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	Parallelism; Memory Hierarchy; Virtual Memory; Multiprocessor Systems; Attached Devices; 2.4.2 Key Features for Performance; Data Locality Parallel Slack2.4.3 Flynn's Characterization; 2.4.4 Evolution; 2.5 Performance Theory; 2.5.1 Latency and Throughput; 2.5.2 Speedup, Efficiency, and Scalability; 2.5.3 Power; 2.5.4 Amdahl's Law; 2.5.5 Gustafson-Barsis' Law; 2.5.6 Work-Span Model; 2.5.7 Asymptotic Complexity; 2.5.8 Asymptotic Speedup and Efficiency; 2.5.9 Little's Formula; 2.6 Pitfalls; 2.6.1 Race Conditions; 2.6.2 Mutual Exclusion and Locks; 2.6.3 Deadlock; 2.6.4 Strangled Scaling; 2.6.5 Lack of Locality; 2.6.6 Load Imbalance; 2.6.7 Overhead; 2.7 Summary; I Patterns; 3 Patterns; 3.1 Nesting Pattern 3.2 Structured Serial Control Flow Patterns3.2.1 Sequence; 3.2.2 Selection; 3.2.3 Iteration; 3.2.4 Recursion; 3.3 Parallel Control Patterns; 3.3.1 Fork-Join; 3.3.2 Map; 3.3.3 Stencil; 3.3.4 Reduction; 3.3.5 Scan; 3.3.6 Recurrence; 3.4 Serial Data Management Patterns; 3.4.1 Random Read and Write; 3.4.2 Stack Allocation; 3.4.3 Heap Allocation; 3.4.4 Closures; 3.4.5 Objects; 3.5 Parallel Data Management Patterns; 3.5.1 Pack; 3.5.2 Pipeline; 3.5.3 Geometric Decomposition; 3.5.4 Gather; 3.5.5 Scatter; 3.6 Other Parallel Patterns; 3.6.1 Superscalar Sequences; 3.6.2 Futures 3.6.3 Speculative Selection3.6.4 Workpile; 3.6.5 Search; 3.6.6 Segmentation; 3.6.7 Expand; 3.6.8 Category Reduction; 3.6.9 Term Graph Rewriting; 3.7 Non-Deterministic Patterns; 3.7.1 Branch and Bound; 3.7.2 Transactions; 3.8 Programming Model Support for
	Patterns; 3.8.1 Cilk Plus; Nesting, Recursion, Fork-Join; Reduction; Map, Workpile; Scatter, Gather; 3.8.2 Threading Building Blocks; Nesting, Recursion, Fork-Join; Map; Workpile; Reduction; Scan; Pipeline; Speculative Selection, Branch and Bound; 3.8.3 OpenMP; Map, Workpile; Reduction; Fork-Join Stencil, Geometric Decomposition, Gather, Scatter
Sommario/riassunto	Programming is now parallel programming. Much as structured programming revolutionized traditional serial programming decades ago, a new kind of structured programming, based on patterns, is relevant to parallel programming today. Parallel computing experts and industry insiders Michael McCool, Arch Robison, and James Reinders describe how to design and implement maintainable and efficient parallel algorithms using a pattern-based approach. They present both theory and practice, and give detailed concrete examples using multiple programming models. Examples are primarily given using two of