

# iPhone Games Projects

**DAVE MARK, SERIES EDITOR**

**PJ CABRERA**

**JOACHIM BONDO**

**AARON FOTHERGILL**

**BRIAN GREENSTONE**

**OLIVIER HENNESSY**

**MIKE KASPRZAK**

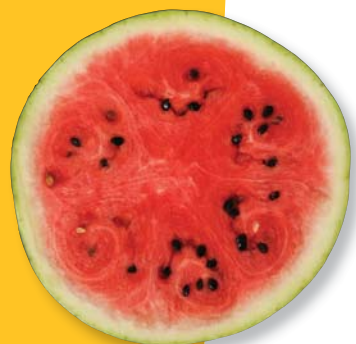
**MIKE LEE**

**RICHARD ZITO**

**MATTHEW AITKEN**

**CLAYTON KANE**

**Apress®**



## iPhone Games Projects

**Copyright © 2009 by PJ Cabrera, Joachim Bondo, Aaron Fothergill, Brian Greenstone, Olivier Hennessy, Mike Kasprzak, Mike Lee, Richard Zito, Matthew Aitken, Clayton Kane**

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 (paperback): 978-1-4302-1968-2

ISBN-13 (electronic): 978-1-4302-1969-9

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.

Lead Editor: Clay Andres

Developmental Editor: Douglas Pundick

Lead Author and Technical Reviewer: PJ Cabrera

Editorial Board: Clay Andres, Steve Anglin, Mark Beckner, Ewan Buckingham, Tony Campbell, Gary Cornell,

Jonathan Gennick, Jonathan Hassell, Michelle Lowman, Matthew Moodie, Duncan Parkes, Jeffrey Pepper,

Frank Pohlmann, Douglas Pundick, Ben Renow-Clarke, Dominic Shakeshaft, Matt Wade, Tom Welsh

Project Manager | Production Director: Grace Wong

Copy Editors: Kim Wimpsett, Marilyn Smith

Associate Production Director: Kari Brooks-Copony

Production Editor: Laura Esterman

Compositor | Interior Designer: Diana Van Winkle

Proofreader: Nancy Bell

Indexer: BIM Indexing & Proofreading Services

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](mailto:orders-ny@springer-sbm.com), or visit <http://www.springeronline.com>.

For information on translations, please contact Apress directly at 2855 Telegraph Avenue, Suite 600, Berkeley, CA 94705. Phone 510-549-5930, fax 510-549-5939, e-mail [info@apress.com](mailto:info@apress.com), or visit <http://www.apress.com>.

Apress and friends of ED books may be purchased in bulk for academic, corporate, or promotional use. eBook versions and licenses are also available for most titles. For more information, reference our Special Bulk Sales–eBook Licensing web page at <http://www.apress.com/info/bulksales>.

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>. You will need to answer questions pertaining to this book in order to successfully download the code.

# Contents

Foreword .....	xiii
About the Lead Author and Technical Reviewer .....	xv
Acknowledgments .....	xvii
Introduction .....	xix

## JOACHIM BONDO

<b>CHAPTER 1</b>	<b>Simplify the User Interface for Complex Games: Chess, the Deep Green Way .....</b>	<b>3</b>
	Once Upon a Time .....	4
	Why Should We Care About Simplicity? .....	7
	How Simplicity Was Achieved .....	7
	Distilling the Essence .....	8
	Pushing the Pixels .....	9
	Letting the User Focus .....	10
	Drilling Down .....	12
	Less Is More .....	13
	Empowering the User .....	15
	Making the User Smile .....	16
	Summary .....	17

## PJ CABRERA

<b>CHAPTER 2</b>	<b>Responsive Social Gaming with RESTful Web Services .....</b>	<b>21</b>
	Social Networking Games and the iPhone .....	22
	Creating the Prototype High-Score Web Service .....	24
	Creating the High-Scores Rails App .....	24
	Using RESTful XML Web Services .....	27
	Displaying High Scores on the iPhone .....	29
	Creating the User Interface .....	30
	Connecting to Web Services .....	36
	Parsing XML .....	42
	Displaying the High Scores in the Table View .....	46

Submitting High Scores to the Web Service .....	49
Submitting User Achievements .....	52
Introducing ObjectiveResource .....	53
Using ObjectiveResource .....	53
Submitting High Scores with ObjectiveResource .....	57
Summary .....	57

## AARON FOTHERGILL

### CHAPTER 3 **Rapid Game Development Using (Mostly) Standard C..... 61**

Getting Started .....	64
Creating the Project .....	66
Addressing the Save Game Problem .....	74
How to Save .....	74
How to Save the Easy Way .....	75
Space Hike: The App .....	81
The Render Loop and Basic Organization .....	81
Game Logic Overview .....	83
Drawing and Handling the Game .....	84
Enhancing the Game .....	97
Summary .....	98

## BRIAN GREENSTONE

### CHAPTER 4 **Brian Greenstone's Jedi Master List for Game Optimization ..... 101**

Memory Matters .....	102
Parlez-vous C? .....	103
Straight C Is Best .....	103
Cocoa vs. Core Foundation .....	105
Compiler Optimizations .....	105
The Thumb Instruction Set .....	106
Compiler Optimization Level .....	108
Optimizing Function Calls .....	108
Audio Optimizations .....	109
Streaming Music Playback .....	109
Sound Effects with OpenAL .....	111
OpenGL Optimizations .....	112
Construct an Efficient OpenGL Draw Context .....	112
Avoid State Changes .....	114

Reducing Texture Sizes .....	116
Using Compressed Textures .....	117
Geometry Data Reduction .....	118
Limit the Quantity of Draw Calls .....	120
Performance Tools .....	121
Using Instruments .....	121
Using Shark .....	123
Summary .....	127

## OLIVIER HENNESSY AND CLAYTON KANE

<b>CHAPTER 5</b>	<b>Starting with a Game Design Document: A Methodology for Success .....</b>	<b>131</b>
	The Game Vision .....	132
	The Game Design Document .....	133
	Title .....	133
	Game Summary .....	133
	Game Detail .....	134
	Game Setting .....	134
	Game System/Engine .....	134
	Game Play: Controls and User Interface .....	136
	Level Map .....	137
	Aesthetic Design .....	138
	Title and Information Screens .....	139
	Sound Effects .....	139
	From Vision to Reality .....	140
	Tips for Creating Realistic Artificial Intelligence .....	140
	Challenges of Designing for the iPhone .....	141
	Game Development Tips .....	144
	Solitaire Top 3 .....	144
	Backgammon .....	145
	Pool .....	146
	Kaleidoscope .....	147
	Shake N' Break .....	148
	Bikini Hunt .....	149
	YoYo .....	150
	Apache Lander .....	151
	Summary .....	152

## MICHAEL KASPRZAK

## CHAPTER 6 **Multiplatform Game Development: iPhone Games for Linux and Windows** ..... 155

The Development of Smiles: A Collection of Puzzle Games ...	156
What Are Cross-Platform and Portability? .....	160
Why Write Portable Code? .....	160
Why Not Write Portable Code? .....	161
Portability from the Ground Up. ....	162
The Classic Game Loop .....	162
A Practical Game Loop .....	163
Frames and Refresh Rates .....	165
Work and Draw Frame Code .....	165
Cooperating with an Event-Driven Operating System .....	167
Preparing to Track Touches .....	167
Tracking Touches .....	167
Simulating Touch and Release Events in a Game Loop ...	170
Frame Skipping .....	172
Creating a Unix System Time Library .....	173
Using the UnixTime Library for Frame Skipping .....	177
Tilt and Touch Physics Sample .....	179
The Game Code for the Physics Simulation Sample .....	180
Further Portability Considerations .....	186
Summary .....	188

## MIKE LEE

## CHAPTER 7 **Code Optimization with Mike Lee, the “World’s Toughest Programmer”** ..... 191

Iteration 1: Particle Effects .....	192
The Big Picture .....	194
Iteration 2: Smoke and Mirrors .....	195
Premature Optimization .....	197
Build Efficiency .....	197
Code Efficiency .....	199
Algorithmic Efficiency .....	201
Iteration 3: Shark Attack Time .....	202
Level-Headed Performance .....	204
Iteration 4: Increasingly Clever Optimizations .....	206
Application-Specific Optimization .....	207
Summary .....	211

RICHARD ZITO  
AND MATTHEW AITKEN

CHAPTER 8 **Networked Games: Choosing the Right Option . . . 215**

Multiplayer Networking Options . . . . .	217
Communication Is Key . . . . .	218
Say “Bonjour” to Local Network Gaming . . . . .	224
Drawing to Screen . . . . .	235
Tic-Tac-Toe, an Example . . . . .	237
Summary . . . . .	249

INDEX . . . . . **251**