



mgwt & gwt-phonegap

GWT's future on mobile

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Google
Developers

Google™



**Daniel
Kurka**

invented mgwt

mgwt



SPEAKER



GWT



mgwt



gwt-phonegap

Inhalt

- Introduction
 - Phonegap
 - mgwt
- Building things once
- mgwt & gwt-phonegap's future





Phone**Gap**

The Problem

Vendor	OS	Language
Apple	iOS	Objective-C
Samsung, HTC, others	Android	Java
RIM	Blackberry OS	Java
Several	WinPhone 7	VB.NET Silverlight
Nokia	Symbian	C++
Palm	webOS	Javascript

The Problem 2.0

Vendor	OS	Language
Apple	iOS	Objective-C
Lots more	Android	Java
RIM	Blackberry OS	Javascript
Nokia, Several	WinPhone 7	VB.NET Silverlight
?	Symbian	C++
HP	webOS	Javascript

The Problem 3.0

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The Problem 4.0

Vendor	OS	Language
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RIM	Blackberry OS	C++/JavaScript
Nokia, Several	WinPhone 7	VB.NET Silverlight
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---	webOS	Javascript



FAIL



PhoneGap for the rescue



PhoneGap



native vs web

	Native	Web
dev time	Slow	Fast
costs	Expensive	Ok
portability	None	High
performance	Ok	Ok*
native	All	None
app store	Yes	No

+ Hybrid

	Native	Web	Hybrid
dev time	Slow	Fast	Fast
costs	Expensive	moderate	moderate
portability	None	High	High
performance	Ok	Ok*	Ok*
native	All	None	All
app store	Yes	No	Yes

A dramatic photograph of a sunburst breaking through dark, heavy clouds over a dark ocean. The sun is positioned in the center-left, creating a bright, glowing effect with rays of light spreading out. The clouds are dark and textured, with some lighter patches where the sun's light hits. The ocean is dark and calm, reflecting the light from the sun.

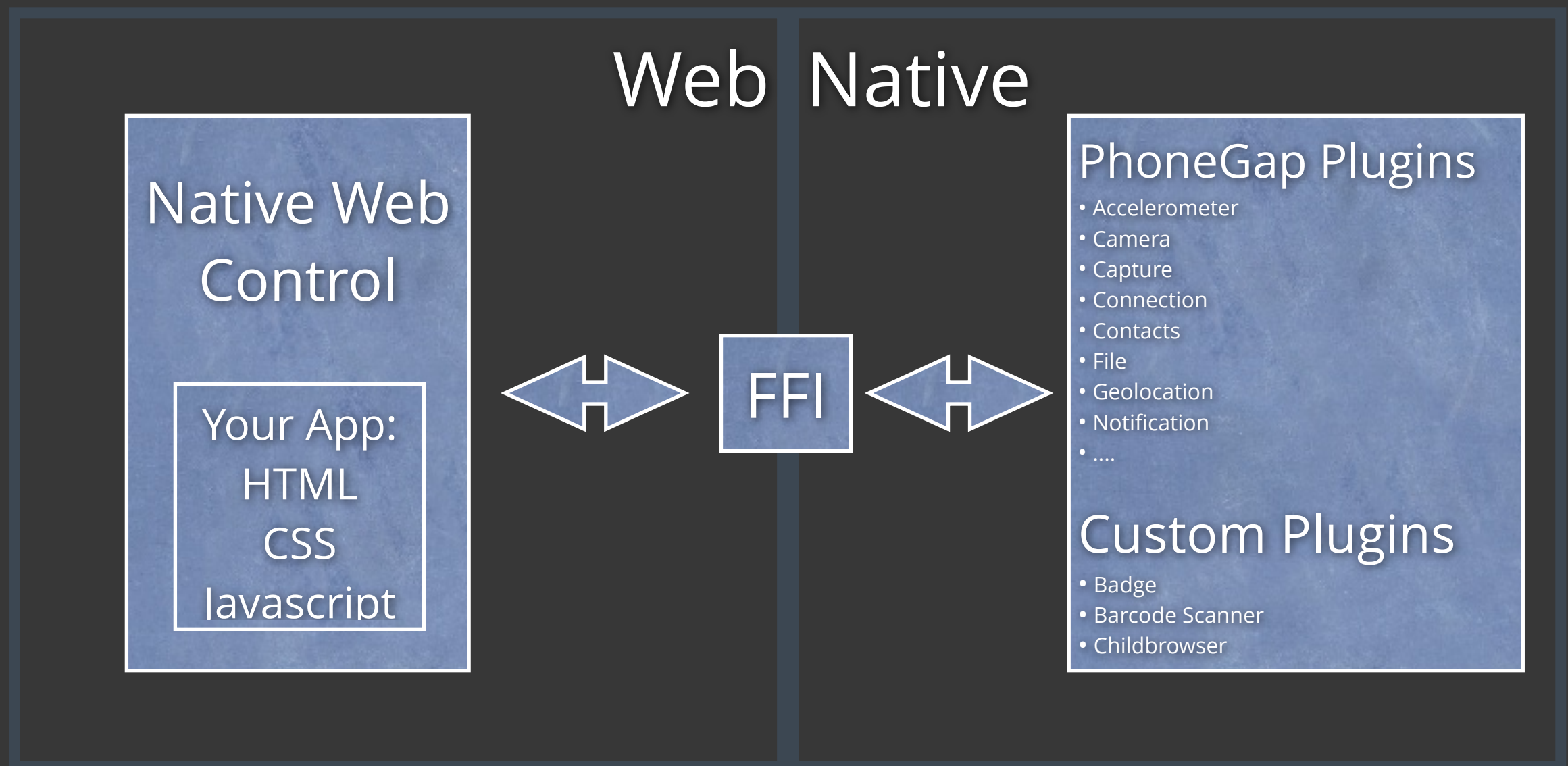
Build once
Wrap with PhoneGap
Run anywhere

	 iPhone / iPhone 3G	 iPhone 3GS and newer	 Android	 OS 4.6-4.7	 OS 5.x	 OS 6.0+	 WebOS	 Symbian	 Bada
ACCELEROMETER	✓	✓	✓	✗	✓	✓	✓	✓	✓
CAMERA	✓	✓	✓	✗	✓	✓	✓	✓	✓
COMPASS	✗	✓	✓	✗	✗	✗	✗	✗	✓
CONTACTS	✓	✓	✓	✗	✓	✓	✗	✓	✓
FILE	✓	✓	✓	✗	✓	✓	✗	✗	✗
GEOLOCATION	✓	✓	✓	✓	✓	✓	✓	✓	✓
MEDIA	✓	✓	✓	✗	✗	✗	✗	✗	✗
NETWORK	✓	✓	✓	✓	✓	✓	✓	✓	✓
NOTIFICATION (ALERT)	✓	✓	✓	✓	✓	✓	✓	✓	✓
NOTIFICATION (SOUND)	✓	✓	✓	✓	✓	✓	✓	✓	✓
NOTIFICATION (VIBRATION)	✓	✓	✓	✓	✓	✓	✓	✓	✓
STORAGE	✓	✓	✓	✗	⚠	✓	✓	✓	✗



Phone**Gap**

Phonegap parts

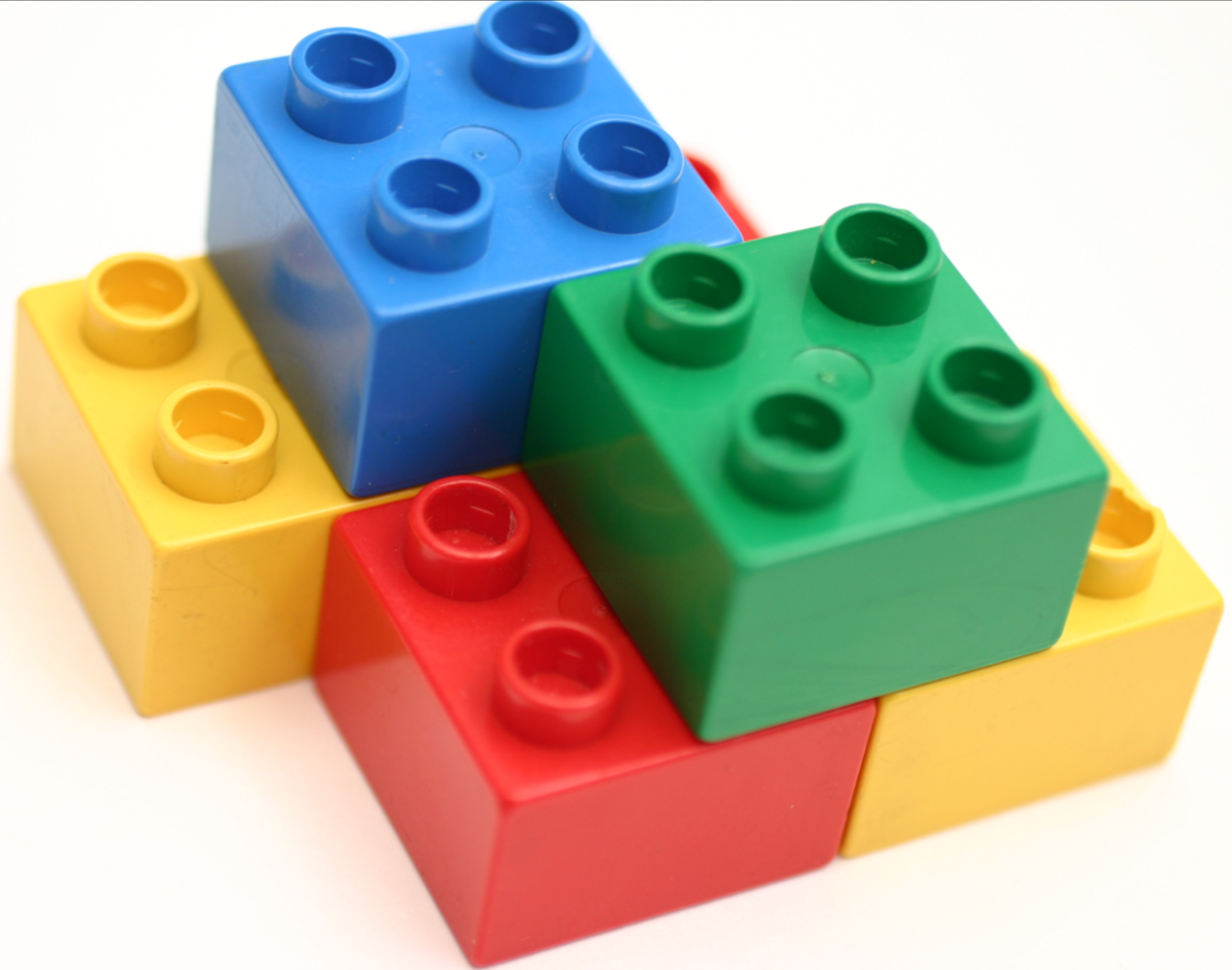




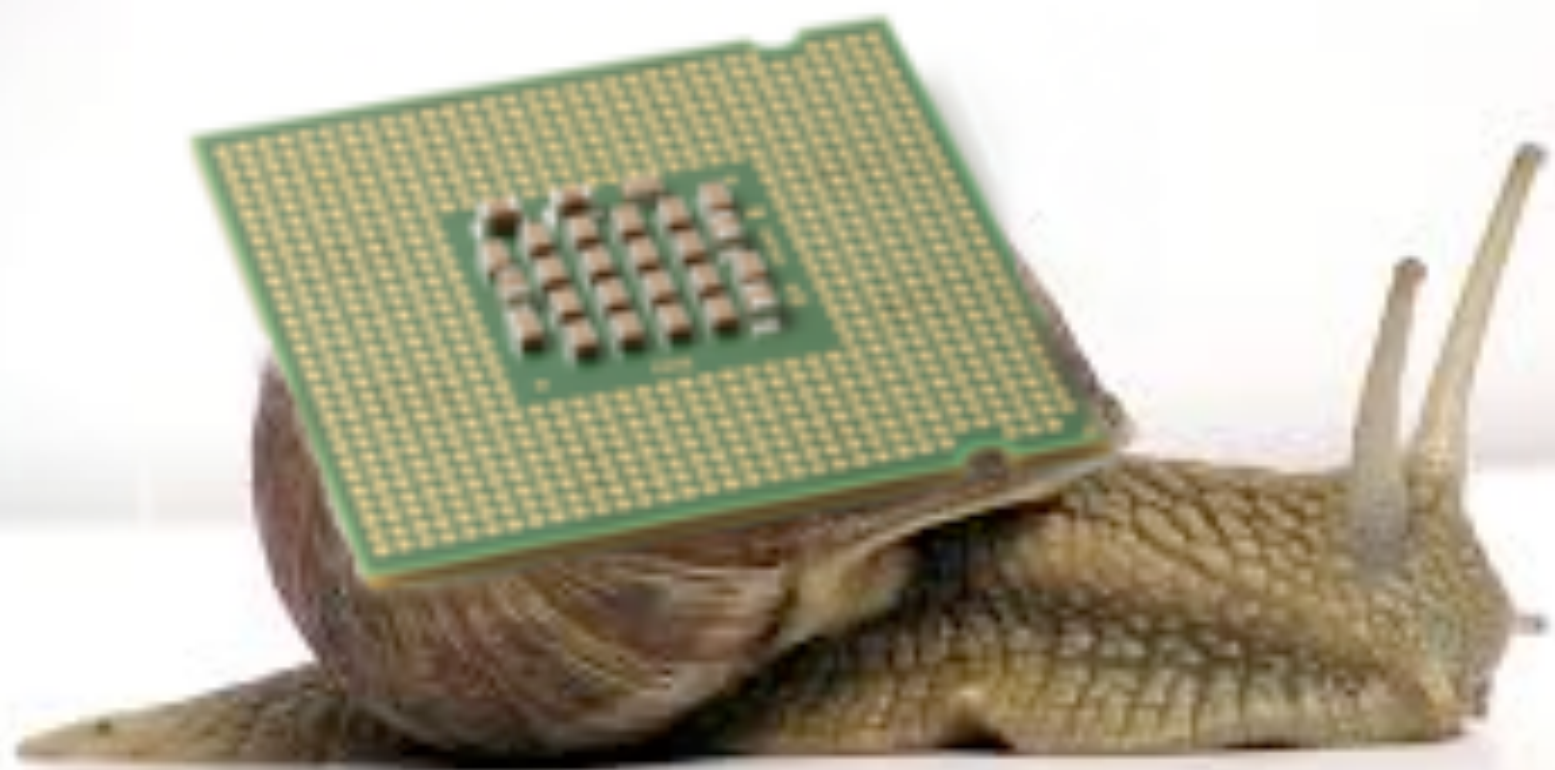
Phone**Gap**

GWT













Energizer®

USE
BY
2013

AA
ALKALINE

AA 1.5V E91-AM2

Respetar las polaridades (+/-). No recargar.



GWT





Phone**Gap**

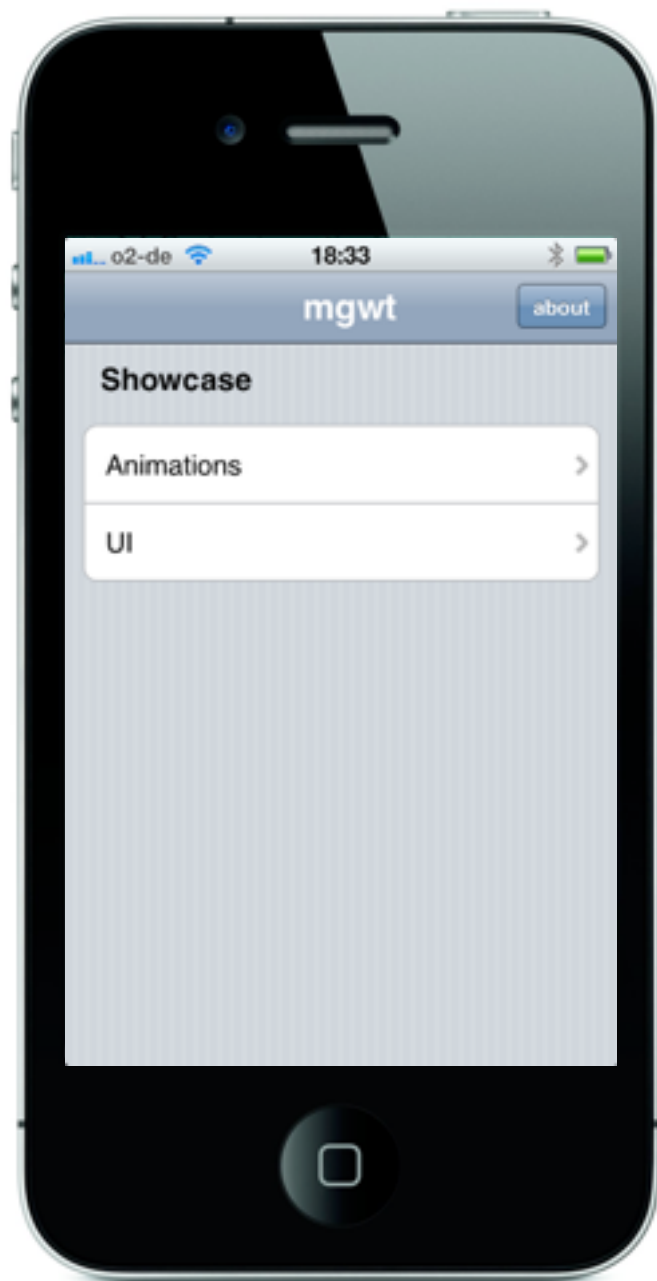


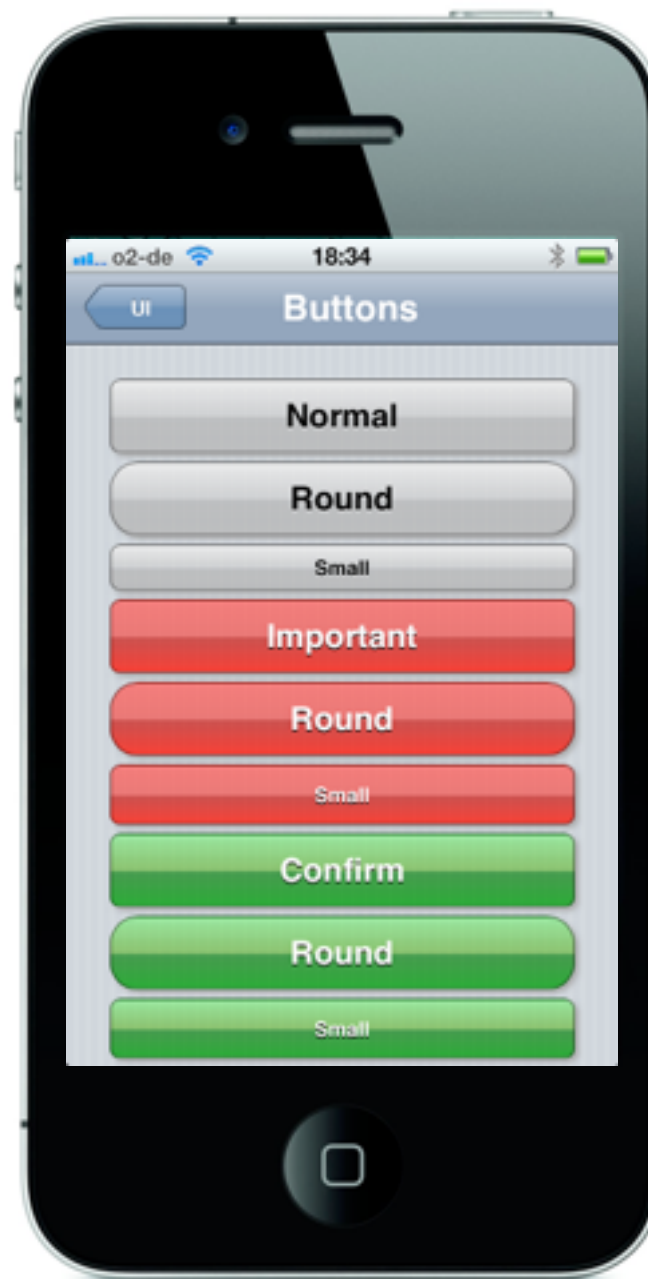
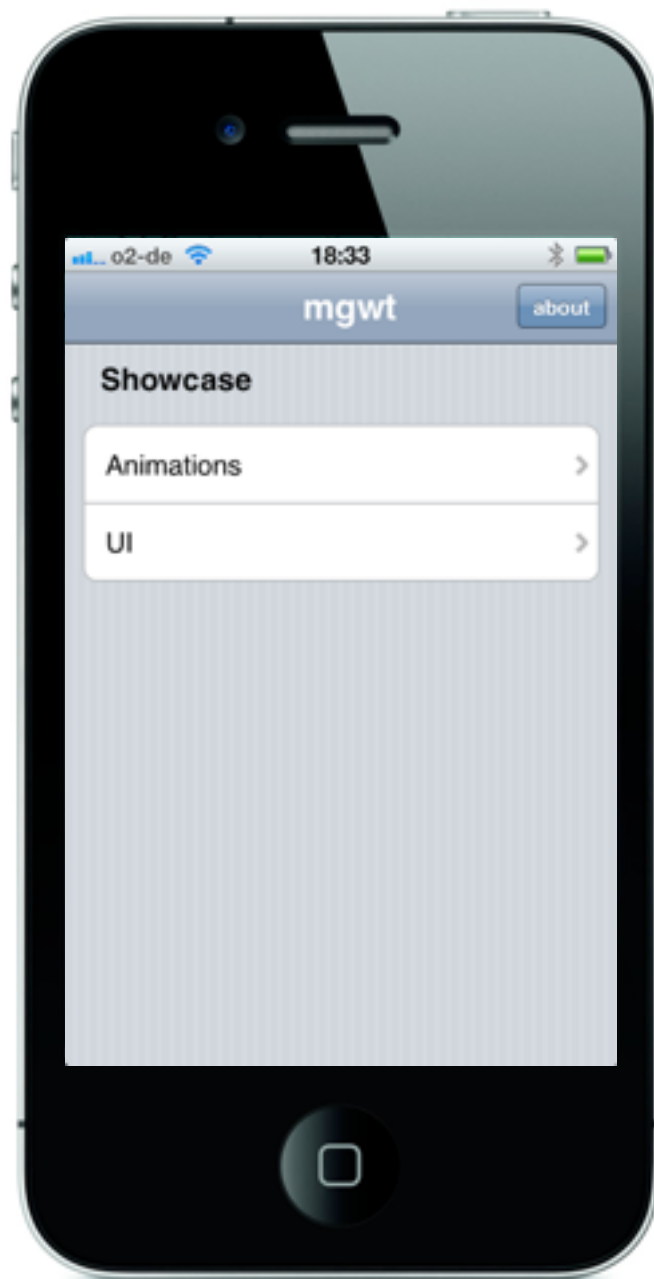
mgwt

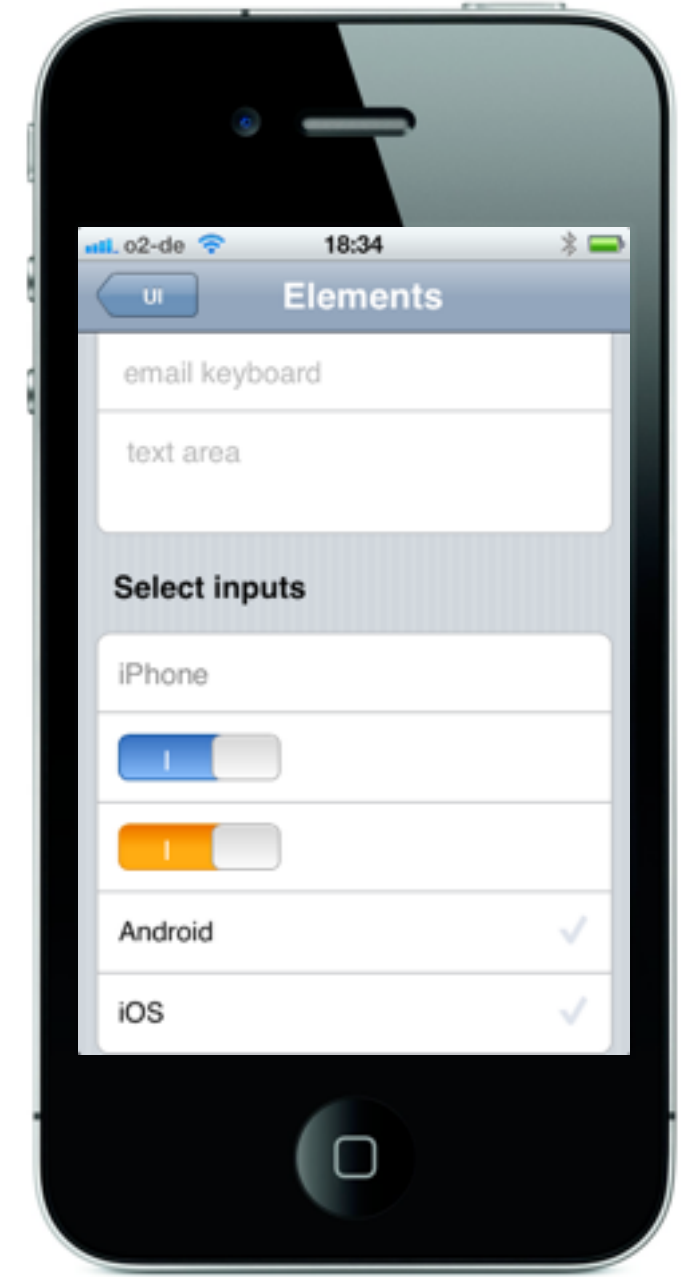
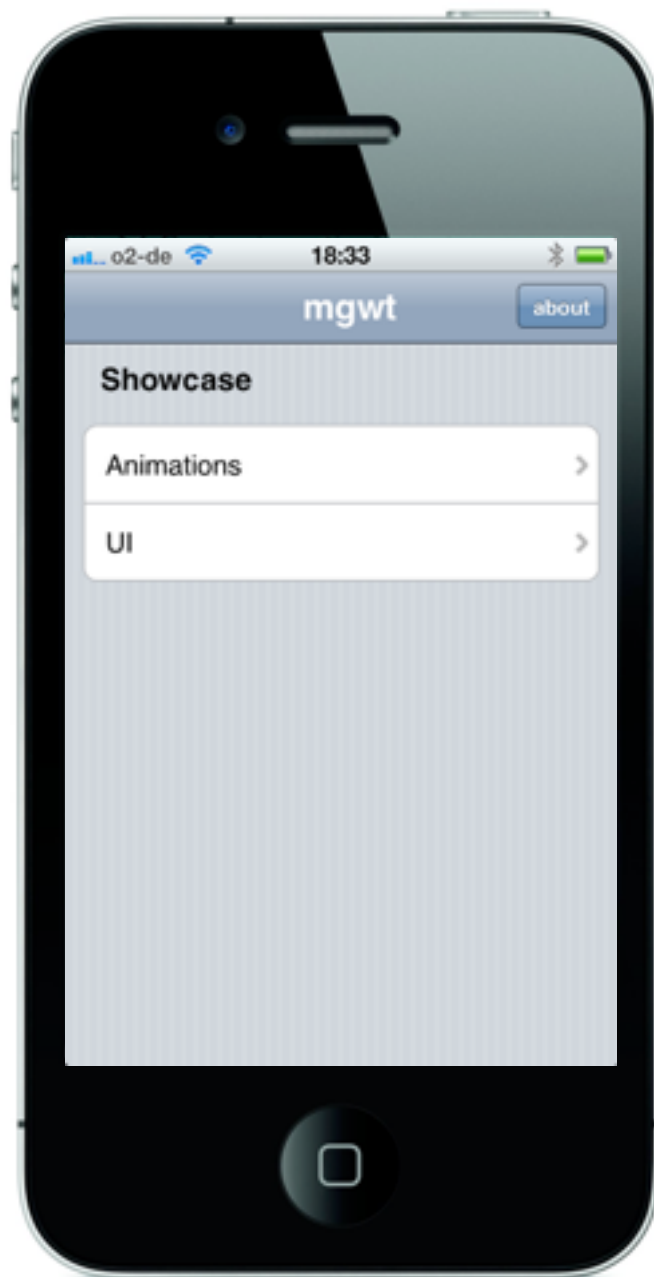


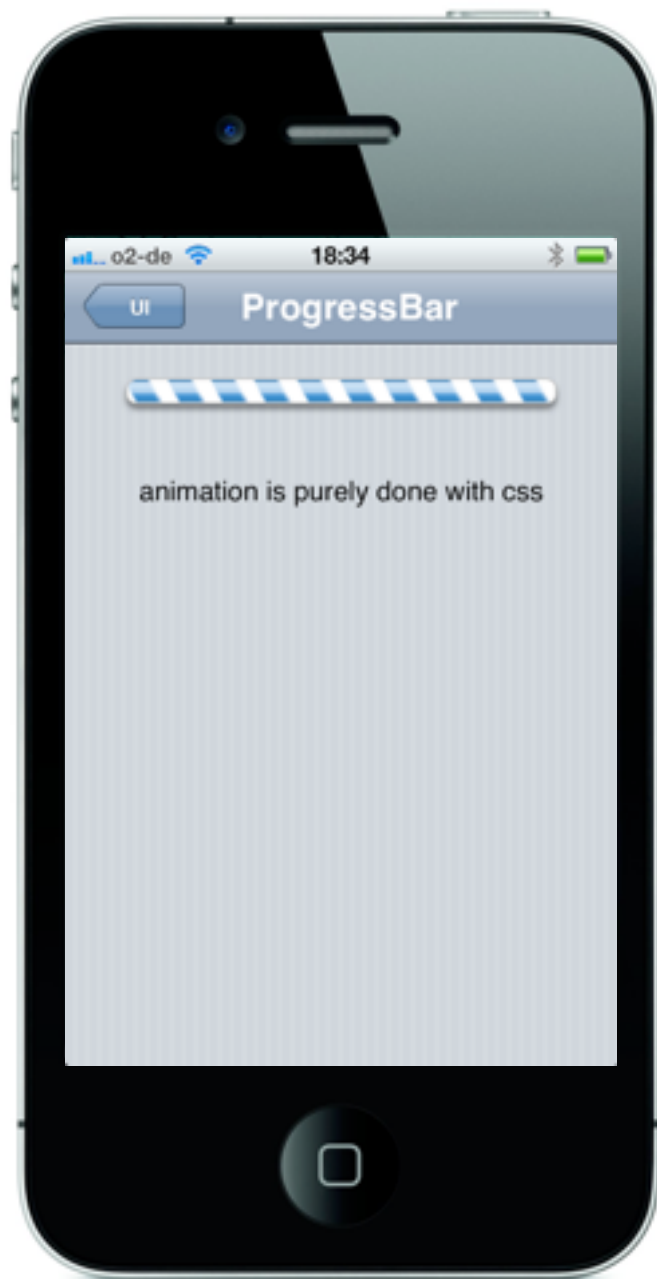
gwt phonegap

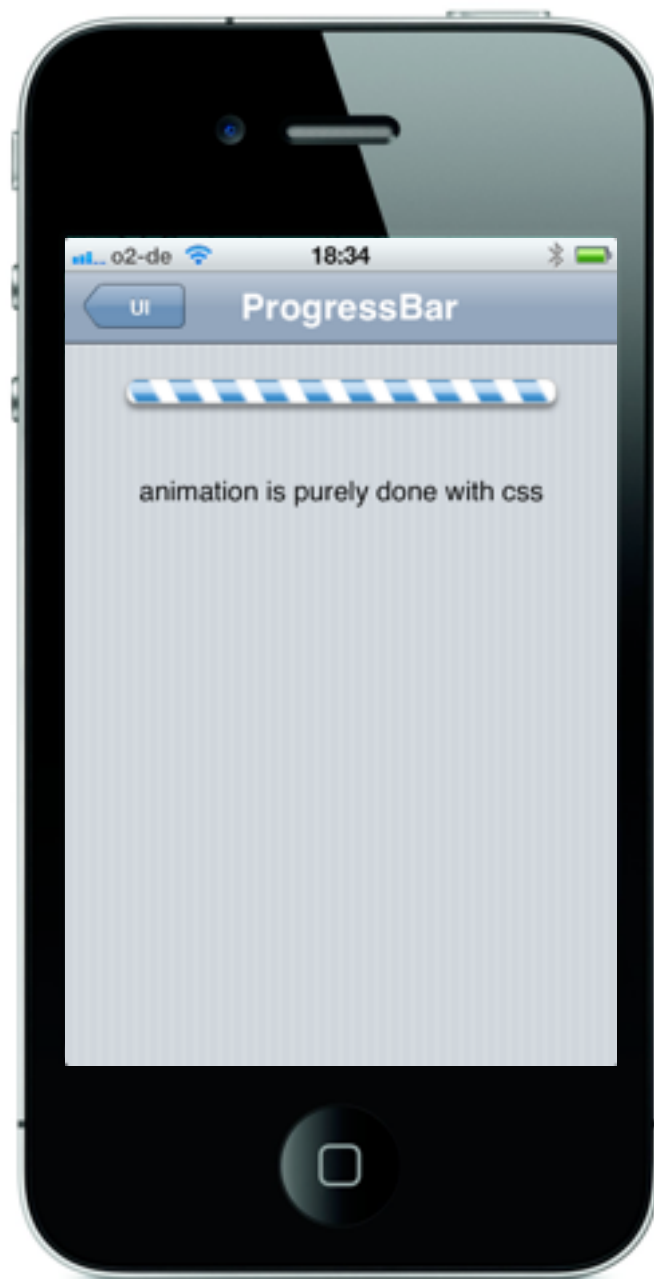


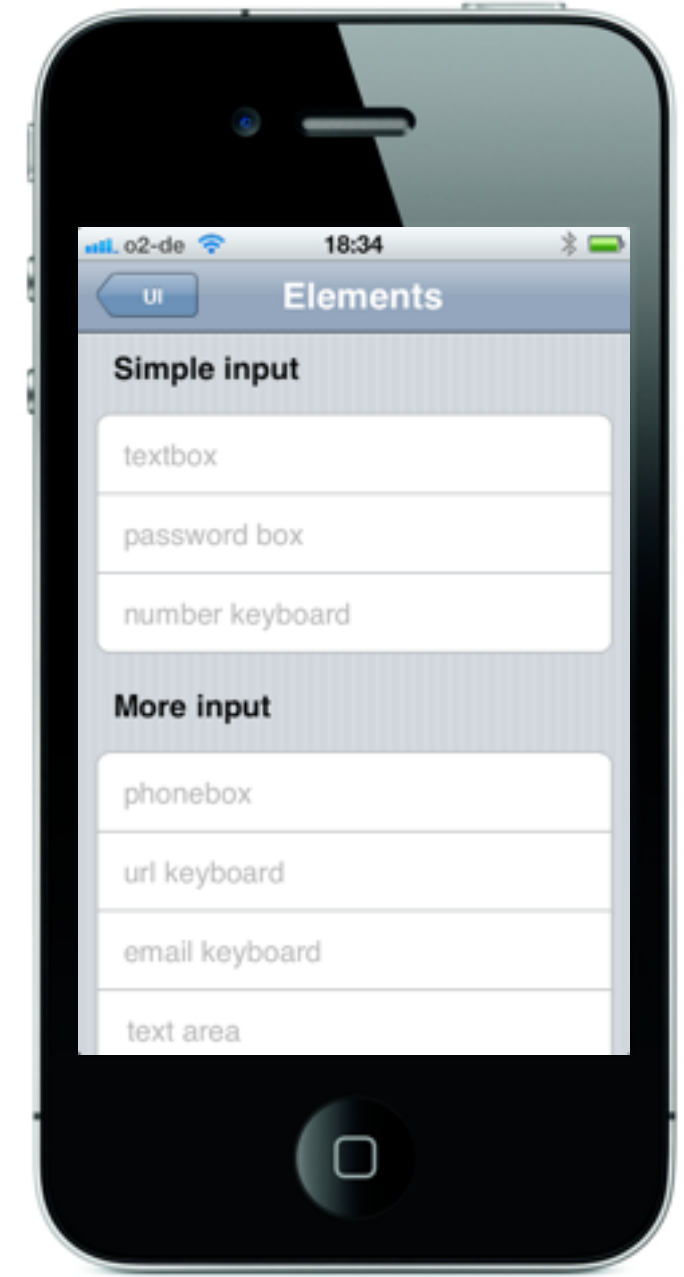
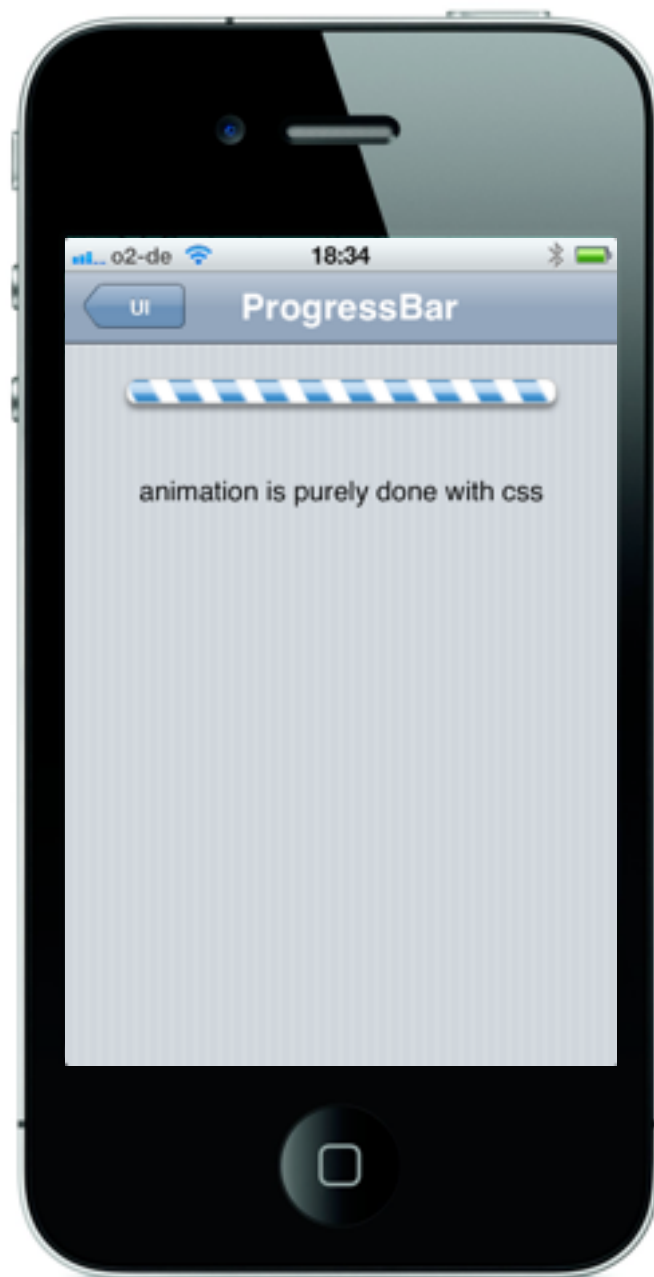


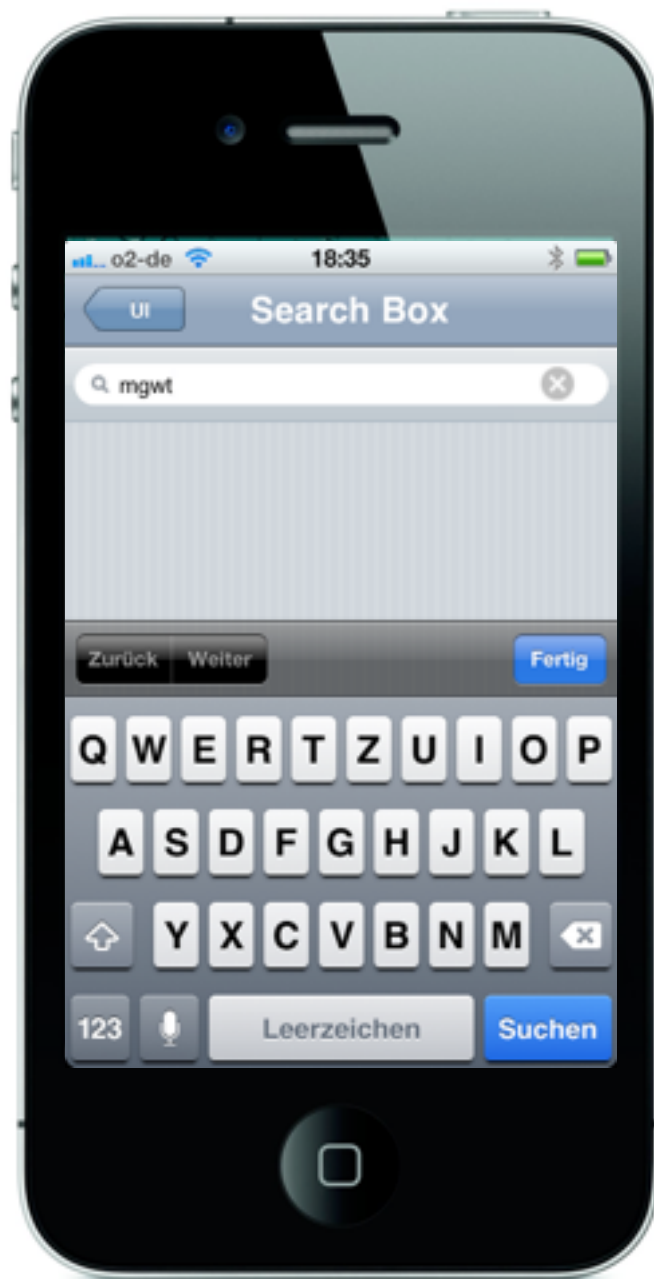


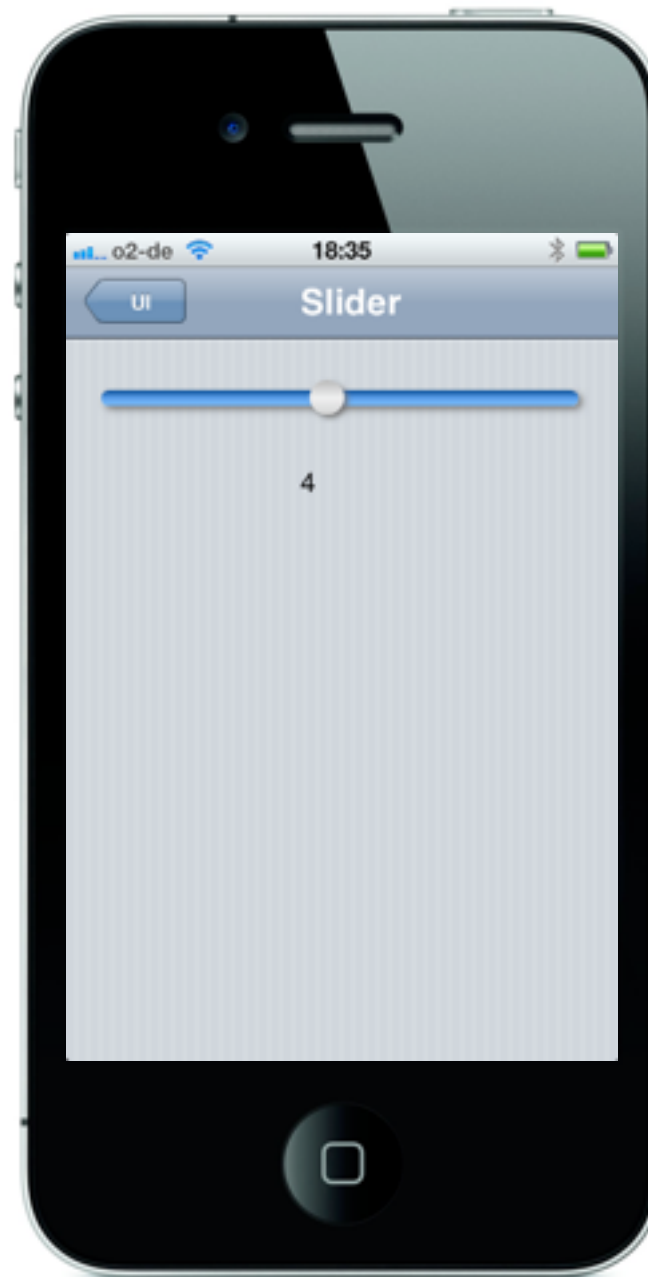
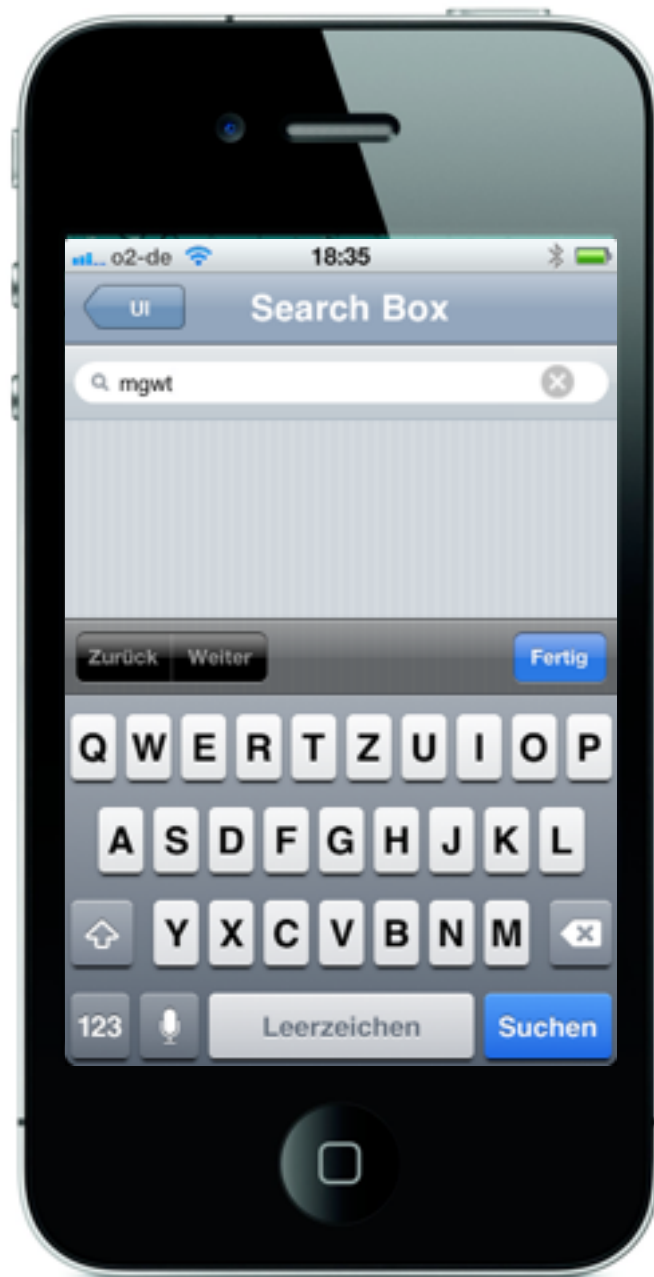


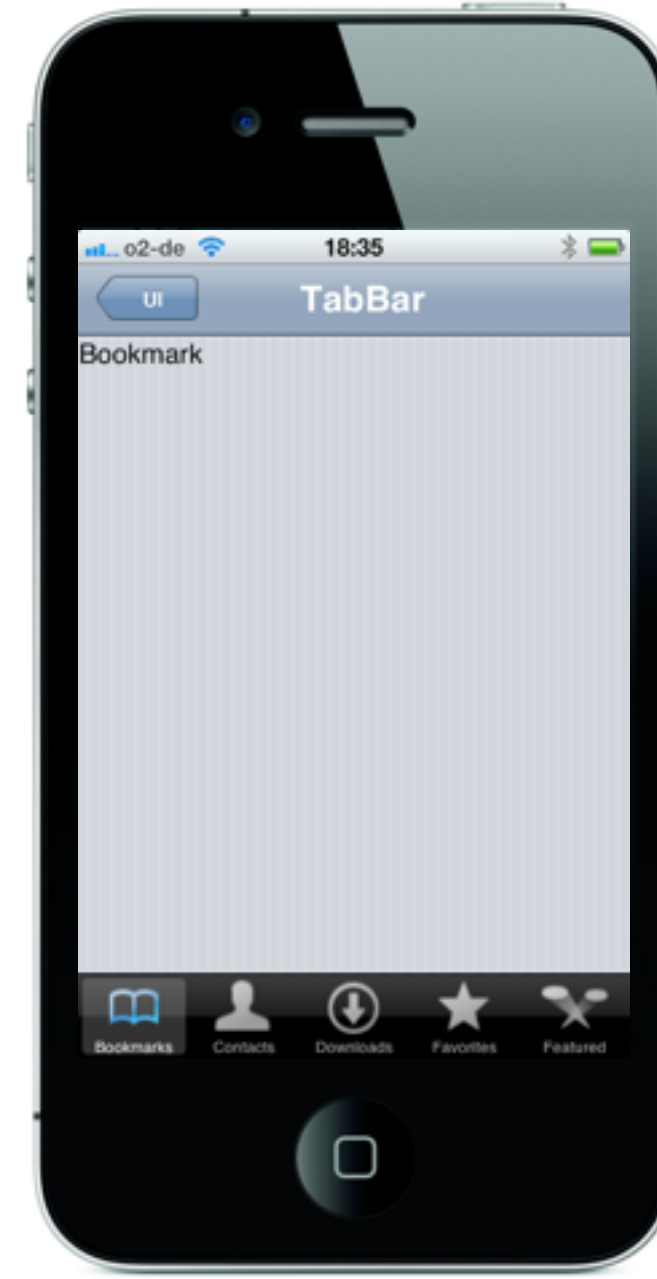
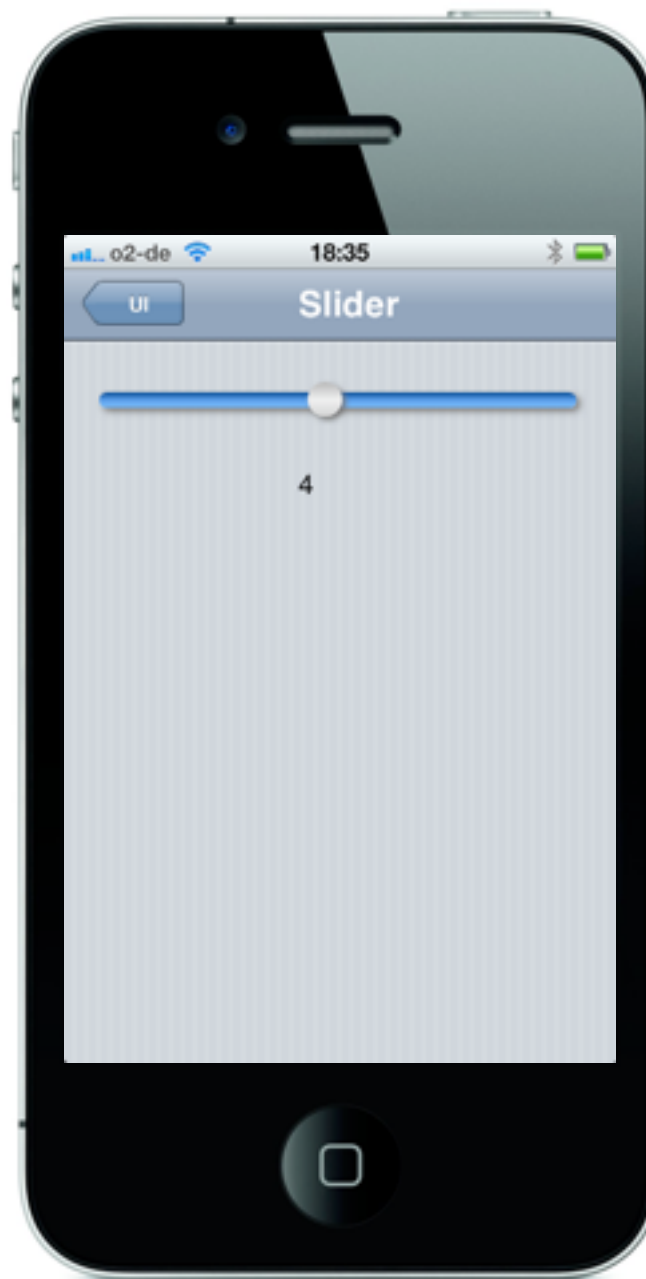
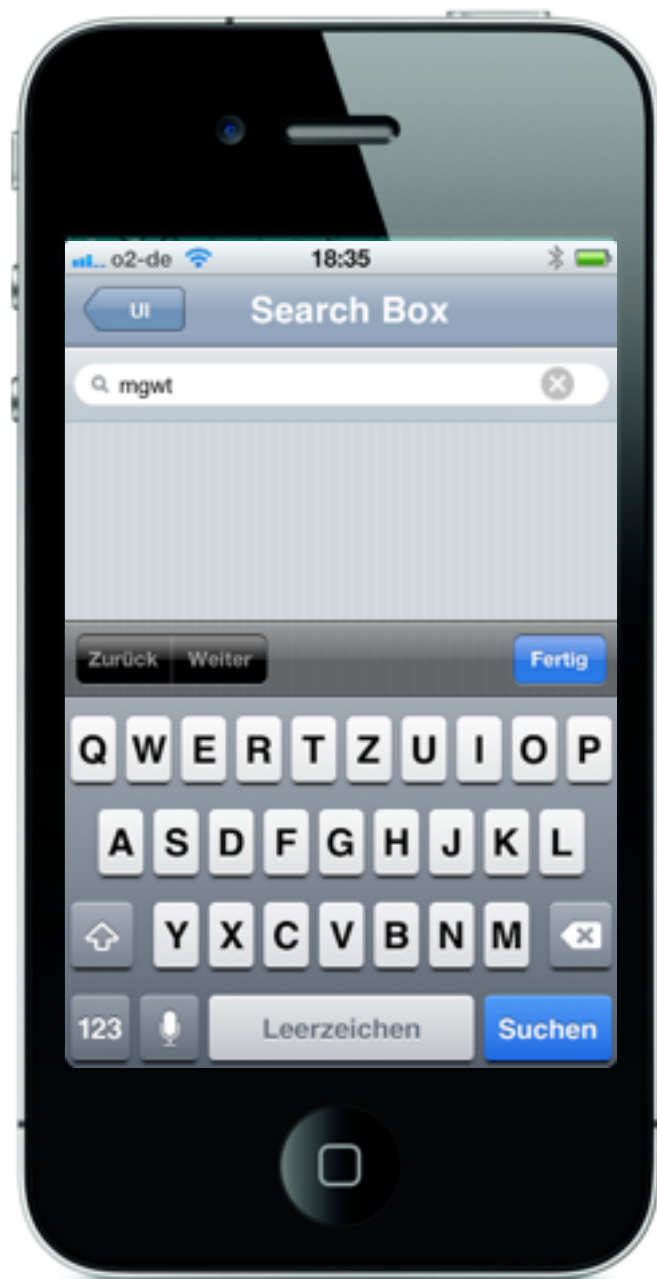




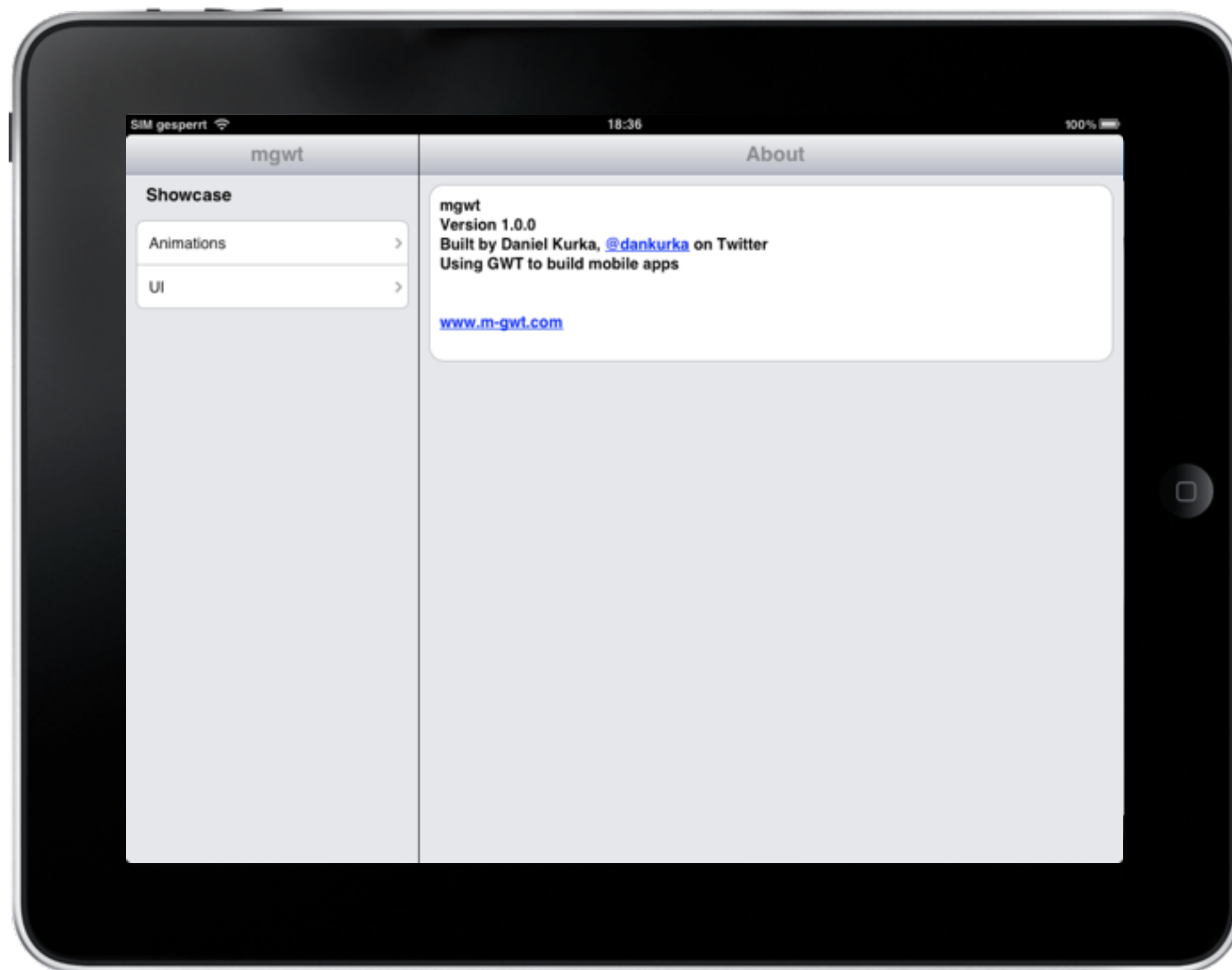


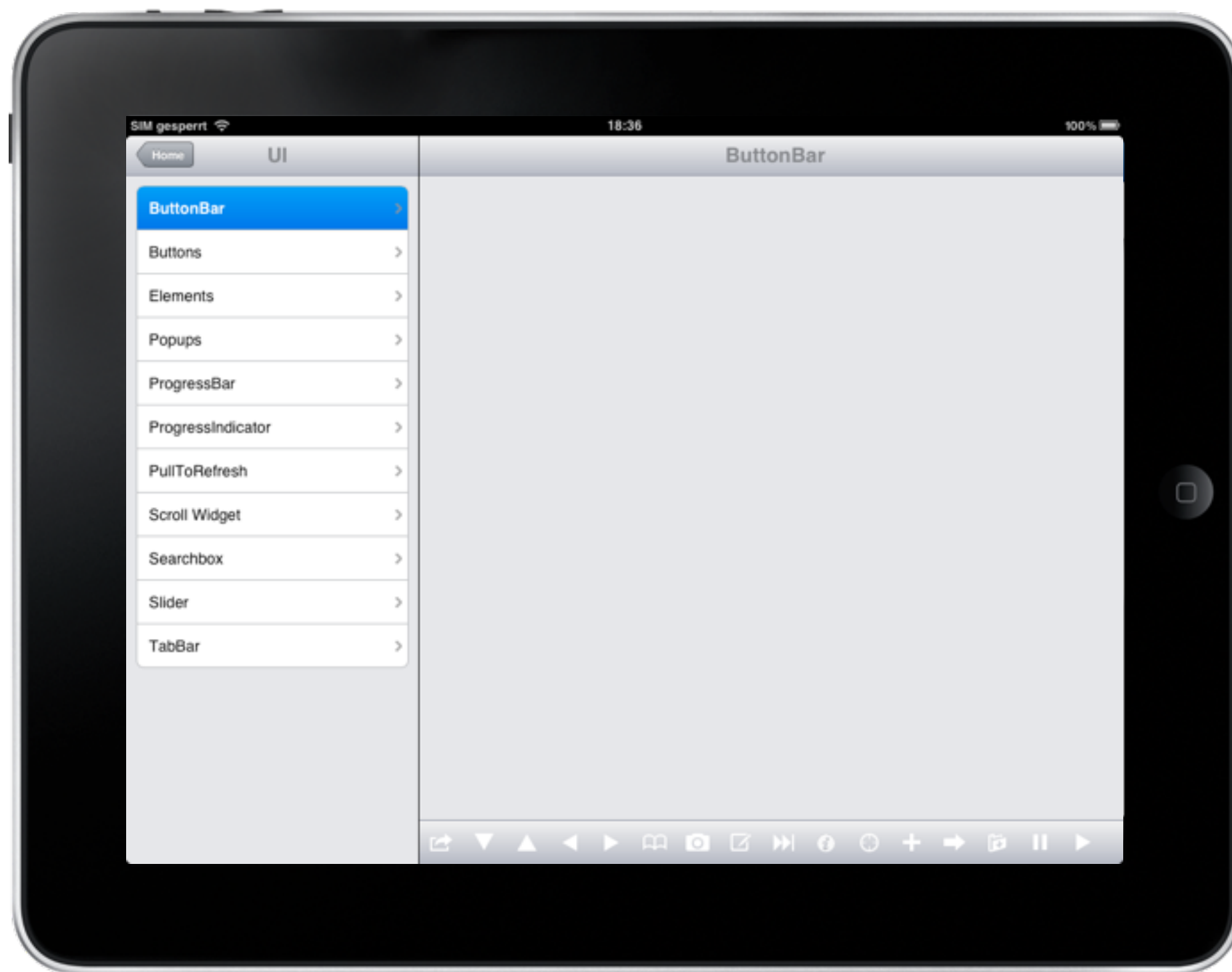


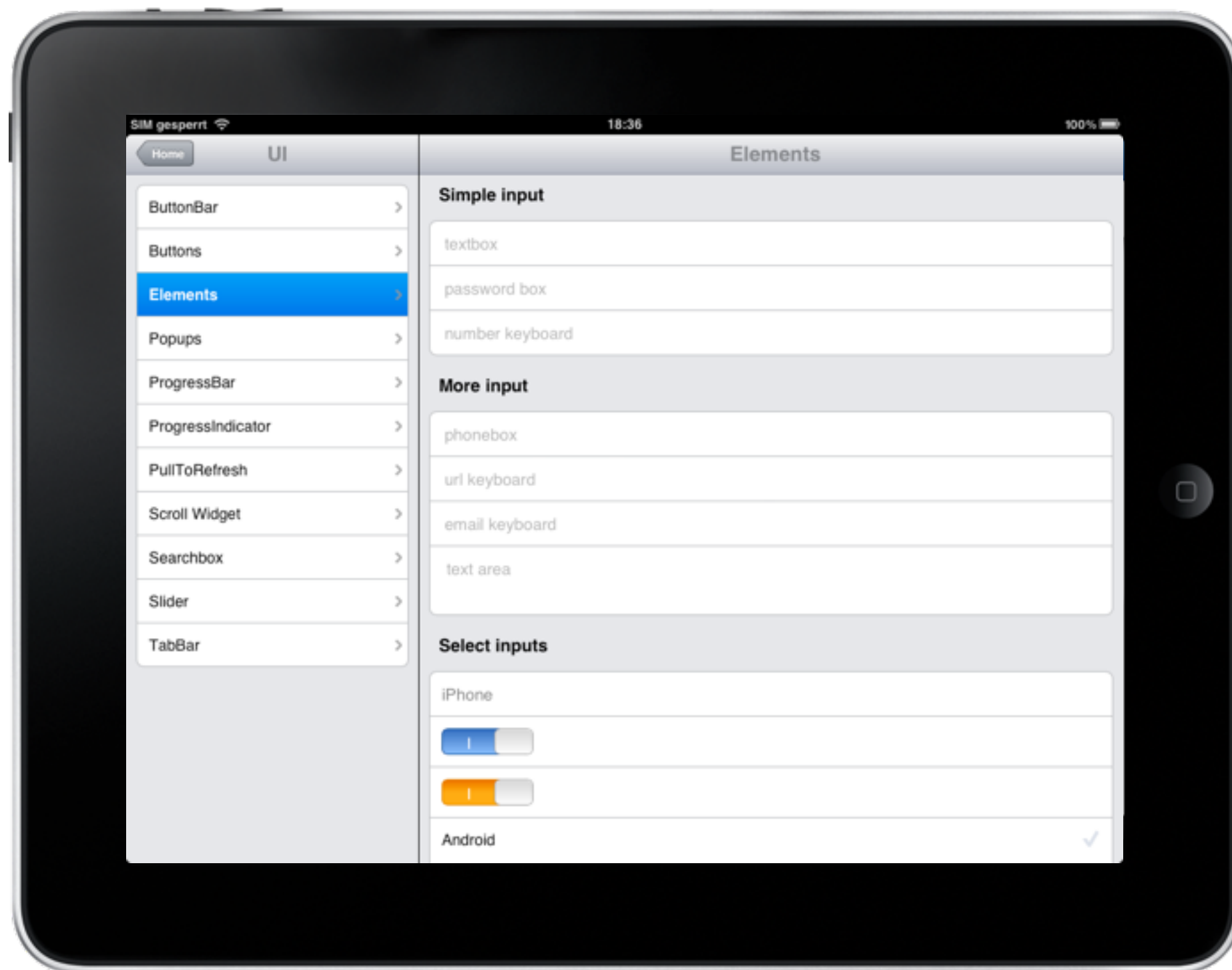


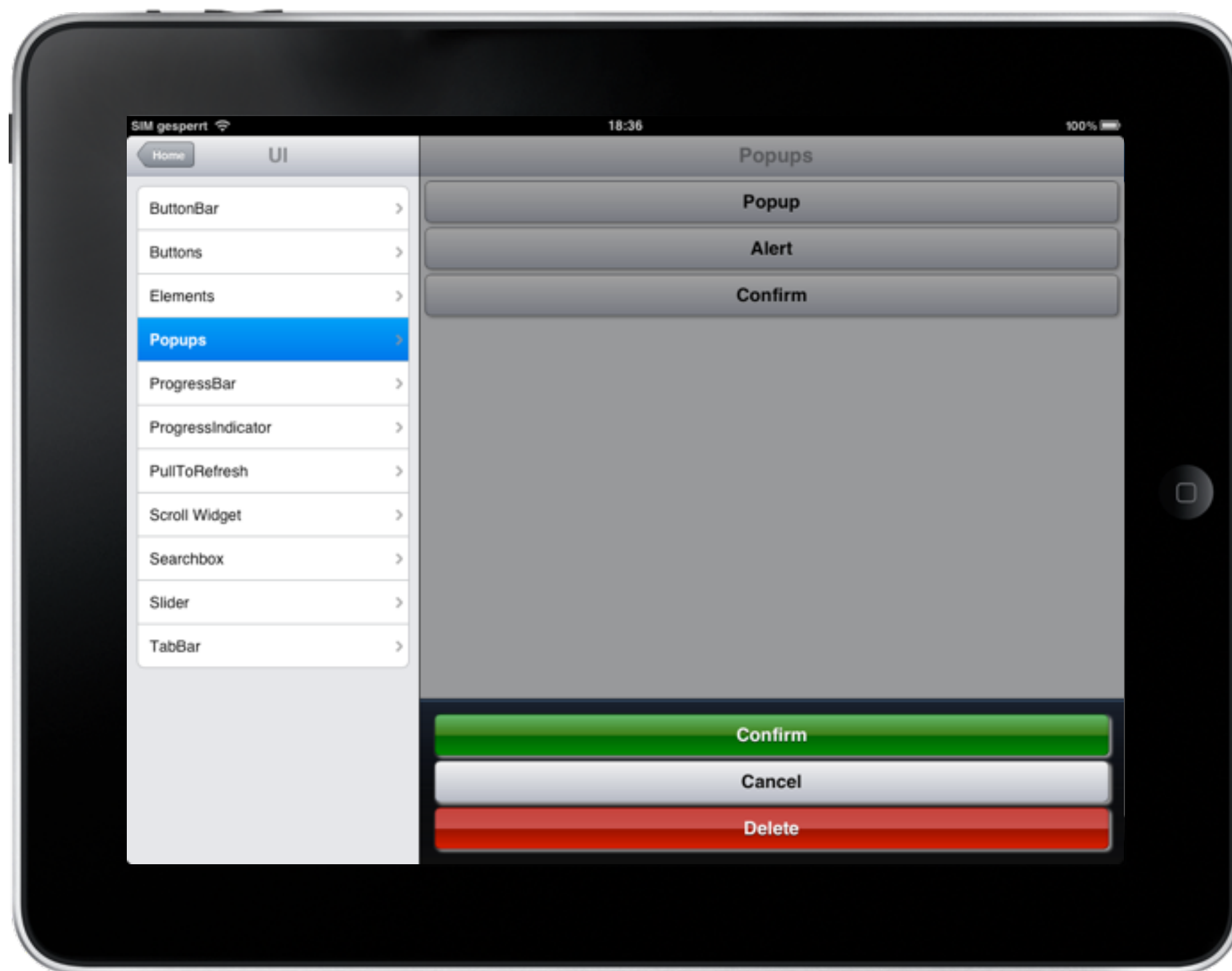


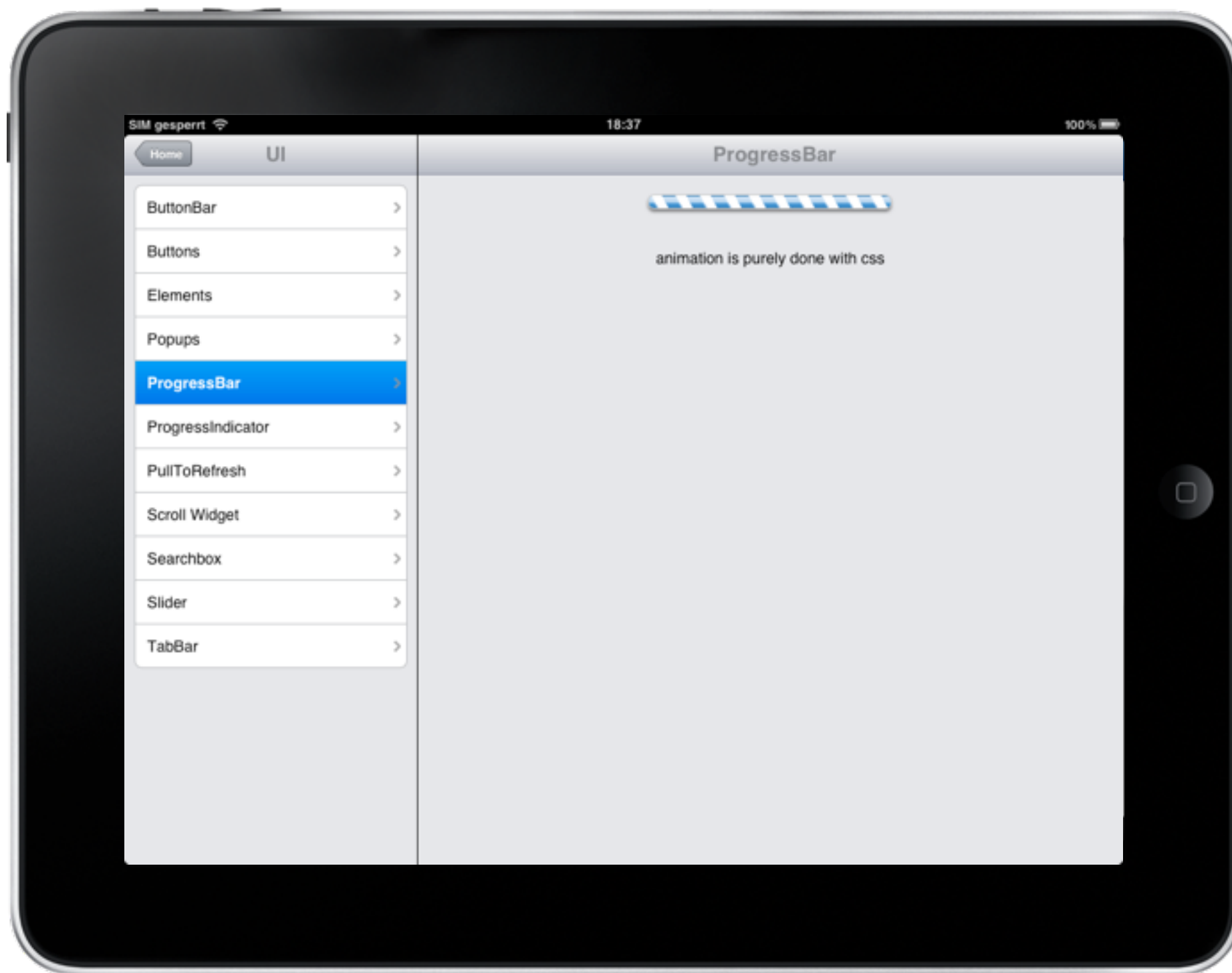




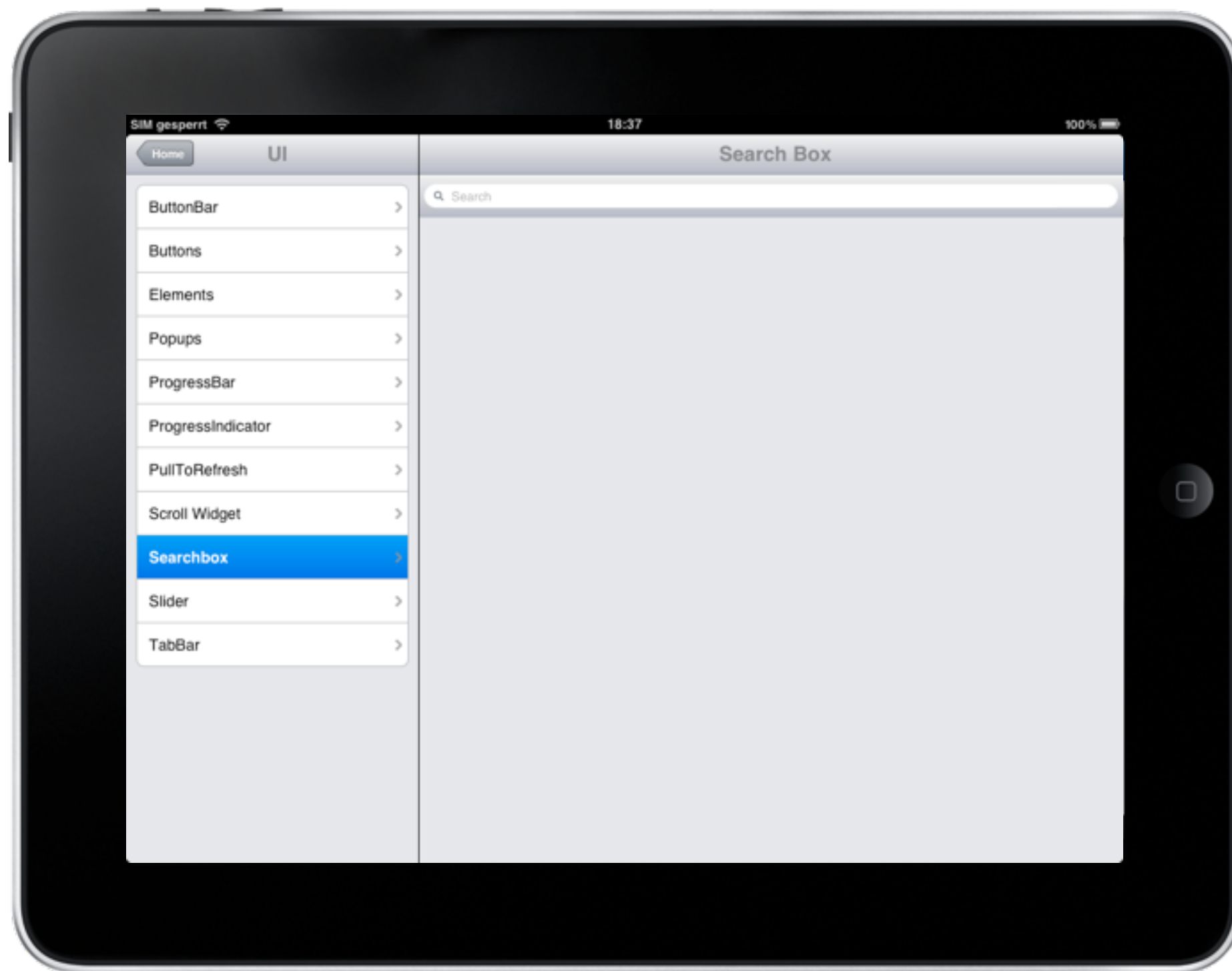


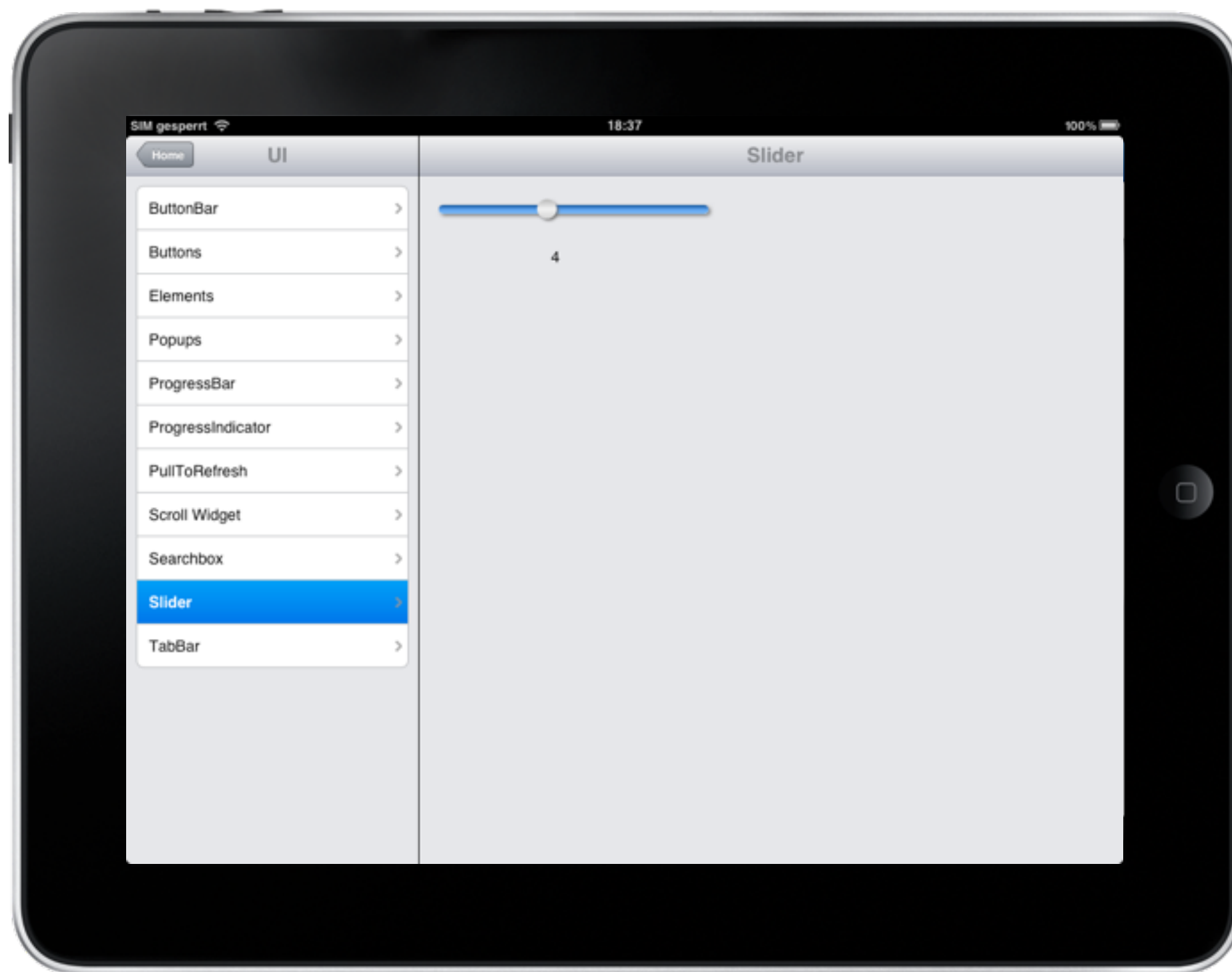


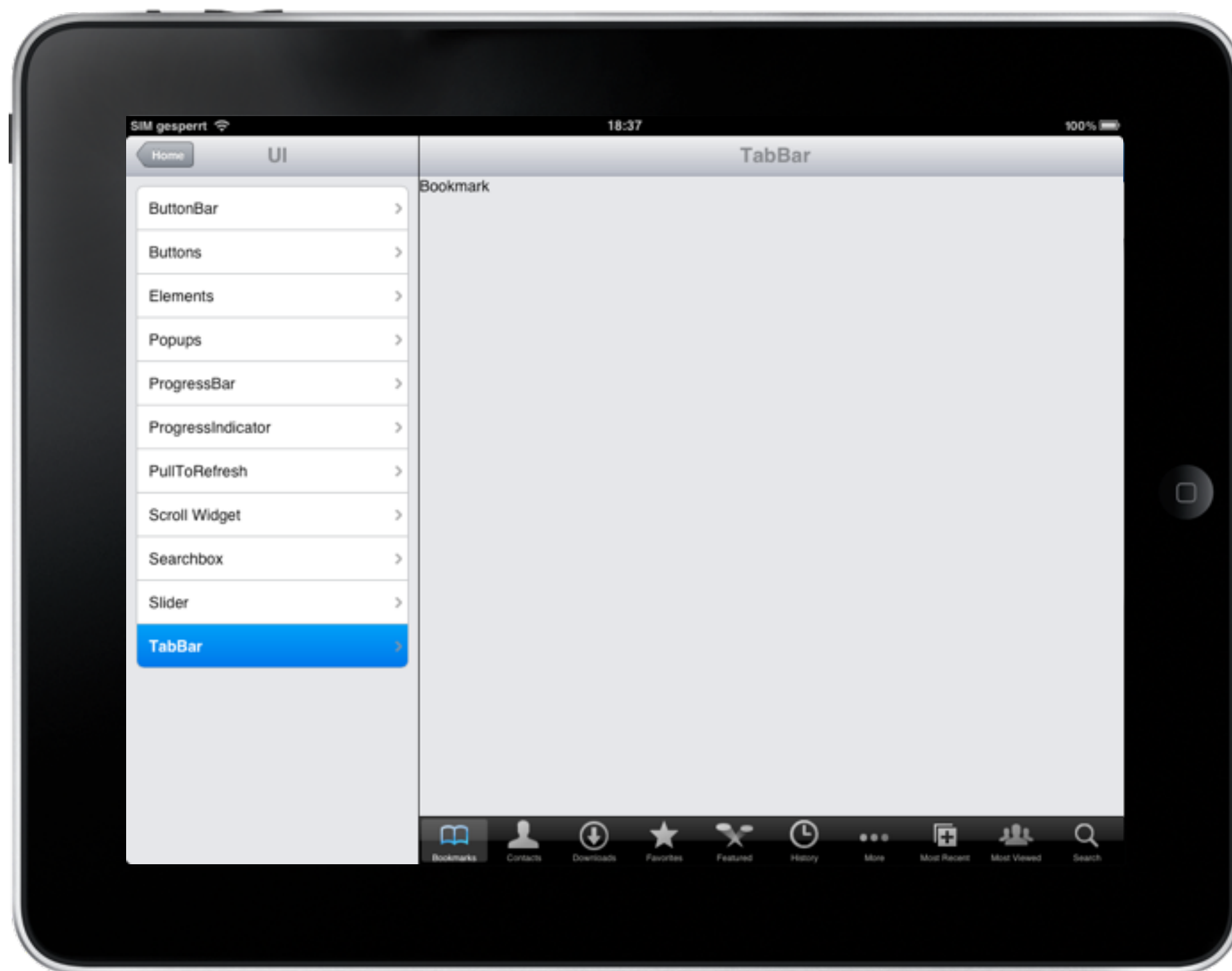




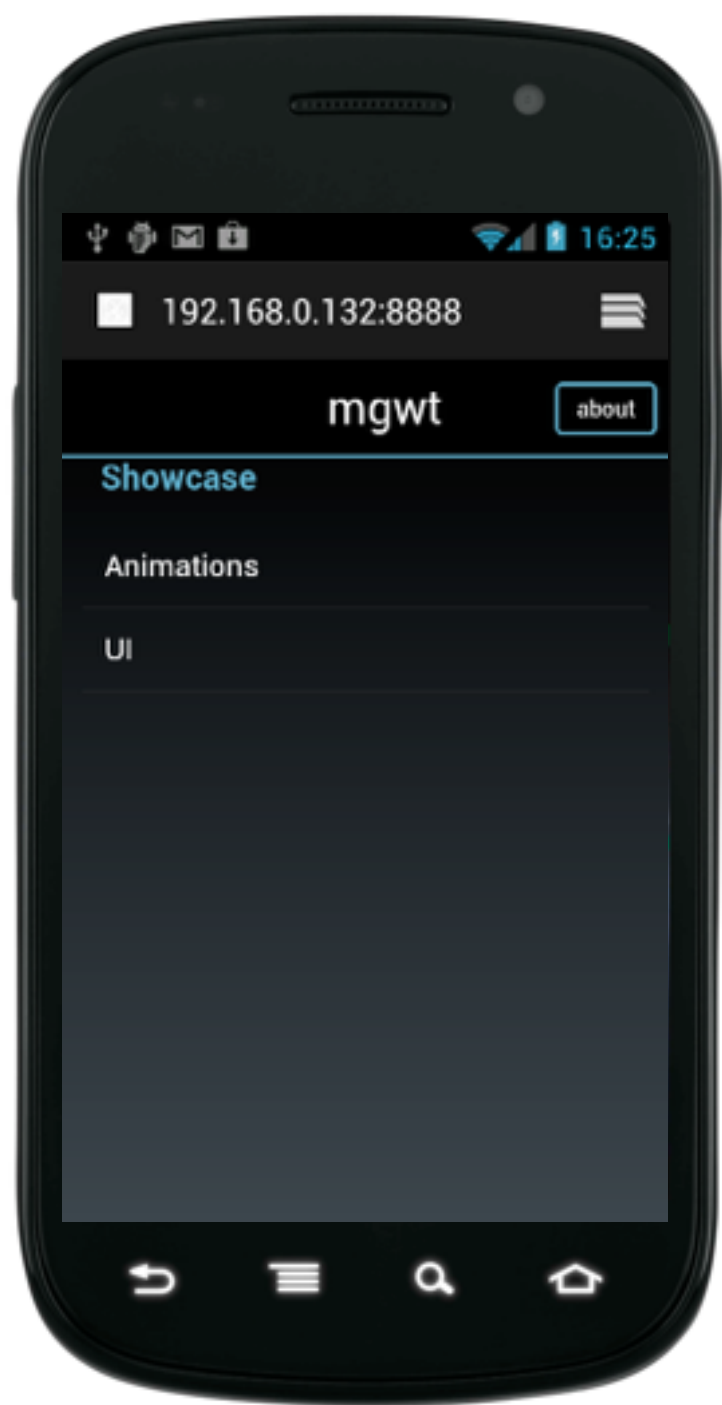


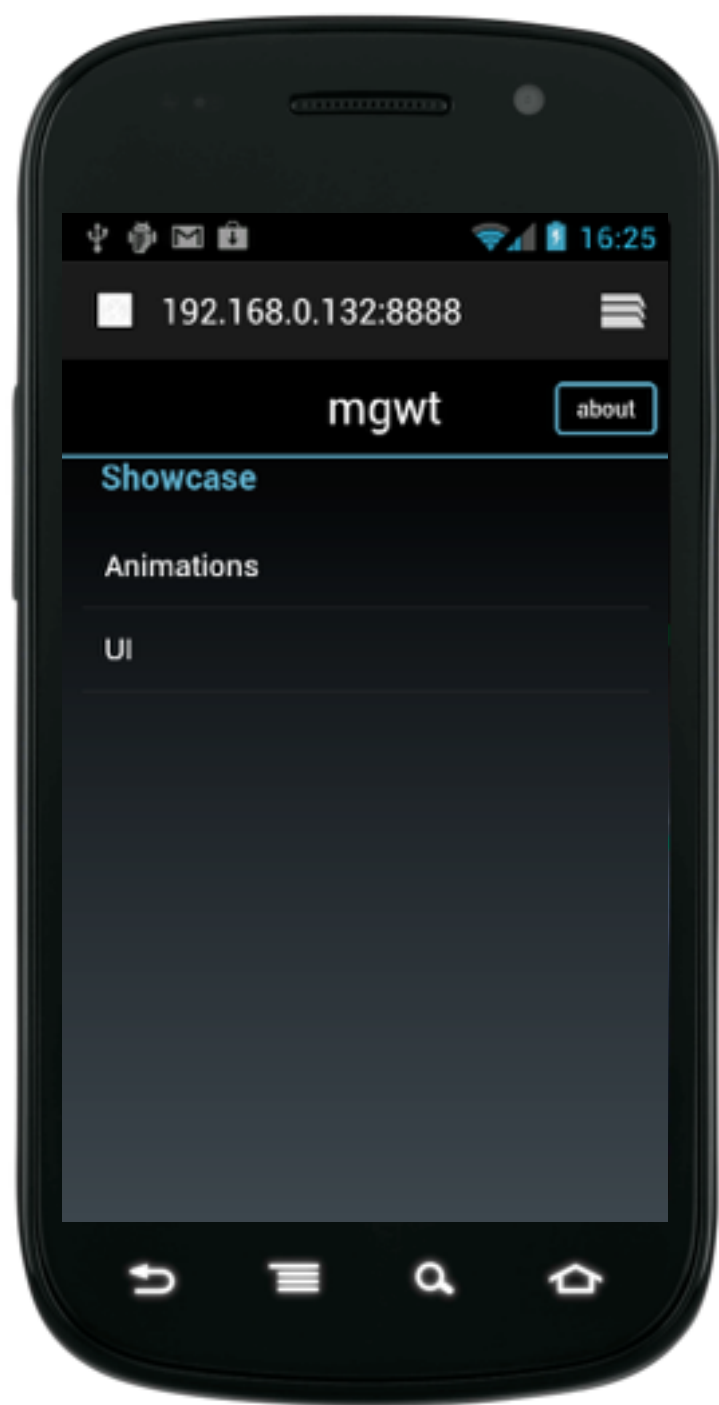


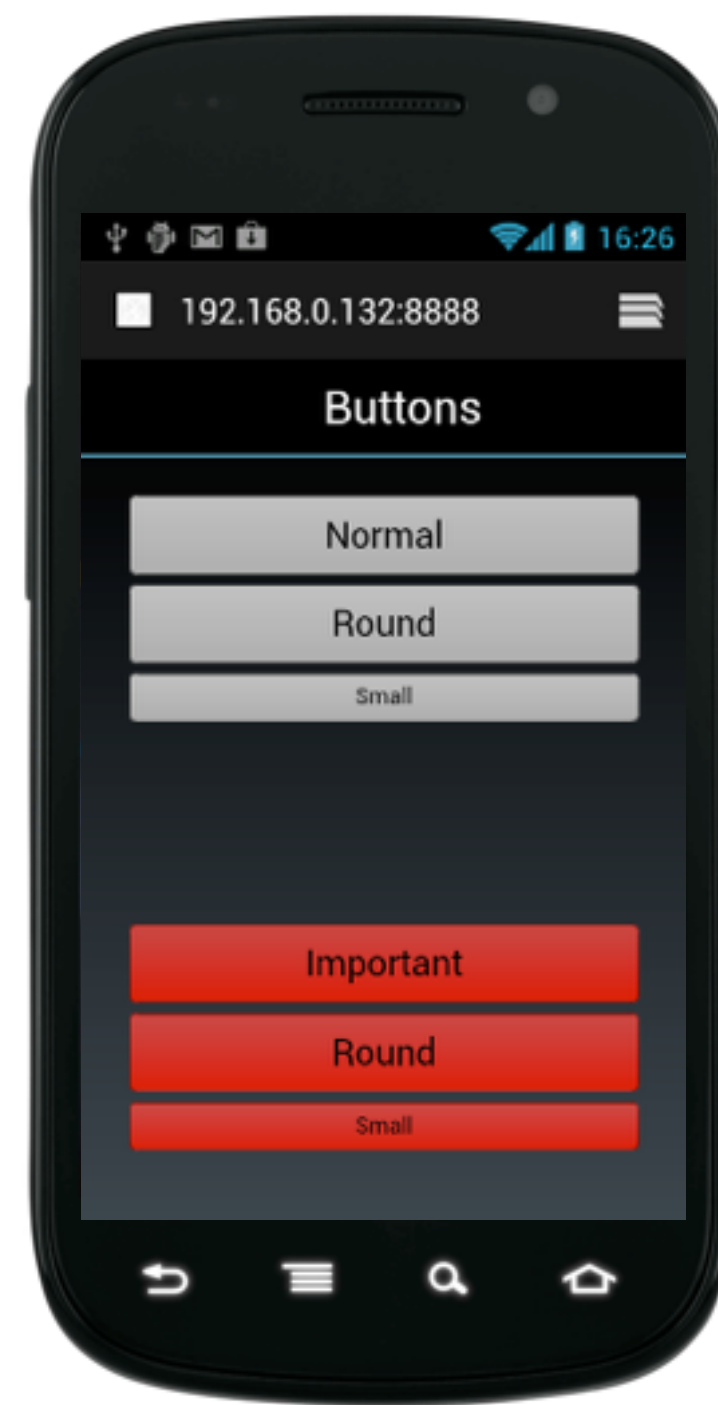
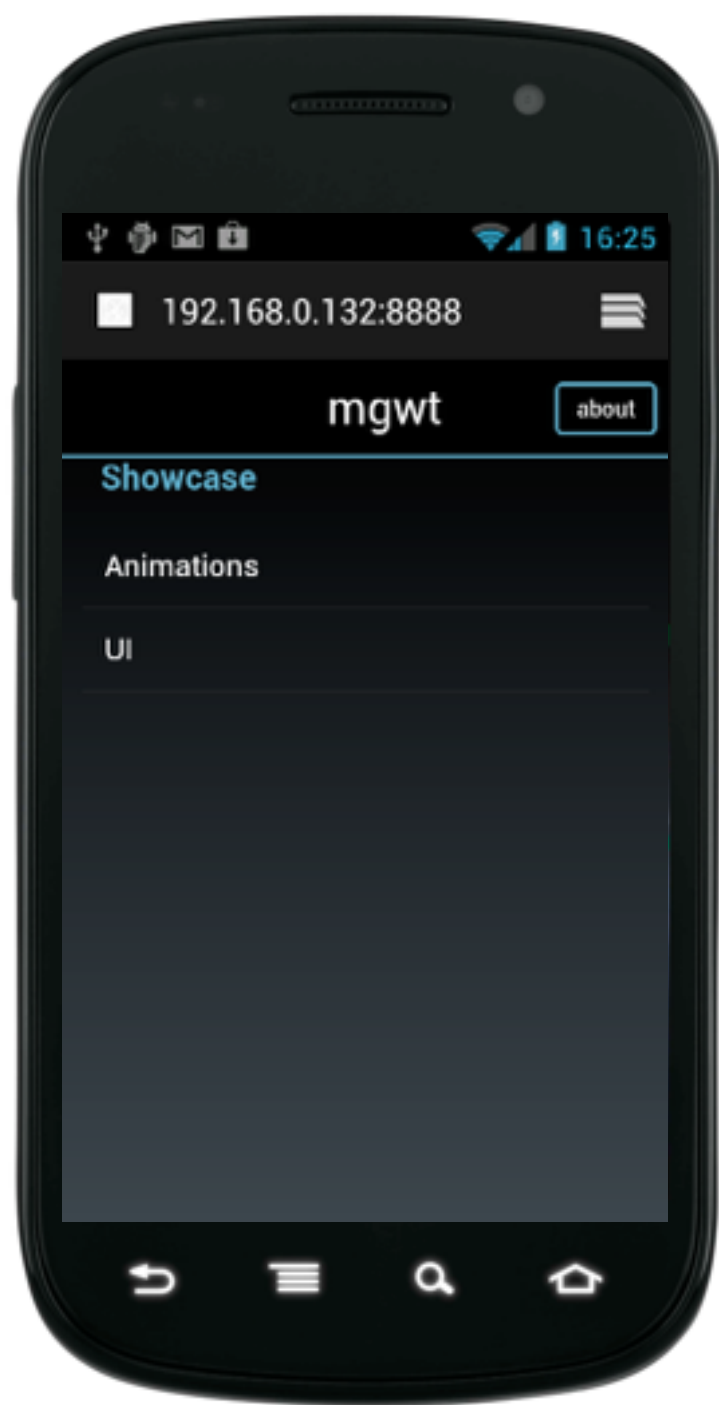


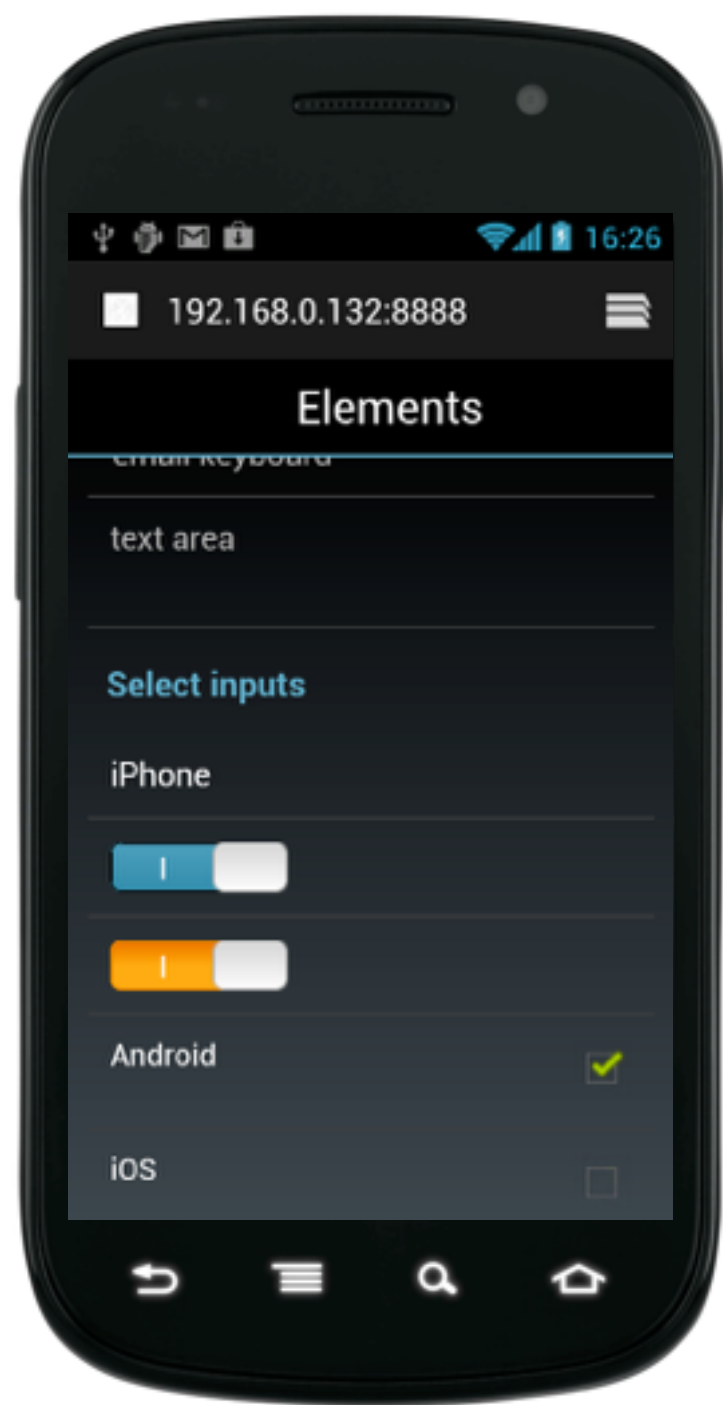


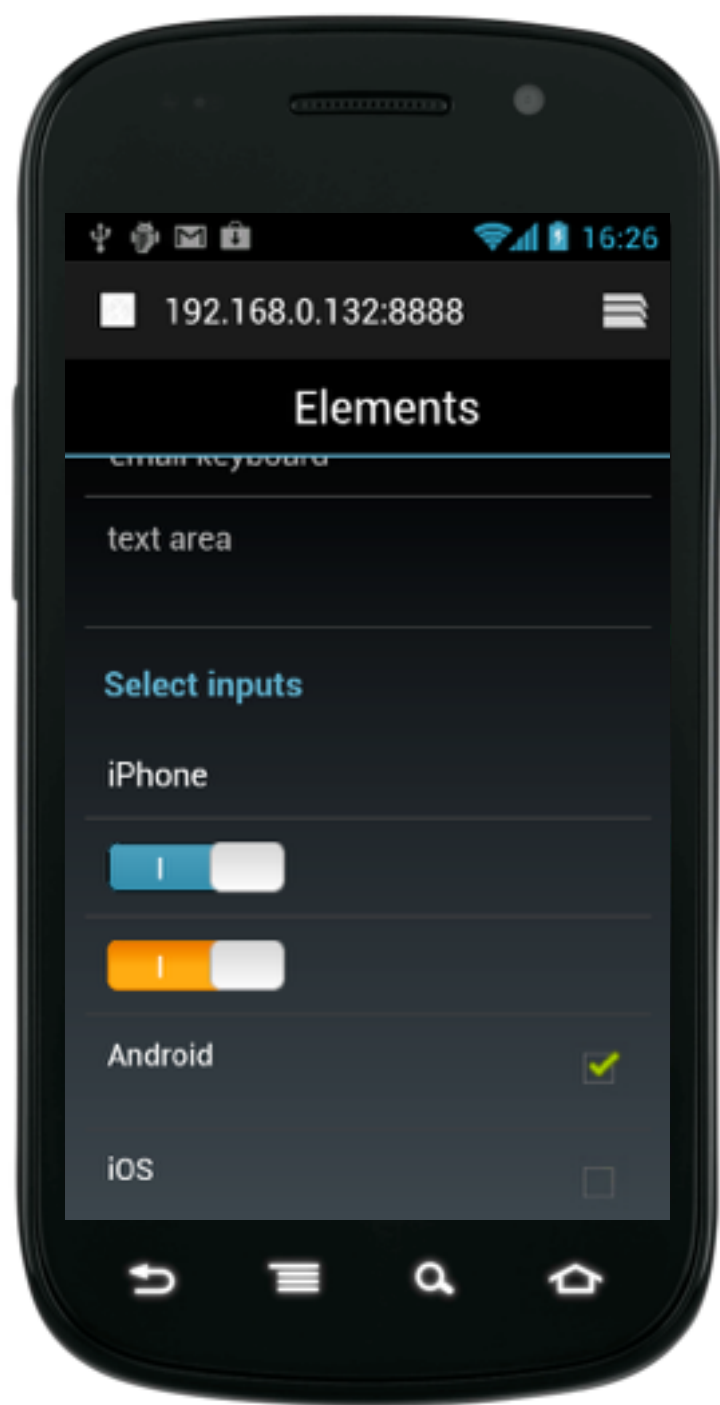


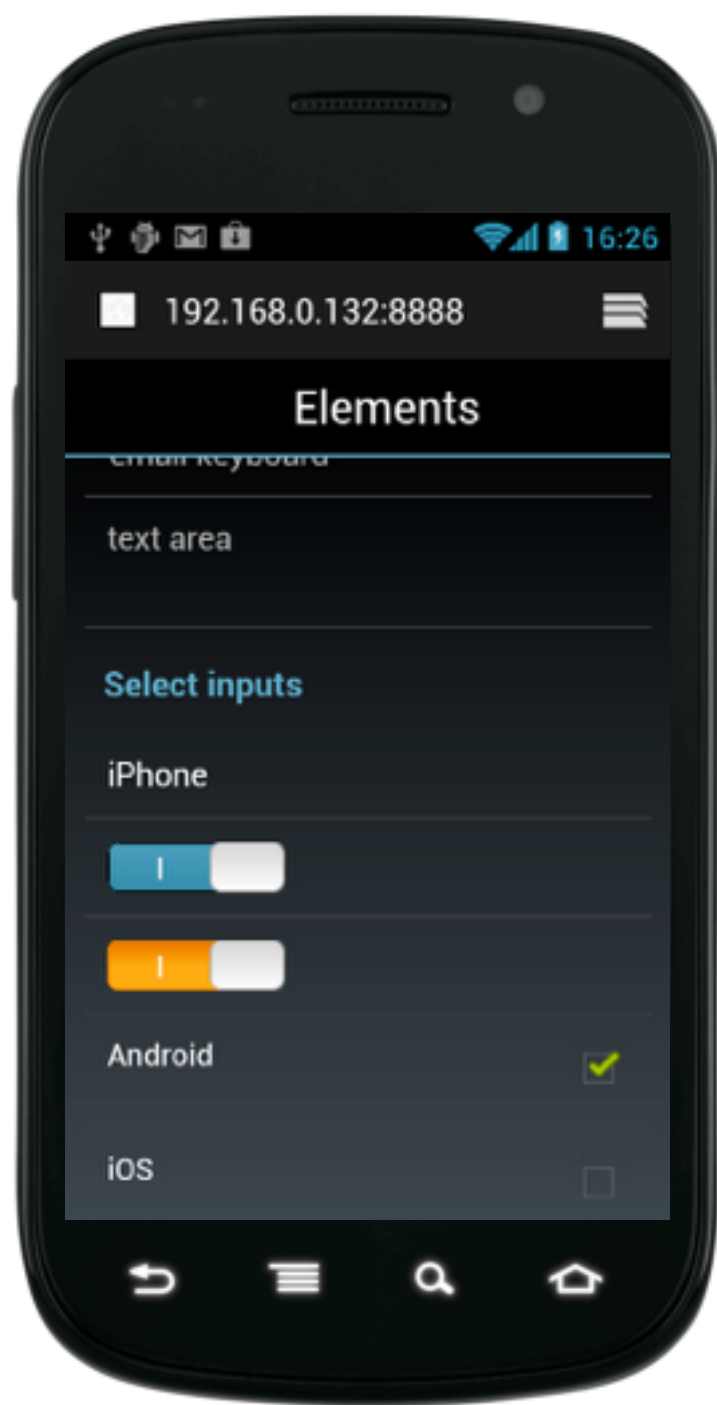






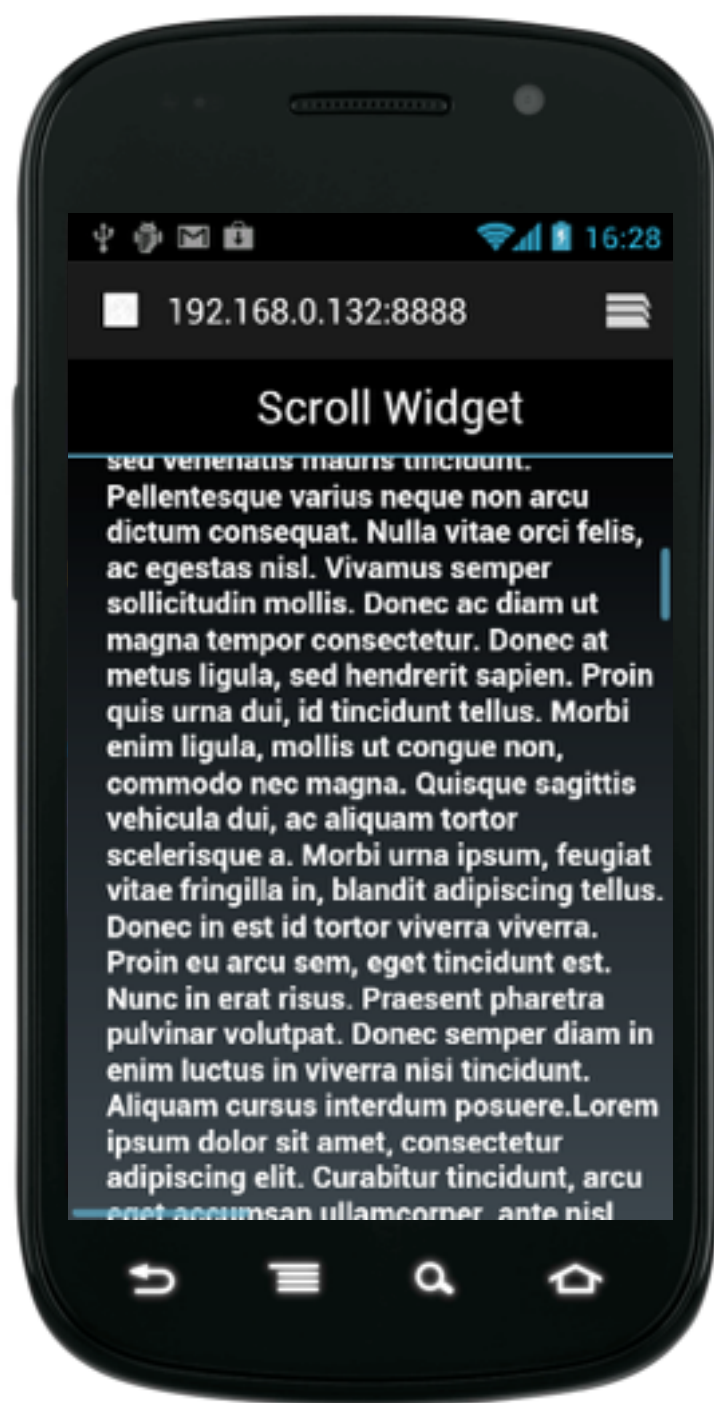














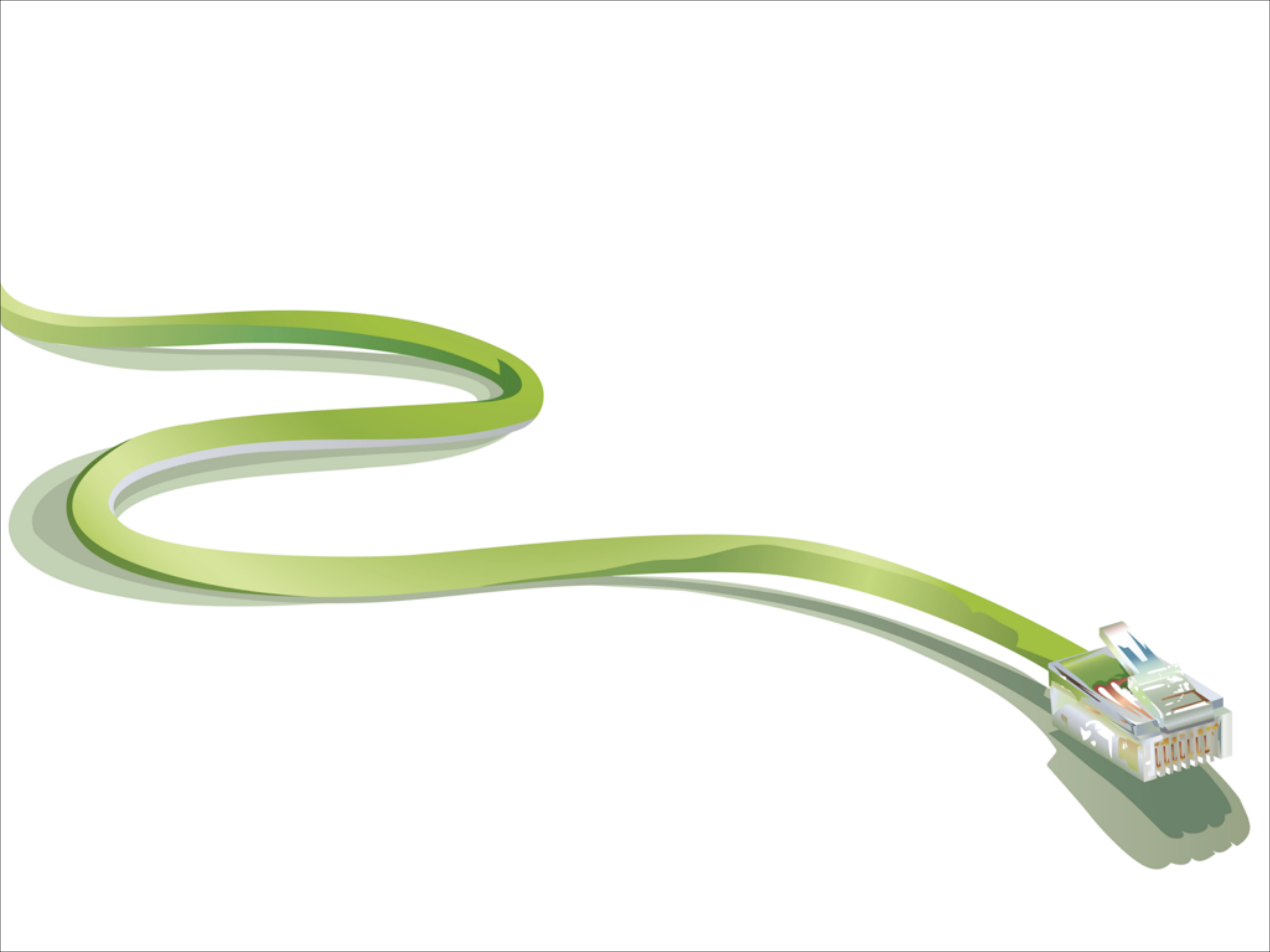


so much stuff



Performance







Bigger is not always better!

optimizing compiler

- Performance is about doing everything that matters right!
- GWT is very good at all of this!
- almost every JS framework misses some part here
- the knowledge is in the compiler => you don't need to handle this!





Perfect Caching!

GWT
output



Automatic Splitting!

GWT output 2

GWT output 1



Offline Support!

GWT

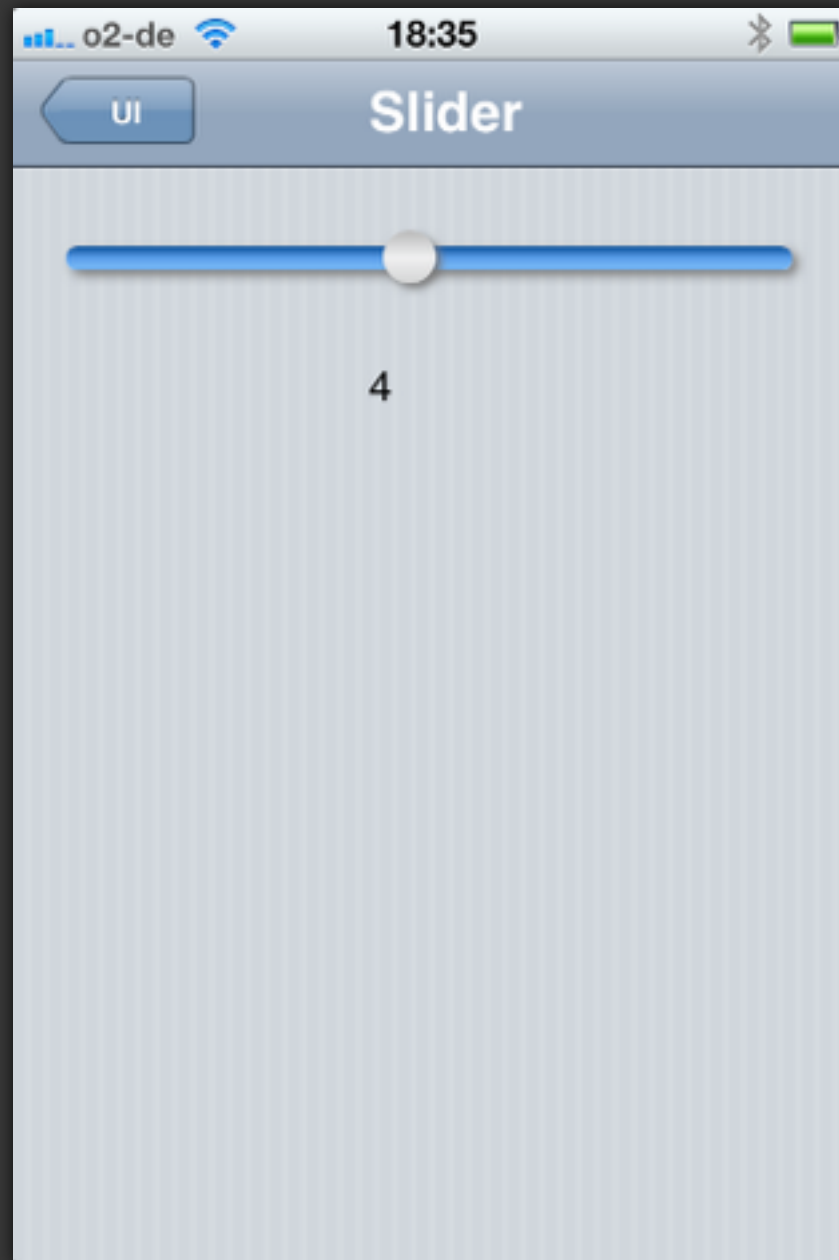


Manifest



no
download!

No Images



Minimal markup

```
<div class="mgwt-Slider">  
  <div class="mgwt-Slider-bar">  
    <div class="mgwt-Slider-pointer"/>  
  </div>  
</div>
```



minimal markup

```
<div class="mgwt-Slider">  
  <div class="mgwt-Slider-bar">  
    <div class="mgwt-Slider-pointer"/>  
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</div>
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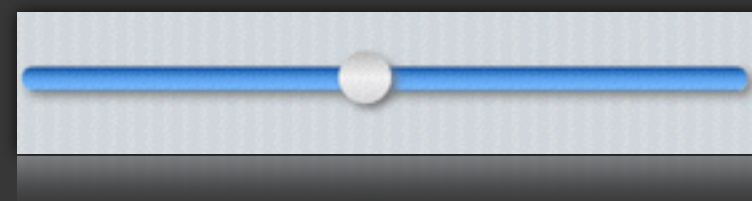
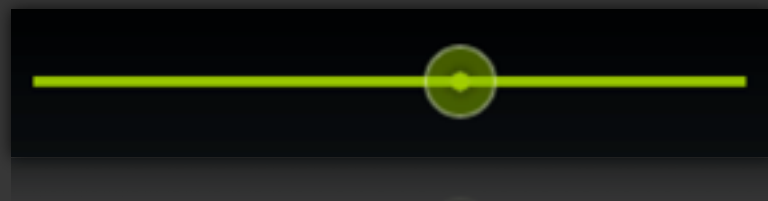
```
▼ <div class="GCEEDRJBAQ">  
  ▼ <div class="GCEEDRJBOP">  
    <div class="GCEEDRJBPP"></div>  
  </div>  
</div>
```





dead code removal

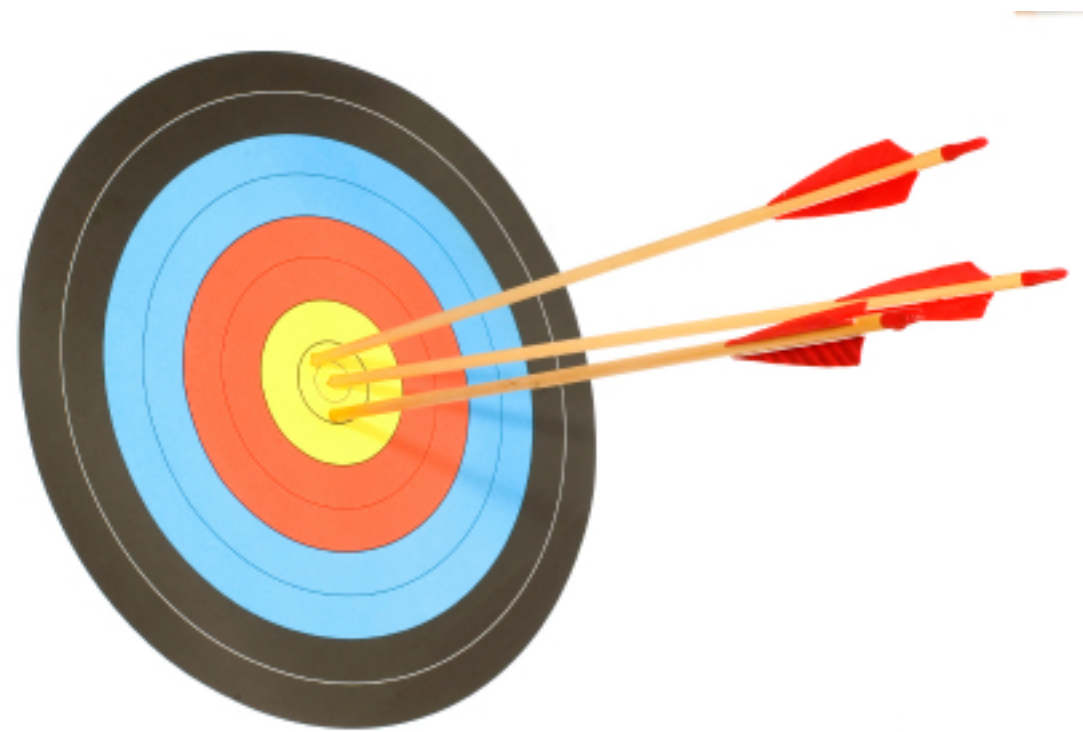
Different CSS



compile per device

remove unused code





Fast Layout

A graphic of a target with concentric rings in grey, blue, red, and yellow. Three arrows with red fletching and yellow shafts are shown hitting the yellow bullseye in the center.

never leave native code

Fast Layout



HTML5 ROCKS

flexible box model



Animations

same performance than
native

mgwt



But mgwt can do more than just mobile



Starting with Java means



...reaching any platform



GWT is key to that!



Run everywhere



But not write everywhere



Difference phone vs. Desktop

- Information density
 - other widgets
 - finger vs. mouse
- different navigation



Reuse most of your code



Model

Presentation
State

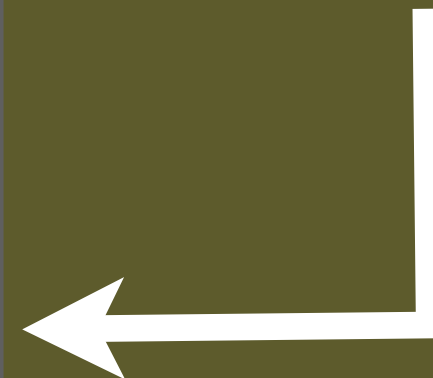
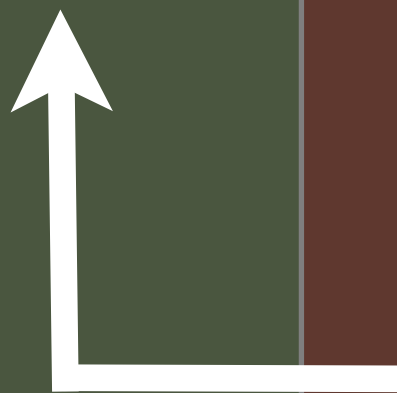
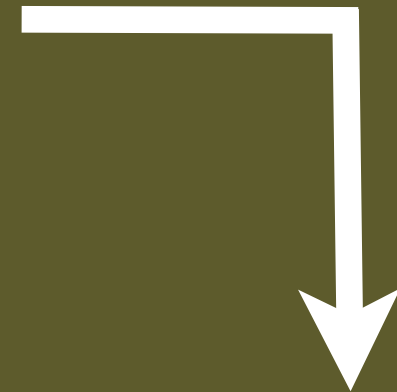
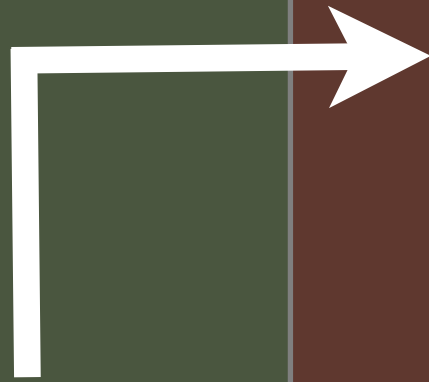
Presenter

Rendering
Logic

UI Event
Handling logic

View

display
(hard to test)



Structure your app right

- only views and navigation are different
- build small reusable presenters
- build navigation in a common place



Item One

[some nav entry](#)
[another nav entry](#)

Item Two

Item Three

Item Four

OneTwoThreeFour

search

Item One
Item Two
Item Three

Some text

Some text

☐ Checkbox

☐ Radio Button

Button



Item One

[some nav entry](#)
[another nav entry](#)

Item Two

Item Three

Item Four

One Two Three Four

search

Item One

Item Two

Item Three

Some text

Some text

ComboBox

☐ Checkbox

☐ Radio Button

Button



Item One

some nav entry

another nav entry

Item Two

Item Three

Item Four

One

Two

Three

Four

search

Item One

Item Two

Item Three

Some text

Some text

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Item One

[some nav entry](#)
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Item Three

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OneTwoThreeFour

search

Item One
Item Two
Item Three

Some text

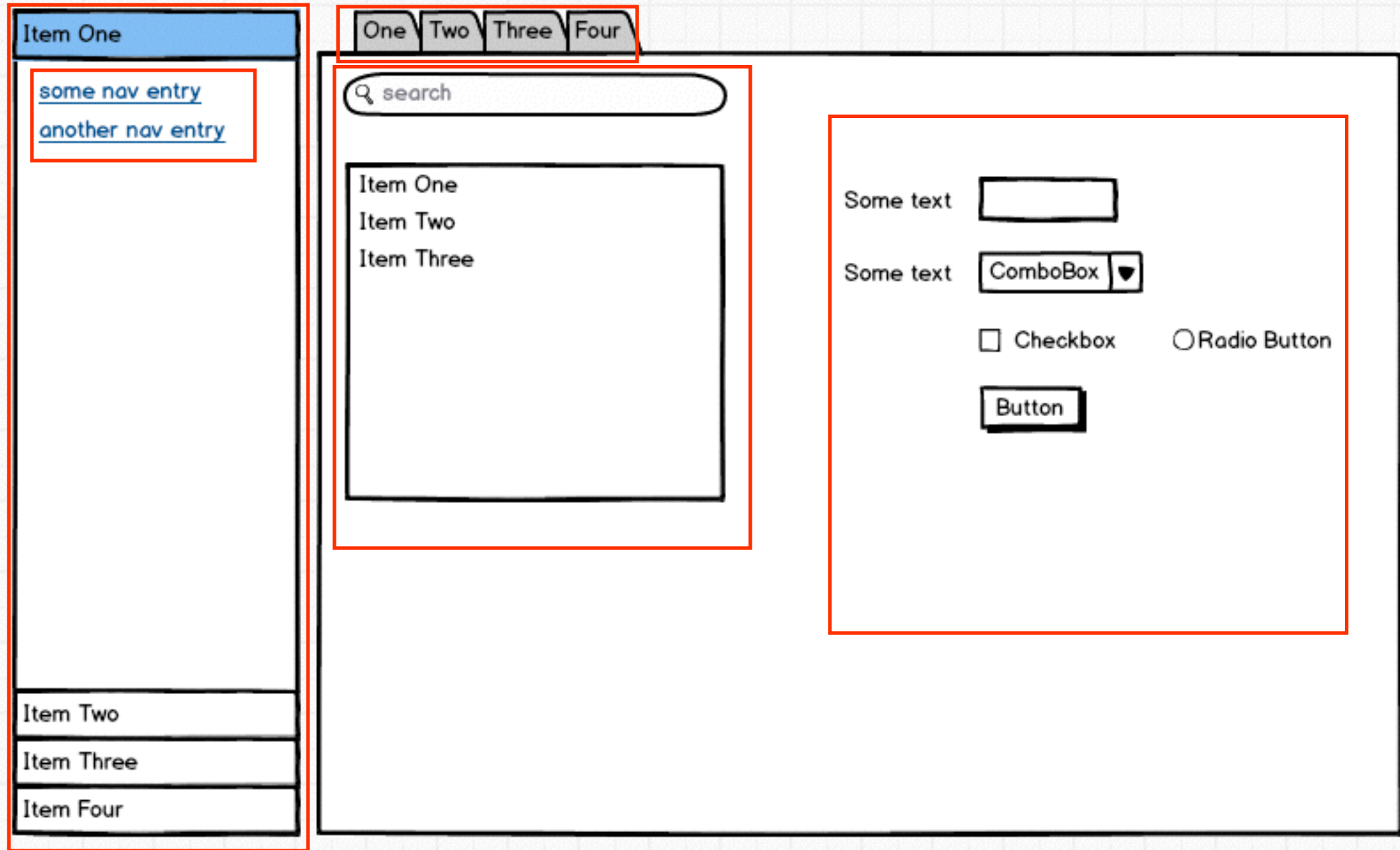
Some text

☐ Checkbox

☐ Radio Button

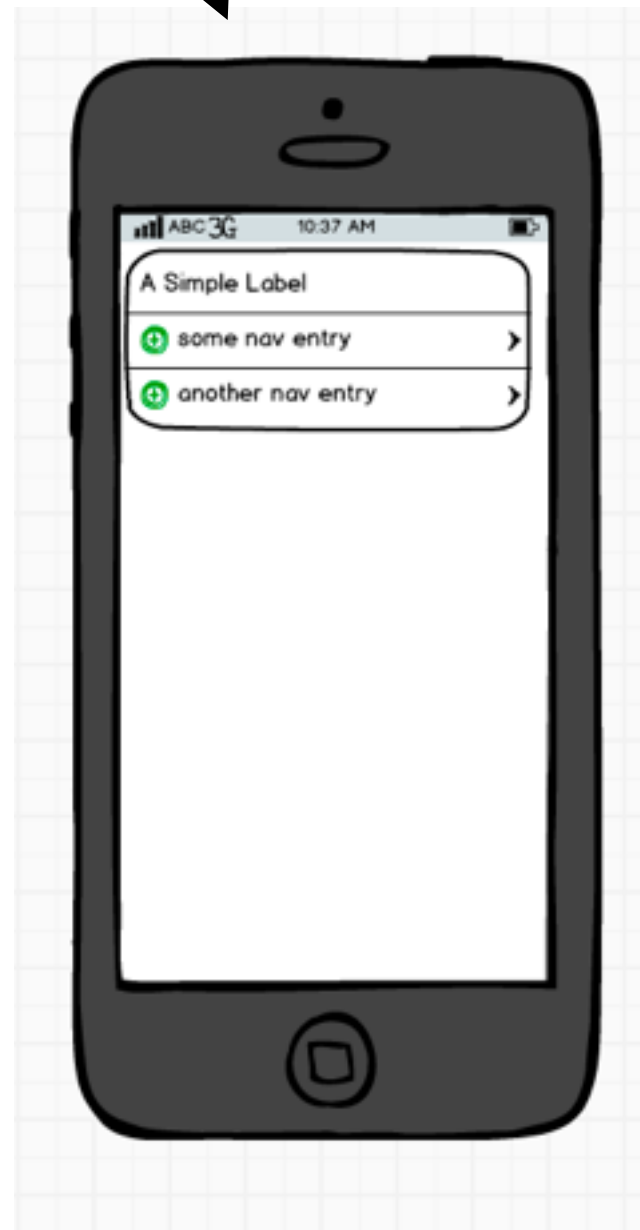
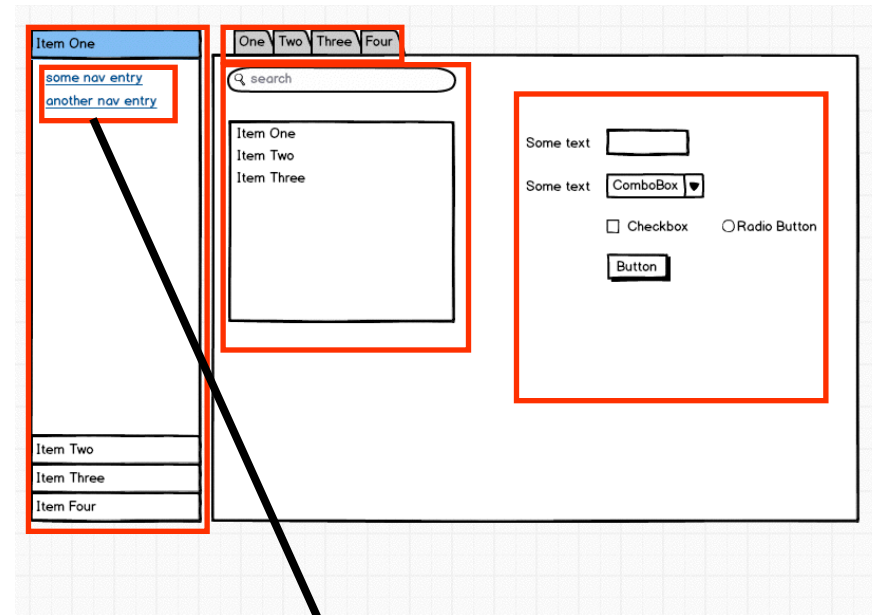
Button

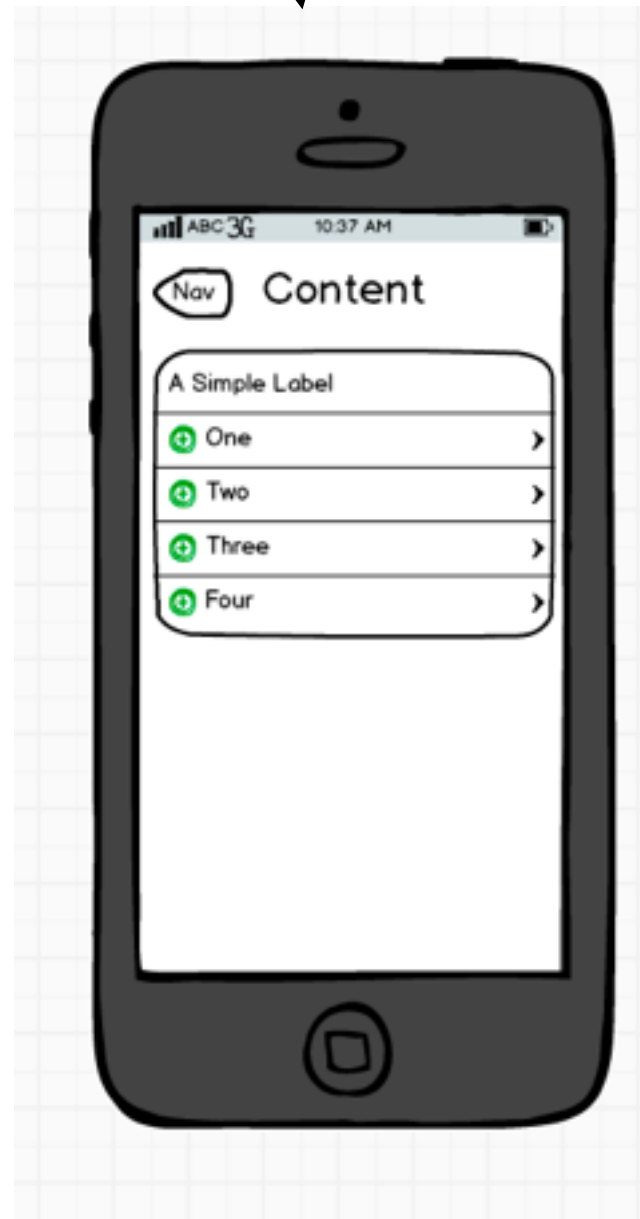


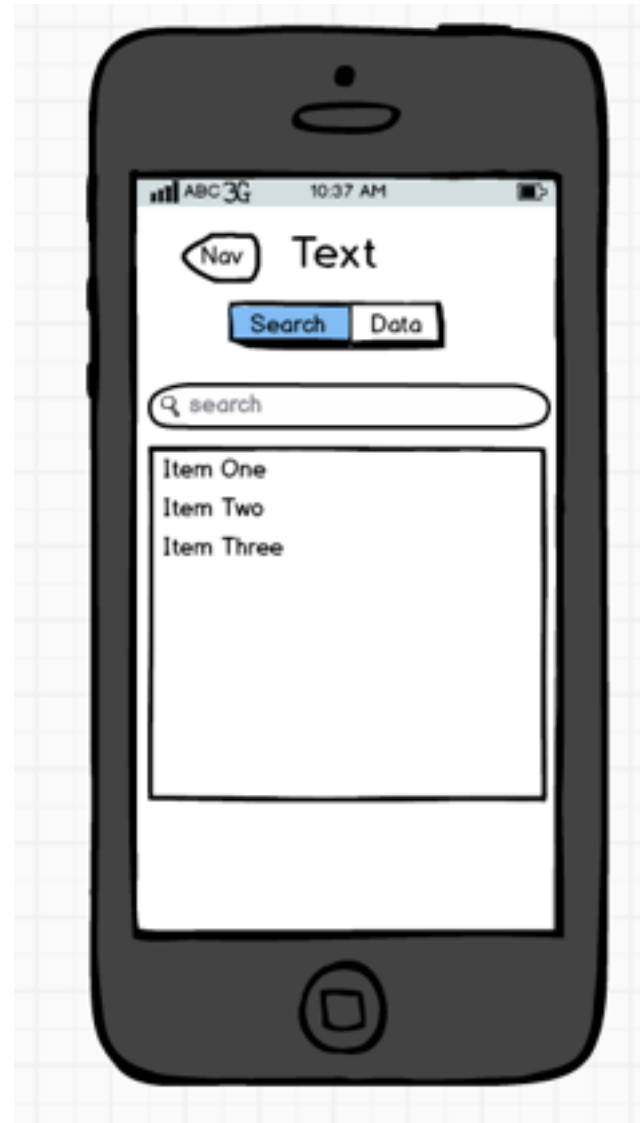
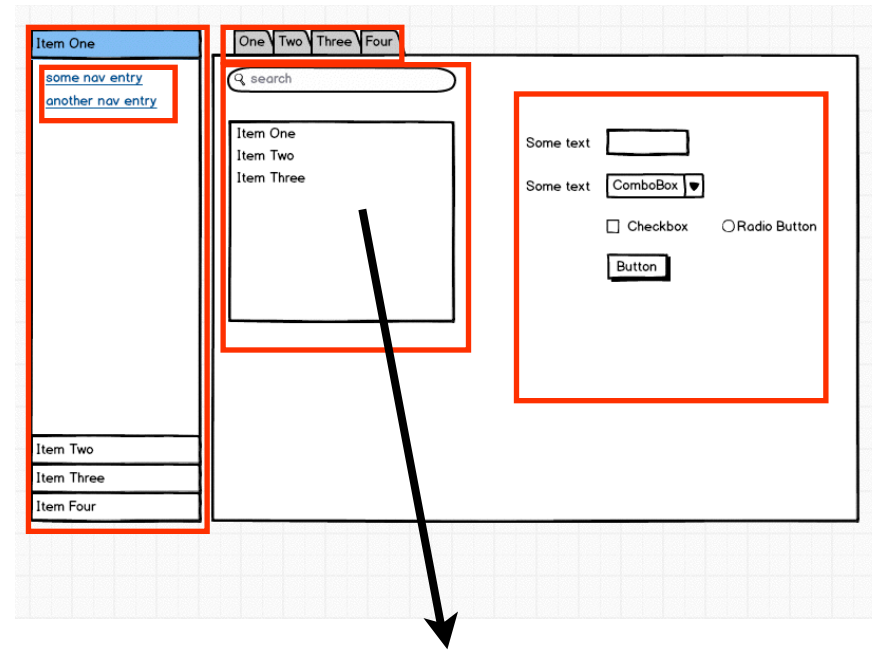


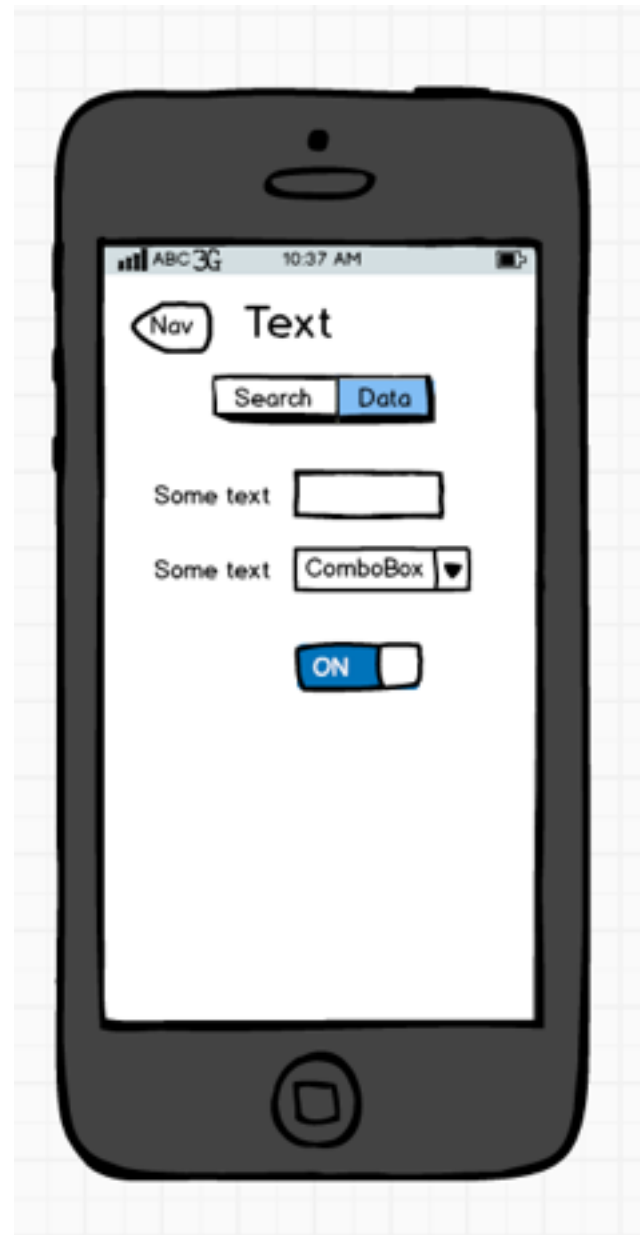
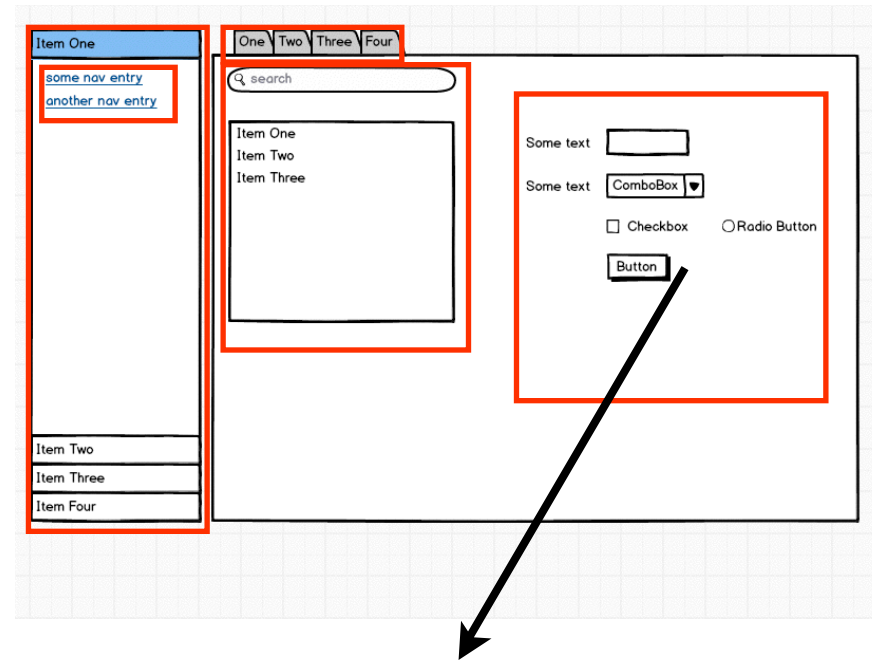
Navigation & Views

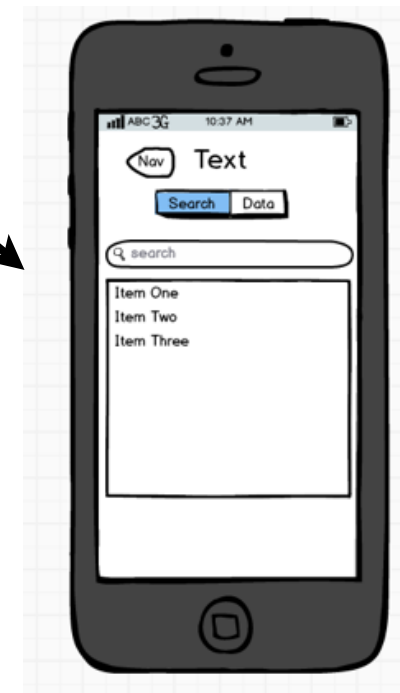
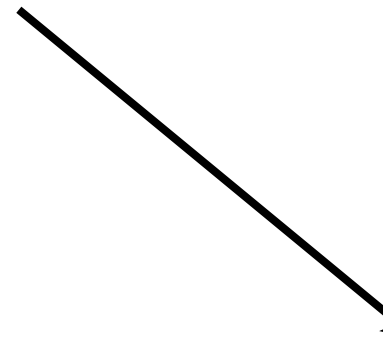
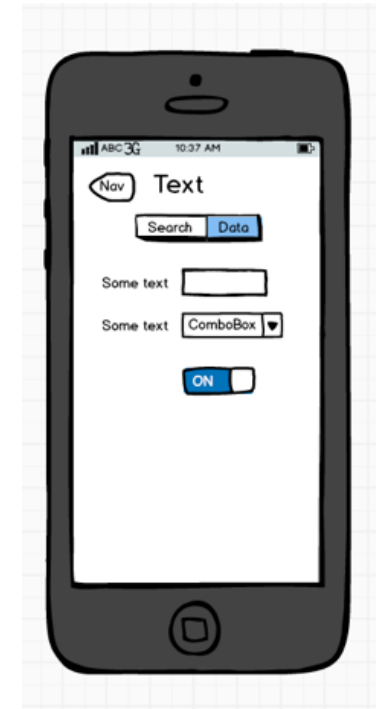
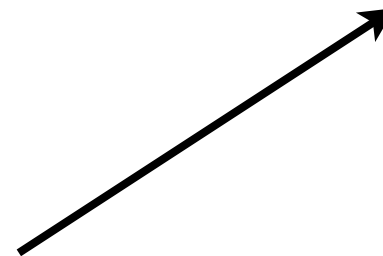
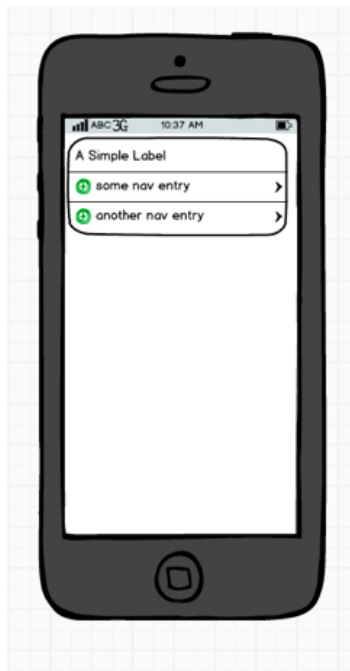












Navigation & Views!



How do I build an app?

1. Start with a solid well build Java application
2. Bring it to the web using GWT
3. Bring it to mobile using mgwt
4. Require platform features, consider phonegap



MGWT



Whats next for mgwt?



**Warning: My personal opinion, no Google
roadmap!**



Drop in 10 more features and we are done



I don't think so



mgwt is good for mobile



but GWT has to become great for mobile



My GWT wish list in 2012

- faster compiles
- better debugging experience for mobile apps
- a more lightweight widget system
- CSS3 support
- improved runtime performance
- remove cruft from GWT



My mobile GWT wish list in 2012

- make mgwt easier to extend
- reduce the work to support a new gwt-phonegap release
- make phone gap on android great



Faster compiles

- Dev mode is a good idea
 - but it is outdated
 - it does not work with every platform
- GWT has been a whole world compiler ever since
- Guess what: Whole world compilers are slow
- Incremental compile is about to land
 - only compile parts that you changed
 - will improve super dev mode dramatically
 - same edit and refresh cycle that JS developers have



A better debugging experience on mobile

- remember debugging on Android/iOS from 2011?
 - `Window.alert()` + remote Loggers
- Faster compiles with super dev mode
- Source map support for actual debugging
- Add a recompile trigger to GWT



Emulation in Chrome

- run chrome in emulation mode
- select any modern phone / tablet
- simulate touch input
- simulate location



Remote Web Inspector

- inspect any chrome tab
- with 4.4 even inside of phonegap
- all the stuff you are used to with chrome dev tools



Remote Inspector demo



Phonegap & Chrome

- Phonegap could not use Chrome
- Chrome is now available to Phonegap apps as a web view
- making GWT inside of Phonegap becomes much better



A new lightweight widget system

- today's widget system was mostly designed for IE6
- introduces lots of dependencies (e.g. Hashmap, ArrayList)
- elemental is a good start, but misses stuff
- web components are much better
- event handling, isolation



CSS3 support

- The flute parser in GWT was made for CSS2 and not CSS3
- mgwt CSS3 looks very ugly because of that
- GWT now supports CSS3 with GSS thanks to Julien
- GWT permutations have a huge value when it comes to CSS



The mgwt slider

- randomly picked a widget here
- All the CSS is about 8kb
- The GWT compiler splits this up
 - by user agent
 - by platform (e.g. iPhone retina, iPhone, android phone)



without GWT
8Kb of CSS



with GWT
734 bytes of CSS



Improved runtime performance

- ArrayList vs. JsArray and HashMap vs. JavaScriptObject
- GWT's collections should be (nearly) as fast as pure JS Objects
- JavaScript VMs changed over the last years
 - We need to update GWT to leverage this
- Make mobile really fast



Profiling GWT apps in d8

- d8 is the command line version of v8
- we added source maps support to it
- we added a linker to GWT that targets d8
- you can now run GWT code in d8 and profile it



Profiling demo



Adding a benchmark suite to GWT

- Track performance
 - run benchmark suite for every commit
 - run a base line as well
 - run benchmarks in pure JS engines
 - run in all important browsers
- optimize compiler output for runtime performance
 - make GWT aware of hidden classes
 - try to be monomorphic at all times
 - maybe allow V8/SpiderMonkey specific passes



Remove cruft from GWT

- GWT permutation were great for IE6 vs. the rest
- Today it is Chrome, Firefox, IE11 vs. rest
- Reduce the number of permutations
 - one for modern
 - one for quirks
- Kill legacy



Improving mgwt

- Making mgwt more extendable
 - appearance based styling
- move layout to proper flex box model
- windows phone support?
- update to GSS resource



Improving gwt-phonegap

- Change to auto generate
- write linkers that target phonegap
- improve phone gap by adding types



mgwt release

- new release with 1.2
- updated to work with GWT 2.6
- SwipeMenu widget
- lots of bug fixes



gwt phonegap release

- gwt-phonegap 3.2.0.0
- works with phonegap 3.2



Questions?



Daniel Kurka

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twitter: @dankurka

