

## ASSIGNMENT – 4

Assignment date	29 October 2022
Project name	Iot Based Smart Crop Protection System for Agriculture
Team ID	PNT2022TMID08774
Maximum mark	2 Marks

### QUESTION 1:

Write code and connections in wokwi for ultrasonic sensor. Whenever distance is less than 100cms send "alert" to ibm cloud and display in device recent events.

**WOKWI LINK:** <https://wokwi.com/projects/347127533902234196>

### CODE:

```
#include <WiFi.h>
#include <PubSubClient.h>

void callback(char* subscribetopic, byte* payload, unsigned int payloadLength);

#define ORG "akptwo"
#define DEVICE_TYPE "ESP32_Controller"
#define DEVICE_ID "BME280_Sensor"
#define TOKEN "pySeb&4Lc@4tEHID(n"
String data3;
float dist;

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);
```

```
int LED = 4;
int trig = 5;
int echo = 18;
void setup()
{
  Serial.begin(115200);
  pinMode(trig,OUTPUT);
  pinMode(echo,INPUT);
  pinMode(LED, OUTPUT);
  delay(10);
  wificonnect();
  mqttconnect();
}
void loop()
{

  digitalWrite(trig,LOW);
  digitalWrite(trig,HIGH);
  delayMicroseconds(10);
  digitalWrite(trig,LOW);
  float dur = pulseIn(echo,HIGH);
  float dist = (dur * 0.0343)/2;
  Serial.print ("Distance in cm :");
  Serial.println(dist);

  PublishData(dist);
  delay(1000);
  if (!client.loop()) {
    mqttconnect();
  }
}

void PublishData(float dist) {
  mqttconnect();
  String object;
  if (dist <100)
  {
    digitalWrite(LED,HIGH);
    Serial.println("object is near");
    object = "Near";
  }
  else
  {
```

```

    digitalWrite(LED, LOW);
    Serial.println("no object found");
    object = "No";
}

String payload = "{\"distance\":";
payload += dist;
payload += "," " \"object\":";
payload += object;
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];
  }
}
data3="";
}

```

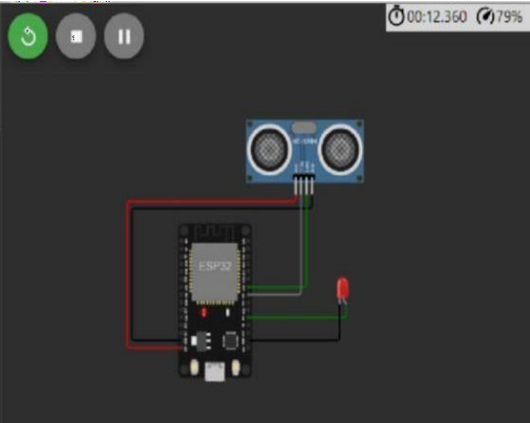
## OUTPUT:

### When object is nearer to Ultrasonic sensor

```

1  #include <WiFi.h>
2  #include <PubSubClient.h>
3
4  void callback(char* subscribetopic, byte* payload, unsigned int payloadLength);
5
6  #define ORG "f59trs"
7  #define DEVICE_TYPE "ultrasonicsensor"
8  #define DEVICE_ID "distancedetection"
9  #define TOKEN "A1GMGaaF01nawa1QA3"
10 String data3;
11 float dist;
12
13 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
14 char publishTopic[] = "iot-2/evt/Data/fmt/json";
15 char subscribetopic[] = "iot-2/cmd/test/fmt/String";
16 char authMethod[] = "use-token-auth";
17 char token[] = TOKEN;
18 char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
19
20
21 WiFiClient wifiClient;
22 PubSubClient client(server, 1883, callback, wifiClient);
23
24 int LED = 4;
25 int trig = 5;
26 int echo = 18;
27 void setup()
28 {
29   Serial.begin(115200);
30   pinMode(trig, OUTPUT);

```



00:12.360 79%

```

no object found
Sending payload: {"distance":403.49,"object":"No"}
Publish ok
Distance in cm :403.49
no object found
Sending payload: {"distance":403.49,"object":"No"}
Publish ok

```

## Data sent to the ibm cloud when the object is near

The screenshot displays the IBM Cloud IoT Platform console. The top navigation bar includes 'Browse', 'Action', 'Device Types', and 'Interfaces'. A sidebar on the left contains icons for various functions. The main content area shows details for a device named 'Arul\_1', which is 'Connected'. The 'Recent Events' tab is selected, displaying a table of events. The table has four columns: 'Event', 'Value', 'Format', and 'Last Received'. It lists five events, all with the value '{"Alert distance":58}', '{"Alert distance":51}', '{"Alert distance":64}', '{"Alert distance":25}', and '{"Alert distance":74}' respectively, all in 'json' format and received 'a few seconds ago'. The bottom of the console shows 'Items per page 50' and '1 of 1 page'. A status bar at the bottom indicates '1 Simulation running'.

Event	Value	Format	Last Received
event_1	{"Alert distance":58}	json	a few seconds ago
event_1	{"Alert distance":51}	json	a few seconds ago
event_1	{"Alert distance":64}	json	a few seconds ago
event_1	{"Alert distance":25}	json	a few seconds ago
event_1	{"Alert distance":74}	json	a few seconds ago