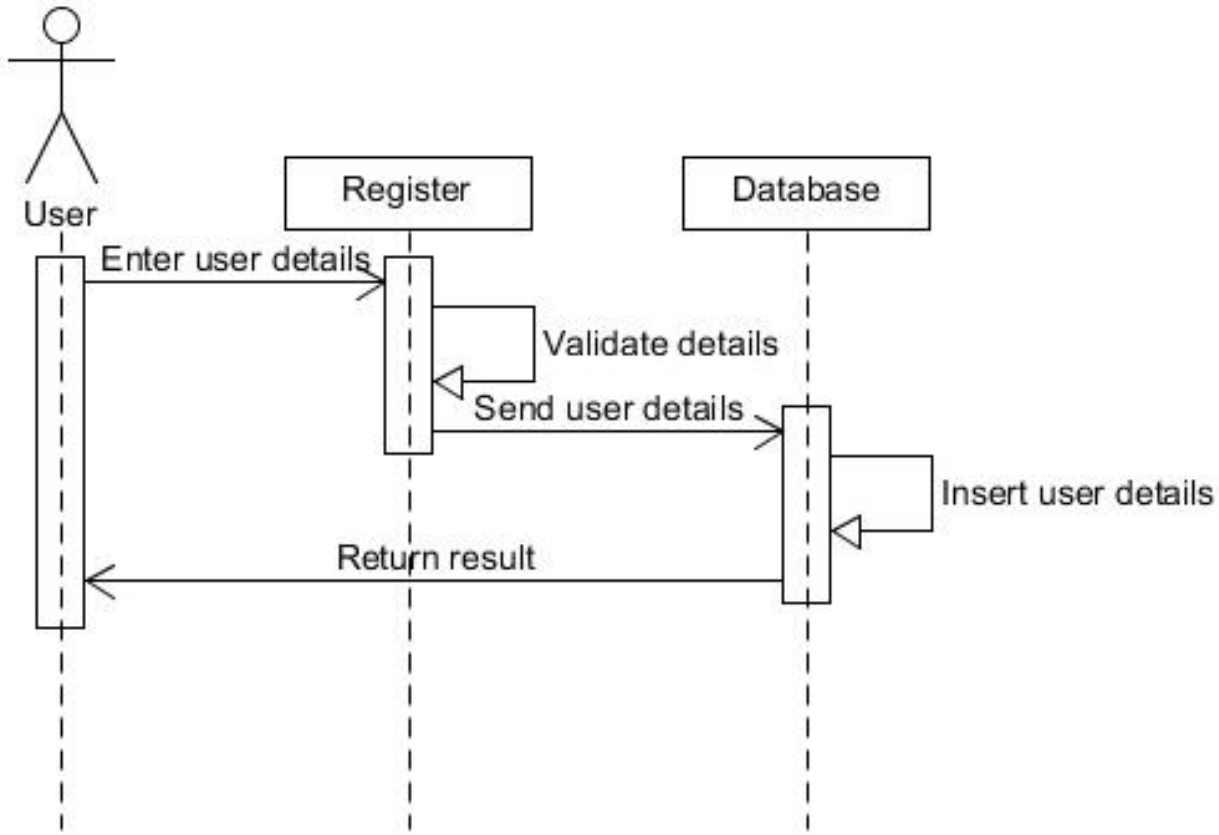


Figure 19: Sequence Diagram of Register Page

- Collaboration Diagram

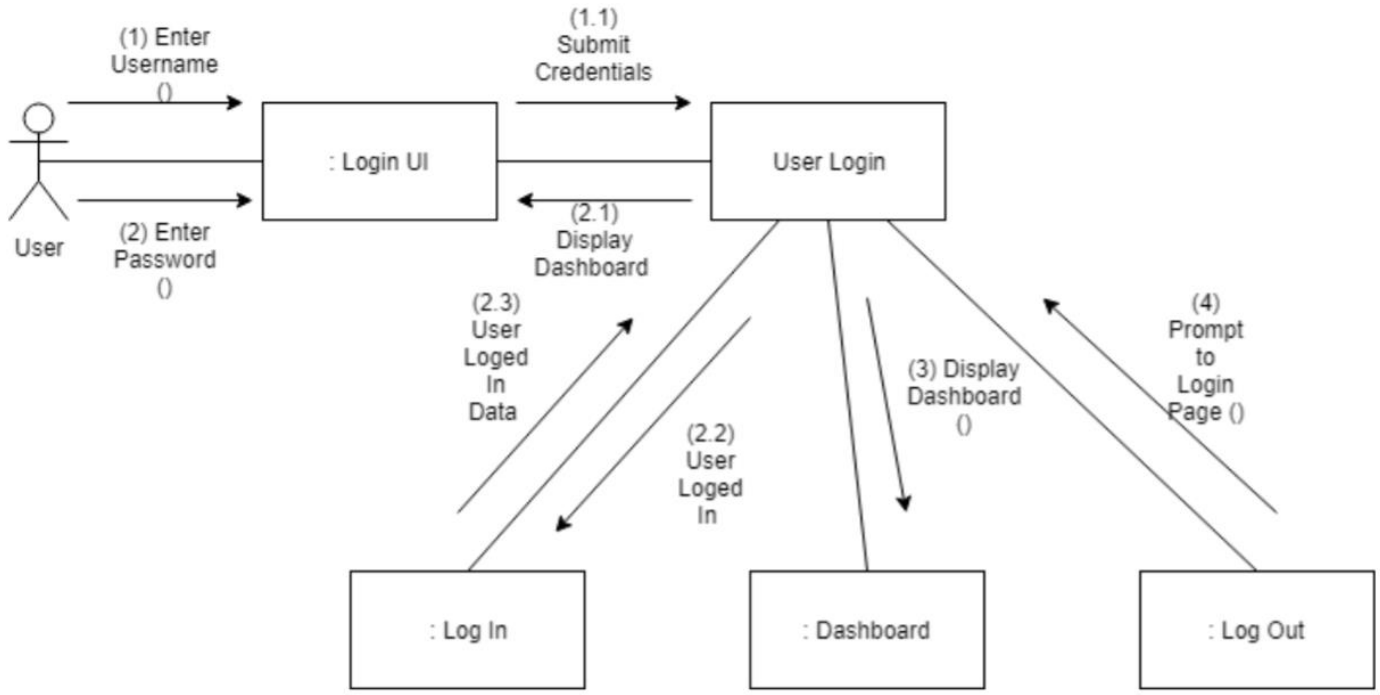


Figure 20 : Collaboration Diagram of Login User Page

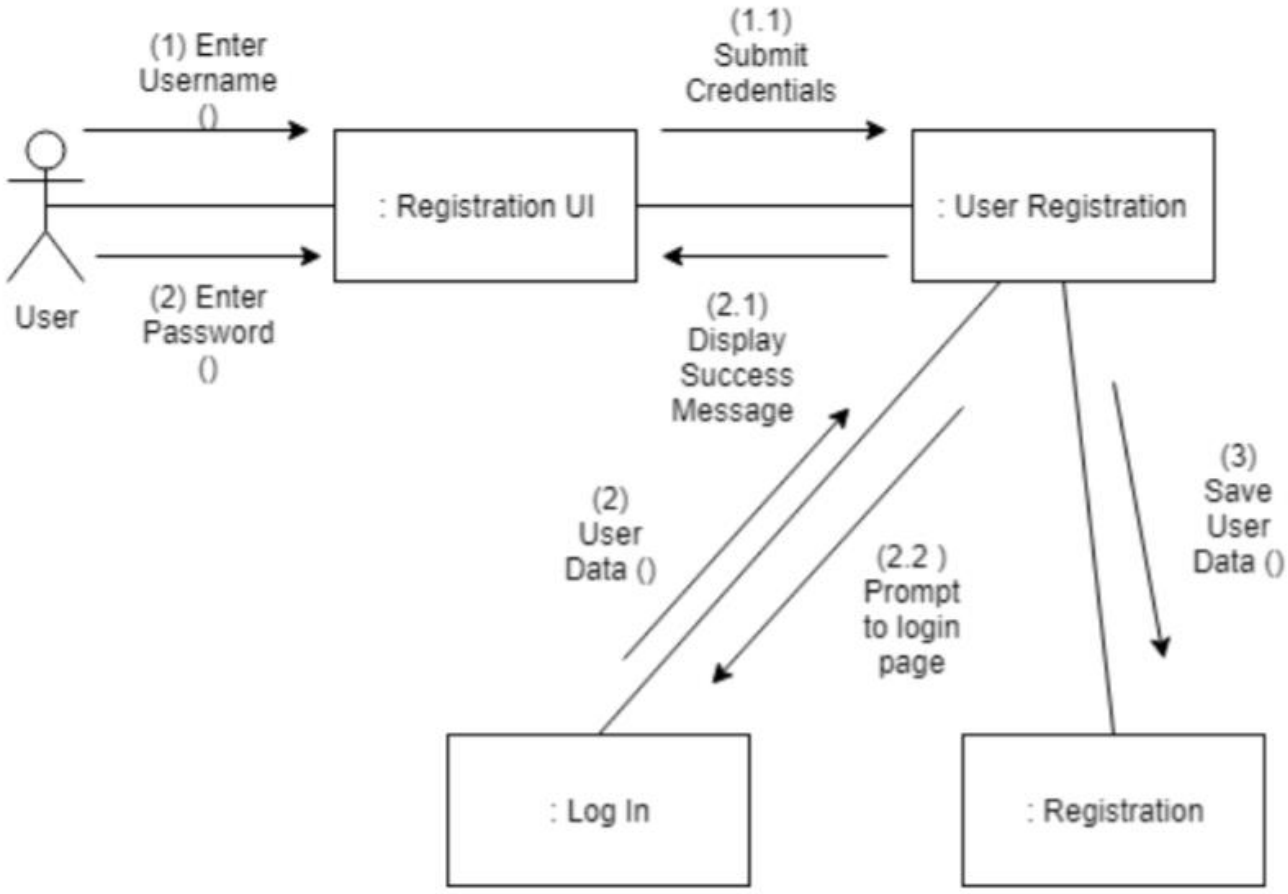


Figure 21: Collaboration Diagram of Register Page

- State Diagram

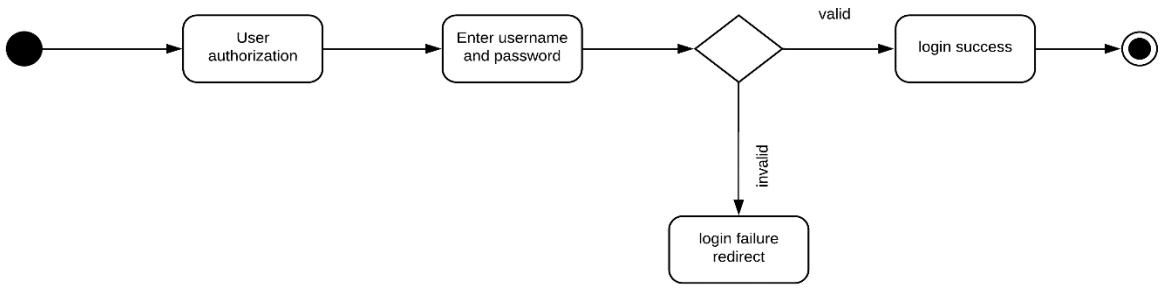


Figure 22: State Diagram of Login User Page

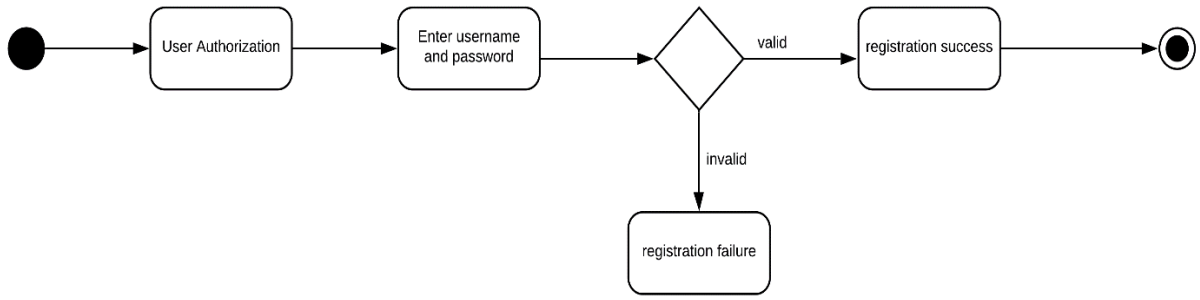


Figure 23: State Diagram of Register

- Activity Diagram

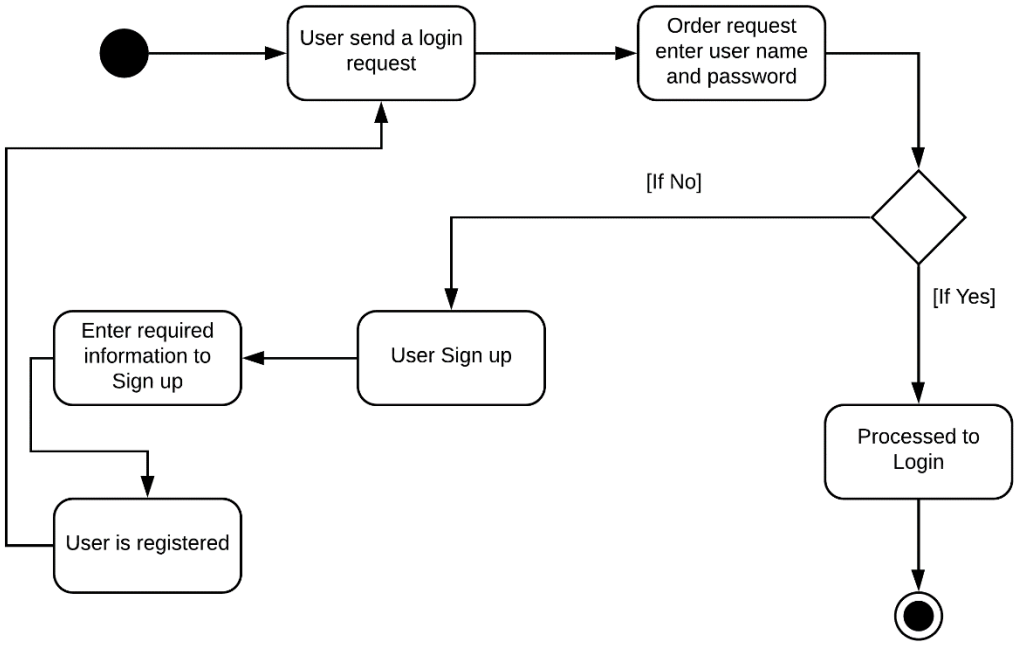


Figure 24: Activity Diagram of Login User and Register Page

- Wireframe

This is the wireframe for user login page where the new users fill up their credentials to log into Get-Fit fitness application

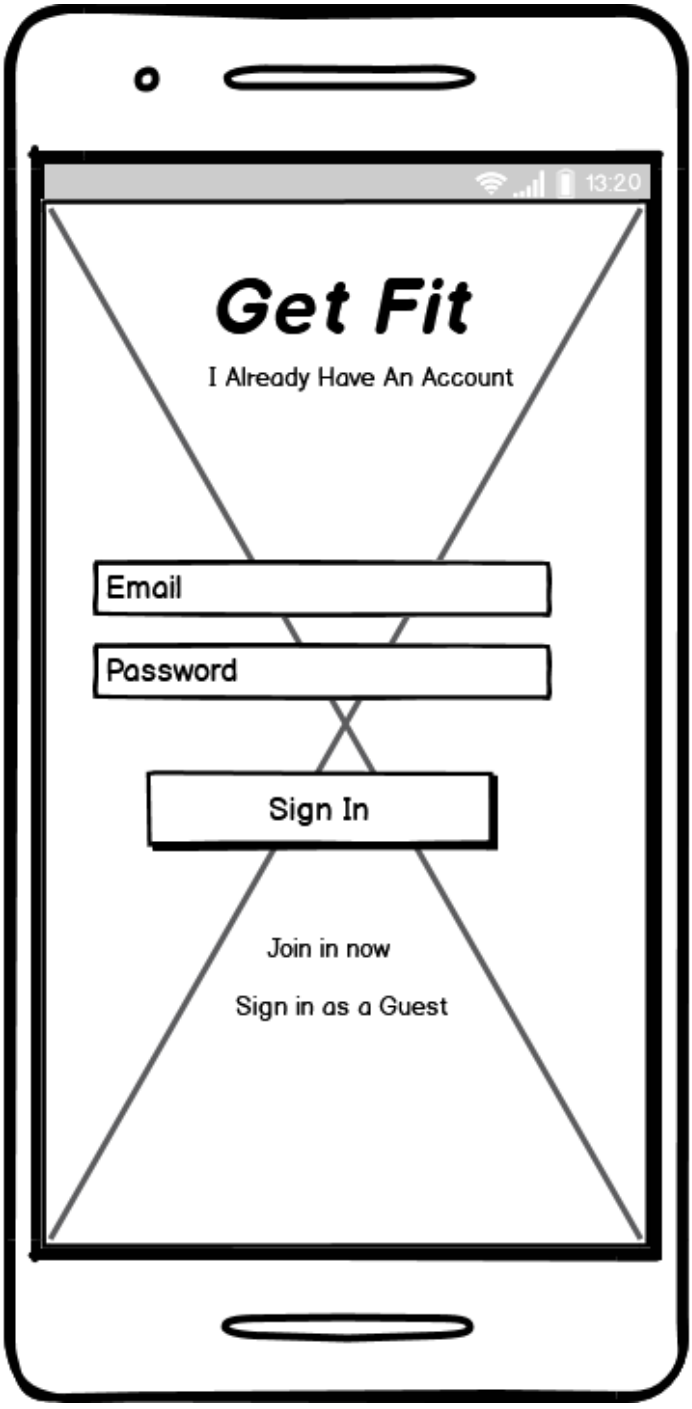


Figure 25: Wireframe of Login User page

This is the wireframe for user registration page where the new users fill up their credentials to create an account for using the Get-Fit fitness application.

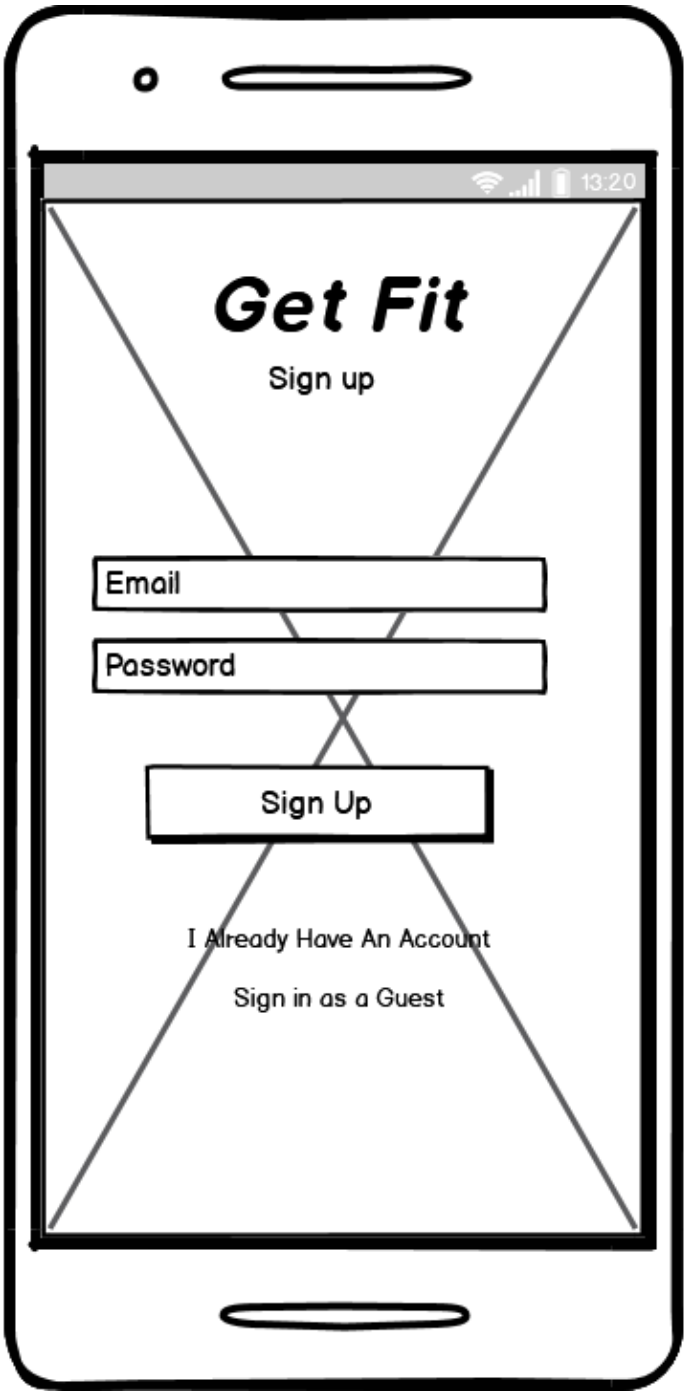


Figure 26:Wireframe of Register page

- Graphical Representation

This is the graphical representation of user login page where the users can enter their correct credentials to gain access to the application.

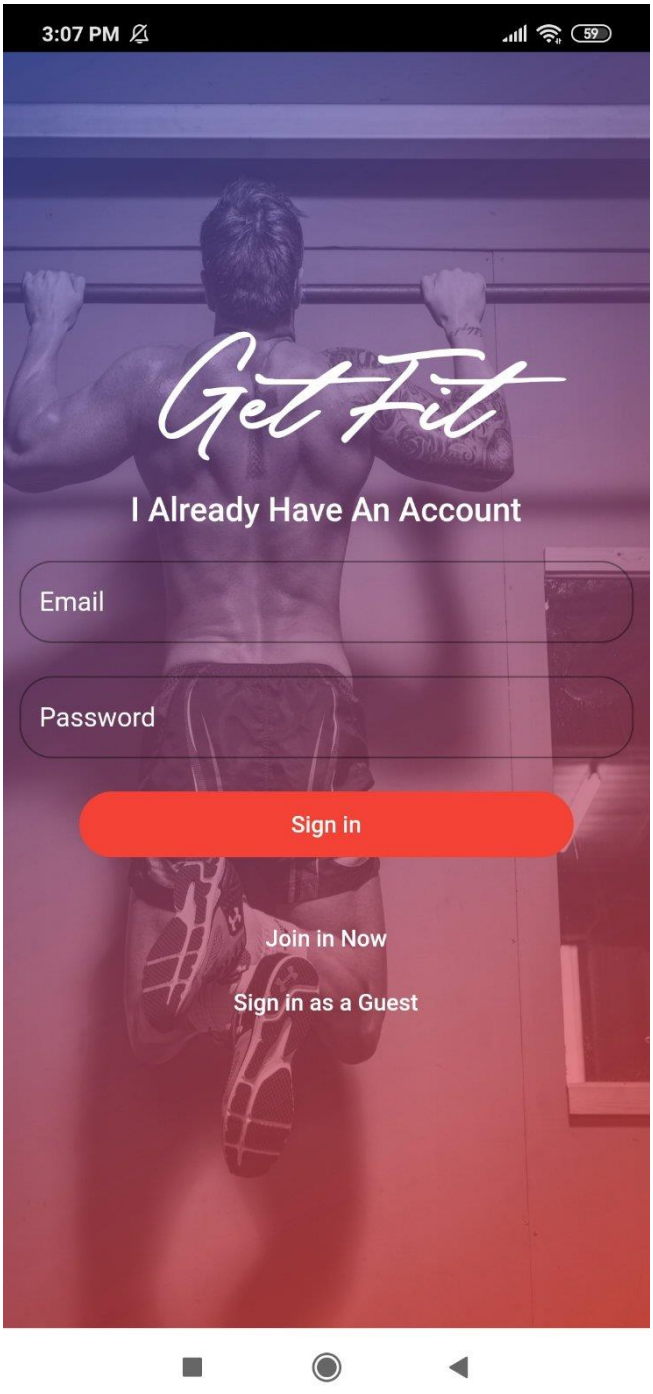


Figure 27: Graphical Representation of Login user page

This is the graphical representation of user registration page in which new users can fill up their credentials to create an account for which they can enjoy the service of full access of the application.

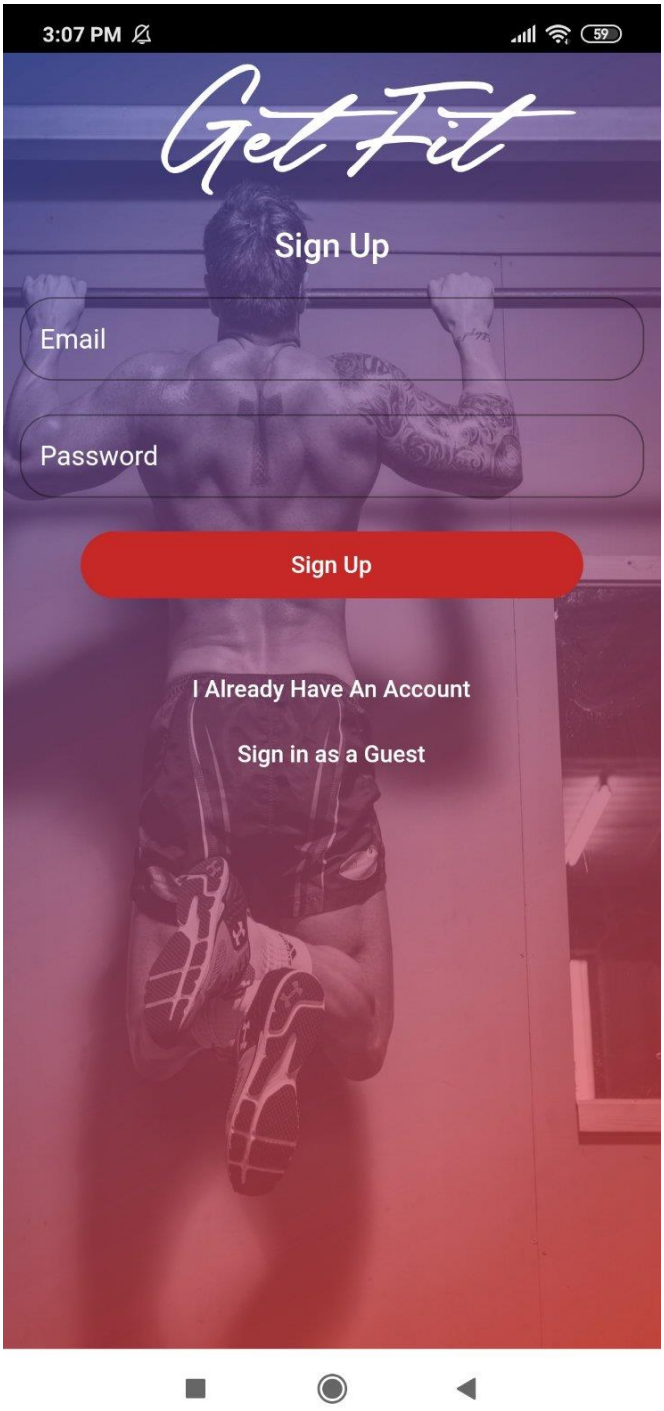


Figure 28: Graphical Representation of Register page

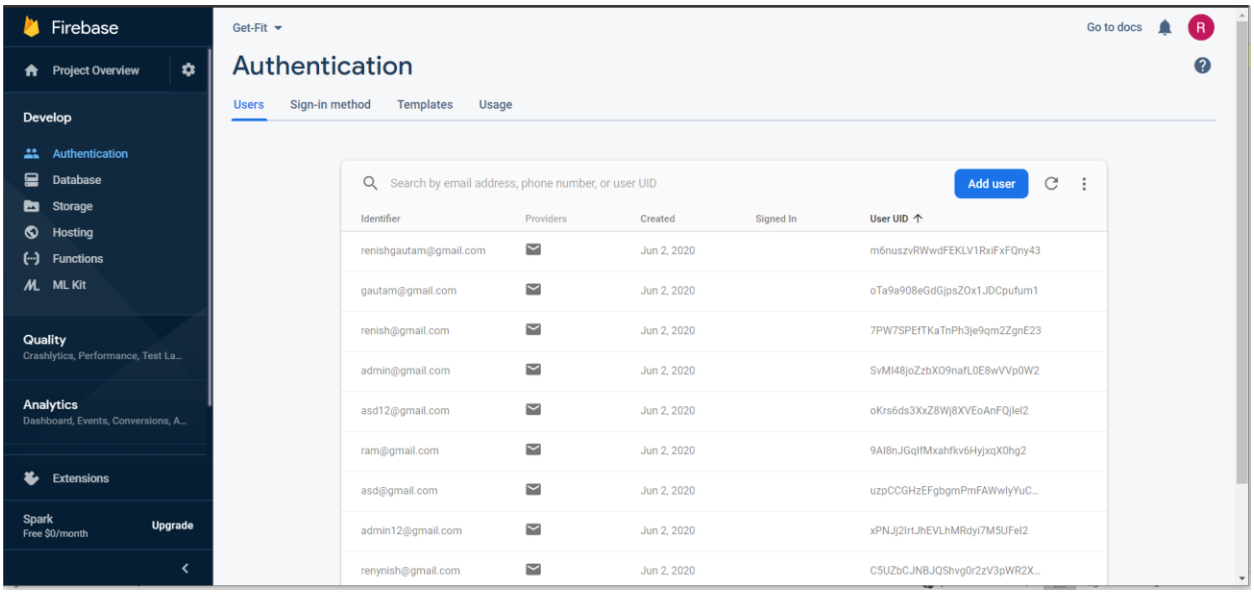


Figure 29: Firebase Console for User Authentication

Engineering

The selected login/registration feature was developed in this phase. This is the key feature of the sprint as development and testing is done in this phase. Selected code snippets are also attached wherever it is feasible.

- Development:

```
Form(
key: _formKey,
child: Column(
mainAxisAlignment: MainAxisAlignment.center,
children: <Widget>[
Container(margin: EdgeInsets.only(top:30,bottom:15),child:Text("Get Fit",style: TextStyle(color: Colors.white,fontFamily:'Heatwood',fontSiz
  Hero(tag:"signin",child:Text('I Already Have An Account',style: TextStyle(color:Colors.white,fontWeight: FontWeight.w500,fontSize:20))),
  Container(
    margin: EdgeInsets.only(top:20,left:10 ,right:10 ),
    height: 50,
    child: TextFormField(
      validator: (input) {
        if(input.isEmpty){
          return 'Provide an email';
        }
        else return null;
      },
      decoration: InputDecoration(
        labelText: 'Email',
        labelStyle: TextStyle(color: Colors.white),
        border: OutlineInputBorder(
            borderRadius: new BorderRadius.circular(20),
            borderSide: new BorderSide(
            color: Colors.white
            ), // BorderSide
          ), // OutlineInputBorder
        ),                    // InputDecoration
      onChanged: (input) => _email = input,
    ), // TextFormField
  ), // Container
```

Figure 30: Code Snippet for Sign in feature

```
Container(margin: EdgeInsets.only(top:30,bottom:15),child:Text("Get Fit",style: TextStyle(color: Colors.white,fontFamily:'Heatwood',font
  Hero(tag:"signup",child:Text('Sign Up',style: TextStyle(color:Colors.white,fontWeight: FontWeight.w500 ,fontSize:20))),
  Container(
    margin: EdgeInsets.only(top:20,left:10 ,right:10 ),
    height: 50,
    child: TextFormField(
      validator: (input) {
        if(input.isEmpty){
          return 'Provide an email';
        }
        else return null;
      },
      decoration: InputDecoration(
        labelText: 'Email',
        labelStyle: TextStyle(color: Colors.white),
          border: OutlineInputBorder(
            borderRadius: new BorderRadius.circular(20),
            borderSide: new BorderSide(
            color: Colors.white
            ), // BorderSide
          ), // OutlineInputBorder
      ), // InputDecoration
      onChanged: (input) => _email = input,
    ), // TextFormField
  ), // Container
  Container(
```

Figure 31: Code Snippet for Sign up feature

3.6.2. Workout Plan

- Use Case Diagram

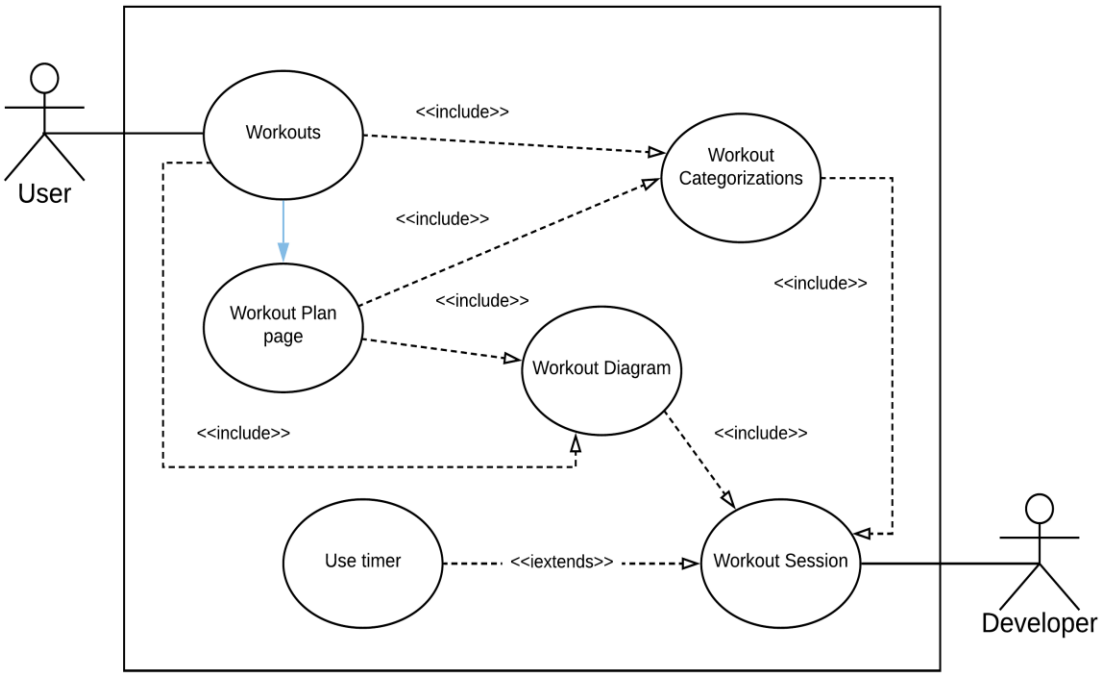


Figure 32: Use Case Diagram of Workout Plan page

- High Level Use Case

Name: Workout Plan Page

Actor: Local User

Description: The user is allowed to view the workout plan page and to choose the workout session of their choice. Workouts are categorized according to the different body types with their distinctive workout sessions. The user is allowed to use the timer feature for their convenience.

- Expanded Use Case

Fitness User	**System**
1. Select workout plan.	
	2. Get all workout plan from database.
	3. Send workout plan to user interface

Table 4: Expanded Use Case of Workout plan

- Sequence Diagram:

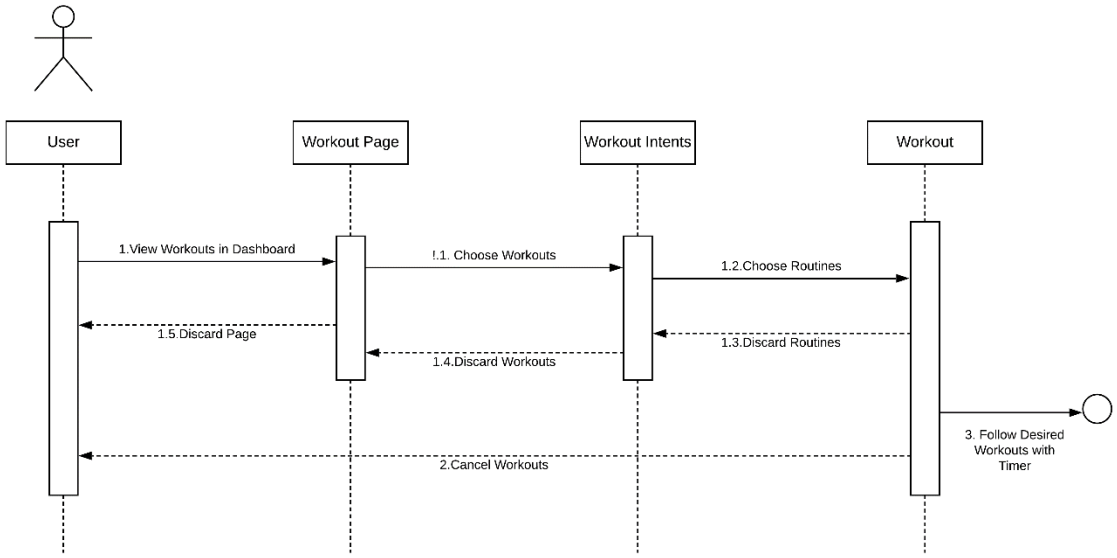


Figure 33: Sequence diagram of Workout Plan page

- Collaboration Diagram:

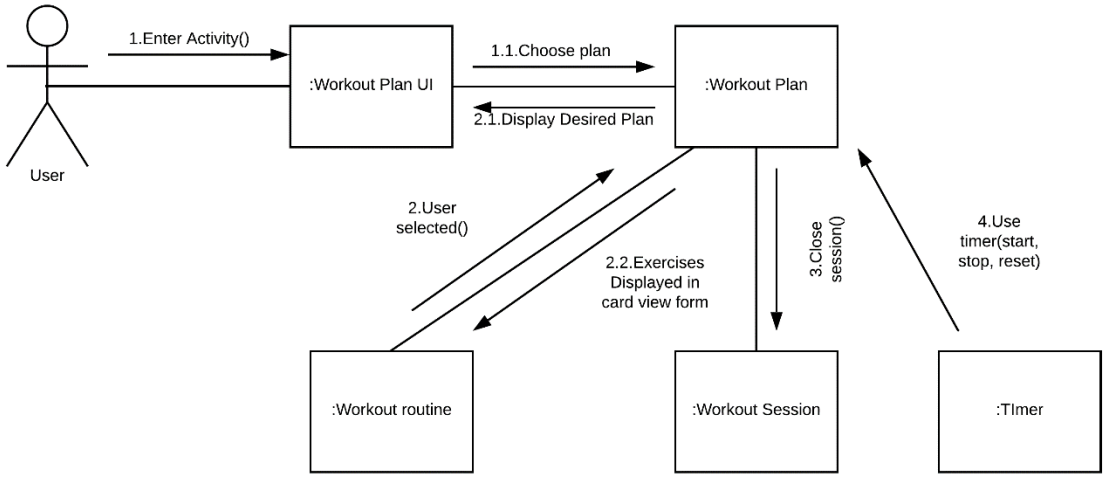


Figure 34: Collaboration Diagram of Workout Plan

- Wireframes

This is the wireframe for workout plan page where workouts are categorized on the basis of body types.

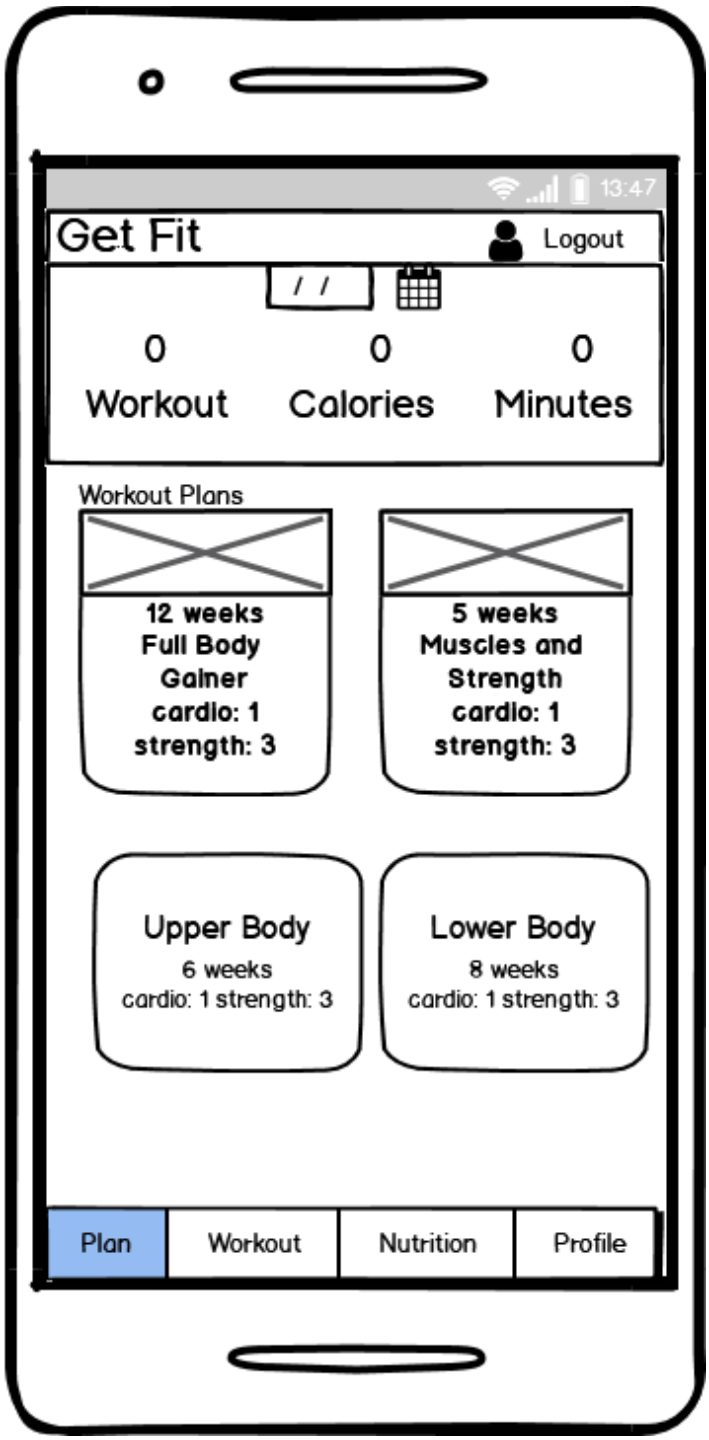


Figure 35: Wireframe for Workouts Plan Page

- Graphical Representation:

This is the graphical representation for workout plan page where workouts are categorized on the basis of body types.

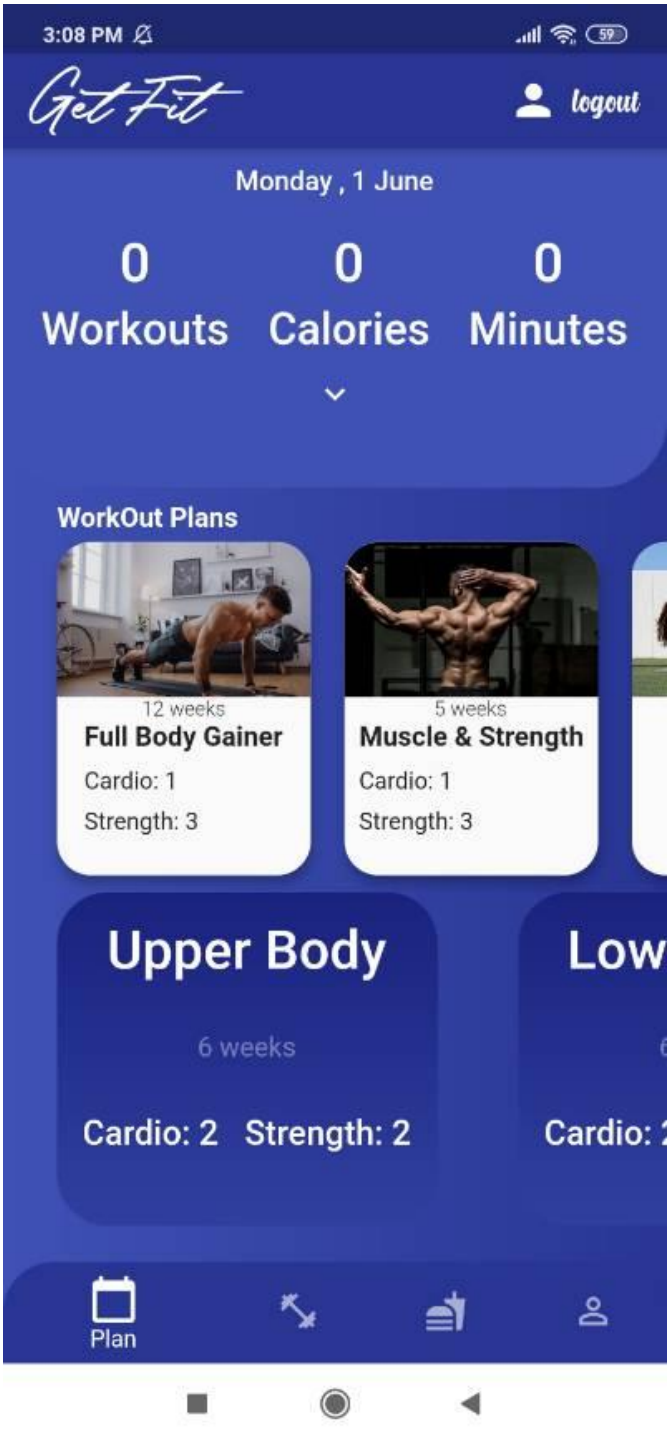
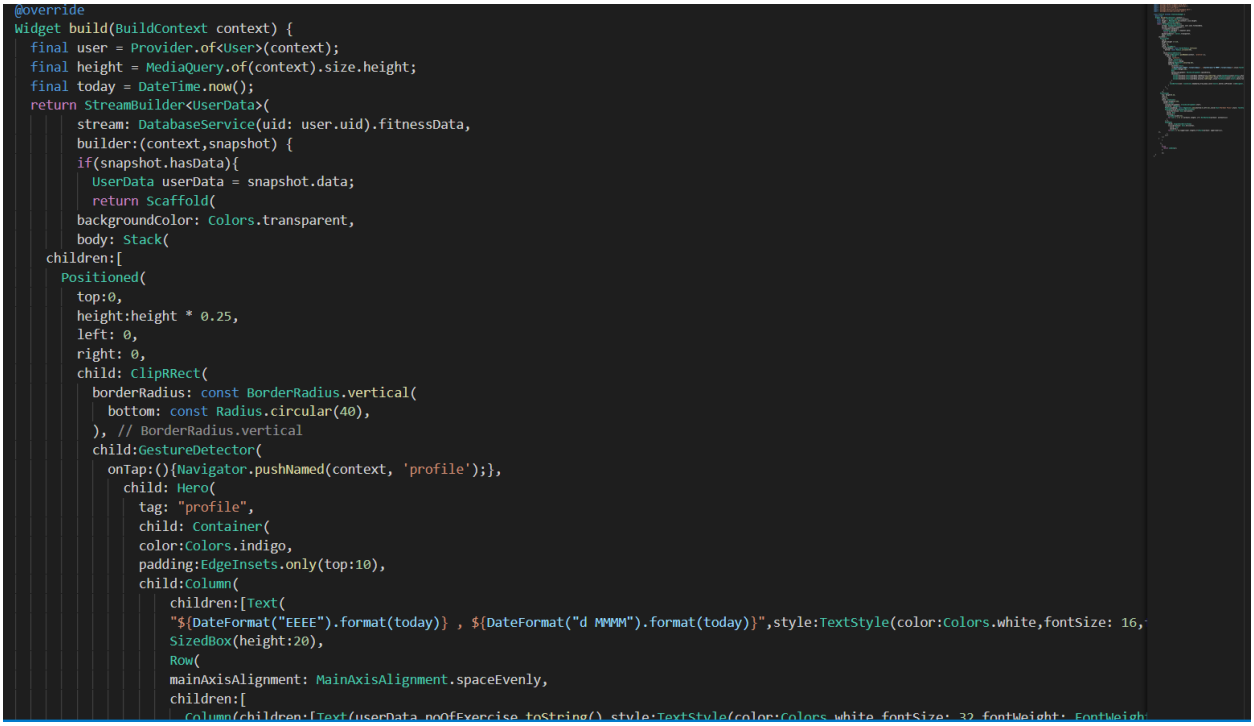


Figure 36: Graphical Representation of Workout Plan page

Engineering

The selected workout plan feature was developed in this phase. This is the key feature of the sprint as development and testing is done in this phase. Selected code snippets are also attached wherever it is feasible**.**

- Development



```
@override
Widget build(BuildContext context) {
  final user = Provider.of<User>(context);
  final height = MediaQuery.of(context).size.height;
  final today = DateTime.now();
  return StreamBuilder<UserData>(
        stream: DatabaseService(uid: user.uid).fitnessData,
        builder:(context,snapshot) {
        if(snapshot.hasData){
          UserData userData = snapshot.data;
          return Scaffold(
        backgroundColor: Colors.transparent,
        body: Stack(
    children:[
      Positioned(
        top:0,
        height:height * 0.25,
        left: 0,
        right: 0,
        child: ClipRRect(
          borderRadius: const BorderRadius.vertical(
            bottom: const Radius.circular(40),
          ), // BorderRadius.vertical
          child:GestureDetector(
            onTap:(){Navigator.pushNamed(context, 'profile');},
              child: Hero(
                tag: "profile",
                child: Container(
                color:Colors.indigo,
                padding:EdgeInsets.only(top:10),
                child:Column(
                    children:[Text(
                    "${DateFormat("EEEE").format(today)} , ${DateFormat("d MMMM").format(today)}",style:TextStyle(color:Colors.white,fontSize: 16,
                    SizedBox(height:20),
                    Row(
                    mainAxisAlignment: MainAxisAlignment.spaceEvenly,
                    children:[
                      Column(children:[Text(userData.noOfExercise.toString(),style:TextStyle(color:Colors.white,fontSize: 32,fontWeight: FontWeigh
```

Figure 37: Code Snippet for Workout Plan feature

3.6.3. Diet Plans

- Use Case Diagram

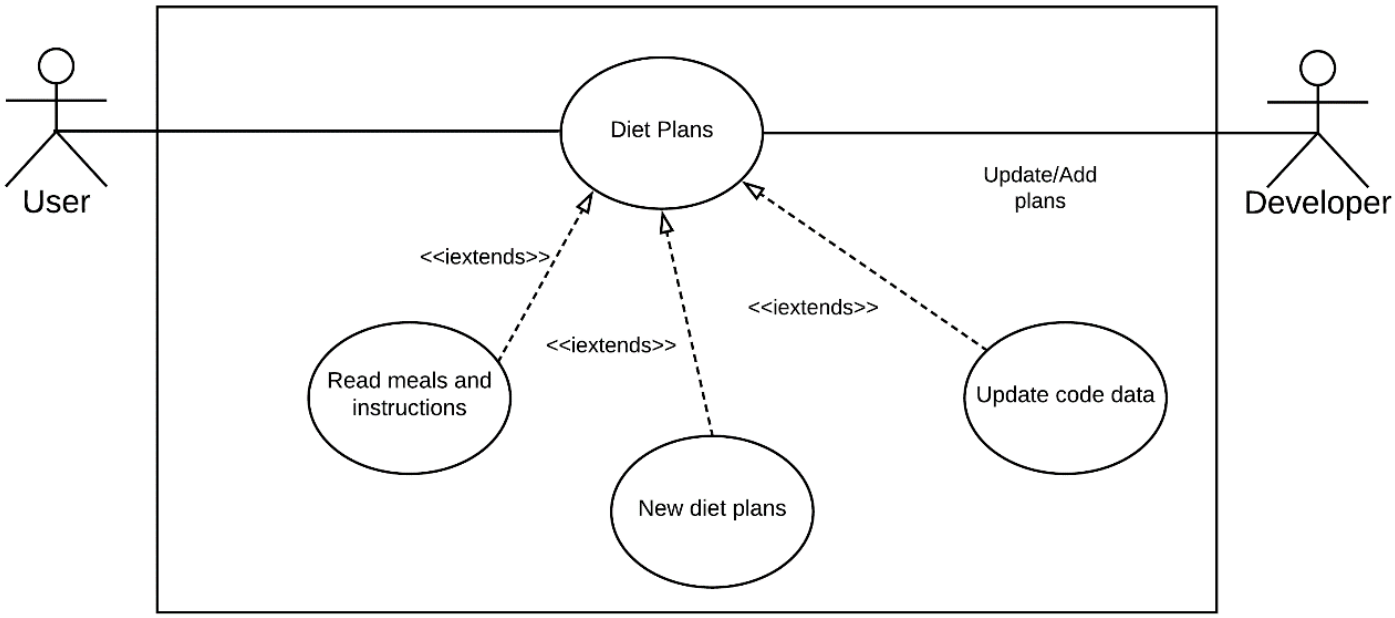


Figure 38: Use Case Diagram of Diet Plan page

- High level Use Case

Name: Diet Plan Page

Actor: Local User

Description: The user is allowed to view the page of Diet plan in the dashboard section. The system provides the users with a set of recipes and its calories that the user can take into consideration during the workouts.

- Expanded Use Case

Fitness User	**System**
1. Select diet plan.	
	2. Get all diet plan from database.
	3. Send diet plan to user interface

Table 5: Expanded Use Case of Diet plan

- Sequence Diagram

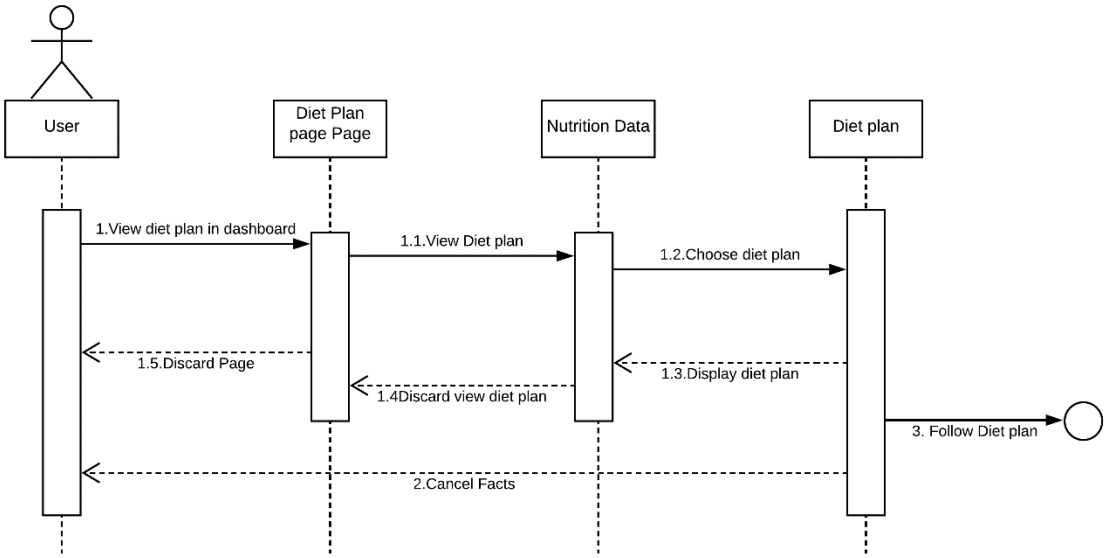


Figure 39: Sequence Diagram of Diet Plan page

- Collaboration Diagram

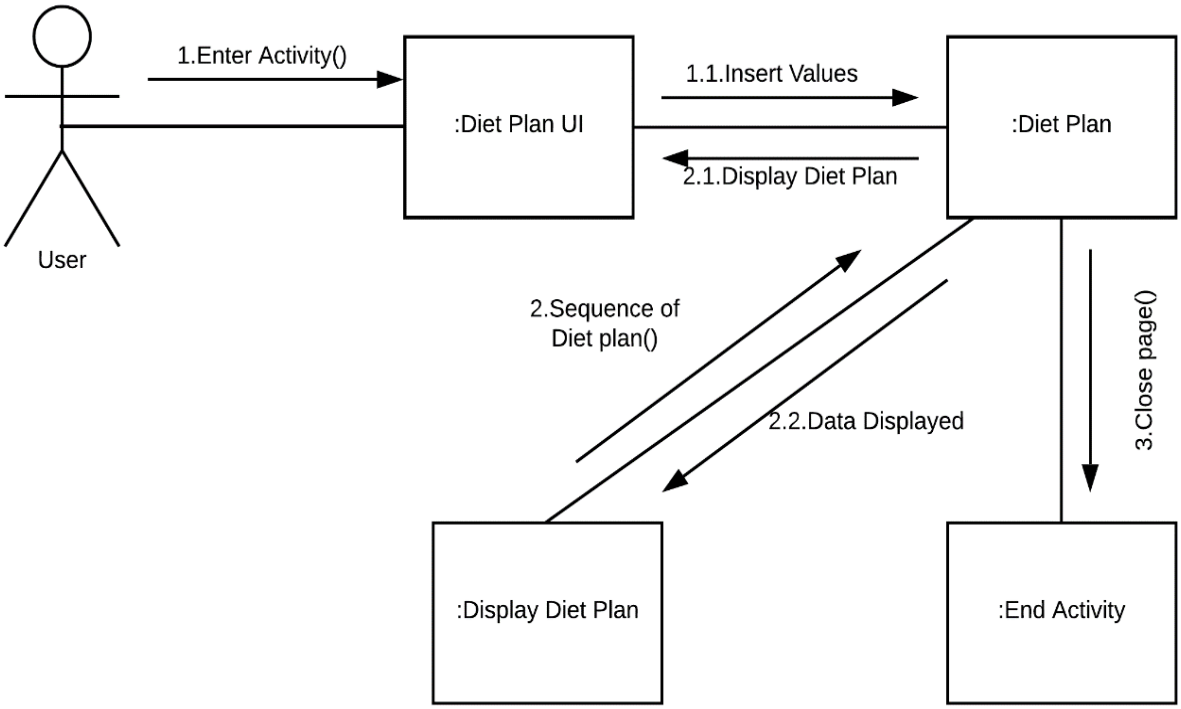


Figure 40: Collaboration Diagram of Diet Plan page

- Wireframe

This is the wireframe for diet plan page where diet plan are categorized on the basis of body types.

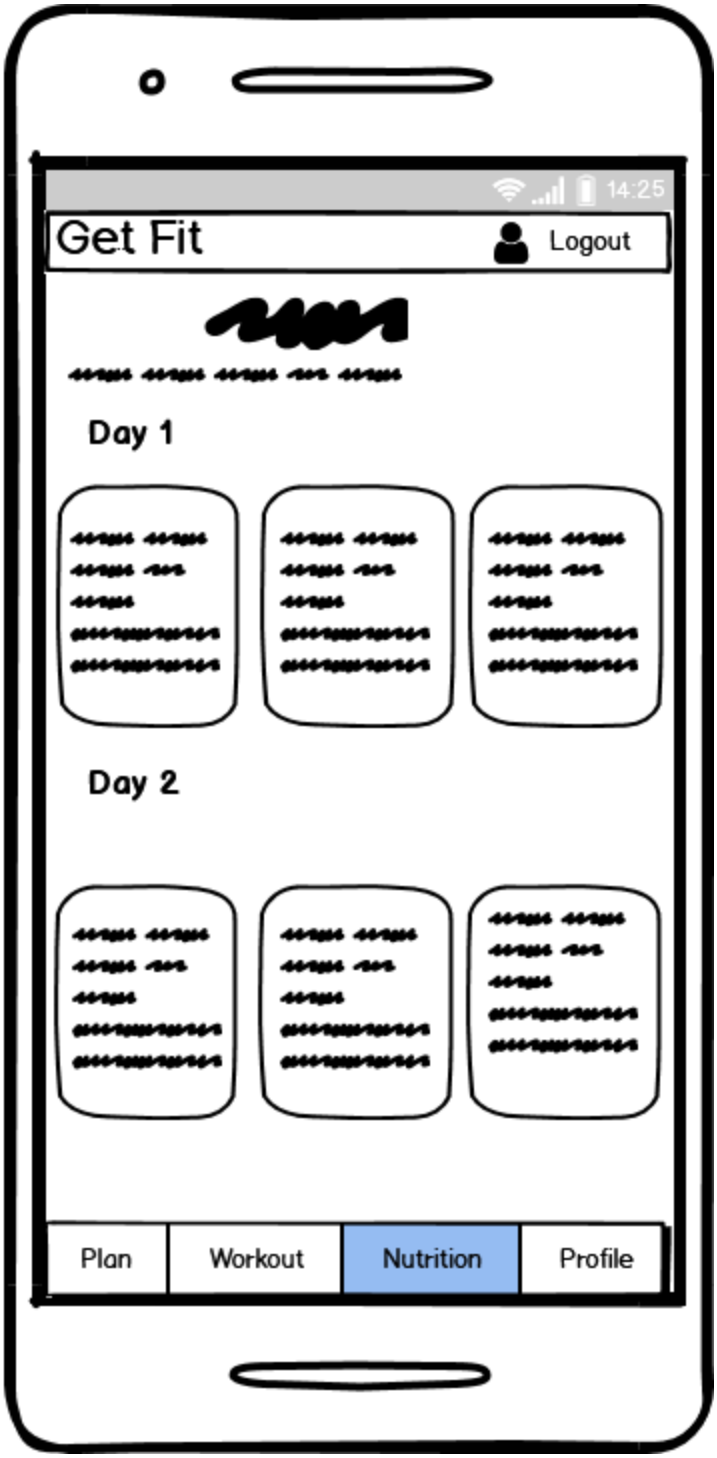


Figure 41: Wireframe of Nutrition page

Graphical Representation

This is the graphical representation for workout plan page where diet plan are categorized on the basis of body types.

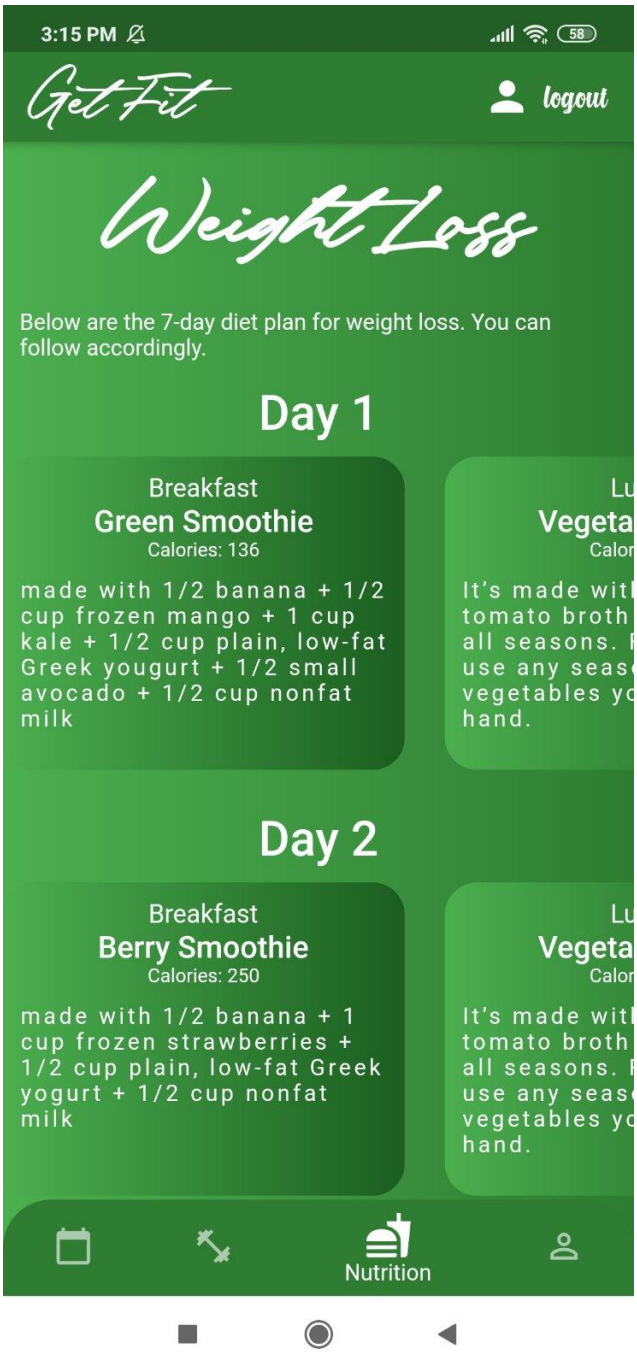


Figure 42: Graphical Representation of Diet Plan

Engineering

The selected diet plan feature was developed in this phase. This is the key feature of the sprint as development and testing is done in this phase. Selected code snippets are also attached wherever it is feasible.

- Development

```
@override
Widget build(BuildContext context) {
  return Container(
    child: Center(
        child: Column(children: <Widget>[
        SizedBox(height:10),
        Container(child: Text(nutrition.name,style: TextStyle(color:Colors.white,fontSize: 28,height:3,fontWeight:FontWeight.w700,fontFamily: 'Hea
        SizedBox(height:10),
        Container(margin: EdgeInsets.only(left:10,right:10),child: Text(nutrition.info,style: TextStyle(color:Colors.white,))),
        SizedBox(height:10),
        Expanded(
            child: SingleChildScrollView(
            scrollDirection: Axis.vertical,
            child:Column(
            children:[for(int i =0;i<nutrition.breakfast.length;i++)
            Container(width:MediaQuery.of(context).size.width,height:260,margin: EdgeInsets.only(top:5),child:
            Column(children:[
              Text("Day "+(i+1).toString(),style: TextStyle(color:Colors.white,fontSize: 30,fontWeight:FontWeight.w500),),
              SizedBox(height:10),
              Expanded(
                child:SingleChildScrollView(
                scrollDirection: Axis.horizontal,
                child:Row(children: <Widget>[
                  Container(decoration:BoxDecoration(borderRadius: BorderRadius.circular(20),gradient: LinearGradient(colors:[Colors.green,Colors.
                  Container(decoration:BoxDecoration(borderRadius: BorderRadius.circular(20),gradient: LinearGradient(colors:[Colors.green,Colors.
                  Container(decoration:BoxDecoration(borderRadius: BorderRadius.circular(20),gradient: LinearGradient(colors:[Colors.green,Colors.
                ],) // <Widget>[] // Row
              )), // SingleChildScrollView // Expanded
              SizedBox(height:20,)
            ]) // Column
            ) // Container
            ]) // Column
          ), // SingleChildScrollView
        )],), // Expanded // <Widget>[] // Column
    ) // Center
  ); // Container
}
```

Ln 1, Col 1 Spaces: 2 UTF-8 LF Dart Flutter: 1.17.2 No D

Figure 43: Code Snippet for Diet Plan feature

3.6.4. Pedometer

- Use Case Diagram

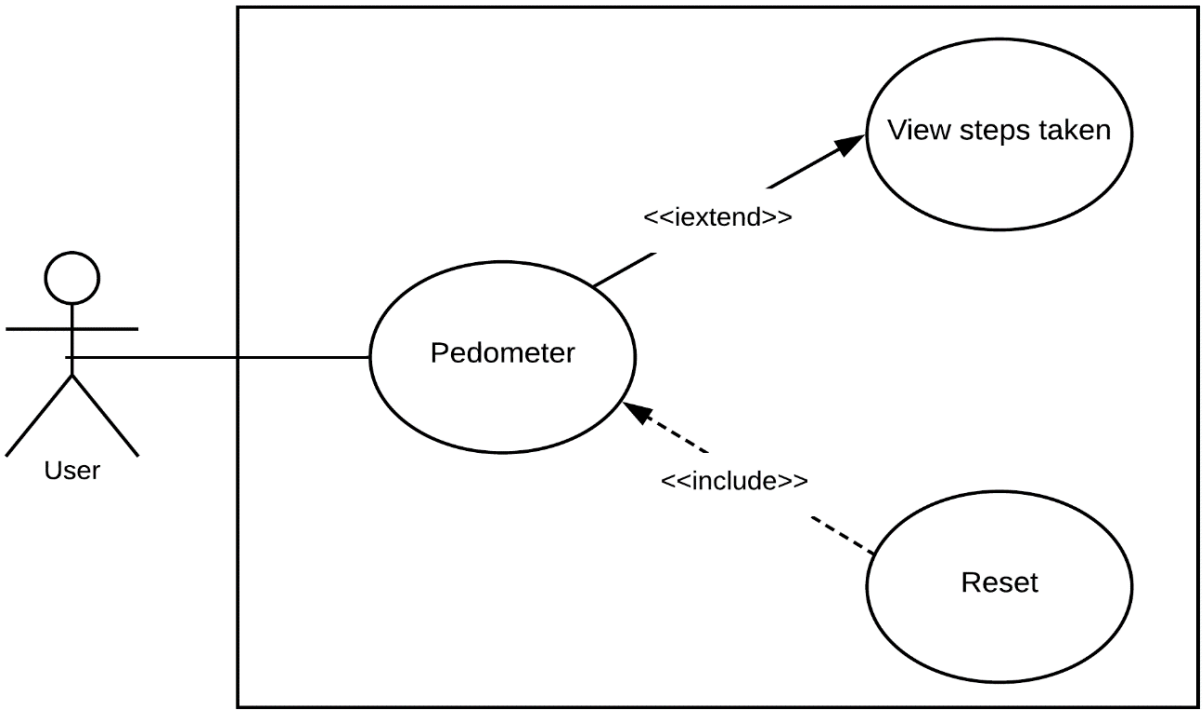


Figure 44: Use Case Diagram of Step Count

- High Level Use Case

Name: Pedometer

Actor: Local User

Description: The user is allowed to view the page of Step Count. The system tracks the sensor data and then displays the steps taken by the user. The user can reset the pedometer to start over to count steps while workout session.

- Expanded Use Case

Fitness User	**System**
1. Start activity.	
	2. Track sensor data.
3. Stop activity	
	4. Save data from sensors to database.

Table 6: Expanded Use Case of Pedometer

- Sequence Diagram:

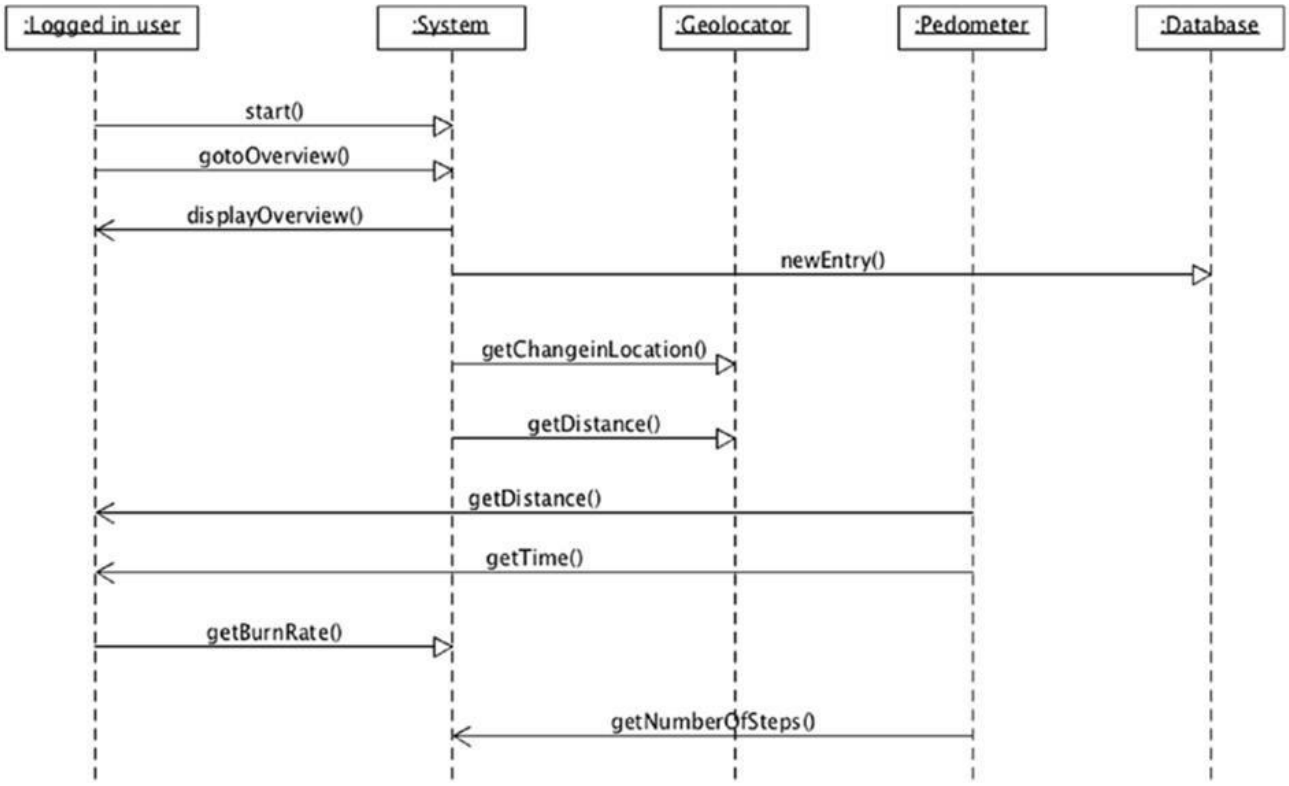


Figure 45: Sequence Diagram of Step Count

- Collaboration Diagram

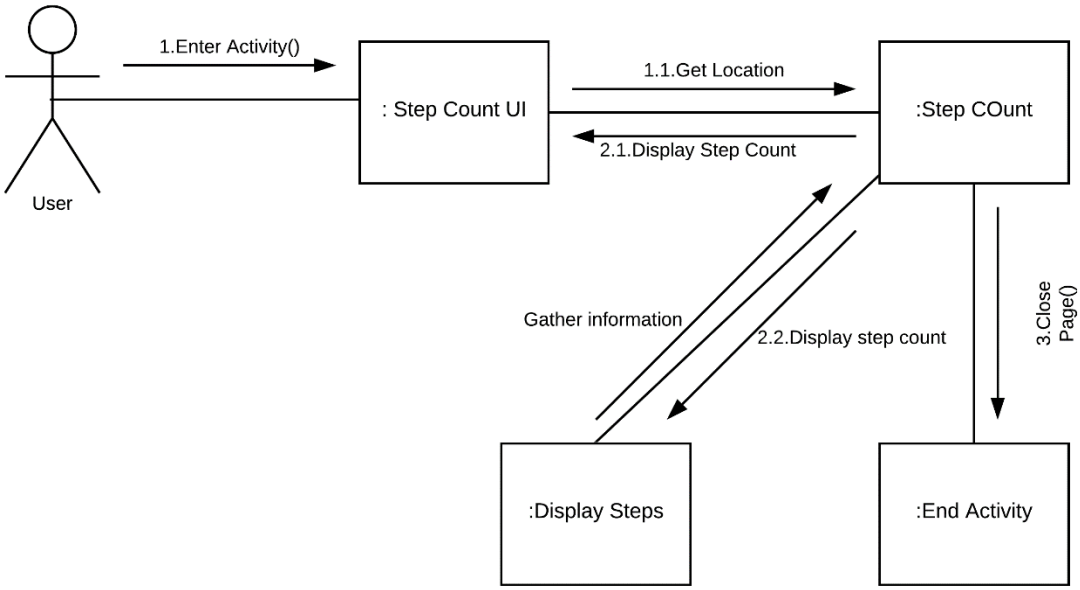


Figure 46: Collaboration Diagram of Step Count

- Wireframe:

This is the wireframe for pedometer page where the steps taken by the users are counted.

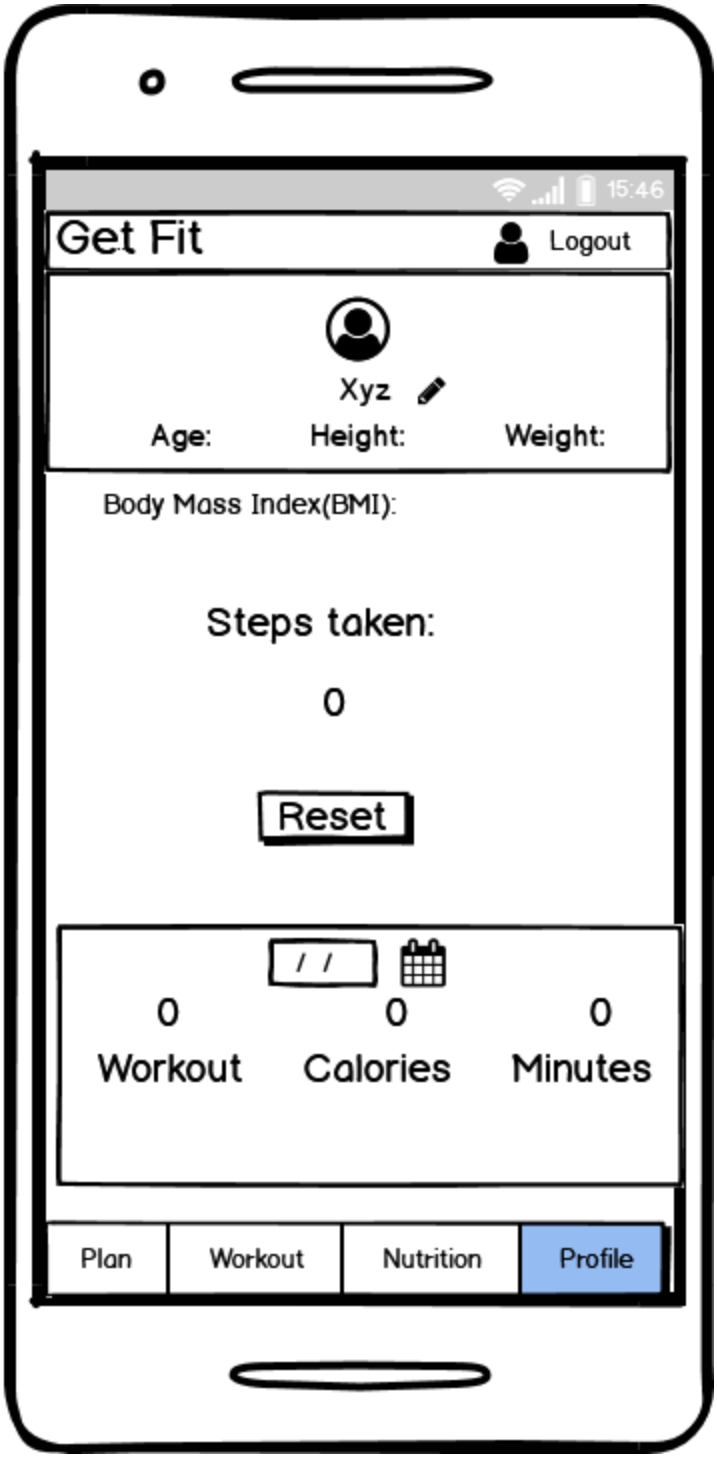


Figure 47: Wireframe of profile where steps count feature is available

- Graphical Representation

This is the graphical representation for pedometer page where the steps taken by the users are counted.

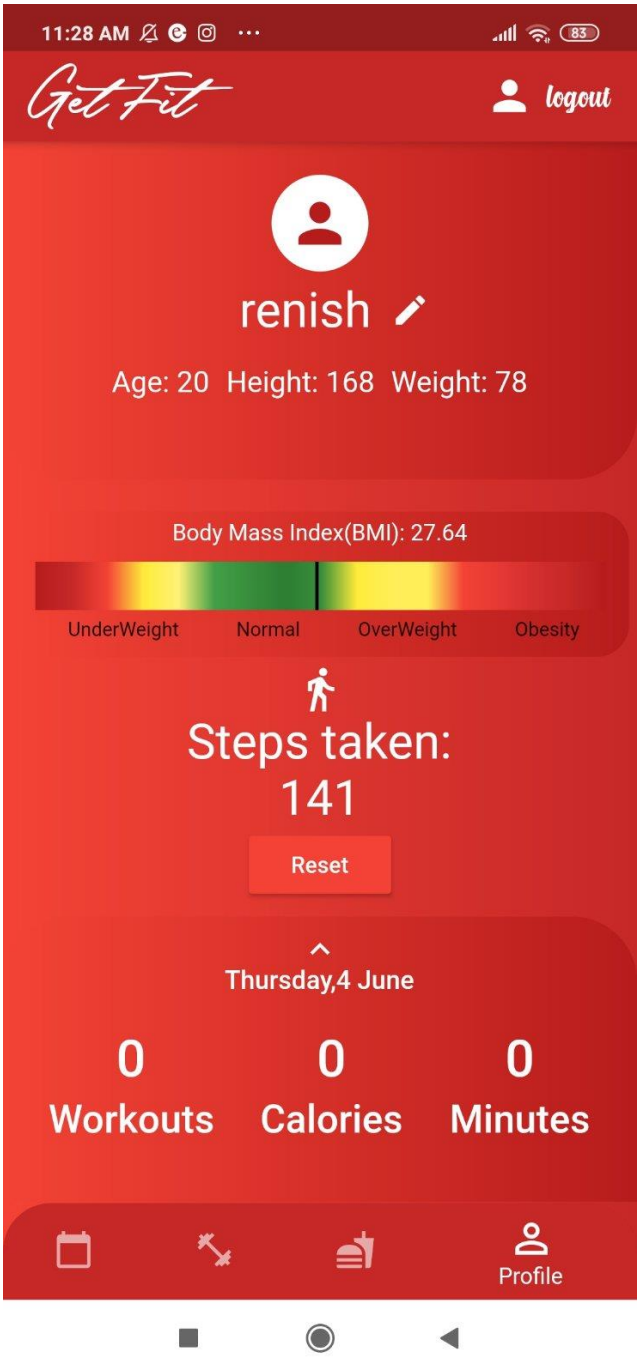


Figure 48: Graphical Representation of Steps Taken

Engineering

The selected step count feature was developed in this phase. This is the key feature of the sprint as development and testing is done in this phase. Selected code snippets are also attached wherever it is feasible.

- Development

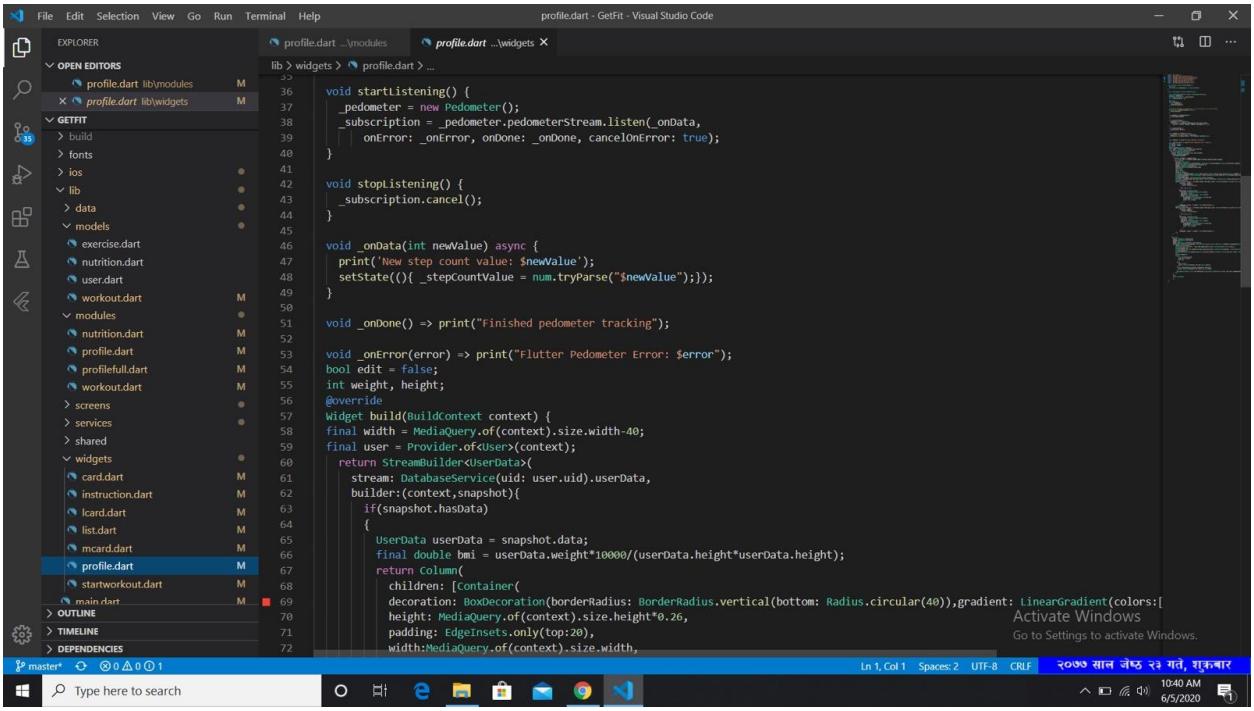


Figure 49: Code Snippet for step count feature

3.6.5. Exercise List

- Use Case Diagram

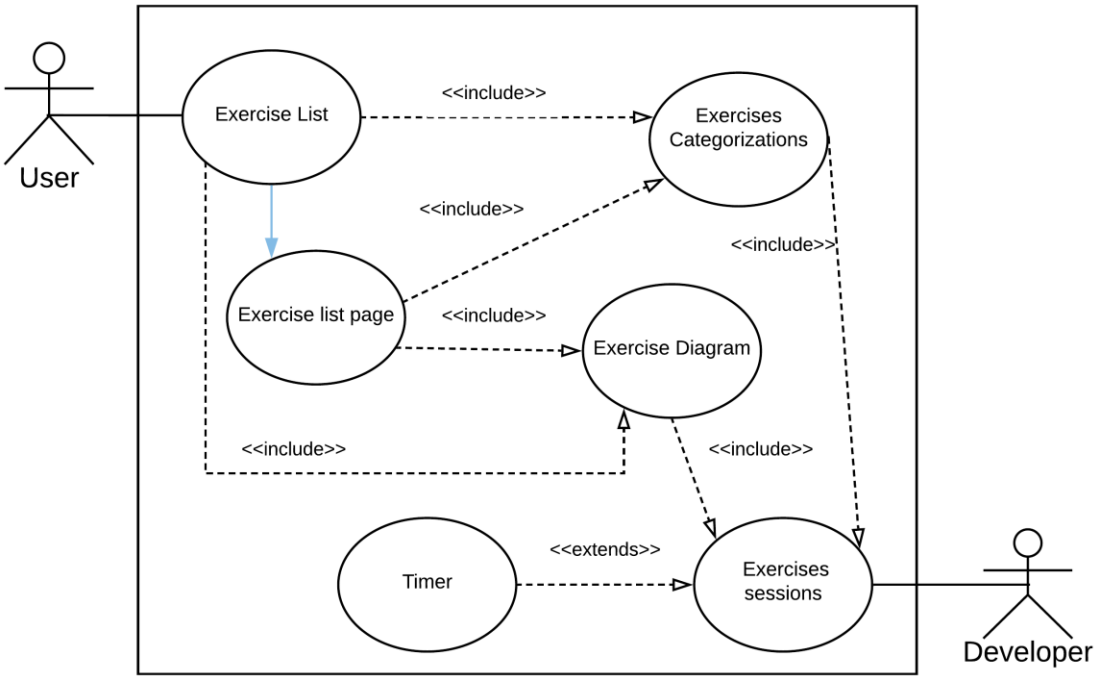


Figure 50: Use Case Diagram of Exercise List

- High Level Use Case

Name: Exercise List Page

Actor: Local User

Description: The user is allowed to view the exercise list page and to choose the exercise of their choice. Exercises are categorized according to the different body parts with their distinctive workout sessions. All the exercises contain a section which has brief information about the exercises which will be helpful during the workout session. The user is allowed to use the timer feature for their convenience.

- Expanded Use Case

Fitness User	**System**
1. Select exercise list.	
	2. Get all exercises from database.
	3. Send exercise list to user interface

Table 7: Expanded Use Case of Exercises

- Sequence Diagram:

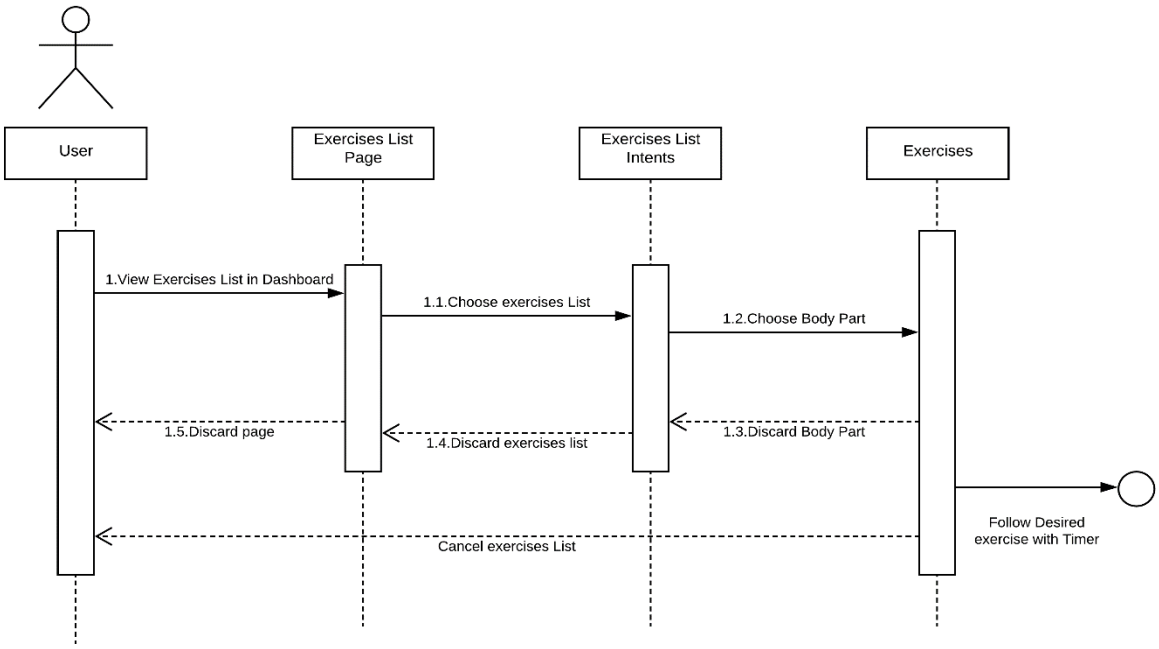


Figure 51: Sequence Diagram of Exercise List

- Collaboration diagram

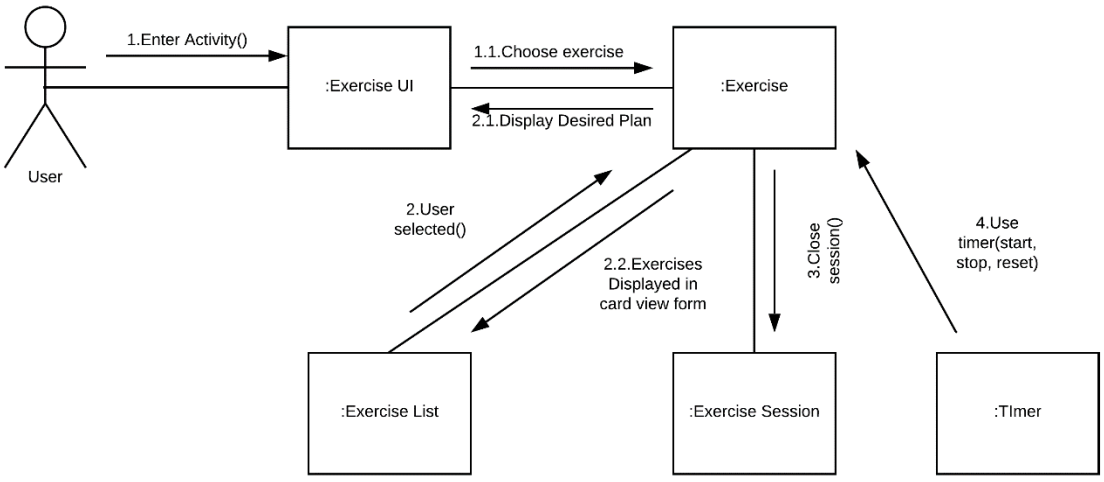


Figure 52: Collaboration Diagram of Exercise List

- Wireframe

This is the wireframe for exercises list page where exercises are categorized on the basis of body parts.

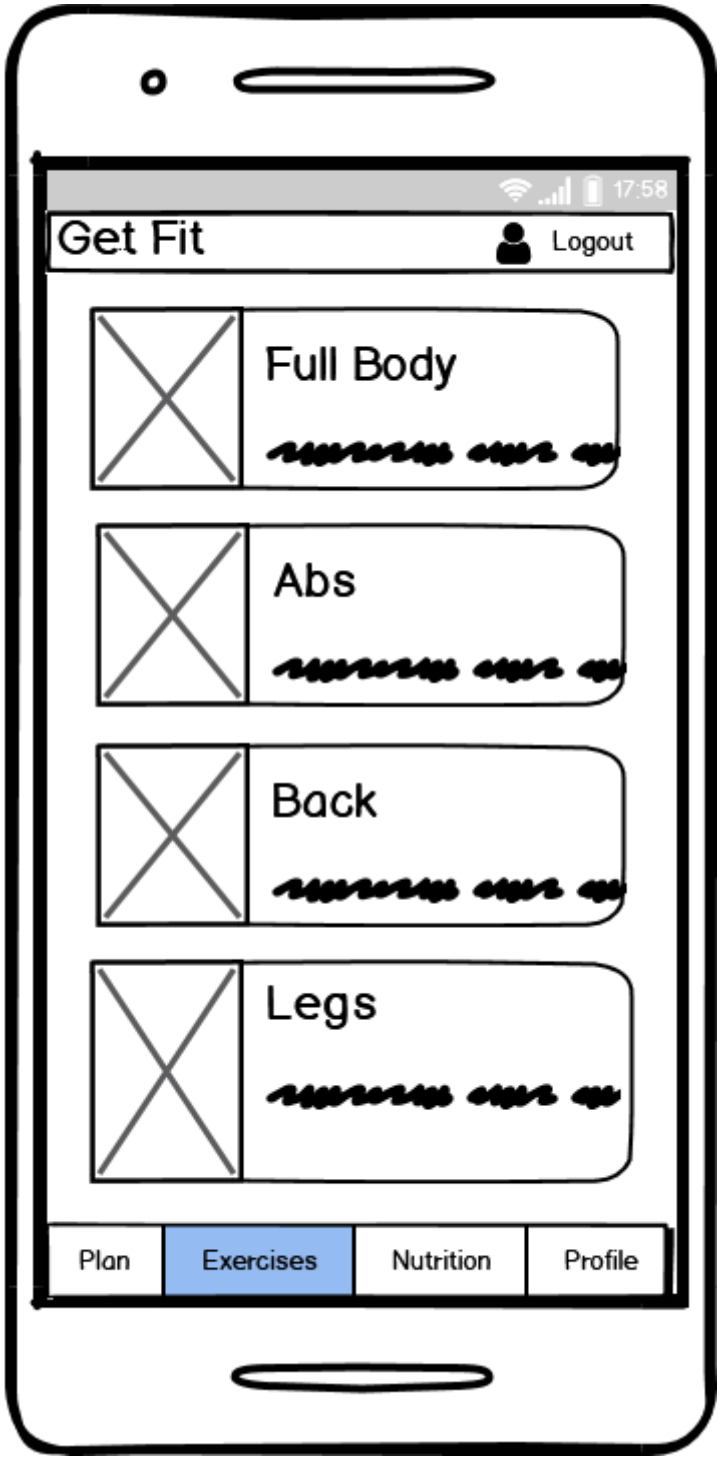


Figure 53: Wireframe of Exercise List Page

- Graphical Representation:

This is the graphical representation for exercise page where exercises are categorized on the basis of body parts.

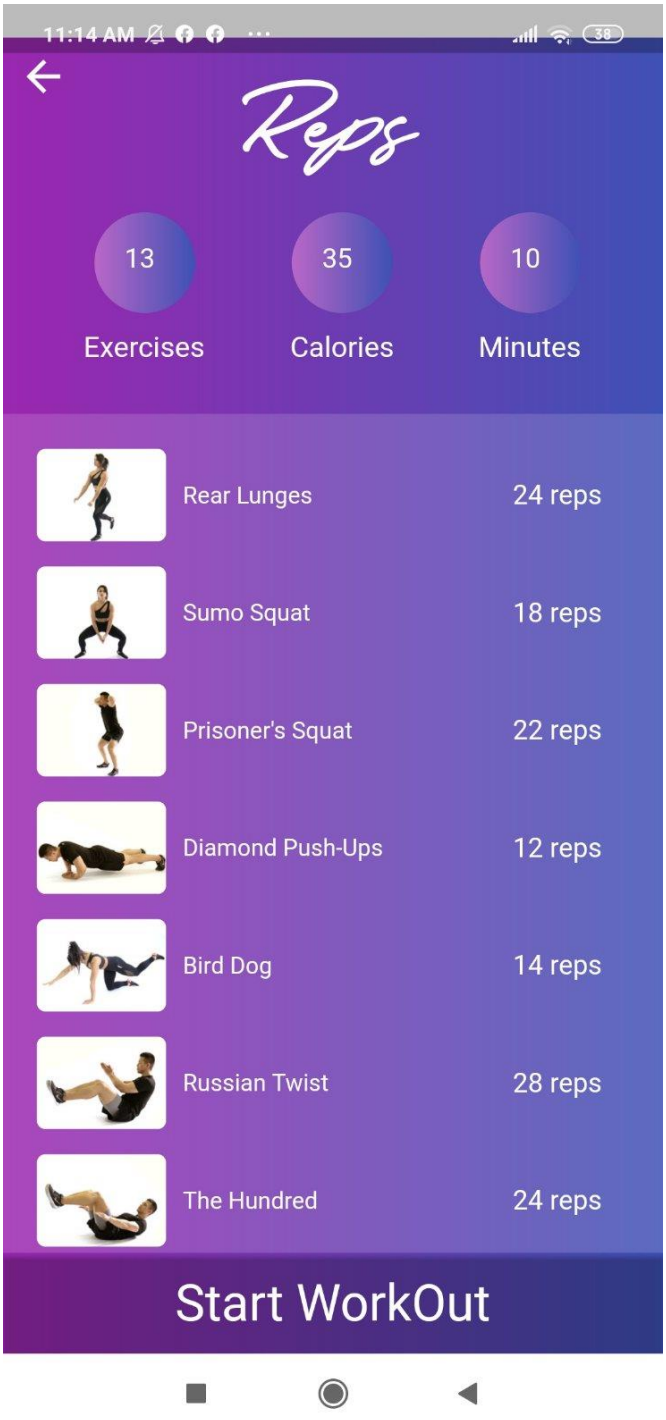


Figure 54: Graphical Representation of Exercise List page

Engineering

The selected exercises list feature was developed in this phase. This is the key feature of the sprint as development and testing is done in this phase. Selected code snippets are also attached wherever it is feasible.

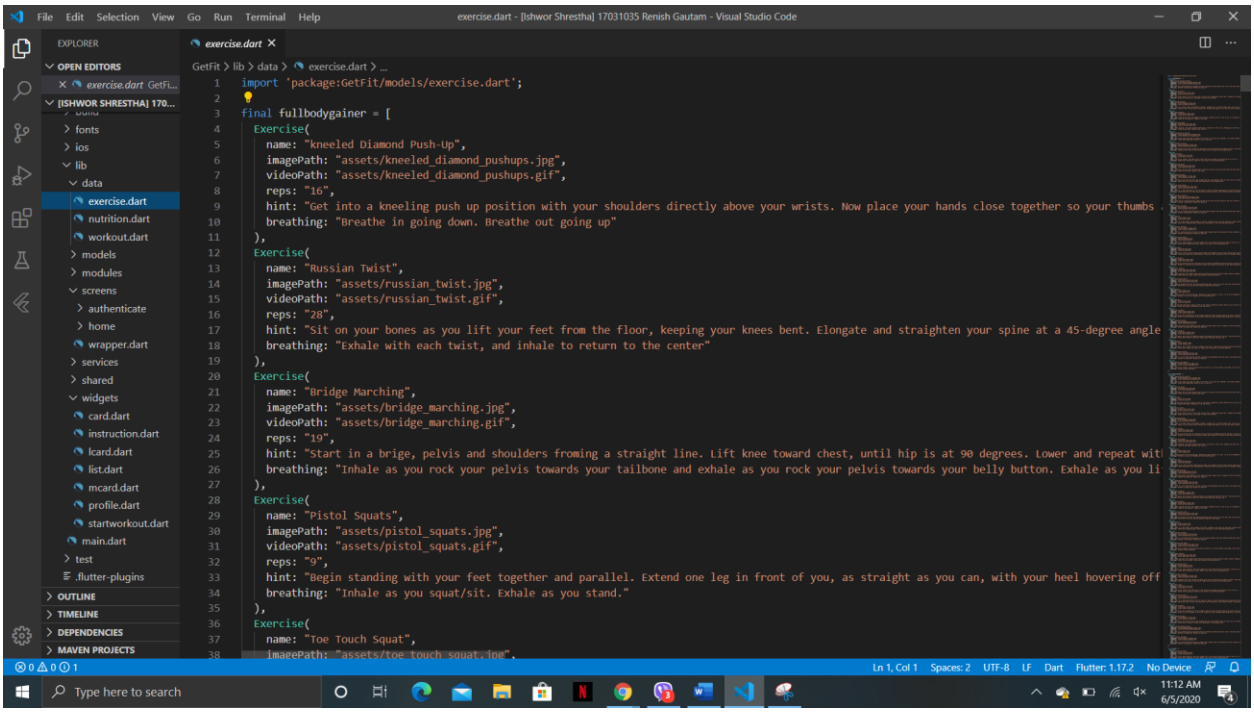


Figure 55: Code Snippet for exercise list feature

3.6.6. BMI Calculator

- Use case Diagram

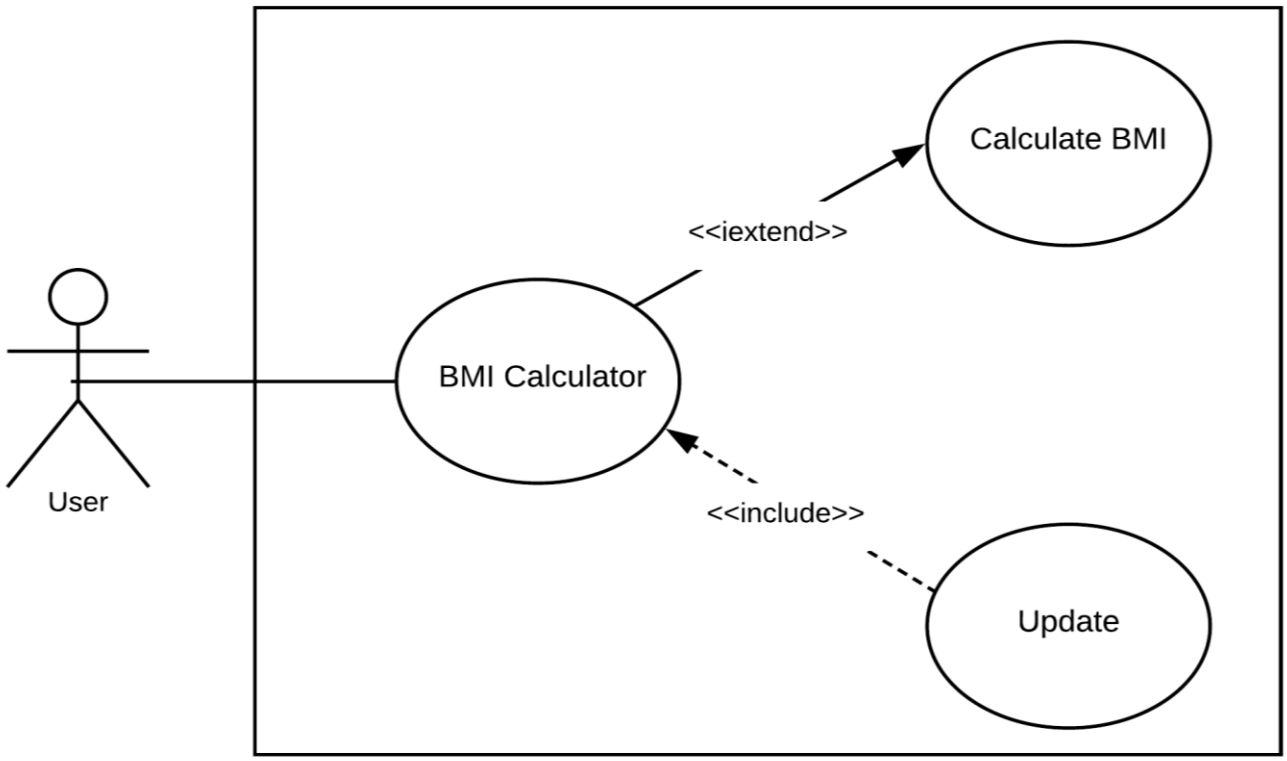


Figure 56: Use case Diagram of BMI calculator

- High Level Use Case

Name: BMI Calculator

Actor: Local User

Description: The user is allowed to view the BMI page and add their height and weight. Then the system tracks the data and calculates the BMI. Users can update height and weight according to their progress and check their updated BMI.

- Expanded Use Case Diagram

Fitness User	**System**
1. Enter details.	
	2. Calculate BMI.
	3. Display BMI in user interface

Table 8: Expanded Use Case of BMI Calculator

- Sequence Diagram

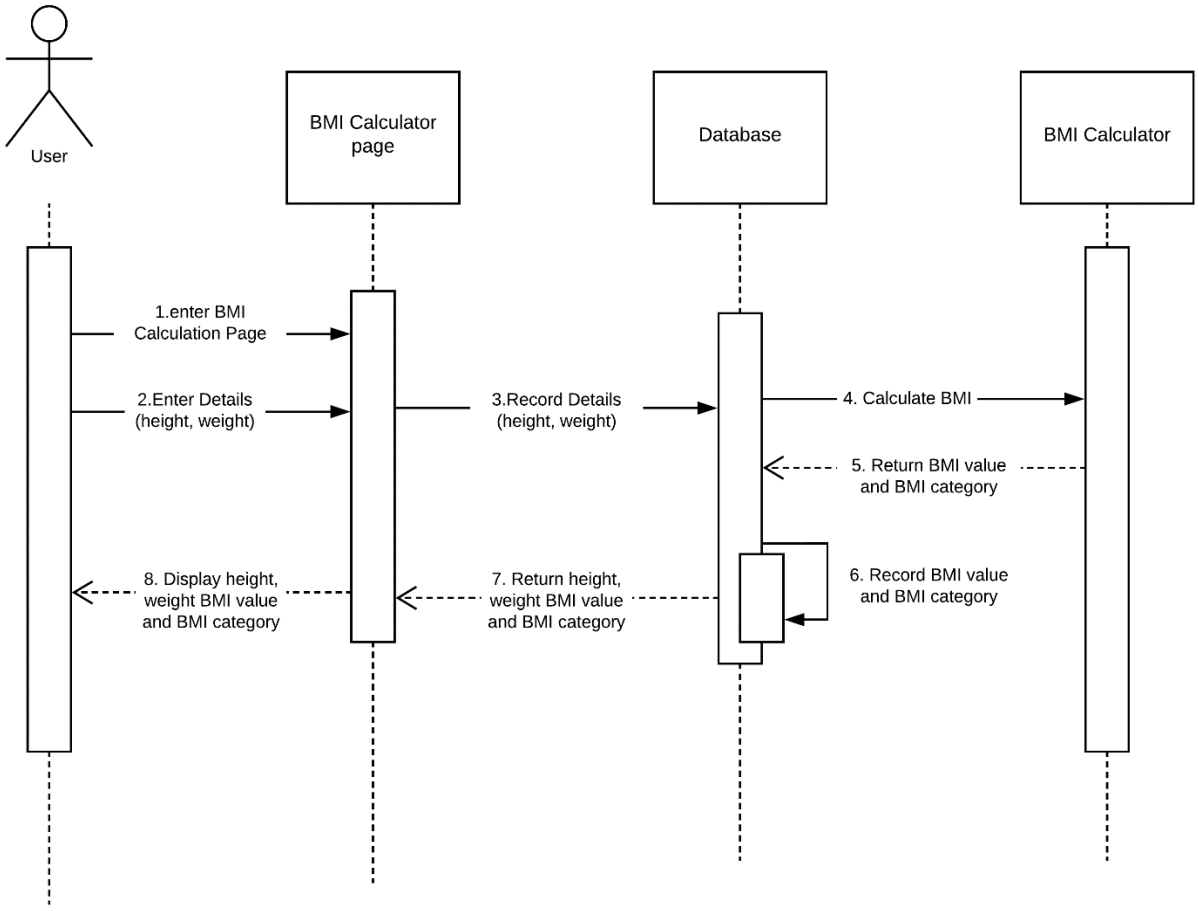


Figure 57: Sequence Diagram of BMI calculator

- Collaboration Diagram:

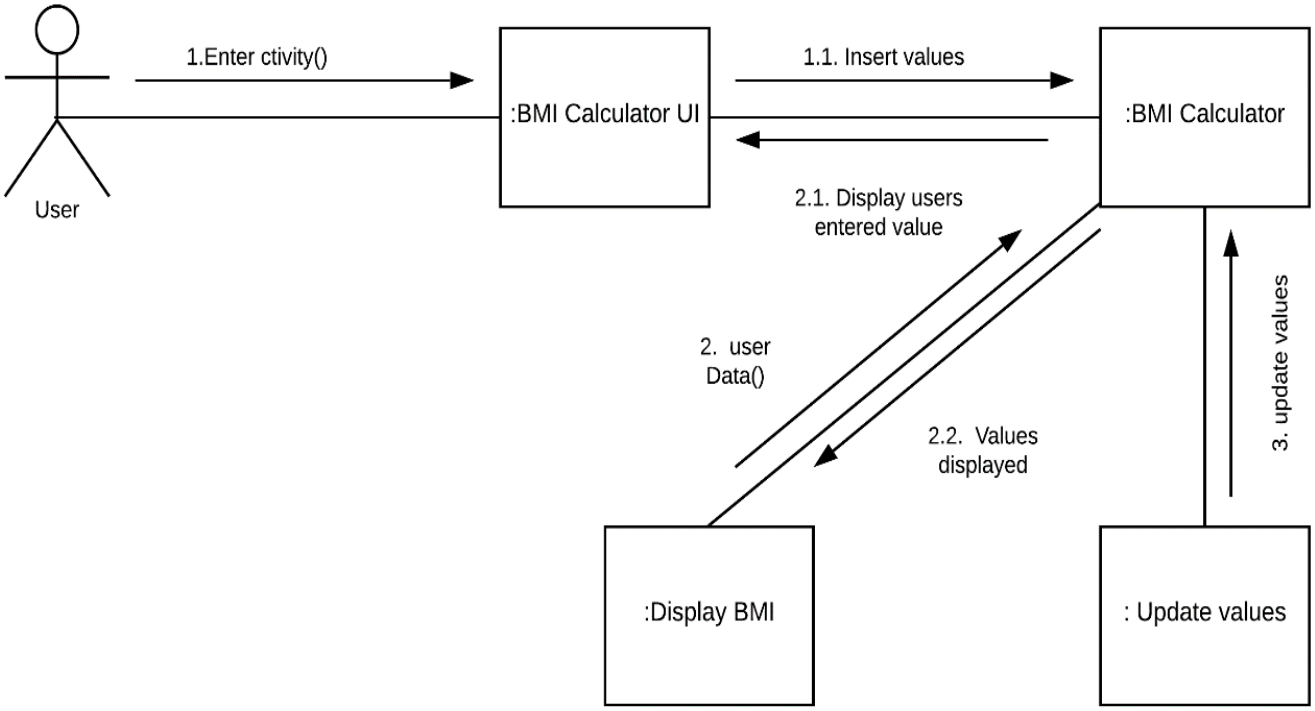


Figure 58: Collaboration Diagram of BMI Calculator

Engineering

The selected BMI Calculator feature was developed in this phase. This is the key feature of the sprint as development and testing is done in this phase. Selected code snippets are also attached wherever it is feasible**.**

- Development

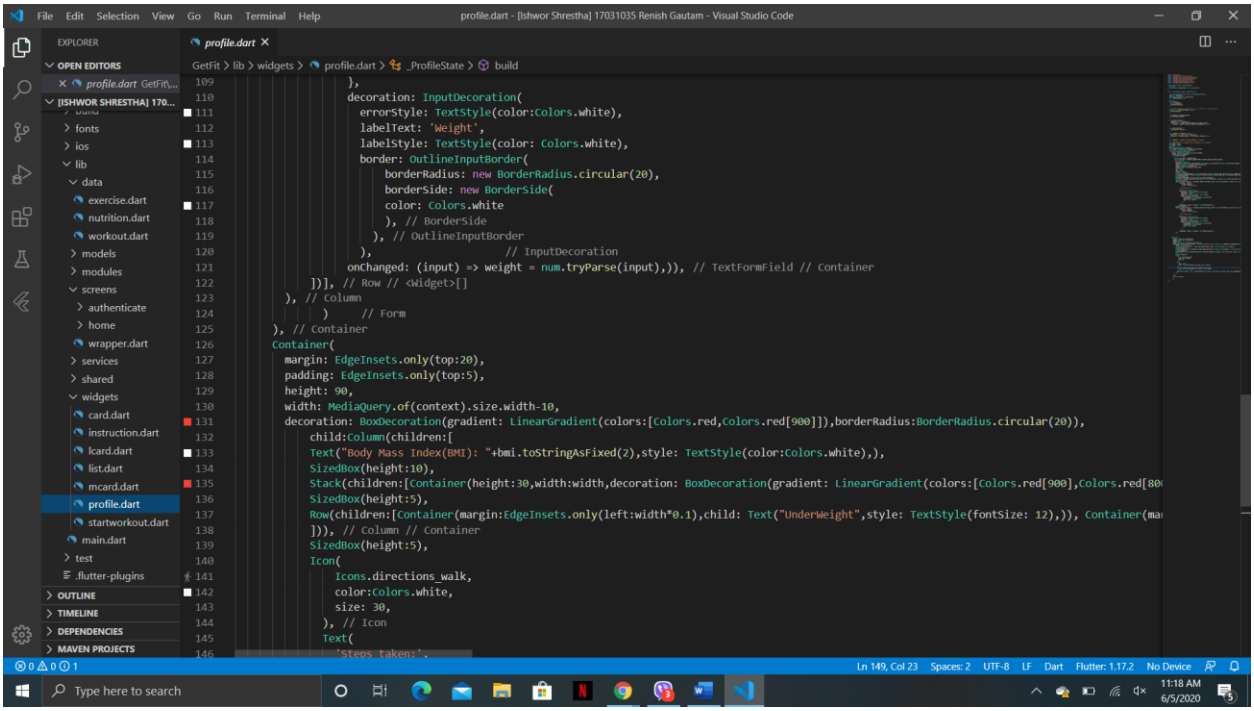


Figure 59: Code Snippet for BMI Calculator feature

3.7. Implementation

1. Pedometer

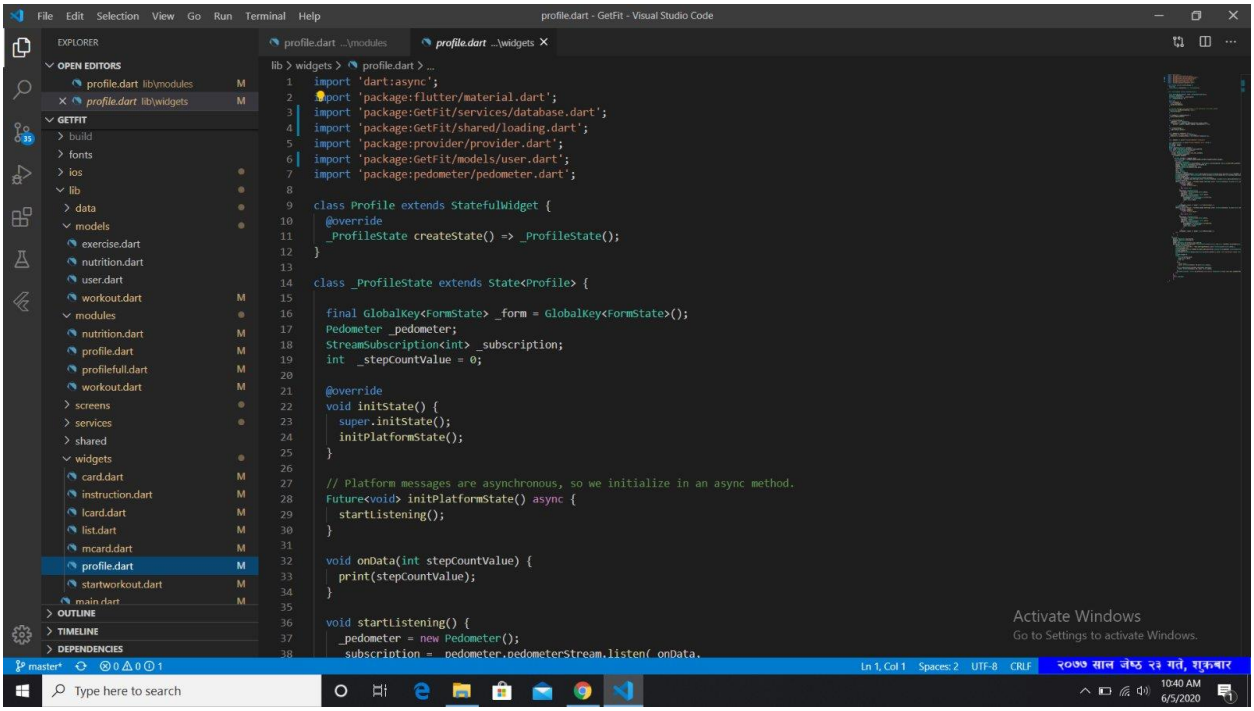


Figure 60: Code Snippet of Pedometer(i)

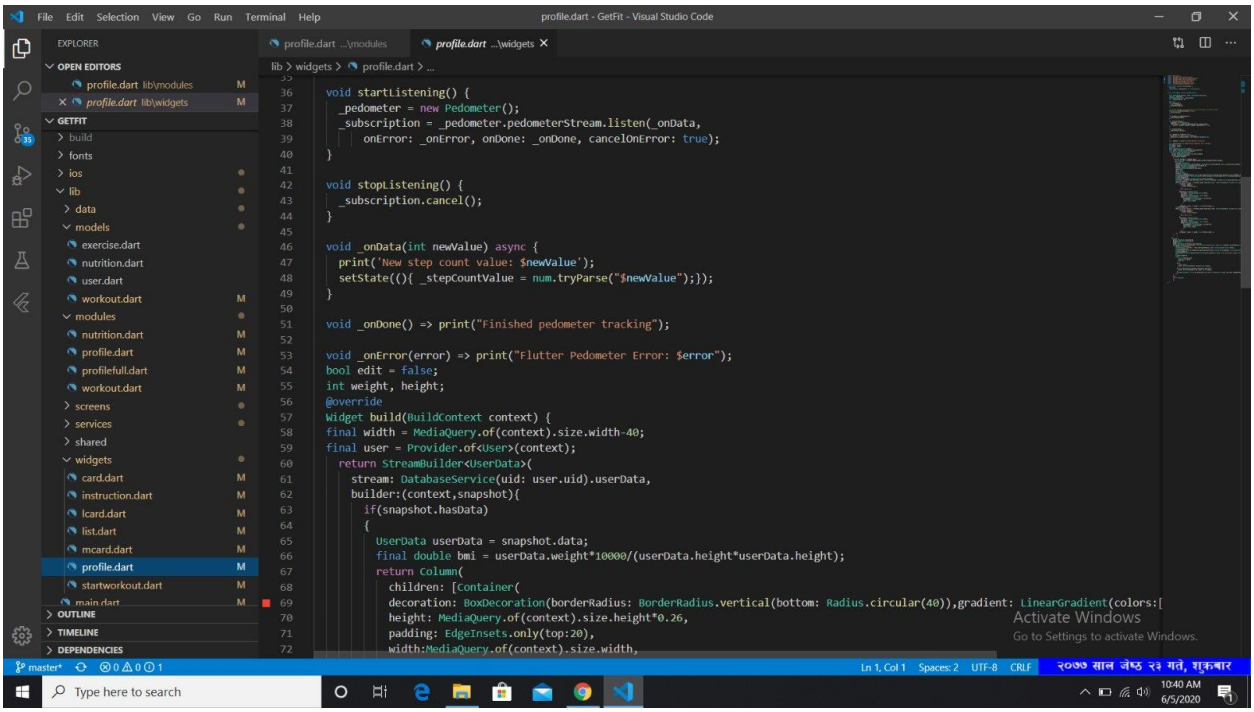


Figure 61: Code Snippet of Pedometer(ii)

2. Daily workout recorder (Workouts, Calorie, Time)

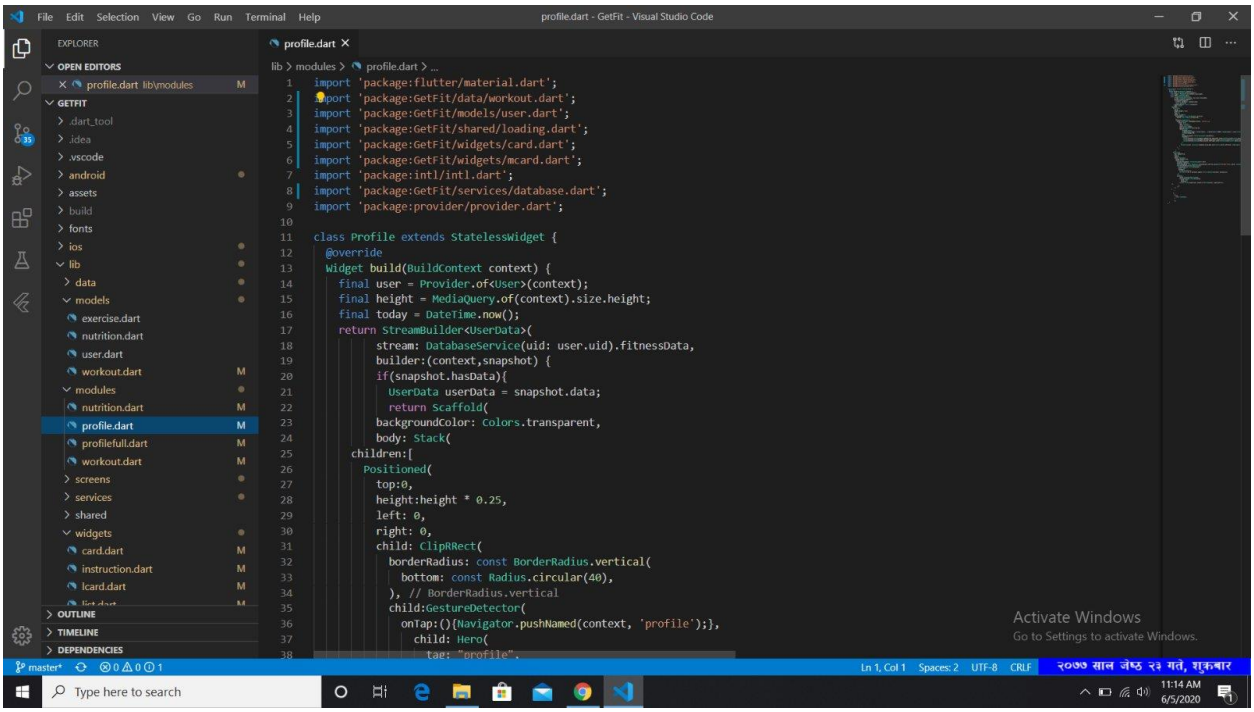


Figure 62: Code Snippet of daily activity recorder(i)

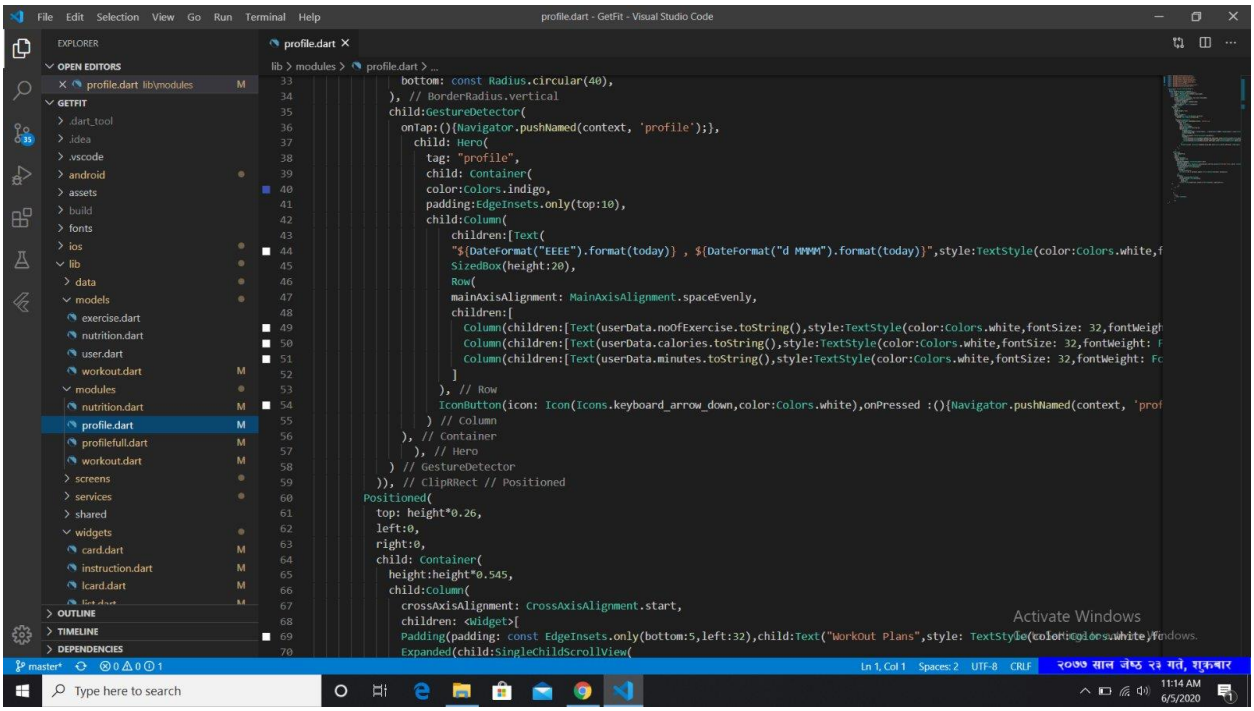


Figure 63: Code Snippet of Daily activity recorder(ii)

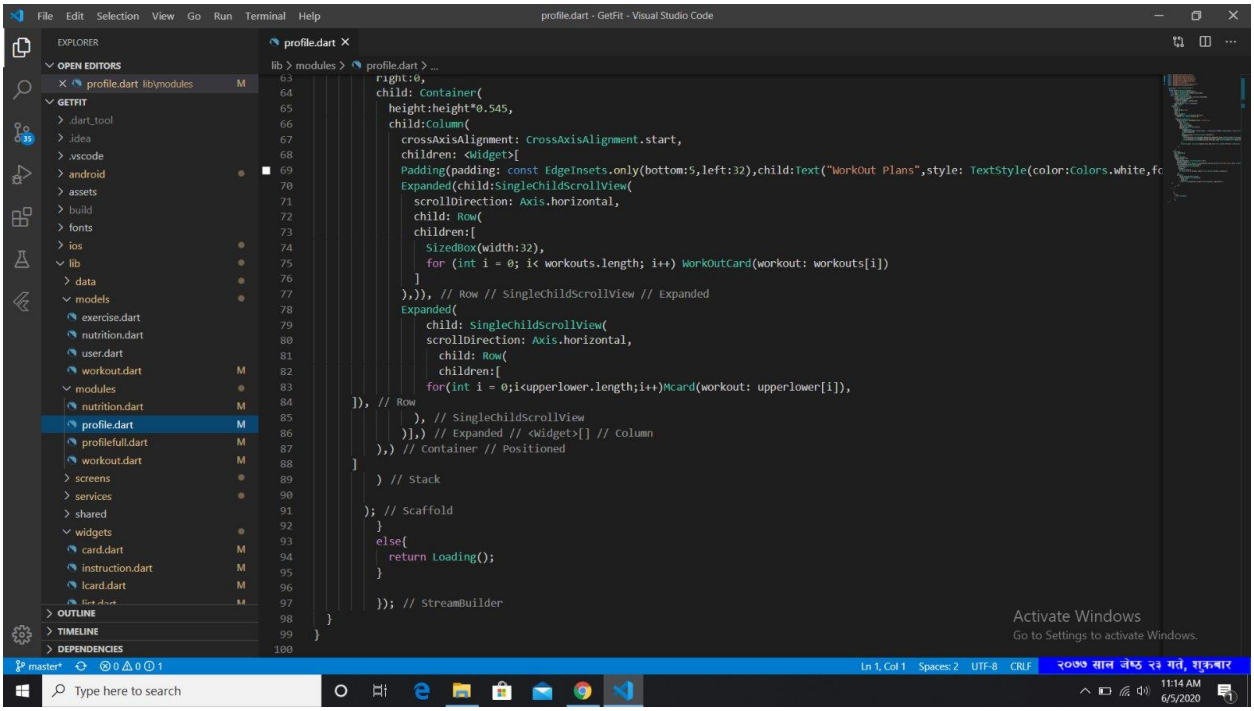


Figure 64: Code Snippet of daily activity recorder(iii)

3. Start Workout Session

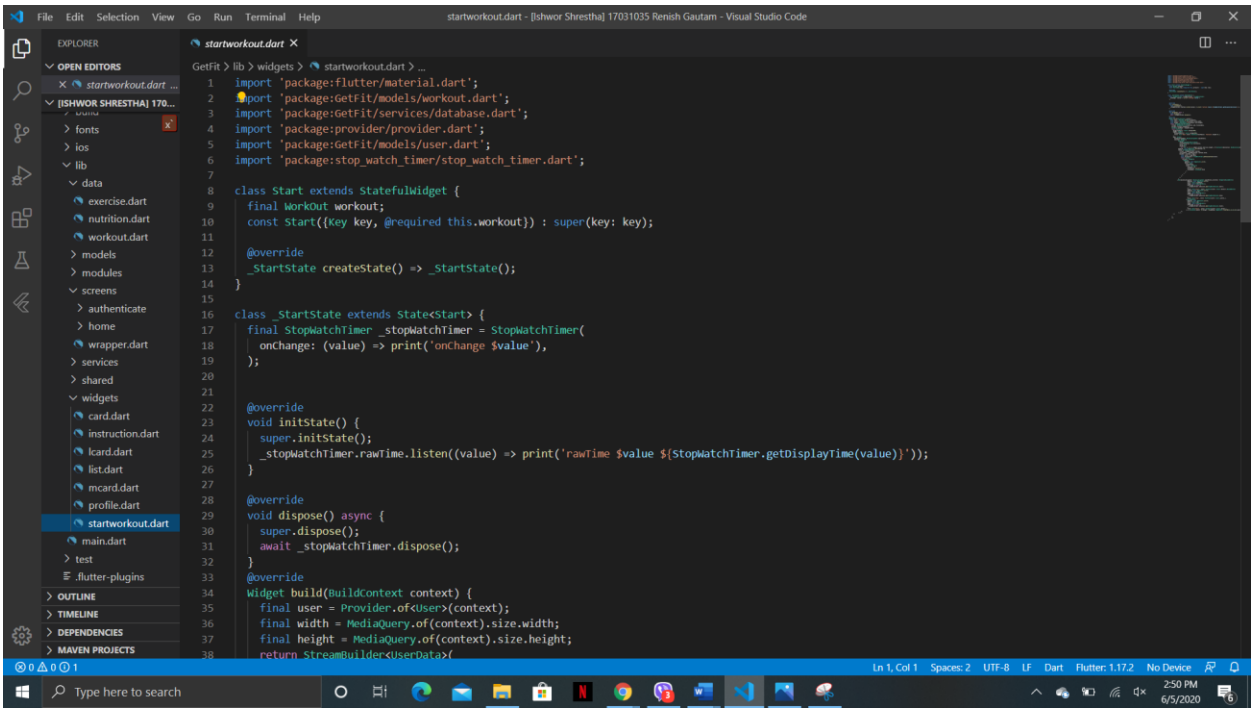


Figure 65: Code Snippet of daily Start workout session(i)

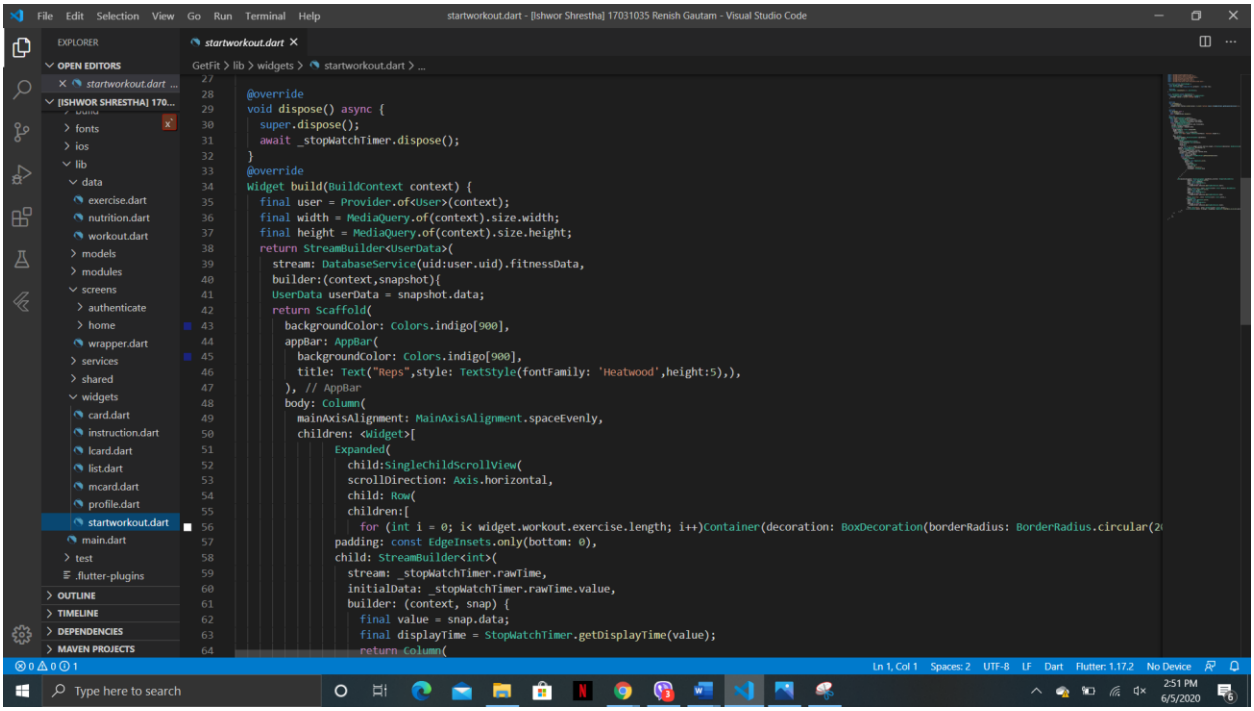


Figure 66: Code Snippet of daily Start workout session(ii)

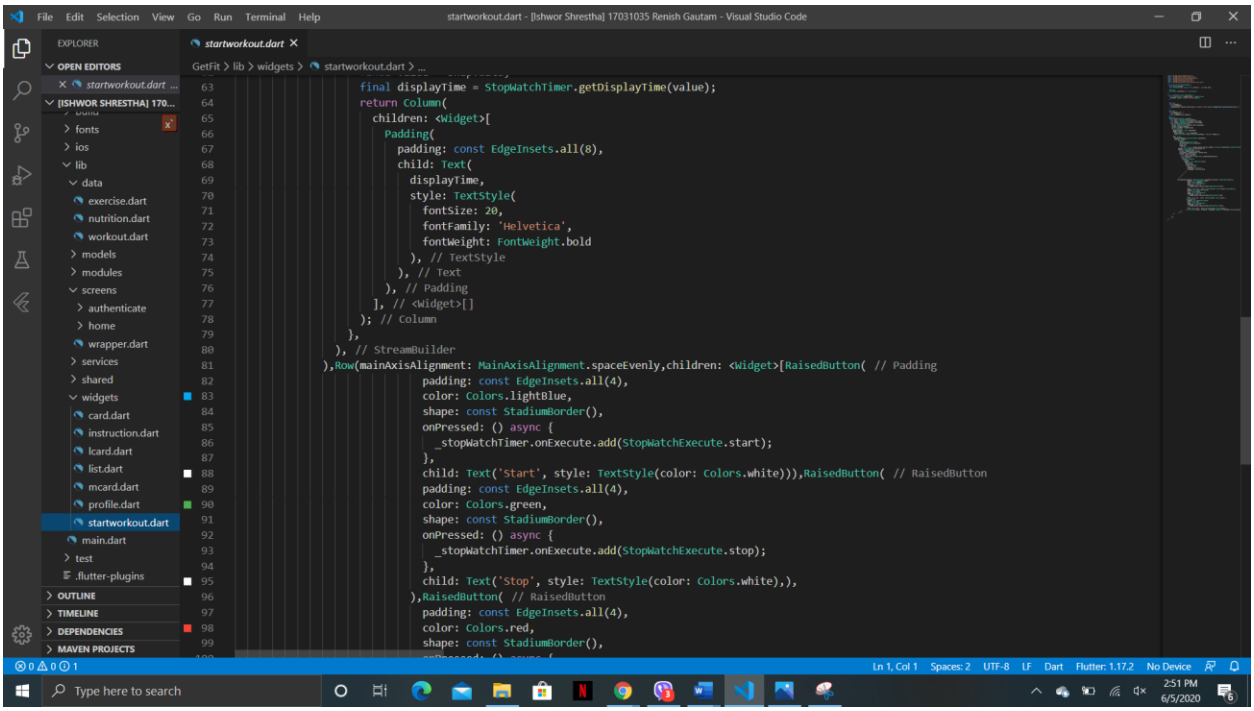


Figure 67: Code Snippet of daily Start workout session(iii)

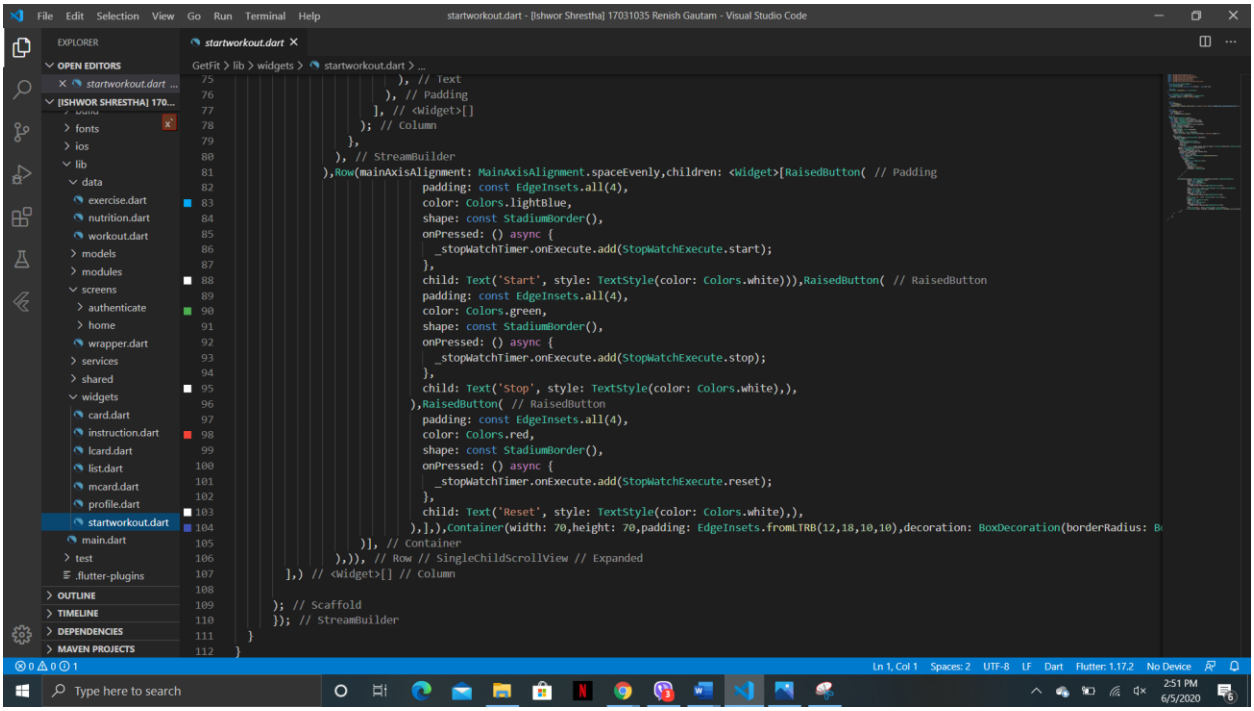


Figure 68: Code Snippet of daily Start workout session(iv)

Chapter 4: Testing and Analysis

4.1. Test Plan

4.1.1. Unit Testing, Test Plan

Unit Testing is a type of software testing in which the components or individual units of a software are tested. The purpose of Unit Testing is to validate that each unit of the software code performs as expected. Unit Testing is done during the coding phase of an application by the developers. Unit Tests isolate a section of code and confirm its correctness. A unit may be an individual function, procedure, module, method, or object. (guru99, 2020)

Test Cases	Test Objectives
1.	To displays error message when wrong password is given while logging in.
2.	To display error message when user leaves the field empty.
3.	To display error message when registering an account with a username that already exists.
4.	To display error message when user leaves the field empty.

Table 9: Test plan for unit testing

4.1.1.1. Testing of wrong login password

Test Case 1	1
Test Objectives	To displays error message when wrong password is given while logging in.
Test data	Try to sign in where user inputs wrong password while logging in to the system.
Expected Result	Error message should be displayed.
Actual Result	Earning message displayed.
Conclusion	Test Successful.

Table 10: Testing of wrong login password

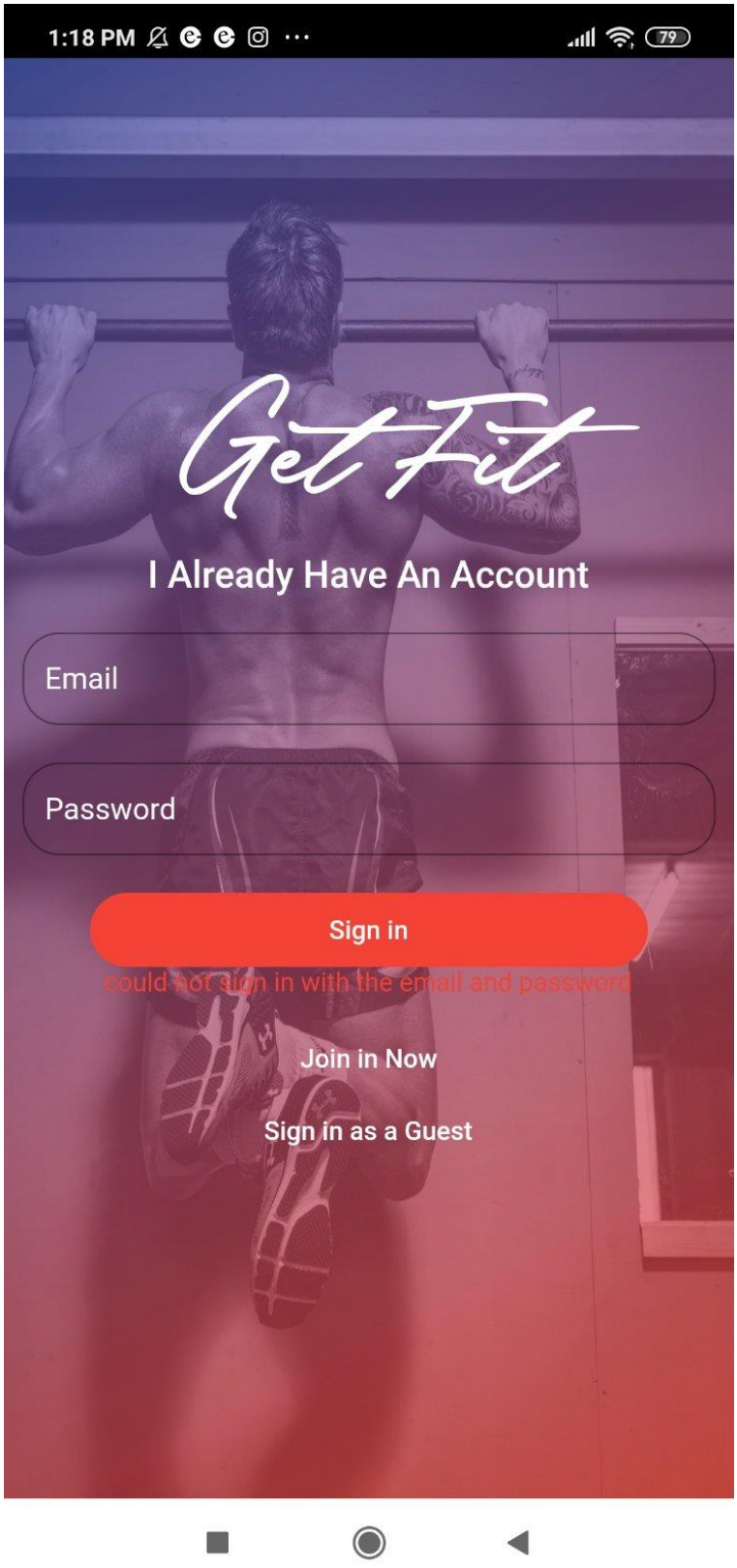


Figure 69: Error message being displayed in case if user enters wrong password.

Screenshot of validation code:

4.1.1.2. Try signing in with empty Fields

Test Case 2	2
Test Objectives	To display error message when user leaves the field empty.
Test data	Try to sign in an account with incomplete data
Expected Result	Error message should be displayed.
Actual Result	Error message displayed.
Conclusion	Test Successful.

Table 11: Try signing in with empty fields

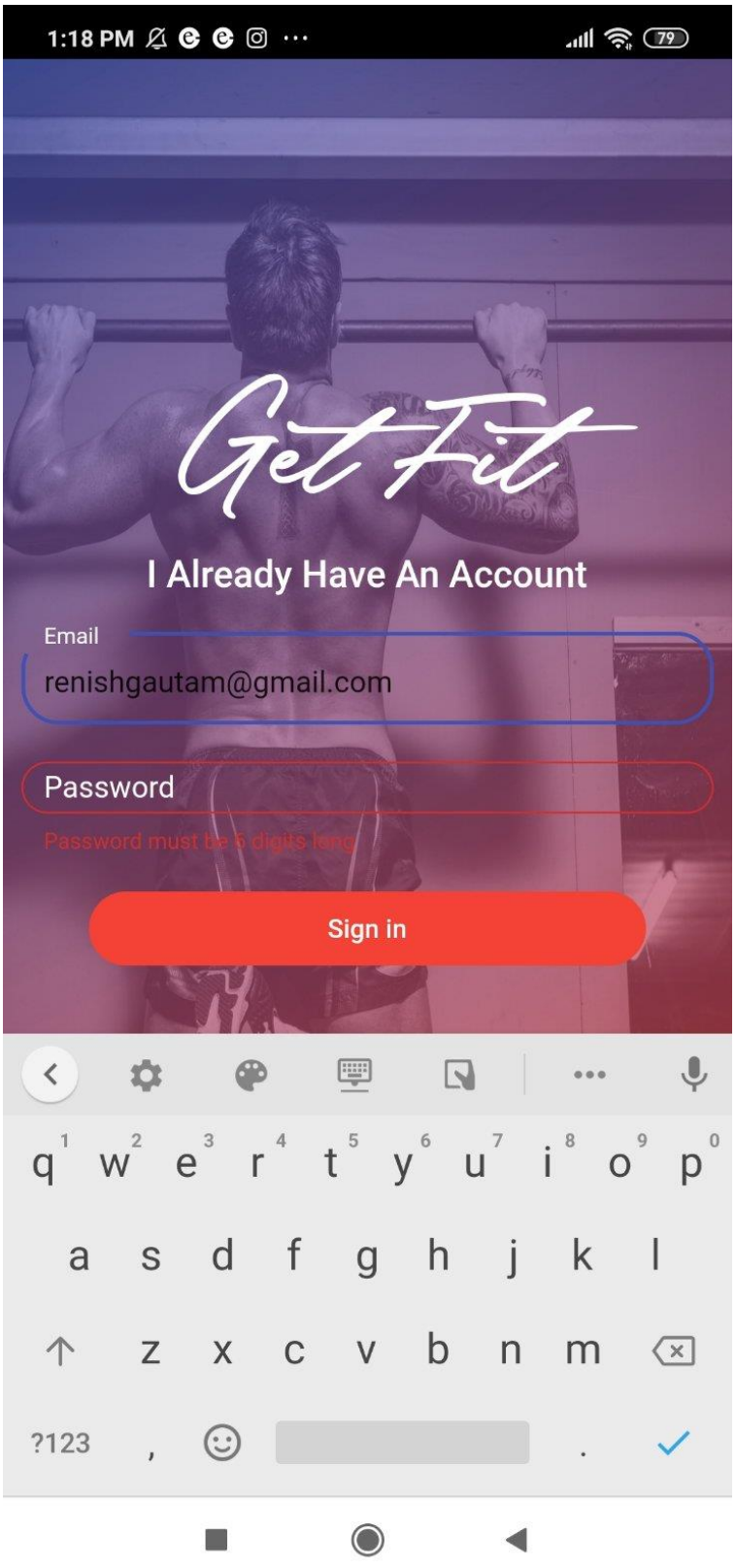


Figure 70: Error message being displayed in case if user leaves password field empty.

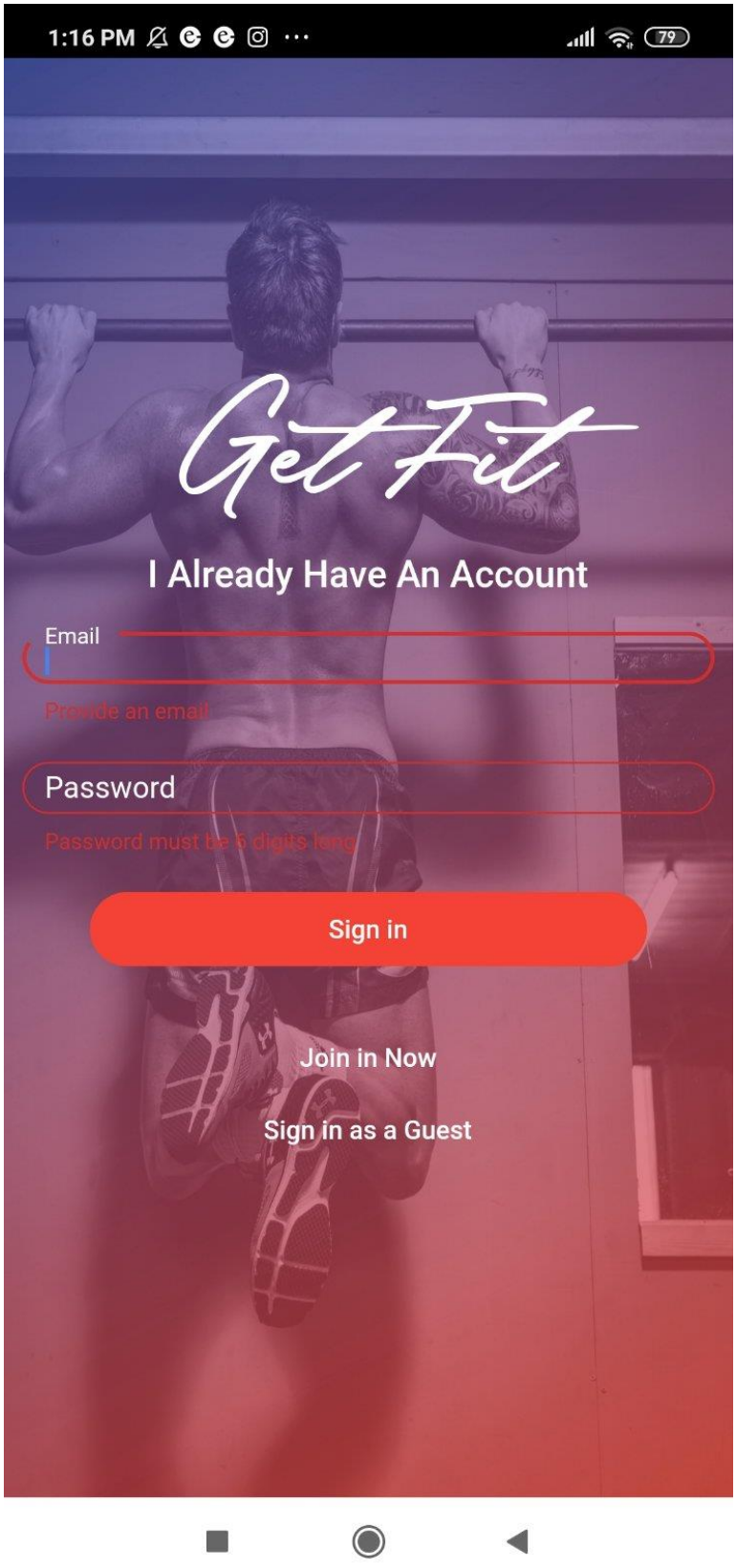

1:16 PM
79
Get Fit
I Already Have An Account
Email
Provide an email
Password
Password must be 6 digits long
Sign in
Join in Now
Sign in as a Guest

Figure 71: Displays error when user does not provide any values in the text field.

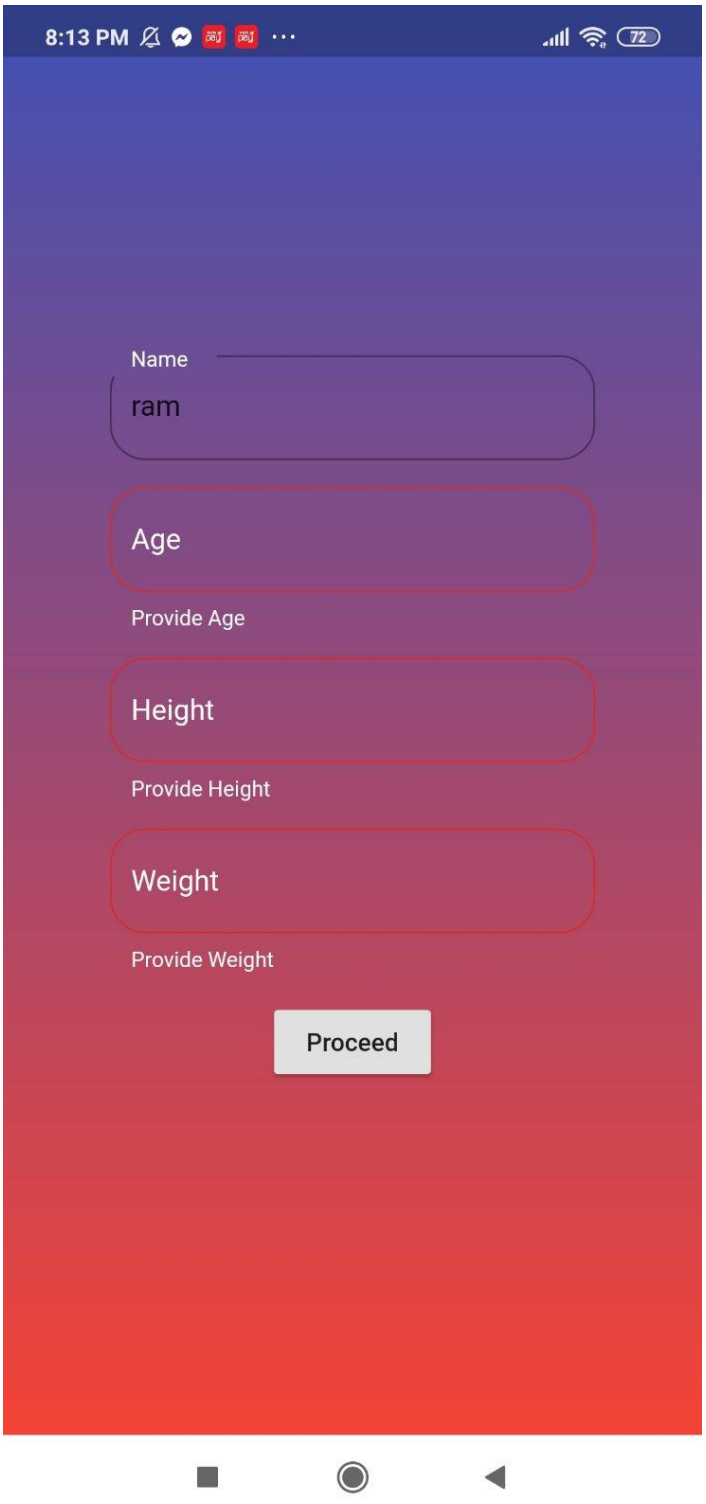


Table 12: Displays error when user does not provide any values in the text field.

4.1.1.3. Register a username that already exists

Test Case 3	3
Test Objectives	To display error message when registering an account with a username that already exists.
Test data	Try to register an account with a username that already exists.
Expected Result	Error message should be displayed.
Actual Result	Error message displayed.
Conclusion	Test Successful.

Table 13: Register a username that already exists

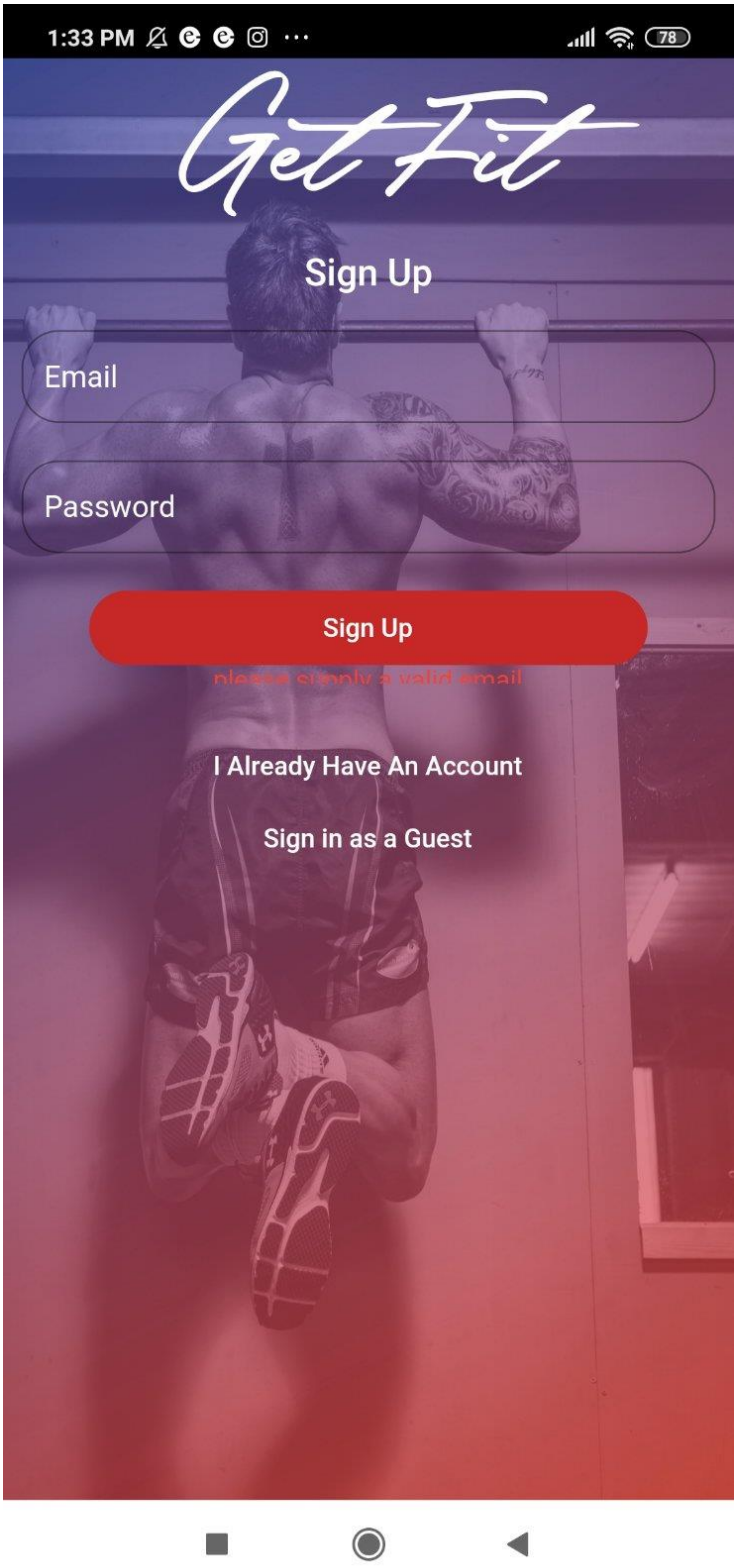


Figure 72: Error message is displayed in case if user tries to register with same email

4.1.1.4. Try registering in with empty Fields

Test Case 2	2
Test Objectives	To display error message when user leaves the field empty.
Test data	Try to register an account with incomplete data
Expected Result	Error message should be displayed.
Actual Result	Error message displayed.
Conclusion	Test Successful.

Table 14: Try registering with empty fields

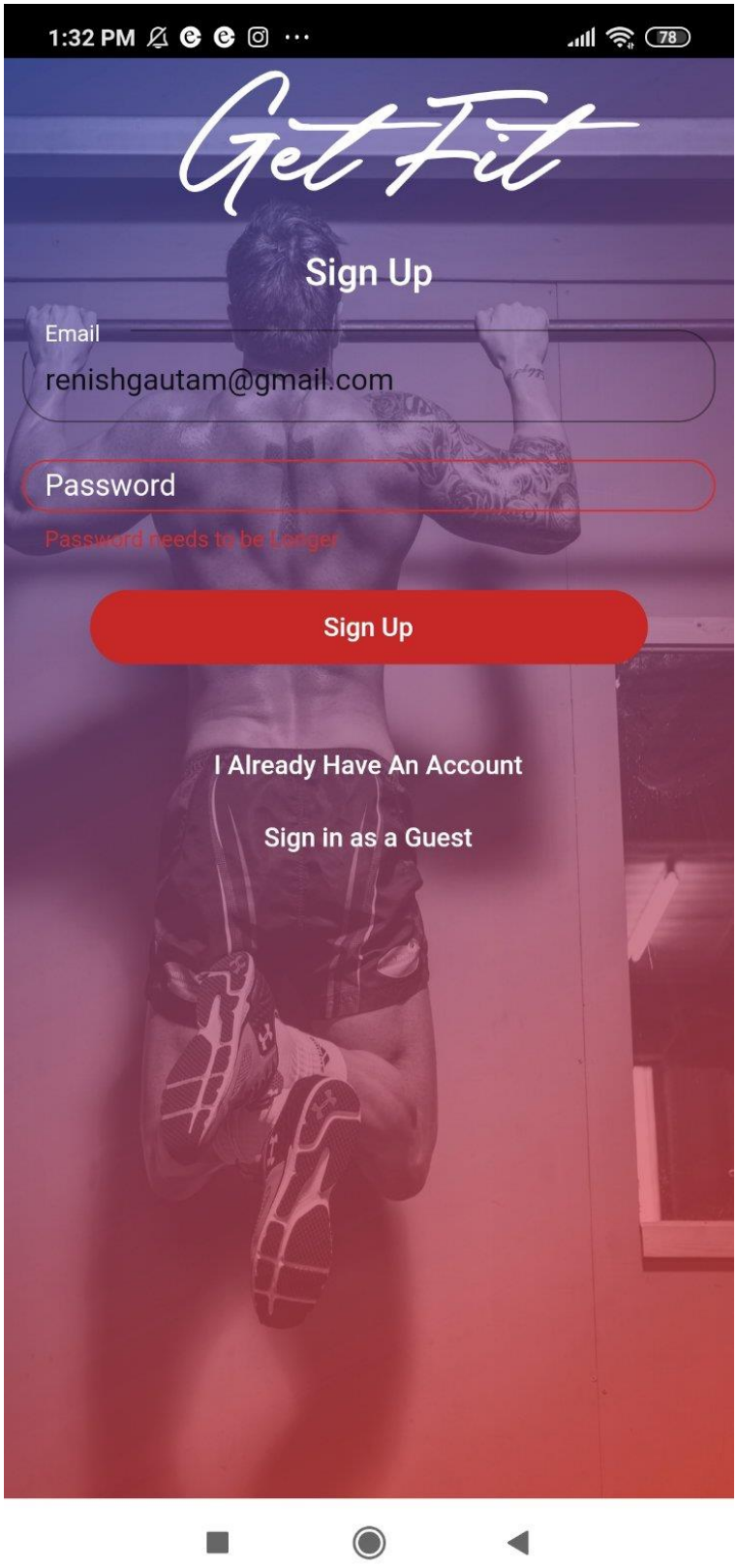


Figure 73: Error message which is displayed in case if user does not provide any password

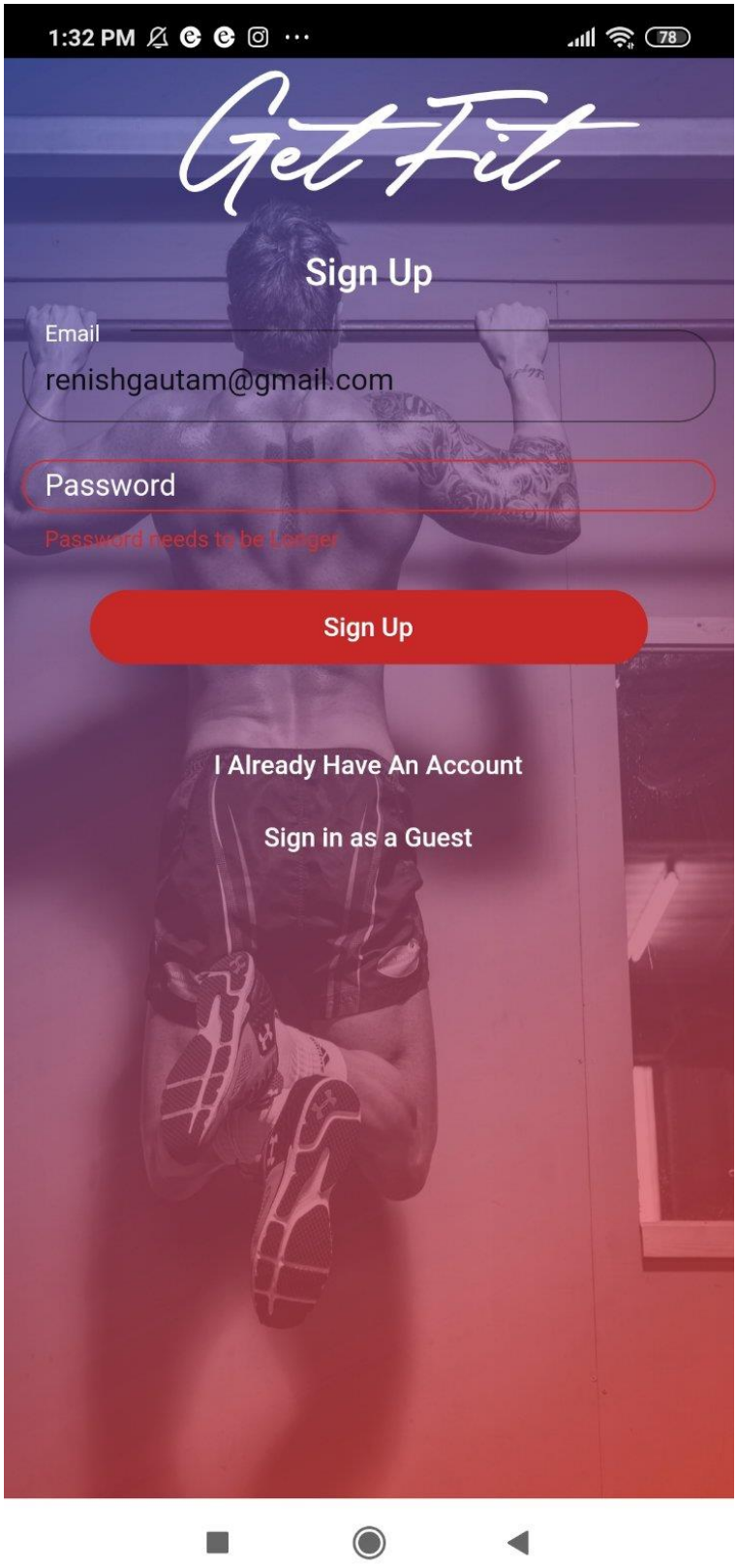


Figure 74: Error message which is displayed in case if user does not provide any password

4.1.2. System Testing, Test Plan

System Testing is a level of testing which validates the complete integrated software product. To evaluate the end-to-end system specifications is the purpose of a system test. Generally, the only one element of a larger computer-based system is the system. Eventually, the software is interfaced with other systems. System Testing is actually a series of different tests whose only purpose is to exercise the full system. (guru99, 2020)

Test Cases	Test Objectives
1	To login into the system.
2	To register a user.
3	To check the details, present in workouts activity.
4	To count steps taken
5	To start, stop and reset timer
6	To redirect to page after clicking 'Log Out' button.
7	To test if Diet Plan page is displayed as desired.
8	To calculate BMI of user
9	To record the daily workout done data

Table 15: Test plan for system testing

4.1.2.1. Testing User Login

Test Case 1	1
Test Objectives	To login into the system.
Test data	Enter correct login credentials and submit.
Expected Result	Should display the home page.
Actual Result	Displays home page.
Conclusion	Test Successful

Table 16: Login Test of user

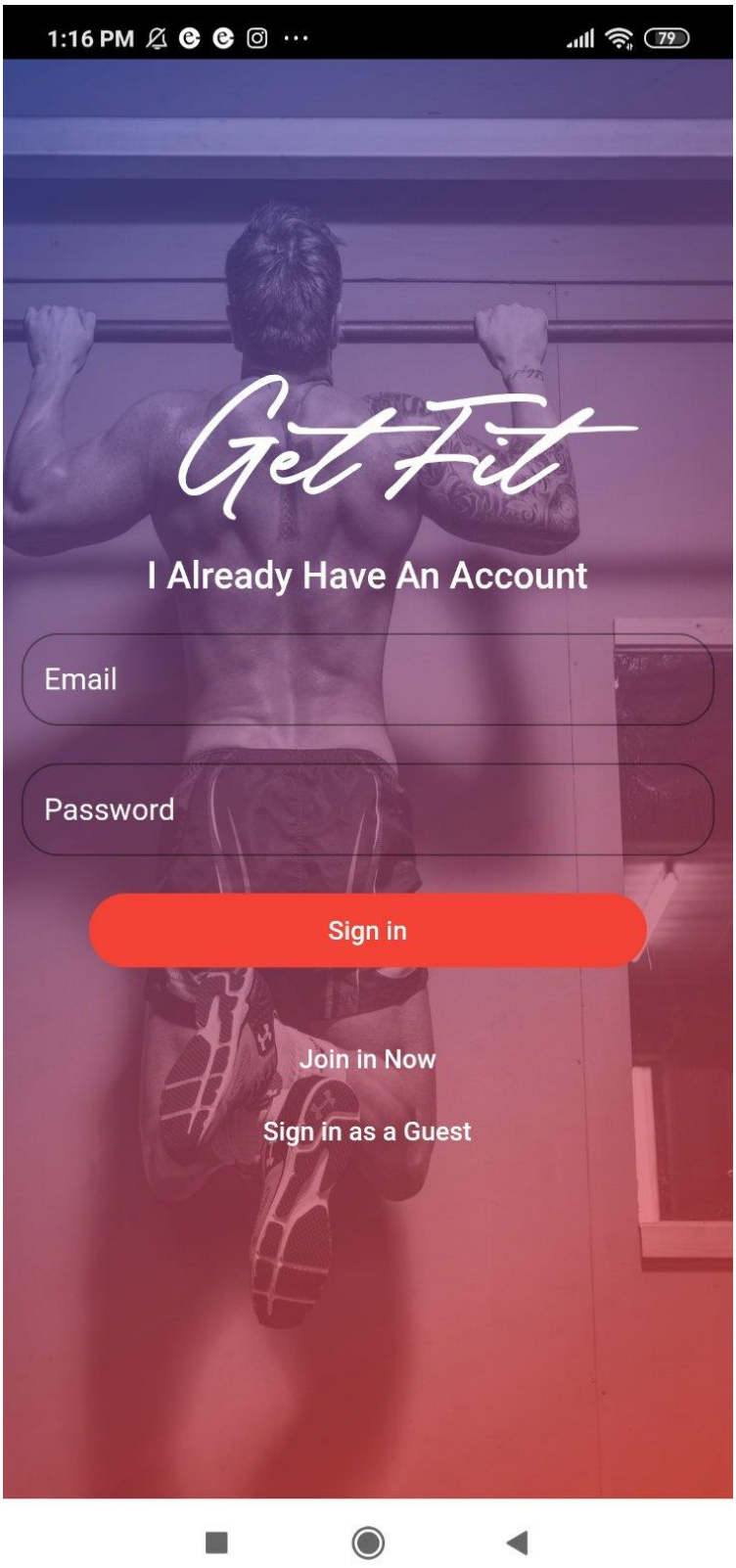


Table 17: Sign In page of the application

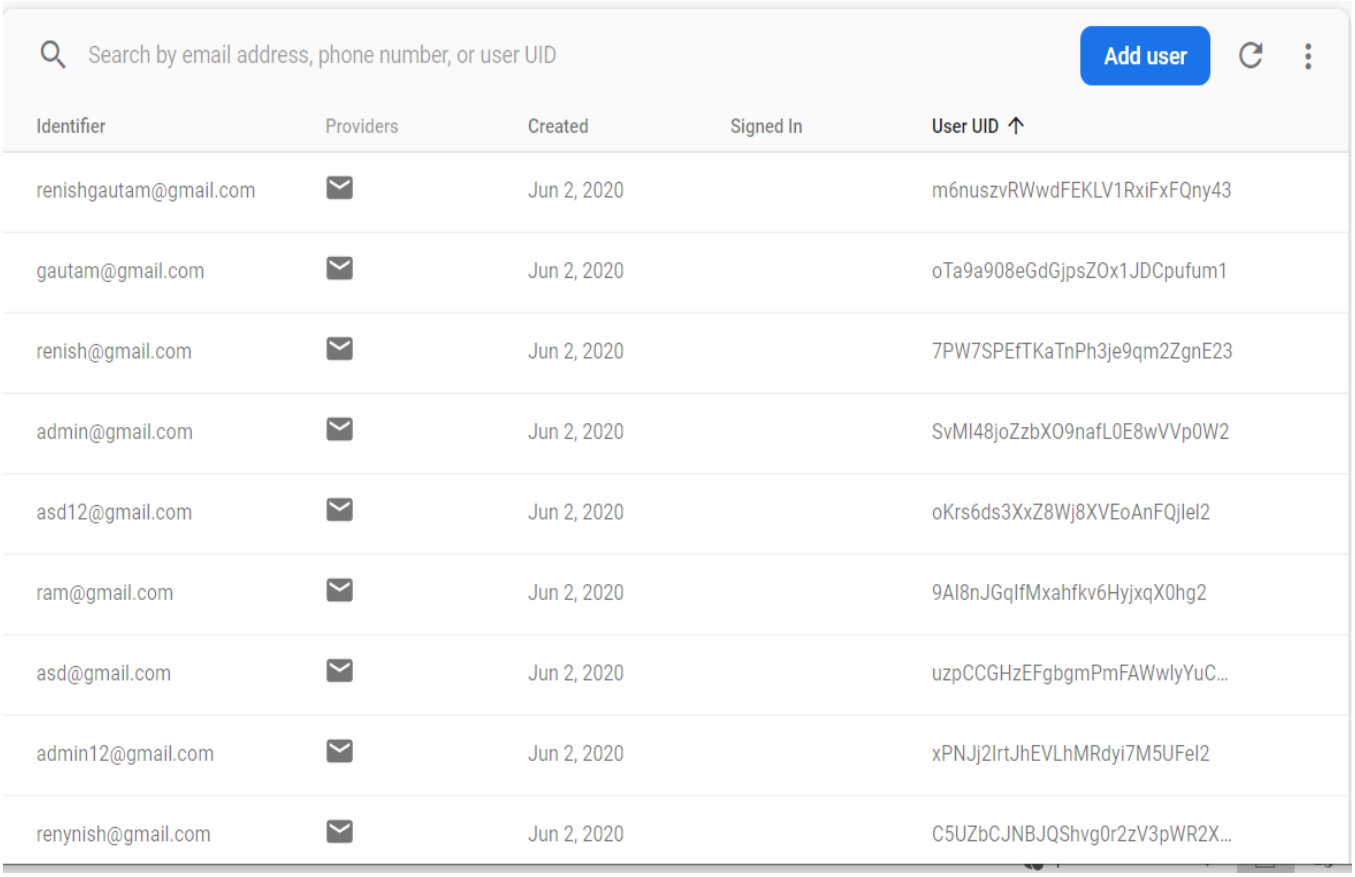


Figure 75: Firebase database screenshot about user email details.

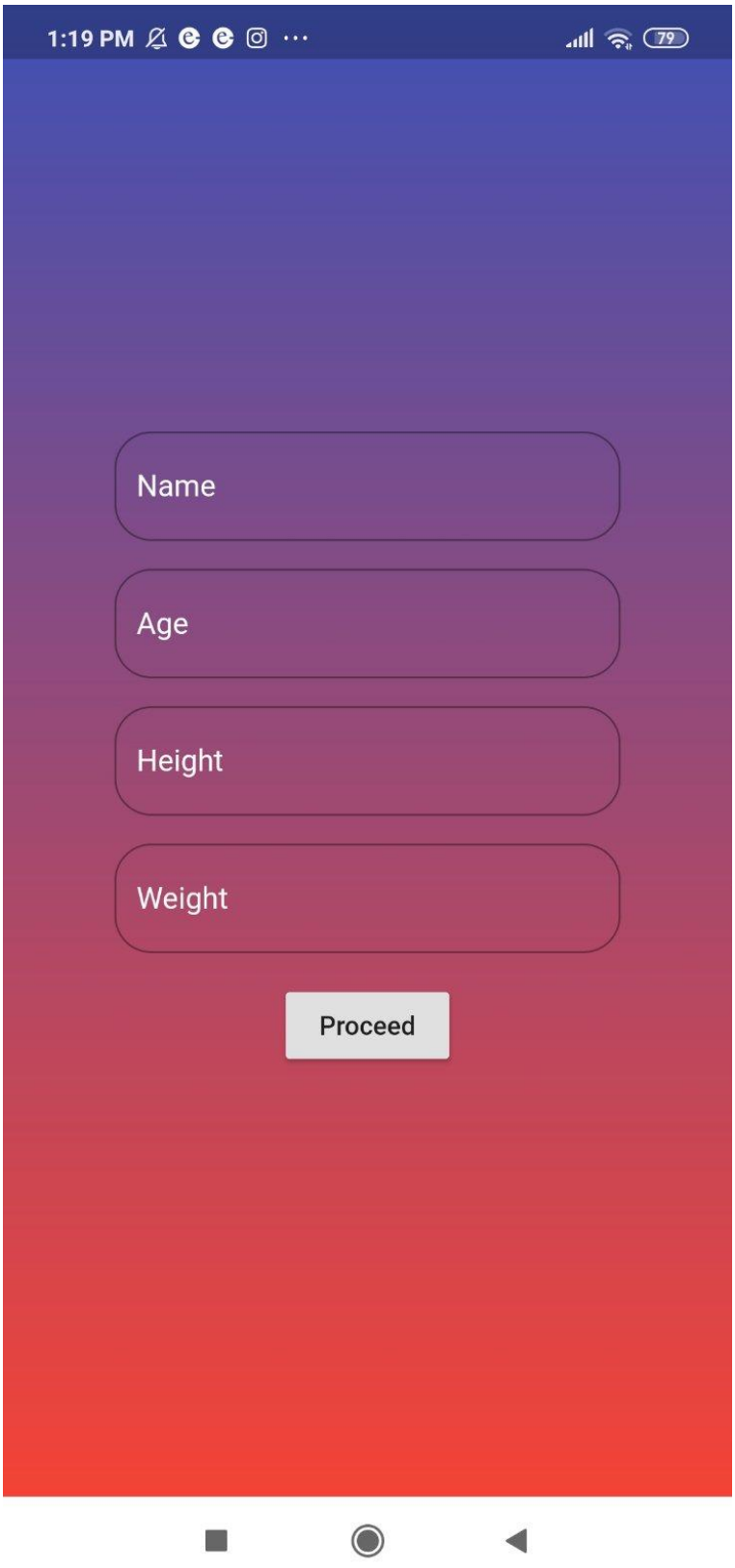


Figure 76: User redirected to User Information page after successful log in

4.1.2.2. Testing User Registration

Test Case 2	2
Test Objectives	To register a user.
Test data	Check if User registration works
Expected Result	Should show register form and should be able to register a user.
Actual Result	Tapping on 'Join in now' displayed a registration form. Filling and submitting the form registered a user.
Conclusion	Test Successful

Table 18: Registration Test of a new user

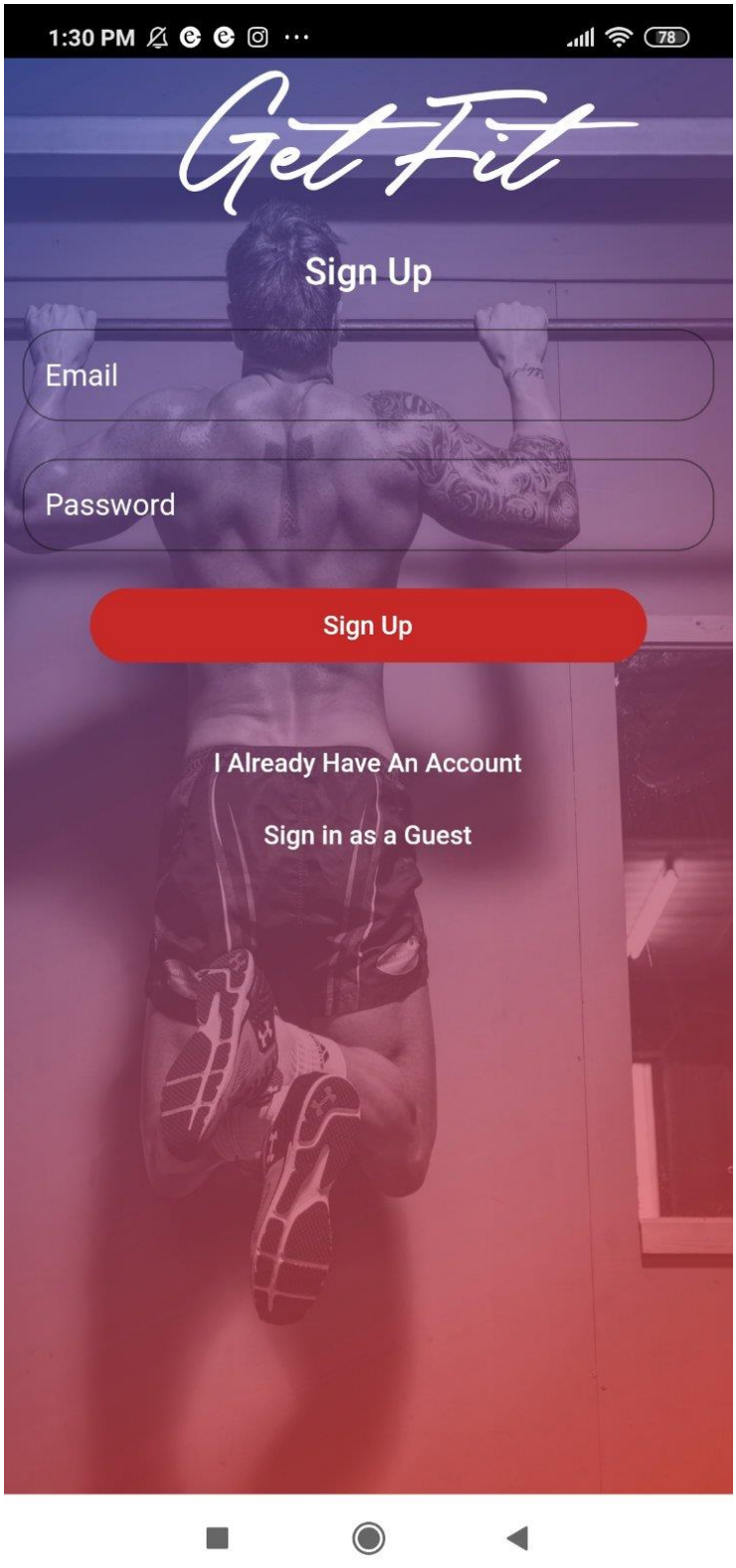


Figure 77: Registration page of the application

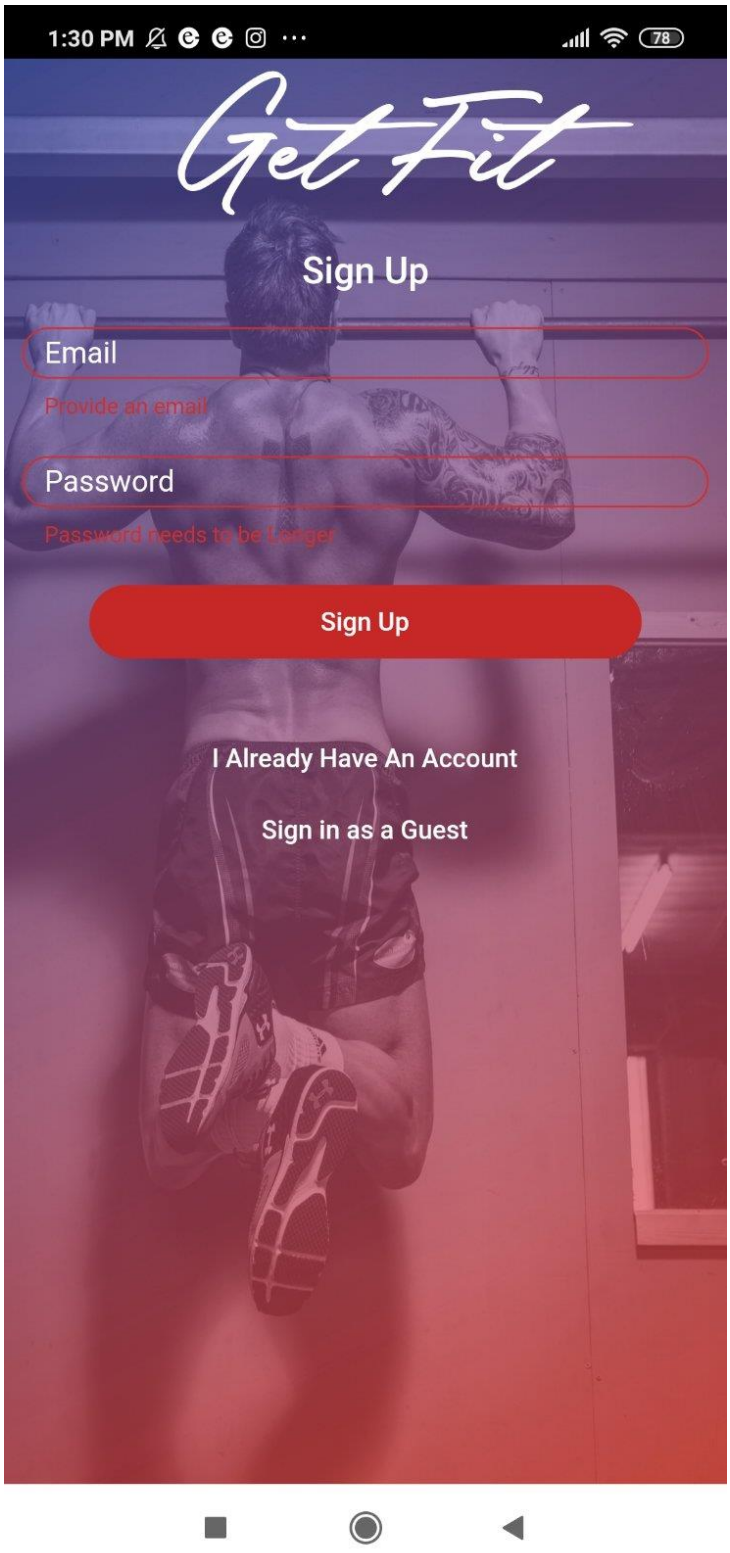


Figure 78: Error message displayed if user leaves both text field empty and tries to register

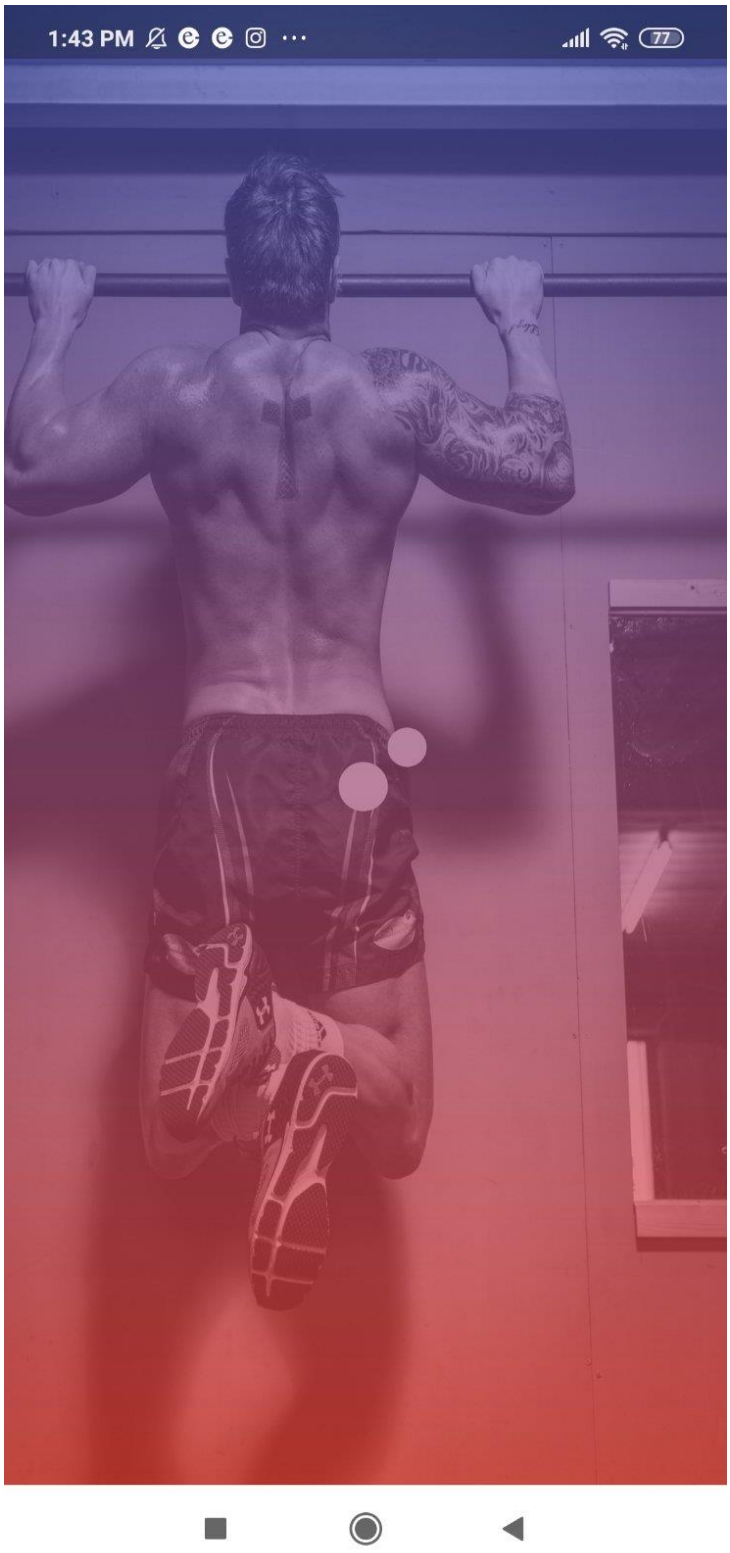


Figure 79: Registration in progress after entering valid username and password.

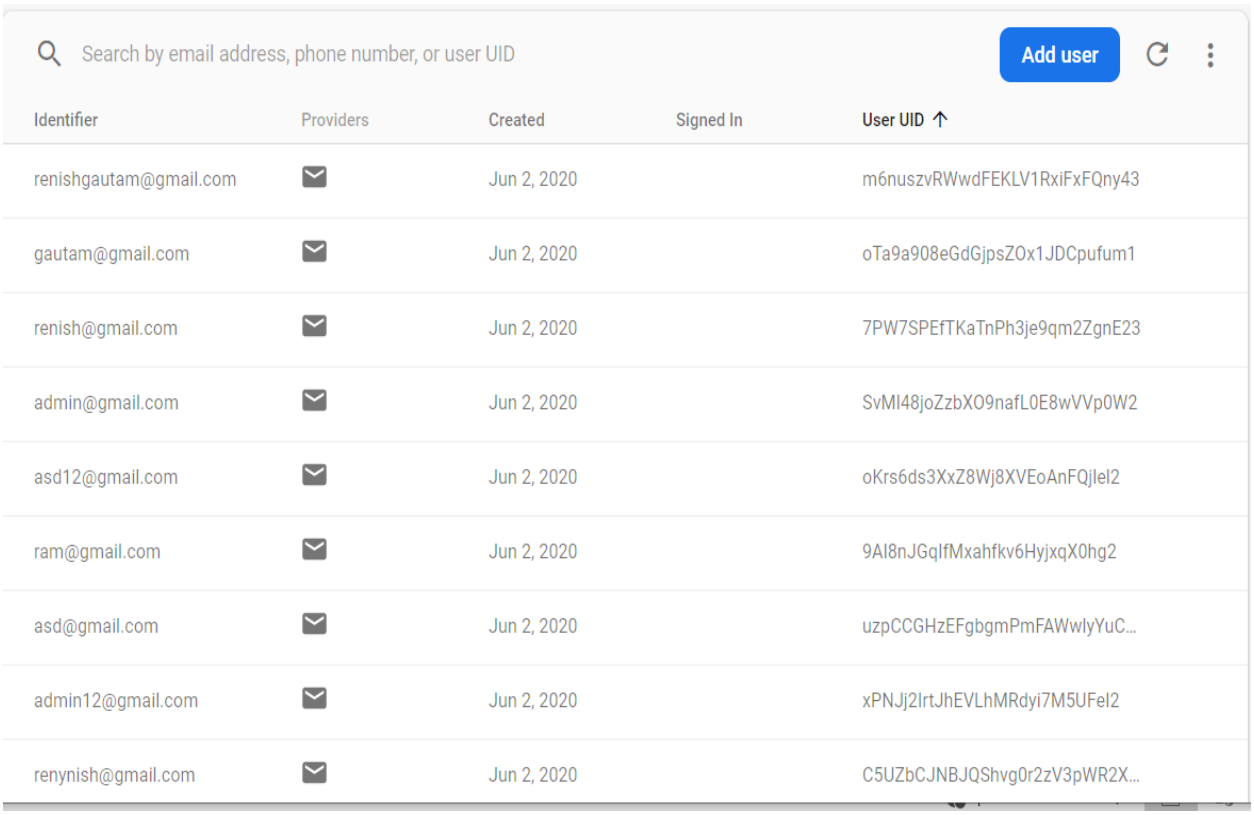


Figure 80: Screenshot of Firebase database in which user is added.

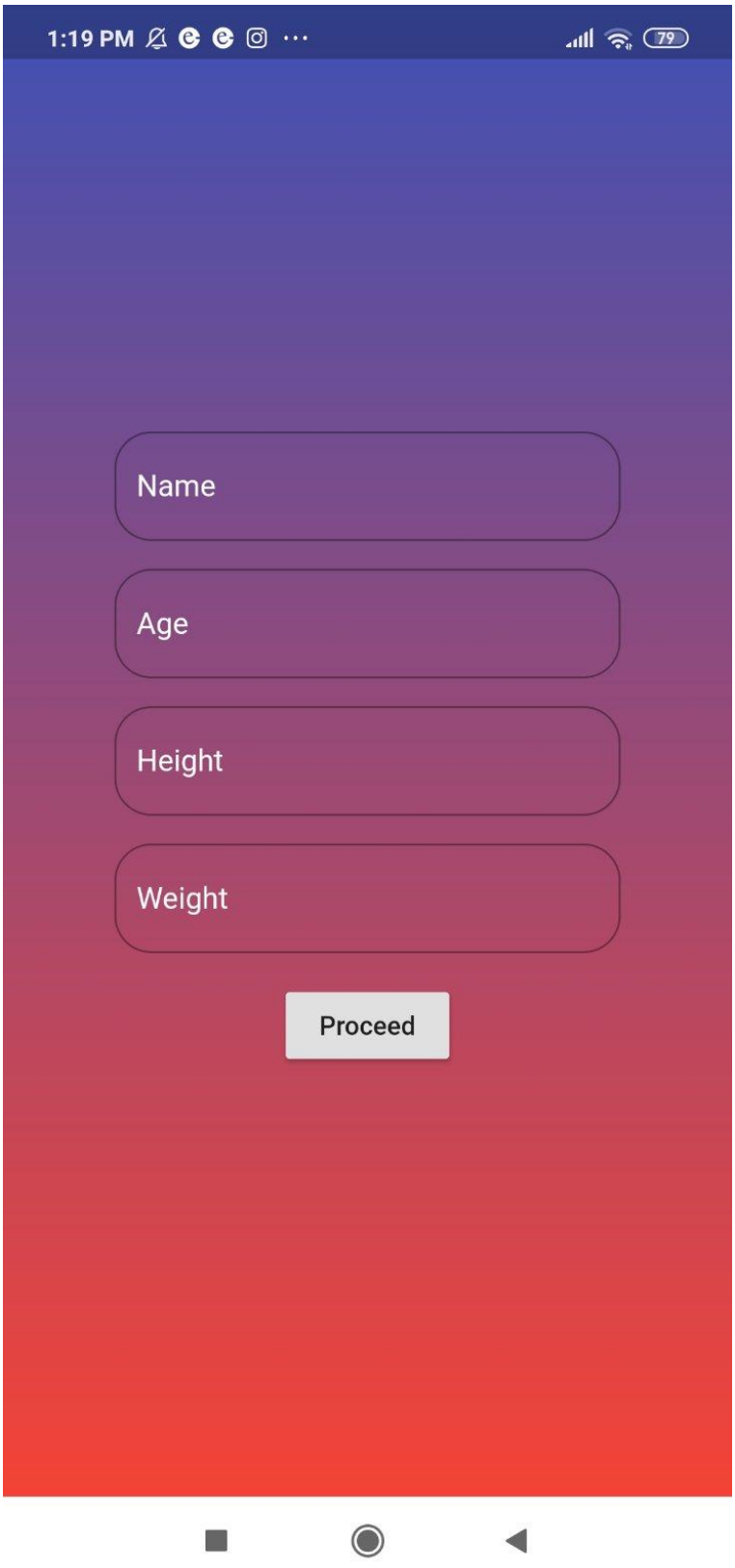


Figure 81: Screenshot of user information page redirected after page is successfully redirected

4.1.2.3. Testing for Viewing workouts

Test Case 3	3
Test Objectives	To check the details, present in workouts activity.
Test data	View content workout that is to be carried out by user daily
Expected Result	User will be allowed to view all the details
Actual Result	User is allowed to allowed to view all the details
Conclusion	Test Successful

Table 19: Testing for viewing workouts

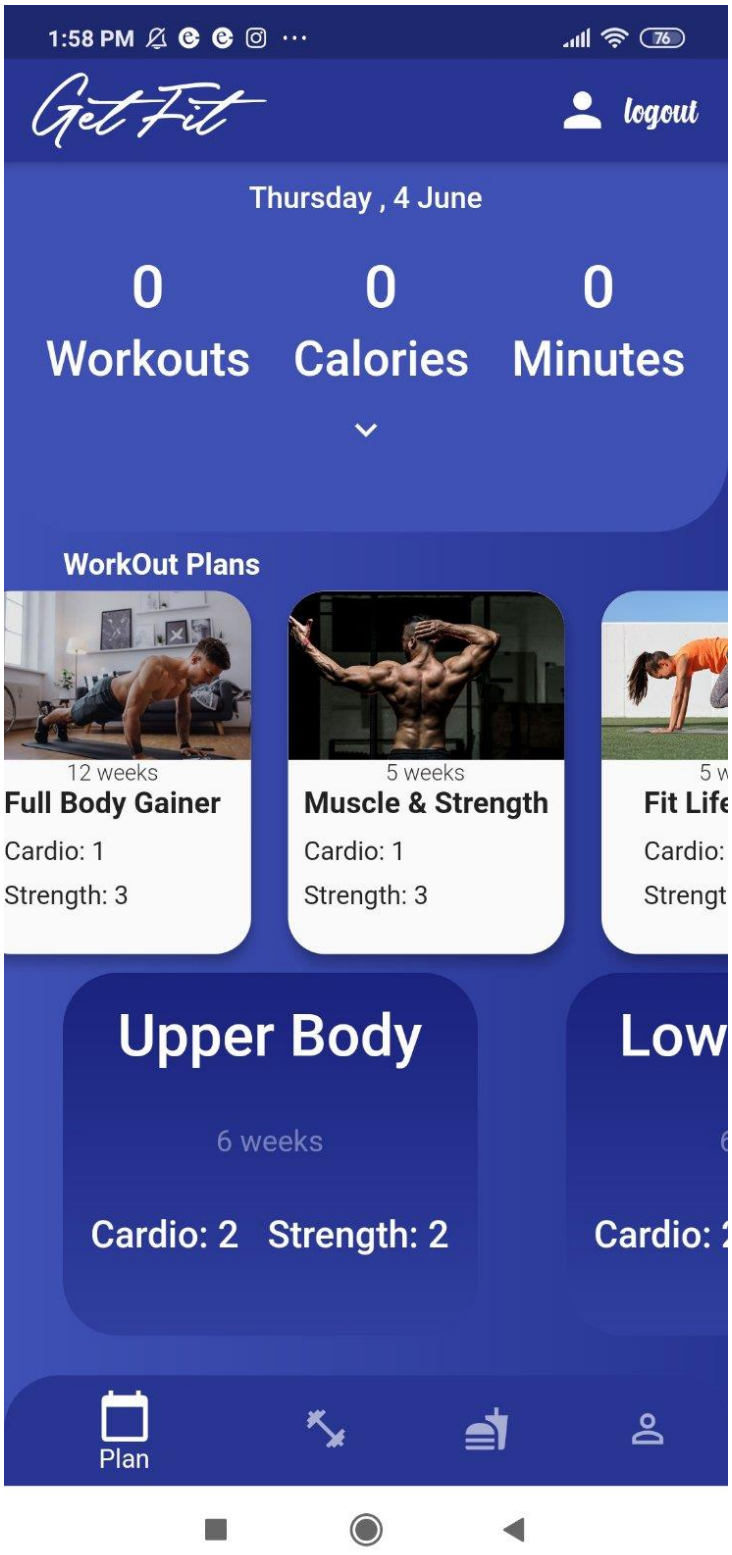


Figure 82: Workout Plans page of application

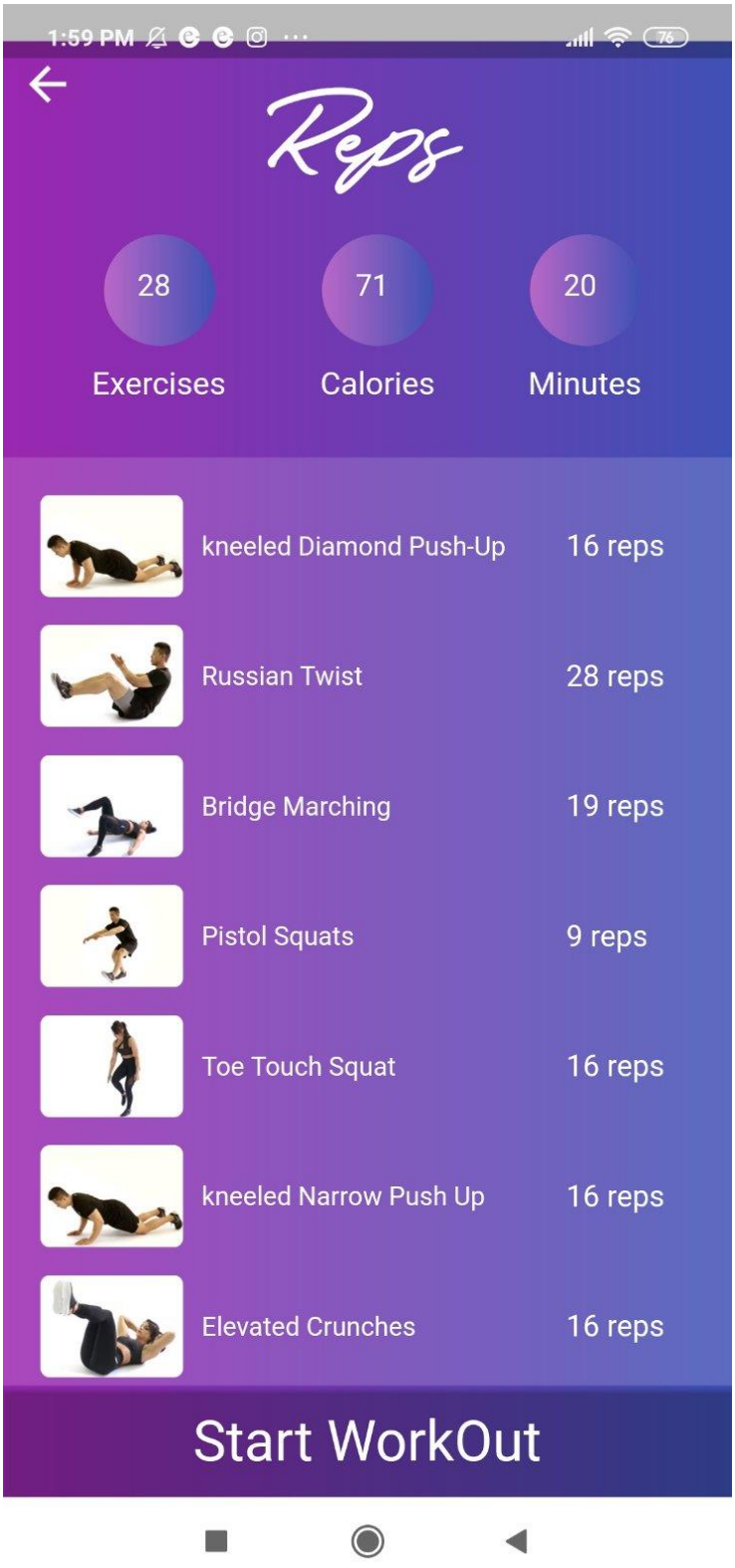


Figure 83: List of exercises in Full Body Gainer page

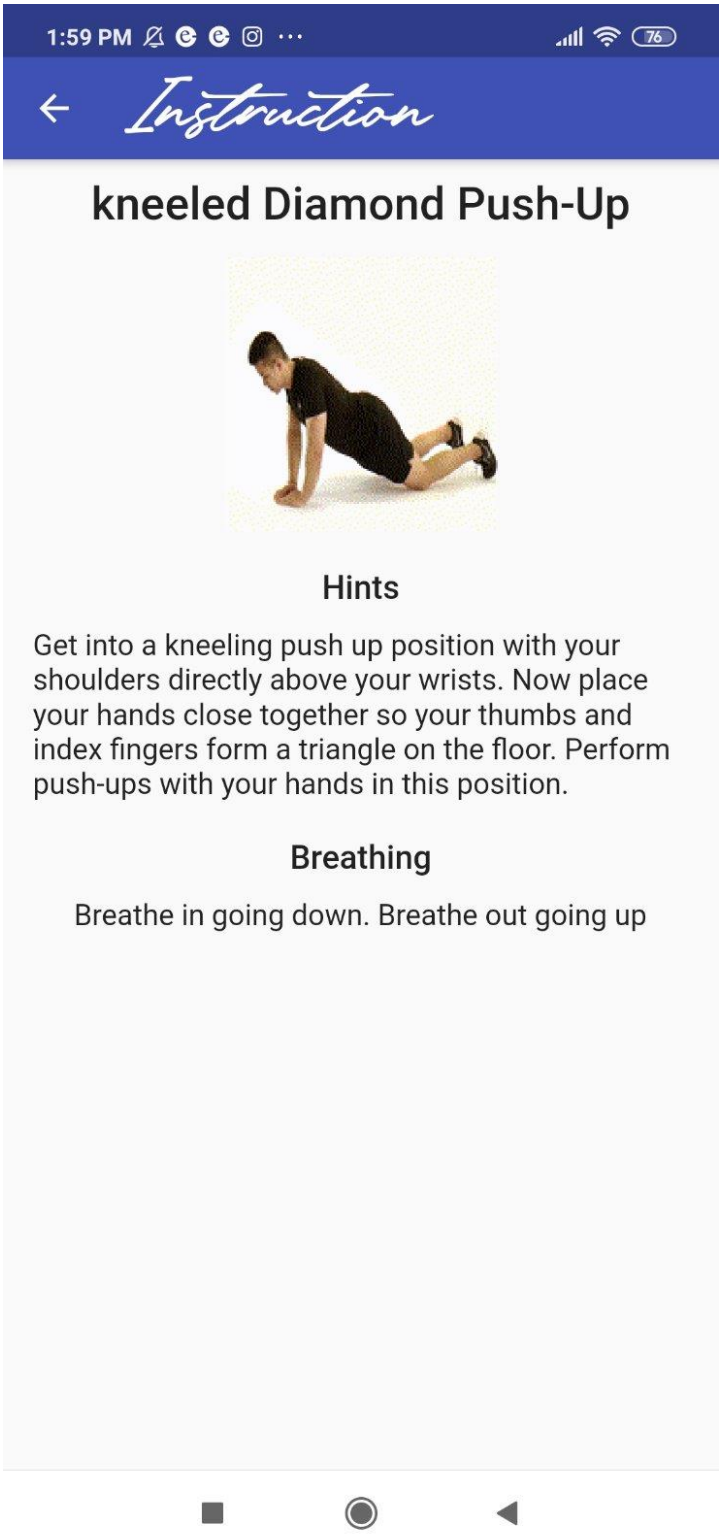


Figure 84: Switch from Full body gainer to kneeled Diamond push-up page

4.1.2.4. Testing of Pedometer

Test Case 4	4
Test Objectives	To count steps taken
Test data	View profile page.
Expected Result	Steps taken will be displayed.
Actual Result	Steps taken displayed.
Conclusion	Test Successful

Table 20: Testing of pedometer

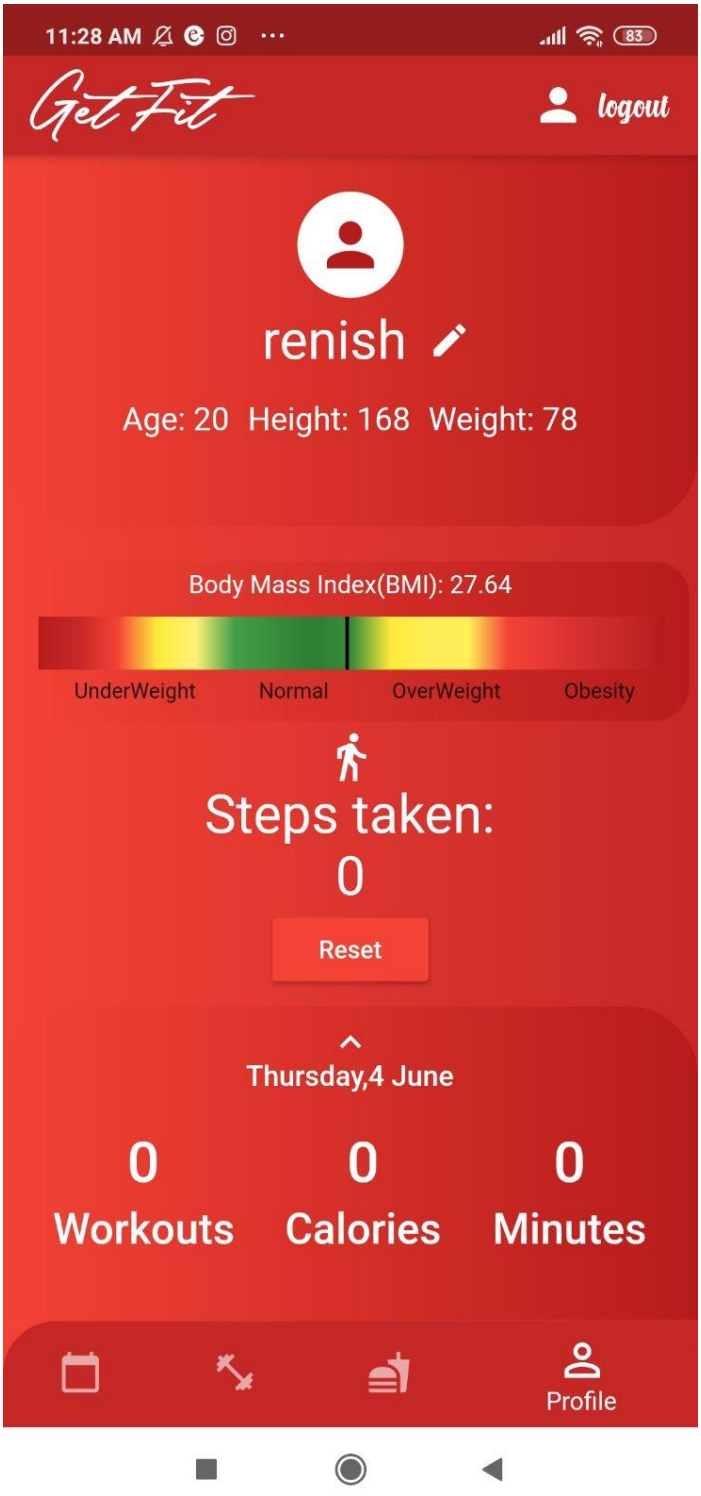


Figure 85: Screen shot of steps count before user walks

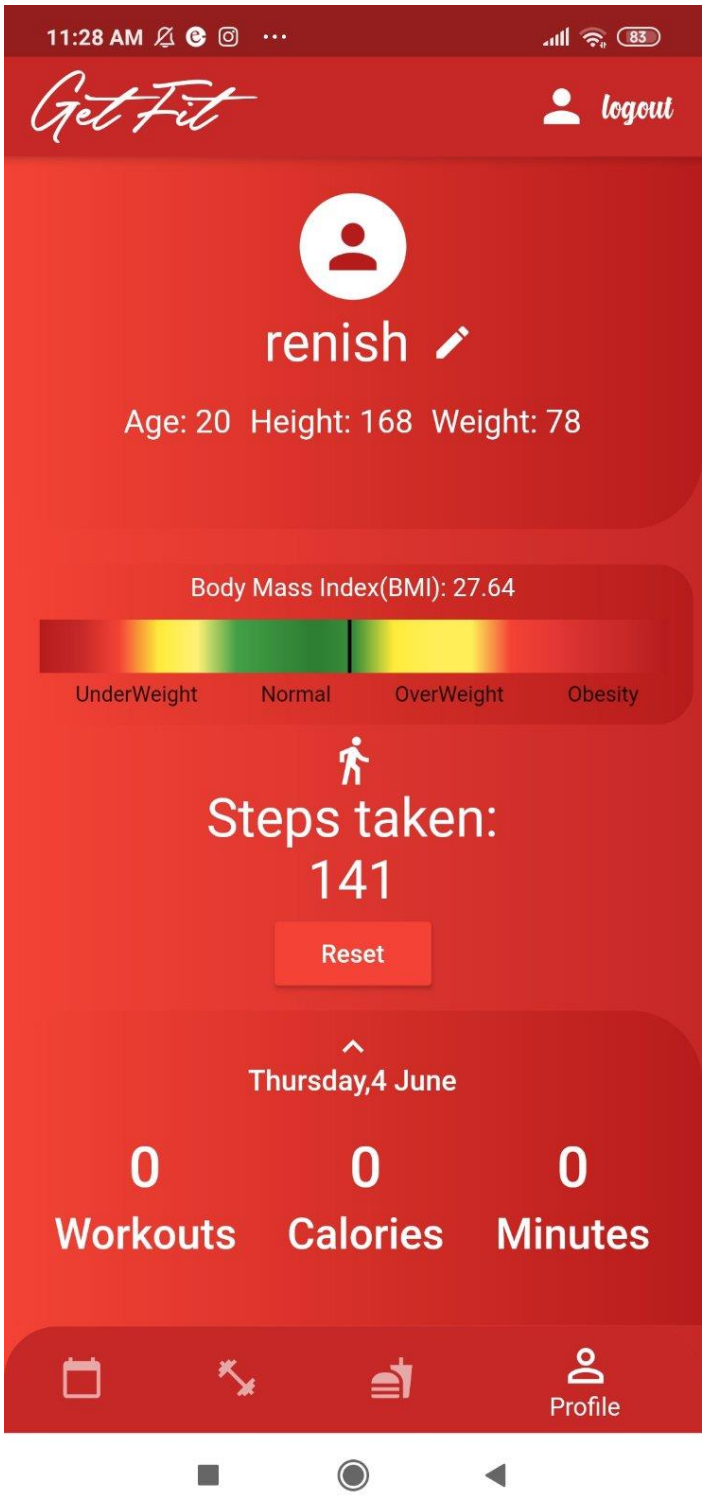


Figure 86: Screen shot of steps count after user walks

4.1.2.5. Testing of timer

Test Case 5	5
Test Objectives	To start, stop and reset timer
Test data	View workout session page
Expected Result	User will be allowed to start, stop and reset timer
Actual Result	User is allowed to allowed to start, stop and reset timer
Conclusion	Test Successful

Table 21: Testing of timer

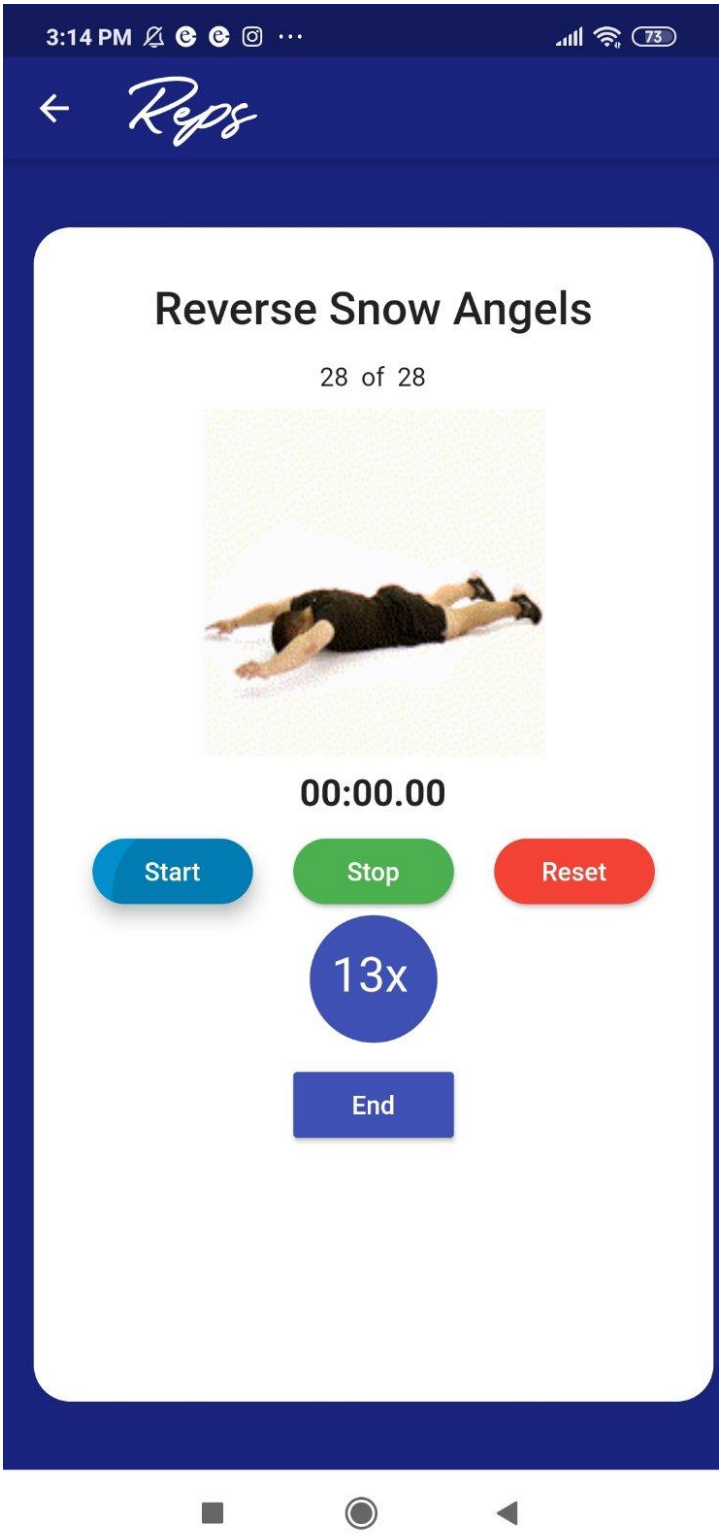


Figure 87: Screenshot of timer then pressing Start button.

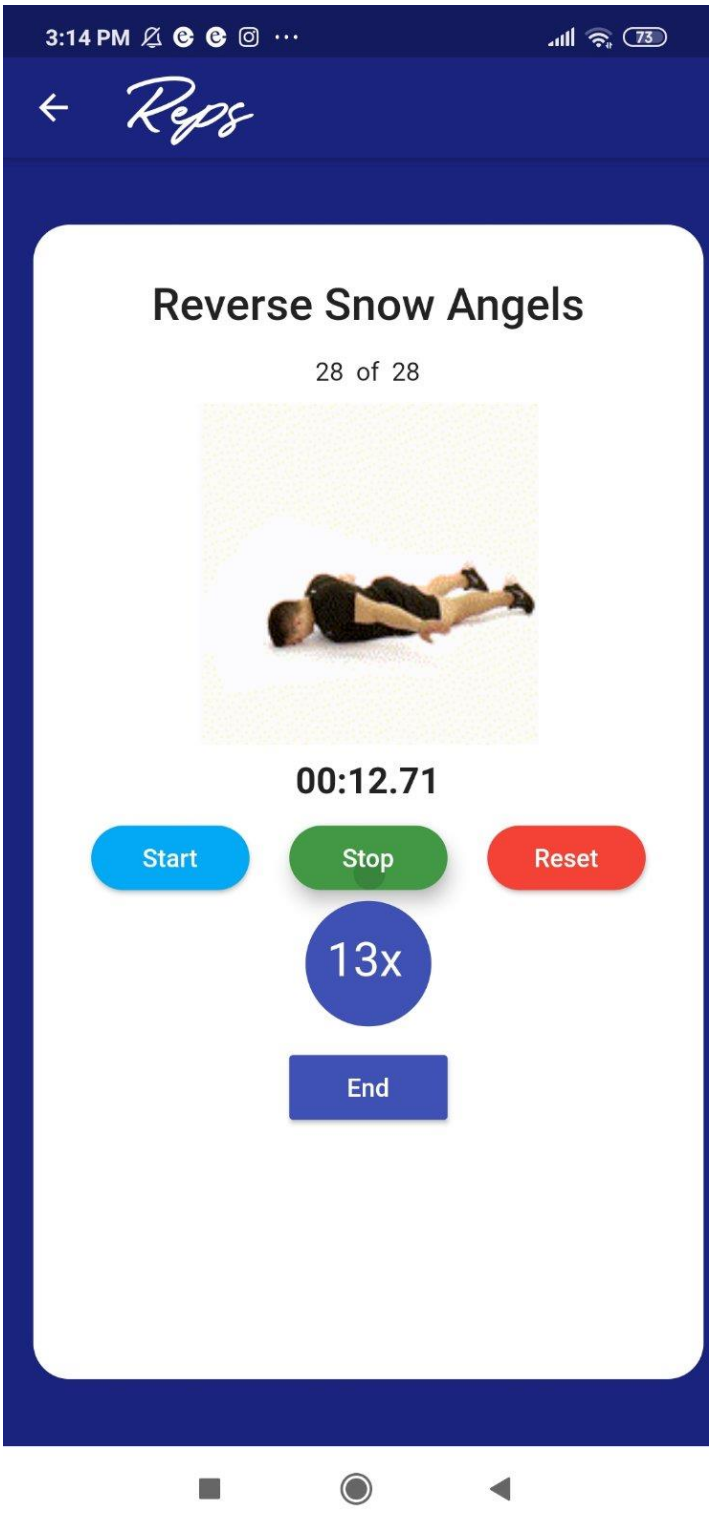


Figure 88: Screenshot of timer in 'Pause' state after pressing Stop button.

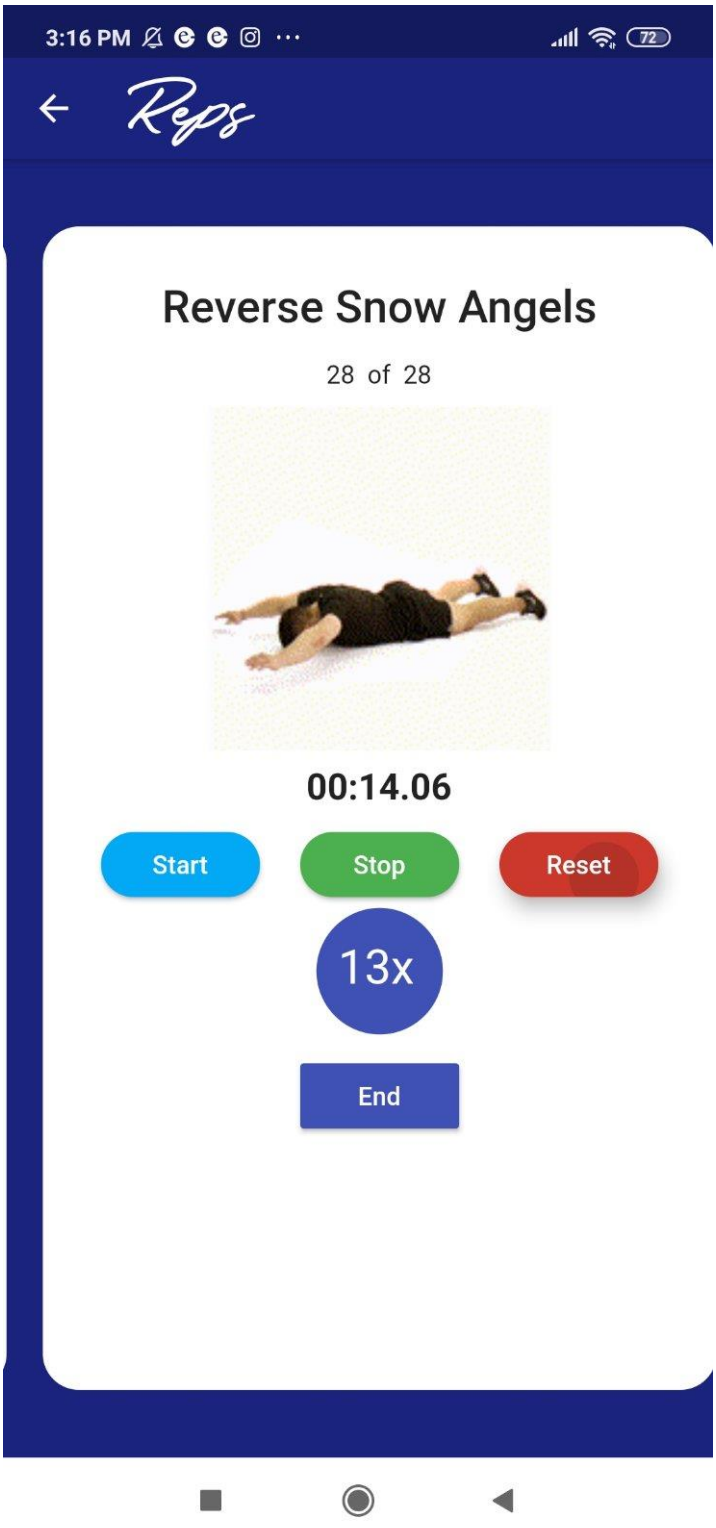


Figure 89: Screenshot of timer in 'Pause' state then pressing reset button.

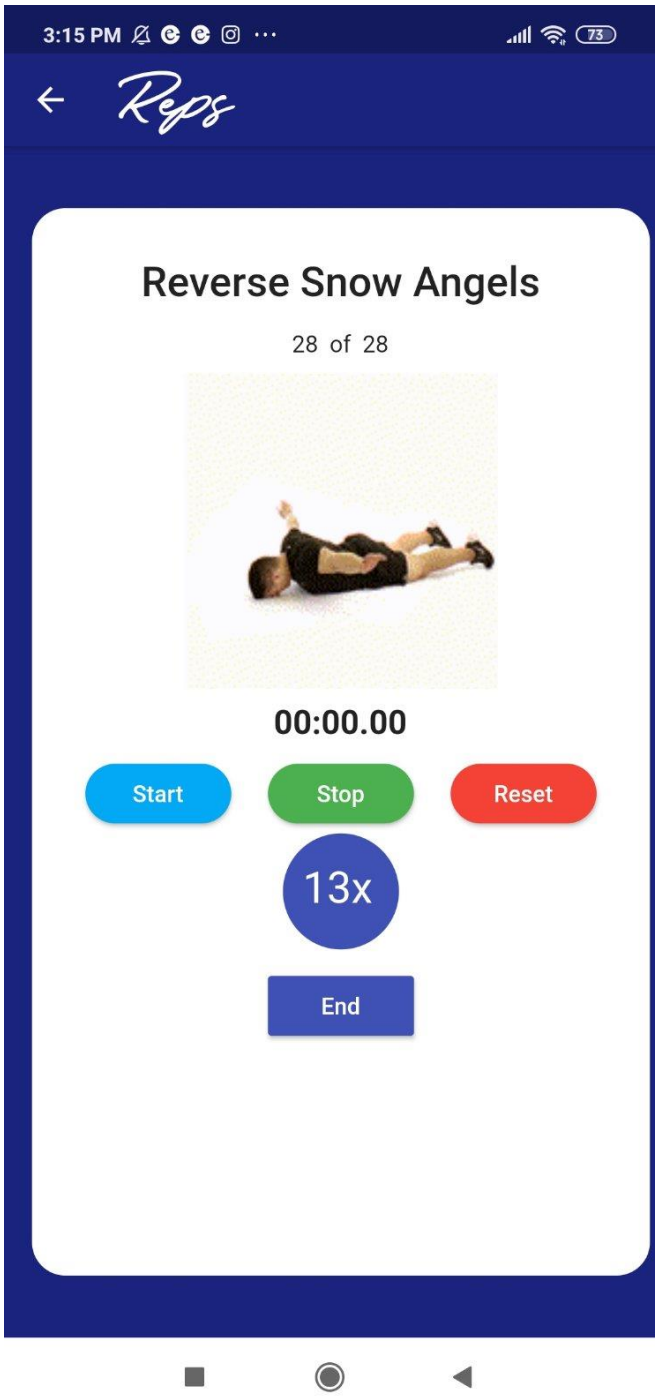


Figure 90: Value of timer is again reset after pressing 'Reset' button.

4.1.2.6. Testing Log Out button

Test Case 6	6
Test Objectives	To redirect to page after clicking ‘Log Out’ button.
Test data	Click on ‘Log Out’ button.
Expected Result	Application will redirect to page on click of ‘Log Out’ button.
Actual Result	Application redirects to page on click of ‘Log Out’ button.
Conclusion	Test Successful

Table 22: Testing of Log Out button

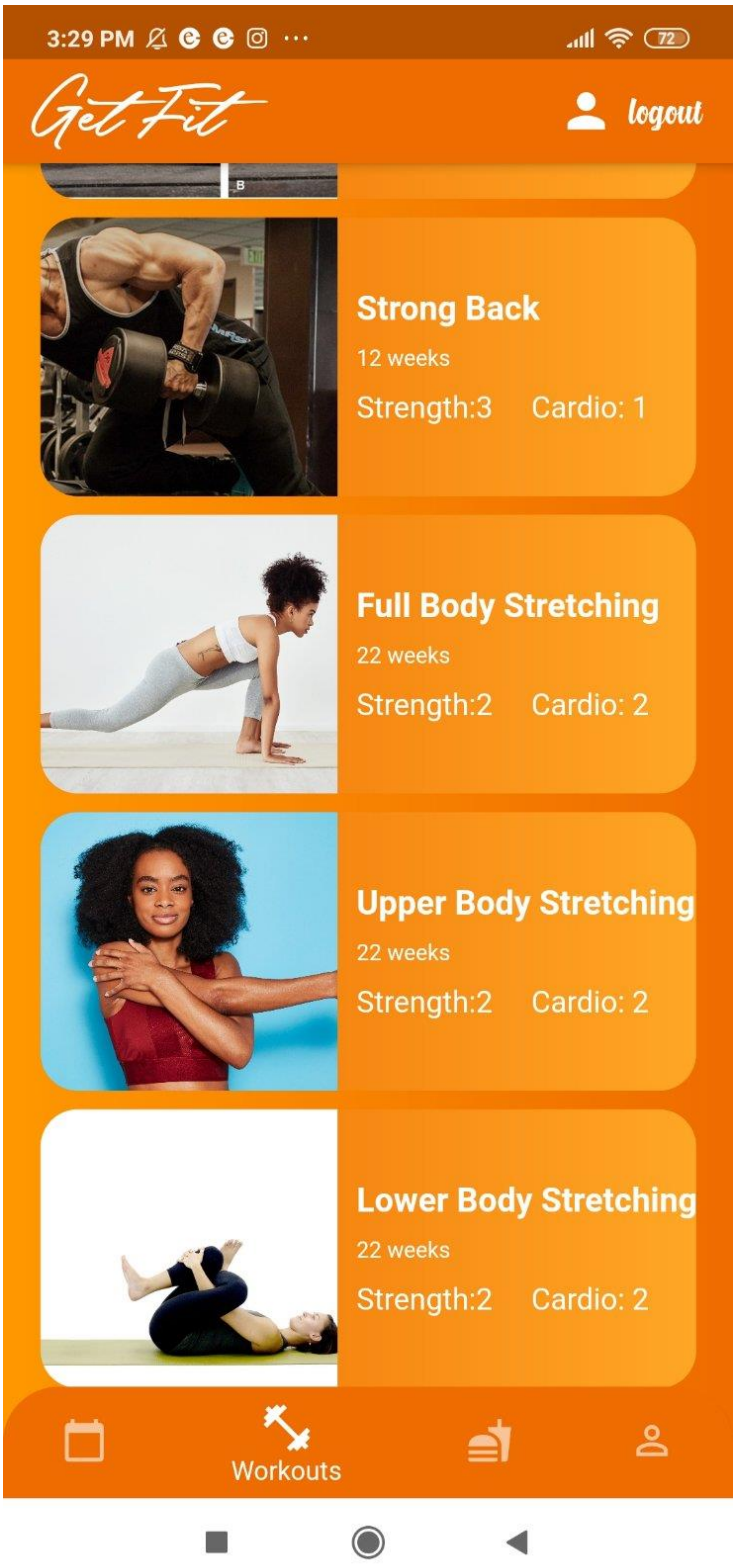


Figure 91: Press 'Log Out' button to log out and redirect to page

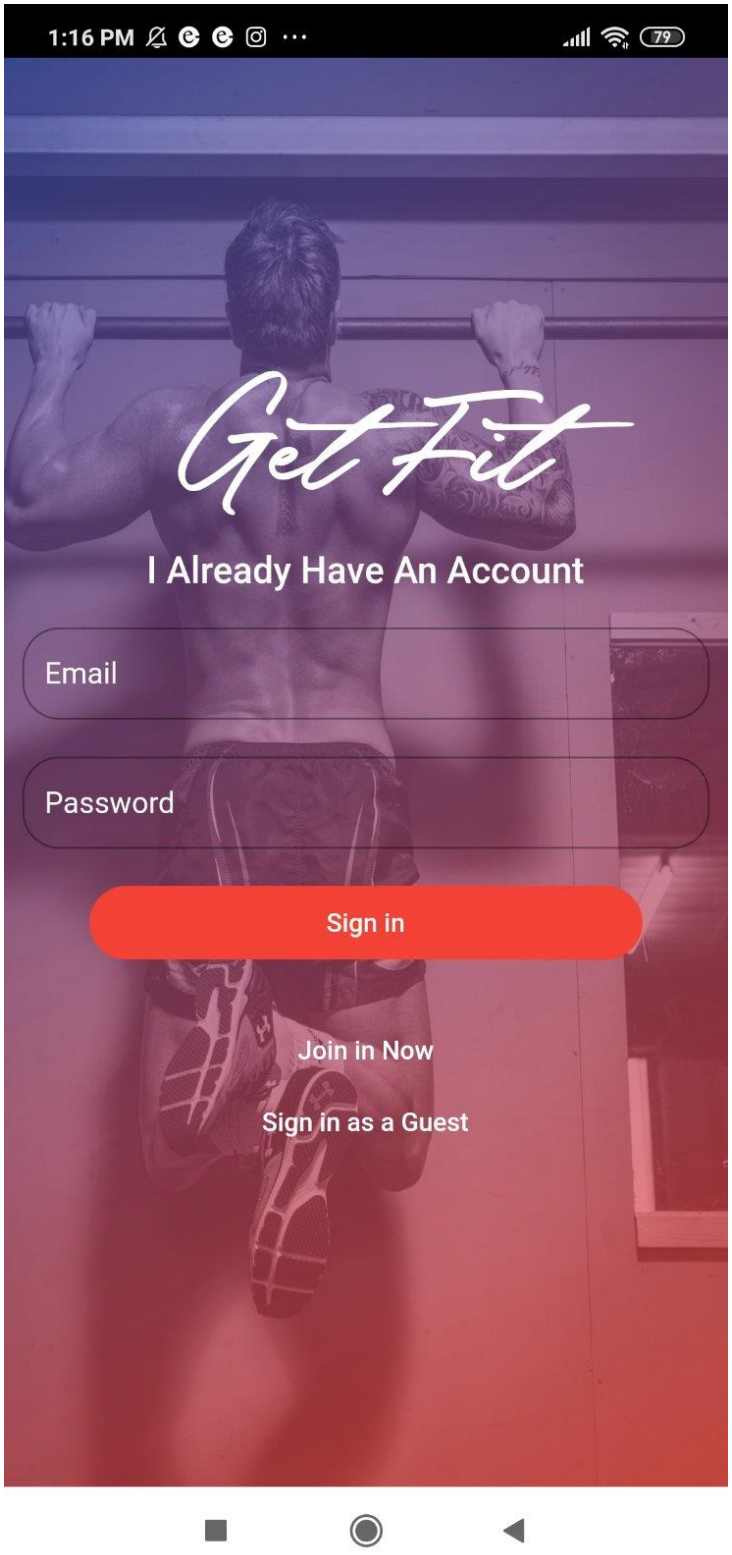


Figure 92: User is redirected to 'Sign In' page

4.1.2.7. Testing Diet Plan page

Test Case 7	7
Test Objectives	To test if Diet Plan page is displayed as desired.
Test data	View content of Diet Plan page.
Expected Result	Android Application will display contents of Diet Plan page.
Actual Result	Android Application displayed contents that are present in Diet Plan page.
Conclusion	Test Successful

Table 23: Testing of Diet Plan page

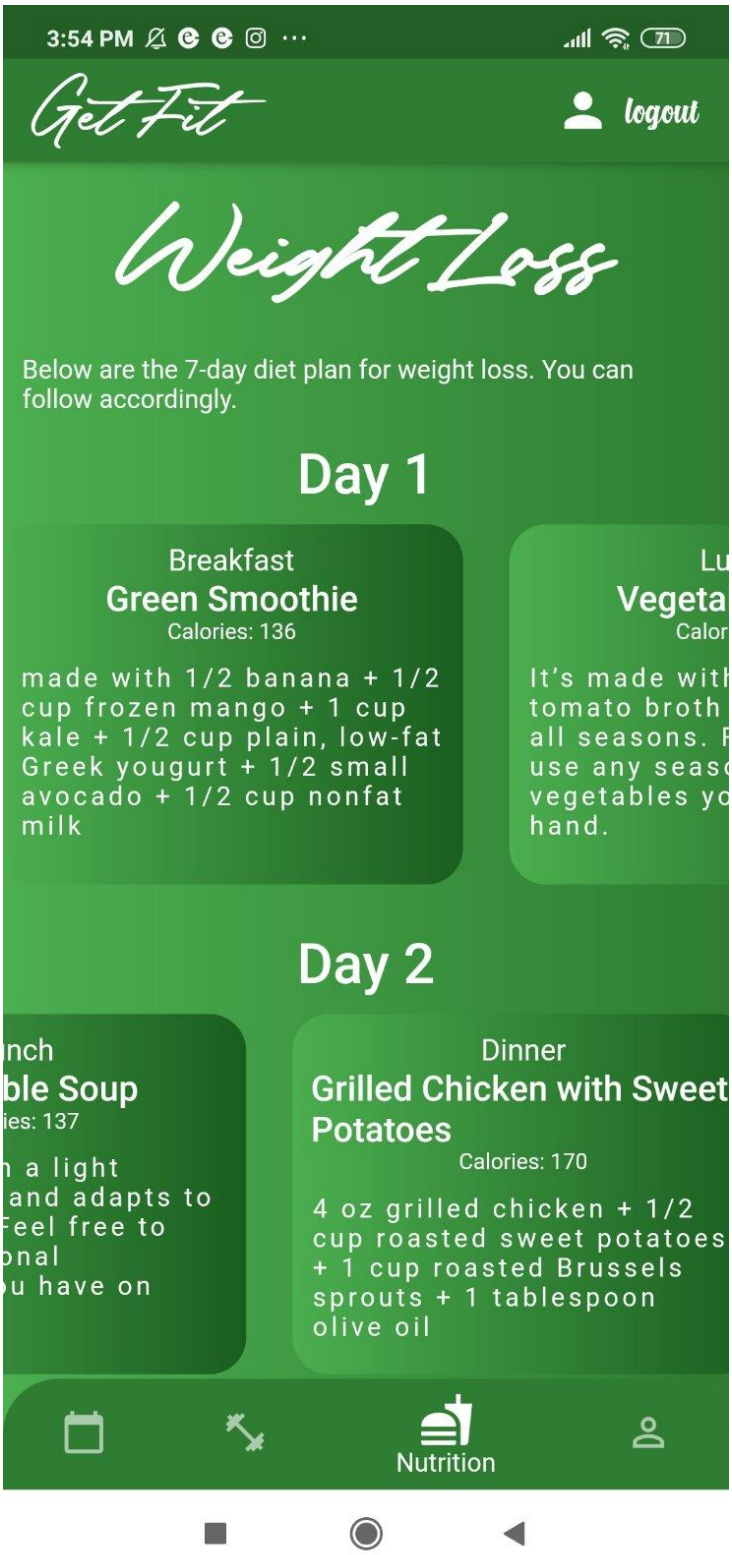


Figure 93: Contents present in diet plan is displayed

4.1.2.8. Testing of BMI Calculator

Test Case 8	8
Test Objectives	To calculate BMI of user
Test data	Enter height and weight.
Expected Result	BMI of the user will be calculated.
Actual Result	BMI of the user will be calculated.
Conclusion	Test Successful

Figure 94: Testing of BMI Calculator

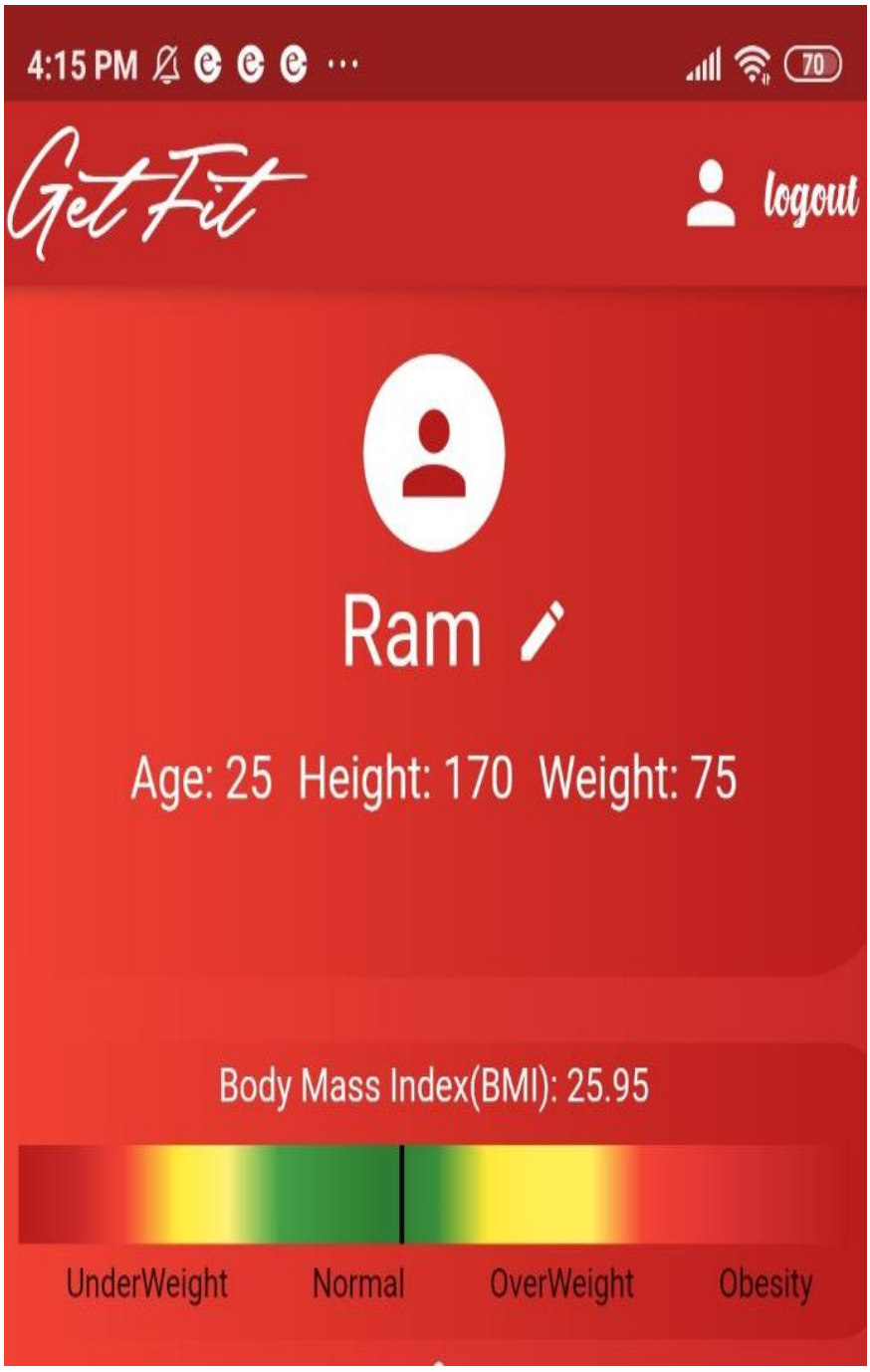


Figure 95: Calculated BMI of the User

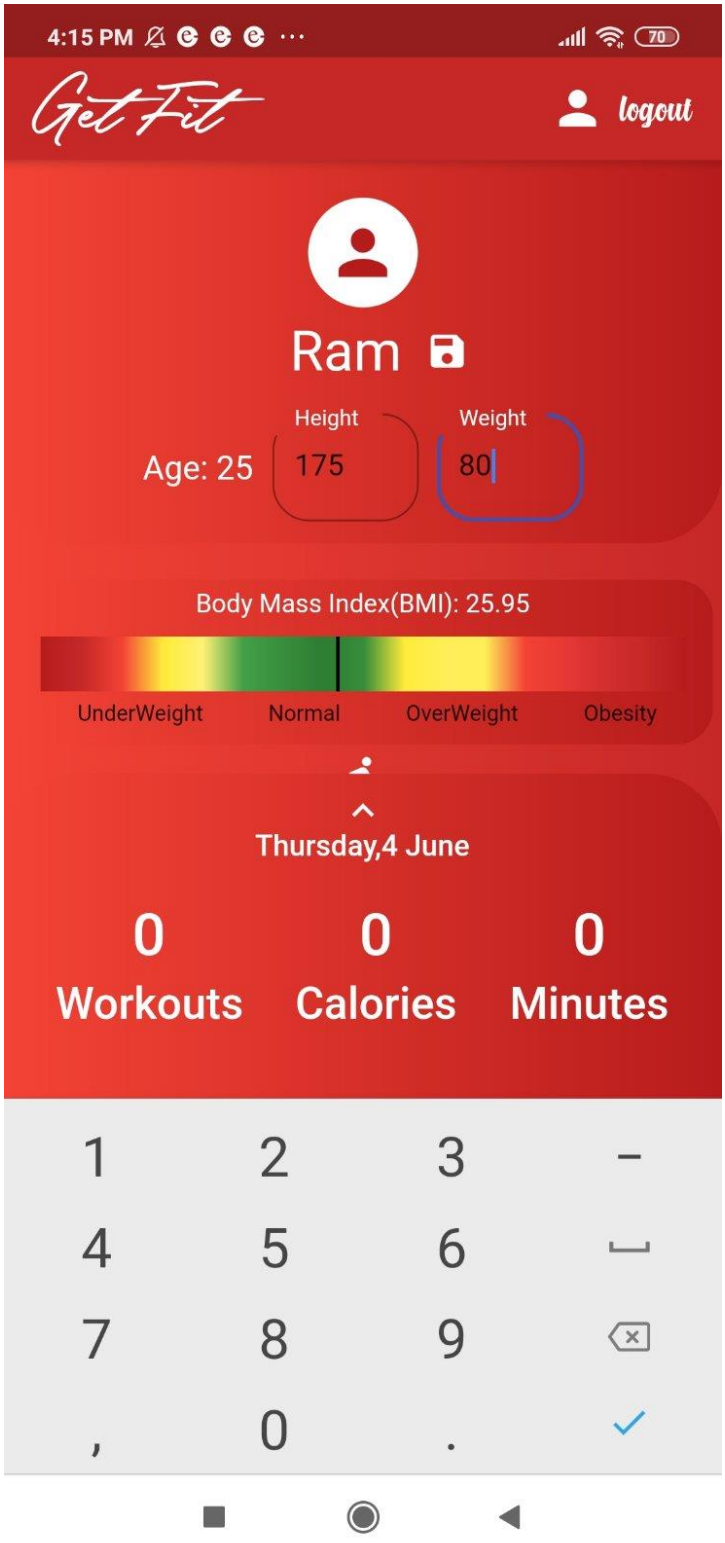


Figure 96: Updating height and weight of the user

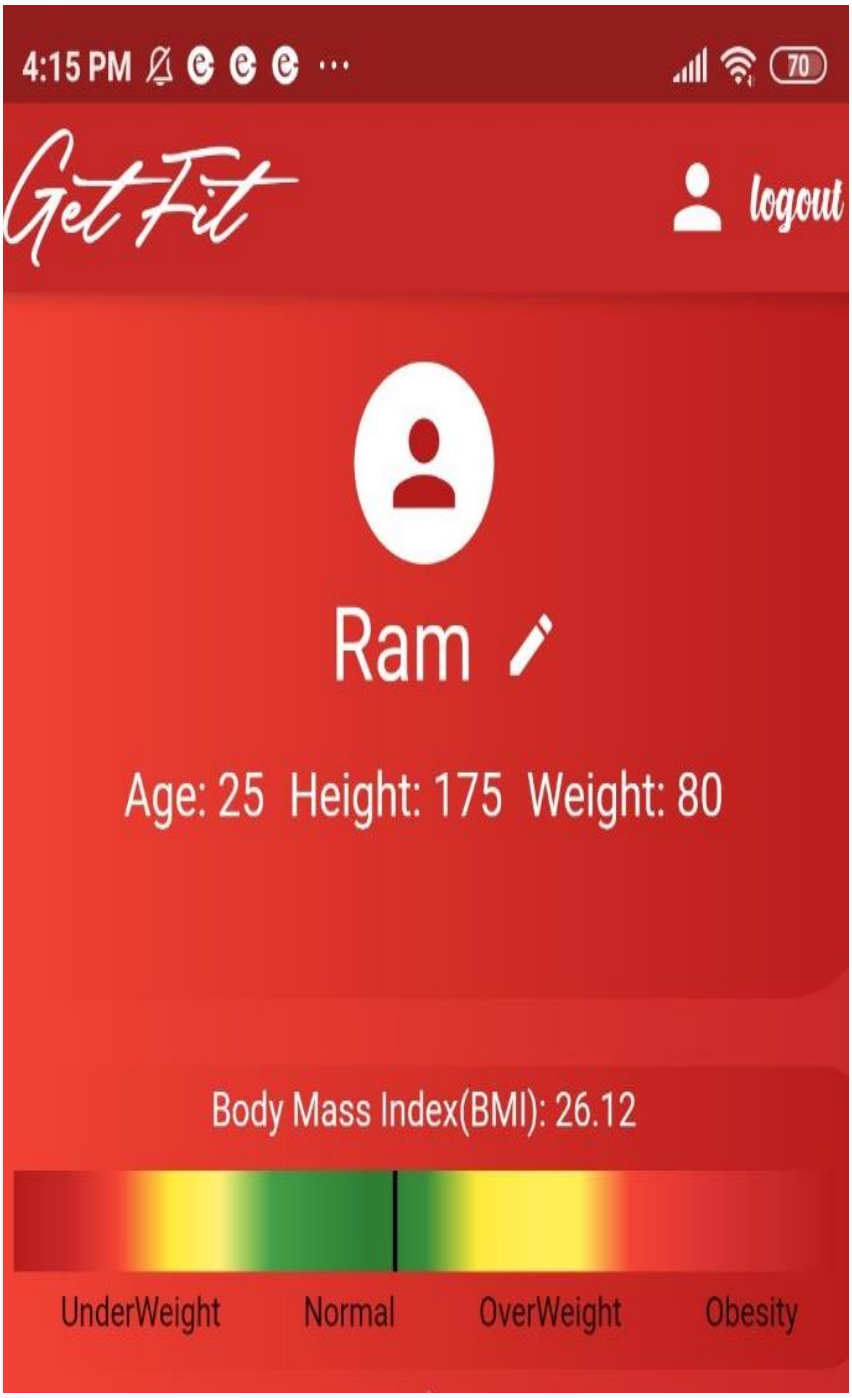


Figure 97: Updated BMI of the user

4.1.2.9.Testing of Daily Workout Done Recorder

Test Case 9	9
Test Objectives	To record the daily workout done data
Test data	Start workout session
Expected Result	Total time, number of workouts, calories burn should be recorded
Actual Result	Total time, number of workouts, calories burn should be recorded.
Conclusion	Test Successful

Figure 98: Testing of Daily Workout Done Recorder

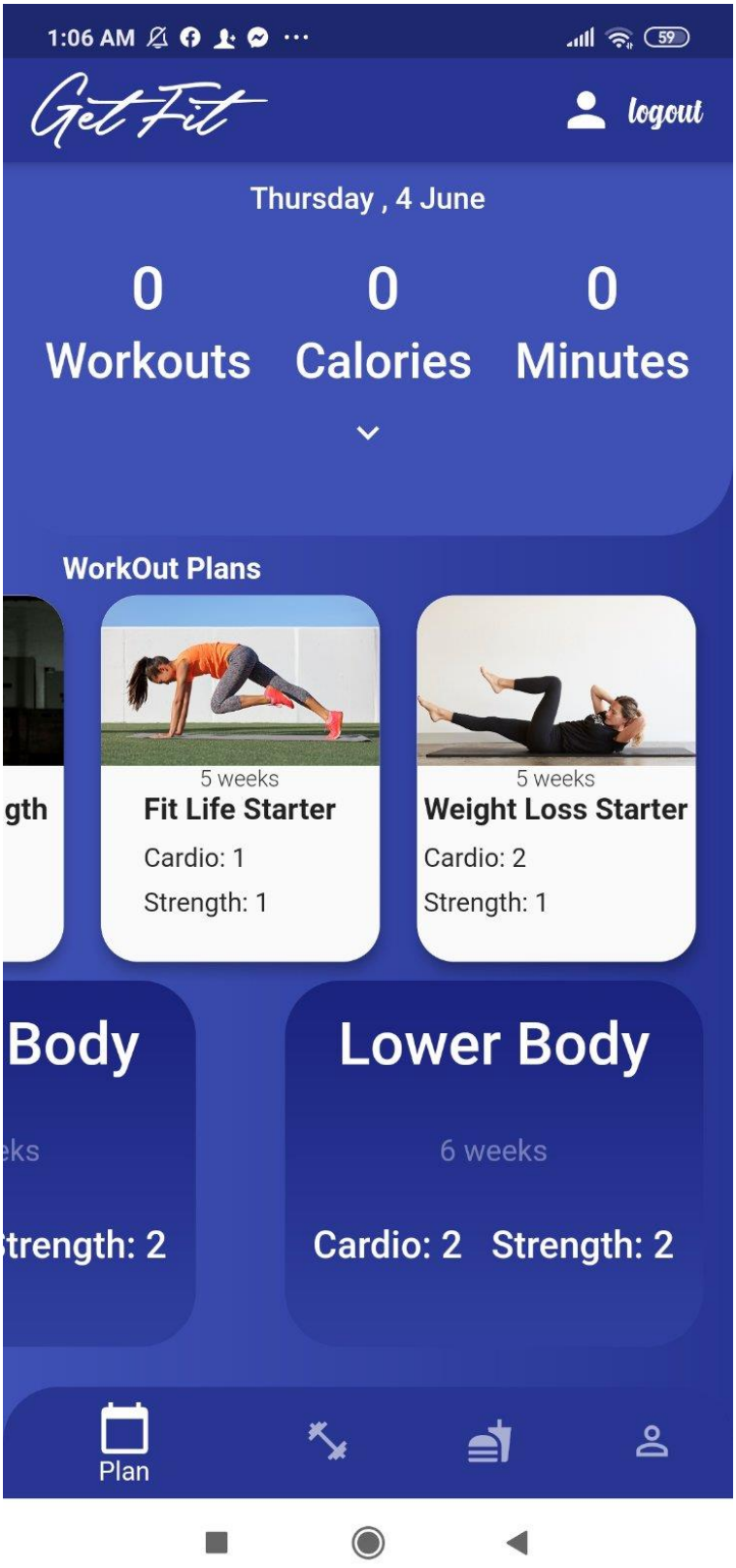


Figure 99:Daily Workout done recorder before starting workout

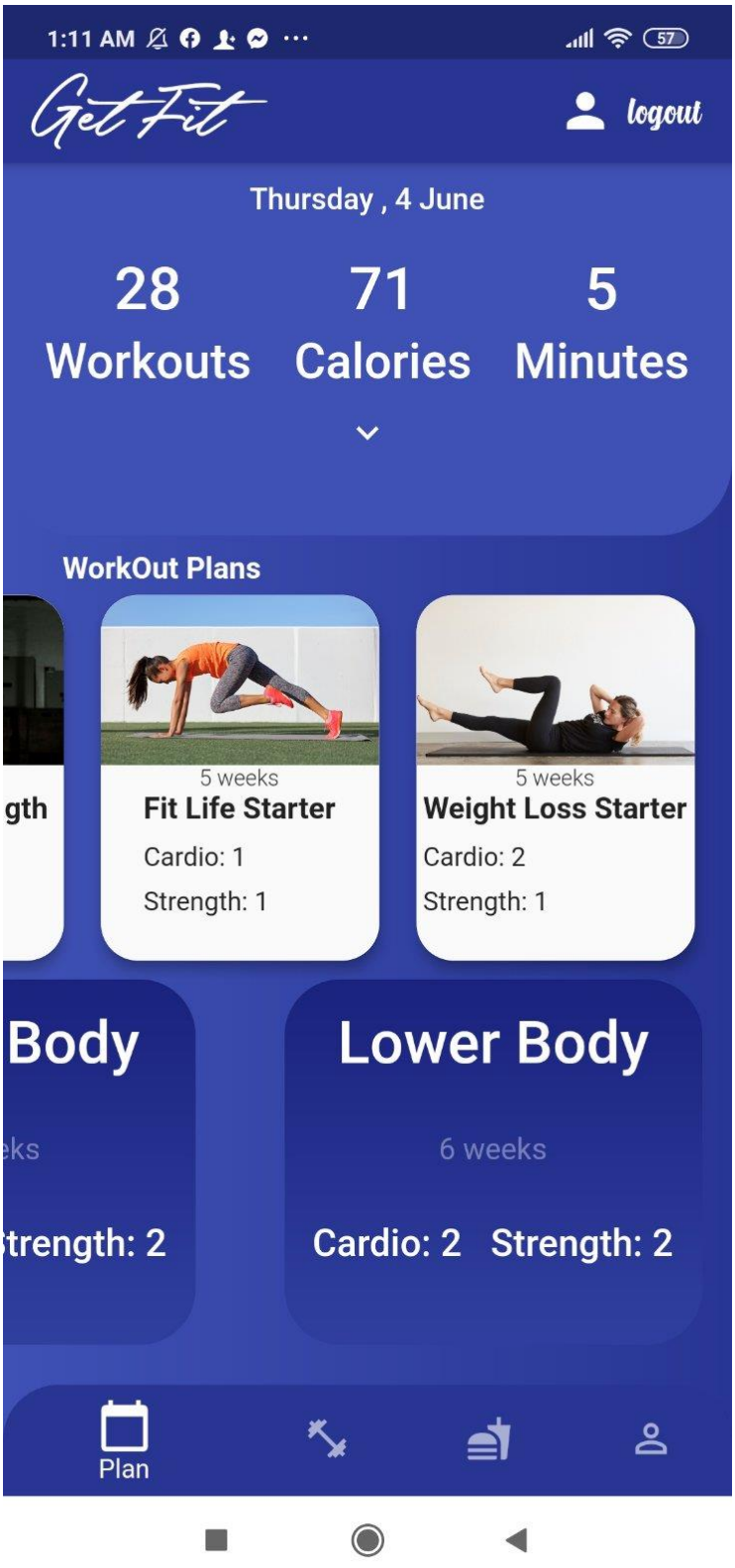


Figure 100: Daily Workout done recorder before starting workout

4.2. Critical Analysis

To summarize, in this chapter all the testing for the development phase of the system was carried out with each step of testing explained with graphical representation and process elaboration. The testing's were categorized into three testing's. which is white box testing, black box texting and Integration testing. Hence, all the testing process are completed in the above processes.

Chapter 5: Conclusions

5.1. Project Evaluation

The development of the project delivers all the requirements of the users which in general is a fitness application. The system has been developed for all types of users those who go to fitness center or gym and also for those who works out at home for a healthy lifestyle. Since this project was done from scratch, the codes in this project is manually coded. Basic features and functions which are needed in a fitness application is used and implemented in this project to make a useful fitness application.

This project is concluded by accomplishing the aims and objective of the project. This project consists of various requirements for the users which will save their time, motivate and also save money. The discussion on the system works and how the user can use the fitness application for their convenience is stated in the documentation section. The main purpose of the document is to give brief description of the system and the work of the system to ensure the requirements of the uses has been fulfilled.

5.2. Advantages

- Free app

The main advantage of the ‘Get-Fit’ app is that it is a free app. All the workout programs including the diet plan for weight loss is completely free.

- Track your footsteps

This app keeps a count of steps and tracks the distance user has covered. Monitoring steps can help improve the users daily step count and work more towards achieving their targets.

- No need for trainers

You no longer need to hunt for trainers or health coach or a fitness class. This app provides excellent workout plans with the workout instruction, breathing process and even shows the video tutorial for all the workouts.

- Exercise according to your schedule

Instead of being locked into a specific class schedule at your local gym, with this app you are offered all the workout programs at your convenience.

- Skip the Gym or Studio

If you're new to exercise, you aren't sure what types of exercise you like, or you feel intimidated when walking into a new workout environment, this app is an excellent reprieve from the traditional gym or studio. You can test different programs from the comfort of your living room, learning the basics before taking your practice into the "real world" of clubs and gyms.

5.3. Limitation

- Cannot create personalized workout plan

Even though this app contains excellent workout plans users still cannot create our own personalized workout plans.

- No body there to check the users form

This app or most of the workout apps does not have features that enables the instructor to see the users, check their forms and offer modifications or corrections based on user's performance. This means you could inadvertently perform exercises incorrectly, or even unsafely, without knowing it. This is particularly concerning for beginners and those recovering from injuries, as they're more likely to perform exercises incorrectly.

- Diet plan may not work

As we know, the inner workings or digestion capabilities varies from person to person so the diet plan which can be effective for some may no work for some people. So, it would be better for the users if they consulted a dietitian.

- Fitness apps can drain your smart phone's battery life.

These apps can quickly cut down the battery life and once your mobile phone is switched off, you cannot use the app.

5.4. Future Work

The current implementation of the project is the initial stage of development for a reliable gym/fitness center. Due to short period of time frame the system lacks web app or desktop app this feature which will be added in the future. The project can be made much bigger by including the advance features which are needed in a fitness application in the future through software updates. The advanced features such as personal trainer will be added. Features like health stats, subscriptions etc. could be taken into considerations. The tools and system used to develop the system could be made open source for the client for which the client can research and gain information on the working of the application with subscription facility for enhanced services. Making the performance even bug free and smoother will also be done later. Improved authentication process can be added to the application for the verification of the user. To protect the data as well as database from being harm proper security measures could be added in to the application. In upcoming days if the project is meant to be sold the system can be accepted by other organizations which can be made better and bigger. At Last, the system has a good scope in any fitness gym for having a working physical fitness application that they can provide to their internal clients or members.

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Chapter 7: Appendix

7.1. Appendix A: Pre-Survey

7.1.1. PRE-SURVEY FORM

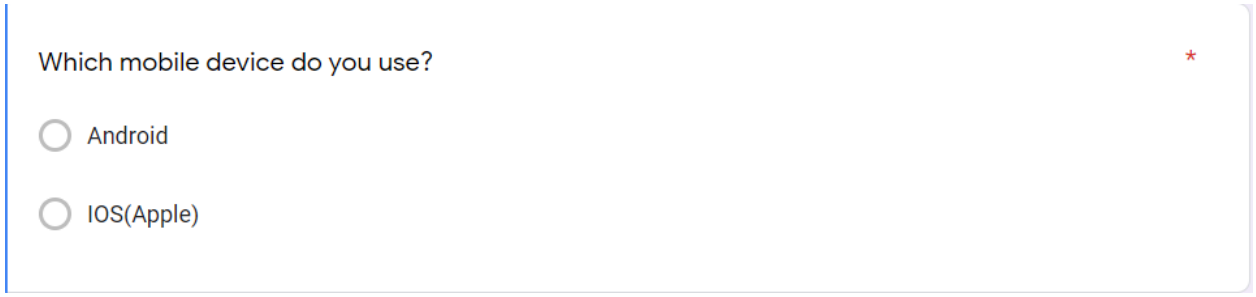

Figure 101: Pre survey form 1

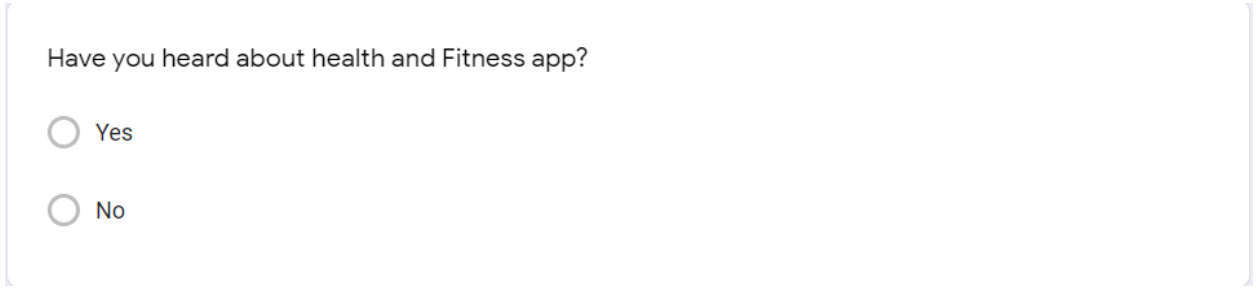

Figure 102: Pre survey form 2

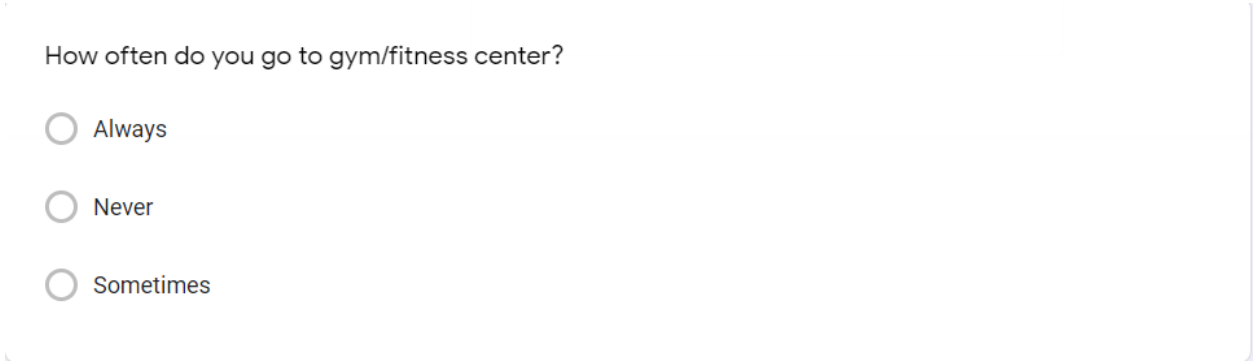

Figure 103: Pre survey form 3

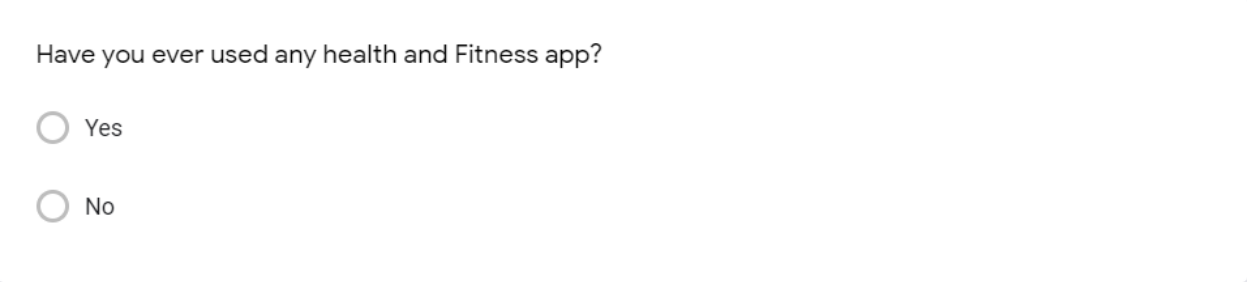

Figure 104: Pre survey form 4

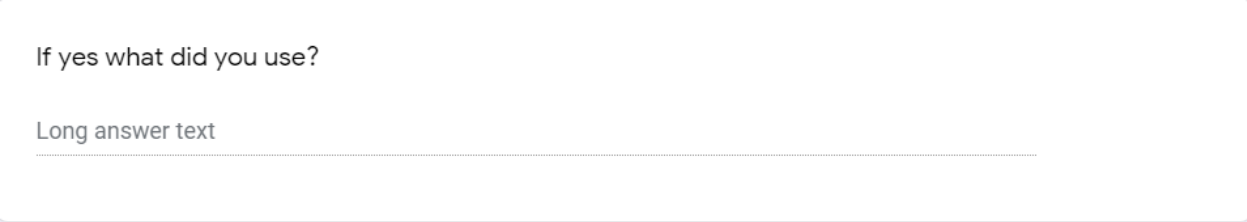

Figure 105: Pre survey form 5

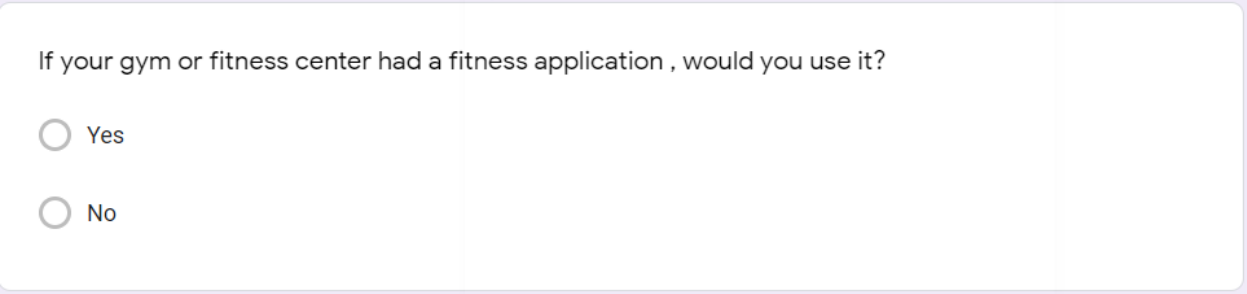

Figure 106: Pre survey form 6

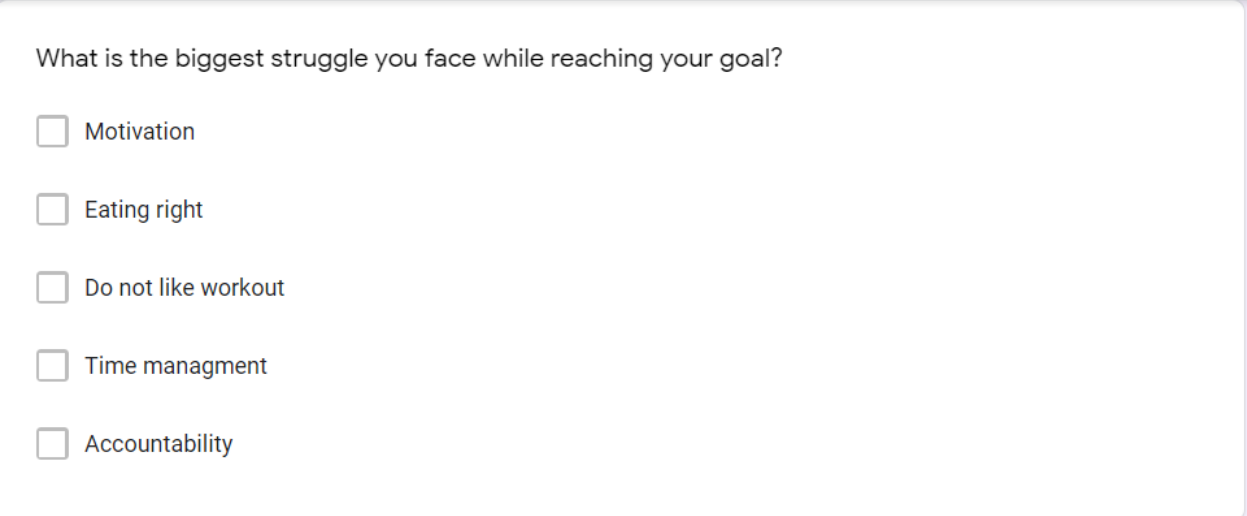

Figure 107: Pre survey form 7

Figure 108: Pre survey form 8

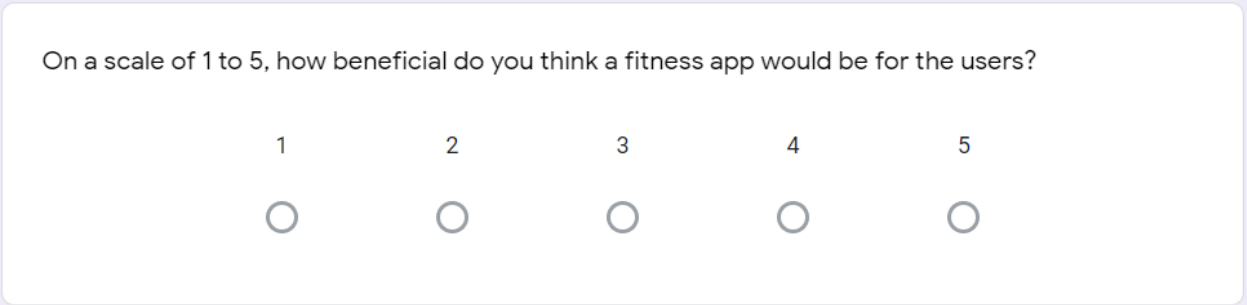

Figure 109: Pre survey form 9

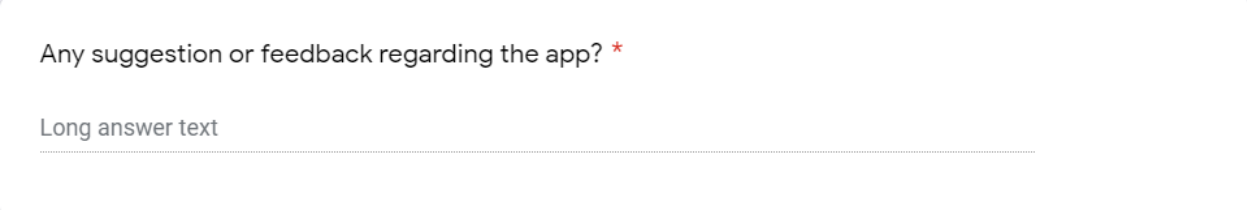

Figure 110: Pre survey form 10

7.1.2. Sample of Filled Pre-Survey Forms

In this part the result data of the first survey is shown in which the needs of the application are highlighted.

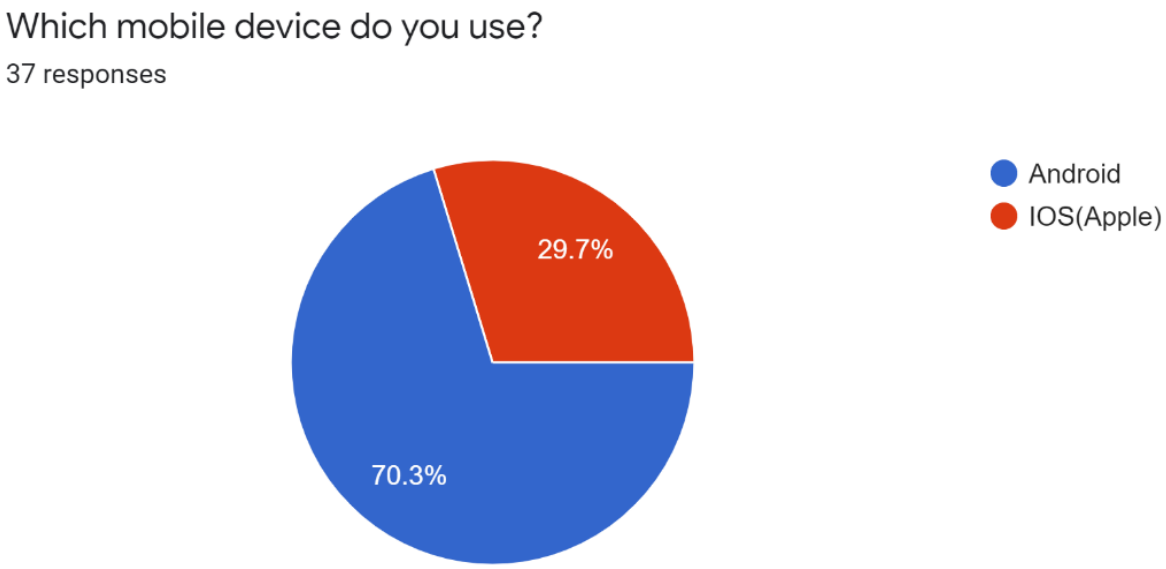

Figure 111: Survey response 1

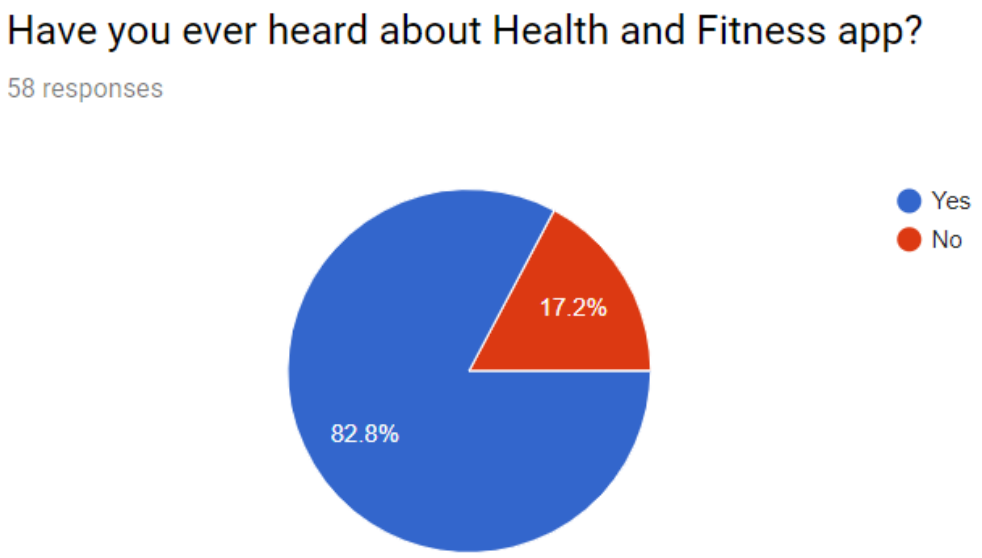

Figure 112 Survey Response 2

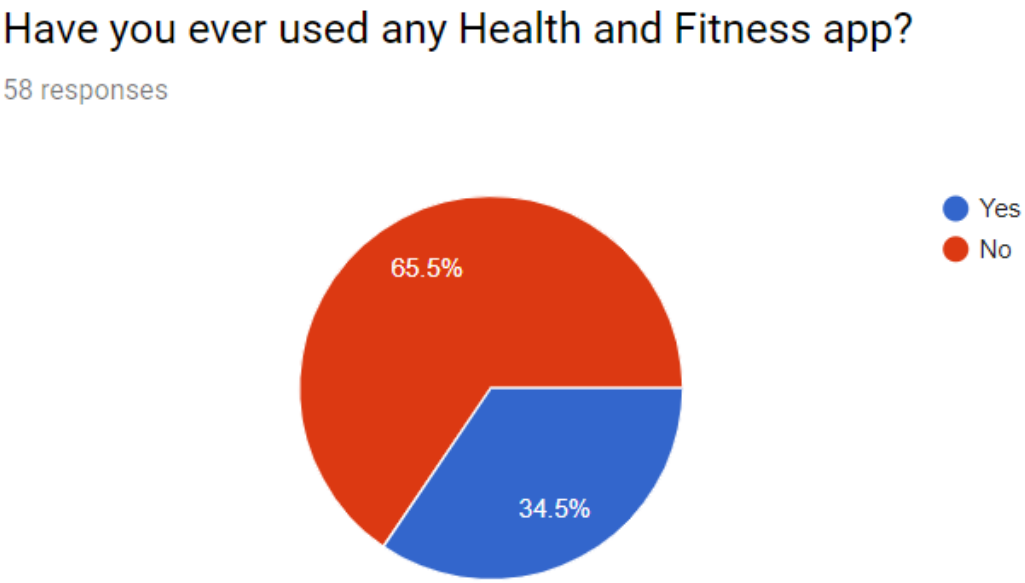

Figure 113 Survey response 3

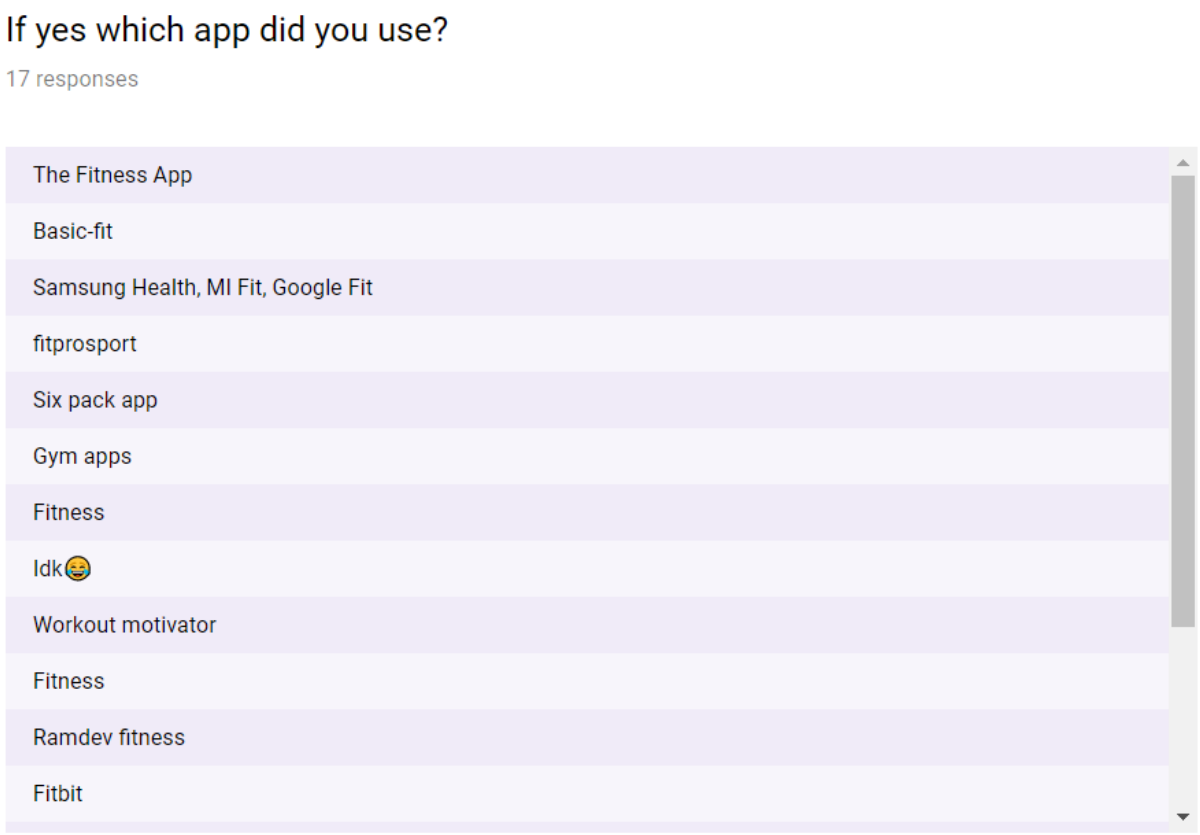

Figure 114 Survey response 4

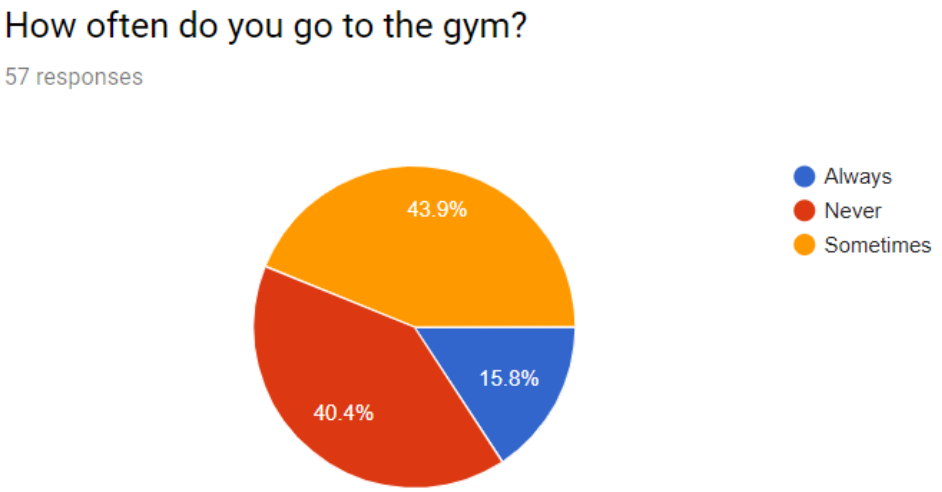

Figure 115 Survey response 5

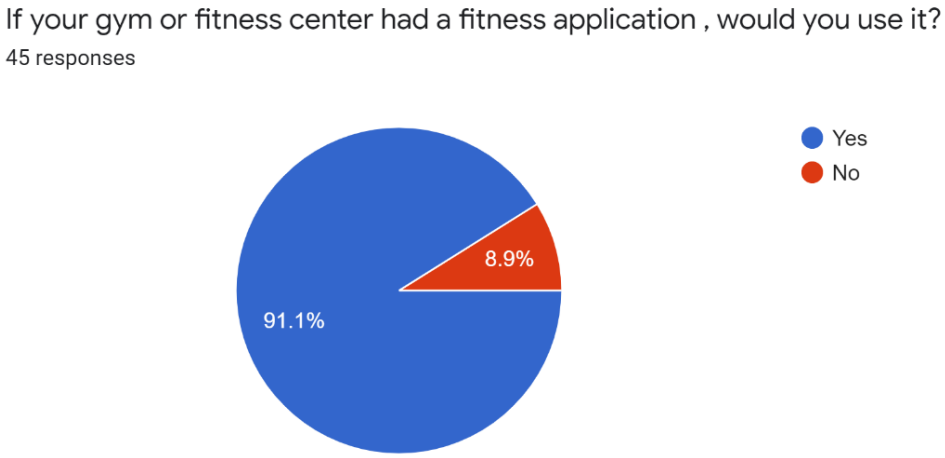

Figure 116: Survey Response 6

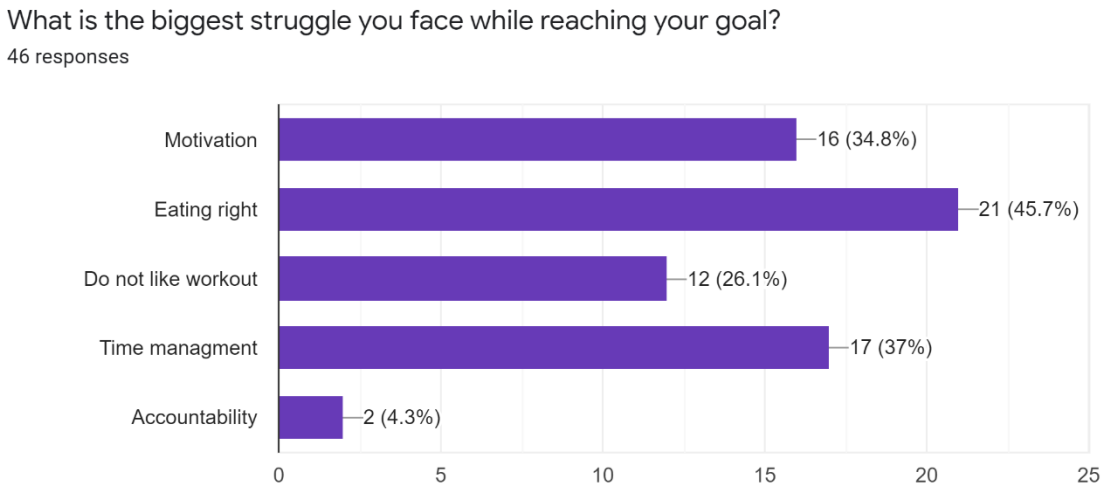

Figure 117: Survey Response 7

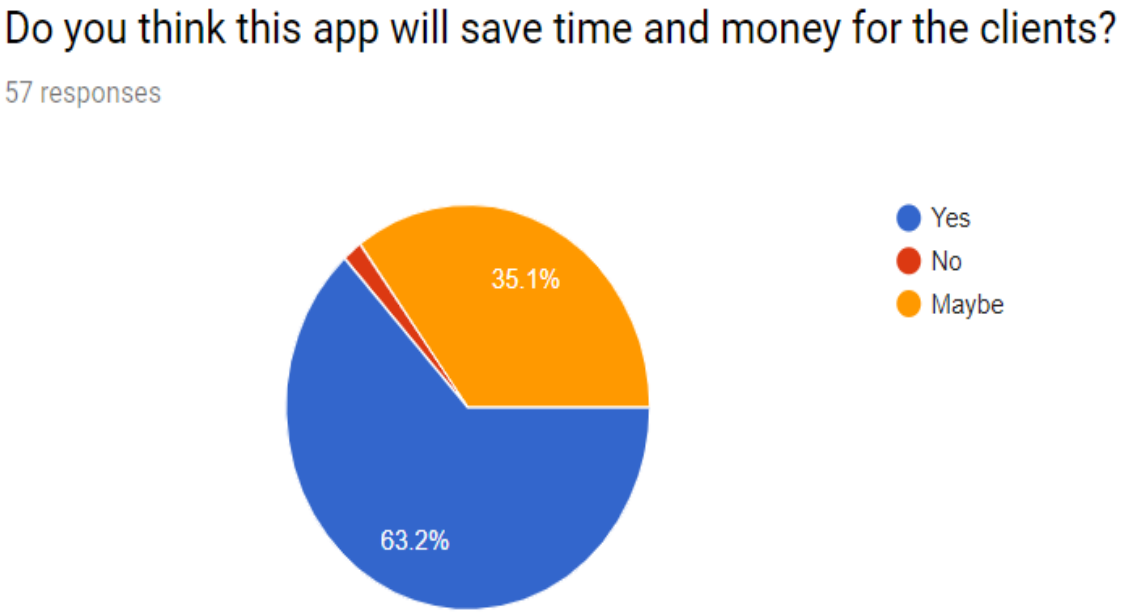

Figure 118 Survey response 8

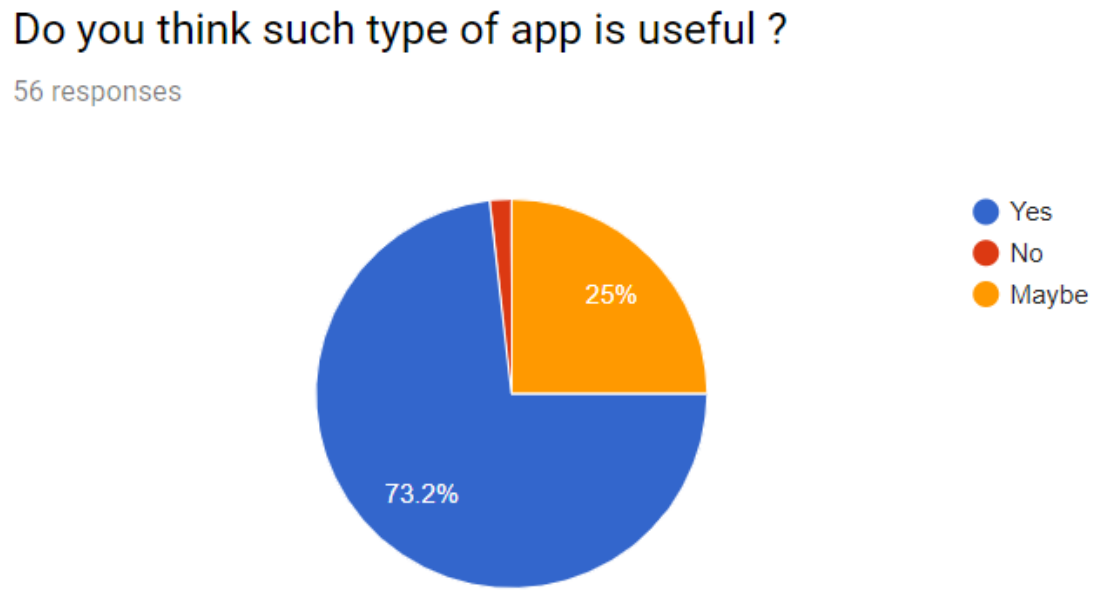

Figure 119 Survey response 9

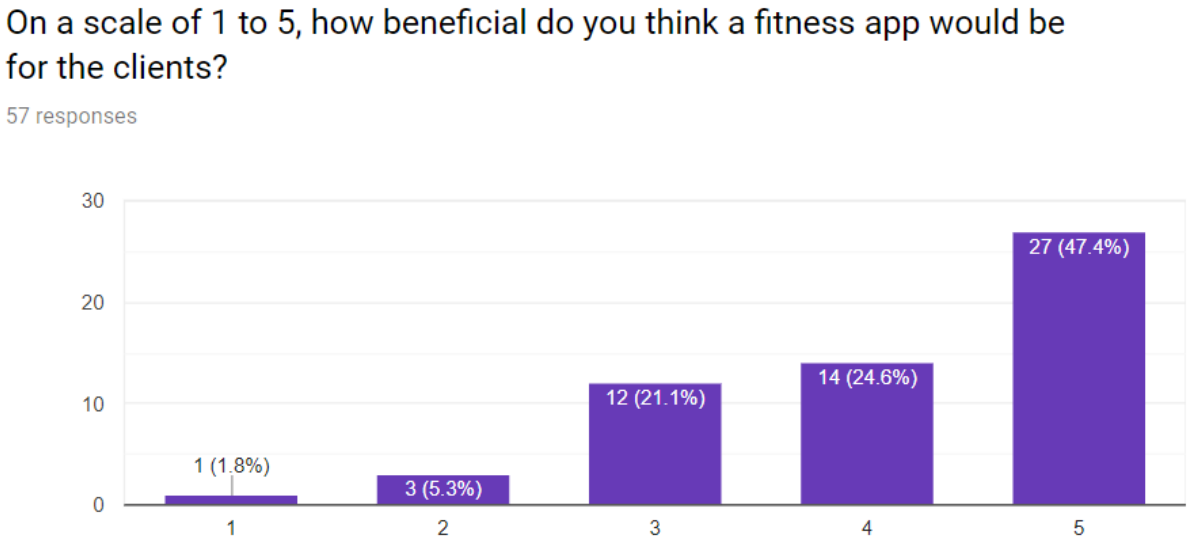

Figure 120 Survey response 10

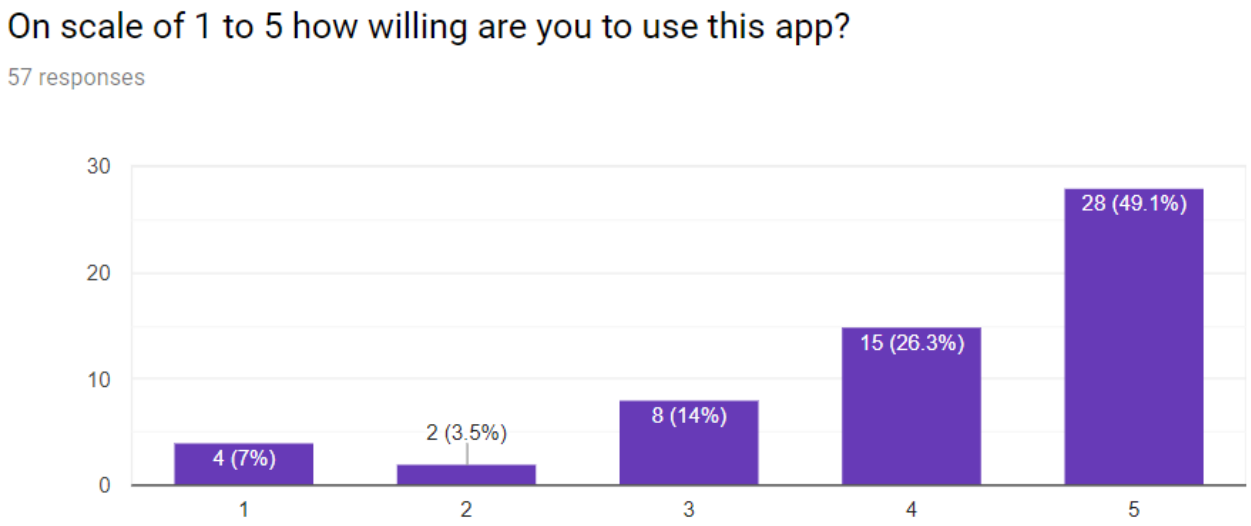

Figure 121 Survey response 11

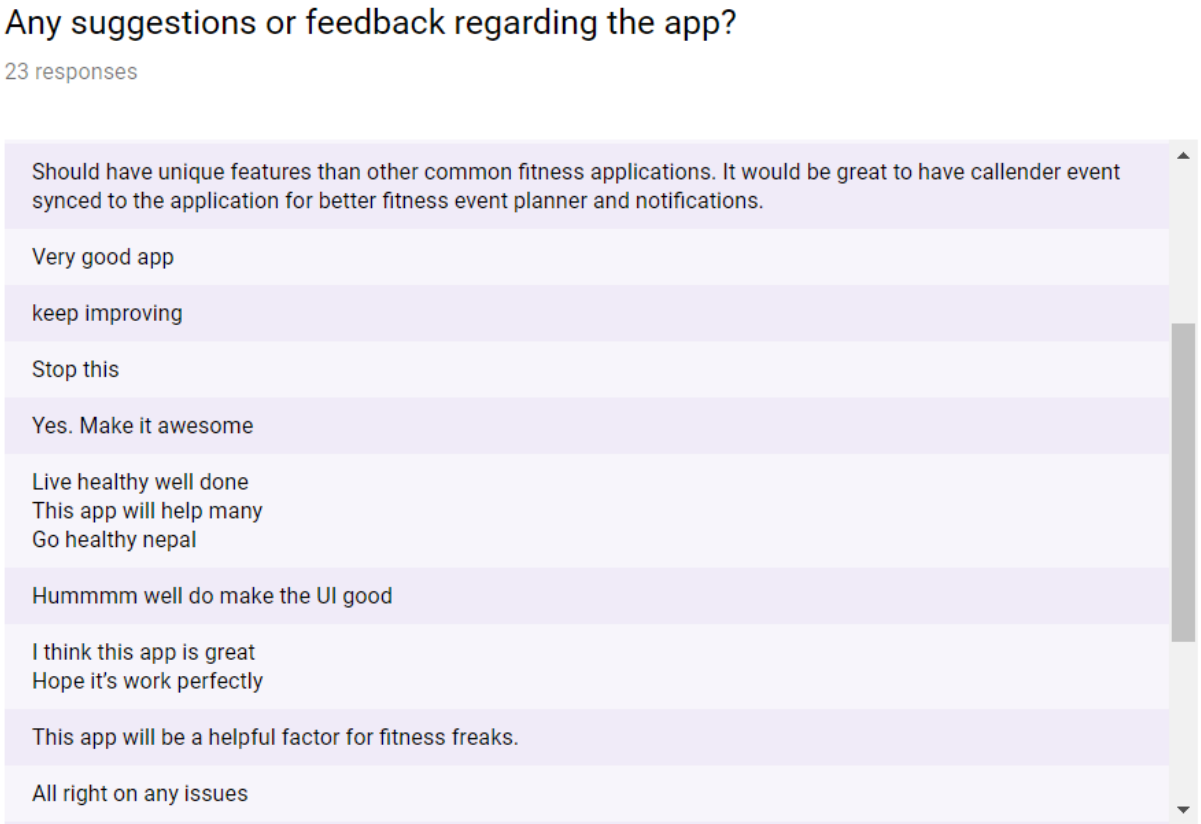

Figure 122 Survey response 12

7.1.3. Pre-Survey Result

Talking from the data collected of 1st phase of survey.

The survey shows that the major struggle people are facing to achieve their goals are not having proper diet, motivation for exercises, time management, time management and even 12 % of them did not like to work out. Very few people often went to gym and fitness centers regularly, 40 % of people were not interested in fitness and 44% of the people were not regular. 47.7 % of the people think this app would be very fruitful to the users as they think this app will save time and money also. This survey showed that 82% of the people have heard about such health and fitness app but 65% of the people have not used any kinds of fitness or gym app. 49% of the people are willing to use this app as 73.2 % of the people believe this as a very useful app. The survey also shows that 63.2% of the people believe that this app will save time and money for them.

Most of the people have not used any kinds of fitness application and by knowing the features and advantages of the mobile fitness app an encouraging data was recorded in which 91% of people were willing to be more active if the gym and fitness center would provide the basis services with a fitness application on their smartphone to use side by side.

7.2. Appendix B: Post-Survey

7.2.1. Post-Survey Form

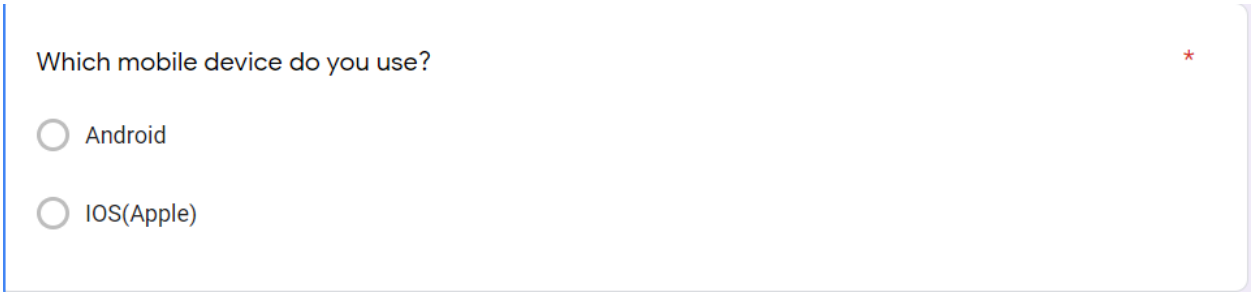

Figure 123: Post survey form 1

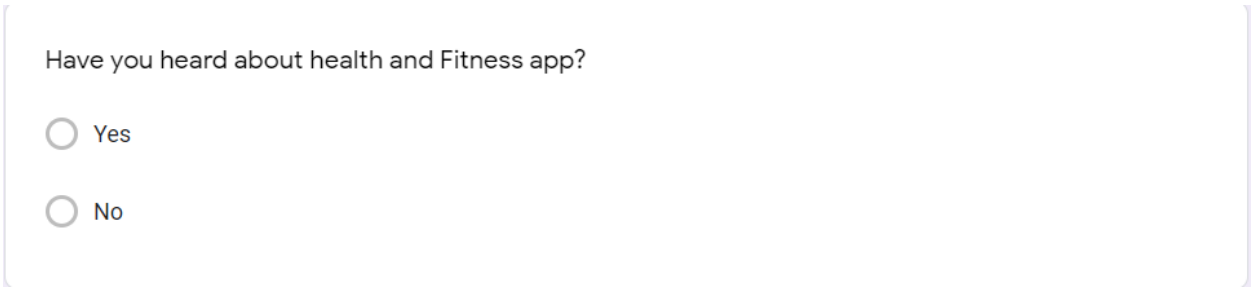

Figure 124: Post survey form 2

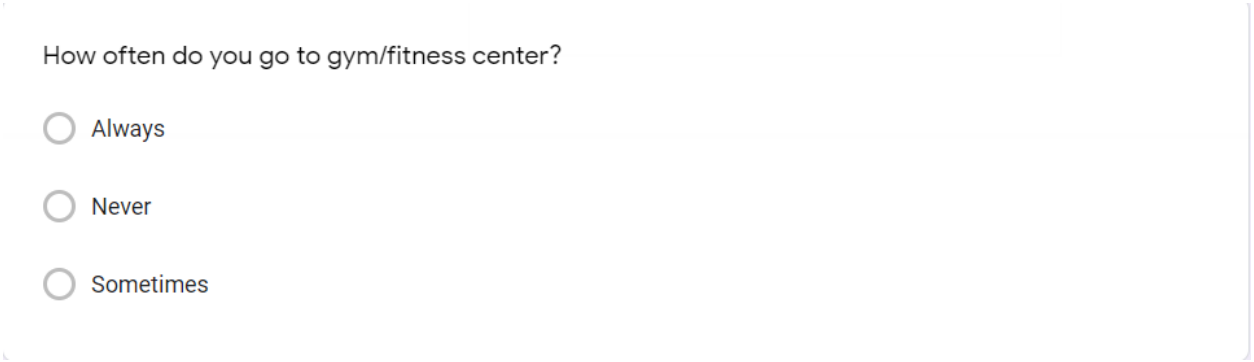

Figure 125: Post survey form 3

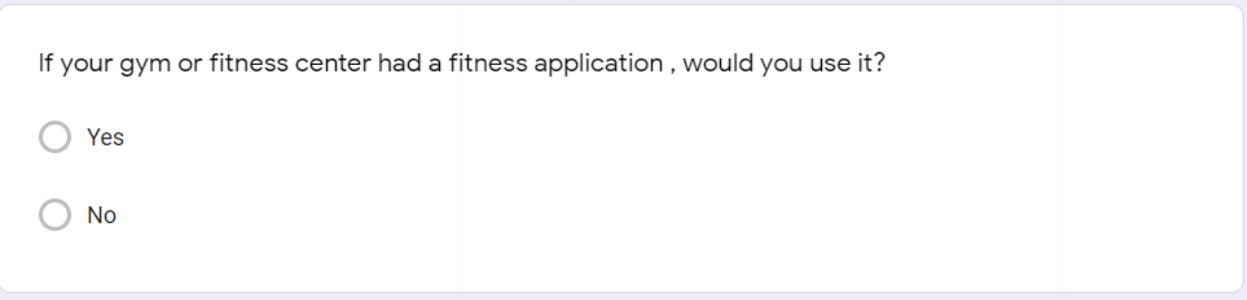

Figure 126: Post survey form 4

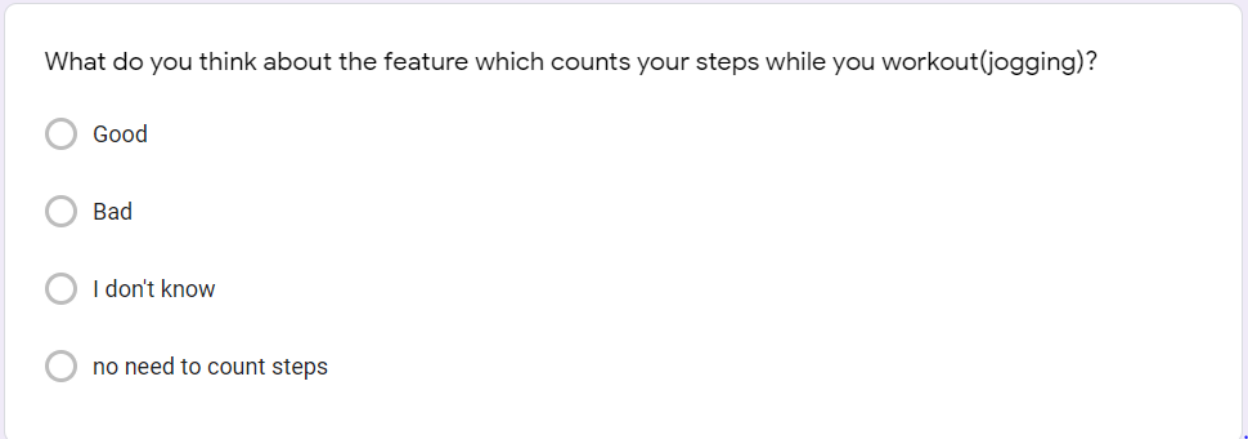

Figure 127: Post survey form 5

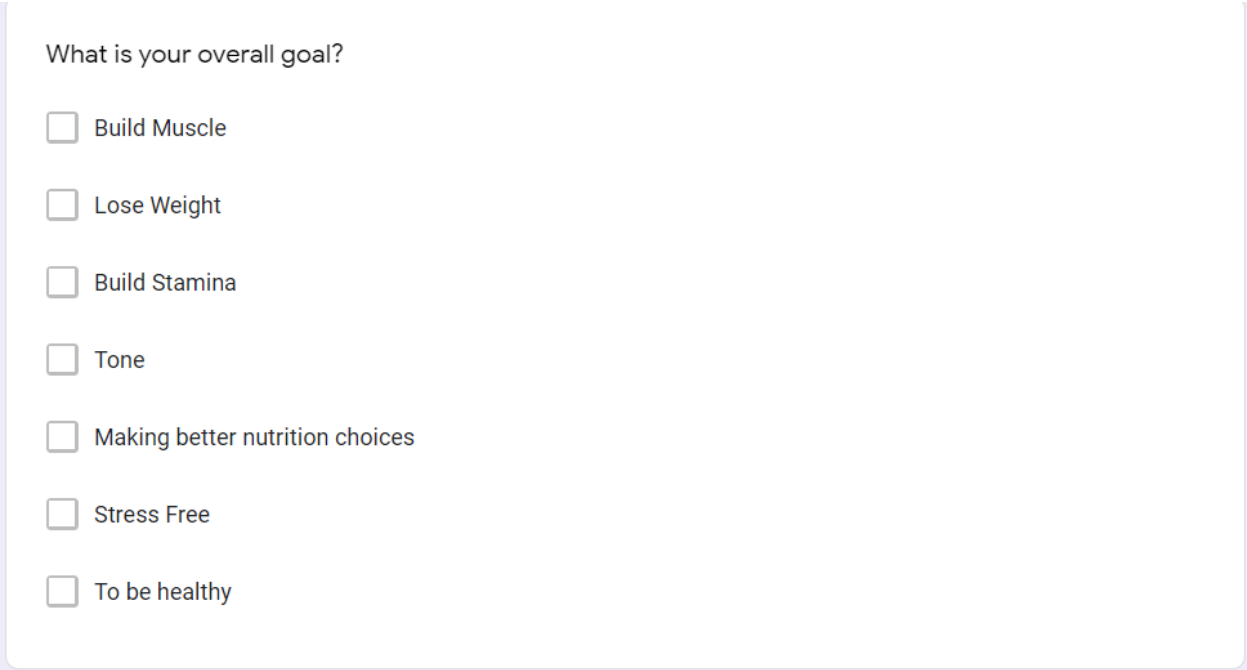

Figure 128: Post survey form 6

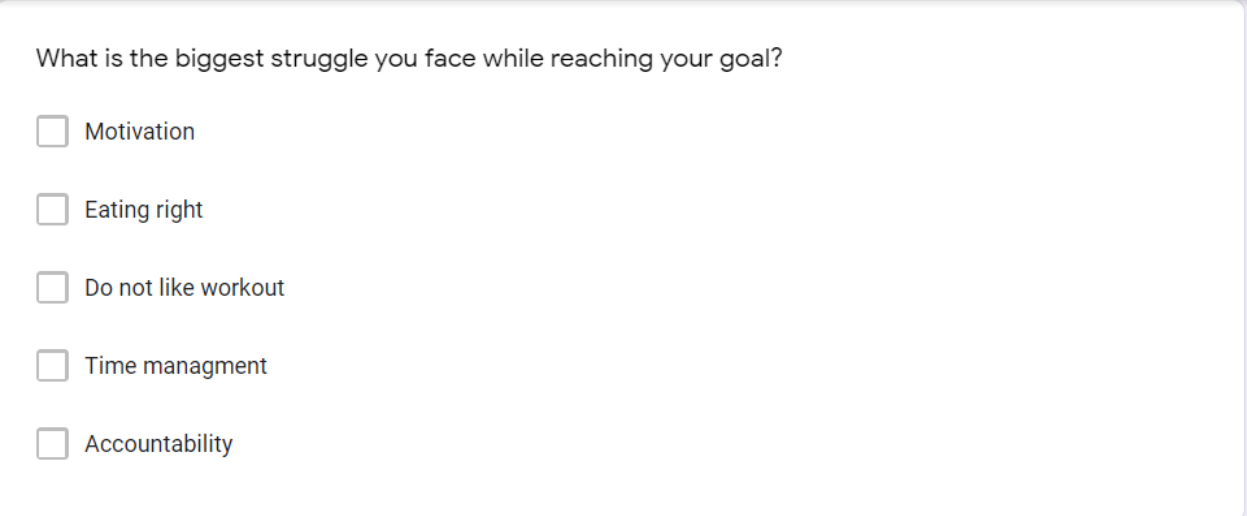

Figure 129: Post survey form 7

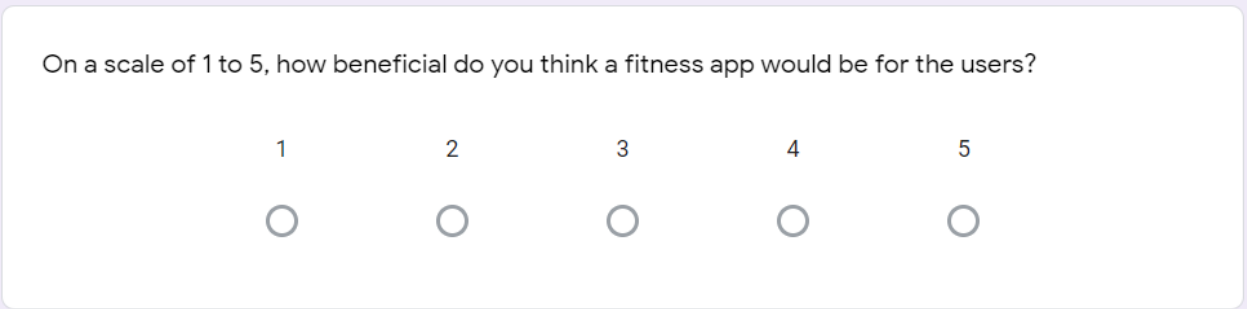

Figure 130: Post survey form 8

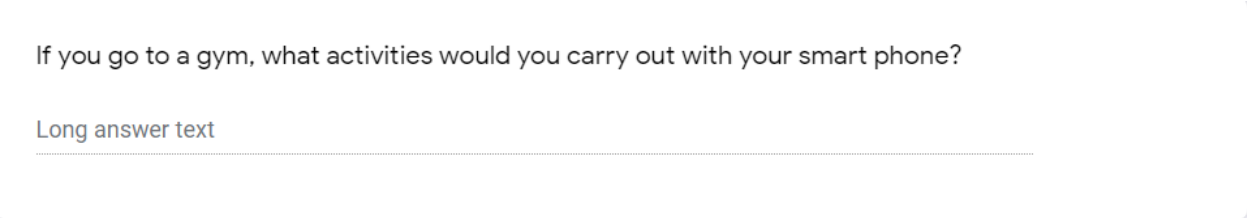

Figure 131: Post survey form 9

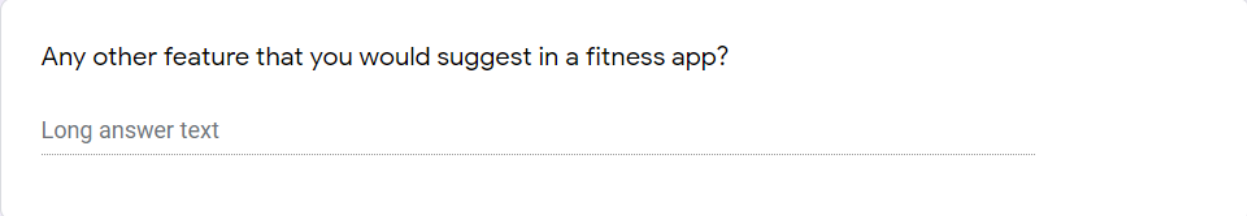

Figure 132: Post survey form 10

7.2.2. Sample of filled Post-Survey Forms

In this part the result data of the final survey is shown in which the needs of the application are highlighted.

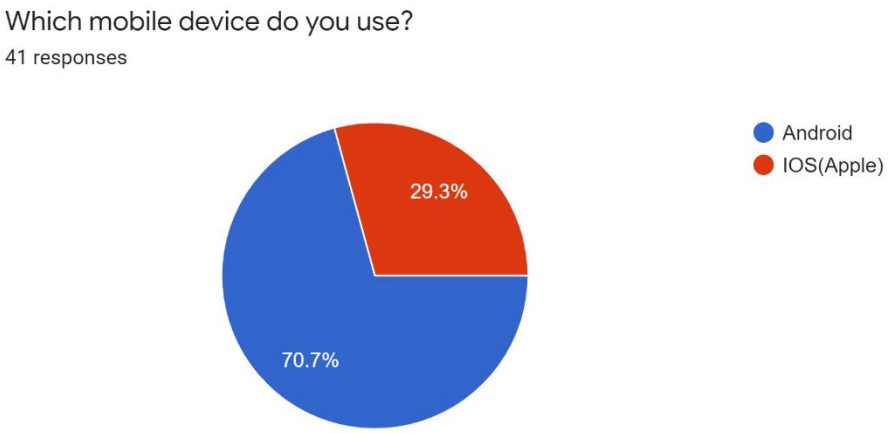

Figure 133: Mobile Device Platform 2nd Phase

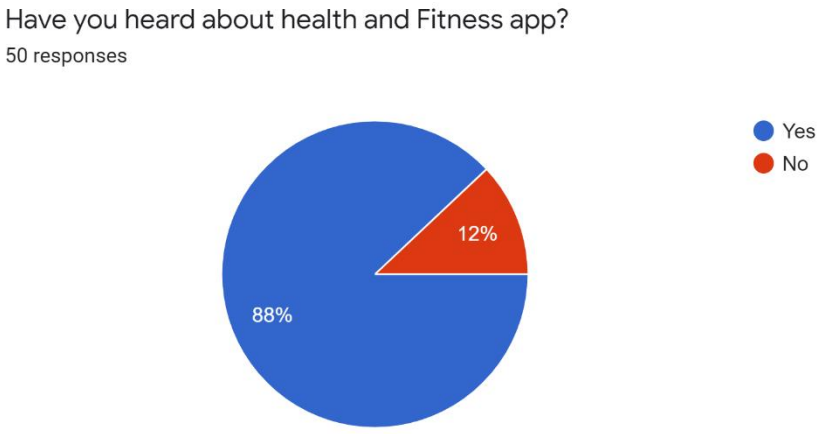

Figure 134: Update of fitness application 2nd Phase.

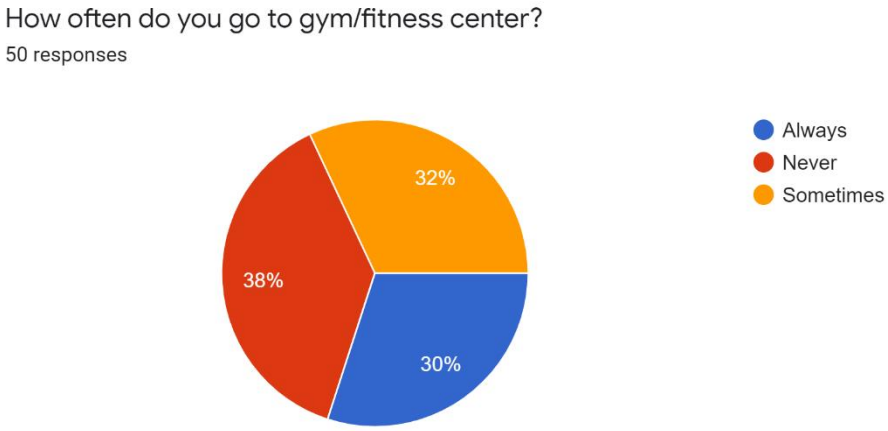

Figure 135: Organization Platform 2nd phase

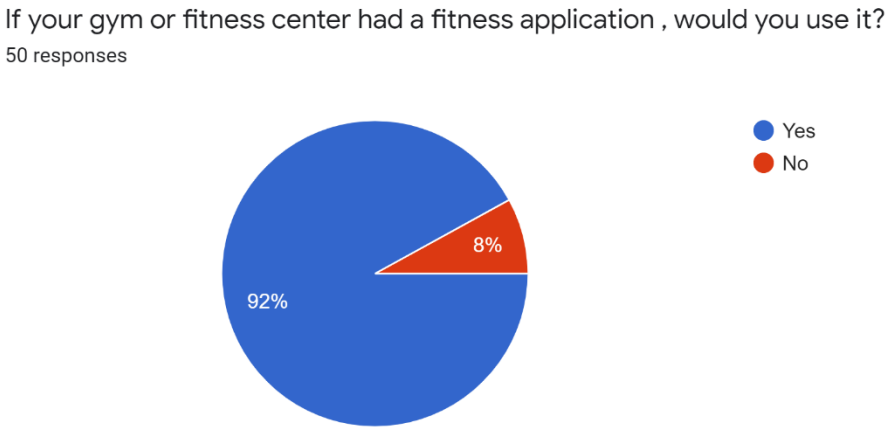

Figure 136: Organization's feature 2nd phase

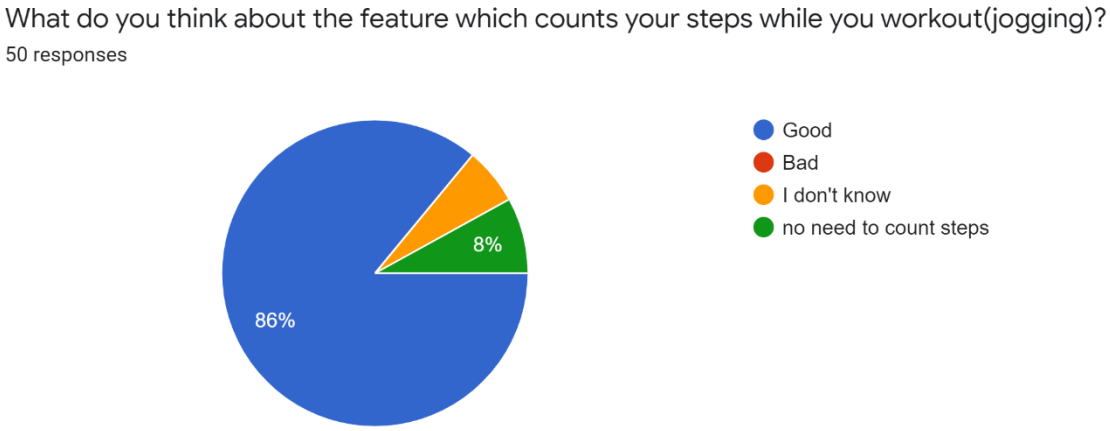

Figure 137: Implementation of Pedometer feature 2nd phase.

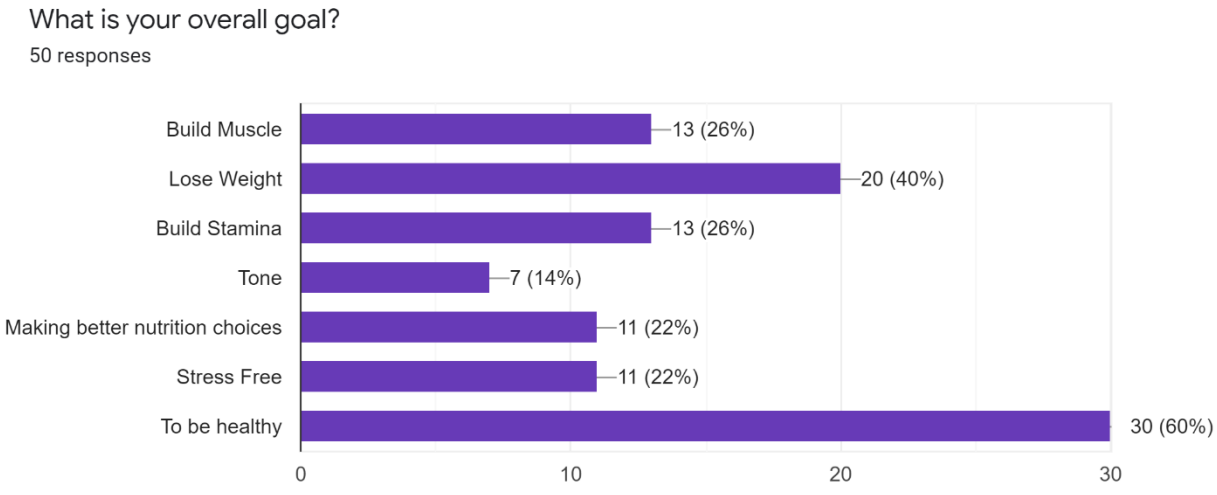

Figure 138: Goals of users 2nd phase

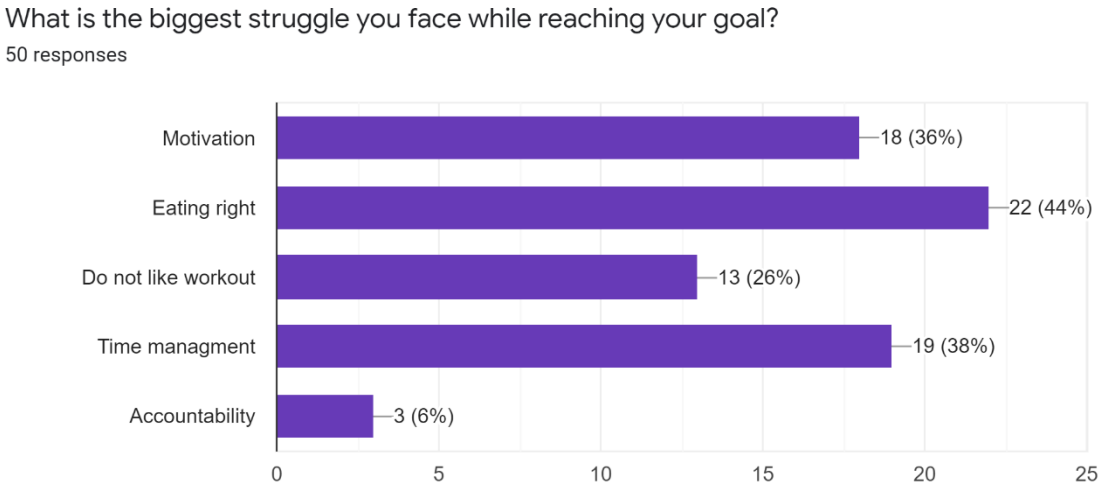

Figure 139: Users Biggest Struggle 2nd phase

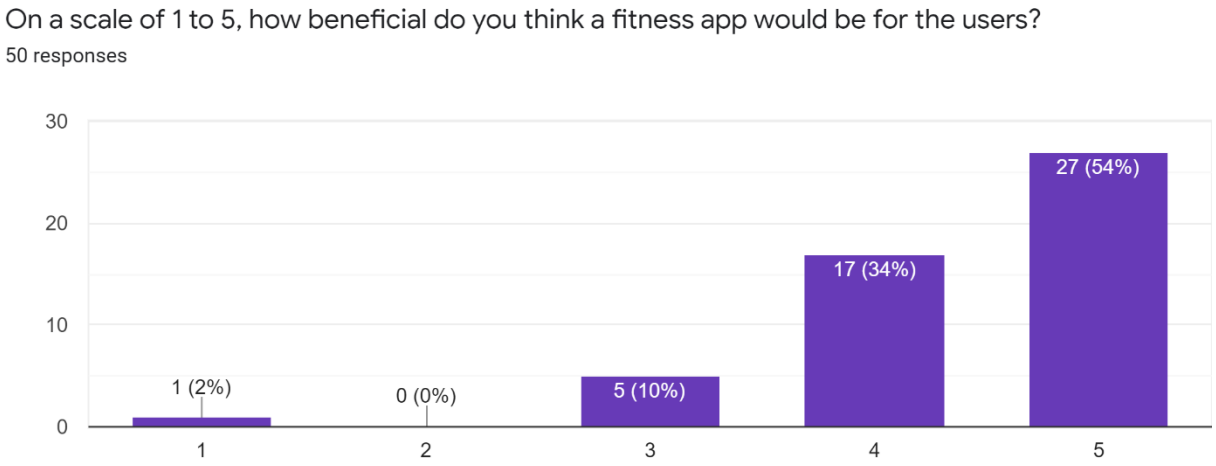

Figure 140: Idea's Approval 2nd phase

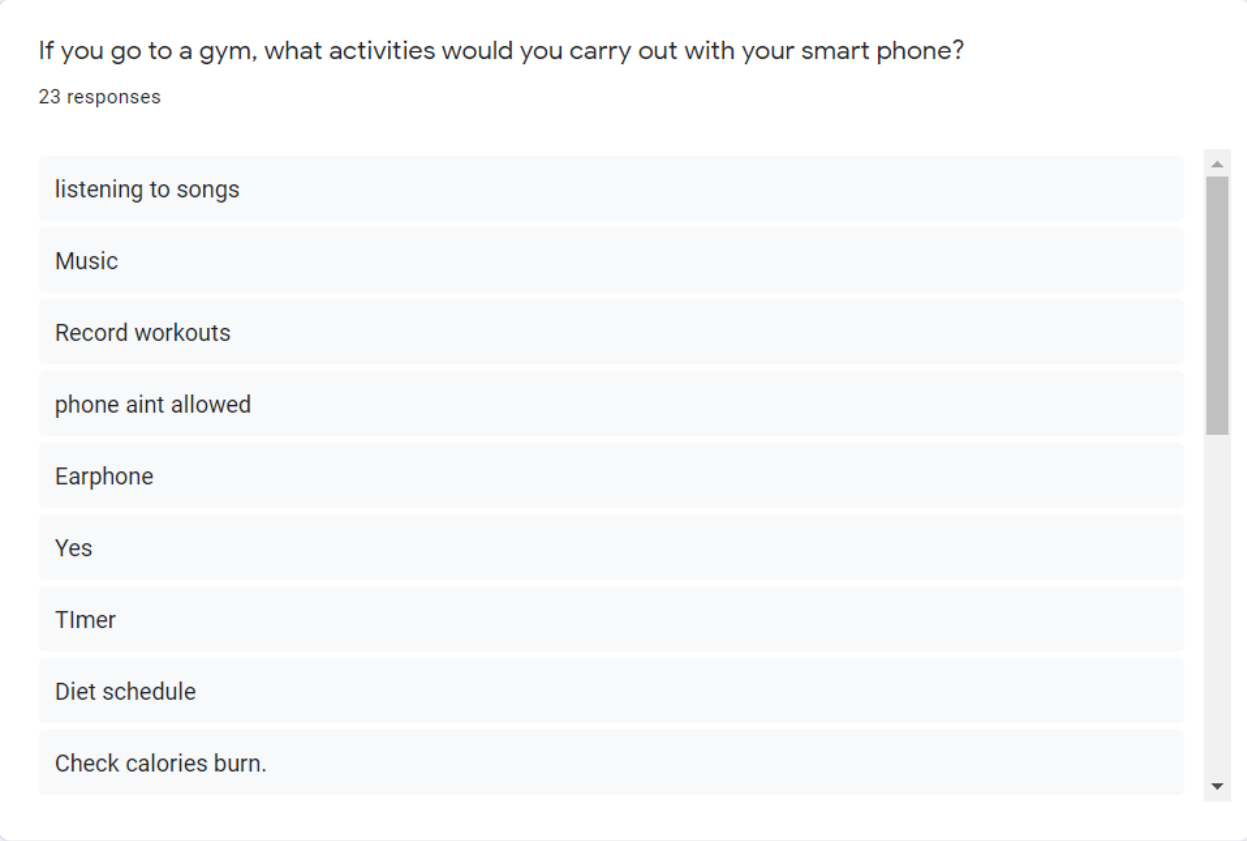

Figure 141: Other activity to carry out in the gym 2nd phase

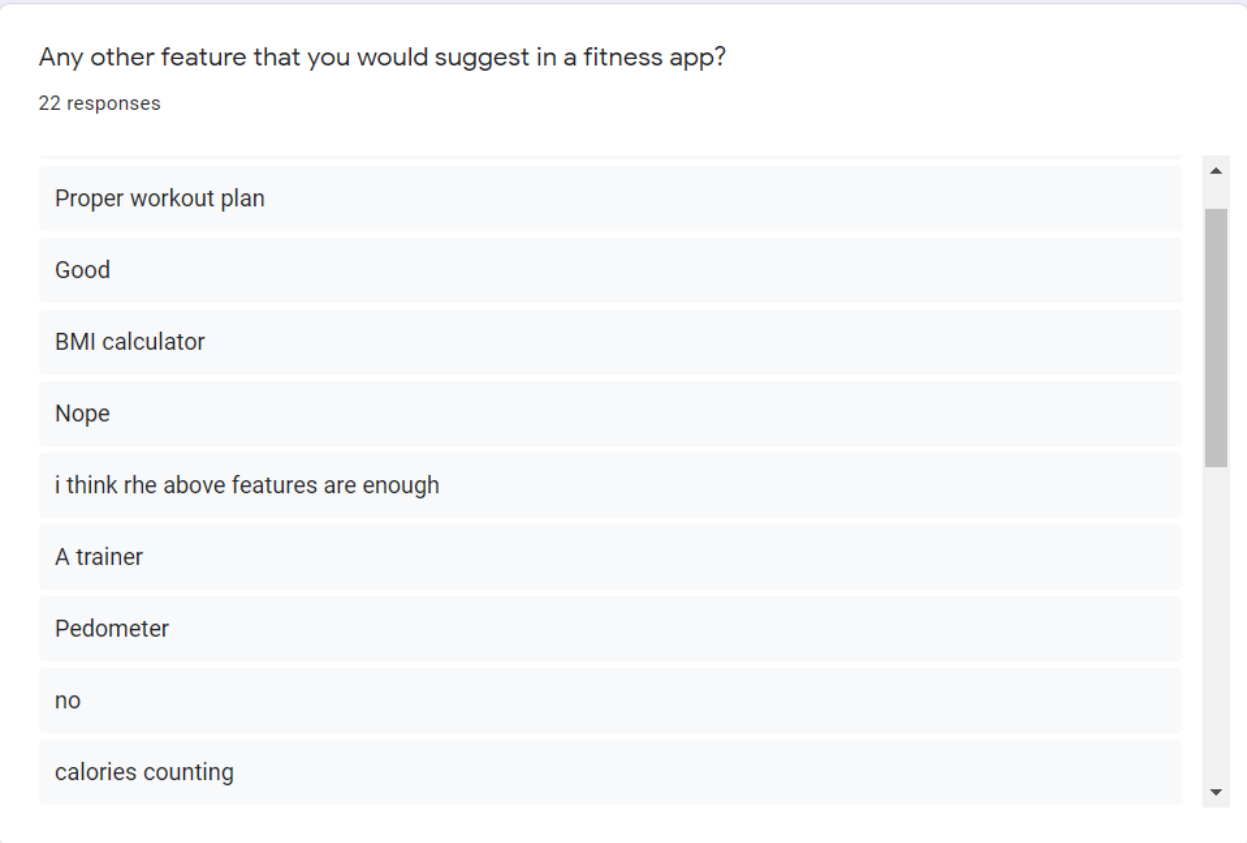

Figure 142: Extra Feature to add in the application 2nd phase

7.2.3. Post Survey Result

Talking from the data collected of 2st phase of survey.

According to the survey, about 70.7% of smartphone users used Android Powered Device and only 29.3% used IOS Powered Device. Therefore, my main target at the moment is Android devices. Most of the people know about health and fitness app. In the survey 88% of the people were familiar with such kind of apps and 54 % of the people think this app would be very fruitful to the users as they think this app will save time and money also.

Only 30% people went to gym and fitness centers regularly, 32% of people were not interested in fitness and 38% of the people were not regular. From this survey it was found that, the main reason people were not interested in fitness was not having proper diet, motivation for exercises, time management, time management and even 26% of the people were not even interested in working out. The major goals of the users are Lose Weight, Build Muscle, Tone, Build Stamina, Endurance, Making better nutrition choices. Etc. The survey also shows that the users think the pedometer feature which tracks steps while working out and BMI calculator which tracks the progress as good features.

Most of the people have not used any kinds of fitness application and by knowing the features and advantages of the mobile fitness app an encouraging data was recorded in which 92% of people were willing to be more active if the gym and fitness center would provide the basis services with a fitness application on their smartphone to use side by side.

7.3. Appendix C: Sample Codes

7.3.1. Sample Code of UI

1. Workout Plan

This is the sample of workout plan UI

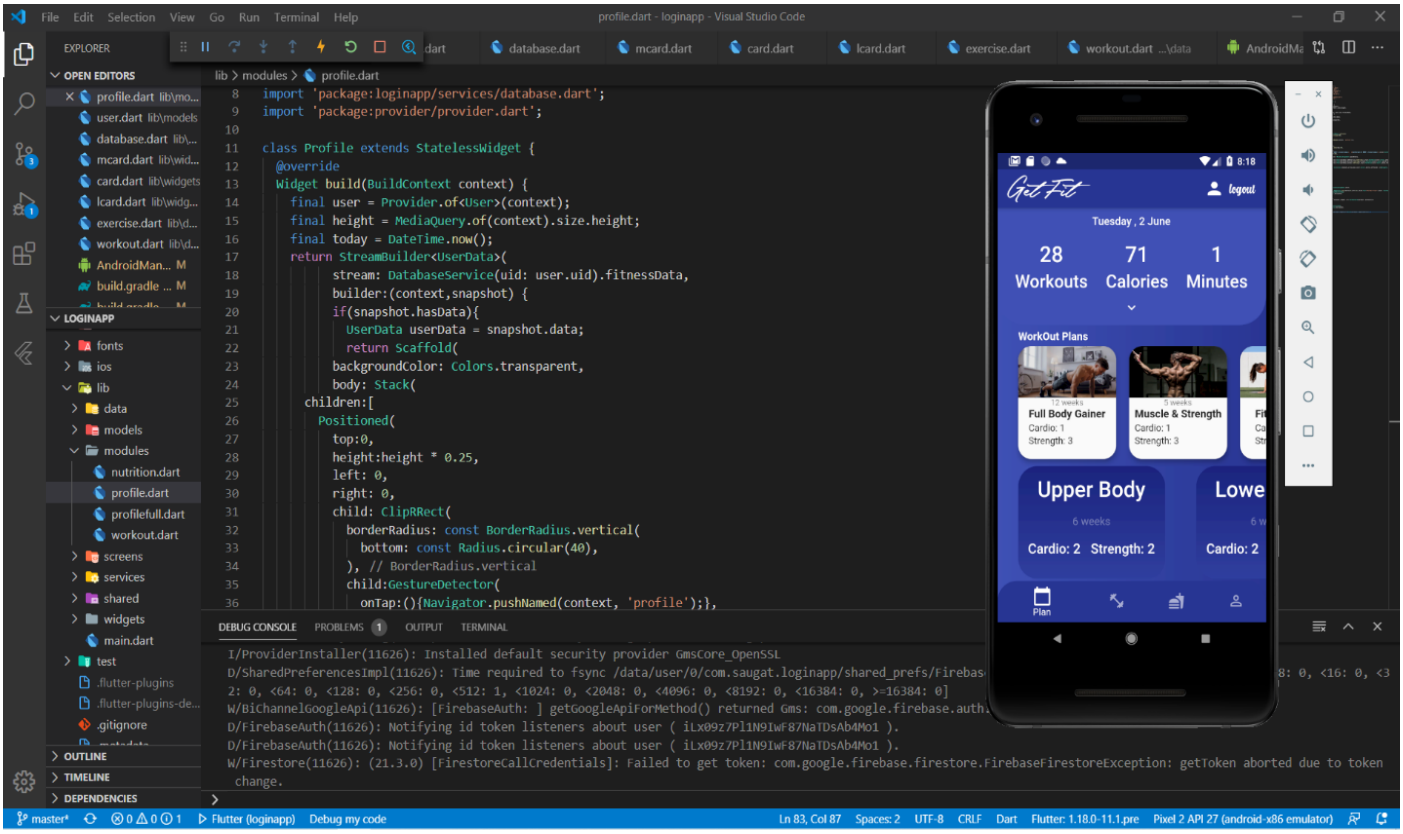

Figure 143: Sample Code of Workout plan UI

2. List of Exercises

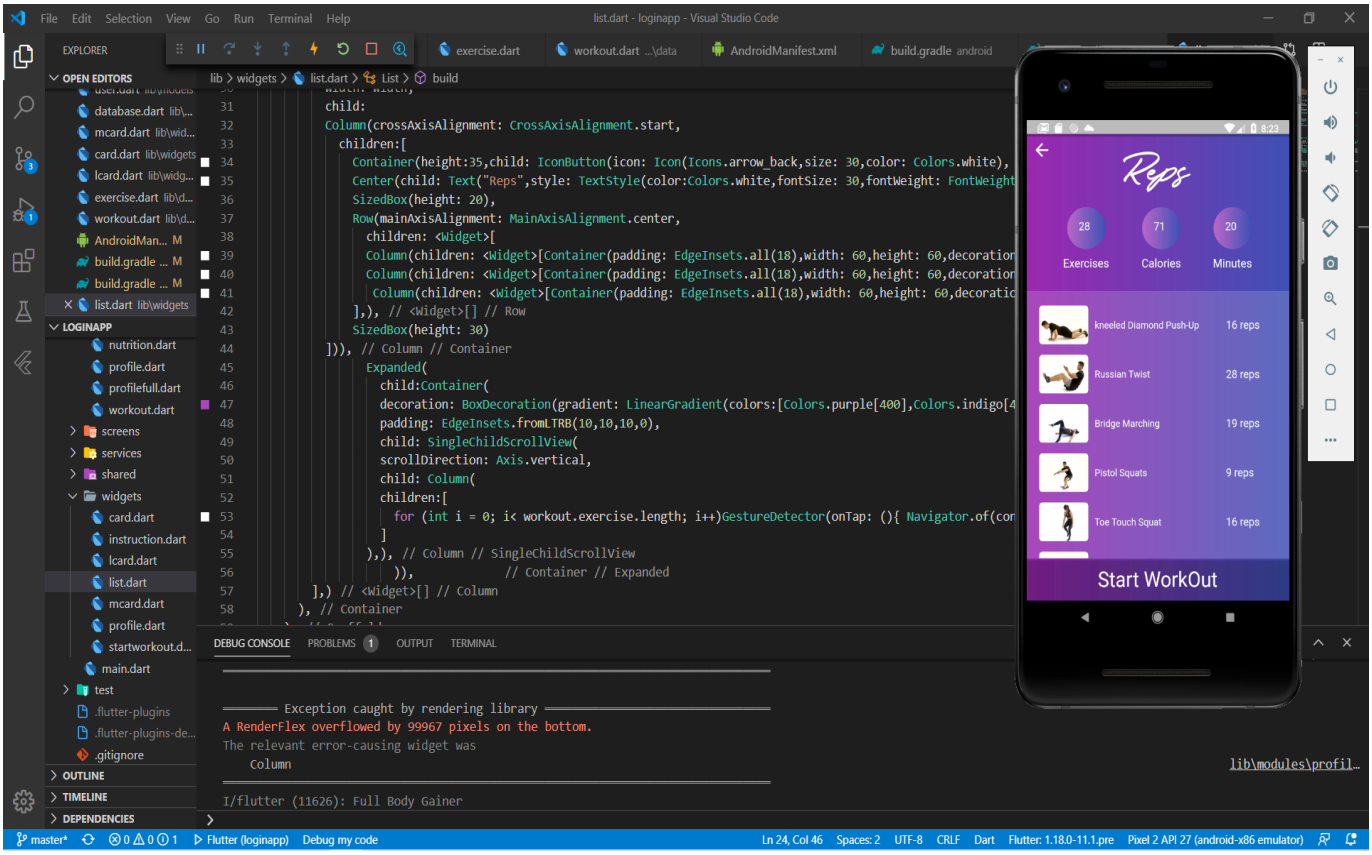

Figure 144: Sample code of list of exercises UI

3. Exercise Description

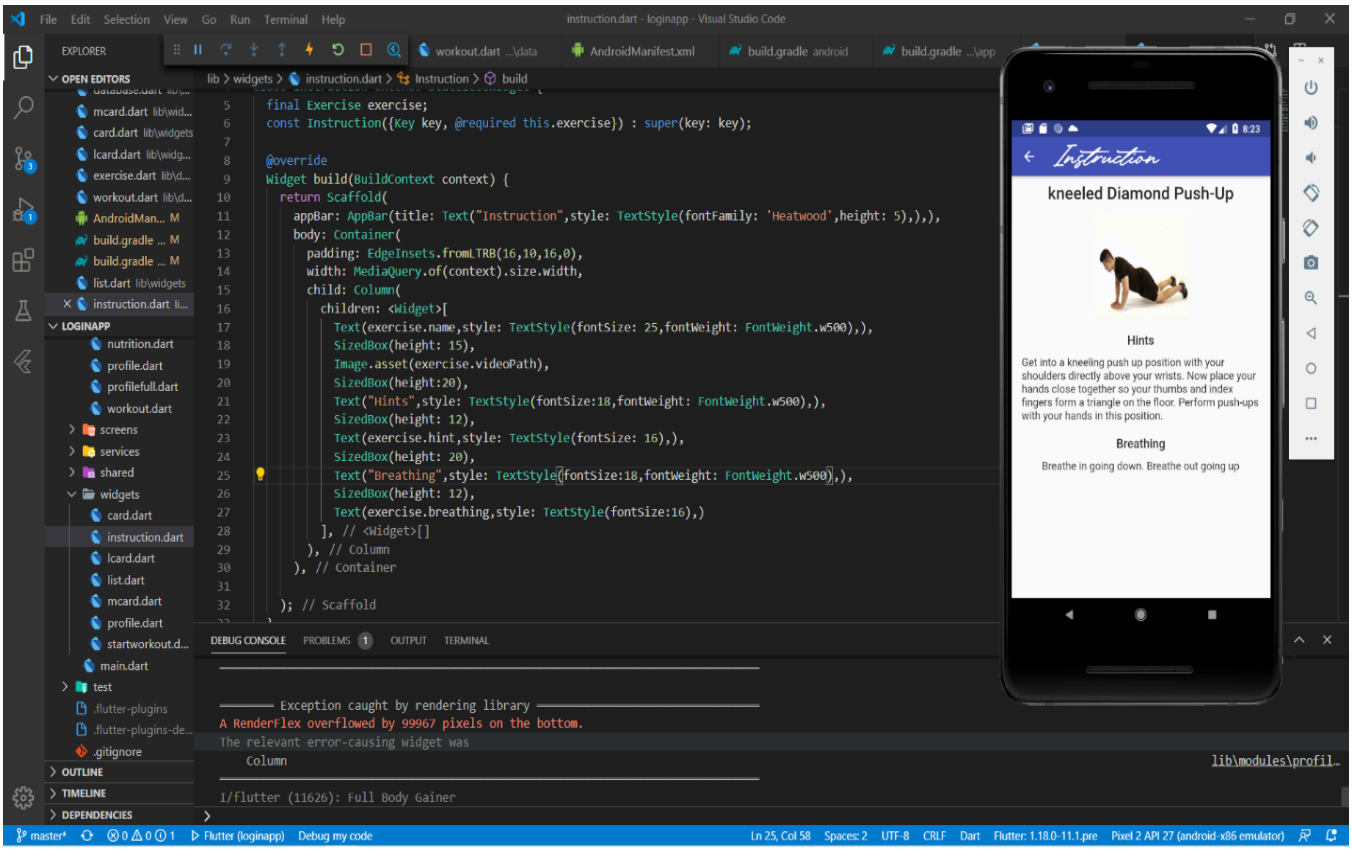

Figure 145: Sample Code for Exercise Description UI

4. Workout Session UI

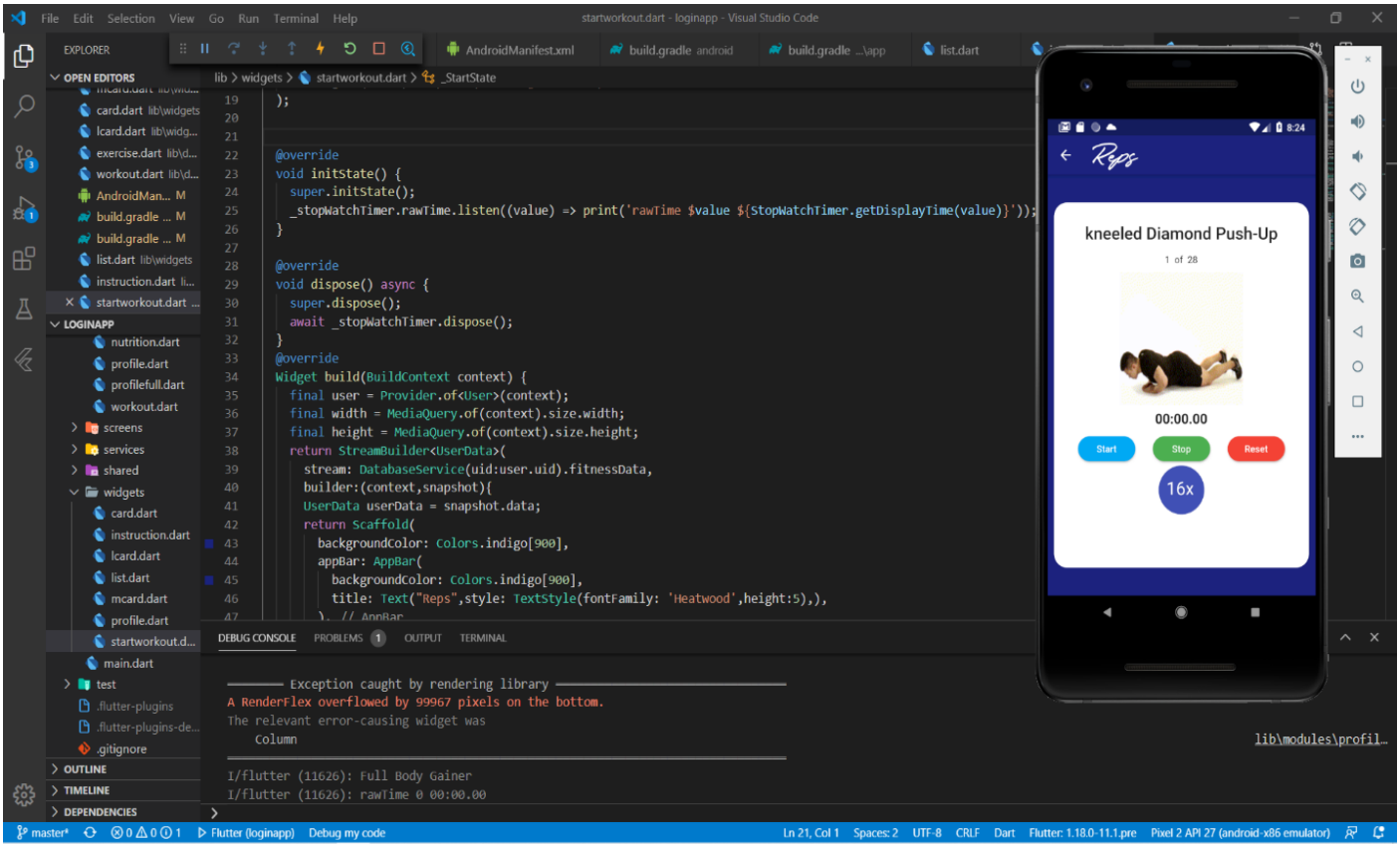

Figure 146: Sample code of workout session UI

5. Workout List

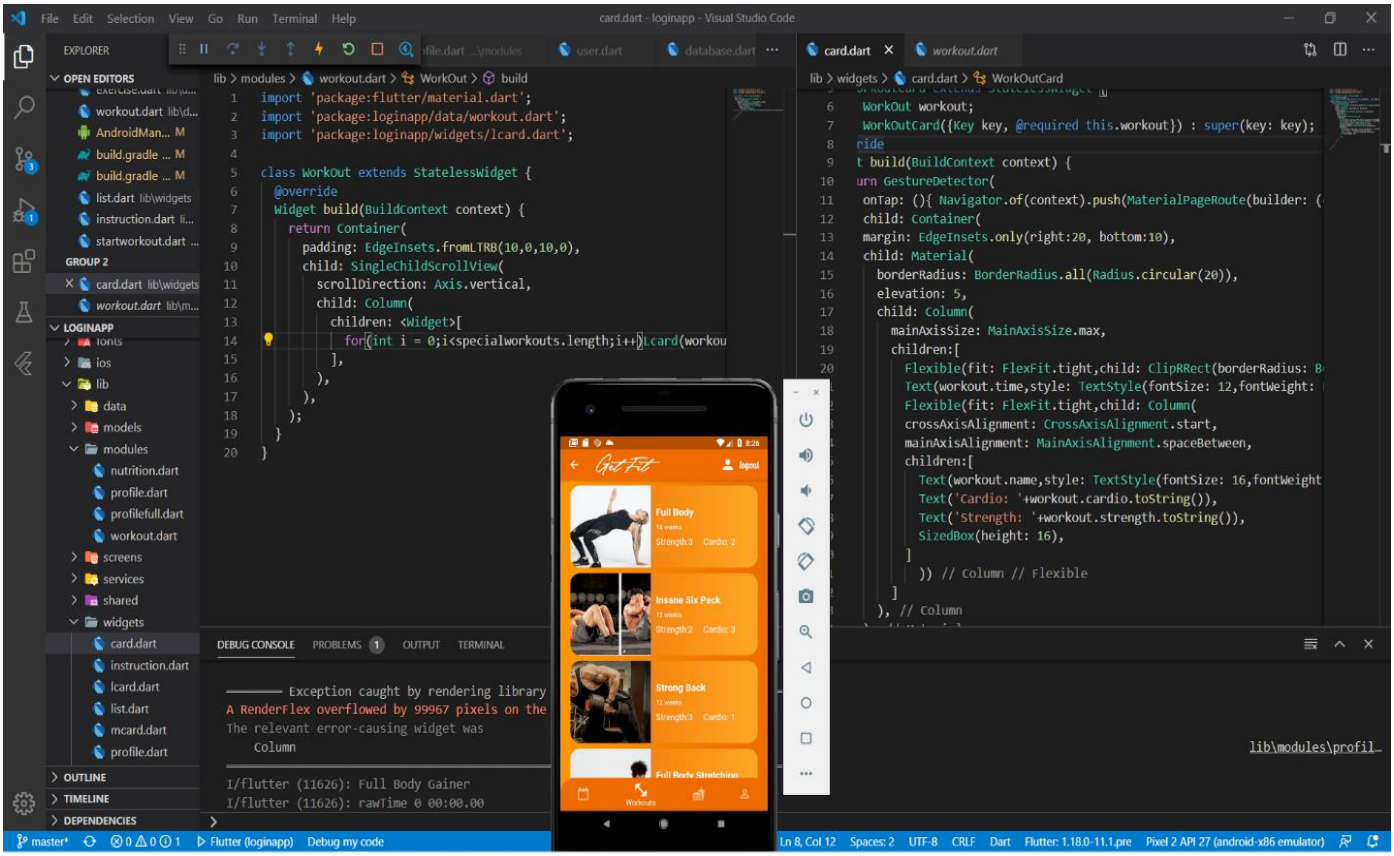

Figure 147: Sample code of Workout List UI

6. Diet Plan

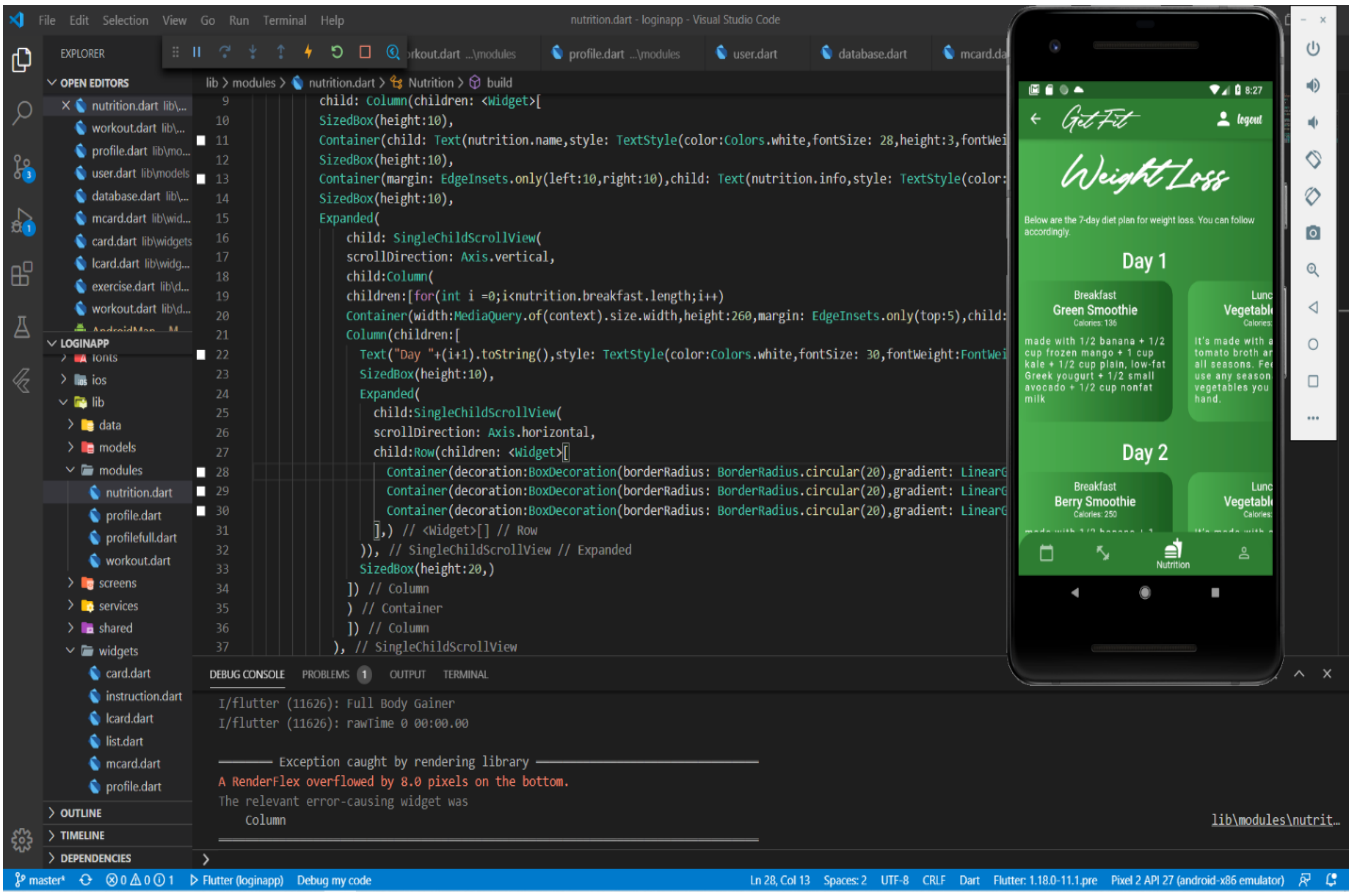

Figure 148: Sample code of Diet Plan UI

7. Profile

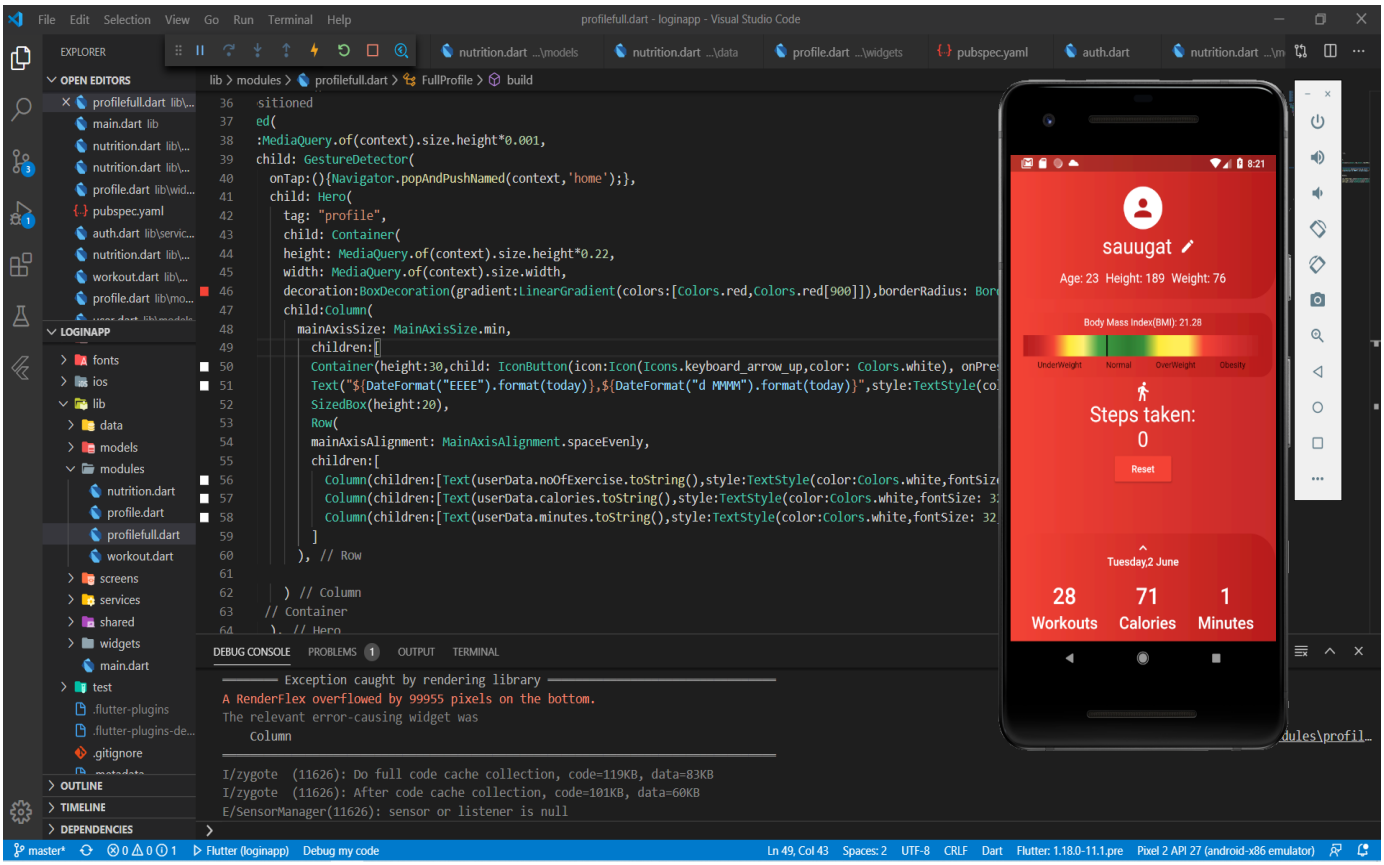

Figure 149: Sample code for UI of Profile

7.4. Appendix D: Designs

7.4.1. Gannt Chart

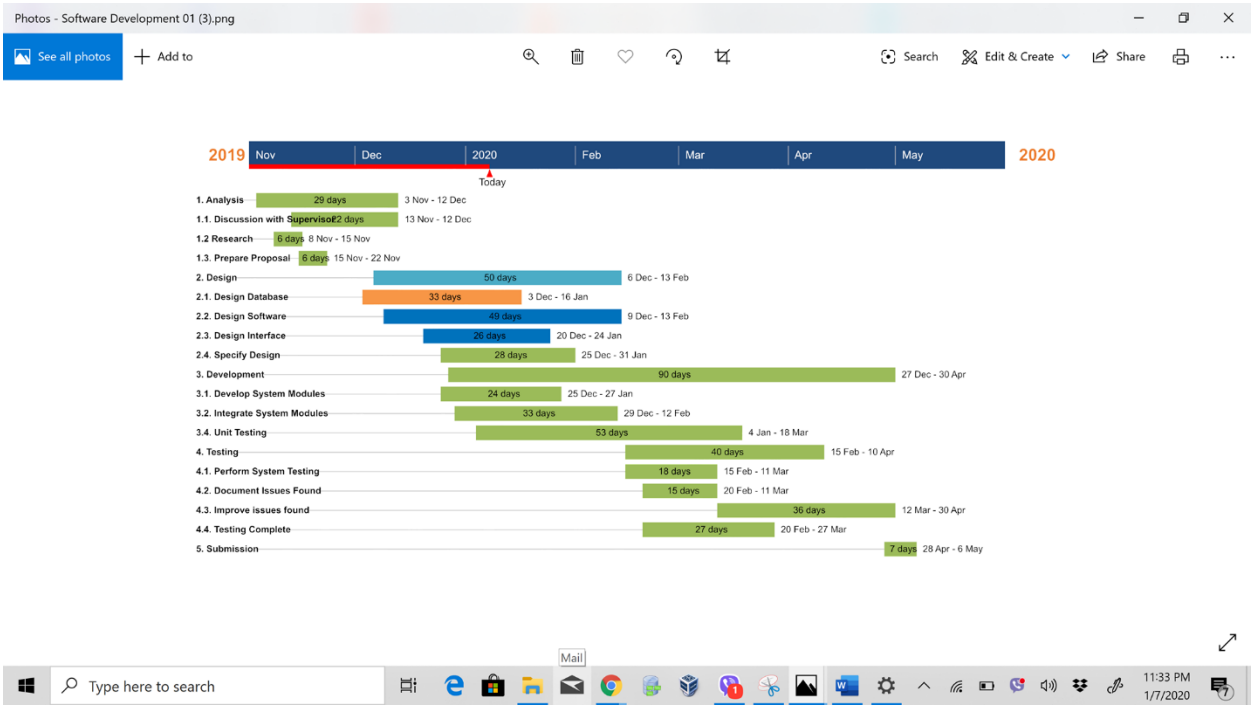

Figure 150: Gannt Chart

7.4.2. Work Break Down Structure

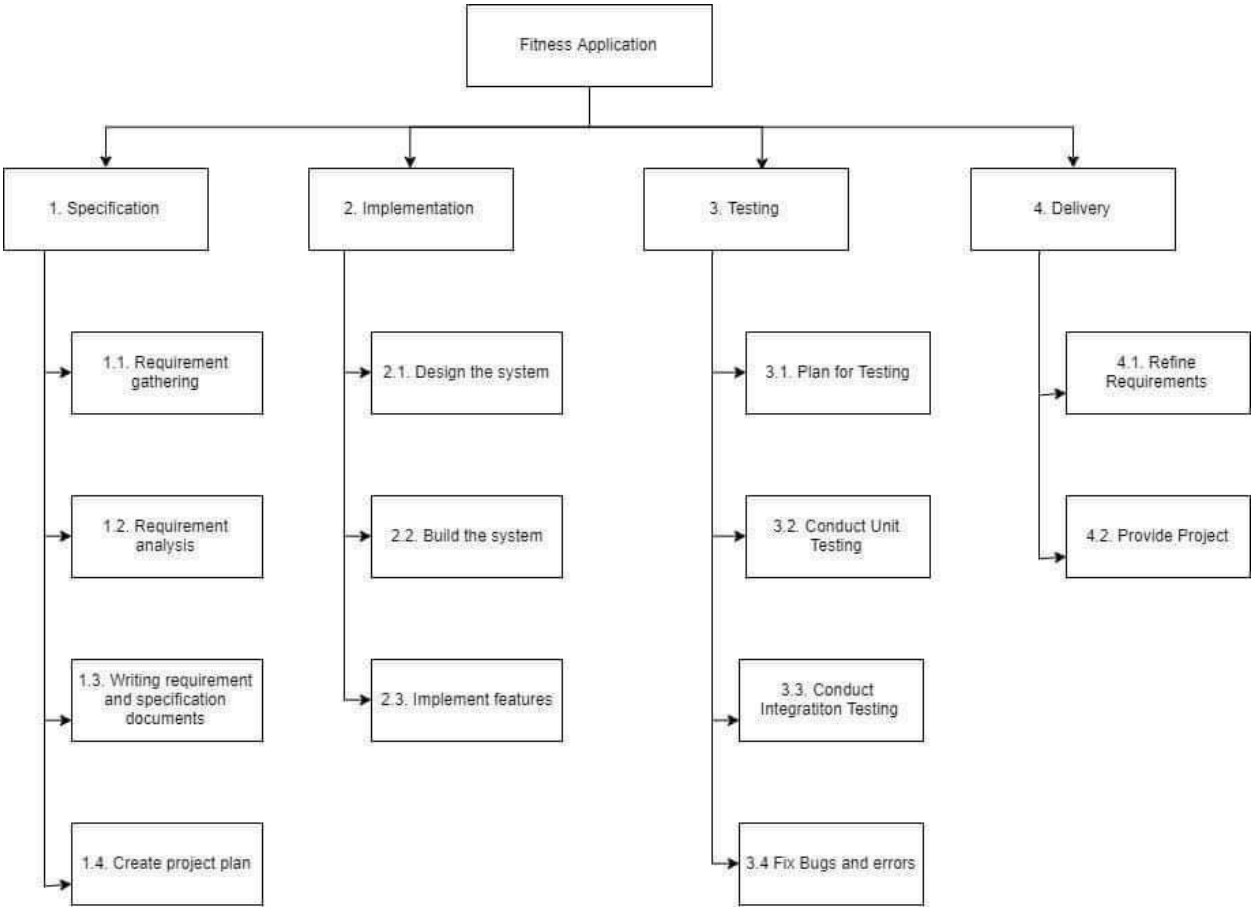

Figure 151: Work break Down Structure

7.4.3. USE CASE

A UML Use Case diagram is a primarily a graphical depiction of a system or a software requirement throughout its underdevelopment. The use case specifies specific behaviour and the interation among the elements of the system. Use case is also used for the system analysis to identify, clarify and organize system requirements.

The main goal of use case is to visually represent a design of the system from end user's perspective.

The use case diagram consisits of four components which are listed below:

- Boundary: Boundary defines the system of interest in relation to the world around it.
- Actors: The actors are the individuals which are involved with the system.
- Use Cases: The use cases are the exact roles playesd by actors within the system.
- Communication link: It shows the relationship between an actor and use case.

Usecase Diagram:

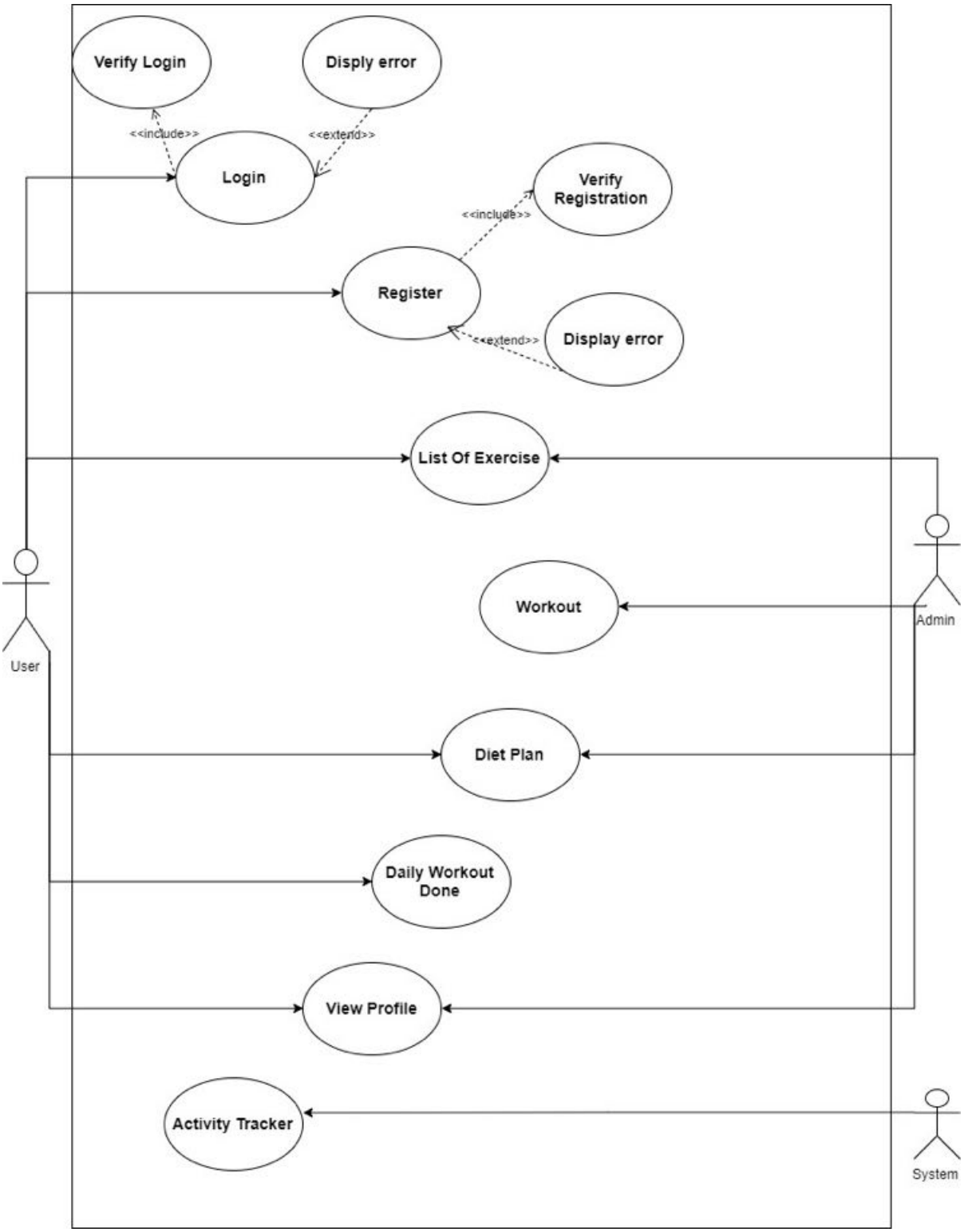

Figure 152: Use case Diagram

7.4.4. Wireframe

A wireframe is a black and white line drawing that's used in early-stage web design to provide stakeholders with a visual representation of a web page's layout and information architecture. Wireframes can be thought of as problem-solving tools; they help design team members prioritize the placement of content on a page and identify user experience (UX) problems early on. The framework, which was inspired by the use of wire mannequins in the fashion world, serves as a skeleton for the page's design. (Rouse, 2020)

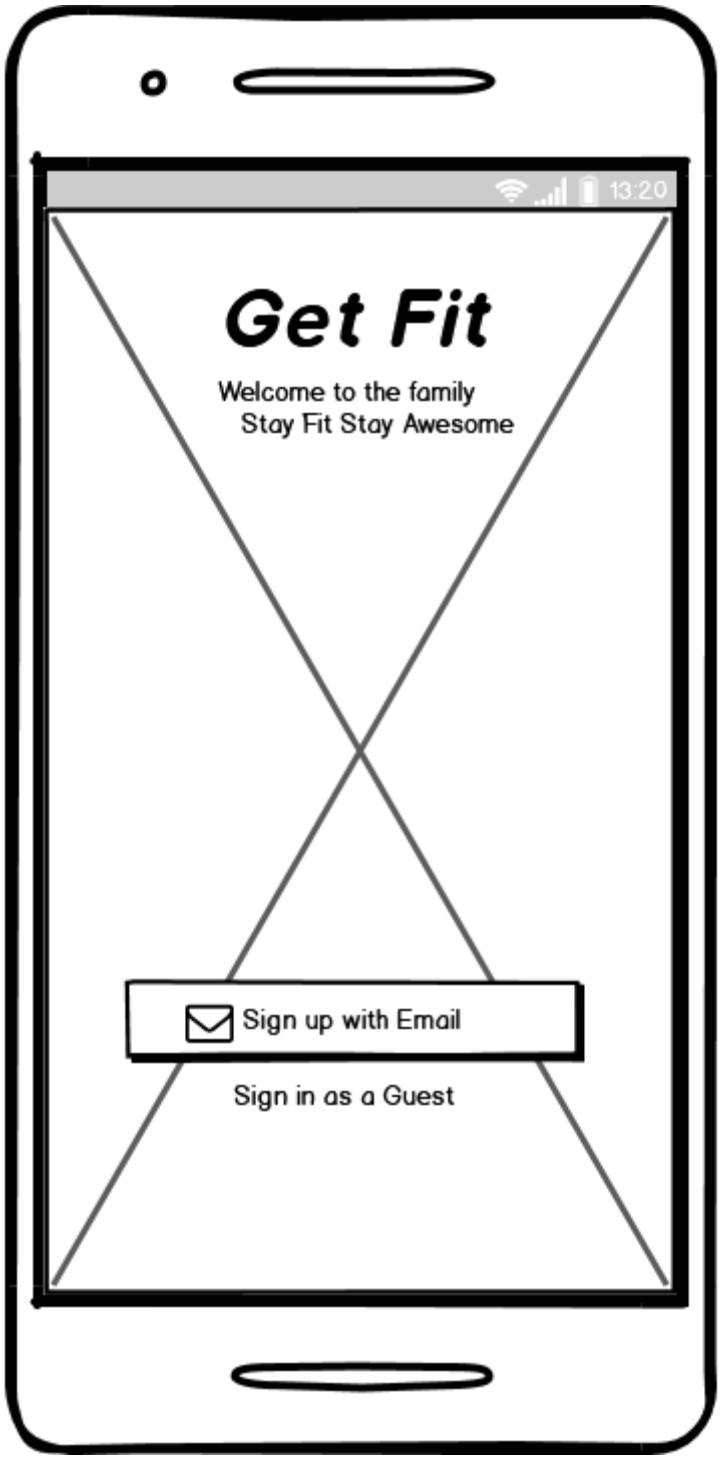

Figure 153: Main page

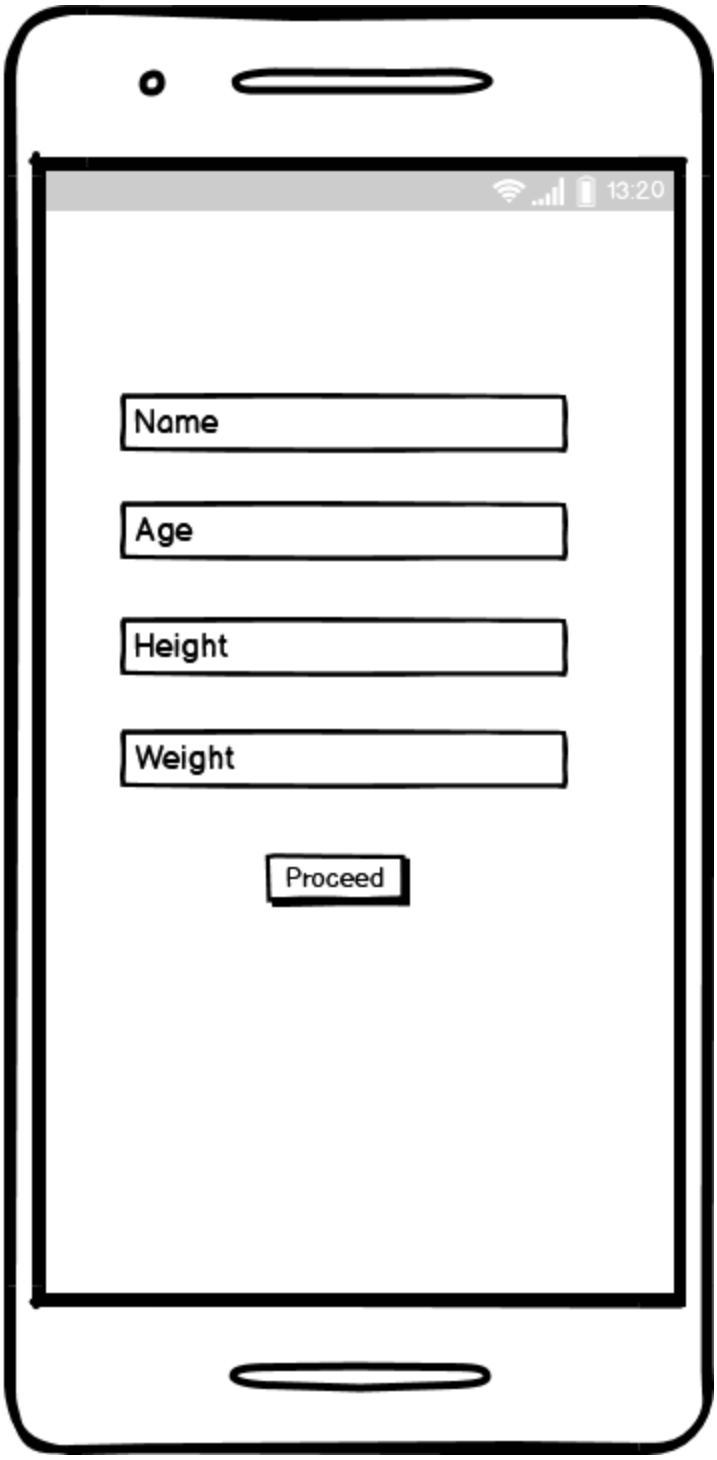

Figure 154: User Information

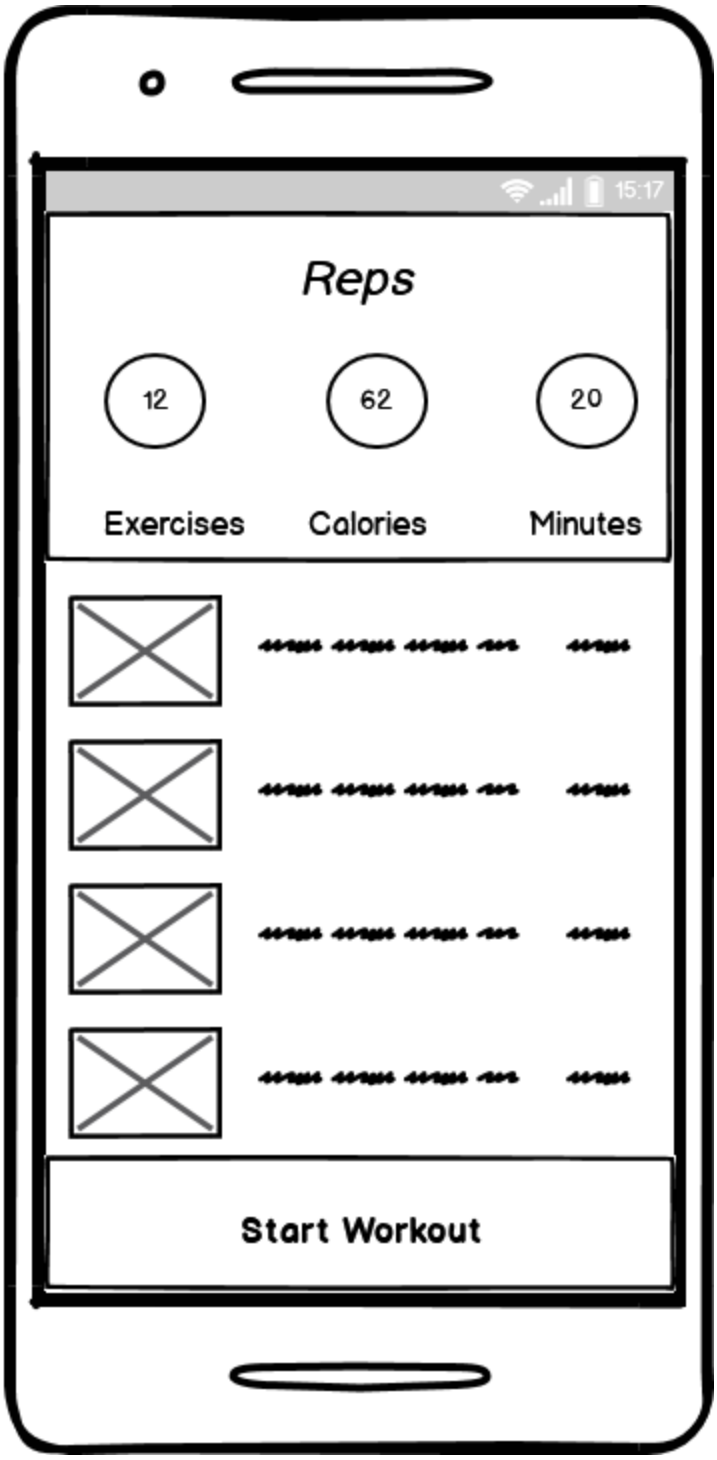

Figure 155: List of workouts

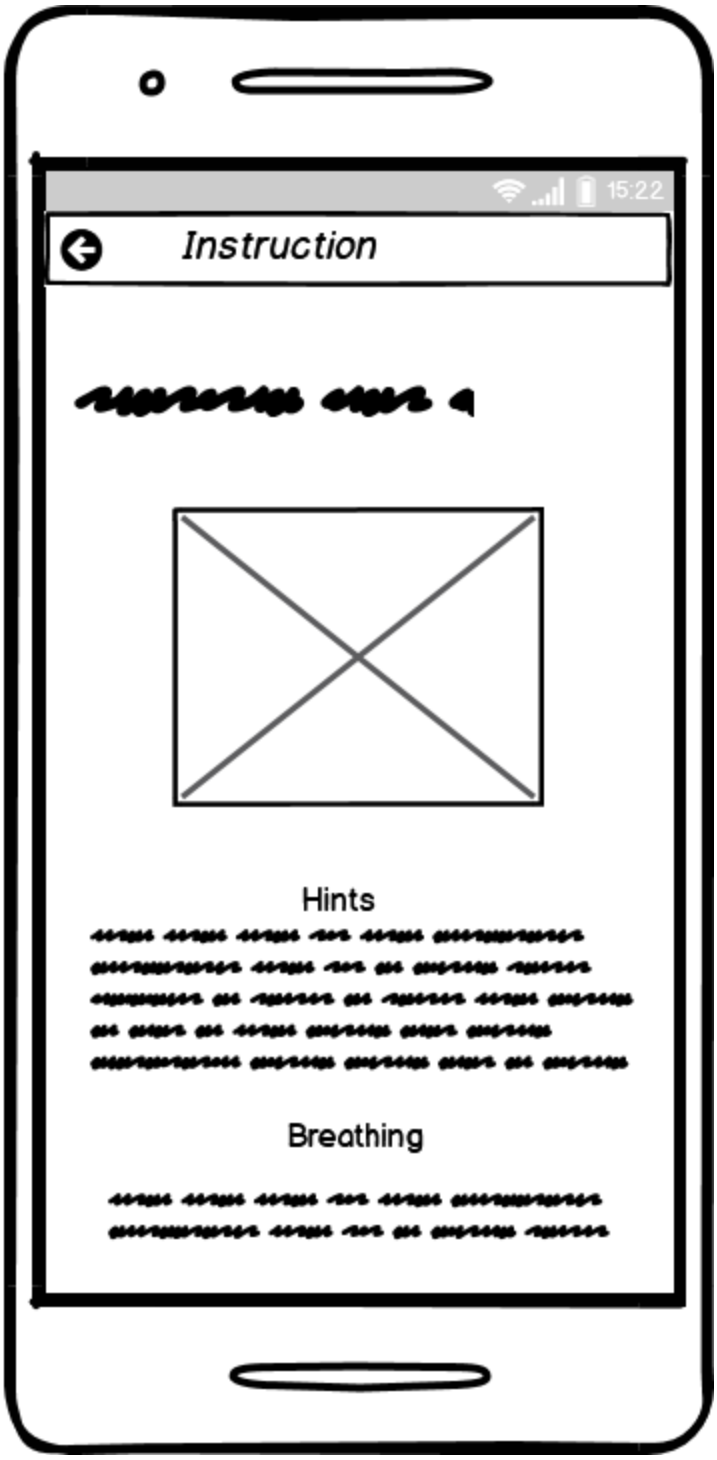

Figure 156: Description of exercise

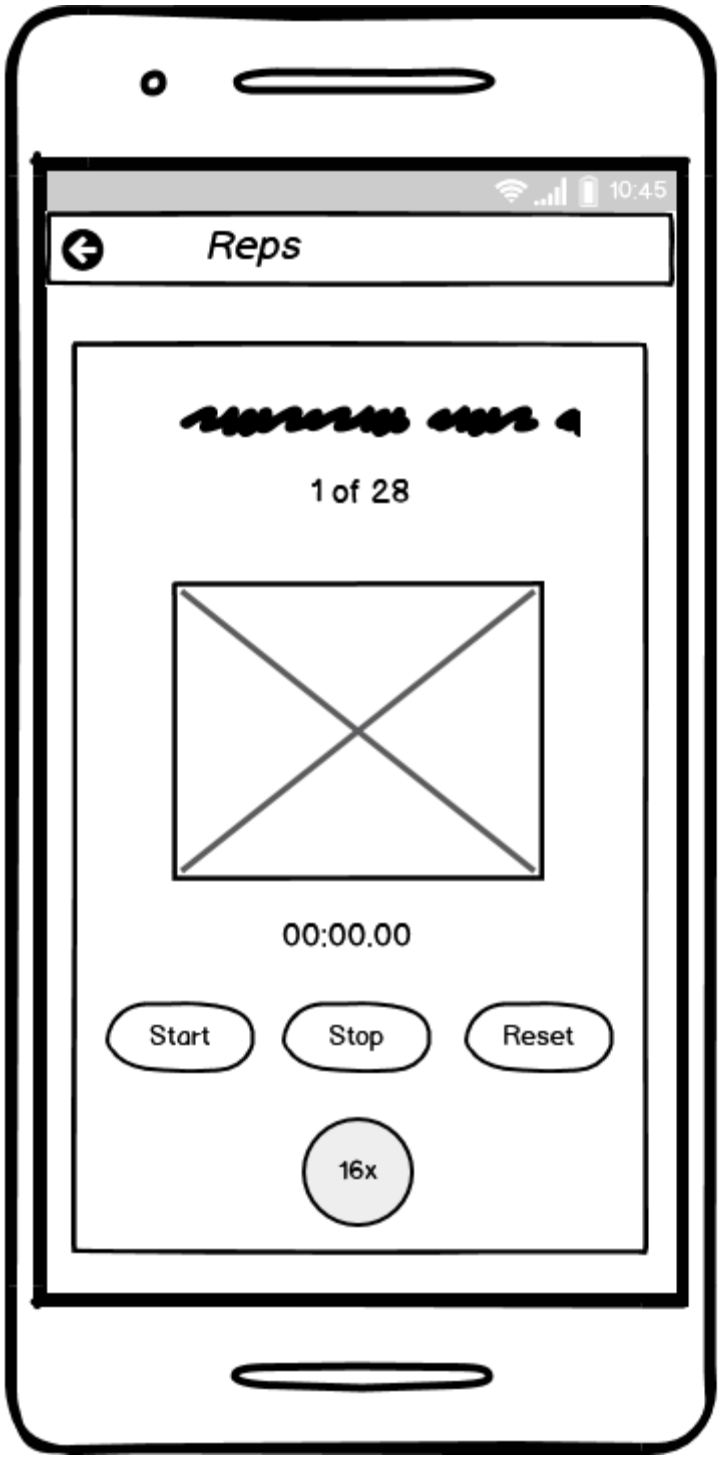

Figure 157: Start Workout page

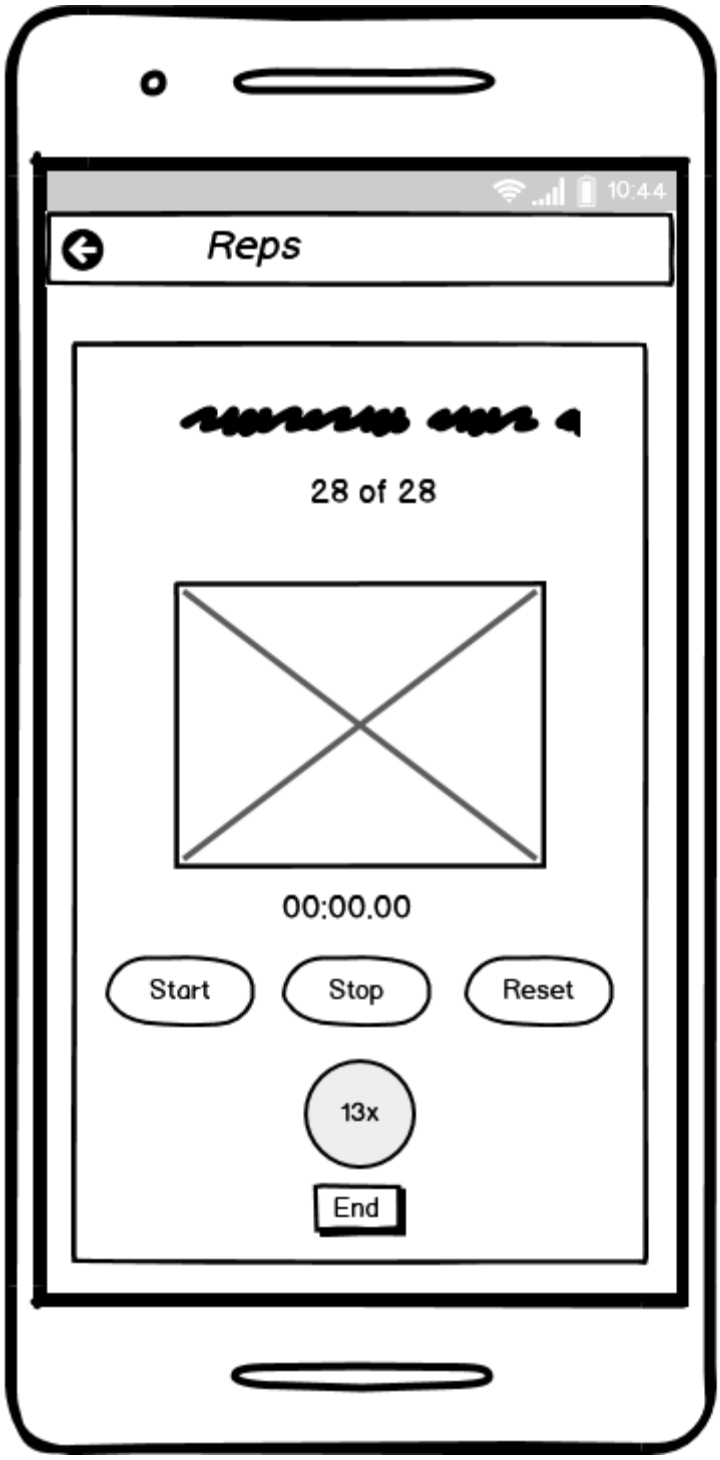

Figure 158: End Workout Page

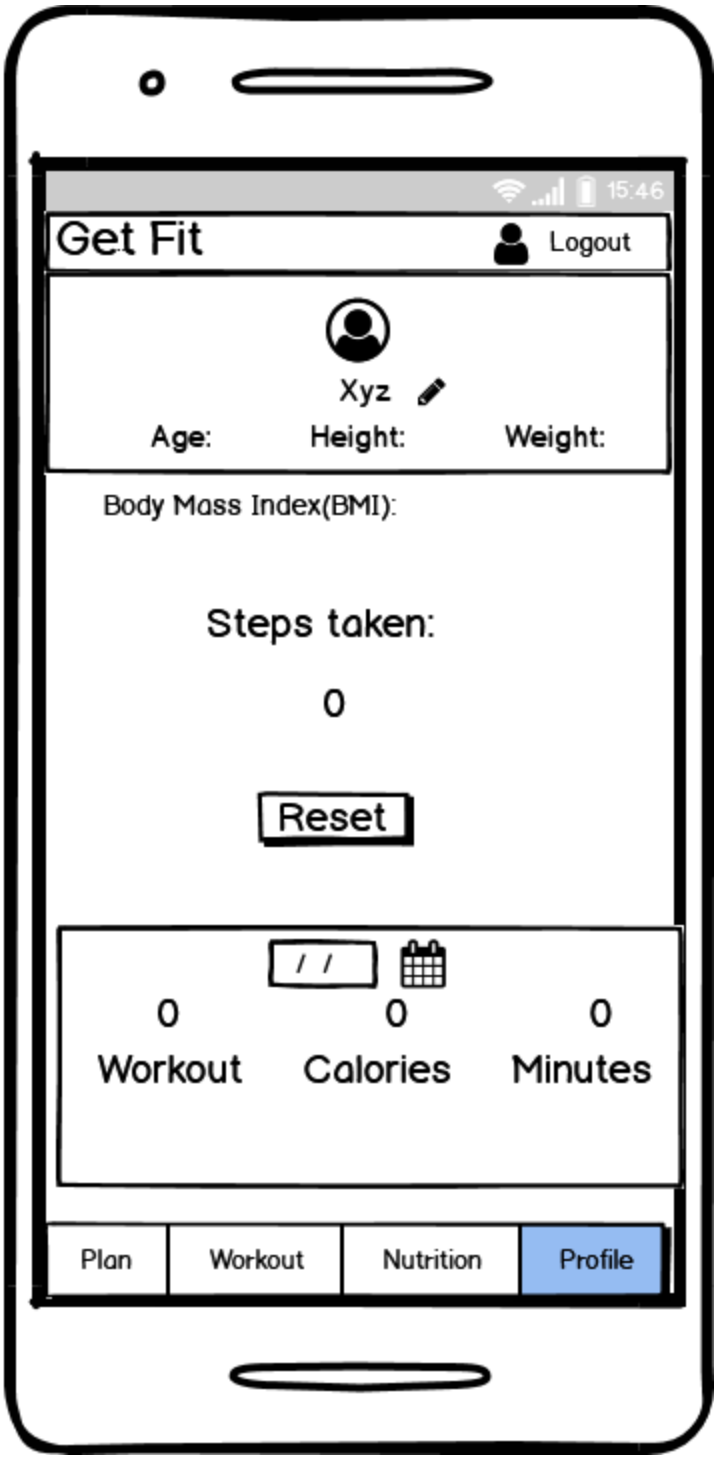

Figure 159: Profile page

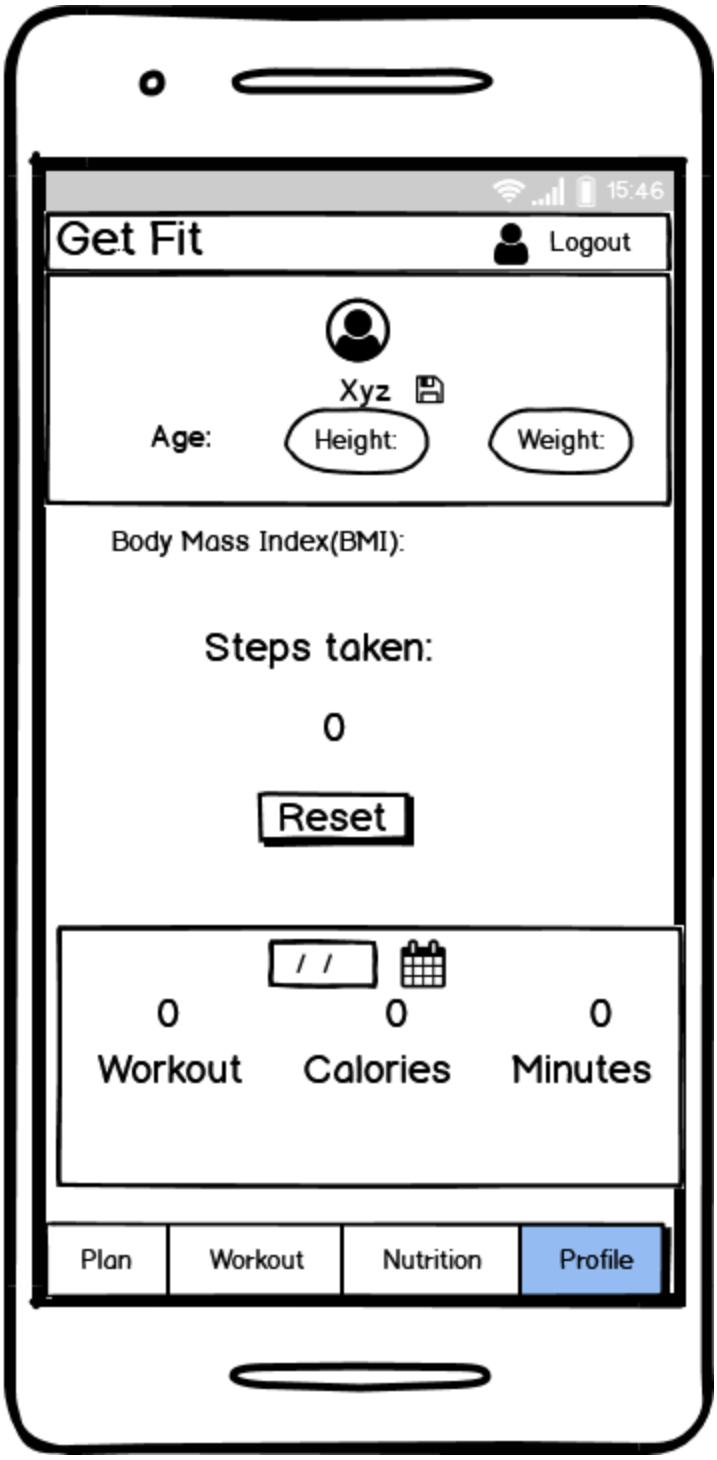

Figure 160: Updating Progress

7.5. Appendix E: Screenshots of the System

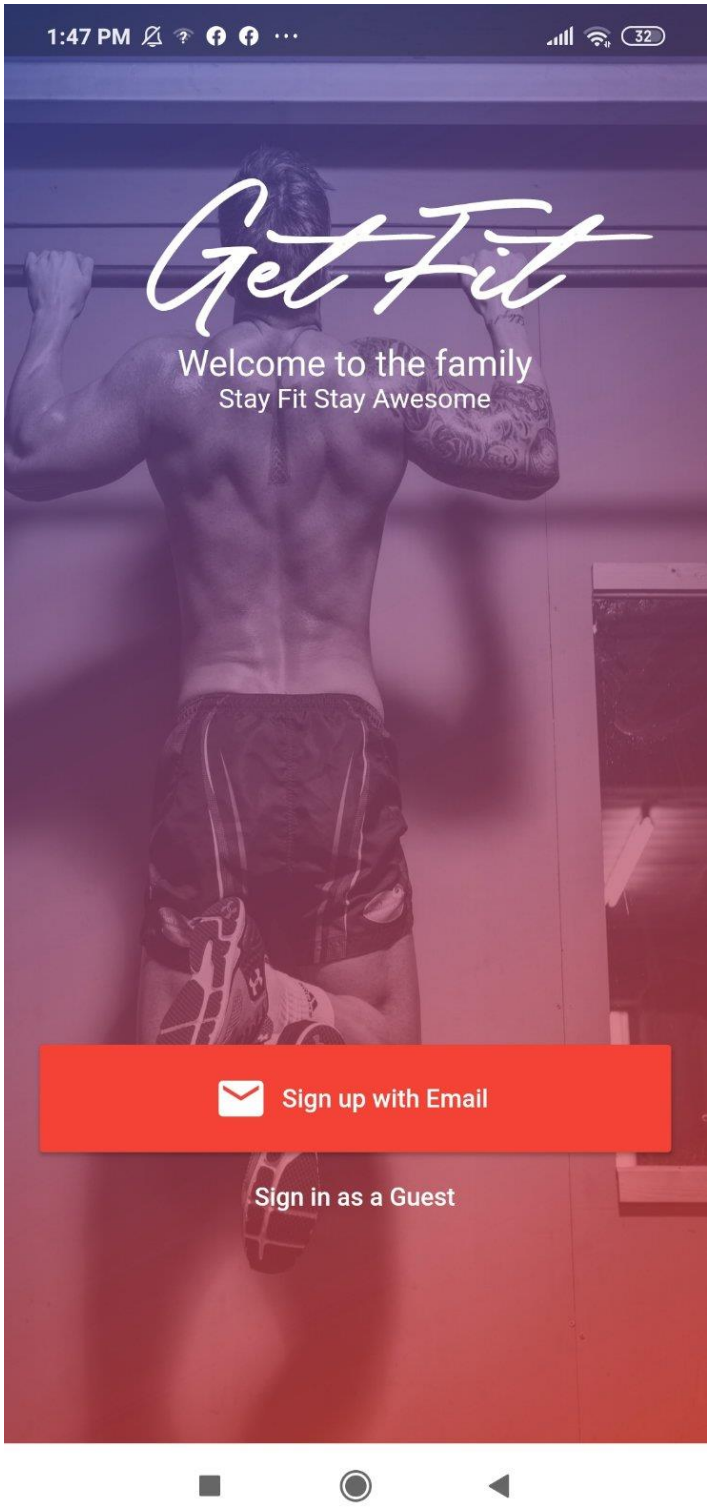

Figure 161: Main Page

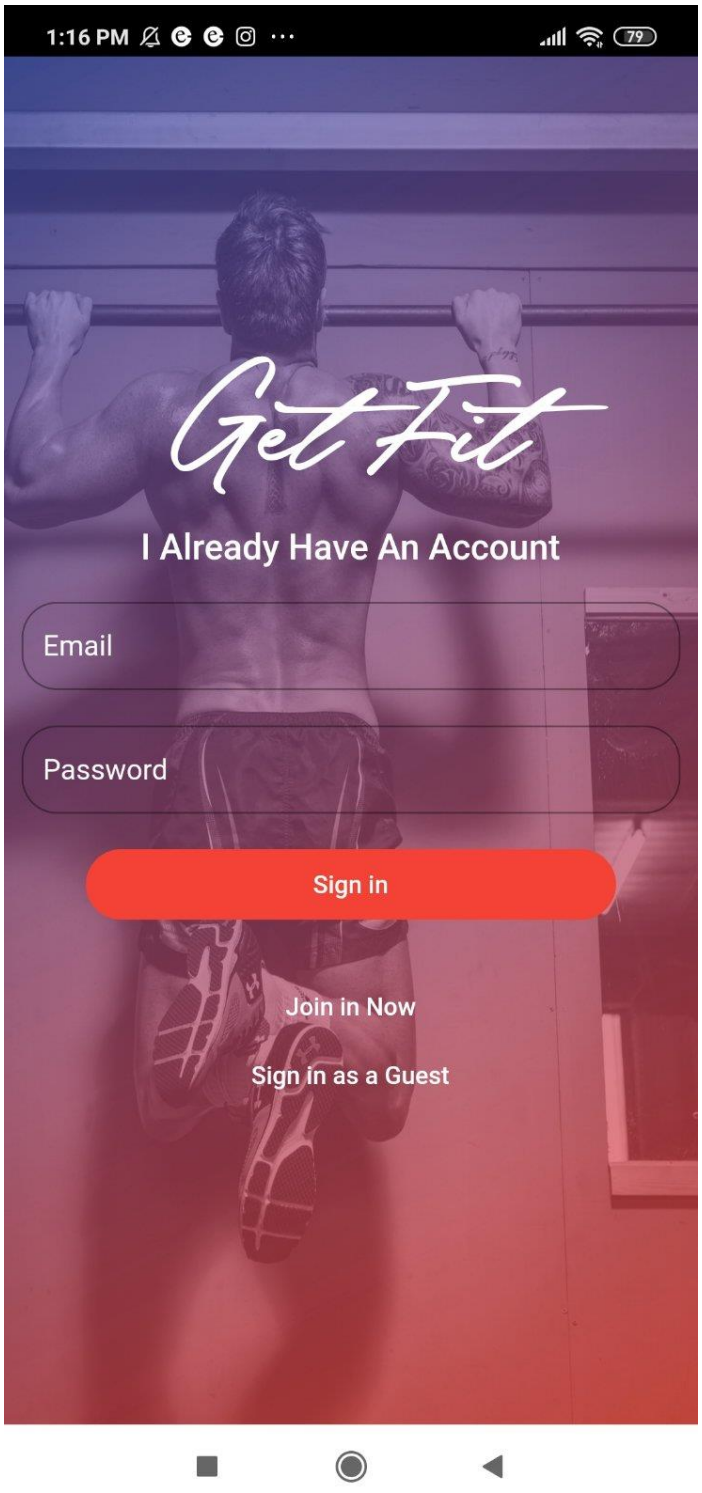

Figure 162: Login Page

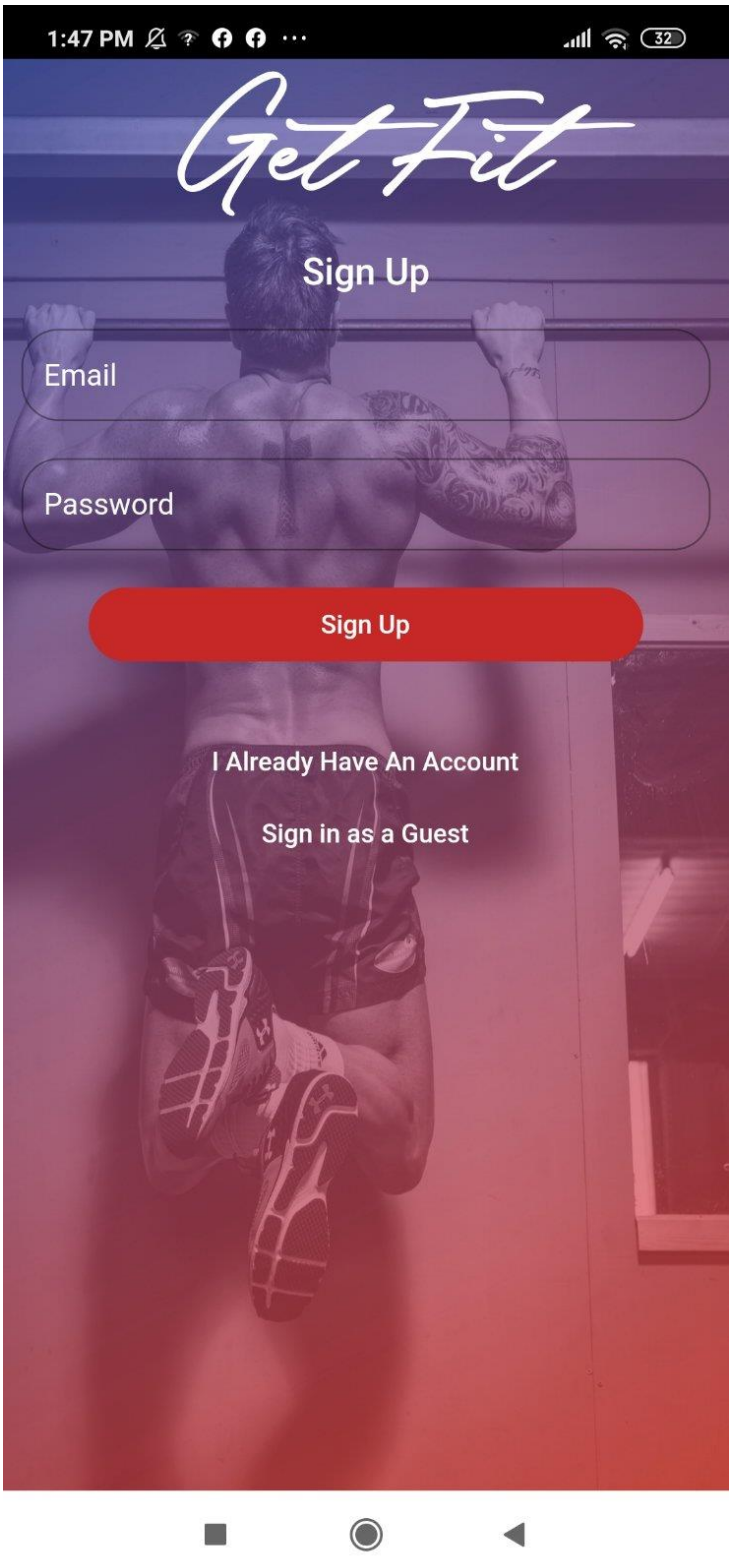

Figure 163: Sign up page

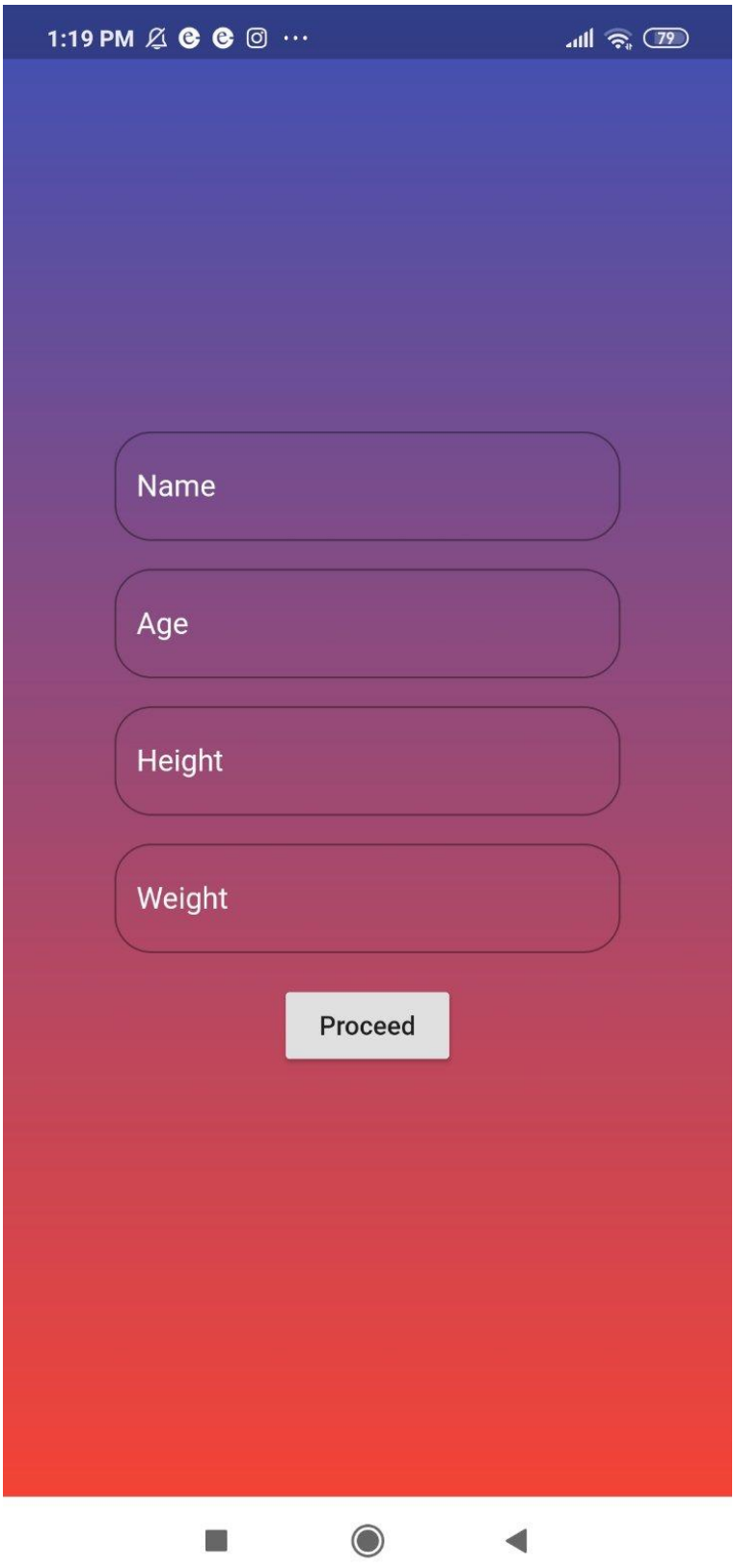

Figure 164: User Information Page

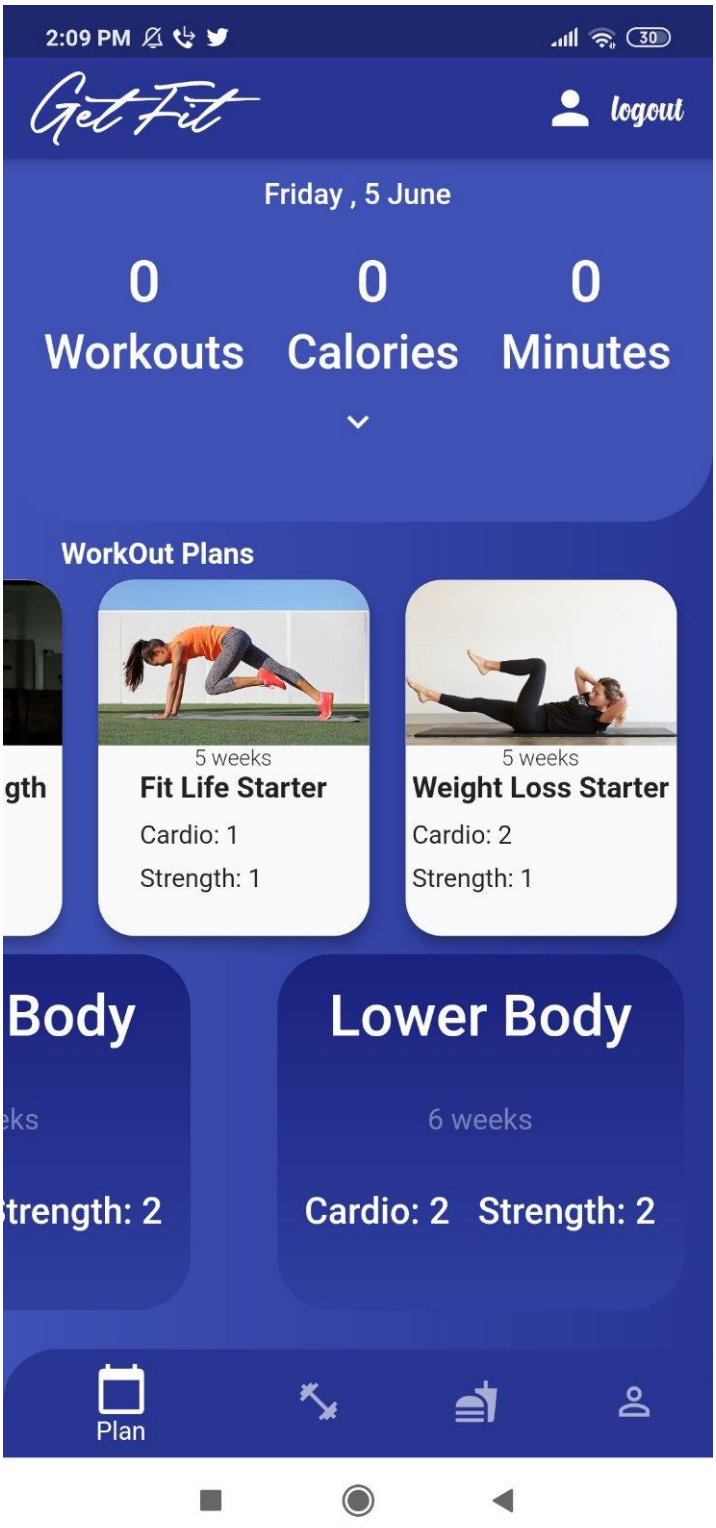

Figure 165: Workout Plan page

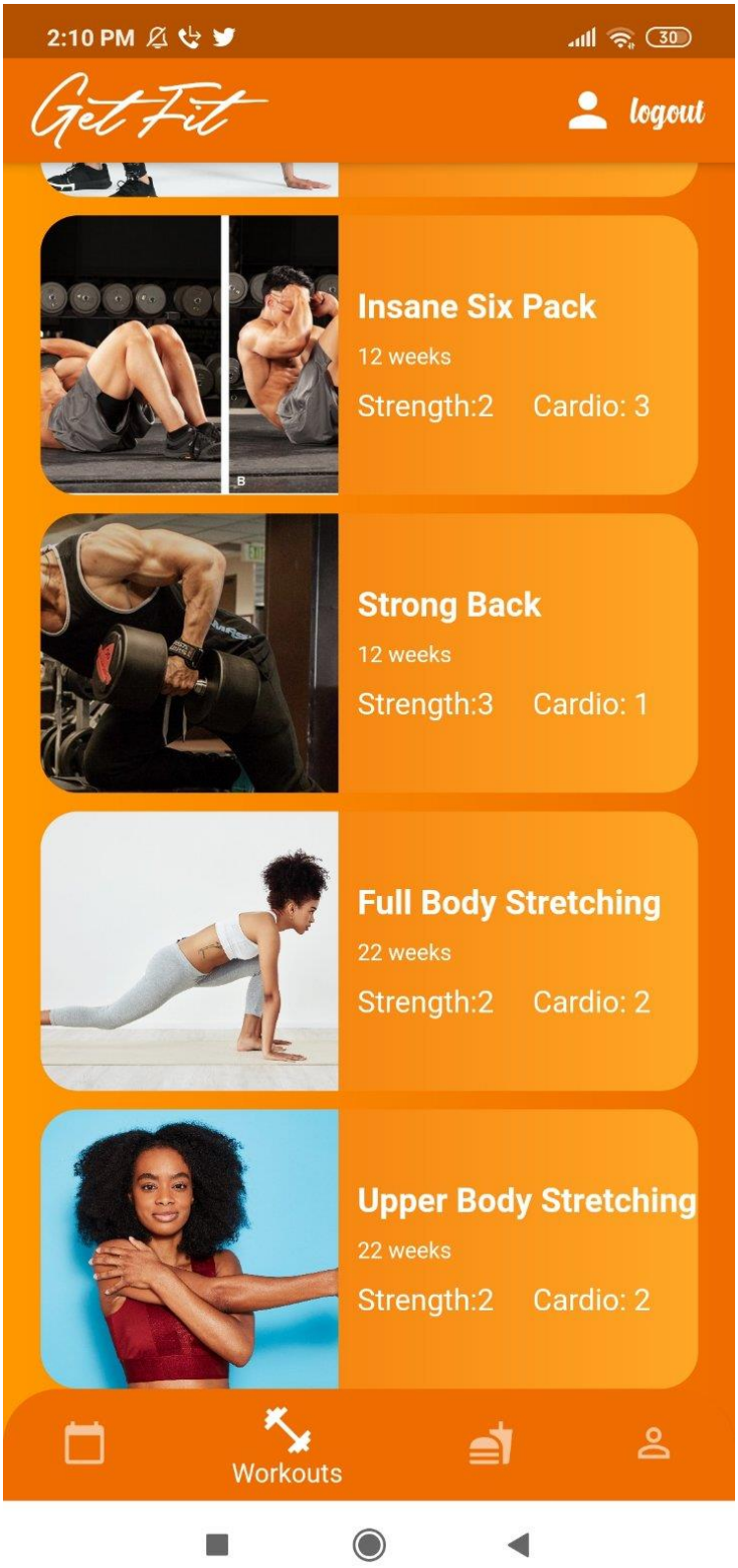

Figure 166: List of Workout routine


2:10 PM
Get Fit
logout
Weight Loss
Below are the 7-day diet plan for weight loss. You can follow accordingly.
have on
+ 1 cup roasted Brussels sprouts + 1 tablespoon olive oil
Day 3
Dinner
Mahi mahi with vegetables
Calories: 140
4 oz mahi-mahi + 1 cup steamed carrots + 1 cup steamed broccoli + 2 tablespoons teriyaki sauce + 1 teaspoon sesame seeds
Day 4
Dinner
Grilled Chicken with Sweet Potatoes
Calories: 170
4 oz grilled chicken + 1/2
Nutrition

Figure 167: Diet Plan page

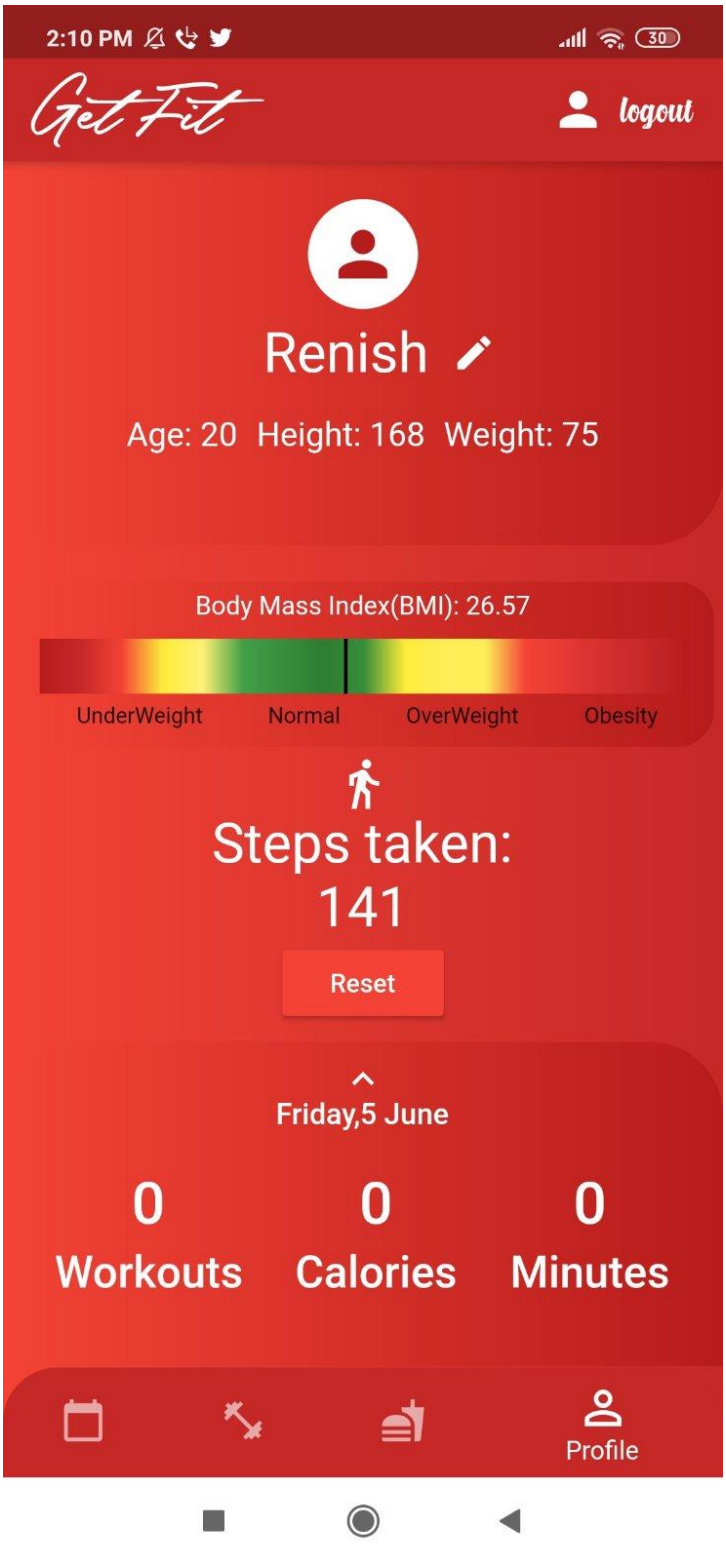

Figure 168: Profile page

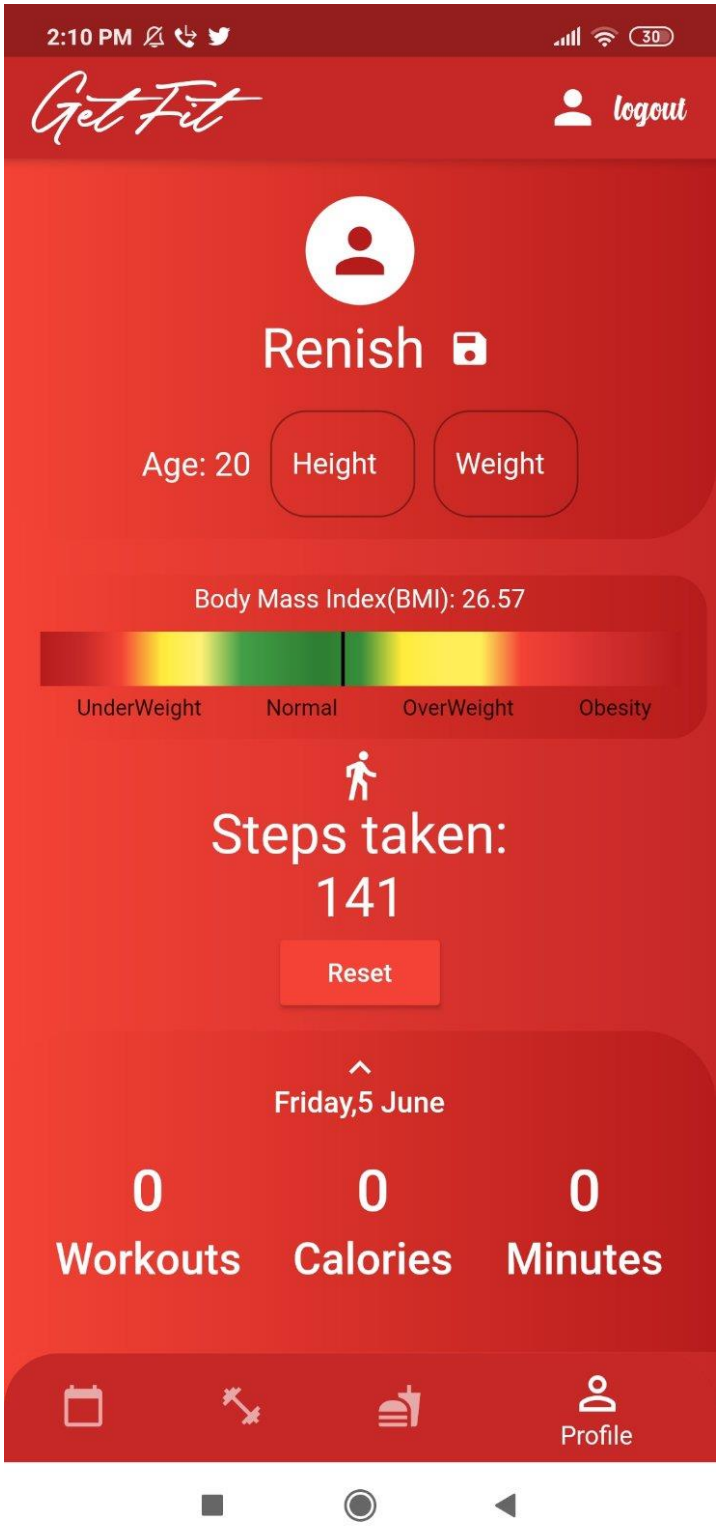

Figure 169: Update Height and weights

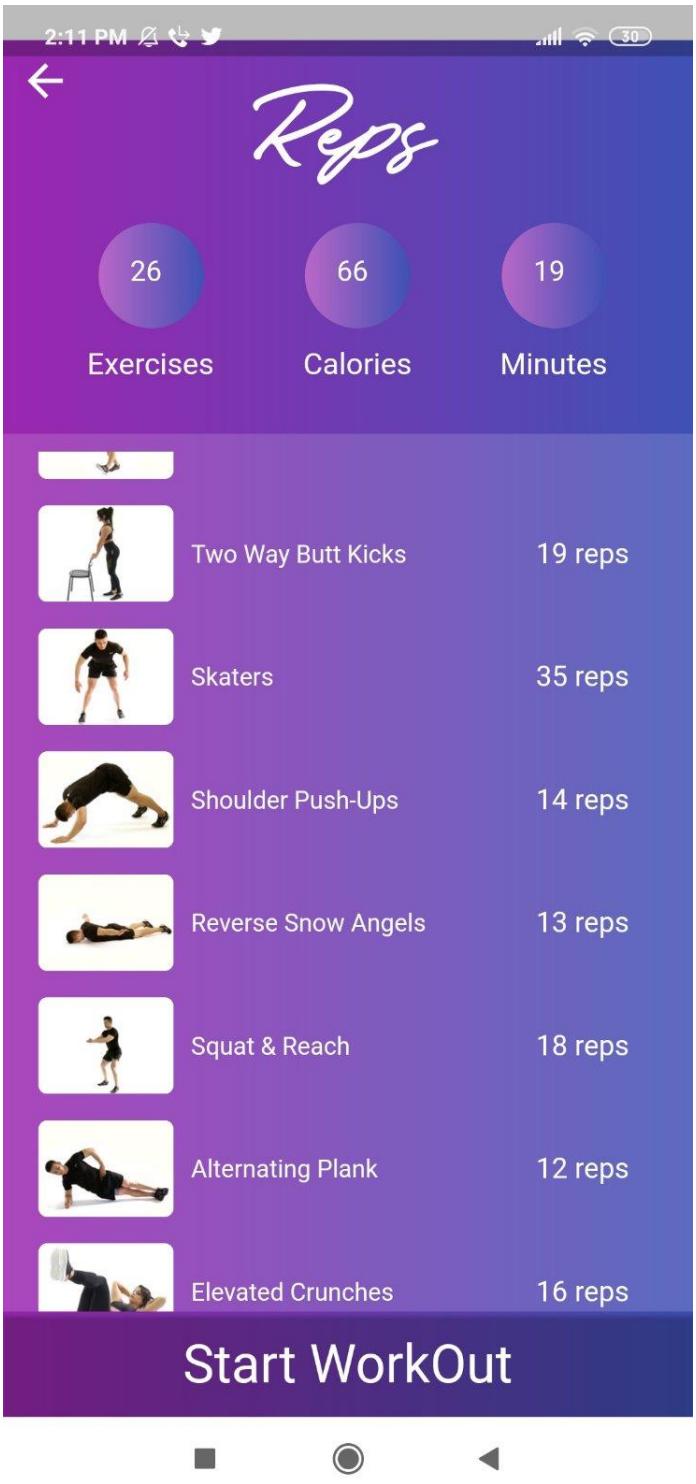

Figure 170: List of exercises

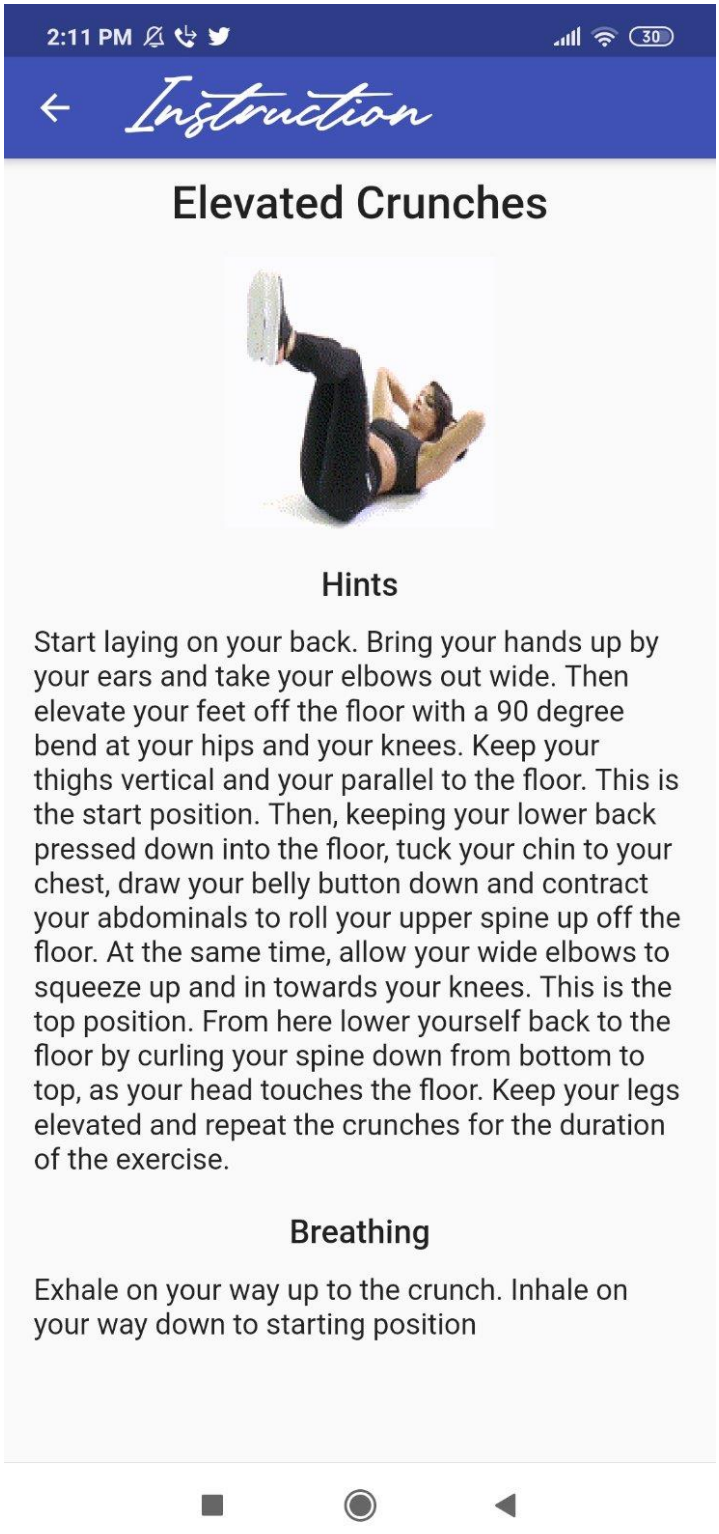

Figure 171: Description of exercise

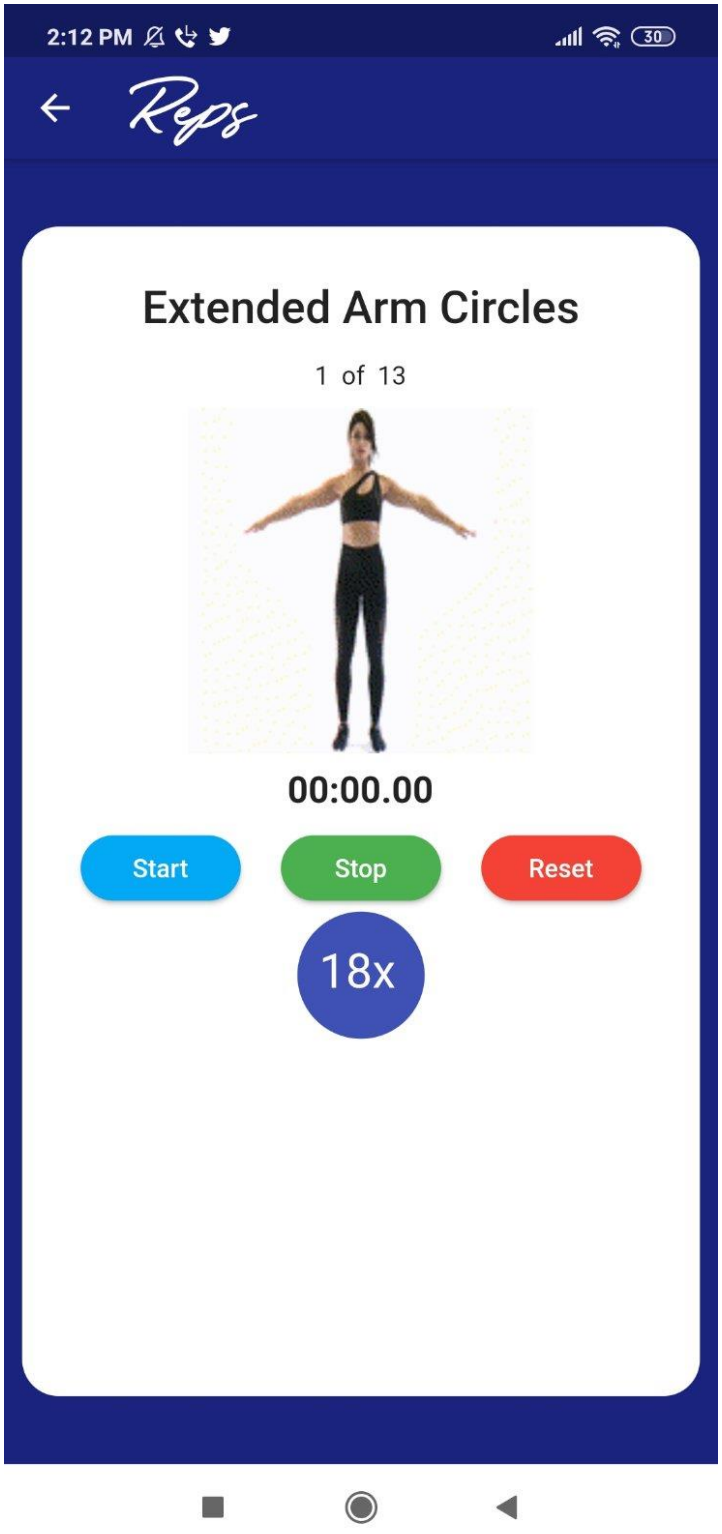

Figure 172: Start workout session

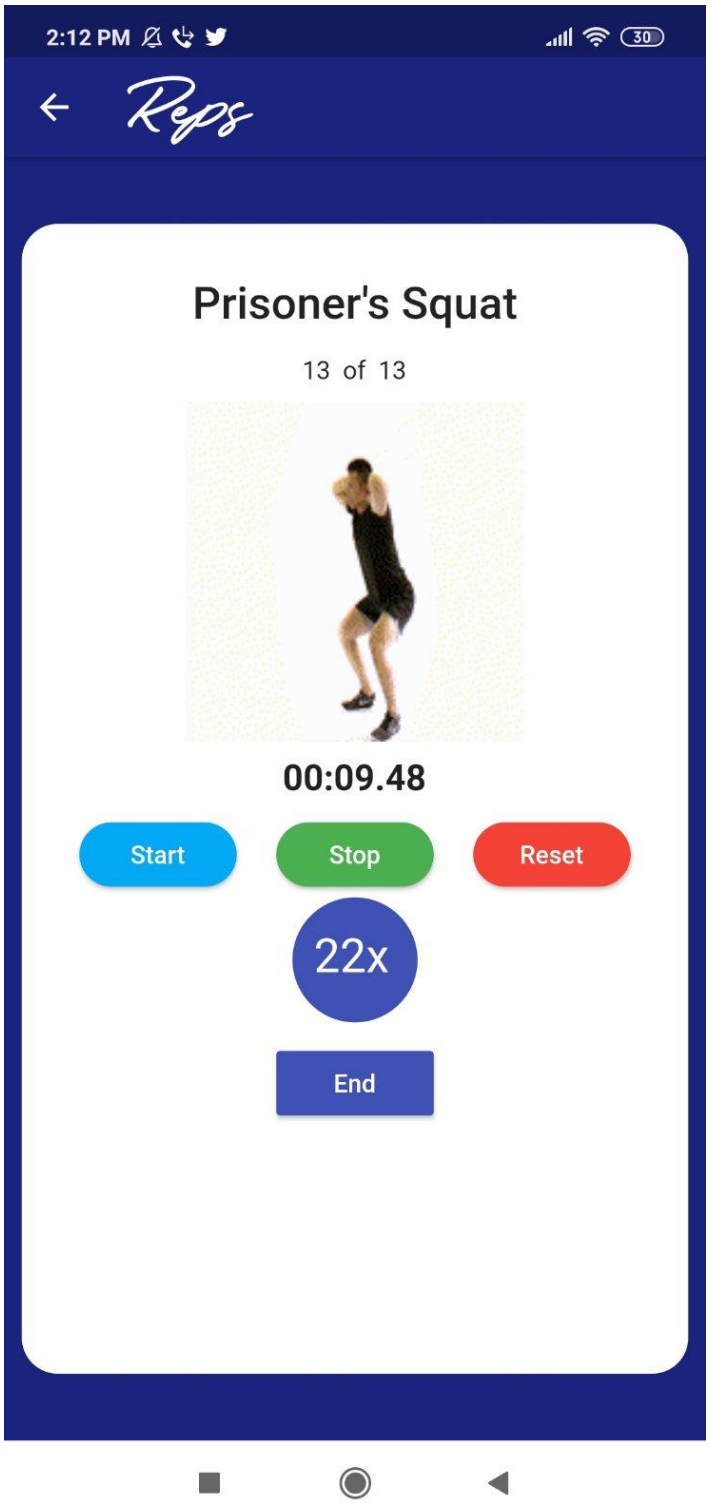

Figure 173: End workout session

7.6. Appendix F: User Feedback

7.6.1. User Feedback Form

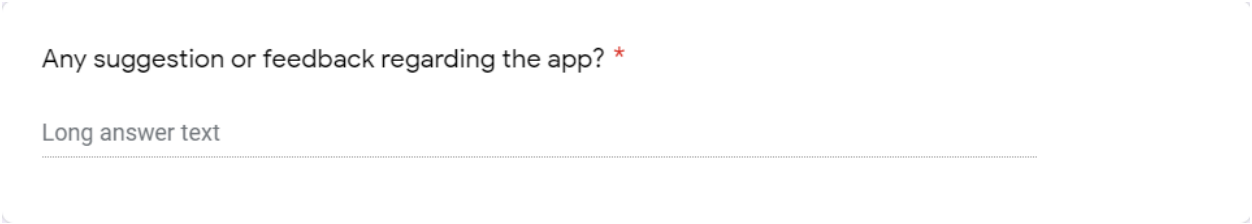

Figure 174: User Feedback Form

7.6.2. Sample of filled user feedback forms

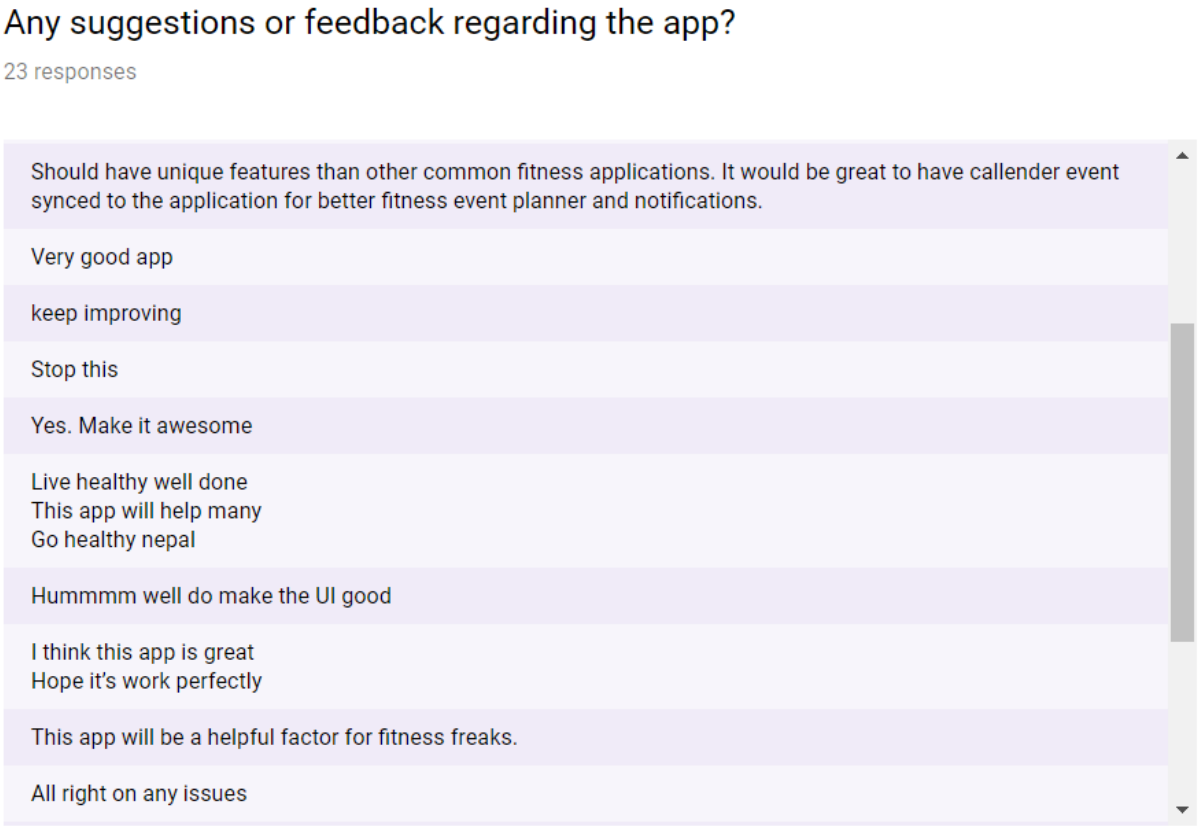

Figure 175: Sample of filled user feedback form