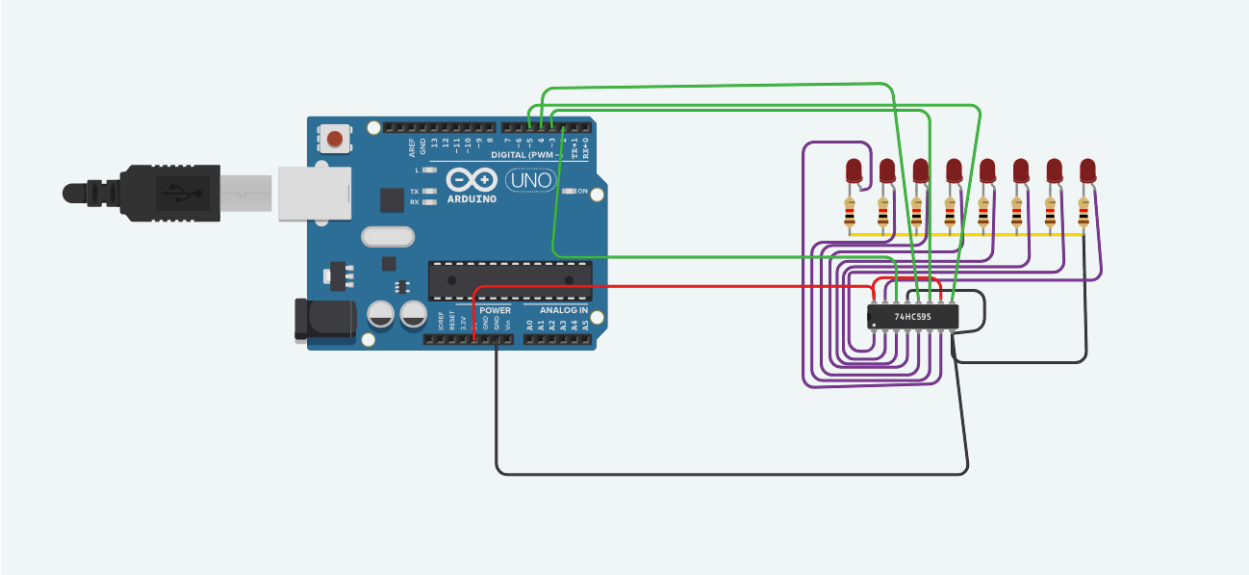
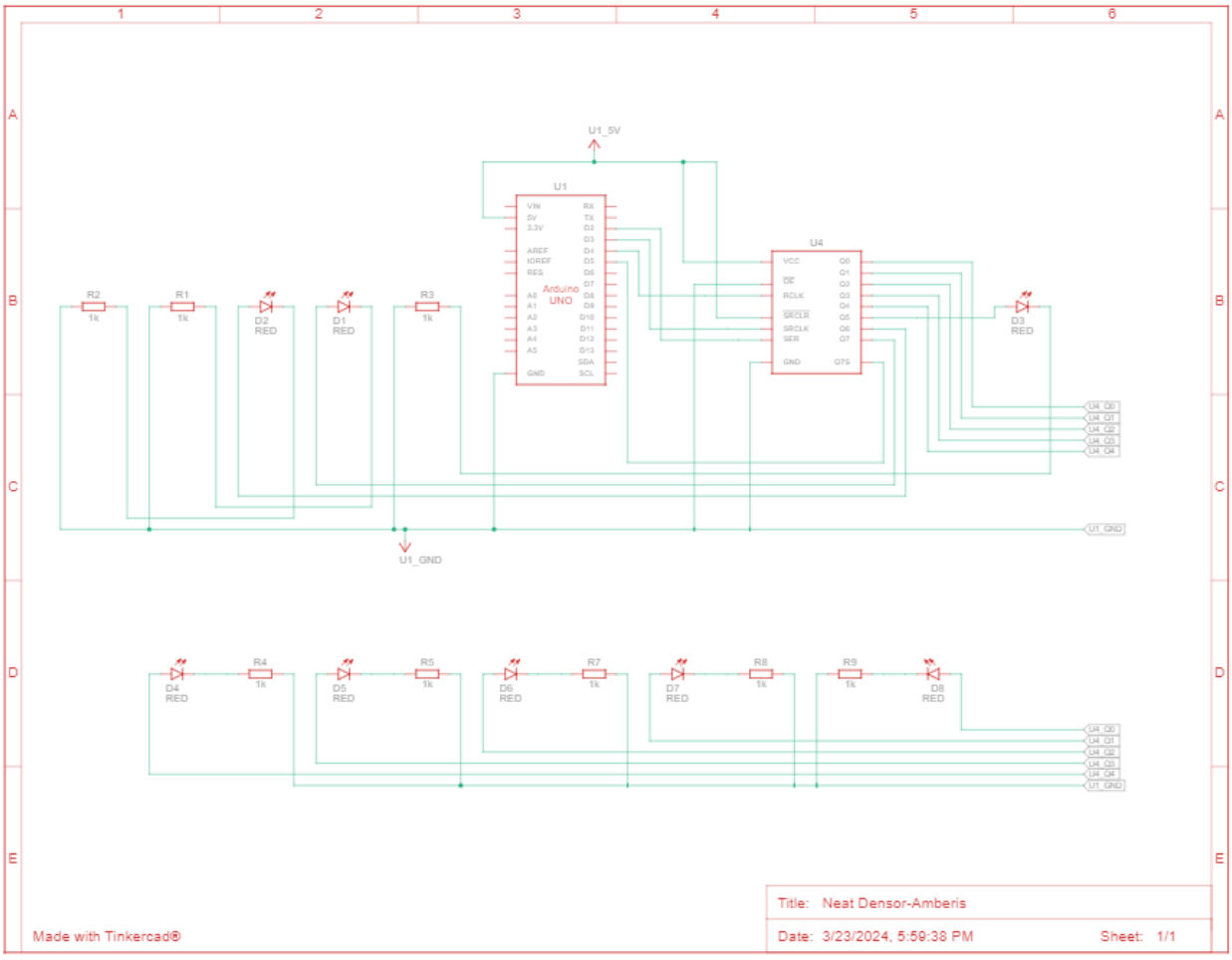
TinkerCad Simulation:



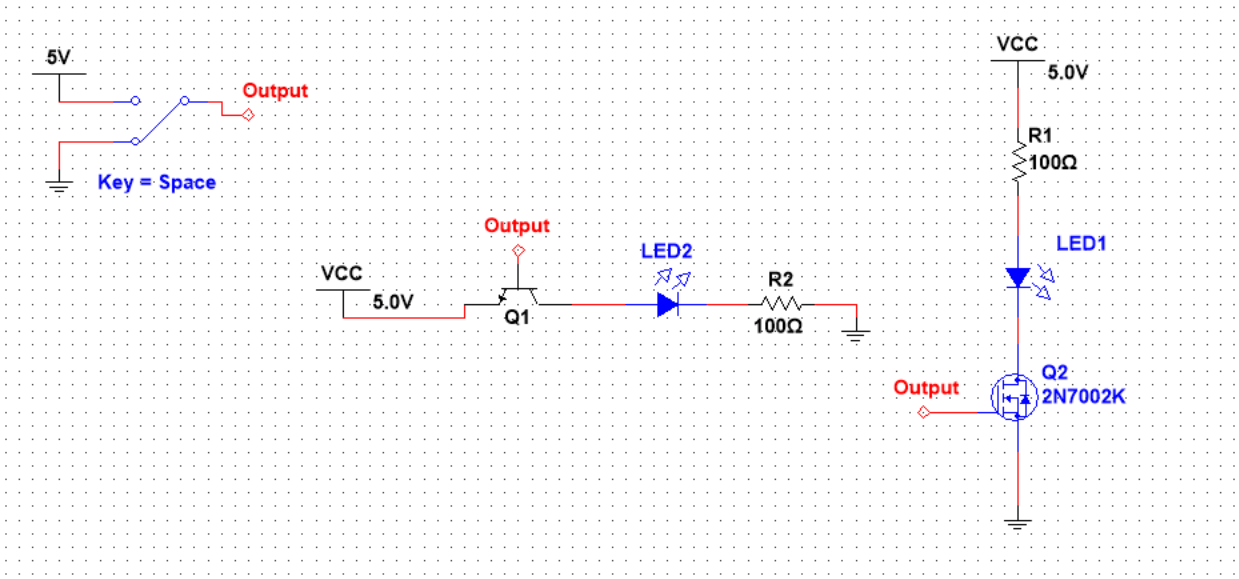

```
// Arduino code

int stcp_pin = 4;
int shcp_pin = 3;
int ds_pin = 2;
int Load = 5;

void setup()
{
  Serial.begin(9600);
  pinMode(stcp_pin, OUTPUT);
  pinMode(shcp_pin, OUTPUT);
  pinMode(ds_pin, OUTPUT);
  pinMode(Load, INPUT);

}

void loop()
{
  digitalWrite(stcp_pin, LOW);
  shiftOut(ds_pin, shcp_pin, MSBFIRST,0B00001000);
  int Output = digitalRead(Load);
  Serial.println(Output);
  digitalWrite(stcp_pin, HIGH);
  delay(500);
}
```

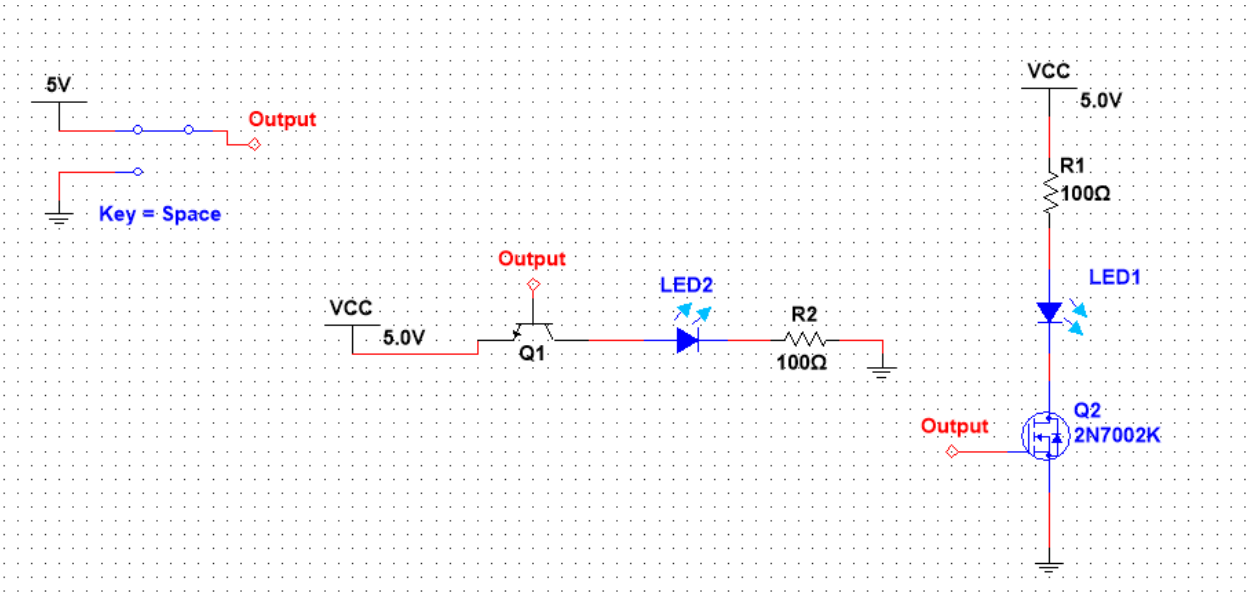



```ino
int stcp_pin = 4;
int shcp_pin = 3;
int ds_pin = 2;
int Load = 5;

void setup() {
  Serial.begin(9600);
  pinMode(stcp_pin, OUTPUT);
  pinMode(shcp_pin, OUTPUT);
  pinMode(ds_pin, OUTPUT);
  pinMode(Load, OUTPUT); // Corrected to OUTPUT
}

void loop() {
  // Send data to shift register
  digitalWrite(Load, LOW); // Ensure Load is LOW before shifting data
  shiftOutTeensy(ds_pin, shcp_pin, MSBFIRST, 0B00001000); // Send data
  digitalWrite(Load, HIGH); // Latch data into the shift register
```

```
  // Check output (assuming Load goes HIGH after data latched)
  int Output = digitalRead(Load);
  Serial.println(Output);

  delay(500);
}

// Manual implementation of shiftOut for Teensy
void shiftOutTeensy(uint8_t dataPin, uint8_t clockPin, uint8_t bitOrder, uint8_t
val) {
  uint8_t i;

  for (i = 0; i < 8; i++)  {
    if (bitOrder == MSBFIRST)
      digitalWrite(dataPin, !!(val & (1 << (7 - i))));
    else
      digitalWrite(dataPin, !!(val & (1 << i)));

    digitalWrite(clockPin, HIGH);
    digitalWrite(clockPin, LOW);
  }
}
```

Multisim Simulation:





Components:

- 8 bit shift register. (74HC164 or 74HC595).

- Mosfet (nmos - 2n7002k).
- LEDs.
- Resistors.
- Microcontroller.
- Check current to GND.
- BJT

Components Selection:

1) 8 bit Shift Register:

- Part Number: 74HC595D
- Description: 8 bit Shift Register , Serial to Parallel.
- Datasheet: Datasheet
- Voltage Supply: 2V - 6V.
- Output Voltage: 0 to Vcc.
- Vih = 5V, ViL = 0V.
- Vol = 0.1V , Voh = 4.9V.
- Quantity: 20.
- Output Current: 35mA (max.)

2) PIN Diode:

- Part Number: SMP1340-040LF
- Description: PIN Diodes.
- Datasheet: Datasheet
- Forward Voltage: Min. 0.85V
- Forward Current: 10mA

3) N-mos:

- Part Number: 2n7002k
- Description: N-Mosfet
- Datasheet: Datasheet
- Voltage rating: Drain to Source Voltage=60V
  Gate to Source Voltage=+-20V

4) LED:

- Part Number: 5973901830F
- Description: White LED Indication - Discrete 3.1V 0603 (1608 Metric)
- Datasheet: Datasheet
- Forward Current: 10mA, Forward Voltage: 3.1V.

5) Resistor:

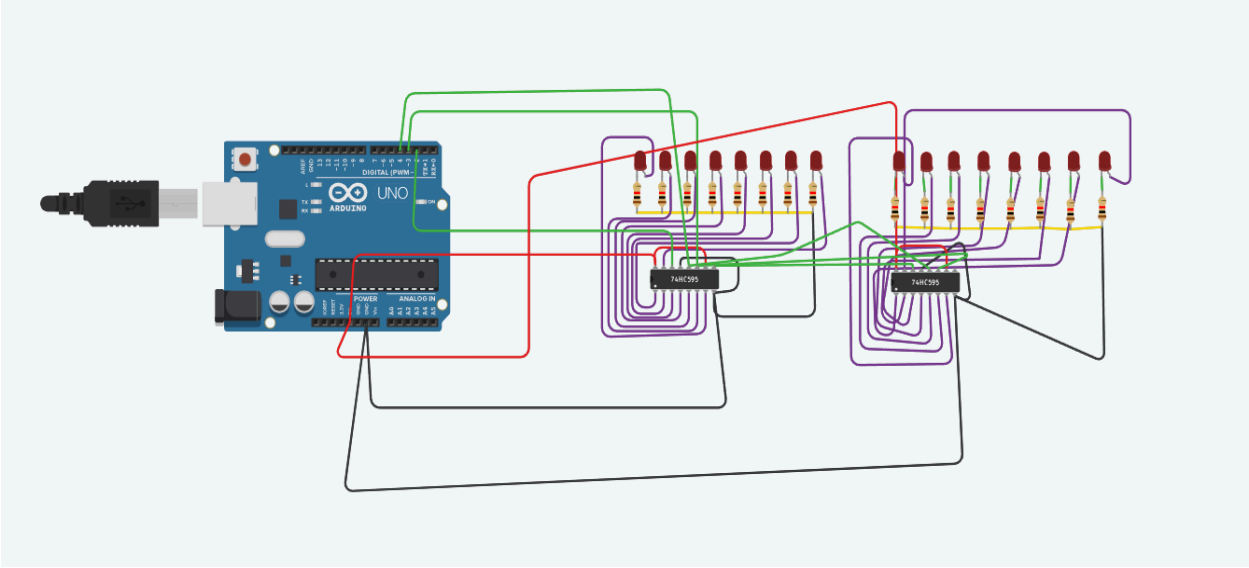
- Part Number: RC0603FR-07105RL
- Description: 105 ohms, 0.1W.
- Datasheet: Datasheet
- Power Rating: 0.1W.

6) 16 pin Connector:

- Part Number: 61201621621

7) Microcontroller:

- Arduino Nano.




```
// C++ code
//
```

```
int stcp_pin = 4;
int shcp_pin = 3;
int ds_pin = 2;
int Load = 5;

const byte byte1 = 0B10010010;
const byte byte2 = 0B11111111;

void setup()
{
  Serial.begin(9600);
  pinMode(stcp_pin, OUTPUT);
  pinMode(shcp_pin, OUTPUT);
  pinMode(ds_pin, OUTPUT);
  pinMode(Load, INPUT);

}

void loop()
{
  digitalWrite(stcp_pin, LOW);
  shiftOut(ds_pin, shcp_pin, MSBFIRST,byte2);
  shiftOut(ds_pin, shcp_pin, MSBFIRST,byte1);
  digitalWrite(stcp_pin, HIGH);
  delay(500);
}
```

LSBFIRST;
Q0, Q1, ….., Q6, Q7