Ashley Raine Legaspi
300399731

Update (20) - Design Coverage (30) - Design Quality (30) - Reflection (20)

PART 1 - Introduction

Describe existing solutions if there are any

This report will be analysing existing contact tracing applications and suggesting different and/or better designs in hopes of encouraging more people to digitally record their locations. Contact tracing is an essential part of combating exposure to COVID-19. They help with tracking and breaking chains of transmission of the virus. The use of mobile applications makes this process easier and more efficient, by scanning QR Codes with their smartphones, rather than having to manually write down their details on a physical form.

The official application being used in New Zealand is the NZ Covid Tracer. There are official QR codes that are used with it. The main objectives of the NZ Covid trace is to register the locations the user has visited, keep a record of the locations they have registered, register nearby users who have their bluetooth on, and to notify the user if they have been in contact with someone that has been diagnosed with COVID-19.

However, according to the Wellington School of Business and Government on the NZ Covid Tracer, "... *there is a very large number of individuals who have downloaded the app, but simply aren't using it.*" and only an increase in usage around times of outbreaks.

My solution is to add game elements, such as social interaction and a rewards system, to the app to encourage users to scan the QR codes and social distance, in the times that require us to.

Explain the business objectives for creating a solution

Businesses are required to have QR Codes up for contact tracing or other ways of registering users. If they don't use the QR Codes, users would have to give their name, their contact numbers as well as the date and time they visited. However, not many are using these physical registers.

The objective of this new app is to encourage users to actively record the places they visit as well as to social distance (in times of need). Having an app that is being used regularly would mean more accurate contact tracing and help with the breaking of virus transmissions. This would benefit businesses as well as that would mean less COVID outbreaks, which in turn mean low alert levels, where they can operate normally.

Explain the importance of the system to stakeholders

The main user of the contact tracing application is the general public. In order to break the chain of community transmission of the virus, it is essential for everyone to practice contact tracing. The system helps make this process easier and more convenient. It records the locations the

users have visited outside of their home and if there is a confirmed case, the system would alert them if they have been in the same vicinity as the infected person at the same time. Having a bluetooth function that records the actual locations would be an improvement especially for those who are forgetful.

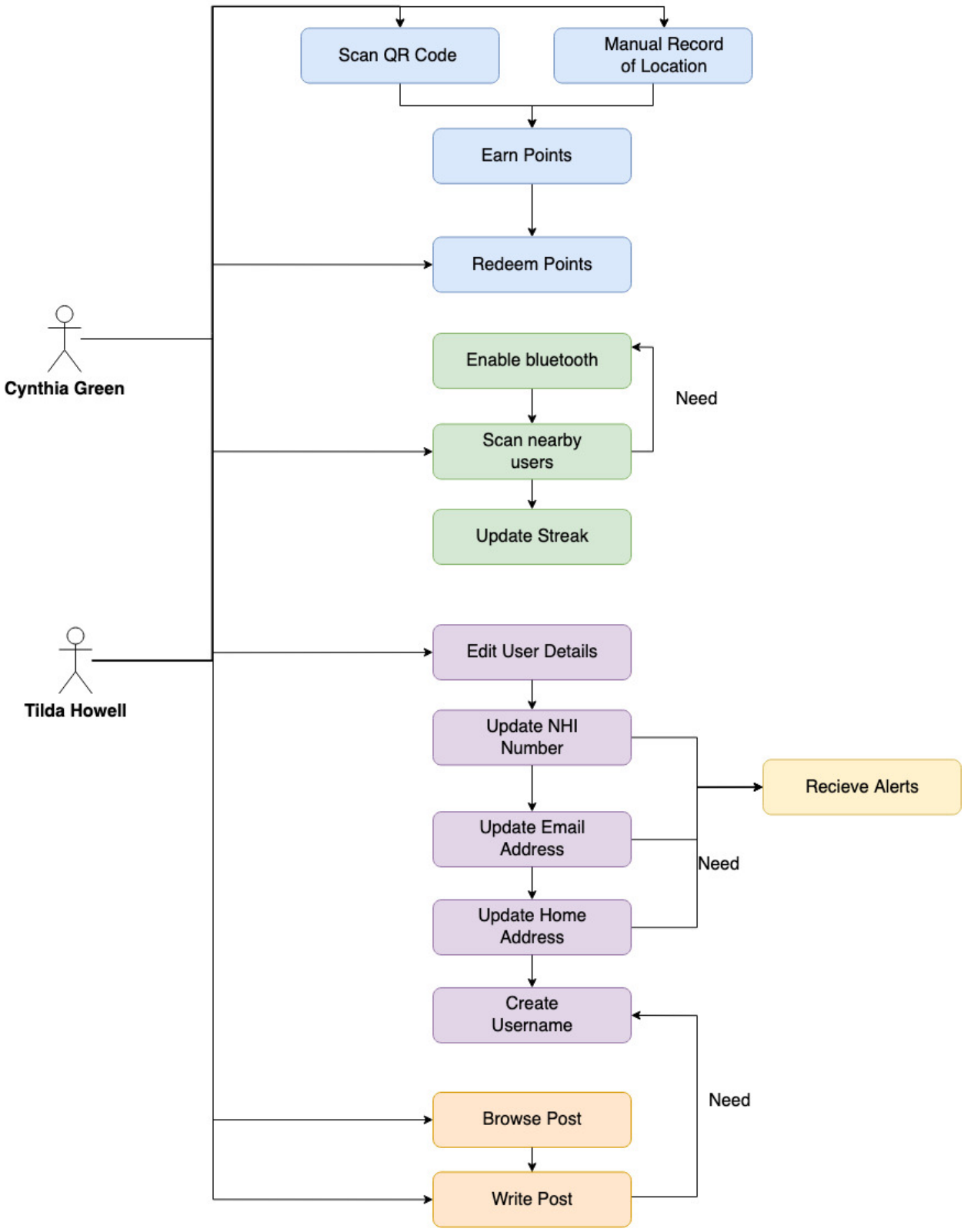
PART 2 - Personas and Requirements

Model Overview and Use Case Diagram

In creating the personas, since the contact tracing application should be used by the general public, I formed age groups that I think that would represent the users well on what they would do each day.

The first persona, Cynthia Green represents young adults as well as those in the workforce. She uses public transportation to commute to her campus, a generally crowded place where large groups of people would be in. She scans her location about twice a day, usually in the morning commute. She tends to forget while at uni and around the time she goes home.

The second persona Tilda Howell, represents the elderly. They generally don't work anymore, and are not that familiar with technology. Her eyesight has also deteriorated over the years and because of her age, she is at higher risk of contracting COVID-19.


Scan QR Code
Manual Record of Location
Earn Points
Redeem Points
Cynthia Green
Enable bluetooth
Need
Scan nearby users
Update Streak
Tilda Howell
Edit User Details
Update NHI Number
Recieve Alerts
Update Email Address
Need
Update Home Address
Create Username
Need
Browse Post
Write Post

Personas

Cynthia ‘Cyn’ Green

Description: A 22 years old student in her 2nd year studying Animation at Yoobee College. Due to her laptop being somewhat old, she has to go to campus to use the equipment there. Its also hard for her to attend her workshops on Zoom so when possible she attends them in person.

Activities: She loves to play games, mostly on her phone and ps4.

Attitudes: She’s shy and an introvert. She doesn't like to ask questions and just prefers to use Google if she’s unsure.

Aptitudes: She’s intelligent and hard working. She does well on her own.

Weaknesses: She’s quite shy and prefers to do things on her own.

Domain Knowledge: She does not actually understand what COVID-19 is but knows it is airborne transmitted as well as through contact with contaminated objects
System Knowledge: She knows how to use the app.

Interaction: Cyn uses the covid app to record the places she has visited, through her daily commute as well as around her campus. But she has a hard time remembering to actually scan the QR codes. She uses it about twice a day.

Priorities: Since she has to go to campus daily, she wants to make sure to record where she has gone to.

Motivations: She is scared of possibly contracting COVID-19 so she makes sure to check for outbreak alerts.

Computer Self-efficacy: She considers herself quite good with technology. If she doesn’t understand something she usually goes on google.

Risk Tolerance: She likes to try out different programs, usually for drawing digitally and animation.

Information Processing: She prefers to learn as she goes.
Tinkering: She is always trying to find hacks and tips for her digital art software for easier use.

Tilda Howell

Description: Tilda, is a retired nurse who lives in Karori with her daughter. Now at 66 years old, she likes to go to the community center to play mahjong with the other ladies there. She also goes to her son's house to see her grandkids. Since she does not drive, she usually takes the bus to these places.

Activities: She loves to bake and cook and usually brings baked goods to her grandkids. She also loves to read. She enjoys going to the local library as well.

Attitudes: She's patient and understanding, which made her a good nurse.
Aptitudes: Tilda is determined and hard working. She might not be good at something at first but that only pushes her to practice more. This however does not apply to tech.

Weaknesses: Her eyesight isn't what it used to be

Domain Knowledge: She is a former nurse so understands what the virus does and how it can be spread.
System Knowledge: She's not familiar with the application or how to actually use it.

Interaction: Tilda would use the app 2-6 times a week, whenever she goes out, she makes sure to scan the bus codes.

Priorities: She uses the app to help in detecting community transmissions of the virus as well as get alerts if there are any outbreaks

Motivations: Tilda intends to live long enough to see her great grandchildren as well as keep her family safe.

Computer Self-efficacy: Tilda is not that good with computers. Her phone was a gift from her daughter and the app was installed for her by her son.

Risk Tolerance: As a retired nurse, she has a fairly high risk tolerance after working in a field steeped in uncertainty.

Information Processing: Tilda prefers to be as fully informed as possible in order to decide the best action to take.

Tinkering: She likes to have instructions and the process fully explained to her. She rarely deviates from what she is told to do

Scenario

Use Case 1: Register your location by QR Code

User Intention	**System Responsibility**
Click ‘Scan QR Code’ button	
	Switch to camera to scan QR code
Scan QR Code	
	Translate image into usable data
	Record location
	Record current time and date
Click ‘Confirm’ button	
	Update history of visited locations
	Update points earned

Use Case 2: Register your location manually by filling out the form

User Intention	**System Responsibility**
Click button for manual entry	
	Load the form
Fill out the location field	
Fill out the current time and date	
Fill out any other details such as who you were with	
Click confirm button	
	Save the entry into the diary timeline
	Update points earned

Use Case 3: Check location history log

User Intention	**System Responsibility**
Click ‘My Data’ navigation button	
	Show Options in the My Data page
Click ‘My Diary’	
	Open record page
Click a specific entry	
	Show full data, including location, time and date, as well as user notes

User Journeys:

Cynthia, recording her locations via QR code throughout the day, to log it into her history			
	Morning	Lunch Time	Night
Doing	On the morning commute to campus. Check the news on the way.	She goes into the city to eat. She forgets to scan the QR code for the restaurant she visited.	Classes are over. She forgets to scan QR codes on the commute home
Thinking	If there are new confirmed cases	She is rushing in case she is late for her next class.	When her next assignment is due
Feeling	Worried that there might be another case	Hungry, she only has food on her mind	Tired after the long day
Insight: Cynthia will scan the code if its on her mind but if there are more things that she considered important at the moment, she will forget		Ownership - Ashley	

PART 3 - Design

The overall color scheme of shades of blue and white were used for ease on the eyes. Helvetica was used as the font for the same purpose. For the page layouts, I referred to similar applications that implement gamification that I have used in my everyday life such as Fitbit, a workout app and the Forest, a productivity app. As well as Snapchat, a social media application.

In the Fitbit app, you can log the number of steps you've taken, recorded using a fitbit and bluetooth, as well as a variety of health related statistics such as the number of hours you've slept, amount of water drank, heart rate, etc. There are challenges you can take, solo or friends that count steps or miles travelled. This encourages users to use the app and workout.

The Forest app locks your phone and grows a tree for the minutes you pick so that you can focus on your task. If you leave, the tree dies. You can grow a virtual forest with the number of minutes you log in. You can earn coins based on the minutes that you log with which you can buy other varieties of trees.

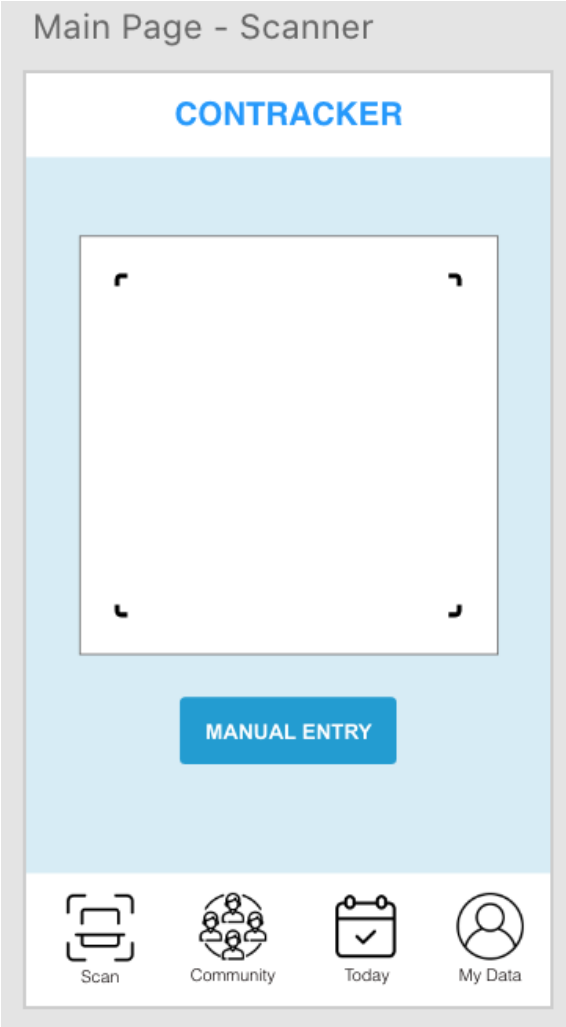
I've decided to implement:

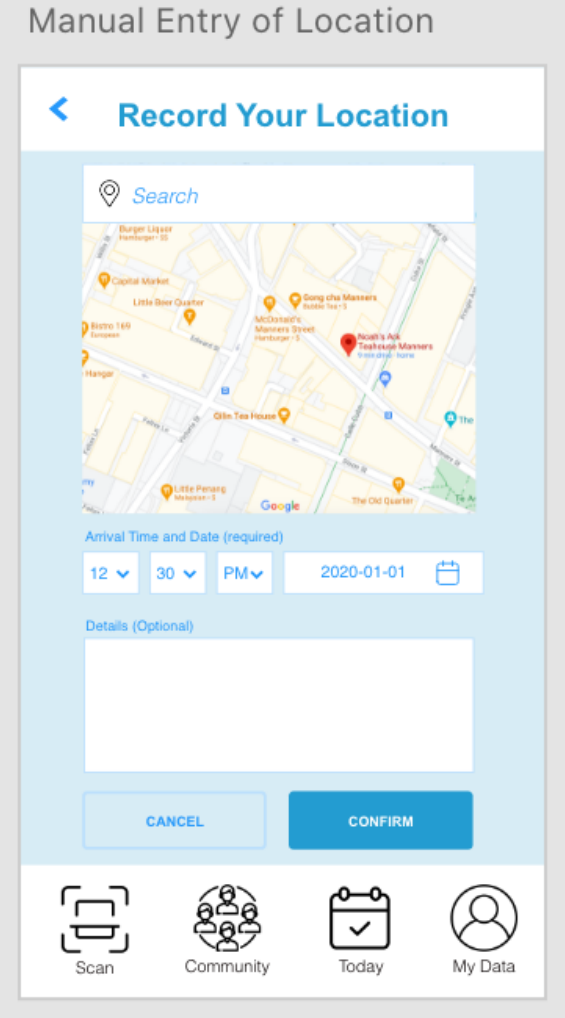
- **Community section of Fitbit -** The Fitbit app has a community page where people can post their achievements and have people cheer them on.
- **Streaks from Snapchat -** In Snapchat, there is a streak feature in which users have to send a snap to each other within a 24 hour period for a consecutive amount of days to keep the streak going. I thought of implementing this to encourage social distancing. A streak would depend on the alert levels and the recommended amount of people gathered in one place per level. The user ex has to enable their bluetooth. The application then anonymously logs other users nearby. If the number of users nearby is lower than the recommended number of people, then the streak continues. If not, the streak is broken and you get an alert that encourages you to move to another place.

- **Reward System for QR Code Scanning -** In Forest, you can earn coins based on the minutes that you log with which you can buy other varieties of trees. In this app, I've implemented a reward system where for every time you scan a QR code (this has some issues with multiples), you get points which you can use to redeem discounts at certain stores. However, the reward system would be put on pause to discourage users during lockdown from going out. An alert would be put up on screen notifying users when they should not be outside.

I have 4 pages that are part of the main navigation menu.

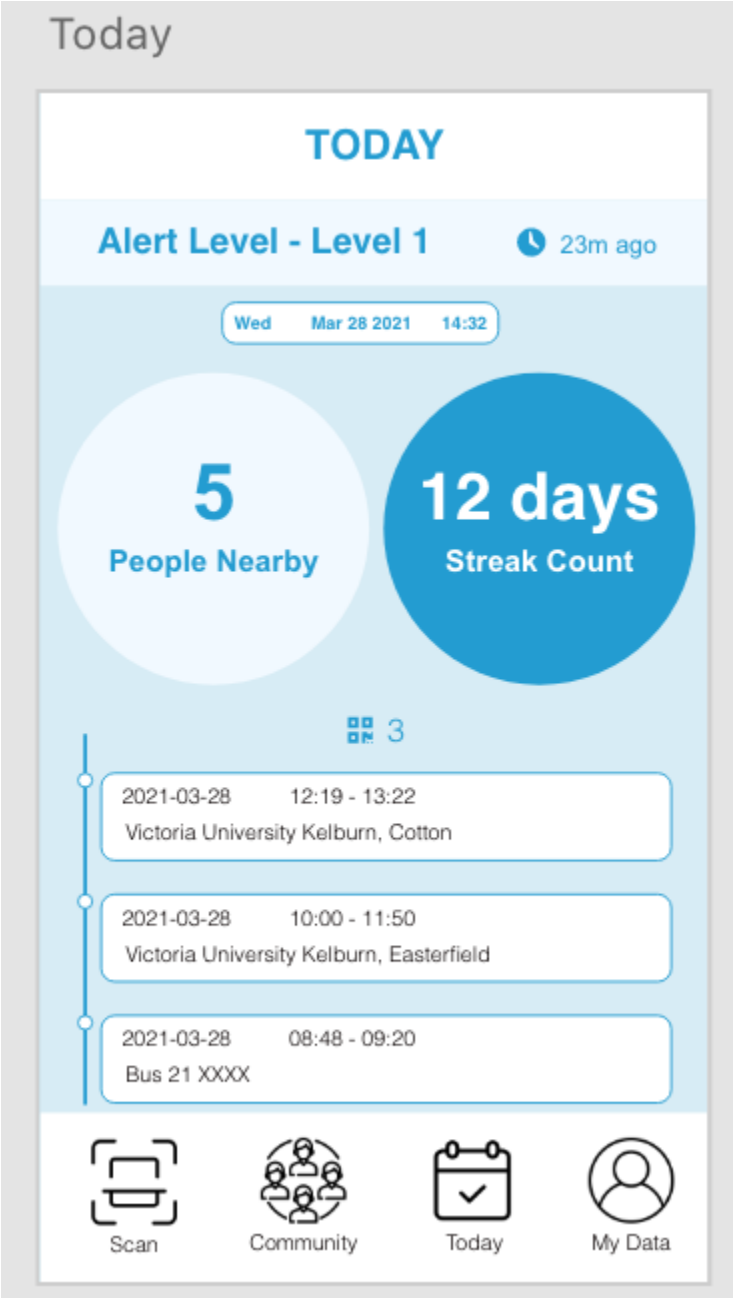
The landing page - Which is the scanner, as that is the primary purpose of the app. You can click the manual entry button to open up the form. After clicking Confirm, it is then recorded into the user's Diary, which can be found in the My Data page.



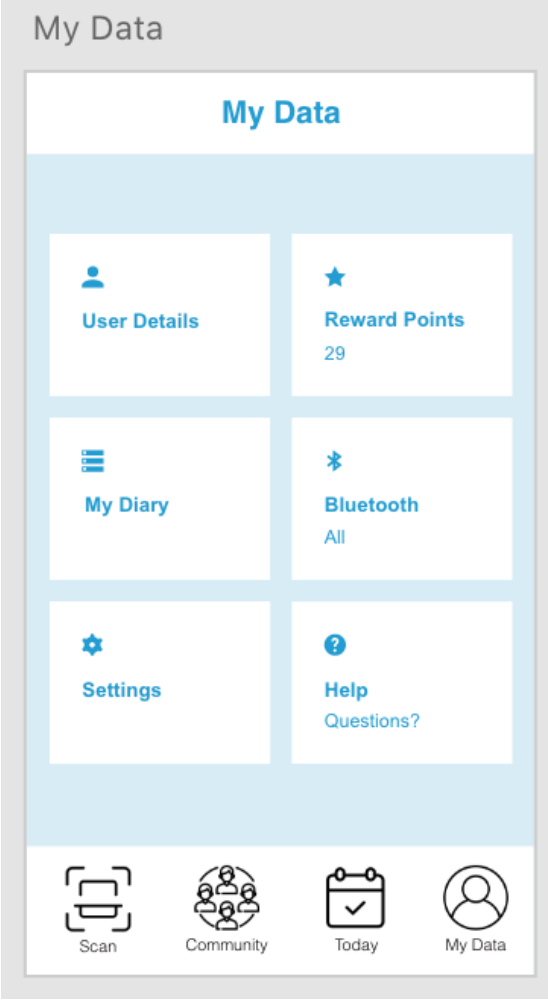


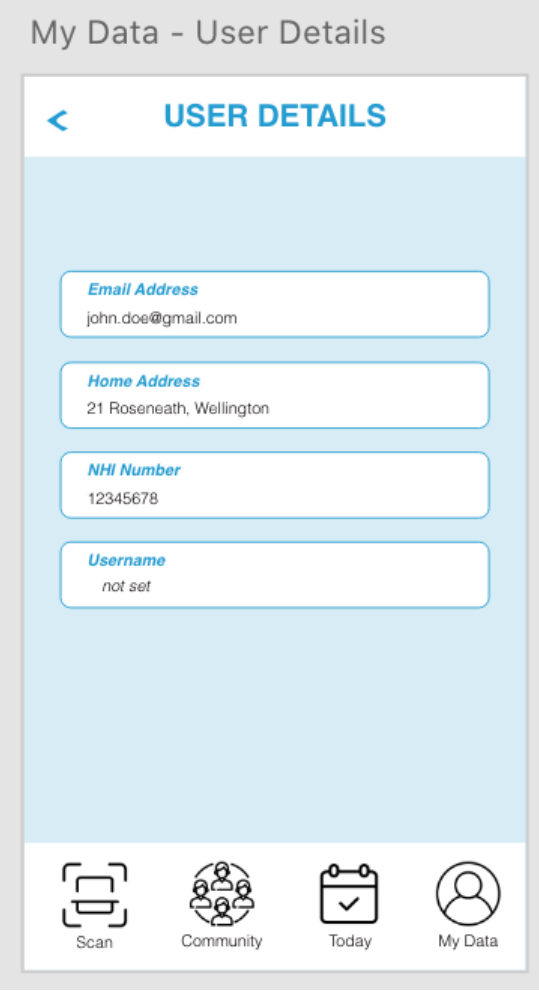
The Today page

where you can see your statistics for the day, such as the number of people nearby, the current alert level and the QR codes scanned for the day.

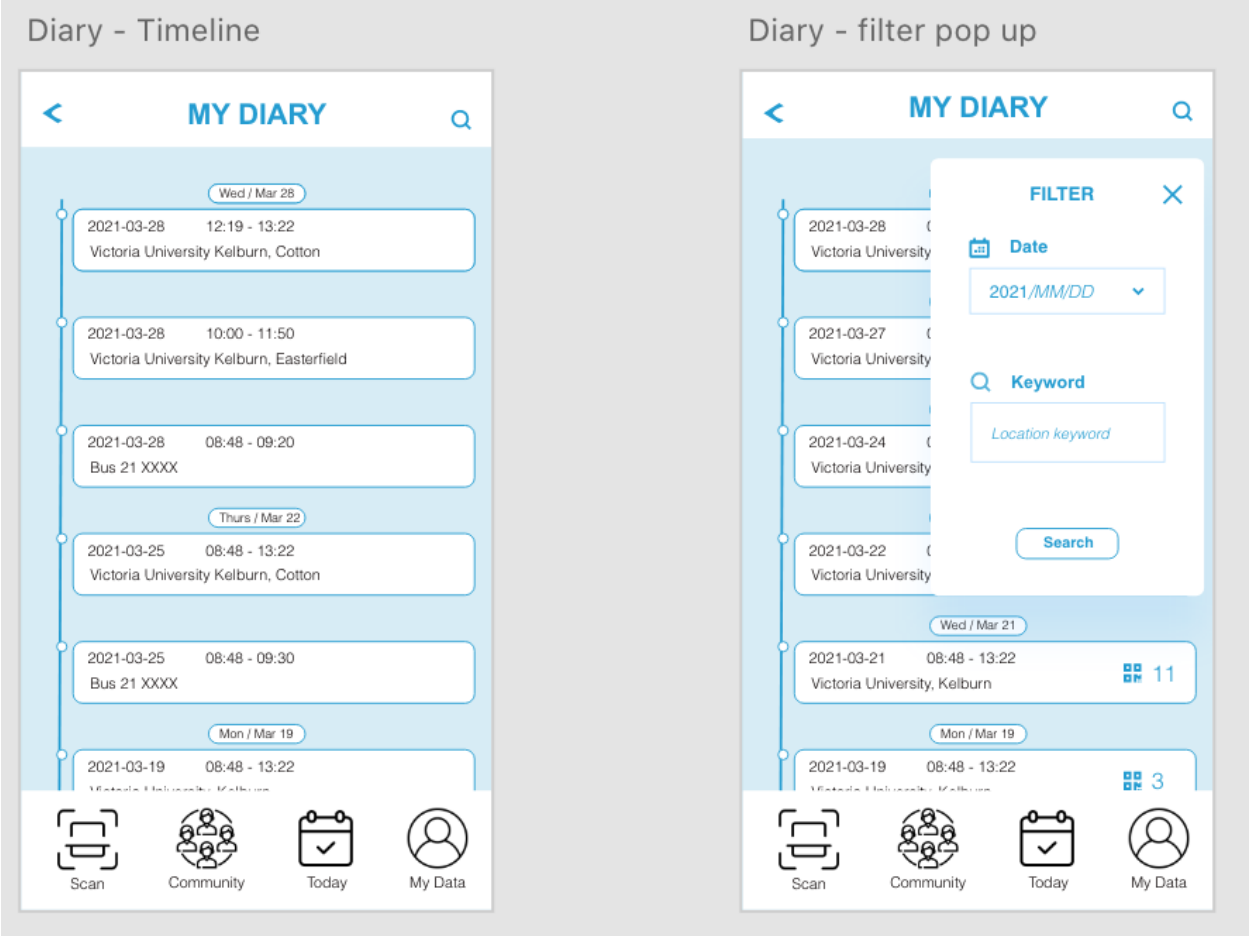


The My Data page - Which has the menu that pertains to the user's details as well as general settings.
The user details page opens up after clicking the User Details option. There, the user can update their information such as contact details for receiving alerts and create a username if they want to participate in the Community page.

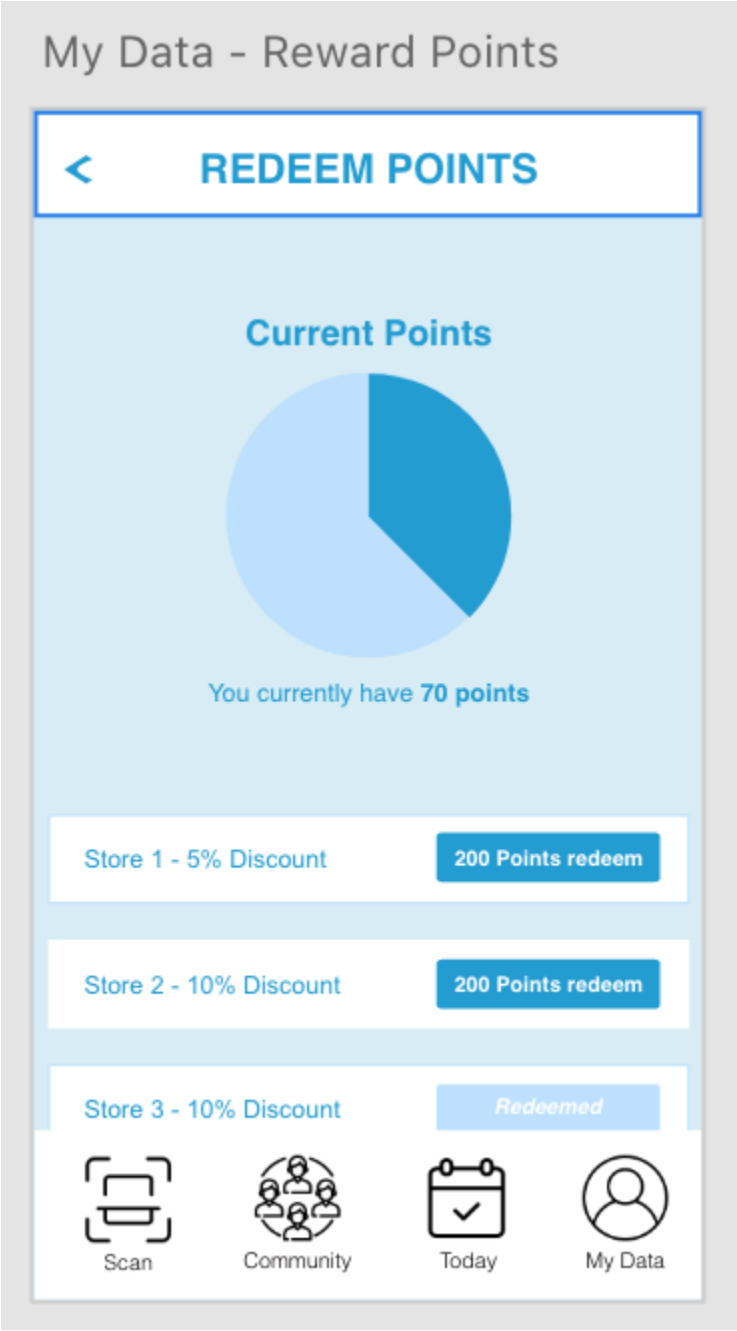




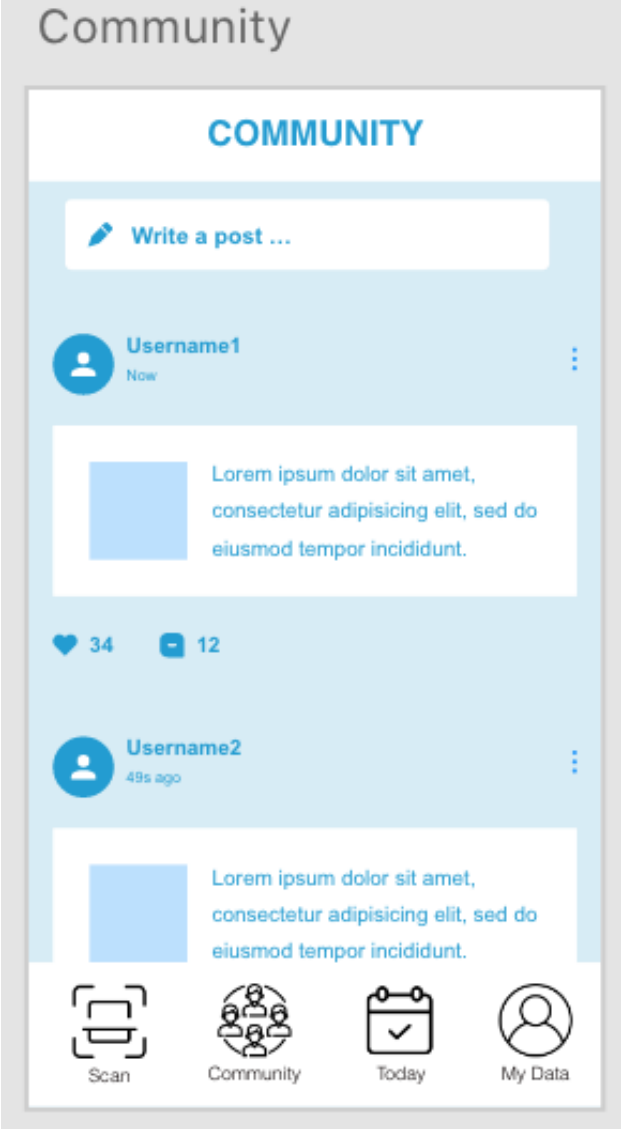
This is the Diary timeline. It has all the recorded locations of the user. There is a filter that the user can use to search either by date or by location.



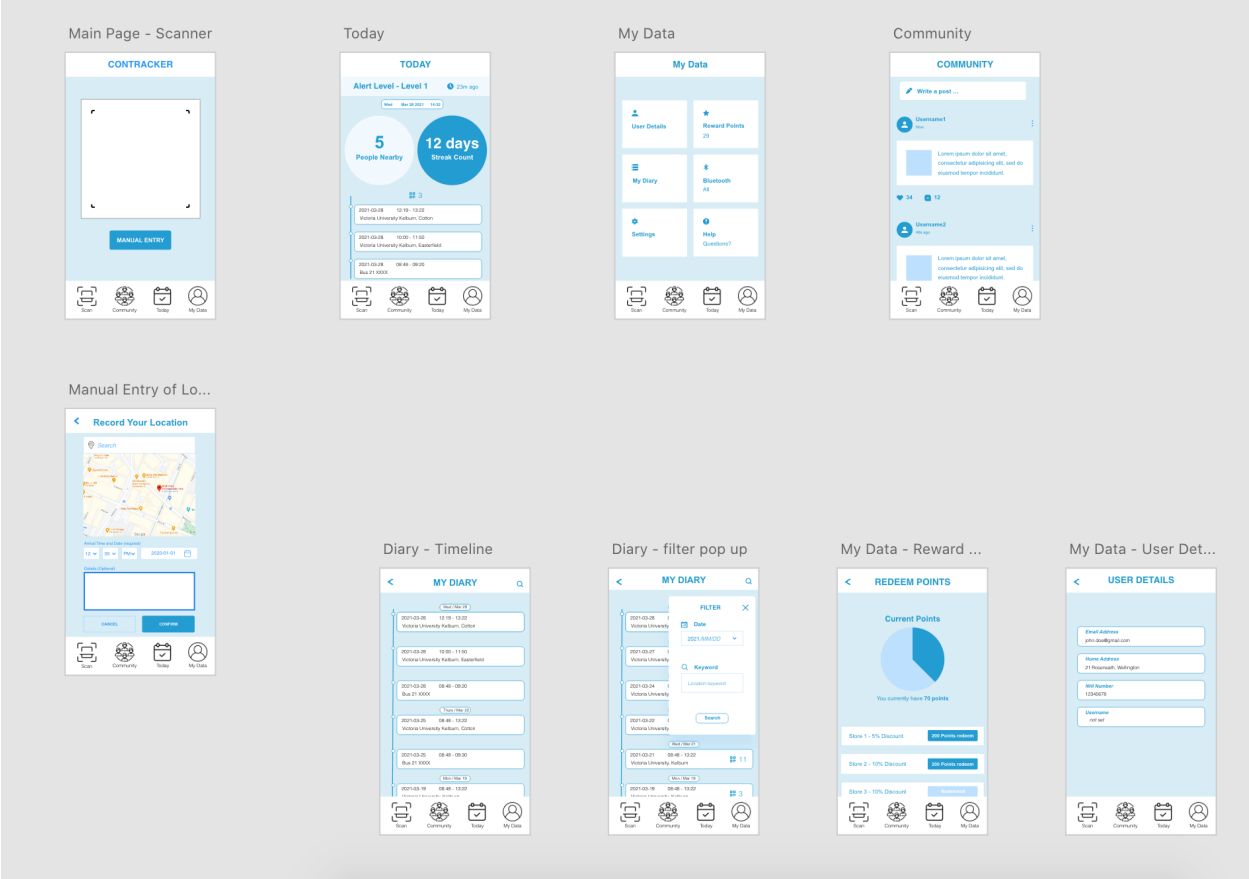
This is the redeem point page from the My Data page where the user can redeem points that they earn for scanning the QR codes. An alert would be put up on screen notifying users when it is during lockdown and points will be on pause.



And the Community Page - Which has the daily post feed of other users. The users can post what they are doing at home (to encourage social distancing) or post their streaks, rewards redeemed, etc. They have to have a username. Their NHI numbers are kept private as well as their alerts.



Storyboard



PART 4 - Reflection

Reflection on changes made:

I realised that expecting businesses to put up BLEs might not be feasible since QR codes are required for each unique location as well as in public transportation, including ubers and taxis. It will cost them more to install BLEs compared to a piece of paper with a QR code.

So I've decided to add game elements to the application. I was hesitant at first to add gamification to a contact tracing app as I thought that it would instead encourage people to go out to scan the QR codes. Also, I couldn't figure out a way to add an actual game into an app for COVID-19 properly without taking away the importance of using the app. Instead, I used elements of a game. So I did some research and found an article by Brian Burke and in it he had an idea: "*... counting the number of contacts by using Bluetooth proximity on an app would provide people with a 'score' to encourage people to practice social distancing".*

So I've updated the description, personas and tasks to reflect that. I've removed the BLE sections and added tasks for the game elements. I've also updated the personas to add the number of times they interacted with the system.

Pros and Cons

PROS	CONS
Social media interaction to encourage users to use the app	Confidentiality is hard to maintain on social media -- have to depend on the users not posting their private info.
Reward system to incentivise QR location	Can be difficult to implement
The app is easier on the eyes, especially for the elderly	

Reflection on design and solution

One game element I thought of adding was social interaction. I read an article from Forbes on using social networks in contact tracing. It said: “Data from behavioral science are clear: humans are social beings that can be influenced by others, particularly in situations of uncertainty.”

This is true. In the Fitbit app, there is a community page where users can post their latest achievements, challenges won and number of steps taken weekly. This encourages other people to partake in the challenges and in turn, workout more. The forest app also has a global ranking page where you can see the weekly focus rankings of users around the world, ie. the users with the most productivity time logged in.

However, both apps are hardly examples of the “particularly in situations of uncertainty” since they gear more towards lifestyle changes. So, I had a hard time balancing how I could implement a social aspect into contact tracing and social distancing whilst maintaining confidentiality of the user. But I felt that it would be an encouragement to see other people staying at home (for times in lockdown) and social distancing.

Another thing that was challenging was encouraging scanning of QR codes. A reward system came to mind like in the Forest app where you get coins for each minute of productivity logged. It might be a bit tricky to implement however, in terms of asking businesses to provide discounts for the app.

Overall, I had to learn how to keep a balance between certain aspects of the new system, such as social interaction of the users but still keeping confidentiality.

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