

**Assignment -1**  
Smart Home Automation

<b>Assignment Date</b>	15 September 2022
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**Question-1:**

**Make a smart home with all the sensors you learned in tinkercad.**

**Solution:**

```
#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
```

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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(5, 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(5000);
    digitalWrite(4, LOW); // RED LED OFF
    digitalWrite(5, HIGH); //GREEN LED ON , indicating motion detected
    Serial.print("    || Motion Detected!    ");
  }
  // ----- 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
}

```

**Reference Link :**

<https://www.tinkercad.com/things/gfsyrYf2GrN-home-automation/editel?sharecode=Phx6kP0spfAMMnydBiKJO6y5BFHsEUkQU2hAw5U18ac&sharecode=Phx6kP0spfAMMnydBiKJO6y5BFHsEUkQU2hAw5U18ac>

**For simulation process**

## Design Architecture :

