Programming Assignment

Below, we can see the results from simulating the particles with gpu.
My files are saved at /ihome/ece2192-2022f/cum6/ece1570/hw3

-- Optimized implementation
CPU-GPU copy time = 4.3e-05 seconds
n = 2000, simulation time = 0.603466 seconds

CPU-GPU copy time = 4.4e-05 seconds
n = 4000, simulation time = 1.12602 seconds

CPU-GPU copy time = 9.5e-05 seconds
n = 16000, simulation time = 4.29286 seconds

CPU-GPU copy time = 0.000149 seconds
n = 32000, simulation time = 8.51689 seconds

-- Original implementation
CPU-GPU copy time = 0.000188 seconds
n = 32000, simulation time = 8.62338 seconds

CPU-GPU copy time = 0.000106 seconds
n = 16000, simulation time = 4.3485 seconds

CPU-GPU copy time = 4.7e-05 seconds
n = 4000, simulation time = 1.11425 seconds

CPU-GPU copy time = 4e-05 seconds
n = 2000, simulation time = 0.594604 seconds

-- Serial implementation
n = 2000, simulation time = 9.11014 seconds

Optimization method: I used the same method as I did in homework 2. This method centers around placing particles into respective bins and performing the necessary calculations upon them.

Results: The speed increase is not noticeable until we scale to much higher values of n, such as 16k and 32k. Additionally, the copy speed marginally increased for higher values of n for both the standard and optimized algorithms.