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ASSIGNMENT 4 :

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 intpayloadLength);

//-----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("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:

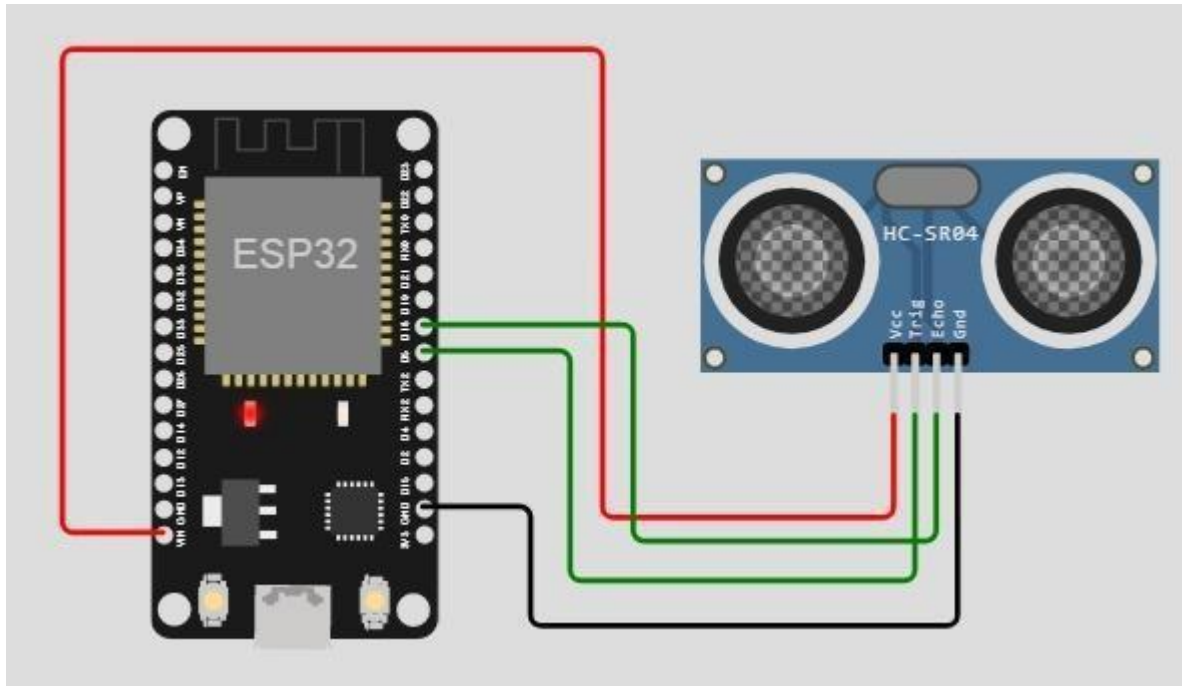
```
{
"version": 1,
"author": "sweetysharon",
"editor": "wokwi",
```

```
"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" ] ]  
]  
}
```

Wokwi simulation link:

<https://wokwi.com/projects/346508314441417298>

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