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 1:00pm-7:00pm> / <0412-2>

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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.

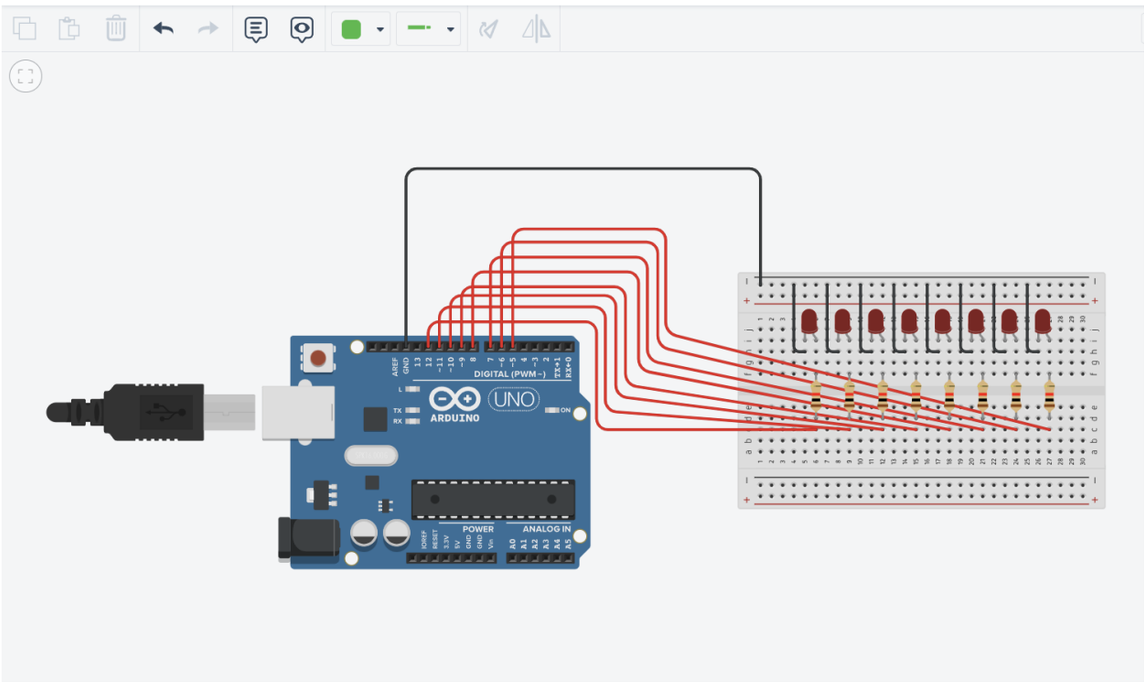

Figure No.1 Ring Counter Display Circuit Diagram

Components Used

1. 8 LEDs
2. Resistor
3. Breadboard

CODE:

```
// 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);
  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 LED2 is HIGH");
  digitalWrite(11, LOW);
  delay(500);
```

```
  Serial.println("The LED2 is LOW");

  digitalWrite(10, HIGH);
  delay(500);
  Serial.println("The LED3 is HIGH");
  digitalWrite(10, LOW);
  delay(500);
  Serial.println("The LED3 is LOW");

  digitalWrite(9, HIGH);
  delay(500);
  Serial.println("The LED4 is HIGH");
  digitalWrite(9, LOW);
  delay(500);
  Serial.println("The LED4 is LOW");

  digitalWrite(8, HIGH);
  delay(500);
  Serial.println("The LED5 is HIGH");
  digitalWrite(8, LOW);
  delay(500);
  Serial.println("The LED5 is LOW");

  digitalWrite(7, HIGH);
  delay(500);
  Serial.println("The LED6 is HIGH");
  digitalWrite(7, LOW);
  delay(500);
  Serial.println("The LED6 is LOW");

  digitalWrite(6, HIGH);
  delay(500);
  Serial.println("The LED7 is HIGH");
```

```
  digitalWrite(6, LOW);
  delay(500);
  Serial.println("The LED7 is LOW");

  digitalWrite(5, HIGH);
  delay(500);
  Serial.println("The LED8 is HIGH");
  digitalWrite(5, LOW);
  delay(500);
  Serial.println("The LED8 is LOW");

}
```

Refer to this link for my tinkercad diagram:

https://www.tinkercad.com/things/1gFzYeCggAt-glorious-lappi-crift/editel?sharecode=_U6_ihHZfu7GxGNyFIh7DcFHI30xGNiSBenCHrOUkzg

IV. Conclusion

A ring counter is a type of counter composed of flip-flops connected into a shift register, with the output of the last flip-flop fed to the input of the first, making a "circular" or "ring" structure. The provided C++ code creates a ring counter display for eight LEDs that sequentially light up from left to right and then turn off in a repeating loop. In the setup function, it initializes serial communication and sets the pinMode for each of the eight LEDs as OUTPUT. In the loop function, the code uses a repetitive pattern to turn on each LED one at a time with a delay of 500 milliseconds, followed by printing a message indicating which LED is currently high. Then, it turns off the same LED and prints a corresponding message. This process repeats for all eight LEDs in sequence. I noticed that the given C++ code can be enhance by using loops and arrays to reduce redundancy.

References

[1] *Controlling LEDs with A Multiplexer and Arduino*. (2022, November 15). Maker Portal. https://makersportal.com/blog/2019/3/12/controlling-leds-with-multiplexer-and-arduino

[2] techZeero. (2020, February 24). Controlling Multiple LEDs With Arduino - 6 Steps. TechZeero. https://techzeero.com/arduino-tutorials/controlling-multiple-leds-with-arduino/?fbclid=IwAR30DdrW8fFKGw-tlL0RhEtczevvP9ztVUM_sJP2RRxN64kzIK9Jzx8IYJI

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