

ASSIGNMENT – IV
TEAM ID: PNT2022TMID30606

Write code and connections in wokwi for ultrasonic sensors.

Whenever distance is less than 100cms send "alert" to ibm cloud 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");
}
}
}

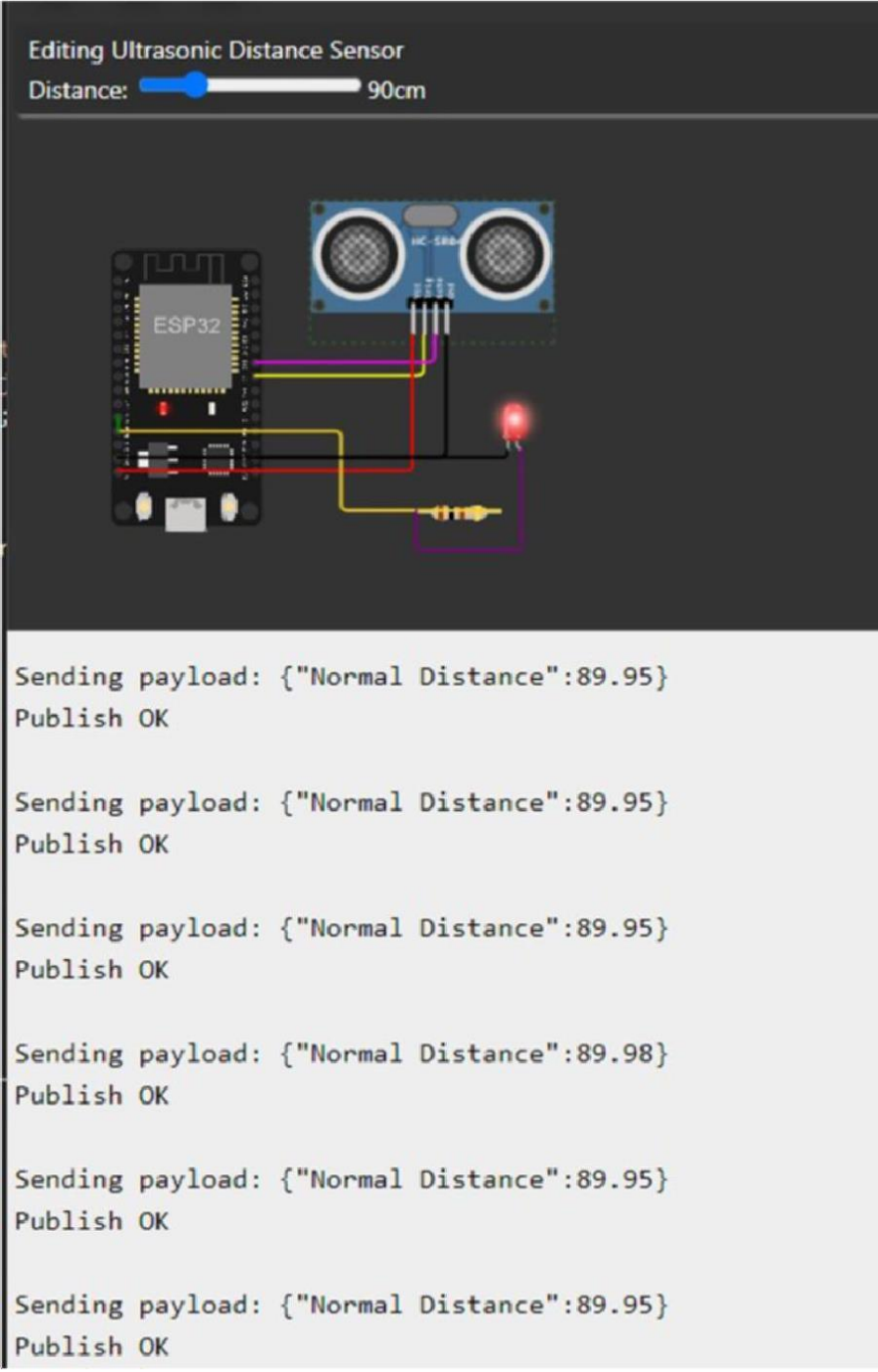
void callback(char* subscribeTopic, byte* payload, unsigned int payloadLength){
Serial.print("callback invoked for topic:");
Serial.println(subscribeTopic);
for(int i=0; i<payloadLength; i++){
dist += (char)payload[i];
}
Serial.println("data:" + data3);
if(data3=="lighton"){
Serial.println(data3);
digitalWrite(led,HIGH);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

```

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

Output :

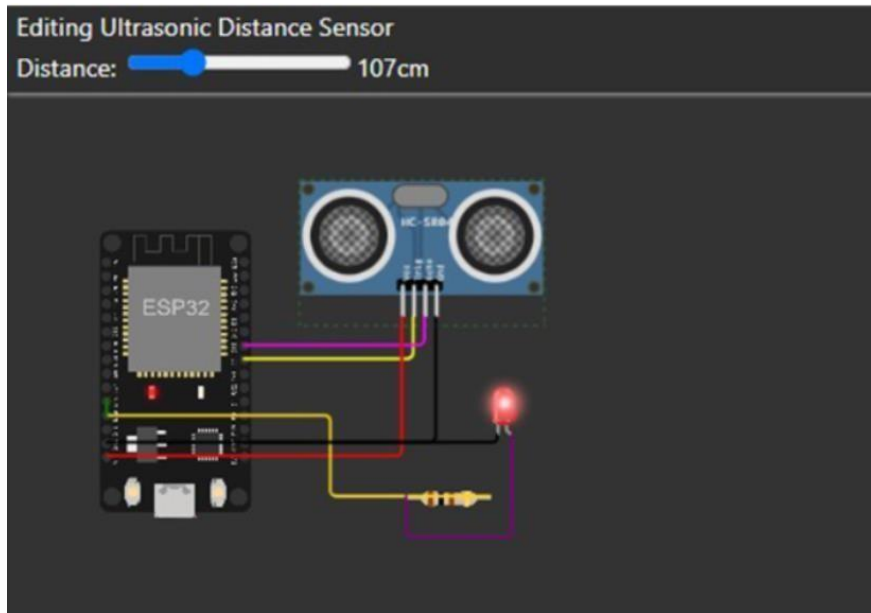
1) When Distance < 100 cm, it will show normal distance.



The screenshot displays a web-based interface titled "Editing Ultrasonic Distance Sensor". At the top, there is a "Distance:" label followed by a slider bar set to "90cm". Below this is a diagram showing an ESP32 microcontroller connected to an HC-SR04 ultrasonic sensor and a red LED. The wiring is as follows: the sensor's VCC is connected to the ESP32's 5V pin, GND to GND, and Trig to D18. The LED's anode is connected to D15 and its cathode to GND. The interface also features a log of MQTT messages:

```
Sending payload: {"Normal Distance":89.95}  
Publish OK  
  
Sending payload: {"Normal Distance":89.95}  
Publish OK  
  
Sending payload: {"Normal Distance":89.95}  
Publish OK  
  
Sending payload: {"Normal Distance":89.98}  
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
```

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Warning crosses 110cm -- it automaticaly of the loop
```

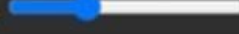
```
Sending payload: {"Alert distance":106.98}  
Warning crosses 110cm -- it automaticaly of the loop
```

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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 IoT project. At the top, it says "Editing Ultrasonic Distance Sensor" with a slider for "Distance:" set to 125cm. Below this is a diagram of an ESP32 microcontroller board connected to an HC-SR04 ultrasonic sensor module. The sensor's VCC pin 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

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
```

IBM Cloud Output:

Recent Events

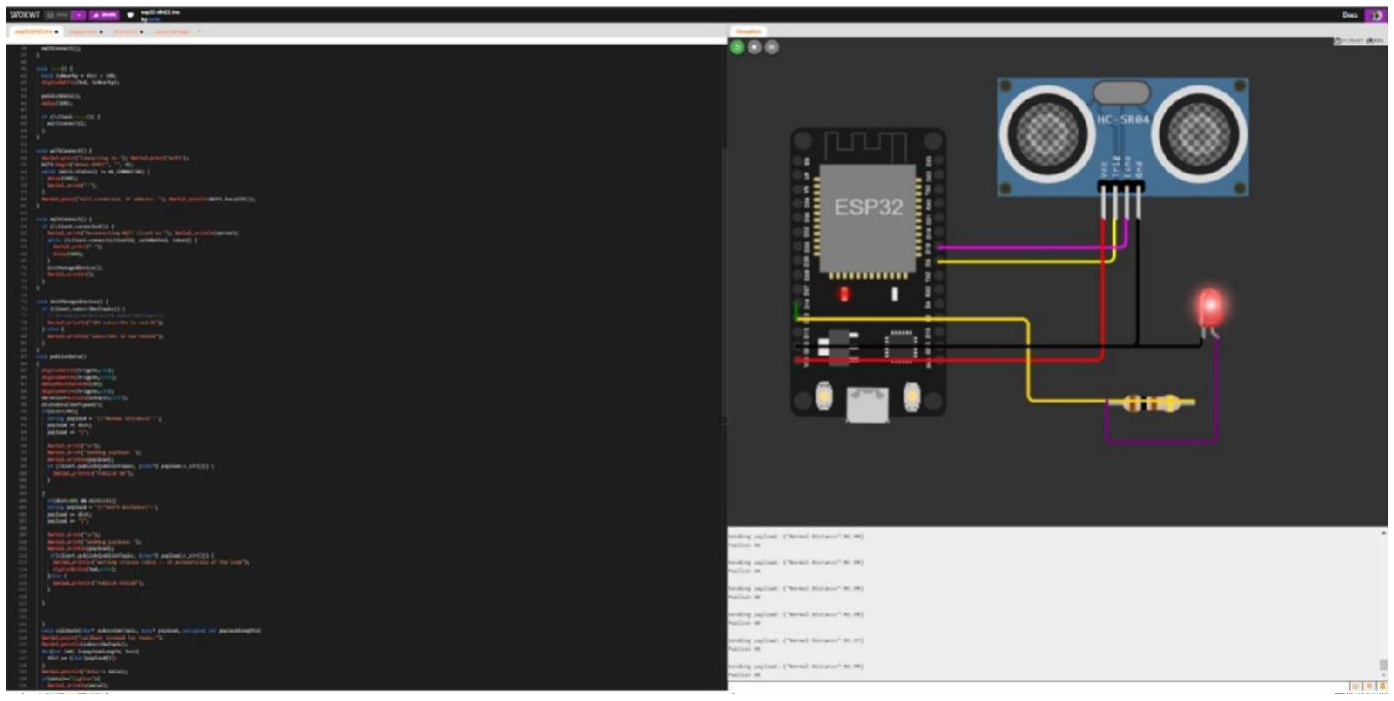
The recent events listed show the live stream of data that is coming and going from this device.

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