Topics

Application of concurrency to speed-up computations.

- Multi-core processors, multi-processor systems, computer clusters, computational grids.
- Shared memory (multi-threaded) and distributed memory (message passing) programming.
- Task parallel and data parallel algorithms.
- Strategies for parallel program design.
- Performance measures and complexity models.
- Performance analysis and debugging.

Various interrelated aspects (many of which we will discuss).
Preliminary Schedule

- March 5 (Schreiner): Parallel Architectures and Performance.
- March 26 (Schreiner): Java Multithreading and OpenMP.
- April 2 (Biere): Low-Level Shared Memory Programming.
- April 9 (Schreiner): Designing Parallel Programs.
- April 30 (Biere): Low-Level Shared Memory Programming.
- May 7 (Schreiner): Presentations of Solutions 1.
- May 14 (Biere): Low-Level Shared Memory Programming.
- May 21 (Biere): Presentations of Solutions 2.
- May 28 (Schreiner): Message Passing Programming with MPI.
- June 18 (Biere): Presentations of Solutions 3.
- June 25 (Schreiner): Presentation of Solutions 4.

Individual meetings for discussing the assignments.
Organization and Grades

■ Moodle Course
  □ Materials and links.
  □ Forums for announcements and Q&A.
  □ Submission of assignments.

■ Assignments
  □ 4 programming assignments will be handed out.
  □ At least 3 have to be turned in and graded positively.
  □ Elaboration individually or in groups of twos.
  □ Selected submissions will be invited for presentation.

No exam, grade will be entirely based on assignments/presentations.
Literature

Literature

Peter Pacheco, *An Introduction to Parallel Programming*, Morgan Kaufmann, 2011.
Literature

Literature

Literature

Ian Foster, *Designing and Building Parallel Programs*, Addison-Wesley, 1995.