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# iOS Duo Report

Time Period from 20 Mar 2023 to 16 Apr 2023

# Contents

# ABOUT

In the second four weeks, we were supposed to create an iOS App using Swift. We got case number 7 from the wheel of fortune - rain radar.

As rain poses a great challenge for a lot of people, it's important to take some precautions to stay safe and prepare in case of unexpected weather conditions. Whether through commuting, running errands, or traveling on a long-distance journey, it's always a good idea to be aware of the weather beforehand.

# PROBLEM

The challenge posed by rain and unexpected weather changes can lead to safety risks and disruption in people's daily activities especially when it comes to commuting, traveling, and running errands.

Many weather apps are sometimes unable to predict changeable weather conditions in certain regions, leading people to be unprepared, not wearing suitable clothes, and being caught off guard by unexpected weather events such as sudden storms, heat waves, or cold snaps.

Furthermore, the impact of rain and unexpected weather conditions can result in floods, landslides, and road closures, and people should be aware of all costs if something like this is happening and have the chance to take the safest road from one place to another.

# SOLUTION

The app that we created aims to help people become more aware of upcoming weather by providing real-time weather updates, warnings, and alerts, allowing users to make informed decisions about their activities and travel plans.

Our goal is to raise awareness about weather preparation as the app is going to provide tips on appropriate clothing and gear for different weather conditions and offer safe spot recommendations based on the user's location.

Also, the app is going to be integrated with a navigation system that takes into account weather conditions and provides users with the safest and most efficient routes.

# TARGET GROUP

- Individuals who frequently commute on foot or by bike
- Individuals who have to deal with changeable weather
- Students, urban professionals, and outdoor enthusiasts
- Those who prioritize convenience, comfort, and safety during their daily commute
- Individuals who have been caught in harsh weather
- People who are interested in staying dry and comfortable during their commute

# OVERVIEW

We focused our target group on individuals who are exposed to different weather conditions and want to stay informed about upcoming weather to better prepare themselves for the day. Being part of this group, we focused on finding out the main pain points we experience and prioritize our needs.

The people from our target group have been caught in harsh weather and want to find a safe way to commute from one place to another. They want to stay dry and comfortable, know what to wear and be prepare for weather changes.

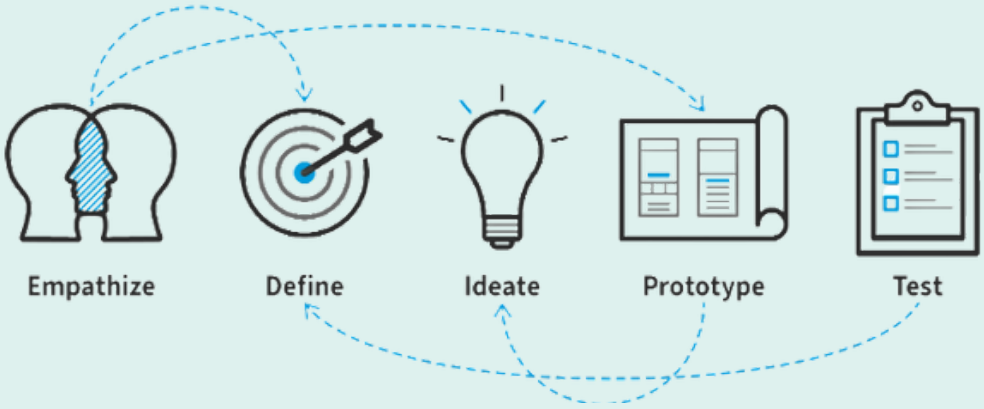
# DESIGN PROCESS

We used the Design Thinking Methodology because it puts the users at the center of the problem-solving process which ensures that solutions aim to meet their needs and expectations. This approach can result in more effective ideas that are more likely to be accepted by the users. Also, this process is non-linear and you can go back to certain steps when you need them. This makes it very flexible and iterative.

We started the design thinking process by identifying the target audience and researching their needs and wishes when it comes to weather and going to university/work. The best way to be aware of what others think and want from a certain product is through emphasizing. We also did library research where we dig deeper into the topic of rain, rain gears and find out what things are currently there on the market that is weather-related and explode their features.

With the data we collected, we started our define stage process. Based on the research, we created a persona, empathy map, storyboard, and affinity map. The way we created them was mainly from the feedback gathered during the research and they helped us generate different ideas to shape our concept.

Then we continued with the ideation phase where we started with sketches and brainstorming ideas about the design. We used the Benchmark creation method to get inspiration from other websites and see what features they offer. The next step was the designing phase with the high-fidelity prototype and the coded app. To finish up the process we conducted some user testing and analyzed the results from it based on the feedback.



EMPHASISE

# SECONDARY RESEARCH

The aim of the secondary research was to highlight different statistics and answer these research questions:

- What is considered heavy rainfall in terms of intensity?
- How is rainfall intensity measured, and what instruments are used?
- What factors determine how quickly a person becomes wet in the rain?
- What are some effective strategies for staying dry in the rain?
- How do people experience different mm of rain?
- What are the best materials for rain gear to keep cyclists dry during rainy weather?

During this research, we focused on finding out the effects of heavy rainfall on people who travel to university either by bike or on foot. We wanted to see what is actually considered heavy rainfall and how is the rain intensity measured. We also aimed to explore how different types of rain gear such as waterproof jackets, pants, and boots, can help individuals stay dry and comfortable during heavy rainfall.

We figured that there are 3 types of rain depending on how intense they are, the geographical location and lasting. The most common clothing when it is raining includes rain jackets (as they are breathable and water resistant), gaiters (to avoid getting your feet wet) and pack covers (to protect your backpacks and items).

To understand rain in general and its intensity, we looked at videos online that capture rain in different mm/hour. We then drew conclusions based on that, combined with some research papers we found. A strong storm is considered to occur when the rain is more than 20mm/hour while light rain is < 2 mm/hour.

Read the whole report - **here**

EMPHASISE

# COMPETITOR ANALYSIS

The goal of the competitor analysis was to find out what is currently on the market when it comes to weather apps. Most of the apps we saw are only limited to showing the weather forecast without any interesting features included.

We looked into 4 apps more in-depth because they were mentioned by our target group and seemed more reliable. The app that mas mentioned the most was "Drops". It provides statistics to the users about upcoming rain and sends alerts. The problem with it is that it has very limited geographical coverage and most of the users cannot use it outside the Netherlands.

Furthermore, from what we found, Accuweather is also very popular and worldly used, but the UI is very cluttered and contains a lot of ads distracting people from seeing the weather and understanding what they are searching for.

The other tools we looked into were "Buienradar" and "Dark Sky". The first one has a downside because it is only in Dutch and internationals look for other alternatives. The second one has recently been bought by Apple and they are trying to implement it in the default weather app. It is also paid and that is not in the users' favor.

All of the apps provide users with different statistics for the upcoming weather. They also send alerts but have very limited geographical coverage.

The competitor analysis can be found in **Appendix A**

EMPHASISE

# SURVEY

**Link to survey: https://forms.office.com/e/Px7PWnZ6sx**

The unmoderated survey aimed to investigate the users' experience while traveling to work or university. We wanted to hear more about their journey and what setbacks they come across.

Another thing we focused on was finding out more about our target group, hear how the weather can influence their day and what apps they use that keep them informed about it.

The survey was made in Microsoft Forms and distributed among people from various backgrounds. It was part of the quantitative research.

## GENERAL INFORMATION

We received 25 answers that helped us understand our target group and their habits while going to work/university. We were able to get a better view of their experience and hear about the setbacks they stumbled upon.

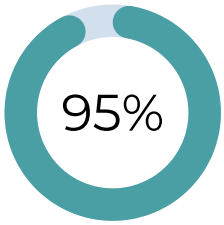
The survey is divided into three sections. They are the following:

- **Introductory:** Getting to know our target audience, where they come from, their occupation, age, and the means of transportation they use to work/university. We also wanted to hear how much time it take them to travel there.
- **Main questions:** The effect of weather on them. how they cope with changeable weather, what apps help them stay informed, and the importance of being aware of the upcoming weather beforehand.
- **Final questions:** Find out what features they like in weather apps, how frequently they use them and how they feel they help them stay informed.

Survey questions
in **Appendix B**

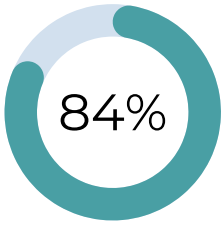
EMPHASISE

# SURVEY ANALYSIS



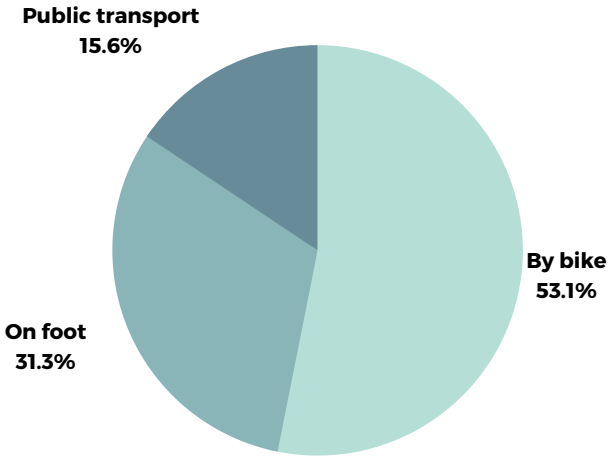

**Age group 18-30**

When it comes to our target group most of them (95%) are young adults from the age of 18 to 30 years old. Only 1 (5%) who completed the survey in under 18.




**Students or working students**

9 (47%) of them are students (leading), 7 (37%) are working students (second place) and only 2 are working without studying. As our idea revolves around helping students who travel to university/work either by bike or on foot, this was helpful for us to better emphasize with them as the respondents are part of our target group.




From the pie chart, it can be seen that more than half of the participants travel by bike to work/university. It takes them approximately more than 15 minutes to get there. Others prefer walking so they spend even more time outside (more than 30 mins).

This means they are exposed sometimes to extreme weather conditions like heavy rain, snow, or extreme heat. As indicated all of the participants have been caught in harsh weather (mostly rain) as stated from them.


**Have been exposed to severe weather while going to work**

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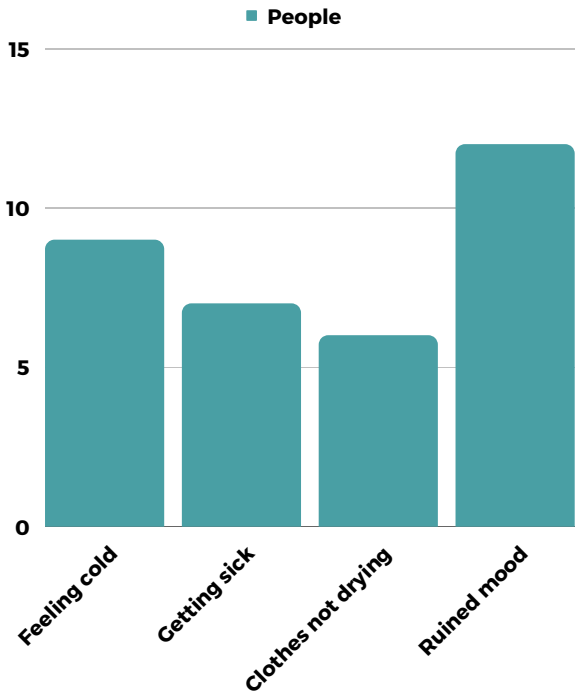
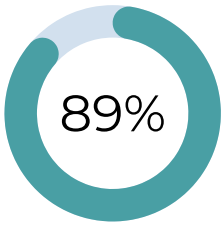
# SURVEY ANALYSIS




When asked about their experience with extreme weather and the effect it has on them, most of the answers were negative with the most common ones being displayed in the graph.

Overall, the participants usually get sick after being exposed to rain showers, their clothes are wet and they feel cold which leaves them less productive, in a bad mood and mad.




**Check weather before going out**

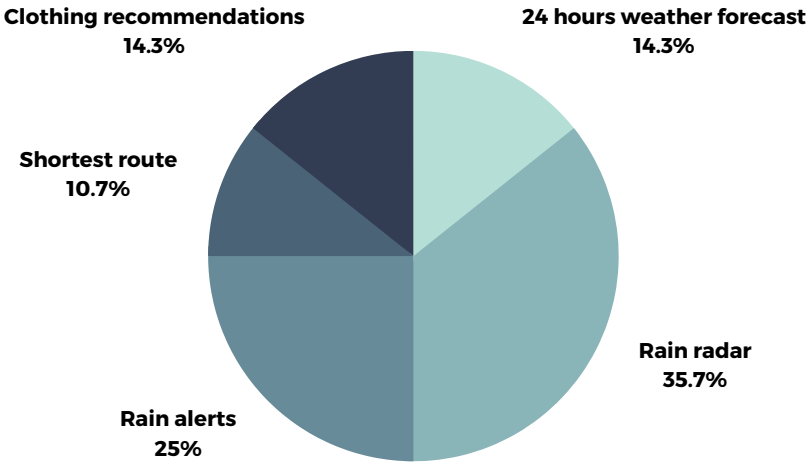
The majority of the participants (89%) stated that they always use their phones to check the weather before going out. The most used applications as stated by them are: Buienradar, Weather app, Drops. AccuWeather.

Importance of weather when it comes to travelling to their work/university

We asked our participants to rate how important is the weather for them and how much they rely on it when it comes to going out and their decisions to attend university. We found out that weather plays a crucial role in their decision making.

EMPHASISE

# SURVEY ANALYSIS




We also asked them about the features they want to see in a weather app so that we can implement them in our work and help them even more.

We found out that people need like seeing detailed weather forecast, rain radar and get alerts when it is going to rain.

| | | |
|---|---|---|
| 1 | anonymous | The weather |
| 2 | anonymous | Wind, unexpected rain showers |
| 3 | anonymous | Not getting wet when it's raining |
| 4 | anonymous | Not knowing if I need a raincoat or not |
| 5 | anonymous | too much traffic |
| 6 | anonymous | The long distance |
| 7 | anonymous | Not being equipped for the weather |
| 8 | anonymous | Being not prepared for te rain |
| 9 | anonymous | Thunderstorms |
| 10 | anonymous | Not having suitable clothes because the weather can change at any time |

Challenges people face while travelling to work/university

## Conclusion

Based on the survey we found out that students face difficulties while traveling to university/work because of unexpected and sometimes harsh weather. They feel like the weather (especially when it is raining) has a negative impact on their day and health. They feel like apps having detailed information about upcoming weather changes is helpful because they always check the weather before going out. The participants also stated another problem - not knowing what to wear because the weather can change at any second during the day. As all of them have been exposed to extreme weather, they feel like cycling or walking sometimes poses a lot of danger and difficulties because it takes them a lot of time to go from point A to point B.

EMPHASISE

# INTERVIEWS

**Link to interview 1: https://youtu.be/tQY1cerWPVI**
**Link to interview 2: https://youtu.be/jBZudy94NZc**

## Introduction

We conducted 2 interviews with people from our target group. They are both students who travel to university either by bike or on foot. The conversations were recorded and the participants were asked questions about their journey to university, the setbacks they have experienced, and the measuresments they have taken in order to arrive safely when extreme weather occurs.

We wanted to know more about their challenges, the apps they have used to keep them informed about weather changes and the features they find the most valuable

## Information Participants

### Deniz Hadjiosmanov

- 20 years old
- Cycling to university
- 15 minutes travel time
- International student
- Challenges: weather, long distance to travel, unexpected road activities
- Uses apps to stay informed about upcoming rain
- Caught in the rain a lot of times while traveling to university

### Aleksandar Karamirev

- 20 years old
- Walking to university
- 40 minutes travel time
- International student
- Challenges: rain, snow, unexpected weather
- Uses stock iOS app to check weather
- Uses the weather app to prepare beforehand what to wear
- Likes to see weather forecast 2-3 hours ahead

Interview questions
in **Appendix C**

EMPHASISE

# INTERVIEWS ANALYSIS

Aleksandar and Deniz are both international students who travel every day to university. Deniz likes biking to university while Aleksandar walking. As expected it takes Alexander quite a while to complete his journey - more than half an hour. This becomes a challenge when exposed to the Dutch weather in particular. Deniz has the same experience and he noted that "ever since I am in the Netherlands, around 30% of my stay here I got caught in the rain".

For this reason, they both use apps to stay informed about the weather (either the pre-installed iOS application or Buienradar) and regularly check the weather so they know what to expect. Deniz mentioned: "I prepare my clothes depending on the weather" having a similar answer from Aleksandar as well: "I want to know if I have to take my jacket with me".

When it comes to information in the apps Aleksandar is mostly interested in knowing the temperature outside for the next few hours, since full-day forecasts tend to be incorrect, along with the possibility and time of rain. In contrast, Deniz prefers more detailed information, including the start and end date of the rainy period.

They were both asked about the idea of an application that would help them plan their journey better and track rain, they both seemed interested to try it out: "Maybe if I like it may replace my weather app, daily driver", "Yeah that would be very handy for me"

# CONCLUSION

Aleksander and Deniz always take the weather forecast into consideration when they are going to university or planning another journey. Even though for Alexander rain doesn't entirely affect his planning, he still uses this information from the apps to prepare accordingly.

Since the full-day forecast tends to be incorrect, Aleksandar only trusts what is displayed a few hours ahead and any application that accurately predicts the weather and helps him with tips to stay dry is valuable to him, while Deniz relies on more detailed information.

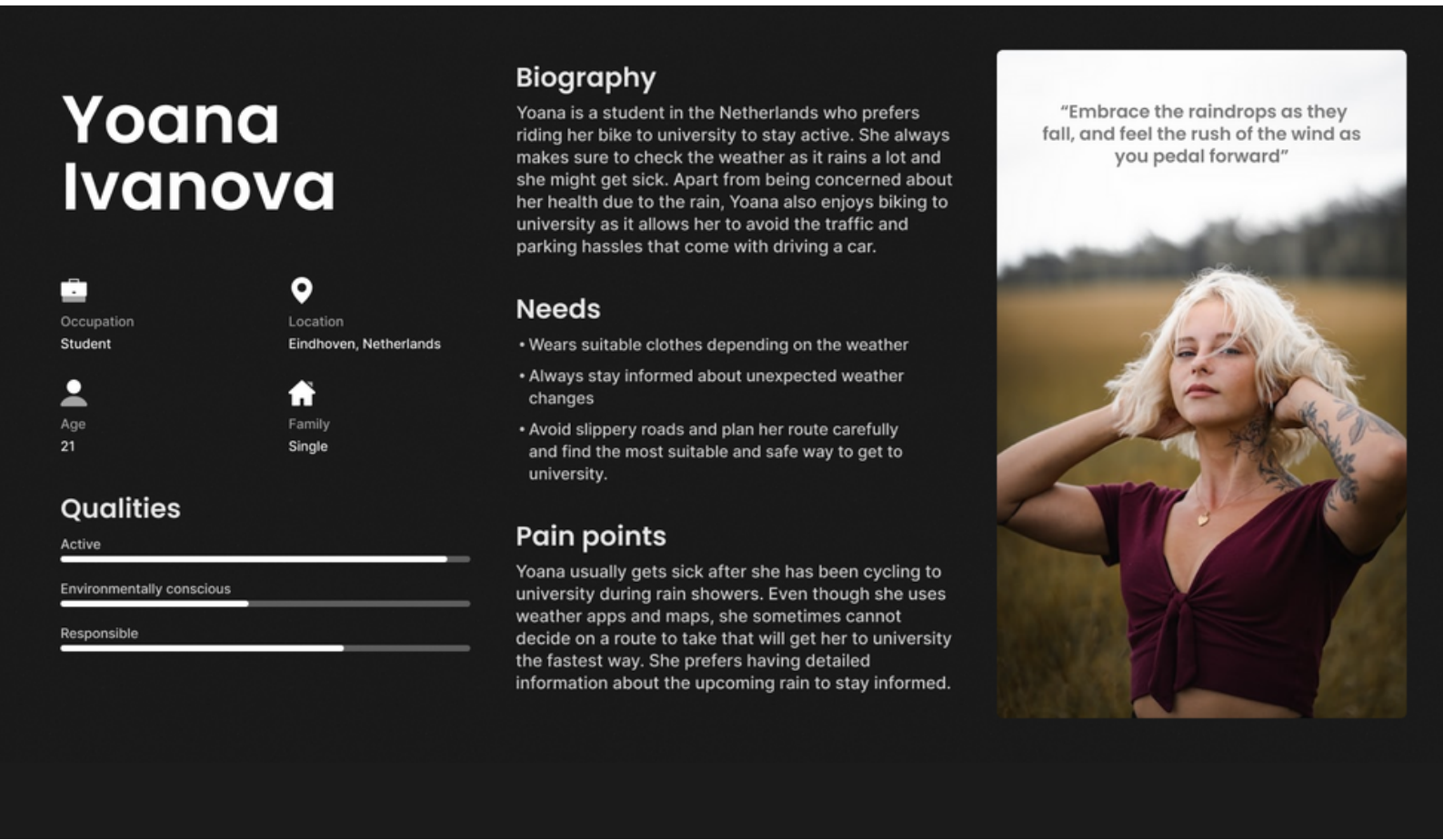
DEFINE

# PERSONA

Based on our research and analysis we created our persona to better understand the users' needs and develop a more human-centered and empathetic approach toward them. The aim was to build a detailed understanding of the target audience's needs, goals, preferences, and pain points.

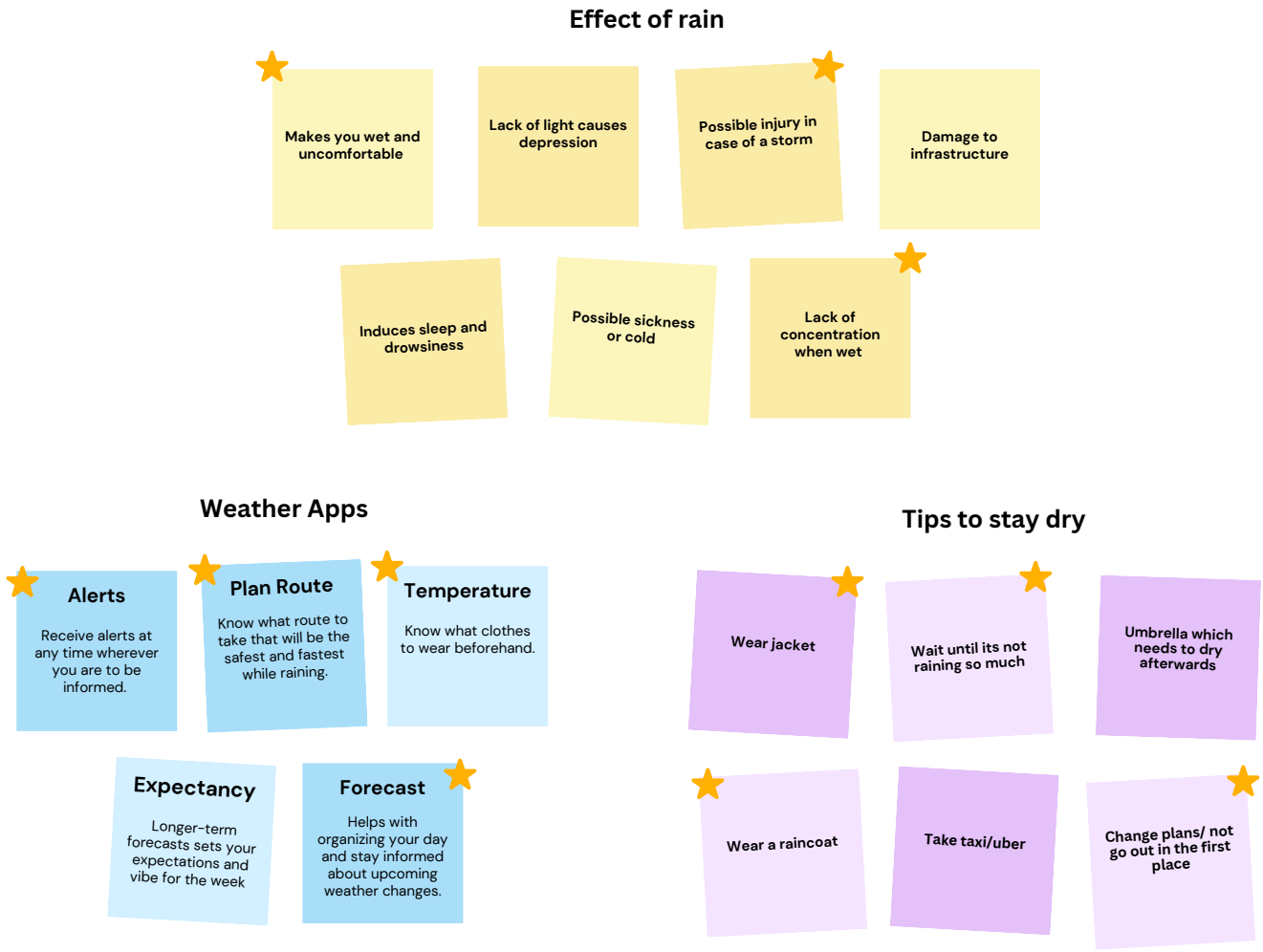
By putting the user at the center of the decision-making process, it is easier to guide the development of the product and create something based on their needs and expectations. It was important for us to build a persona that represents the people from our target group - students who cycle or commune to university.

Our persona represents a person who goes to the university by bike but usually gets caught in unexpected weather changes. When this happens she feels unprepared and wants to go home the fastest way possible. Also, she finds herself not being dressed for the weather and ends up sick.



DEFINE

# AFFINITY MAP




Based on the interviews and survey, we wanted to gather similar answers we got and set priorities for us to follow. It was important to find out the core of the problem with rain and rain apps and find a suitable solution that will help our target group the most.

**Based on this we formed our user requirements:**

- **Real-time weather updates:** stay informed of upcoming weather changes
- **Route Planner:** best route based on weather conditions
- **Rain gear recommendations:** suggestions on what to wear or carry based on weather
- **Safe spots recommendations:** a feature that shows nearby shelters and indoor venues where users can take refuge during unexpected weather

DEFINE

# EMPATHY MAP

## Empathy Map (remote worker)

### Says

"Rain is a hassle."

"I will be sick tomorow."

"Lets check the weather app and see if it's going to rain"

"My route to home is not the safest when it is raining"

### Thinks

"I wish I had better rain gear."

"I need to find a more convenient way to stay dry in the rain."

"I should check the weather more often"

"I need to plan ahead to avoid getting wet in the rain."


### Does

Takes an umbrella or raincoat in case it rains

Checks the weather forecast

Looks for alternative routes to avoid getting caught in the rain.

Tries to avoid puddles

### Feels

Frustrated

Anxious

Unconfortable

Stressed

Angry

Worried

Tired

Hopeful

DEFINE

# STORYBOARD

## RAIN JOURNEY

**Scene 1**

Yoana rides her bicycle on a sunny day, heading towards the university campus.

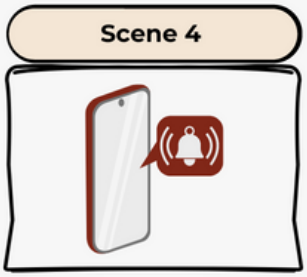
**Scene 2**

Clouds start to gather overhead as she continues to cycle. She looks up at the sky nervously.

**Scene 3**

She checks her phone's weather app while cycling. The forecast shows a high chance of rain later in the day.

**Scene 4**

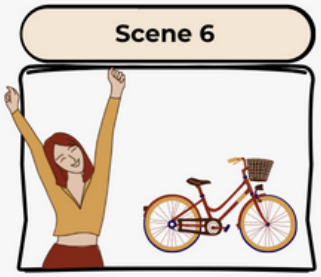


Suddenly, she receives another notification from a different weather app. It says the app provides real-time weather updates based on location.

**Scene 5**

Yoana opens the app and sees her current location along with an alert for an approaching storm. It suggests a new route to avoid it.

**Scene 6**



She follows the app's new route and arrives safely at the university without getting wet. She smiles as she parks her bike and heads to class.

We made a storyboard that shows the emotions and experiences of a person who cycles to university. The story starts with Yoana going to university when she suddenly sees dark clouds and checks her weather app to see that rain is upcoming.

She receives a notification from another app, stops, and checks it to see if it can help her go to university faster using her location to avoid getting into the rain. She immediately starts following the route that it suggests and arrives at university safe and dry.

DEFINE

# POV & HMW

It can be challenging for individuals who frequently cycle or walk to work/university to be aware of upcoming weather changes. They often struggle to find the optimal route and stay informed, which leads to them being caught in the rain and not being aware of nearby shelter options.

- How might we make weather updates more personalized to help users plan ahead for their daily routine?
- How might we encourage people to plan their journey based on weather?
- How might we design an interface that not only shows current weather conditions but also provides forecast data for upcoming weather changes?
- How might we provide users with alternative travel options based on weather conditions, such as shelters and places to hide?
- How might we create a feature that allows users to give them location and receive customized weather alerts and route suggestions?
- How might we suggests appropriate clothing and gear based on the user's commute and the current weather conditions?

IDEATE

# BRAINSTORMING

After we were done collecting information and analyzing it, we continued coming up with the solution and brainstorming interesting ideas to meet the needs of our target audience.

We spent some time thinking about the different features we can implement. The main focus was to make the app informative and useful but at the same time focus on a more playful design as we didn't want to have the regular weather app with only weather updates.

We also thought of the different features that users can benefit from and would use on a daily basis. We wanted to create something helpful and unique and include features that most weather apps do not support.

## The features we came up with:

- **Up-to-date weather updates** - ensures users stay informed about the latest weather conditions, allowing them to make decisions about their activities and travel plans.
- **Plan a journey** - provides users with a safe and efficient route, taking into account any potential weather-related hazards and providing alternative options if necessary.
- **Clothing recommendations** - personalized advice on what to wear based on the current weather conditions and forecast, taking into account factors such as temperature, wind, and precipitation. This feature helps users stay comfortable and prepared.
- **Safe Spots (shelters)** - provides users with information on nearby shelters and safe areas, enabling them to take necessary precautions and avoid dangerous weather conditions. This feature is particularly useful for those who may be traveling to unfamiliar areas.
- **Adding different locations** - gives access to weather information and forecasts for multiple locations, allowing users to plan their activities and travel beforehand. This feature is especially helpful for frequent travelers or those with loved ones in different parts of the world
- **Live Chat** - quick answers to weather-related questions

IDEATE

# CONCEPT

Based on all of the information we gathered from our research, we decided that our concept is going to revolve around weather and weather changes. We found out that people who commute or cycle from one place to another usually get caught in unexpected weather conditions which impacts their day.

The concept behind the "Stormy" app is to help people become more aware of weather changes and help them plan their day accordingly. Having this as our first priority, we also found out that people always check the weather before going out but most of the time they feel unsure of how to plan their journey based on the weather. That's why it was important for us to implement a trip planner that is going to provide a safe and efficient route based on weather conditions.

The app includes options for safe spots and clothing recommendations that are designed to help people travel safely and provide peace of mind so that users feel prepared for any unexpected weather changes.

Additionally, the app includes live chat because we found out that AI chatbots are becoming increasingly popular and useful. Users will be able to get quick answers to their weather-related questions, such as how severe an upcoming storm will be or what to wear based on expected weather conditions.

## TRAVEL PLANNER

The travel planner will consist of a map and users will be able to select a place where they want to go, see the arrival time, and choose an option if they want to walk or cycle to that place. Based on this it will recommend suitable clothing and safe spots along the road.

## WEATHER UPDATES

The users will be able to see detailed information about the upcoming weather (mainly for several hours ahead). They can also switch from one location to another and see the weather there as well. They can also add as many locations as they want and see personalised information.

IDEATE

# WWWWWH

## What is the purpose of the app?

The purpose of the app is to assist individuals who regularly commute or cycle to work or university. It aims to give them up-to-date information on upcoming weather changes, suggests appropriate clothing for the weather, recommend the best route to take and shelter places to hide if caught in unexpected weather changes..

## Who is the target audience for the app?

The target audience for the weather app is individuals who frequently cycle or walk to work or university and need to stay informed about weather changes in order to plan their journey.

## What is our end goal?

The end goal is to help individuals (even us) to stay informed, be prepare and have more (for example) rain free cycling/walking trips.

## Why would people choose to use our weather app?

Because it is more personalized and user-oriented. The character "Stormy" gives a more friendly approach when showing the weather and a welcoming feeling. Also, this app provides safe sports that are going to motivate the users to use it in order to stay dry.

## When will the weather information be updated in the app?

The weather information in the app will be updated in real-time using a special API to provide users with the most up-to-date information about weather conditions.

## How does the app provide recommendations for appropriate clothing?

Based on weather conditions gathered from the API our research we did about how wet certain mm/hour can make you.

Prototyping

# BRAND IDENTITY

## 1
## LOGO AND NAME

The name consists of the word "Stormy" which is going to be our character in the app. It is designed to look like a cloud holding an umbrella. It is going to be featured throughout the app, providing weather updates and adding a playful touch to the user interface.


## 2
## COLORS

The colour palette mainly consists of blue colours as they are often used to represent clear skies and calm weather conditions. Yellow on the other hand is a great complementary colour used to represent sunny or warm weather conditions, such as a clear day with a bright sun.

#203B74 #596EAA #FFDB57 #EDEDED #1E1E1C

## 3
## TYPOGRAPHY

Aa

LOGO FONT

**Cooper Black**

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

Aa

FONT APP

Inter

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

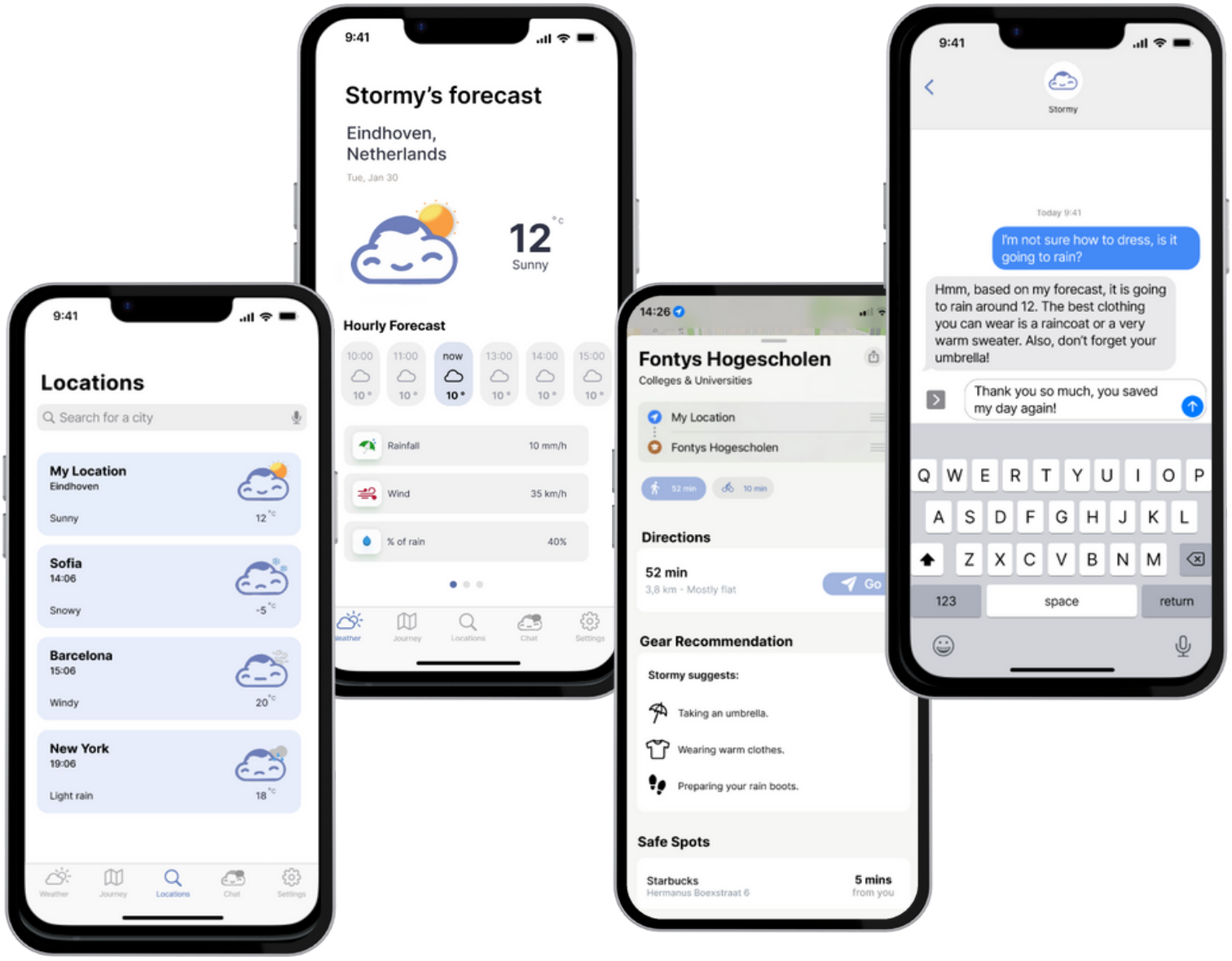
# DESIGN

**Link to prototype:**
https://www.figma.com/file/SwsdfKH3Bfo9OEDED1a55n/iOS-Duo?t=zg3aqzILh785bLIR-1

## PROTOTYPE

After we were ready with the concept, the users' requirements and the features that need to be implemented, we used the Benchmark creation method to get inspiration and look at products that are somehow related to our design goal and solve the same problem. The goal was to see their strategy and find out how to make our app more unique.

We started off with sketches of the different pages and based on them we made the prototype using Figma. Sketches can be found in Appendix D.



TESTING

# USER TESTING

**Links to testing:**
https://youtu.be/Rc0GfBZq5iw
https://youtu.be/waFlaxgNj78
https://youtu.be/mBosXzHTwvM

We conducted remote unmoderated usability testing with 3 people from our target group. The sessions were recorded so we could look at them and analyze everything afterward. The tests lasted from 5 to 7 minutes depending on how well the participants were doing. The testing procedure and questions are in **Appendix D.**

# ANALYSIS AND CHANGES

All of the participants correctly guessed the purpose of the app by only looking at the prototype during the 5-second testing. This indicates that the app has a clear purpose and is easily understandable.

All of the participants succeeded in completing the tasks we gave them. It took them a maximum of 30 seconds to find exactly what they were asked to do and manage to finish the task. They noted that the navigation bar is very helpful as it uses both an icon and text. What stood out the most for them was the logo and how it was implemented on the different pages. While they were doing the tasks, the participants shared that everything looks straightforward, simplistic, and easy to navigate.

During the think-aloud walkthrough, one of the participants was impressed by the chat we implemented and told us that he would definitely use something like this. The gear recommendations were seen as something helpful and the safe spots as something they haven't seen but would definitely use. They like the app because it does not include a lot of animations but is very detailed and gives you everything you need. What grabbed their attention the most was the journey planner, as they feel like most weather apps do not support this feature.

They described this product as helpful, simplistic, eye-catching, easy to navigate

**Based on their feedback we changed:**

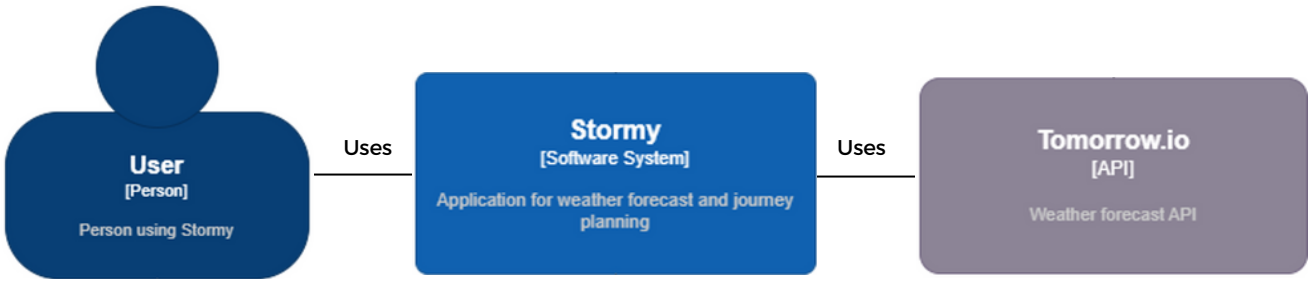
- The icon for the chat: the participants felt like the character Stormy should be involved more in the app
- Make the information about the rainfall, wind, and chance of rain bigger
- Change wording - from "Gear Recommendations" to "Keep it in mind"

# IMPLEMENTATION

## HARDWARE AND SOFTWARE

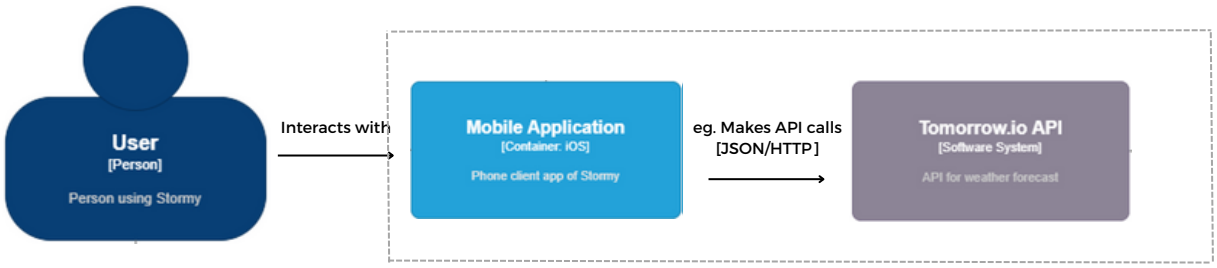
Here we included a comprehensive architectural overview of the system, using several different views to depict different aspects of the system. It is intended to capture and convey the significant architectural decisions which have been made to implement the software solution. It also to helped up more easily grasp the software's modules and components, without digging into the code, while also being incredibly useful as it gives an oversight of the entire system and exposes any potential pitfalls the developers might experience.

### System Context - C1




From the system context diagram, it can be seen that the software is going to make use of an external API for getting the weather forecast. This means that the developers can use the already implemented solution, since implementing an entire weather API and forecast is out of scope for this project.

### Containers and technology - C2




From the diagram it can be seen that the software system is composed of two main containers:

- iOS application using SwiftUI
- API of Tomorrow.io

# IMPLEMENTATION

## Separation of concerns

With the two main containers divided in this way it is ensured that the different divisions of the software are properly separated. The iOS application takes care of all the UI and presentation logic required for using the application. The weather API takes care of the forecast, since it is an incredibly complex and an entire profession by itself, using different sensors and methods to predict the weather.

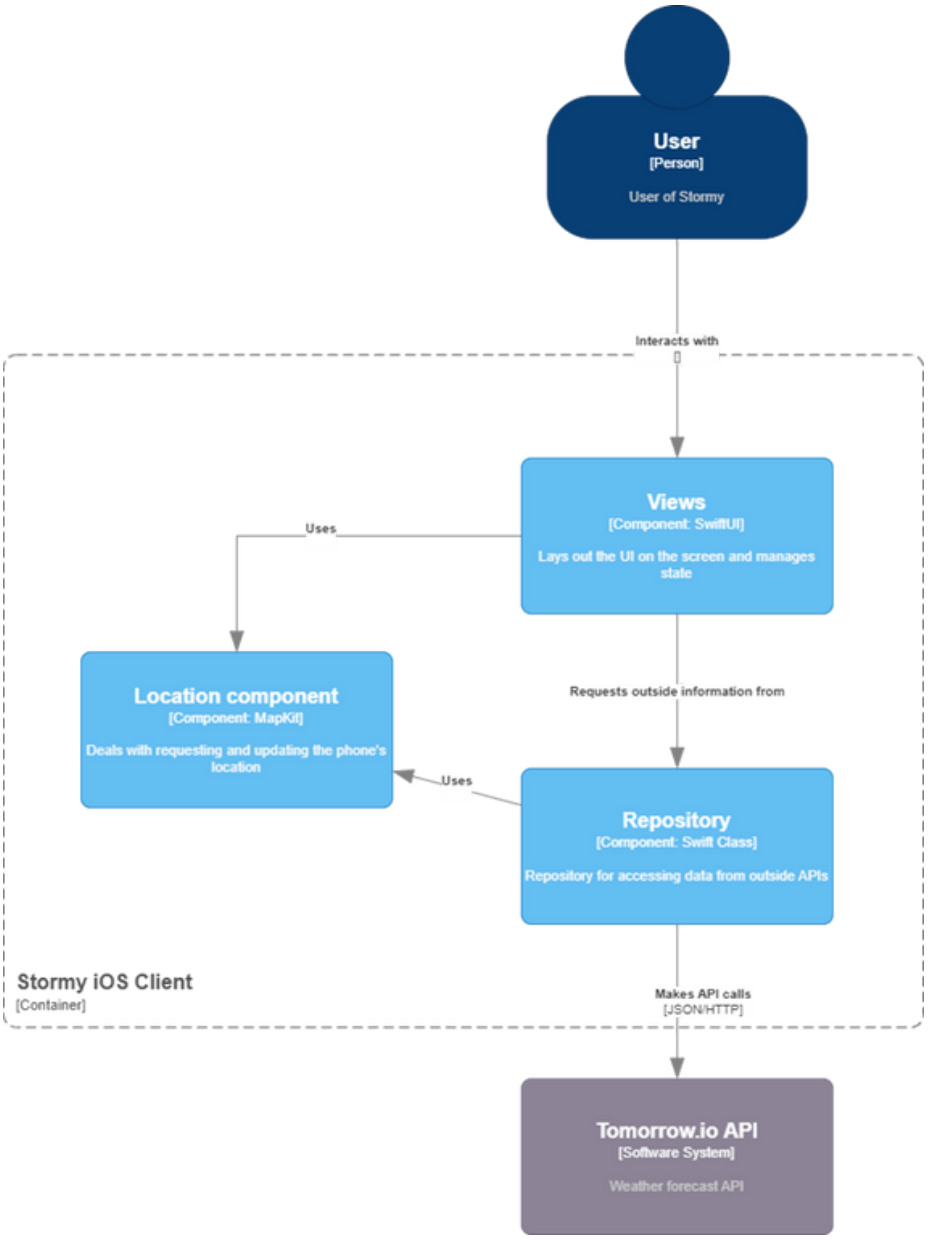
## Why SwiftUI

SwiftUI is the most modern way to design applications for the whole Apple ecosystem. The other option is UIKit, which definitely has its own advantages like storyboards, a drag-and-drop solution to building user interfaces. However, building a user interface programmatically (without storyboards) in UIKit is significantly more difficult compared to SwiftUI. Not only that, but UIKit is known as an imperative framework, which simply means you are stating how to do something. In contrast SwiftUI, is a declarative framework, meaning you are declaring something you want to happen. It is also very well documented in Apple's docs, which is the reason we chose to build our application with SwiftUI

## Why Tomorrow.io

Tomorrow.io is a very intuitive and user-friendly API. They have a lot of solutions like cutting-edge, real-time weather data, hyperlocal data up to 14 days in the future for any location on the globe, and integrations for aviation, transportation, construction, and mining. For this project we are using their weather APIIt is simple to use and implement for our small-scale project, providing a free tier with up to 25 requests per hour, 1 user, and 1 location, which is more than enough to provide proof of concept for this project. Its features has great functionality, documentation, customer support, and HTTPS.

# IMPLEMENTATION




From the component diagram it can be seen in more detail how the iOS client app is structured. The user interacts with the UI, which is written in SwiftUI. The views holds information about their state and other objects. The logic and communication layer are stored in the repositories. By following Apple's code principles, they are injected into the application as an environment object that can be used in the views. Since this application is dependent on the phone's location, that logic is separated into its own component that deals with requesting and sharing the device's coordinates. This component can be injected in any class that requires its functionality. Requests to the Tomorrow.io API are done through the repositories, which parse the JSON and return domain objects that can be used in the application for presentation or logical operations.

# APPENDICES

## APPENDIX A

Cometitor Analysis

## ACCUWEATHER

AccuWeather is a popular weather forecasting service that provides up-to-date weather information for locations all over the world. The service offers a wide range of features and tools to help users stay informed about current and upcoming weather conditions.

**Pros**

- Highly accurate and reliable
- Available on multiple platforms
- Trusted by millions
- Provides detailed information about rain/wind/hurricanes

**Cons**

- Limited free version
- Inaccurate forecasts sometimes
- Cluttering UI
- Too many advertisements in the app and website

**Conclusion:** AccuWeather is used by millions of people around the world but people have reported that sometimes it gives them inaccurate information and it can be misleading. The app provides a lot of information, statistics and forecast predictions and the UI is becoming too much, becoming hard to navigate and understand. The free version is limited and users cannot see the weather for certain countries as they have to pay.

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## DARK SKY

A popular weather app that provides hyperlocal weather information and forecasting. It offers real-time weather updates and minute-by-minute forecasts for up to an hour in advance. Recently Apple bought it and the app will be deleted in the end of March 31, 2023

**Pros**

- Uses GPS to provide highly accurate, location-specific weather data
- Minute-by-Minute Forecasts
- Weather Alerts

**Cons**

- Limited Geographic Coverage
- Subscription Fee
- Limited Features

**Conclusion:** Users have been using Dark Sky for some time but immediately after Apple bought it they are experiencing some limitations. Beforehand, the app was completely free but now it has become paid and has limited features. The app was very good when it comes to location-specific weather data.

# DROPS

A visually stunning weather app that provides users with accurate weather forecasts and information in a unique and engaging format. It gives the users statistics and up-to-date information about upcoming rain. Also, it has satellites that show the clouds at any given point.

**Pros**

- Beautiful visuals
- Free to use
- Accurate weather data
- Hourly and daily forecasts

**Cons**

- Limited geographic coverage
- No widget available
- Slow loading times

**Conclusion:** the app Drops provides users with different statistics for the upcoming weather. It also sends alerts but the app has very limited geographical coverage. It works perfectly fine in the Netherlands but when it comes to Bulgaria - not so much. The app recently included 24-hour forecast which was missing in the previous person.

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# BUIENRADAR

Buienradar is a popular weather app that provides detailed and up-to-date weather information for locations in the Netherlands and some other parts of Europe.

**Pros**

- Radar and satellite maps
- Accurate weather data
- Notifications and alerts
- Widget

**Cons**

- Limited geographic coverage
- Dutch language only
- Limited features
- Battery consumption

**Conclusion:** Buienradar provides very detailed information about upcoming rain, temperature changes, daily forecasts but it only provides weather information for locations in the Netherlands and some other parts of Europe. If people are outside of this coverage area, the app may not be very useful for them. The app is primarily in Dutch language, which may be a drawback for non-Dutch speakers who want to use the app.

# APPENDIX B

## Survey questions

**Section 1: Getting to know you**

- How old are you?
- Where are you from?
- What is your working occupation?
- How do you travel to school/work?
- How much time does it take you to travel from home to work/school?

**Section 2: Rainy Days**

- Have you ever been caught in the rain while traveling to school/work?
- How did getting caught in the rain affect your day?
- Do you check the weather before traveling to school/work?
- Do you currently use any weather-related apps? If yes, which ones?
- How important is it for you to stay dry while traveling to school/work?
- What are the biggest challenges you face when traveling to school/work?

**Section 3: Weather App**

- How likely are you to use an app that tracks rain and helps you plan your journey to school/work?
- What features would you like to see in an app that tracks rain and helps you plan your journey to school/work?
- How frequently do you think you would use an app like this?
- Do you think an app like this would make you more likely to travel to school/work?

# APPENDIX C

## Interview questions

**CONSENT FORM**

Hello, my name is... First of all, do I have your consent to record this conversation for university purposes? Your response will be used for our research and your participation is voluntary, so if you want to withdraw from this at any time, you are allowed to. Also, you have the right to request from us not to upload your responses. Is that all right with you?

**QUESTIONS**

**Getting to know you questions**

- Can you please introduce yourself?
- Do you have a job or work occupation?
- What does your typical day look like?
- How do you travel to university?
- How often do you cycle to school?
- How much time does it take you to travel from home to work/school?
- What are the biggest challenges that you face while traveling to university?

**General questions**

- Do you think that weather affects your journey to university? How?
- Have you ever been caught in the rain while going to university?
- Do you use any apps to check the weather before going to university? Which ones?
- How often do you use your smartphone to check the weather?
- If you use any weather apps, what features do you find the most valuable?
- Do you have any tips that help you stay dry while going out in rainy weather?
- How likely are you to use an app that tracks rain and helps you plan your journey to university accordingly?

# APPENDIX D

Testing procedure and questions

## 1

### 5-SECOND TESTING (Qualitative data)

- What do you remember? (ex: color, shapes)
- What do you think this app is about?
- What's your first impression of the app?

## 2

### TASK-BASED TESTING (Quatitative data)

- chack the weather in Eindhoven at 1 o'clock
- start a trip and find the gear recommendations
- add a new location and check the weather
- start a chat with Stormy

## 3

### THINK- ALOUD WALKTHROUGH (Qualitative data)

- ask for feedback from all of the pages

## 4

### CONCLUSION QUESTIONS

- What grabbed your attention?
- What things can be added or removed?
- Do you think an app like this is useful?
- On a scale of 1 to 5 how likely are you to use this app and why?
- If you have to describe this product in 3 words, what would they be?