

# MIT Inventor

prvý dotyk aplikácie

---

Peter Borovanský  
KAI, I-18

borovan 'at' ii.fmph.uniba.sk



# Ako začať s App Inventor

<http://appinventor.mit.edu/explore/ai2/setup-emulator.html>

- potrebujete google-mail účet
- <http://ai2.appinventor.mit.edu/>

Počítač:

- platformy: MS-Windows, Mac OS X, Ubuntu, Debian
- browser: FF, Safari, Chrome, ~~IE~~
- setup page: <http://appinventor.mit.edu/explore/ai2/setup.html>
- pre MS-Windows treba pustiť **MIT Appinventor Tools 2.3.0 (~80 MB)**



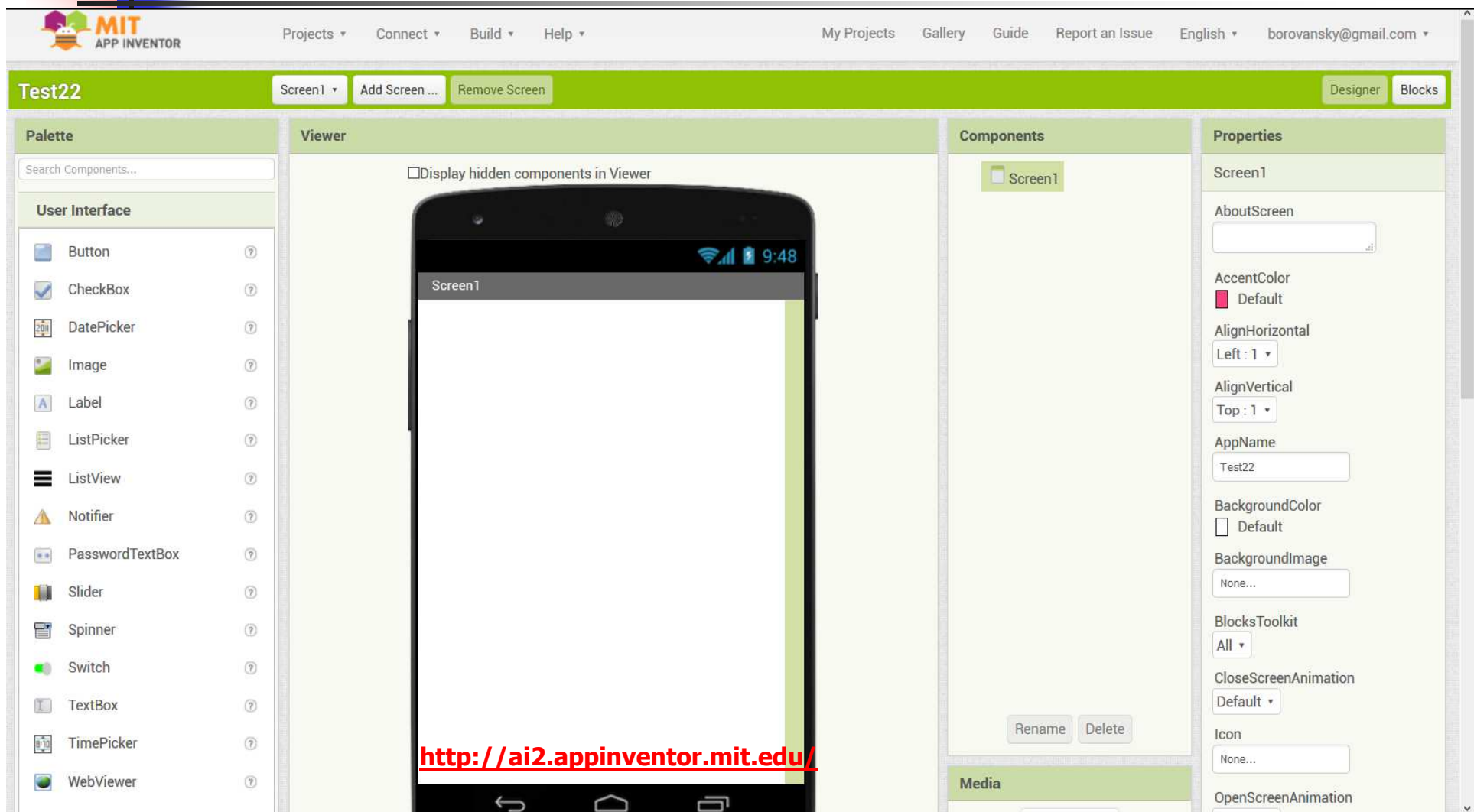
Na zariadení:

<https://play.google.com/store/apps/details?id=edu.mit.appinventor.aicompanion3>

Android Mobil (ale prežijete aj s emulátorom):

- v mobile: Setting/Application/Development/, 7xklik na Build Number  
USB Debugging = ON (môžete uploadovať vlastné aplikácie .apk)  
Stay awake = ON (nebude vám usávať, kým ho máte na kábli)  
Allow mock location = ON (ak chcete používať nejaké fake GPS – neskôr)  
Sound & Display/Orientation = OFF

# MIT Inventor – hlavní panel



# Android Apps with App Inventor: The Fast and Easy Way to Build Android Apps

J.H.Kloss, Amazon: 4.4/5

1. Installing and configuring App Inventor
2. Building modern, attractive mobile user interfaces
3. Controlling Android media hardware, including the camera
4. Saving data locally with TinyDB, or in the cloud with Tiny
5. Streamlining and automating phone, text, and email com
6. Tracking orientation, acceleration, and geoposition
7. Integrating text-to-speech and speech-to-text in your apps
8. Controlling other apps and Web services with ActivityStarter
9. Building mobile mashups by exchanging data with Web APIs
10. Testing your apps for diverse hardware with the Android Emulator
11. Example apps

<http://books.google.sk/books?id=rfKyt6TRLloC&pg=SA4-PA7&lpg=SA4-PA7&dq=laughter+android+kloss&source=bl&ots=Kht9zKTIyK&sig=YqHJbc8v77VtR28RmpZccyV2ScY&hl=sk&sa=X&ei=bGOZUMmgDMbesqbA64HIBq&ved=0CCkQ6AEwAQ#v=onepage&q&f=true>

[http://www.amazon.com/Android-Apps-App-Inventor-Build/dp/0321812700/ref=sr\\_1\\_7?s=books&ie=UTF8&qid=1322522259&sr=1-7](http://www.amazon.com/Android-Apps-App-Inventor-Build/dp/0321812700/ref=sr_1_7?s=books&ie=UTF8&qid=1322522259&sr=1-7)





# Iné zdroje

- AppInventor at MIT (<http://appinventor.mit.edu/>)
- Kurz edX: Mobile Computing with App Inventor - CS Principles (english)  
(<https://courses.edx.org/courses/course-v1:TrinityX+T007x+1T2017/course/>)
- Kurz Learn2Code: MIT Inventor (slovensky)  
(<https://www.learn2code.sk/kurzy/mit-app-inventor>)
- príklady hotových projektov, ak radšej čítate hotové projekty:  
App Inventor Snippets (<http://puravidaapps.com/snippets.php>)
- App Inventor Teach – pre učiteľov (<http://appinventor.mit.edu/explore/teach.html>)
- MIT Inventor Tutorials – Hour of Code (<http://appinventor.mit.edu/explore/hour-of-code.html>)
- MIT Inventor Public Open Source (<http://appinventor.mit.edu/appinventor-sources/>)
- Dlho očakávané MIT Inventor for iOS (<http://doesappinventorrunonios.com/>)

# My projects

zoznam  
mojich  
projektov

import  
export

Connect

Build

login

The screenshot shows the MIT App Inventor web interface. The browser address bar displays `ai2.appinventor.mit.edu/?locale=en#568460635170`. The top navigation bar includes links for Projects, Connect, Build, Help, My Projects, Gallery, Guide, Report an Issue, English, and a user profile for borovansky@gmail.com. The main content area is divided into two sections: 'My Projects' on the left and a table of projects on the right.

**My Projects List:**

Name	Date Modified	Published
<input type="checkbox"/> ShockMe	Sep 29, 2015, 8:42:36 PM	No
<input type="checkbox"/> PresporksePivociary	Sep 17, 2015, 7:47:00 PM	No
<input type="checkbox"/> demo_Media	Oct 1, 2016, 1:23:14 PM	No
<input type="checkbox"/> Prvy	Oct 1, 2016, 1:08:03 PM	No
<input type="checkbox"/> Labilo	Sep 17, 2015, 7:45:04 PM	No
<input type="checkbox"/> MazeLabyrinth	Sep 30, 2016, 12:30:40 PM	No
<input type="checkbox"/> Dynamic		
<input type="checkbox"/> SpiritLevel		
<input type="checkbox"/> Xxxx		
<input type="checkbox"/> Twiitingo		
<input type="checkbox"/> FireBaseDemo		
<input type="checkbox"/> EV3Robot		
<input type="checkbox"/> Social		
<input type="checkbox"/> next		
<input type="checkbox"/> EV3		
<input type="checkbox"/> BaseEV3Project		
<input type="checkbox"/> Hallooooo		
<input type="checkbox"/> PokusPrednaska		

**My projects menu:**

- Start new project
- Import project (.aia) from my computer ...
- Import project (.aia) from a repository ...
- Delete Project
- Save project
- Save project as ...
- Checkpoint
- Export selected project (.aia) to my computer
- Export all projects
- Import keystore
- Export keystore
- Delete keystore

**Connect menu:**

- AI Companion
- Emulator
- USB
- Reset Connection
- Hard Reset

**Build menu:**

- App ( provide QR code for .apk )
- App ( save .apk to my computer )

# Prvý projekt

The screenshot displays the MIT App Inventor web interface. At the top, the MIT App Inventor logo is on the left, and navigation links for Projects, Connect, Build, Help, My Projects, Gallery, Guide, Report an Issue, English, and a user email (borovansky@gmail.com) are on the right. Below the navigation bar, a green header bar contains the project name 'Prvy2017', a dropdown menu for 'Screen1', and buttons for 'Add Screen ...' and 'Remove Screen'. On the far right of this bar are 'Designer' and 'Blocks' tabs.

The main workspace is divided into four panels:

- Palette:** A vertical list of component categories on the left. The 'Connectivity' category is selected and highlighted in blue. Below it, four connectivity components are listed: ActivityStarter, BluetoothClient, BluetoothServer, and Web, each with a question mark icon.
- Viewer:** A central area showing a preview of the app. It includes checkboxes for 'Display hidden components in Viewer' and 'Check to see Preview on Tablet size'. Below these is a simulated mobile screen showing a status bar with Wi-Fi, cellular signal, and battery icons, along with the time '9:48'. The screen content is labeled 'Screen1'.
- Components:** A panel on the right showing a list of components added to the app. Currently, only 'Screen1' is listed.
- Properties:** A panel on the far right showing the properties for the selected 'Screen1' component. Properties include: AboutScreen (a text input field), AlignHorizontal (set to 'Left : 1'), AlignVertical (set to 'Top : 1'), AppName (set to 'Prvy2017'), BackgroundColor (set to 'White'), BackgroundImage (set to 'None...'), CloseScreenAnimation (set to 'Default'), Icon (set to 'None...'), and OpenScreenAnimation (set to 'Default').



# Connect WiFi

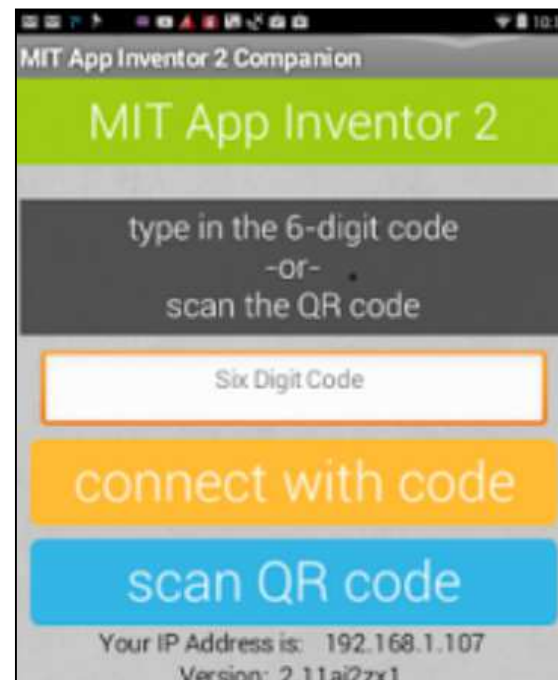
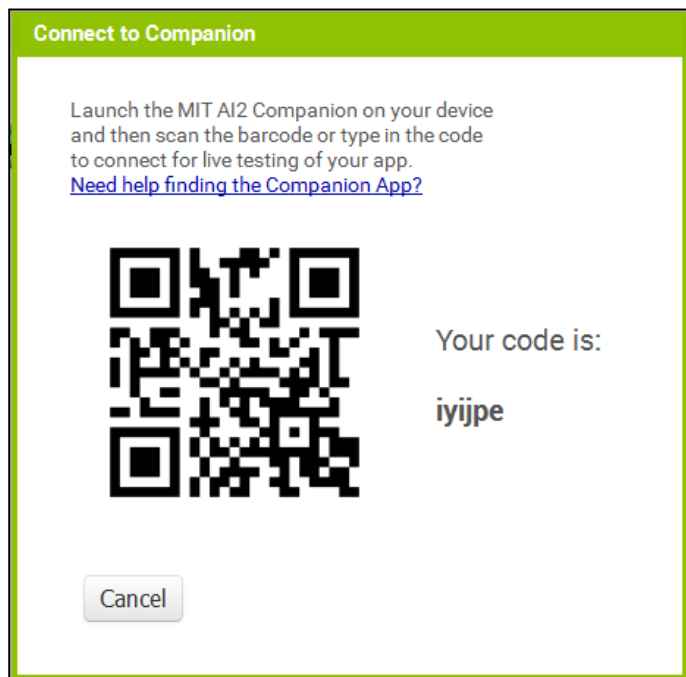
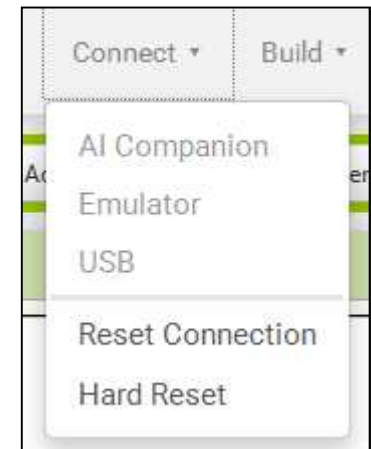


- Nainštalujte MIT AI2 Companion App cez Google Play Store

<https://play.google.com/store/apps/details?id=edu.mit.appinventor.aicompanion3>

Connect to Device

- spusti MIT AI2 Companion App





# Palety komponentov

- User Interface

- Button, CheckBox, Clock, Image, Label, List/Time/Date-Picker, Password, Slider, TextBox

- Layout

- Horizontal/Vertical/Table Arrangement [Scrollable]

- Media

- Camcoder, Camera, ImagePicked, Player, Sound, VideoPlayer, TextToSpeech, SpeechRecognizer

- Drawing and Animation

- Ball, Canvas, ImageSprite

- Social

- ContactPicker, EmailPicker, PhoneNumberPicker, PhoneCall, Texting, Twitter, Sharing

- Sensor

- Accelerometer, Location, Orientation, Gyro, Pedometer, Proximity, Bar Code Scanner

- Storage

- File, TinyDB, FireBaseDB

- Connectivity

- BluetoothClient-Server, ActivityStarter

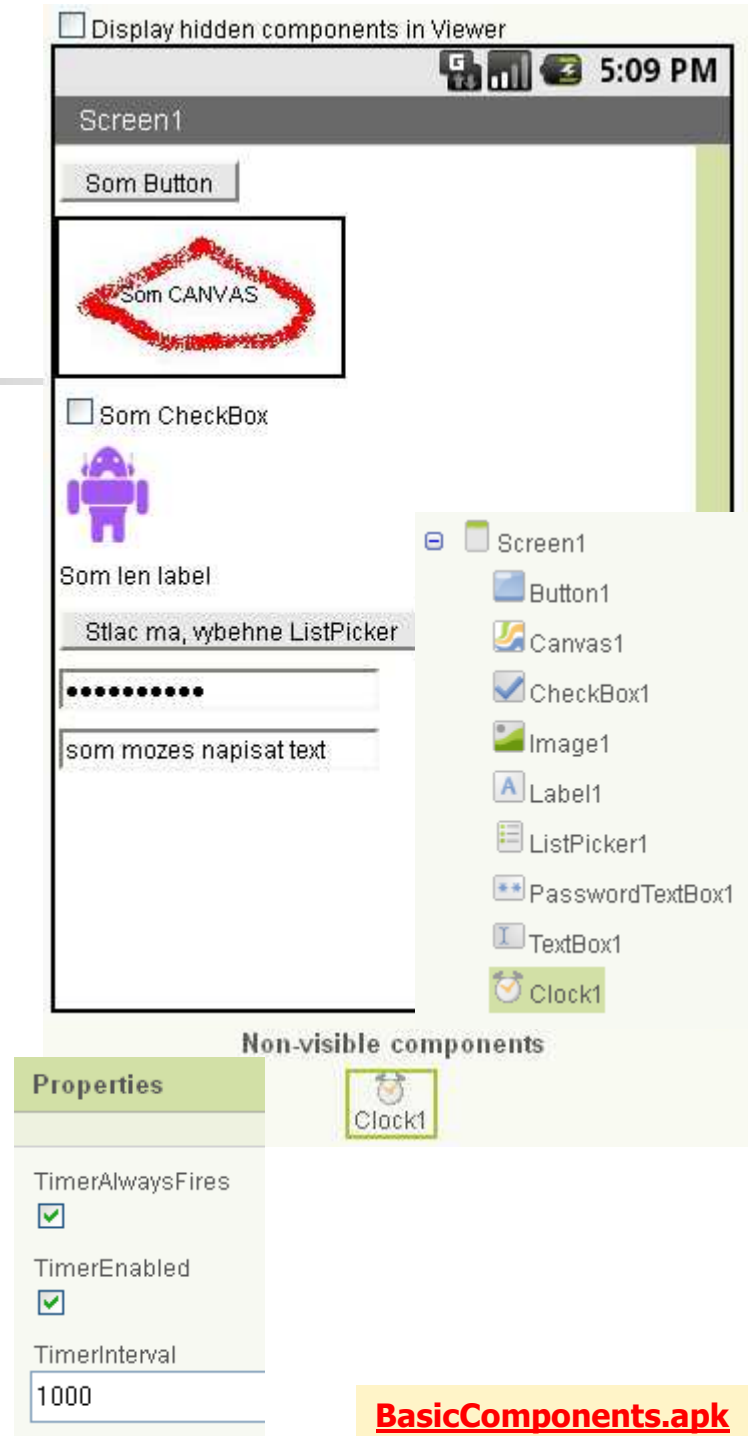
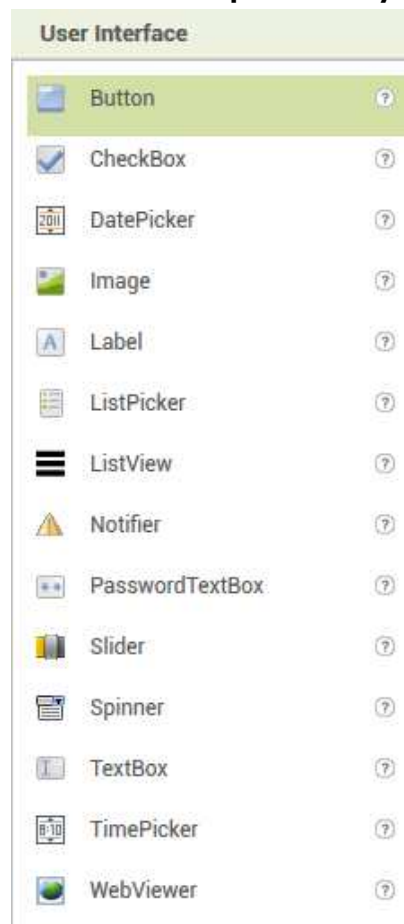
- Lego MINDSTORMS



# User Interface

Ilustrujeme si základné vizuálne komponenty:

- Button
- CheckBox
- Clock
- Image
- Label
- List/Time/Date-Picker
- PasswordTextBox
- TextBox
- Notifier
- WebViewer



# Layouts (Arrangement)

- HorizontalArrangement
- TableArrangement
- VerticalArrangement

☐ Display hidden components in Viewer

Screen2

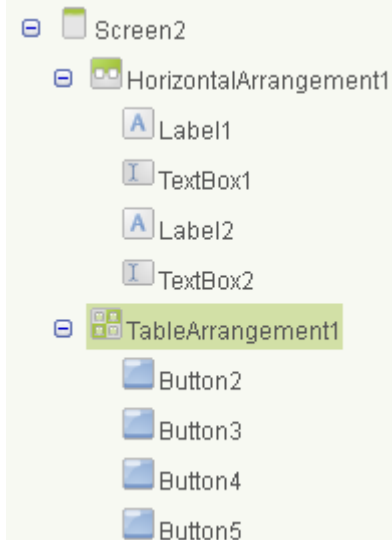
Tah:  Cas:

4	3	5	1
7	9	12	2
6	10	13	.
8	11	14	15

Start Stop

## Layout

- HorizontalArrangement ?
- HorizontalScrollArrangement ?
- TableArrangement ?
- VerticalArrangement ?
- VerticalScrollArrangement ?



## Properties

Columns

4

Rows

4

Visible

showing ▼

Width

Fill parent...

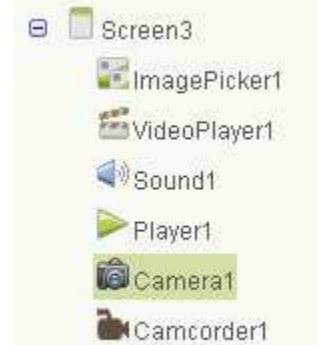
Height

Fill parent...

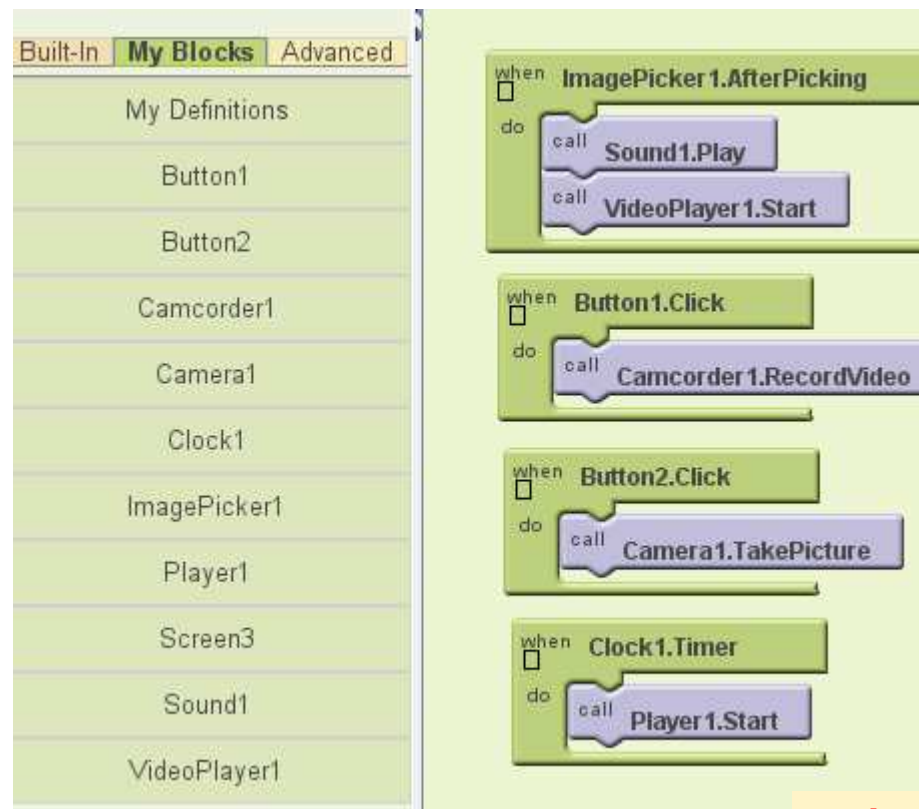
# Media

- [Camera](#)
- [ImagePicker](#)
- [Player](#)
- [Sound](#)
- [VideoPlayer](#)

- Spustiť: block editor
- Uložiť (strýčko Google si to ukladá sám v MyProjects:-)



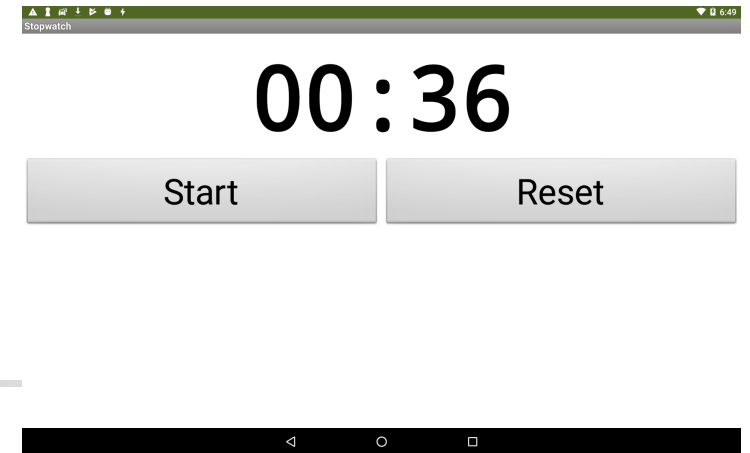
## Non-visible components



[\*\*BasicComponents.apk\*\*](#)

# Stopky

(clock – timer)



```
initialize global millis to 0

when Clock1.Timer
do
  set global millis to get global millis + 1000
  call displayTime

when btnStart.Click
do
  set Clock1.TimerEnabled to true
  set btnStart.Visible to false
  set btnStop.Visible to true

when btnReset.Click
do
  set Clock1.TimerEnabled to false
  set global millis to 0
  call displayTime

to displayTime
do
  set display.Text to call Clock1.FormatDateTime
    instant call Clock1.MakeInstantFromMillis
    millis get global millis
    pattern "mm:ss"

when Screen1.Initialize
do
  set btnStart.Visible to true
  set btnStop.Visible to false

when btnStop.Click
do
  set Clock1.TimerEnabled to false
  set btnStop.Visible to false
  set btnStart.Visible to true
```

# FingerPaint1

jednoduché malovátko prstom



```
when BtnBlue.Click
do set Canvas1.PaintColor to blue

when BtnGreen.Click
do set Canvas1.PaintColor to green

when BtnRed.Click
do set Canvas1.PaintColor to red

when ButtonClear.Click
do call Canvas1.Clear

when ButtonSmall.Click
do set Canvas1.LineWidth to 5

when ButtonBig.Click
do set Canvas1.LineWidth to 15
```

```
when Canvas1.Touched
x y touchedAnySprite
do call Canvas1.DrawCircle
    centerX get x
    centerY get y
    radius 10
    fill true
```

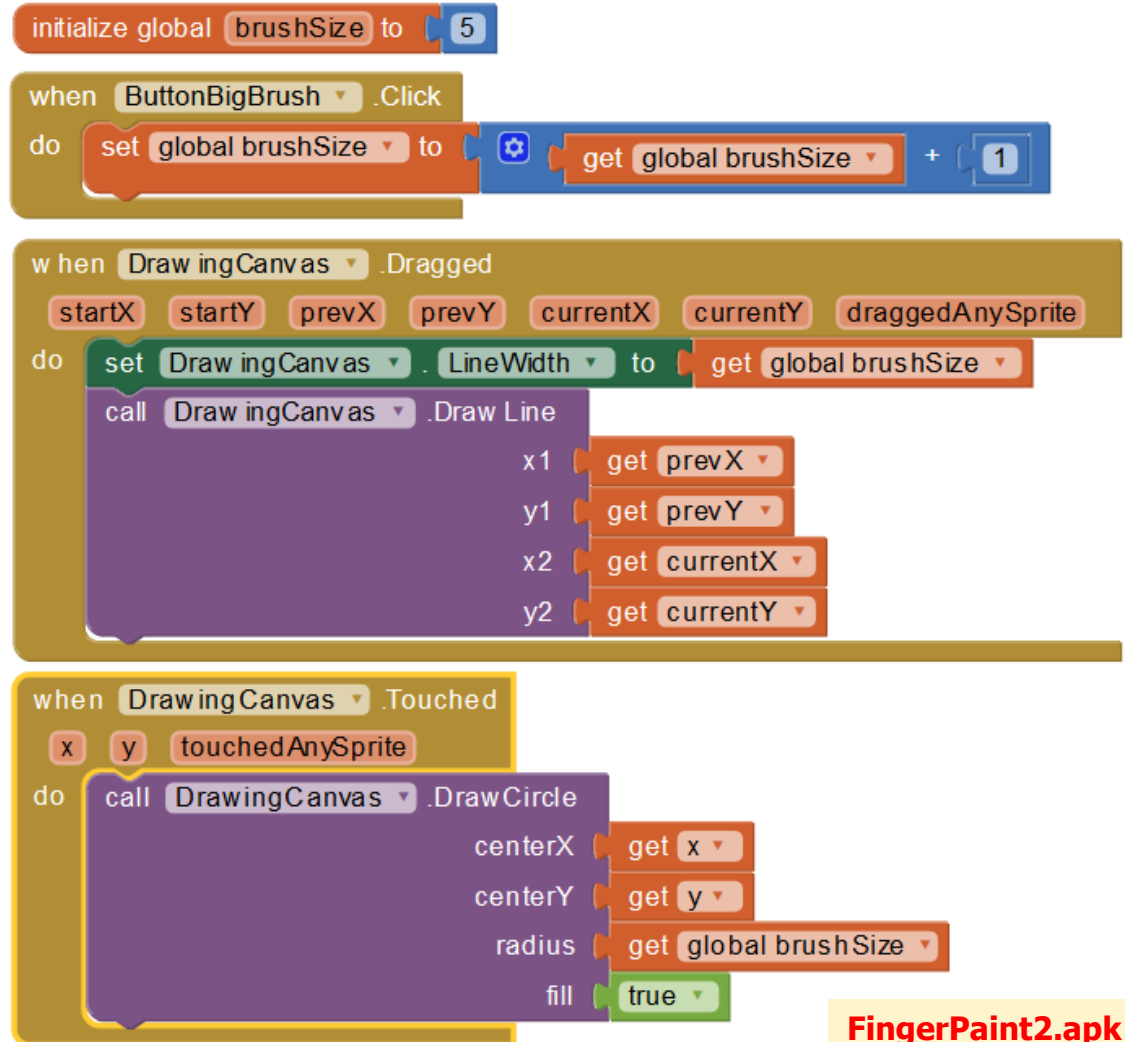
```
when Canvas1.Dragged
startX startY prevX prevY currentX currentY draggedAnySprite
do call Canvas1.DrawLine
    x1 get prevX
    y1 get prevY
    x2 get currentX
    y2 get currentY
    Draw a line on the screen.
```



# FingerPaint2

## Pokročilejšia verzia

- Hrúbka pera
  - globálna premenná brushSize
- Kreslenie čiar
  - drawingCanvas.Dragged



[FingerPaint2.apk](#)

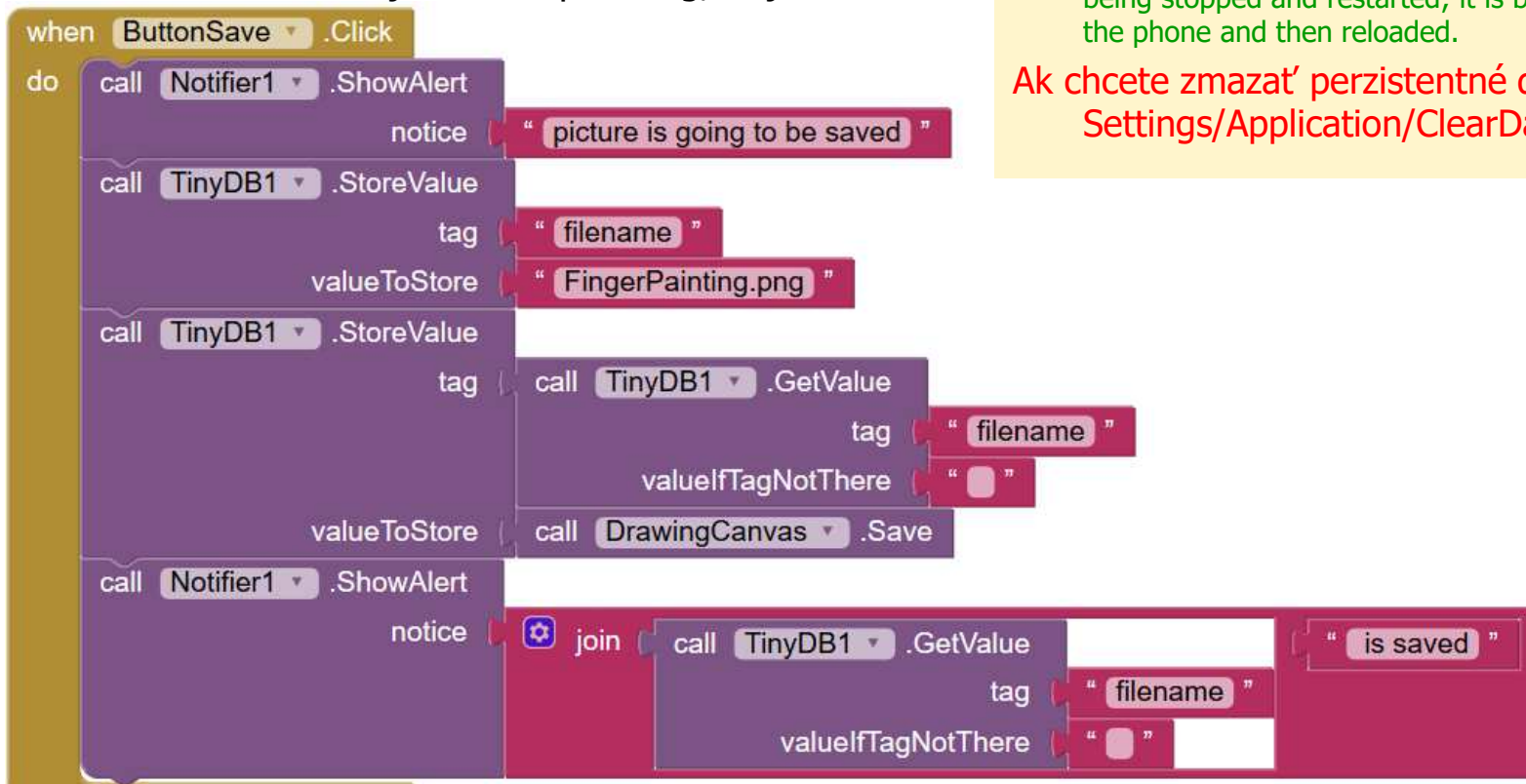


# FingerPaint2

- Ukladanie obrázku
  - Persistencia
- Práca s TinyDB
  - čo je HashMap<String, Object>

The data in TinyDB is persistent only when you have packaged and downloading your app. If you are developing connected to the phone, and you restart the Appinventor application, or if you disconnect and reconnect the phone, then the data base will start fresh. This is a case where the application is not merely being stopped and restarted; it is being removed from the phone and then reloaded.

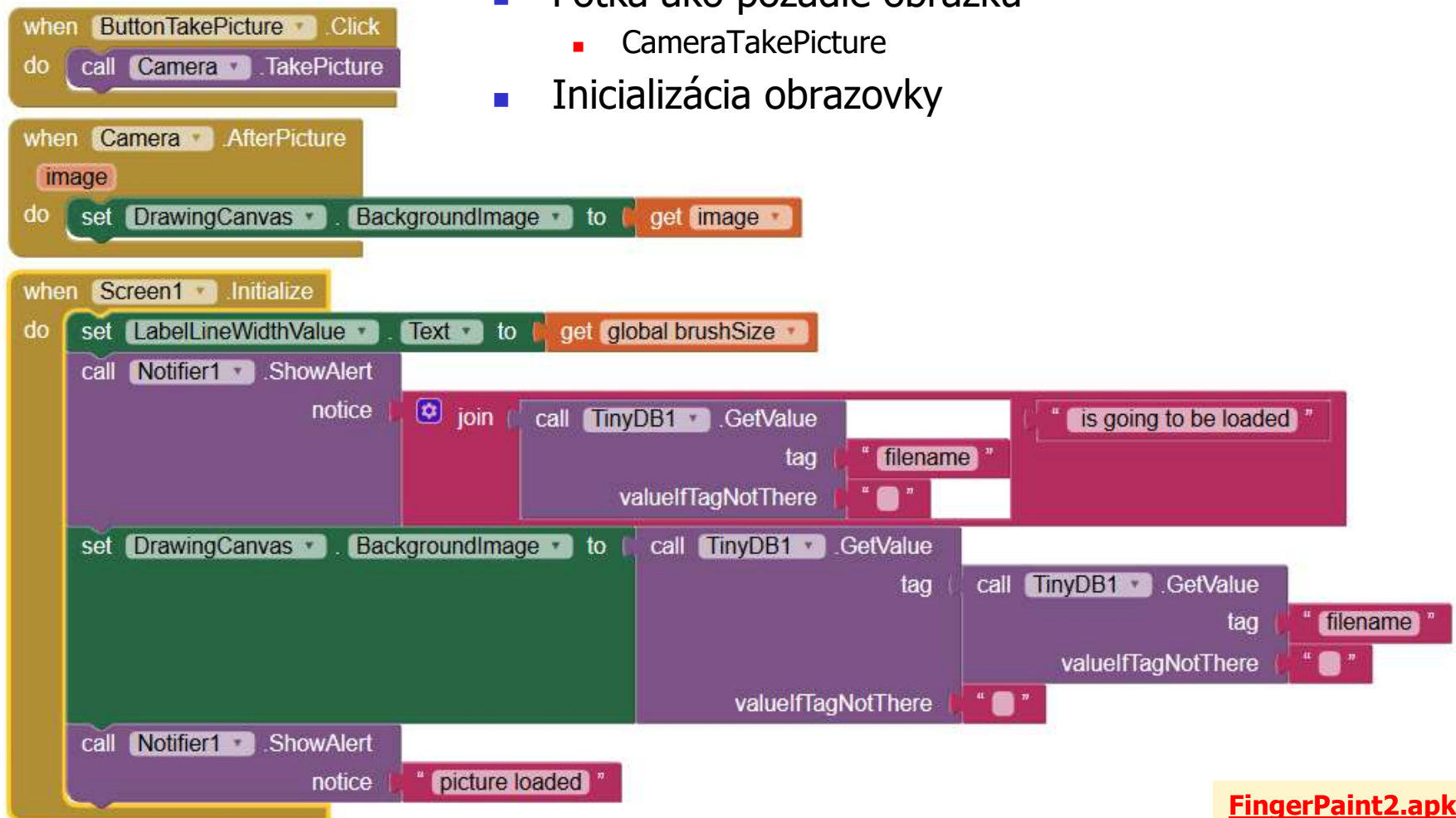
Ak chcete zmazať perzistentné dáta,  
Settings/Application/ClearData



**FingerPaint2.apk**

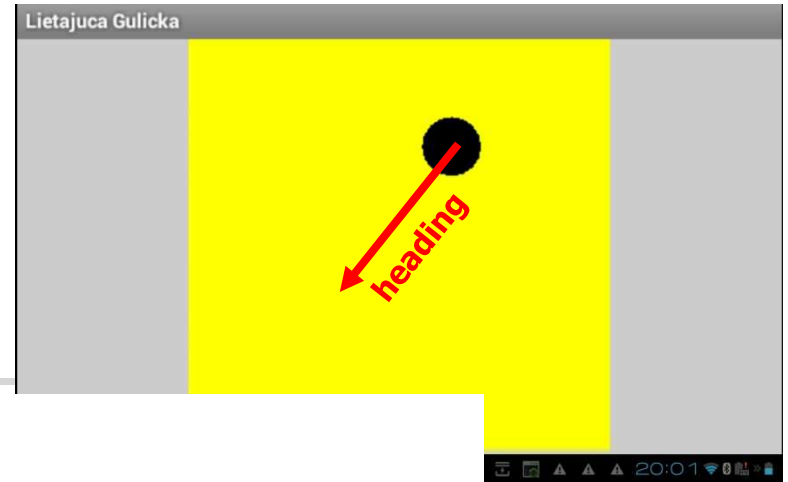
# FingerPaint2

- Fotka ako pozadie obrázku
  - CameraTakePicture
- Inicializácia obrazovky



# Dynamic

(random)



```
when Ball1 .EdgeReached
  edge
do
  set Ball1 . Speed to (Ball1 . Speed) × 1.2
  set Ball1 . Radius to (Ball1 . Radius) × 1.2
  set Ball1 . X to (300 × random fraction)
  set Ball1 . Y to (90 × random fraction)

when Clock1 .Timer
do
  set Ball1 . Heading to (360 × random fraction) - 180

when Canvas1 .Touched
  x y touchedAnySprite
do
  call Ball1 .MoveTo
    x (get x)
    y (get y)
```

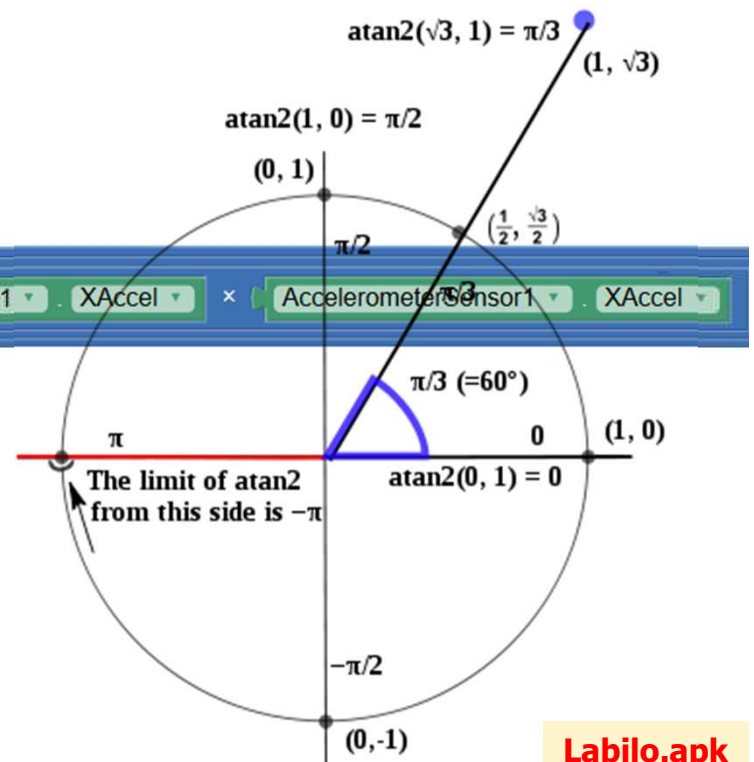
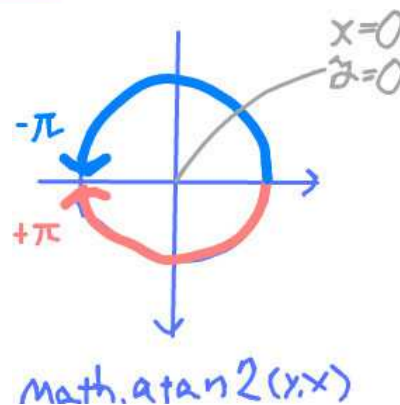
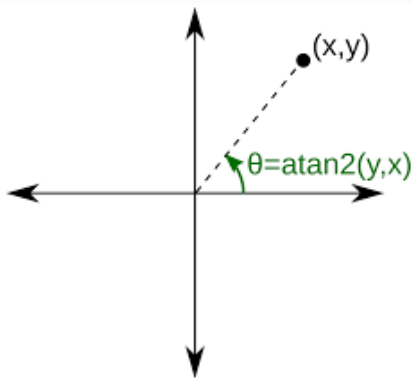
The screenshot shows the Scratch IDE interface. On the left, the "Project Hierarchy" pane displays "Screen1" containing "Canvas1", "Ball1", and "Clock1". On the right, the "Properties" pane for "Clock1" is shown, with the following settings: "TimerAlwaysFires" checked, "TimerEnabled" checked, and "TimerInterval" set to 100.

# Labilo (atan2)

when AccelerometerSensor1 .AccelerationChanged

do

- set X .Text to round get xAccel
- set Y .Text to round get yAccel
- set Z .Text to round get zAccel
- set Uhol .Text to round atan2
  - y neg get xAccel
  - x get yAccel
- set Ball1 .Heading to round atan2
  - y neg get xAccel
  - x get yAccel
- set Ball1 .Speed to square root AccelerometerSensor1 .XAccel × AccelerometerSensor1 .XAccel



# Senzory

(accel, barcode, gyro, NFC, GPS, kompas, pedo, proximity)

Telekom SK 100 % 18

Senzory

Vyzvánací tón

Pedo: 0

Proxi: 5

STLMIČ

Bar Code: Hint for TextBox1 Scan Barcode

Lati: Hint for TextBox1 Longi: Hint for TextBox2

AccelX: 0.26815 AccelY: -0.15323 AccelZ: 9.81623

GyroX: -0.77 GyroY: 0 GyroZ: 0.42

when Pedometer1 .StoppedMoving  
do set Pedo . Text to Pedometer1 . SimpleSteps

when BarcodeScanner1 .AfterScan  
result  
do set BarCode . Text to get result

when ProximitySensor1 .ProximityChanged  
distance  
do set Proxi . Text to get distance

when LocationSensor1 .LocationChanged  
latitude longitude altitude speed  
do set Lati . Text to get latitude  
set Longi . Text to get longitude

when AccelerometerSensor1 .AccelerationChanged  
xAccel yAccel zAccel  
do set AccelX . Text to get xAccel  
set AccelY . Text to get yAccel  
set AccelZ . Text to get zAccel

when PedoResetBtn .Click  
do call Pedometer1 .Reset  
call Pedometer1 .Start

when ScanBtn .Click  
do call BarcodeScanner1 .DoScan

when Clock1 .Timer  
do Timer has gone off. Text to Pedometer1 . SimpleSteps

when GyroscopeSensor1 .GyroscopeChanged  
xAngularVelocity yAngularVelocity zAngularVelocity timestamp  
do set GyroX . Text to get xAngularVelocity  
set GyroY . Text to get yAngularVelocity  
set GyroZ . Text to get zAngularVelocity

when OrientationSensor1 .OrientationChanged  
azimuth pitch roll  
do set Azim . Text to get azimuth  
set Pitch . Text to get pitch  
set Roll . Text to get roll



# Zoznam

(zoznam)

```

when Screen1.Initialize
do call paint

initialize global zoznam to
make a list
"11-2-pokemon-png.png "
"12-2-pokemon-free-download-png.png "
"1-2-pokemon-download-png.png "
"13-2-pokemon-png-image.png "
"3-2-pokemon-png-file.png "
"4-2-pokemon-transparent.png "
"5-2-pokemon-high-quality-png.png "
"7-2-pokemon-png-picture.png "
"8-2-pokemon-free-png-image.png "
"9-2-pokemon-png-clipart.png "
  
```

```
initialize global index to 0
```

```

when NextBtn.Click
do set global index to
get global index + 1
call paint
  
```

```

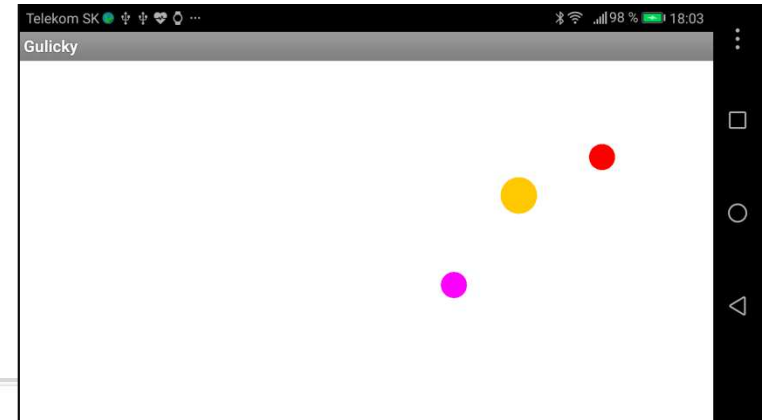
when PrevBtn.Click
do set global index to
get global index - 1
Show Warnings
  
```

```

to paint
do set global index to
modulo of get global index + 10
initialize local subor to
select list item list get global zoznam
index get global index + 1
in set Canvas1.BackgroundImage to get subor
set TextBox1.Text to get subor
  
```



# Zoznam objektov (for each)



**foreach object in a list**

```
to init
do
  add items to list list
  item Ball1
  item Ball2
  item Ball3

  for each item in list
  do
    set Ball. X
    of component get item
    to random integer from 1 to 400

    set Ball. Y
    of component get item
    to random integer from 1 to 400

    set Ball. Speed
    of component get item
    to random integer from 3 to 15

    set Ball. Radius
    of component get item
    to random integer from 5 to 15

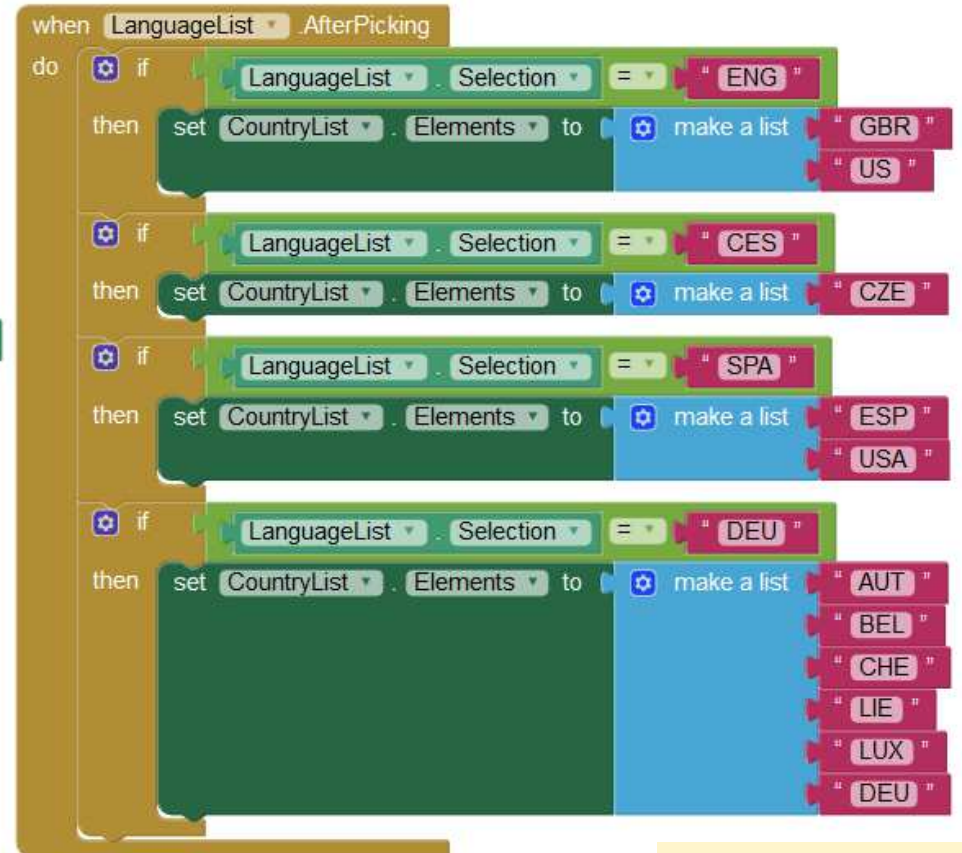
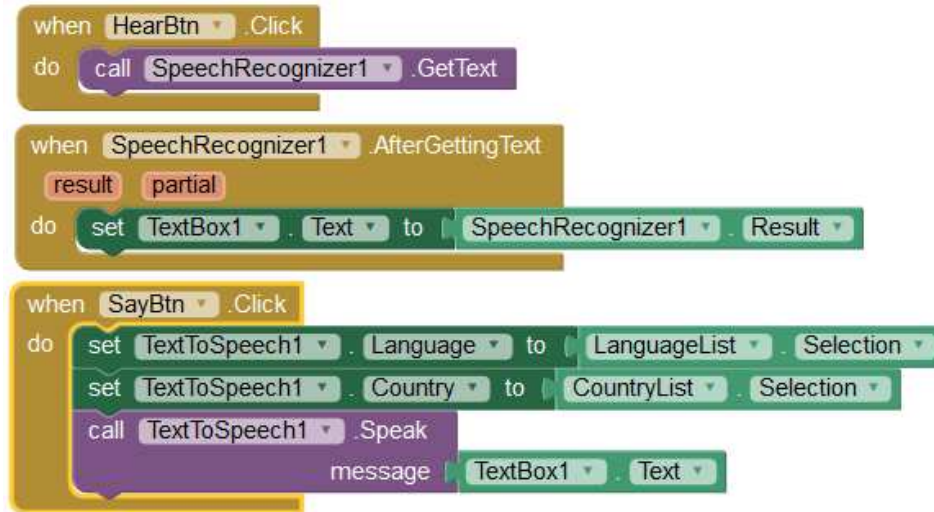
    set Ball. PaintColor
    of component get item
    to pick a random item list make a list
    red green purple yellow

    set Ball. Heading
    of component get item
    to Ball. Heading of component get item + random integer from -30 to 30
```



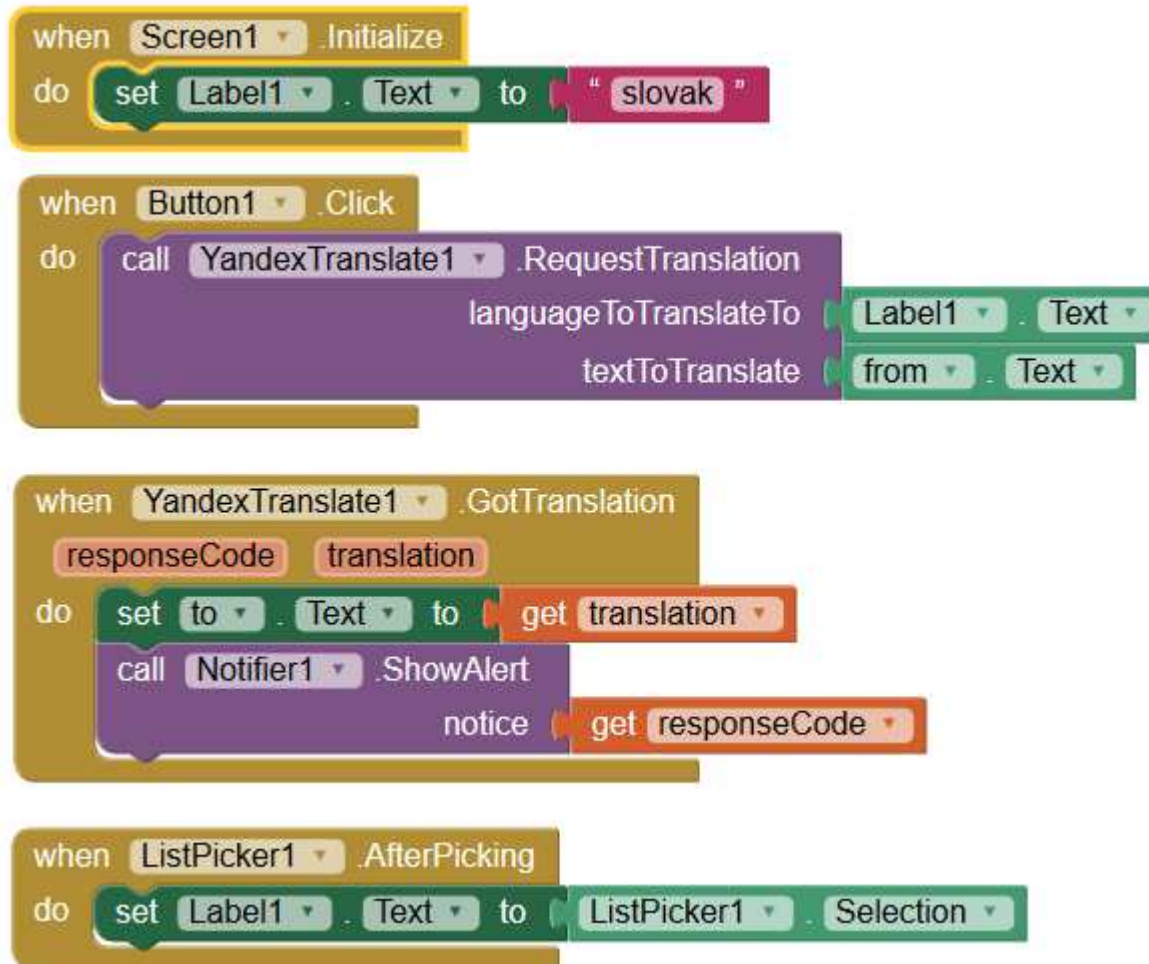
# TextToSpeech

- Nainštaluj eSpeak
- <https://play.google.com/store/apps/details?id=com.googlecode.eyesfree.espeak&hl=sk>



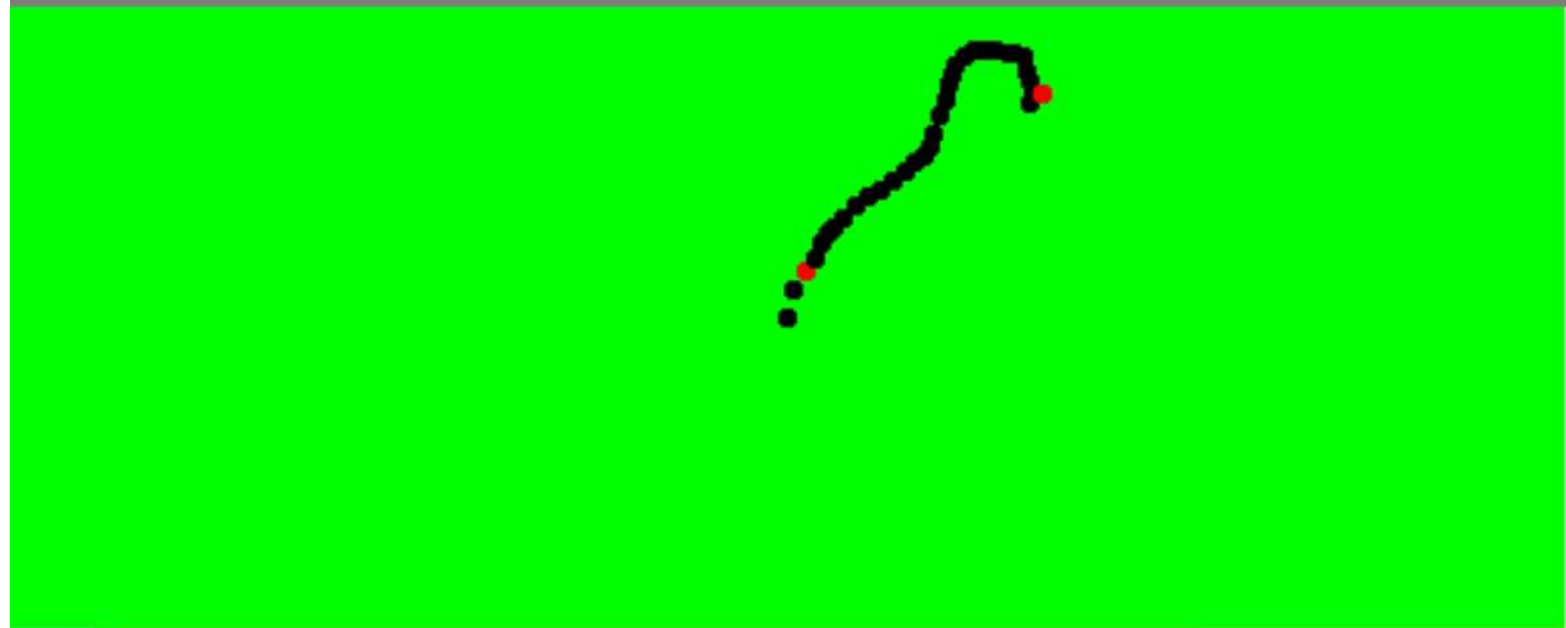
[Text2Speech.apk](#)

# Translator



# GPS Art

GPSArt



[x,y] | 82.37588, long.: -71.55161, accur.: 32.0, prov.: gps, adr: Jeséniova 5A 83101 N

Lat 48.16678

Long 17.10979

GPS

Exit

1000



15:26



# GPS Art



```
when Screen1.Initialize
do
  set LocationSensor1.ProviderName to "gps"
  set LblConnected.Text to "Initialized"
  set LocationSensor1.Interval to 1000
```

```
initialize global initLat to 0
```

```
initialize global initLong to 0
```

```
when BtnExit.Click
do
  close screen
```

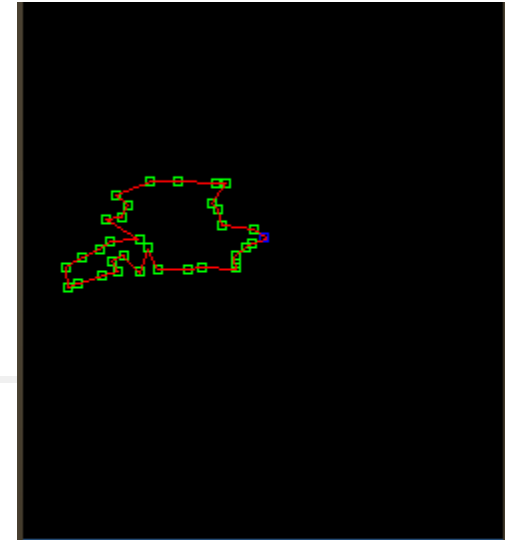
```
when Clock1.Timer
do
  set LocationSensor1.ProviderName to "gps"
  set Canvas1.PaintColor to red
  call ShowPostion
    lat LocationSensor1.Latitude
    long LocationSensor1.Longitude
```

```
when LocationSensor1.LocationChanged
  latitude longitude altitude speed
do
  set Canvas1.PaintColor to black
  call ShowPostion
    lat get latitude
    long get longitude
```

```
when BtnGPS.Click
do
  set Canvas1.PaintColor to blue
  call ShowPostion
    lat LocationSensor1.Latitude
    long LocationSensor1.Longitude
```



# GPS Art



```
to ShowPosition lat long
do
  set TxtLong . Text to get lat
  set TxtLat . Text to get long
  set LblConnected . Text to LocationSensor1 . TimeInterval
  if
    get global initLong × get global initLat = 0
  then
    set global initLat to get lat
    set global initLong to get long
  set TxtLat . Text to get lat
  set TxtLong . Text to get long
  call Canvas1 . DrawCircle
    centerX
    centerY
    radius
    fill
```

centerX:  $(\text{get global initLat} - \text{get lat}) \times 50000 + 250$

centerY:  $(\text{get global initLong} - \text{get long}) \times 50000 + 100$

radius: 3

fill: true

# GPS Art

