Outlook:
From Concurrency to Parallelism

Concurrency vs. Parallelism

Concurrent computing
- 1 or few CPUs
- Quasi-simultaneous execution

Parallel computing
- Many CPUs
- Simultaneous execution of many threads of the same application

Common issues:
- threads/processes for overlapping execution
- synchronization, communication
- resource contention, races, deadlocks

Goals of concurrent execution:
- Increase CPU utilization
- Increase responsiveness of a system
- Support multiple users

Central issues:
Scheduling, priorities, ...

Goals of parallel execution:
- Speedup of 1 application (large problem)

Central issues:
Parallel algorithms and data structures, Mapping, Load balancing...

More about parallel computing

“Students graduating with a competence in engineering software for parallel systems will have a distinct advantage in the work force over those who do not.” — M. Oskin, The Revolution Inside the Box, Comm. ACM 51(7), July 2008