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. ...”

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

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

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
      - Obermarck’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
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

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
  - B = 80 – 89.99
  - C = 70 – 79.99
  - D = 60 – 69.99
  - F = <60
- I do not “curve” final course grades

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!

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 evaluations very seriously — we (the faculty) certainly do!