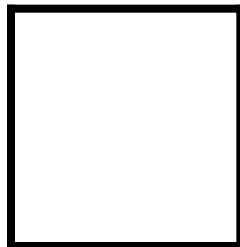




PAMANTASAN NG LUNGSOD NG MAYNILA
(University of the City of Manila)
Intramuros, Manila

Microprocessor Lab

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



Score

Submitted by:
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S 10:00am-1:00pm / CPE 0412.1-1

Date Submitted
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Submitted to:
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I. Objectives

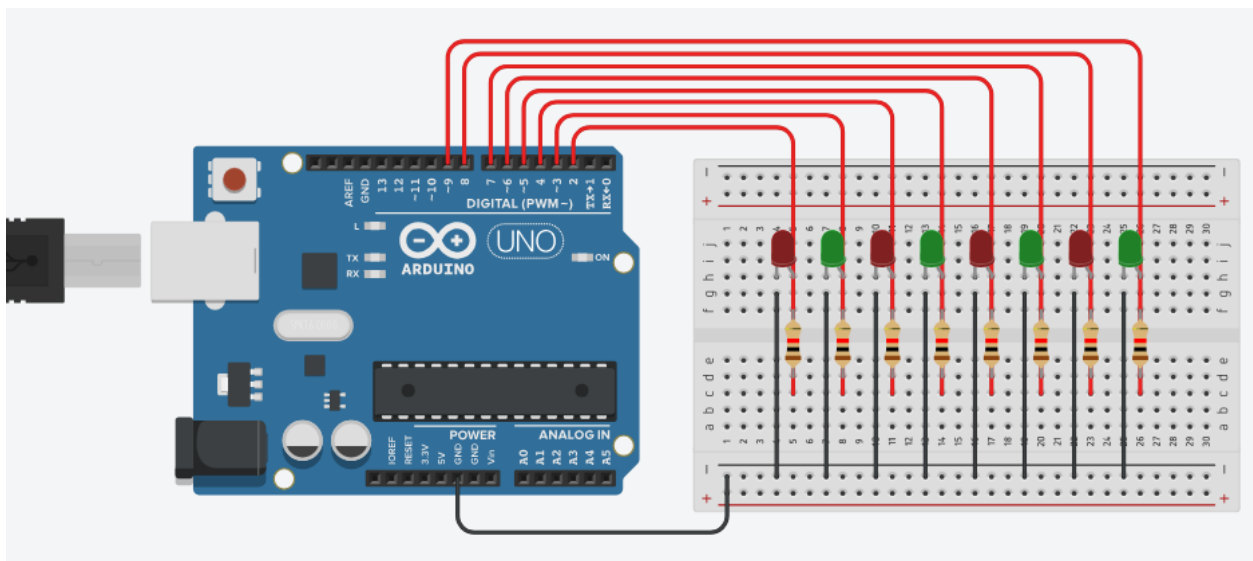
Create an Arduino circuit in Tinkercad to represent decimal numbers from 0 to 255 using 8 LEDs.

II. Method/s

- Write an Arduino program to control the LEDs and display binary representations.
- Implement a function to convert decimal numbers to binary and light up the LEDs accordingly.
- Observe the LEDs to ensure they correctly represent binary numbers from 0 to 255.

III. Results

TinkerCad:



Components Used:

- Arduino microcontroller
- Breadboard
- 8 Resistors
- 8 LEDs
- Jump wires

Source Code:

```
// Binary of 8 LEDs

int ledPins[] = {2, 3, 4, 5, 6, 7, 8, 9};

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

```

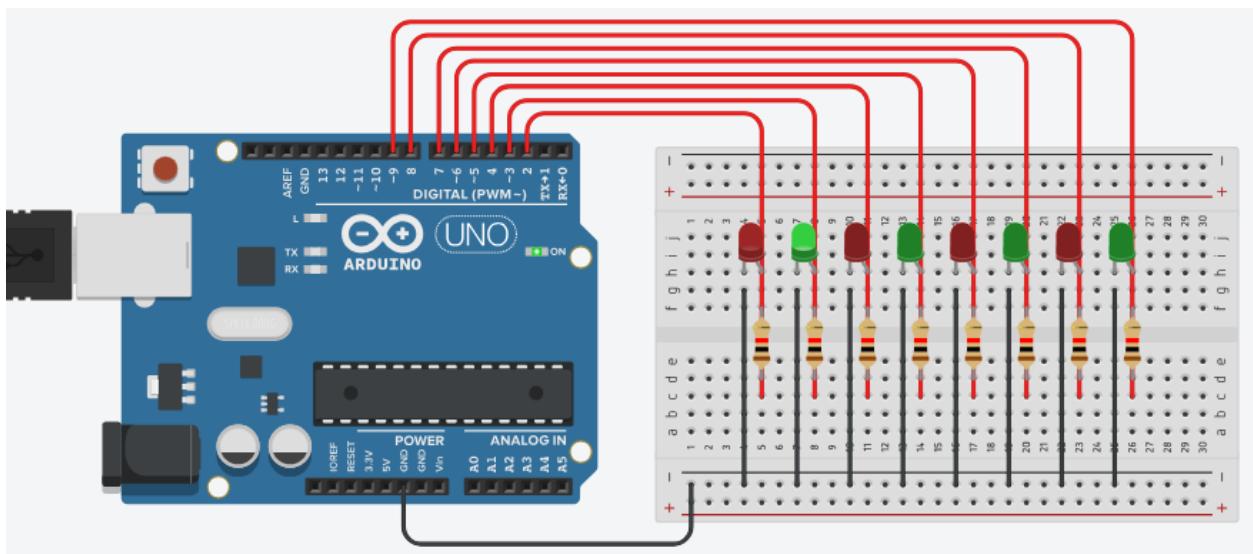
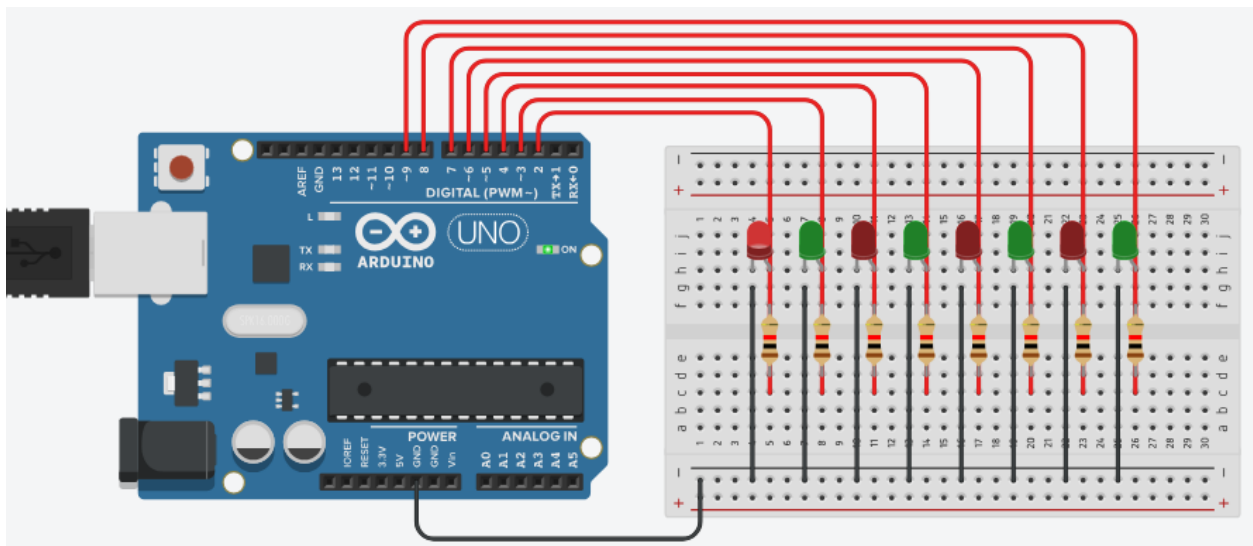
    }
}

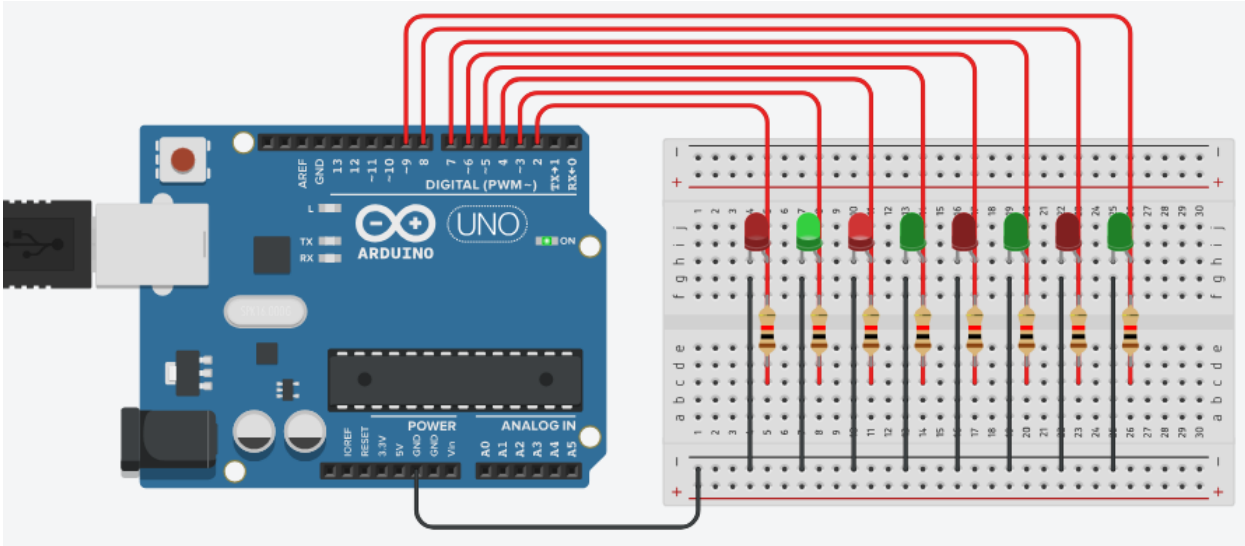
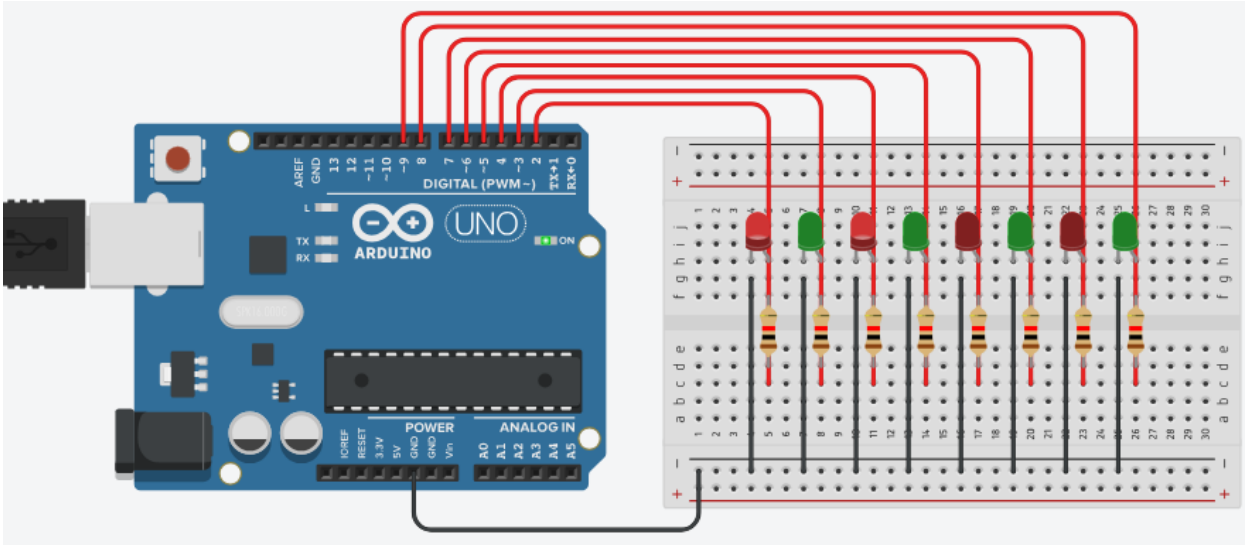
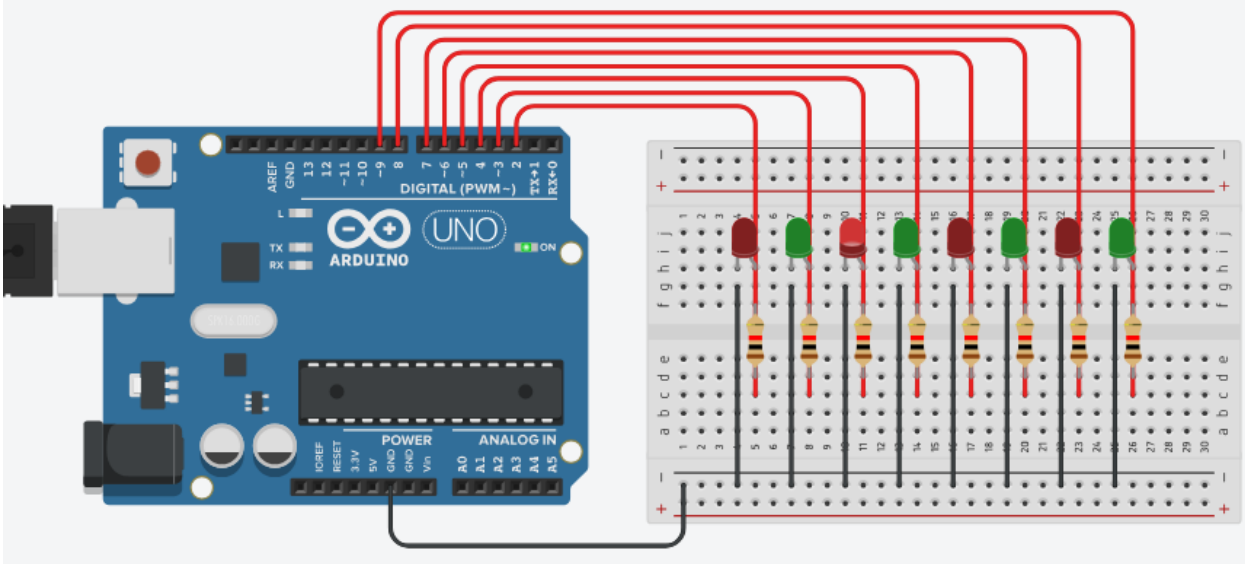
void loop() {
    for (int num = 0; num < 256; num++) {
        displayBinary(num);
        delay(500); // Delay for half a second
    }
}

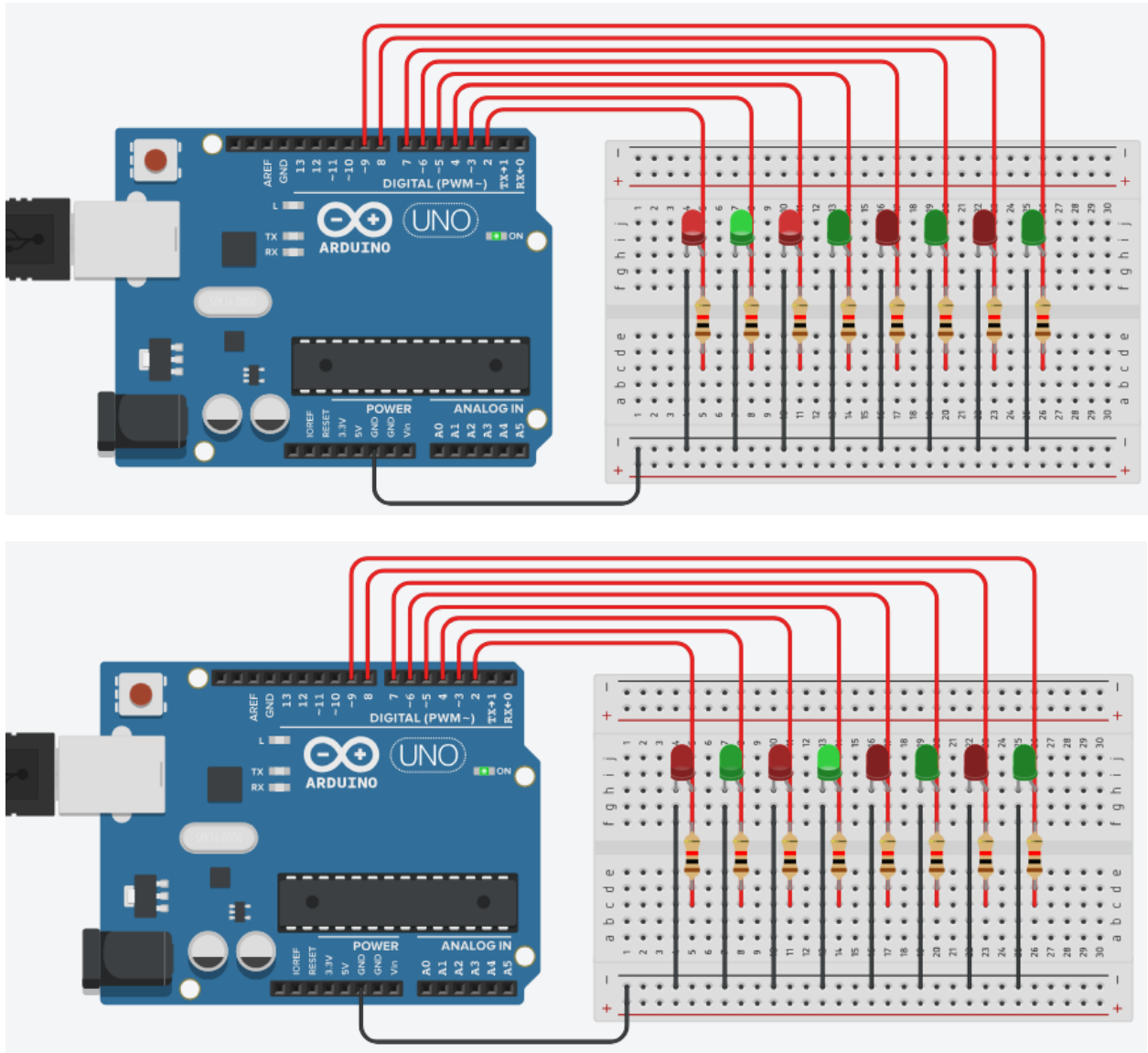
void displayBinary(int num) {
    for (int i = 0; i < 8; i++) {
        int state = (num >> i) & 1;
        digitalWrite(ledPins[i], state);
    }
}

```

Output:







IV. Conclusion

In conclusion, the laboratory activity of creating a binary representation of decimal numbers from 0 to 255 using 8 LEDs in Tinkercad and Arduino was an interesting and engaging experience. Through this laboratory activity, I gained a profound knowledge of digital electronics and programming by implementing the principles of binary representation and bitwise operations. I successfully designed a circuit that effectively visualized the entire range of decimal values using LEDs, offering a tangible and interactive representation of binary numbers. The main result I observed was that the output LEDs accurately displayed binary representations of decimal numbers as we cycled through the full range from 0 to 255. Also, it enabled us to seamlessly control the LEDs and observe the conversion of decimal numbers into binary form. The laboratory activity not only sharpened our technical skills but also encouraged creativity and problem-solving as we worked to display these binary patterns. Overall, it was a practical learning experience that combined theoretical knowledge with practical application and provided a solid foundation for further exploration of electronics and microcontroller-based projects.

References

Guywithtech, V. a. P. B. (2017, April 8). Let's create 8 bit LED binary counter. GuyWithTech.
<https://guywithtech.wordpress.com/2017/03/28/lets-create-8-bit-led-binary-counter/>

MechaMan (2014). Arduino 8 bit Binary LED Counter. Fritzing.
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