

Assignment 4

Assignment date	22 October 2022
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Maximum Marks	2 marks

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* subscribetic, 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 subscribetic[] = "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++) {

```

```

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

```

Diagram.json:

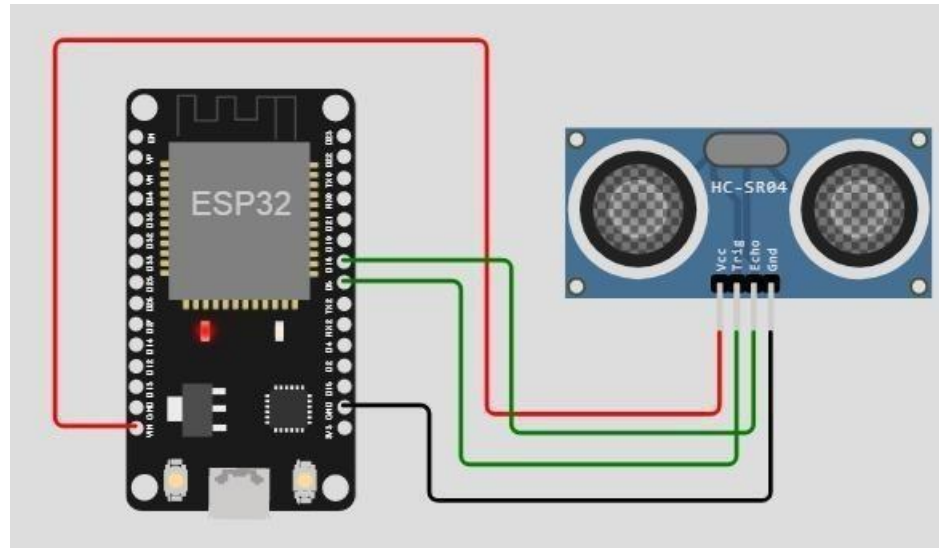
```

{
  "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:

BrowseActionDevice TypesInterfaces

Add Device+

IdentityDevice InformationRecent EventsStateLogs

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