ASSIGNMENT 4

Assignment question:

Write code and connections in wokwi for ultrasonic sensor. Whenever distance is less than 100 cms send “alert” to IBM cloud and display in device recent events.

Program Code:

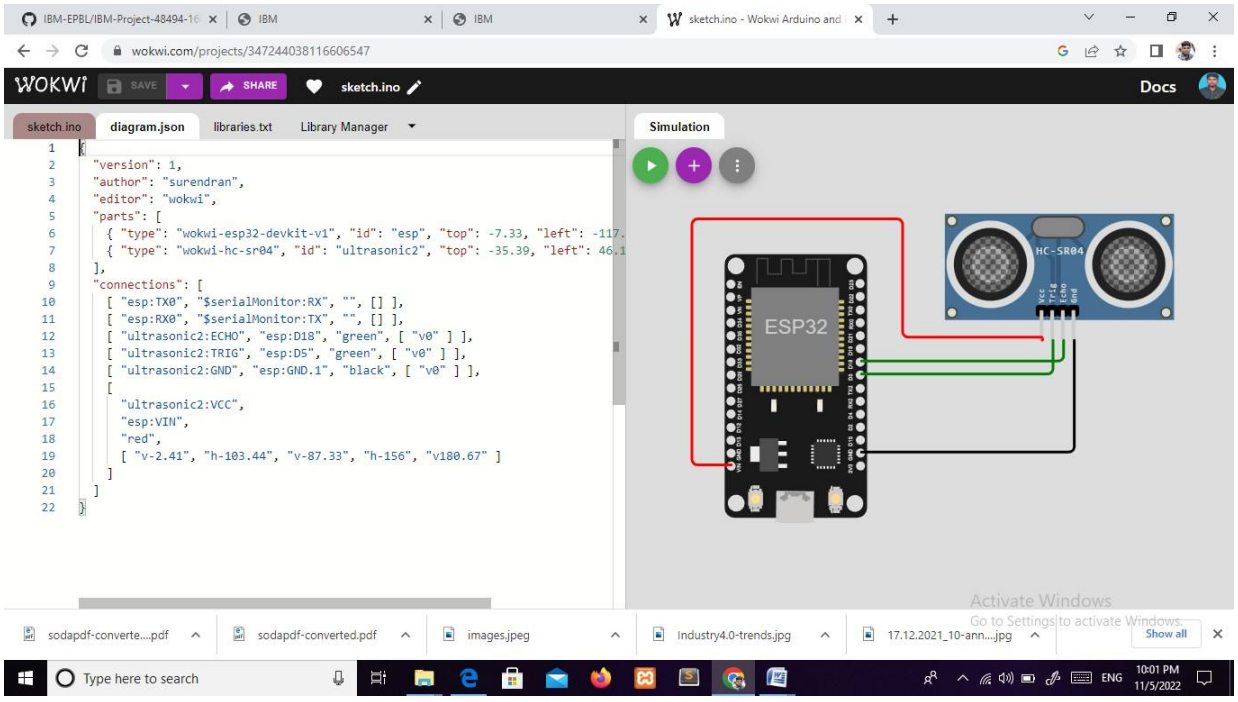
```
#include <WiFi.h>
#include <PubSubClient.h>
void callback(char* subscribetopic, byte* payload, unsigned int payloadLength);
#define ORG "s2qhvm"
#define DEVICE_TYPE "Laptop"
#define DEVICE_ID "0410"
#define TOKEN "20011004"
String data3;
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/event8/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 = 5;
const int echoPin = 18;
#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);
```

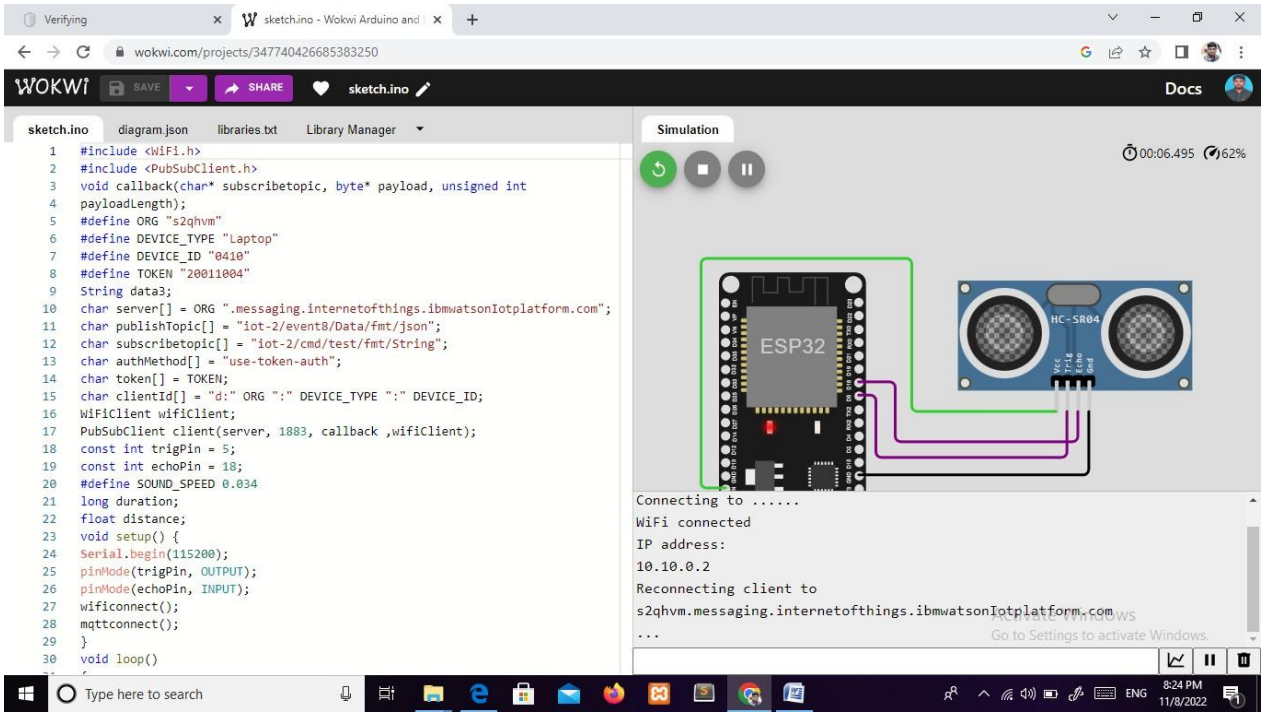
```
  duration = pulseIn(echoPin, HIGH);
  distance = duration * SOUND_SPEED/2;
  Serial.print("Distance (cm): ");
  Serial.println(distance);
  if(distance<100)
  {
    Serial.println("ALERT!!");
    delay(1000);
    PublishData(distance);
    delay(1000);
    if (!client.loop())
      { mqttconnect();
      }
  }
  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();
  }
}
```

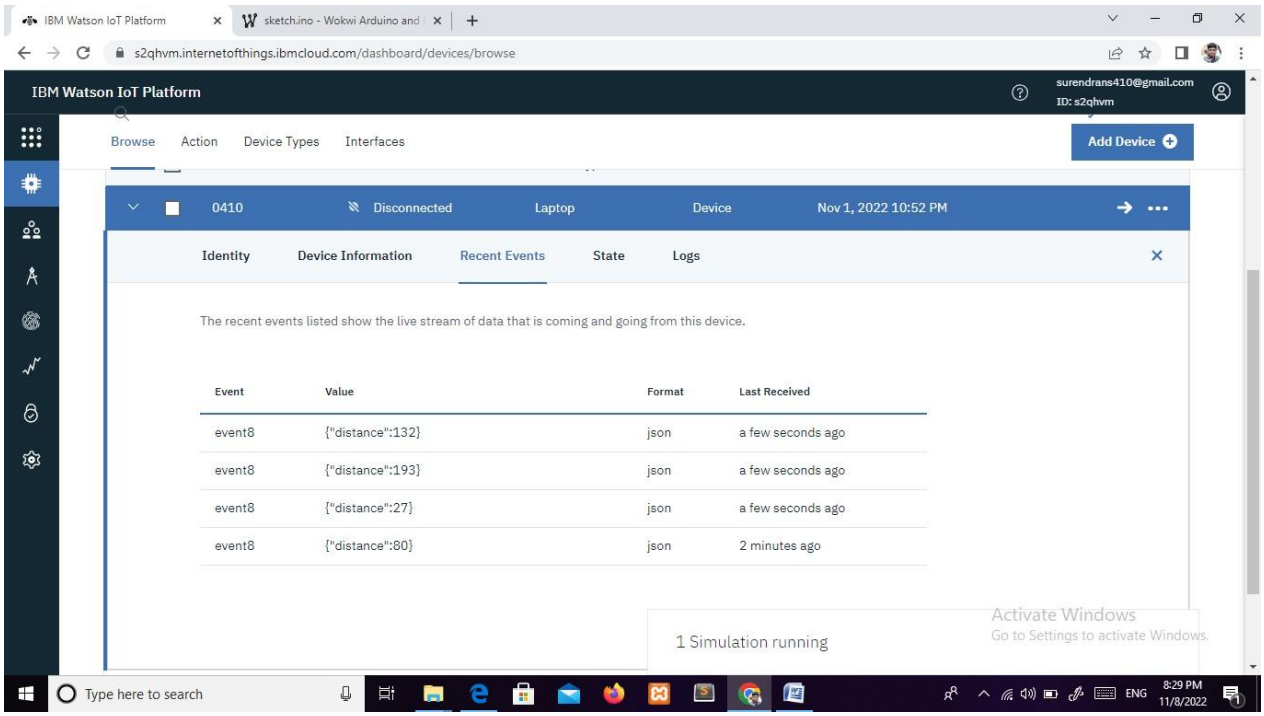
```
void wificonnect()
{
  Serial.println();
  Serial.print("Connecting to ");
  WiFi.begin("Wokwi-GUEST", "", 6);
  while (WiFi.status() != WL_CONNECTED)
  { delay(500);
    Serial.print(".");
  }
  Serial.println("");
  Serial.println("WiFi connected");
  Serial.println("IP address: ");
  Serial.println(WiFi.localIP());
}
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++)
  {
    data3 += (char)payload[i];
  }
  Serial.println("data: "+ data3);
  data3="";
}
```

Diagram.json:

```
{
  "version": 1,
  "author": "surendran",
  "editor": "wokwi",
  "parts": [
    { "type": "wokwi-esp32-devkit-v1", "id": "esp", "top": -7.33, "left": -117.34, "attrs": {} },
    { "type": "wokwi-hc-sr04", "id": "ultrasonic2", "top": -35.39, "left": 46.16, "attrs": {} }
  ],
  "connections": [
    [ "esp:TX0", "$serialMonitor:RX", "", [] ],
    [ "esp:RX0", "$serialMonitor:TX", "", [] ],
    [ "ultrasonic2:ECHO", "esp:D18", "green", [ "v0" ] ],
    [ "ultrasonic2:TRIG", "esp:D5", "green", [ "v0" ] ],
    [ "ultrasonic2:GND", "esp:GND.1", "black", [ "v0" ] ],
    [
      "ultrasonic2:VCC",
      "esp:VIN",
      "red",
      [ "v-2.41", "h-103.44", "v-87.33", "h-156", "v180.67" ]
    ]
  ]
}
```







Reference link: https://wokwi.com/projects/347740426685383250