

Slide 1

Administrivia

- Homework 3 deadline extended until Friday. Writeup now includes mention of seeds for RNGs.

Slide 2

Geometric Decomposition — Recap of Key Ideas

- Decomposing data — size and shape of “chunks”, assigning chunks to PEs / UEs.
- Updating chunks. (If this can be done totally independently, *Task Parallelism* is really a better fit.)
- Synchronization / communication.
- Examples: heat diffusion (continued from previous lectures); block-based matrix multiplication (also in book).

Divide and Conquer

Slide 3

- Problem statement:
Suppose the problem is formulated using the sequential divide and conquer strategy. How can the potential concurrency be exploited?
- Key idea in solution — create new task(s) every time we split (sub)problem, recombine when we merge.
- Examples include mergesort and some non-naive algorithms for N -body problem.
- Straightforward if you already have a sequential divide-and-conquer solution, but scalability is somewhat limited.

Recursive Data

Slide 4

- Problem statement:
Suppose the problem involves an operation on a recursive data structure (such as a list, tree, or graph) that appears to require sequential processing. How can operations on these data structures be performed in parallel?
- Key idea in solution — “out of the box” thinking to expose concurrency.
- Probably least-used structure currently (because it doesn’t map well to current architectures); included for completeness and because examples are interesting — e.g. “roots in forest” example.

Minute Essay

- None — sign in.

Slide 5