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Course Project

For the course project, we created an app called COVID Scan. The app's main purpose is to scan a user's blood pressure, oxygen percentage, and temperature. When the app is first opened there is a brief Welcome message before the Home Page is opened. On the Home Page, There are buttons that lead to other pages such as the Report page, the Tracker Page, the Health Scan page, and the Login Page. There is also a card on the Home Page that displays the data from the user's most recent health scan.

The Health Scan Page collects data from the health scan device and displays the health scan results. If the results of a user's scan have passed the acceptable threshold the app brings up an alert message. The alert message advises the user to file a report if they are experiencing any other COVID related symptoms. The alert message also vibrates and reads itself out to the user. There are also small info buttons beside each health scan icon. These buttons bring up small pop-up messages that give the user additional information on that particular data (e.g: oximeter) and the importance it has in relation to COVID-19. The login page allows the user to log in to their account. The report page allows the user to report if they are currently experiencing any COVID related symptoms. The Tracker Page shows the user how many people in their general vicinity that have filed COVID reports and have tested positive.

Development of the sensor

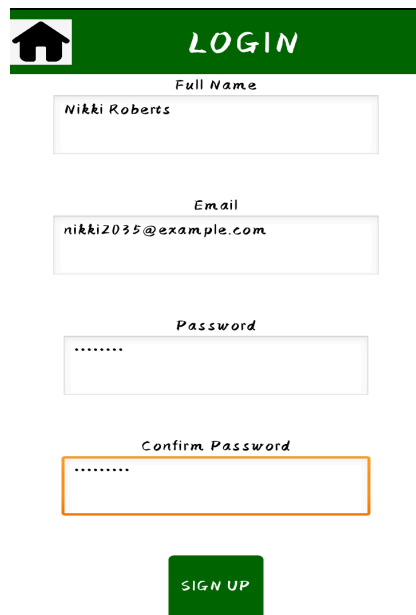
Researchers at Northwestern University joined an expert team from Shirley Ryan AbilityLab to work together in manufacturing and creating a smart sensor that identify, monitor and track COVID-19 symptoms. Its lightweight, the see-through colour and the way it was made to be wireless allowed it to be easy to be worn and does not look out of order. The device can track data that would be monitored for the first time and can identify symptoms before the patients themselves notice. The device is Integrated with Artificial Intelligence to be able to learn from certain data from patients to identify when it occurs in other users.

Simulate the data into our application

Due to the device's location near the respiratory system, It's able track the early COVID-19 symptoms and monitor it. It allowed us to retrieve the data to our app wirelessly such as the body temperature which allows the app to monitor if the user has fever and the lungs oxygen respiration activity and level which allows to detect if there are any virus that is making the lungs tighter and also tracks coughing through the intensity and patterns which is a key symptom to identify covid-19. It also tracks Heart Rate. The device monitors all these data on a real time basis. The device is in a continuous developing and updating status to update the algorithm and software to allow the AI to learn from the data collected from patients.

Application of Visual Design

In this project we have used various methods of visual design in our app. First of all, what is visual design? It is visual communication through the use of photography and various illustrations. The main goals of the visual design is mainly to engage the users. Help the users to build their trust using the app and get comfortable using it easily. Also to help develop a positive UX. We as a team believe that we achieved this by using a few methods that we believe that are very successful and makes the user easier to use the app.



The screenshot shows a login interface. At the top is a green header with a white house icon and the word 'LOGIN' in white. Below the header are four input fields, each with a label above it: 'Full Name' (containing 'Nikki Roberts'), 'Email' (containing 'nikki2035@example.com'), 'Password' (with masked characters), and 'Confirm Password' (with masked characters). The 'Confirm Password' field is outlined in orange. At the bottom is a green button with the text 'SIGN UP' in white.

As you can see in this screenshot we have used a lot of elements to make everything simpler. In this screenshot of the app we have designed firstly the main aspect that attracts the attention of the users is the color scheme. We believe the color green represents health, well-being and earthly. This gives us a positive result and helps generate trust between the app and the user. Also there is a lot of white space. This creates a very positive effect and calm design overall. Mainly it is very easy for the eyes because it is not crowded with information which will make everything easy to understand and not confuse the users.

Also we have layered out the information we need in shapes, in this case rectangles. By having the information in these rectangles it makes the information isolated but mainly very easy on the eyes.

Talking about the principles of visual design, we do think we have included a multiple number of the principles of visual design present in our app. If we look at the pages of the apps we can see they have a very similar design to each other. All the visual elements make all the information in all the pages seem like they belong to each other. This makes the app not dull. This is the definition of the principle "Unity". As mentioned above there is a lot of white space in the app which is an important part of the layout strategy. This improves the readability and avoids a dull design. This makes everything less complicated and it makes everything very easy on the eyes. So this is called the "space" principle. In the screenshot above we can see that the heading is a different font size compared to the information that is below it and also it is in a

different color. This shows the significance between the items which makes the user perceive that the most important information is on the top. This particular principle is called “Hierarchy”. We achieved the principle “Balance” by making all the pages of the app quite similar to each other which makes them equally distributed and well-ordered which makes the information easy to understand. If we pay attention to the screenshot above we can see the part here the user has to submit. This stands out from the others because it has various colors and is more unique when compared to the rest of the information. This principle is called “Contrast”. All of the principles that have been used in this app is mainly used to make sure the user will be able to use the app without a problem and make them feel comfortable to use the app and it is safe to say that we accomplished our goal.

Design Thinking Method

The five phases of Design Thinking are: -

1. Empathize: The first stage of the design thinking is to gain an empathic understanding of the problem you are trying to solve. In order to gain that empathic understanding, we took numerous already existing health related applications for the basic design idea and the overview of the tasks that our application should be able to do. After that, by keeping problem regarding to covid-19 in consideration, the mainly needed things in the application were that the application should be able to tell the user about his health and body condition. Moreover, because of the high contagious nature of the Covid-19, a system which tells about the crowded places and positive patients was also required in order to decrease the contact with others. On the other hand, the idea of voice control system is also being taken in consideration.
2. Define: The health scan supposed to tell the user about the body health. So, for that, the application gathers body data from the user and runs the tests. We decided to include the tracking system which works on GPS, that tells the user about the positive patients around the area and also about the crowded places. The live view of the patients or dense areas with population was a much needed thing, as it helps the person to have less contact with others. The voice control accessibility let those users access the application who are blind or unable to use the app physically.
3. Ideate: For this stage, we started with generating ideas about how the interface should look like. The one of the main target was to make the application easily accessible for every type of persons, therefore we decided to keep the interface simple with just few colors and fonts and also the option of voice control was also included to fulfill the accessibility target. Moreover, there were number of ideas that our team discussed and decided to use them for the project such as, to replace the user password with star(*) symbols to keep the user privacy, the menu bar at the bottom for easy access, the covid-19 which should be available in the application to run the health scan and also what body condition after test should be considered healthy and what should be unhealthy(positive patient). In addition to that, ideas about the icons for health scan, menu bar and tracker etc.

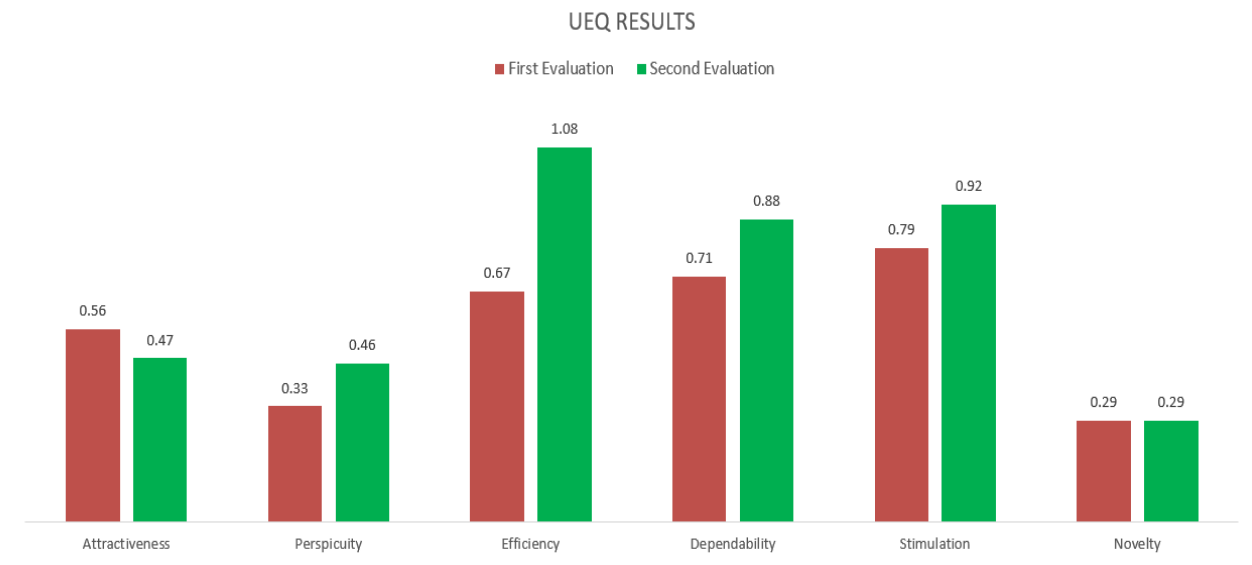
4. Prototype: For the prototype, firstly we decided about the types of colors and fonts should be used so that every person's work should complement each other. Secondly, we made number of sketches of the app to have a rough idea about where and how we are going to implement the ideas in the project. Based on the sketches, we made wireframes of around 9-10 different pages designated to different roles and information. Thirdly, by using wireframes, we built a mid-fidelity prototype. At that time, with the help of mid-fidelity prototype, it was pretty clear about how our application will look like and how it supposed to work. Finally, one of our team-mate built the actual working application with some complex code (screen captures are provided) and made the application able to work and perform the required tasks.
5. Test: In order to test the final designed application, the team ran the application with different sets of information with different profiles. At first, we tried making different profiles and started to log in with those profiles repeatedly in order to check if the application remembers the user information or not and the results turned out to be a success. Secondly, for health scan testing, we entered different symptoms for every different and also different body conditions. In some cases, the heart rate was kept low to find out if application actually warns the user about the bad health, as the result the application did warned the user with exact read numbers (ex: the heart rate should be between 80-100 and yours is 70 which is less "seek help") and also showed the numbers that should be considered as good health. Moreover, the difference of sets were also used for oxygen percentage in the body and the results were successful as it was able to identify the users' health condition.

For tracking systems, the tracking system provides options to the user in order to collect the data about the location i.e., enter the location manually or by using GPS to get the current location. We tried to enter the different locations in the tracker manually and the tracker was able to reach those locations. On the other hand, the GPS (Global Positioning System) option also worked well.

App Testing

To test the app we each downloaded the app on our phones and used it. Some of us gave the app to a few friends and family members to test. There were two main tasks during testing; Try out the info buttons, and run at least two health scans. After the first use of the app, all the group members, as well as two other people filled out the UEQ forms for the First Evaluation. After the first evaluation, we noticed that there were a few kinks with the app that we needed to iron out. First of all, the pop-up messages with added information were not popping up for most of the users. Some of the users also felt that the alert for bad scans was not informative enough. Some also felt alarmed when the message popped-up. After receiving this feedback, we changed the alert message to read as more calm and professional and to be less alarming to the user. We also fixed the issue with the popup messages. After we had resolved the issues with the app, we had the users retake the UEQ survey for the Second Evaluation. The result for the second evaluation

was a lot better than the first one, especially in the Efficiency category.



Wireframes

Tracker Page

Use Current Location

Search

Report page

Type in Full name:

Date of Birth (YYYY/MM/DD)

What symptoms are you having?

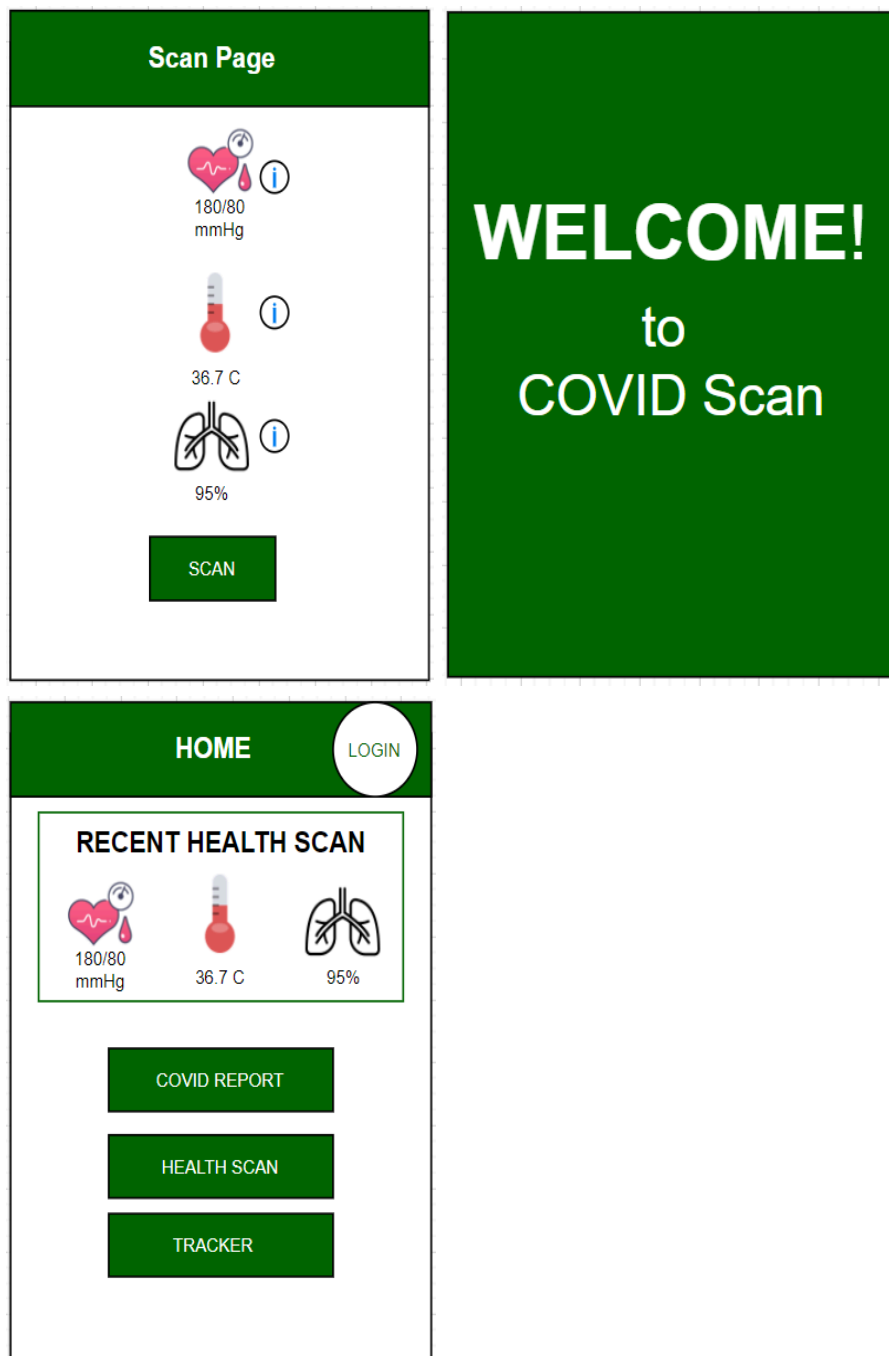
Time period of the chosen symptoms

List of places you visited during last two weeks:

Submit

Login Page

SIGNUP



AppInventor Screenshots

when Image1.Click
do open another screen screenName "SCAN"

when Report.Click
do open another screen screenName "REPORT"

when Login.Click
do open another screen screenName "LOGIN"

when Tracker.Click
do open another screen screenName "TRACKER"

when ScanButton.Click
do open another screen screenName "SCAN"

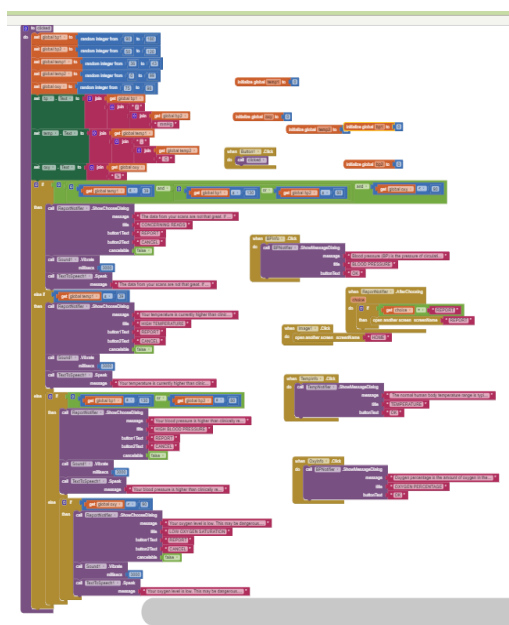
when Clock1.Timer
do set Clock1.TimerEnabled to false
open another screen screenName "HOME"

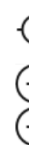
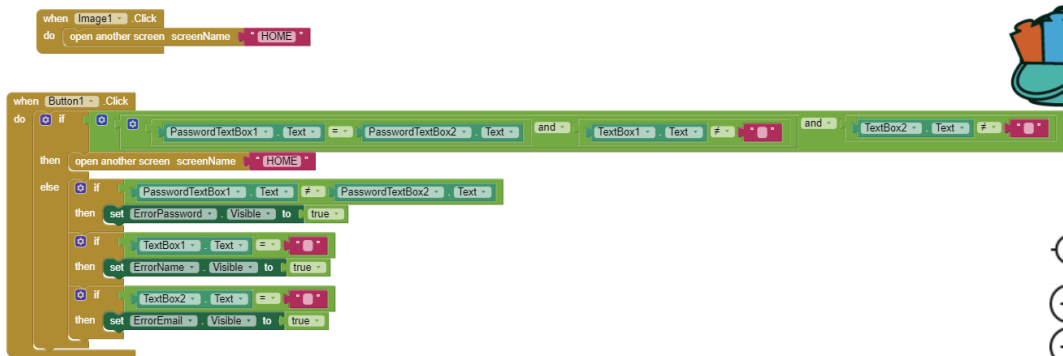
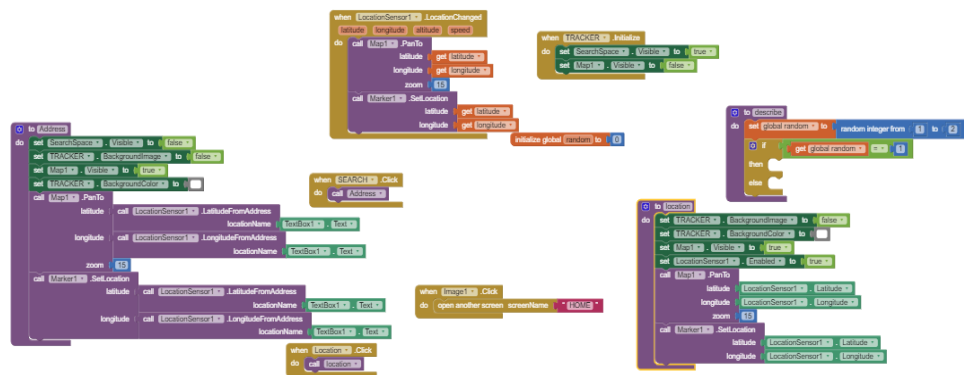
when Image1.Click
do open another screen screenName "HOME"

when Button1.Click
do set VerticalArrangement1.Visible to true

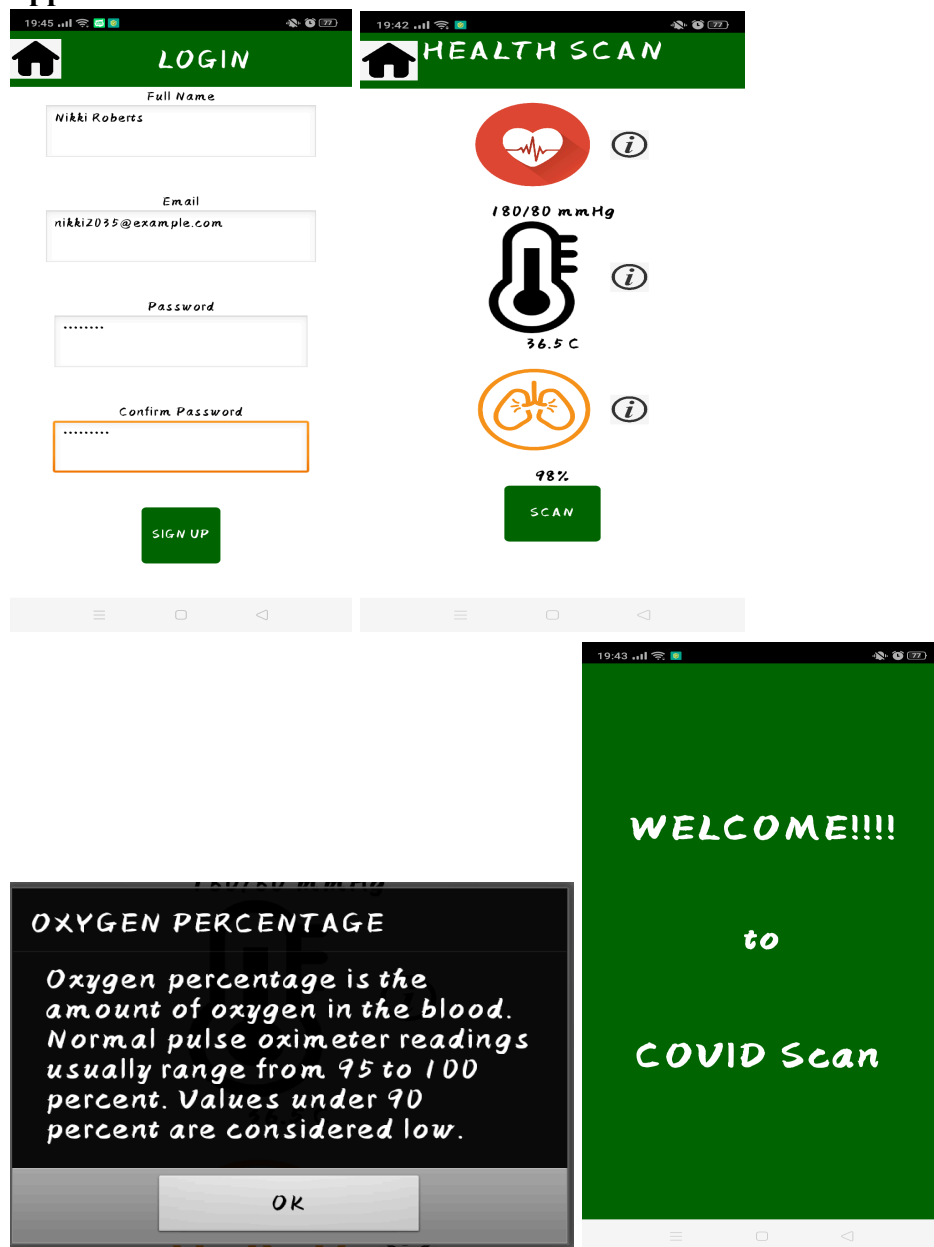
when DatePicker1.AfterDateSet
do set DatePicker1.Text to join DatePicker1.Day join "/" join DatePicker1.Month join "/" join DatePicker1.Year

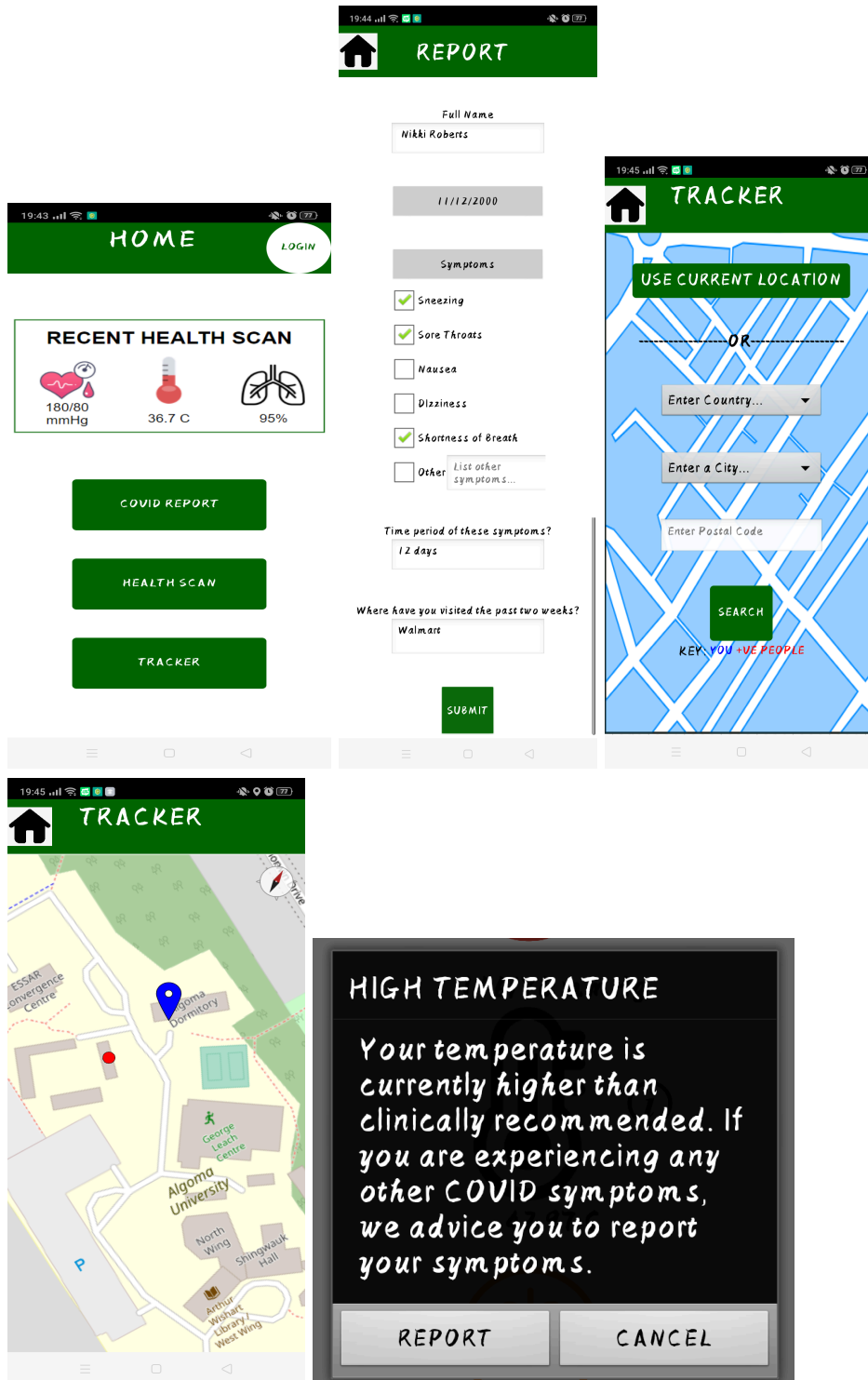
when Submit.Click
do if Name.Text = "" and DatePicker1.Text = "" Date Of Birth
then open another screen screenName "HOME"
else if Name.Text = ""
then set NameError.Visible to true
if DatePicker1.Text = "" Date Of Birth
then set NameError.Visible to true





App Pictures





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- Questionnaire UEQ. URL: <https://www.ueq-online.org/>