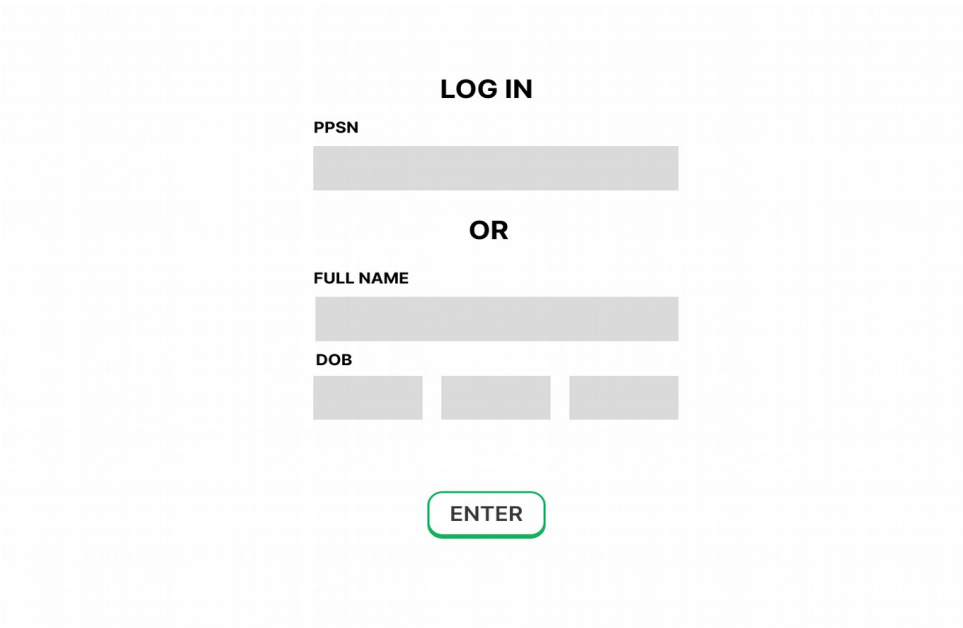
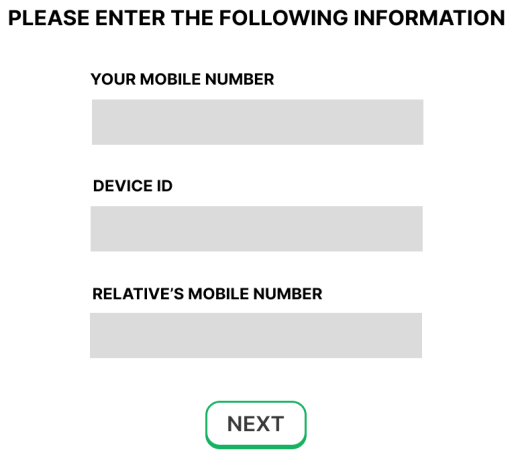
The application

The application consists of two parts: a physical device and a website. The flow of the application is as follows:

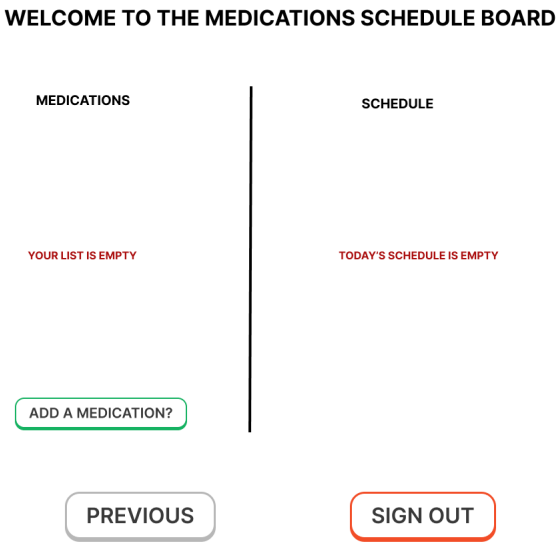
1. First the user loges in into the website, using their PPSN or a combination of their full name and DOB.



2. Next the user enters their mobile number, the ID of their physical device, and a relative's mobile number. The user's mobile number will be used for medication reminder purposes, the ID will be used to link the user's account to an RFID device, and the relative's mobile number will be used for notification purposes in the event the user didn't take the medication after a reminder.



3. The user then enters their account and add all their medications for scheduling. Some or all of the medications will then appear in the 'schedule' side depending on their times. Some days will have fewer or more schedules than others.



Medication Name

Colour/Shape

Dose

How To Use?

Repeat Every

Days

Times to be Taken

ADD MEDICATION

WELCOME TO THE MEDICATIONS SCHEDULE BOARD

MEDICATIONS

Lisinopril	LAST TAKEN: 10/3/23 @ 3:45PM
Metformin	LAST TAKEN: 16/3/23 @ 2 PM
Metoprolol	NOT TAKEN YET
Albuterol	NOT TAKEN YET
Amlodipine	LAST TAKEN: 12/3/23 @ 10AM

ADD A MEDICATION?

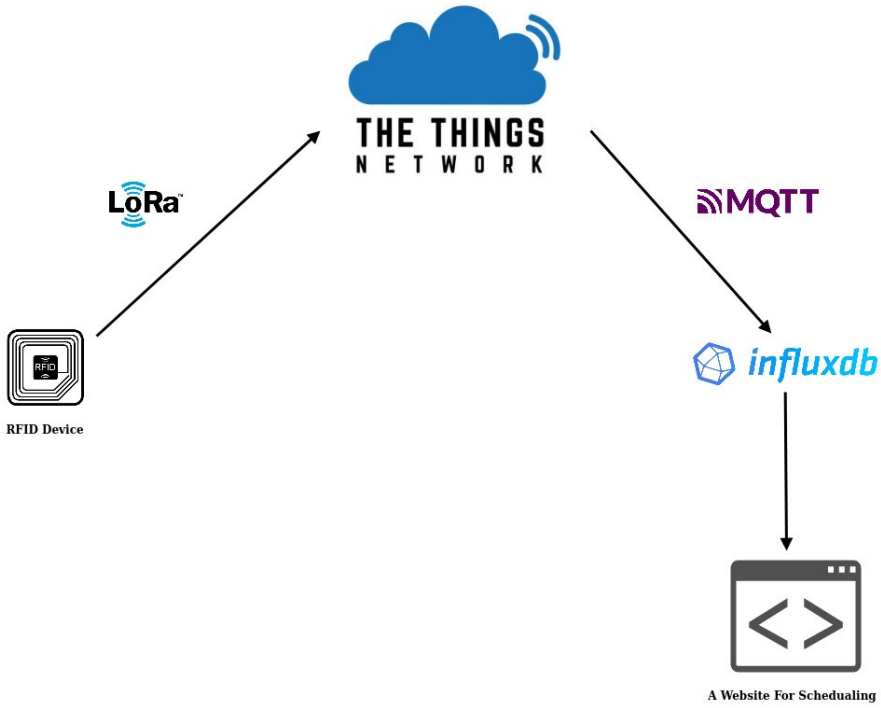
SCHEDULE

Metformin	TK 1 @ 9 AM	TAKEN
Metformin	TK 2 @ 2 PM	TAKEN
Metformin	TK 3 @ 8 PM	NOT YET
Albuterol	TK 1 @ 8 PM	NOT YET

PREVIOUS

SIGN OUT

4. When the time comes, the application will send an SMS message to the user. The message contains information such as the medication name, colour/shape, and how-to-use instructions. The message is used to notify the user that it's time to take a medication.
5. The user then responds to the SMS message by [...THIS PART IS TO BE CLARIFIED….]
6. If no response is received after 15 minutes, a second SMS message of the same information will be sent.
7. Again if no response is received after 15 minutes, an SMS message will be sent to the user's relative, notifying them that the user did not take their medications on time.



The above image gives a general overview of the architecture.

The objective of the project is to create a LoRaWAN application that will help patients take their medications on time and keep track of what medications were taken and not taken. The application will be particularly useful for elderly who live outside of nursing homes, solely responsible for their medications, and live in the country side and have poor internet connection.

The system consists of two parts: a physical device and a website. It should allow for the following:

- Allow the user to create a list of taken medications on the website.
- Allow the user to set a reminder for each medication taken on the website.
- Allow the user to get a reminder as an SMS message for when it's time to take a medication. The message should contain information such as medication name and how-to-use instructions. The user should be reminded every 15 minutes, three times per medication. If there is no response from the user, then the system should notify a relative via an SMS message as well.
- Allow the user to notify the system for when a medication is taken by using the physical device.

To implement the system the following technologies and devices will be used:

1. Radio Frequency Identification RFID
2. Arduino MKR WAN 1310 or Raspberry Pi Pico
3. The Things Network
4. MQTT
5. Influxdb, Express, React, Node.js stack

The overall aims of the project are as follows:

- ✔ To learn and research about LoRa and LoRaWAN.
- ✔ To create a working connection from the physical device to the The Things Network TTN by using an LDR and Arduino MKR WAN 1310. The Arduino should send the LDR's data every three minutes to the TTN.
- ✔ To create a working connection from the TTN to a database hosted on a personal machine. MQTT should be used to send the LDR's data from the TTN to that personal machine. The data should then be stored in an InfluxDB database.
- ✔ To design and create a physical device, consisting of an RFID and Arduino MKR WAN 1310 or Raspberry Pi Pico, that will allow the user to notify the system of when the specified medication was taken.
- ✔ To design and implement a User Interface UI for the website part of the system.
- ✔ To test the workings of the physical device with the website part of the system.