

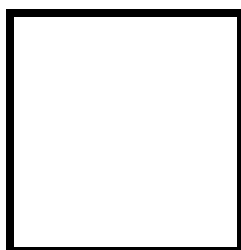


**PAMANTASAN NG LUNGSOD NG MAYNILA**  
(University of the City of Manila)  
Intramuros, Manila

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**Microprocessor Lab**

Laboratory Activity No. 2  
**Arduino and Tinkercad Interface**



Score

*Submitted by:*  
**Aquino, Aaliyah May A.**  
**Saturday 10:00AM – 1:00PM / CPE 0412.1-1**

*Date Submitted*  
**04-11-2023**

*Submitted to:*  
**Engr. Maria Rizette H. Sayo**

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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- Sample Result

SAMPLE

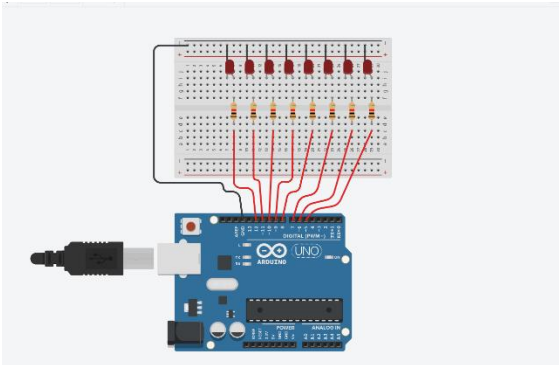


Figure No.1

Components Used

1. 8 LEDs
2. Resistor
3. Breadboard
4. Arduino Uno

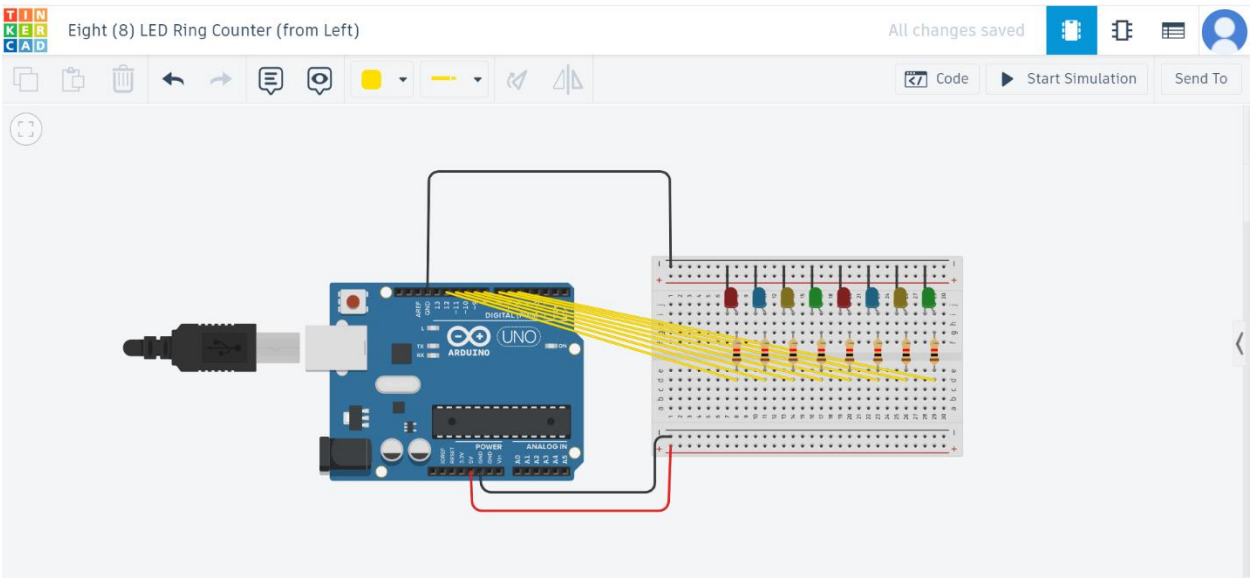
GIVEN CODE:

```
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 }
```

IV. Conclusion

# RESULTS

## Breadboard and Arduino Uno (TinkerCAD)



# CODE

```
Text
1 // C++ code
2 //AQUINO, AALIYAH MAY A.
3 /*
4  * Ring Counter Display for Eight (8) LEDs starting from left.
5  */
6
7
8 void setup()
9 {
10   Serial.begin(9600);
11   pinMode(5, OUTPUT);
12   pinMode(6, OUTPUT);
13   pinMode(7, OUTPUT);
14   pinMode(8, OUTPUT);
15   pinMode(9, OUTPUT);
16   pinMode(10, OUTPUT);
17   pinMode(11, OUTPUT);
18   pinMode(12, OUTPUT);
19 }
20
21
22 void loop()
23 {
24   digitalWrite(12, HIGH);
25   delay(500); // Wait for 500 millisecond(s)
26   Serial.println("LED 1 is HIGH");
27   digitalWrite(12, LOW);
28   delay(500); // Wait for 500 millisecond(s)
29   Serial.println("LED 1 is LOW");
30
31   digitalWrite(11, HIGH);
32   delay(500); // Wait for 500 millisecond(s)
33   Serial.println("LED 2 is HIGH");
34   digitalWrite(11, LOW);
35   delay(500); // Wait for 500 millisecond(s)
36   Serial.println("LED 2 is LOW");
37
38   digitalWrite(10, HIGH);
39   delay(500); // Wait for 500 millisecond(s)
40   Serial.println("LED 3 is HIGH");
41   digitalWrite(10, LOW);
42   delay(500); // Wait for 500 millisecond(s)
43   Serial.println("LED 3 is LOW");
44 }
```

Text

1 (Arduino Uno R3)

48

digitalWrite(9, HIGH);

49

delay(500); // Wait for 500 millisecond(s)

50

Serial.println("LED 4 is HIGH");

51

digitalWrite(9, LOW);

52

delay(500); // Wait for 500 millisecond(s)

53

Serial.println("LED 4 is LOW");

54

55

56

digitalWrite(8, HIGH);

57

delay(500); // Wait for 500 millisecond(s)

58

Serial.println("LED 5 is HIGH");

59

digitalWrite(8, LOW);

60

delay(500); // Wait for 500 millisecond(s)

61

Serial.println("LED 5 is LOW");

62

63

digitalWrite(7, HIGH);

64

delay(500); // Wait for 500 millisecond(s)

65

Serial.println("LED 6 is HIGH");

66

digitalWrite(7, LOW);

67

delay(500); // Wait for 500 millisecond(s)

68

Serial.println("LED 6 is LOW");

69

70

digitalWrite(6, HIGH);

71

delay(500); // Wait for 500 millisecond(s)

72

Serial.println("LED 7 is HIGH");

73

digitalWrite(6, LOW);

74

delay(500); // Wait for 500 millisecond(s)

75

Serial.println("LED 7 is LOW");

76

77

digitalWrite(5, HIGH);

78

delay(500); // Wait for 500 millisecond(s)

79

Serial.println("LED 8 is HIGH");

80

digitalWrite(5, LOW);

81

delay(500); // Wait for 500 millisecond(s)

82

Serial.println("LED 8 is LOW");

83

84

85

}

86

87

88

89

90

Serial Monitor

DEMONSTRATION

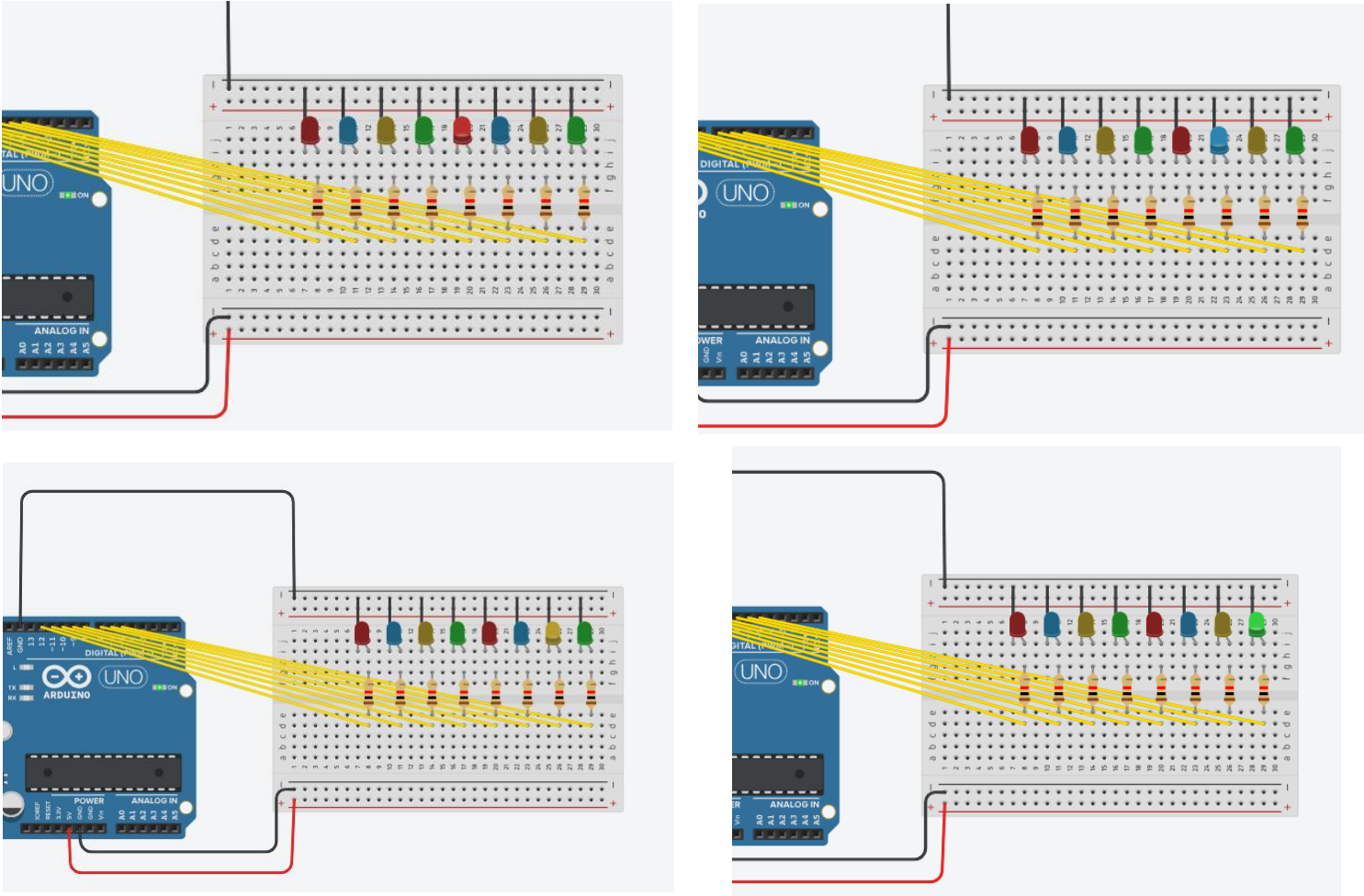
The image contains four sub-diagrams, each showing an Arduino Uno R3 connected to a breadboard with 8 LEDs. In each diagram, a single LED is highlighted with yellow lines indicating its connection to a specific digital pin on the Arduino. The LEDs are arranged in two rows of four on the breadboard. The top row has LEDs with red, blue, yellow, and green heads. The bottom row has LEDs with red, blue, yellow, and green heads. The wiring for each LED is as follows:

- Diagram 1: LED 1 (red head) connected to digital pin 9.
- Diagram 2: LED 2 (blue head) connected to digital pin 8.
- Diagram 3: LED 3 (yellow head) connected to digital pin 7.
- Diagram 4: LED 4 (green head) connected to digital pin 6.

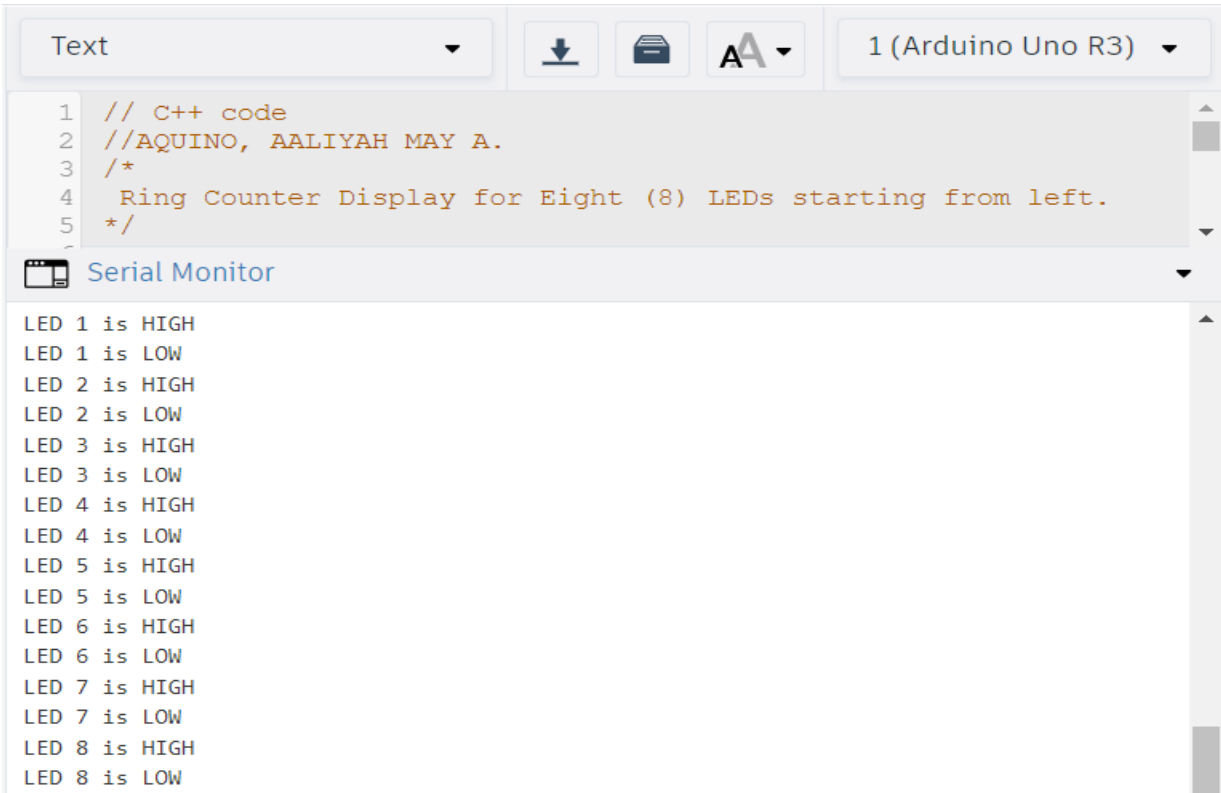
In all diagrams, the other three LEDs in each row are connected to ground (GND) on the breadboard. The Arduino's power pins are connected to the breadboard's power rails: 5V to the positive rail and GND to the ground rail.

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PLM\_CpE



SERIAL MONITOR



CONCLUSION:

This laboratory activity explores the functionalities of an Arduino Uno by simulating a simple LED circuit board in TinkerCAD. The activity made use of fundamental components and while the coding may be straightforward, it’s good practice that will definitely be integrated in more complex projects in the future. Overall, it was an enjoyable learning experience and increased my familiarity with Arduino Uno, coding with integration of hardware components, and TinkerCAD

## References

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

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