

Assignment - 4

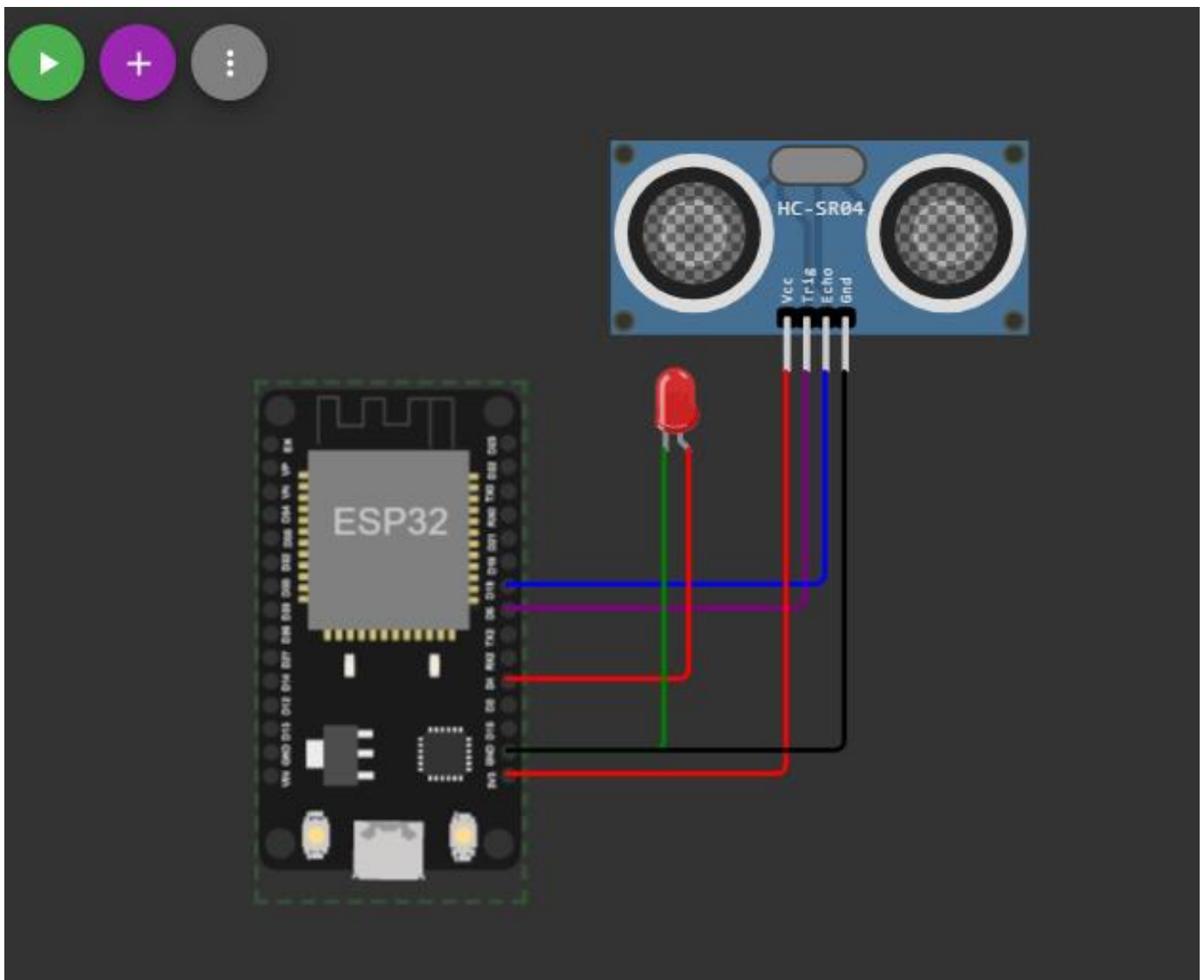
Assignment Date	18/10/2022
Student Name	NANDHAKUMAR L
Student Roll Number	61071912124
Maximum Marks	2 Marks

Question:

Write code and connections in WokWi for Ultrasonic Sensor. Whenever the distance is less 100cm, send "Alert" to IBM cloud and display in device recent events.

Solution:

Circuit Diagram:



Code:

```
sketch.ino  diagram.json  libraries.txt  Library Manager  ▼

1  #include <WiFi.h>
2  #include <PubSubClient.h>
3  void callback(char* subscribetopic, byte* payload, unsigned int payloadLength);
4
5  //-----credentials of IBM Accounts-----
6
7  #define ORG "um5y3e"//IBM ORGANITION ID
8  #define DEVICE_TYPE "ESP32" //Device type mentioned in ibm watson IOT Platform
9  #define DEVICE_ID "ESP3240P"//Device ID mentioned in ibm watson IOT Platform
10 #define TOKEN "Sv*Vgwum-RMJXi0By?"//Token
11 String data3;
12 float dist;
13
14 //-----Customise the above values-----
15 char server[] = ORG ".messaging.internetofthings.ibmcloud.com"; // Server Name
16 char publishTopic[] = "iot-2/evt/Data/fat/json"; // topic name and type of event perform and format in which data to be send
17 char subscribetopic[] = "iot-2/cmd/test/fmt/String"; // cmd REPRESENT command type AND COMMAND IS TEST OF FORMAT STRING
18 char authMethod[] = "use-token-auth"; // authentication method
19 char token[] = TOKEN;
20 char clientid[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID; //client id
21
22
23 WiFiClient wificlient; // creating the instance for wificlient
24 PubSubClient client(server, 1883, callback,wificlient); //calling the predefined client id by passing parameter like server id, portand wificredential
25
26 int LED = 4;
27 int trig = 5;
28 int echo = 18;
29 void setup()
30 {
31     Serial.begin(115200);
32     pinMode(trig, OUTPUT);
33     pinMode(echo, INPUT);
34     pinMode(LED, OUTPUT);
35     delay(10);
36     wificonnect();
```

```
36     wificonnect();
37     mqttconnect();
38 }
39
40 void loop()// Recursive Function
41 {
42     digitalWrite(trig, LOW);
43     digitalWrite(trig,HIGH);
44     delayMicroseconds(10);
45     digitalWrite(trig, LOW);
46     float dur = pulseIn(echo,HIGH);
47     float dist = (dur * 0.0343)/2;
48     Serial.print ("Distance in cm");
49     Serial.println(dist);
50
51
52     PublishData(dist);
53     delay(1000);
54     if (!client.loop()) {
55         mqttconnect();
56     }
57 }
58
59
60 //..retrieving to cloud...
61
62 void PublishData(float dist) {
63     mqttconnect();//function call for connecting to ibm
64     //Creating the string in the form of Json to update the data to ibm cloud
65
66     String object;
67     if (dist <100)
68     {
69         digitalWrite(LED, HIGH);
70         Serial.println("object is near");
```

```

70     Serial.println("object is near");
71     object = "Near";
72 }
73 else
74 {
75     digitalWrite(LED, LOW);
76     Serial.println("no object found");
77     object = "No";
78 }
79
80 String payload="{\"distance\": ";
81 payload += dist;
82 payload += ", \"object\": \"";
83 payload += object;
84 payload += "\"}";
85
86 Serial.print("Sending payload: ");
87 Serial.println(payload);
88 if (client.publish(publishTopic, (char*) payload.c_str())) {
89     Serial.println("Publish ok");// if it successfully upload data on the cloud then it will print publish ok in Serial monitor or else it will print publish failm
90 }
91 else
92 {
93     Serial.println("Publish failed");
94 }
95 }
96
97 void mqttconnect() {
98     if (!client.connected()) {
99         Serial.print("Reconnecting client to ");
100         Serial.print(server);
101         while (!client.connect(clientid, authMethod, token)) {
102             Serial.print(".");
103             delay(500);
104         }

```

```

104     }
105     initManagedDevice();
106     Serial.println();
107 }
108 }
109
110 void wificonnect() //function defination for wificonnect
111 {
112     Serial.println();
113     Serial.print("Connecting to ");
114     WiFi.begin("Wokwi-GUEST", "", 6);//passing the wifi credentials to establish the connection
115     while (WiFi.status() != WL_CONNECTED) {
116         delay(500);
117         Serial.print(".");
118     }
119     Serial.println("");
120     Serial.println("WiFi connected");
121     Serial.print("IP address: ");
122     Serial.println(WiFi.localIP());
123 }
124
125 void initManagedDevice() {
126     if (client.subscribe(subscribetopic)) {
127         Serial.println((subscribetopic));
128         Serial.println("subscribe to cmd OK");
129     } else {
130         Serial.println("subscribe to cmd FAILED");
131     }
132 }
133
134 void callback(char* subscribetopic, byte* payload, unsigned int payloadLength){
135     Serial.print("callback invoked for topic: ");
136     Serial.println(subscribetopic);
137     for (int i=0; i < payloadLength; i++) {
138         //Serial.print((char)payload[i]);

```

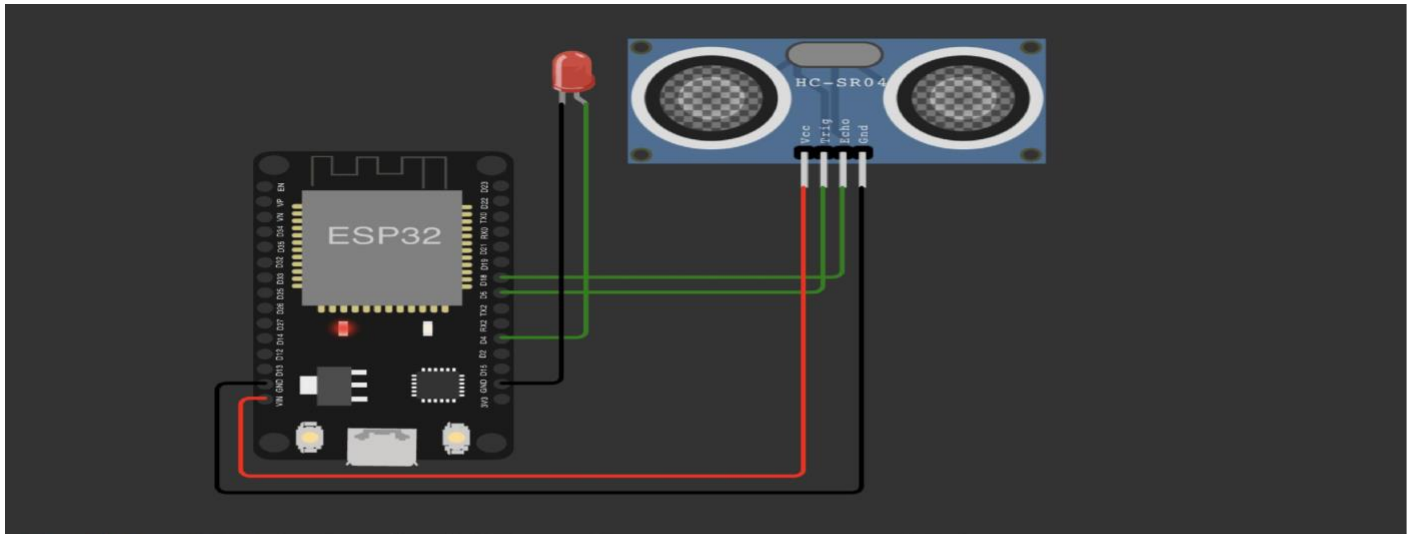
```

134 void callback(char* subscribetopic, byte* payload, unsigned int payloadLength){
135     Serial.print("callback invoked for topic: ");
136     Serial.println(subscribetopic);
137     for (int i=0; i < payloadLength; i++) {
138         //Serial.print((char)payload[i]);
139         data3 += (char)payload[i];
140     }
141     data3 = "";
142 }

```

OUTPUT:

When the Object is Far:



```
no object found
Sending payload: {"distance":141.21,"object":"No"}
Publish ok
Distancein cm141.21
no object found
Sending payload: {"distance":141.21,"object":"No"}
Publish ok
```

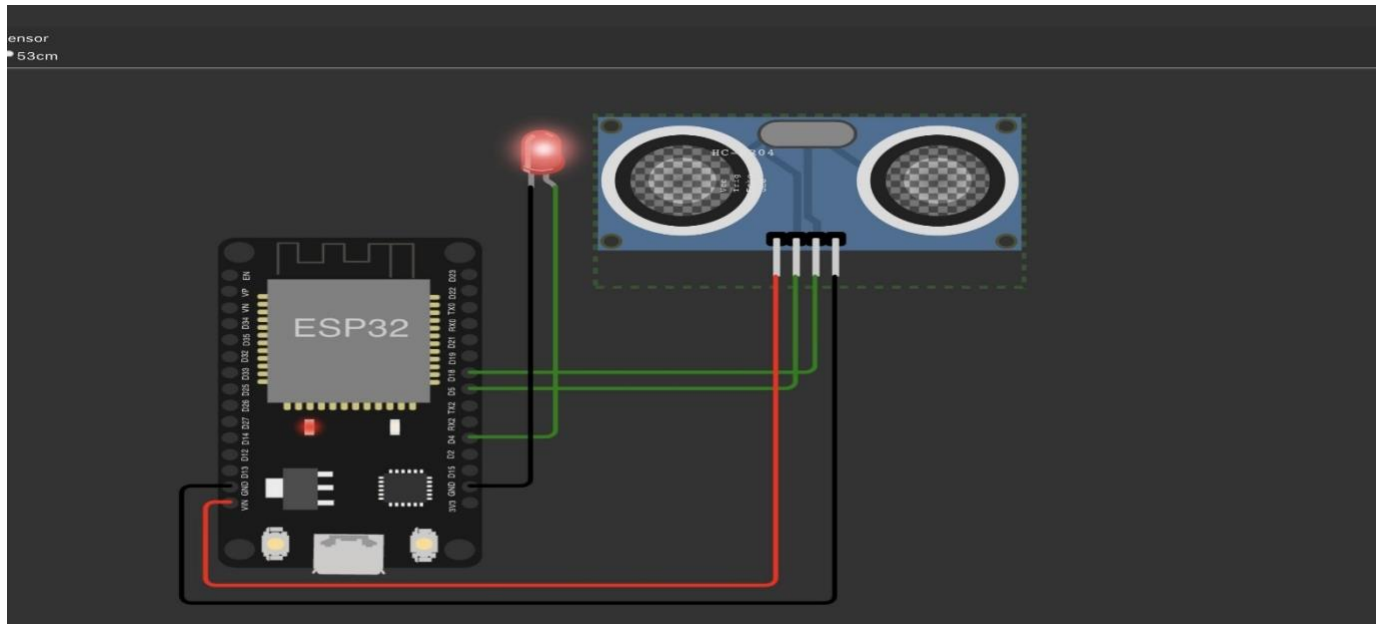
Interface showing device status and recent events for the DISTANCEDETECT device.

Device: DISTANCEDETECT (ULTRASON) | Status: Disconnected | Last Update: Oct 20, 2022 9:46 AM

Recent Events:

Event	Value	Format	Last Received
Data	{"distance":141.21,"object":"No"}	json	a few seconds ago
Data	{"distance":141.21,"object":"No"}	json	a few seconds ago
Data	{"distance":141.21,"object":"No"}	json	a few seconds ago
Data	{"distance":141.18,"object":"No"}	json	a few seconds ago
Data	{"distance":141.2,"object":"No"}	json	a few seconds ago

When the Object is Near:



```
object is near
Sending payload: {"distance":97.82,"object":"Near"}
Publish ok
Distancein cm97.82
object is near
Sending payload: {"distance":97.82,"object":"Near"}
Publish ok
```

Browse Action Device Types Interfaces

Add Device

DistanceDetect Disconnected ULTRASON Device Oct 20, 2022 9:46 AM

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
Data	{"distance":79.66,"object":"Near"}	json	a few seconds ago
Data	{"distance":79.64,"object":"Near"}	json	a few seconds ago
Data	{"distance":79.66,"object":"Near"}	json	a few seconds ago
Data	{"distance":79.64,"object":"Near"}	json	a few seconds ago
Data	{"distance":79.66,"object":"Near"}	json	a few seconds ago