Dylan Lozon

ECE 101-02 MATLAB and C Programming

Mr. Watchorn

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Executive Summary

I wrote a C program to draw on LED arrangements. Currently, it uses a 5x5 array for sample output, but can be easily scaled up. I have also provided two utility functions for use with this system. The first one returns the average of a set of numbers, which is useful for setting the brightness of all pixels to the same level. The second one returns a normalization of the pixel brightness values, which can be used to scale all values to be between 0 and 1.

Discussion

All variables in the utility function are set to accept floating point values so that there is no issue when receiving decimal outputs from division operations. The values in the pixel array, however, are set to integers. This is because we are allocating 1 byte to each led, and decimal numbers would require more space, which would be better spent elsewhere.

I decided to prompt the user to choose between two images in the led sample, which was done with a simple switch statement. The drawback to this is that there is currently no error handling for if the user inputs a letter instead of a number. If the user inputs a non-integer when selecting an image, they have to kill the process with CTRL-C to exit the program. This situation would most likely be handled by a try-catch block, but more research is required.

Outcomes

Everything works as expected. A sample output for the utility functions has been included in figure 1, and the pixel drawings can be found in figure 2.

Conclusions

This currently only serves as a small-scale proof of concept, but with a few hours of development, this could serve as the basis for a decorative LED board. Let me know if you have any interest in pursuing this type of project.

Best,

Dylan

FIGURE 1:

A picture containing text, screenshot, font, line

Description automatically generated

FIGURE 2:

