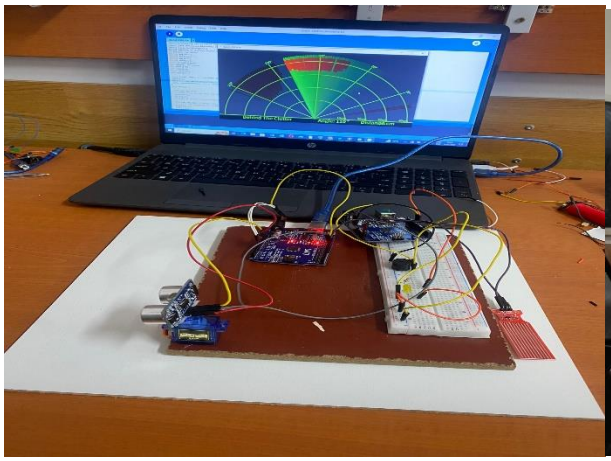
Name of school ENERGETIC
HIGHSCHOOL TARGU-JIU

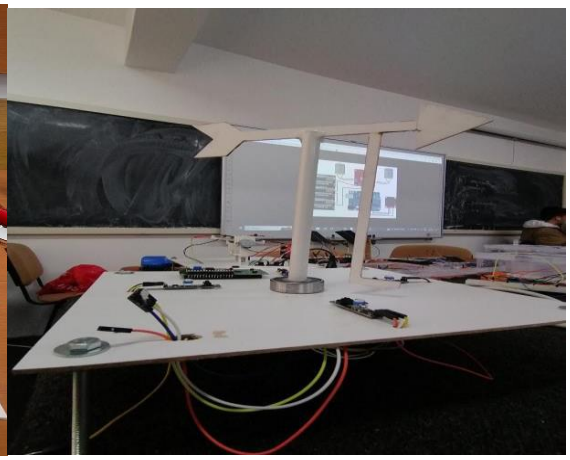
Co-funded by the
Erasmus+ Programme
of the European Union

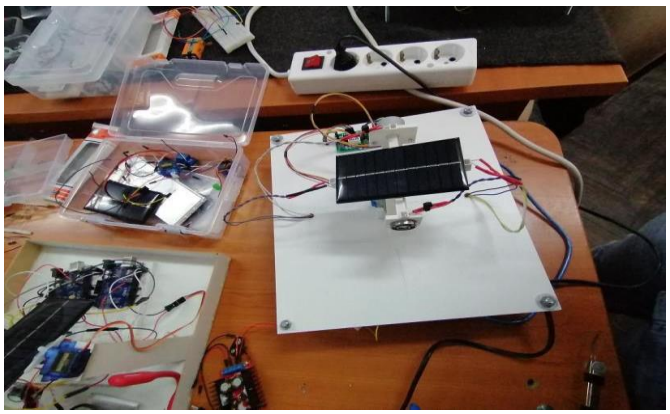
SOLAR TRACKER

ANEMOMETER

ULTRASONIC RADAR







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: 20

Number of supervisors: 5

Number of groups: 3

Age of pupils: 13+

Prerequisites for students: only 8th grade students

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

Table of Contents

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 program a solar tracker, an anemometer and an ultrasonic radar.

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.

Disclaimer

The European Commission's support for the production of this publication does not constitute an endorsement of the contents, which reflect the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

SOLAR TRACKER

- A solar tracker that can rotate automatically to track the sun with the help of four LDR sensors and two servomotors.
- It has the following components:

- 2 solar panels
- 4 LDR sensors
- 2 servomotors

ANEMOMETER
A device used for determining wind direction and a common weather station instrument.
It has the following components:
- Photoresistors
- Breadboards
- Stepper motors

ULTRASONIC RADAR
A device used for detecting objects within a 180 degree-field.
It has the following components:
- Arduino uno
- ultrasonic sensor
- servomotor

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.

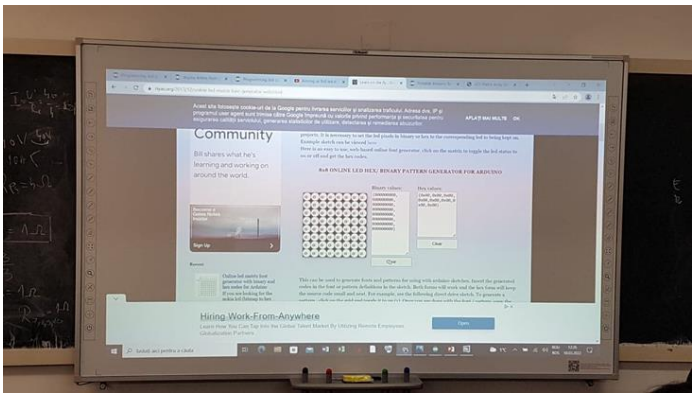
The steps taken to carry out the projects were:

Before starting the activities, the students of our school selected the components of the projects (Arduino kit, connection cables, bred-board (the plate on which all the components are connected) potentiometer with multifunctional role (volume adjustment, brightness, etc.)

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 softwares for programming the Arduino board were installed on the laptop

The operation was checked



Preparations in primary school

20 students of the secondary school went to our school in 2 days accompanied by a teacher. 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

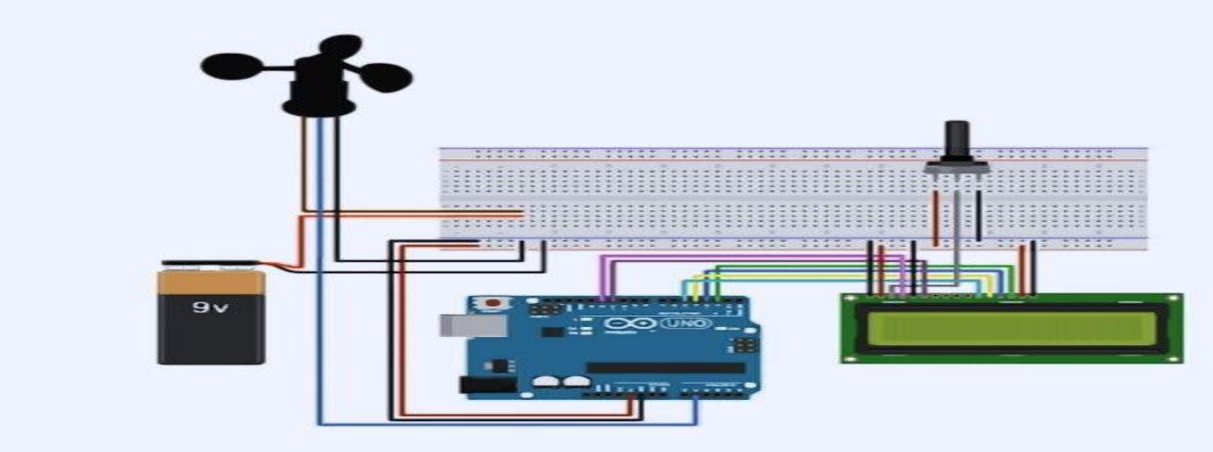
The last 15 minutes of each meeting are reserved for feedback and evaluation

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

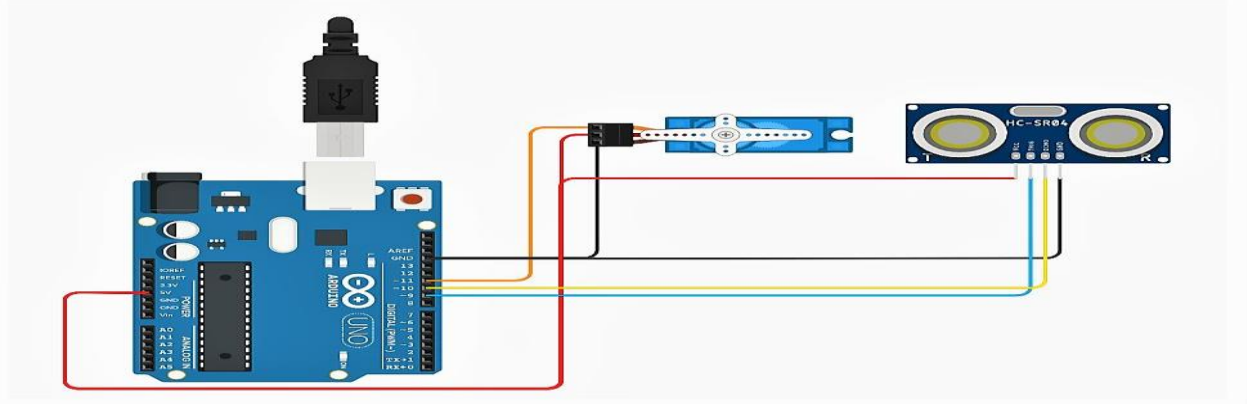
The feedback is made by the completion by the secondary school students of an anonymous satisfaction questionnaire, but also by the verbal exchange of impressions between high school students and secondary school students.

Appendix

ANEMOMETER



ULTRASONIC RADAR



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