



# Smart Farmer-IOT Enabled Smart Farming Application

IBM NALAIYATHIRAN

## Assignment -4

|                         |   |
|-------------------------|---|
| <b>TITLE</b>            | <b>Smart Farmer-IOT Enabled Smart Farming Application</b> |
| <b>DOMAIN NAME</b>      | INTERNET OF THINGS  |
| <b>TEAM ID</b>          | PNT2022TMID17252  |
| <b>LEADER NAME</b>      | KARTHICKRAJA M  |
| <b>TEAM MEMBER NAME</b> | KAVIN M<br>KAVIYARASAN R<br>LOGANATHAN K                  |
| <b>MENTOR NAME</b>      | DIVYA BHARATHI G  |

### Question-1:

Write code and connections in wokwi for the ultrasonic sensor. Whenever the distance is less than 100 cms send an "alert" to the IBM cloud and display in the device recent events. Upload document with wokwi share link and images of IBM cloud

### CODE :

```
#include <WiFi.h>
#include <PubSubClient.h> void callback(char* subscribetopic, byte* payload,
unsigned int payloadLength);
#define ORG "92zbfc"
#define DEVICE_TYPE "esp32"
#define DEVICE_ID "12345"
#define TOKEN "12345678" String data3; char server[] = ORG
".messaging.internetofthings.ibmcloud.com"; char
publishTopic[] = "iot-2/evt/Data/fmt/json"; char subscribetopic[]
= "iot-2/cmd/test/fmt/String"; char authMethod[] = "use-token-
```

```

auth"; char token[] = TOKEN; char clientId[] = "d:" ORG ":"
DEVICE_TYPE ":" DEVICE_ID;
WiFiClient wifiClient;
PubSubClient client(server, 1883, callback ,wifiClient);
const int trigPin = 5; const int echoPin = 18; #define
SOUND_SPEED 0.034 long duration; float distance;
void setup() { Serial.begin(115200); pinMode(trigPin,
OUTPUT); pinMode(echoPin, INPUT); wificonnect();
mqttconnect();
}
void loop() {
digitalWrite(trigPin, LOW);
delayMicroseconds(2);
digitalWrite(trigPin, HIGH);
delayMicroseconds(10);
digitalWrite(trigPin, LOW); duration
= pulseIn(echoPin, HIGH); distance
= duration * SOUND_SPEED/2;
Serial.print("Distance (cm): ");
Serial.println(distance); if(distance<100)
{
Serial.println("ALERT!!");
delay(1000);
PublishData(distance);
delay(1000); if
(!client.loop()) {
mqttconnect();
} }
delay(1000)
; }
void PublishData(float dist) { mqttconnect();
String payload = "{"Distance\":"; payload += dist; payload
+= ",\\"ALERT!!\":"\\"Distance less than 100cms\\""
payload += "}";
Serial.print("Sending payload: ");
Serial.println(payload);

if (client.publish(publishTopic, (char*) payload.c_str())) {
Serial.println("Publish ok");
} else {
Serial.println("Publish failed");
} }
void mqttconnect() { if
(!client.connected()) {
Serial.print("Reconnecting client to ");
Serial.println(server);
while (!client.connect(clientId, authMethod, token)) {
Serial.print("."); delay(500);
}
initManagedDevice();
Serial.println();
} }

```

```

void wificonnect()
{
  Serial.println();
  Serial.print("Connecting to "); WiFi.begin("Wokwi-GUEST", "", 6); while (WiFi.status() !=
WL_CONNECTED) { delay(500); Serial.print(".");
}
  Serial.println("");
  Serial.println("WiFi connected");
  Serial.println("IP address: ");
  Serial.println(WiFi.localIP());
}

void initManagedDevice() {
  if (client.subscribe(subscribetopic)) { Serial.println((subscribetopic));
  Serial.println("subscribe to cmd OK");
  } else {
  Serial.println("subscribe to cmd FAILED");
  } }

void callback(char* subscribetopic, byte* payload, unsigned int payloadLength)
{
  Serial.print("callback invoked for topic: ");
  Serial.println(subscribetopic); for (int i = 0; i
< payloadLength; i++)
{
  data3 += (char)payload[i];
}
  Serial.println("data: "+ data3); data3="";
}
Wokwi Link :

```

<https://wokwi.com/projects/345395196387656275>

Output and Simulation :

The screenshot displays the Wokwi web interface for a project titled "sketch.ino". The code is a C++ sketch for an ESP32 microcontroller, designed to connect to an IBM Watson IoT Platform and publish sensor data. The code includes the following components:

- Libraries:** `<WiFi.h>` for WiFi connectivity, `<PubSubClient.h>` for MQTT, `<DHT.h>` for the DHT11 sensor, and `<Arduino.h>` for the Arduino framework.
- Constants:** `DHTPIN` is defined as 15, `DHTTYPE` is defined as `DHT22`, and `LED` is defined as 2.
- Instance Creation:** A `DHT` object is created using `DHTPIN` and `DHTTYPE`.
- MQTT Configuration:** The `callback` function is defined to handle incoming messages. The `server` is set to `ORG "i3069j"//IBM ORGANITION ID`. The `publishTopic` is set to `"iot-2/evt/Data/fmt/json"`. The `authMethod` is set to `"use-token-auth"`.
- Data Collection:** The `callback` function reads the sensor data and publishes it to the IoT platform using `client.publish(topic, payload)`.
- Simulation:** The simulation window shows a virtual circuit with an ESP32, a red LED, and a DHT22 sensor. The console output shows the device successfully connecting to the IoT platform and publishing temperature and humidity data.

The console output shows the following sequence of events:

```

Humid:40.00
Sending payload: {"temp":24.00,"Humid":40.00}
Publish ok
temp:24.00
Humid:40.00
Sending payload: {"temp":24.00,"Humid":40.00}
Publish ok

```

Whenever the distance is less than 100 cms send an "alert" to the IBM cloud and display in the device recent events.

Delete

1 item selected

Cancel

| Device ID | Status    | Device Type | Class ID | Date Added          | Descriptive Location |
|-----------|-----------|-------------|----------|---------------------|----------------------|
| 12345     | Connected | esp32       | Device   | Nov 1, 2022 9:53 PM |                      |

Identity

Device Information

Recent Events

State

Logs

The recent events listed show the live stream of data that is coming and going from this device.

| Event | Value  | Format | Last Received     |
|-------|--|--------|-------------------|
| Data  | {\"Distance\":72.96,\"ALERT!\": \"Distance less than ... | json   | a few seconds ago |
| Data  | {\"Distance\":72.96,\"ALERT!\": \"Distance less than ... | json   | a few seconds ago |
| Data  | {\"Distance\":72.96,\"ALERT!\": \"Distance less than ... | json   | a few seconds ago |

>

2001

Disconnected

raspberrypi

Device

Oct

0 Simulations running

Items per page 50

1-2 of 2 items

Type here to search

ENG

10:06 PM

01-11-2022