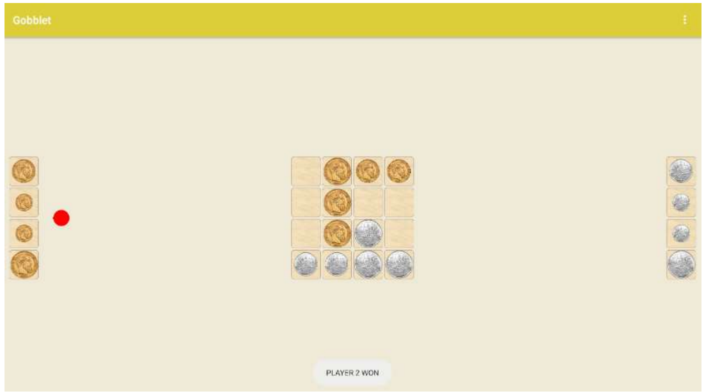
Pokračovanie

Menu
SurfaceView, Gestá
SharedPreferences
PreferenceActivity
RuntimePermissions

Peter Borovanský
KAI, I-18

MS-Teams: 2sf3ph4, List, github

borovan 'at' ii.fmph.uniba.sk



Hitparáda

(Hall of Fame)

DU-2

Erik K. – Gobblet

Marek J. – Remember (todo list)

… ešte chýba 2.polovica od Joža

CV-5

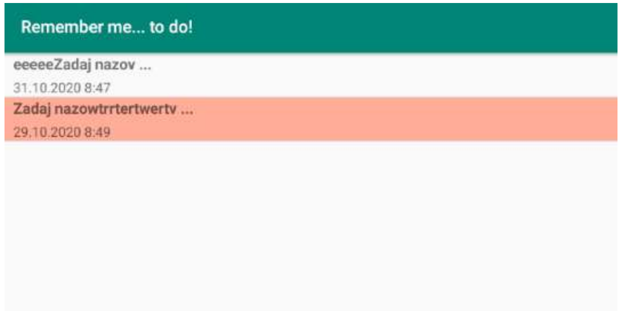
Rado O. - pattern

Ján M. – unlock pattern

Adam O. – unlock pattern

Mário H. – šnúrky

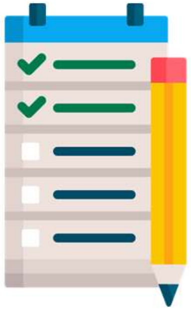
Erik K. - šnúrky



Remember me... to do!

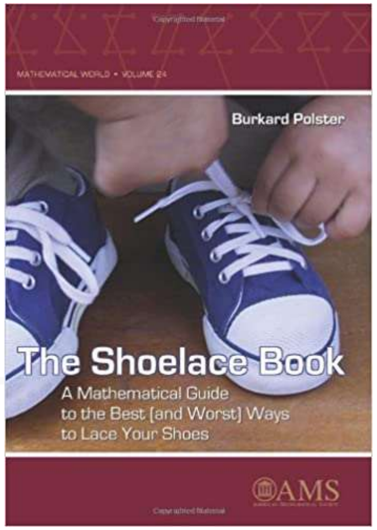
eeeeeZadaj nazov ...
31.10.2020 8:47

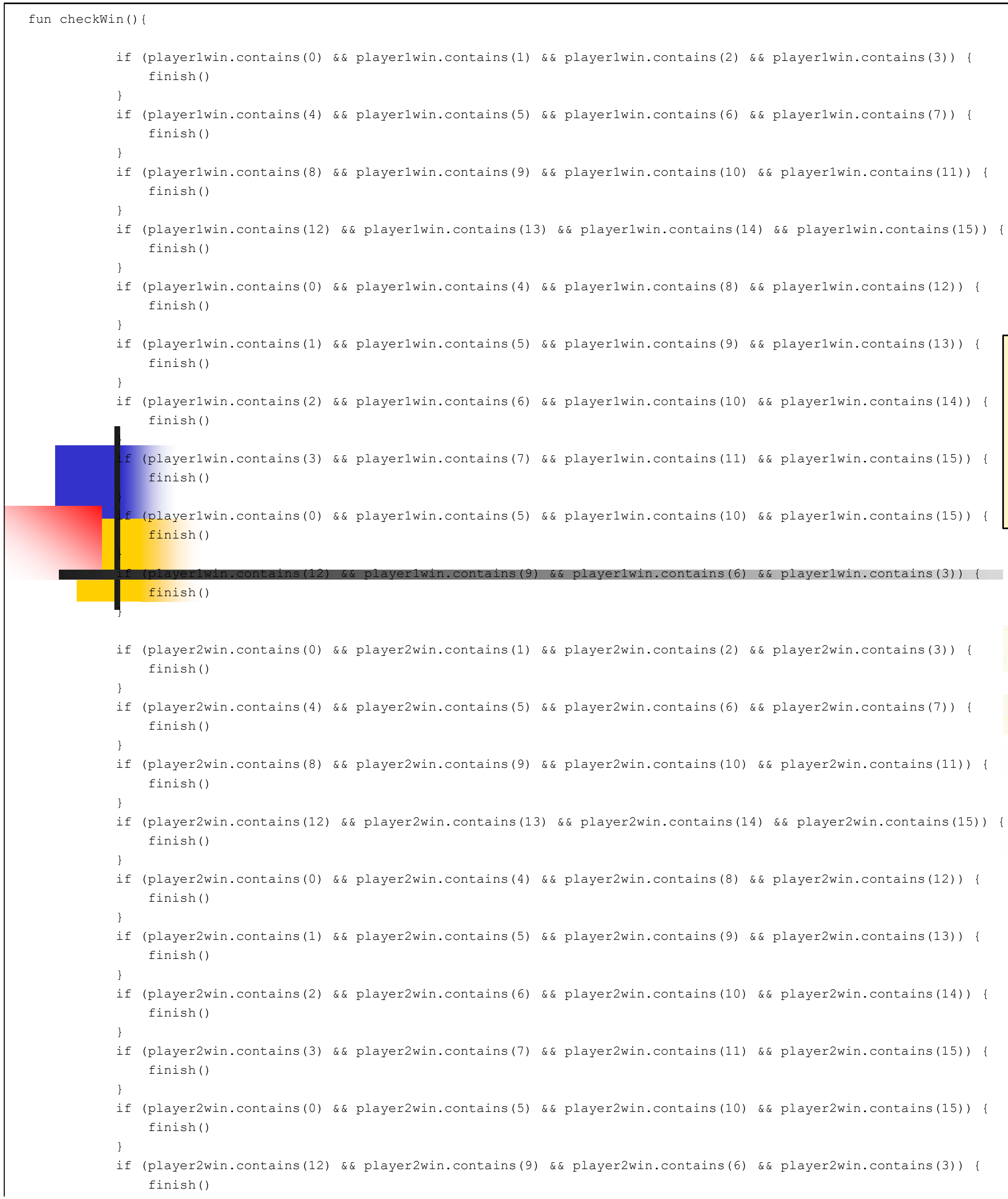
Zadaj nazowtrrtertwertv ...
29.10.2020 8:49



Šnúrky

(Burkard Polster)

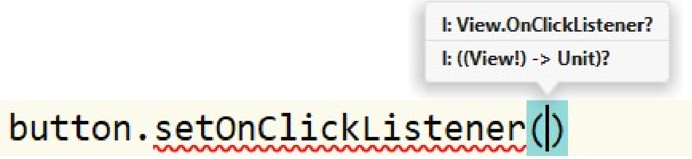

MATHEMATICAL WORLD • VOLUME 24
Burkard Polster
The Shoelace Book
A Mathematical Guide to the Best (and Worst) Ways to Lace Your Shoes
AMS



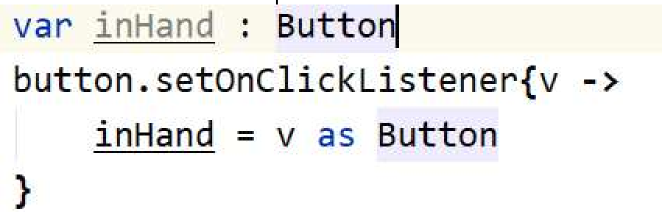
```
fun checkWin(){

        if (player1win.contains(0) && player1win.contains(1) && player1win.contains(2) && player1win.contains(3)) {
            finish()
        }
        if (player1win.contains(4) && player1win.contains(5) && player1win.contains(6) && player1win.contains(7)) {
            finish()
        }
        if (player1win.contains(8) && player1win.contains(9) && player1win.contains(10) && player1win.contains(11)) {
            finish()
        }
        if (player1win.contains(12) && player1win.contains(13) && player1win.contains(14) && player1win.contains(15)) {
            finish()
        }
        if (player1win.contains(0) && player1win.contains(4) && player1win.contains(8) && player1win.contains(12)) {
            finish()
        }
        if (player1win.contains(1) && player1win.contains(5) && player1win.contains(9) && player1win.contains(13)) {
            finish()
        }
        if (player1win.contains(2) && player1win.contains(6) && player1win.contains(10) && player1win.contains(14)) {
            finish()

         f (player1win.contains(3) && player1win.contains(7) && player1win.contains(11) && player1win.contains(15)) {
            finish()

         f (player1win.contains(0) && player1win.contains(5) && player1win.contains(10) && player1win.contains(15)) {
            finish()

         f (player1win.contains(12) && player1win.contains(9) && player1win.contains(6) && player1win.contains(3)) {
            finish()
        }

        if (player2win.contains(0) && player2win.contains(1) && player2win.contains(2) && player2win.contains(3)) {
            finish()
        }
        if (player2win.contains(4) && player2win.contains(5) && player2win.contains(6) && player2win.contains(7)) {
            finish()
        }
        if (player2win.contains(8) && player2win.contains(9) && player2win.contains(10) && player2win.contains(11)) {
            finish()
        }
        if (player2win.contains(12) && player2win.contains(13) && player2win.contains(14) && player2win.contains(15)) {
            finish()
        }
        if (player2win.contains(0) && player2win.contains(4) && player2win.contains(8) && player2win.contains(12)) {
            finish()
        }
        if (player2win.contains(1) && player2win.contains(5) && player2win.contains(9) && player2win.contains(13)) {
            finish()
        }
        if (player2win.contains(2) && player2win.contains(6) && player2win.contains(10) && player2win.contains(14)) {
            finish()
        }
        if (player2win.contains(3) && player2win.contains(7) && player2win.contains(11) && player2win.contains(15)) {
            finish()
        }
        if (player2win.contains(0) && player2win.contains(5) && player2win.contains(10) && player2win.contains(15)) {
            finish()
        }
        if (player2win.contains(12) && player2win.contains(9) && player2win.contains(6) && player2win.contains(3)) {
            finish()
```

(Hall of Blame)

```
glassesA.setOnClickListener {
    if (player) {
        inHand = glassesA
        inHand_pos = 0
    }
}
```

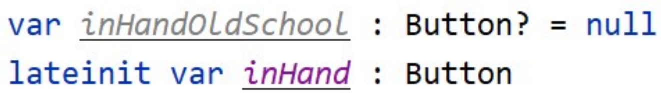


```
I: View.OnClickListener?
I: ((View!) -> Unit)?

button.setOnClickListener()
```



```
var inHand : Button
button.setOnClickListener{v ->
    inHand = v as Button
}
```

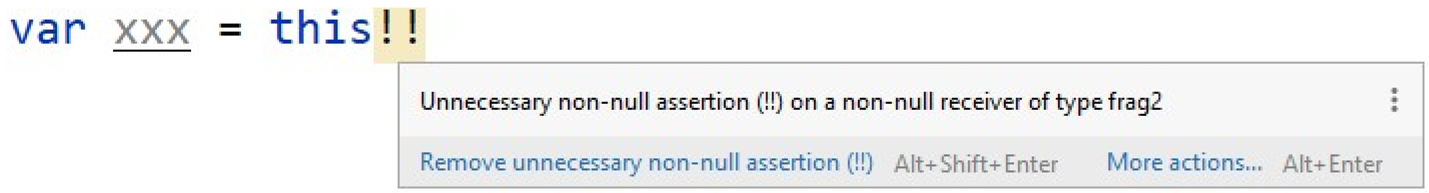
```
var inHand: ImageButton? = null
. . . . . .
player1[this!!.inHand_pos!!] =
player1[this!!.inHand_pos!!] - 1
if (player1[this!!.inHand_pos!!]==3 ){
```



```
var inHandOldSchool : Button? = null
lateinit var inHand : Button
```

this ešte nikdy nebol null

(this!!)



```
var xxx = this!!
```

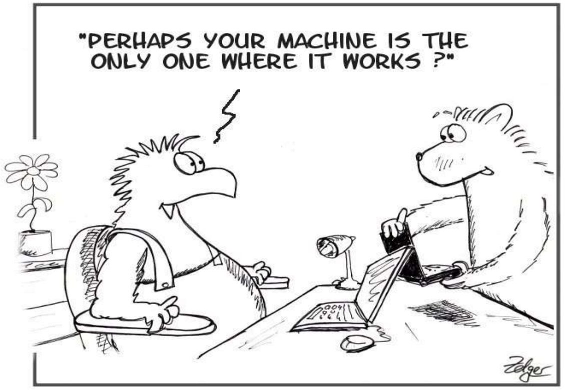
Unnecessary non-null assertion (!!) on a non-null receiver of type frag2

Remove unnecessary non-null assertion (!!) Alt+Shift+Enter
More actions... Alt+Enter

SIMPLY EXPLAINED
ARE YOU REALLY SURE THAT THIS VARIABLE CAN NEVER EVER BE NULL?
OF COURSE!!!

NullPointerException

Works only on my mobile



It works on my machine

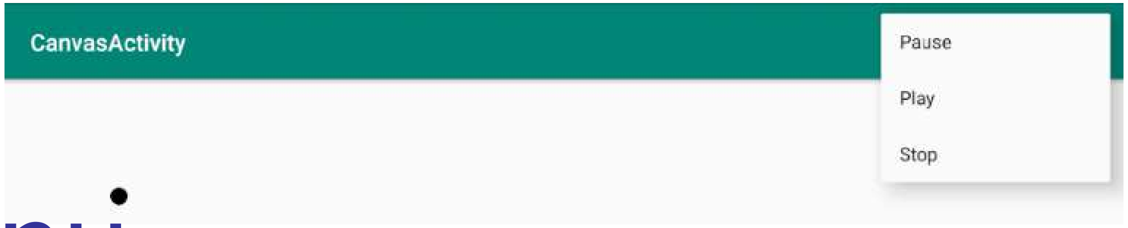
Responzívnosť:

- nebeží to len mne, na mojom zariadení
- najväčší problém je asi rozlíšenie obrazovky a to
- v kombinácii s tzv. absolute layout
- komponenty nemajú mať bezdôvodne fixnú veľkosť
- používať constraint/relative layout, wrap-content/match-parrent
- ak kreslím do canvasu, zistím si jeho veľkosť
- každé View má *časom-raz* .width, .height
- rozvrhnem si playground výpočtom z width, height
- v emulátore používam portrait/landscape
- nakonfigurujem si v AVD zariadenie s iným rozliškom
- aspoň jedno...
- Google hlása tendenciu penalizovať weby, ktoré nie sú prispôsobené mobilným zariadeniam

http://weblogs.asp.net/fredriknormen/stop-saying-quot-but-it-works-on-my-computer-quot

Bolo minule

- layouts, najmä constraint layout
- ListView, ListAdapter, najmä kvôli DÚ2
- intent, intent data
- **`<intent-filter />`** v AndroidManifest
- trochu o permissions
- **`startActivity, startActivityForResult`**



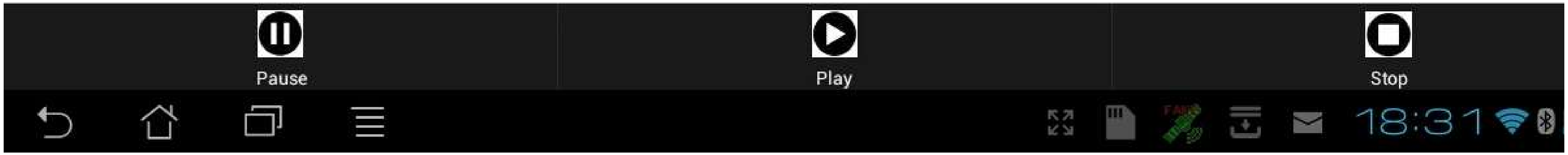
Option Menu

(onCreateOptionMenu)

```
<menu
   xmlns:android="http://schemas.android.com/apk/res/android">
   <item android:id="@+id/pause" android:icon="@drawable/pause“
                 android:title="Pause">
   </item>
   <item android:id="@+id/play"  android:icon="@drawable/play“
         android:title="Play">
   </item>
   <item android:id="@+id/stop" android:icon="@drawable/stop"
         android:title="Stop">
   </item>
</menu>
```

```
override fun onCreateOptionsMenu(menu: Menu): Boolean {
   val inflater = menuInflater
   inflater.inflate(R.menu.activity_canvas, menu)
   return super.onCreateOptionsMenu(menu)
}
```

Project:List.zip

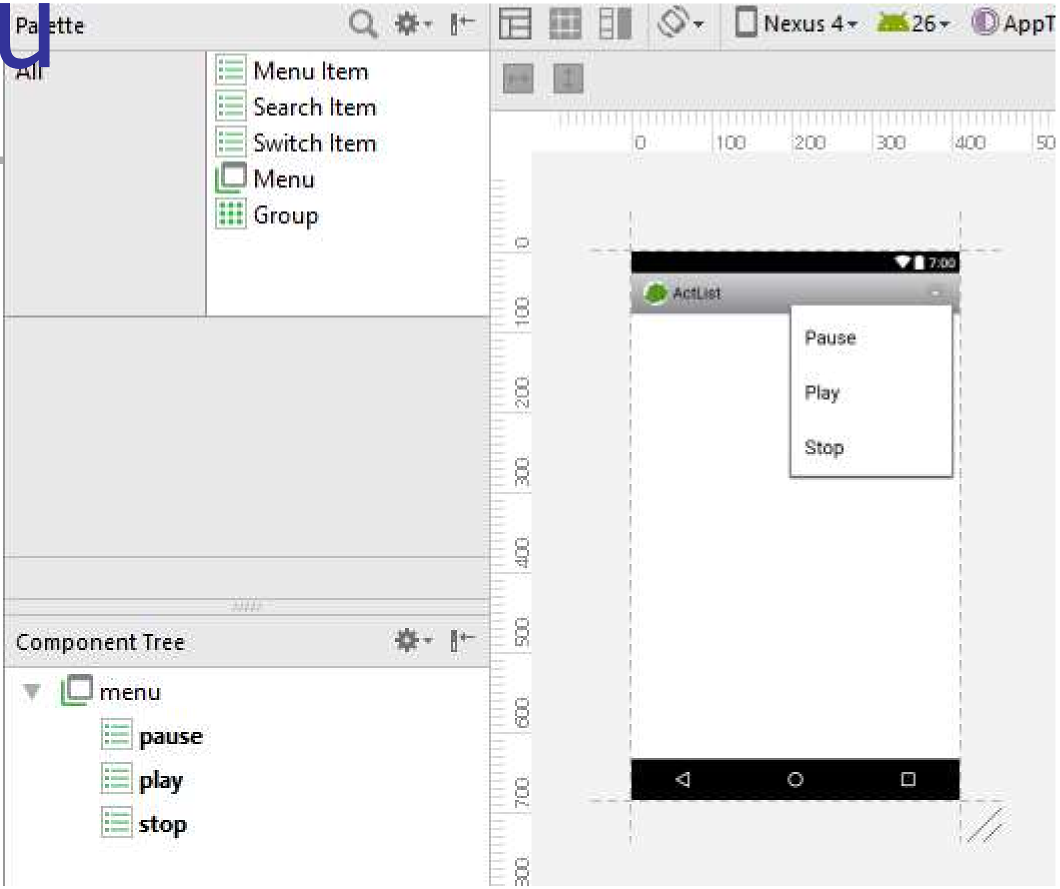


Option Menu

(onCreateOptionMenu)

Rovnako dobre to môžete navrhovať v editore

Spôsob zobrazenia a renderovania závisí na API level zariadenia



```
<menu xmlns:android="http://schemas.android.com/apk/res/android">
   <item android:id="@+id/pause" android:icon="@drawable/pause" android:title="Pause"> </item>
   <item android:id="@+id/play"  android:icon="@drawable/play"  android:title="Play">  </item>
   <item android:id="@+id/stop"  android:icon="@drawable/stop"  android:title="Stop">  </item>
</menu>
```

Project:List.zip

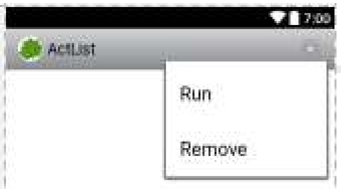
Option Menu

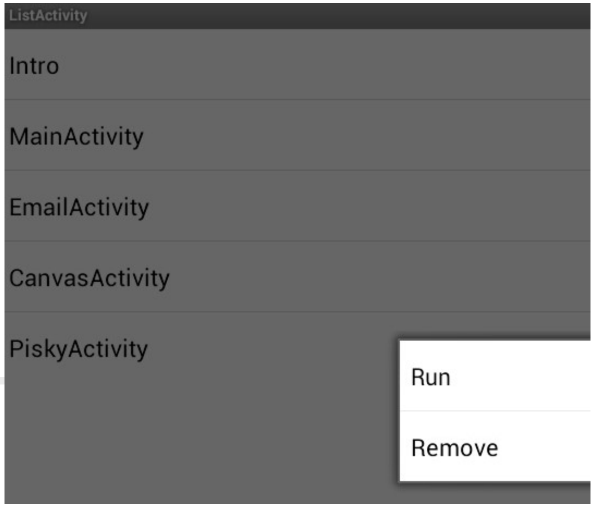
```
Thread th = new Thread() {
fun run() {
    while (!stopped) {
        if (!paused) {
            ...
```

```
override fun onOptionsItemSelected(item: MenuItem): Boolean {
    when (item.getItemId()) {
        R.id.pause -> {
            canvasView1?.paused = true
            return true
        }
        R.id.play -> {
            canvasView1?.paused = false
            return true
        }
        R.id.stop -> {
            canvasView1?.stopped = true
            return true
        }
        else -> return super.onOptionsItemSelected(item)
    }
}
```

Project:List.zip

Context Menu





```
override fun onCreate(
    savedInstanceState:Bundle?) {  ...
    registerForContextMenu(listView1)  // rozdiel od OptionMenu
} ContextMenu (oproti OptionMenu) treba registrovať k príslušnému view

override fun onCreateContextMenu(menu: ContextMenu?, v: View?,
                   menuInfo: ContextMenu.ContextMenuInfo? ) {
     getMenuInflater().inflate(R.menu.list_menu, menu)
}   // v je View, na ktoré bolo spáchané ContextMenu Action

override fun onContextItemSelected(item: MenuItem): Boolean {
  val info = item.getMenuInfo() as AdapterContextMenuInfo
  val className = actList.get(info.id.toInt())
  when (item.getItemId()) {
     R.id.remove -> {
          actList.removeAt(info.id.toInt())
          la.notifyDataSetChanged()
          return true
     }
```

Project:List.zip

invalidate() vs. postInvalidate()

(sumár poznatkov)

vo **View**, ak chceme modifikovať obsah, používame:

- `view.invalidate()` v GUI vlákne, t.j. v event handleroch onKey, onTouch
- `view.postInvalidate()` v iných (non-GUI) vláknach, ktoré chcú view modifikovať, alternatíva `Activity.runOnUiThread` (z minulej prednášky)

toto však nenastane hneď (podobne, ako Event Dispatch Thread vo JavaFx)

nastane to po VSYNC (vertical synchronization), 40 fps ~ každých 25 ms

Všetky podtriedy View sú kreslené v jednom GUI vlákne. Preto, ak

- chceme lepšie kontrolovať renderovanie (veľa) objektov,

resp.

- renderovanie objektov trvá dlho

používame triedu **SurfaceView**. To je však náročnejšie

- na cpu
- programovanie.

SurfaceView

(podtrieda View, nadtrieda ako GLSurfaceView, VideoView)

`SurfaceView` je typicky renderované iným vláknom pomocou `SurfaceHolder.Callback`

```
class GamePanel(context:Context) : SurfaceView(context),
                                           SurfaceHolder.Callback {
lateinit  var thread : GameThread                // vlákno hry
init {
   getHolder().addCallback(this) //kto implementuje SurfaceHolder
   thread = GameThread(this)
   setFocusable(true)
}
override fun surfaceCreated(holder: SurfaceHolder?) {
   thread.start()                      // entry point pre SurfaceView
}

override fun surfaceDestroyed(holder: SurfaceHolder?) {
   // exit point SfV-treba zastaviť vlákno hry a počkať kým skončí
   // viď priložený projekt...
```

interface

https://developer.android.com/reference/android/view/SurfaceView.html

Project:List.zip

GameThread

(čo robí vlákno hry - alternatíva k invalidate)

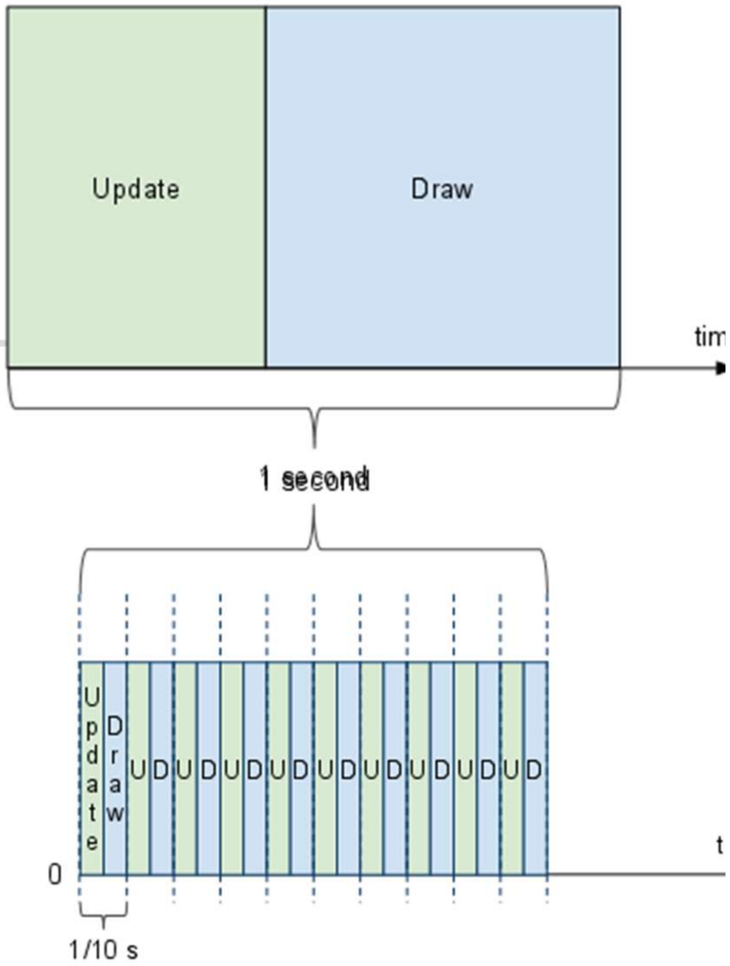
```
class GameThread(val gamePanel: GamePanel) : Thread() {
                              // zapamätáme v konštruktore GameTread
override fun run() {  // hlavný cyklus vlákna, hry, simulácie
   val surfaceHolder = gamePanel.holder
   while (running) {   // kým beží hra
        try {
           canvas = surfaceHolder.lockCanvas()
           synchronized (surfaceHolder) {
                for (pika in gamePanel.pikaList)
                   pika.update(gamePanel.getWidth(),
                               gamePanel.getHeight())
                gamePanel.showPika(canvas) // draw
                running = gamePanel.killed < gamePanel.pika.length
           try {Thread.sleep(FRAME_PERIOD-elapsedTime)} catch (){}
           }
        } finally {
                surfaceHolder.unlockCanvasAndPost(canvas) }
```

vlákno nemusí byť jediné

elapsedTime

Project:List.zip

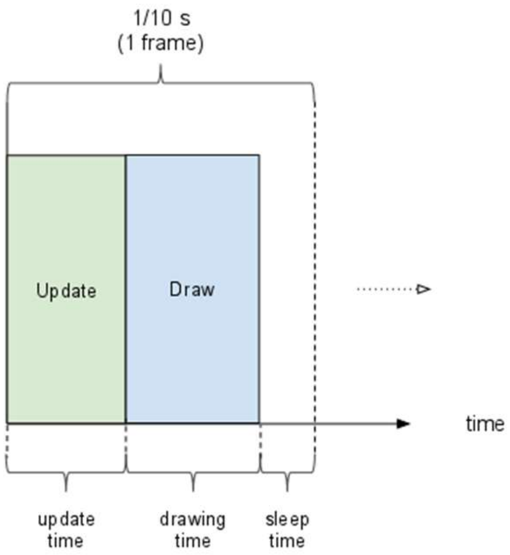
Frame per second

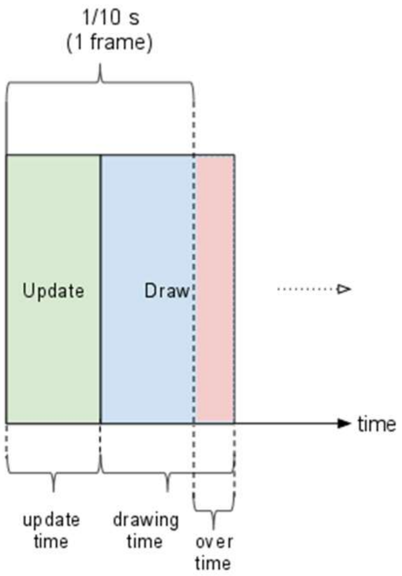


- 1 Frame per Second

Chceli by sme viac, napr. 10 fps

```
FRAME_PERIOD = 1000 / 10 //10 fps
Môže sa nám stať, že to
   stihneme  alebo  nestihneme
```

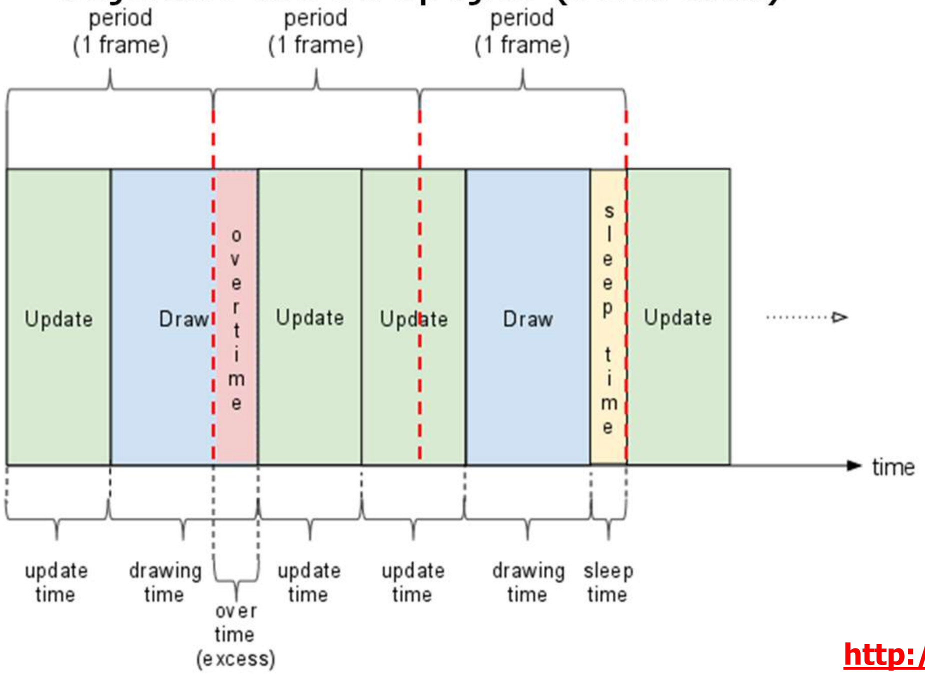




http://obviam.net/index.php/the-android-game-loop/

Čo ak nestíhame vykreslovať

- ak nestíhame vykreslovať, nemali by sme zmenšiť rýchlosť hry,
- rýchlosť hry nie je rýchlosť vykreslovania,
- radšej niektoré prekreslenia scény vynecháme, sústredíme sa na update stavu hry,
- výsledkom je hra, ktorá sa nespomaluje kvôli vykreslovaniu, ale pohyby objektov nie sú spojité (seká to...)

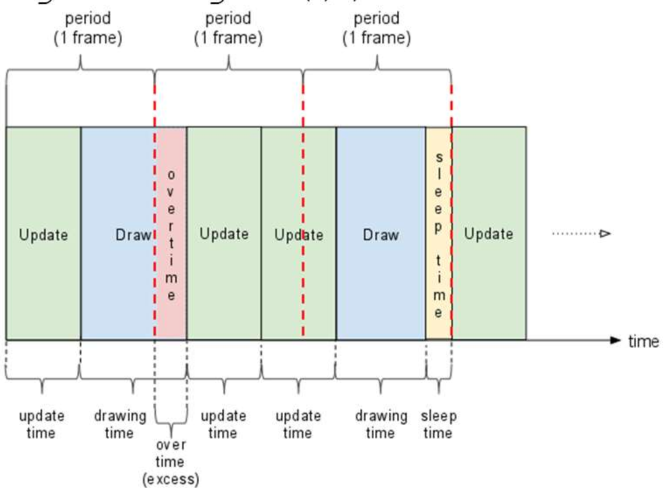


http://obviam.net/index.php/the-android-game-loop/

```
FRAME_PERIOD = 1000/50; //50 fps
```

Preskočíme pár vykreslovaní

```
if (elapsedTime <= FRAME_PERIOD) { // lepší prípad, stíhame
   try {                           // počkáme zvyšný čas
      Thread.sleep(FRAME_PERIOD - elapsedTime)
   } catch (InterruptedException e) {}
}
while (elapsedTime > FRAME_PERIOD) { // nestíhame
   for (pika in gamePanel.pikaList)
      pika.update(r.getWidth(), r.getHeight())
   elapsedTime -= FRAME_PERIOD
   skippedInPeriod++
}
framesInPeriod++
```

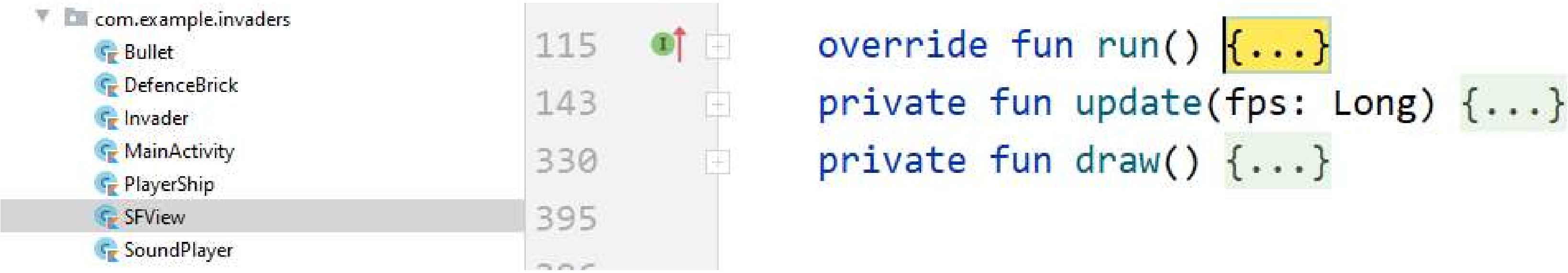


http://obviam.net/index.php/the-android-game-loop/

DU-3

- programujte vašu obľúbenú hru, idea je dynamickú, nie logickú
- navrhnite si triedy pre všetky objekty vo vašej hre
- každý nech má metódu update() a event. aj draw()

```
class InvadersView(context: Context, private val size: Point)
: SurfaceView(context), Runnable {

private fun update(fps: Long) {
private fun draw() { … }
override fun run() { … }
```



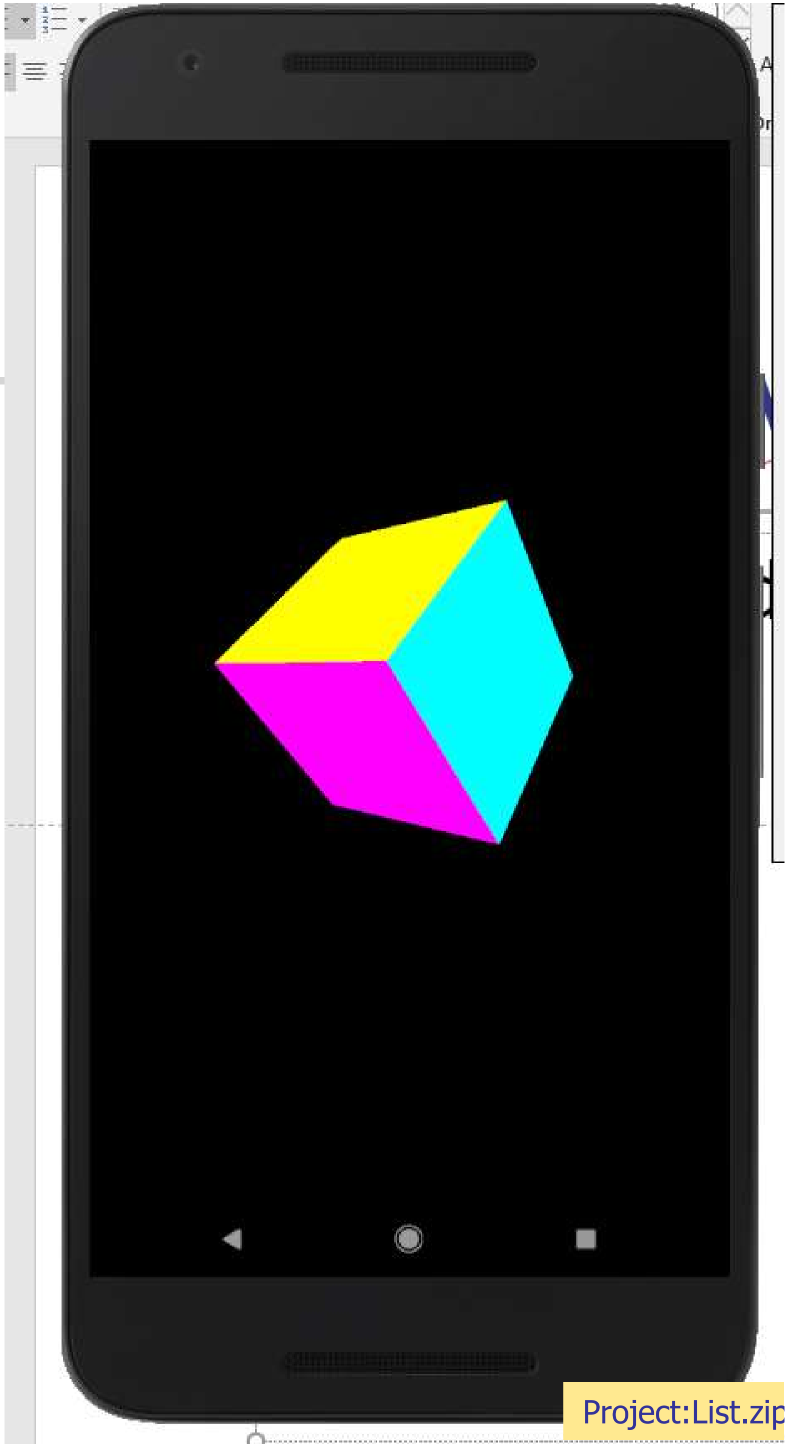
```
override fun run() {...}
private fun update(fps: Long) {...}
private fun draw() {...}
```

Game run thread

```
override fun run() {
   var fps: Long = 0                                   // frame rate
    while (playing) {
        val startFrameTime = System.currentTimeMillis()     // current time
        if (!paused) {
            update(fps)
        }
        draw()
                                  // calculate the fps rate this frame
        val timeThisFrame = System.currentTimeMillis() - startFrameTime
        if (timeThisFrame >= 1) {
            fps = 1000 / timeThisFrame
        }

                                  // Play a sound based on the menace level
        if (!paused && ((startFrameTime - lastMenaceTime) > menaceInterval))
            menacePlayer()
    }
}
```

GLSurfaceView

- openGL renderer
- detaily v kóde pre tých, čo sú 3D...



Project:List.zip

Gestá

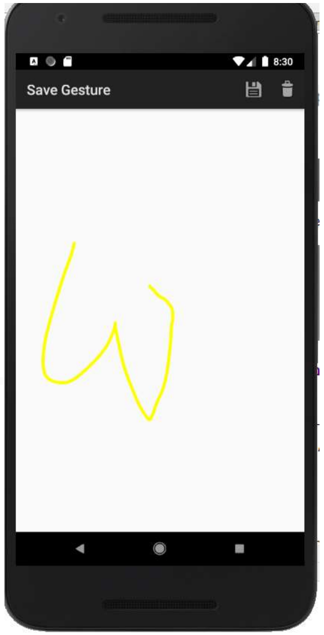
(štandardné)

```
class GesturesActivity : AppCompatActivity(),
    GestureDetector.OnGestureListener,
    GestureDetector.OnDoubleTapListener {
    lateinit var gDetector: GestureDetectorCompat

GestureDetector.OnDoubleTapListener:
override fun onDoubleTap(event: MotionEvent): Boolean
override fun onDoubleTapEvent(event: MotionEvent): Boolean
override fun onSingleTapConfirmed(event: MotionEvent): Boolean

GestureDetector.OnGestureListener:
override fun onDown(event: MotionEvent): Boolean
override fun onFling(event1: MotionEvent, event2: MotionEvent,
                     velocityX: Float, velocityY: Float):Boolean
override fun onLongPress(event: MotionEvent)
override fun onScroll(e1: MotionEvent, e2: MotionEvent,
                      distanceX: Float, distanceY: Float):Boolean
override fun onShowPress(event: MotionEvent)
override fun onSingleTapUp(event: MotionEvent): Boolean
```

Project:List.zip

Gestá

(vlastné – definované)



```
class GesturesActivity : AppCompatActivity(),
       OnGesturePerformedListener {
   lateinit var gLibrary: GestureLibrary
...
gLibrary = GestureLibraries.fromRawResource(this,
             R.raw.gestures2 // tento súbor si
           )      // vyrobíte v Gesture Editore, uložíte do raw/
if (gLibrary.load() == false) {
    finish()
}
gOverlay.addOnGesturePerformedListener {
  overlay: GestureOverlayView, gesture: Gesture ->
    val predictions = gLibrary.recognize(gesture)
    predictions?.let {
      if (it.size > 0 && it[0].score > 1.0) {
        val action = it[0].name
        Toast.makeText(this, action, Toast.LENGTH_SHORT).show()
      }
    }
}
```

Project:GestureBuilder.zip

Ako uložiť dáta/nastavenia

(lokálne/na server)

- SharedPreferences - umožní uložiť dvojice (kľúč, hodnota) pre hodnoty typu int, boolean, string, float, … a podskytuje metódy
  - [get|put][Boolean|Float|String|Long|Int]
- Súbory – ukladá do internej resp. externej pamäte zariadenia
- Databáza – sqlite (http://www.sqlite.org/) - open-source, sql-standard, malá a ľahko použiteľná DB vo vašom zariadení
- Vlastný server – protokol najčastejšie http-https
  - ~~najčastejšie (v bakalárkach) AMP – Apache-MySQL-PHP~~ **OLD STYLE**

príde neskôr...

- Cloudový server - poskytuje nejaké SDK pre našu platformu
  - www.parse.com – iOS, Android, JS, Unity, PHP, Xamarin, Arduino, ...
  - Firebase API – iOS, Android, C++
  - Google datastore API – iOS, Android, JS, PHP, ...

Kľúče si nejako pomenujeme:

```
LOGIN_ENTRY_KEY = "login"
SUCCLOGS_ENTRY_KEY = "SUCC"
```

SharedPreferences

(nič jednoduchšie...)

LoginActivity si pamätá login a passwd, v prípade úspešného prihlásenia, a tiež počet úspešných a neúspešných prihlásení

```
settings=PreferenceManager.getDefaultSharedPreferences(this)
                getPreferences(Activity. MODE_PRIVATE) // alebo
          getSharedPreferences("seti", Activity. MODE_PRIVATE)
                             ...MODE_WORLD_READABLE, MODE_WORLD_WRITABLE
```

Načítanie:

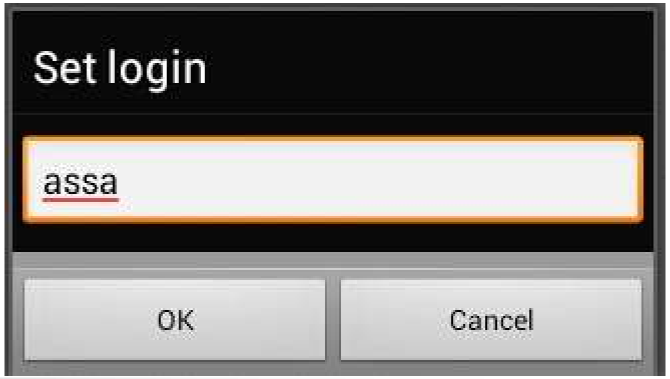
```
settings.getString(LOGIN_ENTRY_KEY, "")//"" default hodnota
settings.getInt(SUCCLOGS_ENTRY_KEY, 0) //0 ak sa nenachádza
```

Uloženie:

```
settings.edit() {
    putString(LOGIN_ENTRY_KEY, "")
    putString(PASSWORD_ENTRY_KEY, "")
    remove(SUCCLOGS_ENTRY_KEY)
    remove(FAILEDLOGS_ENTRY_KEY)
}
```

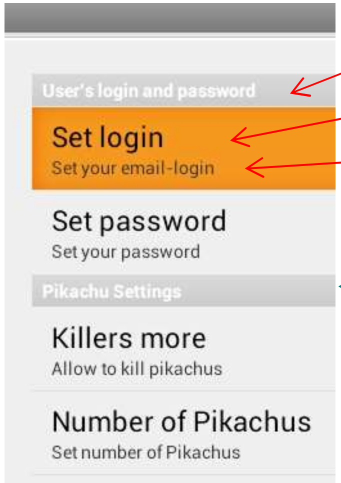
Project:List.zip

PreferenceActivity


Set login

assa

```
public class MyPreferenceActivity extends PreferenceActivity {
public void onCreate(Bundle savedInstanceState) {
   super.onCreate(savedInstanceState)    //res/xml.setting.xml
   addPreferencesFromResource(R.xml.settings)
<PreferenceCategory
   android:title="@string/pref_login_pass_profile" >
        <EditTextPreference
            android:title="@Set login"
            android:summary= "Set your email-login"
            android:key="prefLogin"/>
     <EditTextPreference
            android:title="@string/pref_pass"
            android:summary="@string/pref_pass_summary"
           android:inputType="textPassword"
            android:key="prefPass"/>
```


User's login and password

Set login

Set your email-login

Set password

Set your password

Pikachu Settings

Killers more

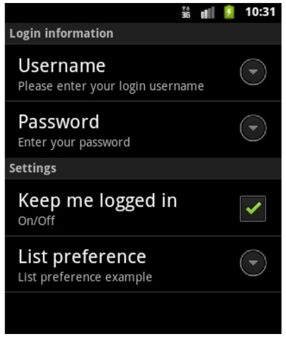
Allow to kill pikachus

Number of Pikachus

Set number of Pikachus

Project:List.zip

PreferenceCategories
(xml)


Login information

Username
Please enter your login username

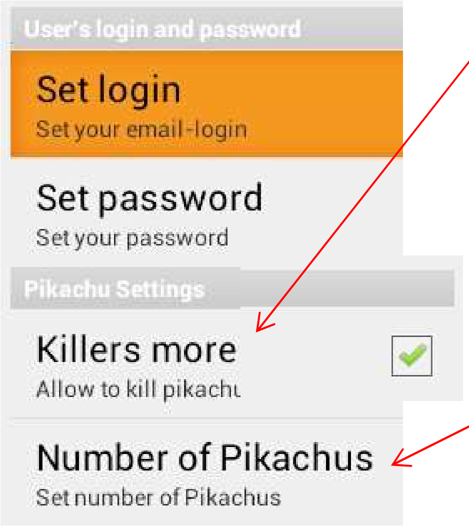
Password
Enter your password

Settings

Keep me logged in ☑
On/Off

List preference
List preference example

```
<PreferenceCategory android:title= "Pikachu settings" >
     <CheckBoxPreference
          android:defaultValue="true"
          android:key="prefKill"
          android:summary="Allow to kill pikachus"
          android:title="@Killers mode" >
     </CheckBoxPreference>

     <ListPreference
          android:key="prefCount"
          android:entries="@array/pikaCount"
          android:summary="Set number of Pikachus"
          android:entryValues="@array/pikaValues"
          android:title="Number of Pikachus" />
 </PreferenceCategory>
```


User's login and password

Set login
Set your email-login

Set password
Set your password

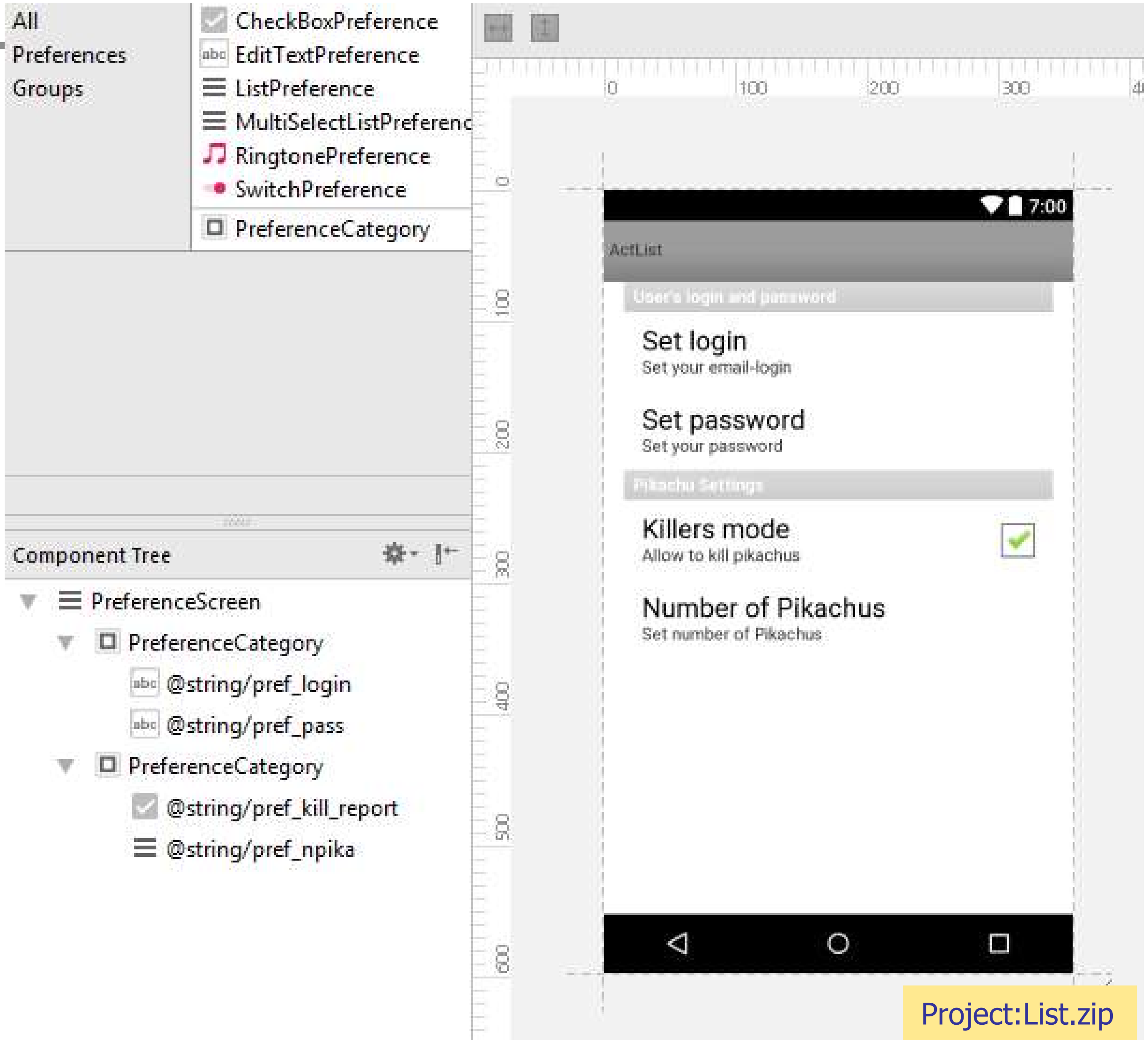
Pikachu Settings

Killers more ☑
Allow to kill pikachu

Number of Pikachus
Set number of Pikachus

Project:List.zip

PreferenceCategories
(editor)



Component Tree

- PreferenceScreen
  - PreferenceCategory
    - @string/pref_login
    - @string/pref_pass
  - PreferenceCategory
    - @string/pref_kill_report
    - @string/pref_npika

7:00

ActList

User's login and password

Set login
Set your email-login

Set password
Set your password

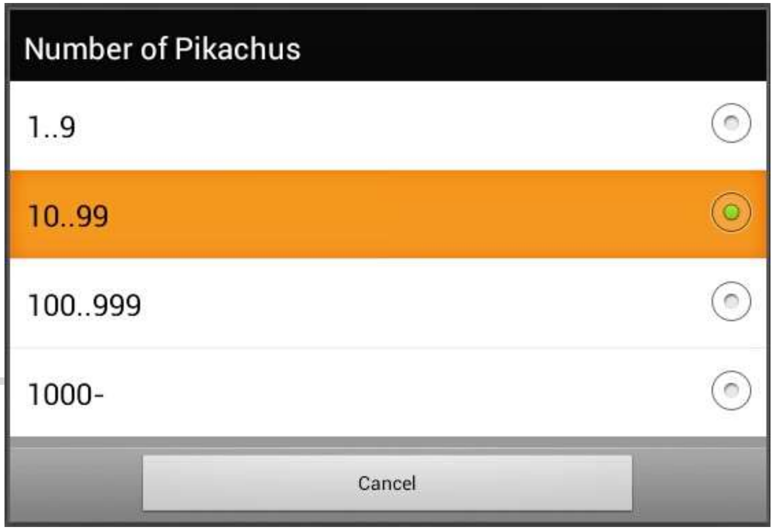
Pikachu Settings

Killers mode
Allow to kill pikachus ☑

Number of Pikachus
Set number of Pikachus

Project:List.zip

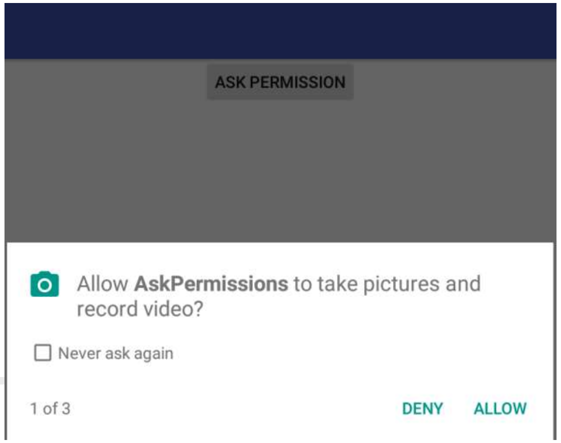
ListPreferences



```
<resources>
<string-array name="pikaCount">
        <item name="1">1..9</item>
        <item name="10">10..99</item>
        <item name="100">100..999</item>
        <item name="1000">1000-</item>
    </string-array>
<string-array name="pikaValues">
        <item name="1">5</item>
        <item name="10">50</item>
        <item name="100">500</item>
        <item name="1000">5000</item>
    </string-array>

</resources>
```

Project:List.zip

Runtime Permissions



Allow **AskPermissions** to take pictures and record video?

□ Never ask again

Povolenia sú:

- neohrozujú vaše privátne dáta (INTERNET, BLUETOOTH, ACCESS_WIFI)
- nebezpečné (ACCESS_FINE_LOCATION, [READ/WRITE]_CONTACTS)

Ak máte Android <= 5.1 || target SDK < 23, <uses-permissions v Manifest.xml,
Povolenia sa získavajú staticky pri inštalácií, ak užívateľ odmietne, neinštaluje sa.

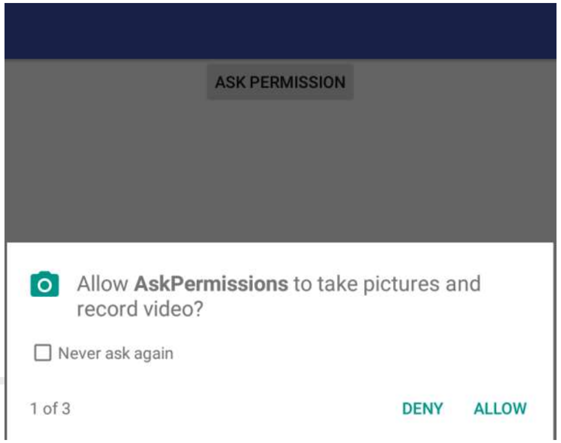
Inak (Android >= 6.0 || target SDK >= 23) aplikácia môže žiadať počas behu.
Ak užívateľ odmietne, aplikácia beží ďalej.

Aj dynamické permissions píšete do AndroidManifest.xml

```
<uses-permission android:name="android.permission.CAMERA" />
<uses-permission-sdk-23 android:name="android.permission.READ_CONTACTS" />
<uses-permission-sdk-23 android:name="android.permission.WRITE_CONTACTS" /
<uses-permission-sdk-23 android:name="android.permission.ACCESS_FINE_LOCATION" /
```

Project:RunTimePermissions.zip

Runtime Permissions



ASK PERMISSION

Allow **AskPermissions** to take pictures and record video?

☐ Never ask again

1 of 3

```
val RUNTIME_PERMISSION_REQUEST_CODE = 777
val perms = arrayOf(
     Manifest.permission.WRITE_CONTACTS,
     Manifest.permission.CAMERA,
     Manifest.permission.ACCESS_FINE_LOCATION ... )
if (getApplicationContext().checkSelfPermission(
    Manifest.permission.READ_CONTACTS) !=
    PackageManager.PERMISSION_GRANTED) {
       requestPermissions(perms, RUNTIME_PERMISSION_REQUEST_CODE)
}
override fun onRequestPermissionsResult( requestCode: Int,
          permissions: Array<String>, grantResults: IntArray) {
    when (requestCode) {
        RUNTIME_PERMISSION_REQUEST_CODE -> {
          for (i in grantResults.indices) {
            if (grantResults[i]==PackageManager.PERMISSION_GRANTED){
              Log.d("Permissions", "GRANTED")
            } else {  // denied
              Log.d("Permissions", "DENIED")
```

Project:RunTimePermissions.zip