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:
Salazar, Harold John C.
<Saturday 4-7> / <4-2>

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Submitted to:

Engr. Maria Rizette H. Sayo

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.

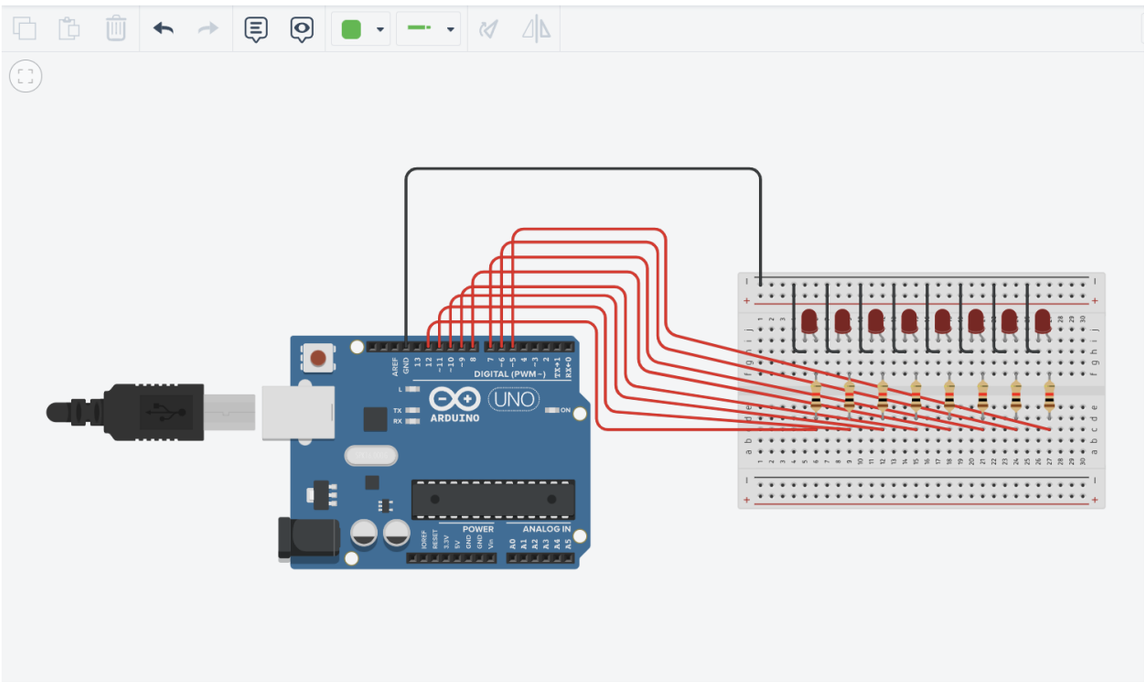
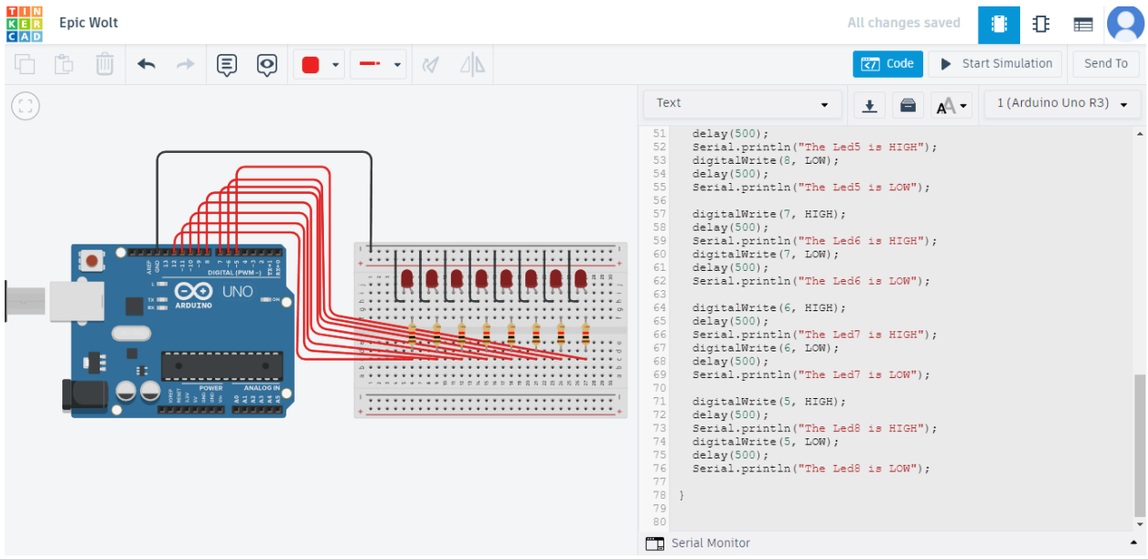
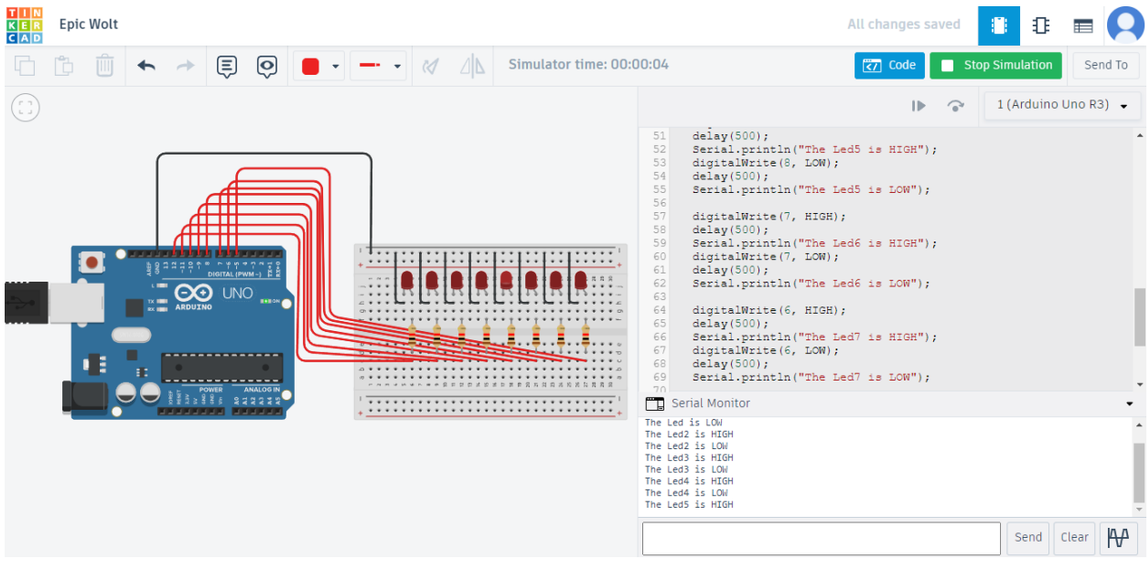


Figure No.1 Ring Counter Display Circuit Diagram

Activity:


Epic Wolt
All changes saved
Code
Start Simulation
Send To
Text
1 (Arduino Uno R3)
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");
}
Serial Monitor


Epic Wolt
All changes saved
Simulator time: 00:00:04
Code
Stop Simulation
Send To
1 (Arduino Uno R3)
Serial Monitor
The Led 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
Send
Clear

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. Conclusion

All in all, the lab activity focuses mainly on the creation of a ring counter display for eight LEDs through the use of Tinkercad. When creating a circular sequence a type of digital counter is used, which is the ring counter. The ring counter shifts the output state for each clock pulse unto the next bit position. With the use of Tinkercad a digital circuit was created which exhibits a ring counter with eight LEDs, Breadboard, arduino and resistors. The codes were used to display the output of the LEDs to which are the on and off state.

References

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

[1]“Ring Counter in Digital Logic,” *GeeksforGeeks*, Jun. 26, 2018. https://www.geeksforgeeks.org/ring-counter-in-digital-logic/