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Autore	Gebali FAYEZ
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Nota di contenuto	Algorithms and Parallel Computing; Contents; Preface; List of Acronyms; Chapter 1: Introduction; 1.1 INTRODUCTION; 1.2 TOWARD AUTOMATING PARALLEL PROGRAMMING; 1.3 ALGORITHMS; 1.4 PARALLEL COMPUTING DESIGN CONSIDERATIONS; 1.5 PARALLEL ALGORITHMS AND PARALLEL ARCHITECTURES; 1.6 RELATING PARALLEL ALGORITHM AND PARALLEL ARCHITECTURE; 1.7 IMPLEMENTATION OF ALGORITHMS: A TWO-SIDED PROBLEM; 1.8 MEASURING BENEFITS OF PARALLEL COMPUTING; 1.9 AMDAHL'S LAW FOR MULTIPROCESSOR SYSTEMS; 1.10 GUSTAFSON-BARSIS'S LAW; 1.11 APPLICATIONS OF PARALLEL COMPUTING; Chapter 2: Enhancing Uniprocessor Performance 2.1 INTRODUCTION 2.2 INCREASING PROCESSOR CLOCK FREQUENCY; 2.3 PARALLELIZING ALU STRUCTURE; 2.4 USING MEMORY HIERARCHY; 2.5 PIPELINING; 2.6 VERY LONG INSTRUCTION WORD (VLIW) PROCESSORS; 2.7 INSTRUCTION-LEVEL PARALLELISM (ILP) AND SUPERSCALAR PROCESSORS; 2.8 MULTITHREADED PROCESSOR; Chapter 3: Parallel Computers; 3.1 INTRODUCTION; 3.2 PARALLEL COMPUTING;

3.3 SHARED-MEMORY MULTIPROCESSORS (UNIFORM MEMORY ACCESS [UMA]); 3.4 DISTRIBUTED-MEMORY MULTIPROCESSOR (NONUNIFORM MEMORY ACCESS [NUMA]); 3.5 SIMD PROCESSORS; 3.6 SYSTOLIC PROCESSORS; 3.7 CLUSTER COMPUTING; 3.8 GRID (CLOUD) COMPUTING 3.9 MULTICORE SYSTEMS3.10 SM; 3.11 COMMUNICATION BETWEEN PARALLEL PROCESSORS; 3.12 SUMMARY OF PARALLEL ARCHITECTURES; Chapter 4: Shared-Memory Multiprocessors; 4.1 INTRODUCTION; 4.2 CACHE COHERENCE AND MEMORY CONSISTENCY; 4.3 SYNCHRONIZATION AND MUTUAL EXCLUSION; Chapter 5: Interconnection Networks; 5.1 INTRODUCTION; 5.2 CLASSIFICATION OF INTERCONNECTION NETWORKS BY LOGICAL TOPOLOGIES; 5.3 INTERCONNECTION NETWORK SWITCH ARCHITECTURE; Chapter 6: Concurrency Platforms; 6.1 INTRODUCTION; 6.2 CONCURRENCY PLATFORMS; 6.3 CILK++; 6.4 OpenMP; 6.5 COMPUTE UNIFIED DEVICE ARCHITECTURE (CUDA) Chapter 7: Ad Hoc Techniques for Parallel Algorithms7.1 INTRODUCTION; 7.2 DEFINING ALGORITHM VARIABLES; 7.3 INDEPENDENT LOOP SCHEDULING; 7.4 DEPENDENT LOOPS; 7.5 LOOP SPREADING FOR SIMPLE DEPENDENT LOOPS; 7.6 LOOP UNROLLING; 7.7 PROBLEM PARTITIONING; 7.8 DIVIDE-AND-CONQUER (RECURSIVE PARTITIONING) STRATEGIES; 7.9 PIPELINING; Chapter 8: Nonserial-Parallel Algorithms; 8.1 INTRODUCTION; 8.2 COMPARING DAG AND DCG ALGORITHMS; 8.3 PARALLELIZING NSPA ALGORITHMS REPRESENTED BY A DAG; 8.4 FORMAL TECHNIQUE FOR ANALYZING NSPAs; 8.5 DETECTING CYCLES IN THE ALGORITHM 8.6 EXTRACTING SERIAL AND PARALLEL ALGORITHM PERFORMANCE PARAMETERS8.7 USEFUL THEOREMS; 8.8 PERFORMANCE OF SERIAL AND PARALLEL ALGORITHMS ON PARALLEL COMPUTERS; Chapter 9: z-Transform Analysis; 9.1 INTRODUCTION; 9.2 DEFINITION OF z-TRANSFORM; 9.3 THE 1-D FIR DIGITAL FILTER ALGORITHM; 9.4 SOFTWARE AND HARDWARE IMPLEMENTATIONS OF THE z-TRANSFORM; 9.5 DESIGN 1: USING HORNER'S RULE FOR BROADCAST INPUT AND PIPELINED OUTPUT; 9.6 DESIGN 2: PIPELINED INPUT AND BROADCAST OUTPUT; 9.7 DESIGN 3: PIPELINED INPUT AND OUTPUT; Chapter 10: Dependence Graph Analysis; 10.1 INTRODUCTION 10.2 THE 1-D FIR DIGITAL FILTER ALGORITHM

Sommario/riassunto

"There is a software gap between the hardware potential and the performance that can be attained using today's software parallel program development tools. The tools need manual intervention by the programmer to parallelize the code. Programming a parallel computer requires closely studying the target algorithm or application, more so than in the traditional sequential programming we have all learned. The programmer must be aware of the communication and data dependencies of the algorithm or application. This book provides the techniques to explore the possible ways to program a parallel computer for a given application"--

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