Assignment - 4

Assignment Date	11 November 2022
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Question-1:

Write code and connections in wokwi for the ultrasonic sensor.

Sketch.ino

```
#include <WiFi.h>
#include <PubSubClient.h>
WiFiClient wifiClient;
String data3;
#define ORG "7hikdc"
#define DEVICE_TYPE "Nodemcu"
#define DEVICE_ID "12345"
#define TOKEN "UU1-JfbzMFv!O5!W0a"
#define speed 0.034
#define led 14
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/priyadharshini/fmt/json";
char topic[] = "iot-2/cmd/home/fmt/String";
char authMethod[] = "use-token-auth";
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
PubSubClient client(server, 1883, wifiClient);
void publishData();


const int trigpin=5;
const int echopin=18;
String command;
String data="";

long duration;
float dist;
```

```
void setup()
{
  Serial.begin(115200);
  pinMode(led, OUTPUT);
  pinMode(trigpin, OUTPUT);
  pinMode(echopin, INPUT);
  wifiConnect();
  mqttConnect();
}

void loop() {
  bool isNearby = dist < 100;
  digitalWrite(led, isNearby);

  publishData();
  delay(500);

  if (!client.loop()) {
    mqttConnect();
  }
}

void wifiConnect() {
  Serial.print("Connecting to "); Serial.print("Wifi");
  WiFi.begin("Wokwi-GUEST", "", 6);
  while (WiFi.status() != WL_CONNECTED) {
    delay(500);
    Serial.print(".");
  }
            Serial.print("WiFi      connected,      IP      address:      ");
Serial.println(WiFi.localIP());
}

void mqttConnect() {
  if (!client.connected()) {
    Serial.print("Reconnecting MQTT client to "); Serial.println(server);
    while (!client.connect(clientId, authMethod, token)) {
      Serial.print(".");
      delay(500);
    }
    initManagedDevice();
    Serial.println();
```

```
  }
}

void initManagedDevice() {
  if (client.subscribe(topic)) {
    // Serial.println(client.subscribe(topic));
    Serial.println("IBM subscribe to cmd OK");
  } else {
    Serial.println("subscribe to cmd FAILED");
  }
}
void publishData()
{
  digitalWrite(trigpin,LOW);
  digitalWrite(trigpin,HIGH);
  delayMicroseconds(10);
  digitalWrite(trigpin,LOW);
  duration=pulseIn(echopin,HIGH);
  dist=duration*speed/2;
  if(dist<100){
    String payload = "{\"Alert Distance\":";
    payload += dist;
    payload += "}";

    Serial.print("\n");
    Serial.print("Sending payload: ");
    Serial.println(payload);
      if(client.publish(publishTopic, (char*) payload.c_str())) {
      Serial.println("Warning crosses 110cm -- it automaticaly of the loop");
      digitalWrite(led,HIGH);
    }

  }
    if(dist>101 && dist<111){
    String payload = "{\"Normal Distance\":";
    payload += dist;
    payload += "}";

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

```
    }

  }
```

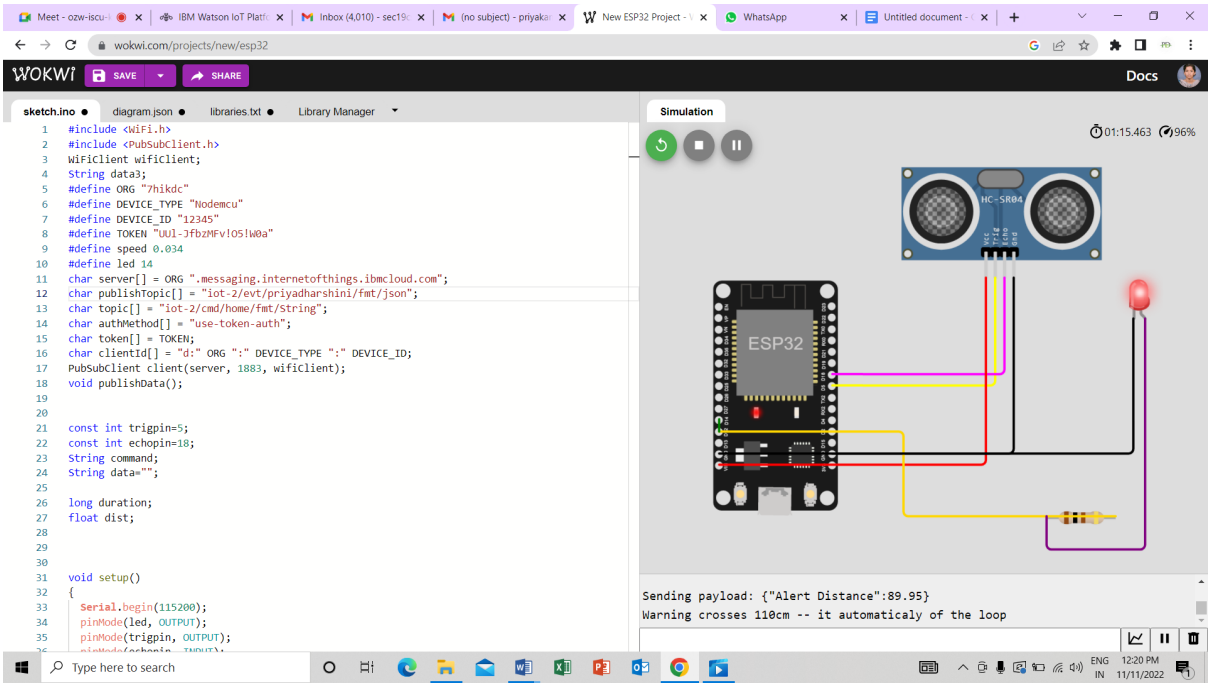
```
    void callback(char* subscribeTopic, byte* payload, unsigned int
payloadLength){
  Serial.print("callback invoked for topic:");
  Serial.println(subscribeTopic);
  for(int i=0; i<payloadLength; i++){
    dist += (char)payload[i];
  }
  Serial.println("data:"+ data3);
  if(data3=="lighton"){
    Serial.println(data3);
    digitalWrite(led,HIGH);
  }
  data3="";
}
```

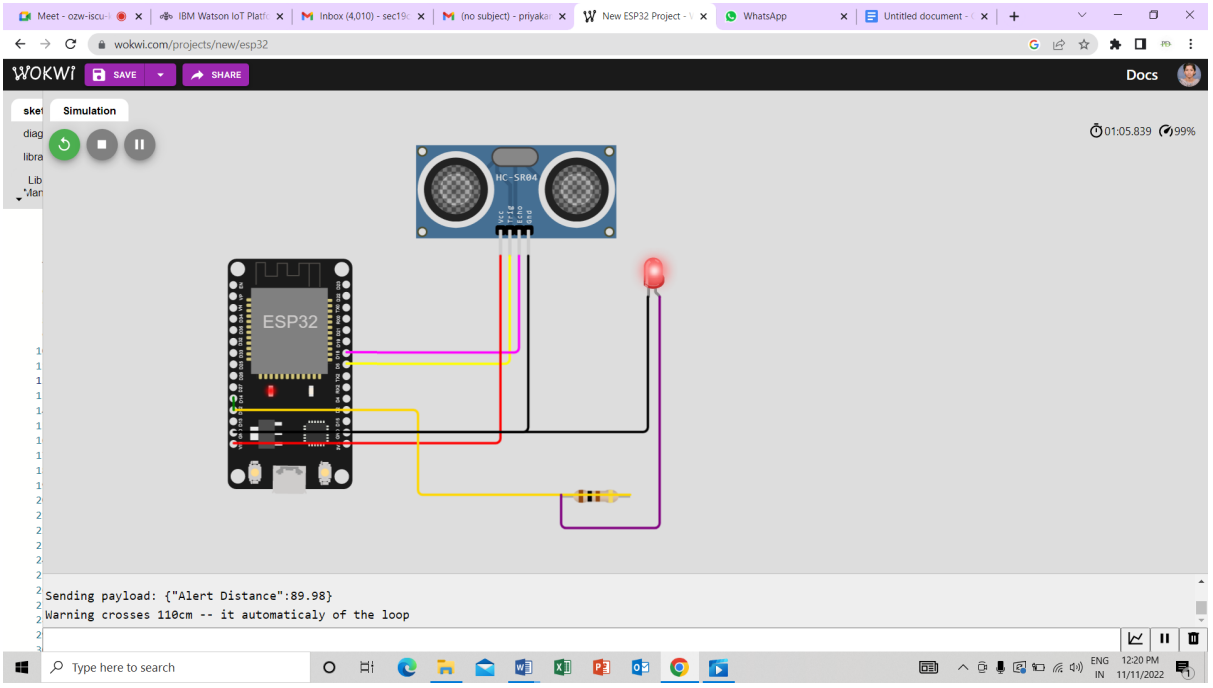
Diagram.json

```
{
  "version": 1,
  "author": "PRIYADHARSHINI K",
  "editor": "wokwi",
  "parts": [
    { "type": "wokwi-esp32-devkit-v1", "id": "esp", "top": 60.67, "left":
-63.33, "attrs": {} },
    {
      "type": "wokwi-led",
      "id": "led1",
      "top": 53.21,
      "left": 279.26,
      "attrs": { "color": "red" }
    },
    {
```

```
      "type": "wokwi-hc-sr04",
      "id": "ultrasonic1",
      "top": -33.96,
      "left": 96.97,
      "attrs": { "distance": "90" }
    },
    {
      "type": "wokwi-resistor",
      "id": "r1",
      "top": 253.89,
      "left": 220.39,
      "attrs": { "value": "100" }
    }
  ],
  "connections": [
    [ "esp:TX0", "$serialMonitor:RX", "", [] ],
    [ "esp:RX0", "$serialMonitor:TX", "", [] ],
    [ "ultrasonic1:TRIG", "esp:D5", "yellow", [ "v0" ] ],
    [ "ultrasonic1:ECHO", "esp:D18", "magenta", [ "v0" ] ],
    [ "ultrasonic1:VCC", "esp:VIN", "red", [ "v0" ] ],
    [ "ultrasonic1:GND", "esp:GND.1", "black", [ "v0" ] ],
    [ "esp:D12", "r1:2", "gold", [ "h156.9", "v62.96" ] ],
    [ "led1:C", "esp:GND.2", "black", [ "v0" ] ],
    [ "r1:1", "led1:A", "purple", [ "v28.12", "h94" ] ],
    [ "esp:D12", "esp:D14", "green", [ "h0" ] ]
  ]
}
```

Simulation:

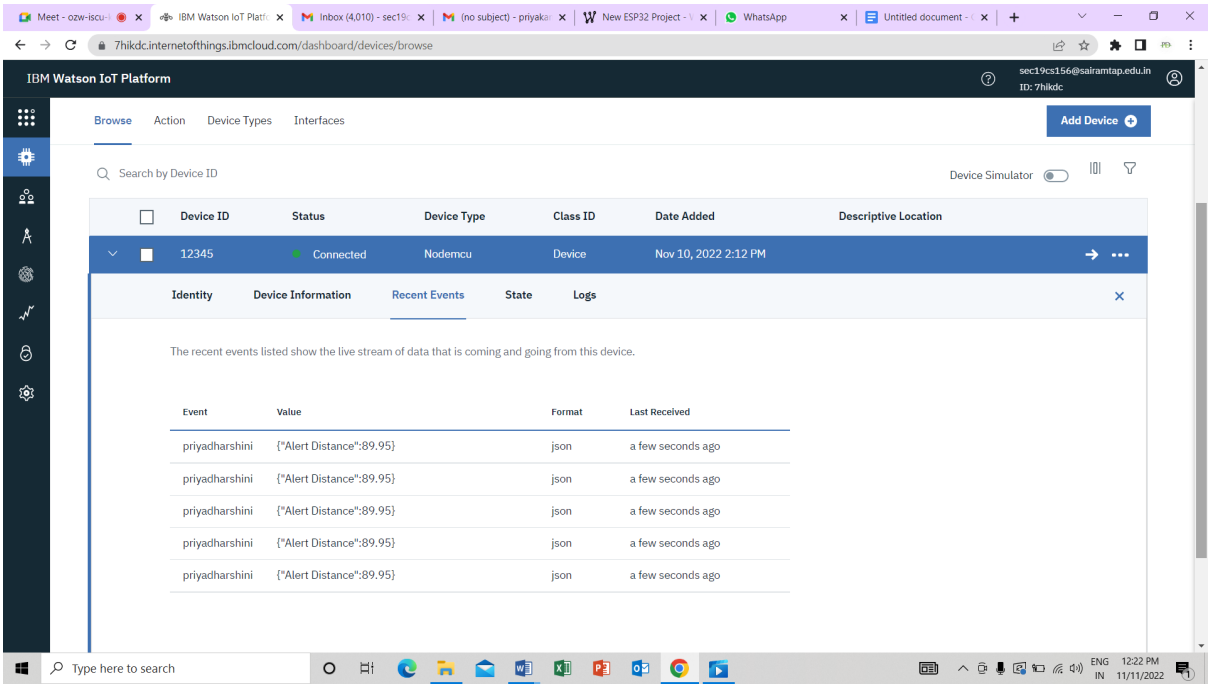

wokwi.com/projects/new/esp32
WOKWI
SAVE
SHARE
Docs
sketch.ino
diagram.json
libraries.txt
Library Manager
Simulation
01:15.463
96%
HC-SR04
ESP32
Sending payload: {"Alert Distance":89.95}
Warning crosses 110cm -- it automaticaly of the loop
Type here to search
ENG
IN
12:20 PM
11/11/2022


wokwi.com/projects/new/esp32
WOKWI
SAVE
SHARE
Docs
Simulation
01:05.839
99%
HC-SR04
ESP32
Sending payload: {"Alert Distance":89.98}
Warning crosses 110cm -- it automaticaly of the loop
Type here to search
ENG
IN
12:20 PM
11/11/2022

Whenever the distance is less than 100 cms send an "alert" to the IBM cloud and display in the device recent events.

IOT platform:

Recent events



WOKWI link:

https://wokwi.com/projects/348012693934834260