NUI Galway
OÉ Gaillimh

School of Computer Science
Final Year Project
Project Definition Document
Submitted in fulfilment of the requirements for the BSc degree in
Computer Science & Information Technology

MADRA & CAIRDE

MOBILE APPLICATION

Contents

1 SUMMARY

This Project Definition Document provides a brief overview of the *Madra & Cairde* mobile application to promote a shared understanding of it and to describe proposals for tackling it.

Madra & Cairde is a mobile application which I plan to design, develop and test as part of my final year project (FYP) for my Computer Science and Information Technology degree. The purpose of the FYP is to demonstrate the diverse range of skills and capabilities I have acquired over the course of my degree.

Madra & Cairde is an app that will allow people to look for dogs in their locale and organise a play date with them. The app should have the ability to use the phone's GPS sensor to determine the location of the users and display dogs in that area. Users should also have the option to input a location to see the dogs there. A messaging service will be part of the app and there will be a review/rating system involved.

1.1 Project Deliverables

The project is expected to have the following deliverables:

#	Deliverable	Date
1	Project Definition Document	30th November 2020
2	Final Project Report	6th May 2021
3	Project Demonstration & *Viva Voce*	10th – 14th May 2021

2 PROJECT DEFINITION

2.1 Background & Research

2.1.1 Project Idea

This project idea came about after lots of thinking and research. I took steps in trying to find a niche mobile application idea as I thought a new and interesting idea would make me more motivated to work on it. I began by identifying my interests, identifying problems that can be solved and looking at similar applications/businesses out there.

One big interest and passion I have is animals. Unfortunately, I have never had a pet but I've always loved going to family and friends' houses who own pets. My social media is filled with animals; from my Instagram explore page to my feed on TikTok – most of the content I interact with is about animals, and in particular – dogs.

One problem I was able to easily identify from my own life is never feeling like I have enough interaction with dogs. My friends also identify with this struggle, even those with their own pet dogs, as they rarely see their dogs any more while they're away for college.

I started thinking about how great an idea it would be for people to be able to borrow dogs for play dates. I thought that it would be a good service for both the borrower and the dog owner for a number of reasons. Lots of owners do not have the time to walk their dog or keep it company while they're working.

My main target audience for the dog borrower user (i.e. Dog Lover) is college students as I fall into that category and believe it would be really beneficial for us. College students these days are very tech-savvy and are well versed in social media and social networking apps. This means I know my app, if offering an intriguing service, could be easily adopted by them as they are already used to using an abundant of apps.

A high number of college students suffer from mental health issues. According to a report done by The Union of Students in Ireland, 'Students are experiencing extremely severe levels of anxiety (38.4%), depression (29.9%) and stress (17.3%)'. There is a great number of students who do not have a proper outlet to discuss or vent through these personal difficulties. [1]

It is scientifically proven that exposure to a dog, or 'puppy love' as many people refer to it, can help reduce stress and anxiety as well as many other things. The love and warmth from a dog can 'buffer depressive tendencies, quell anxious feelings, and mitigate loneliness'.[2] Walking a dog is a great way to encourage exercise, especially if the person is unlikely to go for a walk for any other reason. Exercise is another proven way of improving one mental health and mood. [3]

My main target audience for the Dog Owner user are adults/couples with a pet dog who may not have the time to walk their dog or are anxious about leaving their dog home alone while they go somewhere/go to work.

There has been a huge increase in separation anxiety in pets, especially since the beginning of the pandemic which had most people working from home. Most pets have now become used to and reliant on their owner being with them 24/7. Because of this, it will now be extra tough on pets when their owner has to return to their workplace and leave them unaccompanied for hours on end. This will inevitably cause a lot of stress and anxiety in most pets. [3] As well as humans, pets also benefit a lot from daily exercise. A healthy dog is a happy dog. [4] Unfortunately, some Dog Owners do not have enough time to walk their dog; this may be due to work commitments or other life stresses. [5]

The *Madra & Cairde* app will facilitate both the mental and physical well-being of the Dog Lover and the dog, as well as providing a helpful service for Dog Owners so they can have peace of mind to know that their dog is not lonely while they are busy.

2.1.2 Project Inspiration

I have put a lot of time and thought into how I would implement this idea. I researched other apps and businesses like this. Similar apps included Wag which offers dog walking, training and other pet care services from dog professionals.

There is another app called 'GetPet' and similar ones like 'PawsLikeMe' and 'BarkBuddy' that are designed for people trying to adopt a pet. 'GetPet' is basically *Tinder for dogs*.

Finally, the app most similar to my idea for *Madra & Cairde* is called 'Borrow My Doggy'. Although my app will have similar features to this, the overall user experience of my app will be a lot more enhanced. For example, I tried myself to download the app and I couldn't even get past the login page. This instantly irritated me and I know that would have turned many users off. This poor experience proved to me that signing-up, logging-in and onboarding are key parts to making the app a success.

My app will functionally be similar to those listed above, but in terms of design and layout I will be more trying to mimic the user experience in apps like 'Airbnb'. I'd like to give Dog Lovers the ability to enter a location (or use their own location) and have dogs in that area displayed like *'places to stay'* are on Airbnb.

Profiles of the Dog Lover and dogs will resemble those on dating apps (like Bumble, Tinder, Hinge etc.) to keep the app looking new and up-to-date. I want to give the personal touch to it so users will be able to add different things to their bio to help their personality shine through (e.g. interests & hobbies).

The messaging service available will be simple and effective – like that on Messenger, Instagram, Airbnb etc.

Other apps that have good user experience and overall design which I will be taking inspiration from while designing and developing include:

- Hopper

- Eventbrite
- Waze

2.2 Project Requirements

There are two different types of users that can use this app. A user is either a Dog Owner or a Dog Lover.

- A Dog Owners profile have the description and other information related to their dog.

- A Dog Lovers profile has their own information like description, experience and any other relevant information.
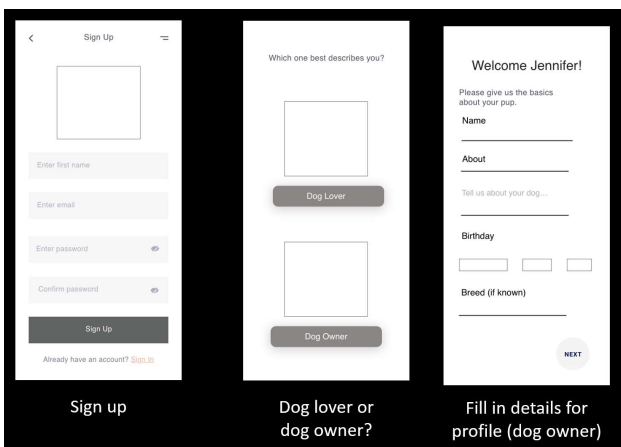
Below, the main requirements/features available to each user is described in a use case diagram followed by a use case table. The associated wireframes for the screens of the app during those use cases accompany them.

2.2.1 Dog Lover


Use Case Diagram – Dog Lover

Register

| Sign up | Dog lover or dog owner? | Fill in details for profile (dog owner) |

Use Case Name	Register
Description	A user registers an account to access the functionality of the Madra & Cairde app.
Actors	Dog Lover
Pre-Condition	System must have an internet connection
Post-Condition	After a successful sign up, a Dog Lover Profile is created and the app can be used.

| Main Scenarios	Steps
Actors	Enter email Enter password Confirm password
	Validate email & password
	Choose Dog Owner Option
	Fill in details about the dog (eg, name, breed, birthday etc.) Details saved to the system
Extensions	Invalid username System shows error message
	Invalid email System shows error message

Search for dogs

Home page (Dog lover)   Search page   Dogs on map
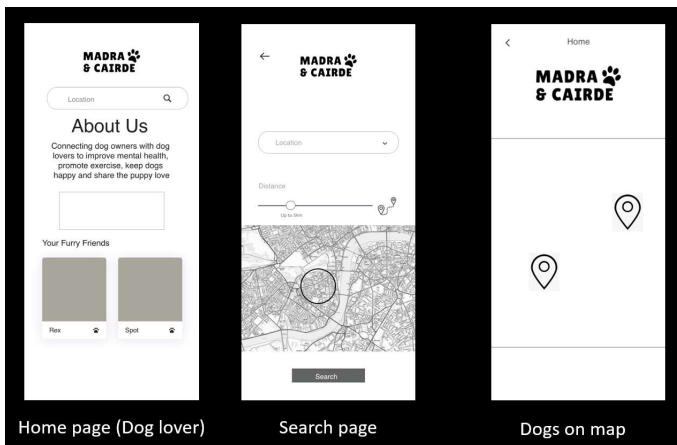
Use Case Name	Search for dogs
Description	The user searches for dogs in a certain location. They can set the km range for the search.
Actors	Dog Lover
Pre-Condition	System must have an internet connection. If user wants to search for dogs within their area, location must be enabled.
Post-Condition	After a successful search, a list of dogs in that area will appear for the user to scroll through
Main Scenarios	Steps
Actors	Click on search bar
	Type in a location e.g. Galway Drag the circle along the line to set the range.
	Click on the map to see the approx. location of some dogs on the map
	Scroll through list of dogs that appears

Message Dog Owners

Dog Profile

Message request
sent & accepted

Message chat
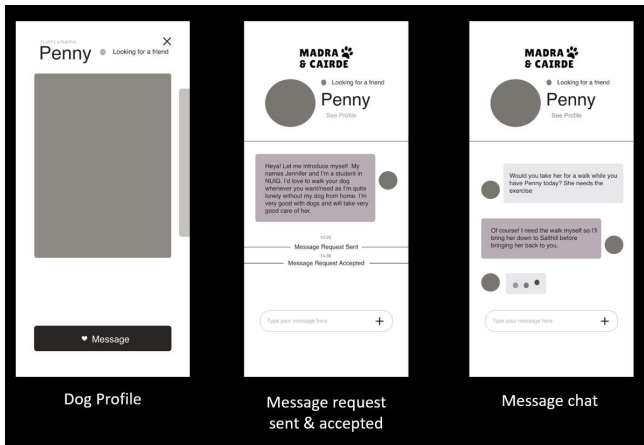
| Use Case Name	Message Dog Owners
Description	The user messages a Dog Owner who's dog they would like to organise a play date with.
Actors	Dog Lover, Dog Owner
Pre-Condition	System must have an internet connection.
Post-Condition	After a Dog Lover messages a Dog Owner, the Dog Owner must accept the message request for the chat to begin properly.
Main Scenarios	**Steps**
Actors	Click on a dog profile
	Click the 'Message' button
	Type a message Click send
	Once message is accepted, messages can be sent back and forth.
Extensions	Message request not accepted No ability to send another message (for a certain period of time)

Leave review

Reviews (add
review button)
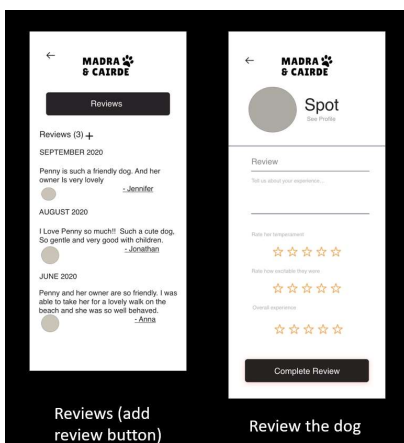
Review the dog

Use Case Name	Leave Review
Description	The user leaves a review and rating about a dog. The ratings left are based on the dogs temperament, excitable level and the experience level needed to mind the dog.
Actors	Dog Lover
Pre-Condition	System must have an internet connection. User must have interacted with the dog so they can evaluate them properly.
Post-Condition	After a Dog Lover leaves a review, it appears on the dogs profile for other Dog Lovers to see.

Main Scenarios	Steps
Actors	Click on a dog profile
	Click the plus sign beside review button
	Type the review into the text bar Click on the stars to allocate a rating on each section
	Click complete review
Extensions	Review too long System shows an error message
	Incomplete fields System shows an error message

2.2.2 Dog Owner
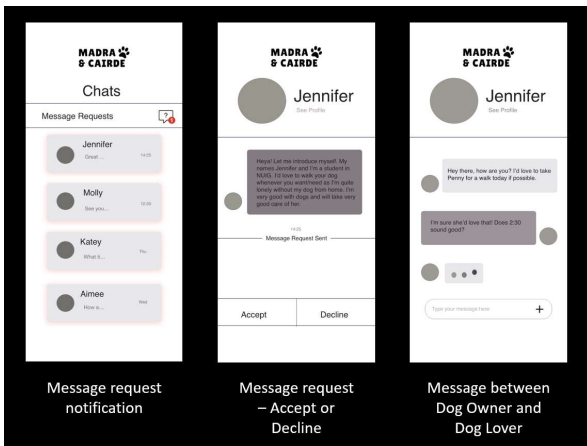

Use Case Diagram – Dog Owner
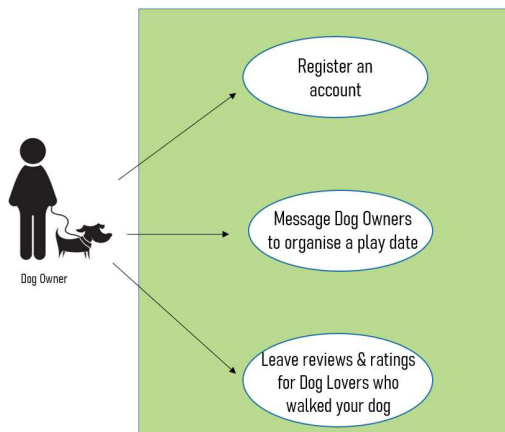
Register
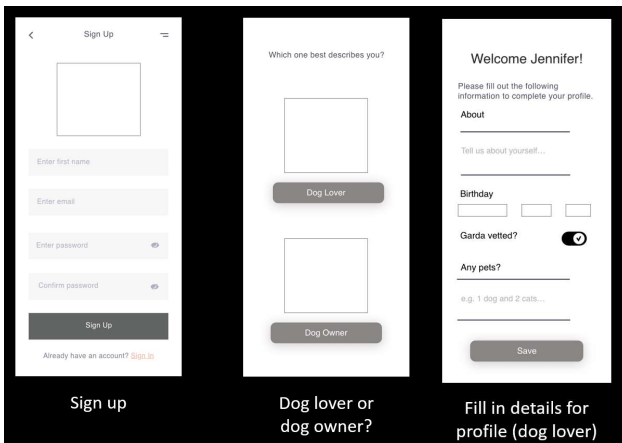
Sign up   Dog lover or dog owner?   Fill in details for profile (dog lover)

Use Case Name	Register
Description	A user registers an account to access the functionality of the Madra & Cairde app.
Actors	Dog Owner
Pre-Condition	System must have an internet connection
Post-Condition	After a successful sign up, a Dog Profile is created and the app can be used.

Main Scenarios	Steps
Actors	Enter email Enter password Confirm password
	Validate email & password
	Choose Dog Lover Option
	Fill in details about themselves (e.g. name, age bracket, etc.) Details saved to the system
Extensions	Invalid username System shows error message
	Invalid email System shows error message

Message Dog Lover

Message request notification

Message request – Accept or Decline

Message between Dog Owner and Dog Lover

Use Case Name	Message Dog Lover
Description	The user accepts a message request from a Dog Lover and can then a messaging conversation can take place between the user and the Dog Lover.
Actors	Dog Owner, Dog Lover
Pre-Condition	System must have an internet connection. Dog Lover must have sent a message request to the user.
Post-Condition	Messages can now be sent back and forth

Main Scenarios	Steps
Actors	On messages, click on message request button.
	Click accept button
	Type message Click send
	Messages can now be sent back and forth

Leave Reviews

Reviews (add review button)	Review the Dog Lover
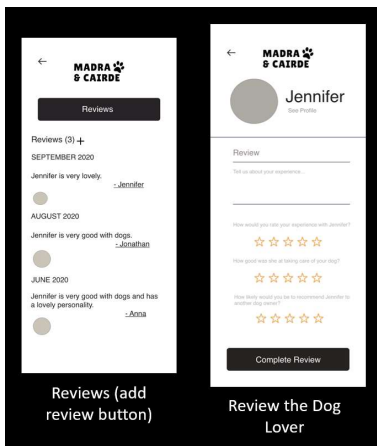
Use Case Name	Leave Review
Description	The user leaves a review and rating about a Dog Lover.
Actors	Dog Lover
Pre-Condition	System must have an internet connection. Users dog must have been minded by the Dog Lover so they can evaluate them properly.
Post-Condition	After a Dog Owner leaves a review, it appears on the dogs profile for other Dog Owners to see.
Main Scenarios	**Steps**
Actors	Click on Dog Lovers profile
	Click the plus sign beside review button
	Type the review into the text bar Click on the stars to allocate a rating on each section
	Click complete review
Extensions	Review too long System shows an error message
	Incomplete fields System shows an error message

3 PROJECT DESIGN

3.1 UI/UX Design

The design of an app is an essential factor involved in the development process. Without a meaningful user experience, an app will not be successful. On my placement, I worked alongside many UX developers and was able to gain an insight into the importance of an intuitive and coherent design.

With that being said, a lot of my time up until now, has been dedicated to finding the perfect design. I have been using Adobe XD to try develop different prototypes. I initially made some simple wireframes (displayed in section 2.2 above), based off a project architecture diagram I had made using MIRO. It was a very rough flow chart of the layout of the app, to give me an idea of how the app would work so I could begin to consider its design.

Some good design practices I will keep in mind while designing both the UI and the UX are:

- Permission priming (to ensure a good onboarding experience for my users)
- Colour-blindness friendly colours and patterns

- Functional animation to clarify navigational transitions
- Skeleton screen when loading
- Personalised experience
- Bite size chunks of information on pages

3.1.1   User Testing

User-Testing will be an essential part in the design process as I will use the results from the test to determine the best design pattern/shape to use.

There are a number of rules I will need to abide by while user testing my subjects, to ensure it is a fair and successful test.

For example, I will need to ensure that it is being tested by people who will actually use it, and completing tasks that they would actually perform with it. Or, I should ensure I am listening to the user's problem and issues, as opposed to their suggestions.

While a final design has still not be settled on, and probably will not be settled on definitively for a while, I have some samples of designs I like. I plan to do some basic user testing with my friends and family to see which design is the preferred choice. I will keep it grayscale to begin with, as I want to ensure people's opinions aren't thrown off or swayed by the use of certain colours. I need to ensure the design of the functionality of the app is what is being judged by my user testers. The design that is the most clear and intuitive design will be the one that wins.

Once I have chosen my layout, I will try a number of different color schemes. Colour is an extremely powerful tool when it comes to design. There are a number of rules that need to be considered when picking which colour pattern to use. For example, the '3 Primary Colour Rule' and the '60-30-10 Rule'. I will do user testing again to see which colour scheme is the winner.

After the user testing, I will continue to iteratively design the UI until I feel like it is perfect for the app.

3.2 Data Design

Entity Relationship Diagram for Madra & Cairde
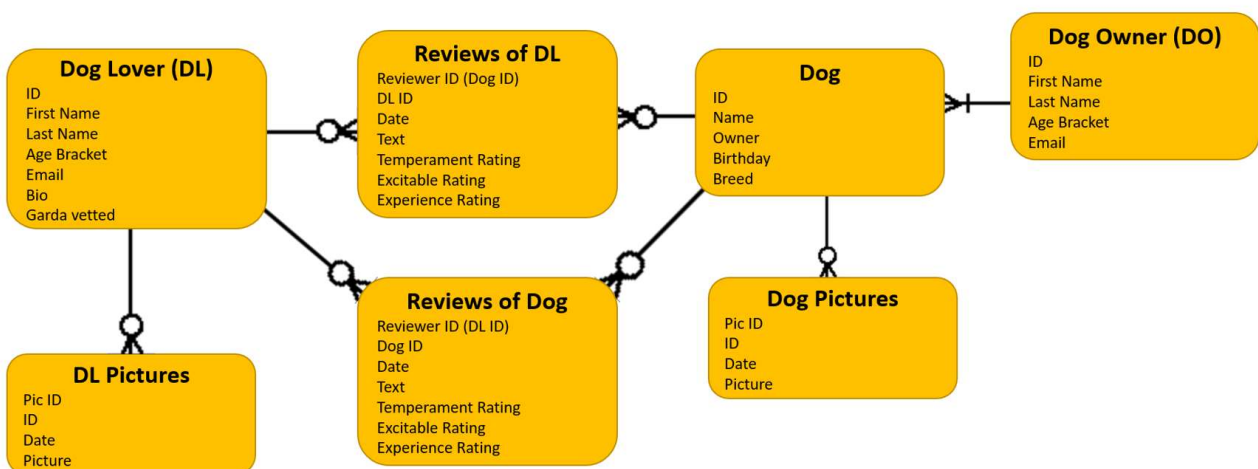
While there are still some design decisions to be made in relation to the shape of the data, this is a general overview of how it will probably look. The potential ways it might differ are when deciding if the Dog and Dog Owner will be the one entity. Regarding implementation, I feel like functionally the app will work most simply if it is one Dog to one Dog Owner. This makes sense in terms of profile and setting up, as with most things people typically only have one profile per 'user'. However, realistically speaking, a Dog Owner could potentially have a number of dogs they want to have profiles for. In the beginning, to get it to work, I plan to have one Dog per Dog Owner. If I have time, I will implement it so that there can be multiple dogs per owner. If I do not have time to develop this strategy, I can reshape the way the data is stored so that the information about the Dog Owner is part of the dog entity (as a one to one relationship is redundant.

4 TECHONOLOGIES & IMPLEMENTATION

4.1 Platform

As an iPhone user myself, I have grown accustomed to the iOS platform. I enjoy its intuitive user experience, simplicity and its overall attractive appearance. After doing some research and comparing iOS and Android, iOS also seems to come out on top for a lot of reasons.

These include, but are not limited to:

- Apple is a closed ecosystem which allows developers a lot more control and stability with their apps.

- Most iPhone users stay up-to-date with iOS updates so it is also easier to guess what most users will see/what my app will be able to do on their phones.

- There are themes and design principles incorporated into all iOS apps that make them stand out which I think really keeps their integrity and standards above those of other operating system apps.

In terms of testing my app in the end stages of production, I will also be able to do this more easily if I can use my own mobile phone and get my friends (who are also iPhone users) to use the app also.

For these reasons, I have chosen to develop my app for the iOS platform.

4.2 Language & IDE

I have become a member of the iOS Developer University Program so I can use Apple's resources to help me develop this project. I will have access to a suite of advanced and sophisticated tools within the iOS software development kit, as well as the range of resources at hand on the Apple Developer website. The main languages I will be using will be Swift and Swift UI. The IDE I will be using to program, test and debug will be Xcode. With this software, I will be able to ensure the correct functionality of my app by installing it directly onto my iPhone.

4.3 Version Control

To keep track of my version control commits and pull requests, I will be using GitHub. I used GitHub while on my placement so I have grown accustomed and become very familiar with it. It is a very good tool as I can use it to seamlessly keep track of any iterations done on my code. If any big mistakes are made, it is possible with GitHub to revert back to a commit where the code is not broken.

A lot of third-party services can work with GitHub which I will probably make use of, like Shippable for example (for continuous integration).

4.4 Hosting

For hosting my app, I will use Google Firebase. It offers a multitude of services all on the one platform. As well as hosting, I will be able to use it for my database and any authentication needed in my app. It has TestLab which I may be able to use to test my app in a real-time environment. While nothing is set in stone and specific details like this could still change, this is the service I plan on using. Potential alternatives to Firebase include AWS, Parse and Atmosphere. If, down the line, I run into some unforeseen issue with Firebase, or learn of a better choice for my app, I will explore those options.

4.5 Design

For designing some of the UI of my app, I have used Adobe XD. It is ideal for developing wireframes and prototypes. If I get time, I plan to illustrate some drawings for the app on Adobe Illustrator, or a technology similar. I would like the theme and drawings of the app to be cohesive and fit well together, which is why I think using my own drawings for it would look very well. I will also use Photoshop Elements for creating any extra design pieces needed for the app.

5 PLAN

One key thing when it comes to app development is planning and project management. Planning is needed to ensure goals are correctly identified, risks are reduced, deadlines are met, and the overall success of the project.

I decided upon the application Trello in order to keep track of things that need to be done, are in progress, and are finished. I chose Trello as I have previous experience with it from my placement in third year – there they used different boards to keep track of work done in different sprints.

To ensure I have a good knowledge of my timeline, I created multiple Gantt charts to keep track of the different sections of my project. Over the next 22 weeks, I need to ensure each part is completed within the given timeframe, so that I keep on track to meet the overall deadline.
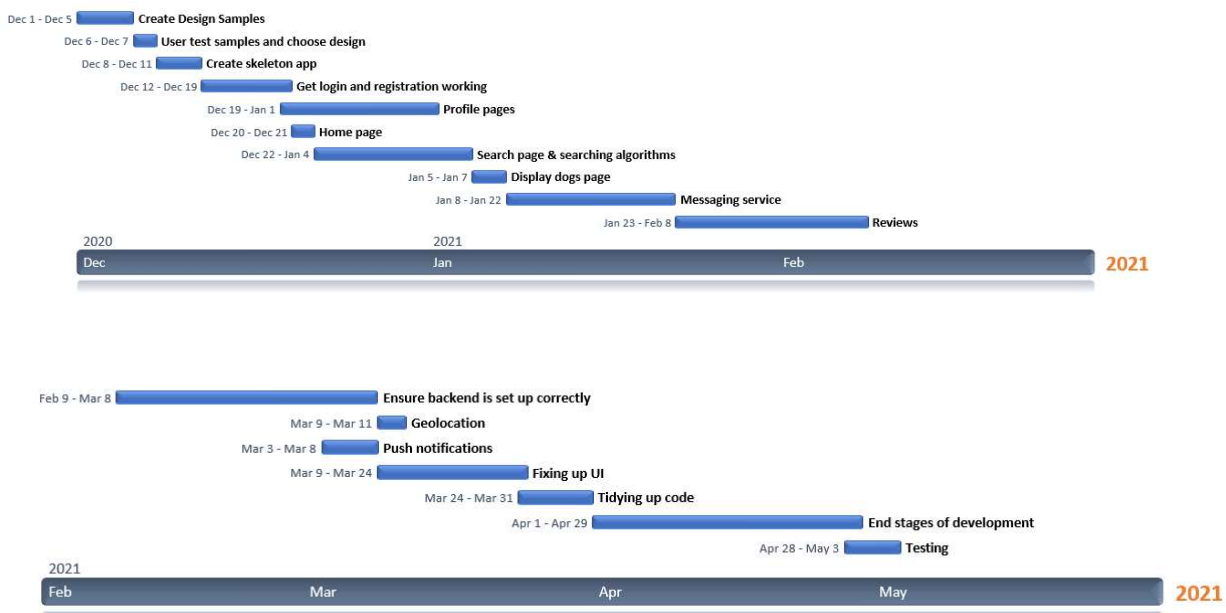
6   CONSTRAINTS

There are a few constraints that may restrict me during the development of this app. Those include:

- Cost and Resources – Having sufficient tools and technologies to implement the necessary features.
- Scope – Ensuring I do not spread myself too thinly trying to work on too many features at once. I should mainly focus on getting the basic functionality working before expanding to get additional features in the application.
- Quality – Making sure the application is of high quality and standard, particularly the UI and UX (as that is the area I am most passionate about).
- Risks – Many risks are involved in such a large undertaking as this project. Running out of time, being unable to get certain features working and neglecting other modules/exams while trying to focus on getting this project done are the main risks I need to keep in mind.
- Time – Need to ensure I set aside enough time to complete this, especially because exams are after Christmas this year so I will already be missing out on that time (due to study).

7   REFERENCES

[1] Dorfman MSW, Ph.D., D., 2020. *The Health Benefits Of Pet Love*. [online] Psychology Today. Available at: <The Health Benefits of Pet Love> [Accessed 29 November 2020].

[2]Sharma, Ashish et al, 2006. *Exercise for Mental Health*. [online] The Primary Care Companion to the Journal of Clinical Psychiatry. Available at: <Exercise Improves Mental Health> [Accessed 29 November 2020]

[3] Bailey, L., 2020. *Coping With Separation Anxiety In Dogs During COVID-19*. [online] Psychology Today. Available at: <Coping With Separation Anxiety in Dogs During COVID-19> [Accessed 29 November 2020].

[4] Run Those Dogs. 2020. *How Exercise Improves Pet Behavior - Run Those Dogs*. [online] Available at: <How Exercise Improves Pet Behavior> [Accessed 29 November 2020].

[5] Tilda.tcd.ie. 2020. [online] Available at: <Report on Pet Ownership>[Accessed 29 November 2020].