



User programmable LED cube

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| Countries: | Hungary  | Slovakia  |
| Suitable for grade: | | 3 - 4 |
| Specialization: | | Technical lyceum Electrotechnics |
| Responsible teacher: | | Michal Copko |

Project description:

Goal is to construct LED cube controlled by microcontroller with displayed pictures programmable by external user. Microcontroller should download displayable data from webserver, SD card or by serial line. Downloaded data will be generated through application that can be web based or local - console/graphical based. Web-based application will generate data through webserver, so LED cube must have Ethernet module to connect to the internet. If application will be local, it will generate text file that will be stored on SD card and readable by microcontroller. Second option of local application is to send generated data by serial line to microcontroller.

Project tasks:

Student #1:

- Design circuit for LED cube controlled by microcontroller with Ethernet module or SD card module
- Design PCB for LED cube
- Prepare microcontroller program for reading data to display on LED cube from internet or SD card or serial line and display them
- Test the functionality of LED cube

Student #2:

- Agree on data format for drawing pictures on LED cube with student #1
- Prepare application where user can draw 3D pictures that will be displayed on LED cube, application will have function to store and load prepared images
- Generate data for LED cube
- Test the functionality of LED cube

Success criteria:

Project will be successful after construction of working LED cube that will display image sent to it through application. 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, electronic measurement, working with optoelectronic parts, network protocols, working with datasheets, programming, computer graphics, 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