Computer Graphics - Assignment 1

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1 Introduction

This report presents the results obtained during the second half of the course as part of Assignment 2. The images are sequential, with all previously mentioned properties carrying over to subsequent ones. Each image can be reconstructed by running the command make followed by ./assignment2 lab_num in the directory. This process will regenerate and save the images in the output_images folder, and also print the execution duration. The relevant classes are organized in the headers folder. The code for Lab 5 is in the folder *lab5* under Part-2 directory and the code for lab9 is under *lab9.cpp*. While no code was copied, I have collaborated with Martin Lau and Andreea Patarlageanu for the project. All images were generated on my local machine (Chip: Apple M1 Pro, Memory: 16GB). All the code and results can be found in GitHub.

2 Implementations

All the results of lab 5 to 8 are found below. The example with 175 frames is produced in 953.902 seconds and the example video is found in the GitHub repository with the initial start point shown in Figure 4.

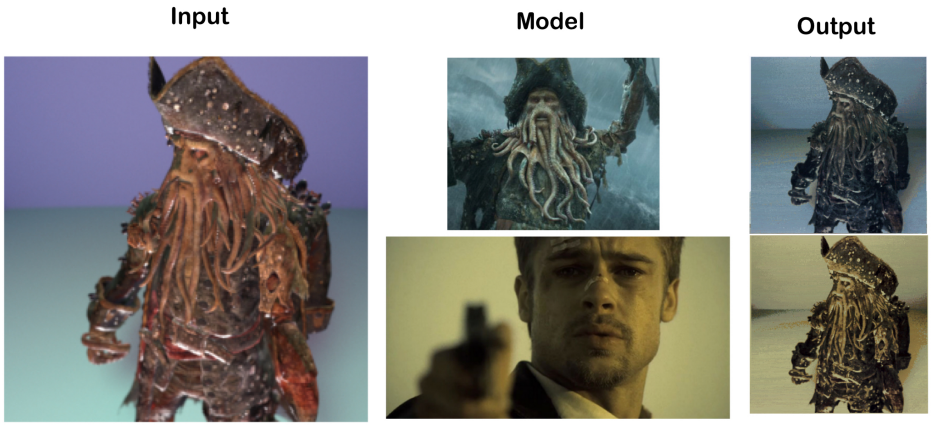

Figure 1: Lab 5 - Color Matching Examples

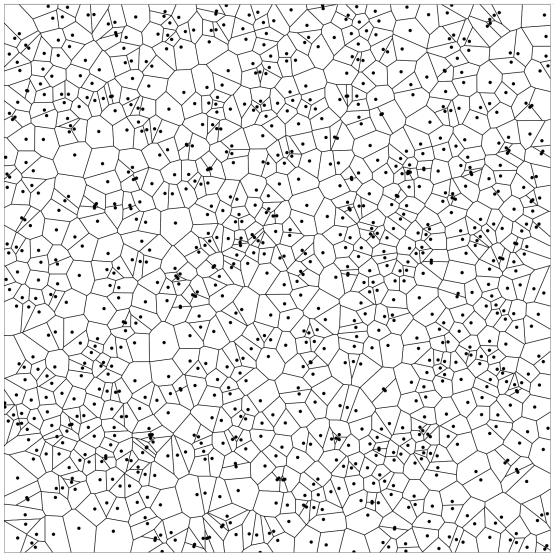

Figure 2: Lab 6 - Voronoi Parallel Linear Enumeration and Sutherland-Hodgman Polygon Clipping Algorithm (Computation Time for 1000 cells: 0.350037 seconds)

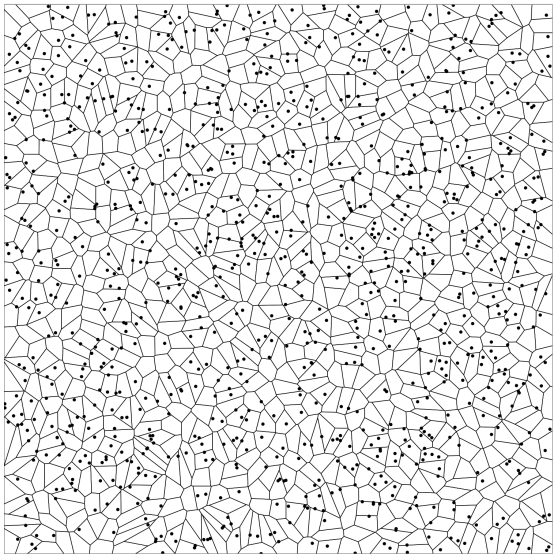

Figure 3: Lab 7 - Diagrams with Optimal Transport for 1000 cells after optimization image of lab 6 (Optimisation Time: 12.1139 seconds)

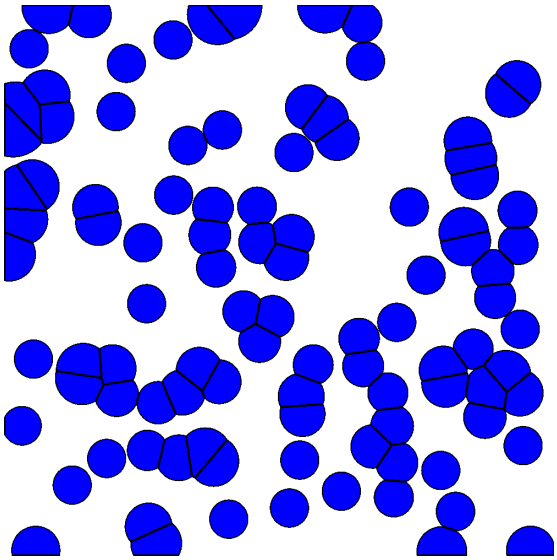

Figure 4: Lab 8 - Fluid Simulation Initial Picture for 60% fluid and 100 particles

3 Feedback

First of all, thank you for all your support throughout the course. I really enjoyed that the course was application based, especially since most of our curriculum is focused on theoretical topics. While I am planning to go into Machine Learning side of computer science, I can really imagine myself utilising the skills I gained from this course being useful for my side projects. Some of the key takeaways for me included: better organising the code base, algorithmic thinking in the context of physical systems, and more structured debugging practices.

I found the first part of the course particularly really engaging. I think this was due to the simplicity of physics for a non-physics major and the detailed optional implementations described in the lecture notes. I also really enjoyed seeing the results of lab 5: colour matching. I felt the second part of the course could have benefited from more explanation in the lecture notes and slightly more advanced or detailed implementation tasks. For example, I would have personally found it interesting to model adhesion/cohesion for fluids. Overall, this course helped me connect my prior programming experience with real-world applications and offered a valuable interdisciplinary perspective. I would happily recommend Computer Graphics to future Bachelor's students.