

Programming Language Pragmatics


By Michael L. Scott




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Programming Language Pragmatics addresses the fundamental principles at work in the most important contemporary languages, highlights the critical relationship between language design and language implementation, and devotes special attention to issues of importance to the expert programmer. Thanks to its rigorous but accessible teaching style, you'll emerge better prepared to choose the best language for particular projects, to make more effective use of languages you already know, and to learn new languages quickly and completely.

- * Addresses the most recent developments in programming language design, spanning more than forty different languages, including Ada 95, C, C++, Fortran 95, Java, Lisp, Scheme, ML, Modula-3, Pascal, and Prolog.
- * Places a special emphasis on implementation issues-how the techniques used by compilers and related tools influence language design, and vice versa.
- * Covers advanced topics in language design and implementation, such as iterators, coroutines, templates (generics), separate compilation, I/O, type inference, and exception handling.
- * Reviews language-related topics in assembly-level architecture critical for understanding what a compiler does to a program.
- * Offers in-depth coverage of object-oriented programming, including multiple inheritance and dynamic method binding.
- * Devotes a special section to static and dynamic linking.
- * Includes a comprehensive chapter on concurrency, with detailed coverage of both shared-memory and message-passing languages and libraries.
- * Provides an accessible introduction to the formal foundations of compilation (automata theory), functional programming (lambda calculus), and logic programming (predicate calculus).

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Editorial Review

Amazon.com Review

As a textbook suitable for the classroom or self-study, Michael Scott's *Programming Language Pragmatics* provides a worthy tour of the theory and practice of how programming languages are run on today's computers. Clearly organized and filled with a wide-ranging perspective on over 40 different languages, this book will be appreciated for its depth and breadth of coverage on an essential topic in computer science.

With references to dozens of programming languages, from Ada to Turing and everything in between (including C, C++, Java, and Perl), this book is a truly in-depth guide to how code is compiled (or interpreted) and executed on computer hardware. Early chapters tend to be slightly more theoretical (with coverage of regular expressions and context-free grammars) and will be most valuable to the computer science student, but much of this book is accessible to anyone seeking to widen their knowledge (especially since recent standards surrounding XML make use of some of the same vocabulary presented here).

The book has a comprehensive discussion of compilation and linking, as well as how data types are implemented in memory. Sections on functional and logical programming (illustrated with Scheme and Prolog, which are often used in AI research) can expand your understanding of how programming languages work. Final sections on the advantages--and complexities--of concurrent processing, plus a nice treatment of code optimization techniques, round out the text here. Each chapter provides numerous exercises, so you can try out the ideas on your own.

Students will benefit from the practical examples here, drawn from a wide range of languages. If you are a self-taught developer, the very approachable tutorial can give you perspective on the formal definitions of many computer languages, which can help you master new ones more effectively. --Richard Dragan

Topics covered: A survey of today's programming languages, compilation vs. interpretation, the compilation process, regular expression and context-free grammars, scanners and parsers, names, scopes and bindings, scope rules, overloading, semantic analysis, introduction to computer architecture, representing data, instruction sets, 680x0 and MIPS architectures, control flow and expression evaluation, iteration and recursion, data types, type checking, records, arrays, strings, sets, pointers, lists, file I/O, subroutines, calling sequences and parameter passing, exception handling, coroutines, compile back-end processing, code generation, linking, object-oriented programming basics, encapsulation and inheritance, late binding, multiple inheritance, functional and logical languages, Scheme and Prolog, programming with concurrency, shared memory and message passing, and code optimization techniques.

Review

"Michael Scott's book could have been entitled: Why Programming Languages Work. It takes a fresh look at programming languages by bringing together ideas and techniques usually covered in disparate language design, compiler, computer architecture, and operating system courses. Its comprehensive and integrated presentation of language design and implementation illustrates and explains admirably the many deep and profitable connections among these fields."

-Jim Larus, Microsoft Research

"This book is the best and most complete on this topic that I've seen until now."

-Klaus Ostermann, Darmstadt University of Technology

From the Back Cover

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Features

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- Places a special emphasis on implementation issues—how the techniques used by compilers and related tools influence language design, and vice versa.
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Users Review

From reader reviews:

Charles Killough:

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