

## ASSIGNMENT-1 SMART HOME BUILDING

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Screenshot of a Tinkercad circuit simulation for a smart home building project. The circuit is connected to an Arduino Uno R3 board.

**Circuit Components and Connections:**

- Arduino Uno R3:** The central microcontroller.
- Ultrasonic Sensor (HC-SR04):** Connected to pins 4 (VCC), 5 (GND), 6 (Trigger), and 7 (Echo).
- Gas Sensor (MQ-135):** Connected to pins 1 (VCC), 2 (GND), 3 (A0), and 4 (A1).
- LDR Sensor:** Connected to pins 1 (VCC), 2 (GND), and 3 (AO).
- Relay Module:** Connected to pins 13 (VCC), 14 (GND), and 12 (Control).
- Servo Motor (SG90):** Connected to pins 5 (VCC), GND, and 7 (Signal).
- Piezobuzzer:** Connected to pins 8 (VCC) and 9 (Signal).
- PIR Sensor:** Connected to pins 1 (VCC), 2 (GND), and 3 (Signal).
- NPN Transistor (2N2222):** Connected to pins 4 (VCC), 1 (GND), 2 (Base), and 3 (Emitter).
- LED:** Connected to pins 10 (VCC) and 11 (Signal).

**Code (Arduino Uno R3):**

```
1 #include <Servo.h>
2
3 int output1Value = 0;
4 int sen1Value = 0;
5 int sen2Value = 0;
6 int const gas_sensor = A1;
7 int const LDR = A0;
8 int limit = 400;
9
10 long readUltrasonicDistance(int triggerPin, int echoPin)
11 {
12   pinMode(triggerPin, OUTPUT); // Clear the trigger
13   digitalWrite(triggerPin, LOW);
14   delayMicroseconds(2);
15   // Sets the trigger pin to HIGH state for 10 microseconds
16   digitalWrite(triggerPin, HIGH);
17   delayMicroseconds(10);
18   digitalWrite(triggerPin, LOW);
19   pinMode(echoPin, INPUT);
20   // Reads the echo pin, and returns the sound wave travel time
21   return pulseIn(echoPin, HIGH);
22 }
23
24 Servo servo_7;
25
26 void setup()
27 {
28   Serial.begin(9600); //initialize serial communication
29   pinMode(A0, INPUT); //LDR
30   pinMode(A1, INPUT); //gas sensor
31   pinMode(13, OUTPUT); //connected to relay
32   servo_7.attach(7, 500, 2500); //servo motor
33
34   pinMode(8, OUTPUT); //signal to piezo buzzer
35   pinMode(9, INPUT); //signal to PIR
36   pinMode(10, OUTPUT); //signal to npn as switch
37   pinMode(4, OUTPUT); //Red LED
38 }
```

**Serial Monitor:**

## CODE:

```
#include <LiquidCrystal.h>
LiquidCrystal lcd(12, 13, 11, 10, 9, 8);
int pirPin=7;
int pirInput=0;
int bulbPin=6;
int photoValue=0;
int tempReading=0,temp1=0,temperature=0;
int fanPin=5;
int gasReading=0;
int greenLed=4;
int yellowLed=3;
int redLed=2;
int piezoPin=0;
void scrollScreenSaver() {

    lcd.clear() ;
    lcd.setCursor(15, 0);
    lcd.print("Welcome");
    lcd.setCursor(15, 1);
    lcd.print("to my home");

    for (int positionCounter = 0; positionCounter < 22; positionCounter++) {
        lcd.scrollDisplayLeft();
        delay(50);
    }
}

void setup()
{
    lcd.begin(16, 2);
    lcd.print("hello, world!");
    pinMode(pirPin, INPUT);
    pinMode(bulbPin, OUTPUT);
    pinMode(greenLed,OUTPUT);
    pinMode(yellowLed,OUTPUT);
    pinMode(redLed,OUTPUT);
    pinMode(piezoPin,OUTPUT);

    Serial.begin(9600);

}

void loop()
```

```

{
  lcd.setCursor(0, 1);
  lcd.print(millis() / 1000);
  pirInput=digitalRead(pirPin);
  photoValue=analogRead(A0);
  Serial.println(photoValue);
  tempReading=analogRead(A1);
  temperature=(5000.0/1024.0*tempReading/10.0);
  Serial.println(temperature);

  gasReading=analogRead(A2);
  Serial.println(gasReading);
  Serial.println(".....");
  digitalWrite(greenLed,gasReading>100 ? HIGH : LOW);
  digitalWrite(yellowLed,gasReading>200 ? HIGH : LOW);
  digitalWrite(redLed,gasReading>300 ? HIGH : LOW);

  if(pirInput==HIGH)
  {
    lcd.clear();
    lcd.setCursor(0,0);
    lcd.print("Motion Detected");
    if(photoValue<300)
    {
      digitalWrite(bulbPin,HIGH);
      lcd.setCursor(0,1);
      lcd.print("Light is on");
      delay(1000);
    }
    if(temperature>25)
    {
      digitalWrite(fanPin,HIGH);
      lcd.setCursor(0,1);
      lcd.print("          ");
      lcd.setCursor(0,1);
      lcd.print("Fan is on");
      delay(1000);
    }
  }
  else
  {
    scrollScreenSaver() ;
  }
}

```

```
}  
/*digitalWrite(13, HIGH);  
delay(1000);  
digitalWrite(13, LOW);  
delay(1000);  
}  
Footer
```