AMERICAN INTERNATIONAL UNIVERSITY-BANGLADESH

408/1, Kuratoli, Khilkhet, Dhaka 1229,
Bangladesh

Title: Familiarization with microcontroller, study of blink test using and implementation of a traffic control system using microcontrollers

Lab report no: 01 **Date of Submission:** 25-09-2023

Course Title: Microprocessor & Embedded System

Course Code: **Section:** L

Semester: 09 2023-24 **Course Teacher:** PROTIK PARVEZ SHEIKH

Declaration and Statement of Authorship:

1. I/we hold a copy of this Assignment/Case-Study, which can be produced if the original is lost/damaged.
2. This Assignment/Case-Study is my/our original work and no part of it has been copied from any other student's work or from any other source except where due acknowledgement is made.
3. No part of this Assignment/Case-Study has been written for me/us by any other person except where such collaborationhas been authorized by the concerned teacher and is clearly acknowledged in the assignment.
4. I/we have not previously submitted or currently submitting this work for any other course/unit.
5. This work may be reproduced, communicated, compared and archived for the purpose of detecting plagiarism.
6. I/we give permission for a copy of my/our marked work to be retained by the Faculty for review and comparison, including review by external examiners.

* *Student(s) must complete all details except the faculty use part.*
** Please submit all assignments to your course teacher or the office of the concerned teacher.

Group Name /No.:

No	Name	ID	Program	Signature
1	NOKIBUL ARFIN SIAM	21-44793-1	CSE	Siam
2	MD. IMRAN AHMED	20-43738-2	CSE	Imran
3	TANVIR HASAN TAMAL	21-44626-1	CSE	Tamal
4	TAZUDDIN AHMAD	20-42787-1	CSE	Tazuddin
5	MD. ZAMIUL SADIK NAHIN	20-44228-3	CSE	Nahin

Faculty use only

FACULTYCOMMENTS		
	Marks Obtained	
	Total Marks	

Title: Familiarization with microcontroller, study of blink test using and implementation of a traffic control system using microcontrollers

Introduction:

The objectives of this experiment are to-
1. Get familiar with Arduino microcontrollers.
2. Use an Arduino and delay functions to make an LED blink.
3. Implement an LED traffic control system using Arduino.
4. Simulate the microcontroller-based systems using proteus.

Equipment List:

1. Arduino IDE (2.0.1 or any recent version)
2. Arduino Microcontroller board
3. Bread board
4. LED lights (Red, Green, and Yellow)
5. Three 200 Ω resistors
6. Jumper wires

Circuit diagram:

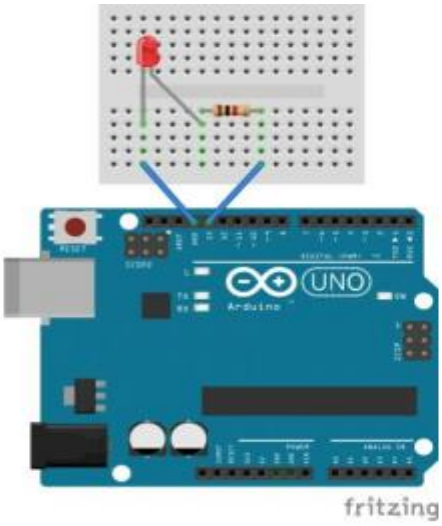


Fig-1: *LED Blink Test using an Arduino Microcontroller Board*

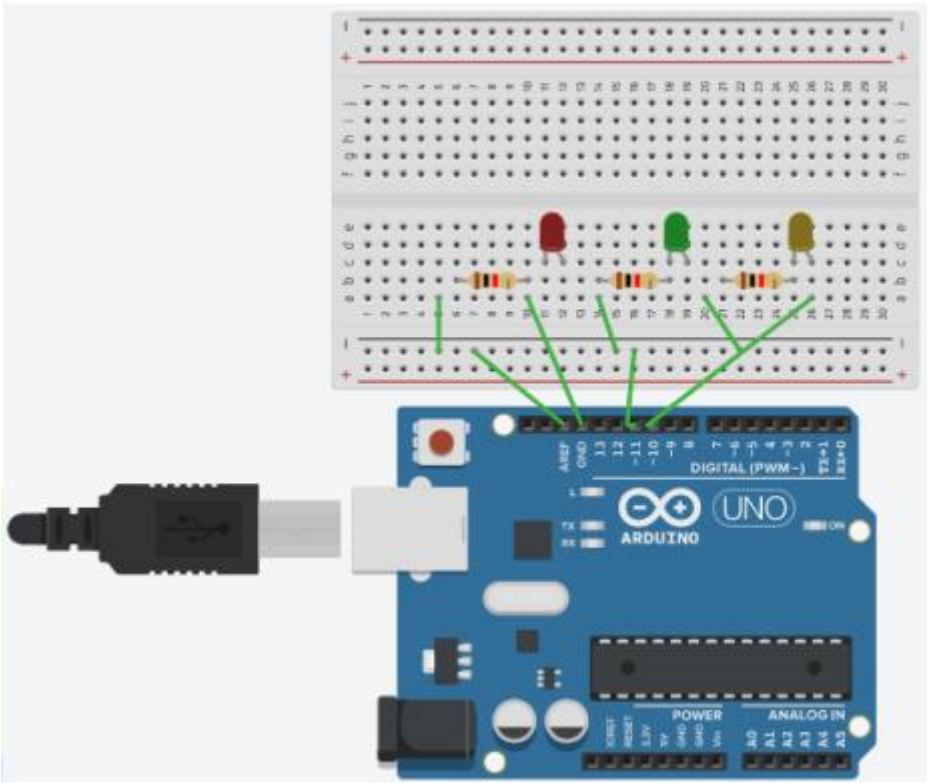


Fig-2: *Traffic Control System using an Arduino Microcontroller Board*

Code/program:

LED Blink

```
int led=13;
void setup () {
  pinMode(led, OUTPUT);
  }

  void loop () {
    digitalWrite (led, HIGH);
    delay (1000);
    digitalWrite (led, LOW);
    delay (1000);
  }
```

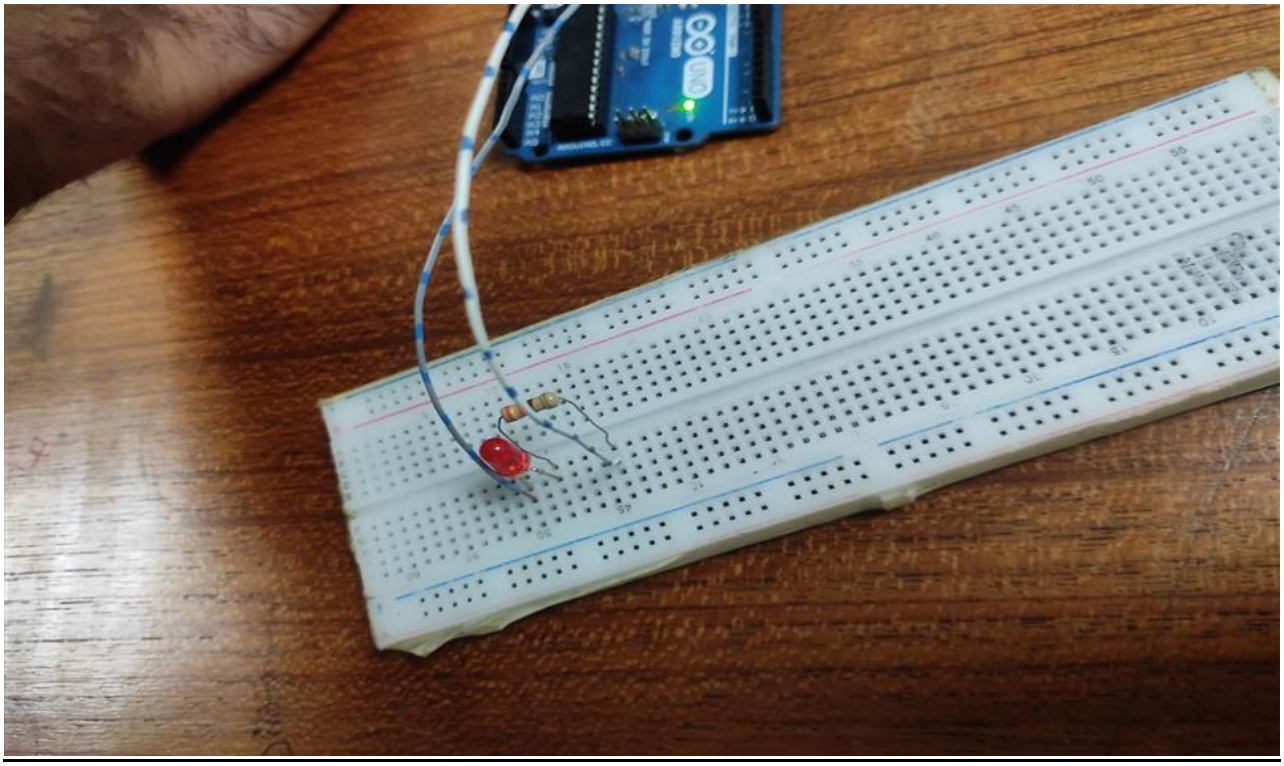
Traffic Control System

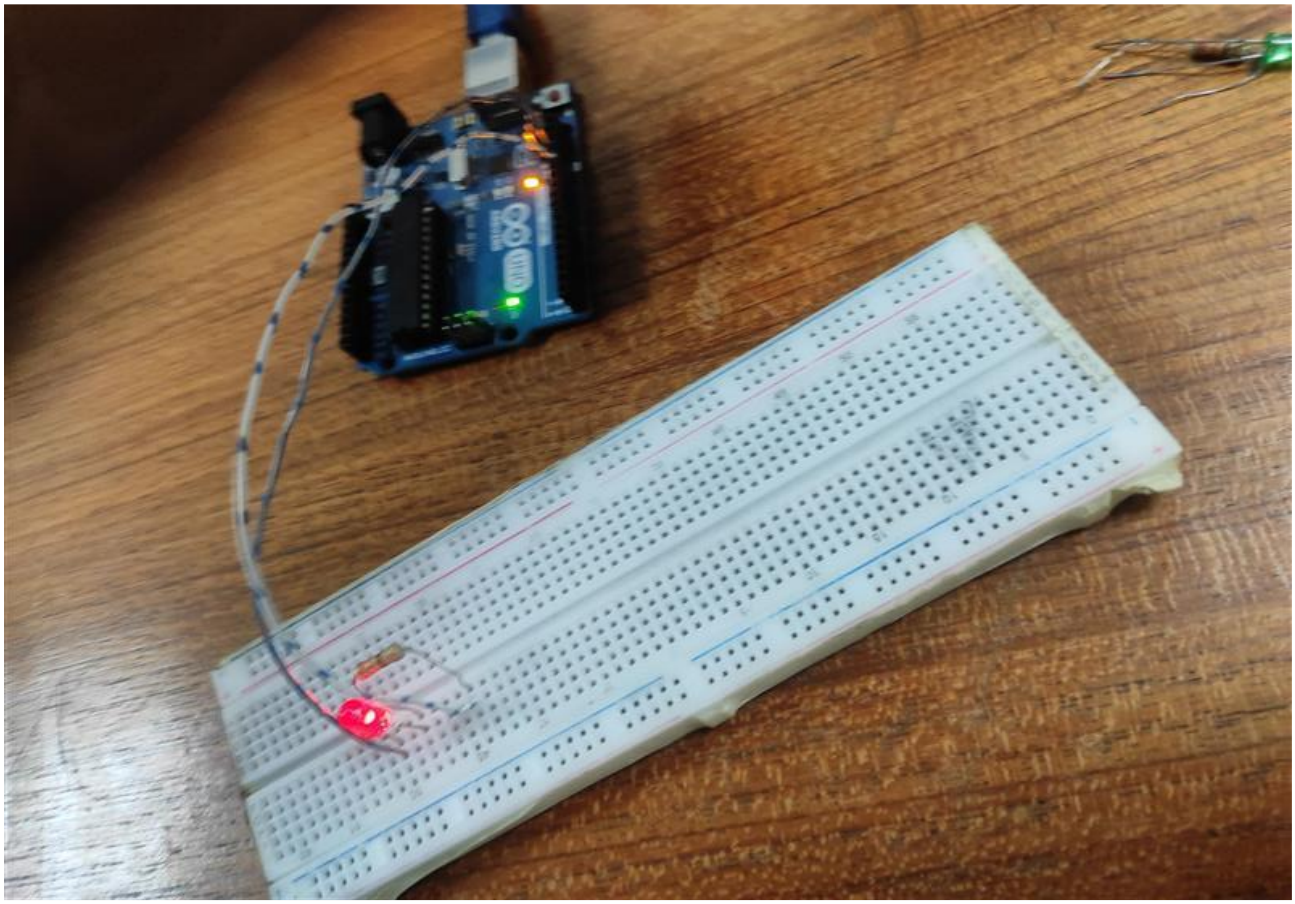
```
#define RED_PIN 8
#define YELLOW_PIN 10
#define GREEN_PIN 12
int red_on = 3000;
int red_yellow_on = 1000;
int green_on = 3000;
int green_blink = 500;
int yellow_on = 1000;
```

```
void setup() {
pinMode(RED_PIN, OUTPUT);
pinMode(YELLOW_PIN, OUTPUT);
pinMode(GREEN_PIN, OUTPUT);
}
void loop() {

digitalWrite(RED_PIN, HIGH);
//to make red LED on
delay(red_on);
//to turn yellow LED on
digitalWrite(YELLOW_PIN, HIGH);
delay(red_yellow_on);



//turning off RED_PIN and YELLOW_PIN, and turrning on greenLEd
digitalWrite(RED_PIN, LOW);
digitalWrite(YELLOW_PIN, LOW);
digitalWrite(GREEN_PIN, HIGH);
delay(green_on);
digitalWrite(GREEN_PIN, LOW);



//for turning green Led on and off for 3 times
for(int i = 0; i < 3; i = i+1)
{
delay(green_blink);
digitalWrite(GREEN_PIN, HIGH);
delay(green_blink);
digitalWrite(GREEN_PIN, LOW);
}
//for turning on yellow LED
digitalWrite(YELLOW_PIN, HIGH);
delay(yellow_on);
digitalWrite(YELLOW_PIN, LOW);
}
```

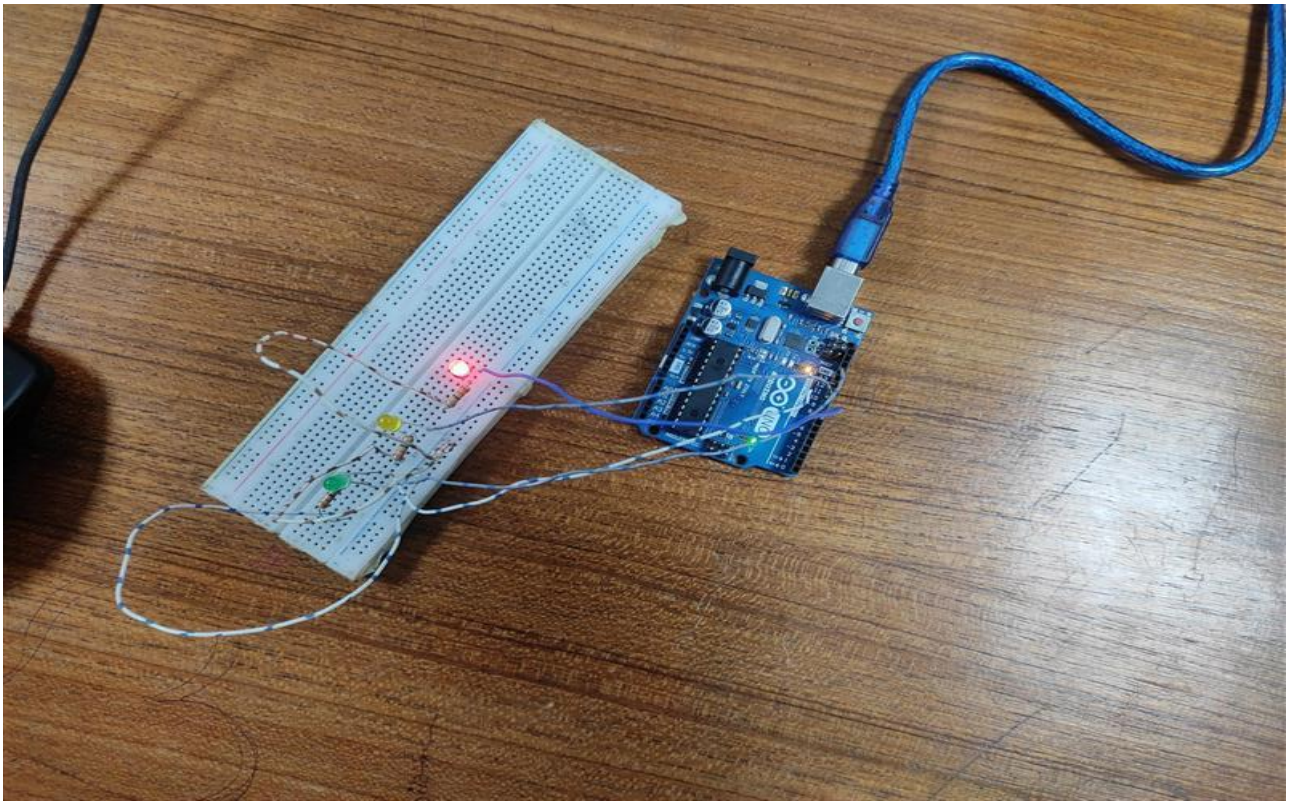
Hardware Implementation:

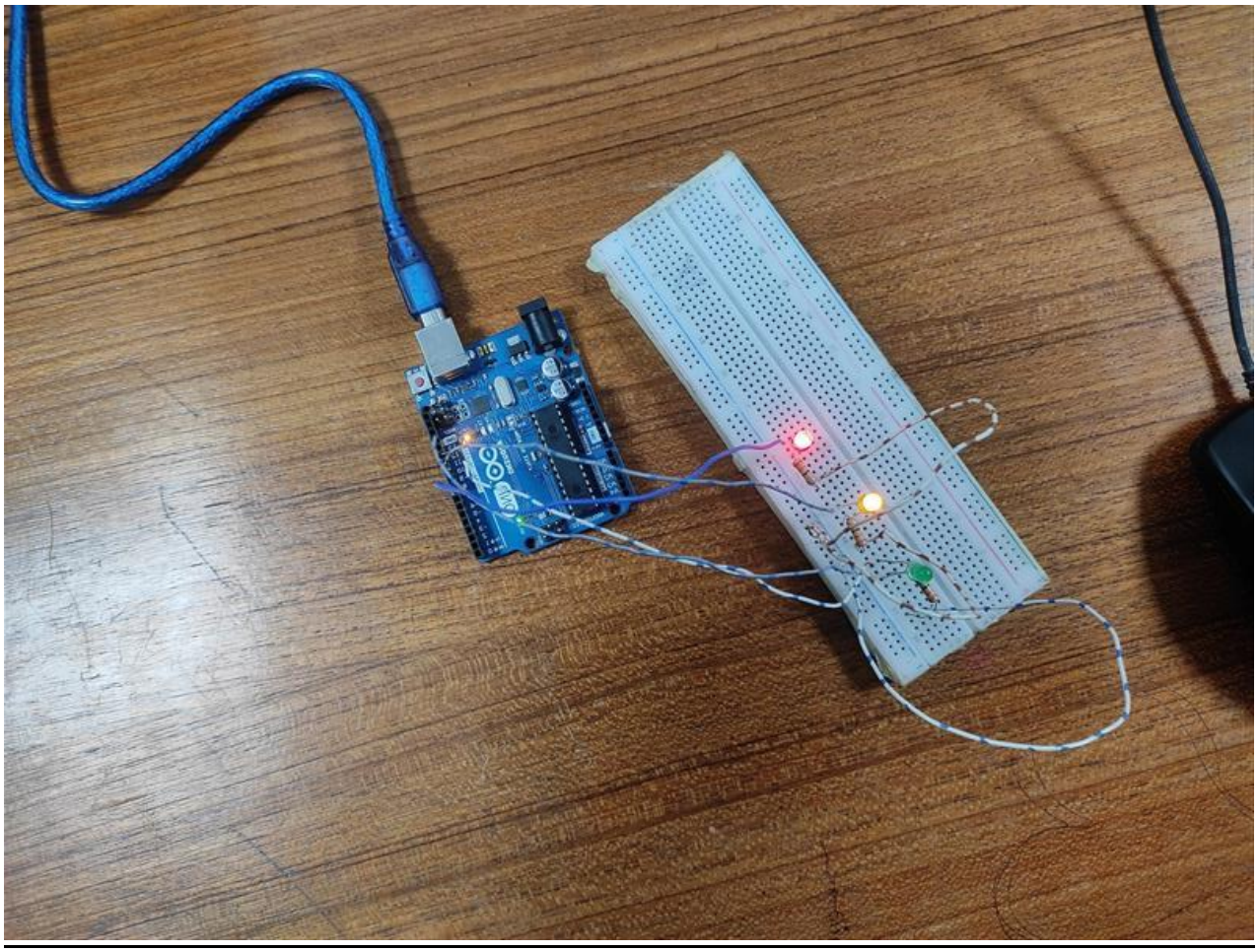
LED Blink Test

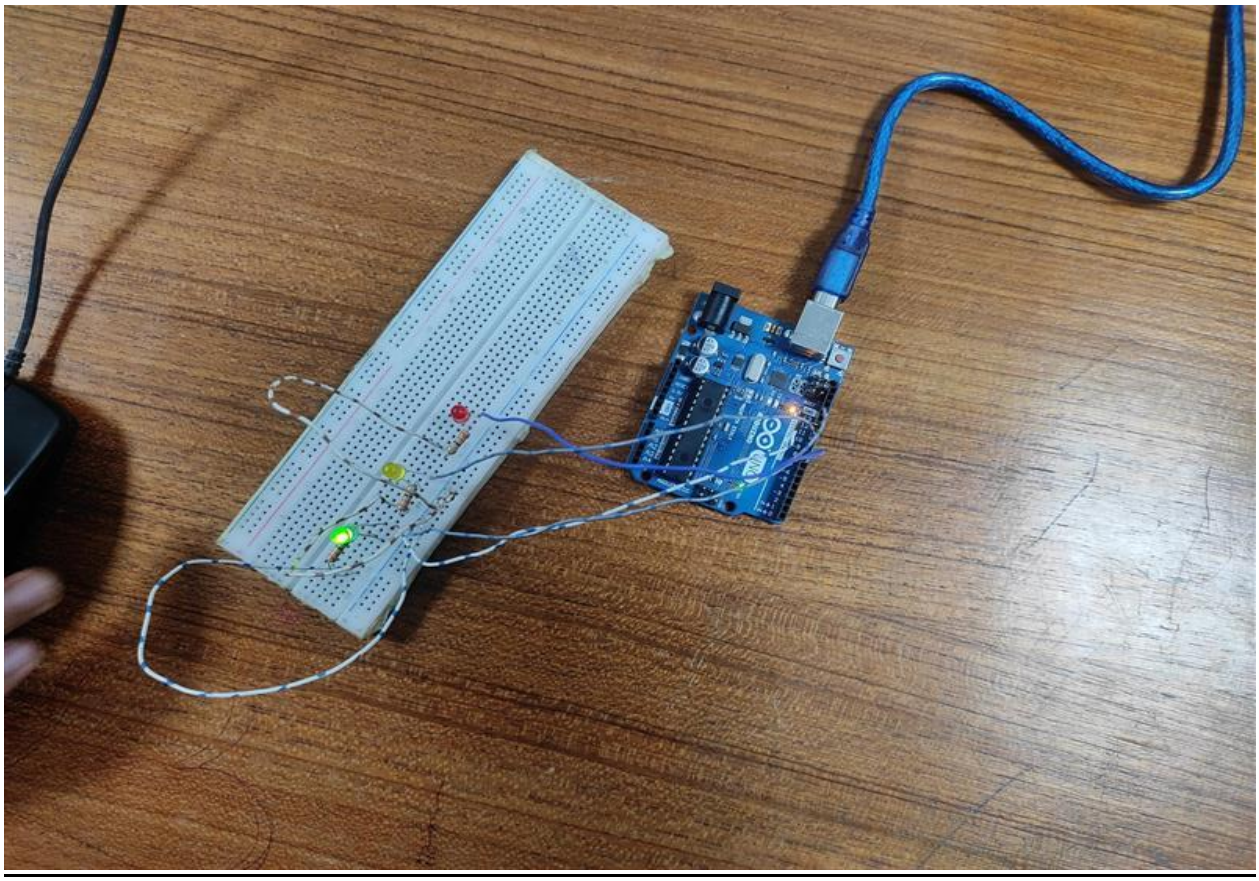


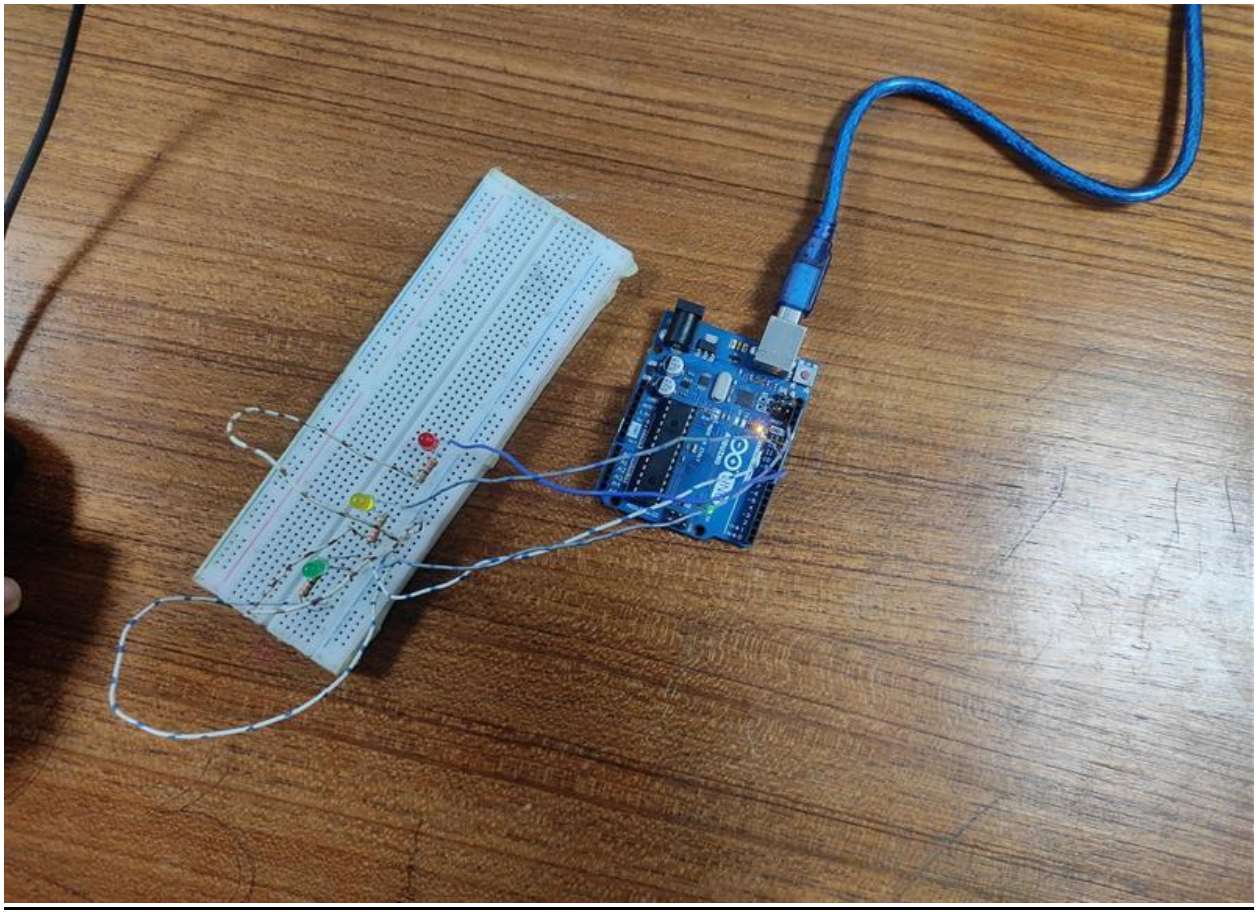


Traffic Control System



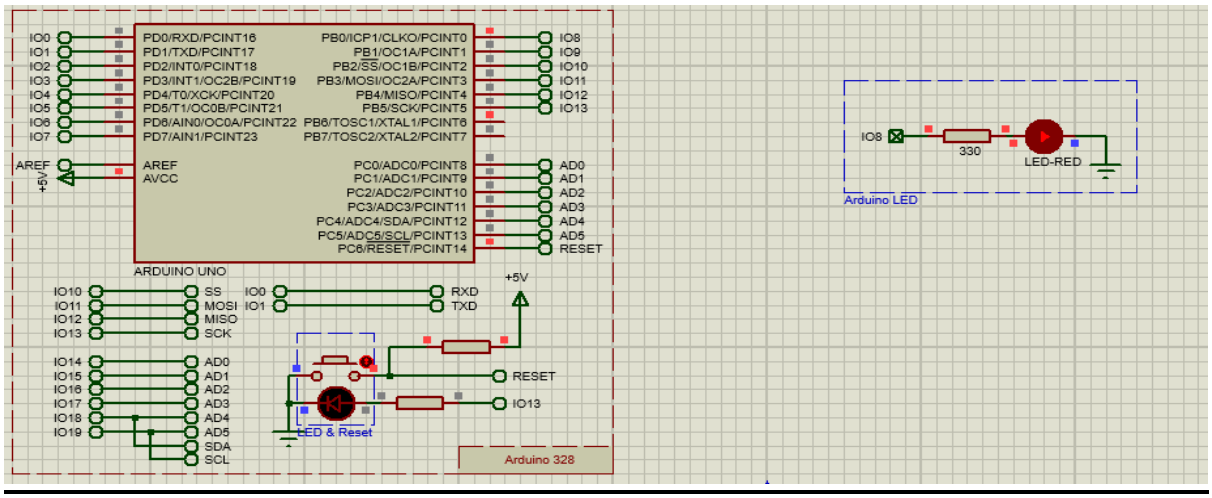




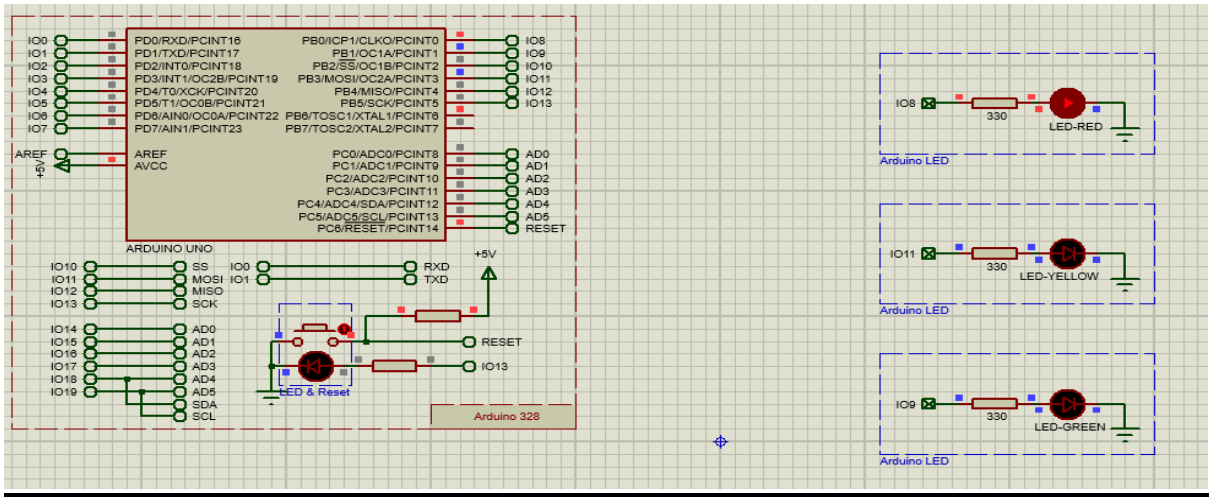


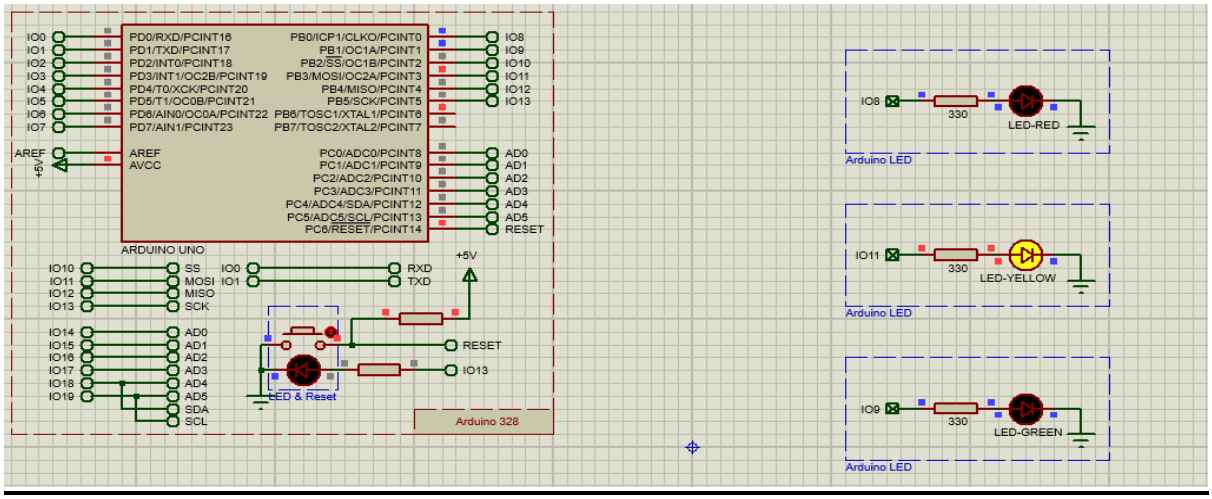
Simulation:

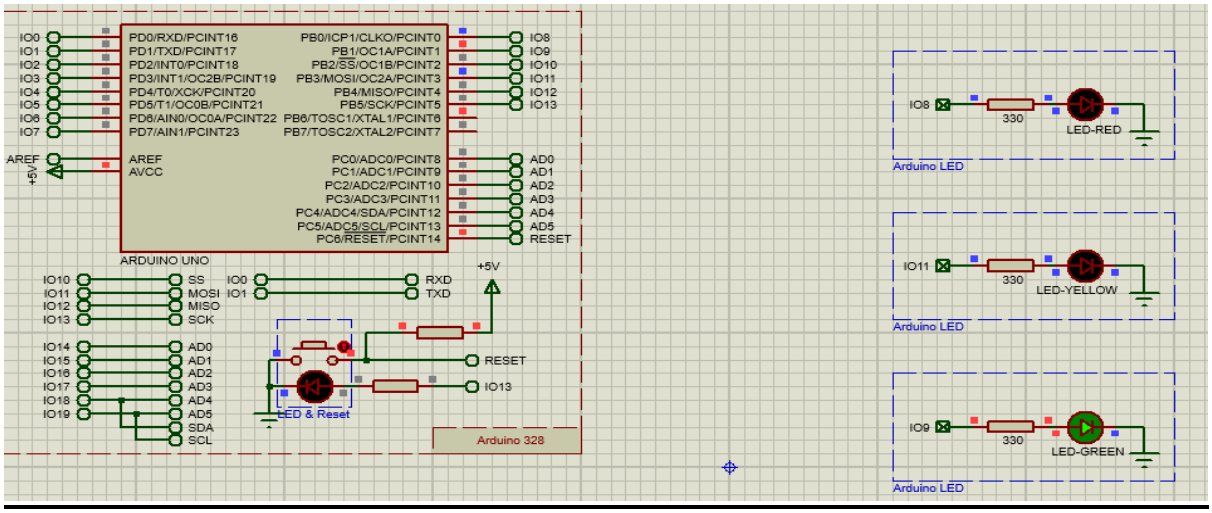
LED blink



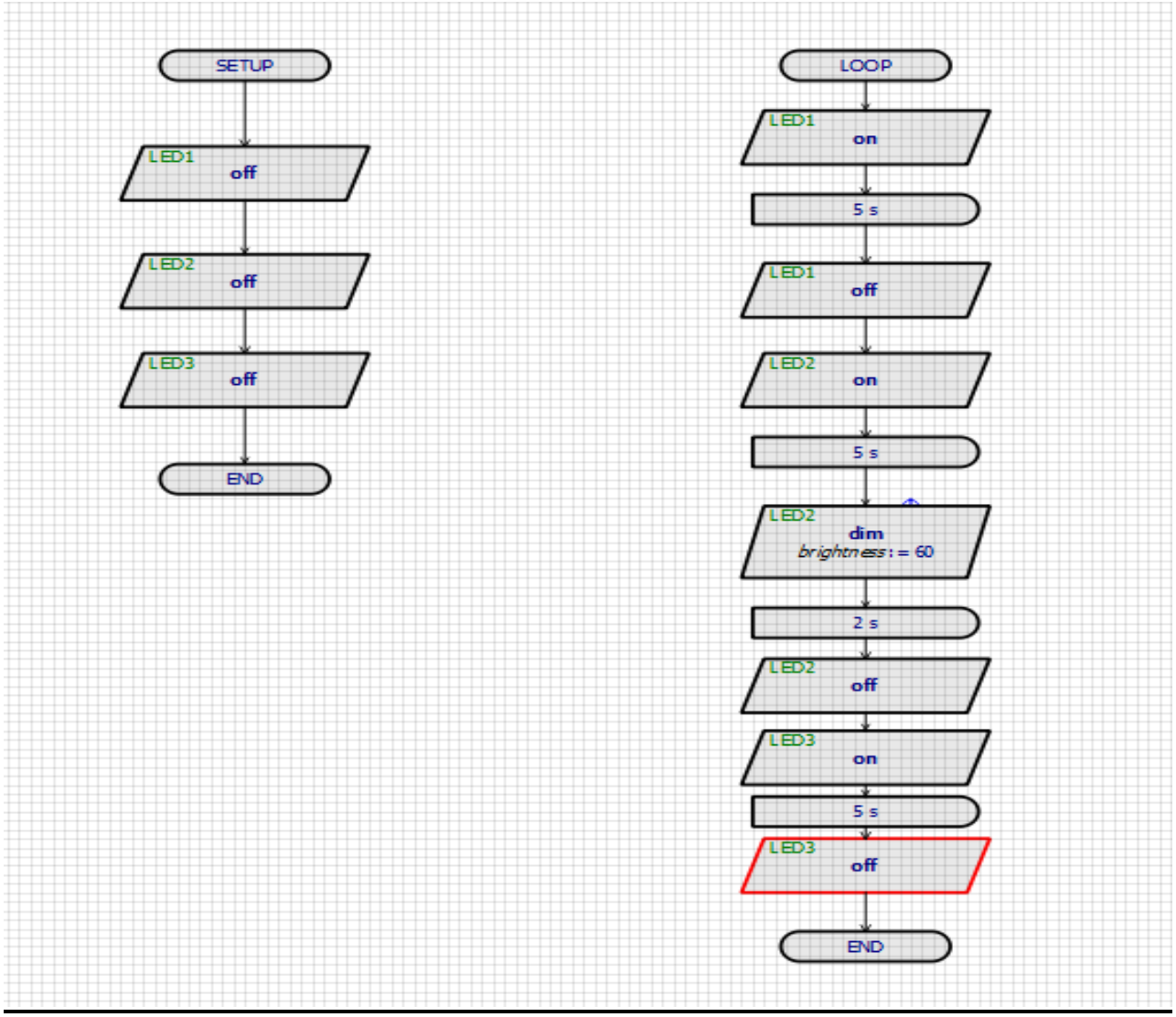
Traffic Light






IO0
IO1
IO2
IO3
IO4
IO5
IO6
IO7
PD0/RXD/PCINT16
PD1/TXD/PCINT17
PD2/INT0/PCINT18
PD3/INT1/OC2B/PCINT19
PD4/T0/XCK/PCINT20
PD5/T1/OC0B/PCINT21
PD6/AIN0/OC0A/PCINT22
PD7/AIN1/PCINT23
PB0/ICP1/CLKO/PCINT0
PB1/OC1A/PCINT1
PB2/SS/OC1B/PCINT2
PB3/MOSI/OC2A/PCINT3
PB4/MISO/PCINT4
PB5/SCK/PCINT5
PB6/TOSC1/XTAL1/PCINT6
PB7/TOSC2/XTAL2/PCINT7
IO8
IO9
IO10
IO11
IO12
IO13
AREF
+5V
AREF
AVCC
PC0/ADC0/PCINT8
PC1/ADC1/PCINT9
PC2/ADC2/PCINT10
PC3/ADC3/PCINT11
PC4/ADC4/SDA/PCINT12
PC5/ADC5/SCL/PCINT13
PC6/RESET/PCINT14
AD0
AD1
AD2
AD3
AD4
AD5
RESET
ARDUINO UNO
IO10
IO11
IO12
IO13
SS
MOSI
MISO
SCK
IO0
IO1
RXD
TXD
+5V
IO14
IO15
IO16
IO17
IO18
IO19
AD0
AD1
AD2
AD3
AD4
AD5
SDA
SCL
RESET
IO13
LED & Reset
Arduino 328
IO8
330
LED-RED
Arduino LED
IO11
330
LED-YELLOW
Arduino LED
IO9
330
LED-GREEN
Arduino LED

Flowchart


SETUP
LED1
off
LED2
off
LED3
off
END
LOOP
LED1
on
5 s
LED1
off
LED2
on
5 s
LED2
dim
brightness := 60
2 s
LED2
off
LED3
on
5 s
LED3
off
END

Discussion: The purpose of the experiment was to gain experience with the Arduino IDE software and to create an LED blink using the Arduino platform and its delay functions. Additionally, a traffic control system was built using the Arduino microcontroller. To begin, the code was written in the IDE software and tested on a breadboard circuit. Once confirmed, the code was then transferred to the Arduino board. The experiment was successfully completed without any hardware or code-related issues and produced similar results both in simulation and in real-life testing.

Reference(s):

1) https://www.arduino.cc/.
2) https://www.coursera.org/learn/arduino/lecture/ei4ni/1-10-first-glance-at-a-program
3) Jeremy Blue; Exploring Arduino: Tools and Techniques for Engineering Wizardry