Android 101

Цэл курса

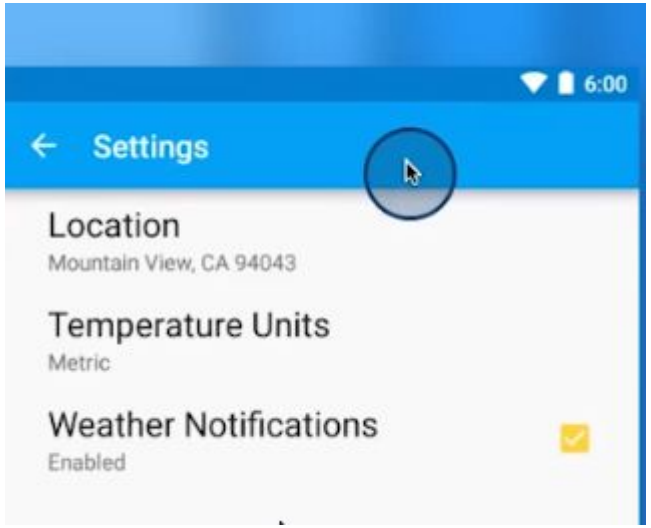
- Стартовый проект
- Соединение с интернетом
- RecyclerView
- Intents
- Жизненный Цикл
- Экран свойств
- Хранение данных в SQLite
- Content providers: использование и создание
- Background задачи
- Улучшение UI

goo.gl/KAEfqs

https://classroom.udacity.com/courses/ud851


6:00
Sunshine
Today, July 1
18°
Light Rain
13°
Tomorrow
Moderate Rain
17° 13°
Sunday
Clear
16° 12°
Monday
Scattered Clouds
12° 12°
Tuesday
Broken Clouds
15° 15°
Wednesday
Light Snow
-1° -2°
Thursday
Snow
-1° -2°

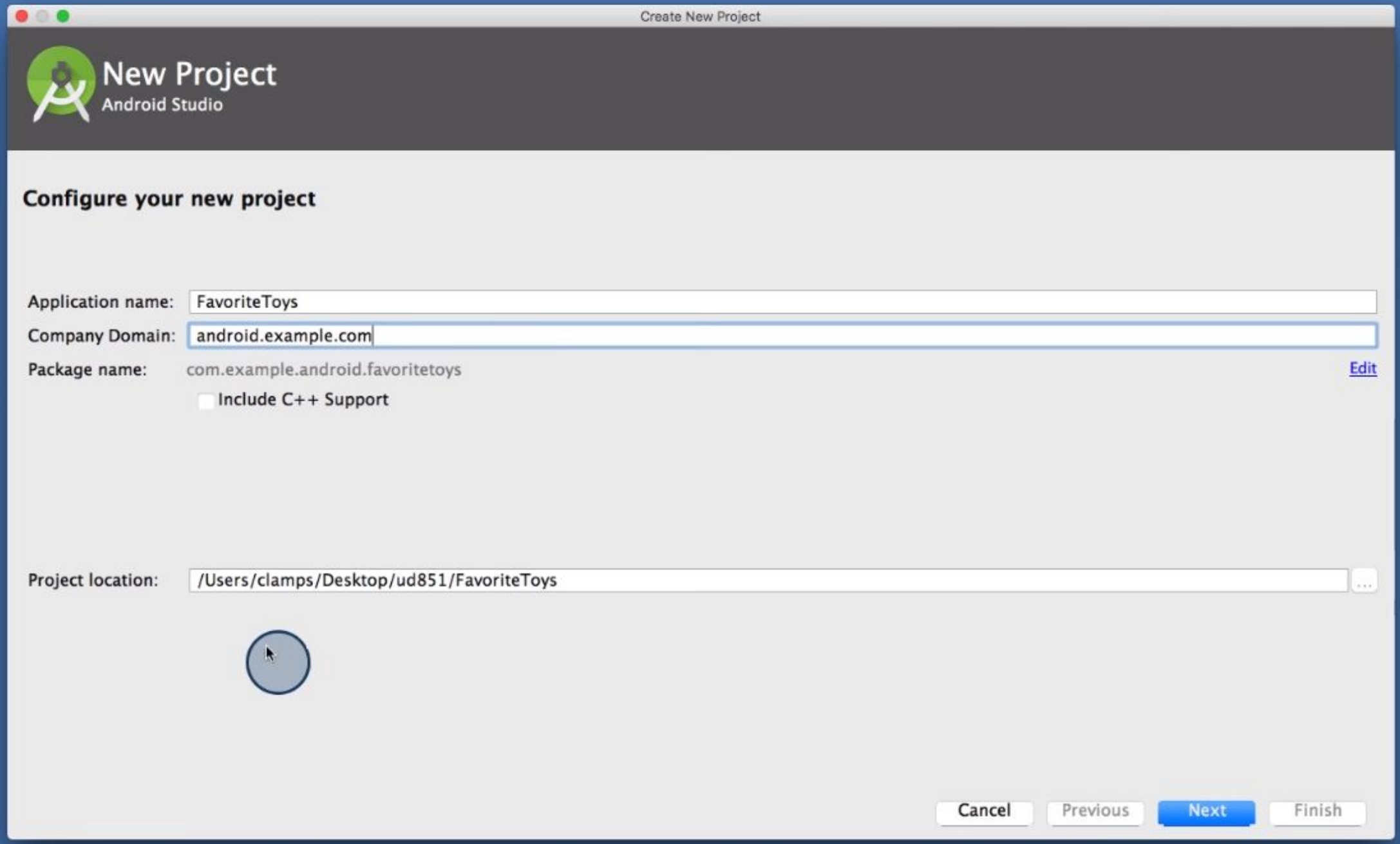

6:00
Details
Sunday, July 3
16°
Clear
12°
Humidity
90 %
Pressure
996 hPa
Wind
8 km/h E

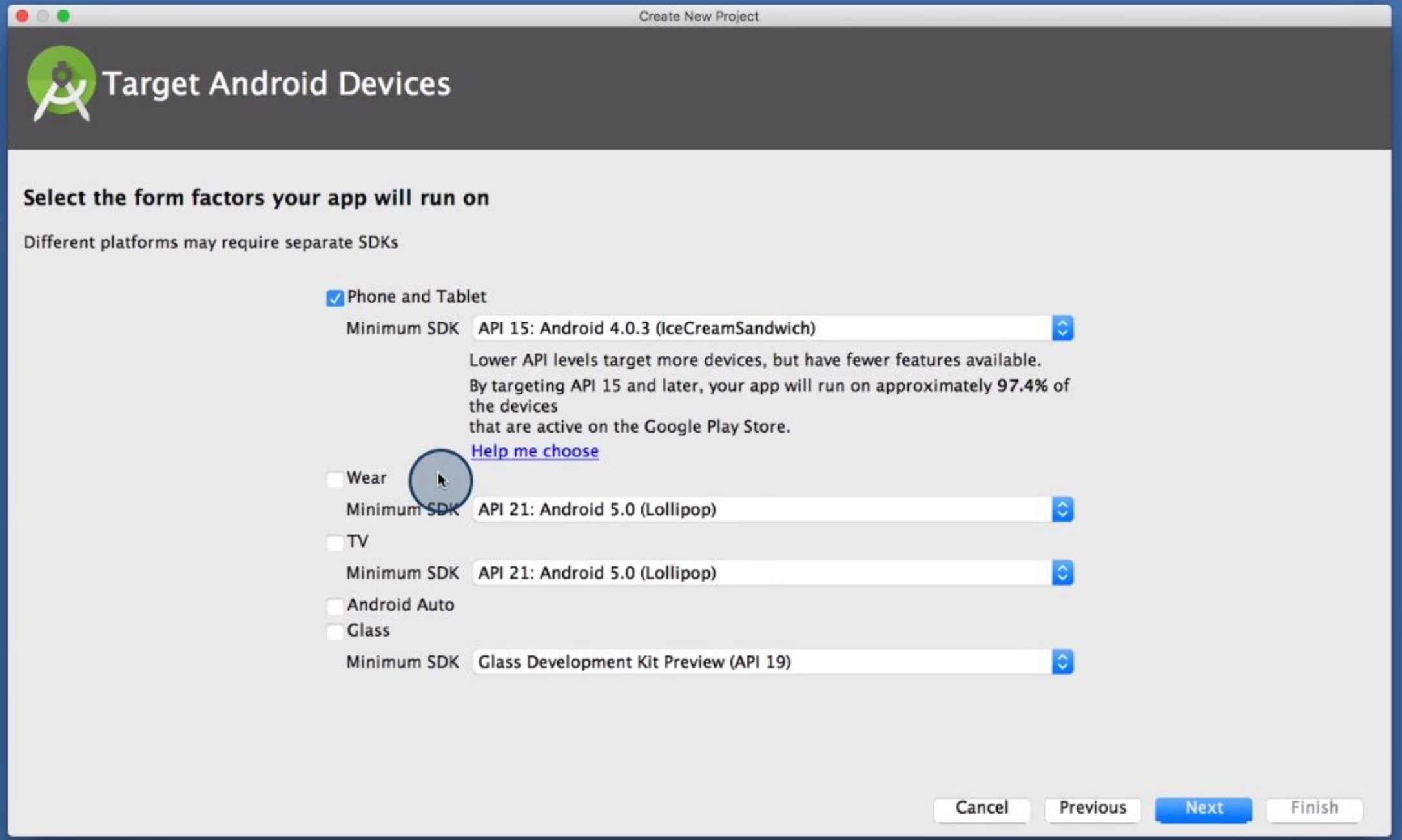

6:00
Settings
Location
Mountain View, CA 94043
Temperature Units
Metric
Weather Notifications
Enabled

https://github.com/udacity/ud851-Sunshine

https://github.com/udacity/ud851-Exercises


Welcome to Android Studio
Android Studio
Version 2.2 RC
Start a new Android Studio project
Open an existing Android Studio project
Check out project from Version Control
Import project (Eclipse ADT, Gradle, etc.)
Import an Android code sample
Configure
Get Help


Create New Project
New Project
Android Studio
Configure your new project
Application name:
FavoriteToys
Company Domain:
android.example.com
Package name:
com.example.android.favoritetoys
Edit
Include C++ Support
Project location:
/Users/clamps/Desktop/ud851/FavoriteToys
Cancel
Previous
Next
Finish


Create New Project
Target Android Devices
Select the form factors your app will run on
Different platforms may require separate SDKs
Phone and Tablet
Minimum SDK
API 15: Android 4.0.3 (IceCreamSandwich)
Lower API levels target more devices, but have fewer features available.
By targeting API 15 and later, your app will run on approximately 97.4% of the devices
that are active on the Google Play Store.
Help me choose
Wear
Minimum SDK
API 21: Android 5.0 (Lollipop)
TV
Minimum SDK
API 21: Android 5.0 (Lollipop)
Android Auto
Glass
Minimum SDK
Glass Development Kit Preview (API 19)
Cancel
Previous
Next
Finish

Create New Project

Add an Activity to Mobile

Add No Activity

Basic Activity

Empty Activity

Fullscreen Activity

Google AdMob Ads Activity

Google Maps Activity

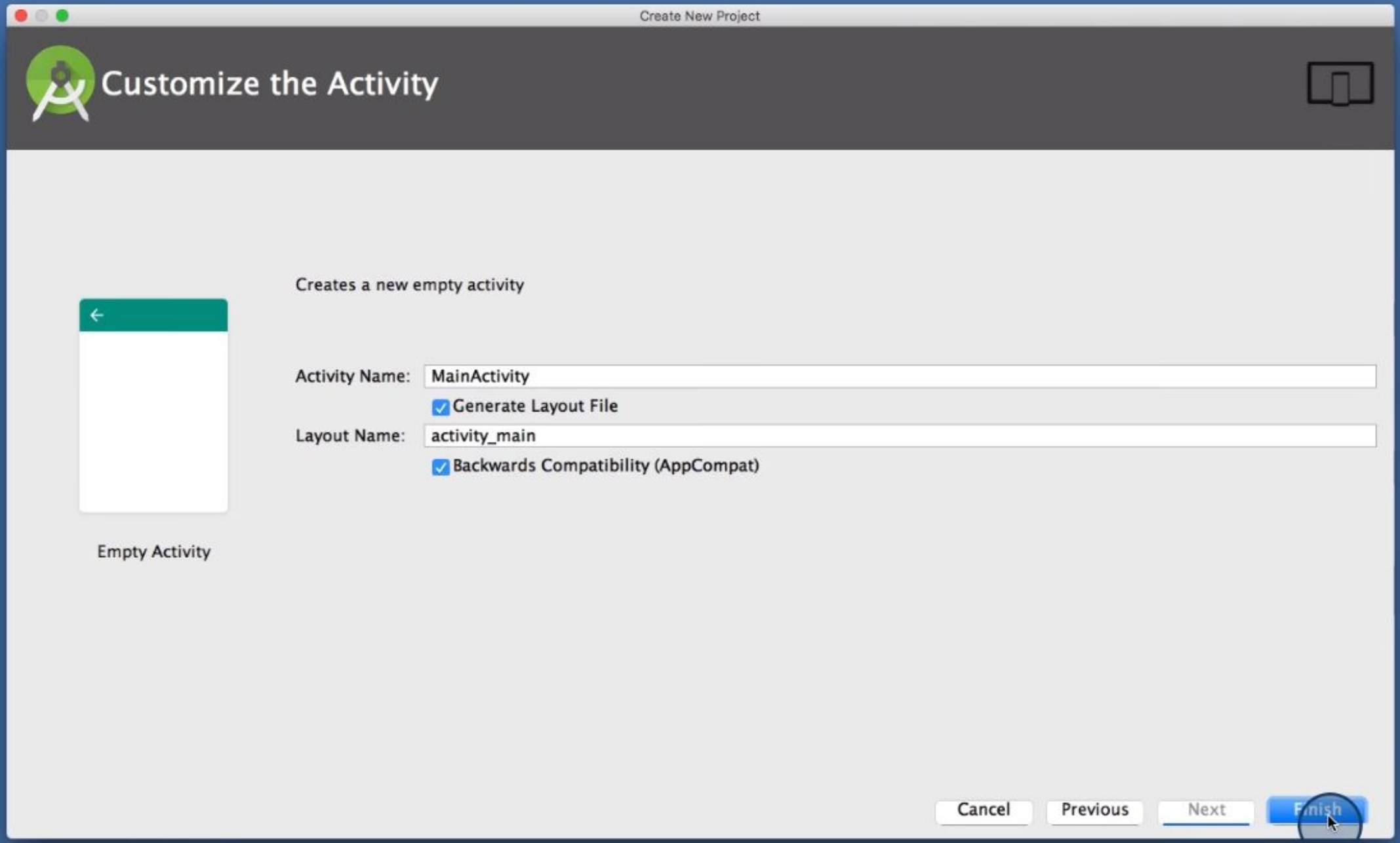
Login Activity

Master/Detail Flow

Navigation Drawer Activity

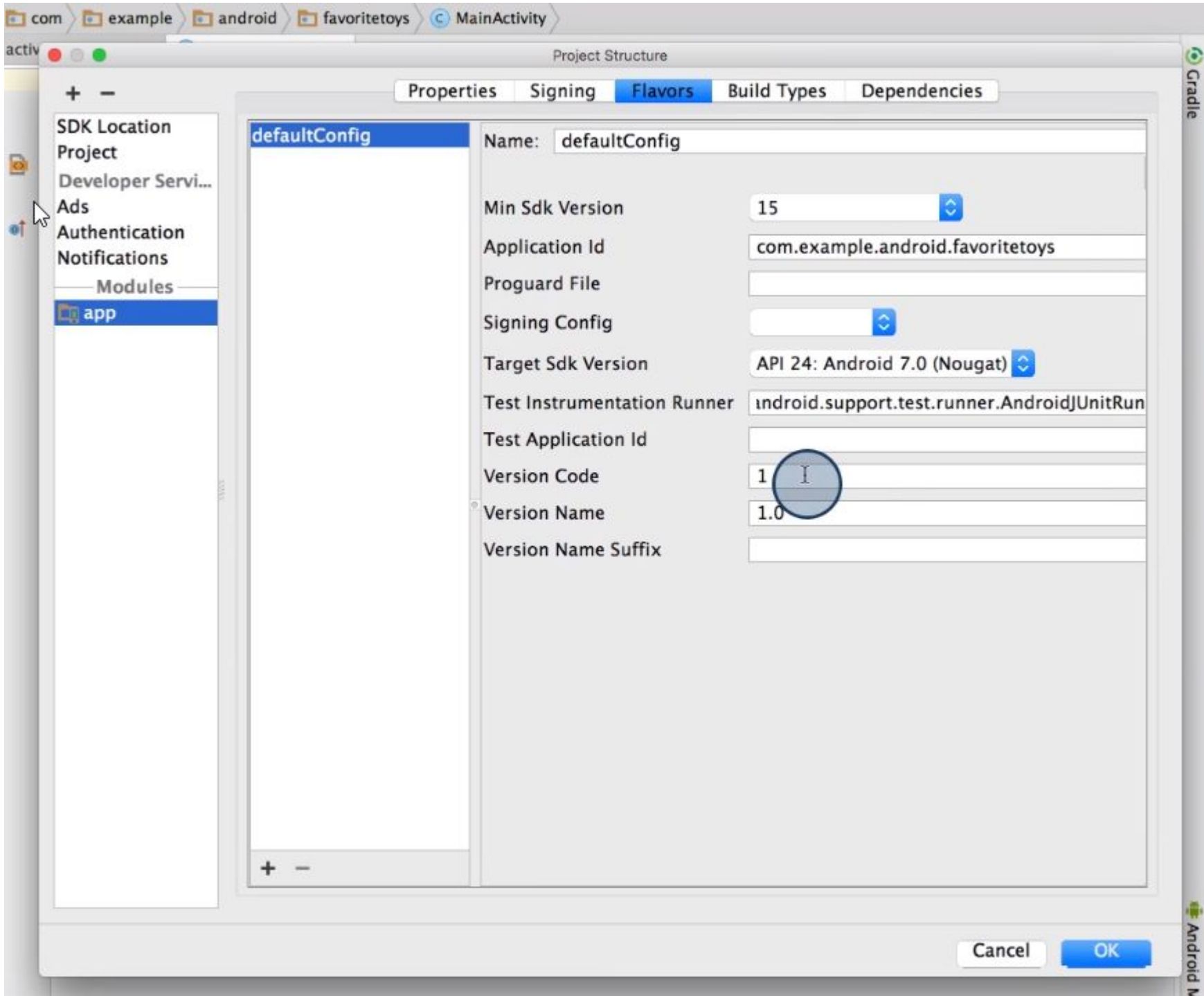
Scrolling Activity

Cancel Previous Next Finish


Create New Project
Customize the Activity
Creates a new empty activity
Activity Name:
MainActivity
Generate Layout File
Layout Name:
activity_main
Backwards Compatibility (AppCompat)
Empty Activity
Cancel
Previous
Next
Finish

Настройки

- Project Structure
  - App
    - Flavours



- minSDK версия – самая маленькая, которую поддерживаем
  - На устройствах с версией ниже это приложение не будет видно в Gplay
- targetSDK защищает наоборот от более новых версий

Android Virtual Device Manager

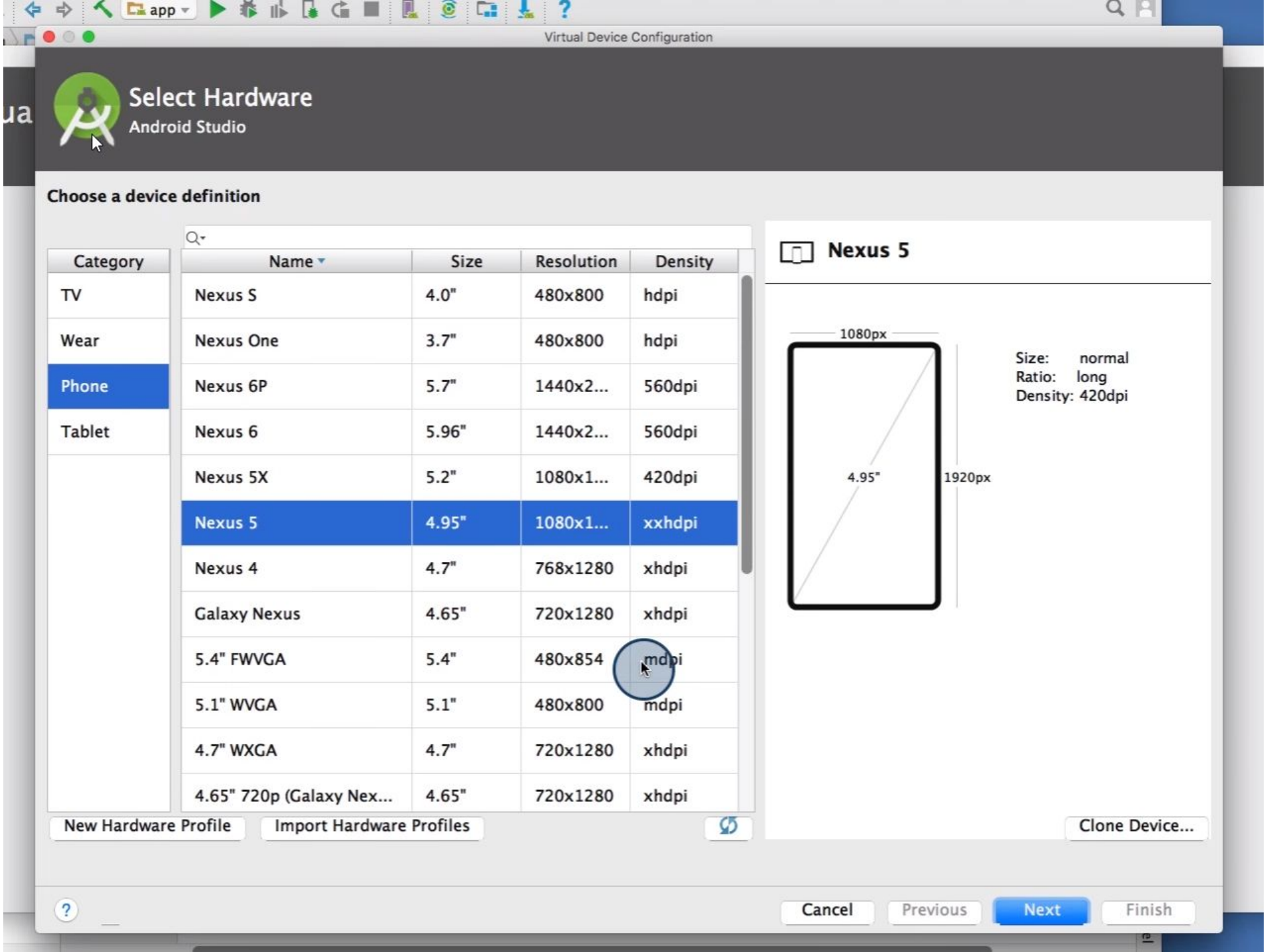
Your Virtual Devices

Android Studio

Virtual devices allow you to test your application without having to own the physical devices.

+ Create Virtual Device...

To prioritize which devices to test your application on, visit the Android Dashboards, where you can get up-to-date information on which devices are active in the Android and Google Play ecosystem.


app
Virtual Device Configuration
Select Hardware
Android Studio
Choose a device definition
Category
Name
Size
Resolution
Density
TV
Wear
Phone
Tablet
Nexus S 4.0" 480x800 hdpi
Nexus One 3.7" 480x800 hdpi
Nexus 6P 5.7" 1440x2... 560dpi
Nexus 6 5.96" 1440x2... 560dpi
Nexus 5X 5.2" 1080x1... 420dpi
Nexus 5 4.95" 1080x1... xxhdpi
Nexus 4 4.7" 768x1280 xhdpi
Galaxy Nexus 4.65" 720x1280 xhdpi
5.4" FWVGA 5.4" 480x854 mdpi
5.1" WVGA 5.1" 480x800 mdpi
4.7" WXGA 4.7" 720x1280 xhdpi
4.65" 720p (Galaxy Nex... 4.65" 720x1280 xhdpi
New Hardware Profile
Import Hardware Profiles
Nexus 5
1080px
4.95"
1920px
Size: normal
Ratio: long
Density: 420dpi
Clone Device...
Cancel
Previous
Next
Finish

Virtual Device Configuration

System Image

Android Studio

Select a system image

Recommended | x86 Images | Other Images

Release Name	API Level	ABI	Target
Nougat	24	x86_64	Android 7.0
Nougat Download	24	x86	Android 7.0
Marshmallow Download	23	x86_64	Android 6.0
Marshmallow Download	23	x86	Android 6.0
Lollipop Download	22	x86_64	Android 5.1
Lollipop Download	22	x86	Android 5.1
Lollipop Download	21	x86_64	Android 5.0 (with Google
Lollipop Download	21	x86	Android 5.0 (with Google
Lollipop Download	21	x86_64	Android 5.0
Lollipop Download	21	x86	Android 5.0
KitKat Download	19	x86	Android 4.4 (with Google
KitKat Download	19	x86	Android 4.4
Jelly Bean Download	18	x86	Android 4.3 (with Google
Jelly Bean Download	18	x86	Android 4.3
Jelly Bean Download	17	x86	Android 4.2 (with Google
Jelly Bean Download	17	x86	Android 4.2
Jelly Bean Download	16	x86	Android 4.1 (with Google

Nougat

API Level
24

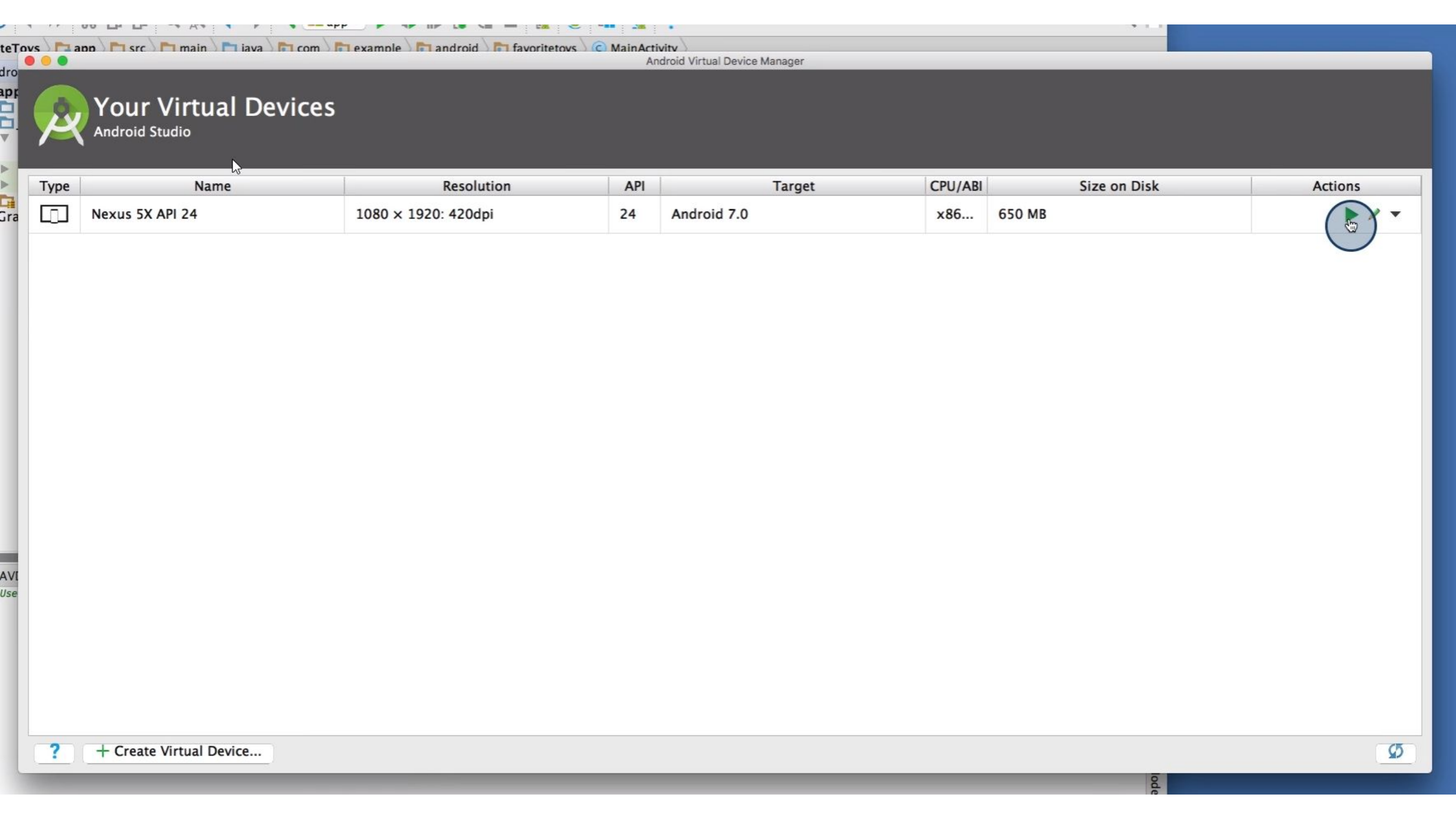
Android
7.0
Android Open Source Project

System Image
x86_64

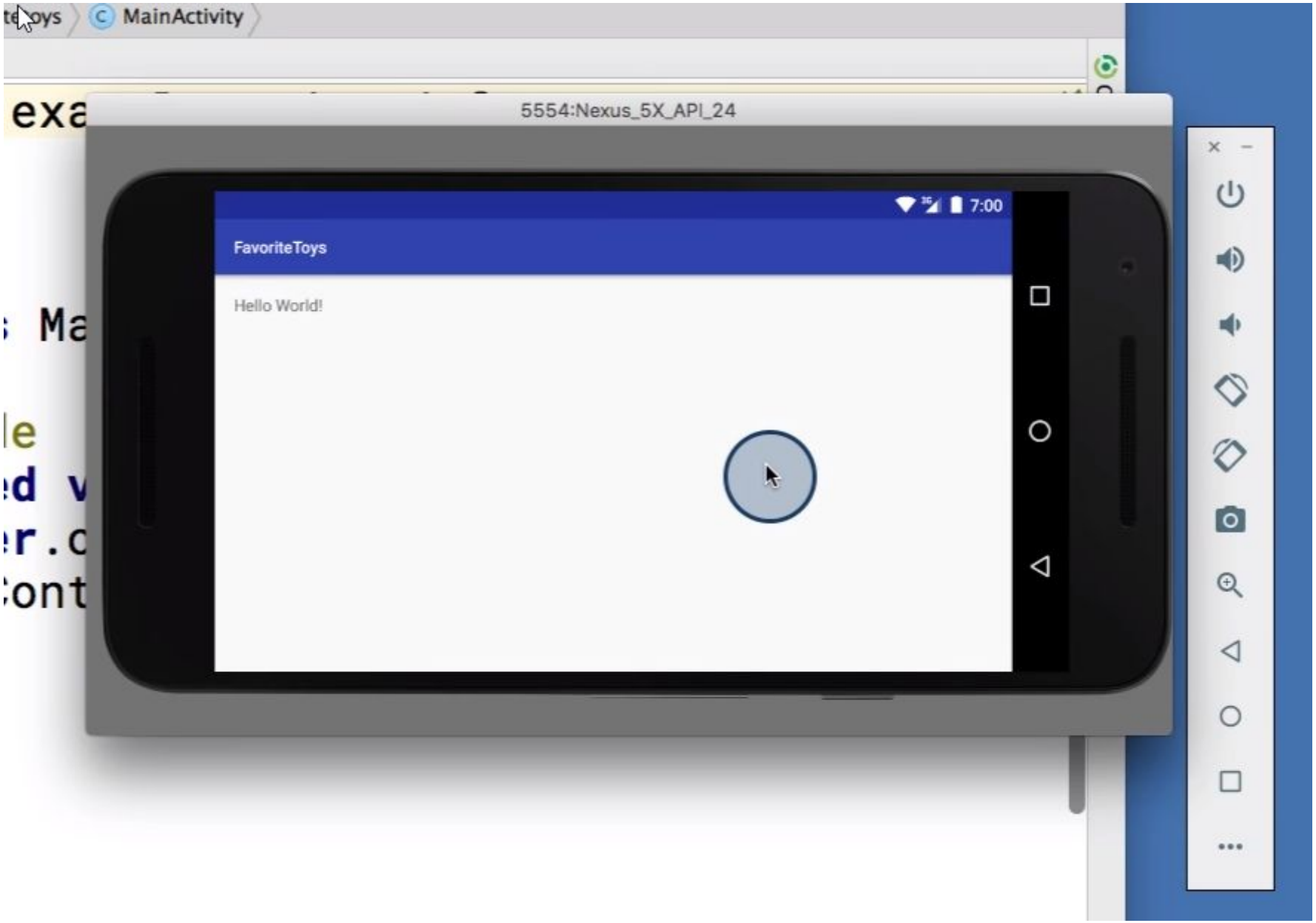
Recommendation
Consider using a system image with Google APIs to enable testing with Google Play Services.

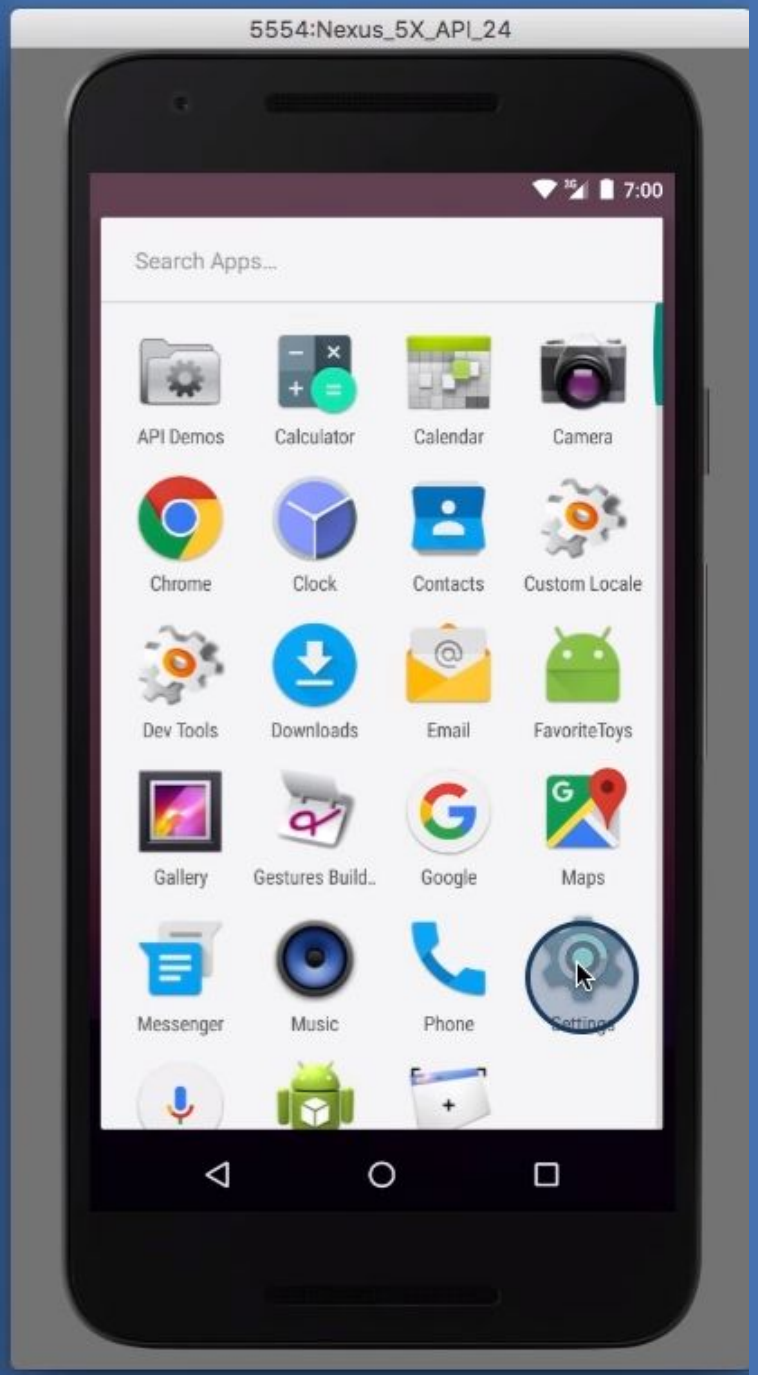
Questions on API level?
See the API level distribution chart

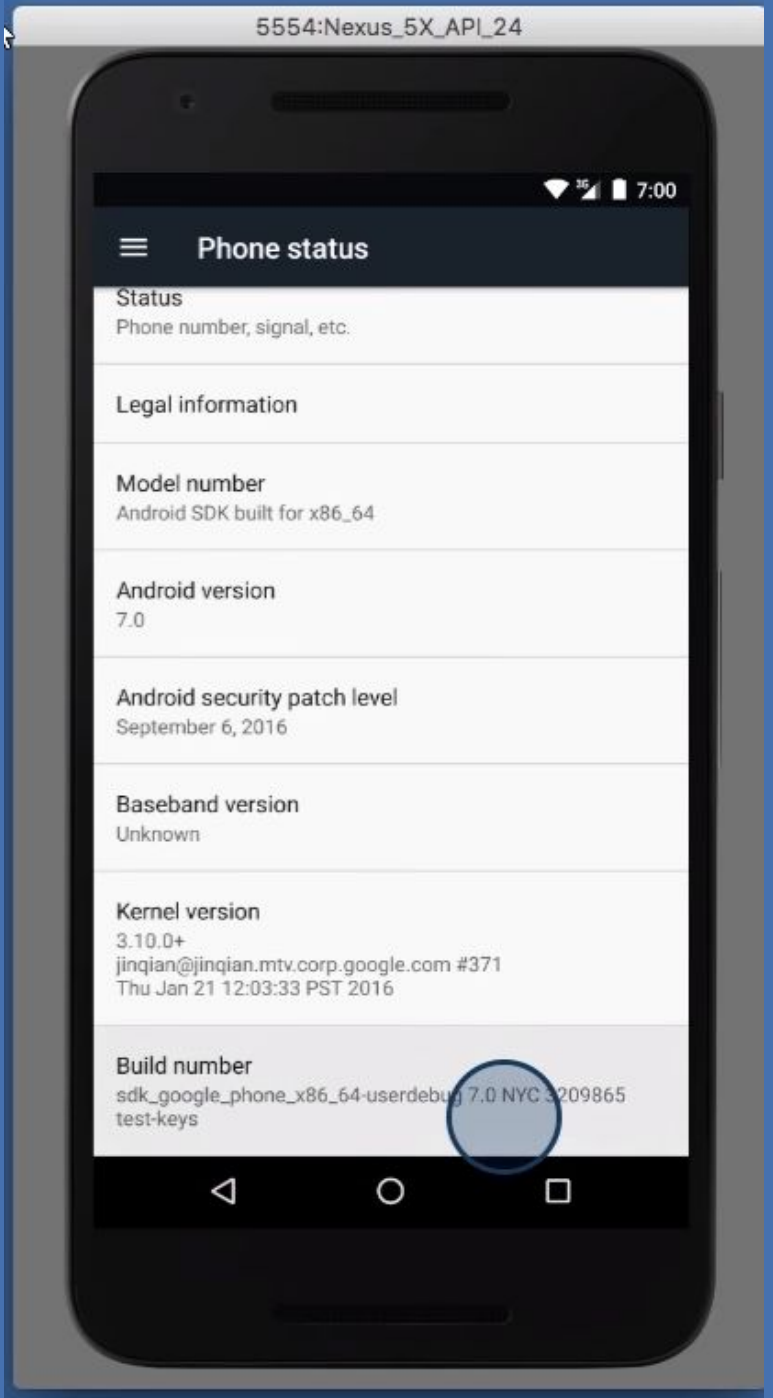
Cancel | Previous | Next | Finish

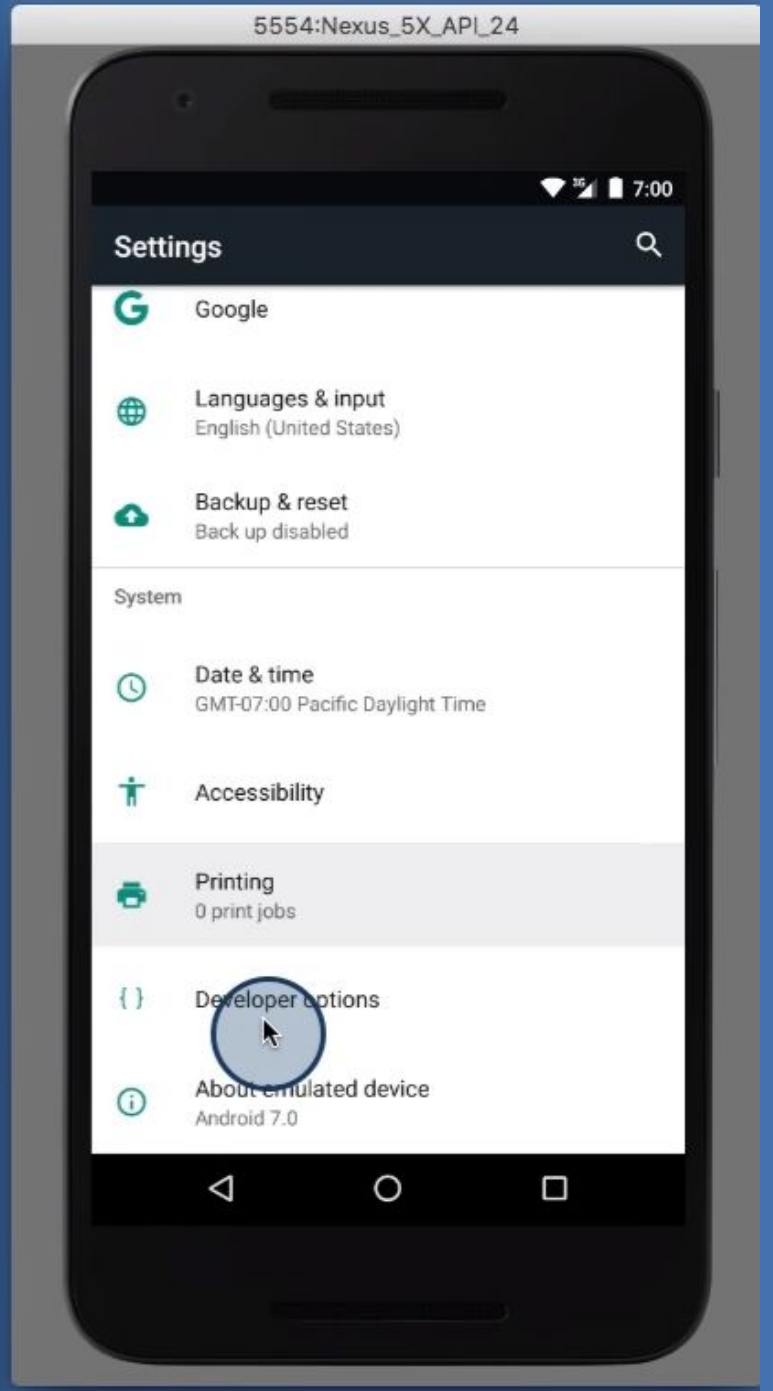

Android Virtual Device Manager
Your Virtual Devices
Android Studio
Type
Name
Resolution
API
Target
CPU/ABI
Size on Disk
Actions
Nexus 5X API 24
1080 × 1920: 420dpi
24
Android 7.0
x86...
650 MB
Create Virtual Device...

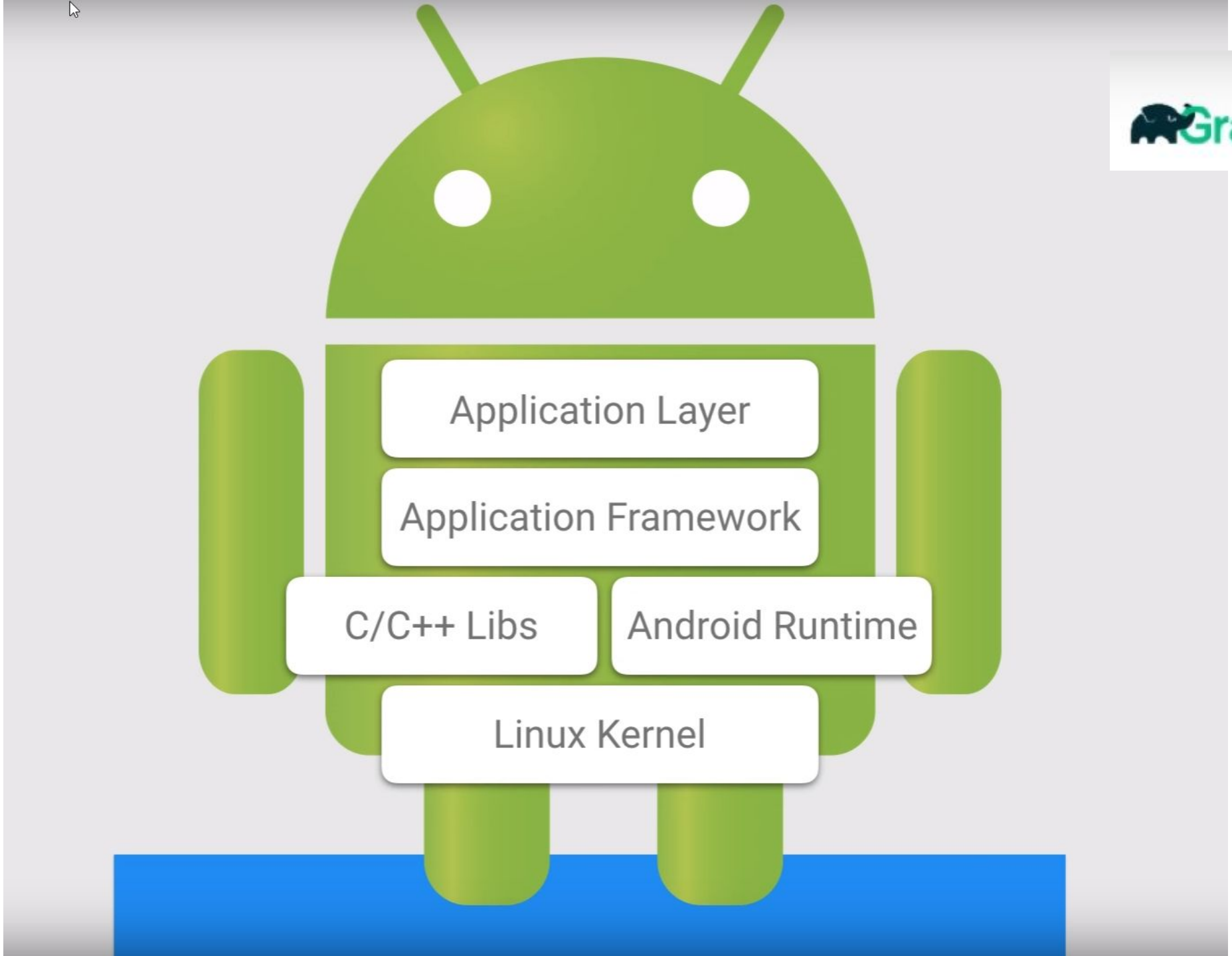

5554:Nexus_5X_API_24
7:00
Google
Email
Gallery

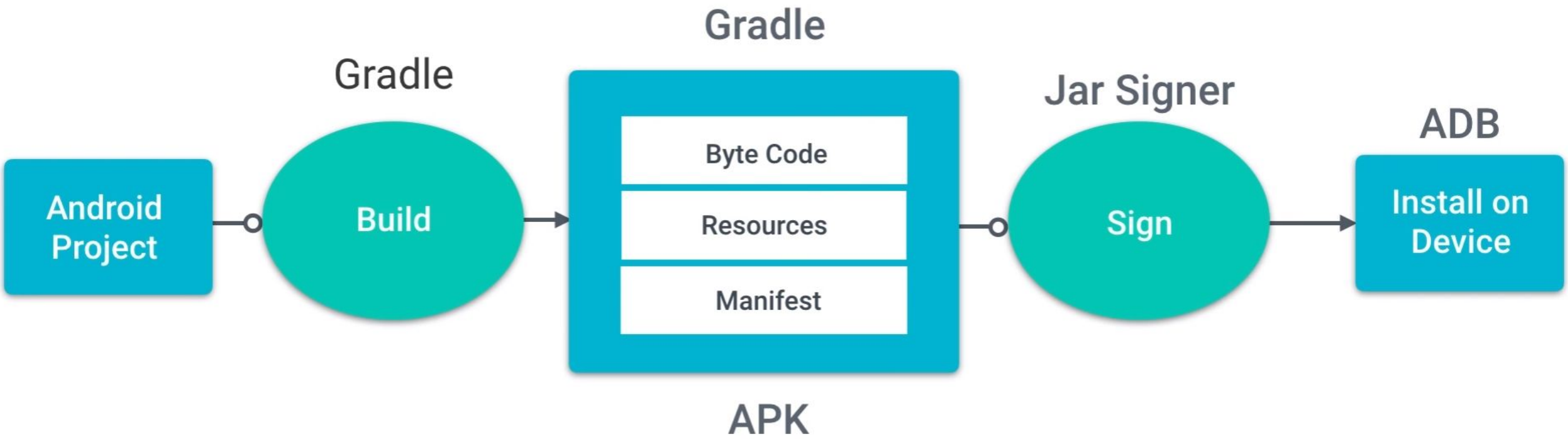

MainActivity
5554:Nexus_5X_API_24
7:00
FavoriteToys
Hello World!


5554:Nexus_5X_API_24
7:00
Search Apps...
API Demos
Calculator
Calendar
Camera
Chrome
Clock
Contacts
Custom Locale
Dev Tools
Downloads
Email
FavoriteToys
Gallery
Gestures Build..
Google
Maps
Messenger
Music
Phone
Settings


5554:Nexus_5X_API_24
7:00
Phone status
Status
Phone number, signal, etc.
Legal information
Model number
Android SDK built for x86_64
Android version
7.0
Android security patch level
September 6, 2016
Baseband version
Unknown
Kernel version
3.10.0+
jinqian@jinqian.mtv.corp.google.com #371
Thu Jan 21 12:03:33 PST 2016
Build number
sdk_google_phone_x86_64-userdebug 7.0 NYC 3209865
test-keys

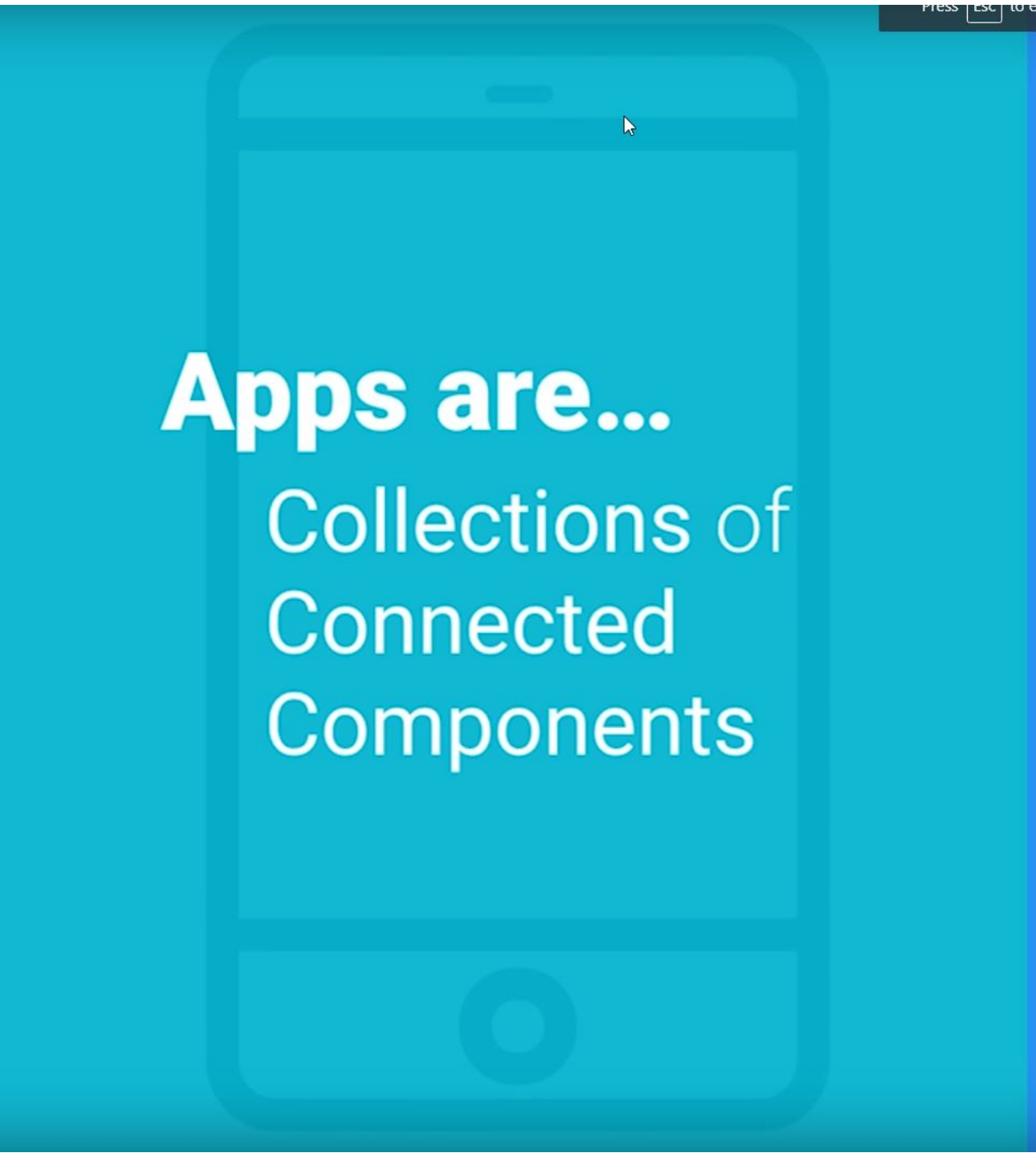

5554:Nexus_5X_API_24
7:00
Settings
Google
Languages & input
English (United States)
Backup & reset
Back up disabled
System
Date & time
GMT-07:00 Pacific Daylight Time
Accessibility
Printing
0 print jobs
Developer options
About emulated device
Android 7.0


Gradle
Application Layer
Application Framework
C/C++ Libs
Android Runtime
Linux Kernel


Gradle
Gradle
Jar Signer
ADB
Android Project
Build
Byte Code
Resources
Manifest
Sign
Install on Device
APK

```
11/14 08:29:16: Launching app
$ adb push /Users/clamps/Downloads/ud851-Exercises-student/Lesson01-Favorite-Toys/T01.03-Solution-AddScrolling/app/build/outputs/apk/app-debug.apk /data/local/tmp/c
$ adb shell pm install -r "/data/local/tmp/com.android.example.favoritetoys"
Success


$ adb shell am start -n "com.android.example.favoritetoys/com.example.android.favoritetoys.MainActivity" -a android.intent.action.MAIN -c android.intent.category.LA
Client not ready yet..Waiting for process to come online
Connected to process 3427 on device Nexus_5X_API_25 [emulator-5554]
W/System: ClassLoader referenced unknown path: /data/app/com.android.example.favoritetoys-1/lib/x86_64
W/art: Before Android 4.1, method android.graphics.PorterDuffColorFilter android.support.graphics.drawable.VectorDrawableCompat.updateTintFilter(android.graphics.Po
I/OpenGLRenderer: Initialized EGL, version 1.4
D/OpenGLRenderer: Swap behavior 1
```

Press Esc to exit full screen



What
is an
Activity?

Activity

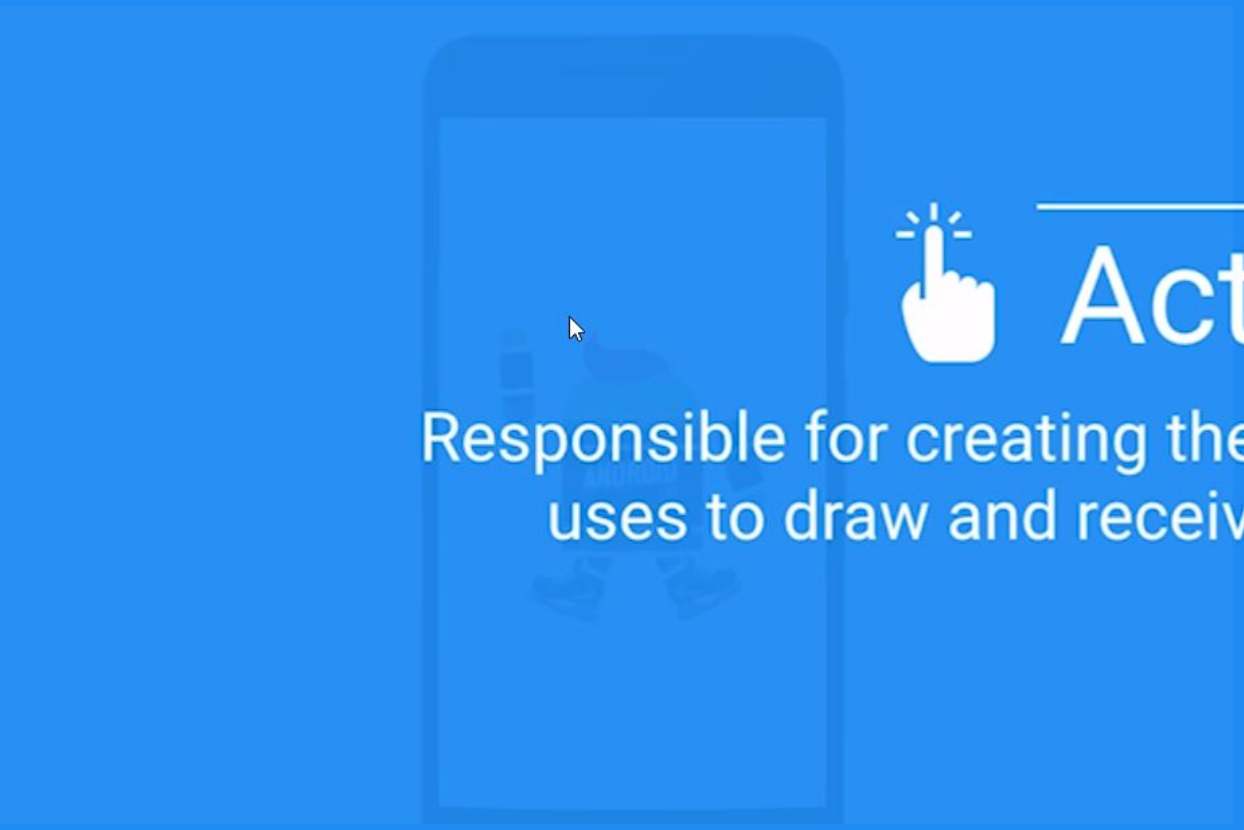
Service

Content Provider

Broadcast Receiver

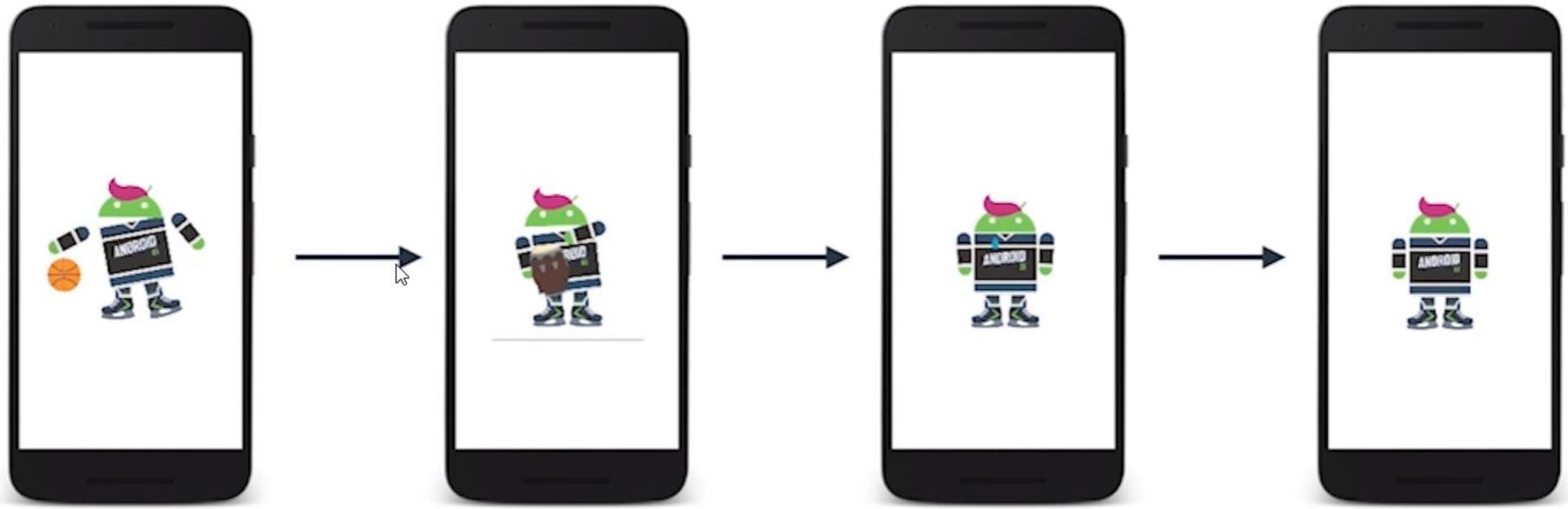
Activity

Single focused thing that the **user** can **do.**



Activity

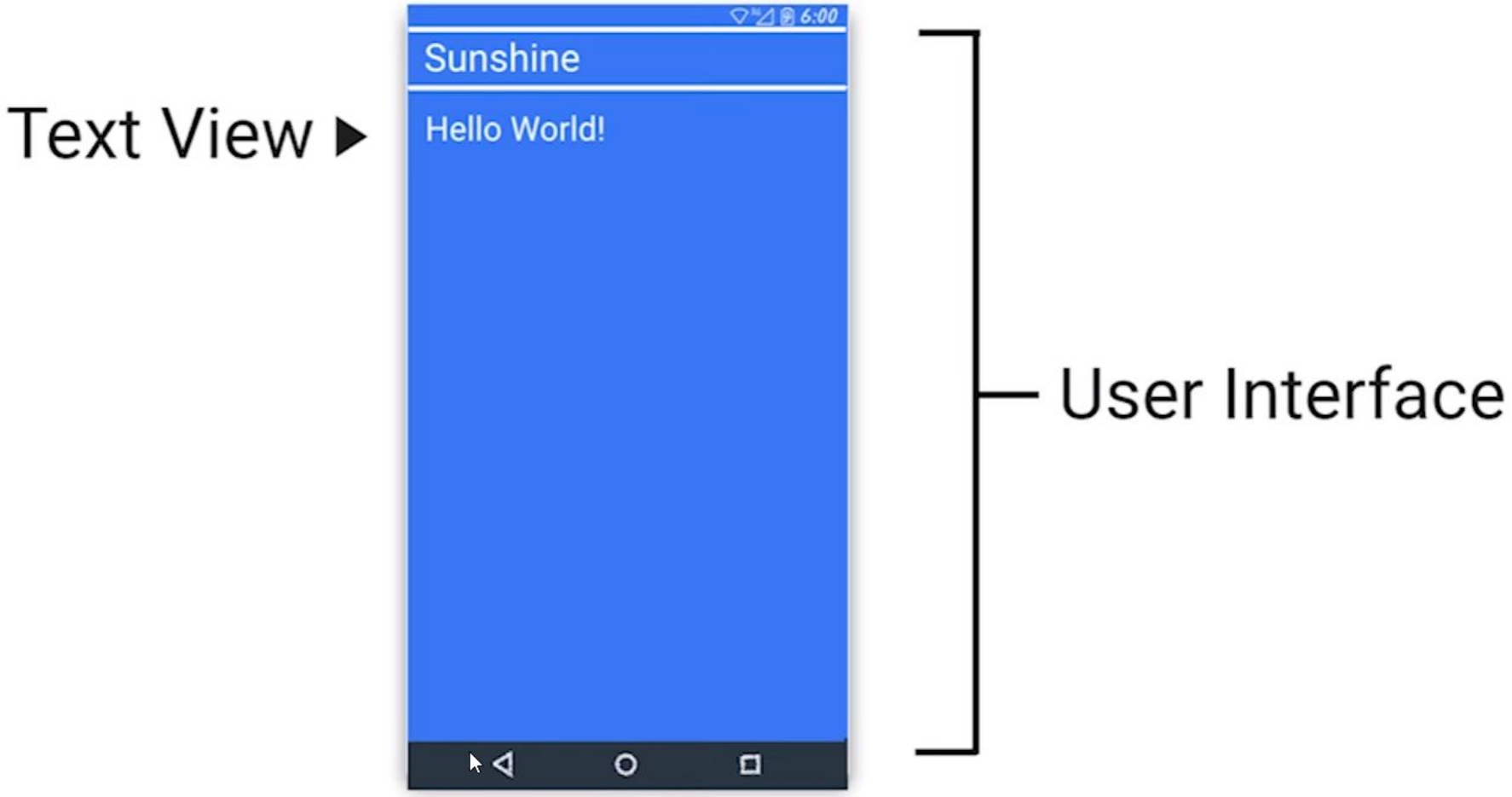
Responsible for creating the window that your application uses to draw and receive events from the system

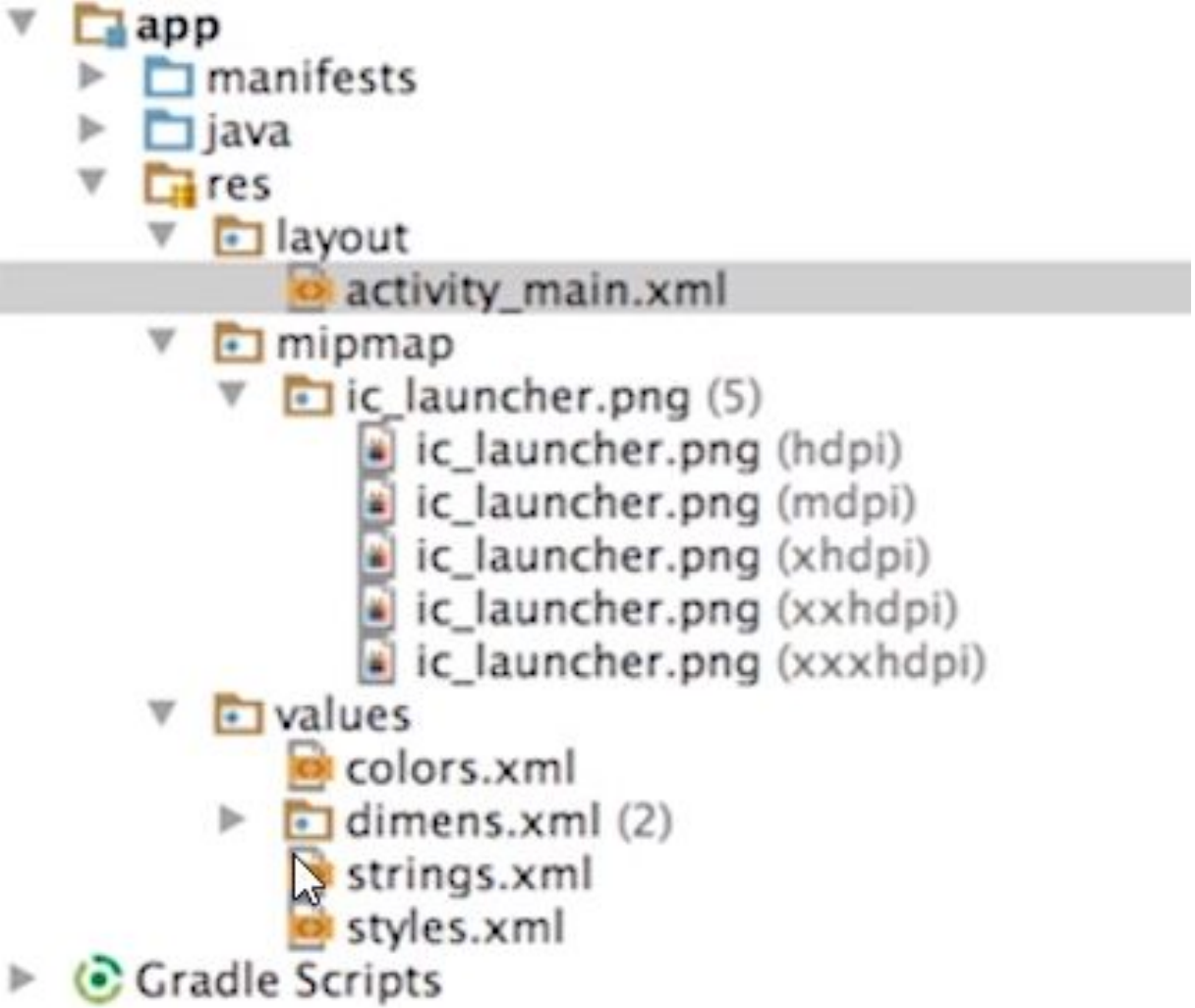


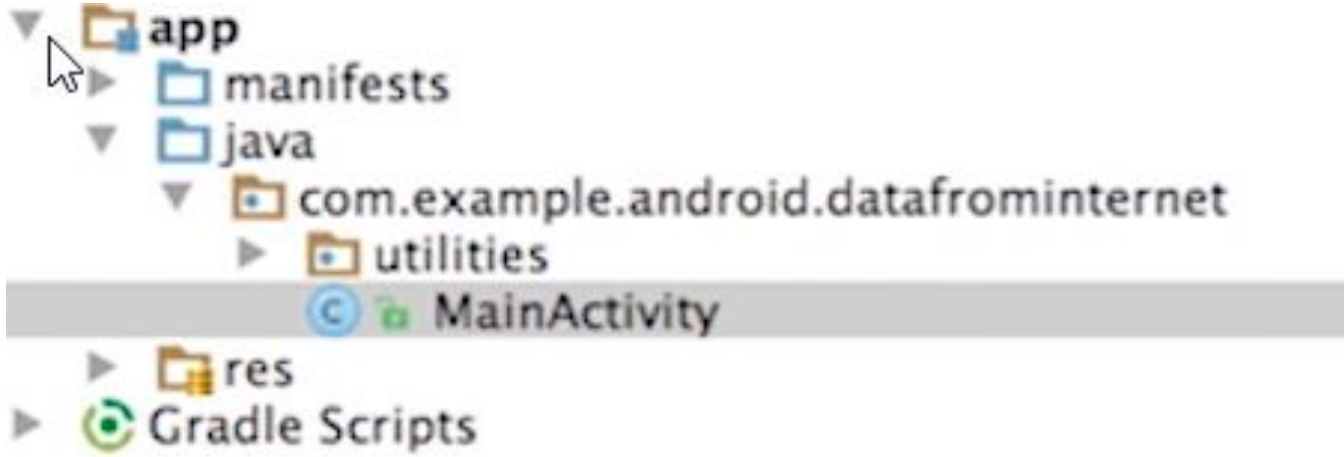
Android Manifest

```xml
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
          package="com.example.android.favoritetoys">

    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:supportsRtl="true"
        android:theme="@style/AppTheme">
        <activity android:name="com.example.android.favoritetoys.MainActivity">
            <intent-filter>
                <action android:name="android.intent.action.MAIN"/>
                <category android:name="android.intent.category.LAUNCHER"/>
            </intent-filter>
        </activity>
    </application>

</manifest>
```

Android Framework

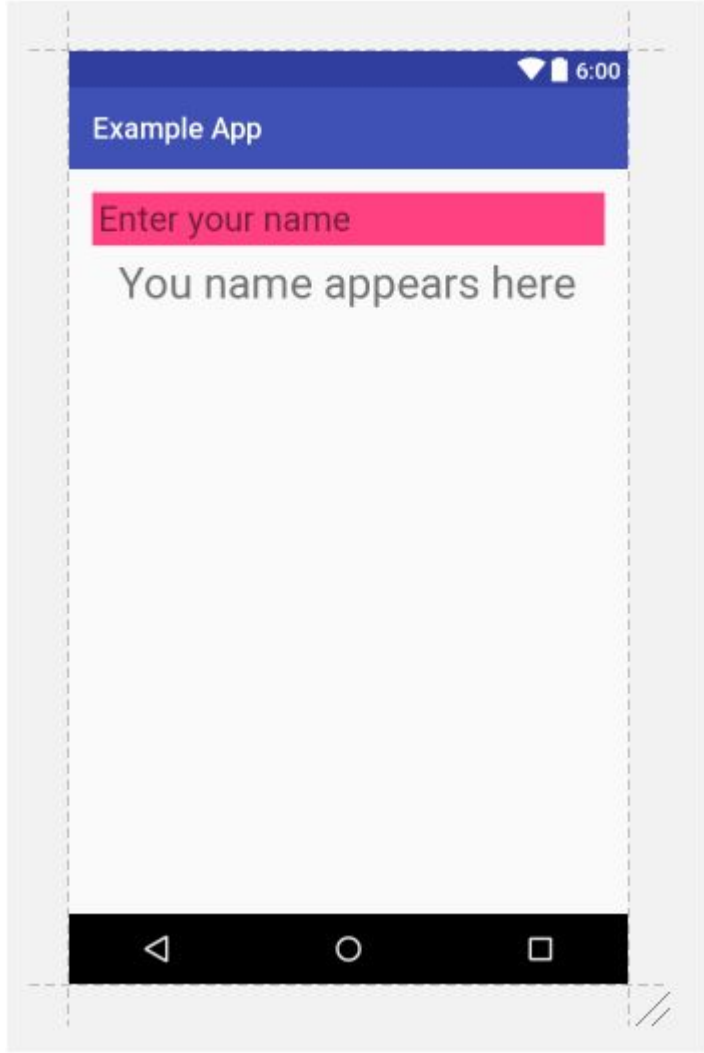



app
manifests
java
res
layout
activity_main.xml
mipmap
ic_launcher.png (5)
ic_launcher.png (hdpi)
ic_launcher.png (mdpi)
ic_launcher.png (xhdpi)
ic_launcher.png (xxhdpi)
ic_launcher.png (xxxhdpi)
values
colors.xml
dimens.xml (2)
strings.xml
styles.xml
Gradle Scripts


app
manifests
java
com.example.android.datafrominternet
utilities
MainActivity
res
Gradle Scripts

```
@Override
protected void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);
    setContentView(R.layout.activity_main);

    // TODO (29) Use findViewById to get a reference t
    mSearchBoxEditText = (EditText) findViewById(R.id.

    // TODO (30) Use findViewById to get a reference t
    mUrlDisplayTextView = (TextView) findViewById(R.id
    // TODO (31) Use findViewById to get a reference t
    mSearchResults = (TextView) findViewById(R.id.tv_g
}
```

```xml
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    android:padding="16dp"
    tools:context="com.example.android.exampleapp.MainActivity">

    <EditText
        android:id="@+id/edit_text_name_input"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:background="@color/colorAccent"
        android:hint="Enter your name"
        android:padding="4dp"
        android:textSize="24sp" />

    <TextView
        android:id="@+id/text_view_name_display"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_gravity="center"
        android:layout_marginTop="8dp"
        android:text="Your name appears here"
        android:textSize="30sp" />
</LinearLayout>
```



UI Components

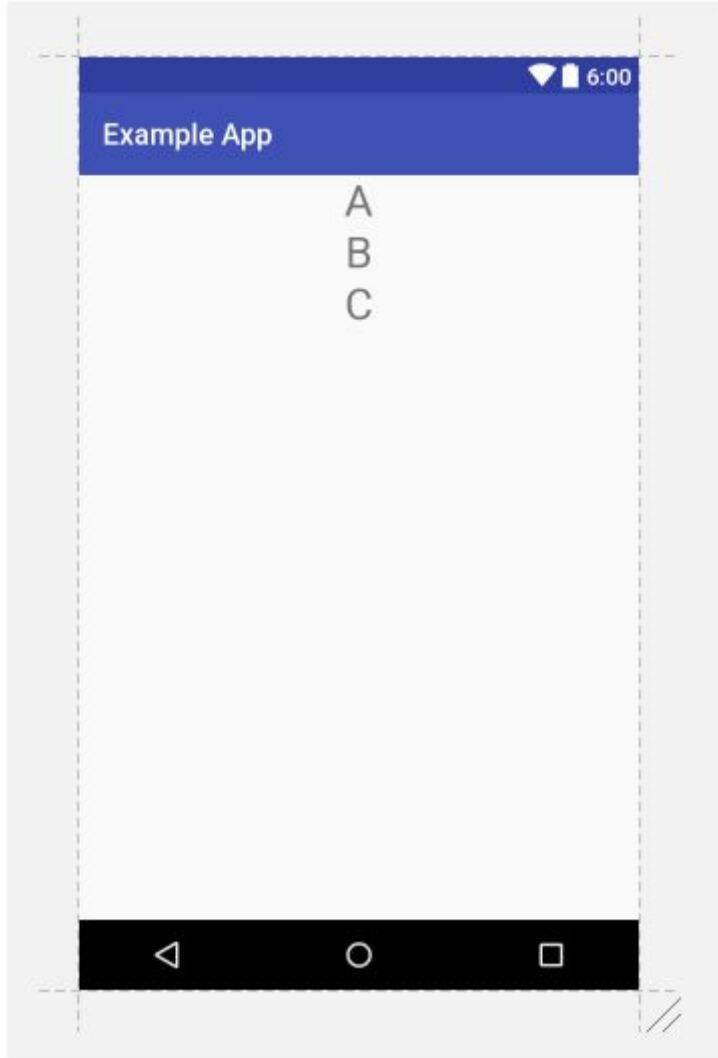
Class Name	Description
TextView	Creates text on the screen; generally non interactive text.
EditText	Creates a text input on the screen
ImageView	Creates an image on the screen
Button	Creates a button on the screen
Chronometer	Create a simple timer on screen

The android.widget package contains a list of *most* of the UI view classes available to you.

Container view

- Ещё называют Layout-компонентами
- Наследуются от класса ViewGroup
- Нужны, чтобы в них засовывать разные элементы

```xml
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    tools:context="com.example.android.exampleapp.MainActivity">
    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_gravity="center"
        android:text="A"
        android:textSize="30sp" />
    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_gravity="center"
        android:text="B"
        android:textSize="30sp" />
    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_gravity="center"
        android:text="C"
        android:textSize="30sp" />
</LinearLayout>
```



A few examples of common container views are:

Class Name	Description
LinearLayout	Displays views in a single column or row.
RelativeLayout	Displays views positioned relative to each other and this view.
FrameLayout	A ViewGroup meant to contain a single child view.
ScrollView	A FrameLayout that is designed to let the user scroll through the content in the view.
ConstraintLayout	This is a newer viewgroup; it positions views in a flexible way. We'll be exploring constraint layout later in the lesson.

Note that layout views can be nested in one another, so you can nest a LinearLayout inside of a LinearLayout if you so choose.

Атрибуты

- XML-атрибуты описывают свойства компонент
- К примеру:
  - layout_width – какая будет ширина
  - Background – цвет
  - Padding – внутренняя ширина границ
  - итд

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    android:padding="16dp"
    tools:context="com.example.android.exampleapp.MainActivity">


    <EditText
        android:id="@+id/edit_text_name_input"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:background="@color/colorAccent"
        android:hint="Enter your name"
        android:padding="4dp"
        android:textSize="24sp" />


    <TextView
        android:id="@+id/text_view_name_display"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_gravity="center"
        android:layout_marginTop="8dp"
        android:text="Your name appears here"
        android:textSize="30sp" />
```

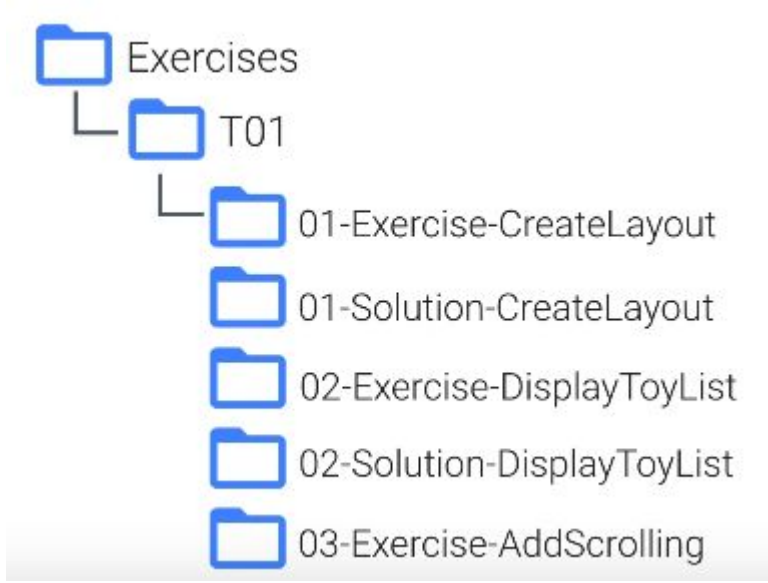
Связь с Java

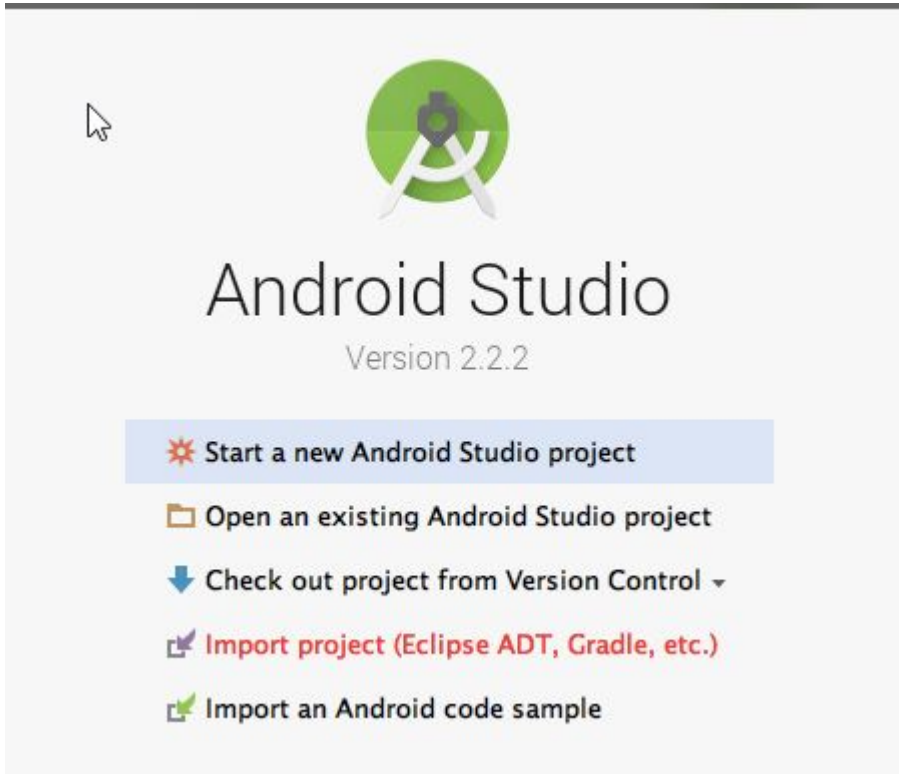
- У каждой activity есть свой класс
- В методе onCreate – связь с XML с помощью setContentView
- R.* -- сгенерированные Java-репрезентации вашего XML

```
public class MainActivity extends AppCompatActivity {
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        // other code to setup the activity
    }
    // other code
}
```

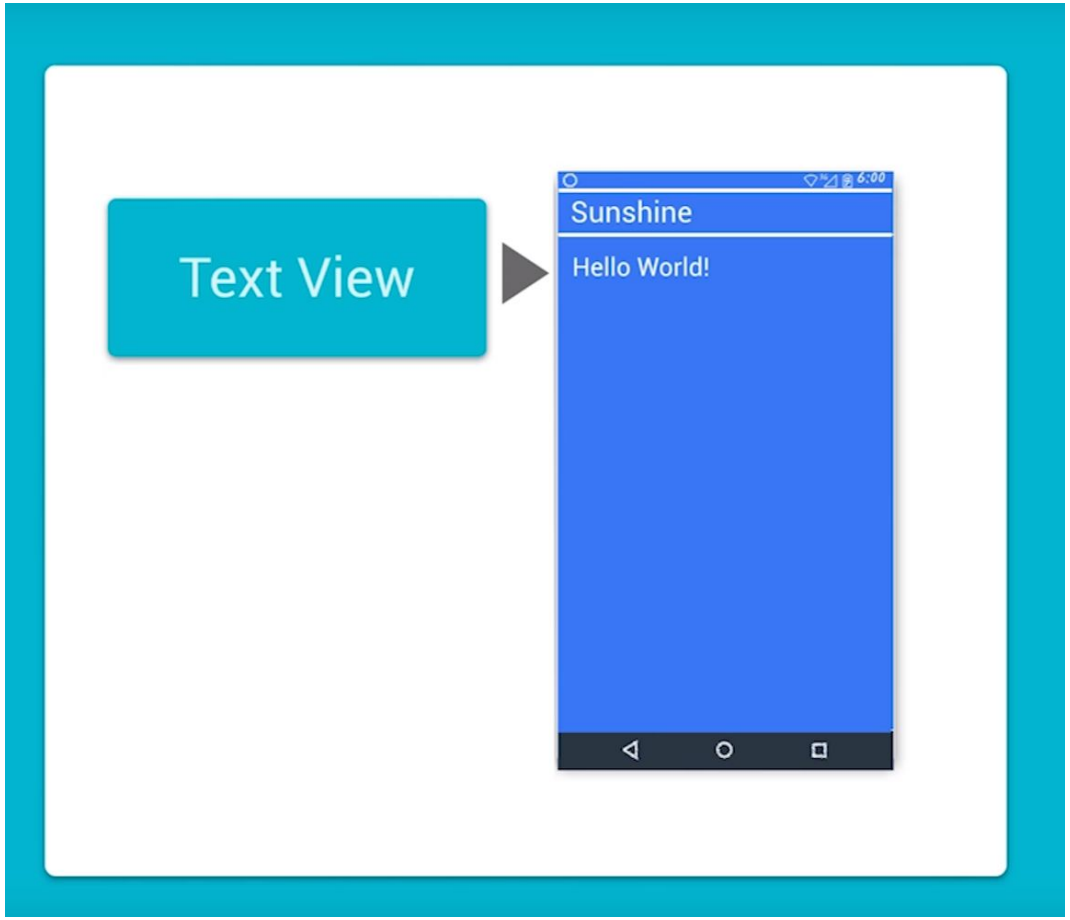
Лабораторная работа

- Импортируем проект из 01-…
- Смотрим TODO
- Удаляем из build.gradle зависимость к ConstraintLayout





Вторая лабораторная работа



@+id/tv_toy_names

- @ говорит, что это не строка, а Android-ресурс
- + говорит, что мы создаём новый id

- R.id.tv_toy_names – имя скомпилированного TextView