

PETER NORTON'S INTRODUCTION TO COMPUTERS

GLENCOE

McGraw-Hill

New York, New York

Columbus, Ohio

Mission Hills, California

Peoria, Illinois

PREFACE

You are entering a world where the skills you learn in this course will be fundamental to your success. Because computing has changed, the need for strong conceptual and practical computer skills has grown. The computer is not like any other appliance: You cannot treat it as you would the telephone—as a "black box."

Computers have gotten easier to use while they've become more powerful. The ways of using them either alone or in the networked environment you may find at work have grown into a large array of options for you, the end user.

This book should help you to become an intelligent end user of this important technology. Our goal is to turn a mysterious "black box" into a comprehensible "glass box," so that you can make more intelligent choices about everything that affects your information-technology needs: what computer, operating system, and applications software do you need? How should you set up your file system to save space and still be accessible? What kinds of information and tools do you need on the computer's "desktop"? How can you customize the way you use your computer to increase your personal efficiency? How can you communicate effectively across a network with others in your organization and outside it?

Almost everything we do in our "information society" depends somewhat on information technology. No matter what you do, chances are that your personal and professional growth can be enhanced with the intelligent use of information technology. The challenge is to incorporate the basic concepts and skills of computing as appropriate into whatever your career and personal goals may be: a business career, or a career of service as a health professional, as a teacher, or as a scholar. We hope that this book gives you the tools to reach your goals.

Special Acknowledgment

Special acknowledgment is due to Rick Stout who worked closely with Peter Norton and Glencoe in writing this text. He has authored magazine articles and several books, including *Power Shortcuts . . . Quattro Pro for Windows*, and *The Internet Complete Reference*, which he coauthored with Harley Hahn. Scott Clark and Kevin Goldstein, editors for Peter Norton, provided constant guidance over 18 months in bringing Peter Norton's approach and expertise to this textbook.

Preface xxv

Acknowledgments

Many people helped to create this book, and each of their contributions has been valuable. Pete Alcorn, Lyn Cordell, Ron Dragushan, Lyn Dupré, Brooke Jarrett, Harley Hahn, Jim Hall, John Heilborn, Nick Keefe, Bruce Lorenzen, Merrill Peterson, Frances Stack, Ronda Stout, Monica Suder, Juan Vargas, Mike Viehman, and Ric Williams all were especially significant in bringing off this ambitious undertaking.

We would also like to thank the following people for their suggestions and help with the programming languages and examples: Leonard Erikson, Mitchel Grunes, Gerald Kleywegt, Uwe Kuhman, Steve Lionel, and Dan Pop.

Reviewers

James Dailey, Rider College Elizabeth Davis, Texas State Technical College Pat Duffy, Trenton State College Guy Giardine, Burlington County College Lynne Groves, Mankato Technical College Sallyann Hanson, Mercer County College Dick Hol, Community Colleges of Spokane David Letcher, Trenton State College Perry Lund, William Penn College Gary Margot, Ashland University Len Parrino, Essex County College Donald L. Phillips, University of North Florida Sylvia Clark Pulliam, Western Kentucky University John R. Ross, Fox Valley Technical College Lorilee Sadler, Indiana University Judy Scholl, Austin Community College Devinder Sud, Devry Technical Institute David Whitney, San Francisco State University Maryanne Zlotow, College of DuPage

BRIEF CONTENTS

Preface xxiv

Part	Ŀ	Aur	Techno	nlogical	Society	2
ı aı-ı		Vui"	IGGIIII	JIVHITUI	OUDIGLY	L

Chapter 1: These Amazing Machines 4
Chapter 2: Computers in Business 41
Chapter 3: Civilizing Cyberspace 72

Part II: How Computers Work 100

Chapter 4: Processing Data 102

Chapter 5: Interacting with the Computer 13

Chapter 6: Storing Information in a Computer 170

Chapter 7: Networks and Data Communications 206

Part III: Using Microcomputer Software 236

Chapter 8: The Operating System and the User Interface 238

Chapter 9: Word Processing and Desktop Publishing 281

Chapter 10: Spreadsheets 344

Chapter 11: Manipulating Data with a Database Manager 360

Part IV: Working as a Computer Professional 398

Chapter 12: Management Information Systems 400

Chapter 13: Creating Computer Programs 425

Chapter 14: Computers and Your Career 469

Appendix A: Exploring Your Computer 493

Appendix B: History of Microcomputers 529

Glossary 538

Photo Credits 555

Index 557

CONTENTS

Preface xxiv

PART I: OUR TECHNOLOGICAL SOCIETY 2

Chapter 1: These Amazing Machines 4

The Multipurpose Tool 6

Computers in Business 6

Medicine and Health Care 6

Norton Notebook: Tools for Independent Living 8

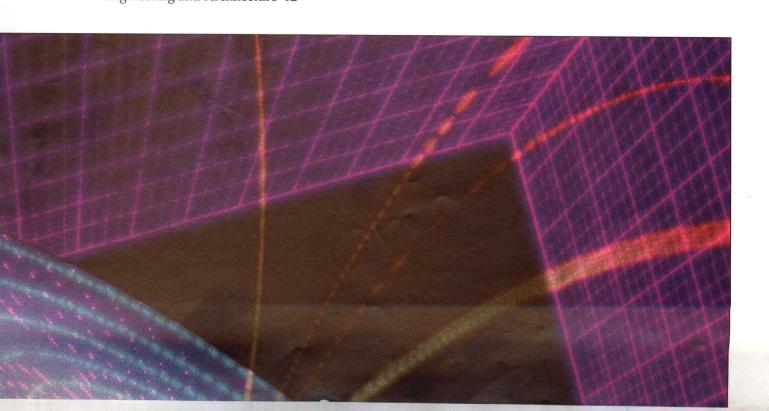
Education 10

Science 11

Archaeology 11

Norton Notebook: Cleaning Up After Hurricane Andrew 12

Engineering and Architecture 12



Manufacturing 13

Legal Practice 14

Law Enforcement 14

Government 14

The Military 15

Music 16

Theater and Film 16

Computers at Home 17

Looking Inside the Machine 18

Norton Notebook: Virtual Reality 19

The Processor 20

Memory 21

Input/Output 21

Techview: Why Isn't Memory Measured in Round Numbers? 22

Storage 23

Software Brings the Machine to Life 24

Operating Systems 25

Application Software 25

The Shapes of Computers Today 30

Supercomputers 31

Mainframe Computers 31

Minicomputers 32

Workstations 32

Personal Computers 33

Working Smart: Buying Your First Computer 35

What to Expect in the Future 36

Summary 38

Review Questions 39

Contents ix

Chapter 2: Computers in Business 41

How Businesses Use Computers 45

Vertical Applications 45

Personal-Productivity Applications 48

Workgroup Computing 49

Norton Notebook: Electronic Data Interchange: Changing the Way

Companies Talk to Each Other 50

Why Businesses Need Information 50

The Value and Cost of Information 52

Planning for Information Automation 53

A Case Study: Mercury Athletic Shoes 56

Establishing an Integrated Approach 57

PCs Steal the Show 58

Competitive Challenges 60

Rising to the Challenge: State-of-the-Art Computing 61

Norton Notebook: Federal Express Uses Computers for a Competitive

Edge 62

Working Smart: Picking a Computer-Based Employer 62

Corporate Culture Shock 67

Who Creates the System 68

How IS Groups Respond to Corporate Needs 68

What the Functions of a Systems Group Are 68

What to Expect in the Future 69

Summary 70

Review Questions 71

x Contents

Chapter 3: Civilizing Cyberspace 72

Computer Crime 74

Software Piracy 74

Computer Viruses 77

Hardware Theft 79

Data Theft 80

Norton Notebook: The Software Police 81

Invasions of Privacy 84

Mailing Lists 84

Norton Notebook: Steve Jackson versus the Secret Service 85

Credit Histories 86

Corporations and Their Employees 86

Reclaiming Our Privacy 87

Ergonomics 87

Choosing the Right Chair 87

Preventing Repetitive Stress Injuries 88

Norton Notebook: Fair Information Practices 89

Protecting the Eyes 90

Techview: Data Encryption 92

Computers and the Environment 92

The Myth of the Paperless Office 93

Chlorofluorocarbons in the Production of Computer Chips 93

The Scourge of Heavy Metals 94

Wasted Power 94

Working Smart: Ten Steps toward Environmentally Conscious

Computing 95

What to Expect in the Future 96

Summary 96

Review Questions 98

PART II: HOW COMPUTERS WORK 100

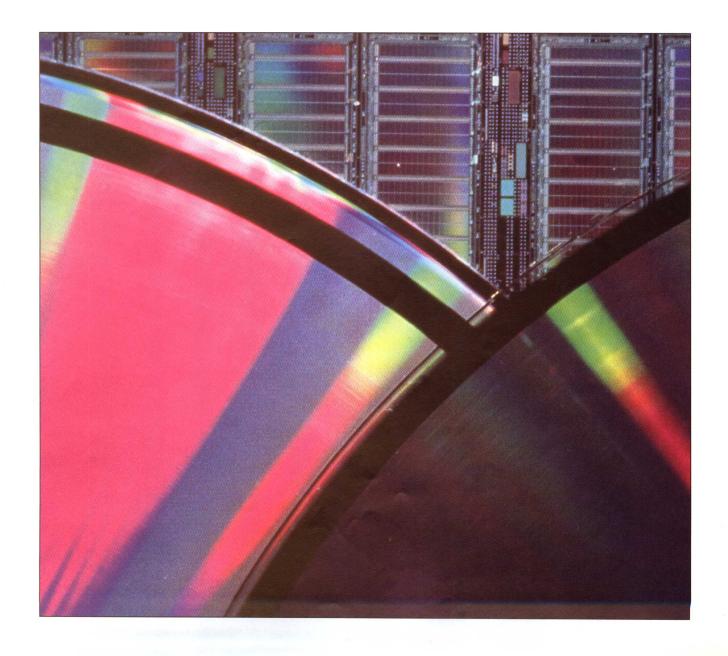
Chapter 4: Processing Data 102

Transforming Data into Information 104

Number Systems 104

Norton Notebook: Morse Code Is Binary! 106

Representing Data 110



How a Computer Processes Data 114

The Central Processing Unit 114

Memory 115

Techview: An Example of Processing 116

Factors Affecting Processing Speed 117

How Registers Affect Speed 118

Memory and Computing Power 118

The Computer's Internal Clock 119

The Bus 120

Cache Memory 121

Passing Math Operations to the Math Coprocessor 122

CPUs Used in Personal Computers 122

The Intel Processors 124

Norton Notebook: Self-Healing Computer Chips 125

The Motorola Processors 128

RISC Processors 128

Parallel Processing 130

What to Expect in the Future 130

Summary 131

Review Questions 132

Contents xiii

Chapter 5: Interacting with the Computer 134

The Keyboard 136

The Standard Keyboard Layout 136

Norton Notebook: Alphanumeric Layouts: QWERTY vs. Dvorak 137

How the Computer Accepts Input from the Keyboard 137

Working Smart: Getting Comfortable with Computers 138

The Mouse 139

Using the Mouse 139

The Inner Workings of a Mouse 140

Mouse Devices 142

The Trackball 143

Other Input Devices 143

Pens 144

Touch Screens 145

Bar-Code Readers 145

Techview: Handwriting Recognition 146

Imaging Scanners and Optical Character Recognition 148

The Monitor 149

Norton Notebook: Multimedia: The PC Comes to Life 150

How a CRT Monitor Displays an Image 151

Comparing CRT Monitors 152

The Video Controller 153

Flat Panel Monitors 156

Printers 157

Dot-Matrix Printers 158

Laser Printers 159

Ink-Jet Printers 161

Plotters 161

Connecting Devices to the Computer 162

Expansion Slots and Adapter Boards 162

Serial and Parallel I/O Ports 164

SCSI 165

What to Expect in the Future 166

Summary 167

Review Questions 168

Chapter 6: Storing Information in a Computer 170

Types of Storage Devices 172

Magnetic Storage 172

How Magnetic Media Work 172

Floppy-Disk Drives 175

Types of Floppy Disks 177

How Data Is Organized on a Floppy Disk 178

How the Operating System Finds Data on a Disk 180

Working Smart: Taking Care of Your Floppy Disks 182

Hard Disks 183

Norton Notebook: Extra Data Security for Networks 186

Tape Drives 187

Optical Storage Devices 189

CD-ROM 190

Norton Notebook: The i.Station: Where CD-ROM and MUSIC CDs

Meet 192

Write Once, Read Many (WORM) 192

Magneto-Optical 192

Measuring Drive Performance 194

Average Access Time 194

Average Data-Transfer Rate 195

Drive-Interface Standards 195

The ST-506 Standard 195

Integrated Drive Electronics 196

Enhanced Small Device Interface 196

Small Computer System Interface 197

Organizing and Protecting Stored Data 197

Organizing Your Files 197

Protecting Your Data with Regular Backups 199

Techview: Secrets of Data Recovery 200

What to Expect in the Future 201

Summary 202

Review Questions 204

Contents xv

Chapter 7: Networks and Data Communications 206

Communications Media 208

Twisted-Pair Wire 208

Coaxial Cable 208

Fiber-Optic Cable 209

Wireless Links 210

Network Communications 212

Four Advantages of Networking 212

Types of Networks 214

Norton Notebook: Data Superhighways 215

Network Topologies 218

The Network-Interface Card and Network Protocols 220

Telecommunications Using a Modem 222

How People Use Modems 223

Norton Notebook: Telecommuting: Redefining Homework 224

Working Smart: Tips for Fast On-Line Searches 228

Types of Modems 229

Comparing Modem Performance 230

Techview: Setting up for Modem Communications 231

What to Expect in the Future 233

Summary 233

Review Questions 234

PART III: USING MICROCOMPUTER SOFTWARE 237

Chapter 8: The Operating System and the User Interface 238

What Is an Operating System? 240

The Command-Line Interface 241

The Graphical User Interface 243

Norton Notebook: Bill Gates and the Fall of CP/M 244

Managing the Hardware 250

Managing the File System 252

Supporting Programs 254

Categories of Operating Systems 255

Multitasking Operating Systems 255

Multiuser Operating Systems 255

Norton Notebook: Job's NeXTStep Operating System for Intel 256

Multiprocessing Operating Systems 259

Popular Personal-Computer Operating Systems 259

Techview: How a Computer Does Multitasking 260

DOS 260

OS/2 266

The Macintosh OS 267

Unix 269

Microsoft Windows NT 270

Enhancing the OS with Utility Software 272

File Fragmentation 272

Data Compression 273

Working Smart: Organizing Your Files 274

Antivirus Utilities 276

Memory Management 277

What to Expect in the Future 277

Summary 278

Review Questions 279



Contents xvii

Chapter 9: Word Processing and Desktop Publishing 281

Using a Word Processor 283

Your Window into the Document 283

Entering Text 286

Making the Change 290

Formatting Text 294

Printing Your Documents 298

Filing Your Documents 299

Advanced Word-Processor Features 301

Checking Your Spelling 301

Techview: How Spell Checkers Work 302

Using a Thesaurus 304

Using an Outliner 304

Norton Notebook: Grammar Checkers 305

Styles and Style Sheets 307

Desktop-Publishing Software 307

Working Smart: Using Style Sheets and Templates 308

What Is Desktop-Publishing Software 309

Norton Notebook: DTP Gives Rise to Plethora of Small Publications 310

Desktop Publishing Versus Word Processing 312

Desktop Publishing in the Real World 318

Working with a Desktop Publisher 319

What to Expect in the Future 321

Summary 321

Review Questions 322

