

Android™



Introductie

- **Introductie**
- **Basis**
 - *Activities*
 - *Fragments*
 - *Context*
 - *R*
 - *Intents*
 - *Permissions*
- **MVC**
 - *Hoe toe te passen*

Android

Wat is Android en wat gaan we er mee doen?

INTRODUCTIE

Wie zijn wij?

Rick Erkens

derdejaars informatica

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- *Testing*

Maurice Knoop

derdejaars informatica

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- *Android*

Wat is Android?

- OS voor telefoons, tablets, ...
- Linux Kernel
- Java Virtual Machine
- Ice Cream Sandwich+
79,7%



Wat is Android?

Java

dynamisch

- Logica
- Events

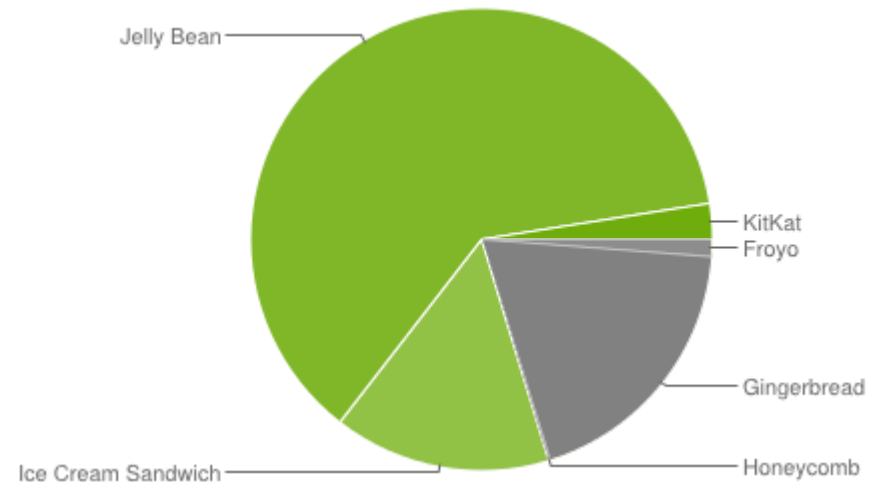
XML

statisch

- Opmaak
- Language support
- Manifest

Wat gaan we doen?

- Applicatie voor 4.0+ (ICS)
- *API level 14+*
- *Lagere versie ook toegestaan (API 9+)*



Android distributie op 3-3-2014

Android

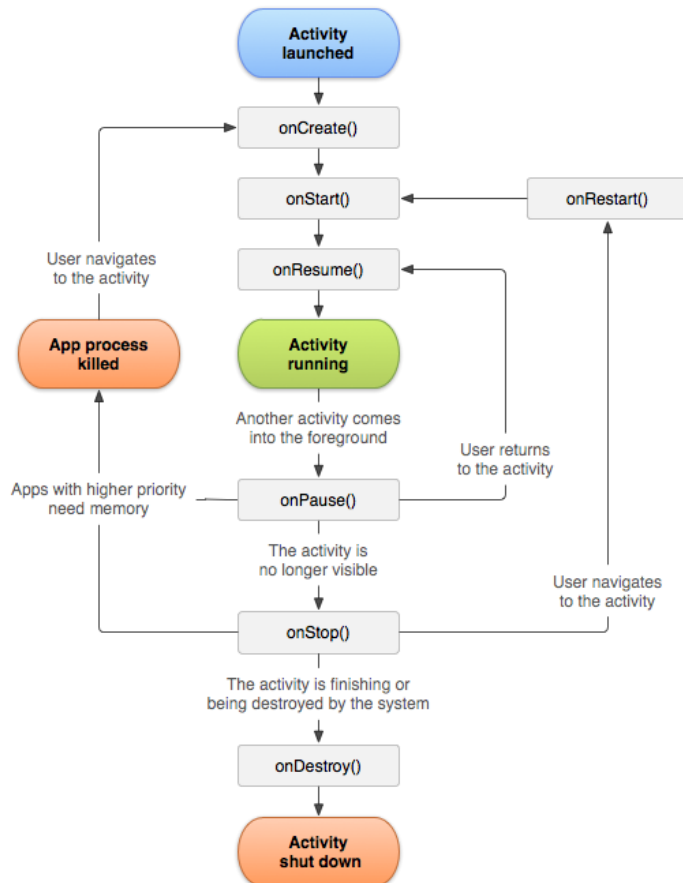
ACTIVITIES | FRAGMENTS | R | CONTEXT | INTENTS | PERMISSIONS | MANIFEST

BASIS

Wat is een Activity?

- Bevat logica en view
- Lifecycle
- *Beeldvullend* (“Eén scherm”)

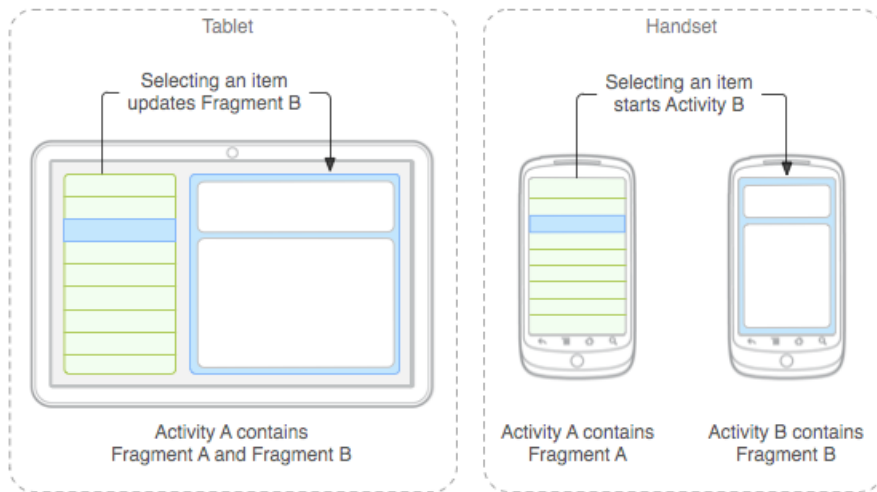
Wat is een Activity?



Key lifecycle moments

- (constructor)
 - Activity wordt gemaakt
- `onCreate(...)`
 - Activity wordt klaargezet
 - Main
- `onPause(...)/onStop(...)`
 - Afsluiting, log uit, etc...

Wat zijn Fragments?



- Kleiner “scherm”
- Meerdere Fragments in Activity
- Niet noodzakelijk
- Heeft ook een lifecycle

Wat is Context?

```
Context ctx = this;  
ctx.getString(R.string.hello_world);  
TextView tv = new TextView(ctx);  
tv.setText(ctx.getString(R.string.hello_world));  
tv.setText(R.string.hello_world);
```

- De omgeving van de app.
- Houdt resources vast
- Resources zijn benaderbaar met identifiers in R
- Activities kunnen worden gebruikt als Context

Wat is R?

```
/* AUTO-GENERATED FILE. DO NOT MODIFY.

package com.appic.music.player;

public final class R {
    public static final class attr {
    }
    public static final class dimen {
        /** Default screen margins, per the Android Design guidelines.
        public static final int activity_horizontal_margin=0x7f040000;
        public static final int activity_vertical_margin=0x7f040001;
        public static final int play_bar_height=0x7f040002;
    }
    public static final class drawable {
        public static final int ic_launcher=0x7f020000;
    }
    public static final class id {
        public static final int action_settings=0x7f080003;
        public static final int btn_play_next=0x7f080002;
        public static final int btn_play_previous=0x7f080000;
        public static final int btn_play_state=0x7f080001;
    }
    public static final class layout {
        public static final int play_bar=0x7f030000;
    }
    public static final class menu {
        public static final int play=0x7f070000;
    }
    public static final class string {
        public static final int action_settings=0x7f050001;
        public static final int app_name=0x7f050000;
        public static final int hello_world=0x7f050002;
    }
    public static final class style {
        Base application theme, dependent on API level. This theme is replaced
        public static final int AppBaseTheme=0x7f060000;
        /** Application theme.
        public static final int AppTheme=0x7f060001;
    }
}
```

- Resources
- Automatisch gegenereerd
- Bevat verwijzingen (integers) voor Android

Waarom R?

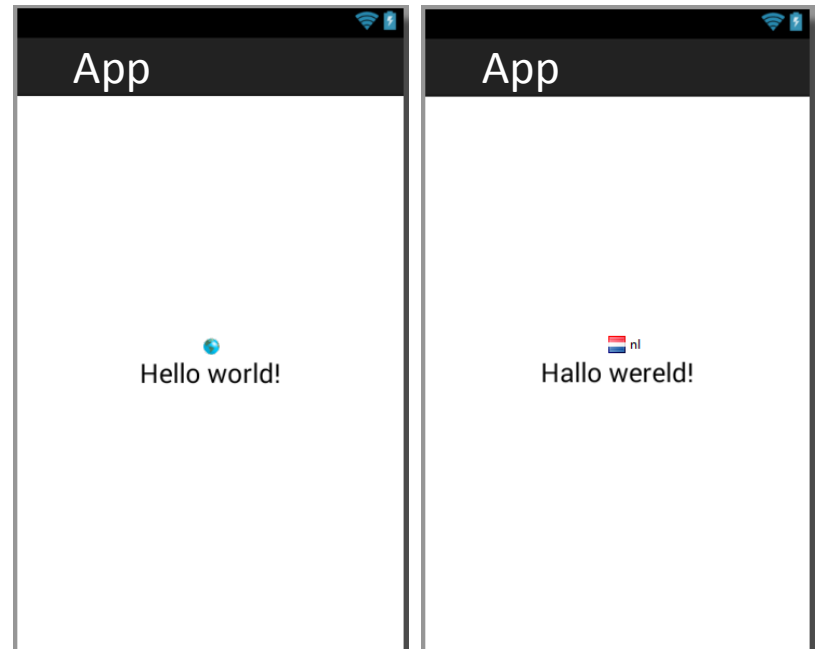
values

```
<resources>  
  <string name="hello_world">Hello world!</string>  
</resources>
```

values_nl-NL

```
<resources>  
  <string name="hello_world">Hallo wereld!</string>  
</resources>
```

- Maakt app dynamisch
- Laadt wat nodig is



Hoe gebruik je R?

Java

```
(new TextView(context)).setText(R.string.hello_world);
```

XML

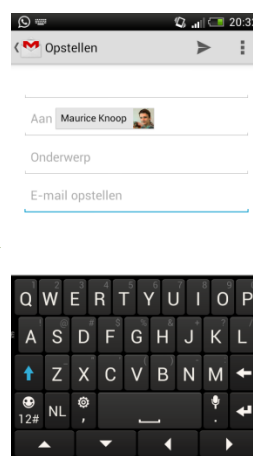
```
<TextView  
    android:layout_width="wrap_content"  
    android:layout_height="wrap_content"  
    android:text="@string/hello_world" />
```

- Aantal functies gebruiken int
- Geef daar referenties mee
- In XML gebruik je @ voor referenties
 - @string/...
 - @id/...
 - @color/...
 - @dimens/...

Wat zijn Intents?



Intent:
Extra: EMAIL
value: maurice.knoop@student.ru.nl



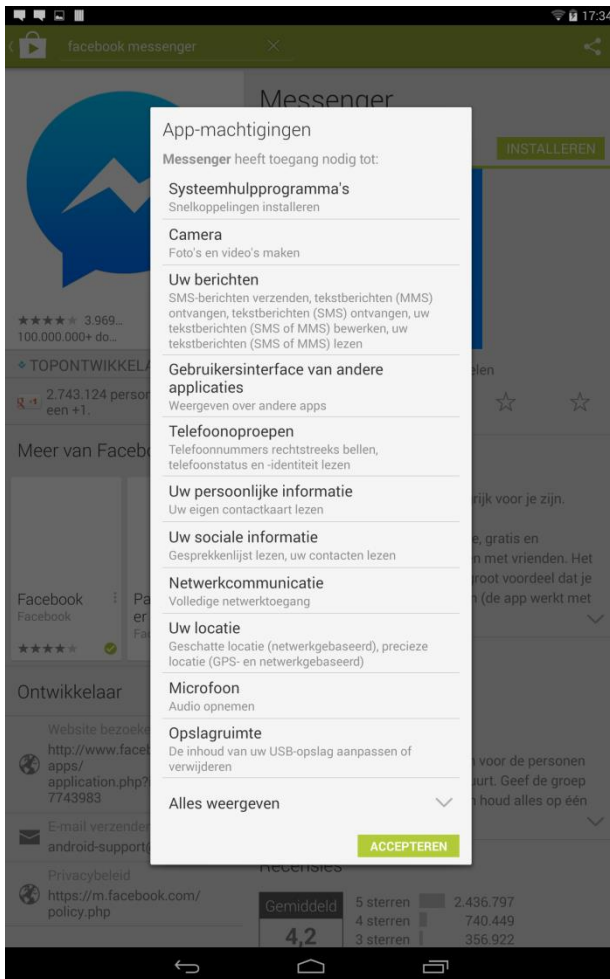
- Worden gebruikt om Activities te starten
- Kunt argumenten meegeven in de vorm van Strings.
- Kan voor eigen activity of van derden
- OS/User bepaalt welke app wordt gebruikt voor activity van derden

Hoe gebruik je Intents?

```
Intent intent = new Intent(this, SimpleActivity.class);  
intent.putExtra("example", "value");  
this.startActivity(intent);
```

- Context
- Geef argumenten mee als
 - Extra
- Ander eigenschappen
 - Action
 - Broadcast
 - Category

Wat zijn Permissions?



- Geven aan welke gegevens de app wil gebruiken
 - WiFi
 - SD-kaart
 - Contacten
 - etc

Wat is het Manifest?

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="rend1.example.simpleapplication"
    android:versionCode="1"
    android:versionName="1.0" >

    <uses-sdk
        android:minSdkVersion="14"
        android:targetSdkVersion="19" />

    <application
        android:allowBackup="true"
        android:icon="@drawable/ic_launcher"
        android:label="@string/app_name"
        android:theme="@style/AppTheme" >
        <activity
            android:name="rend1.example.simpleapplication.MainActivity"
            android:label="@string/app_name" >
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />

                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
    </application>
</manifest>
```

- Bevat informatie over app
 - Min. android versie,
 - Icon
 - **Alle** activities
 - Intent filters
 - **Alle** Permissions

Wat is het Manifest?

```
FATAL EXCEPTION: main
Process: rend1.example.simpleapplication, PID: 12596
java.lang.RuntimeException: Unable to start activity ComponentInfo{
rend1.example.simpleapplication/rend1.example.simpleapplication.Mai
nActivity}: android.content.ActivityNotFoundException: Unable to fi
nd explicit activity class {rend1.example.simpleapplication/rend1.e
xample.simpleapplication.SecondActivity}; have you declared this ac
tivity in your AndroidManifest.xml?
at android.app.ActivityThread.performLaunchActivity(ActivityThread
.java:2195)
at android.app.ActivityThread.handleLaunchActivity(ActivityThread.
java:2245)
at android.app.ActivityThread.access$800(ActivityThread.java:135)
at android.app.ActivityThread$H.handleMessage(ActivityThread.java:
1196)
```

- Altijd declareren wat je gebruikt. Dit geldt voor:
 - Activity
 - Permissions
 - Internet
 - Accounts
 - Sd kaart
 - ...

MODEL | VIEW | CONTROLLER

MVC PATTERN

Model

- Java
- **Vrijheid:** eigen implementatie

View

- XML
- *Java is mogelijk maar af te raden*

View



- Views
 - TextView
 - EditText
 - ImageView
 - ...
- Containers
 - LinearLayout
 - RelativeLayout
 -

View

```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:background="#888" >

    <LinearLayout
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_centerHorizontal="true"
        android:layout_centerVertical="true"
        android:orientation="vertical"
        android:background="#A22"
        >

        <TextView
            android:id="@+id/textView1"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:text="@string/username"
            android:background="#AA2"
            android:textSize="25sp"
            android:layout_margin="5dp"/>

        <EditText
            android:id="@+id/editText1"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:hint="@string/password"
            android:background="#22A"
            android:textSize="25sp"
            android:layout_margin="5dp">

            <requestFocus />
        </EditText>

    </LinearLayout>
</RelativeLayout>
```

XML attributen

- Width, height
 - *wrap_content/match_parent*
- Id
 - *Alleen als je die later nodig hebt*
- Background
 - #ARGB, @drawable/

Een voorbeeld

- Beeldvullende balk
- 3 knoppen



Alleen Java



```
private boolean playing = false;
private ImageView play;

public PlayBarFullyJava(Context context) {
    super(context);

    // Set the layout parameters for the entire bar
    this.setLayoutParams(new LayoutParams(LayoutParams.MATCH_PARENT, LayoutParams.WRAP_CONTENT));

    //Background color
    this.setBackgroundColor(Color.argb(128, 0, 0, 0));
    // Create the images
    ImageView back = new ImageView(context);
    ImageView next = new ImageView(context);
    this.play = new ImageView(context);

    // Set base images
    back.setImageResource(android.R.drawable.ic_media_previous);
    next.setImageResource(android.R.drawable.ic_media_next);
    play.setImageResource(android.R.drawable.ic_media_play);

    final int MARGIN = 12;

    {
        // Create the layout parameters for the back button
        LayoutParams params = new LayoutParams(LayoutParams.WRAP_CONTENT, LayoutParams.WRAP_CONTENT);
        params.addRule(RelativeLayout.CENTER_VERTICAL);
        params.addRule(RelativeLayout.LEFT_OF, R.id.btn_play_next);
        params.setMargins(MARGIN, MARGIN, MARGIN, MARGIN);

        back.setLayoutParams(params);
    }
}
```

Alleen Java



```
{
    // Create the layout parameters for the next button
    LayoutParams params = new LayoutParams(LayoutParams.WRAP_CONTENT, LayoutParams.WRAP_CONTENT);
    params.addRule(RelativeLayout.CENTER_VERTICAL);
    params.addRule(RelativeLayout.RIGHT_OF, R.id.btn_play_next);
    params.setMargins(MARGIN, MARGIN, MARGIN, MARGIN);

    next.setLayoutParams(params);
}
{
    // Create the layout parameters for the play button
    LayoutParams params = new LayoutParams(LayoutParams.WRAP_CONTENT, LayoutParams.WRAP_CONTENT);
    params.addRule(RelativeLayout.CENTER_HORIZONTAL);
    params.addRule(RelativeLayout.CENTER_VERTICAL);
    params.setMargins(MARGIN, MARGIN, MARGIN, MARGIN);

    play.setLayoutParams(params);
}

// The back pressed click listener
back.setOnClickListener(new OnClickListener(){

    @Override
    public void onClick(View v) {
        onBackPressed();
    }

});
```

Alleen Java



```
// The next pressed click listener
next.setOnClickListener(new OnClickListener(){

    @Override
    public void onClick(View v) {
        onNextPressed();
    }

});

// The play pressed click listener
play.setOnClickListener(new OnClickListener(){

    @Override
    public void onClick(View v) {
        onPlayToggled();
    }

});
}
```

Java en XML

```
private boolean playing = false;
private ImageView play;

public PlayBarXML(Context context) {
    super(context);
    LayoutInflater.from(context).inflate(R.layout.play_bar, this);

    //Find the play image view
    play = (ImageView)this.findViewById(R.id.btn_play_state);
}
```



```
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:background="#8000" >

    <ImageView
        android:id="@+id/btn_play_previous"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_centerVertical="true"
        android:layout_margin="12dp"
        android:layout_toLeftOf="@+id/btn_play_state"
        android:onClick="onBackPressed"
        android:src="@android:drawable/ic_media_previous" />

    <ImageView
        android:id="@+id/btn_play_next"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_centerVertical="true"
        android:layout_margin="12dp"
        android:layout_toRightOf="@+id/btn_play_state"
        android:onClick="onNextPressed"
        android:src="@android:drawable/ic_media_next" />

    <ImageView
        android:id="@+id/btn_play_state"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_centerHorizontal="true"
        android:layout_centerVertical="true"
        android:layout_margin="12dp"
        android:onClick="onPlayToggled"
        android:src="@android:drawable/ic_media_play" />

</RelativeLayout>
```

GUI (Java en XML)



The screenshot displays the Android Studio IDE with the following components:

- Palette:** A sidebar on the left containing various Android widgets categorized into Form Widgets, Text Fields, Layouts, Composite, Images & Media, Time & Date, Transitions, Advanced, Other, and Custom & Library Views.
- Preview Window:** A central window showing a mobile device mockup (Nexus One) with a UI for 'MusicApp'. It features a play button and three navigation buttons (previous, play, next) at the top.
- Properties Panel:** A panel on the right showing the XML structure of the selected RelativeLayout. The structure is as follows:

```
RelativeLayout  
├── btn_play_previous (ImageView) - @android:drawable/  
├── btn_play_next (ImageView) - @android:drawable/i  
└── btn_play_state (ImageView) - @android:drawable/
```

Belangrijke methodes

```
public class PlayActivity extends Activity {  
    @Override  
    protected void onCreate(Bundle savedInstanceState) {  
        super.onCreate(savedInstanceState);  
        this setContentView(R.layout.example);  
    }  
}
```

Gebruik de layout
example.xml

```
    ImageView playBtn = (ImageView) this.findViewById(R.id.btn_play_state);  
}
```

Krijg de View met id
btn_play_state

Controller

- **Java**
- Meestal onderdeel **Activity**

- **Telefoon eigenschappen**
 - Internet, Bluetooth, SDCard, etc...
- **De eerste app**
 - De stappen om een app op te zetten

- **Uitleg**

- <http://developer.android.com>
- <http://developer.android.com/training/>
- <http://developer.android.com/guide/>

- **API**

- <http://developer.android.com/reference/>

- **Specifieke problemen**

- *stackoverflow.com (via google)*

[1] *Nexus 5 en nexus 7*

<http://developer.android.com/design/index.html>

[2] *Verdeling Android versies*

<https://developer.android.com/about/dashboards/index.html>

[3] *Activity lifecycle*

<http://developer.android.com/guide/components/activities.html>

[4] *Fragment design*

<http://developer.android.com/guide/components/fragments.html>