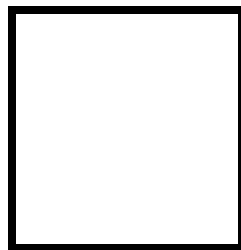# PAMANTASAN NG LUNGSOD NG MAYNILA

(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:
Santiago, Fernand D.
Sat 1:00-4:00PM / CpE-412-2

Date Submitted
09/10/2023

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:

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

II.   Method/s

-        Design and construct a functional Arduino circuit capable of visually representing decimal numbers from 0 to 255 (8-bit binary) using a set of 8 LEDs.

-        Ensure that each LED corresponds to one bit in the binary representation

-        Ensure that visual representation in binary and decimal value in serial monitor are the same.

III.   Results

TinkerCad:

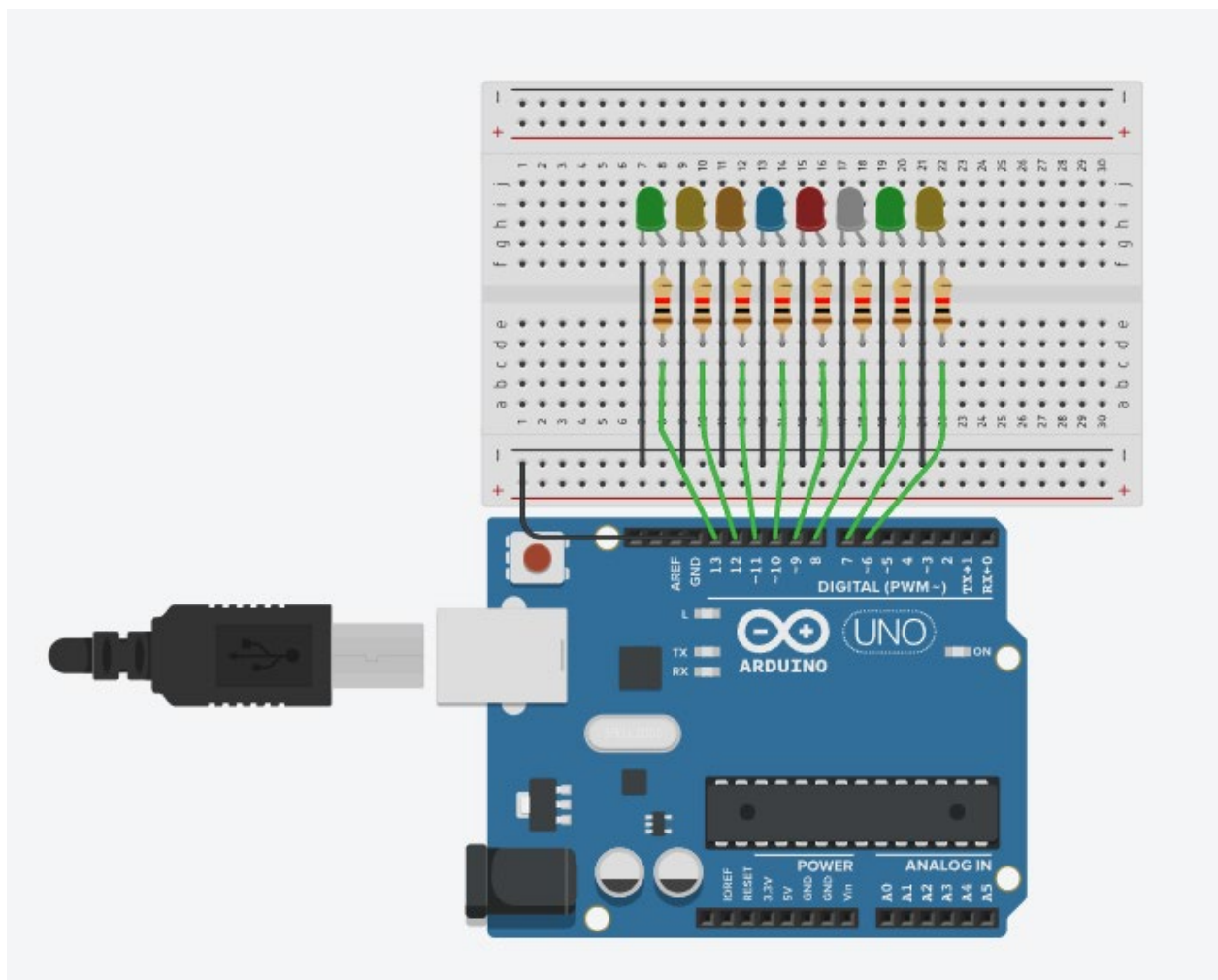**Exercise 1: Write a code that visually represents binary numbers from 0 to 255 using 8 LEDs.**

Figure No.1 8-Bit Counter using Arduino in TinkerCad

Components Used

1. 8 LEDs

2. Resistor

3. Breadboard

4. Wires

**TinkerCad Link**

https://www.tinkercad.com/things/7LXkNZf5m41

CODE:

```
//initializing the pins and count
int ledPins[] = {13, 12, 11, 10, 9, 8, 7, 6};
byte count = 0;

//sets the output signal
void setup() {
  for (int i = 0; i < 8; i++) {
    pinMode(ledPins[i], OUTPUT);
  }
  Serial.begin(9600);
}

//main loop function and increment the count by iteration
void loop() {
  count++;
  for (int i = 0; i < 8; i++) {
    digitalWrite(ledPins[i], count & (1 << i));
  }
  Serial.println(count); //decimal value in serial monitor
  delay(1000);
}
```

SIMULATION:
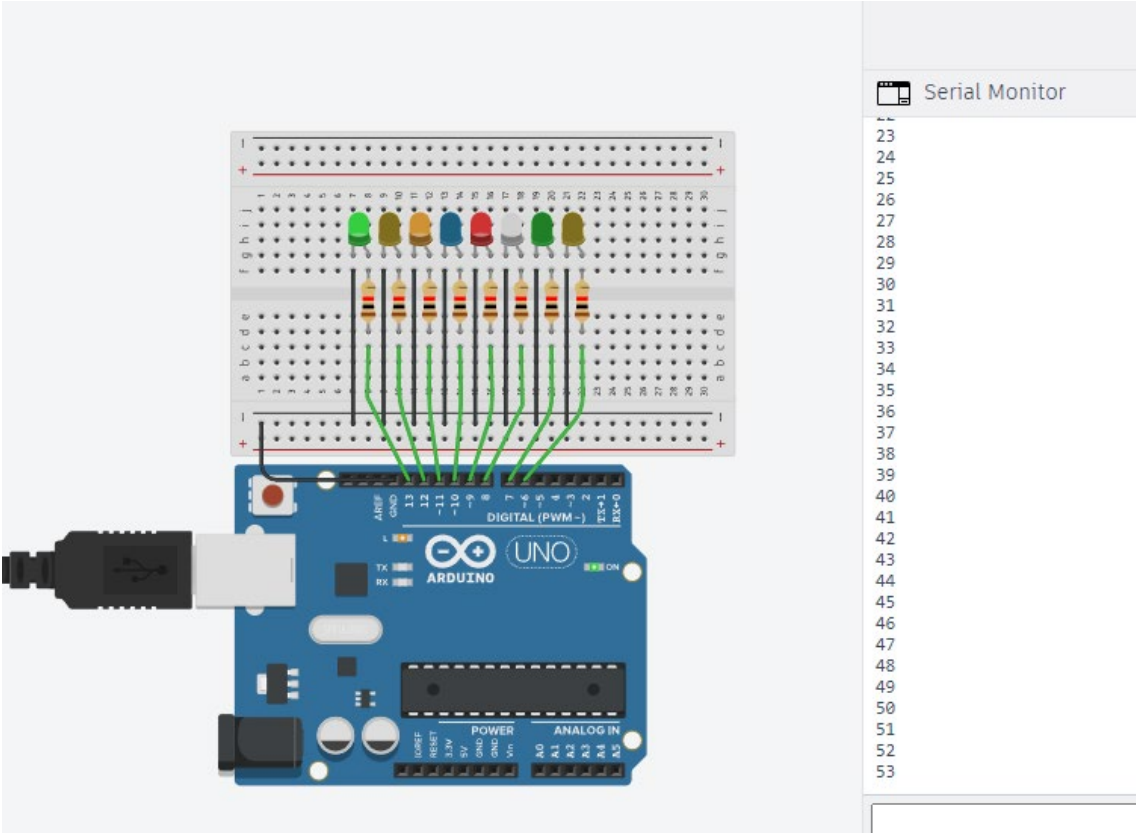
IV. Conclusion

In this laboratory exercise, I created a circuit with 8 LEDs connected to specific digital pins on the Arduino board. Through the use of binary representation, the circuit was able to visually display decimal numbers ranging from 0 to 255.

In the main program loop, I continuously incremented a 'count' variable and updated the LEDs to reflect the binary representation of 'count.' Additionally, I printed the decimal value of 'count' to the serial monitor, to track the progression and accuracy of the count. This is to cross-check if the binary values represented by the LED outputs are the same as the decimal values.

This lab exercise allowed me to demonstrate my understanding of key concepts in Arduino programming, and bitwise operations using the Arduino simulation in TinkerCad. In summary, I was able to make an 8-bit binary counter visually using 8 LEDs.

References

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