SWEN303 ASSIGNMENT1
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Covid Contact Tracing

Part 1, Introduction:

Description:

Key background and existing solutions:
Coronavirus disease 2019 (COVID-19) is a contagious disease caused by SARS-CoV-2, since the disease was first identified, it has spread worldwide and led to an ongoing pandemic. To slow the spread of the disease and keep track of potential disease carriers, the government needs to track close contacts between citizens. A contact tracing system is essential.
Currently, there is an existing contact tracing system. Covid contact tracing app is the Ministry of Health's official contact tracing mobile app to keep fast contact tracing of citizens to prevent community transition of Covid 19. It has two ways to keep track of users, first is using BlueTooth to keep an anonymized record of the people users have been near. The second way is to use a QR code to keep track of users' location which requires users to scan the QR code whenever they visit public places and users are able to form a private digital diary with this. Users are also required to register the contact information so the contact tracer can get in touch if they need to.
Overview of the current system, there are still some problems such as it requires users to scan the QR code wherever they go but it is a forgetful thing to do. It may cause further issues.
I will be creating personas who will be key kinds of users of the general public to use this system and provide scenarios to improve the user experience. So, this report will be exploring a better design of covid tracing systems from the user experience perspective.

Business Objectives:
As the aiming users are 'general public' and to keep track of potential covid 19 disease carriers, we would have to have the digital location record of every person in NewZealand because if there is one of the disease carriers is not on the tracking system, it will bring uncountable negative impact to the community. So, we potentially need to track as many people as possible in New Zealand.
Getting every citizen to use the covid tracing app is just the first step. Even though all people who live in New Zealand have downloaded the app, there are also too many

things that might cause people don't scan the QR code at all such as laziness or bad memory then the tracing app still won't be helpful. There will be a huge amount of missing location data, if there is one of them is a potential disease carrier will also bring a huge negative impact as we mentioned before. The current solution is when users visit a public store or restaurant, the staff there will ask users to scan the QR code. But we cannot guarantee that stores' staff will follow the rule which is the same as we cannot guarantee users will follow the rule as well. From my personal experience, I haven't been asked to scan the QR code ever again after the covid alert level has dropped from level 3. So, to keep the integrity of our data and make sure of all locations that users have been to are recorded, we should come up with a new solution to motivate people to scan the QR code or we could improve the contact tracing system to be able to record users' location without requiring them to scan the QR code. Also, the contact list should be easy to track if the location record is more accurate.
With a good and accurate location record of users. It is also important to consider their usage. For official usage, the tracer could use it to warn people if they are exposed to the virus. Also, users should be able to check it as well. So the system should provide operations that allow users to check and export their data directly. The function should be easily used by the user and the data should be clear to read visually by users.

From above, I derived the first business objective of the covid tracking system:
1: Motivate as many people as possible to use the covid tracing system.
2: Make user location recording processes be convenient for users and track accurately.
3:Provide operations that allow users to easily check and export their data.

the importance of the system to stakeholders

The covid tracing system is important to all of the people who are living in New Zealand currently. There are 117 million covid 19 cases in the world and only 66.1 million of them have recovered from the disease. There are 2.6 million death cases already. As we all know coronavirus is leading to an ongoing pandemic, the reason that the virus can be so dangerous is that it spreads through respiratory droplets when an infected person coughs, sneezes, or speaks which means it can be easily infected and hard to control. Citizens can infect the virus by just simply talking to each other or sitting in the same dining room with the virus carrier. In order to control the disease, the government would have to track citizens' locations to be able to tell if anyone has close contact with a virus carrier and ask them to self-isolate to prevent them from bringing bigger harm to society. The government would not be able to do it without the contact tracing system which will cause more people to get infected and more people to die because of the virus which makes the covid tracing system extremely important.

Model Overview:

Persona Generation:

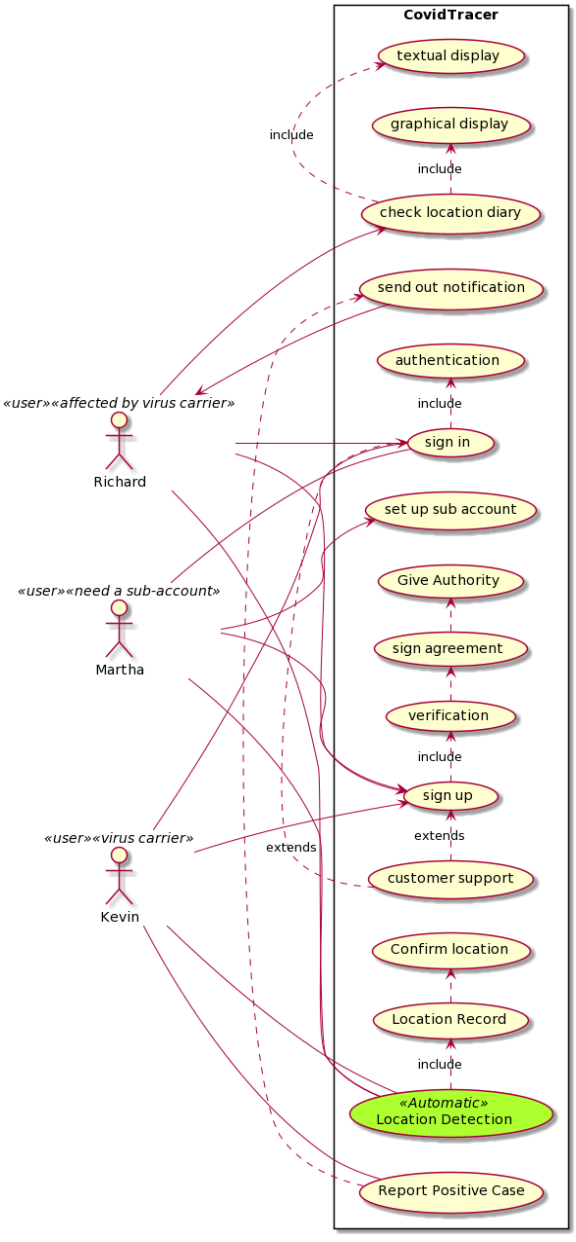
Conduct and Condense User Research:
From user research of the current covid tracing system of New Zealand, the current user group of the system is mostly people who have opportunities to have close contacts with others such as students, white-collar, etc. The reason why the current users are using covid tracers is that they understand the disease's endangerment and they understand the contact tracer is the most efficient way to protect people from the virus. But the goal used for the covid tracing app is the general public and not everybody in the society cares so the UX design of the system should consider the general public instead of current users of the system. In theory, the covid contact tracing system works efficiently when the system is used by 60 percent of people in society.
characteristics and expectations:
For the current user, they just expect the system's function is enough and the tracer to be accurate. For the others, if we can motivate them to be the system's future users, I believe that convenience is most important because apparently, they do not want to put much effort into tracing contacts.
Refine persona and make them realistic:
I summarized the user report and created few persona traits that should be most considerable with the system design. These personal traits include age, personality, behavior variables and I created backgrounds for them to suit their personal traits. Also, these persona traits cover the system's goal user, for example, the age can be varied into different abstract groups as elder,mid-aged, teenager and chances of getting close contact can be varied from highly, median, low which cover every situation. I want to make sure the persona has good coverage of goal users.
At last, I created 3 personas that have different age, background, feeling about the pandemic and these 3 personas covers all the general public who are going to use the system. These 3 people are Richard, Martha, and Kevin.
Why choose these personas to focus on:
Richard is an elder who has a high chance to gain close contact with others and has a careless attitude with the disease. He contains every trait that the system should consider during the web design. He is the 'problem maker' and the most important persona.
Martha is a mid-aged person who has limited chances to gain close contact. But her family members have a high amount of close contact with other people so she needs some supportive function with the tracing app to take care of her family.
Kevin is a young man with a high amount of contacts so he is mainly for the warning and reporting function of the system.
These personas that I use have different problems using the covid tracing system and these problems create different requirements for the system in UX design.

Tasks Creation && Prioritize Tasks:

The process to Create Tasks:

The first step to create scenarios is to create problems. Creating problems helps us to discover the potential usage of the system and that helps us to create vision statements. This step is to establish the goals of the system design. The second step would be brainstorming potential solutions. For example, one problem that I found for the tracing system is the location recording step is relying on users to complete it, users will be distracted from what they are doing to record their location. From this problem, I created the vision statement: The tracing system should be able to record users' location automatically. And after brainstorm, I came up with 2 solutions, one is to use a GPS system for automatic recording and the other one is to install BlueTooth hardware within every store and connect it with the user's phone to achieve an auto location record. The third step is to identify users' expectations then combine it with my brainstorm and come up with the best solution. At the last step, create a scenario with the right persona.

UML System ---------->



Prioritize Tasks :

The principle that I follow is the design requirement to prioritize my tasks. As following the design requirement, the data and function is the primary requirement. Before considering the data and functional requirements, the one thing that is most important is the sign-up task. It sets up the fundamentals for everything including data collection, data usage, and system function. So the first scenario is 'set up covid tracing app'. Besides this, the data is more important compared to functional requirements. The accuracy of data collected is the key to the whole system. So tasks related to data are primary tasks. This is why the number two scenario is about the collecting data process which is called 'automatic record location'. Then the third scenario is about the main usage of data recorded within the tracing system which is reporting positive cases and using recorded data to notify affected people. This is the official usage of collected data but the user can also access and view data by themselves. Scenarios:'Search for particular record' and 'Sends out location tracing map' are ranked right after which are both functional requirements designed for a more convenient experience with accessing and viewing data. At last, I have a 'set up a

sub-account scenario which is particularly designed for a special user group.

Part 2, Personas:

Persona 1 :

Name: Richard
Age: 65
Occupation: IS manager
Location: Wellington

Richard is 65 years old IT support manager who lives in Wellington. He goes to work before 8 am every single day and leaves at 5 pm. He has chances to gain close contact with a lot of people at work because he is basically in charge of everything about IT. He is a quite technical person to use the covid tracing system but he does not pay much attention to the coronavirus news and feels it is very inconvenient to record his location.

Activities: Richard does enjoy having brunch at cafes during his free time and he goes swimming every once a week.

Hobby: Richard likes to gather and save vouchers for a long time then use them all at once so he feels there is a huge discount.

Attitudes: Richard is very optimistic which he believes nothing bad will happen to him at all.

Aptitudes: Richard is a technical person and capable to solve technical issues independently.

Weaknesses: Richard does not care about the covid 19 pandemics and does not care about the tracing system.

Goal: Richard is going to retire soon, he is moving to Auckland with his wife soon. He just wants to enjoy his life.

Persona 2 :

Name: Martha
Age: 35
Occupation: Accountant
Location: A Auckland

Martha is a mid-aged mother of 2 children. One child is 5 years old and one is 11 years old. She is an accountant who is currently working from home to take care of her kids because she is a family person. She is a strict mum and tries to teach her children to be independent. As the pandemic situation is getting better and her kids are back to school, she is worried about her children while they are not at home. She does not have much opportunity to have close contact with other people during working hours but her 12 years old son attends multiple after-school activities including basketball and rugby.

Activities: Martha goes to the supermarket to shop for the whole family once a week. She takes her whole family out for special activities once every 2 weeks.

Attitudes: Martha is pessimistic. She is always worrying which causes her to be stressed all the time.

Aptitudes: Martha is numerate and dealing with numbers all the time.

Weaknesses: She prefers geographical display instead of textual because of dyslexia.

Goal: Martha is hoping the covid 19 pandemics could be over soon so she can bring her whole family out for a vacation overseas.

Persona 3:

Name: Kevin
Age:19
Occupation: Student
Location: Auckland

Kevin is a first-year student studying business analyst at Auckland University. He is really into college life and he thinks campus life is very important. He insists on attending as many lectures and tutorials as possible and he goes to the gym to work out 5 times a week. Kevin awakes that covid 19 pandemics can be very harmful to society so he uses covid 19 tracer everywhere he goes but he is a little sensitive about the privacy and safety of his personal information.

Activity: Kevin works out at the gym 5 times a week and socializes with his university friends often.

Attitudes: Kevin has an energetic and outgoing personality, he is always up to something.

Aptitudes: Kevin is athletic and has good logic.

Weaknesses: Kevin has a lot of public activities so he has many opportunities for close contact with others.

Goal: Kevin just wants to enjoy his college life.

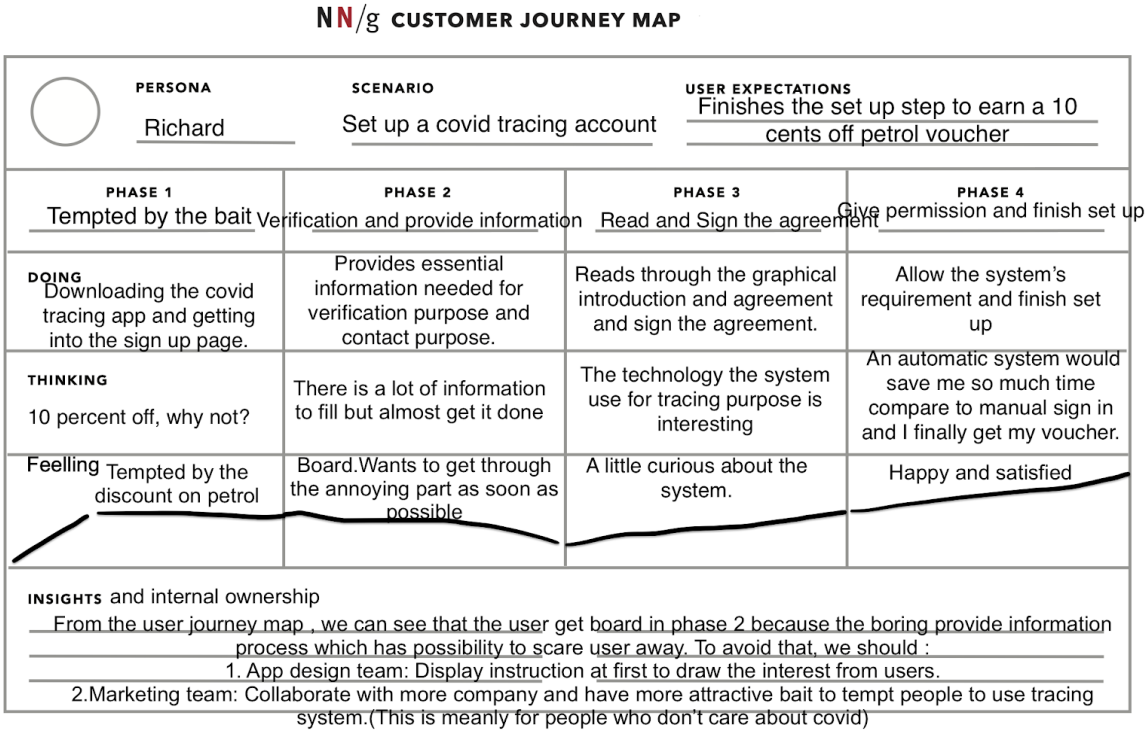
Part 3, Scenarios:

Scenario:
Sign up for to Covid Tracing app

Persona: Richard

Richard has seen a commercial email from AA smart fuel that says it will be 10 cents per liter off for petrol if he downloads the covid tracing app and signs up to the tracing system. So he intends to sign up for the covid tracing system. So he downloads the covid tracing app from the link provided in the commercial email and opens it. The system displays options for login or sign up. Richard presses the sign-up account option. Because it is a real-name system so the system requires Richard‘s personal information(name, photo ID, NHI number, etc.) to make sure that he has never registered before. Richard enters them and selects verify the system firstly checks there isn’t a duplicate person in the covid tracing system’s database already then verify if Richard’s ID and NHI number are valid. After a moment, the system displays verification completed and brings Richard into the next step which asks Richard for his personal information(phone number, address, etc) again for contact purposes. This information was not required in the last gathering information step because that was mainly for verification. Richard fills them in and the system presents a sample graphical introduction of the system and a user agreement about how the tracing app will trace his location and where his location data are going to be stored. Richard reads through and agrees to the agreement. Then the system takes him to the last step which is to gain permission to Richard's phone’s GPS system and BlueTooth hardware for tracing purposes. Richard accepted the permission and completed the setup.

The User Journey Map of set up an account**:**



Scenario :

automatic record location
Persona: Richard

Richard needs to go to the laptop company to pick up 3 laptops that were freshly built. When he walks into the building, the NZ tracing system detects that Richard is in a public building using GPS location information within Richard's phone. Then the system records the time when he walks in and the location of the building automatically but the system is not putting this information in the official diary. After Richard has picked up these laptops that he needs, he intends to leave the building and the system detects that his location shown in the GPS system is no longer at the building. Then the system records the time information of when Richard leaves the building. When Richard is back to his own company and he checks his phone. The covid tracing app pops up a notification to remind him to confirm that the information that the system detected is correct. Because Richard doesn't give much attention to the covid-19 so he would never check the covid tracing app without notification. Richard checks the information that the system recorded and realizes the floor number is not recorded so he presses the edit button to add the floor number and laptop company name into recorded information. He presses confirm tab then the system receives confirm the order and records the information into the official covid tracing diary.

Scenario:
Report positive case
Pers on: Kevin

Kevin has just got his result for a covid test, the result shows positive. Because he already recorded his NHI number when he signed up to the tracing system so the tracing system synced his testing result from the hospital. When the system detected individual users got positive test results, the system immediately sends a notice to Kevin to access Kevin's personal location data stored in Kevin's phone and a privacy agreement to ensure Kevin knows his personal data would only be used to anonymously notice people that had close contact with him may have been exposed under covid 19. When Kevin receives the notice and the privacy agreement, he reads the agreement carefully to make sure there is no problem with the privacy agreement. After he signs the agreement, anonymous notices will be sent to every person that had potential close contact with Kevin.

Scenario :
Sends out location tracking map
Persona: Martha

Martha wants to share her recent location data with her husband. Because of her dyslexia so she prefers a graphical display version. So she opens myData within the covid tracing app then the system displays options for different data. The options are

an official location diary and a draft location diary. The draft location diary contains location data that have not been confirmed. Martha did not find any graphical display option so she picked the official location diary. After she pressed the option, the tracer system then showed the location diary of the textual version which is the default setting of the location diary. Also, on the right top field of the screen has a button called ‘show graphical display’, Martha then presses that tab. Then the system converts the textual record to a graphical record. It is a map with all locations that Martha has been to within the past 2 Months if a particular location within the map is selected, it then displays details of the visit including time getting in, getting out, and specific address. Martha is satisfied with the map, she presses the share button on the left top corner then the system converts the whole map into an encrypted document for her to share and her husband can decrypt the document to view the map on his own phone using the covid tracer so the system has records of who have view the shared data.

Scenario :
Search for a particular record
Person a: Richard

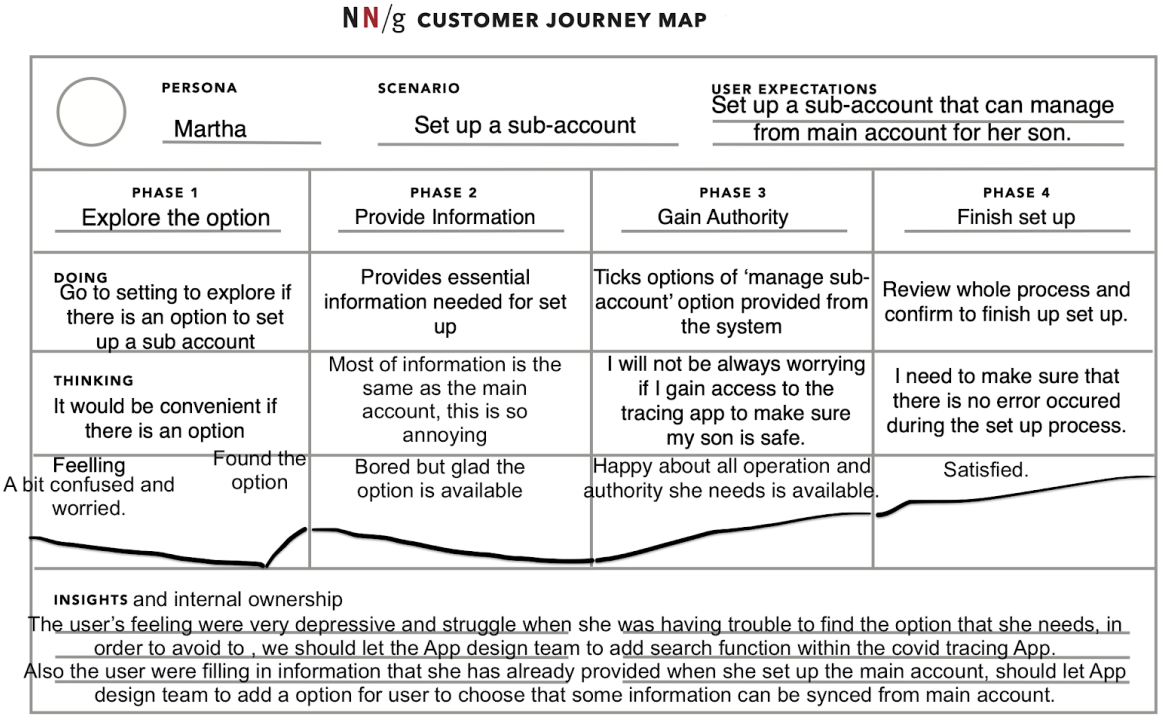
Richard received a notice from the covid tracing app saying there is one covid positive case detected in one cafe he has been to three days ago. The notice mentioned that the time of the new positive case walked into the cafe was around 1 PM which is pretty much the same time as when Richard left the cafe. Richard couldn’t remember the exact time when he left the cafe so he is not sure if he had close contact with the virus carrier or not. Then he logged into the covid tracer app and opened the myData tab to view his location data then he opened my diary tab to check his personal diary. Richard opened the search button and entered the cafe’s name to search for the exact report Because it was from 3 days ago so it would be hard to scroll down and find the restaurant name. Then the system showed him the record of the cafe's location and time. From the record, he discovered that he left 5 min after the virus carrier walked in. Sadly, he had to apply self-isolation for 14 days to make sure that he did not get infected.

Scenario :
Set up and use a sub-account
Persona: Martha

Martha is going to set her 12 years old son a sub-account for the covid tracing system because her son is too young to have his own phone and to manage his own account but he still needs to attend a public activity. She presses the setting tab then the system shows her setting options including setting up a sub-account. She selects to set up a sub-account option and the system pops up an authentication process again just to make sure the person making the operation is actually herself.

After she authentics herself. the system requires her to enter information the system needs to set up a sub-account including name, address, and NHI number. She enters them and then the system generates a username for the sub-account and gives her the option to have the same password as the main account or set up a new password. She picks to have the same password. The system then displays that the initial setup is finished. It asks the authority the main account wants to gain and displays few options to Martha. Martha ticks two options that are ‘authority to view and confirm the initial diary to the official diary.’ and ‘get a notification when the sub-account receives notification’.After she has done that the system shows it is all set and asks her to review the whole application to prevent mistakes. She checks that there aren't any mistakes made and presses confirm.

The User Journey Map of set sub-accounts:



Then she uses a smartwatch to download the covid tracing app and enters sub-account login information when the app requires login. The system then asks to use the location information and GPS access of the smartwatch then Martha gives allowance to that. The system now works properly and Martha can gain access to her son’s account and she doesn’t need to worry about her son all the time anymore.

Part 4,Reflection:

Personal Reflection:

Process of creating the personas and learned from the process:
For the process, I understood even there are a lot of different needs and expectations for different users but they can all be summarised into a few typical categories. From the process, I gained experience summarising typical user types for the system that I design and maintain a good coverage of the whole user group. Different groups of people would have different types of behavior, different behavior variables were created for different groups of people and at last, these behavior variables will be necessary for personas as well.
During the creation of the persona process, I learned about the user's preference in all aspects that helped me with the system design.
I have asked my landlord, my manager from the internship, and some friends of mine about their living habits, hobbies, and preferences that could help me to create abstract personas to represent a particular user group. It really helped me, for example, my landlord is a mid-aged lady that has 2 children. Some of her thinking and personality is very representative of most mid-aged mothers such as the worries of her kids in this horrible pandemic. And these were helpful for creating persona and behavior variables.
Aspects of the users ignored:
There are some aspects that I did not think of when I started to write the persona. At first, all I can think of are traits that might affect people's use of the contact tracer procedure such as their aptitudes or their attitude to the tracer. I ignored the demand level of the covid tracing system. A student who uses zoom to attend classes would have a different interaction frequency of the system compared to a student who attends classes physically. This is important as it requires different UX designs of the system.

Scenario Reflection:

From the scenario creation process, I brainstormed the main operations the system should contain based on problem identifying and vision statements. Then combine these with the persona's expectation and implement persona to form scenarios.
Learned from formalizing thought processes:
When I was formalizing my thought processes, I learned to analyze details within the system design's touchpoint with users that will bring a better user experience. For example, in the scenario 'set up an account, we can tell Richard wasn't in a good mood from the user journey map because of the huge amount of personal information he has to fill in. But if we swap step 2 to step 3(graphical introduction and user agreement), the introduction will drag interest from Richardson he knows what he is doing and that will make him feel less annoyed. Even the order of set up steps could make some differences taught me every single little detail matters in UX design.
Aspects of the system ignored:
When I first started to write the scenario, I focused too much on caring about the functional aspect of the system and on details of the system such as adding a search

bar within the location diary. I ignored the most important part of the system --- the location collecting process. Which from user experience and design requirement aspects, the solution at that time was not enough. From a user experience perspective, using QR code scan is still an inconvenient and manual way to record user location which doesn’t meet personas expectation. From the design requirement perspective, the Bluetooth hardware isn't an efficient and effective method since it requires 60 percent of the whole population to use the tracer. At last, I decided to use a GPS system for the tracer since it is an independent system and is able to achieve automatic recording.

UML code for the diagram:

```
left to right direction
skinparam packageStyle rectangle
skinparam usecase {
          BackgroundColor<< Selected >> GreenYellow
        BackgroundColor<< Automatic >> GreenYellow

}
actor Richard << user >> << affected by virus carrier>>
actor Martha << user >><< need a sub-account >>
actor Kevin << user >><< virus carrier >>
rectangle CovidTracer{
  (sign up) as SU
  Richard-> SU
  Martha-> SU
  Kevin-> SU
  (SU) .> (verification) : include
  (verification) .> (sign agreement)
  (sign agreement) .> (Give Authority)
  (customer support) .> SU : extends
  (sign in) as SI
  Richard-- SI
  Martha-- SI
  Kevin-- SI
  (SI) .> (authentication) : include
  (customer support) .> SI : extends
  (Location Detection) << Automatic >> as RL
  (RL) .> (Location Record) : include
  (Location Record) .> (Confirm location)
  Richard -- RL
  Martha -- RL
  Kevin -- RL
  Kevin-- (Report Positive Case)
  (Report Positive Case).>(send out notification)
  (send out notification)->Richard
  Richard ->(check location diary)
  (check location diary) .> (textual display) :include
(check location diary) .> (graphical display) :include
Martha -> (set up sub account)
}
```