

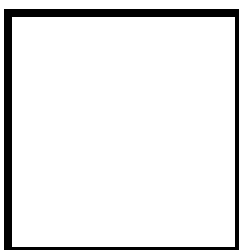


PAMANTASAN NG LUNGSOD NG MAYNILA
(University of the City of Manila)
Intramuros, Manila

Microprocessor Lab

Laboratory Activity No. 3

Binary Representation of 8 LEDs in TinkerCad and Arduino Programming



Score

Submitted by:
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Saturday 4-7PM / CpE 0412-2

Date Submitted
14-10-2023

Submitted to:
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I. Objectives

To create Arduino circuit of Binary representation (decimal 0-256 using 8 LEDs)

II. Method/s

- Write a code and perform an Arduino circuit diagram of a ring counter that display binary representation (decimal 0-256) of 8 LEDs.

III. Results

TinkerCad

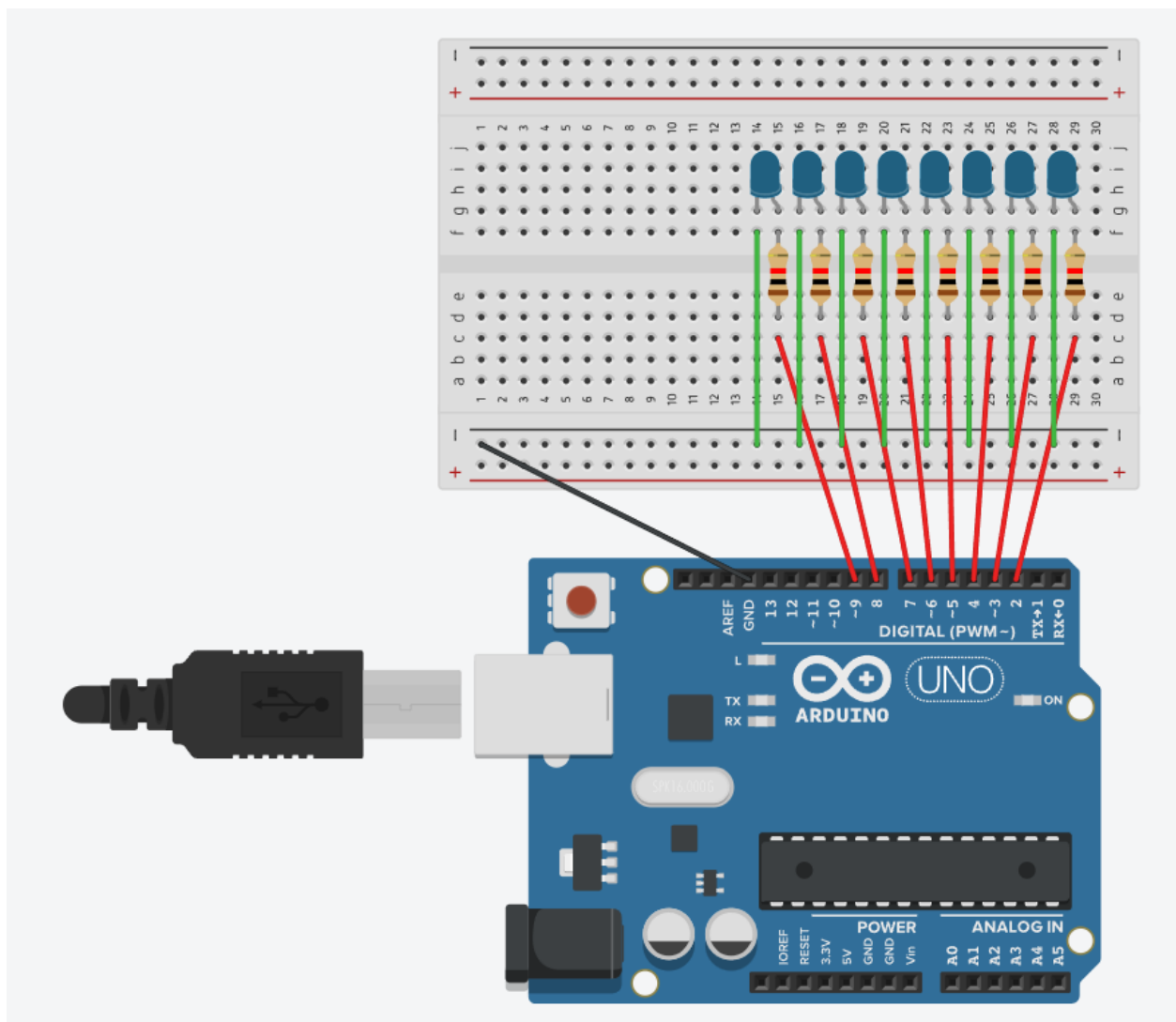


Figure No.1 8-Bit Binary Counter Circuit Diagram

Components Used

1. 8 LEDs
2. Resistor
3. Breadboard

CODE:

```
1  const int ledPins[] = {9, 8, 7, 6, 5, 4, 3, 2};
2  const int numLEDs = 8;
3
4  byte binaryCounter = 0;
5
6  void setupPins() {
7      for (int i = 0; i < numLEDs; i++) {
8          pinMode(ledPins[i], OUTPUT);
9      }
10 }
11
12 void modifyLEDs() {
13     for (int i = 0; i < numLEDs; i++) {
14         digitalWrite(ledPins[i], binaryCounter & (1 << i));
15     }
16 }
17
18 void displayBinaryCount() {
19     Serial.print("8-Bit Binary Counter: ");
20     Serial.println(binaryCounter, BIN);
21 }
22
23 void setup() {
24     setupPins();
25     Serial.begin(9600);
26 }
27
28 void loop() {
29     binaryCounter++;
30     if (binaryCounter > 255) {
31         binaryCounter = 0;
32     }
33
34     modifyLEDs();
35     displayBinaryCount();
36     delay(800);
37 }
38
39
```

IV. Conclusion

In this lab activity, we explored how to use TinkerCAD and Arduino programming together to build a working circuit that displays the binary representation of eight LEDs. The main goal was to use TinkerCAD to create a working circuit that displayed binary numbers from 0 to 256 utilizing the eight available LEDs. As such, eight LEDs, eight resistors, a breadboard, and an Arduino Uno R3 microprocessor were used as the components.

We were able to build a device that used LEDs to represent an 8-bit binary counter that displayed the values 00000000 to 11111111 in binary. The binary counting sequence was demonstrated by the LEDs lighting up one by one in a left to right motion.

Through this exercise, we were able to understand how Arduino code could control the LEDs to display binary representation, providing us with useful insights into the interaction between the hardware and software. We were able to see and understand the visual representation of binary data through the circuit and code.

In conclusion, this lab activity provided an educative experience for us using Arduino programming and circuit construction. It improved our comprehension of binary representation and enhanced our TinkerCAD programming and circuit design abilities. Overall, this project helped us to solidify our understanding of Arduino programming and circuit principles.