EXPERIMENT NUMBER-1.2

NAME OF EXPERIMENT: Design a cloud based weather monitoring system using IOT platform and relevant sensors.

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AIM OF THE PRACTICAL

Design a cloud based weather monitoring system using IOT platform and relevant

sensors.

TOOLS USED :
  1.ESP-32
  2.BMP280
  3.UBIDOTS

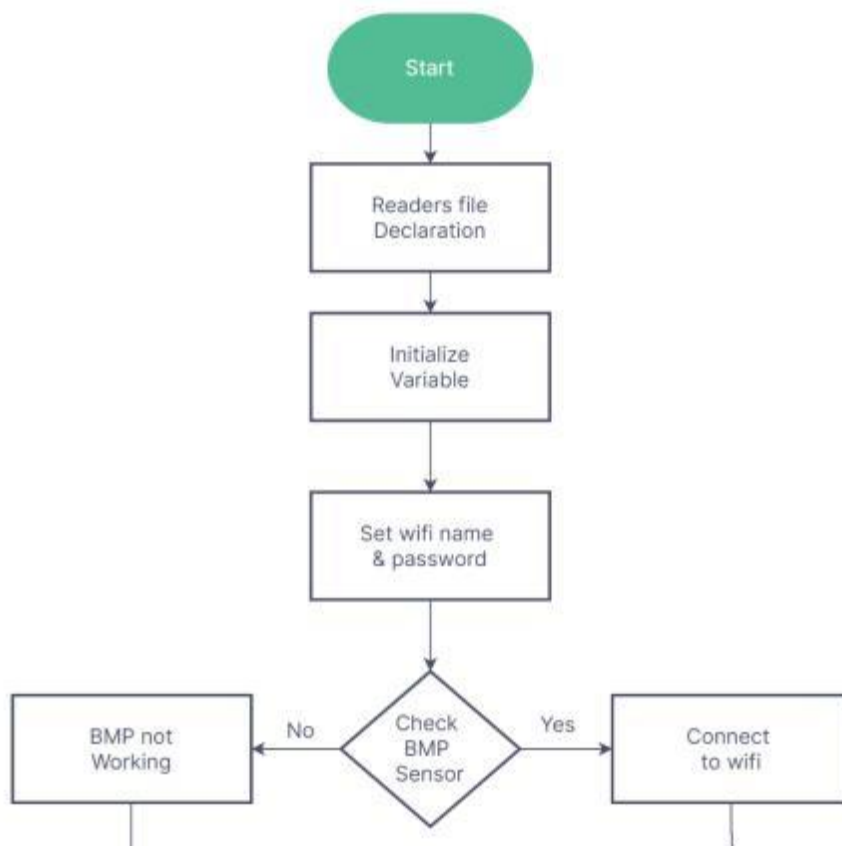# Basic code and command description

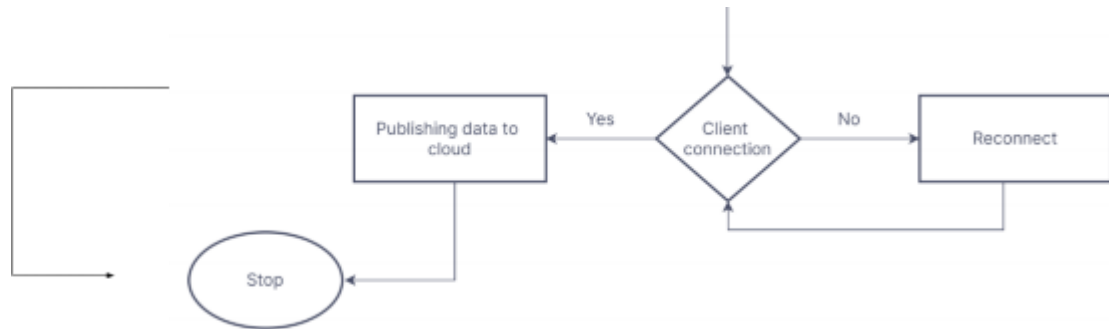**Esp32**: It is a series of low cost lowpower system on a chipmicrocontroller with integrated wifi and dual mode

bluetooth . Can provide wifi and bluetoothand functionality through it SDIO/SPIorI2C/UARIinterface.

BMP 280: It is a digital pressure sensor,which gives temperature in degrees centigrade and pressure in pa. The output are digital because pressure changes with altitude, with great precision , low energy consuption and an ultra compact format.

 UBIDOTS: It is a virtual representation of a data source or simply, an asset taking sensor data and transmitting said data through a connection protocol to ubidots cloud.

FLOWCHART-

```
                    ┌─────────┐
                    │  Start  │
                    └────┬────┘
                         ↓
                  ┌──────────────┐
                  │ Readers file │
                  │ Declaration  │
                  └──────┬───────┘
                         ↓
                  ┌──────────────┐
                  │  Initialize  │
                  │   Variable   │
                  └──────┬───────┘
                         ↓
                  ┌──────────────┐
                  │ Set wifi name│
                  │  & password  │
                  └──────┬───────┘
                         ↓
                        ◇ Check
 ┌──────────┐   No     BMP      Yes   ┌──────────┐
 │ BMP not  │ ←────── Sensor ──────→  │ Connect  │
 │ Working  │          ◇              │ to wifi  │
 └──────────┘                         └──────────┘
```

PROGRAM CODE-

#include <Adafruit_BMP280.h>

#include <UbidotsESPMQTT.h>

#define BMP_SDA 21

#define BMP_SCL 22

#define TOKEN "BBFF-TajCdHsZicOOJccUn14tVc0HRRTtb7" // Your Ubidots TOKEN

#define WIFISSID "PC 46" // Your SSID

#define WIFIPASS "123456789" // Your Wifi Pass

Adafruit_BMP280 bmp280;

Ubidots client(TOKEN);

```cpp
void callback(char* topic, byte* payload, unsigned int length) {

Serial.print("Message arrived [");

Serial.print(topic);
```

```
Serial.print("] ");

for (inti = 0; i < length; i++) {

Serial.print((char)payload[i]);

}

Serial.println();

}

void setup() {

Serial.begin(9600);

Serial.println("Init... T2_Weather");

Serial.println("Initializing BMP280");

boolean status = bmp280.begin(0x76);

if (!status) {

Serial.println("BMP280 Not connected!");

}

Serial.println("Done");

Serial.print("Connecting to SSID: ");

Serial.print(WIFISSID);
```

```
Serial.print(", Password: ");

Serial.println(WIFIPASS);

client.wifiConnection(WIFISSID,WIFIPASS);

Serial.println("Done");
Serial.println(" Initializing Ubidots Connection...");
```

```cpp
client.ubidotsSetBroker("industrial.api.ubidots.com"); // Sets the broker properly for the

business account

client.setDebug(true); // Pass a true or false bool value to activate debug messages

client.begin(callback);

Serial.println("Done");

Serial.println("DONE");

}
void loop() {

// Acquiring data from BMP280

float temperature = bmp280.readTemperature();

float pressure = bmp280.readPressure();

Serial.print("Temperature: ");

Serial.print(temperature);

Serial.println(" °C");

Serial.print("Pressure: ");

Serial.print(pressure);
```

```
Serial.println(" Pa");

// Establising connection with Ubidots

if (!client.connected()) {

client.reconnect();

}
```

```
// Publising data of both variable to Ubidots

client.add("temperature", temperature); // Insert your variable
Labels and the value to be

sent

client.add("pressure", pressure);

//client.add("altitude", altitude); // Insert your variable Labels
and the value to be sent

//client.add("wbp", water_boiling_point);

client.ubidotsPublish("weather-forecasting"); // insert your

device label here

client.loop();

delay(5000);

}
```
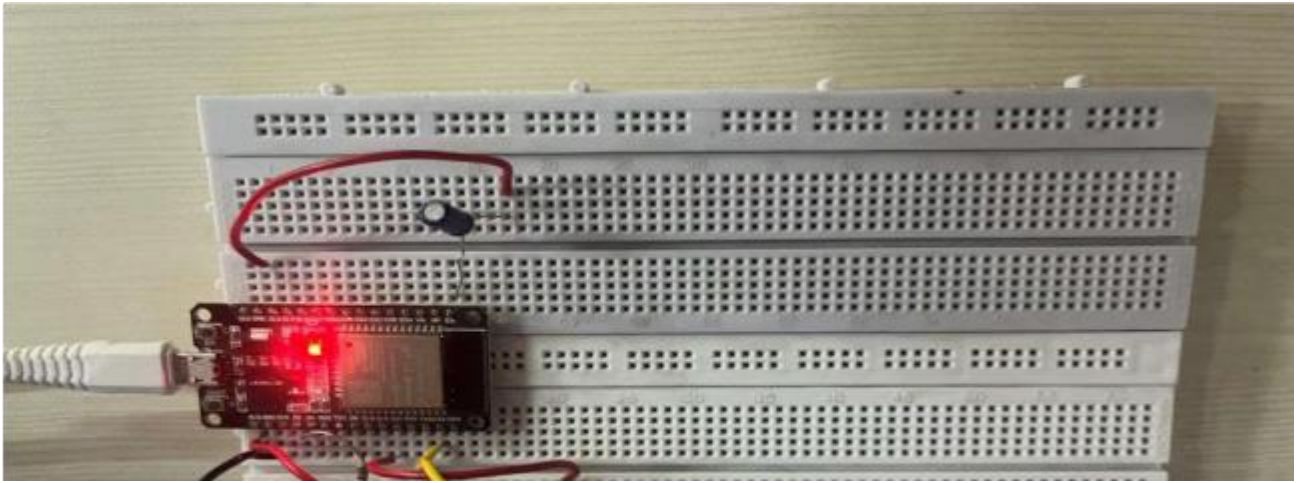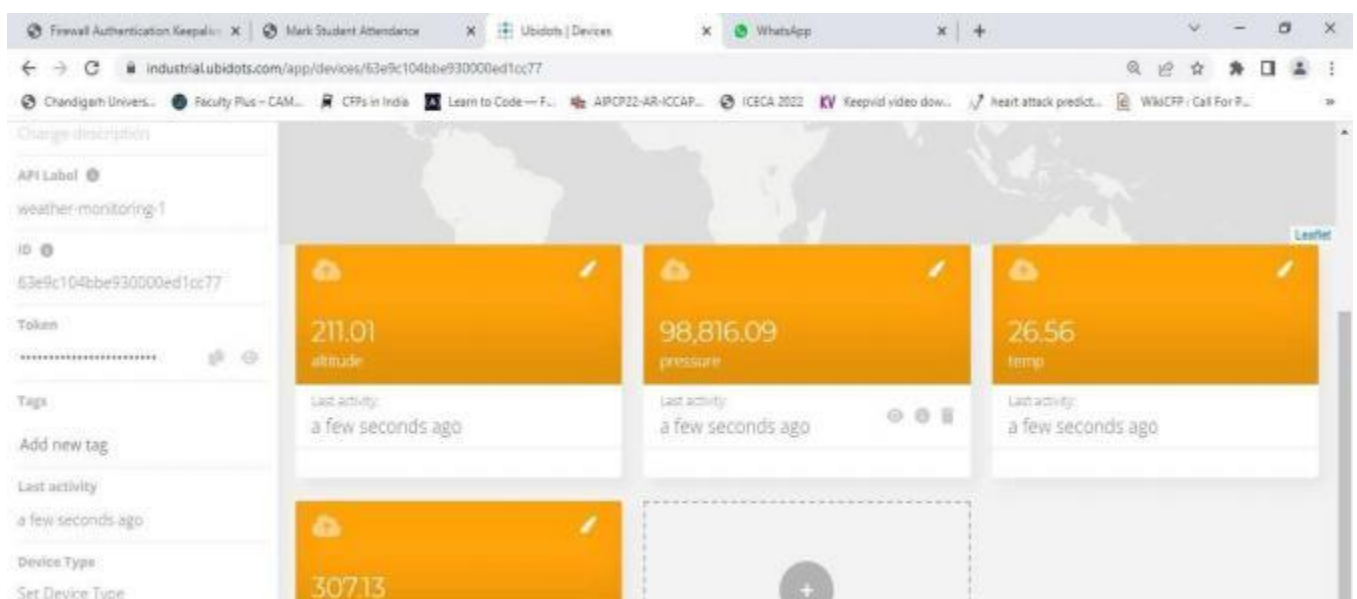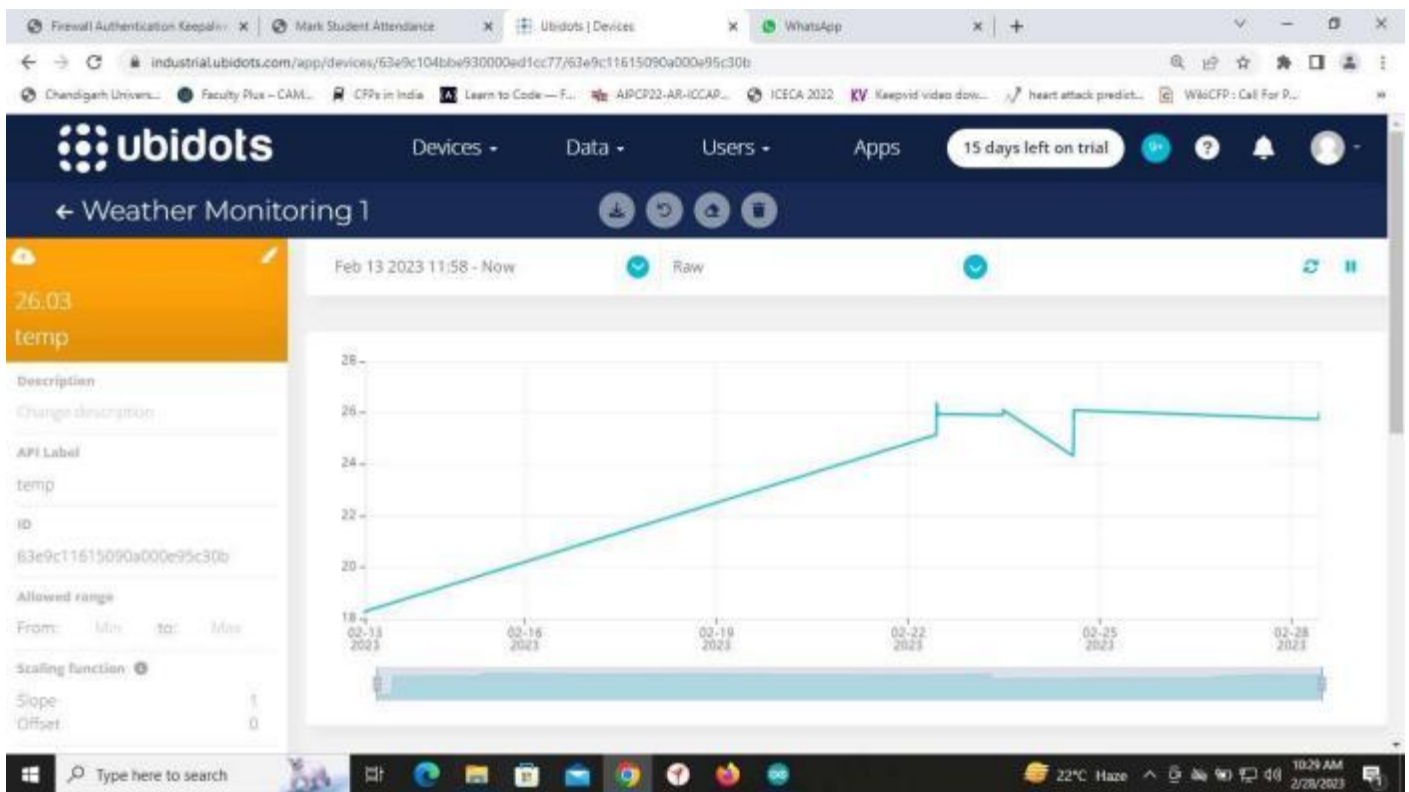
Observations, stimulation, screenshots and discussions-

COM3 — □ ×

Send

Pressure: 98800.34 Pa
Altitude: 212.35 m
Water Boiling Point: 307.12 F
publishing to TOPIC:
/v1.6/devices/weather-monitoring-1
JSON dict: {"temp": [{"value": 26.51}], "pressure": [{"value": 98800.34}], "altitude": [{"value": 212.35}], "wbp": [{"value": 307.12}]}
Temperature: 26.51 °C
Pressure: 98802.73 Pa
Altitude: 212.14 m
Water Boiling Point: 307.12 F
publishing to TOPIC:
/v1.6/devices/weather-monitoring-1
JSON dict: {"temp": [{"value": 26.51}], "pressure": [{"value": 98802.73}], "altitude": [{"value": 212.14}], "wbp": [{"value": 307.12}]}
Temperature: 26.51 °C
Pressure: 98808.73 Pa
Altitude: 211.63 m
Water Boiling Point: 307.12 F
publishing to TOPIC:
/v1.6/devices/weather-monitoring-1
JSON dict: {"temp": [{"value": 26.51}], "pressure": [{"value": 98808.73}], "altitude": [{"value": 211.63}], "wbp": [{"value": 307.12}]}
Temperature: 26.55 °C
Pressure: 98805.80 Pa
Altitude: 211.88 m
Water Boiling Point: 307.12 F
publishing to TOPIC:
/v1.6/devices/weather-monitoring-1
JSON dict: {"temp": [{"value": 26.55}], "pressure": [{"value": 98805.80}], "altitude": [{"value": 211.88}], "wbp": [{"value": 307.12}]}

Autoscroll ☐ Show timestamp   Newline ∨   9600 baud ∨   Clear output

Result and summary-

BMP280 was successfully used to determine the temperature and pressure inside the Lab.

EVALUATION COLUMN(To be filled by Concerned faculty only)

Sr.No.	Parameters	Maximum Marks	Marks Obtained
1.	WorksheetCompletion	10	
2.	Viva	8	
3.	Conduct	12	
	TotalMarks	30	