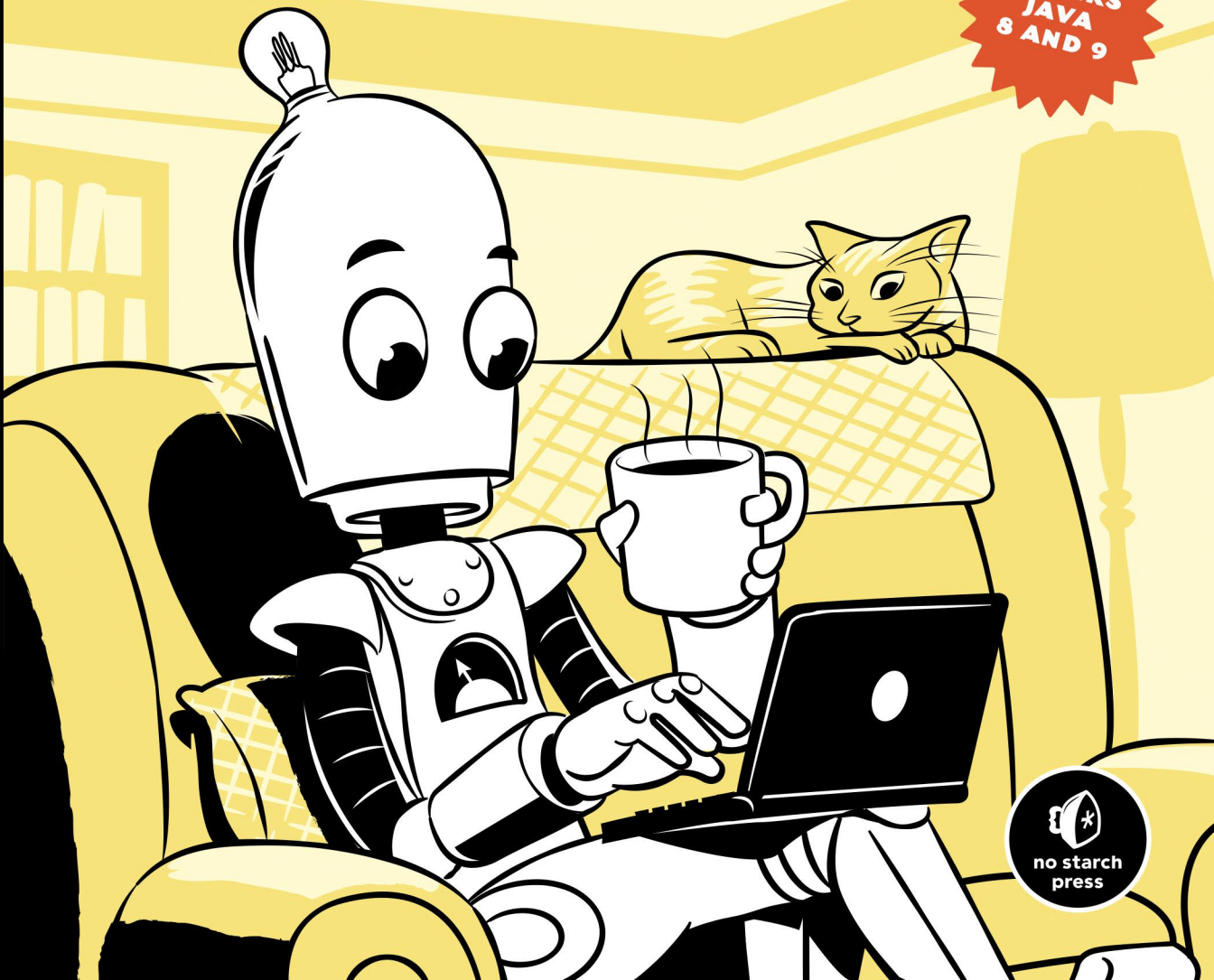


# LEARN JAVA THE EASY WAY

A HANDS-ON INTRODUCTION  
TO PROGRAMMING

BRYSON PAYNE

COVERS  
JAVA  
8 AND 9





# BRIEF CONTENTS

Acknowledgments . . . . .	xvii
Introduction . . . . .	xix
Chapter 1: Getting Started . . . . .	1
Chapter 2: Build a Hi-Lo Guessing Game App! . . . . .	19
Chapter 3: Creating a GUI for Our Guessing Game . . . . .	43
Chapter 4: Creating Your First Android App . . . . .	75
Chapter 5: Polishing Your App by Adding Menus and Preferences. . . . .	109
Chapter 6: Deciphering Secret Messages . . . . .	125
Chapter 7: Creating Advanced GUIs and Sharing Your App. . . . .	147
Chapter 8: Make Secret Messages a Phone App to Share with Friends! . . . . .	175
Chapter 9: Paint Colorful Bubbles with Your Mouse! . . . . .	197
Chapter 10: Adding Animation and Collision Detection with Timers. . . . .	221
Chapter 11: Making BubbleDraw a Multitouch Android App . . . . .	249
Appendix: Debugging and Avoiding Common Errors in Java . . . . .	273
Index . . . . .	279

# CONTENTS IN DETAIL

<b>ACKNOWLEDGMENTS</b>	<b>xvii</b>
------------------------	-------------

<b>INTRODUCTION</b>	<b>xix</b>
---------------------	------------

Why Should I Learn to Code? . . . . .	xx
Why Should I Learn Java? . . . . .	xx
What's in This Book . . . . .	xx
What Tools Do I Need? . . . . .	xxi
Online Resources . . . . .	xxi
Start Now! . . . . .	xxii

<b>1</b>	
<b>GETTING STARTED</b>	<b>1</b>

Java on Windows, macOS, and Linux . . . . .	1
Installing Java 8 and 9 for Developers . . . . .	2
Installing the Eclipse IDE for Java Developers . . . . .	3
Setting Up Eclipse . . . . .	4
Installing the WindowBuilder Editor . . . . .	6
Customizing Eclipse's Look and Feel . . . . .	7
Installing Android Studio for Mobile App Development . . . . .	8
Getting to Know Java with JShell . . . . .	9
Running JShell . . . . .	9
Working with Java Expressions in JShell . . . . .	12
Declaring Java Variables in JShell . . . . .	13
Printing Output in Java . . . . .	15
JShell Commands . . . . .	16
What You Learned . . . . .	17

<b>2</b>	
<b>BUILD A HI-LO GUESSING GAME APP!</b>	<b>19</b>

Planning the Game Step-by-Step . . . . .	20
Creating a New Java Project . . . . .	20
Creating the HiLo Class . . . . .	21
Generating a Random Number . . . . .	23
Getting User Input from the Keyboard . . . . .	25
Making the Program Print Output . . . . .	27
Loops: Ask, Check, Repeat . . . . .	28
if Statements: Testing for the Right Conditions . . . . .	30
Adding a Play Again Loop . . . . .	33
Testing the Game . . . . .	36
What You Learned . . . . .	38
<b>Programming Challenges</b> . . . . .	<b>39</b>
#1: Expanding Your Range . . . . .	40
#2: Counting Tries . . . . .	40
#3: Playing MadLibs . . . . .	41

### **3**

## **CREATING A GUI FOR OUR GUESSING GAME** **43**

Practicing with JShell . . . . .	44
Creating a GUI in Four Lines of Code . . . . .	44
Creating an Interactive GUI in 10 Lines of Code! . . . . .	45
Setting Up the GUI App in Eclipse . . . . .	48
GUI Design with Eclipse’s WindowBuilder Editor . . . . .	50
Designing the User Interface . . . . .	51
Setting GUI Properties in the Properties Pane . . . . .	51
Customizing GUI Components in the Palette Pane . . . . .	52
Aligning GUI Elements . . . . .	54
Naming GUI Components for Coding . . . . .	55
Connecting the GUI to Your Java Code . . . . .	56
Adding a Method to Check the Player’s Guess . . . . .	58
Getting Text from a JTextField . . . . .	59
Converting Strings to Numbers . . . . .	60
Starting a New Game . . . . .	61
Listening for User Events: Click to Guess! . . . . .	62
Setting Up the GUI Window . . . . .	64
Time to Play! . . . . .	66
Adding a Play Again Feature . . . . .	66
Improving the UX . . . . .	67
Allowing Users to Press Enter to Guess . . . . .	68
Automatically Removing Old Guesses . . . . .	68
Handling Bad User Input . . . . .	70
What You Learned . . . . .	73
<b>Programming Challenges . . . . .</b>	<b>73</b>
#1: Showing Users How Many Tries They Took . . . . .	73
#2: Showing and Hiding a Play Again Button . . . . .	73
#3: Creating a GUI MadLib . . . . .	74

### **4**

## **CREATING YOUR FIRST ANDROID APP** **75**

Starting a New Android Studio App Project . . . . .	76
Building the GUI Layout in Design View . . . . .	80
Naming GUI Components in Android Studio . . . . .	83
Connecting the GUI to Java in Android Studio . . . . .	85
Adding Methods to Check the Guess and Begin a New Game . . . . .	88
Handling Events in Android . . . . .	91
Running the App on the Android Emulator . . . . .	94
Running the App on a Real Android Device . . . . .	100
Preparing Your Device . . . . .	100
Connecting Your Device . . . . .	101
Running the App on Your Device . . . . .	101
Improving the UX . . . . .	102
Centering the User’s Guess in the Text Field . . . . .	103
Adding a Listener for the Enter Key . . . . .	103
Adding One More Finishing Touch . . . . .	104
What You Learned . . . . .	105

<b>Programming Challenges</b> .....	<b>105</b>
#1: “Toast”-ing to the Number of Tries .....	106
#2: Adding Visual Appeal .....	107
#3: Creating a MadLibs Mobile App .....	107

## **5 POLISHING YOUR APP BY ADDING MENUS AND PREFERENCES**

**109**

Adding an Options Menu in Android .....	109
Adding Items to the Menu’s XML File .....	110
Displaying the Options Menu .....	111
Responding to User Selections .....	112
Creating an Alert Dialog Pop-up for the About Screen .....	113
Changing the Guessing Range .....	114
Adding a Variable for the Range .....	115
Using the range Variable .....	115
Building the Dialog to Allow the User to Select the Range .....	116
Storing User Preferences and Game Stats .....	118
Storing and Retrieving the User’s Preferred Range .....	118
Storing the Number of Games Won .....	120
What You Learned .....	122
<b>Programming Challenges</b> .....	<b>122</b>
#1: You Win Some, You Lose Some .....	122
#2: Ratio of Wins to Losses .....	123

## **6 DECIPHERING SECRET MESSAGES**

**125**

The Caesar Cipher .....	125
Setting Up the Secret Messages App .....	126
Creating the Secret Messages Project in Eclipse .....	127
Beginning to Code SecretMessages.java .....	128
Messing with Strings .....	128
Characters and Values in Java .....	132
Encoding Just the Letters .....	133
Closing the Scanner .....	135
Adding a Custom Key Value .....	137
Encoding Digits .....	138
Running Command Line Apps Without Eclipse .....	141
Finding Your Workspace Folders .....	141
Opening a Command Line Window .....	142
What You Learned .....	144
<b>Programming Challenges</b> .....	<b>144</b>
#1: Looping the Loop .....	144
#2: Reversing and Encoding .....	145
#3: Safely Handling Keys with try and catch .....	145

## 7

### **CREATING ADVANCED GUIs AND SHARING YOUR APP 147**

Setting Up the Secret Messages GUI App Project . . . . .	148
Designing the GUI and Naming Components . . . . .	148
Coding the Secret Messages GUI App . . . . .	152
Creating the encode() Method . . . . .	152
Writing the Event Handler for the Encode/Decode Button . . . . .	154
Handling Bad Input and User Errors . . . . .	156
Building the main() Method and Running the App . . . . .	156
Improving the GUI . . . . .	159
Setting Line Wrap and Word Wrap . . . . .	161
Handling Bad Input and User Errors: Part 2 . . . . .	162
Adding a Slider to the Secret Messages GUI . . . . .	164
Code Cracking with the Slider . . . . .	166
Bonus: Sharing Your App as a Runnable JAR File . . . . .	169
What You Learned . . . . .	172
<b>Programming Challenges . . . . .</b>	<b>172</b>
#1: Movin' On Up! . . . . .	172
#2: Scrolling Away! . . . . .	173
#3: Changing the Text to Change the Slider . . . . .	174

## 8

### **MAKE SECRET MESSAGES A PHONE APP TO SHARE WITH FRIENDS! 175**

Setting Up the Mobile GUI . . . . .	176
Designing the Mobile GUI . . . . .	177
Wiring the GUI to the Java Code . . . . .	182
Connecting the Encode Button to the encode() Method . . . . .	182
Testing the App . . . . .	185
Working with the SeekBar . . . . .	187
Running the App on the Emulator and on an Android Device . . . . .	188
Bonus: Customizing the Floating Action Button . . . . .	190
Receiving Secret Messages from Other Apps . . . . .	193
What You Learned . . . . .	195
<b>Programming Challenges . . . . .</b>	<b>196</b>
#1: Creating a Move Up Button . . . . .	196
#2: Changing the SeekBar's Progress . . . . .	196

## 9

### **PAINT COLORFUL BUBBLES WITH YOUR MOUSE! 197**

Creating the BubbleDraw Project Files . . . . .	198
Building the BubbleDraw Frame . . . . .	199
Creating a Class for Bubbles . . . . .	200
Defining a Bubble . . . . .	200
Designing a Bubble's Methods . . . . .	202
Storing Bubbles in an ArrayList . . . . .	205
Adding a Constructor to the BubblePanel Class . . . . .	206
Adding a Method to Draw on the Screen . . . . .	207
Testing the BubblePanel Class . . . . .	208

Handling Mouse Events from the User . . . . .	210
Creating a Reusable Event Listener . . . . .	211
Handling Clicks and Drags . . . . .	212
Bonus: Handling MouseWheel Events . . . . .	215
What You Learned . . . . .	218
<b>Programming Challenges . . . . .</b>	<b>218</b>
#1: No Bubble Too Small . . . . .	218
#2: PixelDraw! . . . . .	219

## 10

### **ADDING ANIMATION AND COLLISION DETECTION WITH TIMERS**

**221**

Copying the BubbleDraw Java Project to Create BubbleDrawGUI . . . . .	222
Renaming the Main Class and Java File . . . . .	222
Adding Transparency . . . . .	224
Adding Animation: Bubbles Rising! . . . . .	225
Adding a Timer . . . . .	226
Setting the Timer . . . . .	226
Preparing the Animation . . . . .	227
Starting the Timer . . . . .	229
Forever Blowing Bubbles: Adding Random Speed and Direction . . . . .	229
Building a GUI for Our Animated Drawing App . . . . .	232
Setting Up the GUI Panel and Buttons . . . . .	232
Coding the Clear and Pause/Start Buttons . . . . .	234
Bouncing off the Walls with Collision Detection . . . . .	235
A Soft Bounce . . . . .	236
A Hard Bounce . . . . .	238
Adding a Slider to Control the Animation Speed . . . . .	240
Customizing the Slider . . . . .	241
Implementing the Slider Event Handler . . . . .	242
What You Learned . . . . .	243
<b>Programming Challenges . . . . .</b>	<b>244</b>
#1: No Bubble Left Behind . . . . .	244
#2: Flexi-Draw! . . . . .	244
#3: PixelDraw 2.0 . . . . .	245

## 11

### **MAKING BUBBLEDRAW A MULTITOUCH ANDROID APP**

**249**

Setting Up the BubbleDraw Project . . . . .	250
Creating the BubbleView Constructor . . . . .	252
Adding the Animation Variables . . . . .	252
Creating the BubbleView() Constructor . . . . .	254
Preparing the Layout to Use BubbleView . . . . .	254
Modifying the Bubble Class . . . . .	255
Drawing in Android with the onDraw() Method . . . . .	257
Testing BubbleDraw with 100 Bubbles . . . . .	258
Adding testBubbles() . . . . .	258
Fixing the onTouchListener Error . . . . .	259
Running the BubbleDraw App . . . . .	260



Using Threaded Animation and Multitasking in Java . . . . .	261
Using Touch to Draw with Your Finger . . . . .	264
Using Multitouch to Draw with 10 Fingers at a Time! . . . . .	266
Testing Multitouch Events on an Android Device . . . . .	266
Changing the App Launcher Icon . . . . .	268
Creating a Custom App Icon . . . . .	268
Adding the Custom Icon to Your App . . . . .	268
Displaying Your New Icon . . . . .	269
Changing the App Name . . . . .	270
What You Learned . . . . .	270
<b>Programming Challenges . . . . .</b>	<b>271</b>
#1: Combining One-Finger and Multitouch Events, v1.0 . . . . .	271
#2: Combining One-Finger and Multitouch Events, v2.0 . . . . .	271

**APPENDIX**  
**DEBUGGING AND AVOIDING COMMON ERRORS IN JAVA** **273**

Spelling and Case . . . . .	274
Correcting Typos in Eclipse . . . . .	274
Correcting Typos in Android Studio . . . . .	275
Avoiding Other Common Spelling Errors . . . . .	276
Comparison Trouble . . . . .	276
Grouping Symbols . . . . .	276
Quick Fixes in Eclipse . . . . .	277
Code Completion in Android Studio . . . . .	277
Summary . . . . .	278

**INDEX** **279**