

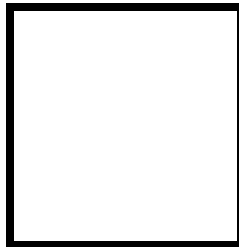


**PAMANTASAN NG LUNGSOD NG MAYNILA**  
(University of the City of Manila)  
Intramuros, Manila

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**Microprocessor Lab**

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



Score

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

*Date Submitted*  
**7-10-2023**

*Submitted to:*  
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I. Objectives

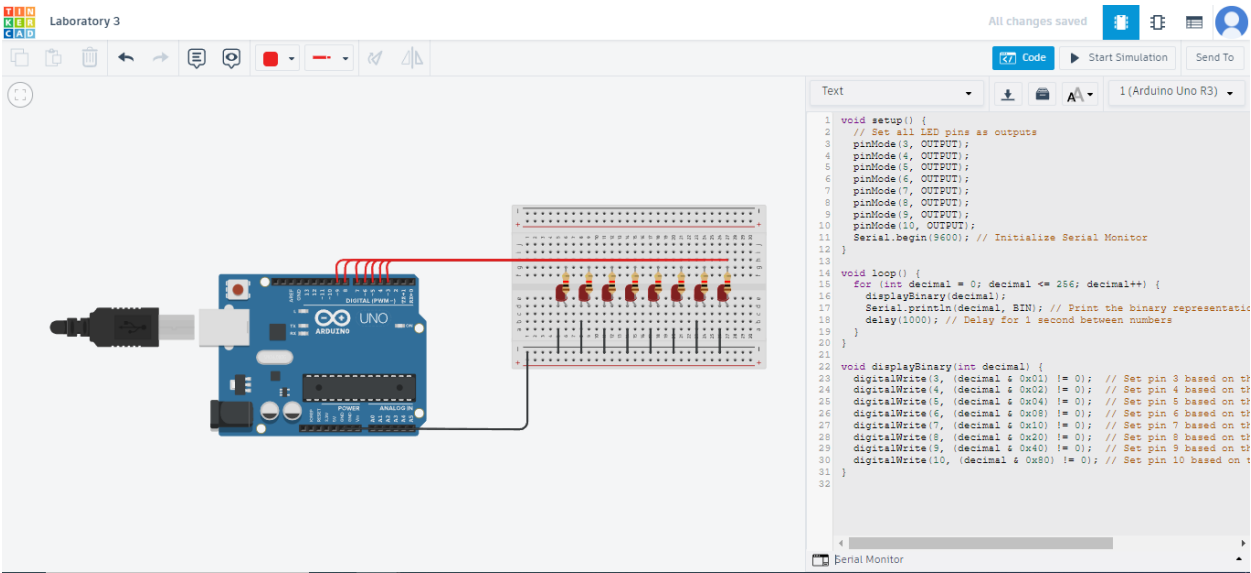
This laboratory activity aims to implement the principles and techniques of hardware programming using Arduino through:

- 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.

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 laboratory experiment successfully implemented the principles and techniques of hardware programming using Arduino. The task involved creating an Arduino circuit to represent decimal values from 0 to 256 using 8 LEDs and implementing a ring counter that displays eight LEDs in a sequential manner. The provided Arduino code effectively demonstrated the conversion of decimal numbers to binary representation, showcasing the binary patterns through the LEDs. Through this experiment, hands-on experience was gained in hardware programming, binary representation, and circuit design. It enhanced understanding of fundamental concepts in digital electronics and provided a practical foundation for further exploration and application of Arduino-based projects.



## References

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