Table of Contents

Introduction 1

How to Use This Book 1
Conventions Used in This Book 2
What You Don't Have to Read 2
Foolish Assumptions 3
How This Book Is Organized 4
Part I: Getting Started with Java Programming for Android Developers 4
Part II: Writing Your Own Java Programs 5
Part III: Working with the Big Picture: Object-Oriented Programming 5
Part IV: Powering Android with Java Code 5
Part V: The Part of Tens 5
More on the web! 6
Icons Used in This Book 6
Beyond the Book 7
Where to Go from Here 7

Part 1: Getting Started with Java Programming for Android Developers 9

Chapter 1: All about Java and Android 11

The Consumer Perspective 12
The Many Faces of Android 13
The Developer Perspective 14
Java 14
XML 16
Linux 18
From Development to Execution with Java 18
What is a compiler? 19
What is a virtual machine? 22
Java, Android, and Horticulture 24

Chapter 2: Getting the Tools That You Need 25

The Stuff You Need 25
If You Don't Like Reading Instructions 27
Getting This Book's Sample Programs 30
Gathering Information 31

Are you running a 32-bit or 64-bit operating system? 31
If you're a Mac user, which version of Mac OS X do you have? 35
Is a recent version of Java installed on your computer? 36
Setting Up Java 37
Setting Up the Android SDK 38
Running Eclipse for the First Time 39
Dude, where's my Android SDK? 41
Eclipse, meet Java! 42
Importing this book's sample programs 46
Creating an Android Virtual Device 50

Chapter 3: Running Standard Java Programs 53

Running a Canned Java Program 53
Typing and Running Your Own Code 58
Separating your programs from mine 58
Writing and running your program 59
What's All That Stuff in the Eclipse Window? 68
Understanding the big picture 69
Views, editors, and other stuff 70
Looking inside a view or an editor 73
Returning to the big picture 74

Chapter 4: Creating an Android App 77

Creating Your First Android App 78
Creating an Android project 78
Running your project 83
What if 87
Testing Apps on a Real Device 92
Examining an Android App 94
The src directory 94
The res directory 95
The gen directory 100
The Android 4.2 branch 101
The AndroidManifest.xml file 103

Part II: Writing Your Own Java Programs 107

Chapter 5: An Ode to Code 109

Examining a Standard Oracle Java Program 110
The Java class 111
The names of classes 113
Why Java methods are like meals at a restaurant 115
What does Mom's Restaurant have to do with Java? 116

The main method in a standard Java program ... 120
Punctuating your code ... 121
Comments are your friends ... 123
What's Barry's excuse? ... 126
Another One-Line Method ... 126
More Java Methods ... 127
Using an import declaration ... 129
More method parameters ... 130
Fewer method parameters ... 132
Hello, Android ... 132
Where's the main method? ... 133
Extending a class ... 134
Overriding methods ... 135
An activity's workhorse methods ... 136

Chapter 6: Java's Building Blocks 137

Info Is as Info Does ... 138
Variable names ... 140
Type names ... 140
Assignments and initializations ... 141
Expressions and literals ... 143
How to string characters together ... 146
Java's primitive types ... 146
Things You Can Do with Types ... 148
Add letters to numbers (Huh?) ... 150
Java's exotic assignment operators ... 152
True bit ... 153
Java isn't like a game of horseshoes ... 154
Use Java's logical operators ... 156
Parenthetically speaking 162

Chapter 7: Though These Be Methods, Yet There Is Madness in't. . . 165

Practice Safe Typing ... 166
Widening is good; narrowing is bad ... 168
Incompatible types ... 169
Using a hammer to bang a peg into a hole ... 169
Calling a Method ... 170
Method parameters and Java types ... 173
Return types ... 175
The great void ... 176
Displaying numbers ... 176
Method overload without software bloat ... 177
Primitive Types and Pass-by Value ... 181
What's a developer to do? ... 185
A final word ... 187

Chapter 8: What Java Does (and When) 191

Making Decisions 191
Testing for equality 193
Java if statements 194
A detour concerning Android screen densities 195
Choosing among many alternatives 197
Some formalities concerning Java switch statements 203
Repeating Instructions Over and Over Again 204
Check, and then repeat 205
Some formalities concerning Java while statements 208
Repeat, and then check 211
Some formalities concerning Java do statements 212
Count, count, count 213
Some formalities concerning Java for statements 216
What's Next? 216

Part III: Working with the Big Picture: Object-Oriented Programming 217

Chapter 9: Why Object-Oriented Programming Is Like Selling Cheese 219

Classes and Objects 221
What is a class, really? 222
What is an object? 224
Creating objects 225
Reusing names 227
Calling a constructor 230
More About Classes and Objects (Adding Methods to the Mix) 231
Constructors with parameters 234
The default constructor 237
This is it! 237
Giving an object more responsibility 239
Members of a class 243
Reference types 243
Pass by reference 245
Java's Modifiers 248
Public classes and default-access classes 248
Access for fields and methods 250
Using getters and setters 254
What does static mean? 257
Knowing when to create a static member 259
What's Next? 263

Chapter 10: Saving Time and Money: Reusing Existing Code 265

The Last Word on Employees — Or Is It? 266
Extending a class 267
Overriding methods 270
Java annotations 276
More about Java's Modifiers 277
Keeping Things Simple 281
Using an interface 282
Creating a callback 286
How versatile is this interface? 293
Java's super keyword 295
What Does This Have to Do with Android? 296

Part IV: Powering Android with Java Code 301

Chapter 11: A Simple Android Example: Responding to a Button Click 303

The First Button-Click Example 303
Creating the Android app 304
Making a view available to your Java code 311
Casting, again 315
Introducing Inner Classes 316
No Publicity, Please! 317
Doing It the Easy Way 320
I warned you to skip the rest of this chapter 320
The "no-hassle" way to click a button 320

Chapter 12: Dealing with a Bunch of Things at a Time 325

Creating a Collection Class 326
Java generics 327
Java's wrapper classes 331
Stepping through a collection 333
A cautionary tale 335
Java's many collection classes 336
Arrays 337
Java's varargs 339
Using Collections in an Android App 342
The main activity's initial layout 343
The app's main activity 344
The app's List Activity 347
The app's AndroidManifest.xml file 349

Chapter 13: An Android Social Media App 351

The Twitter App's Files 352
The Twitter4J API jar file 352
The manifest file 354
The main activity's layout file 355
The twitter4j.properties file 358
Getting OAuth codes 359
The Application's Main Activity 361
The onCreate method 366
The button listener methods 367
The trouble with threads 367
Android's AsyncTask 370
My Twitter app's AsyncTask classes 372
Cutting to the chase, at last 374
Java's Exceptions 375
Catch clauses 377
A finally clause 378
Passing the buck 379

Chapter 14: Hungry Burds: A Simple Android Game 383

Introducing the Hungry Burds Game 384
The Project's Files 387
The Main Activity 389
The code, all the code, and nothing but the code 391
Random 394
Measuring the display 395
Constructing a Burd 397
Android animation 399
Shared preferences 400
It's Been Fun 402

Part V: The Part of Tens 403

Chapter 15: Ten Ways to Avoid Mistakes 405

Putting Capital Letters Where They Belong 405
Breaking Out of a switch Statement 406
Comparing Values with a Double Equal Sign 406
Adding Listeners to Handle Events 406
Defining the Required Constructors 407
Fixing Nonstatic References 408
Staying within Bounds in an Array 408
Anticipating Null Pointers 408
Using Permissions 409
The Activity Not Found 410

Chapter 16: Ten Websites for Developers 411

This Book's Websites 411
The Horse's Mouth 411
Finding News and Reviews 412
Everyone's Favorite Sites 412

Index 413