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 19 (Schreiner): Concurrency in Java and OpenMP.
- April 9 (Zoitl): Shared Memory Programming.
- April 16 (Zoitl): Lockless Data Structures and Work Stealing.
- April 23 (Schreiner): Presentations of Solutions 1.
- April 30 (Schreiner): Message Passing Programming with MPI.
- May 7 (Schreiner): Designing Parallel Programs.
- May 14 (Zoitl): Presentation of Solutions 2.
- May 28 (Zoitl): Parallel Computing With Modern C++.
- June 4 (Schreiner): Presentations of Solutions 3.
- June 25 (Zoitl): 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 \textit{individually}.
  - Selected submissions will be invited for presentation.

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

Literature

Literature

Literature

Literature

Literature

Literature

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