Slide 1

Administrivia

- Reminder: Homework 8 due today. Accepted without penalty through 5pm tomorrow.
- Review sheet for final on Web. Solutions to all homeworks available now (but please do not pick up a solution for Homework 8 until you've turned something in!). Solution to midterm also available.
- Grading — I will send mail if/when there is something to report!
- Since we did some review Friday I don't have more to say in a review session. ?
- Is there interest in extra-credit problems, to be due next week?
- Information about office hours this week and next coming by e-mail soon.

Slide 2

Minute Essay From Last Lecture

- Only one war story, but a pretty good one . . .

Slide 3

Course Recap

- Four key areas (the gospel according to Pitts):
  - Process management.
  - Memory management.
  - I/O management.
  - Filesystem management.
- Two views of operating systems:
  - "Virtual machine" that provides useful abstractions for applications programs, end users.
  - Resource manager.
- Also a little about history, a little about security.

Slide 4

Process Management

- O/S as virtual machine — process abstraction, "concurrent" execution, IPC, concurrent algorithms.
- O/S as resource manager — implementation of above, including interrupts and context switches, CPU scheduling.

Slide 5

Memory Management

- O/S as virtual machine — memory protection, virtual memory, “multiprogramming”.
- O/S as resource manager — implementation of above, including page replacement algorithms.

Slide 6

Filesystem Management

- O/S as virtual machine — filesystem abstractions (files, file attributes, directory structures).
- O/S as resource manager — implementation of above, disk-space management, reliability and consistency.

Slide 7

I/O Management

- O/S as virtual machine — layered abstractions for working with I/O devices (user-level s/w, device-independent s/w).
- O/S as resource manager — implementation of above, plus a little about lower-level interaction with devices (programmed versus interrupt-driven I/O versus DMA).

Slide 8

Recap, Continued

- Some recurring themes:
  - Interaction between h/w and s/w — some h/w features are there to support o/s features; o/s influenced by what's available in h/w.
  - Trade-offs — often the answer to "which is best?" is "it depends".
- We didn't cover the whole book, but if you look at the ACM's guidelines for an undergrad o/s course — we pretty much did what they said.

Slide 9

Recap, Continued

- A very smart person I know once said the only interesting part of an o/s course was concurrent algorithms, and the rest is "just details".

  A student a few years ago said "a lot of this just seems like common sense" (once you understand the basic ideas).

  Both sort of right . . .

- Goal of this course is to learn/retain basic ideas. Details may help with that — and can be interesting in themselves — but should not be the focus.

Slide 10

Minute Essay

- How did the course compare to your expectations/goals? Did you learn what you hoped to learn?