PAMANTASAN NG LUNGSOD NG MAYNILA
(University of the City of Manila)
Intramuros, Manila

Microprocessor Lab

Laboratory Activity No. 3
Binary Representation of 8 LEDs in TinkerCad and Arduino Programming

Score

Submitted by:
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10:00 AM – 1:00 PM Saturday / CPE 0412.1-1

Date Submitted
10-14-2023

Submitted to:

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I. **Objective:** To create Arduino circuit of Binary representation (decimal 0-256 using 8 LEDs)

II. **Methods**:

Components Used

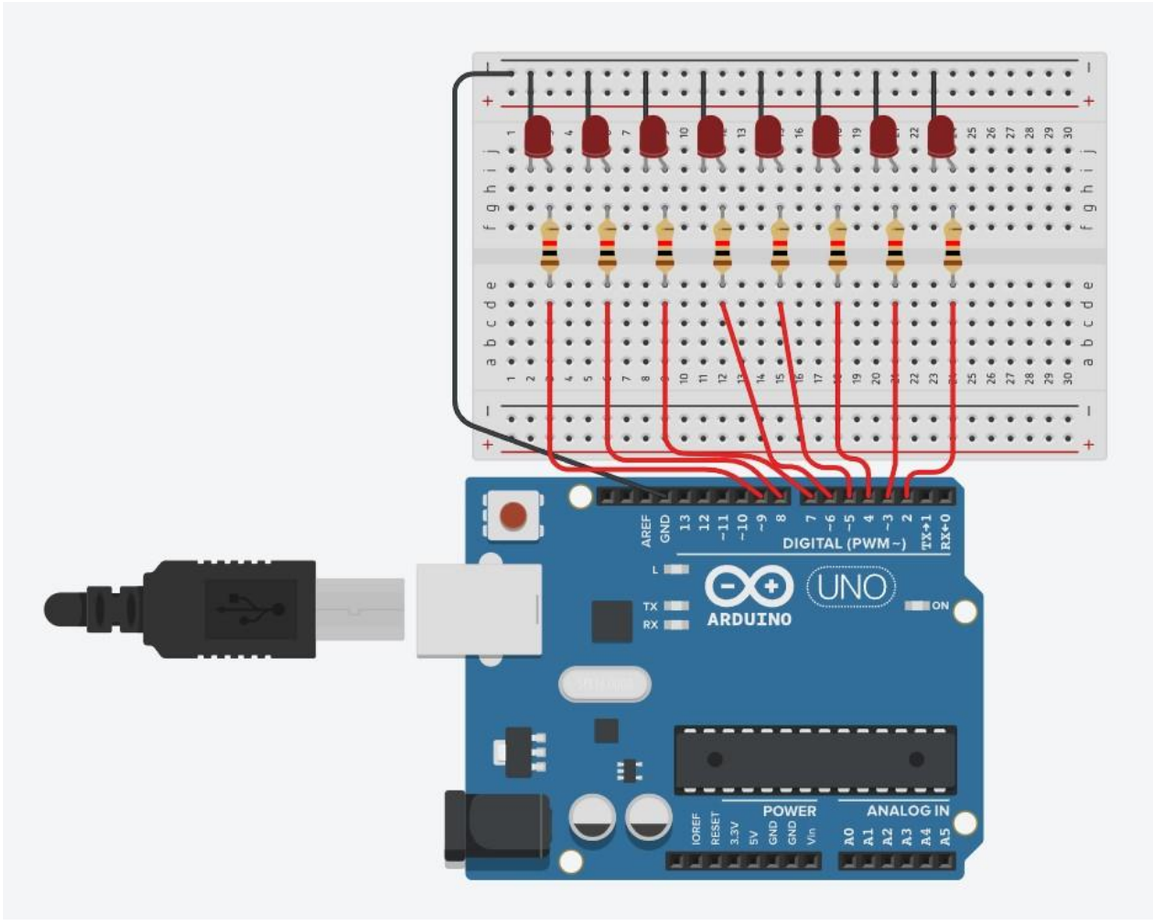
1. 8 LEDs
2. Resistor
3. Breadboard
4. Arduino Uno

CODE:

```
void setup() {
  Serial.begin(9600);  // Initialize serial communication   for
(int i = 2; i <= 9; i++) {     pinMode(i, OUTPUT);  // Set
pins 2 to 9 as OUTPUT
  }
}

void loop() {   for (int decimal = 0; decimal <= 255;
decimal++) {
    displayBinary(decimal);  // Display binary representation on LEDs
    Serial.print("Decimal: ");
    Serial.print(decimal);
    Serial.print("\tBinary: ");
    Serial.println(decimal, BIN); // Print both decimal and binary representations
delay(1000); // Adjust the delay as per your preference
  }

  while (true) {
    // Stop the program at 255
  }
}

void displayBinary(int decimal) {   for (int i = 2; i <= 9; i++) {
int bit = (decimal >> (i - 2)) & 1;     digitalWrite(i, bit);  // Display the
binary representation on LEDs   }
}
```

III. Results

TinkerCad Link: https://www.tinkercad.com/things/7SvkGg4F0an-copy-of-lab-2microprocessor-ring-counter-8leds/editel?sharecode=5D9cboH3QIMZDqzjinTySZ7wW7eq1t1Aeb_Uc1afLZA



IV. Conclusion

In this laboratory project, we successfully demonstrated the binary representation of decimal numbers using an Arduino and a circuit with 8 LEDs. The code and circuit were set up to display the binary representation of numbers from 0 to 255.

Key Takeaways:

1. The setup() function initializes serial communication and configures pins 2 to 9 as output pins for the LEDs.

2. The loop() function iterates through decimal values from 0 to 255, displaying the binary representation on the LEDs and printing both the decimal and binary representations to the serial monitor.

3. The displayBinary() function is responsible for calculating and displaying the binary values on the LEDs.

4. This project is an excellent educational tool for understanding how binary representation works and how it can be applied practically using Arduino and LEDs.

5. The delay(1000) function allows for a one-second pause between each binary representation display, making it easy to observe and study.

In conclusion, this laboratory project serves as a hands-on way to learn about binary representation, Arduino programming, and digital electronics. Understanding binary is fundamental in computer science, and this project provides a tangible way to visualize this concept.
It can be a great starting point for further explorations into digital systems and programming.

References

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

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