Inputs are taken from galaxy.txt, in the zip found in [this site](#).

N = 1000 delta_t = 25000 T = 75000

Serial

position of particle 48 is (-2.20707e+10,-1.17584e+10)
velocity of particle 48 is (74508.4,-146102)
…
position of particle 560 is (2.87574e+10,1.05611e+10)
velocity of particle 560 is (-48806.9,135757)
…
position of particle 998 is (2.48982e+11,3.6825e+09)
velocity of particle 998 is (-726.452,49096.8)
position of particle 999 is (2.49482e+11,3.6788e+09)
velocity of particle 999 is (-723.543,49047.6)

Time in seconds: 0.365685

Parallel

-bash-4.1$ ./main 1000 25000 75000 0 1 ./nbody_data/galaxy.txt

position of particle 48 is (-2.20707e+10,-1.17584e+10)
velocity of particle 48 is (74508.4,-146102)
…
position of particle 560 is (2.87574e+10,1.05611e+10)
velocity of particle 560 is (-48806.9,135757)
…
position of particle 998 is (2.48982e+11,3.6825e+09)
velocity of particle 998 is (-726.452,49096.8)
position of particle 999 is (2.49482e+11,3.6788e+09)
velocity of particle 999 is (-723.543,49047.6)

Time in seconds: 0.026158
Gflops Rate: 2.293766 GFlop/s
Bandwidth Rate : 2.752519 GB/s

-bash-4.1$ ./main 1000 25000 75000 0 8 ./nbody_data/galaxy.txt

position of particle 48 is (-2.20707e+10,-1.17584e+10)
velocity of particle 48 is (74508.4,-146102)
…
position of particle 560 is (2.87574e+10,1.05611e+10)
velocity of particle 560 is (-48806.9,135757)
…

position of particle 998 is (2.48982e+11,3.6825e+09)
velocity of particle 998 is (-726.452,49096.8)
position of particle 999 is (2.49482e+11,3.6788e+09)
velocity of particle 999 is (-723.543,49047.6)

 Time in seconds: 0.005714
 Gflops Rate: 10.500636 GFlop/s
 Bandwidth Rate : 12.600763 GB/s

-bash-4.1$ ./main 1000 25000 75000 0 32 ./nbody_data/galaxy.txt

position of particle 48 is (-2.20707e+10,-1.17584e+10)
velocity of particle 48 is (74508.4,-146102)
…
position of particle 560 is (2.87574e+10,1.05611e+10)
velocity of particle 560 is (-48806.9,135757)
…
position of particle 998 is (2.48982e+11,3.6825e+09)
velocity of particle 998 is (-726.452,49096.8)
position of particle 999 is (2.49482e+11,3.6788e+09)
velocity of particle 999 is (-723.543,49047.6)

 Time in seconds: 0.007083
 Gflops Rate: 8.471060 GFlop/s
 Bandwidth Rate : 10.165272 GB/s

-bash-4.1$ ./main 1000 25000 75000 0 64 ./nbody_data/galaxy.txt

position of particle 48 is (-2.20707e+10,-1.17584e+10)
velocity of particle 48 is (74508.4,-146102)
…
position of particle 560 is (2.87574e+10,1.05611e+10)
velocity of particle 560 is (-48806.9,135757)
…
position of particle 998 is (2.48982e+11,3.6825e+09)
velocity of particle 998 is (-726.452,49096.8)
position of particle 999 is (2.49482e+11,3.6788e+09)
velocity of particle 999 is (-723.543,49047.6)

 Time in seconds: 0.007138
 Gflops Rate: 8.405700 GFlop/s
 Bandwidth Rate : 10.086840 GB/s

N = 1000 delta_t = 25000 T = 31557600.0

Serial:

position of particle 127 is (1.29817e+11,-5.66829e+10)
velocity of particle 127 is (33332.4,57638.6)
…
position of particle 503 is (-2.10515e+14,1.80889e+13)
velocity of particle 503 is (-6.67776e+06,573247)
…
position of particle 717 is (-1.57532e+11,2.73697e+10)
velocity of particle 717 is (-13425.7,-60015.1)
…
position of particle 998 is (2.50464e+11,-8.37033e+10)
velocity of particle 998 is (15074.7,45170.9)
position of particle 999 is (2.49512e+11,-8.79465e+10)
velocity of particle 999 is (15798.6,44874.5)

Time in seconds: 17.505

Parallel

-bash-4.1$ ./main 1000 25000 31557600 0 1 ./nbody_data/galaxy.txt

position of particle 127 is (1.29817e+11,-5.66829e+10)
velocity of particle 127 is (33332.4,57638.6)
…
position of particle 503 is (-2.10515e+14,1.80889e+13)
velocity of particle 503 is (-6.67776e+06,573247)
…
position of particle 717 is (-1.57532e+11,2.73697e+10)
velocity of particle 717 is (-13425.7,-60015.1)
…
position of particle 998 is (2.50464e+11,-8.37033e+10)
velocity of particle 998 is (15074.7,45170.9)
position of particle 999 is (2.49512e+11,-8.79465e+10)
velocity of particle 999 is (15798.6,44874.5)

Time in seconds: 16.429943
Gflops Rate: 1.536220 GFlop/s
Bandwidth Rate : 1.843463 GB/s

-bash-4.1$ ./main 1000 25000 31557600 0 4 ./nbody_data/galaxy.txt

position of particle 127 is (1.29817e+11,-5.66829e+10)
velocity of particle 127 is (33332.4,57638.6)

…
position of particle 503 is (-2.10515e+14,1.80889e+13)
velocity of particle 503 is (-6.67776e+06,573247)
…
position of particle 717 is (-1.57532e+11,2.73697e+10)
velocity of particle 717 is (-13425.7,-60015.1)
…
position of particle 998 is (2.50464e+11,-8.37033e+10)
velocity of particle 998 is (15074.7,45170.9)
position of particle 999 is (2.49512e+11,-8.79465e+10)
velocity of particle 999 is (15798.6,44874.5)

 Time in seconds: 6.319974
 Gflops Rate: 3.993687 GFlop/s
 Bandwidth Rate : 4.792425 GB/s

-bash-4.1$ ./main 1000 25000 31557600 0 8 ./nbody_data/galaxy.txt

position of particle 127 is (1.29817e+11,-5.66829e+10)
velocity of particle 127 is (33332.4,57638.6)
…
position of particle 503 is (-2.10515e+14,1.80889e+13)
velocity of particle 503 is (-6.67776e+06,573247)
…
position of particle 717 is (-1.57532e+11,2.73697e+10)
velocity of particle 717 is (-13425.7,-60015.1)
…
position of particle 998 is (2.50464e+11,-8.37033e+10)
velocity of particle 998 is (15074.7,45170.9)
position of particle 999 is (2.49512e+11,-8.79465e+10)
velocity of particle 999 is (15798.6,44874.5)

 Time in seconds: 3.545052
 Gflops Rate: 7.119783 GFlop/s
 Bandwidth Rate : 8.543739 GB/s

-bash-4.1$ ./main 1000 25000 31557600 0 16 ./nbody_data/galaxy.txt

position of particle 127 is (1.29817e+11,-5.66829e+10)
velocity of particle 127 is (33332.4,57638.6)
…
position of particle 503 is (-2.10515e+14,1.80889e+13)
velocity of particle 503 is (-6.67776e+06,573247)
…
position of particle 717 is (-1.57532e+11,2.73697e+10)
velocity of particle 717 is (-13425.7,-60015.1)
…
position of particle 998 is (2.50464e+11,-8.37033e+10)

velocity of particle 998 is (15074.7,45170.9)
position of particle 999 is (2.49512e+11,-8.79465e+10)
velocity of particle 999 is (15798.6,44874.5)

 Time in seconds: 3.738401
 Gflops Rate: 6.751550 GFlop/s
 Bandwidth Rate : 8.101860 GB/s

-bash-4.1$ ./main 1000 25000 31557600 0 32 ./nbody_data/galaxy.txt

position of particle 127 is (1.29817e+11,-5.66829e+10)
velocity of particle 127 is (33332.4,57638.6)
…
position of particle 503 is (-2.10515e+14,1.80889e+13)
velocity of particle 503 is (-6.67776e+06,573247)
…
position of particle 717 is (-1.57532e+11,2.73697e+10)
velocity of particle 717 is (-13425.7,-60015.1)
…
position of particle 998 is (2.50464e+11,-8.37033e+10)
velocity of particle 998 is (15074.7,45170.9)
position of particle 999 is (2.49512e+11,-8.79465e+10)
velocity of particle 999 is (15798.6,44874.5)

 Time in seconds: 4.406026
 Gflops Rate: 5.728518 GFlop/s
 Bandwidth Rate : 6.874222 GB/s

-bash-4.1$ ./main 1000 25000 31557600 0 64 ./nbody_data/galaxy.txt

position of particle 127 is (1.29817e+11,-5.66829e+10)
velocity of particle 127 is (33332.4,57638.6)
…
position of particle 503 is (-2.10515e+14,1.80889e+13)
velocity of particle 503 is (-6.67776e+06,573247)
…
position of particle 717 is (-1.57532e+11,2.73697e+10)
velocity of particle 717 is (-13425.7,-60015.1)
…
position of particle 998 is (2.50464e+11,-8.37033e+10)
velocity of particle 998 is (15074.7,45170.9)
position of particle 999 is (2.49512e+11,-8.79465e+10)
velocity of particle 999 is (15798.6,44874.5)

 Time in seconds: 4.468210
 Gflops Rate: 5.648795 GFlop/s
 Bandwidth Rate : 6.778553 GB/s