ASSIGNMENT -4

ASSIGNMENT DATE	20 OCTOBER 2022
PROJECT NAME	IOT based smart crop protection system for agriculture
TEAM ID	PNT2022TMID04642
MAXIMUM MARKS	2 marks

WRITE A CODE AND CONNECTION IN WOWKI FOR ULTASONIC SENSOR.WHENEVER DISTANCE IS LESS THAN 100 CMS SEND "ALERT" TO IBM CLOUD AND DISPLAY IN DEVICE RECENT EVENTS

CODE

```
// 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 tl;

unsigned long t2;

unsigned long pulse_width;

float cm;
```

```cpp
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
tl = micros();
while (digitalRead(ECHO_PIN) == 1);
t2 = micros();
pulse_width = t2- tl;
// 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("*******************************");
```
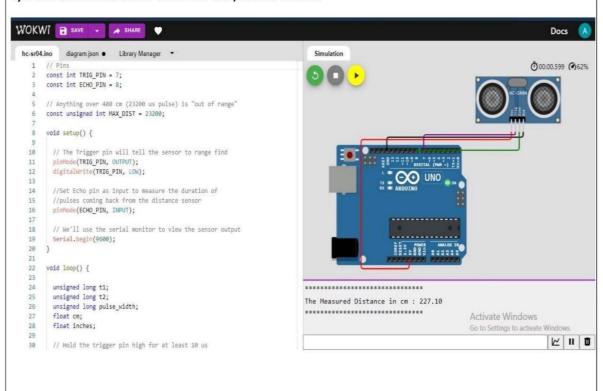
```
}
// Wait at least 1000ms before next measurement
delay(1000);
}
```

Output:

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


```
1   // Pins
2   const int TRIG_PIN = 7;
3   const int ECHO_PIN = 8;
4
5   // Anything over 400 cm (23200 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
```

Editing Ultrasonic Distance Sensor
Distance: 83cm

```
*********************************
The Measured Distance in cm : 84.14
Alert!!
*********************************
```

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


```
1   // Pins
2   const int TRIG_PIN = 7;
3   const int ECHO_PIN = 8;
4
5   // Anything over 400 cm (23200 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
```

```
*********************************
The Measured Distance in cm : 227.10
*********************************
```

3) Simulation and code execution

The code visible in the editor:

```cpp
// 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 it !!");
      // }
    }

    Serial.print("*********************************");
  }

  // Wait at least 1000ms before next measurement
  delay(1000);
}
```


Editing Ultrasonic Distance Sensor
Distance: 199cm

```
*********************************
The Measured Distance in cm : 201.79
*********************************
```



```
*********************************
The Measured Distance in cm : 57.79
Alert it !!
*********************************
```