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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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.

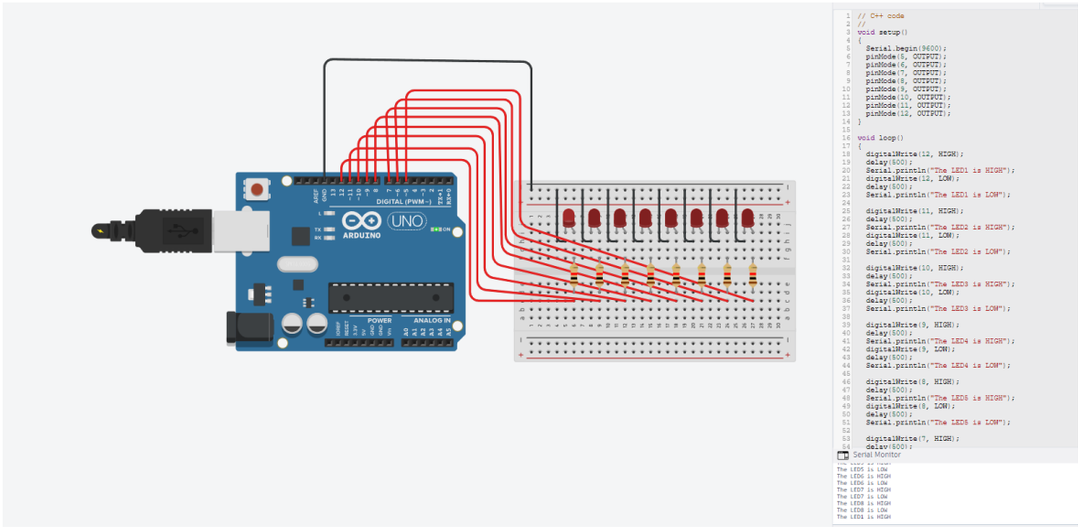

Figure No.1 Ring Counter Display Circuit Diagram

Components Used

1. 8 LEDs
2. Resistor
3. Breadboard

CODE:

```
// 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

In conclusion, the laboratory activity aimed to implement hardware programming principles and techniques using Arduino, specifically focusing on creating a ring counter display with eight LEDs. The objective was to have the LEDs light up one at a time in a sequential manner. The activity was successful in achieving this goal.

Upon writing and executing the Arduino code and designing the corresponding circuit, we observed that the LEDs blinked in a precise sequence, starting from LED 1 and progressing sequentially to LED 8. Each LED lit up at a set interval, demonstrating the functionality of a ring counter. This not only validated the principles of hardware programming but also provided a practical illustration of how a ring counter operates.

The successful completion of this laboratory activity reinforced our understanding of Arduino programming and hardware design concepts. We learned how to program and control multiple LEDs sequentially, which is a fundamental skill in embedded systems development. Additionally, this exercise introduced us to the concept of a ring counter, which has practical applications in various digital electronics circuits.

Overall, the activity served as an effective hands-on learning experience, enabling us to apply theoretical knowledge to a practical project. It highlighted the power and versatility of Arduino in implementing hardware solutions and provided valuable insights into the world of digital electronics and microcontroller programming.

References

[1] GeeksforGeeks. "Ring counter in digital logic," GeeksforGeeks, 2023. [Online]. Available: https://www.geeksforgeeks.org/ring-counter-in-digital-logic/. Accessed: [Date].

[2] "Arduino - Home," Arduino, [Online]. Available: https://www.arduino.cc/. Accessed: [Date].

[3] "Tinkercad - From mind to design in minutes," Tinkercad, [Online]. Available: https://www.tinkercad.com/. Accessed: [Date].