

ASSIGNMENT 4

Assignment Date	03 November 2022
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Maximum Marks	2 Marks

Ultrasonic sensor simulation in Wokwi

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>
voidcallback(char*subscribetopic,byte*payload,unsignedint payloadLength);
//-----credentials of IBM Accounts-----
#define ORG "kotoq5"//IBM ORGANITIONID
#defineDEVICE_TYPE"ESP32"//DevicetypementionedinibmwatsonIOTPlatform #defineDEVICE_ID
"12345"//DeviceIDmentionedinibmwatsonIOTPlatform
#defineTOKEN"12345678"//Token String
data3;
```

```
charserver[]=ORG".messaging.internetofthings.ibmcloud.com"; char publishTopic[] =  
"iot-2/evt/Data/fmt/json";  
charsubscribetopic[]="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("IPAddress:
"); 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++) {
```

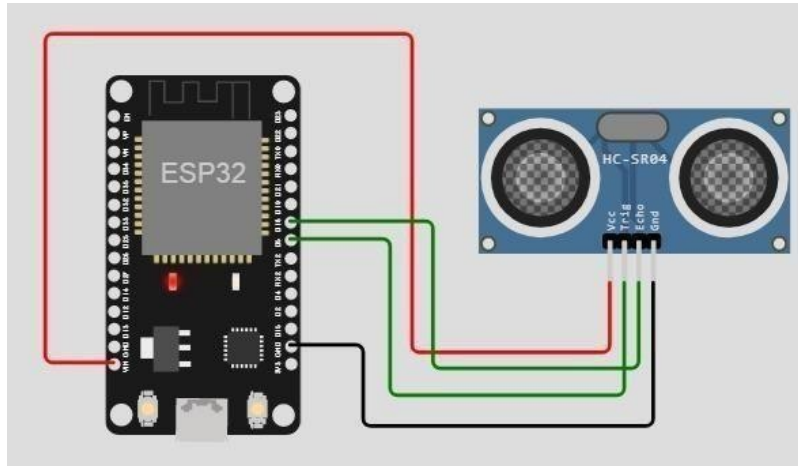
```
//Serial.print((char)payload[i]); data3 +=
(char)payload[i];
}
Serial.println("data:"+data3); data3="";
}
```

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:

Wokwi 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

X

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