

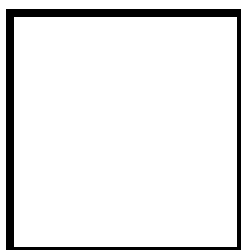


PAMANTASAN NG LUNGSOD NG MAYNILA
(University of the City of Manila)
Intramuros, Manila

Microprocessor Lab

Laboratory Activity No. 3

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



Score

Submitted by:

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S 01:00 pm – 07:00 pm / CPE 0412.2 - 2

Date Submitted

14-10-2023

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 an Arduino programming and circuit diagram.

II. Method/s

- Perform a task problem given in the presentation.
- Write a code and perform an Arduino circuit of Binary representation using 8 LEDs

III. Results

TinkerCad

Exercise 1: Create an Arduino circuit of Binary representation (decimal 0-256 using 8 LEDs)

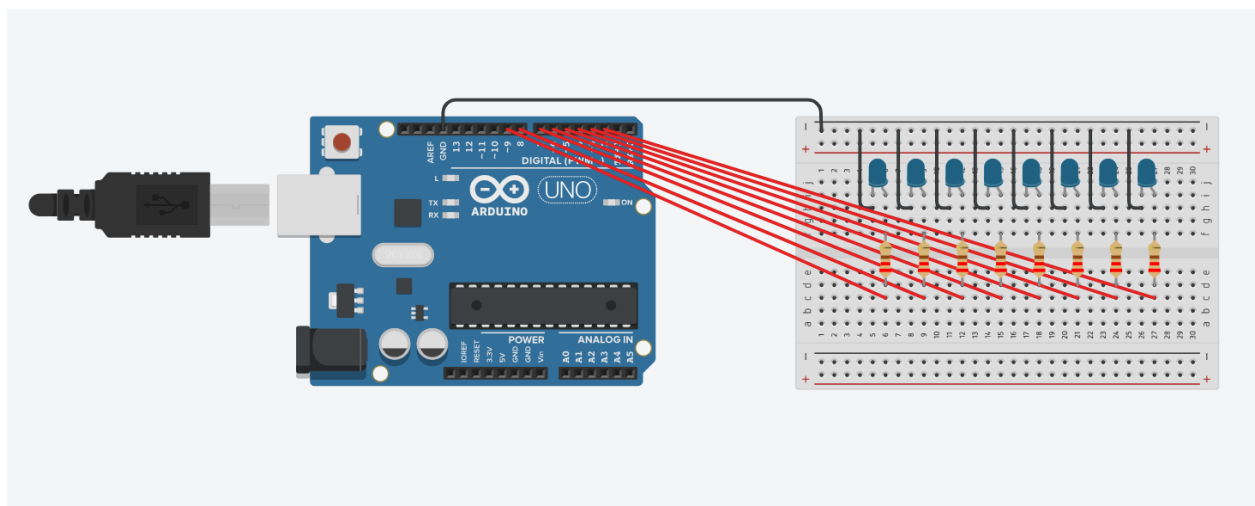


Figure No.1 Arduino Circuit of Binary representation Diagram

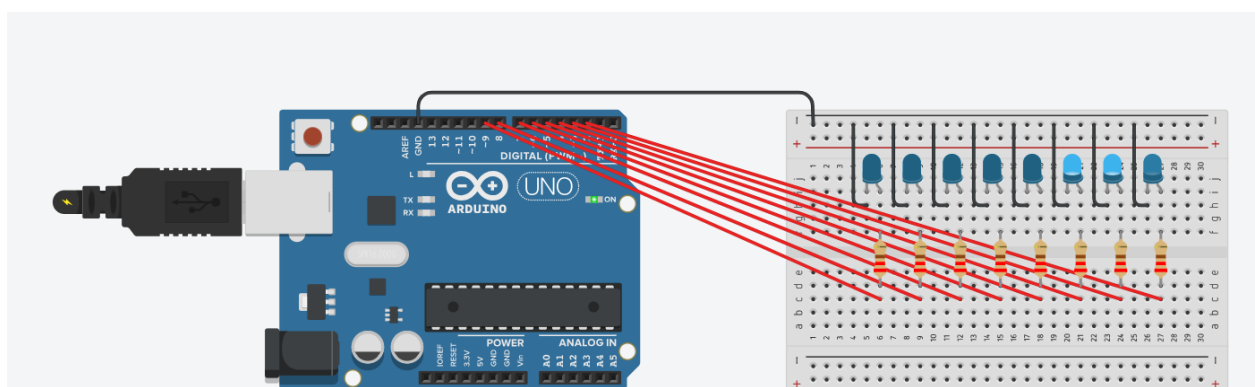


Figure No. 2 Arduino Circuit of Binary representation working

Components Used

1. 8 LEDs
2. 8 220-ohm Resistors
3. Breadboard

CODE:

```
1 // C++ code
2 //
3 int ledPins[] = {2, 3, 4, 5, 6, 7, 8, 9};
4
5 void setup() {
6     for (int i = 0; i < 8; i++) {
7         pinMode(ledPins[i], OUTPUT);
8     }
9 }
10
11 void loop() {
12     for (int decimal = 0; decimal <= 256; decimal++) {
13         for (int i = 0; i < 8; i++) {
14             int bit = (decimal >> i) & 1;
15             digitalWrite(ledPins[i], bit);
16         }
17         delay(1000);
18     }
19 }
20
```

IV. Conclusion

Although done virtually, this project provided a hands-on experience with hardware and software integration through the use of TinkerCAD. It also enhanced my understanding of binary arithmetic and how it relates to digital electronics. The code I made, helped me visualize the binary representation of decimal numbers, which is a fundamental concept in the world of computing and electronics. I also gained practical knowledge in building circuits, programming Arduino microcontrollers, and interpreting binary data. This foundational understanding can also be applied to even more complex projects and can serve as a very important stepping stone for further exploration in the field of electronics and embedded systems which is what ma'am Sayo tackles usually during her lectures.

References

- [1] D.J.D. Sayo. "University of the City of Manila Computer Engineering Department Honor Code," PLM-CpE Departmental Policies, 2020.
- [2] "How RGB LEDs work and how to control color," CircuitBread, Aug. 10, 2023.
<https://www.circuitbread.com/tutorials/how-rgb-leds-work-and-how-to-control-color> (accessed Sep. 30, 2023).
- [3] "Decimal to Binary conversion (0-1023) printed to LED," Arduino Forum, Feb. 16, 2016. Available:
<https://forum.arduino.cc/t/decimal-to-binary-conversion-0-1023-printed-to-led/366388>. [Accessed: Oct. 13, 2023]