Contents

Series Editor's Note xi

Foreword xiii

Preface xv

Acknowledgments xvii

A Brief History of Qt xix

Part I: Basic Qt

1. Getting Started 3

Hello Qt 3

Making Connections 5

Laying Out Widgets 6

Using the Reference Documentation 10

2. Creating Dialogs 13

Subclassing QDialog 13

Signals and Slots in Depth 20

Rapid Dialog Design 23

Shape-Changing Dialogs 31

Dynamic Dialogs 38

Built-in Widget and Dialog Classes 39

3. Creating Main Windows 45

Subclassing QMainWindow 46

Creating Menus and Toolbars 50

Setting Up the Status Bar 55

Implementing the File Menu 57

Using Dialogs 63

Storing Settings 69

Multiple Documents 71

Splash Screens 74

4. Implementing Application Functionality 77

The Central Widget 77

Subclassing QTableWidget 78

Loading and Saving 84

Implementing the Edit Menu 87

Implementing the Other Menus 91

Subclassing QTableWidgetItem 95

5. Creating Custom Widgets 105

Customizing Qt Widgets 105

Subclassing QWidget 107

Integrating Custom Widgets with Qt Designer 117

Double Buffering 121

Part II: Intermediate Qt

6. Layout Management 141

Laying Out Widgets on a Form 141

Stacked Layouts 147

Splitters 149

Scrolling Areas 152

Dock Windows and Toolbars 154

Multiple Document Interface 157

7. Event Processing 167

Reimplementing Event Handlers 167

Installing Event Filters 172

Staying Responsive during Intensive Processing 175

8. 2D Graphics 179

Painting with QPainter 180

Coordinate System Transformations 185

High-Quality Rendering with QImage 193

Item-Based Rendering with Graphics View 195

Printing 217

9. Drag and Drop 227

Enabling Drag and Drop 227

Supporting Custom Drag Types 232

Clipboard Handling 237

10. Item View Classes 239
Using the Item View Convenience Classes 240
Using Predefined Models 247
Implementing Custom Models 252
Implementing Custom Delegates 266

11. Container Classes 273
Sequential Containers 274
Associative Containers 282
Generic Algorithms 285
Strings, Byte Arrays, and Variants 287

12. Input/Output 295
Reading and Writing Binary Data 296
Reading and Writing Text 301
Traversing Directories 307
Embedding Resources 308
Inter-Process Communication 309

13. Databases 315
Connecting and Querying 316
Viewing Tables 322
Editing Records Using Forms 324
Presenting Data in Tabular Forms 330

14. Multithreading 339
Creating Threads 340
Synchronizing Threads 343
Communicating with the Main Thread 349
Using Qt's Classes in Secondary Threads 356

15. Networking 359
Writing FTP Clients 359
Writing HTTP Clients 368
Writing TCP Client–Server Applications 371
Sending and Receiving UDP Datagrams 381

16. XML 387
Reading XML with QXmlStreamReader 388
Reading XML with DOM 395

Reading XML with SAX 400
Writing XML 404

17. **Providing Online Help** 407
Tooltips, Status Tips, and "What's This?" Help 407
Using a Web Browser to Provide Online Help 409
Using QTextBrowser as a Simple Help Engine 411
Using Qt Assistant for Powerful Online Help 414

Part III: Advanced Qt

18. **Internationalization** 419
Working with Unicode 420
Making Applications Translation-Aware 423
Dynamic Language Switching 429
Translating Applications 435

19. **Look and Feel Customization** 439
Using Qt Style Sheets 439
Subclassing QStyle 454

20. **3D Graphics** 471
Drawing Using OpenGL 471
Combining OpenGL and QPainter 477
Doing Overlays Using Framebuffer Objects 484

21. **Creating Plugins** 491
Extending Qt with Plugins 492
Making Applications Plugin-Aware 502
Writing Application Plugins 505

22. **Application Scripting** 509
Overview of the ECMAScript Language 510
Extending Qt Applications with Scripts 519
Implementing GUI Extensions Using Scripts 523
Automating Tasks through Scripting 530

23. **Platform-Specific Features** 543
Interfacing with Native APIs 543
Using ActiveX on Windows 547
Handling X11 Session Management 559

24. Embedded Programming 567

Getting Started with Qt/Embedded Linux 568

Customizing Qt/Embedded Linux 570

Integrating Qt Applications with Qtopia 571

Using Qtopia APIs 576

Appendixes

A. Obtaining and Installing Qt 589

B. Building Qt Applications 593

C. Introduction to Qt Jambi 605

D. Introduction to C++ for Java and C# Programmers 623

Index 665