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Gosnel

OMG its OpenMP

Part 1  
The fix for the dot product ended up being rather simple to fix. The code to fix it ended up being adding in the reduce(operator: variable) method in openMP as the for loop needed to be able to calculate and store the data that was being worked on in parallel.

Part 2

This one took a bit of thinking in how to approach the modification to openMP. The main calculation function bodyForce needed to be parallelized to give some sort of speed up. Compared to the GPU based calculations, the open MP speedup was not even a fraction of what was possible on the GPU implementation. The provided excel data sheet has a listing of all of the recorded times along with further multithreading capabilities of multithreading the loop function in main. The threading of the loop in main did not result in any significant speed up.

All code was tested locally on my mac, using the gcc compiler g++9, with an intel 3.6Ghz 6 core CPU. The openMP parallel for loops where left to default to what the compiler chose for the chunk size as it provided the best speedup.