

ASSIGNMENT – 4

Assignment Date	22 October 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 100 cm, send an "Alert" to IBM cloud and display in the device recent events.

Code:

```
#include
<WiFi.h>#include<PubSubClient.h>
void callback(char*topic,byte*payload,unsignedintpayloadLength);
//-----credentials of IBM Accounts-----
```

```

#defineORG"kotoq5"//IBMORGANITIONID
#defineDEVICE_TYPE"ESP32"//DevicetypementionedinibmwatsonIOTPlatform#
defineDEVICE_ID "12345"//Device ID mentioned in ibmwatson IOT
Platform#defineTOKEN"12345678"//Token
Stringdata3;
charserver[]=ORG".messaging.internetofthings.ibmcloud.com";charp
ublishTopic[]="iot-2/evt/Data/fmt/json";
charsubscribetopic[]="iot-
2/cmd/test/fmt/String";charauthMethod[]="use-token-
auth";

chartoken[]=TOKEN;
charclientId[]="d:"ORG":"DEVICE_TYPE":"DEVICE_ID;
WiFiClientwifiClient;
PubSubClientclient(server,1883,callback,wifiClient);constint
trigPin =5;
const int echoPin =
18;#defineSOUND_SPEED0.0
34longduration;
floatdistance;
voidsetup(){
Serial.begin(115200);pinMod
e(trigPin,OUTPUT);pinMode(e
choPin,
INPUT);wificonnect();mqttco
nnect();
}

```

```

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.connected()){mqtt.connect(
      "mqtt://192.168.1.100:1883");
    ;
    }
    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");S
        erial.println(server);
        while(!!!client.connect(clientId,authMetho
        d,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("WiFiconnected");
Serial.println("IP address:
");Serial.println(WiFi.localIP());
}
voidinitManagedDevice(){
if (client.subscribe(subscribetopic))
{Serial.println((subscribetopic)); Serial.println("subscribe
tocmdOK");
}else{
Serial.println("subscribetocmdFAILED");
}
}
voidcallback(char*subscribetopic,byte*payload,unsignedintpayloadLength)
{
Serial.print("callbackinvokedfortopic:");
Serial.println(subscribetopic);
for(inti=0;i<payloadLength;i++){

        //Serial.print((char)pa
        yload[i]);
        data3+=(char)payload
        [i];

```

```

    }
    Serial.println("data:"+data3);data3="";
  }
}

```

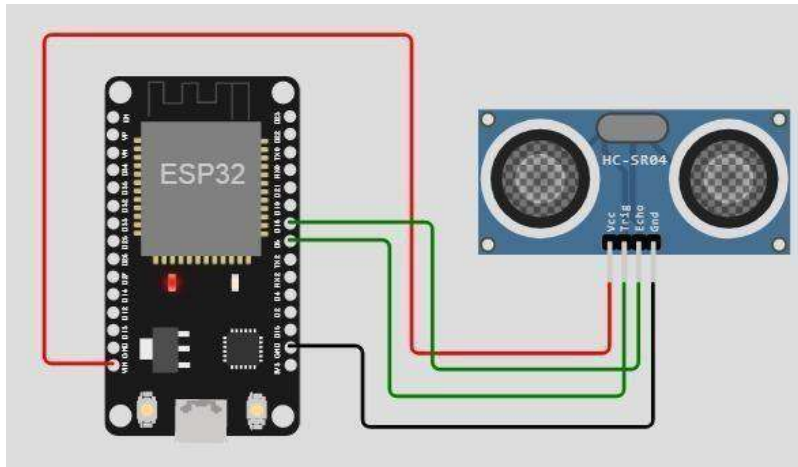
Diagram.json:

```

{
  "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"]
  ]
}

```

CircuitDiagram:



Output:

Wokwioutput:

```
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
```

IBMcloudoutput:

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