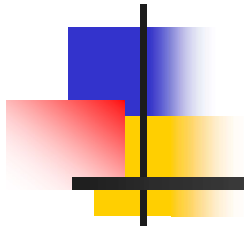


Android Studio (ako začat')

Jazyk Kotlin (ako neskončit')



Peter Borovanský
KAI, I-18

MS-Teams: [2sf3ph4](#), [List](#), [github](#)

borovan 'at' ii.fmph.uniba.sk

Vývojové platformy

(pre natívne appky)



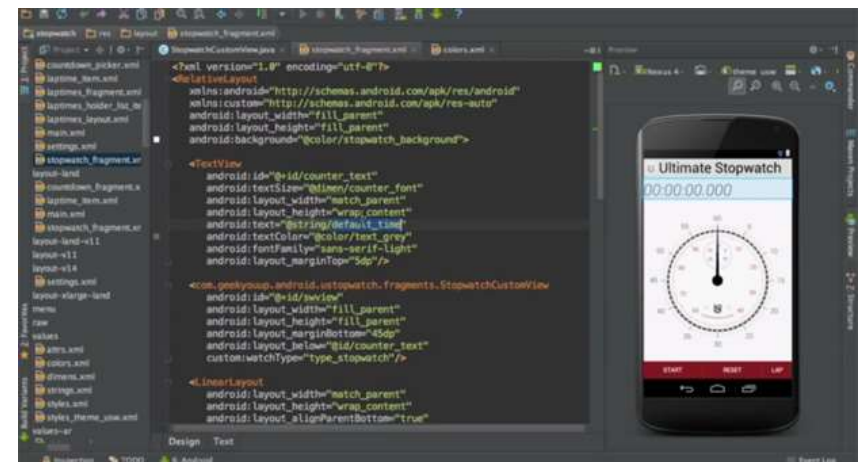
- A.I.D.E. – Android IDE on Android
Java+Android SDK/ C/C++ Android NDK
<https://play.google.com/store/apps/details?id=com.aide.ui&hl=sk>

- 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 ☹



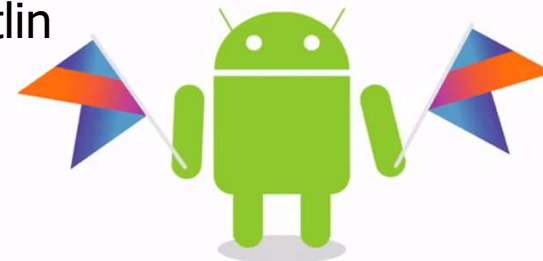
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v bratislave

Používame Android Studio 4.0 (Official IDE for Android)

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



Už obsahuje aj Kotlin
(1.4) support





Free Udacity courses

(alternatívne free online)

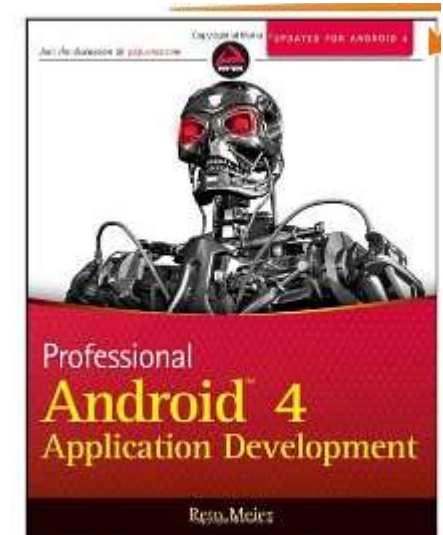
- [user interface](#) – začiatok, user interface
- [user input](#)
- [multiscreen apps](#) – activities, fragments, master-detail view, ...
- [networking](#) – http networking, json parsing, ...
- [data storage](#) - sqlite
- [material design](#)
- [Google Firebase](#)
- [Kotlin for Android](#)

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

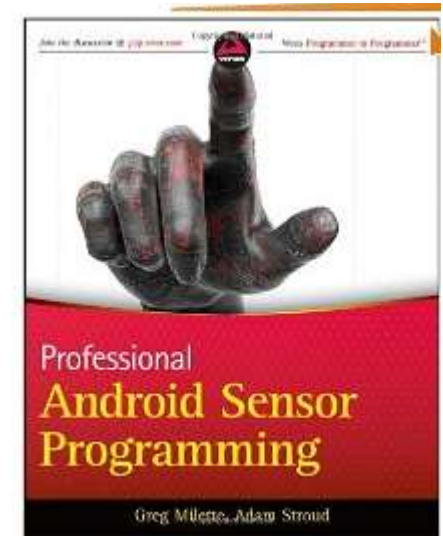
CHAPTER 15 Designing a Speech-Enabled App

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



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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



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ANDROID™ 6 FOR PROGRAMMERS

AN APP-DRIVEN APPROACH

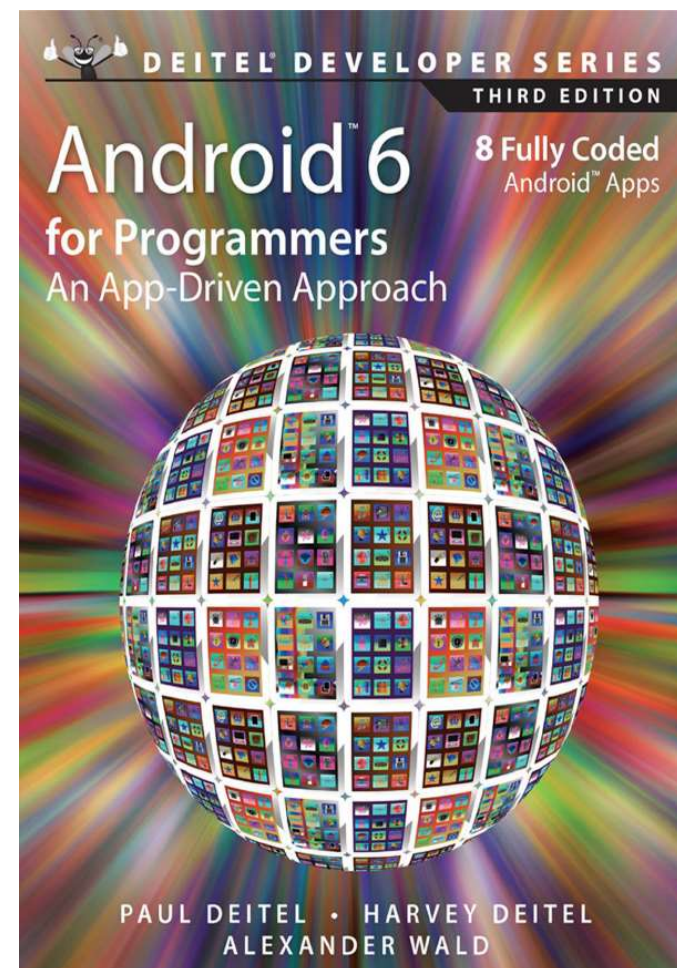
■ Paul Deitel • Harvey Deitel • Alexander Wald, 2016, 3rd Edition, Amazon 4.4/5

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



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Java vs. Kotlin



tradičný VMA 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 >7 rokov
 - kompiluje do JVM
 - funguje s Android Studiom a na JetBrains produkty ste si asi zvykli, sú top
 - oboznámite sa s niektorými princípmi moderných jazykov
-
- Reference: <https://kotlinlang.org/docs/reference/>
 - Online: <https://play.kotlinlang.org/byExample/>



Why Teach Kotlin

- Kotlin is basically becoming the language of Android.
- Decrease in boilerplate helps us to quickly identify which fundamental Android concepts students are missing.
- On numerous courses, where we proceed through Java to Kotlin, we are considering a Kotlin-first approach.
- Students are happy to have the chance to program in something they may have heard about.
- I think our students benefit in general from being exposed to a wide range of programming languages, and I think it is valuable for them to gain experience in using more modern languages alongside the more traditional ones like Java and C++.
- My Kotlin students in fact understand OO concepts better than my Java students do.
- One of Kotlin's advantages is a good combination of strong typing and nullability.

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:

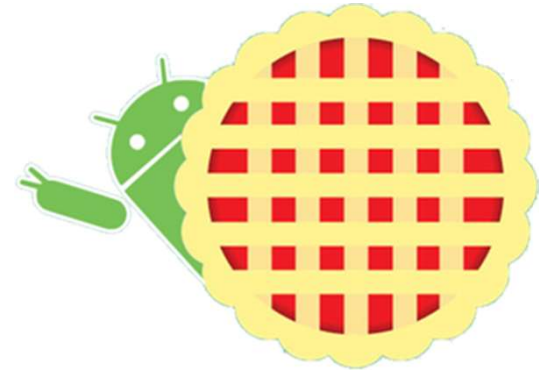
- ozvite sa v prípade problémov inštalácie na platformy, napr. Linux, Mac.
- Jožo, Lukáš, ja sa vám posnažíme problém vyriešiť

Inštalácia Android Studia:

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



Android a Google



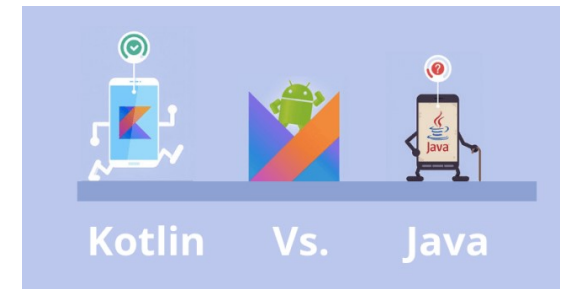
- 2005 [Google](#) acquired Android Inc. with Rubin, Miner et al.
- 2007 [Open Handset Alliance](#), a consortium
 - device manufacturers: [HTC](#), [Sony](#) and [Samsung](#),
 - wireless carriers: [T-Mobile](#), ...
 - chipset makers: [Qualcomm](#), [Texas Instruments](#),includes Google with a goal to develop open standards for mobile devices
- major release named in alphabetical order after a dessert or sugary treat
 - 2.3 [Gingerbread](#)
 - 4.3 [Jelly Bean](#), July, 2012,
 - 4.4 [KitKat](#), announced, October, 2013,
 - 5.1 [Lollipop](#), November, 2014,
 - 6.0 [Marshmallow](#), October, 2015,
 - 7.0 [Nougat](#), August, 2016.
 - 8.0 [Oreo](#), August, 2017,
 - 9.0 [Pie](#), August, 2018,
 - 10.0 [Android 10](#), September 2019
 - 11.0 [Android 11](#), tba

Version history by API level

- 2.1 Android 1.0 (API 1)
- 2.2 Android 1.1 (API 2)
- 2.3 Android 1.5 Cupcake (API 3)
- 2.4 Android 1.6 Donut (API 4)
- 2.5 Android 2.0 Eclair (API 5)
- 2.6 Android 2.2 Froyo (API 8)
- 2.7 Android 2.3 Gingerbread (API 9)
- 2.8 Android 3.0 Honeycomb (API 11)
- 2.9 Android 4.0 Ice Cream Sandwich (API 14)
- 2.10 Android 4.1 Jelly Bean (API 16)
- 2.11 Android 4.4 KitKat (API 19)
- 2.12 Android 5.0 Lollipop (API 21)
- 2.13 Android 6.0 Marshmallow (API 23)
- 2.14 Android 7.0 Nougat (API 24)
- 2.15 Android 8.0 Oreo (API 26)
- 2.16 Android 9 Pie (API 28)
- 2.17 Android 10 (API 29)
- 2.18 Android 11 (API 30)

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: C:\Users\borovan\AppData\Local\Android\Sdk [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.

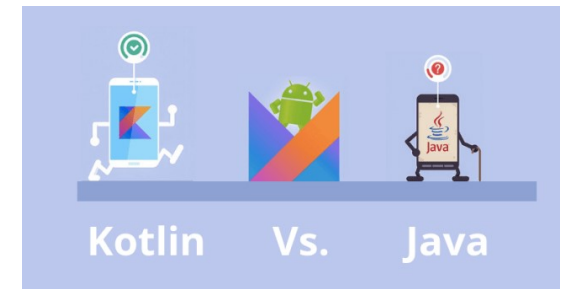
	Name	API Level	Revision	Status
<input type="checkbox"/>	Google Play Intel x86 Atom System Image	29	7	Not installed
<input type="checkbox"/>	Google Play Intel x86 Atom_64 System Image	29	7	Not installed
<input type="checkbox"/>	Android Q Preview			
<input type="checkbox"/>	Android TV Intel x86 Atom System 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: [Edit](#)

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

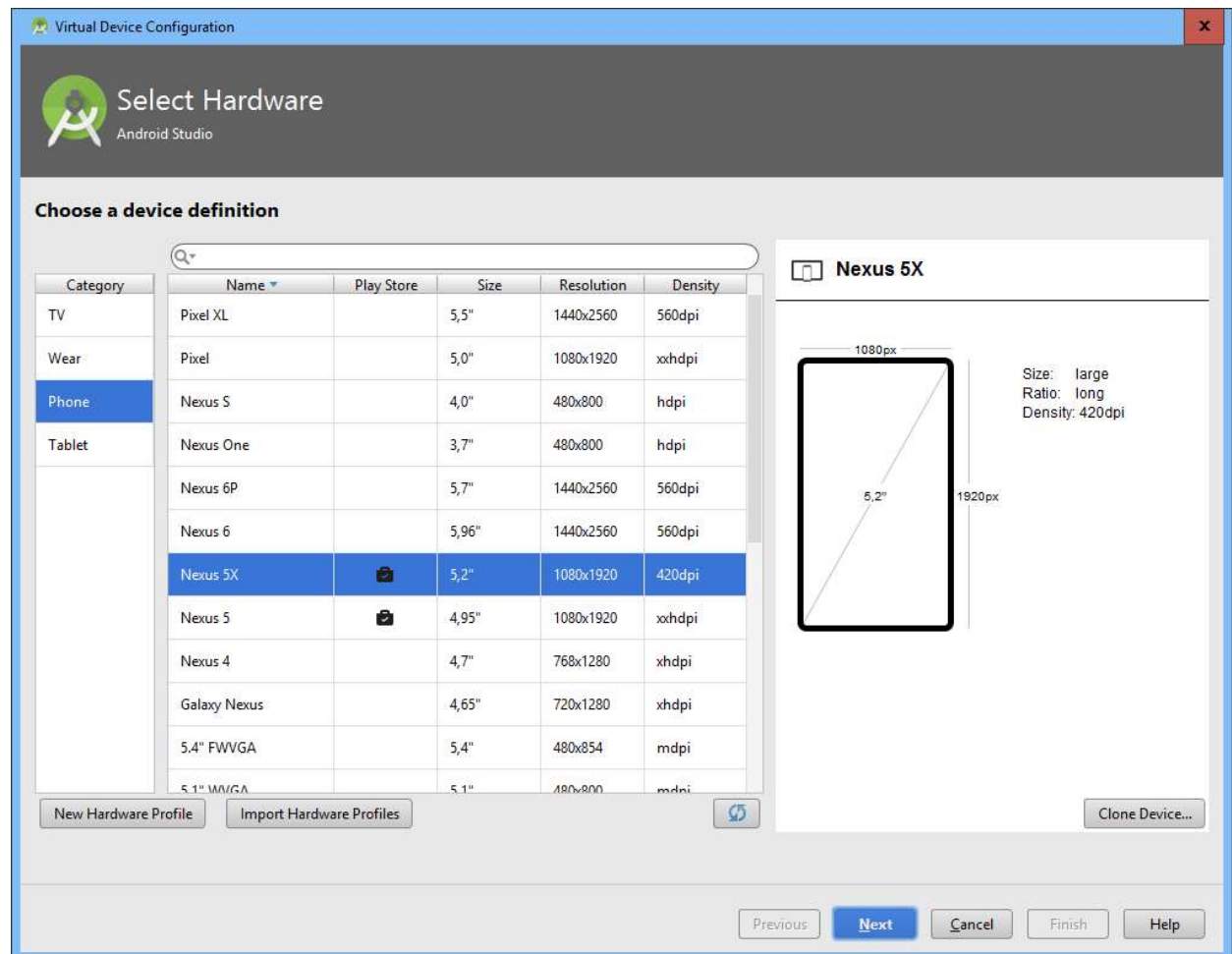
predvolených,

- Create Device
- modifikujte

nastavenia

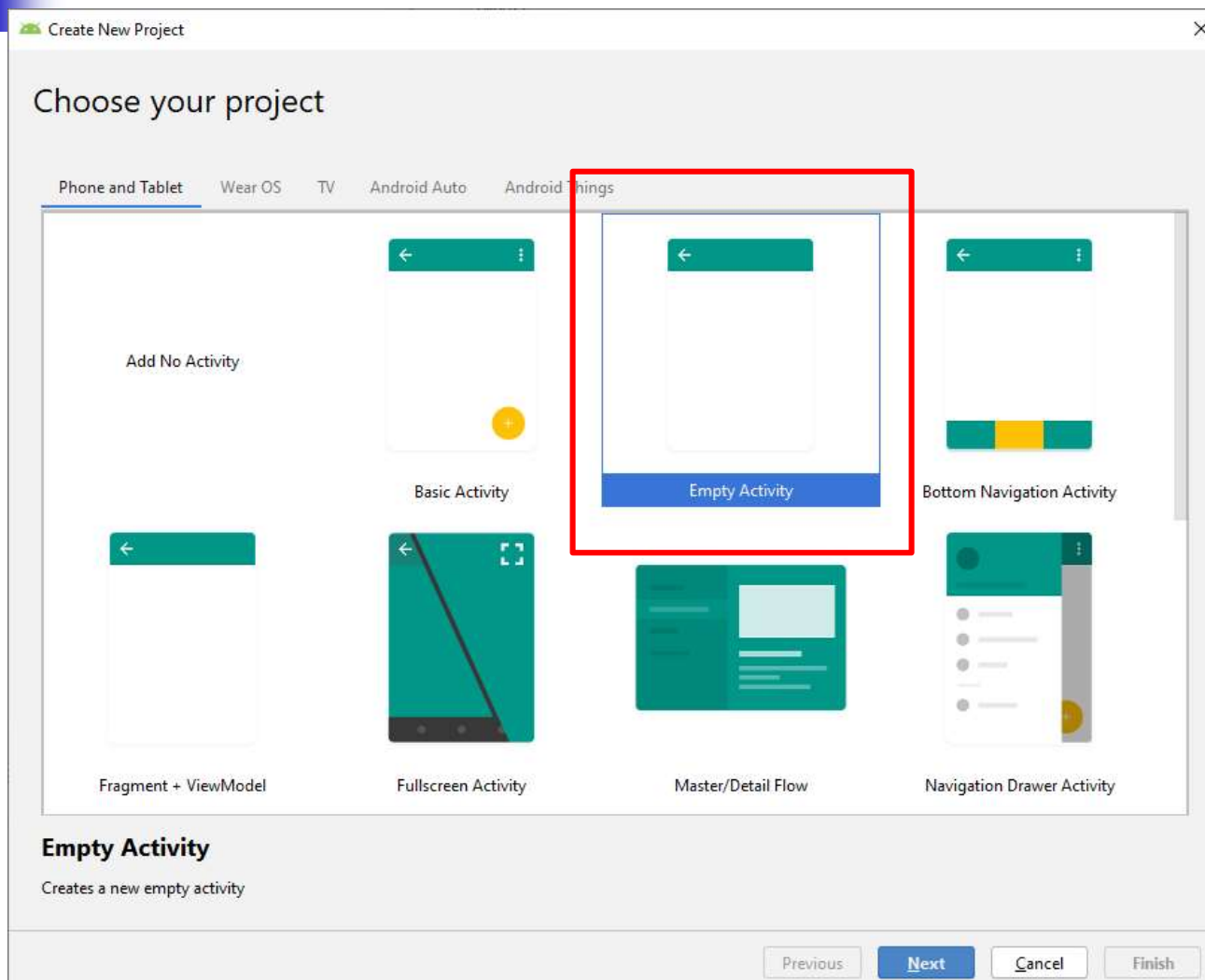
podľa vášho

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

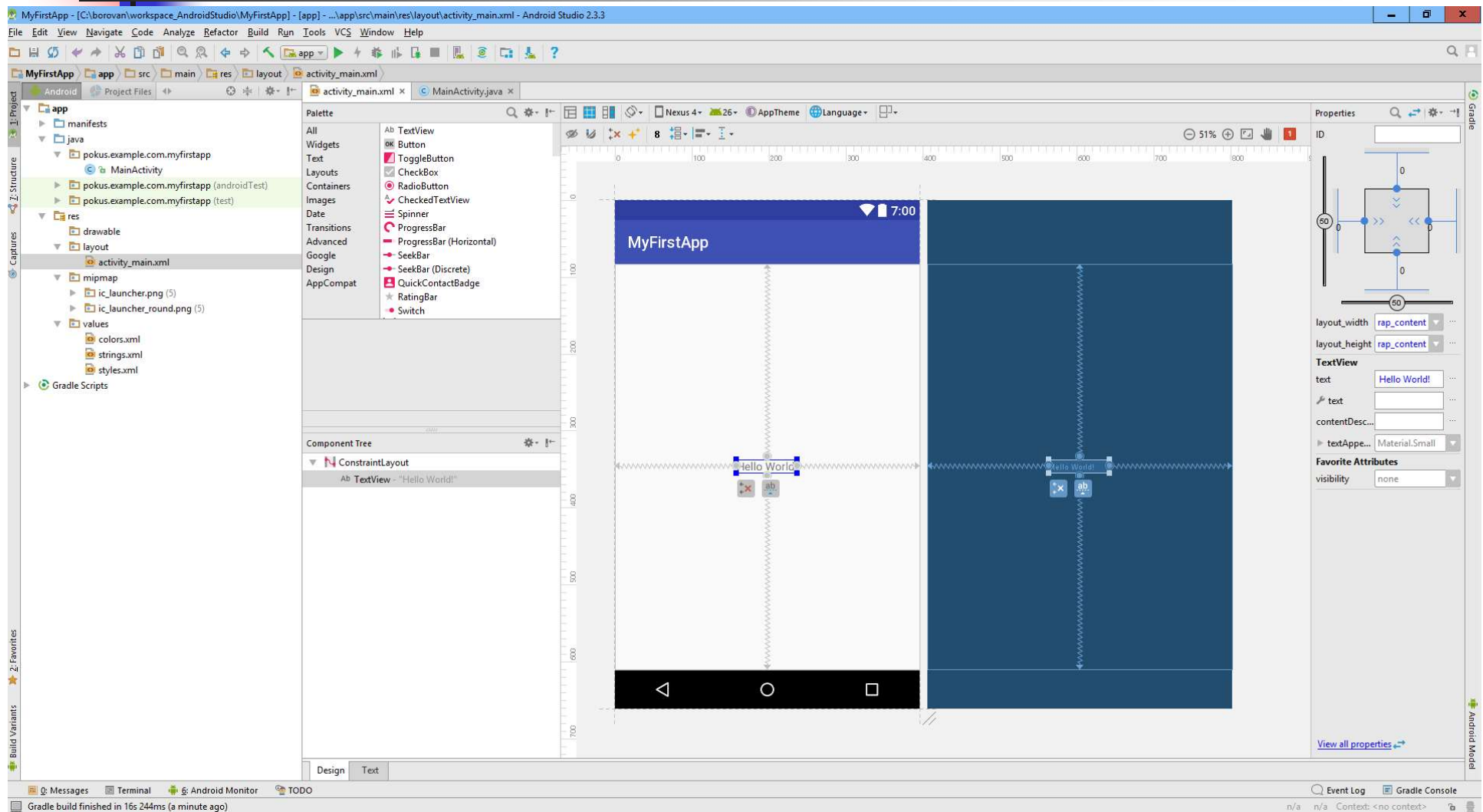
ANDROID PLATFORM
VERSION

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)

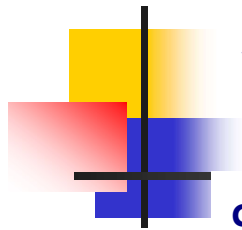


The screenshot displays the Android Studio interface for a new project named "My Application". The top toolbar includes standard IDE actions like File, Edit, View, Navigate, Code, Analyze, Refactor, Build, Run, Tools, VCS, Window, and Help. The main workspace is divided into several panels:

- Project View:** Shows the file structure of the project, including `manifests`, `java` (with `com.example.myapplication`), `res` (with `drawable` and `layout`), and `Gradle Scripts`. The `activity_main.xml` file is selected in the `layout` folder.
- Palette:** Displays a list of UI widgets for the design view, including `TextView`, `Button`, `ImageView`, `RecyclerView`, `<fragment>`, `ScrollView`, and `Switch`.
- Component Tree:** Shows the hierarchy of the layout, starting with `ConstraintLayout` and containing a `TextView` with the text "Hello World!".
- Attributes:** Shows the attributes for the selected `TextView`, including `id`, `Declared Attributes`, and `Layout` constraints.
- Design View:** The central area where the UI is visualized. It shows a dark blue background with a white `TextView` containing "Hello World!".
- Build Output:** The bottom panel shows the build process, including the message "Build: completed successfully at 9/21/2019 12:35 PM with 2 warnings".

The bottom status bar indicates the build is finished in 886 ms (23 minutes ago).





Ako si skúšať Kotlin v AS

(kým sa nedozvieme viac)

```
class MainActivity : AppCompatActivity() {  
    override fun onCreate(savedInstanceState: Bundle?) {  
        super.onCreate(savedInstanceState)  
        setContentView(R.layout.activity_main)  
        //println(fact(10))  
        for (i in 0..10) {  
            Log.d("TAG", "$i != ${fact(i)}")  
            // vypisuje do konzoly Logcat, použite filter s "TAG"  
            tv.text = "$i != ${fact(i)}"  
            // vypise do View komponentu, ktory je v Activite  
            Toast.makeText(this, "$i != ${fact(i)}",  
                Toast.LENGTH_SHORT).show()  
            // Toast alias Notifier (MITI)  
        }  
    }  
    fun fact(n : Int) : Int {  
        if (n == 0) return 1  
        else return n * fact(n-1)  
    }  
}
```





Break point

(Štruktúrou projektu pokračujeme na budúce)

- Switch to kotlin intro



Čo dostaneme zadarmo

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

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

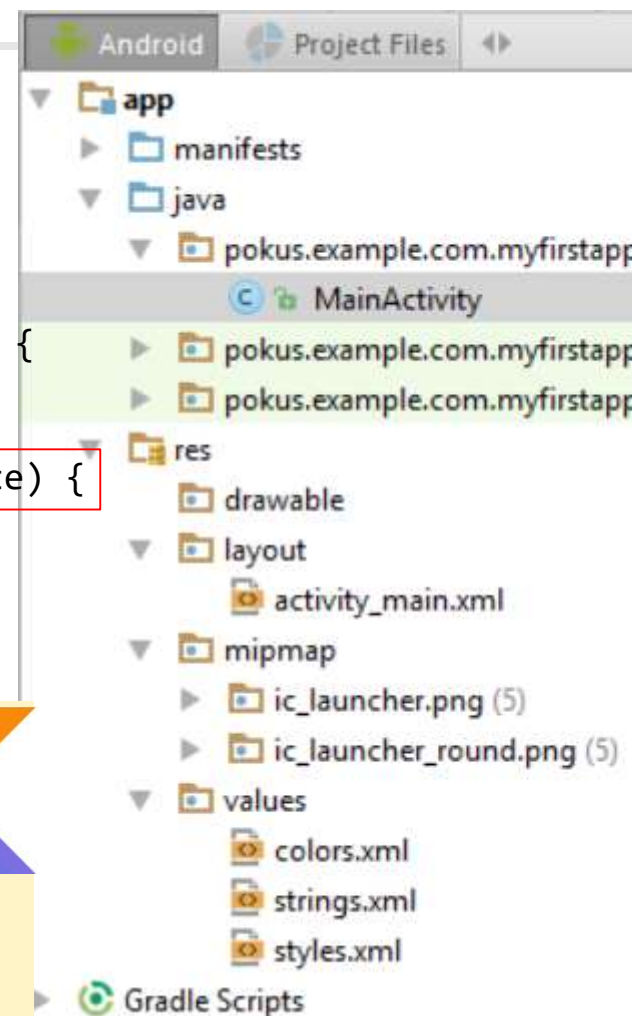
public class MainActivity extends AppCompatActivity {

    @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() {

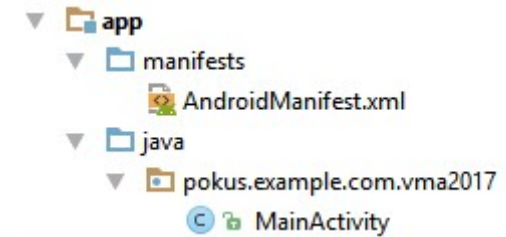
    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        setContentView(R.layout.activity_main)
    }
}
```



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:supportRtl="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)

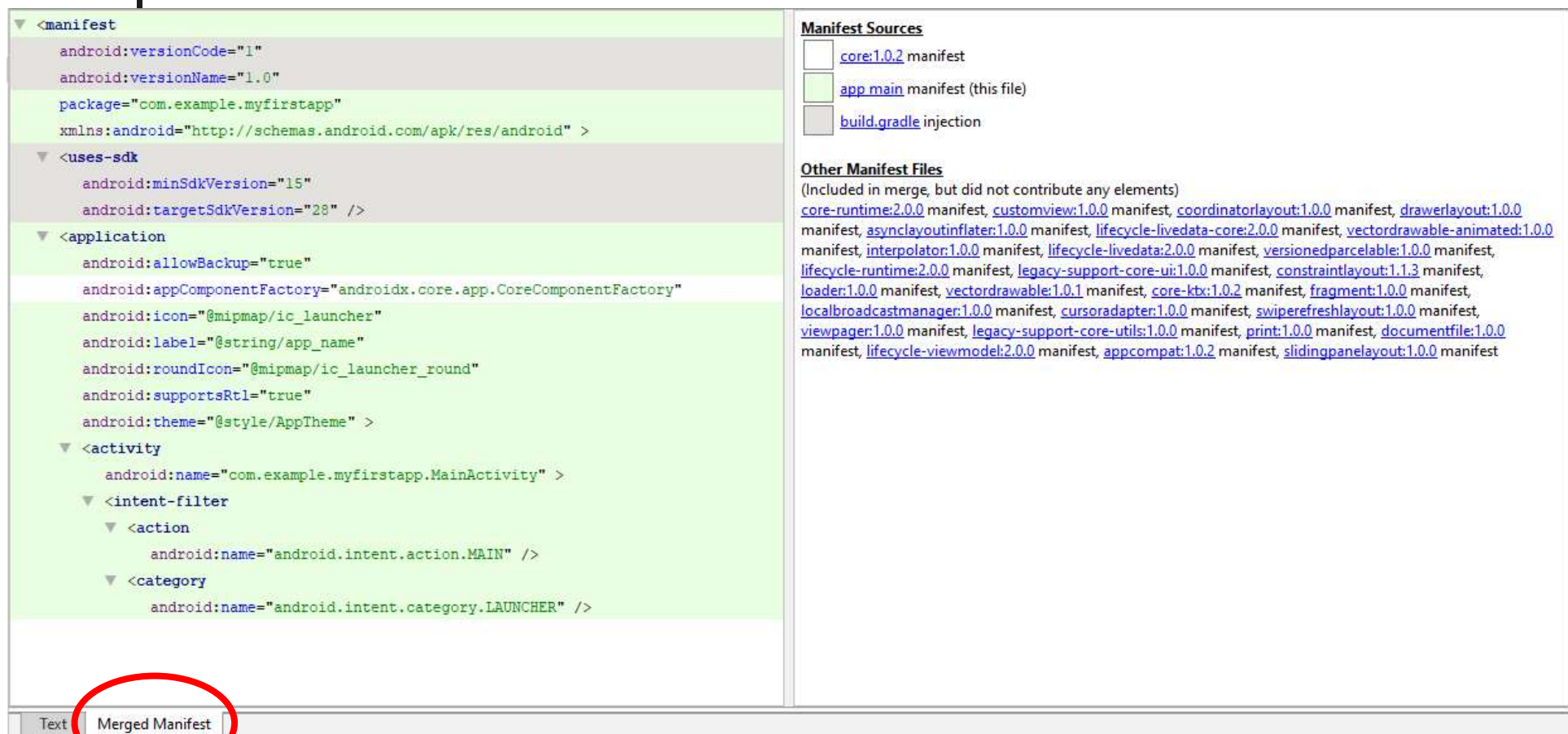
Najhlavnejšie tagy:

- `<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 bežiacie 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

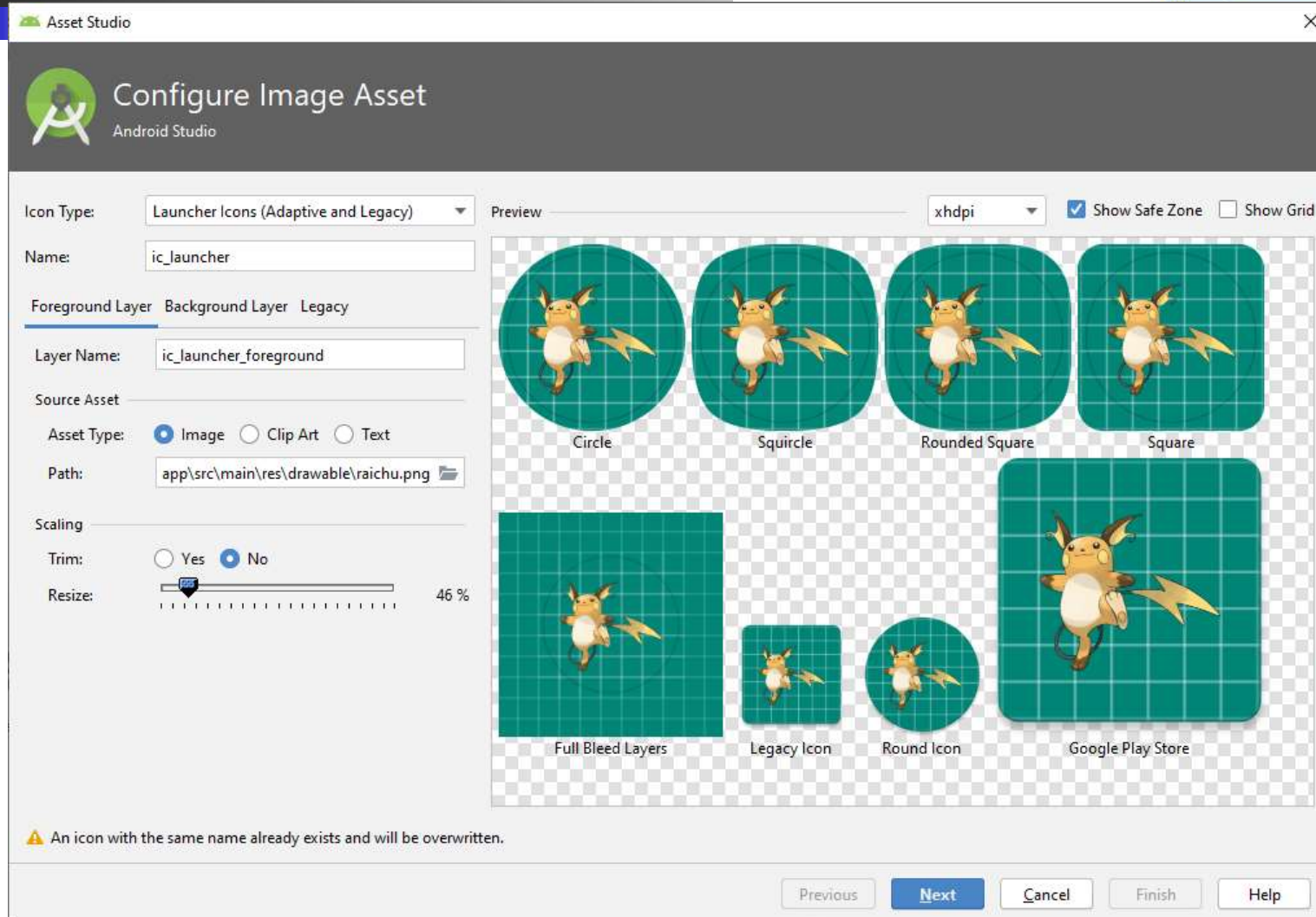
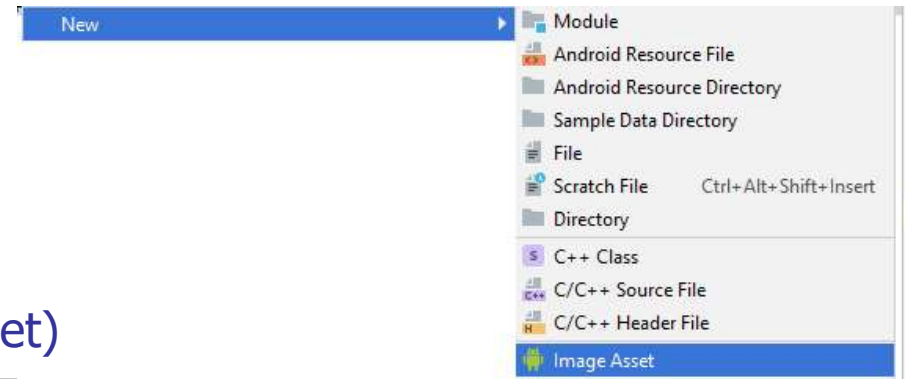
(aspoň pri ic_launcher ikone)

Je hrozné mať v tablete viacero riešení s generickými neosobnými ikonami



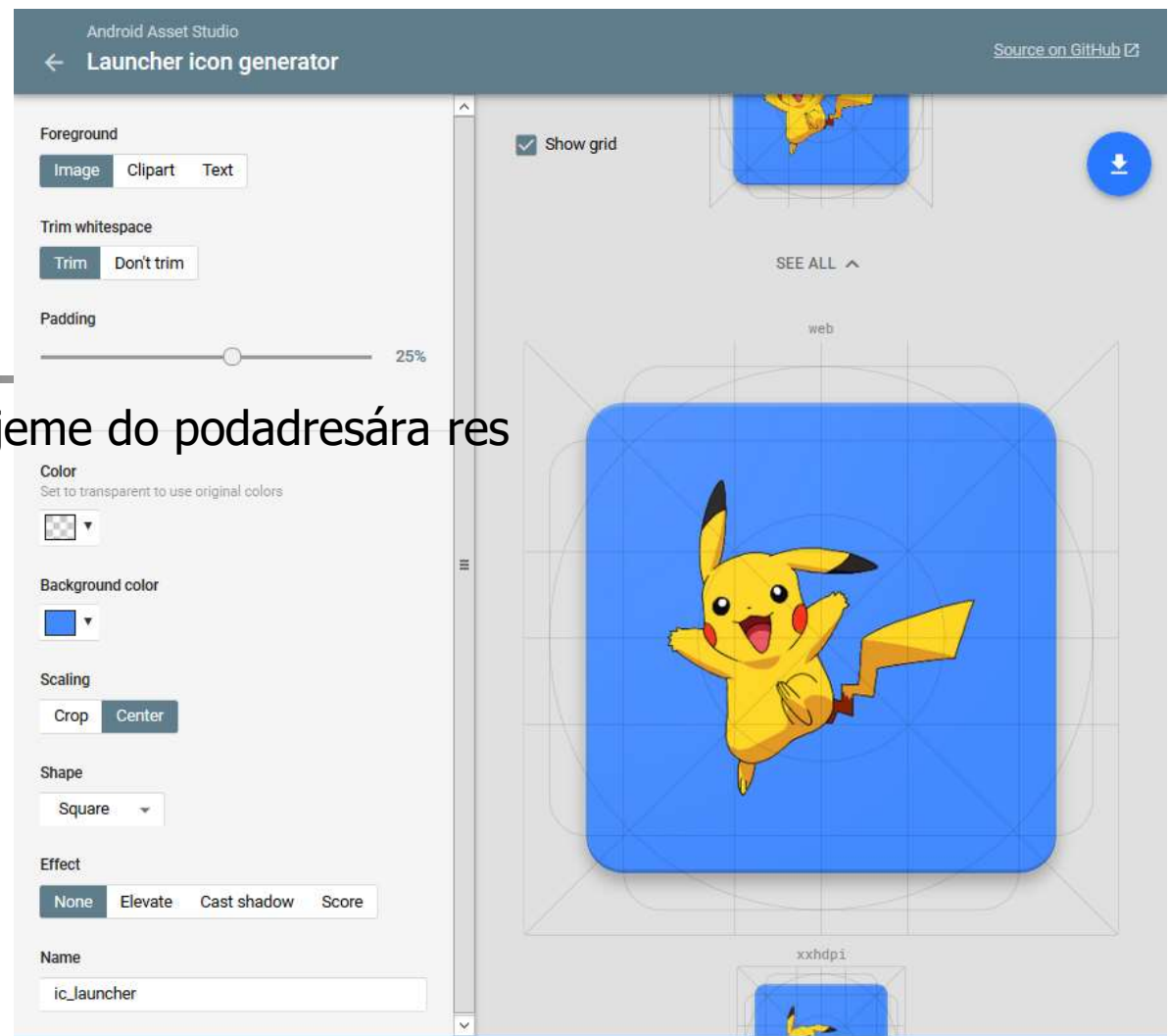
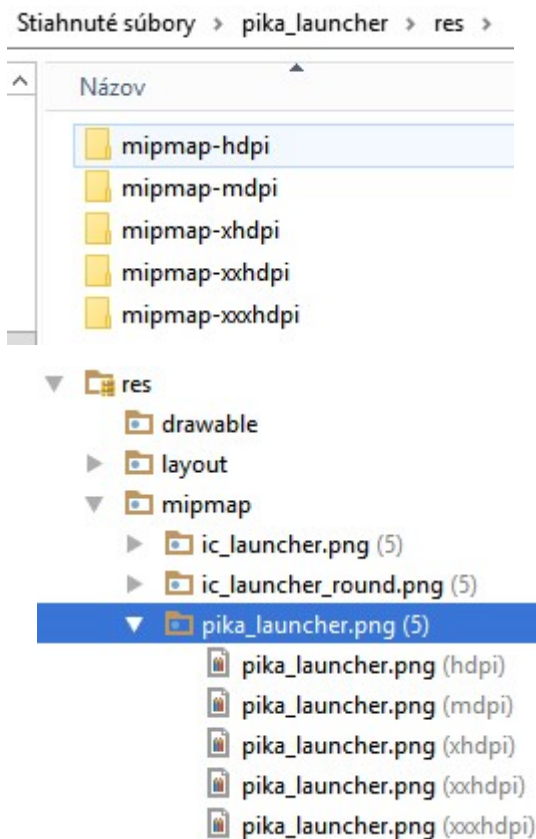
Bud' kreatívny

(a použi Asset Studio- New/ImageAsset)



Android Asset Studio Icon generator

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



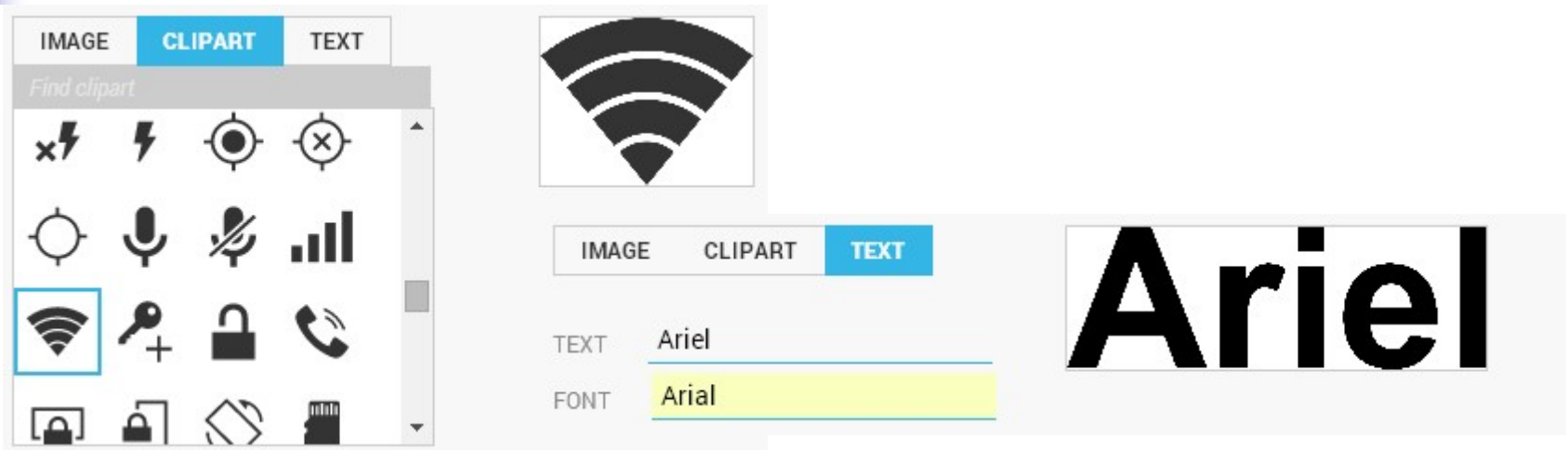
```
5  
6  
7 <application  
8     android:allowBackup="true"  
9     android:icon="@mipmap/pika_  
10    android:label="@mipmap/pika_launcher  
11    android:roundIcon="@mipmap/ic_launcher_round"  
12    android:supportRtl="true"
```

Project:Pikas.zip, Pikas2.zip

Android Asset Studio

(jedna z alternatív)

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



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



Resources/Drawables/Mipmap

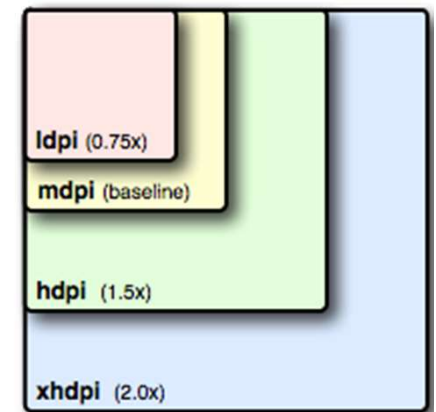
(ikona - viacero rozlíšení)

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)

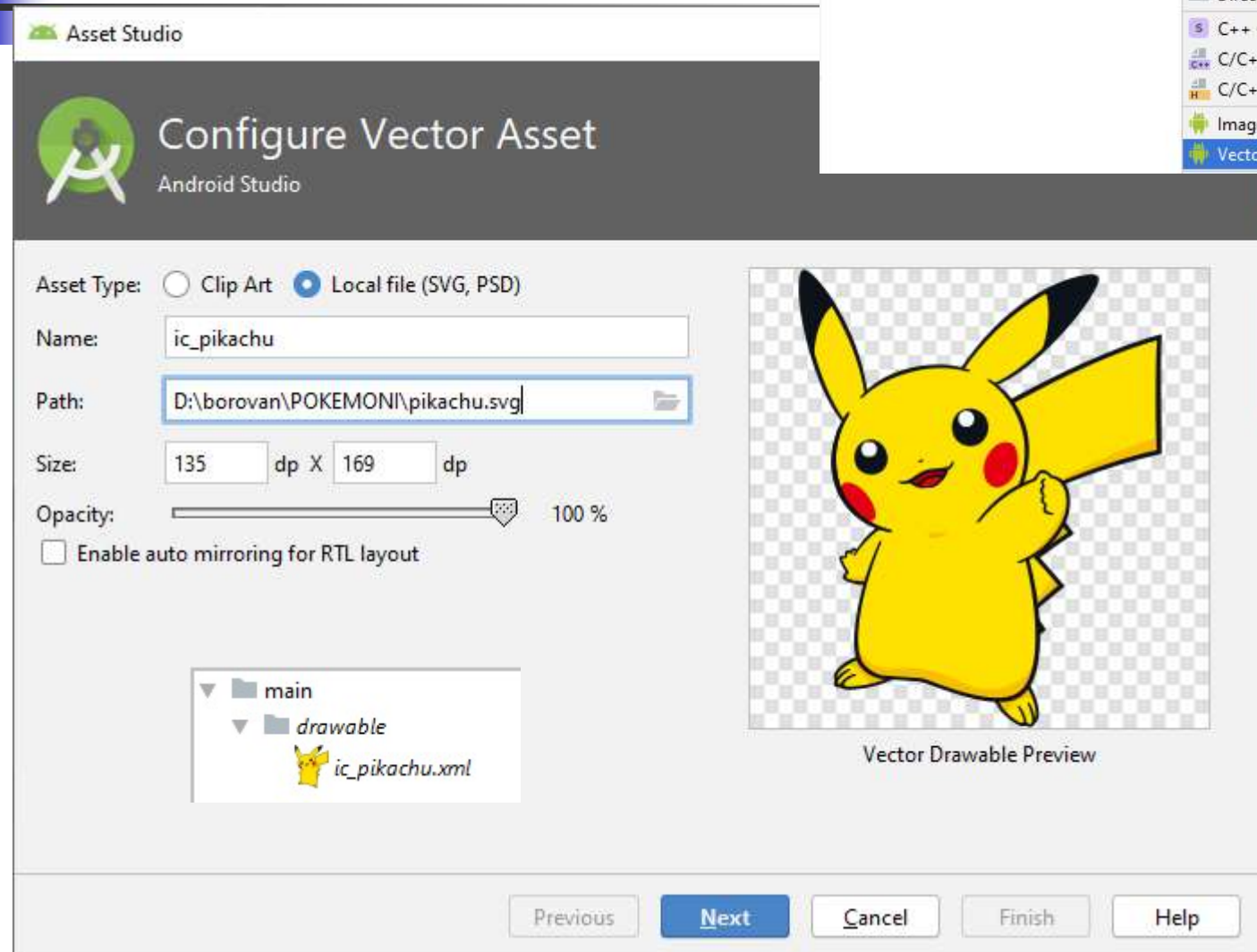
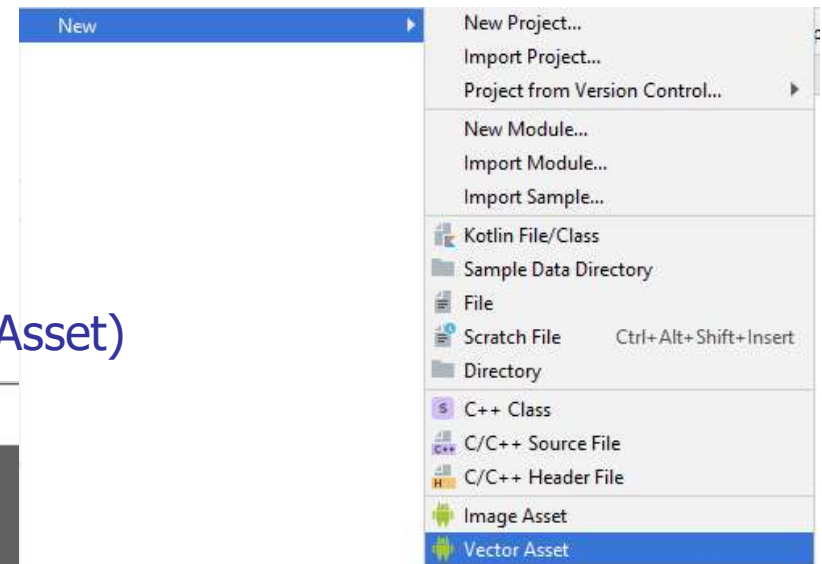
- 36x36 for low-density (LDPI = ~ 120 dpi)
- 48x48 for medium-density (MDPI = ~ 160 dpi)
- 72x72 for high-density (HDPI = ~ 240 dpi)
- 96x96 for extra high-density (XHDPI = ~ 320 dpi)
- 144x144 for extra² high-density (XXHDPI = ~ 480 dpi)
- 192x192 for extra³ high-density (XXXHDPI = ~ 640 dpi)



$\sqrt{2}$

Bud' kreatívny

(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>
```

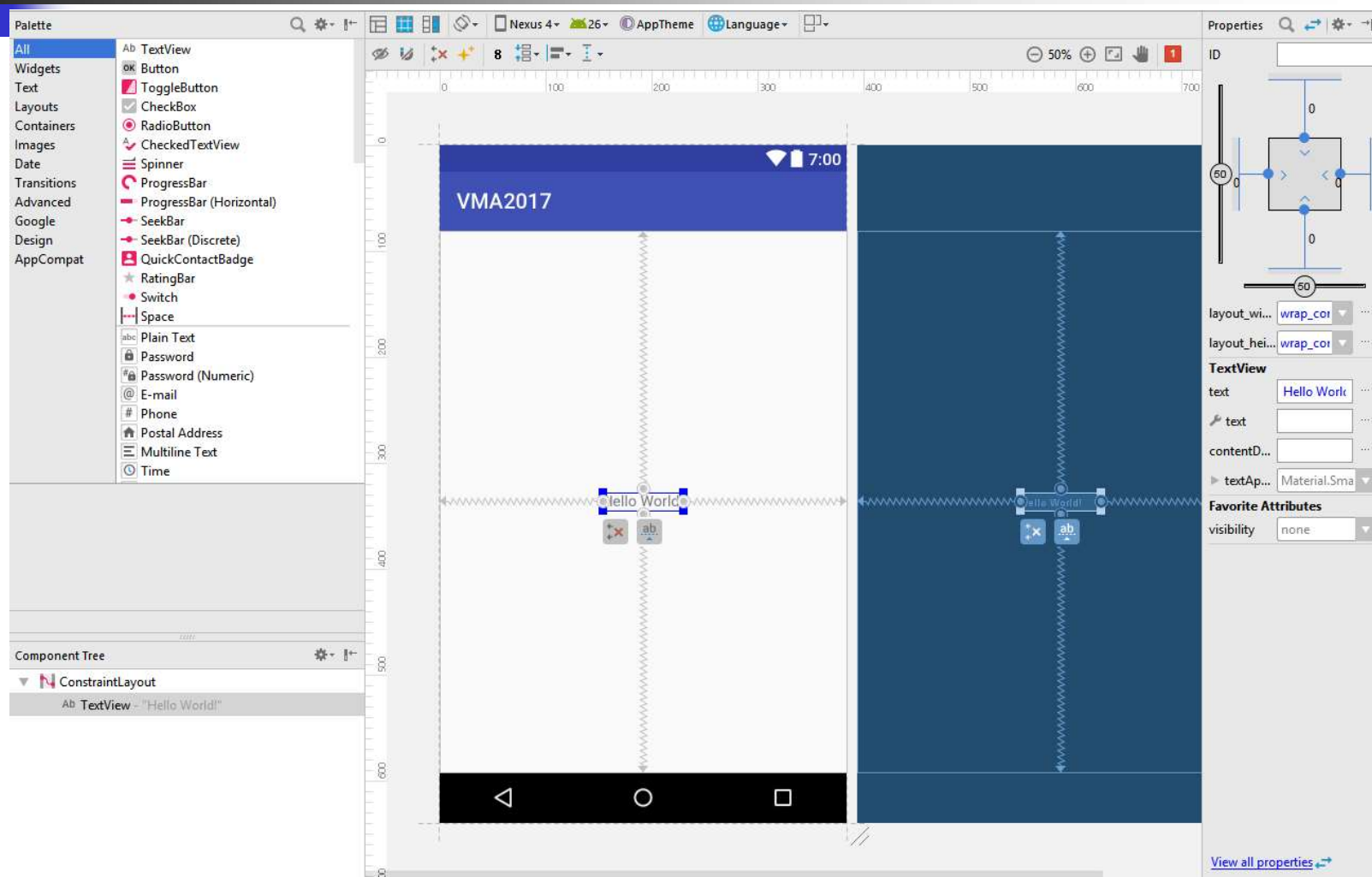
- plurals (quantity strings)

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

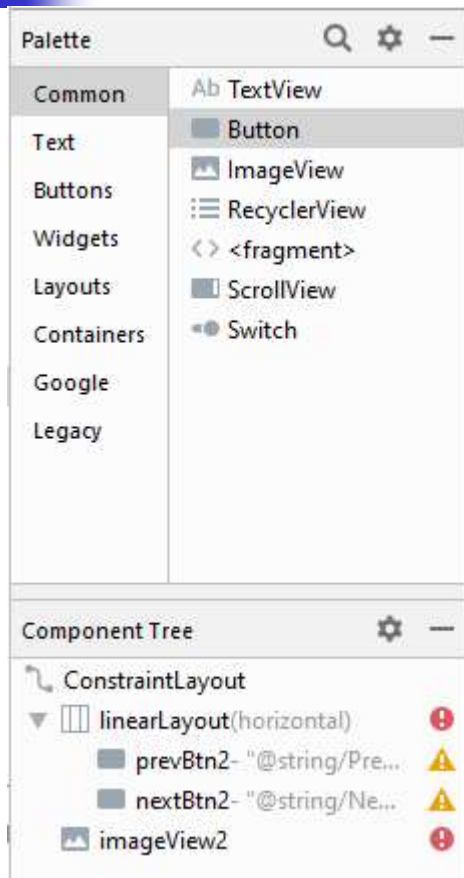
Resources/Layout

(Design View)

Konvencia:
`MainActivity[.kt/.java]`
má layout
`activity_main.xml`



Layout Manager



Design/Blueprint/Design+Blueprint

Layout: Landscape/Portrait/...

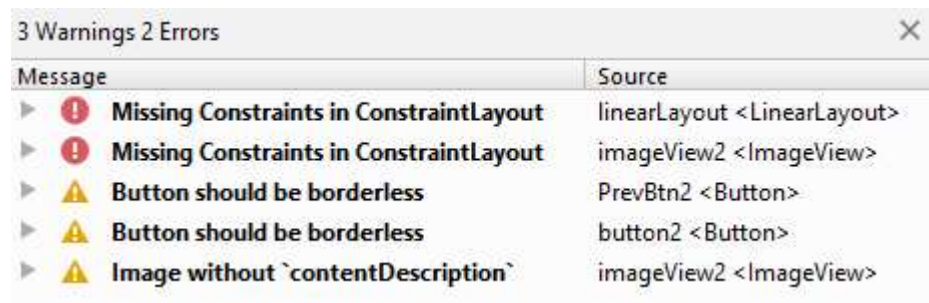
Pixel: AVD/Pixel2/Pixel#

API Level: 26/27/28/...

AppTheme :

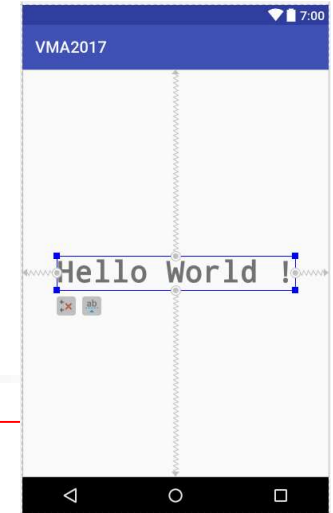
Default (en-us) : lokalizácie do rôznych jazykov

: warnings, errors



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*

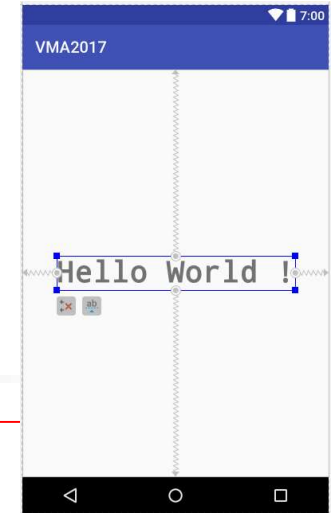
```
<TextView
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:fontFamily="monospace"
    android:text="Hello World!"
    android:textSize="36sp"
    android:textStyle="bold"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintLeft_toLeftOf="parent"
    app:layout_constraintRight_toRightOf="parent"
    app:layout_constraintTop_toTopOf="parent" />
```

Bad style

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

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">
```

```
        <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>
```

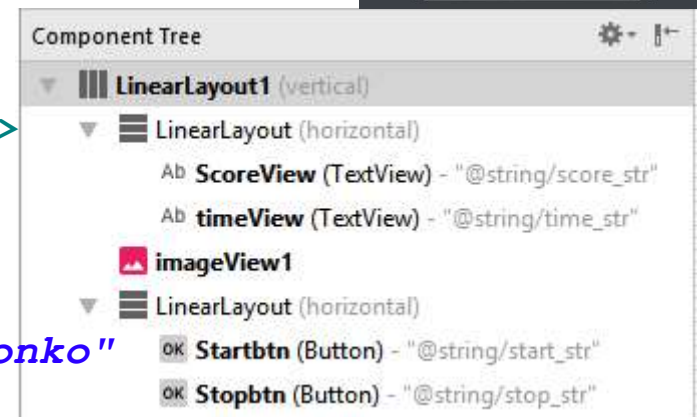
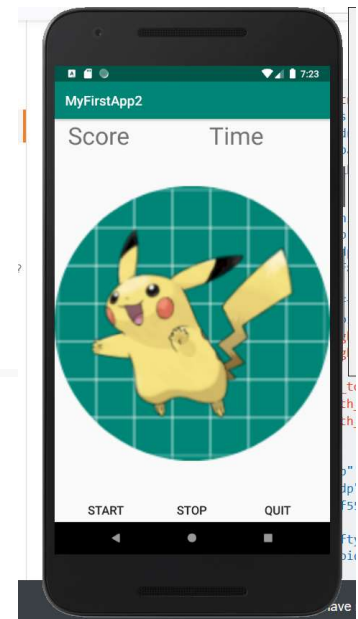
```
            <dimen name="reallyBigFont">30dp</dimen>
```

```
        </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



Logovanie

Tri najbežnejšie spôsoby:

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

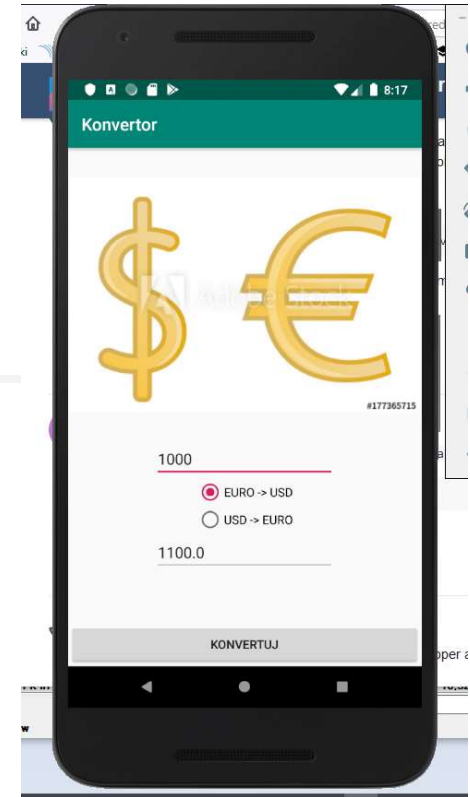
```
dependencies {  
    implementation 'com.android.support.design:28.0.0'  
    import com.google.android.material.snackbar.Snackbar  
  
    prevBtn2.setOnClickListener({  
        Toast.makeText(this, "prev...", Toast.LENGTH_SHORT).show()  
  
        Log.d(TAG, "prev...")  
  
        Snackbar.make(it, "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])
    })
}
```

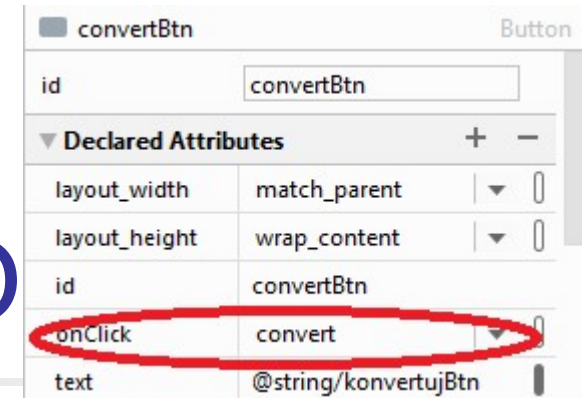


Konvertor EURO USD



```
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")
    }
}
```