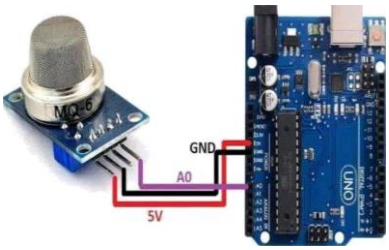
Project Title: Air Ouality Monitoring - loT

PHASE 2:
INNOVATION

SENSORS:

A. Temperature and Humidity sensor.



B. Gas sensor.

Definition for sensors:

Temperature Sensor:

A temperature sensor is a device that detects and measures heat energy, allowing it to determine the temperature of an object or environment. The sensor converts the temperature data into an electrical signal which can be read and interpreted by a computer or display unit. Common types of temperature sensors include thermocouples, resistance temperature detectors (RTDs), and thermistors.

Humidity Sensor (Hygrometer):

A humidity sensor, or hygrometer, is a device that measures the amount of water vapor present in the air or in a gas. It provides an electrical output related to the concentration of water vapor, which can be interpreted to give relative humidity (RH) values.

Gas Sensor:

A gas sensor is a tool that can detect and measure specific gases in the air. When the gas touches the sensor, it sends out a signal showing how much gas is present. It's like a nose that can "smell" gases and tell us about them.

STEPS FOR FLOWCHART:

STEP 1: Start the program.

STEP 2: Turn on the Gas, Temperature and Humidity sensors. STEP 3:

Collect the data:

i. Read gas concentration.
ii. Measure temperature and humidity level.

STEP 4: Analyze Data:

i. Check if gas concentration is within safe limits.
ii. Check if temperature and humidity is within comfort range. STEP

4: Display results:

i. Show gas concentration on display.
ii. Show temperature value on display.
iii. Show humidity percentage.

STEP 5: Take action (if necessary):

i. If gas concentration is high, activate alarm or ventilation.
ii. If temperature is too high or low, adjust heating or cooling system.
iii. If humidity is too high or low, activate dehumidifier or humidifier.

STEP 6: Wait for a set time. STEP 7:

Repeat 3-7 continuously. STEP 8:

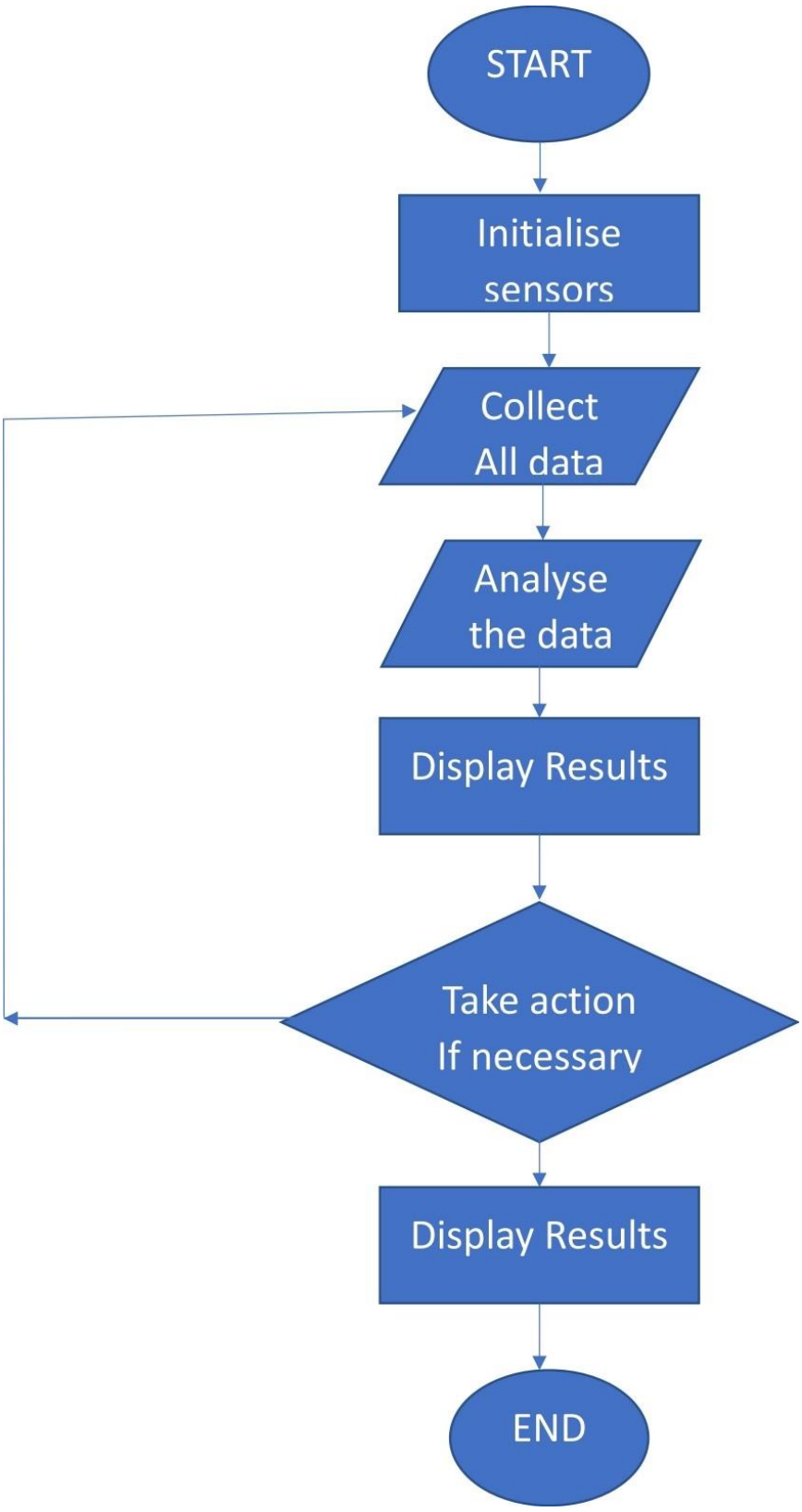
End the program.

CODE:

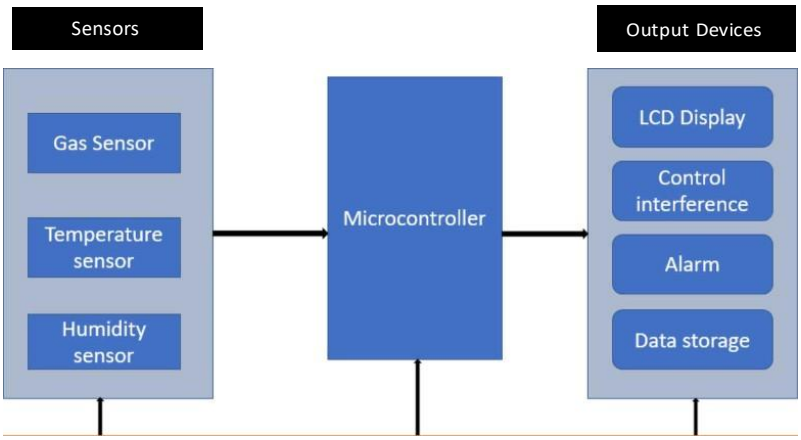
```cpp
#include <WiFi.h>
#include <Wokwi.h>

const char* ssid = "Your_SSID";
const char* password = "Your_PASSWORD";
```

```
// Define virtual sensors
WokwiDHT dht(5); // DHT sensor on pin 5
WokwiMQ135 mq135(A0); // MQ135 air quality sensor on analog pin A0

void setup() {
  Serial.begin(115200);

  // Connect to Wi-Fi
  WiFi.begin(ssid, password);
  while (WiFi.status() != WL_CONNECTED) {
    delay(1000);
    Serial.println("Connecting to WiFi...");
  }

  Serial.println("Connected to WiFi");
}

void loop() {
  float temperature = dht.readTemperature();
  float humidity = dht.readHumidity();
  int airQuality = mq135.read();

  Serial.print("Temperature: ");
  Serial.print(temperature);
  Serial.println(" °C");

  Serial.print("Humidity: ");
  Serial.print(humidity);
  Serial.println(" %");

  Serial.print("Air Quality: ");
  Serial.println(airQuality);

  delay(5000); // Delay for 5 seconds before taking the next reading
```

FLOW CMŒ:


START
Initialise sensors
Collect All data
Analyse the data
Display Results
Take action If necessary
Display Results
END

BLOCK DIAGRAM:



Block Diagram Description:

1. **Microcontroller/Main Processing Unit:**
   This is the brain of the system, collecting data from sensors and process it and managing output actions and displays.

2. Sensors:
   - Gas Sensor: Connects to the microcontroller and detects specific gases.
   - Temperature Sensor: Connects to the microcontroller to measure temperature.
   - Humidity Sensor: Connects to the microcontroller to measure humidity.

3. **Communication Interface:**
   Enables the microcontroller to communicate with external devices or a computer. This can be Wi-Fi, Bluetooth, or wired connections like USB or Ethernet.

4. **Display:** Shows real-time data reading, alerts,or system status.

5. **Alarm/Notification System:**

This can be an audible alarm, LED indicator, or any other signaling device that alerts the user when air quality goes outside the desired range.

6. Power Supply:

Provides power to the entire system. This could be batteries, solar panels, or a direct power source.

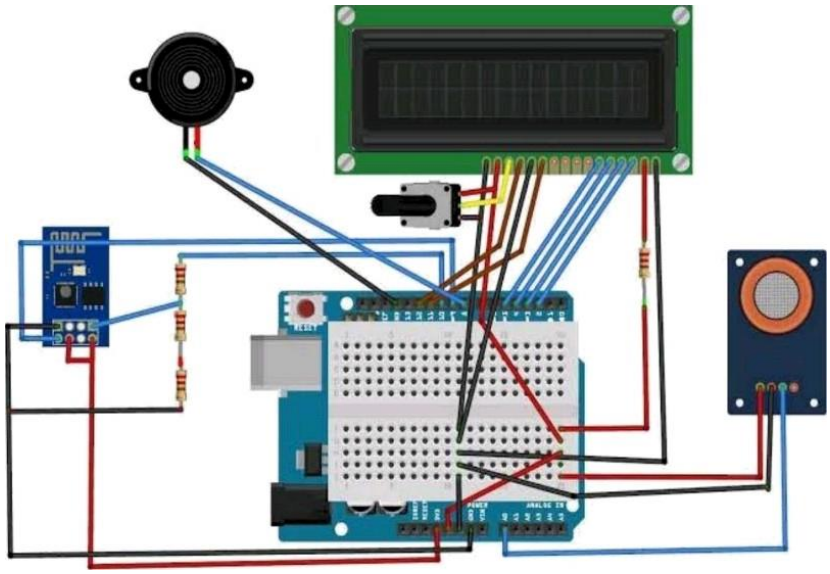
7. Data Storage:

Where the data can be logged for historical analysis. This could be an SD card, onboard memory, or cloud storage.

8. **Control Buttons/Interface:**

Allows the user to interact with the system, set thresholds, or view historical data.

CIRCUIT DIAGRAM:



APPLICATION:

i. Monitor air in urban areas to ensure it is safe to breathe.
ii. Detect harmful substance like CO2, Green house gases and volatile organic compounds.
iii. Inform farmers about best time of plant or harvest based on air quality.