

COMP2213 - Interaction Design

Handin 3

Problem Statement, Ideation Evidence and Design Concepts

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TABLE OF CONTENTS

Problem Statement	2
Ideation Evidence	3
Design Concepts	8
First Design Concept	9
Second Design Concept	16
Third Design Concept	23
Selection and Development of Design	30

Problem Statement

Whilst sustainable forms of public transport are available to the public, some may be more difficult to access compared to other, more harmful methods of transport (e.g. cars). Technology can help to promote the use of these more sustainable forms of transport easier. Our interactive solution should inform users on how their usage of transport affects the environment and how using more environmentally friendly forms of transport

The problem usually arises when people are trying to access forms of transport other than things like cars, but don't know where to find out times or aren't feeling motivated to use them. Other factors come into play that need to be considered. The solution should take into account

- Users would need to feel motivated or rewarded to be more likely to use more sustainable forms of transport.
- People often aren't aware, as shown in our interviews, or don't care about how much pollution they are using when travelling from a to b.
- People care about their benefit more than the public benefit.
- People are unwilling to change their current behaviour
- People only follow an environmental trend if it brings them publicity

As presented within the literature review, people within local groups have different needs/wants from their local council, so the solution must be versatile. Attempts have been made to tackle problems regarding the lack of use of public transport. For example, some UK bus apps have presented bus routes and stops, showing where the buses are on live time, and the ability to purchase tickets for a trip. The issue presented with this is that people who have been using cars won't be motivated to swap to using buses, therefore an incentive needs to be provided to make users want to swap to using more sustainable forms of transport. An incentive may be making the user feel responsible for the emissions they produce whilst using transport, or trying to show how this may affect someone's personal life to make them feel personally responsible and more beneficial for the environment.

Ideation Evidence

As part of the process of developing complete Ideation Evidence, we came up with a wide range of responses to the problem statement described above, clearly presented as divergent and convergent phases of ideation.

Ideas generation process

During the idea generation process, we challenged ourselves to come up with an innovative and practical solution to our problem statement. During the Divergent Thinking stage a variety of different ideas were raised, and only the most promising ones were chosen, using Convergent Thinking we achieved a mixture of some of those ideas. The result of our Divergent Thinking stage is a map that has been produced.

Divergent thinking stage

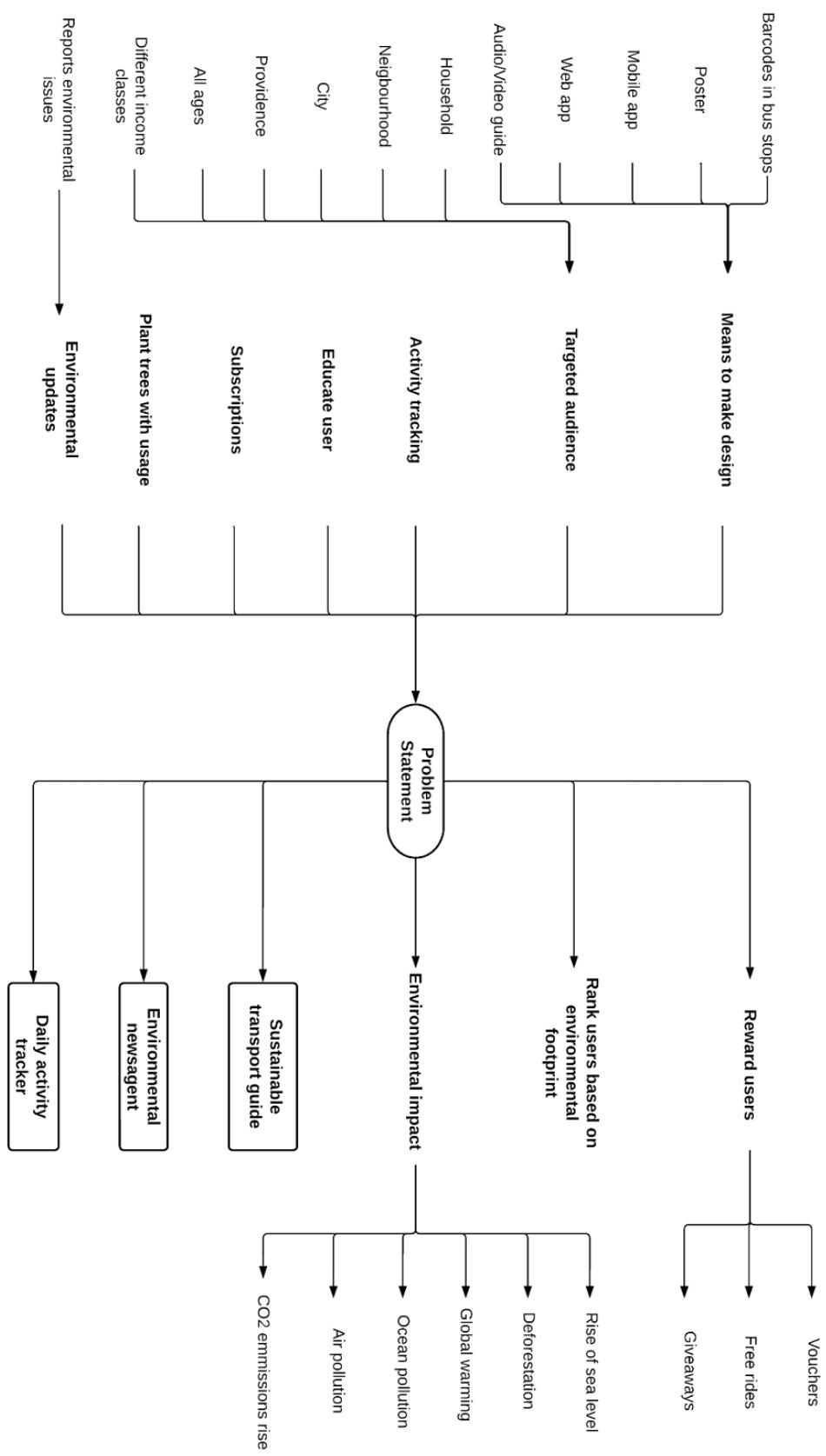
During this stage of our development of some ideas, we went through an array of ideas to try and get an understanding of what it was we were trying to produce. Firstly we used free association to spontaneously say whatever ideas come to mind when thinking upon the idea. We would use free association to further freely go into slightly more depth about the idea to see whether it may be worth taking upon. This provided an easy and relaxed ideation process that allows for a large variety of ideas to be generated. Whilst doing this, we were thinking about each user's needs and how an app might be able to accompany them.

Convergent thinking stage

In the convergent thinking stage, we proceeded to try and evaluate our ideas created in the idea generation phase, this was done by thinking about each of the ideas and judging them upon certain criteria. This could be about how feasible it would be to create or implement these ideas in the real world, how we would gather all the information necessary for these ideas, or how useful the idea is in general. When thinking about the ideas we had to take into account how much impact they would have on a user when using public transport, if the idea wouldn't change much about a user's trip somewhere then not only would it be unhelpful but it also would not be good enough to motivate someone to use it. When evaluating the ideas, we would also look at how other apps that are related to the general idea have tackled the problem to assess its feasibility.

The result of our Thinking stage is a map that has been produced through an online intelligent diagramming application "LucidChart". In this, we have considered a wide range of information including what different things our app could use, like subscriptions, and what it might include, like activity tracking and different methods to educate the user. The target audience is also an important factor to consider as that will affect the possible features of the app, depending on where it is based, for example, if the area caters for lower-income classes, then the app may need to show cheaper forms of travel, including buses. These aspects feed into the general problem the app we are trying to create will solve. The outcome of this is what our app can do, including rewarding users for their use of more sustainable travel, this could be as they use sustainable transport more or a one-off reward for signing up to promote the use of the app more. A ranking of environmental footprint also makes a user feel rewarded for their savings and provides the opportunity for friendly competition among friends, to motivate people to use an app more. Guides and news outlets also provide information to the user to helpfully inform them on what is going on and how their usage affects the environment.

We have also produced a table to show each form of transport apart from a car and shown how each of the methods of transport compares to it. This is important as it shows how each of the other forms of transport is more sustainable and more environmentally friendly. This allows us to see which of the methods of transport we could focus more on to try and motivate more people to use them. Methods like cycling provide health benefits and produce no carbon emissions, this would be a good example of a method of transport to try and promote the usage of. This could be done by rewarding the user for their travelling with things like gift cards and providing a tracking system to show how much emissions they are saving.



Form of transport	Sustainability/how it affects the environment	Why to transfer to the specified method of transport?	How to keep people motivated to use that form of transport?
Train	Low emissions per person, the more people using trains and the busier they are the more efficient they are.	Environmental protection Cost savings Improved quality of life Enhanced economic development	Keep trains well maintained and clean so people feel cleaner whilst using them. Reward schemes or discounts for travel can incentivise people to use the method of transport more.
Bus	Fewer emissions per person, the more people using buses (the more full), the fewer emissions per person.	Cost savings Community building Enhanced economic development Environmental protection	Providing reliable and efficient bus services, as well as making sure that bus stops and routes are accessible and well-maintained.
Bike	No emissions, therefore doesn't negatively affect the environment as long as there are pre-determined bike paths.	Improved quality of life Health benefits Environmental protection	Show how much emissions they have not produced whilst travelling using a bike. Provide bike lanes for users to feel safer whilst riding. Providing more bike racks and other bike-friendly infrastructure can help. Reward schemes can motivate people to use bikes to travel more.

E-scooter	With low emissions per person, batteries are more sustainable than engines.	Improved quality of life Health benefits Environmental protection	Make them more accessible and convenient to use, e.g. putting access points in busy areas. Also, offer periodic discounts for using e-scooters. Provide free rides for first-time users to make more people more likely to use them.
Taxi service	Slightly fewer emissions than cars, fewer people own cars if using taxi services so the emissions whilst producing a car is not a factor.	Enhanced economic development Community building	Providing reliable and efficient services, as well as making sure that they are convenient and flexible.

Environmental protection: Using environmentally friendly transportation methods, can lessen pollution of the air and water, save energy, and cut down on greenhouse gas emissions. This could contribute to environmental protection and the preservation of natural resources for future generations.

Health Benefits: Physical activity can be obtained and general health can be improved, resulting in lower medical expenses and higher quality of life.

Community building: Using sustainable modes of transportation can encourage social contact and community involvement since it encourages people to interact with their surroundings and one another.

Enhanced economic development: Investing in environmentally friendly transportation may boost economic development, create jobs, and increase access to opportunities and services for both individuals and communities.

Cost savings: Using environmentally friendly transportation options can reduce your spending on gas and car maintenance. Additionally, a lot of municipalities and cities give incentives and discounts to people who use eco-friendly modes of transportation.

Improved quality of life: By reducing traffic congestion and noise pollution, sustainable means of transportation can raise the standard of living in towns and cities.

Three Design Concepts

First Design Concept - Carbon footprint counter

Users will interact with the interface by selecting their transport uses and entries. Loading pages will then be correlated to the choices made, resulting in a user's CO2 emissions being accounted for. The user has to make different choices to have enough data to make an accurate calculation of environmental damage. Once the calculations are complete, users will be provided with feedback on ways to further preserve the environment. As an example, a user might choose a private car, then choose the specific model of car that runs on gas, then twice a week. A page will be loaded stating the exact number of CO2 emissions emitted, as well as some suggestions on how to reduce them with different transportation methods.

Benefits and Drawbacks

We believe that a carbon footprinting system is really useful for the average consumer, as most people have to travel long distances by private or public transport for the daily needs of our society. Awareness of CO2 emissions released into the environment, and finding more environmentally friendly ways to travel. While it is immersive, useful, and versatile, the user must provide information correctly to ensure the correct information. The app also raises awareness of the impact of travelling by unsustainable forms of travel and thus motivates people to use more environmentally friendly modes of transport. The app can also be very flexible as anyone, including businesses, can use the app to make people more responsible within the company to use more sustainable forms of travel.

However, the process of collecting all the data from the user can be considered exhausting and complicated, which reduces the interest of some users who do not have enough time. The amount of precise information that the user may need to input may discourage them from wanting to use the app in the first place. If the user enters incorrect data into the app, the information displayed may be unreliable and give the user a false sense of security about how the transport use affects the environment.

Welcome

[Login](#)[Sign up](#)[Terms and Conditions](#)

Welcome

Please enter your email and choose a password

email address:

Password: (Must be between 6-10 characters and contain 1 special symbol)

Re-enter password:

[Submit](#)

Welcome

Please enter your username and password

Username:

Password:

[Submit](#)

Welcome

Please enter your email and choose a password

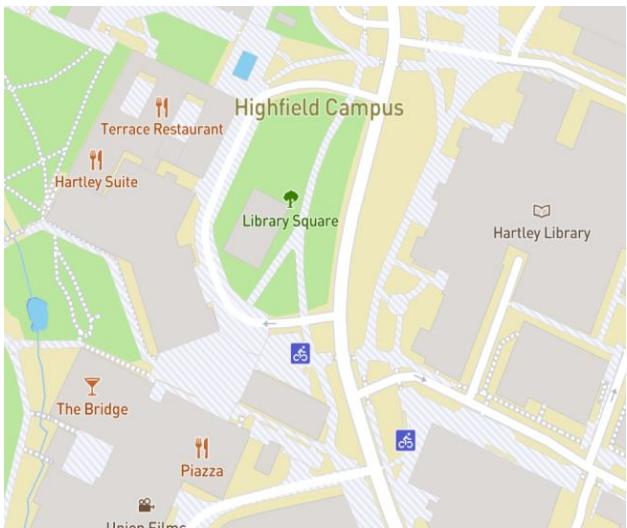
email address:

Password: (Must be between 6-10 characters and contain 1 special symbol)

Re-enter password:

[Allow location](#)[Choose manually](#)

Which of the following modes of sustainable transport do you use on a regular basis?



Bus

Cycle/Scooter

Private car

Taxi

Train

None of these

Which is the bus service that you mostly use? (Select from the list below)

Select from the options below:

- Bluestar
- First Southampton
- Unilink
- Xelabus
- Coaches



Well done! You are a true environmentalist. Keep on going!



1

Which is the car that do you drive?(Select from the list below)

Select from the options below:

- A(34) _____
- Abdal
 - Abarth
 - Abbott-Detroit
 - ABT
 - AC
 - Acura
 - Always
 - Aixam
 - Alfa Romeo

Which is the train service that you mostly use?(Select from the list below)

Select from the options below:

- Great Western Railway
- Southern
- CrossCountry
- South Western Railway

Which is the taxi service that you mostly use?(Select from the list below)

Select from the options below:

- Uber
- Cab my ride
- Bolt
- Radio Taxis
- WestQuay Cars
- Freedom Cabs
- Aero Taxis Southampton
- Southampton Taxis
- Alicia's Cars Southampton

Please enter the mode of transport that you use on a regular basis

Write your option in the blank space below.



What is your usual weekly bus usage?

Once to twice a week

Twice to six times a week

More than 6 times a week

Different every week

What is your usual weekly car usage?

Once a week

Twice to four times a week

More than 4 times a week

Different every week

What is your usual weekly car usage?

Once a week

Twice to four times a week

More than 4 times a week

Different every week

What is your usual weekly train usage?

Once a week

Twice to four times a week

More than 4 times a week

Different every week

Your average CO2 emissions are:

221.4 grams
per mile.

You can reduce your CO2 emissions by choosing the following modes of transport.

- Bus
- Cycle/Scooter
- Electric car
- Train



Well done for using an electric car! You care about the environment.



1

!?

!?

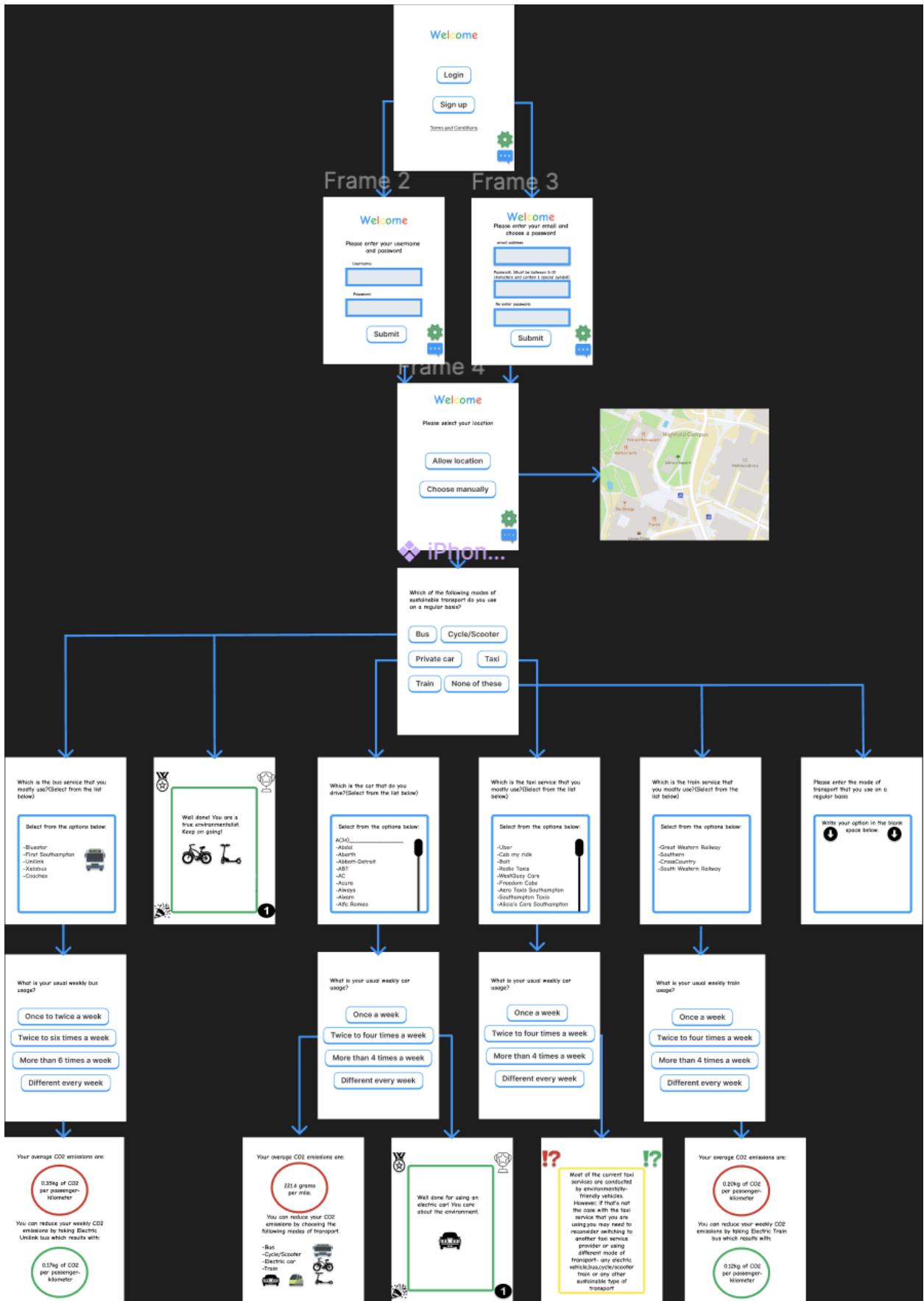
Most of the current taxi services are conducted by environmentally-friendly vehicles. However, if that's not the case with the taxi service that you are using, you may need to reconsider switching to another taxi service provider or using different mode of transport- any electric vehicle, bus, cycle/scooter train or any other sustainable type of transport

Your average CO2 emissions are:

0.20kg of CO2 per passenger-kilometer

You can reduce your weekly CO2 emissions by taking Electric Train bus which results with:

0.12kg of CO2 per passenger-kilometer



Second Design Concept - Environmental SUPER APP

Users will interact with the app by choosing between quiz games and an environmental newsfeed. The quiz game will have a range of questions based on the environment and public transport that will be designed to allow users to test their knowledge. There will also be different difficulties to make the experience useful and fair for both the more familiar and less familiar players. Players will be able to compare their scores with other players so that friends can compete in a friendly way to motivate each other to get better at the quiz by tracking their progress. By selecting a news feed, a list of newly published content focused on the environment and public transport will be displayed, which is designed to be informative and easily shared between friends. The app aims to produce a fun and friendly way of interacting with an environmentally friendly app with friendly competition, whilst informing users on environmental news.

Benefits and Drawbacks

The Environmental SUPER APP is a fun and interactive way to engage users whilst increasing users' knowledge and awareness of environmental and public transport topics. The fun aspect of the app motivates people to use it whilst increasing knowledge on the topic will promote and motivate users to be more sustainable within their day-to-day life. The competition aspect also promotes users to get more informed in the app to better their friends.

However this app is most effective when there are groups of people using the app, this is due to the friendly competition aspect of the quiz, tracking progress, and motivating people to increase their knowledge. If users are not interested in the subject then it may also be hard to try and gain their interest in the topic and keep them interacting with the app. The simplicity of the app may also lead to people getting bored after using the app for a certain amount of time as the question may feel similar or repetitive.



ENVIRONMENTAL SUPER APP

Login

Sign Up

[Terms and Conditions](#)



PLEASE ENTER USERNAME AND
PASSWORD

USERNAME:

PASSWORD:

Login



PLEASE CHOOSE A USERNAME:

PLEASE CHOOSE A PASSWORD:

CONFIRM PASSWORD:

PLEASE ENTER EMAIL ADDRESS:

Sign Up

DAILY LOGIN

1	2	3
4	5	6
7	8	9
10	11	12

**REWARD
AVAILABLE
CLAIM HERE**

**CONGRATULATIONS
YOU HAVE WON THE
FOLLOWING PRIZE!**



10 FREE COINS

Continue

**ENVIRONMENTAL
SUPER APP**



**'A remarkable sign' /
Flurry of wolf births offers
hope for California
comeback**

**Cop15 / What are the key
targets for the biodiversity
agreement?**

**'My life is being
endangered' / The
growing struggle against**

**DAILY
FEED**

QUIZ

SETTINGS

**ENVIRONMENTAL
SUPER APP**

DAILY QUIZ!



**Choose difficulty
level!**

Easy

Hard

**ENVIRONMENTAL
SUPER APP**



Account settings



**Data privacy and
collection**



App customization



**View previous quiz
results**



**Browse and clear
your history**



Content preferences

DAILY FEED	QUIZ	SETTINGS
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DAILY FEED	QUIZ	SETTINGS
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ENVIRONMENTAL SUPER APP

DAILY QUIZ!

Question 1:

True or False?

Bicycles are more sustainable than cars

True

False

Question 2:

True or False?

20% of cars in the UK are electric

True

False

Question 3:

Select all modes of transport which do emit carbon dioxide:

Bicycle



Horse



Car



Bus



Plane



Kayak



Skateboard



DAILY
FEED

QUIZ

SETTINGS

ENVIRONMENTAL SUPER APP

DAILY QUIZ!

Question 1:

What percentage of cars are electric in the UK?

A. 3%



B. 5%



C. 8%



D. 1%



Question 2:

How much carbon dioxide is emitted by each UK person on average each year?

A. 5 tonnes



B. 40 tonnes



C. 2 tonnes



D. 10 tonnes



Question 3:

Which mode of transport is the most sustainable?

A. Bus



B. Train



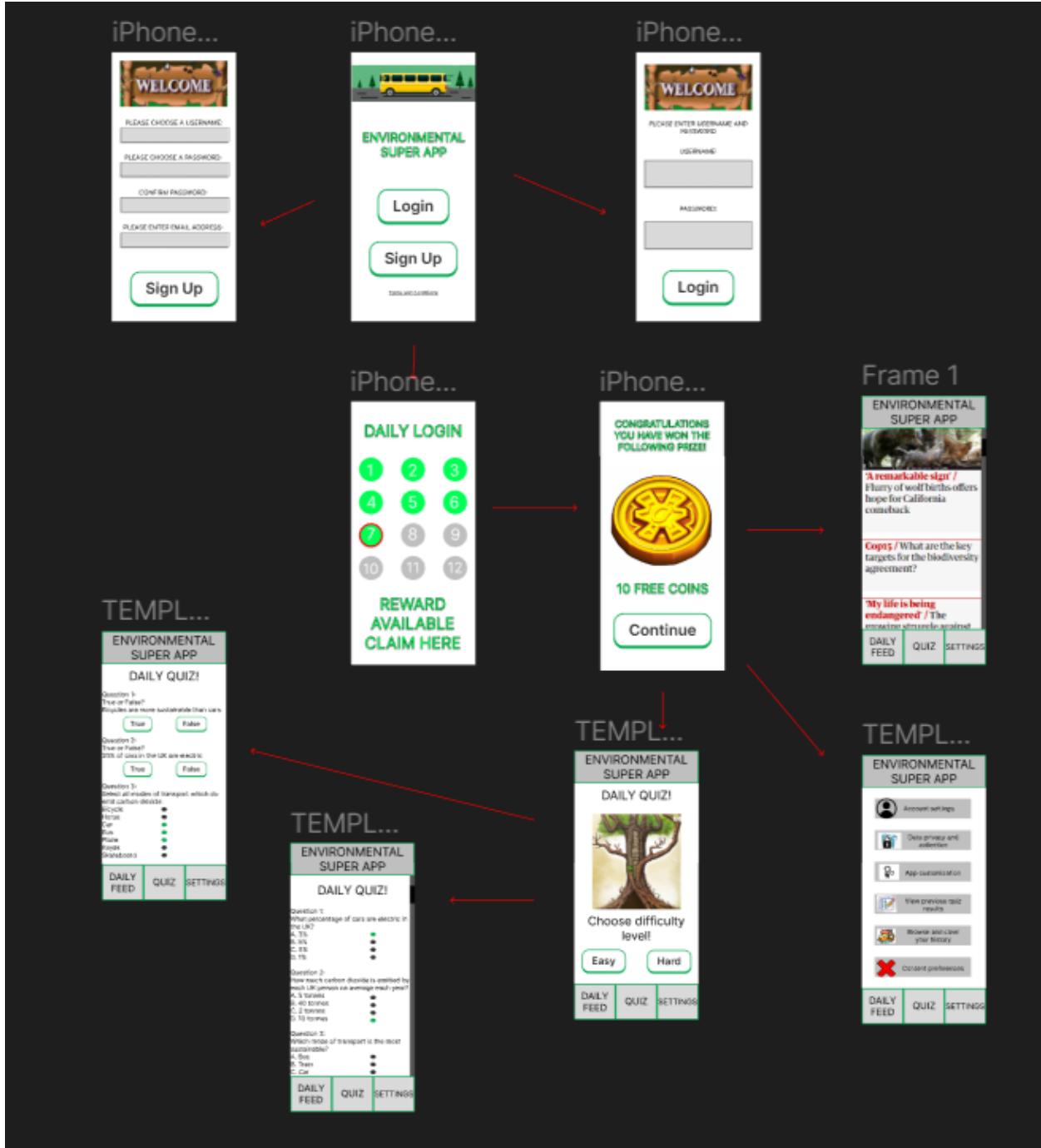
C. Car



DAILY
FEED

QUIZ

SETTINGS



Third Design Concept - Tree Maps

Users will interact with an interface on the home page. The app will provide information on routes travelled by different environmentally friendly modes of transport, such as buses and trains. Based on weather conditions, the route and mode of sustainable transport chosen by the app will be the most appropriate one for each situation and weather condition. To further encourage the use of public transport, exclusive discounts and offers will be offered to every user who purchases a subscription, and a tree will be planted for every 10 registered uses of public transport, as well as up to 10 per subscriber. The app's rewards program and tree planting challenge also encourage users to be more environmentally conscious and adopt sustainable behaviours.

Benefits and Drawbacks

The Tree Maps app looks incredibly promising as it offers important information on different transport modes in real-time, making it much easier for users to make decisions. In addition, having a game-like challenge to users to help plant trees and with the damage to the environment will make users feel responsible for inappropriate behaviours towards the environment. While being extremely useful to some people, it should be noted that the app may not be as useful in less developed countries or areas with limited public transportation options.

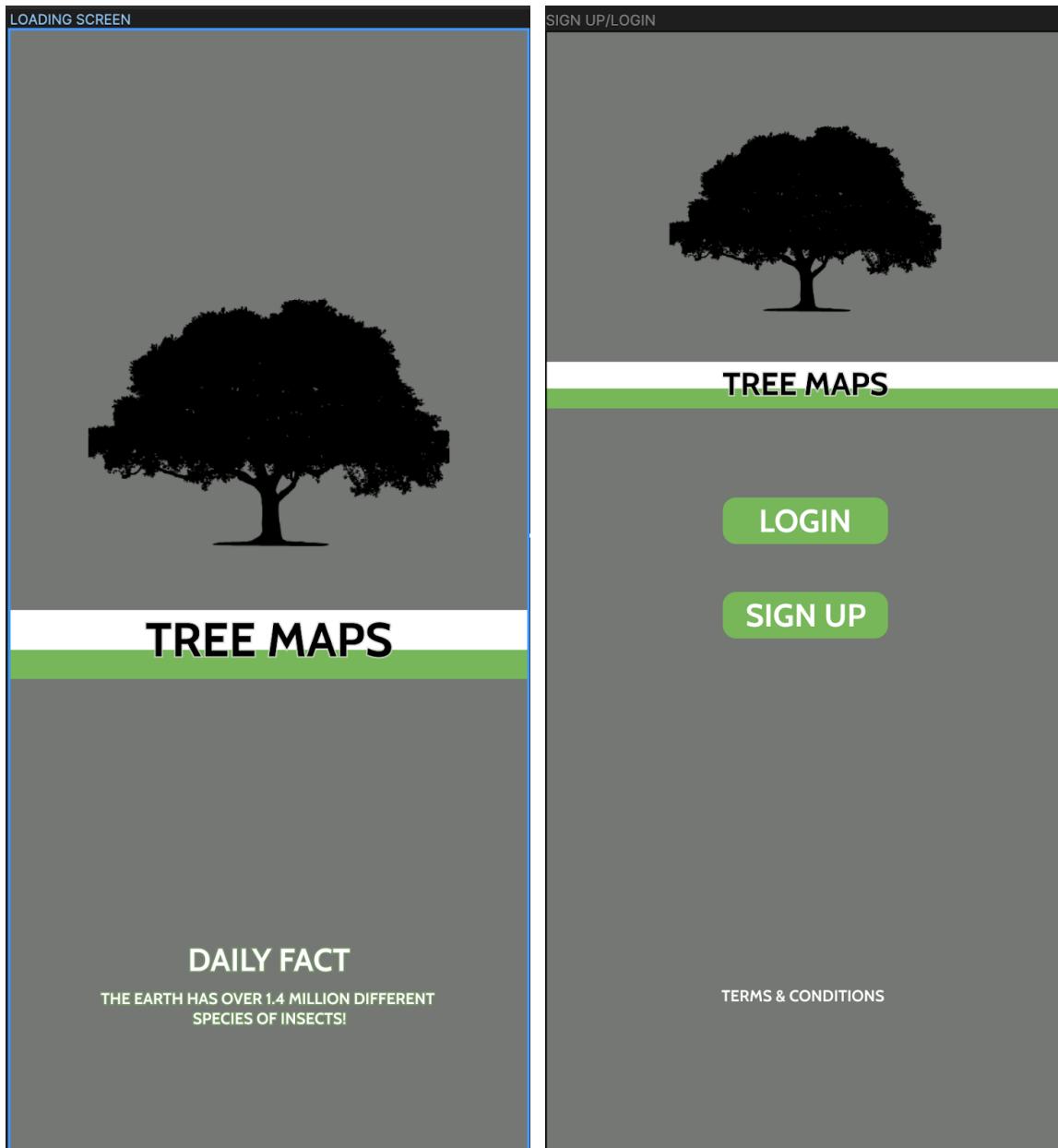


Figure 1

Figure 2

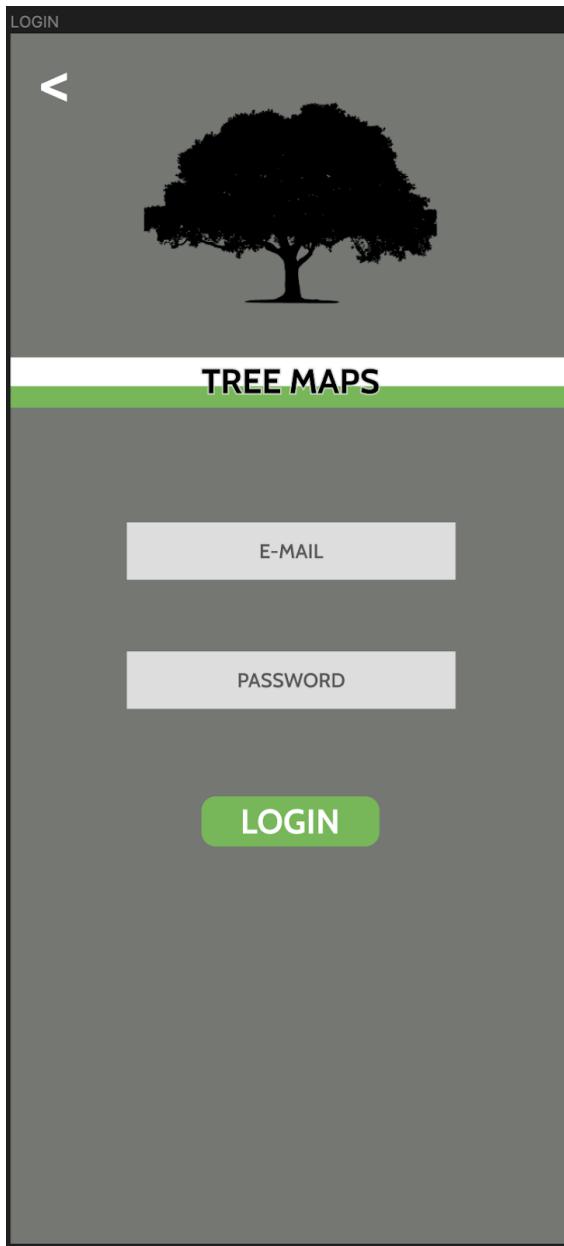


Figure 3

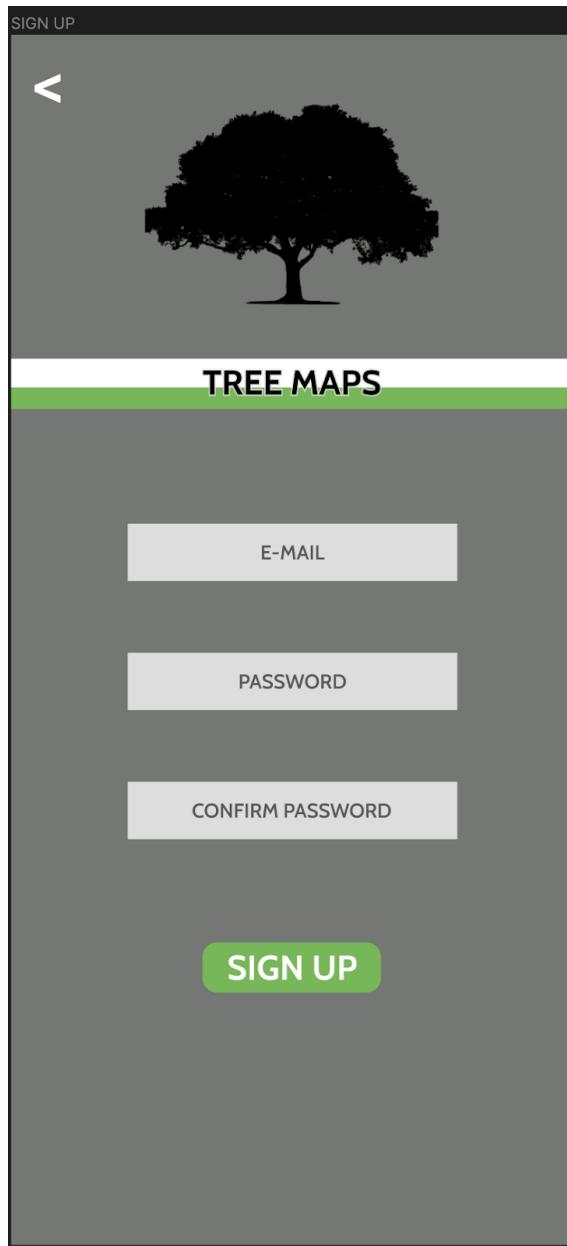


Figure 4

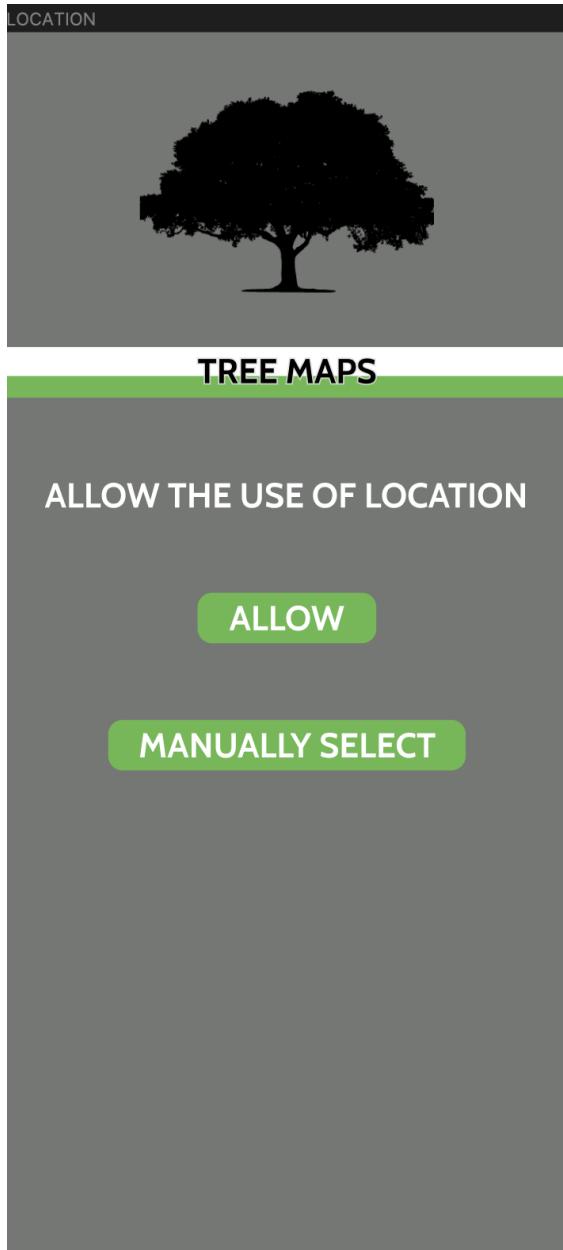


Figure 5

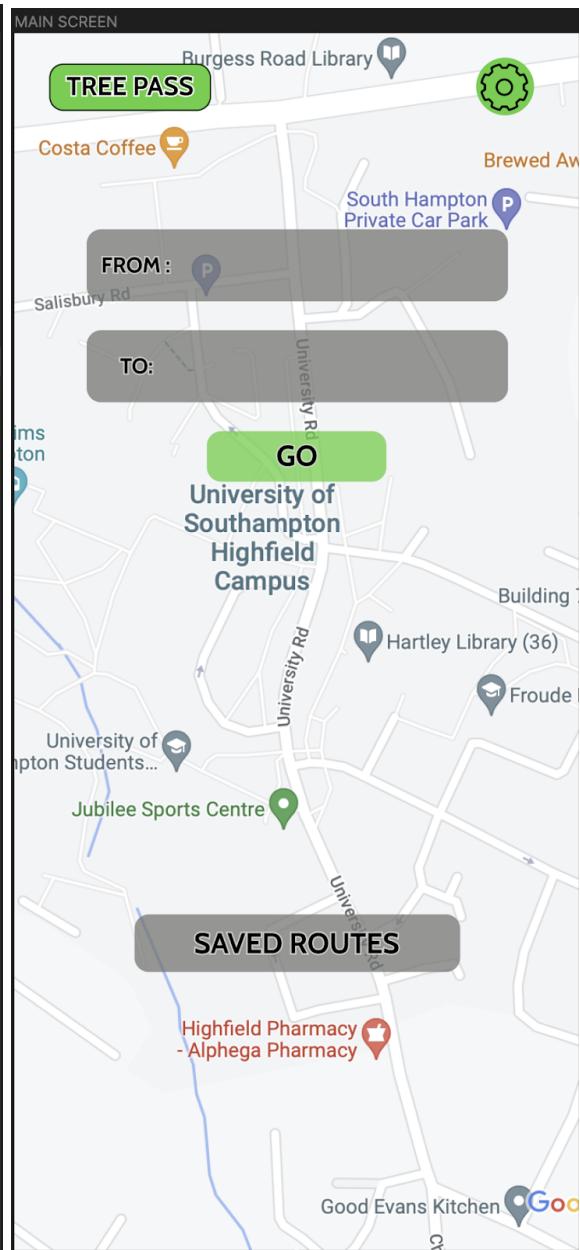


Figure 6

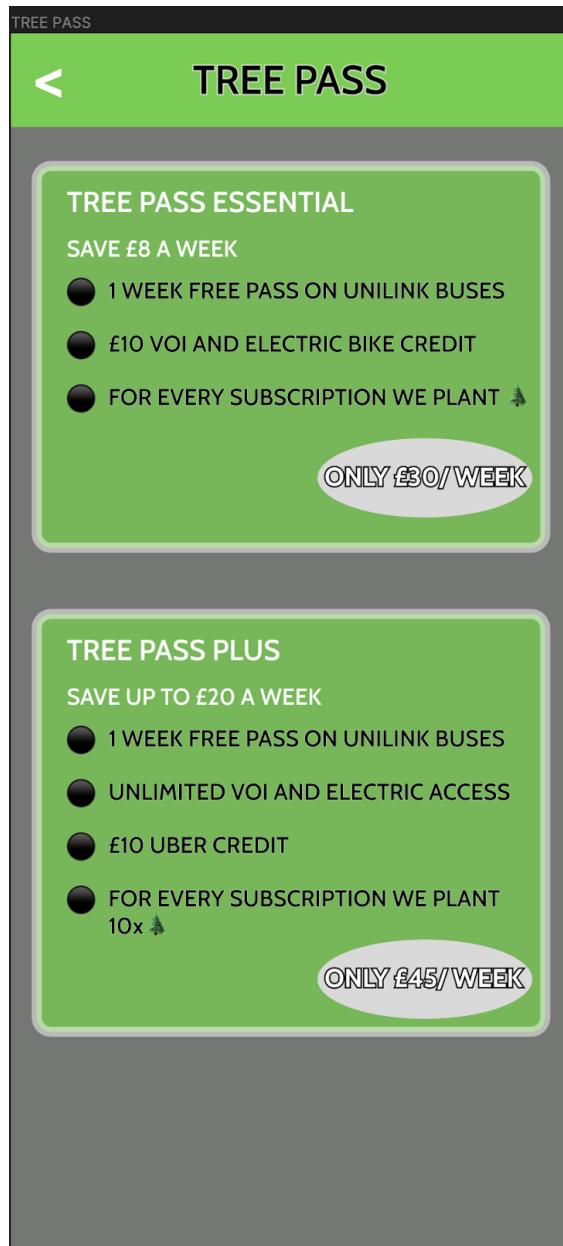


Figure 7



Figure 8

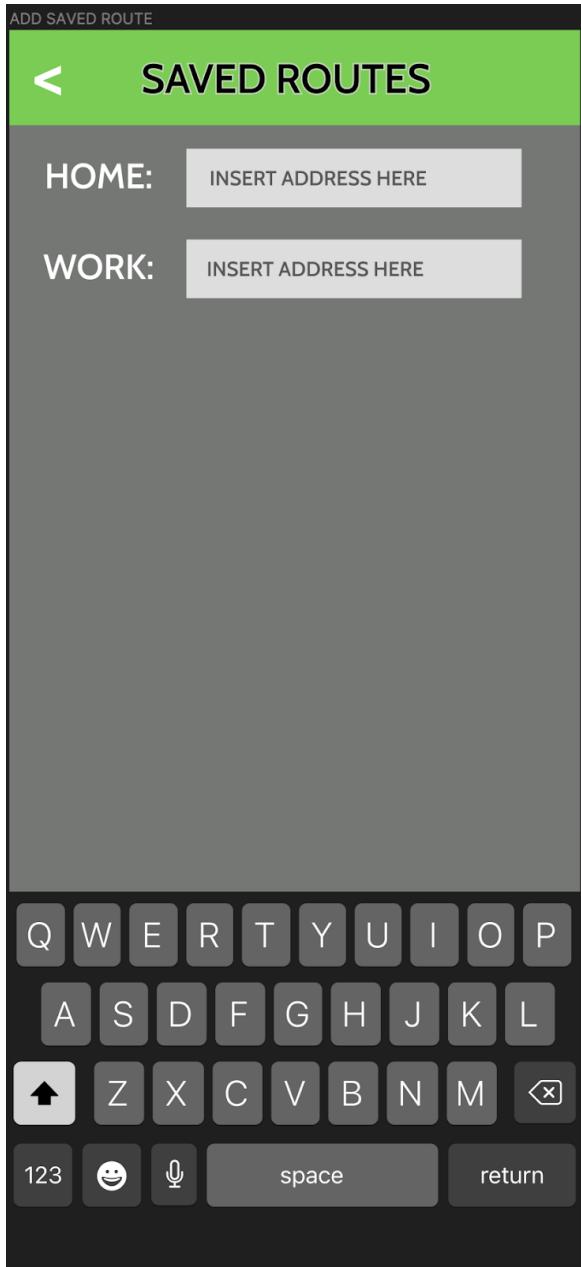


Figure 9

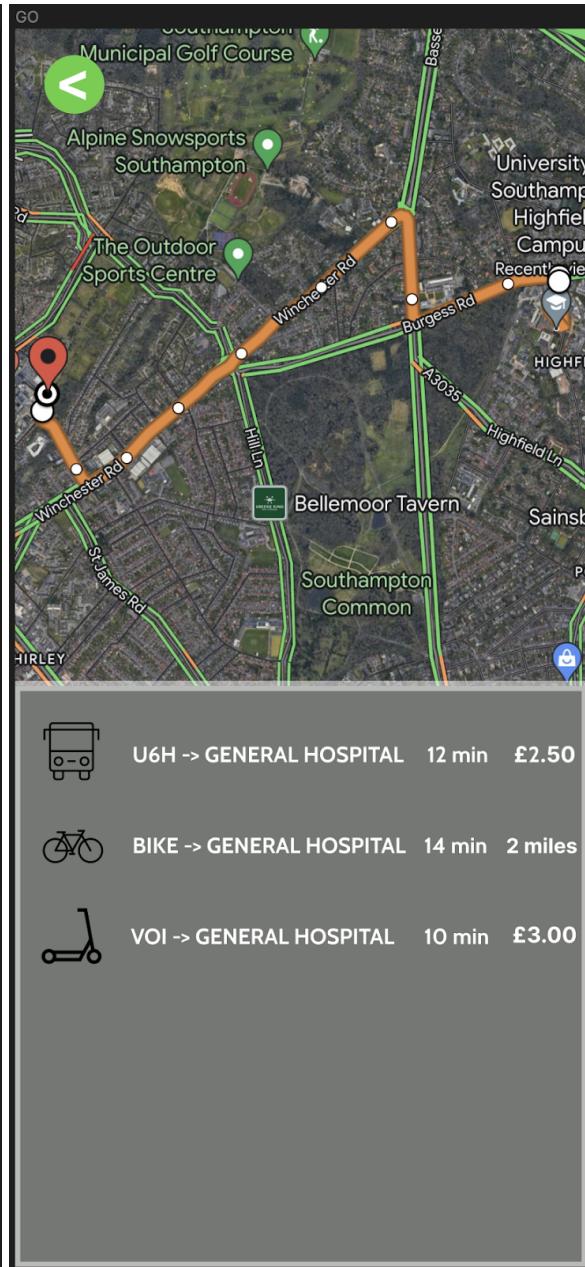
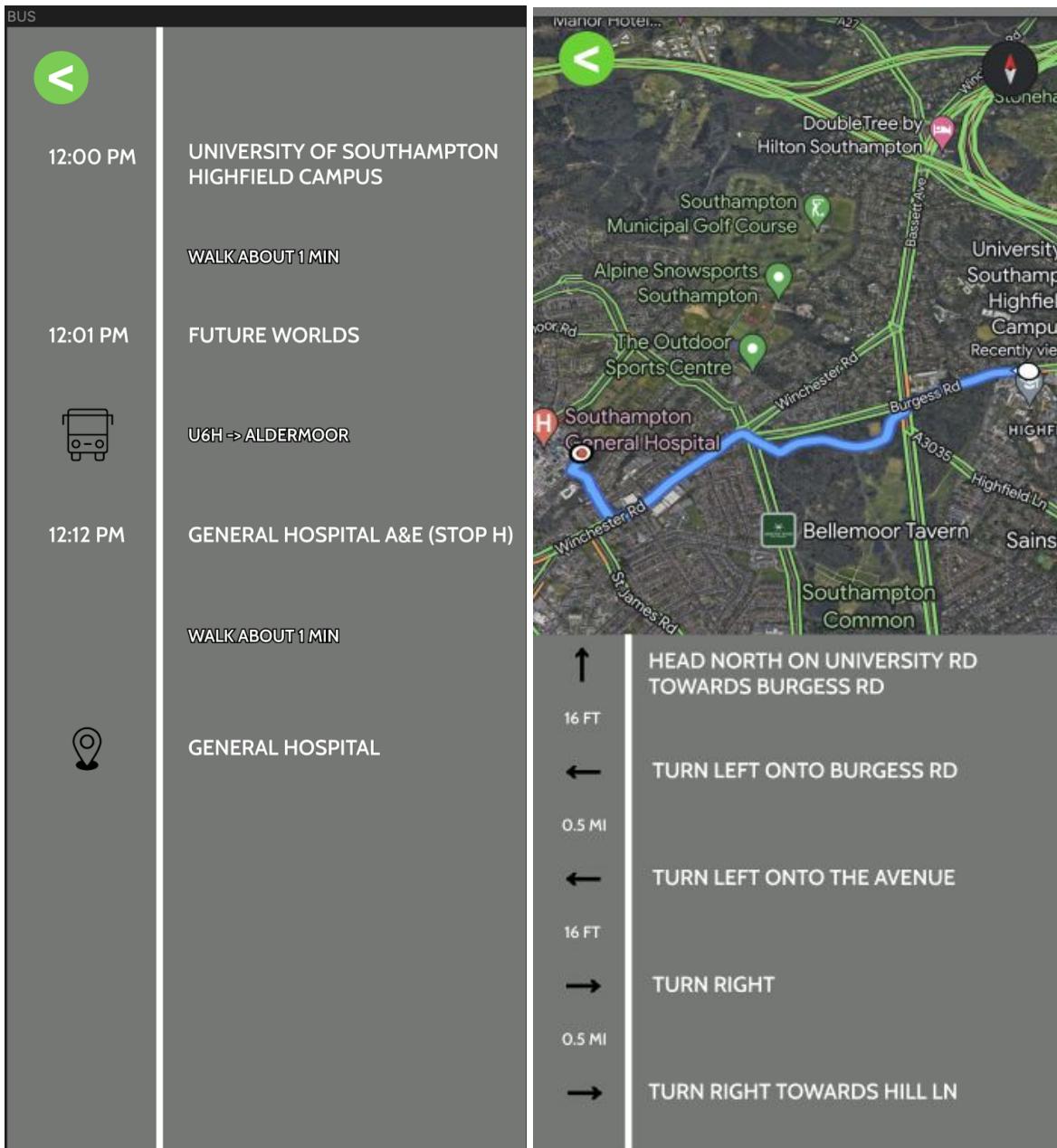


Figure 10



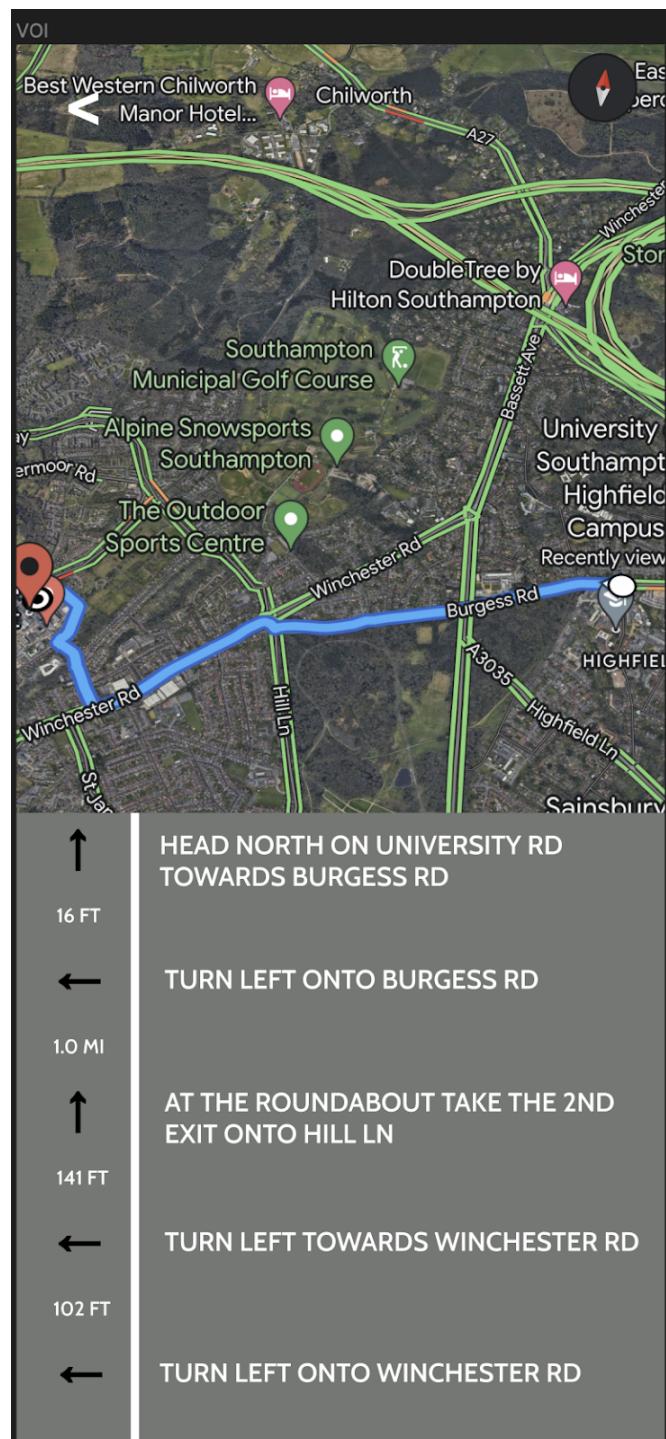


Figure 13

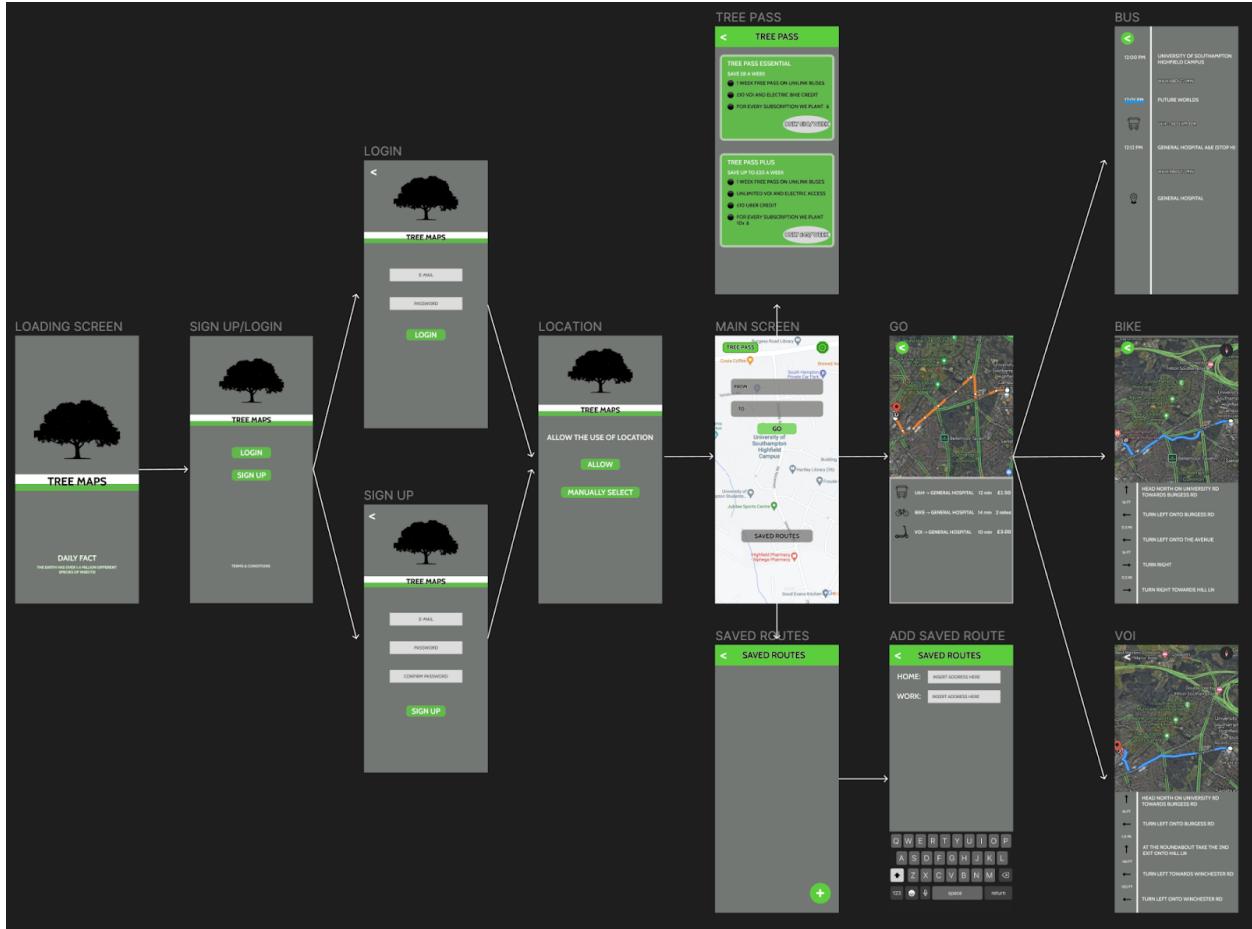


Figure 14

Selection and Development of Design Concept

The concept we have chosen to develop further is the third design concept of "Tree Maps", which is the most accurate way to be more conscious of the environmental issues arising from sustainable transport.

We have taken into account the necessity of real-time information on various eco-friendly means of transportation as well as the significance of promoting sustainable behaviours to defend our design choice. Users may choose their mode of transportation wisely thanks to the app's important information on various routes and weather conditions. Additionally, users are encouraged to adopt sustainable behaviours and take charge of the environment through the rewards programme and tree-planting challenge.

In terms of presumptions, we have presumed that the app will work by offering users who buy a membership exceptional discounts and prizes in addition to delivering real-time information on various transportation options and weather conditions. A tree will be planted for every ten registered uses of public transportation, up to a maximum of ten trees per subscriber, according to the app.

To expand on the idea, we picture the app having a user-friendly UI and a home page that lists details on various types of transportation and their associated routes. Users will be able to choose a method of transportation and view real-time weather and route information. Additionally, the app will provide subscribers with access to special discounts and offers, as well as a rewards programme that promotes sustainable behaviours and awards users for taking public transportation.

Running and biking enthusiasts can benefit from our app's speech navigation by using it to get voice-guided directions while they are on the move. This enables individuals to avoid looking at their mobile device's screen while running or bicycling, allowing them to maintain their attention on the road or route. Using speech navigation, cyclists and runners may hear spoken alerts about traffic, turns, and other crucial information, making it easier and safer for them to find their way. Additionally, the tool may offer directions in a variety of languages, making it available to consumers anywhere. In general.

To further the idea, the Tree Maps app is a resource that gives users up-to-the-minute details on various environmentally friendly means of transportation and the routes they take. Through a rewards programme and a challenge to plant trees, the app promotes sustainable behaviours and offers subscribers special discounts and benefits. Users can choose their mode of transportation with the use of the app's user-friendly layout, which includes a home page that provides details on various types of transportation and

itineraries. The Tree Maps app is a helpful resource for promoting eco-friendly transportation options and fostering sustainable behaviours overall.

Figure 1

Figure 1 shows an opening screen, which features the name of the app, followed by a picture of a tree. This provides a friendly introduction to the app whilst it loads and also features a daily fact relating to the environment. The user is interacting and reading the fact whilst the app loads so their attention is retained.

Figure 2

Figure 2 presents the user with a screen providing the options with a login and signup button so that the user can sign into their account or create an account to use the service. If the user is concerned about how their data is being used, they can click on the terms and conditions button to see what they agree to when using the app and how their data is being processed.

Figure 3 & 4

Figure 3 and 4 presents the user with a screen that requires the user to provide an email and password if already a user or email a new password and reconfirm the password if it's a new user so that the user can sign into their account or create an account to use the service.

Figure 5

Figure 5 presents the user with the choice to choose whether to allow the app to access the user's exact location, this provides the user with the choice of allowing the app to see your location. If the user chooses not to do so then they can manually select a location instead.

Figure 6

Figure 6 displays a multi-functional screen which is also considered to be the main page. From this screen, the user can go to settings (top right icon), access their tree pass (top left icon), and see their saved addresses (bottom icon). In the centre of the screen the user can set their starting point and final destination, whereas the map behind either shows their current location or any saved addresses.

Figure 7

The seventh figure shows the different types of membership that contribute towards saving money on sustainable transport. By adding different modes of transport to the offer, customers are given a variety of choices including buses, electric scooters, and taxis, depending on their time constraints and current situations. The purpose of the remaining funds is to be invested in planting trees, and taking care of the environment.

Figure 8

The eighth figure focuses on storing commonly used routes. The user can easily add their preferred journey from the "plus" button, which will take them to the next page where they can add their daily journey to or from home or work more easily and conveniently. The user always has the choice to not add any trip in this menu and just return to the previous page.

Figure 9

This page displays the routes that you have saved under the headings that you have given. For example, you can save the address of your home or work which would increase the efficiency of the app as you would not need to type in the same address all the time. A keyboard appears for the user when clicking the enter address button to allow them to interact with the system.

Figure 10

This page of the app will display the nearby public transport routes which are available in the location you have decided on. It will show sustainable modes of transport as well which the user will be rewarded for using. They allow live location features to improve user interaction whilst ensuring we are being transparent with our users.

Figure 11

From having a starting and an ending location, and calculating all routes that can be taken, the screen shows the directions and instructions for the user to follow, to arrive at the final destination. There is a back button on the top left of the screen, for the user to be able to minimise the instructions.

Figure 12 & 13

By pressing the back button on the top left of the screen in figure 11, the user minimises the instructions to the bottom half of the page, having the map with the highlighted route on the top half of the page. On the top right of the page, there is a compass, helping the

user with his orientation. The back button on the top left of this new page will bring the user back to the selection of destination. Using map services based on your current location and final destination, this page displays multiple routes, to get from point A to point B. It displays when to take a turn and at how much distance. Having in mind cyclists and runners, there is also a text-to-speech option to provide those users with a safer environment.

Figure 14

Figure 14 displays how each page interacts with the other, showing how the flow actions will be executed in the application.