





Project work input

Input on “steering” projects’ workflow

- What is part of your design/system?
 - q What are you assuming being provided by others services?
- Prioritization:
 - q What are the essential features for your app? (MVP)
 - q What are the feasible features given the time window?
 - q Is a secure login needed?
 - v Many features like this can be key priorities for a real product
 - v However they are pretty much commodities nowadays (oauth)
 - v Thus the focus should probably be on your core concepts!



ReCap – Mobile UeX

Key Concept: User Experience

The mobile user experience encompasses the user's perceptions and feelings before, during and after their interaction with your mobile app



What does the system feels like?

- Fun
- Aesthetically pleasing
- Entertaining
- Rewarding
- Motivating
- Emotionally fulfilling

Expressed in context-specific user experience goals.



Assignment 1: Course project proposals

- Collect some mobile user-experiences: Observation-based field study
- Define the course project proposal: Brainstorm and create user stories
- Prepare a project proposal presentation for S1:
 - Write up 2-3 scenarios how this App could be used
 - Use a selection of collected mtrl to ground the scenario
 - Tell us a good story!!
- Write a 2-4p summary of your field study and course project proposal

A1: Questions that your fieldstudy should / could answer...

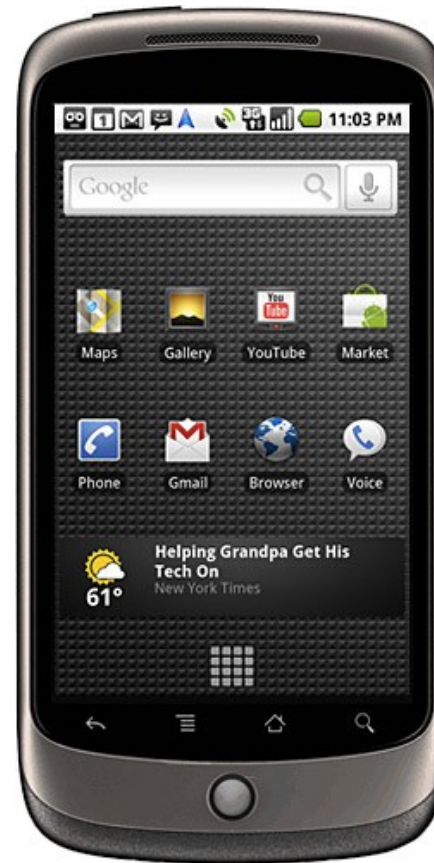
- What basic users needs should your service meet?
- Who are your users? Which devices do they use?
- How should they interact with the service?
- To what extent the users want to use such service and why?
- How do people perform this functionality now?
- What tools do they use? What challenges people face in doing this?
- How/where can the process be improved?
- Do people see their need being met by this service?
- What direct benefits & incentive will drive the adoption of this service?
- Where will the service be used?

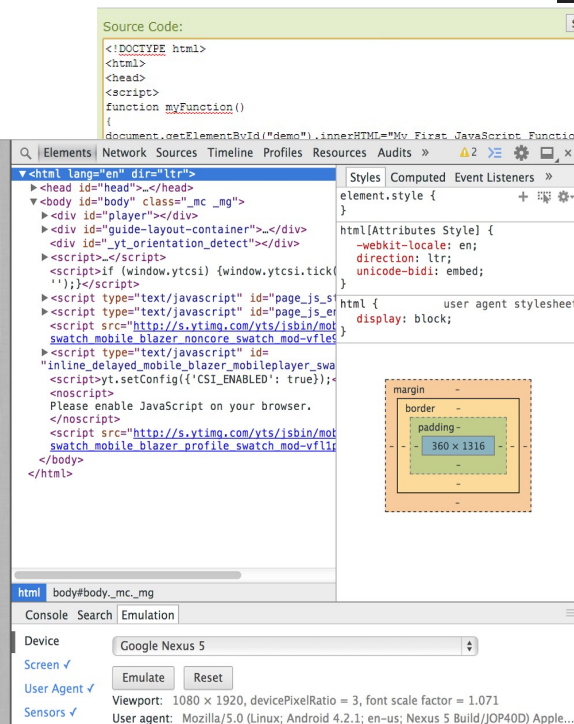
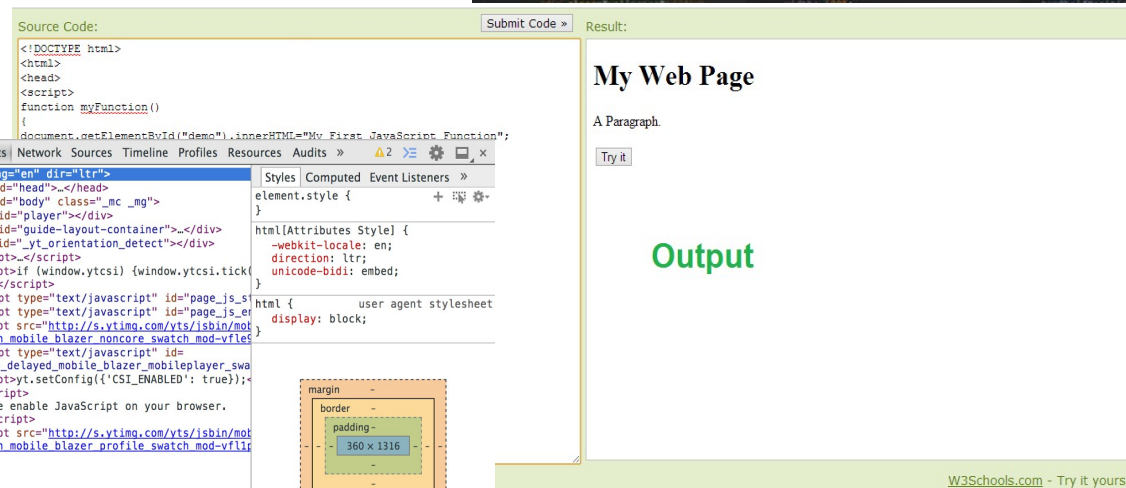


F2. Mobile Web Apps / Outline

- What is a mobile app? [chap6]
- Mobile Web Apps Versus Native Applications [chap9]
- Mobile Information architecture [chap7]
- Mobile Web design [chap8]
- Mobile Web Development [chap11]

Connect Phone to Computer?







What is a mobile app?

What is a mobile app?

There are many different kinds of application and service framework on a mobile platform...



Brick | Candy | Feature | Smart

What is a mobile app?

- Integrated: SMS, Calling, Camera,
- Mobile Web Applications
- Native Apps



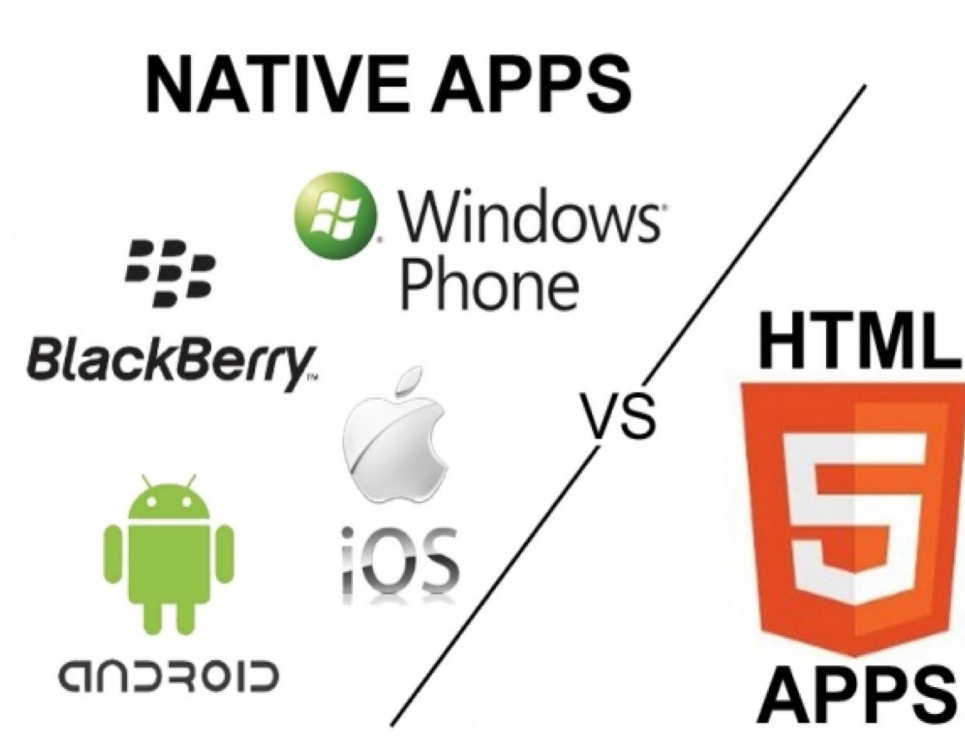
Nokia 215: 15 Euro
In-built basic apps for
Facebook, Skype
and Opera.
Standby: 29 days





Mobile Web Apps Versus Native Applications

Mobile Web Apps vs Native Applications



Mobile app development platforms (Web vs. Native)

Mobile OS	Native apps	Mobile web apps
Android	Java	HTML5
iOS	Objective C	HTML5
Windows Mobile	C# (VC++, JScript)	HTML5
Blackberry	Java	HTML5
WebOS	-	HTML5

Mobile Web Apps vs Native Applications

Native App



vs.

Web App



MOBILE APP VS RESPONSIVE DESIGN

— ASK THESE 10 QUESTIONS FIRST —

Will your native mobile app take advantage of smart phone functionality?

Do you need to use the camera, GPS, scan feature, or other phone functions? If you intend to provide unique functionality or content not available on the mobile web, then an app is likely the way to go.



RESPONSIVE DESIGN



ADVANTAGE MOBILE APP



Is SEO an important consideration?

If part of your strategy is to increase visibility among search engines and drive traffic to your site, then stick with a responsive mobile website. Apps are closed environments and cannot be crawled by search engines—they won't impact your organic search ranking.

ADVANTAGE RESPONSIVE DESIGN



MOBILE APP

Will you have difficulty getting App Store approval?

Apple asks developers to follow stringent guidelines when submitting to the App Store, and the approval process can take anywhere from a week to several months. There are certain areas that are regulated more strictly than others, such as in-app purchases and in-app subscriptions.



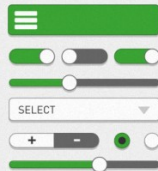
ADVANTAGE RESPONSIVE DESIGN



MOBILE APP

Do you have complex design and UI?

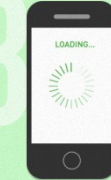
At a certain level of complexity, HTML5 (responsive web) may not work to achieve your goals. HTML5 can indeed deliver customized user experiences, but native apps tend to provide the most tailored UX.



RESPONSIVE DESIGN



ADVANTAGE MOBILE APP



Are you sending and receiving massive amounts of data?

An app will generally work faster than a responsive website since it doesn't rely as heavily on Internet and network speed to serve up information. However, responsive websites may soon be closing the gap.

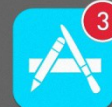
RESPONSIVE DESIGN



ADVANTAGE MOBILE APP

Do you plan to make frequent updates?

Native applications make frequent updates rather painful. First, application updates need to go through the same lengthy approval process in the App Store. If you expect to have frequent design updates, a responsive design may be the simplest way to ensure your users are accessing the most recent version.



ADVANTAGE RESPONSIVE DESIGN



MOBILE APP

Are you trying to monetize content and encourage purchasing?

If you have a product that offers potential for ongoing micro-purchases, then a native application is the way to go. A shopping cart on your website can facilitate this, but the in-app purchasing system is so simple and tied into all the rest of a user's purchases on the platform that it is second to none.



RESPONSIVE DESIGN



ADVANTAGE MOBILE APP



Are you trying to create something that's universally accessible?

If you want to appeal to everyone across multiple platforms and devices, responsive is the answer. It's faster and easier to get your product in people's hands, and it's fairly straightforward to build a mobile-specific menu that gives mobile users what they need.

ADVANTAGE RESPONSIVE DESIGN



MOBILE APP

Responsive Design vs Native App

<http://www.tablexi.com/mobile/infographic-mobile-app-vs-responsive-website/>

Native – Hybrid - Web apps

NATIVE vs. WEB vs. HYBRID: 7 FACTORS OF COMPARISON

KEY

CON

PRO

NEUTRAL

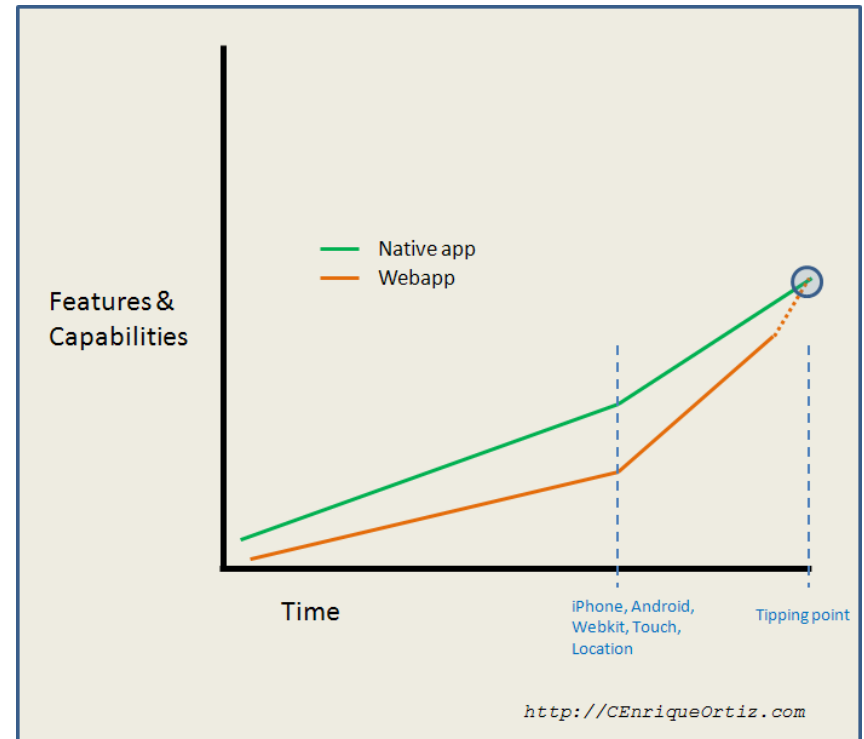
	NATIVE	HYBRID	WEB
COST	Commonly the highest of the three choices if developing for multiple platforms	Similar to pure web costs, but extra skills are required for hybrid tools	Lowest cost due to single codebase and common skillset
CODE REUSABILITY/ PORTABILITY	Code for one platform only works for that platform	Most hybrid tools will enable portability of a single codebase to the major mobile platforms	Browser compatibility and performance are the only concerns
DEVICE ACCESS	Platform SDK enables access to all device APIs	Many device APIs closed to web apps can be accessed, depending on the tool	Only a few device APIs like geolocation can be accessed, but the number is growing
UI CONSISTENCY	Platform comes with familiar, original UI components	UI frameworks can achieve a fairly native look	UI frameworks can achieve a fairly native look
DISTRIBUTION	App stores provide marketing benefits, but also have requirements and restrictions	App stores provide marketing benefits, but also have requirements and restrictions	No restrictions to launch, but there are no app store benefits
PERFORMANCE	Native code has direct access to platform functionality, resulting in better performance	For complex apps, the abstraction layers often prevent native-like performance	Performance is based on browser and network connection
MONETIZATION	More monetization opportunities, but stores take a percentage	More monetization opportunities, but stores take a percentage	No store commissions or setup costs, but there are few monetization methods

<https://html5test.com/compare/browser/index.html>

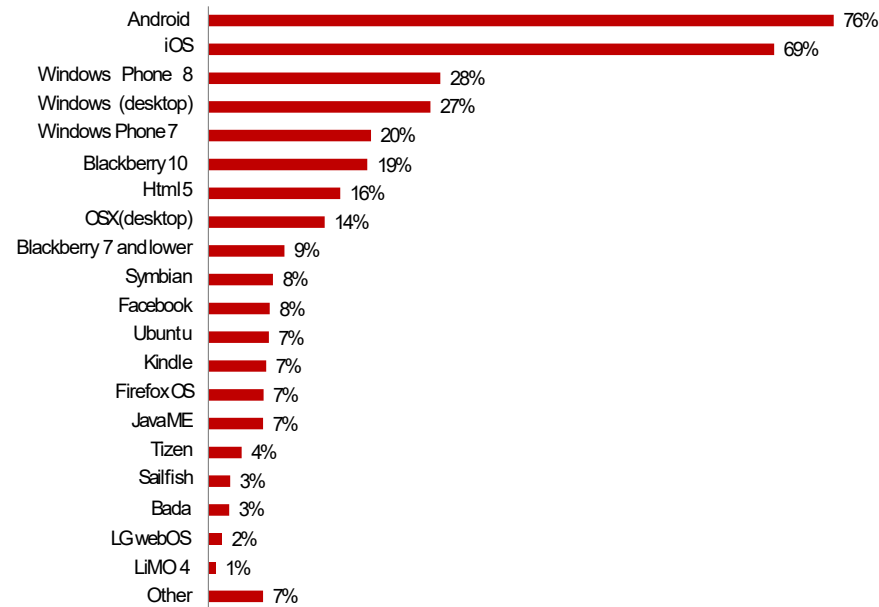
<https://developer.mozilla.org/en-US/docs/Web/Guide/API/Camera>

Mobile Web App vs. Native – cntd.

- Progressive Web Apps (PWAs)
- Twitter Lite
- Forbes
- Flipkart Lite



Platforms CPT users publish apps on



Source: research2guidance, **CPT Benchmarking Study 2014**, n=2,188

<http://www.research2guidance.com/r2g/Cross-Platform-Tool-Benchmarking-Report-2014.pdf>



Mobile Apps Information Architectures

Web Information architect

- The structural design of shared information environments
- The combination of organizations, labeling, search, and navigation systems within websites and intranets
- The art and science of shaping information products and experiences to support usability and findability
- An emerging discipline and community of practice focused on bringing principles of design and architecture to the digital landscape

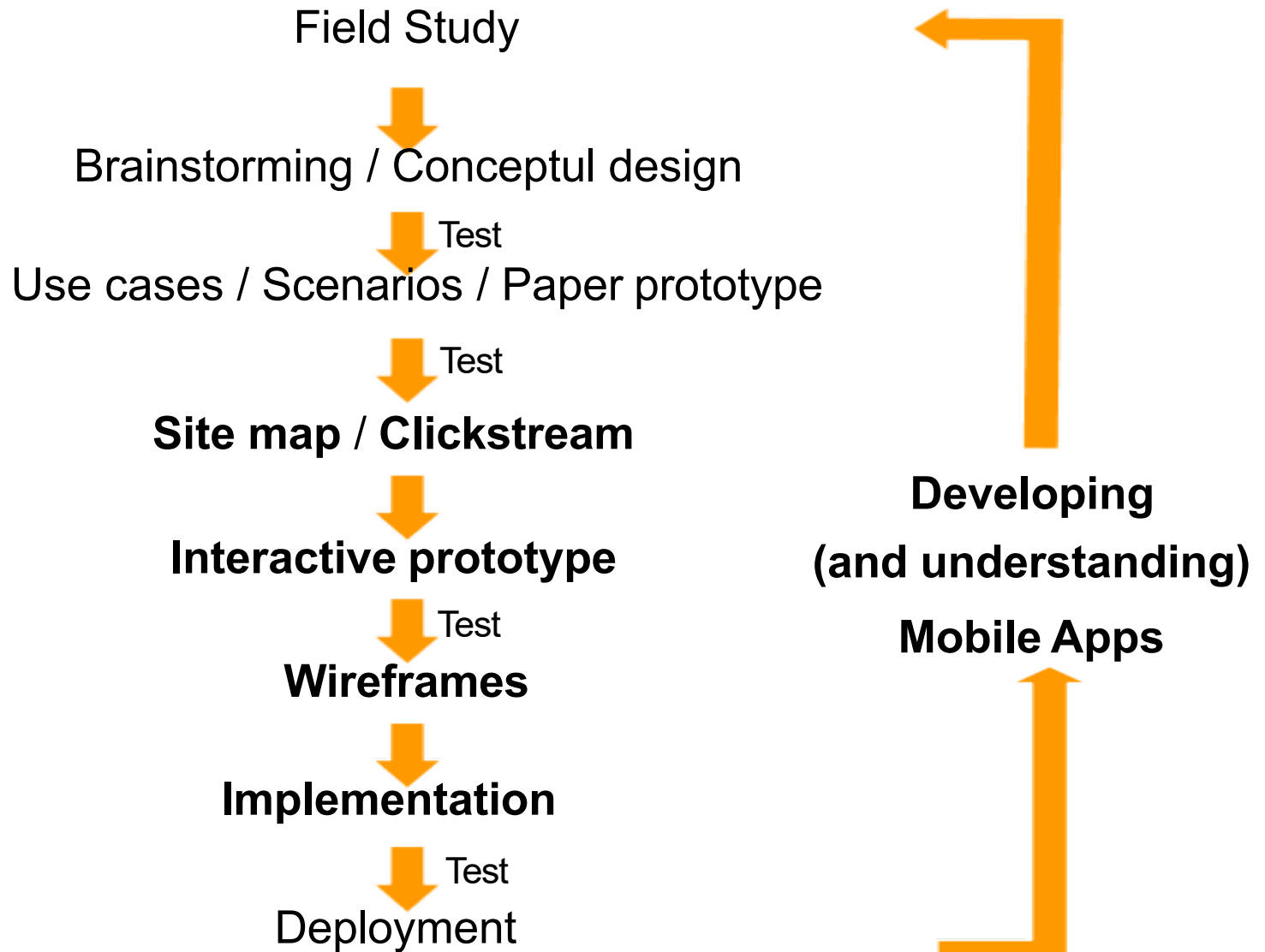
[Morville and Rosenfeld 2002]



Mobile Information Architecture: Keep it simple ,)

1. Site Maps: Relationship of content
2. Clickstream: Showing the behavior on websites
3. Wireframes: Lay out information on the page
4. Paper prototypes: Wireframes shows static views but not interaction.
5. HTML prototype: Semifunctional static prototype using XHTML, CSS, and JavaScript

[Mobile Design and Development, Brian Fling, O'Reilly Media, August 2009]



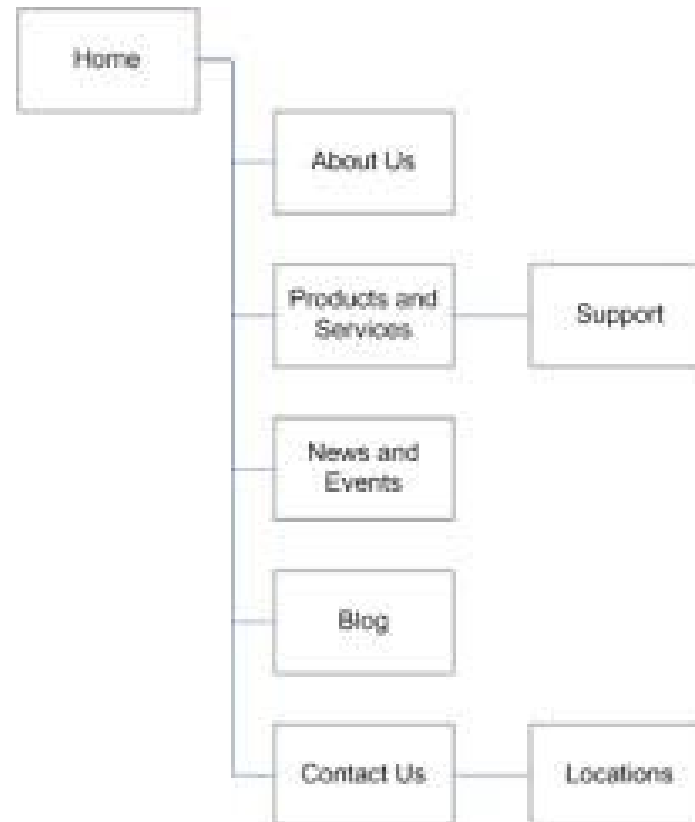


Site maps

- Classic information architecture in the Web
- List of views in a hierarchical fashion
- Represent relationships of content
- Provide a map to travel the information space

Site map

diagram showing the structure of the mobile web app



Clickstreams

- Shows the behavior of the user
 - How the user travels
- When to do it:
 - In the beginning
 - Visually lay out the paths
 - Holistic view like a road map
 - Used to see possible shortcuts
 - In the end
 - Log usage information
 - Heat-mapping
 - Percentage of "clicks"
 - Used to detect flaws in the information architecture
 - Possible ethical implications





Site maps VS Clickstreams

- Site maps
 - How the views are structured and their relationships
- Clickstreams
 - How the user can travel between the views



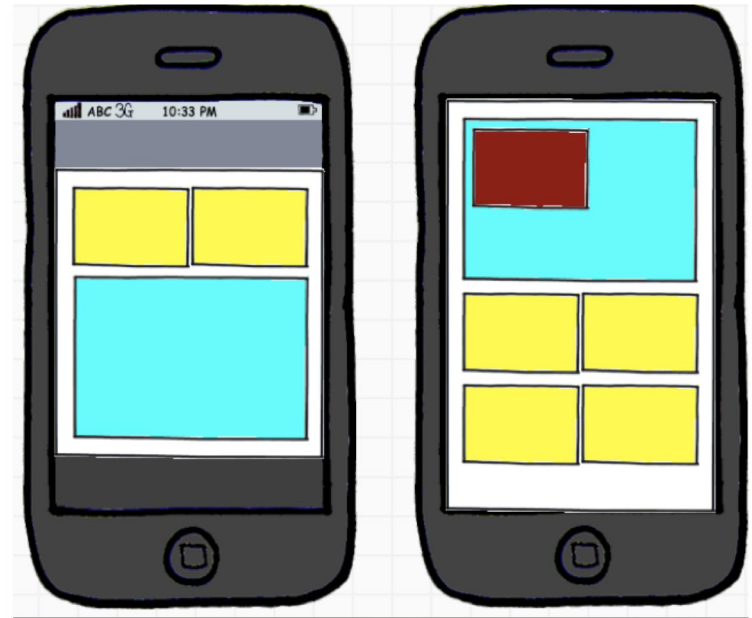
Mobile Web design

Mobile Web design



Typical App Composition

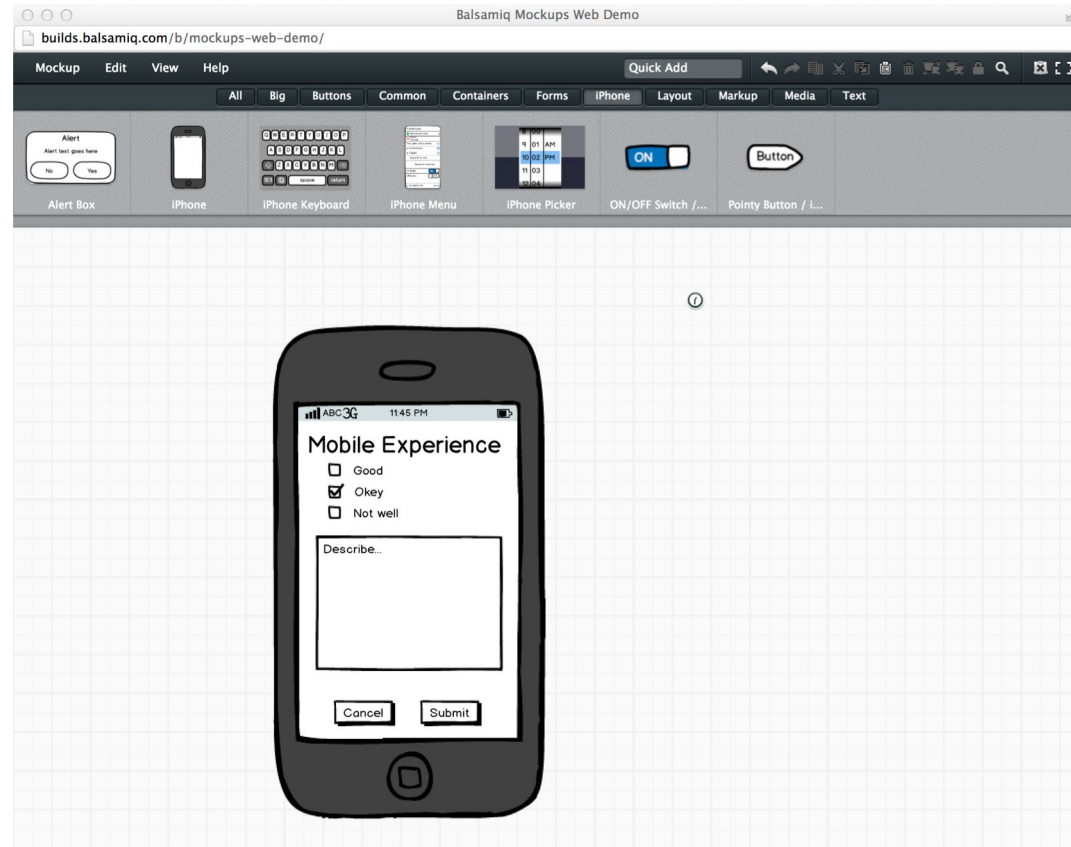
- A single window or stack of windows
- Top menu w navigation
- Tab Group containing many windows
- Difference between Mobile Web App and Desktop Web?



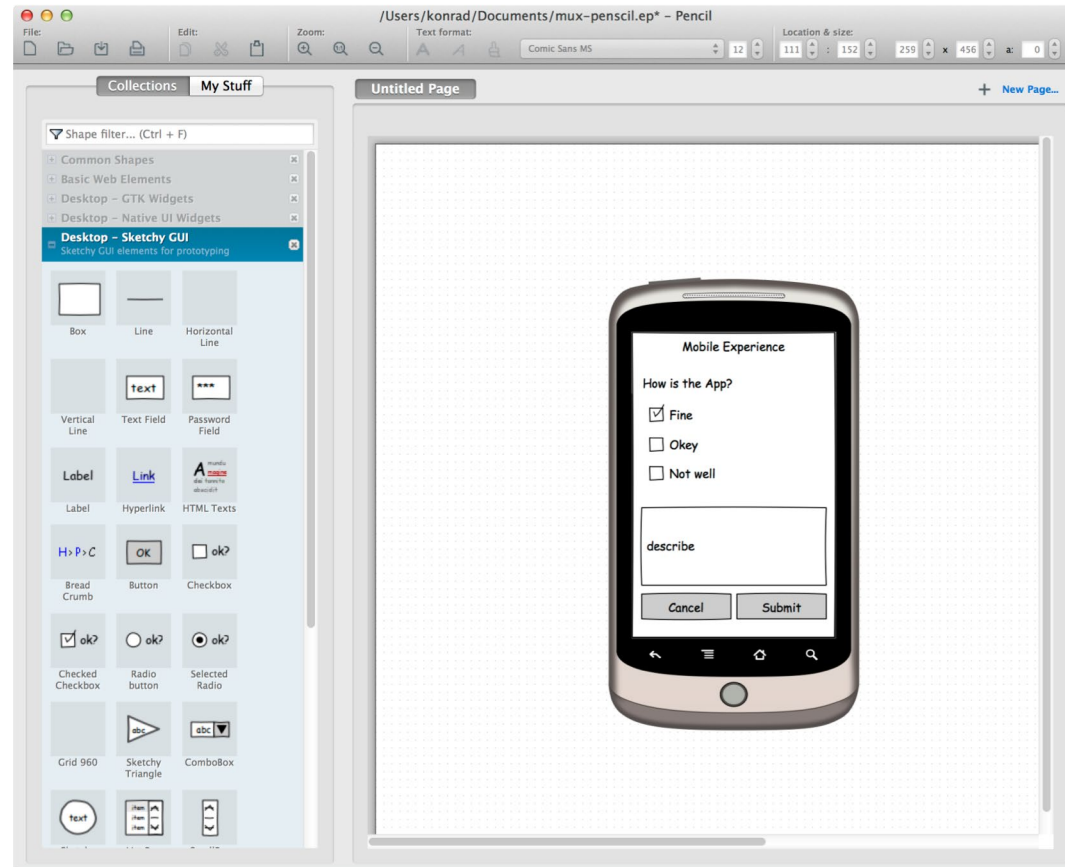
Wireframes



Prototypes / Web Mockups / Wireframes : Balsamiq



Prototypes / Web Mockups / Wireframes : Pensil



Web-based tools for prototyping

- Origami
 - <http://origami.design/>
- Marvel
 - <https://marvelapp.com/>
- Pop
 - <https://popapp.in/>
- Framer
 - <https://framerjs.com/>
 - <https://github.com/koenbok/Framer>

A/B testing

- Amy Gallo, “A Refresher on A/B Testing”, June 28, 2017, Harvard Business Review
<https://hbr.org/2017/06/a-refresher-on-ab-testing>
- In your case is not most likely “standard” A/B, but some initial aspects are surely relevant
- Important to provide a questionnaire (e.g. GoogleForms) with a prototype version (A or B, better not both)
- Ask specific questions with feedback input in MOS scale, e.g, like 1-5
- This makes it easy to perform statistical analysis of the retrieved data!



Mobile Web Development



EDIT



HELP US



EXPLORE



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wikiHow to Ride a Bicycle

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? Community Q&A

Do you wish to go outside and ride a bike? Maybe you're embarrassed that you don't know how to ride a bike yet? Or quite possibly, you're as eager as anything to start riding and enjoying one of the healthiest and most satisfying forms of self-transportation possible! To ride a bicycle, follow these simple steps.



Steps



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[Click a star to vote](#)Co-authors: **188**Updated: **12 days ago**Views: **1,203,654**

Related Articles





Web Stds

HTML, XHTML, WML, XHTML Basic, XHTML-MP, etc

- XHTML (Extensible HyperText Markup Language) is a family of XML markup languages that extend HTML.
- <http://en.wikipedia.org/wiki/XHTML>

CSS: Cascading Style Sheets

- Cascading Style Sheets (CSS) is a style sheet language
- <http://www.w3.org/Style/CSS/>

JavaScript:

- JavaScript (JS) is an open source programming language commonly implemented as part of a web browser in order to create enhanced user interfaces and dynamic websites.
- JavaScript, DHTML, Ajax
- <https://developer.mozilla.org/en/JavaScript>



HTML development:

Prerequisite knowledge

HTML content

- <http://diveintohtml5.info>
- http://www.w3schools.com/html/html5_intro.asp

CSS (Cascading Style Sheets) style

- http://www.w3schools.com/css/css3_intro.asp

JavaScript logic

- <http://www.w3schools.com/js/>
- http://www.w3schools.com/jquery/default.asp?utm_source=twitterfeed&utm_medium=twitter



HTML5 is the new standard for HTML

Some rules for HTML5 were established:

- New features should be based on HTML, CSS, DOM, and JavaScript
- Reduce the need for external plugins (like Flash)
- Better error handling
- More markup to replace scripting
- HTML5 should be device independent
- The development process should be visible to the public

New HTML5 Elements

- semantic elements like i.e.
`<header>`, `<footer>`, `<article>`, and `<section>`.
- attributes of form elements e.g.
number, date, time, calendar, and range.
- graphic elements:
`<svg>` and `<canvas>`.
- multimedia elements:
`<audio>` and `<video>`.



New API's in HTML5

- HTML Geolocation
- HTML Drag and Drop
- HTML Local Storage
- HTML Application Cache
- HTML Web Workers
- HTML SSE

Basic HTML5

```
① <!DOCTYPE html>
② <html>
③ <head>
④ <meta charset="UTF-8">
⑤ <title>Title of the document</title>
⑥ </head>
⑦ <body>
⑧   Content of the document.....
⑨ </body>
⑩ </html>
```

http://www.w3schools.com/html/html5_intro.asp

https://www.w3schools.com/html/tryit.asp?filename=tryhtml_default



Javascript

JavaScript is Scripting Language that can be inserted into HTML pages, can be executed by all modern web browsers. And soon also mobile web browsers

JavaScript is easy to learn:

- Writing Into HTML Output
- Reacting to Events
- Changing HTML Content
- Changing HTML Styles
- Validate Input

JavaScripts Example: Events

```
① <!DOCTYPE html>
② <html>
③ <body>
④ <h2>My First JavaScript</h2>
⑤ <button type="button"
⑥ onclick="document.getElementById('demo').innerHTML
  = Date()">
⑦ Click me to display Date and Time.</button>
⑧ <p id="demo"></p>
⑨ </body></html>
```

https://www.w3schools.com/js/tryit.asp?filename=tryjs_myfirst

Mobile web frameworks

Frameworks:

jQuery Mobile [old]

Bootstrap

PhoneGap (Cordova)

Intel XDK

Famo.us

Ionic Framework [AngularJS]

Sencha Touch

Mobile Angular UI

Multiplatform:

MoSync

QT

Unity

Meteor

FireBase

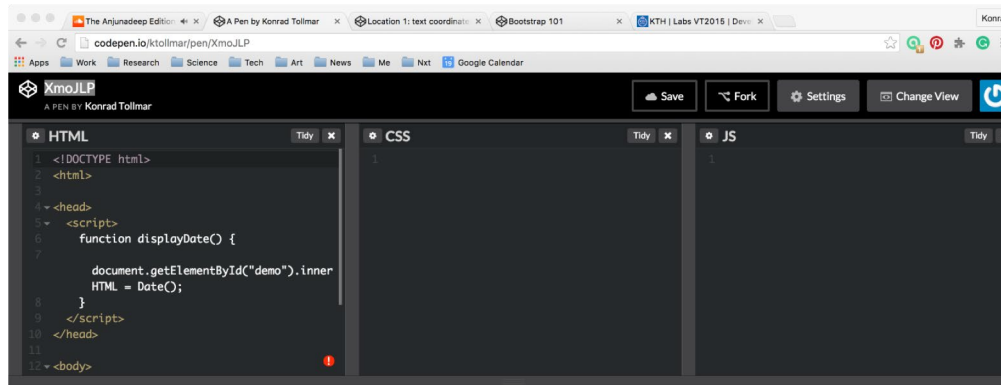
http://en.wikipedia.org/wiki/Multiple_phone_web-based_application_framework

http://en.wikipedia.org/wiki/Mobile_application_development

How to start?

- w3schools tryit
 - Use Chrome and “Developer Tools” on your PC
 - In your mobile phone’s browser or download a mobile phone emulator
- Setup a local webserver
 - XAMPP (<http://www.apachefriends.org/index.html>)
 - Web Server for Chrome (<https://www.chromebeat.com>)
- Publish files on Web
 - Google drive
 - Create a folder and make public
 - Add files etc

<http://codepen.io/>



My First JavaScript

This is a paragraph.

Display Date



Exercise: Convert tryjs_myfirst into CodePen

Try on a “real” device



- <https://mobiletestingblog.com/2016/10/26/mobile-testing-on-real-devices-vs-emulators/>
- <https://developers.google.com/web/tools/chrome-devtools/device-mode/>

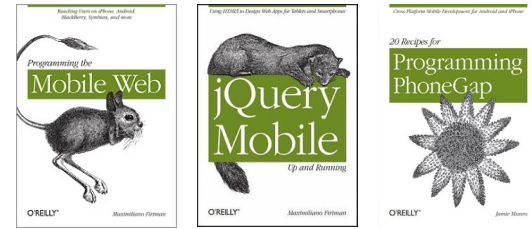
Some more links...

- <http://phonegap.com/>
- <http://getbootstrap.com/>
- <https://angularjs.org/>

- <http://www.appnotch.com/>
- <http://html5boilerplate.com/mobile/>

- <http://app-framework-software.intel.com/>
- <https://crosswalk-project.org/>

References



- Mobile Design and Development: MDD: 6-9,15
- Mark W. Newman and James A. Landay. 2000. Sitemaps, storyboards, and specifications: a sketch of Web site design practice, DIS '00, 263-274.
- Zakas N. (2013) The evolution of web development for mobile devices. Commun. ACM56, 4 (April 2013), 42-48.
- Research2guidance (2014) Cross Platform App Development Tool Benchmarking
- <http://www.w3.org/standards/webdesign/mobilweb>
- http://en.wikipedia.org/wiki/Mobile_Web



Assignment 2: WebApp Prototype

High Fidelity prototype

- Define a High Fidelity prototype with Figma and share it online to your social contacts to get more detailed feedback on specific design aspects. I
- Use this moment to assess user preferences on specific open design issues. This can be achieved by defining a couple of slightly different prototype versions (varying only for the features to be tested) and performing an A/B testing on the experimental data points that will return with the Google Forms. Remember to add also some selector questions, e.g. 1-5, and not only open ended questions to be answered with text!

Web app prototype

- Based on your Balsamiq prototype develop a similar UI using one of the web application frameworks for mobile and touch applications, like JQuery Mobile, jQTouch.
- Test your new prototype with real users (record and take notes for documentations).
- Compare and improve the prototype based on the outcomes from the real users' feedbacks.

Write a report of 2-4 pages including choice of Web App tools, implementation, pictures of your Web App prototype, and the results of the tests.



Nxt...

- L2: Mobile Web Frameworks
- F3: Mobile Ecosystem
- F4: Native Apps
- L4: Android SDK
- F5: Mobile Mashups
- L5: Mobile Web Services
- F6: Internet of Things



JavaScript

- Scripts can be put in the <body> and in the <head> section of an HTML page, but also external JavaScripts
- Scripts in HTML must be inserted between <script> and </script> tags.

Test this:

http://www.w3schools.com/js/tryit.asp?filename=tryjs_where_to_head

Exercise 1: Port this example to Codepen

JavaScripts Example: Canvas

- ① `<!DOCTYPE html>`
- ② `<html>`
- ③ `<body>`
- ④ `<canvas id="myCanvas" width="200" height="100" style="border:1px solid #d3d3d3;">`
Your browser does not support the HTML5 canvas tag.`</canvas>`
- ⑤ `<script>`
`var c=document.getElementById("myCanvas");`
`var ctx=c.getContext("2d");`
`ctx.moveTo(0,0);`
`ctx.lineTo(200,100);`
`ctx.stroke();`
`</script>`
- ⑥ `</body>`
`</html>`

http://www.w3schools.com/html/tryit.asp?filename=tryhtml5_canvas_tut_path



Google Map in HTML5 / Javascript

- ① `<!DOCTYPE html> <html> <body>`
- ② `<p id="demo">Click the button to get your position.</p>`
- ③ `<button onclick="getLocation()">Try It</button>`
- ④ `<div id="mapholder"></div>`
- ⑤

```
<script>
var x = document.getElementById("demo");
function getLocation() {
  if (navigator.geolocation) {
    navigator.geolocation.getCurrentPosition(showPosition, showError);
  } else {
    x.innerHTML = "Geolocation is not supported by this browser.";
  }
}
```
- ⑥

```
function showPosition(position) {
  var latlon = position.coords.latitude + "," +
    position.coords.longitude;
  var img_url =
    "https://maps.googleapis.com/maps/api/staticmap?center="
    +latlon+"&zoom=14&size=400x300&key=AIzaSyBu-
    916DdpKAjTmJNIngS6HL_kDIKU0aU";
  document.getElementById("mapholder").innerHTML =
    "<img src='"+img_url+"'>";
}
```
- ⑦

```
function showError(error) {...}
```
- ⑧ `</script></body></html>`
- ⑨

https://www.w3schools.com/html/tryit.asp?filename=tryhtml5_geolocation_map

Exercise 2: Add markers to the map

jQuery

- A JavaScript Library that greatly simplifies JavaScript programming.
- Wraps common tasks into methods that you can call with a single line of code.
- Contains the following features:
 - HTML/DOM manipulation
 - CSS manipulation
 - HTML event methods
 - Effects and animations
 - AJAX
 - Utilities

<http://www.w3schools.com/jquery>

JQuery example #1

```
① <!DOCTYPE html>
② <head>
③ <script
  src="https://ajax.googleapis.com/ajax/libs/jquery/3.1.1/jquery.min.js">
④ </script>
⑤ <script>
⑥ $(document).ready(function() {
⑦     $("button").click(function() {
⑧         $("p").hide();
⑨     });});
⑩ </script>
⑪ </head>
⑫ <body>
⑬ <h2>This is a heading</h2>
⑭ <p>This is a paragraph.</p>
⑮ <p>This is another paragraph.</p>
⑯ <button>Click me to hide paragraphs</button>
⑰ </body>
⑱ </html>
```

Exercise 3: Create a btn that both hide the paragraphs.

JQuery example #2

```
① <!DOCTYPE html>
② <head>
③ <script
  src="https://ajax.googleapis.com/ajax/libs/jquery/3.1.1/jquery.min.js">
④ </script>
⑤ <script>
⑥ $(document).ready(function() {
⑦     $("p").click(function() {
⑧         $(this).hide();
⑨     });
⑩ });
⑪ </script>
⑫ </head>
⑬ <body>
⑭ <p>If you click on me, I will disappear.</p>
⑮ <p>Click me away!</p>
⑯ <p>Click me too!</p>
⑰ </body>
⑱ </html>
```

http://www.w3schools.com/jquery/tryit.asp?filename=tryjquery_hide

jQuery Mobile

jQuery Mobile is a touch-optimized mobile web framework in JavaScript:

- Compatible with all major mobile platforms as well as all major desktop browsers
- Built on top of jQuery core so it has a minimal learning curve for people already familiar with jQuery syntax.
- Theming framework that allows creation of custom themes.
- Limited dependencies and lightweight to optimize speed.
- HTML5-driven configuration for laying out pages with minimal scripting
- Ajax-powered navigation with animated page transitions that provides ability to clean URLs through pushState.
- UI widgets that are touch-optimized and platform-agnostic

<http://jquerymobile.com/>

jQuery Mobile Example: Lists

```
<!DOCTYPE html>
<html>
<head>
<title>Page Title</title>
<meta name="viewport" content="width=device-width, initial-scale=1">
<link rel="stylesheet"
href="http://code.jquery.com/mobile/1.4.5/jquery.mobile-1.4.5.min.css" />
<script src="http://code.jquery.com/jquery-3.2.1.min.js"></script>
<script src="http://code.jquery.com/mobile/1.4.5/jquery.mobile-
1.4.5.min.js"></script>
</head>
<ul data-role="listview">
  <li><a href="#">Acura</a></li>
  <li><a href="#">Audi</a></li>
  <li><a href="#">BMW</a></li>
  <li><a href="#">Cadillac</a></li>
  <li><a href="#">Ferrari</a></li>
</ul>
</html>
```

Exercise 4: Browse <http://demos.jquerymobile.com/1.4.5/> and test RIB

Bootstrap = Mobile-first

- Bootstrap was developed by Mark Otto and Jacob Thornton at Twitter as a framework to encourage consistency
- HTML and CSS-based design templates for typography, forms, buttons, navigation and other interface components
- Optional JavaScript extensions in the form of jQuery plugins.
- Bootstrap is compatible with the latest versions of all major browsers.
- No.1 project on GitHub (June 2014)

<http://www.w3schools.com/bootstrap/>

<http://mobileangularui.com>

Bootstrap

Bootstrap Grid System: 12 columns across the page

span1	span1	span1	span1	span1	span1	span1	span1	span1	span1	span1	span1
span 4				span 4				span 4			
span 4				span 8							
span 6						span 6					
span 12											

The Bootstrap grid system has four classes:

- xs (for phones - screens less than 768px wide)
- sm (for tablets - screens equal to or greater than 768px wide)
- md (for small laptops - screens equal to or greater than 992px wide)
- lg (for laptops and desktops - screens equal to or greater than 1200px wide)



Bootstrap Example

Three Equal Columns

```
<div class="row">
  <div class="col-sm-4">.col-sm-4</div>
  <div class="col-sm-4">.col-sm-4</div>
  <div class="col-sm-4">.col-sm-4</div>
</div>
```

Need a bit more: Mobile Angular UI is a mobile UI framework just like Sencha Touch or jQuery Mobile.

Exercise 5: Go to <http://mobileangularui.com/docs/#learning-by-examples>.
Download and install on your machine, then browse the demo folder

