

---

---

## Book Review

---

---

### *The Complete Forth, A New Way To Program Microcomputers* by Alan Winfield

Published by Sigma Technical Press and distributed by  
John Wiley and Sons, Inc., 1983 (£ 6.95).

The title of Alan Winfield's book, *The Complete Forth, A New Way to Program Microcomputers*, is a variation on the title of a 1974 paper on Forth by Charles Moore, "Forth: A New Way to Program Minicomputers". Whereas Moore tersely described Forth's features, Winfield presents a complete introductory Forth text. I wish that *The Complete Forth* had been available when I first used Forth on minicomputers.

Leo Brodie's text, *Starting Forth*, has been the best introductory Forth text since its appearance in 1981. During the past two years several other texts have appeared, but not until Alan Winfield's *The Complete Forth* has one been as useful as Brodie's. Where *Starting Forth* takes 365 pages to introduce the reader to Forth, computers, and programming etiquette, Winfield quickly covers similar ground in 130 pages. His book is organized into ten chapters: fundamentals, including the stack; variables and constants; colon definitions; conditionals; looping; editing; numbers and strings; double precision; extending Forth; and two programming projects as a "Forth Finale". These are followed by a bibliography, answers to problems, a glossary of Forth terminology, an index of Forth-79 words used and a detachable Forth-79 reference card.

Each chapter ends with a summary and problem set, and additional programming examples may be found throughout the chapters. Two particularly good examples are an array defining word which tests for out-of-bounds conditions, and another one which maintains a running average of data stored into it. Oftentimes, new words are introduced through the examples, as in the section on strings. Occasionally, the Forth examples are juxtaposed with BASIC code to help novices familiar with that language.

Chapter 10, the "Forth Finale", has two larger programs. The first is Zeller's Congruence, which is used to determine the day of the week in a perpetual calendar, and uses 6 blocks. The second program is a video game 5 blocks long. Although considerable space is devoted to explaining the workings of these two problem sets, insufficient attention is given to interactive Forth debugging techniques. A simple, FIG-Forth-like editor is discussed in Chapter 6 because Forth-79 doesn't specify an editor. This would have been an appropriate opportunity to design and debug an editor using words developed in the text or to include it as a third programming project.

Winfield discusses documentation style and consistently uses it throughout the problem sets. However, many of the briefer programming examples, even though discussed, should have had their stack parameters specifically identified. This is apparent with a word, F., on page 82 which prints a fixed point integer. F. takes multiple parameters on the stack, but their number and significance isn't obvious without stepping through the word.

These minor points are more than compensated for by section 9.6, Defining New Compiling Words. Few authors of introductory Forth texts present understandable and useful information on words like DOES> or EXECUTE, or show the development of alternative control structures. An author must thoroughly understand the material and have an insight into what is important. Winfield has elegantly and concisely addressed these topics. His section, Self-Modifying Data

Structures, captures both the philosophy and technique of Forth. I would have liked this material expanded, but the book would have lost its valuable conciseness.

By basing a book upon the Forth-79 Standard, Winfield has a less rich vocabulary to draw upon than Brodie does with polyFORTH. However, the greater availability of Forth-79 compatible versions over polyFORTH may make *The Complete Forth* a more easily used text than *Starting Forth*. In any event, it is heartening to see a text successfully present Forth from this vantage. Like Brodie, he is considerate of the reader and points out Forth-79 departures to be wary of in other Forths. In other places Winfield directs the reader to where he has previously defined a non-Standard word. With the exception of FIND and EXECUTE, which use code field rather than parameter field address, this book appears to follow the 79-Standard. Similarly, only a few places like VOCABULARY and ' will need to be changed to reflect the adoption of Forth-83, since FIND and EXECUTE as described are Forth-83 Standard.

There are few improvements which could have been made to the book. The index might have included non-Standard words developed in the text and a narrower, pocket-sized reference card would have been convenient. The use of { } to delineate Forth words in the text is awkward, and would have been better served by bold-face. The useful and infrequent footnotes were typeset too small and are difficult to read.

Winfield's text was required reading in my course this past summer along with optional readings from Brodie and collected papers. My class of 16 was primarily made up of continuing education students, ranging from a musician to a C programmer and including physicists and engineers. The students' preferences were evenly divided between Brodie and Winfield. The major disadvantage perceived with Winfield's book was its terseness. One student remarked that he had only to read 10 pages of Winfield to get what Brodie covers in 40, but that he often had to reread Winfield. My view is that Brodie is superior for self-study, but that Winfield is better as a lecture companion or if a tutor is available. *The Complete Forth* is direct and concise, and I recommend it highly for novice and intermediate users.

Lawrence P. Forsley  
University of Rochester

---

---

## Books

---

---

- Chirlian, Paul. *Beginning FORTH*, Matrix Publishers, Inc., Beaverton, Oregon. 1983.
- McCabe, C. Kevin. *FORTH Fundamentals, Volume 1 Language Usage, Volume 2 Language Glossary*, dilithium Press, Beaverton, Oregon. 1983.
- Hofert, David, editor. *A Bibliography of Forth References*, 1st Edition. The Institute for Applied Forth Research, Inc. Rochester, New York. 1983.
- Proceedings: *1983 Rochester Forth Applications Conference*, The Institute for Applied Forth Research, Inc. Rochester, New York. 1983.
- Proceedings: *1983 Forth Modification Laboratory*, FORML, Palo Alto, California. 1983.
- Dr. Dobb's Journal, Annual Forth Issue, #83* September 1983.