

National University of Singapore
CP2106 (Orbital)



WALKAHOLICS

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Walkaholics

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Proposed Level of Achievement:

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Date:

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Motivation

As more people are becoming aware of the significance of health, there is an even greater need for reliable health information. **Especially some university students like us, who spend most of their time studying hard; they might face a variety of health problems** such as anxiety disorders, Binge Eating Disorders, and obesity. However, it is difficult for them to understand their personal health conditions and make efficient approaches to alleviate them. **This discourages them from taking the first step toward their health goals.**

Thus, we want to provide a professional analysis of users' personal health data(e.g. age, height, weight, body fat percentage, sleep time) to recommend ways to improve their quality of life. We want to show our users that **even a small change like 2000 more steps per day could lead to their health improvements**. We also want to provide a **basic fitness plan for fitness beginners to start with and allow them to customize the plan while they become more professional at fitness**.

Aim

We hope that our app could help users tackle some health issues(psychologically and physically) and have a healthier lifestyle.

We also hope to make managing one's health easy and enjoyable for everyone.

User Stories

1. As a person who is looking for a healthier diet, I can input personal data of weight, height, and gender, and receive customized weekly diet plans.
2. As a person who is looking to lose weight, I want to be able to have a personalized exercise plan that can ensure the desired result.
3. As a person who is looking to build muscle, I want to be able to follow a reliable workout and nutrition plan that allows me to efficiently gain muscle mass.
4. As a person who wants to track body data and see the changes, I want to be able to see easier-understood plots and receive notifications when there are negative changes in my body
5. As a student who wants to manage stress, I want to be able to see personal health reports and what to do to release pressure.

Tech Stack

1. React Native (Frontend)
2. Supabase (Backend)
3. Expo CLI
4. HTML/CSS/Javascript

Scope of Project

The App provides an interface for users to input their key health data such as age, height, weight, as well as their health goals; a weekly fitness plan would also be recommended.

Features to be completed by the mid of June:

1. Fitness planner
 - Provides users with a recommended weekly fitness plan
 - Display details of each workout and weekly progress circle
 - Allow users to update the status of whether they have completed each exercise
2. Personal report
 - Analysis of user's health levels based on their BMI(Body Mass Index) and BFP(Body Fat Percentage)
 - Calculate the user's BMR(basal metabolic rate) and display an image showing BMR's relationship with TDEE(Total Daily Energy Expenditure)

Features to be completed by the mid of July:

1. Customized diet plan
 - Develop a personalized and editable weekly diet plan for users(they could change the specific food in the same category)
2. Report Page Add-on
 - A TDEE Calculator that calculates user's TDEE based on the activity rate they chose and their BMR

By end of July:

- A complete Settings page for users to change personal data, fitness goal, and upload a profile picture

Our strengths compared to other similar apps

1. No ads, entirely free for all features, including customized plans for fitness and diet
2. Beginner-friendly: start with a basic fitness plan, and can change the level of exercise by changing to a different fitness plan as the user feels their fitness level is improved (e.g. become healthier to build muscles)
3. Good UI/UX design, easy and comfortable to use

Development Plan

May 9 to May 15: Complete Mockup, poster, and video

May 16 to May 22: Pick up necessary technologies - Javascript/HTML/CSS, React, Nodejs, Supabase

May 23 to May 29: Start building the register/login page

May 30 to June 5: Finalize the features and start building a user-health data input page.

June 6 to June 12: Start building the data reports page

June 13 to June 19: Finalize data report and fitness plan pages

June 20 to June 26: Testing and debugging

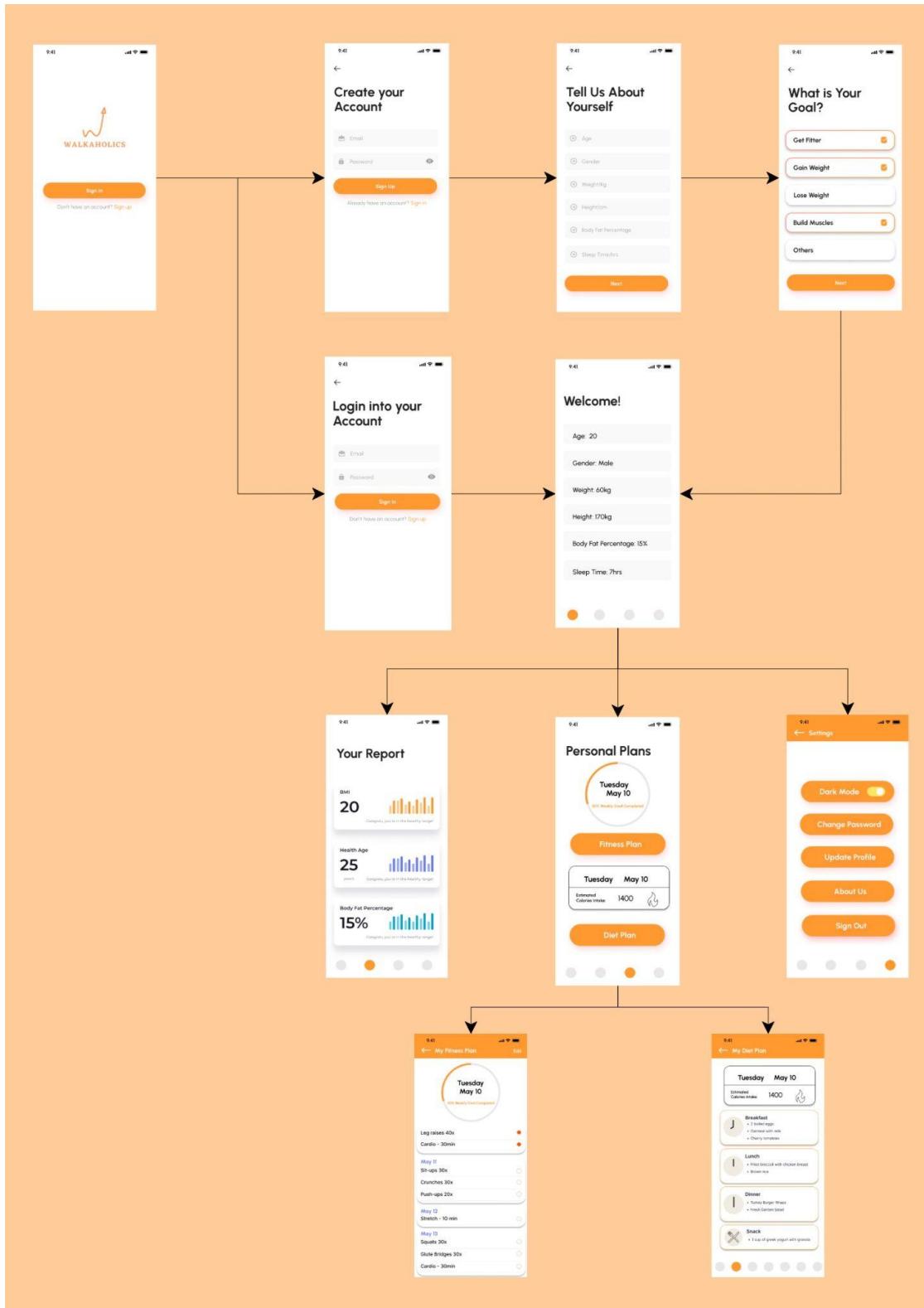
June 27 to July 3: Implementation of peer teams' suggestions

July 4 to July 10: Implement additional capabilities – Diet plan Page

July 11 to July 17: Finalize the settings page, video, and poster

July 18 to July 24: Finalize README file, testing and debugging

User Flow(MS1)

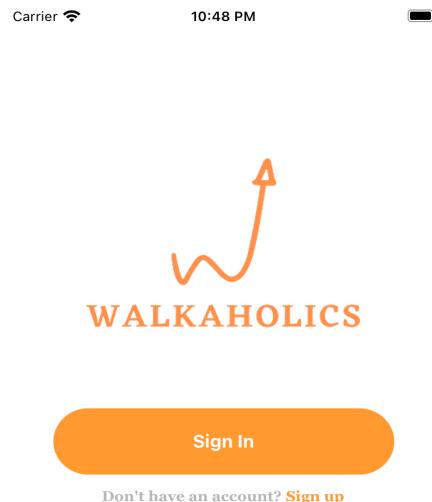


Technical Proof(MS1)

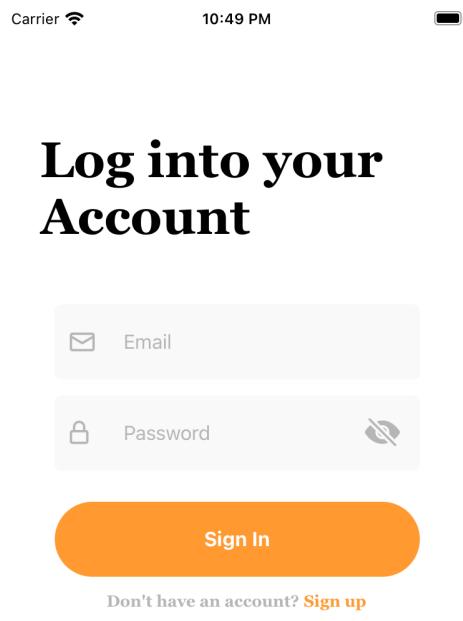
splash screen



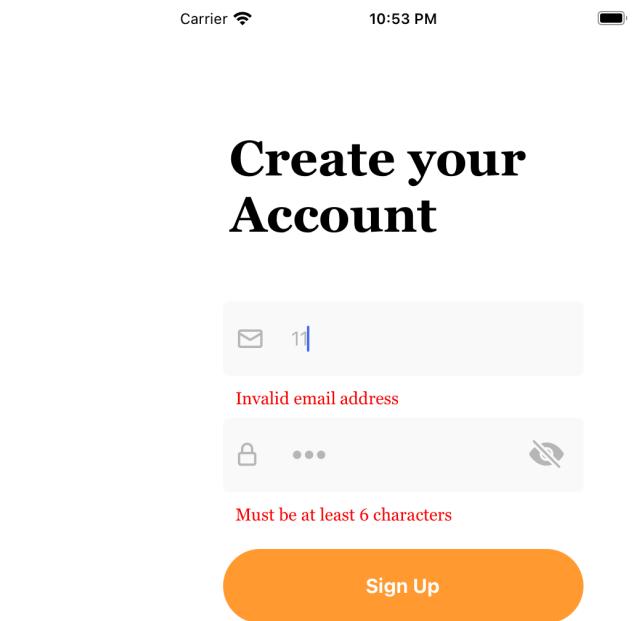
Launch Screen



Signup Screen



Login Screen



Problems Encountered

1. For the data visualization part of the report page, firstly we decided to use stacked bar charts and add a marker showing the user's data level in those ranges. However, the number labels on stacked bar charts are not cumulative, which is not suitable for displaying BMI and BFP ranges.



Then we tried a few npm packages but all of them have error messages 'View config getter callback for component `div` must be a function (received `undefined`)'; finally realized that those are for web development only, and found a react native speedometer package.

2. As for the plans page part, we discussed many times the customization part and how to recommend plans for users. Especially for the diet plan, to make the plan very detailed, we might need to learn machine learning and train models, which is too complicated for us and hard to complete before the end of July.

After several meetings, we decided in mid-June that for milestone 2, we will do a fitness plan only, and provide a basic plan based on the user's fitness goal, then allow them to customize the amount of each exercise.

3. Since we want to allow users to change their fitness goal as their fitness level is improved, or they feel that their initial goal is too hard to achieve, we need to ensure that their diet and fitness plans are updated when they change their goals. However, the update() command will not work as the old and new plans are different and we did not set primary keys but made it auto-generated. Besides, updating with different rows once at a time would make code very long complicated. Then we tried with deleting and inserting plans, but didn't know why deleting and immediately inserting when user clicks on 'confirm' caused errors that only new diet plan inserted but fitness plan not. We thought it might be problems with async function or supabase bugs, but couldn't resolve this.

We finally decided to delete user plans once they click into the edit profile page, and since the only button users can click to exit that page is 'confirm', we insert plans when user clicks on 'confirm' button. This fixes the problem for now, but we will certainly try to find better ways, if possible.

Bugs Squashed

1. Diet Page shows nothing on Sunday

11:23 Debugging: firstly checks if it is the issue with variable day:

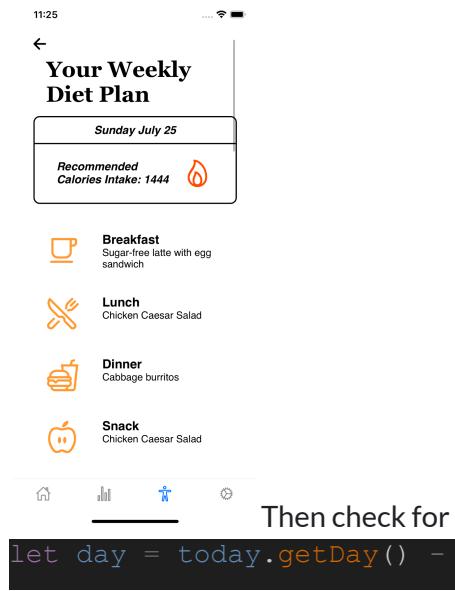


```

150   {plan.map((item, i) => {
151     if (i == day)
152       return (
153         <View key={i}>
154           <MealView>
155             <DietIconView>
156               <Ionicons
157                 name={'cafe-outline'}
158                 size={55}
159                 color={secondary}
160               />
161             </DietIconView>

```

Change it to 0, and diet page shows Sunday's diet plan



Then check for variable day

```
let day = today.getDay() - 1;
```

Research on Supabase async function to check if the index of data returned from getPlan() starts from 0, after confirming, remove the - 1 code, and Sunday's diet plan shows correctly on diet page

2. Circular Progress causing app to freeze

```
// Get Percentage of Exercises completed this week
async function getProgress() {
  let { data, error, status } = await supabase
    .from('Exercise')
    .select('*', { count: 'exact' }) // if you don't want to
    .eq('id', supabase.auth.user().id)
    .eq('Status', 1);
  let result = (data.length / plan.length) * 100;
  //console.log((data.length / plan.length) * 100);
  if (isFinite(result)) {
    setProgress(result);
  } else {
    setProgress(0);
  }
  console.log('progress ' + progress);
}
```

Added additional if-else statement to check if result is infinity as plan.length could be null as the async request for the plan details from supabase might not have been carried out yet. This is so that the “progress” value would not be infinity which when input into circular progress would cause the program to hang.

3. Main page data is not updated after editing profile

```
useEffect(() => {
  const unsubscribe = navigation.addListener('focus', () => {
    // The screen is focused
    // Call any action
    setDetailedData();
  });
  return unsubscribe;
}, [navigation]);
```

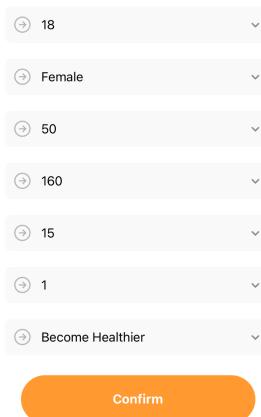
Upon toggling back to the main page from the profile page, the page is not re-rendered. So using react navigation, the function “setDetailedData” would be called upon toggling back and this function updates the data displayed on the page.

4. BMI and BMR returned null or incorrect number in both userdata and editprofile pages

After clicking confirm, user profile data in supabase is updated, but bmr and bmi returned are null

11:39

Added a useffect function to update bmi and bmr when data values are updated



	id	uuid	BMI	varchar	BMR	varchar
	c8145cf2-b98a-4f80-8b0f-4380a064f9ff	tier		NULL		NULL

```
useEffect(() => {
  handleBMRnBMI(value1, value2, value3, value4);
}, [value1, value2, value3, value4]);
```

Then test again with edit profile feature - now the BMI and BMR is updated in supabase

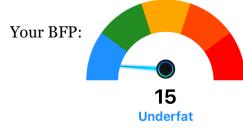
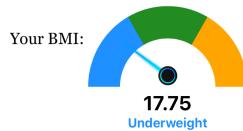
	id	uuid	BMI	varchar	BMR	varchar
	c8145cf2-b98a-4f80-8b0f-4380a064f9ff	tier	19.53		1328	

Core Features

Report Page

8:18

Your Report



Your BMR: 1050 Calories



Calculate Your TDEE (Total Daily Energy Expenditure) Based On BMR and Activity Rate

TDEE Calculator

8:19

Choose Your Activity Rate

- Sedentary: little or no exercise, desk job
- Lightly active: light exercise/ sports 1-3 days/week
- Moderately active: moderate exercise/ sports 6-7 days/week
- Very active: hard exercise every day, or exercising 2 xs/day
- Extra active: hard exercise 2 or more times per day, or training for marathon, or triathlon, etc.

Sedentary

Lightly active

Moderately active

0

Based on the user's height and weight, calculate their BMI and display their health level based on BMI health ranges -

- Below 18.5 – underweight range
- Between 18.5 and 24.9 – normal/healthy weight range
- Above 24.9 – overweight range

Based on the user's gender and Body Fat Percentage, display their health conditions-

Female:

- Between 15 and 18 - underfat range
- Between 18 and 24 - healthy range
- Between 25 and 30- slightly overweight range
- Between 31 and 36 - moderately overfat range
- Above 36 - extremely overfat range

Male:

- Between 15 and 19: healthy range
- Between 20 and 24- slightly overweight range
- Between 25 and 29- moderately overfat range
- Above 30: extremely overfat range

Based on the user's gender, weight, height, and age, we calculate their BMR(basal metabolic rate), the formula used is $[88.362 + (13.397 \times \text{weight in kg}) + (4.799 \times \text{height in cm}) - (5.677 \times \text{age in years})]$; also display a self-made picture in excel showing the composition of TDEE, i.e. BMR, eat, NEAT, TEF.

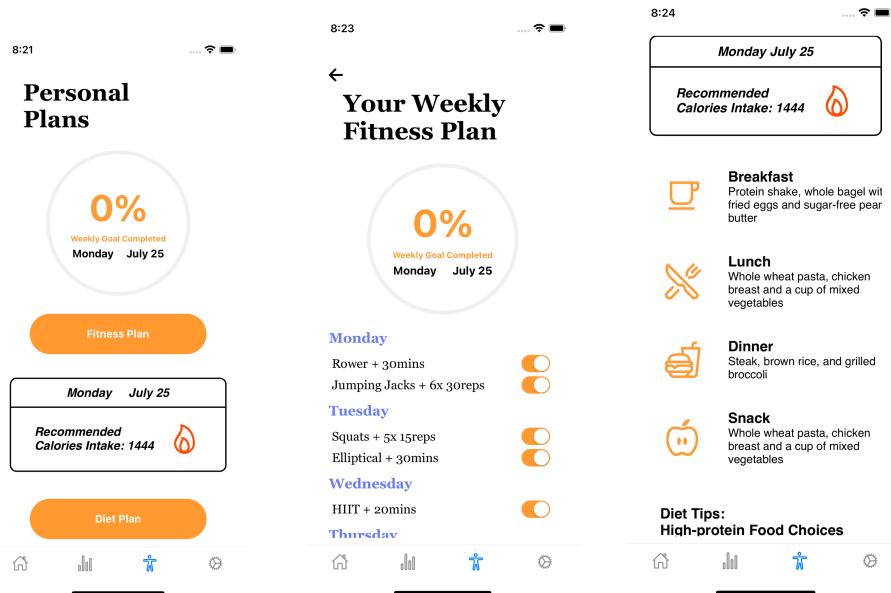
TDEE Calculator Page

We added a page that calculates user's TDEE based on their chosen activity rate.

This is how we calculated TDEE:

- Sedentary: BMR x 1.2 (little or no exercise, desk job)
- Lightly active: BMR x 1.375 (light exercise/ sports 1-3 days/week)
- Moderately active: BMR x 1.55 (moderate exercise/ sports 6-7 days/week)
- Very active: BMR x 1.725 (hard exercise every day, or exercising 2 xs/day)
- Extra active: BMR x 1.9 (hard exercise 2 or more times per day, or training for marathon, or triathlon, etc.)

Plans Page



Provide a very basic weekly fitness plan and a diet plan based on the user's selected goal. (6 templates in total, 3 each for fitness and diet, and each for different fitness goals)

Exercise Page

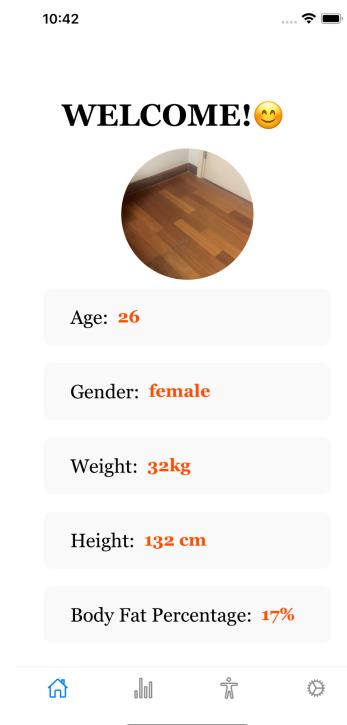
- Users can update their exercise completed status by clicking on switches. Based on this, the progress circle at the top will show the percentage of weekly goal completion status

Diet Page

- As for each diet, we don't recommend a specific amount of food or calories. Instead, user controls their daily calorie intake themselves based on the daily recommended calories intake which we have calculated for them(BMR times the lightly active rate, which is a reference for most people's TDEE). They could also see each section for their diet plan - breakfast, lunch, dinner, and snack.
- There are also diet tips of high-protein food choices for users, including pictures, names, and amount of protein in 100g of that food. Users can substitute the food in diet plan if they don't like, based on the tips on diet page. (e.g. Fish → chicken, beef → tofu if they are vegetarian)

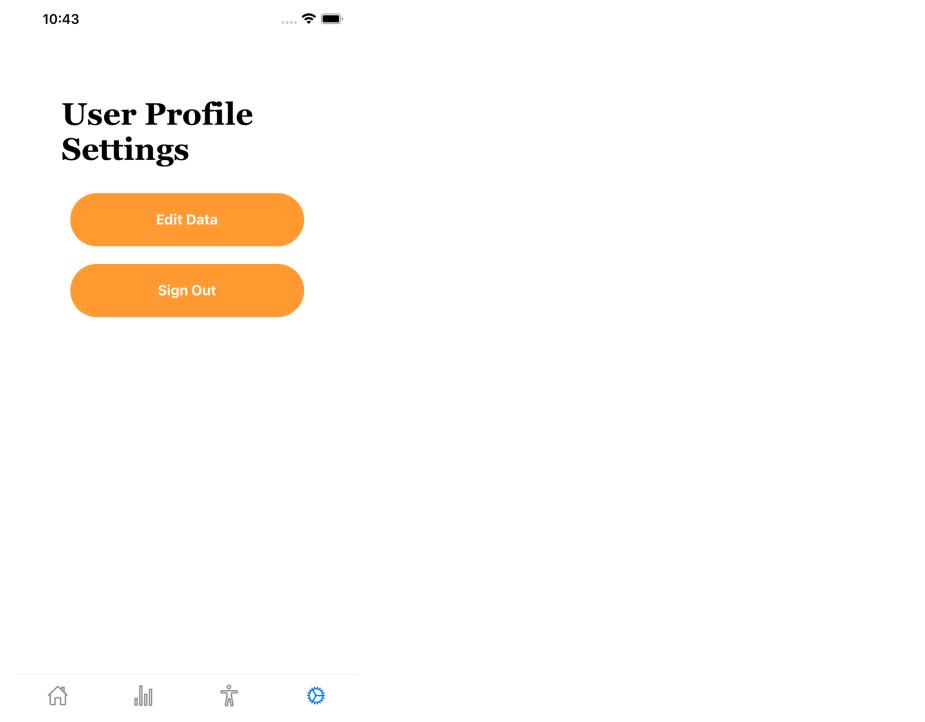
Edge Features

Main Page



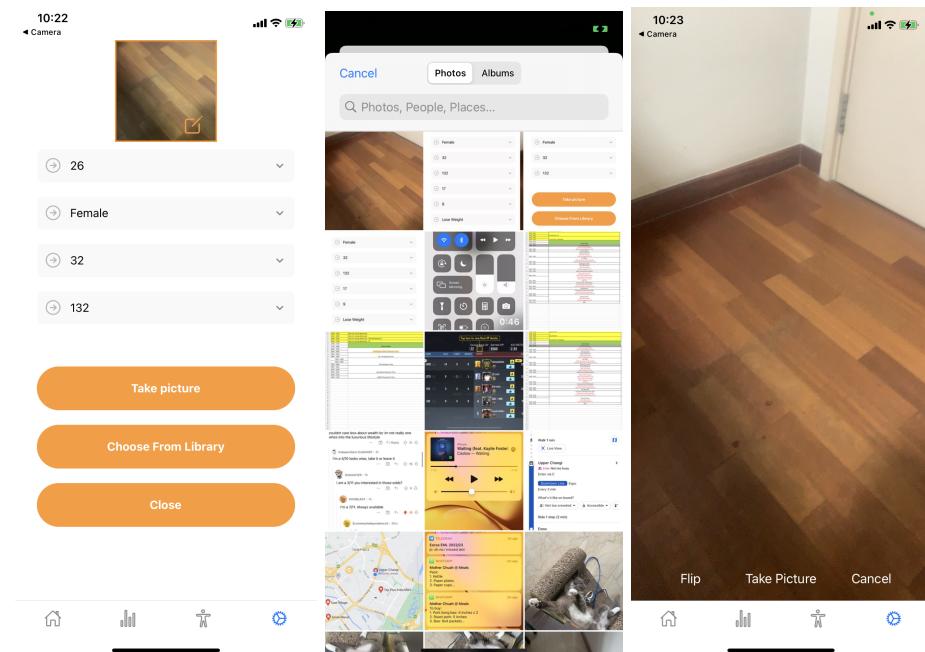
Users can view the health data that they had previously input as well as their profile picture

Settings Page



Users sign out or edit their profile details

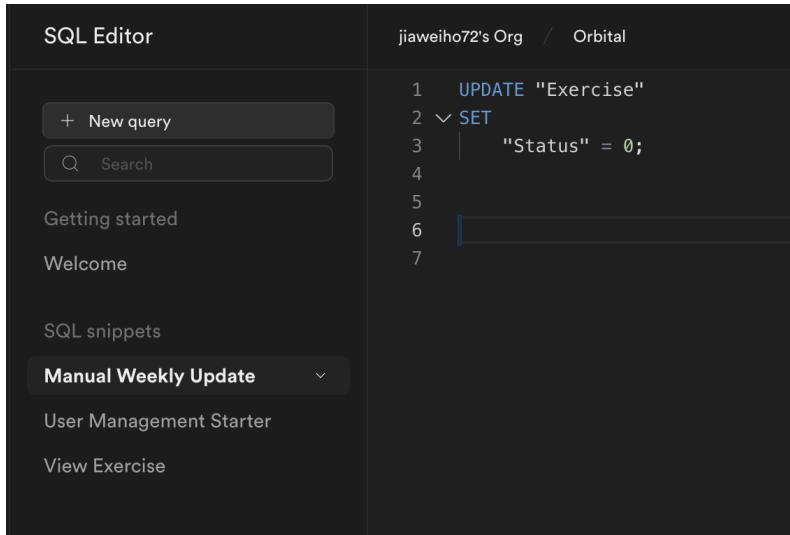
Change Profile Picture



Users can either choose to take a picture from their camera or photo library. For the camera, access would be requested and it would bring the user to a screen where he can flip the camera,

take a picture or cancel to go back to the previous page. For the photo library, access to the library would also be requested and users would be able to select any photo from it.

Weekly refresh of fitness plan



The screenshot shows the Supabase SQL Editor interface. On the left, there's a sidebar with options like 'New query', 'Search', 'Getting started', 'Welcome', 'SQL snippets', and a dropdown menu set to 'Manual Weekly Update'. The main area displays a SQL query:

```
1 UPDATE "Exercise"
2 ∵ SET
3 |   "Status" = 0;
4
5
6
7
```

This function would be carried out in Supabase every Monday at 12:00 am to refresh all user's progress in their exercises to zero.

Procedure to run *Walkaholics* locally

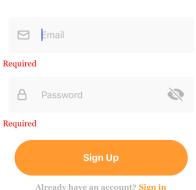
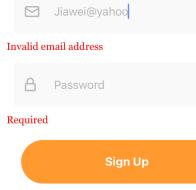
Git: https://github.com/Walkaholics/team_5378

Stack: React Native

- Do not have Expo CLI installed - run `npm install -g expo-cli`
- Change directory to this project
- Run `npm install` in the terminal
- Run `expo start` in the terminal
 - a. Have iOS simulator installed- press 'i'
 - b. Have Andriod emulator installed - press 'a'
 - c. Have Expo Go app installed on mobile phone - open camera on your phone and scan the QR code to open the project

User Testing

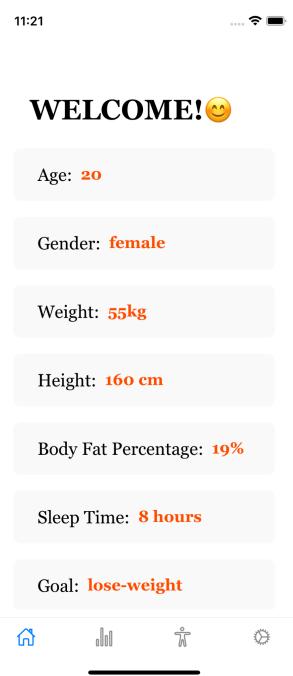
Sign Up Page

TestCase	Description	Input	Output
No input	User left email and password inputs empty	None	<p>10:55</p>  <p>Create your Account</p> <p>Required</p> <p>Already have an account? Sign in</p>
Invalid email address	User input an incorrect email address	Invalid Email address	<p>10:57</p>  <p>Invalid email address</p> <p>Required</p> <p>Already have an account? Sign in</p>

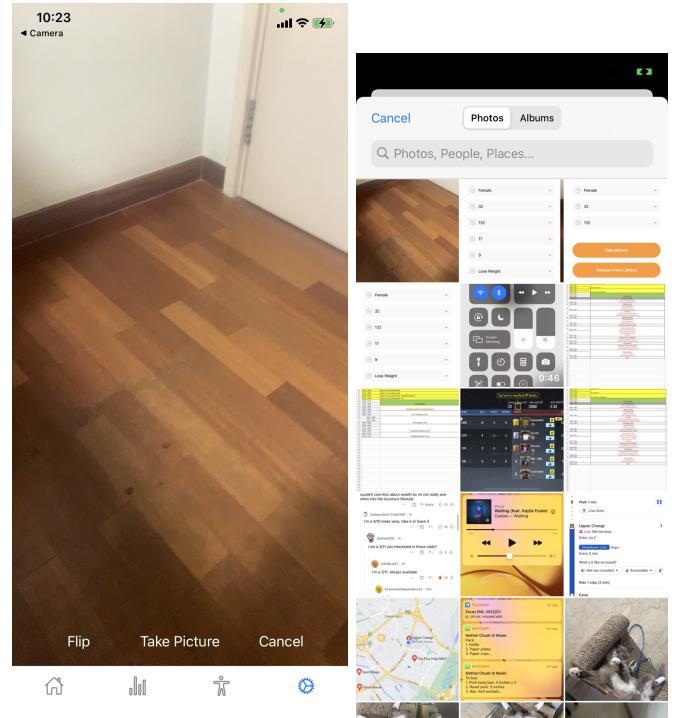
Weak password	User inputs a password of insufficient length	Password less than 6 characters long	<p>The screenshot shows a mobile application interface for account creation. At the top, it says "Create your Account". Below that is an email input field containing "Jiawei@yahoo.com.sg". Below the email is a password input field with five dots visible. A red error message "Must be at least 6 characters" is displayed below the password field. At the bottom right is an orange "Sign Up" button.</p>
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Sign In Page

TestCase	Description	Input	Output
Error signing in	Sign in with wrong email address or wrong password	Right username and wrong password	<p>The screenshot shows a mobile application interface for logging in. At the top, it says "Log into your Account". Below that is an email input field containing "Hester03sfy@gmail.com". A modal dialog box appears with the title "Error Signing In" and the message "Invalid login credentials". At the bottom of the dialog are "OK" and "Bypass Sign In" buttons. At the very bottom of the screen is a "Don't have an account? Sign up" link.</p>

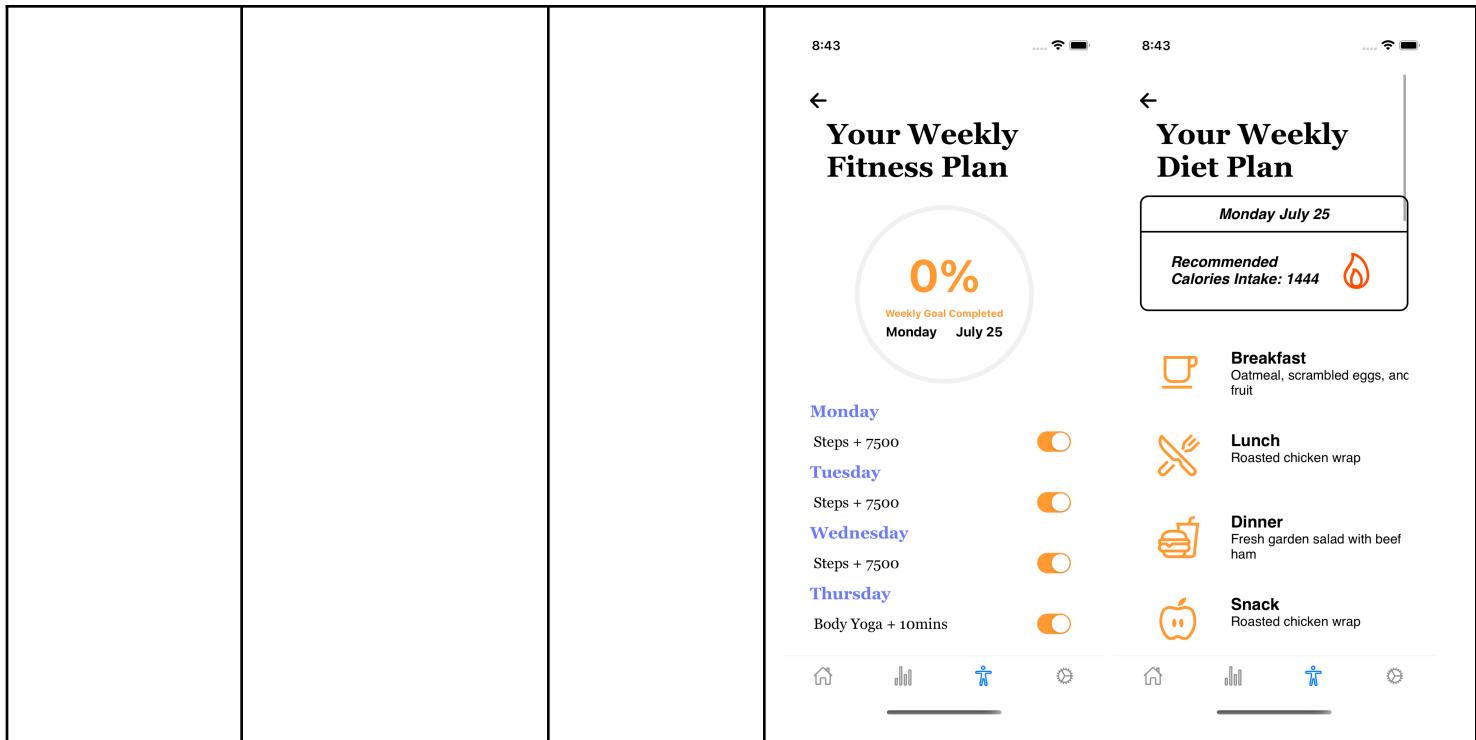
Successful signing in	Sign in with correct password for input username, directs the user to the main page in app	Correct username and password	
-----------------------	--	-------------------------------	---

Edit Profile Page

TestCase	Description	Input	Output
Profile Picture from phone library	Upload profile pictures from phone library	An image is taken from phone camera	

Update profile data	Change personal data including age, gender, weight, height, BFP(body fat percentage), sleep time	Some data different than previous data (e.g. weight was changed from 60 to 55; age was changed from 22 to 23)	

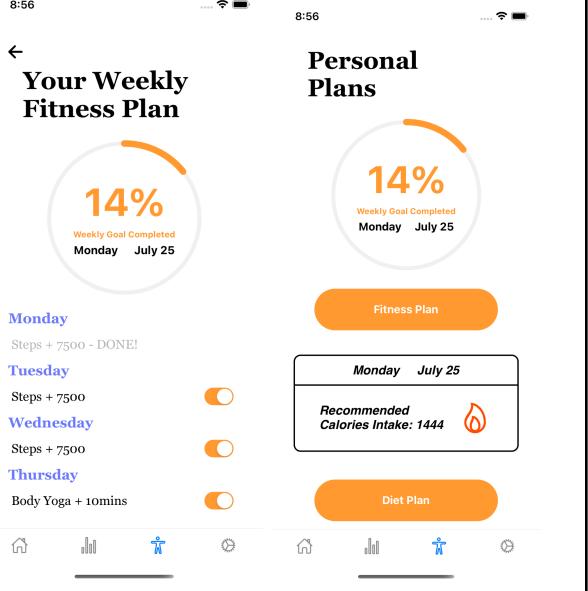
			<p>11:30</p> <p>WELCOME!😊</p> <p>Age: 23</p> <p>Gender: female</p> <p>Weight: 55kg</p> <p>Height: 170 cm</p> <p>Body Fat Percentage: 19%</p> <p>Sleep Time: 9 hours</p> <p>Goal: lose-weight</p>
Change fitness goal	Change fitness goal; it is expected that the correspond new diet and fitness plans will also be updated ➡ is updated!	Change from build-muscles to become healthier	<p>8:43</p> <p>Your Weekly Diet Plan</p> <p>0% Weekly Goal Completed</p> <p>Monday July 25</p> <p>Recommended Calories Intake: 1444</p> <p>Breakfast: Protein shake, whole bagel with fried eggs and sugar-free peanut butter</p> <p>Lunch: Whole wheat pasta, chicken breast and a cup of mixed vegetables</p> <p>Dinner: Steak, brown rice, and grilled broccoli</p> <p>Snack: Whole wheat pasta, chicken breast and a cup of mixed vegetables</p>



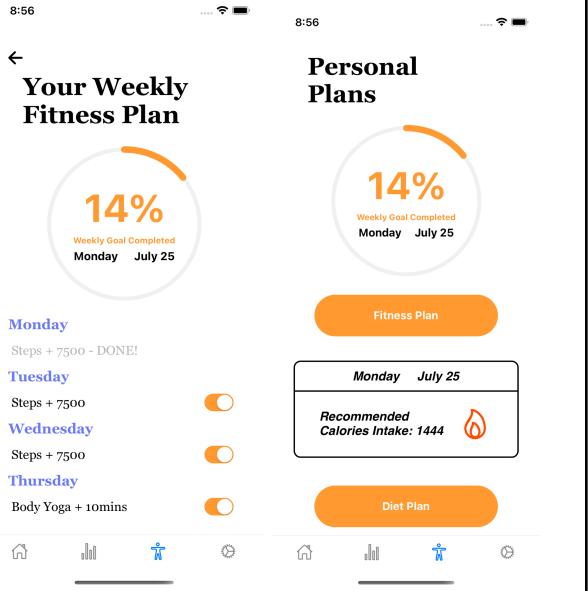
TDEE Calculator Page

TestCase	Description	Input	Output										
Select Buttons	Changes on TDEE with different activity rates; TDEE showing below select buttons should be updated when user clicks on different buttons	Extra active & Moderately active	<p>8:53 8:52</p> <p>← ←</p> <p>Choose Your Activity Rate</p> <ul style="list-style-type: none"> • Extra active: hard exercise 2 or more times per day, or training for marathon, or triathlon, etc. <table border="1"> <tr> <td>Sedentary</td> <td>Sedentary</td> </tr> <tr> <td>Lightly active</td> <td>Lightly active</td> </tr> <tr> <td>Moderately active</td> <td>Moderately active</td> </tr> <tr> <td>Very active</td> <td>Very active</td> </tr> <tr> <td>Extra active</td> <td>Extra active</td> </tr> </table> <p>Your TDEE: 1995 Your TDEE: 1627.5</p> <p><input checked="" type="checkbox"/> On Diet Page the suggested calories intake is for Lightly</p> <p><input checked="" type="checkbox"/> On Diet Page the suggested calories intake is for Lightly</p>	Sedentary	Sedentary	Lightly active	Lightly active	Moderately active	Moderately active	Very active	Very active	Extra active	Extra active
Sedentary	Sedentary												
Lightly active	Lightly active												
Moderately active	Moderately active												
Very active	Very active												
Extra active	Extra active												

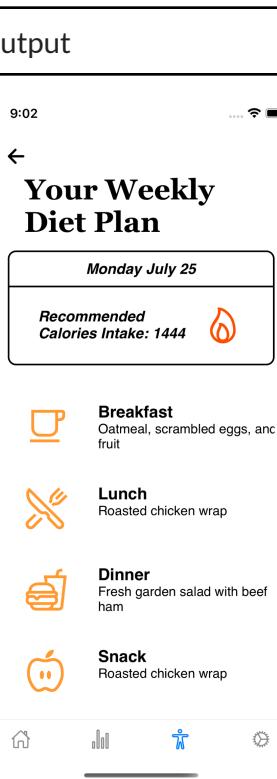
Plans Page

TestCase	Description	Input	Output
Progress Circle Update	Expected updates on progress circle if the inner progress circle (on exercise page) is updated → correct updates!	Check that Monday's exercise is completed by clicking on switch of that exercise - progress circle shows 14%	

Exercise Page

TestCase	Description	Input	Output
Progress Circle Update and Exercise Database	Expected updates on progress circle whenever user updates completion status of each exercise → correct! Expected correct exercise showing for each day → correct!	Check that Monday, Tuesday, and Wednesday's exercises are completed by clicking on switches of the exercises - progress circle shows 43%(3/7); Exercise Done Text is showing, switch is disabled	

Diet Page

TestCase	Description	Input	Output
DietPlan Database	Expected Correct date, BMR, and diet plan showing on page → correct!	NIL	<p>9:02 ⌂</p> <p>←</p> <p>Your Weekly Diet Plan</p> <p><i>Monday July 25</i></p> <p>Recommended Calories Intake: 1444 </p> <p> Breakfast Oatmeal, scrambled eggs, and fruit</p> <p> Lunch Roasted chicken wrap</p> <p> Dinner Fresh garden salad with beef ham</p> <p> Snack Roasted chicken wrap</p> <p>   </p> 

Sign Out

TestCase	Description	Input	Output
Sign Out	User signing out, navigate to launch page	NIL	<p>9:10 ⌂</p> <p> WALKAHOLICS</p> <p> Sign In</p> <p>Don't have an account? Sign up</p> 