EE/CprE/SE 491 WEEKLY REPORT 6

March 7 – March 11

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*

o **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. Mac implementation progress is moving forward. Pixels are now output to the screen, but we still need to have the correct pixels output from our world. Movement was added to Memworld, so we can now move forward, back, left, and right. Multithreading and physics is continuing to be implemented. We looked into OpenCL and OpenGL interoperation in order to cut down on the time between transferring data between the CPU and GPU. The project is also cleaned up so that it is a lot easier to read. There are also comments added to functions that didn't have them.

- o **Past week accomplishments**
  - · Wil Blanchard:
    - - Implemented forward/backward/left/right movement into the frame tick function.
  - · [Mason DeClercq](#):
    - - Started the approach of ray traversal based on meta-data instead of a sparse voxel octree. It seems to be working as expected for two layers.
    - - Cleaned up the code for the project, so it is easier to read. Added comments to the different functions.
    - - Started looking into OpenCL/OpenGL interoperation. This will cut down on the transfer time between the GPU and CPU.
  - · Jay Edwards:
    - - Worked on implementing multithreading
  - · Cristofer Medina Lopez:
    - - Trying to debug the OpenCL implementation of memworld on Mac, specifically the kernel source code for the project.
    - - Got Mac to output an image(color) for memworld but getting the world to render completely is still an issue.
    - - Read some sources for OpenCL support for Mac.
  - · Dalton Rederick:
    - - Worked with Collin on getting physics to work
    - - Worked with importing objects before finding that it was already set up
    - - Got to work messing around with the import function in order to get world
  - · Collin Reeves:
    - - Continued implementing more physics into the world
    - - Added acceleration and velocity, figuring out collision fixes.

- o **Pending issues**
  - - OpenCL on mac is appearing to be difficult to get working. Issues with the kernel being initialized and built properly.

- **Individual contributions**

NAME	Individual Contributions *(Quick list of contributions. This should be short.)*	Hours this week	HOURS cumulative
Wil Blanchard	Implemented forward, backward, left, and right movement	1	18.5
Mason DeClercq	Started a different approach to ray traversal, cleaned up code, looked into OpenGL/CL interoperation	8	49
Jay Edwards	Continued working on multithreading	2	20
Cristofer Medina Lopez	Debugging the kernel source code to correct issues. Output picture achieved on the Mac but additional fixes needed.	2.5	28.5
Dalton Rederick	Worked with Collin on Physics. Worked on getting a new test environment set up	5	22.5
Collin Reeves	Implemented some velocity and acceleration to objects.	5	23

- **Plans for the upcoming week**
  - · Wil Blanchard: Physics research and implementation

· Mason DeClercq : Continue working on voxel octree implementation, also try to test out OpenCL/GL interoperation to see if it is viable

· Jay Edwards: Try to implement Multithreading into Memworld

· Cristofer Medina Lopez: Debugging the kernel source code for OpenCL for Memworld application so it can run on Mac. Do some more research on how OpenCL managed on Mac do to significant differences to other platforms.

· Dalton Rederick: Load a new test environment and investigate how to load different colors into the model

· Collin Reeves: Fix up velocity collisions, possibly look into bouncing.

- o **<u>Summary of weekly advisor meeting</u>**

In this week's advisor meeting, we talked about where we are currently with the project and what we were struggling with. We discussed how we are currently progressing with OpenCL on Mac and how we are changing sparse voxel octrees back to what we had before, but we are now adding metadata so we can traverse the voxels efficiently. We were told that we needed to start looking into what we should make for our test application. Our advisor is also wanting a demonstration of the current application we have so far out of curiosity.