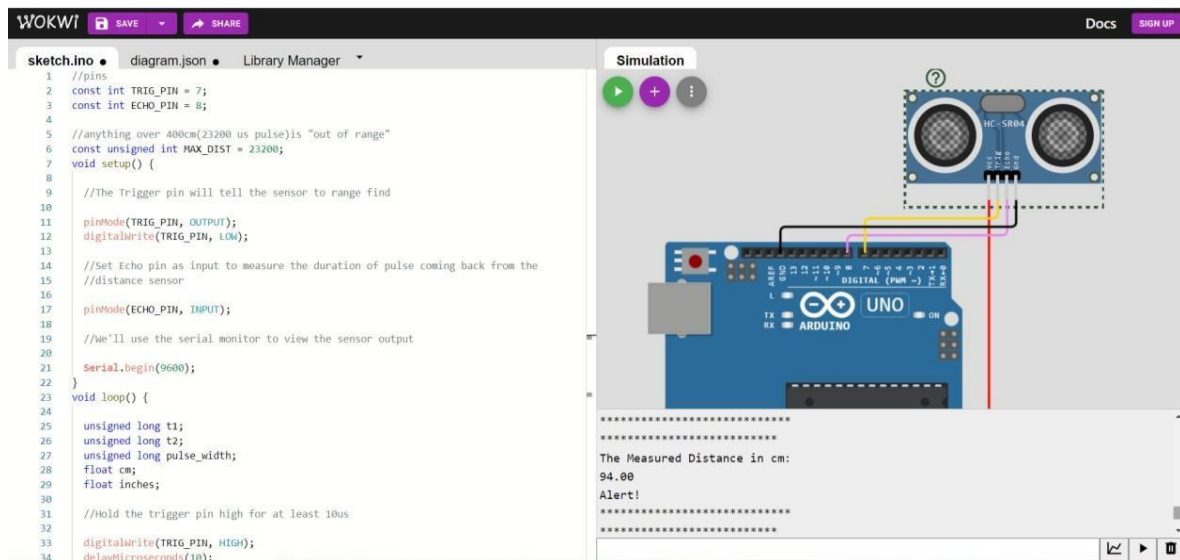


ASSIGNMENT-4

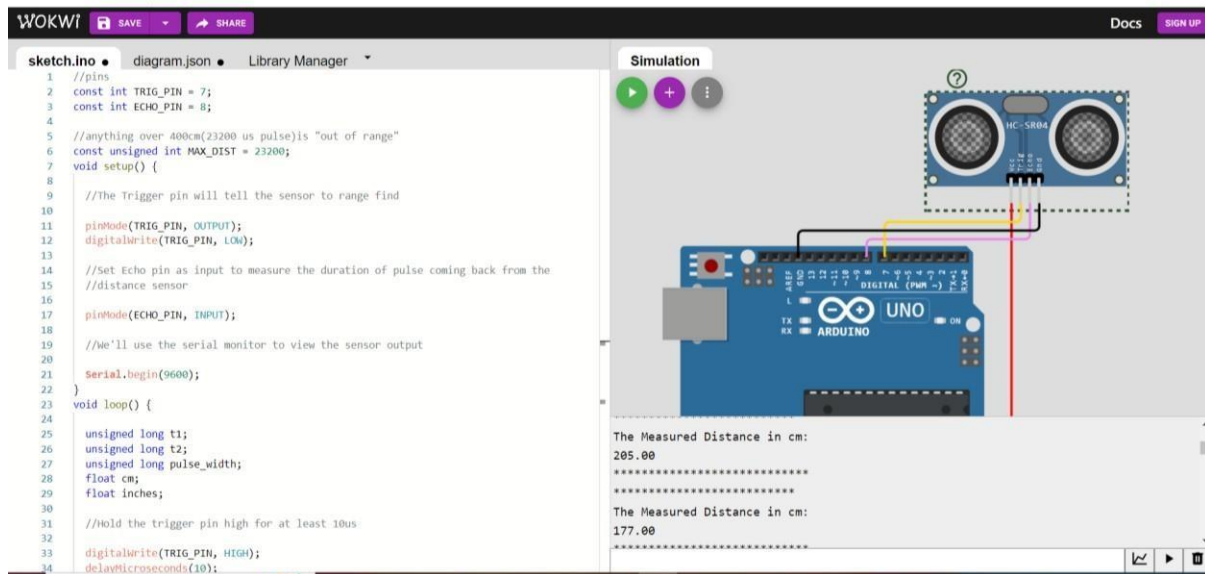
QUESTION:

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.

CASE 1: Distance less than 100cm → It Alerts



CASE 2: Distance more than 100cm → It won't Alert



WOKWI

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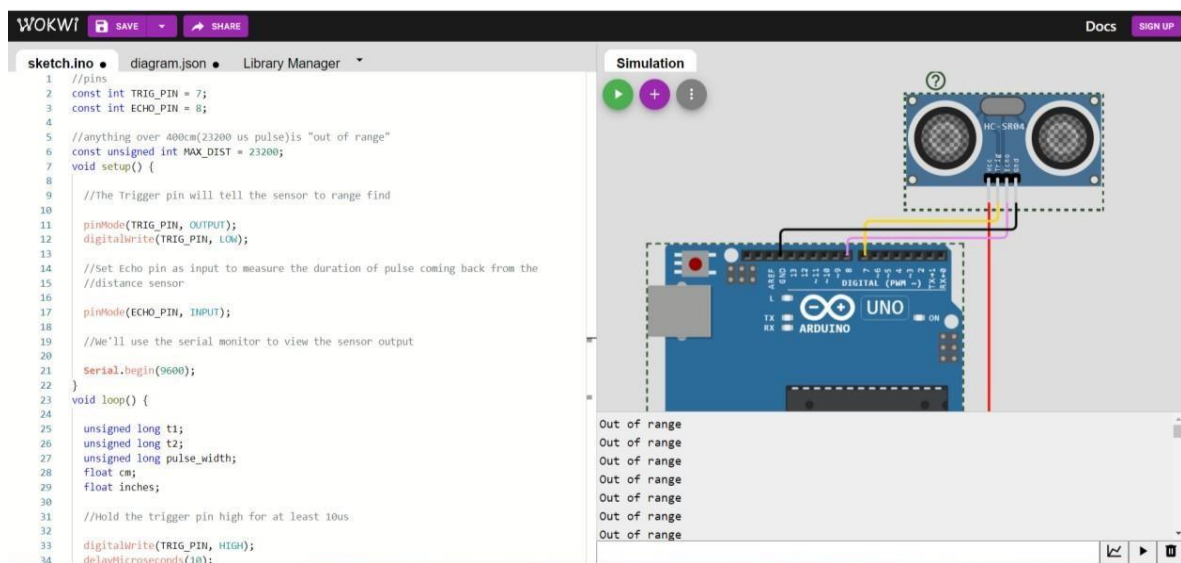
```
1 //pins
2 const int TRIG_PIN = 7;
3 const int ECHO_PIN = 8;
4
5 //anything over 400cm(23200 us pulse)is "out of range"
6 const unsigned int MAX_DIST = 23200;
7 void setup() {
8
9   //The Trigger pin will tell the sensor to range find
10
11   pinMode(TRIG_PIN, OUTPUT);
12   digitalWrite(TRIG_PIN, LOW);
13
14   //Set Echo pin as input to measure the duration of pulse coming back from the
15   //distance sensor
16
17   pinMode(ECHO_PIN, INPUT);
18
19   //We'll use the serial monitor to view the sensor output
20
21   Serial.begin(9600);
22 }
23 void loop() {
24
25   unsigned long t1;
26   unsigned long t2;
27   unsigned long pulse_width;
28   float cm;
29   float inches;
30
31   //Hold the trigger pin high for at least 10us
32
33   digitalWrite(TRIG_PIN, HIGH);
34   delayMicroseconds(10);
```

Simulation

The Measured Distance in cm:
205.00

The Measured Distance in cm:
177.00

CASE 3: Beyond limits → Out of Range



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```
1 //pins
2 const int TRIG_PIN = 7;
3 const int ECHO_PIN = 8;
4
5 //anything over 400cm(23200 us pulse)is "out of range"
6 const unsigned int MAX_DIST = 23200;
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14   //Set Echo pin as input to measure the duration of pulse coming back from the
15   //distance sensor
16
17   pinMode(ECHO_PIN, INPUT);
18
19   //We'll use the serial monitor to view the sensor output
20
21   Serial.begin(9600);
22 }
23 void loop() {
24
25   unsigned long t1;
26   unsigned long t2;
27   unsigned long pulse_width;
28   float cm;
29   float inches;
30
31   //Hold the trigger pin high for at least 10us
32
33   digitalWrite(TRIG_PIN, HIGH);
34   delayMicroseconds(10);
```

Simulation

Out of range
Out of range
Out of range
Out of range
Out of range
Out of range
Out of range

CODING:

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

//anything over 400cm(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

    pinMode(TRIG_PIN, OUTPUT);
    digitalWrite(TRIG_PIN, LOW);

    //Set Echo pin as input to measure the duration of pulse 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 10us

    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 ~70min
```

```

t1 = 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.println("The Measured Distance in cm:");
    Serial.println(cm);

    if (cm < 100)
    {
        //while (true)
        {
            Serial.println("Alert!");
        }
    }
    Serial.println("*****");
}

//wait at least 1000ms before next measurement

delay(1000);
}

```

WOKWI LINK:

<https://wokwi.com/projects/346663565867876948>

CIRCUIT:

