Assignment - 4

Name	Mukil S
Team ID	PNT2022TMID43363
Project Name	Hazardous Area Monitoring for Industrial Plant Powered by IoT
Maximum Marks	4 Marks

Program

```
#include <WiFi.h>
#include<PubSubClient.h>


void callback(char* subscribetopic,byte* payload,unsigned int payloadLength);
#define ORG "4wj0mx"
#define DEVICE_TYPE "TempAndHumid"
#define DEVICE_ID "TH-01"
#define TOKEN "1234567890"
#define SOUND_SPEED 0.034
#define CM_TO_INCH 0.393701

const int trigPin = 5;
const int echoPin = 18;

long duration;
float distanceCm;
float distanceInch;
String data;

char server[]=ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/Data/fmt/json";
char subscribeTopic[] = "iot-2/cmd/command/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);

void setup() {
  Serial.begin(115200); // Starts the serial communication
  pinMode(trigPin, OUTPUT); // Sets the trigPin as an Output
  pinMode(echoPin, INPUT); // Sets the echoPin as an Input
  wificonnect();
  mqttconnect();
}
```

```
void loop() {
  // Clears the trigPin
  digitalWrite(trigPin, LOW);
  delayMicroseconds(2);
  // Sets the trigPin on HIGH state for 10 micro seconds
  digitalWrite(trigPin, HIGH);
  delayMicroseconds(10);
  digitalWrite(trigPin, LOW);

  // Reads the echoPin, returns the sound wave travel time in microseconds
  duration = pulseIn(echoPin, HIGH);

  // Calculate the distance
  distanceCm = duration * SOUND_SPEED/2;

  // Convert to inches
  distanceInch = distanceCm * CM_TO_INCH;

  // Prints the distance in the Serial Monitor
  Serial.print("Distance (cm): ");
  Serial.println(distanceCm);

  delay(1000);

  PublishData(distanceCm);
  delay(1000);
  if(!client.loop())
  {
    mqttconnect();
  }
}

void PublishData(float distanceCm)
{

  mqttconnect ();
  String payload;
```

```
  if(distanceCm<100.0)
  {
    payload = "{\"Alert\":";
    payload += distanceCm;
    payload += "}";
  }
  else
  {
    payload = "{\"distanceCm\":";
    payload += distanceCm;
    payload += "}";
  }



  Serial.print("Sending payload: ");
  Serial.print(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();
}}

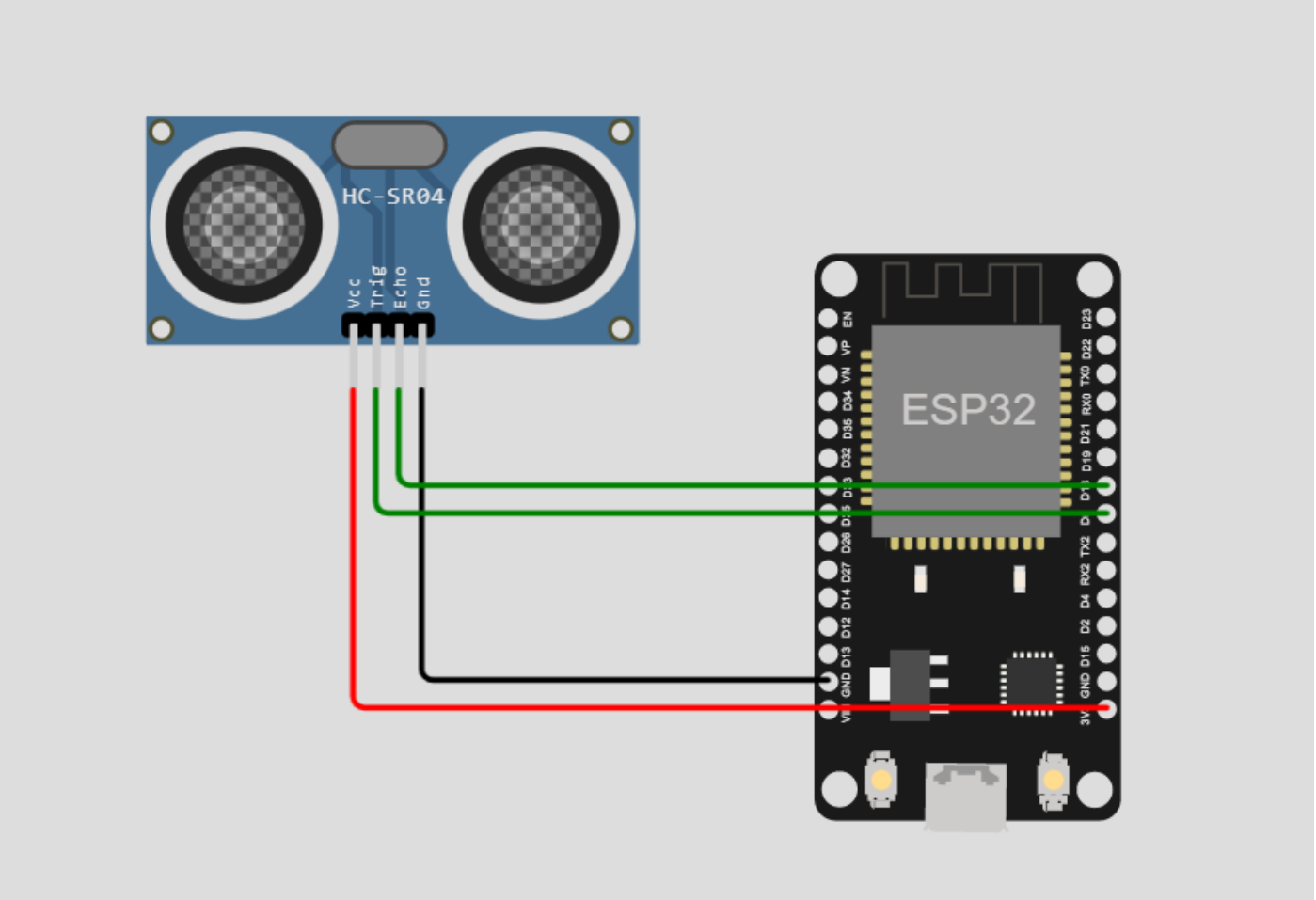
void wificonnect()
{
  Serial.println();
  Serial.print("Connecting to");

  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++)
  {
    data +=(char)payload[i];
  }
  Serial.println("data: "+data);
  if(data>(char)100)
  {
    Serial.println("Alert!");
  }*/

}
```

Circuit Diagram



Wokwi Simulation

sketch.ino | diagram.json | Ultrasonic.h | libraries.txt | Ultrasonic.cpp | Library Manager

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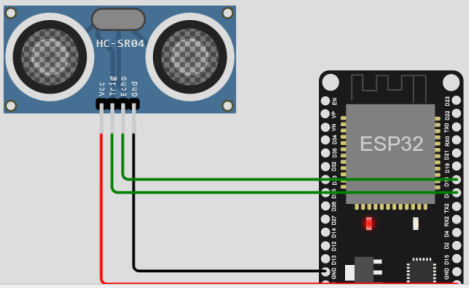
Simulation — 00:25.098 — 62%




```
Distance (cm): 394.98
Sending payload: {"distanceCm":394.98}Publish ok
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```

WOKWI — SAVE — SHARE — Docs

sketch.ino | diagram.json | Ultrasonic.h | libraries.txt | Ultrasonic.cpp | Library Manager

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```

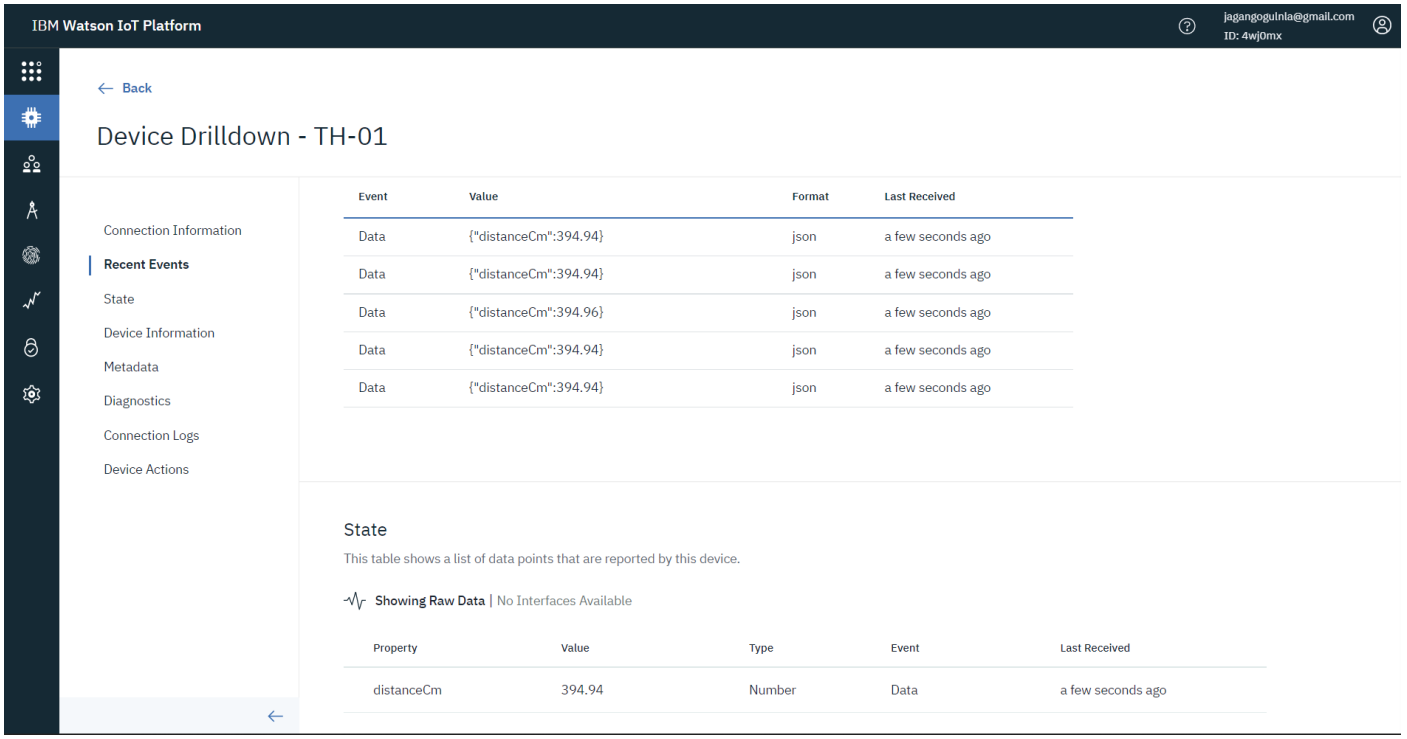
Simulation — 00:16.382 — 85%

Editing Ultrasonic Distance Sensor
Distance: 395cm

```
Connecting to..
WiFi connected
IP ADDRESS
10.10.0.2
Reconnecting client to4wj0mx.messaging.internetofthings.ibmcloud.com
iot-2/cmd/command/fmt/String
subscribe to cmd OK

Distance (cm): 200.01
Sending payload: {"distanceCm":200.01}Publish ok
Distance (cm): 199.94
Sending payload: {"distanceCm":199.94}Publish ok
Distance (cm): 115.96
Sending payload: {"distanceCm":115.96}Publish ok
Distance (cm): 92.97
Sending payload: {"Alert":92.97}Publish ok
Distance (cm): 92.97
Sending payload: {"Alert":92.97}Publish ok
Distance (cm): 165.97
Sending payload: {"distanceCm":165.97}Publish ok
Distance (cm): 394.94
Sending payload: {"distanceCm":394.94}Publish ok
```

IBM Watson Cloud



Project Link - https://wokwi.com/projects/348669654654255699