CSE 451: Operating Systems
Winter 2024

Module 20
Review

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Today’s Agenda

• One last hard lesson learned
• Quick recap of topics covered
• Open discussion on any topic
• Finally, some last words
But first, we’re being watched
CSE 451: Operating Systems
Hard Lessons Learned

Windows
Generic Table Package using Splay Tree

Gary Kimura
A simple package to look up keyed data

• Create() a table, specify a generic ordering function
• Add() an entry to the table
• Lookup() an entry based on a key
• Remove() an entry

• Great for things like symbol tables in a compiler or tracking opened files

• Added a way to enumerate a table from beginning to end, really as a debug tool
Splay trees: the perfect solution

• Just a binary search tree
• Self adjusting based on lookup
Performance gains

• Locality of lookups
What could possibly go wrong?

• My simple solution for enumerating a table linearized the tree. Augh!
Back to the drawing board.

- Red Black replaced Splay
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Major Topics

- Hardware Modes
- General Structure, Architecture, and Processes
- Interrupt, Exception, and Syscall
- Locks, Deadlock, and Starvation
- CPU Scheduling
- Memory
- Virtual Memory
- Storage and File Systems
Obsolescence in design

• Ponder the implications of all the changes that have taken place in last 40 years regarding computers.

• Word size: 8bit, 12bit, 16bit, 32bit, 36bit, 60bit, 64bit.
• Many things have become bigger and keep getting bigger
• Some things have shrunk
• A lot of things have becoming faster, but some speeds haven’t changed
• And a lot more things…
Pet Peeves

• Overly complex design (Keep It Simple)
• Poorly commented code
• Undocumented Tribal knowledge
• Picking a solution because it works well on some contrived data sets. Sorting is an example
• The job interview and selection process in the tech industry
• And the list goes on…
Wrap up

• OS design is not magic

• But the OS is a whole lot of stuff all tied together in sometimes unobvious, convoluted, and messy ways

• Hot OS topics? Research versus Industry

• What I hope you got out of this class
  – A more complete understanding of the OS environment that will make you better programmers and computer users
  – And when you stumble upon a bug in Windows you’ll know who to blame
Penultimate slide

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• Quick recap of topics covered
• Open discussion on any topic
• Finally, some last words
Last lecture is over, time for a nap