

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

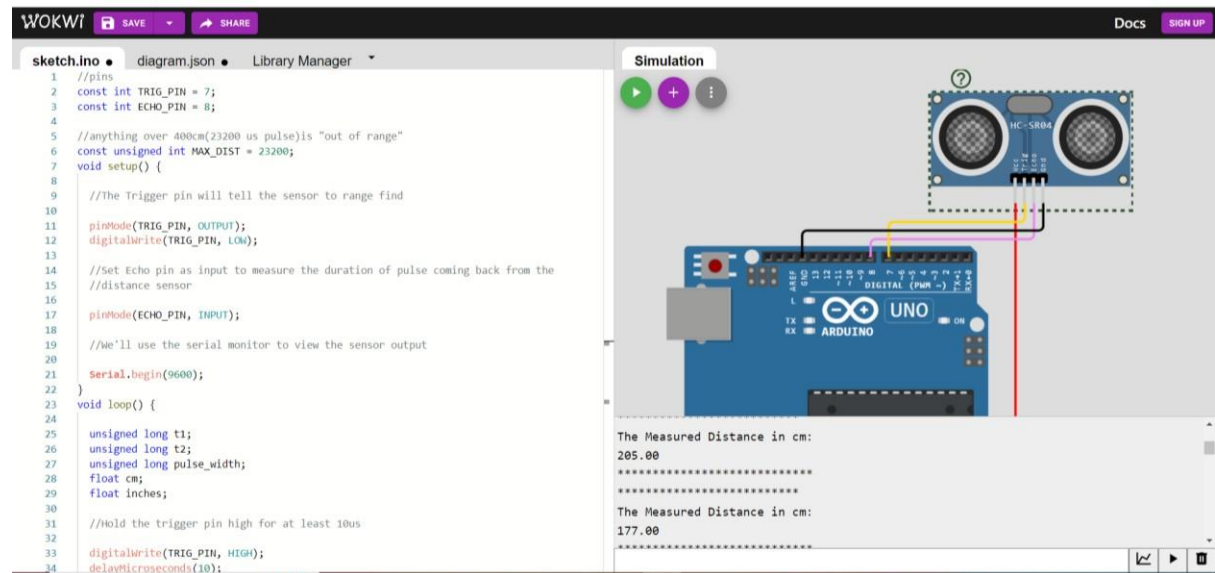
The screenshot shows the Wokwi simulation interface. On the left, the 'sketch.ino' file is open, displaying the following code:

```
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   pinMode(ECHO_PIN, INPUT);
17
18   //We'll use the serial monitor to view the sensor output
19
20   Serial.begin(9600);
21 }
22 void loop() {
23
24   unsigned long t1;
25   unsigned long t2;
26   unsigned long pulse_width;
27   float cm;
28   float inches;
29
30   //Hold the trigger pin high for at least 10us
31   digitalWrite(TRIG_PIN, HIGH);
32   delayMicroseconds(10);
```

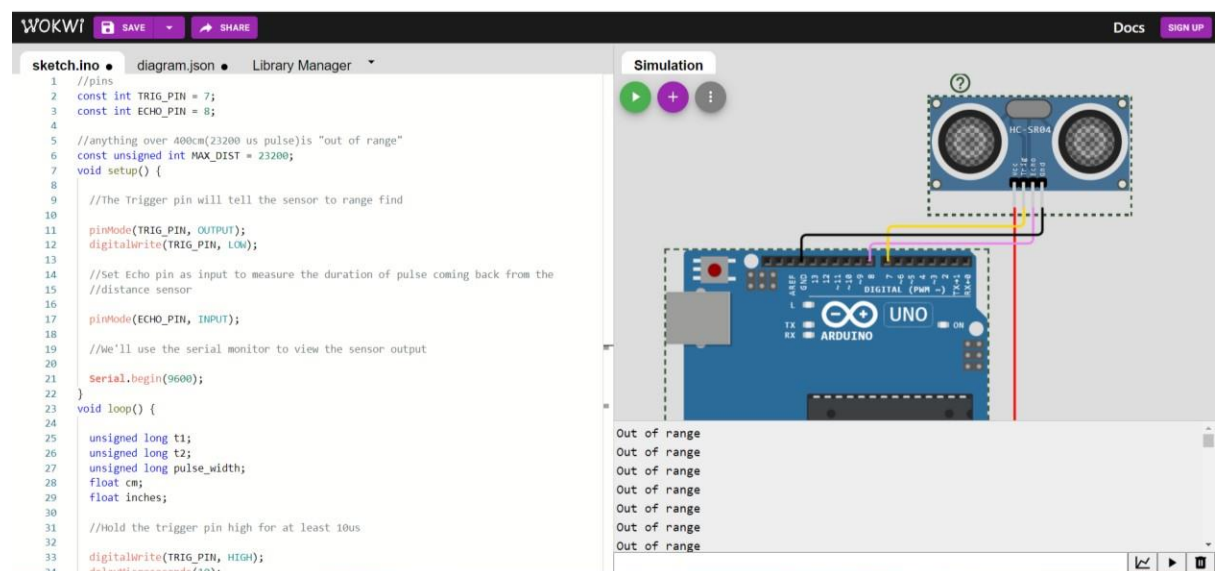
On the right, the 'Simulation' window shows a 3D model of an Arduino Uno board connected to an HC-SR04 ultrasonic sensor. The sensor's VCC pin is connected to the 5V pin on the Arduino, GND to GND, TRIG to digital pin 7, and ECHO to digital pin 8. Below the simulation, the serial monitor displays the following output:

```
*****
The Measured Distance in cm:
94.00
Alert!
*****
```

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



CASE 3: Beyond limits → 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/new/arduino-uno>

CIRCUIT:

