

IBM ASSIGNMENT – 4

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1. Write Code and connections in wokwi for ultrasonic sensor. Whenever distance is less than 100 cm send “Alert” to ibm cloud and display in device recent events.

CODE:

```
//Pins
const int TRIG_PIN = 7 ;
const int ECHO_PIN = 8;
const unsigned int MAX_DIST = 23200;
void setup() {
  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 ) ;
  // serial monitor used 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 )
  Serial.println("Alert!!");
  Serial.print("Sending to the Cloud:{Distance:}");
  Serial.print(cm);
  Serial.println("}");
  Serial.println("-----");
}
//wait at least 1000ms before next measurement
delay(1000);
}

```

OUTPUT:

1. WHEN DISTANCE IS GREATER THAN 100cm:

The screenshot shows the Wokwi IDE interface. On the left, the code for 'DHT22-example.ino' is displayed. The code includes pin definitions, initialization, and a loop that triggers an ultrasonic sensor (HC-SR04) and prints the measured distance. The right side shows a simulation of the hardware, with an Arduino Uno connected to an HC-SR04 sensor. The output window at the bottom right displays the following text:

```

-----
The Measured Distance in cm: 205.00
Sending to the Cloud:{Distance:205.00}
-----

```

2.WHEN DISTANCE IS LESSER THAN 100 cm (Alert is given and data is sent to the cloud):

WOKWI SAVE SHARE DHT22-example.ino by urish Docs SIGN UP

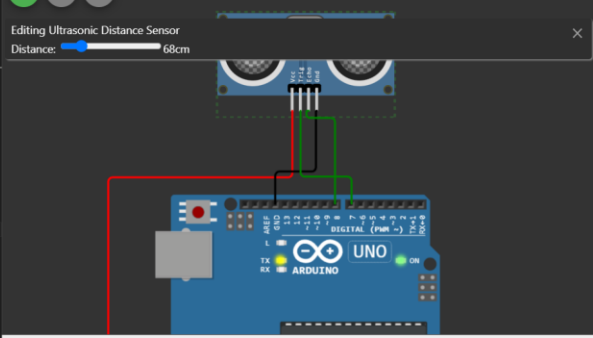
DHT22-example.ino • diagram.json • Library Manager

```
1 //Pins
2 const int TRIG_PIN = 7 ;
3 const int ECHO_PIN = 8;
4 const unsigned int MAX_DIST = 23200;
5 void setup() {
6   pinMode(TRIG_PIN, OUTPUT);
7   digitalWrite(TRIG_PIN, LOW);
8   //Set Echo pin as input to measure the duration of
9   //pulses coming back from the distance sensor
10  pinMode(ECHO_PIN, INPUT );
11  // serial monitor used to view the sensor output
12  Serial.begin(9600);
13 }
14 void loop() {
15   unsigned long t1;
16   unsigned long t2;
17   unsigned long pulse_width;
18   float cm;
19   float inches;
20   // hold the trigger pin high for at least 10 us
21   digitalWrite(TRIG_PIN, HIGH);
22   delayMicroseconds(10);
23   digitalWrite(TRIG_PIN, LOW);
24   // wait for pulse on echo pin
25   while (digitalRead( ECHO_PIN )!=0 );
26   // Measure how long the echo pin was held high (pulse width)
27   // Note: the micros() counter will overflow after 70 min
28   t1= micros ();
29   while (digitalRead(ECHO_PIN) == 1);
30   t2= micros ();
31   pulse_width = t2-t1;
32   // calculate distance in centimeters and inches. The constants
33   // are found in the datasheet, and calculated from the assumed speed
34   // of sound in air at sea level (- 340m/s)
35   cm=pulse_width / 58 ;
```

Simulation

00:16.701 100%

Editing Ultrasonic Distance Sensor
Distance: 68cm



The Measured Distance in cm: 68.00
Alert!!
Sending to the Cloud:{Distance:68.00}