Car blind spot monitor

Course Name: Special Topics/Problems in CS: Cyber Physical Systems

Course Number: CS-5331

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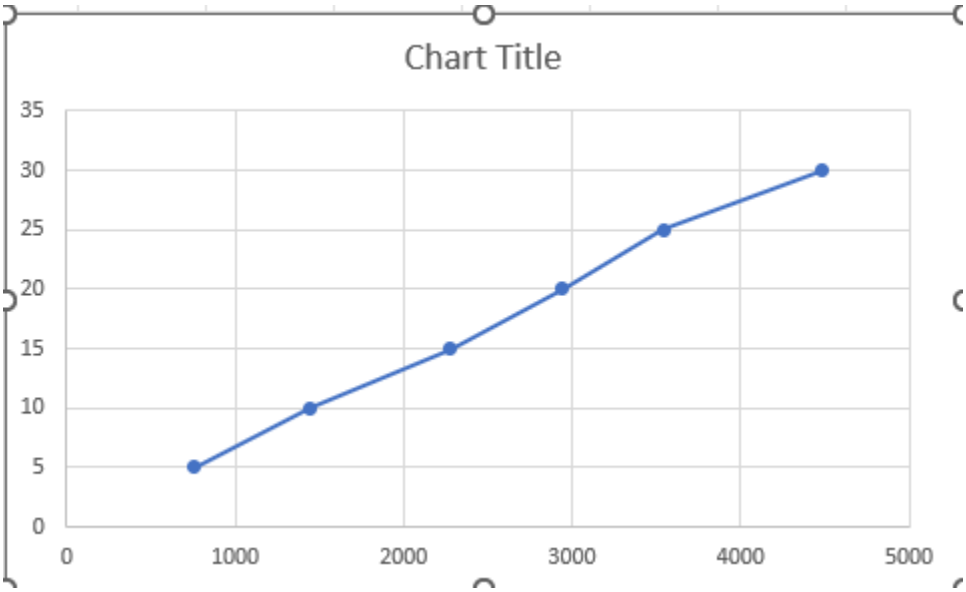
1.

Distance data (y in cm)	Sensor value (x)	
5	758	(i)
10	1448	(ii)
15	2277	
20	2944	
25	3538	
30	4480	

From the above data,

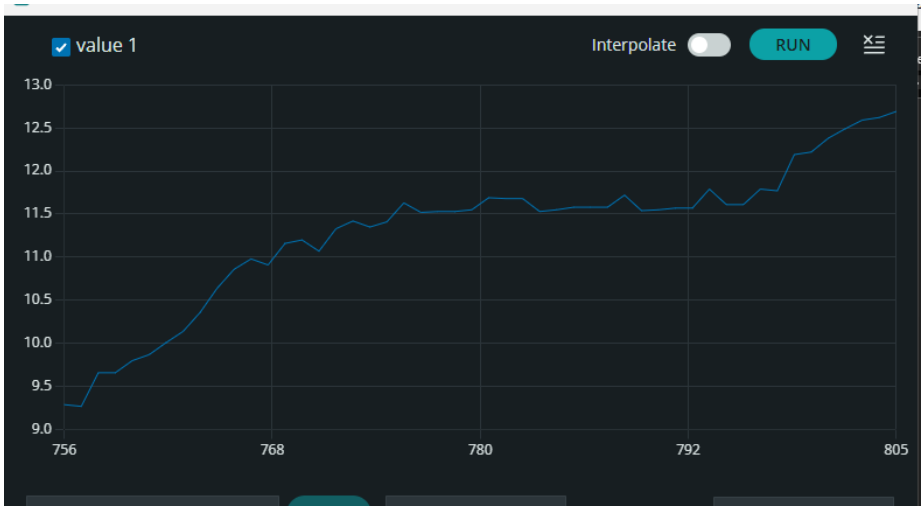
M= (y2-y1)/(x2-x1) =0.0072

C= -0.49




```
const int pingPin = 7; // Trigger Pin of Ultrasonic Sensor
const int echoPin = 6; // Echo Pin of Ultrasonic Sensor
// Connect Ultrasonic sensor VCC to 5 V, and Gnd to 0 V
int duration;
void setup() {
 Serial.begin(9600); // Starting Serial Terminal
}
```

```
void loop() {
// Ultrasound sensor ping
 pinMode(pingPin, OUTPUT);
 digitalWrite(pingPin, LOW);
 delayMicroseconds(2);
 digitalWrite(pingPin, HIGH);
 delayMicroseconds(10);
 digitalWrite(pingPin, LOW);
// Ultrasound sensor echo catch
 pinMode(echoPin, INPUT);
 duration = pulseIn(echoPin, HIGH);
  float m =0.0072;
  float C = -0.49;

  float distance = duration * m + C;
  Serial.println(distance);


 //Serial.println(duration);
// Wait before next ping
 delay(100);
}
```



2.

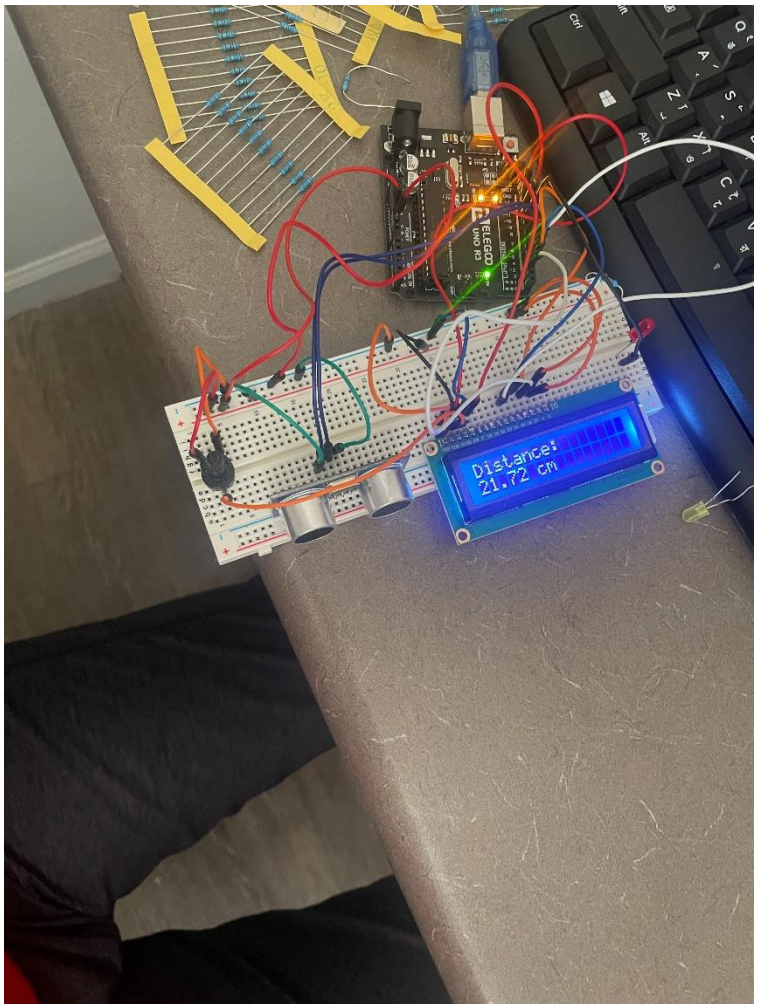
```
#include <LiquidCrystal.h>

const int pingPin = 7; // Trigger Pin of Ultrasonic Sensor
const int echoPin = 6; // Echo Pin of Ultrasonic Sensor
int duration;

LiquidCrystal lcd(12,11,5,4,3,2);

void setup()
{
  lcd.begin(16, 2);
  lcd.print("Initializing...");
  Serial.begin(9600);
  delay(3000);
}
void loop()
{
  lcd.clear();
    // Ultrasound sensor ping
  pinMode(pingPin, OUTPUT);
  digitalWrite(pingPin, LOW);
  delayMicroseconds(2);
  digitalWrite(pingPin, HIGH);
  delayMicroseconds(10);
  digitalWrite(pingPin, LOW);
  // Ultrasound sensor echo catch
  pinMode(echoPin, INPUT);
  duration = pulseIn(echoPin, HIGH);
  // Send raw data to Serial port

  //float distance = duration * 0.034 / 2;

  float m =  0.0072;
  float C = -0.49;

  // if (distance >= 29.8 && distance <= 30.2) {
  //   Serial.println("Object is 30 cm away");
  //   Serial.println(duration);
  // }
  float distance = duration * m + C;
  Serial.println(distance);
  lcd.print("Distance: ");
  lcd.setCursor(0,1);
```

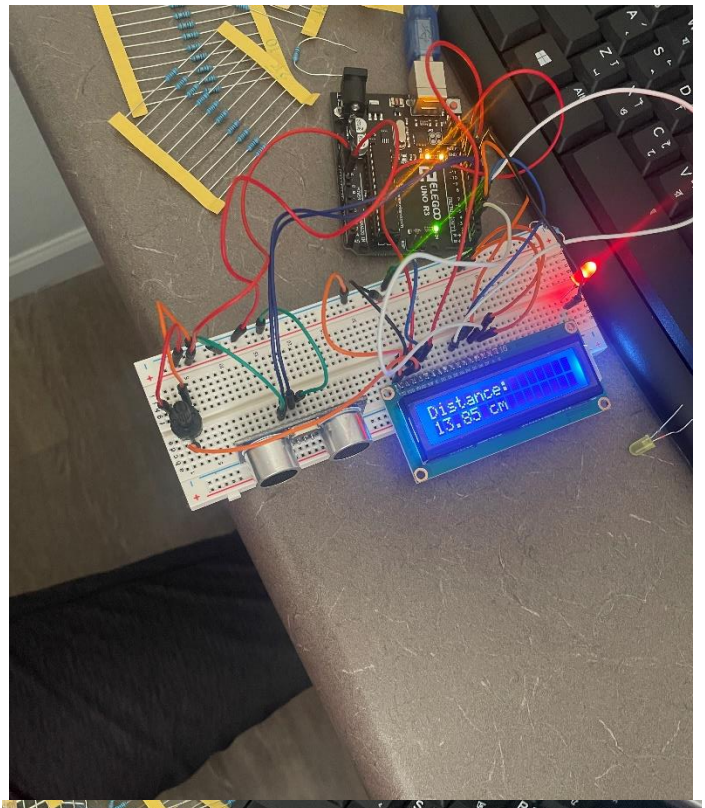
```
  lcd.print(distance);
  lcd.print(" cm");
  delay(1000);
}
```

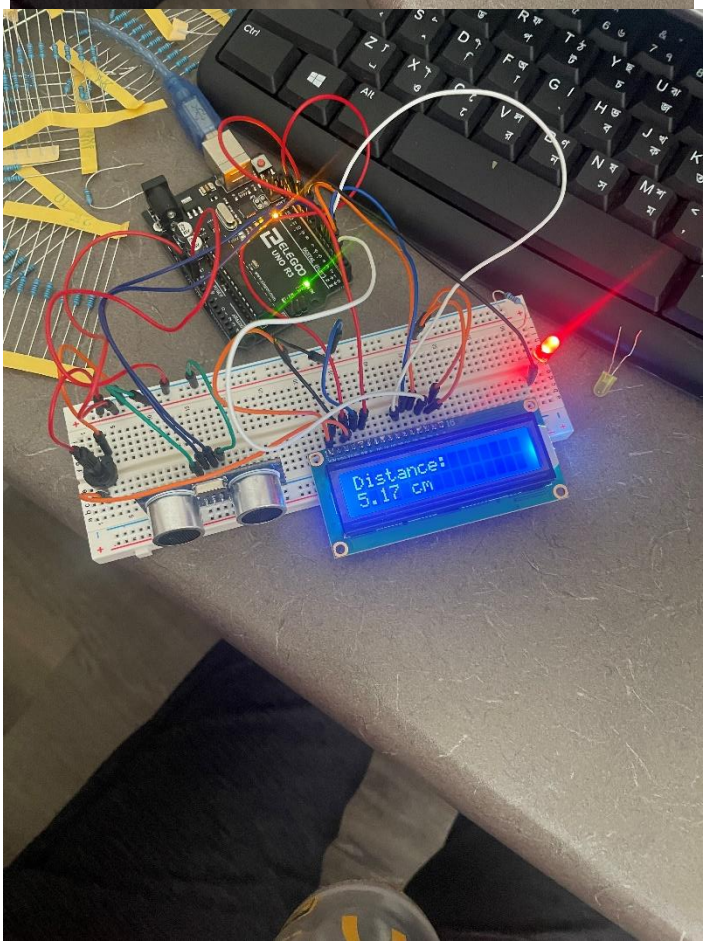
3.

```
#include <LiquidCrystal.h>

const int pingPin = 7; // Trigger Pin of Ultrasonic Sensor
const int echoPin = 6; // Echo Pin of Ultrasonic Sensor
int duration;

LiquidCrystal lcd(12,11,5,4,3,2);

void setup()
{
  lcd.begin(16, 2);
  lcd.print("Initializing...");
  Serial.begin(9600);
  pinMode(9, OUTPUT);
  delay(3000);
}
void loop()
{
  lcd.clear();
    // Ultrasound sensor ping
  pinMode(pingPin, OUTPUT);
  digitalWrite(pingPin, LOW);
  delayMicroseconds(2);
  digitalWrite(pingPin, HIGH);
  delayMicroseconds(10);
  digitalWrite(pingPin, LOW);
  // Ultrasound sensor echo catch
  pinMode(echoPin, INPUT);
  duration = pulseIn(echoPin, HIGH);
  // Send raw data to Serial port

  //float distance = duration * 0.034 / 2;

  float m =  0.0072;
```

```
  float C = -0.49;
  float distance = duration * m + C;
  Serial.println(distance);
  lcd.print("Distance: ");
  lcd.setCursor(0,1);
  lcd.print(distance);
  lcd.print(" cm");
  if (distance < 20) {
    digitalWrite(9, HIGH);
  }
  else{
    digitalWrite(9, LOW);
  }

  delay(1000);
}
```


Distance:
21.72 cm


Distance:
13.85 cm


Distance:
5.17 cm