Assignment - 4

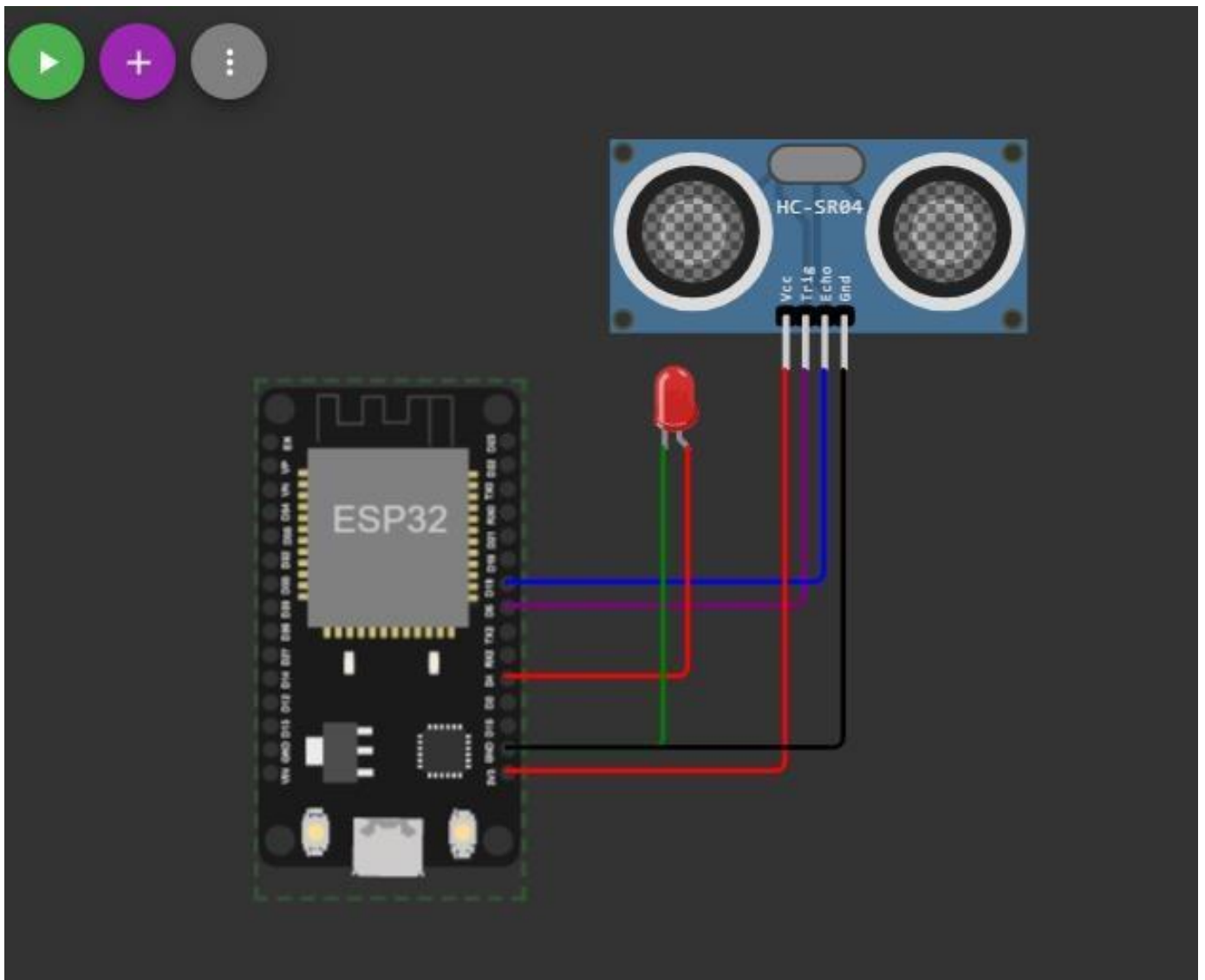| Assignment Date	16/11/2022
Student Name	K.Venkatesh
Student Roll Number	212219060141

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:

```
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*Ygwum-RMJXiOBy?"//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");
```

```arduino
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 sucessfully 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       }
```

```arduino
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[1]);
```

```arduino
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[1]);
139       data3 += (char)payload[1];
140     }
141     data3 = "";
142   }
```
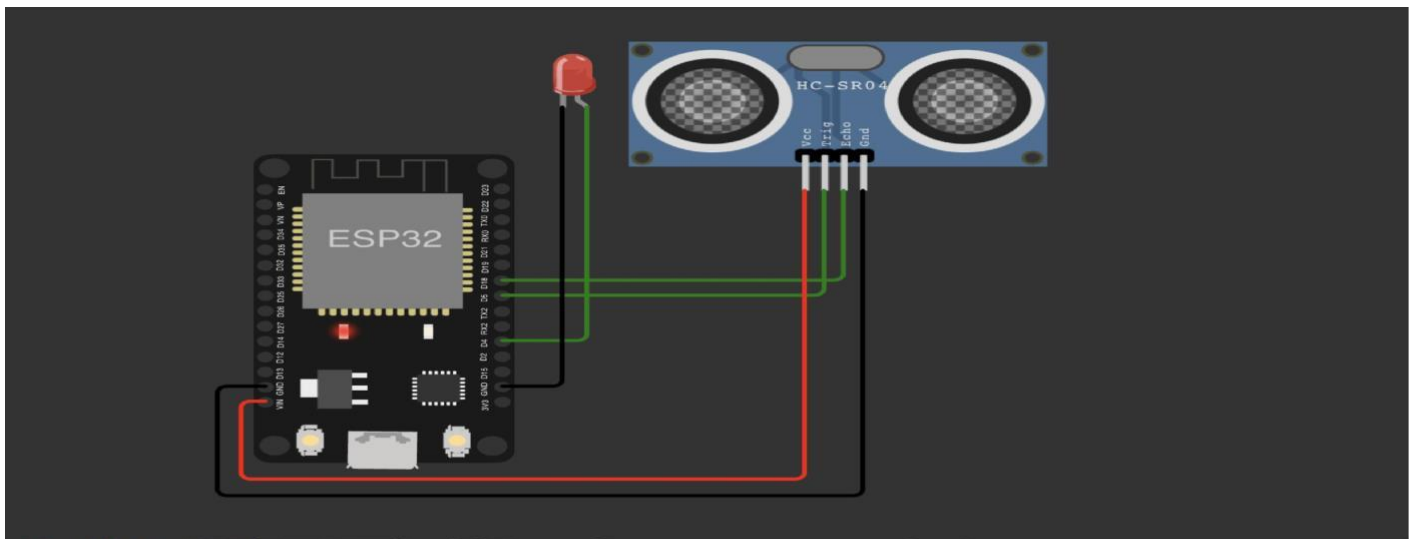
OUTPUT:

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
```


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":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:

ensor
53cm

ESP32

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