

CS323 Operating Systems Review

Yuanyuan Zhou
Lecture 40
5/7/2003

Process and Threads

- Basic concepts: process, threads, process states
- Thread implementation: kernel, user-level
- Synchronization
 - Race conditions, critical regions
 - Multiple ways to implement critical regions
 - Mutex, semaphores, monitors, test-and-set, swap
 - Classical problems
- Scheduling algorithms

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Deadlocks

- Deadlock conditions and deadlock preventions
- Deadlock detection and recovery
- Deadlock avoidance: banker's algorithm
- Two-phase locking
- Starvation

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Memory Management

- Virtual memory
 - Paging, page tables, TLBs, inverted page tables, page faults, swapping
 - Page replacement algorithms
 - Understand the reason besides the mechanics
 - Modeling page replacement algorithms
 - Distance string
- Segmentation with/without paging

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Input/Output

- Blocking, non-blocking, and async I/Os
- Programmed I/O, interrupt-driven I/O and I/O using DMA
- Clock, timers
- Disk scheduling, RAID

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File Systems

- Basic concepts: file, directory, inode
- File operations: synchronous, asynchronous
- File system implementation
 - Layout
 - Hard links/symbolic links
- Log-structured file system
- Unix file system

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Multimedia

- Audio and video encoding and compression: basic idea
- Multimedia process scheduling
- Multimedia disk scheduling
- Caching

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Distribute Systems/Network

- Network protocols
 - Socket communication
 - RPC, RMI
- Middleware
- Distributed file systems
 - Consistency
 - Caching

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Security

- Asymmetric: Public key systems
- Symmetric: secret key systems
- Authentication: various methods
- Attacks, viruses, worms
- Capabilities and access control list

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How to Prepare for Final

- Text book
 - Text
 - Questions after each chapter
- Lecture slides, esp discussion questions
- Midterms, quizzes, sample exams

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