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Algorithmically Specialized Parallel  
Computers focuses on the concept

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and characteristics of an algorithmically specialized computer. This book discusses the algorithmically specialized computers, algorithmic specialization using VLSI, and innovative architectures. The

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architectures and algorithms for digital signal, speech, and image processing and specialized architectures for numerical computations are also elaborated. Other topics include the model for analyzing generalized inter-

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processor, pipelined architecture for search tree maintenance, and specialized computer organization for raster graphics display. The data base applications of the FETCH-AND-ADD instruction, distributed parallel architecture for speech

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understanding, and two parallel formulations of particle-in-cell models are likewise covered in this text. This publication is suitable for students, researchers and professionals concerned with algorithmically specialized

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computers.

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first volume in 1960, Advances in  
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coverage of innovations in computer hardware, software, theory, design, and applications. It has also provided contributors with a medium in which they can explore their subjects in greater depth and breadth than journal articles usually

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allow. As a result, many articles have become standard references that continue to be of significant, lasting value in this rapidly expanding field. This text is designed to document and unify much of the theory, techniques, and understanding



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about pipelining, presenting the material so that the reader can recognize and use the techniques in future design. It is more of an engineering than a theoretical text; discussions range from logic design considerations, through the

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construction, cascading, and control of pipelined structures, to the architecture of complete systems and the development of programming techniques to efficiently use such machines. Examples from real are used whenever possible to amplify

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the development and presentation of concepts.

“ China ’ s e-Science Blue Book 2020 ” has been jointly compiled by the Chinese Academy of Sciences, Cyberspace Administration of China, Ministry of Education of the

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Agricultural Sciences. It was focusing on the new situation, new progress and new achievements of China's e-Scientific in the past two years. During the “ 13th Five-Year Plan ” period, Chinese scholars make full use of advanced

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information technology to carry out scientific research work, and have achieved a series of major scientific and technological achievements.

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introduce the application in the frontier research of science and technology, the progress of e-Science in major projects and the achievements of informatization in interdisciplinary. As such it provides a valuable reference resource for

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researchers and students in this area  
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numerical algorithms;  
asynchronous algorithms;  
libraries of subroutines;***



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directions for exciting  
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***and VUV excitation. The understanding of elementary processes is essential for the design of novel deposition methods, with diamond CVD being an outstanding***

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***industry.***

***This book constitutes the  
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***Computing, WMC 2004,  
held in Milan, Italy in June  
2004. The 20 revised full  
papers presented  
together with 6 invited  
papers went through two  
rounds of reviewing and***

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***improvement. All current topics in the area of membrane computing are addressed, ranging from mathematics and theoretical computer science to applications in***

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***biology, linguistics, and  
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classes of P systems,  
fuzzy approaches, and***



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***reversibility and energy  
consumption are dealt  
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***Computer Literature***

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trends which are taking place in the architecture of computing systems today. Due to the sheer number of different applications to which computers are being applied, there seems no end to the different adoptions which

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proliferate. There are, however, some underlying trends which appear. Decision makers should be aware of these trends when specifying architectures, particularly for future applications. This report is fully revised and

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updated and provides insight into the fundamentals of computer architecture – what it is, and how it is applied to fit a particular problem definition. Also discussed is where the future leads, given current trends in computer



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potential engineering/scientific users. An overview of the state-of-the-art in several important research areas is given by leading scientists in their field. The classification question is taken up at various points, ranging from

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parametric characterizations, communication structure, and memory distribution to control and execution schemes. Central issues in multiprocessing hardware and operation, such as scalability, techniques of overcoming memory

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latency and synchronization overhead, as well as fault tolerance of communication networks are discussed. The problem of designing and debugging parallel programs in a user-friendly environment is addressed and a

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number of program transformations for enhancing vectorization and parallelization in a variety of program situations are described. Two different algorithmic techniques for the solution of certain classes of partial

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differential equations are discussed. The properties of domain-decomposition algorithms and their mapping onto a CRAY-XMP-type architecture are investigated and an overview is given of the merit of various

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approaches to exploiting the acceleration potential of multigrid methods. Finally, an abstract performance modeling technique for the behavior of applications on parallel and vector architectures is described.

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was held in Boston, USA, in December 2010. The 78 revised full papers were carefully reviewed and selected from numerous submissions for inclusion in the proceedings. BIONETICS 2010 aimed to provide the

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understanding of the fundamental principles and design strategies in biological systems and leverage those understandings to build bio-inspired systems.

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programs typically combine distributed memory and shared memory programming models and use the Message Passing Interface (MPI) and OpenMP for multi-threading to achieve the ultimate goal of high performance at low power consumption on

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clusters mixing both architectures. Besides the tutorial and reference content, the authors address and refute many myths and misconceptions surrounding the topic. The text is augmented and enriched by descriptions of real-life situations.

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In brief summary, the following results were presented in this work:

- A linear time approach was developed to find register requirements for any specified CS schedule or filled MRT.
- An algorithm was developed for finding register requirements for



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any kernel that has a dependence graph that is acyclic and has no data reuse on machines with depth independent instruction templates. • We presented an efficient method of estimating register requirements as a function of pipeline depth. • We

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developed a technique for efficiently finding bounds on register requirements as a function of pipeline depth. • Presented experimental data to verify these new techniques. • discussed some interesting design points for register file size

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Michael J. Flynn. Very High-Speed Computing Systems. Proceedings of the IEEE, 54:1901-1909, December 1966.

The results are presented of the engineering and programming characteristics of one hundred twelve different electronic digital

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**Input/Output in Parallel and**

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**last few years, as it has become**



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**apparent that input/output performance, rather than CPU performance, may be the key limiting factor in the performance of future systems. This I/O bottleneck is caused by the increasing speed mismatch between processing units and storage devices, the use of multiple processors**

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**operating simultaneously in parallel and distributed systems, and by the increasing I/O demands of new classes of applications, like multimedia. It is also important to note that, to varying degrees, the I/O bottleneck exists at multiple levels of the memory hierarchy. All indications are that the**

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**I/O bottleneck will be with us for some time to come, and is likely to increase in importance. Input/Output in Parallel and Distributed Computer Systems is based on papers presented at the 1994 and 1995 IOPADS workshops held in conjunction with the International Parallel Processing Symposium. This**

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**book is divided into three parts. Part I, the Introduction, contains four invited chapters which provide a tutorial survey of I/O issues in parallel and distributed systems. The chapters in Parts II and III contain selected research papers from the 1994 and 1995 IOPADS workshops; many of these papers have**

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**been substantially revised and updated for inclusion in this volume. Part II collects the papers from both years which deal with various aspects of system software, and Part III addresses architectural issues. Input/Output in Parallel and Distributed Computer Systems is suitable as a secondary text**

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management; testing and evaluation methodologies; and case studies for programming multi-core and many-core systems. Program development for multi-core processors, especially for heterogeneous multi-

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core processors, is significantly more complex than for single-core processors. However, programmers have been traditionally trained for the development of sequential programs, and only a small

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percentage of them have experience with parallel programming. In the past, only a relatively small group of programmers interested in High Performance Computing (HPC) was concerned with the parallel

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programming issues, but the situation has changed dramatically with the appearance of multi-core processors on commonly used computing systems. It is expected that with the pervasiveness of multi-core

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processors, parallel programming will become mainstream. The pervasiveness of multi-core processors affects a large spectrum of systems, from embedded and general-purpose, to high-end computing systems.

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This book assists programmers in mastering the efficient programming of multi-core systems, which is of paramount importance for the software-intensive industry towards a more effective product-development

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Parallel Computing Architectures  
and APIs

5th International ICST  
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## Bio-Inspired Models of Network, Information, and Computing Systems

This book presents a unified treatment of recently developed techniques and current

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understanding about  
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linear equations and  
large scale eigenvalue  
problems on high-  
performance computers.  
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introduction to the world of vector and parallel processing for these linear algebra applications. Topics include major elements of advanced-architecture

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computers and their  
performance, recent  
algorithmic development,  
and software for direct  
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problems, direct  
solution of sparse

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systems of equations,  
iterative solution of  
sparse systems of  
equations, and solution  
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millions of machines  
being sold (and  
discarded) annually.  
Powerful machines are  
produced for only a few  
hundred U.S. dollars,  
and one of the problems

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faced by vendors of these machines is that, due to the continuing adherence to Moore's law, where the speed of such machines doubles about every 18 months,

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we typically have more than enough computer power for our needs for word processing, surfing the web, or playing video games. However, the same cannot be said

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for applications that require large powerful machines. Applications such as weather and climate prediction, fluid flow for designing new airplanes or

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automobiles, or nuclear plasma flow require as much computer power as we can provide, and even that is not enough.

Today's machines operate at the teraflop level

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(trillions of floating point operations per second) and this book describes research into the petaflop region (1,015 FLOPS). The six chapters provide an



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overview of current activities that will provide for the introduction of these machines in the years 2011 through 2015.

Offering a carefully

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systems -using more than one processor to allow for parallel execution, and hence completion of a complex computing task in a minimal amount of time. The other 5

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Symposium on  
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Techniques for Computing  
Systems, Washington,  
D.C., May 17, 18, 19,  
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ICASE Conference on  
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***development. One of the most important reasons for studying parallel computing architectures is to learn how to extract the best performance from parallel systems. Specifically, you***

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***must understand its architectures so that you will be able to exploit those architectures during programming via the standardized APIs. This book would be useful for analysts,***

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Stream Processing discusses  
stream processing that  
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heterogeneous, continuous  
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data streams, to extract  
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**Keywords: Computer  
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The International Workshops  
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Theoretical Science" have  
become a tradition at the  
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supercomputers have  
become a major tool for  
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contains the proceedings of  
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Engineering at the NASA  
Langley Research Center. The  
conference provided a forum  
for reviewing all the  
aspects of scientific  
computing and covered topics  
ranging from computer-aided  
design (CAD) and computer



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science technology to the design of large hydrodynamics codes. Case studies in reliable computing are also presented. Comprised of 13 chapters, this book begins with an introduction to the

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use of the hierarchical family concept in the development of scientific programming systems. The discussion then turns to the data structures of scientific computing and their representation and

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management; some important CAD capabilities required to support aerospace design in the areas of interactive support, information management, and computer hardware advances as well as some computer science

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developments which may contribute significantly to making such capabilities possible; and the use of symbolic computation systems for problem solving in scientific research. Subsequent chapters deal

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with computer applications in astrophysics; the possibility of computing turbulence and numerical wind tunnels; and the basis for a general-purpose program for finite element analysis. Software tools for

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computer graphics are also considered. This monograph will be of value to scientists, systems designers and engineers, and students in computer science who have an interest in the subject of scientific

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computing.

The end of dramatic exponential growth in single-processor performance marks the end of the dominance of the single microprocessor in computing. The era of sequential computing must

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give way to a new era in which parallelism is at the forefront. Although important scientific and engineering challenges lie ahead, this is an opportune time for innovation in programming systems and



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computing architectures. We have already begun to see diversity in computer designs to optimize for such considerations as power and throughput. The next generation of discoveries is likely to require advances

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at both the hardware and software levels of computing systems. There is no guarantee that we can make parallel computing as common and easy to use as yesterday's sequential single-processor computer

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systems, but unless we aggressively pursue efforts suggested by the recommendations in this book, it will be "game over" for growth in computing performance. If parallel programming and related

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software efforts fail to become widespread, the development of exciting new applications that drive the computer industry will stall; if such innovation stalls, many other parts of the economy will follow

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suit. The Future of  
Computing Performance  
describes the factors that  
have led to the future  
limitations on growth for  
single processors that are  
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technology. It explores challenges inherent in parallel computing and architecture, including ever-increasing power consumption and the escalated requirements for heat dissipation. The book

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delineates a research, practice, and education agenda to help overcome these challenges. The Future of Computing Performance will guide researchers, manufacturers, and information technology

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professionals in the right direction for sustainable growth in computer performance, so that we may all enjoy the next level of benefits to society.

Big Data Systems encompass massive challenges related



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to data diversity, storage mechanisms, and requirements of massive computational power. Further, capabilities of big data systems also vary with respect to type of problems. For instance, distributed memory systems

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are not recommended for iterative algorithms.

Similarly, variations in big data systems also exist related to consistency and fault tolerance. The purpose of this book is to provide a detailed explanation of big

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data systems. The book covers various topics including Networking, Security, Privacy, Storage, Computation, Cloud Computing, NoSQL and NewSQL systems, High Performance Computing, and Deep

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4th International DFVLR  
Seminar on Foundations of  
Engineering Sciences, Bonn,  
FRG, June 25/26, 1987  
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