# Environmental monitoring

## Phase3:

IoT devices and then Developing a Python script on the IoT devices as per the project .

## Introduction:.

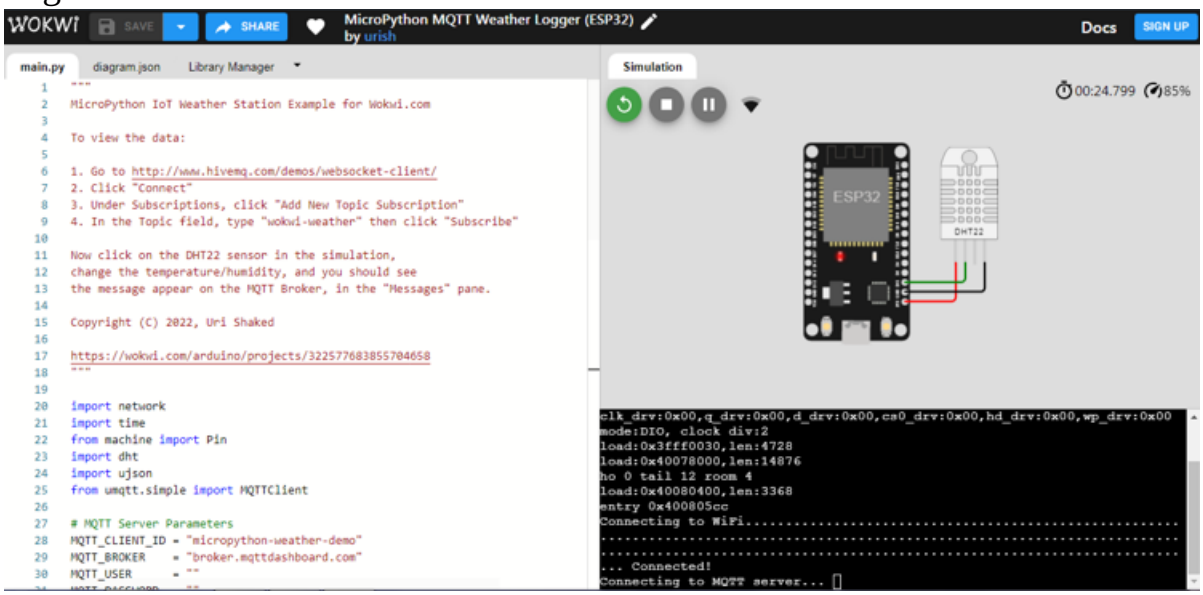
The purpose of an Environmental Monitoring Program is to identify problem areas where potentially harmful microorganisms may be harboring, becoming a source of contamination

## Microcontroller Naming:1.ESP32:

It is a successor to ESP8266 SoC and comes in both single-core and dual-core variations of the Tensilica's 32-bit Xtensa LX6 Microprocessor with integrated Wi-Fi and Bluetooth.

## 2.Arduino uno:

Arduino UNO is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header and a reset button.It simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.



# Program:

**PYTHON CODE**

```
import Adafruit_DHT
import time

# Sensor should be set to Adafruit_DHT.DHT11,
# Adafruit_DHT.DHT22, or Adafruit_DHT.AM2302.
DHT_SENSOR = Adafruit_DHT.DHT11
DHT_PIN = 4  # GPIO pin the sensor is connected to

def get_temperature_humidity():
    humidity, temperature = Adafruit_DHT.read_retry(DHT_SENSOR, DHT_PIN)
    if humidity is not None and temperature is not None:
        return temperature, humidity
    else:
        return None, None

def log_data(temperature, humidity):
    with open("environment_log.txt", "a") as file:
        current_time = time.strftime('%Y-%m-%d %H:%M:%S')
        log_entry = f"{current_time} - Temperature: {temperature}°C, Humidity: {humidity}%\n"
        file.write(log_entry)

if __name__ == '__main__':
    while True:
```

```
    temperature, humidity = get_temperature_humidity()
    if temperature is not None and humidity is not None:
        log_data(temperature, humidity)
        print(f"Temperature: {temperature}°C, Humidity: {humidity}%")
    else:
        print("Failed to retrieve data from the sensor.")
    time.sleep(60)  # Adjust this time to set the interval for data collection.
```

**Components:**

## 1.Sensors:

These are the physical devices responsible for collecting data about various environmental parameters such as temperature, humidity, air quality, pollution levels, etc.

## 2.Data Logger:

This component stores the data collected from the sensors for further processing and analysis.

## 3.Microcontroller/Single Board Computer (SBC):

It processes the data from the sensors and communicates with the data logger. It might also handle data transmission to a cloud storage system for long-term data storage.

## 4.Cloud storage:

This is optional but often used for long-term storage of large datasets. It provides accessibility and scalability for handling vast amounts of environmental data.

## 5.Data Processing Algorithms:

These algorithms process the collected data, perform statistical analysis, and identify patterns or trends. They may also trigger alerts or warnings based on predefined thresholds.

## 6.Analysis Report:

This component involves generating insights, creating reports, and visualizing the data in a meaningful way for decision-making purposes.

## 7.Visualization Interface:

This is the user interface that allows stakeholders to interact with the system, view real-time data, access historical data, and interpret the analyzed results. It can include dashboards, charts, graphs, and other visual representations of the environmental data.