

# Contents

<b>Introduction</b>	<b>ix</b>
<b>Chapter 1: Introduction to Eclipse</b>	<b>1</b>
<b>Installing Eclipse</b>	<b>1</b>
<b>The First Application: Hello World</b>	<b>5</b>
Perspectives	5
Projects	7
Create a New Class	7
Launch	9
<b>The Most Important Preferences for Java Development</b>	<b>10</b>
Workbench Preferences	11
Installed JREs	12
Compiler Preferences	14
Formatting Code	15
Templates	16
<b>Tasks and Problems</b>	<b>18</b>
Problems, Problems	19
General Tasks	21
Bookmarks	22
<b>The Scrapbook</b>	<b>22</b>
<b>Summary</b>	<b>24</b>
<b>Chapter 2: Effective Programming with Eclipse</b>	<b>25</b>
<b>Little Helpers</b>	<b>25</b>
System Information	25
Help and Hover	26
Java Information Views	27
Automatic Code Completion	28
The Correction Assistant	33
Convenience Functions of the Java Editor	35
<b>Source Code Navigation</b>	<b>36</b>
<b>Refactoring Code</b>	<b>38</b>
Modifying Types	38
Refactoring Code	39
<b>Undo and Redo</b>	<b>42</b>

# Contents

---

<b>Local History</b>	<b>43</b>
Comparing Resources	43
Replacing with an Older Version	43
Restore Deleted Resource	43
<b>Summary</b>	<b>44</b>
<b>Chapter 3: The Art of (Visual) Composition</b>	<b>45</b>
<b>Installation</b>	<b>45</b>
<b>Invocation</b>	<b>46</b>
<b>Preferences</b>	<b>46</b>
<b>Composition</b>	<b>46</b>
<b>Beans and Bean Properties</b>	<b>48</b>
Generic Beans	48
Properties	48
<b>Layouts</b>	<b>49</b>
<b>Event Processing</b>	<b>49</b>
<b>Summary</b>	<b>50</b>
<b>Chapter 4: Organizing Your Code</b>	<b>51</b>
<b>The Workbench</b>	<b>51</b>
<b>Resources</b>	<b>52</b>
Resource Types	52
Where Resources Are Stored	52
Synchronizing Resources	53
Navigation	53
<b>Associations</b>	<b>54</b>
<b>Packages</b>	<b>55</b>
Folders and Packages	55
Navigation	56
Hierarchy	56
<b>The Outline View</b>	<b>57</b>
Representation	58
Context Functions	59
<b>Searching</b>	<b>60</b>
The Search Function	60
Find and Replace	62
Marking Name Occurrences	63
<b>Arranging Editors and Views</b>	<b>63</b>
Docked Windows	63
Stacked Windows	64
Desktop Windows	64
FastView	64

---

Opening and Closing Windows	65
Maximizing Windows	65
Minimizing Views	65
<b>Managing Perspectives</b>	<b>65</b>
Defining New Perspectives	65
Configuring Perspectives	66
<b>Importing Files</b>	<b>67</b>
<b>Project Properties</b>	<b>69</b>
<b>The Java Browsing Perspective</b>	<b>71</b>
<b>Summary</b>	<b>72</b>
<b>Chapter 5: Project One: Duke Speaks</b>	<b>73</b>
<hr/>	
<b>Setting Up the Project</b>	<b>73</b>
<b>A Short Excursion into Speech Synthesis</b>	<b>74</b>
<b>Extending the FreeTTS System</b>	<b>75</b>
Animation Events	75
The Animator	77
Embedding into FreeTTS	81
Connection with the Java Audio System	83
<b>The User Interface</b>	<b>84</b>
The Animated Face	85
The Control Panel	87
The Model	87
The Presentation	91
The Complete Application	106
Exporting the application	109
<b>Bibliography</b>	<b>110</b>
<b>Summary</b>	<b>110</b>
<b>Chapter 6: Project Development</b>	<b>113</b>
<hr/>	
<b>Debugging</b>	<b>113</b>
The Debug Configuration	113
The Debug Perspective	114
Controlling Program Execution	115
Managing Breakpoints	117
The Java Console	118
Remote Debugging	119
<b>JUnit</b>	<b>120</b>
Setting Up JUnit	120
Creating a Test Suite	122
Running a Test Suite	124

# Contents

---

<b>Documentation</b>	<b>125</b>
Try It Out: Javadoc Options	126
Try It Out: Command-Line Options	126
<b>Summary</b>	<b>128</b>
<b>Chapter 7: Advanced Topics of Project Development</b>	<b>129</b>
<hr/>	
<b>Developing in a Team</b>	<b>129</b>
Setting Up a Repository	130
Projects in the Repository	132
Version Management	133
Working in a Team	133
Other Functions	135
<b>External Tools</b>	<b>135</b>
Refresh	135
Environment	135
Associations	135
<b>Summary</b>	<b>136</b>
<b>Chapter 8: The SWT Library</b>	<b>137</b>
<hr/>	
<b>SWT Function Group Overview</b>	<b>138</b>
<b>SWT—Pros and Cons</b>	<b>139</b>
Advantages of SWT	140
Disadvantages of SWT	140
<b>The SWT Package</b>	<b>141</b>
<b>Events</b>	<b>141</b>
Listeners	141
Adapters	142
Events	142
Overview of Listeners, Adapters, and Events	143
<b>Widgets</b>	<b>145</b>
The Widget Class	146
The Control Class	146
Visual Overview	146
Displays, Shells, and Monitors	146
Dialogs	152
Composites, Groups, and Canvas	155
Buttons	156
Sliders and Scales	158
ProgressBar	159
Scrollable and ScrollBar	159

---

Text Fields and Labels	159
Tables, Lists, and Combos	161
Trees	166
Sashes	167
Tabbed Folders	168
Toolbars	169
Moveable Tool Groups (CoolBar)	170
Menus	170
Custom Widgets	174
The Browser Widget	177
<b>Layouts</b>	<b>177</b>
Visual Overview	178
The FillLayout Class	178
The RowLayout Class	179
The GridLayout Class	180
The FormLayout Class	182
The StackLayout class	184
<b>Graphics</b>	<b>185</b>
The Graphics Context	185
Colors	186
Fonts	187
Images	189
The Cursor	190
<b>Widgets That Swing</b>	<b>191</b>
Embedded Contents	192
Events	192
<b>Output to a Printer</b>	<b>196</b>
<b>Data Transfer</b>	<b>198</b>
The Clipboard	198
Drag and Drop	199
<b>Resource Management</b>	<b>200</b>
<b>Windows32 Support (OLE)</b>	<b>201</b>
<b>SWT on the Pocket PC</b>	<b>202</b>
<b>Accessibility</b>	<b>202</b>
<b>Summary</b>	<b>203</b>
<b>Chapter 9: JFace</b>	<b>205</b>
<b>Resource Management</b>	<b>205</b>
The FontRegistry Class	205
The ImageRegistry Class	206
The JFaceColors Class	206
The JFaceResources Class	206

# Contents

---

<b>Dialogs and Windows</b>	<b>206</b>
Some Dialog Subclasses	207
Implementing Your Own Dialog Classes	210
Making Dialogs Persistent	213
<b>Viewers</b>	<b>214</b>
The Viewer Event Model	215
The Viewer Hierarchy	215
Cell Editors	217
Data Transfer	218
<b>Text Processing</b>	<b>218</b>
Text Processing Base Classes	218
The ProjectionViewer	226
Comfortable Text Fields and Combos	226
<b>Actions and Menus</b>	<b>226</b>
The IAction Interface	226
The Managers	227
<b>Wizards</b>	<b>228</b>
The Wizard Class	228
The WizardPage Class	229
The WizardSelectionPage Class	230
The WizardDialog Class	230
<b>Preferences</b>	<b>230</b>
The PreferenceStore and PreferenceConverter Classes	231
The PreferencePage Class	232
Field Editors	232
Preference Page Trees	233
<b>Summary</b>	<b>235</b>
<b>Chapter 10: Project Two: Jukebox</b>	<b>237</b>
<hr/>	
<b>Design Goals and How to Achieve Them</b>	<b>237</b>
<b>Installing the Project</b>	<b>238</b>
<b>The Player Module</b>	<b>241</b>
Layout	241
Threads	242
The Player.java Class	243
BasicPlayerListener	260
<b>The Playlist Domain Model</b>	<b>261</b>
The Interface	261
Implementing IPlaylist	268
Accessing Features	270
Managing Entries	271

---

Content Provider	273
Playlist Switch	273
Selections	274
<b>The Description Window</b>	<b>275</b>
The DescriptionWindow Class	276
<b>The Playlist Viewer</b>	<b>278</b>
The PlaylistWindow Class	278
The PlaylistViewer Class	281
Nested Grid Layout	289
Toolbar	290
File-Selection Dialogs	292
Menu	293
<b>The PlaylistLabelProvider Class</b>	<b>295</b>
Returning a Warning Icon	296
Cell Text	297
<b>The FileCellEditor Class</b>	<b>299</b>
<b>The Description Editor</b>	<b>300</b>
The DescriptionCellEditor Class	300
<b>The DescriptionEditorDialog Class</b>	<b>302</b>
Code Scanner	303
Content Assistant	304
SourceViewer Configuration	307
SourceViewer	308
<b>Deploying the Jukebox</b>	<b>311</b>
<b>Summary</b>	<b>311</b>
<b>Chapter 11: Developing Plug-ins for the Eclipse Platform</b>	<b>313</b>
<hr/>	
<b>The Architecture of the Eclipse Platform</b>	<b>314</b>
Extension Points	314
OSGi	314
A Minimal Platform	315
Rich Client Platform vs. IDE	315
Resource Management	315
User Interface	316
Help System	316
Team Support	316
Other Plug-in Groups	317
Architecture Summary	317
<b>The Core Classes of the Eclipse Platform</b>	<b>318</b>
The Platform Class	318
The Plugin Class	318

# Contents

---

The Preferences Class	319
Path Specifications	319
Monitoring Long-Running Processes	320
<b>The Eclipse Workspace</b>	<b>320</b>
Resources	320
Markers	324
Reacting to Resource Changes	325
Managing Long-Running Processes	326
<b>Configuring Plug-ins</b>	<b>327</b>
The Plug-in Development Perspective	327
The Plug-in Manifest	329
The Most Important SDK Extension Points	332
The Schema Editor	341
<b>Components of the Eclipse User Interface</b>	<b>344</b>
Forms	344
The Eclipse Workbench	350
The Architecture of the Eclipse Workbench	351
Event Processing in the Eclipse Workbench	352
Editors	355
Views	362
Actions	367
Dialogs	372
Workbench Wizards	374
Preferences and Property Pages	377
Defining Perspectives	377
The Help System	379
Cheat Sheets	383
<b>Summary</b>	<b>385</b>
<b>Chapter 12: Developing Your Own Eclipse-Based Products</b>	<b>387</b>
<hr/>	
<b>Embedded Ant</b>	<b>388</b>
Configuration	388
Editing Ant Scripts	389
<b>Plug-ins and Fragments</b>	<b>390</b>
<b>Features</b>	<b>391</b>
Creating and Editing Features	391
<b>Deployment</b>	<b>393</b>
Deploying a Feature	393
Deploying Complete Products	394
Customizing Products	394
Populating the Workspace	396
Creating Update Sites	398

<b>Installing from an Update Site</b>	<b>399</b>
Adding an Update Site	400
Installing Features	400
Updating Features	400
Managing the Configuration	400
Install Handlers	401
<b>Internationalizing Products</b>	<b>401</b>
Text Constants in Programs	402
Text Constants in Manifest Files	403
Help Texts and Cheat Sheets	404
Deploying National Language Resource Bundles	405
<b>Patches</b>	<b>405</b>
<b>Summary</b>	<b>405</b>
<b>Chapter 13: Project Three: A Spell Checker as an Eclipse Plug-in</b>	<b>407</b>
<b>The Spell Checker Core Classes</b>	<b>408</b>
The Engine	408
Overview	409
<b>Setting Up the Project</b>	<b>410</b>
<b>The Plug-in Configuration</b>	<b>412</b>
The Manifest plugin.xml	413
The Schema documentTokenizer.exsd	417
Imported Files	419
<b>The Plugin Class</b>	<b>419</b>
Dictionary URL	421
Initializing Preferences	422
The Manager	423
<b>The Check Spelling Action</b>	<b>424</b>
The SpellCheckingTarget Class	425
Factory Method	426
Selections	427
Document Management	428
Text Replacement	429
Disposal	430
The CheckSpellingActionDelegate Class	431
<b>The Correction Window</b>	<b>439</b>
The SpellCorrectionView Class	439
View Actions	449
Managing Images	450
<b>Coordinating Core Classes with GUI Classes</b>	<b>452</b>
The Manager	453
Selecting the Plug-in	454

# Contents

---

Running the Engine	457
Managing Engines	458
Creating Engines	459
Processing Bad Words	462
Operations	462
<b>Analyzing Documents</b>	<b>463</b>
<b>Configuring the Spell Checker</b>	<b>463</b>
Preferences	463
Domain Model	464
The GUI	466
Reading from the PreferenceStore	471
<b>The Help System</b>	<b>473</b>
The Help Table of Contents	473
Context-Sensitive Help	473
Active Help	474
Running the Help Action	476
<b>A Plug-in for Java Properties</b>	<b>477</b>
Setting Up the Project	477
The Manifest	478
Tokenizer Extension	478
Manifest	479
The Plugin Class	480
The Preferences	481
The Preference Page	482
The Java-Properties Tokenizer	483
The Help System	483
<b>Internationalizing the Spell Checker</b>	<b>484</b>
Text Constants in Java Code	484
Text Constants in Manifest Files	487
Creating a Language Fragment	487
<b>Deploying the Spell Checker</b>	<b>490</b>
Defining the Spell Checker Feature	490
Configuring Ant Scripts	492
Defining the Language Feature	495
Defining the Update Site	497
Installation	498
<b>Summary</b>	<b>499</b>

---

<b>Chapter 14: The Rich Client Platform</b>	<b>501</b>
<b>Definition and Motivation</b>	<b>501</b>
<b>Plug-ins and the RCP</b>	<b>502</b>
<b>Creating an Application</b>	<b>503</b>
The IPlatformRunnable Interface	503
The WorkbenchAdvisor Class	503
<b>Testing a Rich Client Application</b>	<b>507</b>
<b>Deploying a Rich Client Application</b>	<b>507</b>
<b>Advanced Product Customization</b>	<b>508</b>
<b>The Global Welcome Screen</b>	<b>508</b>
<b>Summary</b>	<b>509</b>
<b>Chapter 15: Project 4: The Hex Game as a Rich Client Application</b>	<b>511</b>
<b>Overview</b>	<b>511</b>
<b>Setting Up the Project</b>	<b>512</b>
<b>The Manifest plugin.xml</b>	<b>512</b>
Required Eclipse Plug-ins	514
Declaring the Application	514
Defining a Perspective	515
Defining a View	515
Product Customization	515
Linking the Welcome Screen	515
Adding Help	516
The Completed Manifest	516
<b>The RcpApplication Class</b>	<b>517</b>
<b>The RcpWorkbenchAdvisor Class</b>	<b>518</b>
<b>The RcpPerspective Class</b>	<b>519</b>
<b>The IGame and IStatusListener Interfaces</b>	<b>520</b>
The IStatusListener Interface	520
The IGame Interface	520
<b>The HexView Class</b>	<b>521</b>
<b>The Game Engine</b>	<b>527</b>
<b>The Welcome Screen</b>	<b>531</b>
<b>Test</b>	<b>534</b>
<b>Deployment</b>	<b>534</b>
<b>Summary</b>	<b>535</b>

# Contents

---

<b>Chapter 16: Conclusions and Outlook</b>	<b>537</b>
<b>Programming Style</b>	<b>537</b>
Executable Prototypes	538
Automated Tests	538
Refinements	538
Embrace Change	540
Save Energy	541
<b>Java 1.5</b>	<b>541</b>
<b>Summary</b>	<b>542</b>
<b>Appendix A: Useful Plug-ins for Eclipse</b>	<b>545</b>
<b>Appendix B: Migrating Projects to a New Eclipse Version</b>	<b>551</b>
<b>Projects</b>	<b>551</b>
<b>Plug-ins</b>	<b>552</b>
<b>Migration to Eclipse 3</b>	<b>552</b>
<b>Appendix C: Important Downloads</b>	<b>555</b>
<b>Project One: Duke Speaks</b>	<b>555</b>
<b>Project Two: Jukebox</b>	<b>555</b>
<b>Project Three: A Spell Checker as an Eclipse Plug-In</b>	<b>555</b>
<b>Book Web Site</b>	<b>556</b>
<b>Appendix D: Bibliography</b>	<b>557</b>
<b>Index</b>	<b>559</b>