ASSIGNMENT 4

Write code and connections in wokwi for the ultrasonic sensor.Whenever the distance is less than 100 cms send an "alert" to the IBM cloud and display in the device recent events.

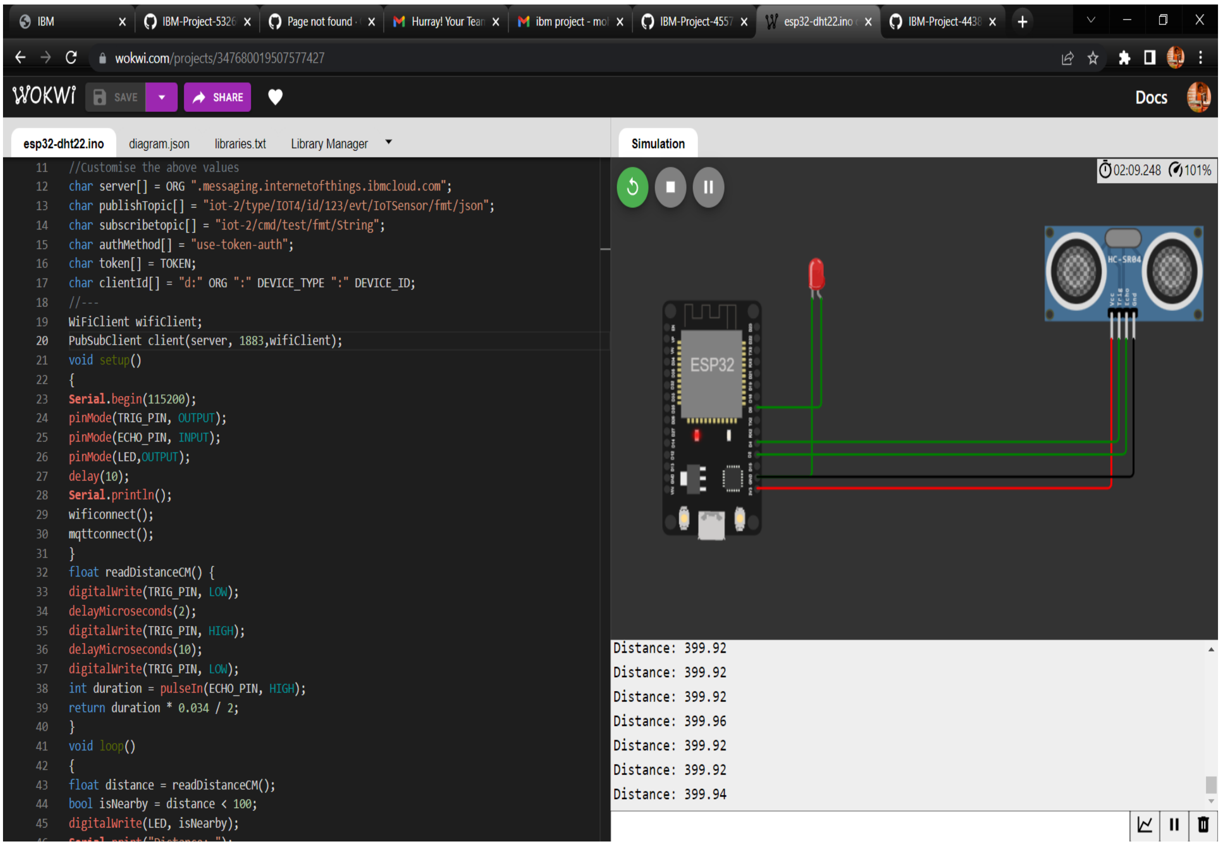
code:

```
#include <WiFi.h>
#include <PubSubClient.h>
#define ECHO_PIN 2
#define TRIG_PIN 4
#define LED 5
//IBM credentials
#define ORG "ld4vg3"
#define DEVICE_TYPE "TestDevice"
#define DEVICE_ID "102030"
#define TOKEN "4+*C1BQ7bY7+b3E2vf"
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/IoTSensor/fmt/json";
char subscribetopic[] = "iot-2/cmd/test/fmt/String";
char authMethod[] = "use-token-auth";
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
WiFiClient wifiClient;
PubSubClient client(server, 1883,wifiClient);
void setup(){
Serial.begin(115200);
pinMode(TRIG_PIN, OUTPUT);
pinMode(ECHO_PIN, INPUT);
pinMode(LED,OUTPUT);
delay(10);
Serial.println();
wificonnect();
mqttconnect();
}
float readDistanceCM() {
```

```
digitalWrite(TRIG_PIN, LOW);
delayMicroseconds(2);
digitalWrite(TRIG_PIN, HIGH);
delayMicroseconds(10);
digitalWrite(TRIG_PIN, LOW);
int duration = pulseIn(ECHO_PIN, HIGH);
return duration * 0.034 / 2;
}
void loop(){
float distance = readDistanceCM();
bool isNearby = distance < 100;
digitalWrite(LED, isNearby);
Serial.print("Distance: ");
Serial.println(distance);
delay(100);
if (isNearby == 1){
PublishData(distance);
}
delay(1000);
if (!client.loop()) {
mqttconnect();
}
}
void PublishData(float distance) {
mqttconnect();
String payload = "{\"Alert\":""\"";
payload += distance;
payload += " is less than 100cms\"";
payload += "}";
Serial.print("Sending payload: ");
Serial.println(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");
}
}
```

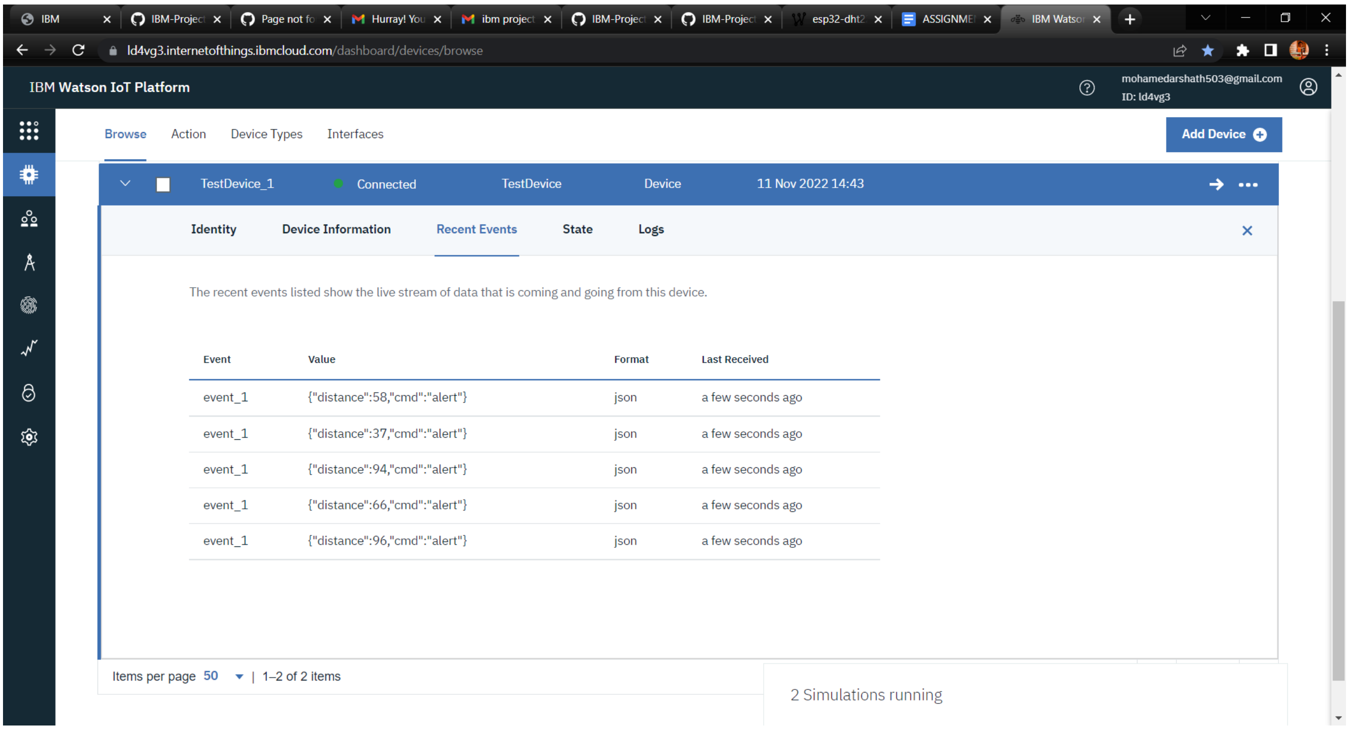
Output:



```
//Customise the above values
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/type/IOT4/id/123/evt/IoTSensor/fmt/json";
char subscribetopic[] = "iot-2/cmd/test/fmt/String";
char authMethod[] = "use-token-auth";
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
//---
WiFiClient wifiClient;
PubSubClient client(server, 1883,wifiClient);
void setup()
{
Serial.begin(115200);
pinMode(TRIG_PIN, OUTPUT);
pinMode(ECHO_PIN, INPUT);
pinMode(LED,OUTPUT);
delay(10);
Serial.println();
wificonnect();
mqttconnect();
}
float readDistanceCM() {
digitalWrite(TRIG_PIN, LOW);
delayMicroseconds(2);
digitalWrite(TRIG_PIN, HIGH);
delayMicroseconds(10);
digitalWrite(TRIG_PIN, LOW);
int duration = pulseIn(ECHO_PIN, HIGH);
return duration * 0.034 / 2;
}
void loop()
{
float distance = readDistanceCM();
bool isNearby = distance < 100;
digitalWrite(LED, isNearby);
Serial.print("Distance: ");
```

```
Distance: 399.92
Distance: 399.92
Distance: 399.92
Distance: 399.96
Distance: 399.92
Distance: 399.92
Distance: 399.94
```

IBM IOT WATSON OUTPUT:



TestDevice_1 Connected TestDevice Device 11 Nov 2022 14:43

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

Event	Value	Format	Last Received
event_1	{"distance":58,"cmd":"alert"}	json	a few seconds ago
event_1	{"distance":37,"cmd":"alert"}	json	a few seconds ago
event_1	{"distance":94,"cmd":"alert"}	json	a few seconds ago
event_1	{"distance":66,"cmd":"alert"}	json	a few seconds ago
event_1	{"distance":96,"cmd":"alert"}	json	a few seconds ago

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2 Simulations running