

# Bonus Chapter

## Android 4.4 KitKat Highlights

The Android 4.4 KitKat Highlights bonus chapter is a supplement to *Introduction to Android™ Application Development, Fourth Edition*, by Joseph Annuzzi, Jr., Lauren Darcey, and Shane Conder.

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## Android 4.4 KitKat Highlights

Android 4.4 KitKat, API Level 19, has just been released, and we are excited to learn about the possibilities this new version of Android presents. We have decided to publish a bonus chapter about this new Android release to introduce readers to the features that are now available. Luckily for us, the majority of additions and updates to Android 4.4 do not affect the content, best practices, or code samples presented within the book. Most of the additions and updates affect the advanced capabilities that Android has to offer. Since this is an introductory book, you should feel confident that the information presented is up to date, with the latest and greatest practices. We would like to highlight some of the newest features of this version of Android that are suitable for an introductory book.

### Introducing New Optimizations and Tools

The Android team has been busy making this newest release capable of running optimally on a wide range of devices. The new KitKat release can now be run on devices with only 512MB of RAM, broadening the potential for Android to operate on less expensive, less powerful devices.

Many of the optimizations found in KitKat provide new and improved memory management features that are automatically handled by the Android OS; in addition, there are new APIs that allow developers to monitor and configure their applications for a particular device's memory configuration. The `ActivityManager.isLowRamDevice()` API method allows you to determine if the device your application is running on is a low-RAM device; if so, you are now able to control the memory-intensive operations within your application's code or to limit the types of operations performed on such a device.

The new `Procstats` tool allows you to analyze the memory of your applications and other running processes on a device so that you are better able to understand the memory performance of your applications.

Listed under `Settings`, then `Developer Options` on Android 4.4 devices is the `Process Stats` option. This option allows you to look into the performance of your application and others on a device or AVD in order to analyze memory and RAM usage while the applications are running.

## Looking at New Design Patterns and Style Guides

Some additions to Android 4.4 make it even easier to create amazing applications. Enhancements to application branding features, full-screen mode, and gesture additions provide easy ways for developers to build an optimal user experience.

Android 4.4 makes it easier than ever to incorporate your own branding look and feel into your applications. You are able to control the colors presented and insert your launcher icon into the `ActionBar` of your application, and you are also able to include your own branded icons rather than the default system icons.

The new full-screen mode has been added to allow developers to take advantage of the entire screen of a device. There are two ways to show system bars when operating in full-screen mode: Lean Back and Immersive. Lean Back is managed by touching anywhere on the screen to show the system bars, and Immersive allows users to swipe from the edges of the screen toward the center to reveal system bars. Immersive is more suited for gaming applications because swipes rather than simple screen touches reveal system bars.

The new gestures introduced are double touch drag and double touch, which are two ways to increase and decrease the size of content on a device's screen.

## Leveraging New Developer Features and APIs

Android 4.4 introduces many developer features and APIs that you may want to use in your applications. One significant change to Android 4.4 has been with `WebView`, which is now based on Chromium. If your application currently uses `WebView`, make sure that your code works on Android 4.4 because the Chromium version of `WebView` is a brand-new addition. This allows developers to leverage advanced HTML5, CSS3, and JavaScript capabilities, and most Chrome for Android 30 features of HTML5 are also available. In addition, the Chrome DevTools are now available to developers to debug their `WebView` applications.

Chapter 12 briefly introduced the `getExternalStoragePublicDirectory()` method of the `Environment` class for storing shared files such as pictures, movies, music, ringtones, or podcasts on a shared external storage region. In order to use this method for reading and writing shared files to external storage, the `READ_EXTERNAL_STORAGE` or `WRITE_EXTERNAL_STORAGE` permission is now required. However, when using the `getExternalFilesDir()` to access your own application's content stored on external storage, those permissions are not required.

## Working with Android 4.4 KitKat

Now that you are familiar with some of the newest features of Android 4.4, you should set up your development environment so that you can begin developing and testing applications against this newest version of Android. You should do this as soon as possible, especially if you have already released an application or will be releasing one soon. Many

Android enthusiasts upgrade to the latest version of Android as soon as it is available on real devices. If these users upgrade their devices to Android 4.4, and you have not tested your application's compatibility with this newest version of Android, your users may experience problems when trying to use your application, or worse, your application may not function at all.

## Installing Android 4.4 KitKat SDK

In order to begin working with the new Android 4.4 SDK, you must first install it on your system. Begin by opening the Android SDK Manager, then select the appropriate Android SDK packages to install. Figure B.1 shows the appropriate packages to select, so once these are selected, press “Install 8 Packages . . .”



### Note

The number of packages may be different for you depending on the quantity of packages that you have selected to install and the version number of the Android ADT Bundle you are using. The number of packages that were selected for installation for this example is eight.

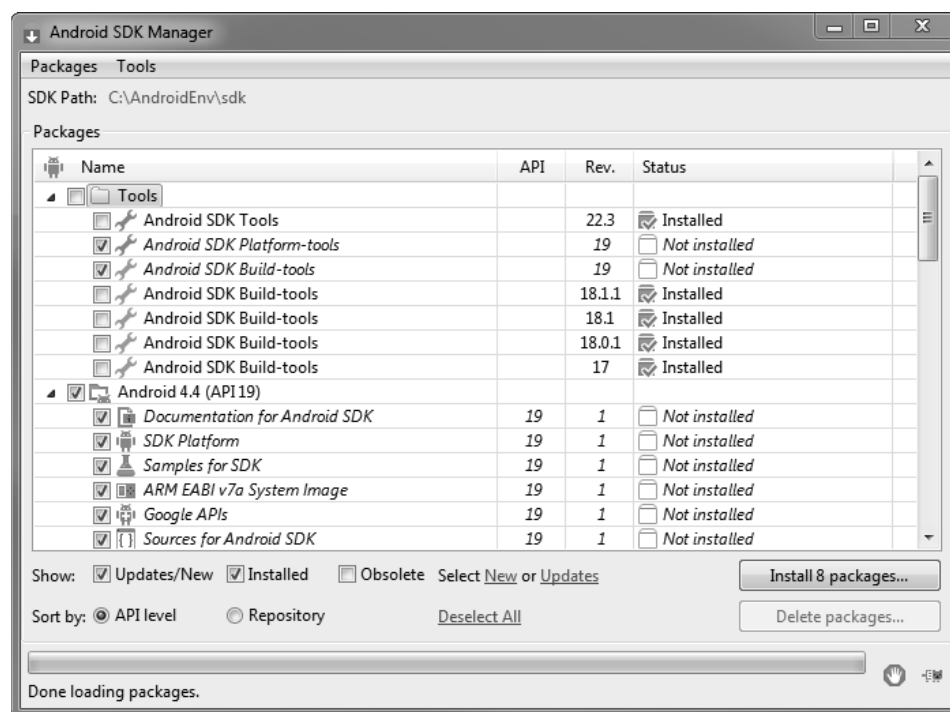


Figure B.1 Installing Android 4.4 KitKat using the Android SDK Manager.

Once you have installed the appropriate packages for your system, you must accept the Android SDK License agreements for each package. You may select each license and accept it individually, or you may select Android SDK License at the root of the license tree to accept all the licenses at once. Then press Install to begin downloading the packages to your system. Figure B.2 shows the Choose Packages to Install wizard.

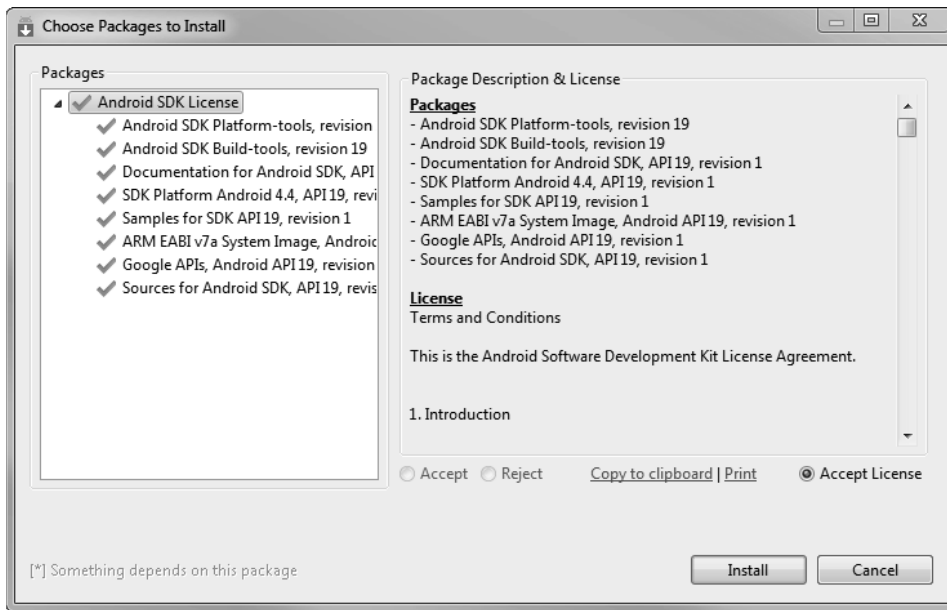


Figure B.2 Accepting the Android 4.4 KitKat license agreements.

## Create an Android 4.4 KitKat AVD

Now that you have Android 4.4 KitKat (API Level 19) installed on your system, you need to create an AVD with which to begin testing your applications. You create the AVD by opening the Android Virtual Device Manager and selecting New. Figure B.3 shows an example AVD configuration for a device with a Target SDK set to “Android 4.4—API Level 19.”

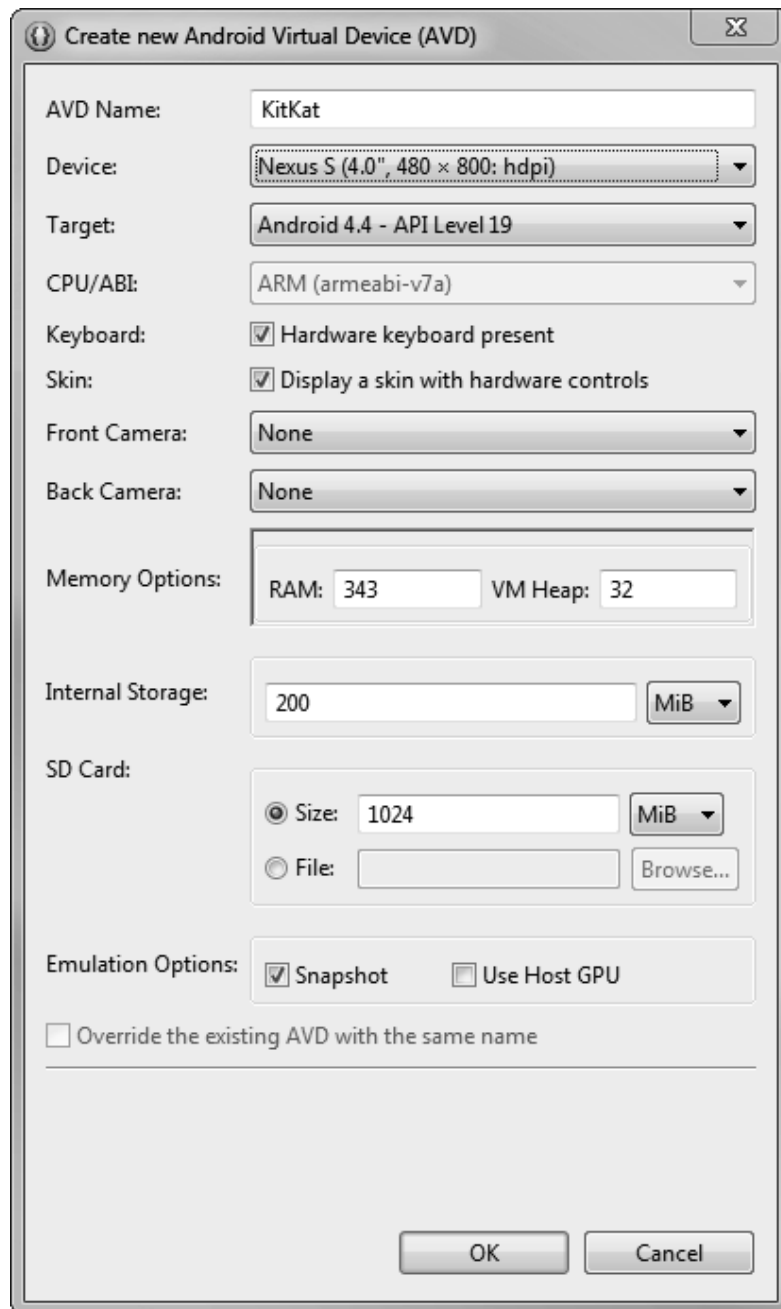


Figure B.3 Creating a new Android 4.4 KitKat AVD.

You should now see the KitKat AVD (Figure B.4) you just created listed within your Android Virtual Device Manager. You are now able to launch this AVD to begin testing your applications with API Level 19.

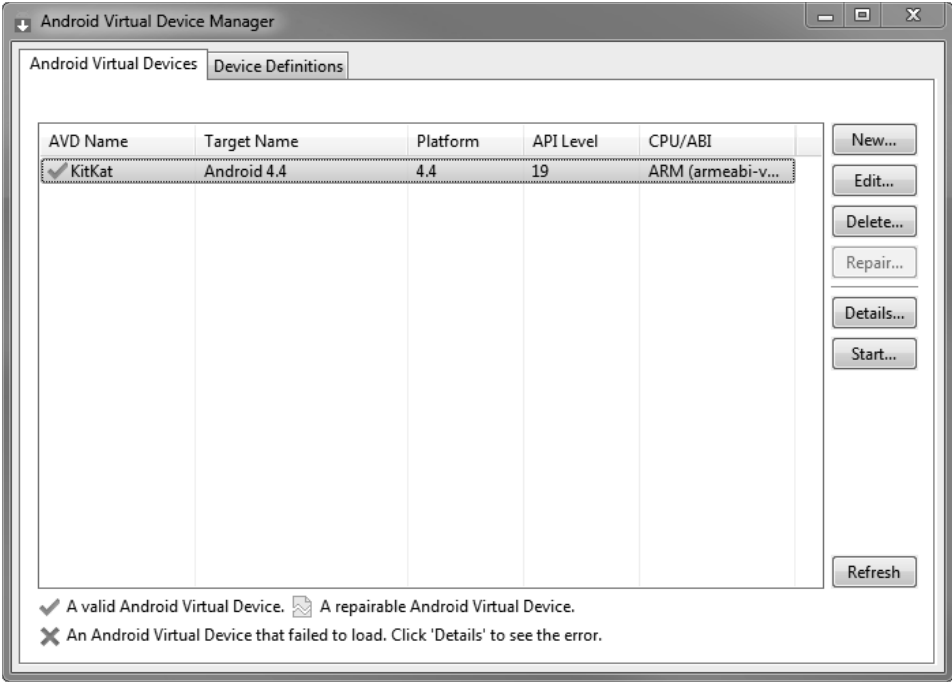


Figure B.4 Listing the newly created KitKat AVD within the Android Virtual Device Manager.

Upgrade MyFirstAndroidApp to API Level 19

Now that your development environment is configured, you should test an application that you have already created with API Level 19. For this example, we will use the MyFirstAndroidApp. The first step you must take is to upgrade the build target for the project. You do this by right-clicking the project and selecting Properties, then choosing Android. You should now be able to select a new Project Build Target, and in this case, select Android 4.4. Figure B.5 shows the Project Build Target selection options.



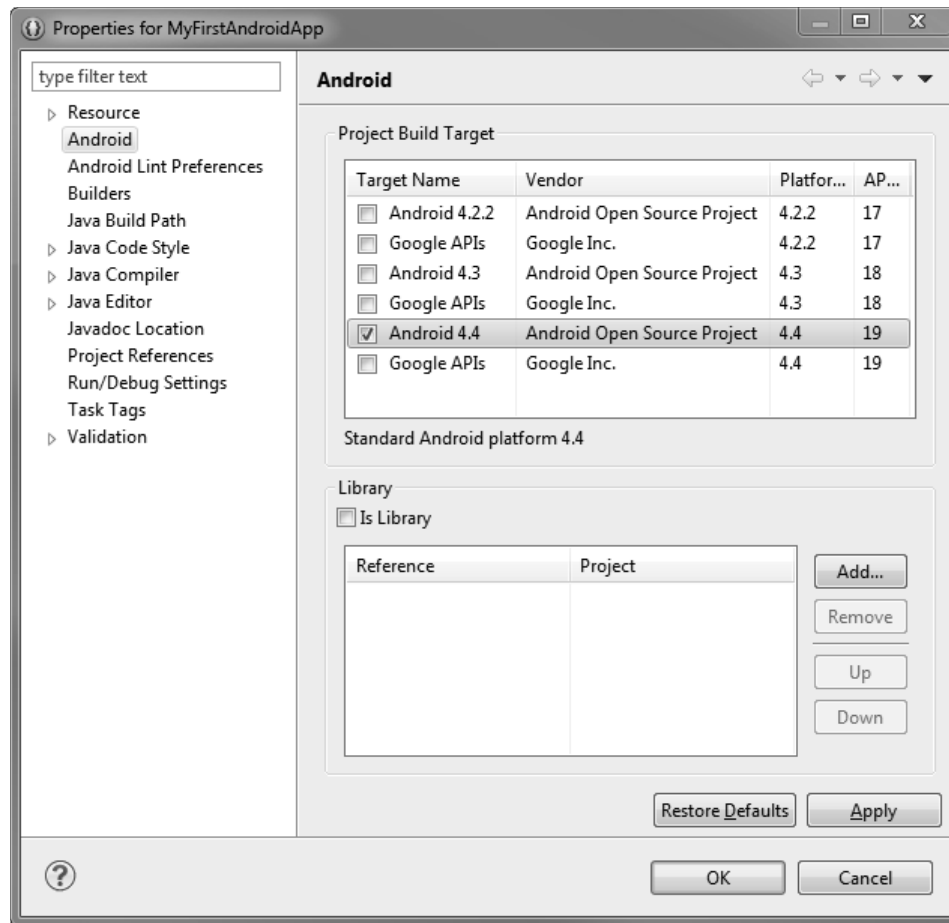


Figure B.5 The Project Build Target with Android 4.4 selected for the MyFirstAndroidApp project.

With the build target properly configured, you then need to update the `AndroidManifest.xml` file to use the appropriate Target SDK version. Figure B.6 shows the Target SDK version within the manifest file set to 19.

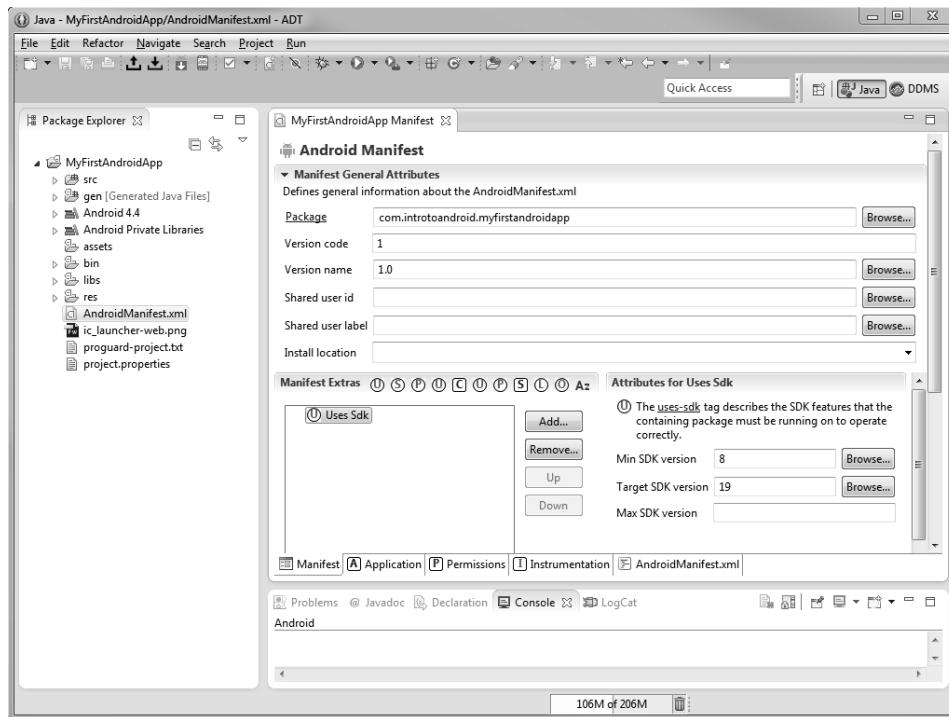


Figure B.6 The `AndroidManifest.xml` file of the `MyFirstAndroidApp` project with the Target SDK version configured for API Level 19.

You should now be ready to launch the KitKat AVD you have created and should also be able to install and debug the `MyFirstAndroidApp` project onto this AVD.

## Testing on Real Devices with Android 4.4

As of this writing, the only device available on the market with Android 4.4 KitKat is the newly released Nexus 5, but by the time you read this, there may very well be many more. We have stressed throughout this book that testing on a real device is the only way to ensure that your application will work properly on actual hardware. We recommend that you test your applications on as many real devices with Android 4.4 as possible when they become available.

## Summary

The latest version of Android 4.4 KitKat introduces new and exciting features for developers, designers, and users. The new optimizations introduced should allow developers to construct even better-performing applications. The introductions that relate to design should allow designers and developers to create more immersive and better user experiences. Luckily, the changes to API features that are relevant for this introductory book are few, although they are worth mentioning.

## References and More Information

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