

Operating System Comprehensive Exam Syllabus

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List of topics:

1. Basic concepts: System components, operating system services, virtual machines, security, energy awareness, system design and implementation.
2. Process management: process description and control, threads, Micro kernels, Linux mechanisms for process and thread management.
3. Process scheduling: scheduling for uniprocessors and multi-processors, load-balancing, and real-time scheduling.
4. Concurrency and synchronization: locks, semaphores, monitors, lock-free data structures, read-copy-update, messages, communicating sequential processes, sample synchronization problems and their solutions.
5. Deadlocks: characterization of deadlock handling approaches, prevention, avoidance, detection and recovery, graph theoretical model for deadlock detection.
6. Memory management: memory allocation methods, paging and segmentation, virtual memory management, small object allocation mechanisms, replacement algorithms, thrashing and working set models.
7. File system: basic concepts, implementation, and protection, file system security.
8. Distributed system concepts: distributed file systems, security, and energy awareness.
9. Distributed operating systems: global time, logical clocks, vector clocks, causal ordering of messages, cuts and consistency, termination detection.
10. Distributed algorithms: Lamport's algorithm for mutual exclusion, Chandy-Misra-Haas algorithm for distributed deadlock detection.