

Distributed Operating System

CS704A

Contracts: 3L

Credits- 3

Introduction to Distributed System [2]

Introduction, Examples of distributed system, Resource sharing, Challenges

Operating System Structures [3]

Review of structures: monolithic kernel, layered systems, virtual machines. Process based models and client server architecture; The micro-kernel based client-server approach.

Communication [4]

Inter-process communication , Remote Procedure Call, Remote Object Invocation, Tasks and Threads. Examples from LINUX, Solaris 2 and Windows NT.

Theoretical Foundations [2]

Introduction. Inherent Limitations of distributed Systems. Lamport's Logical clock. Global State **Distributed**

Mutual Exclusion [4]

Classification of distributed mutual exclusion algorithm. NonToken based Algorithm:Lamport's algorithm, Ricart-Agrawala algorithm. Token based Algorithm: Suzuki-Kasami's broadcast algorithm.

Distributed Deadlock Detection [4]

Deadlock handling strategies in distributed systems. Control organizations for distributed deadlock detection. Centralized and Distributed deadlock detection algorithms: Completely Centralized algorithms, path pushing, edge chasing, global state detection algorithm.

Protection and Security [4]

Requirements for protection and security regimes. The access matrix model of protection. System and user modes, rings of protection, access lists, capabilities. User authentication, passwords and signatures. Use of single key and public key encryption.

Distributed file systems [6]

Issues in the design of distributed file systems: naming, transparency, update semantics and fault resilience. Use of the Virtual File System layer. Examples of distributed systems including Sun NFS, the Andrew filestore, CODA file system and OSF DCE.

Distributed Shared Memory [4]

Architecture and motivations. Algorithms for implementing DSM. Memory Coherence

CORBA [3]

The Common Object Request Broker Architecture model and software and its relationship to Operating Systems.

Books:

- 1 Andrew S. Tanenbaum and Maarten Van Steen, *Distributed Systems Principles and Paradigms*, PHI
2. Singhal Mukesh & Shivaratri N. G., *Advanced Concepts in Operating Systems*, TMH
3. Tanenbaum, A. S. *Distributed Operating Systems*, (ISBN 0-131-439-340), Prentice Hall 199
4. Tanenbaum, A. S. *Modern Operating Systems*, 2nd Edition (ISBN 0-13-031358-0), Prentice Hall 2001.
5. Bacon, J., *Concurrent Systems*, 2nd Edition, (ISBN 0-201-177-676), Addison Wesley 1998.
6. Silberschatz, A., Galvin, P. and Gagne, G., *Applied Operating Systems Concepts*, 1st Edition, (ISBN 0-471-36508-4), Wiley 2000.
7. Coulouris, G. et al, *Distributed Systems: Concepts and Design*, 3rd Edition, (ISBN 0-201- 61918-0), Addison Wesley 2001.
8. Galli, D.L., *Distributed Operating Systems: Concepts and Practice* (ISBN 0-13-079843-6), Prentice-Hall 2000.