Gym Analytics and Personal Training Application

Design Manual

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Abstract

The purpose of this “Gym Analytics and Personal Training application” is to develop a mobile application for Android and iOS with two sections available to the public. Firstly, we have a client section to help the average person hire a personal trainer, purchase a workout plan whether it is a pre-made plan or a requested plan. The client also has the option to set motivational personal goals/ milestones for them to achieve.

Secondly, we have the trainer side of this application, it is here where a Personal Trainer can grow their business by posting pre-made plans, create custom plans for clients, reach a wide range of potential clients and receive payments directly into their PayPal accounts.

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Introduction

The purpose of this document is to define the technologies and expand upon the functionality outlined in the function specification. From reading this document a developer should have the ability to easily understand the architecture of this project and with this knowledge begin development. This application's main goal is different depending on the observer. To the "client" the main purpose of this application is the ability to easily hire a personal trainer to help them achieve their goals. However, in the eyes of the "trainer" the main purpose of this application is to allow them to expand their reach and client base.

This documentation will include sections on System Architecture, UI design, Sequence diagrams and accompanying notes on each section. This document does not represent the final outcome but instead is to be used as a guide.

System Architecture

This Gym Analytics and Personal Training application will be developed in a Xamarin environment to ensure cross compatibility between Android and iOS. The backend database will be developed and hosted by Firebase Realtime Database. All data contained within the application will be stored in this database e.g., Trainer/Client information, goals, payments, etc. If the Application cannot reach the database an error message will be displayed back to the user in place of the data.

Figure 1. System Architecture

Firebase

Firebase is an extremely powerful and secure BaaS (Backend as a Software).[1] Firebase's goal is to provide developers with all the tools and services needed to securely develop high-quality apps.[1] For my project I will be use Firebase's Realtime database, Authentication and Storage. Xamarin communicates with Firebase with the help of its NuGet Packages and a .cs file names "FireAssistant". In the FireAssistant file Xamarin will connect to my Firebase client and all communication will go through it.

Xamarin

Xamarin is where 90% of my code will be developed. Xamarin is an open-source platform for building modern and performant applications for iOS, Android, and Windows with .NET. Xamarin is an abstraction layer that manages communication of shared code with underlying platform code.[2] This is important as my intent is to release this application on both Android and iOS which can prove difficult due to their different architectures.

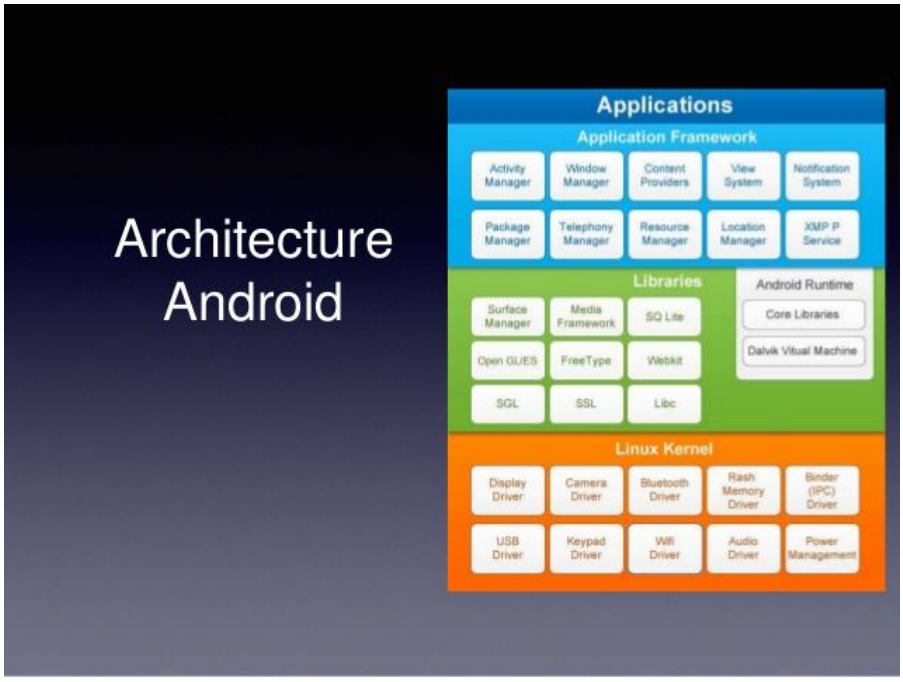

Figure 2. Android Architecture

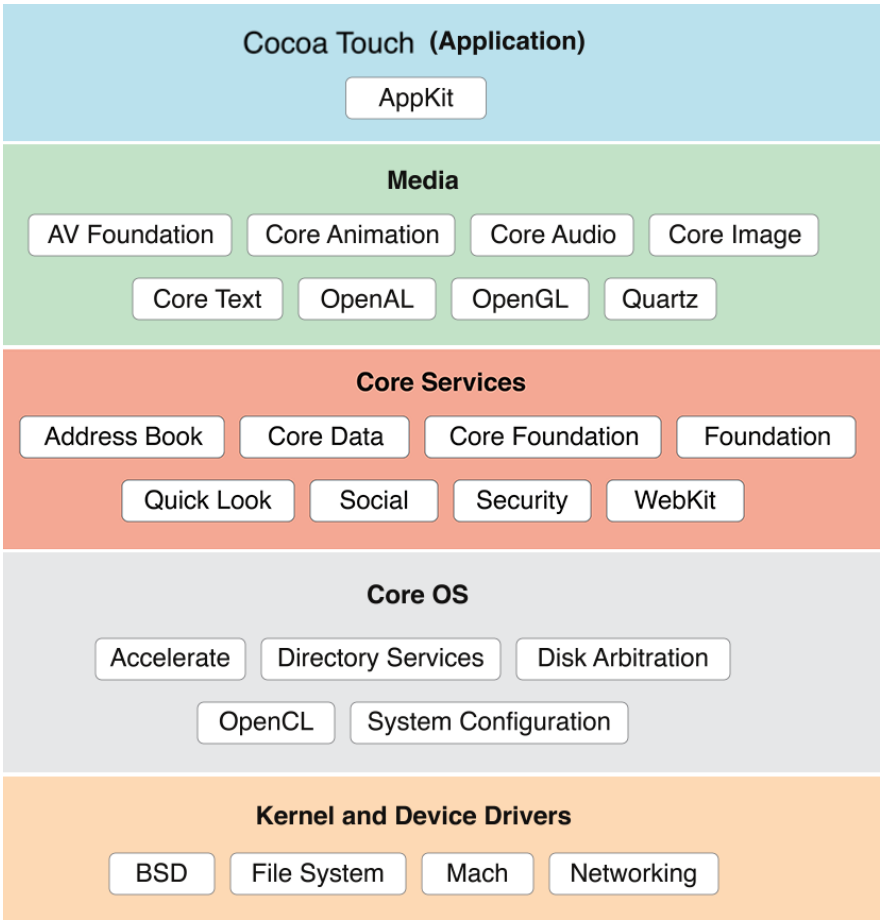

Figure 3. iOS Architecture

Xamarin enables developers to share an average of 90% of their application across platforms. This pattern allows developers to write all their business logic in a single language (or reuse existing application code) but achieve native performance, look, and feel on each platform. [2]

In order to create my application Xamarin requires an integrated development environment (IDE) to work in. For the duration of this project, I will be using Microsoft Visual Studio as my IDE.

UI Design

This section of the design manual displays mock-up designs for use as a guide during the development process of the user interface (UI). The Finalized product may vary.

Figure 4. Login Screen

This screen is the login screen for this application. Here the Trainer, Client or Admin enter their Email and password to be granted access to the application. This screen will also provide a link to the reset password and registration pages.

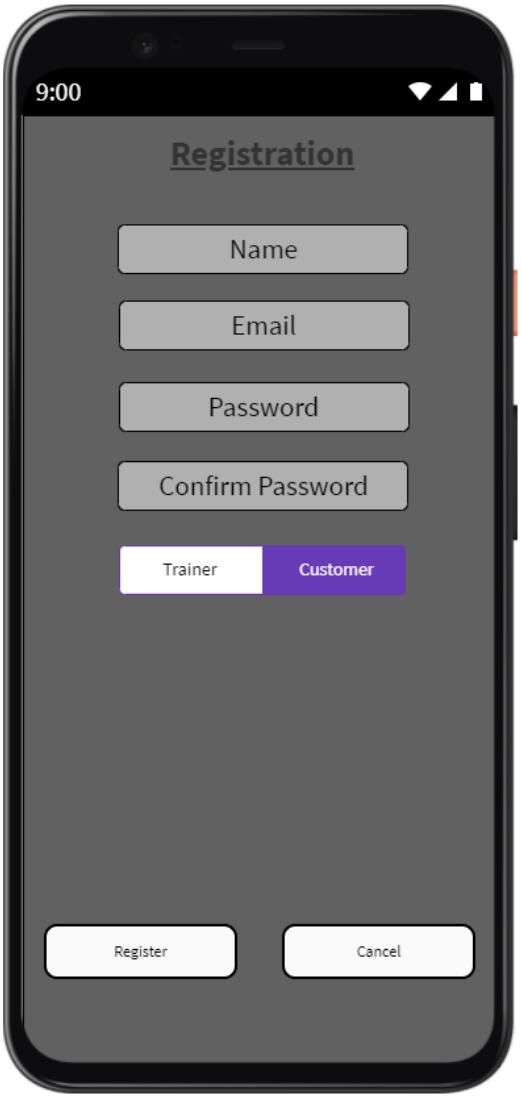

Figure 5. Registration Screen

This screen is the general registration screen for this application. I have opted to not require gender input. The user is prompted to enter their name, email, a password, confirmation of this password and indicate whether they are a trainer or client.

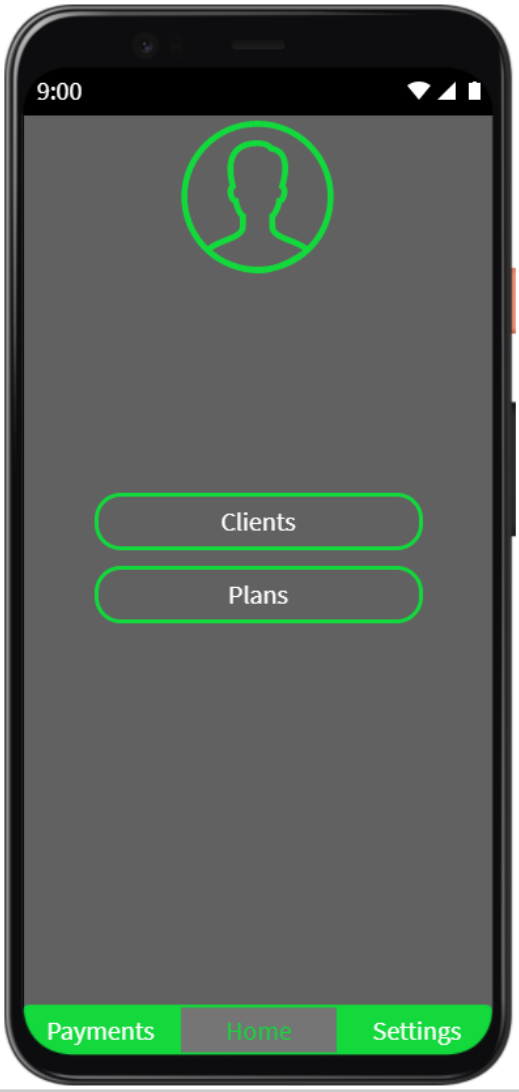

Figure 6. Trainer Home Screen

Once the Trainer is logged in, they are brought to the home screen. Here the trainer can view their clients and navigate to their plans or use the bottom bar to navigate to payments or settings tabs.

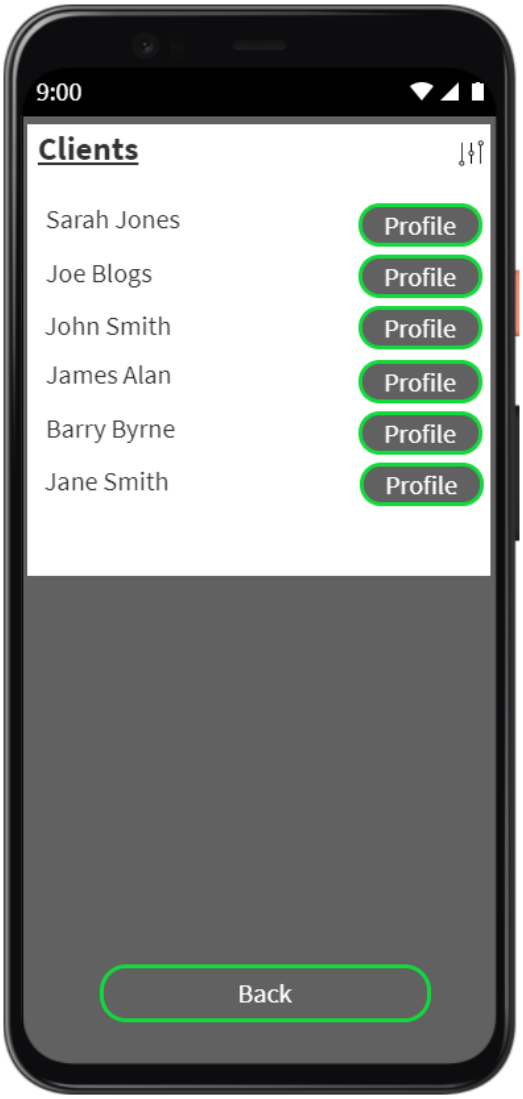

Figure 7. Trainer Client Screen

This is the clients list screen accessed by the trainer from the home screen. Here the trainer can view a list of all current clients and access their profiles through the link. The trainer can also opt to return to their home screen using the back button.

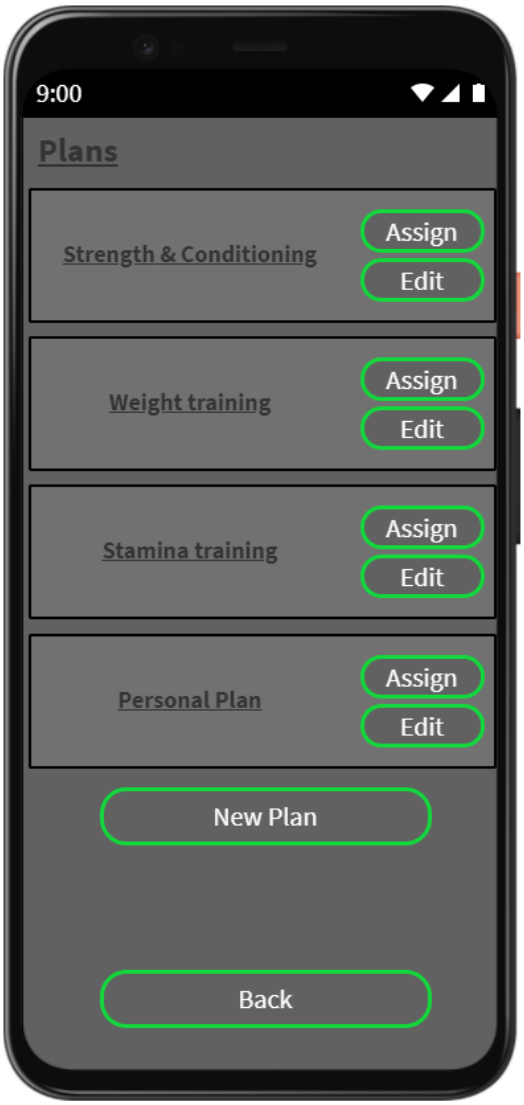

Figure 8. Trainer Plans Screen

This is the Plans screen accessed by the trainer from the home screen. Here the trainer can view a list of all current Plans, assign a plan to a client, edit or create a new plan. The trainer can also opt to return to their home screen using the back button.

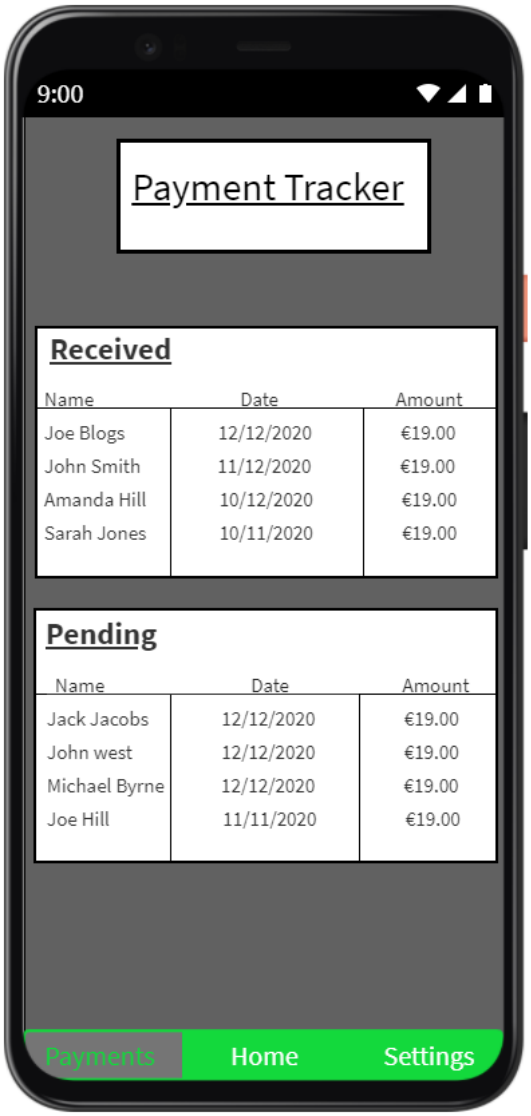

Figure 9. Trainer Payments Screen

This is the Payments screen accessed by the trainer from the navigation bar at the bottom of the screen. Here the trainer can view all recent payments received along with pending payments. The trainer can navigate to the home screen or settings screen using the navigation bar at the bottom.

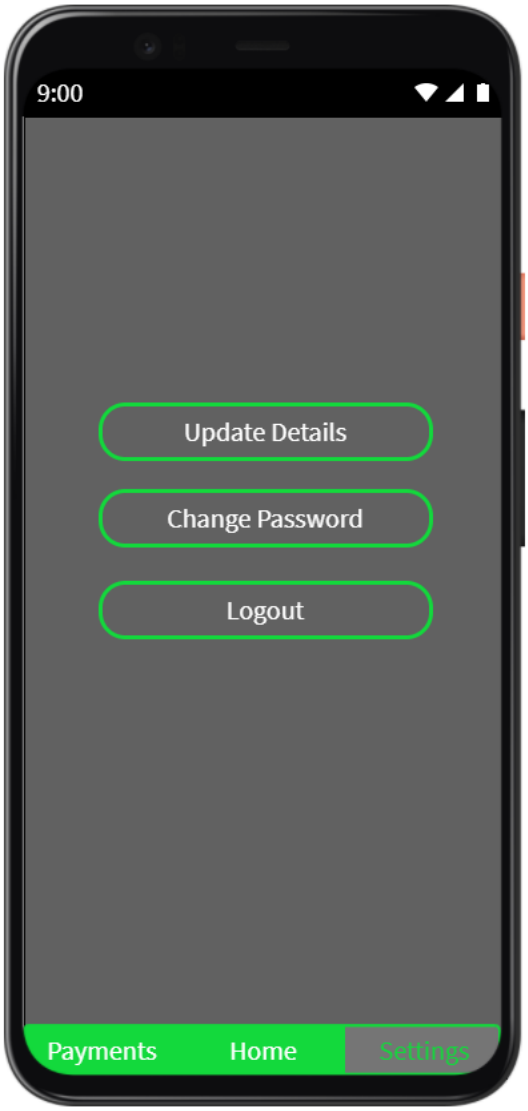

Figure 10. General Settings screen

This is the Settings screen accessed by all users from the navigation bar at the bottom of the screen. Here the user can change their password, close their account or logout of the application. The user can also return to the home or payments screens using the navigation bar.

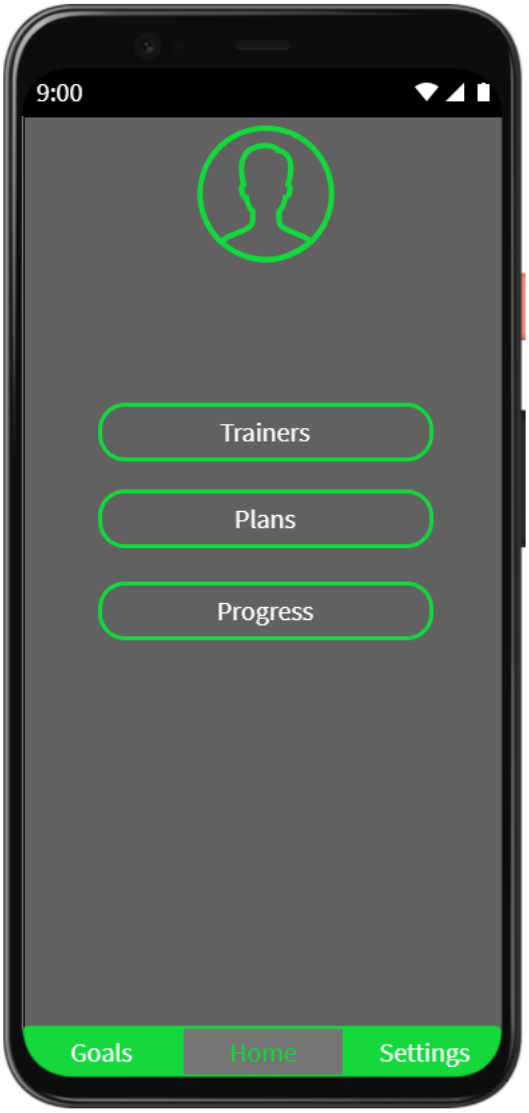

Figure 11. Client Home Screen

Once the client is logged in, they are brought to the home screen. Here the client can access the trainers list, current plans they can take part in or quick access to their progress screen. The client can also access the goals and settings tabs through quick navigation bar at the bottom of the screen.

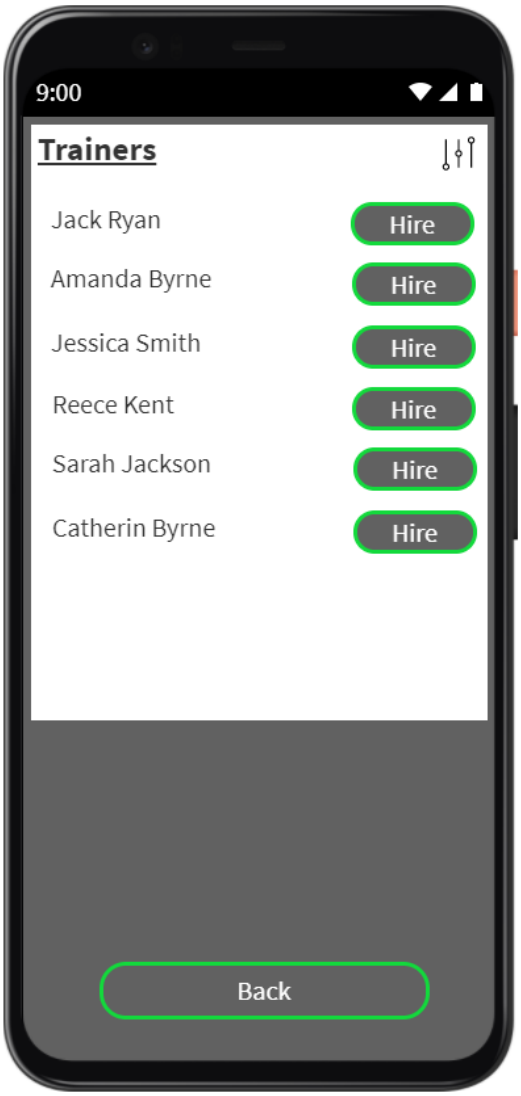

Figure 12. Client Trainer Screen

This is the trainer list screen accessed by the client from the home screen. Here a client can hire a trainer to help them achieve their goals. Once the hire button is selected the database is updated to link the selected trainer to the client. The client can also opt to return to their home screen using the back button.

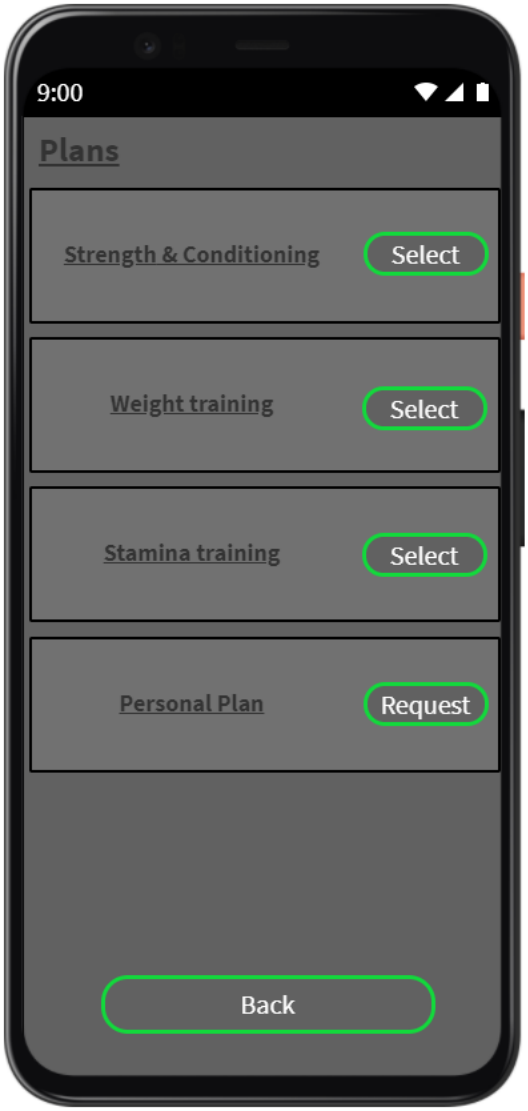

Figure 13. Client Available Plans Screen

This is the Plans list screen accessed by the client from the home screen. Here a client can select a plan created by their hired trainer to help them achieve their goals. Once a plan is selected the client is guided to the payment screen where they will provide their card information for the stripe payment transaction. The client can also opt to return to their home screen using the back button.

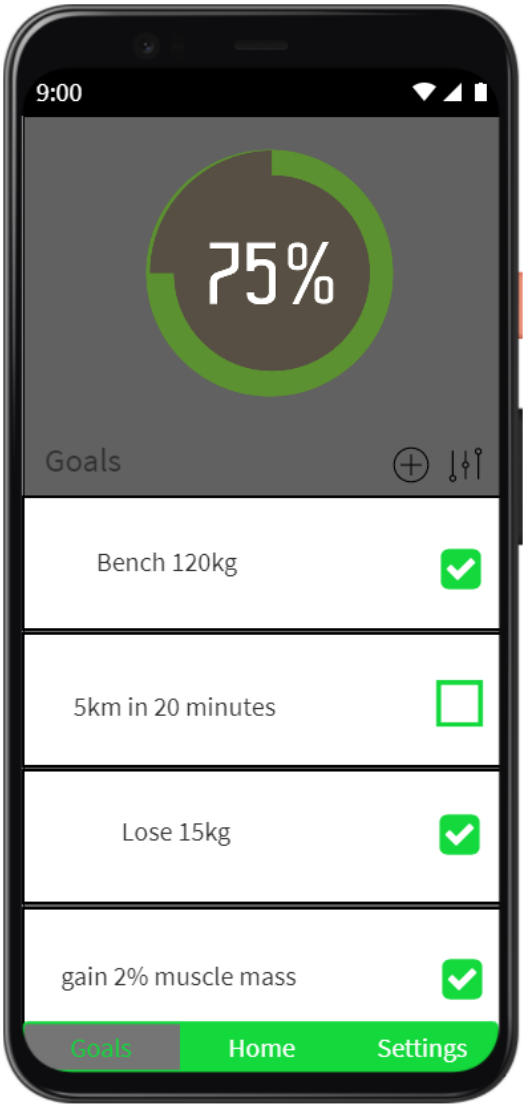

Figure 14. Client Progress/Goals Screen

This is the Goals screen accessed by the client from the navigation bar at the bottom of the screen. Here the client can view current progress as indicated using the chart at the top and the check boxes. The client can also add new goals through the plus icon or edit existing goals by accessing the edit section using the edit icon beside the add. The client can also return to the home or settings screens from the navigation bar.

Database Schematic

In this section I am going to display the database tables used in my application when communicating with my database. As Firebase uses a JSON Format the Tables are not laid out like your typical database Tables.

Client Table in Xamarin

```
namespace GymAndPAapp.Tables
{
    public class Clients
    {
        public string UserName { get; set; }
        public string Token { get; set; }
        public string TrainerName { get; set; }
        public string PlanTitle { get; set; }
        public string Email { get; set; }

    }
}
```

Figure 15. Client Table

Client Table in Firebase

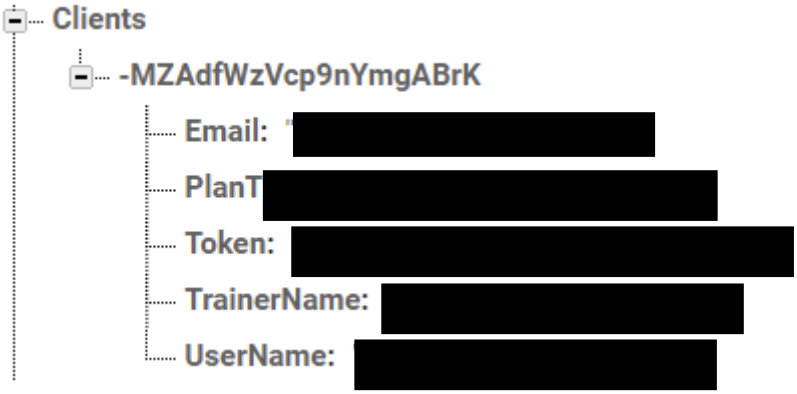

Figure 16. Client Table in Firebase

Trainer Table in Xamarin

```
namespace GymAndPAapp.Tables
{
    public class Trainers
    {
        public string UserName { get; set; }
        public string Token { get; set; }
        public string PaypalAddress { get; set; }
    }
}
```

Figure 17. Trainer Table in Xamarin

Trainer Table in Firebase

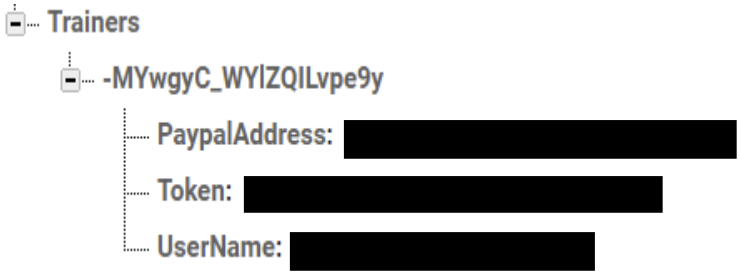

Figure 18. Trainer Table in Firebase

Requests Table in Xamarin

```
namespace GymAndPAapp.Tables
{
    public class Requests
    {
        public string ClientName { get; set; }
        public string TrainerName { get; set; }
        public string Age { get; set; }
        public string Height { get; set; }
        public string Weight { get; set; }
        public string Goals { get; set; }
        public string Equipment { get; set; }
    }
}
```

Figure 19. Request Table in Xamarin

Requests Table in Firebase

Figure 20. Request Table in Firebase

Plan Table in Xamarin

```
namespace GymAndPAapp.Tables
{
    public class Plans
    {
        public bool active { get; set; }
        public string TrainerName { get; set; }
        public string PlanTitle { get; set; }
        public string Description { get; set; }
        public string Monday { get; set; }
        public string Tuesday { get; set; }
        public string Wednesday { get; set; }
        public string Thursday { get; set; }
        public string Friday { get; set; }
        public string Saturday { get; set; }
        public string Sunday { get; set; }
        public string Calorie { get; set; }
        public string Fee { get; set; }
        public string Link  { get; set; }
        public string Client { get; set; }

    }
}
```

Figure 21. Plan Table in Xamarin

Plan Table in Firebase

Figure 22. Plan Table in Firebase

Goals Table in Xamarin

```
namespace GymAndPAapp.Tables
{
    public class Goals
    {
        public string UserName { get; set; }
        public string Goal { get; set; }
        public bool Done { get; set; }

    }
}
```

Figure 23. Goal Table in Xamarin

Goals Table in Firebase

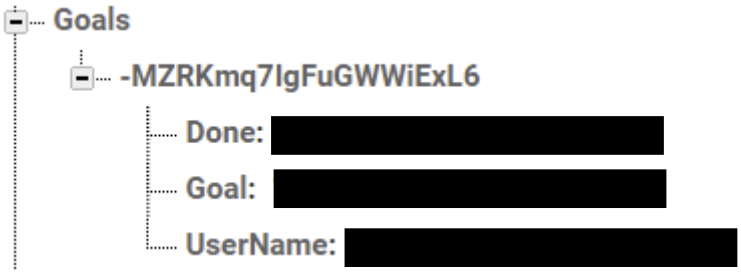

Figure 24. Goal Table in Firebase

Exercises Table in Xamarin

```
namespace GymAndPAapp.Tables
{
    public class Exercises
    {
        public int id { get; set; }
        public string name { get; set; }
    }
}
```

Figure 25. Exercise Table in Xamarin

Exercises Table in Firebase

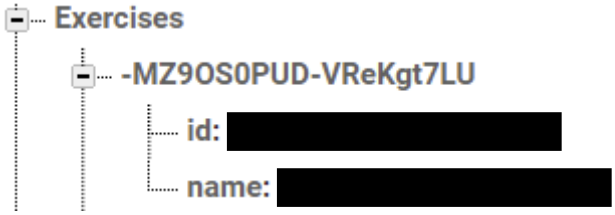

Figure 26. Exercise Table in Firebase

Payments Table in Xamarin

```
namespace GymAndPAapp.Tables
{
    public class Payments
    {
        public string ClientName { get; set; }
        public string Amount { get; set; }
        public string TrainerName { get; set; }
        public string Date { get; set; }
        public string PlanTitle { get; set; }
    }
}
```

Figure 27. Payment Table in Xamarin

Payments Table in Firebase

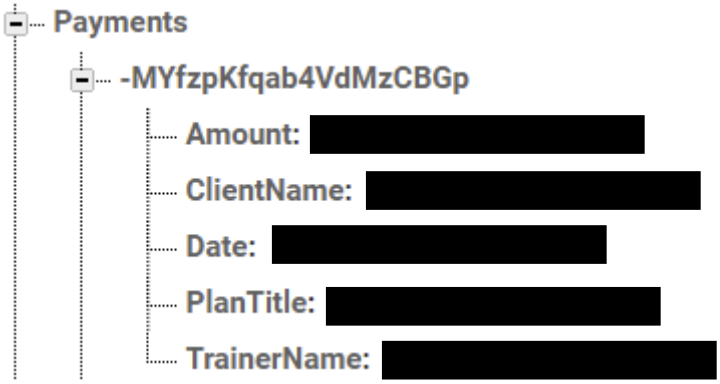

Figure 28. Payment Table in Firebase

Admin Table in Xamarin

```
namespace GymAndPAapp.Tables
{
    public class Admin
    {
        public string UserName { get; set; }
        public string Token { get; set; }
    }
}
```

Figure 29. Admin Table in Xamarin

Admin Table in Firebase

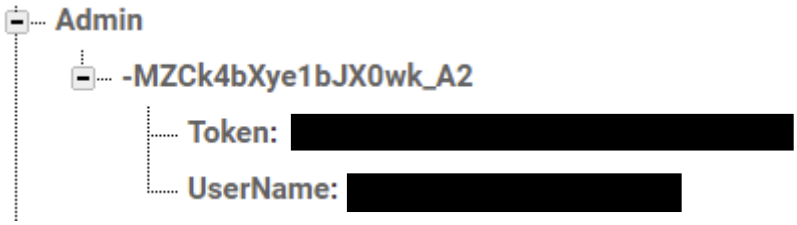

Figure 30. Admin Table in Firebase

Some Basic Sequence Diagrams

Below I have included some basic sequence diagrams showing how the user, application and firebase communicate. This does not represent the final iteration but is to be used as a guide

Trainer Create a Plan

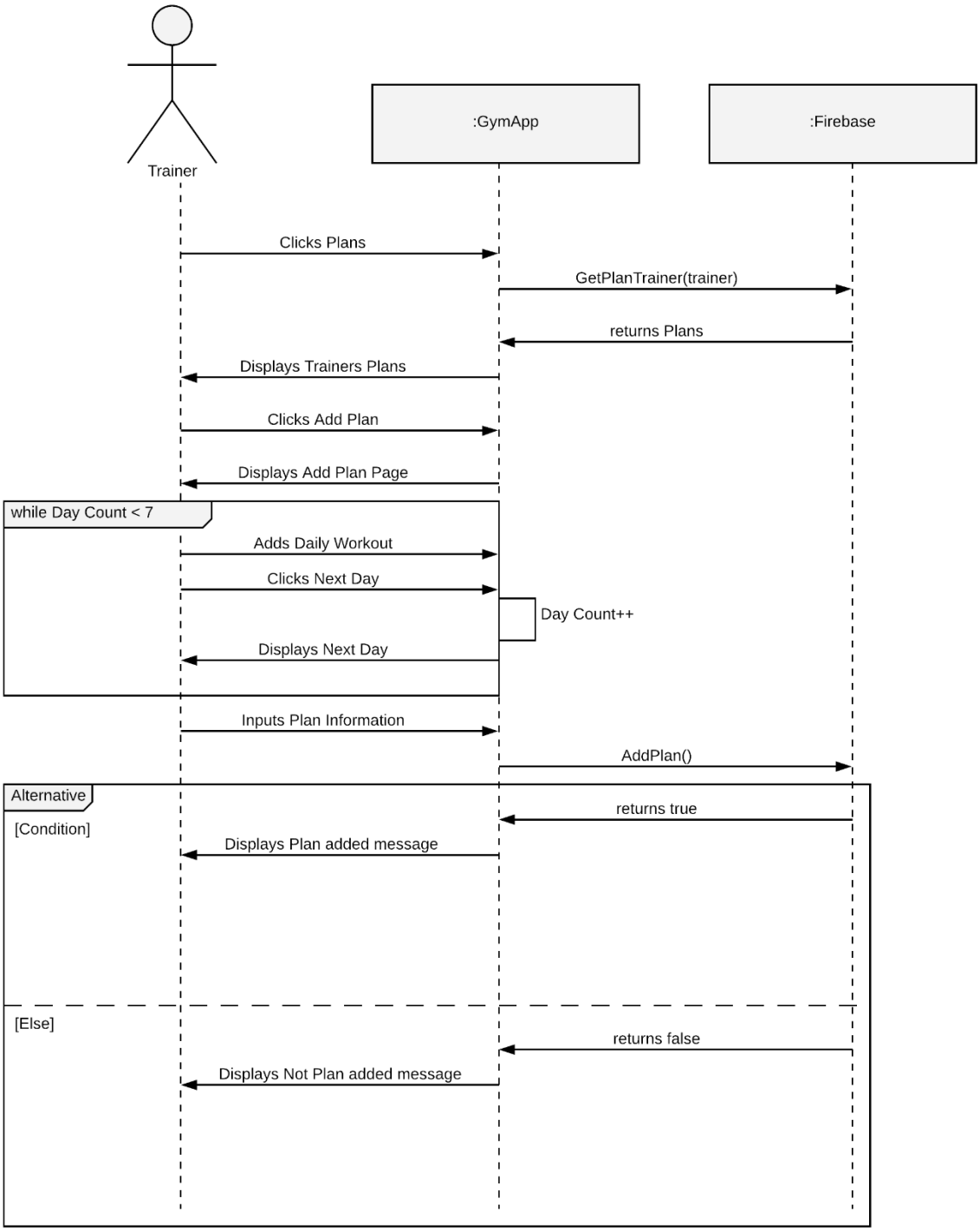

Figure 31. Trainer Create a Plan Sequence Diagram

Client Selecting a Trainer

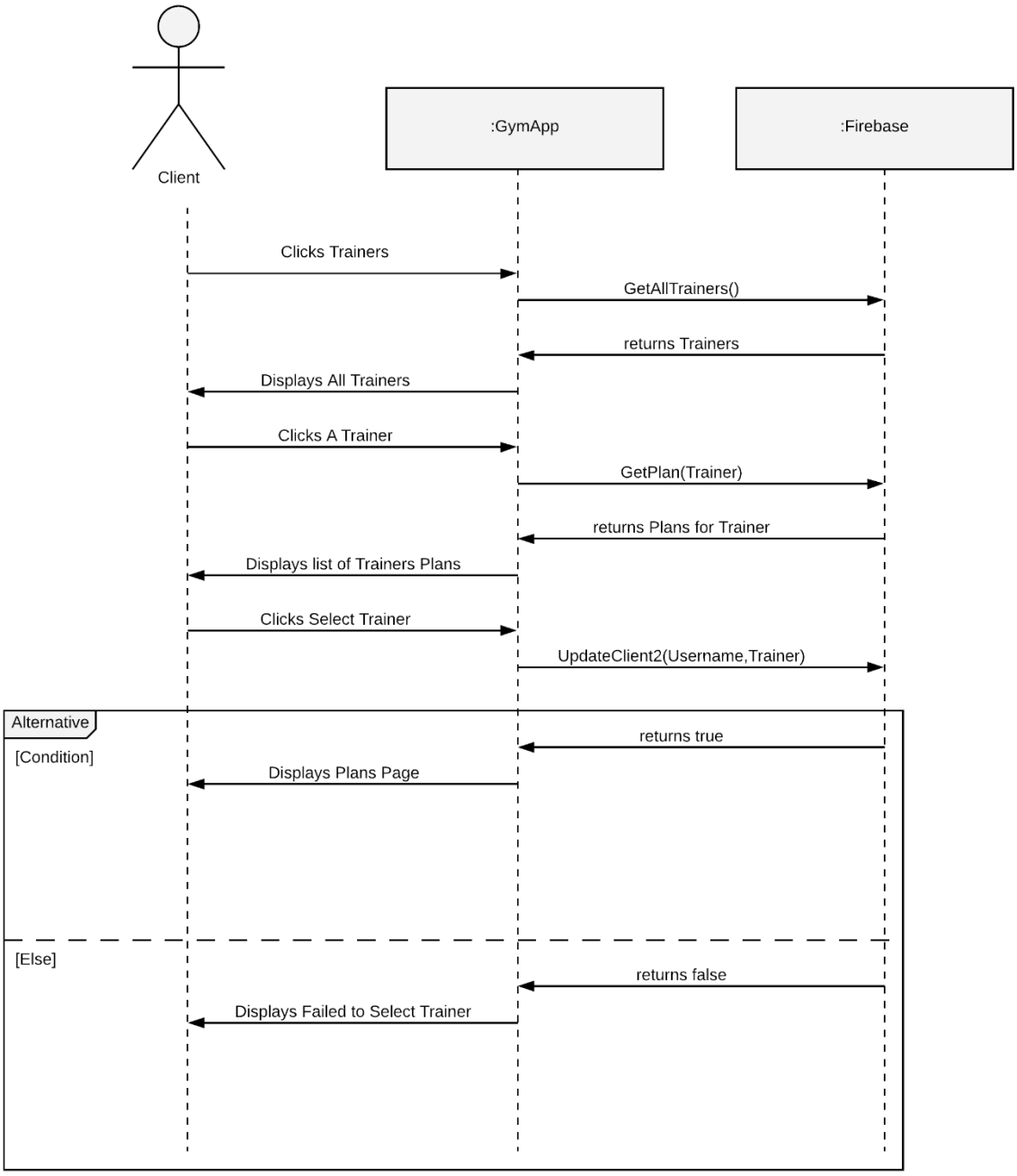

Figure 32. Client Selecting a Trainer Sequence Diagram

Client Create a goal

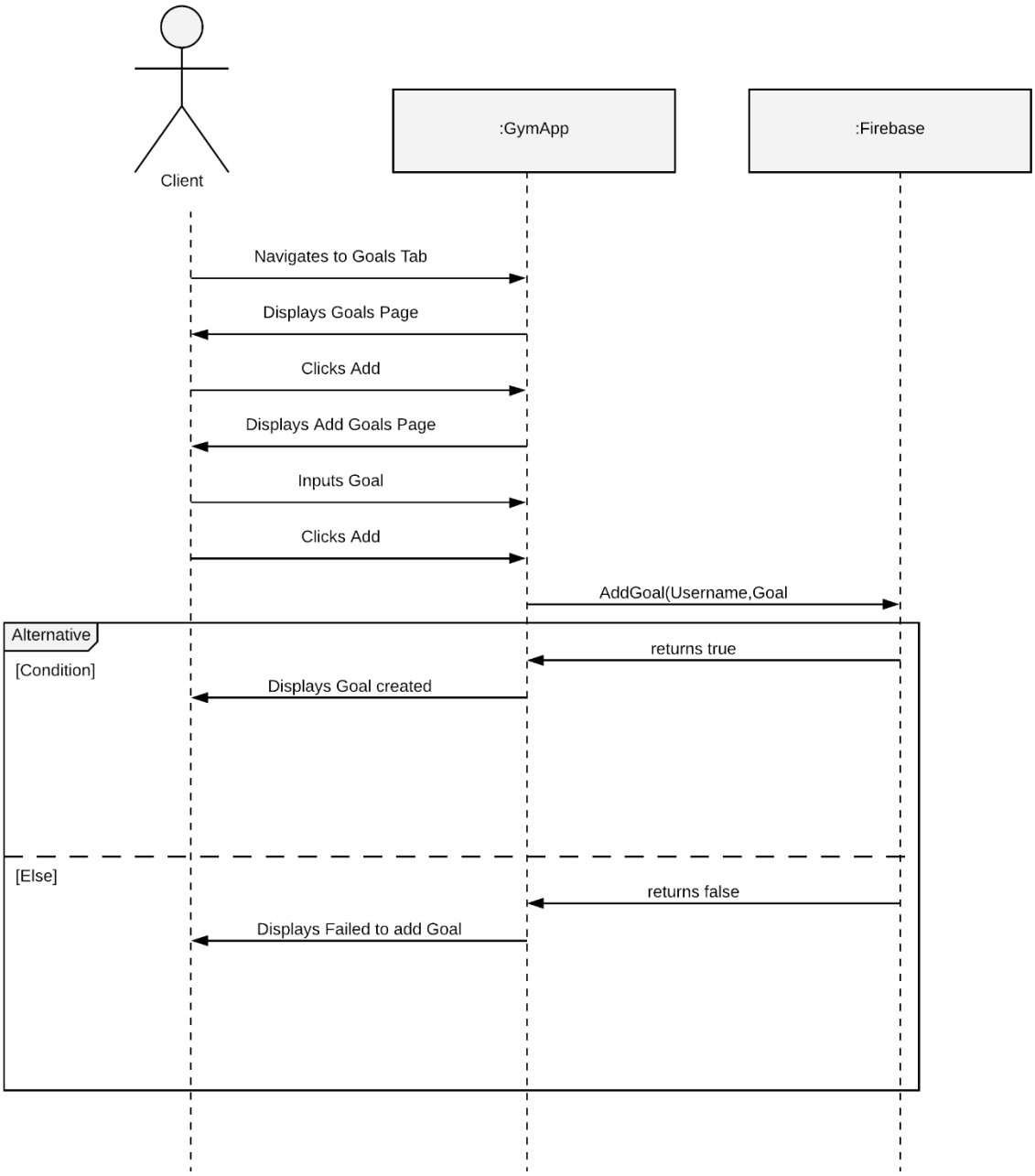

Figure 33. Client Create Goal Sequence Diagram

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2. Docs.microsoft.com. 2020. *What Is Xamarin? - Xamarin*. [online] Available at: <https://docs.microsoft.com/en-us/xamarin/get-started/what-is-xamarin#:~:text=Modern%20language%20constructs%20%E2%80%93%20Xamarin%20applications,programming%2C%20generics%2C%20and%20more>.
3. En.wikipedia.org. n.d. *Android (operating system) - Wikipedia*. [online] Available at: https://en.wikipedia.org/wiki/Android_(operating_system).

Declaration

- I declare that all material in this submission, e.g., thesis/essay/project/assignment, is entirely my own work except where duly acknowledged.

- I have cited the sources of all quotations, paraphrases, summaries of information, tables, diagrams, or other material; including software and other electronic media in which intellectual property rights may reside.

- I have provided a complete bibliography of all works and sources used in the preparation of this submission.

- I understand that failure to comply with the Institute's regulations governing plagiarism constitutes a serious offense.

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Student Number: C00226160

Student Signature:

Date: 30/04/2021