Widgets

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App Widgets

- Widgets (App Widgets) are miniature (interactive) application views that can be embedded in other applications and receive periodic updates
  - Home screen is an application!
  - Locked screen too
- A widget can be thought of as extremely efficient and very limited Activity

Interaction with Widgets

- Always remember that a user will only interact with a widget with either
  - Touch
  - Vertical swipe
- The WidgetCategory attribute allows your widget to be displayed in multiply locations
  - Home Screen
  - LockScreen in Android 4.2

Security and Performance Matters

- App Widgets should be extremely fast and very efficient as screen updates should happen immediately, otherwise users are frustrated
- Embedded widgets inherit permissions of its activity
  - Thus widgets are extremely limited by design both for performance and security reasons.

Creating an App Widget

- Design UI Layout
- Add Metadata description in XML
- Implement Intent Receiver

Designing Layout

- App Widget UI is a typical layout, with certain limitations
- Default grid layout is 4x4 cells, each 74dp minimum
- Calculating minimum # of pixels for an app widget:

  minsize = (Cell count * 74dp) 2dp

Appwidget Provider Metadata

```
<?xml ... >
<appwidgetprovider
xmlns:android="..."
android:initialLayout = \
"@layout/my_widget_layout"
android:minWidth="146dp"
android:minHeight="146dp"
android:label="My App Widget"
android:updatePeriodMillis="3600000"
/>
```

App Widget Intent Receiver

```
import android.appwidget.AppWidgetManager;
import android.appwidget.AppWidgetProvider;
import android.content.Context;
public class MyAppWidget extends AppWidgetProvider
{
        @Override
        public void onUpdate(Context context,
                        AppWidgetManager
                        appWidgetManager,
                        int[] appWidgetIds)
                        {
                                // TODO Update the Widget UI.
                        }
}
```

App Widget in Manifest

```
<receiver android:name=".MyAppWidget"
                android:label="My App Widget">
        <intentfilter>
                <action android:name=
"android.appwidget.action.APPWIDGET_UPDATE" />
        </intentfilter>
<metadata android:name = "android.appwidget.provider"
    android:resource =  "@xml/my_app_widget_info" />
</receiver>
```

App Widget Limitations

- Using a App Widget it can only support the follow layout Limitations
  - FrameLayout
  - LinearLayout
  - RelativeLayout
  - GridLayout

App Widget Limitations Cont’d

- The only UI elements allowed are
  - AnalogClock
  - Button
  - Chronometer
  - ImageButton
  - ImageView
  - ProgressBar
  - TextView
  - ViewFlipper
  - ListView
  - GridView
  - StackView
  - AdapterViewFlipper

App Widget Limitations Cont'd

- App Widget interaction is limited to:
  - Adding a click listener to one or more views within the layout
  - Changing the UI based on selection changes

App Widgets: Other

- Typically Remote Views can be (now best practice) used to modify app widgets
- App Widgets can support multiple intent filters
- App Widgets can also be nicely integrated with Alarm Manager (for automatic periodic updates, etc)
- App Widgets can also have configuration

Questions

- Please ask in the Student Forum