PAMANTASAN NG LUNGSOD NG MAYNILA
(University of the City of Manila)
Intramuros, Manila

Microprocessor Lab

Laboratory Activity No. 2
Arduino and Tinkercad Interface

Score

Submitted by:
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Saturday 10:00 AM – 1:00 PM / CPE 0412.1-1 Microprocessors

Date Submitted
30-09-2023

Submitted to:

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I. Objectives

This laboratory activity aims to implement the principles and techniques of hardware programming using Arduino through:

- creating an Arduino programming and circuit diagram.

II. Method/s

- Perform a task problem given in the presentation.
- Write a code and perform an Arduino circuit diagram of a ring counter that display eight (8)LEDs starting from left.

III. Results

TinkerCad

Exercise 1: Write a code that does a ring counter display for eight (8) LEDs starting from left.

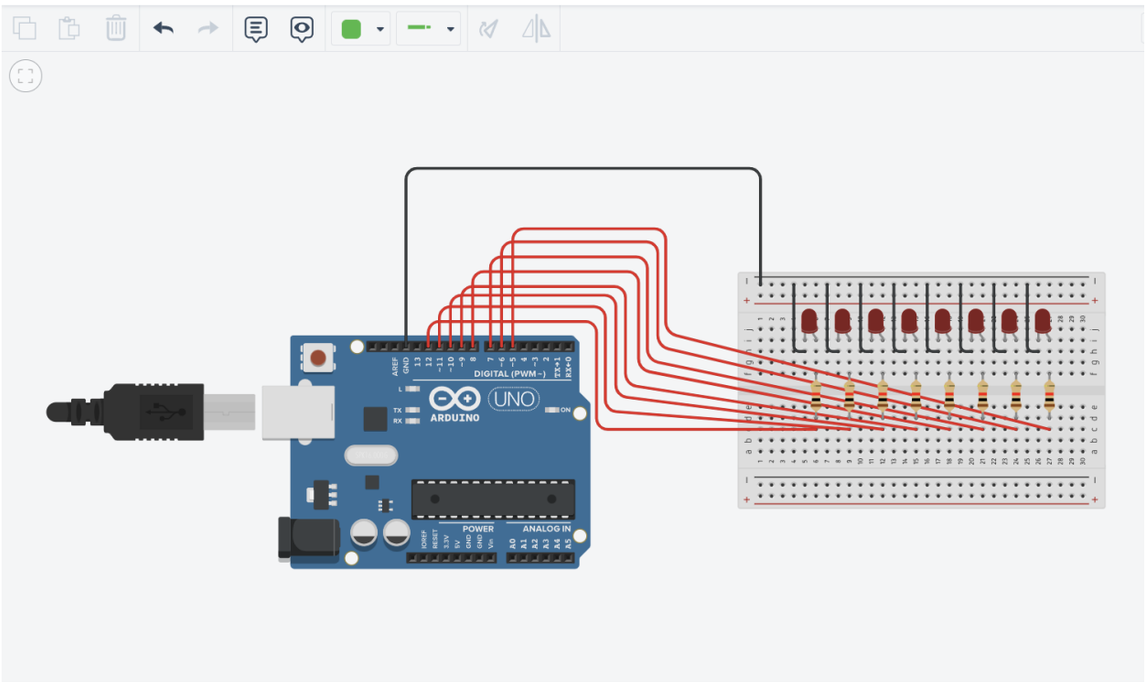
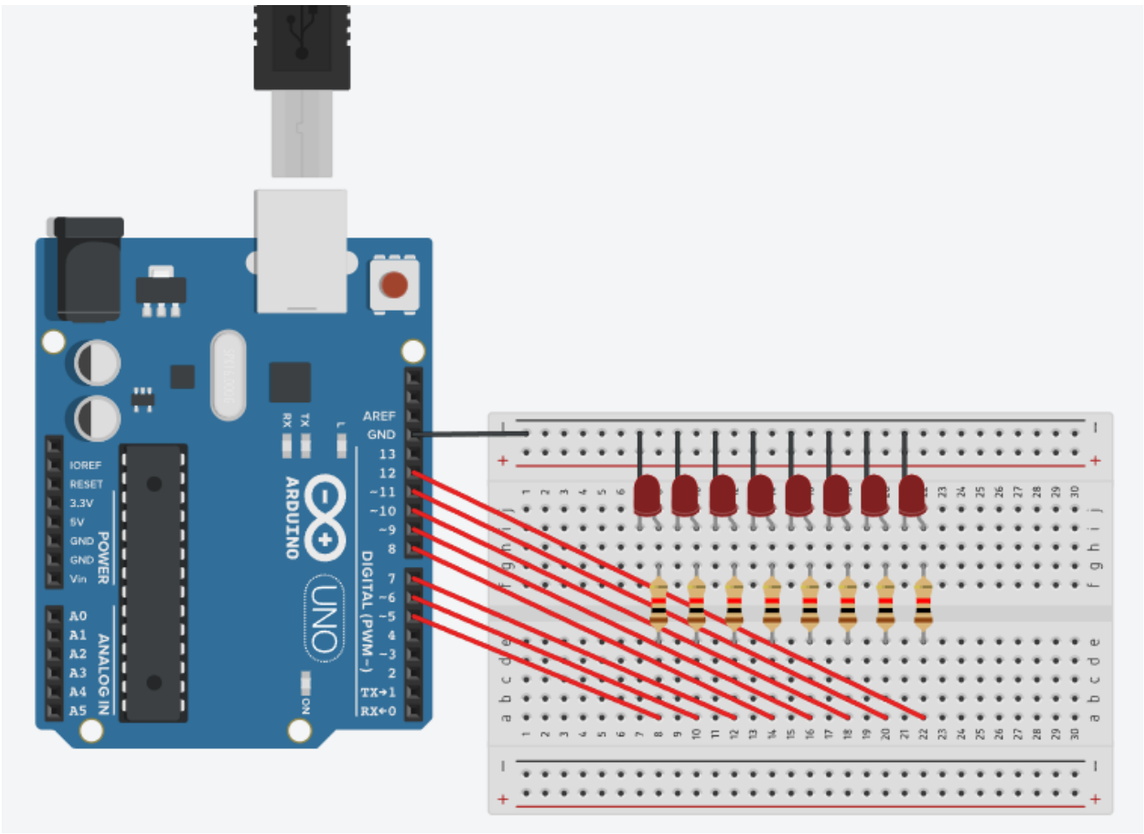


Figure No.1 Ring Counter Display Circuit Diagram

Components Used

1. 8 LEDs
2. Resistor
3. Breadboard

SETUP:


AREF
GND
13
12
~11
~10
~9
8
7
~6
~5
4
~3
2
TX→1
RX←0
DIGITAL (PWM~)
IOREF
RESET
3.3V
5V
GND
GND
Vin
POWER
A0
A1
A2
A3
A4
A5
ANALOG IN
ARDUINO
UNO
ON
TX
RX
L

CODE:

```
// C++ code
// Ring Counter Display for eight (8) LEDs starting from left
void setup()
{
  Serial.begin(9600);
  pinMode(5,OUTPUT);
  pinMode(6,OUTPUT);
  pinMode(7,OUTPUT);
  pinMode(8,OUTPUT);
  pinMode(9,OUTPUT);
  pinMode(10,OUTPUT);
  pinMode(11,OUTPUT);
  pinMode(12,OUTPUT);
}

void loop()
{
  digitalWrite(5, HIGH);
  Serial.println("Led1 is HIGH");
  delay(500);
  digitalWrite(5, LOW);
  Serial.println("Led1 is LOW");
  delay(500);

  digitalWrite(6, HIGH);
  Serial.println("Led2 is HIGH");
  delay(500);
  digitalWrite(6, LOW);
  Serial.println("Led2 is LOW");
  delay(500);

  digitalWrite(7, HIGH);
  Serial.println("Led3 is HIGH");
  delay(500);
  digitalWrite(7, LOW);
  Serial.println("Led3 is LOW");
  delay(500);

  digitalWrite(8, HIGH);
  Serial.println("Led4 is HIGH");
  delay(500);
  digitalWrite(8, LOW);
  Serial.println("Led4 is LOW");
  delay(500);

  digitalWrite(9, HIGH);
  Serial.println("Led5 is HIGH");
  delay(500);
  digitalWrite(9, LOW);
  Serial.println("Led5 is LOW");
  delay(500);

  digitalWrite(10, HIGH);
  Serial.println("Led6 is HIGH");
  delay(500);
  digitalWrite(10, LOW);
  Serial.println("Led6 is LOW");
  delay(500);

  digitalWrite(11, HIGH);
  Serial.println("Led7 is HIGH");
  delay(500);
  digitalWrite(11, LOW);
  Serial.println("Led7 is LOW");
  delay(500);

  digitalWrite(12, HIGH);
  Serial.println("Led8 is HIGH");
  delay(500);
  digitalWrite(12, LOW);
  Serial.println("Led8 is LOW");
  delay(500);
}
```

Result:

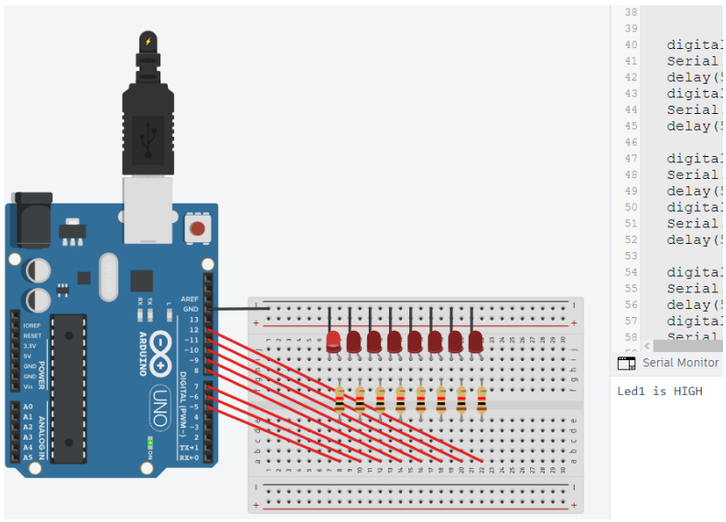


Figure 1. LED 1 On

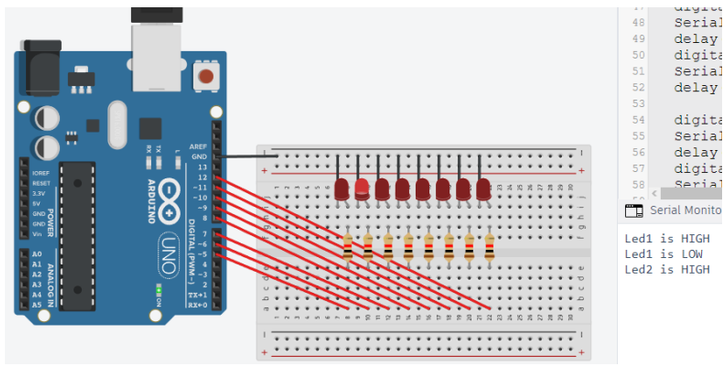


Figure 2. LED 2 On

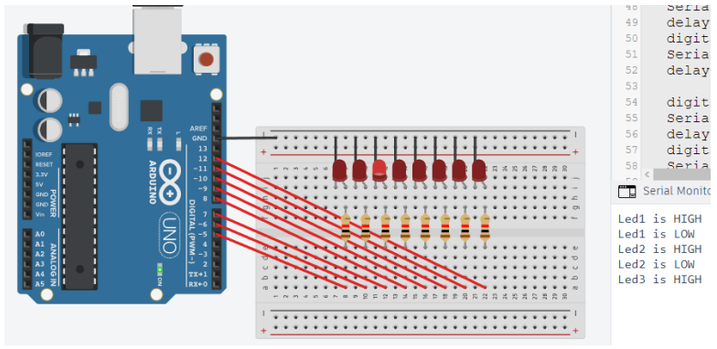


Figure 3. LED 3 On

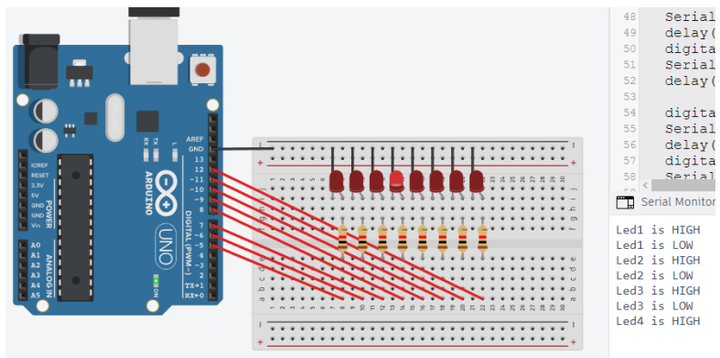


Figure 4. LED 4 On

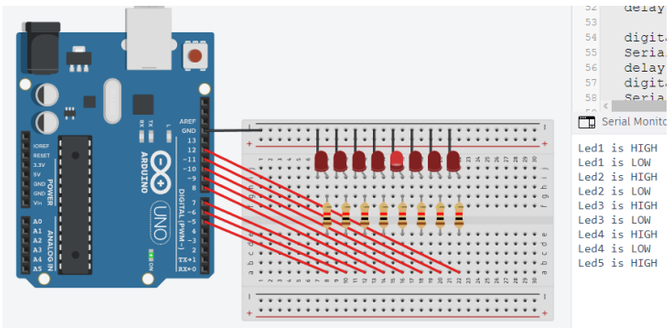


Figure 5. LED 5 On

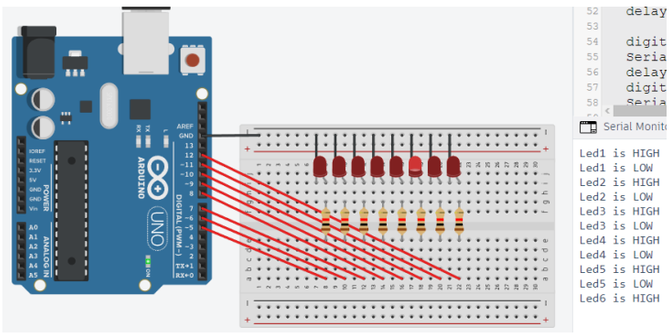


Figure 6. LED 6 On

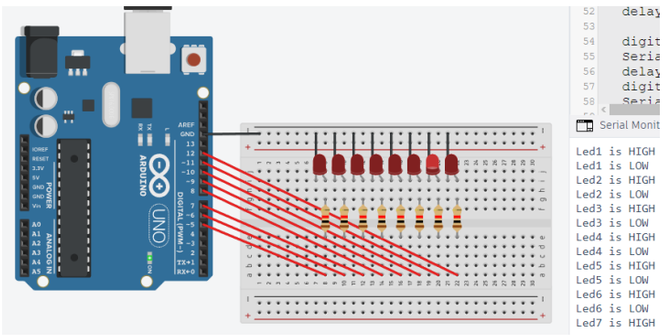


Figure 7. LED 7 On

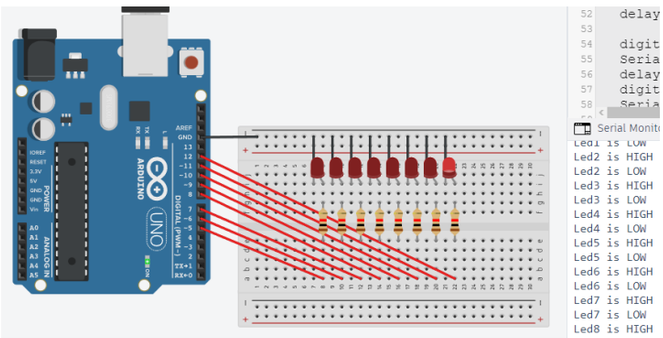


Figure 8. LED 8 On

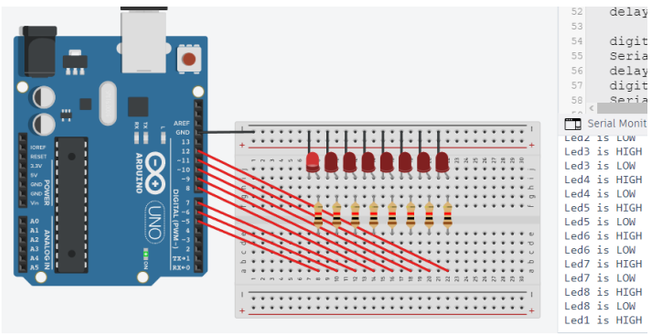


Figure 9. LED 1 On – Reset to LED 1

IV. Conclusion

This experiment shows the circuit of a Ring Counter that blinks one by one from left to right. A ring counter is a special type of counter that uses flip-flops to circulate a single 1 bit around a ring. The output of the last flip-flop is connected to the input of the first flip-flop, forming a closed loop.[1] This circuit made use of eight (8) Red LEDs and eight (8) 1k Ω resistors.

The use of delay is important in showing the process of making the LED blink one by one from left to right. By making the LED light up by digitalWrite(pinNumber,HIGH), then turning it off by digitalWrite(pinNumber,LOW), then placing a delay to turn off delay(500), then turning the next pin/LED on shows the activity of turning the LEDs on one by one. Setting-up the serial monitor is also important by writing Serial.begin(9600) in the set-up. In this activity, the use of serial monitor shows which LED is lighting up.

References

[1] Electrical4U. (2023, June 19). *Ring counter: A type of shift register counter*. https://www.electrical4u.com/ring-counter/