

#### Assignment -4

Assignment Date	25 October 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.

```
//Pins
const int TRIG_PIN = 7;
const int ECHO_PIN = 8;

//Anything over 400cm (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 10us
  digitalWrite(TRIG_PIN, HIGH);
```

```

delayMicroseconds(10);
digitalWrite(TRIG_PIN,LOW);

//Waitforpulseonechopin
while(digitalRead(ECHO_PIN)==0);

//Measurehowlongtheechopinwasheldhigh(pulsewidth)
//Note:the micros()counterwilloverflowafter~70min t1
= micros();
while(digitalRead(ECHO_PIN)==1);
t2 = micros();
pulse_width=t2-t1;

//Calculatedistanceincentimetersandinches.Theconstants
//arefoundinthedatasheet,andcalculatedfromtheassumedspeed
//ofsoundinairatsealevel(~340m/s). cm
= pulse_width / 58.0;
inches=pulse_width/148.0;

//Printoutresults
if(pulse_width>MAX_DIST){
  Serial.println("Out of range");
} else {
  Serial.println("*****");S
  erial.print("The Measured Distance in cm : ");
  Serial.println(cm);

  if(cm<100){
    // while(true){
    Serial.println("Alert!!");
    //}
  }

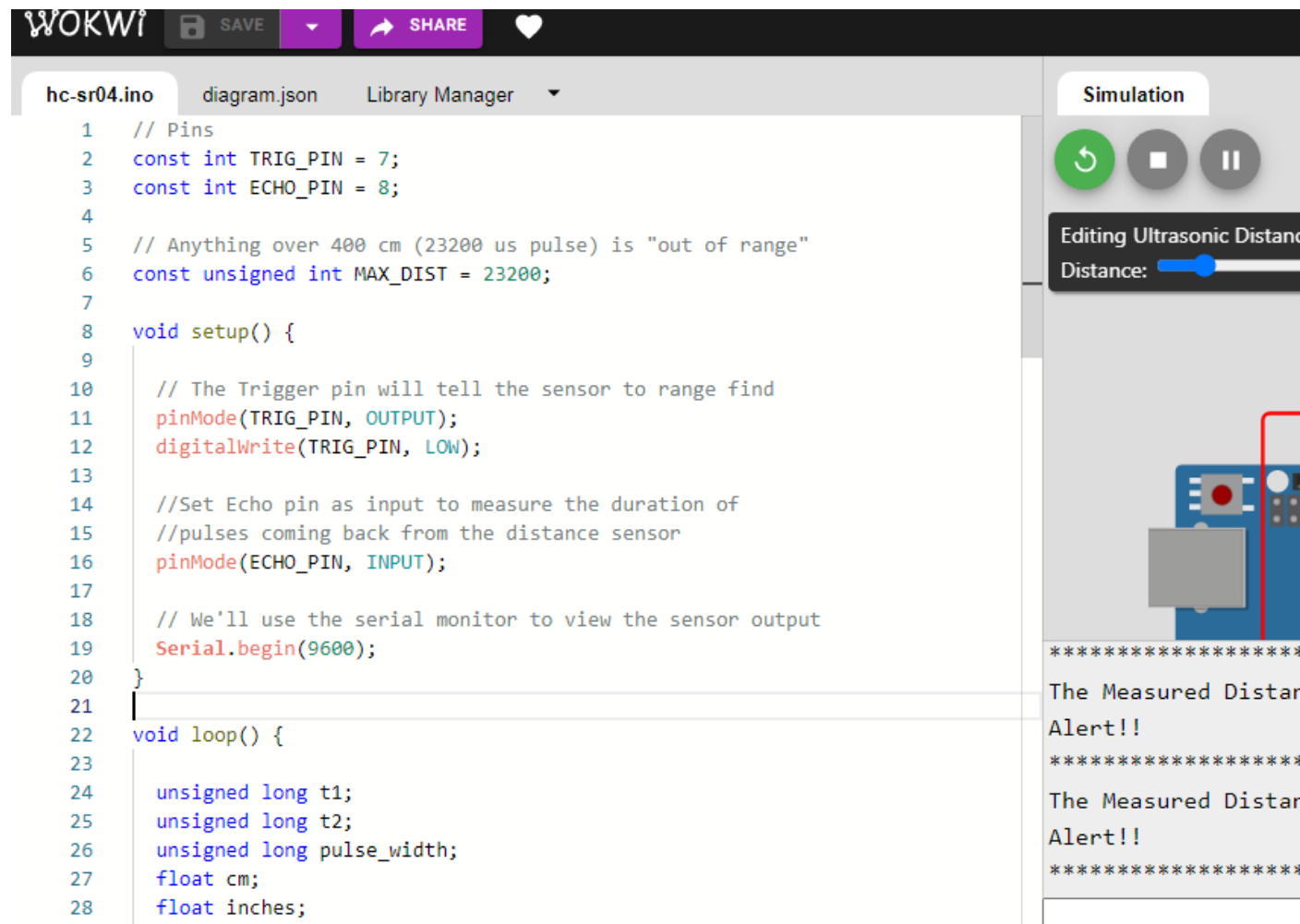
  Serial.print("*****");
}

//Waitatleast1000msbeforenextmeasurement
delay(1000);
}

```

## WOKWI SIMULATION:

Case 1: Distance less than 100 cm



The screenshot shows the Wokwi web-based simulation environment. The main area displays an Arduino IDE with a code file named `hc-sr04.ino`. The code is for an HC-SR04 ultrasonic sensor. The `setup()` function initializes the trigger pin (7) as an output and the echo pin (8) as an input. It also sets a maximum distance of 23200 cm. The `loop()` function declares variables for timing and distance in centimeters and inches. The right sidebar contains a 'Simulation' panel with a green 'Run' button, a 'Stop' button, and a 'Pause' button. Below these is a slider for 'Editing Ultrasonic Distance' with a 'Distance:' label. At the bottom of the sidebar, there is a text area showing the output of the serial monitor, which displays 'The Measured Distance is 100 cm' and '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;
```

Case 2: Distance greater than 100 cms

WOKWI

SAVE SHARE

hc-sr04.ino diagram.json Library Manager

```
1 {
2   "version": 1,
3   "author": "Uri Shaked",
4   "editor": "wokwi",
5   "parts": [
6     { "type": "wokwi-arduino-uno", "id": "uno", "top": 130.93, "left": 2.53, "
7     {
8       "type": "wokwi-hc-sr04",
9       "id": "ultrasonic",
10      "top": -4.1,
11      "left": 296.43,
12      "attrs": { "distance": "66" }
13    }
14  ],
15  "connections": [
16    [ "uno:GND.1", "ultrasonic:GND", "black", [ "v-8", "*", "v8" ] ],
17    [ "uno:8", "ultrasonic:ECHO", "green", [ ] ],
18    [ "uno:7", "ultrasonic:TRIG", "purple", [ "*", "v4" ] ],
19    [ "uno:5V", "ultrasonic:VCC", "red", [ "v16", "h-96", "*", "v12" ] ]
20  ]
21 }
```

Simulation

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The Measured Distar  
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WOKWI LINK:

<https://wokwi.com/projects/346845722909344339>

IBM CLOUD:



Browse   Action   Device Types   Interfaces

Identity   Device Information   Recent Events   State   Logs

The recent events listed show the live stream of data that is coming and going from this device.

Event	Value	Format	Last Rec
event_1	{"randomNumber":64}	json	a few s
event_1	{"distance":91,"status":"alert"}	json	a few s
event_1	{"distance":9,"status":"alert"}	json	a few s
event_1	{"distance":64,"status":"alert"}	json	a few s
event_1	{"distance":15,"status":"alert"}	json	a few s

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