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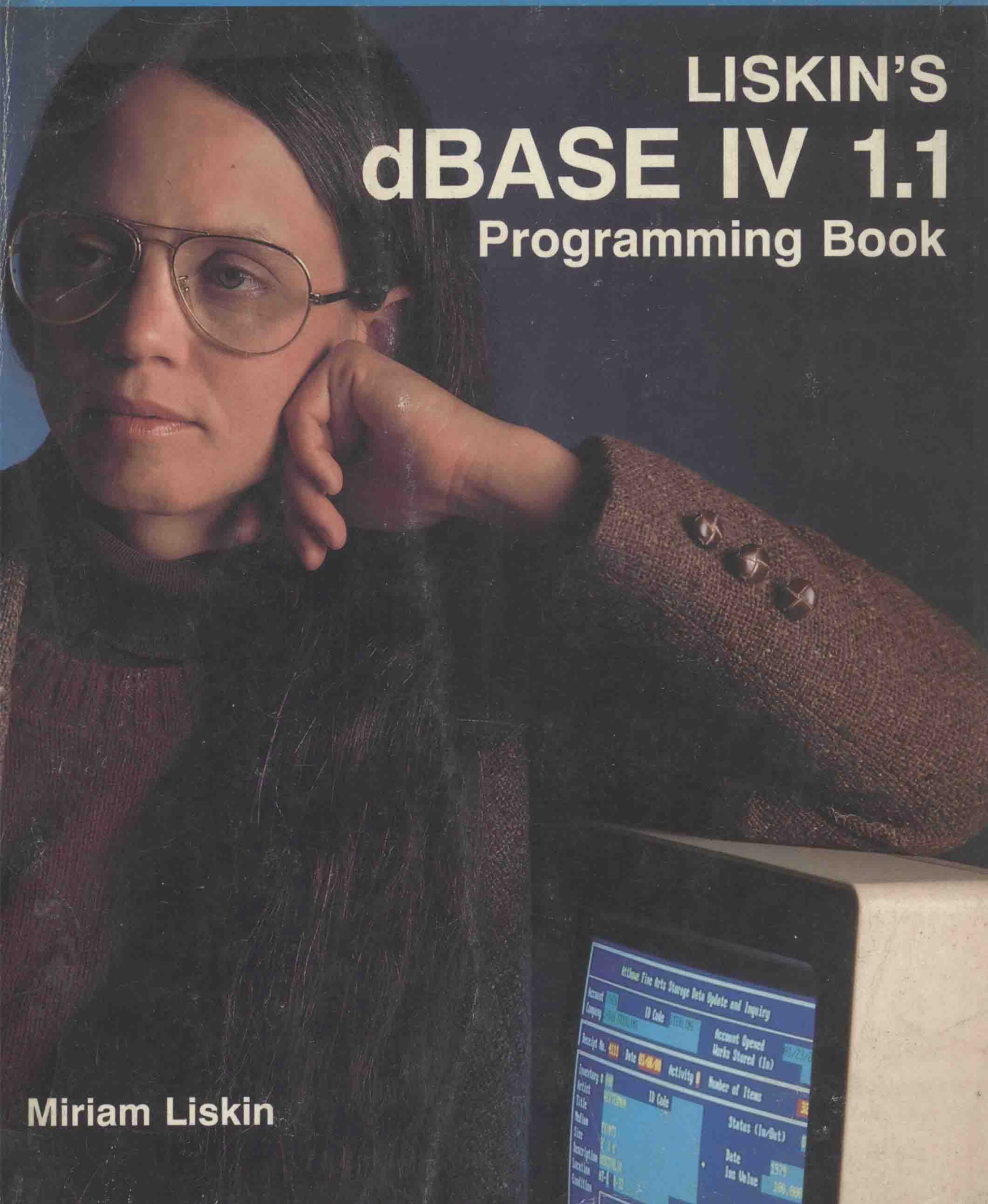
LISKIN'S dBASE IV 1.1 Programming Book



Miriam Liskin

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Liskin's dBASE IV® 1.1 Programming Book

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INTRODUCTION

dBASE IV is the newest version of Ashton-Tate's data base management and application development software package. Even more so than earlier versions of dBASE, dBASE IV is a large program with several distinctly different operating modes. You can use dBASE IV in five ways:

- Through a system of pull-down menus centered around a main screen called the Control Center, which includes a full complement of data entry screens, inquiry screens, form layout editors, and an applications generator
- By typing commands one at a time at the dot prompt
- By writing programs in the dBASE IV language
- By typing SQL commands at the SQL prompt
- By writing programs in the SQL language

Because dBASE IV includes both intrinsic data base management commands and a complete programming language, it is an ideal development environment for building specialized applications where comparable packaged software does not exist or is very expensive, inflexible, or both. A program written

in the dBASE IV language can make use of all of the intrinsic file management capabilities that are accessible from the dot prompt, and the development process generally takes far less time than writing a comparable system in another higher level language like Pascal or COBOL. Many people buy dBASE IV or hire dBASE IV programmers because they need software that is highly customized to the requirements of their type of business, profession, or non-profit organization, or to the needs of one individual organization.

In many ways, learning to use dBASE IV to its fullest capacity parallels the development of an individual application: from working at command level and using the built-in form layout editors, you will progress to writing simple batch-type programs and finally graduate to writing longer, more complex programs that can be run by other users who have little or no knowledge of dBASE IV. For readers who have no prior experience with other higher level languages, this approach eases the transition to learning dBASE IV programming.

If you have programmed in other languages, you will already understand many of the concepts and will recognize the basic programming structures and commands used in the dBASE IV language. However, learning to analyze a manual system, work out specifications for the computer-based replacement, design a security system, and implement a scheme for allowing multiple users to update the same files in a local area network environment is much more difficult than simply learning the syntax of a new programming language. This is true not only for novices but for more experienced programmers who have never had sole responsibility for the design of a complete data base application.

ABOUT THIS BOOK

This book is a comprehensive guide to developing a complete data base application using dBASE IV. No previous programming experience, either with dBASE IV or any other language, is necessary in order to use this book to learn to write dBASE IV programs. This book does assume a basic familiarity with data base management concepts and the terminology used in the dBASE IV community to discuss these concepts. It assumes that you know how to operate the dBASE IV full-screen editors and form layout editors and that you have used dBASE IV, either through the menu system or from the dot prompt, to manage simple filing systems involving one data base. If you have done most of your work in the menu system, you should pay special attention to the

review of the basic elements of the dBASE IV command language presented in Chapter 4 and to the fundamental data base manipulation commands covered in Chapter 5. To use this book effectively, you should already understand

- How to use the full-screen cursor movement and editing commands, operate the dBASE IV menu system, and choose items from pick lists
- How to create a data base file with character, numeric, logical, date, and memo fields
- How to modify the structure of an existing data base
- How to enter, edit, delete, and view individual records and groups of records on the Edit and Browse screens and from the dot prompt
- How to build indexes for a data base
- How to use indexes to control the order in which records are displayed or printed, and to rapidly retrieve individual records
- How to use the label, report, and screen layout editors to design simple forms
- How to specify selection criteria for screen displays or printed forms

This book uses as a case study a sample accounts receivable system for an imaginary company called National Widgets. You may want to build this system on your own computer as you read. If you are already planning another dBASE IV application, you may prefer to parallel the development process with your system. In either case, you will find that you are the most relaxed and receptive to new ideas if you have a specific project to relate the concepts in this book to but are not under pressure to complete the project to meet an impending deadline.

The programs in this book attain a level of sophistication applicable to real-world data base problems. However, the National Widgets system is not a complete, fully functional accounting system. This book describes *each type* of program required by the application, but it does not include every program listed in the system outline, and the refinements outlined in the later chapters are not incorporated into all of the programs presented earlier (although suggestions for doing so appear regularly).

This book covers both dBASE IV version 1.0 and 1.1. The major differences between the two versions are described in the sections where the relevant

feature is introduced, and noted again in subsequent chapters that elaborate on the same features. Except in a few cases, which are clearly marked with comments in the listings, the programs in this book will run under version 1.0. Specific changes or enhancements that are supported only in version 1.1 are outlined in the text, often with illustrative code fragments. If you are using version 1.0, some of the dBASE IV screen displays (for example, the Browse and Edit screens and some error messages) will differ slightly from the screens pictured in this book, which were captured with version 1.1 running.

This book is not intended to be a substitute for the dBASE IV reference manuals. While it covers a broad range of programming commands and techniques, it does not describe every command or function in detail (some are not covered at all). The reasons range from the varying intrinsic utility and applicability of the commands and the history of the dBASE IV language (many commands that were retained for compatibility with dBASE III and III PLUS have more powerful or flexible replacements in dBASE IV) to purely subjective factors—the author's personal preferences and programming style. Although the Ashton-Tate documentation has improved steadily with each new version of dBASE, you may also benefit from owning at least one other independent reference guide to the dBASE IV language. If you are an experienced programmer, you might also want (instead of or in addition to a complete reference) a concise guide to command syntax such as the *dBASE IV Pocket Reference* published by Osborne/McGraw-Hill. You will benefit greatly by periodically skimming through your reference manuals and books. Each time you scan a list of commands or functions, you may find that items that did not catch your attention the first time you read the manual—because you had no immediate use for them—will suggest easy solutions to new programming problems or better ways to accomplish certain objectives.

If you are upgrading from dBASE III PLUS, you may also want to keep at hand the section of the Ashton-Tate documentation that summarizes the new features of your version of dBASE IV. For the most part, this book does not explicitly compare dBASE IV with its predecessors, and most of the sample programs include commands or functions that are new in dBASE IV, even when a dBASE III PLUS command sequence would also have served the purpose. However, dBASE IV will run most dBASE III PLUS programs with very few changes. If you have no prior experience with earlier versions of the dBASE language and find that you must modify or convert a dBASE III PLUS system, you will probably find that a programming book on dBASE III PLUS is a useful adjunct to this volume.

HOW THIS BOOK IS ORGANIZED

For the most part, this book is not structured around specific commands, programming structures, or algorithms. The book is structured to follow the process of designing, implementing, testing, refining, maintaining, and enhancing a typical business application. Part One covers the design and prototyping phase of application development, describes how to make the most of the built-in form layout editors, and presents a complete application constructed by using the applications generator. These techniques are often adequate for handling small applications or those designed for your personal use. Part Two details the dBASE IV programming structures that you can use to write programs that replace or augment the menu system created in the applications generator. Parts Three and Four focus on developing increasingly sophisticated programs from scratch, without recourse to the built-in form layout editors and applications generator. These programs carry out all the fundamental operations required in a complete custom data base application—viewing and updating data, printing reports, performing calculations and file updates, and carrying out periodic file maintenance procedures.

As the development of the National Widgets system progresses, it may seem that the programs are being tailored increasingly to the specific requirements of this imaginary business. Try not to lose sight of the basic principles illustrated by the detailed examples—in particular, the way the data base files are related to each other, the programming strategies, and the way the programs interact with the user. For example, Chapter 23 describes a program that prints a customer reference list, complete with order history and financial transactions. The same program structure could also be used to print a donor list with gift transactions for a nonprofit organization, a patient list with a history of all office visits and prescriptions for a doctor's office, or an inventory report listing all stocked items with shipping and receiving transactions. The National Widgets programs are presented as models, or prototypes, that you can adapt and expand to suit the unique requirements of your own data base systems.

CONVENTIONS

The programs in this book follow the guidelines suggested by Ashton-Tate for capitalization. All keywords—words that are recognized by dBASE IV as part of the command language, including command verbs, function names, and words that introduce optional command clauses, such as FOR and WHILE—are

spelled out in full and are written in uppercase. Initial capital letters are used for the names of disk files, fields, index tags, programs, and procedures; and lowercase is used for the names of memory variables, menus, pop-ups, pick lists, and windows. In the text, uppercase is used for the names of objects that would in a program be written in initial capital letters or lowercase, so that they are clearly distinguishable from the surrounding text.

New technical terms or common English words that have specialized meanings in the dBASE IV language are italicized the first time they are used. Menu options and the names of dBASE IV menus are boldfaced, and the names of specialized screens and modes, such as the Edit screen, use initial capital letters. Small capital letters are used for the names of special keys, such as PGUP or F1. References to function keys used in the context of the dBASE IV layout editors, where these keys have standard meanings, include the dBASE IV key names, for example, F8 (Copy).

Command syntax paradigms are set off from the text and indented. All keywords are printed in uppercase, and all substitution items in lowercase italics. Command examples—specific commands that you could use at the dot prompt or in a dBASE IV program to accomplish a particular objective—are printed in Letter Gothic, monospaced, and aligned at the left margin.

A PERSONAL NOTE FROM THE AUTHOR

The best way to learn any programming language is by experimentation, and a willingness to explore—and to make mistakes—is a far more valuable asset than prior experience with dBASE IV or with programming. You will get the most out of this book if you take an active, exploratory approach to the learning process. Whenever you find yourself wondering, "Why did she do it this way instead of that?" or "What would happen if I tried something slightly different?"—go ahead and try it. There is almost always more than one correct way to accomplish any goal. If, in certain contexts, one method has strong advantages, this book describes them, but it also points out alternative methods that are better for certain situations or that reflect different programming styles. You should always feel free to vary the techniques presented or substitute others that seem more appropriate in a given context. And despite the serious, businesslike orientation of the sample application, programming is in many ways like a game or a puzzle—try to have fun with dBASE IV.

—Miriam Liskin

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