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Voltage meter with voice output

Countries:	**Hungary**	**Slovakia**
Suitable for grade:		**3 - 4**
Specialization:		**Electrotechnics**
Responsible teacher:		**Peter Psota**

Project description:
The goal is to construct voltage meter for voltages 0-5V and 0-30V with voice output as a tool for visually impaired people. Voltage meter should have LCD display for local check of measured voltage and Arduino or other microcontroller with voice output. After connecting measuring probes to voltage, voltage meter will measure voltage based on selected range (5V/30V) and microcontroller should trigger voice output that will tell user measured voltage with precision of two decimal points. Voice output can be either robotic voice or recorded voice.

Project tasks:
Student #1 (SK):
- Design circuit for measuring voltages in ranges 0-5V and 0-30V based on microcontroller
- Design PCB for voltage meter
- Prepare microcontroller program for sending measured values to display and voice module
- Test the functionality of voltage meter and compare precision of constructed voltmeter with other voltage meteres with higher precision

Student #2 (HU):
- Design circuit for output module displaying measured value of voltage received from other microcontroller and say them in chosen language (SK/HU/EN)
- Design PCB for display and voice output module
- Prepare microcontroller program for displaying received value and tell it
- Test the functionality of output module

Success criteria:
Project will be successful after construction of working voltage meter for two voltage ranges with desired precision based on microcontroller with LCD and voice output. Project should also follow safety rules according to working with voltage. All project parts should be cost efficient and software code should be well designed (time and memory efficient, without bugs). Project documentation has to be prepared based on given template in the range of 15-25 in English and native language.

Developed hard skills:
Programming, debugging, making connectors and connections, electronic measurement, working with optoelectronic parts, working with datasheets, programming in C, working with audio electronic parts, CAD systems, design of PCB, soldering

Developed soft skills:
Cooperation, working with computer, planning, teamwork, tracking progress, communication in foreign language, responsibility, compliance with agreements, respect deadlines, problem solving, finding and processing information, design thinking, following safety and ergonomic rules