

ASSIGNMENT – IV
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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];
}

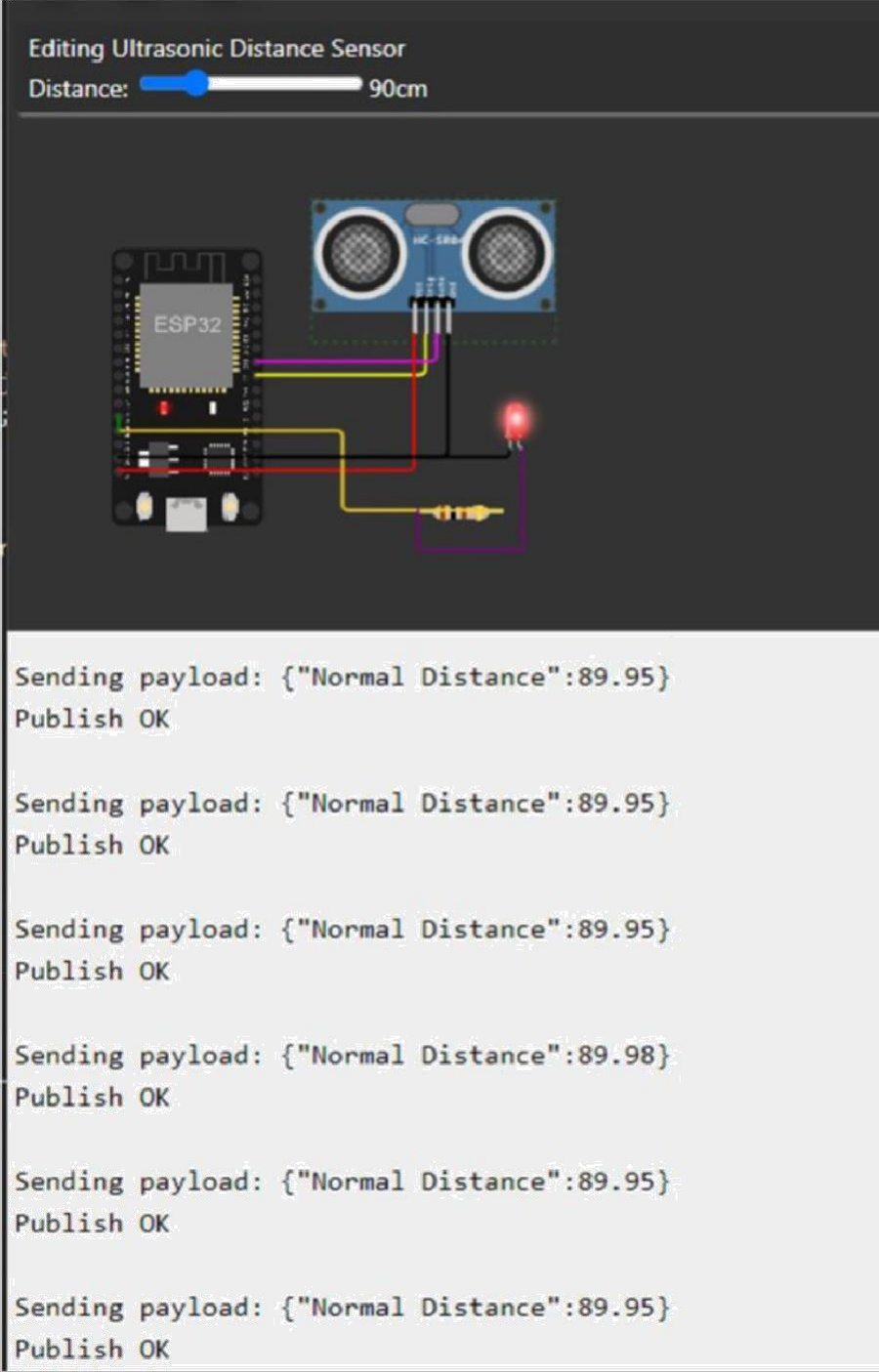
Serial.println("data:" + data3);
if(data3=="lighton"){
Serial.println(data3);
digitalWrite(led,HIGH);
}
}

```

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

Output :

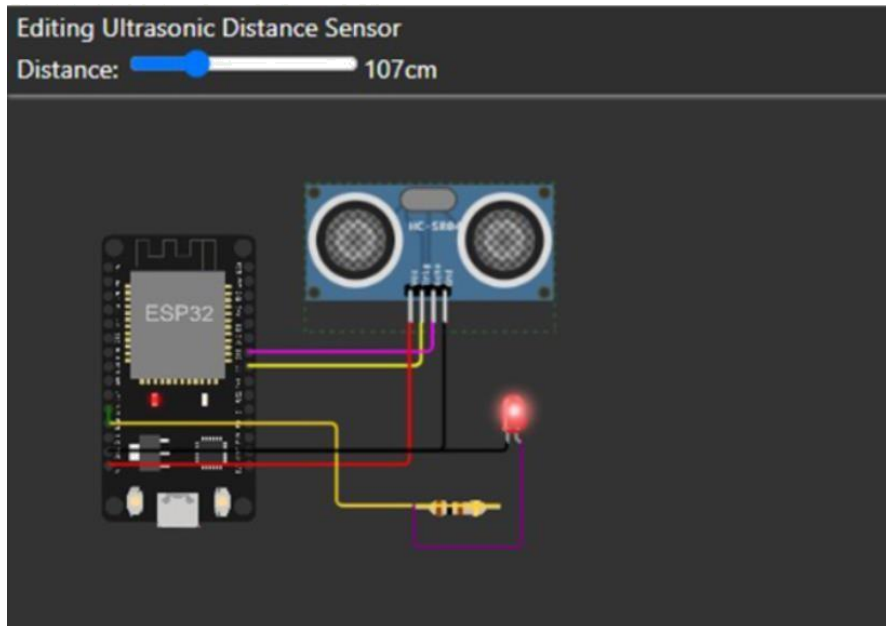
1) When Distance < 100 cm, it will show normal distance.



The screenshot shows a web interface for an IoT project titled "Editing Ultrasonic Distance Sensor". At the top, there is a slider control for "Distance:" set to 90cm. Below this is a wiring diagram showing an ESP32 microcontroller connected to an HC-SR04 ultrasonic sensor and a red LED. The sensor's VCC is connected to the ESP32's 5V pin, GND to GND, Trig to D4, and Echo to D5. The LED's anode is connected to D4 and its cathode to GND. The dashboard log shows the following 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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```


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

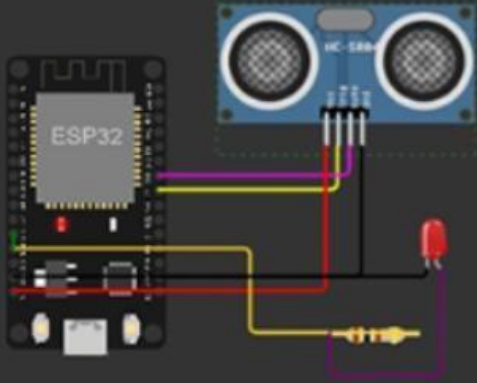
```
Sending payload: {"Alert distance":106.98}  
Warning crosses 110cm -- it automaticaly of the loop
```

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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.

Editing Ultrasonic Distance Sensor
Distance:  125cm



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

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

IBM Cloud Output:

Recent Events

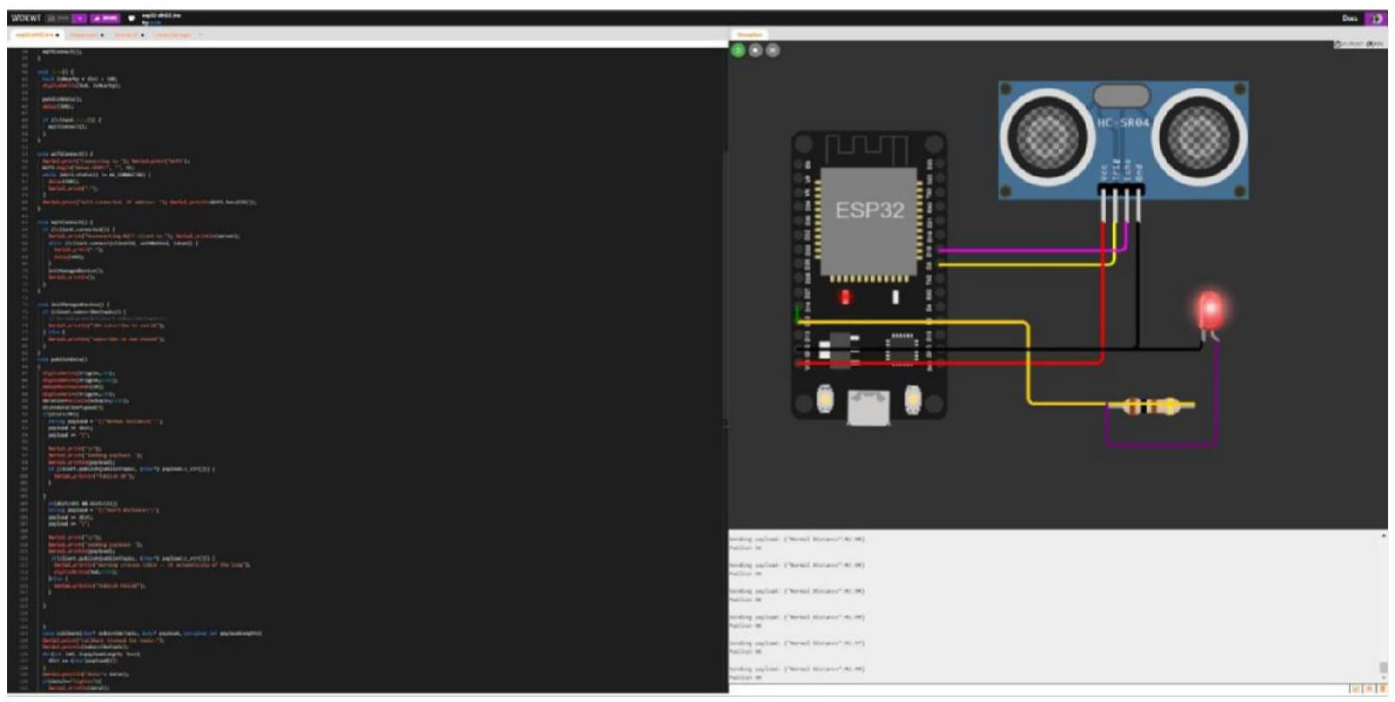
The recent events listed show the live stream of data that is coming and going from this device.

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