Assignment -4

Assignment Date	14 November 2022
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Maximum Marks	2 Marks

Question-1:

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. Upload document with wokwi share link and images of IBM cloud

Solution:

Source Code:

```
#include <WiFi.h>

#include <PubSubClient.h>

void callback(char* subscribetopic, byte* payload, unsigned int payloadLength);

#define ORG "vf1g00"

#define DEVICE_TYPE "DeviceType"

#define DEVICE_ID "54321"

#define TOKEN "Du@CS0CS9phctYRacI"

String data3;

char server[] = ORG ".messaging.internetofthings.ibmcloud.com";

char publishTopic[] = "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 = 18;

const int echoPin = 21;

#define SOUND_SPEED 0.034

long duration;

float distance;

void setup() {

  Serial.begin(115200);
```

```
  pinMode(trigPin, OUTPUT);
  pinMode(echoPin, INPUT);
  wificonnect();
  mqttconnect();
}
void loop()
{
  digitalWrite(trigPin, LOW);
  delayMicroseconds(2);
  digitalWrite(trigPin, HIGH);
  delayMicroseconds(10);
  digitalWrite(trigPin, LOW);
  duration = pulseIn(echoPin, HIGH);
  distance = duration * SOUND_SPEED / 2;
  Serial.print("Distance (cm): ");
  Serial.println(distance);
  if (distance < 100)
  {
    Serial.println("ALERT!!");
    delay(1000);
    PublishData(distance);
    delay(1000);
    if (!client.loop()) {
      mqttconnect();
    }
  }
  delay(1000);
}
void PublishData(float dist) {
  mqttconnect();
  String payload = "{\"Distance\":";
  payload += dist;
  payload += ",\"ALERT!!\":""\"Distance less than 100cms\"";
  payload += "}";
```

```
  Serial.print("Sending payload: ");
  Serial.println(payload);

  if (client.publish(publishTopic, (char*) payload.c_str())) {
    Serial.println("Publish ok");
  } else {
    Serial.println("Publish failed");
  }
}
void mqttconnect() {
  if (!client.connected()) {
    Serial.print("Reconnecting client to ");
    Serial.println(server);
    while (!!!client.connect(clientId, authMethod, token)) {
      Serial.print(".");
      delay(500);
    }
    initManagedDevice();
    Serial.println();
  }
}
void wificonnect()
{
  Serial.println();
  Serial.print("Connecting to ");
  WiFi.begin("Wokwi-GUEST", "", 6);
  while (WiFi.status() != WL_CONNECTED) {
    delay(500);
    Serial.print(".");
  }
  Serial.println("");
  Serial.println("WiFi connected");
  Serial.println("IP address: ");
  Serial.println(WiFi.localIP());
```

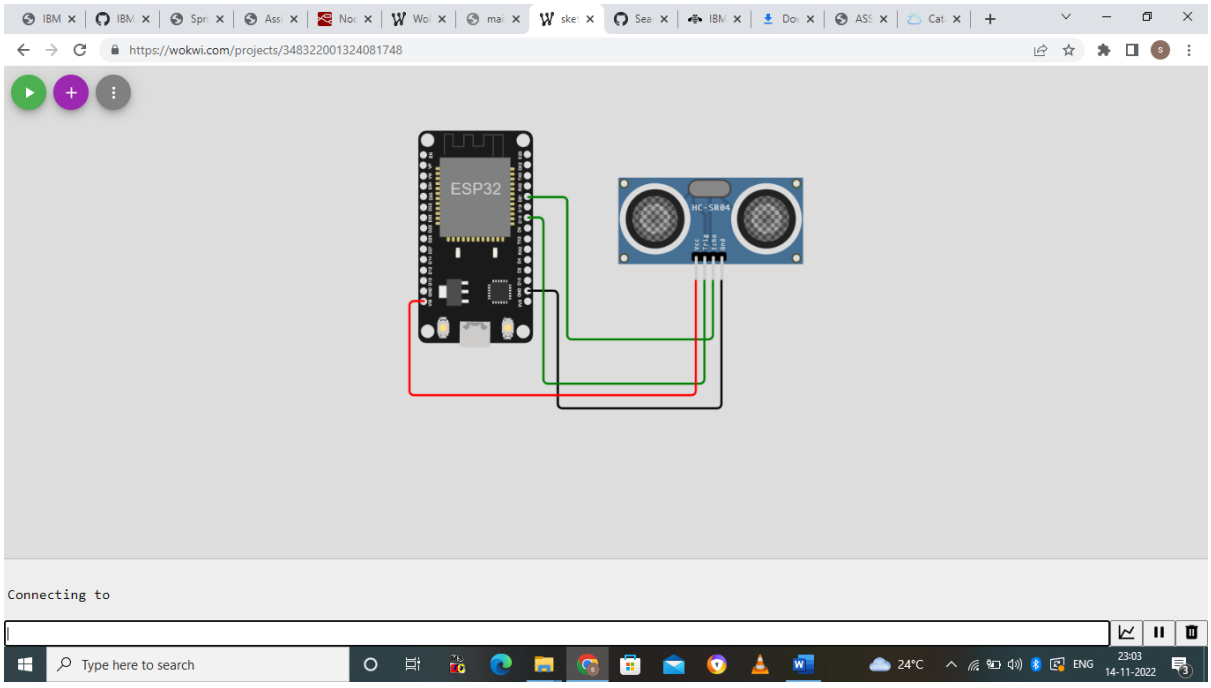
```
}
void initManagedDevice() {
  if (client.subscribe(subscribetopic)) {
    Serial.println((subscribetopic));
    Serial.println("subscribe to cmd OK");
  } else {
    Serial.println("subscribe to cmd FAILED");
  }
}
void callback(char* subscribetopic, byte* payload, unsigned int payloadLength)
{
  Serial.print("callback invoked for topic: ");
  Serial.println(subscribetopic);
  for (int i = 0; i < payloadLength; i++) {
    //Serial.print((char)payload[i]);
    data3 += (char)payload[i];
  }
  Serial.println("data: " + data3);
  data3 = "";
}
```

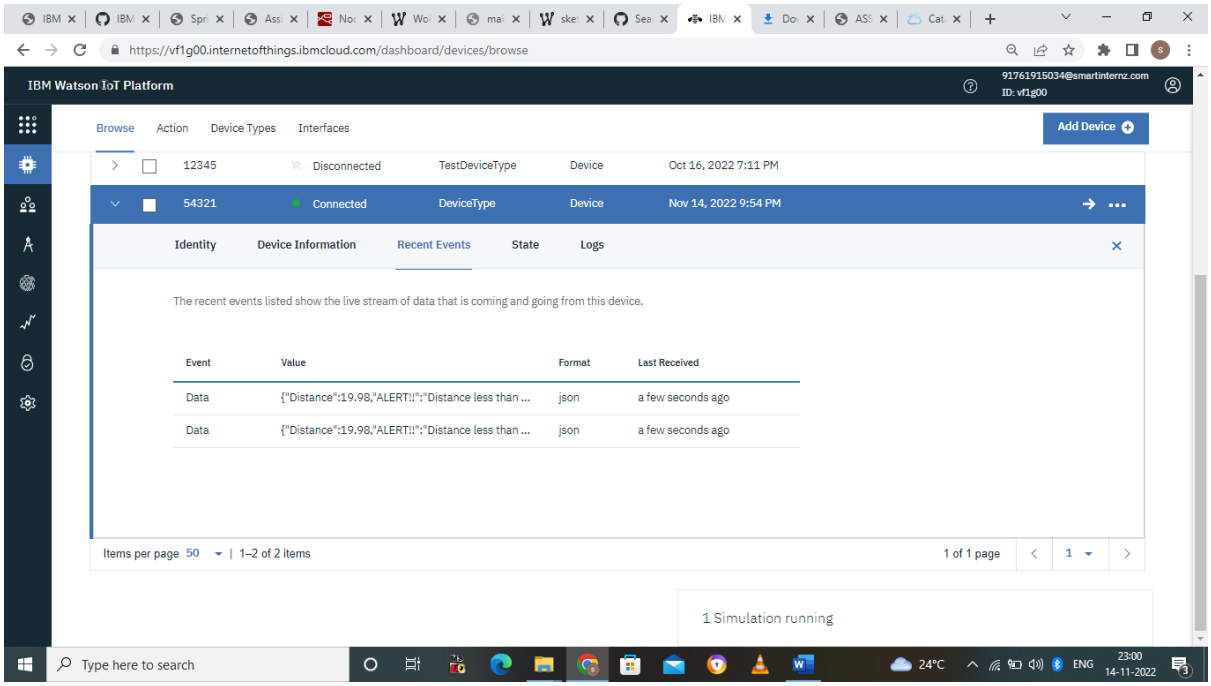
Output:

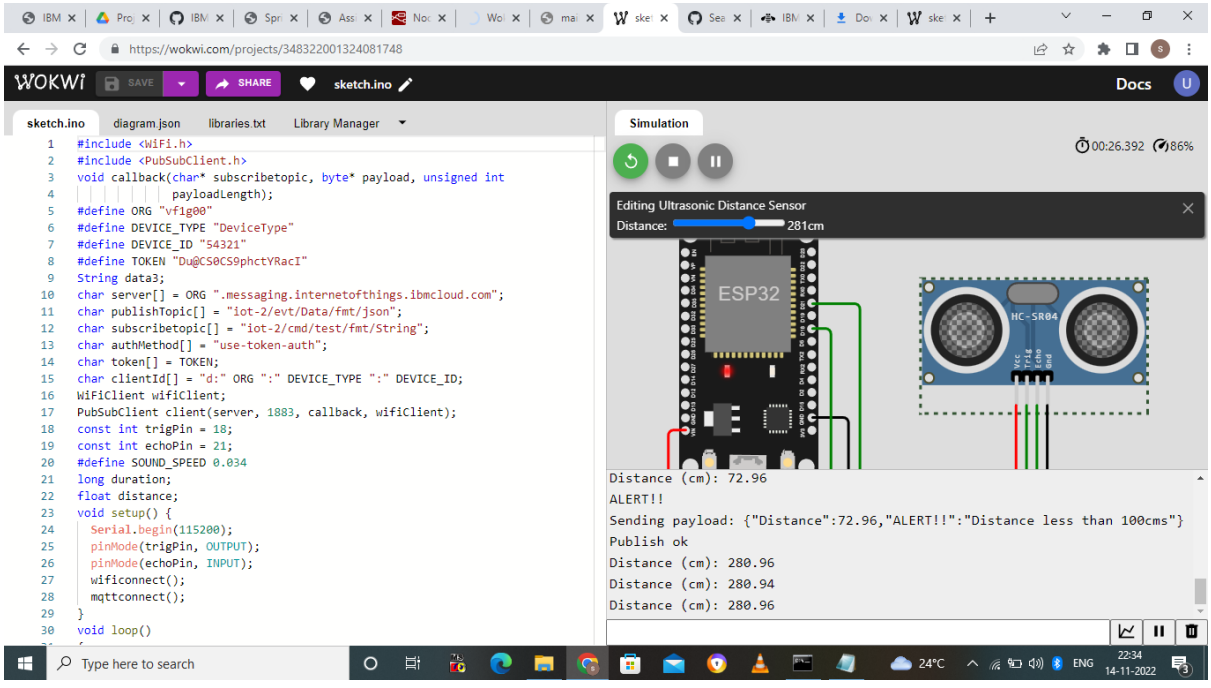
```
Connecting to ...
WiFi connected
IP address:
10.10.0.2
Reconnecting client to vf1g00.messaging.internetofthings.ibmcloud.com
iot-2/cmd/test/fmt/String
subscribe to cmd OK

Distance (cm): 399.98
ALERT!!
Sending payload: {"Distance":12.99,"ALERT!!":"Distance less than 100cms"}
Publish ok
Distance (cm): 12.99
ALERT!!
Sending payload: {"Distance":12.99,"ALERT!!":"Distance less than 100cms"}
Publish ok
Distance (cm): 213.95
```

Distance (cm): 213.95
Distance (cm): 19.98
ALERT!!
Reconnecting client to vf1g00.messaging.internetofthings.ibmcloud.com
iot-2/cmd/test/fmt/String
subscribe to cmd OK
Sending payload: {"Distance":19.98,"ALERT!!":"Distance less than 100cms"}
Publish ok
Distance (cm): 19.98
ALERT!!
Sending payload: {"Distance":19.98,"ALERT!!":"Distance less than 100cms"}
Publish ok

Screenshots:







Wokwi Link: https://wokwi.com/projects/348322001324081748