

ASSIGNMENT 1

Make a smart home with sensors learnt

Aim:

To design a smart home automation system using primary sensors

Software used:

TinkerCad

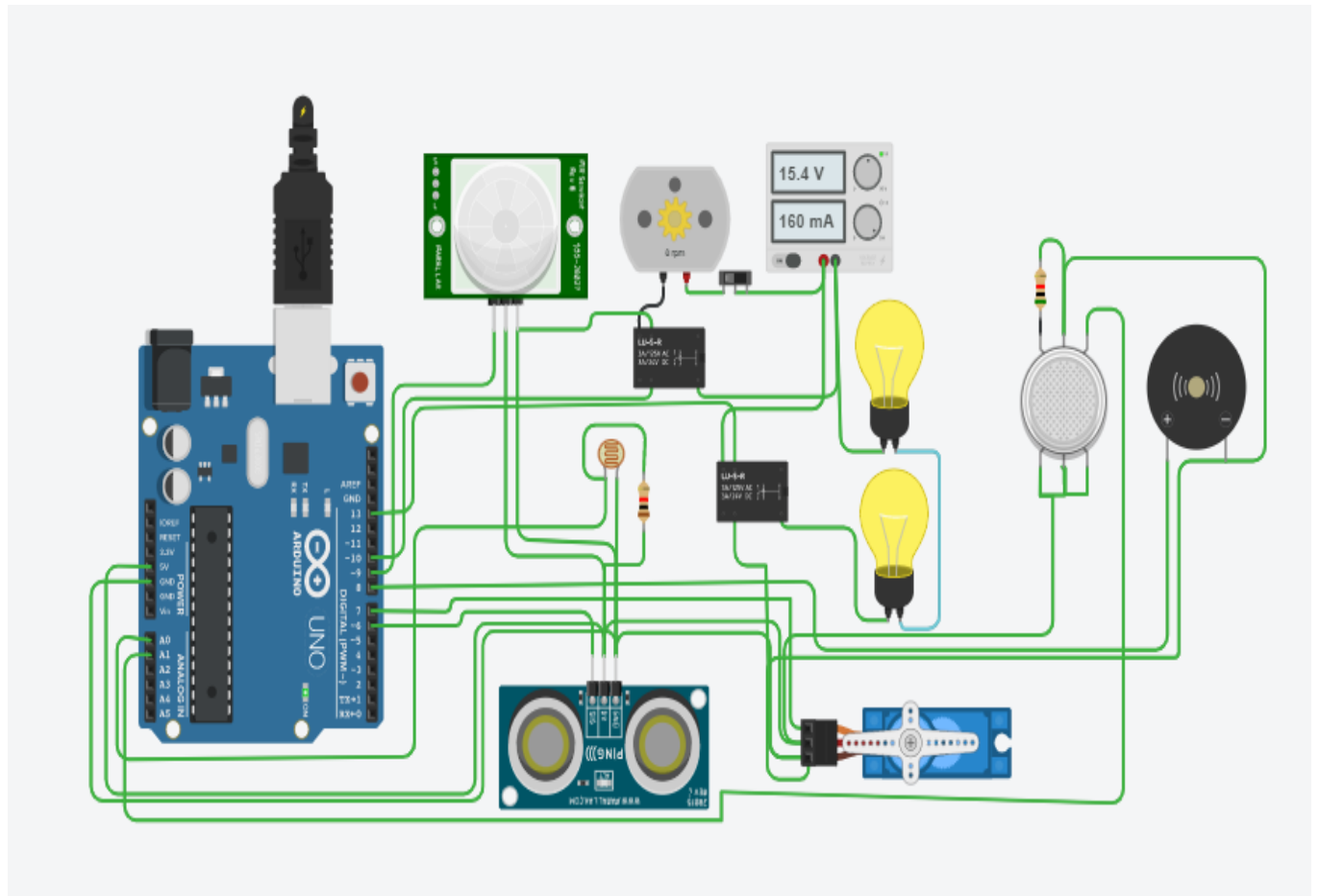
Components required:

- Arduino Uno R3
- Smoke detector
- PIR sensor
- LDR sensor
- Ultrasonic sensor
- DC power source
- Relay

Working:

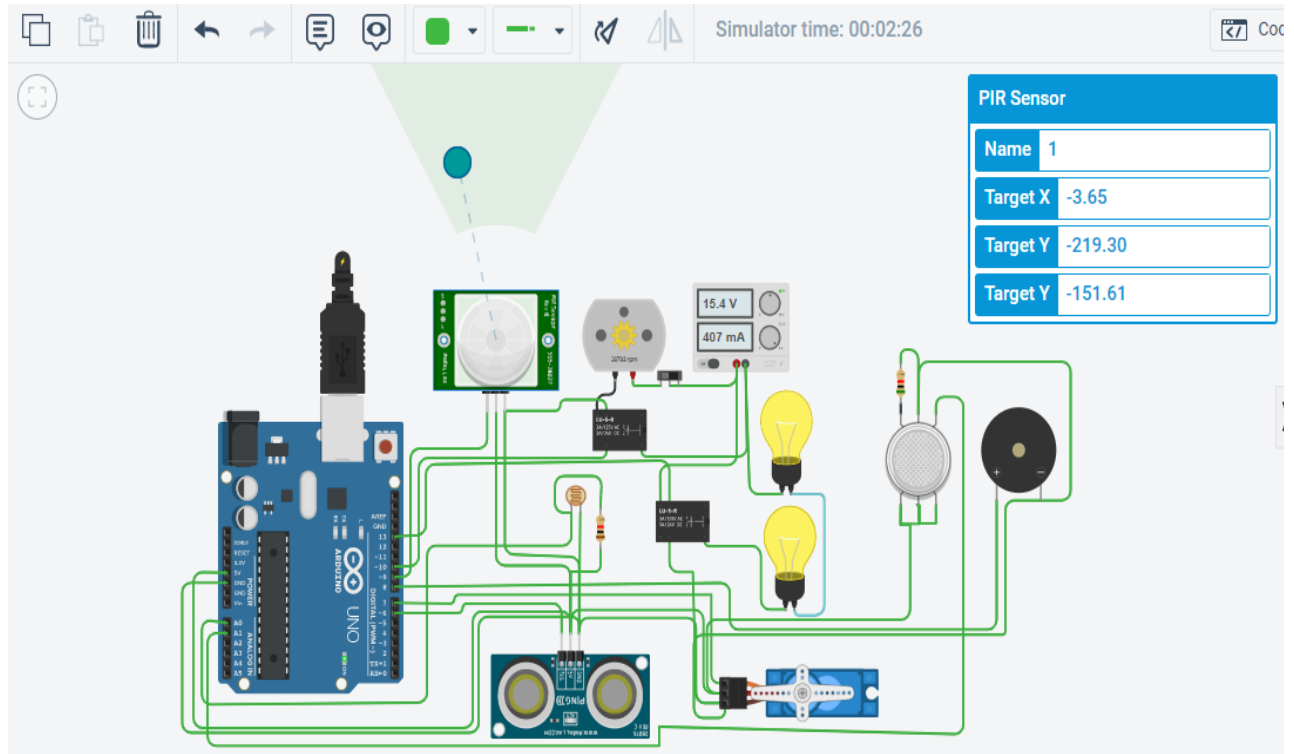
- If someone enters inside the home, the Fan will be automatically turned ON, which can also be controlled manually using switch.
- If LPG gas is leaked, the alarm circuit will get activated the buzzer will start buzzing.
- An Ultrasonic sensor will be set up on the top of the main door. The door will automatically open if anyone comes near to it.
- If the room is dark, the LDR sensor will activate and turns ON the bulb.

CIRCUIT DIAGRAM: Before Simulation:

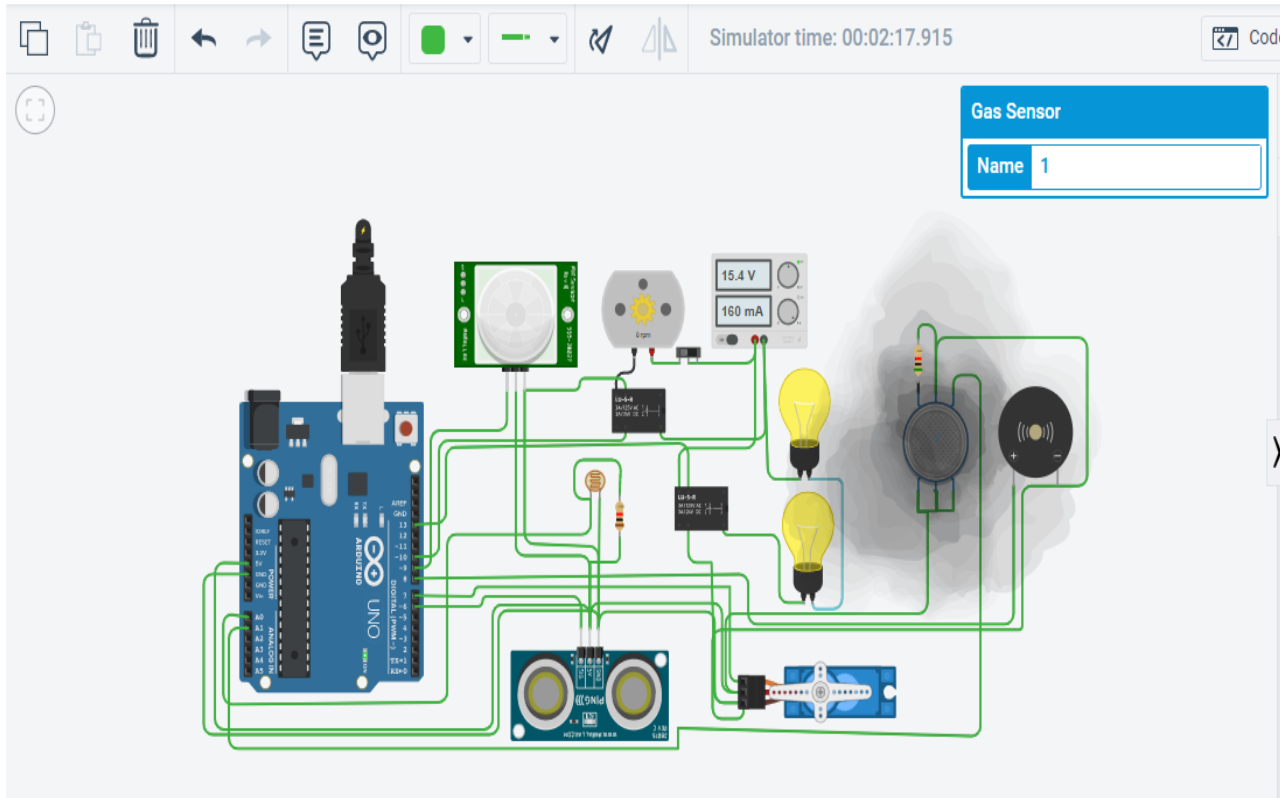


After simulation:

The bulb glows and the fan starts to rotate



Leakage of LPG gas is detected



CODE:

```
#include <Servo.h>
```

```
int output1Value = 0;
```

```
int sen1Value = 0;
```

```
int sen2Value = 0;
```

```
int const gas_sensor = A1;
```

```
int const LDR = A0;
```

```
int limit = 400;
```

```
long readUltrasonicDistance(int triggerPin, int echoPin)  
{
```

```
pinMode(triggerPin, OUTPUT); // Clear the trigger
digitalWrite(triggerPin, LOW);
delayMicroseconds(2);
// Sets the trigger pin to HIGH state for 10 microseconds
digitalWrite(triggerPin, HIGH);
delayMicroseconds(10);
digitalWrite(triggerPin, LOW);
pinMode(echoPin, INPUT);
// Reads the echo pin, and returns the sound wave travel
time in microseconds
return pulseIn(echoPin, HIGH);
}
```

```
Servo servo_7;
```

```
void setup()
{
  Serial.begin(9600);          //initialize serial communication
  pinMode(A0, INPUT);          //LDR
  pinMode(A1, INPUT);          //gas sensor
  pinMode(13, OUTPUT);          //connected to relay
  servo_7.attach(7, 500, 2500); //servo motor

  pinMode(8, OUTPUT);          //signal to piezo buzzer
  pinMode(9, INPUT);           //signal to PIR
  pinMode(10, OUTPUT);          //signal to npn as switch
  pinMode(4, OUTPUT);           //Red LED
}
```

```

pinMode(3, OUTPUT);          //Green LED

}

void loop()
{

    //-----light intensity control-----//
    //-----
    int val1 = analogRead(LDR);
    if (val1 > 500)
    {
        digitalWrite(13, LOW);
        Serial.print("Bulb ON = ");
        Serial.print(val1);
    }
    else
    {
        digitalWrite(13, HIGH);
        Serial.print("Bulb OFF = ");
        Serial.print(val1);
    }

    //-----
    //----- light & fan control -----//
    //-----
    sen2Value = digitalRead(9);

```

```
if (sen2Value == 0)
{
    digitalWrite(10, LOW); //npn as switch OFF
    digitalWrite(4, HIGH); // Red LED ON,indicating no
motion
    digitalWrite(3, LOW); //Green LED OFF, since no
Motion detected
    Serial.print("    || NO Motion Detected    ");
}
```

```
if (sen2Value == 1)
{
    digitalWrite(10, HIGH); //npn as switch ON
    delay(3000);
    digitalWrite(4, LOW); // RED LED OFF
    digitalWrite(3, HIGH); //GREEN LED ON , indicating
motion detected
    Serial.print("    || Motion Detected!    ");
}
delay(300);
```

```
//-----
```

```
// ----- Gas Sensor -----//
```

```
//-----
```

```
int val = analogRead(gas_sensor);    //read sensor value
Serial.print("|| Gas Sensor Value = ");
```



```

    Serial.print(val);                //Printing in serial
monitor
//val = map(val, 300, 750, 0, 100);
if (val > limit)
{
    tone(8, 650);
}
delay(300);
noTone(8);

//-----
//----- servo motor -----//
//-----

sen1Value = 0.01723 * readUltrasonicDistance(6, 6);

if (sen1Value < 100)
{
    servo_7.write(90);
    Serial.print("    || Door Open! ; Distance = ");
    Serial.print(sen1Value);
    Serial.print("\n");

}
else
{
    servo_7.write(0);
    Serial.print("    || Door Closed! ; Distance = ");

```

```
    Serial.print(sen1Value);  
    Serial.print("\n");  
}  
delay(10); // Delay a little bit to improve simulation  
performance  
}
```

RESULT:

Hence, a smart home automation system is designed using Tinkercad