

ASSIGNMENT – 4

Assignment date	29 October 2022
Project name	Iot Based Smart Crop Protection System for Agriculture
Team ID	PNT2022TMID01702
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];

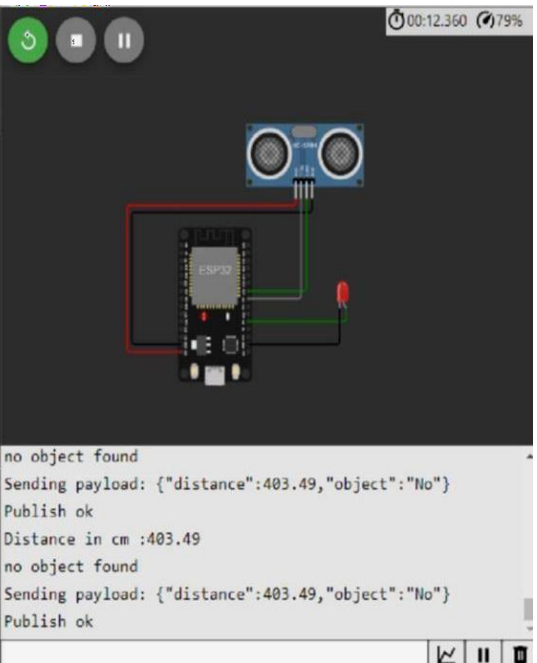
```

```
} 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 "A1GMGaaF0inawa1QA3"  
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);  
31  
32   client.connect();  
33   if (client.connected()) {  
34     client.publish(publishTopic, "no object found");  
35     Serial.println("Sending payload: {\"distance\":403.49,\"object\":\"No\"}");  
36     client.publish(subscribetopic, "no object found");  
37     Serial.println("Publish ok");  
38     delay(1000);  
39     client.publish(publishTopic, "Distance in cm :403.49");  
40     Serial.println("no object found");  
41     client.publish(subscribetopic, "Sending payload: {\"distance\":403.49,\"object\":\"No\"}");  
42     Serial.println("Publish ok");  
43   }  
44 }
```



Data sent to the ibm cloud when the object is near

The screenshot shows the IBM Watson IoT Platform dashboard. The top navigation bar includes tabs for Browse, Action, Device Types, and Interfaces. A search bar is present, and a 'Device Simulator' toggle is visible. The main content area displays details for a device with ID 12345, which is currently 'Disconnected'. The 'Recent Events' tab is selected, showing a table of events.

Event	Value	Format	Last Received
Distance	{"distance":74}	json	a few seconds ago
Distance	{"distance":89}	json	a few seconds ago
Distance	{"distance":12}	json	a few seconds ago
Distance	{"distance":52}	json	a few seconds ago
Distance	{"distance":45}	json	a few seconds ago

At the bottom of the screen, a Windows taskbar is visible with the text '1 Simulation running' and a system tray showing the date and time as 15:29 on 31-10-2022.