Assignment -1

Smart home automation

Assignment Date	16 September 2022
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Maximum Marks	2 Marks

Question-1:

Make a smart home in Tinkercad , using 2+ sensors ,LED, Buzzer in a single code and circuit.

SOLUTION:

SMART HOME AUTOMATION

- In this project three sensors are used to guide various applications.
- An ultrasonic sensor is placed near the door to sense someone's presence and notify people inside or can be connected to an automatic door.
- A temperature sensor is used to monitor the room's temperature and give feedback which can be applied to operate an air conditioner or a heater.
- Lastly a Gas sensor is embedded to detect fire and can take action accordingly.
- All the devices outputs are connected to an LCD to present the current status these feedbacks can be connected to drive further appliances accordingly.

PROGRAM:

```
#include <Adafruit_LiquidCrystal.h>

#define gas A0

#define temp A1

int buz=8;

int a=2;

int b=4;

int c=12;

int t=7;

int e=6;

Adafruit_LiquidCrystal lcd_1(0);


void setup()
```

```
{
  lcd_1.begin(16, 2);
  lcd_1.setBacklight(0);
  pinMode(gas, INPUT);
  pinMode(buz, OUTPUT);
  pinMode(a, OUTPUT);
  pinMode(b, OUTPUT);
  pinMode(c, OUTPUT);
  pinMode(temp, INPUT);
  pinMode(t,OUTPUT);
  pinMode(e,INPUT);
  digitalWrite(buz,LOW);
  digitalWrite(a,LOW);
  digitalWrite(b,LOW);
  digitalWrite(c,LOW);
}
void loop()
{
  int val1=analogRead(gas);
  int val2= analogRead(temp);
  digitalWrite(t,LOW);
  digitalWrite(t,HIGH);
  delay(0.01);
  digitalWrite(t,LOW);
  float dur = pulseIn(e,HIGH);
  float dis =((dur/2)*0.0343);

  if(val1>110 && val1<200)
  {
    //If smoke deteced is less due to burning of something in the gas or oven...
    lcd_1.setBacklight(1);
    digitalWrite(buz,HIGH);
```

```
  lcd_1.print("ALERT!!!");
  lcd_1.setCursor(0, 1);
  lcd_1.print("Detecting smoke!");
  delay(1000);
  digitalWrite(buz,LOW);
  lcd_1.setBacklight(0);
  lcd_1.clear();
}
 if(val1>200 && val1<345)
{
   //If huge smoke is deteced due to a fire accident a buzzer is triggered
  lcd_1.setBacklight(1);
  digitalWrite(buz,HIGH);
          lcd_1.print("ALERT!!!");
  lcd_1.setCursor(0, 1);
  lcd_1.print("FIRE is detected!");
  delay(1000);
  digitalWrite(buz,LOW);
  lcd_1.setBacklight(0);
  lcd_1.clear();
 }
if(dis>0 && dis<96)
{
  //Someone standing in front of the door
  lcd_1.setBacklight(1);
  digitalWrite(buz,HIGH);
  lcd_1.print("Hello...");
  lcd_1.setCursor(0, 1);
  lcd_1.print("Open the door!");
  delay(1000);
  digitalWrite(buz,LOW);
  lcd_1.setBacklight(0);
```

```
  lcd_1.clear();
}
if(dis>95 && dis<230)
{
  //Someone being detected near the entrance
  lcd_1.setBacklight(1);
  digitalWrite(buz,HIGH);
  lcd_1.print("Hello...");
  lcd_1.setCursor(0, 1);
  lcd_1.print("Someone coming!");
  delay(1000);
  digitalWrite(buz,LOW);
  lcd_1.setBacklight(0);
  lcd_1.clear();
}
if(dis>230)
{
  lcd_1.clear();
}
 if(val2>20 && val2<135)
{
  lcd_1.setBacklight(1);
  digitalWrite(a,HIGH);
  lcd_1.print("TEMPERATURE:");
  lcd_1.setCursor(0, 1);
  lcd_1.print("Very cold!");
  delay(1000);
  digitalWrite(a,LOW);
  lcd_1.setBacklight(0);
  lcd_1.clear();
}
if(val2>134 && val2<184)
```

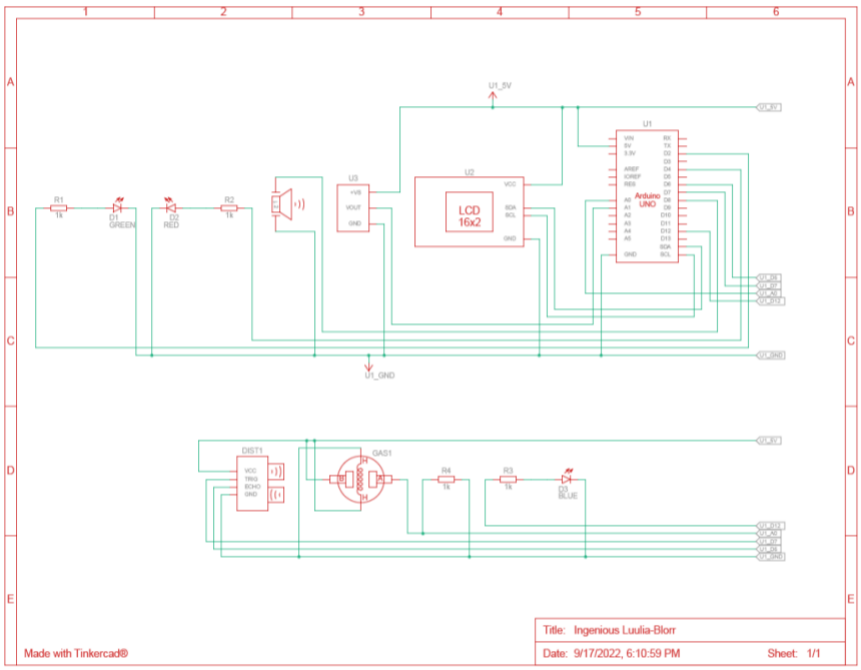
```
 {
   lcd_1.setBacklight(1);
   digitalWrite(b,HIGH);
   lcd_1.print("TEMPERATURE:");
   lcd_1.setCursor(0, 1);
   lcd_1.print("Normal!");
   delay(1000);
   digitalWrite(b,LOW);
   lcd_1.setBacklight(0);
   lcd_1.clear();
 }
 if(val2>183)
 {
   lcd_1.setBacklight(1);
   digitalWrite(c,HIGH);
   lcd_1.print("TEMPERATURE:");
   lcd_1.setCursor(0, 1);
   lcd_1.print("Very hot!");
   delay(1000);
   digitalWrite(c,LOW);
   lcd_1.setBacklight(0);
   lcd_1.clear();
 }

 delay(2000);
}
```

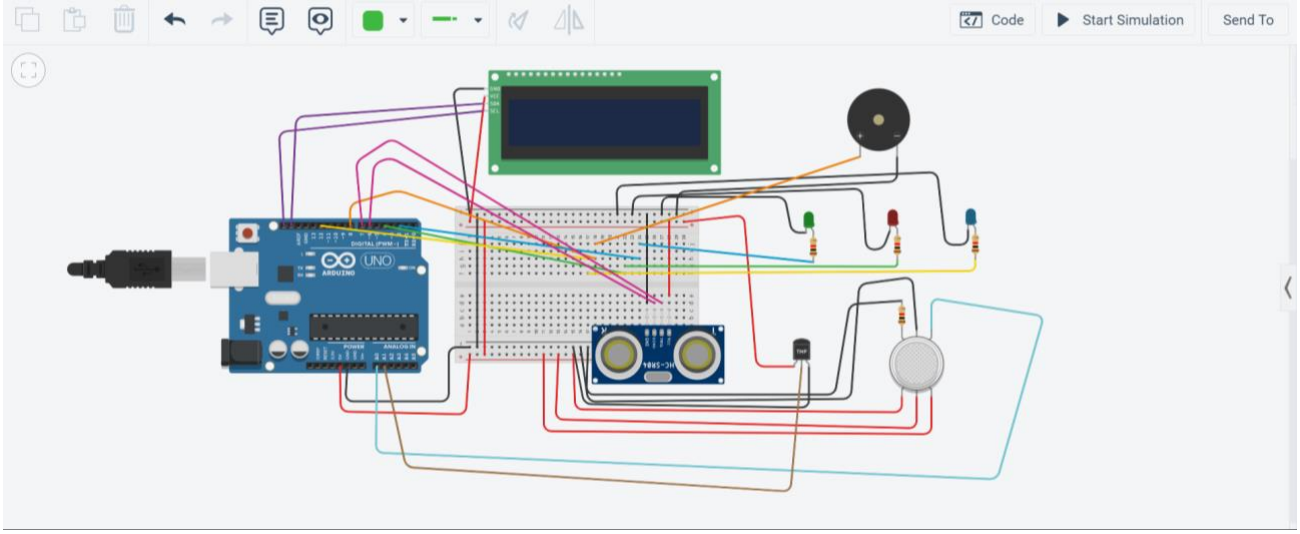
COMPONENTS LIST:

Name	Quantity	Component
U1	1	Arduino Uno R3
U2	1	MCP23008-based, 32 LCD 16 x 2 (I2C)
PIEZO1	1	Piezo
D1	1	Green LED
D2	1	Red LED
D3	1	Blue LED
R1 R2 R3 R4	4	1 kΩ Resistor
U3	1	Temperature Sensor [TMP36]
GAS1	1	Gas Sensor
DIST1	1	Ultrasonic Distance Sensor

SCHEMATIC DIAGRAM:



CIRCUIT DIAGRAM:



SIMULATION LINK:

https://www.tinkercad.com/things/kkuXZAUV131-ingenious-luulia-blorr/editel?tenant=circuits