SOFTWARE ENGINEERING

ASSIGNMENT PART 1 – Project Proposal

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Contents

Introduction

For this project, we are creating a "Track and Trace" app for the NHS. The app is split into two sections; one for people who develop coronavirus symptoms, and the other for people who have been in close contact with someone who has tested positive for coronavirus.

Part one will be able to do the following:

- Inform the user they need to isolate for at least 10 days once they develop symptoms, and their household needs to isolate for at least 14 days or risk being fined.
- Inform the user that they should get a test from the NHS for free (available via this link: https://www.gov.uk/get-coronavirus-test, or by calling 119 if no internet access is available).
- Tell the user if they are able to end their isolation based upon their test results. If they test negative, both the user and their household are able to end isolation early. If they test positive, the user must complete their 10 days of isolation at a minimum and their family 14 days or they will possibly be fined.
- If the user tests positive, send them a message asking them about people they have seen and locations they have been to, and send a warning to anybody who falls into these categories informing them that they are at risk.

Part two will be able to do the following:

- Alert the user that they have been in close contact with someone who has tested positive for coronavirus (via text, email or phone call), and that they should log onto the NHS test and trace website to communicate (under-18s will receive a phone call with permission from a guardian).
- Alert the user that they will be self-isolating for 14 days from the last contact with coronavirus. Failure to self isolate can result in a fine. Normal protocols should be implemented inside the household.
- The user will be told to get a test if they are developing symptoms of coronavirus, and have another option of calling 119 if they have no internet access. Members of the household would be put in isolation for 14 days. If the test is positive, the user will be asked to mention the people who've been in contact, as they may need to self isolate. If the test is negative, 14-day self isolation will still be required.

Both parts will be combined into one app.

Actors

User with COVID-19 symptoms

Anybody who is using the app to report symptoms of COVID-19.

User in contact

Anybody who is contacted by an NHS contact tracer (via text/email) due to being in contact with someone who has tested positive for COVID-19.

NHS contact tracer

An NHS worker who is responsible for bridging contact between the track and trace services and users with COVID-19 symptoms, users in contact and establishment owners.

Track and trace admin

An administrative user who oversees and maintains the services within the system, including the main track and trace service.

Track and trace service

The main service of the system, responsible for sending data between other services and end-users.

Email service

The service that is responsible for sending emails to end-users.

SMS service

The service that is responsible for sending text messages to end-users.

Contact sharing service

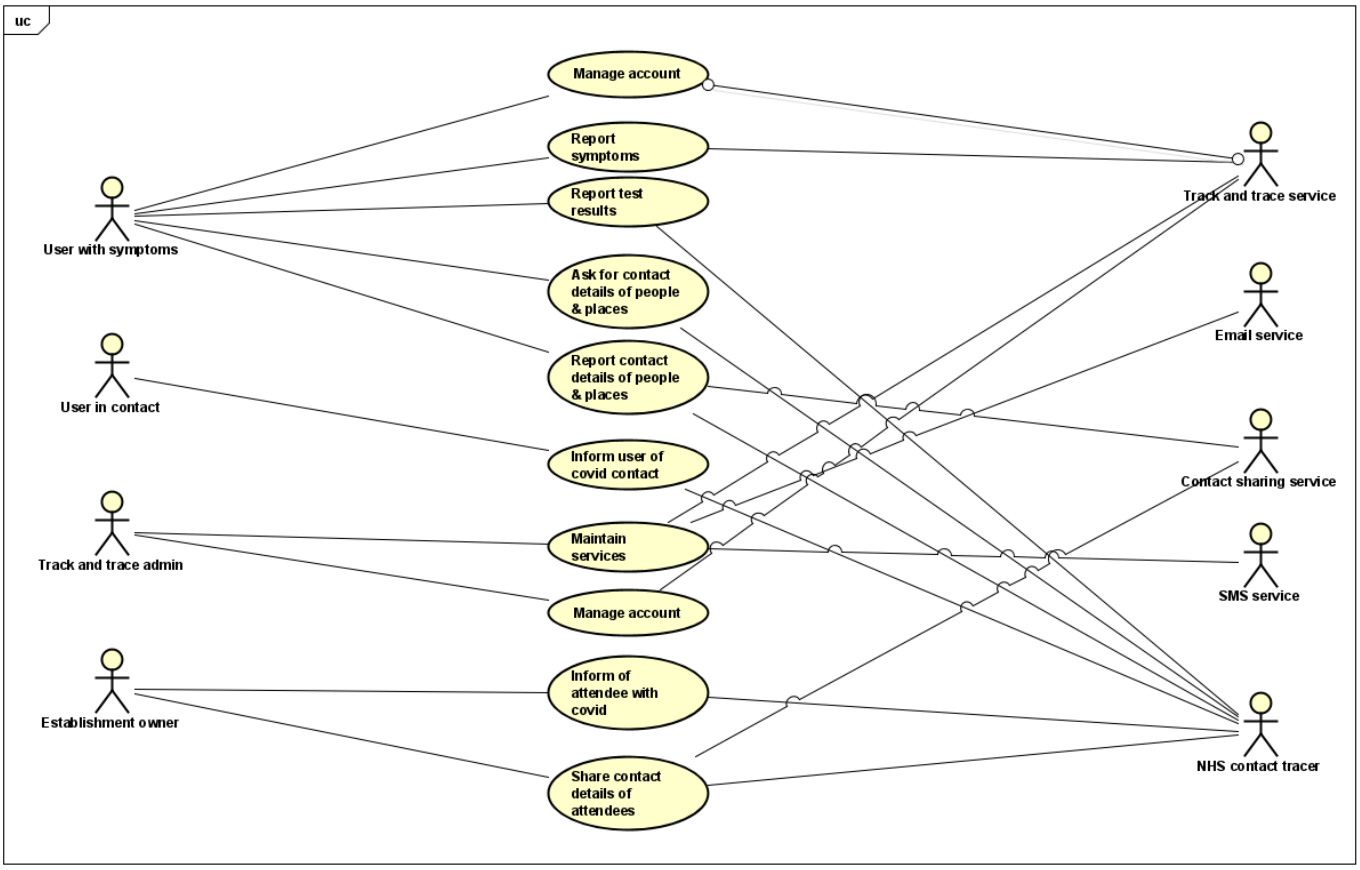
The service that is responsible for securely sending the contact details of people and places to the track and trace service and NHS contact tracers

Establishment owner

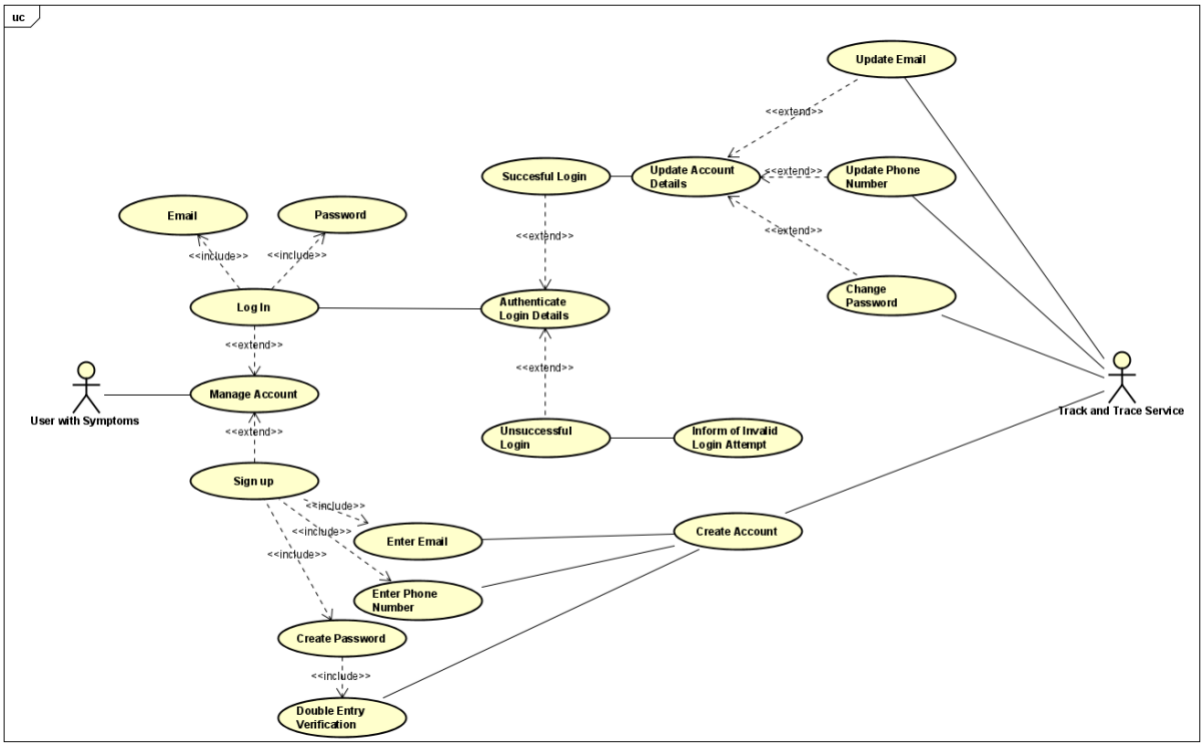
Anybody who owns a business that houses multiple people at once, such as a restaurant owner. In the use cases, it is assumed that the establishment owner records the contact details of whoever enters their establishment.

Usecase

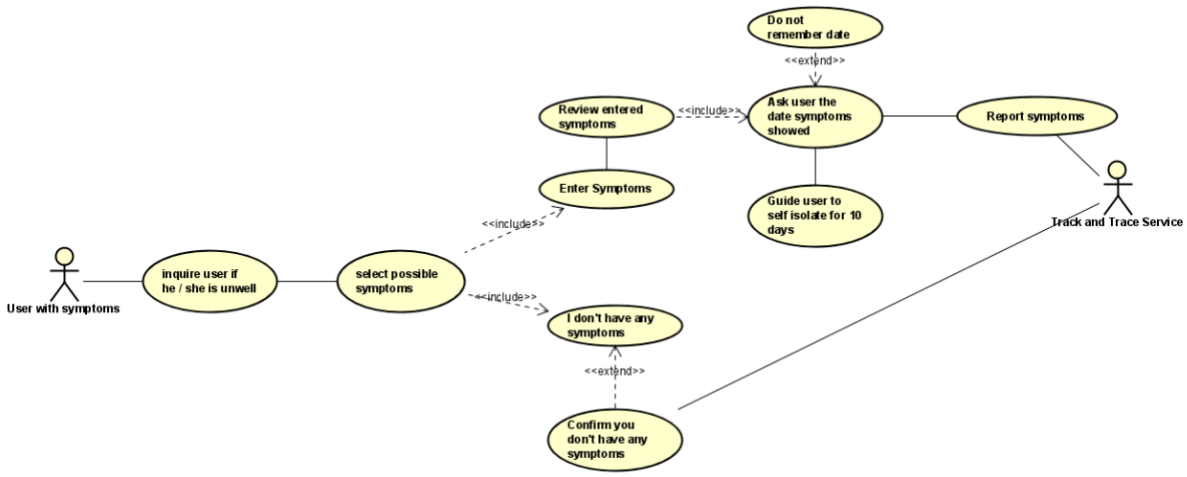
System Level Diagram



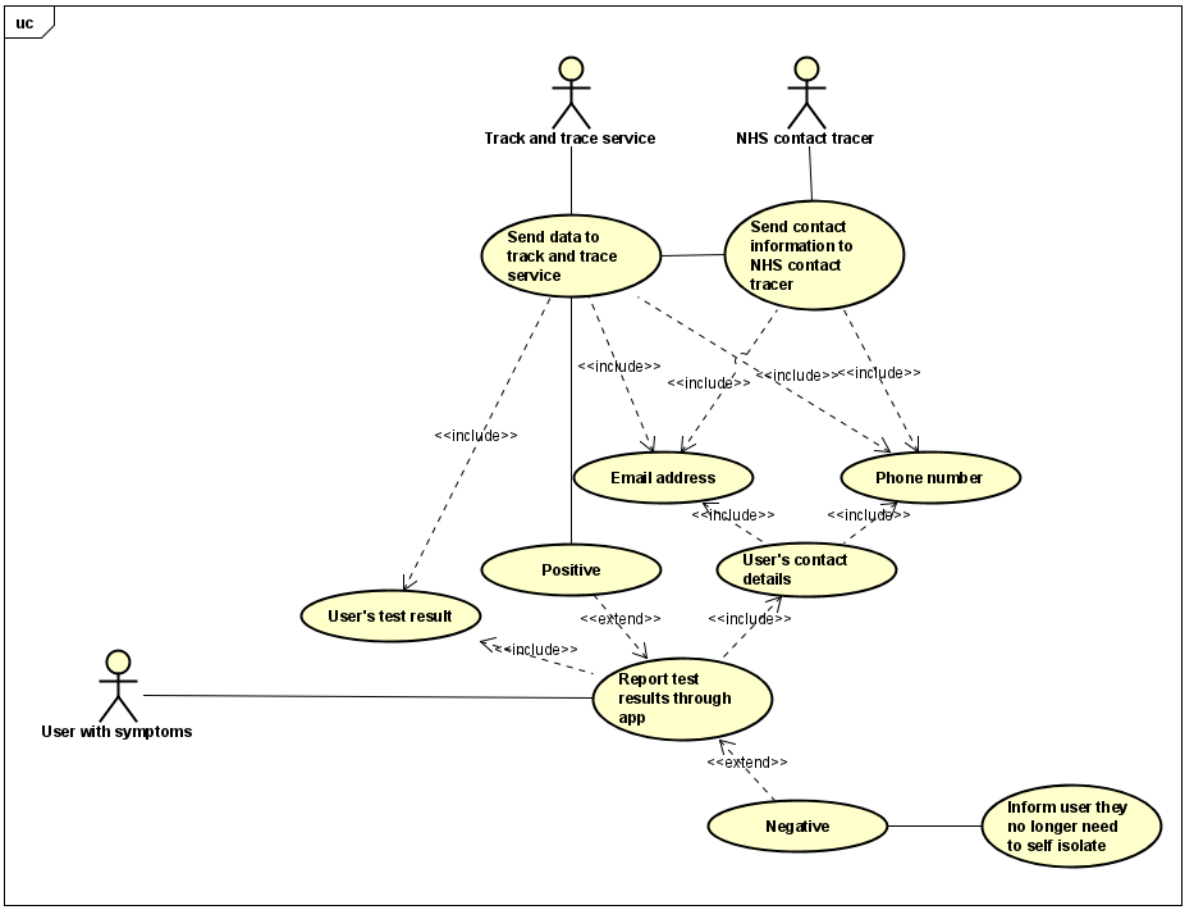
Level 2 Diagrams



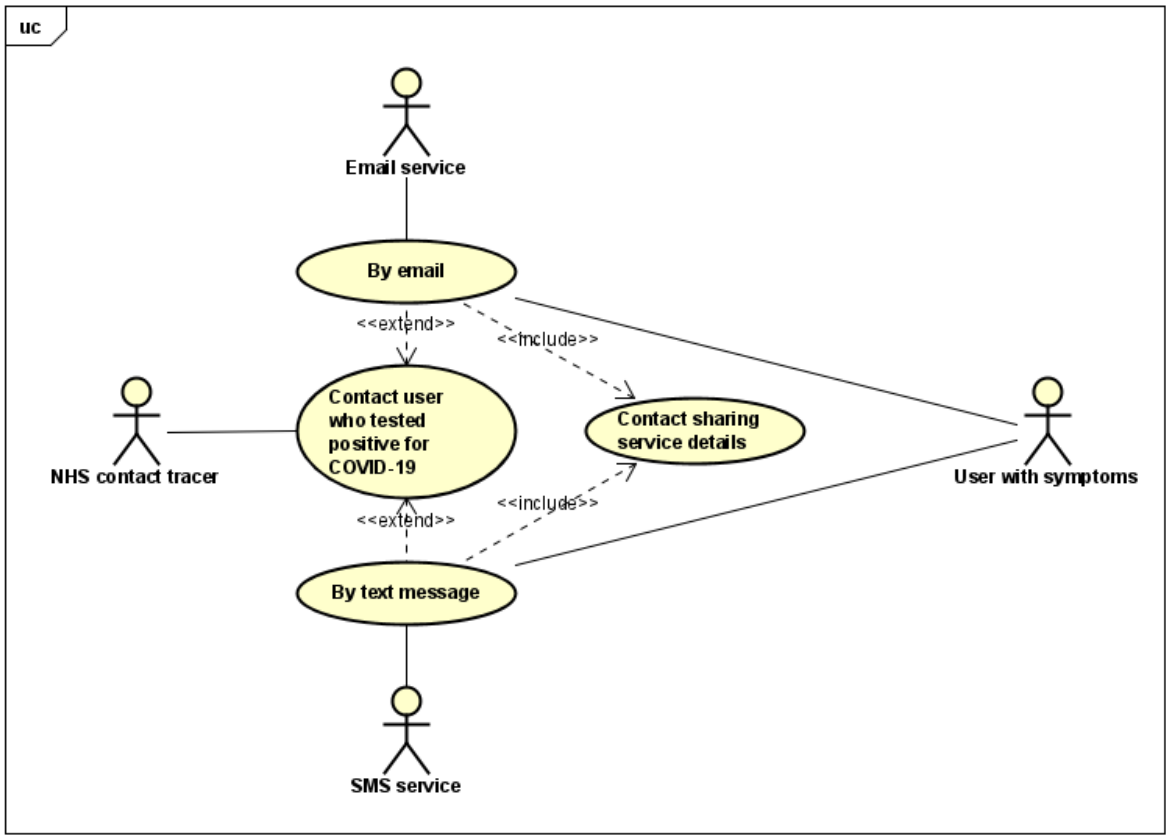
This use case represents how a user who has COVID-19 symptoms would manage their account on the app. This includes initial sign up and logging in. Once they sign up, an account is created, and the information is sent to the main track and trace service. When they attempt to log in, their details are checked against the details within the main service. They can manage their account once logged in.



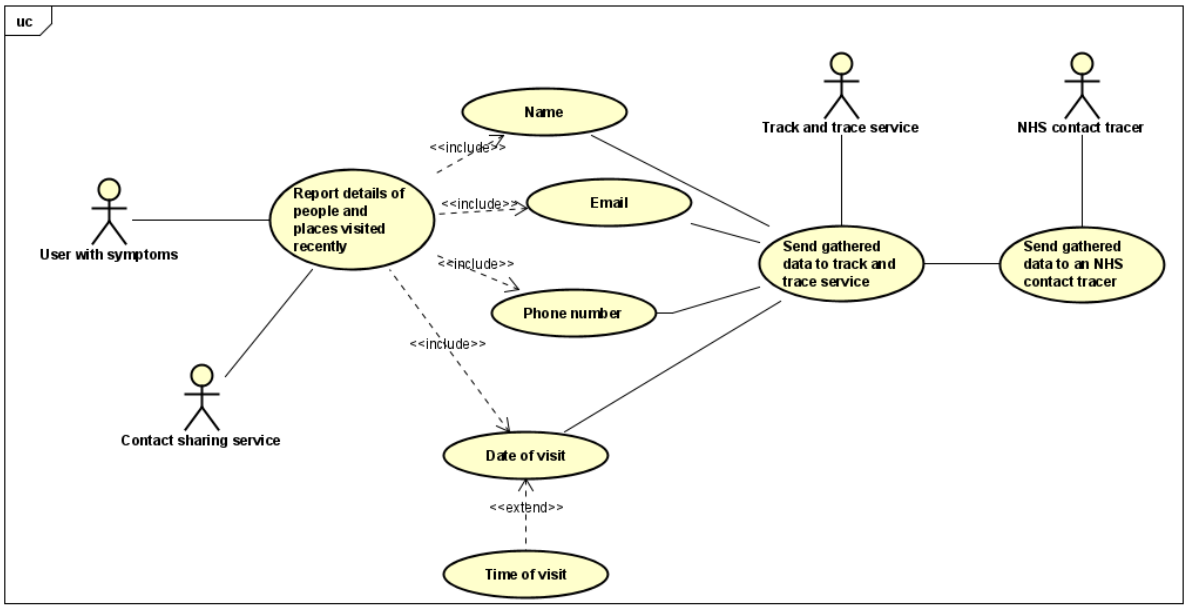
This use case represents how a user with COVID-19 symptoms would get guidance on isolation when they have symptoms. The app will check if the user reports symptoms and ask for the date these symptoms started. If the user remembers, it will tell them to self-isolate 10 days from when they started and order a test from the NHS. If they do not, it will tell them to self-isolate immediately and order a test from the NHS.



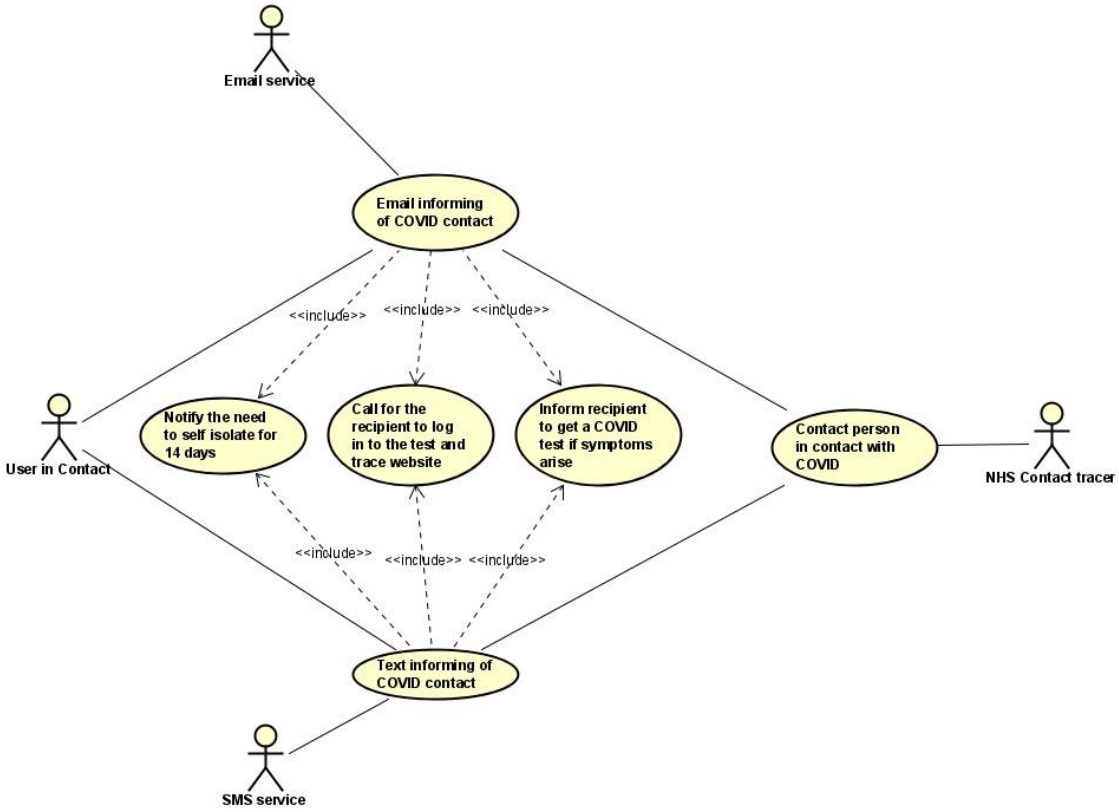
The user reports their test results through the app. If they report a negative result, the app informs them that they no longer have to self-isolate. If they report a positive result, the app sends the user's contact details and test results to the track and trace service, which then sends the contact information of the user to an NHS contact tracer.



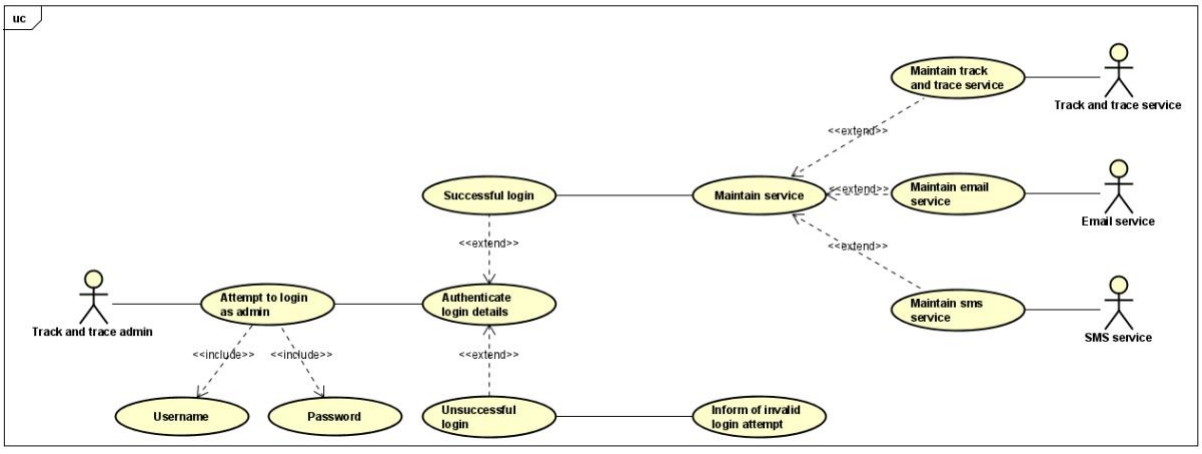
An NHS contact tracer will send a message to the user who reported a positive COVID-19 test result. The message will ask them to use the contact sharing service to share the contact details of people and places they visited recently, along with the date they visited them.



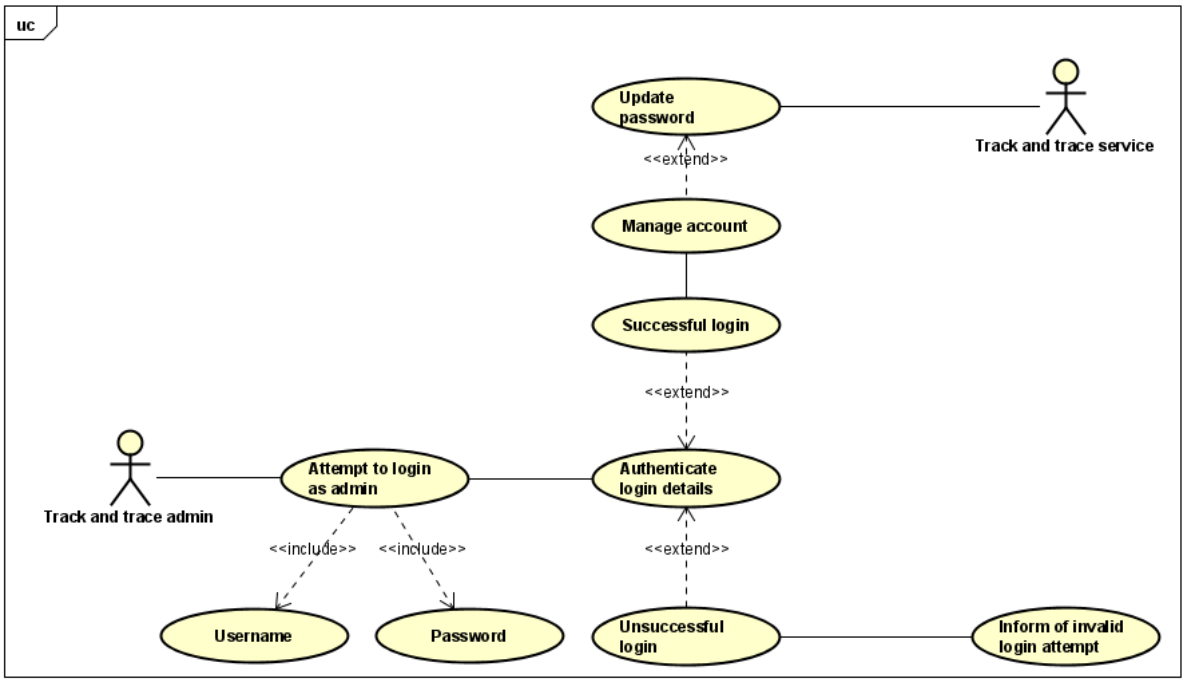
The user who tested positive for COVID-19 will use the contact sharing service to report the contact details of people & places they visited recently. The data is then sent to the track and trace service which in turn sends it to an NHS contact tracer.



An NHS contact tracer will get in touch with someone who was in contact with a person who tested positive for COVID-19 via either email or a text message. The message should include warnings to self-isolate, get a test if symptoms arise and ask them to sign up for the track and trace service.

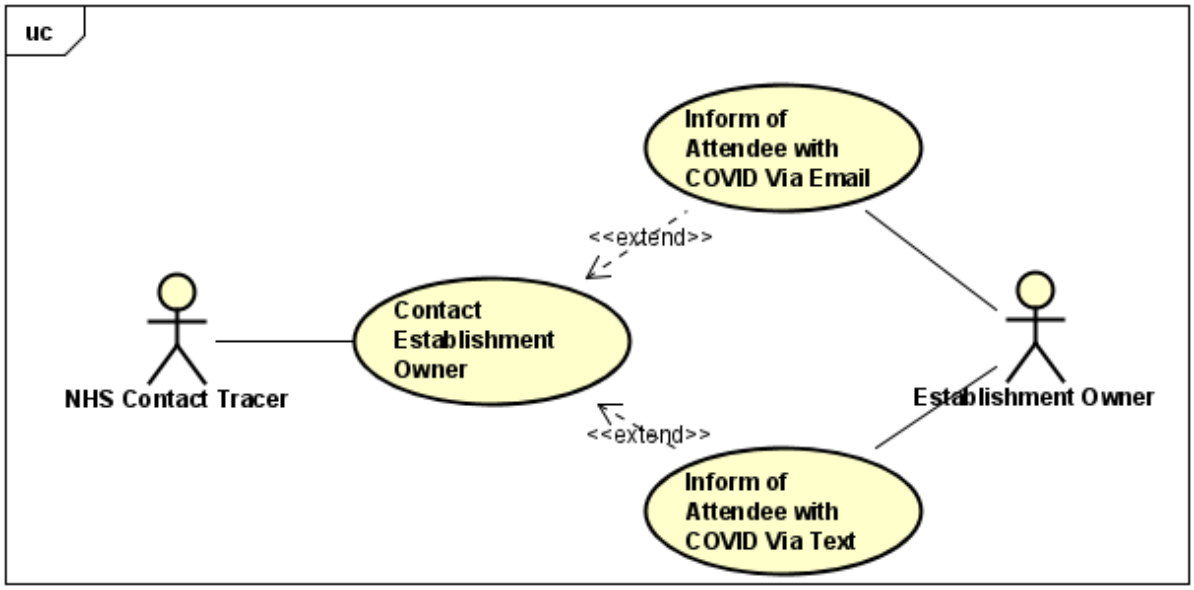


The system has set administrators (each with their own account), when they attempt to login the system will verify the details. If they were inputted correctly, they will be logged in on their admin account. From there, they can maintain the 3 key services that are a part of the system. If the details were inputted incorrectly, they will be told as such and not logged in.

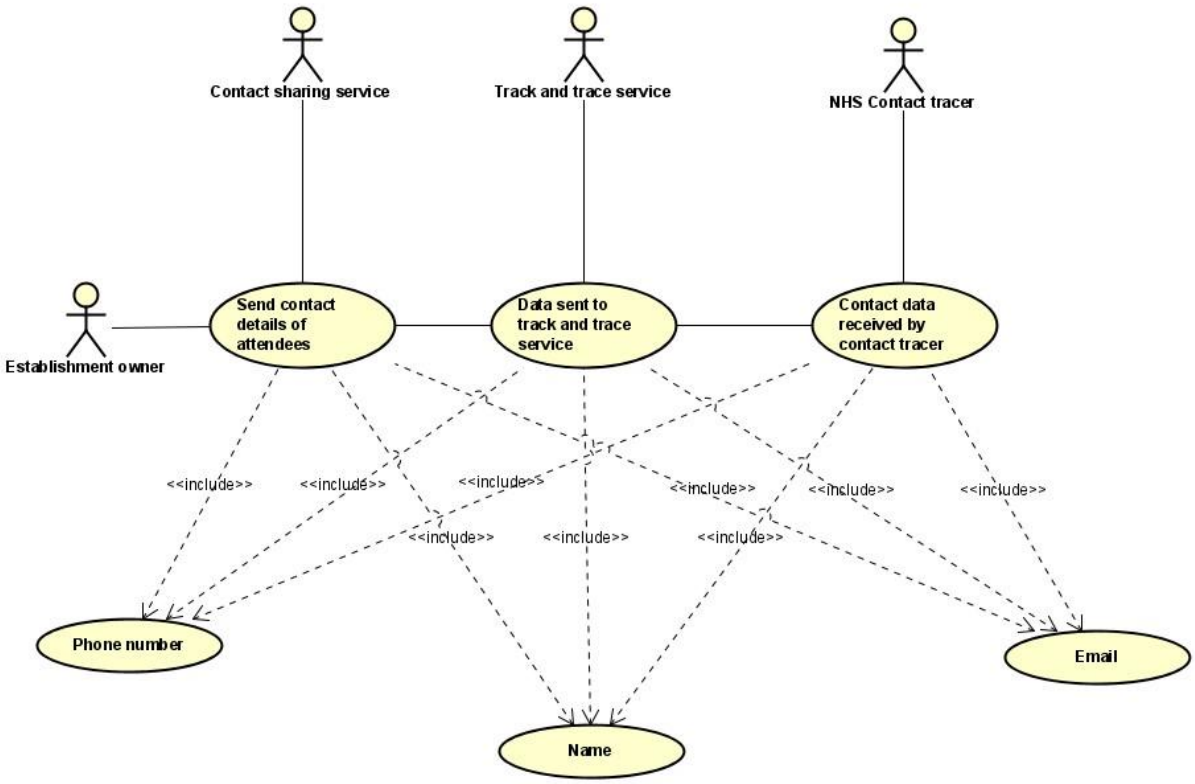


Uses the same login system as the above use case. The admin can update their account password in case they want to change it, and any changes they make are submitted to the track and trace service.

Since their account use a pre-determined username, they are unable to change it. They also do not have any contact details since they are already a part of the system itself.



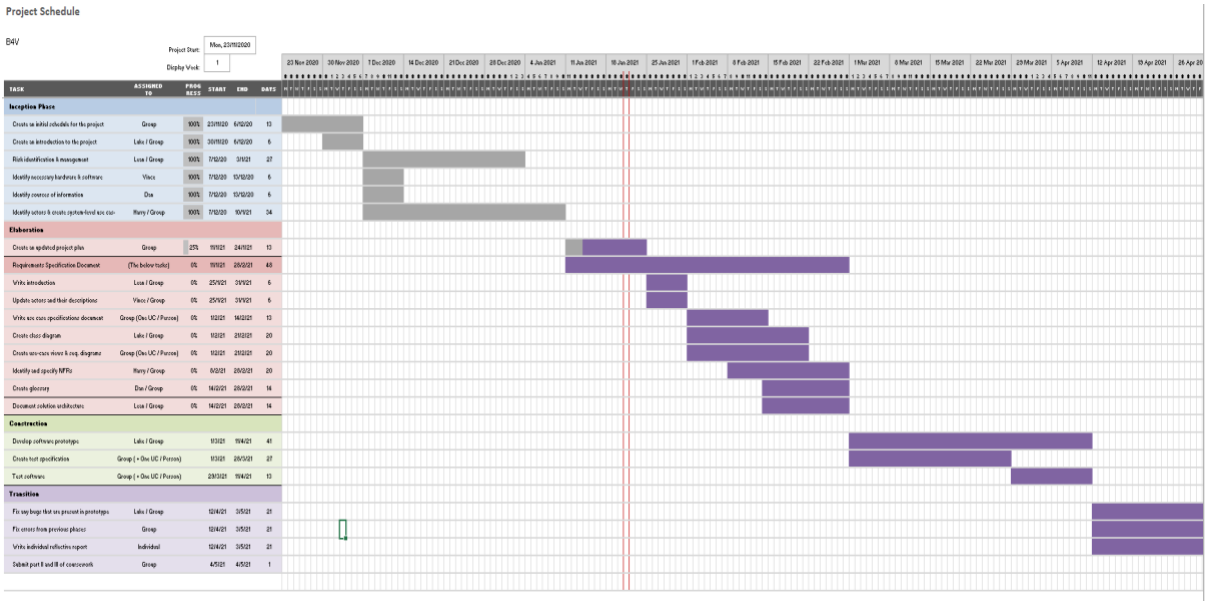
An NHS contact tracer will get in contact with an establishment owner via either email or text message. The message will ask them to use the contact sharing service to securely send the contact details of anybody in attendance on the day that a COVID-19 positive customer attended the establishment.



The establishment owner will use the contact sharing service to send the contact details of all attendees that were present on the day that a COVID-19 positive attendee was at the establishment. The data is then sent to the track and trace service which in turn sends the details to an NHS contact tracer.

It is assumed the establishment owner keeps a record of every attendee and the days that they attended the establishment.

Project Schedule



(If this is hard to read, a full version of the project schedule has been attached as a .xlsx file).

Risk Management

RISK	RISK TYPE	RISK CHANCE	RISK IMPACT	RISK AVOIDANCE	RISK MITIGATION
Schedule / Availability	Person	Low	This risk will make it harder to work together and not be able to work on the project effectively, as there would be days that a member of the group would not be available at the distinguished time especially with this pandemic that gives us unforeseen circumstances.	To better the outcome of the project it is advised to the group members on the days they unable to do and work with the days that they are available. Being able to have a choice of days to choose from will allow the project schedule to be more versatile as we can arrange a more appropriate time for everyone to be able to work together.	You can lessen the threat of this risk by planning as soon as possible the dates of meetings etc. Everyone should also update if they have sudden changes on their availability, so that there would be time for adjustments.
Lack of commitment	Person	Low	With this risk there would be delays in deliveries and this would impact a negative motivation to the other group members, and this could affect the quality of the project	To avoid this risk, the leader of the group should discuss around each team member's talents and strength, and what are they passionate about to align roles and responsibilities that would suit them. Also, the leader should show appreciation to every team member for the work they do, and everyone should trust one another.	You can lessen the threat of this risk by having a positive working environment and by the help of each member in encouraging one another in the works that they are doing.
Technical Issues	Project	Medium	There are certain applications that is needed to be able to complete the task. Having an unstable and/or old computer will halt this process as it may not allow the application to install or run especially with people who are unable to travel to the University and does not have the right equipment	To be able to avoid this kind of threat, the group should have a meeting before starting the project and the member should mention on what they would need or lack from the very start so that there would be time for everyone to think of a solution and make adjustments.	You can lessen the threat of this risk by setting roles to each member of the group that is efficient to one another especially with people who do not have the right application or equipment for the project, for

			needed. Moreover, the software may cause issues like not being able to save your progress and the program itself may crash.		them to have equal distributions on the project
Sudden Change to requirements	Project	Medium	When the task requirements change this will greatly impact the group's performance and the already made tasks that have been completed. This will have a domino effect from the work that has already been done. We, as a group will have to re-evaluate everything that we have completed and see if it meets the new requirements.	This could be avoided through daily updates or meetings as every team member would be able to talk about the tasks they have completed, the issues they faced and the task they intend to finish. So that change in requirements would be discussed at a higher level and agreed upon quickly.	You can lessen the threat of this risk by proofreading every now and then to everything that has been done and to double check if everything meets the requirements.
Language Barrier	Group	Medium	This risk could lead to a lot of misinterpretation, and this can be conflicting to the project as they can go on and do a task completely wrong without realising.	When working with people that English is not their native language, it is important to emphasize their understanding of the task. Being able to communicate and understand each other before continuing with the task is important as this will allow you to trust the person and be comfortable that they are doing the project within the requirements.	You can lessen the threat of this risk by having group meetings every now and then so that there would be updates on the progress of each work so that if ever there are changes need to be done because of misinterpretation there would be a lot of time for improvements.
Poor documentation	Group	Medium	Poor documentation will leave the group in chaos, there would be unnecessary	To avoid this risk, you should allow a lot of time for the documentation of the project, so that the project	You can lessen the threat of this risk by giving each member of the group all

			repeated questions regarding to basic project information, and there would be insufficient knowledge for each group member joining the project midway.	will be properly detailed, and all the information needed will be available.	the information they need.

Hardware and Software Tools

Excel

Microsoft Excel is a software program. It is used to make spreadsheets, which are documents in which, like a table, information is organised in rows and columns.

Microsoft Excel aids to construct a project schedule for the associated assigned task roles in this project. The timeline of the project describes what needs to be done, which task roles, and when the project is due. This ensures that Excel software will support the team as it will display a timeline showing the start and end dates and goals that should be completed and achieved to finish the project on time.

IntelliJ

IntelliJ IDEA is an Integrated Development Environment (IDE). We will be using IntelliJ to create the app for this project. It is aimed at increasing the productivity of developers. This helps to focus on software development by offering clever clean code and performing the routine and boring tasks for you, ensuring it not only efficient but also pleasant. It will also search at all project documents and languages for links between symbols. IntelliJ can give assistance whether incorrect by displaying error analysis and it is quick to navigate.

Astah

Astah is a programme that can be useful for modelling, concept visualisation, safe and secure systems. They help the team and stakeholders, such as your clients, to connect more efficiently to build better communications. Tools such as Use Case Diagram, Sequence Diagram, Class Diagram, Activity Diagram, etc. can provide the project with a full solution and this will be a graphical interpretation of what the app will consist of when creating the app itself.

Word

You can make records, papers, letters, and summaries with Microsoft Word, Microsoft Word has features and advantages, unlike a plain text editor, including spell check, speech recognition, adding images to the document and tables. Microsoft Word is a word processor that has the potential to help users modify various types of files. For instance, in our project, it would be helpful to explain what we want to say, such as recording the risk assessment, descriptions of each actor, etc.

Computer technology

Computer technology includes the related areas of both computer software and hardware. They have lots of diverse parts and each of them have a unique job to do. The parts of a computer are called hardware and software is the program that instructs the computer on what to do.

Computer technology is accessible to majority of people nowadays. In our project, we all have our own computers which will help us to complete every stage of the project. It enables us to communicate easily with one another and we use different software to create programs, proposals, diagrams and project schedules for the task. In this time of pandemic, online learning and virtual meetings are now undertaken in digital platforms.

Outlook

The outlook is used for communication and it allows to send and receive email messages. Outlook can organise email and manage your schedules too. By using this, users can share files and can discuss a specific topic that they need to talk about by addressing who they want to send it to. This software/website will be used to contact our team members throughout the project if we don't have any information such as their contact details.

Blackboard

Blackboard is also used for communication and is a virtual learning environment for students. By using breakout rooms, the team members can discuss what they have done through each other and can talk it through the teacher quickly. Student can also submit their assignments electronically.

Sources of information

Concerned stakeholders:

- **NHS** - initial stakeholder, as the commissioner for the app they would have a close affiliation with the project and the system.
- **General public/those at risk of COVID-19/people with symptoms and contacts** – general users of the app, interest due to (COVID-19) directly affecting them as users and members of society.
- **NHS employees (doctors, Nurses, etc.)** – employees of the app commissioner, is a direct aspect of the function of the app and test and trace service itself.
- **UK Government** – owner of the NHS, heavily reliant on data collected by the app for political and economical decisions and information regarding COVID-19.

Material to be consulted:

- https://www.gov.uk/guidance/nhs-test-and-trace-how-it-works#contents

    - Details how the test and trace procedure is carried out and how it helps reduce the spread of the virus. This will be especially useful as the information will need to be conveyed to any user of the app and enforced by the app, knowing this information will allow us to implement the system in a way that follows specified government guidelines such as differentiating between users with symptoms and those in contact with symptomatic individuals and provide the correct information and interfaces.

- https://www.nhs.uk/conditions/coronavirus-covid-19/symptoms/

    - Details the common symptoms developed by those who have contracted COVID-19, these symptoms include: a high temperature, a new continuous cough and a loss or change to the sense of smell or taste; it also gives simple directions on what to do if symptoms arise. This will be useful as it allows the app to include common symptoms that a user with symptoms can provide to the app as options that are selected. This allows a much easier and more streamlined interface for providing and storing data on symptoms of COVID-19 to be developed.

- https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html

    - Gives a greater list of possible COVID-19 symptoms not found on the NHS website such as shortness of breath and nausea. Acquiring a large array of possible symptoms can allow users to more accurately be diagnosed by the system, pointed towards getting tested and stop the spread due to considering any more unique symptoms shown by a user.

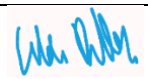
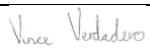
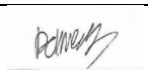
- https://www.who.int/health-topics/coronavirus#tab=tab_2

- Goes into great detail about COVID-19 giving useful information for use in the system such as general prevention measures for people to do in order to avoid contracting the virus in people who have not shown symptoms and a general overview of the virus itself like how it spreads and how it affects or can affect different people. This information can be used within the app to great effect to inform users and make the system far more effective in reducing COVID-19 numbers.

- Group Meetings (recordings on blackboard)

    - Group meetings allow for a greater understanding and sharing of how the system can function on a technical level by discussing the different aspects and methods of achieving the end goal of the system such as how actors will interact with the system via use cases.

TEAM CONTRACT

Name	Email	Student ID	Contact Number	Work %	Signature
Luke Butterick	Luke2.Butterick@live.uwe.ac.uk	19011469	07460569073	20%	
Vince Verdadero	Vince2.verdadero@live.uwe.ac.uk	19009246	07446109166	20%	
Lean Bernardo	Lean2.Bernardo@live.uwe.ac.uk	18017803	07947748984	20%	
Harry Bishop	Harry2.Bishop@live.uwe.ac.uk	19012637	07879492834	20%	
Daniel Brown	Daniel10.Brown@live.uwe.ac.uk	19012651	07414653781	20%	

This is an official contract of Team B4V. This contract benefits an opportunity for our group to specify preferred methods of communication, action plans, meeting schedules, goals, and consequences of actions (or inactions) of group members. Contract should be made and signed BEFORE starting the actual course project. For the Team Contract to be valid, the paper must be approved and signed by All members.

All members should be held accountable and responsible for their own actions. Be honest and open during all project activities, provide the opportunity for equal participation, and decide as a team on the best way to communicate various information.

References

Centres for Disease Control and Prevention(2020) *Symptoms.* Available from: https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html *[Accessed 18th Jan 2021]*

Gov(2020), *NHS Test and Trace: how it works.* Available from: https://www.gov.uk/guidance/nhs-test-and-trace-how-it-works#contents [Accessed 18th Jan 2021]

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