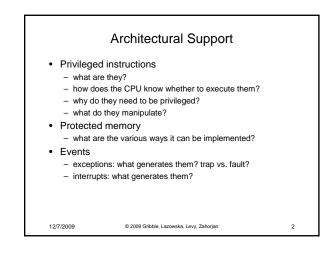
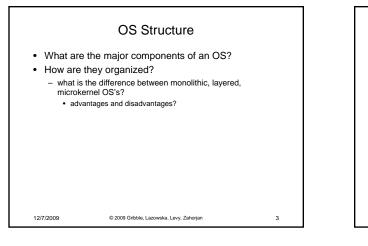
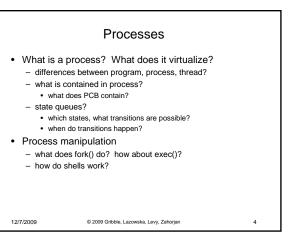
# CSE 451: Operating Systems Autumn 2009

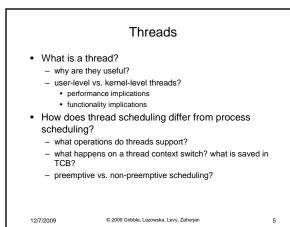
### Module 26 Course Review

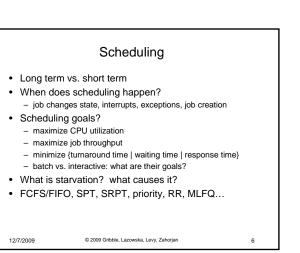
Ed Lazowska lazowska@cs.washington.edu Allen Center 570

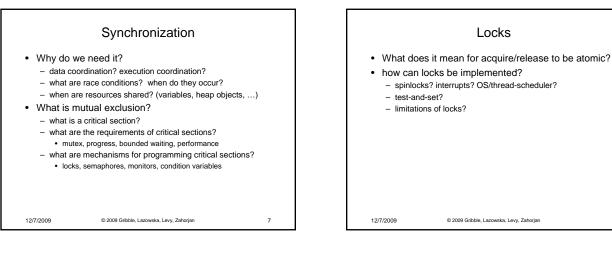


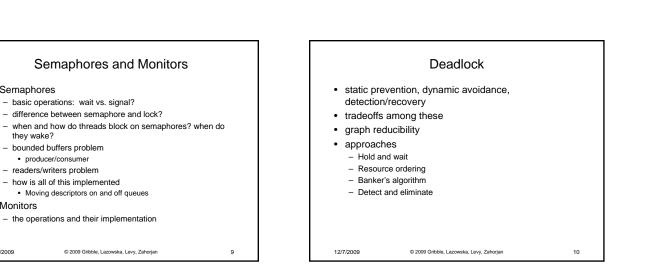


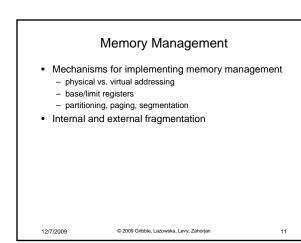










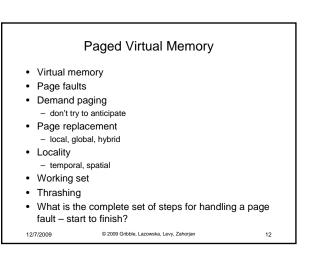


· Semaphores

Monitors

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they wake?

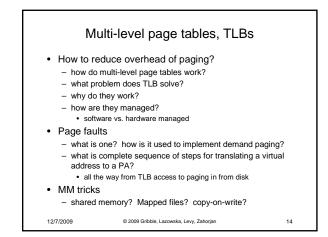


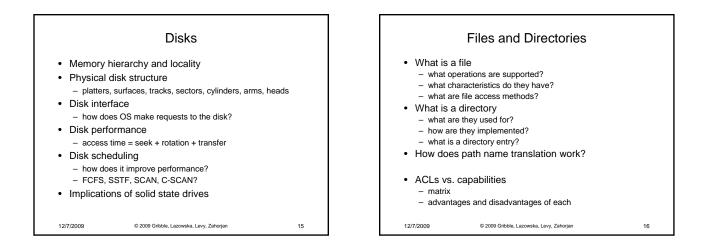
### Page replacement algorithms

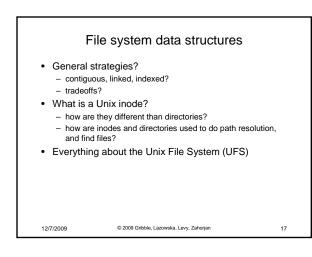
- Belady's optimal, but unrealizable
- · FIFO replace page loaded furthest in the past
- LRU replace page referenced furthest in the past
   approximate using PTE reference bit
- LRU Clock replace page that is "old enough"
- · Working Set keep the working set in memory
- Page Fault Frequency grow/shrink number of frames as a function of fault rate

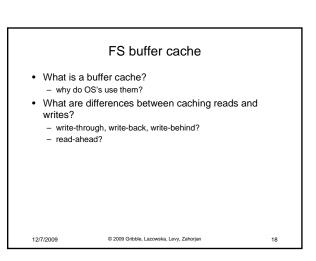
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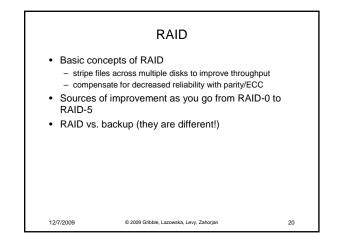
# FFS, JFS, LFS

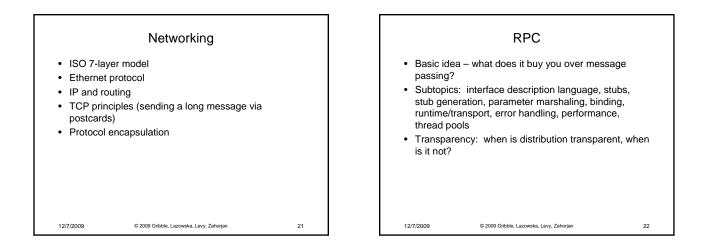
- What is FFS, how specifically does it improve over original Unix FS?
- How about JFS, what is the key problem that it solves, what are the basic ideas?

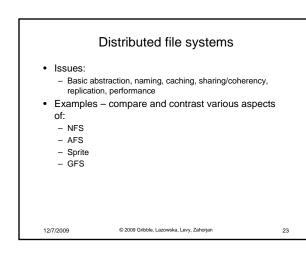
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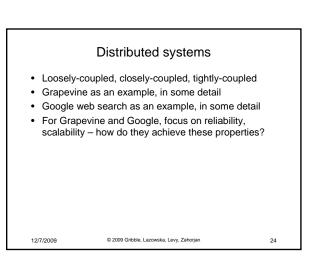
• How about LFS, what are the basic ideas, when does it yield an improvement, when does it not?

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## Virtual Machine Monitors

- · Basic concepts of VMM's
- Modern examples:
  - OS-X and Windows on the same laptop
  - Server consolidation
  - Amazon Web Services
- In some detail, what is the relationship between an application, the guest OS on which it runs, the VMM, and the hardware?
  - How does control transfer appropriately?
  - How do reconcile the fact that both the apps and the guest OS's are running in user mode?

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# Security Principals, objects, rights Authentication, authorization, auditing "Gotchas" with simple password protection Gotchas" with simple password protection Privacy Privacy Privacy Achieving them using symmetric (shared key) and asymmetric (public/private key) systems Certificate authorities Spyware Confinement

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