Exploring Building Blocks

Based on Chapter 7, but expanded by KJK

Overview

- Understand Android views, controls, and layouts
- Accept input with EditText
- Display text to users with TextView
- Give users choices using Spinner controls
- Allow simple user selections with buttons, check boxes, switches, and radio groups
- Retrieve dates and times from users
- Use indicators to display data to users
- Play a movie

The Android Controls

- The Android SDK contains a Java package named `android.widget`.
- An Android control typically refers to a class within this package.
- The Android SDK includes classes to representing most common UI controls, including:
  - `ImageView`
  - `FrameLayout`
  - `EditText`
  - `Button`
- As mentioned previously, all controls are typically derived from the `View` class.

The Android Controls

- Each control you want to be able to access programmatically must have a unique identifier specified using the `android:id` attribute.
  - You use this identifier to access the control with the `findViewById()` method in your Activity class, e.g.,

```
TextView view = findViewById( R.id.textView );
```

Retrieving Data from Users with EditText

- The Android SDK provides a number of controls for retrieving data from users.
- One of the most common types of data that applications often need to collect from users is text.
- Two frequently used views to handle this type of job are `EditText` and `Spinner` controls.

Retrieving Text Input Using EditText Controls

- The Android SDK provides an `EditText` to handle text input from a user (it is similar to a `TextField` in JavaFX).
- The `EditText` class is derived from `TextView`.
- Most of its functionality is contained within `TextView` but is enabled when created as an `EditText`.

Retrieving Text Input Using EditText Controls

```
<EditText
    android:id="@+id/editText01"
    android:layout_height="wrap_content"
    android:hint=”Enter name"
    android:lines="4"
    android:layout_width=”match_parent" />
```

We will start using XML notation, even though we will mostly use the Layout Editor.

Retrieving Text Input Using EditText Controls

Elemen name (tag)

```
<EditText
    android:id="@+id/editText01"
    android:layout_height="wrap_content"
    android:hint=”Enter name"
    android:lines="4"
    android:layout_width=”match_parent" />
```

Atrtribute name

Atrtribute value

We will start using XML notation, even though we will mostly use the Layout Editor.

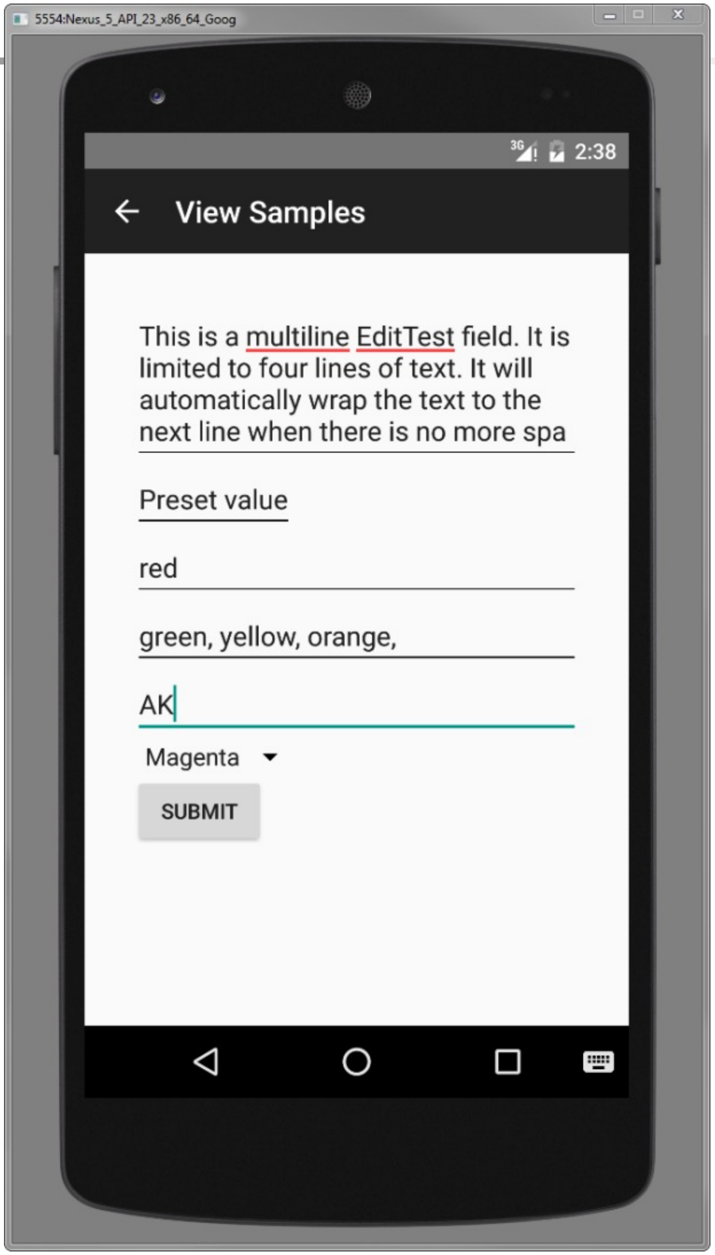
Retrieving Text Input Using EditText Controls

- Reading data from EditText:

```
EditText nameET = findViewById( R.id.editText01 );
String name = nameET.getText().toString();
```

- `nameET.getText()` returns an `Editable` type and `toString` is necessary.

Retrieving Text Input Using EditText Controls



This is a multiline EditTest field. It is limited to four lines of text. It will automatically wrap the text to the next line when there is no more spa

Preset value

red

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Magenta

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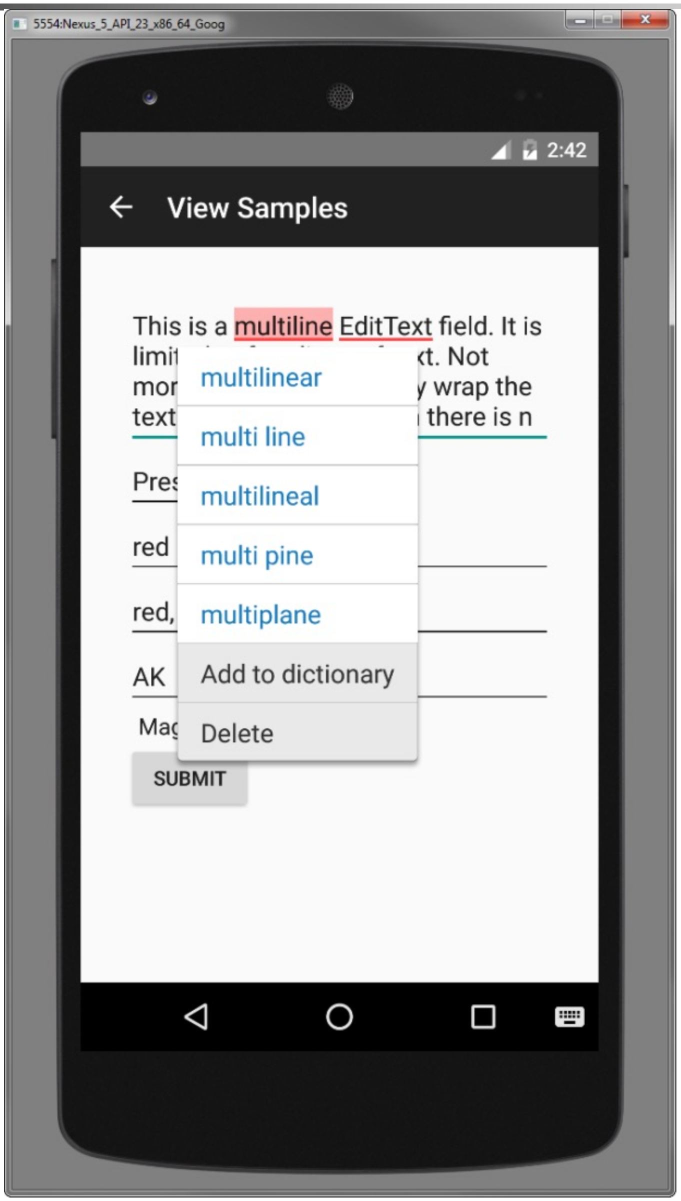
Retrieving Text Input Using EditText Controls



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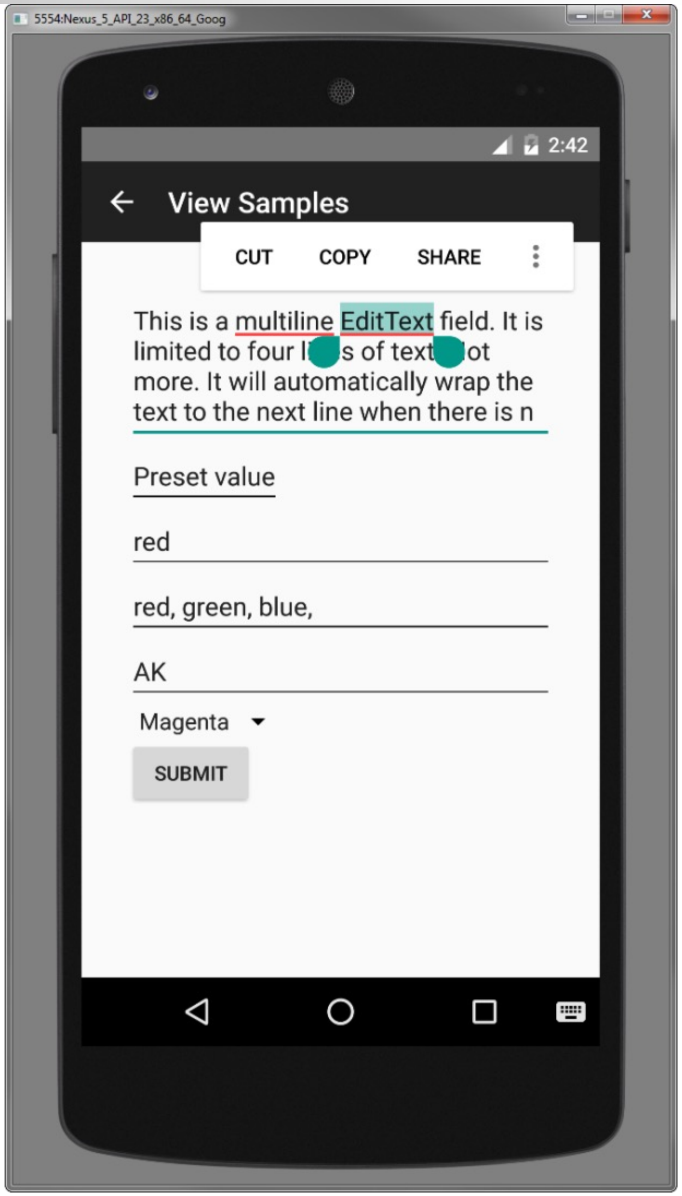


This is a multiline EditText field. It is
limited to four l s of text ot
more. It will automatically wrap the
text to the next line when there is n

Preset value

red

red, green, blue,

AK

Magenta

EditText InputTypes

- EditText has a few specific subtypes, each for a different type of input
- They are specified with the `android:inputType` attribute
  - number, numberSigned, numberDecimal
  - phone
  - textPassword
  - textEmailAddress
  - datetime
  - many others

Constraining User Input with Input Filters

- There are times when you don't want the user to type just any string.
  - Validating input after the user has entered something is one way to do this.
  - A better way to avoid wasting the user's time is to filter the input.
  - The `EditText` control provides a way to set an `InputFilter` that does this.

Constraining User Input with Input Filters

- The Android SDK provides `InputFilter` objects.
  - `InputFilter` objects enforce such rules as allowing only uppercase text or limiting the length of the text entered
  - You can create custom filters by implementing the `InputFilter` interface, which contains the single method called `filter()`.

Constraining User Input with Input Filters

```
final EditText text_filtered =
        findViewById(R.id.input_filtered);
text_filtered.setFilters( new
      InputFilter[] {
           new InputFilter.AllCaps(),
           new InputFilter.LengthFilter(2)
} );
```

Helping the User with Autocompletion

- The Android SDK also provides a way to help the user with entering commonly used data into forms.
  - This functionality is provided through the autocomplete feature.

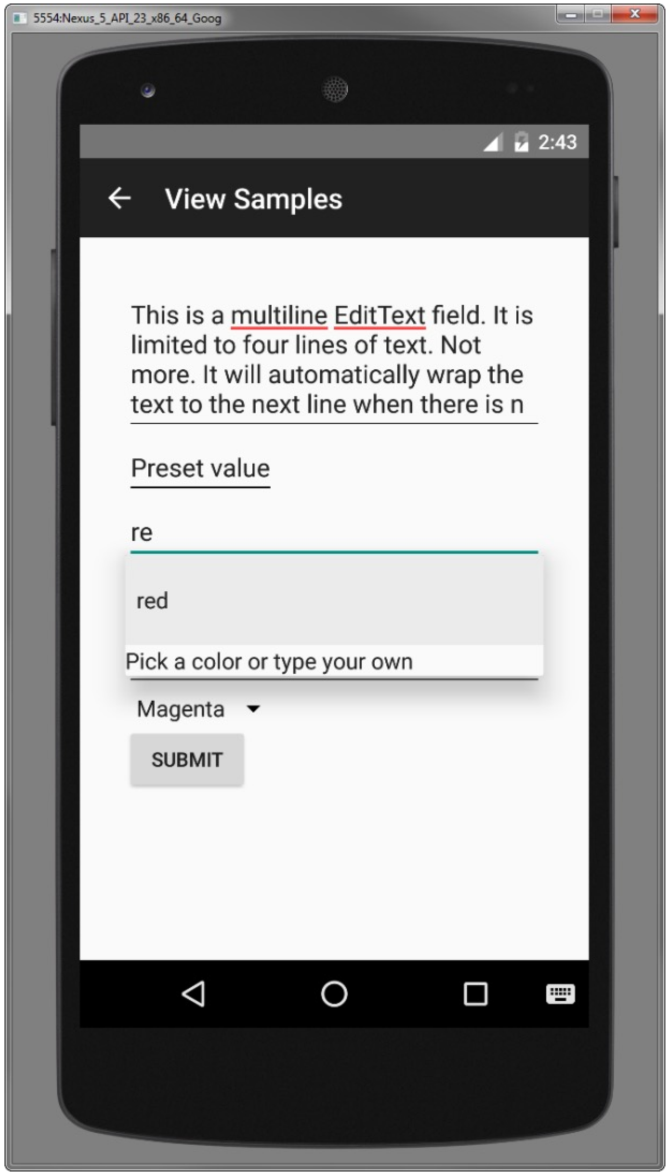
Helping the User with Autocompletion

- There are two forms of autocomplete:
  - One is the more standard style of filling in the entire text entry based on what the user types.
  - If the user begins typing a string that matches a word in a developer-provided list, the user can choose to complete the word with a tap.
  - This is done through the AutoCompleteTextView control.

Helping the User with Autocompletion

- The second method allows the user to enter a list of items, each of which has autocomplete functionality.
  - These items must be separated in some way by providing a `Tokenizer` to the `MultiAutoCompleteTextView` object.
  - A common `Tokenizer` implementation is provided for comma-separated lists using the `MultiAutoCompleteTextView.CommaTokenizer` object.

Helping the User with Autocompletion


5554:Nexus_5_API_23_x86_64_Goog

2:43

View Samples

This is a multiline EditText field. It is limited to four lines of text. Not more. It will automatically wrap the text to the next line when there is n

Preset value

re

red

Pick a color or type your own

Magenta

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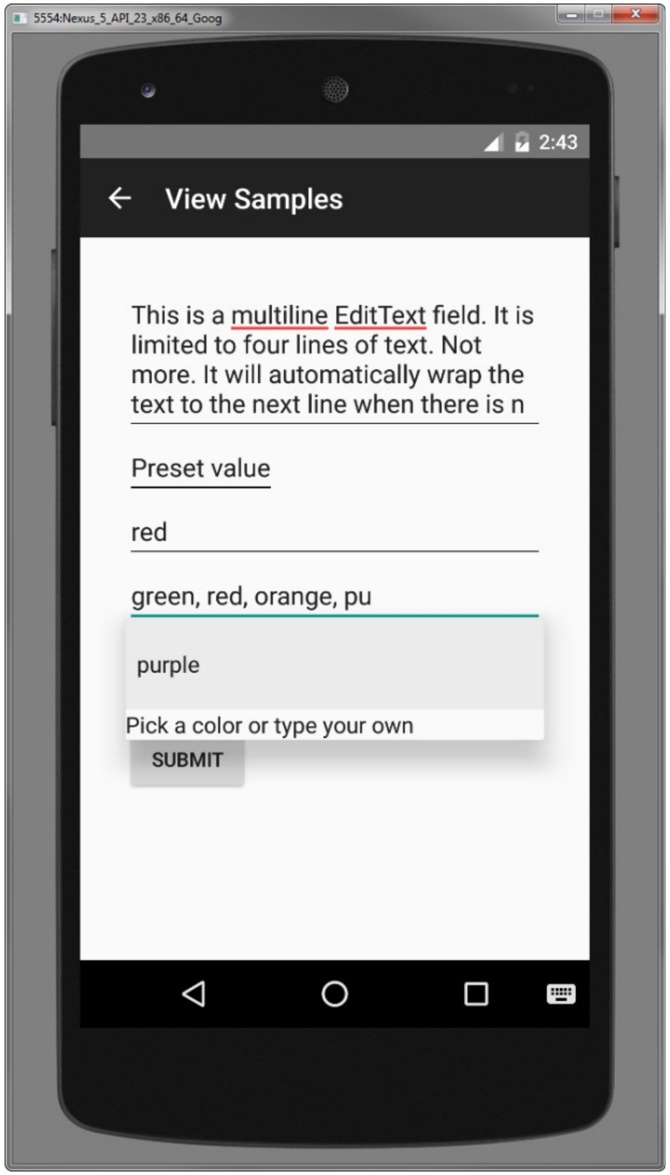

5554:Nexus_5_API_23_x86_64_Goog

2:43

View Samples

This is a multiline EditText field. It is limited to four lines of text. Not more. It will automatically wrap the text to the next line when there is n

Preset value

red

green, red, orange, pu

purple

Pick a color or type your own

SUBMIT

Helping the User with Autocompletion

- Both of the autocomplete text editors use an Adapter to get the list of text they use to provide completions to the user.

Helping the User with Autocompletion

- This example shows how to provide an `AutoCompleteTextView` that can help users type some of the basic colors from an array in the code:

```
final String[] COLORS = {
    "red", "green", "orange", "blue", "purple",
    "black", "yellow", "cyan", "magenta" };
ArrayAdapter<String> adapter =
    new ArrayAdapter<String>(this,
        android.R.layout.simple_dropdown_item_1line,
        COLORS);
AutoCompleteTextView text = (AutoCompleteTextView)
    findViewById(R.id.AutoCompleteTextView01);
text.setAdapter(adapter);
```

Helping the User with Autocompletion

```
<AutoCompleteTextView
    android:id="@+id/AutoCompleteTextView01"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:completionHint="Pick a color or type your own"
    android:completionThreshold="1" />
```

Helping the User with Autocompletion

- The `MultiAutoCompleteTextView` is essentially the same as the regular autocomplete, except that you must assign a Tokenizer to it so that the control knows where each autocompletion should begin.

Helping the User with Autocompletion

- The following is an example that uses the same Adapter as the previous example but includes a Tokenizer for a list of user color responses, each separated by a comma:

```
MultiAutoCompleteTextView mtext =
        (MultiAutoCompleteTextView)
                findViewById(R.id.MultiAutoCompleteTextView01);
mtext.setAdapter(adapter);
mtext.setTokenizer(new
                MultiAutoCompleteTextView.CommaTokenizer());
```

Displaying Text to Users with TextView

- One of the most basic user interface elements, or controls, in the Android SDK is the `TextView` control.
  - You primarily use it to display fixed text strings or labels.
- The `TextView` control is a child control within other screen elements and controls.
- As with most of the user interface elements, it is derived from View and is within the

  `android.widget` package.
- Because it is a `View`, all the standard attributes such as width, height, padding, and visibility can be applied to the object.

Displaying Text to Users with TextView

- However, because this is a text-displaying control, you can apply many other `TextView` attributes to control behavior and how the text is viewed in a variety of situations.
- `<TextView>` is the XML layout file tag used to display text on the screen.
- You can set the `android:text` property of the `TextView` to be either a raw text string in the layout file or a reference to a string resource.

Displaying Text to Users with TextView

```
<TextView
    android:id="@+id/TextView01"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="Some text for display here" />

<TextView
    android:id="@+id/TextView02"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="@string/sample_text" />
```

The last example references one of the string resources (sample_text), which we will discuss later.

Displaying Text to Users with TextView

- You can change the text displayed programmatically by calling the `setText()` method on the TextView object.
- Retrieving the text is done with the `getText()` method.

Configuring Layout and Sizing

- The `TextView` control has a number of attributes that dictate how the text is drawn and flows.
- You can set the `TextView` to be just a single line and a fixed width.
- If you enter a long string of text that can’t fit, the text truncates abruptly.
- Special attributes can handle this problem.

Configuring Layout and Sizing

- The width of a TextView can be specified in terms of ems rather than in pixels.
- An em is a term used in typography that is defined in terms of the point size of a particular font.
  - For example, the measure of an em in a 12-point font is 12 points (in digital typography, 1 pt is 1/72 of an inch).
  - Through the ems attribute, you can set the desired width of a `TextView`.
  - Additionally, you can use the `maxEms` and `minEms` attributes to set the maximum width and minimum width, respectively, of the `TextView` in terms of ems.

Configuring Layout and Sizing

- The height of a `TextView` can be set in terms of lines of text rather than pixels.
  - This is useful for controlling how much text can be viewed regardless of the font size.
  - The lines attribute sets the number of lines that the `TextView` can display.
  - You can also use `maxLines` and `minLines` to control the maximum height and minimum height, respectively, that the `TextView` displays.

Configuring Layout and Sizing

```
<TextView
    android:id="@+id/TextView04"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:lines="2"
    android:ems="12"
    android:text="@string/autolink_test" />
```

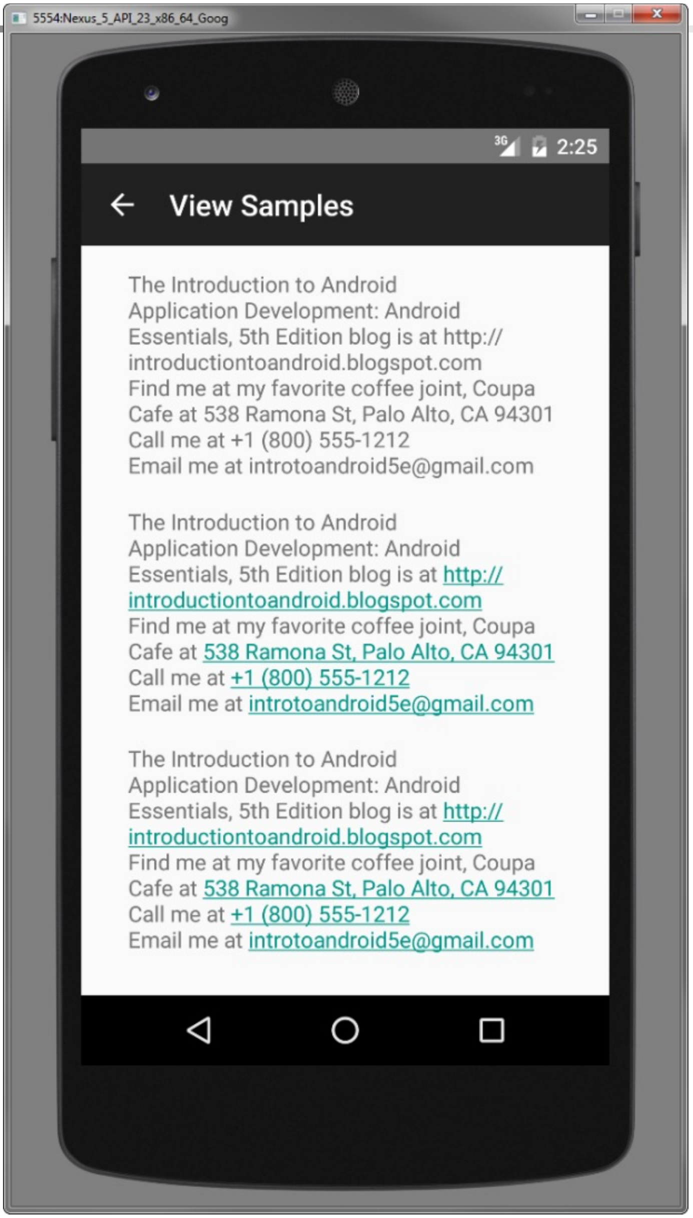
Creating Contextual Links in Text

- If your text contains references to email addresses, Web pages, phone numbers, or even street addresses, you might want to consider using the attribute `autoLink`.
- The `autoLink` attribute has four values that you can use in combination with each other.
- When enabled, these `autoLink` attribute values create standard Web-style links to the application that can act on that data type.
- For instance, setting the attribute to web automatically finds and links any URLs to Web pages.

Creating Contextual Links in Text

- Your text can contain the following values for the `autoLink` attribute:
  - `none`: disables all linking
  - `web`: enables linking of URLs to Web pages
  - `email`: enables linking of email addresses to the mail client with the recipient filled in
  - `phone`: enables linking of phone numbers to the dialer application with the phone number filled in, ready to be dialed
  - `map`: enables linking of street addresses to the map application to show the location
  - `all`: enables all types of linking

Creating Contextual Links in Text



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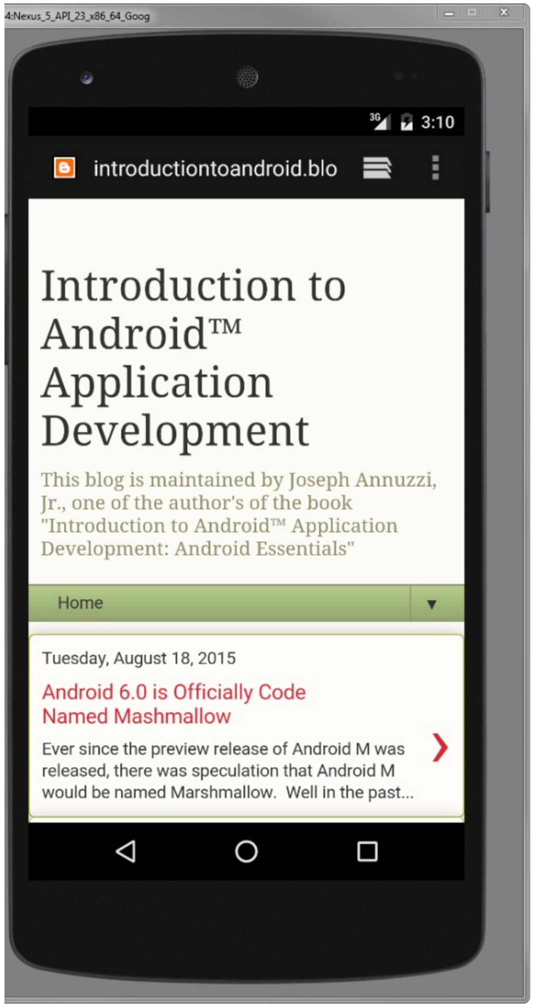
Call me at +1 (800) 555-1212
Email me at introtoandroid5e@gmail.com

Creating Contextual Links in Text

```
<TextView
    android:id="@+id/TextView02"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="@string/autolink_test"
    android:autoLink="web|email" />
```

Creating Contextual Links in Text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Introduction to Android™ Application Development

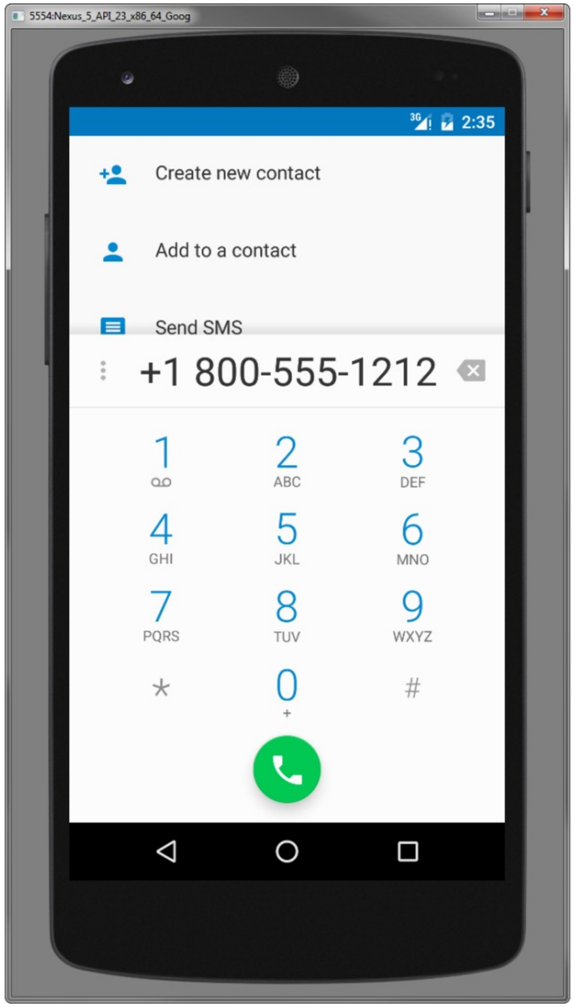
This blog is maintained by Joseph Annuzzi, Jr., one of the author's of the book "Introduction to Android™ Application Development: Android Essentials"

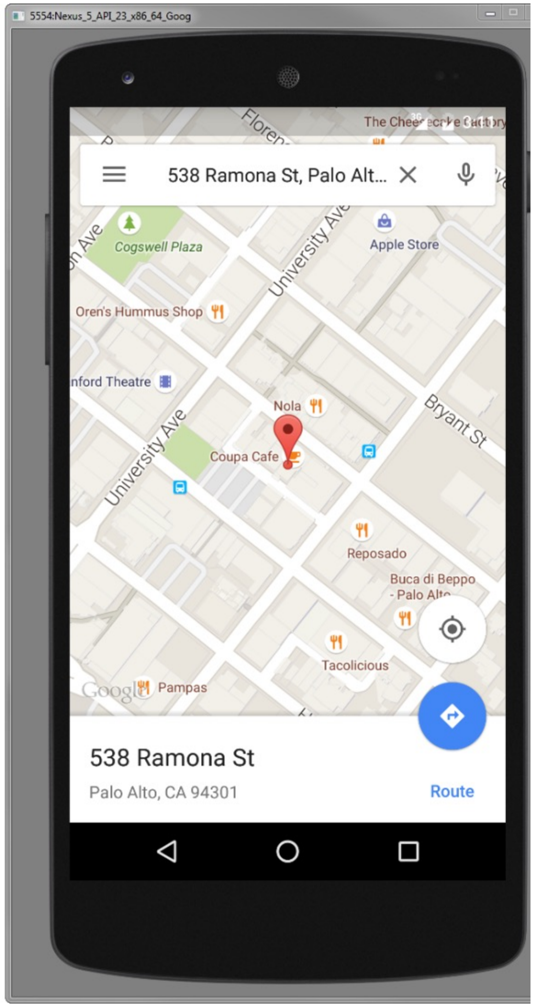
Home ▾

Tuesday, August 18, 2015

Android 6.0 is Officially Code Named Mashmallow

Ever since the preview release of Android M was released, there was speculation that Android M would be named Marshmallow. Well in the past...





Giving Users Choices Using Spinner Controls

- Sometimes you want to limit the choices available for users to type.
  - For instance, if users are going to enter the name of a state, you might as well limit them to only the valid states, because this is a known set.
  - Although you could do this by letting them type something and then blocking invalid entries, you can also provide similar functionality with a `Spinner` control.

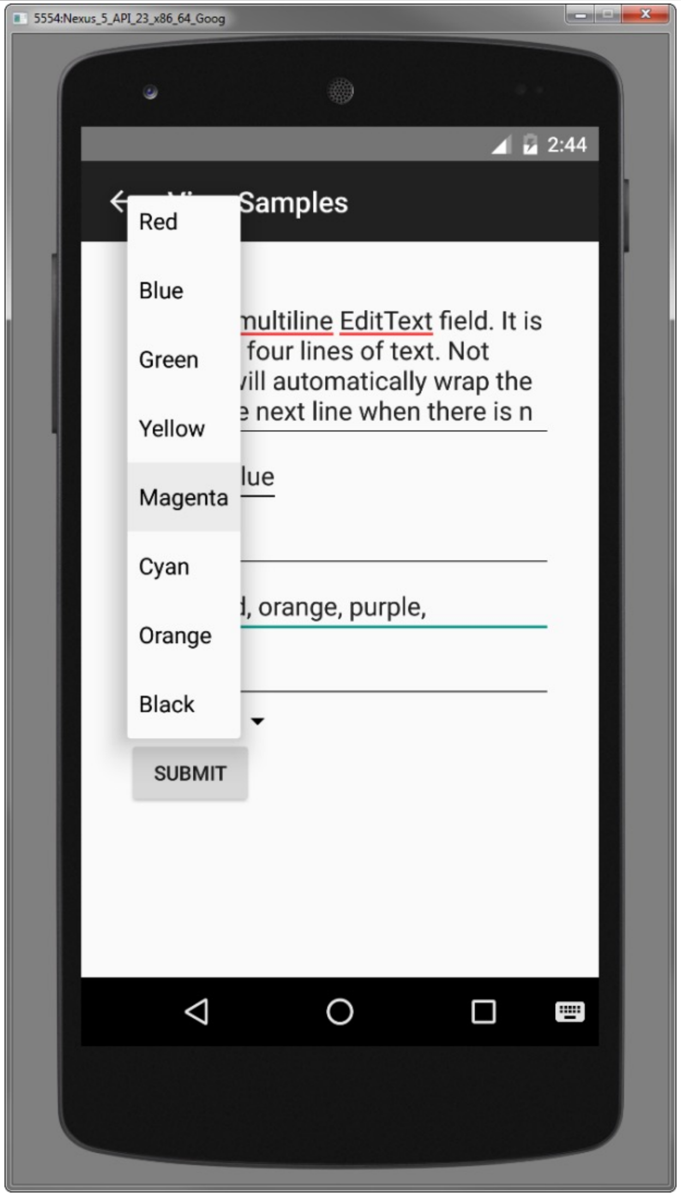
Giving Users Choices Using Spinner Controls

- As with the autocomplete method, the possible choices for a `Spinner` can come from an Adapter.
- It is also possible to set the available choices in the layout definition by using the entries attribute with an array resource.
  - Specifically, this is a string array that is referenced as something, such as `@array/state-list`.
- The `Spinner` control isn't actually an `EditText`, although it is frequently used in a similar fashion.

Giving Users Choices Using Spinner Controls

```
<Spinner
    android:id="@+id/Spinner01"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:entries="@array/colors"
    android:prompt="@string/spin_prompt" />
```

Giving Users Choices Using Spinner Controls



multiline EditText field. It is four lines of text. Not will automatically wrap the e next line when there is n

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Giving Users Choices Using Spinner Controls

- Because the Spinner control is not a `TextView` but a list of `TextView` objects, it is not possible to directly request the selected text from it.
- Instead, the app must retrieve the specific selected option (each of which is a `TextView` control) and extract the text directly from it

Giving Users Choices Using Spinner Controls

- For example:

```
Spinner spin = findViewById(R.id.Spinner1);
TextView text_sel = spin.getSelectedView();
String selected_text = text_sel.getText().toString();
```

- Alternatively, we could call the `getSelectedItem()` or `getSelectedItemId()` method to deal with other forms of selection.

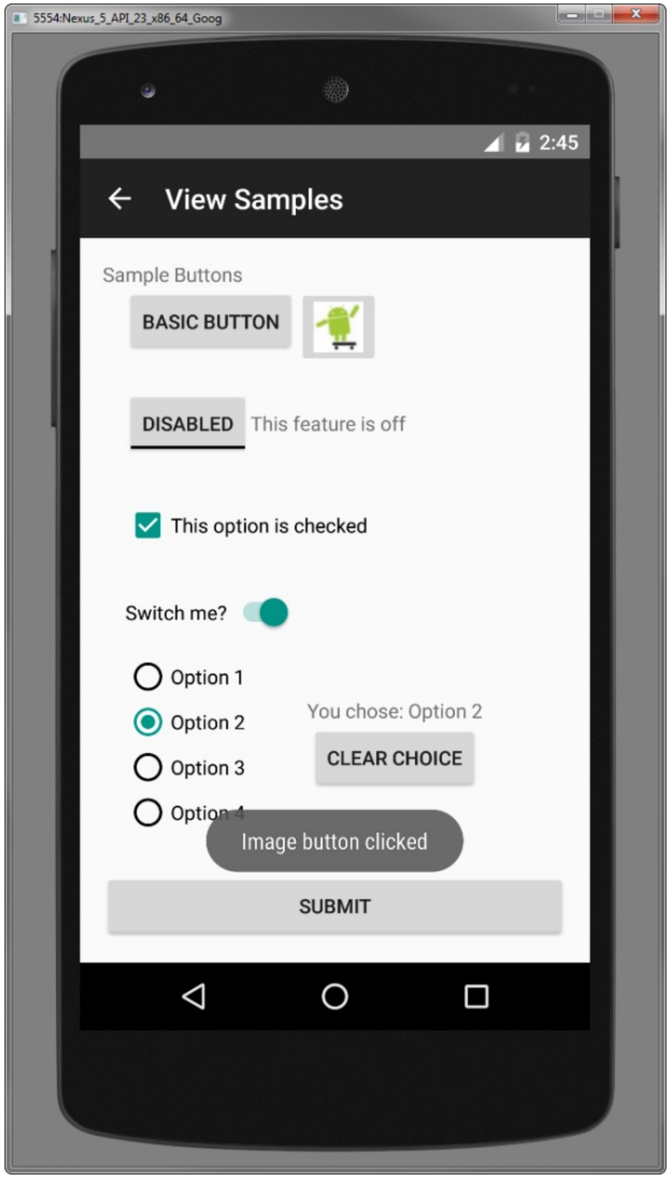
Selections: Buttons, Check Boxes, Switches, Radio Groups

- Other common UI elements are the basic `Button`, `CheckBox`, `ToggleButton`, and `RadioButton`.
- A basic `Button` is often used to perform some sort of action, such as submitting a form or confirming a selection.
- A `CheckBox` is a button with two states—checked and unchecked.

Selections: Buttons, Check Boxes, Switches, Radio Groups

- A `ToggleButton` is similar to a `CheckBox`, but you use it to show the state visually.
- A `Switch` is similar to a `CheckBox`, in that it is a two-state control.
- A `Switch` should be used to present a single choice, while `CheckBox`es are usually shown as a group.
- A `RadioButton` provides an exclusive selection of an item out of a group of items.

Selections: Buttons, Check Boxes, Switches, Radio Groups



Using Basic Buttons

- The `android.widget.Button` class provides a basic Button implementation in the Android SDK.
- Within the XML layout resources, buttons are specified using the `Button` element.
- The primary attribute for a basic `Button` is the text field.
- This is the label that appears on the middle of the button's face.
- You often use basic `Button` controls for buttons with text such as "OK," "Cancel," or "Submit."

Using Basic Buttons

```
<Button
    android:id="@+id/basic_button"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="Basic Button" />
```

Using Basic Buttons

```
setContentView( R.layout.buttons );
final Button basic_button = (Button)
                                        findViewById(R.id.basic_button);
basic_button.setOnClickListener(new View.OnClickListener() {
    public void onClick(View v) {
        Toast.makeText( ButtonsActivity.this,
                                "Button clicked”,
                                Toast.LENGTH_SHORT ).show();
    }
});
```

- A `Toast` is a small pop-up message.

Using Basic Buttons

- A Button-like control whose primary label is an image is an `ImageButton`.
- An `ImageButton` is almost exactly like a basic Button.
- Click actions are handled in the same way.
- The primary difference is that you can set its `src` attribute to be an image.

Using Basic Buttons

```
<ImageButton
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:id="@+id/image_button"
    android:src="@drawable/droid"
    android:contentDescription="@string/droidSkater"/>
```

Using CheckBox and ToggleButton Controls

- The `CheckBox` button is often used in lists of items where the user can select multiple items.
- The Android `CheckBox` contains a text attribute that appears to the side of the check box.
- Because the `CheckBox` class is derived from the `TextView` and `Button` classes, many of the attributes and methods behave in a similar fashion.

Using CheckBox and ToggleButton Controls

```
<CheckBox
    android:id="@+id/checkbox"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="Check me?" />
```

Using CheckBox and ToggleButton Controls

```
CheckBox check_button = findViewById(R.id.checkbox);

check_button.setOnClickListener(new View.OnClickListener() {
    public void onClick (View v) {
        CheckBox cb = findViewById(R.id.checkbox);
        cb.setText( check_button.isChecked() ?
                        "This option is checked" :
                        "This option is not checked");
    }
});
```

Using CheckBox and ToggleButton Controls

- A ToggleButton is similar to a `CheckBox` in behavior but is usually used to show or alter the “on” or “off” state of something.
- Like the `CheckBox`, it has a state (checked or not).
- Also like the `CheckBox`, the act of changing what displays on the button is handled for us.

Using CheckBox and ToggleButton Controls

- Unlike the `CheckBox`, it does not show text next to it. Instead, it has two text fields:
  - The first attribute is `textOn`, which is the text that displays on the button when its checked state is on.
  - The second attribute is `textOff`, which is the text that displays on the button when its checked state is off.
  - The default text for these is "ON" and "OFF," respectively.

Using CheckBox and ToggleButton Controls

```
<ToggleButton
    android:id="@+id/toggle_button"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="Toggle"
    android:textOff="Disabled"
    android:textOn="Enabled" />
```

Using CheckBox and ToggleButton Controls

- The Switch control, `android.widget.Switch`, provides similar two-state behavior to the `ToggleButton` control, only instead of the control being clicked to toggle between the states, it looks more like a slider.
  - The `Switch` control was introduced in API Level 14.

Using CheckBox and ToggleButton Controls

```
<Switch android:id="@+id/switch1"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="Switch me?"
    android:textOn="Wax On"
    android:textOff="Wax Off" />
```

Using RadioGroup and RadioButton

- You often use radio buttons when a user should be allowed to select only one item from a small group of items.
  - For instance, a question asking for gender can give three options: male, female, and unspecified.
  - Only one of these options should be checked at a time.

Using RadioGroup and RadioButton

- The `RadioButton` objects are similar to `CheckBox` objects.
  - They have a text label next to them, set via the text attribute, and they have a state (checked or unchecked).
  - However, you can group `RadioButton` objects inside a `RadioGroup` that handles enforcing their combined states so that only one `RadioButton` can be checked at a time.
  - If the user selects a `RadioButton` that is already checked, it does not become unchecked.
  - You can provide the user with an action to clear the state of the entire `RadioGroup` so that none of the buttons are checked.

Using RadioGroup and RadioButton

```
<RadioGroup
   android:id="@+id/RadioGroup01"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content">
   <RadioButton android:id="@+id/RadioButton01"
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:text="Option 1" />
   <RadioButton android:id="@+id/RadioButton02"
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:text="Option 2" />
   <RadioButton android:id="@+id/RadioButton03"
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:text="Option 3" />
   <RadioButton android:id="@+id/RadioButton04"
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:text="Option 4" />
</RadioGroup>
```

Using RadioGroup and RadioButton

```
final RadioGroup group = findViewById(R.id.RadioGroup01);
final TextView tv = findViewById(R.id.TextView01);

group.setOnCheckedChangeListener(new
    RadioGroup.OnCheckedChangeListener() {
        public void onCheckedChanged(
            RadioGroup group, int checkedId) {
            if (checkedId != -1) {
                RadioButton rb = findViewById(checkedId);
                if (rb != null) {
                    tv.setText("You chose: " + rb.getText());
                }
            } else {
                tv.setText("Choose 1");
            }
        }
});
```

Using RadioGroup and RadioButton

- Clearing the selection

```
Button clear_choice = findViewById(R.id.Button01);
clear_choice.setOnClickListener( new View.OnClickListener() {
    public void onClick(View v) {
        RadioGroup group = findViewById(R.id.RadioGroup01);
        if (group != null) {
            group.clearCheck();
        }
    }
}
```

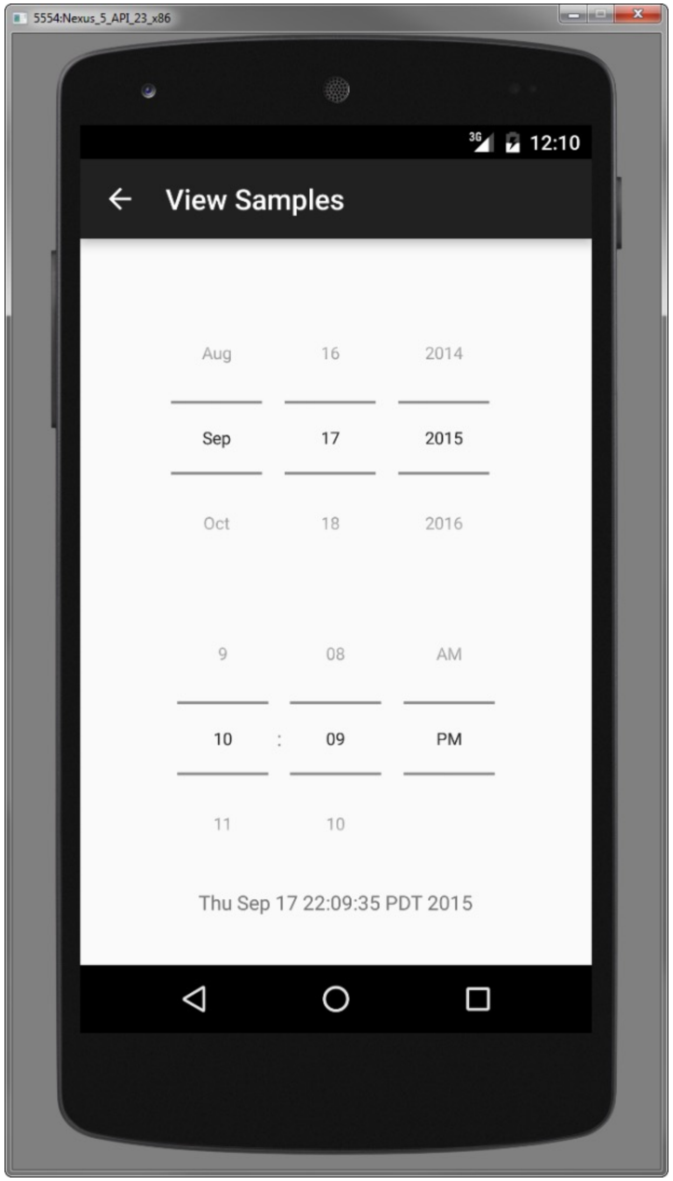
Using ImageView

```
<ImageView
        android:id="@+id/imageView2"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:paddingLeft="40dp"
        android:paddingRight="40dp"
        android:scaleType="fitCenter"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:srcCompat="@drawable/uga_seal" />
```

Retrieving Dates and Times from Users

- The Android SDK provides a couple of controls for getting date and time input from the user.
- One particular control is the `DatePicker` control.
  - It can be used to get a month, day, and year from the user.

Retrieving Dates and Times from Users



Thu Sep 17 22:09:35 PDT 2015

Retrieving Dates and Times from Users

```
<DatePicker
    android:id="@+id/DatePicker01"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:calendarViewShown="false‟
    android:datePickerMode=”spinner”
    android:spinnersShown="true" />
```

or

```
    android:datePickerMode=”calendar”
```

and/or

```
    android:calendarViewShown="false” or ”false”
```

Retrieving Dates and Times from Users

```
final DatePicker date = findViewById(R.id.DatePicker01);
date.init( 2015, 7, 17,
    new DatePicker.OnDateChangedListener() {
        public void onDateChanged( DatePicker view, int year,
            int monthOfYear, int dayOfMonth ) {
            Calendar calendar = Calendar.getInstance();
            calendar.set( year,
                    monthOfYear,
                    dayOfMonth,
                    time.getCurrentHour(),
                    time.getCurrentMinute() );
            text.setText( calendar.getTime().toString() );
        }
});
```

Retrieving Dates and Times from Users

```
time.setOnTimeChangedListener(new
TimePicker.OnTimeChangedListener() {
    public void onTimeChanged( TimePicker view,
        int hourOfDay, int minute ) {
        Calendar calendar = Calendar.getInstance();
        calendar.set( calendar.get( Calendar.YEAR ),
                calendar.get( Calendar.MONTH ),
                calendar.get( Calendar.DAY_OF_MONTH ),
                hourOfDay,
                minute );
        text.setText( calendar.getTime().toString() );
    }
});
```

Retrieving Dates and Times from Users

- Android also provides a `NumberPicker` widget, which is very similar to the `TimePicker` widget.
- You can use a `NumberPicker` to present to users a selection mechanism for choosing a number from a predefined range.
- There are two different types of `NumberPicker` you can present; both are entirely based on the theme your application is using.
- To learn more about the `NumberPicker`, see:
  - http://d.android.com/reference/android/widget/NumberPicker.html

Using Indicators to Display Progress and Activity to Users

- The Android SDK provides a number of controls that can be used to show some form of activity-in-progress information to the user.
- These indicator controls include the `ProgressBar`, clocks, and other similar controls.

Indicating Progress with ProgressBar

- Applications commonly perform actions that can take a while.
- A good practice during this time is to show users some sort of progress indicator that informs them that the application is off "doing something."
- Applications can also show how far a user has progressed through some operation.

Indicating Progress with ProgressBar

- The Android SDK provides several types of `ProgressBar`.
  - The standard `ProgressBar` is a circular indicator that only animates.
    - It does not show how complete an action is.
    - It can, however, show that something is taking place.
      - This is useful when an action is indeterminate in length.
    - There are three sizes for this type of progress indicator.

Indicating Progress with ProgressBar

- The second type is a horizontal `ProgressBar` that shows the completeness of an action.
  - For example, you can see how much of a file has downloaded.
  - The horizontal `ProgressBar` can also have a secondary progress indicator on it.
  - This can be used to show the completion of a downloading media file while that file plays.

Indicating Progress with ProgressBar

```
<ProgressBar
    android:id="@+id/progress_bar"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content" />
```

Indicating Progress with ProgressBar

- The default style is for a medium-size circular progress indicator.
  - This is not a “bar” at all.
- The other two styles for indeterminate `ProgressBar` are `progressBarStyleLarge` and `progressBarStyleSmall`.
- These styles animate automatically.

Indicating Progress with ProgressBar

```
<ProgressBar
    android:id="@+id/progress_bar"
    style="?android:attr/progressBarStyleHorizontal"
    android:layout_width=" match_parent"
    android:layout_height="wrap_content"
    android:max="100" />
```

Indicating Progress with ProgressBar

- We can set the indicator progress status programmatically as follows:

```
mProgress = findViewById(R.id.progress_bar);
mProgress.setProgress(75);
```

Adding Progress Indicators to the ActionBar

- You can also put a `ProgressBar` in your application’s title bar (on top of the screen).
- This can save screen real estate and can also make it easy to turn an indeterminate progress indicator on and off without changing the look of the screen.
- Indeterminate progress indicators are commonly used to display progress on pages where items need to be loaded before the page can finish drawing.
- This is often employed on Web browser screens.

Adding Progress Indicators to the ActionBar

```
<android.support.v7.widget.Toolbar xmlns:app="http://schemas.android.com/apk/res-
auto"
    android:id="@+id/toolbar_progress"
    android:background="@color/bg_color"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:minHeight="?attr/actionBarSize"
    app:popupTheme="@style/ThemeOverlay.AppCompat.Light"
    app:theme="@style/ToolbarTheme">
    <ProgressBar
        android:id="@+id/toolbar_spinner"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_gravity="end"
        android:indeterminate="true"
        android:visibility="gone" />
</android.support.v7.widget.Toolbar>
```

Adding Progress Indicators to the ActionBar

```
supportRequestWindowFeature(Window.
                FEATURE_INDETERMINATE_PROGRESS);
supportRequestWindowFeature(Window.FEATURE_PROGRESS);
setContentView(R.layout.indicators);
Toolbar toolbar = (Toolbar) findViewById(R.id.toolbar_progress);
toolbar.setTitleTextColor(Color.WHITE);
setSupportActionBar(toolbar);
if (getSupportActionBar() != null) {
  getSupportActionBar().setDisplayHomeAsUpEnabled(true);
}
ProgressBar toolbarProgress = findViewById(R.id.toolbar_spinner);
toolbarProgress.setVisibility(View.VISIBLE);
toolbarProgress.setProgress(5000);
```

Adding Progress Indicators to the ActionBar

- To use the indeterminate indicator on your Activity object’s `ActionBar`, you need to request the feature `Window.FEATURE_INDETERMINATE_PROGRESS`, as previously shown.
  - This shows a small circular indicator in the right side of the `ActionBar`.
  - For a horizontal `ProgressBar` style that shows behind the `ActionBar`, you need to enable `Window.FEATURE_PROGRESS`.
  - These features must be enabled before your application calls the `setContentView()` method, as shown in the preceding example.

Indicating Activity with Activity Bars and Activity Circles

- When there is no telling how long an operation will take to complete, but you need a way to indicate to the user that an operation is taking place, you should use an activity bar or an activity circle.

Indicating Activity with Activity Bars and Activity Circles

- You define an activity bar or circle exactly like you define a `ProgressBar`, with one small change: you need to tell Android that the operation running will continue for an indeterminate amount of time by either setting the attribute within your layout file using `android:indeterminate`, or from within your code by setting the `ProgressBar`'s visibility to indeterminate using the `setProgressBarIndeterminateVisibility()` method.

Adjusting Progress with SeekBars

- You have seen how to display progress to the user.
- If it is necessary to allow user to adjust the current cursor position in a playing media file or to adjust a volume setting, use a `SeekBar`.
- `SeekBar` control is provided by the Android SDK.

Adjusting Progress with SeekBars

- It’s like the regular horizontal `ProgressBar` but includes a thumb, or selector, that can be dragged by the user.
- A default thumb selector is provided, but you can use any drawable item as a thumb.

Adjusting Progress with SeekBar

```
<SeekBar
    android:id="@+id/seekbar1"
    android:layout_height="wrap_content"
    android:layout_width="240dp"
    android:max="500"
    android:thumb="@drawable/droidsk1" />
```

Adjusting Progress with SeekBar

```
SeekBar seek = findViewById(R.id.seekbar1);
seek.setOnSeekBarChangeListener(
    new SeekBar.OnSeekBarChangeListener() {
        public void onProgressChanged(
            SeekBar seekBar, int progress,boolean
            fromTouch)
        {
            ((TextView)findViewById(R.id.seek_text))
                .setText("Value: "+progress);
            seekBar.setSecondaryProgress(
                (progress+seekBar.getMax())/2);
        }
});
```

Other Valuable User Interface Controls

- Android has a number of other ready-to-use user interface controls to incorporate into your applications.
- The following section is dedicated to introducing the following:
  - RatingBar
  - Time controls, such as
    - Chronometer
    - DigitalClock
    - TextClock
    - AnalogClock

Displaying Rating Data with RatingBar

- Although the `SeekBar` is useful for allowing a user to set a value, such as the volume, the `RatingBar` has a more specific purpose:
  - Showing ratings or getting a rating from a user
- By default, this `ProgressBar` uses the star paradigm, with five stars by default.
- A user can drag across this horizontally to set a rating.
- A program can set the value as well.
- However, the secondary indicator cannot be used because it is used internally by this particular control.

Displaying Rating Data with RatingBar

```
<RatingBar
    android:id="@+id/ratebar1"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:numStars="4"
    android:stepSize="0.25" />
```

Displaying Rating Data with RatingBar

```
RatingBar rate = findViewById(R.id.ratebar1);
rate.setOnRatingBarChangeListener(new
    RatingBar.OnRatingBarChangeListener() {
    public void onRatingChanged(RatingBar ratingBar,
        float rating, boolean fromTouch) {
        ((TextView)findViewById(R.id.rating_text))
            .setText("Rating: "+ rating);
    }
});
```

Showing Time Passage with the Chronometer

- Sometimes you want to show time passing instead of incremental progress.
- In this case, you can use the `Chronometer` control as a timer.
- This might be useful if it is the user who is taking time doing some task or playing a game where some action needs to be timed.

Showing Time Passage with the Chronometer

```
<Chronometer
    android:id="@+id/Chronometer01"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:format="Timer: %s" />
```

Showing Time Passage with the Chronometer

```
final Chronometer timer = findViewById(R.id.Chronometer01);

long base =  timer.getBase();
Log.d(ViewsMenu.debugTag, "base = "+ base);
timer.setBase(0);
timer.start();
```

Displaying the Time

- Displaying the time in an application is often not necessary because Android devices have a status bar to display the current time.
- However, two clock controls are available to display this information:
  - The `TextClock` and `AnalogClock` controls

Using the TextClock

- The `TextClock` control was added in API Level 17.
  - It is meant to be a replacement for the `DigitalClock`, which was deprecated in API Level 17.
- The `TextClock` has many more features than the `DigitalClock`.
  - It allows you to format the display of the date and/or time.
- The `TextClock` allows you to display the time in 12-hour mode or 24-hour mode and even allows you to set the time zone.
- By default, the `TextClock` control does not show the seconds.

Using the TextClock

```
<TextClock
    android:id="@+id/TextClock01"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content" />
```

Using the AnalogClock

- The `AnalogClock` control is a dial-based clock with a basic clock face with two hands.
- It updates automatically as each minute passes.
- The image of the clock scales appropriately with the size of its View.

Using the AnalogClock (Cont'd)

```
<AnalogClock
    android:id="@+id/AnalogClock01"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content" />
```

Playing Video with VideoView

- The `VideoView` control is a video player View used for playing video in your application.
- This View has controls of to play, pause, skip forward, skip backward, and seek.

Playing Video with VideoView

```
<VideoView
    android:id="@+id/video_view"
    android:layout_width="match_parent"
    android:layout_height="match_parent" />
```

Playing Video with VideoView

```
@Override
protected void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);
    setContentView(R.layout.activity_simple_video_view);
    VideoView vv = findViewById(R.id.videoView);
    MediaController mc = new MediaController(this);
    Uri video = Uri.parse("http://andys-veggie-
garden.appspot.com/vid/reveal.mp4");
    vv.setMediaController(mc);
    vv.setVideoURI(video);
}
```

Playing Video with VideoView

```
protected void onCreate(Bundle savedInstanceState) {
    super.onCreate( savedInstanceState );
    setContentView( R.layout.activity_simple_video_view );
    VideoView vv = findViewById( R.id.videoView );
    MediaController mc = new MediaController( this );
    Uri video = Uri.parse(
     "https://ia802205.us.archive.org/31/items/Unexpect2001/Unexpect2001_512kb.mp4");
    mc.setAnchorView( vv );
    vv.setMediaController( mc );
    vv.setVideoURI( video );
    vv.requestFocus();
    vv.setOnPreparedListener( new MediaPlayer.OnPreparedListener() {
                                             public void onPrepared(MediaPlayer mp) {  vv.start();  }
                                         } );
}
```

Playing Video with VideoView

- You first want to get the `VideoView` from the layout.
  - Then you need to create a `MediaController` object.
- In our case, we are obtaining the video from the Internet.
  - We first need to parse the URL of the video using the `Uri.parse` method so that our code uses a valid Uri object.
- We then use the `setMediaController()` method for adding the `MediaController` object to your `VideoView`, and then we use the `setVideoURI()` method to pass the Uri to our `VideoView`.

Playing Video with VideoView

- In order to play a video from the Internet, add this line to AndroidManifest.xml

```
<uses-permission
    android:name="android.permission.INTERNET" />
```

Summary

- We have learned how to use a `TextView` and how to define many of its attributes.
- We have learned how to use an `EditText` control and how to implement its `InputFilter` interface.
- We have learned about the different types of autocompletion and how to implement an `Adapter` for the different autocomplete views.
- We have learned how to populate `Spinner` controls with different choices and are able to retrieve the selected option.

Summary

- We have learned how to use and implement different forms of user selections, such as buttons, check boxes, switches, and radio groups.
- We are now able to retrieve the date and time from users.
- We are now able to use indicators to display data to users.

References and More Information

- Android API Guides: “User Interface”:
  - http://d.android.com/guide/topics/ui/index.html
- Android SDK Reference regarding the application View class:
  - http://d.android.com/reference/android/view/View.html
- Android SDK Reference regarding the application TextView class:
  - http://d.android.com/reference/android/widget/TextView.html
- Android SDK Reference regarding the application EditText class:
  - http://d.android.com/reference/android/widget/EditText.html

References and More Information

- Android SDK Reference regarding the application Button class:
  - http://d.android.com/reference/android/widget/Button.html
- Android SDK Reference regarding the application CheckBox class:
  - http://d.android.com/reference/android/widget/CheckBox.html
- Android SDK Reference regarding the application Switch class:
  - http://d.android.com/reference/android/widget/Switch.html

References and More Information

- Android SDK Reference regarding the application RadioGroup class:
  - http://d.android.com/reference/android/widget/Switch.html
- Android SDK Reference regarding the support v7 Toolbar class:
  - http://d.android.com/reference/android/support/v7/widget/Toolbar.html
- Android SDK Reference regarding the application VideoView class:
  - http://d.android.com/reference/android/widget/VideoView.html