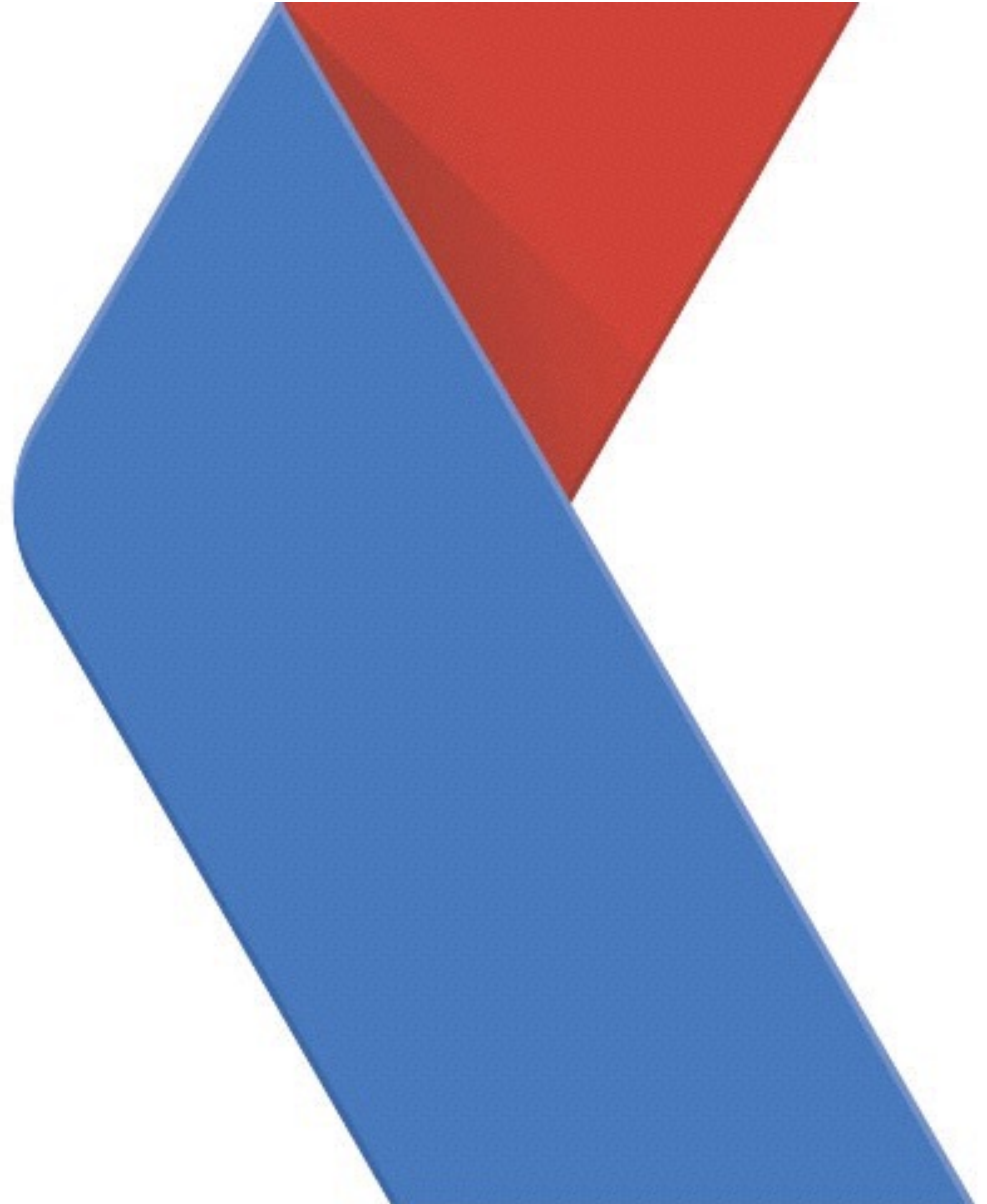
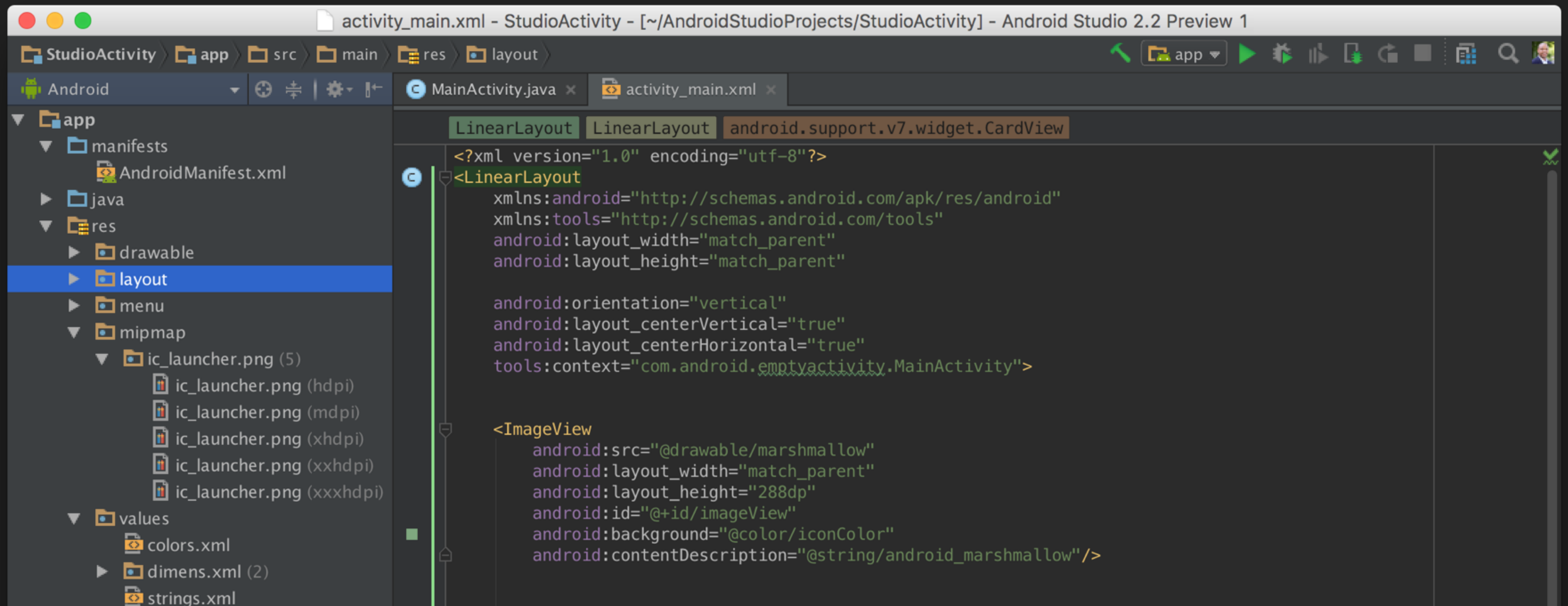


Android Studio and Tools

December 2016





Android Studio



Google Developer Day



92%



of top 125 apps use
Android Studio



143

Releases across
Preview, Beta, and Stable
Channels





Android Studio 2.0

Instant Run

Accelerated build and deployment speeds

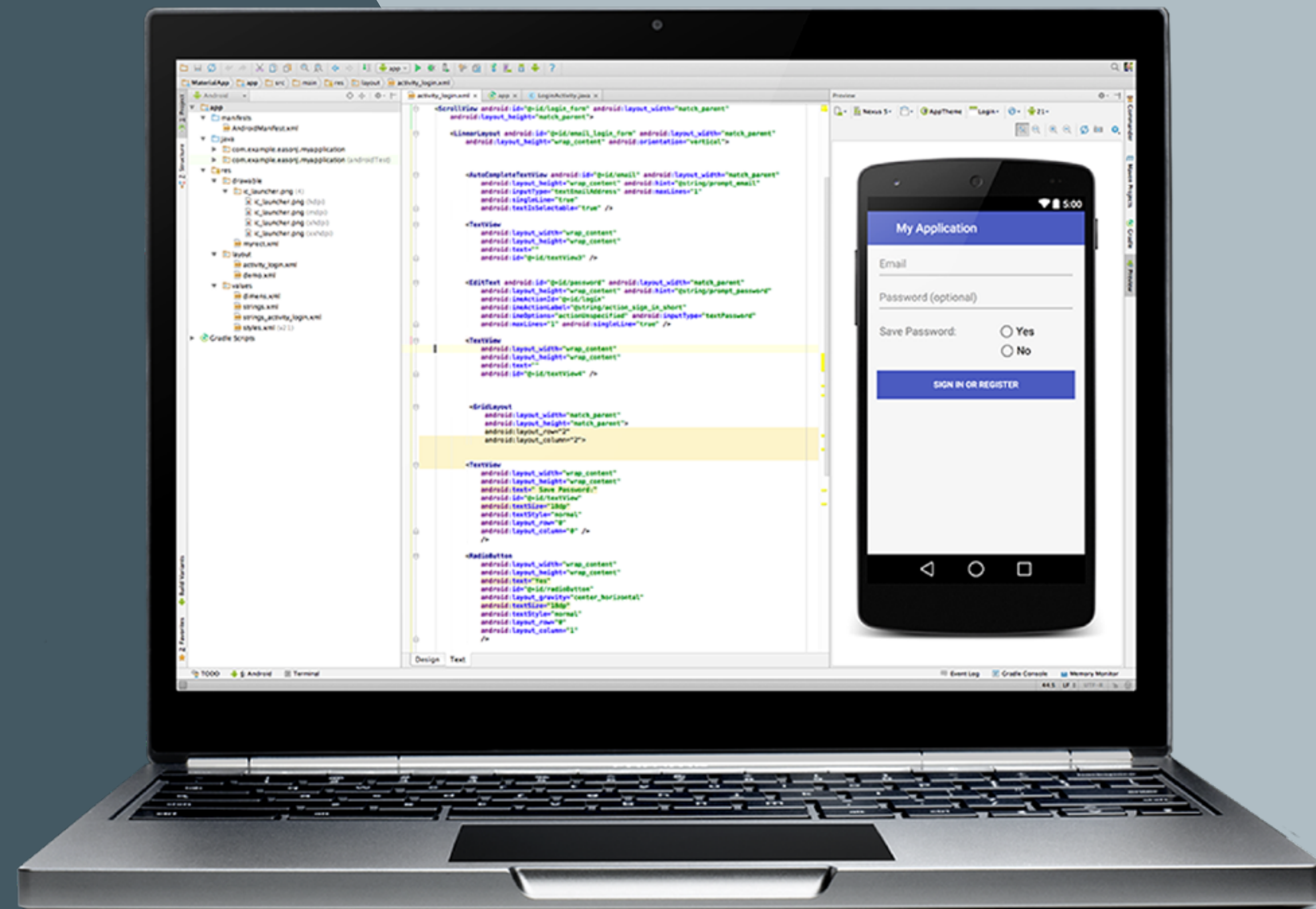
Next-generation Emulator

New GPU profiler

IntelliJ 15

Enhanced testing support

Support for Google Search deep linking



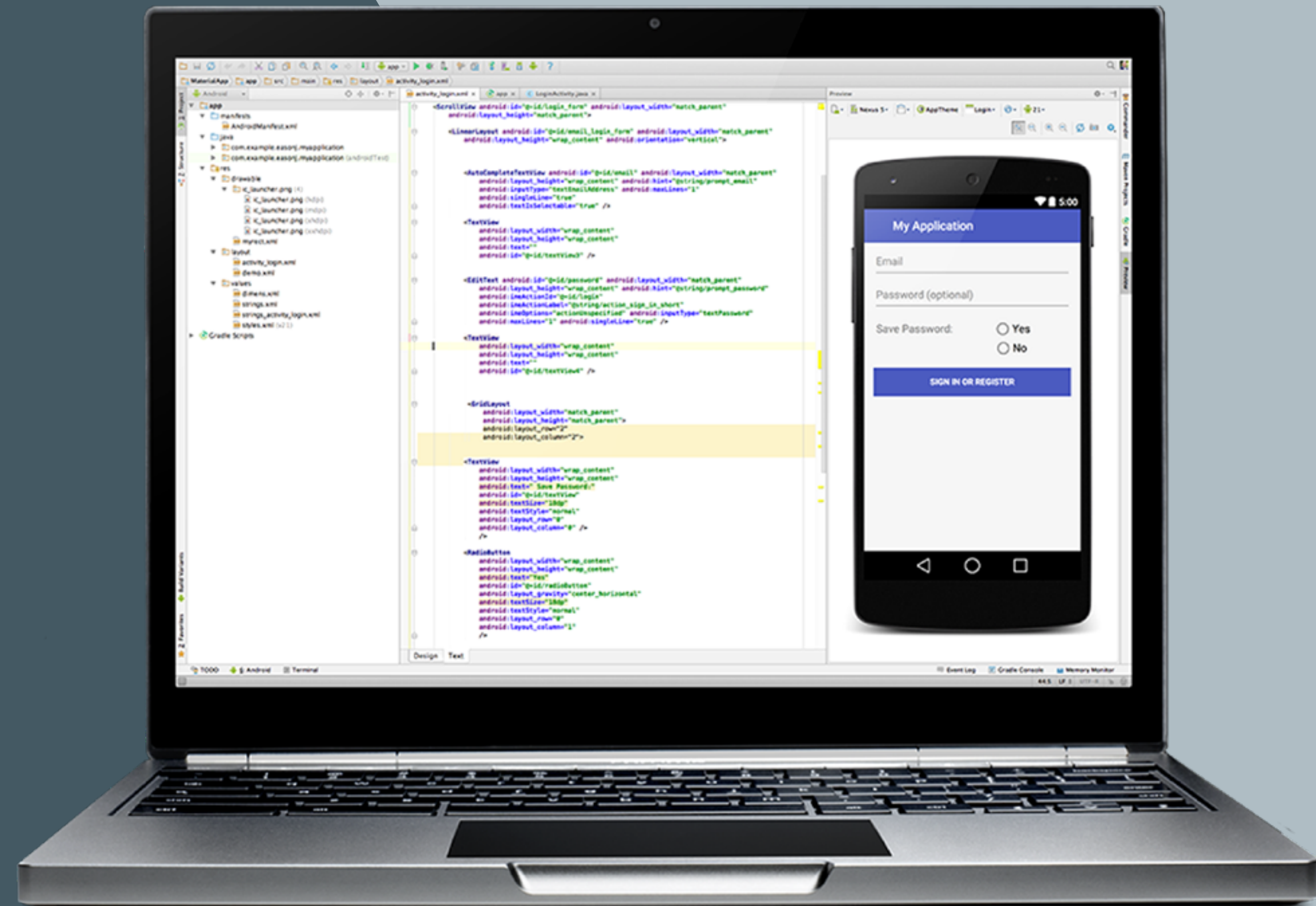
Android Studio 2.1

Nougat Developer Preview Features & APIs

Jack compiler & Java8 language feature support

Nougat Developer Preview Android Virtual Devices (AVDs)

Instant Run - incremental java compilation + dex in process





Android Studio 2.2



Design



Develop



Build



Test



Design



Develop



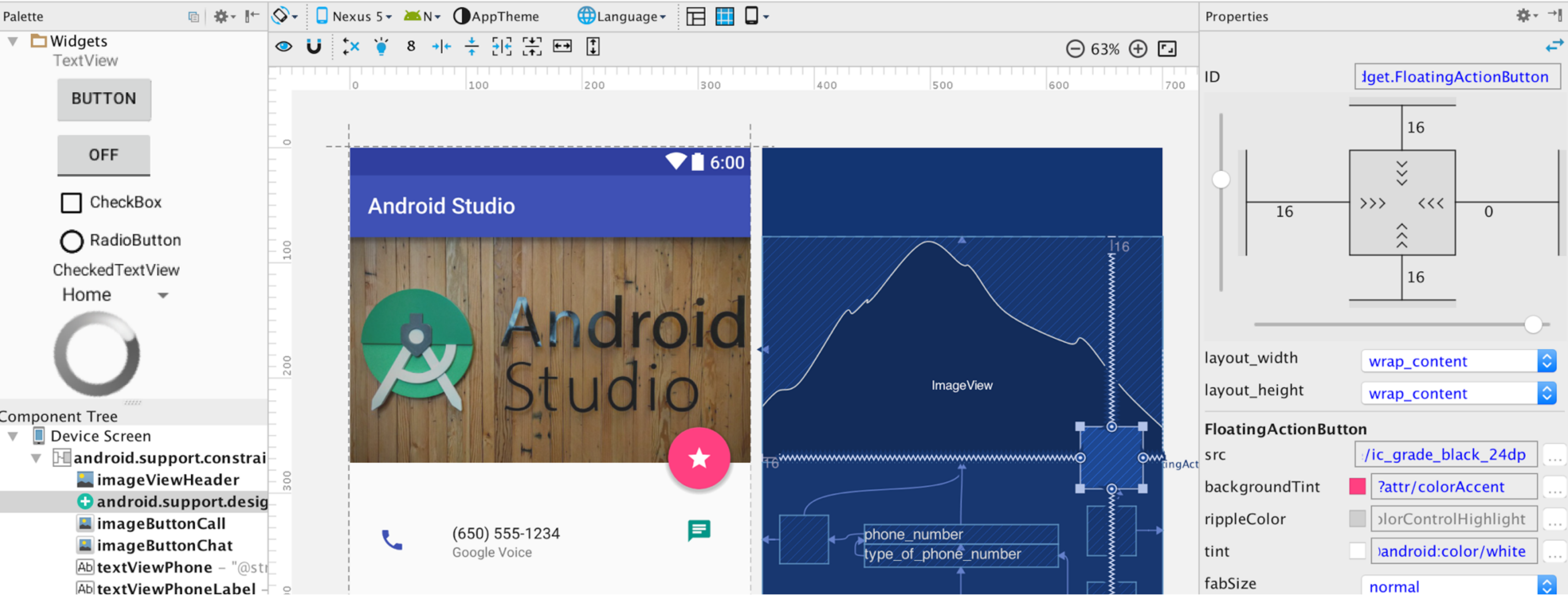
Build



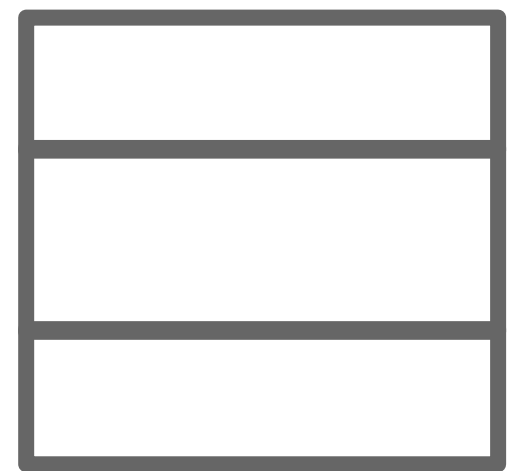
Test

No XML Editing
Required

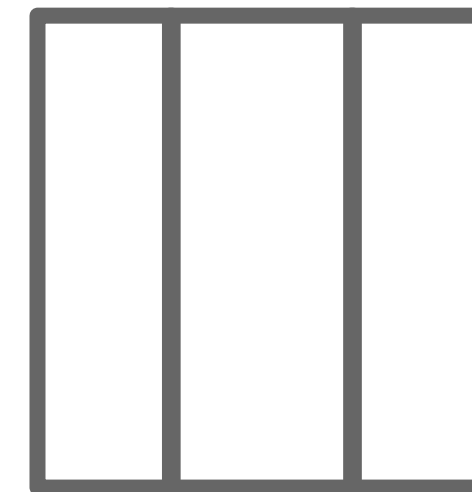




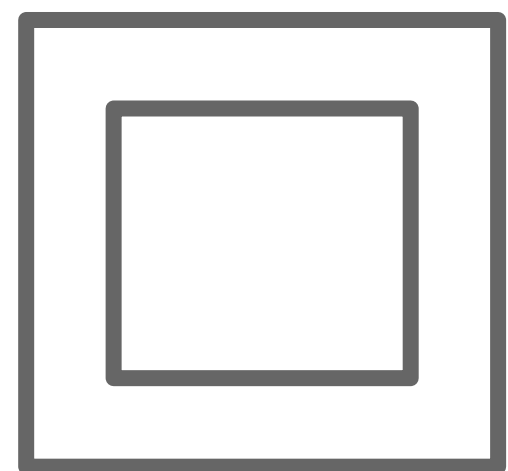
Layout Editor



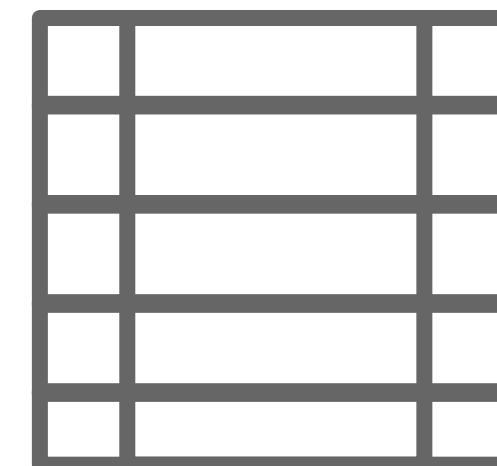
LinearLayout
(horizontal)



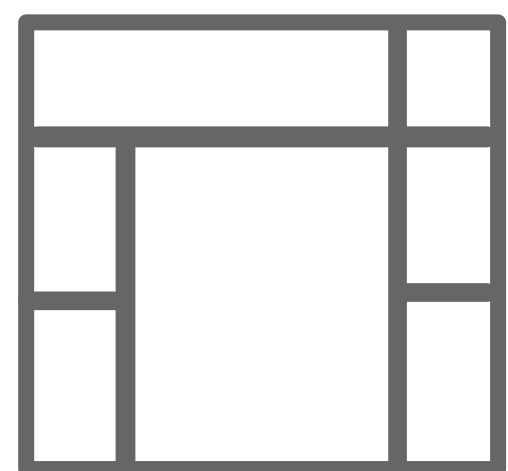
LinearLayout
(vertical)



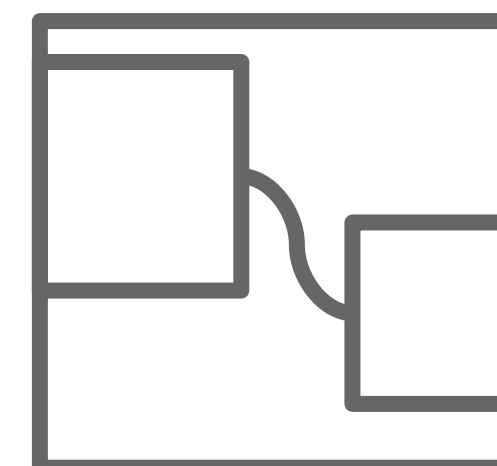
FrameLayout



TableLayout

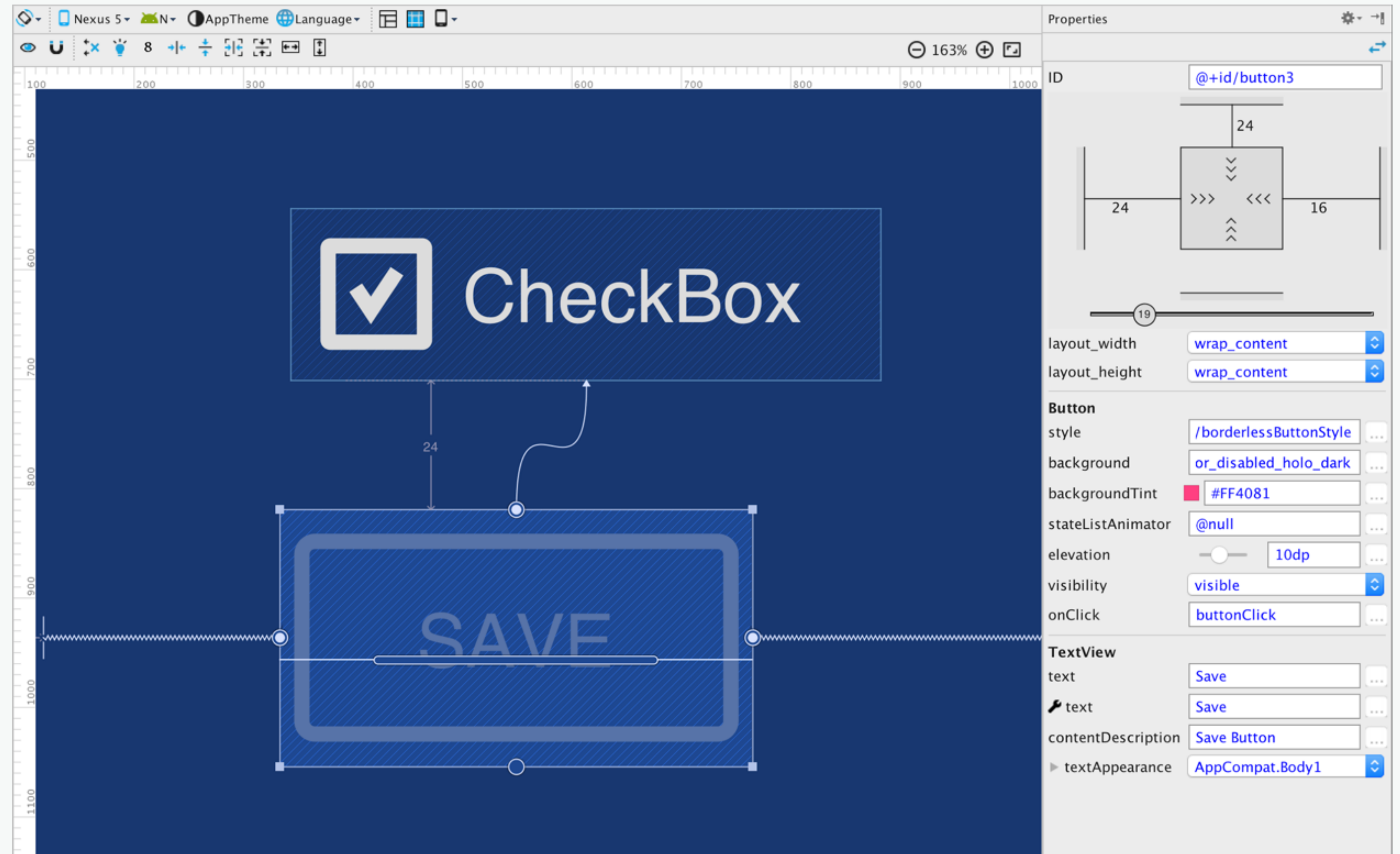


GridLayout



RelativeLayout

Constraint Layout



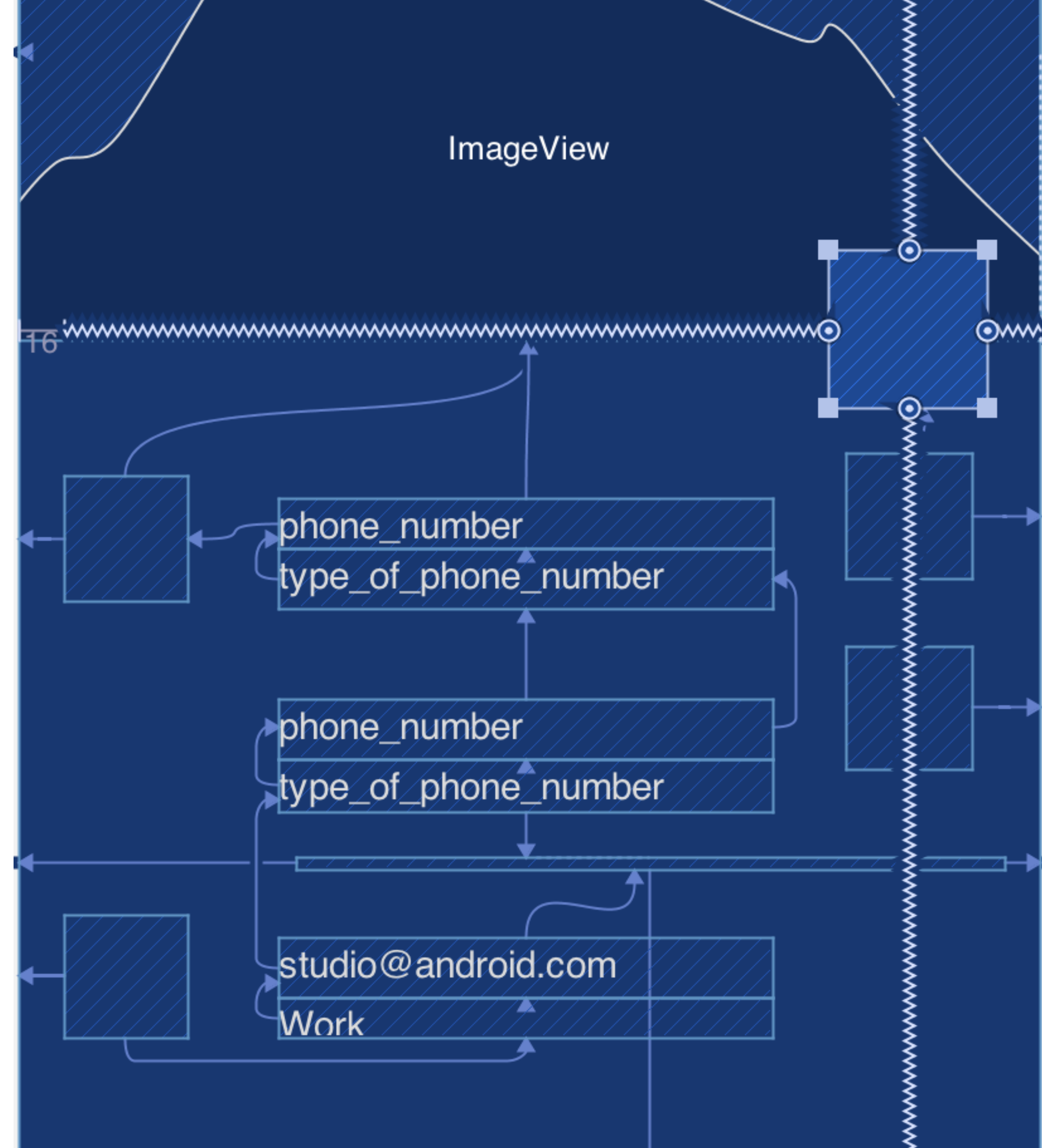
Constraint Layout

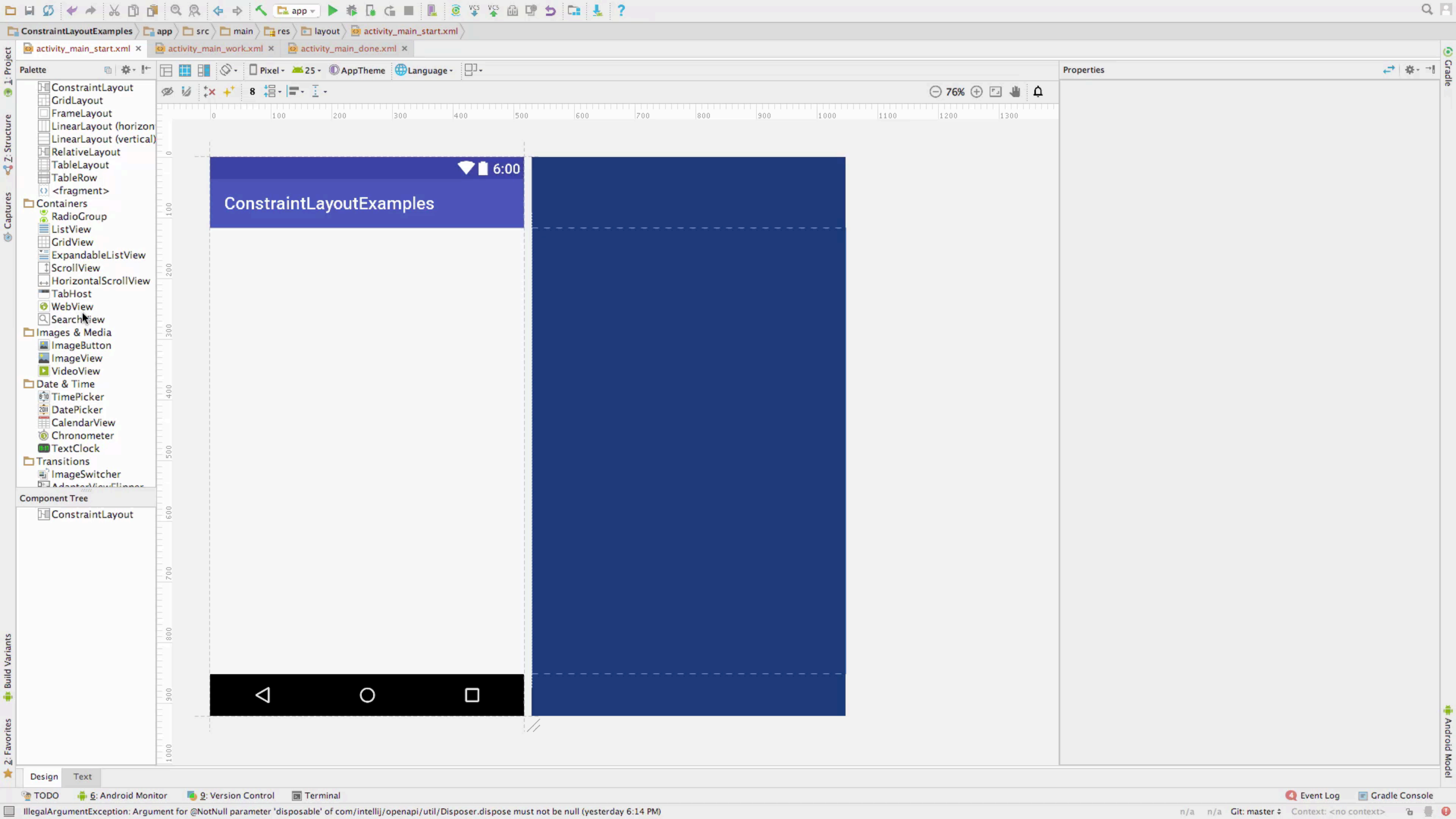
Fast UI Development

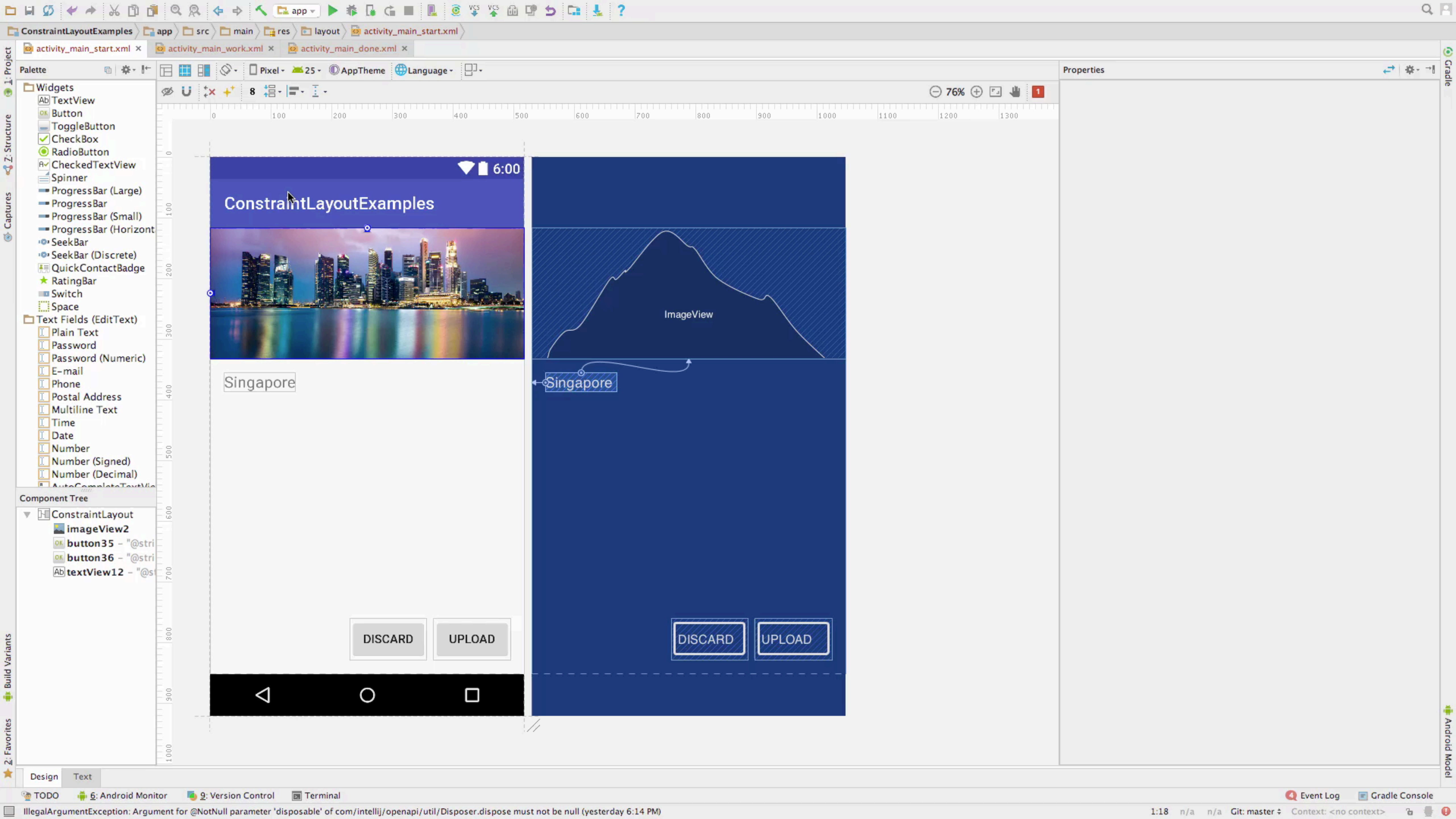
Responsive Design

Performant UI

Gingerbread Compatible







Project

Z-Structure

Captures

Build Variants

Favorites

ConstraintLayoutExamples

app

src

main

res

layout

activity_main_start.xml

activity_main_start.xml

activity_main_work.xml

activity_main_done.xml

Palette

Widgets

TextView

Button

ToggleButton

CheckBox

RadioButton

CheckedTextView

Spinner

ProgressBar (Large)

ProgressBar

ProgressBar (Small)

ProgressBar (Horizontal)

SeekBar

SeekBar (Discrete)

QuickContactBadge

RatingBar

Switch

Space

Text Fields (EditText)

Plain Text

Password

Password (Numeric)

E-mail

Phone

Postal Address

Multiline Text

Time

Date

Number

Number (Signed)

Number (Decimal)

AutoCompleteTextView

Component Tree

ConstraintLayout

imageView2

button35

button36

textView12

editText

editText2

textView13

textView15

textView16

Pixel

25

AppTheme

Language


8

76%

6

ConstraintLayoutExamples

6:00



Singapore

Camera Leica M Typ 240

Settings f/4 16s ISO 200

Singapore officially the Republic of Singapore, and often referred to as the Lion City, the Garden City, and the Red Dot, is a global city in Southeast Asia and the world's only island city-state. It lies one degree (137 km) north of the equator, at the southernmost tip of continental Asia and peninsular Malaysia, with Indonesia's Riau Islands to the south. Singapore's territory consists of the diamond-shaped main island and 62 islets.

DISCARD

UPLOAD

imageView

Singapore

Camera Name

Settings f/4 16s ISO 200

Singapore officially the Republic of Singapore, and often referred to as the Lion City, the Garden City, and the Red Dot, is a global city in Southeast Asia and the world's only island city-state. It lies one degree (137 km) north of the equator, at the southernmost tip of continental Asia and peninsular Malaysia, with Indonesia's Riau Islands to the south. Singapore's territory consists of the diamond-shaped main island and 62 islets.

DISCARD

UPLOAD

Properties

TODO

6: Android Monitor

9: Version Control

Terminal

Event Log

Gradle Console

IllegalArgumentExcep... Argument for @NotNull parameter 'disposable' of com/intellij/openapi/util/Disposable.dispose must not be null (yesterday 6:14 PM)

1:30

n/a

n/a

Git: master

Context: <no context>

The image is a screenshot of the Android Studio IDE. At the top, there is a toolbar with various icons for file operations, navigation, and development. Below the toolbar, the breadcrumb navigation shows the path: ConstraintLayoutExamples > captures > com.google.samples.apps.iosched_2016.11.18_07.1... The tabs at the top indicate the current project is com.google.samples.apps.iosched_2016.11.18_07.14.li. On the left side, the 'Project' tab is active, showing a hierarchical tree of the app's structure. The tree starts with 'LinearLayout' at the top, followed by 'ViewStub', 'FrameLayout', 'FitWindowsLinearLayout', 'ViewStubCompat', 'ContentFrameLayout', 'CoordinatorLayout', 'AppBarLayout', 'CollapsingToolbarLayout', 'AspectRatioView', 'AppCompatActivity', 'AppCompatActivity Watch', 'LinearLayout', 'Toolbar', 'ImageButton Close and go back', 'ActionMenuView', 'ActionMenuView Map', 'ActionMenuView Share', 'AppCompatActivity What's new in Android development t', 'AppCompatActivity May 19, 10:00 - 11:00 AM in Amphit', 'NestedScrollView', and 'LinearLayout'. The 'LinearLayout' under 'NestedScrollView' is expanded, showing 'MessageCardView', 'AppCompatActivity', 'AppCompatActivity In this session we will provide an in d', and 'AppCompatActivity Live streamed'. The main editor area on the right shows a preview of the app's UI. It features a green header bar with a play button icon. Below the header, there is a section titled 'What's new in Android development tools' with a subtitle 'May 19, 10:00 - 11:00 AM in Amphitheatre'. The main content area has a white background with a text box containing the text 'In this session we will provide an in depth tour of the Android development tools and take a closer look at everything new - along with tips and tricks for getting the most out of them!'. Below the text box, there are two buttons labeled 'Develop' and 'Android'. The bottom section of the UI preview is titled 'Speakers' and features a profile card for 'Jamal Eason, Google'. The card includes a profile picture, a bio stating 'Jamal Eason is a product manager for Android developer tools & products at Google. He is responsible for setting the product roadmap and features that help Android developers make great apps. Prior to Google, he worked on developer tools at Intel, worked as product manager at a mobile app startup, and was a telecommunications officer in the US Army.', and a list of education: 'Jamal earned a bachelor's degree in computer science from the US Military Academy (West Point), a master's degree from UMUC, and a MBA from Harvard Business School.' On the far right, the 'Properties' panel is visible, showing a table of properties and their values. The table has two columns: 'Property' and 'Value'. The properties listed include mGroupFlags..., mGroupFlags..., mGroupFlags, bg_, fg_, mID, mPrivateFlags..., mPrivateFlags, mSystemUiVis..., mSystemUiVis..., mViewFlags, getFilterTouc..., getFitsSystem..., getScrollBarSt..., getTag(), getTransition..., getVisibility(), isActivated(), isClickable(), isEnabled(), isFocusableIn..., isHapticFeed..., isHovered(), isInTouchMod..., isPressed(), isSelected(), isSoundEffect..., and getContentDe... The values for these properties are listed in the 'Value' column, ranging from 0x1, 0x2, 0x224053, null, NO_ID, 0x20, 0x10088B0, 0x0, 0x0, 0x18000882, false, true, INSIDE_OVER..., null, null, null, false, false, true, false, true, false, true, false, true, and null.



Design



Develop



Build



Test

Firebase

Easy Access to Firebase Resources



The screenshot shows the Android Studio IDE interface. The top toolbar contains various icons for file operations and development. The breadcrumb navigation at the top shows the path: `android-topeka` > `app` > `src` > `main` > `java` > `com` > `google` > `samples` > `apps` > `topeka` > `AppData1`. The left sidebar has tabs for 'Project', 'Structure', 'Captures', and 'Favorites'. The 'Project' tab is active, showing a tree view of the project structure. The 'app' directory is expanded, showing subdirectories like 'manifests', 'java', and 'res'. The 'AppData1' file is highlighted in blue. The right sidebar features the 'Assistant' panel, which displays the Firebase logo and a list of Firebase services with brief descriptions and links to 'More info'.

Project Structure:

- android-topeka
 - app
 - manifests
 - java
 - android.support.test.espresso
 - com.google.samples.apps.topeka
 - activity
 - adapter
 - fragment
 - helper
 - model
 - persistence
 - widget
 - res
 - animator
 - drawable
 - layout
 - activity_category_select
 - activity_quiz.xml
 - activity_sign_in.xml
 - answer_submit.xml
 - fab_done.xml
 - fragment_categories.xml
 - fragment_quiz.xml
 - fragment_sign_in.xml (2)
 - item_answer.xml
 - item_answer_start.xml
 - item_avatar.xml
 - item_category.xml
 - item_scorecard.xml
 - question.xml

Assistant Panel:

- Firebase**
Firebase gives you the tools and infrastructure from Google to help you develop, grow and earn money from your app. [Learn more](#)
- Analytics**
Measure user activity and engagement with free, easy, and unlimited analytics. [More info](#)
- Cloud Messaging**
Deliver and receive messages and notifications reliably across cloud and device. [More info](#)
- Authentication**
Sign in and manage users with ease, accepting emails, Google Sign-In, Facebook and other login providers. [More info](#)
- Realtime Database**
Store and sync data in realtime across all connected clients. [More info](#)
- Storage**
Store and retrieve large files like images, audio, and video without writing server-side code. [More info](#)
- Remote Config**
Customize and experiment with app behavior using cloud-based configuration parameters. [More info](#)
- Test Lab**
Test your apps against a wide range of physical devices hosted in Google's cloud. [More info](#)
- Crash Reporting**
Get actionable insights and reports on app crashes, ANRs or other errors. [More info](#)
- Notifications**
Send targeted notifications to engage the right users at the right time. [More info](#)

Sample Browser

Quick search for
relevant sample code

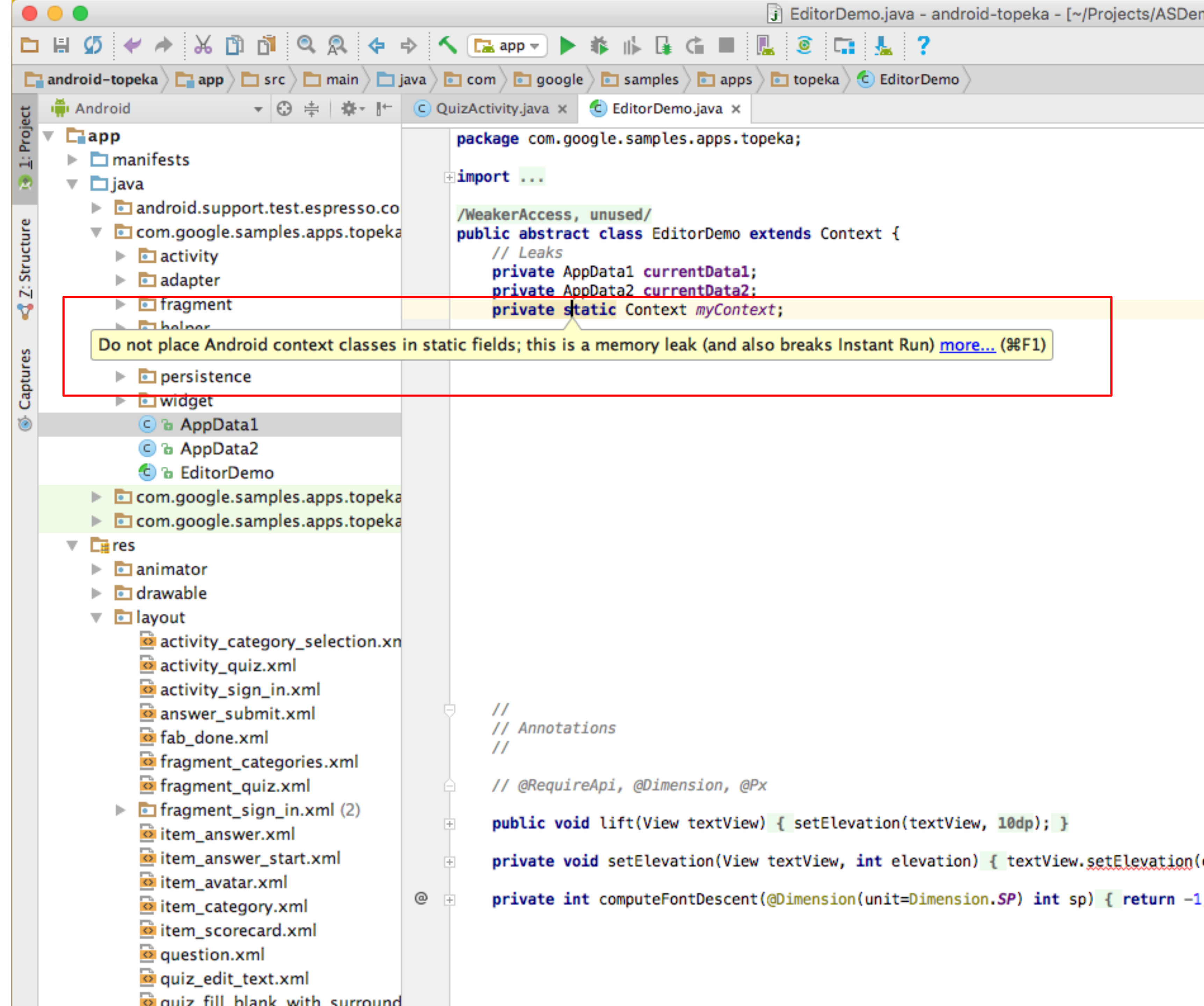
The screenshot shows the Android Studio IDE with the 'QuizActivity.java' file open. A context menu is displayed over the class definition, with the 'Find Sample Code' option highlighted. The bottom panel shows the search results for 'android.support.v7.app.AppCompatActivity'.

Find Sample Code

- Symbol
 - android.support.v7.app.AppCompatActivity
- Found results (63 results)
 - Android Developers
 - google/iosched
 - LUtils.java (10 results)
 - BaseActivity.java (1 result)
 - WelcomeActivity.java (1 result)
 - SessionDetailFragment.java (1 result)
 - googlemaps/android-samples
 - TileOverlayDemoActivity.java (1 result)
 - MarkerDemoActivity.java (1 result)
 - CircleDemoActivity.java (1 result)
 - PermissionsUtils.java (4 results)

Enhanced Code Analysis

New code quality checks



Google Developer Day



Design



Develop

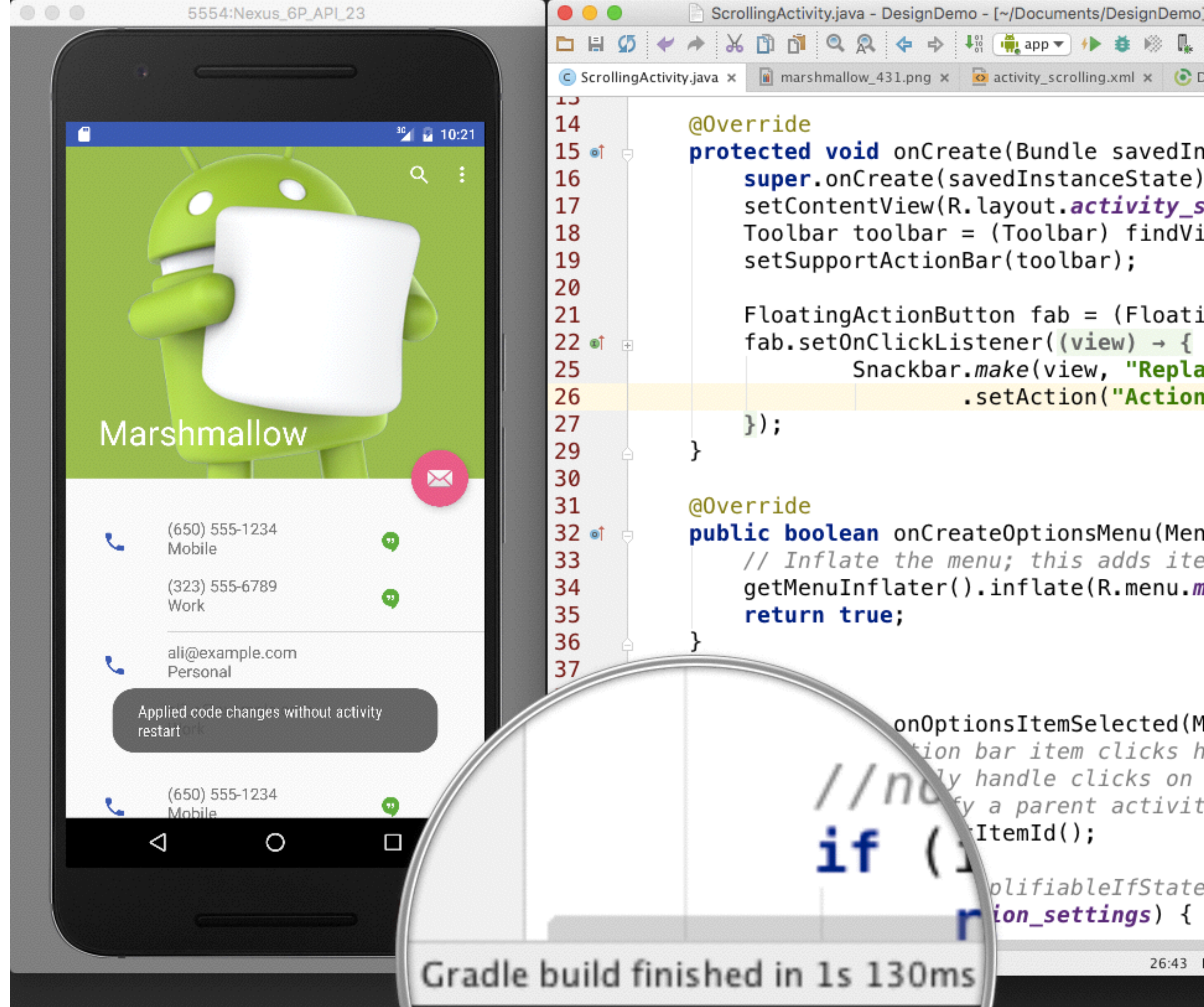


Build



Test

Instant Run



Hot
Swap

Warm
Swap

Cold
Swap

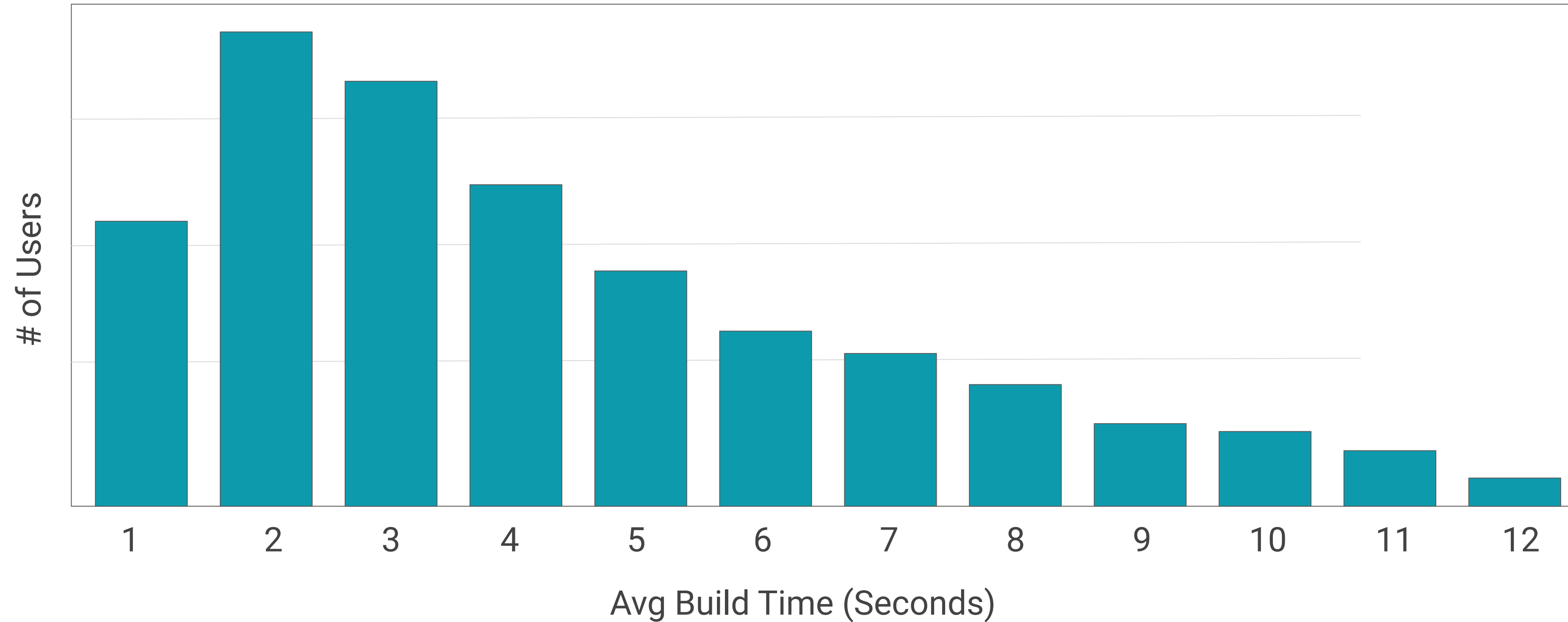


Instant Run: Benchmark

Version Build Type	Mean (seconds)	StdDev	Delta
2.0 Instant Run Disabled	45.02	0.78	n/a
2.1 Cold Swap	9.46	0.56	4.7X faster
2.1 Hot Swap	4.20	0.70	10.7X faster

@Github: [wikimedia/apps-android-wikipedia](https://github.com/wikimedia/apps-android-wikipedia)

Instant Run: Average Build Time per User



Android Studio opted-in user IDE instrumentation, May 2016

Instant Run

Build

Speed

Enhancements

New AAPT

Split APK



Google Developer Day

Project Structure Dialog

The screenshot shows the 'Project Structure' dialog with the 'Dependencies' tab selected. The 'Modules' list on the left contains '<All Modules>' and 'app'. The 'All Dependencies' list on the right includes:

- cardview-v7:23.2.1
- constraint-layout:1.0.0-alpha1
- design:23.3.0
- ▶ appcompat-v7:23.3.0** (selected)
- recyclerview-v7:23.3.0
 - support-annotations:23.3.0
 - support-v4:23.3.0

The 'Details' section for the selected dependency shows:

- Group ID: com.android.support
- Artifact Name: appcompat-v7

The 'Information' section shows:

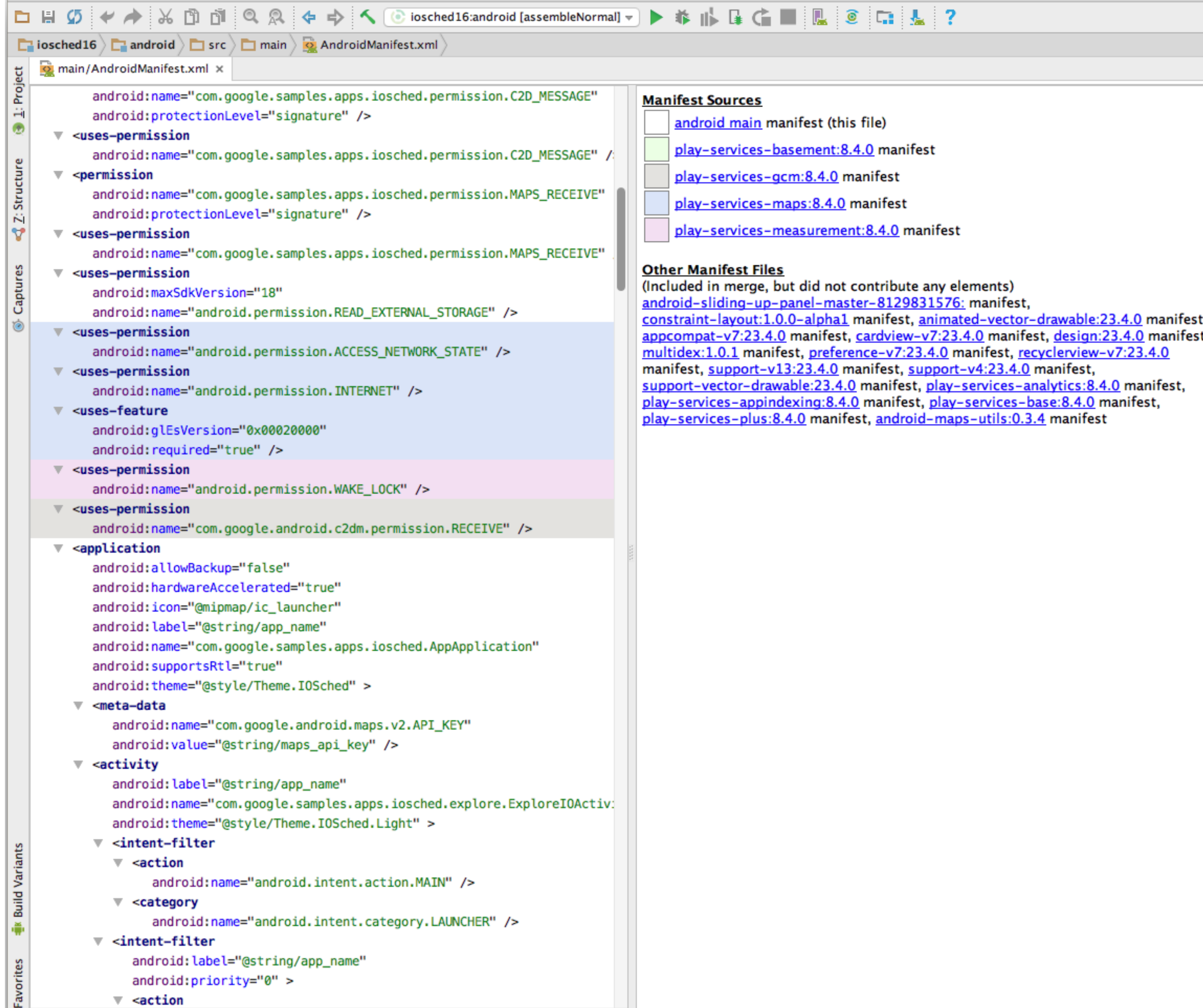
- [appcompat-v7:23.2.1](#) (app): Gradle promoted version from 23.2.1 to 23.3.0

The 'Update' section shows:

- [appcompat-v7:23.2.1](#) (app): Newer version 23.4.0 (Android SDK) [\[Update\]](#)



Merged Manifest Viewer



The screenshot displays the Merged Manifest Viewer in Android Studio. The main pane shows the merged `AndroidManifest.xml` for the project `iosched16`. The manifest includes several permissions, a feature, and an application element. The permissions are:

- `android.permission.C2D_MESSAGE` (signature protection)
- `android.permission.MAPS_RECEIVE` (signature protection)
- `android.permission.READ_EXTERNAL_STORAGE`
- `android.permission.ACCESS_NETWORK_STATE`
- `android.permission.INTERNET`
- `android.permission.WAKE_LOCK`
- `com.google.android.c2dm.permission.RECEIVE`

The application element includes the following attributes:

- `android:allowBackup="false"`
- `android:hardwareAccelerated="true"`
- `android:icon="@mipmap/ic_launcher"`
- `android:label="@string/app_name"`
- `android:name="com.google.samples.apps.iosched.AppApplication"`
- `android:supportRtl="true"`
- `android:theme="@style/Theme.IOSched"`

The meta-data element includes:

- `com.google.android.maps.v2.API_KEY` with value `@string/maps_api_key`

The activity element includes:

- `android:label="@string/app_name"`
- `android:name="com.google.samples.apps.iosched.explore.ExploreIOActiv"`
- `android:theme="@style/Theme.IOSched.Light"`

The intent-filter element includes:

- `android:name="android.intent.action.MAIN"`
- `android:category="android.intent.category.LAUNCHER"`

The intent-filter element also includes:

- `android:label="@string/app_name"`
- `android:priority="0"`

The right pane shows the Manifest Sources, which include:

- `android main` manifest (this file)
- `play-services-basement:8.4.0` manifest
- `play-services-gcm:8.4.0` manifest
- `play-services-maps:8.4.0` manifest
- `play-services-measurement:8.4.0` manifest

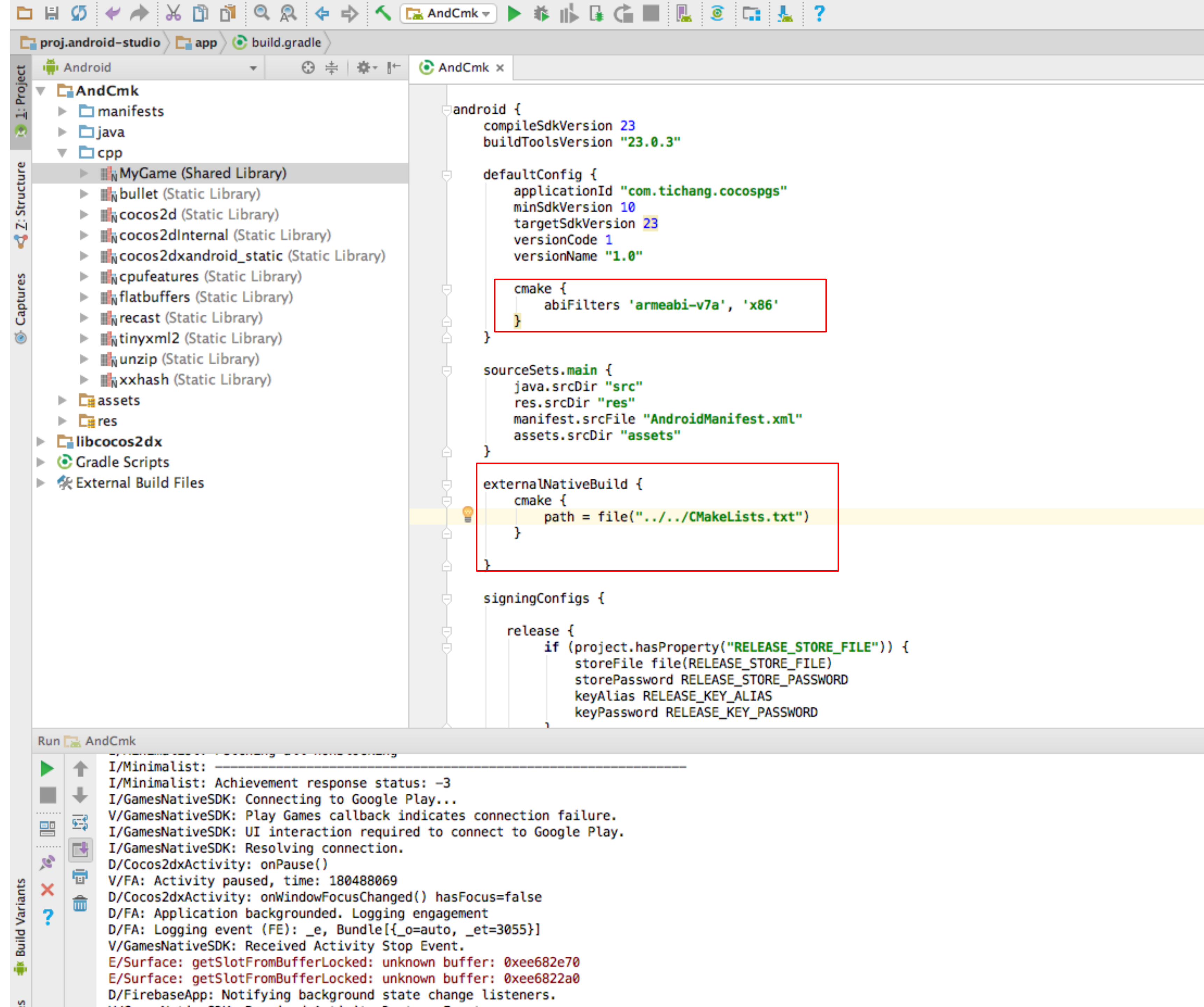
The bottom pane shows the Other Manifest Files, which include:

- `android-sliding-up-panel-master-8129831576` manifest
- `constraint-layout:1.0.0-alpha1` manifest
- `animated-vector-drawable:23.4.0` manifest
- `appcompat-v7:23.4.0` manifest
- `cardview-v7:23.4.0` manifest
- `design:23.4.0` manifest
- `multidex:1.0.1` manifest
- `preference-v7:23.4.0` manifest
- `recyclerview-v7:23.4.0` manifest
- `support-v13:23.4.0` manifest
- `support-v4:23.4.0` manifest
- `support-vector-drawable:23.4.0` manifest
- `play-services-analytics:8.4.0` manifest
- `play-services-appindexing:8.4.0` manifest
- `play-services-base:8.4.0` manifest
- `play-services-plus:8.4.0` manifest
- `android-maps-utils:0.3.4` manifest

C++ Support

ndk-build

CMake



C++ Support

Native Debugging

The screenshot displays an IDE with two main panels. The top panel shows the project structure and source code. The bottom panel shows the native debugging interface.

Project Structure:

- Android
 - AndCmk
 - manifests
 - java
 - cpp
 - MyGame (Shared Library)
 - Classes
 - hellocpp
 - main.cpp
 - StateManager.cpp
 - StateManager.h
 - bullet (Static Library)
 - cocos2d (Static Library)
 - cocos2dInternal (Static Library)
 - cocos2dxandroid_static (Static Library)
 - cpufeatures (Static Library)
 - flatbuffers (Static Library)
 - recast (Static Library)
 - tinysql2 (Static Library)
 - unzip (Static Library)
 - xxhash (Static Library)
 - assets
 - res
 - libcocos2dx
 - Gradle Scripts
 - External Build Files

Source Code (main.cpp):

```
#include ...

#define LOG_TAG "main"
#define LOGD(...) __android_log_print(ANDROID_LOG_DEBUG, LOG_TAG, __VA_ARGS__)

using namespace cocos2d;

void cocos_android_app_init (JNIEnv* env) {
    LOGD("cocos_android_app_init");
    gpg::AndroidInitialization::JNI_OnLoad(JniHelper::getJavaVM());
    AppDelegate *pAppDelegate = new AppDelegate();
}

namespace analytics = ::firebase::analytics;
::firebase::App* app = NULL;

extern "C"
{
    JNIEXPORT void
    Java_org_cocos2dx_cpp_AppActivity_nativeInitialize(JNIEnv* env, jobject thiz, jobject activity)
    {
        LOGD("Java_com_tichang_cocospgs_AppActivity_nativeInitGPGS");
        auto callback = [&](gpg::AuthOperation op, gpg::AuthStatus status) {
            LOGD("OnAuthActionFinished");
            if (IsSuccess(status)) {
                LOGD("You are logged in!");
            } else {
                LOGD("You are not logged in!");
                StateManager::BeginUserInitiatedSignIn();
            }
        };
        gpg::AndroidPlatformConfiguration platform_configuration;
        platform_configuration.SetActivity(activity);
        StateManager::InitServices(platform_configuration, NULL, callback);

        LOGD("initializeFirebase");
    }
}
```

Native Debugging Interface:

The bottom panel shows the native debugging interface with the following sections:

- Frames:** main, ::Java_org_cocos2dx_cpp_AppActivity, void org.cocos2dx.cpp.AppActivity, void org.cocos2dx.cpp.AppActivity, unknown function.
- Variables:** env = {JNIEnv * | 0xf4019ae0} 0xf4019ae0, [0] = {JNIEnv}, functions = {const JNINativeInterface * | 0xf3f72a40} 0xf3f72a40, [0] = {const JNINativeInterface}, reserved0 = {void * | 0x0} nil, reserved1 = {void * | 0x0} nil, reserved2 = {void * | 0x0} nil, reserved3 = {void * | 0x0} nil, GetVersion = {jint (*)(JNIEnv *) | 0xf3990535} (libart.so`art::CheckJNI::GetVersic... View, DefineClass = {jclass (*)(JNIEnv *, const char *, jobject, const jbyte *, jsize) | 0x... View, FindClass = {jclass (*)(JNIEnv *, const char *) | 0xf3991ecc} (libart.so`art::Chec... View, FromReflectedMethod = {jmethodID (*)(JNIEnv *, jobject) | 0xf3992b6f} (libart.s... View, FromReflectedField = {jfieldID (*)(JNIEnv *, jobject) | 0xf39930f4} (libart.so`art:... View, ToReflectedMethod = {jobject (*)(JNIEnv *, jclass, jmethodID, jboolean) | 0xf39... View.
- Watches:** No watches.



Design



Develop



Build



Test

Android Emulator

Faster than Device

10x fast ADB

Sensor Control

New UI



Google Developer Day



Extended controls

- Location
- Cellular
- Battery
- Phone
- Directional pad
- Fingerprint
- Virtual sensors
- Settings
- Help

Accelerometer

Additional sensors

☒ Rotate ☐ Move

Yaw -180 180 0.0

Pitch -180 180 0.0


Roll -180 180 -1.5


Device rotation


Resulting Values

Accelerometer (m/s ²):	-0.00	9.80	0.00
Magnetometer (uT):	23.12	5.90	42.51
Rotation:	ROTATION_0		

+ -


 Custom


 Defaults


 Sample configuration (12)


Name

Sample configuration

 Device (2/16)

 Platform (3/6)

 Locale (1/1)

 Orientation (2/2)

☒ PHYSICAL

☐ Moto E, Motorola

☐ Moto G (1st Gen), Motorola

☐ Nexus 7 (2013), ASUS

☐ Nexus 9, HTC

☐ LG G3, LG

☒ **Nexus 5, LG**

☐ Galaxy Note 3 Duos, Samsung

☐ HTC One (M8), HTC

☐ Galaxy S4 (3G), Samsung

Tests will run on **12 configurations** and [Cloud Test Lab pricing](#) will apply.



Firebase Test Lab



Espresso Test Recorder



Record Your Test

- Tap NavigationMenuItemView with text **Schedule**
- Tap LinearLayout with ID **touch_area**
- Tap ImageButton with content description **Close and go back**
- Tap LinearLayout
- Tap SquareFrameLayout with position index 2
- Tap ImageButton with content description **Close and go back**
- Tap ImageButton with content description **Close and go back**
- Tap ImageButton with content description **Navigation Menu**
- Tap TabView with text **May 19**
- Tap NavigationMenuItemView with text **Settings**
- Tap ImageButton with content description **Navigation Menu**
- Tap NavigationMenuItemView with text **About**
- Tap ImageButton with content description **Navigation Menu**
- Tap NavigationMenuItemView with text **Explore**
- Tap FrameLayout with position index 1

Edit assertion

com.google.samples.apps.iosched:id/live_streamed_indicator ▼

text is ▼

Live streamed

Cancel Save Assertion Save and Add Another

What's new in Android development tools

May 19, 10:00 – 11:00 AM in Amphitheatre L

In this session we will provide an in depth to the Android development tools and take a cl look at everything new - along with tips and t for getting the most out of them!

Live streamed

Develop Android

Speakers

J. Eason, Google

Jamal Eason is a product manager for Andro developer tools & products at Google. He is responsible for setting the product roadmap features that help Android developers make apps. Prior to Google, he worked on develop tools at Intel, worked as product manager at mobile app startup, and was a telecommunic officer in the US Army.

Jamal earned a bachelor's degree in comput science from the US Military Academy (West a master's degree from UMUC, and a MBA fr Harvard Business School

APK Analyzer

Method counts

Ref. counts

iosched16

android

build

outputs

apk

android-normal-release-unsigned.apk

android-normal-release-unsigned.apk x

com.google.samples.apps.iosched (version 4.3.0d)

Raw File Size: 4.5 MB, Download Size: 3.6 MB

File	Raw File Size	Download Size	% of Total Download
classes.dex	5.5 MB	2.2 MB	61.3%
res	1.8 MB	1.2 MB	31.9%
resources.arsc	898.4 KB	218.9 KB	5.9%
assets	83.3 KB	26.3 KB	0.7%
AndroidManifest.xml	24.1 KB	4.8 KB	0.1%
NOTICE_firebase_jvm	2 KB	1 KB	0%
NOTICE_firebase_android	2 KB	1 KB	0%
META-INF	463 B	379 B	0%

This dex file defines 5418 classes with 34099 methods, and references 42019 methods.

Class	Defined Methods	Referenced Methods
com	25655	25746
google	15625	15670
fasterxml	4954	4973
firebase	2717	2734
bumptech	1590	1596
android	329	330
sothree	189	190
turbomanage	87	87
larvalabs	84	84
jakewharton	80	80
nineoldandroids	0	2
android	12136	14829
java	0	1333
org	0	93
javax	0	10
dalvik	0	1
byte[]	0	1
char[]	0	1
double[]	0	1
float[]	0	1
int[]	0	1
long[]	0	1
boolean[]	0	1



APK Analyzer

Resource Lookup

iosched16

android

build

outputs

apk

android-normal-release-unsigned.apk

android-normal-release-unsigned.apk x

com.google.samples.apps.iosched (version 4.3.0d)

Raw File Size: 4.5 MB, Download Size: 3.6 MB

File	Raw File Size	Download Size	% of Total Download
classes.dex	5.5 MB	2.2 MB	61.3%
res	1.8 MB	1.2 MB	31.9%
resources.arsc	898.4 KB	218.9 KB	5.9%
assets	83.3 KB	26.3 KB	0.7%
AndroidManifest.xml	24.1 KB	4.8 KB	0.1%
NOTICE_firebase_jvm	2 KB	1 KB	0%
NOTICE_firebase_android	2 KB	1 KB	0%
META-INF	463 B	379 B	0%

Package: com.google.samples.apps.iosched

Resource Types	There are 350 id resources across 1 configuration		
	ID	Name	default
drawable	0x7f130000	action_bar_activity_content	
mipmap	0x7f130001	action_bar_spinner	
layout	0x7f130002	action_menu_divider	
anim	0x7f130003	action_menu_presenter	
animator	0x7f130004	home	
transition	0x7f130005	item_touch_helper_previous_elevati...	
xml	0x7f130006	myschedule_generation_tagkey	
raw	0x7f130007	myschedule_listview_day1	
string	0x7f130008	myschedule_listview_day2	
plurals	0x7f130009	myschedule_listview_preconference...	
bool	0x7f13000a	myschedule_uri_tagkey	
dimen	0x7f13000b	myschedule_viewtype_tagkey	
style	0x7f13000c	progress_circular	
integer	0x7f13000d	progress_horizontal	
fraction	0x7f13000e	split_action_bar	
array	0x7f13000f	tag_person_id	
color	0x7f130010	tag_person_name	
id	0x7f130011	tag_person_note	
menu	0x7f130012	text	
	0x7f130013	up	
	0x7f130014	view_offset_helper	
	0x7f130015	listMode	false
	0x7f130016	normal	false
	0x7f130017	tabMode	false
	0x7f130018	disableHome	false
	0x7f130019	homeAsUp	false
	0x7f13001a	none	false
	0x7f13001b	showCustom	false

GPU Debugger

Troubleshooting 3D
Graphics

iosched16

android

build

outputs

apk

android-normal-release-unsigned.apk

android-normal-release-unsigned.apk x

com.google.samples.apps.iosched (version 4.3.0d)

Raw File Size: 4.5 MB, Download Size: 3.6 MB

Comp

File	Raw File Size	Download Size	% of Total Download
classes.dex	5.5 MB	2.2 MB	61.3%
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assets	83.3 KB	26.3 KB	0.7%
AndroidManifest.xml	24.1 KB	4.8 KB	0.1%
NOTICE_firebase_jvm	2 KB	1 KB	0%
NOTICE_firebase_android	2 KB	1 KB	0%
META-INF	463 B	379 B	0%

Package: com.google.samples.apps.iosched

Resource Types


There are 350 id resources across 1 configuration

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attr			
drawable	0x7f130000	action_bar_activity_content	
mipmap	0x7f130001	action_bar_spinner	
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anim	0x7f130003	action_menu_presenter	
animator	0x7f130004	home	
transition	0x7f130005	item_touch_helper_previous_elevati...	
xml	0x7f130006	myschedule_generation_tagkey	
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integer	0x7f13000d	progress_horizontal	
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array	0x7f13000f	tag_person_id	
color	0x7f130010	tag_person_name	
id	0x7f130011	tag_person_note	
menu	0x7f130012	text	
	0x7f130013	up	
	0x7f130014	view_offset_helper	
	0x7f130015	listMode	false
	0x7f130016	normal	false
	0x7f130017	tabMode	false
	0x7f130018	disableHome	false
	0x7f130019	homeAsUp	false
	0x7f13001a	none	false
	0x7f13001b	showCustom	false

zooshi.gfxtrace x

The GPU Debugger is currently in beta.

OpenGL ES context 0




GPU Commands

→* Framebuffer →* Shaders →* Geometry →* GPU State →* Memory →* Textures →*

Regex

- ▶ 2174: Draw 11 (14 Commands)
- ▶ 2188: Draw 12 (17 Commands)
- ▶ 2205: Draw 13 (17 Commands)
- ▶ 2222: Draw 14 (17 Commands)
- 2239: glDisableVertexAttribArray(Location:0)
- 2240: glDisableVertexAttribArray(Location:3)
- 2241: eglSwapBuffers(Display:0x00000001, Surface:0xe7241720)->1
- ▼ 2242: Frame 2 (1116 Commands)
 - ▶ 2242: Draw 0 (117 Commands)
 - ▶ 2359: Draw 1 (21 Commands)
 - ▶ 2380: Draw 2 (21 Commands)
 - ▶ 2401: Draw 3 (21 Commands)
 - ▶ 2422: Draw 4 (26 Commands)
 - ▶ 2448: Draw 5 (28 Commands)
 - ▶ 2476: Draw 6 (23 Commands)
 - ▶ 2499: Draw 7 (26 Commands)
 - ▶ 2525: Draw 8 (28 Commands)
 - ▶ 2553: Draw 9 (23 Commands)
 - ▶ 2576: Draw 10 (21 Commands)
 - ▶ 2597: Draw 11 (26 Commands)
 - ▶ 2623: Draw 12 (23 Commands)
 - ▶ 2646: Draw 13 (21 Commands)
 - ▶ 2667: Draw 14 (21 Commands)
 - ▶ 2688: Draw 15 (21 Commands)
 - ▶ 2709: Draw 16 (21 Commands)
 - ▶ 2730: Draw 17 (21 Commands)
 - ▶ 2751: Draw 18 (23 Commands)
 - ▶ 2774: Draw 19 (25 Commands)
 - ▶ 2799: Draw 20 (24 Commands)
 - ▶ 2823: Draw 21 (24 Commands)
 - ▶ 2847: Draw 22 (25 Commands)
 - ▶ 2872: Draw 23 (24 Commands)
 - ▶ 2896: Draw 24 (25 Commands)
 - ▶ 2921: Draw 25 (24 Commands)
 - ▶ 2945: Draw 26 (24 Commands)
 - ▶ 2969: Draw 27 (25 Commands)
 - ▶ 2994: Draw 28 (24 Commands)



Design



Layout Editor
Constraint
Layout
Layout Inspector

Develop



Firebase
Sample Search
Enhanced Lint
Analysis
IntelliJ 2016.1
Accessibility

Build



Instant Run
Project Structure
Jack Compiler
C++: NDK &
CMake Build

Test



Android Emulator
Firebase Test Lab
Espresso Test
Recorder
APK Analyzer

Android Studio 2.2



Google Developer Day



Android Studio 2.3

Android Studio 2.3

IntelliJ Idea 2016.2

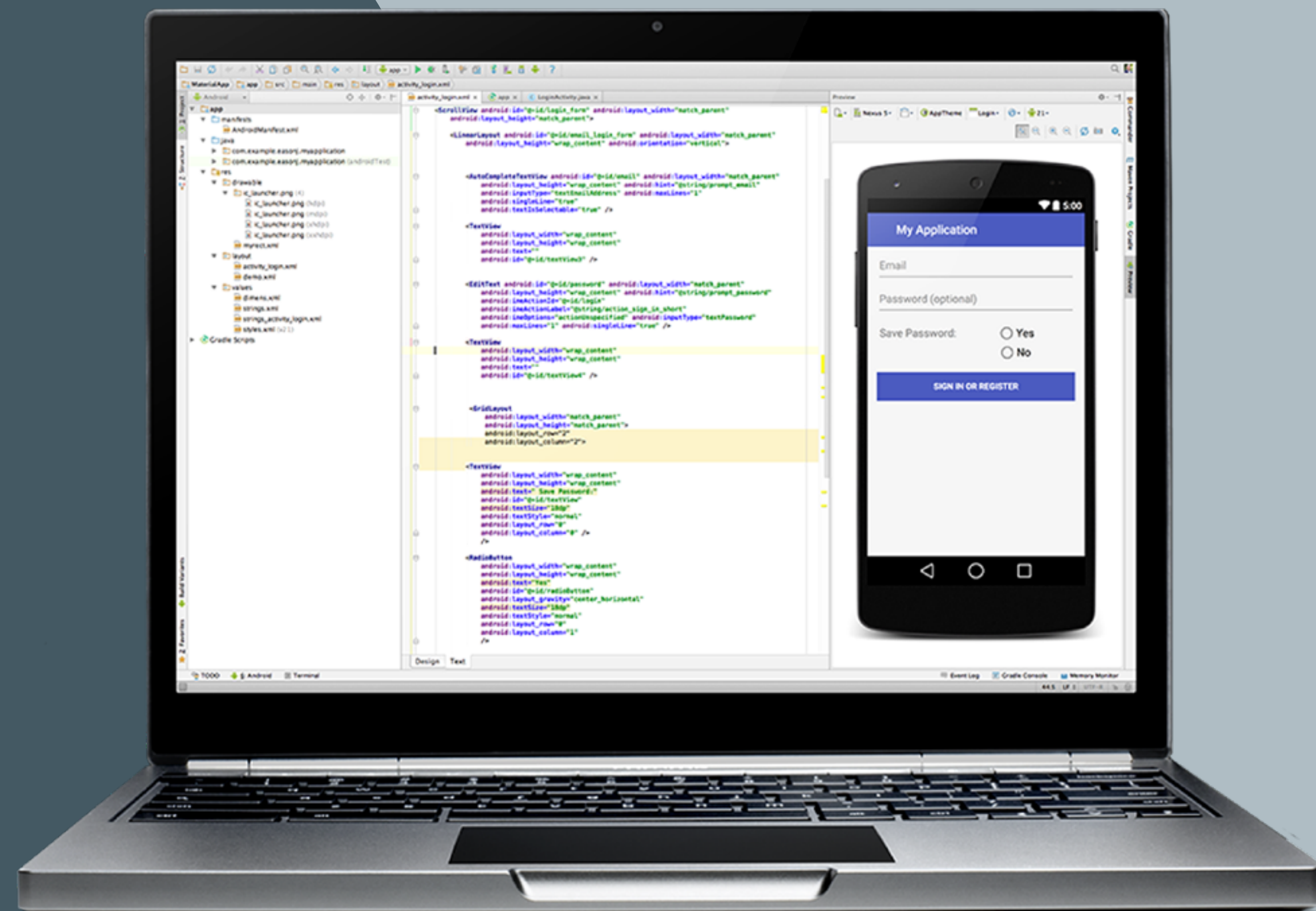
Constraint Layout: Chains and Ratios support

New Lint checks + baseline support

PNG to WebP converter

Data Binding generated code debugging

Incremental SDK Updates



IntelliJ Idea 2016.2

Background Images

Font Ligatures

Improved Version Control

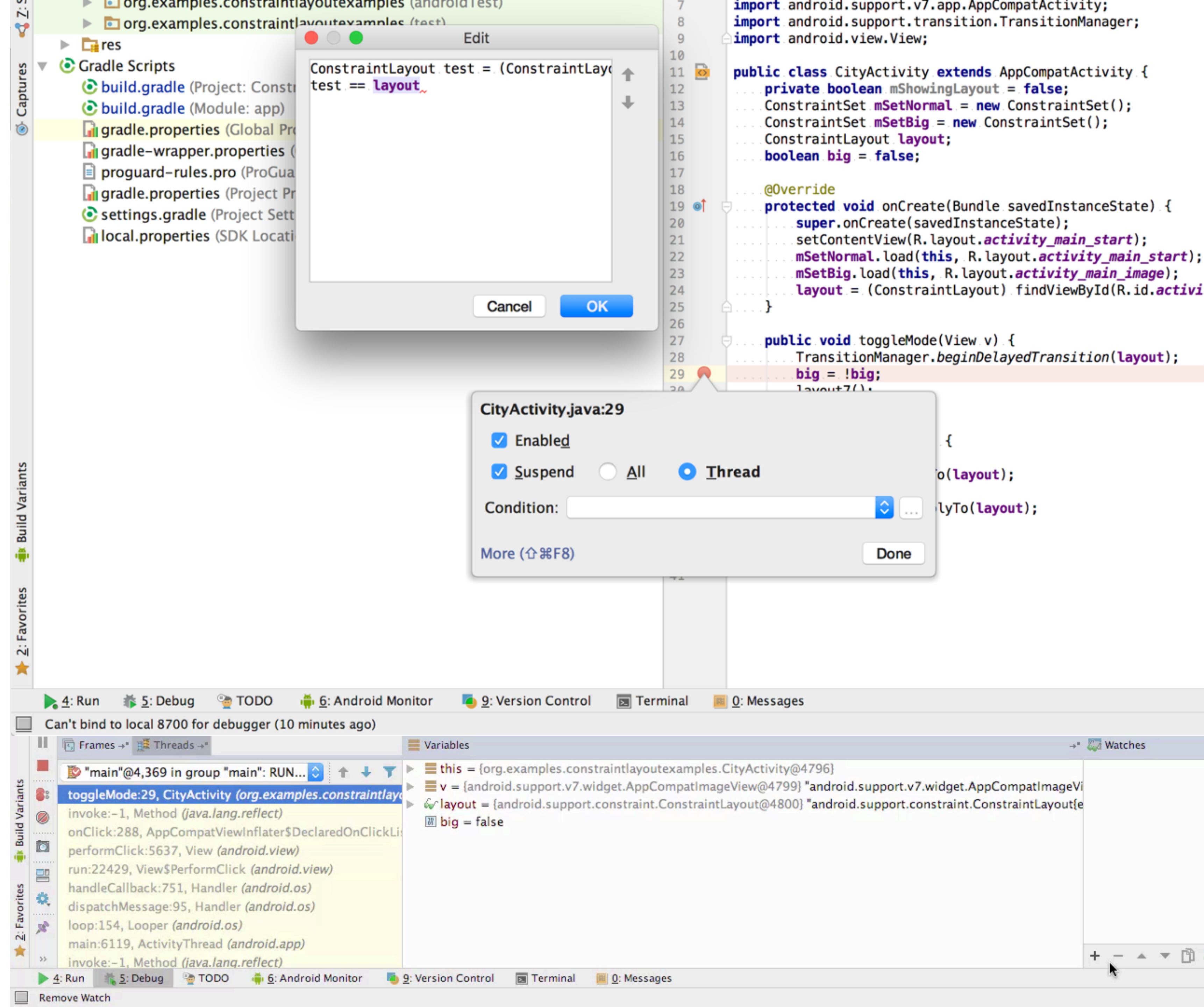
Log View

Multiline Breakpoint

Expressions

Merged Watch/Variables

And more!



Project
Z: Structure
Captures

ConstraintLayoutExamples

app

src

main

java

org

examples

constraintlayoutexamples

CityActivity

Android

Project Files

Problems

Production

Tests

activity_main_start.xml

activity_main_image.xml

activity_main_done.xml

CityActivity.java

ConstraintLayoutExamples

app

app

manifests

java

org.examples.constraintlayoutexamples

CityActivity

MainActivity

org.examples.constraintlayoutexamples (androidTest)

org.examples.constraintlayoutexamples (test)

res

Gradle Scripts

build.gradle (Project: ConstraintLayoutExamples)

build.gradle (Module: app)

gradle.properties (Global Properties)

gradle-wrapper.properties (Gradle Version)

proguard-rules.pro (ProGuard Rules for app)

gradle.properties (Project Properties)

settings.gradle (Project Settings)

local.properties (SDK Location)

CityActivity

toggleMode()

```
5 import android.support.constraint.ConstraintLayout;
6 import android.support.constraint.ConstraintSet;
7 import android.support.v7.app.AppCompatActivity;
8 import android.support.transition.TransitionManager;
9 import android.view.View;
10
11 public class CityActivity extends AppCompatActivity {
12     private boolean mShowingLayout = false; mShowingLayout: false
13     ConstraintSet mSetNormal = new ConstraintSet(); mSetNormal: android.support.constraint.ConstraintSet@4806
14     ConstraintSet mSetBig = new ConstraintSet(); mSetBig: android.support.constraint.ConstraintSet@4805
15     ConstraintLayout layout; layout: "android.support.constraint.ConstraintLayout{e5fedb1 V.E..... 0,0-1080,1584 #7f0b005d app:id/activity_main}"
16     boolean big = false; big: false
17
18     @Override
19     protected void onCreate(Bundle savedInstanceState) {
20         super.onCreate(savedInstanceState);
21         setContentView(R.layout.activity_main_start);
22         mSetNormal.load(this, R.layout.activity_main_start);
23         mSetBig.load(this, R.layout.activity_main_image);
24         layout = (ConstraintLayout) findViewById(R.id.activity_main);
25     }
26
27     public void toggleMode(View v) { v: "android.support.v7.widget.AppCompatImageView{a330e17 V.ED..C.. ...P.... 0,0-1080,394 #7f0b0071 app:id/imageView2}"
28         TransitionManager.beginDelayedTransition(layout); layout: "android.support.constraint.ConstraintLayout{e5fedb1 V.E..... 0,0-1080,1584 #7f0b005d app:id/activity_main}"
29         big = !big; big: false
30         layout7();
31     }
32
33     private void layout7() {
34         if (big) {
35             mSetBig.applyTo(layout);
36         } else {
37             mSetNormal.applyTo(layout);
38         }
39     }
40 }
41
```

Debug

app

Debugger

Console

Frames

Threads

Variables

Watches

"main"@4,369 in group "main": RUN...

toggleMode:29, CityActivity (org.examples.constraintlayoutexamples)

invoke:-1, Method (java.lang.reflect)

onClick:288, AppCompatActivity\$DeclaredOnClickLi

performClick:5637, View (android.view)

run:22429, View\$PerformClick (android.view)

handleCallback:751, Handler (android.os)

dispatchMessage:95, Handler (android.os)

loop:154, Looper (android.os)

main:6119, ActivityThread (android.app)

invoke:-1, Method (java.lang.reflect)

this = {org.examples.constraintlayoutexamples.CityActivity@4796}

v = {android.support.v7.widget.AppCompatImageView@4799} "android.support.v7.widget.AppCompatImageVi

layout = {android.support.constraint.ConstraintLayout@4800} "android.support.constraint.ConstraintLayout{e

big = false

No watches

4: Run

5: Debug

TODO

6: Android Monitor

9: Version Control

Terminal

0: Messages

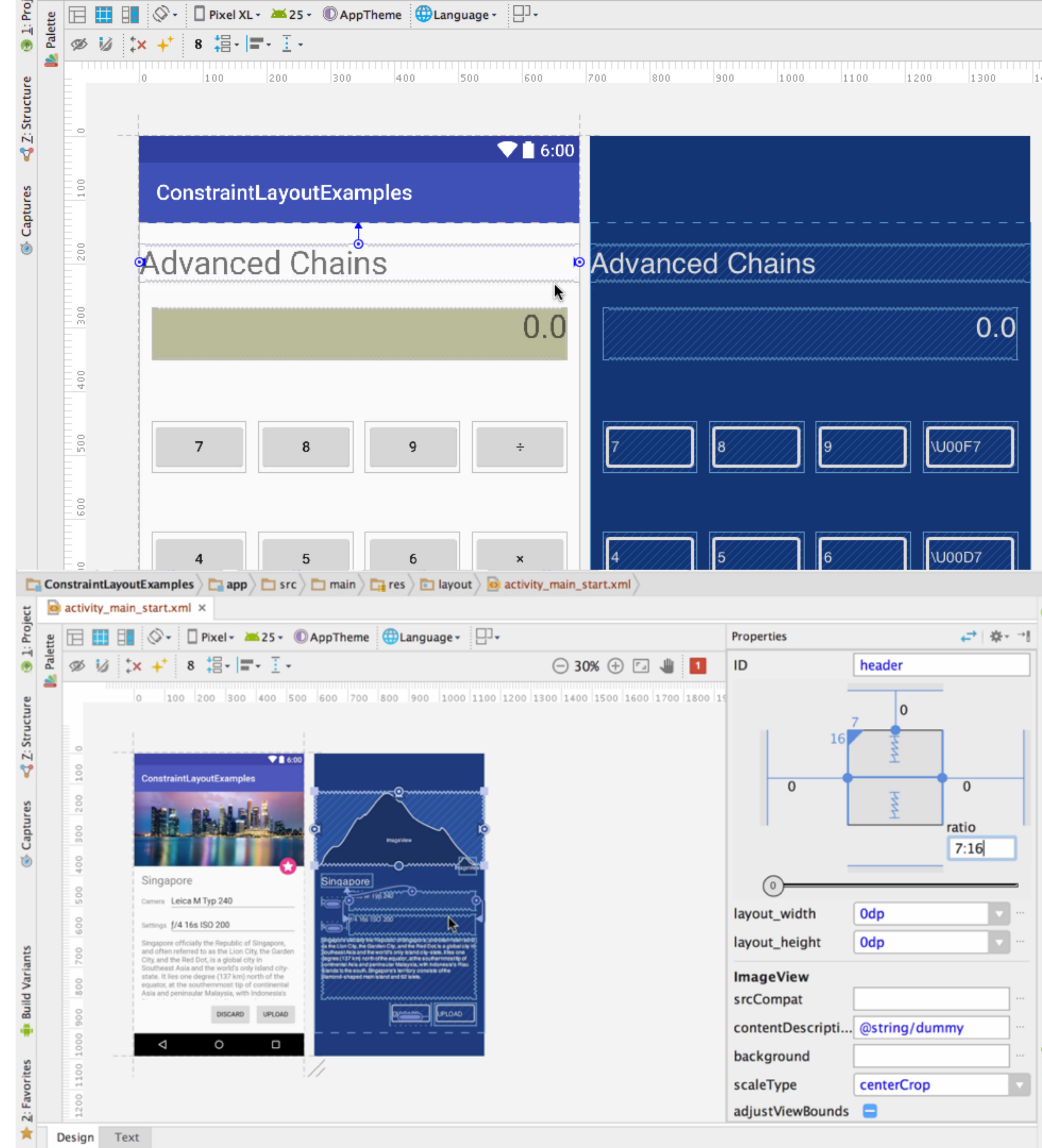
Event Log

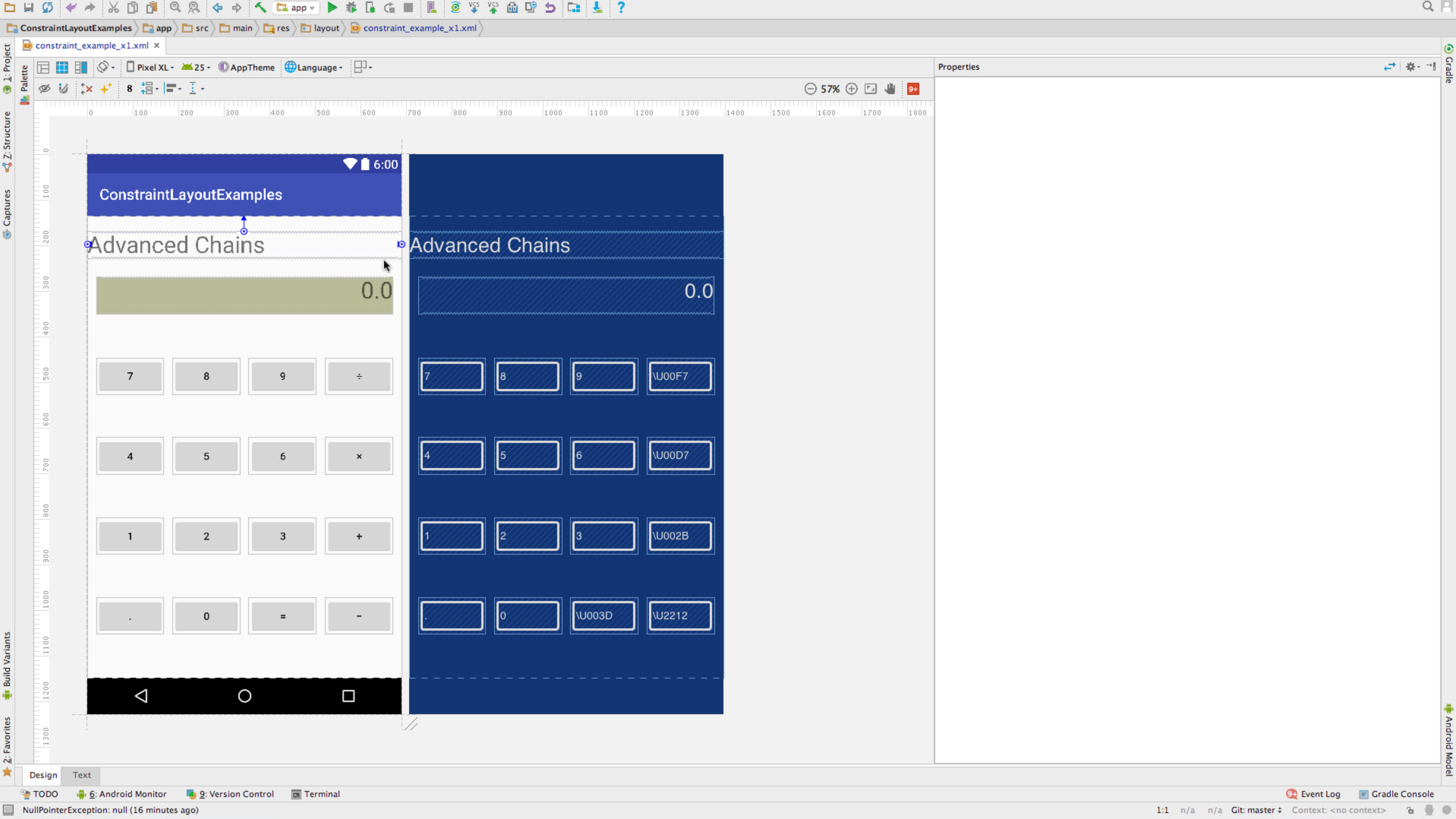
Gradle Console

1:16 LF UTF-8 Git: master Context: <no context>

Constraint Layout

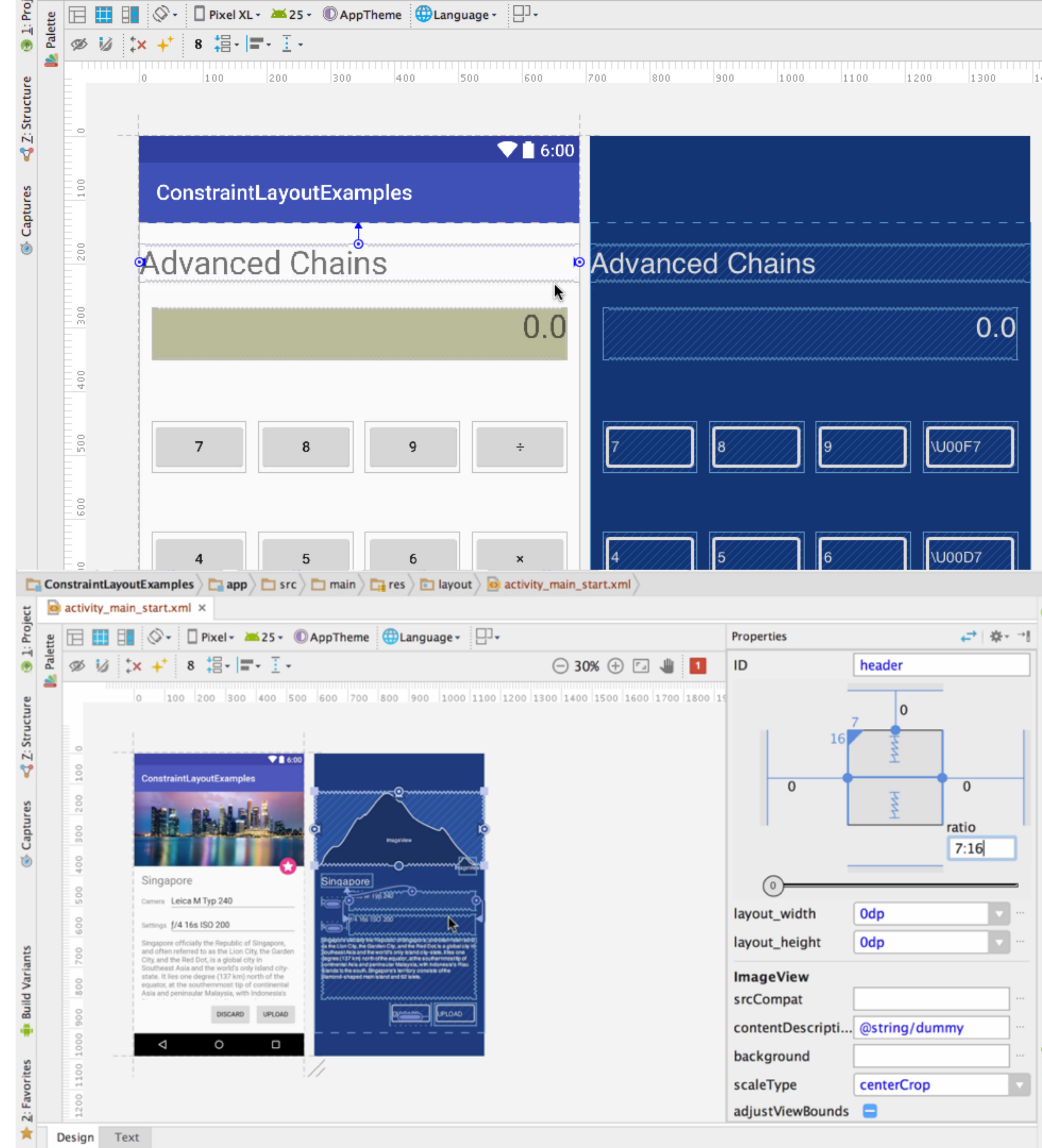
Chains and Ratios Support





Constraint Layout

Chains and Ratios Support

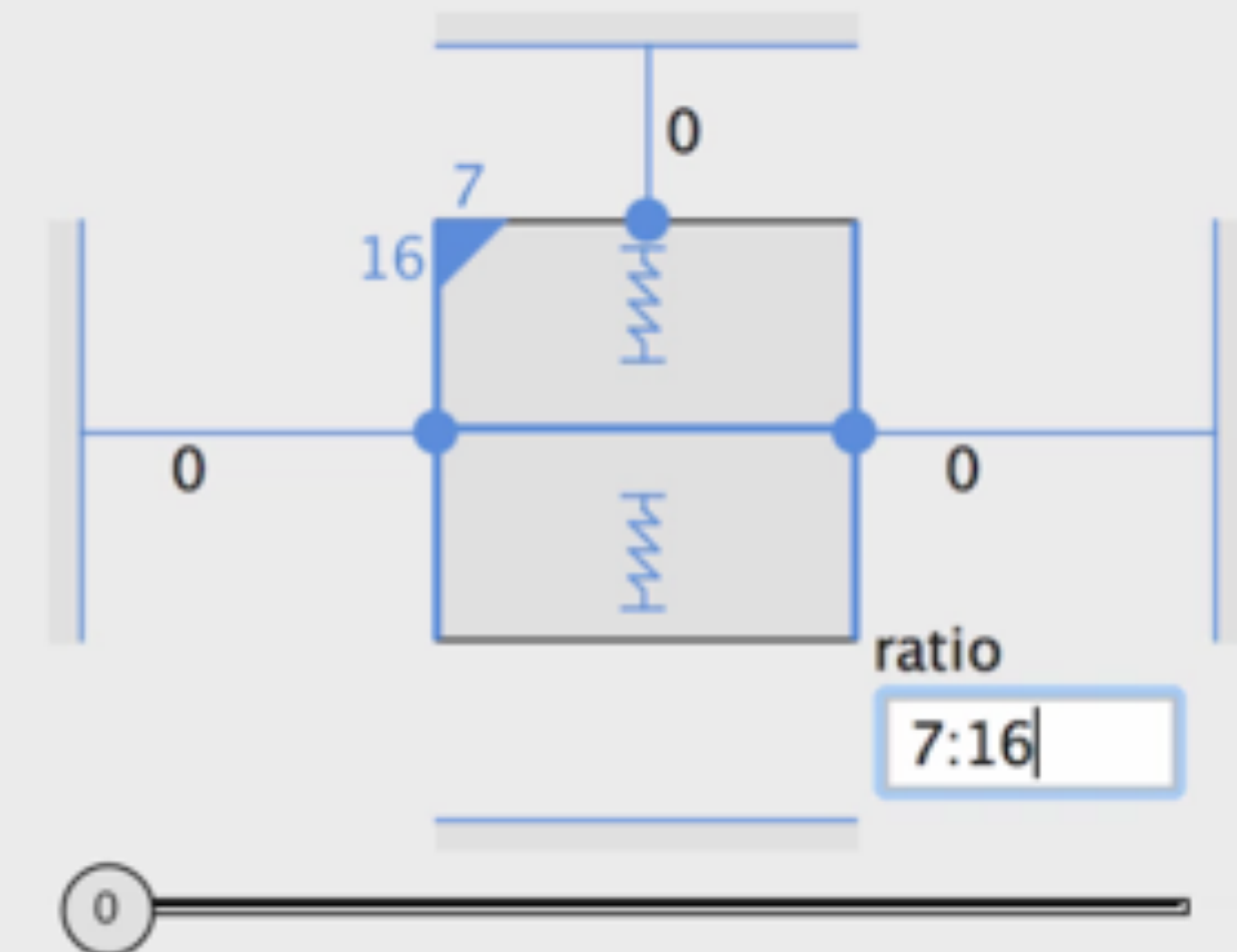




Properties

ID

header



layout_width

0dp

layout_height

0dp

ImageView

srcCompat

contentDescripti...

@string/dummy

background

scaleType

centerCrop

adjustViewBounds

Lint

Baseline Support

```
android {  
    lintOptions {  
        baseline file("lint-baseline.xml")  
    }  
}
```

New Lint Checks

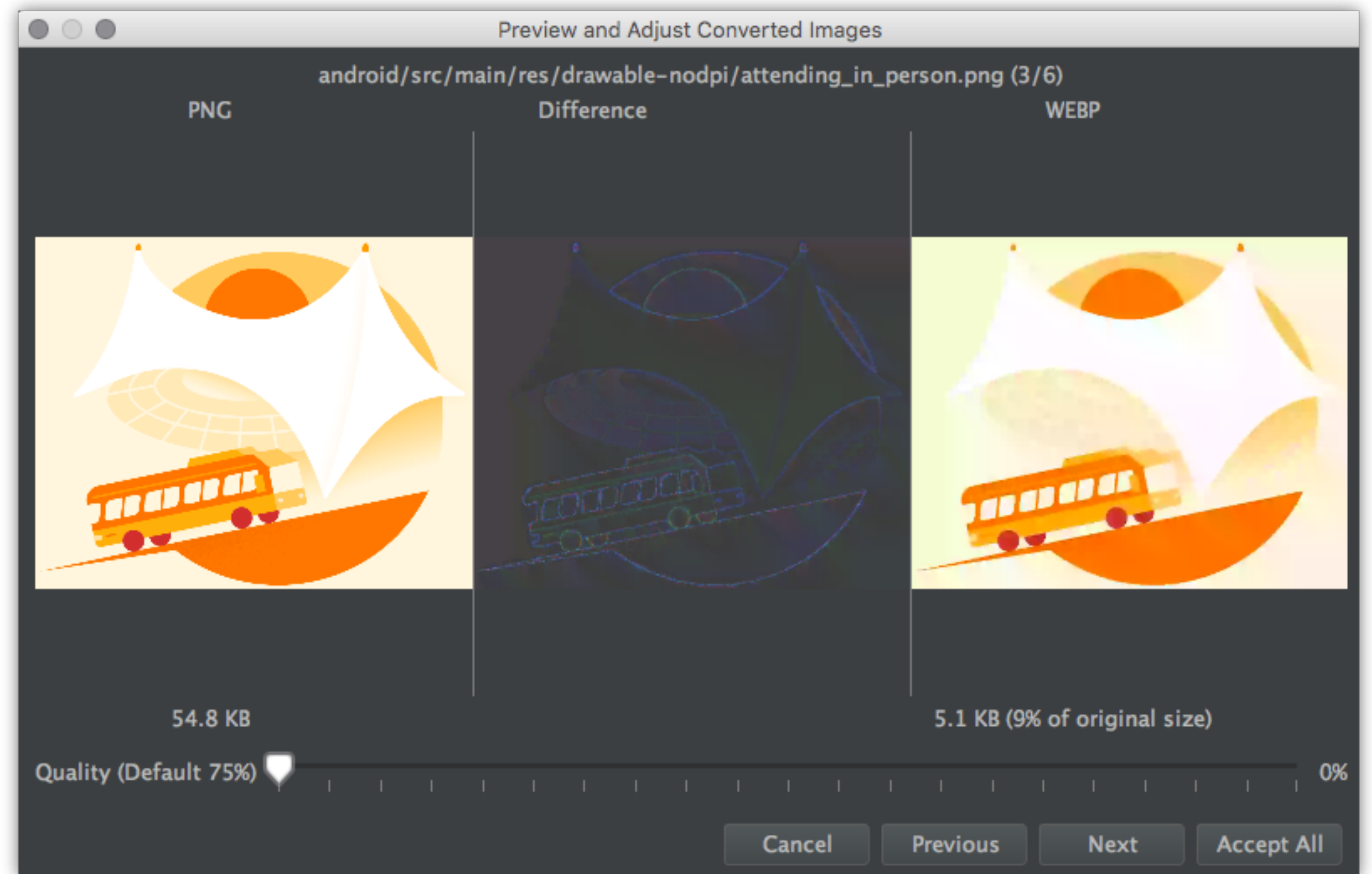
Obsolete SDK_INT
Object Animator Validation
Unnecessary Item Decorator Copy
WifiManager Leak

and many more!



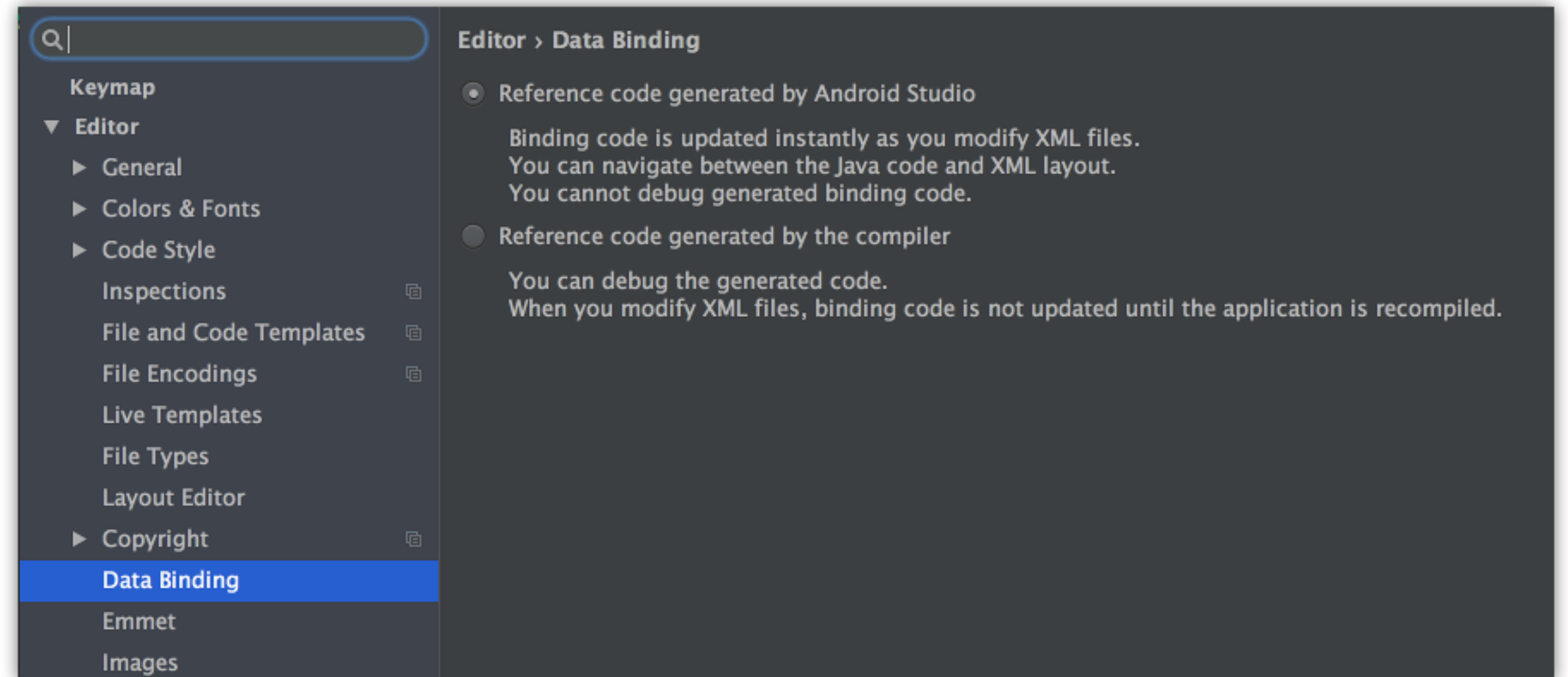
PNG to WebP

#APKSizeMatters



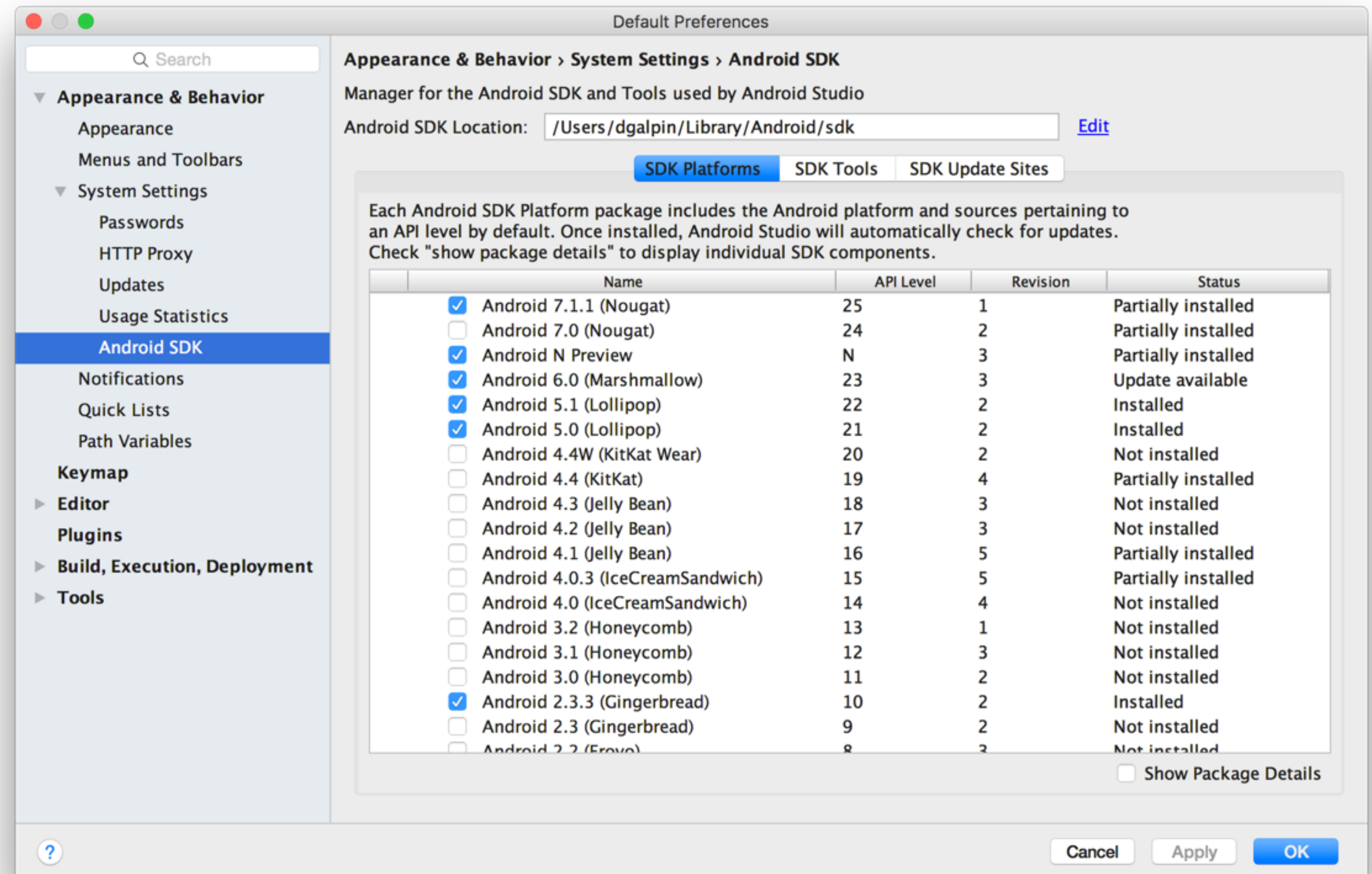
Data Binding

Now Debuggable!



Incremental SDK Updates

Less waiting!





Support Library

Support Library

Night Mode

Bottom Navigation

Transitions Framework

Constraint Layout

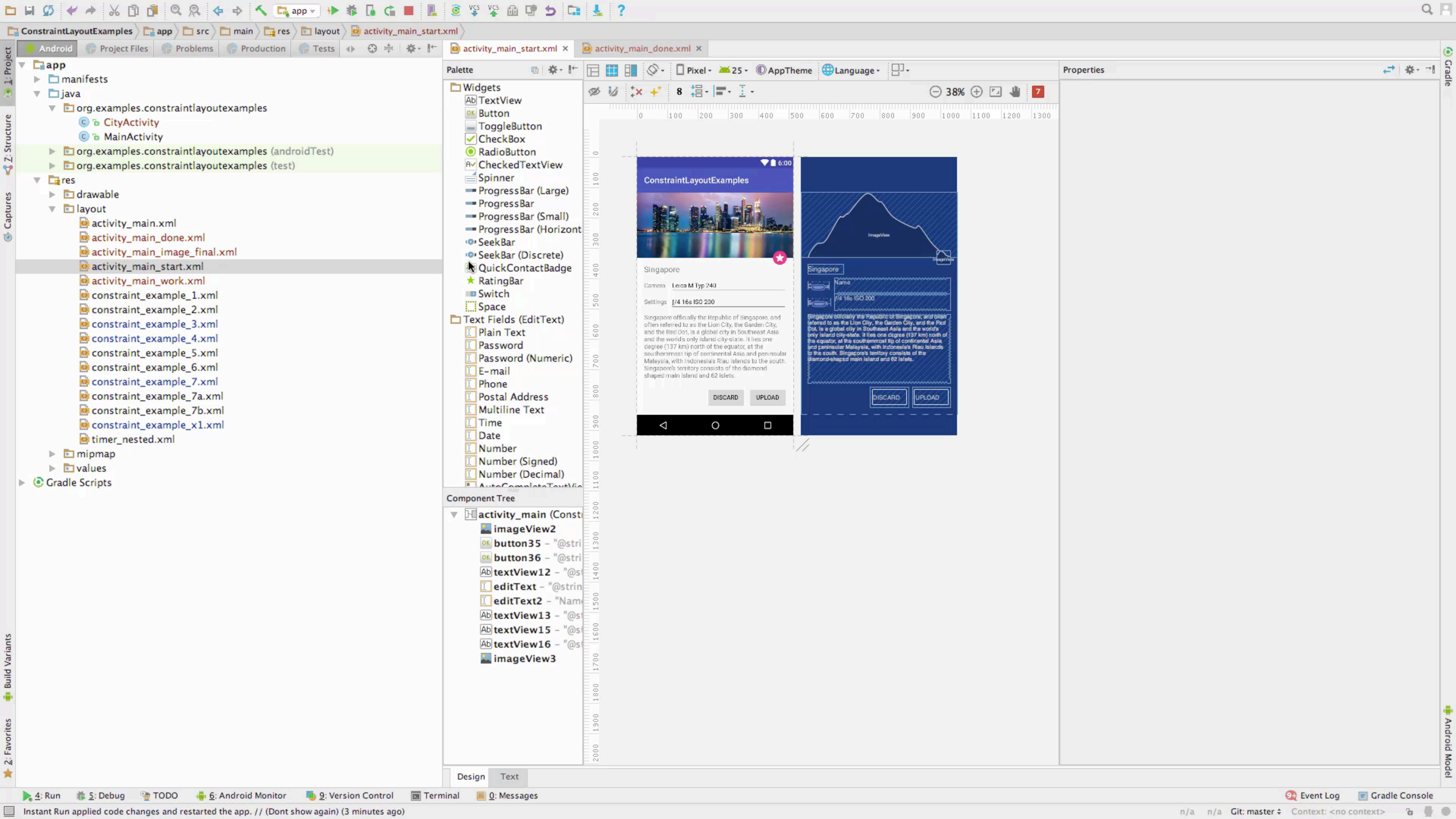
Custom Tabs

DiffUtil

Commit Content



Google Developer Day



Helpful Links

Android Studio: d.android.com/studio

Support Library: d.android.com/topic/libraries/support-library

Constraint Layout: d.android.com/training/constraint-layout

