

Android Studio

(ako začat')



Peter Borovanský
KAI, I-18

borovan 'at' ii.fmph.uniba.sk

Vývojové platformy

(nativne appky)



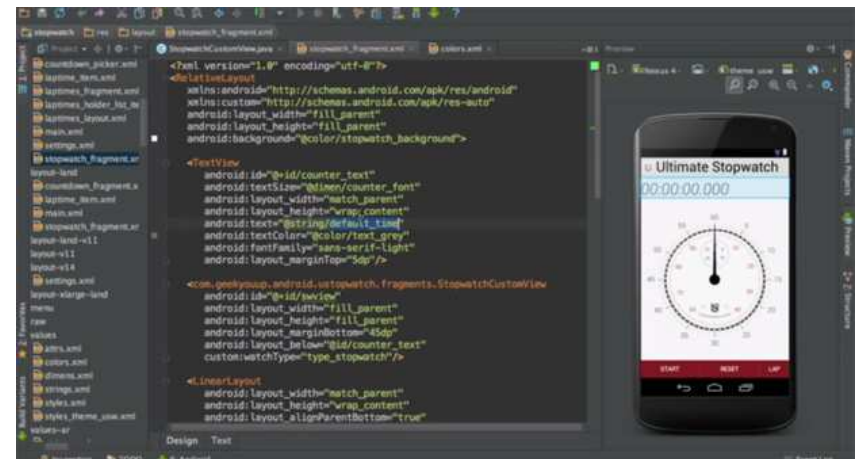
- A.I.D.E. – Android IDE on Android
Java+Android SDK/ C/C++ Android NDK
<https://play.google.com/store/apps/details?id=com.aide.ui&hl=sk>

- Android Studio (IntelliJ iDEA)
<http://developer.android.com/sdk/installing/studio.html>
<http://developer.android.com/tools/studio/index.html>



- IntelliJ iDEA plugging for Android (**Professional Android IDE**)
<http://www.jetbrains.com/idea/>

- ADT plugin pre Eclipse
Android Development Tool
Eclipse ADT plugin is no longer supported, as per this announcement in June 2015



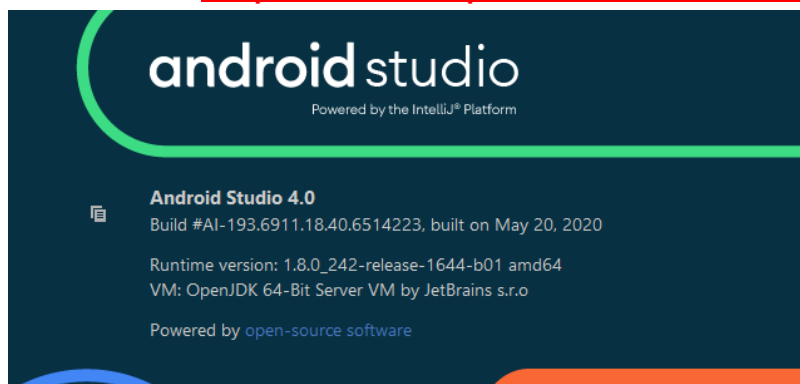
Zdroje a Android Studio

Android Studio a jeho eco-systém:

- Developer Android Forum (<http://developer.android.com/>)
- Stackoverflow (<http://stackoverflow.com/>)
- kotlin.org (<https://kotlinlang.org/>)
- iná literatúra (<http://dai.fmph.uniba.sk/courses/VMA/android/pdfs/>)
- (!) väčšinu odporúčaných kníh nájdete v našej knižnici, pav.

Používame Android Studio 4.0 (Official IDE for Android)

<https://developer.android.com/studio/index.html>



Už obsahuje aj Kotlin
(1.4) support



univerzitná knižnica
v bratislave



Free Udacity courses

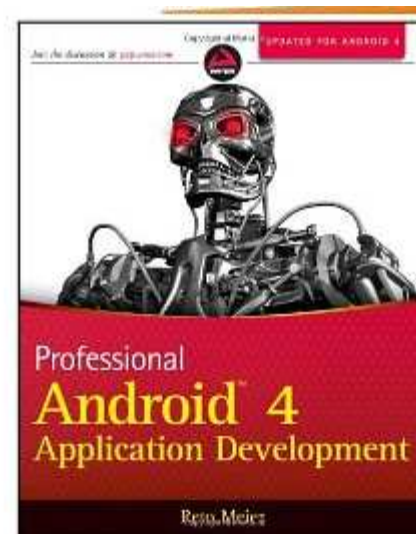
- [user interface](#) – začiatovník, user interface
- [user input](#)
- [multiscreen apps](#) – activities, fragments, master-detail view, ...
- [networking](#) – http networking, json parsing, ...
- [data storage](#) - sqlite
- [material design](#)
- [Google Firebase](#)
- [Kotlin for Android](#)

Professional Android 4

(stará ale dobrá...java)

- 2012, Reto Meier, Amazon: 4/5

CHAPTER 1	Hello, Android.	1
CHAPTER 2	Getting Started.	19
CHAPTER 3	Creating Applications and Activities	53
CHAPTER 4	Building User Interfaces	95
CHAPTER 5	Intents and Broadcast Receivers	165
CHAPTER 6	Using Internet Resources	201
CHAPTER 7	Files, Saving State, and Preferences	221
CHAPTER 8	Databases and Content Providers	251
CHAPTER 9	Working in the Background	331
CHAPTER 10	Expanding the User Experience	359
CHAPTER 11	Advanced User Experience	425
CHAPTER 12	Hardware Sensors	481
CHAPTER 13	Maps, Geocoding, and Location-Based Services	513
CHAPTER 14	Invading the Home Screen.	565
CHAPTER 15	Audio, Video, and Using the Camera.	621
CHAPTER 16	Bluetooth, NFC, Networks, and Wi-Fi.	665
CHAPTER 17	Telephony and SMS.	701
CHAPTER 18	Advanced Android Development	739
CHAPTER 19	Monetizing, Promoting, and Distributing Applications	771



univerzitná knižnica
v bratislave

Android Sensor Programming

(stará ale dobrá...java)

2012, Greg Milette, Adam Stroud, Amazon: 5/5

PART I LOCATION SERVICES

CHAPTER 1 Introducing the Android Location Service

CHAPTER 2 Determining a Device's Current Location

CHAPTER 3 Tracking Device Movement

CHAPTER 4 Proximity Alerts

PART II INFERRING INFORMATION FROM PHYSICAL SENSORS

CHAPTER 5 Overview of Physical Sensors

CHAPTER 6 Errors and Sensor Signal Processing

CHAPTER 7 Determining Device Orientation

CHAPTER 8 Detecting Movement

CHAPTER 9 Sensing the Environment

CHAPTER 10 Android Open Accessor

PART III SENSING THE AUGMENTED, PATTERN-RICH EXTERNAL WORLD

CHAPTER 11 Near Field Communication (NFC)

CHAPTER 12 Using the Camera

CHAPTER 13 Image-Processing Techniques

CHAPTER 14 Using the Microphone

PART IV SPEAKING TO ANDROID

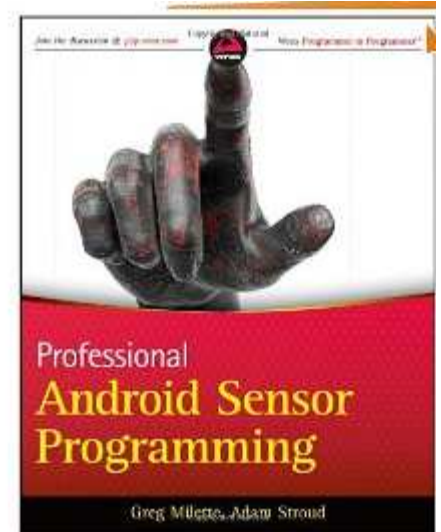
CHAPTER 15 Designing a Speech-Enabled App

CHAPTER 16 Using Speech Recognition and Text-To-Speech APIs

CHAPTER 17 Matching What Was Said

CHAPTER 18 Executing Voice Actions

CHAPTER 19 Implementing Speech Activation



univerzitná knižnica
v bratislave

Professional Android Application Development

(stará ale dobrá...java)

- 2014, Reto Meier, Amazon: 4/5
 1. Hello, Android
 2. Getting Started
 3. Creating Applications and Activities
 4. Creating User Interfaces
 5. Intents, Broadcast Receivers, Adapters, and the Internet
 6. Data Storage, Retrieval, and Sharing
 7. Maps, Geocoding, and Location-Based Services
 8. Working in the Background
 9. Peer-to-Peer Communication
 10. Accessing Android Hardware
 11. Advanced Android Development

V knižnici FMFI

Bohužiaľ len na prezenčnú výpožicku (t.j. len tam):

- Meier: Professional Android 4 Application
- Milette: Professional Android Sensor Programming
- Wii-Meng Lee: Beginning Android 4 Application Development



univerzitná knižnica
v bratislave



ANDROID™ 6 FOR PROGRAMMERS

AN APP-DRIVEN APPROACH

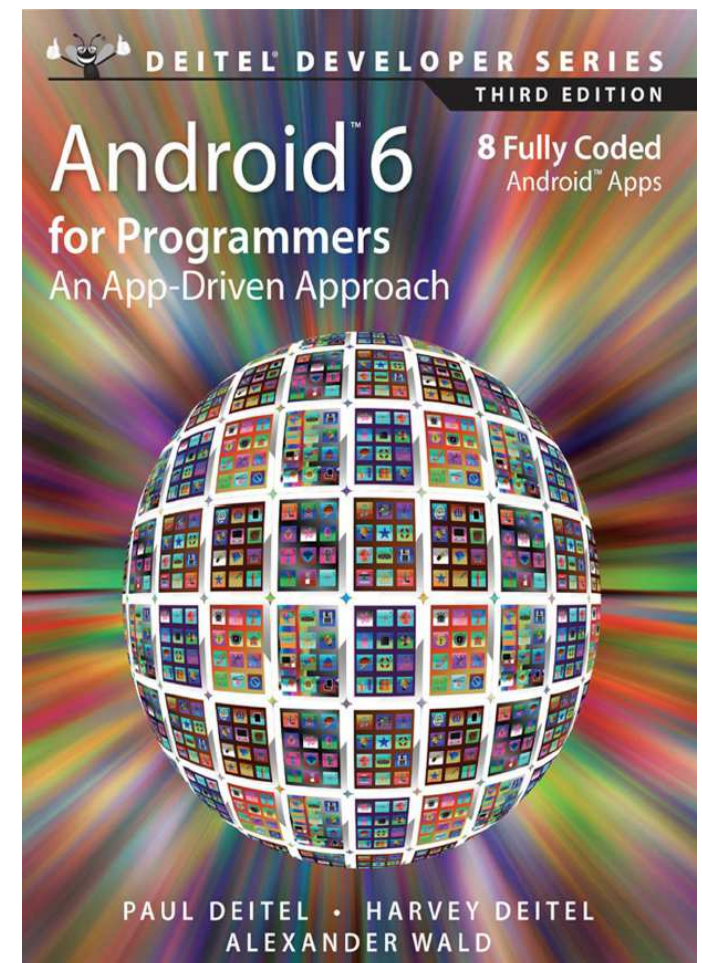
■ Paul Deitel • Harvey Deitel • Alexander Wald, 2016, 3rd Edition, Amazon 4.4/5

8 konkrétnych appiek detailne vysvetlených

1. Welcome App
2. Cannon Game
3. Tip Calculator
4. Weather Viewer
5. Flag Quiz
6. Twitter® Searches
7. Doodlz
8. Address Book



univerzitná knižnica
v bratislave



Java vs. Kotlin



tradičný kurz postavený na Java už druhý rok beží v jazyku Kotlin 1.3

Dôvody:

- ako iOS má svoj moderný jazyk Swift (3/4/5), aj Android má svoj Kotlin
- Java je trochu *skamenelina* medzi modernými jazykmi (Swift, Kotlin, Scala)
- Kotlin je Googlom oficiálne podporovaným vývojový nástroj pre Android
- projekt Kotlin má už >5 rokov
- kompiluje do JVM
- funguje s Android Studiom
- oboznámite sa s niektorými princípmi moderných jazykov – *pers.challenge*
- Reference: <https://kotlinlang.org/docs/reference/>
- Online: <https://play.kotlinlang.org/byExample/>

Android Studio 4.* Development Essentials – Kotlin Edition

- <https://www.amazon.com/Android-Studio-4-0-Development-Essentials-ebook/dp/B089T8Z66P>
- sources: <https://www.ebookfrenzy.com/retail/as40kotlin/page.php>

Inštalácia Android Studio (4.0):

<https://developer.android.com/studio>

Predmet má cvičenie, ale aj tak:

- ozvite sa v prípade problémov inštalácie na platformy napr. Linux.
- Jožo, Lukáš, ja sa vám posnažíme problém vyriešiť

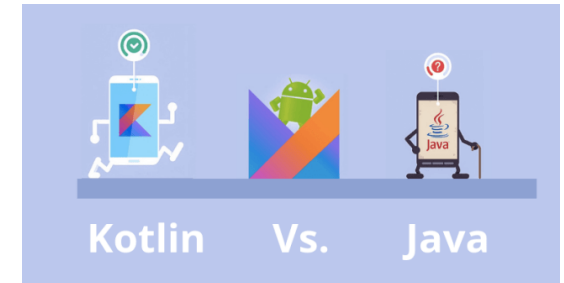
Inštalácia Android Studia:

- SDK Packages: Tools/SDK Manager tab SDK Platforms
- AVD: Android Virtual Device



Android SDK Packages

Tools/SDK Manager tab SDK Platforms



Settings for New Projects

Appearance & Behavior > System Settings > Android SDK

Manager for the Android SDK and Tools used by Android Studio

Android SDK Location: [Edit](#)

SDK Platforms SDK Tools SDK Update Sites

Each Android SDK Platform package includes the Android platform and sources pertaining to an API level by default. Once installed, Android Studio will automatically check for updates. Check "show package details" to display individual SDK components.

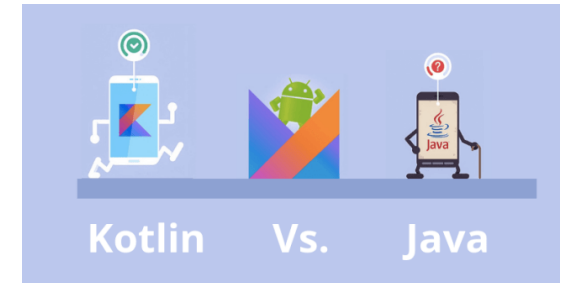
	Name	API Level	Revision	Status
<input type="checkbox"/>	Google Play Intel x86 Atom System Image	29	7	Not installed
<input type="checkbox"/>	Google Play Intel x86 Atom_64 System Image	29	7	Not installed
<input type="checkbox"/>	Android Q Preview			
<input type="checkbox"/>	Android TV Intel x86 Atom System Image	Q	1	Not installed
<input checked="" type="checkbox"/>	Android 9.0 (Pie)			
<input checked="" type="checkbox"/>	Android SDK Platform 28	28	6	Installed
<input checked="" type="checkbox"/>	Sources for Android 28	28	1	Installed
<input type="checkbox"/>	Android TV Intel x86 Atom System Image	28	8	Not installed
<input type="checkbox"/>	China version of Wear OS Intel x86 Atom System Image	28	3	Not installed
<input type="checkbox"/>	Wear OS Intel x86 Atom System Image	28	3	Not installed
<input type="checkbox"/>	Intel x86 Atom System Image	28	4	Not installed
<input type="checkbox"/>	Intel x86 Atom_64 System Image	28	4	Not installed
<input type="checkbox"/>	Google APIs Intel x86 Atom System Image	28	9	Not installed
<input type="checkbox"/>	Google APIs Intel x86 Atom_64 System Image	28	9	Not installed
<input type="checkbox"/>	Google Play Intel x86 Atom System Image	28	8	Not installed
<input type="checkbox"/>	Google Play Intel x86 Atom_64 System Image	28	8	Not installed
<input checked="" type="checkbox"/>	Android 8.1 (Oreo)			
<input checked="" type="checkbox"/>	Android SDK Platform 27	27	3	Installed
<input type="checkbox"/>	Sources for Android 27	27	1	Not installed
<input type="checkbox"/>	Android TV Intel x86 Atom System Image	27	7	Not installed
<input type="checkbox"/>	Intel x86 Atom System Image	27	1	Not installed
<input type="checkbox"/>	Intel x86 Atom_64 System Image	27	1	Not installed
<input type="checkbox"/>	Google APIs Intel x86 Atom System Image	27	9	Not installed
<input checked="" type="checkbox"/>	Google Play Intel x86 Atom System Image	27	3	Installed

☒ Hide Obsolete Packages ☒ Show Package Details

OK Cancel Apply Help

Android SDK Packages

Tools/SDK Manager tab SDK Tools



Settings for New Projects

Appearance & Behavior > System Settings > Android SDK

Manager for the Android SDK and Tools used by Android Studio

Android SDK Location: C:\Users\borovan\AppData\Local\Android\Sdk

SDK Platforms SDK Tools SDK Update Sites

Below are the available SDK developer tools. Once installed, Android Studio will automatically check for updates.
Check "show package details" to display available versions of an SDK Tool.

Name	Version	Status
<input checked="" type="checkbox"/> Android SDK Build-Tools		Update Available: 29.0.2
<input type="checkbox"/> GPU Debugging tools		Not Installed
<input type="checkbox"/> LLDB		Not Installed
<input type="checkbox"/> NDK (Side by side)		Not Installed
<input type="checkbox"/> CMake		Not Installed
<input type="checkbox"/> Android Auto API Simulators	1	Not installed
<input type="checkbox"/> Android Auto Desktop Head Unit emulator	1.1	Not installed
<input checked="" type="checkbox"/> Android Emulator	29.0.11	Installed
<input checked="" type="checkbox"/> Android SDK Platform-Tools	29.0.2	Installed
<input checked="" type="checkbox"/> Android SDK Tools	26.1.1	Installed
<input type="checkbox"/> Documentation for Android SDK	1	Not installed
<input type="checkbox"/> Google Play APK Expansion library	1	Not installed
<input checked="" type="checkbox"/> Google Play Instant Development SDK	1.8.0	Installed
<input type="checkbox"/> Google Play Licensing Library	1	Not installed
<input checked="" type="checkbox"/> Google Play services	49	Installed
<input checked="" type="checkbox"/> Google USB Driver	11	Installed
<input type="checkbox"/> Google Web Driver	2	Not installed
<input checked="" type="checkbox"/> Intel x86 Emulator Accelerator (HAXM installer)	7.5.2	Installed

☒ Hide Obsolete Packages ☐ Show Package Details

OK Cancel Apply Help

Android Virtual Device

Tools/AVD manager

Nakonfigurujte si AVD zodpovedajúci vášmu zariadeniu

alebo si vyberte zo
zoznamu

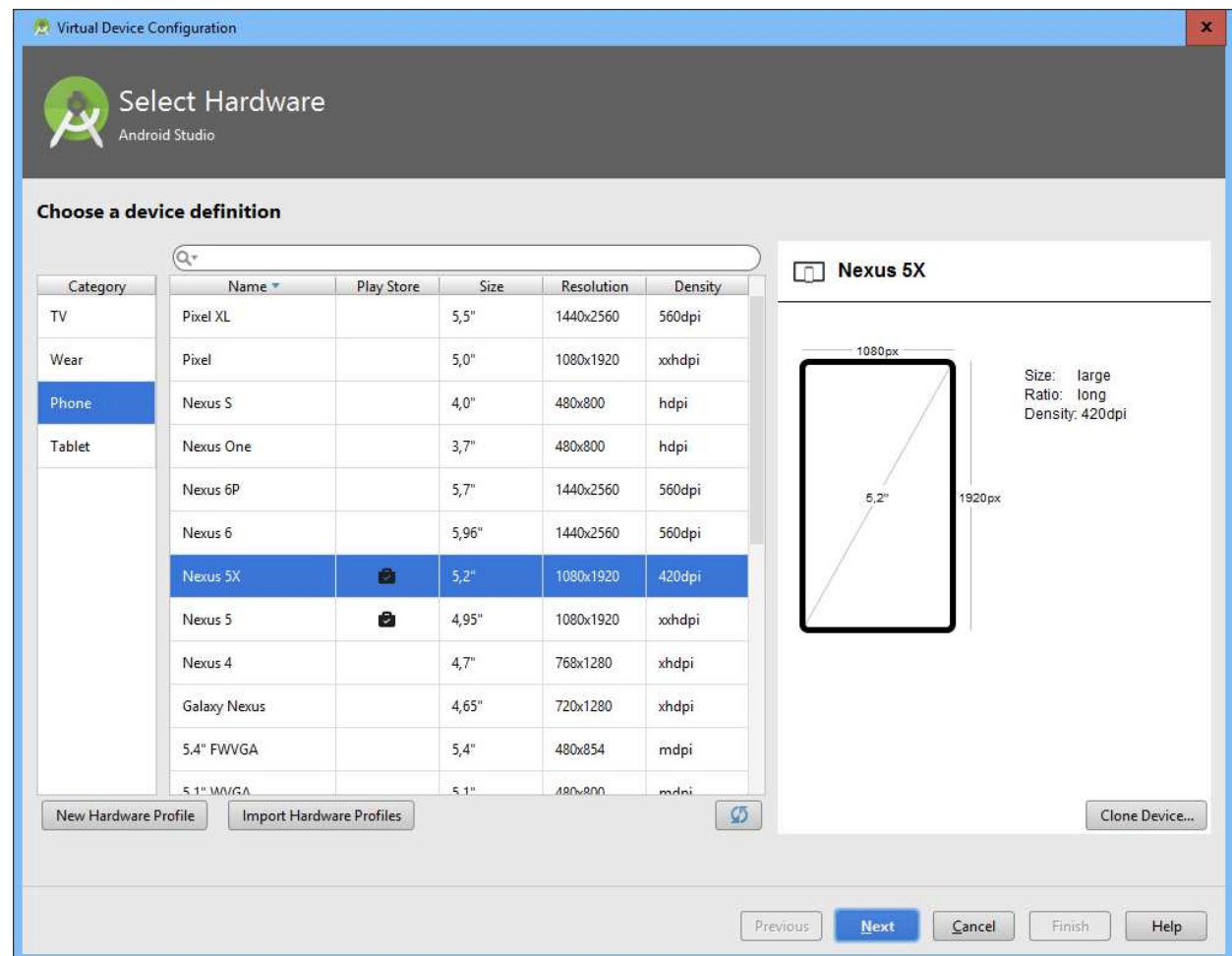
predvolených,

- Create Device
- modifikujte

nastavenia

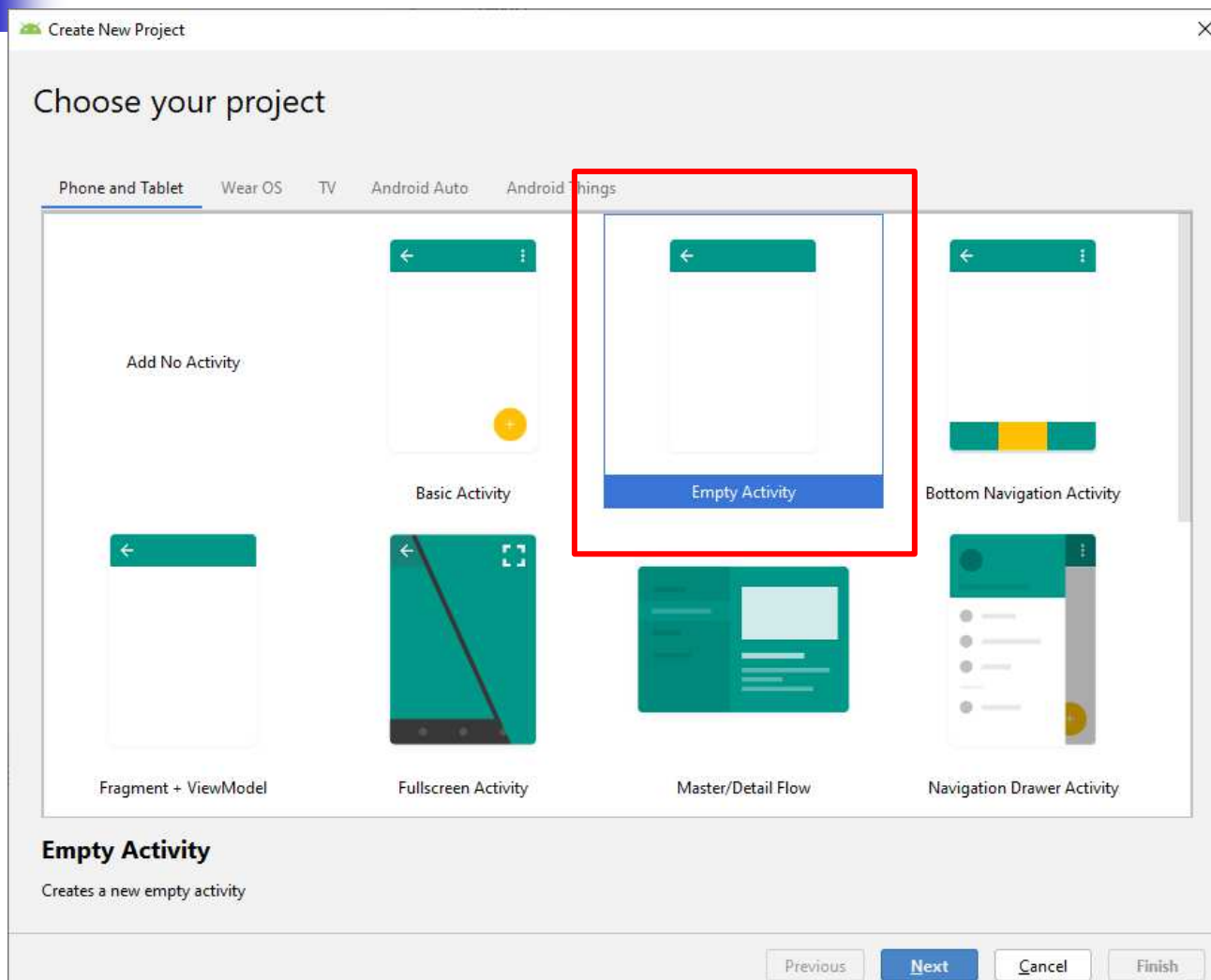
podľa vášho

zariadenia



Nový projekt

(File/New/New Android Project)



Nový projekt

(File/New/New Android Project)

Create New Project

Configure your project

Name

My Application

Package name

com.example.myapplication

Save location

D:\borovan\workspace_AndroidStudio\MyApplication4

Language

Kotlin

Minimum API level

API 15: Android 4.0.3 (IceCreamSandwich)

i Your app will run on approximately **100%** of devices.

[Help me choose](#)

☐ This project will support instant apps

☒ Use androidx.* artifacts

Empty Activity

Creates a new empty activity

Minimum API level

API 29: Android 10.0 (Q)

i Your app will run on **< 1%** of devices.

[Help me choose](#)

Previous

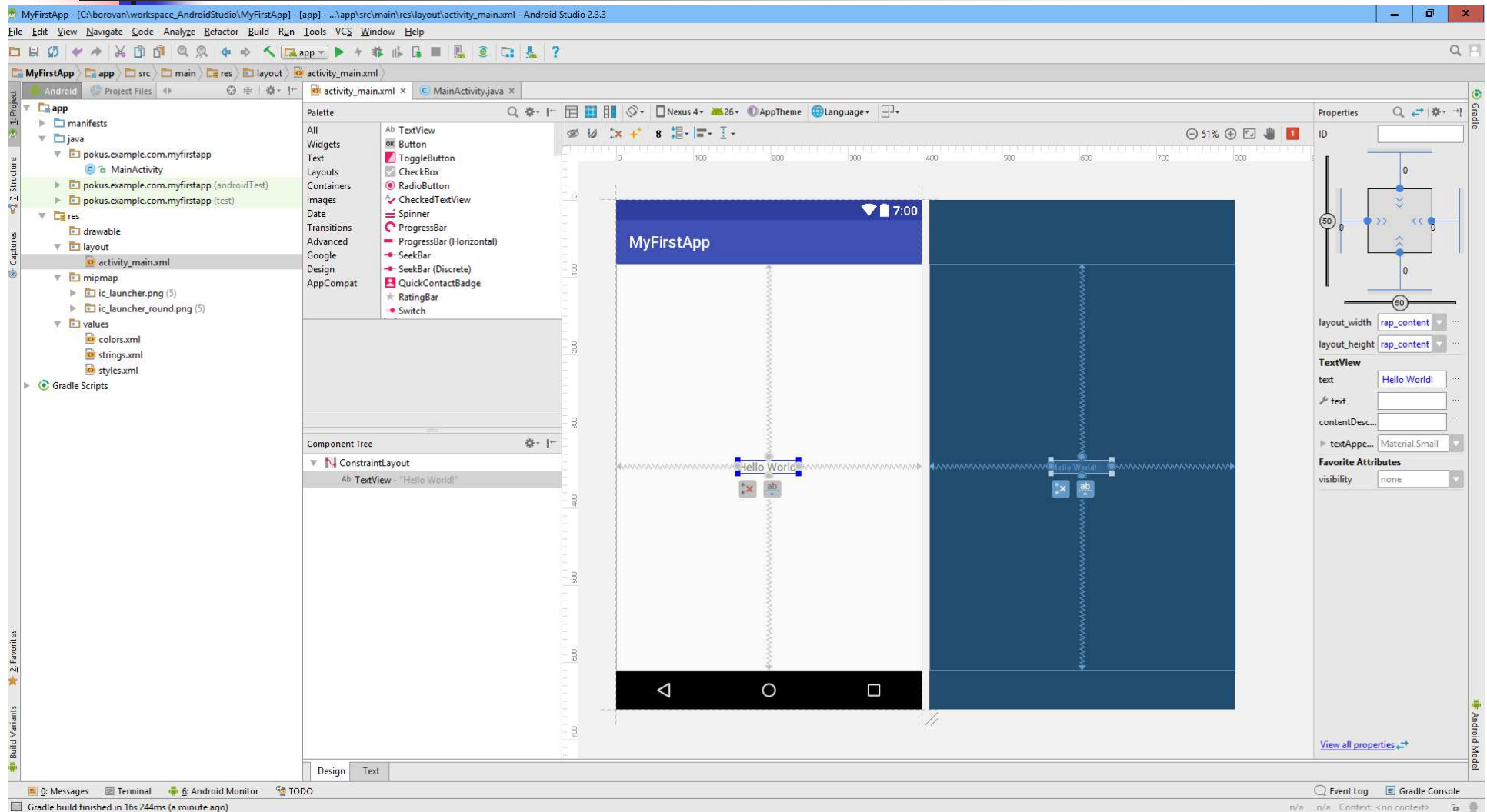
Next

Cancel

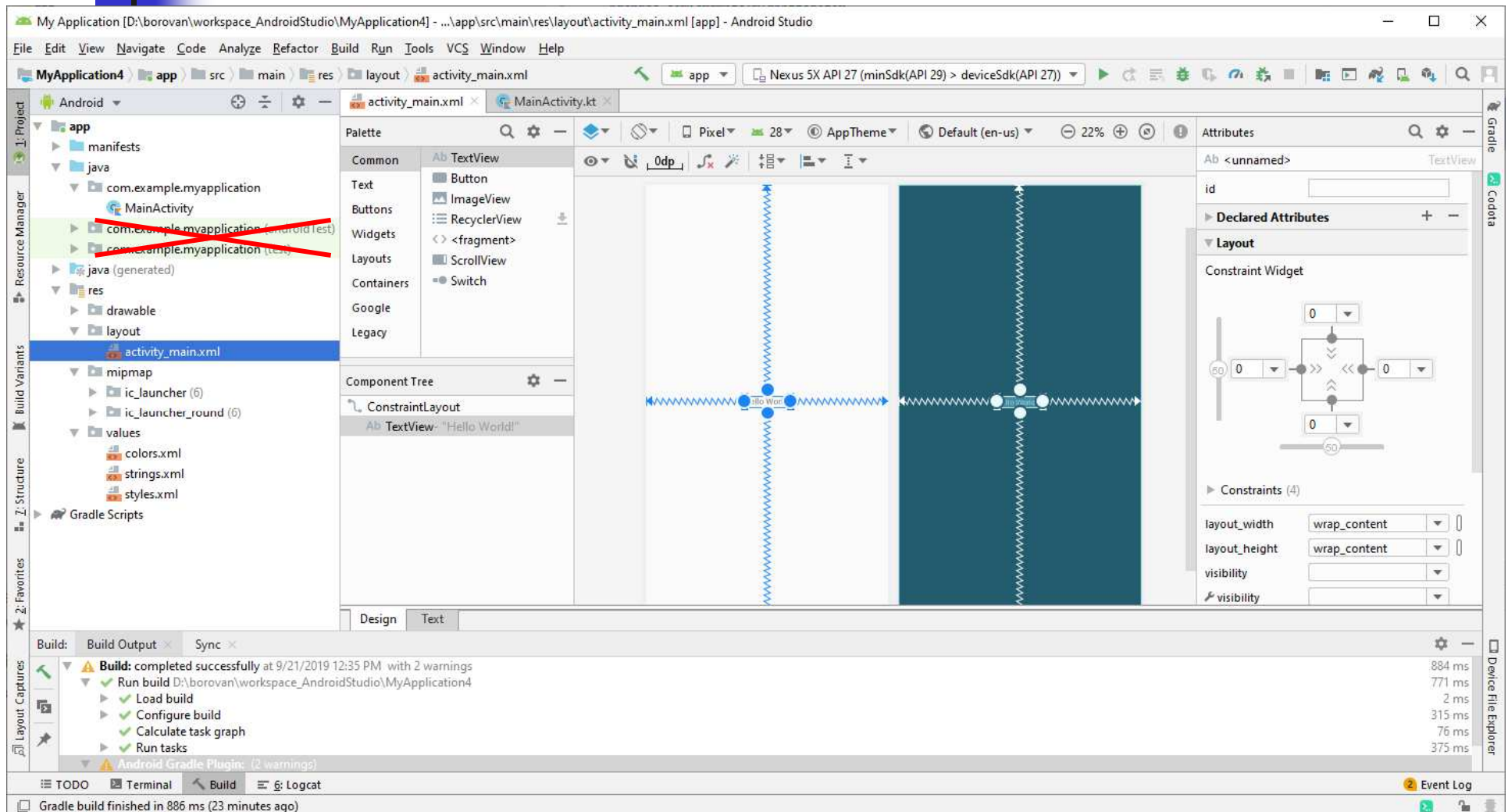
Finish

ANDROID PLATFORM VERSION	API LEVEL	CUMULATIVE DISTRIBUTION
4.0 Ice Cream Sandwich	15	
4.1 Jelly Bean	16	99.6%
4.2 Jelly Bean	17	98.1%
4.3 Jelly Bean	18	95.9%
4.4 KitKat	19	95.3%
5.0 Lollipop	21	85.0%
5.1 Lollipop	22	80.2%
6.0 Marshmallow	23	62.6%
7.0 Nougat	24	37.1%
7.1 Nougat	25	14.2%
8.0 Oreo	26	6.0%
8.1 Oreo	27	1.1%

Nový projekt (java)



Nový projekt (kotlin)



The screenshot displays the Android Studio interface for a new project named "MyApplication4". The main editor shows the "activity_main.xml" file in Design mode, featuring a dark blue background with a white "Hello World!" text view centered. The left sidebar contains the Project, Resource Manager, Build Variants, Z Structure, Favorites, and Layout Captures panels. The right sidebar includes the Attributes panel, which shows the "id" attribute and declared attributes for the selected text view. The bottom status bar indicates a successful build at 9/21/2019 12:35 PM with 2 warnings. The bottom toolbar shows the TODO, Terminal, Build, and Logcat buttons.

My Application [D:\borovan\workspace_AndroidStudio\MyApplication4] - ...app\src\main\res\layout\activity_main.xml [app] - Android Studio

File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help

MyApplication4 app src main res layout activity_main.xml app Nexus 5X API 27 (minSdk(API 29) > deviceSdk(API 27))

Android app

manifests

java

com.example.myapplication

MainActivity

~~com.example.myapplication (androidTest)~~

~~com.example.myapplication (test)~~

java (generated)

res

drawable

layout

activity_main.xml

mipmap

ic_launcher (5)

ic_launcher_round (5)

values

colors.xml

strings.xml

styles.xml

Gradle Scripts

Palette

Common

TextView

Button

ImageView

RecyclerView

<> <fragment>

ScrollView

Switch

Text

Buttons

Widgets

Layouts

Containers

Google

Legacy

Component Tree

ConstraintLayout

Ab TextView: "Hello World!"

Design Text

Attributes

Ab <unnamed> TextView

id

Declared Attributes

Layout

Constraint Widget

Constraints (4)

layout_width wrap_content

layout_height wrap_content

visibility

visibility

Build: Build Output Sync

Build: completed successfully at 9/21/2019 12:35 PM with 2 warnings

Run build D:\borovan\workspace_AndroidStudio\MyApplication4

Load build

Configure build

Calculate task graph

Run tasks

Android Gradle Plugin: (2 warnings)

884 ms

771 ms

2 ms

315 ms

76 ms

375 ms

TODO Terminal Build Logcat

Gradle build finished in 886 ms (23 minutes ago)

Event Log

Pýtajte sa kým nedostanete



A screenshot of an Android emulator. The top status bar shows various icons and the time 9:54. Below it is a blue header bar with the text 'MyFirstApp'. The main content area is white and displays 'Hello World!'. On the left side of the emulator, there is a vertical toolbar with icons for power, volume, rotation, camera, zoom, and navigation. Below the emulator, there is a black bar with three white navigation icons (back, home, recent apps).

Emulátor

—

- je pomalý, dlho bootuje
- neposkytuje všetky služby ako konkrétne zariadenie
- o senzoch ani nehovorí
- dá sa použiť na začiatku

+

- má ho každý, nič nestojí
- dokonca má viac platforiem
- netreba sync-driver

Ked' už beží, tak ho nezabíjajte !



Čo dostaneme zadarmo

```
package pokus.example.com.myfirstapp;

import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;

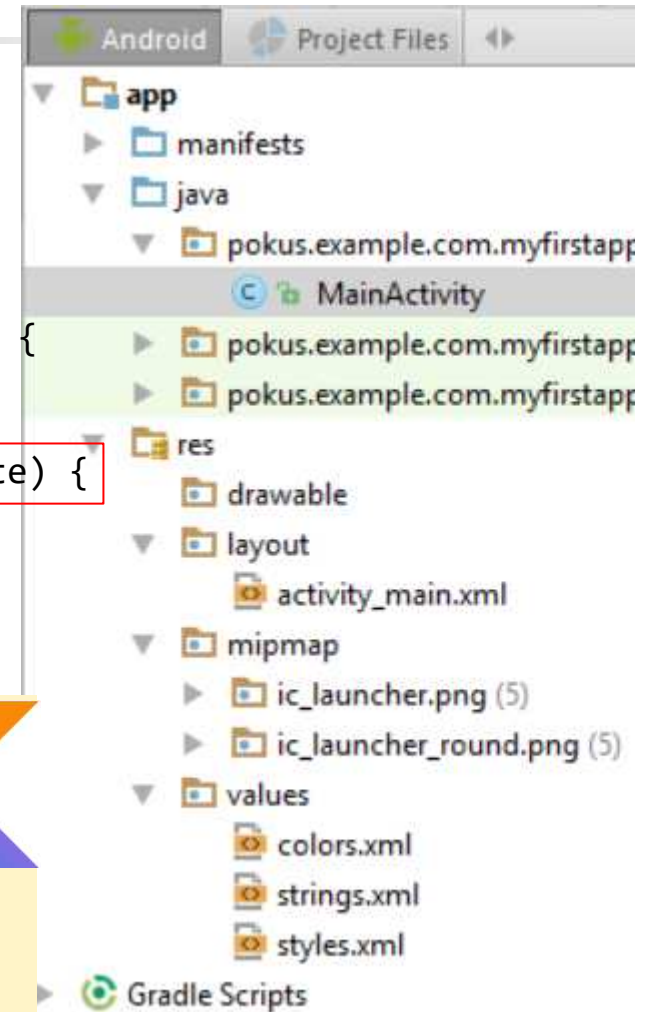
public class MainActivity extends AppCompatActivity {

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

```
import android.support.v7.app.AppCompatActivity
import android.os.Bundle

class MainActivity : AppCompatActivity() {

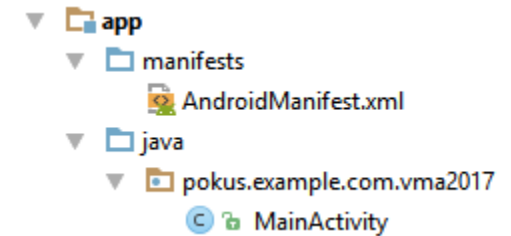
    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        setContentView(R.layout.activity_main)
    }
}
```



Project: [MyFirstApp2.zip](#)

AndroidManifest.xml

(automaticky vygenerovaný súbor aplikácie)



```
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="pokus.example.com.myfirstapp">
```

```
<application
```

```
    android:allowBackup="true"
```

```
    android:icon="@mipmap/ic_launcher"
```

```
    android:label="@string/app_name"
```

```
    android:roundIcon="@mipmap/ic_launcher_round"
```

```
    android:supportsRtl="true"
```

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

```
        <activity android:name=".MainActivity">
```

```
            <intent-filter>
```

```
                <action android:name="android.intent.action.MAIN" />
```

```
                <category android:name="android.intent.category.LAUNCHER" />
```

```
            </intent-filter>
```

```
        </activity>
```

```
</application>
```

```
</manifest>
```

referencia na ikonu apky
referencia meno apky





AndroidManifest.xml

(AS-manifest ochudobnel, mnohé veci sa presunuli do build.gradle)

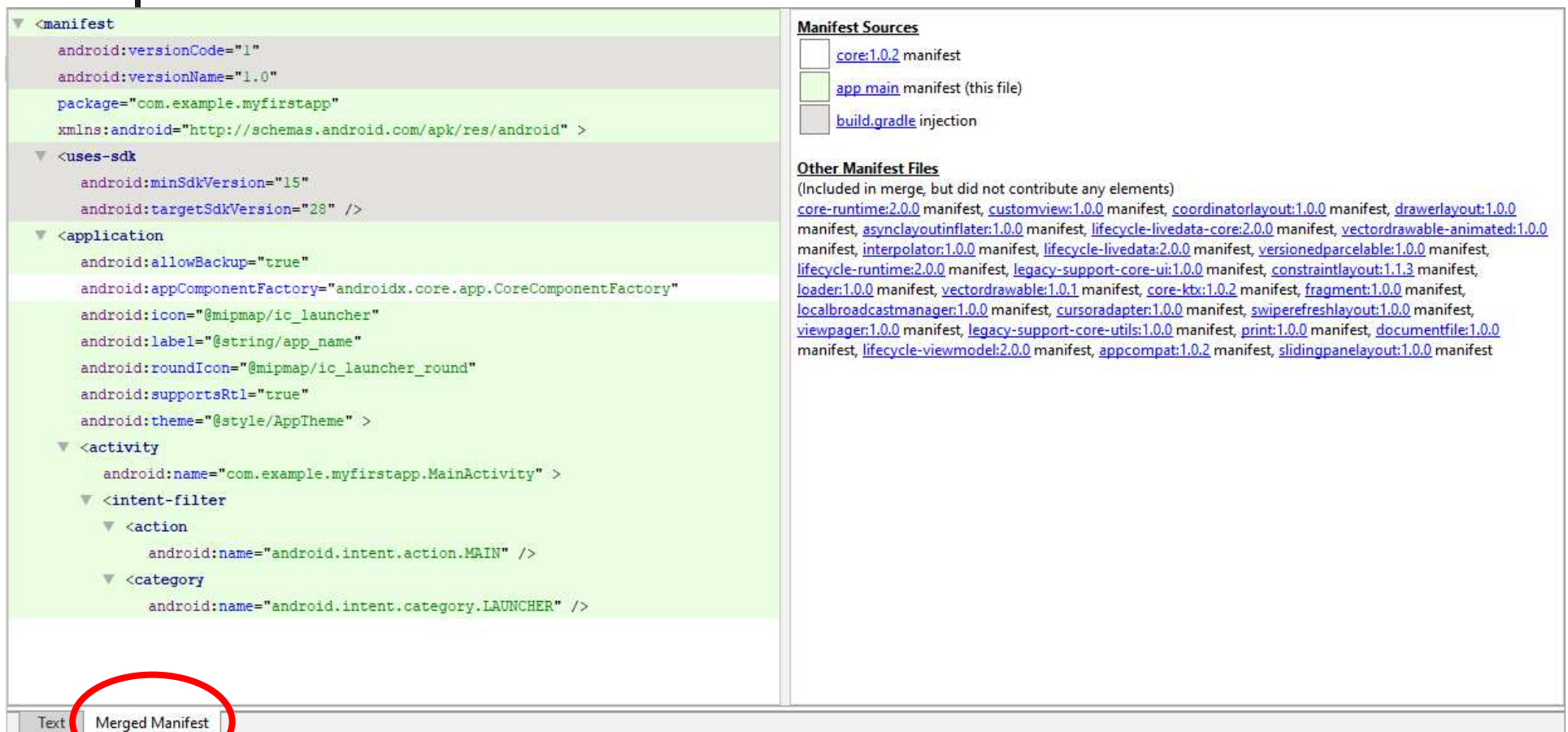
Najhlavnejšie tagy:

- **<uses-sdk** popisuje min./max. SDK a cieľovú verziu SDK
Akú verziu SDK potrebujem pre moju verziu Androidu ?
<http://developer.android.com/guide/topics/manifest/uses-sdk-element.html#ApiLevels>
- **<uses-configuration** a **<uses-feature**
popisujú HW predpoklady na spustenie apky, display, klávesnicu, senzory
- **<uses-supportScreens** popisuje rozlíško HVGA, QVGA, QVGA, WQVGA
- **<uses-permissions** popisuje práva, ktoré apka musí mať schválené
- **<application** je jediná a popisuje ikonu, logo, meno, ... aplikácie
- **<activity** popisujú package, intent, filtre pre aktivitu, môže ich byť viac
- **<service** popisujú aplikácie bežiace na pozadí, tzv. servisy
- **<provider** popisuje Content Provider, napr. lokálnu databázu LiteSQL
- **<receiver** popisuje Broadcast Receiver prijímajúci nejaké Intenty
- **<uses-library** popisuje externé knižnice, napr. Google Maps, ...

viac na: <http://developer.android.com/guide/topics/manifest/manifest-intro.html>

MergedManifest

(spája AndroidManifest a build.gradle)



```
<manifest
  android:versionCode="1"
  android:versionName="1.0"
  package="com.example.myfirstapp"
  xmlns:android="http://schemas.android.com/apk/res/android" >

  <uses-sdk
    android:minSdkVersion="15"
    android:targetSdkVersion="28" />

  <application
    android:allowBackup="true"
    android:appComponentFactory="androidx.core.app.CoreComponentFactory"
    android:icon="@mipmap/ic_launcher"
    android:label="@string/app_name"
    android:roundIcon="@mipmap/ic_launcher_round"
    android:supportsRtl="true"
    android:theme="@style/AppTheme" >

    <activity
      android:name="com.example.myfirstapp.MainActivity" >
      <intent-filter>
        <action
          android:name="android.intent.action.MAIN" />
        <category
          android:name="android.intent.category.LAUNCHER" />
      </intent-filter>
    </activity>
  </application>
</manifest>
```

Manifest Sources

- ☐ [core:1.0.2](#) manifest
- ☒ [app main](#) manifest (this file)
- ☐ [build.gradle](#) injection

Other Manifest Files
(Included in merge, but did not contribute any elements)

[core-runtime:2.0.0](#) manifest, [customview:1.0.0](#) manifest, [coordinatorlayout:1.0.0](#) manifest, [drawerlayout:1.0.0](#) manifest, [asynclayoutinflater:1.0.0](#) manifest, [lifecycle-livedata-core:2.0.0](#) manifest, [vectordrawable-animated:1.0.0](#) manifest, [interpolator:1.0.0](#) manifest, [lifecycle-livedata:2.0.0](#) manifest, [versionedparcelable:1.0.0](#) manifest, [lifecycle-runtime:2.0.0](#) manifest, [legacy-support-core-ui:1.0.0](#) manifest, [constraintlayout:1.1.3](#) manifest, [loader:1.0.0](#) manifest, [vectordrawable:1.0.1](#) manifest, [core-ktx:1.0.2](#) manifest, [fragment:1.0.0](#) manifest, [localbroadcastmanager:1.0.0](#) manifest, [cursoradapter:1.0.0](#) manifest, [swiperefreshlayout:1.0.0](#) manifest, [viewpager:1.0.0](#) manifest, [legacy-support-core-utils:1.0.0](#) manifest, [print:1.0.0](#) manifest, [documentfile:1.0.0](#) manifest, [lifecycle-viewmodel:2.0.0](#) manifest, [appcompat:1.0.2](#) manifest, [slidingpanelayout:1.0.0](#) manifest

Text | **Merged Manifest**



build.gradle

(konfiguračný súbor pre gradle)

- build tool, podobne ako make, maven

```
apply plugin: 'com.android.application'  
apply plugin: 'kotlin-android'  
apply plugin: 'kotlin-android-extensions'
```

```
android {  
    compileSdkVersion 28  
    defaultConfig {  
        applicationId "com.example.myfirstapp"  
        minSdkVersion 15  
        targetSdkVersion 28  
        versionCode 1  
        versionName "1.0"  
        testInstrumentationRunner "androidx.test.runner.AndroidJUnitRunner"  
    }  
    ...  
}
```

```
dependencies {  
    implementation fileTree(dir: 'libs', include: ['*.jar'])  
    implementation "org.jetbrains.kotlin:kotlin-stdlib-jdk7:$kotlin_version"  
    implementation 'androidx.appcompat:appcompat:1.0.2'  
    ...  
}
```

referencia meno apky

```
<resources>  
  <string name="app_name">MyFirstApp</string>  
</resources>
```

Resources/Values

- drawables - obrázky v rôznych rozlíšeníach (ldpi, mdpi, hdpi, xhdpi, xxhdpi)
- layouts – rozloženia komponentov na aktivitách (bude dnes)
- menus – pre aktivity (bude neskôr)
- values (strings.xml, colors.xml, styles.xml ...)

```
<?xml version="1.0" encoding="utf-8"?>  
<resources>  
  <color name="colorPrimary">#3F51B5</color>  
  <color name="colorPrimaryDark">#303F9F</color>  
  <color name="colorAccent">#FF4081</color>
```

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

Bud' kreatívny

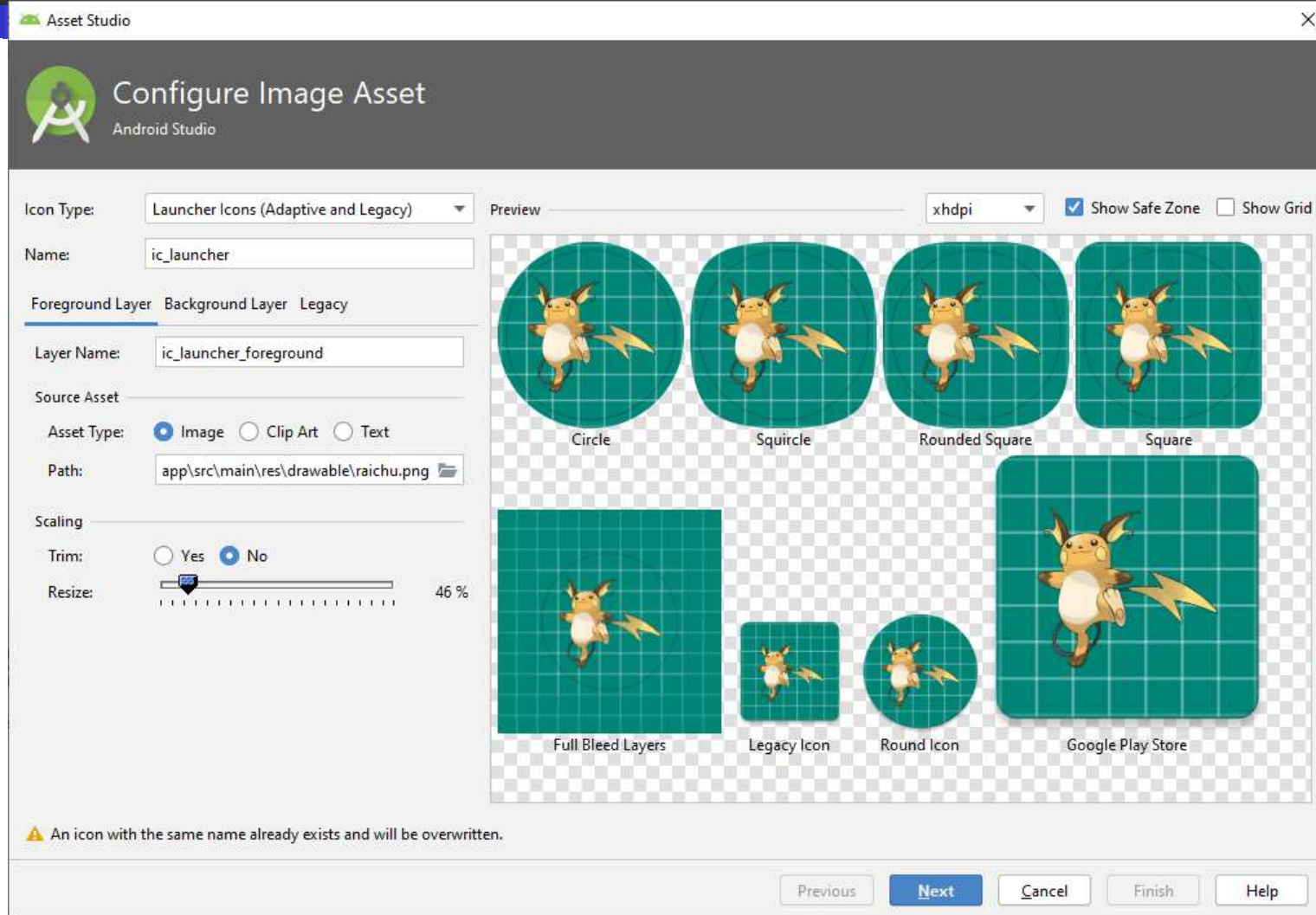
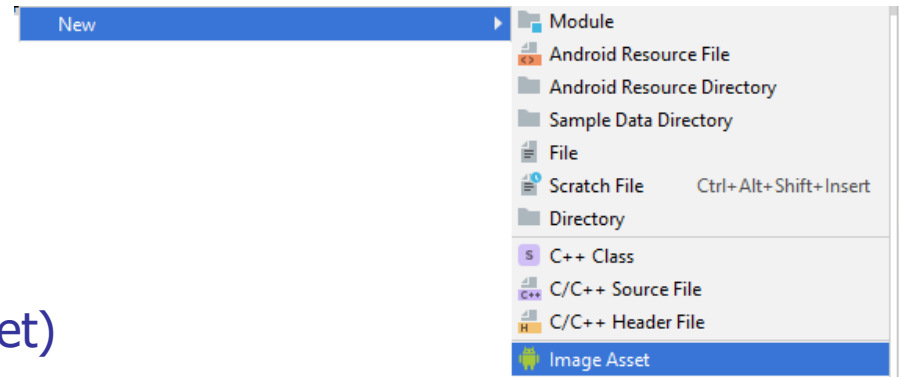
(aspoň pri ic_launcher ikone)

Je hrozné mať v tablete viacero riešení s generickými neosobnými ikonami



Bud' kreatívny

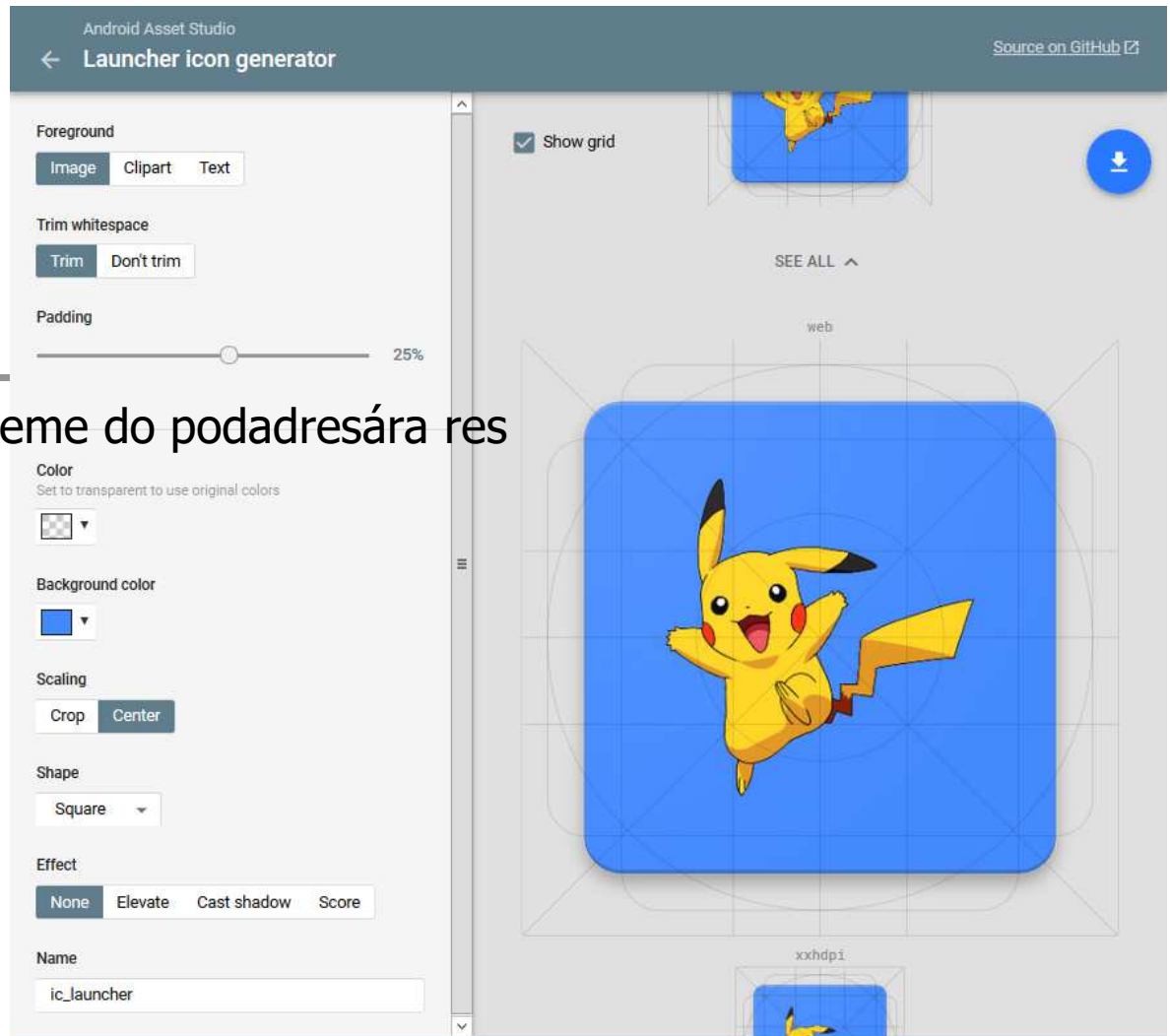
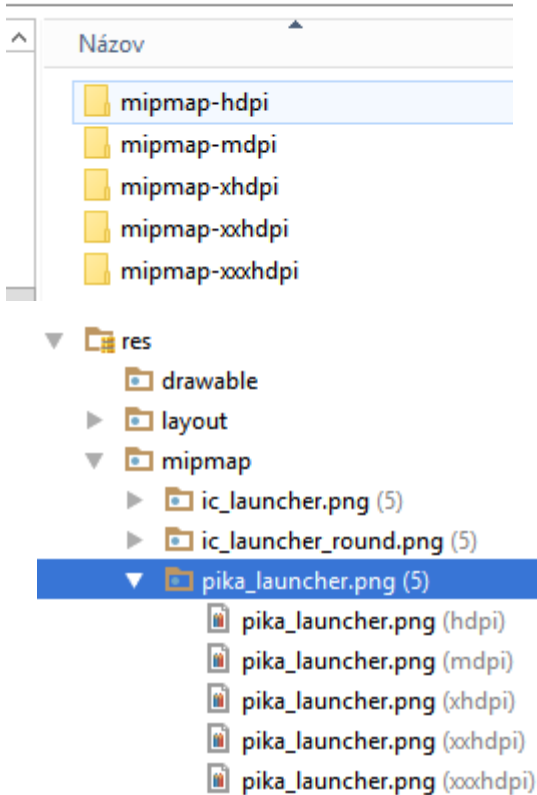
(a použi Asset Studio- New/ImageAsset)



Android Asset Studio Icon generator

výsledok priamo nakopírujeme do podadresára res
Ikony/obrázky sa
sa objaví v projekte

Stiahnuté súbory > pika_launcher > res >



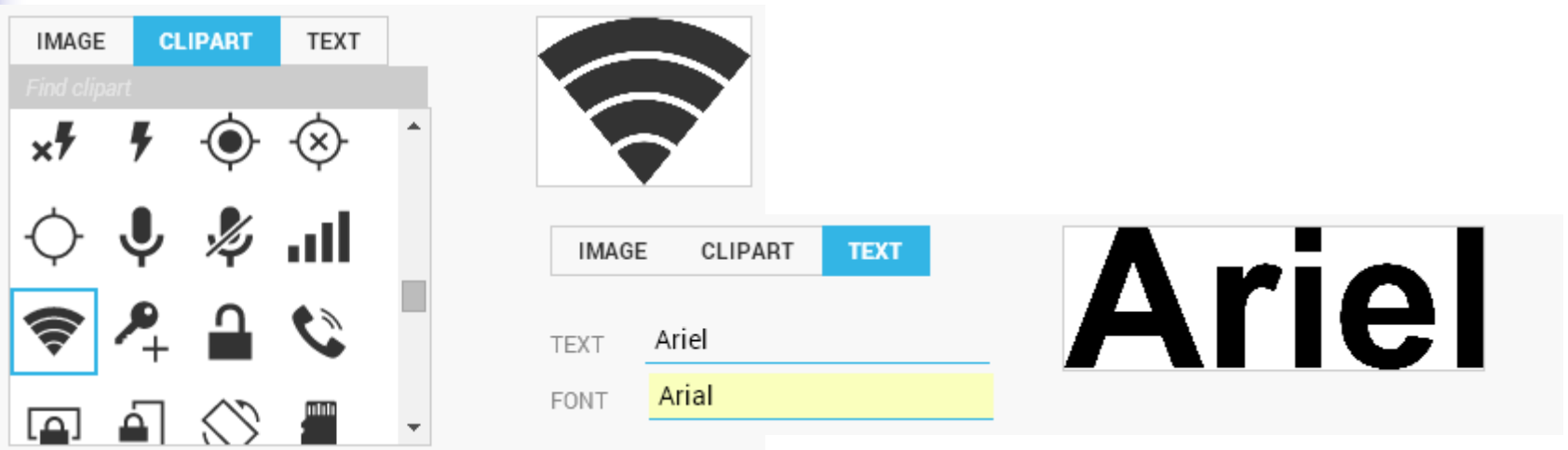
```
5 <application
6     android:allowBackup="true"
7     android:icon="@mipmap/pika_launcher"
8     android:label="@mipmap/pika_launcher"
9     android:roundIcon="@mipmap/ic_launcher_round"
10    android:supportRtl="true"
```

Project:Pikas.zip, Pikas2.zip

Android Asset Studio

(jedna z alternatív)

<https://romannurik.github.io/AndroidAssetStudio/>



- .png, .jpg, .bmp, ...
- cliparty
- texty



Resources/Drawables/Mipmap

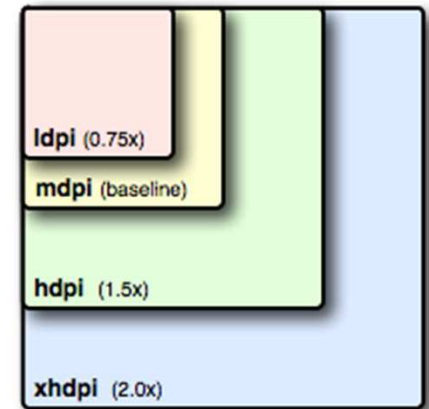
(ikona - viacero rozlíšení)

http://developer.android.com/guide/practices/screens_support.html



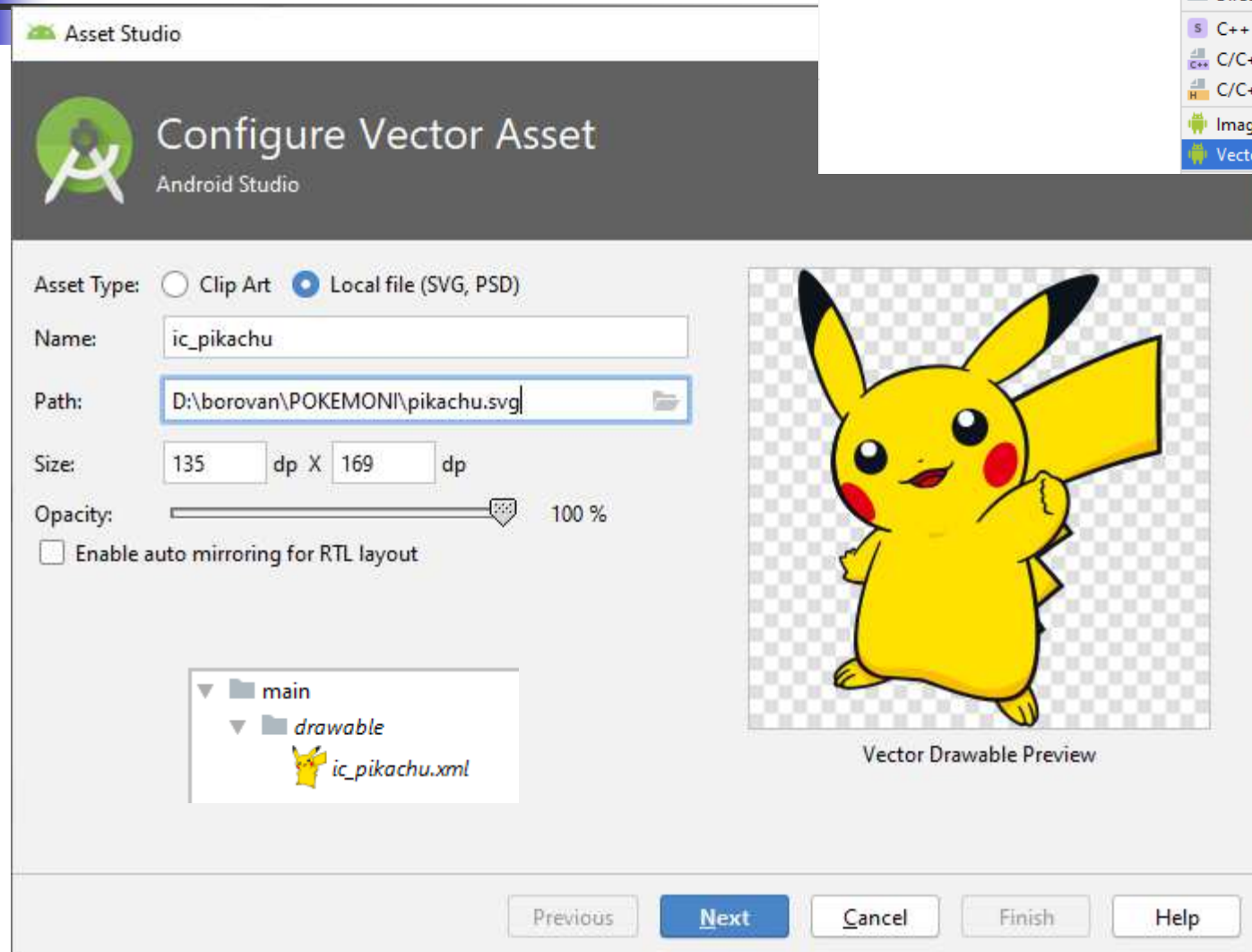
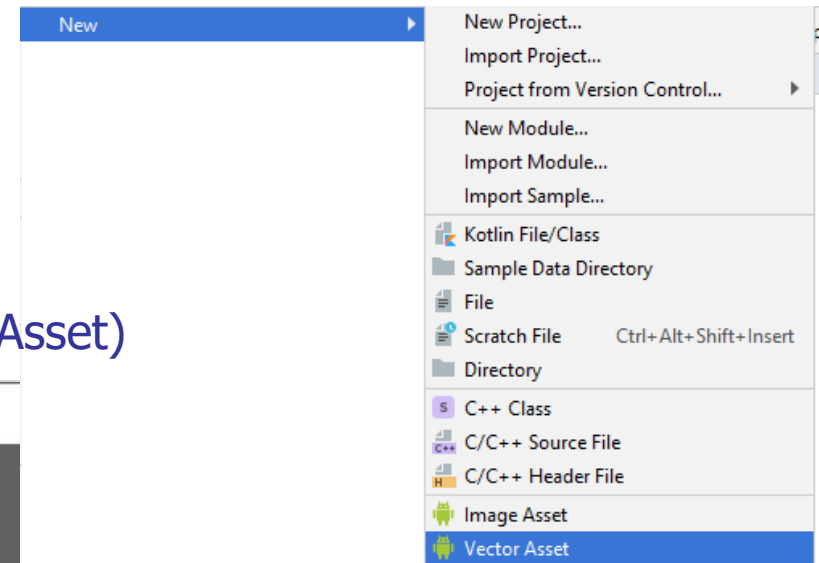
pomer l/m/h/xh/x²h/x³h-dpi 3:4:6:8:12:16 - geom.postupnosť s koef. $\sqrt{2}$

- 36x36 for low-density (LDPI = ~ 120 dpi)
- 48x48 for medium-density (MDPI = ~ 160 dpi)
- 72x72 for high-density (HDPI = ~ 240 dpi)
- 96x96 for extra high-density (XHDPI = ~ 320 dpi)
- 144x144 for extra² high-density (XXHDPI = ~ 480 dpi)
- 192x192 for extra³ high-density (XXXHDPI = ~ 640 dpi)



Bud' kreativny

(a použi Vector Asset Studio- New/VectorAsset)





Resources/Values

- string

```
<string name="app_name">YourFirstHello</string>
```

- color

```
<color name="transparent_green">#7700FF00</color>
```

- dimensions

```
<dimen name="absolutLarge">144dp</dimen>
```

- style

```
<style name="myStyle">
```

```
    <item name="android:textSize">12sp</item>
```

```
    <item name="android:textColor">#FF00FF</item>
```

```
</style>
```

px = Pixels

in = Inches

mm = Millimeters

pt = Points, 1/72 of an inch

sp = Scale - Independent Pixels – používame pre veľkosť fontu

dp = Density - Independent Pixels – používame pre všetko ostatné



Resources/Values

- array-string/integer

```
<string-array name="poker">  
  <item>full-hand</item>  
  <item>postupka</item>  
  <item>royal</item>  
</string-array>
```

```
<integer-array name="coins">  
  <item>1</item>  
  <item>2</item>  
  <item>5</item>  
  <item>10</item>  
  <item>20</item>  
</integer-array>
```

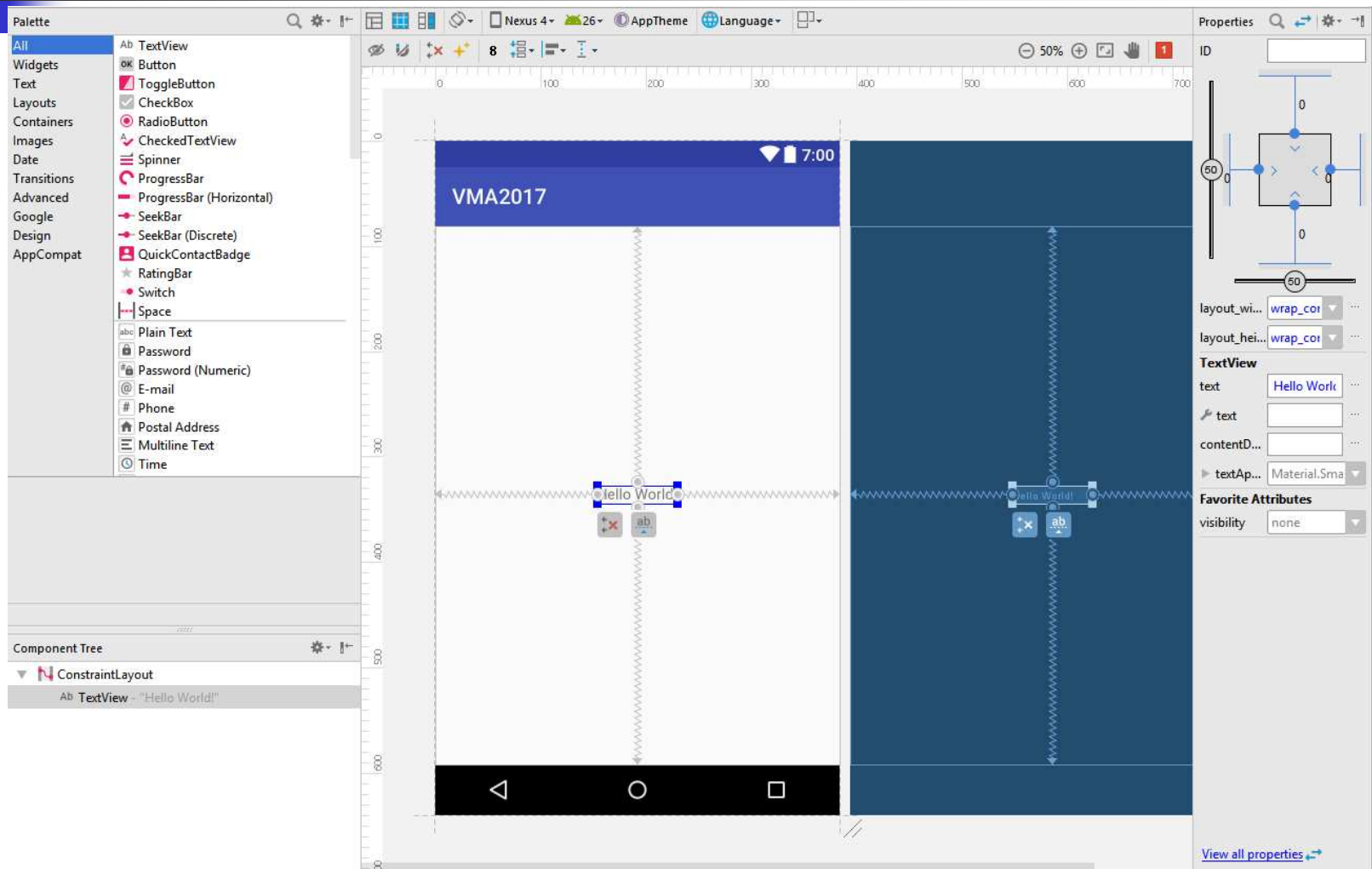
- plurals (quantity strings)

```
<plurals name="man">  
  <item quantity="one">man</item>  
  <item quantity="many">men</item>  
  <item quantity="zero">paradis</item>  
</plurals>
```

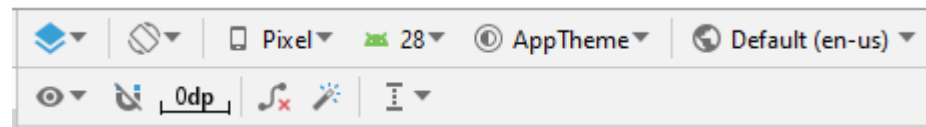
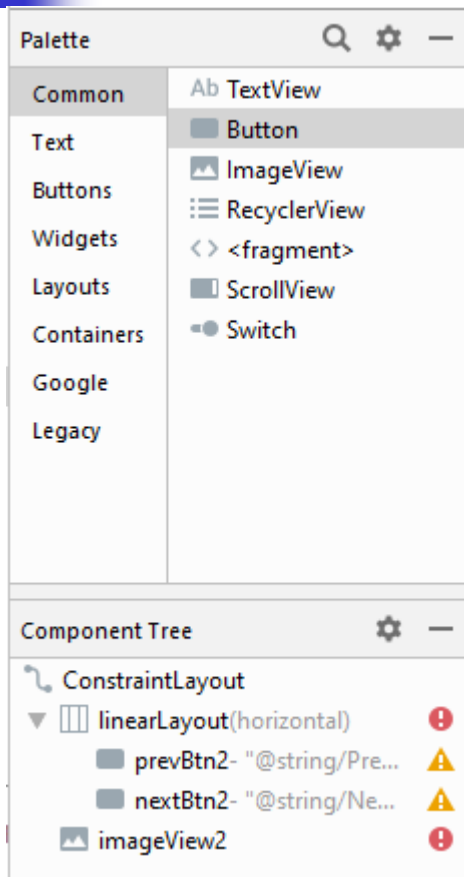
Resources/Layout

(Design View)

Konvencia:
MainActivity[.kt/.java]
má layout
activity_**main**.xml



Layout Manager

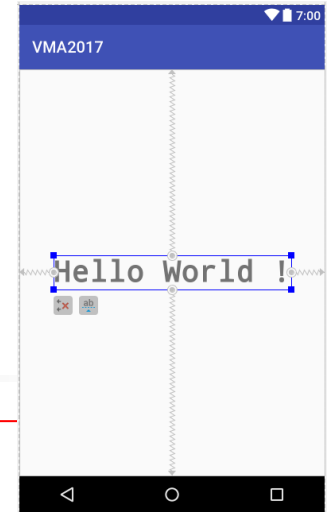


- Design/Blueprint/Design+Blueprint
- Layout: Landscape/Portrait/...
- Pixel: AVD/Pixel2/Pixel#
- API Level: 26/27/28/...
- AppTheme :
- Default (en-us) : lokalizácie do rôznych jazykov
- : warnings, errors

3 Warnings 2 Errors		
Message		Source
▶ Missing Constraints in ConstraintLayout		linearLayout <LinearLayout>
▶ Missing Constraints in ConstraintLayout		imageView2 <ImageView>
▶ Button should be borderless		PrevBtn2 <Button>
▶ Button should be borderless		button2 <Button>
▶ Image without `contentDescription`		imageView2 <ImageView>

Resources/Layout

(Text View)



```
<android.support.constraint.ConstraintLayout
```

```
    xmlns:android="http://schemas.android.com/apk/res/android"
```

```
    xmlns:app="http://schemas.android.com/apk/res-auto"
```

```
    xmlns:tools="http://schemas.android.com/tools"
```

```
    android:layout_width="match_parent"
```

```
    android:layout_height="match_parent"
```

```
    tools:context="pokus.example.com.vma2017.MainActivity">
```

*wrap_content
fill_parent=
match_parent*

```
        <TextView
```

```
            android:layout_width="wrap_content"
```

```
            android:layout_height="wrap_content"
```

```
            android:fontFamily="monospace"
```

```
            android:text="Hello World!"
```

```
            android:textSize="36sp"
```

```
            android:textStyle="bold"
```

```
            app:layout_constraintBottom_toBottomOf="parent"
```

```
            app:layout_constraintLeft_toLeftOf="parent"
```

```
            app:layout_constraintRight_toRightOf="parent"
```

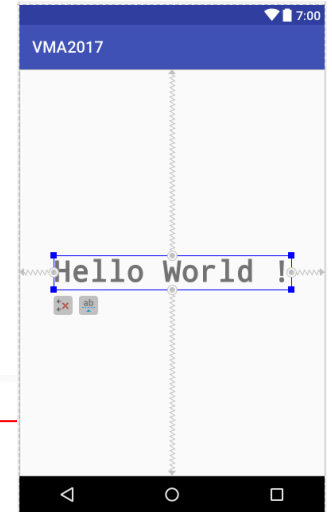
```
            app:layout_constraintTop_toTopOf="parent" />
```

```
</android.support.constraint.ConstraintLayout>
```

Bad style

Resources/Layout

(Text View)



```
<android.support.constraint.ConstraintLayout
```

```
    xmlns:android="http://schemas.android.com/apk/res/android"
```

```
    xmlns:app="http://schemas.android.com/apk/res-auto"
```

```
    xmlns:tools="http://schemas.android.com/tools"
```

```
    android:layout_width="match_parent"
```

```
    android:layout_height="match_parent"
```

```
    tools:context="pokus.example.com.vma2017.MainActivity">
```

wrap_content
fill_parent
match_parent

```
        <TextView
```

```
            android:layout_width="wrap_content"
```

```
            android:layout_height="wrap_content"
```

```
            android:fontFamily="monospace"
```

```
            android:text="@string/IntroString"
```

```
            android:textSize="@dimen/reallyBigFont"
```

```
            android:textStyle="bold"
```

```
            app:layout_constraintBottom_toBottomOf="parent"
```

```
            app:layout_constraintLeft_toLeftOf="parent"
```

```
            app:layout_constraintRight_toRightOf="parent"
```

```
            app:layout_constraintTop_toTopOf="parent" />
```

```
</android.support.constraint.ConstraintLayout>
```

```
        <resources>
```

```
            <string name="app_name">VMA2017</string>
```

```
            <string name="IntroString">Hello World</string>
```

```
        </resources>
```

```
        <resources>
```

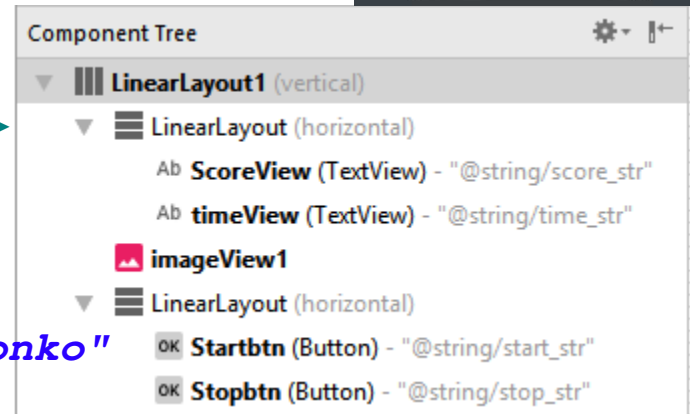
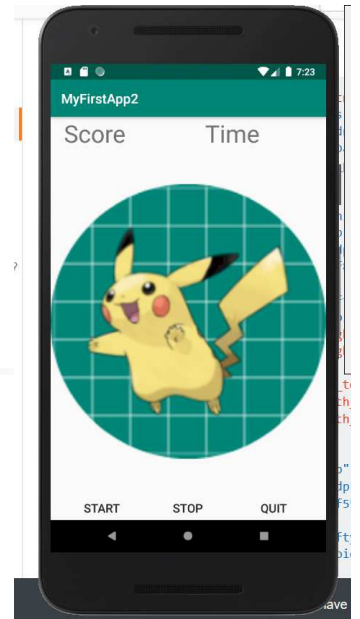
```
            <dimen name="reallyBigFont">30dp</dimen>
```

```
        </resources>
```


Ako by to malo vyzerat'

```
<LinearLayout
    <TextView
        android:id="@+id/ScoreView"
        android:text="@string/score_str"/>
    <TextView
        android:id="@+id/timeView"
        android:text="@string/time_str" />
</LinearLayout>
<ImageView
    android:id="@+id/imageView1"
    android:contentDescription="@string/dronko"
    android:src="@drawable/ic_launcher" />
<LinearLayout
    <Button
        android:id="@+id/Startbtn"
        android:text="@string/start_str" />
    <Button
        android:id="@+id/Stopbtn"
        android:text="@string/stop_str" />
```

Žiadne warnings



zjednodušené pre
účely slajdu

Project: [MyFirstApp22.zip](#)



Logovanie

Tri najbežnejšie spôsoby:

- Log
- Toast
- Snackbar – to chce pridať závislosť do build.gradle

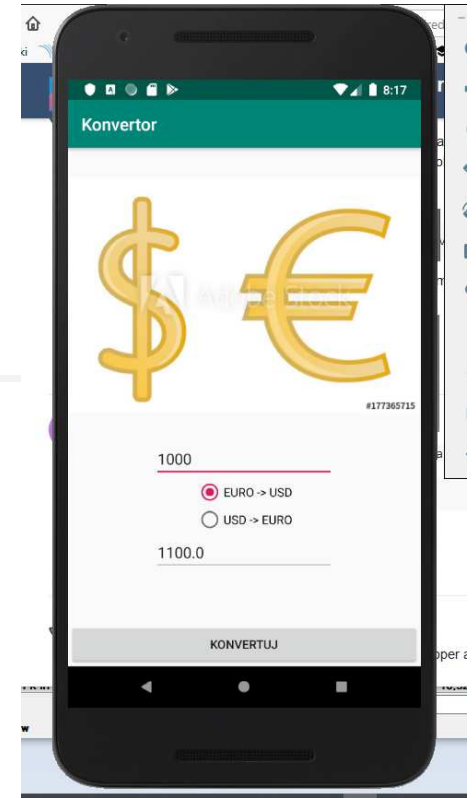
```
dependencies {  
    implementation 'com.android.support.design:28.0.0'  
    import com.google.android.material.snackbar.Snackbar  
  
    prevBtn2.setOnClickListener({  
        Toast.makeText(this, "prev...", Toast.LENGTH_SHORT).show()  
  
        Log.d(TAG, "prev...")  
  
        Snackbar.make(it, "prev...",  
            Snackbar.LENGTH_SHORT).setAction("Action", null).show()  
        ...  
        if (--i < 0) i += imgs.size  
        imageView2.setImageDrawable(imgs[i])  
    })
```

Pikas

```
override fun onCreate(savedInstanceState: Bundle?) {
    super.onCreate(savedInstanceState)
    setContentView(R.layout.activity_main)
    var i = 0
    var imgs = arrayOf(
        ContextCompat.getDrawable(applicationContext,
                                R.drawable.butterfree),
        ...
    )
    imageView2.setImageDrawable(imgs[i])
    prevBtn2.setOnClickListener({
        Toast.makeText(this, "prev...", Toast.LENGTH_SHORT).show()
        if (--i < 0) i += imgs.size
        imageView2.setImageDrawable(imgs[i])
    })
    nextBtn2.setOnClickListener({
        Toast.makeText(this, "next...", Toast.LENGTH_LONG).show()
        i = (++i) % imgs.size
        imageView2.setImageDrawable(imgs[i])
    })
}
```

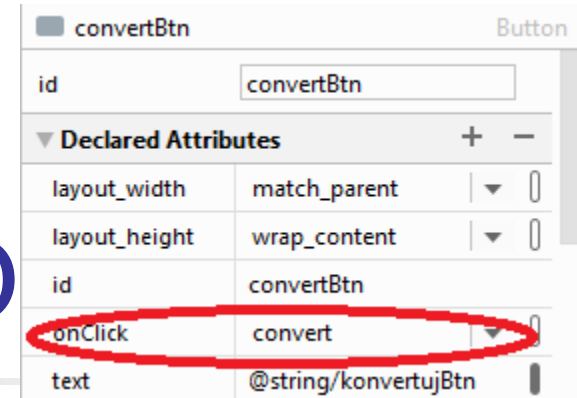


Konvertor EURO USD



```
override fun onCreate(savedInstanceState: Bundle?)
    super.onCreate(savedInstanceState)
    setContentView(R.layout.activity_main)
    convertBtn.setOnClickListener({
        Toast.makeText(this, "convert", Toast.LENGTH_SHORT).show()
        if (inputText.text.isNotEmpty()) {
            val input = inputText.text.toString().toFloat()
            var output = input
            if (eur2usd.isChecked) output = 1.1F * output
            if (usd2eur.isChecked) output = output / 1.1F
            outputText.setText("$output")
        }
    })
}
```

Konvertor EURO USD



// very old fashion

```
val cBtn = findViewById<Button>(R.id.convertBtn)
cBtn.setOnClickListener( { v -> convert(v) } )
```

// old fashion

```
convertBtn.setOnClickListener { v -> convert(v) }
```

```
fun convert(v: View) {
    Toast.makeText(this, "convert", Toast.LENGTH_SHORT).show()
    if (inputText.text.isNotEmpty()) {
        val input = inputText.text.toString().toFloat();
        var output = input
        if (eur2usd.isChecked) output = 1.1F * output
        if (usd2eur.isChecked) output = output / 1.1F
        outputText.setText("$output")
    }
}
```