

SMARTO- IoT based Smart Home Automation

GROUP:- 1

GROUP MEMBERS:

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ABSTRACT

- ▶ Now a days everything becomes connected to Internet that make our life easy. The world is moving ahead very fast after the Internet came. First peoples were connected with internet and now devices.
- ▶ Our Project SMARTO- is smart Home Automation based on IOT. This system will be able to control lights and other home appliances, water level, fire notification via smartphone and the data will be send to the cloud database firebase and can be retrieve on the smartphone and we will get the notification on our android app.

INTRODUCTION

A home automation system means to grant the end users to manage and handle the electric appliances.

If we look at different home automation systems over time, they have always tried to provide efficient, convenient, and safe ways for home inhabitants to access their homes.

Regardless of the change in user's hope, growing technology, or change of time, the appearance of a home automation system has remained the same.

Home automation systems

Bluetooth based home automation system using cell phones.

Zigbee based home automation system using cell phones.

GSM based home automation system using cell phones.

COMPONENTS

1. Arduino AT Mega 2560 board .
2. Node MCU Wi-Fi Module.
3. Ultrasonic sensor HC-SR04.
4. Gas sensor MQ5.
5. 4 channel 5V Relay module.
6. IR sensor.
7. Flame Sensor.
8. Led

IMPLEMENTATION AND DESIGN METHODOLOGY

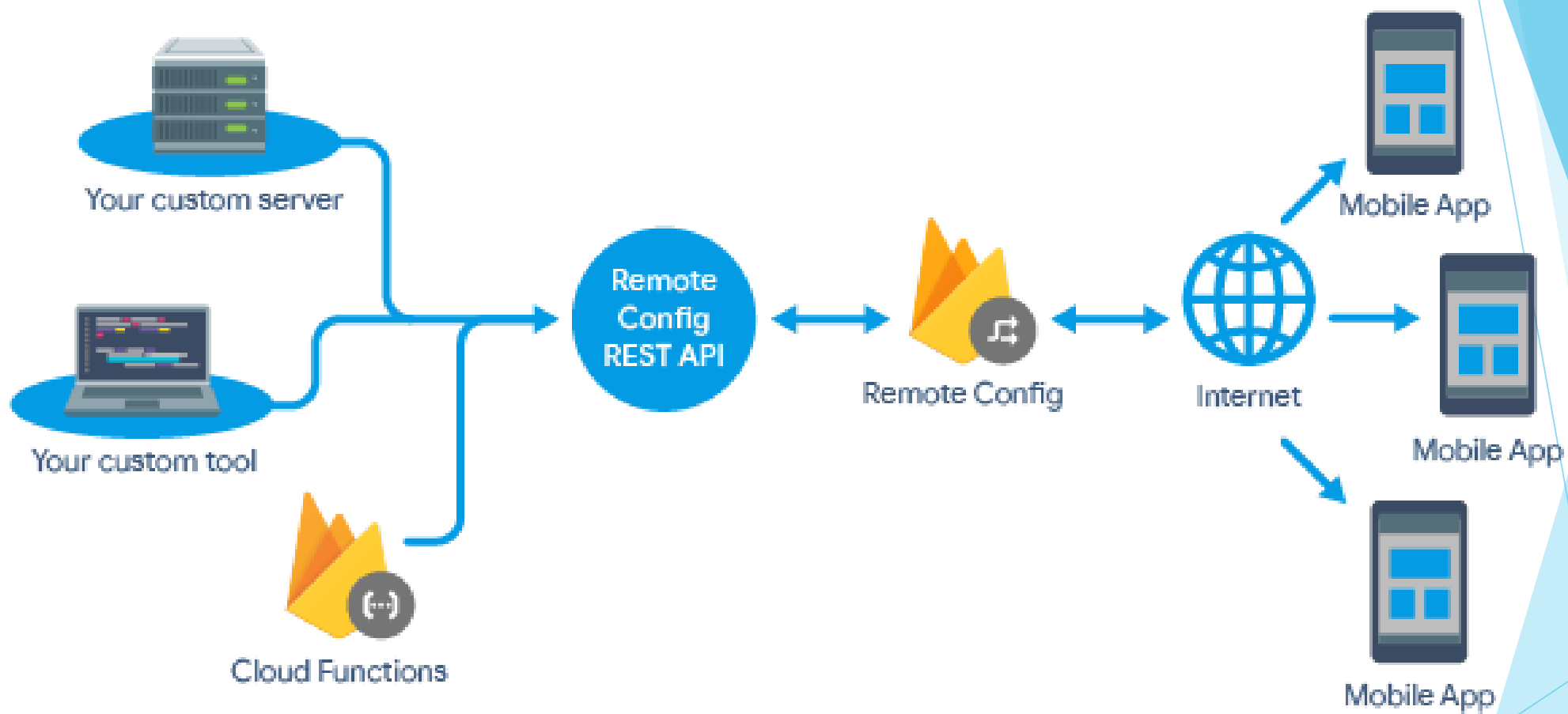
- ▶ In home automation system, that we are designing the home appliances are connected to the Arduino board at input output ports using relay.
- ▶ We are interfacing fire sensor for detecting fire, water level indicators for measuring water level, LPG gas sensor for detecting gas leakages, IR sensor, with Arduino ATmega 2560.
- ▶ The program is implemented to work on data collected from sensors.

IMPLEMENTATION AND DESIGN METHODOLOGY

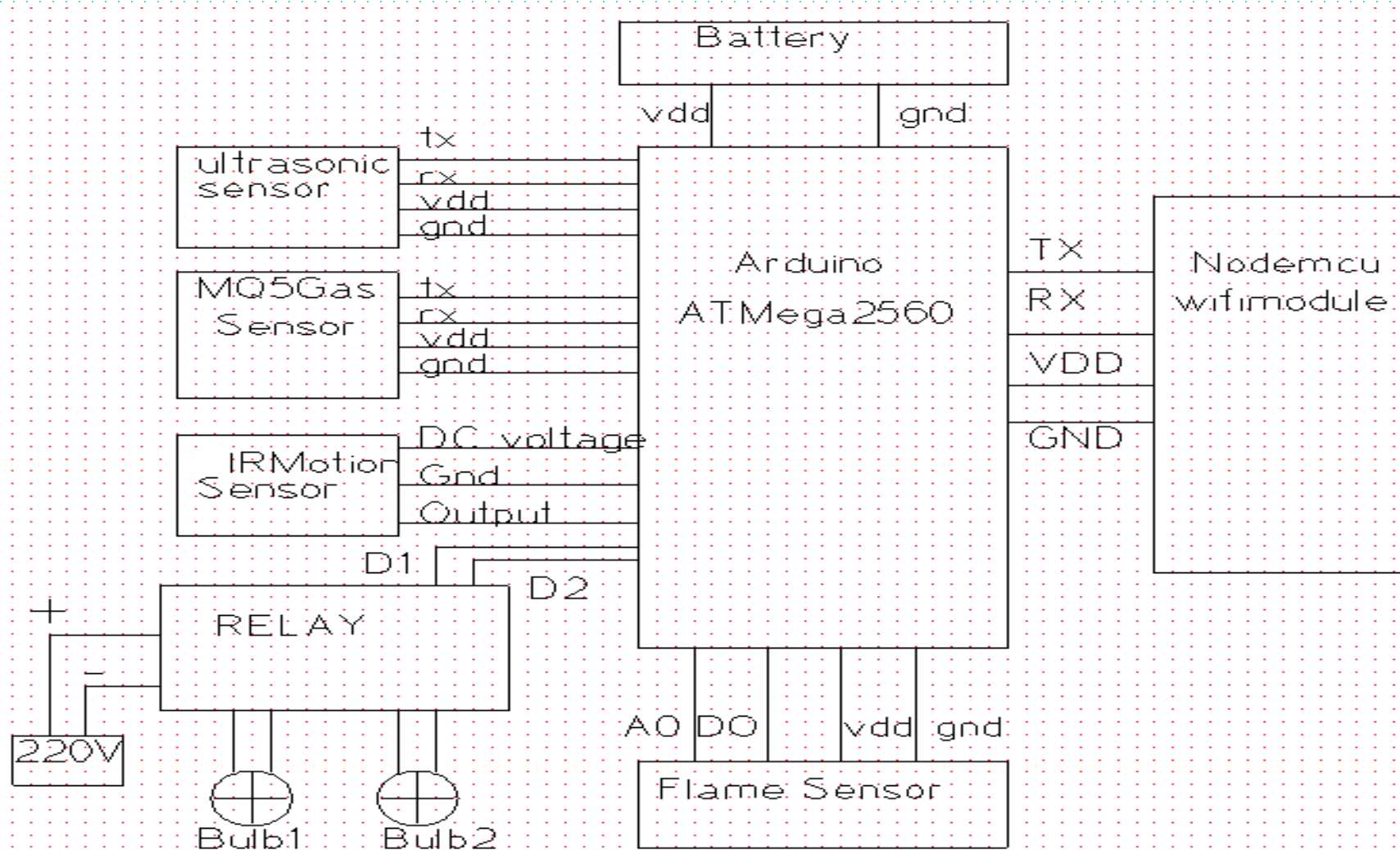
- ▶ The program of Arduino board is based on high level interactive C language of microcontrollers; that is interfaced with Node MCU board that has an in-built ESP8266 Wi-Fi connection module that helps in connecting the system with internet.
- ▶ That data is send to database on Google firebase which is Cloud base Real-Time Database, from there the data can be accessed on smartphone and actions can be taken accordingly.
- ▶ The password protection is provided so only authorized user is allowed to access the appliances. The connection is established between Arduino board and smartphone for wireless communication.

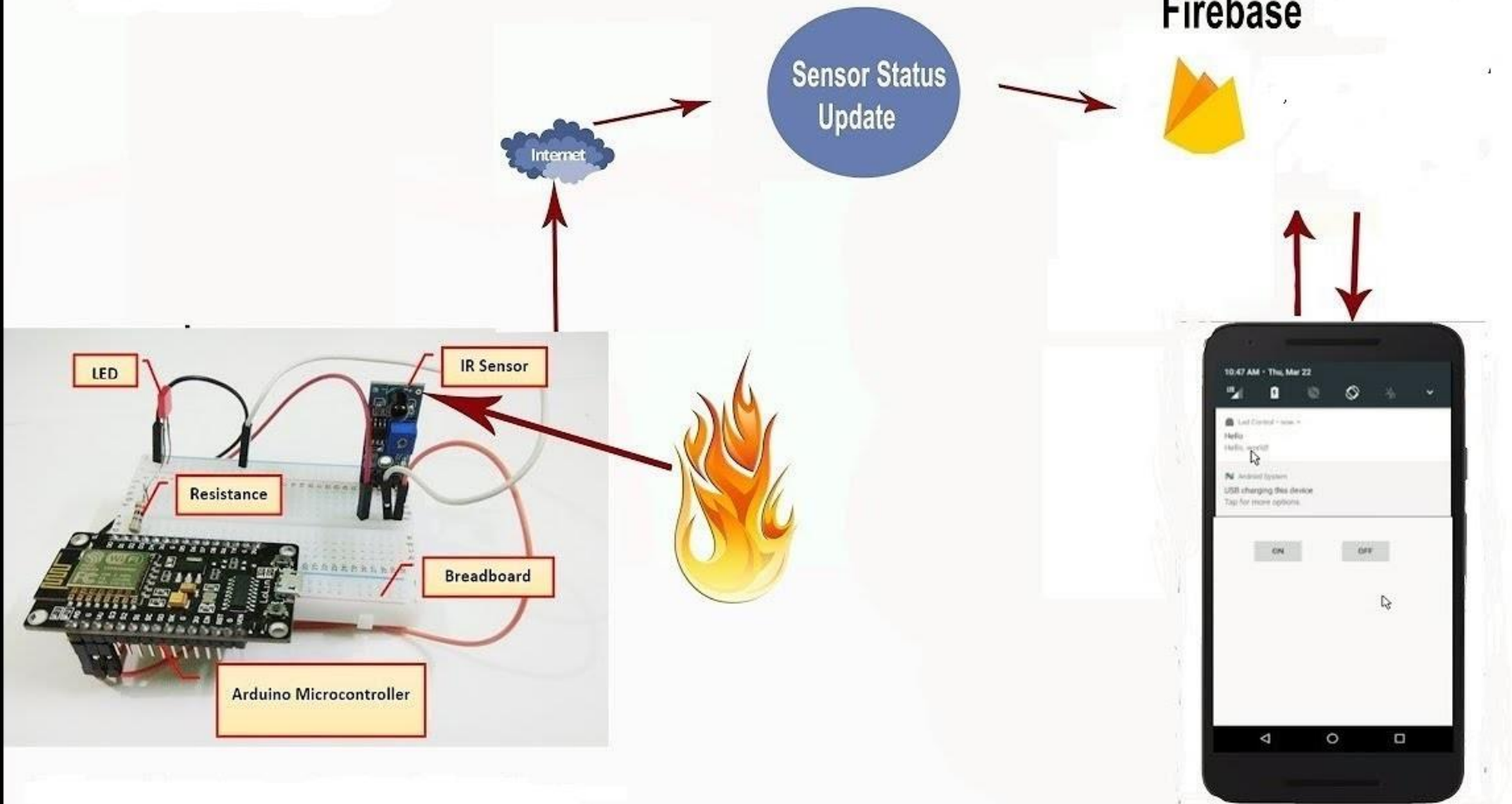
IMPLEMENTATION AND DESIGN METHODOLOGY

- ▶ We have added Cloud Messaging which used for sending notification to our smartphone whenever we have to notify to our user about required task according to the user need.
- ▶ In the nodemcu Wi-Fi module we are using Hypertext Transfer Protocol(HTTP) to send and receive data.



BLOCK DIAGRAM FOR THE CIRCUIT



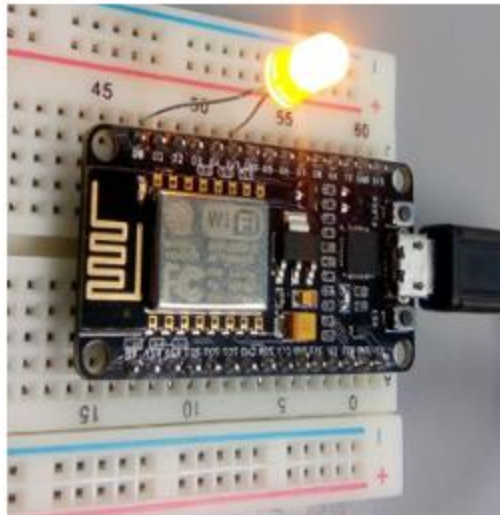




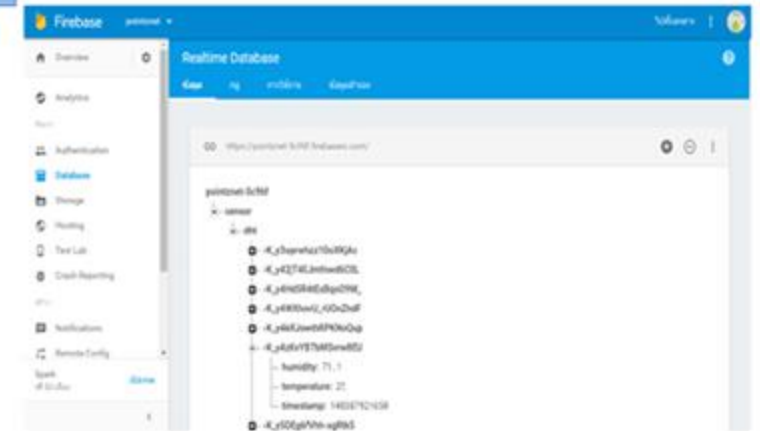
Firebase



NodeMCU & LED

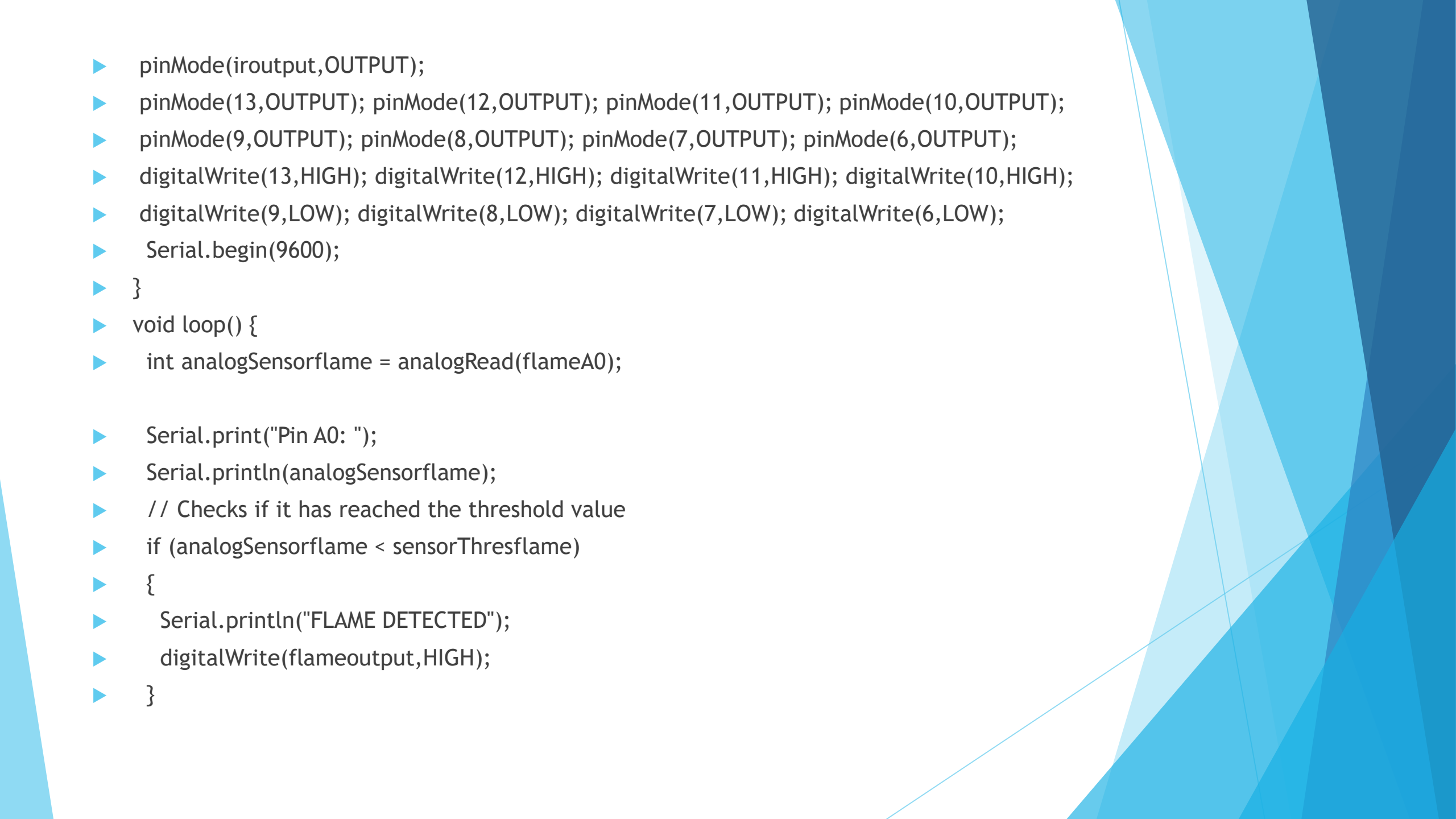


Firebase Console

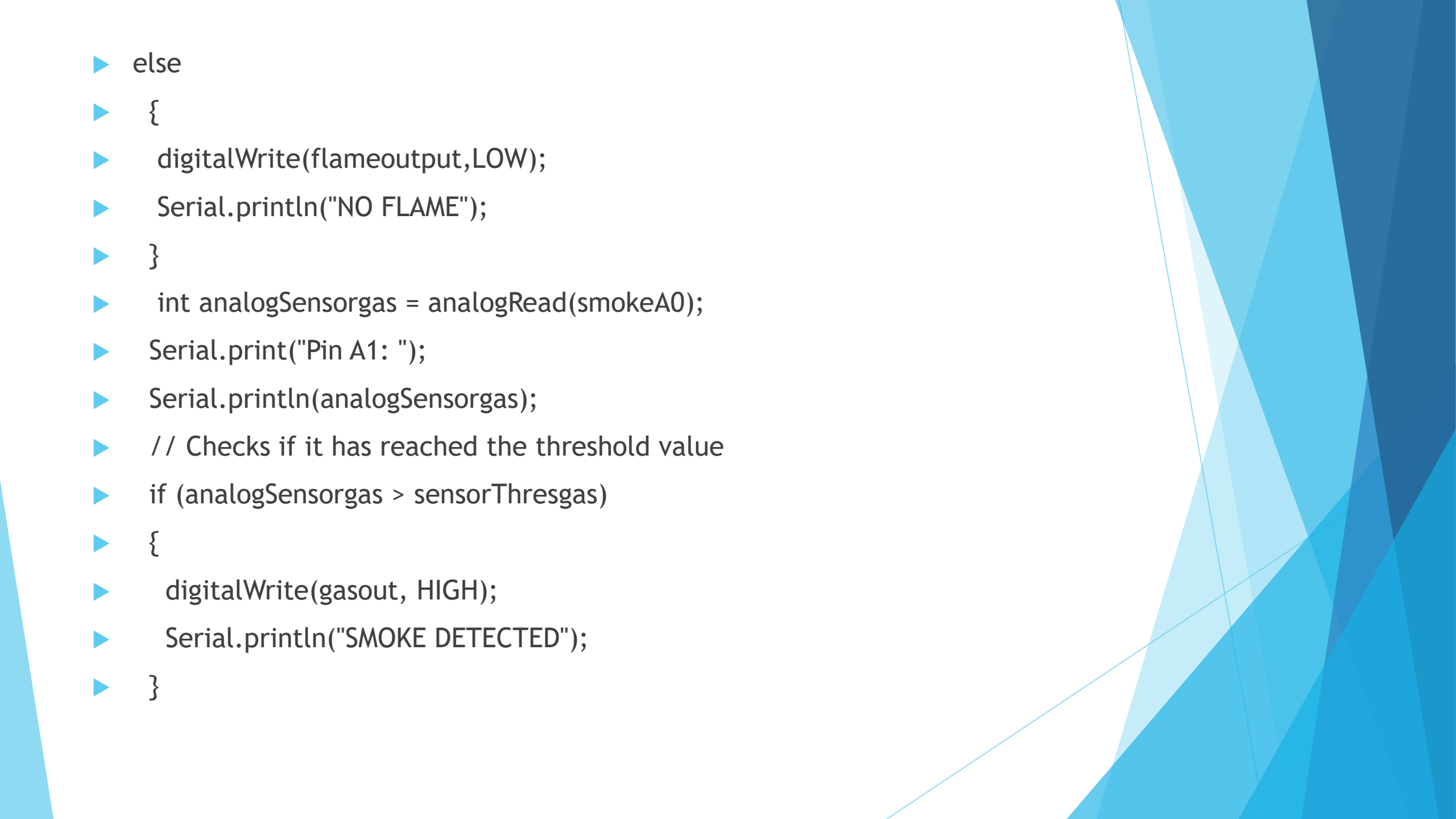


Arduino code(SENSOR)

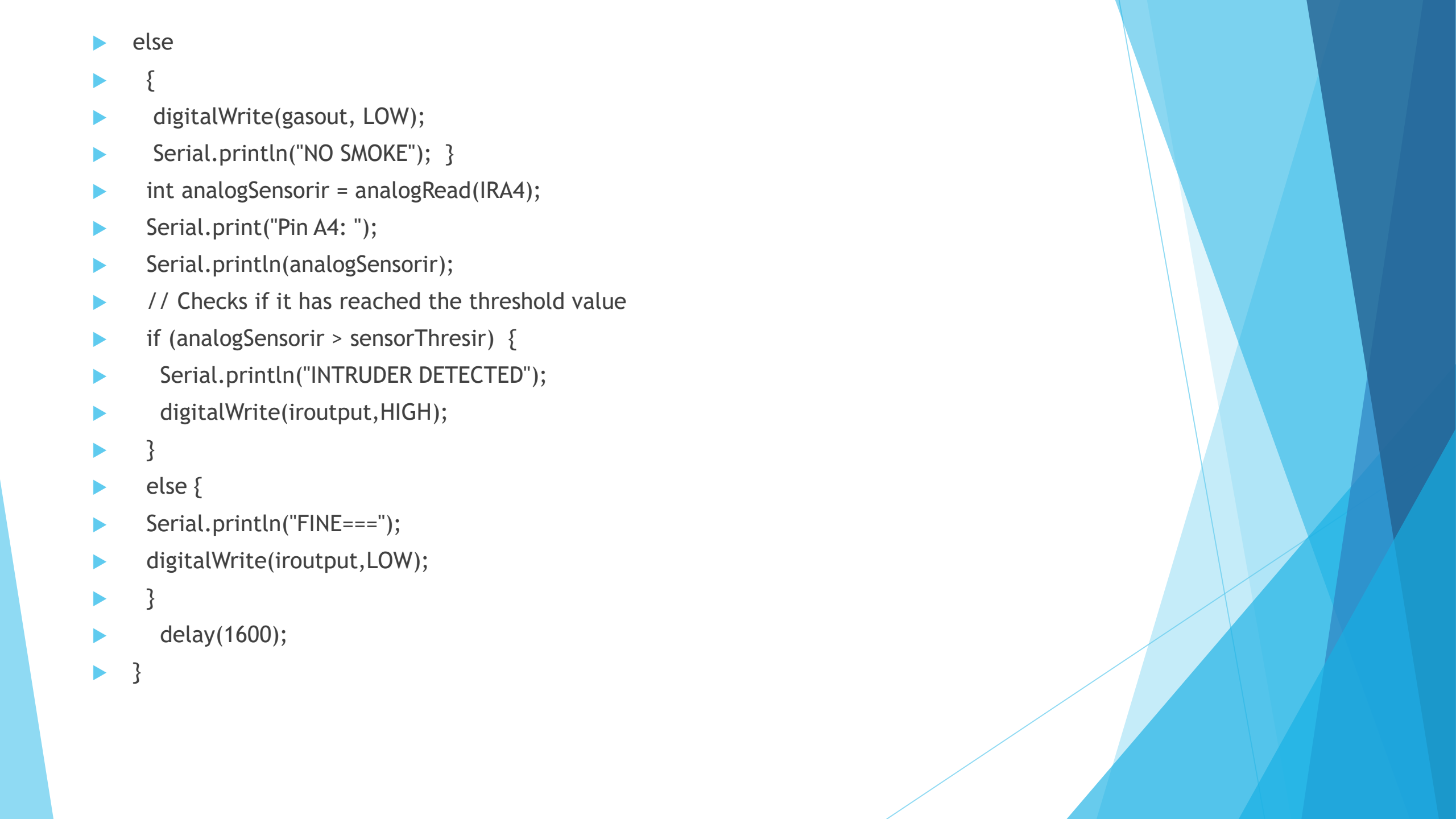
- ▶ `int flameA0 = A0;`
- ▶ `int sensorThresflame = 900;`
- ▶ `int flameoutput=2;`
- ▶ `int smokeA0 = A1;`
- ▶ `int sensorThresgas = 250;`
- ▶ `int gasout=3;`
- ▶ `int IRA4 = A4;`
- ▶ `int iroutput=4;`
- ▶ `int sensorThresir = 100; // 15-20 range of threshold`
- ▶ `void setup() {`
- ▶ `Serial.begin(9600);`
- ▶ `pinMode(smokeA0, INPUT);`
- ▶ `pinMode(gasout,OUTPUT);`
- ▶ `pinMode(flameA0, INPUT);`
- ▶ `pinMode(flameoutput,OUTPUT);`
- ▶ `pinMode(IRA4, INPUT);`

The background of the slide features abstract, overlapping geometric shapes in various shades of blue, ranging from light sky blue to deep navy blue. These shapes are primarily located on the right side and bottom of the slide, creating a modern, tech-oriented aesthetic.

- ▶ pinMode(iroutput,OUTPUT);
- ▶ pinMode(13,OUTPUT); pinMode(12,OUTPUT); pinMode(11,OUTPUT); pinMode(10,OUTPUT);
- ▶ pinMode(9,OUTPUT); pinMode(8,OUTPUT); pinMode(7,OUTPUT); pinMode(6,OUTPUT);
- ▶ digitalWrite(13,HIGH); digitalWrite(12,HIGH); digitalWrite(11,HIGH); digitalWrite(10,HIGH);
- ▶ digitalWrite(9,LOW); digitalWrite(8,LOW); digitalWrite(7,LOW); digitalWrite(6,LOW);
- ▶ Serial.begin(9600);
- ▶ }
- ▶ void loop() {
- ▶ int analogSensorflame = analogRead(flameA0);
-
- ▶ Serial.print("Pin A0: ");
- ▶ Serial.println(analogSensorflame);
- ▶ // Checks if it has reached the threshold value
- ▶ if (analogSensorflame < sensorThresflame)
- ▶ {
- ▶ Serial.println("FLAME DETECTED");
- ▶ digitalWrite(flameoutput,HIGH);
- ▶ }

The background of the slide features a complex, abstract pattern of overlapping triangles and polygons in various shades of blue, ranging from light sky blue to deep navy blue. The pattern is more prominent on the right side of the slide, creating a modern, tech-oriented aesthetic.

```
▶ else
▶ {
▶   digitalWrite(flameoutput,LOW);
▶   Serial.println("NO FLAME");
▶ }
▶   int analogSensorgas = analogRead(smokeA0);
▶   Serial.print("Pin A1: ");
▶   Serial.println(analogSensorgas);
▶   // Checks if it has reached the threshold value
▶   if (analogSensorgas > sensorThresgas)
▶   {
▶     digitalWrite(gasout, HIGH);
▶     Serial.println("SMOKE DETECTED");
▶   }
```

The background features a complex, abstract pattern of overlapping triangles and polygons in various shades of blue, ranging from light sky blue to deep navy blue. The pattern is more prominent on the right side of the slide, creating a modern, tech-oriented aesthetic.

```
▶ else
▶ {
▶   digitalWrite(gasout, LOW);
▶   Serial.println("NO SMOKE"); }
▶   int analogSensorir = analogRead(IRA4);
▶   Serial.print("Pin A4: ");
▶   Serial.println(analogSensorir);
▶   // Checks if it has reached the threshold value
▶   if (analogSensorir > sensorThresir) {
▶     Serial.println("INTRUDER DETECTED");
▶     digitalWrite(iroutput,HIGH);
▶   }
▶   else {
▶     Serial.println("FINE===");
▶     digitalWrite(iroutput,LOW);
▶   }
▶   delay(1600);
▶ }
```


Arduino code(Nodemcu)

- ▶ `#include <ESP8266WiFi.h>`
- ▶ `#include <FirebaseArduino.h>`
- ▶ `float f=100.0;`
- ▶ `int trigpin = D5;`
- ▶ `int echopin = D6;`
- ▶ `int flamedetect=D7;`
- ▶ `int gasdetect=D8;`
- ▶ `int irdetect=D0;`
- ▶ `long duration;`
- ▶ `int distance;`
- ▶ `#define WIFI_SSID "NO" //replace SSID with your wifi username`
- ▶ `#define WIFI_PASSWORD "12345678" //replace PWD with your wifi password`
- ▶ `#define FIREBASE_HOST "smarto-7050b.firebaseio.com" //link of api`
- ▶ `#define FIREBASE_AUTH "xkKsh9QugSpT64ZrFSCj1m3droxVy0hcehipPV2H"`

```
void setup() {  
  pinMode(trigpin, OUTPUT);  
  pinMode(echopin, INPUT);  
  Serial.begin(9600);  
  pinMode(D1,OUTPUT);  
  pinMode(D2,OUTPUT);  
  pinMode(D3,OUTPUT);  
  pinMode(D4,OUTPUT);  
  pinMode(flamedetect,INPUT);  
  pinMode(gasdetect,INPUT);  
  pinMode(irdetect,INPUT);  
  WiFi.begin(WIFI_SSID, WIFI_PASSWORD); //connect to wifi  
  while (WiFi.status() != WL_CONNECTED) {  
    delay(100);  
    Serial.println("");  
  }
```

```
Serial.println("WiFi connected");  
Serial.println("IP address: ");  
Serial.println(WiFi.localIP());  
Firebase.begin(FIREBASE_HOST, FIREBASE_AUTH);  
  
}
```


Android Application development

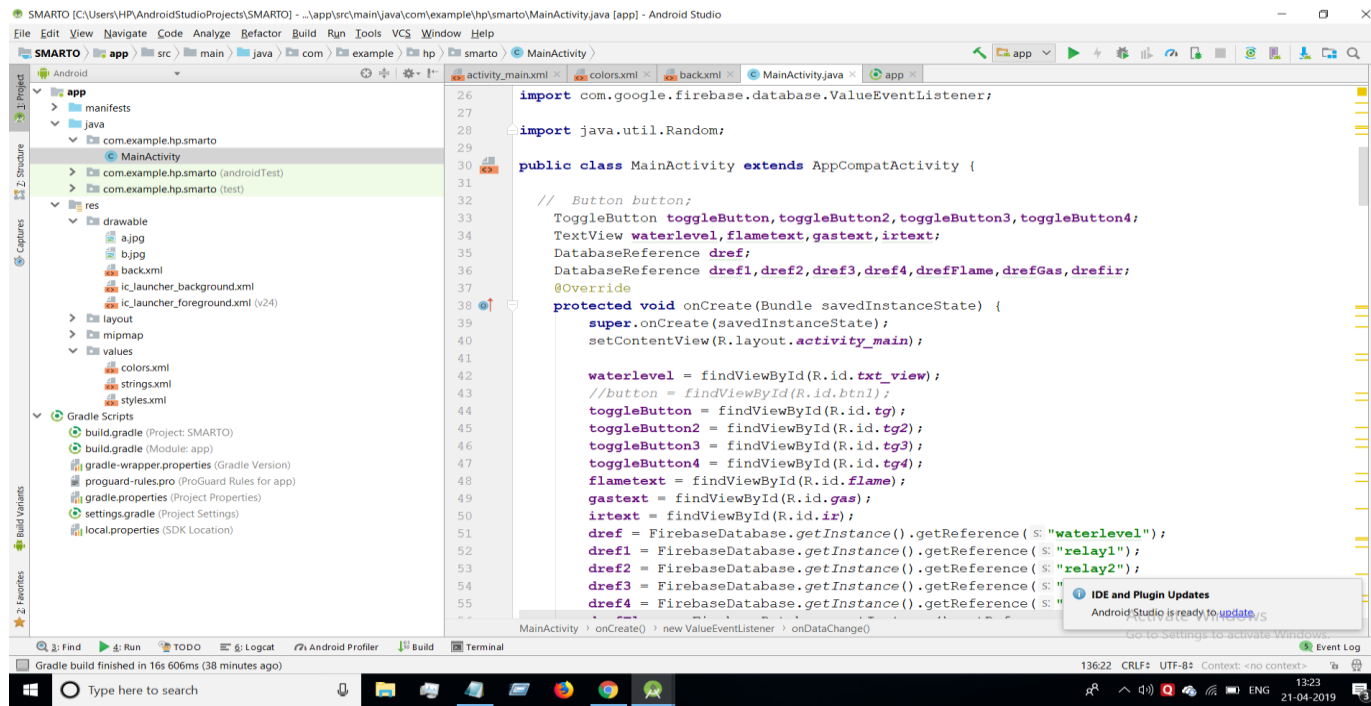
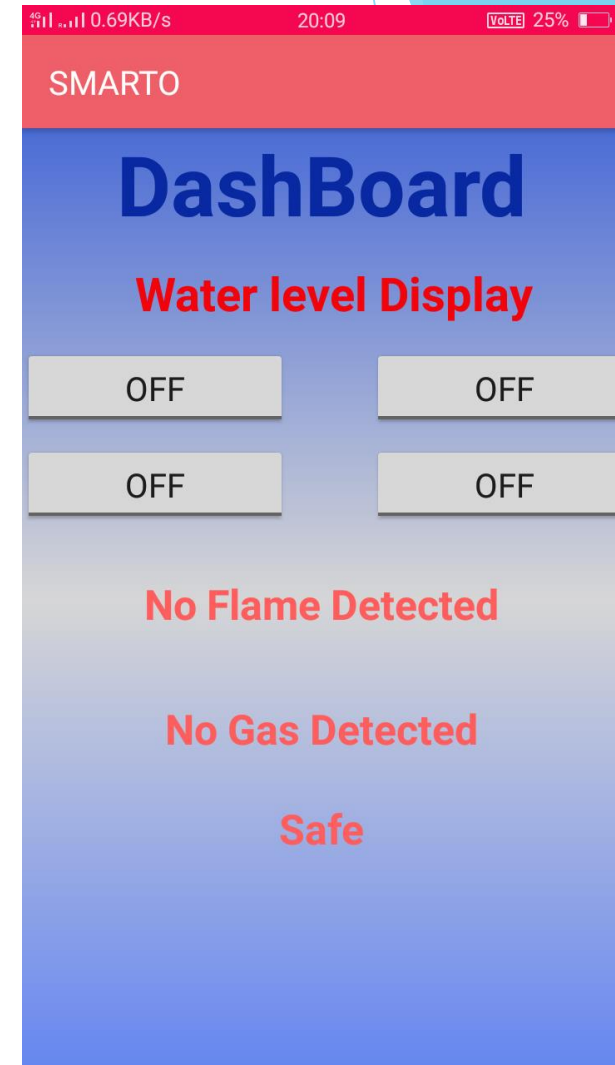
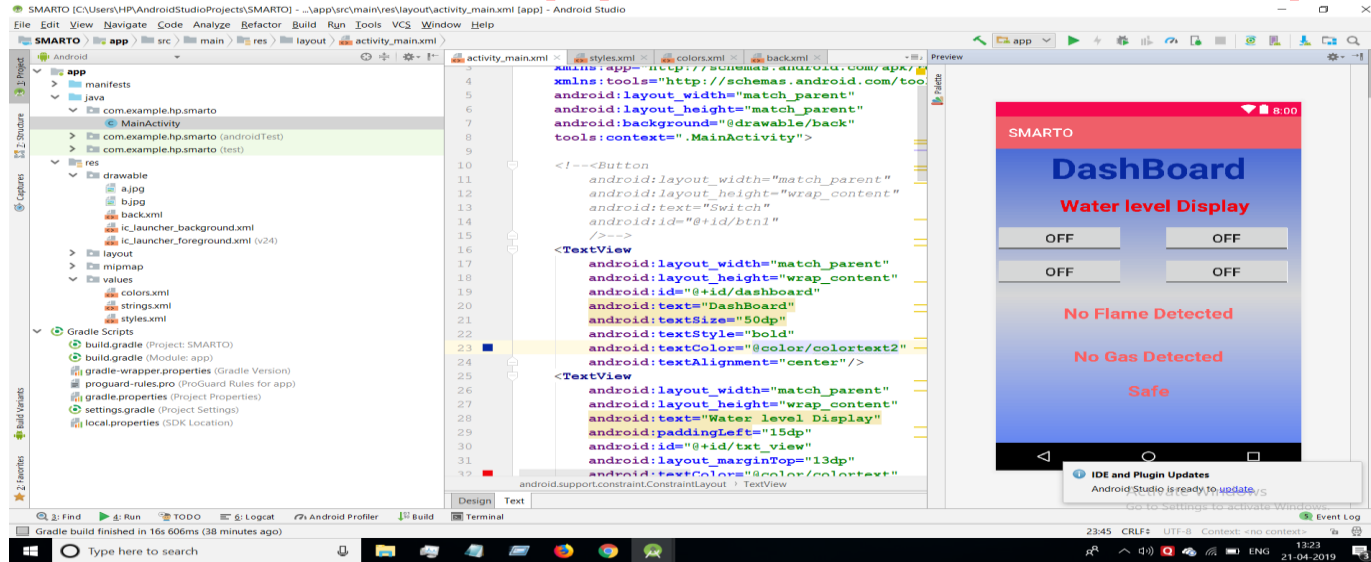
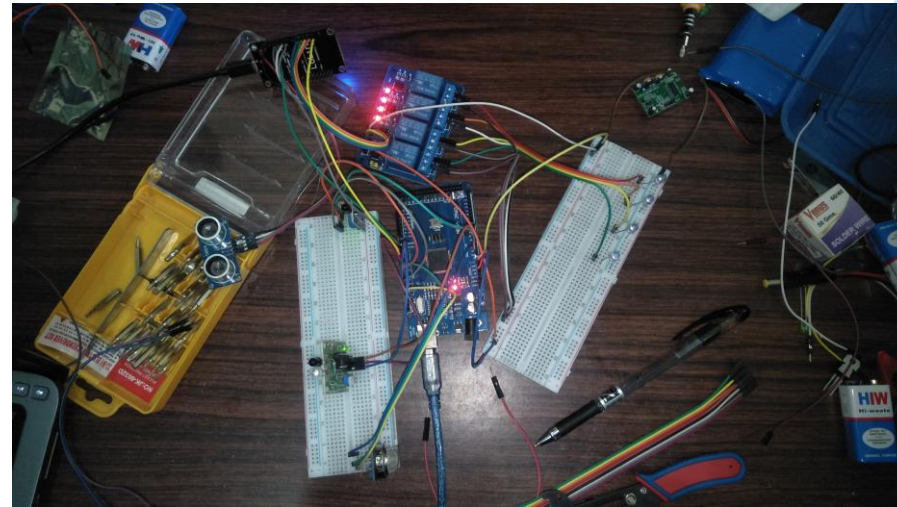
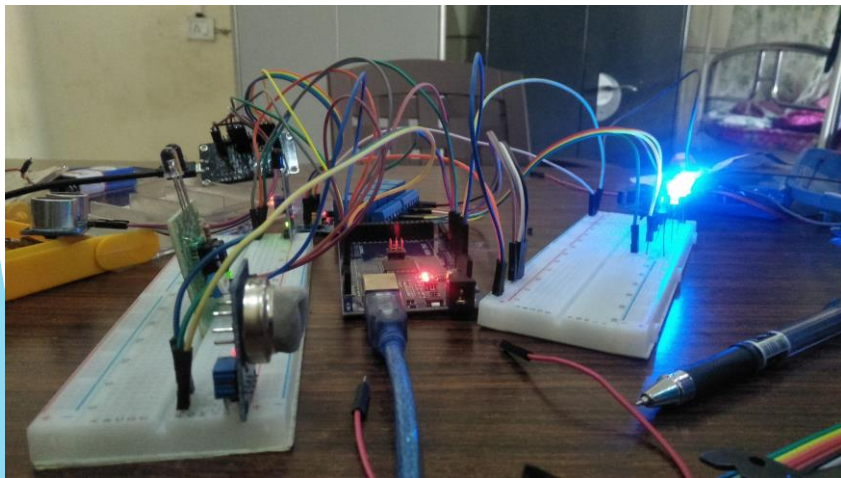
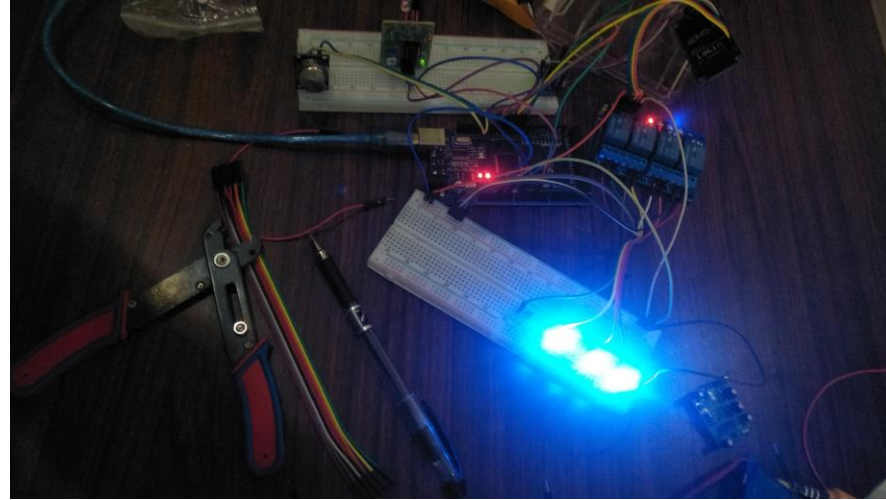
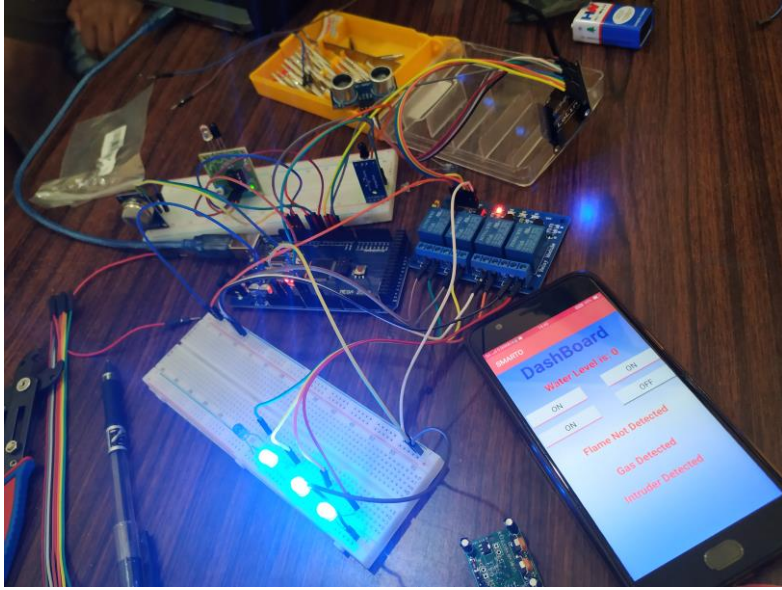
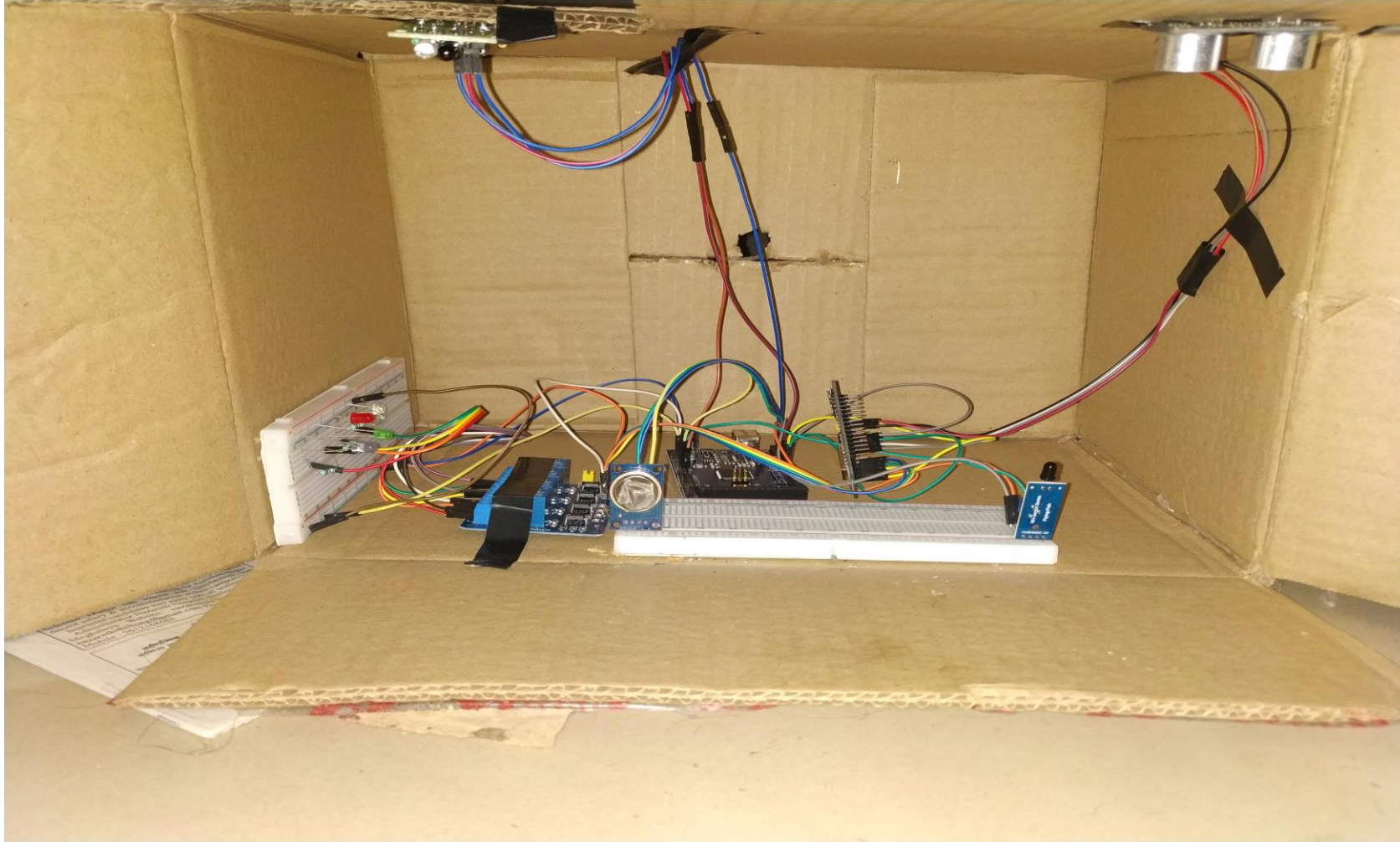


Photo Gallery



Final project Model



RESULTS

- ▶ The sensor are sensing the data and the data is going to the cloud and accordingly the user is getting the Notification in the user's Smartphone.
- ▶ For example : The output of the Smoke sensor i.e the data is send to the cloud database ,when it detects Lpg gas and CO2 in our case, from the cloud database we get the notification that the smoke/Gas is detected.

SMARTO – Database – Firebase

Android Notifications

How to display multiple notificati

How to make gradient backgrou

New Tab

https://console.firebase.google.com/u/0/project/smarto-7050b/database/smarto-7050b/data

Apps Regarding not getti... expt.no.4 - c.goyal... expt.no.4 - c.goyal... https://www.google... Indian Insitute of In... Google Dr. Calculus - PCB... Other bookmarks

Firestore

Project Overview

Develop

Authentication

Database

Storage

Hosting

Functions

ML Kit

Quality

Crashlytics

Performance

Test Lab

Analytics

Spark

Free \$0/month

Upgrade

SMARTO

Database

Realtime Database

DataRulesBackupsUsage

https://smarto-7050b.firebaseio.com/

smarto-7050b

flame: "Flame Detectec

gas: "Gas Not Detectec

ir: "Safe'

relay1: "ON"

relay2: "ON"

relay3: "OFF'

relay4: "ON"

sensor: "OFF" X

waterlevel: 7

Activate Windows

Go to Settings to activate Windows.

Type here to search

File Explorer

Google Chrome

WhatsApp

13:08

21-04-2019

ENG

Firestore

Project Overview

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- Authentication
- Database**
- Storage
- Hosting
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Quality

- Crashlytics
- Performance
- Test Lab

Analytics

Spark
Free \$0/month

Upgrade

SMARTO

Database Realtime Database

Data Rules Backups Usage

https://smarto-7050b.firebaseio.com/

```
smarto-7050b
├── flame: "Flame Detectec"
├── gas: "Gas Detected"
├── ir: "Safe"
├── relay1: "ON"
├── relay2: "ON"
├── relay3: "OFF"
├── relay4: "ON"
├── sensor: "OFF"
└── waterlevel: 7
```

Activate Windows
Go to Settings to activate Windows.

22:05

Sun. Apr. 21
Mostly clear 23°



Input word to translate



1 device(s) connected to pers.. 20:43

Tap to set up



SMARTO

Gas Detected

Flame not Detected

Gas Detected

Safe



8787316971 Data usage, today: 1.33 GB, this month: 15.40 GB

CONCLUSION

- ▶ The proposed Home Automation System enhances mobility control of devices from any remote location.
- ▶ Being a simple and user friendly application it serves as an application of great help to the people.
- ▶ Thus, the Internet of Things based Home Automation System with android app will solve many problems of the people.

FUTURE SCOPE

- ▶ We can upgrade it so that it can be controlled by voice assistant like Alexa, Google Assistant etc.
- ▶ We can using machine learning to improve the functionality.
- ▶ Advance networking protocol like MQTT can be used to improve the functionality and decreasing the delay.

THANK YOU