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CENG320L

Lab 10 Report

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1. Lab Overview

The purpose of this lab was to implement a previous lab, the one which converts the array of rgb pixel values to an array of grayscale values, using SIMD instructions. This lab was meant to be relatively easy, just learning to implement SIMD instructions since we already have somewhat of a framework from doing Lab 5. By that token, the lab was pretty straightforward, just actually implementing SIMD instructions and learning some new ones. This program contains an extra loop compared to Lab 5. At the beginning of each width loop (incremented by j), I check to see if there are less than 8 pixels left; if so, then the program will change to computing the remaining pixels manually so that it does not overstep.

Other than that, the process is the same as Lab 5, in the sense that the calculation is still (54 red + 184 green + 18 blue) / 256. In general, the program loops through all of the pixels in the rgb format, converts the groups of pixels to their respective grayscale value, and then outputs the values into the file so that the resulting image can be read into a program such as GIMP as a grayscale pgm image.

2. Bugs and Hurdles

This program was pretty straightforward, since I have already written basically the same thing earlier in the year. The main hurdle for me was actually figuring out the SIMD instructions to use, but that was easy enough. Since we are still using the same files as before, my tictac.ppm file was corrupted when opened in GIMP, but it still worked fine to convert to a grayscale.

3. Results

This lab helped me to teach myself more about SIMD instructions, and actually implement them as opposed to just learning them hypothetically through the book and homework. In the end, the program ran without errors or failure, and outputted the correct grayscale image, matching the one from Lab 5.