

INTRODUCTION TO PARALLEL ALGORITHMS AND PROGRAMMING

CSE 40833/60833 - FALL 2007

Instructor

Scott Emrich

Office: 351 Fitzpatrick Hall

Phone: (574)631-0353; E-mail: semrich@nd.edu

Office hours: 10-11:30am, Wed and Fri and by appointment

Overview

This course will provide a comprehensive introduction to parallel algorithms and parallel programming. Emphasis will be on both algorithmic techniques and parallel programming using MPI. Lecture topics will be: models of parallel computation, performance measures, basic parallel constructs and communication primitives, and parallel algorithms for selected problems including sorting. Approximately 40% of the course will be seminar-style. Programming assignments and a research-oriented final project will be done on a 22 node partition of a campus computing cluster.

Prerequisites

- CSE 40113 – Design and Analysis of Algorithms (or equivalent)
- Knowledge of C, C++, or Fortran

Text

Parallel Programming with MPI by Peter S. Pacheco

Additional material will also be made available throughout the semester.

Web page

A web page for this seminar will announced via email shortly.

Course objectives:

- (1) Assess the advantages and disadvantages of parallel processing
- (2) Define and employ measures of parallel efficiency
- (3) Describe commonly used communication primitives and topologies
- (4) Design parallel algorithms and analyze their complexity
- (5) Demonstrate MPI programming skills on a computing cluster

Grading

A total of 4 problem sets (PS), 2 programming assignments (PA), one midterm exam (ME) and a research-oriented project will be evaluated. The final grade will be weighted as follows: 30% PS, 20% PA, 20% ME, 30% FP. The lowest problem set score will be dropped.

Academic dishonesty

All are required to abide by the CSE and University honor code. Discussions are encouraged, but all answers/programs must be written/developed individually. Final projects may be performed in groups of up to three students if the permission of the instructor is obtained.