

**ASSIGNMENT – IV**  
**TEAM ID: PNT2022TMID17577**

Write code and connections in wokwi for ultrasonic sensors.

Whenever distance is less than 100cms send "alert" to ibmcloud and display device recent events.

**Code:**

```
#include <WiFi.h>
#include <PubSubClient.h>
WiFiClient wifiClient;
String data3;
#define ORG "4yi0vc"
#define DEVICE_TYPE "nodeMcu"
#define DEVICE_ID "Assignment4"
#define TOKEN "123456789"
#define speed 0.034
#define led 14

char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/Data/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 = "{\"Normal Distance\":\"";
    payload += dist;
    payload += "\"}";
    Serial.print("\n");
  }
}

```

```

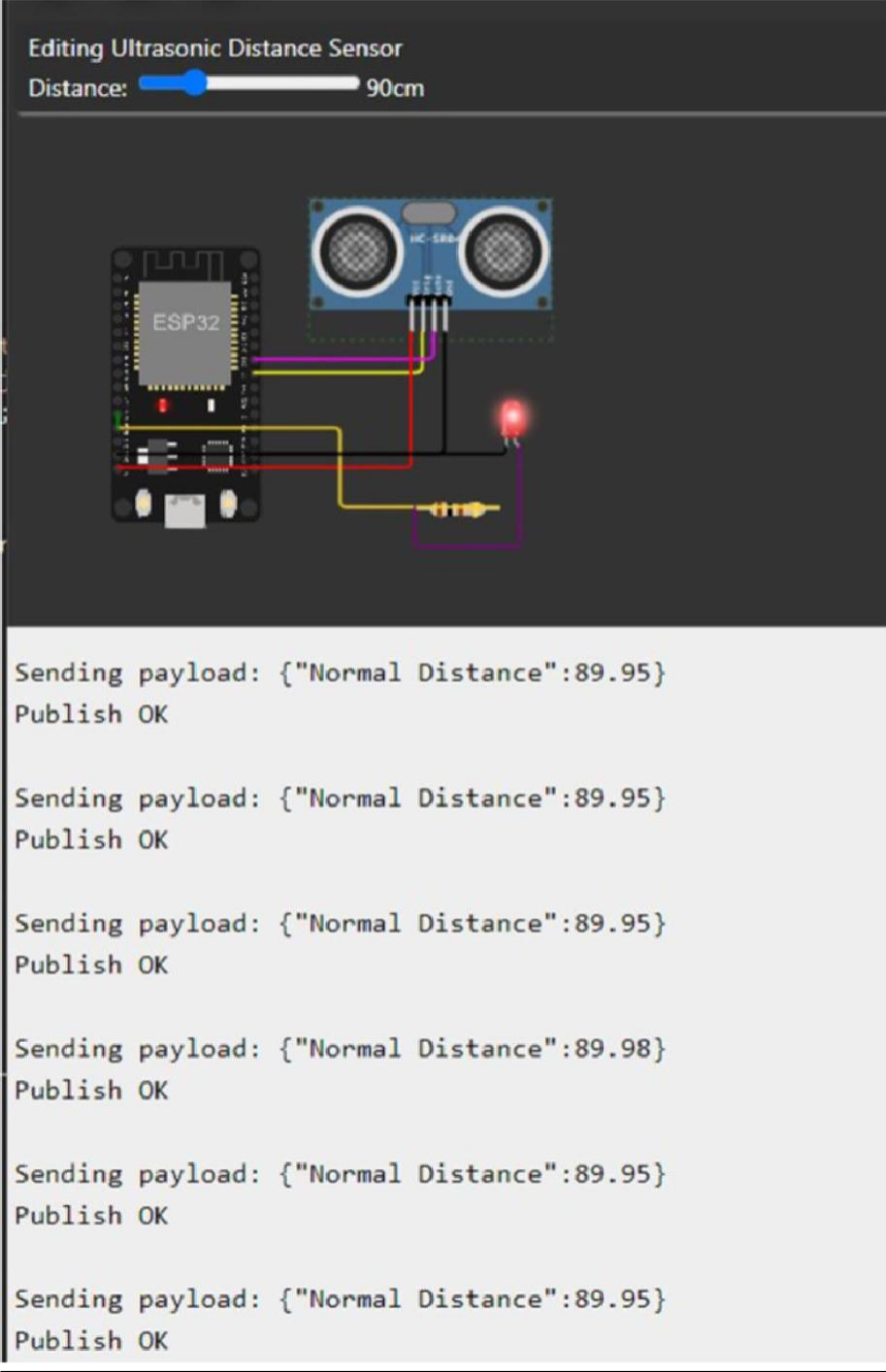
Serial.print("Sending payload: ");
Serial.println(payload);
if (client.publish(publishTopic, (char*) payload.c_str())) {
    Serial.println("Publish OK");
}
}
if(dist>101 && dist<111){
String payload = "{"Alert distance\":";
payload += dist;
payload += "}";
Serial.print("\n");
Serial.print("Sending payload: ");
Serial.println(payload);
if(client.publish(publishTopic, (char*) payload.c_str())) {
    Serial.println("Warning crosses 110cm -- it automaticaly of the loop");
    digitalWrite(led,HIGH);
}else {
    Serial.println("Publish 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++){
    dist += (char)payload[i];
}
Serial.println("data:" + data3);
if(data3=="lighton"){
Serial.println(data3);
digitalWrite(led,HIGH);
}
}

```

```
}  
data3="";  
}
```

### **Output :**

1) When Distance < 100 cm, it will show normal distance.



Editing Ultrasonic Distance Sensor  
Distance:  90cm

ESP32

HC-SR04

Sending payload: {"Normal Distance":89.95}  
Publish OK

Sending payload: {"Normal Distance":89.95}  
Publish OK

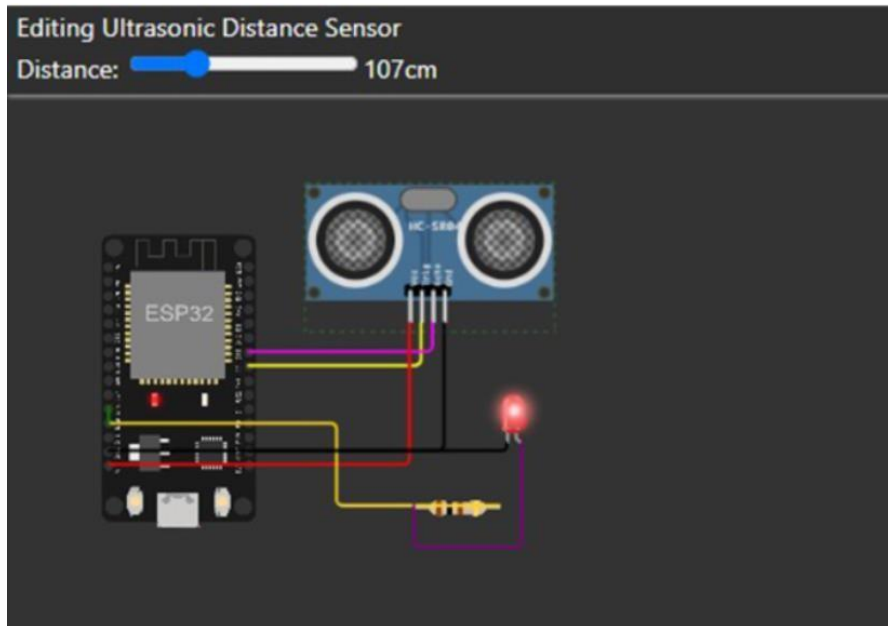
Sending payload: {"Normal Distance":89.95}  
Publish OK

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Publish OK

Sending payload: {"Normal Distance":89.95}  
Publish OK

Sending payload: {"Normal Distance":89.95}  
Publish OK

2)When distance > 100cm <110cm, alert with warning message occurs.



```
Sending payload: {"Alert distance":106.98}  
Warning crosses 110cm -- it automaticaly of the loop
```

```
Sending payload: {"Alert distance":106.98}  
Warning crosses 110cm -- it automaticaly of the loop
```

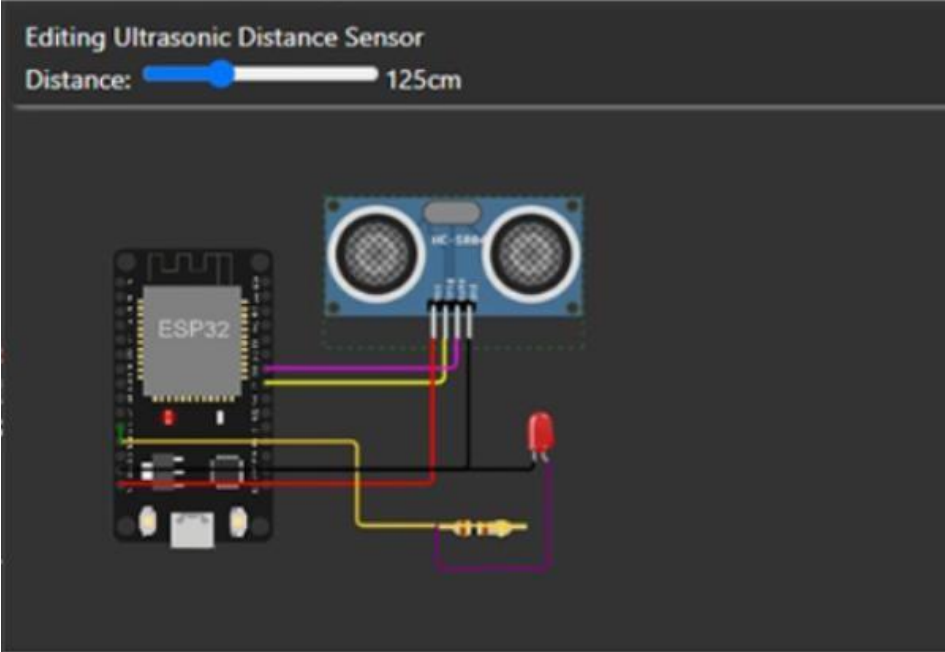
```
Sending payload: {"Alert distance":106.98}  
Warning crosses 110cm -- it automaticaly of the loop
```

```
Sending payload: {"Alert distance":106.98}  
Warning crosses 110cm -- it automaticaly of the loop
```

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```
Sending payload: {"Alert distance":106.98}  
Warning crosses 110cm -- it automaticaly of the loop
```

3) When distance > 110cm, totally moves to iff state.



The screenshot shows a software interface for an ultrasonic distance sensor. At the top, it says "Editing Ultrasonic Distance Sensor" with a slider set to "Distance: 125cm". Below this is a diagram of an ESP32 microcontroller connected to an HC-SR04 ultrasonic sensor. The sensor's VCC is connected to the ESP32's 5V pin, GND to GND, and the Trig pin to a digital pin. The Echo pin is connected to a red LED. Below the diagram is a terminal window showing the following output:

```
Sending payload: {"Alert distance":106.96}
Warning crosses 110cm -- it automaticaly of the loop

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**IBM Cloud Output:**



## Recent Events

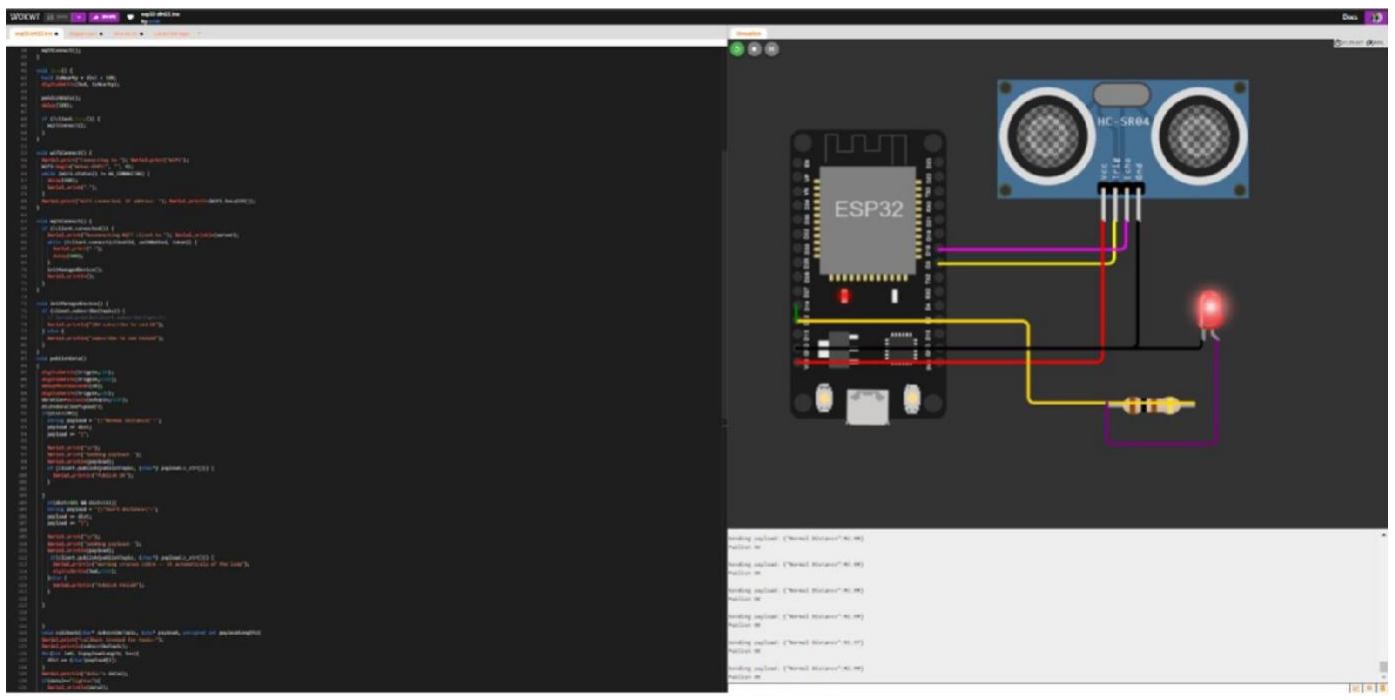
The recent events listed show the live stream of data that is coming and going from this device.

Event	Value	Format	Last Received
Data	{"Normal Distance":89.95}	json	a few seconds ago
Data	{"Normal Distance":89.95}	json	a few seconds ago
Data	{"Normal Distance":89.95}	json	a few seconds ago
Data	{"Normal Distance":89.95}	json	a few seconds ago
Data	{"Normal Distance":89.95}	json	a few seconds ago

## Recent Events

The recent events listed show the live stream of data that is coming and going from this device.

Event	Value	Format	Last Received
Data	{"Alert distance":106.98}	json	a few seconds ago
Data	{"Alert distance":107.03}	json	a few seconds ago
Data	{"Alert distance":106.98}	json	a few seconds ago
Data	{"Alert distance":106.98}	json	a few seconds ago
Data	{"Alert distance":106.98}	json	a few seconds ago



## Recent Events

The recent events listed show the live stream of data that is coming and going from this device.

Event	Value	Format	Last Received
Data	{"Normal Distance":92.99}	json	a few seconds ago
Data	{"Normal Distance":92.99}	json	a few seconds ago
Data	{"Normal Distance":92.99}	json	a few seconds ago
Data	{"Normal Distance":92.99}	json	a few seconds ago
Data	{"Normal Distance":92.99}	json	a few seconds ago