

Contents

Foreword	ix
Acknowledgments	xiii
Introduction	xv
1. Hello Kotlin	1
Reasons to Love Kotlin	3
Why Should You Choose Kotlin?	6
Taking Kotlin for a Ride	7
Compile to Bytecode and Run	8
Compiling to Other Targets	13
Which Option to Choose?	14
Wrapping Up	14
Part I — Scripting with Kotlin	
2. Kotlin Essentials for the Java Eyes	19
Less Typing	20
Sensible Warnings	24
Prefer val over var	26
Improved Equality Check	28
String Templates	29
Raw Strings	30
More Expressions, Fewer Statements	33
Wrapping Up	35
3. Working with Functions	37
Creating Functions	38
Default and Named Arguments	43
vararg and Spread	46

Destructuring	49
Wrapping Up	51
4. External Iteration and Argument Matching	53
Range and Iteration	54
Iterating over Arrays and Lists	57
When It's Time to Use when	58
Wrapping Up	62
5. Using Collections	63
Flavors of Collections	63
Using Pair and Triple	66
Arrays of Objects and Primitives	68
Using List	70
Using Set	72
Using Map	73
Wrapping Up	75
6. Type Safety to Save the Day	77
Any and Nothing Classes	78
Nullable References	80
Type Checking and Casting	87
Explicit Type Casting	91
Generics: Variance and Constraints of Parametric Types	93
Reified Type Parameters	101
Wrapping Up	104
Part II — Object-Oriented Kotlin	
7. Objects and Classes	107
Objects and Singletons	107
Creating Classes	113
Companion Objects and Class Members	124
Creating Generics Classes	127
Data Classes	129
Wrapping Up	132
8. Class Hierarchies and Inheritance	133
Creating Interfaces and Abstract Classes	134
Nested and Inner Classes	138
Inheritance	140

Sealed Classes	144
Creating and Using Enums	145
Wrapping Up	148
9. Extension Through Delegation	149
When to Choose Delegation over Inheritance?	150
Designing with Delegates	151
Delegating to a Parameter	156
Dealing with Method Collisions	157
Caveats of Kotlin Delegation	160
Delegating Variables and Properties	162
Built-in Standard Delegates	166
Wrapping Up	170
Part III — Functional Kotlin	
10. Functional Programming with Lambdas	175
The Functional Style	176
Lambda Expressions	179
Lambdas and Anonymous Functions	186
Closures and Lexical Scoping	188
Non-Local and Labeled return	190
Inlining Functions with Lambdas	194
Wrapping Up	201
11. Internal Iteration and Lazy Evaluation	203
External vs. Internal Iterators	204
Internal Iterators	206
Sequences for Lazy Evaluation	213
Wrapping Up	218
Part IV — Elegant and Efficient Kotlin	
12. Fluency in Kotlin	221
Overloading Operators	222
Injecting Using Extension Functions and Properties	226
Extending Functions	234
Function Fluency with infix	235
Fluency with Any Object	236

Implicit Receivers	243
Wrapping Up	247
13. Creating Internal DSLs	249
Types and Characteristics of DSLs	250
Kotlin for Internal DSLs	251
Challenges in Building for Fluency	254
Type-Safe Builders	260
Narrowing Access with Scope Control	265
Wrapping Up	268
14. Programming Recursion and Memoization	269
The Power and Perils of Recursion	269
Tail Call Optimization	271
Memoization	274
Applying Memoization to Dynamic Programming	279
Wrapping Up	281
Part V — Programming Asynchronous Applications	
15. Exploring Coroutines	285
Coroutines and Concurrency	285
Running Concurrently Using Coroutines	287
Coroutine Context and Threads	293
Debugging Coroutines	298
async and await	300
A Peek at Continuations	301
Creating Infinite Sequences	303
Wrapping Up	307
16. Asynchronous Programming	309
Programming Asynchronously	309
Exception Handling	314
Cancellations and Timeouts	318
Wrapping Up	326
Part VI — Interop and Testing	
17. Intermixing Java and Kotlin	329
Joint Compilation	330
Calling Java from Kotlin	333

Calling Kotlin from Java	336
Wrapping Up	346
18. Unit Testing with Kotlin	347
The Code Under Test	348
Getting the Project Files	349
Starting with a Canary Test	352
Writing Empirical Tests	353
Writing Data-Driven Tests	356
Mocking Out Dependencies	357
Testing Top-Level Functions	363
Testing Coroutines and Asynchronous Calls	366
Integrating with the Service	370
Viewing the Code Coverage	371
Taking the App for a Drive	372
Wrapping Up	373
19. Programming Spring Applications with Kotlin	375
Creating a Starter Project	376
Creating a Controller	378
Creating an Entity Class	380
Creating a Repository Interface	381
Creating a Service	381
Integrating the Service with Controller	383
Taking It for a Ride	385
Wrapping Up	386
20. Writing Android Applications with Kotlin	387
Creating a Project	388
Defining Domain Objects	390
Creating Layouts	391
Implementing the Activity	395
Updating the RecyclerView	399
Seeing the App in Action	401
Wrapping Up	402
A1. Transpiling to JavaScript	405
A2. Kotlin/Native	409
A3. Kotlin to WebAssembly	413
Bibliography	417
Index	419