

THE EXPERT'S VOICE® IN OPEN SOURCE

Beginning Android

*Master Android from first principles
and begin the journey toward your
own successful Android applications!*

Mark L. Murphy

Apress®

Beginning Android



Mark L. Murphy

Beginning Android

Copyright © 2009 by Mark L. Murphy

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): 978-1-4302-2419-8

ISBN-13 (electronic): 978-1-4302-2420-4

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 Editor: Matthew Moodie

Editorial Board: Clay Andres, Steve Anglin, Mark Beckner, Ewan Buckingham, Tony Campbell, Gary Cornell, Jonathan Gennick, Michelle Lowman, Matthew Moodie, Duncan Parkes, Jeffrey Pepper, Douglas Pundick, Frank Pohlmann, Ben Renow-Clarke, Dominic Shakeshaft, Matt Wade, Tom Welsh

Project Manager: Douglas Sulenta

Copy Editors: Candace English and Katie Stence

Associate Production Director: Kari Brooks-Copony

Production Editor: Ellie Fountain

Compositor: Susan Glinert

Proofreader: Lisa Hamilton

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, 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, 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>.

Contents at a Glance

About the Author	xvii
Acknowledgments	xix
Introduction	xxi

PART 1 ■■■ Core Concepts

■ CHAPTER 1	The Big Picture	3
■ CHAPTER 2	Project Structure	7
■ CHAPTER 3	Inside the Manifest	9

PART 2 ■■■ Activities

■ CHAPTER 4	Creating a Skeleton Application	15
■ CHAPTER 5	Using XML-Based Layouts	21
■ CHAPTER 6	Employing Basic Widgets	27
■ CHAPTER 7	Working with Containers	37
■ CHAPTER 8	Using Selection Widgets	55
■ CHAPTER 9	Getting Fancy with Lists	71
■ CHAPTER 10	Employing Fancy Widgets and Containers	93
■ CHAPTER 11	Applying Menus	113
■ CHAPTER 12	Fonts	125
■ CHAPTER 13	Embedding the WebKit Browser	129
■ CHAPTER 14	Showing Pop-Up Messages	137
■ CHAPTER 15	Dealing with Threads	141
■ CHAPTER 16	Handling Activity Lifecycle Events	147

PART 3 ■■■ Data Stores, Network Services, and APIs

■ CHAPTER 17	Using Preferences	153
■ CHAPTER 18	Accessing Files	167
■ CHAPTER 19	Working with Resources	175
■ CHAPTER 20	Managing and Accessing Local Databases	193
■ CHAPTER 21	Leveraging Java Libraries	201
■ CHAPTER 22	Communicating via the Internet	207

PART 4 ■■■ Intents

■ CHAPTER 23	Creating Intent Filters	215
■ CHAPTER 24	Launching Activities and Sub-Activities	221
■ CHAPTER 25	Finding Available Actions via Introspection	231
■ CHAPTER 26	Handling Rotation	237

PART 5 ■■■ Content Providers and Services

■ CHAPTER 27	Using a Content Provider	253
■ CHAPTER 28	Building a Content Provider	259
■ CHAPTER 29	Requesting and Requiring Permissions	269
■ CHAPTER 30	Creating a Service	273
■ CHAPTER 31	Invoking a Service	279
■ CHAPTER 32	Alerting Users via Notifications	285

PART 6 ■■■ Other Android Capabilities

■ CHAPTER 33	Accessing Location-Based Services	293
■ CHAPTER 34	Mapping with MapView and MapActivity	299
■ CHAPTER 35	Handling Telephone Calls	309
■ CHAPTER 36	Searching with SearchManager	313
■ CHAPTER 37	Development Tools	321
■ CHAPTER 38	Where Do We Go from Here?	337
■ APPENDIX	Introducing Android 1.5	339
■ INDEX	347

Contents

About the Author	xvii
Acknowledgments	xix
Introduction	xxi

PART 1 ■■■ Core Concepts

■ CHAPTER 1	The Big Picture	3
	What Androids Are Made Of	4
	Activities	4
	Content Providers	5
	Intents	5
	Services	5
	Stuff at Your Disposal	5
	Storage	5
	Network	5
	Multimedia	5
	GPS	6
	Phone Services	6
■ CHAPTER 2	Project Structure	7
	Root Contents	7
	The Sweat of Your Brow	7
	The Rest of the Story	8
	What You Get Out of It	8
■ CHAPTER 3	Inside the Manifest	9
	In the Beginning There Was the Root, and It Was Good	9
	Permissions, Instrumentations, and Applications (Oh, My!)	10
	Your Application Does Something, Right?	10
	Achieving the Minimum	11

PART 2 ■■■ Activities

■ CHAPTER 4	Creating a Skeleton Application	15
	Begin at the Beginning	15
	The Activity	15
	Dissecting the Activity	16
	Building and Running the Activity	18
■ CHAPTER 5	Using XML-Based Layouts	21
	What Is an XML-Based Layout?	21
	Why Use XML-Based Layouts?	21
	OK, So What Does It Look Like?	22
	What's with the @ Signs?	23
	We Attach These to the Java ... How?	23
	The Rest of the Story	24
■ CHAPTER 6	Employing Basic Widgets	27
	Assigning Labels	27
	Button, Button, Who's Got the Button?	28
	Fleeting Images	28
	Fields of Green. Or Other Colors.	29
	Just Another Box to Check	31
	Turn the Radio Up	34
	It's Quite a View	35
	Useful Properties.	35
	Useful Methods.	36
■ CHAPTER 7	Working with Containers	37
	Thinking Linearly	37
	Concepts and Properties	37
	Orientation.	37
	LinearLayout Example	40
	All Things Are Relative	44
	Concepts and Properties	44
	RelativeLayout Example.	46