

Traffic Light simulation Project

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Survey

What is survey?

A survey is a report about currently implemented systems at different type of facilities (e.g. universities or factories).

Software development tools, hardware needed, operating systems used in addition to technical features such as the included processes and procedures addressed by the systems and user interface.

project uses an Arduino and some LEDs to replicate a traffic light. It uses code as an internal timer and continues to run until you cut the Arduino's power supply.

From the moment we're rushing to our offices in the morning until the moment we eagerly want to get home, we pass by traffic lights as part of our daily routine.

Wherever there is a reasonable amount of traffic, these devices are installed. The primary purpose of traffic lights is to efficiently control traffic, and they frequently include timers, sensors, and traffic monitoring systems.

Using an Arduino, we will create a traffic light. This exercise will not only help you comprehend the fundamentals of how an Arduino functions, but it will also give you a roadmap for how to solve similar complex problems while adhering to predefined criteria. Additionally, you'll learn the fundamentals of how a traffic light works.

State of the art

Our system processes (Steps) include:

- 1) Connect the board to your PC
- 2) Install and open the Arduino IDE ⑦ [Arduino website](#)
([Arduino documentation](#))
- 3) Configure the board settings
- 4) Write the code
- 5) Press a button on the IDE to upload the program to the board

Introduction about Our Project

Comparatively speaking, modern traffic lights are extremely intelligent. Along with keeping an eye on the flow of traffic, they also adjust their light-switching schedules in response to pedestrian requests.

Based on a fixed time interval for each light, we will create a four-way intersection for this project. This indicates that the light won't turn on in response to traffic volume. Therefore, while the lights would be cost-effective, they would not be sufficiently intelligent.

The traffic lights will be represented by LEDs, and the Arduino will be used exclusively to perform the logic and function. The Arduino's code will be written in such a way that it will understand when to turn on each light in relation to time intervals.

Tools Used

Using number of software and hardware to implement this project

software programs used such as:

1. Online IDE ([Arduino Editor](#)).










Hardware Used:

- 1) Arduino UNO
- 2) 5 mm LED: Red
- 3) 5 mm LED: Yellow
- 4) 5 mm LED: GREEN
- 5) Breadboard (generic)
- 6) Male/Male Jumper Wires (7)

7) Resistor 220 ohm (3)

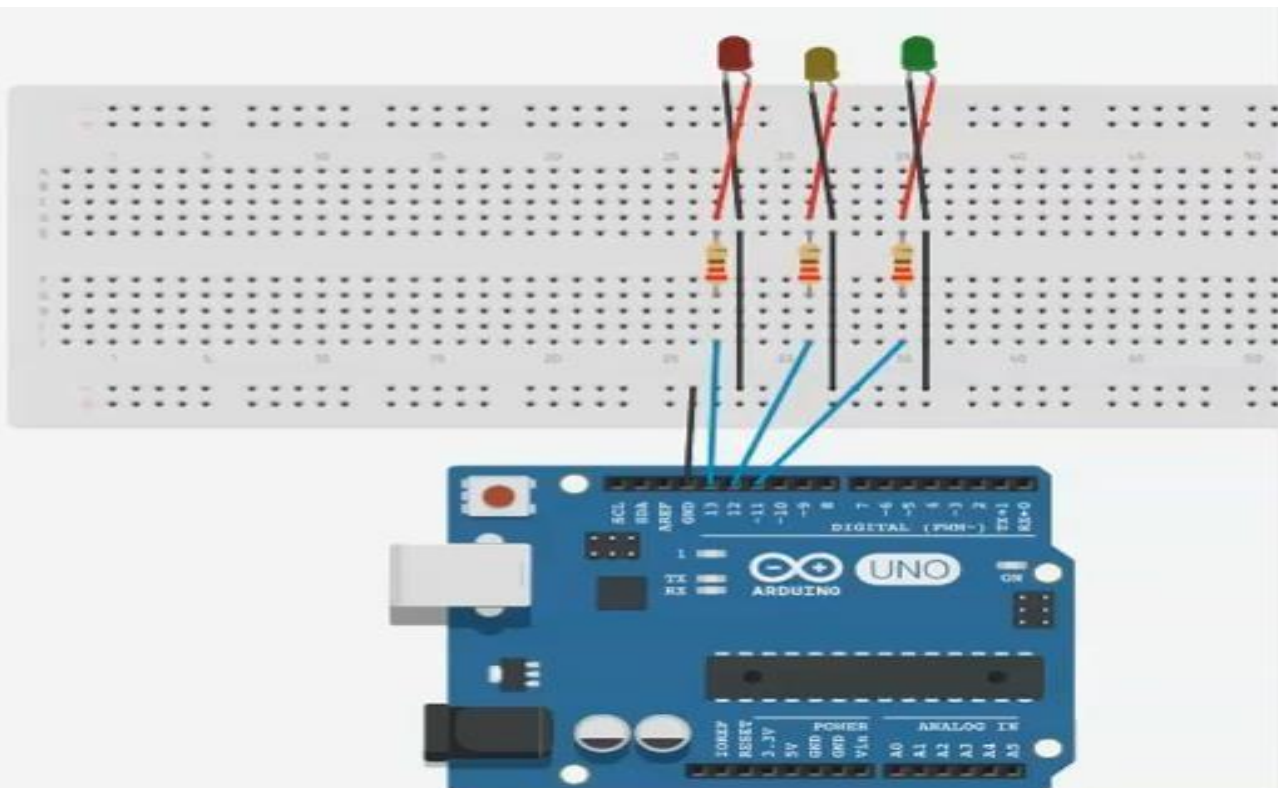
8) Arduino USB 2.0 data Cable

Business Model

<p>Key Partners</p> <p>- TEAM</p> 	<p>Key Activities</p> <ul style="list-style-type: none"> - Data collection - Data archiving 	<p>Value Propositions</p> <p>try and fix errors in coding the system.</p> <p>Working as a team.</p> <p>Learning new prog. Language and new HW features.</p> 	<p>Customer Relationships</p> <p>Customer uses our program to increase the reliability of their data.</p> 	<p>Customer Segments</p> <p>Firstly, The Team.</p> <p>Secondly, the Later students benefit from it.</p> 
<p>Key Resources</p> <ul style="list-style-type: none"> - Arduino SW - elec. components - Leds - Hardware Kit 		<p>Channels</p> <ul style="list-style-type: none"> - Website - contacting us By WhatsApp 		
<p>Cost Structure</p> <ul style="list-style-type: none"> - Cost of Hardware Components - No Cost for Software (its Online IDE) or using PyCharm, python-3.10.6-amd64, or Visual Studio Code. 		<p>Revenue Streams</p> <ul style="list-style-type: none"> - Learning how to work together. - New Programming language. - Team Work. 		

Code for the Arduino Traffic Light

Start by defining variables so that you can address the lights by name rather than a number. Start a new Arduino project, and begin with these lines: `int red = 10;` Next, let's add the `setup` function, where you'll configure the red, yellow and green LEDs to be outputs. Since you have created variables to represent the pin numbers, you can now refer to the pins by name instead: `void setup(){` The `pinMode` function configures the Arduino to use a given pin as an output. You have to do this for your LEDs to work at all. Now for the actual logic of the traffic light. Here's the code you need. Add this below your variable definitions and `setup` function: `void loop(){` Upload this code to your Arduino, and run (make sure to select the correct board and port from the Tools > Board and Tools > Port menus). You should have a working traffic light that changes every 0.5 second.



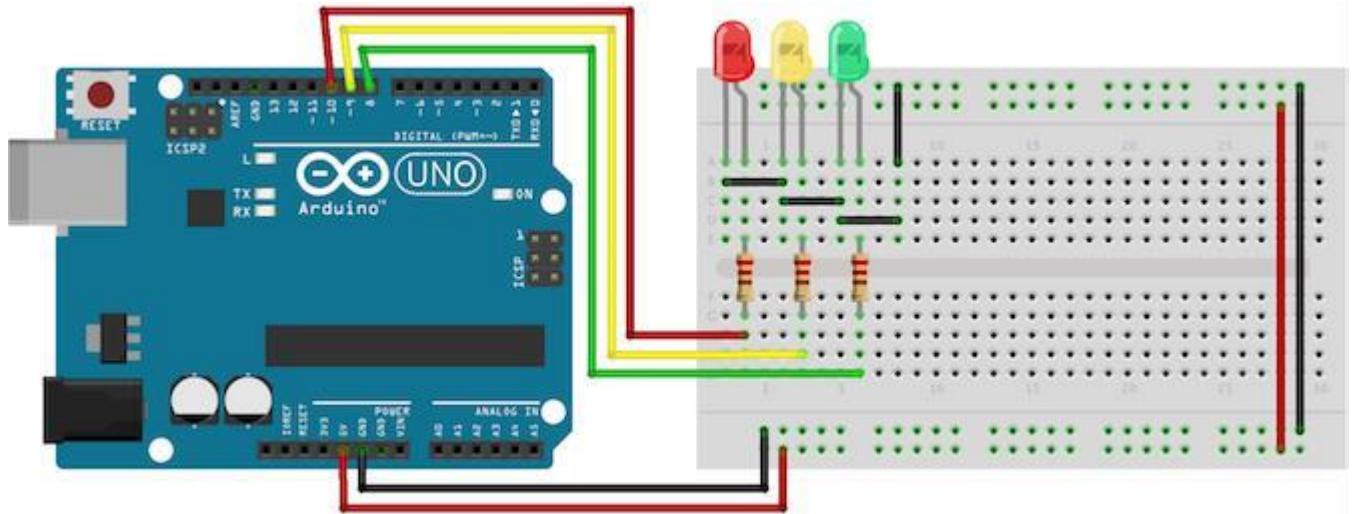
```

1 int green = 11;    // on Arduino lig 11
2 int yellow = 12;   // on Arduino lig 12
3 int red = 13;      // on Arduino lig 13
4
5 void setup(){
6     pinMode(green, OUTPUT);
7     pinMode(yellow, OUTPUT);
8     pinMode(red, OUTPUT);
9 }
10 // functions
11 void loop(){      // Loop Func.
12     changelights();
13     delay(500);    // all of the code(lights) will be repeated again and again after 0.5s
14 }
15
16 void changelights(){
17     // Green on for 40 seconds , red and Yellow off
18
19     digitalWrite(green, HIGH);
20     delay(40000);
21
22     // Green off, Yellow on for 10 seconds
23     digitalWrite(green, LOW);
24     digitalWrite(yellow, HIGH);
25     delay(10000);
26
27     // Yellow off , Red on for 50 seconds
28     digitalWrite(yellow, LOW);
29     digitalWrite(red, HIGH);
30     delay(50000);
31
32     // Red OFF and Yellow still OFF too.
33     digitalWrite(red, LOW);
34     digitalWrite(green, HIGH);
35
36 }

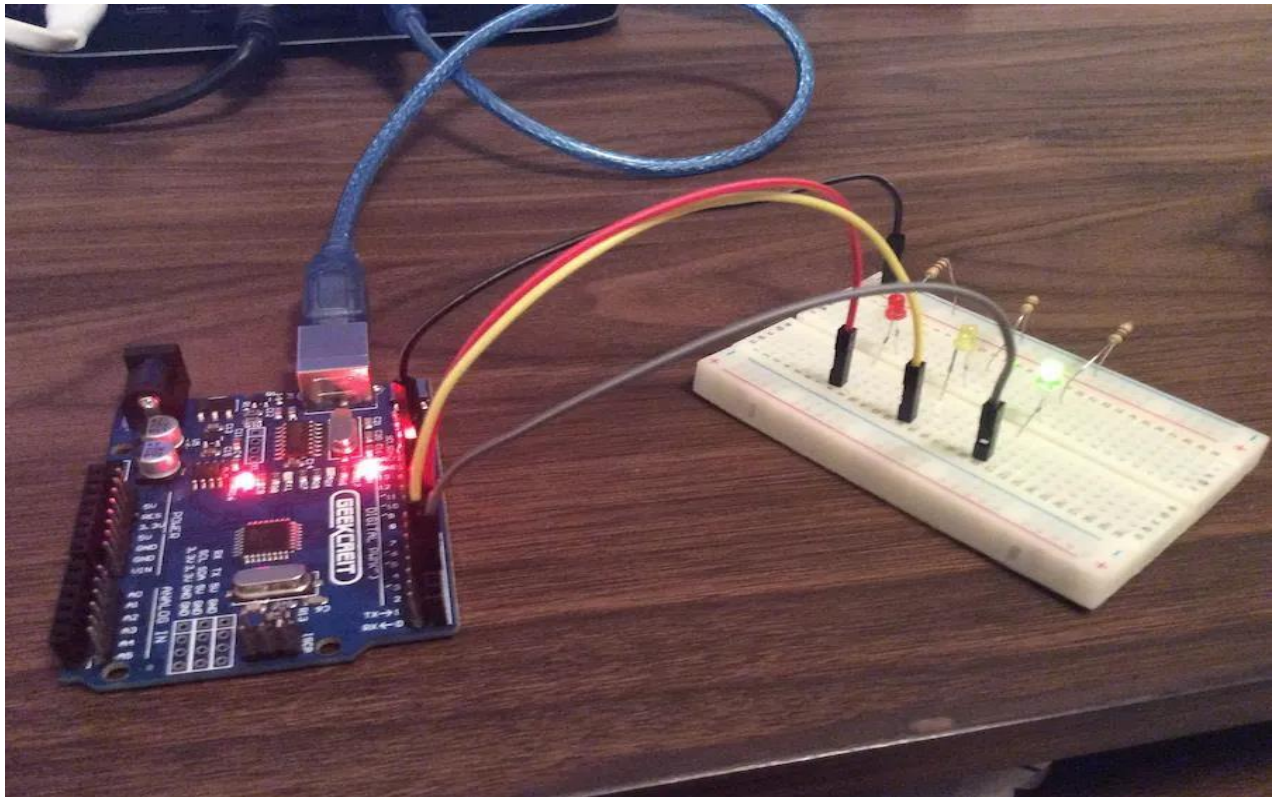
```

The Delay Func. takes time in (ms)

The O/P:



The Green will be on 40 Sec , Yellow on 10 sec , and Red on 50 sec. of total time of 100 sec here on our Project.



Conclusion

The Project presented software-hardware development tools, hardware needed, operating systems used.

In order to create a street traffic light for cars, the goal of this Project is to **design and implement** a low-cost system that is intended in terms of hardware and software.

The LabVIEW graphical programming environment will be used to build this system using the Arduino Uno development platform. Three suitable resistors (probably 220 Ohms is fine) for the LEDs we have, a breadboard, an Arduino Uno, and connecting wires are the hardware resources that will be used in the Project. The three LEDs on the breadboard as well as the serial interface on the computer's LabVIEW programmer will both display the results.

Our References

1. <https://www.youtube.com/watch?v=-VLNg0skcSc>
2. <https://engineerexperiences.com/traffic-light-simulation-through-arduino.html>
3. [\(1\) \(PDF\) Traffic Light Using Arduino Uno and LabVIEW \(researchgate.net\)](#)
4. https://create.arduino.cc/projecthub/techno_z/arduino-traffic-light-simulator2ec9f7?ref=similar&ref_id=399366&offset=3
5. [Arduino With Python: How to Get Started – Real Python](#)

Our Sharable *Code* Link:

https://create.arduino.cc/editor/aea_power/3c25138e-004e-4adb-853c29106e36ae5a/preview

To upload the code from our Online Editor:

can see ⑦ [Arduino Web Editor Tutorial Step By Step | Arduino Online Code Upload - Online Programming - YouTube](#)