1 . AIM: Distance Measurement Using an Ultrasonic Sensor with Arduino Tinkercad:

Code:

```
//MAYANK
int trigPin = 9;  int
echoPin = 10; int  buzzerPin = 8;
void setup() {
 pinMode(trigPin, OUTPUT);
 pinMode(echoPin, INPUT);
 pinMode(buzzerPin, OUTPUT);

 Serial.begin(9600);
}
void loop() {
    long duration;  int distance;
  digitalWrite(trigPin, LOW);
   delay Microseconds(2);
  digitalWrite(trigPin, HIGH);
  delayMicroseconds(10);
  digitalWrite(trigPin, LOW);
  duration = pulseIn(echoPin, HIGH);
  distance = duration * 0.034 / 2;
  Serial.println(distance);

 if (distance < 28) {

    digitalWrite(buzzerPin, HIGH);}
  else {
    digitalWrite(buzzerPin, LOW);}
    delay(500);
}
```
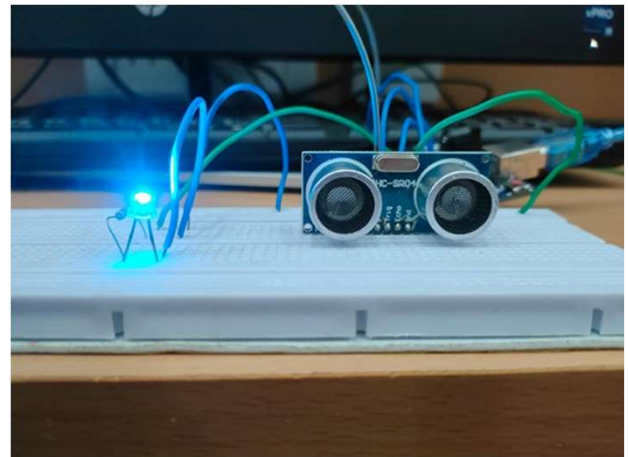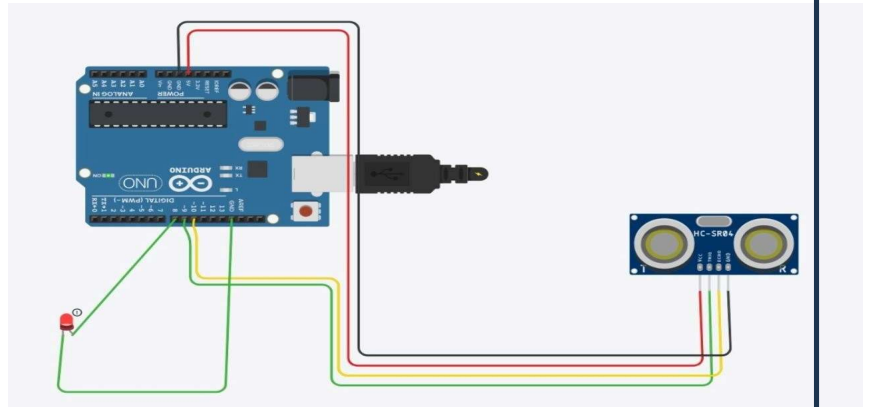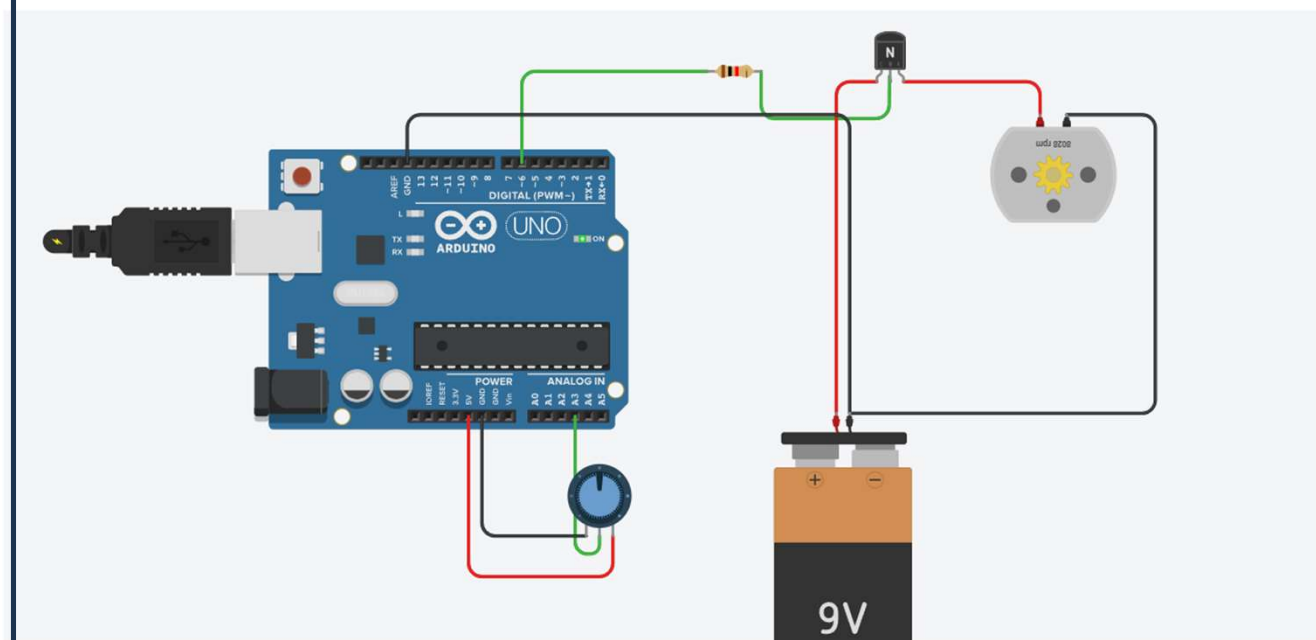
2. To interface a DC motor and to write a program to control its speed.

CODE

```
const int poten = A3;
    int var;

void setup()
{
  pinMode(6, OUTPUT);
}

void loop()
{
  var = analogRead(poten);
  analogWrite(6,var);

}
```

3. Aim: To display a sequence of numbers from 0 to 9 on a 7segment display with Arduino Tinkercad:
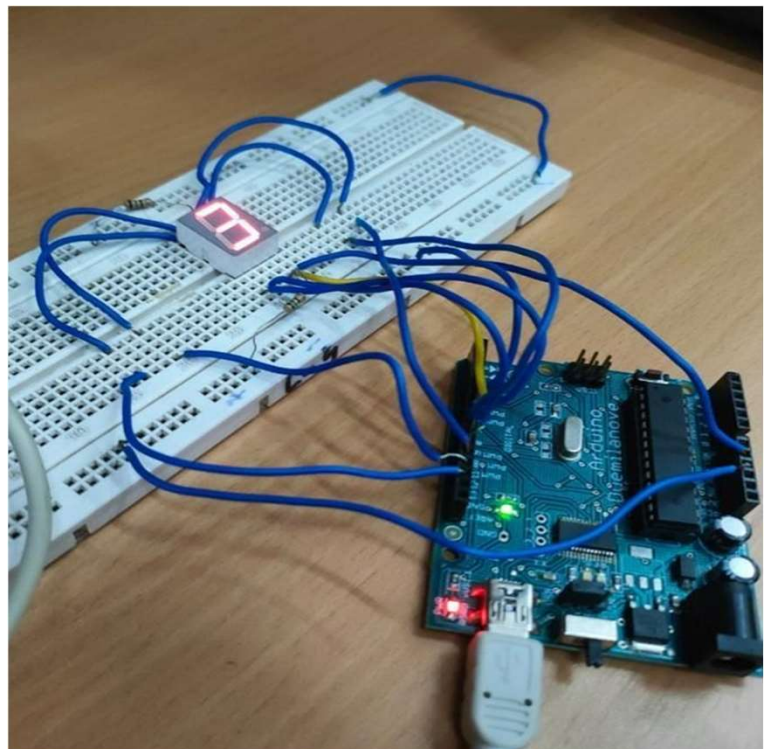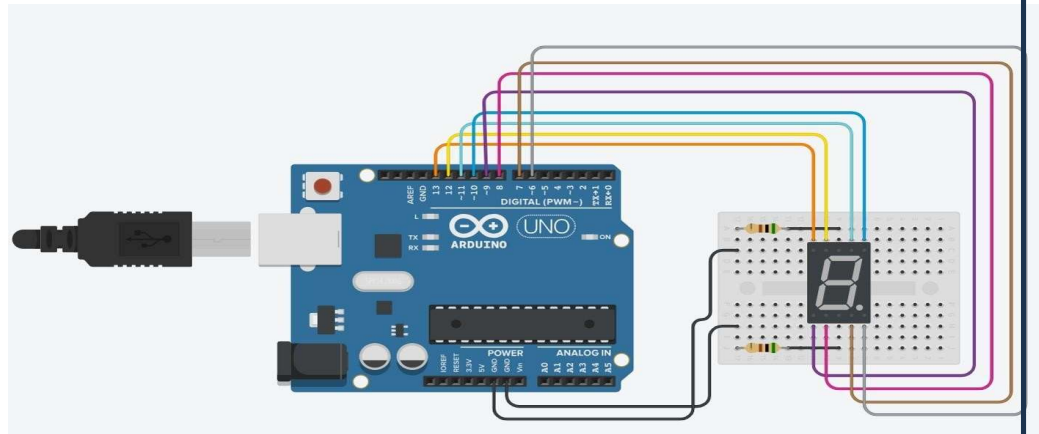
Code:

```
// MAYANK

int segPins[8] = {A, B, C, D, E, F, G, DP};

byte mapping[11][8] = {
  {0, 1, 1, 1, 1, 1, 1, 0},
  {1, 0, 1, 1, 0, 0, 0, 0},
  {2, 1, 1, 0, 1, 1, 0, 1},
  {3, 1, 1, 1, 1, 0, 0, 1},
  {4, 0, 1, 1, 0, 0, 1, 1},
  {5, 1, 0, 1, 1, 0, 1, 1},
  {6, 1, 0, 1, 1, 1, 1, 1},
  {7, 1, 1, 1, 0, 0, 0, 0},
  {8, 1, 1, 1, 1, 1, 1, 1},
  {9, 1, 1, 1, 1, 0, 1, 1},
  {'A', 1, 1, 1, 0, 1, 1, 1}
};

void setup() {
  pinMode(A, OUTPUT);
  pinMode(B, OUTPUT);
  pinMode(C, OUTPUT);
  pinMode(D, OUTPUT);
  pinMode(E, OUTPUT);
  pinMode(F, OUTPUT);
  pinMode(G, OUTPUT);
  pinMode(DP, OUTPUT);
}

void loop() {
  /*
  for(int i = 0; i < 10; i++) {
    displayNum(i);
    delay(1000);
  }
  */
  displayChar('A');
  delay(50);
}

void displayChar(byte num) {
  for (int i = 0; i < 11; i++) {
    if (mapping[i][0] == num) {
      int idx = 1;
      for (int j = 0; j < 8; j++) {
        digitalWrite(segPins[j], mapping[i][idx]);
        idx++;
      }
      break;
    }
  }
}
```

4. Temperature Monitoring using an Arduino and a Temperature Sensor LED

Code:
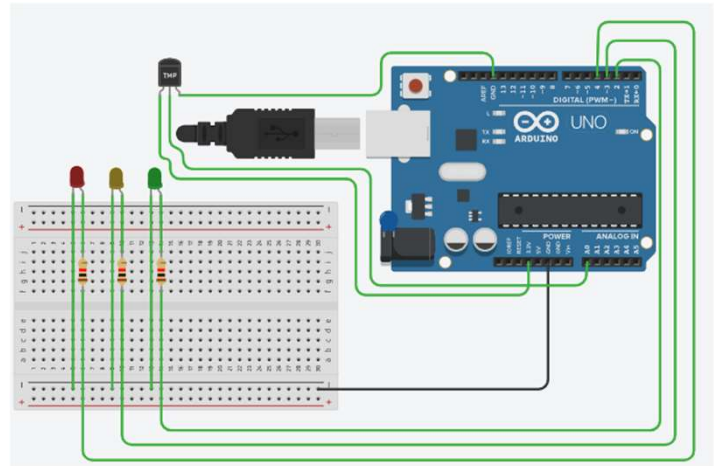
```
int baselineTemp = 0;

int celsius = 0;

int fahrenheit = 0;


void setup()

{

  pinMode(A0, INPUT);

  Serial.begin(9600);

  pinMode(2, OUTPUT);

  pinMode(3, OUTPUT);

  pinMode(4, OUTPUT);

}

void loop()

{

  digitalWrite(2, LOW);

  digitalWrite(3, LOW);

  digitalWrite(4, LOW);


  baselineTemp = 40;

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

  if (celsius < baselineTemp)

  {

    digitalWrite(2, HIGH);

  }

  else if (celsius >= baselineTemp + 20 && celsius <= baselineTemp + 40)

  {

    digitalWrite(3, HIGH);

  }

  else if (celsius >= baselineTemp + 40)

  {

    digitalWrite(4, HIGH);

  }

}
```
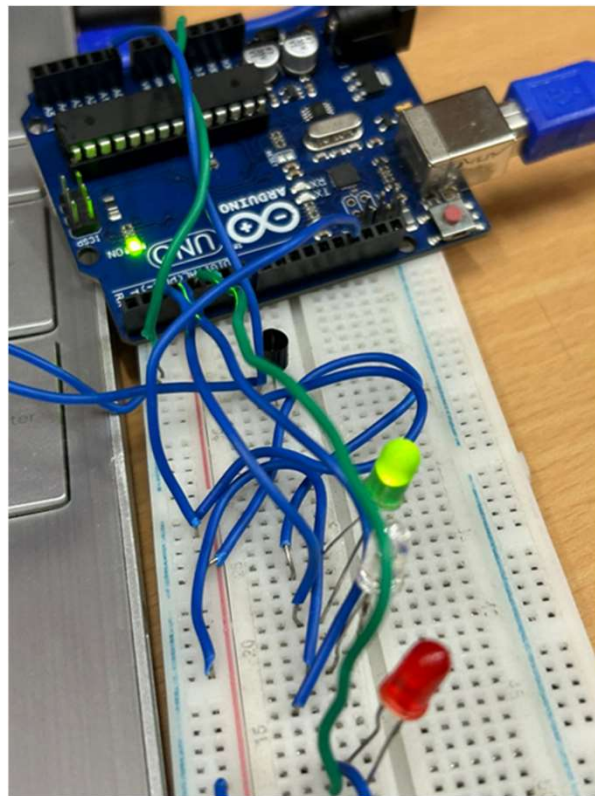
Ouput:

Output   Serial Monitor ✕

Not connected. Select a board and a port to connect automatically.

11:52:59.994 -> 27 C, 80 F
11:53:00.996 -> 27 C, 80 F
11:53:02.011 -> 27 C, 80 F
11:53:03.003 -> 25 C, 77 F
11:53:04.005 -> 26 C, 78 F
11:53:05.017 -> 27 C, 80 F
11:53:06.051 -> 25 C, 77 F
11:53:07.014 -> 27 C, 80 F
11:53:08.017 -> 27 C, 80 F
11:53:09.020 -> 27 C, 80 F
11:53:10.047 -> 27 C, 80 F
11:53:11.065 -> 27 C, 80 F
11:53:12.063 -> 26 C, 78 F
11:53:13.032 -> 27 C, 80 F
11:53:14.066 -> 25 C, 77 F
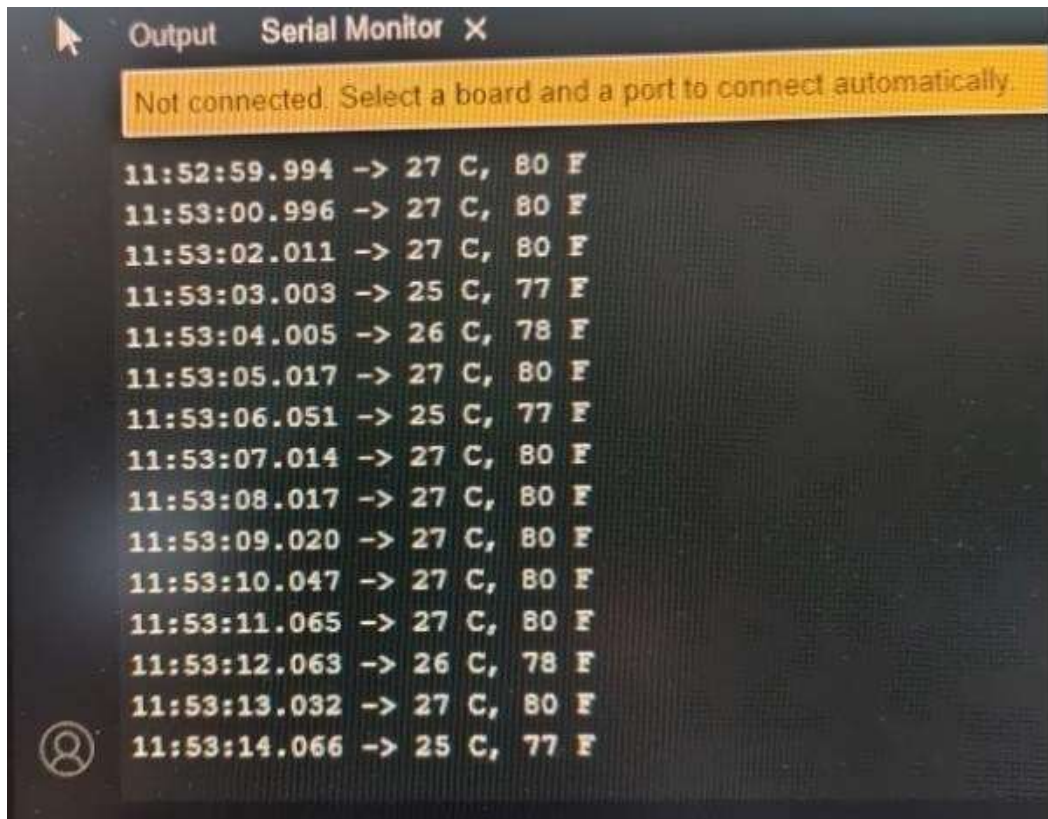
5. Aim: RGB light Control using Arduino
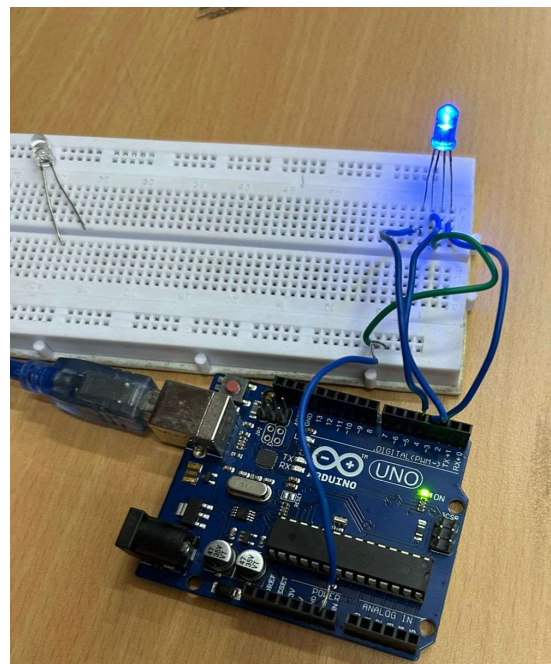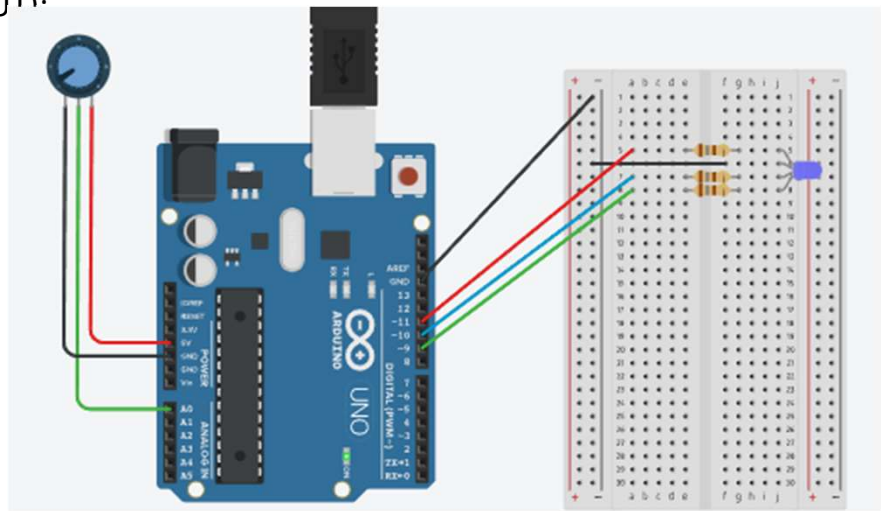
CODE

```
int pt = 0;

void setup()
{
  pinMode(A0, INPUT);
  Serial.begin(9600);
  pinMode(11, OUTPUT);
  pinMode(10, OUTPUT);
  pinMode(9, OUTPUT);
  pinMode(LED_BUILTIN, OUTPUT);
}

void loop()
{
  pt = analogRead(A0);
  Serial.println(pt);
  if (pt > 680) {
    analogWrite(11, 255);
    analogWrite(10, 0);
    analogWrite(9, 0);
  }
  if (pt < 340) {
    analogWrite(11, 51);
    analogWrite(10, 255);
    analogWrite(9, 51);
  }
  if (pt >= 340 && pt <= 680) {
    analogWrite(11, 51);
    analogWrite(10, 51);
    analogWrite(9, 255);
  }

  digitalWrite(LED_BUILTIN, HIGH);
  delay(1000); // Wait for 1000 millisecond(s)
  digitalWrite(LED_BUILTIN, LOW);
  delay(1000); // Wait for 1000 millisecond(s)
}
```

6. To interface a 4x4 Keypad/push button keys with I/O pins of AVR microcontroller. Write a program to display the decimal number format on 7-segment LED

CODE----------

```
void setup()
{
  for(int i = 2;i<=17;i++)
  {
    if(i<=5)
    {
      pinMode(i,INPUT_PULLUP);
    }
    else
    {
      pinMode(i,OUTPUT);
      digitalWrite(i,1);
    }
  }
  Serial.begin(9600);
}
int c1[10][7] =
{{0,0,0,0,0,0,1},{1,0,0,1,1,1,1},{0,0,1,0,0,1,0},{0,0,0,0,1,1,0},{1,0,0,1,1,0,0},{0,1,0,0,1,0,0},{0,1,0,0,0,0,0},{0,0,
0,1,1,0,1},{0,0,0,0,0,0,0},{0,0,0,1,1,0,0}};
int tlacitka[4][4] = {{1,2,3,10},{4,5,6,11},{7,8,9,12},{13,0,14,15}};
int konecna = 0;
void loop()
{
  for(int i = 6;i<=9;i++)
  {
    digitalWrite(i,0);
    for(int u = 2;u<=5;u++)
    {
              if(digitalRead(u) == 0)
      {
        if(konecna != tlacitka[i-6][u-2])
        {
          konecna = tlacitka[i-6][u-2];
          Serial.print(tlacitka[i-6][u-2]);
        }
      }
    }
    digitalWrite(i,1);
  }

  digitalWrite(17,1);
  for(int i = 10;i<=16;i++)
  {
    digitalWrite(i,c1[konecna][i-10]);
  }
}
```
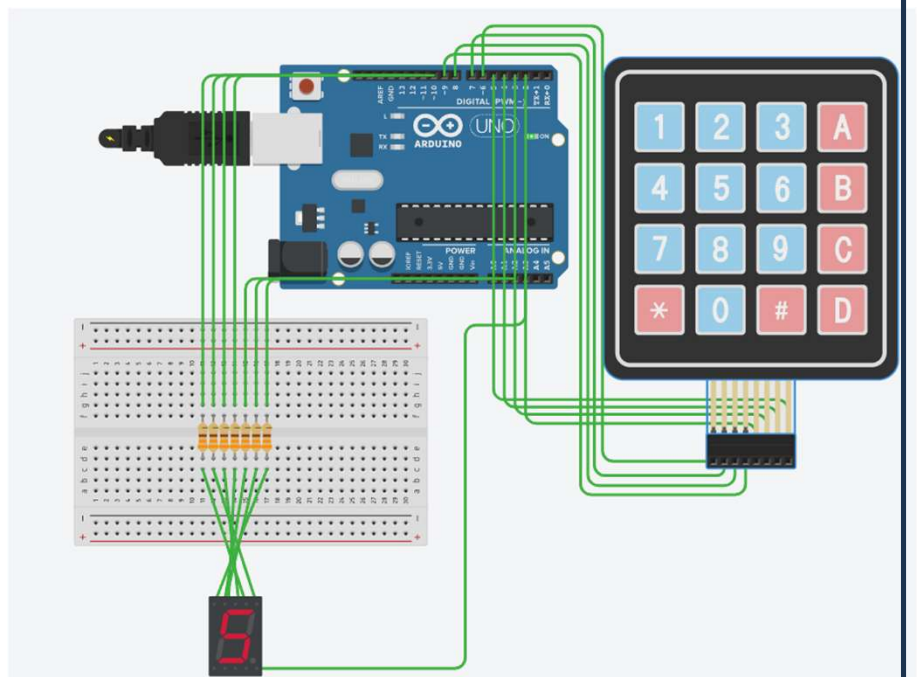
7. Write a program to display the dc input voltage on an output device (LED array / 7-segment LED / LCD / Serial Monitor).

CODE--

```
#include <LiquidCrystal.h>
LiquidCrystal lcd(12, 11, 5, 4, 3, 2);
int analogInput = 0;
float vout = 0.0;
float vin = 0.0;
float R1 = 100000.0; // resistance of R1 (100K)
float R2 = 10000.0; // resistance of R2 (10K)
int value = 0;
void setup() {
  Serial.begin(9600);
  pinMode(analogInput, INPUT);
  lcd.begin(16, 2);
  lcd.setCursor(2, 0);
  lcd.print("DC VOLTMETER");
  lcd.setCursor(0, 1);
  lcd.print("");
  delay(3000);
  lcd.clear();

}
void loop() {
  lcd.print("Voltage input VR");
  // read the value at analog input
  value = analogRead(analogInput);
  vout = (value * 5) / 1024.0;
  vin = (vout / (R2 / (R1 + R2)));

  Serial.println(vin);
  lcd.setCursor(0, 1);
  lcd.print("Vin = ");
  if(vin<0.00)
  {
    lcd.print("-");
    lcd.print(vin);
  }
  else
    lcd.print(vin);
  lcd.print(" V");
  delay(800);
  lcd.clear();
}
```