ASSIGNMENT – 4

Assignment Date	22 October 2022
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Maximum Marks	2 Marks

Ultrasonic sensor simulation in Wokwi

Question:

Writeacodeandconnectionsinwokwifortheultrasonicsensor.Wheneverthedistanceisle ssthan100cmssen d an"Alert" to IBM cloudanddisplayinthedevicerecentevents.

Code:

```
#include
<WiFi.h>#include<PubSu
bClient.h>
voidcallback(char*subscribetopic,byte*payload,unsignedintpayloadL
ength);
//-------credentialsofIBMAccounts------
```

```c
#define ORG "kotoq5"//IBMORGANITIONID
#define DEVICE_TYPE "ESP32"//DevicetypementionedinibmwatsonIOTPlatform#
define DEVICE_ID "12345"//Device ID mentioned in ibmwatson IOT
Platform#define TOKEN "12345678"//Token
String data3;
char server[]=ORG".messaging.internetofthings.ibmcloud.com";char p
ublishTopic[]="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 0.0
34 long duration;
float distance;
void setup(){
Serial.begin(115200);pinMod
e(trigPin,OUTPUT);pinMode(e
choPin,
INPUT);wificonnect();mqttco
nnect();
}
```

```
void loop()
{
digitalWrite(trigPin,
LOW);delayMicroseconds(2);digitalWr
ite(trigPin,
HIGH);delayMicroseconds(10);digital
Write(trigPin,LOW);duration =
pulseIn(echoPin,
HIGH);distance=duration*SOUND_SPEED
/2;Serial.print("Distance (cm):
");Serial.println(distance);if(distance<100)
{
Serial.println("ALERT!!");de
lay(1000);

                PublishDat
                a(distance)
                ;
                delay(100
                0);
                if(!client.l
                oop()){mq
                ttconnect()
                ;
                }
                }
                delay(1000);
                }
```

```arduino
                void PublishData(float dist){mqttconnect(
                );

                String payload="{\"Distance\":";payload+
                =dist;
                payload+=",\"ALERT!!\":""\"Distancelessthan100cms\"
                ";payload+="}";
    Serial.print("Sendingpayload:");Serial.println(payload);

                if(client.publish(publishTopic,(char*)payload.c_str())){
    Serial.println("Publishok");
                }else{
                Serial.println("Publishfailed");
                }
                }
                void mqttconnect(){
                if (!client.connected())
                {Serial.print("Reconnectingclientto");S
                erial.println(server);
                while(!!!client.connect(clientId,authMetho
                d,token)){Serial.print(".");
                delay(500);
                }
initManagedDevice();
Serial.println();
}
}
void wificonnect()
{
```

```cpp
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","ultraso
            nic1: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:
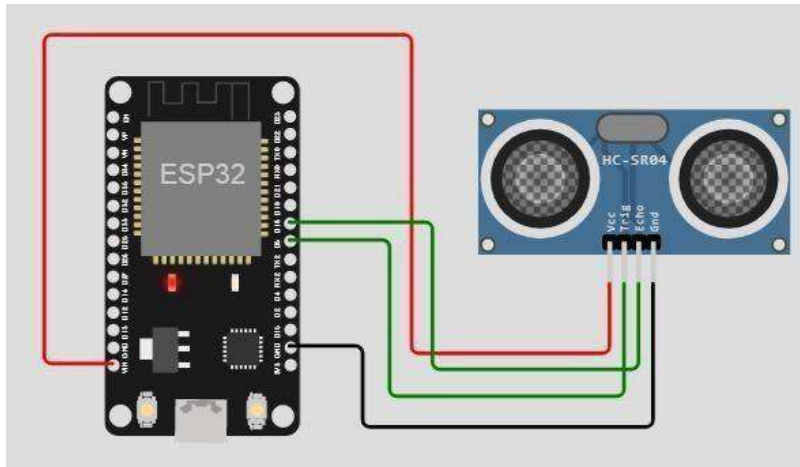
Output:
Wokwioutput:

```
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:

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

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.