

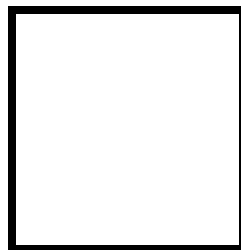


**PAMANTASAN NG LUNGSOD NG MAYNILA**  
(University of the City of Manila)  
Intramuros, Manila

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**Microprocessor Lab**

Laboratory Activity No. 3  
**Binary Representation of 8 LEDs in TinkerCad and Arduino Programming**



Score

*Submitted by:*  
**Termulo, Erica Rose C.**  
**10:00 AM – 1:00 PM Saturday / CPE 0412.1-1**

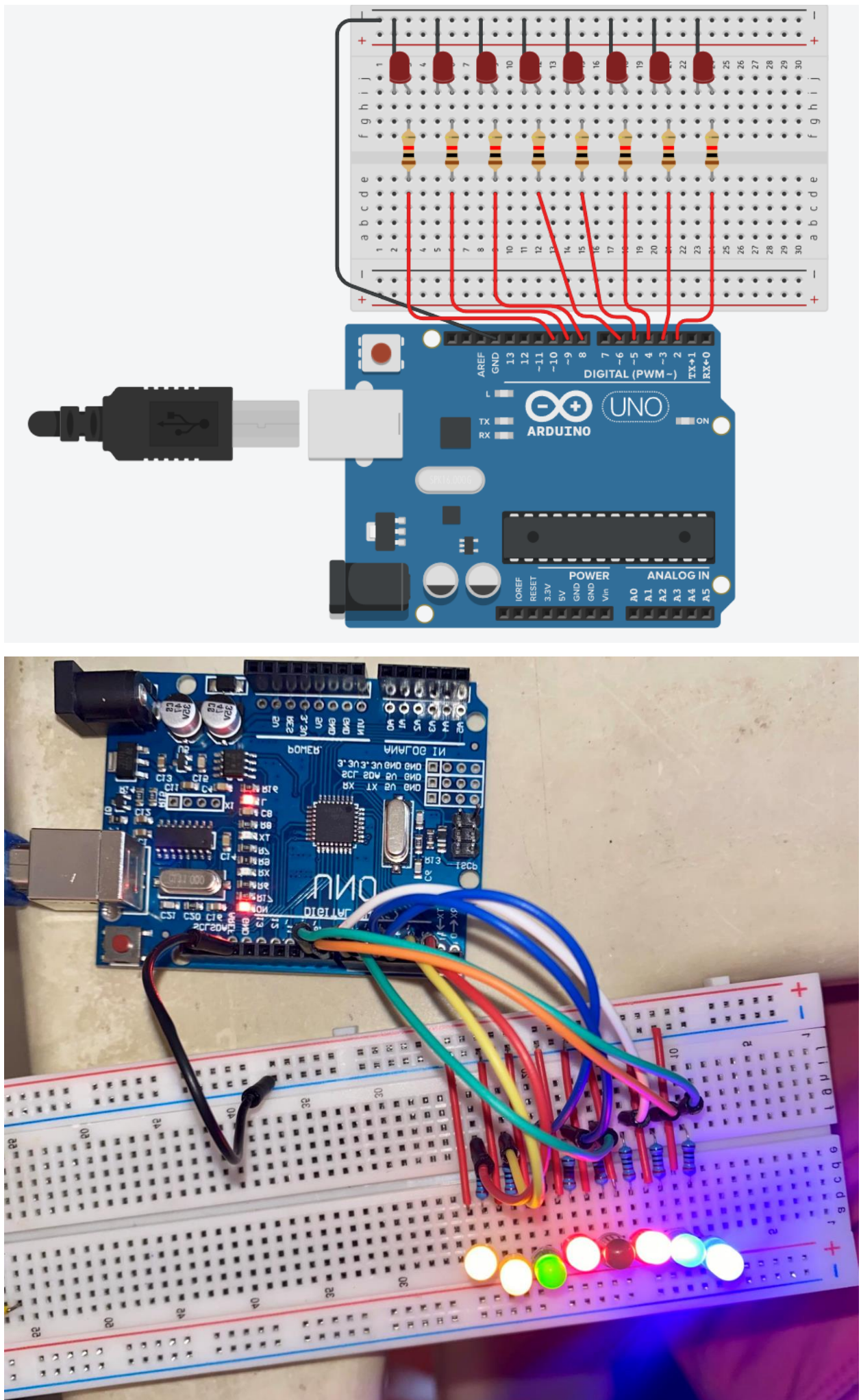
*Date Submitted*  
**10-14-2023**

*Submitted to:*  
**Engr. Maria Rizette H. Sayo**

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## I. Results

TinkerCad Link: [https://www.tinkercad.com/things/7SvkGg4F0an-copy-of-lab-2-microprocessor-ring-counter-8-leds/editel?sharecode=5D9cboH3QIMZDqzjinTySZ7wW7eq1t1Aeb\\_Uc1afLZA](https://www.tinkercad.com/things/7SvkGg4F0an-copy-of-lab-2-microprocessor-ring-counter-8-leds/editel?sharecode=5D9cboH3QIMZDqzjinTySZ7wW7eq1t1Aeb_Uc1afLZA)



## Components Used

1. 8 LEDs
2. Resistor
3. Breadboard
4. Arduino Uno

## CODE:

```
void setup() {
  Serial.begin(9600); // Initialize serial communication
  for (int i = 2; i <= 9; i++) {
    pinMode(i, OUTPUT); // Set pins 2 to 9 as OUTPUT
  }
}

void loop() {
  for (int decimal = 0; decimal <= 255; decimal++) {
    displayBinary(decimal); // Display binary representation on LEDs
    Serial.print("Decimal: ");
    Serial.print(decimal);
    Serial.print("\tBinary: ");
    Serial.println(decimal, BIN); // Print both decimal and binary representations
    delay(1000); // Adjust the delay as per your preference
  }

  while (true) {
    // Stop the program at 255
  }
}

void displayBinary(int decimal) {
  for (int i = 2; i <= 9; i++) {
    int bit = (decimal >> (i - 2)) & 1;
    digitalWrite(i, bit); // Display the binary representation on LEDs
  }
}
```

#### IV. Conclusion

The provided Arduino code and TinkerCad circuit seem to be part of a laboratory project designed to demonstrate the binary representation of numbers using eight LEDs. The code sets up a loop to count from 0 to 255 and display the corresponding binary representation on the LEDs.

Here's a conclusion for your laboratory project:

In this laboratory project, we successfully demonstrated the binary representation of decimal numbers using an Arduino and a circuit with 8 LEDs. The code and circuit were set up to display the binary representation of numbers from 0 to 255.

#### Key Takeaways:

1. The `setup()` function initializes serial communication and configures pins 2 to 9 as output pins for the LEDs.
2. The `loop()` function iterates through decimal values from 0 to 255, displaying the binary representation on the LEDs and printing both the decimal and binary representations to the serial monitor.
3. The `displayBinary()` function is responsible for calculating and displaying the binary values on the LEDs.
4. This project is an excellent educational tool for understanding how binary representation works and how it can be applied practically using Arduino and LEDs.
5. The `delay(1000)` function allows for a one-second pause between each binary representation display, making it easy to observe and study.

In conclusion, this laboratory project serves as a hands-on way to learn about binary representation, Arduino programming, and digital electronics. Understanding binary is fundamental in computer science, and this project provides a tangible way to visualize this concept. It can be a great starting point for further explorations into digital systems and programming.

## References

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

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