

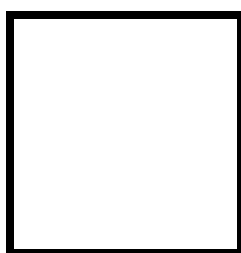


PAMANTASAN NG LUNGSOD NG MAYNILA
(University of the City of Manila)
Intramuros, Manila

Microprocessor Lab

Laboratory Activity No. 3

**Binary Representation of Eight (8) LEDs in TinkerCad and Arduino
Programming**



Score

Submitted by:

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Saturday (10am-1pm) / CPE 0412.1

Date Submitted

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Submitted to:

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I. OBJECTIVES

This laboratory activity aims to accomplish the following:

- To create an Arduino Circuit that will display a Binary Representation of the Decimals (0-256) using eight (8) LEDs
- To write a functional code for the circuit
- To deliver the desired outputs
- To understand how the circuit works
- To enhance the proponent's Arduino Programming and Circuit making skills

II. PROCEDURE

a. Construct and Design a TinkerCad Circuit Diagram

Components Used:

1. Arduino Uno Microcontroller
2. Breadboard
3. (8) LEDs
4. (8) 1K Ω resistor
5. Connectors

- TinkerCad Diagram

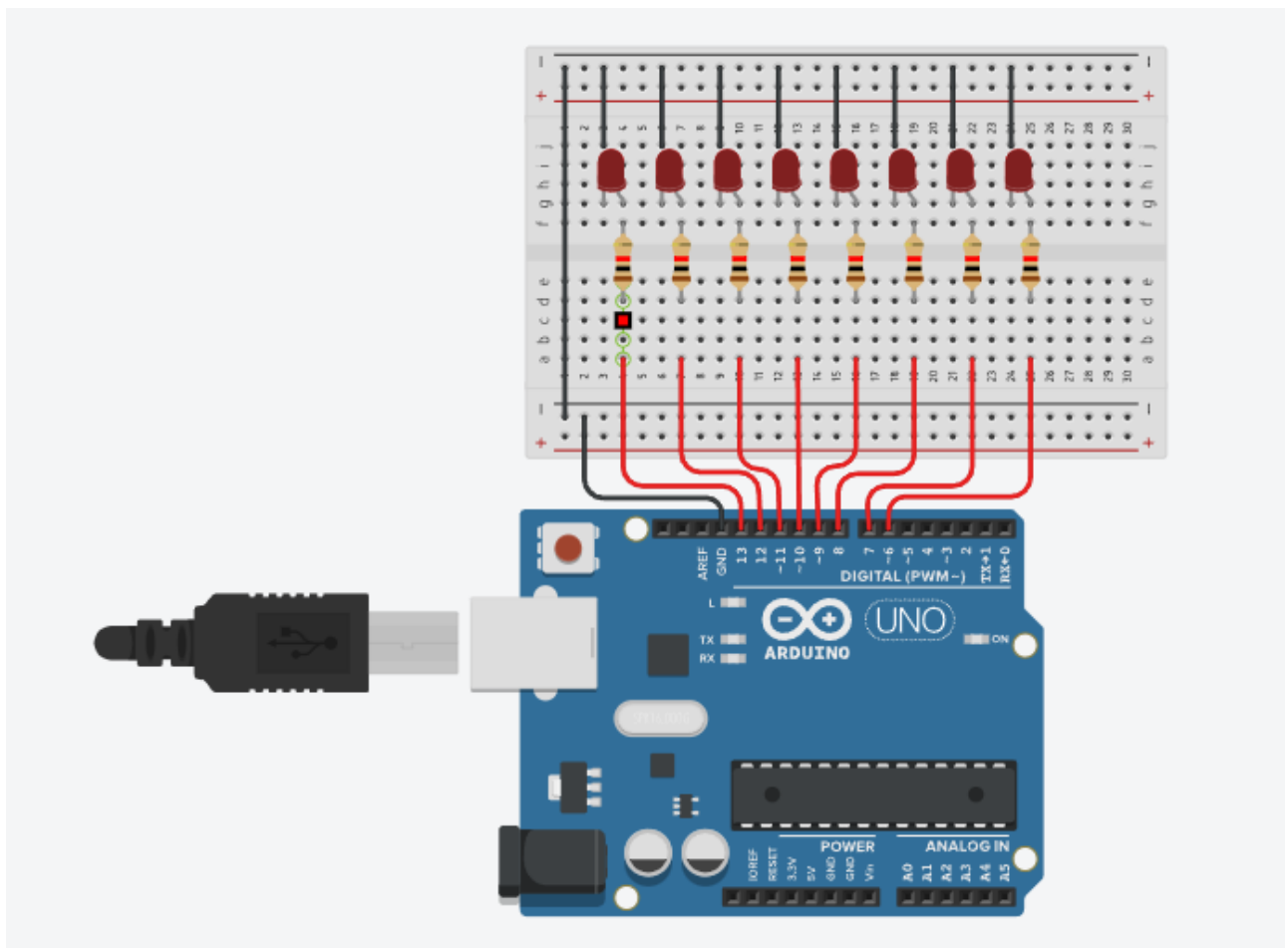
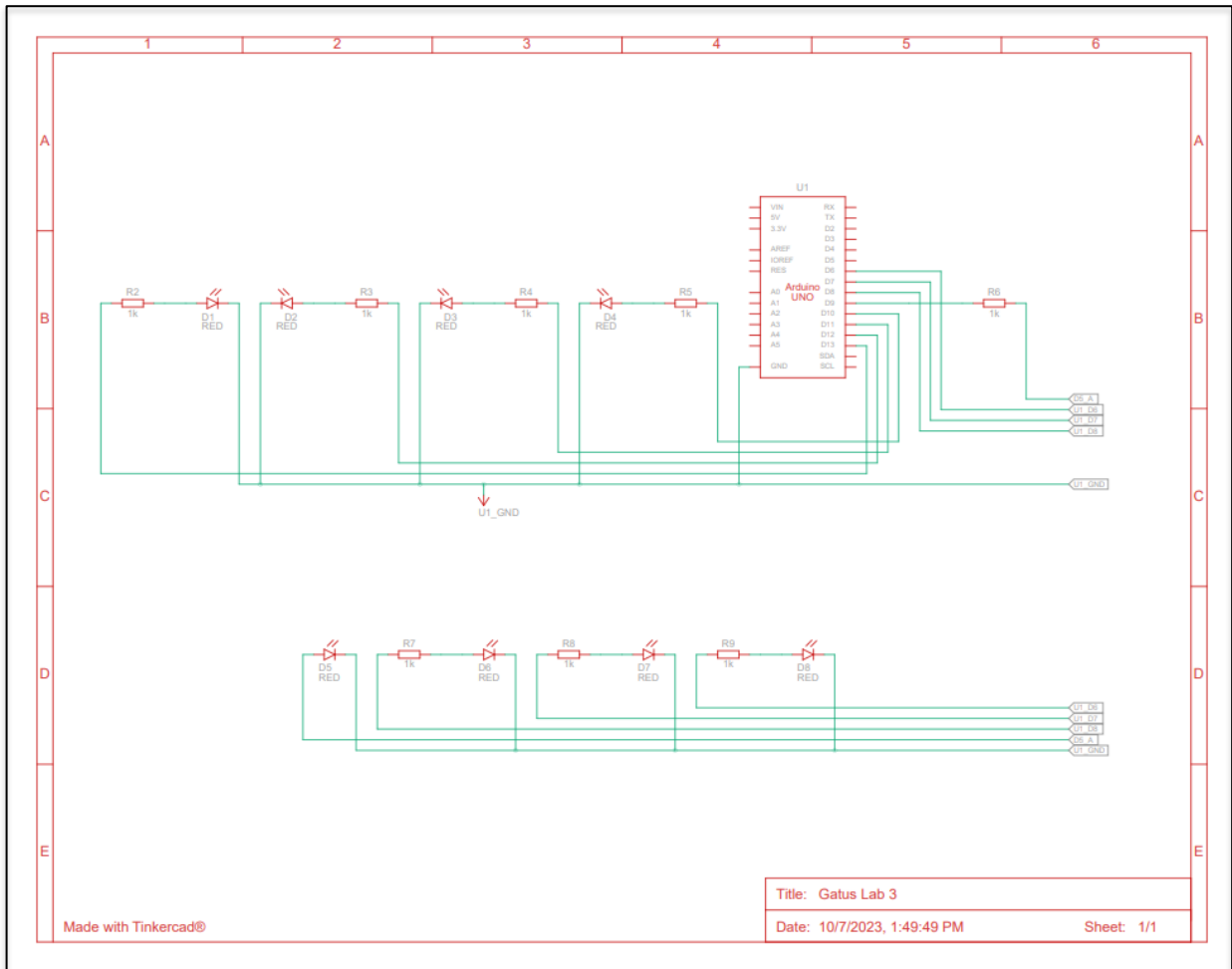


Figure No.1 Arduino Binary Number Representation Circuit (Decimals 0-256)

- Schematic View



b. Write a code and make a binary representation of the decimals (0-256) using 8 LEDs

```
const int ledPins[] = {6, 7, 8, 9, 10, 11, 12, 13};
int decimalValue = 0;

void setup() {
  Serial.begin(9600);

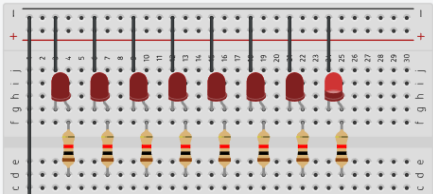
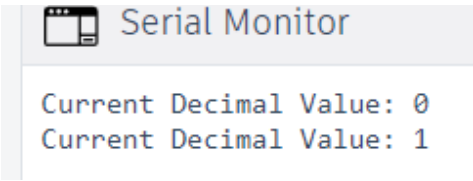
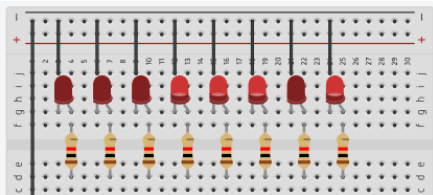
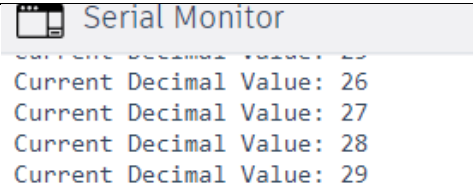
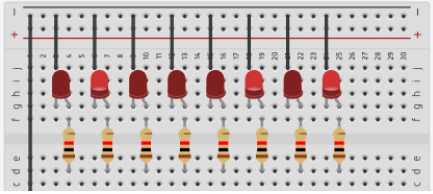
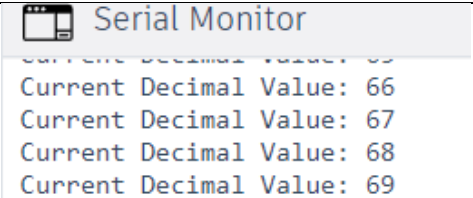
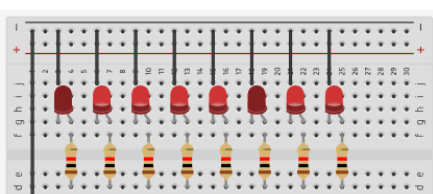
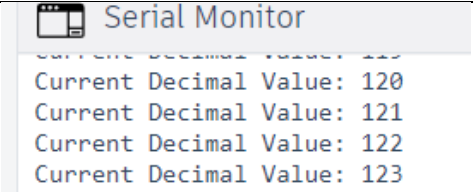
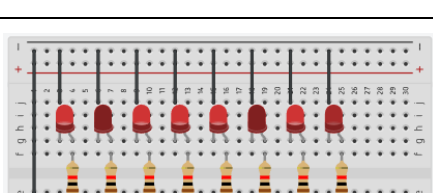
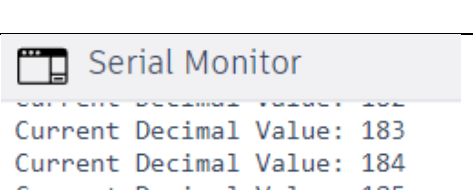
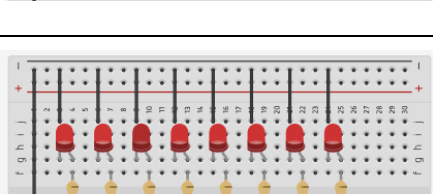
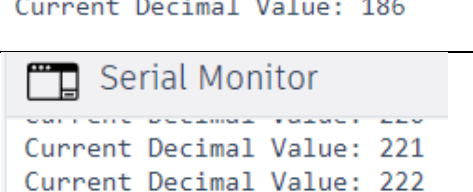
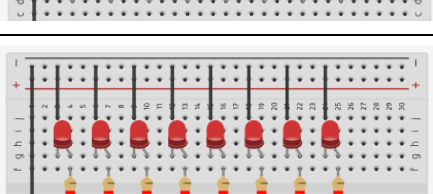
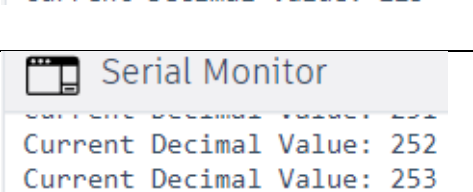
  for (int i = 0; i < 8; i++) {
    pinMode(ledPins[i], OUTPUT);
  }
}

void displayBinary(int decimal) {
  for (int i = 0; i < 8; i++) {
    digitalWrite(ledPins[i], (decimal >> i) & 1);
  }
}

void loop() {
  for (int i = 0; i < 256; i++) {
    decimalValue = i;
    displayBinary(decimalValue);
    Serial.print("Current Decimal Value: ");
    Serial.println(decimalValue);
    delay(500);
  }
}
```

III. RESULTS

In this section, the proponent sampled random numbers of the circuit that is being simulated, garnering random numbers. Numbers include decimals 1, 29, 69, 123, 186, 223, and 255. In the table below, the binary representation of each decimal numbers sampled are show along with the current decimal value that is being represented.

Decimal	Figure	Serial Monitor
1		
29		
69		
123		
186		
223		
255		

IV. Conclusion

This laboratory activity provided us with an opportunity to apply our Arduino programming and circuit diagram design skills, culminating in the creation of a arduino circuit that represents the binary equivalent of the decimal value that is being sampled. Utilizing the capabilities of the Tinkercad Software, the proponent executed these tasks. This is by first (1) creating a circuit diagram from scratch (2) Providing a c++ code for the arduino circuit to run, and (3) Delivered the outputs correctly.

Furthermore, the student gained a deeper understanding of the logic of the circuit works, enhanced the student's comprehension of key concepts, including the utilization of digitalWrite for pin control and the specific pin assignments. Finally, the student had his Arduino Programming and Circuit making skills.

References

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