

Assignment – 4

Question-1:

Write code and connections in wokwi for ultrasonic sensor. Whenever distance is less than 100 cms 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
    pinMode(TRIG_PIN, OUTPUT); digitalWrite(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 min 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 (~340 m/s). cm = pulse_width / 58.0; 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 measurement
delay(1000);
}

```

Output:

1) If the distance is less than 100 cms , it alerts.

WOKWI

```
1 // Pins
2 const int TRIG_PIN = 7;
3 const int ECHO_PIN = 8;
4
5 // Anything over 400 cm (131230 us pulse) is "out of range"
6 const unsigned int MAX_DIST = 23200;
7
8 void setup() {
9
10 // The trigger pin will tell the sensor to range find
11 pinMode(TRIG_PIN, OUTPUT);
12 digitalWrite(TRIG_PIN, LOW);
13
14 //Set Echo pin as input to measure the duration of
15 //pulses coming back from the distance sensor
16 pinMode(ECHO_PIN, INPUT);
17
18 // We'll use the serial monitor to view the sensor output
19 Serial.begin(9600);
20 }
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 10 us
```

Simulation

Editing Ultrasonic Distance Sensor

Distance: 84.14 cm

The Measured Distance in cm : 84.14
Alert!!

Activate Windows
Go to Settings to activate Windows

2) If the distance is more than 100 cms, it won't alert.

WOKWI

```
1 // Pins
2 const int TRIG_PIN = 7;
3 const int ECHO_PIN = 8;
4
5 // Anything over 400 cm (131230 us pulse) is "out of range"
6 const unsigned int MAX_DIST = 23200;
7
8 void setup() {
9
10 // The trigger pin will tell the sensor to range find
11 pinMode(TRIG_PIN, OUTPUT);
12 digitalWrite(TRIG_PIN, LOW);
13
14 //Set Echo pin as input to measure the duration of
15 //pulses coming back from the distance sensor
16 pinMode(ECHO_PIN, INPUT);
17
18 // We'll use the serial monitor to view the sensor output
19 Serial.begin(9600);
20 }
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 10 us
```

Simulation

The Measured Distance in cm : 227.10

Activate Windows
Go to Settings to activate Windows

3) Simulation and code execution

