Fragment

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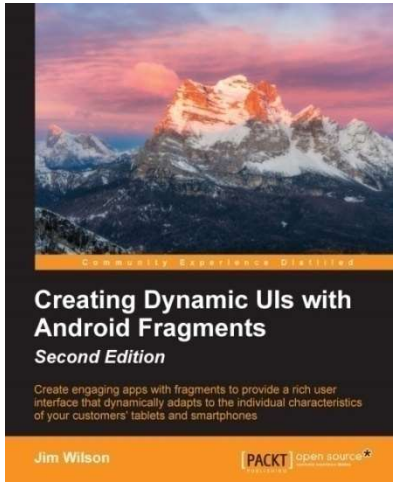
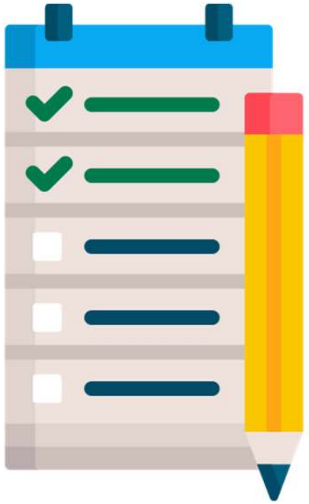


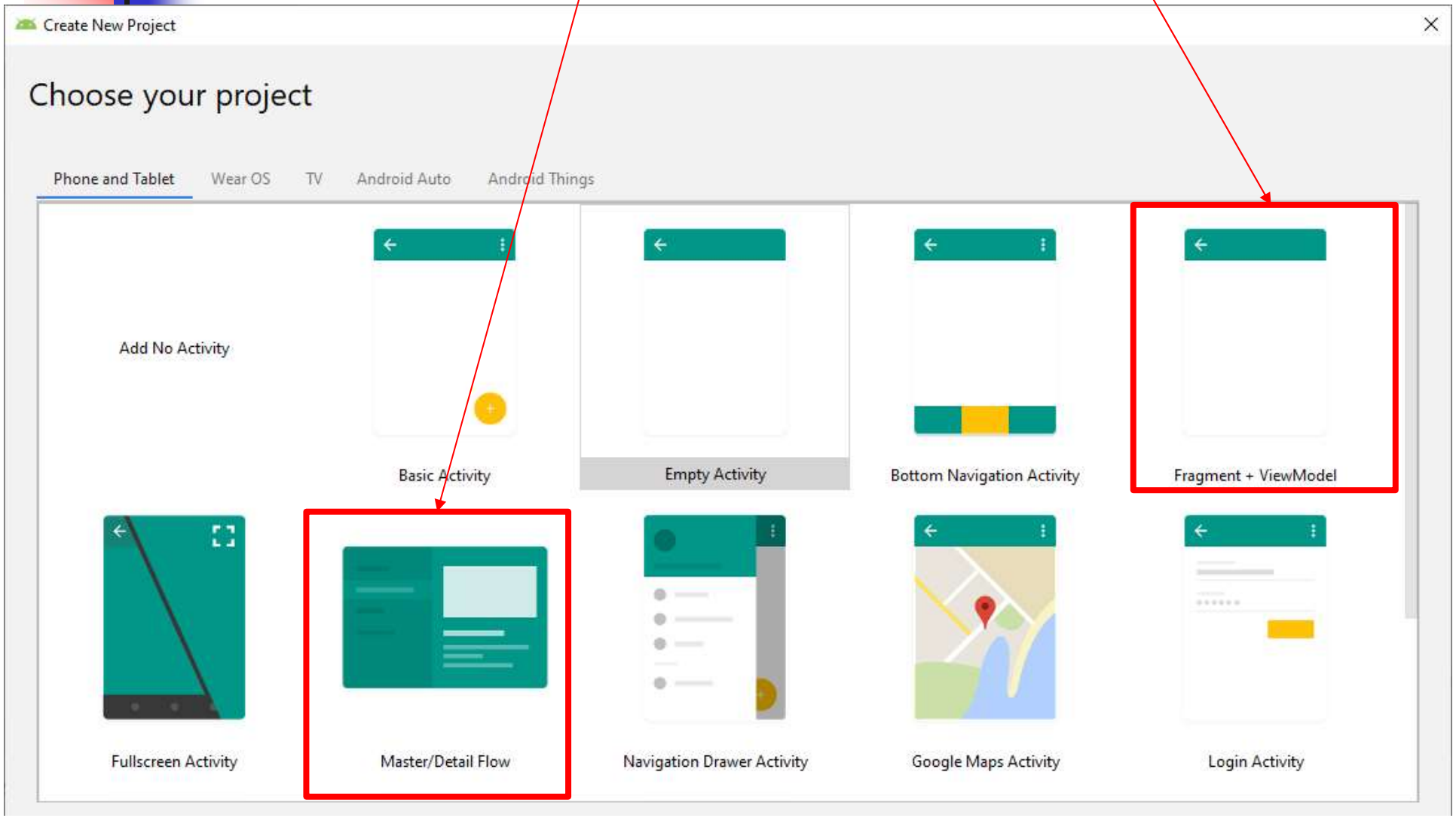
Hitparáda DU2

(Hall of Fame)

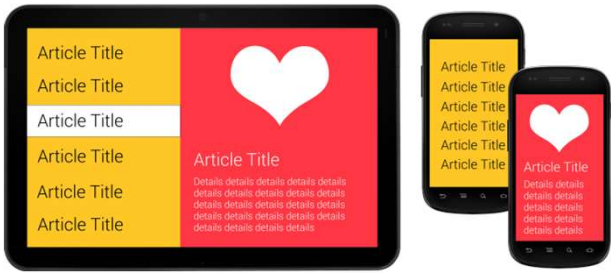


coming soon

O čo to dnes a na budúce bude



O čo to dnes bude



- **Fragment** ako základný stavebný kameň zložitejšej aplikácie
  - fragment je samostatne existujúca modul časť aplikácie majúca layout aj správanie
  - je to podtrieda FragmentActivity (nie AppCompatActivity)
  - svoj layout m8 definovaný v .xml
  - princípy fungovania
  - jednoduché používanie existujúcich Dialog Fragmentov

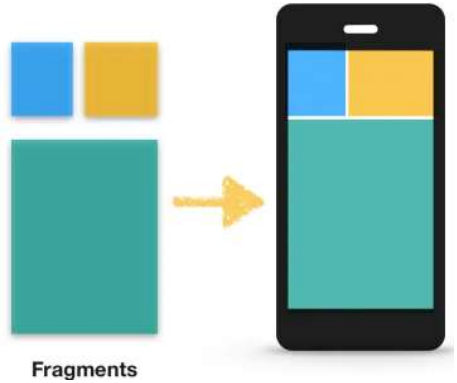
- **Master-Detail** aplikácia
  - Master je napr. zoznam všetkých objektov, Detail je detail jedného z nich

Na budúce:

- Návrhové vzory a Android
  - Model View Controller (MVC)

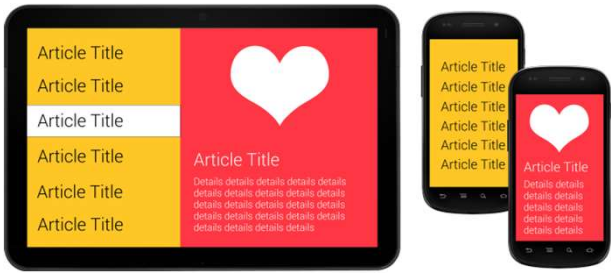
  - **Model View ViewModel** (MVVM)
  - **JetPack v AndroidX** (androidx.* packages)

Fragmenty



- **fragment** predstavuje ucelenú časť GUI, podobne ako aktivita
- fragment má, podobne ako aktivita, životný cyklus, ale zložitejší
- hlavným cieľom fragmentu je jeho znovu-použiteľnosť (reusability)
- každý fragment má svoju aktivitu, ktorá si ho pri inicializácii pripojí (**attach**)
  - aktivita si vkladá do seba jeden, alebo viac fragmentov, ktoré môžu komunikovať
- koexistencia fragmentu a aktivity je zložitejšia ako život aktivity
- vzťah fragment-aktivita je typu many-many
  - fragment môže hosťovať v rôznych aktivitách, o tom je reusability fragmentu
- aktivita môže obsahovať/kombinovať viacero fragmentov, dvomi spôsobmi
  - **staticky** (sú navrhnuté v layout .xml-súboroch)
  - **dynamicky** (vzniknú dynamicky v kóde pomocou konštruktora podtriedy Fragmentu)

Fragmenty
(história a následky)



- fragmenty sú podporované od Android 3.1 (API 11)
- ak naše minSDK < 11, použijeme Support Library
  https://developer.android.com/topic/libraries/support-library/index.html

- knižnice podporujúce Fragment sú:
  - ~~`android.app.Fragment`~~ (This class was deprecated in API level 28)
  - `android.support.v4.app` (od API 26-July,2017, min.API level 14)
  - a najnovšie Android Jetpack, balíky `andoridx.*` od Android 9.0 (API level 28)

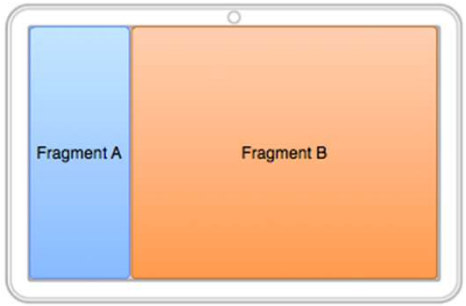
Pozor na miešanie importov z rôzných knižníc:

- `android.app.Fragment`
- `!= android.support.v4.app.Fragment`
- `!= androidx.fragment.app.Fragment`

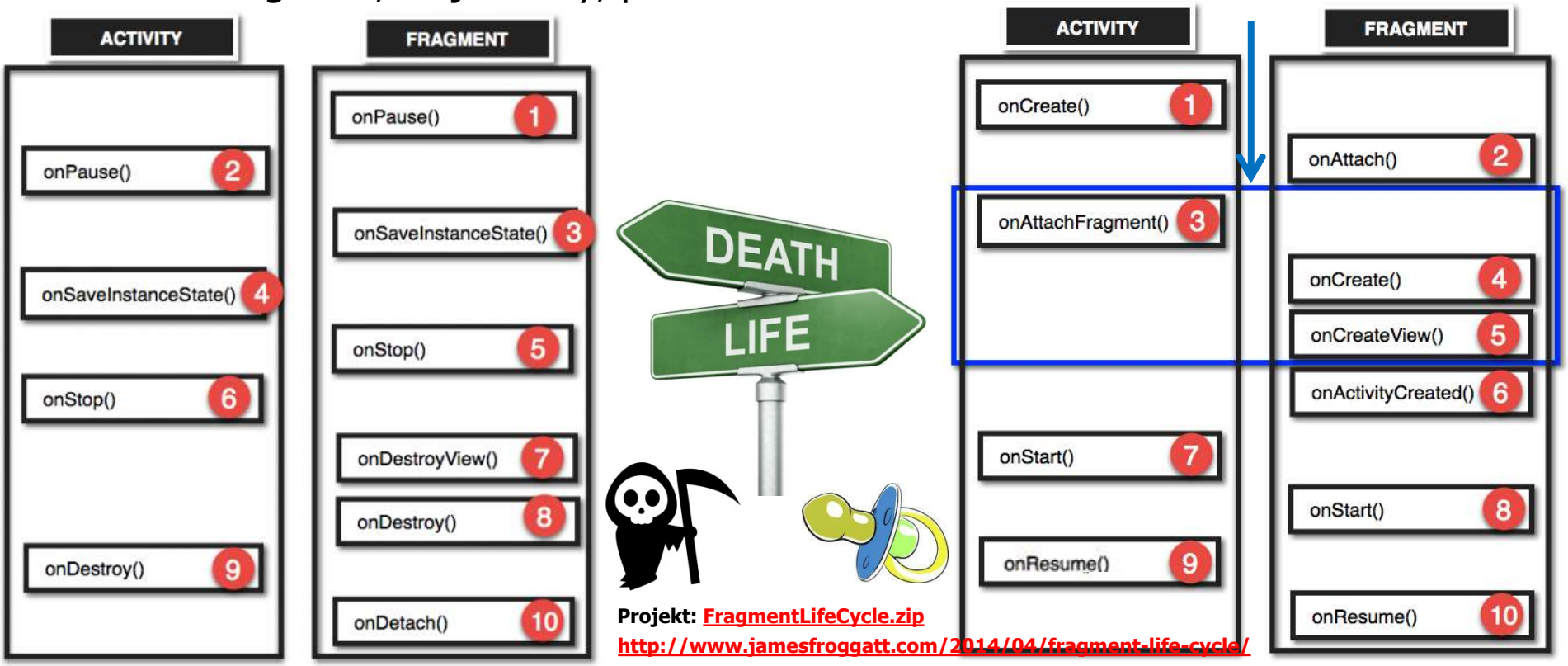
- Stavy fragmentu (životný cyklus extrémne stručne):
  - definujeme podtriedu triedy Fragment, kým nezavoláme konštruktor, tak *neexistuje nič !*
  - po FragmentSubClass(), existuje inštancia fragmentu ako objekt, *nevidíme nič !*
  - aktivita linkuje (*attachne*) fragment, *nevidíme nič*, ale aspoň fragment vie, že má aktivitu
  - fragment sa zobrazí na obrazovke, a *vidíme ho a existuje*

Život fragmentu

(je zložitejší ako u aktivity)



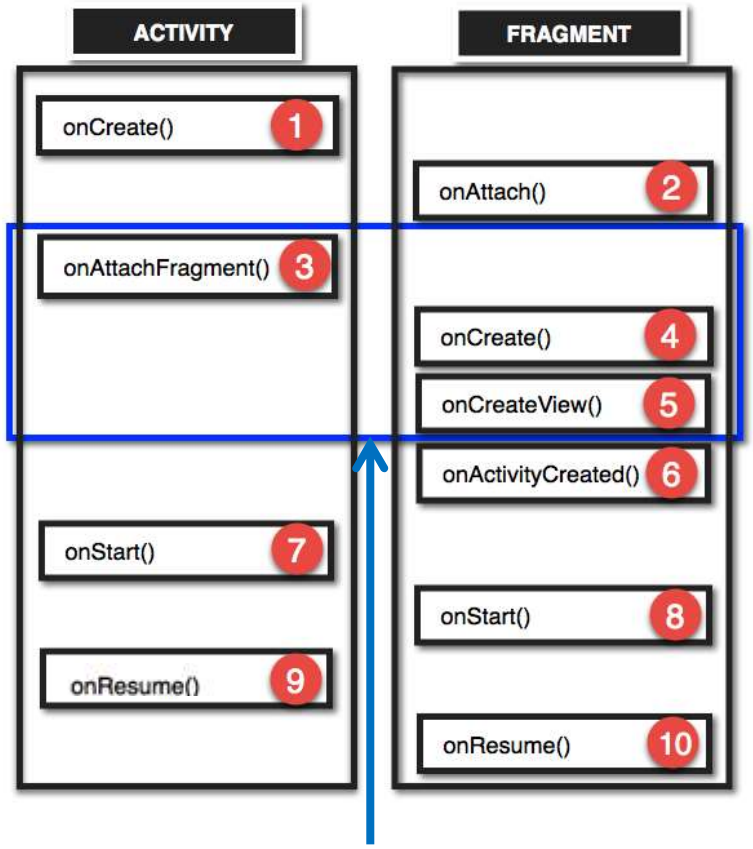
- fragment predstavuje ucelenú časť GUI, podobne ako aktivita
- fragment má svoju aktivitu, ktorá ho pripojí (predpokladajme vzťah 1:1)
- …aktivita môže obsahovať/kombinovať (aj dynamicky) viacero fragmentov
- fragment, ak je dobrý, používa ho viacero aktivít (reusability)



Projekt: FragmentLifeCycle.zip
http://www.jamesfroggatt.com/2014/04/fragment-life-cycle/

Vznik fragmentu

(venujme sa vzniku, nie zániku)



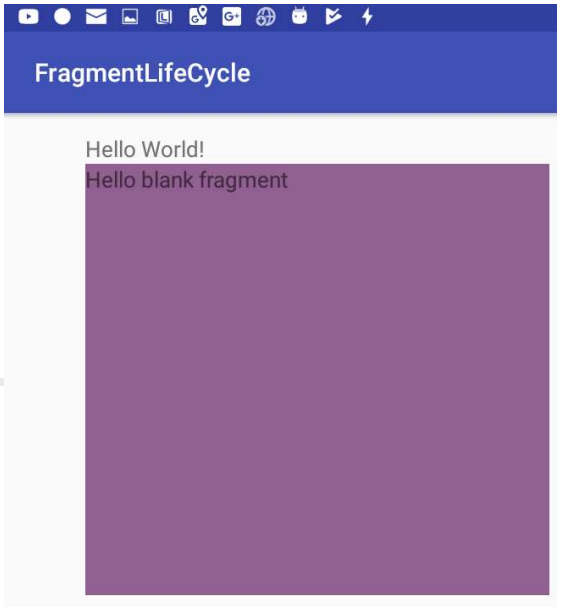
1. onCreate v activite: Najčastejšie obsahuje setContentView, ktorá definuje layout aktivity
2. onAttach vo fragmente: dostaneme pointer na aktivitu, do ktorej je vkladaný, uložíme si ho...
3. onAttachFragment v aktivite: dozvie sa, že fragment bol attach-nutý do aktivity
4. onCreate vo fragmente: aktivity onCreate nemusí byť ukončená, preto nie je dovolené adresovať UI komponenty z aktivity
5. onCreateView vo fragmente: fragmentu určíme layout, inflater inflatuje
6. onActivityCreated vo fragmente: už konečne vidíme UI komponenty aj z aktivity
7. onStart v aktivite
8. onStart vo fragmente
9. onResume v aktivite
10. onResume vo fragmente

http://www.jamesfroggatt.com/2014/04/fragment-life-cycle/

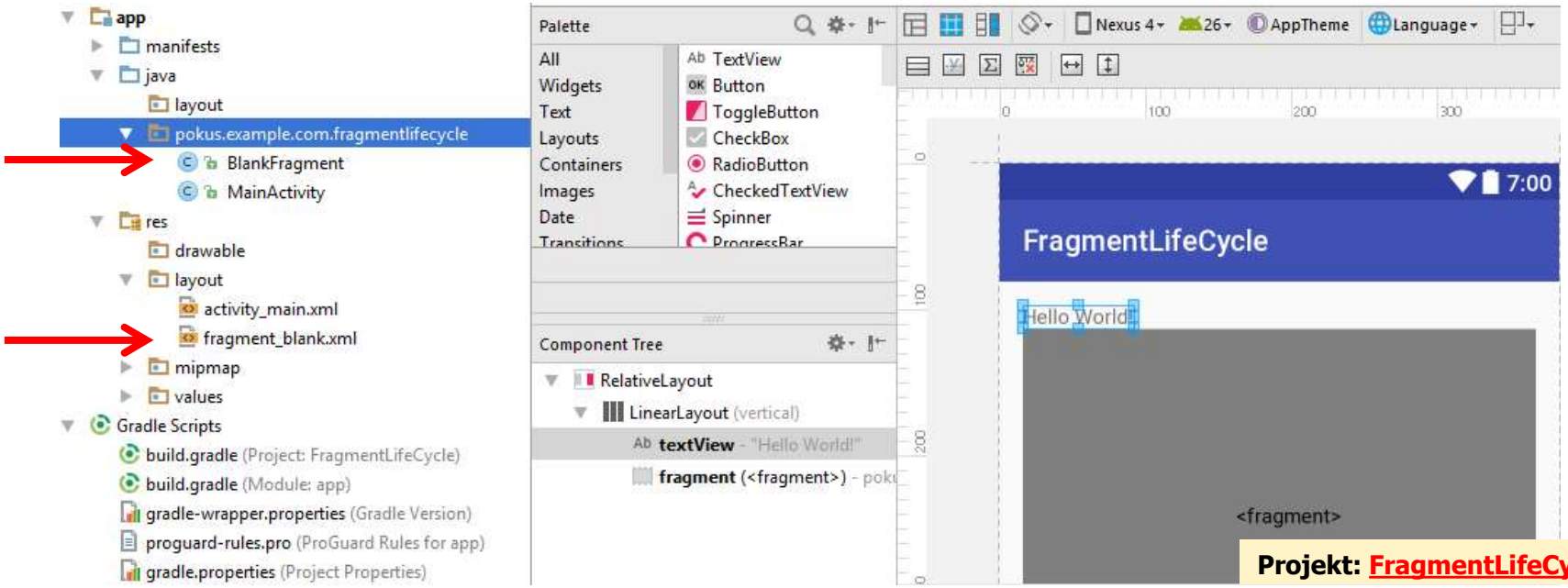
Projekt: FragmentLifeCycle.zip

Život fragmentu

(jeden fragment v aktivite)




```
<RelativeLayout
  <LinearLayout>
    <TextView ...android:text="Hello World!"/>
    <fragment android:id="@+id/fragment"
      android:name="com.example.fragmentlifecycle.BlankFragment"/>
   </LinearLayout>
 </RelativeLayout>
```



Projekt: FragmentLifeCycle.zip

Život fragmentu
(onSaveInstance)

- napr. zmena orientácie displaya
- ak fragment/aktivita zaniká, môžeme si zapamäť jej stav cez `Bundle` v `onSaveInstanceState`

```
on Attach
on Create
on CreateView
on Activity Created
on Start
on Resume
on Pause
on Save Instance State
on Stop
on Destroy View
on Destroy
on Detach
on Attach
on Create
on CreateView
on Activity Created
on Start
on Resume
```


```
override fun onSaveInstanceState(
                savedInstanceState? : Bundle) {
   super.onSaveInstanceState(savedInstanceState);
   savedInstanceState?.putString("key", "value")
   savedInstanceState?.putInt("score", ...)
   savedInstanceState?.putLong("time", ...)
}
```

- a následne reštaurovať:

```
override fun onCreate(savedInstanceState?:Bundle) {
   super.onCreate(savedInstanceState);
   savedInstanceState?.getString("key")
   savedInstanceState?.getInt("score")
   savedInstanceState?.getLong("time")
   ... }
```

bez **onSaveInstanceState**

```
on Pause
on Stop
on Destroy View
on Destroy
on Detach
```

Projekt: FragmentLifeCycle.zip

Život fragmentu

(detail)

```
on Create ACTIVITY
on Attach Fragment
on Create Fragment
on CreateView Fragment
on Activity Created Fragment
on Start ACTIVITY
on Start Fragment
on Resume ACTIVITY
on Resume Fragment
on Pause Fragment
on Pause ACTIVITY
on Save Instance State Fragment
on Save Instance State ACTIVITY
on Stop Fragment
on Stop ACTIVITY
on Destroy View Fragment
on Destroy Fragment
on Detach Fragment
on Destroy ACTIVITY
on Create ACTIVITY
on Attach Fragment
on Create Fragment
on CreateView Fragment
on Activity Created Fragment
on Start ACTIVITY
on Start Fragment
on Restore Instance State ACTIVITY
on Resume ACTIVITY
on Resume Fragment
```

Zmena orientácie

home screen

```
on Pause Fragment
on Pause ACTIVITY
on Save Instance State Fragment
on Save Instance State ACTIVITY
on Stop Fragment
on Stop ACTIVITY
```

restart

```
on Restart ACTIVITY
on Start ACTIVITY
on Start Fragment
on Resume ACTIVITY
on Resume Fragment
```

keď aktivitu/fragment dáme na pozadie ◻ , tak sa:

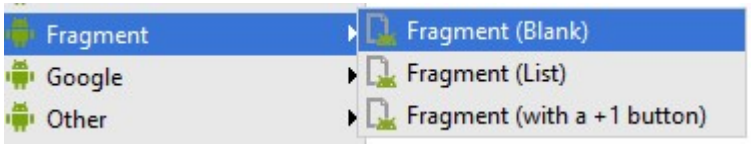
- nevolá **`onDestroy`**,
- pri opätovnom spustní sa nevolá **`onCreate`**, ale **`onRestart`**

eload=10&spfreload=10&spfreload=10#t=264.85907

Projekt: FragmentLifeCycle.zip

Statický fragment

(existuje jeho layout)



- vytvoríme podtriedu Fragment
- AS nám pomôže File/New/Fragment
- vytvoríme dva fragmenty First/Second fragment, a rôzne ofarbíme ich

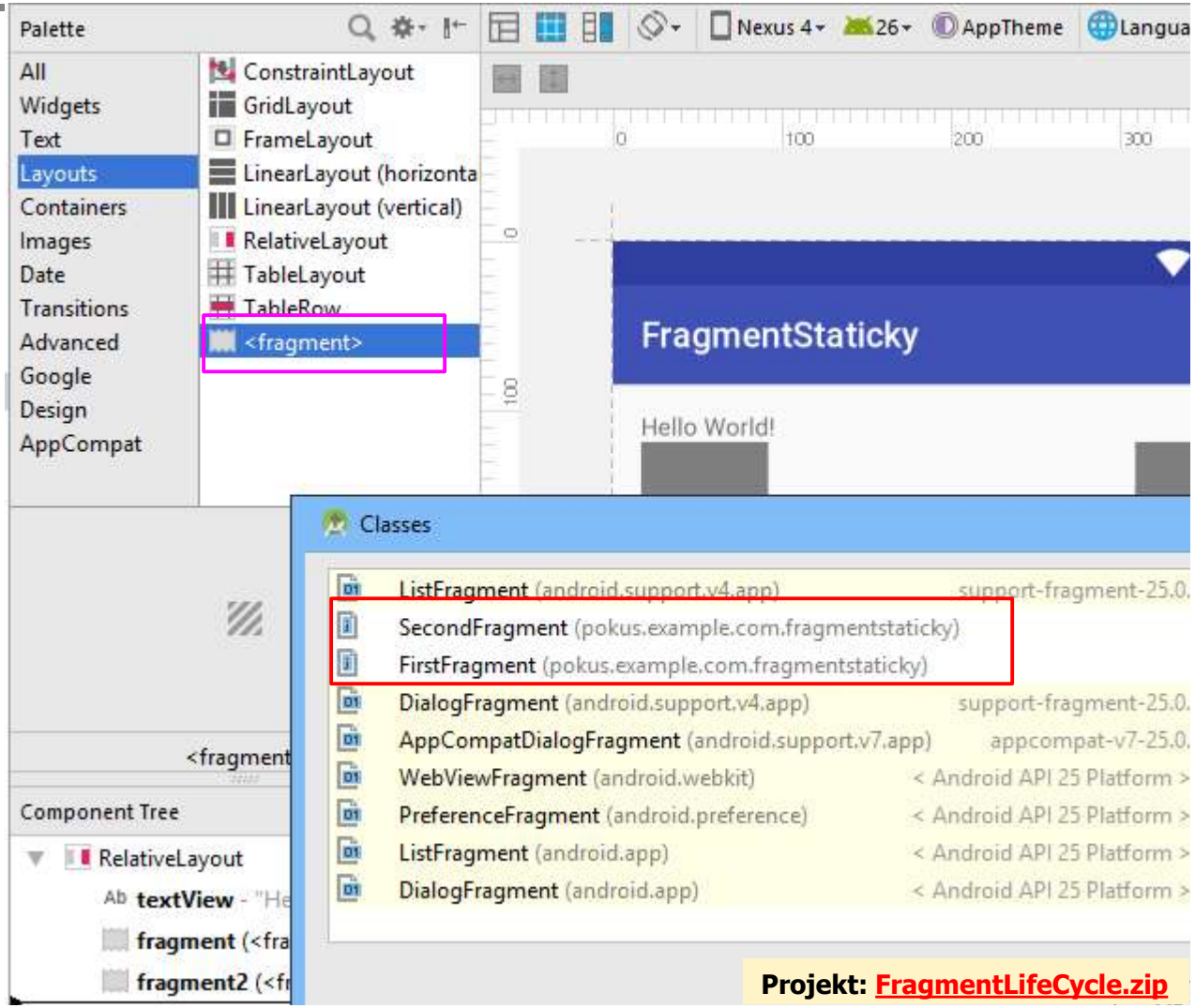
fragment_first.xml

```
<FrameLayout xmlns:android=http://schemas.android.com/apk/res/android
    xmlns:tools=http://schemas.android.com/tools
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context="pokus.example.com.fragmentstaticky.FirstFragment">
    <!-- TODO: Update blank fragment layout -->
    <TextView
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:background="@color/colorAccenty"
        android:text="Hello from fist fragment" />
</FrameLayout>
```

Projekt: FragmentLifeCycle.zip

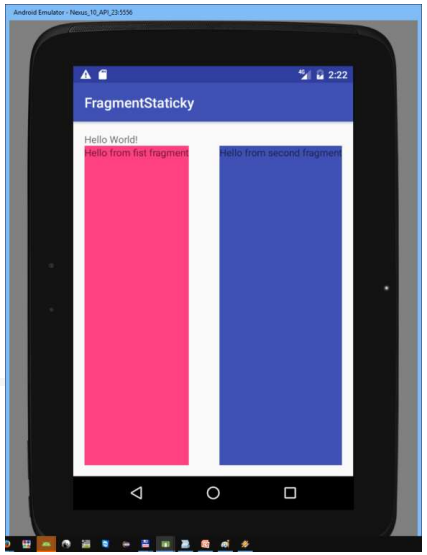
Statický fragment

Keď potom editujeme layout aktivity, tak môžeme doň vložiť <fragment> a v detailnejšej ponuke nájdeme nami vytvorené fragmenty



Projekt: FragmentLifeCycle.zip

Statický fragment
(jednoduchá verzia)

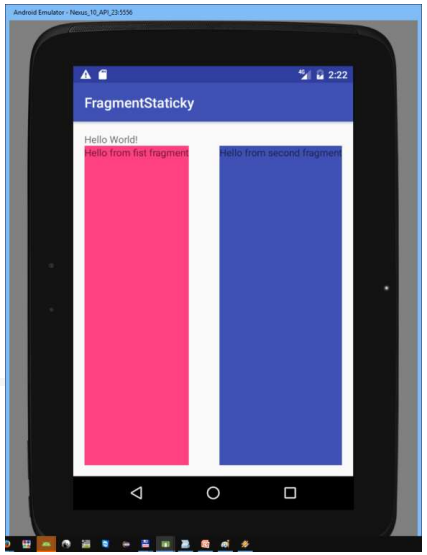



```
class FirstFragment : Fragment() {
    lateinit var mainActivity: MainActivity

    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
            }
      // onCreateView: fragmentu určíme layout, inflater inflatuje
    override fun onCreateView(inflater: LayoutInflater,
                              container: ViewGroup?,
                              savedInstanceState: Bundle?): View? {
        return inflater.inflate(R.layout.fragment_first,
                                container, false)
    }
    override fun onAttach(context: Context) {
        super.onAttach(context)
        mainActivity = context as MainActivity
    }
}
```

Projekt: FragmentLifeCycle.zip

Statický fragment

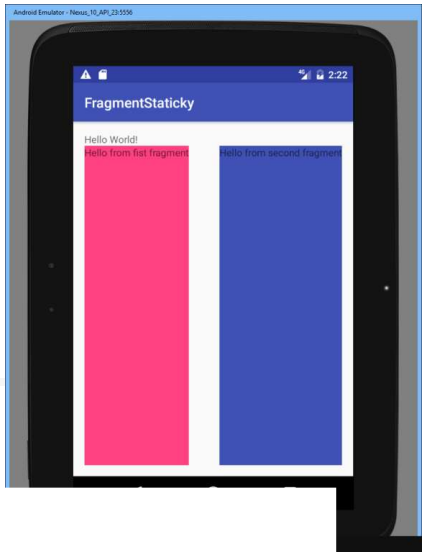
(reálne dostanete – ak si ho necháte vygenerovať)




```
private const val ARG_PARAM1 = "param1"
private const val ARG_PARAM2 = "param2" // raz mená vašich parametrov

class BlankFragment1 : Fragment() {
    private var param1: String? = null // premenné, kam sa načítajú
    private var param2: String? = null

    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        param1 = arguments?.getString(ARG_PARAM1) // tu sa načítajú
        param2 = arguments?.getString(ARG_PARAM2)
    }
```

Projekt: FragmentLifeCycle.zip

Statický fragment
(reálne dostanete)



Companion object je Singleton Pattern

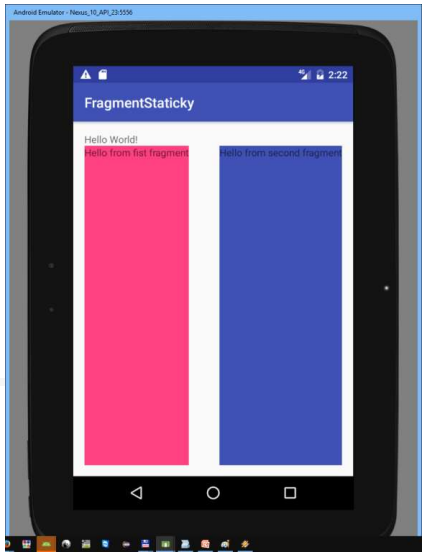
```
companion object {
    @JvmStatic
    fun newInstance(param1: String, param2: String) =
            BlankFragment1().apply {
                arguments = Bundle().apply {
                    putString(ARG_PARAM1, param1)
                    putString(ARG_PARAM2, param2)
                }
            }
}
```

inštanciu by ste vyrobili:

```
val bf = BlankFragment1.newInstance("value1", "value2")
```

Projekt: FragmentLifeCycle.zip

Statický fragment
(reálne dostanete)




```
definujete akýkoľvek listner na komunikáciu s aktitou
interface OnFragmentInteractionListener {
    fun onFragmentInteraction(uri: Uri)
}
// definujete premennú, kam si uložíte pointer na rodičovskú aktivitu,
// ktorá musí implementovať váš listener
private var listener: OnFragmentInteractionListener? = null

fun onButtonPressed(uri: Uri) {
    listener?.onFragmentInteraction(uri)
}
override fun onAttach(context: Context) {
    super.onAttach(context) // aktivita, ktorá ho attachuje, musí
    if (context is OnFragmentInteractionListener) { // spĺňať
        listener = context // interface, a uložíte si pointer na ňu
    } else {  // inak fail
        throw RuntimeException(context.toString() +
          " must implement OnFragmentInteractionListener")
    }
}
```

Projekt: FragmentLifeCycle.zip

Slajder Fragement

```
fragment_slajder.xml
<RelativeLayout >

    <EditText
        android:id="@+id/editText“
        ...
    />

    <SeekBar
        android:id="@+id/seekBar"
        ...
    />

    <Button
        android:id="@+id/button"
        ...
    />
</RelativeLayout>
```

```
fragment_text.xml
<RelativeLayout >

    <TextView
        android:id="@+id/textView“
        ...
    />
</RelativeLayout>
```

```
activity_main.xml
<RelativeLayout >
  <fragment
    android:id="@+id/fragmentSlajder"
  />
  <fragment
    android:id="@+id/fragmentTextView"
  />
</RelativeLayout>
```

Projekt: FragmentSlajder.zip

Slajder Fragement

```
class SlajderFragment : Fragment() {
    var slajder = 50

    interface Listener {
        fun onButtonClick(postion: Int, text : String)
    }
    lateinit var activityCallBack : Listener
    override fun onAttach(context: Context) {
        super.onAttach(context)
        try { activityCallBack = context as Listener
        } catch (e : ClassCastException) {
            throw ClassCastException(context.toString() + " does not implement Listener")
        }
    }
    override fun onCreateView(
        inflater: LayoutInflater, container: ViewGroup?, savedInstanceState: Bundle?  ): View? {
        return inflater.inflate(R.layout.fragment_slajder, container, false)
    }
    override fun onViewCreated(view: View, savedInstanceState: Bundle?) {
        super.onViewCreated(view, savedInstanceState)
        seekBar.setProgress(slajder)
        seekBar.setOnSeekBarChangeListener (
            object : SeekBar.OnSeekBarChangeListener {
                override fun onProgressChanged(sb: SeekBar, progress: Int, fromUser: Boolean) {
                    slajder = progress
                }
}
        )
        button.setOnClickListener{ v -> activityCallBack.onButtonClick(slajder, editText.text.toString())}
    }
}
```

Projekt: FragmentSlajder.zip

Slajder Fragement

```
class TextViewFragment : Fragment() {

    override fun onCreateView(
        inflater: LayoutInflater,
        container: ViewGroup?,
        savedInstanceState: Bundle?
    ): View? {
         return inflater.inflate(R.layout.fragment_text,
                                 container, false)
    }

    fun changeText(fontsize : Int, text : String) {
return        textView.textSize = fontsize.toFloat()
        textView.text = text
    }
}
```

Projekt: FragmentSlajder.zip

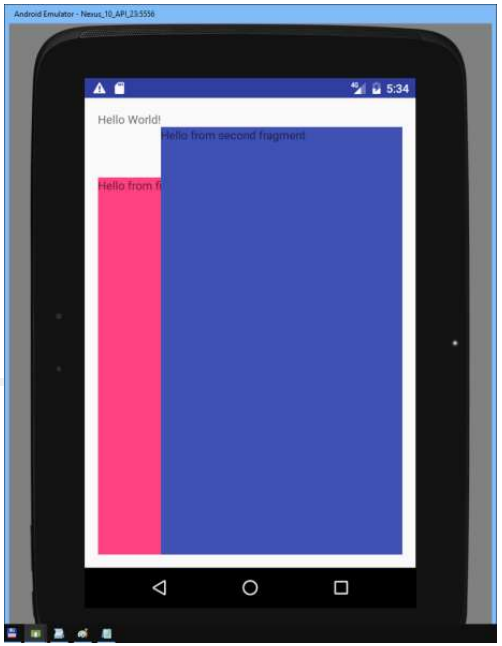
Slajder Fragement

```
class MainActivity : FragmentActivity(), SlajderFragment.Listener {
    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        setContentView(R.layout.activity_main)
    }

    override fun onButtonClick(fontSize: Int, text: String) {
        val textViewFragment =
            supportFragmentManager.findFragmentById(
                  R.id.fragmentTextView) as TextViewFragment
        textViewFragment.changeText(fontSize, text)
    }
}
```

Projekt: FragmentSlajder.zip

Break

Dynamický fragment



- dynamická práca s fragmentmi je častejšia ako statická
- adresovanie fragmentu používame:
  - *supportFragmentManager (nie fragmentManager)*
  - findFragmentById()
  - findFragmentByTag()

```
val sfr = supportFragmentManager // nie FragmentManager android.app.*
        .findFragmentById(R.id.frameLayout2) as SecondFragment
alebo
        .findFragmentByTag("tag2") as SecondFragment
sfr.setFText(s)

<RelativeLayout   // layout activity je zjednodušený, pozri kód
   <TextView android:text="Hello World!" android:id="@+id/textView" />
   <FrameLayout android:id="@+id/frameLayout1" </FrameLayout>
   <FrameLayout android:id="@+id/frameLayout2" </FrameLayout>
</RelativeLayout>
```

placeholdery

Projekt: FragmentDynamicky.zip

Dynamický fragment

- dynamická práca s fragmentmi je častejšia ako statická

- vytvorenie inštancie podtriedy Fragment
- podslanie argumentov fragmentu
- získanie referencie na fragment
- beginTransaction()
- add()
- commit()

Projekt: FragmentDynamicky.zip

Dynamický fragment

aktivita môže mať viac fragmentov, ktoré spravuje *supportFragmentManager*

- pridávanie/rušenie/modifikácia fragmentu je vždy cez FragmentTransaction:

```
val ft = supportFragmentManager.beginTransaction()
val firstFragment = FirstFragment()
   val bundle = Bundle()
   bundle.putInt("init", 10)  // posielanie argumentu/ov do fragmentu
   firstFragment.arguments = bundle
ft.add(R.id.frameLayout1, firstFragment, "tag1")
ft.add(R.id.frameLayout2, SecondFragment(),"tag2")
ft.commit()
```

vo fragmente získame context activity a hodnotu poslaných argumentov

```
override fun onAttach(context: Context) {
    super.onAttach(context)
    state = arguments?.getInt("init", 0)?:0 // získanie argumentu
    mainActivity = context as Updater
}
```

Projekt: FragmentDynamicky.zip

Dynamický fragment

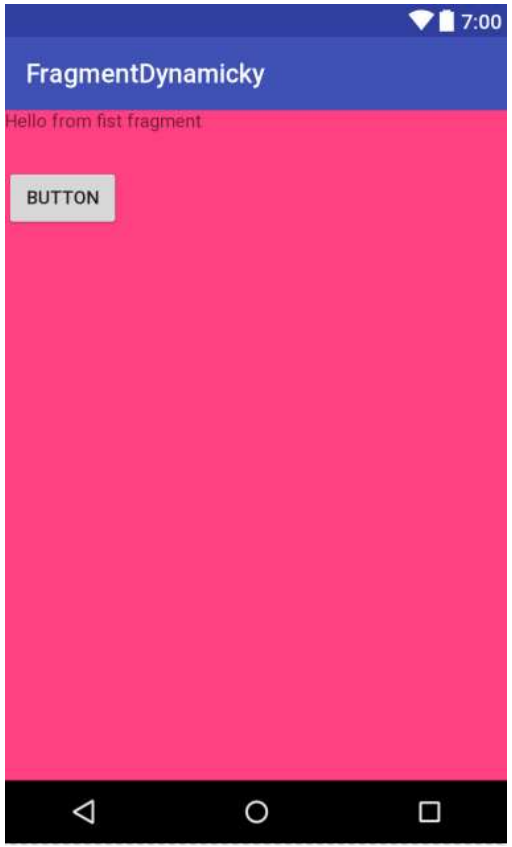
```
val firstFragment = FirstFragment()
    val bundle = Bundle()
    bundle.putInt("init", 10)  // posielanie argumentu/ov do fragmentu
    firstFragment.arguments = bundle

supportFragmentManager
        .beginTransaction()
        .add(R.id.frameLayout1, firstFragment, "tag1")
        .commit()

        .remove(firstFragment)

        .replace(R.id.frameLayout1, firstFragment)
```

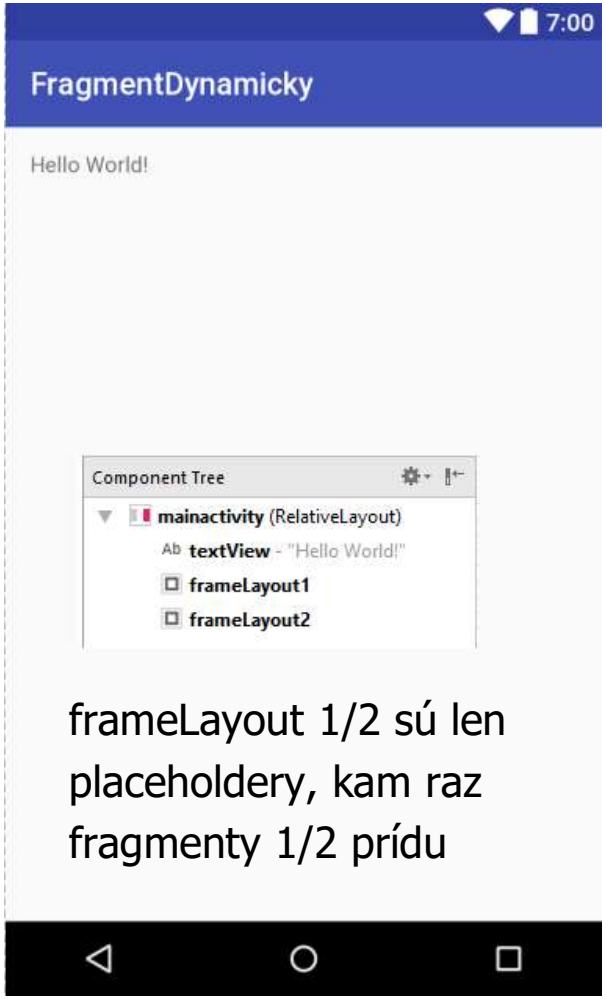
Projekt: FragmentDynamicky.zip

Dynamický fragment

activity_main.xml

fragment_first.xml





frameLayout 1/2 sú len placeholdery, kam raz fragmenty 1/2 prídu

fragment_second.xml

Projekt: FragmentDynamicky.zip

Komunikácia medzi fragmentami

Nikdy nie fragment<->fragment, ale nepriamo cez ich spoločnú aktivitu !

MainActivity implementuje náš Update interface

```
interface Updater {
   fun update(s:String); // medzi aktivitami chceme posielať string
}
class MainActivity : FragmentActivity(), Updater {
  override fun update(s:String) {
     textView.text = s          // TextView v bielej aktivite
     val sfr =
        supportFragmentManager // nájdi druhý/modrý fragment
              .findFragmentById(R.id.frameLayout2) as SecondFragment
   alebo
        supportFragmentManager
              .findFragmentByTag("tag2") as SecondFragment
     sfr.setFText(s)
   }
```

Projekt: FragmentDynamicky.zip

Komunikácia medzi fragmentmi

Nikdy nie fragment<->fragment, ale nepriamo cez ich spoločnú aktivitu

FirstFragment volá náš update do main activity

```
class FirstFragment : Fragment() {
        lateinit var mainActivity: Updater
        private var state = 0

    override fun onAttach(context: Context) {
        super.onAttach(context)
        state = arguments?.getInt("init", 0)?:0
        mainActivity = context as Updater
    }

    override fun onActivityCreated(savedInstanceState: Bundle?) {
        super.onActivityCreated(savedInstanceState)
        button.setOnClickListener {
                mainActivity.update("state:" + state++) }
    }
```

Projekt: FragmentDynamicky.zip

Komunikácia medzi fragmentmi

Nikdy nie fragment<->framgment, ale nepriamo cez ich spoločnú aktivitu

SecondFragment

```
class SecondFragment : Fragment() {

    fun setFText(s: String) {
        largeTextView.text = s
    }
```

Projekt: FragmentDynamicky.zip

Komunikácia medzi fragmentmi

(sumarizácia)

```
class FirstFragment {
var ma : Updater
var state …
// API < 23
onAttach(Activity a) {
  ma = a as Updater
}
// API >= 23
onAttach(Context ctx) {
  ma = ctx as Updater
}
onActivityCreated(...){
  Button = ...
  ..onClick() {
   ...ma.update(state)
  }
}
```

```
class
  MainActivity : Updater {

fun update(state){
  f=supportFragmentManager().
  findFragmentById/Tag()
 f.setFText(state)
}
```

```
interface Updater {
  fun update(state)
}
```

```
class
 SecondFragment {

 setFText(state){
   ...
 }
}
```

Ak by chceli komunikovať obojsmerne, tak **SecondF** tiež si musí odložiť referenciu na aktivitu a komunikovať cez ňu, referencia z fragmentu na jeho aktivitu je **getActivity()**

Projekt: FragmentDynamicky.zip

Komunikácia medzi fragmentmi

(nech zostane skryté, čo môže zostať skyté)

```
class FirstFragment {
 interface Updater {
   fun update(state)
 }
var ma : Updater
var state …

onAttach(Activity a) {
onAttach(Context a) {
  ma = a as Updater
}
onActivityCreated(...){
  Button =...
  ..onClick() {
   ...ma.update(state)
  }
}
```

```
class MainActivity :
 FirstFragment.Updater {

void update(state){
 f=supportFragmentManager().
  findFragmentById/Tag()
 f.setFText(state)
}
```

```
class
 SecondFragment {

 setFText(state){
   ...
 }
}
```

Interface Updater súvisí len s **FirstFragment** a **MainActivity**, takže v niektorej z nich by mal byť ukrytý

Projekt: FragmentDynamicky.zip

Aktivita fragmentu


```
<LinearLayout
    android:orientation="vertical" >

    <Button
        android:id="@+id/fragment1"
        android:text="Show Fragment 1" />

    <Button
        android:id="@+id/fragment2"
        android:text="Show Fragment 2" />

    <FrameLayout  // sem dynamicky vložíme jeden z fragmentov
        android:id="@+id/fragment_place"
        android:layout_width="match_parent"
        android:layout_height="match_parent" />
</LinearLayout>
```

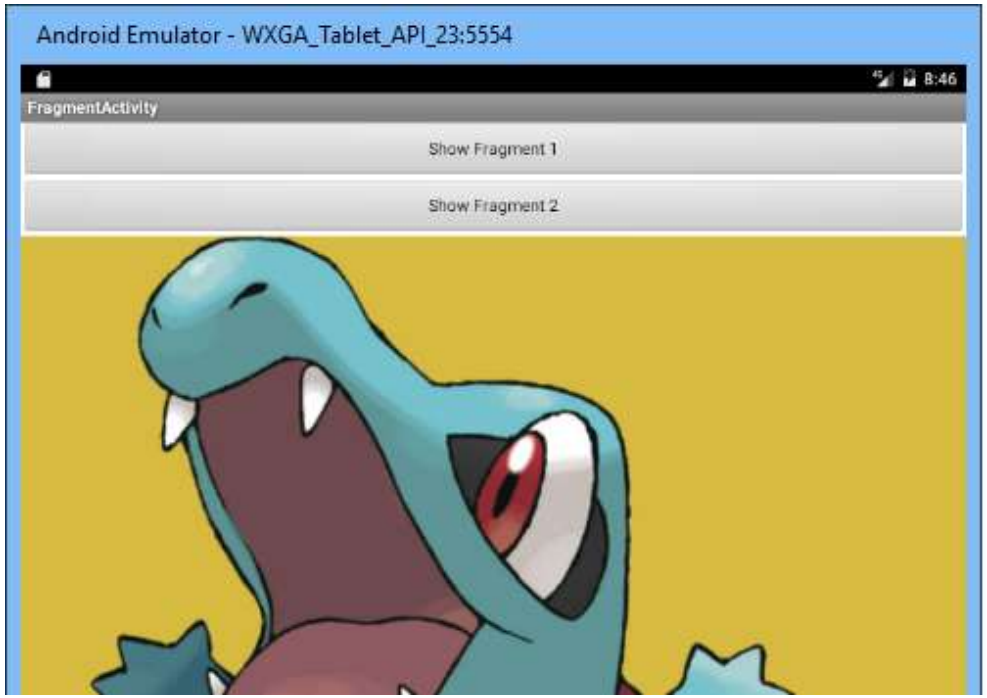
Projekt: FragmentPikas.zip

Fragmenty

```
<LinearLayout  ...FragmentButtons
    android:orientation="horizontal"
    <Button
      android:text="Previous"
      android:id="@+id/prevBtn"/>
    <Button
      android:text="Next"
      android:id="@+id/nextBtn"
    />
    <Button
      android:text="Quit"
      android:id="@+id/quitBtn"
    />
```

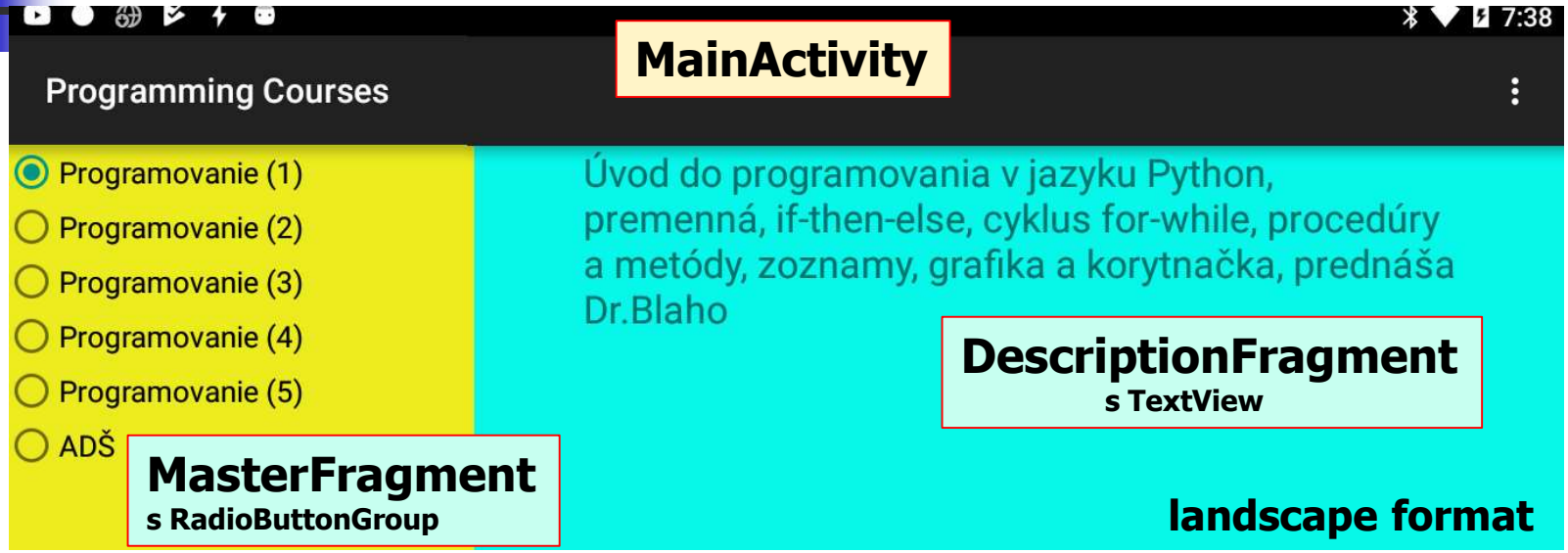
Projekt: FragmentPikas.zip

```
<LinearLayout ...FragmentImage
    android:orientation="vertical">
    <ImageView
        android:id="@+id/imageView"
    />
</LinearLayout>
```



Master Detail

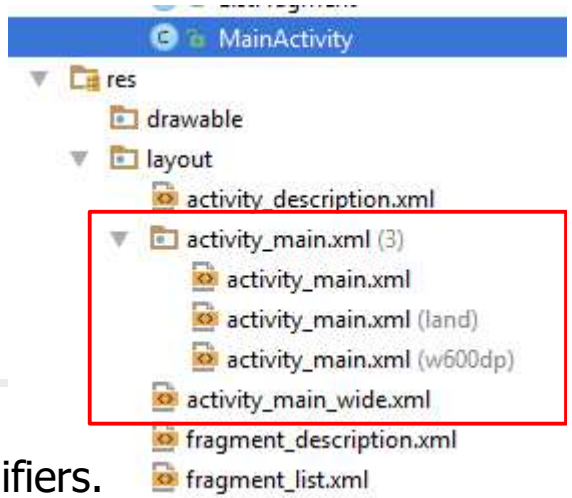
(MainActivity)



Projekt: [FragementCourses.zip]

Master Detail

(MainActivity)

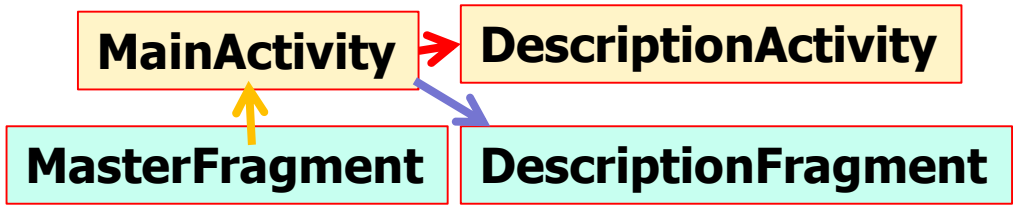


- aktivita/fragment môžu mať rôzne zobrazenia/layouts, napr. podľa orientácie, resp. rozlíšenia displaya, tzv.qualifiers.
- Kľúčom je Android Resource Directory, ak na zdrojáku aktivity klikneme pravým, pomôže vám vygenerovať špecializované layouts aktivity podľa zobraz. parametrov

```
activity_main_wide.xml
<LinearLayout ...
    android:orientation="horizontal“
    <fragment ...
     tools:layout="@layout/fragment_list"/>
    <fragment ...
     tools:layout="@layout/fragment_description"/>
</LinearLayout>
```

```
activity_main.xml
<LinearLayout ...
    android:orientation="vertical"
    <fragment
         android:layout_width="match_parent"
         android:id="@+id/fragmentTitles"/>
</LinearLayout>
```

Projekt: FragementCourses.zip



Master Detail

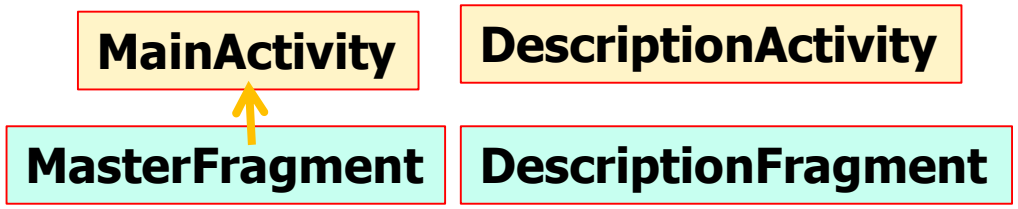
(MainActivity)

```
class MainActivity : AppCompatActivity(), ListFragment.Updater {

    override fun update(selectedIndex: Int) {
        val descriptionFragment = supportFragmentManager.
                findFragmentById(R.id.fragmentDescription)
                        as? DescriptionFragment
        if (descriptionFragment == null ||
            !descriptionFragment.isVisible) {
            if (!mCreating) {
                val intent = Intent(this,
                        DescriptionActivity::class.java)
                intent.putExtra("selectedIndex", selectedIndex)
                startActivity(intent)
            }
        } else {
            descriptionFragment.setDetail(selectedIndex)
        }
    }
```

Projekt: FragementCourses.zip

Master Detail

(MasterFragment)




```
class ListFragment:Fragment(),RadioGroup.OnCheckedChangeListener {
   internal interface Updater {
      fun update(selectedIndex: Int)
   }
   override fun onCheckedChanged(group:RadioGroup,checkedId:Int) {
           var selectedIndex = -1
           when (checkedId) {
               R.id.prog1ID -> selectedIndex = 0
               R.id.prog2ID -> selectedIndex = 1
               R.id.prog3ID -> selectedIndex = 2
               R.id.prog4ID -> selectedIndex = 3
               R.id.prog5ID -> selectedIndex = 4
               R.id.adsID   -> selectedIndex = 5
           }
           val listener = activity as Updater
           listener.update(selectedIndex)
       }
```

Projekt: FragementCourses.zip

MainActivity | DescriptionActivity

MasterFragment | DescriptionFragment

Master Detail

(DescriptionFragment)

```
class DescriptionFragment : Fragment() {
    lateinit var tv: TextView
    override fun onCreateView(inflater: LayoutInflater,
                              container: ViewGroup?,
                              savedInstanceState:Bundle?):View? {
        val view = inflater.inflate(
                              R.layout.fragment_description,
                              container, false)
        tv = view.findViewById(R.id.descriptionID) as TextView
        return view
    }

    fun setDetail(index: Int) {
        val descriptions =
              resources.getStringArray(
                  R.array.course_full_descriptions)
        val course = descriptions[index]
        tv.text = course
    }
}
```

```
<string-array
name="course_full_descriptions">
  <item>@string/prog1Detail</item>
  <item>@string/prog2Detail</item>
  <item>@string/prog3Detail</item>
  <item>@string/prog4Detail</item>
  <item>@string/prog5Detail</item>
  <item>@string/adsDetail</item>
</string-array>
```

Projekt: FragementCourses.zip

MainActivity | DescriptionActivity

MasterFragment | DescriptionFragment

Master Detail

(DescriptionActivity)

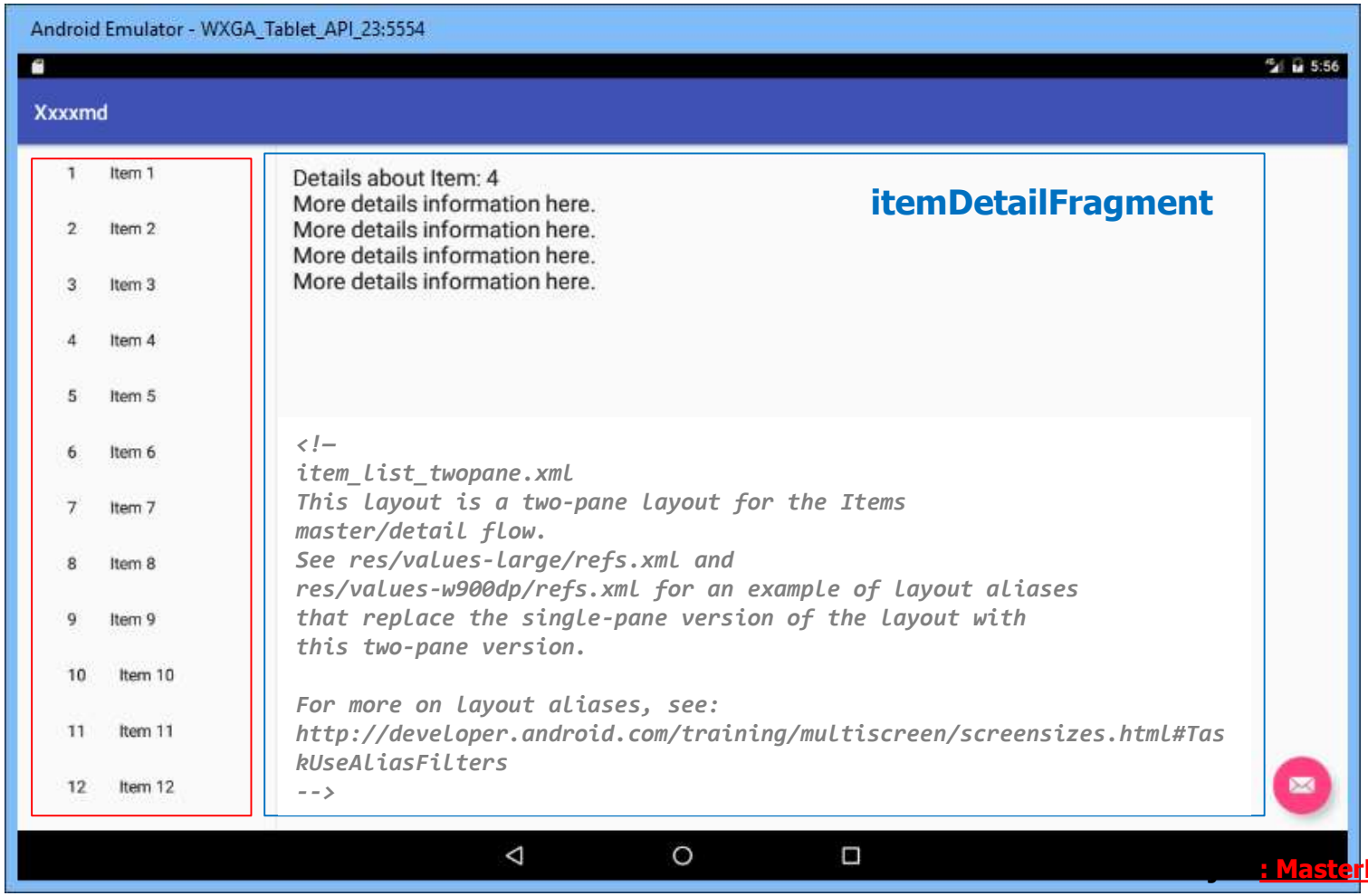
```
class DescriptionActivity : AppCompatActivity() {
    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        setContentView(R.layout.activity_description)
        val intent = intent
        val selectedIndex = intent.getIntExtra("selectedIndex",-1)
        if (selectedIndex != -1) {
            val descriptionFragment = supportFragmentManager
                        .findFragmentById(R.id.fragmentDescription)
                        as DescriptionFragment
            descriptionFragment.setDetail(selectedIndex)
        }
    }
```

Projekt: FragementCourses.zip

MasterDetail

(veľké rozlíšenie)

- nechajte AS vygenerovať M/D projekt, a pokúste sa pochopiť kód

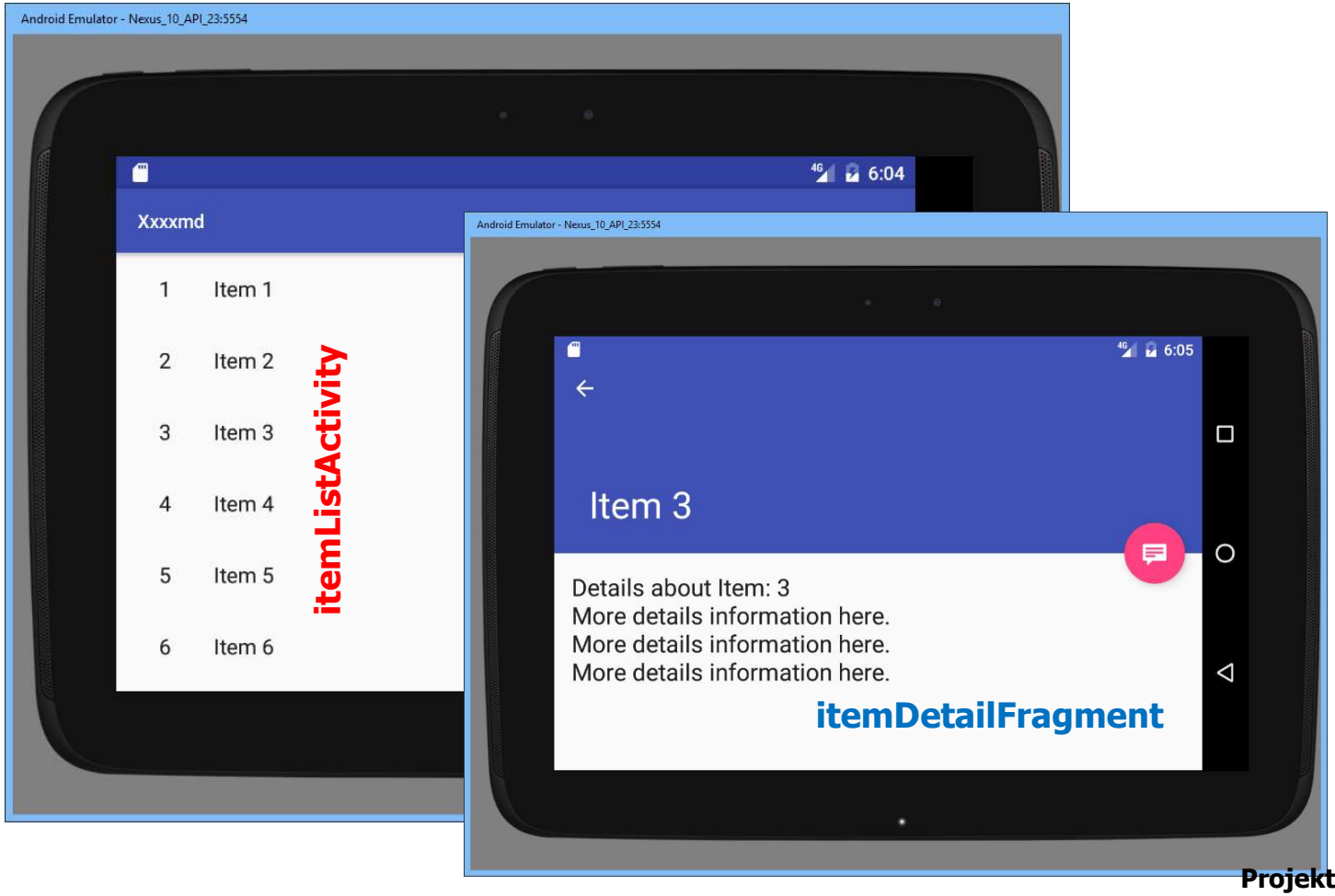


: MasterDetail.zip

MasterDetail

(malé rozlíšenie)

- pre iné rozlíšenie dostanete iný look

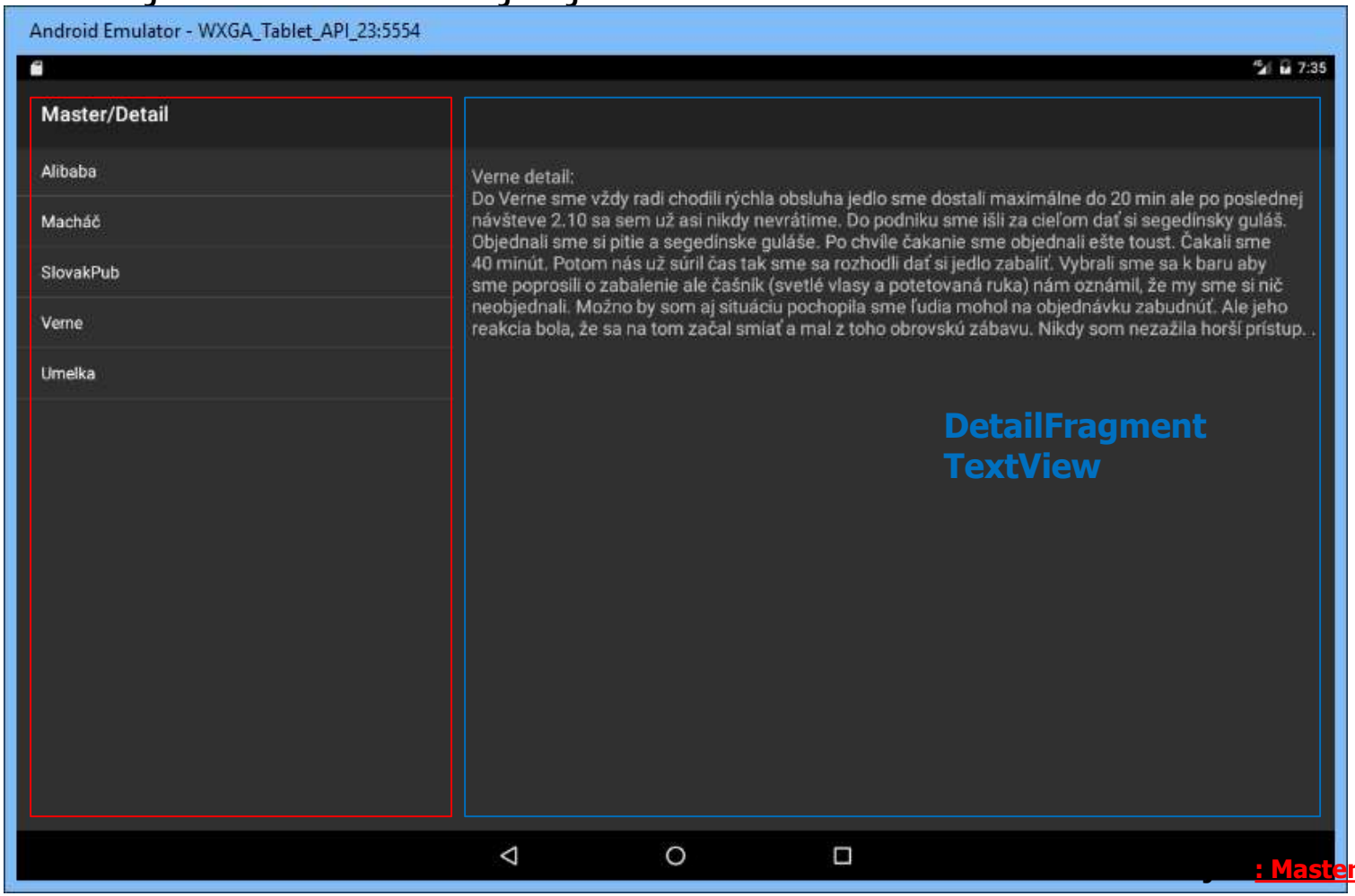


Projekt: MasterDetail.zip

MasterDetails

(veľké rozlíšenie)

- Projekt MasterDetails je zjednodušená verzia



: MasterDetails.zip

MasterDetails

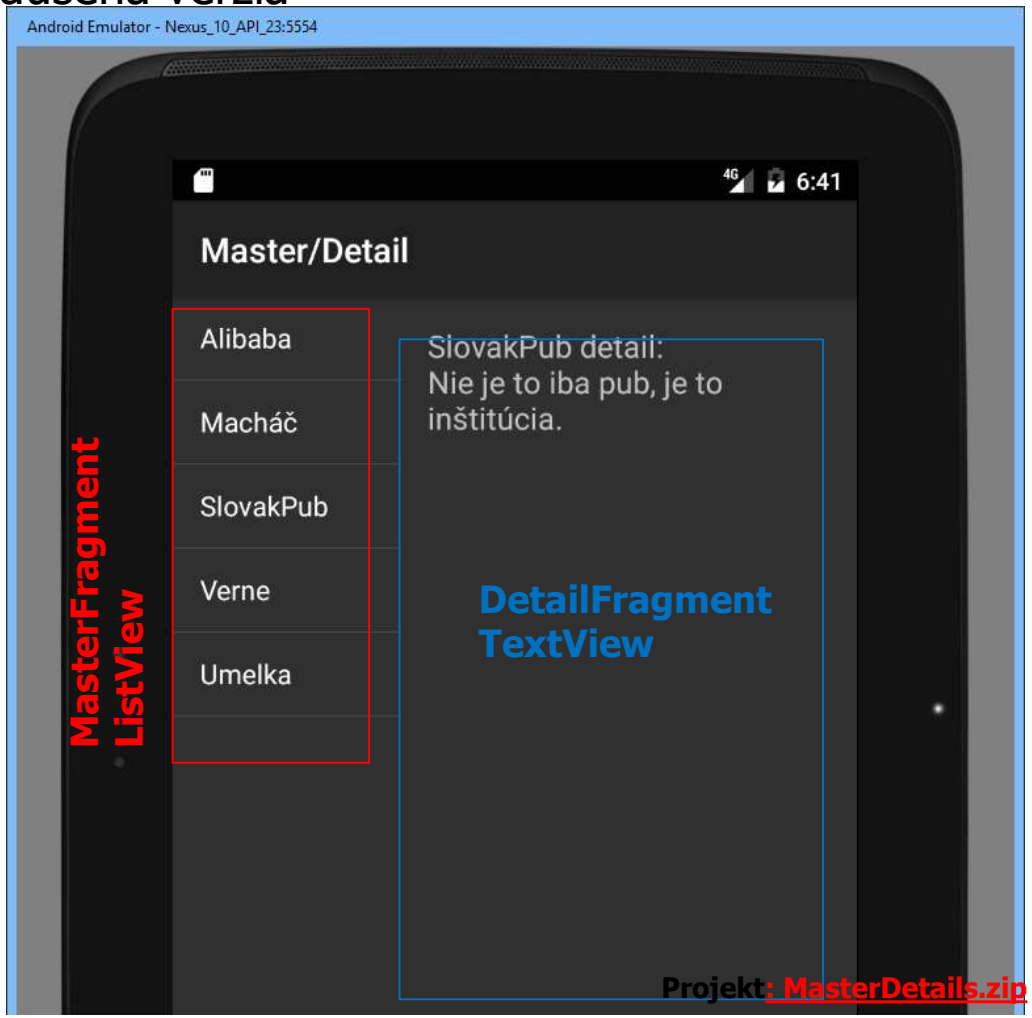
(malé rozlíšenie)

- Projekt MasterDetails je zjednodušená verzia

Problémy:

- pri zmene orientácie aktivity/ fragmentu príde k strate dát/ nastavení aktivity/fragmentu

- pri menšom rozlíšení by sme privítali iný layout fragmentov v móde landscape/portrait



Projekt: MasterDetails.zip

Perzistencia dát fragmentu

- potrebujeme uložiť index v `ListView`, na ktorom sme stáli do `Bundle savedInstance`
- pri `onCreateView` fragementu opätovne obnovíme index zo `savedInstance`

```
class DetailFragment : Fragment() {
   private var index = -1

   // toto sa zavolá pred restartom aktivity/fragementu
   override fun onSaveInstanceState(outState: Bundle) {
       super.onSaveInstanceState(outState)
       outState.putInt("INDEX", index)
   }

   // bundle outstate sa odpamätá až do event.volania/reštartu a/f
   override fun onCreateView(inflater: LayoutInflater,
   container: ViewGroup?, savedInstanceState: Bundle?): View? {
       index = savedInstanceState?.getInt("INDEX")?:-1
       return
           inflater.inflate(R.layout.detail_view, container, false)
   }
   // bundle je dictionary resp. HashMap<String, Object>
```

Projekt: MasterDetails.zip

Argumenty fragmentu

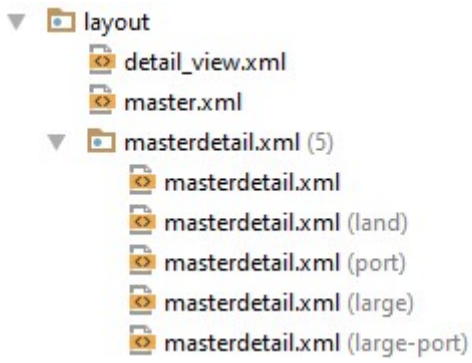
(fragment môže dostať argumenty od aktivity – tiež Bundle)

```
public class DetailFragment extends Fragment {
    // fragment môže dostať bungle argumentov aj od aktivity
    override fun onStart() {
        super.onStart()
        val args = arguments
        if (args != null) {
            updateDetailView(args.getInt("INDEX"))
        } else if (index != -1) {
            updateDetailView(index)
        }
    }
    // Pri vytvorení fragmentu, ak aktivita chce odovzdať bungle
    argumentov vznikajúcemu fragmentu
    val newFragment = DetailFragment()
    val args = Bundle()
    args.putInt("INDEX", index)
    newFragment.arguments = args
```

Bundle je HashMap<String, Object>

Projekt: MasterDetails.zip

Adaptívny layout



Ak pre rôzne rozlíšenia a orientácie display (...qualifiers) chceme iné layouty

qualifiers

New Resource File

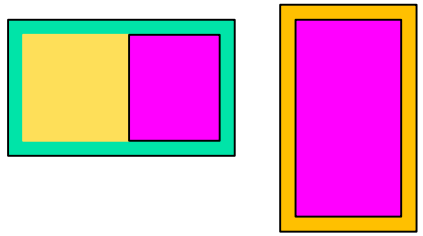
File name: masterdetail
Root element: LinearLayout
Source set: main
Directory name: layout-land
Available qualifiers:
Layout Direction
Smallest Screen V
Screen Width
Screen Height
Size
Ratio
UI Mode
Night Mode
Density
Touch Screen
Keyboard
Text Input
Navigation State
>>
<<
Chosen qualifiers:
Landscape
Screen orientation:
Landscape

New Resource File

File name: masterdetail
Root element: LinearLayout
Source set: main
Directory name: layout-port
Available qualifiers:
Country Code
Network Code
Locale
Layout Direction
Chosen qualifiers:
Portrait
Screen orientation:
Portrait

Projekt: MasterDetailsAdaptive.zip

Flexibilný layout

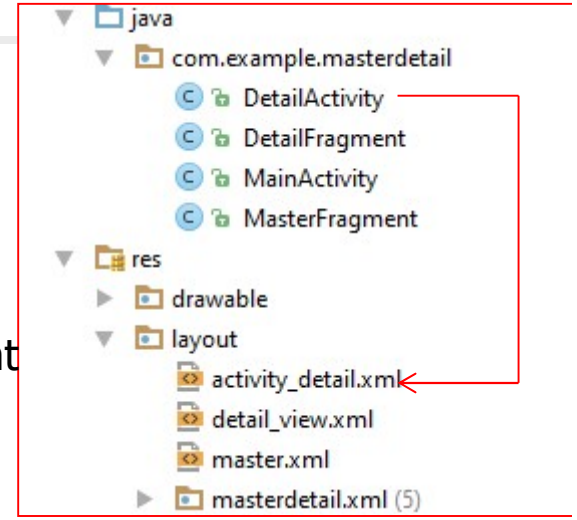


Landscape

- MainActivity
  - First/MasterFragment
  - Second/DetailFragment

Portrait

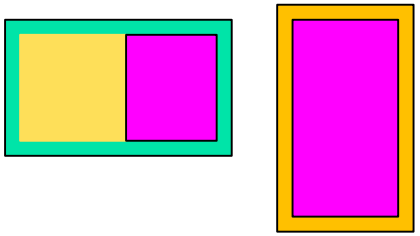
- MainActivity
  - First/MasterFragment
- DetailActivity
  - Second/DetailFragment




```
public void update(int index) {
    int orientation=getResources().getConfiguration().orientation;
    if (orientation== Configuration.ORIENTATION_LANDSCAPE) {
            ... to, čo sme robili predtým
    } else { // Configuration.ORIENTATION_PORTRAIT
        Intent in = new Intent(this, DetailActivity.class);
        in.putExtra("YNDEX",index);
        startActivity(in);
    }
}
```

Projekt: MasterDetailsFlexible.zip

Flexibilný layout

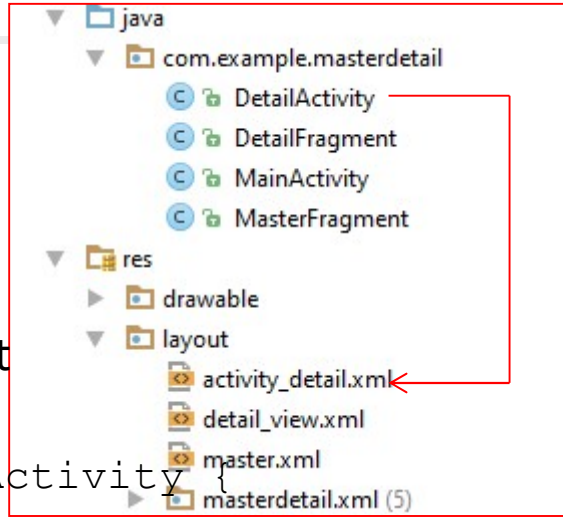


Landscape

- MainActivity
  - First/MasterFragment
  - Second/DetailFragment

Portrait

- MainActivity
  - First/MasterFragment
- DetailActivity
  - Second/DetailFragment




```
public class DetailActivity extends FragmentActivity {
  protected void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);
    setContentView(R.layout.activity_detail);
    Intent in = getIntent();
    int yndex = in.getIntExtra("YNDEX",0);
    FragmentManager fm = getSupportFragmentManager();
    DetailFragment detailfr =
        (DetailFragment)fm.findFragmentById(R.id.detail_fragment);
    if (detailfr != null) {
      detailfr.updateDetailView(yndex);
    }
```

Projekt: MasterDetailsFlexible.zip

R.layout.*yes_no_layout*

Dialog Fragment

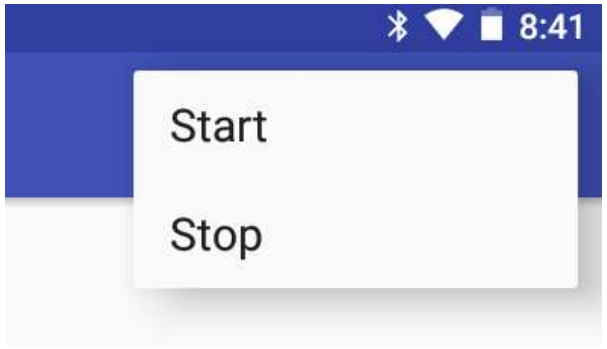
(podtrieda Fragment)

```
class YesNoDialog : DialogFragment() {
    lateinit var updater : Updater
    override fun onAttach(activity: Activity) {
        super.onAttach(activity)
        updater = activity as Updater
    }
    override fun onCreateView(inflater: LayoutInflater,
                              container: ViewGroup?,
                              savedInstanceState: Bundle?): View? {
        isCancelable = false   // neda sa zrusit dialog
        val view = inflater.inflate(R.layout.yes_no_layout,
                                    container, false)
        (view.findViewById(R.id.yesBtn) as Button)
                .setOnClickListener {
                    updater.sendMessage("yes pressed")
                    dismiss()  // zmizne dialog
                }
        return view
    }
```

Projekt: FragmentDialog.zip

Dialog Fragment

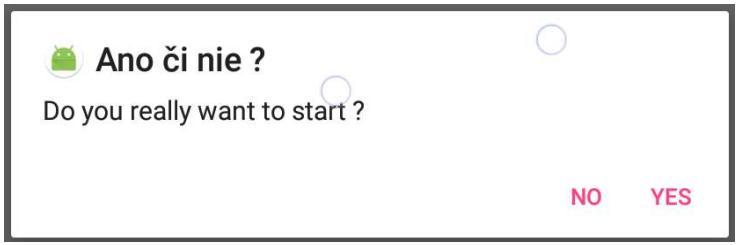
(volanie v MainActivity)




```
class MainActivity : AppCompatActivity(), YesNoDialog.Updater {

    override fun onOptionsItemSelected(item: MenuItem): Boolean {
      when (item.itemId) {
            ...
        R.id.StopID -> {
           YesNoDialog().show(supportFragmentManager, "Yes or No ?")
             return true
        }
      }
      return super.onOptionsItemSelected(item)
    }

    override fun sendMessage(msg: String) {
        if (msg == "yes pressed")
            this@MainActivity.finish()
    }
```

Ak bolo Yes na really want?

Projekt: FragmentDialog.zip

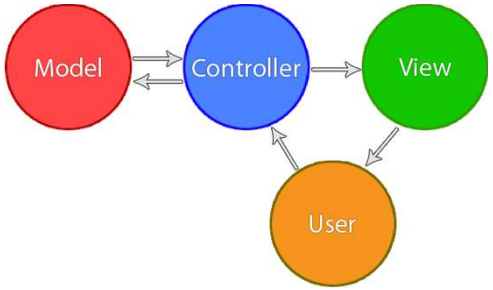


Alert Dialog

(musí to isť aj jednoduchšie – varenie z polotovarov)

```
R.id.StartID -> {
  val builder = AlertDialog.Builder(this@MainActivity)
  builder.setTitle("Ano či nie ?")
    .setMessage("Do you really want to start ?")
    .setIcon(R.mipmap.ic_launcher_round)
    .setCancelable(false)
    .setPositiveButton(R.string.yesText)
        { dialogInterface, i -> Toast.makeText(this@MainActivity,
                "Start it", Toast.LENGTH_SHORT).show() }
    .setNegativeButton(R.string.noText)
        { dialogInterface, i -> Toast.makeText(this@MainActivity,
                "DO NOT Start it", Toast.LENGTH_SHORT).show() }
    .setNeutralButton(R.string.whoKnowsText)
        { dialogInterface, i -> Toast.makeText(this@MainActivity,
                "DO NOTHING", Toast.LENGTH_SHORT).show() }
    val alertDialog = builder.create()
    alertDialog.show()
    return true
}
```

Projekt: FragmentDialog.zip



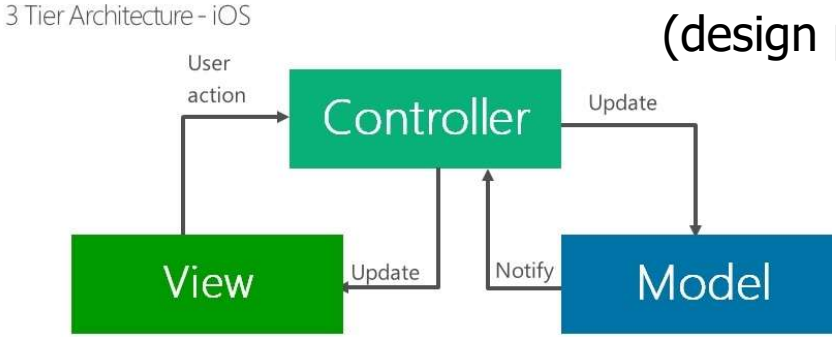
Architektonický *mess*

(MVC)

- vzniká, ak vizuálne komponenty (Views) sú zviazané s dátovými objektami a opačne

```
prev.setOnClickListener(new OnClickListener() {
  @Override
  public void onClick(View v) {
    i++;
    i %= imgs.length;
    iv.setImageDrawable(imgs[i]);
  }
});
```

- preto sa pri návrhu GUI používajú návrhové vzory, Model-View-Controller (design patterns)



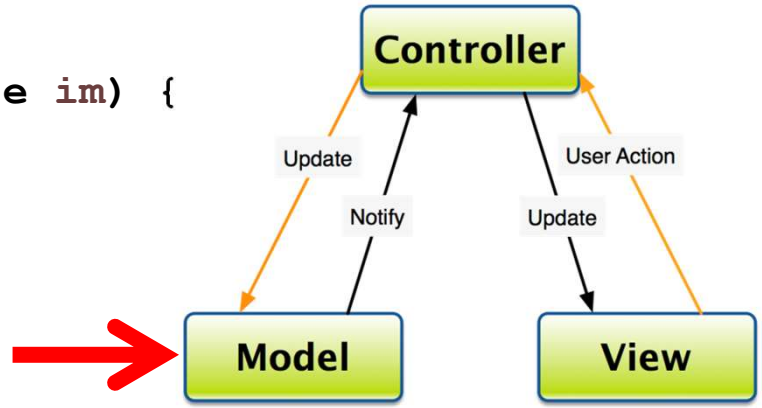
- motto: the architecture of most Android-apps is a mess.

http://doridori.github.io/Android-Architecture-MV%3F/#sthash.SiE5eude.IQq3XhmU.dpbs

Model View Controller (MVC)

(model – len data, netuší nič o ich prezentácii)

```
public class Model extends Observable {
int indx = 0;            // actual picture on the screen
ArrayList<Drawable> list = new ArrayList<Drawable>(); // all pics

public void addDrawableImage(Drawable im) {
   list.add(im);
}
public Drawable getDrawable() {
   return list.get(indx);
}
public void nextValue() {
   indx++;
   indx %= list.size();
   setChanged();
   notifyObservers();
}
```



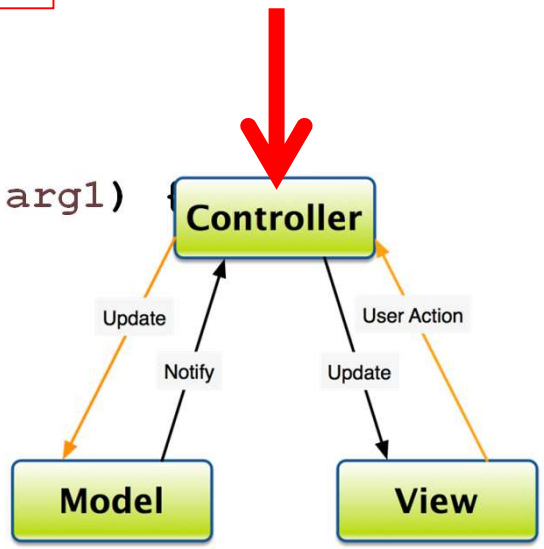

```
public void prevValue() {
   indx--;
   if (indx < 0)
      indx = list.size()-1;
   setChanged();
   notifyObservers();
}
```

PikatchuMVC.zip

Model View Controller (MVC)

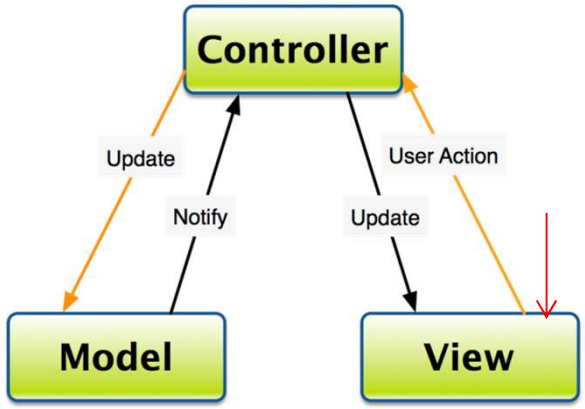
(controller – komunikuje medzi modelom a view)

```
public class Controller extends … implements Observer {

mModel = new Model();
mModel.addObserver(this);
mModel.addDrawableImage(getResources().getDrawable(R.drawable.pok0));
mModel.addDrawableImage(getResources().getDrawable(R.drawable.pok1));

mView = new myView(this);

@Override
public void update(Observable arg0, Object arg1) {
   mView.update(mModel.getDrawable());
}
```



PikatchuMVC.zip

Model View Controller (MVC) (view)




```
public class myView {
    final Controller controller;
    ImageView iv;
    Button prev, next;

public myView(Controller c) {
    this.controller = c;
    iv = (ImageView)mainActivity.findViewById(R.id.imageView1);
    Button prev = (Button)mainActivity.findViewById(R.id.prevBtn);
    prev.setOnClickListener(new OnClickListener() {
    @Override
        public void onClick(android.view.View v) {
          controller.mModel.prevValue(); }
    });
public void update(android.graphics.drawable.Drawable im) {
    iv.setImageDrawable(im);
}
```

PikatchuMVC.zip