

## **Introduction/Problem Definition/Stakeholder Engagement**

My client is the government of the NGO organization USAC which is trying to test the country's population and quarantine all infected people and people who came in contact with the infected ones. The number of infected people is not yet known, but it is expected to take a sufficient percentage from the overall population. Hence, the government decided to keep the data in a database of software.

The software named TISCO will contain all the recent data on the current situation in the country. The data will include general COVID-19 statistics such as the number of aggregate, active, recovered, critical, death, tested, and quarantined cases, along with the number of tests, cases today, deaths today. The program will also include personal(profile) COVID-19 statistics such as the names and last names, registered date, and status(positive, negative, quarantined, dead). There is also going to be a list of all the people's profiles. General statistics will be impossible to edit as they will be based and calculated on the list of personal profile information of people.

The data will be used by stakeholders: government and emergency services members(including police), doctors(hospitals), and patients, the general population. The number of users and the update frequency is expected. The requirements of the program will be discussed during the interview session with the client; the information from stakeholders will be gained through the documentation—collecting reports. It is important to receive the information as fast as possible as coronavirus is a big accelerating issue in the world, therefore fast program development is needed. Surveys, in this case, will be useless as the virus situation is relatively new and there is no specific set of questions that can be used to get the information from stakeholders.

The software will include different levels of access depending on the category, where the formation of the category will be based on the person's profession.

### **Categories of access**

Hospitals—are allowed to view, edit(add/remove) the personal profile.

Government—is allowed to view general statistics.

Emergency services—are allowed to view general statistics and personal profiles they can change people's status to quarantine.

Patients—are allowed to view general statistics and view individual profiles.

General Population—are allowed to view the general statistics and their individual profiles.

IT Specialist—is allowed to view, edit(add/remove) the personal profile.

The program will be stored in clouding storage to ensure its recovery. If data will be lost it is going to cause a serious issue, in hospitals it will lead to incorrect treatment. The data stored in this software is important in dealing with COVID-19 problems, therefore wasting time and money—financing problems—to restore the information is detrimental to the USAC. Without that data, the emergency services and hospitals won't know who is positive and who is negative, thus causing chaos and spreading the disease more. If viruses are going to corrupt data, then the data will be unreliable or inaccessible. To counter the virus, the antivirus will be installed in Proxy servers. If data will be hacked the private personal information will be might be stolen and used in illegal transactions. To counter this problem firewalls can be implemented and used as data can be stolen through a network. Also, different access levels will ensure that stakeholders themselves won't sell or use personal data in a criminal way. There will also be a human error such as registering a

different person as positive, especially when doctors don't know the patient personally; however, it can be resolved by citizens by just contacting and providing information to the hospital, which is very unlikely but possible, or backing up data from cloud storage. Other human errors will be resolved with the help of proper training and cloud backup.

Aspects to consider the kind of software and the stakeholders that are going to use the system. The software, hardware requirements, and OS compatibility should be wide as the software is designed for a country. Detailizations such as usability and accessibility will be discussed with the client during the interview. The software will also be using the network to remotely and fastly transfer data to citizens.

To encounter any technical issue the software will deliver any type of information in the form of notification. The ethical issue associated with this software is that personal information is not isolated from doctors, emergency services—some members of such might use it in an inappropriate and not intended way.

### **Overall Concept**

First of all, the system will be run in the background thus working as a notifier—any status update will be notified. To secure privacy the system won't track anyone's location and won't know anyone's phone number. Therefore, if the USAC testing discovers a person who came in contact with other people a software will check the history of people who were closer than 1.5m or 2m, using Bluetooth or LAN or advanced network that the USAC has, and send these people a notification that they might be at risk of having corona and a 14 quarantine countdown. TISCO will have a simple design because the first priority is for everyone to access the program. The system will also have different languages. Even though the client said that people in the USAC are educated, it is still open-source so other countries might also use it.

TISCO's slogan: "TISCO we are here to keep you safe" which means that the software's main purpose is to protect people from contagious disease.

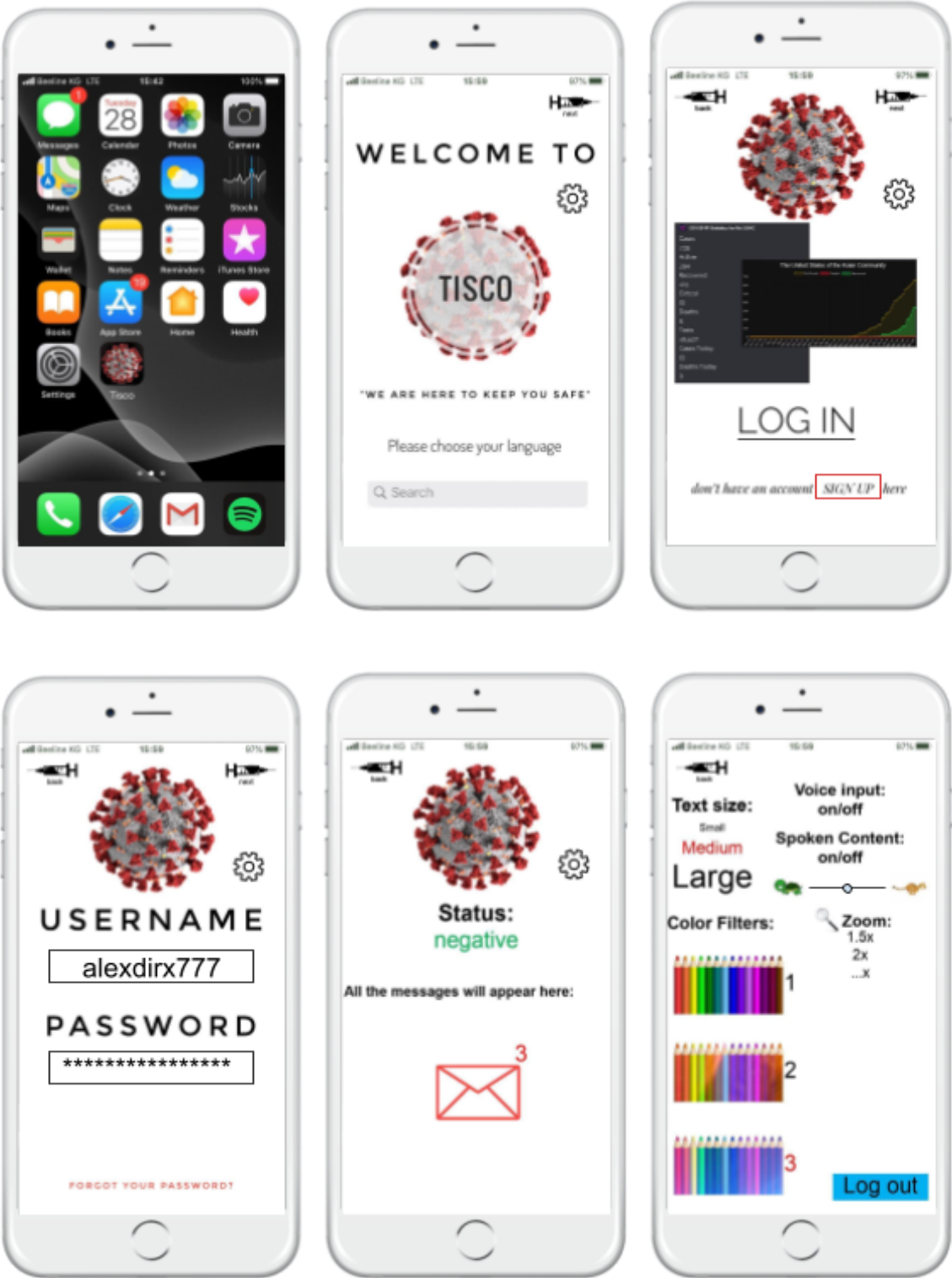
To improve accessibility the system will feature vocal output and vocal input; text size, color change options. The system will also be able to convert text to speech. The system might feature a smart assistant (Alexa for example) to help them remotely. In conclusion, the system will be equally convenient for older and disable people.

There will be two different networks implemented:

Bluetooth will be used to record the history of phones that have been closer than 2m to the infected—the network's area is limited.

Pos 5g or WIFI will be used to notify people as it has a bigger active area. It is important to have an internet connection as in this urgent situation citizens needed to be notified as soon as possible.

UI Design





## Database Prototype

### ERD

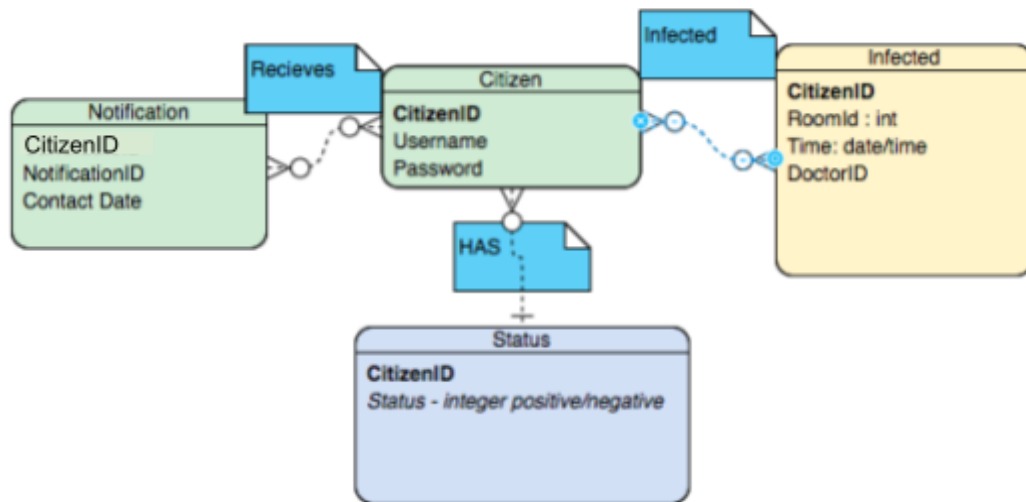


Table 1 Citizen

CitizenID	Username	Password
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Table 2 Status

CitizenID	Status
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Table 3 Notification

CitizenID	NotificationID	Contact Date
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Table 4 Infected

CitizenID	RoomID	Time	DoctorID
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**CitizenID**—unique identifier that is given to every person(based on their username).  
**Status**—either active or inactive—can be represented as either 0 for negative test result and 1 for positive test result.  
**NotificationID**—the id of the notification for every person that is also based on the username and the date.  
**Contact Date**—a date where the citizen was close to the infected.  
**Test Results**—positive or negative.  
**DoctorID**—unique identifier of the doctor of the patient.

## **Queries(SQL)**

### ***New User Registration***

```
insert into Citizen  
values (CitizenID, Username, Password)
```

### ***Monitoring Corona***

```
insert into Infected  
values (CitizenID, RoomID, Time, DoctorID)
```

### ***Updating Status***

```
update Status  
set Status = negative
```

### ***Notification***

```
insert into Notification  
values (CitizenID, NotificationID, Contact Date)
```