M. J. C. GORDON and T. F. MELHAM
Introduction to HOL. Cambridge University Press, 1993. £27.95, 472 pp. spiralbound. ISBN 0 521 44189 7.

HOL is a theorem-proving environment based on Church's theory of simple types. It presents the user with an LCF-style environment in which proof is conducted in the forward direction by the application of inference rules, and in the backward direction by proof tactics and tacticals. Backward proof is generally simpler, so there are many tactics and tacticals, as well as rewriting methods that can be applied by the HOL user.

HOL is a large system. Its documentation, when printed, consists of a large pile of paper. The current book is an introduction to the use of HOL. As such, it contains descriptions of the use of forward inference methods, but emphasises backward techniques to a greater extent. The proof methods are illustrated by a number of examples, some small and some relatively extended. Included among the examples are the formal specification and verification of a parity checker and a proof of the binomial theorem (the proof requires the development of structures such as groups and monoids—one way of developing these in HOL is presented). All of the examples in the early parts of the book are explained in detail, and careful reading leads to a good understanding of how the proofs were developed.

In addition to showing how HOL can be used, the authors include a description of the ML programming language used as the meta-language for HOL. The HOL logic is also treated in some detail. The system itself is then described and the built-in theories of HOL are presented in outline so that the reader gains an understanding of what is available at start-up. Finally, the book contains three chapters on the various tools that can be used to prove theorems with HOL: these include derived inference rules, conversions and tactics. The last chapters list the various concepts in a more-or-less manual form. By the time one has read this far, and provided that one has been diligent in working through previous material, this style of presentation is perfectly adequate.

The material contained in this book is derived, for the most part, from the online HOL documentation. The manual material has been stringently edited: the book form is considerably more readable than the online manuals. Pointers into the online documentation are contained in the book, so integration of the two should be relatively easy.

Readers who want to use HOL will find this an invaluable source of introductory information that will render more pleasurable the process of learning about this large system. The appearance of the book is greatly to be welcomed.

The book comes with an Appendix containing the manual information to cover the examples in Chapter 5, as well as a description of the tautology library. The index is comprehensive and useful; the references are relatively few in number, but well chosen. For those involved in formal methods, HOL is probably the most outstanding proof tool available and this book will certainly greatly assist newcomers to get to grips with the HOL system.

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HANS VAN VLIET
Software Engineering—Principles and Practice. John Wiley, 1993. £27.95, 558 pp. hardbound. ISBN 0 471 93611 1.

The book, according to its blurb, aims to give a broad coverage of software development issues and it achieves this in a competent and interesting style. Specifically it looks at the formal, informal and human parts of software development and the relationships between them. The subject is large and most of the relevant parts are covered in sufficient but minimal detail.

Topics the book covers include development models and formal processes of specification; management, psychological and financial issues; and methods of software design and analysis.

In the introduction the author explains the need for formalisation of Software Development and then, through structured chapters, he goes on to describe various methods and issues involved in this process. The book is well ordered and easy to dip into to as each section is largely independent and complete in itself. The scope of the book means that it gives a good basic coverage of the major issues in software development today, this makes it particularly suitable for someone who doesn't know much about the development process but is involved from perhaps a managerial point of view. Flicking through this book would give someone with low computer literacy a good grounding in the standards, issues and terms of the subject.

Although a large book, the diversity of topics and approachable, chatty style of this book makes it generally readable as a whole. The subject area is one not usually included in a theoretical degree and gives a useful perspective of software development from a practical and managerial point of view. Exercises are given at the end of each chapter and further information is available for lecturers making it perhaps suitable as a recommended course book on a related topic.

Therefore I believe the book is aimed primarily at two distinct audiences. Firstly undergraduates doing a course on this subject and secondly at people in business who are about to become involved in the development of some software and would like an understanding of the process.

A little basic programming knowledge is useful for some of the chapters and examples are give mainly in Modula-2. The book has a very thorough and complete