

Traffic Light Control System Project Report

Introduction

The traffic light control system project aims to simulate a basic traffic light sequence using Arduino Uno and Tinkercad. This report details the design, implementation, and outcomes of the project.

Methodology

Components Used:

- Arduino Uno R3
- Breadboard
- LEDs (Red, Yellow, Green)
- Resistors (220 ohms)
- Jumper Wires

Circuit Design:

The circuit was designed on Tinkercad, a virtual electronics platform, to replicate the functionality of a traffic light system. LEDs were connected to Arduino digital pins to control their operation.

Wiring Connections:

- Red LED anode to pin 4
- Yellow LED anode to pin 3
- Green LED anode to pin 2
- Each LED cathode connected through a 220-ohm resistor to the ground rail on the breadboard.

Code

```
void setup()

{

  pinMode(4,OUTPUT);

  pinMode(3,OUTPUT);

  pinMode(2,OUTPUT);
```

```
}
```

```
void loop()
```

```
{
```

```
    digitalWrite(4, HIGH);
```

```
    delay(3000); // Wait for 1000 millisecond(s)
```

```
    digitalWrite(4, LOW);
```

```
    digitalWrite(3, HIGH);
```

```
    delay(1000); // Wait for 1000 millisecond(s)
```

```
    digitalWrite(3, LOW);
```

```
    digitalWrite(2, HIGH);
```

```
    delay(3000); // Wait for 1000 millisecond(s)
```

```
    digitalWrite(2, LOW);
```

```
}
```

Results and Observations

Simulation Results:

The Tinkercad simulation accurately reproduced the traffic light sequence as programmed. Each LED operated according to the specified timing intervals, demonstrating effective control over the LEDs.

Link for the output is provided here

https://www.tinkercad.com/things/8pUufamJv3g-spectacular-stantia/editel?sharecode=alMiOYTtu1ppDB5xFXnbb6mTQMzIMD_TAOeSUZnW8Mo

Challenges Faced:

- Initial setup and understanding of pin configurations.
- Adjusting timing intervals to match traffic light standards.

Performance:

The traffic light system performed reliably during simulation, effectively simulating a basic traffic control scenario.

How does this help an electronics and communication student?

For my electronics and communication studies, designing and simulating a traffic light control system using Arduino and Tinkercad has been an invaluable learning experience. This project allowed me to delve into practical aspects of circuit design, programming, and simulation.

Hands-on Experience

Creating the circuit and programming the Arduino taught me firsthand about component integration and circuit behavior. Connecting LEDs to specific pins (4 for Red, 3 for Yellow, and 2 for Green) and using resistors provided insights into how electrical components interact in a controlled environment.

Programming Skills

Coding the Arduino to control the sequence of the traffic lights sharpened my programming skills. I learned to write and debug code in the Arduino IDE, improving my understanding of programming concepts in embedded systems.

Simulation and Visualization

Using Tinkercad for simulation was instrumental in visualizing the operation of the traffic lights. It allowed me to test different scenarios, adjust timings, and troubleshoot potential issues virtually before implementing them in a physical circuit.

Conclusion

Overall, the traffic light control system project has significantly contributed to my growth as an electronics and communication student. It provided me with practical skills, technical

knowledge, and a deeper appreciation for the complexities of electronic systems. This experience has prepared me for future challenges in the field and enhanced my readiness for professional opportunities in electronics engineering.



