

Assignment -4

Student Name	P .Nagasri
Student Roll Number	810419106037
Project Name	IOT based child safety monitoring gadget

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 "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 :

Output and Simulation :

The screenshot shows the Wokwi web interface. On the left, the sketch code is displayed, which includes an ESP32 setup with an Ultrasonic Distance Sensor. The code defines an MQTT client and publishes distance data to an IBM Watson IoT topic. On the right, the simulation window shows the physical components: an ESP32 board and an HC-SR04 sensor. Below the simulation, the console output shows the device sending MQTT payloads when the distance is less than 100cm.

```
1 #include <WiFi.h>
2 #include <PubSubClient.h>
3 void callback(char* topic, byte* payload, unsigned int payloadlength);
4 #define ORG "92zbfc"
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();
28 }
29 void loop()
30 {
31   digitalWrite(trigPin, LOW);
32   delayMicroseconds(2);
33   digitalWrite(trigPin, HIGH);
34   delayMicroseconds(10);
```

Simulation output:

```
ALERT!!
Sending payload: {"Distance":72.96,"ALERT!!":"Distance less than 100cms"}
Publish ok
Distance (cm): 72.96
ALERT!!
Sending payload: {"Distance":72.96,"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.

The screenshot shows the IBM Watson IoT Platform dashboard. The top navigation bar includes the IBM logo and the user profile. The main content area displays the details for a device with ID 12345, which is an ESP32. The 'Recent Events' tab is selected, showing a list of events where the distance is less than 100cm, triggering an alert.

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