# Smart Farmer -IoT Enabled Smart Farming Application

## ASSIGNMENT – 4

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**Write Code and connections in wokwi for ultrasonic sensor. Whatever distance is less than 100 cm send "Alert" to ibm cloud and display in device recent events.**

## Solution:

```
//Pins
const int TRIG_PIN = 7 ;const int ECHO_PIN = 8;

//Anything over 400 cm (23200 us pulse) is "out of range"const unsigned int MAX_DIST = 23200;


 void setup() {


// The Trigger pin will tell the sensor to range find
Pin Mode(TRIG_PIN, OUTPUT);
digital Write(TRIG_PIN, LOW);


 //Set Echo pin as input to measure the duration of

  //pulses coming back from the distance sensor

 pinMode(ECHO_PIN, INPUT ) ;


 // We'll use the serial monitor to view the sensor output

  Serial.begin(9600);

 }
void loop()
{
 unsigned long  t1;
```

```
  unsigned long t2;

   unsigned long

   pulse_width;float cm;

   float inches;

  // Hold the trigger pin high for at least 10 us

  digitalWrite(TRIG_PIN, HIGH);

  delayMicroseconds(10);

  digitalWrite(TRIG_PIN, LOW);


  // Wait for pulse on echo pin

  while (digitalRead( ECHO_PIN )==0 );


  // Measure how long the echo pin was held high (pulse width)

   // Note: the micros() counter will overflow after-70

   mint1= micros ();

while (digitalRead(ECHO_PIN) == 1);t2= micros ();
pulse_width = t2-t1;

// Calculate distance in centimeters and inches. The constants

//are found in the datasheet, and calculated from the assumed speed
// of sound in air at sea level (- 340m/s)
cm=pulse_Width / 58 ;
inches = pulse_width/148.0;
```

```
// Print out results
if (pulse_width >MAX _ DIST
){Serial.println("Out of
range");
} else {
Serial.println("*****************************");
Serial.print("The Measured Distance in cm: ");
Serial.println(cm);

if( cm < 100 ){
    //while(true){
     Serial.println("Alert!!");
     //}
}
Serial.print("*******************************");
}
//wait at least 1000ms before next
measurementDelay(1000);
}
```

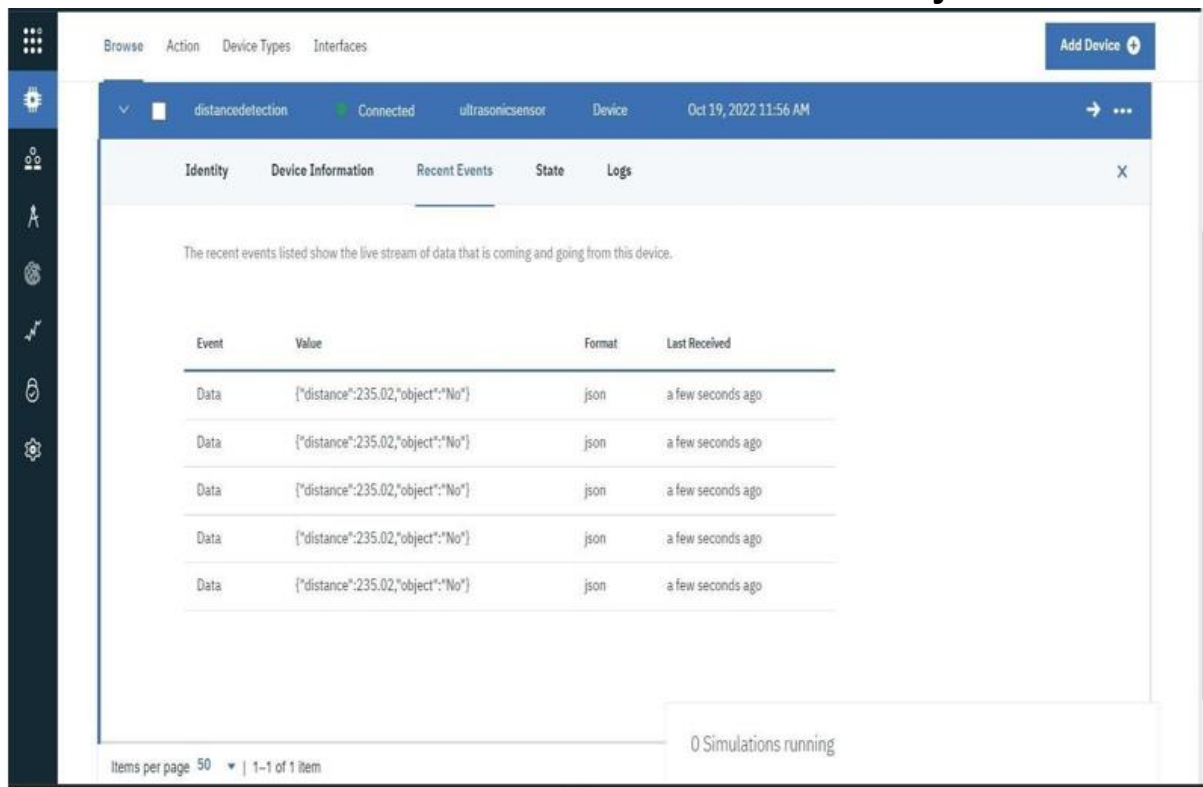**OUTPUT :**

**When object is not near to the ultrasonic sensor**



```
sketch.ino    diagram.json    libraries.txt    Library Manager  ▼

1   #include <WiFi.h>//library for wifi
2   #include <PubSubClient.h>//library for MQtt
3
4
5   void callback(char* subscribetopic, byte* payload, unsigned int payloadLength);
6
7   //-------credentials of IBM Accounts------
8
9   #define ORG "f59trs"//IBM ORGANITION ID
10  #define DEVICE_TYPE "ultrasonicsensor"//Device type mentioned in ibm watson IOT Platform
11  #define DEVICE_ID "distancedetection"//Device ID mentioned in ibm watson IOT Platform
12  #define TOKEN "AlGMGaaF01nawa1QA3"    //Token
13  String data3;
14  float dist;
15
16
17  //-------- Customise the above values --------
18  char server[] = ORG ".messaging.internetofthings.ibmcloud.com";// Server Name
19  char publishTopic[] = "iot-2/evt/Data/fmt/json";// topic name and type of event perform and
20  char subscribetopic[] = "iot-2/cmd/test/fmt/String";// cmd  REPRESENT command type AND COMM
21  char authMethod[] = "use-token-auth";// authentication method
22  char token[] = TOKEN;
23  char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;//client id
24
25
26  //---------------------------------------
27  WiFiClient wifiClient; // creating the instance for wificlient
28  PubSubClient client(server, 1883, callback ,wifiClient); //calling the predefined client id
29
30  int LED = 4;
31  int trig = 5;
32  int echo = 18;
33  void setup()
```

Simulation

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```
no object found
Sending payload: {"distance":403.45,"object":"No"}
Publish ok
Distancein cm233.00
no object found
Sending payload: {"distance":233.00,"object":"No"}
Publish ok
```
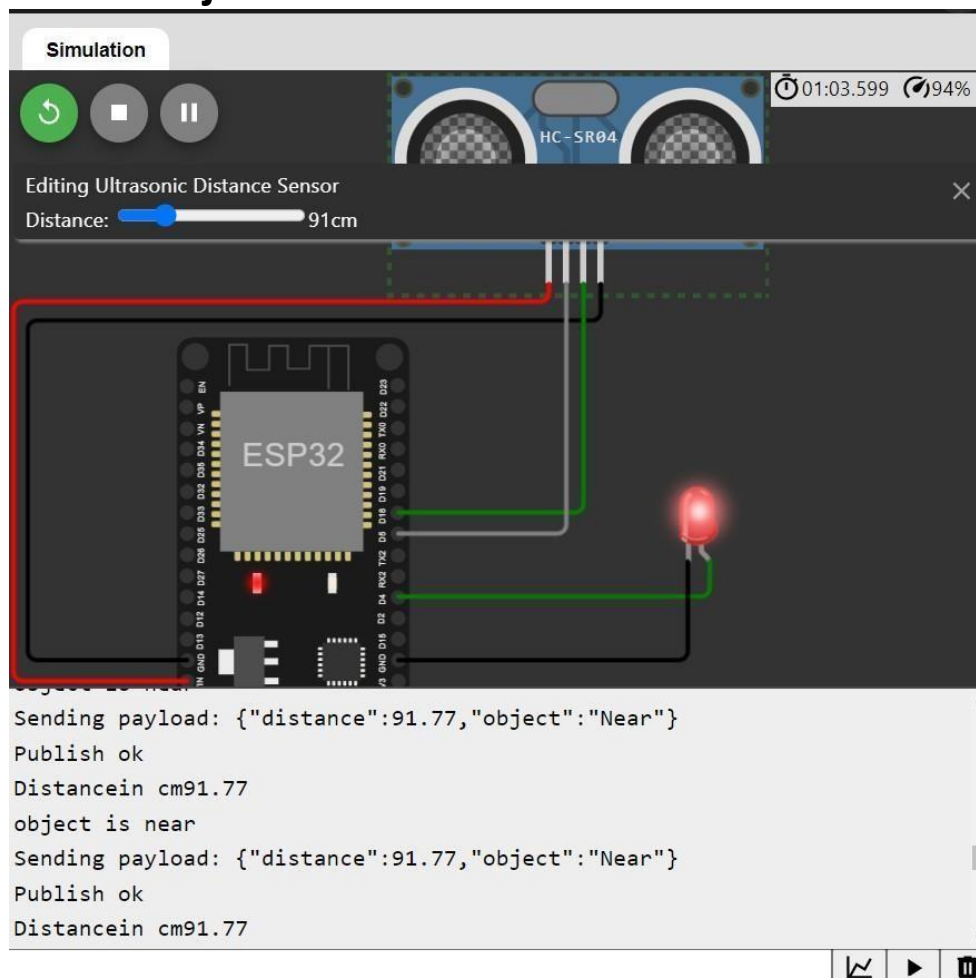
# Data sent to the IBM cloud device when the object is far



| Event | Value | Format | Last Received |
|-------|-------|--------|---------------|
| Data | {"distance":235.02,"object":"No"} | json | a few seconds ago |
| Data | {"distance":235.02,"object":"No"} | json | a few seconds ago |
| Data | {"distance":235.02,"object":"No"} | json | a few seconds ago |
| Data | {"distance":235.02,"object":"No"} | json | a few seconds ago |
| Data | {"distance":235.02,"object":"No"} | json | a few seconds ago |

# When object is nearer to the ultrasonic sensor



```
Sending payload: {"distance":91.77,"object":"Near"}
Publish ok
Distancein cm91.77
object is near
Sending payload: {"distance":91.77,"object":"Near"}
Publish ok
Distancein cm91.77
```

# Data sent to the IBM cloud device when the object is near

Browse  Action  Device Types  Interfaces

Add Device

| | Device ID | Status | Device Type | Class ID | Date Added | Descriptive Location |
|---|---|---|---|---|---|---|
| | distancedetection | Connected | ultrasonicsensor | Device | Oct 19, 2022 11:56 AM | → ... |

Identity  Device Information  Recent Events  State  Logs  X

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

| Event | Value | Format | Last Received |
|---|---|---|---|
| Data | {"distance":91.77,"object":"Near"} | json | a few seconds ago |
| Data | {"distance":91.75,"object":"Near"} | json | a few seconds ago |
| Data | {"distance":91.77,"object":"Near"} | json | a few seconds ago |
| Data | {"distance":91.79,"object":"Near"} | json | a few seconds ago |
| Data | {"distance":91.8,"object":"Near"} | json | a few seconds ago |

0 Simulations running