

Parallel Processing

Important Questions

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PARALLEL PROCESSING

CHAPTER - 1 PARALLEL PROGRAMMING PLATFORMS

- Q.1) Explain Pipelining and Superscalar Execution for Parallel Processing.
- Q.2) Describe Effect of Memory Latency using Cache & Memory Bandwidth in detail.
- Q.3) Explain Message Passing Costs in Parallel Computers.
- Q.4) Explain Communication Costs in Shared-Address-Space Machine.
- Q.5) Explain Cache-Coherence in Multiprocessor System.
- Q.6) Describe Snoopy Cache System.
- Q.7) Explain Crossbar & Multistage Interconnection Network for Parallel Computing.
- Q.8) Explain Physical Architecture of an Ideal Parallel Computer.
- Q.9) Explain Routing Mechanism for Interconnection Network.
- Q.10) List Mapping Techniques for Graph and Explain any two.
- Q.11) Enlist Flynn's Classification. Explain SIMD & MIMD architecture.
- Q.12) Differ Centralized Directory & Distributed Directory.

CHAPTER - 2 PRINCIPLES OF PARALLEL ALGORITHM DESIGN

- Q.1) What is Decomposition? Enlist types of decomposition. Explain any two.
- Q.2) Explain the define terms:
 - i) Granularity
 - ii) Speed Up
 - iii) Degree of Concurrency
 - iv) Barriers
 - v) Fine Grain & Coarse Grain
 - vi) Task

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vii) Dependency Graph

viii) Overhead

xi) Broadcast

x) Reduction

Q.3) Describe Parallel Algorithm Models.

Q.4) Describe Concept of Overlapping Computations with Interactions.

Q.5) Show Mapping Techniques for Load Balancing (Static & Dynamic).

CHAPTER - 3 BASIC COMMUNICATION OPERATIONS

Q.1) Explain One-to-All Broadcast & All-to-One Reduction and Cost Analysis for Ring, Mesh, Hypercube and Balanced Binary Tree.

Q.2) Explain All-to-All Broadcast and Reduction and Cost Analysis for Ring(Linear Array), Mesh and Hypercube.

Q.3) Explain Scatter and Gather for Communication.

Q.4) Explain All-to-All Personalized Communication for Ring, Mesh, Hypercube.

Q.5) Explain Splitting and Routing Messages in parts to improve communication.

Q.6) Explain Circular Shift for Mesh & Hypercube.

CHAPTER - 4 ANALYTICAL MODELLING OF PARALLEL PROGRAMS

Q.1) Explain Performance Metrics for Parallel Systems with short description.

Q.2) Explain Degree of Concurrency and Isoefficiency Function.

Q.3) Compare Minimum Execution Time and Minimum Cost-Optimal Execution Time.

Q.4) Explain Asymptotic Analysis of Parallel Programs.

CHAPTER - 5 PROGRAMMING USING THE MESSAGE-PASSING PARADIGM

Q.1) What is MPI? Describe Principles of MPP.

Q.2) Explain Blocking Message Passing Operations.

Q.3) Explain Non-Blocking Message Passing Operations.

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CHAPTER - 6 PROGRAMMING SHARED ADDRESS SPACE PLATFORMS

- Q.1) What PThread? Explain Thread Basics: Creation and Termination.
- Q.2) Explain Mutual Exclusion for Shared Variables.
- Q.3) Describe Thread Cancellation.
- Q.4) Short Note on Read-Write Locks.

CHAPTER - 7 DENSE MATRIX ALGORITHMS

- Q.1) Explain Cannon's Algorithm for Matrix-Matrix Multiplication.
- Q.2) Explain DNS Algorithm for Matrix-Matrix Multiplication.
- Q.3) Compare Row-wise 1-D and 2-D Partitioning and conclude the best.

CHAPTER - 8 SORTING

- Q.1) Explain Mapping Bitonic Sort to a Hypercube and a Mesh.
- Q.2) Explain Pivot Selection for Quicksort and Parallelizing Quicksort.

CHAPTER - 9 GRAPH ALGORITHMS

- Q.1) Explain Prim's Algorithm for Minimum Spanning Tree.
- Q.2) Compare Single-Source Shortest Path and All-Pairs Shortest Path for Dijkstra's Algorithm.
- Q.3) Define Floyd's Algorithm and explain its Performance.