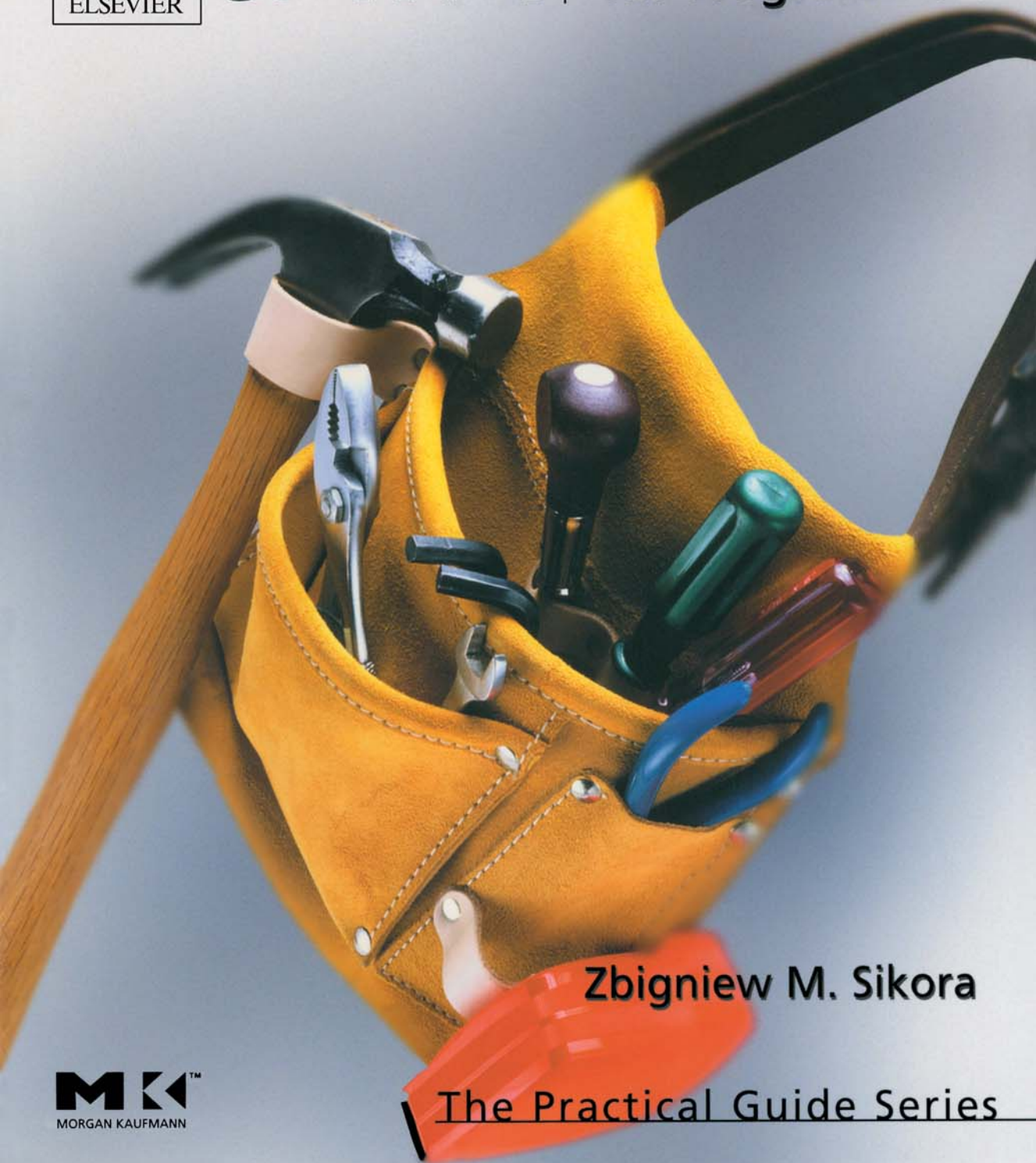


# JAVA

Practical Guide  
for Programmers



Zbigniew M. Sikora

The Practical Guide Series

**MK**<sup>TM</sup>  
MORGAN KAUFMANN

# Java

Practical Guide for Programmers

**The Morgan Kaufmann Practical Guides Series**  
Series Editor: Michael J. Donahoo

*Java: Practical Guide for Programmers*  
Zbigniew M. Sikora

*Multicast Sockets: Practical Guide for Programmers*  
David Makofske and Kevin Almeroth

*The Struts Framework: Practical Guide for Java Programmers*  
Sue Spielman

*TCP/IP Sockets in Java: Practical Guide for Programmers*  
Kenneth L. Calvert and Michael J. Donahoo

*TCP/IP Sockets in C: Practical Guide for Programmers*  
Michael J. Donahoo and Kenneth L. Calvert

*JDBC: Practical Guide for Java Programmers*  
Gregory D. Speegle

For further information on these books and for a list of forthcoming titles,  
please visit our Web site at [www.mkp.com/practical](http://www.mkp.com/practical).

# Java

## Practical Guide for Programmers

**Zbigniew M. Sikora**

Independent Consultant



**MORGAN KAUFMANN PUBLISHERS**

AN IMPRINT OF ELSEVIER SCIENCE

AMSTERDAM BOSTON LONDON NEW YORK  
OXFORD PARIS SAN DIEGO SAN FRANCISCO  
SINGAPORE SYDNEY TOKYO

*Senior Editor* Rick Adams  
*Publishing Services Manager* Edward Wade  
*Developmental Editor* Karyn Johnson  
*Cover Design* Yvo Riezebos Design  
*Cover Image* Siede Preis/Getty Images  
*Text Design* Side by Side Studios/Mark Ong  
*Composition and Illustration* Windfall Software, using ZzTeX  
*Copyeditor* Robert Fiske  
*Proofreader* Sarah Burgundy  
*Indexer* Steve Rath  
*Interior Printer* The Maple-Vail Book Manufacturing Group  
*Cover Printer* Phoenix Color Corporation

Designations used by companies to distinguish their products are often claimed as trademarks or registered trademarks. In all instances in which Morgan Kaufmann Publishers is aware of a claim, the product names appear in initial capital or all capital letters. Readers, however, should contact the appropriate companies for more complete information regarding trademarks and registration.

Morgan Kaufmann Publishers  
An Imprint of Elsevier Science  
340 Pine Street, Sixth Floor  
San Francisco, CA 94104-3205  
[www.mkp.com](http://www.mkp.com)

© 2003 by Elsevier Science (USA)  
All rights reserved  
Printed in the United States of America

07 06 05 04 03 5 4 3 2

No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means—electronic, mechanical, photocopying, recording, or otherwise—without the prior written permission of the publisher.

**Library of Congress Control Number: 2002114098**  
ISBN: 1-55860-909-1

This book is printed on acid-free paper.

*To my mother, Janina*

This Page Intentionally Left Blank

# Contents

Preface xi

- 1 Introduction 1**
  - 1.1 Simple Java Application 1
  - 1.2 Java Tools 4
  - 1.3 Language Features 5
- 2 Basic Language Syntax 7**
  - 2.1 Comments 8
  - 2.2 Statements 8
  - 2.3 Variables 9
  - 2.4 Constants 9
  - 2.5 Data Types 10
  - 2.6 Arithmetic Operations 17
  - 2.7 Data Type Conversion 18
- 3 Flow Control 21**
  - 3.1 Conditional Statements 21
  - 3.2 Relational and Logical Operators 26
  - 3.3 Iteration Statements 28
- 4 Classes and Objects 33**
  - 4.1 Class and Object with No Methods 33
  - 4.2 Class with Methods 35
  - 4.3 Constructors 37
  - 4.4 Method Overloading 39
  - 4.5 Argument Passing in Java 39
  - 4.6 Instance and Static Variables 42
  - 4.7 Instance and Static Methods 44



4.8	this Keyword	45
4.9	StringBuffer	46
4.10	Vectors	47
4.11	Object Wrappers	47
<b>5</b>	<b>Inheritance and Access Control</b>	<b>49</b>
5.1	Creating Subclasses	49
5.2	The Object Class	53
5.3	Abstract Classes and Methods	57
5.4	Interfaces	59
5.5	Packages	60
5.6	Access Control	63
5.7	Inner Classes	67
<b>6</b>	<b>Exceptions</b>	<b>71</b>
6.1	Exception Handling	71
6.2	Java Exception Classes	74
6.3	Creating Exception Classes	75
6.4	Propagation of Exceptions	76
6.5	Runtime Exceptions	79
6.6	Assertions	80
<b>7</b>	<b>Input/Output</b>	<b>83</b>
7.1	Terminal I/O Example	85
7.2	FileReader and FileWriter Streams	86
7.3	FileInputStream and FileOutputStream	92
7.4	Buffered Input and Output Streams	93
7.5	DataInputStream and DataOutputStream	95
7.6	Random Access Files	98
7.7	Object Serialization	101
<b>8</b>	<b>Developing GUIs</b>	<b>107</b>
8.1	Introduction	107
8.2	Swing Components	108
8.3	Component Methods	115
8.4	Swing Containers	117
8.5	Layouts	120
8.6	Specifying Look and Feel	123
8.7	Event Handling	124
8.8	Painting with Swing	129
8.9	CustomerDetails Example	130
8.10	Applets	135

**9 Collections 143**

- 9.1 Set Interface 143
- 9.2 List Interface 151
- 9.3 Map Interface 152
- 9.4 The Collections Class 154

**10 Threads 157**

- 10.1 The Thread Class 157
- 10.2 Multithreaded Application Example 158
- 10.3 Thread Priorities 160
- 10.4 The Runnable Interface 160
- 10.5 Synchronizing Threads 164
- 10.6 Thread States 166

**Appendix A: Operator Precedence 167****Appendix B: Swing Events 169****Index 173**