

PANIMALAR ENGINEERING COLLEGE

Department of Electronics and Communication Engineering IOT Assignment
Assignment -4
Python Programming

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Question:

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.

Code:

```
const int TRIG_PIN = 7;  
const int ECHO_PIN = 8;  
  
const unsigned int MAX_DIST = 5800;  
  
void setup()  
{  
    pinMode(TRIG_PIN, OUTPUT);  
    digitalWrite(TRIG_PIN, LOW);  
    pinMode(ECHO_PIN, INPUT);  
    Serial.begin(9600);  
}  
  
void loop()  
{  
    unsigned long t1;  
    unsigned long t2;  
    unsigned long pulse_width;
```

```

float cm;
float inches;
digitalWrite(TRIG_PIN,HIGH);
delayMicroseconds(10);
digitalWrite(TRIG_PIN, LOW);

while ( digitalRead(ECHO_PIN) == 0 );

t1 = micros();
while ( digitalRead(ECHO_PIN) == 1 );

t2 = micros();
pulse_width = t2 - t1;
cm= pulse_width / 58.0;
inches = pulse_width / 148.0;

if ( pulse_width < MAX_DIST )
{
    Serial.println("Out of range");setup1();
    loop1();
}
else
{
    Serial.print(cm);
    Serial.print(" cm \t");
    Serial.print(inches);
    Serial.println(" in");
}
}

delay(60);
}

```

```

void setup1() { pinMode(10,
    OUTPUT); }
void loop1() {
    digitalWrite(10, HIGH);
    delay(500);
    digitalWrite(10, LOW);
    delay(500);
}

```

Output (Distance less than 100m):

The screenshot shows the Wokwi simulation environment for an Arduino Uno. On the left, the sketch code for an ultrasonic distance sensor is visible:

```
1: const int TRIG_PIN = 7;
2: const int ECHO_PIN = 8;
3: const unsigned int MAX_DIST = 5800;
4: void setup() {
5:   pinMode(TRIG_PIN, OUTPUT);
6:   digitalWrite(TRIG_PIN, LOW);
7:   pinMode(ECHO_PIN, INPUT);
8:   Serial.begin(9600);
9: }
10: void loop() {
11:   unsigned long t1;
12:   unsigned long t2;
13:   unsigned long pulse_width;
14:   float cm;
15:   float inches;
16:   digitalWrite(TRIG_PIN, HIGH);
17:   delayMicroseconds(10);
18:   digitalWrite(TRIG_PIN, LOW);
19:   while ( digitalRead(ECHO_PIN) == 0 );
20:   t1 = micros();
21:   while ( digitalRead(ECHO_PIN) == 1 );
22:   t2 = micros();
23:   pulse_width = t2 - t1;
24:   cm = pulse_width / 148.0;
25:   inches = pulse_width / 58.0;
26:   if ( pulse_width < MAX_DIST ) {
27:     Serial.println("Out of range");
28:     setup();
29:     loop();
30:   } else {
31:     Serial.print(cm);
32:     Serial.print(" cm \t");
33:     Serial.print(inches);
34:     Serial.println(" in");
35:   }
}
```

The simulation window on the right displays the circuit diagram with an Arduino Uno and an HC-SR04 ultrasonic distance sensor. A red LED is connected to pin 13. The simulation results show the output of the sketch:

Out of range
Out of range

The simulation interface includes a top bar with navigation icons, a save/share button, and user account links. The bottom right corner shows a progress bar at 100%.

Output (Distance greater than 100m):

The screenshot shows the Wokwi web-based simulation environment. On the left, the code for the sketch is visible:

```
sketch.ino
1 const int TRIG_PIN = 7;
2 const int ECHO_PIN = 8;
3 const unsigned int MAX_DIST = 5800;
4 void setup() {
5   pinMode(TRIG_PIN, OUTPUT);
6   digitalWrite(TRIG_PIN, LOW);
7   pinMode(ECHO_PIN, INPUT);
8   Serial.begin(9600);
9 }
10 void loop() {
11   unsigned long t1;
12   unsigned long t2;
13   unsigned long pulse_width;
14   float cm;
15   float inches;
16   digitalWrite(TRIG_PIN, HIGH);
17   delayMicroseconds(10);
18   digitalWrite(TRIG_PIN, LOW);
19   while ( digitalRead(ECHO_PIN) == 0 );
20   t1 = micros();
21   while ( digitalRead(ECHO_PIN) == 1 );
22   t2 = micros();
23   pulse_width = t2 - t1;
24   cm = pulse_width / 58.0;
25   inches = pulse_width / 148.0;
26   if ( pulse_width < MAX_DIST ) {
27     Serial.println("Out of range");
28   }
29   setup();
30   loop();
31 } else {
32   Serial.print(cm);
33   Serial.print(" cm \t");
34   Serial.print(inches);
35   Serial.println(" in");
}
```

The simulation window on the right displays the HC-SR04 sensor connected to an Arduino Uno. The sensor is set to 192cm. The Arduino pins are labeled: TX, RX, V_{cc}, GND, AREF, and ANALOG. The serial monitor shows the following data:

Distance (cm)	Distance (in)
194.76	76.32
194.76	76.32
194.69	76.30
194.76	76.32
194.76	76.32
194.69	76.30
194.69	76.30

Wokwi link: <https://wokwi.com/projects/346150431971344979>