CS 475 -- Spring Quarter 2021

Project #7A

OpenCL / OpenGL Particle System

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1. A web link to the video showing your program in action -- be sure your video is Unlisted.

   https://media.oregonstate.edu/media/t/1_kglwjfpd

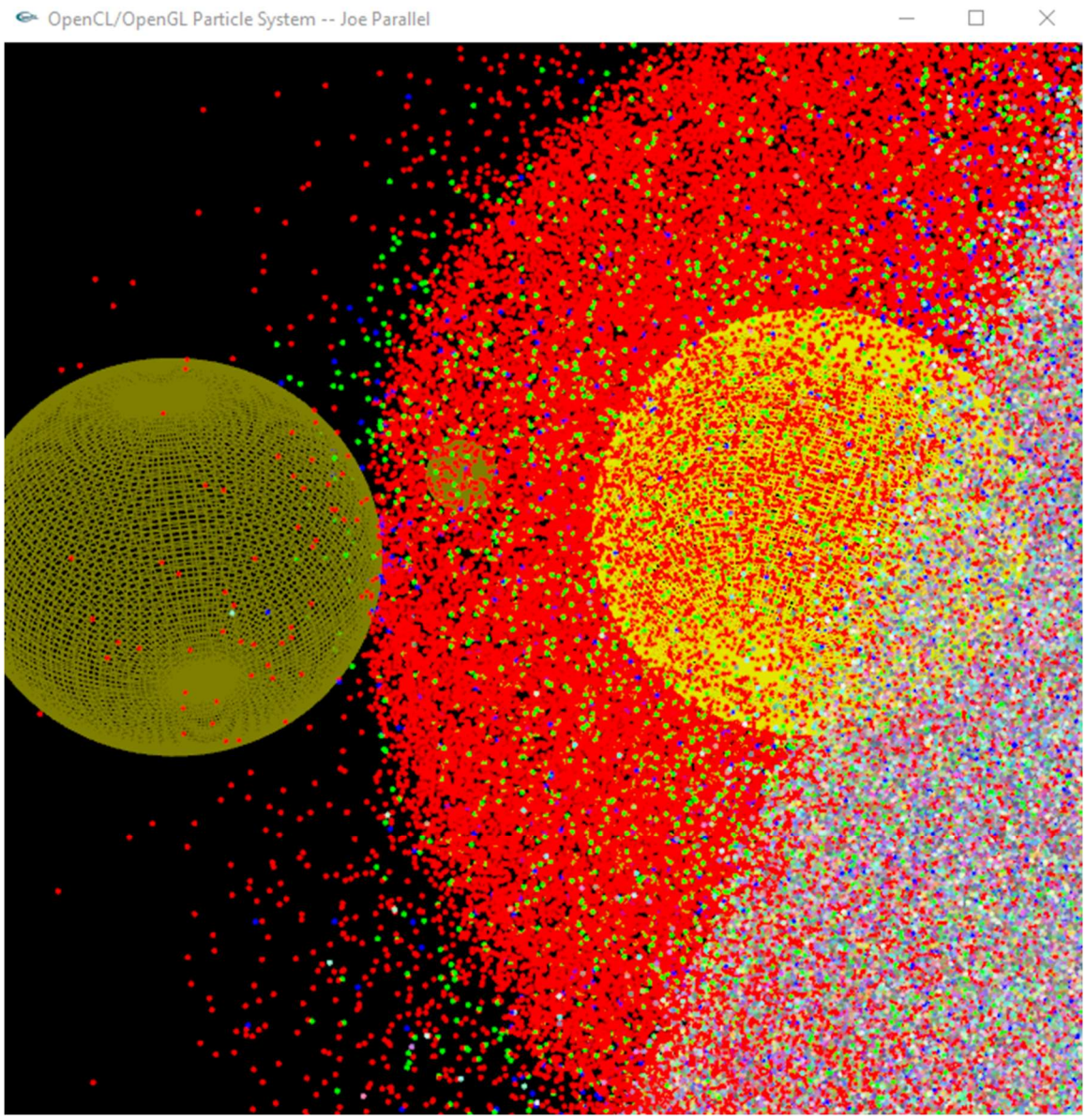
2. Tell what machine you ran this on

   The machine that I am my personal computer. The graphic card I have is NVIDIA GeForce GTX 1070 with Max-Q Design. And Intel® Core™ i7-7700HQ cup @ 2.80GHz.

3. What predictable dynamic thing did you do with the particle colors (random changes are not good enough)

   I change when particles hit first sphere becomes red. The second sphere that have same size as the first one will become blue. And the third sphere is small and in the middle of first and second sphere, it will become green when it hit particles.

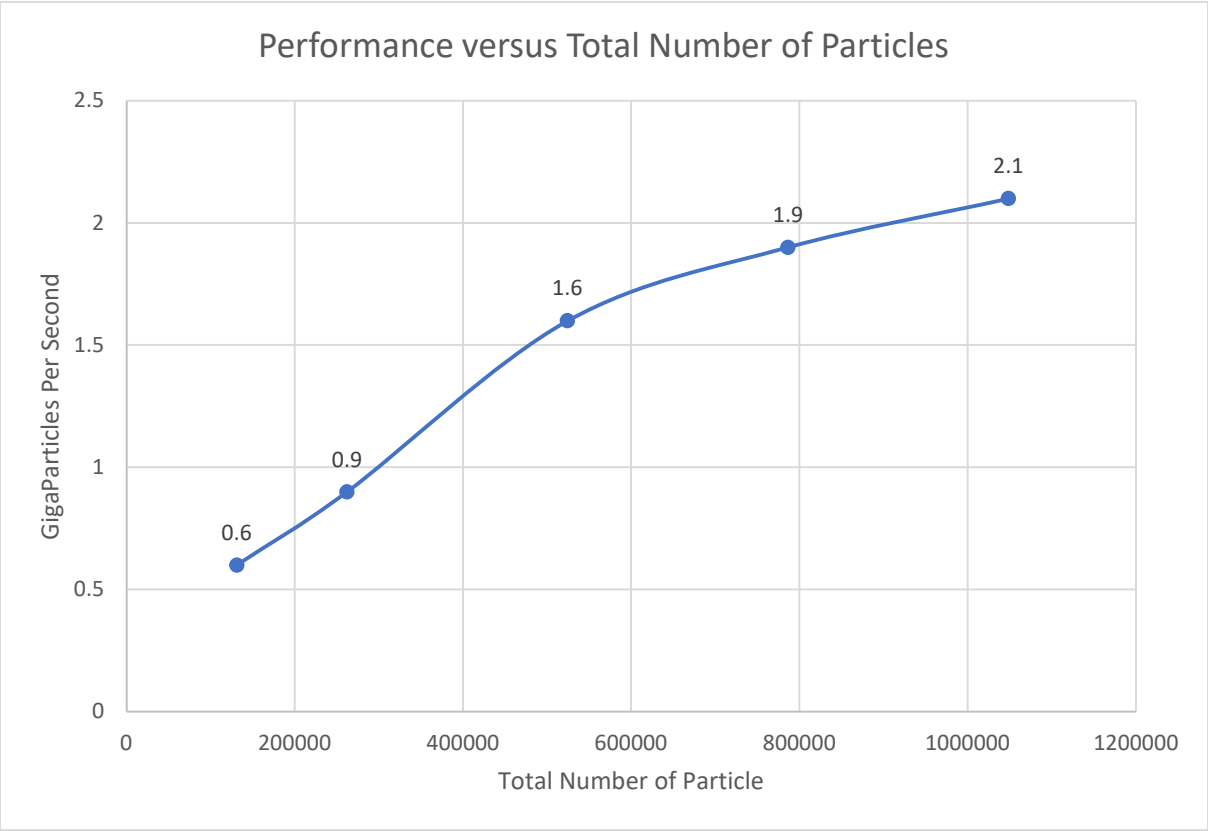
4. Include at least one screen capture image of your project in action




5. Show the table and graph

| total number of particles | GigaParticles Per Second |
|---|---|
| 131072 | 0.6 |
| 262144 | 0.9 |
| 524288 | 1.6 |

| | |
|---|---|
| 786432 | 1.9 |
| 1048576 | 2.1 |




6. What patterns are you seeing in the performance curve?

   The patterns in the performance curve is strong positive liner Correlations. The performance growing when there more total number of particles. The performance start low when there having small numbers of particles, as total number of particles increasing, the performance increasing.

7. Why do you think the patterns look this way?

   I think it looks correct because when there having smaller number of particles, the total number of particles is too small that not enough for GPU to fully running for p parallel computing, but when particles growing, the GPU will work their best so the performance will keep increasing.

8. What does that mean for the proper use of GPU parallel computing?

GPU parallel computing will have low performance when there having a small size of elements that using. GPU will work their best to having higher performance when the number of particles is larger. If number of particles is too small, it means that GPU will unable to fully running parallel computing. So when people want using GPU for parallel computing, they should be careful about their size of elements that using.