

## Assignment 2

Develop an "Automatic garage door opening system". Use an Ultrasonic sensor to detect if there is a vehicle in front of the garage. if any vehicle is detected open the garage door (rotate the servo motor) for some time and close it.

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### CODE

```
const int pingPin = 7;
#include <Servo.h>
int position = 0;
int i = 0;
int j = 0;
Servo servo_9;

void setup()
{
  Serial.begin(9600);
  servo_9.attach(9);
  servo_9.write(0);
}

void loop()
{
  long duration, cm;
  pinMode(pingPin, OUTPUT);
  digitalWrite(pingPin, LOW);
  delayMicroseconds(2);
  digitalWrite(pingPin, HIGH);
  delayMicroseconds(5);
  digitalWrite(pingPin, LOW);
  pinMode(pingPin, INPUT);
  duration = pulseIn(pingPin, HIGH);
  cm = microsecondsToCentimeters(duration);
  Serial.print("Distance: ");
  Serial.print(cm);
```

```
Serial.print("cm");
```

```
Serial.println();
```

```
position = 0;
```

```
if(cm<=50)
```

```
{
```

```
    servo_9.write(180);
```

```
    delay(1000);
```

```
}
```

```
else
```

```
{
```

```
    delay(1000);
```

```
    servo_9.write(0);
```

```
}
```

```
}
```

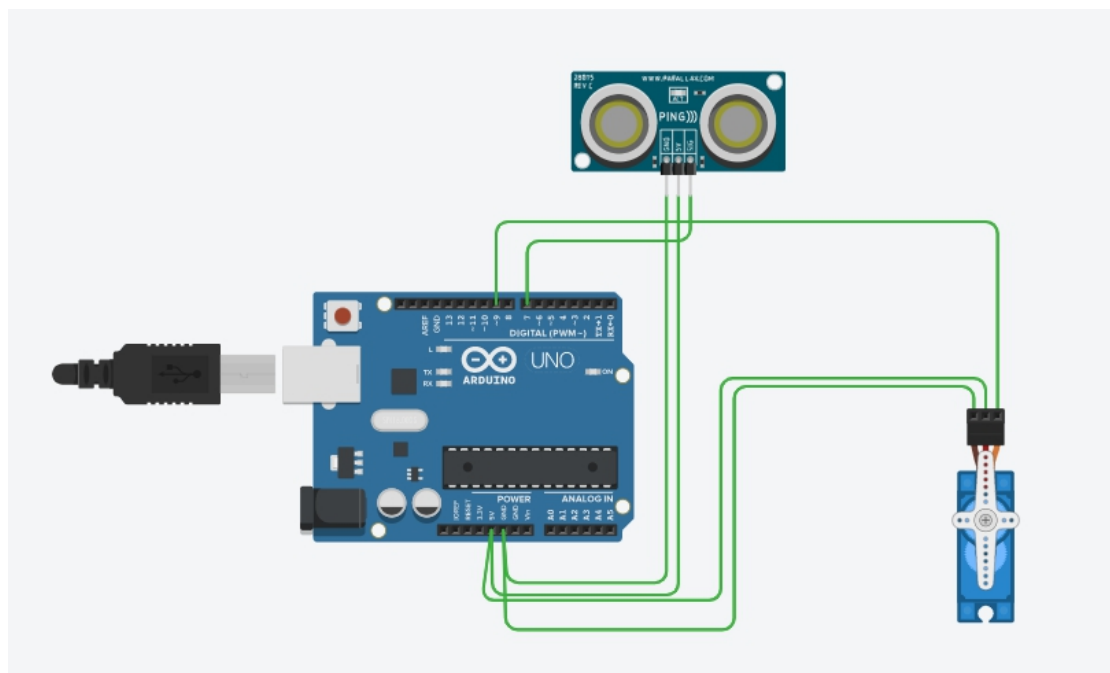
```
long microsecondsToCentimeters(long microseconds)
```

```
{
```

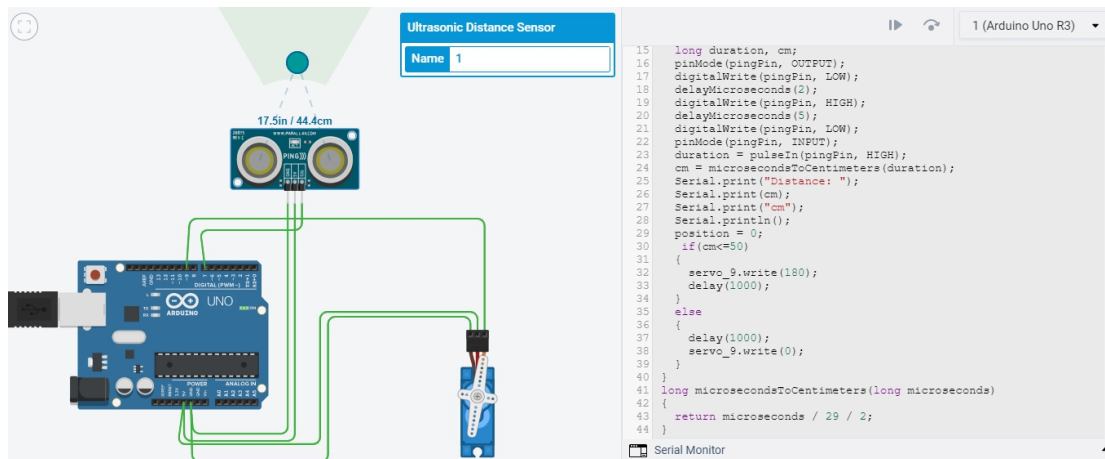
```
    return microseconds / 29 / 2;
```

```
}
```

## **CIRCUIT**



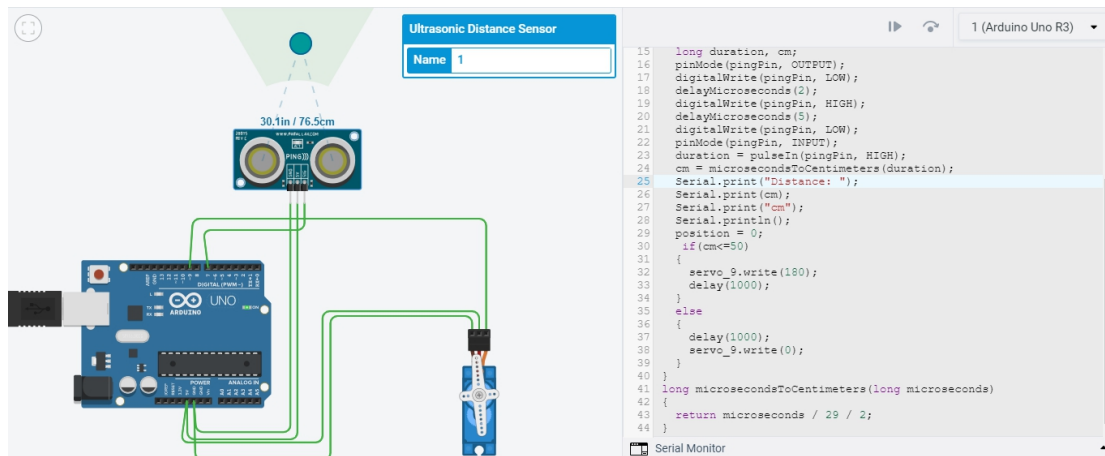
## When distance is less than 50Cm gate open



The screenshot shows the Arduino IDE interface. On the left, a circuit diagram illustrates an Arduino Uno R3 connected to an Ultrasonic Distance Sensor and a servo motor. The sensor's VCC pin is connected to the 5V pin on the Arduino, GND to GND, and the Trig pin to digital pin 12. The Echo pin is connected to digital pin 11. The servo motor's VCC pin is connected to the 5V pin, GND to GND, and the signal pin to digital pin 9. A label above the sensor indicates a distance of 17.5in / 44.4cm. On the right, the code is displayed, with the Serial Monitor window open at the bottom.

```
15 long duration, cm;
16 pinMode(pingPin, OUTPUT);
17 digitalWrite(pingPin, LOW);
18 delayMicroseconds(2);
19 digitalWrite(pingPin, HIGH);
20 delayMicroseconds(5);
21 digitalWrite(pingPin, LOW);
22 pinMode(pingIn, INPUT);
23 duration = pulseIn(pingPin, HIGH);
24 cm = microsecondsToCentimeters(duration);
25 Serial.print("Distance: ");
26 Serial.print(cm);
27 Serial.print("cm");
28 Serial.println();
29 position = 0;
30 if (cm<50)
31 {
32   servo_9.write(180);
33   delay(1000);
34 }
35 else
36 {
37   delay(1000);
38   servo_9.write(0);
39 }
40 }
41 long microsecondsToCentimeters(long microseconds)
42 {
43   return microseconds / 29 / 2;
44 }
```

## When distance is greater than 50Cm gate remain closed



This screenshot is identical to the one above, showing the same circuit diagram and code. However, the distance reading displayed above the ultrasonic sensor is now 30.1in / 76.5cm. The code and Serial Monitor output remain the same.