

CISC 372: INTRODUCTION TO PARALLEL PROGRAMMING
Fall 2007 Second Exam Study Guide
Second Exam Time and Date: Last day of our class, December 5, regular classroom

1 References

- Lecture notes from first exam through December 3, 2007.
- Textbook: Relevant sections that go with material presented in class. (see schedule on course website)
- Labs due since first exam - Student oral presentations.
- Inclass handouts since midterm exam.
- Weekly quizzes.

2 Topic Coverage

- manager/worker paradigm: dynamic load balancing and scheduling tasks at runtime - versus static decomposition, how to implement, tradeoffs and challenges
- document classification problem and solution as example application
- different modes of communication - standard, buffered, synchronous, ready and concepts regarding these modes
- overlapping communication with computation: blocking versus nonblocking communication, asynchronous communication - test, wait, isend, irectv, probe, and others from handout
- parallel architectures: fine grain versus coarse grain parallelism, Flynn's taxonomy, SIMD, MIMD, uniform shared memory, nonuniform shared memory, distributed memory, - tradeoffs
- performance evaluation of parallel programs: relative and absolute speedup, efficiency, performance curves and how to read and interpret them, measuring running time, concepts from handout
- shared memory programming and OpenMP - versus MPI, parallel constructs and uses, clauses, advantages and disadvantages, challenges, local versus globally shared variables, concepts from handout
- high level questions from student oral presentations and research project experience

3 Format of Exam

The exam is closed book, closed neighbor and you will have the full final exam period to work. You will be given a list of MPI commands with their parameters for reference. In general, the exam will be a combination of testing your basic knowledge and understanding of the concepts covered in class and application of the concepts. The questions will be chosen from the following forms:

- Short answer.
 - Explain what will happen when a particular code segment is executed.
 - Show what the storage for each process will look like after some set of commands is executed.
 - Write a short (5-10) line MPI program, given a list of MPI commands with parameters.
 - true/false with explanations of why false
 - Interpret a performance evaluation graph
 - Draw a simple picture to demonstrate particular parallel architecture
 - Analyze a code segment for overlapping communication and computation
 - Compute performance numbers given some measurements
 - General short answer about parallelism with shared memory and message passing.
 - most likely matching/fill in the blank from student presentations
- Partial credit will be given when possible on any question in the exam.

4 How to Study

Review your lecture notes, handouts, labs, and textbook chapters. Try some problems of the form above.