INSTITUTE of TECHNOLOGY CARLOW

Institiúid Teicneolaíochta Cheatharlach

BAINISTEOIR BEAG MOBILE APPLICATION DESIGN MANUAL

BY

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Contents

Introduction

The purpose of this project is to provide an outline of the chosen technologies for the project, the overall architecture planned for the project as a whole, as well as any planned database and storage schema necessary to the function of the application.

This document will also include the planned design for the application's user interface and the use case diagrams related to the use of the mobile application and the accompanying web app for admin use.

Overall Architecture

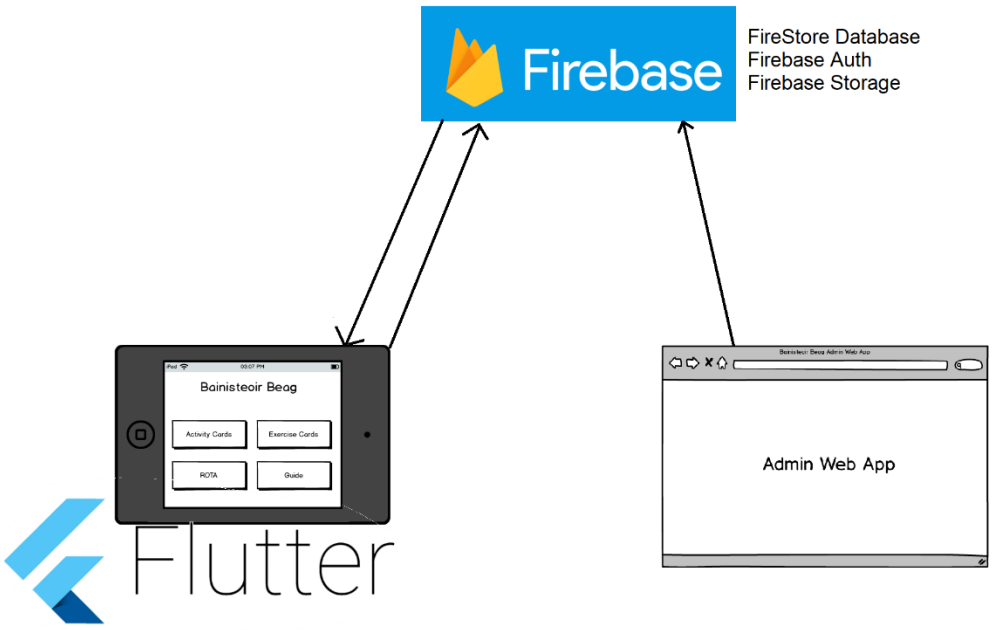
Bainisteoir Beag will consist of a mobile application built with Google Flutter, coded in DART programming language. This application will provide the main functionality of the project.

For features such as databases, storage, and authentication, Google Firebase has been implemented as a cloud back-end. The databases hosted on Firebase will be shared by the mobile application and the accompanying web application for administrator use.

Much of the core functionality of the mobile application should be available offline to account for situations in which the device in use may be out of range of a router and without an internet connection. This consideration has been made based on the intended use of the application, which will mean that the app will be used outdoors in school yards. To achieve this, the entire core set of cards will be stored locally as image assets and indexed in a local JSON file.

Some functionality is planned which will require an internet connection, however, such as the ability to download new cards from a cloud storage bucket.

The purpose of the web application is to allow an administrator to upload new cards to the set via Firebase Storage. The mobile application will then download these newly added cards and add them to the existing set.



Database Schema

Overview

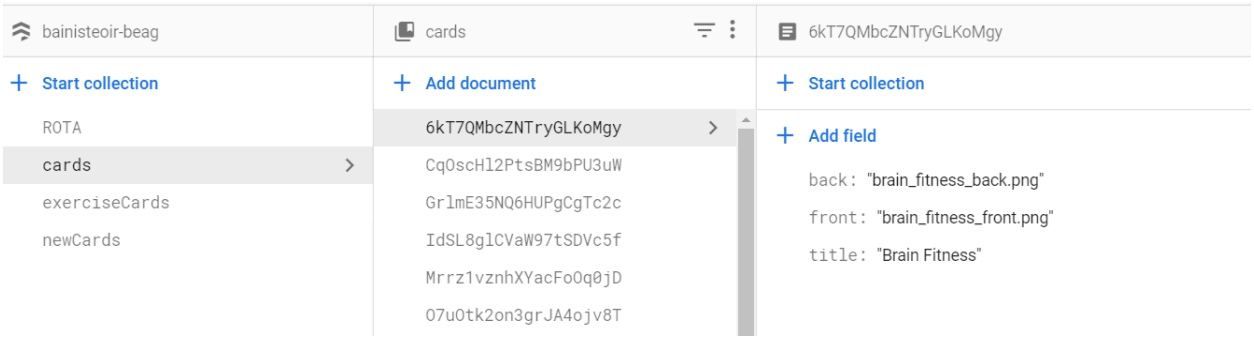
As mentioned, Google Firebase has been chosen as a cloud back-end for this project, and as such, the mobile and web application will utilize the Firestore database service.

Firestore provide a NoSQL database which stores “collections” of “documents”, which may be used in functions similarly to how local JSON files may be used for the offline functionality.

Several databases are planned for use with both the mobile and web applications, and each collection will be discussed below.

Cards

The Cards collection will store the base set of activity cards, which may be read by the mobile application when a user chooses a card. This collection is also stored as a local JSON file in case the device is offline.



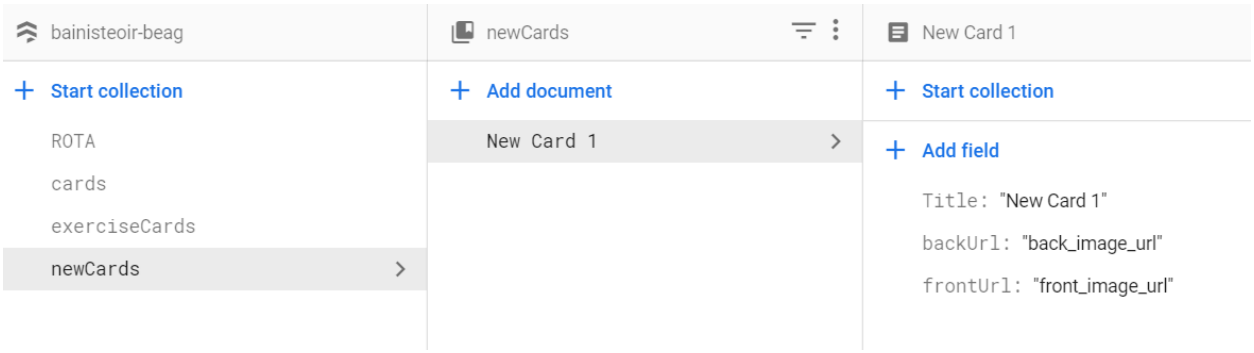
exerciseCards

Like the Cards collection, this collection stores the base set of exercise cards in the set.

newCards

This Collection will store any new cards which are added by an admin via the web application. When a card is uploaded to the project's Firebase Storage bucket, its title and the download URLs for the front and back image will be written to this collection.

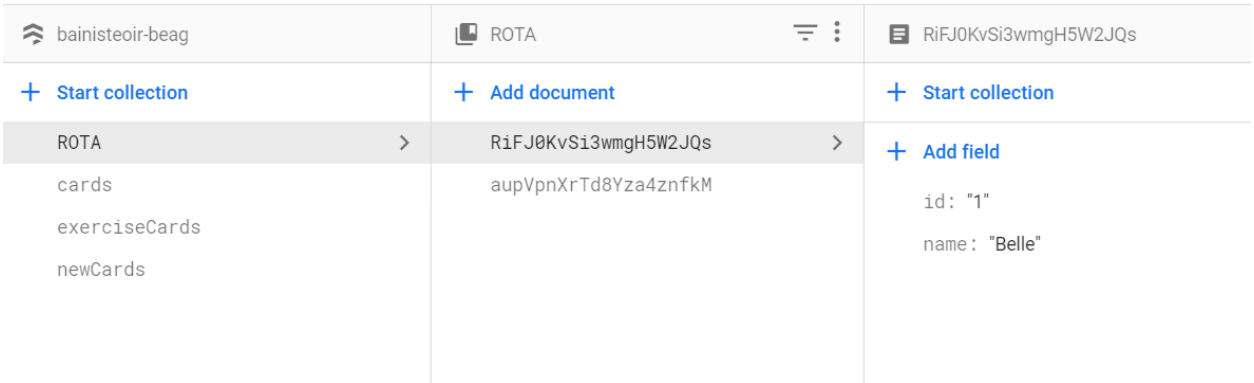
The Mobile application will then be able to access these new cards and display them using the download URLs in the document.



ROTA

This collection will store data necessary for the ROTA system, wherein a list of first names may be stored, for example, for each student in a class. This list of names may be read in on the mobile application and shuffled, in order to provide a turn system with a new name chosen for each game.

Each entry in this collection is also to include a unique identifier based on the device to ensure that only names entered on a device will be displayed on that device.



Authentication

Authentication is to be implemented via Firebase Auth. On the mobile application, teachers may authentication accounts and login in order to manage the ROTA system.

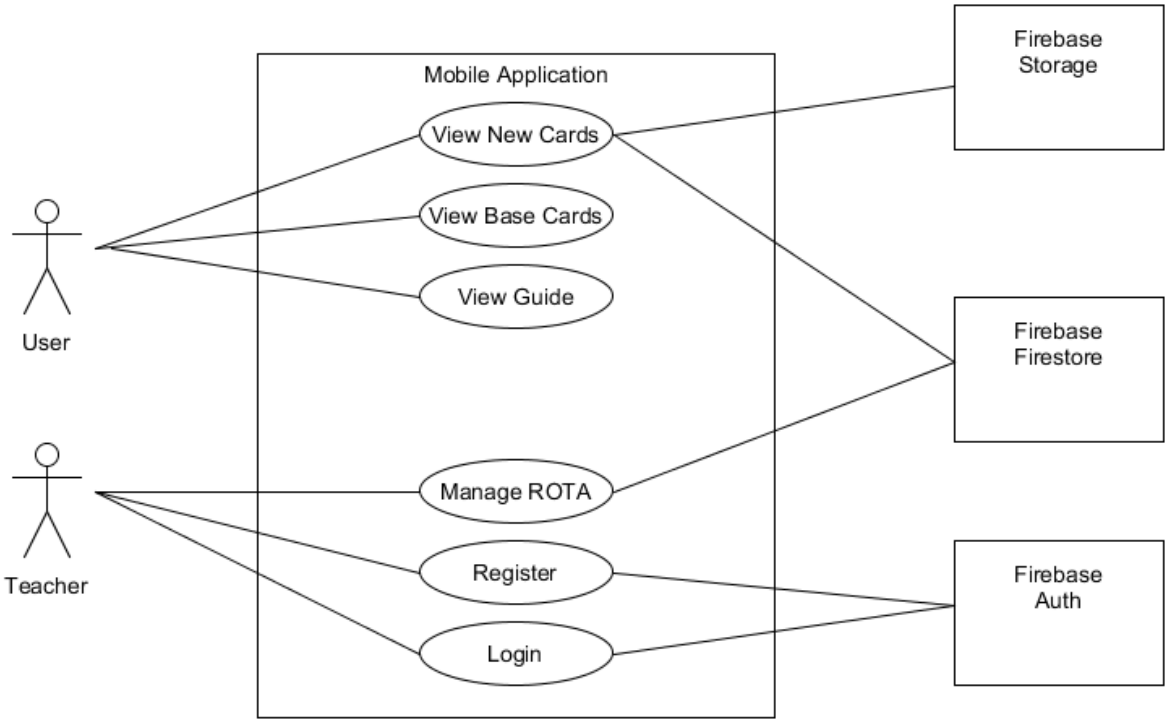
In addition to this, the accompanying web application is intended for administrator use only. One admin account will be registered to allow an admin access to the web application. Administrator credentials will be created and handed over to a new administrator, the client and manager of Bainisteoir Beag, on completion of the project.

Cloud Storage

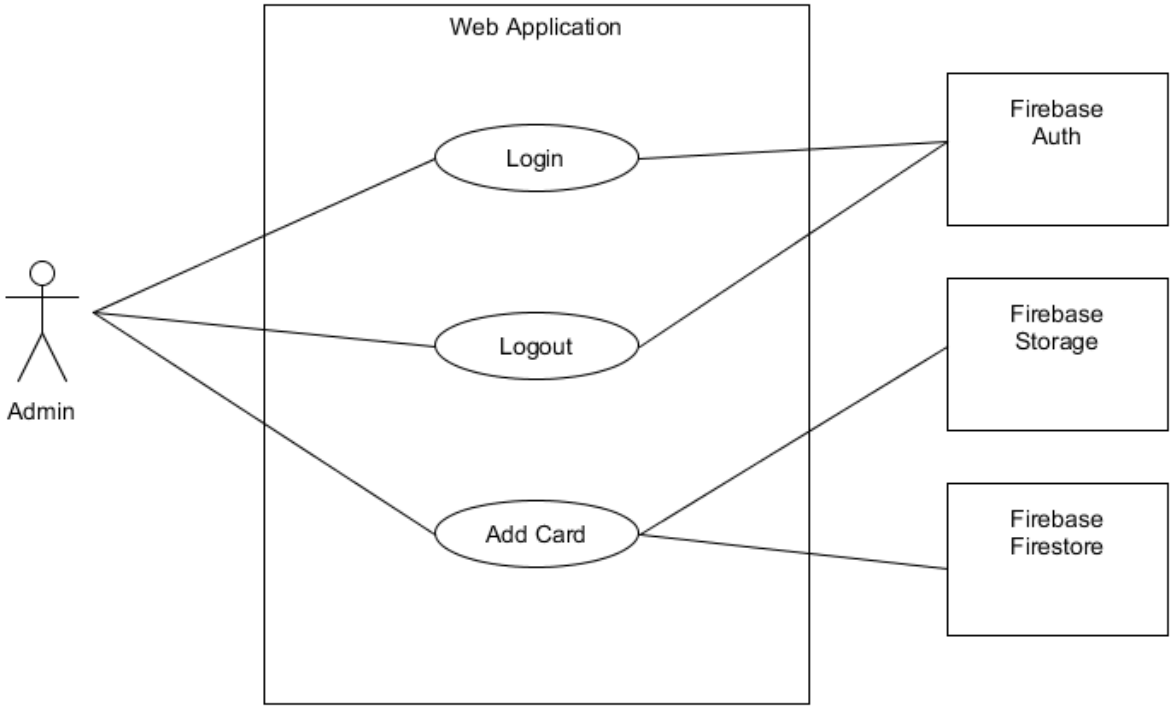
Cloud Storage will be necessary for allowing new cards to be added to the project in the event that any new cards are created at a later date. To accomplish this, a storage bucket will be set up via Firebase Storage. Firebase Storage allows for data within a bucket to be accessed via a generated download URL. This storage bucket will store the images necessary for displaying the cards in the mobile application. When a new card is added via the web application, an administrator may upload two images, one for the front of a card, and another for the back. A card entry will be added to the database mentioned previously, which will store both download URLs related to the uploaded card.

Use Case Diagrams

Mobile Application



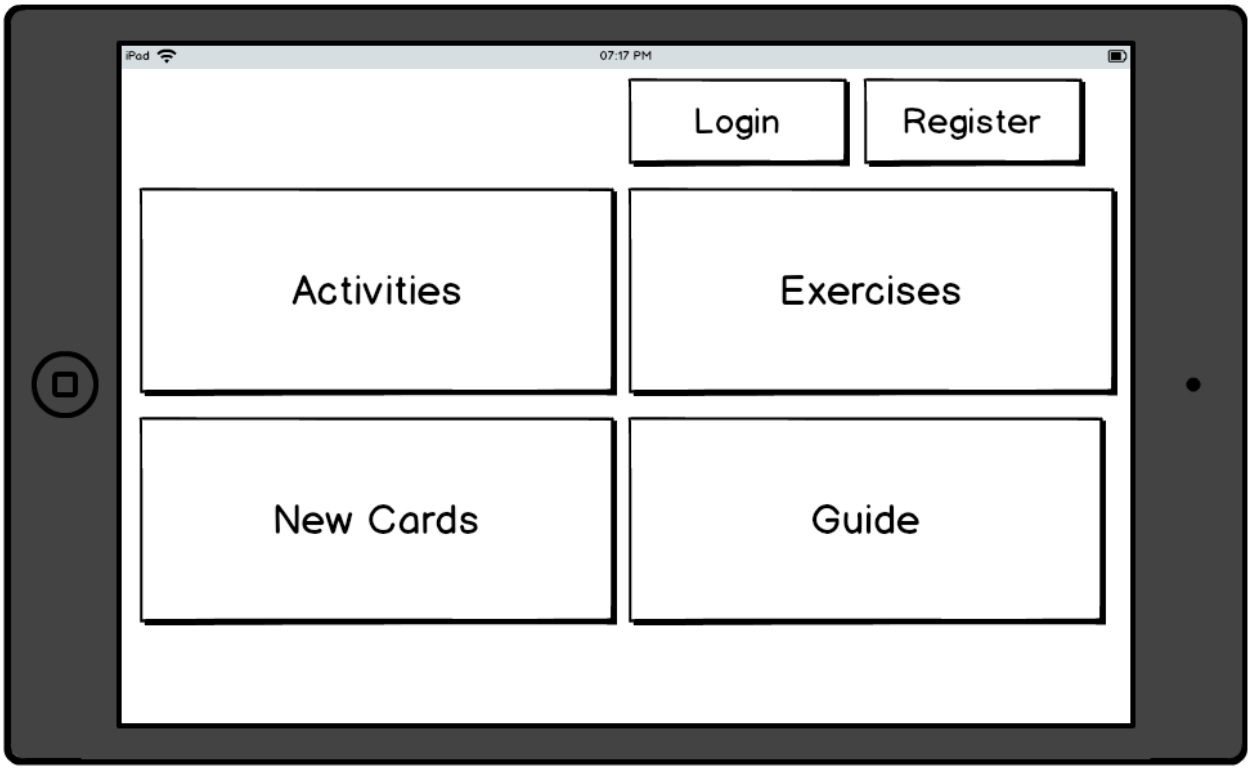
Web Application



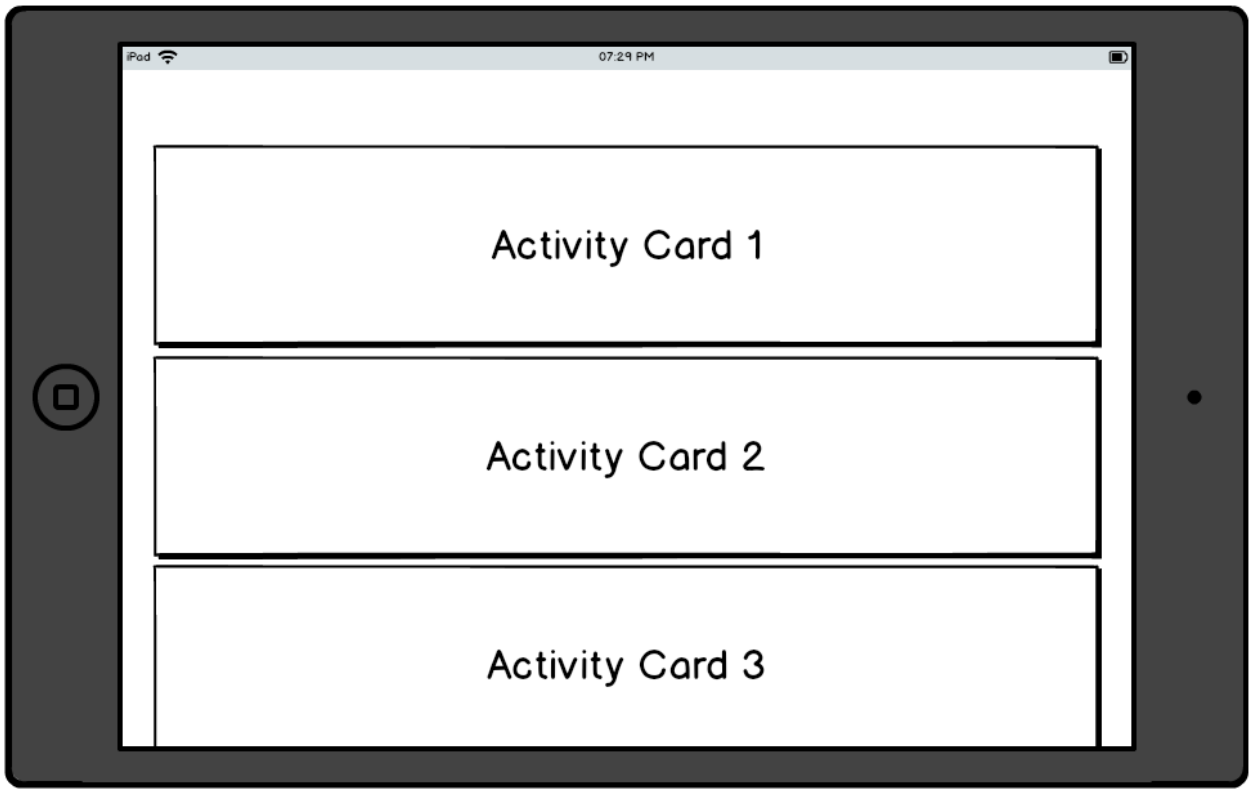
User Interface (UI) Design

Mobile App

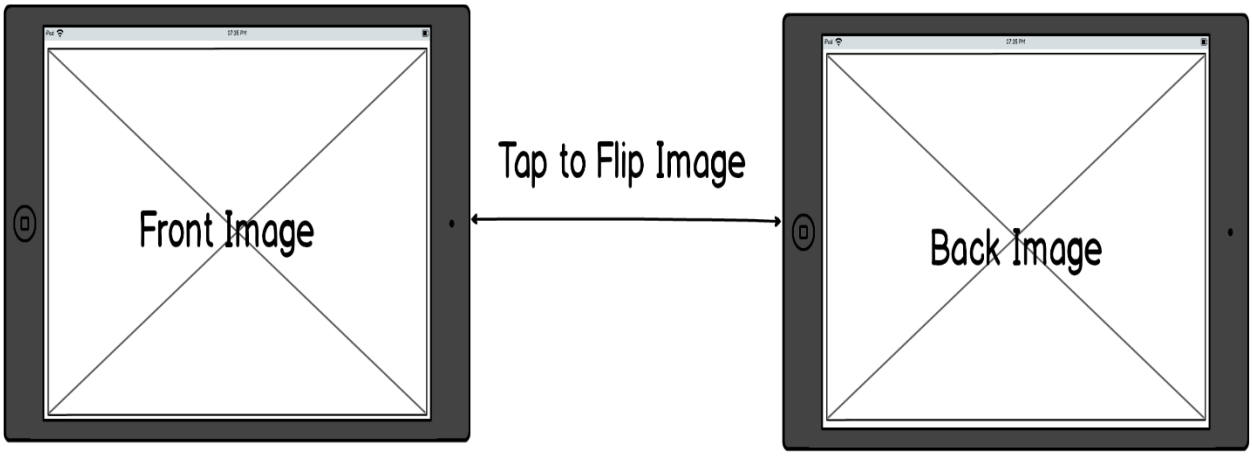
Main Menu



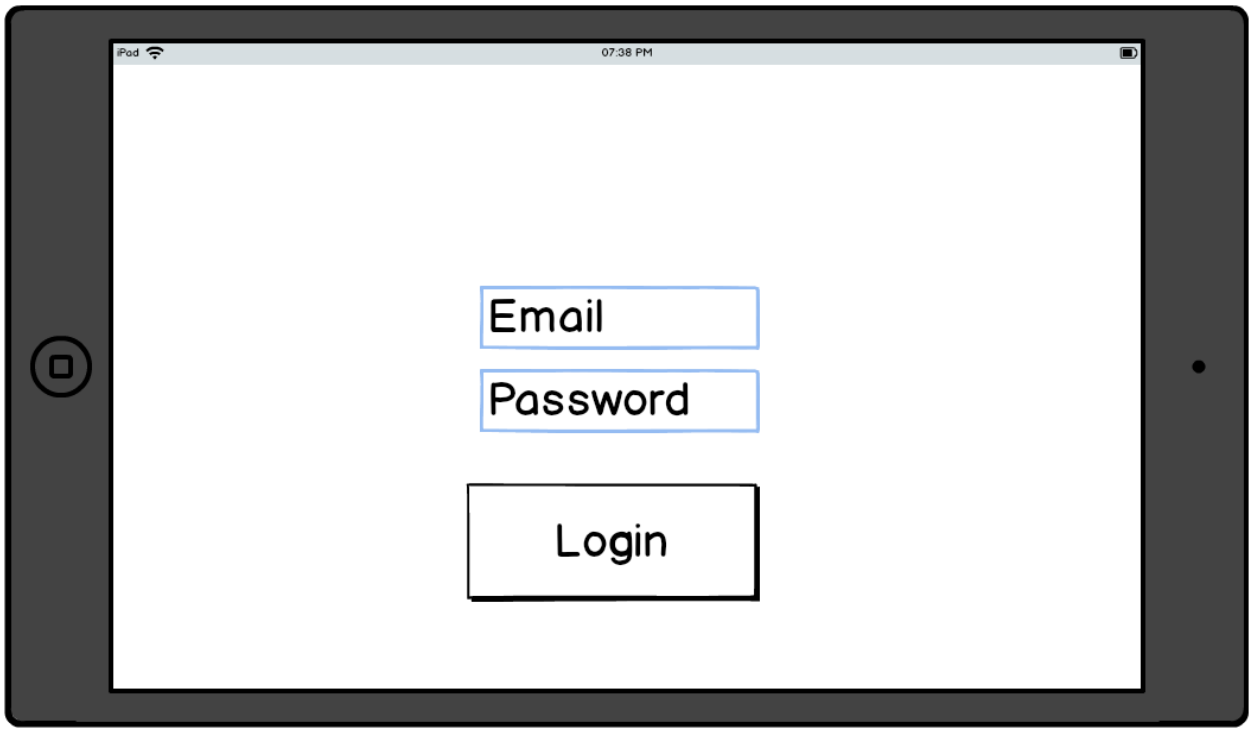
Activities/Exercises/New Cards Menu



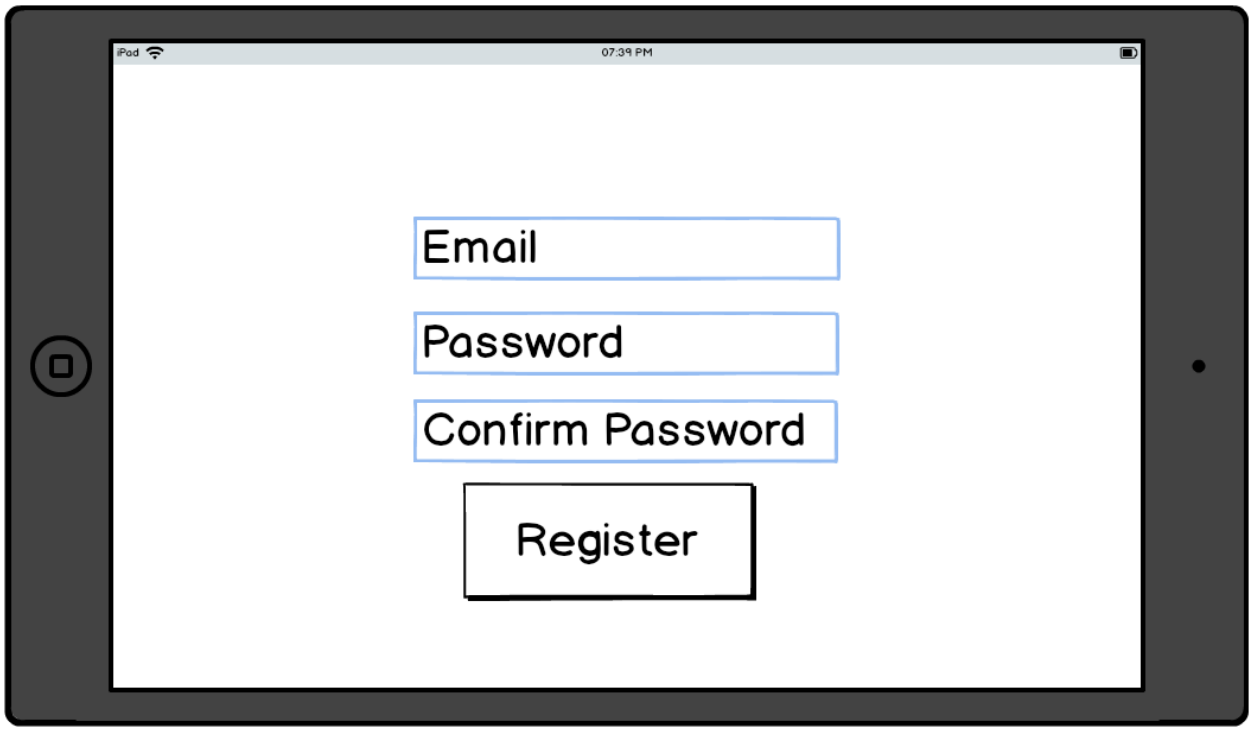
View Cards



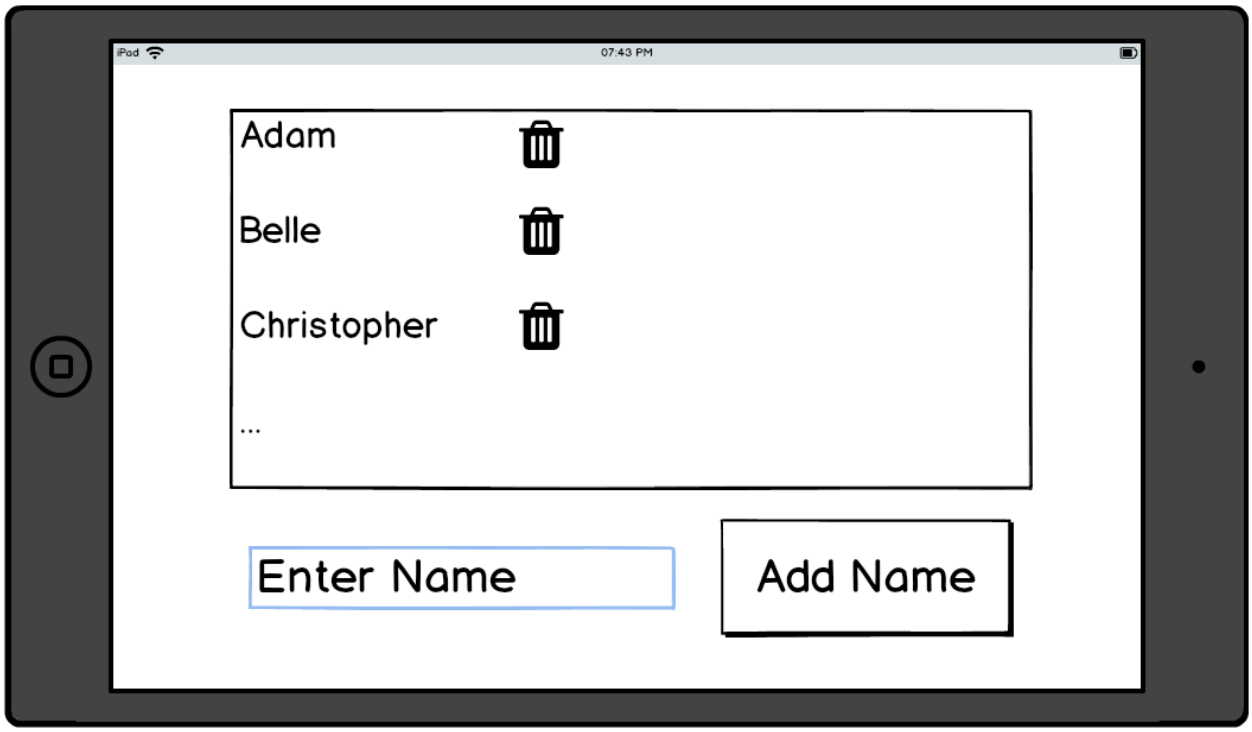
Teacher Login



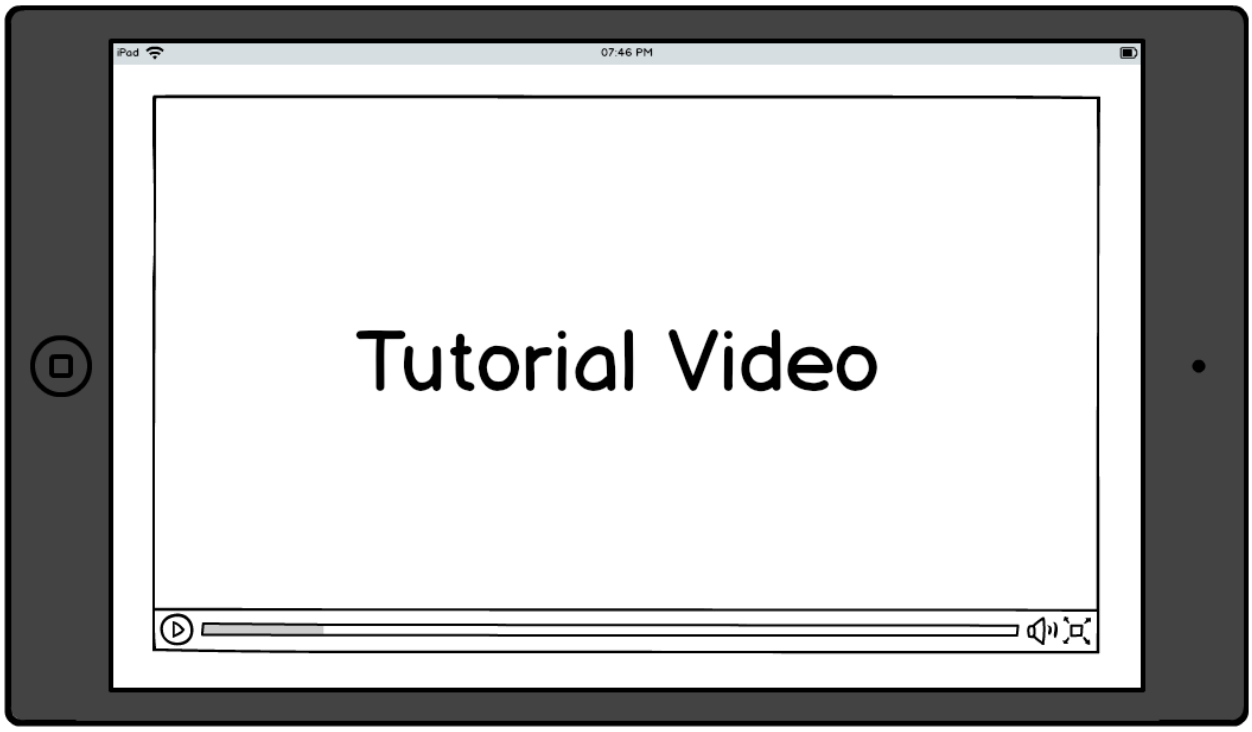
Teacher Register



Manage Rota

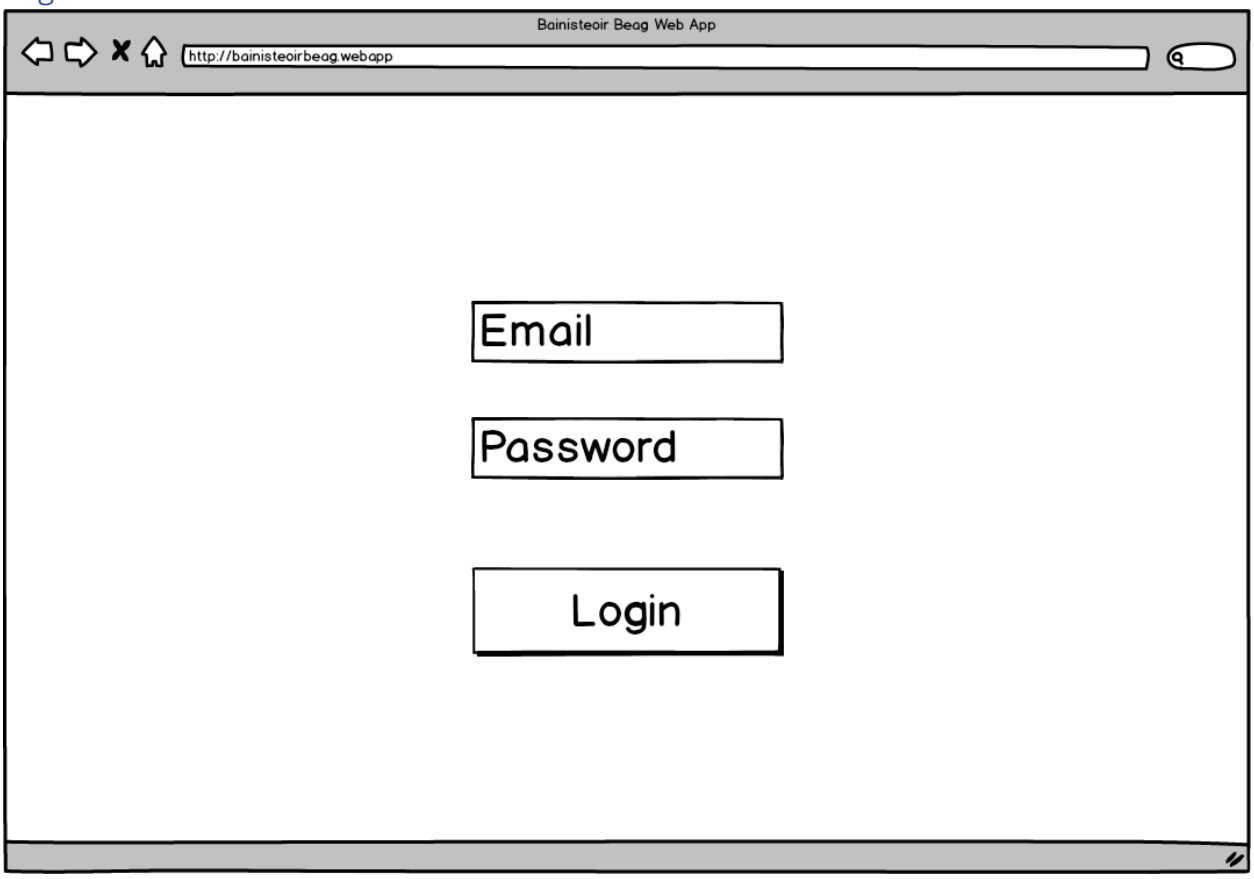


Guide/Tutorial

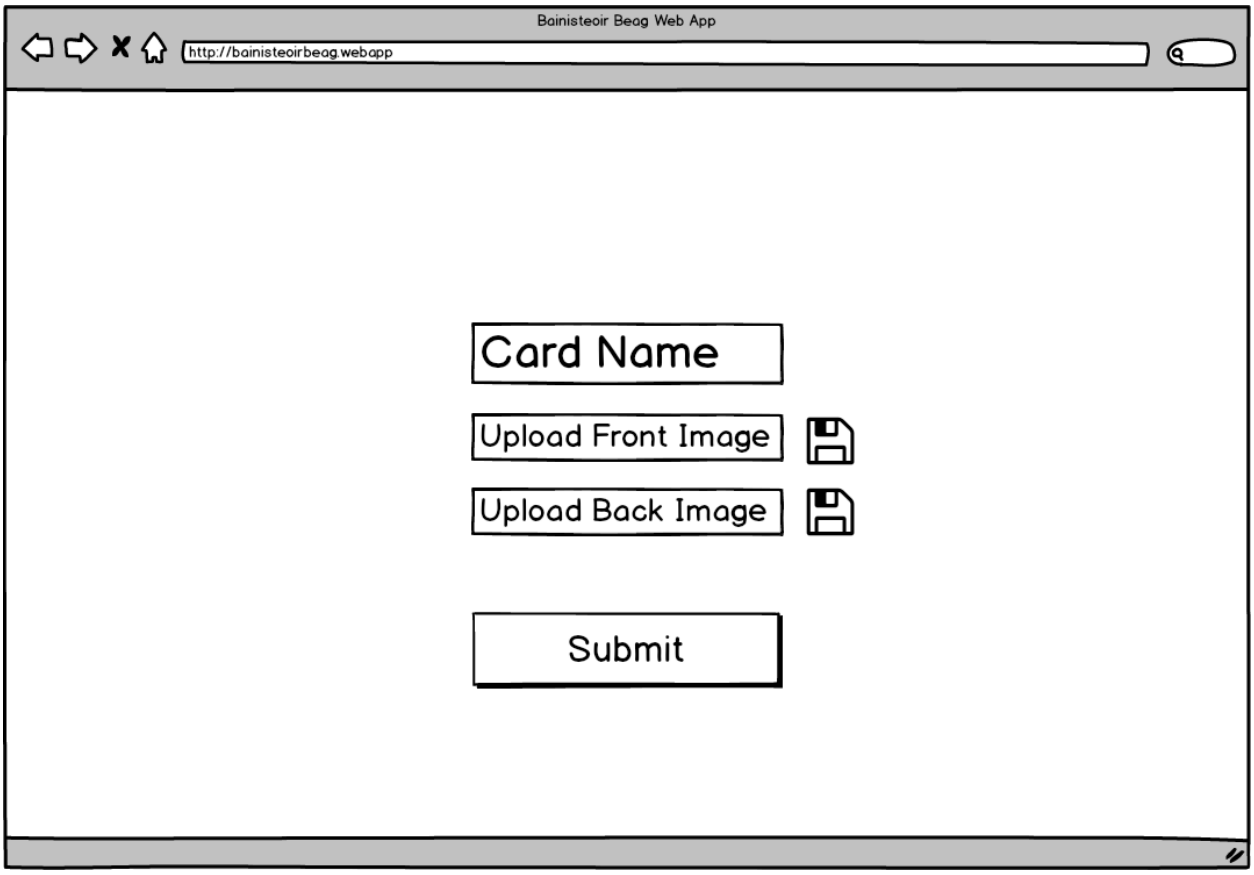


Web App

Login



Add Card


Bainisteoir Beag Web App
http://bainisteoirbeag.webapp
Card Name
Upload Front Image
Upload Back Image
Submit

Declaration

- I declare that all material in this submission e.g. thesis/essay/project/assignment is entirely my/our 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.

Student Name: Francis Hall

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Signature: 

Date: 20/04/2020