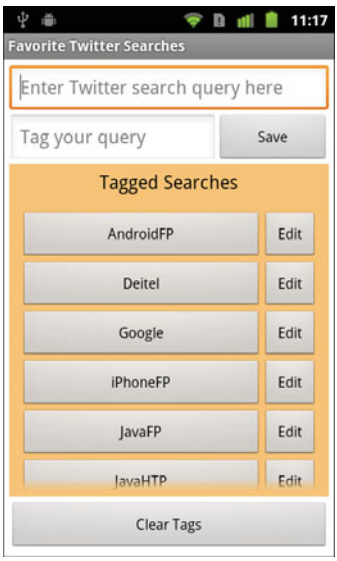
5

Favorite Twitter® Searches App

SharedPreferences, Buttons, Nested Layouts, Intents AlertDialogs, Inflating XML Layouts and the Manifest File



Objectives

In this chapter you'll:

- Enable users to interact with an app via `Button`s.
- Use a `ScrollView` to display objects that do not fit on the screen.
- Create GUI components dynamically in response to user interactions by inflating an XML layout.
- Store key/value pairs of data associated with an app using `SharedPreferences`.
- Modify key/value pairs of data associated with an app using `SharedPreferences.Editor`.
- Use an `AlertDialog.Builder` object to create `AlertDialog`s.
- Programmatically open a website in a web browser by using an `Intent`.
- Programmatically hide the soft keyboard.

Outline

5.1 Introduction

The **Favorite Twitter Searches** app allows users to save their favorite (possibly lengthy) Twitter search strings with easy-to-remember, user-chosen, short tag names. Users can then conveniently follow the tweets on their favorite topics. Twitter search queries can be finely tuned using Twitter's search operators (`dev.twitter.com/docs/using-search`)—but more complex queries are lengthy, time consuming and error prone to type on a mobile device. The user's favorite searches are saved on the device, so they're immediately available each time the app launches. Figure 5.1(a) shows the app with several saved

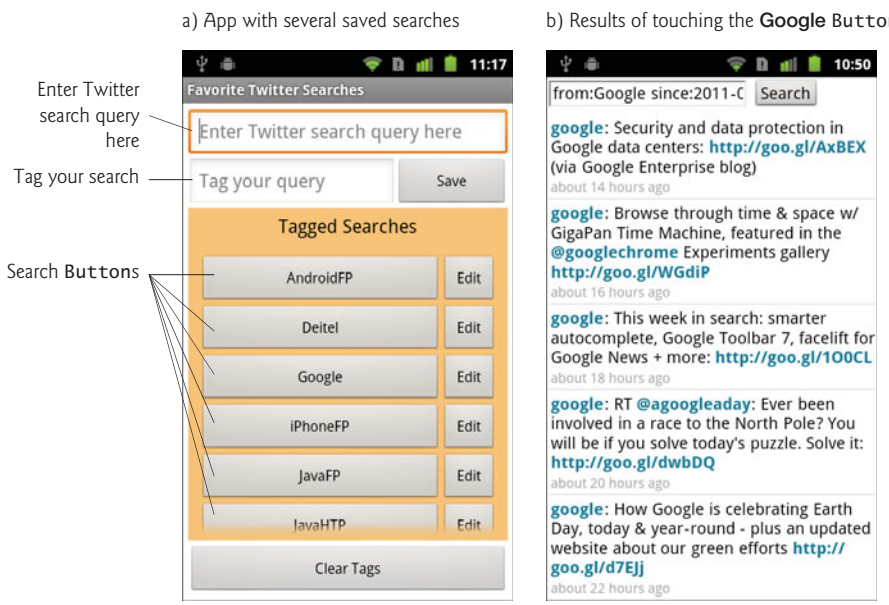


Fig. 5.1 | **Favorite Twitter Searches** app.

searches—the user can save many searches and scroll through them in alphabetical order. Search queries and their corresponding tags are entered in the `EditTexts` at the top of the screen, and the **Save** `Button` adds each search to the favorites list. Touching a search `Button` sends that search to Twitter and displays the search results in the device's web browser. Figure 5.1(b) shows the result of touching the **Google** `Button`, which searches for tweets from Google—specified by the Twitter search `from:Google`. You can edit the searches using the **Edit** `Buttons` to the right of each search `Button`. This enables you to tweak your searches for better results after you save them as favorites. Touching the **Clear Tags** `Button` at the bottom of the screen removes all the searches from the favorites list—a dialog asks the user to confirm this first.

5.2 Test-Driving the Favorite Twitter Searches App

Opening and Running the App

Open Eclipse, then import the **Favorite Twitter Searches** app project. Perform the following steps:

1. *Open the* **Import** *Dialog.* Select **File > Import...** to open the **Import** dialog.
2. *Import the* **Favorite Twitter Searches** *app project.* In the **Import** dialog, expand the **General** node and select **Existing Projects into Workspace**, then click **Next >** to proceed to the **Import Projects** step. Ensure that **Select root directory** is selected, then click the **Browse...** button. In the **Browse For Folder** dialog, locate the `FavoriteTwitterSearches` folder in the book's examples folder, select it and click **OK**. Click **Finish** to import the project into Eclipse. The project now appears in the **Package Explorer** window at the left side of the Eclipse window.
3. *Launch the* **Favorite Twitter Searches** *app.* In Eclipse, right click the `FavoriteTwitterSearches` project in the **Package Explorer** window, then select **Run As > Android Application** from the menu that appears. This will execute **Favorite Twitter Searches** in the AVD that you created in the Before You Begin section (Fig. 5.2).

The top two `EditTexts` allow you to enter new searches, and the **Tagged Searches** section displays previously saved searches (in this case, none yet).

Adding a New Favorite Search

Enter `from:Google` into the top `EditText` specifying your search subject. Enter `Google` into the bottom `EditText` (Fig. 5.3(a)). This will be the short name displayed in the **Tagged Searches** section. Press the **Save** `Button` to save the search and hide the keyboard—a **Google** `Button` appears under the **Tagged Searches** heading (Fig. 5.3(b)). Also, notice that the soft keyboard is dismissed—this app hides the soft keyboard programmatically.

Editing a Search

To the right of each search `Button` is an **Edit** `Button`. Touch this to reload your query and tag into the `EditTexts` at the top of the app for editing. Let's restrict our search to tweets since April 1, 2011. Add `since:2011-04-01` to the end of the query (Fig. 5.4). Touching **Save** updates the saved search. [*Note:* If you change the tag name, this will create a new search `Button`—this is useful if you want to base a new query on a previously saved query.]

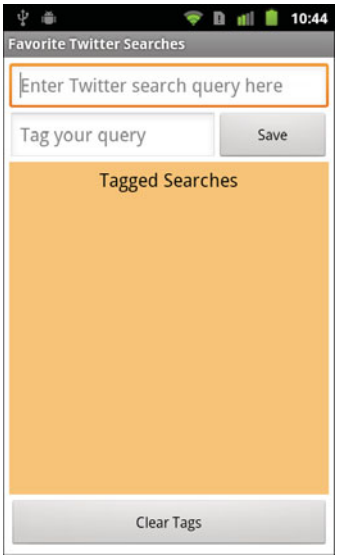
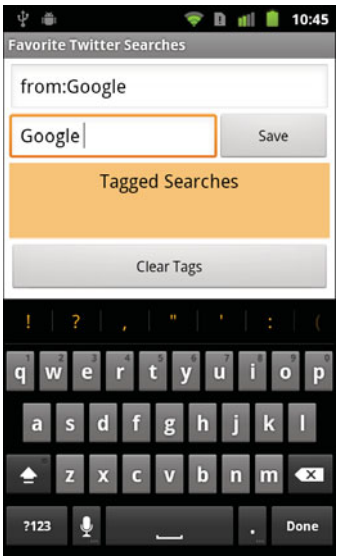


Fig. 5.2 | Running the **Favorite Twitter Searches** app.

a) Entering a Twitter search and search tag



b) App after saving the search and search tag

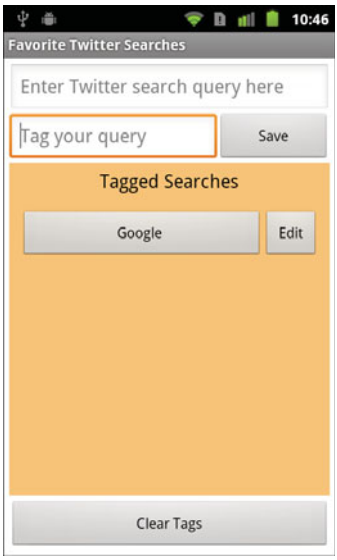


Fig. 5.3 | Entering a Twitter search.

Viewing Twitter Search Results

To see the search results touch the **Google** search query `Button`. This opens the web browser and accesses the Twitter website to obtain and display the search results (Fig. 5.5).

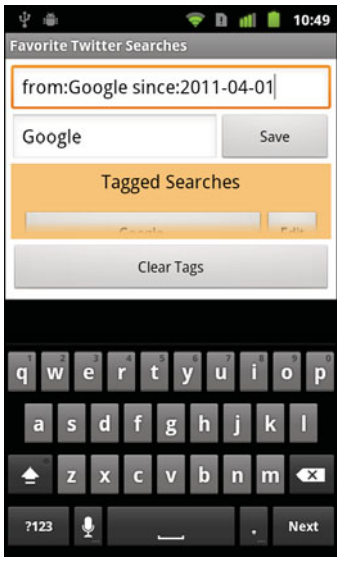


Fig. 5.4 | Editing a Twitter search.

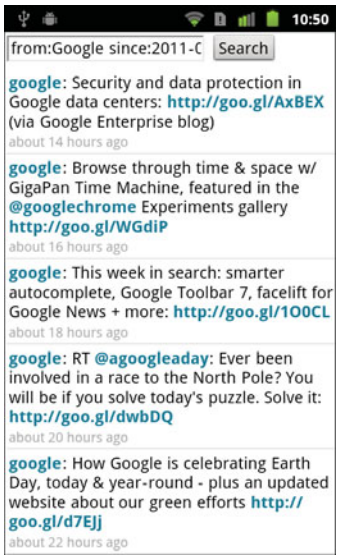


Fig. 5.5 | Viewing search results.

5.3 Technologies Overview

This app uses `EditText`, `ScrollView` and `Button` GUI components. A **`ScrollView`** is a **`ViewGroup`** that can contain other `Views` (like a layout) and that lets users *scroll* through content too large to display on the screen. We use a `ScrollView` to display an arbitrarily

large list of saved searches, because the user may have more favorite searches than can fit on the screen. Each search is associated with a **`Button`**, which the user can tap to pass the search to the browser.

`SharedPreferences`

You can have one or more files containing key/value pairs associated with each app. We use this capability to manipulate a file called `searches` in which we store the pairs of tags and Twitter search queries that the user creates. To read the key/value pairs from this file we'll use **`SharedPreferences`** objects (package **`android.content`**). To modify the file's contents, we'll use **`SharedPreferences.Editor`** objects (package `android.content`). The keys in the file must be `String`s, and the values can be `String`s or primitive-type values.

We read in the saved searches in our `refreshButtons` method, which is called from the `Activity`'s `onCreate` method—this is acceptable because the amount of data being loaded is small. When an app is launched, Android creates a main thread called the UI thread which handles the GUI—*extensive input/output should not be performed on the UI thread, since that would affect your app's responsiveness.* We'll show how to deal with this in Chapter 10.

`Intents`

`Intents` are typically used to launch activities—they indicate an *action* to be performed and the *data* on which that action is to be performed. When the user touches a `Button` representing a search, we create a URL that contains the Twitter search query. We load the URL into a web browser by creating a new `Intent` for viewing a URL, then passing that `Intent` to the **`startActivity` method,** which our `Activity` inherits indirectly from class `Context`. To view a URL, `startActivity` launches the device's web browser to display the content—in this app, the results of a Twitter search.

`LayoutInflater`

Each new search that the user enters adds another row of `Button`s to the user interface—one `Button` that represents the search and one that allows you to edit that search. We use a **`LayoutInflater`** to programmatically create these GUI components from a predefined XML layout. The `LayoutInflater` inflates an XML layout file, thus creating the components specified in the XML. Then we set the search `Button`'s text, register event handlers for each `Button` and attach the new GUI components to the user interface.

`AlertDialog`

We want the user to enter both a query and a tag before storing a new search—if either `EditText` is empty, we display a message to the user. We also want the user to confirm that all searches should be deleted when the **Clear Tags** button is touched. You can display messages and confirmations like these with an **`AlertDialog`**. While the dialog is displayed, the user cannot interact with the app—this is known as a **modal dialog**. As you'll see, you specify the settings for the dialog with an **`AlertDialog.Builder`** object, then use it to create the `AlertDialog`.

`AndroidManifest.xml`

The **`AndroidManifest.xml`** file is created for you when you create an app using the ADT Plugin in Eclipse. This file specifies settings such as the app's name, the package name, the

target and minimum SDKs, the app's Activity name(s) and more. We'll introduce this file at the end of the chapter and show you how to add a new setting to the manifest that prevents the soft keyboard from displaying when the app first loads.

5.4 Building the App's GUI and Resource Files

In this section, we'll build the GUI for the **Favorite Twitter Searches** app. We'll present the XML that the ADT Plugin generates for the app's layout. We'll focus primarily on new GUI features and present the final XML layout, highlighting the key portions of the XML. We'll also create a second XML layout that will be dynamically inflated to create the tag and **Edit** `Buttons` for each search. This will allow the app to load the previously stored searches and adapt at runtime as the user adds or deletes searches.

5.4.1 `main.xml` `TableLayout`

As in Chapter 4, this app's main layout uses a `TableLayout` (Fig. 5.6)—here we use five rows and two columns. All of the GUI components in row 0 and rows 2–4 span both columns. The `TableLayout`'s `android:stretchColumns` attribute is set to "*", which indicates that all of the table's columns are stretchable—the elements in each column can expand to the screen's full width.

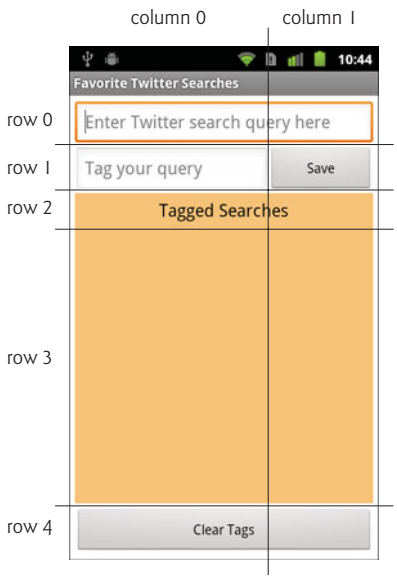


Fig. 5.6 | Rows and columns in the **Favorite Twitter Searches** app's `TableLayout`.

Figure 5.7 shows the names of all the app's GUI components. Recall that, for clarity, our naming convention is to use the GUI component's class name in each component's **Id** property in the XML layout and in each variable name in the Java code.

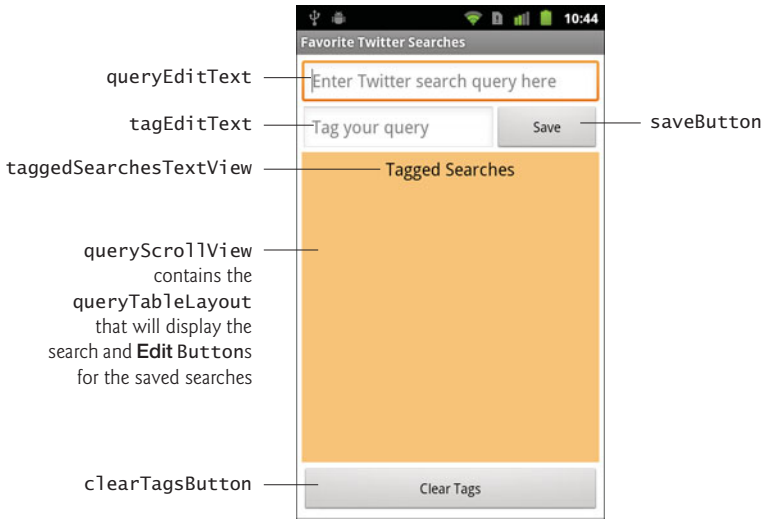


Fig. 5.7 | **Favorite Twitter Searches** GUI's components labeled with their **Id** property values.

5.4.2 Creating the Project

Begin by creating a new Android project named `FavoriteTwitterSearches`. Specify the following values in the **New Android Project** dialog, then press **Finish**:

- **Build Target**: Ensure that **Android 2.3.3** is checked
- **Application name**: `Favorite Twitter Searches`
- **Package name**: `com.deitel.favoritetwittersearches`
- **Create Activity**: `FavoriteTwitterSearches`
- **Min SDK Version**: 10. [*Note:* This SDK version corresponds to Android 2.3.3; however, we do not use any Android 2.3.3-specific functionality in this app. If you'd like this app to execute on AVDs or devices running an earlier Android version, you can set the **Min SDK Version** to a lower value. For example, you could specify 8 to indicate that the app can execute on Android 2.2 or higher.]

5.4.3 Creating the Resource Files

In this app, we stored a literal color value and a few literal dimension values in the files `colors.xml` and `dimen.xml`, respectively. These file names are used by convention, and the files are placed in the app's `res/values` folder. Each color and dimension you create in these files will be represented in the auto-generated `R.java` file by a constant that you can use to reference the specified value. To create each file:

1. Right click the project name in the **Package Explorer** window and select **New > Other...**, then select **Android XML File** from the **Android** node in the **New** dialog. This displays the **New Android XML File** dialog.
2. In the **File** text field, enter the name `colors.xml`.

3. Under **What type of resource would you like to create?**, select the **Values** radio button. This will cause the new file to be placed into the project's `res/values` folder.
4. Click **Finish** to create the file.
5. Repeat this process to create the `dimen.xml` file.

The contents of these two files are shown in Figs. 5.8–5.9. As you'll see, we use the color and dimensions in these files in our XML layouts. We'll also use several Android predefined colors from the class `R.color`. As in previous apps, we also defined various string resources in the `strings.xml` file.

`colors.xml`

Each XML document that represents resources must contain a ***`resources` element*** in which you specify the resources. Within that element in Fig. 5.8, we define the one color value that we use in this app (`light_orange`). The ***`color` element*** (line 3) specifies a `name` attribute that's used to reference the color and a hexadecimal value specifying the color.

```
1  <?xml version="1.0" encoding="UTF-8"?>
2  <resources>
3     <color name="light_orange">#8f90</color>
4  </resources>
```

Fig. 5.8 | Colors defined in `colors.xml`.

`dimen.xml`

In Fig. 5.9, we define ***`dimen` elements*** that represent the widths search tag and **Edit** `Button`s. A benefit of defining dimensions as resources is that you can use density-independent pixel (`dp` or `dip`) and scale-independent pixel (`sp`) values, which Android automatically converts to the appropriate pixel values for a given device. In code, you can set only fixed pixel sizes, so you'd have to manually calculate the proper pixel values for each device.

```
1  <?xml version="1.0" encoding="UTF-8"?>
2  <resources>
3     <dimen name="tagButtonWidth">230dp</dimen>
4     <dimen name="editButtonWidth">50dp</dimen>
5  </resources>
```

Fig. 5.9 | Dimensions defined in `dimen.xml`.

`strings.xml`

In Fig. 5.10, we define the `String` literal values we use throughout this app. Line 4 defines the `searchURL`. The user's search queries are appended to this URL before the twitter search is displayed in the device's web browser.

```
1  <?xml version="1.0" encoding="UTF-8"?>
2  <resources>
3     <string name="app_name">Favorite Twitter Searches</string>
```

Fig. 5.10 | Strings defined in `strings.xml`. (Part 1 of 2.)

```
4     <string name="searchURL">http://search.twitter.com/search?q=</string>
5     <string name="tagPrompt">Tag your query</string>
6     <string name="queryPrompt">Enter Twitter search query here</string>
7     <string name="taggedSearches">Tagged Searches</string>
8     <string name="edit">Edit</string>
9     <string name="clearTags">Clear Tags</string>
10    <string name="save">Save</string>
11    <string name="erase">Erase</string>
12    <string name="cancel">Cancel</string>
13    <string name="OK">OK</string>
14    <string name="missingTitle">Missing Text</string>
15    <string name="missingMessage">
16       Please enter a search query and tag it.</string>
17    <string name="confirmTitle">Are You Sure?</string>
18    <string name="confirmMessage">
19       This will delete all saved searches</string>
20 </resources>
```

Fig. 5.10 | Strings defined in `strings.xml`. (Part 2 of 2.)

5.4.4 Adding the `TableLayout` and Components

Using the techniques you learned in Chapter 4, you'll build the GUI in Figs. 5.6–5.7. You'll start with the basic layout and controls, then customize the controls' properties to complete the design. As you add components to each row of the `TableLayout`, set the **Id** and **Text** properties of the components as shown in Fig. 5.7. When building the GUI, place your literal string values in the `strings.xml` file in the app's `res/values` folder. Use the **Outline** window to add components to the proper `TableRows` of the `TableLayout`.

Step 1: Deleting and Recreating the `main.xml` File

For this application, once again you'll replace the default `main.xml` file with a new one that uses a `TableLayout` in which components are arranged relative to one another. Perform the following steps to replace the default `main.xml` file:

1. Right click the `main.xml` file in the projects `/res/layout` folder and select **Delete** to delete the file.
2. Right click the layout folder and select **New > Other...** to display the **New** dialog.
3. In the **Android** node, select **Android XML File** and click **Next >** to display the **New Android XML File** dialog.
4. Specify the file name `main.xml` and select `TableLayout`, then click **Finish**.

Step 2: Configuring the Visual Layout Editor to Use the Appropriate Android SDK

As you did in Fig. 3.7, select Android 2.3.3 from the SDK selector drop-down list at the top-right side of the **Graphical Layout** tab to indicate that we're designing a GUI for an Android 2.3.3 device.

Step 3: Configuring the Visual Layout Editor's Size and Resolution

As you did in Fig. 3.11, select **3.7in WVGA (Nexus One)** from the Device Configurations drop-down list at the top-left side of the **Graphical Layout** tab. This configures the design area for devices with 480-by-800 (WVGA) resolution.

Step 4: Configuring the `TableLayout`

In the **Outline** window, select the `TableLayout` and set the following properties:

- **Background:** `@android:color/white`
- **Id:** `@+id/tableLayout`
- **Padding:** `5dp`
- **Stretch columns:** *

We've specified the **Background** color using one of Android's predefined color values (`white`) from the ***`R.color` class***—you can find the names of the predefined colors at

```
developer.android.com/reference/android/R.color.html
```

To access a predefined color resource, you specify `@android:color/` followed by the name of the resource.

By default, the layout fills the entire screen, because the **Layout width** and **Layout height** properties have the value `match_parent`. Setting the **Padding** property to `5dp` ensures that there will be 5 density-independent pixels around the border of the entire GUI. The **Stretch columns** property indicates that the columns should stretch horizontally to fill the layout's width.

Step 5: Adding the `TableRows`

Next, use the **Outline** window as you did in Chapter 4 to add five `TableRows` to the `TableLayout`. Select the `TableLayout` each time before adding the next `TableRow`, so that the `TableRows` are properly nested in the `TableLayout`. Change the **Id** properties of the five `TableRows` to `tableRow0`, `tableRow1`, `tableRow2`, `tableRow3` and `tableRow4`, respectively. Also, select each `TableRow` and set its **Layout width** property to `match_parent` so that the rows are the full width of the layout.

Step 6: Adding the Components to the `TableRows`

Using Figs. 5.6–5.7 as your guide, add the `EditTexts`, `Buttons`, `TextView` and `ScrollView` to the layout. Also, place a `TableLayout` inside the `ScrollView`. Name the elements as shown in Fig. 5.7. Study the XML elements in `main.xml` (Fig. 5.11) to see the values specified for the attributes of each GUI component. We've highlighted the new features and key features for this example.

```
1  <?xml version="1.0" encoding="utf-8"?>
2  <TableLayout xmlns:android="http://schemas.android.com/apk/res/android"
3     android:id="@+id/tableLayout" android:layout_width="match_parent"
4     android:layout_height="match_parent" android:padding="5dp"
5     android:stretchColumns="*" android:background="@android:color/white">
6
7     <!-- tableRow0 -->
8     <TableRow android:id="@+id/tableRow0"
9        android:layout_height="wrap_content"
10       android:layout_width="match_parent">
11       <EditText android:layout_width="match_parent"
12          android:layout_height="wrap_content" android:layout_span="2"
```

Fig. 5.11 | **Favorite Twitter Search** app's XML layout. (Part 1 of 3.)

```
            android:inputType="text" android:id="@+id/queryEditText"
            android:hint="@string/queryPrompt"
            android:imeOptions="actionNext">
         </EditText>
      </TableRow>

      <!-- tableRow1 -->
      <TableRow android:id="@+id/tableRow1"
         android:layout_height="wrap_content"
         android:layout_width="match_parent">
         <EditText android:layout_height="wrap_content"
            android:hint="@string/tagPrompt" android:inputType="text"
            android:id="@+id/tagEditText" android:imeOptions="actionDone"
            android:layout_gravity="center_vertical"></EditText>
         <Button android:id="@+id/saveButton"
            android:layout_height="wrap_content"
            android:layout_width="wrap_content"
            android:layout_gravity="center_vertical"
            android:text="@string/save"></Button>
      </TableRow>

      <!-- tableRow2 -->
      <TableRow android:id="@+id/tableRow2"
         android:layout_height="wrap_content"
         android:layout_width="match_parent"
         android:background="@color/light_orange">

         <TextView android:layout_height="wrap_content"
            android:id="@+id/taggedSearchesTextView"
            android:text="@string/taggedSearches"
            android:layout_width="match_parent"
            android:layout_gravity="center_horizontal"
            android:layout_span="2" android:textSize="18sp"
            android:textColor="@android:color/black"
            android:padding="5dp"></TextView>
      </TableRow>

      <!-- tableRow3 -->
      <TableRow android:id="@+id/tableRow3"
         android:background="@color/light_orange"
         android:layout_height="wrap_content"
         android:layout_width="match_parent" android:layout_weight="1">

         <ScrollView android:id="@+id/queryScrollView"
            android:layout_width="match_parent"
            android:layout_span="2" android:padding="5dp">
            <TableLayout android:id="@+id/queryTableLayout"
               android:layout_width="match_parent"
               android:layout_height="match_parent" android:padding="5dp"
               android:stretchColumns="*"></TableLayout>
         </ScrollView>
      </TableRow>

```

Fig. 5.11 | **Favorite Twitter Search** app's XML layout. (Part 2 of 3.)

```
66      <!-- tableRow4 -->
67      <TableRow android:id="@+id/tableRow4"
68         android:layout_height="wrap_content"
69         android:layout_width="match_parent">
70
71         <Button android:layout_width="wrap_content"
72            android:layout_height="wrap_content"
73            android:text="@string/clearTags"
74            android:id="@+id/clearTagsButton"
75            android:layout_span="2" android:layout_marginTop="5dp"></Button>
76      </TableRow>
77   </TableLayout>
```

Fig. 5.11 | **Favorite Twitter Search** app's XML layout. (Part 3 of 3.)

Key Features in `main.xml`

Recall from Chapter 4 that the `android:layout_span` attribute (lines 12, 45, 58 and 75) *must* be specified directly in the XML, as it does *not* display in the **Properties** window in design view. We've highlighted the resources from the `colors.xml`, `dimen.xml` and `strings.xml` files that were used to set various properties of the GUI components. You can access the various resource values in XML as follows:

- Strings: Specify `@string/` followed by the name of the resource—for example, lines 14 and 31 specify string resource values for the ***`android:hint`*** attribute of the each `EditText`. This attribute displays inside an `EditText` a hint that helps the user understand the `EditText`'s purpose. We use other string resources to represent the text on various GUI components, such as the `Buttons` (lines 31 and 73) and the `TextView` (line 41).
- Colors: Specify `@color/` followed by the name of the resource—for example, lines 38 and 52 specify a color resource for the background color of `tableRow2` and the `ScrollView`, respectively.

Lines 15 and 25 introduce the `EditText` attribute **`android:imeOptions`**, which enables you to configure options for the current input method. For example, when `queryEditText` has the focus and the soft keyboard is displayed, the keyboard contains a **Next** button—specified with the `android:imeOptions` attribute value `actionNext` (line 15). If the user touches this button, the focus is transfered to the next component that can accept text input—`tagEditText`. When `tagEditText` has the focus, the soft keyboard contains a **Done** button—specified with the `android:imeOptions` attribute value `actionDone` (line 25). If the user touches this button, the system hides the soft keyboard.

Lines 27–31 and 71–75 define the `Buttons` for saving a search and clearing all previously saved searches, respectively. Lines 56–63 define a `ScrollView` that contains a `TableLayout` (lines 59–62) in which the search `Buttons` will be displayed programmatically. The `TableLayout`'s `android:stretchColumns` attribute is set to `"*"` so that the contents of each `TableRow` we programmatically place in this `TableLayout` can stretch to fill the layout's width. If there are more search `Buttons` than can be displayed on the screen, you can drag your finger up or down the `ScrollView` to scroll through the `Buttons` in the `TableLayout`. As you'll see in Section 5.5, this `TableLayout` will contain `TableRows` that each contain a search `Button` and an **Edit** `Button`.

You'll notice in line 54 that we set `tableRow3`'s `android:layout_weight` attribute to `1`. This value makes `tableRow3` more important than the other rows when the main table layout is resized based on the available space. Because `tableRow3` is the only component to that specifies a `android:layout_weight` attribute, it stretches vertically to occupy all remaining vertical space that is not occupied by the other rows.

5.4.5 Creating a TableRow That Displays a Search and an Edit Button

Next, you'll define a `TableRow` that will be programmatically inflated to create each search `Button` and corresponding **Edit** `Button`. In Section 5.5, you'll configure these `Buttons` and add this `TableRow` to the `queryTableLayout` (Fig. 5.11, lines 59–62) to display the `Buttons`. To create another layout XML file:

1. Right click the layout folder and select **New > Other...** to display the **New** dialog.
2. In the **Android** node, select **Android XML File** and click **Next >** to display the **New Android XML File** dialog.
3. In the **File** text field, enter the name `new_tag_view.xml`.
4. Under **What type of resource would you like to create?**, select the **Layout** radio button. This places the new file `new_tag_view.xml` into the project's `res/layout` folder.
5. At the bottom of the dialog, you can select the *root element* for the new layout. Choose `TableRow`.
6. Click **Finish** to create the file. The file opens immediately in **XML** view.
7. Switch to **Graphical Layout** tab in the Visual Layout Editor, then select Android 2.3.3 from the SDK selector drop-down list at the top-right side of the **Graphical Layout** tab and **3.7in WVGA (Nexus One)** from the Device Configurations drop-down list at the top-left side of the **Graphical Layout** tab.

Add two `Buttons` to the layout. Configure the `Buttons`' and the layout's properties as shown in (Fig. 5.12). We didn't specify the `android:text` attribute for the `newTagButton` because we'll set this text to a particular search tag when the `Buttons` are created programmatically. We set the `TableLayout`'s `android:background` attribute to the predefined color ***`transparent`*** (line 6), so that the background color of the `ScrollView` will show through when we attach the `TableRow` to the `ScrollView`. By default, the `ScrollView` has the same background color as its parent—that is, `tableRow3`. In lines 9 and 12, notice that we use `@dimen/` followed by the name of a dimension resource to specify the `Buttons`' widths.

```
1  <?xml version="1.0" encoding="UTF-8"?>
2  <TableRow xmlns:android="http://schemas.android.com/apk/res/android"
3     android:id="@+id/newTagTableRow"
4     android:layout_width="match_parent"
5     android:layout_height="wrap_content"
6     android:background="@android:color/transparent">
7
```

Fig. 5.12 | The `newTagTableRow` that will be programmatically inflated. (Part 1 of 2.)

```
8       <Button android:id="@+id/newTagButton"
9          android:layout_width="@dimen/tagButtonWidth"
10         android:layout_height="wrap_content"></Button>
11      <Button android:id="@+id/newEditButton"
12         android:layout_width="@dimen/editButtonWidth"
13         android:layout_height="wrap_content"
14         android:text="@string/edit"></Button>
15   </TableRow>
```

Fig. 5.12 | The `newTagTableRow` that will be programmatically inflated. (Part 2 of 2.)

5.5 Building the App

Figures 5.13–5.23 implement the **Favorite Twitter Searches** app in the single class `FavoriteTwitterSearches`, which extends `Activity`.

The `package` *and* `import` *Statements*

Figure 5.13 shows the app's `package` and `import` statements. The `package` statement (line 4) indicates that the class in this file is part of the `com.deitel.favoritetwittersearches` package. This line was inserted by the IDE when you created the project. The `import` statements in lines 6–23 import the various classes and interfaces the app uses.

```
1   // FavoriteTwitterSearches.java
2   // Stores Twitter search queries and tags for easily opening them
3   // in a browser.
4   package com.deitel.favoritetwittersearches;
5
6   import java.util.Arrays;
7
8   import android.app.Activity;
9   import android.app.AlertDialog;
10  import android.content.Context;
11  import android.content.DialogInterface;
12  import android.content.Intent;
13  import android.content.SharedPreferences;
14  import android.net.Uri;
15  import android.os.Bundle;
16  import android.view.LayoutInflater;
17  import android.view.View;
18  import android.view.View.OnClickListener;
19  import android.view.inputmethod.InputMethodManager;
20  import android.widget.Button;
21  import android.widget.EditText;
22  import android.widget.TableLayout;
23  import android.widget.TableRow;
24
```

Fig. 5.13 | `FavoriteTwitterSearches`' `package` and `import` statements.

Line 6 imports the `Arrays` class from the `java.util` package. We'll use this class's `sort` method to sort the tags that represent each search so they appear in alphabetical

order. Of the remaining `import` statements, we consider only those for the classes being introduced in this chapter.

- **Class `AlertDialog` of package `android.app`** (line 9) is used to display dialogs.
- **Class `Context` of package `android.content`** (line 10) provides access to information about the environment in which the app is running and allows you to access various Android services. We'll be using a constant from this class with a `LayoutInflater` (discussed below) to help load new GUI components dynamically.
- **Class `DialogInterface` of package `android.content`** (line 11) contains the nested interface ***`OnClickListener`***. We implement this interface to handle the events that occur when the user touches a button on an `AlertDialog`.
- **Class `Intent` of package `android.content`** (line 12) enables us to work with `Intents`. An `Intent` specifies an *action* to be performed and the *data* to be acted upon—Android uses `Intents` to launch the appropriate activities.
- **Class `SharedPreferences` of package `android.content`** (line 13) is used to manipulate persistent key/value pairs that are stored in files associated with the app.
- **Class `Uri` of package `android.net`** (line 14) enables us to convert an Internet URL into the format required by an `Intent` that launches the device's web browser. We'll say more about URIs and URLs in Section 5.5.
- **Class `LayoutInflater` of package `android.view`** (line 16) enables us to inflate an XML layout file dynamically to create the layout's GUI components.
- **Class `InputMethodManager` of package `android.view.inputmethod`** (line 19) enables us to hide the soft keyboard when the user saves a search.
- **Package `android.widget`** (lines 20–23) contains the widgets (i.e., GUI components) and layouts that are used in Android GUIs. **Class `Button` of package `android.widget`** (line 20) represents a simple push button that the user touches to get the app to perform a specific action. You implement **interface `View.OnClickListener` of package `android.view`** (line 18) to specify the code that should execute when the user touches a `Button`.

Favorite Twitter Searches App `Activity`

`FavoriteTwitterSearches` (Figs. 5.14–5.23) is the **Favorite Twitter Searches** app's only `Activity` class. When you created the `FavoriteTwitterSearches` project, the ADT Plugin generated this class as a subclass of `Activity` (Fig. 5.14, line 26) and provided the shell of an overridden `onCreate` method, which every `Activity` subclass *must* override.

```
25 // main (and only) Activity class for the Favorite Twitter Searches app
26 public class FavoriteTwitterSearches extends Activity
27 {
28    private SharedPreferences savedSearches; // user's favorite searches
29    private TableLayout queryTableLayout; // shows the search buttons
30    private EditText queryEditText; // where the user enters queries
31    private EditText tagEditText; // where the user enters a query's tag
32
```

Fig. 5.14 | Class `FavoriteTwitterSearches` is a subclass of `Activity`.

Line 28 declares the `SharedPreferences` instance variable `savedSearches`. `SharedPreferences` objects store *key/value pairs* in which the keys are `String`s and the values are primitive types or `String`s. We use the `SharedPreferences` object to store the user's saved searches. Line 29 declares the `TableLayout` that will be used to access the part of the GUI in which we programmatically display new buttons. Lines 30–31 declare two `EditText`s that we'll use to access the queries and tags the user enters at the top of the app.

Overridden Method `onCreate` *of Class* `Activity`

The `onCreate` method (Fig. 5.15) is called by the system

- when the app loads
- if the app's process was killed by the operating system while the app was in the background, and the app is then restored
- each time the configuration changes, such as when the user rotates the device or opens/closes a physical keyboard.

The method initializes the `Activity`'s instance variables and GUI components—we keep it simple so the app loads quickly. Line 37 makes the required call to the superclass's `onCreate` method. As in the previous app, the call to `setContentView` (line 38) passes the constant `R.layout.main` to inflate the GUI from `main.xml`. Method `setContentView` uses this constant to load the corresponding XML document, then inflates the GUI.

```
33     // called when the activity is first created
34     @Override
35     public void onCreate(Bundle savedInstanceState)
36     {
37        super.onCreate(savedInstanceState); // call the superclass version
38        setContentView(R.layout.main); // set the layout
39
40        // get the SharedPreferences that contains the user's saved searches
41        savedSearches = getSharedPreferences("searches", MODE_PRIVATE);
42
43        // get a reference to the queryTableLayout
44        queryTableLayout =
45           (TableLayout) findViewById(R.id.queryTableLayout);
46
47        // get references to the two EditTexts and the Save Button
48        queryEditText = (EditText) findViewById(R.id.queryEditText);
49        tagEditText = (EditText) findViewById(R.id.tagEditText);
50
51        // register listeners for the Save and Clear Tags Buttons
52        Button saveButton = (Button) findViewById(R.id.saveButton);
53        saveButton.setOnClickListener(saveButtonListener);
54        Button clearTagsButton =
55          (Button) findViewById(R.id.clearTagsButton);
56        clearTagsButton.setOnClickListener(clearTagsButtonListener);
57
58        refreshButtons(null); // add previously saved searches to GUI
59     } // end method onCreate
60
```

Fig. 5.15 | Overriding `Activity` method `onCreate`.

Line 41 uses the method **getSharedPreferences** (inherited indirectly from class Context) to get a SharedPreferences object that can read *tag/query pairs* stored previously (if any) from the "searches" file. The first argument indicates the name of the file that contains the data. The second argument specifies the accessibility of the file and can be set to one of the following options:

- **MODE_PRIVATE**—The file is accessible *only* to this app. In most cases, you'll use this constant as the second argument to getSharedPreferences.
- **MODE_WORLD_READABLE**—Any app on the device can *read* from the file.
- **MODE_WORLD_WRITABLE**—Any app on the device can *write* to the file.

These constants can be combined with the bitwise OR operator (|).

We aren't reading a lot of data in this app, so it's fast enough to load the searches in onCreate—*lengthy data access should never be done in the UI thread; otherwise, the app will display an Application Not Responding (ANR) dialog—typically after five seconds of inactivity*. For more information about ANR dialogs and designing responsive apps, see

```
developer.android.com/guide/practices/design/responsiveness.html
```

Lines 44–49 obtain references to the queryTableLayout, queryEditText and tagEditText to initialize the corresponding instance variables. Lines 52–56 obtain references to the saveButton and clearTagsButton and register their listeners. Finally, line 58 calls refreshButtons (discussed in Fig. 5.16) to create Buttons for the previously saved searches and their corresponding **Edit** buttons that allow the user to edit each search.

refreshButtons Method of Class FavoriteTwitterSearches

Method refreshButtons of class FavoriteTwitterSearches (Fig. 5.16) creates and displays new query tag and edit Buttons either for a newly saved search (when its argument is not null) or for all saved searches (when its argument is null).

We'd like to display the Buttons in *alphabetical order* so the user can easily scan them to find a search to perform. First, lines 66–67 get an array of Strings representing the keys in the SharedPreferences object. SharedPreferences method **getAll** returns a Map containing all the key/value pairs. We then call **keySet** on that object to get a Set of all the keys. Finally, we call **toArray** (with an empty String array as an argument) on the Set object to convert the Set into an array of Strings, which we then sort in line 68. **Arrays.sort** (a static method of class Arrays from package java.util) sorts the array in its first argument. Since the user could enter tags using mixtures of uppercase and lowercase letters, we chose to perform a *case-insensitive sort* by passing the predefined Comparator<String> object **String.CASE_INSENSITIVE_ORDER** as the second argument to Arrays.sort.

```
61      // recreate search tag and edit Buttons for all saved searches;
62      // pass null to create all the tag and edit Buttons.
63      private void refreshButtons(String newTag)
64      {
```

Fig. 5.16 | refreshButtons method of class FavoriteTwitterSearches recreates and displays new search tag and edit Buttons for all saved searches. (Part 1 of 2.)

```
65          // store saved tags in the tags array
66          String[] tags =
67             savedSearches.getAll().keySet().toArray(new String[0]);
68          Arrays.sort(tags, String.CASE_INSENSITIVE_ORDER); // sort by tag
69
70          // if a new tag was added, insert in GUI at the appropriate location
71          if (newTag != null)
72          {
73             makeTagGUI(newTag, Arrays.binarySearch(tags, newTag));
74          } // end if
75          else // display GUI for all tags
76          {
77             // display all saved searches
78             for (int index = 0; index < tags.length; ++index)
79                makeTagGUI(tags[index], index);
80          } // end else
81       } // end method refreshButtons
82
```

Fig. 5.16 | `refreshButtons` method of class `FavoriteTwitterSearches` recreates and displays new search tag and edit `Buttons` for all saved searches. (Part 2 of 2.)

Lines 71–80 determine whether the method was called to create the GUI for one new search or for all the saved searches. Line 73 calls `makeTagGUI` (Fig. 5.18) to insert the GUI for one new tag. The call to **`Arrays.binarySearch`** in the second argument locates the insertion point that enables us to maintain the tag buttons in alphabetical order. When `refreshButtons` is called with a null argument, lines 78–79 call `makeTagGUI` for every saved search.

`makeTag` Method of Class `FavoriteTwitterSearches`

Method `makeTag` of class `FavoriteTwitterSearches` (Fig. 5.17) adds a new search to `savedSearches` or modifies an existing search. Line 87 uses `SharedPreferences` method **`getString`** to look up the previous value, if any, associated with `tag`. If the `tag` does not already exist in the file, the second argument (`null` in this case) is returned. In this case, the method also calls `refreshButtons` (line 96) to add the GUI for the new search.

```
83       // add new search to the save file, then refresh all Buttons
84       private void makeTag(String query, String tag)
85       {
86          // originalQuery will be null if we're modifying an existing search
87          String originalQuery = savedSearches.getString(tag, null);
88
89          // get a SharedPreferences.Editor to store new tag/query pair
90          SharedPreferences.Editor preferencesEditor = savedSearches.edit();
91          preferencesEditor.putString(tag, query); // store current search
92          preferencesEditor.apply(); // store the updated preferences
93
```

Fig. 5.17 | `makeTag` method of class `FavoriteTwitterSearches` adds a new search to the save file, then resets the `Buttons`. (Part 1 of 2.)

```
94          // if this is a new query, add its GUI
95          if (originalQuery == null)
96             refreshButtons(tag); // adds a new button for this tag
97       } // end method makeTag
98
```

Fig. 5.17 | `makeTag` method of class `FavoriteTwitterSearches` adds a new search to the save file, then resets the `Buttons`. (Part 2 of 2.)

Lines 90–92 add the new `tag` or modify the existing `tag`'s corresponding value. To modify the file associated with a `SharedPreferences` object, you must first call its ***`edit` method*** to obtain a `SharedPreferences.Editor` object (line 90). This object provides methods for adding key/value pairs to, removing key/value pairs from, and modifying the value associated with a particular key in a `SharedPreferences` file. Line 91 calls its ***`putString` method*** to save the new search's tag (the key) and query (the corresponding value). Line 92 *commits* the changes to the `"searches"` file by calling `SharedPreferences.Editor` method ***`apply`*** to make the changes to the file.

`makeTagGUI` Method of Class `FavoriteTwitterSearches`

Method `makeTagGUI` of class `FavoriteTwitterSearches` (Fig. 5.18) adds to the `queryTableLayout` one new row containing a tag and an **Edit** button. To do this, we first inflate the `new_tag_view.xml` layout that you created in Section 5.4.5. Recall that this layout consists of a `TableRow` with a `newTagButton` and a `newEditButton`.

Android provides a *service* that enables you to *inflate a layout*. To use this service, you obtain a reference to it (lines 103–104) by calling the `Activity`'s inherited ***`getSystemService` method*** with the argument ***`Context.LAYOUT_INFLATER_SERVICE`***. Since `getSystemService` can return references to various system services, you must *cast* the result to type `LayoutInflater`. Line 107 calls the `LayoutInflater`'s ***`inflate` method*** with the `R.layout.new_tag_view` constant that represents the `new_tag_view.xml` layout. This returns a reference to a `View`, which is actually the `TableRow` containing the `Buttons`. Lines 110–113 get a reference to the `newTagButton`, set its text to the value of `tag` and register its `OnClickListener`. Lines 116–118 get a reference to the `newEditButton` and register its `OnClickListener`. Line 121 adds the `newTagView` to the `queryTableLayout` at the specified `index`.

```
99       // add a new tag button and corresponding edit button to the GUI
100      private void makeTagGUI(String tag, int index)
101      {
102         // get a reference to the LayoutInflater service
103         LayoutInflater inflater = (LayoutInflater) getSystemService(
104            Context.LAYOUT_INFLATER_SERVICE);
105
106         // inflate new_tag_view.xml to create new tag and edit Buttons
107         View newTagView = inflater.inflate(R.layout.new_tag_view, null);
108
```

Fig. 5.18 | `makeTagGUI` method of class `FavoriteTwitterSearches` creates the tag and **Edit** `Button`'s for one search and adds them to the `queryTableLayout` at the specified index. (Part 1 of 2.)

```
109         // get newTagButton, set its text and register its listener
110         Button newTagButton =
111            (Button) newTagView.findViewById(R.id.newTagButton);
112         newTagButton.setText(tag);
113         newTagButton.setOnClickListener(queryButtonListener);
114
115         // get newEditButton and register its listener
116         Button newEditButton =
117            (Button) newTagView.findViewById(R.id.newEditButton);
118         newEditButton.setOnClickListener(editButtonListener);
119
120         // add new tag and edit buttons to queryTableLayout
121         queryTableLayout.addView(newTagView, index);
122      } // end makeTagGUI
123
```

Fig. 5.18 | `makeTagGUI` method of class `FavoriteTwitterSearches` creates the tag and `Edit Button`'s for one search and adds them to the `queryTableLayout` at the specified index. (Part 2 of 2.)

`clearButtons` Method of Class `FavoriteTwitterSearches`

Method `clearButtons` (Fig. 5.19) removes all of the saved search `Button`s from the app. Line 128 calls the `queryTableLayout`'s **`removeAllViews` method** to remove all of the nested `TableRow`s containing the `Button`s.

```
124     // remove all saved search Buttons from the app
125     private void clearButtons()
126     {
127        // remove all saved search Buttons
128        queryTableLayout.removeAllViews();
129     } // end method clearButtons
130
```

Fig. 5.19 | method `clearButtons` of class `FavoriteTwitterSearches` removes all the `Button`s representing the saved searches from the app.

Anonymous Inner Class That Implements Interface `OnClickListener` to Respond to the Events of the `saveButton`

Lines 132–170 (Fig. 5.20) create the anonymous inner-class object `saveButtonListener` that implements interface `OnClickListener`. Line 53 registered `saveButtonListener` as `saveButtons`'s event-handling object. Lines 134–169 implement the `OnClickListener` interface's `onClick` method. If the user entered both a query and a tag (lines 138–139), the method calls `makeTag` (Fig. 5.17) to store the tag/query pair (lines 141–142), then clears the two `EditText`s (lines 143–144) and hides the soft keyboard (lines 147–149).

If the user did not enter both a query and a tag, the method displays an `AlertDialog` (lines 151–168) indicating that the user must enter both a query and a tag. You use an `AlertDialog.Builder` object (created at lines 154–155) to configure and create an `AlertDialog`. The argument to the constructor is the `Context` in which the dialog will be displayed—in this case, the `FavoriteTwitterSearches` `Activity`, which we refer to via its `this` reference. Because we're accessing `this` from an anonymous inner class, we must

```
131    // create a new Button and add it to the ScrollView
132    public OnClickListener saveButtonListener = new OnClickListener()
133    {
134       @Override
135       public void onClick(View v)
136       {
137          // create tag if both queryEditText and tagEditText are not empty
138          if (queryEditText.getText().length() > 0 &&
139             tagEditText.getText().length() > 0)
140          {
141             makeTag(queryEditText.getText().toString(),
142                tagEditText.getText().toString());
143             queryEditText.setText(""); // clear queryEditText
144             tagEditText.setText(""); // clear tagEditText
145
146             // hide the soft keyboard
147             ((InputMethodManager) getSystemService(
148                Context.INPUT_METHOD_SERVICE)).hideSoftInputFromWindow(
149                tagEditText.getWindowToken(), 0);
150          } // end if
151          else // display message asking user to provide a query and a tag
152          {
153             // create a new AlertDialog Builder
154             AlertDialog.Builder builder =
155                new AlertDialog.Builder(FavoriteTwitterSearches.this);
156
157             builder.setTitle(R.string.missingTitle); // title bar string
158
159             // provide an OK button that simply dismisses the dialog
160             builder.setPositiveButton(R.string.OK, null);
161
162             // set the message to display
163             builder.setMessage(R.string.missingMessage);
164
165             // create AlertDialog from the AlertDialog.Builder
166             AlertDialog errorDialog = builder.create();
167             errorDialog.show(); // display the Dialog
168          } // end else
169       } // end method onClick
170    }; // end OnClickListener anonymous inner class
171
```

Fig. 5.20 | Anonymous inner class that implements interface `OnClickListener` to respond to the events of the `saveButton`.

fully qualify it with the class name. Line 157 sets the `AlertDialog`'s title with the `String` resource `R.string.missingTitle`. This will appear at the top of the dialog.

Dialogs often have multiple buttons. In this case, we need only one button that allows the user to acknowledge the message. We specify this as the dialog's positive button (line 160). Method `setPositiveButton` receives the button's label (specified with the `String` resource `R.string.OK`) and a reference to the button's event handler. For this dialog, we don't need to respond to the event, so we specify `null` for the event handler. When the user touches the button, the dialog is simply dismissed from the screen.

Line 163 sets the message that appears in the dialog (specified with the `String` resource `R.string.missingMessage`). Line 166 creates the `AlertDialog` by calling the `AlertDialog.Builder`'s `create` method. Line 167 displays the modal dialog by calling `AlertDialog`'s `show` method.

Anonymous Inner Class That Implements Interface `OnClickListener` to Respond to the Events of the `clearTagsButton`

Lines 173–213 of Fig. 5.21 create the anonymous inner-class object `clearTagsButtonListener` that implements interface `OnClickListener`. Line 56 registered this object as `clearTagsButtons`'s event handler. Lines 175–212 implement the `OnClickListener` interface's `onClick` method, which displays an `AlertDialog` asking the user to confirm that all the stored searches should be removed.

```
172    // clears all saved searches
173    public OnClickListener clearTagsButtonListener = new OnClickListener()
174    {
175       @Override
176       public void onClick(View v)
177       {
178          // create a new AlertDialog Builder
179          AlertDialog.Builder builder =
180             new AlertDialog.Builder(FavoriteTwitterSearches.this);
181
182          builder.setTitle(R.string.confirmTitle); // title bar string
183
184          // provide an OK button that simply dismisses the dialog
185          builder.setPositiveButton(R.string.erase,
186             new DialogInterface.OnClickListener()
187             {
188                @Override
189                public void onClick(DialogInterface dialog, int button)
190                {
191                   clearButtons(); // clear all saved searches from the map
192
193                   // get a SharedPreferences.Editor to clear searches
194                   SharedPreferences.Editor preferencesEditor =
195                      savedSearches.edit();
196
197                   preferencesEditor.clear(); // remove all tag/query pairs
198                   preferencesEditor.apply(); // commit the changes
199                } // end method onClick
200             } // end anonymous inner class
201          ); // end call to method setPositiveButton
202
203          builder.setCancelable(true);
204          builder.setNegativeButton(R.string.cancel, null);
205
206          // set the message to display
207          builder.setMessage(R.string.confirmMessage);
```

Fig. 5.21 | Anonymous inner class that implements interface `OnClickListener` to respond to the events of the `clearTagsButton`. (Part 1 of 2.)

```
208
209             // create AlertDialog from the AlertDialog.Builder
210             AlertDialog confirmDialog = builder.create();
211             confirmDialog.show(); // display the Dialog
212          } // end method onClick
213       }; // end OnClickListener anonymous inner class
214
```

Fig. 5.21 | Anonymous inner class that implements interface `OnClickListener` to respond to the events of the `clearTagsButton`. (Part 2 of 2.)

Lines 185–201 define the `AlertDialog`'s positive button and its event handler. When the user clicks this button, its event handler executes. Line 191 calls `clearButtons` (Fig. 5.19) to remove all the `Buttons` representing the saved searches. Then, we get a `SharedPreferences.Editor` object for `savedSearches` (lines 194–195), clear all the *key/value pairs* by calling the `SharedPreferences.Editor` object's ***`clear` method*** (line 192) and *commit* the changes to the file (line 198). Line 203 indicates that the dialog is cancelable, so the user can press the back button on the device to dismiss the dialog. Line 204 sets the dialog's negative button and event handler. Like the positive button in Fig. 5.20, this button simply dismisses the dialog. Lines 207–211 set the dialog's message, create the dialog and display it.

Anonymous Inner Class That Implements Interface `OnClickListener` to Respond to the Events of each of the `newTagButtons`

Lines 216–234 of Fig. 5.22 create the anonymous inner-class object `queryButtonListener` that implements interface `OnClickListener`. Line 113 registers this object as the event-handling object for each of the `newTagButtons` as they're created.

Lines 218–233 implement the `OnClickListener` interface's `onClick` method. Line 222 gets the text of the `Button` that was clicked, and line 223 retrieves the corresponding search query from `savedSearches`. Line 226 call `Activity`'s inherited method ***`getString`*** to get the `String` resource named `searchURL`, which contains the Twitter search page's URL. We then append the `query` to the end of the URL.

```
215    // load selected search in a web browser
216    public OnClickListener queryButtonListener = new OnClickListener()
217    {
218       @Override
219       public void onClick(View v)
220       {
221          // get the query
222          String buttonText = ((Button)v).getText().toString();
223          String query = savedSearches.getString(buttonText, null);
224
225          // create the URL corresponding to the touched Button's query
226          String urlString = getString(R.string.searchURL) + query;
227
```

Fig. 5.22 | Anonymous inner class that implements interface `OnClickListener` to respond to the events of the `queryButton`. (Part 1 of 2.)

```
228          // create an Intent to launch a web browser
229          Intent getURL = new Intent(Intent.ACTION_VIEW,
230             Uri.parse(urlString));
231
232          startActivity(getURL); // execute the Intent
233       } // end method onClick
234    }; // end OnClickListener anonymous inner class
235
```

Fig. 5.22 | Anonymous inner class that implements interface `OnClickListener` to respond to the events of the `queryButton`. (Part 2 of 2.)

Lines 229–230 create a new `Intent`, which we'll use to launch the device's web browser and display the Twitter search results. An `Intent` is a description of an *action* to be performed with associated *data*. The first argument passed to `Intent`'s constructor is a constant describing the *action* we wish to perform. Here we use **`Intent.ACTION_VIEW`** because we wish to display a representation of the data. Many constants are defined in the `Intent` class describing actions such as *searching*, *choosing*, *sending* and *playing*. The second argument (line 230) is a **`Uri`** (uniform resource identifier) to the *data* on which we want to perform the action. Class `Uri`'s **`parse` method** converts a `String` representing a URL (uniform resource locator) to a `Uri`.

Line 232 passes the `Intent` to the `startActivity` method (inherited indirectly from class `Context`) which starts the correct `Activity` to perform the specified action on the given data. In this case, because we've said to view a URI, the `Intent` launches the device's web browser to display the corresponding web page. This page shows the results of the supplied Twitter search. This is an example of an **implicit `Intent`**—*we did not specify a component to display the web page but instead allowed the system to launch the most appropriate* `Activity` *based on the type of data.* If multiple activities can handle the action and data passed to `startActivity`, the system displays a dialog in which the user can select which activity to use. If the system cannot find an activity to handle the action, then method `startActivity` throws an `ActivityNotFoundException`. In general, it's a good practice to handle this exception. We chose not to here, because Android devices on which this app is likely to be installed will have a browser capable of displaying a web page.

In future apps, we'll also use **explicit `Intents`**, which specify an exact `Activity` class to run in the same app. For a list of apps and the intents they support, visit

```
openintents.org
developer.android.com/guide/appendix/g-app-intents.html
```

Anonymous Inner Class That Implements Interface `OnClickListener` to Respond to the Events of the `editButton`

Lines 237–253 of Fig. 5.23 create the anonymous inner-class object `editButtonListener` that implements interface `OnClickListener`. Line 118 registers this object as each `newEditButtons`'s event-handling object. Lines 239–252 implement the `onClick` method of interface `OnClickListener`. To determine which search `Button`'s query to edit, we first get the `editButton`'s *parent layout* (line 243)—the one that contains the `editButton`—then use it to get the `Button` with the ID `R.id.newTagButton` in that layout (lines 244–245)—this is the corresponding search `Button`. Line 247 gets the `searchButton`'s text, then uses

it in line 250 to set the `tagEditText`'s value. Finally, line 251 gets the corresponding query from the `savedSearches` object and displays that value in the `queryEditText`.

```
236     // edit selected search
237     public OnClickListener editButtonListener = new OnClickListener()
238     {
239        @Override
240        public void onClick(View v)
241        {
242           // get all necessary GUI components
243           TableRow buttonTableRow = (TableRow) v.getParent();
244           Button searchButton =
245              (Button) buttonTableRow.findViewById(R.id.newTagButton);
246
247           String tag = searchButton.getText().toString();
248
249           // set EditTexts to match the chosen tag and query
250           tagEditText.setText(tag);
251           queryEditText.setText(savedSearches.getString(tag, null));
252        } // end method onClick
253     }; // end OnClickListener anonymous inner class
254  } // end class FavoriteTwitterSearches
```

Fig. 5.23 | Anonymous inner class that implements interface `OnClickListener` to respond to the events of the `editButton`.

5.6 AndroidManifest.xml

When you create the project for each Android app in Eclipse, the ADT Plugin creates and configures the `AndroidManifest.xml` file (also known as the app's *manifest*), which describes information about the app. Here, we introduce the contents of this file (Fig. 5.24) and discuss one new feature we added to it. We'll discuss other manifest features file as they're needed in later apps. For complete details of the manifest, visit:

```
developer.android.com/guide/topics/manifest/manifest-intro.html
```

The **`manifest` element** (lines 2–17) is the root element of `AndroidManifest.xml`. This element's `package` attribute (line 3) specifies the package that's used to manage the code. The element's `android:versionCode` attribute (line 4) specifies an internal integer version number for your app that's used to determine whether one version of the app is newer than another. The element's `android:versionName` attribute (line 4) specifies the version number that is displayed to users when they're managing apps on a device.

Within the `manifest` element are the nested `application` (lines 5–15) and `uses-sdk` (line 16) elements. The **`application` element** is required. The element's **`android:icon` attribute** specifies a drawable resource which is used as the app's icon. If you don't provide your own icon, the app uses the icon that is supplied by the ADT Plugin when you create the app's project. Versions of this icon are stored in app's `res/drawable` folders. The element's **`android:label` attribute** specifies the app's name. The **`uses-sdk` element** specifies the app's target SDK (10 represents Android SDK version 2.3.3) and its minimum SDK (8 represents version 2.2). These settings allow this app to execute on devices running Android versions 2.2 and higher.

```
1  <?xml version="1.0" encoding="utf-8"?>
2  <manifest xmlns:android="http://schemas.android.com/apk/res/android"
3     package="com.deitel.favoritetwittersearches"
4     android:versionCode="1" android:versionName="1.0">
5     <application android:icon="@drawable/icon"
6        android:label="@string/app_name">
7        <activity android:name=".FavoriteTwitterSearches"
8           android:label="@string/app_name"
9           android:windowSoftInputMode="stateAlwaysHidden">
10          <intent-filter>
11             <action android:name="android.intent.action.MAIN" />
12             <category android:name="android.intent.category.LAUNCHER" />
13          </intent-filter>
14       </activity>
15    </application>
16    <uses-sdk android:targetSdkVersion="10" android:minSdkVersion="8"/>
17 </manifest>
```

Fig. 5.24 | `AndroidManifest.xml` file for the **Favorite Twitter Searches** app.

Within the application element is the **`activity` element** (lines 7–14), which specifies information about this app's `Activity`. If the app has more than one `Activity`, each will have its own `activity` element. The **`android:name` attribute** (line 7) specifies the `Activity`'s fully qualified class name. If you precede the class name with just a dot (`.`), the class name is automatically appended to the package name specified in the `manifest` element. The **`android:label` attribute** (line 8) specifies a string that is displayed with the `Activity`. By default, the manifest was configured with the app's name for this attribute. We added the **`android:windowSoftInputMode` attribute** in line 9. The value `stateAlwaysHidden` indicates that the soft keyboard should not be displayed when this `Activity` is launched. To add this attribute, you can either edit the XML directly, or you can double click the `AndroidManifest.xml` file in your project to open the manifest editor. Figure 5.25 shows the **Application** tab of the manifest editor. The tab names are at the bottom of the editor window. To set the `android:windowSoftInputMode` attribute, select `.FavoriteTwitterSearches` in the **Application Nodes** section of the window (at the bottom-left side). This displays the activity elements attributes at the bottom-right of the editor. Scroll to **Window soft input mode** and click the **Select...** button to see the available options, then select `stateAlwaysHidden` and click **OK**.

Within the `activity` element is the ***`intent-filter` element*** (lines 10–13), which specifies the types of intents the `Activity` can respond to. This element must contain one or more ***`action` elements***. The one at line 11 indicates that this is the app's main activity—that is, the one that is displayed when the app is launched. The ***`category` element*** (line 12) specifies the kind of Android component that handles the event. In this case, the value `"android.intent.category.LAUNCHER"` indicates that this activity should be listed in the application launcher with other apps on the device.

5.7 Wrap-Up

In this chapter, we created the **Favorite Twitter Searches** app. First we designed the GUI. We introduced the `ScrollView` component—a `ViewGroup` that lets users *scroll* through

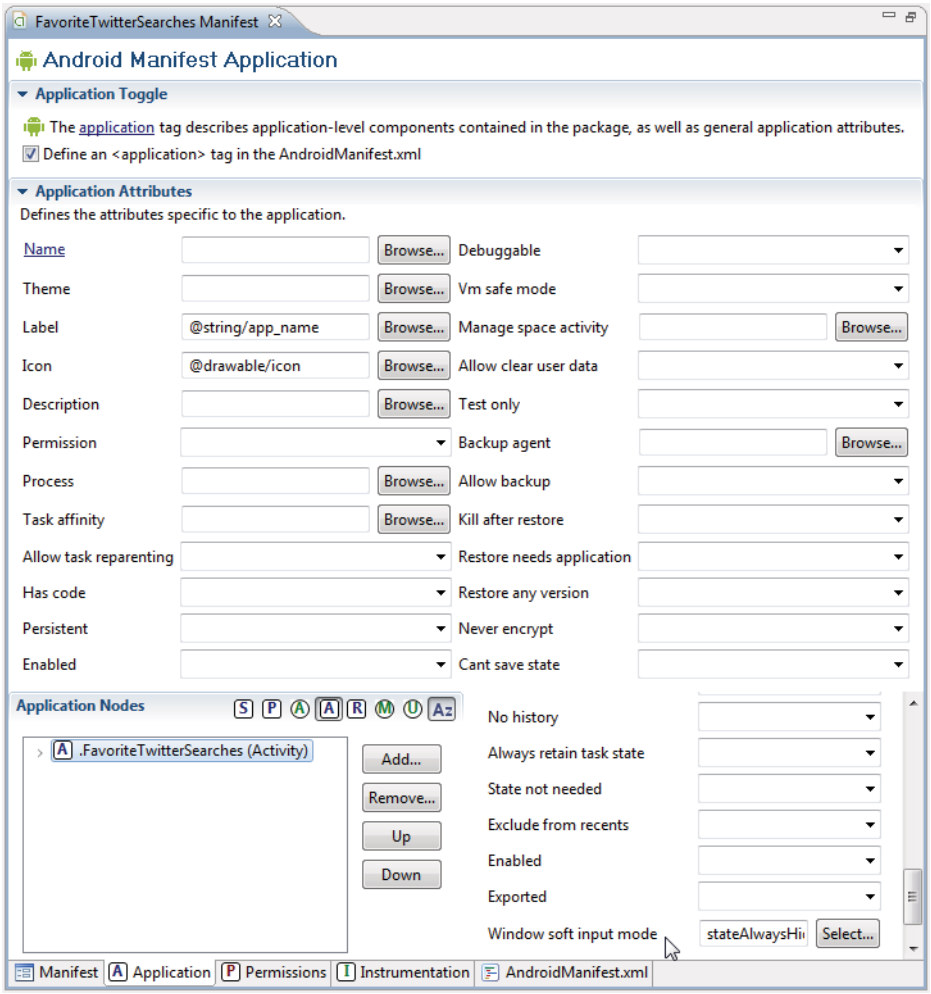


Fig. 5.25 | **Application** tab in the manifest editor.

content too large to display in the space available—and used it to display the arbitrarily large list of saved searches. Each search was associated with a `Button` that the user could touch to pass the search to the device's web browser. You also learned how to create resource files by using the **New Android XML File** dialog. In particular, you created a `colors.xml` file to store color resources, a `dimen.xml` file to store dimensions and a second layout file that the app inflated dynamically. We discussed how to reference colors and dimensions in XML layouts and how to use predefined colors from Android's `R.color` class.

We stored the search tag/query pairs in a `SharedPreferences` file associated with the app and showed how to programmatically hide the soft keyboard. We also used a `SharedPreferences.Editor` object to store values in, modify values in and remove values from a `SharedPreferences` file. In response to the user touching a search `Button`, we loaded a `Uri`

into the device's web browser by creating a new `Intent` and passing it to `Context`'s `startActivity` method.

You used `AlertDialog.Builder` objects to configure and create `AlertDialogs` for displaying messages to the user. You created GUI components programmatically by manually inflating an XML layout file, which enabled the app to modify the GUI dynamically in response to user interactions. You used this technique to create a `TableRow` containing two new `Buttons` for each search—one to perform the search and one to edit the search. These `TableRows` were added to a `TableLayout` in a `ScrollView`, so that all the tagged searches could be displayed in a scrollable region on the screen.

Finally, we discussed the `AndroidManifest.xml` file and showed you how to configure the app so that the soft keyboard is not displayed when the app is launched.

In Chapter 6, you'll build the **Flag Quiz Game** app in which the user is shown a graphic of a country's flag and must guess the country from 3, 6 or 9 choices. You'll use a menu and checkboxes to customize the quiz, limiting the flags and countries chosen to specific regions of the world.