

Android Developer Fundamentals V2

Delightful User Experience

Lesson 5



5.1 Drawables, styles, and themes



Contents

- Drawables
- Creating image assets
- Styles
- Themes



Drawables

Drawables

- [Drawable](#)—generic Android class used to represent any kind of graphic
- All drawables are stored in the **res/drawable** project folder



Drawable classes

[Bitmap File](#)

[Nine-Patch File](#)

[Layer List Drawable](#)

[Shape Drawable](#)

[State List Drawable](#)

[Level List Drawable](#)

[Transition Drawable](#)

[Vector Drawable](#)

... and more

Custom Drawables



Bitmaps

- PNG (.png), JPG (.jpg), or GIF (.gif) format
- Uncompressed BMP (.bmp)
- [WebP](#) (4.0 and higher)
- Creates a [BitmapDrawable](#) data type
- Placed directly in res/drawables



Referencing Drawables

- XML: @[package:]drawable/filename

```
<ImageView  
    android:layout_height="wrap_content"  
    android:layout_width="wrap_content"  
    android:src="@drawable/myimage" />
```

- Java code: R.drawable.filename

```
Resources res = \_getResources\(\);  
Drawable drawable = res.getDrawable(R.drawable.myimage);
```


Nine-Patch Files

- [Nine-patch](#) files (.9.png) are PNG with stretchable regions
- Only stretches bigger, not smaller, so start with small image
- Often used for backgrounds of UI elements
- Example: button background changes size with label length
- Good [intro](#)



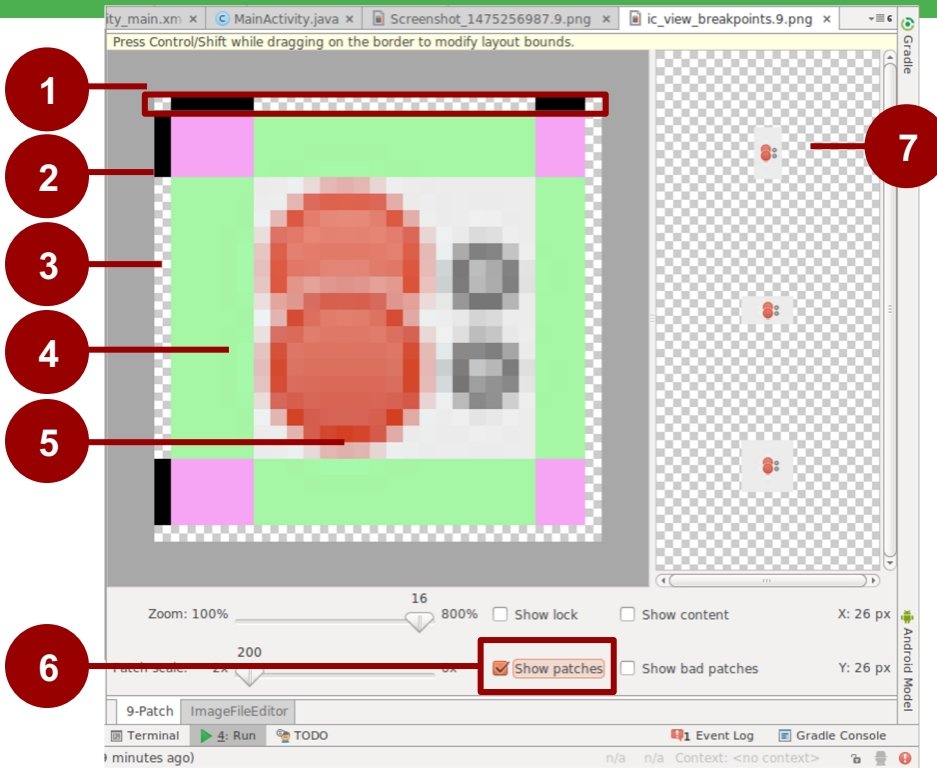
Creating Nine-Patch Files

1. Put a small PNG file into **res/drawable**
2. Right-click and choose **Create 9-Patch file**
3. **Double-click** 9-Patch file to open editor
4. Specify the stretchable regions (next slide)



Editing Nine-Patch Files

1. Border to mark stretchable regions for width
2. Stretchable regions marked for height
Pink == both directions
3. Click to turn pixels black. Shift-click (ctrl-click on Mac) to unmark
4. Stretchable area
5. Not stretchable
6. Check **Show patches**
7. Preview of stretched image



Layer List

- You can create layered images, just like with drawing tools, such as Gimp
- In Android, each layer is represented by a drawable
- Layers are organized and managed in XML
- List and the items can have properties
- Layers are drawn on top of each other in the order defined in the XML file
- [LayerDrawable](#)



Creating Layer List

```
<layer-list>
  <item>
    <bitmap android:src="@drawable/android_red"
      android:gravity="center" />
  </item>
  <item android:top="10dp" android:left="10dp">
    <bitmap android:src="@drawable/android_green"
      android:gravity="center" />
  </item>
  <item android:top="20dp" android:left="20dp">
    <bitmap android:src="@drawable/android_blue"
      android:gravity="center" />
  </item>
</layer-list>
```



Shape Drawables & GradientDrawable

- Define a shape and its properties in XML
 - Rectangle, oval, ring, line
- Styled with attributes such as <corners>, <gradient>, <padding>, <size>, <solid> and <stroke>

See [Shape Drawables](#) for more attributes

- Can be inflated for a [GradientDrawable](#)



Creating a GradientDrawable

```
<shape ... android:shape="rectangle">
  <gradient
    android:startColor="@color/white"
    android:endColor="@color/blue"
    android:angle="45"/>
  <corners android:radius="8dp" />
</shape>
```

here is a color
gradient...

```
Resources res = \_getResources\(\);
Drawable shape = res.getDrawable(R.drawable.gradient_box);
TextView tv = (TextView)findViewById(R.id.textview);
tv.setBackground(shape);
```



Transition Drawables

- Drawable that can cross-fade between two other drawables
- Each graphic represented by <item> inside <selector>
- Represented by [TransitionDrawable](#) in Java code
- Transition forward by calling `startTransition()`
- Transition backward with `reverseTransition()`



Creating Transition Drawables

```
<transition ...>  
  <selector> <item android:drawable="@drawable/on" />  
    <item android:drawable="@drawable/off" />  
  </selector>  
</transition>
```

```
<ImageButton  
  android:id="@+id/button"  
  android:src="@drawable/transition" />
```

```
ImageButton button = findViewById(R.id.button);  
TransitionDrawable drawable =  
    (TransitionDrawable) button.getDrawable();  
drawable.startTransition(500);
```



Vector drawables

- Scale smoothly for all screen sizes
- Android API Level 21 and up
- Use Vector Asset Studio to create (slides below)
- [VectorDrawable](#)



Creating Vector drawables

```
<vector ...  
    android:height="256dp" android:width="256dp"  
    android:viewportWidth="32" android:viewportHeight="32">  
    <path android:fillColor="@color/red"  
        android:pathData="M20.5,9.5  
            c-1.955,0,-3.83,1.268,-4.5,3  
            c-0.67,-1.732,-2.547,-3,-4.5,-3 ... />  
    </vector>
```



pathData for heart shape



Image Asset Studio

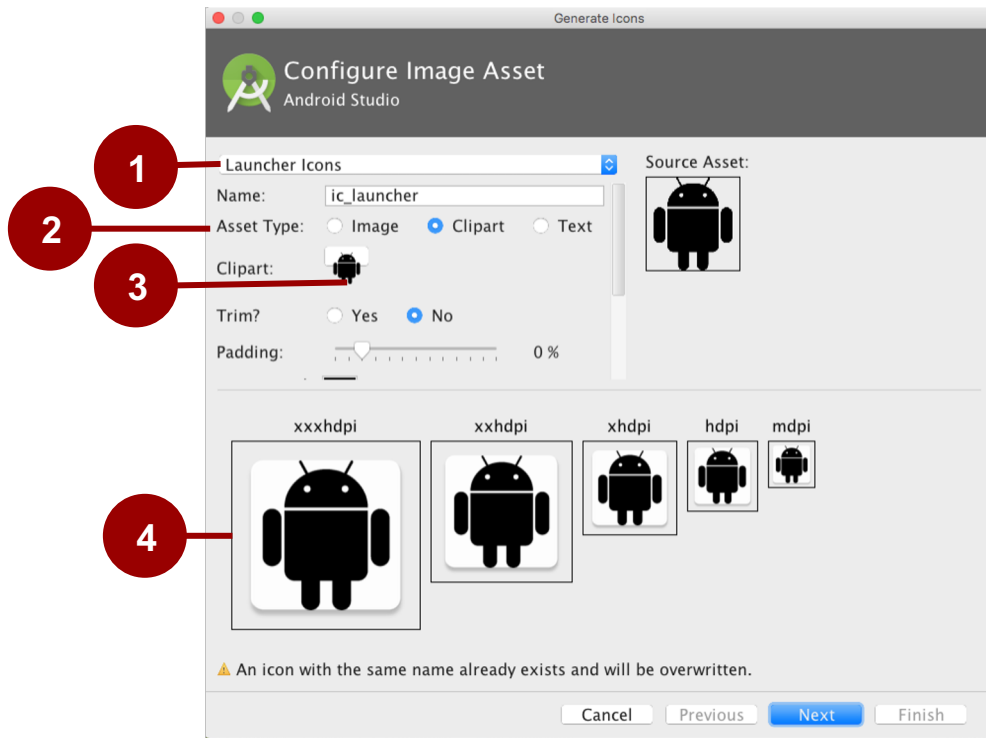
What is Image Asset Studio?

- Create icons from material icons, images, and text
 - Launcher, action bar, tab, notification icons
 - Generates a set of icons for [generalized screen density](#)
 - Stored in **/res** folder
-
- To start Image Asset Studio
 1. **Right-click** the **res** folder of your project
 2. Choose **New > Image Asset**



Using Image Asset Studio

1. Chose icon type and change name
2. Choose Image, Clipart, or Text
3. Click icon to chose clipart
4. Inspect assets for multiple screen sizes



Vector Asset Studio

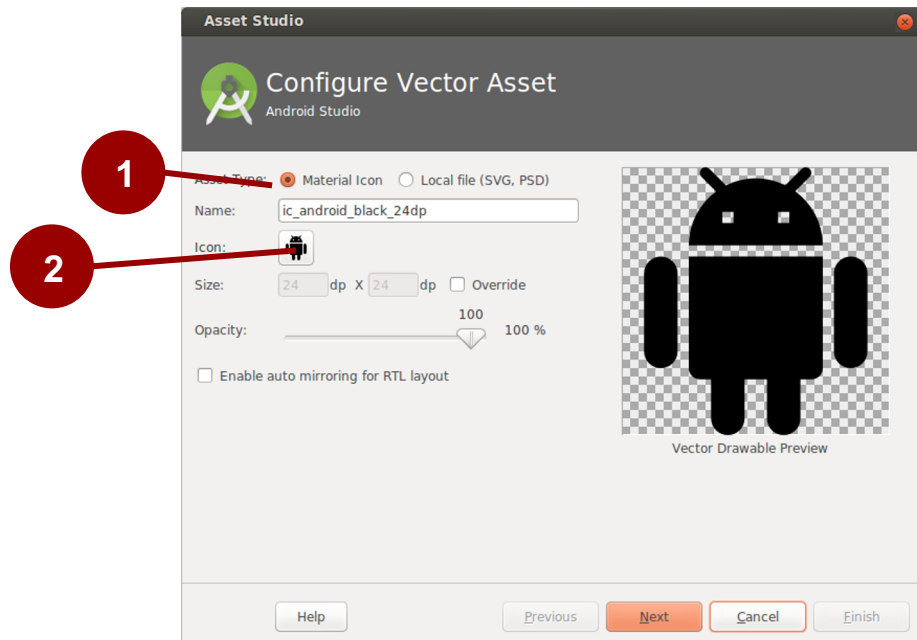
What is Vector Asset Studio?

- Create icons from material icons or supply your own vector drawings for API 21 and later
- Launcher, action bar, tab, notification icons
- Generates a scalable vector drawable
- Stored in **res** folder
- To start Image Asset Studio
 1. Right-click **res** folder of your project
 2. Choose **New > Vector Asset**



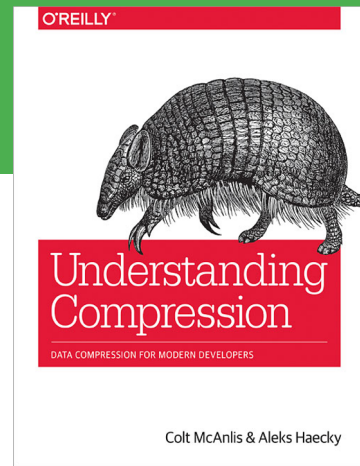
Using Image Asset Studio

1. Choose from Material Icon library, or supply your own SVG or PSD vector drawing
2. Opens Material Icon library



Images, memory, and performance

- Use smallest resolution picture necessary
- Resize, crop, compress
- Vector drawings for simple images
- Use Libraries: [Glide](#) or [Picasso](#)
- Choose appropriate image formats for image type and size
- Use lossy image formats and adjust quality where possible
- Learn about data compression for developers from [Understanding Compression](#)



Styles


What is a Style?

- Collection of attributes that define the visual appearance of a View
- Reduce duplication
- Make code more compact
- Manage visual appearance of many components with one style



Styles reduce clutter

```
<TextView
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:textColor="#00FF00"
    android:typeface="monospace"
    android:text="@string/hello" />
```



```
<TextView
    style="@style/CodeFont"
    android:text="@string/hello"
/>
```

Define styles in styles.xml

styles.xml is in **res/values**

```
<resources>
    <style name="CodeFont">
        <item name="android:textColor">#00FF00</item>
        <item name="android:typeface">monospace</item>
    </style>
</resources>
```



Inheritance: Parent

Define a parent style...

```
<resources>
    <style name="CodeFont">
        <item name="android:layout_width">match_parent</item>
        <item name="android:layout_height">wrap_content</item>
        <item name="android:textColor">#00FF00</item>
        <item name="android:typeface">monospace</item>
    </style>
</resources>
```



Inheritance: Define child

Define child with Codefont as parent

```
<resources>
    <style name="RedCode" parent="@style/Codefont">
        <item name="android:textColor">#FF0000</item>
    </style>
</resources>
```


Themes

Themes

- A Theme is a style applied to an entire activity or even the entire application
- Themes are applied in AndroidManifest.xml

```
<application android:theme="@style/AppTheme">
```



Customize AppTheme of Your Project

```
<!-- Base application theme. -->
<style name="AppTheme"
    parent="Theme.AppCompat.Light.DarkActionBar">
<!-- Try: Theme.AppCompat.Light.NoActionBar -->
    <!-- Customize your theme here. -->
    <item name="colorPrimary">@color/colorPrimary</item>
    <item name="colorPrimaryDark">@color/colorPrimaryDark</item>
    <item name="colorAccent">@color/colorAccent</item>
</style>
```



Styles and Themes Resources

Android platform has collection of built in

- [Android Styles](#)
- [Android Themes](#)
- [Styles and Themes Guide](#)
- [DayNight Theme Guide](#)



Learn more

- [Drawable Resource Documentation](#)
- [ShapeDrawable](#)
- [LinearLayout Guide](#)
- [Drawable Resource Guide](#)
- [Supported Media formats](#)
- [9-Patch](#)
- [Understanding Compression](#)

What's Next?

- Concept Chapter: [5.1 Drawables, styles, and themes](#)
- Practical: [5.1 Drawables, styles, and themes](#)

END