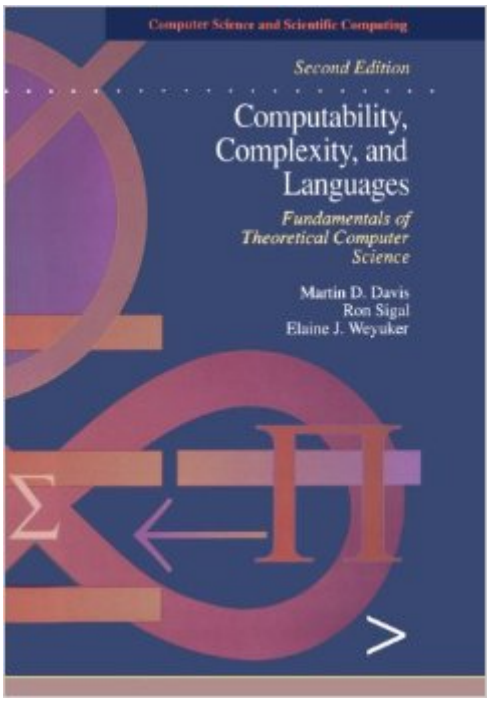
# Computability, Complexity, And Languages, Second Edition: Fundamentals Of Theoretical Computer Science (Computer Science And Scientific Computing)



## Synopsis

This introductory text covers the key areas of computer science, including recursive function theory, formal languages, and automata. It assumes a minimal background in formal mathematics. The book is divided into five parts: Computability, Grammars and Automata, Logic, Complexity, and Unsolvability. * Computability theory is introduced in a manner that makes maximum use of previous programming experience, including a "universal" program that takes up less than a page.* The number of exercises included has more than tripled.* Automata theory, computational logic, and complexity theory are presented in a flexible manner, and can be covered in a variety of different arrangements.

## Book Information

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## Customer Reviews

The authors of this book define theoretical computer science as the mathematical study of models of computation, and they do an excellent job of detailing the major results in the theory of computation as related to mathematical logic. Mathematicians, programmers, and philosophers will find the book an effective one in which to learn computability theory, and it serves well as a textbook for courses in the subject. After a brief review of elementary mathematics and mathematical logic in chapter 1, the authors move right into the consideration of computable functions in chapter 2. They choose a particular abstract programming language in which to study the computability theory, which is built from variables, and programs that can be built from lists of instructions. Examples of

programs are given, which have a Fortran flavor, with examples of computing partial functions. Unfortunately, a plethora of GOTO statements appear in the programs, and throughout the rest of the book, which is surprising given the publishing date. The use of these GOTO statements in the book is a major annoyance. Then in chapter 3, the authors discuss primitive recursive functions, beginning with a treatment of composition, followed by the all-important concept of recursion. The class (PRC) of primitive recursive functions is introduced, and shown to be computable. The primitive recursive predicates are introduced, followed by a proof that the existential and universal quantifiers over an element of a PRC class are also PRC. This is followed by a discussion of minimalization and Godel numbers. The next chapter is very interesting, wherein the famous halting problem is discussed and related to Church's thesis.

Computing and Modeling An Introduction to Data Structures and Algorithms (Progress in Theoretical Computer Science) Randomization Methods in Algorithm Design: Dimacs Workshop, December 12-14, 1997 (Dimacs Series in Discrete Mathematics and Theoretical Computer Science) Languages and Machines: An Introduction to the Theory of Computer Science (3rd Edition)