

EECS 211: Advanced System Software Lecture 14

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Lecture 14: Overview

- Course Administration
 - Final Course Evaluation
- Assignment 3
 - Priority-based scheduling, bounded buffer
- Assignment 4
 - User programs in Nachos
- Assignment 5
 - Exception handling and system calls
- Storage Management
 - I/O Systems

Course Administration

- Final Course Evaluation
 - 8th through 10th week
 - February 22, 2011 – March 13, 2011, 11:45pm
 - Online via EEE Evaluation application
- Feedback from students to instructors
 - Voluntary
 - Completely anonymous!
 - Very valuable!
- Please help to improve this class!

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Assignment 3

- The Nachos System
 - Task 1: Implement a priority-based scheduler
 - Non-preemptive! (we don't use any `-rs` option this time!)
 - Files `thread.h`, `thread.cc` and `scheduler.cc`
 - Task 2: Bounded buffer for safe communication
 - Template code provided, `threadtest.cc.W11templateA3`
 - 2 producer and 2 consumer threads with different priorities
 - Add missing synchronization using locks, condition variables
- Deliverables
 - Brief explanation (in body of email)
 - Scheduler: `thread.h`, `thread.cc`, `scheduler.cc`
 - Bounded buffer: `threadtest.cc`
 - Log file: `log.txt`
- Due by email to `doemer@uci.edu`
 - Wednesday, February 23, 2011, at 2pm (sharp!)

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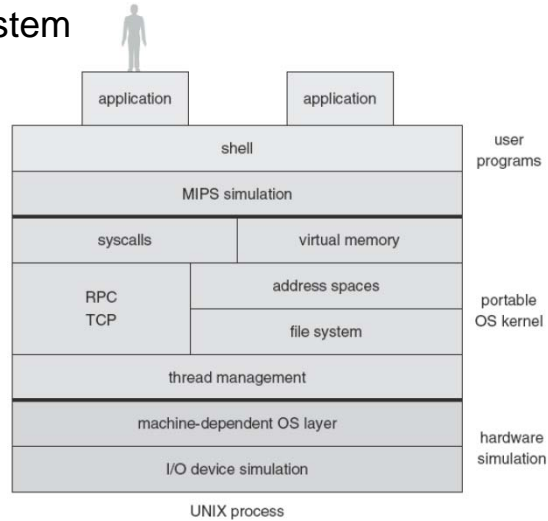
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Assignments 4 and 5

• The Nachos System

- **User code:**
 - Cross-compiled C/C++ code
 - emulated by MIPS simulator
- **Kernel:**
 - Compiled C/C++ code
 - normal (debug'able) Unix process
- **I/O System:**
 - simulated by Unix process I/O



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Assignment 4

- **User programs in Nachos**
 - Write simple user programs to be run on Nachos kernel
 - “good” programs: `HelloWorld.c`, `Reverse.c`, `ListFile.c`
 - “bad” programs: `MemError.c`, `FileError.c`, `IOError.c`
 - Validate kernel using these test programs
 - “good” programs should run successfully
 - “bad” programs should be caught and cleanly killed
- **Deliverables**
 - brief explanation (in body of email)
 - `HelloWorld.c`, `Reverse.c`, `ListFile.c`, `MemError.c`, `FileError.c`, `IOError.c`
 - corresponding log files
 - Email to `doemer@uci.edu`
- **Due**
 - Wednesday, March 2, 2011, at 2pm (sharp!)

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Assignment 5

- Exceptions and System Calls in Nachos
 - Implement exception handling and system calls
 - Implement `ExceptionHandler()`; handle 9 exceptions
 - Implement `SystemCall()`; handle 7 (out of 9) system calls
 - Validate kernel using the test programs from Assignment 4
 - “good” programs: `HelloWorld.c`, `Reverse.c`, `ListFile.c`
 - “bad” programs: `MemError.c`, `FileError.c`, `IOError.c`
 - Make your kernel bullet-proof!
- Deliverables
 - brief explanation (in body of email)
 - `exception.cc`
 - Log files of running examples from Assignment 4
 - Email to `doemer@uci.edu`
- Due
 - Wednesday, March 9, 2011, at 2pm (sharp!)

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Assignment 4

- User Programs in Nachos
 - Interactive discussion and code review
 - `cd code/userprog`
 - `./nachos`
 - `./nachos -x ../test/halt`
 - `./nachos -x ../test/shell`
 - `more ../machine/machine.h`
 - `more ../syscall.h`
 - `cd ../test`
 - `more halt.c`
 - `more sort.c`
 - `vim Makefile`
 - `gmake`
 - `../userprog/nachos -x halt`

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Storage Management

- Note: We skip chapter 12, “Mass-Storage Structure”
 - Hard disks (incl. RAID) are devices
 - Devices are important, but outside of OS topic
 - Modern hard disks handle physical block layout internally
 - *Cylinder, track, sector* numbers (and bad blocks)
 - OS sees *logical block numbers* only
- Excerpts from chapter 13 of “*Operating System Concepts*”, 8th Edition, by A. Silberschatz, P. B. Galvin, G. Gagne, John Wiley & Sons, 2009.
- Storage Management
 - I/O Systems