

THE EXPERT'S VOICE® IN JAVA

Java 7 for Absolute Beginners

Jay Bryant

Apress®

Java 7 for Absolute Beginners



Jay Bryant

Apress®

Java 7 for Absolute Beginners

Copyright © 2012 by Jay Bryant

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed. Exempted from this legal reservation are brief excerpts in connection with reviews or scholarly analysis or material supplied specifically for the purpose of being entered and executed on a computer system, for exclusive use by the purchaser of the work. Duplication of this publication or parts thereof is permitted only under the provisions of the Copyright Law of the Publisher's location, in its current version, and permission for use must always be obtained from Springer. Permissions for use may be obtained through RightsLink at the Copyright Clearance Center. Violations are liable to prosecution under the respective Copyright Law.

ISBN-13 (pbk): 978-1-4302-3686-3

ISBN-13 (electronic): 978-1-4302-3687-0

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

The use in this publication of trade names, trademarks, service marks, and similar terms, even if they are not identified as such, is not to be taken as an expression of opinion as to whether or not they are subject to proprietary rights.

While the advice and information in this book are believed to be true and accurate at the date of publication, neither the authors nor the editors nor the publisher can accept any legal responsibility for any errors or omissions that may be made. The publisher makes no warranty, express or implied, with respect to the material contained herein.

President and Publisher: Paul Manning

Lead Editor: Steve Anglin

Technical Reviewer: Massimo Nardone

Editorial Board: Steve Anglin, Mark Beckner, Ewan Buckingham, Gary Cornell, Morgan Ertel, Jonathan Gennick, Jonathan Hassell, Robert Hutchinson, Michelle Lowman, James Markham, Matthew Moodie, Jeff Olson, Jeffrey Pepper, Douglas Pundick, Ben Renow-Clarke, Dominic Shakeshaft, Gwenan Spearing, Matt Wade, Tom Welsh

Coordinating Editor: Adam Heath

Copy Editor: Chandra Clarke

Production Support: Patrick Cunningham

Indexer: SPi Global

Artist: SPi Global

Cover Designer: Anna Ishchenko

Distributed to the book trade worldwide by Springer Science+Business Media New York, 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 www.springeronline.com.

For information on translations, please e-mail rights@apress.com, or visit 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 www.apress.com/bulk-sales.

Any source code or other supplementary materials referenced by the author in this text is available to readers at www.apress.com. For detailed information about how to locate your book's source code, go to www.apress.com/source-code.

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 www.apress.com/bulk-sales.

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.

For Clancey, Kylie, and Philip
–Jay Bryant

Contents at a Glance

Foreword	xiii
About the Author	xiv
About the Technical Reviewer	xv
Acknowledgments	xvi
Introduction	xvii
■ Chapter 1: Writing Your First Java Program	1
■ Chapter 2: Java Syntax	15
■ Chapter 3: Data Types	35
■ Chapter 4: Operators	51
■ Chapter 5: Control Flow, Looping, and Branching	77
■ Chapter 6: Object-oriented Programming	95
■ Chapter 7: Writing a User Interface	111
■ Chapter 8: Writing and Reading Files	151
■ Chapter 9: Writing and Reading XML	169
■ Chapter 10: Animation	185
■ Chapter 11: Debugging with Eclipse	205
■ Chapter 12: Video Games	221
■ Chapter 13: Garbage Collection	249

■ Chapter 14: Recursion	263
■ Chapter 15: Generics and Regular Expressions.....	279
Index.....	291

Contents

Foreword	xiii
About the Author	xiv
About the Technical Reviewer	xv
Acknowledgments	xvi
Introduction	xvii
■ Chapter 1: Writing Your First Java Program	1
Installing the JDK.....	1
Installing Eclipse.....	2
Creating Your First Project.....	2
Creating the Program.....	5
Adding More Functionality.....	9
Further Development.....	11
About Java Objects.....	12
Summary	12
■ Chapter 2: Java Syntax.....	15
An Example	15
Lines	18
Package Declaration.....	20
Imports	21
Classes	22
Fields	23

Methods.....	24
Constructors	26
Access Modifiers	27
Interfaces.....	27
Exceptions	28
Blocks.....	30
Comments	31
Summary	33
Chapter 3: Data Types	35
Primitive Data Types.....	35
Integer Primitives	35
Real Primitives.....	36
boolean.....	37
char	37
The Special Type: String.....	37
Literals.....	38
Wrapper Classes.....	41
Arrays	43
The Non-Existent Type: null.....	44
Enumerations.....	45
Summary	48
Chapter 4: Operators	51
Operator Precedence.....	52
The Missing Operator: Parentheses.....	52
Postfix Operators	53
Unary Operators.....	53
Casting.....	55
Multiplicative Operators	57

Additive Operators	57
Shift Operators	58
Relational Operators	60
Equality Operators	62
Bitwise AND Operator (&)	63
Bitwise Exclusive OR Operator (^).....	63
Bitwise Inclusive OR Operator ()	64
Logical AND Operator (&&)	64
Logical OR Operator ().....	65
Assignment Operators	66
Comparing and Sorting Objects	67
Implementing the equals Method	68
Comparisons for Sorting.....	70
Summary	75
■ Chapter 5: Control Flow, Looping, and Branching	77
Control Flow.....	77
if and if-else Statements	77
switch Statements.....	79
Looping	82
For Loops.....	82
While loops	85
Do-while Loops.....	87
Branching	88
The break Statement	88
The continue Statement	89
The return Statement	91
Summary	93

■ Chapter 6: Object-oriented Programming	95
Objects.....	95
Encapsulation	96
Inheritance.....	96
Multiple Inheritance.....	97
Modeling Behavior through Interfaces	98
Abstract Classes.....	98
Static Members	100
Polymorphism.....	101
Our Animals in Java.....	102
A Lesson about Granularity.....	106
Pass-by-Reference and Pass-by-Value	107
Summary	109
■ Chapter 7: Writing a User Interface	111
Java Swing: The Basics.....	111
A Basic Swing Application.....	112
A Larger Swing Application	119
Summary	149
■ Chapter 8: Writing and Reading Files	151
Working with File Objects.....	151
Opening a File.....	153
Deleting a File.....	154
Working with Temporary Files.....	155
Creating a Directory.....	157
Deleting a Directory.....	159
Deleting Multiple Directories	160