Distributed and Mobile Programming Paradigms
Lab Sessions

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AMBIENTTALK

Software Languages.Lab

Vrije
Universiteit
Brussel

Lab Sessions - Goals

- Get you familiar with concurrent and distributed programming abstractions.
- Get you ready for the project.

Implementing small applications in AmbientTalk

Lab Sessions Schedule

W	Date	Exercise	Concepts
22	12/02/2012	First steps in Android - Simon	Android programming
23	19/02/2012	First steps in AmbientTalk	Sequential programming, Java symbiosis
24	26/02/2012	Internet Cafe	Concurrent programming, unit test
25	05/03/2012	Mobile Music Player	Distributed programming, Failure Handling
26	12/03/2012	weScribble on Android devices	Distributed programming, Java symbiosis
27	19/03/2012	Flikken in TOTAM	Tuple-based distributed programming
28	26/03/2012	wePoker on Android devices	Distributed programming, Java symbiosis
EASTER HOLIDAY			
31	16/04/2012	goShopping with REME-D	Reflective progr.,Distributed Debugging
32	23/04/2012	Omnireferences	Reflective progr., Intercession
...			
39	10/06/2012	Project delivery	report + code
40/1	17-30/06/2012	Project defenses	30-minute discussion with demo

Android Platform

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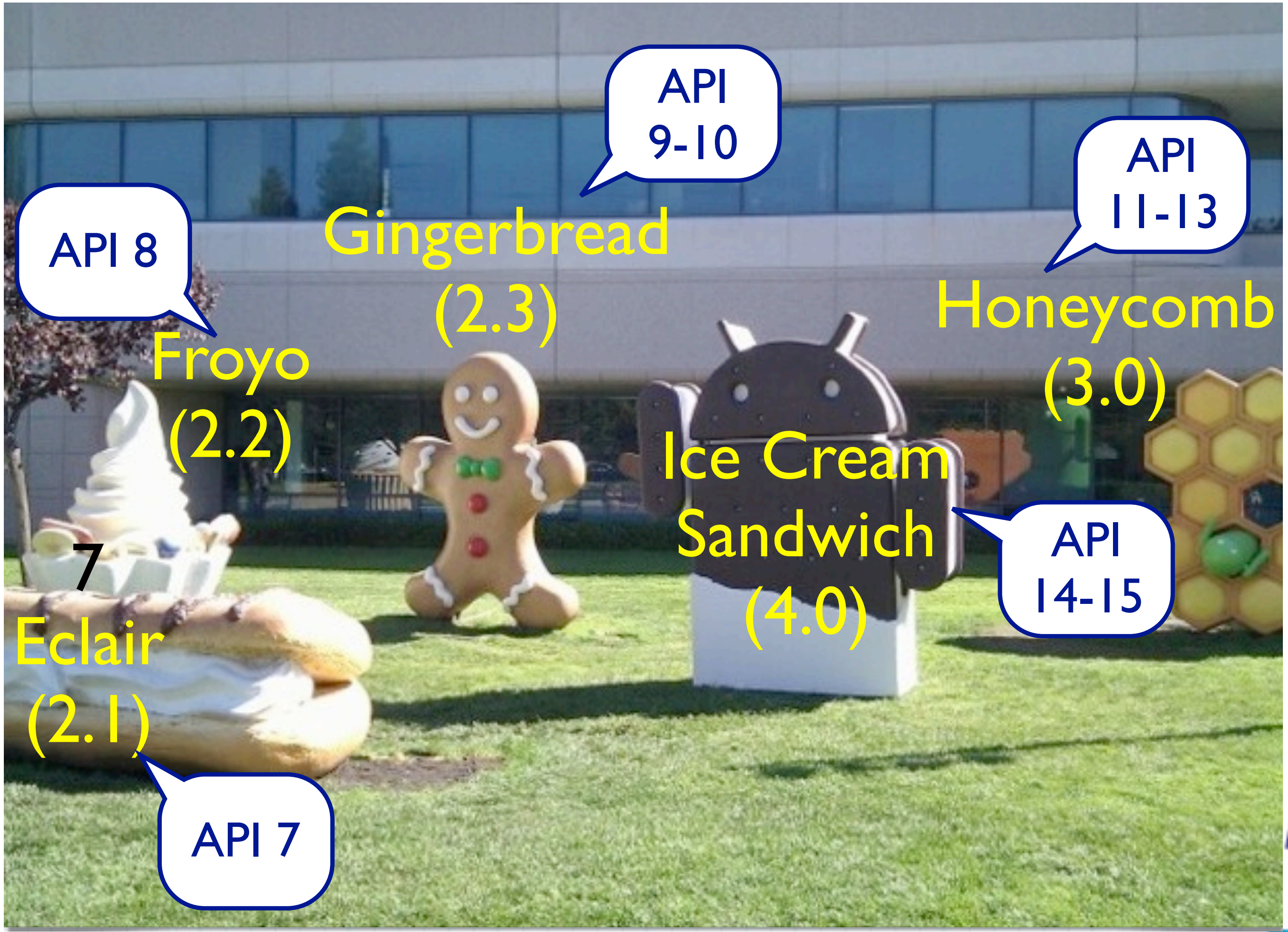
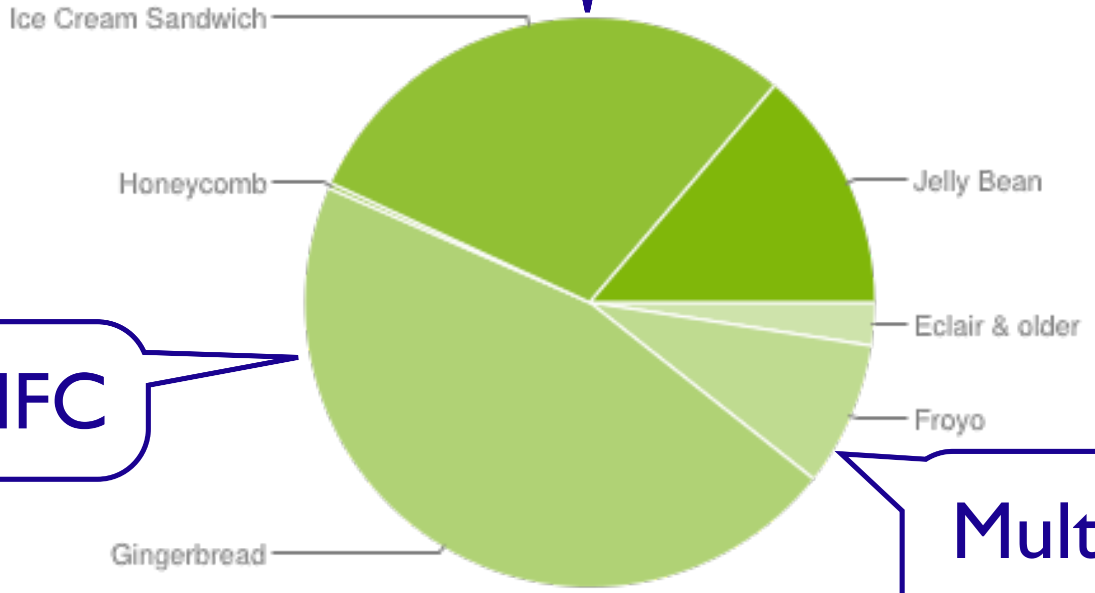
Android Versions



Android Version



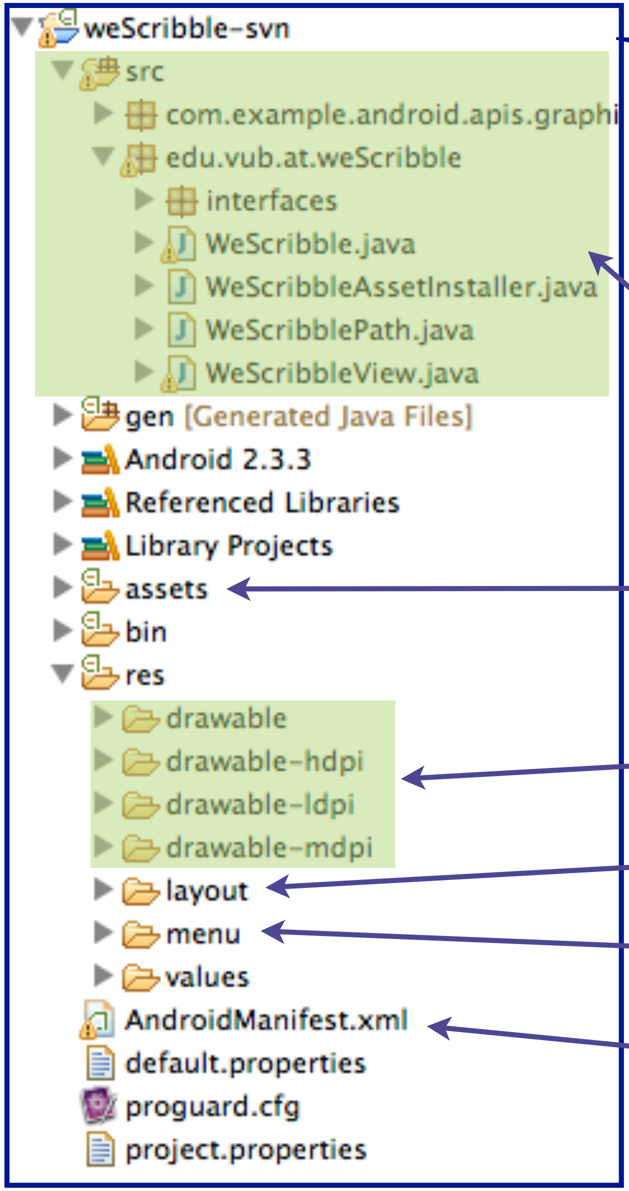
Phone & Tablets

NFC

Multi-touch gestures; JIT

http://developer.android.com/resources/

Android Project Layout



- weScribble-svn
  - src
    - com.example.android.apis.graphi
    - edu.vub.at.weScribble
      - interfaces
      - WeScribble.java
      - WeScribbleAssetInstaller.java
      - WeScribblePath.java
      - WeScribbleView.java
  - gen [Generated Java Files]
  - Android 2.3.3
  - Referenced Libraries
  - Library Projects
  - assets
  - bin
  - res
    - drawable
    - drawable-hdpi
    - drawable-ldpi
    - drawable-mdpi
    - layout
    - menu
    - values
  - AndroidManifest.xml
  - default.properties
  - proguard.cfg
  - project.properties

code + data ➠ .apk file

Source files

Assets (copied to device)

Icons

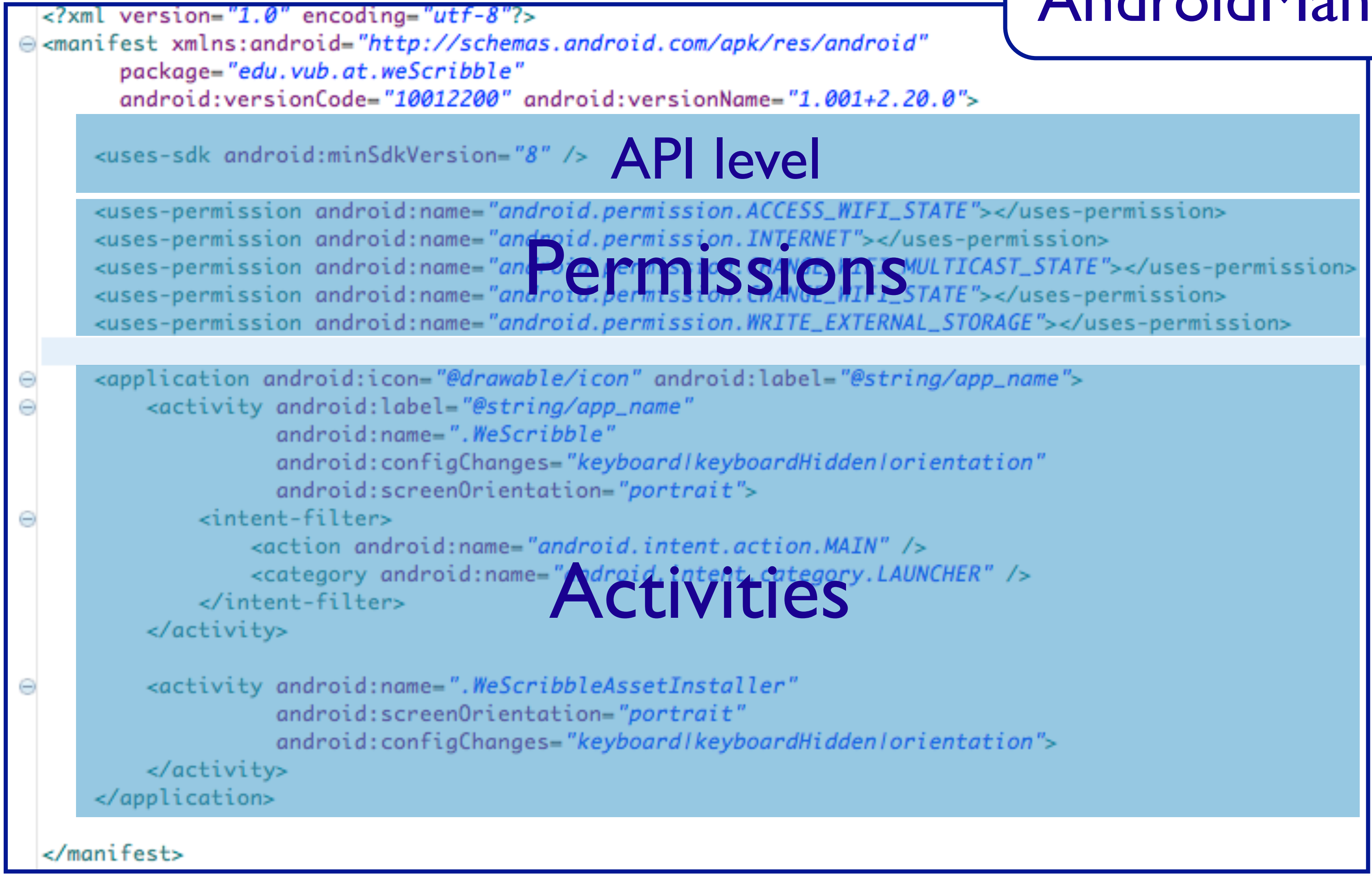
Screen layouts

Menu definitions

Manifest file

Android Manifest

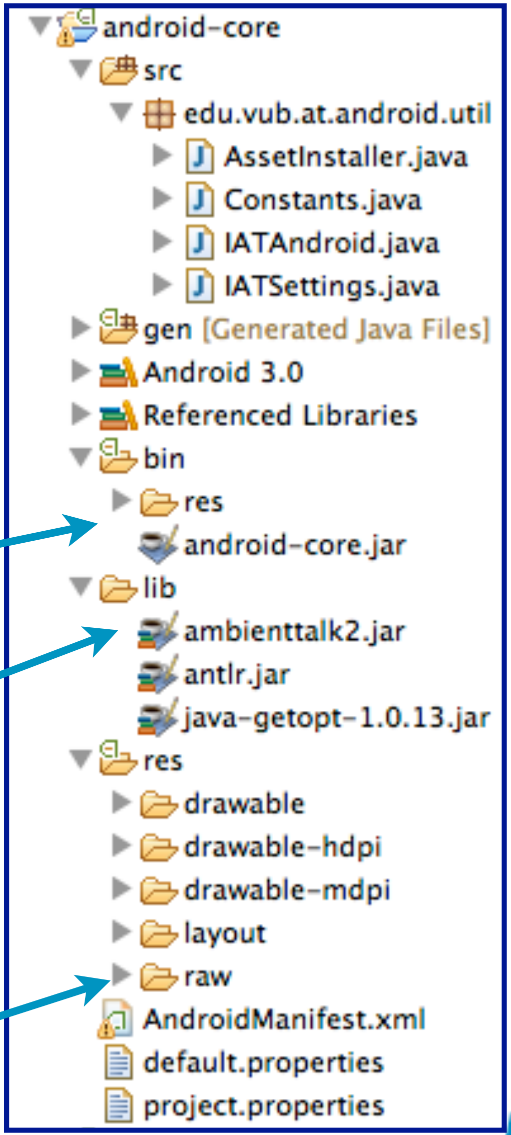
AndroidManifest.xml



```xml
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
      package="edu.vub.at.weScribble"
      android:versionCode="10012200" android:versionName="1.001+2.20.0">

    <uses-sdk android:minSdkVersion="8" />

    <uses-permission android:name="android.permission.ACCESS_WIFI_STATE"></uses-permission>
    <uses-permission android:name="android.permission.INTERNET"></uses-permission>
    <uses-permission android:name="android.permission.CHANGE_WIFI_MULTICAST_STATE"></uses-permission>
    <uses-permission android:name="android.permission.CHANGE_WIFI_STATE"></uses-permission>
    <uses-permission android:name="android.permission.WRITE_EXTERNAL_STORAGE"></uses-permission>

    <application android:icon="@drawable/icon" android:label="@string/app_name">
        <activity android:label="@string/app_name"
                  android:name=".WeScribble"
                  android:configChanges="keyboard|keyboardHidden|orientation"
                  android:screenOrientation="portrait">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />
                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>

        <activity android:name=".WeScribbleAssetInstaller"
                  android:screenOrientation="portrait"
                  android:configChanges="keyboard|keyboardHidden|orientation">
        </activity>
    </application>

</manifest>
```

Android Library Project

- Shared code or resources are organized in a library project.
- Referenced from other Android project



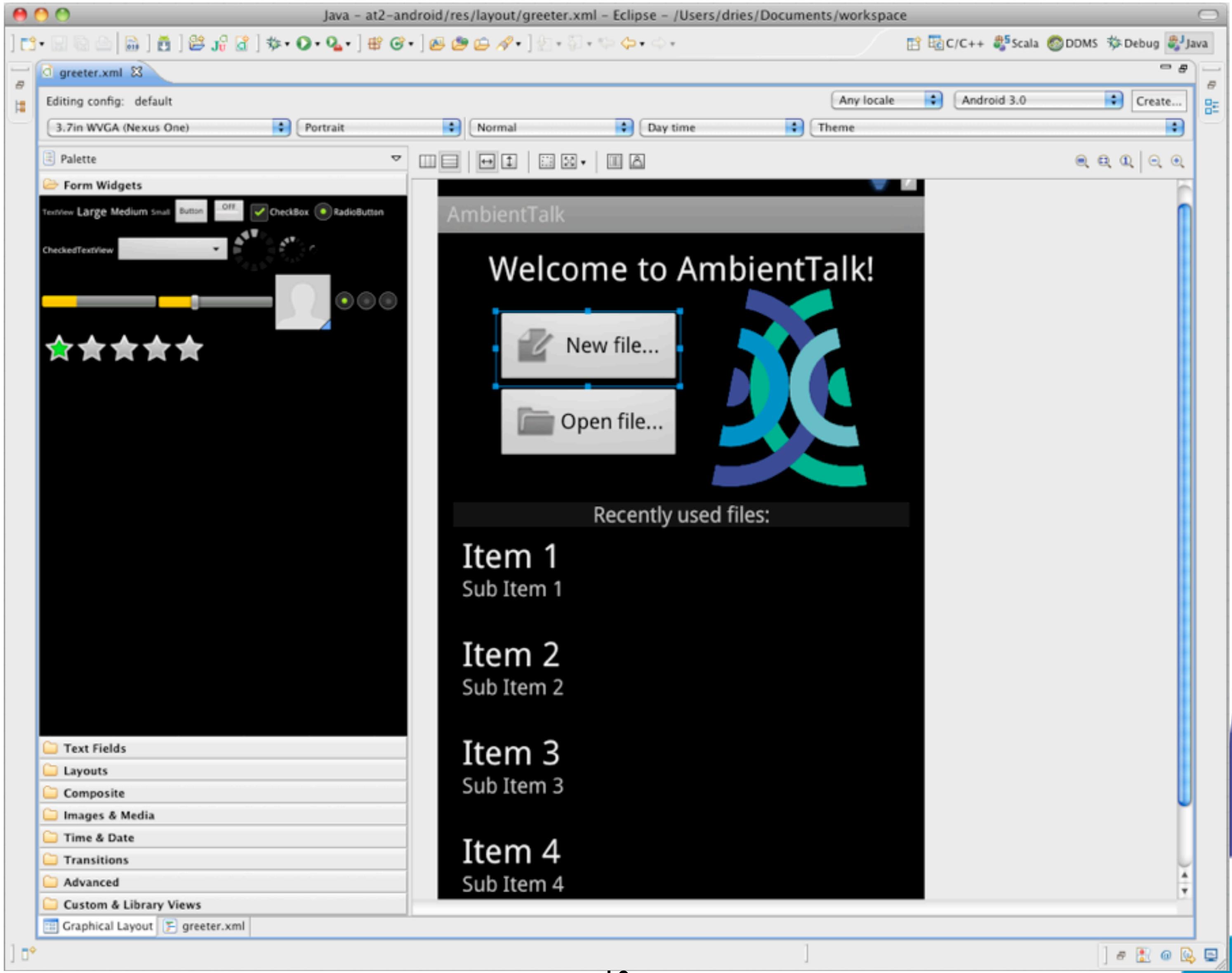
- android-core
  - src
    - edu.vub.at.android.util
      - AssetInstaller.java
      - Constants.java
      - IATAndroid.java
      - IATSettings.java
  - gen [Generated Java Files]
  - Android 3.0
  - Referenced Libraries
  - bin
    - res
    - android-core.jar
  - lib
    - ambienttalk2.jar
    - antlr.jar
    - java-getopt-1.0.13.jar
  - res
    - drawable
    - drawable-hdpi
    - drawable-mdpi
    - layout
    - raw
  - AndroidManifest.xml
  - default.properties
  - project.properties

does not compile
as an .apk

can include jar file,
but it cannot be exported to a .jar

cannot include its
own raw assets

User Interface Design



Java – at2-android/res/layout/greeter.xml – Eclipse – /Users/dries/Documents/workspace

Editing config: default

Any locale

Android 3.0

3.7in WVGA (Nexus One)

Portrait

Normal

Day time

Theme

AmbientTalk

Welcome to AmbientTalk!

New file...

Open file...

Recently used files:

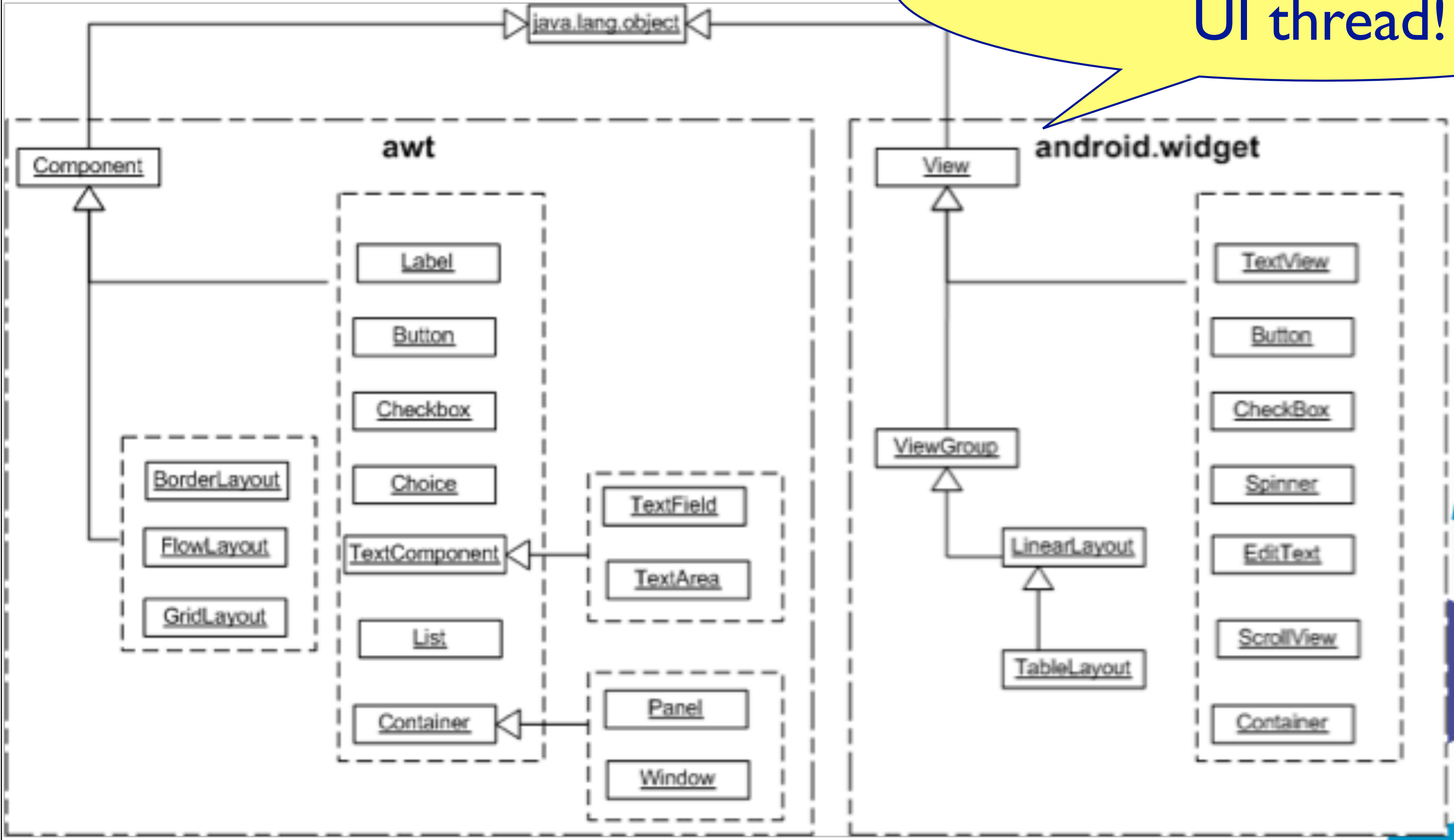
Item 1
Sub Item 1

Item 2
Sub Item 2

Item 3
Sub Item 3

Item 4
Sub Item 4

User Interface Design



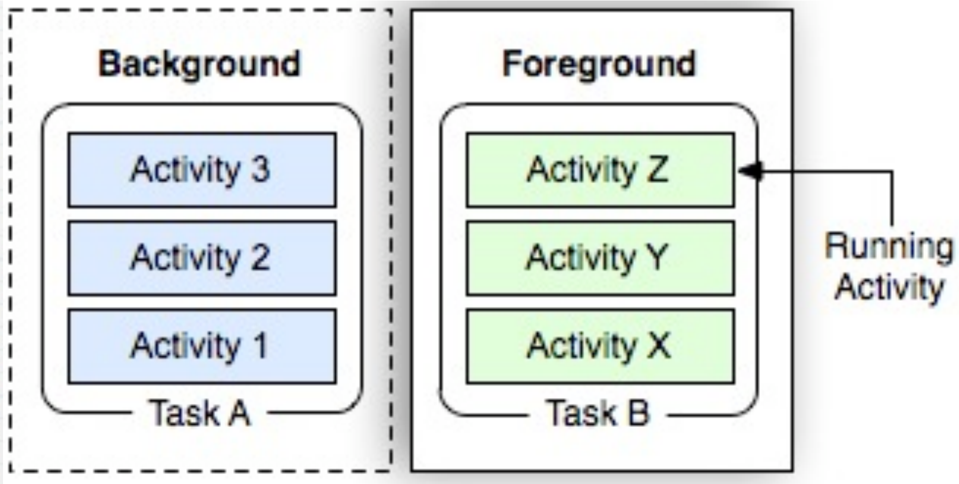
created only in the UI thread!

ListView

- ... is your friend
- Presents a list of items sequentially
- Adapter encapsulates items
- Adapter determines item presentation
- onItemClick / onItemLongClick
- Adapter.notifyDataSetChanged()

Application Fundamentals

- Android application = collection of tasks.



“An activity is a single screen
with a user interface”

Intents

- 1 screen = 1 activity
- Can use other application’s activities:

```
Intent dial =
  new Intent(ACTION_DIAL, Uri.parse(“tel:123”));
startActivity(dial);
```

Intents

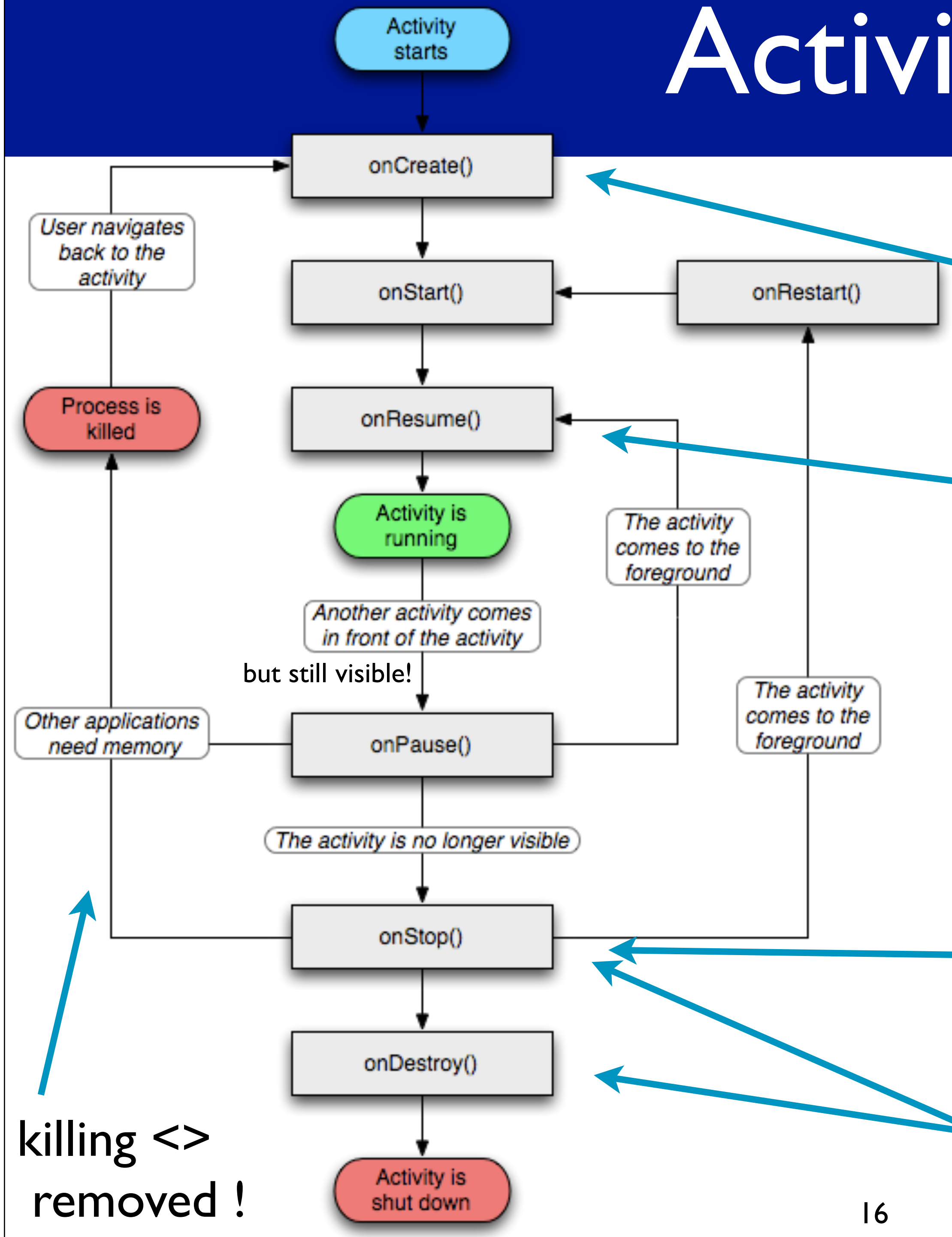
```
Intent i2 = new Intent(this,
 BrowseFriends.class);
i2.putExtra(“context”, “VUB”);
startActivityForResult(i2, REQUEST_CODE);
```

can
pass additional information to the activity

can
receive a result from the activity you start

onActivityResult

Activity LifeCycle


Activity starts
onCreate()
User navigates back to the activity
onStart()
onRestart()
Process is killed
onResume()
Activity is running
The activity comes to the foreground
Another activity comes in front of the activity
The activity comes to the foreground
Other applications need memory
onPause()
The activity is no longer visible
onStop()
onDestroy()
Activity is shut down

but still visible!

intializing static data (e.g.layout)

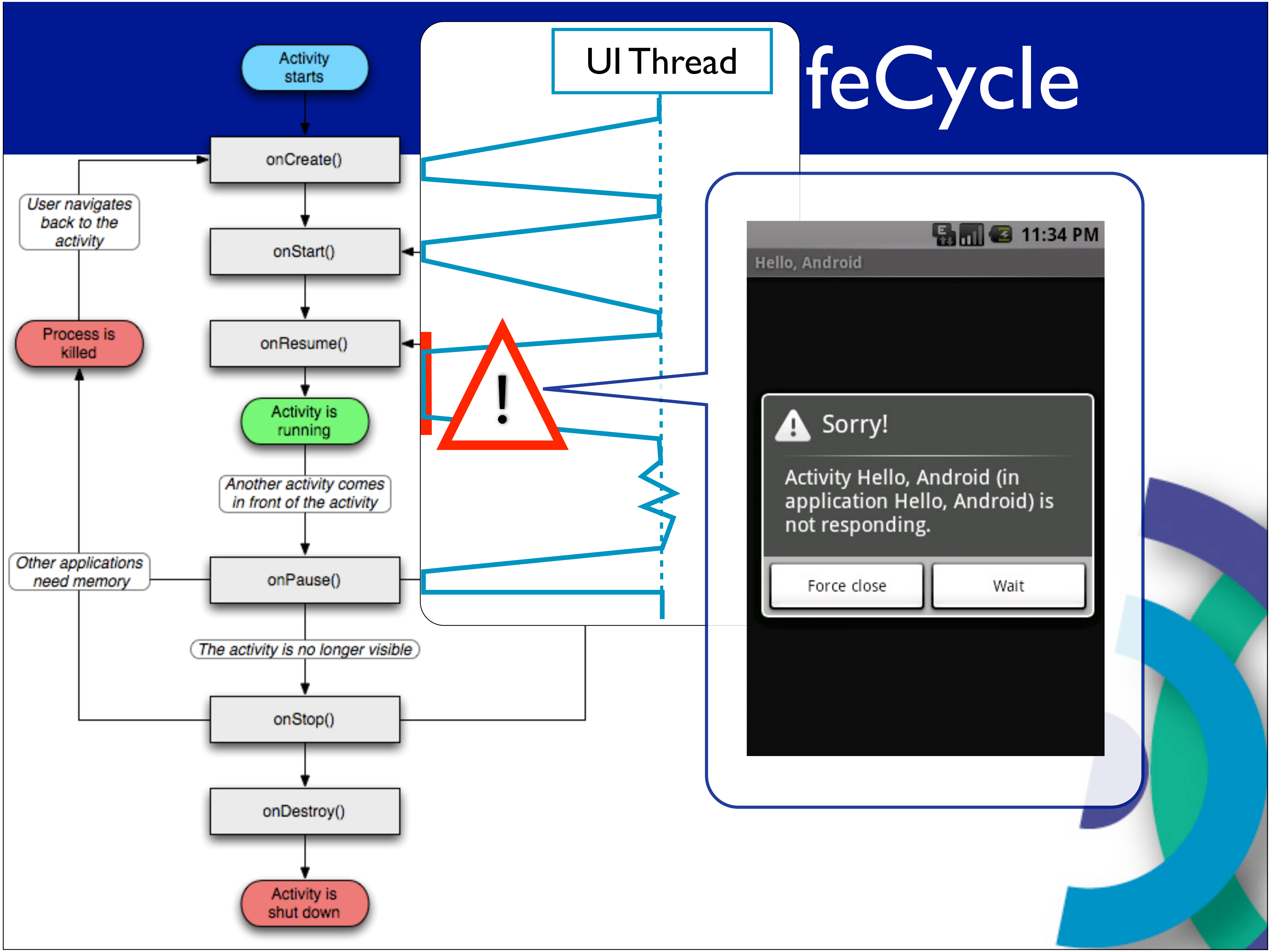
intializing and retrieving activity data

stop, save and release activity data

may not be called!

killing <> removed !

feCycle

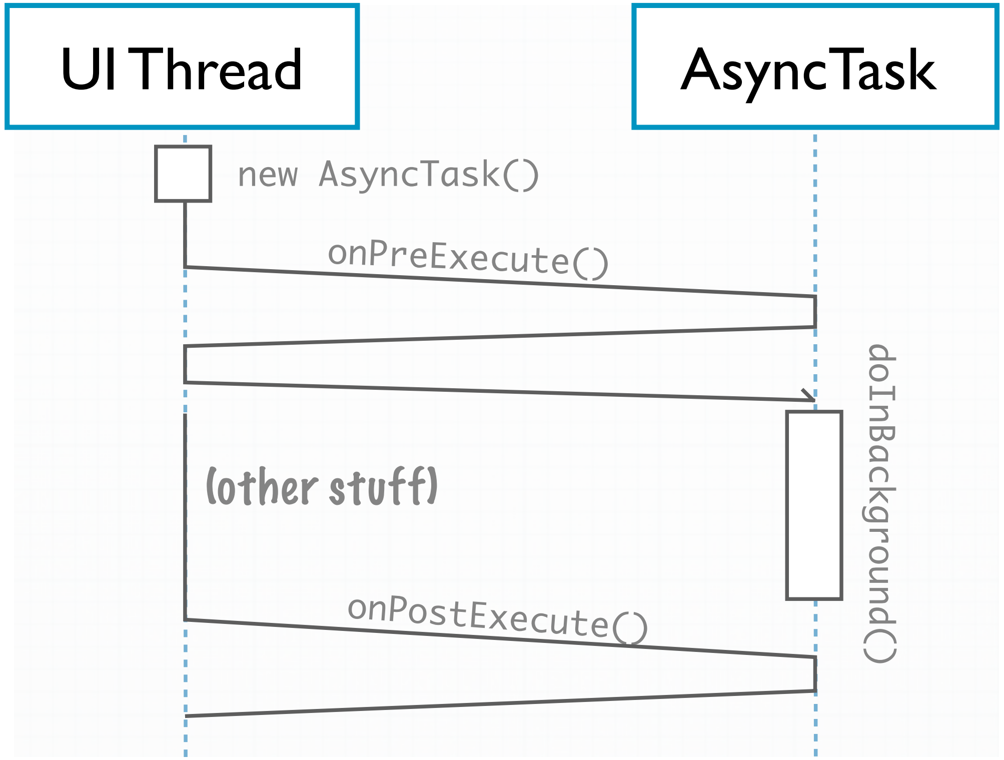


Sorry!

Activity Hello, Android (in application Hello, Android) is not responding.

Hiding work with AsyncTasks

`new AsyncTask<Params,Progress,Result>().execute()`



Useful Android tools

adb (android debug bridge)

- Low-level tool used to interact with the device.
- Specially useful:
    - Issue shell commands in the target device.
    - Commands can be directed to specific devices.
    - Logcat command

Useful Android tools

Debug & DDMS perspective in Eclipse

- Debugging on the target device!
  - Set “USB debugging” flag on the device.
  - Set “debuggable” flag in the AndroidManifest.xml.
- adb commands visualization: LogCat, Devices, etc.
- Adding your own messages to LogCat:

```
Log.e(), Log.i(), Log.w(), Log.wtf(), etc.
Log.e(MY_TAG,“index out of bounds + i”);
```

Lessons Learned

- TabActivities = bad idea
- Don’t forget configuration changes (rotate device)
- Test the onStop -> onCreate path!
- Verify permissions!
- Clean your project (yes, it sometimes helps!)

Resources

- http://developer.android.com
- http://android-developers.blogspot.com
- Android SDK Examples
- Stack Overflow ;)

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http://soft.vub.ac.be/amop