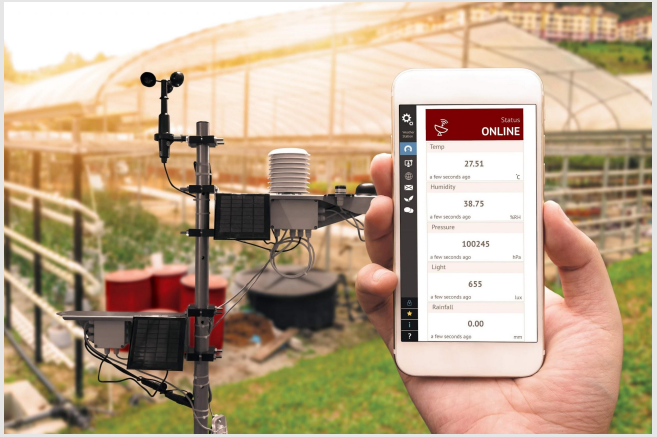
INTERNET OF THINGS

C3 PROJECT PRESENTATION

GROUP 03

WEATHER MONITORING SYSTEM



GROUP MEMBERS
GROUP 3

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PROBLEM STATEMENT

The main aim is to develop an android based application, which can display temperature, pressure, humidity and air quality index at multiple locations.

NEEDS : WHY THIS PROJECT ?

1. **Sudden weather changes can damage the crops and causes a huge food, crop loss which can be prevented by monitoring the weather.**

2. **Regional weather forecasts provide a spatiotemporally continuous estimate of weather conditions, but such estimates are still limited in their spatial resolution, especially for personal or street-level uses. Multi-node IoT Weather monitoring system are very useful for this purpose.**

3. **Need to detect and limit pollution in places.**

APPLICATIONS

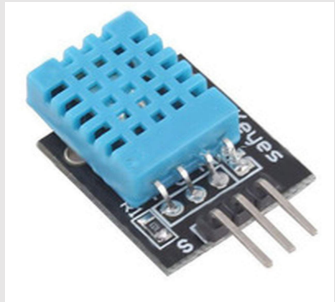
- Weather monitoring is useful in agriculture in which weather is the most important element that affects the production of the crops.
- The detection of various environmental factors can be used in many cases like hospitals, factories, servers, forest fires detection etc.
- It is also useful to manage energy consumption by predicting the demand for resources based on the weather conditions. Also it helps in pollution detection by detecting the air-quality in cities,factories.

SOLUTION

We came up with an idea in which an android mobile app will be made to show the data of multiple weather stations to multiple users.

HARDWARE REQUIREMENTS

- NodeMCU ESP8266
- DHT11
- Battery
- BMP180
- Bread Board
- MQ135
- Jumper Wires



HARDWARE DESCRIPTION

- **NodeMCU:** NodeMCU(Node Microcontroller Unit) is a low-cost open source IoT platform. It is a wifi module having esp8266 firmware within. All the other sensors are connected to this micro-controller. They send the measured values to it and it uploads all the values to the cloud where the values are analyzed.

- **DHT11 sensor:** It is a temperature and humidity sensor, connected to NodeMCU.

- **BMP180 sensor:** It is a barometric pressure sensor, connected to NodeMCU.

- **MQ135 sensor:** It is an air quality sensor which detects air quality index in ppm.

SOFTWARE REQUIREMENTS

LANGUAGES AND LIBRARIES

JAVA
for backend development of the android app

XML for frontend development of the android app

App Development Tools

DHT11 Sensor Library

BMP180 Sensor Library

MQ135 Sensor Library

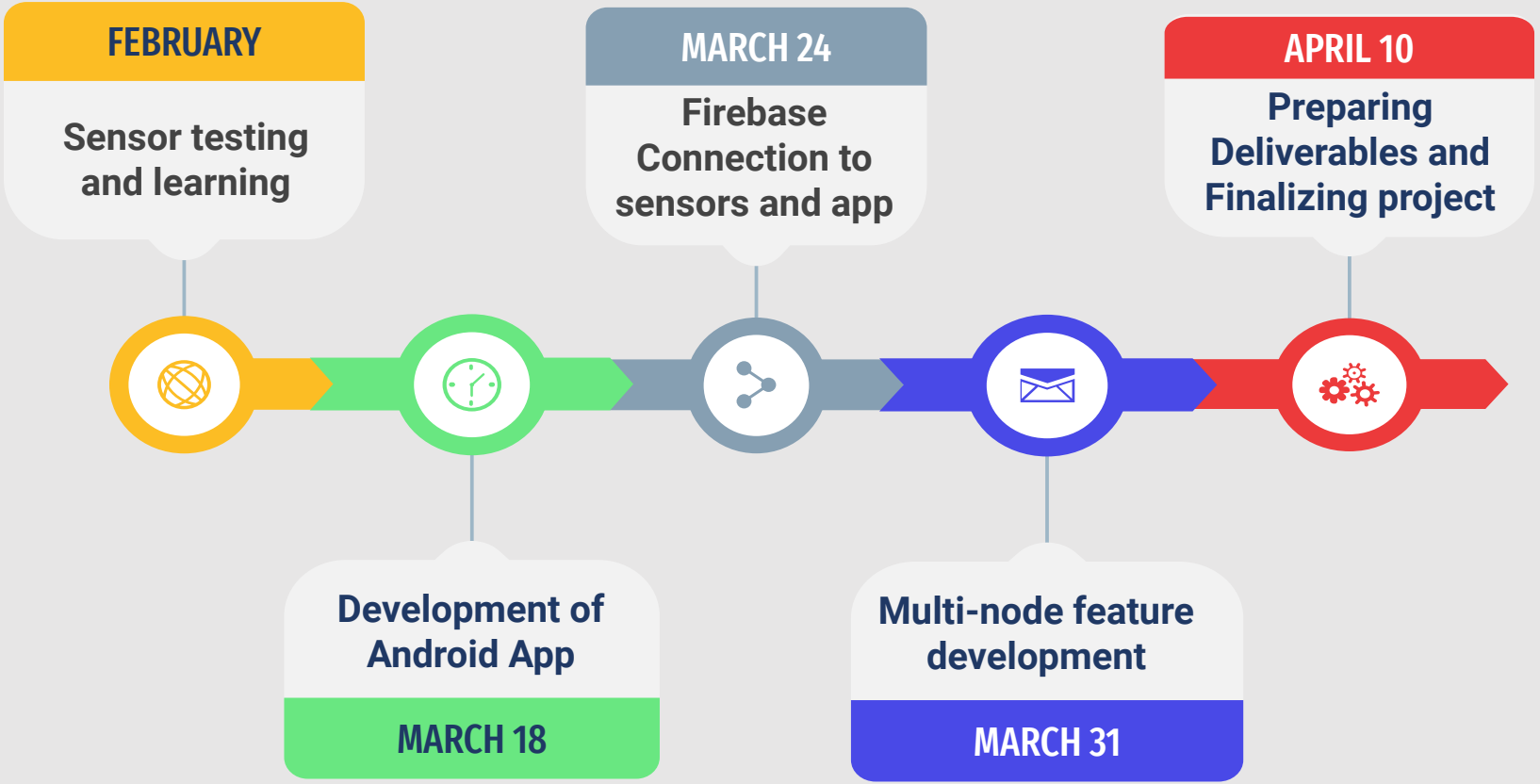
Microcontroller Programming Tools

DELIVERABLES

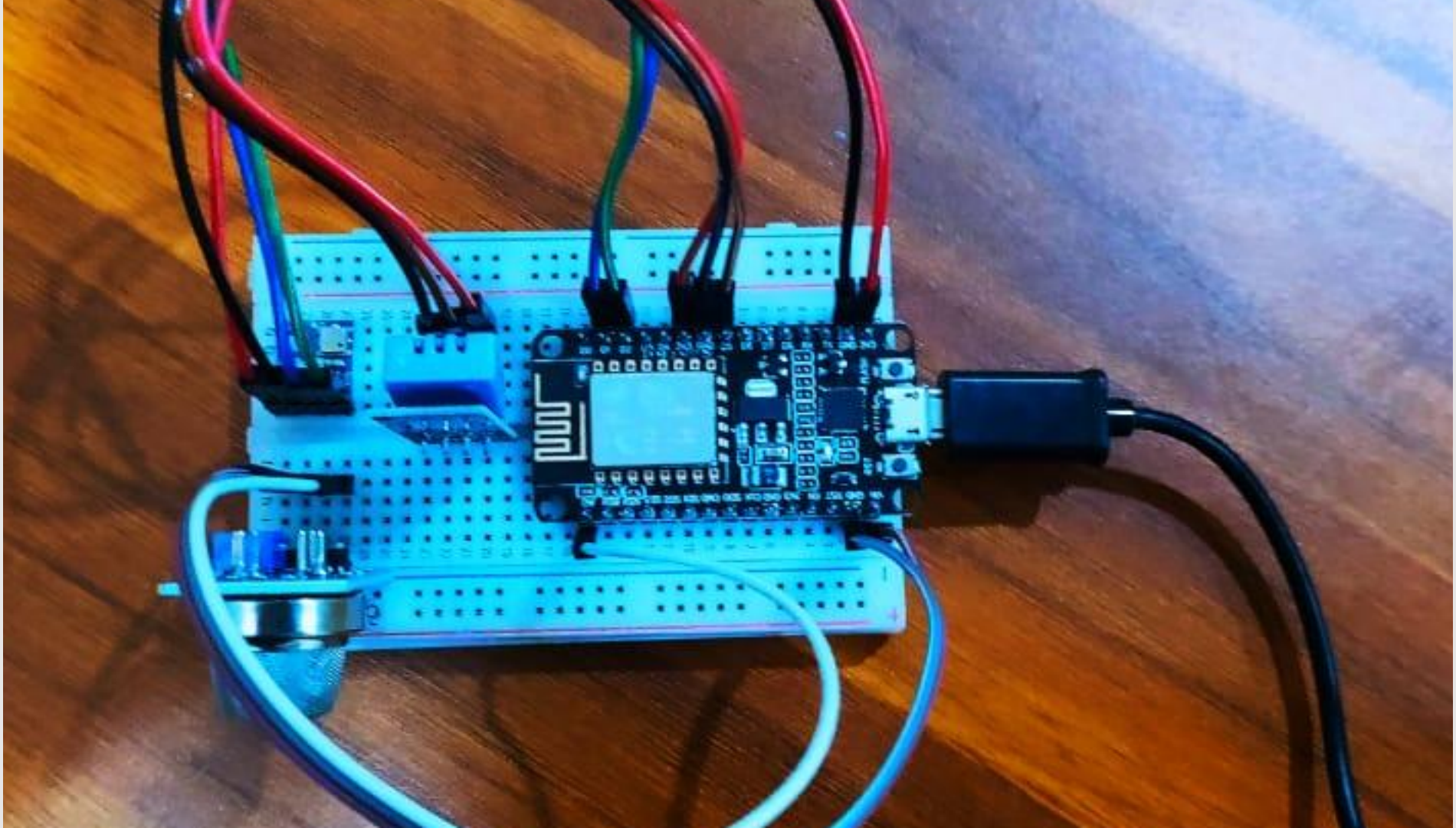
2 Weather station that uploads data on cloud using the respective weather-station-ID

Delivering Android application in which user can enter **weather-station-ID** to view details of respective weather station

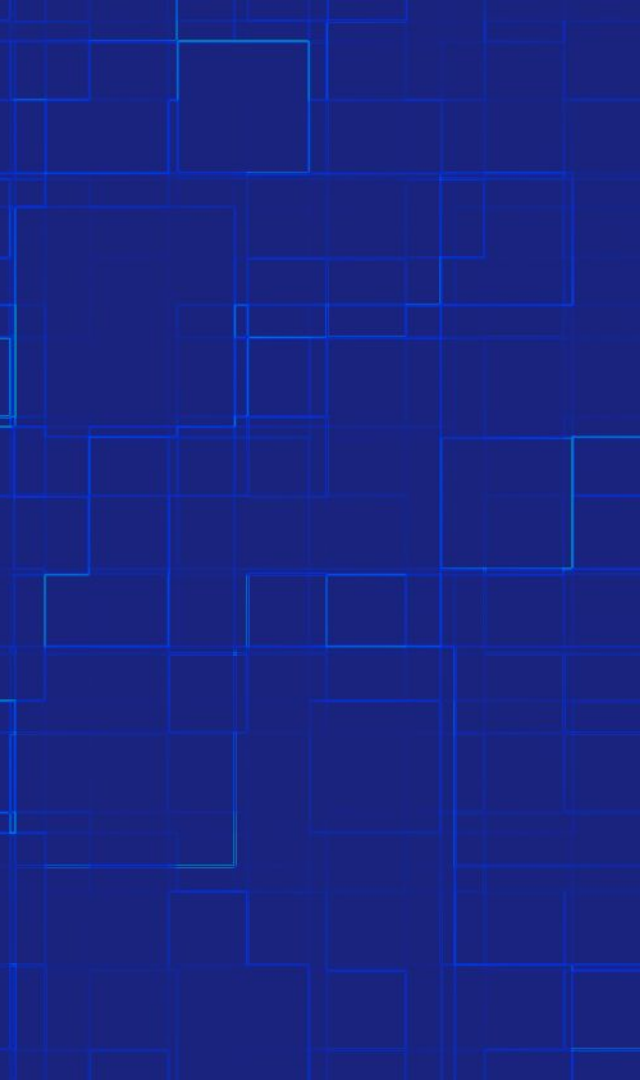
TIMELINE


FEBRUARY
Sensor testing and learning
MARCH 18
Development of Android App
MARCH 24
Firebase Connection to sensors and app
MARCH 31
Multi-node feature development
APRIL 10
Preparing Deliverables and Finalizing project

Setup Image



Implementation

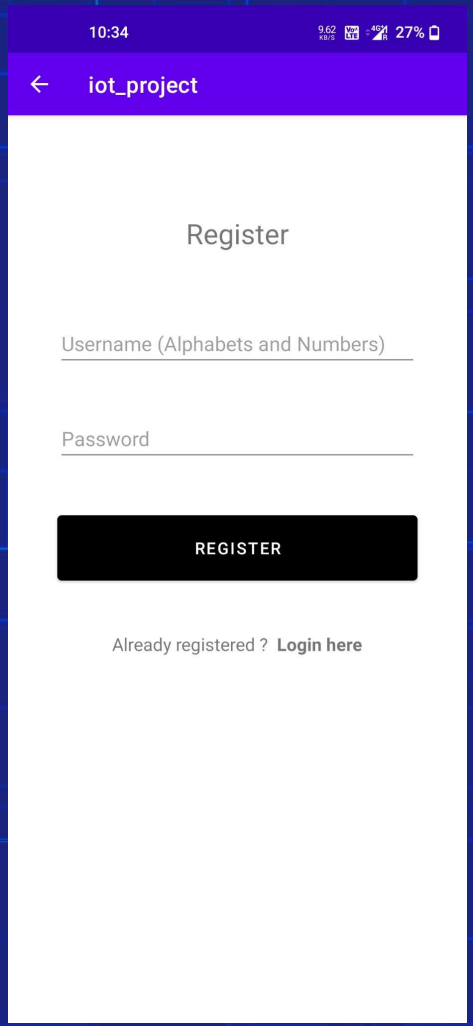


Weather station

A sample weather station send data of temperature, humidity, air pressure, air quality data of a weather station and uploads that data to firebase using its respective weather station id.

Multi Node

As each weather station has its own weather station id, we have scope of multi node setup. We can store each weather station data using its own weather station id.



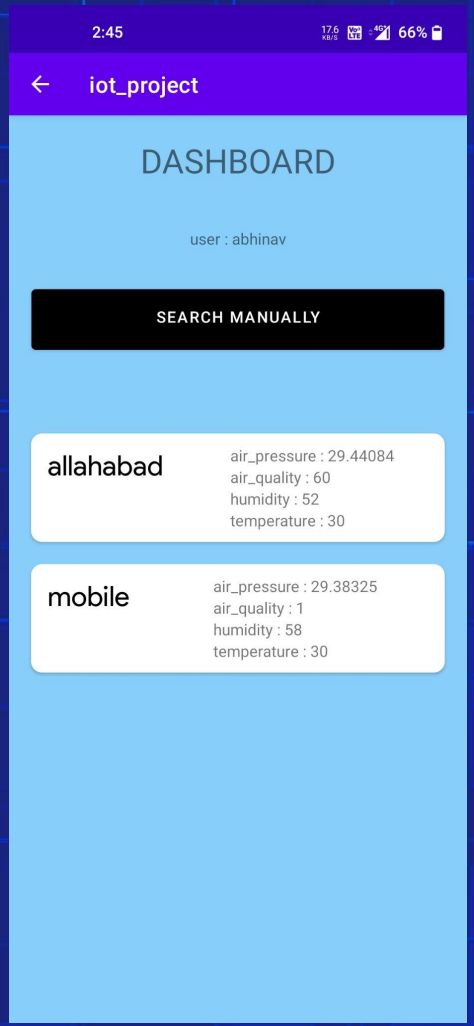
Login - SignUp

In this project, multiple users are able to register and login. Through this we get to store the user data using their username for further features.

Main Activity

Backend link

Frontend link



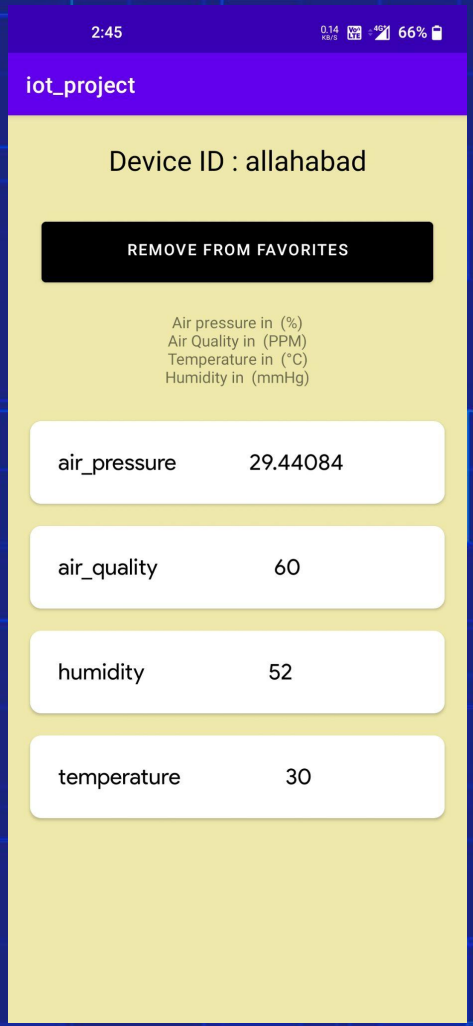
Favourites

A weather station can be added to favourites of a user. Through this, when a user logs in, he can view a short description of all his favorite weather stations.

Dashboard Activity

Backend link

Frontend link



Favourites

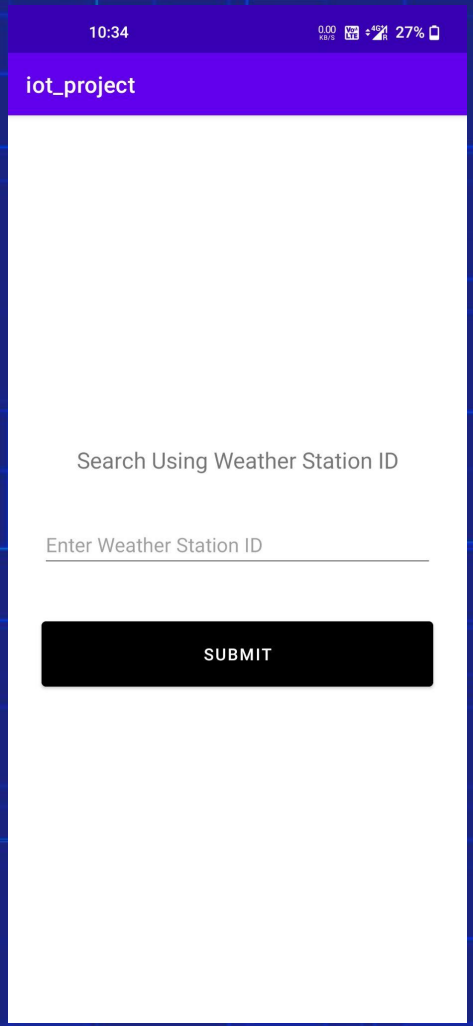
He can also view a detailed view of any weather station.

User can add/remove favorite weather stations anytime

Display Activity

Backend link

Frontend link



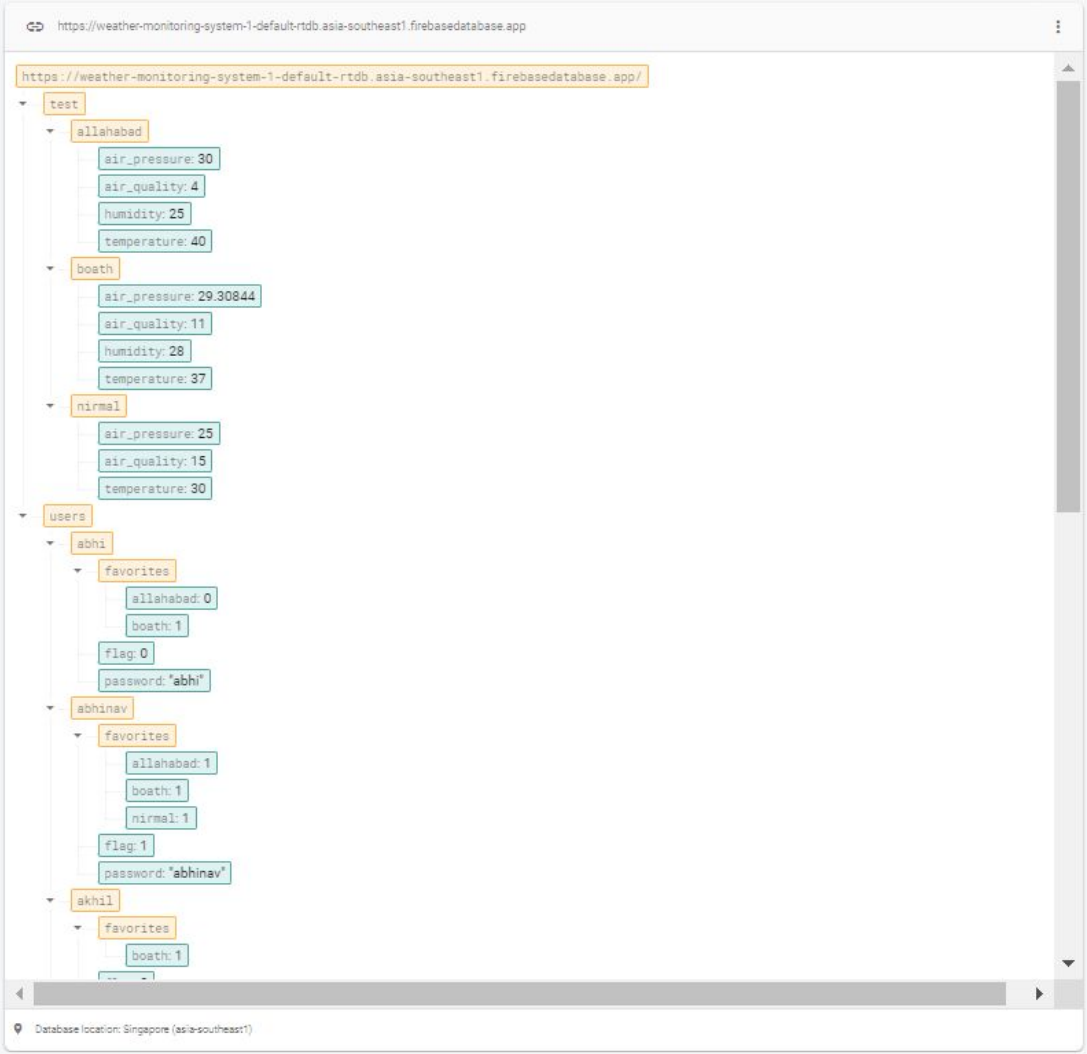
Search Option

Users can view the data of any weather station using this feature, if they know the weather station id's.

Search Manually Activity

Backend link

Frontend link



Firebase Structure

Challenges faces

The main challenge for us was, we are new to IOT based project, firebase based project.
We have overcome that by following thingspeak tutorials on YouTube.

By that we were able to easily do the connections, importings, etc..

Limitations

Our project is limited to displaying weather station data whenever user wants to access the data.

There is no any alert system in our project.

Future Scope

As our project is limited to displaying weather station data whenever user wants to access the data. There is no any alert system in our project.

So in Future we can add an alert system by fixing certain user defined thresholds for different types of environments.

By this user is notified in such situations, where he need to be alerted.

Thank You