

# Arduino Based Four Way Traffic Light System: The Ultimate Guide



## Arduino Based Four Way Traffic Light System: Arduino Based Project by Kathy Kuhl

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Traffic signals play a vital role in maintaining Free Download and safety on our roads. They provide clear instructions to vehicles and pedestrians, ensuring smooth and efficient traffic flow. In this article, we delve into the fascinating world of traffic management by building an Arduino-based four way traffic light system. This project is not only educational but also a fun and rewarding way to explore the capabilities of Arduino.

## Understanding Traffic Light Systems

Before we dive into the technical details, let's gain a basic understanding of traffic light systems. A four way traffic light system consists of four sets of traffic lights, one for each direction of traffic. Each set typically comprises

three lights: red, yellow, and green. The sequence of these lights is controlled by a timer or a traffic controller, which determines the duration of each phase.

The most common traffic light sequence is as follows:

1. **Red:** All traffic stops.
2. **Yellow:** Traffic prepares to stop.
3. **Green:** Traffic proceeds.

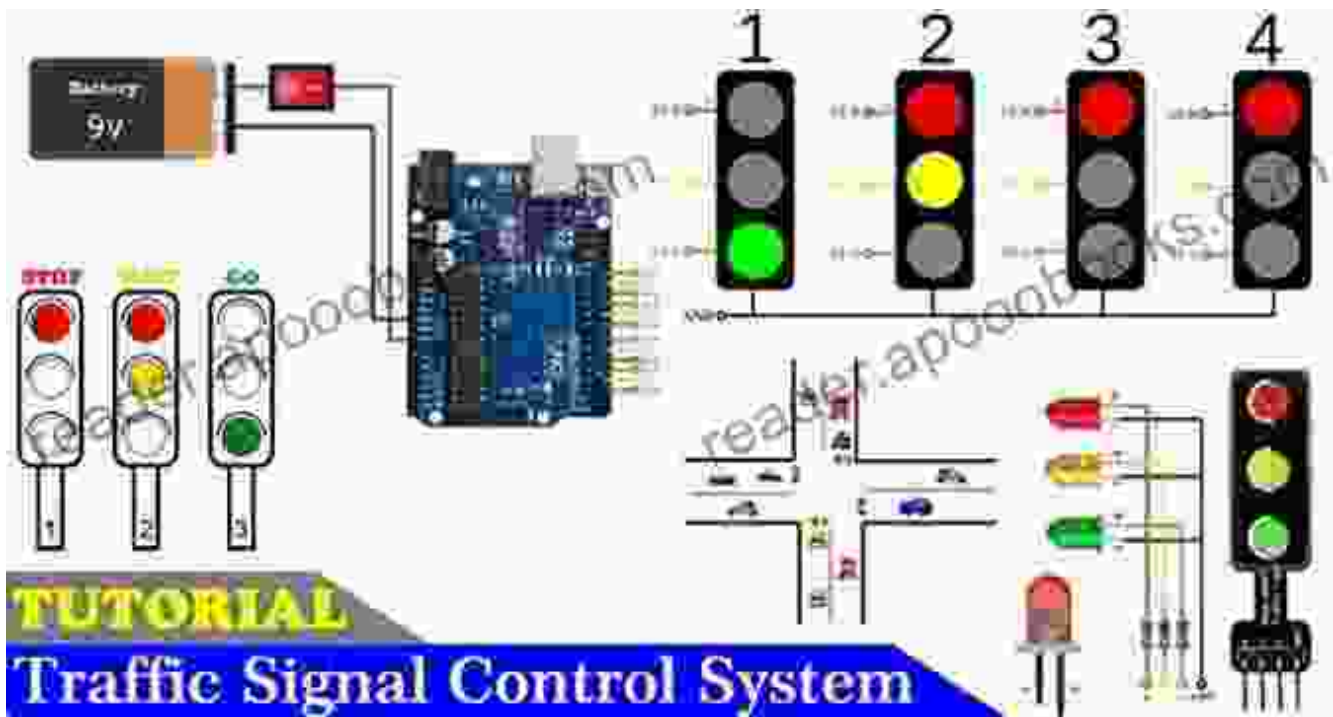
## Components Required

To build our Arduino-based traffic light system, we will need the following components:

- Arduino Uno microcontroller
- 12 LEDs (3 red, 3 yellow, 3 green, 3 white)
- 12 resistors (220 ohms)
- Breadboard
- Jumper wires
- Power supply (5V DC)

## Circuit Diagram and Schematic

The circuit diagram for our traffic light system is quite straightforward. Each set of traffic lights is connected to the Arduino through a resistor. The white LEDs are used to indicate the current phase of the traffic light (red, yellow, or green). The complete schematic is shown below:



## Programming the Arduino

The Arduino code for our traffic light system is relatively simple. We will use the `delay()` function to control the duration of each phase. The complete code is provided below:

```
c++ const int redPin = 2; const int yellowPin = 3; const int greenPin = 4;
const int whitePin = 5;
```

```
void setup(){pinMode(redPin, OUTPUT); pinMode(yellowPin, OUTPUT);
pinMode(greenPin, OUTPUT); pinMode(whitePin, OUTPUT); }
```

```
void loop(){digitalWrite(redPin, HIGH); digitalWrite(yellowPin, LOW);
digitalWrite(greenPin, LOW); digitalWrite(whitePin, HIGH); delay(5000); // 5
seconds
```

```
digitalWrite(redPin, LOW); digitalWrite(yellowPin, HIGH);  
digitalWrite(greenPin, LOW); digitalWrite(whitePin, HIGH); delay(2000); // 2  
seconds
```

```
digitalWrite(redPin, LOW); digitalWrite(yellowPin, LOW);  
digitalWrite(greenPin, HIGH); digitalWrite(whitePin, HIGH); delay(5000); }
```

## Testing and Troubleshooting

Once the circuit is assembled and the Arduino is programmed, it's time to test the system. Connect the power supply and observe the traffic lights. They should cycle through the red, yellow, and green phases as programmed. If the lights are not working properly, check the following:

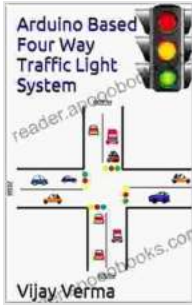
- Make sure all the connections are correct.
- Verify that the Arduino is programmed correctly.
- Check the power supply to ensure it is providing the correct voltage.

Congratulations! You have successfully built an Arduino-based four way traffic light system. This project is a great way to learn about electronics, programming, and traffic management. You can further enhance the system by adding additional features, such as pedestrian crossings, turn signals, or even a countdown timer. The possibilities are endless!

We hope you enjoyed this guide. If you have any questions or comments, please feel free to leave them below. Happy tinkering!

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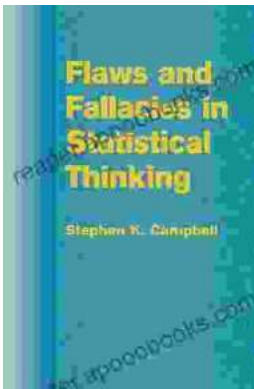
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