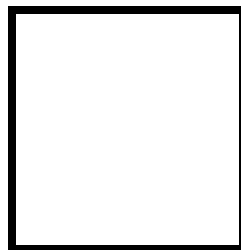**PAMANTASAN NG LUNGSOD NG MAYNILA**

(University of the City of Manila)

Intramuros, Manila

Microprocessor Lab

Laboratory Activity No. 2
Arduino and Tinkercad Interface

Score

Submitted by:
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Saturday 1PM-4PM / CPE 0412.1-2

Date Submitted
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Submitted to:

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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.   Results

TinkerCad

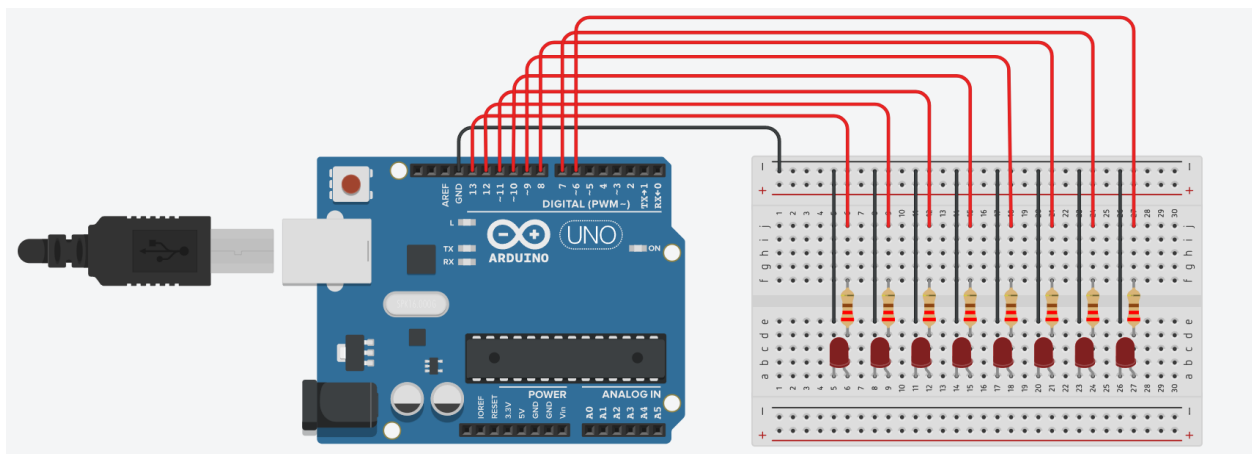**Exercise 1: Write a code that does a ring counter display for eight (8) LEDs starting from left.**

Figure No.1 Ring Counter Display Circuit Diagram

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()
{
  pinMode(13, OUTPUT);
  pinMode(12, OUTPUT);
  pinMode(11, OUTPUT);
  pinMode(10, OUTPUT);
  pinMode(9, OUTPUT);
  pinMode(8, OUTPUT);
  pinMode(7, OUTPUT);
  pinMode(6, OUTPUT);
  Serial.begin(9600);
}

void loop()
{
  digitalWrite(13, HIGH);
  delay(500);
  Serial.println("The LED1 is HIGH");
  digitalWrite(13, LOW);
  delay(500);
  Serial.println("The LED1 is LOW");

  digitalWrite(12, HIGH);
  delay(500);
  Serial.println("The LED2 is HIGH");
  digitalWrite(12, LOW);
  delay(500);
  Serial.println("The LED2 is LOW");

  digitalWrite(11, HIGH);
  delay(500);
  Serial.println("The LED3 is HIGH");
  digitalWrite(11, LOW);
  delay(500);
  Serial.println("The LED3 is LOW");

  digitalWrite(10, HIGH);
  delay(500);
  Serial.println("The LED4 is HIGH");
  digitalWrite(10, LOW);
  delay(500);
  Serial.println("The LED4 is LOW");

  digitalWrite(9, HIGH);
  delay(500);
  Serial.println("The LED5 is HIGH");
  digitalWrite(9, LOW);
  delay(500);
  Serial.println("The LED5 is LOW");

  digitalWrite(8, HIGH);
  delay(500);
  Serial.println("The LED6 is HIGH");
  digitalWrite(8, LOW);
  delay(500);
  Serial.println("The LED6 is LOW");

  digitalWrite(7, HIGH);
  delay(500);
  Serial.println("The LED7 is HIGH");
  digitalWrite(7, LOW);
  delay(500);
  Serial.println("The LED7 is LOW");

  digitalWrite(6, HIGH);
  delay(500);
  Serial.println("The LED8 is HIGH");
  digitalWrite(6, LOW);
  delay(500);
  Serial.println("The LED8 is LOW");
}
```

IV. Conclusion

The main goal of this activity was to make a ring counter display for 8 LEDs starting from the left. Utilizing TinkerCAD, the circuit was simulated by assembling the circuit components (LEDs, Arduino Uno, and Resistors), and by writing and executing the given code for this exercise. First, the basic concepts in Arduino and constructing simple circuits were applied. The cathode legs of the LED were connected to the GROUND pin of the Arduino, while the anode legs were connected to the digital pins, with a 220 ohms resistor connected to it to prevent electrical stress. Connecting them to the digital pins and using the digitalWrite() function enabled the turning on and off of each LED, by setting it to either HIGH or LOW . Adding delay() between the commands set the timing for the ring counter display, telling it exactly when to light up and when to turn off, creating an effect moving from left to right. This was demonstrated after starting the simulation, thus, successfully achieving the objective of this experiment.

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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