

Android™ for Programmers

An App-Driven Approach



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The professional programmer's Deitel® guide to Android™ smartphone and tablet app development and the Eclipse IDE with the Android Development Tools (ADT) plug-in

Billions of apps have been downloaded from Android Market! This book gives you everything you'll need to start developing great Android apps quickly and getting them published on Android Market. The book uses an **app-driven approach**—each new technology is discussed in the context of 16 fully tested Android apps, complete with syntax coloring, code walkthroughs and sample outputs. Apps you'll develop include:

- SpotOn Game
- Route Tracker
- Tip Calculator
- Cannon Game
- Slideshow
- Favorite Twitter® Searches
- Doodlz
- Voice Recorder
- Flag Quiz
- Address Book
- Weather Viewer
- Pizza Ordering

Paul Deitel, Abbey Deitel and Harvey Deitel are from Deitel & Associates, Inc., the internationally recognized programming languages authoring and corporate-training organization. Over a million people worldwide have used Deitel books to master Java™, iPhone app development, C#, C++, C, Internet and web programming, JavaScript, XML, Visual Basic®, Visual C++®, Perl, Python and more. Michael Morgano is a professional Android developer with Imerj.

Reviewer Testimonials

"I really love what you're doing with the book. It has the potential to become the best Android book on the market. It's impressive to see so many well-explained useful examples of Android patterns. The coverage of recent Honeycomb-specific APIs such as ViewPropertyAnimator and resizable AppWidgets makes this work especially current." —Dan Galpin, *Android Advocate and author of Intro to Android Application Development*

"I really like that this is aiming to stay up-to-date with Android 3 and be the most current book possible by covering key Android 3 features such as property animation, fragments, the ActionBar, tabbed navigation and more. I haven't seen any other books cover app publishing so well and the links provided throughout are an impressive collection that I think would be valuable to anyone getting started. You get full applications that show multiple parts of the APIs working together. I wish this book had been around when I started developing on Android." —Douglas Jones, *Senior Software Engineer, Fullpower Technologies*

"This is the book for developers interested in starting Android application development. While the target of *Android for Programmers* is people with some development experience, even novices will find this book an interesting read and it will speed their immersion into Android development. The book starts by describing the Android development environment. Then each chapter introduces a core aspect of the Android platform by briefly explaining the topic, then illustrating the capability with working code. The sample apps demonstrate the topics of each chapter, which easily can be applied to your own projects. By far, this is the quickest way to get comfortable writing applications for the #1 smartphone operating system. I really enjoy the book." —Eric J. Bowden, *COO, Safe Driving Systems, LLC*

"Takes the ideal approach of teaching you the Android SDK through actual use. Rather than regurgitate the API documentation, this book shows you how to write an app in every chapter, explaining each aspect of the SDK as it's encountered. Some apps are built from scratch; others expand on the apps in previous chapters, iterating on the code to implement new functionality. The full source code is available, so you can see how the SDK is really used. Teaches you all the Android essentials from layouts to sensors and even on to features added in Honeycomb such as property animation, tabbed navigation with the ActionBar, fragments and web services with JsonReader. Whether you've never touched Android or you have some apps under your belt already, this book is definitely worth picking up." —Ian G. Clifton, *Independent Contractor and Android App Developer*

(Continued Inside Back Cover)

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Smartphone and Tablet Apps
ADT Plug-In for Eclipse
ADT Visual Layout Editor
Activities • GUI • Resources
Intents • Content Providers
Events • Touches • Gestures
ActionBar • Fragments
Audio • Video • Animation
Graphics • OpenGL ES
Gallery • Media Library
Files • Serialization • SQLite
Handlers • Multithreading
Camera • Maps • Sensors
Location Services • GPS
Speech • Web Services
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DEITEL® DEVELOPER SERIES

The DEITEL® DEVELOPER SERIES is designed for professional programmers. The series presents focused treatments of a growing list of emerging and mature technologies, including Android and iPhone app development, Java™, C# and .NET, C++, JavaScript, Internet and web development and more. Each book in the series contains the same live-code teaching methodology used in the Deitel's How to Program Series college textbooks—most concepts are presented in the context of complete working applications.

ABOUT THIS BOOK

The first-generation Android phones were released in October 2008. A study by comScore® showed that Android had 41.8% of the U.S. smartphone market share, compared to 27% for Apple's iPhone and 21.7% for BlackBerry (www.comscore.com/Press_Events/Press_Releases/2011/8/comScore_Reports_July_2011_U.S._Mobile_Subscriber_Market_Share). Billions of apps have been downloaded from Android Market. More than 500,000 Android devices are being activated daily, and there are now over 300 different Android devices. The opportunities for Android app developers are enormous.

This book presents leading-edge computing technologies for professional software developers. At the heart of the book is the Deitel “app-driven approach”—concepts are presented in the context of complete working Android apps, rather than using code snippets. The introduction and app test drives at the beginning of each chapter show one or more sample executions. The book's source code is available at www.deitel.com/books/androidfp/.

The apps in this book were carefully designed to introduce you to key Android features and APIs. You'll quickly learn everything you need to start building Android apps—beginning with a test-drive of a drawing app in Chapter 1, then building your first app in Chapter 3. You'll quickly be ready to create your own apps for submission to Android Market and other app marketplaces. We'll walk you through the Android Market submission process, including uploading your apps, deciding whether to sell your apps or offer them for free, and marketing them using in-app advertising, social media, Internet public relations and more.

The front cover is part of our tablet app (Chapter 14), created using WeatherBug® web services. The weather information and images in the app are provided by WeatherBug (weather.weatherbug.com).



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REVIEWER TESTIMONIALS (Continued from Back Cover)

“With the increasing scope of Android, getting up to speed can be a challenge. This book addresses a compelling set of topics, presenting them in self-contained packages that are fun and instructive. The coverage of key Android 3 features such as fragments, resizable App Widgets and the Action Bar is interesting. For tablet-oriented app development, familiarity with these tools is essential. Creates UI/layouts with a depth of detail I've not seen elsewhere.” —**Sebastian Nykopp, Chief Architect, Reaktor**

“The **Welcome app** looks solid; great to see the integration of the new layout editor. The **Tip Calculator app** is a pretty cool example and definitely a useful app; I love the deeper coverage of the lifecycle. The **Favorite Twitter Searches app** is a good way to demonstrate ScrollView. The **Flag Quiz app** is one of my favorites, covering delayed events, View animations and string arrays; I like the use of the AssetManager for the flags. The XML declaration and explanation of the tweened flag-shake animation is nicely done. The **SpotOn Game app** is one of my favorites; it does an excellent job in covering the new Honeycomb+ property animations, and uses them in a creative way to build a surprisingly fun little game. Nice job of keeping the database queries out of the UI thread in the **Address Book app**. It's great how the **Route Tracker app** chapter puts so much useful MapView information in one place. **Slideshow** is a beautiful app.” —**Dan Galpin, Android Advocate and author of Intro to Android Application Development**

“The **Welcome app** does a great job illustrating the Visual Layout Editor; I liked the approach of building visual components without code; this makes it easy to experiment with other properties to customize the look of the app. There's a lot of time spent on the **Tip Calculator app** UI in the Visual Layout Editor—the line-by-line explanations of the code are extremely valuable; this is a solid introduction to how Android works. **Favorite Twitter Searches** taught me things I didn't know. The **Flag Quiz app** is a great chapter; clearly written, and I particularly appreciated the completeness of the code comments. The **Cannon Game app** is a nice introduction to animation. The **SpotOn Game app** did a great job introducing Android 3+; in a lot of ways, Google has separated Android 2.x and 3.x by intended use (i.e. phone vs. tablet); this chapter introduces some of those concepts and helps the software developer understand some of the SDK differences. The **Doodlz app** chapter uses great examples to illustrate the concepts. The **Address Book app** is a good introduction to SQLite databases. The introduction to the camera in the **Enhanced Slideshow app** chapter is valuable information.” —**Eric J. Bowden, COO, Safe Driving Systems, LLC**

“The Intro chapter gives a solid overview of Android. The **Welcome app** chapter is a nice intro to layouts, keeping it simple, while still using a common layout (RelativeLayout) and explaining the resulting XML. **Favorite Twitter Searches app** is a great chapter that introduces a lot of new (core) concepts. The app descriptions give a clear understanding of what is being built and the technologies overviews are particularly nice; the colored highlighting is helpful. The **SpotOn Game app** is a great intro to 3.x animation and produces a fun game without a lot of code. **Doodlz** is a great app—anyone can identify with it and it gives readers a chance to learn about Android. The **Address Book app** is a good intro to some key aspects of Android programs (in particular, launching other Activities and utilizing a SQLite database). The **Route Tracker app** chapter is excellent.” —**Ian G. Clifton, Independent Contractor and Android App Developer**

“One of the most comprehensive intro chapters I have read, especially the number and variety of links to outside sources. I like the **Welcome app** as a way to get the reader's feet wet; it breaks them into Eclipse and it gets them making something without Java code. The **Tip Calculator app** UI highlights the tricky cases of TableLayout and TableRow. The **Favorite Twitter Searches app** does a good job of introducing important UI skills, especially using the LayoutInflater and the ScrollView to programmatically add UI elements. The **Flag Quiz app** chapter does a good job of showing a variety of tools, such as collections, DialogBuilder options and animations; the method used to handle all the data is a good one. Those property animators sure make the **SpotOn Game app** code straightforward; well done. The **Route Tracker** is a solid example of a location and map app. The **Slideshow app** reinforces list handling and adapters. I like the intro to serialization in the **Enhanced Slideshow app**.” —**Douglas Jones, Senior Software Engineer, Fullpower Technologies**

“Good intro to overall Android, Java and OO concepts.” —**Ronan “Zero” Schwarz (CIO, OpenIntents)**

“A good intro to Android platform capabilities and online resources for getting into Android development; a valuable timesaver, particularly with the increasing amount of available Android information; the walkthrough for getting an app running in the emulator is easy to follow. The **Flag Quiz app** chapter is easy to follow and quite enjoyable; clear description of key UI elements; good that the distinction between assets/ and res/ is presented; nice that View animation is included in an example relevant to the app (adds a professional touch); the yellow code highlighting works well. The **Address Book app** chapter is a good introduction to CRUD [create, read, update and delete] apps. The **Route Tracker app** chapter is an easy introduction to location tracking. The **Enhanced Slideshow app** is a straightforward demonstration on how to use the camera and display video in an application.” —**Sebastian Nykopp, Chief Architect, Reaktor**