

# Android Studio

(ako začat')

## Jazyk Kotlin

(ako neskončit')

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Peter Borovanský  
KAI, I-18

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

borovan 'at' ii.fmph.uniba.sk



# Základné info o kurze

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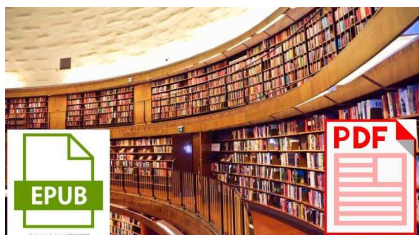
- Prémiovo-orientované vyučovanie
    - prihláste sa do [L.I.S.T.](#)
    - ak ste v ňom nikdy neboli, ozvite sa mi mailom
    - sledujte LIST, všetky zadania budú v ňom
    - sledujte Teams [2sf3ph4](#), komunikácia/prednášky/oznamy budú tam
  - Prednášky 2021 sú na MS-Teams (slajduio)
    - konto (priezvisko@uniba.sk), prihlasovací kód je [2sf3ph4](#)
  - zmena oproti 2020, 2021
    - viac je venované Kotlinu, úplne vynechaný MIT Inventor
- prémie sa budú nepravidelne objavovať a sú **plnohodnotná** alternatíva k domácim úlohám
- prvá už tam visí...
  - prvá časť kurzu bude dobre sledovateľná v knihe **Android Studio 4.0 Development Essentials - Kotlin Edition: Developing Android Apps Using Android Studio 4.0, Neil Smyth**



# Literatúra

Okrem zdrojov tak trochu prístupných na stránke, pravidelne kupujeme najnovšie knihy do knižnice

Samozrejme, uvedomte si, že v mobilných aplikáciach je často 3 roky veľa, veci stárnu rýchlejšie ako v iných oblastiach



<http://dai.fmph.uniba.sk/courses/VMA/android/pdfs/>



MatFyz je In

12 h · Verejné

Ako si najefektívnejšie a najrýchlejšie požičiate knihu z knižnice? V tento prvý týždeň aktuálne najmä pre prvákov 😊

[https://www.youtube.com/watch?v=5EjY8j\\_IgDE](https://www.youtube.com/watch?v=5EjY8j_IgDE)



YOUTUBE.COM

Ako si požičať knihu | Knižnica FMFI UK

Ako si požičať knihu | Knižnica FMFI UK Knižničné a edičné centrum FMFI UK htt...

# Vývojové jazyky/nástroje

- Symbian
  - C++, Java ME, Python, ...
- Windows Mobile 6
  - C# (MS Visual Studio)
- iOS
  - Objective-C -> Swift 3/4/5 (Xcode)
- Android
  - scratch (MIT Inventor)
  - java (Android SDK + plugin pre Eclipse) -> (Android Studio)
  - java (A.I.D.E.)
  - Kotlin (Android Studio 4+)
  - C++ (Android NDK)
- Multi-platform
  - C# (Xamarin iOS, Android, Windows) – fy. MS, Visual Studio 2015
  - Pascal (Delphi XE5 iOS, Android, Windows 10) – fy. Embarcadero
  - JavaScript/TypeScript (React Native)
  - Flutter od Google
- game engine
  - C# (Unity 2D/3D)

iOS - Apple Center kurz

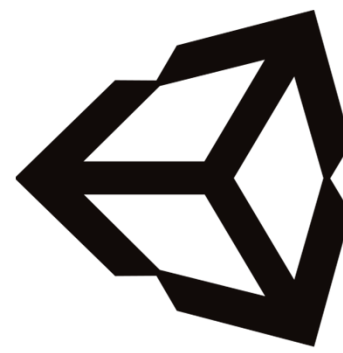
1-AIN-303/15

...



# Unity

(game engine)



# unity

#1 Unreal Engine

#2 Unity

Oblíbený nástroj pre tvorbu multi-platform aplikácií pre bakalárske práce

- 2-INF-263/15 magisterský predmet: Tvorba a dizajn počítačových hier
  - <http://sccg.sk/~mferko/tdh/>
  - <https://candle.fmph.uniba.sk/ucitelia/Michal-Ferko>
- 1-AIN-303/15 bakalársky predmet: Game Engines
  - <http://www.agentspace.org/ge/>
  - <https://candle.fmph.uniba.sk/ucitelia/Andrej-Lucny>

# Vývoj a nástroje

(detailnejšie)

## ■ natívne aplikácie

- Android



- Java
- Kotlin



- iOS



- Objective-C
- Swift



Priamy prístup k všetkým fičúrkam a komponentom OS, aj tým najnovším ...

## ■ hybridné aplikácie

- Cordova

- ionic



APACHE  
CORDOVA™



Web-app na báze .html, .css, .js, ktoré púšťame v prostredí WebView=browser/wrapper bez browserových ovládačov

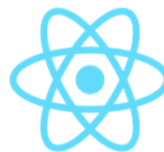
# Vývoj a nástroje

(detailnejšie)

## ■ kompilované aplikácie

### ■ React Native

- JavaScript
- Facebook
- nekompiluje do natívneho kódu
- obmedzená množina widgets



### ■ Flutter (Dart framework od Googlu)

- Dart
- Google
- kompilované do ARM C++
- bohatšia množina widgets
- Material design (Quantum Paper)– Google 2014



### ■ NativeScript

- JavaScript



QUANTUM  
and the building blocks of a unified interface





# Aspekty programátora

## **Code sharing** (write once, use everywhere)

- Cordova, ionic
- Flutter (Material Design)
- ReactNative
- Java, Swift



## **Knowledge sharing** (learn once, use everywhere)

- Cordova, ionic, ReactNative (.js), Flutter (Dart)
- Java, Kotlin, Swift



## **Widget library**

- Java, Swift, Cordova, ionic
- Flutter (Dart)
- ReactNative (.js)



<https://www.youtube.com/watch?v=bnYJRYFsrSw&feature=youtu.be>



# Aspekty programátora

**Eco-system** (schopnosť nájsť riešenie/radu/blog na stackoverflow,..)

- Java, Swift, Kotlin 😊
- Cordova, ionic (.js) 😐
- ReactNative (.js, React) 😐
- Flutter (nové ale zlepšuje sa) 😞

## Popularita

- Java, Swift, Kotlin 😊
- Cordova, ionic, ReactNative, Flutter (pushujú FB a Google) 😐



# Kotlin Multiplatform Mobile

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- *KMM* is an SDK designed to simplify creating cross-platform mobile applications (Android, iOS iPhone, watchOS)
- share common code between iOS and Android apps
- write platform-specific code
- platforms jvm, js, wasm
- xcode (mac) is necessary to build an iOS app
- KMM news 2021

[https://www.youtube.com/watch?v=QJqLpTw3vwI&list=PLIFc5cFwUnmy\\_oVc9YQzjasSNoAk4hk\\_C&index=1&t=47s](https://www.youtube.com/watch?v=QJqLpTw3vwI&list=PLIFc5cFwUnmy_oVc9YQzjasSNoAk4hk_C&index=1&t=47s)

# Android Studio



**How to use Android studio on low-end machines 4GB 8 GB of RAM**

# Vývojové platformy

(pre natívne appky)



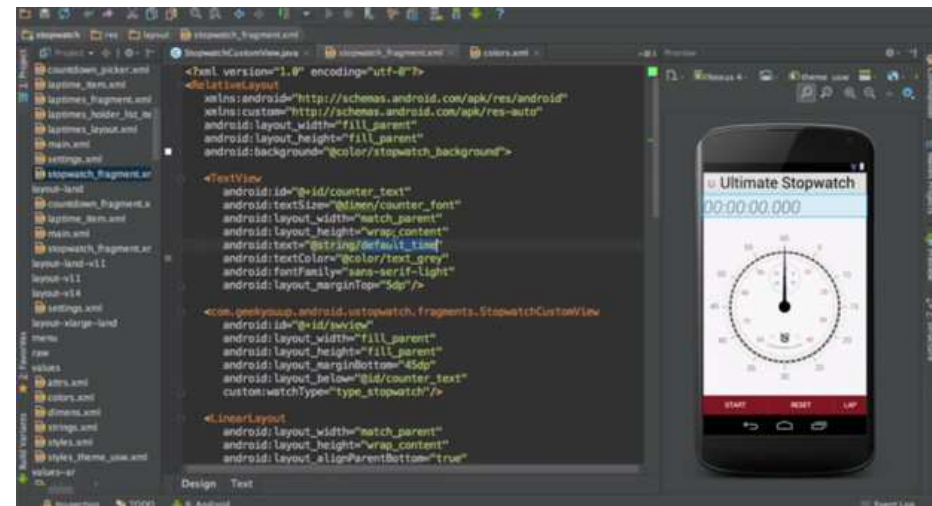
- A.I.D.E. – Android IDE on Android  
Java+Android SDK/ C/C++ Android NDK  
<https://play.google.com/store/apps/details?id=com.aide.ui&hl=sk>

- 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**  
Google ended official support in June 2015



# Java vs. Kotlin



tradičný VMA kurz postavený na Java už tretí rok beží v jazyku Kotlin 1.5

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 >10 rokov
  - kompiluje do JVM
  - funguje s Android Studiom
  - na JetBrains produkty ste si asi zvykli, a sú top
  - oboznámite sa s niektorými princípmi moderných jazykov
- 
- 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:

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

Predmet má cvičenie, ale aj tak:

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

Inštalácia Android Studia:

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

Android Studio 4.0  
Development  
Essentials



Kotlin Edition

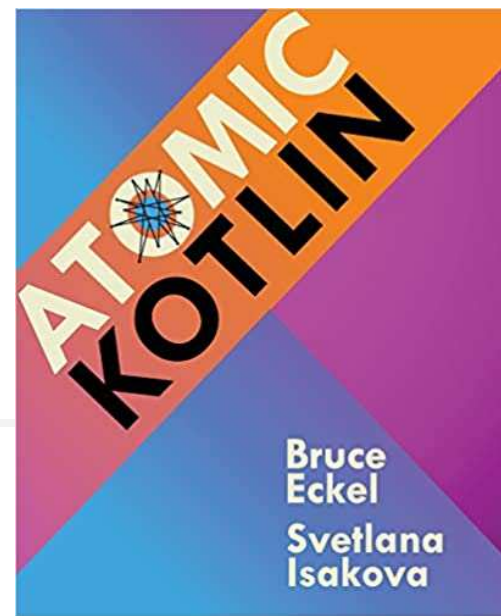
Android Studio  
Chipmunk  
Essentials



Kotlin Edition



# Atomic Kotlin



<https://www.amazon.com/Atomic-Kotlin-Bruce-Eckel/dp/0981872557>

## Section I: Programming Basics

- Introduction
- Why Kotlin?
- Hello, World!
- var & val
- Data Types
- Functions
- if Expressions
- String Templates
- Number Types
- Booleans
- Repetition with while
- Looping & Ranges
- The in Keyword
- Expressions & Statements
- Summary 1

## Section II: Introduction to Objects

- Objects Everywhere
- Creating Classes
- Properties
- Constructors
- Constraining Visibility
- Packages
- Testing
- Exceptions
- Lists
- Variable Argument Lists
- Sets
- Maps
- Property Accessors
- Summary 2

## Section III: Usability

- Extension Functions
- Named & Default Arguments
- Overloading
- when Expressions
- Enumerations
- Data Classes
- Destructuring Declarations
- Nullable Types
- Safe Calls & the Elvis Operator
- Non-Null Assertions
- Extensions for Nullable Types
- Introduction to Generics
- Extension Properties
- break & continue

## Section IV: Functional Programming

- Lambdas
- The Importance of Lambdas
- Operations on Collections
- Member References
- Higher-Order Functions
- Manipulating Lists
- Building Maps
- Sequences
- Local Functions
- Folding Lists
- Recursion

## Section V: Object-Oriented Programming

- Interfaces
- Complex Constructors
- Secondary Constructors
- Inheritance
- Base Class Initialization
- Abstract Classes
- Upcasting
- Polymorphism
- Composition
- Inheritance & Extensions
- Class Delegation
- Downcasting
- Sealed Classes



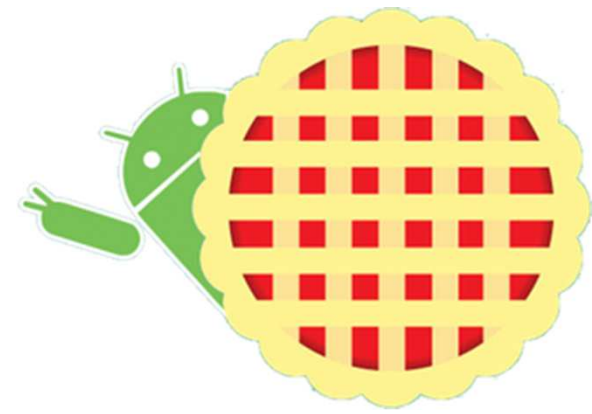


# Why Teach Kotlin

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- 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 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 - API 30



Settings for New Projects

Appearance & Behavior > System Settings > Android SDK

Manager for the Android SDK and Tools used by the IDE

Android SDK Location: C:\Users\borovan\AppData\Local\Android\Sdk [Edit](#) [Optimize disk space](#)

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, the IDE will automatically check for updates. Check "show package details" to display individual SDK components.

Name	API Level	Revision	Status
<input type="checkbox"/> Google APIs Intel x86 Atom_64 System Image	31	8	Not installed
<input type="checkbox"/> Google Play Intel x86 Atom_64 System Image	31	8	Not installed
<b>Android 11.0 (R)</b>			
<input checked="" type="checkbox"/> Android SDK Platform 30	30	3	Installed
<input checked="" type="checkbox"/> Sources for Android 30	30	1	Installed
<input type="checkbox"/> Android TV Intel x86 Atom System Image	30	3	Not installed
<input type="checkbox"/> China version of Wear OS - Preview Intel x86 Atom System Image	30	4	Not installed
<input type="checkbox"/> Wear OS - Preview Intel x86 Atom System Image	30	4	Not installed
<input type="checkbox"/> Google TV Intel x86 Atom System Image	30	3	Not installed
<input type="checkbox"/> Google APIs ARM 64 v8a System Image	30	11	Not installed
<input checked="" type="checkbox"/> Google APIs Intel x86 Atom System Image	30	10	Installed
<input type="checkbox"/> Google APIs Intel x86 Atom_64 System Image	30	10	Not installed
<input type="checkbox"/> Google Play Intel x86 Atom System Image	30	9	Not installed
<input type="checkbox"/> Google Play Intel x86 Atom_64 System Image	30	10	Not installed
<b>Android 10.0 (Q)</b>			
<input checked="" type="checkbox"/> Android SDK Platform 29	29	5	Installed
<input type="checkbox"/> Sources for Android 29	29	1	Not installed
<input type="checkbox"/> Android TV Intel x86 Atom System Image	29	3	Not installed

☒ Hide Obsolete Packages ☒ Show Package Details

OK Cancel Apply

# 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 the IDE

Android SDK Location:  [Edit](#) [Optimize disk space](#)

SDK Platforms SDK Tools SDK Update Sites

Below are the available SDK developer tools. Once installed, the IDE 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 31		Update Available: 31.0.0
<input checked="" type="checkbox"/> GPU Debugging tools		Installed
<input type="checkbox"/> NDK (Side by side)		Not Installed
<input type="checkbox"/> Android SDK Command-line Tools (latest)		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	30.8.4	Installed
<input type="checkbox"/> Android Emulator Hypervisor Driver for AMD Processors (installer)	1.7.0	Not installed
<input checked="" type="checkbox"/> Android SDK Platform-Tools	31.0.3	Installed
<input checked="" type="checkbox"/> Android SDK Tools	26.1.1	Installed
<input type="checkbox"/> Google Play APK Expansion library	1	Not installed
<input checked="" type="checkbox"/> Google Play Instant Development SDK	1.9.0	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	13	Installed
<input type="checkbox"/> Google Web Driver	2	Not installed
<input checked="" type="checkbox"/> Intel x86 Emulator Accelerator (HAXM installer)	7.6.5	Installed
<input type="checkbox"/> Layout Inspector image server for API 29-30	6	Not installed

☒ Hide Obsolete Packages ☐ Show Package Details

OK Cancel Apply

# Android Virtual Device

Tools/AVD manager

**Nakonfigurujte si AVD zodpovedajúci vášmu zariadeniu**

alebo si vyberte zo  
zoznamu

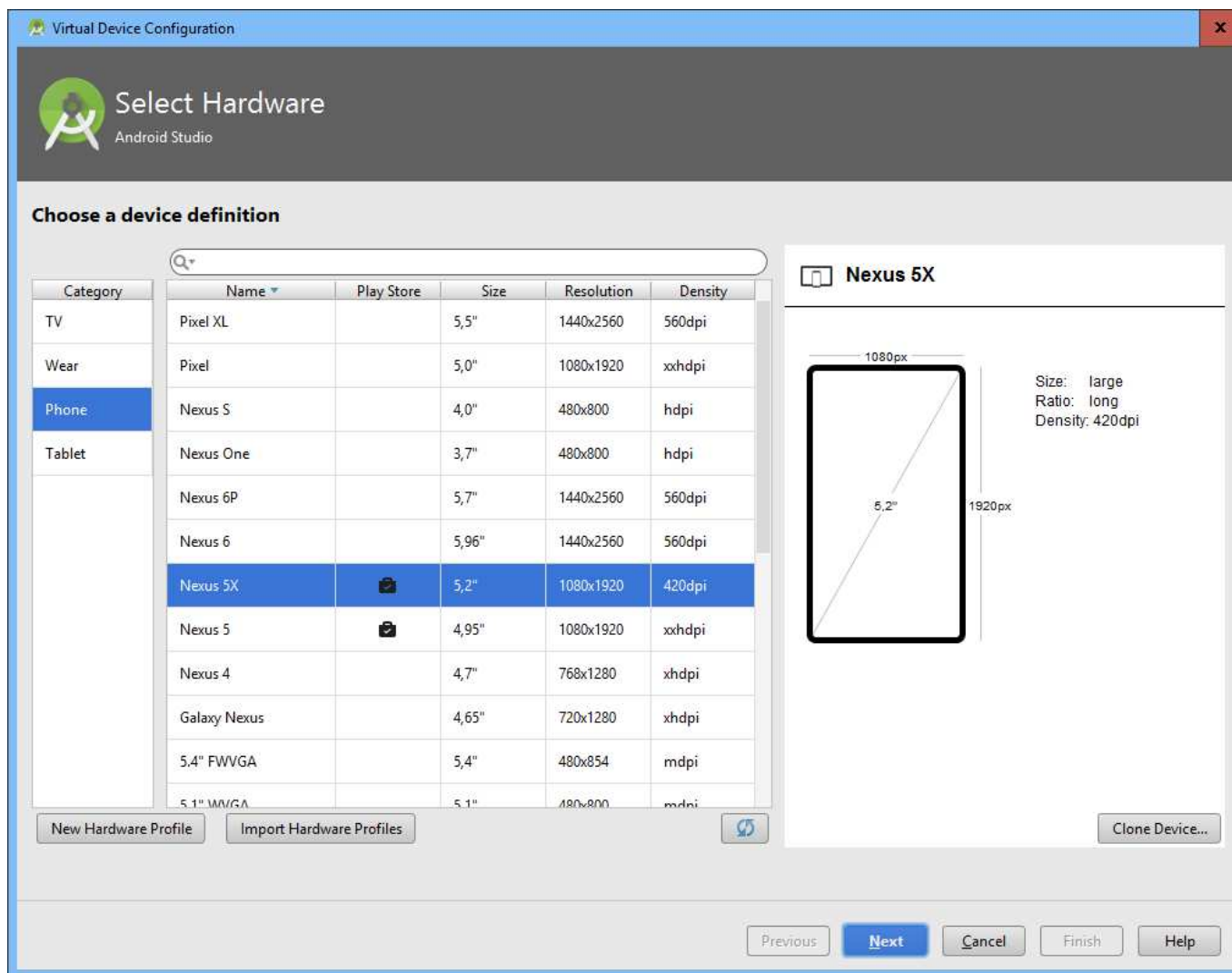
predvolených,

- Create Device
- modifikujte

nastavenia

podľa vášho

zariadenia



# 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>

Kapitola 2. Setting up an Android Studio Development Environment  
(mac/Windows/Linux)

Kapitola 3. Creating an Example Android App in AS

Kapitola 4. Creating an Android Virtual Device (AVD) in AS

Kapitola 5. Using and Configuring the Android Studio AVD Emulator

Kapitola 6. A tour of the Android Studio User Interface

Kapitola 7. Testing Android Studio App on a Physical Android Device

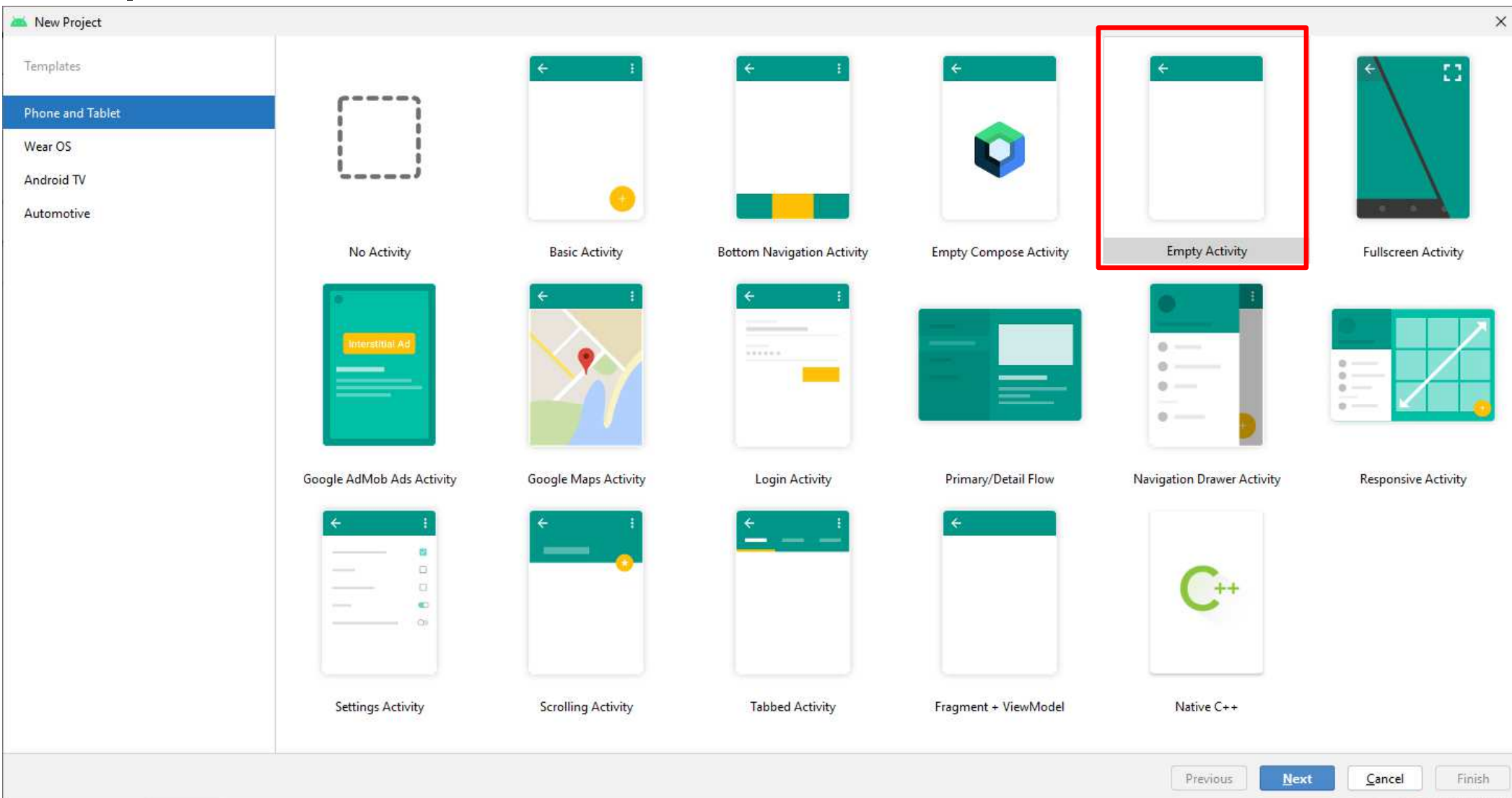
Android Studio 4.0  
Development  
Essentials



Kotlin Edition

# Nový projekt


(File/New/New Android Project)





# Nový projekt

(File/New/New Android Project)

 New Project

**Empty Activity**

Creates a new empty activity


Name


Package name

Save location

Language

Minimum SDK

 Your app will run on approximately **84,9%** of devices.  
[Help me choose](#)

☐ Use legacy android.support libraries 


Using legacy android.support libraries will prevent you from using the latest Play Services and Jetpack libraries

[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%

Submitovanie riešení: Android SDK 11 (API 30),  
(compileSdkVersion 30, buildToolsVersion "30.\*"),  
a min.požadované SDK (minSdkVersion 23)

Minimum SDK

 Your app will run on **< 1%** of devices.  
[Help me choose](#)

# Nový projekt

(File/New/New Android Project)

```
plugins {  
    id 'com.android.application'  
    id 'kotlin-android'  
}
```

```
android {  
    compileSdk 30
```

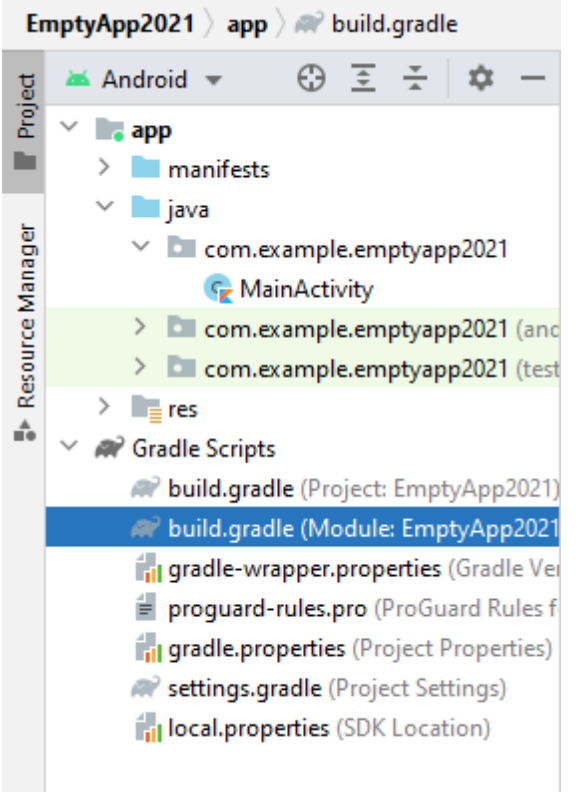
```
defaultConfig {  
    applicationId "com.example.emptyapp2021"  
    minSdk 23  
    targetSdk 30  
    versionCode 1  
    versionName "1.0"  
}
```

Submitovanie riešení: Android SDK 11 (API 30),  
(compileSdkVersion 30, buildToolsVersion "30.\*"),  
a min.požadované SDK (minSdkVersion 23)

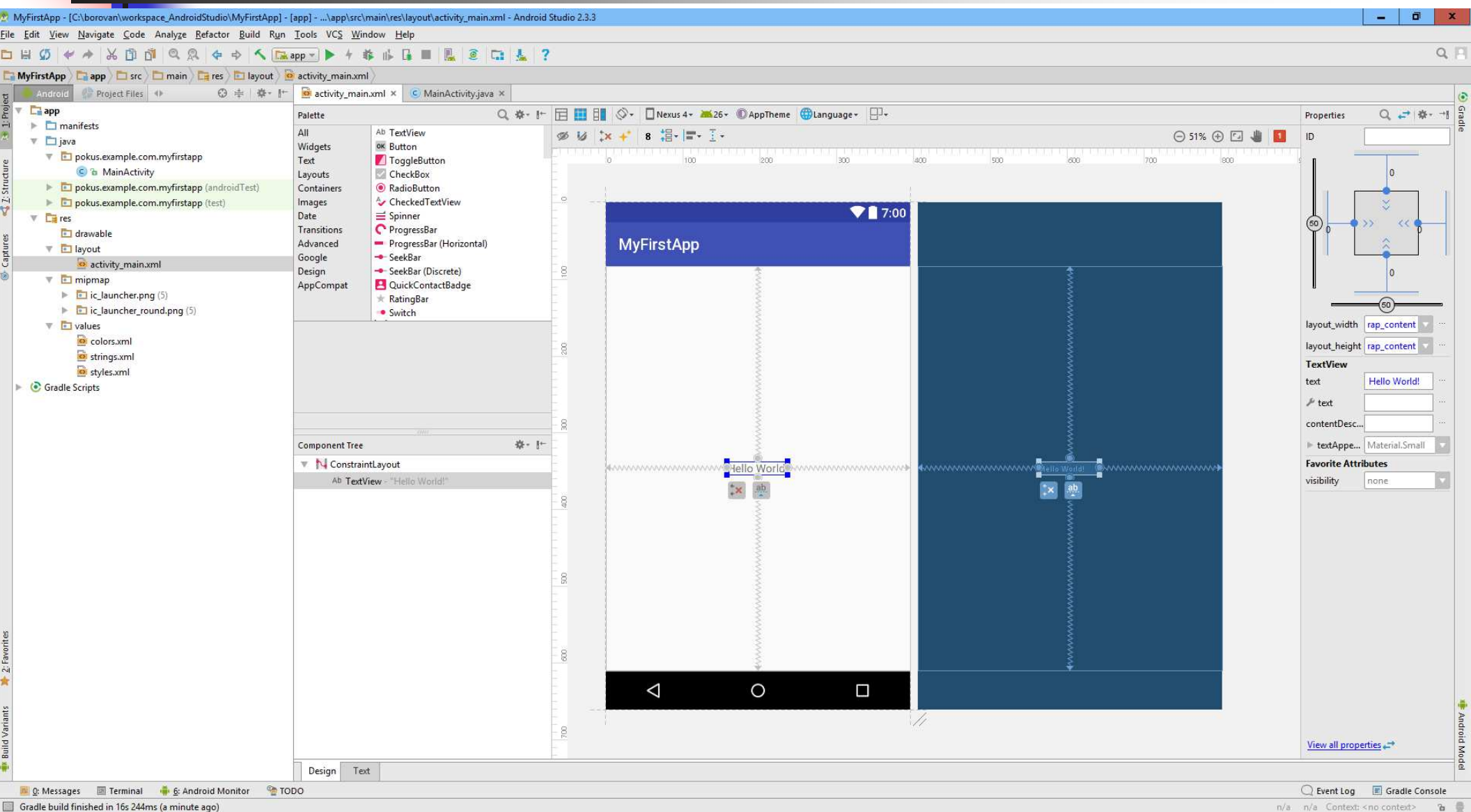
Opening Android projects be like...



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)



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

Nexus 5X API 27 (minSdk(API 29) > deviceSdk(API 27))

Android > activity\_main.xml > MainActivity.kt

Project: app

- manifests
- java
  - com.example.myapplication
    - MainActivity
    - ~~com.example.myapplication (Android Test)~~
    - ~~com.example.myapplication (test)~~
  - java (generated)
  - res
    - drawable
    - layout
      - activity\_main.xml
- mipmap
  - ic\_launcher (6)
  - ic\_launcher\_round (6)
- values
  - colors.xml
  - strings.xml
  - styles.xml

Gradle Scripts

Build Variants

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)

Event Log

Gradle build finished in 886 ms (23 minutes ago)

Attributes

Ab <unnamed> TextView

id

Declared Attributes

Layout

Constraint Widget

Constraints (4)

layout\_width wrap\_content

layout\_height wrap\_content

visibility

visibility

# Pýtajte sa kým nedostanete



MyFirstApp

My Application

Hello World!

## Emulátor

- 
- je pomalý, dlho bootuje
- neposkytuje všetky služby ako konkrétne zariadenie
- o senzoroch ani nehovorí
- dá sa použiť na začiatku
- +
- má ho každý, nič nestojí
- dokonca má viac platforiem
- netreba sync-driver

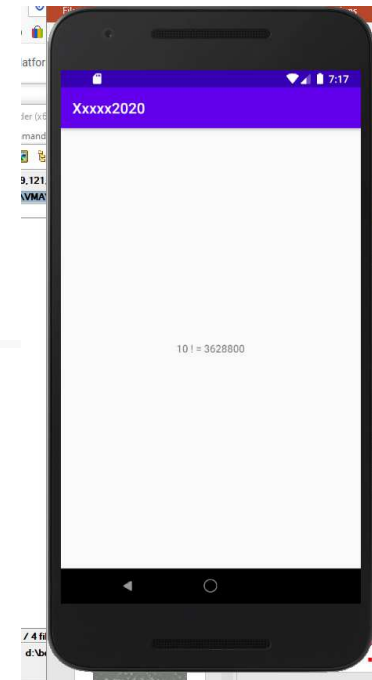
**Ked' už beží, tak ho nezabíjajte !**



# Ako si skúšať Kotlin v AS

(kým sa nedozvieme viac)

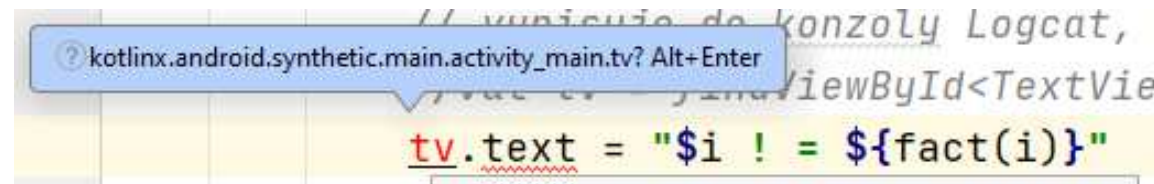
```
class MainActivity : AppCompatActivity() {  
    override fun onCreate(savedInstanceState: Bundle?) {  
        super.onCreate(savedInstanceState)  
        setContentView(R.layout.activity_main)  
        //println(fact(10))  
        for (i in 0..10) {  
            Log.d("TAG", "$i ! = ${fact(i)}")  
            // vypisuje do konzoly Logcat, použite filter s "TAG"  
            val tv = findViewById<TextView>(R.id.tv)  
            tv.text = "$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) 1 else n * fact(n-1)  
}
```



# Integrovanie Android Extensions

```
plugins {  
    id 'com.android.application'  
    id 'kotlin-android'  
    id 'kotlin-android-extensions'  
}  
  
import androidx.appcompat.app.AppCompatActivity  
import android.os.Bundle  
import android.util.Log  
import android.widget.TextView  
import android.widget.Toast  
import kotlinx.android.synthetic.main.activity_main.*
```

```
for (i in 0..10) {  
    Log.d("TAG", "$i ! = ${fact(i)}")  
    // vypisuje do konzoly Logcat, pouzite filter s "TAG"  
    val tv = findViewById<TextView>(R.id.tv)  
    tv.text = "$i ! = ${fact(i)}"  
    // vypise do View komponentu, ktory je v Aktivite  
    Toast.makeText(this, "$i ! = ${fact(i)}",  
        Toast.LENGTH_SHORT).show()  
    // Toast alias Notifier (MITI)  
}
```







# Break point

(štruktúrou projektu pokračujeme na budúce)

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- Switch to kotlin intro