CS 594 –
Understanding Parallel Architectures: From Theory To Practice

Web page for the course:

CS 594 –
Wednesday's 1:30 – 4:00

- Understanding Parallel Architectures: From Theory To Practice
- Spring 2003 - 3 credits
  - Jack Dongarra, Professor
- Class will meet in Room C205, Claxton Building
- TA:

To Get Hold of Us

- Email: dongarra@cs.utk.edu
  - Room: 413, Claxton
  - Phone: 974-8295
- Office hours:
  - Wednesday 11:00 - 1:00, or by appointment
- TA:
  - Room:, Claxton
  - Phone: 974-

Schedule of Topics

- Introduction
- Parallel Programming Models and Machines
  - Shared Memory and Multithreading
  - Distributed Memory and Message Passing
  - Data parallelism
- Sources of Parallelism in Simulation
  - Algorithms and Software Tools (depends on student interest)
  - Dense Linear Algebra
  - Partial Differential Equations (PDEs)
  - Load balancing, synchronization techniques
  - Sparse matrices
  - Visualization and monitoring
  - Debugging parallel programs
  - Sorting and data management
  - Metacomputing
  - Applications (including guest lectures)
  - Project Reports

Grades Based on:

- 30% on weekly homework
  (the lowest homework grade will be dropped)
- 30% on a written report and presentation
  (20 pages circa.)
- 30% on a final exam (2 hours)
- 10% on class participation.

Homework

- Usually weekly
- Lowest grade will be dropped
- Must be turned in on time (no late homework)
- Don't copy someone else's homework.
- Sometimes problems, sometimes programming assignment, sometimes requiring running a program to find the solution.
Homework (continued)

- We expect an analysis and detailed discussion of the results of your efforts.
  - The program itself is not very interesting.
- Programming in C or Fortran or Java.
- Will go over the assignments the following week.
- See class web page weekly for details.

Project

- Topic of general interest to the course.
- The idea is to read three or four papers from the literature (references will be provided)
- Synthesize them in terms of a report (~20 pages)
- Present your report to class (~30 mins)
- New ideas and extensions are welcome, as well as implementation prototype if needed.

Final Exam

- In class
- Will cover the material presented in the course
- ~2 hours

Material

- Book:
  - For each lecture a set of slides will be made available in postscript or html.
  - Other reading material will be made available electronically if possible.
  - The web site for the course is:

Background

- C and/or Fortran programming
- Knowledge of parallel programming
- Some background in numerical computing
Computer Accounts

- For much of the class computing you can use one of our set of computer clusters. More on this later
- If you have an account in the Department you have access to the TORC cluster: torc1 through torc8.
- Cluster of PC’s:
  - [http://icl.cs.utk.edu/internal/iclhelp/clusters.html](http://icl.cs.utk.edu/internal/iclhelp/clusters.html)