

### Assignment - 4

Assignment Date	5 NOVEMBER 2022
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Maximum Marks	2 Marks

#### **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 it !!");
    // }
  }

  Serial.print("*****");
}
// Wait at least 1000ms before next measurement
delay(1000);
}

```

## Output:

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

The screenshot shows the Wokwi IDE interface. On the left, the code for `hc-sr04.ino` is displayed. The code configures an HC-SR04 ultrasonic sensor with TRIG\_PIN = 7 and ECHO\_PIN = 8. It sets a maximum distance of 23200 cm. In the `setup()` function, the trigger pin is set to output and initialized to LOW. The echo pin is set to input. The serial monitor is initialized at 9600 baud. The `loop()` function declares variables for timing and distance, but the logic for the alert is not yet implemented. The right side of the interface shows a simulation of the Arduino Uno and the sensor. A pop-up window titled "Editing Ultrasonic Distance Sensor" is open, showing a distance of 83cm. Below the simulation, the text "The Measured Distance in cm : 84.14" and "Alert!!" is displayed, indicating that the sensor has detected an object within the 100cm range.

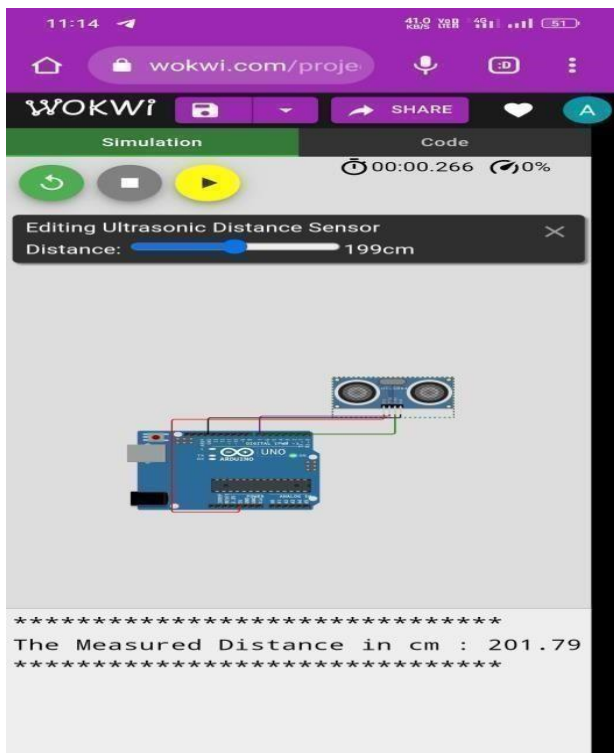
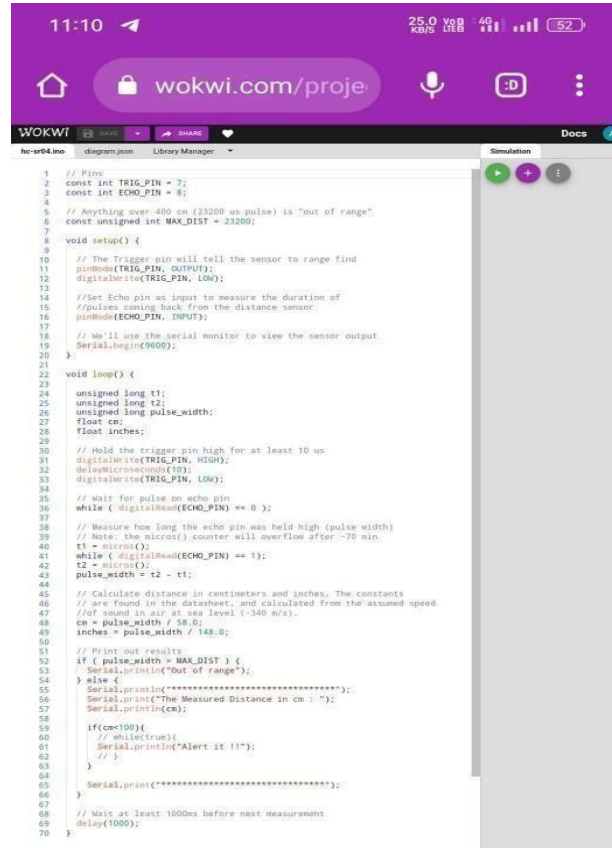
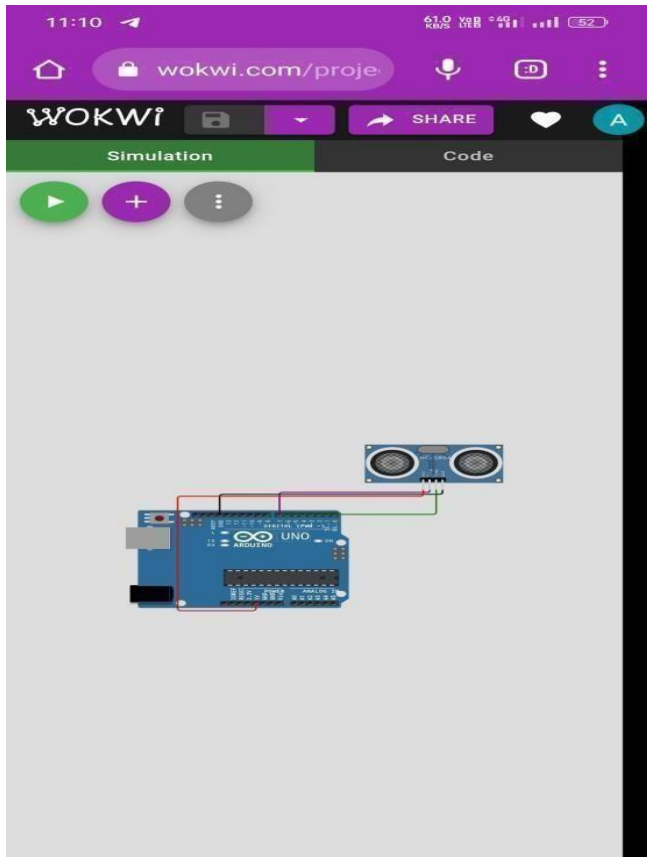
```
1 // Pins
2 const int TRIG_PIN = 7;
3 const int ECHO_PIN = 8;
4
5 // Anything over 400 cm (23200 us pulse) is "out of range"
6 const unsigned int MAX_DIST = 23200;
7
8 void setup() {
9
10 // The Trigger pin will tell the sensor to range find
11 pinMode(TRIG_PIN, OUTPUT);
12 digitalWrite(TRIG_PIN, 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
```

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

The screenshot shows the Wokwi IDE interface with the same code as the first image. The simulation shows the Arduino Uno and the HC-SR04 sensor. The distance measured is 227.10 cm, which is greater than 100 cm. Therefore, no alert is triggered. The text "The Measured Distance in cm : 227.10" is displayed at the bottom of the simulation window.

```
1 // Pins
2 const int TRIG_PIN = 7;
3 const int ECHO_PIN = 8;
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5 // Anything over 400 cm (23200 us pulse) is "out of range"
6 const unsigned int MAX_DIST = 23200;
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8 void setup() {
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10 // The Trigger pin will tell the sensor to range find
11 pinMode(TRIG_PIN, OUTPUT);
12 digitalWrite(TRIG_PIN, LOW);
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14 //Set Echo pin as input to measure the duration of
15 //pulses coming back from the distance sensor
16 pinMode(ECHO_PIN, INPUT);
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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
```

### 3) Simulation and code execution



**Project Link:**

<https://wokwi.com/projects/346871471668200019>