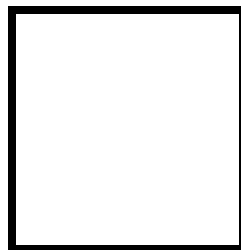# PAMANTASAN NG LUNGSOD NG MAYNILA

(University of the City of Manila)

Intramuros, Manila

Microprocessor Lab

Laboratory Activity No. 2

Arduino and Tinkercad Interface

Score

Submitted by:

Termulo, Erica Rose C.

<Saturday 10:00a-1:00p > / <CPE 0412.1-1>

Date Submitted

30-09-2023

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 diagram of a ring counter that display eight (8)LEDs starting from left.

III. Results

https://www.tinkercad.com/things/96n0lBfgGqU-terrific-jaban/editel?sharecode=lJOIWkZgYoVJxRrP1JfQ5Q2H1ZTR2nLBHKXGf2_y5kw

TinkerCad

Exercise 1: Write a code that does a ring counter display for eight (8) LEDs starting from left.
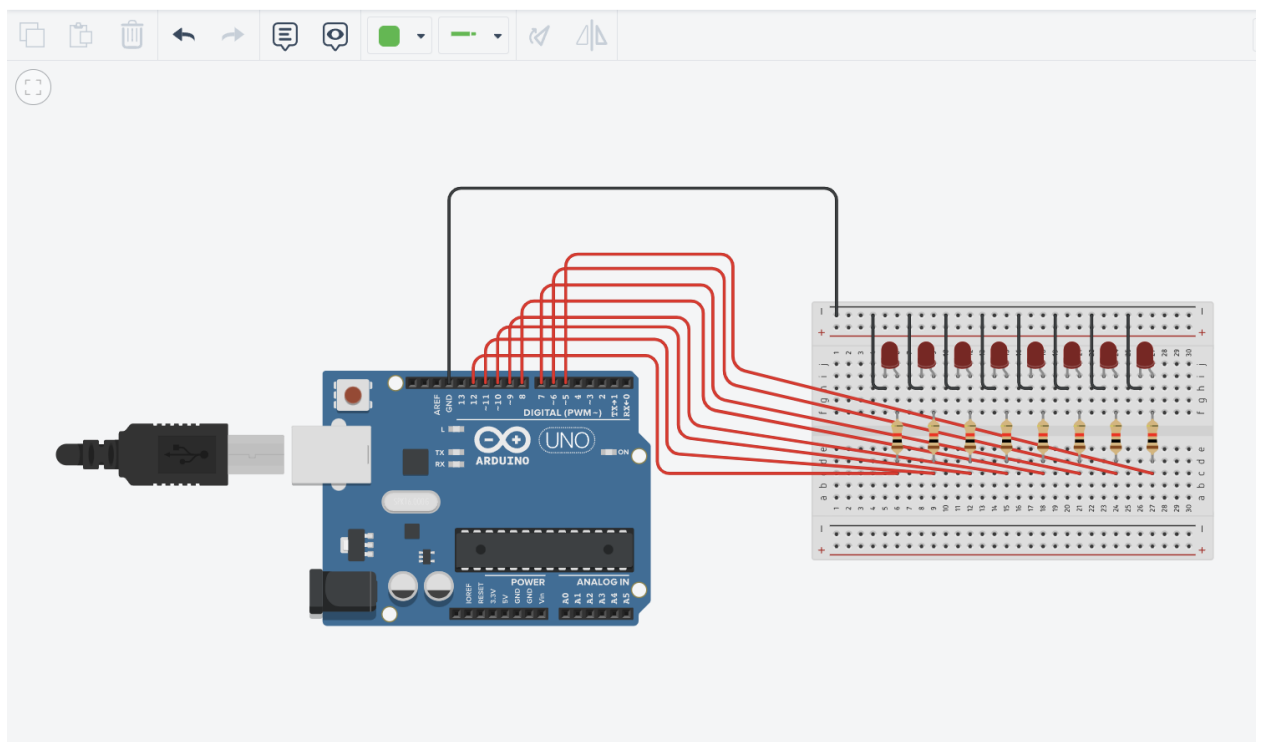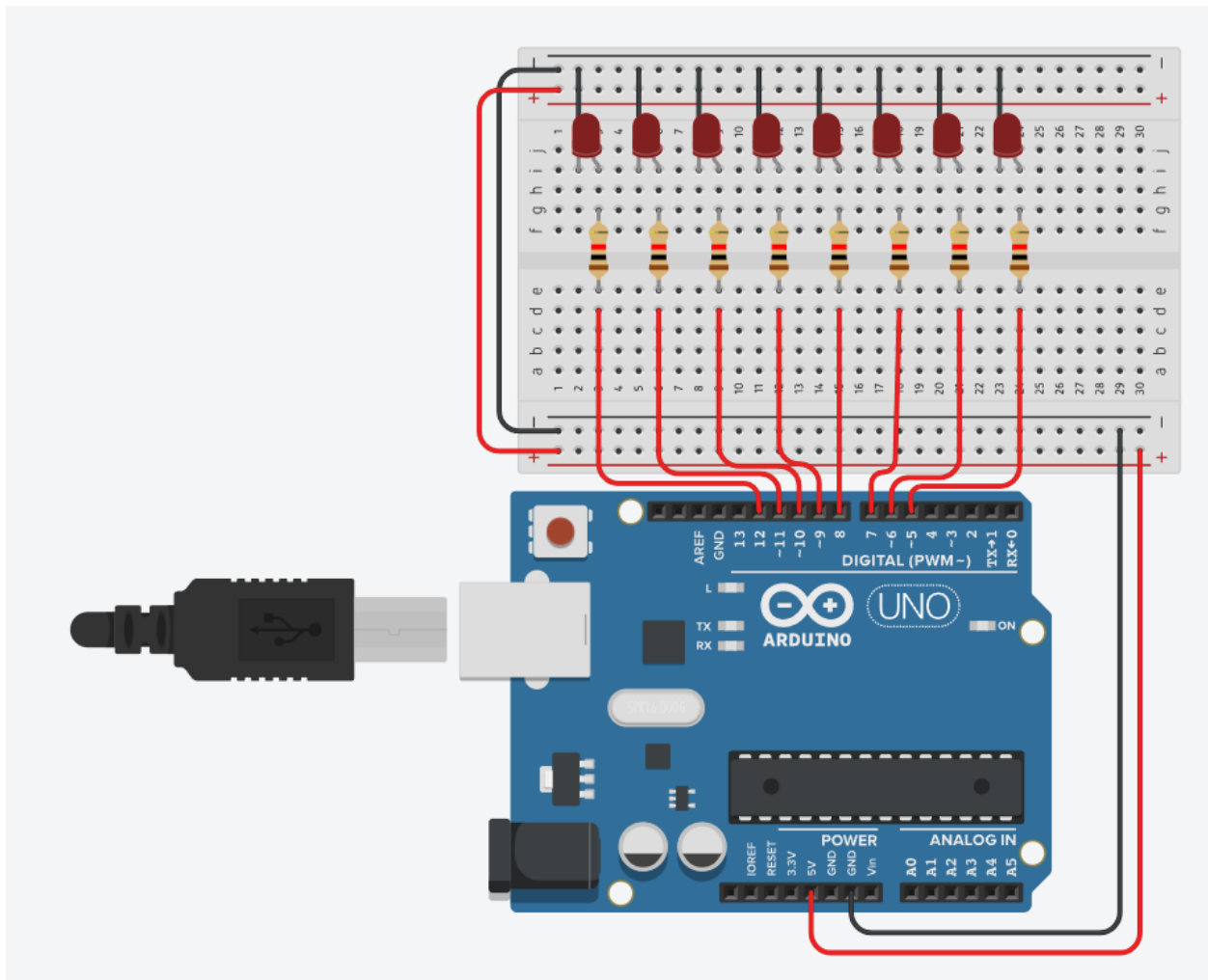

Figure No.1 Ring Counter Display Circuit Diagram

Figure No.2 Own Simulation of Ring Counter Display Circuit Diagram

Components Used

1. 8 LEDs

2. Resistor

3. Breadboard

CODE:

```cpp
// C++ code
//
/*Ring counter display for eight (8) LEDs starting from left.
*/
void setup()
{
  Serial.begin(9600);
  pinMode(5, OUTPUT);
  pinMode(6, OUTPUT);
  pinMode(7, OUTPUT);
  pinMode(8, OUTPUT);
  pinMode(9, OUTPUT);
  pinMode(10, OUTPUT);
  pinMode(11, OUTPUT);
  pinMode(12, OUTPUT);
}

void loop()
{
  digitalWrite(12, HIGH);
  delay(500); // Wait for 500 millisecond(s)
  digitalWrite(12, LOW);
  delay(500); // Wait for 500 millisecond(s)

  digitalWrite(11, HIGH);
  delay(500); // Wait for 500 millisecond(s)
  digitalWrite(11, LOW);
  delay(500); // Wait for 500 millisecond(s)

  digitalWrite(10, HIGH);
```

```
 delay(500); // Wait for 500 millisecond(s)
 digitalWrite(10, LOW);
 delay(500); // Wait for 500 millisecond(s)

 digitalWrite(9, HIGH);
 delay(500); // Wait for 500 millisecond(s)
 digitalWrite(9, LOW);
 delay(500); // Wait for 500 millisecond(s)

 digitalWrite(8, HIGH);
 delay(500); // Wait for 500 millisecond(s)
 digitalWrite(8, LOW);
 delay(500); // Wait for 500 millisecond(s)

 digitalWrite(7, HIGH);
 delay(500); // Wait for 500 millisecond(s)
 digitalWrite(7, LOW);
 delay(500); // Wait for 500 millisecond(s)

 digitalWrite(6, HIGH);
 delay(500); // Wait for 500 millisecond(s)
 digitalWrite(6, LOW);
 delay(500); // Wait for 500 millisecond(s)

 digitalWrite(5, HIGH);
 delay(500); // Wait for 500 millisecond(s)
 digitalWrite(5, LOW);
 delay(500); // Wait for 500 millisecond(s)
}
```

```
1   // C++ code
2   //
3   /*
4     Ring counter display for eight (8) LEDs starting from left.
5   */
6
7   void setup()
8   {
9     Serial.begin(9600);
10    pinMode(5, OUTPUT);
11    pinMode(6, OUTPUT);
12    pinMode(7, OUTPUT);
13    pinMode(8, OUTPUT);
14    pinMode(9, OUTPUT);
15    pinMode(10, OUTPUT);
16    pinMode(11, OUTPUT);
17    pinMode(12, OUTPUT);
18  }
19
20  void loop()
21  {
22    digitalWrite(12, HIGH);
23    delay(500);
24    Serial.println("The LED1 is HIGH");
25    digitalWrite(12, LOW);
26    delay(500);
27    Serial.println("The LED1 is LOW");
28
29    digitalWrite(11, HIGH);
30    delay(500);
31    Serial.println("The LED2 is HIGH");
32    digitalWrite(11, LOW);
33    delay(500);
```

```
34    Serial.println("The LED2 is LOW");
35
36    digitalWrite(10, HIGH);
37    delay(500);
38    Serial.println("The LED3 is HIGH");
39    digitalWrite(10, LOW);
40    delay(500);
41    Serial.println("The LED3 is LOW");
42
43    digitalWrite(9, HIGH);
44    delay(500);
45    Serial.println("The LED4 is HIGH");
46    digitalWrite(9, LOW);
47    delay(500);
48    Serial.println("The LED4 is LOW");
49
50    digitalWrite(8, HIGH);
51    delay(500);
52    Serial.println("The LED5 is HIGH");
53    digitalWrite(8, LOW);
54    delay(500);
55    Serial.println("The LED5 is LOW");
56
57    digitalWrite(7, HIGH);
58    delay(500);
59    Serial.println("The LED6 is HIGH");
60    digitalWrite(7, LOW);
61    delay(500);
62    Serial.println("The LED6 is LOW");
63
64    digitalWrite(6, HIGH);
65    delay(500);
66    Serial.println("The LED7 is HIGH");
```

IV. Conclusion

The provided C++ code in Tinkercad is designed to create a ring counter display for eight LEDs, starting from the leftmost LED and moving towards the right. The code is set up to repeatedly turn each LED on for 500 milliseconds and then turn it off for another 500 milliseconds before moving to the next LED. Here's a summary of what the code does:

1. It initializes the serial communication at a baud rate of 9600 and sets pins 5 to 12 as OUTPUT pins to control the LEDs.

2. In the `loop()` function, it sequentially turns on and off each LED in the following order:

   - LED connected to pin 12

   - LED connected to pin 11

   - LED connected to pin 10

   - LED connected to pin 9

   - LED connected to pin 8

   - LED connected to pin 7

   - LED connected to pin 6

   - LED connected to pin 5

Each LED remains on for 500 milliseconds and then turns off for 500 milliseconds before the next LED is activated. This sequence repeats continuously, creating a visual effect where the LEDs light up one after another, simulating a ring counter display.

Overall, the code effectively achieves the desired ring counter display for the eight LEDs, providing a clear and simple example of controlling multiple LEDs with Arduino.

References

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