

## Assignment 4

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**Maximum Marks :** 2 Marks

**Project Name :** IoT based safety gadget for child  
safety monitoring notification

### Question :

Write a code and connections in wokwi for the ultrasonic sensor. Whenever the distance is less than 100cms send an "Alert" to IBM cloud and display in the device recent events.

### Code:

```
#include
<WiFi.h>
#include
<PubSubClient.h>
void callback(char* subscribetopic, byte* payload,
unsigned int payloadLength);
//-----credentials of IBM Accounts-----
#define ORG "kotoq5"//IBM ORGANITION ID
#define DEVICE_TYPE "ESP32"//Device type mentioned in ibm
watson IOT Platform#define DEVICE_ID "12345"//Device ID
mentioned in ibm watson IOT Platform #define TOKEN
"12345678" //Token
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("Reconnectin  
g 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++) {
```



```
//Serial.print((char)payload[i])  
; data3 += (char)payload[i];  
}  
Serial.println("data: "+  
data3); data3="";  
}
```

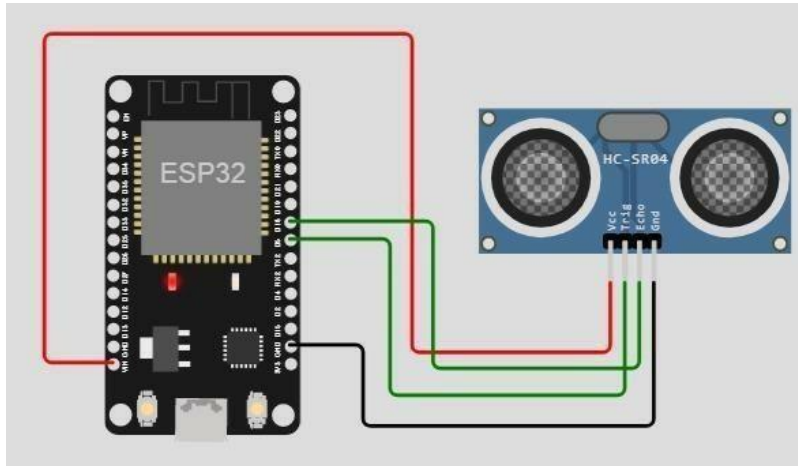
**Diagram.json:**

```
{  
  "version": 1,  
  "author":  
    "sweetysharon",  
  "editor":  
    "wokwi",  
  "parts": [  
    { "type": "wokwi-esp32-devkit-v1", "id": "esp", "top": -4.67, "left": -114.67,  
      "attrs": {} },  
    { "type": "wokwi-hc-sr04", "id": "ultrasonic1", "top": 15.96, "left": 89.17,  
      "attrs": {} }  
  ],  
  "connections": [  
    [ "esp:TX0", "$serialMonitor:RX", "", [] ],  
    [ "esp:RX0", "$serialMonitor:TX",  
      "", [] ], [
```

```
"esp:VIN",  
"ultrasonic1:  
VCC"  
 , "red",  
 [ "h-37.16", "v-178.79", "h200", "v173.33", "h100.67" ]  
],  
[ "esp:GND.1", "ultrasonic1:GND", "black", [ "h39.87", "v44.04", "h170" ] ],  
[ "esp:D5", "ultrasonic1:TRIG", "green", [ "h54.54", "v85.07", "h130.67" ] ],  
[ "esp:D18", "ultrasonic1:ECHO", "green", [ "h77.87", "v80.01", "h110" ] ]
```

```
]
}
```

## Circuit Diagram:



## Output:

output:

```
Connecting to ....
WiFi connected
IP address:
10.10.0.2
Reconnecting client to ytluse.messaging.internetofthings.ibmcloud.com
iot-2/cmd/test/fmt/String
subscribe to cmd OK

Distance (cm): 399.92
Distance (cm): 399.96
Distance (cm): 399.94
Distance (cm): 399.98
Distance (cm): 399.94
Distance (cm): 399.92
Distance (cm): 399.94
```

IBM cloud output:

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     |
|---------|--|--------|-------------------|
| event_1 | {"distance":7,"Alert":"Distance less than 10"} | json   | a few seconds ago |
| event_1 | {"distance":9,"Alert":"Distance less than 10"} | json   | a few seconds ago |
| event_1 | {"distance":8,"Alert":"Distance less than 10"} | json   | a few seconds ago |
| event_1 | {"distance":9,"Alert":"Distance less than 10"} | json   | a few seconds ago |