

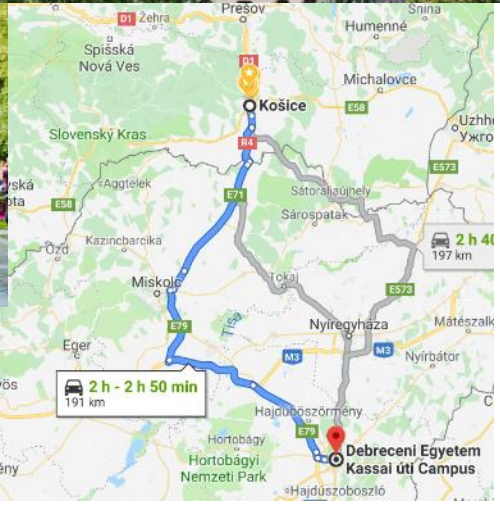
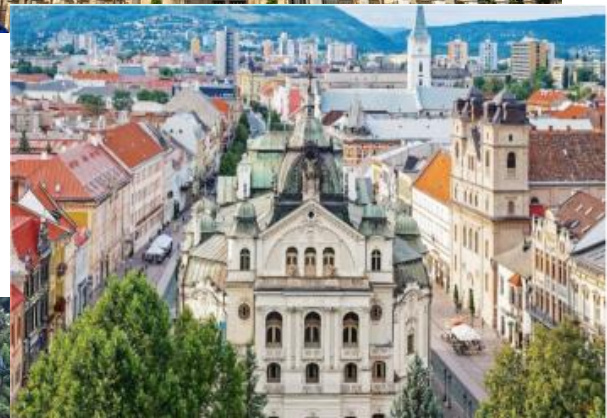
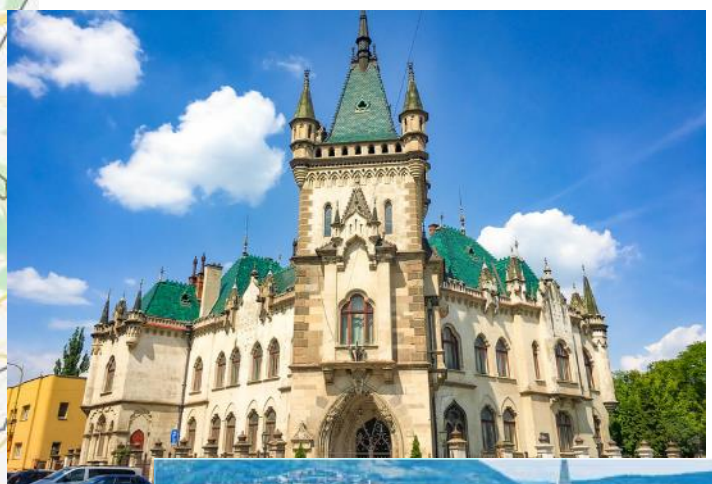


Programming Android mobile devices in MIT App Inventor



Ľubomír Šnajder
[Pavol Jozef Šafárik in Košice, Slovakia](#)

May, 20th -24th 2019, University of Debrecen, Hungary



Subject Informatics in Slovakia

- Elementary School 1 2 **3 4 5 6 7 8** 9
- Secondary School **10 11 12** 13
- Topics:
 - Representations and Tools
 - **Algorithmical Problem solving**
 - Hardware and Software
 - Communication and Collaboration
 - Informatics Society



Programming in schools

- **Paradigms** (procedural -> event driven, OOP)
- **Languages** (Logo, Pascal -> Scratch, Python)
- **Devices** (PC -> robotics, mobile devices, drones, IoT)
- **Aims** (language constructions -> CT, inquiry skills)
- **Approaches** (traditional -> PBL, IBSE)

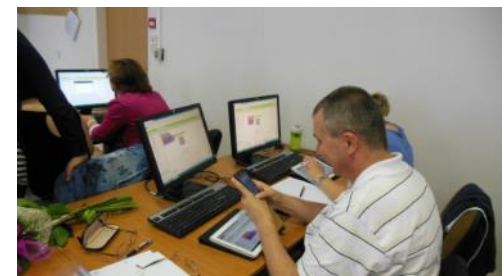
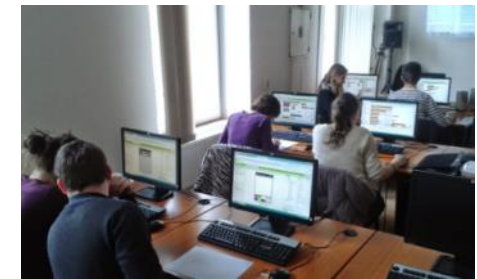


Programming of Mobile Devices

- non-formal classes (rings) for K7-K9 (2012-2017)
- summer camps for K8 (2015)



- Clubs of informatics teachers (2014-)
- future informatics teachers – subject “School programming environments” (2013-)
- [NPITA](#) – subject “Programming mobile devices” for secondary schools (2018-)



A model for informatics classes

- Problem solving and Programming
- **Programming of Mobile Devices**
- Computer Systems and Networks
- Information Security
- Databases
- Object approach to Problem solving
- Data creation and Presentation
- Programming the Websites



Characteristics of the subject

```
when Button_Nahovor .Click
do call SpeechRecognizer1 .GetText

when SpeechRecognizer1 .AfterGettingText
result
do set TextBox_Vstup .Text to get result
```



- Rotation Vector
- Gravity
- Light
- Accelerometer
- Geomagnetic Field
- Orientation
- Gyroscope
- Pressure
- Linear Acceleration
- Proximity
- Step Counter
- Location

Project



Projects



Etudes



Intro

7 Team project

4.4 Party game	4.5 Dice poker	5.1 Reverse caching	5.2 Geolocation game	6.1 Trainer for patients and sportsmen	6.2 Touch gestures game
3.1 MM notebook for young reporter	3.2 Breath trainer	3.3 First aid assistant	4.1 Traffic data logger	4.2 Polling system	4.3 Foreign language assistant

2.7 Physical exercise assistant	2.8 Random sentences generator	2.9 Displaying GPS position	2.10 GPS position assistant	2.11 Internet polling	2.12 Communication assistant
2.1 Drawing editor	2.2 Quick response game	2.3 Ball game	2.4 Calculator	2.5 Collection of jokes	2.6 QR code reader

1.2 First application
1.1 Android mobile device

Structure of teaching materials - etudes

- Keywords
- Cognitive objectives of the chapter
- Preparation for teaching
- Recommend process of the instruction
- List of etudes
- Table with mapping tasks to components and language concepts
- Collection of 12 etudes
- Bibliography
- Index

Structure of particular etudes

- Learning elements (components, events, methods, properties, language concepts)
- List of working files
- Commentary on instruction progress
- Worksheet with several tasks
- Worksheet with tasks' solution
- Self-assessment card

Components and language concepts

User Interface:	Language concepts:
<ul style="list-style-type: none"> • Screen, Canvas, Ball, Image • Multiple Screens • Button, TextBox, Label, CheckBox • Horizontal/Vertical/Table Arrangements • ListView, ListPicker • Slider, Spinner • Notifier 	<ul style="list-style-type: none"> • Loops • Branches, conditions • Mathematical operations a functions • Global variable (numbers, colors) • Lists • Procedures, functions • Local variables
Sensors:	Communication:
<ul style="list-style-type: none"> • Clock • AccelerometerSensor • LocationSensor • Map • OrientationSensor • BarcodeScanner • ProximitySensor • Pedometer 	<ul style="list-style-type: none"> • ActivityStarter • Texting • PhoneCall
Memory:	Multimedia:
<ul style="list-style-type: none"> • TinyDB • FireBase 	<ul style="list-style-type: none"> • Sound, TextToSpeech • SpeechRecognizer



Support for teachers

- Teaching materials and aids for pupils
 - teaching materials, worksheet with tasks' solutions, source codes of applications
 - worksheet with several tasks, self-assessment card, working files, reference materials
- Course for teachers (50 hours)
- Communication with teachers (LMS Moodle)
 - questionnaire for teachers (feedback after lessons)
 - pupils' applications
 - discussion forums

Verifying and reviewing of the subject



11B-PMZ

Účastníci

Odznaky

Kompetencie

Známky

Všeobecné

Úvod

Tvorba jednoduchých projektov – programátorských etúd

Vývoj aplikácií s využitím multimédií

Vývoj aplikácií s využitím sieti

Vývoj aplikácií s využitím geolokácie

Vývoj aplikácií s využitím senzorov a aktuátorov

Vývoj a prezentácia vlastnej tímovej aplikácie

LMS Moodle



Diskusia k priebehu overovania predmetu PMZ

discussion forum

Úvod



1. Úvod - metodika, pracovné listy, sebahodnotiace karty, zdrojákie



Dotazník na hodnotenie výučby kapitoly 1



Výstupy žiakov z výučby kapitoly 1

Tvorba jednoduchých projektov – programátorských etúd

9. 9. 2018 - aktualizovaná kapitola 2 a jej podkapitoly 2.3, 2.4, 2.5, 2.6, 2.7, 2.9, 2.11, 2.12



2. Etudy - metodika, pracovné listy, sebahodnotiace karty, zdrojáky, multimediálne súbory



Dotazník na hodnotenie výučby podkapitoly 2.1



Výstupy žiakov z výučby podkapitoly 2.1



Dotazník na hodnotenie výučby podkapitoly 2.2



Výstupy žiakov z výučby podkapitoly 2.2



Dotazník na hodnotenie výučby podkapitoly 2.3



Výstupy žiakov z výučby podkapitoly 2.3

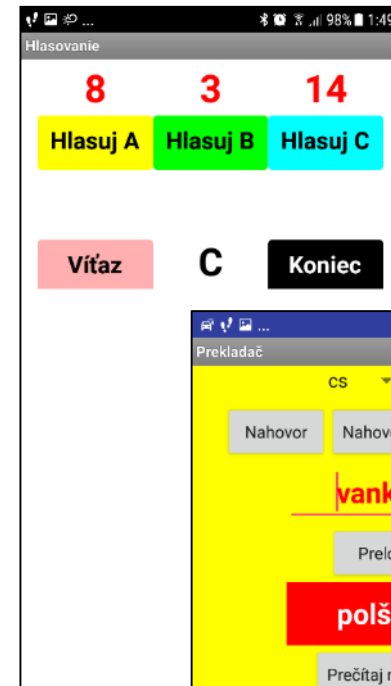
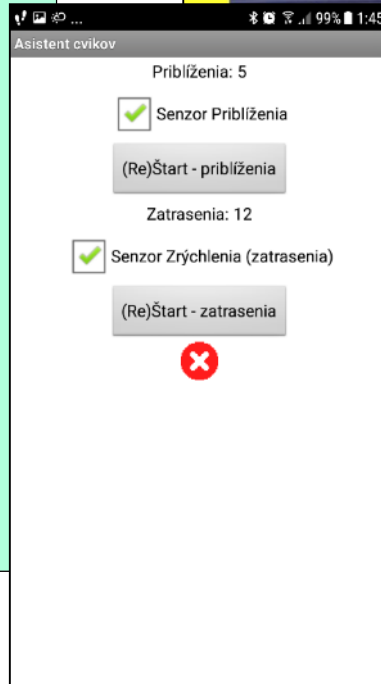
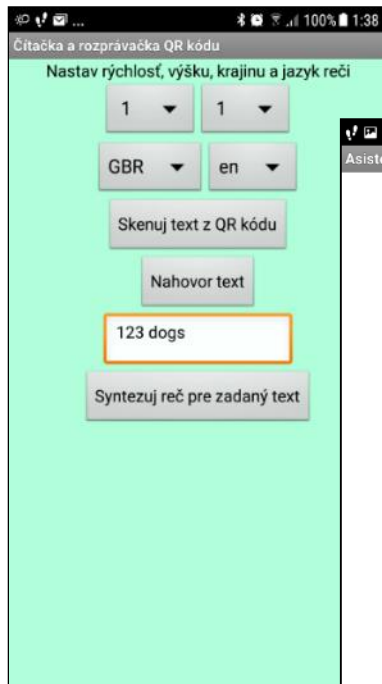


Dotazník na hodnotenie výučby podkapitoly 2.4

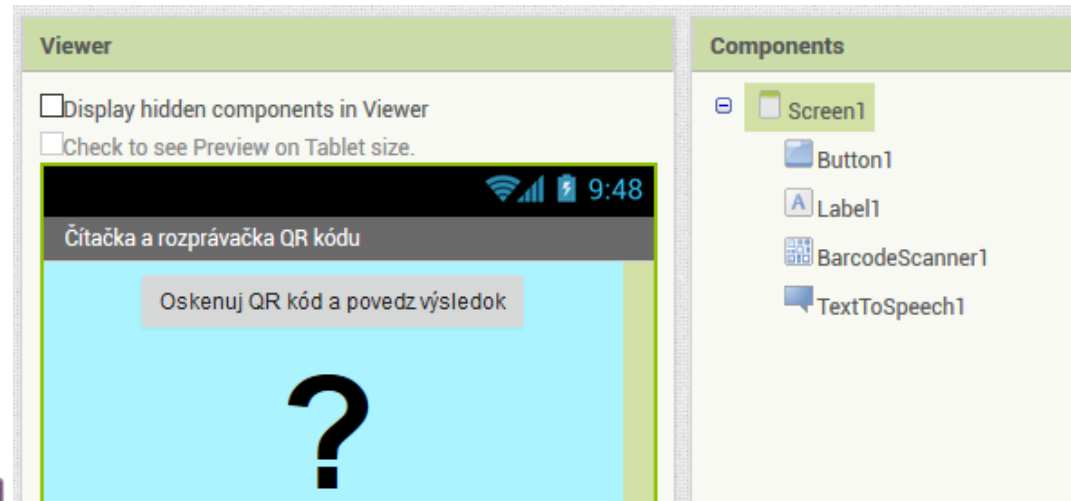
**teaching material
worksheets
working files
self-assessment**

**questionnaires
pupils' outputs**

Samples of etudes



QR code reader





```
when Button1 .Click  
do call BarcodeScanner1 .DoScan
```

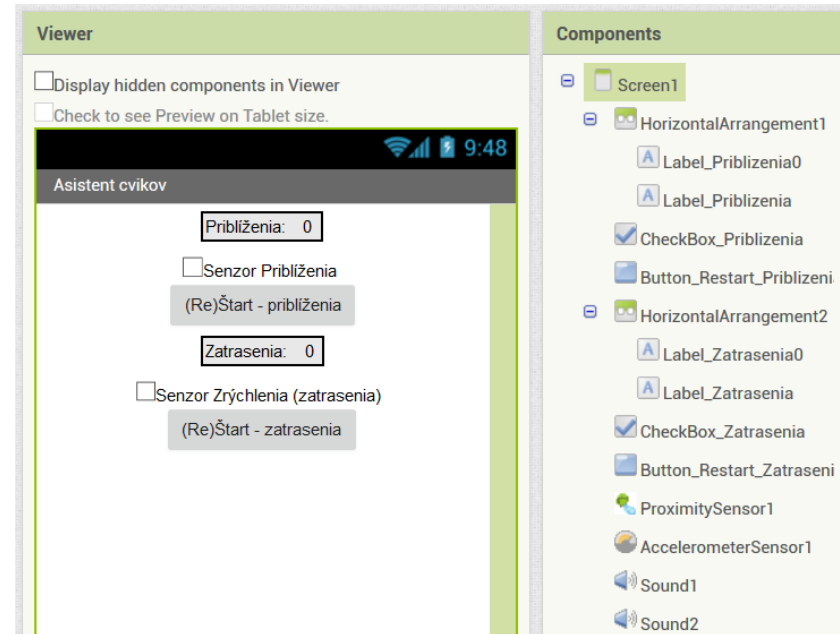
```
when BarcodeScanner1 .AfterScan  
  result  
do set Label1 .Text to get result  
  call TextToSpeech1 .Speak  
  message get result
```



Physical exercise assistant

```
when ProximitySensor1 ProximityChanged
  distance
do
  if get distance = 0
  then
    set Screen1 BackgroundColor to 
    call Sound1 Play
    call Sound1 Vibrate
    milliseconds 100
  else
    set Screen1 BackgroundColor to 
```

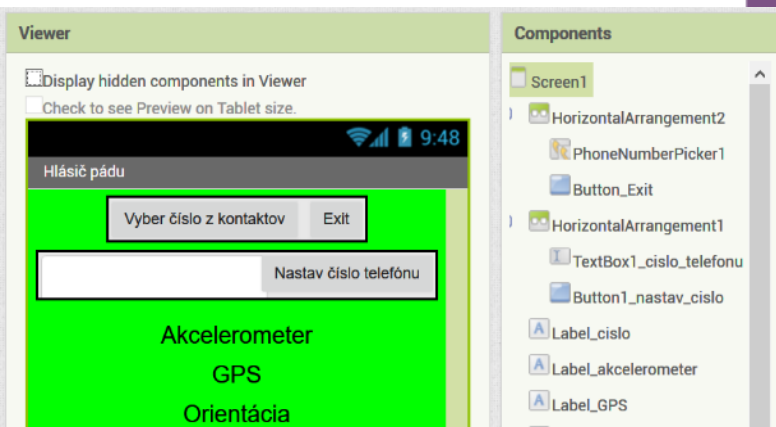
```
when AccelerometerSensor1 Shaking
do
  call Sound2 Play
```



Alarm for seniors' falls

```
when AccelerometerSensor1 . AccelerationChanged
  xAccel yAccel zAccel
do
  call vypis_hodnoty_senzorov
  if
    get global akceleracia < -5
  then
    call registracia_padu
```

```
to registracia_padu
do
  call Sound1 . Play
  if
    Label_cislo . Text ≠ " "
  then
    set Texting1 . PhoneNumber to Label_cislo . Text
    set Texting1 . Message to
      join
        " Registrovany pad pana LS. In Akceleracia: "
        Label_akcelerometer . Text
        "\n GPS: "
        Label_GPS . Text
        "\n Orientacia: "
        Label_orentacia . Text
    set Label_cislo . Text to " "
    set global cakaj to 1
    set global akceleracia to 9.8
    set AccelerometerSensor1 . Enabled to false
    set Clock1 . TimerEnabled to true
    call Texting1 . SendMessage
```

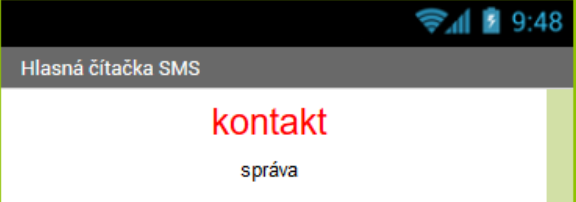


SMS reader

```
when Texting1 MessageReceived
  number messageText
do
  set Label_Kontakt Text to get number
  set Label_Sprava Text to get messageText
  call TextToSpeech1 Speak
    message join "Došla Ti správa od "
              get number
              " Text správy: "
              get messageText
```

Viewer

Display hidden components in Viewer
 Check to see Preview on Tablet size.



Components

- Screen1
 - Label_Kontakt
 - Label_Sprava
 - Texting1
 - TextToSpeech1



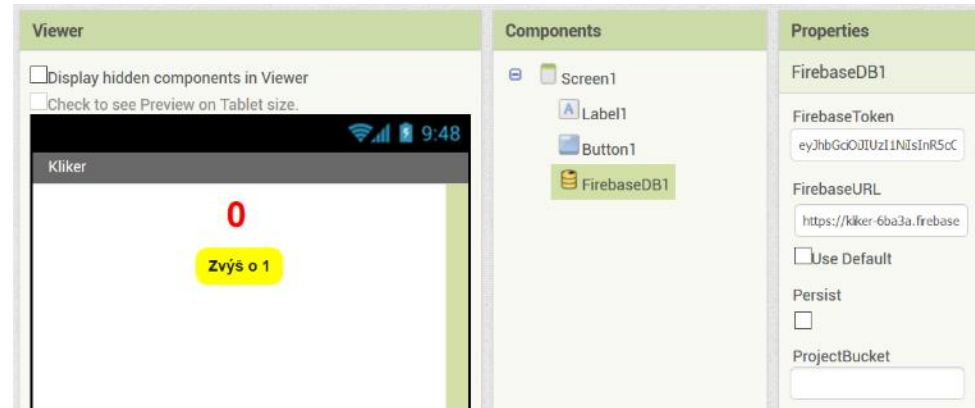
Internet polling

```
when Screen1 Initialize
do call FirebaseDB1 GetValue
    tag pocet
    valueIfTagNotThere 0
```

```
when Button1 Click
do set Label1 Text to Label1 Text + 1
    call FirebaseDB1 StoreValue
        tag pocet
        valueToStore Label1 Text
```

```
when FirebaseDB1 GotValue
    tag value
do set Label1 Text to get value
```

```
when FirebaseDB1 DataChanged
    tag value
do set Label1 Text to get value
```






Acknowledgements

- Projects: NPITA, KEGA 029UKF-4/2018
- Secondary school teachers (verifiers), IT consultants

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	Rotation Vector
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	Step Counter
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Contact



doc. RNDr. Ľubomír ŠNAJDER, PhD.

lubomir.snajder@upjs.sk

P. J. Šafárik University in Košice

Faculty of Science

Institute of Computer Science

Jesenná 5, 041 54 Košice

SLOVAKIA

