

# 50.001 1D Project Report(1D-F03J)

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## 1. Background

### a. Describe your problem and a proposed solution

In today's world, busy work and high stress levels are ubiquitous and this has led to a gradual deterioration in people's health. There is no doubt that fitness has become the key to a healthy and sustainable lifestyle. However, Singaporeans still face huge hurdles in their pursuit of regular fitness, mainly due to the lack of effective means of exercise motivation, exercise direction and monitoring dietary intake.

This is why our team has developed a fitness tracker specifically for Singaporeans. HealthMate is a mobile application designed specifically to help users adhere to a healthy lifestyle by effectively monitoring their fitness activities while facilitating social interactions with other fitness enthusiasts. The app accesses and integrates users' fitness data and provides a social platform that facilitates the sharing of workout results, fitness tips and motivational support. Thus achieving the goal of enabling people to live healthier lives.

### b. Description of resources used in your project

External tools:

- SQL, SQL database:

Structured Query Language (SQL) is a programming language designed for managing and manipulating data stored in relational database management systems (RDBMS). SQL enables users to create, modify, and retrieve data from databases, as well as to define and manage relationships between tables within a database. RDBMSs that use SQL are known as SQL databases, which store data in tables with rows and columns. These tables are connected through keys, which define the relationships between them. SQL databases are used across a wide range of industries and applications. And they can store various types of data, ranging from simple lists to complex data structures.

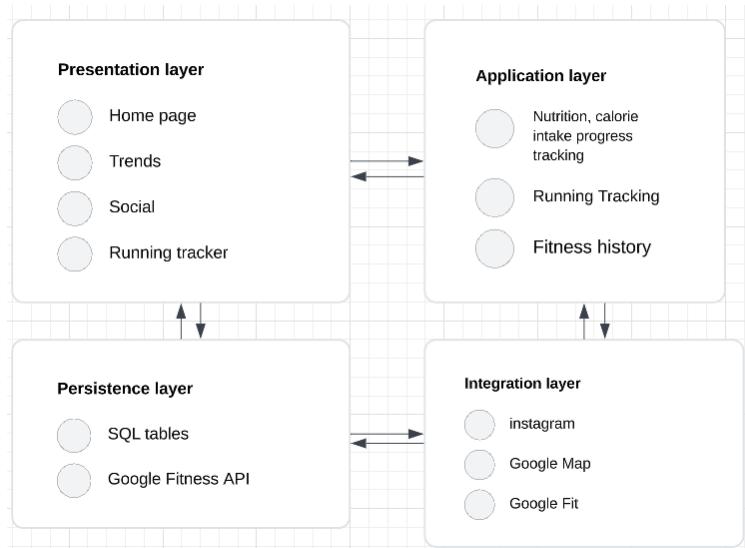
Documentation used:

stock1-stock8:

stock1 to stock8 are eight images that are used for the user's post in the Social interface. Since there is no data on the phone in the Android emulator, we need to prepare some images in advance for display.

## 2. System Design and Implementation

### a. System architecture



### b. App screenshots

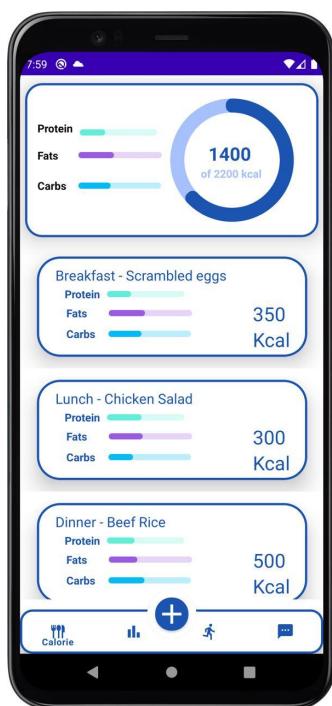


Figure 1. Home page

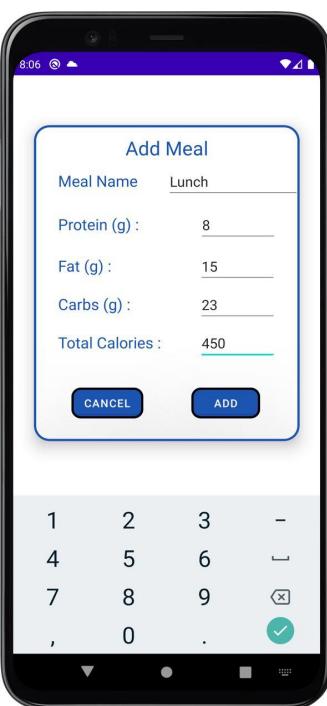


Figure 2. Adding meals

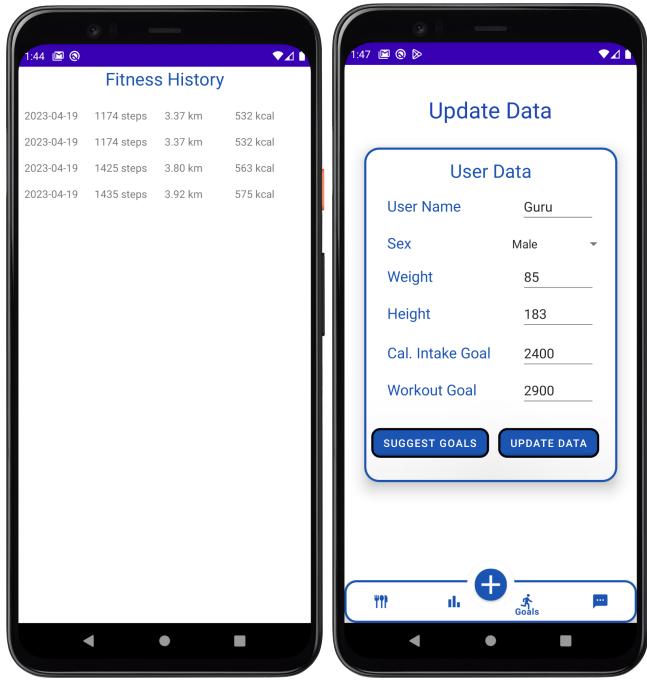


Figure 3. Fitness History   Figure 4. Update User Data

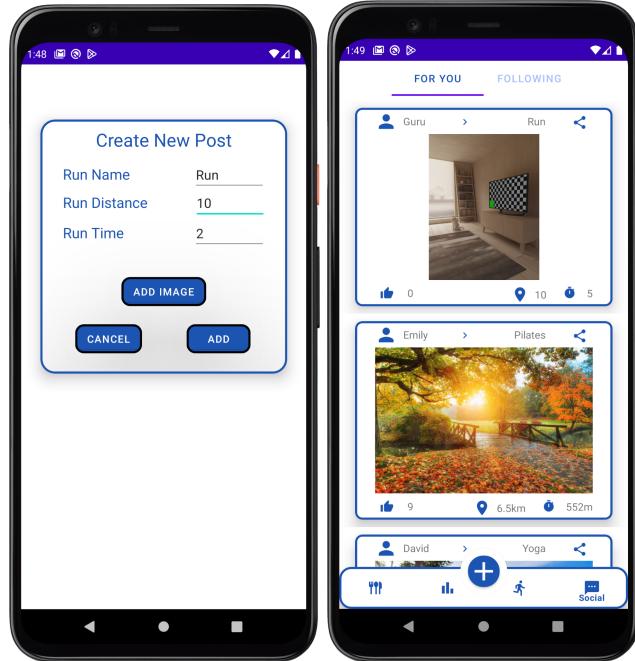


Figure 5. Create New Posts   Figure 6. Social

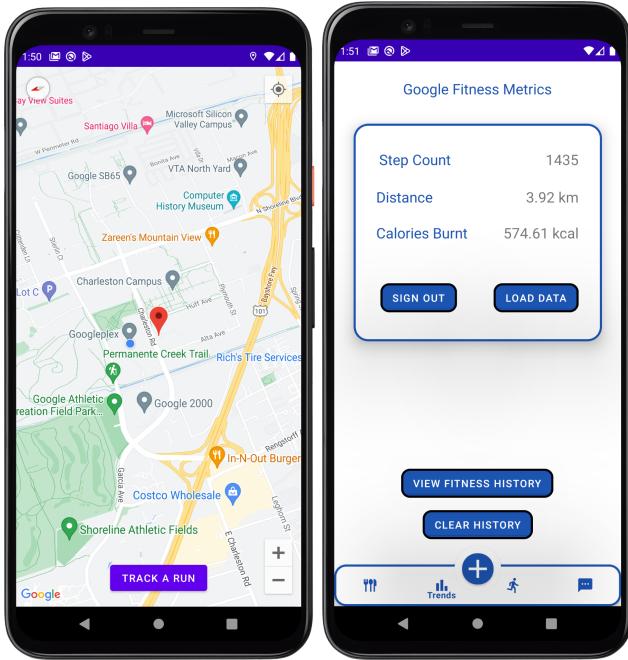


Figure 7. Run Tracking    Figure 8. Google Fitness Metrics

1. Home page:
  - Displays the recommended daily calorie intake progress bar and nutrient progress bar
  - Shows the current nutrient and calorie intake in the diet
2. Adding meals:
  - Here users can add the nutrients and calories they intake during today's meals
3. Fitness History:
  - Record the user's exercise data
4. Setting Goals
  - Allow users to enter body data and set fitness goals
5. Create New Posts
  - Users can create new posts by selecting images from the gallery and entering run names, distances and running time
6. Social:
  - Users can see other people posts at this page
7. Running Tracking:
  - Users can click the TRACK A RUN button below to open Google Maps on their phones.
8. Trends:
  - In this interface users can see their exercise data

### c. Design Patterns and principles used

1. Singleton design pattern
- UserDatasingleton: UserDatasingleton is a singleton class that holds a single instance of UserData, which represents the user's data such as name, sex, weight, height, calorie intake goal, and workout goal. The singleton pattern ensures that there is only one instance of the user's data throughout the app.

## 2. Adapter design pattern

2.1. FitnessDataAdapter: The FitnessDataAdapter is the bridge between the FitnessData object and the RecyclerView, handling the necessary data binding to ensure a smooth and efficient user experience.

2.2. FYP\_Adapter: This adapter is used to implement a RecyclerView in the social interface. It displays social posts as a list. The adapter extends RecyclerView.Adapter to use the Social\_PostModel object's ArrayList to manage the data displayed in the RecyclerView.

2.3. MealAdapter: This adapter is used to display a list of meals and their nutrient categories in a RecyclerView with a progress bar.

## 3. Observer design pattern

MyObserver: Onchange() method is called when meal data updates. Update the UI accordingly. Classes that implement this interface are able to react to changes in observable objects, allowing for efficient and flexible communication between different meal objects.

## 4. Open/Closed Principle

4.1 FitnessData: To extend the functionality of FitnessData, you can create a new class that implements the FitnessDataInterface without modifying the existing FitnessData class. The new class can have additional functionality specific to the new requirements. By using the Open/Closed Principle, you can extend the functionality of the FitnessData class without modifying the original class, keeping it closed for modification while allowing new features to be added through extension.

## d. Any other key technical features to highlight (e.g. external APIs used, frameworks used etc)

- Google Map API:

Our group utilized the Google Maps API to seamlessly integrate Google Maps functionality into the HealthMate app. With this feature, users can conveniently access Google Maps within the app and easily select their end points for their run.

- Google Fitness API:

Our group also utilized the Google Fitness API to retrieve the data of the run tracked by the user, which is subsequently displayed in the Trends interface of the app. This interface provides users with an in-depth and comprehensive view of their fitness progress, enabling them to track their progress and make informed decisions. This also provides convenience to the user for allowing them to access all their fitness data within the HealthMate app.

This information is then used to collect data on the user's run, which is subsequently displayed in the Trends interface of the app. The Trends interface provides users with an in-depth and comprehensive view of their fitness progress, enabling them to track their progress and make informed decisions about their fitness regimen. The integration of the Google Maps API in the healthMate app enhances its functionality and provides a more personalized and engaging fitness experience for users.

### **3. Description showing who was responsible for what**

Zhang JianYu: poster, report, backend developer

Noven Zen Hong: idea refinement, backend developer

Toh Hong Jing: frontend designer, API usage explorer

Zhang QiXiang: backend developer, code checking and correcting

Gopal Guruprasath: video, frontend, backend developer

### **4. Possible Future Work**

- Integration with wearables: Having our App sync with a fitness tracker, such as the Apple Watch, provides users with more accurate information about their daily activity levels and helps them track their progress more easily.
- Gamification: Add game-like elements to the app, such as challenges, badges and rewards, etc., to keep our app usage up.
- Artificial Intelligence Driven: Integrate AI technology to make the AI the user's own personal virtual coach. It can provide users with personalized workout, exercise and nutrition coaching advice based on their goals, fitness levels and preferences.
- Food Recognition: Using computer vision technology to help users identify the types of their daily meals, users only need to enter the weight of their food to know how much nutrition they are consuming and the number of calories.

### **5. Conclusion**

By using HealthMate, an app designed by our team, users have the ability to take control of their fitness goals and maintain enthusiasm for a healthier lifestyle. The app's ability to monitor and track fitness activity provides users with a tangible way to see their progress and encourages them to continue with their fitness program. In addition, the social platform provided by the app promotes connection with like-minded fitness enthusiasts, creating a supportive community that can provide motivation and encouragement for users to stick to their goals. Overall, the combination of personalized tracking, social engagement and motivational support provided by HealthMate is an effective solution for those looking to improve their fitness and lead a healthier life.

### **6. Citations**

- Google Fit API

<https://developers.google.com/fit/android>

- Google Maps API

[Maps SDK for Android overview | Google Developers](#)

- SQL tables

[Save data using SQLite | Android Developers](#)

[Use SQL to read and write to a database \(android.com\)](#)

- Fragments

[Fragments | Android Developers](#)

- Bottom navigation bar

[Bottom Navigation Bar in Android - GeeksforGeeks](#)

- Camera intents

[Camera intents | Android Developers](#)

- Github link

[Collaboration95/HealthMate: Repo for University Course Project - Building an android app in Java \(github.com\)](#)