

Assignment #1

Due: 3/1/2011

1. Applications of Parallel Computing

- Document an application of supercomputers (with parallel computing technique) on solving challenging problems in the past two years (2009, 2010) . Your document should minimally include the following sections:
 - Problem description
 - Difficulties
 - Computing facility
 - No. of processors, amount of memory, ...
 - Computational resources used
 - How long did it take to solve the problem
 - Amount of memory consumed, amount of disk space used, etc.
 - Reference
 - Results (e.g. animations, images)

1. Applications of Parallel Computing

- Hint: the following URLs may help
 - <http://www.top500.org>
 - <http://www.psc.edu/>
 - <http://www.sdsc.edu/>
 - <http://www.osc.edu/>
 - <http://www.ncsa.uiuc.edu/>
 - Or other supercomputer centers in the world
- Due: 3/1/2011
- An example is given at <http://yo-1.ct.ntust.edu.tw/Courses/PA/01-Example/>

2. Reading Assignment

- Chapter 2, “Thinking Parallel”, of “Intel Threading Building Blocks: Outfitting C++ for Multi-core Processor Parallelism”, included in today’s handout.
- After reading, you should be able to understand:
 - Difference between: 1) data parallelism, 2) task parallelism, and 3) pipelining.
 - Definition of “embarrassingly parallel”?
 - Speedup and scaling
 - Amdahl’s Law vs. Gustafson’s observations
 - The difference between a thread and a process?
 - Synchronization
 - *Threads: thread-safe, mutual exclusion and locks, deadlock, race condition.*
 - *Abstraction, Patterns*
- **You will be asked these questions later in the course ...**