ECS522U Weather Application

Group 3

Stakeholder Research, Requirements Analysis and Design

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Overview of our stakeholder group

For our primary stakeholder, we are looking at businessmen and women specifically - people who fly frequently due to their occupation, and whose flights need to be on time. They are keeping to a tight schedule and are still travelling despite the current pandemic. Businesses will always pay for their employees to fly business class. Note that we are **not** looking at business class passengers, i.e. the ticket class, we are looking at people who travel **for** business.

Why are we looking at this group? According to a study by Trodent Development Corp, while business class passengers account for only 12% of passenger numbers, they can make up as much as 75% of the profit an airline receives[1]. While naturally some of this will be leisure travel, we can tell from this that corporate passengers have more money to spend on flights, and we can assume that this also applies to accompanying and supporting applications, such as flight information and weather apps. Perhaps we are able to blend the two into a seamless experience.

A UK Department for Transport study states that 75% of business passengers are travelling to or from an international destination. With this in mind, the weather at both ends of the flight will be important to consider, as they will most likely be vastly different climates. From the same study, we know meetings are the primary objective of business passengers. Punctuality is an important aspect of meetings, so cancellations or delays are undesirable.[2]

Looking at statistics between January and December 2019 for USA, over 1 in 5 flights were delayed or cancelled. For flights that are delayed, more than 1 in 40 are due to weather. More than 1 in 50 flights are cancelled[3]. Considering how many flights there are per year (almost 70 million in 2019[4]), we consider this a significant enough point to investigate this stakeholder group, as these cancellations and delays are the least desirable for business passengers.

By having this as our primary stakeholder, we are covering a global market, allowing our application to be used regardless of the current world situation.

Business passengers and their companies spend a large amount of money on the travel industry, and fly frequently. They are looking for:

- A comfortable travel experience so they arrive at their destination ready to work;
- An on-time flight, both on departure and arrival, so that they do not miss vital meetings;
- Good synchronisation of transfers to and from the arrival and departure terminals, so they are not waiting long.
- Information on the climate at the destination, so they can prepare correct clothing.

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[1] https://www.trondent.com/business-travel-statistics/#:~:text=Business%20passengers%20represent%2075%20percent,of%20profit%20for%20increased%20sales

[2] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/917808/dynamic-surveying-business-passengers-document.pdf

[3] https://www.transtats.bts.gov/OT_Delay/OT_DelayCause1.asp?20=E

[4] https://www.flightradar24.com/blog/flightradar24s-2019-by-the-numbers/

The weather app aids in this by providing some insight to the runway conditions to give an idea of if the flight will be going ahead or divert at the destination - if conditions are icy, visibility is obscured, or there is a large-scale weather event, we can give more of an estimate. Comfort wise, we can offer some insight on the type of clothing to pack. In a more trivial matter, perhaps we can offer some insight into how good the visibility will be from the plane window.

With the current pandemic, we want to ensure an efficient and stress-free travel system to the essential workers that are still travelling. Tourists are not our primary group right now, we are not facilitating luxury travel, instead providing a premium app for corporate passengers.

Description of wider stakeholders

Secondary

The secondary stakeholders for this business would be the people who have an indirect relationship with the application, and are unlikely to be an employee or a company director. While they can be influential, they will not have a direct engagement with our company.

Our secondary stakeholders include:

Airline companies. They will be affected if a user of the system decides not to travel due to the weather shown on the application with potential delays/cancellations.

Destination companies. If business professionals cannot stick to pre-planned schedules, any work may be delayed as a result potentially costing businesses time and money.

Tertiary

The tertiary stakeholders for this business would be the people who are more indirectly affected by the application than the secondary stakeholders. The success of a project can often rest on the tertiary stakeholder, as they can be directly involved in the project i.e., their opinions and views can influence business decisions.

Our tertiary stakeholders include:

Company directors could make key decisions, and will be directly affected by the success of the application. This could subsequently affect company profits and valuation.

Business Partners. Any potential investors will also make a profit/loss based on the success of the application.

Facilitating

The facilitating stakeholders in our scenario would be the software developers, as the facilitating stakeholder is responsible for designing and implementing the application.

Software developers will also consider user-friendliness, functionality, performance and cost-effectiveness.

Developers will endeavour to deliver a product which is intuitive to use, and will improve the user experience by identifying any possible conditions which could affect travel.

Developers will also conduct a phase of data gathering from potential users. By doing this, the eventual user-friendliness and functionality of the application can be determined by identifying what features and functions will be most needed for the application user.

Data gathering

https://docs.google.com/forms/d/e/1FAIpQLSfJ5lY15zqbxM3VHA6XmKsVcQyhUANZuGQdZAAiFocN2eKNnw/viewform

a)

We've decided to use a questionnaire with closed questions as our primary data-gathering technique. This is because we can obtain a larger sample of the population as well as obtaining a rich amount of structured data.

Alternatively, we could've gone with an interview which would provide us with a richer amount of data but we would not be able to collect as much as the interview process consumes a significant amount of time. Likewise, the observation method would yield a much larger amount of data but it would have less quality than both the interview and questionnaire data-gathering techniques.

b)

We've identified several potential patterns as well as possible points of interest from our data gathering results which should give us good insight on how our application will work for the consumer. We conducted a questionnaire with a total of 85 people on how they behaved when travelling by airplane.

In the first question, we asked roughly how often people travelled by plane every year. Less than 10% of people said they haven't travelled at all this year while 70% said they travelled from 1-4 times and final 20% said they travelled 5 or more times. We can infer this to mean that people from our sample are frequent flyers.

We followed up with a few more questions in order to better isolate our target audience such as what is the usual purpose of their trips, what class they fly in and whether or not they have flown during the COVID-19 pandemic - of which just over 20% travelled for business and fly business class and 16% claimed to have flown during the pandemic.

With this in mind, we could now ask questions related to the app itself and therefore the suitability of our ideas to our target demographic. And from this we discovered that:

- 70% of people encountered delays due to bad weather at least once every ten flights of which 6.5% said they encountered delays roughly every other flight
- 32% of people had flights unexpectedly cancelled due to bad weather
- 35% were not generally informed of the destination's weather before take off
- Over 85% of people expect to spend approximately 0-30 seconds using a weather app
- Only 12.5% have seen a weather app that aids people who tend to fly a lot
- Less than 10% of people check the weather conditions of a flight at home while the rest preferred to either check the weather whilst on the move or didn't check the weather at all

From this sample of people, we can highlight some key indicators of a potential gap in this market. Firstly, the large number of people experiencing delays or cancellations in their flights due to bad weather is significant as these issues can impact the business of not only the passenger but also the airline itself. With an app to check the latest weather before a flight, we can expect a possible reduction in last minute unexpected cancellations from bad weather due to passengers being able to take better initiative to

cancel their flights earlier. Furthermore, with a low number of people seeing a pre-existing app with this idea already could suggest a lack of competition and good room for growth. Also with few people checking weather conditions at home, it reinforces the idea that we should develop this new app for mobile platforms first.

Requirements development on our primary stakeholder

Requirements Development Model

Aims:

Via the use of this weather app, the stakeholder will hopefully be able to get an idea of the weather conditions at both ends of their plane trips, the departure and landing location. Thus the main aim of this application will be to help with preparation and for the users of the system to know how any plans they may have be possibly affected by the weather. The success of this system would be measured by the reviews and popularity of it among peripatetic users and its ability to inform them in advance of the weather in different locations so any plans can be devised or adjusted.

Job Satisfaction:

Regular flight-users gain most of their satisfaction from knowing what to expect in the future. Because they tend to live very busy lifestyles (e.g. business workers), they have very little to no time to check conditions of locations in advance which can be very bad for morale/productivity, especially if something unexpected arises which they are not ready for. Furthermore, they prefer it when there is little to no traces of useless data to read through so they can easily retrieve the essential data they require. Using the app should be a fast process.

Knowledge and Skills:

General users can vary in terms of their skill set however with peripatetic users, we can narrow done their skill sets. The majority of these users consist of people who work for businesses and tend to go meet their clients. They are usually very intellectual and exceptional when it comes to problem solving and thus should be able to use the application without any issues. Even though the system would be designed for peripatetic users, the application will hopefully have a user-friendly interface which all users can benefit from and not much experience with technology will be required.

Work Attitude:

The target market for this application will have a lot of experience when it comes to computer technology since it traditionally revolves around their daily tasks. This means that even if the application was complex, it would not pose as big of a problem to the success of the system. However since it is a simple application, we would expect to design a system with ease-of-use and simplicity in mind which also caters to a wider market.

Work Group Attributes:

Even though there are many other weather applications on the market, there are very few weather applications which target people who tend to fly regularly. A general weather app can do what the system we plan on creating but will take a much longer time to get the output the stakeholder actually wants. This application's main aim is to make it easier for peripatetic consumers to check the weather of multiple locations at once. In addition, since this application is suitable for mobile usage, it would be great for people who are on the move regularly.

Features of Activity:

The stakeholders which are being targeted use flying services on a very regular basis. They would tend to use this application whenever they are about to travel to a different location, and want to be informed of the weather conditions/forecast. Our primary stakeholder are people who have professions revolving around working in a business and thus they will require the services of such an app on a regular basis. From our research, it can be seen that the app usage may need to be required to be flexible in terms of environment as the majority of our market checks the weather last minute or before any major plans.

Responsibilities:

The stakeholder does not have to consider any responsibilities to any other person except itself and possibly the company they are a part of. They have responsibility for their own wellbeing, and making sure they are prepared for whatever circumstances may be present. Also, if they work for an organisation, they may be carrying important files and documents, so if they make a miscalculation on what to pack and equipment to bring with them due to lack of knowledge on the weather, this can be detrimental and lead to either damaged or lost documents.

Work Conditions:

The primary stakeholders will typically use the system either at home (before they leave), on the go, or whilst at the airport/on the plane. The conditions surrounding these environments can vary depending on the location of use and therefore, the system should be able to cater to all of these possible locations, whether it be noisy (from other people in an airport) or quiet (at home) or whilst travelling.

Functional Requirements

Set Location

Users will be able to set the location for which they would want to see the weather information of. They could either set their current location, which will possibly require location access and will be automatic, or they could set a preferred location manually. The system will allow the user to choose which option they prefer via a possible settings menu.

View Current Weather

The main feature of the weather app besides the flight section would be able to see the current weather and the current conditions. The current weather will output the temperature, conditions (e.g. snow, sunny, rainy), precipitation levels, visibility, humidity, pressure, sunset/sunrise times of that day as well as possibly additional features.

View Daily Forecast

Application will give users the option to check the weather forecast. This could be a weekly, daily, hourly forecast and will inform the user about the expected conditions of a location they have set. These figures may change but they will generally be along the right lines and will provide the same information as the ones shown in the current weather tab but for the specified day.

Set Starting Location

Users will be able to set the location/airport from where the plane will take off from. This will allow the system to extract the conditions of the departing airport without needing to be present at the location.

This is the USP of this app and is information which is required by the system to provide correct weather information at the base location.

Set Final Destination

Users will be able to set the location/airport of where the plane will land. This will allow the system to extract the conditions of the local area without needing to be present at the location. This is the USP of this app and is information which is required by the system to provide correct weather information at the final destination.

Ability to input Flight Code

An alternative to explicitly stating the destination and the departing/landing time will be inputting the flight code. This will fill out the fields automatically to generate an output and is less hassle for the user. This feature would be optional and not necessary to enter information in as long as it has been manually entered. Flight information could also possibly be entered via scanning of a plane ticket.

Set Departing/Landing Time

App will not incorporate flight information directly in its database, so this is essential data which would need to be entered alongside the destination and base locations. By receiving this information, the system will be able to estimate the weather forecast at both locations by extracting the hourly forecast for the locations in question.

Accessibility Features

Some Users will have disabilities compared to other users which makes this an important requirement to implement in order to cater to a wider market/audience. Some features may include tackling colourblind issues, having a dyslexic mode for people who find it difficult to understand the app and how it works as well as larger text/bigger buttons.

Display Warnings

The system should display warnings in the forecast section if the user is suspected of facing a natural disaster in the future such as thunderstorms, heavy rain, snow, fog or even tornadoes. This allows the user to prepare before the scenario was to occur and will boost user satisfaction.

Display Summary

To make the application seem more friendly and appealing to the user, sentence templates or cards will be used to output messages to the user of the weather and what they should expect. This would be helpful for the people who do not like looking at a lot of statistics and will give a quick summary to the user to tackle this issue.

Non-Functional Requirements

Cross Platform

The ability to use the application on a variety of devices ensures that all business clients can utilise the app regardless of the hardware they have with them. Businesses often provide their employees with

work phones when travelling, so we must ensure that the application can run on all of these, preferably as many versions as possible to support older devices.

Uptime

Flights occur all day and there are no legal restrictions on night flights apart from a numerical limit to the number of flights per year[5]. With this in mind, we must ensure our app has a high degree of uptime, for 24 hours a day. Downtime for maintenance should be kept in between the hours of 23:30 and 6:00, preferably towards the first half of this period, as towards the end of the restricted time zone people may be looking at their flight information, checking for cancellations, or confirming weather on the day of their flight.

App usable internationally

People fly over the whole globe so you need to be able to use the app no matter where you are. So the app can not be restricted by region.

Legality and licensing

We need to ensure all APIs are accessed legally, as we are creating an application for profit. Accessing this information in the wrong way could result in lawsuits and notable downtime while a new source of information is obtained.

Size

The nature of mobile devices means that there is limited storage for apps. With this in mind, it is important to ensure that our app does not get deleted in low-storage scenarios. We should minimise the size, and Preact should help with this.

Performance

Checking weather and flight information should be a quick, seamless process and therefore we need to use as little RAM and CPU as possible to avoid device slowdown and improve user experience.

App must be easily deployed

People must be able to get the app no matter where they are so that they can check the weather of their flight anywhere they are on the globe. This can be achieved by being downloadable from the google app store and ios app store.

Price

We would likely be looking at a subscription model, with most features being available to “Executive Plus” users. This ensures a monthly source of income to help fund APIs, a large adoption base due to the initial free app, and a free trial to hook users into the service. A monthly, quarterly and yearly subscription could be possible, with potential “Corporate” options for adapting it to businesses who wish to purchase the usage for all their employees.

[5] https://www.heathrow.com/company/local-community/noise/operations/night-flights

Design

a)

The design is for phones so our primary stakeholder can easily check the weather before each flight. As they would be traveling often, they would want to view the application in the airport or while traveling. To easily access our product they would use their phone which is easy to carry, then quickly check the weather and decide whether or not to travel.

The application has intentionally been designed to be as intuitive to use, as it is comprehensive in the up-to-date information that it provides. The functionality and layout of each page is intended to provide a rich user-friendly experience where there are as few unnecessary distractions as possible, enabling the user to be fully engaged with the app.

The features that have been decided to be incorporated into the application to provide real-time information have been thought-out/designed to improve the overall experience for the user. Users will benefit from a wide range of options within the application currently unavailable from a standard weather app, such as being able to scan their ticket in order to provide the necessary journey information, through to being able to have access to a comprehensive list of mid-flight atmospheric conditions to observe.

b)

The first screen the user will see is either the departure screen or the arrival screen. Which screen gets presented all depends on the state the user leaves the system.

The initial functional screen has a lot of different functionalities. From here, you can quickly check the weather at both locations (departing and arrival locations) by pressing the pindrop icons. For example, our departure screen shows Heathrow Airport is the initial airport and that JFK is the landing airport. When viewing the departure screen, you can see the weather conditions of the location you are travelling from by pressing on the weather icon. To view the weather conditions of the destination location, you would navigate to the arrival screen and press the weather icon there.

To change the departing and landing locations, you would hold onto the pindrop icons which will allow you to alter the location.

Depending on the screen you are on, the time zone will automatically adjust itself to show the correct time for the respective locations.

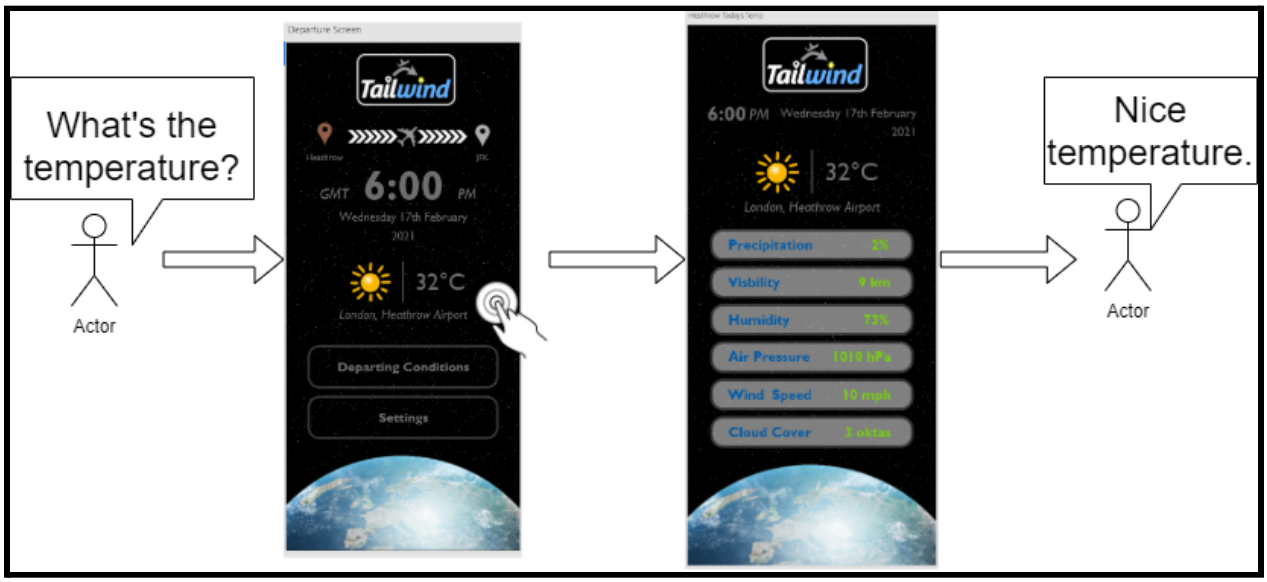
Departure screen will include the weather conditions as well as a short written summary. Arrival forecast will include the forecast over the next couple of days at the destination location.

Main menu will also have a button which will lead you to the settings page where you will be able to access accessibility features and format of timings etc.

c)

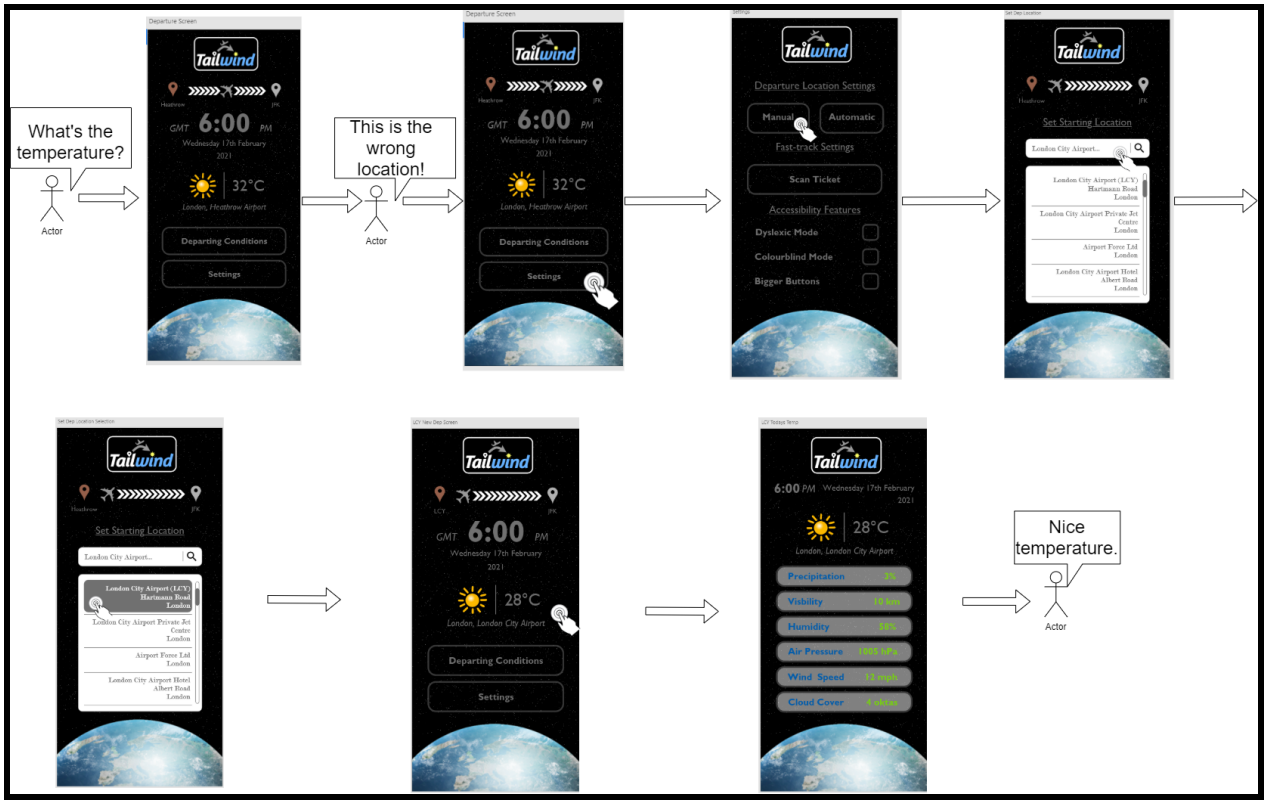
The method which is needed to complete a task such as finding today's temperature would be the same but there are multiple scenarios which can lead up to the outcome via the interactions with the interface. These can be seen below via the following storyboards.

Storyboard 1



This scenario assumes the application already has a preset ready which can occur if the state is memorised from any previous interactions (remembering last set locations). This is the fastest possible scenario in order to find temperature. To navigate to the advanced current temperature screen, the user just needs to tap on the temperature/weather icon on the home screen which will give a more detailed overview.

Storyboard 2



The scenario being displayed here entails the user wanting to set the location manually via the settings menu. By altering the departing location, the current location's temperature can be found. In the example shown above, the user changes the preset location to a different location of their choice, by searching and selecting, and this results in being able to view the temperature of the new location. To navigate to the advanced current temperature screen, the user just needs to tap on the temperature/weather icon on the home screen which will give a more detailed overview.

Storyboard 3

If the user wanted to use their current location, which would require GPS usage, they would need to navigate to the settings and press automatic. By doing so, the departure location is changed to the current location of the user which can then be used to see the temperature of that exact location. To navigate to the advanced current temperature screen, the user just needs to tap on the temperature/weather icon on the home screen which will give a more detailed overview.

Storyboard 4

Another feature which would be implemented into the system is being able to scan tickets to automate the updating of the departure and arrival locations. To do this, the user would need to navigate to the settings page, scan their ticket, and if successful, the locations will be updated and the temperature can be viewed. To navigate to the advanced current temperature screen, the user just needs to tap on the temperature/weather icon on the home screen which will give a more detailed overview.

d)

Our app shows the temperature, wind speed, cloud cover, humidity and the chance of precipitation of your chosen departure and arrival destination of your inputted flight. You will be able to switch between viewing the weather at the destination and the departure area you set. There is also the option to view the weather forecast of the coming days as well so you can make future plans once you arrive. By informing the user of essential information prior to the event occurring, plans can be adjusted or revised to give the user the best possible experience at their destination location.

Project roadmap

Skills

At least one group member has direct links to business people who would benefit from this application. This will be of a huge benefit to this project, particularly where the data-gathering aspect of this task is concerned. We will formulate a questionnaire to gain an insight as to what potential users current travel experiences are, people who travel for business are exactly the focus group of potential users for the application that we can learn from and fine tune the features for.

There are people in the group that are very skilled and proactive at using image creation software, with some great ideas from the start. This will accelerate what can be achieved in the given timeframe for this project, and the general storyboard planning/initial design work for the application will be of a professional standard. This is the ideal foundation to make a comprehensive application which will be designed to a high standard. By having a strong design base, this will help with the overall 'feel' and user-friendliness aspect of the application.

Only one of us has pre-existing Preact skill, and so we will need to learn on the go. The implementation phase, therefore, will be slow overall, and require significant man-hours to achieve, as we must factor in learning time. Each member who doesn't have the required Preact skill will work together to get the skills to where they need to be useful during the implementation phase.

Everybody has naturally filled a role for this project. People with strong initial ideas whether it's been devising the concept and/or the design of the application have been able to explore those thoughts in particular sections of this phase of the assignment and have helped shape the project from the start. Other members have focused on different areas such as making the questionnaire and exploring different aspects of the assignment such as explaining the different stakeholders involved, and what their part is in the structure of the business and generally brainstorm ideas to help move the project forward.

Roadmap

Firstly, we considered such ideas as:

- What was the purpose of the app? We needed to identify what the app was going to achieve, and begin to understand what kind of features and functionality would be required for this project.
- Why would the app be unique? What did our application offer that one of the many other available well established weather applications currently do not.
- How will it help others? What would be the advantages of using this application in the respect of making peoples' lives easier.
- Who is the app intended for? While this application could be used by a wide range of people, the features and concept would be aimed at the professional business person who is required to travel - even in the current circumstance of the pandemic.

Next we explored:

- What possible features the app could include and look at the functionality/user-friendliness of the app. By trying to understand the features that could be beneficial to the primary user, we in turn could sharpen our ideas and have a more focused view of what direction the application should take.
- Who the stakeholders are and what role they would have in the business. This was important to fully understand some of the human elements involved in the business, and where they belong in the overall structure of this scenario.

We planned a data-gathering stage to gain more information about the potential app user by:

- Formulating a questionnaire and sending it out via facebook to gain responses and learn from the feedback to optimise the app features, and understand the requirements for our target app user group. By gaining an insight from a potential user of the application, a deeper insight was gained on how to improve the app based on the real experiences from the actual people who the application is being designed for.

A preliminary design was made by:

- Creating a company logo. This was important as there was a strong idea for a logo design and concept from the start, and this directly helped to create a company 'identity' or 'brand' which greatly helped influence, focus and accelerate the design process.
- Creating a rendering of the app's first functional screen. This is important to physically see a version of what the home screen will be like. From here changes can be made about the appearance, and we can consider what immediate features the user will see as soon as the application is opened. This will help with the user-friendliness of the app, and set the tone for the creation and functionality of the other pages.
- Creating an initial storyboard. By creating the initial storyboard, a sense of how the whole user-experience will occur over the various pages of the app. This was another good opportunity to also reflect on the features, functionality and ease of use available to the user for our app.

There will be an implementation phase:

- To create the app. This is the stage where all of our planning, data gathering and application design will result in devising a first version of the app which will be created through Preact.

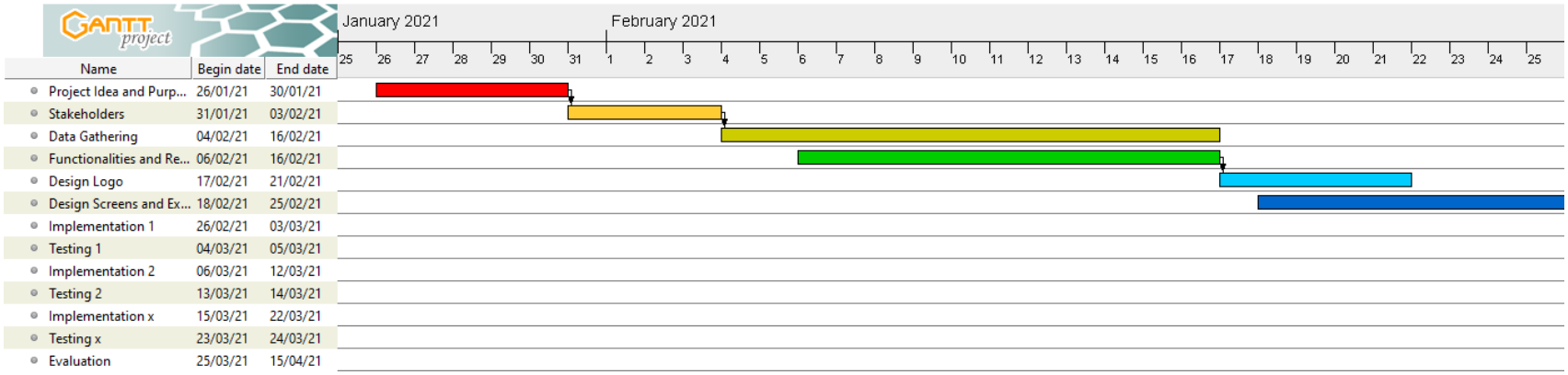
We will test the application:

- To find any potential problems, bugs etc. We can anticipate that there will initially be potential teething problems such as fixes to be made, or changes needed with the first version of the app. This is an important stage to potentially rectify and refine the application before retesting if required.

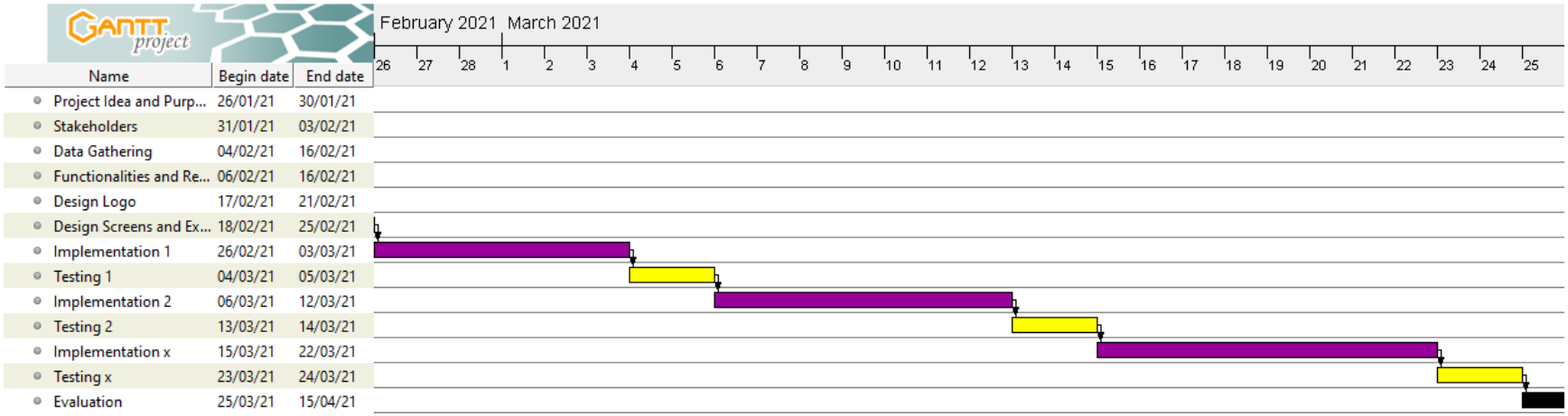
- We can then ask potential users of the app to try it out, explore all of the features, and repeat the process of testing and changing until everyone is happy with what the app delivers, and all involved are satisfied with how the information from the app is being delivered, which will ultimately result in a comprehensive and user-friendly experience for the user.

We will then evaluate the project as a whole, analyse what successes we had, and identify where we could have improved in order to accelerate and refine the process. This would ultimately save time and money for all parties involved if creating this app was a live project and needed to be deployed in a professional scenario.

Below is a plan we hope to follow to get our project completed in time. With the implementation stage, we expect to repeatedly test as we go along and depending on how we progress, we may fit in more or less iterations. This is subject to change. This does not incorporate any lessons, to understand how to implement, we may need to take as we hope to be doing this in the background. Division of tasks will be clearer as we progress through the project and understand how we can be efficient.



Name	Begin date	End date
Project Idea and Purp...	26/01/21	30/01/21
Stakeholders	31/01/21	03/02/21
Data Gathering	04/02/21	16/02/21
Functionalities and Re...	06/02/21	16/02/21
Design Logo	17/02/21	21/02/21
Design Screens and Ex...	18/02/21	25/02/21
Implementation 1	26/02/21	03/03/21
Testing 1	04/03/21	05/03/21
Implementation 2	06/03/21	12/03/21
Testing 2	13/03/21	14/03/21
Implementation x	15/03/21	22/03/21
Testing x	23/03/21	24/03/21
Evaluation	25/03/21	15/04/21



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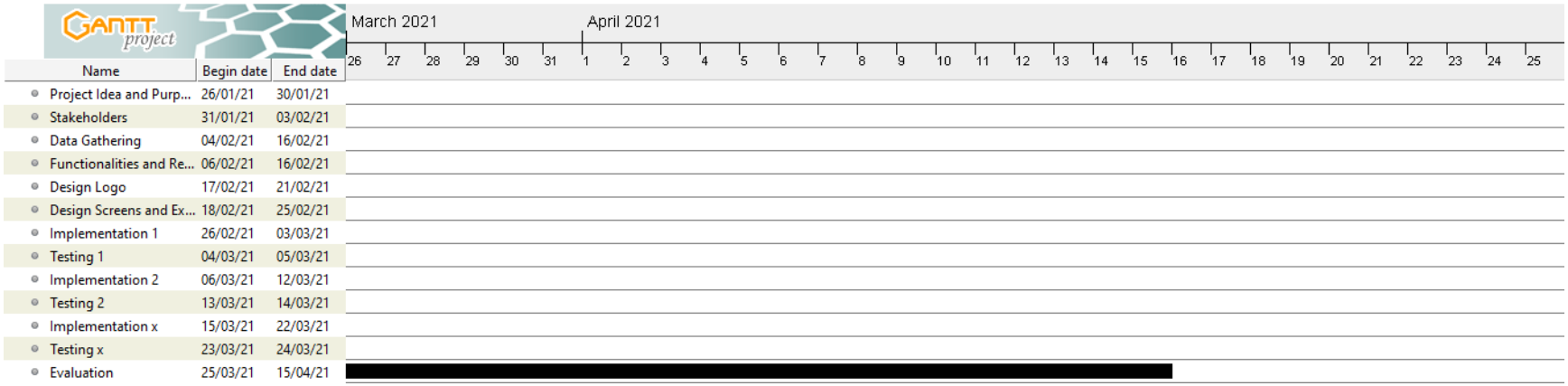
Implementation 2	06/03/21	12/03/21
Testing 2	13/03/21	14/03/21
Implementation x	15/03/21	22/03/21
Testing x	23/03/21	24/03/21
Evaluation	25/03/21	15/04/21



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Testing 1	04/03/21	05/03/21
Implementation 2	06/03/21	12/03/21
Testing 2	13/03/21	14/03/21
Implementation x	15/03/21	22/03/21
Testing x	23/03/21	24/03/21
Evaluation	25/03/21	15/04/21

Group Contribution

Name	Sahir Ahmed	Mohamed Reda Bacha	Savio Fung	David Jones	Maximilian Vaughan
Tasks	Requirements and Functional Requirements, Screen Designs and Explanation	Data gathering section, survey writing	Made a list of all wider stakeholders. Created all storyboards using the designs of the app.	Description of wider stakeholders. Roadmap skills and bullet points of Roadmap.	Primary stakeholder, non-functional requirements, group contribution section, contributed to survey, document editing, logo and name, design ideas, original app idea, Trello board

Percentage of work completed	100%	100%	100%	100%	100%
Meeting attendance	Excellent	Poor	Excellent	Excellent	Excellent
Quality of work	Excellent	Excellent	Excellent	Excellent	Excellent
Punctuality of work	Excellent	Good	Excellent	Excellent	Excellent