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ASSIGNMENT 4

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>
void callback(char* subscribetopic, byte* payload,
unsigned int payloadLength);
//-----credentials of IBM Accounts-----
#define ORG "ge3f42"//IBM ORGANITION ID
#define DEVICE_TYPE "ESP32"//Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "3A-85-DD-94-7D-BC"//Device ID mentioned in ibm watson
IOT Platform #define TOKEN "sPNiIvo1-SQoK4Dhx8" //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(100);
PublishData(distance);
delay(100);
if (!client.loop()) {
mqttconnect();
}
}
delay(100);
}
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(100);
}
initManagedDevice();
Serial.println();
}
}
}

```

```

void wificonnect()
{
  Serial.println();
  Serial.print("Connecting to ");
  WiFi.begin("Wokwi-GUEST", "", 6);
  while (WiFi.status() != WL_CONNECTED) {
    delay(100);
    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": -112.87, "attrs": {} },
    { "type": "wokwi-hc-sr04", "id": "ultrasonic1", "top": 15.96, "left": 89.17, "attrs": {} }
  ],
  "connections": [
    [ "esp:TX0", "$serialMonitor:RX", "", [] ],
    [ "esp:RX0", "$serialMonitor:TX", "", [] ],

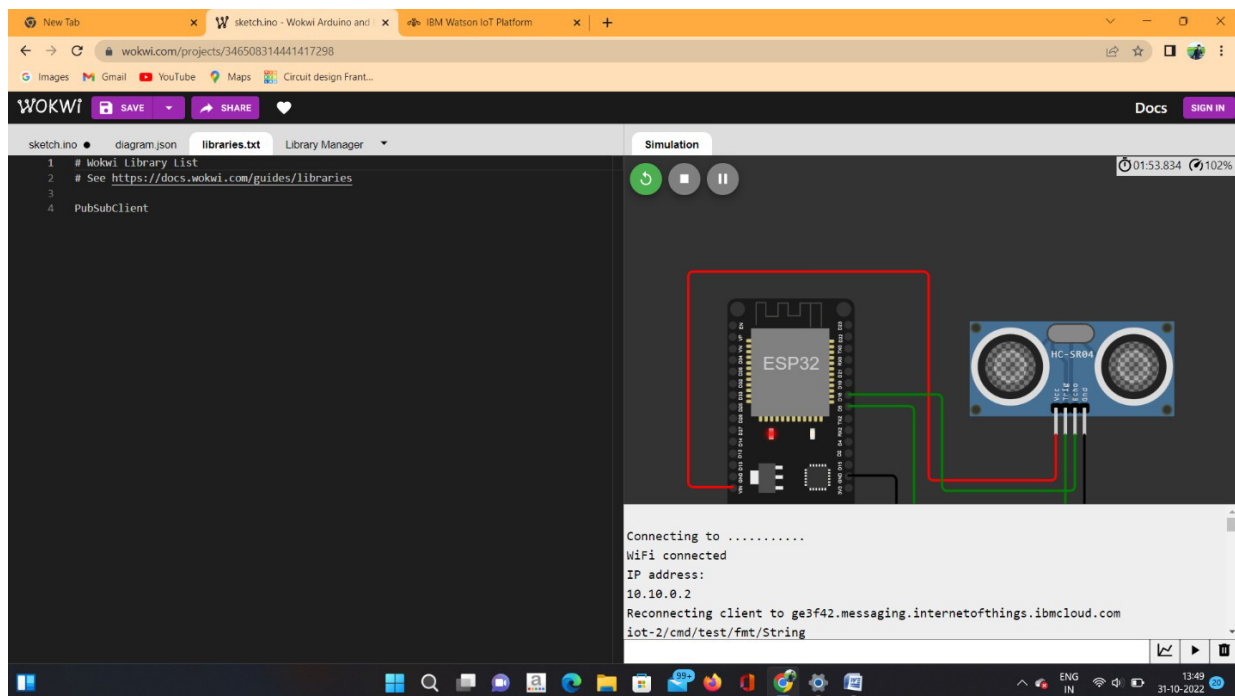
```

```

[
  "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" ] ]
]
}

```

OUTPUT :



IBM Watson IoT Platform

913019104009@smarinternz.com
ID: ge3f42

Browse Action Device Types Interfaces

Search by Device ID

Device Simulator

Device ID	Status	Device Type	Class ID	Date Added	Descriptive Location
3A-85-DD-94-7D-BC	Disconnected	ESP32	Device	Oct 31, 2022 1:40 PM	

Identity Device Information Recent Events State Logs

Showing Raw Data | No Interfaces Available

Property	Value	Type	Event	Last Received
Distance	399.94	Number	Data	a few seconds ago
ALERT!!	Distance less than 100cms	String	Data	a few seconds ago

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CIRCUIT DIAGRAM :

