

```

// *** LCD Display ***

#include<LiquidCrystal.h>

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


// *** Ultrasonic Sensor ***

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
{
    //display 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)
{
    //display 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);  
}
```