Smart Waste Management System For Metropolitant Cities
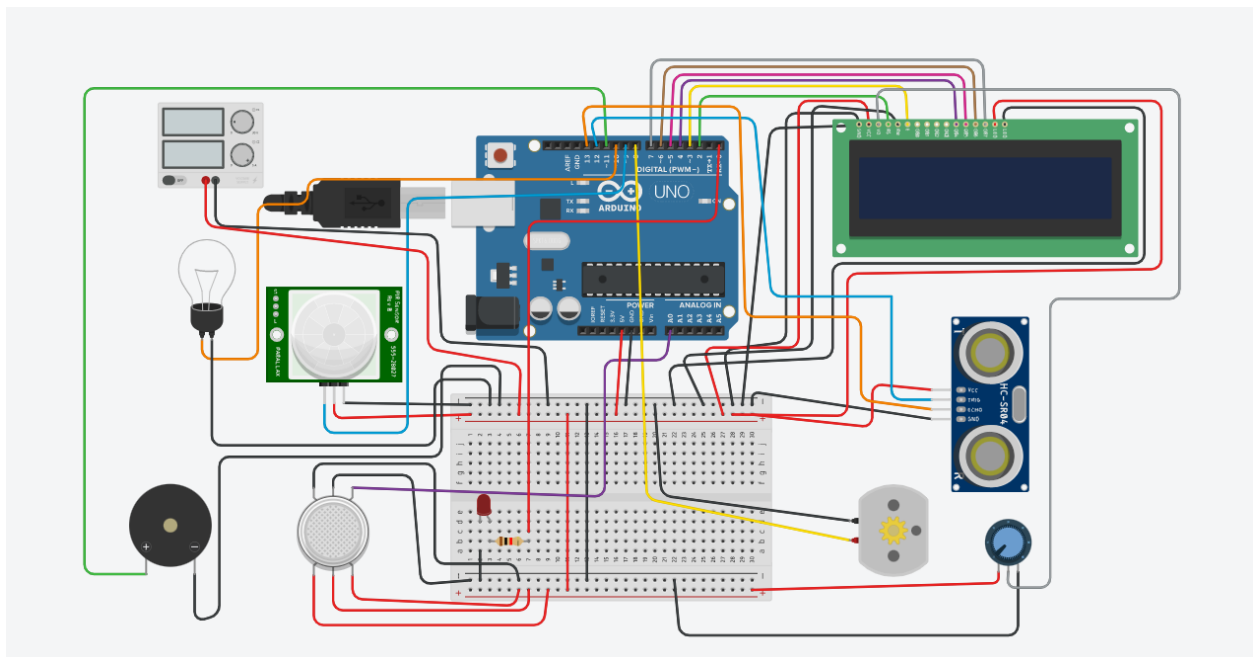
Team ID : PNT2022TMID27134   **Submitted by: Bentyson.J**

ASSIGNMENT 1

SMART HOME IN TINKERCAD USING 2+ SENSORS

- **Circuit Diagram**

- **Components Required:**

Name	Quantity	Component
U1	1	Arduino Uno R3
DIST1	1	Ultrasonic Distance Sensor
M1	1	DC Motor
U2	1	LCD 16 x 2
P1	1	21 , 5 Power Supply
PIR1	1	20.722593638638443 , - 237.58262756842853 , -

			197.9092690878765 , -253.1130883508938 PIR Sensor
L2		1	Light bulb
GAS1		1	Gas Sensor
PIEZO1		1	Piezo
R1		1	10 kâ„¦ Resistor
Rpot1		1	250 kâ„¦ Potentiometer
D1		1	Red LED
R2		1	330 â„¦ Resistor

- **Running Simulation in Tinkercad**
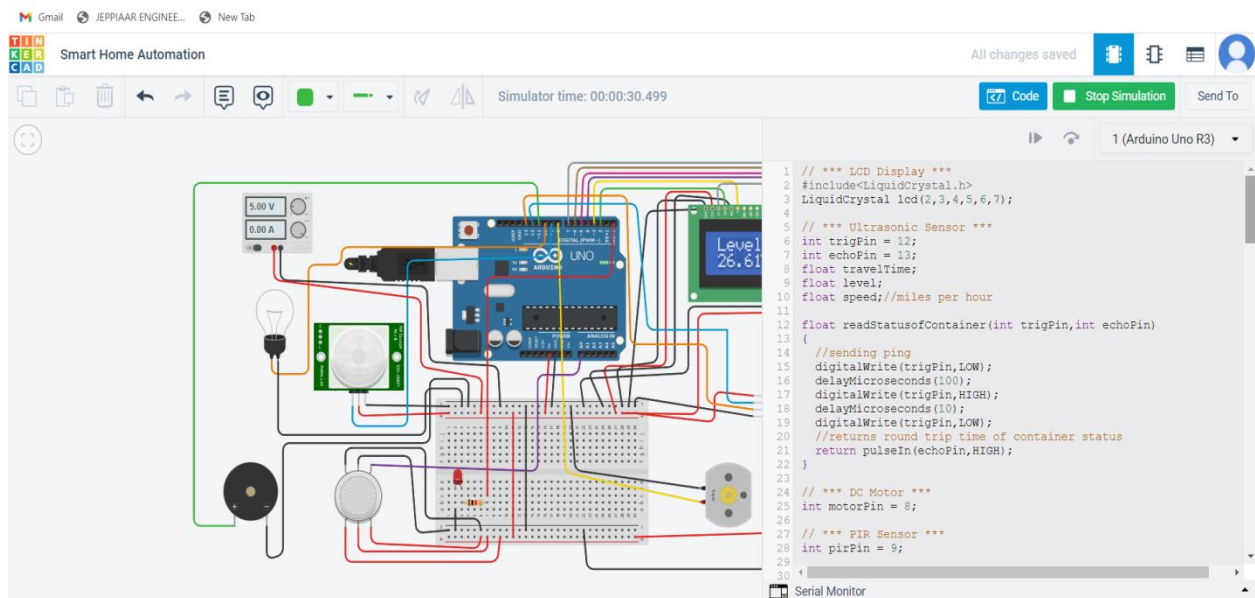
- **Code:**

```
// *** LCD Display ***
#include<LiquidCrystal.h>
LiquidCrystal lcd(2,3,4,5,6,7);

// *** Ultrasonic Sensor ***
```

```arduino
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
{
 //dispaly 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);
}
```

- **Output:**