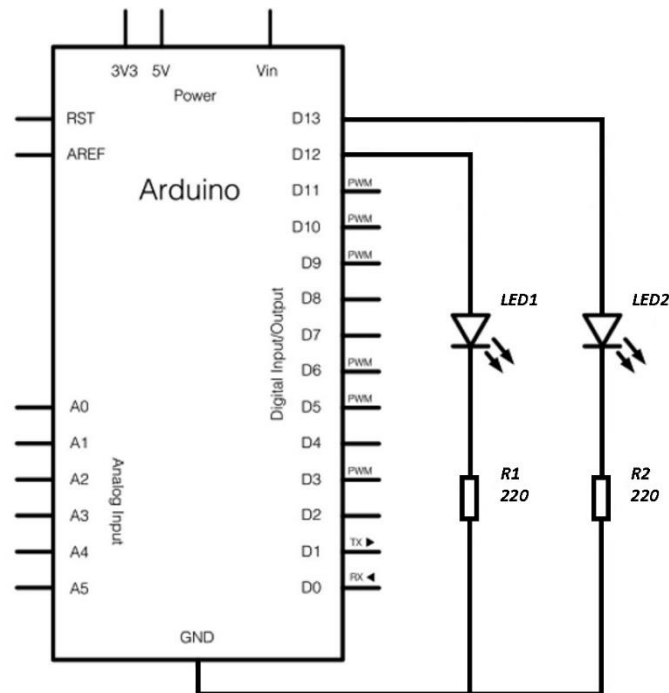| SCENARIO	
Title	**Control of two LEDs using digital outputs**
Summery	LEDs are widely used in electronic devices. They can be of different colors, illuminated or flashing for a given period, indicating the various functions of the operating device.
Author/s	Kristina Višnevskienė, Pavel Mechovicius	Date:20/03/2020

Didactic objectives
Set the required flashing period of the two LEDs using the microcontroller

Physics☒   Mathematics☒   Information Technology☒   Robotics☒   Programming☒

Education Level: 10-12 years☐   12-14 years☒

Problem Statement

1. To practically apply the acquired theoretical knowledge about the use of a microcontroller and the application of electronic elements - resistors, light emitting diodes - in connecting electrical circuits;
2. Use a microcontroller and programmatically control information transmission processes and conditions in the electrical circuit - programmatically set the conditions of LED functions, change them.

BOM (Bill Of Materials needed)

Computer, Kit Details: Microcontroller Board, Micro Controller Board USB Connection Cable, Layout Board, Layout Cables for Layout Board, LEDs 5 mm, Resistor 220 Ω.

Activity description

1. Locate the Arduino IDE application icon on your desktop and launch the application.
2. Connect the microcontroller board to the computer via USB cable.
3. Familiarize with the basic circuit diagram, identify and describe the parts of the circuit shown in the diagram: LEDs, resistors, microcontroller.

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4. The parts of the electrical circuit are placed on the layout board and connected with connecting wires, connecting them to the microcontroller connectors - digital outputs Pin12, Pin13 and Gnd (ground).
5. The LED conducts electricity in only one direction; when an electric current flows, the LED emits light. The three-characterization scheme of the anode and cathode is used to connect the LED
6. The submitted program code is loaded into the Arduino IDE programming window. The program is checked (Verify button) and uploaded to the microcontroller (Upload button).
7. By monitoring the operation of the electrical circuit (LEDs flash at a frequency of 1 s), the program is analysed. Its main functions are explained: *int, void setup (), void loop (), pinMode, digitalWrite, delay.*
8. The program changes the rhythm and frequency of the LEDs
9. There are several ideas for practical creativity, such as making lamps, alarms.

Resources
According to the schematic diagram of the electrical circuit, the necessary means are selected, the electrical circuit is connected in a consistent, safe and rational manner. Independently uses the microcontroller programming environment, analyses the program, changes it. Performs all scheduled tasks.

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.

Bibliography
http://www.digikey.com/schemeit http://fritzing.org/home/

Scalability
Physics: Electrical Circuits. Information Technology: Programming

More information
Traffic light. Control of three LEDs. "Flame on" - control of eight LEDs.