

Contents

Acknowledgments	ix
Introduction	xxi
Chapter 1: Introduction to TiVo Applications	1
The TiVo Platform	1
Brief History of Software Development for TiVo	2
Home Media Option and TiVo Desktop	3
TiVo Desktop as a Server	4
HMO Protocol	6
HMO Applications	7
TiVo Server-Hosted Applications	7
Desktop Applications	7
Home Media Engine	8
Software Development Kit	10
How HME Interacts with TiVo	11
What HME Is and Isn't	11
Summary	12
Questions	12
Chapter 2: Getting the TiVo Box Ready for HME	13
TiVo Requirements for HME	13
Supported TiVo Boxes	13
Series1 Standalone	14
Series2 Standalone	15
DirectTV Integrated TiVo (DirectTiVo)	15
Series3	16
Active TiVo Service Subscription	17
Checking the Version of TiVo Software	17
Forcing a Connection to the TiVo Service	18

Contents

The Household Network	19
Wired vs. Wireless	20
Network Adapters	20
Wired Adapters	20
Wireless Adapters	21
Adding TiVo Boxes to a Household Network	21
Setting up Wired Access	21
Setting up Wireless Access	22
TCP/IP Settings	22
Music, Photos, & More	23
Summary	24
Questions	25
Chapter 3: Your Development Environment	27
Required Software	27
Java SDK	28
Windows	28
Mac OS X	29
Linux and Unix	29
Text Editor	30
Getting the TiVo HME SDK	30
Exploring the SDK	30
Classpath	31
Recommended Software	32
Ant	32
Log4j	33
JDIC	33
JUnit	33
Subversion	33
Setting up Eclipse	33
Installation	34
Running Eclipse	34
Starting a New Project	35
Running the Sample Applications	39
Starting the Applications	40
Using the Sample Applications in Eclipse	41

The HME Simulator	44
Limitations of the Simulator	46
Summary	46
Questions	46
Chapter 4: Your First TiVo HME Application	47
<hr/>	
Hello World	47
Creating Hello World	47
Running the Example in the Simulator	50
Simulator in Discovery Mode	50
Simulator in Direct Mode	52
Starting Hello World on the TiVo Box	53
Handling Events	56
Application Lifecycle	57
Startup	57
Running Events	57
Errors	58
Shutdown	58
Summary	58
Questions	59
Chapter 5: Displaying Resources	61
<hr/>	
Understanding Views	61
Introduction to Views	61
View Hierarchy	61
Drawing Order and Hiding Views	63
Properties of Views	64
Translation	64
Scaling	65
Visibility, Transparency, and Focus	66
Extending Views	67
Code Example	69
Text	72
Creating Text Resources	72

Contents

Image Resources	80
Supported Graphic Formats	80
Creating Image Resources	80
Size, Scaling, and Alignment	87
Updating the Weather Application with Graphics	89
Sounds	92
Creating Sound Resources	92
Built-in Sounds	93
Summary	93
Questions	94
Chapter 6: Events	95
<hr/>	
Types of Events	95
Device Info	96
Init Info	97
Application Info	97
Idle Info	97
Key Event	98
Font Info	98
Event Flow	98
Key Events	98
Optional Keys	100
Events Example	101
Sending Custom Events	105
Ticker Events	106
Focus Events	112
Application Event Handling	114
Summary	115
Questions	116
Chapter 7: Going Bananas	117
<hr/>	
How to Include Bananas in Your Application	117
Reasons to Use Bananas	119
Bananas Sample Application	119
BApplication	122
Other Features of BApplication	124

BScreen	125
New Methods in BScreen	126
Pushing and Popping BScreens	127
Transitions	129
Creating Custom Transitions	130
BView	134
BList	136
Using BLists	138
Styling the List	138
Managing the List	139
BList Example	139
BList Methods	142
Focus	144
BText	146
BButton	147
Using BButtons	147
BKeyboard	149
Using the Keyboard Widget	151
BSkin	154
BDirSkin	155
BZipSkin	155
BResSkin	155
Example	155
Summary	157
Questions	158
Chapter 8: Using Bananas Events	159
Event Model	159
New Events in Bananas	161
Using Actions	164
Custom Actions	164
Custom Widgets	166
Weather Application Example	170
Summary	178
Questions	178

Contents

Chapter 9: Advanced Resources **179**

Streaming Resources	179
Streaming Graphics	179
Streaming Audio	180
MPEG Video Backgrounds	181
Creating MPEG Video Backgrounds	182
Using TiVo's MKLOOP FFMPEG Wrapper	182
Using a Web-Based MKLOOP FFMPEG Wrapper	183
Setting MPEG Video Backgrounds	183
MPEG Video Background Caveats	184
Simulator	184
Not Pixel Perfect	187
Root View Method Behavior	190
System Reboots	191
Resource Management	191
Caching and Removing Resources	191
Debugging the Resource Tree	192
Resource Limitations	193
Pixel Buffer and Rendering Engine	194
Best Practices for Predictable Rendering	195
Debugging Software Rendering	196
CPU Resource Concerns	197
Network Resource Constraints	198
Summary	198
Questions	199

Chapter 10: Advanced HME Application Lifecycle **201**

HME SDK Architecture Impact	201
Overriding the Factory	202
Accessing Files and Resources	205
Changing the Application Name	206
Handling Arguments	207
Common Actions	208
Using Factory for Shared Data	208
Singletons	210

Threads	211
Using Threads	212
Java 4 Threads	212
Java 5 Executor	212
Stopping Threads Correctly on Application Exit	214
Keeping Shared Threads Running between Applications	215
Calling Other Applications	215
Transitioning to Another Application	215
Running the Example	217
Transitioning Back to the Original Application	220
Summary	220
Questions	220
Chapter 11: Application Preferences	223
<hr/>	
Per-TiVo Preferences	223
Using Per-TiVo Preferences	223
How the Data Is Stored	225
Per-Application Preferences	227
Using Persistent Data	227
Using the Java Preference System	228
Details of Java Preference API	228
Converting BWeatherApp to use Java Preferences	229
Why Use the Preferences API?	230
Other Methods of Saving Preference Data	230
Summary	231
Questions	231
Chapter 12: Animation	233
<hr/>	
Animation Resources	233
What Can Be Animated	234
Moving Views	235
Animating Transparency	236
Graphics Scaling	237
Visibility	237
Animating Events	238

Contents

Chaining Animations	238
Putting It All Together	240
Summary	242
Questions	242
Chapter 13: Connecting to External Resources	243
Data from the Web	243
Setting the Resource as a URL	243
Retrieving the Resource and Saving It Locally	244
SOAP, RSS, & XML	246
SOAP	246
RSS	247
XML Data	248
JDBC	248
Other Options	251
Summary	251
Questions	251
Chapter 14: Deploying an HME Application	253
Jar from Command Line	253
Creating a Web Start Application	255
Using Web Start with HME	256
OS X Native App	258
Creating an Application Icon	258
Bundler	258
Preparing Your Resources	259
Creating a Jar Bundle	259
Final Touches	261
Packaging	263
Creating the Disk Image	263
Stylizing the Disk Image	264
Compressing and Locking Down the Disk Image	267
Launching a Disk Image Automatically Upon Download	267
Displaying a Software License Agreement	268

Windows Native App	268
Creating an Application Icon	268
Bundler	269
Installer	269
Packaging	270
Selling Your Application	270
Summary	270
Questions	270
Chapter 15: Tips and Troubleshooting	271
<hr/>	
Logging	272
Common Problems	274
Additional Resources	275
Summary	275
Appendix A: Exercise Answers	277
<hr/>	
Index	283

