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

Microprocessor Lab

Laboratory Activity No. 2

Binary Representation of 8 LEDs in TinkerCad And Arduino Programming

Score

Submitted by:
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Submitted to:

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I. Objectives

The objective of this laboratory acitivity is to investigate and demonstrate the binary representation of 8 Light Emitting Diodes (LEDs) in TinkerCad through the utilization of Arduino programming. This experiment aims to provide a comprehensive understanding of binary numbering systems and their application in controlling multiple LEDs, fostering proficiency in Arduino programming, and gaining practical experience with TinkerCad for virtual circuit simulation.

II. Method/s

- Write a code and perform an Arduino circuit diagram of a Binary representation (decimal 0-255 using 8 LEDs)

Materials Needed:

1. Arduino Uno
2. 8 LEDs
3. 8 220 Ohms Resistors
4. Breadboard
5. Jumper / Connecting Wires
6. Computer with TinkerCad and Arduino IDE Installed

TinkerCad Simulation Link: *https://www.tinkercad.com/things/cDmxS4mSppM-tremendous-maimu-uusam/editel?sharecode=daYChWtQPK0_dReiMEn4fDOkatGQ9LFKMuEN3MdYHJY*

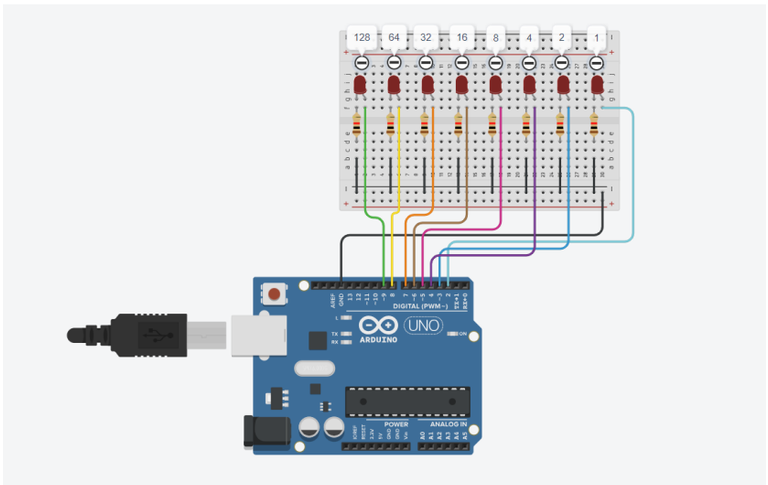


Figure 1: Simulation in TinkerCad of Binary Representation of 8 LEDS

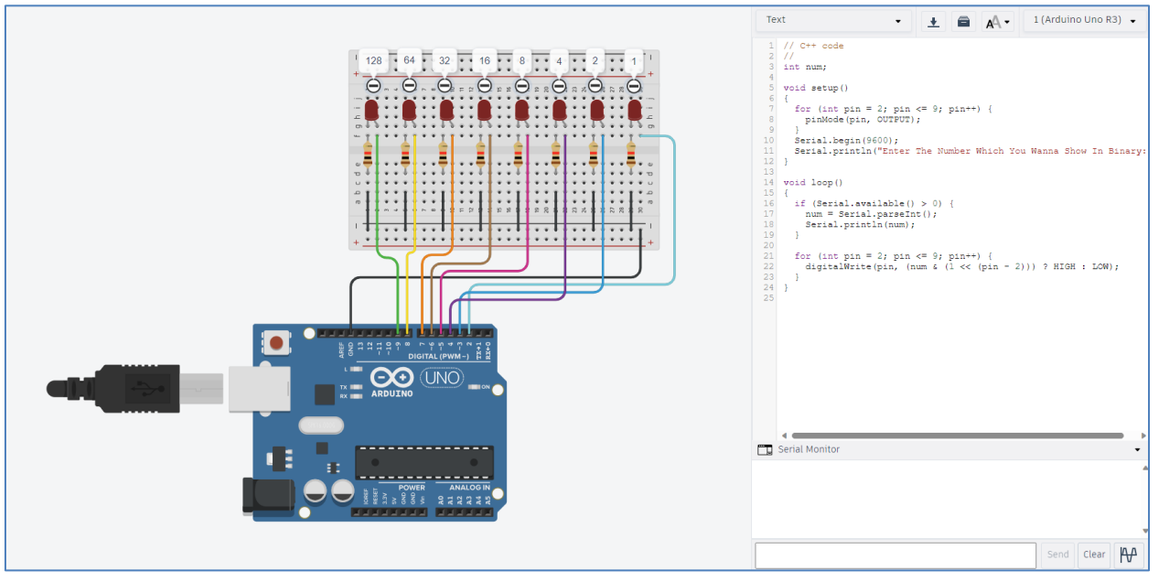
Written Code:

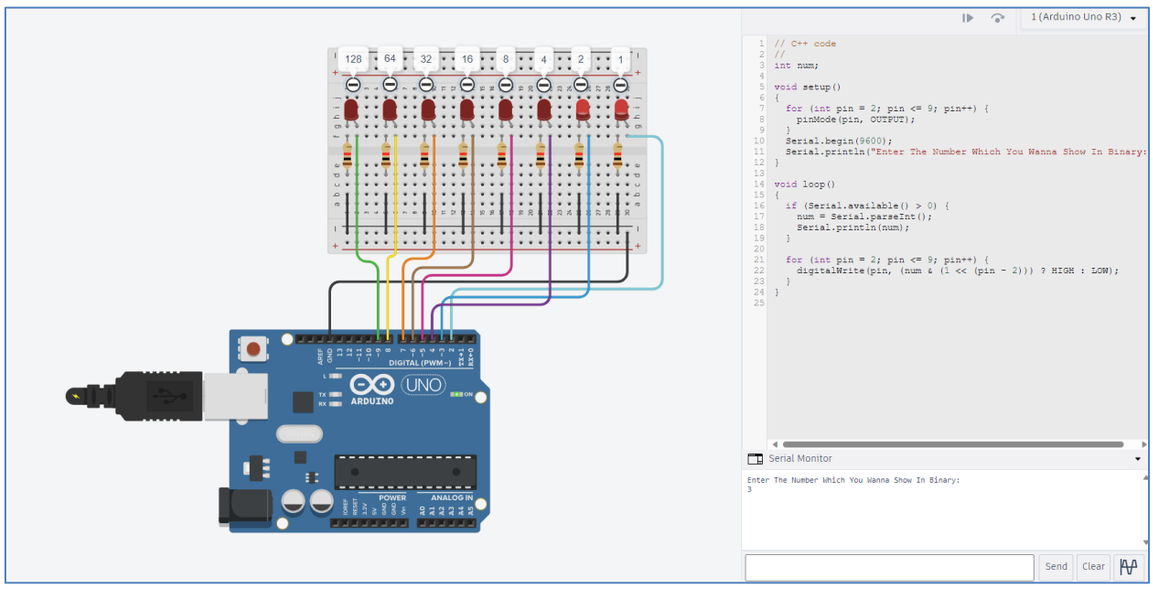
```
// C++ code
//
int num;

void setup()
{
  for (int pin = 2; pin <= 9; pin++) {
    pinMode(pin, OUTPUT);
  }
  Serial.begin(9600);
  Serial.println("Enter The Number Which You Wanna Show In Binary:");
}
```

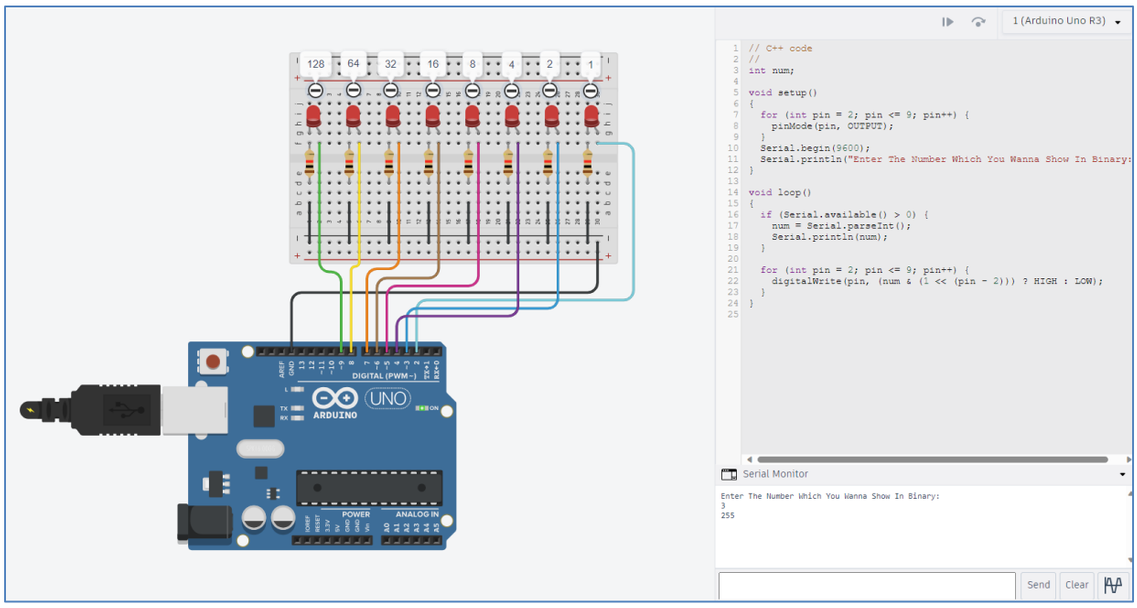
```
void loop()
{
  if (Serial.available() > 0) {
    num = Serial.parseInt();
    Serial.println(num);
  }

  for (int pin = 2; pin <= 9; pin++) {
    digitalWrite(pin, (num & (1 << (pin - 2))) ? HIGH : LOW);
  }
}
```

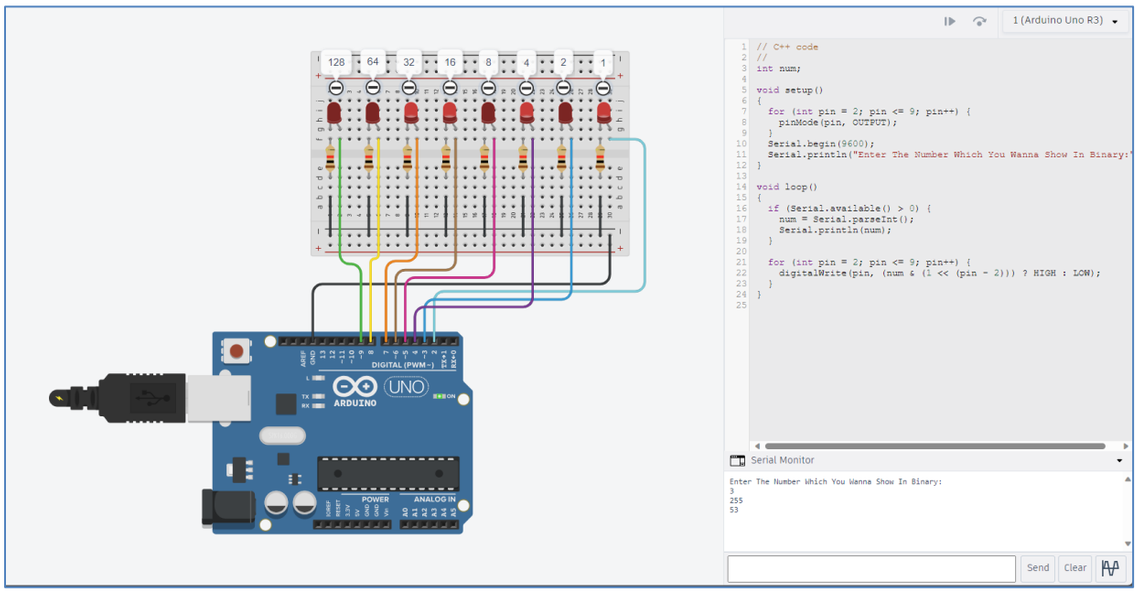
III. Results

TinkerCad Simulation

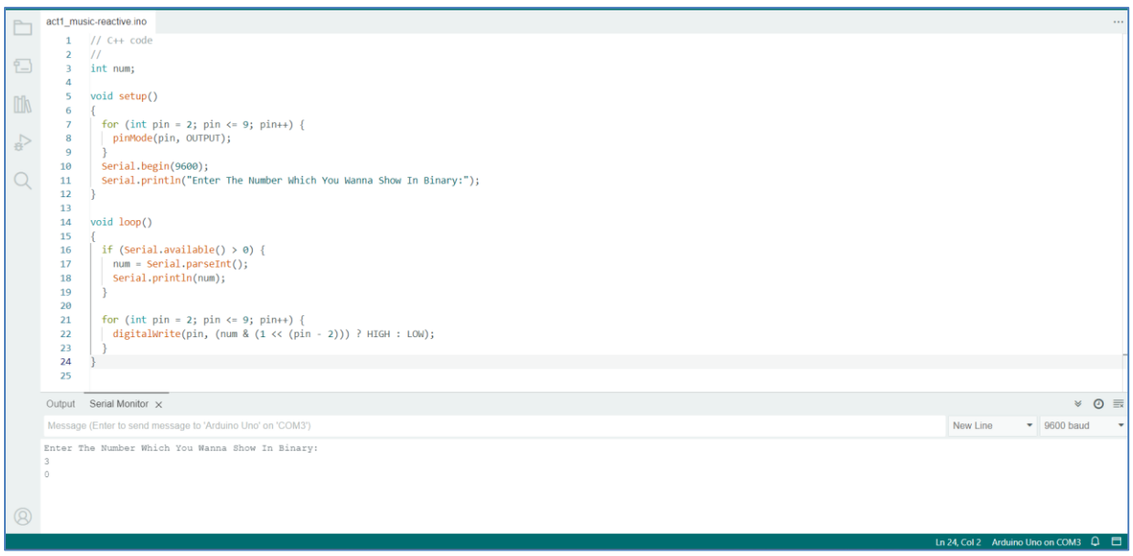


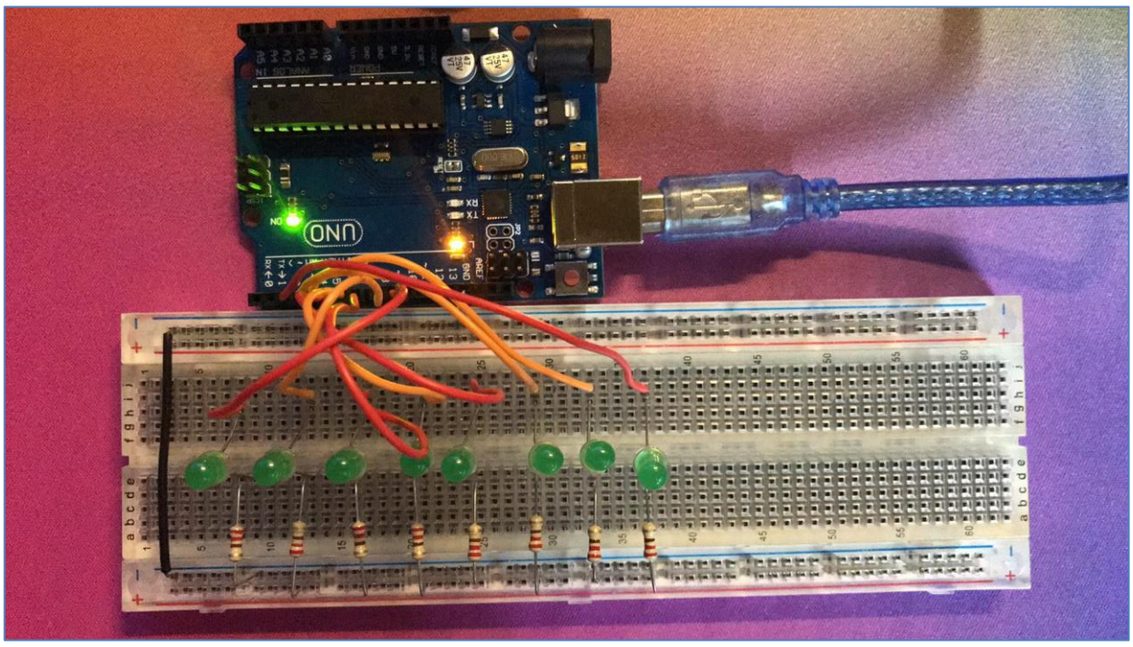


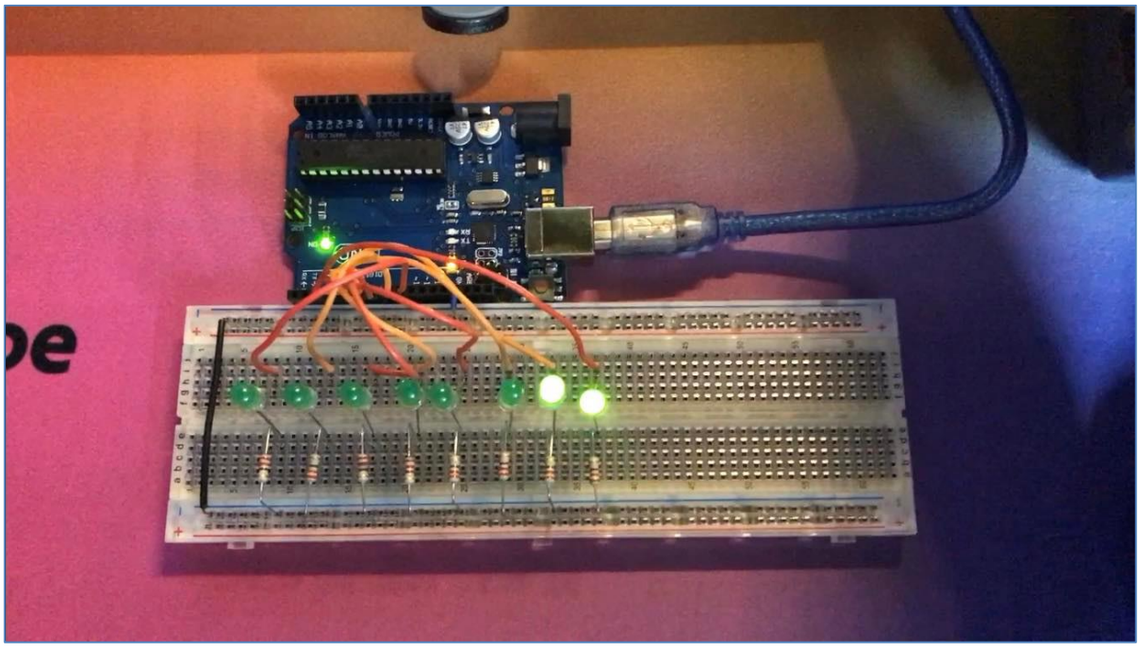




Actual Simulation (Arduino IDE and Arduino UNO)







IV. Conclusion

In conclusion, the code effectively demonstrates how to control 8 LEDs using Arduino and binary representation. By inputting a number through the serial monitor, we can see a visual binary representation, where each LED corresponds to a binary bit. This experiment not only provides a clear understanding of binary encoding but also showcases how Arduino programming can be used to control hardware components. It's a fundamental step in understanding the relationship between digital numbers and the physical world, opening the door to more complex applications in electronics and programming.

References

Login | TinkerCad. (n.d.). Tinkercad. https://www.tinkercad.com/things/f8h8YCQuJGg-copy-of-binary-representation-by-leds/editel?tenant=circuits