Slide 1

Minute Essay From Previous Lecture

- A week ago I asked you for opinions about whether users preferred features over security.
- Most thought that users in general prefer features, often because they don't know security can be a problem. Sadly, probably true.
- But there were a few who said they themselves would rather have security!

Slide 2

Administrivia

- Homeworks 6 and 7 graded.
- Reminder (as if you needed one!): Final Friday. Review sheet on the Web.
- Solutions to homework problems and midterm distributed in hardcopy; ask me if you missed one.
- I will send out a "grade summary", similar to what I sent out at midsemester, soon.
- I will post extra-credit problems soon. Can only help your grade. Turn in by Wednesday the 13th by 5pm.
- My office hours this week — I'm not quite sure. I should be around Wednesday and late Friday; I'll let you know when by e-mail.

Slide 3

Exam Review

- (Topic by topic through the review sheet.)

Slide 4

Course Recap

- Four key areas (the gospel according to former chair Pitts):
  - Process management.
  - Memory management.
  - Filesystem management.
  - I/O 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 5

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 6

Memory Management

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

Slide 7

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 8

I/O Management

- O/S as virtual machine — layered abstractions for working with I/O devices (user-level s/w, device-independent s/w, etc.).
- 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 9

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 I think we addressed the topics most crucial for an undergraduate course in operating systems. I haven't looked at recent ACM guidelines, but the ones in effect a few years ago — we pretty much did what they said about this subject.

Slide 10

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 11

Minute Essay

- None really — just sign in.
- And best wishes for a successful end of semester and a good holiday!