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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S 01:00 pm – 07:00 pm / CPE 0412.2 - 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.

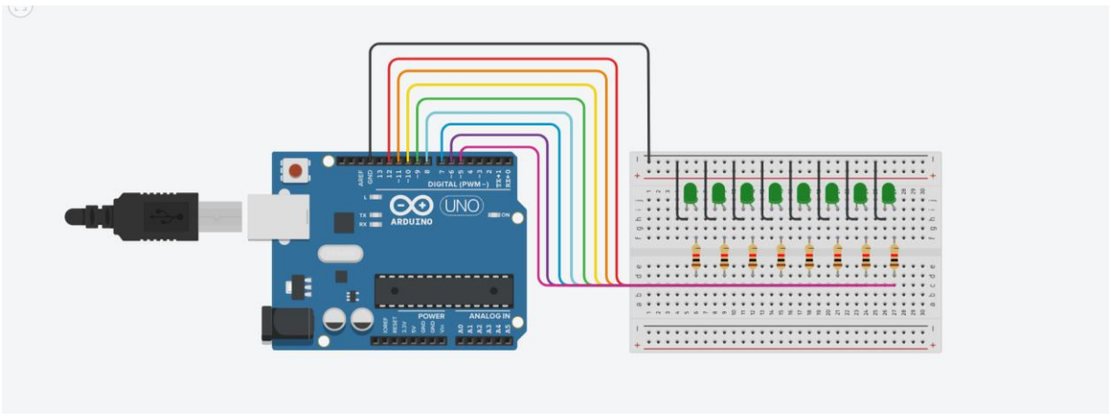

Figure No.1 Ring Counter Display Circuit Diagram

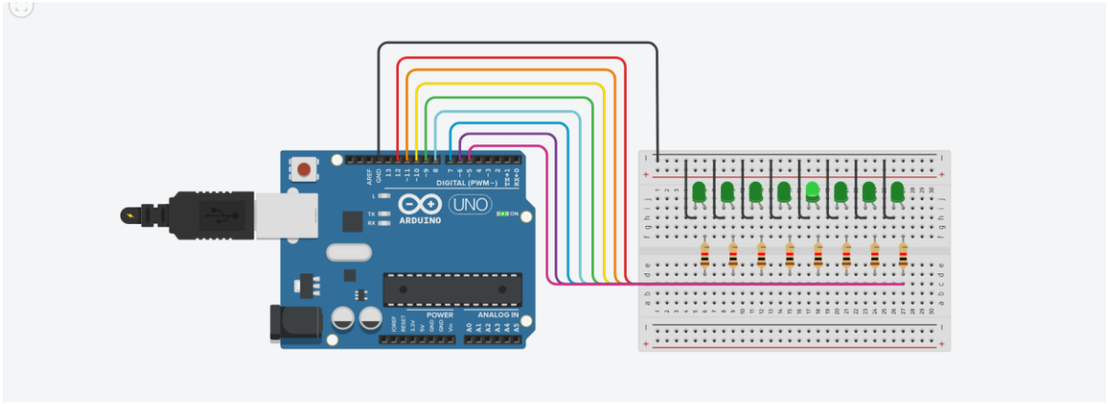

Figure No. 2 Ring Counter Display Circuit working

Components Used

1. 8 LEDs
2. Resistor
3. Breadboard

CODE:

```
// C++ code
//
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");

}
```

IV. Conclusion

The code was written for an Arduino microcontroller and controls a sequence of LEDs. It configures pins 5 to 12 as OUTPUT pins, which means they can be used to control LEDs or other devices. The loop function is the main program loop that repeats indefinitely. It follows a specific pattern for each LED.

It sets one of the pins which turns on an LED, then waits for 500 milliseconds using the delay function. It will then print a message to the Serial Monitor using the Serial.println function to indicate that a specific LED is set to HIGH. It sets the same pin back to LOW, turning off the LED. It then again waits for 500 milliseconds. It will then print a message to the Serial Monitor indicating that the same LED is now LOW. This process is repeated for each of the eight LEDs, with a delay between each LED's HIGH and LOW state and corresponding messages printed to the Serial Monitor.

This code works as a simple LED sequence controller. It turns on each LED one at a time, waits for half a second, and then turns it off while logging messages to the Serial Monitor to provide feedback about which LED is currently on or off. The delay between each LED transition creates a sequential blinking pattern, allowing you to see the LEDs light up in a sequence.

References

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

[2] “How RGB LEDs work and how to control color,” CircuitBread, Aug. 10, 2023. https://www.circuitbread.com/tutorials/how-rgb-leds-work-and-how-to-control-color (accessed Sep. 30, 2023).