

6ASSIGNMENT – 4

Date	26.10.2022
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Maximum Marks	2 Marks

DISTANCE DETECTION USING ULTRASONIC

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:

The screenshot displays the Wokwi IDE interface with the following components:

- Browser Tabs:** IBM Watson IoT Platform, WhatsApp.
- Address Bar:** wokwi.com/projects/346127578924319314
- Wokwi Header:** WOKWI, SAVE, SHARE, Docs, SIGN IN.
- File Explorer:** esp32-dht22.ino, diagram.json, libraries.txt, Library Manager.
- Code Editor:** Contains the C++ code for the ESP32-DHT22 sensor connected to the IBM Watson IoT Platform. The code includes headers for WiFi and MQTT, defines credentials and device information, and sets up the MQTT client and DHT22 sensor.
- Simulation Window:** Shows the sensor output: Distance in cm: 403.49, no object found, and the sending payload: {\"distance\": 403.49, \"object\": \"N\"}.

```
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 "smihq" //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 "ZfgVHiGddDKufi3HF8" //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
```

WOKWI

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```
28 PubSubClient client(server, 1883, callback ,wifiClient); //calling the predefined client id by passing parameter like server id,portand wifiClient
29
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   wifiConnect();
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 }
```

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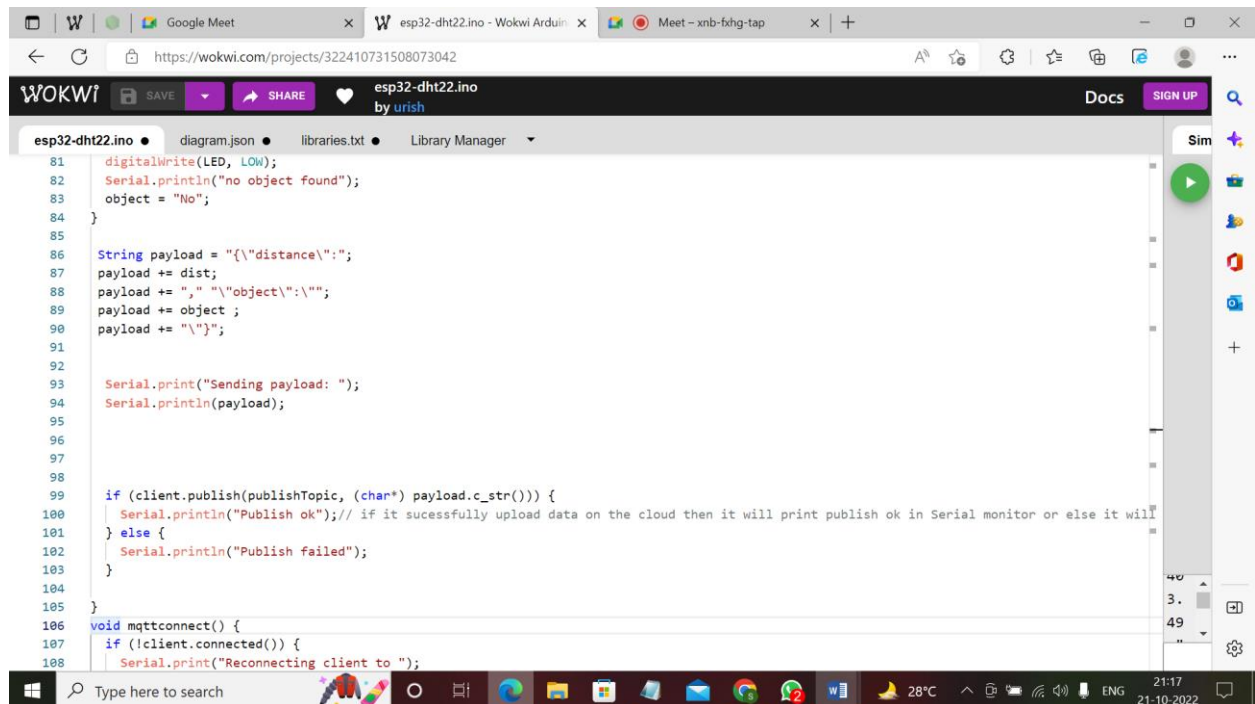
WOKWI

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```
55
56 PublishData(dist);
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   }
84 }
```

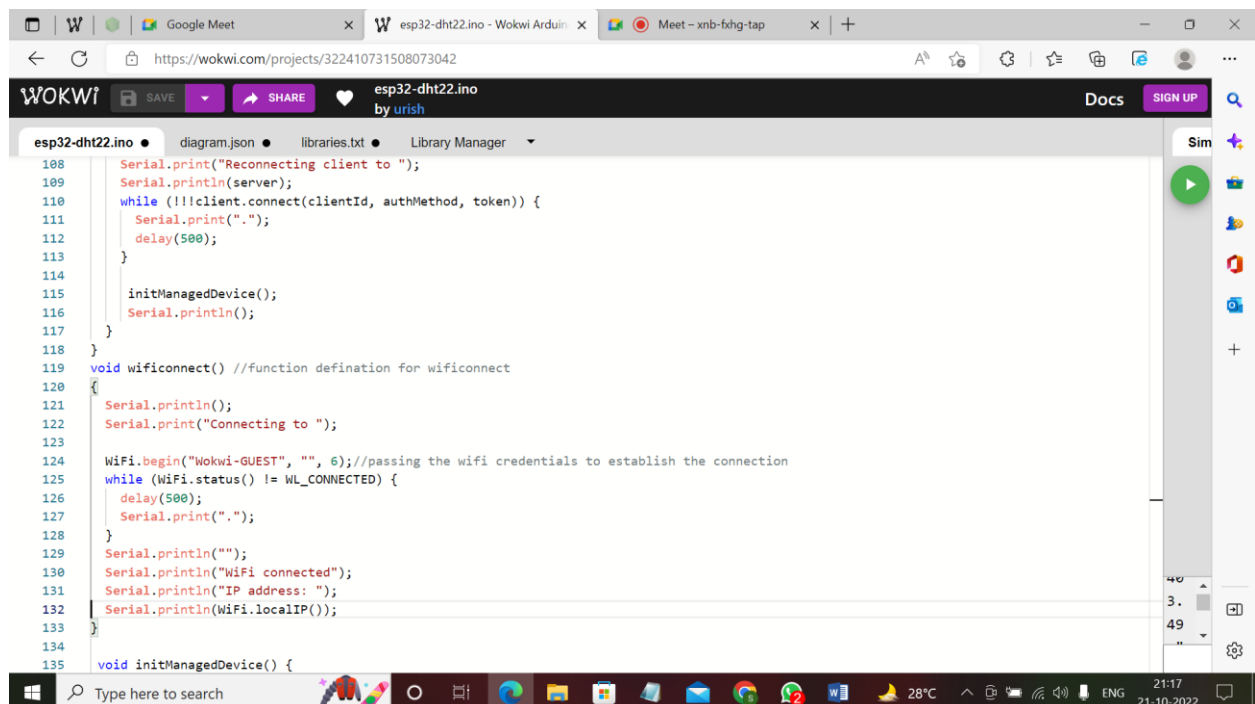
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```
81 digitalWrite(LED, LOW);
82 Serial.println("no object found");
83 object = "No";
84 }
85
86 String payload = "{\"distance\": ";
87 payload += dist;
88 payload += ", \"object\": \"";
89 payload += object;
90 payload += "\"}";
91
92
93 Serial.print("Sending payload: ");
94 Serial.println(payload);
95
96
97
98
99
100 if (client.publish(publishTopic, (char*) payload.c_str())) {
101   Serial.println("Publish ok");// if it sucessfully upload data on the cloud then it will print publish ok in Serial monitor or else it will
102 } else {
103   Serial.println("Publish failed");
104 }
105
106 void mqttconnect() {
107   if (!client.connected()) {
108     Serial.print("Reconnecting client to ");
```



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```
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
115 initManagedDevice();
116 Serial.println();
117 }
118
119 void wificonnect() //function defination 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() {
```

WOKWI

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

```
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 }
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 }
```

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WOKWI

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

```
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
162   // else
163   // {
164   //   Serial.println(data3);
165   //   digitalWrite(LED,LOW);
166
167   // }
168   data3="";
169
170 }
```

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OUTPUT:

