Submit the following project by May 10 (Wed). In addition, each student is required to make a brief (~2 minutes) presentation about his/her project at one of the last two classes — either April 26 (Wed) or April 28 (Fri). Please see me to discuss your potential project by April 14 (Fri), so that we can agree on your topic.

Project: Choose one of the following three options. (The subject can be anything related to simulations such as molecular dynamics, Monte Carlo, quantum dynamics, or eigenvalue problems.)

1. Write a program that is related to one of the subjects covered in the class. The following is a list of possible topics (note that this list will expand as we learn more simulation methods in the class):
   - Change the integration algorithm in the molecular dynamics (MD) program, md.c, to a higher-order trotter expansion method, and compare its energy conservation property with that of the velocity Verlet algorithm.
   - Ising-model simulation, using one of advanced Monte Carlo (MC) algorithms, e.g., Wolff’s cluster MC, multigrid MC (MGMC), replica exchange MC.
   - Hybrid MC simulation of particles on a disk.
   - Write a program for MGMC simulation of particles.


3. Write a short research proposal containing novel extensions of any of the techniques you have learned in the class. The proposal should contain: Goal, specific objectives, current state of the knowledge/previous work, techniques to be used, and expected results.

---