

ASSIGNMENT 1

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REGISTRATION NO: 20BEC1174

DATE: 20/05/2023

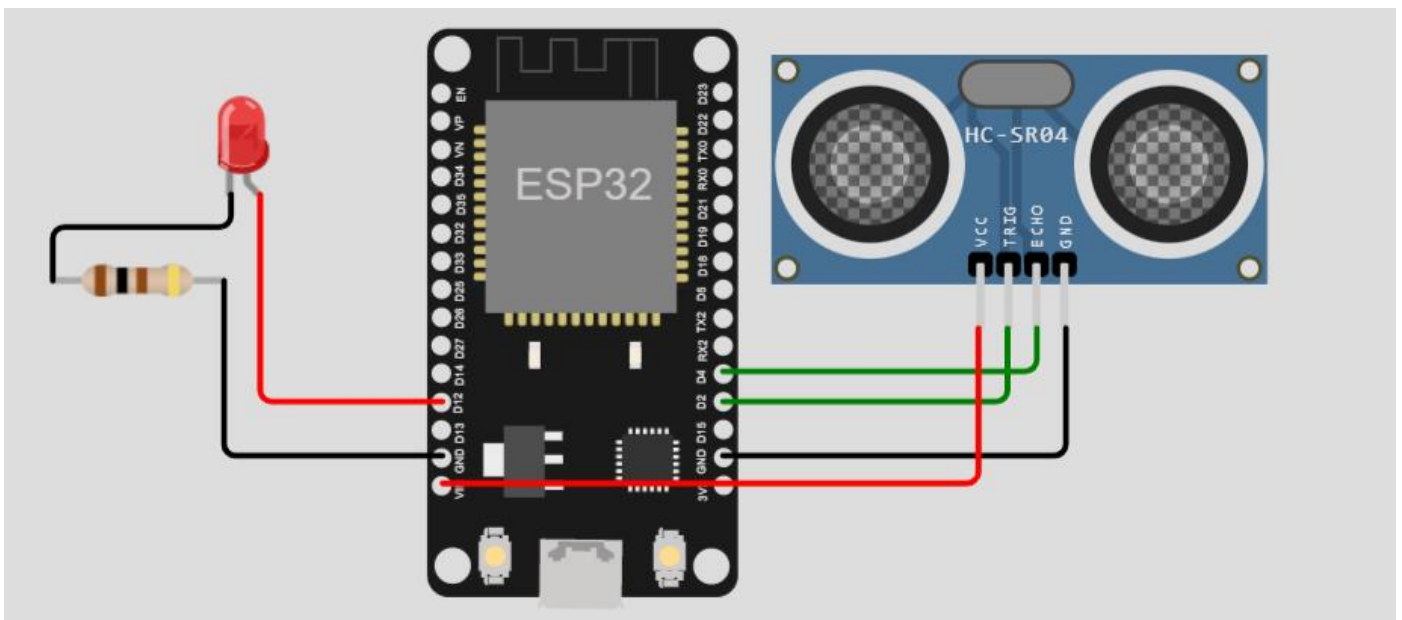
ULTRASONIC SENSOR CIRCUIT USING WOKWI

Aim: To construct a circuit with Ultrasonic sensor in WOKWI such that if distance is less than 100 cm, the led must glow.

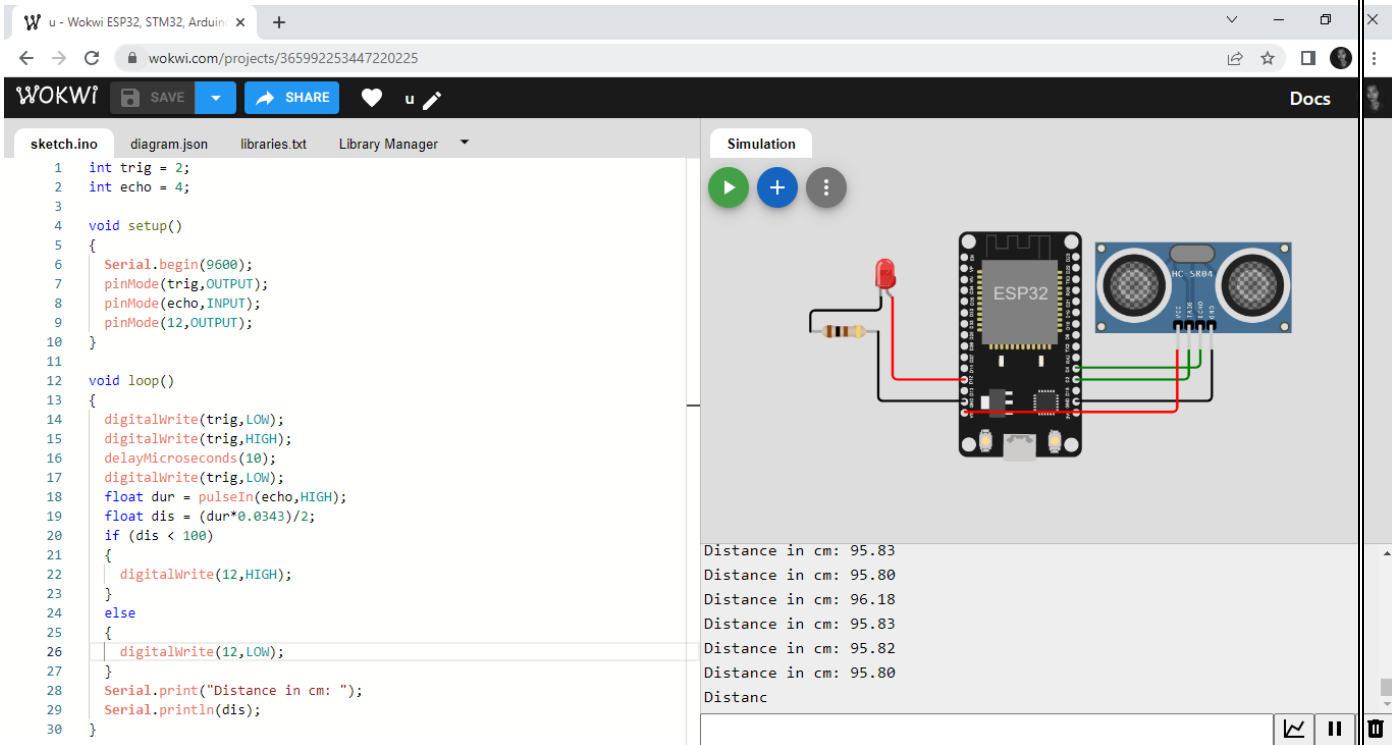
Software required: WOKWI

Components Required: ESP32, 100 ohm Resistor, Ultrasonic sensor, LED, Connecting wires

Circuit Diagram:



Simulation:



The screenshot shows the Wokwi web interface for simulating an ESP32-based project. The left pane displays the Arduino sketch code, and the right pane shows the simulated hardware and its output.

```
1 int trig = 2;
2 int echo = 4;
3
4 void setup()
5 {
6   Serial.begin(9600);
7   pinMode(trig, OUTPUT);
8   pinMode(echo, INPUT);
9   pinMode(12, OUTPUT);
10 }
11
12 void loop()
13 {
14   digitalWrite(trig, LOW);
15   digitalWrite(trig, HIGH);
16   delayMicroseconds(10);
17   digitalWrite(trig, LOW);
18   float dur = pulseIn(echo, HIGH);
19   float dis = (dur*0.0343)/2;
20   if (dis < 100)
21   {
22     digitalWrite(12, HIGH);
23   }
24   else
25   {
26     digitalWrite(12, LOW);
27   }
28   Serial.print("Distance in cm: ");
29   Serial.println(dis);
30 }
```

The simulation output on the right shows the following distance measurements in cm:

- Distance in cm: 95.83
- Distance in cm: 95.80
- Distance in cm: 96.18
- Distance in cm: 95.83
- Distance in cm: 95.82
- Distance in cm: 95.80
- Distance in cm: 95.80

Procedure:

1. Place the components on the breadboard
2. Connect the Ultrasonic Sensor's TRIG pin to the ESP32's D2 pin.
3. Connect the Ultrasonic Sensor's ECHO pin to the ESP32's D4 pin.
4. Connect the Ultrasonic Sensor's GND pin to the ESP32's GND.1 pin.
5. Connect the LED's Cathode (C) to the Resistor's pin 1.
6. Connect the Resistor's pin 2 to the ESP32's GND.2 pin.
7. Connect the LED's Anode (A) to the ESP32's D12 pin.
8. Connect the Ultrasonic Sensor's VCC pin to the ESP32's VIN pin.
9. Upload the necessary code.
10. Run the simulation.

Code :

```
int trig = 2;
int echo = 4;

void setup()
{
    Serial.begin(9600);
    pinMode(trig, OUTPUT);
    pinMode(echo, INPUT);
    pinMode(12, OUTPUT);
}

void loop()
{
    digitalWrite(trig, LOW);
    digitalWrite(trig, HIGH);
    delayMicroseconds(10);
    digitalWrite(trig, LOW);
    float dur = pulseIn(echo, HIGH);
    float dis = (dur*0.0343)/2;
    if (dis < 100)
    {
        digitalWrite(12, HIGH);
    }
    else
    {
        digitalWrite(12, LOW);
    }
    Serial.print("Distance in cm: ");
    Serial.println(dis);
}
```

Outputs :

When Distance > 100 cm

Wokwi - Wokwi ESP32, STM32, Arduino: x +

wokwi.com/projects/365992253447220225

WOKWI SAVE SHARE Docs

sketch.ino diagram.json

libraries.txt Library Manager

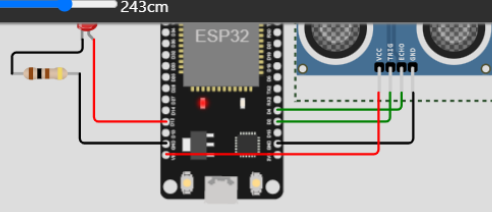
```
19 float dis = (dur*0.0343)/2;  
20 if (dis < 100)  
21 {  
22   digitalWrite(12,HIGH);  
23 }  
24 else  
25 {  
26   digitalWrite(12,LOW);  
27 }  
28 Serial.print("Distance in cm: ");  
29 Serial.println(dis);  
30 }
```

Simulation

00:09.999 66%

Editing Ultrasonic Distance Sensor

Distance: 243cm



Distance in cm: 245.12
Distance in cm: 245.11
Distance in cm: 245.11
Distance in cm: 245.14
Distance in cm: 245.11
Distance in cm: 245.11
Distance in cm: 245

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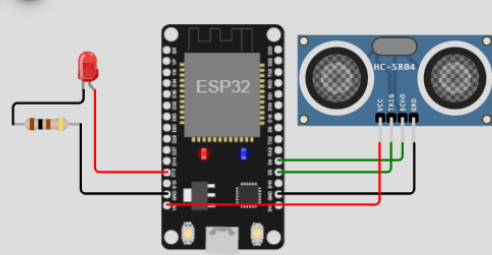
sketch.ino diagram.json

libraries.txt Library Manager

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19 float dis = (dur*0.0343)/2;  
20 if (dis < 100)  
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22   digitalWrite(12,HIGH);  
23 }  
24 else  
25 {  
26   digitalWrite(12,LOW);  
27 }  
28 Serial.print("Distance in cm: ");  
29 Serial.println(dis);  
30 }
```

Simulation

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Distance in cm: 245.09
Distance in cm: 245.07
Distance in cm: 245.14
Distance in cm: 245.11
Distance in cm: 245.11
Distance in cm: 245.14
Distance in cm: 245.07

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When Distance < 100 cm

Wokwi ESP32, STM32, Arduino

wokwi.com/projects/365992253447220225

WOKWI! SAVE SHARE

Docs

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Simulation

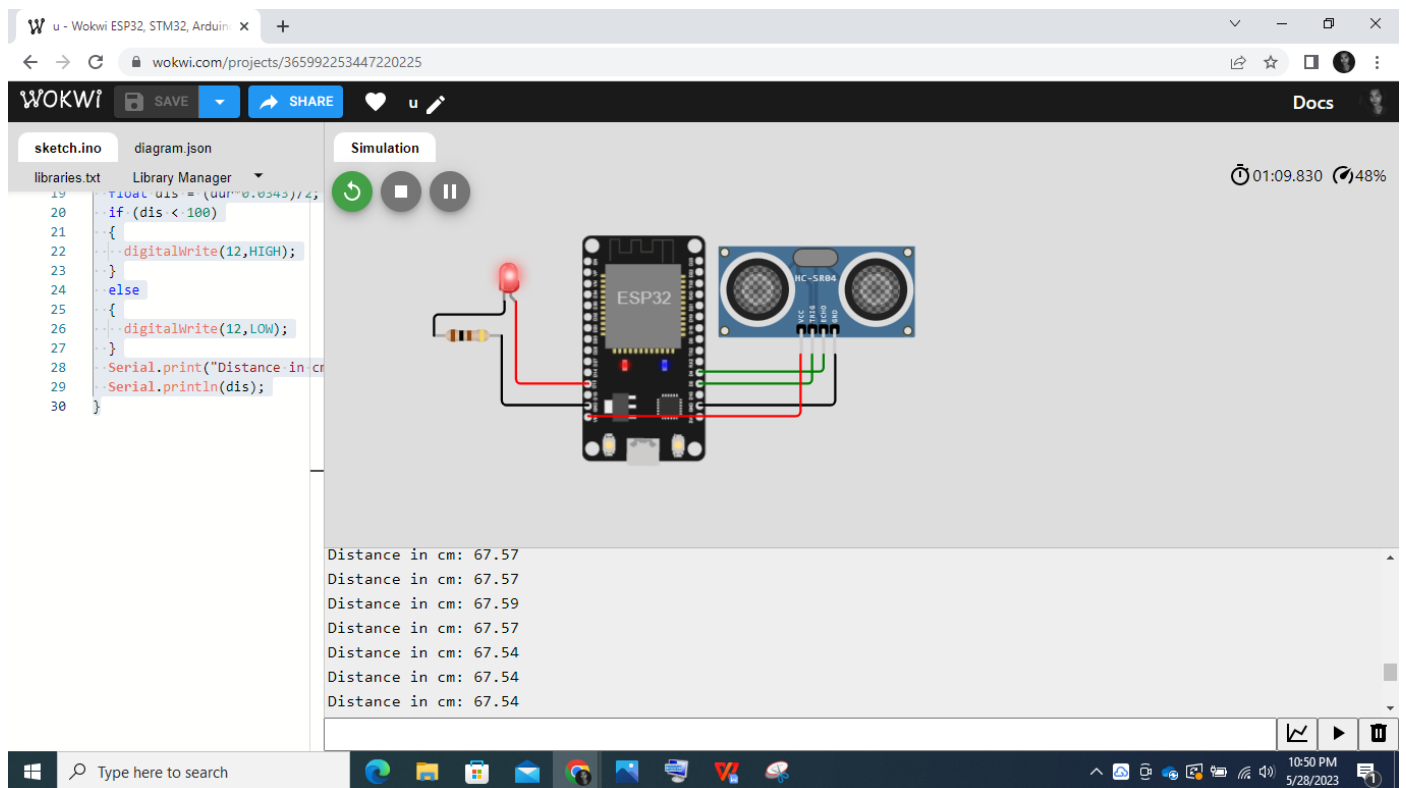
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Editing Ultrasonic Distance Sensor
Distance: 67cm

Distance in cm: 67.57
Distance in cm: 67.57
Distance in cm: 67.59
Distance in cm: 67.57
Distance in cm: 67.54
Distance in cm: 67.54
Distance in cm: 67.54

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The circuit has been constructed in WOKWI and the LED glows when distance <100 cm

Result:

Thus, the circuit has been constructed using WOKWI and outputs have been verified.