

Date : 11/04/2022

CSLR61 : EMBEDDED SYSTEMS LAB-7

Roll no.: 106119100

Name: Rajneesh Pandey

Section: CSE-B

1. Interface two 7-segment display with Arduino Uno board. Implement the
a) odd counter

Link : <https://www.tinkercad.com/things/9IpwxBgLeHC-106119100-lab7-q1-i/editel?sharecode=S2PmChnLRfuHzxZiJLKISQm57T-rjxdWfT0BuPgEopQ>

```
/* 106119100 Rajneesh */

// a,b,c,d,e,f,g
byte segValue[10][7] = {
    {0, 0, 0, 0, 0, 0, 1}, // 0
    {1, 0, 0, 1, 1, 1, 1}, // 1
    {0, 0, 1, 0, 0, 1, 0}, // 2
    {0, 0, 0, 0, 1, 1, 0}, // 3
    {1, 0, 0, 1, 1, 0, 0}, // 4
    {0, 1, 0, 0, 1, 0, 0}, // 5
    {0, 1, 0, 0, 0, 0, 0}, // 6
    {0, 0, 0, 1, 1, 1, 1}, // 7
    {0, 0, 0, 0, 0, 0, 0}, // 8
    {0, 0, 0, 0, 1, 0, 0} // 9
};

byte segPin[8] = {12, 13, 4, 6, 7, 10, 9, 3}; // {a,b,c,d,e,f,g,dp}
byte digitPin[2] = {A1, A2}; // segment

void setup()
{
    for (int i = 0; i < 10; i++)
    {
        pinMode(segPin[i], OUTPUT);
    }
    pinMode(digitPin[0], OUTPUT);
    pinMode(digitPin[1], OUTPUT);
    digitalWrite(digitPin[0], LOW);
}
```

```

    digitalWrite(digitPin[1], LOW);
}

void loop()
{
    for (int i = 1; i < 100; i += 2)
    {
        display_N(i);
        delay(1);
    }
}

void display_N(int num)
{
    int und = num % 10;
    int dec = (num % 100) / 10;
    for (int i = 0; i < 100; i++)
    {
        segOutput(1, und, 1);
        segOutput(0, dec, 1);
        delay(2);
    }

    Serial.print(dec);
    Serial.println(und);
}

// LED
void segClear()
{
    for (int i = 0; i < 8; i++)
    {
        digitalWrite(segPin[i], HIGH);
    }
}

// LED
void segOutput(int d, int Number, int dp)

```

```

{
  segClear();
  digitalWrite(digitPin[d], HIGH);
  for (int i = 0; i < 7; i++)
  {
    digitalWrite(segPin[i], segValue[Number][i]);
  }
  digitalWrite(segPin[7], dp);
  delayMicroseconds(1000);
  digitalWrite(digitPin[d], LOW);
}

```

Circuit design 106119100 Lab7-q1-i

https://www.tinkercad.com/things/9lpwxBgLeHC-106119100-lab7-q1-i/editel

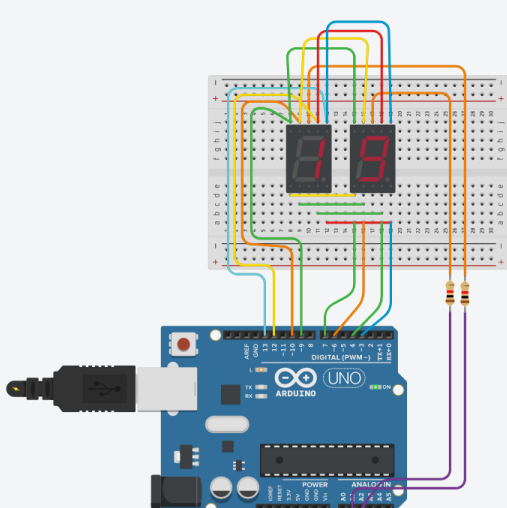
106119100 Lab7-q1-i

Simulator time: 00:00:04.391

All changes saved

Code Stop Simulation Send To

1 (Arduino Uno R3)



```

1 /* 106119100 Rajneesh */
2
3 // a,b,c,d,e,f,g
4
5 byte segValue[10][7] = {
6   {0, 0, 0, 0, 0, 0, 1}, // 0
7   {1, 0, 0, 1, 1, 1, 1}, // 1
8   {0, 0, 1, 0, 0, 1, 0}, // 2
9   {0, 0, 0, 0, 1, 1, 0}, // 3
10  {1, 0, 0, 1, 1, 0, 0}, // 4
11  {0, 1, 0, 0, 1, 0, 0}, // 5
12  {0, 1, 0, 0, 0, 0, 0}, // 6
13  {0, 0, 0, 1, 1, 1, 1}, // 7
14  {0, 0, 0, 0, 0, 0, 0}, // 8
15  {0, 0, 0, 0, 1, 0, 0}, // 9
16 };
17
18 byte segPin[8] = {12, 13, 4, 6, 7, 10, 9, 3}; // {a,b,c,d,e,f,g,dp}
19 byte digitPin[2] = {A1, A2}; // segment
20
21 void setup()
22 {
23   for (int i = 0; i < 10; i++)
24   {
25     pinMode(segPin[i], OUTPUT);
26   }
27   pinMode(digitPin[0], OUTPUT);
28   pinMode(digitPin[1], OUTPUT);
29   digitalWrite(digitPin[0], LOW);
30   digitalWrite(digitPin[1], LOW);
31 }
32
33 void loop()
34 {
35   for (int i = 0; i < 10; i++)

```

Serial Monitor

b) even counter and display the values in the seven-segment display.

Link : <https://www.tinkercad.com/things/i3kE0WcmLRn-106119100-lab7-q1-ii/editel?sharecode=632ZWroBVuHbe0hf15xq5hasFydG7J8vcpd8C7sYk4k>

```
/* 106119100 Rajneesh */

// a,b,c,d,e,f,g
byte segValue[10][7] = {
    {0, 0, 0, 0, 0, 0, 1}, // 0
    {1, 0, 0, 1, 1, 1, 1}, // 1
    {0, 0, 1, 0, 0, 1, 0}, // 2
    {0, 0, 0, 0, 1, 1, 0}, // 3
    {1, 0, 0, 1, 1, 0, 0}, // 4
    {0, 1, 0, 0, 1, 0, 0}, // 5
    {0, 1, 0, 0, 0, 0, 0}, // 6
    {0, 0, 0, 1, 1, 1, 1}, // 7
    {0, 0, 0, 0, 0, 0, 0}, // 8
    {0, 0, 0, 0, 1, 0, 0} // 9
};

byte segPin[8] = {12, 13, 4, 6, 7, 10, 9, 3}; // {a,b,c,d,e,f,g,dp}
byte digitPin[2] = {A1, A2}; // segment

void setup()
{
    for (int i = 0; i < 10; i++)
    {
```

```

        pinMode(segPin[i], OUTPUT);
    }
    pinMode(digitPin[0], OUTPUT);
    pinMode(digitPin[1], OUTPUT);
    digitalWrite(digitPin[0], LOW);
    digitalWrite(digitPin[1], LOW);
}

void loop()
{
    for (int i = 0; i < 100; i += 2)
    {
        display_N(i);
        delay(1);
    }
}

void display_N(int num)
{
    int und = num % 10;
    int dec = (num % 100) / 10;
    for (int i = 0; i < 100; i++)
    {
        segOutput(1, und, 1);
        segOutput(0, dec, 1);
        delay(2);
    }

    Serial.print(dec);
    Serial.println(und);
}

// LED
void segClear()
{
    for (int i = 0; i < 8; i++)
    {

```

```

        digitalWrite(segPin[i], HIGH);
    }
}
// LED
void segOutput(int d, int Number, int dp)
{
    segClear();
    digitalWrite(digitPin[d], HIGH);
    for (int i = 0; i < 7; i++)
    {
        digitalWrite(segPin[i], segValue[Number][i]);
    }
    digitalWrite(segPin[7], dp);
    delayMicroseconds(1000);
    digitalWrite(digitPin[d], LOW);
}

```

Circuit design 106119100 Lab7-q1 - x Circuit design 106119100 Lab7-q1 - x New Tab

https://www.tinkercad.com/things/3kE0WcmLRn-106119100-lab7-q1-ii/editel

106119100 Lab7-q1-(ii) All changes saved Code Stop Simulation Send To

Simulator time: 00:00:02.774 1 (Arduino Uno R3)

```

1  /* 106119100 Rajneesh */
2
3  // a,b,c,d,e,f,g
4  byte segValue[10][7] = {
5      {0, 0, 0, 0, 0, 0, 1}, // 0
6      {1, 0, 0, 1, 1, 1, 1}, // 1
7      {0, 0, 1, 0, 0, 1, 0}, // 2
8      {0, 0, 0, 0, 1, 1, 0}, // 3
9      {1, 0, 0, 1, 1, 0, 0}, // 4
10     {0, 1, 0, 0, 1, 0, 0}, // 5
11     {0, 1, 0, 0, 0, 0, 0}, // 6
12     {0, 0, 0, 1, 1, 1, 1}, // 7
13     {0, 0, 0, 0, 0, 0, 0}, // 8
14     {0, 0, 0, 0, 1, 0, 0}, // 9
15 };
16
17 byte segPin[8] = {12, 13, 4, 6, 7, 10, 9, 3}; // {a,b,c,d,e,f,g,dp}
18 byte digitPin[2] = {A1, A2}; // segment
19
20 void setup()
21 {
22     for (int i = 0; i < 10; i++)
23     {
24         pinMode(segPin[i], OUTPUT);
25     }
26     pinMode(digitPin[0], OUTPUT);
27     pinMode(digitPin[1], OUTPUT);
28     digitalWrite(digitPin[0], LOW);
29     digitalWrite(digitPin[1], LOW);
30 }
31
32 void loop()
33 {
34     for (int i = 0; i < 100; i+=2)
35

```

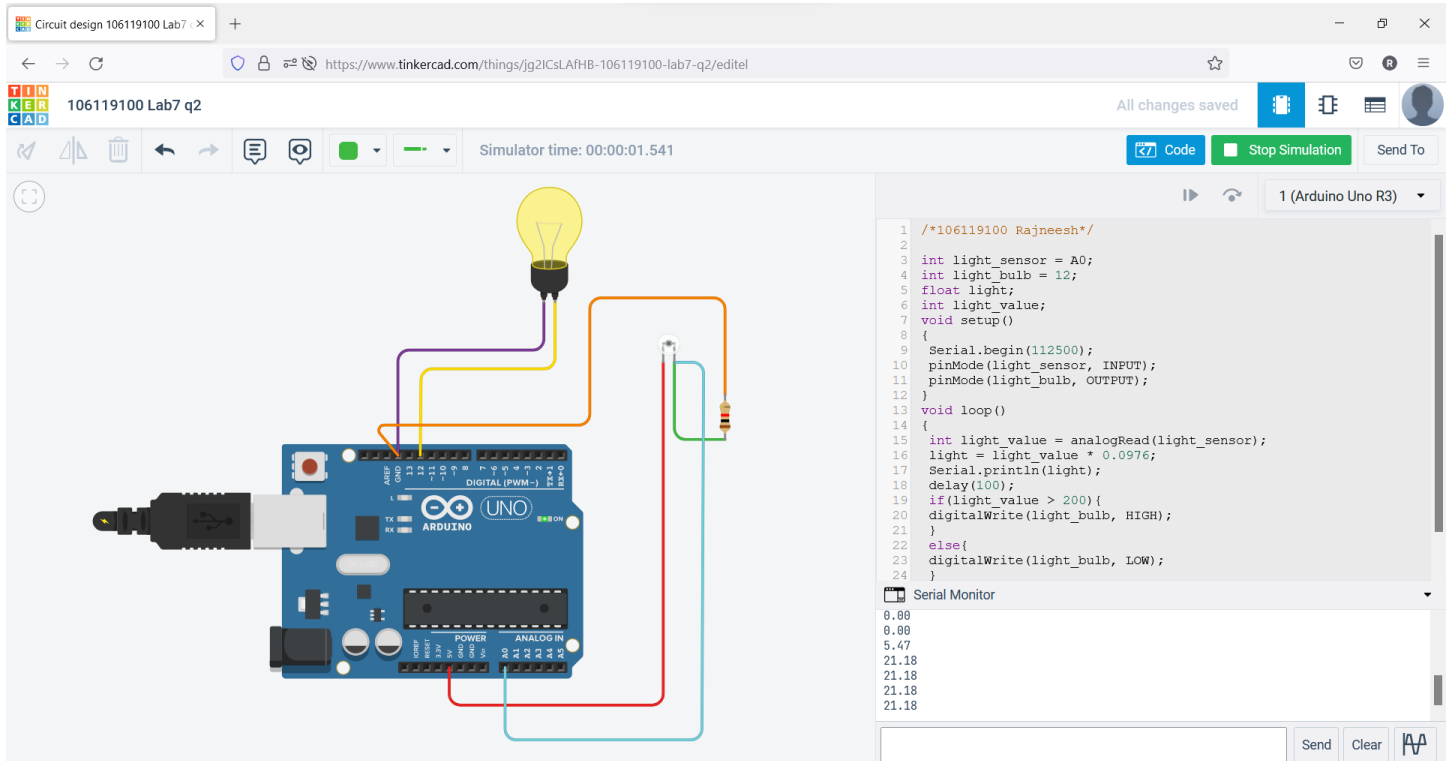
Serial Monitor

2. Interface the ambient light sensor with Arduino Uno board. Check the light value from the sensor and switch on/off the bulb (based on the threshold value).

Link : https://www.tinkercad.com/things/jg2ICsLAfHB-106119100-lab7-q2/editel?sharecode=_vwvrcA1bRGyAOu6DKauWFbLLU_nXI52jxm7Bgp3pDs

```
/*106119100 Rajneesh*/

int light_sensor = A0;
int light_bulb = 12;
float light;
int light_value;
void setup()
{
    Serial.begin(115200);
    pinMode(light_sensor, INPUT);
    pinMode(light_bulb, OUTPUT);
}
void loop()
{
    int light_value = analogRead(light_sensor);
    light = light_value * 0.0076;
    Serial.println(light);
    delay(100);
    if (light_value > 200)
    {
        digitalWrite(light_bulb, HIGH);
    }
    else
    {
        digitalWrite(light_bulb, LOW);
    }
}
```

Link : https://www.tinkercad.com/things/2VPQyAckkix-106119100-lab7-q3/editel?sharecode=vT98EZ_41leVnMoweOEe_bxhC3n9emomRhB9PTTwzB8

```
/*106119100 Rajneesh*/
```

```
int baselineTemp = 0;
int celsius = 0;
int fahrenheit = 0;
int buzzer = 7;
```

```

int MQ2pin = A2;
const int TEMP_THRESHOLD = 40, SMOKE_THRESHOLD = 300;

void setup()
{
    pinMode(A0, INPUT);
    Serial.begin(9600);

    pinMode(2, OUTPUT);
    pinMode(buzzer, OUTPUT);
}

void loop()
{
    float sensorValue = analogRead(MQ2pin);

    celsius = map((analogRead(A0) - 20) * 3.04, 0, 1023, -40, 125);

    fahrenheit = ((celsius * 9) / 5 + 32);
    Serial.print(celsius);
    Serial.print(" C, ");
    Serial.print(fahrenheit);
    Serial.println(" F");

    if (celsius >= TEMP_THRESHOLD && sensorValue >= SMOKE_THRESHOLD)
    {
        digitalWrite(2, HIGH);
        digitalWrite(buzzer, HIGH);
        delay(500);
        digitalWrite(buzzer, LOW);
        delay(500);
    }
    else
    {
        digitalWrite(2, LOW);
        delay(1000);
    }
}

```



Circuit design 106119100 Lab7-q3 x

Circuit design Copy of lab7-q3 x

MUTED

https://www.tinkercad.com/things/2VPQyAckkix-copy-of-lab7-q3/editel?tenant=circuits

106119100 Lab7-q3

All changes saved

Code

Stop Simulation

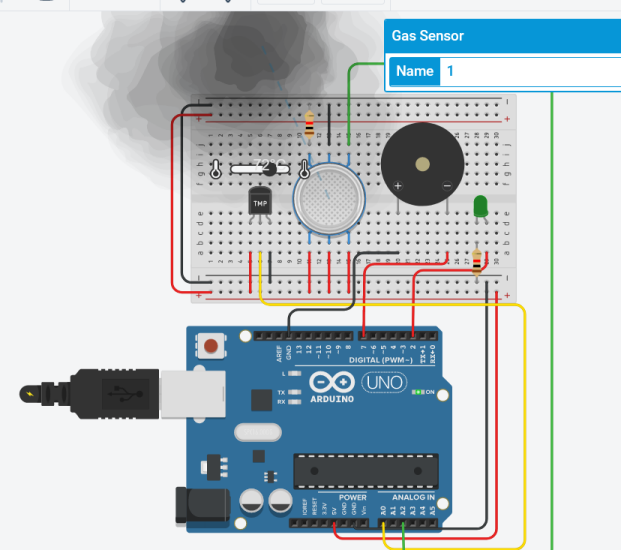
Send To

Simulator time: 00:00:21.221

1 (Arduino Uno R3)

Gas Sensor

Name 1



```
19 void loop()
20 {
21   float sensorValue = analogRead(MQ2pin);
22
23   celsius = map((analogRead(A0) - 20) * 3.04, 0, 1023, -40, 125);
24
25   fahrenheit = ((celsius * 9) / 5 + 32);
26   Serial.print(celsius);
27   Serial.print(" C, ");
28   Serial.print(fahrenheit);
29   Serial.println(" F");
30
31   if (celsius >= TEMP_THRESHOLD && sensorValue >= SMOKE_THRESHOLD)
32   {
33     digitalWrite(2, HIGH);
34     digitalWrite(buzzer, HIGH);
35     delay(500);
36     digitalWrite(buzzer, LOW);
37     delay(500);
38   }
39   else
40   {
41     digitalWrite(2, LOW);
42     delay(1000);
43   }
44 }
```

Serial Monitor

25 C, 77 F
25 C, 77 F
25 C, 77 F
25 C, 77 F
73 C, 163 F
73 C, 163 F
73 C, 163 F

Send Clear