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	Titolo	Sequential and Parallel Algorithms and Data Structures : The Basic Toolbox / / by Peter Sanders, Kurt Mehlhorn, Martin Dietzfelbinger, Roman Dementiev
	Pubbl/distr/stampa	Cham : , , : Springer International Publishing : , , : Imprint : Springer, , 2019
	ISBN	3-030-25209-4
	Edizione	[1st ed. 2019.]
	Descrizione fisica	1 online resource (XV, 509 p.)
	Disciplina	518.1
	Soggetti	Algorithms
		Microprocessors
		Data structures (Computer science)
		Engineering—Data processing
		Algorithm Analysis and Problem Complexity
		Processor Architectures
		Data Structures and Information Theory
		Data Engineering
		Mathematics of Algorithmic Complexity
	Lingua di pubblicazione	Inglese
	Formato	Materiale a stampa
	Livello bibliografico	Monografia
	Nota di contenuto	Appetizer: Integer Arithmetic -- Introduction -- Representing Sequences by Arrays and Linked Lists -- Hash Tables and Associative Arrays -- Sorting and Selection -- Priority Queues -- Sorted Sequences -- Graph Representation -- Graph Traversal -- Shortest Paths -- Minimum Spanning Trees -- Generic Approaches to Optimization -- Collective Communication and Computation -- Load Balancing -- App. A, Mathematical Background -- App. B, Computer Architecture Aspects -- App. C, Support for Parallelism in C++ -- App. D, The Message Passing Interface (MPI) -- App. E, List of Commercial Products, Trademarks and Licenses.
	Sommario/riassunto	This textbook is a concise introduction to the basic toolbox of structures that allow efficient organization and retrieval of data, key algorithms for problems on graphs, and generic techniques for

modeling, understanding, and solving algorithmic problems. The authors aim for a balance between simplicity and efficiency, between theory and practice, and between classical results and the forefront of research. Individual chapters cover arrays and linked lists, hash tables and associative arrays, sorting and selection, priority queues, sorted sequences, graph representation, graph traversal, shortest paths, minimum spanning trees, optimization, collective communication and computation, and load balancing. The authors also discuss important issues such as algorithm engineering, memory hierarchies, algorithm libraries, and certifying algorithms. Moving beyond the sequential algorithms and data structures of the earlier related title, this book takes into account the paradigm shift towards the parallel processing required to solve modern performance-critical applications and how this impacts on the teaching of algorithms. The book is suitable for undergraduate and graduate students and professionals familiar with programming and basic mathematical language. Most chapters have the same basic structure: the authors discuss a problem as it occurs in a real-life situation, they illustrate the most important applications, and then they introduce simple solutions as informally as possible and as formally as necessary so the reader really understands the issues at hand. As they move to more advanced and optional issues, their approach gradually leads to a more mathematical treatment, including theorems and proofs. The book includes many examples, pictures, informal explanations, and exercises, and the implementation notes introduce clean, efficient implementations in languages such as C++ and Java.