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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Sat 10:00AM - 1:00PM / CPE 0412-1

Date Submitted
09-30-2023

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.

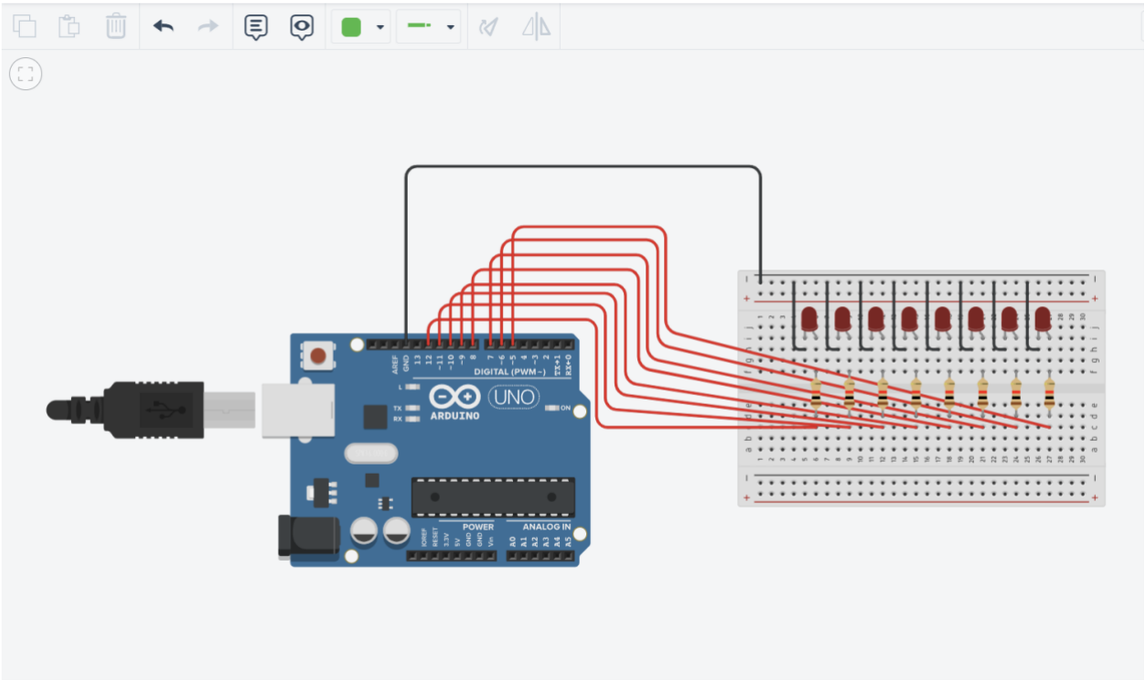


Figure No.1 Ring Counter Display Circuit Diagram

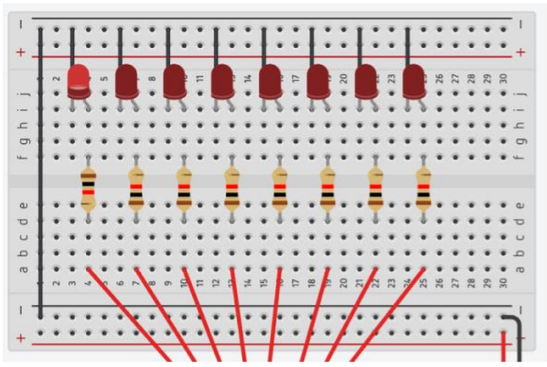
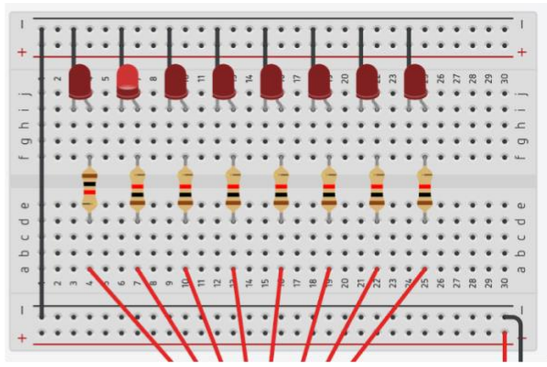
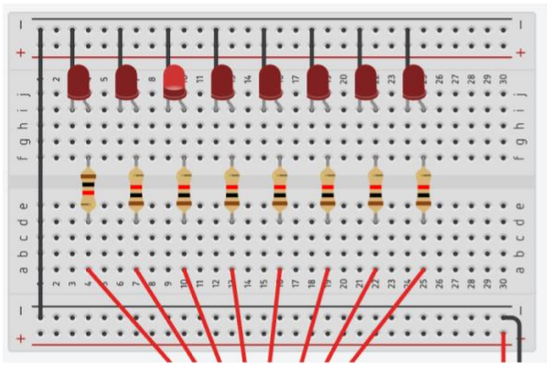
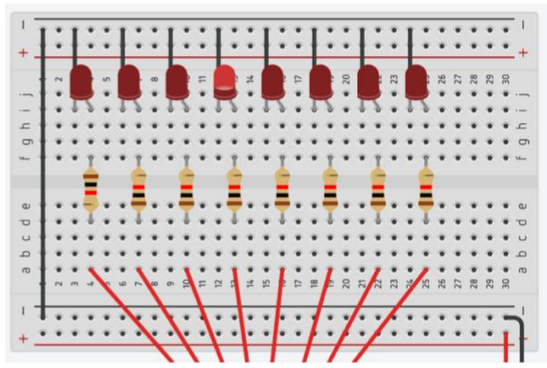
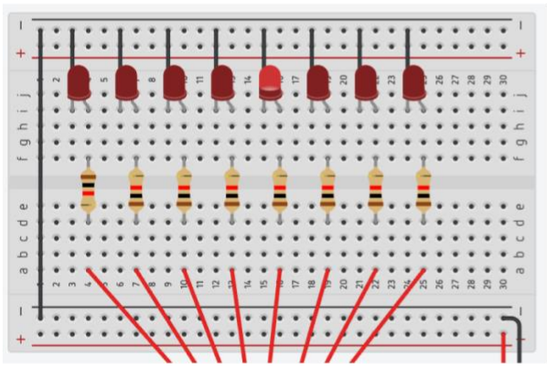
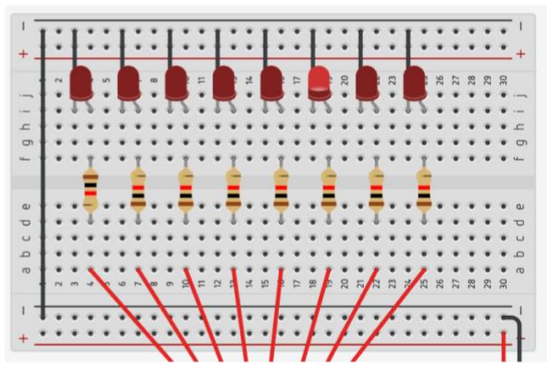
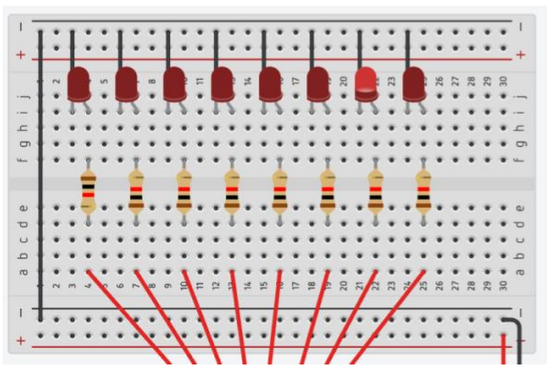
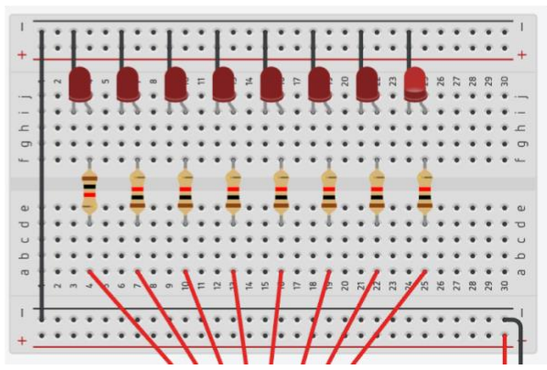
Components Used

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");

}
```

IV. RESULTS

Serial Monitor

```
The LED4 is HIGH
The LED4 is LOW
The LED5 is HIGH
The LED5 is LOW
The LED6 is HIGH
The LED6 is LOW
The LED7 is HIGH
The LED7 is LOW
The LED8 is HIGH
The LED8 is LOW
The LED1 is HIGH
The LED1 is LOW
The LED2 is HIGH
The LED2 is LOW
The LED3 is HIGH
The LED3 is LOW
The LED4 is HIGH
The LED4 is LOW
The LED5 is HIGH
The LED5 is LOW
```

V. Conclusion

In this laboratory activity, we set out to apply the principles and techniques of hardware programming using Arduino. Our primary objectives were to create an Arduino program and corresponding circuit diagram that portrays a ring counter. [2] Ring counters using LEDs are often used for visual indication or sequencing purposes in digital electronics projects. They can be used in applications such as traffic lights, chaser lights, or any scenario where a sequential pattern of lights is desired.

To meet these objectives, we successfully implemented a ring counter using an Arduino microcontroller. The ring counter was designed to illuminate eight LEDs sequentially, starting from the leftmost LED and progressing in a circular fashion. This task required the integration of hardware components such as LEDs, resistors, and a breadboard, all of which were interconnected to form the circuit.

Through this hands-on experience, we gained valuable insights into hardware programming and the use of Arduino, a versatile platform for creating interactive and embedded systems. We learned how to write code that controls the behavior of hardware components, in this case, the LEDs, and how to design a circuit to bring our program to life.

Furthermore, this activity helped us develop problem-solving skills by addressing the challenge of creating a ring counter that produced the desired LED pattern. We had to consider factors such as the timing of LED activations and the correct wiring of components to ensure the counter functioned as intended.

In conclusion, this laboratory activity was a practical and engaging way to explore hardware programming concepts using Arduino. It provided us with hands-on experience in both coding and circuit design, which are essential skills for anyone interested in the field of electronics and embedded systems development. By successfully completing this exercise, we have taken a step forward in our understanding of Arduino and its applications in real-world projects.

Tinkercad Link

References

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

[2] J. D. Brown and Z. G. Vranesic, "Foundations of Digital Logic Design," [Online]. Available: URL.

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