NFC DOOR SECURITY

LED CAR TAIL LIGHTS

Course summary

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In the course, secondary school students learn the basics of the ARDUINO program - an open-source company that produces both development plates based on microcontrollers and the software part intended for the operation and programming of plates.

Course facts in brief

Time: 2 meetings x 120 minutes

Number of pupils: 15

Number of supervisors: 2

Number of groups: 1

Age of pupils: 13+

Prerequisites for students: only 8th grade students

Prerequisites for supervisors: electronics and automation teachers who use ARDUINO programme/software

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Introduction

Background

Society's and business's need for people with technical knowledge is increasing, at the same time as the interest in applying for technical education is decreasing or at least not increasing to a sufficient extent. Something should therefore be done so that more young people will choose technical both vocational and pre-school education in upper secondary school.

Purpose

The purpose of these lessons is to allow younger students in primary school to come into contact with interesting technology they have not worked with before, while they are supervised by older students who go to high school technical education. The older students become a bit of role models and can then more easily with their youthful enthusiasm transfer their interest in and attitude to technology to the younger students.

Method

Younger students are given the task of solving a technical problem, for example to design an NFC door security and a LED car tail light. To achieve this, older students at our high school must teach and supervise younger students, from elementary school, in current technology.

Contact between younger and older students around concrete tasks can create conditions for both arousing and increasing interest in technology.

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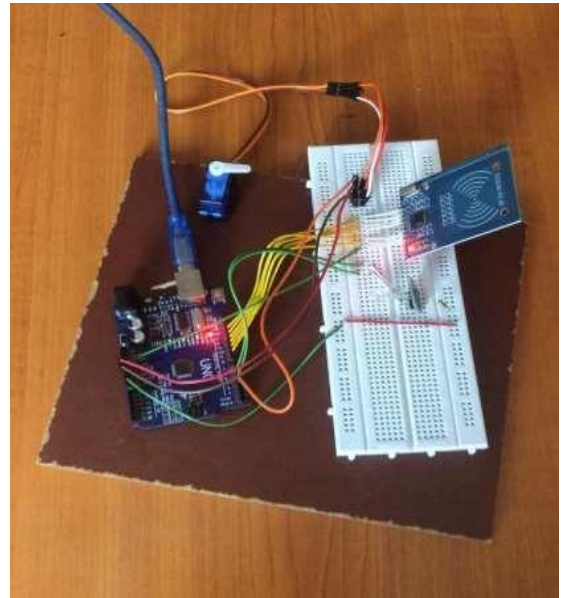
NFC Door Security

Components: NFC Reader Arduino Uno

Servo Motor 2 Blank Key Cards

A door lock system using an Arduino Uno relay.

It is an electronic security system that grants access

to a door based on a blank key card

LED CAR TAIL LIGHT

Components: 12V Red Led Strip 20-0.8V Regulator
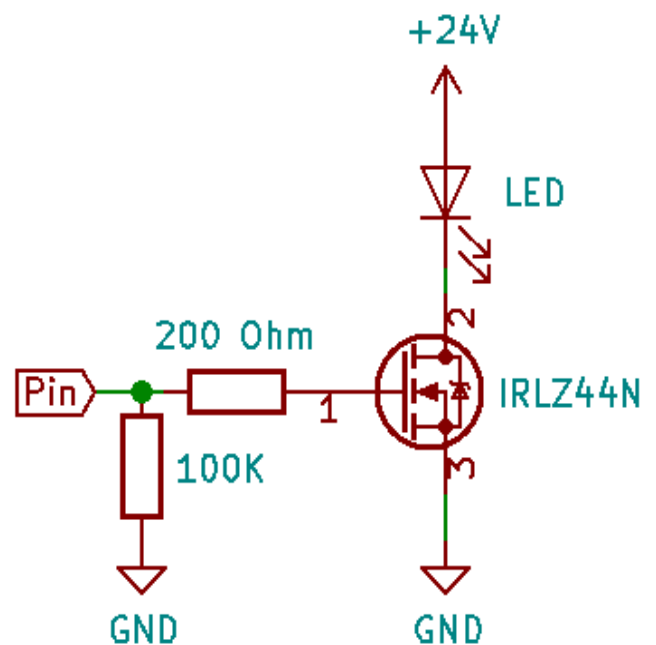
IRLZ44N Mosfet

200 Ohm and 100k Ohm Resistors

 Custom car tail lights

  which can switch

  between static and

  dynamic lightning using

  a US style remote.

Preparations in high school

The high school students attended theoretical and practical courses on electronics and the use of information technologies included in the educational programs over 100 hours annually.

During the practical training classes they learned to program the Arduino pads.

The steps taken to carry out the projects were:

Before starting the activities, the students of our school selected the components of the projects: NFC Reader Arduino Uno, Servo Motor 2 Blank Key Cards, 12V Red Led Strip 20-0.8V Regulator, IRLZ44N Mosfet, 200 Ohm and 100k Ohm Resistors.

For the realization of the connection schemes, the website was used https://www.tinkercad.com/circuits

The connections were made according to the connection schemes and the codes for the Arduino board were installed on the Arduino board.

The operation was then checked for any errors.
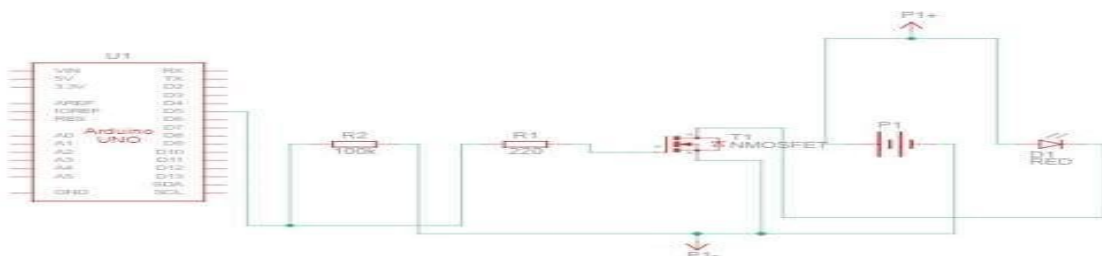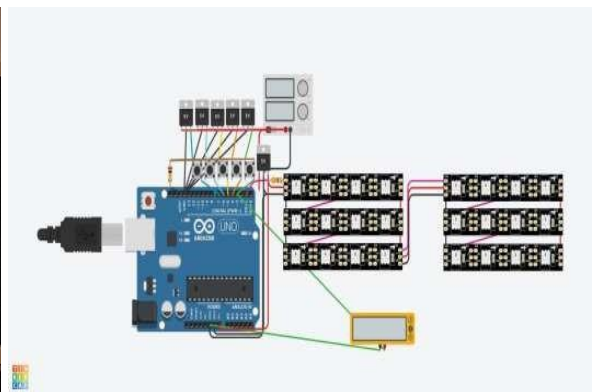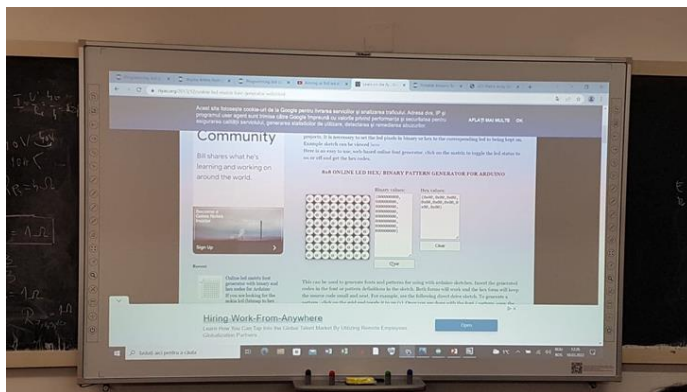
Preparations in primary school

15 students of the secondary school went to our school in 2 days accompanied by two teachers. At our school they carried out practical activities guided by a group of 5 students from our high school.

Implementation

During each activity lasting about 120 minutes, the students of the secondary school were trained by the high school students, they were presented with theoretical notions and the advantages of using Arduino, they were presented with the components that will be used to carry out the project, the connections were demonstratively made and the functioning was checked.

Secondary school students were encouraged to perform small operations for measuring electrical sizes, connecting in an electronic circuit some components
Permanently the activities were supervised and coordinated by 2-3 engineering teachers.

Evaluation

The last 15 minutes of each meeting are reserved for feedback and evaluation

Evaluation is ensured by assigning small practical tasks to secondary school students and tracking their resolution by high school students.

The feedback is made by the completion by the secondary school students of an anonymous satisfaction questionnaire, but also by the verbal exchange of impressions between high school students and secondary school students.