Assignment-4

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1. 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 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 (- 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 measurement
 Delay(1000);
 }
```

Output:

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

```
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             hc-sr04.ino diagram.json ● Library Manager ▼
                                                                       // Pins
const int TRIG_PIN = 7;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ₫00:00.466 (%58%
                                                                       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);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       OO UNO
                                                                                   //Set Echo pin as input to measure the duration of
//pulses coming back from the distance sensor
pinMode(ECHO_PIN, IMPUT);
                                                                                   // We'll use the serial monitor to view the sensor output Serial.begin (9600); \label{eq:serial} % \[ \frac{1}{2} \left( \frac{1}{2} \right) \left(
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   PORT ANALOG IN
                                                                     void loop() {
                                                                                unsigned long t1;
unsigned long t2;
unsigned long pulse_width;
float cm;
float inches;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   The Measured Distance in cm : 84.14
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Alert!!
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        W II 0
                                                                                     // Hold the trigger pin high for at least 10 us
```

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

```
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         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);
                                                                                                                        SERVICE (PAR -) ES
   11
           digitalWrite(TRIG_PIN, LOW);
                                                                                                                             OO UNO
   14
15
           //Set Echo pin as input to measure the duration of
//pulses coming back from the distance sensor
pinMode(ECHO_PIN, INPUT);
   17
18
            // We'll use the serial monitor to view the sensor output
   19
           Serial.begin(9600);
   20
21
                                                                                                                            POWER ANALOG I
   22
         void loop() {
           unsigned long t1;
                                                                                               ************************
   25
           unsigned long t2;
                                                                                              The Measured Distance in cm : 227.10
            unsigned long pulse_width;
                                                                                               ********************
            float cm:
                                                                                                                                                     Activate Windows
                                                                                                                                                     Go to Settings to activate Windows
```

3. Simulation and code execution





