

ASSIGNMENT-4
DISTANCE DETECTION USING ULTRASONIC SENSOR

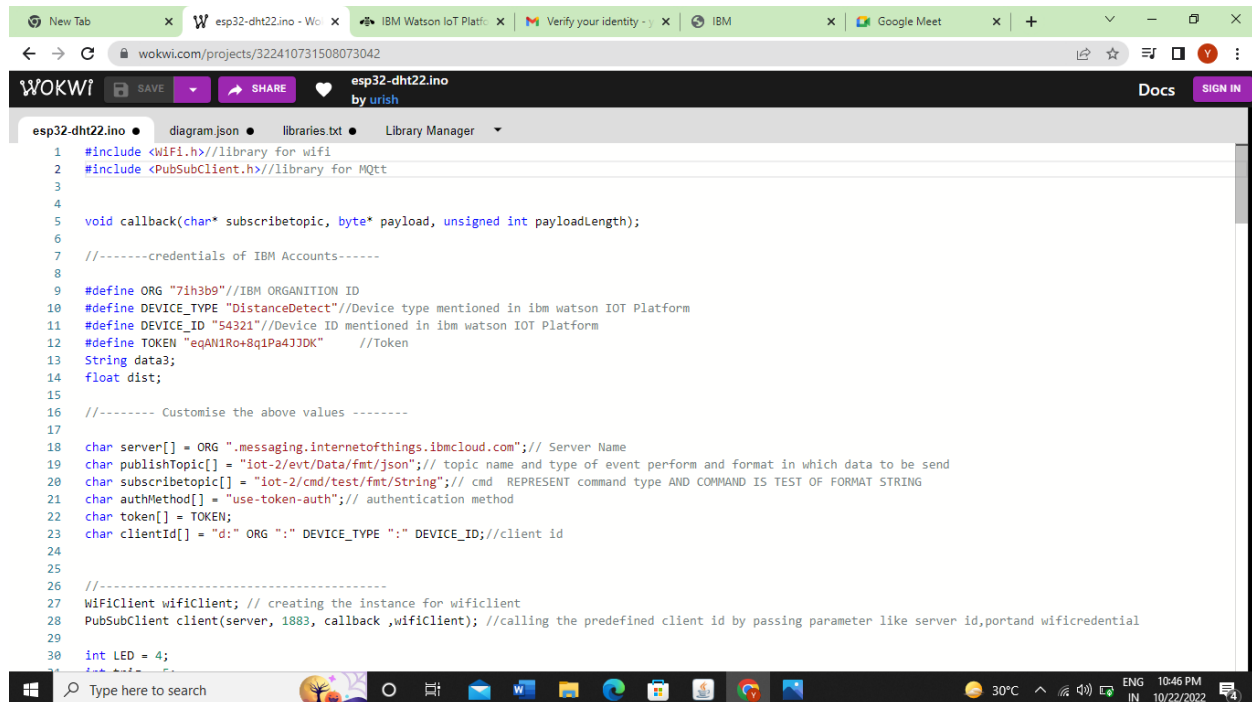
Team ID	PNT2022TMID27689
Name	V.S.Yuvati malavikaa
Student Roll Number	311419104099
Maximum Marks	2 marks

QUESTION:

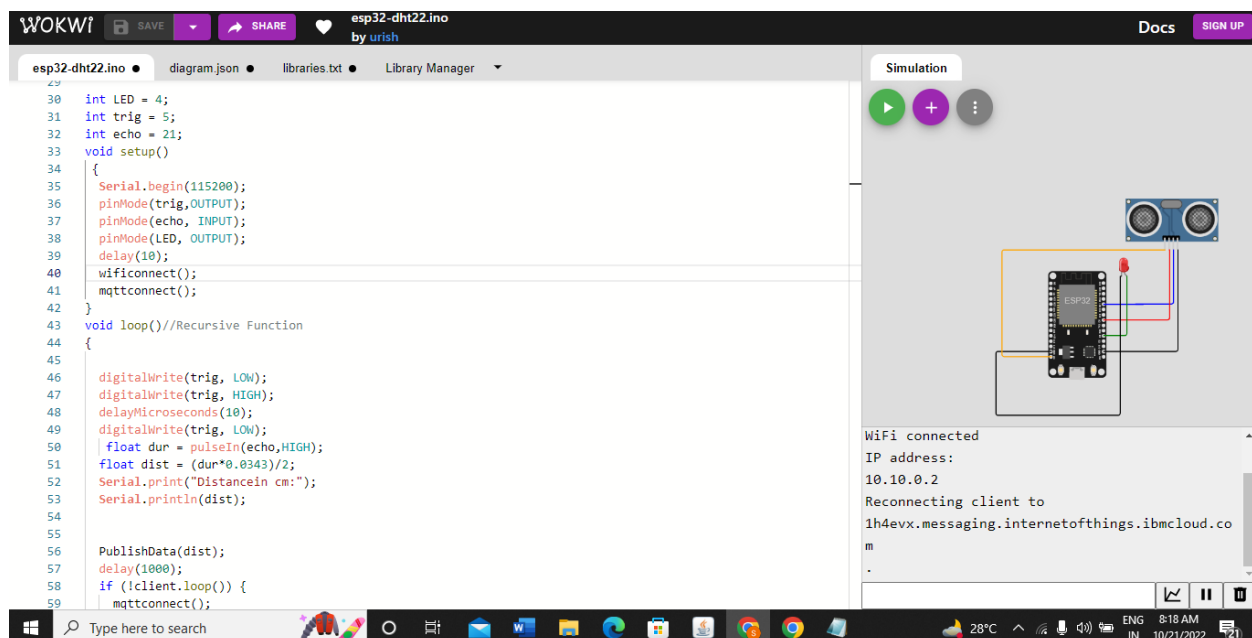
Write code and connections in wokwi for the ultrasonic sensor.

Whenever the distance is less than 100 cms send an "alert" to the IBM cloud and display in the device recent events.

CODE:

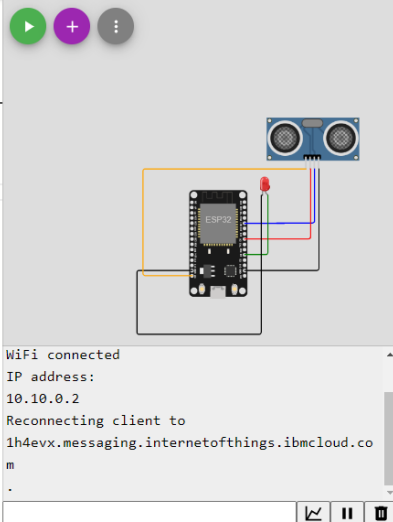


```
1 #include <WiFi.h> //library for wifi
2 #include <PubSubClient.h> //library for MQTT
3
4
5 void callback(char* subscribetopic, byte* payload, unsigned int payloadLength);
6
7 //-----credentials of IBM Accounts-----
8
9 #define ORG "7ih3b9" //IBM ORGANITION ID
10 #define DEVICE_TYPE "DistanceDetect" //Device type mentioned in ibm watson IOT Platform
11 #define DEVICE_ID "54321" //Device ID mentioned in ibm watson IOT Platform
12 #define TOKEN "eqAN1Ro+8q1Pa4JDK" //Token
13 String data3;
14 float dist;
15
16 //----- Customise the above values -----
17
18 char server[] = ORG ".messaging.internetofthings.ibmcloud.com"; // Server Name
19 char publishTopic[] = "iot-2/evt/Data/fmt/json"; // topic name and type of event perform and format in which data to be send
20 char subscribetopic[] = "iot-2/cmd/test/fmt/String"; // cmd REPRESENT command type AND COMMAND IS TEST OF FORMAT STRING
21 char authMethod[] = "use-token-auth"; // authentication method
22 char token[] = TOKEN;
23 char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID; //client id
24
25
26 //-----
27 WiFiClient wificlient; // creating the instance for wificlient
28 PubSubClient client(server, 1883, callback ,wificlient); //calling the predefined client id by passing parameter like server id,portand wificredential
29
30 int LED = 4;
```



```
30 int LED = 4;
31 int trig = 5;
32 int echo = 21;
33 void setup()
34 {
35   Serial.begin(115200);
36   pinMode(trig, OUTPUT);
37   pinMode(echo, INPUT);
38   pinMode(LED, OUTPUT);
39   delay(10);
40   wificlient.connect();
41   mqttconnect();
42 }
43 void loop() //Recursive Function
44 {
45
46   digitalWrite(trig, LOW);
47   digitalWrite(trig, HIGH);
48   delayMicroseconds(10);
49   digitalWrite(trig, LOW);
50   float dur = pulseIn(echo, HIGH);
51   float dist = (dur*0.0343)/2;
52   Serial.print("Distance in cm:");
53   Serial.println(dist);
54
55
56   PublishData(dist);
57   delay(1000);
58   if (!client.loop()) {
59     mqttconnect();
```

Simulation



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```
57 delay(1000);
58 if (!client.loop()) {
59   mqttconnect();
60 }
61 }
62
63
64
65 /*.....retrieving to Cloud.....*/
66
67 void PublishData(float dist) {
68   mqttconnect();//function call for connecting to ibm
69   /*
70    | creating the String in in form JSON to update the data to ibm cloud
71    */
72   String object;
73   if (dist<100)
74   {
75     digitalWrite(LED, HIGH);
76     Serial.println("object is near");
77     object = "Near";
78   }
79   else
80   {
81     digitalWrite(LED, LOW);
82     Serial.println("no object found");
83     object = "No";
84   }
85
86   String payload = "{\"distance\":\"";
```

Simulation

WiFi connected
IP address:
10.10.0.2
Reconnecting client to
1h4evx.messaging.internetofthings.ibmcloud.co
m

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```
85
86 String payload = "{\"distance\":\"";
87 payload += dist;
88 payload += "," + "\"object\":\"";
89 payload += object ;
90 payload += "\"";
91
92
93 Serial.print("Sending payload: ");
94 Serial.println(payload);
95
96
97
98
99 if (client.publish(publishTopic, (char*) payload.c_str())) {
100   Serial.println("Publish ok");// if it sucessfully upload data on the cloud then it will print publish ok in
101 } else {
102   Serial.println("Publish failed");
103 }
104
105 }
106 void mqttconnect() {
107   if (!client.connected()) {
108     Serial.print("Reconnecting client to ");
109     Serial.println(server);
110     while (!client.connect(clientId, authMethod, token)) {
111       Serial.print(".");
112       delay(500);
113     }
114 }
```

Simulation

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m

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esp32-dht22.ino • diagram.json • libraries.txt • Library Manager

```
111     Serial.print(".");
112     delay(500);
113 }
114
115     initManagedDevice();
116     Serial.println();
117 }
118 }
119 void wificonnect() //function definition for wificonnect
120 {
121     Serial.println();
122     Serial.print("Connecting to ");
123
124     WiFi.begin("Wokwi-GUEST", "", 6); //passing the wifi credentials to establish the connection
125     while (WiFi.status() != WL_CONNECTED) {
126         delay(500);
127         Serial.print(".");
128     }
129     Serial.println("");
130     Serial.println("WiFi connected");
131     Serial.println("IP address: ");
132     Serial.println(WiFi.localIP());
133 }
134
135 void initManagedDevice() {
136     if (client.subscribe(subscribetopic)) {
137         Serial.println(subscribetopic);
138         Serial.println("subscribe to cmd OK");
139     } else {
140         Serial.println("subscribe to cmd FAILED");
141     }
142 }
```

Simulation

WiFi connected
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m

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WOKWI SAVE SHARE esp32-dht22.ino by urish Docs SIGN IN

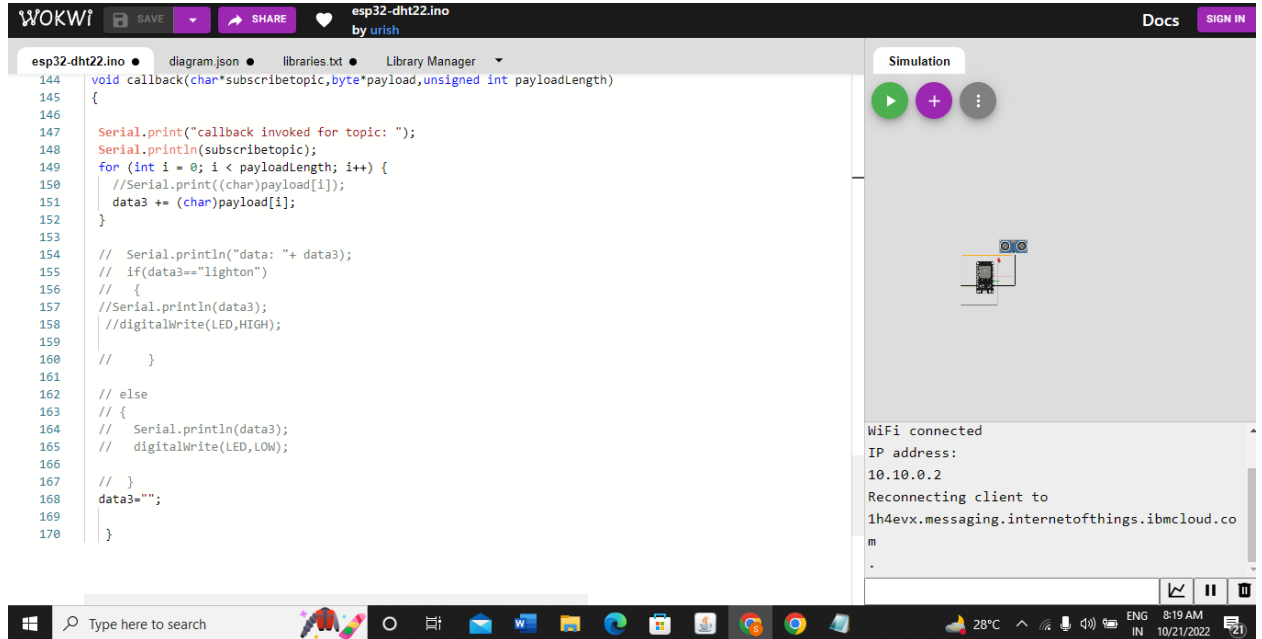
esp32-dht22.ino • diagram.json • libraries.txt • Library Manager

```
139 } else {
140     Serial.println("subscribe to cmd FAILED");
141 }
142 }
143
144 void callback(char* subscribetopic, byte* payload, unsigned int payloadLength)
145 {
146
147     Serial.print("callback invoked for topic: ");
148     Serial.println(subscribetopic);
149     for (int i = 0; i < payloadLength; i++) {
150         //Serial.print((char)payload[i]);
151         data3 += (char)payload[i];
152     }
153
154     // Serial.println("data: "+ data3);
155     // if(data3=="lighton")
156     // {
157     //     Serial.println(data3);
158     //     digitalWrite(LED,HIGH);
159     // }
160
161     // else
162     // {
163     //     Serial.println(data3);
164     //     digitalWrite(LED,LOW);
165     // }
166     data3="";
167 }
168
169 }
```

Simulation

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Reconnecting client to
1h4evx.messaging.internetofthings.ibmcloud.co
m

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OUTPUT:

