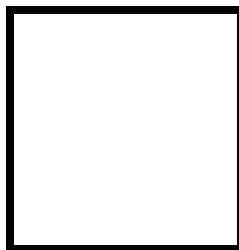




PAMANTASAN NG LUNGSOD NG MAYNILA
(University of the City of Manila)
Intramuros, Manila

Microprocessor Lab

Laboratory Activity No. 2
Arduino and Tinkercad Interface



Score

Submitted by:
Isidro, Cheilo Marie P.
Sat 10:00-1:00 / CPE 0412.1-1

Date Submitted
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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.

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

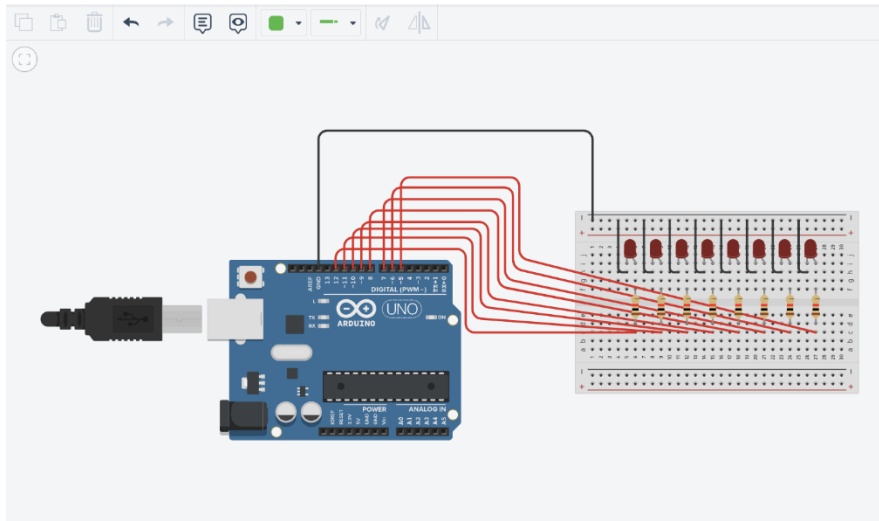


Figure No.1 Ring Counter Display Circuit Diagram

Components Used

1. 8 LEDs
2. Resistor
3. Breadboard

CODE:

```
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);
```

```

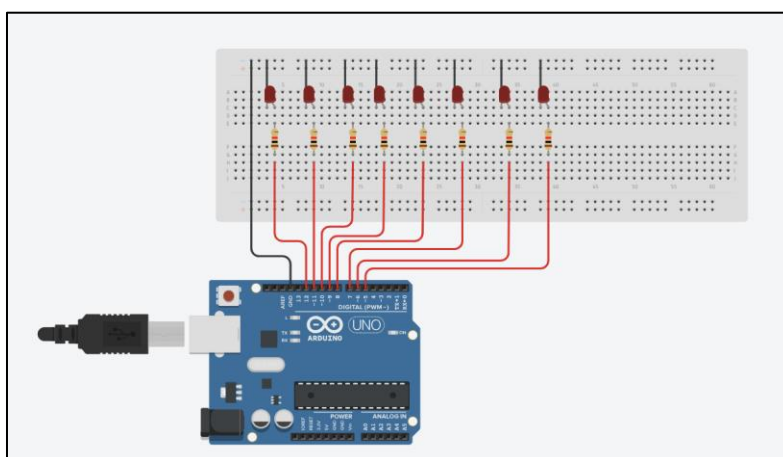
34 Serial.println("The LED2 is LOW");
35
36 digitalWrite(10, HIGH);
37 delay(500);
38 Serial.println("The LED3 is HIGH");
39 digitalWrite(10, LOW);
40 delay(500);
41 Serial.println("The LED3 is LOW");
42
43 digitalWrite(9, HIGH);
44 delay(500);
45 Serial.println("The LED4 is HIGH");
46 digitalWrite(9, 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");
67
68 digitalWrite(6, LOW);
69 delay(500);
70 Serial.println("The LED7 is LOW");
71
72 digitalWrite(5, HIGH);
73 delay(500);
74 Serial.println("The LED8 is HIGH");
75 digitalWrite(5, LOW);
76 delay(500);
77 Serial.println("The LED8 is LOW");
78 }

```

III. Results

Tinker Cad Link:

https://www.tinkercad.com/things/dplz8dNzVEn-super-hango/editel?sharecode=FAuqxZtjjBMeFbaoW6-ytw3_Nf5xJJzTuAO5NbXy0U



Type Written Code:

```

// C++ code
// Ring counter display for eight (8) LEDs

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);
    Serial.println("The LED1 is HIGH");
    digitalWrite(12,LOW);
    delay(500);
    Serial.println("The LED1 is LOW");

    digitalWrite(11,HIGH);
    delay(500);
    Serial.println("The LED1 is HIGH");
    digitalWrite(11,LOW);
    delay(500);
    Serial.println("The LED1 is LOW");

    digitalWrite(10,HIGH);
    delay(500);
    Serial.println("The LED1 is HIGH");
    digitalWrite(10,LOW);
    delay(500);
    Serial.println("The LED1 is LOW");

    digitalWrite(9,HIGH);
    delay(500);
    Serial.println("The LED1 is HIGH");
    digitalWrite(9,LOW);
    delay(500);
    Serial.println("The LED1 is LOW");

    digitalWrite(8,HIGH);
    delay(500);
    Serial.println("The LED1 is HIGH");
    digitalWrite(8,LOW);
    delay(500);
    Serial.println("The LED1 is LOW");

    digitalWrite(7,HIGH);
    delay(500);
    Serial.println("The LED1 is HIGH");
    digitalWrite(7,LOW);
    delay(500);
    Serial.println("The LED1 is LOW");

```

```

digitalWrite(6,HIGH);
delay(500);
Serial.println("The LED1 is HIGH");
digitalWrite(6,LOW);
delay(500);
Serial.println("The LED1 is LOW");

digitalWrite(5,HIGH);
delay(500);
Serial.println("The LED1 is HIGH");
digitalWrite(5,LOW);
delay(500);
Serial.println("The LED1 is LOW");
}

```

IV. Conclusion

When the provided C++ program is executed, it will create a visually appealing and interactive LED display. The code sets up eight LEDs, and they will light up one after the other in sequence with a half-second interval, creating a clockwise "ring" effect. As each LED turns on, the program will print a message to the Serial monitor indicating that the LED is "HIGH," and when the LED turns off, it will print that it is "LOW." This sequence will continue indefinitely, giving the impression of a rotating light pattern, with each LED briefly illuminating before passing the "light" to the next one. Overall, this code produces a simple yet visually engaging LED ring counter display that can be observed both through the LEDs themselves and in the Serial monitor.

In conclusion, the provided C++ code demonstrates a ring counter display for eight LEDs. The program sets up the pins for the LEDs and then repeatedly cycles through them, turning each LED on and off in sequence with a 500-millisecond delay while also printing the LED state to the Serial monitor. This code creates a simple visual and serial output pattern for controlling the LEDs in a ring counter fashion.

References

- [1] C. Isidro. 'Arduino and Tinkercad Interface,' Pamantasan Lungsod ng Maynila, 2023
- [2] "Ring Counter in Digital Logic," *GeeksforGeeks*, Jun. 26, 2018. <https://www.geeksforgeeks.org/ring-counter-in-digital-logic/>