



```

#include<LiquidCrystal.h>

LiquidCrystal lcd(2,3,4,5,6,7);

int trigPin = 12;

int echoPin = 13;

float travelTime;

float level;

float speed;//miles per hour

float readStatusofContainer(int trigPin,int echoPin)

{
    //sending ping
    digitalWrite(trigPin,LOW);
    delayMicroseconds(100);
    digitalWrite(trigPin,HIGH);
    delayMicroseconds(10);
    digitalWrite(trigPin,LOW);
    //returns round trip time of container status
    return pulseIn(echoPin,HIGH);
}

// *** DC Motor ***

int motorPin = 8;

// *** PIR Sensor ***

int pirPin = 9;

// *** Light ***

int lightPin = 10;

// *** Gas Sensor ***

int gasPin = A0;

int threshold = 400;

// *** Piezo ***

int buzzPin = 11;

```

```
// *** LED ***  
  
int ledPin = 0;  
  
void setup()  
{  
  Serial.begin(9600);  
  
  // *** LCD Display ***  
  lcd.begin(16,2);  
  
  // *** Ultrasonic Sensor ***  
  pinMode(trigPin,OUTPUT);  
  pinMode(echoPin,INPUT);  
  
  // *** DC Motor ***  
  pinMode(motorPin,OUTPUT);  
  
  // *** PIR Sensor ***  
  pinMode(pirPin,INPUT);  
  
  // *** Light ***  
  pinMode(lightPin,OUTPUT);  
  
  // *** Gas Sensor ***  
  pinMode(gasPin,INPUT);  
  
  // *** Piezo ***  
  pinMode(buzzPin, OUTPUT);  
  
  // *** LED ***  
  pinMode(ledPin,OUTPUT);
```

```

}

void loop()
{
  // *** Trash can monitoring ***
  // Trash can height 5 inches
  travelTime = readStatusofContainer(trigPin,echoPin);//microseconds
  travelTime = travelTime/1000000;//seconds
  travelTime = travelTime/3600;//hours
  speed = 60.0;//miles per hour(86.4 for 5 inches)
  level = speed * travelTime;//miles
  level = level/2;//because travelTime is round trip time
  level = level * 63360;//inch
  if(level <= 4.5)
  {
    //dispaly status
    lcd.clear();
    lcd.setCursor(0,0);
    lcd.print("Trash Level:");
    lcd.setCursor(0,1);
    lcd.print(level);
    lcd.print(" inches");
    delay(100);
  }
  else
  {
    //dispaly status
    lcd.clear();
    lcd.setCursor(0,0);
    lcd.print("Trash is full");
  }
}

```

```
lcd.setCursor(0,1);
```

```
lcd.print(level);
```

```
lcd.print(" inches away");
```

```
delay(100);
```

```
}
```

```
// *** Water level monitoring ***
```

```
// Water tank height 20 inches
```

```
travelTime = readStatusofContainer(trigPin,echoPin);//microseconds
```

```
travelTime = travelTime/1000000;//seconds
```

```
travelTime = travelTime/3600;//hours
```

```
speed = 240.1;//miles per hour(345.3 for 20 inches)
```

```
level = speed * travelTime;//miles
```

```
level = level/2;//because travelTime is round trip time
```

```
level = level * 63360;//inch
```

```
if(level <= 19.0)
```

```
{
```

```
//dispaly status and Turn on motor
```

```
digitalWrite(motorPin,HIGH);
```

```
lcd.clear();
```

```
lcd.setCursor(0,0);
```

```
lcd.print("Level: Motor");
```

```
lcd.setCursor(0,1);
```

```
lcd.print(level);
```

```
lcd.print(" in On");
```

```
delay(100);
```

```
}
```

```
else
```

```
{
```

```

//display status and Turn off motor
digitalWrite(motorPin,0);
lcd.clear();
lcd.setCursor(0,0);
lcd.print("Level: Motor");
lcd.setCursor(0,1);
lcd.print(level);
lcd.print(" in Off");
delay(100);
}

// *** Motion Detection
if(digitalRead(pirPin)==HIGH)
digitalWrite(lightPin, HIGH);
else
digitalWrite(lightPin, LOW);
delay(100);

// *** Detects flammable gases ***
if(analogRead(gasPin) >= threshold)
{
digitalWrite(ledPin,HIGH);
digitalWrite(buzzPin,HIGH);
}
else
{
digitalWrite(ledPin,LOW);
digitalWrite(buzzPin,LOW);
}
delay(100);

```

