Lecture 12. 10/19/2010

final projects
labs 3 and 4
an "indirect" quiz review

final projects:
1 person or 2-person team
abstract (11/5), proposal (11/12), report (12/3)
in-class presentation (12/6)
driven by apps (TSP, etc. maybe microbenchmark)
TSP
Jacobi
Parallel sort
Map-reduce
...
Nice to have apps with much synchronization/coordination

project ideas:
cache-coherence
read/write locks with a parallel app that benefits from them
scalable locks
monitors
fetch-and-add
accumulator functions in ring
flow control for messages
emulate memory hierarchy
hardware-accelerated work-stealing library
active messages
hardware multicast
improve ring protocol:
remove train
several modules
prefetch module
block transfer/swap
transactional memory (v6)
[ Look at TMC C library C* CMMD, CM-5 ]

lab 4: barrier implementations: sw and hw
algorithms sw
hardware broadcast
number of ring messages?
why correct?
using ptp messages: broadcast in sw.
ordering a problem?
number of ring messages?
organize nodes in a ring, master passes token twice around the ring
[number of ring messages? skip]
what bugs?
algorithms hw
like hardware broadcast: count, when n reset to 0
set done when count reaches n
order locker, messenger, and barrier unit
what bugs?

lab 3: tsp mp
algorithmic
divide up the work
static partition
dynamic with work queue
master-less work queue
reduce the amount of work
pick bound using approximate TSP solver
explore greedily
sort input matrix
eliminate path permutations
management of the bound
how to propagate updates?
how often to poll?
how often is the bound updated?
what bugs?
performance
speedup vs. performance
show jonathan charts
how to measure?
  average over many graphs
what hacks?
  how to encode work?
  how to implement present? (bit vector)
how general are the hacks?
Distribution of Speedups

Speedup (parallel version, 11 workers vs. 1 worker)
Distribution of Execution Times

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<th>Count</th>
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