

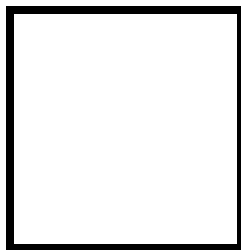


**PAMANTASAN NG LUNGSOD NG MAYNILA**  
(University of the City of Manila)  
Intramuros, Manila

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**Microprocessor Lab**

Laboratory Activity No. 2  
**Arduino and Tinkercad Interface**



Score

*Submitted by:*  
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**Saturday (1PM-4PM) / CPE 0412-2.1**

*Date Submitted*  
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*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

[https://www.tinkercad.com/things/ayqTlbH8x7L-amazing-lahdi-trug/editel?sharecode=hbr5Q5QKIcCnPSCVfw9L\\_UO9O3HnP00aI6pPscIoj\\_E](https://www.tinkercad.com/things/ayqTlbH8x7L-amazing-lahdi-trug/editel?sharecode=hbr5Q5QKIcCnPSCVfw9L_UO9O3HnP00aI6pPscIoj_E)

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

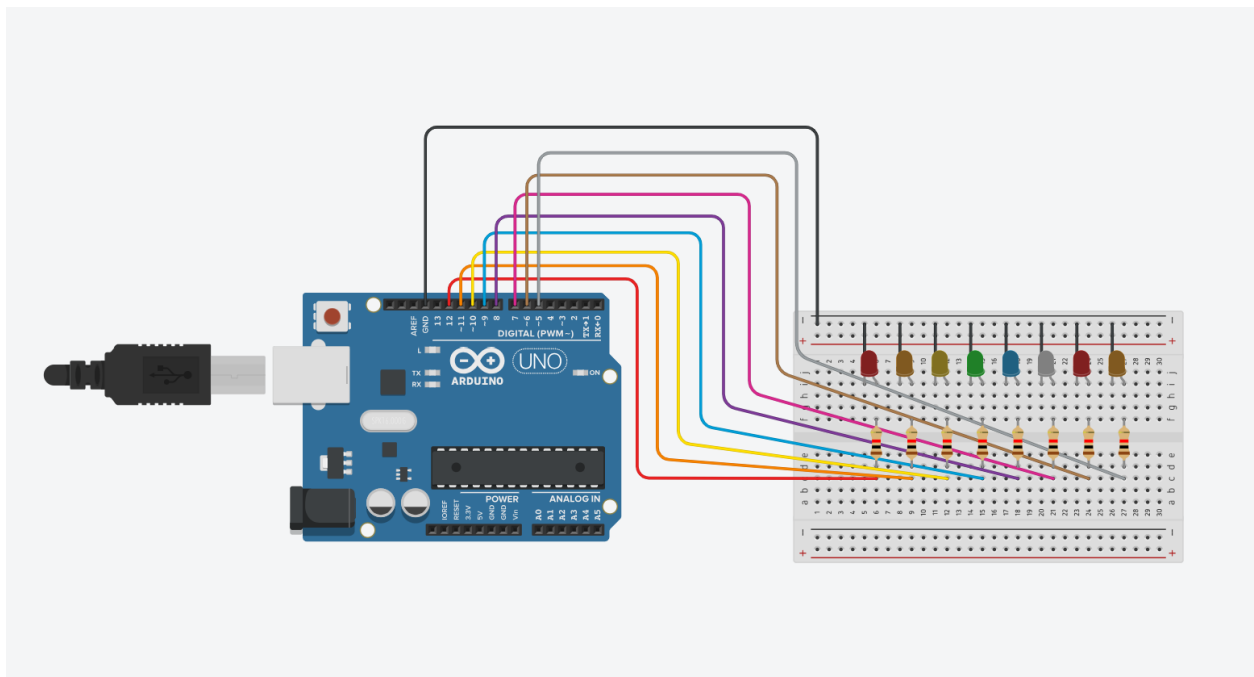


Figure No.1 Ring Counter Display Circuit Diagram

### Components Used

1. 8 LEDs
2. Resistor
3. Breadboard

## CODE:

```
// C++ code
// Ring counter display for eith (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(12, HIGH);
    delay(500);
    Serial.println("The LED1 is HIGH");
    digitalWrite(12, LOW);
    delay(500);
    Serial.println("The LED1 is LOW");

    digitalWrite(11, HIGH);
    delay(500);
    Serial.println("The LED2 is HIGH");
    digitalWrite(11, LOW);
    delay(500);
    Serial.println("The LED2 is LOW");

    digitalWrite(10, HIGH);
    delay(500);
    Serial.println("The LED3 is HIGH");
    digitalWrite(10, LOW);
    delay(500);
    Serial.println("The LED3 is LOW");

    digitalWrite(9, HIGH);
    delay(500);
    Serial.println("The LED4 is HIGH");
    digitalWrite(9, LOW);
    delay(500);
    Serial.println("The LED4 is LOW");

    digitalWrite(8, HIGH);
    delay(500);
    Serial.println("The LED5 is HIGH");
    digitalWrite(8, LOW);
    delay(500);
    Serial.println("The LED5 is LOW");

    digitalWrite(7, HIGH);
    delay(500);
    Serial.println("The LED6 is HIGH");
    digitalWrite(7, LOW);
```

```

delay(500);
Serial.println("The LED6 is LOW");

digitalWrite(6, HIGH);
delay(500);
Serial.println("The LED7 is HIGH");
digitalWrite(6, LOW);
delay(500);
Serial.println("The LED7 is LOW");

digitalWrite(5, HIGH);
delay(500);
Serial.println("The LED8 is HIGH");
digitalWrite(5, LOW);
delay(500);
Serial.println("The LED8 is LOW");
}

```

#### IV. Conclusion

*The conclusion expresses the summary of the whole laboratory report as perceived by the authors of the report.*

A ring counter is when the output of a shift register is looped back to its input, it forms a ring counter. This configuration allows the data stored in the shift register to circulate endlessly as long as clock pulses continue to be applied. In this laboratory exercise, we are able to make it easy to understand using only LEDs, resistors, a breadboard, an Arduino Uno R3, and jumping wires to show how ring counter works which is not as complicated as the meaning of it. With the help of TinkerCad, an online simulation software for circuitry I was able to do the provided circuit design and apply code to simulate it. The implemented code effectively creates a fundamental ring counter with 8 LEDs. The LEDs connected to pins 12, 11, 10, 9, 8, 7, 6, 5 illuminate sequentially, forming a circular pattern reminiscent of a ring counter effectively mimicking an 8-bit ring counter with LED lights.

## References

[1] D.J.D. Sayo. “University of the City of Manila Computer Engineering Department Honor Code,” PLM-CpE Departmental Policies, 2020.

[2] “Ring Counters | Shift Registers | Electronics Textbook,” *www.allaboutcircuits.com*. <https://www.allaboutcircuits.com/textbook/digital/chpt-12/ring-counters/>

[3] “Ring Counter in Digital Electronics - Javatpoint,” *www.javatpoint.com*. <https://www.javatpoint.com/ring-counter-in-digital-electronics>