

Creating Mobile Games

Using Java™ ME Platform to Put
the Fun into Your Mobile Device
and Cell Phone



Carol Hamer

Creating Mobile Games: Using Java™ ME Platform to Put the Fun into Your Mobile Device and Cell Phone

Copyright © 2007 by Carol Hamer

All rights reserved. No part of this work may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or by any information storage or retrieval system, without the prior written permission of the copyright owner and the publisher.

ISBN-13 (pbk): 978-1-59059-880-1

ISBN-10 (pbk): 1-59059-880-6

Printed and bound in the United States of America 9 8 7 6 5 4 3 2 1

Trademarked names may appear in this book. Rather than use a trademark symbol with every occurrence of a trademarked name, we use the names only in an editorial fashion and to the benefit of the trademark owner, with no intention of infringement of the trademark.

Java™ and all Java-based marks are trademarks or registered trademarks of Sun Microsystems, Inc., in the US and other countries. Apress, Inc., is not affiliated with Sun Microsystems, Inc., and this book was written without endorsement from Sun Microsystems, Inc.

Lead Editors: Steve Anglin, Jeff Pepper

Technical Reviewer: Alain Le Guirec

Editorial Board: Steve Anglin, Ewan Buckingham, Gary Cornell, Jonathan Gennick, Jason Gilmore, Jonathan Hassell, Chris Mills, Matthew Moodie, Jeffrey Pepper, Ben Renow-Clarke, Dominic Shakeshaft, Matt Wade, Tom Welsh

Project Manager: Richard Dal Porto

Copy Edit Manager: Nicole Flores

Copy Editor: Liz Welch

Assistant Production Director: Kari Brooks-Copony

Production Editor: Laura Esterman

Compositor: Kinetic Publishing Services, LLC

Proofreader: Elizabeth Berry

Indexer: Carol Burbo

Artist: April Milne

Cover Designer: Kurt Krames

Manufacturing Director: Tom Debolski

Distributed to the book trade worldwide by Springer-Verlag New York, Inc., 233 Spring Street, 6th Floor, New York, NY 10013. Phone 1-800-SPRINGER, fax 201-348-4505, e-mail orders-ny@springer-sbm.com, or visit <http://www.springeronline.com>.

For information on translations, please contact Apress directly at 2560 Ninth Street, Suite 219, Berkeley, CA 94710. Phone 510-549-5930, fax 510-549-5939, e-mail info@apress.com, or visit <http://www.apress.com>.

The information in this book is distributed on an “as is” basis, without warranty. Although every precaution has been taken in the preparation of this work, neither the author(s) nor Apress shall have any liability to any person or entity with respect to any loss or damage caused or alleged to be caused directly or indirectly by the information contained in this work.

The source code for this book is available to readers at <http://www.apress.com> in the Source Code/Download section.

To my boys: Nicolas, Léo, and Emmanuel

Contents at a Glance

About the Author	xi
Introduction	xiii
CHAPTER 1 Getting Started	1
CHAPTER 2 Using MIDlets	21
CHAPTER 3 Using the MIDP 2 Games API	53
CHAPTER 4 Using Threads and Media	95
CHAPTER 5 Storing and Retrieving Data	131
CHAPTER 6 Using Network Communications	193
CHAPTER 7 Advanced Messaging and Data Access	263
CHAPTER 8 Securing Your Applications	305
CHAPTER 9 The Mobile 3D Graphics API	317
CHAPTER 10 Adding a Professional Look and Feel	351
INDEX	409

Contents

About the Author	xi
Introduction	xiii
CHAPTER 1 Getting Started	1
Understanding Java ME	1
How the CLDC Differs from the Rest of the Java Universe	2
The Three Versions of MIDP	3
Downloading and Installing the Toolkit	4
Building an Application for MIDP	5
Creating the “Hello, World” Application	6
Using KToolbar	11
Running Your Game on an Actual Cell Phone	14
Using WAP	14
Preparing the WML File	15
Configuring the Server	16
Accessing the WML File and Downloading Applications	18
Summary	19
CHAPTER 2 Using MIDlets	21
Using the MIDlet Class	22
Understanding the MIDlet Lifecycle	22
Using the Displayable and Display Classes	26
Using Buttons and Menus	28
Using the Form and Item Classes	29
Using the Graphics and Canvas Classes	34
Using the java.util Package	44
Summary	51
CHAPTER 3 Using the MIDP 2 Games API	53
Starting with the MIDlet Class	53
Using the Thread Class	58

Using the GameCanvas Class	62
How GameCanvas Differs from Canvas	62
Using the Graphics Class with a GameCanvas	69
Using the LayerManager Class	71
Using the Sprite Class	77
Using the TiledLayer Class	89
Summary	94
 CHAPTER 4 Using Threads and Media	95
Using Threads	95
Differences Between CLDC Threads and Threads in Standard Java	95
Strategies for Deciding When to Use a New Thread	104
Avoiding Race Conditions and Deadlock	115
Using Media	118
Playing Simple Tones	118
Playing Tones with a Player	122
Using Audio Files	128
Summary	129
 CHAPTER 5 Storing and Retrieving Data	131
Saving Simple Data	131
Serializing More Complex Data Using Streams	135
Using Data Types and Byte Arithmetic	136
Applying Data Storage to a Dungeon Game	143
Creating the Complete Example Game	159
Summary	192
 CHAPTER 6 Using Network Communications	193
Choosing a Protocol	193
Using the Micro Edition IO API	194
Using HTTP	195
The Dungeon Example: Downloading the Next Board	197
Writing the Client Code for the Dungeon Example	198
Writing the Server Code for the Dungeon Example	206
Using SMS	209
Using the Push Registry	210

Creating a Multiplayer Game Example: Checkers	212
Writing the Communications Code for the Checkers Example.	212
Writing the Game Logic for the Checkers Example	234
Summary	262
CHAPTER 7 Advanced Messaging and Data Access	263
Using Bluetooth	263
Using the Personal Information Management API	285
Using the File Connection API	297
More Options	302
Summary	303
CHAPTER 8 Securing Your Applications	305
Understanding Protection Domains and Permissions	305
Requesting Permissions	307
Using Digital Certificates	308
Setting Up Secure Connections.	311
Using HTTPS	311
Using Other Secure Connections.	315
Summary	316
CHAPTER 9 The Mobile 3D Graphics API.	317
Vertex Buffers and Coordinates.	317
Defining the Polygon	317
Lights, Camera, Render!	322
Textures and Lighting	325
The M3G File Format.	332
The M3G File Structure.	332
Creating an M3G File.	333
Nodes and Rendering	335
Rendering Modes.	336
A Tour of the World Node	336
Further Tools and Features	345
Animations	345
Collisions.	348
Optimization	349
Summary	349

■ **CHAPTER 10 Adding a Professional Look and Feel** 351

 Customizing for Multiple Target Platforms 352

 Organizing Custom Resources..... 352

 Modifying Image Colors and Transparency 363

 Creating a GUI 367

 Starting Off on the Right Foot 367

 Creating Custom Menus..... 380

 Implementing Softkeys..... 396

 Applying Custom Resources to the Game..... 398

 Summary 407

■ **INDEX** 409