**Fitness Buddy App**

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**Analysis**

**Project Proposal and Problem Specification**

I’ve chosen to create a mobile application, called ‘Fitness Buddy’ because I think that the fitness tracking apps like Strava and MyFitnessPal are annoying to use since they always want you to upgrade to their monthly subscriptions just so that you can unlock a few extra features that should be free in the first place like having the ability to add custom exercise goals and if you don’t upgrade you are forced to watch advertisements whenever you want to do something like record the exercise that you have just done. From my experience, I have found that these apps lack an incentive for me to use them as I don’t feel like I get anything from using them.

The app will be available on most Android devices that run Android 6.0 and higher. If there is time, I will try to bring the app to iOS as that would make my app more widely available. My app will have many features that are going to be similar to those found on Strava and MyFitnessPal like the ability to track your height, weight and exercise, set goals, compare data, create exercise groups and many more. The app will be heavily dependent on a backend service, for this project I have chosen to use Google Firebase as the backend provider which I will explain why in the research section.

**Computational Methods**

**Abstraction**

Abstraction is when you ignore irrelevant details that aren’t important to the current situation. In this project, Abstraction will play a key role as it will help me focus on developing the core features of the app while not having to worry about things like how the app recognise touch inputs as that is handled by the operating system. Firebase will also allow me to focus more of my time on developing the app as I will not have to worry about how my app interacts with the backend as that is already handled by Firebase API.

**Backtracking**

Backtracking is a method that is used in solving a problem that involves examining more than one possible solution. In this project, backtracking will be important as it will be used for the algorithms that are going to improve user engagement by using analytics data to create personalised activities/plans for users.

**Concurrency**

Concurrency allows for more than one process to happen at the same time. In this project, concurrency will be important as the backend service Firebase will need to be concurrent so that multiple users can use the app at the same time and do multiple things like update their profiles and add the exercise that they have just done without having to wait for one of these processes to take place.

**Caching**

Caching allows for the storage of previously calculated results. In this project, caching will be used for storing data on users’ devices so that they can still use the app even if they are not connected to the database. Firebase Cloud Firestore supports offline data persistence and this feature caches a copy of the data stored on the database.

**Stakeholders**

**Developers**

The developers are the people who are going to program the app. They are important as they turn an idea into reality. For this project, it’s just going to be me who is going to be programming the app and doing all the backend using Firebase, however, usually you would have multiple developers that are all assigned specific tasks that need to be completed for an app to be functional and these extra developers help with producing prototypes quicker and overall development time reducing.

**Maintainer**

The maintainer is any person who is going to update the project to make sure it stays up to date. If I choose to make the code available to the public by using a service like GitHub, then the maintainer is going to be anyone who will update the publicly available code to make the app work on new devices and operating systems.

**Testers**

Graphical user interface, application

Description automatically generatedGraphical user interface

Description automatically generatedThe testers are people who will have access to the app before the app is publicly available to allow them to test the app functionality and report back to the developers with constructive feedback on how the app could be improved. For this project, the testers are going to be key as they will allow me to focus more of my time polishing features out without having to do all the testing myself. Firebase will also help me to a certain extent as they have a service called Test Lab which consists of multiple Android and iOS devices that can be used to test an app. The results that come back from Firebase Test Lab include performance metrics (CPU, memory, and network usage), accessibility data (how can content labelling be improved) and screenshots of each step that the AI took when testing the app.

**Backend provider**

The backend provider which in this case is Firebase, is a very important stakeholder for this project as without a backend provider my app would not be able to function as the app is dependent on the backend since most of the data that is displayed on the app (frontend) is coming from the backend, therefore, I must ensure I follow the terms of use agreement.

**Target audience**

The target audience for this app is anyone who is already using a fitness tracker app or who wants to start using a fitness tracker app. The target audience are also stakeholders as they are the key factor to the success of the app and can influence what happens to the project next. For example, if the user base is relatively low then there is an obvious lack of demand for the app and that can result in the development being stopped, on the other hand, if the user base is growing then there is demand for the app meaning I’m more likely to continue the development of the app.

**Research**

To create a successful app, I need to know what the competition looks like and therefore, in my research I will focus on two main apps, Strava and MyFitnessPal. Both apps are extremely popular both on Android and iOS as they have many excellent features, however, if you look at the reviews on Google Play Store, you can easily find many one- or two-star reviews that complain about the number of ads on MyFitnessPal and how they removed features that were previously free.

Text

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Strava is an app made for tracking physical exercise and it incorporates social network features. It was initially released in 2009 and as of October 2022 it is the 9th ranking app in the health and fitness genre on the Apple App Store with average stars of 4.7 and on the Google Play Store it has more than 50 million downloads with average stars of 4.6. The key features include the ability to record any exercise whether it’s runs or yoga, sync with other apps and devices and create or join challenges.

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Description automatically generated

MyFitnessPal is an app made for tracking diets and exercise. It was initially released in 2005 and as of October 2022 it is the 5th ranking app in health and fitness genre on the Apple App Store with average stars of 4.7 and on the Google Play Store it has more than 100 million downloads with average stars of 4.3. The key features include the ability to log food and activity, set goals and track progress.

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Firebase is a set of hosting services for any type of application. It offers NoSQL and real-time databases, authentication, website hosting, cloud functions and many other services. Firebase was founded in 2011 and brought by Google in 2014. The use of firebase will allow me to focus on writing code for app and spend less time getting a database and authentication working as that is done for me by Firebase.

**Essential Features**

One essential feature that my app is going to have the ability to record any exercise. It is going to work in a similar way to Strava by using GPS to track users’ runs and other outside and inside exercises by using a variety of sensors found on phones but also using algorithms.

Another essential feature that my app is going to have the ability for users to track their height and weight. This data is going to be stored on the backend and will be displayed to the user on graphs that can be interacted with to compare data. This feature will be like the one found on MyFitnessPal app.

The final essential feature that my app is going to have a social media aspect to it. This is not just going to be one feature but multiple, the first one being a feature where users can share their progress/exercise to all other users. This is going to be probably one of the hardest features to implement as there are many things that could go wrong and that I will have to account for. Another feature will be the ability for users to create or join exercise groups. And the last feature is the ability for users to edit their public profiles for use on the social media side of the app.

**Limitations**

There are many limitations that I am going to experience, one of these being the time that I have to develop, test, and evaluate this app. Even though I have until March 2023, there are many things that I will have to complete before then and one important thing that I will need to do is the actual programming of the app. It may be that I will have to scrap some features that I was planning to add or scrap the iOS version of the app due to time constraints.

Another limitation of the project is the size of the development team which is only me as many companies that create mobile applications have development teams that consist of many developers that are assigned specific features that they are responsible for, and this helps with faster prototyping and development. Since it is only me, it’s going to limit the number of things that I can create for the app within the given time, and this is going to impact how my app functions at the end. Although, there have been many mobile applications that were created by solo developers they usually did not have time constraints and had outside help with testing.

Another limitation is my decision to focus on creating the app for Android and not iOS, as this limits the number of testers and users my app can have since there are many people who are iPhone users. This will not necessarily affect the design and functionality of my app although, it will affect the availability of my app which could become a problem as it would make it harder for me to compete with existing fitness tracker apps.

**Requirements**

To develop this mobile app, I will be using Android Studio which is an IDE (Integrated development environment) developed by Google and JetBrains along with the Flutter framework which is developed by Google to create the app for Android and potential for iOS as well since the framework allows for cross-platform development. The programming language that I will be using is Dart, which is an object-oriented, class-based, garbage-collected language with C-style syntax, developed by Google and used for both web and mobile apps.

There are going to be many dependencies that I will be using for this project, they include all firebase dependencies for flutter, pedometer, quick actions, permission handler, geolocator, flutter polyline points and many more. All these dependencies can be found at <https://pub.dev/packages>

The operating system that I will be using to develop this app is going to be Windows 10 and I am going to be doing my testing on either a Google Pixel 4a emulator running Android 12 or my physical Google Pixel 4a running Android 13. The hardware required to run my app is any Android phone that can run Android 6.0 and higher. The phone must have a working touch screen and working sensors, this includes the motion sensors, accelerometer sensor, gyroscope sensor and pedometer sensor.

**Functional requirements**

My software must:

* Use suitable variable naming and annotations to ensure the code is written well and understandable.
* Respond to user input – if it is the wrong input type have an error message show up and respond to buttons being pressed.
* Have a set colour theme – use a set colour palette for logos, backgrounds, and text colours.
* Connect to the backend – the app must be able to connect to Firebase for authentication, analytics, database, and storage.

My software should:

* Have a loading screen – show users that the app has not crashed and is just loading data or authenticating.
* Be able to run on most phones running Android 6.0 and higher.

My software could:

* Have the option to connect with other devices like smart-watches – this would be someone with a smart-watch could synchronise it with the app to have all their exercise data in one place although this would require extra time.
* Have a diet tracker – this would mean users would be able to record the food they consume however it would require developing a food database which would take time.

My software won’t:

* Be able to replace all fitness apps – to do this the app would require more advanced features that I will not be able to implement within the time that I have.

**Non-functional requirements**

My software must:

* Be secure – the connection between the app and the database must be secure to ensure that the data is safe.
* Be maintainable – my app must be easy to maintain through the use of annotations to ensure the code is understandable, but it also must be well written.

My software should:

* Be easy to navigate – any user should be able to navigate between screens, and the app should be responsive.
* Be scalable – the app should be easy to expand by adding new features but also the backend should be scalable to allow for more users.

My software could:

* Be available on iOS – if I have time, I will try to bring the app to iOS so that more people can use the app.
* Be reusable – the code from this project could be used in the future for another project if the code is written well.

**Success Criteria**

* The app must be able to connect to the Firebase as the app is dependent on the backend to work.
* The app should react to touch input within 0.5 seconds. This is to ensure that the app is responsive to user inputs.
* The app should have a crash rate of under 1% per user. This is to ensure that the app is stable and does not affect the user experience negatively.
* The user retention rate should be over 25%. User retention is a measure of the percentage of new users who return each day. This would be a good measure to check if users are returning to use the app or if they downloaded it to check what the app has to offer.
* User activity over time should be increasing day by day as that would mean that the user base is growing and therefore, it could be said that the app is a success.

**Design**

**Decomposition**

**Structure**

**Algorithms**

Check user status (is user logged in)

**Usability**

**Test Data**

**Further Data**

**Developing the coded solution**

**Iterative Stages**

**Prototypes**

**Modularity**

**Annotations**

**Naming**

**Validation**

**Review**

**Testing Evidence**

**Failed Tests**

**Evaluation**

**Alpha Testing**

**Beta Testing**

**Success Criteria vs Test Evidence**

**Addressing Unmet Criteria**

**Usability Features Evaluation**

**Addressing Unmet Usability**

**Maintenance/Limitations**

**Future Development**

**Quality**

**References**

**Strava**

<https://apps.apple.com/app/strava-cycling/id426826309>

<https://play.google.com/store/apps/details?id=com.strava>

<https://www.strava.com/>

**MyFitnessPal**

<https://apps.apple.com/us/app/myfitnesspal/id341232718>

<https://play.google.com/store/apps/details?id=com.myfitnesspal.android>

<https://www.myfitnesspal.com/>

**Firebase**

<https://firebase.google.com/>