

What Did You Learn This Semester?

■ From class syllabus:

“The goal of this course is to provide an introduction to distributed operating systems. The first third of the course emphasizes *communication methods* that the OS must provide in a distributed system. The second third of the course considers how OS handling of *synchronization and mutual exclusion* — central concepts in any operating system — must change in a distributed system. The final third of the course examines additional OS support required for a practical distributed system.

Note that this is a course in distributed operating systems, not a course in distributed computing algorithms. ...”

1

Spring 2001, Lecture 25

What Did You Learn This Semester? (cont.)

■ Overview

- Distributed OS vs. network OS, etc.
- Distributed system vs. parallel system
- Client / server information systems

■ Communication between processes in a distributed system

- Network topologies
- Network communication protocols
- Client / server model
- Message-passing
 - LAM & MPI
- Remote procedure call (RPC)
- Threads
- Distributed shared memory and consistency models

2

Spring 2001, Lecture 25

What Did You Learn This Semester? (cont.)

■ Synchronization and mutual exclusion in a distributed system

- Synchronizing physical clocks
- Synchronizing logical (and vector) clocks
- Distributed mutual exclusion
 - Centralized algorithms
 - Central coordinator
 - Distributed algorithms
 - Time-based event ordering
 - » Lamport's algorithm
 - » Ricart & Agrawala's algorithm
 - » Suzuki & Kasimi's algorithm
 - Token passing
 - » Le Lann's token ring
 - » Raymond's tree
 - Sharing k identical resources
 - » Raymond's extension to Ricart & Agrawala's algorithm
 - Election algorithms

3

Spring 2001, Lecture 25

What Did You Learn This Semester? (cont.)

■ Deadlock in a distributed system

- Deadlock conditions
- Resource allocation graph, cycles, knots
- Deadlock detection
 - Centralized algorithms
 - Central coordinator
 - Ho & Ramamoorthy's one & two phase algs.
 - Distributed algorithms
 - Obemarck's path pushing
 - CMH's edge-chasing
 - Hierarchical algorithms
 - Menasce & Muntz's controllers
 - Ho & Ramamoorthy's clustering
- Deadlock prevention
- Atomic transactions & concurrency control
 - Centralized concurrency control
 - Various locking algorithms
 - Optimistic concurrency control
 - Distributed transactions

4

Spring 2001, Lecture 25

What Did You Learn This Semester? (cont.)

- Distributed file systems
 - Naming
 - Cache location, modification, & validation
 - Sun's NSF
 - CMU's Andrew
- Load distribution / distributed scheduling
 - Process migration
 - Classifying load distribution algorithms, components of a load distrib. algorithm
 - 3 sender-initiated algorithms
 - 1 receiver-initiated algorithm
 - Adaptive symmetrically-initiated algorithm
- Clusters
- Self-stabilization

5

Spring 2001, Lecture 25

Final Exam

- The final exam will be held:
 - Wednesday, May 9
from 5:45pm– 8:00pm
in the usual classroom (MSB 115)
- The final exam is comprehensive, although the emphasis will be on the last set of material (Lectures 15–25)
 - It will be approximately 150% of the length of the regular in-class exams
 - It comprises 25% of your course grade
- Course grades are determined as:
A = 90 – 100 D = 60 – 69.99
B = 80 – 89.99 F = <60
C = 70 – 79.99
 - I do not “curve” final course grades

6

Spring 2001, Lecture 25

You've (Almost) Finished AOS — What Comes Next?

- Parallel and distributed computing:
 - 6/73995 Parallel & Dist. Computing (F'01)
 - Architecture and programming
 - 6/79995 Parallel & Dist. Algorithms (S'02)
 - Models and algorithms
 - <http://www.mcs.kent.edu/~parallel>
 - <http://www.mcs.kent.edu/~distrib>
- Networking:
 - 4/55201 Comp. Comm. Networks (F'01)
 - 6/75201 Dist. Proc. & Interc. Nwks (S'03)
 - 6/75202 Adv. Comm. Networks (S'02)
 - 6/75301 Syst. Mod. & Perf. Eval. (??)
 - <http://www.mcs.kent.edu/~networks>
- Thesis projects available in each group!

7

Spring 2001, Lecture 25

Course Evaluations

- Use a #2 pencil to fill out the form
 - Write “11902” (the course call number) in the ***top left corner*** of the form
 - Fill out all the questions on the front ***and*** back of the form
 - Student monitor will return the forms to the MCS office; I won't see the results until ***after*** I hand in the course grades
- In the “additional comments” area:
 - Tell me what you *like* about the course (so that I'll keep doing it)
 - Tell me what you *do not like* about the course (so that I can consider changing it)
- Take these these evaluations very seriously — we (the faculty) certainly do!

8

Spring 2001, Lecture 25