

AMERICAN INTERNATIONAL UNIVERSITY BANGLADESH
Assignment Cover Sheet



Students must complete all details except the faculty use part.

Please submit all assignments to your subject lecturers or the office of the concerned lecturer.

Assignment Title: Essay: Implementation of a traffic control system
Assignment Number: 02 Due Date: 03-10-22 Semester: _____
Subject Code: _____ Subject Name: microprocessor Section: N
Course Instructor: DR. Mohammad Shidduzzaman Degree Program: CSE

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For faculty use only:

Total Marks: _____ Marks Obtained: _____

Faculty comments _____

Introduction:- In this experiment we have learned about microcontrollers, we have learn about Arduino. using Arduino we have to design a project named traffic control. we have done this project in lab and also tinker cad software which is available in online platform. we have used code ~~code~~ for simulating the project. we have design a traffic system and run it by codes. The objective of this experiment is to get familiarized with Timers and use them for the implementation of a traffic control system.

Theory and methodology:

Timer: Every electronic component of a sequential logic circuit works on a time base. This time base helps to keep all the works synchronize. without a time base, devices would have no idea as to

when to perform particular actions. Thus the timer is an important concept in the field of electronics.

A timer/counter is a piece of hardware built into the Arduino controller. It is like a clock and can be used to measure time events. A timer is a register whose value increases/decreases automatically.

In AVR timers are of two types: 8-bits and 16-bit. In an 8-bit timer the register used is 8 bit wide whereas in a 16-bit timer the register width is 16 bits.

Apparatus:

- i) Arduino Uno
- ii) LED lights (yellow, Red, and green.)
- iii) Resistor (220 ohm).

Experimental setup :



```

1 // C++ code
2 //
3 void setup()
4 {
5   pinMode(2, OUTPUT);
6   pinMode(4, OUTPUT);
7   pinMode(8, OUTPUT);
8 }
9
10 void loop()
11 {
12   digitalWrite(2, HIGH);
13   digitalWrite(4, LOW);
14   digitalWrite(8, LOW);
15   delay(3000); // Wait for 3000 millisecond(s)
16
17   digitalWrite(2, LOW);
18   digitalWrite(4, HIGH);
19   digitalWrite(8, LOW);
20   delay(3000); // Wait for 3000 millisecond(s)
21
22   digitalWrite(2, LOW);
23   digitalWrite(4, LOW);
24   digitalWrite(8, HIGH);
25   delay(3000); // Wait for 3000 millisecond(s)
26 }

```

RESULT:

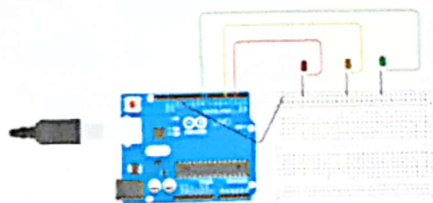
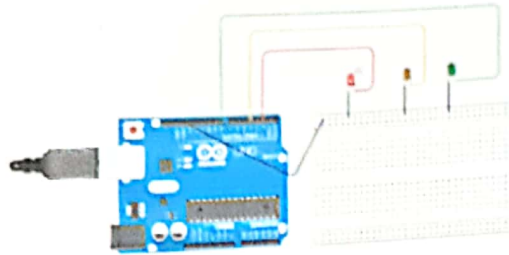


Figure 1: Total Traffic Signal Model

For RED LED ON:

Simulator time: 00:00:04



```

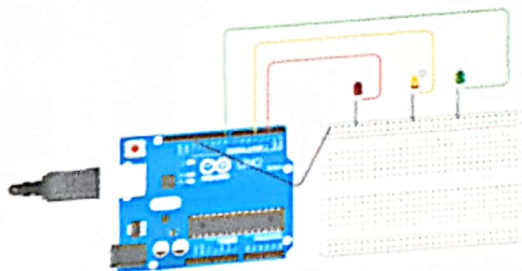
1 // ON CODE
2
3 void setup()
4 {
5   pinMode(13, OUTPUT);
6   pinMode(12, OUTPUT);
7   pinMode(11, OUTPUT);
8 }
9
10 void loop()
11 {
12   digitalWrite(13, HIGH);
13   digitalWrite(12, LOW);
14   digitalWrite(11, LOW);
15   delay(5000); // Wait for 5000 milliseconds (5s)
16
17   digitalWrite(13, LOW);
18   digitalWrite(12, HIGH);
19   digitalWrite(11, LOW);
20   delay(5000); // Wait for 5000 milliseconds (5s)
21 }

```

Figure 2: Simulation For Only Red LED IS On For 5 second

For Yellow LED On:

Simulator time: 00:00:06



```

1 // ON CODE
2
3 void setup()
4 {
5   pinMode(12, OUTPUT);
6   pinMode(13, OUTPUT);
7   pinMode(11, OUTPUT);
8 }
9
10 void loop()
11 {
12   digitalWrite(12, HIGH);
13   digitalWrite(13, LOW);
14   digitalWrite(11, LOW);
15   delay(3000); // Wait for 3000 milliseconds (3s)
16
17   digitalWrite(12, LOW);
18   digitalWrite(13, HIGH);
19   digitalWrite(11, LOW);
20   delay(5000); // Wait for 5000 milliseconds (5s)
21
22   digitalWrite(12, LOW);
23   digitalWrite(13, LOW);
24   digitalWrite(11, HIGH);
25   delay(5000); // Wait for 5000 milliseconds (5s)
26 }

```

Figure 3: Simulation For Only Yellow LED IS On For 3 second

For Green LED On:

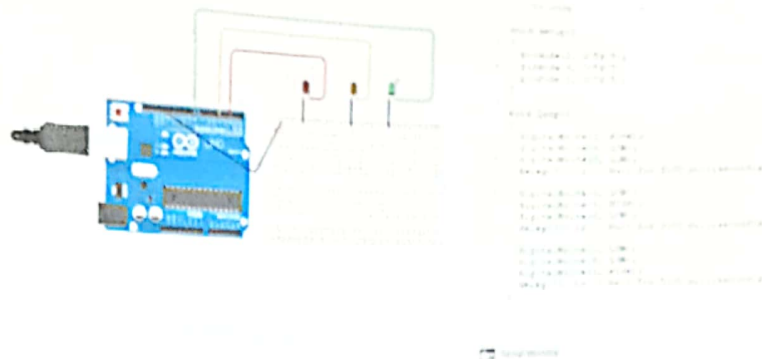


Figure 4: Simulation For Only Green LED IS On For 5 second

Discussion:-

In this experiment, traffic control system has been implemented by using Arduino Uno. For implementing this, a website called tinkercad.com has been used. In here, 3 LED light Red, yellow, and green has been taken with 3 resistors along with a breadboard. The resistors have been taken to the ground. After designing the circuit, the code was implemented. Codes were written in Arduino IDE 1.8.13 where LED Blink and delay functions were added into the codes.

References:-

1. <https://www.arduino.cc/>.
2. ATmega328 manual
3. <https://www.avrfreaks.net/forum/tut-c-newbies-guide-avr-timers>.
4. <https://maxembedded.com/2011/06/avr-timers-timer0/>