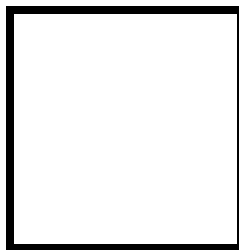




PAMANTASAN NG LUNGSOD NG MAYNILA
(University of the City of Manila)
Intramuros, Manila

Microprocessor Lab

Laboratory Activity No. 3
**BINARY REPRESENTATION OF 8 LEDS IN TINKERCAD
AND ARDUINO PROGRAMMING**



Score

Submitted by:
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< Saturday 10:30am – 1:00pm >
< CPE 0412-1.1 >

Date Submitted
7-10-2023

Submitted to:
Engr. Maria Rizette H. Sayo

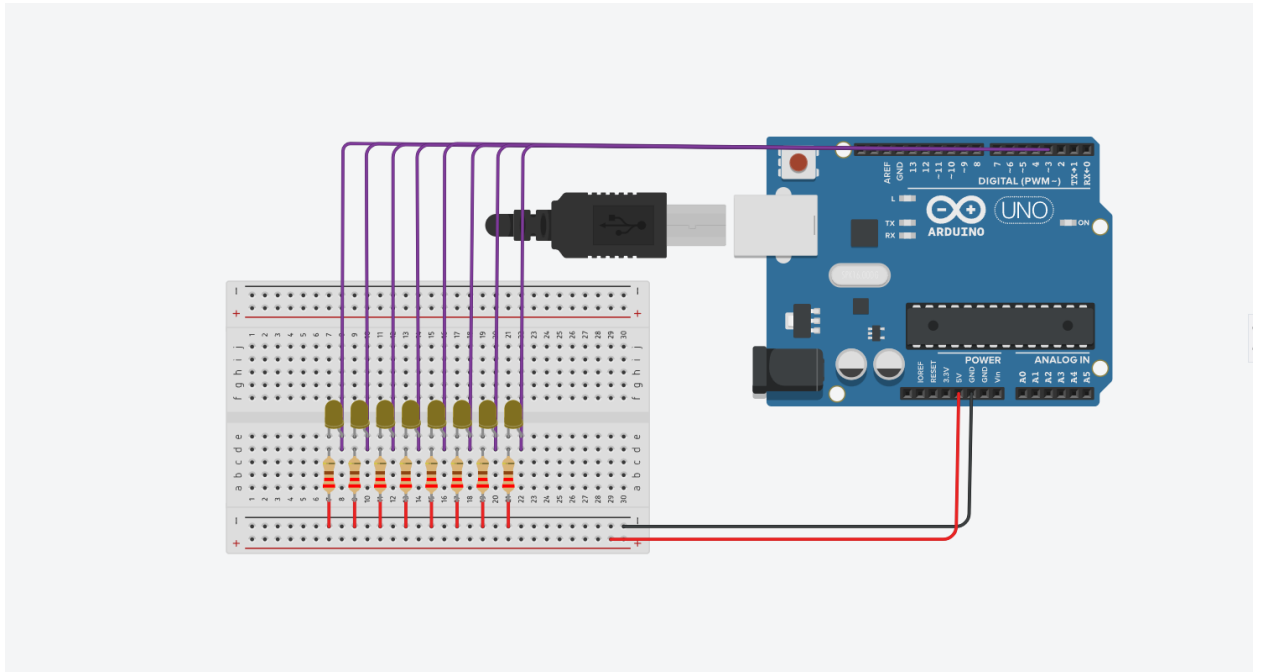
I. Objectives

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

- To create Arduino circuit of Binary representation (decimal 0-256 using 8 LEDs)

II. Method/s

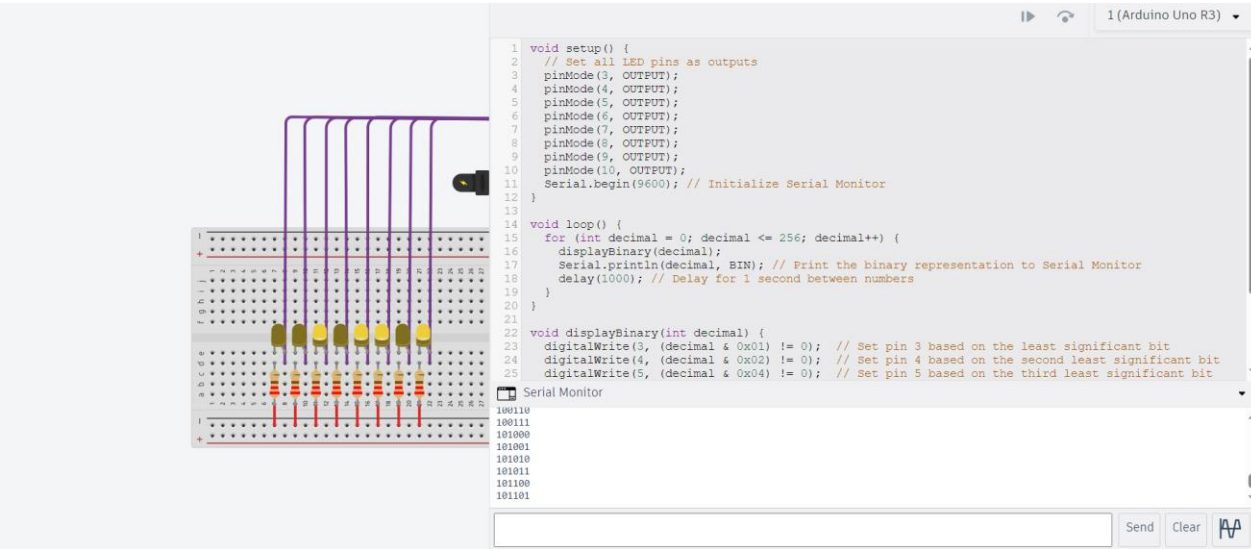
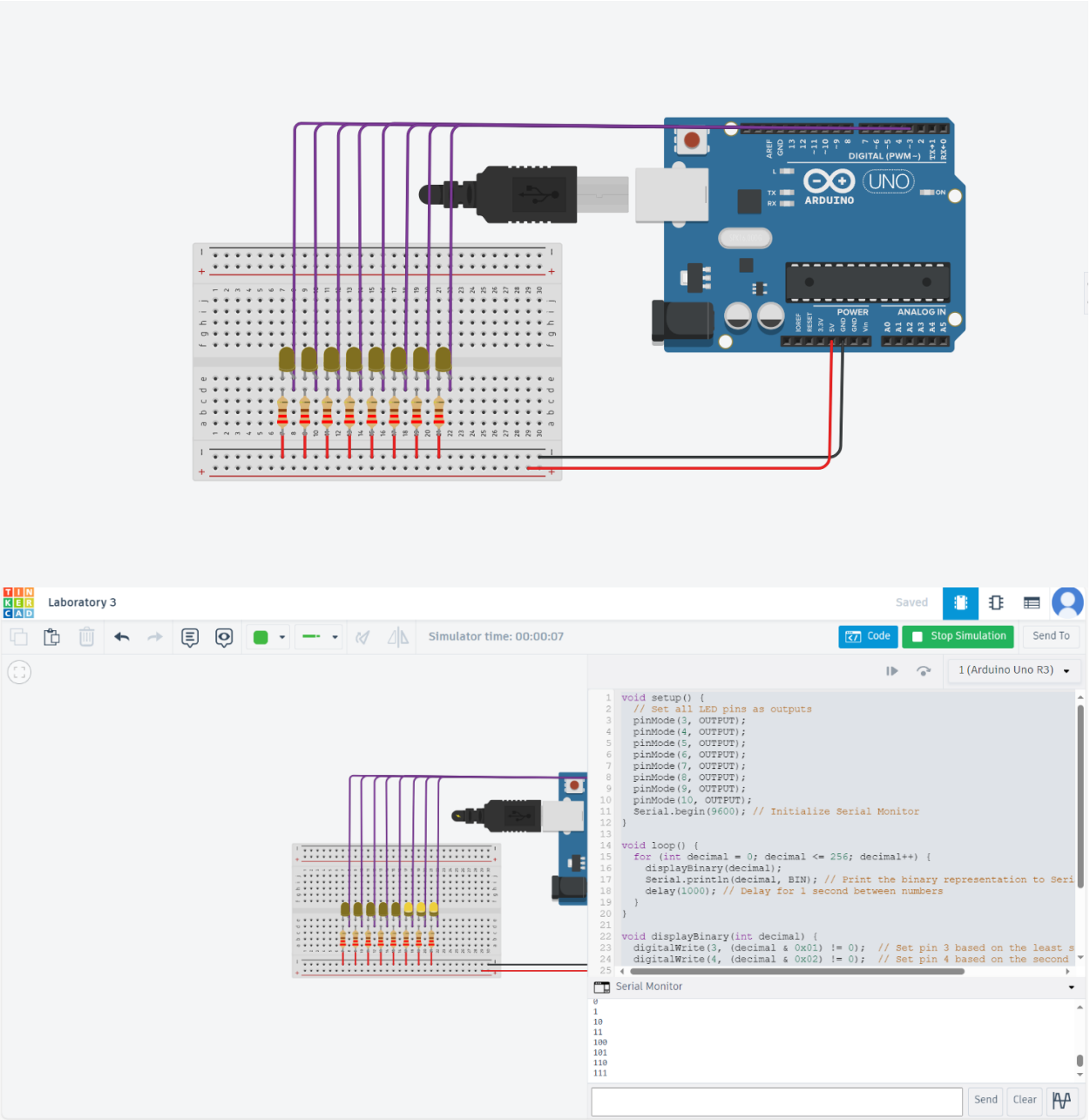
- Perform a task problem given in the presentation.
- Write a code and perform an Arduino circuit diagram of a ring counter that display



eight (8)LEDs starting from left.

<https://www.tinkercad.com/things/jfIHZbQo3E0> (Simulation)

III. Results



CODE:

```
void setup() {
    // Set all LED pins as outputs
    pinMode(3, OUTPUT);
    pinMode(4, OUTPUT);
    pinMode(5, OUTPUT);
    pinMode(6, OUTPUT);
    pinMode(7, OUTPUT);
    pinMode(8, OUTPUT);
    pinMode(9, OUTPUT);
    pinMode(10, OUTPUT);
    Serial.begin(9600); // Initialize Serial Monitor
}

void loop() {
    for (int decimal = 0; decimal <= 256; decimal++) {
        displayBinary(decimal);
        Serial.println(decimal, BIN); // Print the binary representation to Serial Monitor
        delay(1000); // Delay for 1 second between numbers
    }
}

void displayBinary(int decimal) {
    digitalWrite(3, (decimal & 0x01) != 0); // Set pin 3 based on the least significant bit
    digitalWrite(4, (decimal & 0x02) != 0); // Set pin 4 based on the second least significant bit
    digitalWrite(5, (decimal & 0x04) != 0); // Set pin 5 based on the third least significant bit
    digitalWrite(6, (decimal & 0x08) != 0); // Set pin 6 based on the fourth least significant bit
    digitalWrite(7, (decimal & 0x10) != 0); // Set pin 7 based on the fifth least significant bit
    digitalWrite(8, (decimal & 0x20) != 0); // Set pin 8 based on the sixth least significant bit
    digitalWrite(9, (decimal & 0x40) != 0); // Set pin 9 based on the seventh least significant bit
    digitalWrite(10, (decimal & 0x80) != 0); // Set pin 10 based on the most significant bit
}
```

IV. Conclusion

The lab experiment effectively showcases binary counting using an Arduino Uno. LEDs are employed to visually represent each bit of a binary number. The state of each LED (lit or unlit) signifies a particular bit value (1 or 0). As the count increases, the configuration of the illuminated LEDs alters, mirroring the current number's binary form. This setup also highlights the application of bitwise operations in coding to manage and isolate certain bits from a given number.

References

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