

Juichi Lee

Email: leejuic@oregonstate.edu

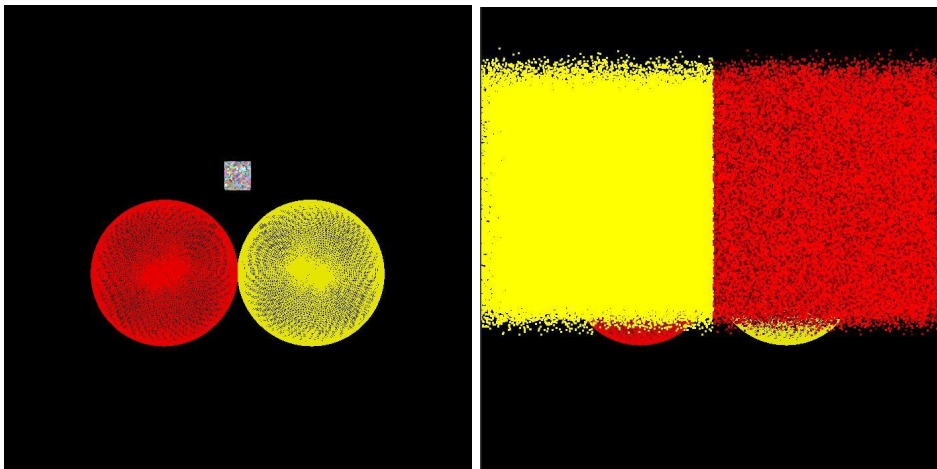
CS 475 Parallel Programming

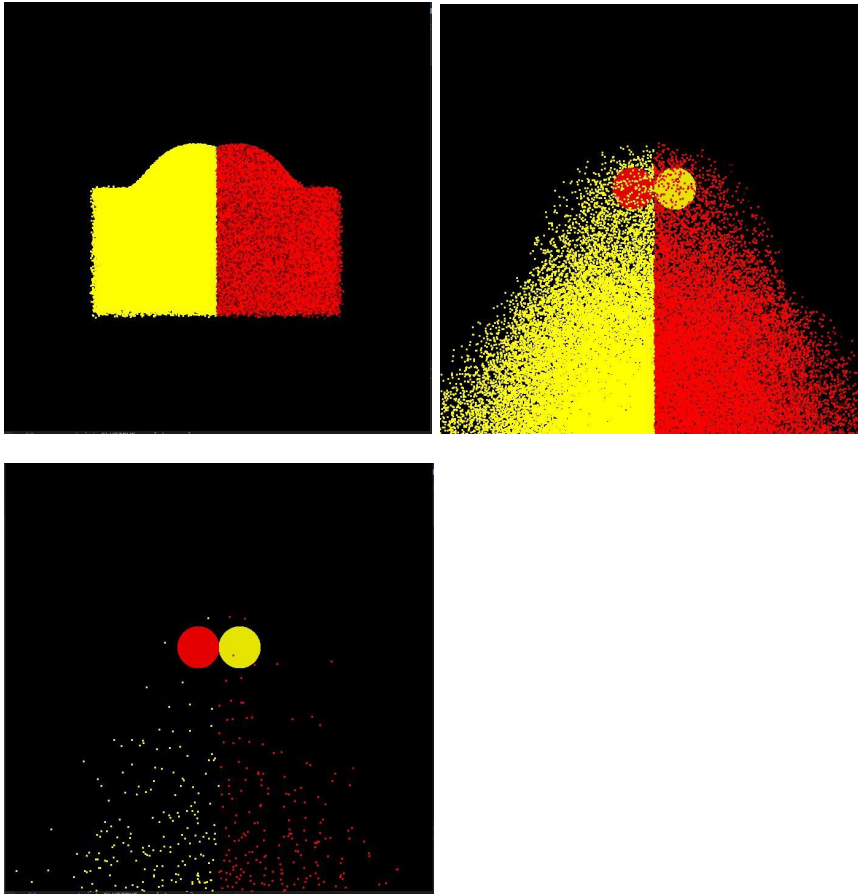
6/2/2022

Project #7A: OpenCL / OpenGL Particle System

Link to Video: https://media.oregonstate.edu/media/t/1_voay1rof

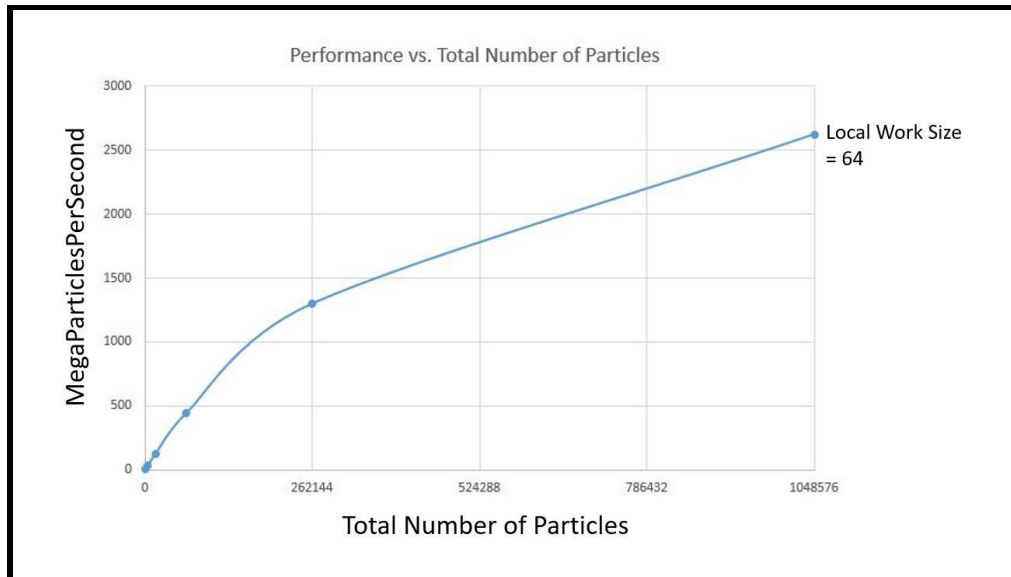
1. What machine you ran this on
 - I ran this project on my own computer, which has a NVIDIA GeForce RTX 2070 and Intel(R) Core(TM) i7-9700K CPU @ 3.60GHz.
2. What predictable dynamic thing did you do with the particle colors (random changes are not good enough)
 - I modified the particle colors in the particles.cl such that particles with x positions greater than or equal to 0 have their color set to red whereas those with x positions less than 0 have their color set to yellow.
3. Include at least one screen capture image of your project in action





4. Show the tables and graphs

Local Size	Number of Particles	MegaParticles Per Second
64	1024	7.8
64	4096	30.7
64	16384	124
64	65536	446.7
64	262144	1298.4
64	1048576	2622.1



5. What patterns are you seeing in the performance curves?
 - The curve appears to speed up quickly between 0 and 262144 total number of particles and then slow down between 262144 and 1048576.
6. Why do you think the patterns look this way?
 - I believe the curve looks this way because of the Gustafson-Baris Observation, which posits that the parallel fraction increases as the size of the input data increases. This implies that the project's parallel components are more efficient at processing the position, velocity, and color of individual particles when handling large amounts of data with respect to the time elapsed. The slowdown near the end may be because of the graphics card reaching its peak performance in terms of the change in MegaParticlesPerSecond given the Total Number of Particles.
7. What does that mean for the proper use of GPU parallel computing?
 - I believe this means that to fully utilize the power of GPU parallel computing, parallel systems should be designed to handle large quantities of data to improve its overall efficiency.