CISC 372: INTRODUCTION TO PARALLEL PROGRAMMING
Fall 2003
Final Exam Study Guide
Final Exam Time and Date: 1-3 pm, Wednesday, December 17, 2003, regular classroom

1 References

- Lectures notes from midterm through December 9, 2003.
- Textbook: Sections 6.4,6.5,5.1-5.3,5.4.1,2.1-2.3,2.4.1-5,7.1,7.2,7.10 (only parts covered in class).
- Individual Lab 3, programming contest, Student oral presentations.

2 Topic Coverage

- Cartesian topologies: how to set them up, how to use them, benefits/issues
- communicators and groups: how to set them up and use them, when to use them, benefits/issues
- parallel architectures: fine grain parallelism in a uniprocessor, Flynn's taxonomy,
SIMD, vector machines, array processors, MIMD, uniform share memory, nonuniform shared memory, distributed memory, distributed shared memory
- interconnection networks: topologies and advantages and disadvantages
- overlapping communication with computation: test, wait, isend, irecv, probe
- Shared memory programming with OpenMP: differences from message passing, basic parallel constructs in OpenMP and kinds of parallelism achieved, challenges in shared memory parallel programming: data races and how to deal with them
- performance evaluation of parallel programs: speedup, efficiency, throughput, performance curves and how to read them and interpret them, measuring running time
- (very few) high level questions from student oral presentations

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
- Draw a Cartesian topology constructed from a given small code segment
- Compute performance numbers given some measurements
- most likely matching/fill in the blank (with word list to choose from) from student oral presentations
     Partial credit will be given when possible on any question in the exam.

4 How to Study

Review your lecture notes, labs, and textbook chapters. Write some code segments with each of the MPI constructs to be covered, to make sure you understand how to pass the proper parameters. Try some problems of the form above for topics covered in class.