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Titolo	Algorithms for Constructing Computably Enumerable Sets // by Kenneth J. Supowit
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ISBN	9783031269042 9783031269035
Edizione	[1st ed. 2023.]
Descrizione fisica	1 online resource (191 pages)
Collana	Computer Science Foundations and Applied Logic, , 2731-5762
Disciplina	004.0151
Soggetti	Computer science Computable functions Recursion theory Set theory Computer science—Mathematics Theory of Computation Computability and Recursion Theory Set Theory Theory and Algorithms for Application Domains Mathematics of Computing
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references.
Nota di contenuto	1 Index of notation and terms -- 2 Set theory, requirements, witnesses -- 3 What's new in this chapter? -- 4 Priorities (a splitting theorem) -- 5 Reductions, comparability (Kleene-Post Theorem) -- 6 Finite injury (Friedberg-Muchnik Theorem) -- 7 The Permanence Lemma -- 8 Permitting (Friedberg-Muchnik below C Theorem) -- 9 Length of agreement (Sacks Splitting Theorem) -- 10 Introduction to infinite injury -- 11 A tree of guesses (Weak Thickness Lemma) -- 12 An infinitely branching tree (Thickness Lemma) -- 13 True stages (another proof of the Thickness Lemma) -- 14 Joint custody (Minimal Pair Theorem) -- 15 Witness lists (Density Theorem) -- 16 The theme of this book: delaying tactics -- Appendix A: a pairing function -- Bibliograph -- Solutions to selected exercises.

Logicians have developed beautiful algorithmic techniques for the construction of computably enumerable sets. This textbook presents these techniques in a unified way that should appeal to computer scientists. Specifically, the book explains, organizes, and compares various algorithmic techniques used in computability theory (which was formerly called "classical recursion theory"). This area of study has produced some of the most beautiful and subtle algorithms ever developed for any problems. These algorithms are little-known outside of a niche within the mathematical logic community. By presenting them in a style familiar to computer scientists, the intent is to greatly broaden their influence and appeal. Topics and features:

- All other books in this field focus on the mathematical results, rather than on the algorithms.
- There are many exercises here, most of which relate to details of the algorithms.
- The proofs involving priority trees are written here in greater detail, and with more intuition, than can be found elsewhere in the literature.
- The algorithms are presented in a pseudocode very similar to that used in textbooks (such as that by Cormen, Leiserson, Rivest, and Stein) on concrete algorithms.
- In addition to their aesthetic value, the algorithmic ideas developed for these abstract problems might find applications in more practical areas.

Graduate students in computer science or in mathematical logic constitute the primary audience. Furthermore, when the author taught a one-semester graduate course based on this material, a number of advanced undergraduates, majoring in computer science or mathematics or both, took the course and flourished in it. Kenneth J. Supowit is an Associate Professor Emeritus, Department of Computer Science & Engineering, Ohio State University, Columbus, Ohio, US.
