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Parallel Computing
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Homework 2 Write up:

I started by reading all documentation and digesting the starter code. After understanding the problem, I began implementing the sequential portion of the assignment. After creating a midpoint of type Vec2 for reference, I created four separate vectors containing particles in their respective quadrants and passed those in the function calls. This step does require a for-loop but it didn't seem extremely beneficial to parallelize. In order to reduce overhead on small datasets or once the particle vectors got small enough, I created an if statement that would switch the processs back to sequential to save time. Next, I parallelized the recursive node building function calls using omp task and ending with omp task wait to insure consistency. I then wrapped the function call to buildQuadTree in a parallel region along with an omp single region to ensure the original call is made by one thread prior to the task distribution. The last thing I parallelized was the for loops in the simulatestep function. This allowed for openMP to choose the best number of threads scheduled with the width of a cache line. This project was really interesting and challenging and I thoroughly enjoyed it.