CS/IT 451 & CS 551 – Parallel Processing

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Parallel Processing

L.M. Liebrock

Lecture 0 – Course Introduction
Description

- Introduction to supercomputers and massively-parallel machine architecture, models of parallel computation, parallel algorithms, synchronization, parallel languages, data and functional parallelism, parallel performance analysis, popular interfaces, and parallel debugging.
Objectives

- Students will gain experience in:
  - parallelization of sequential algorithms
  - implementation of parallel algorithms
  - analysis of parallel algorithms
  - modelling of parallel program performance
Textbook

- Parallel Programming
- Barry Wilkinson
- Michael Allen
- Prentice Hall, 2005
- IBSN 0-13-140563-2
Textbook

- Parallel Programming
- Michael J. Quinn
- 2004
Professor

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Ethics

- Plagiarism.
- Having someone else do your work.
- Doing someone else’s work.
- Not citing work appropriately.
- Turning in any one else’s work.
- Copying code.
- Allowing violations to continue.
Requirements

• Quizzes & in class assign. 10%
• Homework 15%
• Projects 50%
• Tests
  – Midterm 10%
  – Final 15%
Projects

- Substantial application
- Parallelization
- Performance Evaluation
  - multiple machines
  - model
  - performance scalability prediction
Parallel Machines
Course Overview

- Parallel Computers
- Message-Passing Computing
- Programming with Shared Memory
- Embarrassingly Parallel Computations
- Partitioning and Divide-and-Conquer Strategies
- Pipeline Computations
- Synchronous Computations
- Load Balancing and Termination Detection
- Other topics...
551 Description

Additional 551 Objectives

- Students will gain experience in:
  - hybrid parallelization
  - analysis of hybrid parallel algorithms
  - modelling of hybrid parallel program performance