

TCS2033 INTERCONNECTION NETWORKS

Module 1

Introduction: Parallel computing and network, Parallel Computer Architectures, Network Design considerations, Classification of interconnection Network, Shared Medium networks, Direct Networks, Indirect Network, Hybrid Network, A unified view of direct and Indirect networks.

Module 2

Network and Router Model: Basic concept, Basic switching techniques, Virtual channels, Hybrid switching techniques, Optimizing Switching Techniques, A Comparisons of switching techniques, Engineering Issue.

Module 3

Deadlock, live lock, and Starvation: A theory of dead lock avoidance, Extensions, Alternative Approaches, Deadlock Avoidance in Switch Based networks, Deadlock prevention in Circuit switching and PCS, Dead lock Recovery, Live lock Avoidance Engineering issues.

Module 4

Routing Algorithms: Taxonomy of Routing algorithms, Deterministic Routing algorithms, Partially Adaptive algorithms, Fully adaptive algorithms, Maximally adaptive Routing algorithms Nonminimal Routing algorithms, Backtracking protocols, Routing in MINs, Routing in switch based networks with irregular Topologies, Engineering Issues.

Module 5

Collective Communication Support: Collective communication services, System support for collective communication, preliminary consideration, Models for Multicast Communication, Hardware Implementations of Multicast, Hardware support for barrier Synchronization and reduction, Software Implementation of Multicast, Engineering issues.

Module 6

Fault Tolerant Routing: Fault Induced Deadlock and Livelock, Channel and Network Redundancy, Fault Models, Fault Tolerant Routing in SAG and VCT Networks, Fault Tolerant Routing in Wormhole Switched networks, Fault Tolerant Routing in PCS and Scouting Networks, Dynamics Fault Recovery, Engineering Issues.

Module 7

Network Architectures: Network Topology and Physical Constraints, Router Architectures, Engineering Issues.

Text Book:

Jose Duato et al., "Interconnection Networks an Engineering Approach", Morgan Kaufman Publishers, 2003.

Reference Book:

Dally et al., "Principles And Practices of Interconnection Networks", Elsevier Science Publications, 2005.