15-400 Milestone 1

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https://thenumbat.github.io/15400-s21/

Changes

No major changes.

Accomplished

1. Benchmarked our current CPU implementations and compared with commercial state of the art. Thread based scaling works well, decided not to pursue 8x SIMD scaling since previous work has also found much difficulty with it.
2. Added some profiling features for future performance comparisons.
3. Brainstormed algorithmic improvements to implement next (better bounding volumes)

Milestone

My previous milestone for this week included "complete CPU benchmarking" and "preliminary results regarding improving scaling."

I have completed the comparative benchmarking, but am still working on automating the benchmarking process. I determined thread-based scaling works well, and while we get a moderate speedup with 4-wide SIMD, 8-wide is not useful. After discussing with my collaborators, we decided this probably wasn't worth putting a lot of time into since the problem is naturally very divergent if we don't use very coherent inputs.

Surprises

No major surprises, although I am a bit surprised to find that even when this research work is enshrined in the 15-400 class, I feel like I need more head space/motivation for it than is left after taking several other classes as well...

Looking Ahead

I will have a lot of time next week to work on 15-400, so I would like to finish automating the benchmark suite, add more benchmark metrics, implement several types of better bounding volumes, and do some code refactoring. If I can do all of that, I will start working on a GPU implementation.

Revisions

The milestones look realistic as is so far.

Resources

Same as previously: still working on getting an RTX GPU, but this is not (yet) a blocking issue for working on the project.

References

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