

# Table of Contents

<b>INTRODUCTION</b> .....	1
About This Book.....	2
Foolish Assumptions.....	2
Icons Used in This Book.....	3
Beyond the Book.....	4
Where to Go from Here.....	4
<b>BOOK 1: JAVA BASICS</b> .....	5
<b>CHAPTER 1: Welcome to Java</b> .....	7
What Is Java, and Why Is It So Great? .....	8
Platform independence .....	8
Object orientation .....	9
The Java API .....	10
The Internet .....	10
Java versus Other Languages.....	11
Important Features of the Java Language .....	12
Type checking.....	13
Exception handling .....	14
On the Downside: Java's Weaknesses .....	15
Java Version Insanity.....	16
What's in a Name?.....	18
<b>CHAPTER 2: Installing and Using Java Tools</b> .....	19
Downloading and Installing the Java Development Kit .....	20
Downloading the JDK .....	20
Installing the JDK .....	21
Perusing the JDK folders.....	21
Setting the path .....	22
Using Java's Command-Line Tools .....	24
Compiling a program .....	24
Compiling more than one file .....	25
Using Java compiler options.....	26
Running a Java program.....	28
Using the javap command.....	28
Using Java Documentation.....	30

<b>CHAPTER 3:</b>	<b>Working with TextPad</b> .....	33
	Downloading and Installing TextPad .....	33
	Editing Source Files .....	35
	Compiling a Program .....	37
	Running a Java Program .....	38
	 <b>BOOK 2: PROGRAMMING BASICS</b> .....	41
<b>CHAPTER 1:</b>	<b>Java Programming Basics</b> .....	43
	Looking at the Infamous Hello, World! Program .....	44
	Dealing with Keywords .....	47
	Working with Statements .....	49
	Types of statements .....	49
	White space .....	50
	Working with Blocks .....	52
	Creating Identifiers .....	53
	Crafting Comments .....	54
	End-of-line comments .....	54
	Traditional comments .....	54
	JavaDoc comments .....	55
	Introducing Object-Oriented Programming .....	56
	Understanding classes and objects .....	56
	Understanding static methods .....	56
	Creating an object from a class .....	57
	Viewing a program that uses an object .....	58
	So what's the difference? .....	60
	Importing Java API Classes .....	61
<b>CHAPTER 2:</b>	<b>Working with Variables and Data Types</b> .....	63
	Declaring Variables .....	64
	Declaring two or more variables in one statement .....	65
	Declaring class variables .....	65
	Declaring instance variables .....	66
	Declaring local variables .....	67
	Initializing Variables .....	68
	Initializing variables with assignment statements .....	69
	Initializing variables with initializers .....	70
	Using Final Variables (Constants) .....	70
	Working with Primitive Data Types .....	71
	Integer types .....	72
	Floating-point types .....	74

The char type .....	76
The Boolean type .....	77
Using wrapper classes .....	78
Using reference types .....	78
Using inferred variable types .....	80
Working with Strings .....	81
Declaring and initializing strings .....	82
Combining strings .....	82
Converting primitives to strings .....	83
Converting strings to primitives .....	84
Converting and Casting Numeric Data .....	85
Automatic conversions .....	85
Type casting .....	86
Thinking Inside the Box .....	87
Understanding Scope .....	87
Shadowing Variables .....	89
Printing Data with System.out .....	90
Using standard input and output streams .....	91
Using System.out and System.err .....	92
Getting Input with the Scanner Class .....	93
Importing the Scanner class .....	94
Declaring and creating a Scanner object .....	94
Getting input .....	94
Getting Input with the JOptionPane Class .....	96
Using enum to Create Your Own Data Types .....	98
<b>CHAPTER 3: Working with Numbers and Expressions .....</b>	<b>99</b>
Working with Arithmetic Operators .....	99
Dividing Integers .....	102
Combining Operators .....	104
Using the Unary Plus and Minus Operators .....	105
Using Increment and Decrement Operators .....	106
Using the Assignment Operator .....	108
Using Compound Assignment Operators .....	110
Using the Math Class .....	111
Using constants of the Math class .....	112
Working with mathematical functions .....	113
Creating random numbers .....	116
Rounding functions .....	119

Formatting Numbers .....	121
Recognizing Weird Things about Java Math.....	123
Integer overflow.....	123
Floating-point weirdness .....	124
Division by zero .....	125
<b>CHAPTER 4: Making Choices .....</b>	<b>129</b>
Using Simple Boolean Expressions.....	130
Using if Statements.....	132
Simple if statements .....	132
if-else statements .....	135
Nested if statements.....	136
else-if statements .....	140
Using Mr. Spock's Favorite Operators (Logical Ones, of Course) . . .	142
Using the ! operator .....	142
Using the & and && operators .....	144
Using the   and    operators .....	145
Using the ^ operator.....	146
Combining logical operators .....	147
Using the Conditional Operator .....	148
Comparing Strings.....	149
<b>CHAPTER 5: Going Around in Circles (Or, Using Loops).....</b>	<b>151</b>
Using Your Basic while Loop .....	152
The while statement .....	152
A counting loop .....	152
Breaking Out of a Loop.....	154
Looping Forever.....	154
Letting the user decide when to quit .....	156
Letting the user decide in another way .....	157
Using the continue Statement.....	158
Running do-while Loops.....	159
Validating Input from the User .....	161
Using the Famous for Loop .....	164
Understanding the formal format of the for loop .....	164
Scoping out the counter variable .....	166
Counting even numbers.....	167
Counting backward .....	168
Using for loops without bodies .....	169
Ganging up your expressions .....	170

	Omitting expressions . . . . .	172
	Breaking and continuing your for loops. . . . .	172
	Nesting Your Loops. . . . .	173
	A simple nested for loop . . . . .	174
	A guessing game . . . . .	174
<b>CHAPTER 6:</b>	<b>Pulling a Switcheroo . . . . .</b>	<b>179</b>
	Battling else-if Monstrosities . . . . .	179
	Viewing an example else-if program . . . . .	180
	Creating a better version of the example program . . . . .	181
	Using the switch Statement. . . . .	183
	Viewing a boring switch example, complete with flowchart. . . . .	184
	Putting if statements inside switch statements . . . . .	186
	Creating Character Cases. . . . .	187
	Intentionally Leaving Out a Break Statement . . . . .	188
	Switching with Strings. . . . .	192
	Enhanced Switch Features with Java 13. . . . .	193
<b>CHAPTER 7:</b>	<b>Adding Some Methods to Your Madness . . . . .</b>	<b>197</b>
	The Joy of Methods . . . . .	198
	The Basics of Making Methods . . . . .	198
	An example. . . . .	200
	Another example. . . . .	201
	Methods That Return Values . . . . .	203
	Declaring the method's return type . . . . .	203
	Using the return statement to return the value . . . . .	204
	Using a method that returns a type . . . . .	205
	You gotta have a proper return statement . . . . .	205
	Trying another version of the guessing-game program . . . . .	207
	Methods That Take Parameters . . . . .	210
	Declaring parameters . . . . .	211
	Scoping out parameters. . . . .	212
	Understanding pass-by-value . . . . .	213
	Trying yet another version of the guessing-game program . . . . .	214
<b>CHAPTER 8:</b>	<b>Handling Exceptions . . . . .</b>	<b>217</b>
	Understanding Exceptions. . . . .	218
	Witnessing an exception. . . . .	219
	Finding the culprit . . . . .	220
	Catching Exceptions . . . . .	221
	A simple example . . . . .	222
	Another example. . . . .	222

Handling Exceptions with a Preemptive Strike .....	224
Catching All Exceptions at Once .....	226
Displaying the Exception Message .....	227
Using a finally Block .....	228
Handling Checked Exceptions .....	231
Viewing the catch-or-throw compiler error .....	232
Catching FileNotFoundException .....	232
Throwing the FileNotFoundException .....	233
Throwing an exception from main .....	234
Swallowing exceptions .....	234
Throwing Your Own Exceptions .....	236
<b>BOOK 3: OBJECT-ORIENTED PROGRAMMING.....</b>	<b>239</b>
<b>CHAPTER 1: Understanding Object-Oriented Programming...</b>	<b>241</b>
What Is Object-Oriented Programming? .....	242
Understanding Objects .....	243
Objects have identity .....	243
Objects have type .....	244
Objects have state .....	245
Objects have behavior .....	246
Understanding the Life Cycle of an Object .....	247
Working with Related Classes .....	248
Inheritance .....	248
Interfaces .....	249
Designing a Program with Objects .....	250
Diagramming Classes with UML .....	251
Drawing classes .....	252
Drawing arrows .....	253
<b>CHAPTER 2: Making Your Own Classes.....</b>	<b>255</b>
Declaring a Class .....	256
Picking class names .....	256
Knowing what goes in the class body .....	257
Seeing where classes go .....	258
Working with Members .....	259
Understanding fields .....	259
Understanding instance methods .....	260
Understanding visibility .....	261
Using Getters and Setters .....	261
Overloading Methods .....	264
Creating Constructors .....	266

	Creating basic constructors .....	266
	Creating default constructors .....	267
	Calling other constructors .....	268
	Finding More Uses for the this Keyword .....	270
	Using Initializers .....	271
	Using Records .....	273
<b>CHAPTER 3:</b>	<b>Working with Statics .....</b>	<b>275</b>
	Understanding Static Fields and Methods .....	275
	Working with Static Fields .....	276
	Using Static Methods .....	277
	Counting Instances .....	278
	Preventing Instances .....	281
	Using Static Initializers .....	282
<b>CHAPTER 4:</b>	<b>Using Subclasses and Inheritance .....</b>	<b>285</b>
	Introducing Inheritance .....	285
	Motorcycles, trains, and automobiles .....	287
	Game play .....	287
	A businesslike example .....	288
	Inheritance hierarchies .....	288
	Creating Subclasses .....	289
	Overriding Methods .....	291
	Protecting Your Members .....	292
	Using this and super in Your Subclasses .....	293
	Understanding Inheritance and Constructors .....	294
	Using final .....	295
	Final methods .....	296
	Final classes .....	296
	Casting Up and Down .....	297
	Determining an Object's Type .....	299
	Poly What? .....	300
	Creating Custom Exceptions .....	302
	Tracing the Throwable hierarchy .....	302
	Creating an exception class .....	304
	Throwing a custom exception .....	305
<b>CHAPTER 5:</b>	<b>Using Abstract Classes and Interfaces .....</b>	<b>307</b>
	Using Abstract Classes .....	307
	Using Interfaces .....	310

	Creating a basic interface . . . . .	311
	Implementing an interface . . . . .	312
	Using an interface as a type . . . . .	313
	More Things You Can Do with Interfaces . . . . .	314
	Adding fields to an interface . . . . .	314
	Extending interfaces . . . . .	315
	Using interfaces for callbacks . . . . .	316
	Using Additional Interface Method Types . . . . .	320
<b>CHAPTER 6:</b>	<b>Using the Object and Class Classes . . . . .</b>	<b>323</b>
	The Mother of All Classes: Object . . . . .	323
	Every object is an Object . . . . .	324
	Object as a type . . . . .	324
	Methods of the Object class . . . . .	325
	Primitives aren't objects . . . . .	326
	The toString Method . . . . .	327
	Using toString . . . . .	327
	Overriding toString . . . . .	328
	The equals Method . . . . .	330
	Using equals . . . . .	331
	Overriding the equals method . . . . .	332
	The clone Method . . . . .	336
	Implementing the clone method . . . . .	336
	Using clone to create a shallow copy . . . . .	339
	Creating deep copies . . . . .	341
	The Class Class . . . . .	346
<b>CHAPTER 7:</b>	<b>Using Inner Classes, Anonymous Classes, and Lambda Expressions . . . . .</b>	<b>349</b>
	Declaring Inner Classes . . . . .	350
	Understanding inner classes . . . . .	350
	Viewing an example . . . . .	351
	Using Static Inner Classes . . . . .	354
	Using Anonymous Inner Classes . . . . .	355
	Creating an anonymous class . . . . .	356
	Creating a program with an anonymous class . . . . .	357
	Using Lambda Expressions . . . . .	359

<b>CHAPTER 8:</b>	<b>Working with Packages and the Java Module System</b> .....	361
	Working with Packages.....	362
	Importing classes and packages.....	362
	Creating your own packages.....	363
	An example.....	365
	Putting Your Classes in a JAR File.....	366
	jar command-line options.....	366
	Archiving a package.....	367
	Adding a jar to your classpath.....	368
	Running a program directly from an archive.....	369
	Using Javadoc to Document Your Classes.....	370
	Adding Javadoc comments.....	371
	Using the javadoc command.....	373
	Viewing Javadoc pages.....	374
	Using the Java Module System.....	375
	Understanding modules.....	376
	The module-info.java file.....	377
	Setting up folders for a module.....	378
	Compiling a module.....	379
	Creating a modular JAR file.....	379
	Running a modular JAR file.....	380
	<b>BOOK 4: STRINGS, ARRAYS, AND COLLECTIONS</b> .....	381
<b>CHAPTER 1:</b>	<b>Working with Strings</b> .....	383
	Reviewing Strings.....	384
	Using the String Class.....	386
	Finding the length of a string.....	388
	Making simple string modifications.....	389
	Extracting characters from a string.....	389
	Extracting substrings from a string.....	390
	Splitting a string.....	392
	Replacing parts of a string.....	394
	Using the StringBuilder and StringBuffer Classes.....	395
	Creating a StringBuilder object.....	396
	Using StringBuilder methods.....	396
	Viewing a StringBuilder example.....	398
	Using the CharSequence Interface.....	399

<b>CHAPTER 2:</b>	<b>Using Arrays</b>	401
	Understanding Arrays	401
	Creating Arrays	402
	Initializing an Array	404
	Using for Loops with Arrays	404
	Solving Homework Problems with Arrays	405
	Using the Enhanced for Loop	408
	Using Arrays with Methods	409
	Using Varargs	410
	Using Two-Dimensional Arrays	411
	Creating a two-dimensional array	412
	Accessing two-dimensional array elements	413
	Initializing a two-dimensional array	414
	Using jagged arrays	415
	Going beyond two dimensions	416
	Working with a Fun but Complicated Example: A Chessboard	417
	Using the Arrays Class	425
	Filling an array	426
	Copying an array	427
	Sorting an array	428
	Searching an array	429
	Comparing arrays	429
	Converting arrays to strings	430
<b>CHAPTER 3:</b>	<b>Using the ArrayList Class</b>	431
	Understanding the ArrayList Class	432
	Creating an ArrayList Object	435
	Adding Elements	436
	Accessing Elements	437
	Printing an ArrayList	438
	Using an Iterator	438
	Updating Elements	440
	Deleting Elements	442
<b>CHAPTER 4:</b>	<b>Using the LinkedList Class</b>	445
	Understanding the LinkedList Class	446
	Creating a LinkedList	450
	Adding Items to a LinkedList	450
	Retrieving Items from a LinkedList	452
	Updating LinkedList Items	454
	Removing LinkedList Items	455

<b>CHAPTER 5:</b>	<b>Creating Generic Collection Classes</b> .....	457
	Why Generics? .....	458
	Creating a Generic Class .....	459
	A Generic Stack Class .....	461
	Using Wildcard-Type Parameters .....	464
	A Generic Queue Class .....	466
<b>CHAPTER 6:</b>	<b>Using Bulk Data Operations with Collections</b> .....	471
	Looking At a Basic Bulk Data Operation .....	473
	Looking Closer at the Stream Interface .....	475
	Using Parallel Streams .....	478
	<b>BOOK 5: PROGRAMMING TECHNIQUES</b> .....	481
<b>CHAPTER 1:</b>	<b>Programming Threads</b> .....	483
	Understanding Threads .....	484
	Creating a Thread .....	485
	Understanding the Thread class .....	485
	Extending the Thread class .....	486
	Creating and starting a thread .....	488
	Implementing the Runnable Interface .....	488
	Using the Runnable interface .....	489
	Creating a class that implements Runnable .....	489
	Using the CountdownApp class .....	491
	Creating Threads That Work Together .....	493
	Using an Executor .....	497
	Synchronizing Methods .....	499
	Creating a Lock .....	503
	Coping with Threadus Interruptus .....	505
	Finding out whether you've been interrupted .....	505
	Aborting the countdown .....	506
<b>CHAPTER 2:</b>	<b>Using Regular Expressions</b> .....	511
	Creating a Program for Experimenting with Regular Expressions .....	512
	Performing Basic Character Matching .....	515
	Matching single characters .....	515
	Using predefined character classes .....	515
	Using custom character classes .....	518
	Using ranges .....	519
	Using negation .....	520

	Matching multiple characters .....	520
	Using escapes .....	521
	Using parentheses to group characters .....	522
	Using the pipe symbol .....	523
	Using Regular Expressions in Java Programs .....	524
	Understanding the String problem .....	524
	Using regular expressions with the String class .....	525
	Using the Pattern and Matcher classes .....	526
<b>CHAPTER 3:</b>	<b>Using Recursion .....</b>	<b>529</b>
	Calculating the Classic Factorial Example .....	529
	The nonrecursive solution .....	530
	The recursive solution .....	530
	Displaying Directories .....	532
	Writing Your Own Sorting Routine .....	536
	Understanding how Quicksort works .....	536
	Using the sort method .....	537
	Using the partition method .....	538
	Putting it all together .....	540
<b>CHAPTER 4:</b>	<b>Working with Dates and Times .....</b>	<b>545</b>
	Pondering How Time is Represented .....	546
	Picking the Right Date and Time Class for Your Application .....	547
	Using the now Method to Create a Date-Time Object .....	548
	Using the parse Method to Create a Date-Time Object .....	550
	Using the of Method to Create a Date-Time Object .....	551
	Using the Month enumeration .....	552
	Using the ZoneId class .....	553
	Using the ZoneOffset class .....	554
	Looking Closer at the LocalDate Class .....	554
	Extracting Information About a Date .....	556
	Comparing Dates .....	557
	Calculating with Dates .....	558
	Formatting Dates .....	560
	Looking at a Fun Birthday Calculator .....	562
<b>CHAPTER 5:</b>	<b>IoT Programming with Raspberry Pi .....</b>	<b>567</b>
	Introducing the Raspberry Pi .....	568
	Setting Up a Raspberry Pi .....	570
	Installing Java on a Raspberry Pi .....	571
	Installing the Pi4J Library .....	572

Configuring the Geany Integrated Development Environment for Java Development .....	572
Examining GPIO Ports .....	574
Connecting an LED to a GPIO Port .....	576
Building a Raspberry Pi LED Circuit .....	581
Parts .....	581
Steps .....	582
Examining the Pi4J Library .....	582
Importing GPIO Types .....	583
Instantiating a GpioController .....	584
Provisioning GPIO Pins .....	584
Controlling the Pin State .....	587
The Morse Code Program .....	589
The Cylon Eyes Program .....	593
Assembling the Cylon Eyes circuit .....	593
Running the Cylon Eyes program .....	596
Working with Input Pins .....	598
Understanding active-high and active-low inputs .....	599
Provisioning a digital input .....	600
Reading the state of a digital input pin .....	601
Building a circuit with a digital input pin .....	602
Running the Button Switcher Program .....	604
Finding a Better Way to Handle Input Events .....	606
Crafting a state change event listener .....	607
Adding an event handler to a pin .....	608
Using automatic debounce .....	609
Working with the EventSwitcher program .....	610
<b>BOOK 6: JAVAFX .....</b>	<b>613</b>
<b>CHAPTER 1: Hello, JavaFX! .....</b>	<b>615</b>
Perusing the Possibilities of JavaFX .....	616
Getting Ready to Run JavaFX .....	618
Looking at a Simple JavaFX Program .....	620
Importing JavaFX Packages .....	622
Extending the Application Class .....	623
Launching the Application .....	624
Overriding the start Method .....	625
Creating a Button .....	626
Handling an Action Event .....	627

	Creating a Layout Pane . . . . .	629
	Making a Scene . . . . .	630
	Setting the Stage . . . . .	631
	Examining the Click Counter Program . . . . .	632
<b>CHAPTER 2:</b>	<b>Handling Events . . . . .</b>	<b>637</b>
	Examining Events . . . . .	638
	Handling Events . . . . .	639
	Implementing the EventHandler Interface . . . . .	641
	Handling Events with Inner Classes . . . . .	644
	Handling Events with Anonymous Inner Classes . . . . .	647
	Using Lambda Expressions to Handle Events . . . . .	649
<b>CHAPTER 3:</b>	<b>Setting the Stage and Scene Layout . . . . .</b>	<b>655</b>
	Examining the Stage Class . . . . .	656
	Examining the Scene Class . . . . .	659
	Switching Scenes . . . . .	661
	Creating an Alert Box . . . . .	666
	Exit, Stage Right . . . . .	670
	Creating a Close button . . . . .	671
	Handling the CloseRequest event . . . . .	672
	Putting it all together . . . . .	674
<b>CHAPTER 4:</b>	<b>Using Layout Panes to Arrange Your Scenes . . . . .</b>	<b>677</b>
	Working with Layout Panes . . . . .	678
	Introducing five JavaFX layout panes . . . . .	678
	Creating layout panes . . . . .	679
	Combining layout panes . . . . .	680
	Using the HBox Layout . . . . .	680
	Spacing Things Out . . . . .	682
	Adding Space with Margins . . . . .	684
	Adding Space by Growing Nodes . . . . .	685
	Using the VBox Layout . . . . .	687
	Aligning Nodes in a Layout Pane . . . . .	689
	Using the Flow Layout . . . . .	690
	Using the Border Layout . . . . .	694
	Using the GridPane Layout . . . . .	697
	Sketching out a plan . . . . .	697
	Creating a grid pane . . . . .	698

	Working with grid pane constraints .....	701
	Examining a grid pane example .....	703
<b>CHAPTER 5:</b>	<b>Getting Input from the User</b> .....	<b>709</b>
	Using Text Fields .....	710
	Validating Numeric Data .....	717
	Using Check Boxes .....	719
	Using Radio Buttons .....	721
<b>CHAPTER 6:</b>	<b>Choosing from a List</b> .....	<b>725</b>
	Using Choice Boxes .....	725
	Creating a choice box .....	727
	Setting a default value .....	728
	Getting the selected item .....	729
	Working with Observable Lists .....	729
	Listening for Selection Changes .....	732
	Using Combo Boxes .....	734
	Creating combo boxes .....	735
	Getting the selected item .....	736
	Handling combo box events .....	737
	Using List Views .....	738
	Creating a list view .....	739
	Getting the selected items .....	740
	Using Tree Views .....	740
	Building a tree .....	742
	Creating a TreeView control .....	745
	Getting the selected node .....	746
	Looking at a complete program that uses a tree view .....	748
	<b>BOOK 7: WEB PROGRAMMING</b> .....	<b>751</b>
<b>CHAPTER 1:</b>	<b>Creating Servlets</b> .....	<b>753</b>
	Understanding Servlets .....	753
	Using Tomcat .....	755
	Installing Tomcat .....	755
	Testing Tomcat .....	756
	Creating a Simple Servlet .....	757
	Creating the folder structure for a servlet .....	758
	Creating the web.xml file .....	758
	Importing the servlet packages .....	760
	Extending the HttpServlet class .....	760

	Printing to a web page .....	761
	Responding with HTML .....	762
	Running a Servlet .....	764
	Improving the HelloWorld Servlet .....	765
	Getting Input from the User .....	767
	Working with forms .....	767
	Using the InputServlet servlet .....	768
	Using Classes in a Servlet .....	769
<b>CHAPTER 2:</b>	<b>Using JavaServer Pages .....</b>	<b>775</b>
	Understanding JavaServer Pages .....	776
	Using UEL Expressions .....	778
	Unified Expression Language .....	778
	JSP Standard Tag Library .....	780
	Looking at Core Tags .....	782
	Using c:out .....	783
	Working with variables .....	783
	Getting conditional .....	784
	Creating loops .....	785
	Formatting Numbers .....	786
	Considering the Controller Servlet .....	788
	Setting request attributes .....	788
	Redirecting to the JSP page .....	789
	The ListMovies Application Meets JSP .....	790
<b>CHAPTER 3:</b>	<b>Using JavaBeans .....</b>	<b>797</b>
	Getting to Know JavaBeans .....	797
	Looking Over a Sample Bean .....	799
	Using Beans with JSP Pages .....	801
	Creating bean instances .....	802
	Getting property values .....	803
	Setting property values .....	803
	Viewing a JSP page that uses a bean .....	804
	Scoping Your Beans .....	806
	A shopping cart application .....	807
	The shopping cart page .....	808
	The BookCart JavaBean .....	810

<b>CHAPTER 4: Using HttpClient</b> .....	815
Understanding HTTP.....	815
Diving into HTTP .....	817
Looking at a simple HTTP exchange.....	822
Getting Started with Java's HTTP Client Library.....	822
HttpClient .....	823
HttpRequest.....	824
HttpResponse.....	827
Using the send method .....	828
Putting It All Together.....	829
The HTTP Tester Program .....	831
 <b>INDEX</b> .....	 835