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Date: 28/11/18 Group 1

Problem Statement

The goal of this project is the implementation of a modular and scalable system to control public lights, saving energy but preserving adequate levels of comfort and security. The overall system has some degree of fault tolerance and fail safe behavior.

Design of the circuits of the controller and lamps

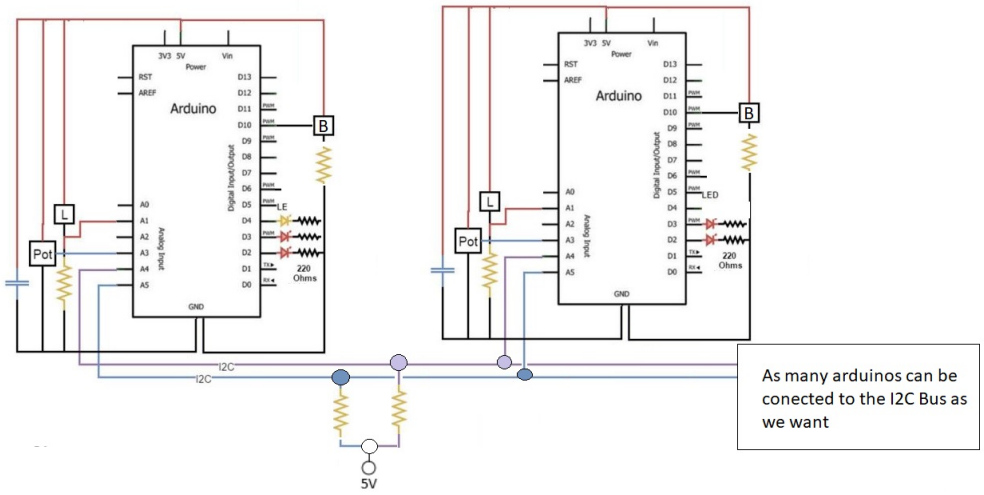

Figure 1: Design of the circuits of the controller and the lamp

The figure will be attached to this report as well.

Overall architecture of the software in the controller and lamps

Regarding the controller, it's located in the (0,0) cell and provides information if the lamps are faulty or not. Lighting the yellow Led when it has received a fault message, and put's it out if an equal number of "it is ok" messages is received.

Each Arduino controls two contiguous cells, the first one has a red led which is controlled by a potentiometer while in the second the led is controlled by pressing a button.

Safety and fault-tolerance measures adopted

When a device receives one request by a cell which is contiguous to both it's cells, they both start executing when the first request is received, instead of waiting for the second request to be delivered.

Intelligent functions implemented

In order to pass the identifier of the I2C sender, it was implemented the following function: **identifier = x1*10 +y1;** Also the adress was calculated in the following way: **adress = (int(x1/2)*16 + y1);**

Program implementing the system

The program's code is attached to this report.