



CS 502

ADVANCED OPERATING SYSTEMS

UNIT-I

Architecture of Distributed Systems. : Types, Distributed OS, Issues in Distributed Operating Systems, Theoretical Foundations : Global Clock, Lamport's Logical Clock, Vector Clocks, Global State, Termination Detection.

UNIT-II

Distributed Mutual Exclusion : Classification, requirement, performance, non-token based

algorithms, Lamport's algorithm, the Ricart-Agarwala algorithm, token-based algorithm-Suzuki liasamil's broadcast algorithm, Singhal's heuristic algorithm.

Deadlock Detection : Resource Vs Communication deadlock, A graph - theoretic model,

prevention, avoidance, detection, control organization, centralized deadlock-detection algorithm, the completely centralized algorithm, the HO-Ramamoorthy algorithm. Distributed deadlock detection algorithm - path - pushing, edge-chasing, hierarchical deadlock detection algorithm, menace-muntz and Ho-Ramamoorthy algorithm. Agreement Protocols : The system model, the Byzantine agreement, the consensus problem.

UNIT-III

Distributed File System : Mechanisms, Design Issues.

Case Studies : Sun NFS, Sprite File System, DOMAIN, Coda File System.

Distributed shared memory : Algorithms for Implementing DSM, Memory Coherence, Coherence Protocols, Design Issues.

Case Studies : IVY, Mirage, Clouds.

Distributed Scheduling : Issues in Load Distribution, Components of Algorithm, Stability Load Distributing Algorithm, Performance.

UNIT IV

Failure Recovery : Backward, Forward Error Recovery in Concurrent Systems, Consistent Set of Check Points, Synchronous and Asynchronous Check Pointing and Recovery.

Fault Tolerance : Commit protocols, Non-Blocking Commit Protocols, Voting Protocols.

Protection and Security: Access Matrix, Private Key, Public key, Kerberos System.

UNIT -V

Multiprocessor Operating Systems : Motivation, Basic Multiprocessor System Architecture, Interconnection Networks for Multiprocessor Systems, Caching, Hypercube Architecture. Threads, Process Synchronization, Processor scheduling, memory management.

Database Operating System : Concurrence Control, Distributed Databases, Concurrency Control Algorithms.

Suggested Reading:

1. Singhal M, Shivaratri N.G. "Advanced concepts in operating systems"Mc-Graw-Hill Intl., 1994.
2. Pradeep K Sinha, : "Distributed Operating Systems Concepts and Design", PHI, 2002.
- 3 Andrew S. Tanenbaum, "Distributed Operating Systems", Pearson Education India, 2011