

Table of Contents

Introduction 1

Who Should Buy This Book	2
How This Book Is Organized	2
Part I: Programming a Computer	2
Part II: Learning Programming with Liberty BASIC	3
Part III: Advanced Programming with Liberty BASIC	3
Part IV: Dealing with Data Structures	3
Part V: Algorithms: Telling the Computer What to Do	4
Part VI: Internet Programming	4
Part VII: The Part of Tens	4
How to Use This Book	5
Foolish assumptions	5
Icons used in this book	5

Part 1: Programming a Computer 7

Chapter 1: Learning Computer Programming for the First Time 9

Why Learn Computer Programming?	9
How Does a Computer Program Work?	13
Programming is problem-solving	14
Programming isn't difficult; it's just time-consuming	15
What Do I Need to Know to Program a Computer?	16

Chapter 2: All about Programming Languages 19

Why So Many Different Programming Languages?	19
The joy of assembly language	20
C: The portable assembler	22
High-level programming languages	24
Rapid Application Development (RAD)	
programming languages	27
Database programming languages	29
Scripting programming languages	30
Web-page programming languages	32
So What's the Best Programming Language to Learn?	34

Chapter 3: How to Write a Program 37

Before You Write Your Program	37
The program's users	38
The target computer	38
Your own programming skill	39



The Technical Details of Writing a Program	40
Prototyping	41
Choosing a programming language	42
Defining how the program should work	43
The Life Cycle of a Typical Program	44
The development cycle	44
The maintenance cycle	45
The upgrade cycle	46

Chapter 4: The Tools of a Computer Programmer 47

Writing Programs in an Editor	48
Using a Compiler or an Interpreter	50
Compilers	50
Interpreters	51
P-code: A combination compiler and interpreter	51
So what do I use?	53
Squashing Bugs with a Debugger	53
Writing a Help File	55
Creating an Installation Program	56

Part II: Learning Programming with Liberty BASIC 59

**Chapter 5: Getting Your Hands on a Real Language:
Liberty BASIC 61**

Why Learn Liberty BASIC?	62
Liberty BASIC is (almost) free	62
Liberty BASIC is easy	62
Liberty BASIC runs on Windows	62
You can start using Liberty BASIC today	63
Installing Liberty BASIC	63
Loading Liberty BASIC	64
Your First Liberty BASIC Program	64
Running a Liberty BASIC program	65
Saving a Liberty BASIC program	66
Loading or starting a Liberty BASIC program	67
Using Keystroke Commands in Liberty BASIC	68
Getting Help Using Liberty BASIC	69
Exiting Liberty BASIC	70

Chapter 6: Handling Input and Output 71

Inputting and Outputting Data: The Old-Fashioned Way	71
Inputting and Outputting Data: The Modern Way	74
Getting input	74
Displaying output	75
Sending Data to the Printer	76

Chapter 7: Variables, Constants, and Comments	79
Storing Data in Variables	80
Creating a variable	81
Assigning a value to a variable	83
Declaring your variables	87
Using Constants	90
Commenting Your Code	92
Chapter 8: Crunching Numbers and Playing with Strings	95
Adding, Subtracting, Dividing, and Multiplying	95
Using variables	96
Working with precedence	97
Using parentheses	99
Using Liberty BASIC's Built-In Math Functions	100
Manipulating Strings	101
Declaring variables as strings	102
Smashing strings together	103
Playing with Liberty BASIC's String Functions	103
Playing with UPPERCASE and lowercase	104
Counting the length of a string	104
Trimming the front and back of a string	105
Inserting spaces	106
Yanking characters out of a string	106
Looking for a string inside another string	107
Converting strings into numbers (and vice versa)	108
Chapter 9: Making Decisions with Control Statements	111
Using Boolean Expressions	111
Using variables in Boolean expressions	113
Using Boolean operators	114
Exploring IF THEN Statements	119
IF THEN ELSE statements	120
Working with SELECT CASE Statements	121
Checking a range of values	124
Checking a relational operator	125
Chapter 10: Repeating Yourself with Loops	129
Using the WHILE-WEND Loop	130
Exiting a WHILE-WEND loop prematurely	131
Endless loops #1: Failing to modify the Boolean expression inside the loop	132
Endless loops #2: Failing to initialize a Boolean expression outside the loop	133
Looping a Fixed Number of Times	134
Counting with different numbers	135
Counting in increments	135
Exiting a FOR-NEXT loop prematurely	137

Part III: Advanced Programming with Liberty BASIC 139

Chapter 11: Writing Large Programs by Using Subprograms141

Breaking the Bad Programming Habits of the Past	141
Introducing Structured Programming	144
Sequential instructions	144
Branching instructions	144
Looping instructions	145
Putting structured programming into practice	146
Writing Modular Programs	147
Using Subroutines	150
Defining a subroutine	151
Passing data to a subroutine	151
Calling a subroutine	153
Exiting prematurely from a subroutine	154
Using Functions	155
Defining a function	155
Passing data to a function	156
Calling a function	156
Exiting prematurely from a function	158
Passing Data by Value or by Reference	158

Chapter 12: Drawing Pictures and Making Noise161

Creating a Graphics Control	161
Using Turtle Graphics	162
Defining line thickness	166
Defining line colors	167
Drawing Circles	168
Drawing Boxes	170
Displaying text	171
Making Sounds	172
Making a beeping noise	173
Playing WAV files	173

Chapter 13: Saving and Retrieving Stuff in Files175

Storing Stuff in Text Files	175
Creating a new text file	176
Putting stuff in a text file	176
Adding new stuff to an existing text file	177
Retrieving data from a text file	178
Storing Stuff in Random-Access Files	180
Creating a new random-access file	181
Saving data into a random-access file	183
Retrieving data from a random-access file	184

Saving and Retrieving Data in a Binary File	186
Creating a new binary file	186
Saving stuff in a binary file	187
Changing stuff in a binary file	187
Retrieving stuff from a binary file	189
Chapter 14: Creating a User Interface	191
Designing a Window	191
Creating a new window	192
Defining the size and location of a window	193
Adding color to a window	194
Putting Pull-Down Menus in a Window	195
Making Pop-Up Menus	198
Putting Controls in a Window	200
Creating a command button	200
Displaying text	203
Creating a check box	204
Creating a radio button	205
Creating text boxes	207
Creating list boxes	209
Creating combo boxes	211
Creating group boxes	213
Chapter 15: Debugging Programs	215
Anatomy of a Computer Bug	215
Syntax Errors	216
Run-Time Errors	218
Fun with Logic Errors	219
Stepping line by line	220
Tracing through your program	221
<i>Part IV: Dealing with Data Structures</i>	<i>223</i>
Chapter 16: Storing Stuff in Arrays	225
Making an Array	226
Storing (and Retrieving) Data in an Array	228
Making a Multidimensional Array	230
Creating Dynamic Arrays	232
Chapter 17: Lumping Related Data in Records	235
Creating a Record	236
Manipulating Data in Records	237
Storing data in a record	237
Retrieving data from a record	238
Using Records with Arrays	239

Chapter 18: Linked Lists and Pointers241

Starting with a Pointer	241
Defining the parts of a linked list	243
Creating a linked list	245
Managing a linked list	247
Making Data Structures with Linked Lists	249
Double-linked lists	249
Circular-linked lists	250
Stacks	251
Queues	252
Trees	253
Graphs	254

Chapter 19: Playing with Object-Oriented Programming255

The Problem with Software	256
Ways to Make Programming Easier	256
Breaking Programs into Objects	258
How to use objects	259
How to create an object	261
Writing an object's methods	262
Creating an object	263
Choosing an Object-Oriented Language	265

Part V: Algorithms: Telling the Computer***What to Do267*****Chapter 20: Sorting269**

Insertion Sort	270
Bubble Sort	273
Shell Sort	276
Quicksort	280
Sorting Algorithms	283

Chapter 21: Searching287

Searching Sequentially	287
Performing a Binary Search	289
Hashing	292
Dealing with collisions	293
Searching by using a hash function	294
Picking a Searching Algorithm	297

Chapter 22: Optimizing Your Code299

Choosing the Right Data Structure	300
Choosing the Right Algorithm	300
Fine-Tuning the Source Code	301
Put the condition most likely to be false first	301
Put the condition most likely to be true first	302
Don't run a FOR-NEXT loop needlessly	303
Clean out your loops	304
Use the correct data types	304
Use built-in commands whenever possible	306
Using a Faster Language	306
Optimizing Your Compiler	307

Part VI: Internet Programming309**Chapter 23: Playing with HTML311**

Grasping the Basics of HTML	312
Grasping the most important HTML tags	313
Creating a header and title	313
Defining the bulk of your Web page	314
Adding comments	314
Defining Text with Tags	315
Making a heading	315
Defining a paragraph	316
Highlighting a quote	317
Adding emphasis to text	318
Using Tag Attributes	319
Aligning text	319
Playing with colors	319
Coloring your hyperlinks	320
Making a List	321
Unordered lists	321
Ordered lists	323
Definition lists	323
Creating Hyperlinks	325
Making external hyperlinks	326
Making internal hyperlinks	326
Linking to a specific spot on a Web page	326
Displaying Graphics	327
Putting a picture on a Web page	328
Adding a background picture	329

Creating a User Interface on a Form	329
Handling events	330
Creating a text box	331
Creating a command button	332
Creating a check box	333
Creating a radio button	335
Deciding to Use Additional HTML Features	337

Chapter 24: Making Interactive Web Pages with JavaScript 339

Understanding the Basics of JavaScript	340
Displaying text	341
Creating variables	342
Making dialog boxes	343
Playing with Functions	345
Opening and Closing a Window	347
Opening a window	348
Defining a window's appearance	348
Closing a window	349

Chapter 25: Using Java Applets on Web Pages 351

How Java Applets Work	351
Adding a Java Applet to a Web Page	354
Defining the size of a Java applet window	354
Aligning the location of a Java applet window	355
Defining space around a Java applet	356
Finding Free Java Applets	358

***Part VII: The Part of Tens* 359**

Chapter 26: Ten Cool Programming Careers 361

Programming Computer Games for Fun and Profit	361
Creating Computer Animation	363
Making (and Breaking) Encryption	364
Internet Programming	365
Fighting Computer Viruses and Worms	366
Hacking for Hire	367
Participating in an Open-Source Project	368
Niche-Market Programming	369
Teaching Others about Computers	369
Selling Your Own Software	370

Chapter 27: Ten Additional Programming Resources 371

Trying Commercial Compilers	372
Windows programming	372
Macintosh and Palm OS programming	374
Linux programming	375
Testing the Shareware and Freeware Compilers	376
BASIC compilers	376
C/C++ and Java compilers	377
Pascal compilers	377
Oddball language compilers and interpreters	378
Using a Proprietary Language	378
HyperCard	379
Revolution	380
PowerBuilder	380
Shopping by Mail Order	380
Getting Your Hands on Source Code	381
Joining a Local User Group	382
Frequenting Usenet Newsgroups	382
Playing Core War	383
Programming a Battling Robot	384
Toying with Lego Mindstorms	385

Appendix: About the CD 387

System Requirements	387
Using the CD with Microsoft Windows	388
Using the CD with Mac OS	389
Using the CD with Linux	389
What You'll Find	390
Software	390
If You've Got Problems (Of the CD Kind)	392

Bonus Chapter: Programming in Python CD-1

Understanding Python	CD-1
Playing with data	CD-3
Data structures	CD-5
Comments	CD-7
Using Control Structures.....	CD-8
Using Control Structures.....	CD-9
The while statement	CD-10
The for statement.....	CD-10
Writing Subprograms in Python.....	CD-11

Index 395***End-User License Agreement 413***