

Slide 1

Administrivia

- Reading quizzes and homeworks on Chapters 4 and 5 due as shown in schedule. Final exam — later slide.
- “Not accepted past” deadline is awkward — I’d say next Friday, but grades for graduating seniors are due at noon next Thursday, so — next Wednesday for them, next Friday for everyone else. (Graduating senior and not sure you can finish? Let’s negotiate.)
- I will post sample solutions to all homeworks and reading quizzes later this week, probably Friday.
- (Grade information update.)

Slide 2

Administrivia

- Is there still interest in the extra-credit problem about synchronization? (I’ll ask in minute essay.)
- Office hours this week and next TBA (in e-mail). Also e-mail is usually a good way to reach me.
- No, this hasn’t been a good semester for me, and I really regret that.

Slide 3

More Administrivia

- I had planned to do the final like the midterm (timed take-home, you choose the time). I think that does not make sense, so a revision:
- It will only be worth 100 points, and will be untimed. So really it's kind of a glorified problem set, but with different rules about collaboration (basically, none — same rules as for midterm). (I'll post a "review sheet" with details.)
- It will still be comprehensive, i.e., will include material from before the midterm; split likely to be about a third from earlier, two-thirds on topics past midterm.
- I'll post it later this week, by Friday at the latest. Due date would normally be a week later, but has to be earlier for graduating seniors.

Slide 4

A Very Little Bit About Security

- Usually I ask students to read/skim Chapter 9. I won't this time, but it's interesting reading, so if you have some free time (ha)?
- Topics include:
 - Goals (data confidentiality, data integrity, system availability) and what can go wrong (deliberate intrusion, accident).
 - User authentication.
 - Attacks from within and from outside.
 - Trusted systems; designing a secure system.

Slide 5

A Very Little Bit About Security, Short Version

- Many many ways for attackers to compromise security.
- Common factors:
 - Executable content from untrustworthy source.
 - Human factors.“Monoculture” makes it easier!
- Shameless not-self-promotion: Strongly consider taking Dr. Myers’s course “Information Assurance and Security” (CSCI 3311).

Slide 6

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.

Slide 7

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 8

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.

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 9

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).

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Recap, Continued

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- 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, though for some topics we didn't go into much detail. Fortunately the ones we did address seem to be considered more important.

Recap, Continued

Slide 12

- 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

Slide 13

- A while back I said I'd offer an extra-credit problem about synchronization. Is there still interest?
- For office hours I'm thinking most days 6pm to 7pm. Does that time work for you?
- Parting remarks? (You might not have any.)
- Course evaluations:
URL sent to you in e-mail.
Password TBA in class (to also be sent by e-mail after class).
- And best wishes for a successful end of semester and a good holiday!