Pokračovanie

ListView/RecycleView, Intent
Canvas

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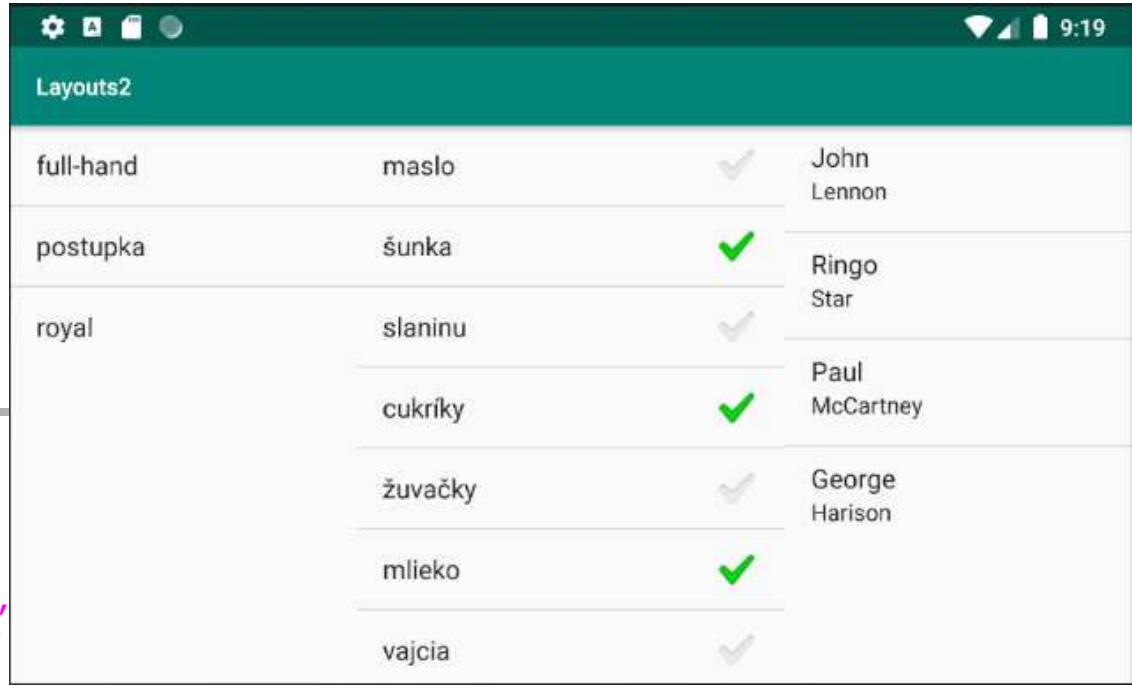
MS-Teams: 2sf3ph4, List, github

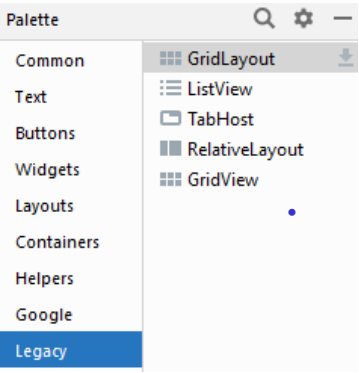
borovan 'at' ii.fmph.uniba.sk

ListView
(variabilita)



ListView a ListActivity zobrazujú zoznam položiek a môžu mať

- preddefinovaný štýl
  - môžu/nemusia sa nám páčiť
  - ale sú *ready to use*
  - sú jednoduché
  - ale jemne zastaralé - legacy
- user defined
  - narobíme sa pri ich definícii
  - to už radšej RecycleView...



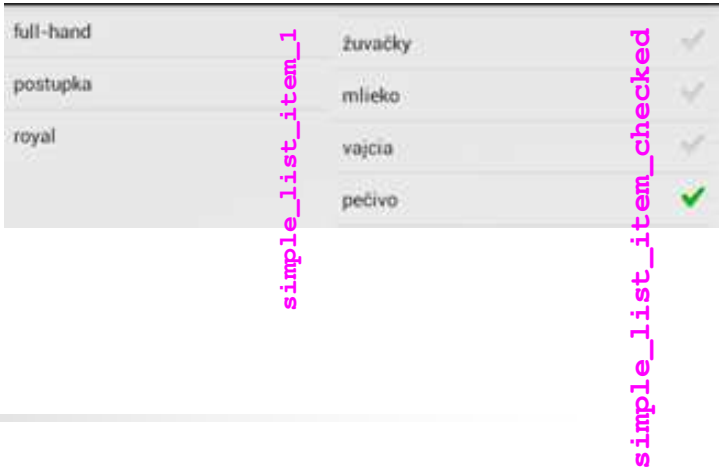
Rôzne inštancie ListView

simple_list_item_1,
simple_list_item_activated_1
simple_list_item_checked
simple_list_item_2
....

Odchytávanie udalostí v ListView

```
com.example.layouts2 D/ZOZNAM: beatles click: 2:{krstne=Paul, priezv=McCartney}
com.example.layouts2 D/ZOZNAM: beatles click: 1:{krstne=Ringo, priezv=Star}
com.example.layouts2 D/ZOZNAM: beatles click: 3:{krstne=George, priezv=Harison}
com.example.layouts2 D/ZOZNAM: check click: 3:cukríky
com.example.layouts2 D/ZOZNAM: check click: 4:žuvačky
com.example.layouts2 D/ZOZNAM: item click: 1:postupka
com.example.layouts2 D/ZOZNAM: item click: 2:royal
com.example.layouts2 D/ZOZNAM: item click: 0:full-hand
com.example.layouts2 D/ZOZNAM: check click: 2:slaninu
```

Project: Layouts2.zip



ListView
(simple_list_item_1)

ListView potrebuje inštanciu implementujúcu interface **ListAdapter**, napr. triedy **ArrayAdaper**, ktorý slúži na vykreslenie položiek **ListView**

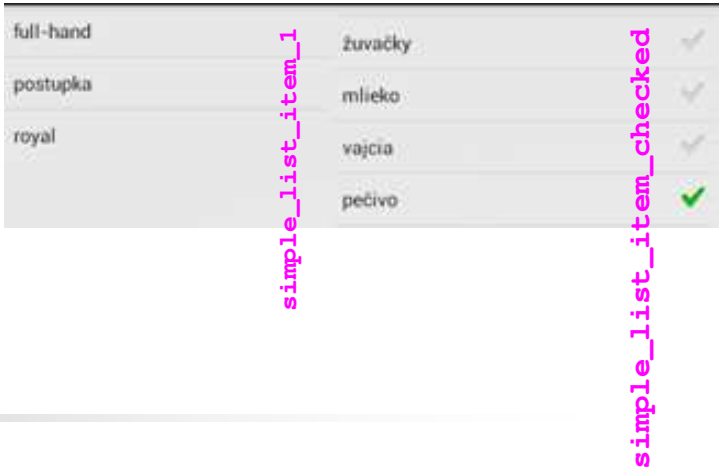
```
// poker - simple_list_item1 view
listView1.adapter = ArrayAdapter(
    this,                                          // kontext ListView
    android.R.layout.simple_list_item_1,           // štýl- jednoriadkový
    resources.getStringArray(R.array.poker)        // hodnoty
)

// listView1.choiceMode =
        ListView.CHOICE_MODE_MULTIPLE
```

```
res/values/strings.xml
<string-array name="poker">
    <item>full-hand</item>
    <item>postupka</item>
    <item>royal</item>
</string-array>
```

```
listView1.setOnItemClickListener {
   adapterView, view, index, l -> // View.OnItemClickListener
      val hodnota = adapterView.getItemAtPosition(index)
      Log.i(TAG, "item click: $index:$hodnota")
}
```

Project: Layouts2.zip



ListView
(simple_list_item_checked)

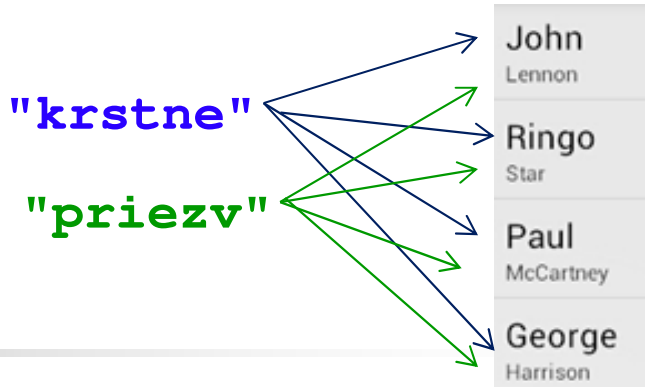
```
// nákup - checked box list view
listView2.adapter = ArrayAdapter (
    this,
    android.R.layout.simple_list_item_checked, //2-riadkový štýl
    resources.getStringArray(R.array.nakup)
)

listView2.setOnItemClickListener {
    adapterView, view, index, l ->
        val hodnota = adapterView.getItemAtPosition(index)
        (view as CheckedTextView).toggle() // prekresli
        Log.i(TAG, "check click: $index:$hodnota")
}
```

```
res/values/strings.xml
<string-array name="nakup">
    <item>maslo</item>
    <item>šunka</item>
    <item>slaninu</item>
    <item>cukríky</item>
    ...
    <item>kvety pre svokru</item>
</string-array>
```

Project: Layouts2.zip

ListView 2
(simple_list_item_2)



Naplniť iný, napr. dvojriadkový **ListView** je náročnejšie

```
val pairs = listOf(    // hodnoty sú zoznamy máp typu kľúč->hodnota
    mapOf("krstne" to "John","priezv" to "Lennon"),   mapOf("krstne" to "Ringo","priezv" to "Star"),
    mapOf("krstne" to "Paul","priezv" to "McCartney"),mapOf("krstne" to "George","priezv" to "Harison")
)
listView3.adapter = SimpleAdapter(this,
      pairs,                    // hodnoty typu List<? extends Map<String,?>>
      android.R.layout.simple_list_item_2, // formát/štýl ListView
      arrayOf("krstne", "priezv"),          // zoznam kľúčov
      arrayOf(android.R.id.text1,android.R.id.text2) // štýl riadkov
         .toIntArray()
   )
   listView3.setOnItemClickListener {
        adapterView, view, index, l ->
       val hodnota = adapterView.getItemAtPosition(index)
       Log.i(TAG, "beatles click: $index:$hodnota:"+
                "${(hodnota as Map<String, String>)["krstne"]
}
```

Project: Layouts2.zip

Rôzne preddefinované ListView
(prehľad)

zdroj: https://developer.xamarin.com/guides/android/user_interface/working_with_listviews_and_adapters/part_3_-_customizing_a_listview's_appearance/

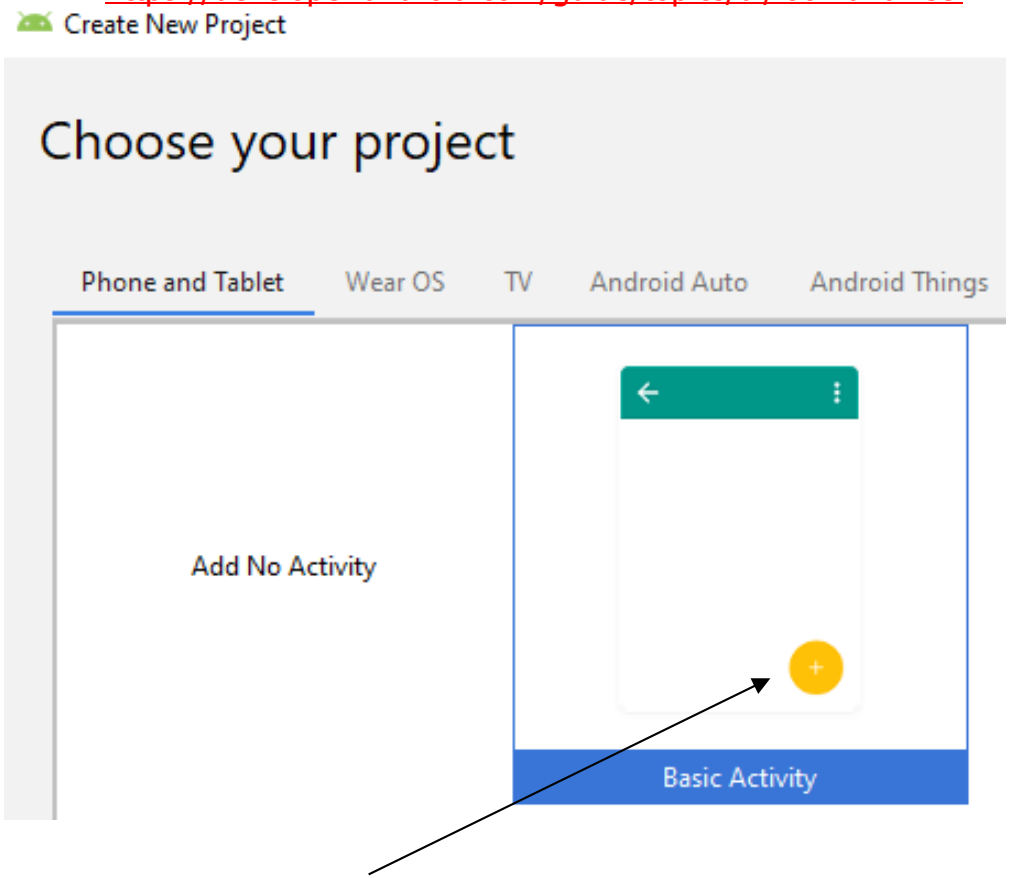
java.lang.Object
↳ android.view.View
↳ android.widget.ImageView
↳ android.widget.ImageButton
↳ com.google.android.material.floatingactionbutton.FloatingActionButton

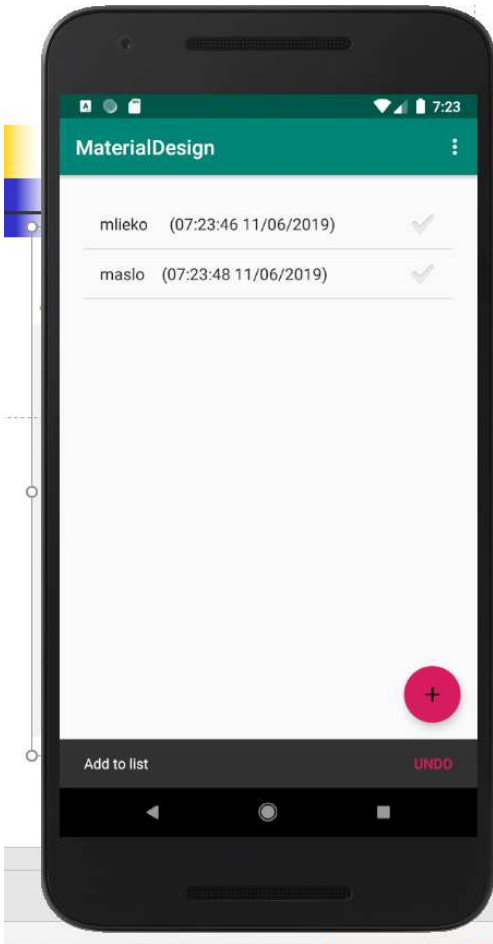
Material Design

(ako a kde začať https://material.io/)

Kotlin Android Fundamentals: 10.2
Material Design, dimens, and colors

- https://codelabs.developers.google.com/codelabs/kotlin-android-training-material-design-dimens-colors/index.html?index=..%2F..android-kotlin-fundamentals#0
- https://developer.android.com/guide/topics/ui/look-and-feel





Floating Action Button

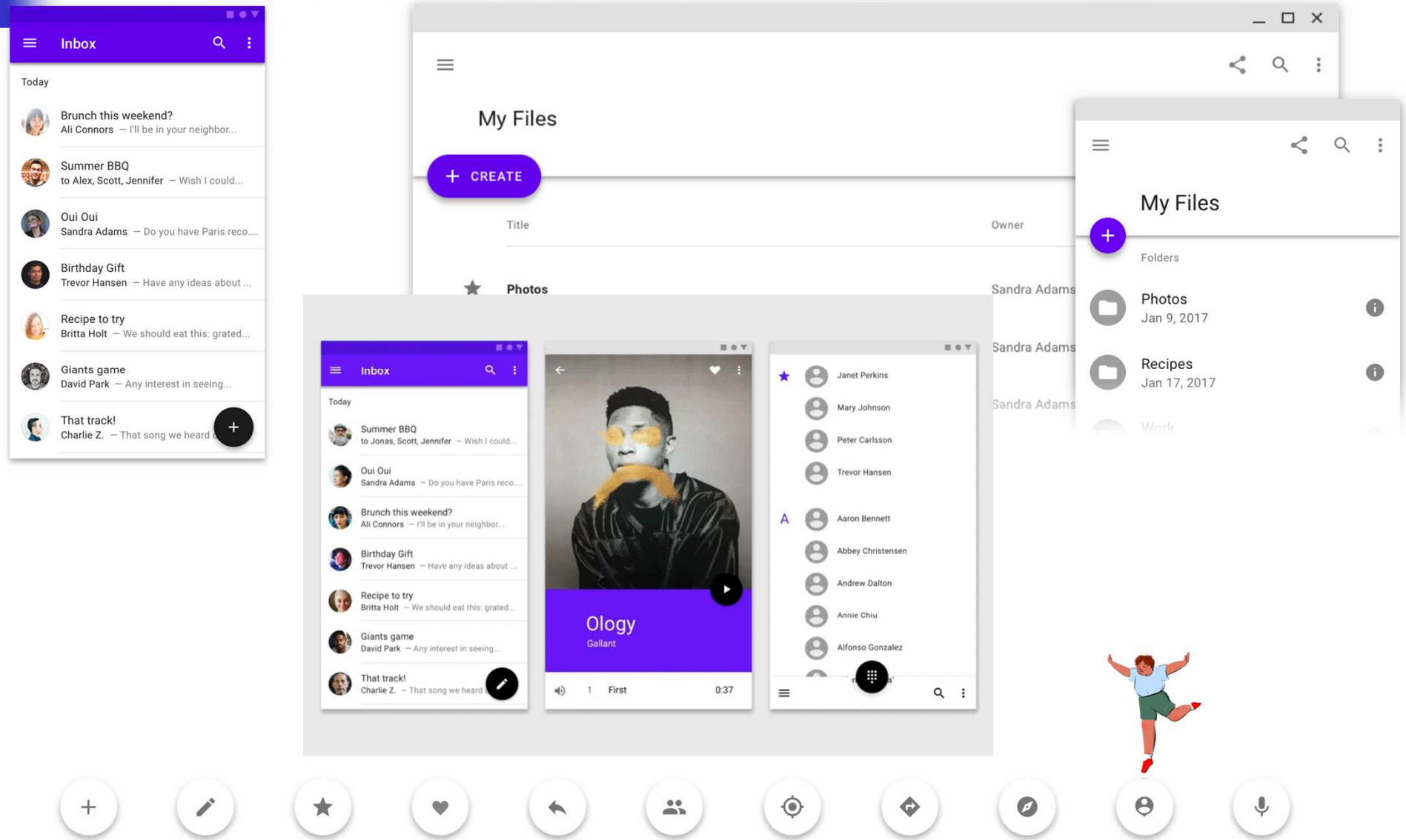
`<com.google.android.material.floatingactionbutton.FloatingActionButton`

Project: MaterialDesign.zip

52. Working with the Floating Action Button and Snackbar

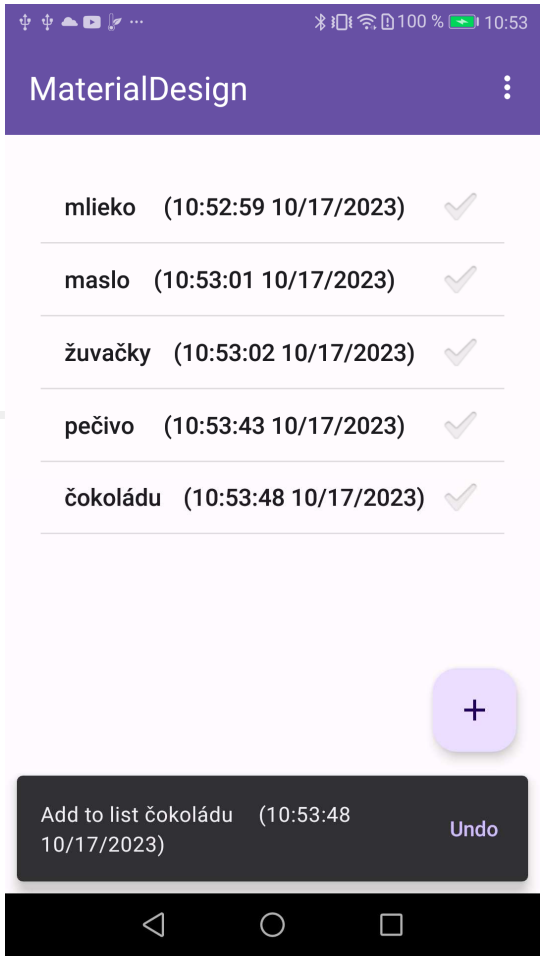
Material Design

https://material.io/



TODO List

ListView



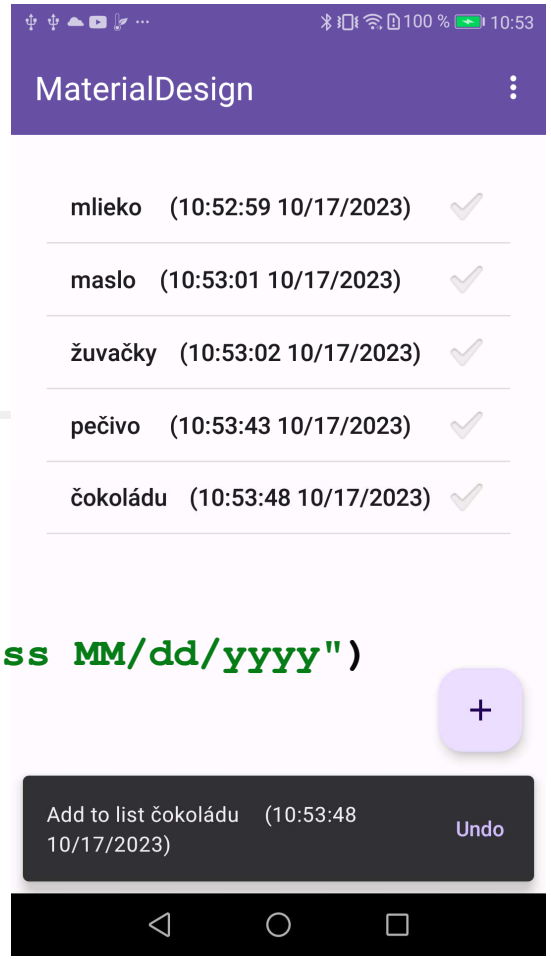

```
adapter = ArrayAdapter(
    this@MainActivity,
    android.R.layout.simple_list_item_checked,
    listItems
)
contentMain.listView.adapter = adapter
contentMain.listView.setOnItemClickListener {
adapterView, view, index, l ->
    val hodnota = adapterView.getItemAtPosition(index)
    (view as CheckedTextView).toggle()
}
```

```
    <com.google.android.material.floatingactionbutton.FloatingActionButton
        android:id="@+id/fab"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_gravity="bottom|end"
        android:layout_margin="@dimen/fab_margin"
        app:srcCompat="@drawable/ic_add_entry"
        android:contentDescription="pridaj polozku" />
```

Project: MaterialDesign.zip

TODO List

setOnClick

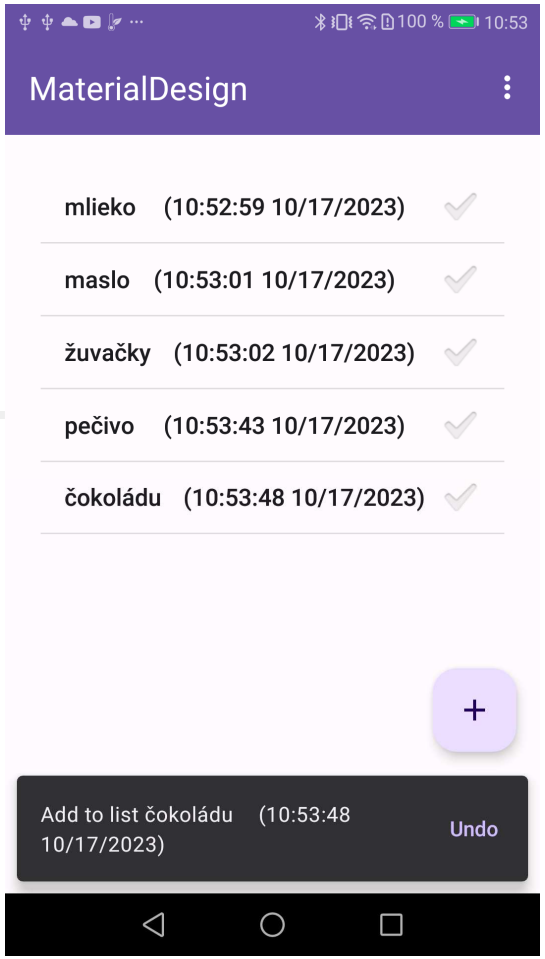



```
fab.setOnClickListener {
    val format: SimpleDateFormat = SimpleDateFormat("HH:mm:ss MM/dd/yyyy")
    var itemText = ""
    try {
        itemText =
            resources.getStringArray(R.array.potraviny)
                            [listItems.size] + "\t\t\t(${
                format.format(
                    Date()
                )
            })"
    } catch (e: Exception) {
        itemText = "no more items"
    }
    listItems.add(itemText)
    adapter.notifyDataSetChanged()
```

Project: MaterialDesign.zip

TODO List

SnackBar

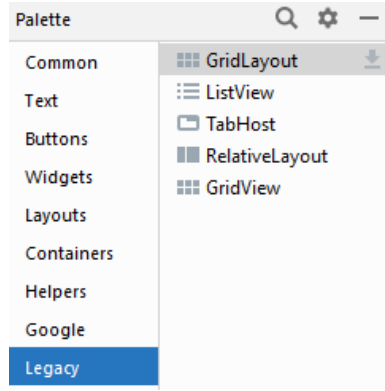



```
Snackbar.make(it, "Add to list $itemText", Snackbar.LENGTH_LONG)
    .setAction("Undo",
        {
            if (listItems.size > 0) {
                listItems.removeAt((listItems.size - 1))
            }
            adapter.notifyDataSetChanged()
            Snackbar.make(it, "last removed", Snackbar.LENGTH_SHORT)
                .setAction("Action", null).show()
        }
    ).show()
```

Project: MaterialDesign.zip

Chapter 54

54. Working with the RecyclerView and CardView Widgets



RecycleView

- podlieha MVVM návrhovému vzoru
- efektívnejšia forma ako **`ListView`**, renderuje len políčka zobrazené, scroluje, ...

ViewModel – dáta, ktoré sa majú zobrazovať v jednom políčku

```
data class ItemsViewModel(val text: String) { }
```

RecycleView.Adapter – boilerplate code

```
class CustomAdapter(private val mList: List<ItemsViewModel>) :
          RecyclerView.Adapter<CustomAdapter.ViewHolder>() {
   // vytvorí view zodpovedajúce jednému riadku zoznamu, bez hodnôt, template riadku
   override fun onCreateViewHolder(parent: ViewGroup, viewType: Int): ViewHolder { ...}
   // previaže prázdny holder s dátami adaptéra, pomocou vstupu mList
   override fun onBindViewHolder(holder: ViewHolder, position: Int) { ... }
   // počet riadkov zobrazených v zozname
   override fun getItemCount(): Int { ... }
   // jeden riadok zoznamu
   class ViewHolder(itemView: View) : RecyclerView.ViewHolder(itemView) {
      val textView = itemView.findViewById<TextView>(R.id.textView)
      init {
         itemView.setOnClickListener {
            Log.i("TAG", "item selected ${textView.text}")
}  }  }  }
```

RecycleViewExample.zip

RecycleView

detail adaptéra

```
res/layouts/R.layout.row
<LinearLayout
  android:layout_width="match_parent"
  android:layout_height="wrap_content"
  android:orientation="horizontal">
    <TextView
        android:id="@+id/textView"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
       android:text="TextView" />
</LinearLayout>
```

```
data class ItemsViewModel(val text: String) { }

class CustomAdapter(private val mList: List<ItemsViewModel>) :
        RecyclerView.Adapter<CustomAdapter.ViewHolder>() {
    // vytvorí view zodpovedajúce jednému riadku zoznamu, bez hodnôt, template riadku
    override fun onCreateViewHolder(parent: ViewGroup, viewType: Int): ViewHolder {
        val view = LayoutInflater.from(parent.context)
                .inflate(R.layout.row, parent, false)
        return ViewHolder(view)
    }
    // previaže prázdny holder s dátami adaptéra, mList
    override fun onBindViewHolder(holder: ViewHolder, position: Int) {
        holder.textView.text = mList[position].text
    }
    // počet riadkov
    override fun getItemCount(): Int {
        return mList.size
    }

    class ViewHolder(itemView: View) : RecyclerView.ViewHolder(itemView) {
        val textView = itemView.findViewById<TextView>(R.id.textView)
        init {
            itemView.setOnClickListener { Log.i("TAG", "selected ${textView.text}")
                Toast.makeText(itemView.context, "item selected ${textView.text}",
                    Toast.LENGTH_SHORT).show()
}   }   }   }
```

RecycleViewExample.zip

Chapter 55

55. An Android RecyclerView and CardView Tutorial

CardView

detail riadku

RecycleV

peter

pavel

anna

```
res/layouts/R.layout.row
<androidx.cardview.widget.CardView
    xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_margin="5dp"
    app:cardCornerRadius="12dp"
    app:cardElevation="3dp"
    app:contentPadding="4dp">

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:orientation="horizontal"
        android:padding="1dp">

        <TextView
            android:id="@+id/textView"
            android:layout_width="0dp"
            android:layout_height="wrap_content"
            android:layout_weight="1"
            android:textSize="32sp"
            android:background="@color/black"
            android:textColor="@color/white"
            android:text="TextView" />
    </LinearLayout>
</androidx.cardview.widget.CardView>
```

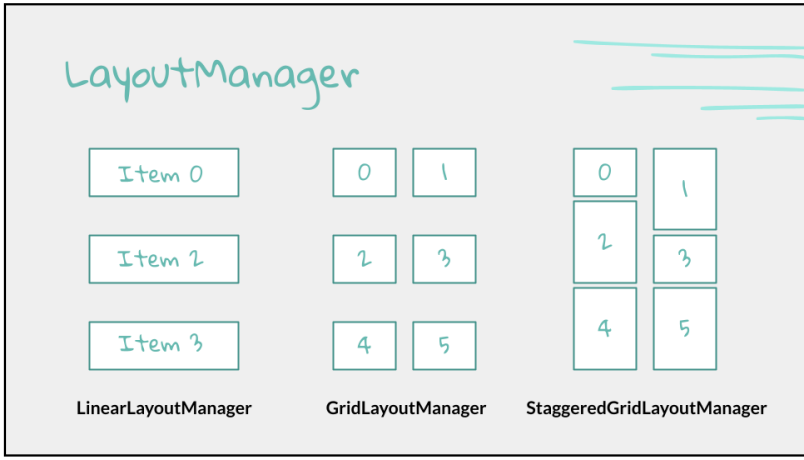
RecycleViewExample.zip

RecycleView

```
layout_main.xml
<LinearLayout
 android:layout_width="match_parent"
  android:orientation="horizontal"
  android:layout_height="match_parent"
  tools:context=".MainActivity" >
  <androidx.recyclerview.widget.RecyclerView
     android:id="@+id/rv"
     android:layout_width="wrap_content"
     android:layout_height="wrap_content" />
</LinearLayout>
```

```
class MainActivity : AppCompatActivity() {
    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        val binding = ActivityMainBinding.inflate(layoutInflater)
        setContentView(binding.root)

        //-- recycleView inicializácia
        binding.rv.layoutManager = LinearLayoutManager(this)
        binding.rv.adapter = CustomAdapter(
            listOf(
                ItemsViewModel("peter"),
                ItemsViewModel("pavel"),
                ItemsViewModel("anna")
        ))
```

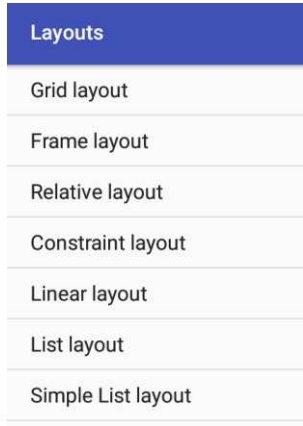


https://magdamiu.com/2020/12/29/recyclerview-android/

RecycleViewExample.zip

Chapter 57

57. An Overview of Android Intents



Intent

(filter)

vid' AndroidManifest: `<intent-filter>` hovorí, na aký intent aktivita reaguje

```
<activity android:name=".MainActivity">
    <intent-filter>
        <action android:name="android.intent.action.MAIN" />
        <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>
</activity>
```

Spustí sa ako prvá

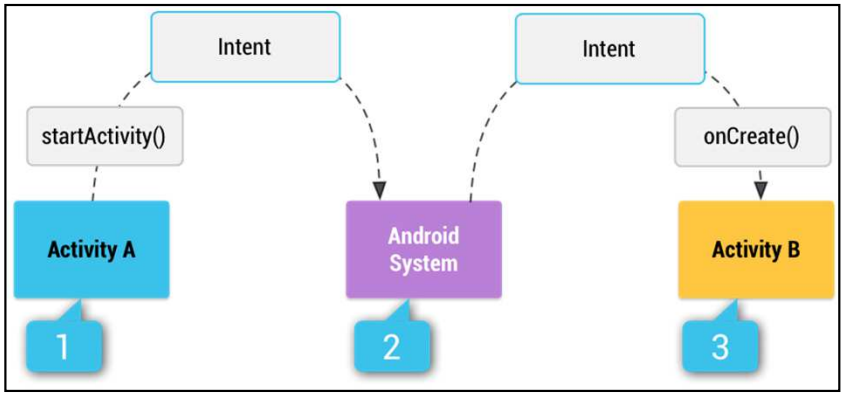
Aktivita je vlastne jedno-obrazovková aplikácia

```
<activity android:name=".ListActivity">
    <intent-filter>
        <category android:name="android.intent.category.DEFAULT" />
    </intent-filter>
</activity>
```

nespustí sa

Project: Layouts2.zip

Intent



Scenár:

- aktivita A vytvorí objekt Intent, na ktorý má Aktivia B nastavený `intent-filter`
- zavolá ho cez `startActivity(intent..)`, resp. `startActivityForResult(…)`
- systém hľadá aplikáciu, ktorá má daný nastavený `intent-filter`
- ak ich existuje viacero, vyskočí dialóg na výber správnej aplikácie
- zavolá sa `onCreate` aktivity v nájdenej aplikácii (B)

Explicitné intenty popisujú plne kvalifikované meno triedy, napr. `com.example.Pokus`

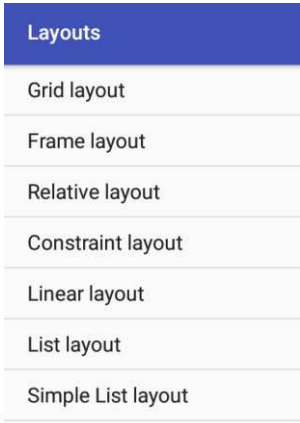
```
<intent-filter>
    <action android:name="com.example.Pokus" />
    <category android:name="android.intent.category.DEFAULT" />
</intent-filter>
```

Implicitné intenty popisujú všobecnú akciu, napr. **`ACTION_IMAGE_CAPTURE`** alebo **`ACTION_VIDEO_CAPTURE`**

Ich zoznam, popis je tu: https://developer.android.com/guide/components/intents-common

https://developer.android.com/guide/components/intents-filters

Intent
(startActivity)




```
listViewID.adapter = ArrayAdapter<String>(
    this, android.R.layout.simple_list_item_1,
    arrayListOf("Grid layout","Frame layout","Relative layout",
          "Constraint layout")) // dáta nepatria do kódu, ale .xml
    resources.getStringArray(R.array.activities)
```

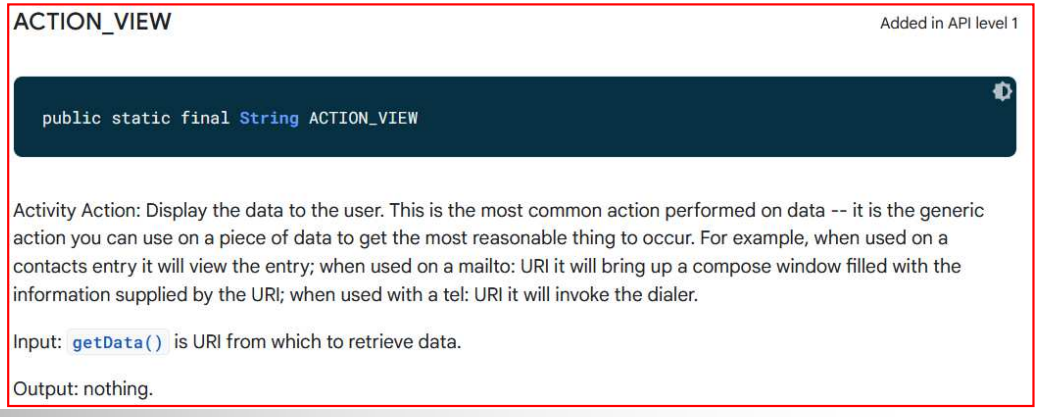
```
listViewID.setOnItemClickListener {
    adapterView, view, index, l ->
    Log.i("LISTPICK",
        "click: $index:${adapterView.getItemAtPosition(index)}")
    if (index < klasy.size)
       startActivity(Intent(this@MainActivity, klasy[index]))
}       čo je this@MainActivity - this z vonkajšieho scope
```

```
val klasy:Array<Class<out AppCompatActivity>>= arrayOf(
    GridLayoutActivity::class.java,
    FrameLayoutActivity::class.java,
    ... .
    MainActivity::class.java
)
```

```
<activity>
  android:name=".GridLayoutActivity"
  android:label="@string/title_activity_grid_layout">
  <intent-filter>
    <action android:name="com.example.layouts2.GridLayoutActivity" />
    <category android:name="android.intent.category.DEFAULT" />
  </intent-filter>
</activity>
```

Project: Layouts2.zip

Reflection & Intent



ACTION_VIEW

Added in API level 1

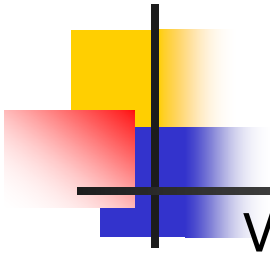
```
public static final String ACTION_VIEW
```

Activity Action: Display the data to the user. This is the most common action performed on data -- it is the generic action you can use on a piece of data to get the most reasonable thing to occur. For example, when used on a contacts entry it will view the entry; when used on a mailto: URI it will bring up a compose window filled with the information supplied by the URI; when used with a tel: URI it will invoke the dialer.

Input: `getData()` is URI from which to retrieve data.

Output: nothing.

- intent vytvoríte
  - Intent(context, Class<*>)
    - `Intent(this@MainActivity, GridLayoutActivity::class.java)`
  - Intent(reťazec, uri),
    - `Intent(MediaStore.ACTION_IMAGE_CAPTURE)`
    - `Intent(Intent.ACTION_VIEW, Uri.parse("https://google.com "));`
    - `Intent(Intent.ACTION_SEND, Uri.parse("mailto:"));`
- Reflection model v Kotline je iný ako v Jave,
  - Kotlin má triedu KClass<>, Java má Class<>
- ```
  val kotlinClass: KClass<GridLayoutActivity> =
        GridLayoutActivity::class
  ```
- na získanie Java class referencie, treba použiť property .java
- ```
  val javaClass: Class<GridLayoutActivity> =
        GridLayoutActivity::class.java
  ```
- ```
  val i = Intent(this@MainActivity, javaClass)
  ```
- viac o Kotlin reflection
  https://kotlinlang.org/docs/reference/reflection.html
  ```



List project

V ďalšom uvidíme sériu rôznych nezávislých aktivít, ktoré ilustrujú:

- intro_activity
  - logo, intent, CountDown/Timer, MediaPlayer
- email_activity
  - listView, intent.putExtra, startActivityForResult
- canvas_activity
  - canvas/view – Draw, MultiTouch, onTouch, Option & Context Menu
- pisky_activity
  - piškvorky, začiatok aj koniec jednoduchej hry
- login_activity
  - ukladanie informácie pomocou SharedPreferences

Project: List.zip

Intent - filter

- CATEGORY_BROWSABLE - ovláda web browser
- CATEGORY_LAUNCHER - ovláda spúšťač aplikácie
- *android.intent.action.MAIN – vstupný bod programu*

```
<intent-filter>
    <action android:name="android.intent.action.MAIN" />
    <category android:name="android.intent.category.LAUNCHER" />
</intent-filter>
```

- CATEGORY_DEFAULT – startActivity/startActivityForResults

```
<intent-filter>
    <action android:name="com.example.list.CanvasActivity" />
    <category android:name="android.intent.category.DEFAULT" />
</intent-filter>
```

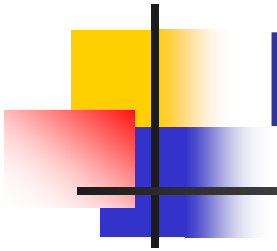
spustenie:

```
startActivity(
    Intent(this@IntroActivity, MainActivity::class.java))
```

ak máme:

```
class MainActivity : AppCompatActivity() {
```

Project: List.zip



Reflexivita

Aby sme nemuseli mať konštantu ako pole všetkých tried, trieda sa dá vyrobiť z mena triedy pomocou reflexívneho volania statickej metódy **`Class.forName`**

```
class MainActivity : AppCompatActivity() {
...
listView1.setOnItemClickListener {
  adapterView, view, index, l ->
    val hodnota = adapterView.getItemAtPosition(index)
    Log.i(TAG, "list item click: $index:$hodnota")
    val klasa: KClass<Any>
        = Class.forName("com.example.list.$hodnota").kotlin
    //val intent = Intent(this, IntroActivity::class.java)
    val qname: String? = klasa.qualifiedName
    Log.i(TAG, "class name: $qname")
    val intent = Intent(qname)
    startActivity(intent)
}
```

Project: List.zip

IntroActivity

(Intent, timer)

IntroActivity – CountDownTimer odpočítavajúci čas pre úvodné logo+.mp3

```
override fun onCreate(savedInstanceState: Bundle?) {
    super.onCreate(savedInstanceState)
    setContentView(R.layout.activity_intro)

    // timer odpočítavajúci 4s.
    object: CountDownTimer(4000,1000) {
        override fun onTick(millisUntilFinished: Long) {}
        override fun onFinish() {
            Log.i(TAG, "go back to mainActivity")
            startActivity(
                Intent(this@IntroActivity, MainActivity::class.java)
            )
        }
    }.start()
```

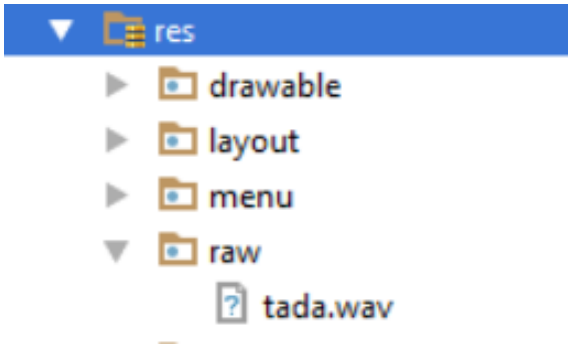
Project: List.zip

Chapter 76

76. Android Audio Recording and Playback using MediaPlayer and

MediaPlayer

(lokálne – adresár raw)



tada.mp3 [.wav] uložíme do project/res/raw
... a bude zakompilovaná do apky, a zazipovaná do zipky ☺

```
lateinit var mp : MediaPlayer          // globálna premenná
// ak je muzička lokálna, v res/raw/tada.wav
mp = MediaPlayer.create(this, R.raw.tada)
mp.isLooping = false
mp.start()
```

```
override fun onPause() {       // ak je IntroActivity pauzovaná, keď
    super.onPause() // odštartujeme com.example.actilist.MainActivity
    mp.release()    // uvoľníme MediaPlayer objekt, mp
    finish()        // akonáhle sa rozbehne MainActivy,
                    // IntroActivity  zanikne
                    // to rieši aj navigáciu, problém s back buttonom
}
```

Media player má problémy v niektorých emulátoroch
https://stackoverflow.com/questions/59073433/building-a-simple-mediaplayer-with-kotlin-in-android-studio-c

Project: List.zip

MediaPlayer
(onPreparedListener)

iná možnosť, tada.mp3 je prístupná niekde na sieti, dotiahneme ju a zahráme

```
        // problém:apka musí deklarovať, že chce prístup na internet
lateinit var mp : MediaPlayer
try { // ak je muzička na webe, jej dotiahnutie môže niečo trvať
    val uri = Uri.parse("https://dai.fmph.uniba.sk/courses/VMA/wave.mp3")
    mp.setAudioStreamType(AudioManager.STREAM_MUSIC)

    mp.setOnPreparedListener { mp.start() }

    mp.setDataSource(getApplicationContext(), uri)
    mp.prepare()     // tu sa spustí doťahovanie súboru
} catch (e:IOException) {
    e.printStackTrace()
    Toast.makeText(this, "file error", Toast.LENGTH_SHORT).show()
}
```

do AndroidManifest.xml

treba deklarovať povolenie aplikácie prístupu na internet

```
<uses-permission android:name="android.permission.INTERNET" />
```

http://dai.fmph.uniba.sk/courses/VMA/wave.mp3

Project: List.zip

AndroidManifest.xml

```
<uses-permission android:name=
   "android.permission.INTERNET" />
<uses-permission android:name=
   "android.permission.READ_EXTERNAL_STORAGE" />
<uses-permission android:name=
   "android.permission.WRITE_EXTERNAL_STORAGE" />
```

MediaPlayer

(na SD-karte, resp. v internej pamäti)

Môžeme sa skúšať triafať do správnej cesty muziky, obrázku, či súboru:

```
mp.setDataSource("/mnt/sdcard/Music/tada.wav")
mp.setDataSource("/mnt/sdcard/Music/wave.mp3")
mp.setDataSource("/storage/sdcard0/Music/wave.mp3")
mp.setDataSource("/Removable/SD/Music/wave.mp3")

// ale správna cesta k prístupu k Music je cez root external storage
val filePath = Environment.getExternalStorageDirectory().toString()
                                    + "/Music/tada.wav"
Log.i(TAG, filePath)   // vždy si zalogujte cestu,
                       // aby ste vedeli, kde súbor hľadá
mp = MediaPlayer()
mp.setDataSource(filePath) // hneď viete, prečo to nehrá..
mp.setOnPreparedListener { mp.start() }
mp.prepare()
```

Project: List.zip

SoundPool

```
var audioAttrib = AudioAttributes.Builder()
      .setUsage(AudioAttributes.USAGE_GAME)
      .setContentType(AudioAttributes.CONTENT_TYPE_SONIFICATION)
      .build()
val soundPool = SoundPool.Builder()
      .setAudioAttributes(audioAttrib)
      .setMaxStreams(10)
      .build()
```

```
class SoundPlayer(context: Context) {
    private val soundPool: SoundPool =
        SoundPool(10, AudioManager.STREAM_MUSIC, 0)
    init {
        try {
            val assetManager = context.assets
            var descriptor: AssetFileDescriptor      // adresár assets
               = assetManager.openFd("shoot.ogg")    //.mp3,.wav,
            shootID = soundPool.load(descriptor, 0) // toto trvá...
        } catch (e: IOException) {
            Log.e("SoundPlayer", "sound file not found")
        }

        soundPool.setOnLoadCompleteListener ({ // keď load skončil
            soundPool, sampleID, status ->      // môžeme zahrať
                soundPool.play(sampleID, 1f, 1f, 1, 1, 1f) }
        )
} }
```

Project: List.zip

EmailActivity

(data do intentu, startActivityForResult s callbackom)

```
val emailString = edtEmail.text.toString() // dáta z formulára
val subjectString = edtSubject.text.toString()
val bodyString = edtBody.text.toString()

Toast.makeText(this@EmailActivity, "posielam mail",
               Toast.LENGTH_LONG).show()

val intent = Intent(android.content.Intent.ACTION_SEND) // SEND

intent.type = "text/plain"
intent.putExtra(android.content.Intent.EXTRA_SUBJECT,subjectString)
intent.putExtra(android.content.Intent.EXTRA_EMAIL,
                 arrayOf(emailString) )        // pole adresátov
intent.putExtra(android.content.Intent.EXTRA_TEXT, bodyString)

// startActivity(intent)
startActivityForResult(intent, REQUEST_SEND_EMAIL)

private val REQUEST_SEND_EMAIL = 777
```

Project: List.zip

EmailActivity

(onActivityResult = callback)

```
private val REQUEST_SEND_EMAIL = 777

override fun onActivityResult( // CALLBACK pre startActivityForResult
        requestCode: Int,
        resultCode: Int,
        data: Intent?) {

    // Check which request we're responding to
    if (requestCode == REQUEST_SEND_EMAIL) {
        Toast.makeText(
            this@EmailActivity, "email poslany, alebo aj nie..",
            Toast.LENGTH_SHORT
        ).show();
    }
}
```

https://developer.android.com/reference/android/content/Intent.html#ACTION_SEND

Project: List.zip

PhotoActivity
(data z intentu)

Princíp intent-**`startActivityForResult`** spolu s **`onActivityResult`** ešte raz:

```
val takePictureIntent = Intent(MediaStore.ACTION_IMAGE_CAPTURE);
    // test, či existuje komponent, ktorý spracuje intent
if (takePictureIntent.resolveActivity(getPackageManager()) != null) {
    Toast.makeText(this@PhotoActivity,
            "smile ... taking picture", Toast.LENGTH_LONG).show();
    startActivityForResult(takePictureIntent, REQUEST_IMAGE_CAPTURE);
} else {
     Toast.makeText(this@PhotoActivity,
            "sorry ... no picture", Toast.LENGTH_LONG).show();
}

private val REQUEST_IMAGE_CAPTURE = 690
```

https://developer.android.com/reference/android/provider/MediaStore.html#ACTION_IMAGE_CAPTURE

Project: List.zip

PhotoActivity
(data z intentu)

Standard Intent action that can be sent to have the camera application capture an image and return it.

The caller may pass an extra EXTRA_OUTPUT to control where this image will be written.

If the EXTRA_OUTPUT is not present, then a small sized image is returned as a Bitmap object in the extra field. This is useful for applications that only need a small image.

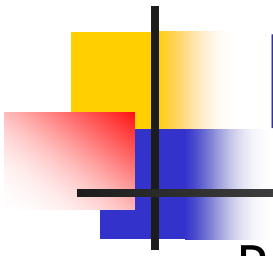
If the EXTRA_OUTPUT is present, then the full-sized image will be written to the Uri value of EXTRA_OUTPUT.

V callback onActivityResult získavame z indentu data/odfotený obrázok ako Bitmap:

```
private val REQUEST_IMAGE_CAPTURE = 690

override fun onActivityResult(requestCode: Int,
    resultCode: Int, data: Intent?) {
    // Check which request we're responding to
    if (requestCode == REQUEST_IMAGE_CAPTURE &&
        resultCode == RESULT_OK) {
        Toast.makeText(this@PhotoActivity, "thanks ...",
                       Toast.LENGTH_LONG).show()
        val extras = data?.getExtras()
        val imageBitmap = extras?.get("data") as Bitmap
        pictureImageView.setImageBitmap(imageBitmap)
    }
```

Project: List.zip



Permissions

Povolenia (permissions) aplikácie slúžia na zabezpečenie:

- vašich privátnych dát (cez INTERNET, BLUETOOTH, ACCESS_WIFI)
- ochranu súkromia (ACCESS_FINE_LOCATION, [READ/WRITE]_CONTACTS)

Ak máte (Android <= 5.1 || target SDK < 23), tak

<uses-permissions /> sú staticky v AndroidManifest.xml,

Povolenia sa získavajú staticky pri inštalácii, ak ich užívateľ odmietne, aplikácia sa neinštaluje.

```
<uses-permission android:name="android.permission.INTERNET" />
<uses-permission android:name="android.permission.READ_EXTERNAL_STORAGE"/>
<uses-permission android:name="android.permission.WRITE_EXTERNAL_STORAGE"/>
```

Inak (Android >= 6.0 && target SDK >= 23) aplikácia môže povolenia žiadať počas behu, podľa toho o akú službu práve ide (tzv. Runtime permissions). Ak užívateľ odmietne, aplikácia beží ďalej.

https://developer.android.com/guide/topics/permissions/overview

Piškvorky

(logická hra v canvase)

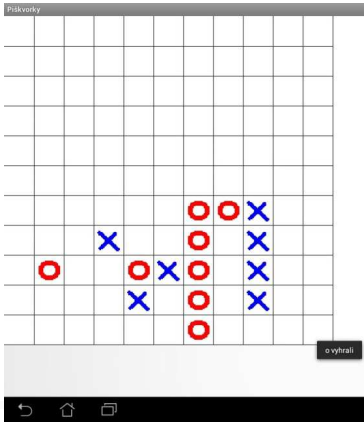
Príklad logickej hry (hlavolamu), kde
- v pozadí nebeží žiadne vlákno,
- nehýbu sa postavičky,
- nemusíme pravideľne prekreslovať plochu, aby sme navodili ilúziu
  - ❑ hry
  - ❑ simulácie

Na príklade Piškvorky ilustrujeme, že View má metódy:
- onTouch
- onDraw

Project:List.zip

onTouch vo View

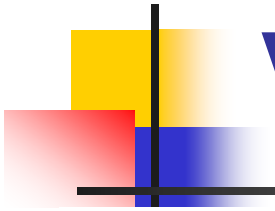
(onTouchEvent)



```
class PiskyView(context: Context, attrs: AttributeSet) :
   View(context,attrs) {     // Piškvorky sú podtrieda View
                             // načítanie bitmapy obrázkov, postavičiek
    o_img = resources.getDrawable(R.drawable.o).toBitmap()
    x_img = ContextCompat.getDrawable(context, R.drawable.x)!!.toBitmap()

override  fun onTouchEvent(e:MotionEvent): Boolean {
   if (e.action == MotionEvent.ACTION_DOWN) {
      val iX = (e.x / cellSize).toInt()              // transformácia
      val iY = (e.y / cellSize).toInt()              // pixlov na bunku
      if (iX >= SIZE || iY >= SIZE) return true      // mimo hraciu dosku
       if (playGround[iY][iX] == -1) {               // voľné políčko ?
          playGround[iY][iX] = onTurn                // polož značku hráča
          onTurn = 1 - onTurn                        // na ťahu, a ide súper
          invalidate()        // toto nakoniec prekreslí view
           val winner = check(iX, iY)                // vyhodnotenie víťazov...
           if (winner != -1)
              Toast.makeText(getContext(),"x vyhrali",Toast.LENGTH_LONG).show(
            } else
```

Project:List.zip



View/Activity

Každá podtrieda View má tieto metódy, ktoré môžeme predefinovať

```
class XXX(var context: Context, attrs: AttributeSet) :
    View(context, attrs) {

    override fun onSizeChanged(w: Int, h: Int, oldw: Int, oldh: Int){
        super.onSizeChanged(w, h, oldw, oldh)
    }

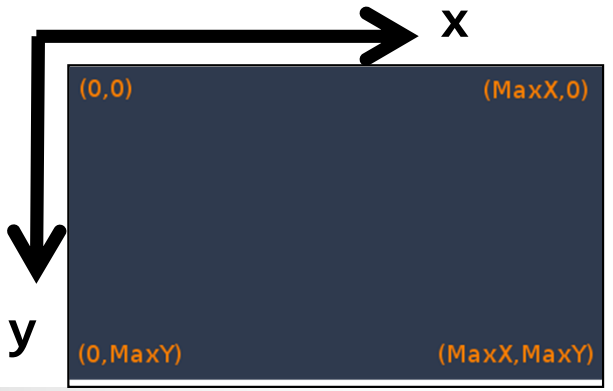
    override fun onTouchEvent(event: MotionEvent?): Boolean {
        return super.onTouchEvent(event)
    }

    override fun onKeyDown(keyCode: Int, event: KeyEvent?):Boolean{
        return super.onKeyDown(keyCode, event)
    }

    override fun onDraw(canvas: Canvas?) {
        super.onDraw(canvas)
    }
}
```

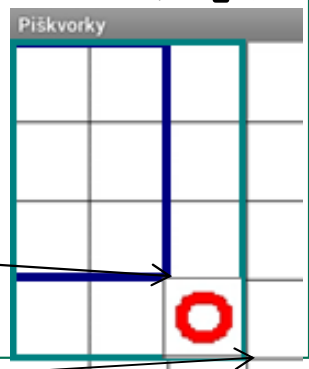
onDraw vo View

(kreslenie do Canvas)




```
override protected fun onDraw(canvas: Canvas) { //  paint()
    minSize = Math.min(getWidth(), getHeight()) - 2
    cellSize = minSize / SIZE //  min.zrozmerov canvas/SIZE=10

    canvas.drawColor(Color.WHITE)
    val p = Paint()
    p.setColor(Color.BLACK)
    p.setStrokeWidth(1f)
    for (i in 1..SIZE) {
      canvas.drawLine(i*cellSize, 0f, i*cellSize, minSize,p)
      canvas.drawLine(0f,i*cellSize, minSize, i*cellSize, p)
    }
    for (y in 0 until SIZE) {
       for (x in 0 until SIZE) {
          canvas.drawBitmap(o_img,null,
                                  Rect(x1,y1,x2,y2),
                                  p)
```



Project:List.zip

Maľovátko

(MotionEvent actions)

event:MotionEvent vám detailnejšie prezradí, aký event skutočne nastal

```
private val mPath: Path // android.graphics.Path
override protected fun onDraw(canvas:Canvas){
    super.onDraw(canvas)
    canvas.drawPath(mPath, mPaint)
}
override fun onTouchEvent(event: MotionEvent): Boolean {
    val x = event.x
    val y = event.y
    when (event.action) {
      MotionEvent.ACTION_DOWN -> {
        startTouch(x, y) invalidate()   }
      MotionEvent.ACTION_MOVE -> {
        moveTouch(x, y)  invalidate()   }
      MotionEvent.ACTION_UP -> {
        upTouch() invalidate()          }
    }
    return true  // event bol spracovaný, nešíri sa ďalej
}
```

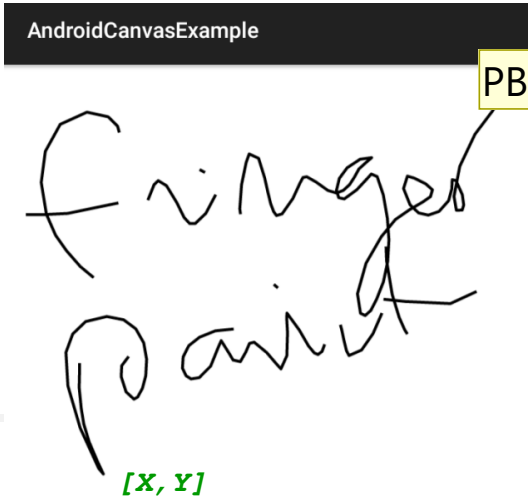
Path je sekvencia
- úsečiek
- kvadratických a
- kubických kriviek

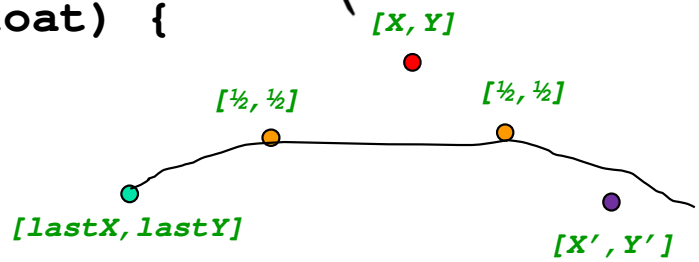
https://examples.javacodegeeks.com/android/core/graphics/canvas-graphics/android-canvas-example/

Project:List.zip/PaintActivity

Maľovátko

(bezier vs. linear - nebezier)





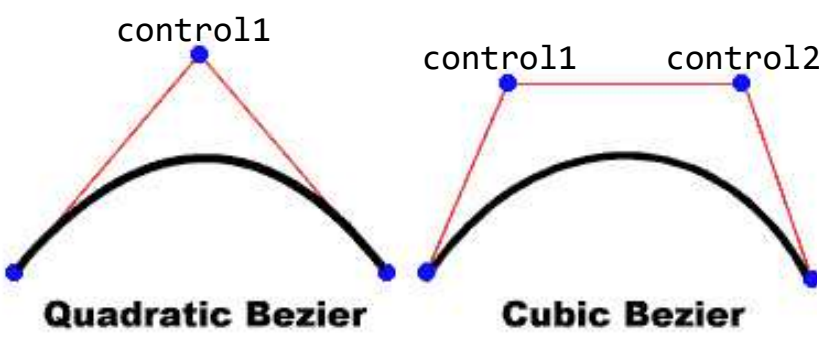

```
private fun startTouch(x: Float, y: Float) {
   mPath.moveTo(x, y)
   lastX = x
   lastY = y
}
private val TOLERANCE = 5f // minimálne epsilon pre pohyb
private fun moveTouch(x: Float, y: Float) {
   val dx = Math.abs(x - lastX)
   val dy = Math.abs(y - lastY)
   if (dx >= TOLERANCE || dy >= TOLERANCE) { // ak zmena bola >=
      mPath.lineTo(x, y); // kreslíme úsečku, dostaneme kostrbaté
                          // úsečka z posledného bodu path do x,y
                          // alebo
      mPath.quadTo(lastX, lastY, (x+lastX)/2, (y+lastY)/2)
                          // kreslíme časť paraboly, aproximácia
      lastX = x           // kvadratickou krivkou...
      lastY = y           // to ale potrebujeme 3 body
   }
}
```

https://examples.javacodegeeks.com/android/core/graphics/canvas-graphics/android-canvas-example/

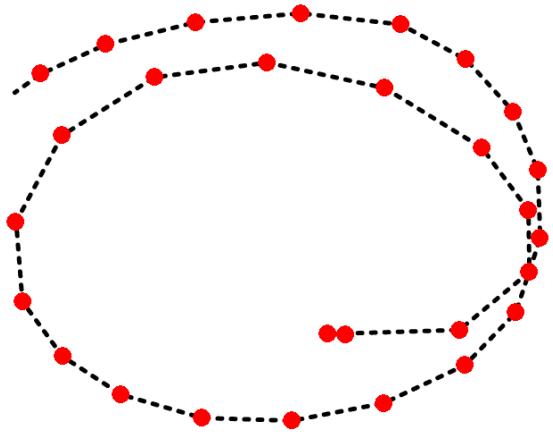
Project:List.zip/PaintActivity

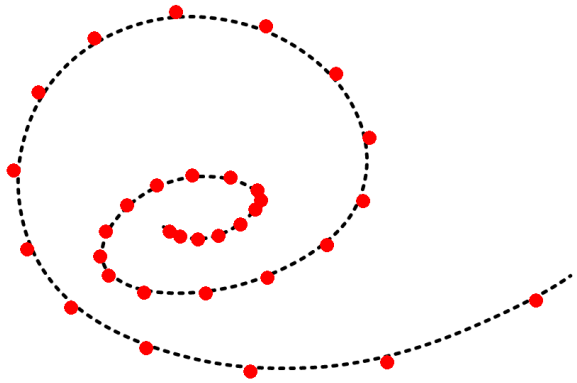
PB1 Peter Borovansky; 6. 11. 2019

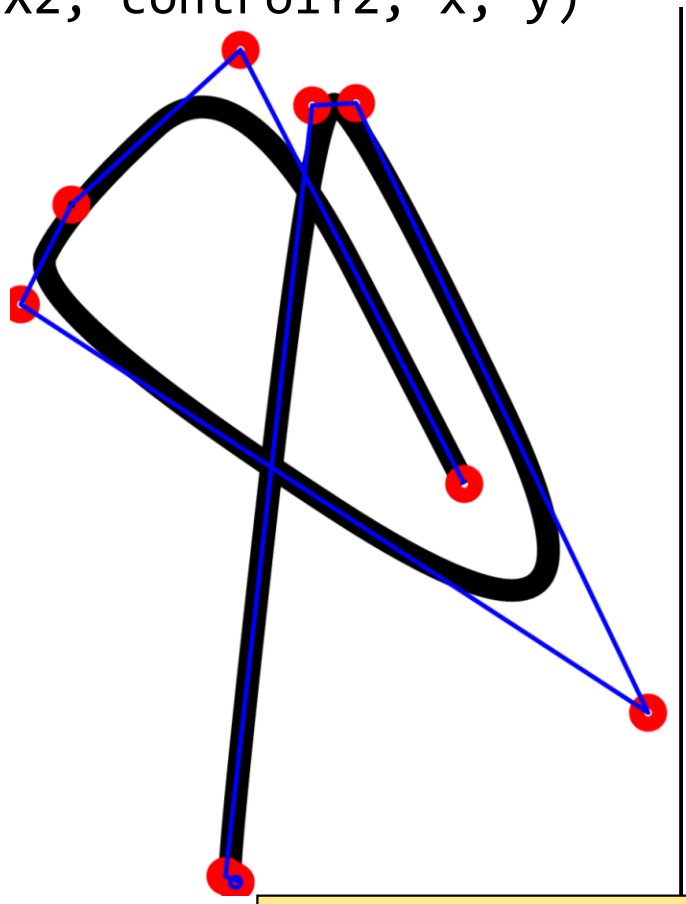
Bézier



- `lineTo(x,y)`
- `quadTo(controlX, controlY, x, y)`
- `cubeTo(controlX1, controlY1, controlX2, controlY2, x, y)`







https://www.desmos.com/calculator/ebdtbxgbq0

Project:List.zip/PaintActivity

Hierarchia

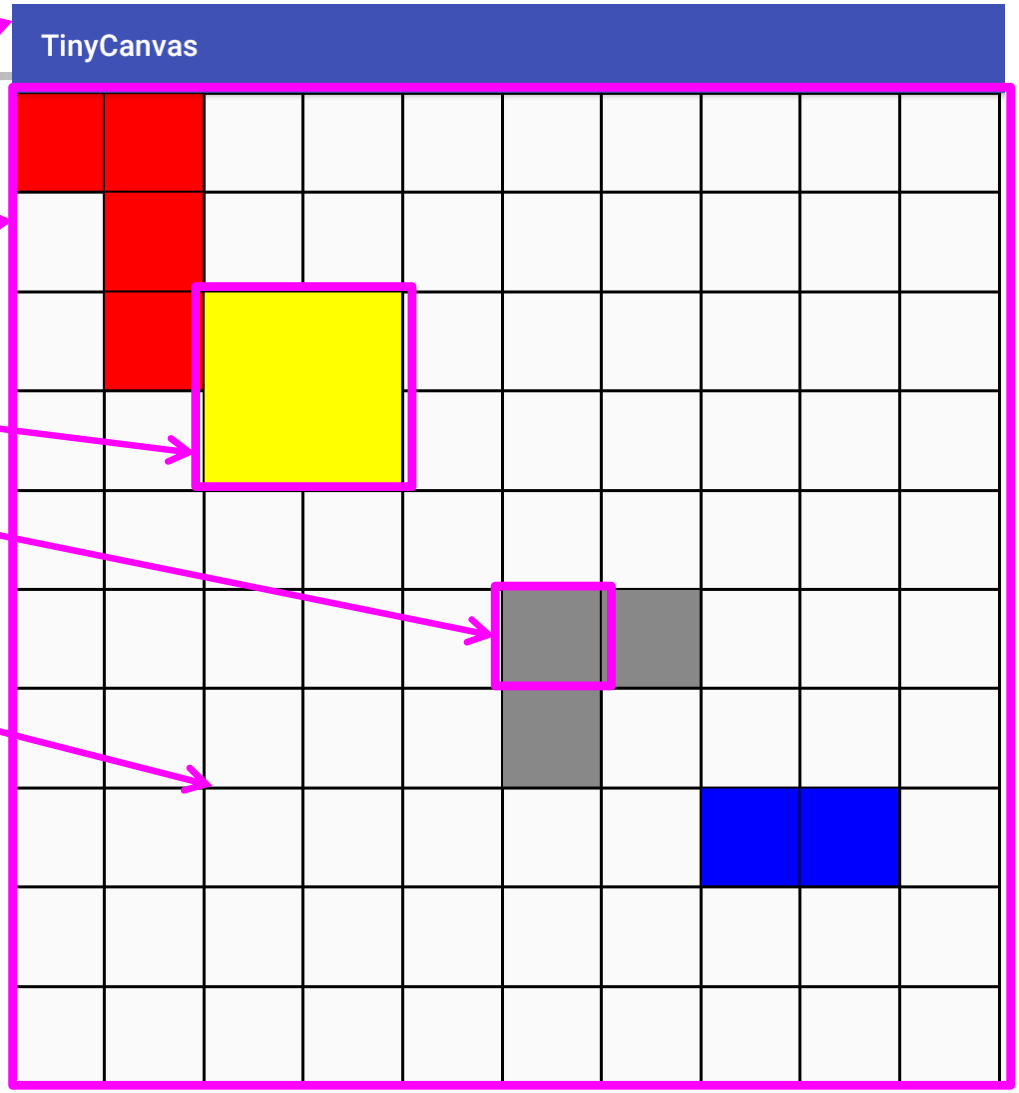
(je dôležitá pre poriadok)

Objektov/tried:

- **`Canvas`**
- **`Scena`**
- **`Tvar`**
- **`Stvorcek`**
- **`Mreza`**

Každý reaguje na:

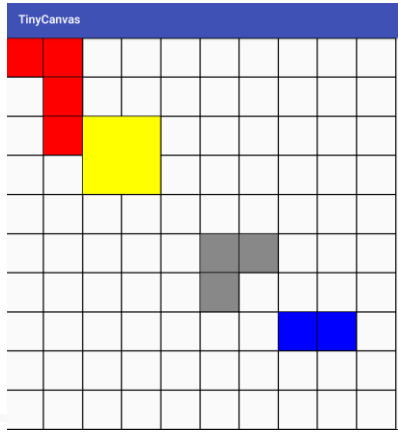
- **`onTouch()`**
- **`onDraw()`**



Project:List.zip/ParketyActivity

Hierarchia

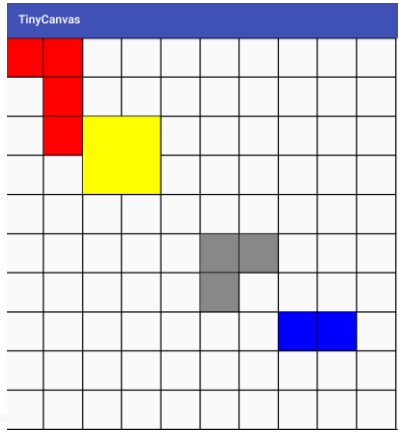
(Tvar - Shape)




```
class Tvar(val stvorceky:List<Stvorcek>) {// Tvar je zoznam štvorčeko
    fun onDraw() {      // vykresli Tvar - vykresli každý jeho štvorček
        for (stvorcek in stvoceky) stvorcek.onDraw()
    }
    fun onTouched(motionEvent: MotionEvent): Boolean {
        if (isIn(motionEvent)) { // bol tvar zasiahnutý eventom ?
            var reDraw = false   // oznám všetkým prekresli sa
            for (stvorcek in stvorceky)
                reDraw = reDraw or stvorcek.onTouched(motionEvent)
            return reDraw        // true, ak treba invalidate()
        } else
            return false
    }
    private fun isIn(motionEvent: MotionEvent) =
        stvorceky.any { it.isIn(motionEvent)}
      var isIn = false              // ak niektorý zo štvorčekov bol
      for (stvorcek in stvorceky) // zasiahnutý, tak Tvar bol tiež
          isIn = isIn or stvorcek.isIn(motionEvent)
      return isIn
}   }
```

Project:List.zip/ParketyActivity

Hierarchia
(Stvorcek)

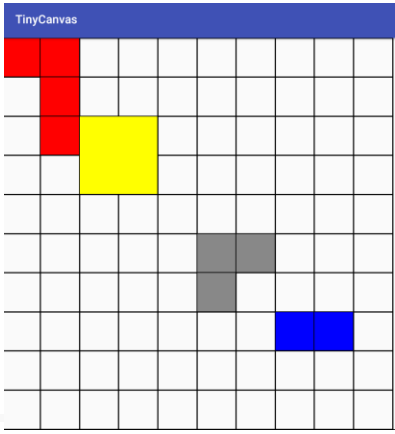



```
fun onDraw() {
     val r = Rect(x+1, y+1, x+sizeX-1, y+sizeY-1)
     CanvasView.c!!.drawRect(r, p) // chýbajú detaily, ako farba...
}
fun onTouched(event: MotionEvent): Boolean {
    int action = event.getAction()
    if (action == MotionEvent.ACTION_DOWN ) {
            ... START MOVE ... }    // začiatok dragovania štvorčeka
    else if (action == MotionEvent.ACTION_UP ||
        action == MotionEvent.ACTION_CANCEL ) {
            ... END MOVE...          // koniec dragovania, urobí 'hop'
    } else if (action == MotionEvent.ACTION_MOVE) {
            ... MOVE ... }          // počas dragovania, prekresľujeme
}
fun isIn(event: MotionEvent): Boolean { // event je v obdĺžniku
    return  x <= event.getX() && event.getX() <= x + sizeX
            &&
            y <= event.getY() && event.getY() <= y + sizeY
}
```

Project:List.zip/ParketyActivity

Hierarchia

(top level Canvas)




```
override fun onTouch(view: View,
                     motionEvent: MotionEvent): Boolean {
    if (scena.onTouched(motionEvent))
        invalidate()
    return true
}

override fun onDraw(canvas: Canvas) {
    super.onDraw(canvas)
    mreza.onDraw() // prekreslí mrežu
    scena.onDraw() // prekreslí scénu,
                   // scéna je List<Tvar>
                   // a každý Tvar je List<Stvorcek>
}
```

Objektov/tried:

- Canvas
- Scena
- Tvar
- Stvorcek
- Mreza

reagujú na:

- onTouch(event)
- onDraw()

príp.

- isIn(event)

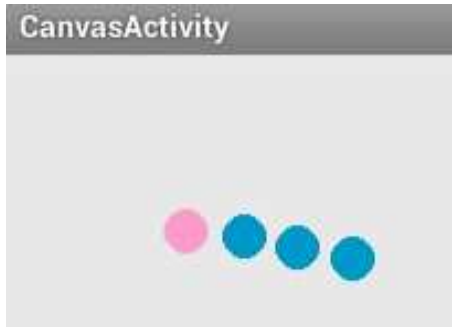
Project:List.zip/parkety/CanvasView

Vlákno (Thread) vo View

(dynamická hra v canvase, simulácia cez thread)

```
class CanvasView(context: Context, attrs: AttributeSet) :
    View(context,attrs), View.OnTouchListener, View.OnKeyListener {
    var touchX = 100f; var touchY = 100f        // interface
    var ballX = 200f;  var ballY = 200f

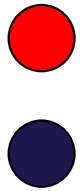
init {
    setOnTouchListener(this) setOnKeyListener(this)
    val th = object : Thread() {   // SAM - single abstract method
       override fun run() {        // život vlákna
          while (!stopped) {
             if (!paused) {        // simulácia
                ballX += (touchX-ballX)/touches/50
                ballY += (touchY-ballY)/touches/50
                touchX = (ballX+50*touchX[i])/51
                touchY = (ballY+50*touchY[i])/51
                try {              // pozdržanie
                   Thread.sleep(100)
                   postInvalidate()    // prekreslenie v GUI vlákne
                } catch (e: InterruptedException) {
    th.start()                     // spustenie vlákna
}
```



Project:List.zip

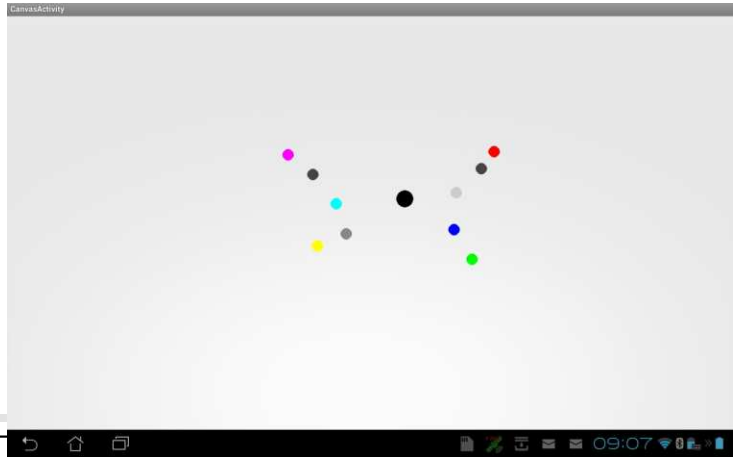
onDraw, onTouch vo View

```
override fun onDraw(canvas: Canvas?) { // prekreslenie
    super.onDraw(canvas)
    if (canvas != null) {
        Paint p = Paint()                    // kreslenie guličiek
        p.setColor(getResources().getColor(R.color.red))
        canvas.drawCircle(touchX, touchY, 10, p)
        p.setColor(getResources().getColor(R.color.blue))
        canvas.drawCircle(ballX, ballY, 10, p)
    } else
        Log.i("Canvas", "null")
}
override fun boolean onTouch(v:View, event:MotionEvent):Boolean {
    touchX = event.getX()                  // netestujeme typ eventu
    touchY = event.getY()                  // zoberieme len X,Y súradnice
    return true
}
```



Project:List.zip/CanvasActivity

MultiTouch



```
override fun onTouch(v: View, event: MotionEvent): Boolean {
    Log.i("Canvas", "counts:" + event.pointerCount)
    val maskedAction = event.actionMasked

    if (maskedAction == MotionEvent.ACTION_DOWN ||
        maskedAction == MotionEvent.ACTION_POINTER_DOWN) {

        touches = event.pointerCount
        for (i in 0 until event.pointerCount) {
            Log.i("Canvas", "X:" + event.getX(i))
            Log.i("Canvas", "Y:" + event.getY(i))
            touchX[i] = event.getX(i)
            touchY[i] = event.getY(i)
        }
        return true
```

Žiadne dva prsty sa nedotknú naraz

```
class CanvasView(…) : View(…),
      View.OnTouchListener,
      View.OnKeyListener {

override fun onTouch(…):Boolean
override fun onKey(...):Boolean
```

Project:List.zip/CanvasActivity

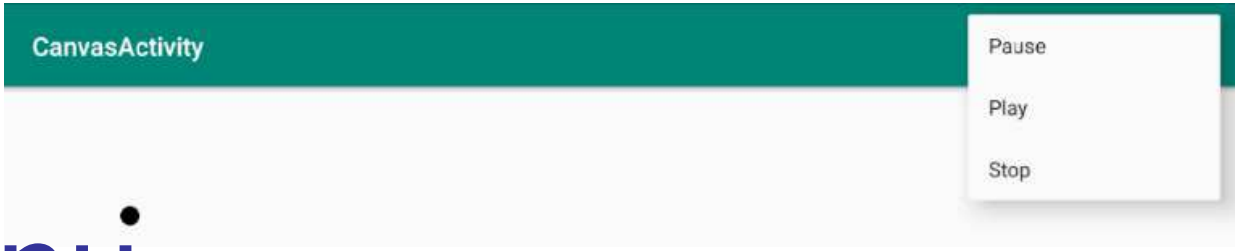
```
class CanvasView(…) : View(…),
      View.OnTouchListener,
      View.OnKeyListener {

override fun onTouch(…):Boolean
override fun onKey(...):Boolean
```

onKey vo View

```
override fun onKey(arg0: View, arg1: Int, arg2: KeyEvent):
                Boolean {
    val rnd = Random()
    when (arg1) {
        KeyEvent.KEYCODE_DPAD_LEFT -> ballX -= rnd.nextInt(50)
        KeyEvent.KEYCODE_DPAD_RIGHT -> ballX += rnd.nextInt(50)
        KeyEvent.KEYCODE_DPAD_UP -> ballY -= rnd.nextInt(50)
        KeyEvent.KEYCODE_DPAD_DOWN -> ballY += rnd.nextInt(50)
        KeyEvent.KEYCODE_SPACE -> {
            ballX += rnd.nextInt(100) - 50
            ballY += rnd.nextInt(100) - 50
        }
        else -> return false
    }
    invalidate()
    return true // event handled
}
```

Project:List.zip/CanvasActivity



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)
}
```

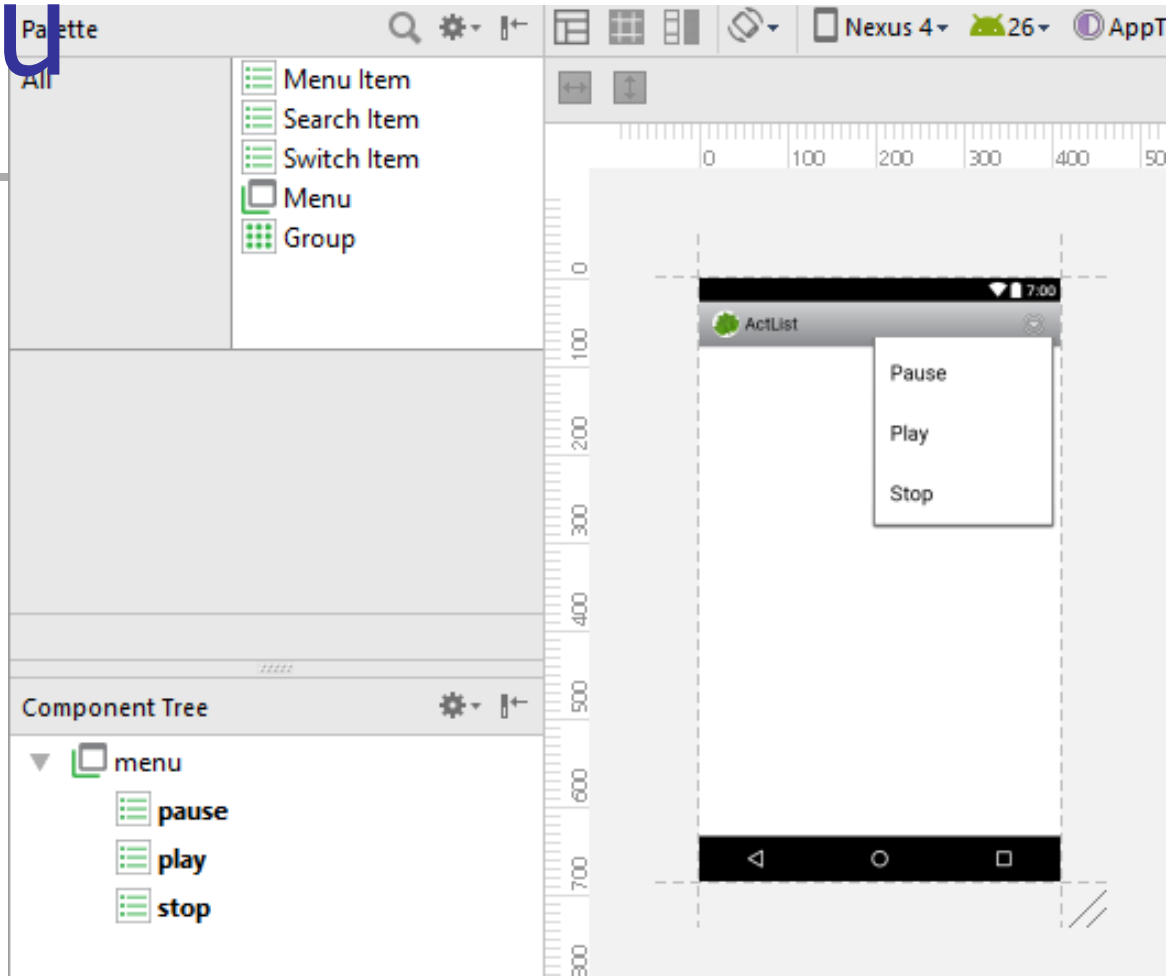
Project:List.zip

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

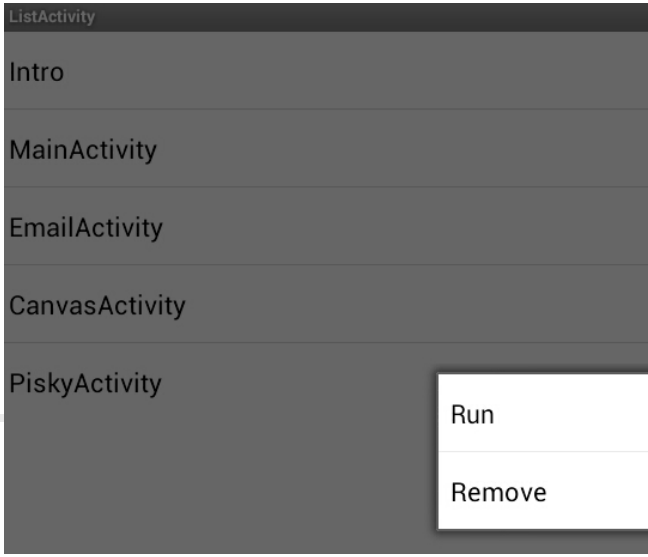
Option Menu

```
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