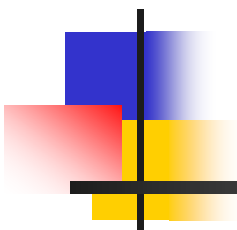


# Vývoj mobilných aplikácií úvod



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KAI, I-18

borovan 'at' ii.fmph.uniba.sk



## ■ Prémiovo-orientované vyučovanie

- prihláste sa do [L.I.S.T.](#)
- ak ste v ňom nikdy neboli, ozvite sa mi...
- sledujte LIST, všetky zadania budú v ňom

## ■ prednášky budú na MS-Teams (slajduio)

- konto (priezvisko@uniba.sk), prihlasovací kód je [2sf3ph4](#)

## ■ oproti 2019

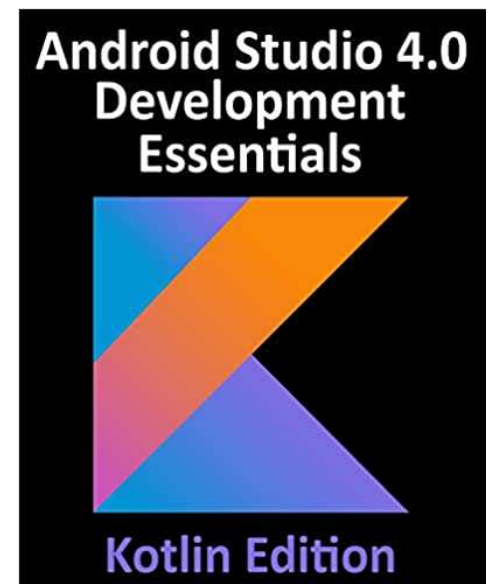
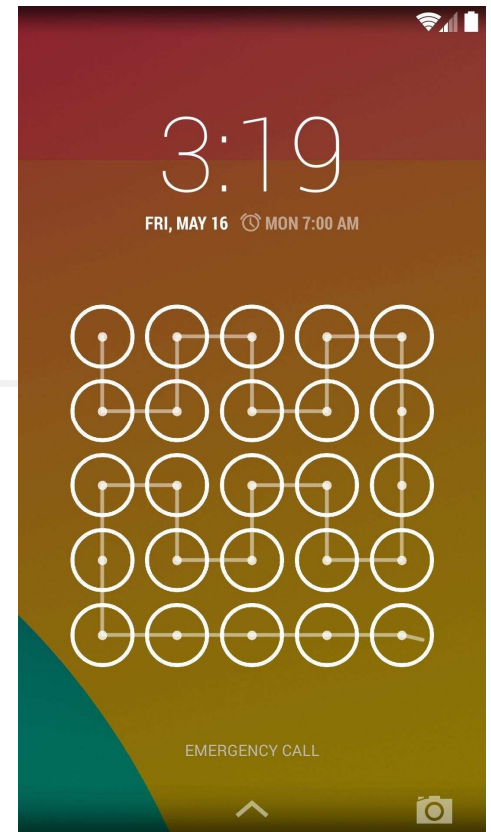
- pribudli: cvičenia a jeden kredit (6)
- zrušené intro cez MIT Inventor

## ■ prémie sa budú sporadicky 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**



# Mobilné OS



aplikácie na rôznych obmedzených HW platformách pod rôznymi OS:

- **Windows Mobile 5.0, 6** - najrôznejšie pda, hand heldy,... fy. Microsoft
- **Windows CE** – pre embeded systémy, fy. Microsoft
- **Palm OS, webOS** – proprietárny OS pre Palm fy. HP, linux kernel
- **Maemo 5** – debian-like od fy.Nokia
- **Symbian** (S60, S80, S90) – open source OS pre smartphony, fy.Nokia, Samsung, SonyEricsson, Panasonic
- **iOS** – iPhone, iPod (unix-like), fy. Apple,
- **Android** - Google
- **Bada** - Samsung (odpoved' na Android) 
- **BlackBerry OS** 
- **Windows Phone** -> **Windows 10 Mobile** 
- **Firefox OS** 
- **Ubuntu Touch** 
- **Huawei OS**

# 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 3+)
  - 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

...

A decorative graphic consisting of overlapping yellow, red, and blue squares with a black crosshair.

# Unity

(game engine)

- #1 Unreal Engine
- #2 Unity

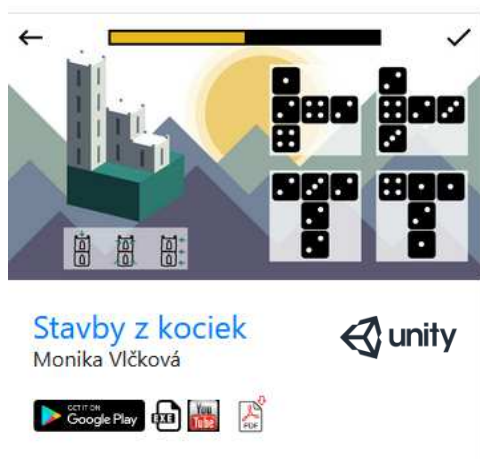
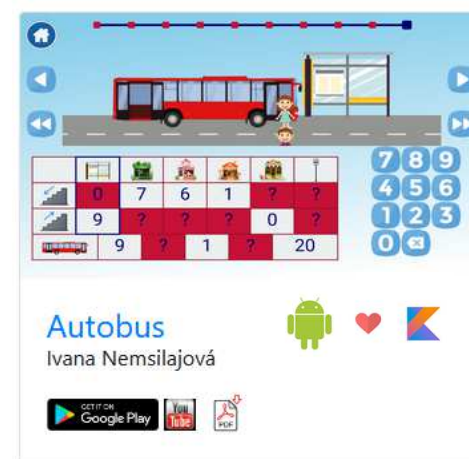
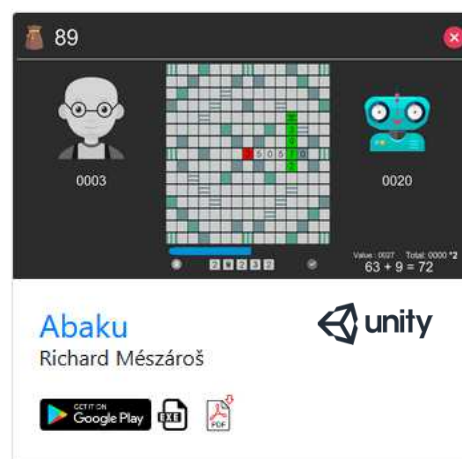
Oblíbený nástroj pre tvorbu multi-platform aplikácií na bakalárske práce

- 2-INF-263/15 magisterský predmet: Tvorba a dizajn počítačových hier
  - začiatok: 26. 9. - 20. 12. 2019
  - <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>

# Príklady bakalárskych prác

([hejny.sk](http://hejny.sk))

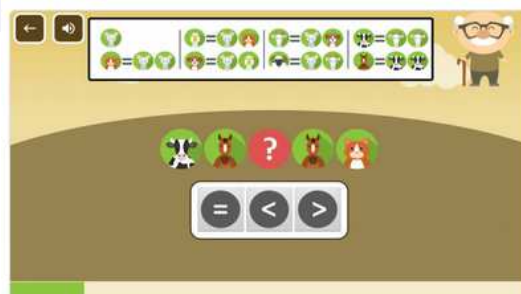
Prostredia Hejného metódy záverečné práce





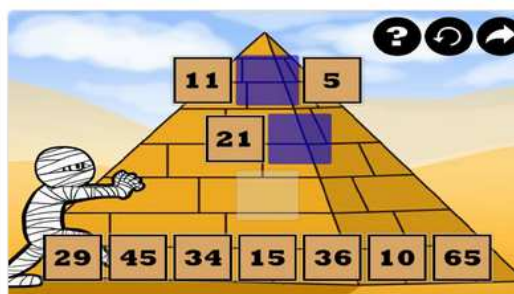
# Príklady bakalárskych prác

([hejny.sk](http://hejny.sk))



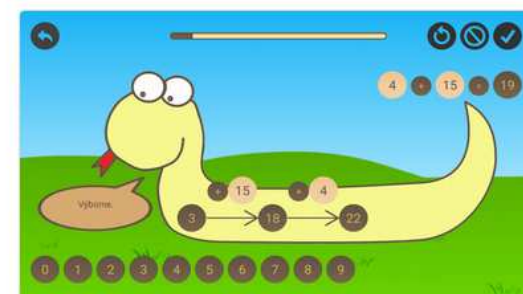
Dedo Lesoň

Alžbeta Bachroníková



Súčtové trojuholníky

Daniel Linhart



Hady

Katarína Fabianová



Násobilkové obdĺžniky

Martin Sadloň



Susedia

Kristína Karafová



Bilandia

Júlia Gablíková



# 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



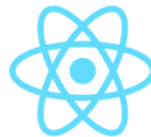
# Vývoj a nástroje

(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 
- Cordova, ionic (.js) 
- Kotlin 
- ReactNative (.js, React) 
- Flutter (nové ale zlepšuje sa) 

Popularita

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



# Trochu (dávnej) histórie

Android, Inc., founded in Palo Alto in Oct 2003 by Andy Rubin, Rich Miner aim to develop:

- "smarter mobile devices that are more aware of its owner's location and preferences"
  - an advanced operating system for digital cameras,
- founders and early employees, Android Inc. operated secretly, just working on software for mobile phones

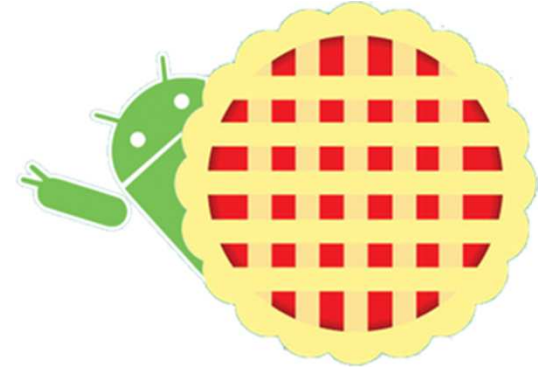
Current (!) rivals Symbian and Windows Mobile

(Apple's iPhone had not been released at the time ... 2007).



Rubin ran out of money. Steve Perlman (QuickTime, WebTV, later working on iPhone, iPods), a close friend of Rubin, brought him \$10,000 in cash in an envelope and refused a stake in the company.

# 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.

## 2 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)
  - 2.5.1 Android 2.0.1 Eclair (API 6)
  - 2.5.2 Android 2.1 Eclair (API 7)
- 2.6 Android 2.2 Froyo (API 8)
- 2.7 Android 2.3 Gingerbread (API 9)
  - 2.7.1 Android 2.3.3 Gingerbread (API 10)
- 2.8 Android 3.0 Honeycomb (API 11)
  - 2.8.1 Android 3.1 Honeycomb (API 12)
  - 2.8.2 Android 3.2 Honeycomb (API 13)
- 2.9 Android 4.0 Ice Cream Sandwich (API 14)
  - 2.9.1 Android 4.0.3 Ice Cream Sandwich (API 15)
- 2.10 Android 4.1 Jelly Bean (API 16)
  - 2.10.1 Android 4.2 Jelly Bean (API 17)
  - 2.10.2 Android 4.3 Jelly Bean (API 18)
- 2.11 Android 4.4 KitKat (API 19)
  - 2.11.1 Android 4.4W KitKat, with wearable extensions (API 20)
- 2.12 Android 5.0 Lollipop (API 21)
  - 2.12.1 Android 5.1 Lollipop (API 22)
- 2.13 Android 6.0 Marshmallow (API 23)
- 2.14 Android 7.0 Nougat (API 24)
  - 2.14.1 Android 7.1 Nougat (API 25)
- 2.15 Android 8.0 Oreo (API 26)
  - 2.15.1 Android 8.1 Oreo (API 27)
- 2.16 Android 9.0 Pie (API 28)

# android android 10



## 10 YEARS OF ANDROID

<https://www.telekom.com/en/blog/group/article/10-years-of-android-541108>

# História sa opakuje

Macworld, Boston, 1997

- <https://www.youtube.com/watch?v=YV9yKB8slJE>
- <https://youtu.be/WxOp5mBY9IY?t=271>





# Raspberry Pi 4

## Iné (nemobilné) zariadenia

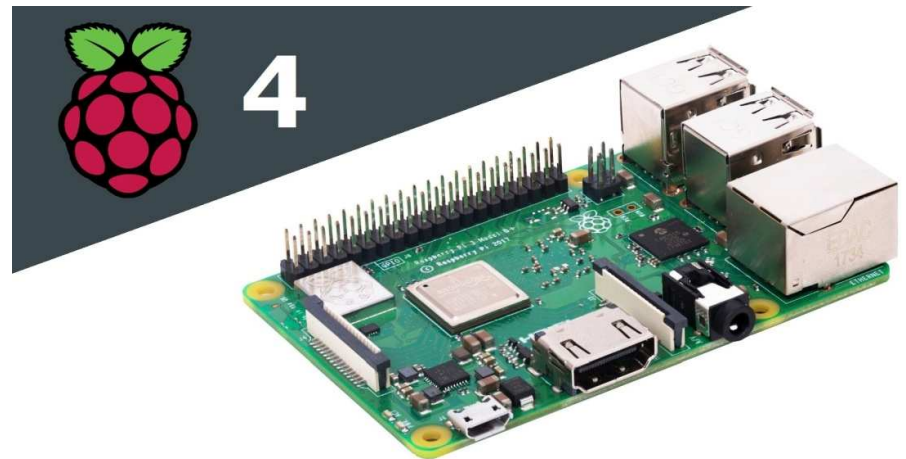
- UK, **Raspberry Pi Foundation**

charity, 2009, to study of basic computer science in schools

- GPIO - Broadcom BCM2711
- Quad ARM 1.5GHz, 64 bit RISC
- 4GB RAM,
- 2xUSB 2.0, 2xUSB 3.0, HDMI,
- RJ-45, microSD slot, BT 5.0

OS:

- Raspbian (Debian Wheezy)
- Pidora (Fedora Remix)
- OpenELEC (An XBMC Media Centre)
- RaspBMC (An XBMC Media Centre)
- Android PI
- Microsoft Windows 10 !!!



# CuBox Pro

## Iné (nemobilné) zariadenia

- Solid Run, Israel (<http://www.solid-run.com/product/cubox-i4pro/>)
- System On Chip i.MX6 Quad Core
- Memory size 2GB/8GB
- GPU GC2000, 3D GPU Type, OpenGL ES1.1,2.0
- HDMI 1080p with CEC 1.4, 3D support
- WiFi 11n BlueTooth
- Ethernet 10/100/1000 Mbps (\*)
- eSata II 3Gbps

OS:

Android 4.3 Jelly Bean

Linaro Ubuntu 11.10

Debian Jessie

XBMC image

GeeXboX, LinXBMC, OpenELEC

