

ECE 493/693
Fall 2004
Assignment 2

Task: Write a parallel n-body simulation

Due: Monday, October 4, 2004

Details:

Write a C/MPI program that reads a file with initial data on some number of bodies - each body should include at least mass, position in x and y and velocity in x and y. Program should simulate the movement of the bodies in free space due to simple Newtonian physics as given in class. The simulation should compute movement for each time step Δt which should be input as a command line argument - a default value can be used as well. Simulation should proceed for T time steps which should also be passed as a command line argument and can also have a default value. The program should produce output in the form of the position x and position y of each body every O time steps (also a command line argument and can have a default of 1) and the output should be written into a file.

Execution should be timed using `MPI_Wtime`. For each time measured, two values should be reported. One starting before reading input and stopping after the program has run, and one starting after input and with output turned off.

Turn in:

Printout of program code

Printout of initial conditions for a small example (no more than 10 bodies)

Printout of no more than 5 steps for the given input.

Timing of executing the program on 1, 2, 4, and 8 nodes on class cluster, suitable graphed for presentation.