

CS341 - Operating Systems

Study Guide for the Final Exam

Spring 2004

- Basic O/S Concepts
 - Types of Operating Systems and their characteristics
 - Operating System Services
 - System Calls - Mechanisms
 - Traps vs System calls vs Interrupts
- Processes
 - What is a process?
 - Threads - lightweight vs heavyweight processes
 - CPU Scheduling of processes
 - * Scheduling criteria
 - * Scheduling algorithms
 - Process synchronization
 - * Concepts: critical section, mutual exclusion
 - * Semaphores
 - * The producer-consumer model
- Deadlocks
 - What is Deadlock?
 - Deadlock detection
 - Methods for handling: prevention, avoidance, ignore
 - Deadlock recovery
- Memory Management
 - Logical vs Physical addresses
 - Allocation schemes - advantages vs disadvantages
 - Contiguous Allocation - partitioning, allocation schemes
 - Segmentation
 - Paging
 - * Basic operations
 - * Translation Hardware (TLB)
- Virtual Memory - Demand Paging
 - Basic operation - page tables, swapping, etc.
 - Page fault handling
 - Page replacement algorithms
 - Thrashing - what is it, what to do about it, etc.
- File System Interface

- File Attributes and structure
- File operations, access methods
- Directory Structure - single level, multi-level, tree, acyclic graph, general graph
- File System Implementation
 - File system structure and organization
 - Allocation methods - contiguous, linked, indexed
 - Allocation examples - MSDos, Unix, NT
 - Free Space management
 - File system performance, consistency, recovery
- I/O Systems
 - I/O device access methods
 - * Polled
 - * Interrupt-driven
 - * Direct Memory Access
 - I/O Device abstractions
 - * Block
 - * Character
 - * Network
 - Role of the OS kernel with I/O devices
- Disk Systems
 - Physical layout - heads, tracks, cylinders, sectors
 - Scheduling algorithms
 - On-Disk structures
 - * Boot block
 - * Partitions
 - * Procedure for reading/writing a file
 - Bad-Block management
 - Swap space management
- Distributed Systems
 - Network O/S vs Distributed O/S
 - Network topologies
 - Communication and routing strategies