



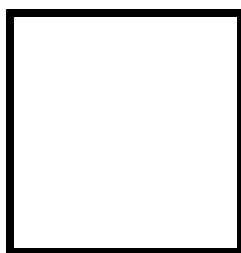
**PAMANTASAN NG LUNGSOD NG MAYNILA**  
(University of the City of Manila)  
Intramuros, Manila

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**Microprocessor Lab**

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



Score

*Submitted by:*  
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**10:00am-1:00pm / CPE 0412.1-1**

*Date Submitted*  
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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.**

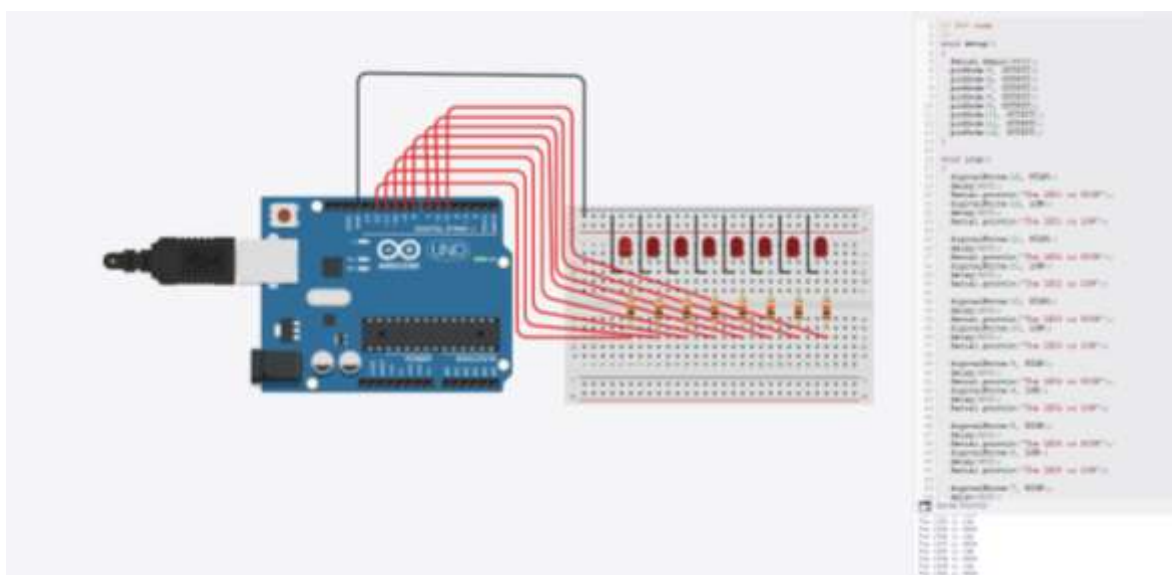


Figure No.1 Ring Counter Display Circuit Diagram

### Components Used

1. 8 LEDs
2. Resistor
3. Breadboard

**CODE:**

```
// C++ code
//
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

*In summary, the laboratory exercise had the primary objective of applying principles and techniques of hardware programming using Arduino, specifically to create an eight-LED ring counter display. The primary aim was to illuminate the LEDs sequentially, one after another. We can confidently state that the activity successfully achieved this goal.*

*After developing and executing the Arduino code and setting up the corresponding circuit, we observed the LEDs illuminating precisely in sequence, commencing with LED 1 and proceeding through to LED 8. Each LED lit up at a specified interval, effectively showcasing the operation of a ring counter. This not only validated our grasp of hardware programming principles but also provided a practical demonstration of how a ring counter functions.*

*This laboratory task bolstered our comprehension of Arduino programming and hardware design concepts. We acquired the essential skill of programming and managing multiple LEDs sequentially, a fundamental skill in the realm of embedded systems development. Additionally, this exercise introduced us to the concept of a ring counter, which holds practical utility in various digital electronics circuits.*

*In conclusion, this activity served as a highly effective hands-on learning experience, enabling us to apply theoretical knowledge to a tangible project. It underscored Arduino's versatility and capabilities in implementing hardware solutions, offering valuable insights into the realm of digital electronics and microcontroller programming.*

## References

- [1] GeeksforGeeks. "Ring counter in digital logic," GeeksforGeeks, 2023. [Online]. Available: <https://www.geeksforgeeks.org/ring-counter-in-digital-logic/>. Accessed: [Date].
- [2] "Arduino - Home," Arduino, [Online]. Available: <https://www.arduino.cc/>. Accessed: [Date].
- [3] "Tinkercad - From mind to design in minutes," Tinkercad, [Online]. Available: <https://www.tinkercad.com/>. Accessed: [Date].