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| Date : 11/04/2022 | | | | | | | |
|  | CSLR61 : EMBEDDED SYSTEMS  **LAB-7** | | | | | |  |
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|  | | |  |  | | | |
|  | | | Roll no.: 106119100Name: Rajneesh PandeySection: 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=S2PmChnLRfuHzxZiJLKlSQm57T-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);

}

Graphical user interface, diagram

Description automatically generated

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);

}

Graphical user interface

Description automatically generated

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(112500);

    pinMode(light\_sensor, INPUT);

    pinMode(light\_bulb, OUTPUT);

}

void loop()

{

    int light\_value = analogRead(light\_sensor);

    light = light\_value \* 0.0976;

    Serial.println(light);

    delay(100);

    if (light\_value > 200)

    {

        digitalWrite(light\_bulb, HIGH);

    }

    else

    {

        digitalWrite(light\_bulb, LOW);

    }

}

Graphical user interface, diagram

Description automatically generated

3. Interface the temperature and gas sensor with Arduino Uno board. Check the temperature and the gas value, if the limit is beyond the threshold, switch on the bulb and make alarm using buzzer.

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);

    }

}

Graphical user interface, application

Description automatically generated