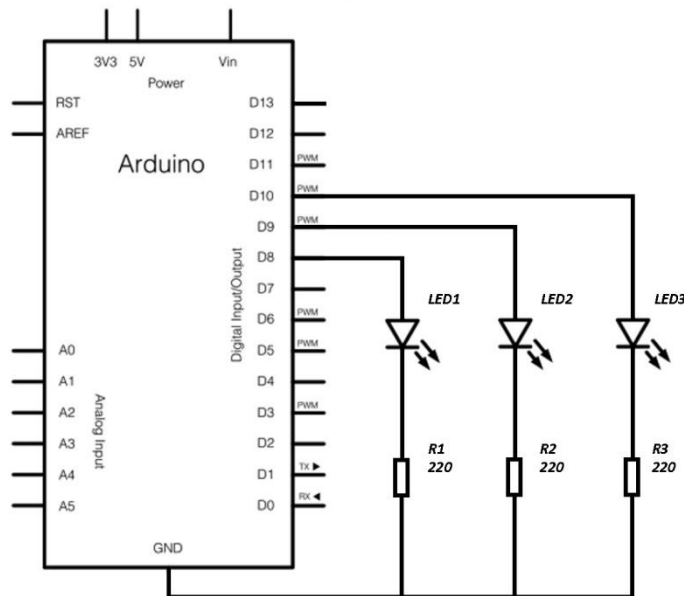


SCENARIO	
<b>Title</b>	<b>Three light LEDs-directional indicator</b>
<b>Summary</b>	Microcomputers and microcontrollers regulate a wide range of automated processes in our environment, for example, the light signals could control regulate movement at intersections. Activities are useful for creation a model of light signaling.
<b>Author/s</b>	Kristina Višnevskienė <span style="float: right;">Date:26/09/2019</span>

Didactic objectives	
Create a model of traffic lights using a microcontroller	
Physics <input checked="" type="checkbox"/>	Mathematics <input checked="" type="checkbox"/> Information Technology <input checked="" type="checkbox"/> Robotics <input checked="" type="checkbox"/> Programming <input checked="" type="checkbox"/>
Education Level:	10-12 years <input type="checkbox"/> 12-14 years <input checked="" type="checkbox"/>
Problem Statement	
<ol style="list-style-type: none"> <li>1. Explain the importance of household electrical appliances for quality of life</li> <li>2. Be able to sort electrical appliances according to purpose, electrical power used</li> <li>3. Substantiate the importance of advanced technologies in the household</li> <li>4. Explain the principles of safe handling of electrical appliances</li> <li>5. Suggest how to choose household electrical appliances responsibly, comparing their energy efficiency to use electricity efficiently</li> </ol>	
BOM (Bill Of Materials needed)	
Computer, Kit Details: Microcontroller Board, Micro Controller Board USB Connection Cable, Layout Board, Layout Cables for Layout Board, LEDs (Red, Yellow and Green), Resistor 220 Ω (3pcs).	
Activity description	
<ol style="list-style-type: none"> <li>1. Locate the Arduino IDE application icon on your desktop and launch the application.</li> <li>2. Connect the microcontroller board to the computer via USB cable.</li> <li>3. Familiarize with the basic circuit diagram, identify and describe the parts of the circuit shown in the diagram: LEDs, resistors, microcontroller.</li> </ol>	



4. Monitoring the operation of the electrical circuit, the program being analyzed. The main functions of its commands are explained: `int`, `void setup ()`, `void loop ()`, `pinMode`, `digitalWrite`, `delay`.
5. Describe the result obtained: turn on red LED, wait 5 s; yellow LED on, waiting 2 s; the red LED is off; the yellow LED turns off; turn on green LED, wait 10 s; yellow LED on; turn off green LED, wait 2 s; the yellow LED turns off; the sequence is repeated.
6. It explains how a traffic light works and what its sequence of signals is: Traffic lights come in three colors and have the following sequence: green - yellow - red - red and yellow together - green. When traffic lights are only switched on to temporarily stop traffic, the sequence of signals shall be as follows: off signals - yellow - red - off signals. When the traffic light is restarted, the sequence of signals is as follows: off signals - yellow in all directions - red in all directions - operating mode.
7. The program is modified to create a sequence of real traffic lights: green - yellow - red - red and yellow combined – green.
8. Describe the result obtained: turn on green LED, wait 5 s; the green LED is off; yellow LED on, waiting 2 s; the yellow LED turns off; red LED on, waiting 5 s; yellow LED on, waiting 2 s; the red LED is off; the yellow LED turns off; turn on green LED, wait 5 s; turn off green LED, wait 10 s; the sequence is repeated.

### Resources

To apply the theoretical knowledge gained in practice regarding the use of a microcontroller and the use of electronic elements - resistors, light-emitting diodes - for connecting electrical circuits;  
Use a microcontroller and programmatically control the information transfer processes and conditions in the electrical circuit - programmatically determine and change the conditions of the LED functions.

### Students' Evaluation

1. The student chooses the necessary tools, connects the electrical circuit, determines the parts used in it, using the microcontroller programming environment, and loads the submitted program.
2. In accordance with the circuit diagram of the electrical circuit, it selects the necessary means and connects the electrical circuit in a consistent, secure manner. Uses microcontroller programming environment, analyzes program, and modifies it.
1. 3. In accordance with the circuit diagram of the electrical circuit, select the appropriate means; connect the electrical circuit in a consistent, safe and rational way. Independently use microcontroller programming environment, analyze program, and modify it. Performs all scheduled tasks.

### Bibliography

<http://www.digikey.com/schemeit>

<http://fritzing.org/home/>

### Scalability

Physics: Electrical Circuits.  
Information Technology: Programming

### More information

Intersection modelling - control of four traffic lights. Make an electrical circuit, write a program.