

Slide 1

Administrivia

- Reminder: Homework 6 due Wednesday.
- Review sheet for final on Web.
- Solutions to written problems in hardcopy — first three distributed before midterm, remaining ones shortly (probably tomorrow for Homeworks 4 and 5, Wednesday or Thursday for Homework 6). Solutions to programming problems on the Web.
- Solution to midterm also available in hardcopy.
- Grading — I will send mail if/when there is something to report. (I have graded Homework 3 and the midterms and just need to add up points and record.)
- Should we have a review session? (I'll make that today's minute essay question.)
- Is there interest in extra-credit problems, to be due next week?

Slide 2

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 3

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 4

Memory Management

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

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 5

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 6

Recap, Continued

Slide 7

- 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.

Recap, Continued

Slide 8

- 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.

Minute Essay

- Are you interested in a review session Wednesday or Thursday afternoon?
What times could you *not* be there?

Slide 9