# **Practical Common Lisp**

PETER SEIBEL

### **Practical Common Lisp**

## Copyright © 2005 by Peter Seibel

Lead Editor: Gary Cornell

Technical Reviewers: Mikel Evins, Steven Haflich, Barry Margolin

Editorial Board: Steve Anglin, Dan Appleman, Ewan Buckingham, Gary Cornell, Tony Davis, Jason Gilmore,

Jonathan Hassell, Chris Mills, Dominic Shakeshaft, Jim Sumser

Assistant Publisher: Grace Wong Project Manager: Beth Christmas Copy Edit Manager: Nicole LeClerc Copy Editor: Kim Wimpsett

Production Manager: Kari Brooks-Copony

Production Editor: Ellie Fountain Compositor: Susan Glinert

Proofreaders: Katie Stence, Liz Welch

Indexer: Kevin Broccoli Cover Designer: Kurt Krames

Manufacturing Manager: Tom Debolski

Library of Congress Cataloging-in-Publication Data

Seibel, Peter.

Practical COMMON LISP / Peter Seibel.

p. cm.

Includes index.

ISBN 1-59059-239-5 (hc.: alk. paper)

1. COMMON LISP (Computer program language) I. Title.

QA76.73.L23S45 2005 005.13'3--dc22

#### 2005005859

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.

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.

Distributed to the book trade in the United States by Springer-Verlag New York, Inc., 233 Spring Street, 6th Floor, New York, NY 10013, and outside the United States by Springer-Verlag GmbH & Co. KG, Tiergartenstr. 17, 69112 Heidelberg, Germany.

In the United States: phone 1-800-SPRINGER, fax 201-348-4505, e-mail orders@springer-ny.com, or visit http://www.springer-ny.com. Outside the United States: fax +49 6221 345229, e-mail orders@springer.de, or visit http://www.springer.de.

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 Downloads section and also at http://www.gigamonkeys.com/book/.

# **Contents at a Glance**

	xix
	al Reviewer
•	3
Typographical Cor	oventions xxv
CHAPTER 1	Introduction: Why Lisp? 1
CHAPTER 2	Lather, Rinse, Repeat: A Tour of the REPL
CHAPTER 3	Practical: A Simple Database19
CHAPTER 4	Syntax and Semantics
CHAPTER 5	Functions51
<b>CHAPTER 6</b>	Variables65
CHAPTER 7	Macros: Standard Control Constructs79
<b>CHAPTER 8</b>	Macros: Defining Your Own89
CHAPTER 9	Practical: Building a Unit Test Framework 103
CHAPTER 10	Numbers, Characters, and Strings115
CHAPTER 11	Collections
CHAPTER 12	They Called It LISP for a Reason: List Processing141
CHAPTER 13	Beyond Lists: Other Uses for Cons Cells
<b>CHAPTER 14</b>	Files and File I/O163
CHAPTER 15	Practical: A Portable Pathname Library179
<b>CHAPTER 16</b>	Object Reorientation: Generic Functions
<b>CHAPTER 17</b>	Object Reorientation: Classes
<b>CHAPTER 18</b>	A Few FORMAT Recipes
CHAPTER 19	Beyond Exception Handling: Conditions and Restarts 233
<b>CHAPTER 20</b>	The Special Operators245
CHAPTER 21	Programming in the Large: Packages and Symbols 263
<b>CHAPTER 22</b>	LOOP for Black Belts277

CHAPTER 23	Practical: A Spam Filter	291
CHAPTER 24	Practical: Parsing Binary Files	311
CHAPTER 25	Practical: An ID3 Parser	335
CHAPTER 26	Practical: Web Programming with AllegroServe	363
CHAPTER 27	Practical: An MP3 Database	385
CHAPTER 28	Practical: A Shoutcast Server	401
CHAPTER 29	Practical: An MP3 Browser	411
CHAPTER 30	Practical: An HTML Generation Library, the Interpreter	431
CHAPTER 31	Practical: An HTML Generation Library, the Compiler	449
CHAPTER 32	Conclusion: What's Next?	465
INDEX		481