

The traffic lights

In this worksheet we will simulate the operation of traffic lights. Thus, giving appropriate time intervals we will keep each color turn on for some time and then the process will be repeated from the beginning. The traffic lights will flash like in Greece*, i.e. Green, Orange, Red, Green, etc.

Circuit description

For this task we will need three LEDs, one red, one green and one orange (or yellow) – one for each traffic light, as well as the corresponding resistors. You can see the circuit in figure 1 below. Note, that since there aren't many GND sockets, they all short on the breadboard (-) and that's where we connect the Arduino's GND.

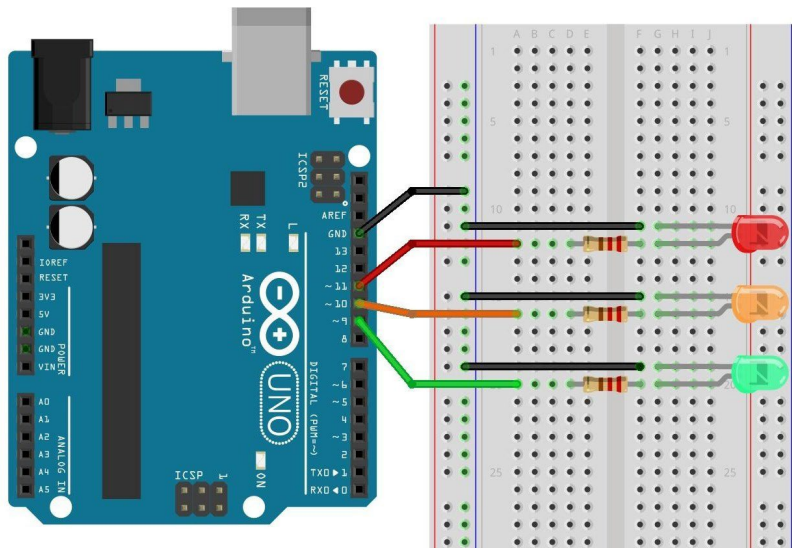


Figure 1

Circuit programming

All that remains is to program our Arduino, according to what we have already mentioned. That is, you will do the necessary initializations and then:

1. You should give a voltage of 5V to the LED you want to light up and 0V to the rest.
2. You should wait for 5 second (or as long as you want) during which apparently one led lights up and the rest are off.
3. You will do steps 1 & 2 as many times as needed for a complete operating cycle of the traffic lights.
4. Try adjusting the times. Orange usually lights up for much less time than the other two colors.

* Please note that in some countries we have variation in the order of colors. If we have red, it lights up first orange (for preparation) and then green. Then orange again and then red.

Indicative sketch

```
int ledRed = 11;
int ledOrange = 10;
int ledGreen = 9;

void setup() {
  pinMode(ledRed, OUTPUT);
  pinMode(ledOrange, OUTPUT);
  pinMode(ledGreen, OUTPUT);
}

void loop() {
  // red for 3 seconds
  digitalWrite(ledRed, HIGH);
  digitalWrite(ledOrange, LOW);
  digitalWrite(ledGreen, LOW);
  delay(3000);
  // green for 5 seconds
  digitalWrite(ledRed, LOW);
  digitalWrite(ledOrange, LOW);
  digitalWrite(ledGreen, HIGH);
  delay(5000);
  // orange for 1 seconds
  digitalWrite(ledRed, LOW);
  digitalWrite(ledOrange, HIGH);
  digitalWrite(ledGreen, LOW);
  delay(1000);
}
```

Prompt

Try to put two more Leds (green & red) simulating pedestrian traffic lights, turning them on at the corresponding times.