PREFACE

What is UNIX?

UNIX is an operating system (OS), software that manages the hardware and software resources of a computer. UNIX is one of the most widely used operating systems in industry, government, and education. It is especially popular in academia: according to AT&T, where UNIX was developed, every major university in the United States now has at least one computer system running under UNIX.

Which Version of UNIX?

Although UNIX originated at the AT&T Bell Laboratories, much of its subsequent development has occurred in academia, most notably at the University of California, Berkeley. Computer manufacturers, too, have gotten into the act, producing their own variations on the UNIX theme. Examples include AIX, from IBM; OS X, from Apple Computer; HP-UX, from Hewlett-Packard; and Solaris, from Sun Microsystems. Then there are various UNIX work-alikes—systems that look and behave like UNIX—the best known of these being Linux.

From the user's standpoint, these versions of UNIX are quite similar. Most can trace their ancestry to either AT&T UNIX or Berkeley UNIX; some are amalgams of both. This book presents features that are found on almost all UNIX systems, with special emphasis on those that are common to AT&T System V and Berkeley System Distribution (BSD) 4.3 UNIX.

Who Should Read This Book?

This book is intended for anyone who wants to acquire a working knowledge of UNIX without having to become a UNIX expert. It is especially appropriate for students of science, engineering, or business who are taking their first computer programming course.
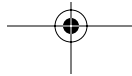
What Does This Book Cover?

This book covers the basics of the UNIX operating system. It has eight main parts:

I   INTRODUCTION TO UNIX

II   UNIX FILE SYSTEM

III   UNIX SHELL

IV   TEXT EDITORS

V   UNIX NETWORKING

VI   STARTUP FILES

VII   SHELL SCRIPTS

VIII   PROGRAMMING UNDER UNIX

INTRODUCTION. In Part I, you will find an overview of the UNIX operating system, and you will learn what you will need to start using it. Three different approaches are presented: traditional (command-line) UNIX; the X Window System with Motif; and the Common Desktop Environment (CDE).

UNIX FILE SYSTEM. UNIX organizes information in collections called files. You will learn how to create, name, rename, copy, and delete files in Part II. You will also learn how UNIX keeps track of your files.

UNIX SHELL. The part of UNIX that interprets user commands and passes them on to the computer is called a shell. Many different shells have been written for UNIX; the most prevalent are the Bourne Shell (sh), the Korn Shell (ksh), the C Shell (csh), the TC Shell (tcsh), and the Bourne-Again Shell (bash). These shells are considered in Part III.

TEXT EDITORS. You can create or modify UNIX files using a utility program called an editor. The most popular UNIX editors are vi ("vee-eye"), emacs, pico, and CDE Text Editor, which are discussed in Part IV.

UNIX NETWORKING. The recent growth of the Internet and World Wide Web around the world has been phenomenal. UNIX systems are a considerable part of this development. Internet and Web tools are presented in Part V.

STARTUP FILES. One of the great advantages of the UNIX operating system is its flexibility. A startup file contains commands for the shell to execute when it begins running. Startup files are examined in Part VI.

SHELL SCRIPTS. The UNIX shell is also a sophisticated programming language. A file containing a program for the UNIX shell is called a shell script. Shell scripts are described in Part VII.

PROGRAMMING UNDER UNIX. Most UNIX systems include the programming languages C, C++, Fortran, and Java. Many also include Pascal and other languages such as BASIC, Lisp, and COBOL. UNIX also offers a selection of software tools that are used in programming. UNIX programming is discussed in Part VIII, with emphasis on C, C++, Fortran, and Java.

What is New in the Fourth Edition

Several new chapters have been added; other chapters have been revised extensively. The following new topics are covered:

- TC Shell (`tcsh`) command interpreter (Chapters 10 through 12);

- Bourne-Again Shell (`bash`) command interpreter (Chapters 10 through 12);

- TC Shell startup files (Chapter 28);

- Bourne-Again Shell startup files (Chapter 29);

- Programming in C++ (Chapter 34);

- Programming in Java (Chapter 36); and

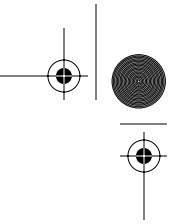- Basic regular expressions (Appendix D).

A chapter on Pascal programming has been deleted. Pascal was developed by Niklaus Wirth in the late 1960s for teaching good programming style. In recent years, however, Pascal has fallen out of favor as a first programming language, its place taken by C, C++, or Java.

How to Use This Book

Anyone who is just starting with UNIX should read straight through Parts I, II, III, and IV. The remaining parts may be read in any order. If your interest is in the Internet and the World Wide Web, read Part V. If you would like to learn about shell scripts and startup files, read Parts VI and VII. If you are interested primarily in using UNIX to program in C, C++, Fortran, or Java, read Part VIII.

Each part of this book begins with a chapter (or two) explaining the material without requiring the use of the computer. Other chapters are called "tutorials." These are intended to be read at the computer terminal. You should plan to spend about an hour at the terminal to cover each tutorial.

At the end of each section, you will find some short exercises. To derive the maximum benefit from this text, be sure to work through all of the exercises.

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Acknowledgments