

John Crawley

Course: BSHc (Hons) Computing - (Software Development)

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Spontaneous

May 13, 2023

Aims

The aim of this project is to create an iOS16 application to help people who are indecisive or want something to do on the spot in their local area or as a tourist abroad and the application will pick a random place / thing to do out of a list of types of things to do and give an option for directions and the user can pick to use the directions or find something else to do. In order to fix this problem of not being able to decide what to do or just do something spontaneously, this project documentation outlines how I plan to solve this problem by developing this application in native iOS using Swift 5 and Google API.

Motivation

With modern technology and a lot of choices of places to see or try out, it may be hard for people to decide what to pick and do, especially in a foreign country where you may not know what to be looking for or what options are out there. This application simplifies this problem by allowing the user to filter the search radius and what type of places that will be included in the search and allow the application to pick what to do for the user rather than the user spending a lot of time deciding on what to do.

Project Scope

The project outlines to aim to provide users to be able to:

- Search all places in local area based on the filters set by the user
- Store all the places in an array
- Shuffle the array using the Fisher-Yates algorithm and randomly return one place
- Allow user to filter search and select what places can be found
- Localisation
- User can select light theme or dark theme for the application

Project Overview

For this project, I researched different APIs I can use to gather information about places in the user's local area, I looked into TripAdvisor for their API but the pricing was too expensive to run over the development process, the pricing was about €99 per month and then I checked out Google's API for Google Map and Places and it appeared to be the best option for the development of this application since the first 28,000 requests are free and anything over that will be billed. This will make it great during the development phases of the application as the requests I need to make will not cost me anything until I release it for beta and/or the release of the application.

I focused on using Swift 5 for developing a native application for iOS devices because I have a keen interest in developing iOS applications and possible MacOS applications in the future. This will be the biggest iOS project I have made to date.

Overview

Spontaneous is an iOS 16 application that uses technologies like Google API including Maps and Places to gather information and uses that information using Swift 5 (UIKit) programming language, I create an application to store places like cafes, cinemas, bakeries etc and then randomly select one random place and prompt the user with a pin to that place and give details such as the name, rating and category of the type of business.

Goals

1. **Get Place Data From Google API:** The first goal of the application is to gather the data from Google, this includes getting access to the user's location to be used in the search along with setting the filters based on the user's selected values in the settings. To get the data, I need to decode the data from Google's online JSON and use structs to store and decode the JSON.
2. **Store Data In Array:** Once the data is decoded and stored in temporary variables and if the criteria is met such as not being a duplicate then it will be added to an array that can be used while the application is running.
3. **Output Random Place:** When the user presses the, "Be Spontaneous" button, it will execute a function to randomly output and display a random place the user can try out based on their filters in the application's settings.
4. **Display Directions to Place:** When the user gets the output of the place that was randomly selected, the user has a choice to get directions, if the user chooses to get directions, a new screen will appear asking the user to start the route and will have an estimated time and distance to the destination.

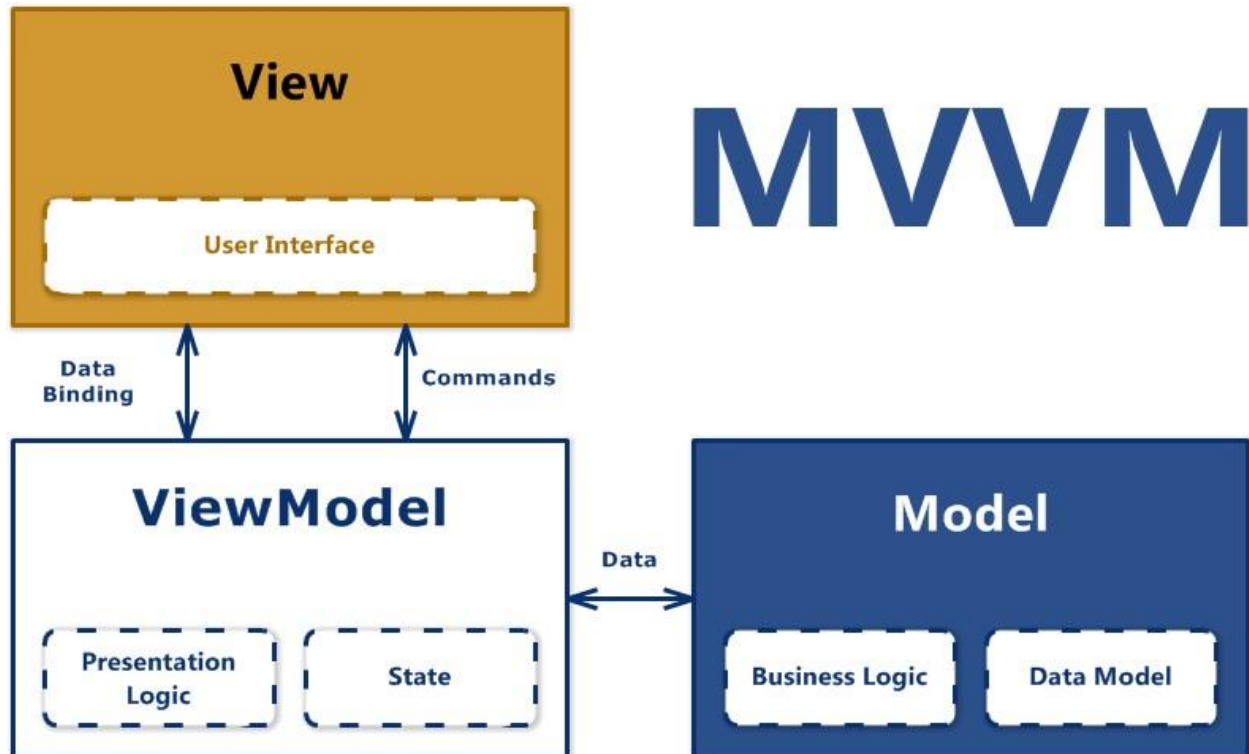
5. **Localisation:** The launch of the application will have localisation in the following languages:

- English (UK)
- Japanese
- Cantonese
- Mandarin
- Italian

The application could have further languages at a later stage such as French, Polish, German.

Specifications

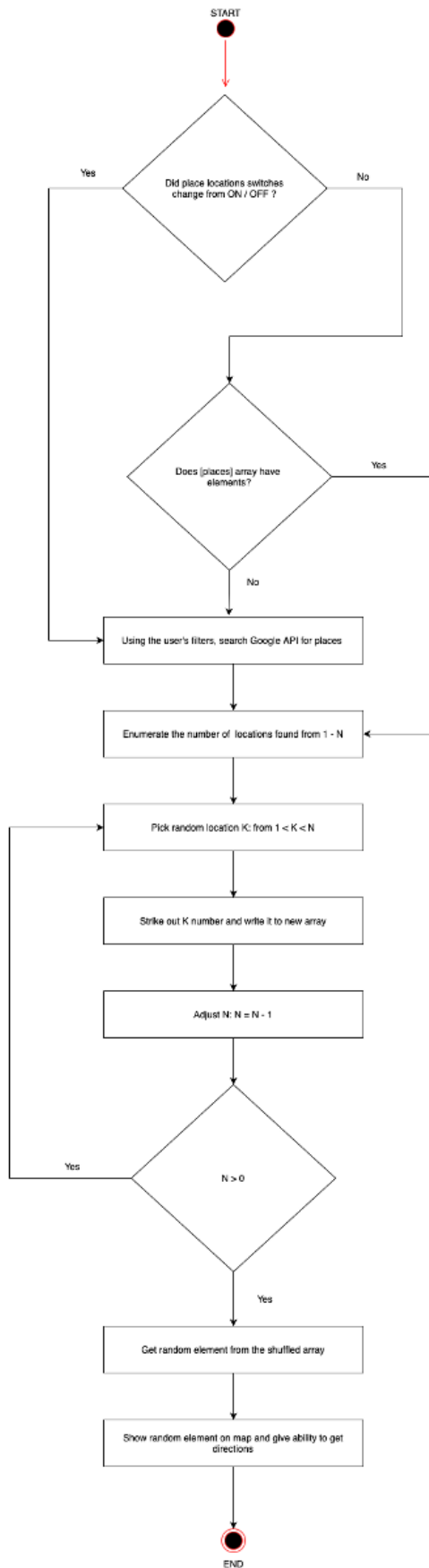
The following specifications for this project including the system architecture of the application is structured, the algorithm used to randomly select a place and how the user interacts with the application and the systems involved to get the place returned back to the user.



System Architecture

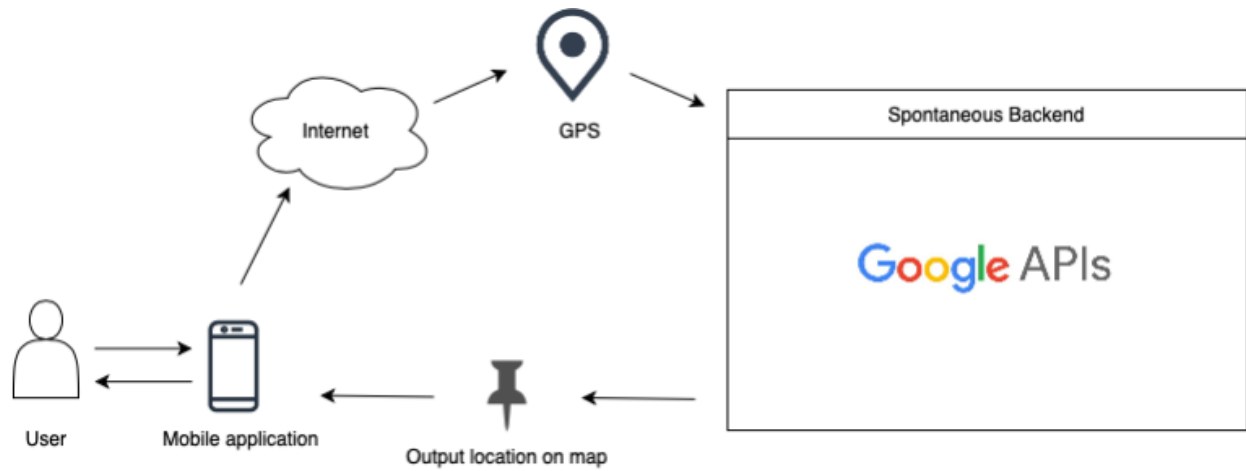
Spontaneous uses MVM architecture, which is Model, View, View-Model is a pattern in software architecture that separates the application's business logic and presentation logic from its user interface which helps maintain a clean separation between the logic of the application and the user interface help address such development issues like testing, maining and evolving.

The class diagram for the application while using MVVM architecture.



The algorithm I have used for the project is the Fisher-Yates shuffle algorithm which completely randomises and shuffles an array, however I have used it to output a place to the user. The function works by checking the location switches and uses the count of that to use as the loop count then it loops over the Google Places API to gather data by decoding Google's JSON and add each data point to a temporary variable and if it meets a criteria then it adds to the array. Once it's all added, the application will shuffle using the Fisher-Yates algorithm and then randomly select one from the array.

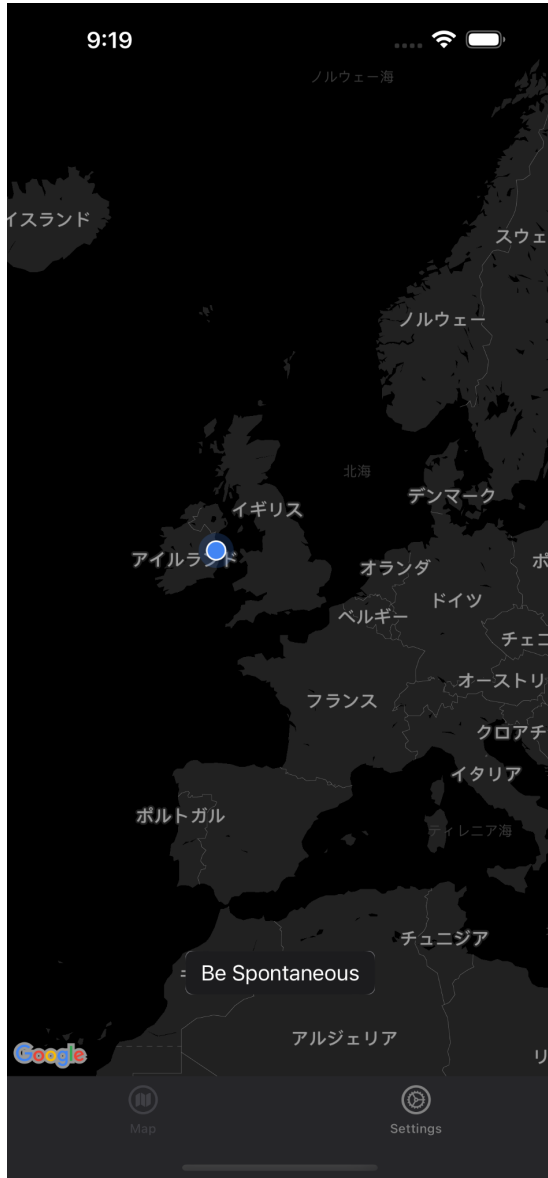
User Interaction Diagram



How the user interacts with the application is that they use their iPhone to connect to the internet and use GPS to get where they are then access Google's API to find something in the user's location and if something is found then output the location to the map and return it to the user's iPhone device.

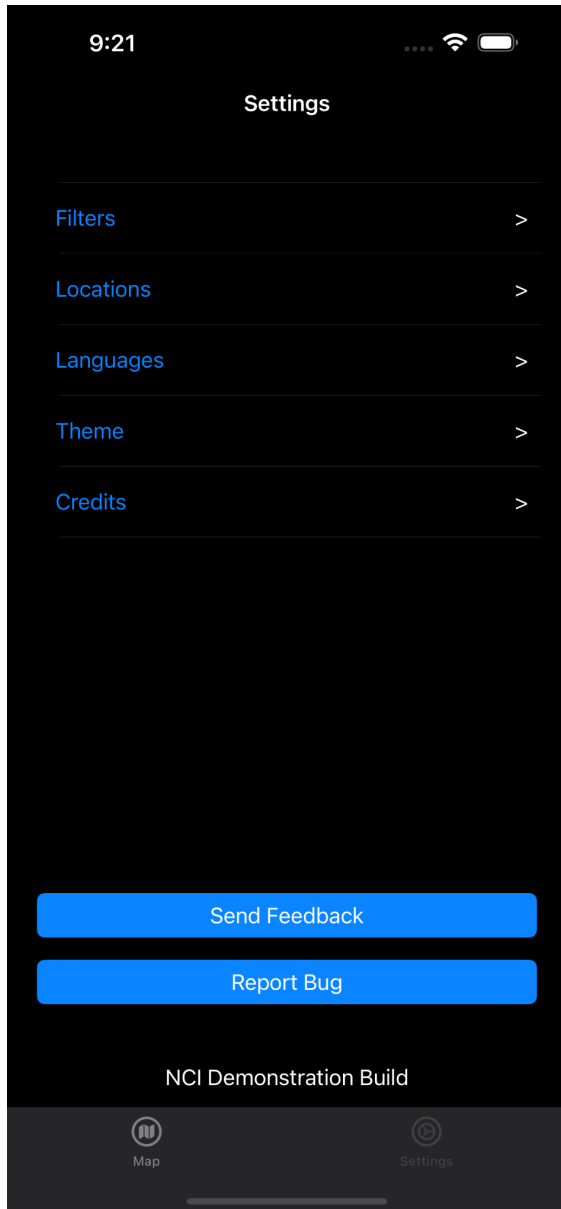
Graphical User Interface

Main Screen



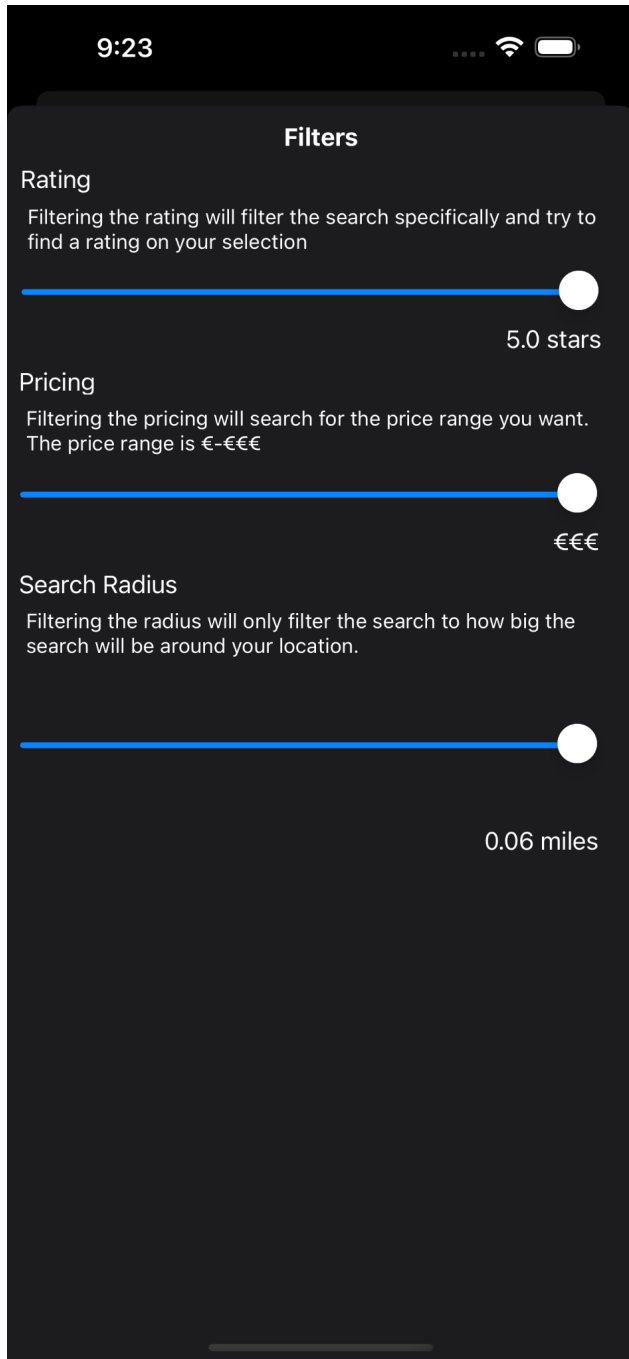
This is the main screen the application will load into when the app loads up. This screen has few user interface items to keep the application as simple as possible, although new user interface elements might be added in later development. This screen shows Google Map View and shows the user's location on the map. We have a button that has a function to execute finding something random to do. It firstly checks the places array in the application if there's something already there, this is to save API requests to Google, if there's nothing in the array it will request Google to get data on places nearby. At the very bottom of the mock-up, there's a navigation bar with two items; first is the main view which is this map view screen and second is going to the settings menu of the application.

Settings Menu



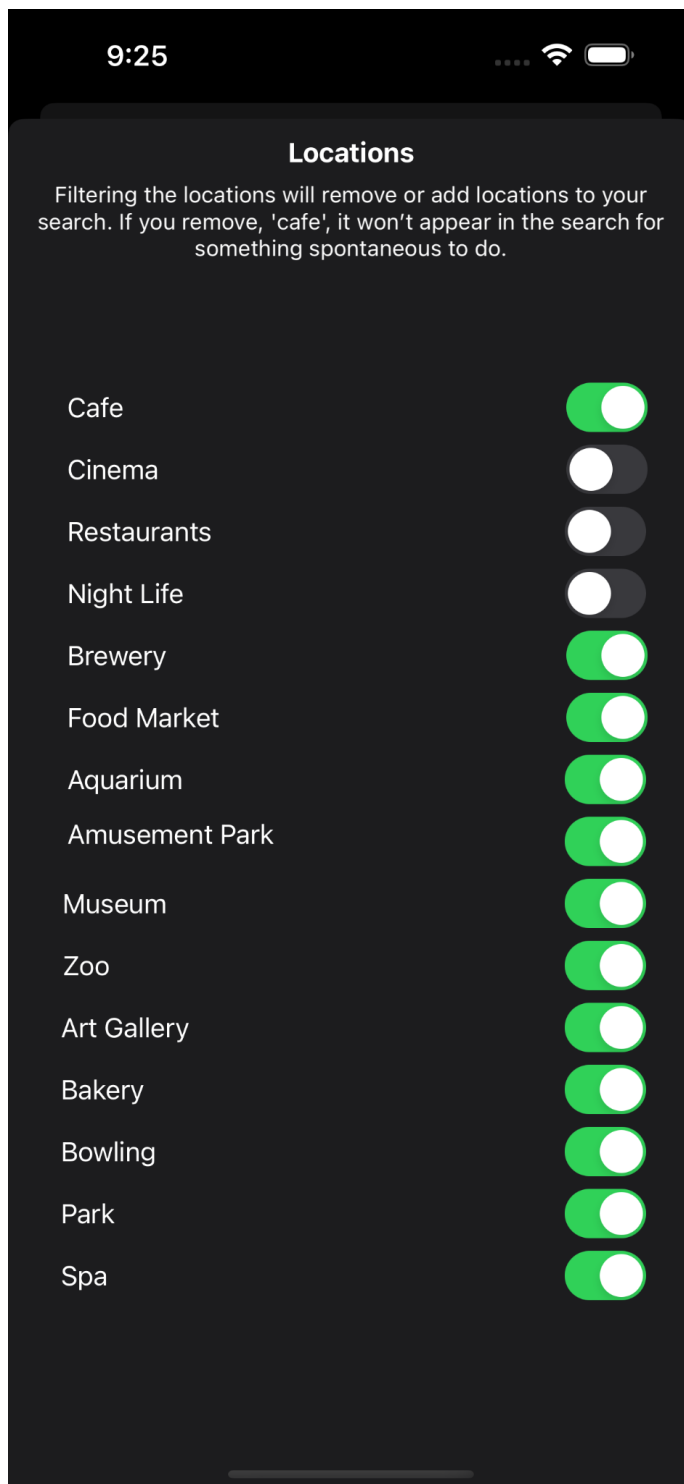
This is the second part of the bottom navigation bar, this screen shows the settings menu that the user can go through to adjust the search or the app itself either changing the theme or the language. The user can also press on either 'Send Feedback' or 'Report bug' button to do either respectively. The settings screen will also show what build this application is in

Filters



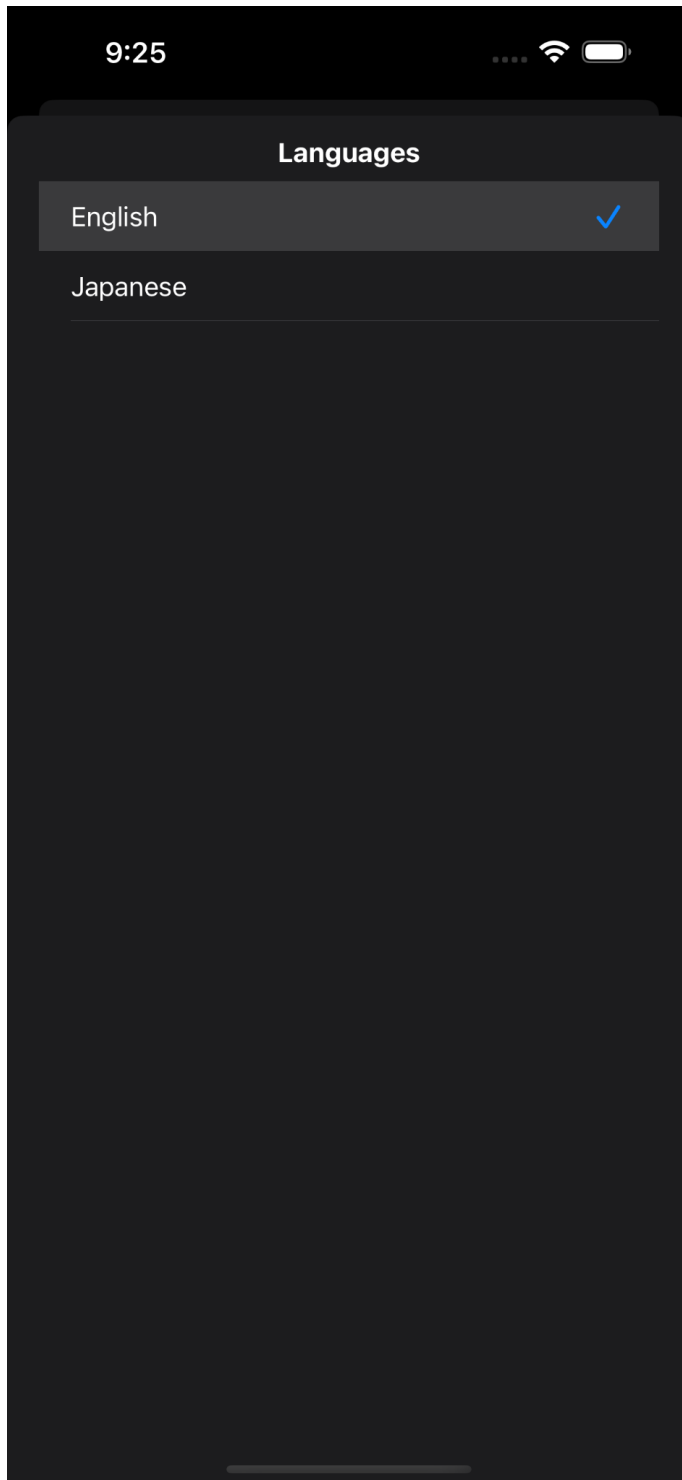
In the filters screen, the user can adjust the search for specific things of the business, such as the place's rating and pricing, the user can also adjust the search radius for searching for something to do. These options may be subject to change throughout the development of this project.

Locations



In the location filters screen, the user can adjust what places can be found throughout the search, if an option is turned on, then it will be included in the search however if it's turned off it won't be added to the search for something random to do. These filters are also subject to change throughout this project.

Languages

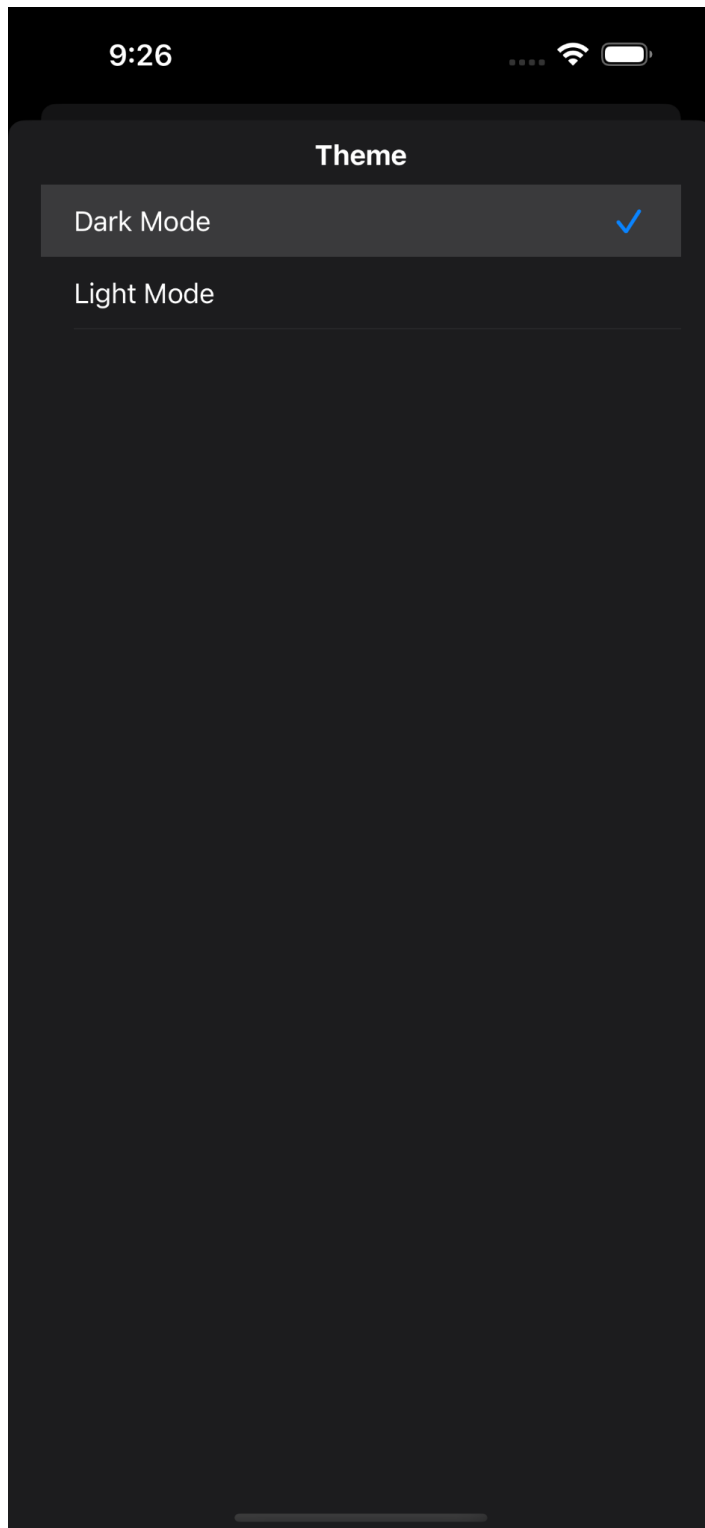


There's a screen for which the user can change the language of the application, the current list of languages that the application will release with are:

- English
- Japanese
- Mandarin
- Cantonese
- Italian

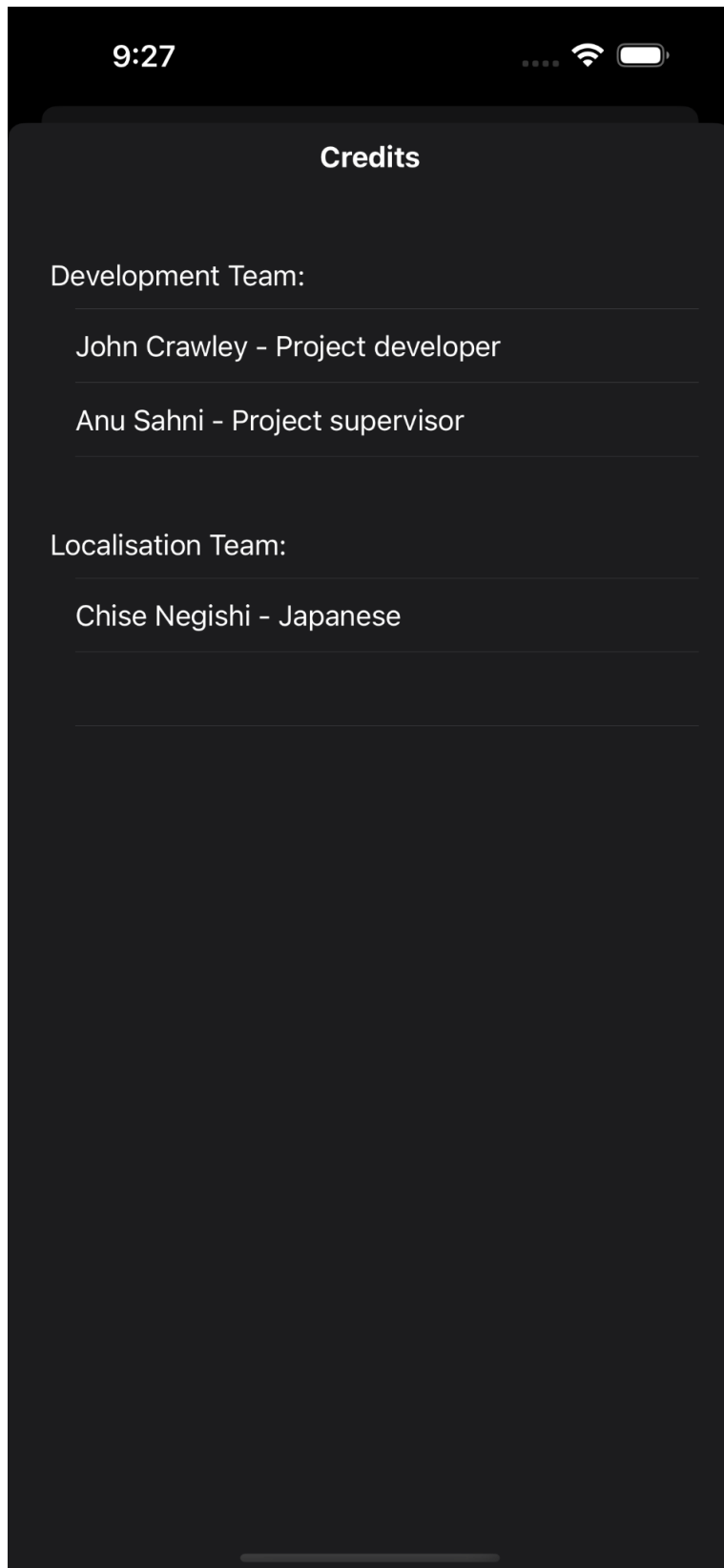
These languages are subject to change throughout the development of the app'.

Theme



This screen is to enable the user to change the theme of the application, there are two themes to select from; light mode which is the current design where the background is white or bright but if the user wants a more dark background, they can select the dark mode.

Credits



I have also included a screen for the credits of the application so if the people working on the localisation part of the project want to be credited, I will include their names here.

Software Interface

The system of the application will interface with the following software systems:

- Google API (Google Maps / Google Places)
- CocoaPod (dependency manager)
- iPhone (Containing iOS16)
- Xcode 14

Software System Attributes

Reliability

The reliability of this iOS application depends on the reliability of internet access on the user's 3G or 4G internet and the reliability of Google API's.

Availability

The application's availability should be available at all times once the user has 3G / 4G internet access and Google's API is running. The main availability problem is mainly with the user's internet access, especially depending on where they are.

Security

Currently the application offers no security problems as the application currently does not store the user's personal information or asks the user to give up any personal information and the application only uses the user's location inside the app itself and requests places from Google to collect as much data on the business as possible.

Maintainability

Using MVVM helps maintain the structure of the code in the application, making it easier to maintain for updating or future development. Using Google's API, I also need to update the API when available and prompted.

Portability

The application is only built for iOS devices using iOS16, using Swift helps keep the application as native as possible, however, future development for an Android native version of this application is possible and can be done in future development. As it's a mobile application, it's a great piece of software on the go.

Assumptions and Constraints

Assumptions

- I have all the resources I need to develop an iOS application by myself
- Google's API will be running all the time and during the development of the app'
- The cost of the problem will be kept below €100
- The project will not go off-rails and working on features not included

Constraints

- The design choices are limited due to the designs done only by myself
- Development will be slower due to solo developer working on the application
- I need to have a fully working application before releasing the beta
- The project features may have initial problems

Testing

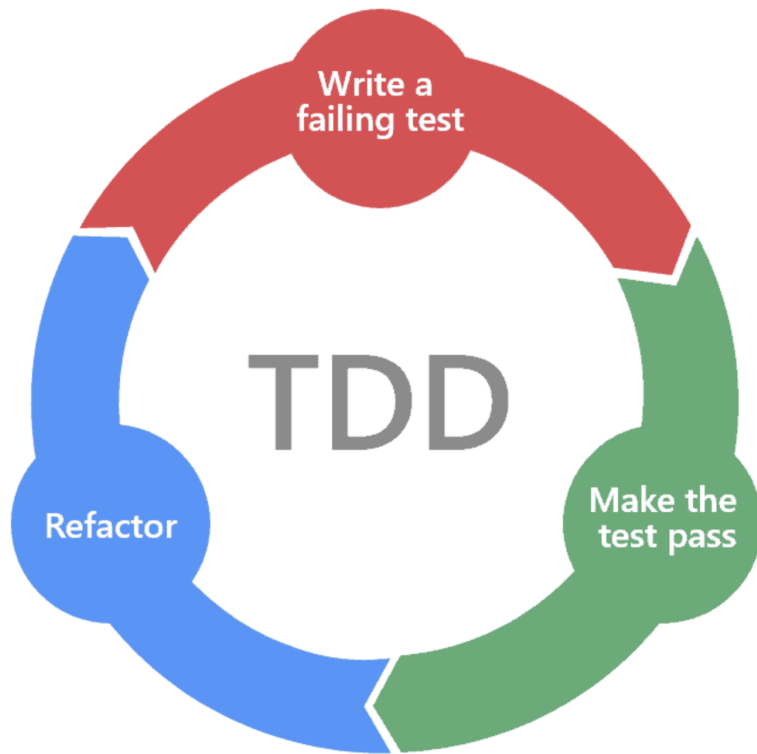
User Testing

When the beta testing begins, it will start with a small group of people, this will help get early feedback and bug reports before opening it up to a wider number of participants. The private testing may last from 2-3 weeks before opening it up to the public.

The public beta will open up after the private beta, the aim of the public beta is to try to get 50-100 people testing out the application, these numbers are goals to meet during this phase of the development. The estimated end of the beta phase is around June, after which all the feedback and bug reports will be included and worked on until the release of the application.

Unit-Testing / Self-Testing

In this project I've been using TDD (Test Driven Development) which involves writing a case that will always fail then make it pass and refactor the code from there.



Milestones

1. Planning

In the planning stage, I plan out the application from the features, application design, language support and so on

2. User Interface / User Experience Designs

I create mock-up designs for UI (User Interface) / UX (User Experience) for the application. All the design works for how the app will look and feel to how the user will enjoy the experience of all the layouts and placements of buttons and text.

3. Prototyping

During the prototype milestone I create a working prototype of the application and to make sure the application can do the features I want before fully investing time into developing the entire application.

4. Pre-Alpha

In the pre-alpha stage of the development I create a rough state of the application.

5. NCI Demo Build (Currently here in the development)

For the NCI build milestone I need to make sure the app works as intended along with including one other language support to showcase the app at the NCI Showcase event.

6. Alpha

In the alpha stage of the project, the application will be more functioning.

7. Beta

In the beta stage, I will create a private beta for user's to try the application and provide early feedback before opening the beta to the public where more user's will try the app out and provide further feedback.

8. Publish to the App Store

The end process of the application is to release it to the App Store.

Reflections

Supervision & Reflection Template	
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Student Name	John Crawley
Student Number	x19141301
Course	BSc in Computing (Software Development) BSHCSD4
Supervisor	Anu Sahni

Month:**What?**

Reflect on what has happened in your project this month?

During my first month of the project. My video pitch and idea got accepted. While I waited for the project idea to get accepted, I wanted to stay on track for developing this application and have it ready for submission and publishing it to the App Store. I starting planning and figuring out the system of the application by creating a UML class diagram, along with a flowchart of how the usage of the Fisher-Yates algorithm will be used. I started a small website for the project, this is outside the scope but I am building it for a place people can go to get information on the project and privacy policy page which I will need to create before uploading it to the App Store as it's required to have. I also went through iterations of design of the user interface (UI) and the user experience (UX) of the iOS application in Figma, I also got myself set up on my project management tool called Jira. I created four localisation documents for the project (Italian, Japanese, Cantonese and Mandarin) which will be sent out the people helping with the translation of the application from English to their native language.

So What?

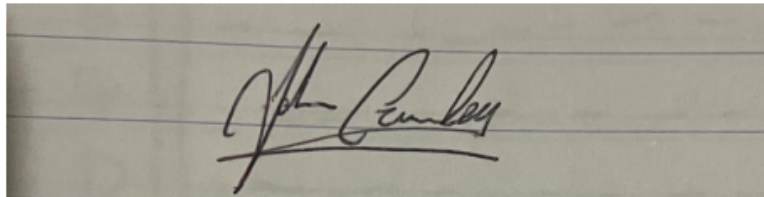
Consider what that meant for your project progress. What were your successes? What challenges still remain?

My current project progress success is that I am on track and able to be ready for each stage I have planned out for my Software Development Life Cycle (SDLC). The challenges that still remain is the development of the iOS application in Xcode and implementing and working with the APIs I have selected for this project. I need to figure out a design still for the application icon.

Now What?

What can you do to address outstanding challenges?

I will be researching into how developing in MVVM architecture works and looks in an iOS project before starting the project, then look into Google's API for maps and information to begin working with the main function of the application. The logo of the application I also need to figure out by running through different designs but that can be done throughout the actual development. When I get to beta stage of the development I can get feedback on the UI/UX and fix up on that if there are any problems with understanding layout etc.

Student SignatureA photograph of a handwritten signature in black ink on lined paper. The signature is written in a cursive style and appears to read "John Cumber".

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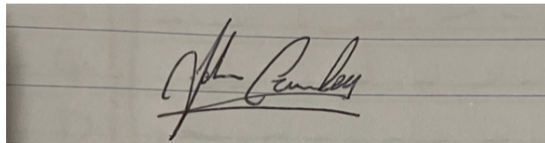
I'm a bit behind on development but still got far this month, I got hosting for the website up and domain and email addresses

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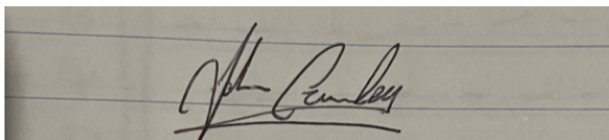
I'm a bit behind on development but got hosting done, emails ready. All I need to do now is make sure the website works.

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I will need to start development ASAP in Xcode.

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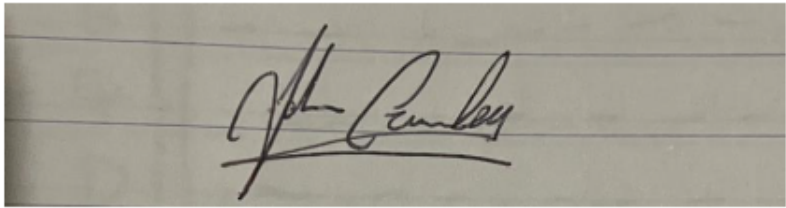
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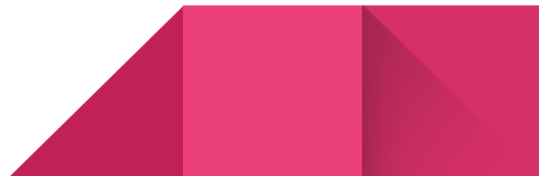
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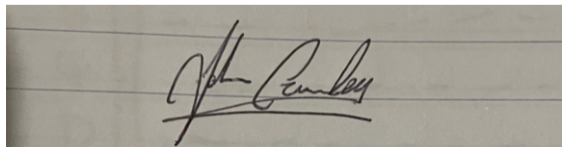
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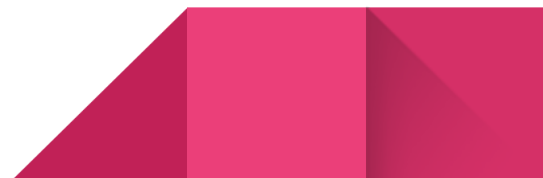
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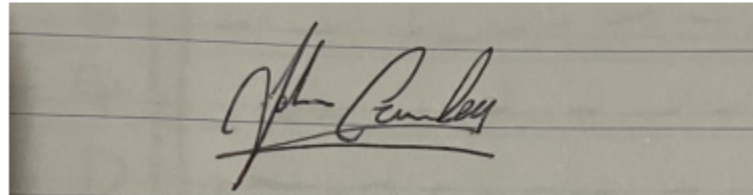
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