

# ASSIGNMENT - 4

## SMARTFARMER - IOT ENABLED SMART FARMING APPLICATION

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### 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 1 :

```
#include <WiFi.h>
#include <PubSubClient.h> void callback(char* subscribetopic, byte* payload, unsigned
int payloadLength);
#define ORG "ocknc6"
#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[] =
"iot2/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="";
}

```

## Output and Simulation :

WOKWI SAVE SHARE sketch.ino Docs

sketch.ino diagram.json library.txt libraries.txt Library Manager

```

1 #include <WiFi.h>
2 #include <PubSubClient.h>
3 void callback(char* topic, byte* payload, unsigned int payloadLength)
4 #define ORG "ocknc6"
5 #define DEVICE_TYPE "esp32"
6 #define DEVICE_ID "12345"
7 #define TOKEN "12345678"
8 String data3;
9 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
10 char publishTopic[] = "iot-2/evt/Data/fmt/json";
11 char subscribTopic[] = "iot-2/cmd/test/fmt/String";
12 char authMethod[] = "use-token-auth";
13 char token[] = TOKEN;
14 char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
15 WiFiClient wifiClient;
16 PubSubClient client(server, 1883, callback, wifiClient);
17 const int trigPin = 5;
18 const int echoPin = 18;
19 #define SOUND_SPEED 0.034
20 long duration;
21 float distance;
22 void setup() {
23   Serial.begin(115200);
24   pinMode(trigPin, OUTPUT);
25   pinMode(echoPin, INPUT);
26   wifiConnect();
27   mqttConnect();

```

Simulation 00:37.057 99%

Editing Ultrasonic Distance Sensor  
Distance: 59cm

Distance (cm): 51.99  
ALERT!!  
Sending payload: {"Distance":51.99,"ALERT!!":"Distance less than 100cms"}  
Publish ok  
Distance (cm): 51.99  
ALERT!!  
Sending payload: {"Distance":51.99,"ALERT!!":"Distance less than 100cms"}  
Publish ok

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

Browse Action Device Types Interfaces Add Device

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":51.99,"ALERT!!":"Distance less than ...	json	a few seconds ago
Data	{"Distance":51.99,"ALERT!!":"Distance less than ...	json	a few seconds ago
Data	{"Distance":51.99,"ALERT!!":"Distance less than ...	json	a few seconds ago

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