EE/CprE/SE 491 WEEKLY REPORT 9

April 4 – April 10

Group number: 18

Project title: GPGPU Parallelization of Memworld

Client &/Advisor: Dr. Wymore

Team Members/Role:

- ***William Blanchard, Parallelization Lead***
- Mason DeClercq***, Team Lead***
- ***Jay Edwards, Documentation Lead***
- Cristofer Medina Lopez***, Integration Lead***
- ***Dalton Rederick, Communications Lead***
- ***Collin Reeves, Game Development Lead***

- **Weekly Summary**

This week, the group had a meeting at the end of the week to discuss what we had done so far and what we wanted to work on for next week. Multithreading and physics is continuing to be implemented. The octree is now working on the GPU allowing for lower end GPUs to increase the size of the world and maintain the 30 fps requirement. A Linux implementation of the program is being looked into to further show off the portability of the application. A settings file is being implemented to help with quickly changing important variables like FOV, world size, and GPU selection. Finally, further changes to the file importer are being added to allow different color palettes of objects.

- **Past week accomplishments**

  · Wil Blanchard:
  - Started creation of thread parallelization code
  - Performed regular checks on main branch
  - Looked into linux implementation

  · Mason DeClercq:
  - Implemented a 3 level octree into the kernel. In the future, more can be added, but the team needs to figure out the cost/reward of adding more metadata that needs to be maintained.
  - Looked into how many kernels could be run at the same time on a GPU. It turns out that only one can be run at a time on most GPUs.
  - Attempted to add another kernel that will go onto the GPU queue for voxel movement, but during testing, it seems to only be working on some of the computers.

  · Jay Edwards:
  - Worked on implementing a settings file into memworld

  · Cristofer Medina Lopez:
  - Did research on OpenCl/OpenGL interoperability. Began adding initialization items for interoperability setup on Memworld. Ran into an issue with context creation when adding context properties in OpenCL initialization.

  · Dalton Rederick:
  - Solved issue with world not loading sizes greater than 128 in any direction
  - Downloaded a few open source assets to test out world loading function
  - Began editing file importer to allow for reading in custom pallets rather than defaulting to the default palette.

  · Collin Reeves:
  - Continued bug fixing physics algorithm, making progress with gravity.

- **Pending issues**

- Possibility that the voxel move kernel is not working on some computers (fixed on one of the broken computers after writing this).

- **Individual contributions**

NAME	**Individual Contributions** *(Quick list of contributions. This should be short.)*	**Hours this week**	**HOURS cumulative**
Wil Blanchard	Started implementation of multithreading. Main branch maintenance. Tries towards Linux implementation.	5	29.5
Mason DeClercq	Implemented a 3 level octree into the kernel program. Added a new kernel for movements of voxels on the GPU (has some bugs)	8	74
Jay Edwards	Worked on implementing a settings file	2	31
Cristofer Medina Lopez	Did research on OpenCL/OpenGL interoperability. Debugging issues with context properties	5	39.5
Dalton Rederick	Fixed world import and began work on allowing custom palettes for importing	4	21.5
Collin Reeves	Working on bug fixing the physics algorithm, fixing bugs with the latest commit to main, causing the program to crash.	4	32

- **Plans for the upcoming week**
  · Wil Blanchard: Implementing Multithreading for:

- Thread for process input
- Thread for compute kernel functionality
- Thread for glfwPollEvents?
- Thread for glTexSubImage2D?
- Thread for physics with timing

· Mason DeClercq : Help try to get the voxel movement kernel working on other computers. Start implementing Unit tests for our application. Start lighting if there is time.

· Jay Edwards: Finish implementing a settings file

· Cristofer Medina Lopez: Do research into OpenGL and OpenCL interoperation. Continue on debugging issues with context properties.

· Dalton Rederick: Finish up color palette chooser and begin creating test cases for the importer.

· Collin Reeves: Finish up gravity, look into adding in jumping.

- **Summary of weekly advisor meeting**

We did not have an advisor meeting this week.