

ASSIGNMENT 4

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Project Name	Real-Time River Water Quality Monitoring and Control System
Marks	2marks

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");
    }
}

mqttconnect()

```

```

void
{

    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");
    }
}

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

    Serial.print("callback invoked for topic: "); Serial.println(subscribetopic);
    for (int i = 0; i < payloadLength; i++)

```

```

void
{
    {
        data3 += (char)payload[i];
    }
    Serial.println("data: " + data3);
    data3="";
}

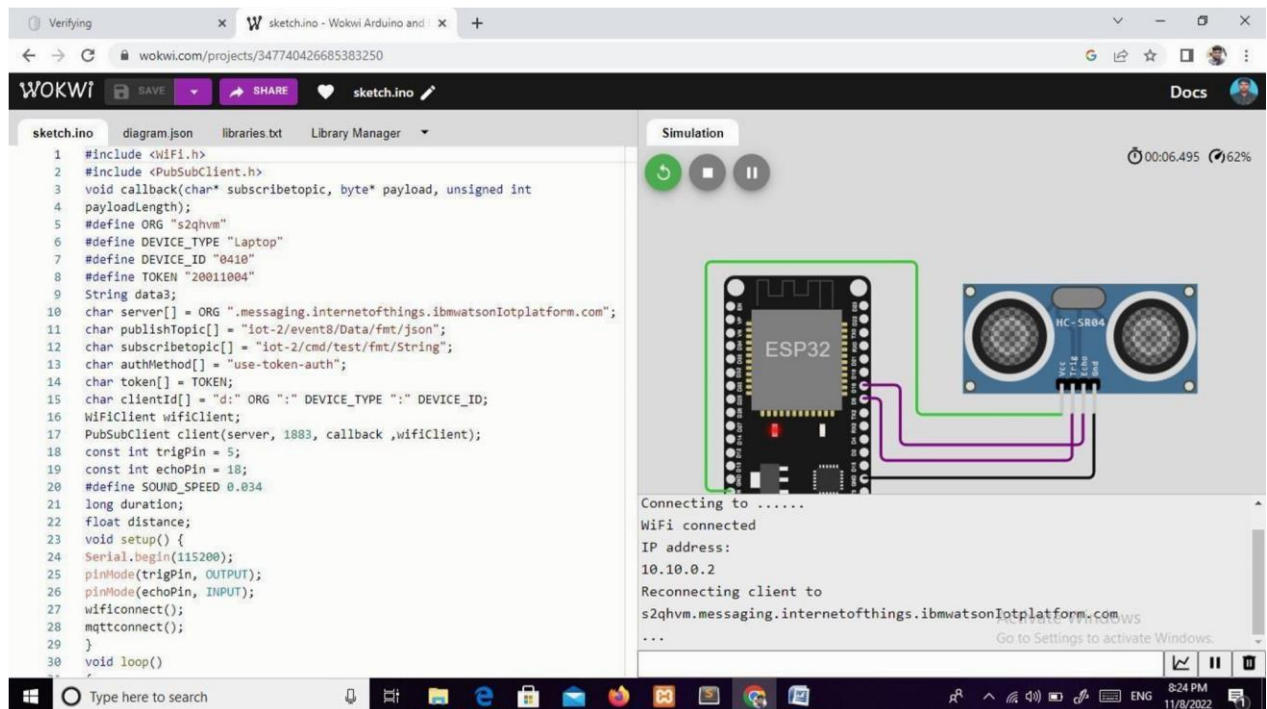
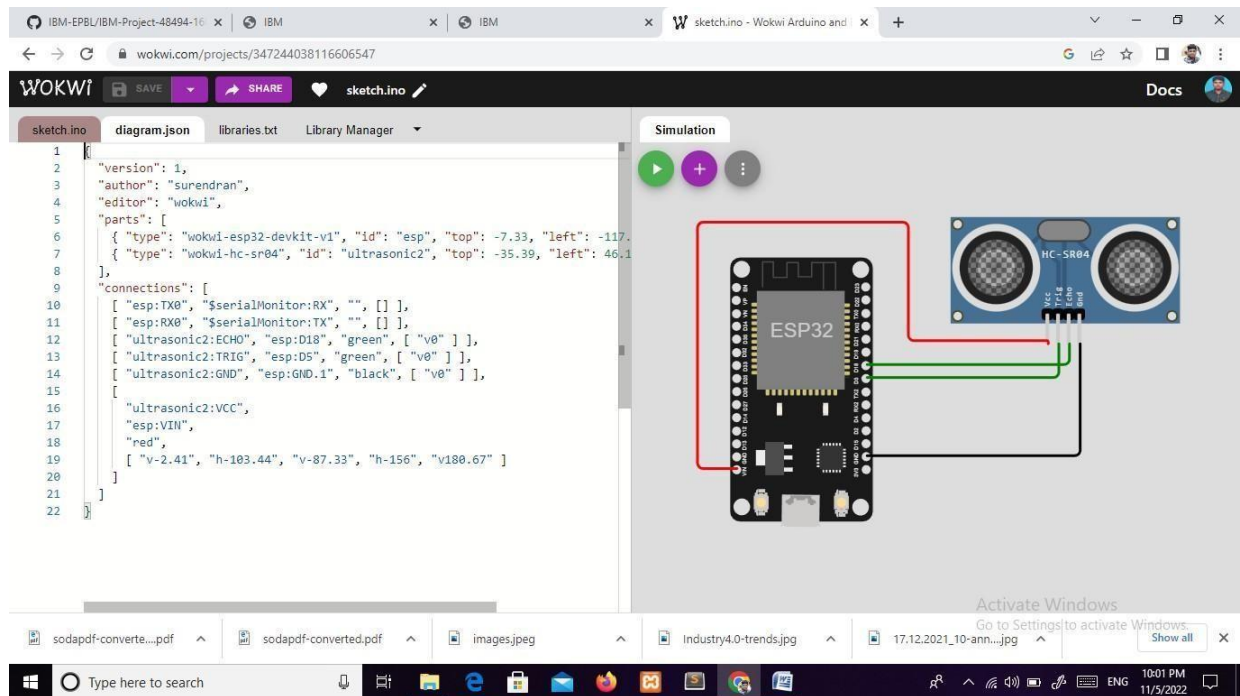
```

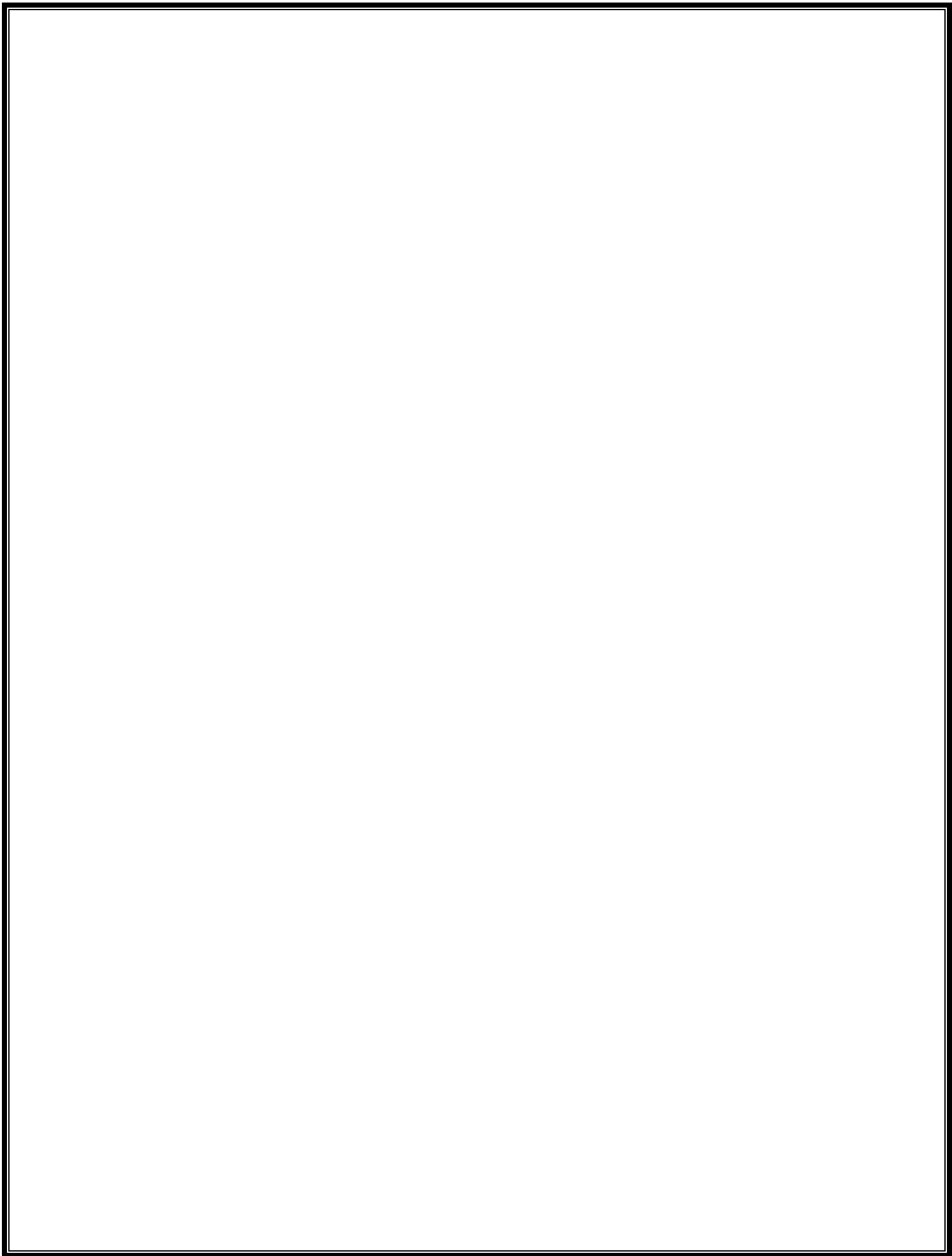
Diagram.json:

```

{
  "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" ]
    ]
  ]
}

```





The screenshot displays the IBM Watson IoT Platform interface. The top navigation bar includes 'Browse', 'Action', 'Device Types', and 'Interfaces'. A sidebar on the left contains icons for various functions. The main content area shows a device named '0410' with a status of 'Disconnected' and a type of 'Laptop'. Below this, the 'Recent Events' tab is active, displaying a table of events. The table has four columns: 'Event', 'Value', 'Format', and 'Last Received'. It lists four events, all labeled 'event8', with values representing distance in JSON format. A status bar at the bottom indicates '1 Simulation running'. The Windows taskbar is visible at the very bottom of the image.

Event	Value	Format	Last Received
event8	{"distance":132}	json	a few seconds ago
event8	{"distance":193}	json	a few seconds ago
event8	{"distance":27}	json	a few seconds ago
event8	{"distance":80}	json	2 minutes ago

Reference link:

<https://wokwi.com/projects/347740426685383250>