Mobile Application Development

User Interface

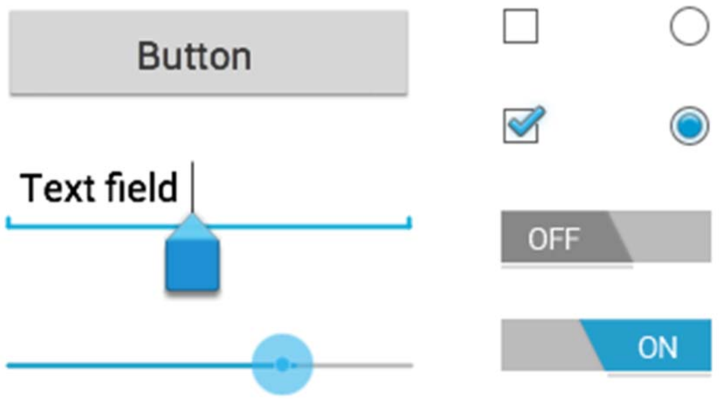
Common Input Controls

Common Input Controls

- Android provides a wide variety of controls you can use in your UI, such as buttons, text fields, seek bars, checkboxes, toggle buttons, and many more.
- Adding an input control to your UI is as simple as adding an XML element to your XML layout.
- Each input control supports a specific set of input events so you can handle events such as when the user enters text or touches a button.

Common Input Controls

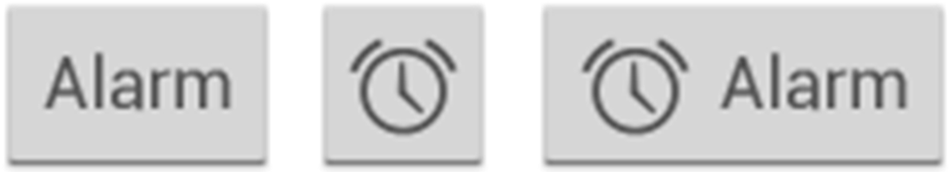
- Some common input controls:
  - Buttons
  - Text Fields
  - Checkboxes
  - Radio Buttons
  - Toggle Buttons
  - Seek Bars



BUTTONS

Buttons

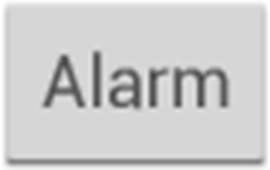
- A Button consists of text and/or an image that clearly communicates what action will occur when the user touches it. A button can have an image, text, or both.



- To define the click event handler for a button, add the android:onClick attribute to the <Button> element in your XML layout.

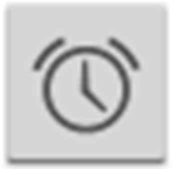
- You can also declare the click event handler programmatically rather than in an XML layout.

Create Text Button (XML)



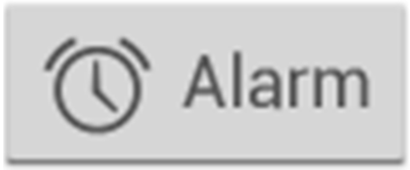
```
<Button
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="@string/button_text"
    ... />
```

Create Icon Button (XML)



```
<ImageButton
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:src="@drawable/button_icon"
    ... />
```

Create Text+Icon Button (XML)



```
<Button
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="@string/button_text"
    android:drawableLeft="@drawable/button_icon"
    ... />
```

Button Click Events

- When the user clicks a button, the Button object receives an on-click event.

- To define the click event handler for a button, add the android:onClick attribute to the <Button> element in your XML layout.

  ```
  android:onClick="sendMessage"
  ```

- The value for this attribute must be the name of the method you want to call in response to a click event.

- The Activity hosting the layout must then implement the corresponding method.

Define Click Event For Button (XML)

```
<Button
    android:id="@+id/button_send"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="@string/button_send"
    android:onClick="sendMessage" />
```

Responding to Click Events (Code)

```
public void sendMessage(View view) {
    // Do something in response to button click

}
```

The method you declare in the android:onClick attribute must have a signature exactly as shown above. Specifically, the method must:

- Be public
- Return void
- Define a View as its only parameter (this will be the View that was clicked)

onClickListener (Code)

```
Button button = (Button) findViewById(R.id.button_send);

button.setOnClickListener(new View.OnClickListener() {
    public void onClick(View v) {
        // Do something in response to button click
    }
});
```

To declare the event handler programmatically, create a View.OnClickListener object and assign it to the button by calling setOnClickListener(View.OnClickListener).

Button References

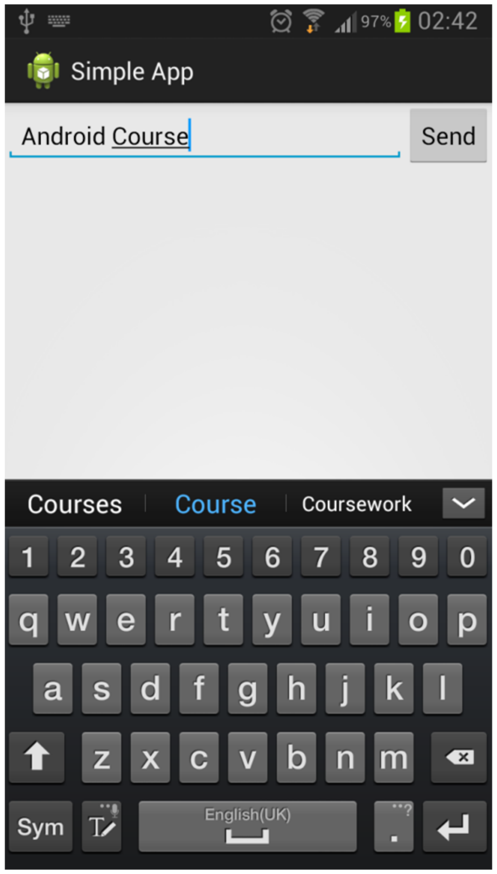
- http://developer.android.com/guide/topics/ui/controls/button.html
- http://developer.android.com/reference/android/widget/Button.html
- http://developer.android.com/reference/android/widget/ImageButton.html

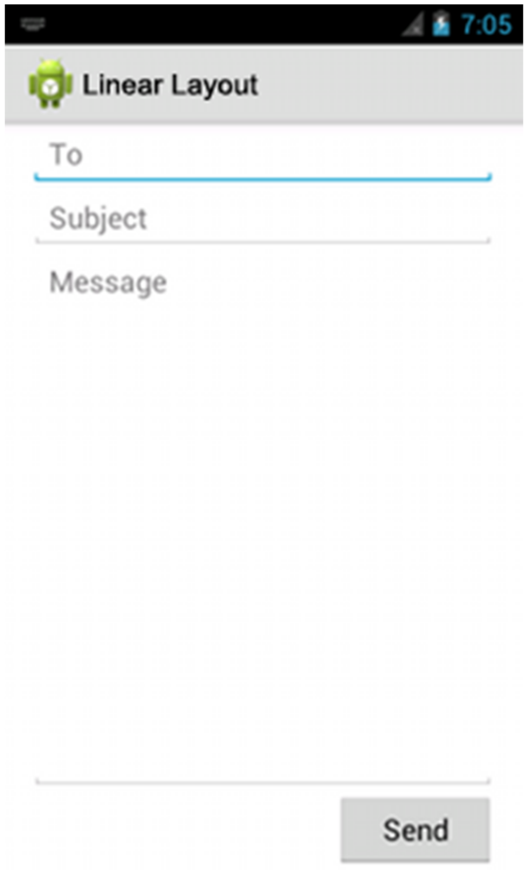
TEXT FIELDS

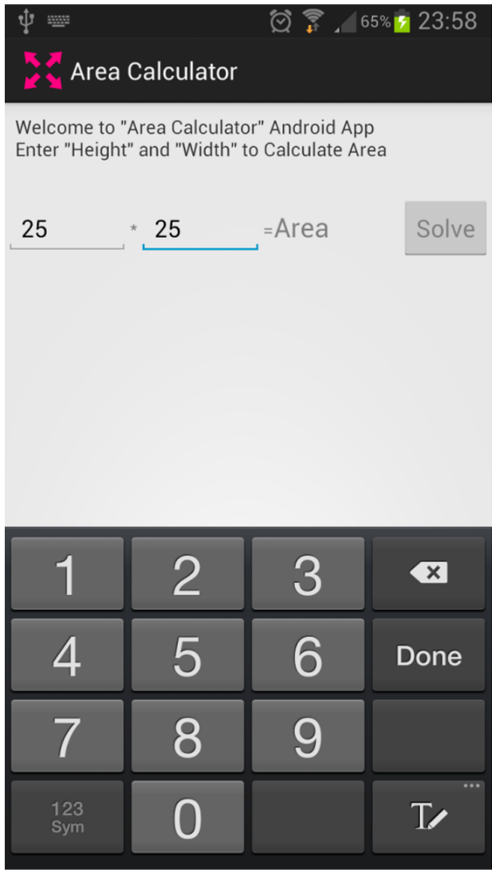
Text Fields

- Text fields allow the user to type text into your app.
- They can be either single line or multi-line.
- Touching a text field places the cursor and automatically displays the keyboard.
- In addition to typing, text fields allow for a variety of other activities, such as text selection (cut, copy, paste) and data lookup via auto-completion.
- You can add a text field to you layout with the EditText object. You should usually do so in your XML layout with a <EditText> element.

Text Fields


97% 02:42
Simple App
Android Course
Send
Courses
Course
Coursework
Sym
English(UK)


7:05
Linear Layout
To
Subject
Message
Send


65% 23:58
Area Calculator
Welcome to "Area Calculator" Android App
Enter "Height" and "Width" to Calculate Area
25
*
25
=Area
Solve
Done
123 Sym

Create EditText (XML)

```
<EditText
    android:id="@+id/someID"
    android:layout_width="fill_parent"
    android:layout_height="wrap_content"
    android:hint="@string/some_hint" />
```

Specifying Keyboard (XML)

- You can specify the type of keyboard you want for your EditText object with the android:inputType attribute.
- For example, if you want the user to input an email address, you should use the textEmailAddress input type:

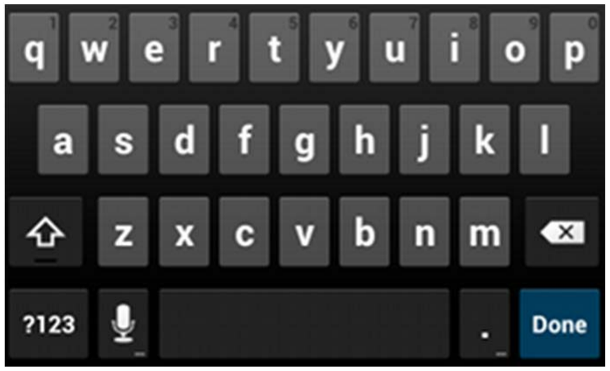
```
<EditText
    android:id="@+id/someID"
    android:layout_width="fill_parent"
    android:layout_height="wrap_content"
    android:hint="@string/some_hint"
    android:inputType="textEmailAddress" />
```

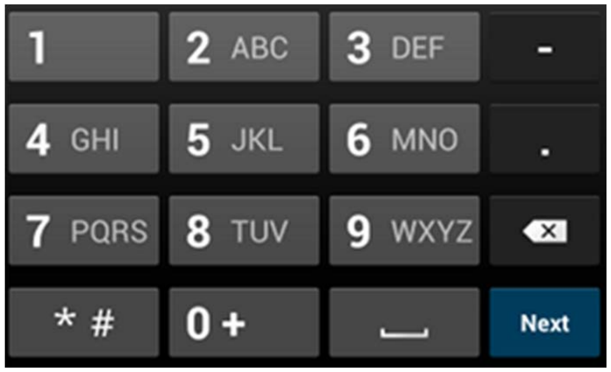
Specifying Keyboard (XML)

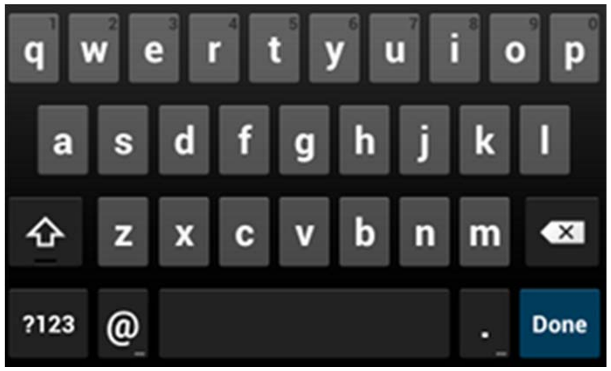
- There are several different input types available for different situations.
  - "text" Normal text keyboard.
  - "textEmailAddress" Normal text keyboard with the @ character.
  - "textUri" Normal text keyboard with the / character.
  - "number" Basic number keypad.
  - "phone" Phone-style keypad.

Specifying Keyboard (XML)

text







phone

textEmailAddress

Keyboard Behavior (XML)

- The android:inputType also allows you to specify certain keyboard behaviors, such as whether to capitalize all new words or use features like auto-complete and spelling suggestions.

Keyboard Behavior (XML)

- The android:inputType attribute allows bitwise combinations so you can specify both a keyboard layout and one or more behaviors at once.
  - "textMultiLine" Normal text keyboard that allow users to input long strings of text that include line breaks (carriage returns).
  - "textCapSentences" Normal text keyboard that capitalizes the first letter for each new sentence.
  - "textCapWords" Normal text keyboard that capitalizes every word. Good for titles or person names.
  - "textAutoCorrect" Normal text keyboard that corrects commonly misspelled words.
  - "textPassword" Normal text keyboard, but the characters entered turn into dots.

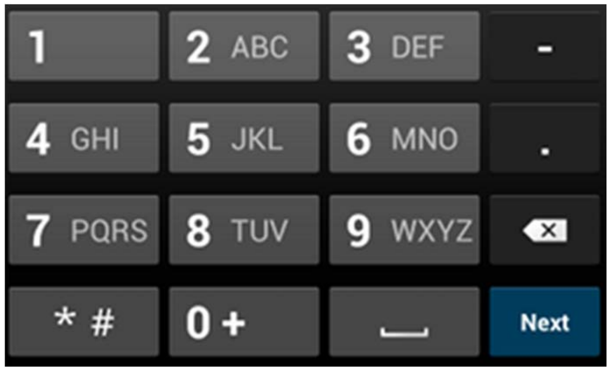
Keyboard Behavior (XML)

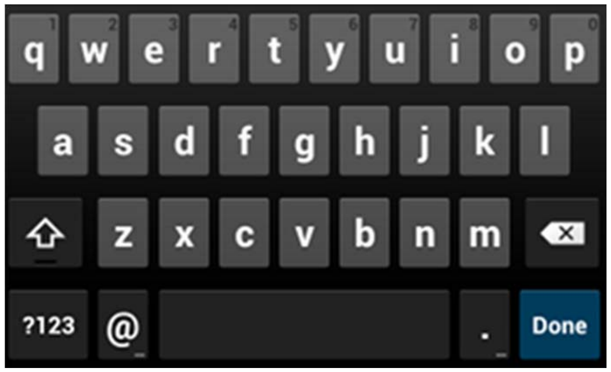
```
<EditText
   android:id="@+id/txt_special"
   android:layout_width="fill_parent"
   android:layout_height="wrap_content"
   android:hint="@string/txt_special_hint"
   android:inputType="textMultiLine|textCapWords" />
```

Specifying Keyboard Actions

- In addition to changing the keyboard's input type, Android allows you to specify an action to be made when users have completed their input.
- The action specifies the button that appears in place of the carriage return key and the action to be made, such as "Search" or "Send.“
- You can specify the action by setting the android:imeOptions attribute.
- IME stand for Input Method Editor.
- imeOptions: http://developer.android.com/reference/android/widget/TextView.html#attr_android:imeOptions

Specifying Keyboard Actions





Specifying Keyboard Actions (XML)

```
<EditText
   android:id="@+id/txt_special"
   android:layout_width="fill_parent"
   android:layout_height="wrap_content"
   android:hint="@string/txt_special_hint"
   android:inputType="text"
   android:imeOptions="actionSend" />
```

Specifying Keyboard Actions

- If you do not explicitly specify an input action then the system attempts to determine if there are any subsequent android:focusable fields. If any focusable fields are found following this one, the system applies the (@code actionNext} action to the current EditText so the user can select Next to move to the next field.

- If there's no subsequent focusable field, the system applies the "actionDone" action.

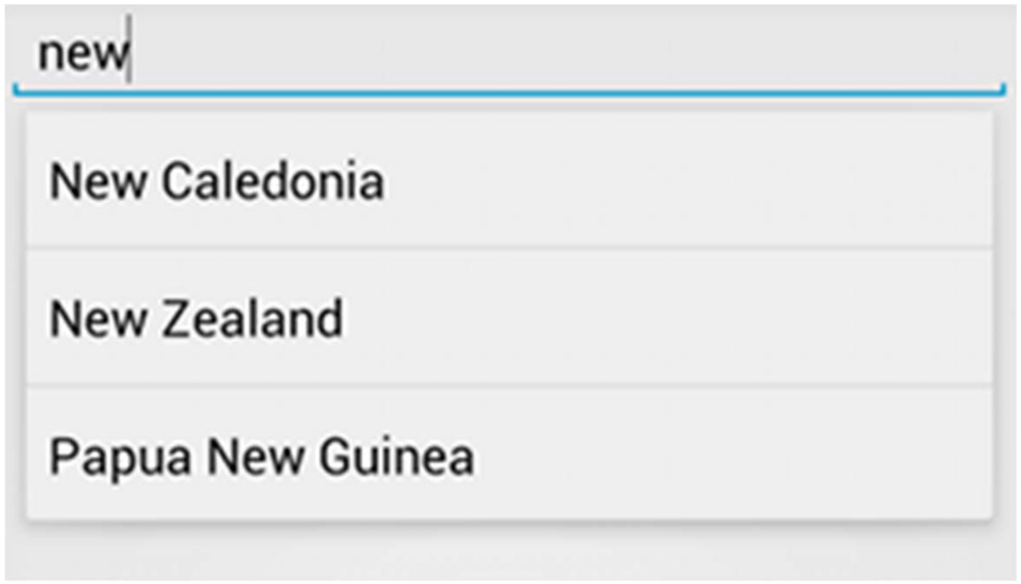
Responding to Keyboard Actions

```
EditText editText = (EditText) findViewById(R.id.txt_special);

editText.setOnEditorActionListener(new OnEditorActionListener() {
    @Override
    public boolean onEditorAction(TextView v, int actionId, KeyEvent event)
   {
        boolean handled = false;
        if (actionId == EditorInfo.IME_ACTION_SEND) {
            sendMessage();
            handled = true;
        }
        return handled;
    }
});
```

Providing Auto Complete

- If you want to provide suggestions to users as they type, you can use a subclass of EditText called AutoCompleteTextView.



Providing Auto Complete

- To implement auto-complete, you must specify an Adapter that provides the text suggestions.
  - An Adapter object acts as a bridge between a View and the underlying data for that view.
  - The Adapter provides access to the data items.
  - The Adapter is also responsible for making a View for each item in the data set.
- There are several kinds of adapters available, depending on where the data is coming from, such as from a database or an array.

Providing Auto Complete

Steps:

1. Add the AutoCompleteTextView to your layout.

2. Define the array that contains all text suggestions. For example, an array of country names that's defined in an XML resource file (res/values/strings.xml):

3. In your Activity, specify the adapter that supplies the suggestions.

1. Add AutoCompleteTextView

```xml
<?xml version="1.0" encoding="utf-8"?>
<AutoCompleteTextView
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:id="@+id/autocomplete_country"
    android:layout_width="fill_parent"
    android:layout_height="wrap_content" />
```

2. Define the Array

```xml
<?xml version="1.0" encoding="utf-8"?>
<resources>
    <string-array name="countries_array">
        <item>Afghanistan</item>
        <item>Albania</item>
        <item>Algeria</item>
        <item>American Samoa</item>
        <item>Andorra</item>
        <item>Angola</item>
        <item>Anguilla</item>
        <item>Antarctica</item>
        ...
    </string-array>
</resources>
```

3. Specify the Adapter

```
// Get a reference to the AutoCompleteTextView in the layout
AutoCompleteTextView textView = (AutoCompleteTextView)
   findViewById(R.id.autocomplete_country);

// Get the string array
String[] countries =
   getResources().getStringArray(R.array.countries_array);

// Create the adapter and set it to the AutoCompleteTextView
ArrayAdapter<String> adapter =
        new ArrayAdapter<String>(this,
   android.R.layout.simple_list_item_1, countries);

textView.setAdapter(adapter);
```

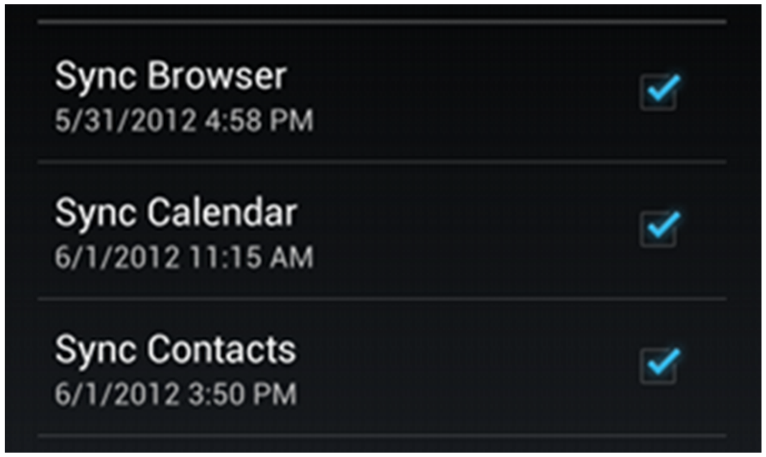
Text Field References

- http://developer.android.com/guide/topics/ui/controls/text.html
- http://developer.android.com/reference/android/widget/EditText.html
- http://developer.android.com/design/building-blocks/text-fields.html
- http://developer.android.com/guide/topics/text/creating-input-method.html
- http://developer.android.com/reference/android/widget/AutoCompleteTextView.html
- http://developer.android.com/reference/android/widget/ArrayAdapter.html
- http://developer.android.com/reference/android/R.layout.html
- http://docs.oracle.com/javase/tutorial/java/generics/types.html

CHECKBOXES

Checkboxes

- Checkboxes allow the user to select one or more options from a set.
- Typically, you should present each checkbox option in a vertical list.



- Because a set of checkbox options allows the user to select multiple items, each checkbox is managed separately and you must register a click listener for each one.

Create Checkbox (XML)

```
<CheckBox android:id="@+id/checkbox_meat"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="@string/meat"
    android:onClick="onCheckboxClicked" />
<CheckBox android:id="@+id/checkbox_cheese"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="@string/cheese"
    android:onClick="onCheckboxClicked" />
```

Responding to Click Events

- When the user selects a checkbox, the CheckBox object receives an on-click event.
- The value for this attribute must be the name of the method you want to call in response to a click event.
- The Activity hosting the layout must then implement the corresponding method.
- The method you declare in the android:onClick attribute must:
  - Be public
  - Return void
  - Define a View as its only parameter (this will be the View that was clicked)

Responding to Click Events (Code)

```
public void onCheckboxClicked(View view) {
    boolean checked = ((CheckBox) view).isChecked();
    switch(view.getId()) {
        case R.id.checkbox_meat:
          if (checked)
              ...
          else
              ...
          break;
        case R.id.checkbox_cheese:
          if (checked)
              ...
          else
              ...
          break;
   }
}
```

Accessing CheckBox (Code)

```
CheckBox cb1 = (CheckBox) findViewById(R.id. checkbox_meat);

if (cb1.isChecked()) {
   ...
} else {
   ...
}

CheckBox cb2 = (CheckBox) findViewById(R.id. checkbox_cheese);
if (cb2.isChecked()) {
   ...
} else {
   ...
}
```

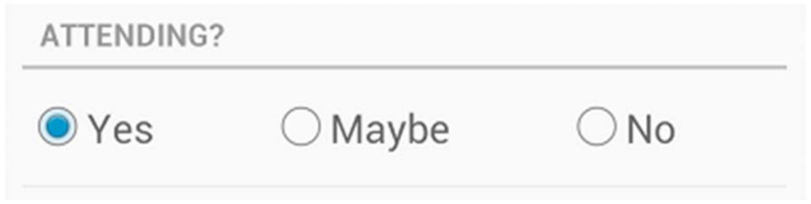
Checkboxes References

- http://developer.android.com/guide/topics/ui/controls/checkbox.html
- http://developer.android.com/reference/android/widget/CheckBox.html

RADIO BUTTONS

Radio Buttons

- Radio buttons allow the user to select one option from a set. You should use radio buttons for optional sets that are mutually exclusive if you think that the user needs to see all available options side-by-side.



- To create each radio button option, create a RadioButton in your layout.
- However, because radio buttons are mutually exclusive, you must group them together inside a RadioGroup.
- By grouping them together, the system ensures that only one radio button can be selected at a time.

Create Radio Buttons (XML)

```
<RadioGroup
    android:layout_width="fill_parent"
    android:layout_height="wrap_content"
    android:orientation="vertical">
    <RadioButton android:id="@+id/radio_pirates"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="@string/pirates"
        android:onClick="onRadioButtonClicked" />
    <RadioButton android:id="@+id/radio_ninjas"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="@string/ninjas"
        android:onClick="onRadioButtonClicked" />
</RadioGroup>
```

Responding to Click Events

- When the user selects one of the radio buttons, the corresponding RadioButton object receives an on-click event.

- To define the click event handler for a button, add the android:onClick attribute to the <RadioButton> element in your XML layout.

- The value for this attribute must be the name of the method you want to call in response to a click event. The Activity hosting the layout must then implement the corresponding method.

- The method you declare in the android:onClick attribute must:

  - Be public
  - Return void
  - Define a View as its only parameter (this will be the View that was clicked)

Responding to Click Events (Code)

```
public void onRadioButtonClicked(View view) {
    boolean checked = ((RadioButton) view).isChecked();

    switch(view.getId()) {
        case R.id.radio_pirates:
            if (checked)
                // Pirates are the best
            break;
        case R.id.radio_ninjas:
            if (checked)
                // Ninjas rule
            break;
    }
}
```

Accessing RadioButton (Code)

```
RadioButton rb1 = (RadioButton) findViewById(R.id. radio_pirates);

if (rb1.isChecked()) {
   ...
}

RadioButton rb1 = (RadioButton) findViewById(R.id. radio_ninjas);
if (rb2.isChecked()) {
   ...
}
```

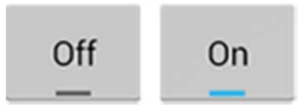
Radio Button References

- http://developer.android.com/guide/topics/ui/controls/radiobutton.html
- http://developer.android.com/reference/android/widget/RadioButton.html
- http://developer.android.com/reference/android/widget/RadioGroup.html

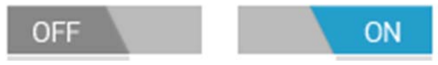
TOGGLE BUTTONS

Toggle Buttons

- A toggle button allows the user to change a setting between two states.
- You can add a basic toggle button to your layout with the ToggleButton object.



- Android 4.0 (API level 14) introduces another kind of toggle button called a switch that provides a slider control, which you can add with a Switch object.



- The ToggleButton and Switch controls are subclasses of CompoundButton and function in the same manner, so you can implement their behavior the same way.

Create ToggleButtons (XML)

```
<ToggleButton
    android:id="@+id/togglebutton"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:textOn="Vibrate on"
    android:textOff="Vibrate off"
    android:onClick="onToggleClicked" />
```

Toggle Buttons

- When the user selects a ToggleButton and Switch, the object receives an on-click event.
- To define the click event handler, add the android:onClick attribute to the <ToggleButton> or <Switch> element in your XML layout.
- The value for this attribute must be the name of the method you want to call in response to a click event. The Activity hosting the layout must then implement the corresponding method.
- The method you declare in the android:onClick attribute must:
  - Be public
  - Return void
  - Define a View as its only parameter (this will be the View that was clicked)

Responding to Click Events (Code)

```
public void onToggleClicked(View view) {
    // Is the toggle on?
    boolean on = ((ToggleButton) view).isChecked();

    if (on) {
        // Enable vibrate
    } else {
        // Disable vibrate
    }
}
```

OnCheckedChangeListener (Code)

```
ToggleButton toggle = (ToggleButton) findViewById(R.id.togglebutton);

toggle.setOnCheckedChangeListener(new
   CompoundButton.OnCheckedChangeListener() {
   public void onCheckedChanged(CompoundButton buttonView,
   boolean isChecked)
   {
         if (isChecked) {
              // do something
         } else {
              // do something
         }
     }
});
```

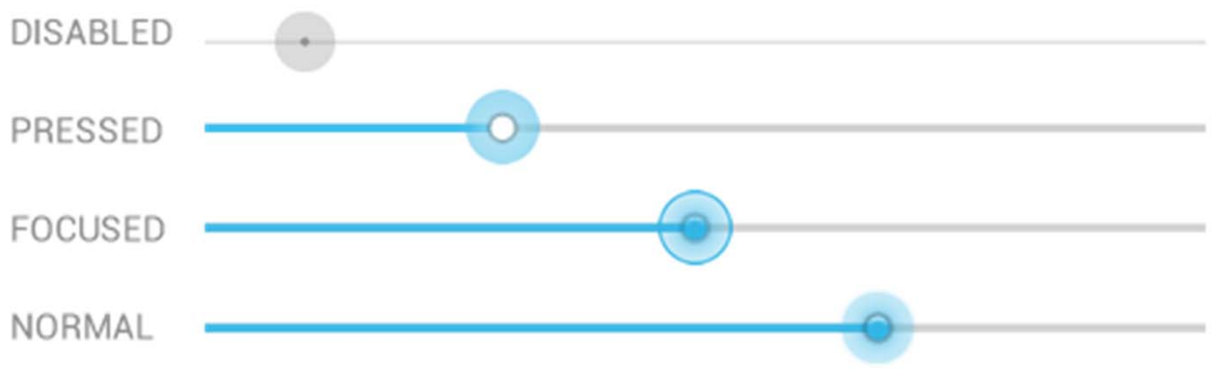
Toggle Button References

- http://developer.android.com/guide/topics/ui/controls/togglebutton.html
- http://developer.android.com/reference/android/widget/ToggleButton.html
- http://developer.android.com/reference/android/widget/Switch.html

SEEK BARS

Seek Bars

- Using SeekBar control, users can set the current value (progress level) by sliding the thumb left or right.



- Clients of the SeekBar can attach a SeekBar.OnSeekBarChangeListener to be notified of the user's actions.

Create SeekBar (XML)

```
<SeekBar
    android:id="@+id/testSeekBar"
    android:
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:progress="30"
    android:max="100" />
```

Access SeekBar (Code)

```
SeekBar sb=(SeekBar) findViewById(R.id.testSeekBar);

int v, max;
v = sb.getProgress();
max = sb.getMax();

TextView tv=(TextView) findViewById(R.id.value);
tv.setText(String.valueOf(v));
```

SeekBar Event Listener

```
sb.setOnSeekBarChangeListener(new OnSeekBarChangeListener() {
    int progress = 0;
    @Override
    public void onProgressChanged(SeekBar seekBar, int progresValue, boolean fromUser)
    {
        progress = progresValue;
    }
    @Override
    public void onStartTrackingTouch(SeekBar seekBar) {
        // Do something here, if you want to do anything at the start of
        // touching the seekbar
    }
    @Override
    public void onStopTrackingTouch(SeekBar seekBar) {
        // Display the value in textview (tv must be final)
        tv.setText(progress + "/" + seekBar.getMax());
    }
});
```

SeekBar References

- http://developer.android.com/design/building-blocks/seek-bars.html
- http://developer.android.com/reference/android/widget/SeekBar.html
- http://developer.android.com/reference/android/widget/SeekBar.OnSeekBarChangeListener.html

Q & A