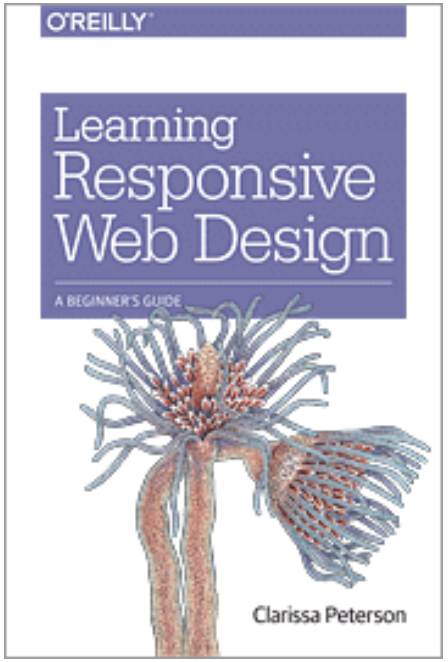
Mobile web development

Putting internet technology on phones and tablets

CENTRIQ TRAINING

Course materials

- **Learning Responsive Web Design -** A Beginner's Guide
- By Clarissa Peterson
- O'Reilly Media
- June 2014



Optional book

- **Mobile Application Development: JavaScript Frameworks by** Hazem Saleh; Ethan Holmes; Tom Bray; Sani Yusuf; Packt Publishing, Sep 2016

Best practices and standards committees leading the efforts for mobile web apps.

Guidelines and standards

Mobile Web Application best practices

- http://www.w3.org/TR/mwabp/ (Dec 2010)
  - The focus of 2008's MWBP was mobile Web *browsing*.
  - The focus of MWABP is development of mobile Web *applications*.
- Cards
  - http://www.w3.org/2010/09/MWABP/

W3C

Spare the network

Use appropriate Web protocol features to reduce network bottlenecks and latency.

- Use transfer compression.
- Cache resources by fingerprinting resource references.
- Cache AJAX data.
- Minimize external resources.
- Minimize application and data size.
- Use cookies sparingly.
- Do not send cookie information unnecessarily.
- Optimize network requests.
- Avoid redirects.

TOP ↑

W3C

Set users free

Mobile devices are used in various contexts, from killing time at home to urgent requests on the go. Let users know and control what happens to earn their trust.

- Ensure the user is informed about use of personal and device information.
- Enable automatic sign-in.
- Offer users a choice of interfaces.
- Don't change focus when dynamically updating page sections.

TOP ↑

W3C

www

Remember Web principles

Mobile devices are just one way to access the Web. Generic Web principles also apply to the development of robust mobile Web applications.

- Replicate local data.
- Ensure consistency of state between devices.
- Do not execute unescaped or untrusted JSON data.
- Use fragment IDs to drive application view.

TOP

W3C

Design for flexibility

Web applications are run in evolving and heterogeneous environments. Flexibility allows you to address more devices and users at reduced cost.

- Design for multiple interaction methods.
- Ensure text flows.
- Prefer server-side detection where possible.
- Use client-side detection when necessary.
- Use device classification to simplify content adaptation.
- Support a non-JavaScript variant if appropriate.

TOP ↑

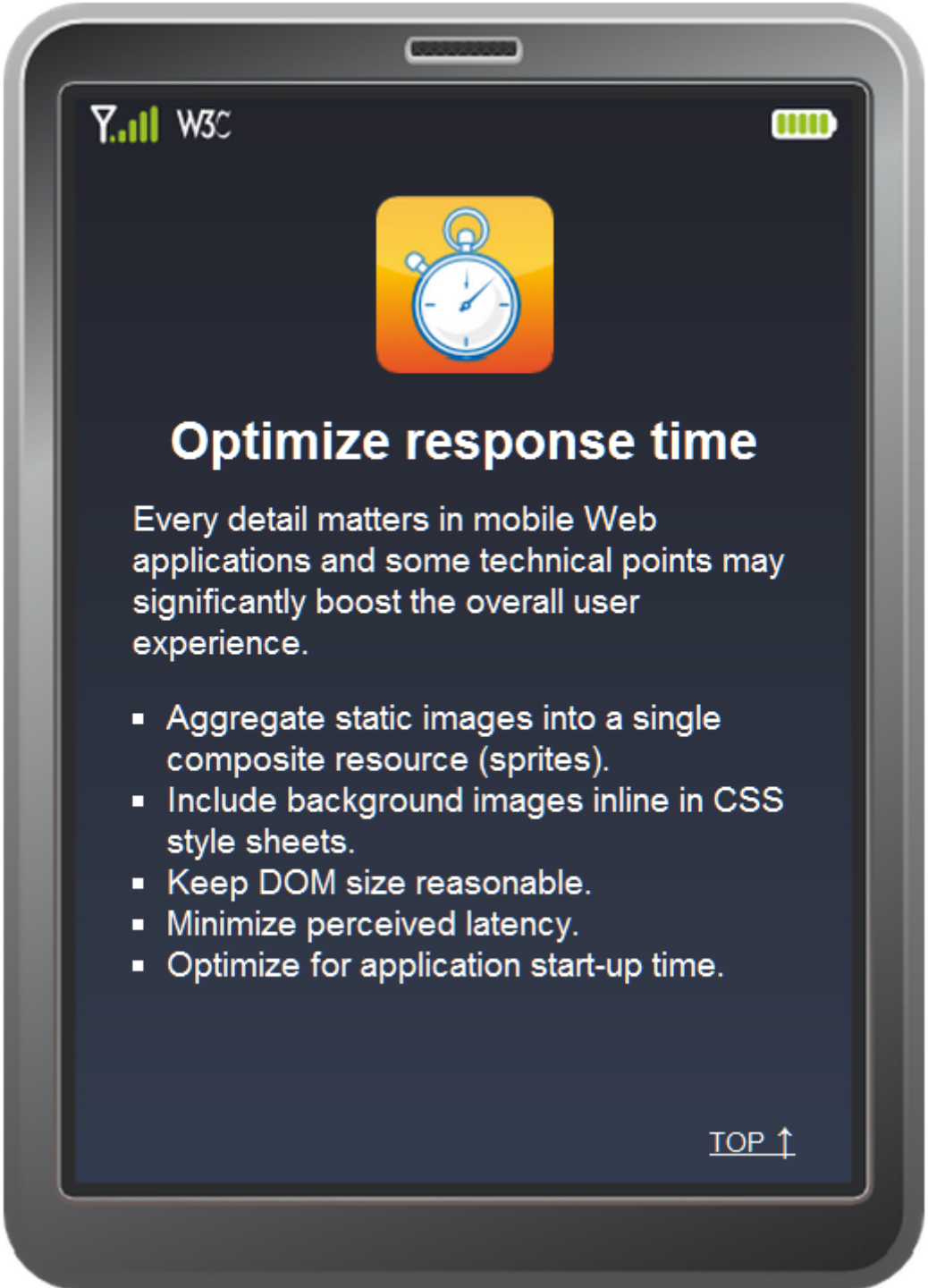
W3C

Exploit mobile-specific features

Some Web technologies are particularly relevant to mobile devices. Learn to use them.

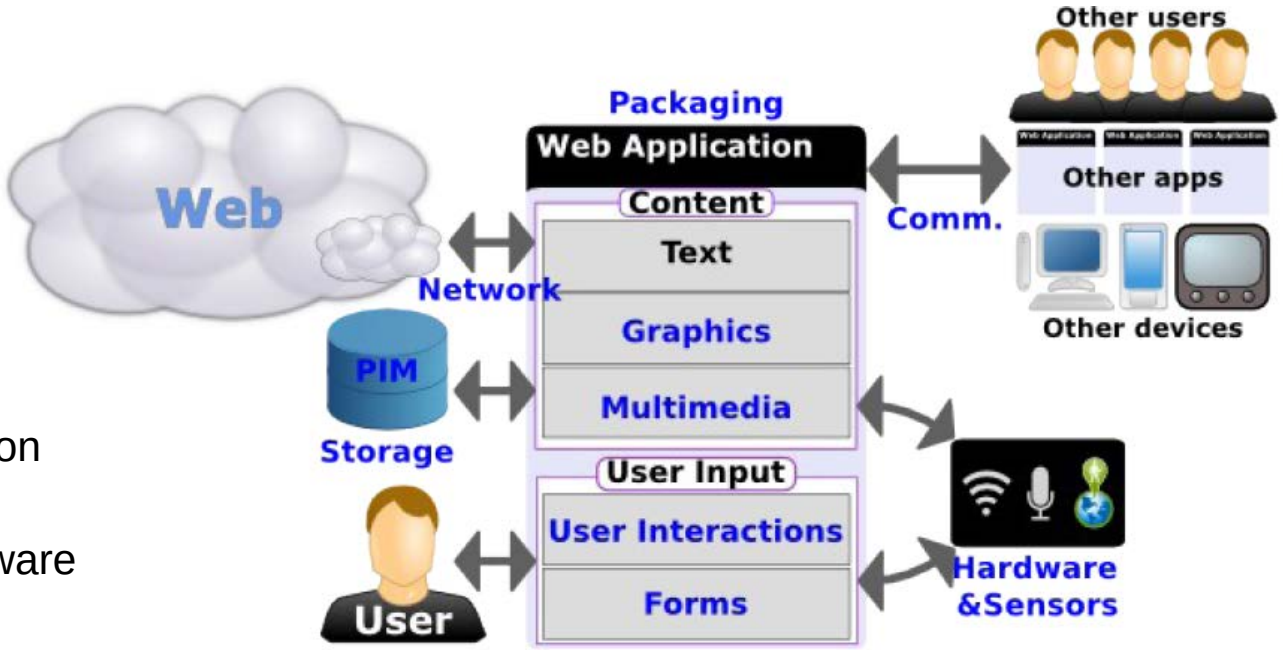
- Make telephone numbers "click-to-call".
- Consider mobile-specific technologies for initiating Web applications.
- Use the meta viewport element to identify the desired screen size.
- Use appropriate client-side storage technologies for local data.

TOP ↑


W3C
Optimize response time
Every detail matters in mobile Web applications and some technical points may significantly boost the overall user experience.
Aggregate static images into a single composite resource (sprites).
Include background images inline in CSS style sheets.
Keep DOM size reasonable.
Minimize perceived latency.
Optimize for application start-up time.
TOP

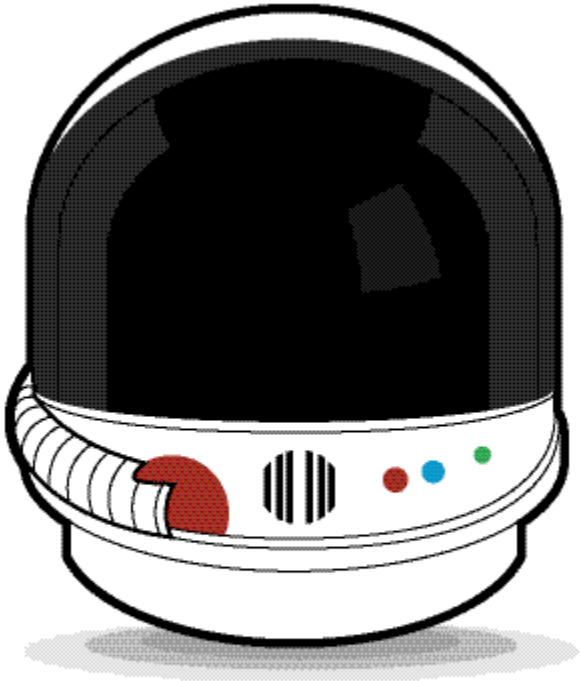
W3C Current state and roadmap

- http://www.w3.org/2012/02/mobile-web-app-state/
  - Graphics
  - Multimedia
  - Device Adaptation
  - Forms
  - User interactions
  - Data storage
  - Personal Information Management
  - Sensors and hardware integration
  - Network
  - Communication and Discovery
  - Packaging
  - Performance & Optimization



Future Friendly

- http://futurefriend.ly/
  - Luke Wroblewski
  - Brad Frost
  - Lyza D. Gardner
  - Stephanie & Bryan Rieger
  - Scott Jenson
  - Jeremy Keith
  - Scott Jehl
  - Jason Grigsby
  - Josh Clark

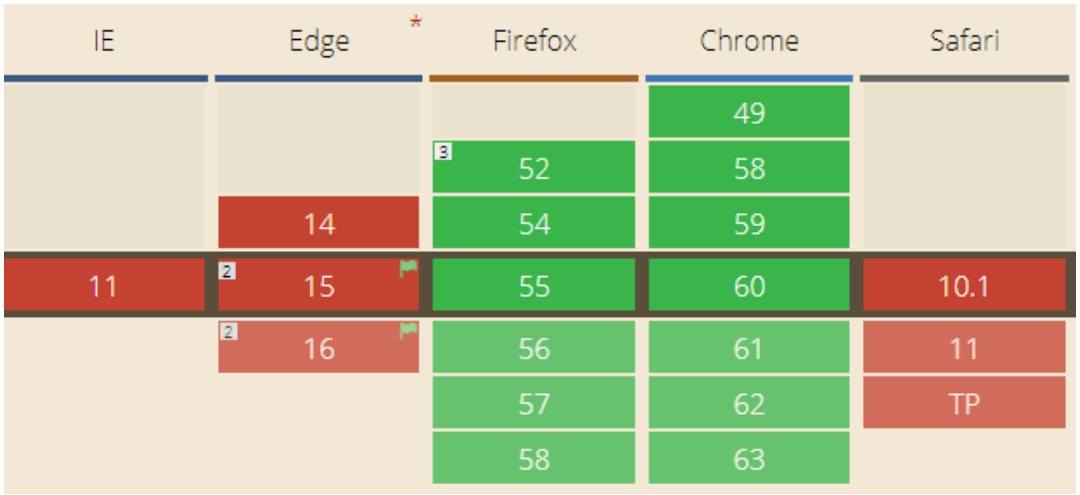


WebAssembly

- http://webassembly.org/

Progressive web apps

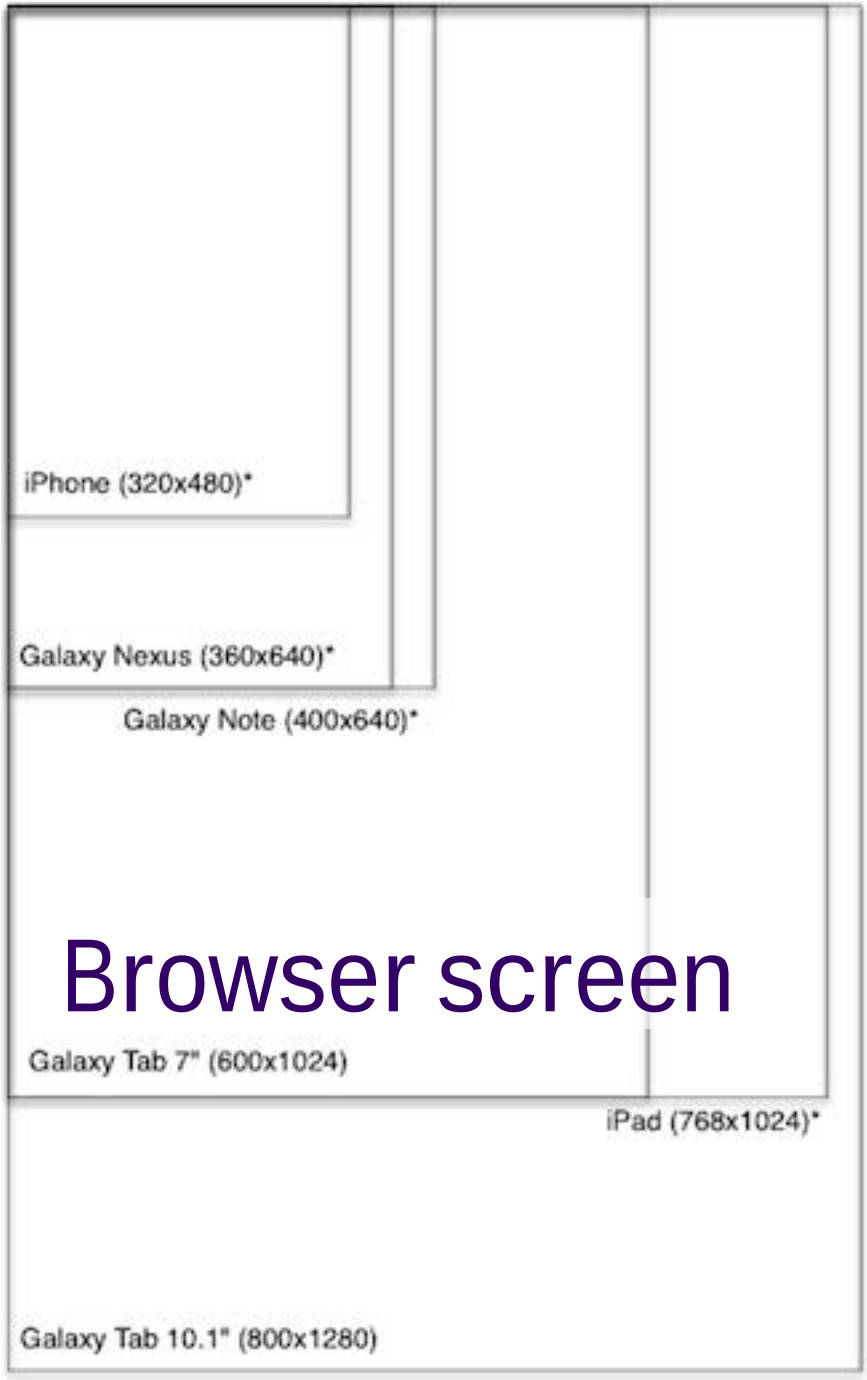
- Google’s responsive web apps which implies
  - HTTPS connection
  - install banners to add to home screen
  - Enabled by application manifest and **service workers** to instantly load app
- Firefox and Chrome support SW
- Chrome only for manifest



Exercise

- Follow instructions in Exercises handout for
  - 1. Create an html template for mobile
  - 2. FTP your site to remote host

server/host	doughoff.com
port	21
Encryption	Only use plain FTP (insecure)
username	mobilewebapps@doughoff.com
password	mobilewebapps395
Advanced - Remote directory (teacher will assign #	/student0?
URL	http://squarealarm.com/mobilewebapps/student0?/


iPhone (320x480)*
Galaxy Nexus (360x640)*
Galaxy Note (400x640)*
Browser screen
Galaxy Tab 7" (600x1024)
iPad (768x1024)*
Galaxy Tab 10.1" (800x1280)

The browser screen

- CSS pixels
  - Expand and contract with zooming; measurement grid for all CSS declarations.
  - Different than hardware units

The browser screen

- Density-independent (device or virtual) pixels
  - Formal number of pixels on device. An abstraction implemented by vendors.
    - Retina displays on iPhone 4,5 are 326 ppi
  - Generally **useless to web developers**.
    - Developers should control CSS pixels
  - JavaScript
    - **`screen.width`** and **`screen.height`**

Viewports

- The total amount of space for a CSS layout
  - desktop = browser window (width=100%)
- Layout viewport
  - The initial area of <HTML>
  - width: 20% would be calculated relative to this viewport
  - Wider than the visual viewport.
- JavaScript - **`document.documentElement.clientWidth`**

Viewports

- Visual viewport -
  - The actual screen viewport through which you look at the layout viewport.
  - JavaScript
    - in CSS pixels
    - **`window.innerWidth`**
      `window.innerHeight`
    - best choice - what the user is currently seeing

Viewport behavior

- Most browsers set visual viewport = layout viewport by zooming out
- Desktop resizing/zooming
  - viewport is shrunk
  - % & ems are recalculated
  - px never changes
- Mobile zooming
  - increase/decrease visual viewport - no recalc

The browser screen

- Event coordinates
- 5 pairs of properties are exposed for each mouse event - 3 are important
  - pageX/Y gives the coordinates relative to the <html> element in CSS pixels. **90% usage**
  - clientX/Y gives the coordinates relative to the viewport in CSS pixels. 10% usage
  - screenX/Y gives the coordinates relative to the screen in device pixels.

The browser screen

- media queries
  - **width**/height - the viewport, CSS pixels, use this on desktop
  - device-width/device-height - the screen, device pixels
- best mobile measurement for media queries
  - undecided
  - OK to ID the desktop, tablet or mobile device

The browser screen

- Summary of quirks
  - HTML5 doctypes affect measurements
  - Default viewports vary
  - Lifecycle can change widths
  - Don’t use height measurements, unless you are on iOS and need it for the width.
- Respond.js - polyfill for min/max width media queries in IE 6-8
- Peter-Paul Koch video on pixels
  - http://www.youtube.com/watch?v=4wscVOXjIzQ

Scrolling

- JavaScript
  - pixels off-screen - **`window.pageXOffset and window.pageYOffset`**
- CSS
  - Native in-element scrolling
    - overflow: scroll or auto
  - Fixed headers and footers
    - position: fixed

Web sites

- Peter-Paul Koch’s viewport tables
  - http://www.quirksmode.org/mobile/tableViewport.html
- Peter-Paul Koch’s compatibility tables
  - http://www.quirksmode.org/compatibility.html
- Phone size
  - http://phone-size.com/
  - actual sizes of phones with image test

`browser/*.html`

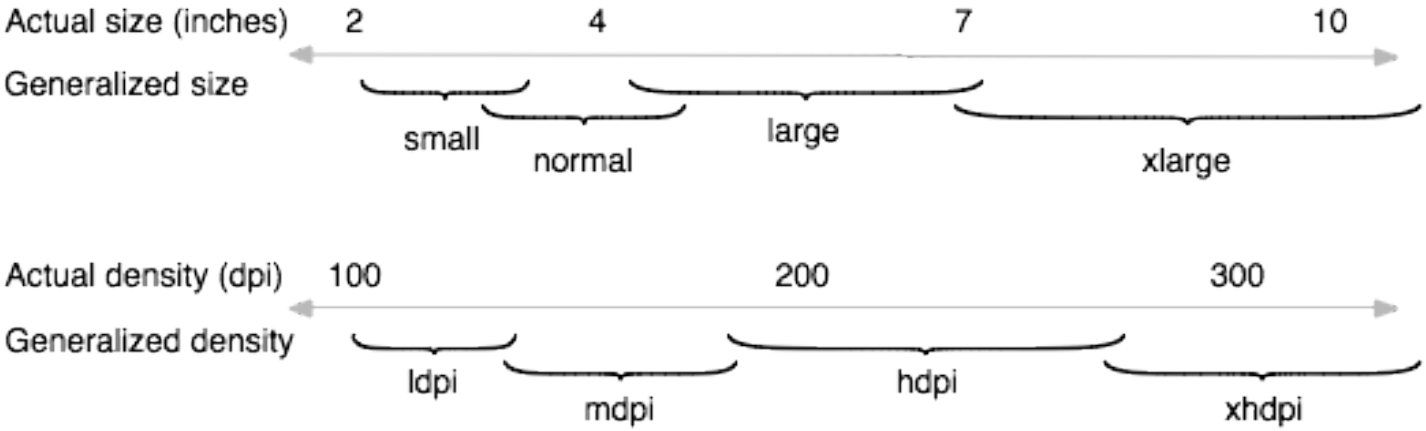
Exercise

- Follow instructions in Exercises handout for
  - Relative font sizes
  - Detect dimensions

Responsive web design

The problem

- multiple screen sizes
  - measured diagonally
- multiple screen densities
  - **medium**, high (1.5x), extra high (2x - Retina), xxhdpi (3x)
  - ignore hardware resolution (ppi)



History

- **Apr 2000** **The right thinking**
  John Allsop wrote “A Dao of Web Design” article
  - http://alistapart.com/article/dao
- **May 2010** **The right design**
  Ethan Marcotte coined term in “Responsive Web Design” article
  - http://alistapart.com/article/responsive-web-design
  - Book

Responsive

- **Adaptive / fluid / flexible** means designs that adjust to the layout
- **Responsive** is more encompassing
- Multiple components
  - flexible grid
  - flexible images
  - flexible CSS - media queries
  - flexible widgets

Mobile First

- **Nov 2009** Luke Wroblewski coined term
  - concentrate on the primary goals of the site
  - reverses graceful degradation
  - uses progressive enhancement

Speed enhancements

- Use file caching
- Move static assets to subdomain
  - reduces cookies being sent
- Apache?
  - use mod_deflate
- Use a CDN ($200/mo)

Reducing content strategies

- Flow
  - content blocks change width and height
  - based on importance
- Collapsing
  - accordions, carousels, scrollers
  - based on activity
- Deleted

User override

- No logic is perfect.
- Give users a choice to pick which version of the site they want.
  - provide a link to another version.
  - Desktop | Mobile

Books

Articles / Slides

- **Responsive Design Actually begins on the server** by Stephanie Rieger
  - http://www.slideshare.net/yiibu/adaptation-why-responsive-design-actually-begins-on-the-server
- **Creating a Mobile-First Responsive Web Design** by Brad Frost
  - http://www.html5rocks.com/en/mobile/responsivedesign/
- **The State Of Responsive Web Design** by Stéphanie Walter, Smashing Magazine. 5/29/2013
  - http://mobile.smashingmagazine.com/2013/05/29/the-state-of-responsive-web-design/

Google advice

- https://developers.google.com/web/fundamentals/design-and-ui/responsive/

Media queries

Intro

- Lets you use conditional CSS based on media feature rules
- Media types
  - all, braille, embossed, handheld, **print**, projection, **screen**, speech, tty, **tv**
- Adaptable layouts for mobile devices, print, …
  - @media screen {
    - /* layout, typography, colors rule sets */ }
  - @media print {
    - /* layout, typography, colors rule sets */ }

Media queries

- Three ways
  - @**media** screen { /* styles */ }
- Or
  - @**import** url(“640px.css”) screen and (max-width=640px);
  - <**link** rel="stylesheet" href="640px.css" media="screen and (max-width=640px)">

Media queries – features

- **width**
- height
- device-width
  - “we don’t care” - Peter-Paul Koch
- device-height
- orientation
- aspect-ratio
- device-aspect-ratio
- color
- color-index
- monochrome
- resolution
- scan
- grid

Media queries – feature prefixes

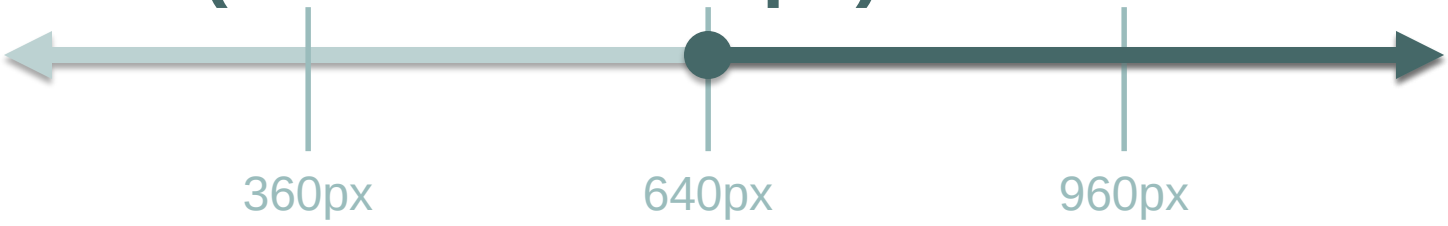
- prefixes can modify features
  - min-, max-
    - (at least) min-width
    - (no wider than) max-width
- Use any measurement style
  - @media screen and (min-width: 20em)
  - @media screen and (min-width: 20rem)
  - @media screen and (min-width: 320em)

Media queries - feature operators

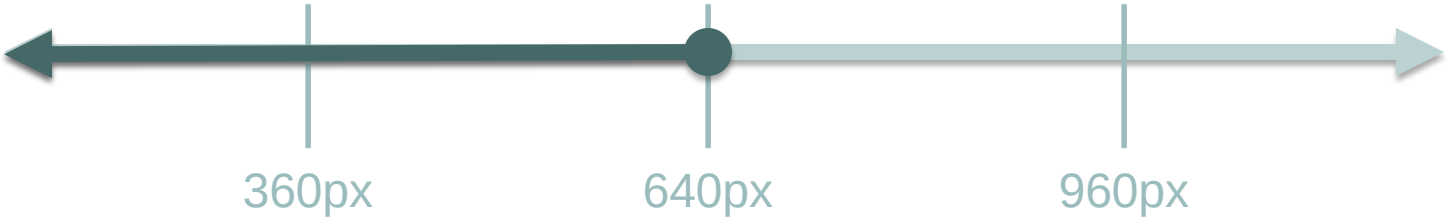
- and
  - @media screen and (min-width: 400px) and (max-width: 700px) { … }
- Minor
  - not
  - , - the union operator
    - @media handheld and (min-width: 20em), screen and (min-width: 20em) { … }
  - only
    - Used to hide style sheets from older browsers (<=IE8)

Setting breakpoints with width

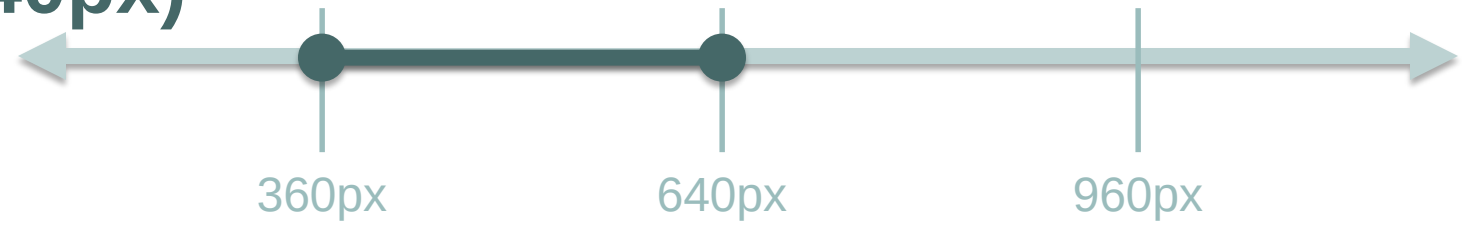
- **Base + (min-width 640px) mobile first**



- **Base + (max-width: 640px) degrading**



- **Base + (min-width 360px) and (max-width: 640px)**



Feature detection - resources

- matchMedia
  - API for finding out whether or not a media query applies to the document (no support in <=IE9)
  - matchMedia polyfill
    - https://github.com/paulirish/matchMedia.js/
    - used in Respond.js, Modernizr
- W3C specification
  - http://www.w3.org/TR/css3-mediaqueries/ (Apr 2012)

Feature detection - resources

- minwidth.js & relocate.js
  - https://github.com/edenspiekermann/minwidth-relocate
  - provide a width at which your functions are called
  - lets you move elements in the DOM from their original place to another when you can't do that desktop design with CSS media queries

`detection/*.html`

Exercise

- Follow instructions in Exercises handout for
  - 5. Detecting device type by Modernizr
  - 6. Detecting device type by media query

JavaScript/server methods to query client software

Browser detection

Agent vs. feature detection

- Feature/capability detection - **client** side logic content selection by what it knows it can do
- Agent detection – **client/server** side logic content and code selection by user-agent in request

Request Headers

```
GET /page/detecting-sniffing-features-device HTTP/1.1
Host: www.scientiamobile.com
Connection: keep-alive
Cache-Control: max-age=0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8
Upgrade-Insecure-Requests: 1
User-Agent: Mozilla/5.0 (Windows NT 6.3; WOW64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/46.0.2490.86 Safari/537.36
Referer: https://www.google.com/
Accept-Encoding: gzip, deflate, sdch
Accept-Language: en-US,en;q=0.8
Cookie: _ga=GA1.2.956937014.1447856347; _gat=1
```

Agent detection/sniffing

- User-Agent: **navigator.userAgent**
- Explanation of your string and others
  - http://www.useragentstring.com/
- Database
  - http://www.user-agents.org/

Agent detection

- User agent string in User-Agent header
  - http://www.reliply.org/tools/requestheaders.php
- Web sites
  - spoofing - http://web-sniffer.net/
  - WURFL - 20Mb of XML
  - Device Atlas - $$$
  - Detect Mobile Browsers - http://detectmobilebrowsers.com/
    - Android tablets, iPads, Kindle Fires and PlayBooks are not detected by design. Must tweak regex.

Agent detection - WURFL

- ScientiaMobile **W**ireless **U**niversal **R**esource **F**i**L**e
  - http://wurfl.sourceforge.net/
  - a Device Description Repository (DDR)
  - a central source of device descriptions for thousands of mobile web devices. Free & commercial use. Commercial licenses available
  - Editions for Java, php, .NET, and database
  - Open source project began in 2002.
- Use a framework using WURFL if you must. Complex.

Feature detection - Modernizr

- Most popular package
  - https://modernizr.com/
  - https://github.com/barisaydinoglu/Detectizr
    - Modernizr extension - detect device, device model, screen size, operating system, and browser details
- Writes classes to html (optional)
- Provides JS support for features
  - Modernizr.geolocation ? “good” : “not good”

Agent detection

- Capability detection
  - **primary features** - touch?, screen is large or small?
- Two workflow choices - both slow
  - Redirect?
    - window.location.href = '/tablet‘
    - change history?
  - Load resources?
    - complex - needs dynamically loaded CSS / JS

Agent detection issues - client

- throughput - how fast will the network handle it?
  - loading all the content at once
  - doing redirects
- memory of device
  - loading large images
- latency - how long does the request and response take?
  - making smaller AJAX requests
  - making redirect requests

Agent detection

- *Device.js
  - http://borismus.github.com/device.js/
  - media query-based device detection and redirection
  - uses CSS links to show which versions you are providing
    - <link rel="alternate" href="http://foo.com" id="desktop" media="only screen and (touch-enabled: 0)">
- Adapt.js - Nathan Smith
  - http://adapt.960.gs/
  - device detection by pixel range
  - possible flash of unstyled content while CSS is loaded again

Feature detection - future

- CSS Feature Queries like @media for conditional loading of CSS using the @supports at rule.
- https://drafts.csswg.org/css-conditional/#at-supports

IE	Edge *	Firefox	Chrome	Safari	Opera
8			43		
9		40	44		
10	12	41	45	8	32
11	13	42	46	9	33
	14	43	47		34
		44	48		35
		45	49		

Web sites

- Web-sniffer
  - http://web-sniffer.net/
  - to see code as another agent

`detection/*.html`

Exercise

- Follow instructions in Exercises handout for
  - 8. Inspect user-agent strings
  - 9. Detecting client by user-agent

Responsive CSS

Fluid units

- Use relative/percentage units for widths
  - Pixel heights are OK since we let people scroll if that's what you really want.
- Use relative units of font measurement
  - pixels were supposed to be relative
    - IE7-9 refuses to let user change font size if in px.

Fluid units

- Better than proportions
  - No measurement at all makes blocks inherently fluid
  - All block elements you build
    - should never have widths (columns exception)
    - should never EVER have heights
    - should be constrained only by their parents
- Any time you can avoid setting a measurement, you should.

Relative units of measurement

- **em** - based on % of **parent** element size or default style from browser (16px)
- **%** - based on % of parent element

- **rem** - based on % of **root** element size
  - IE9+

Relative units of measurement

- **62.5**% is Mr. Rutter's magic font-size
- ems
  - body { font-size : **62.5**%; } /* 10px */
  - ul { font-size : 1.6em; } /* 16px */
  - ul p { font-size : 1.6em; } /* 16 * 1.6 px */
- rems (IE9+, Opera 11.6+)
  - body { font-size : **62.5**%; } /* 10px */
  - ul { font-size : 1.6rem; } /* 16px */
  - ul p { font-size : 1.6rem; } /* 16px */

Relative units of measurement

- Viewport units: vw, vh, vmin, vmax
- Length units representing 1% of the viewport size for viewport width (vw), height (vh), the smaller of the two (vmin), or the larger of the two (vmax).
- http://caniuse.com/#search=vw
- https://web-design-weekly.com/2014/11/18/viewport-units-vw-vh-vmin-vmax/

Fluid fonts

- Also adjust line-height
  - 1.3
  - 1.4 - 1.5 for phone, tablet
  - 1.5 – 1.8 for desktop (airy)

Fluid units

- Best practice
  - Set structure in percentages (divs, aside, nav, …)
  - Set absolute locations in pixels (images, icons, sprites)
  - Set line-height in no units! (relative)
    - http://meyerweb.com/eric/thoughts/2006/02/08/unitless-line-heights/
  - Recommended but not practical…
    - Set any type related CSS (body, h1, list indents, margins…) in rems (or ems) with a pixel fallback (rule: 10px; samerule: 1rem)

Enhancing with media queries

- Start with no media queries
- Embrace the cascade
  - Don’t just swap style sheets, let it cascade
  - Add styles for next size up
  - More nimble, versatile. Reduces jumpiness during device re-orientation

Hide inline elements

- Pro - easy
- Con - loads element anyway

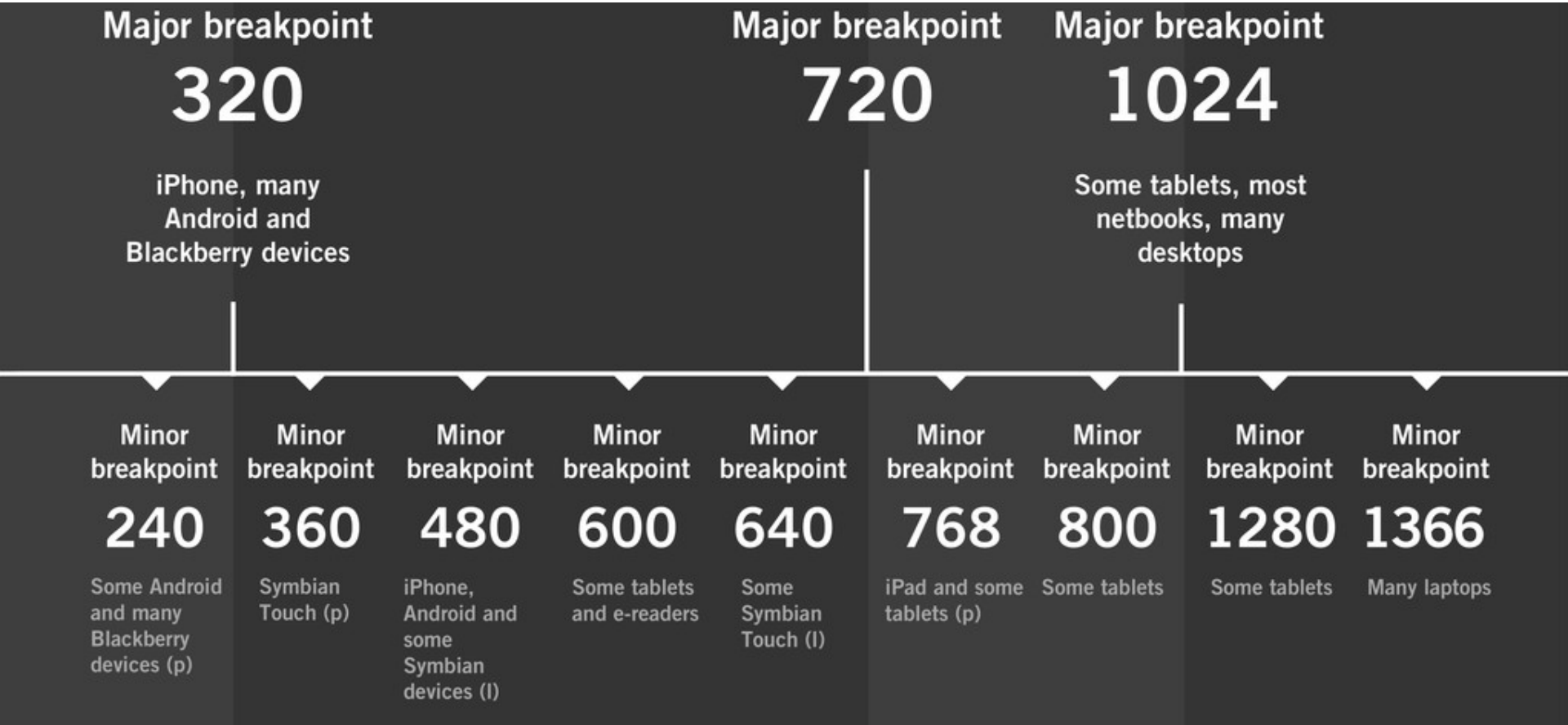
- Useful for printing
  - @media print {
    h1 img { display: none; }
    h1 img:after { content: attr(alt); }
    }

Breakpoint strategy

- Create breakpoints when the layout breaks.
  - Shrink the width of the browser window until the design breaks, then fix it either by changing things or by creating a breakpoint and changing the layout at that point.

Breakpoints

- Andy Clarke’s version of S. Rieger’s system



Breakpoint testing

- http://quirktools.com/screenfly/ - fixed widths
  - Google device inspector
- http://mattkersley.com/responsive/ - 5 versions at once
- https://gist.github.com/1685127 - code your own viewer

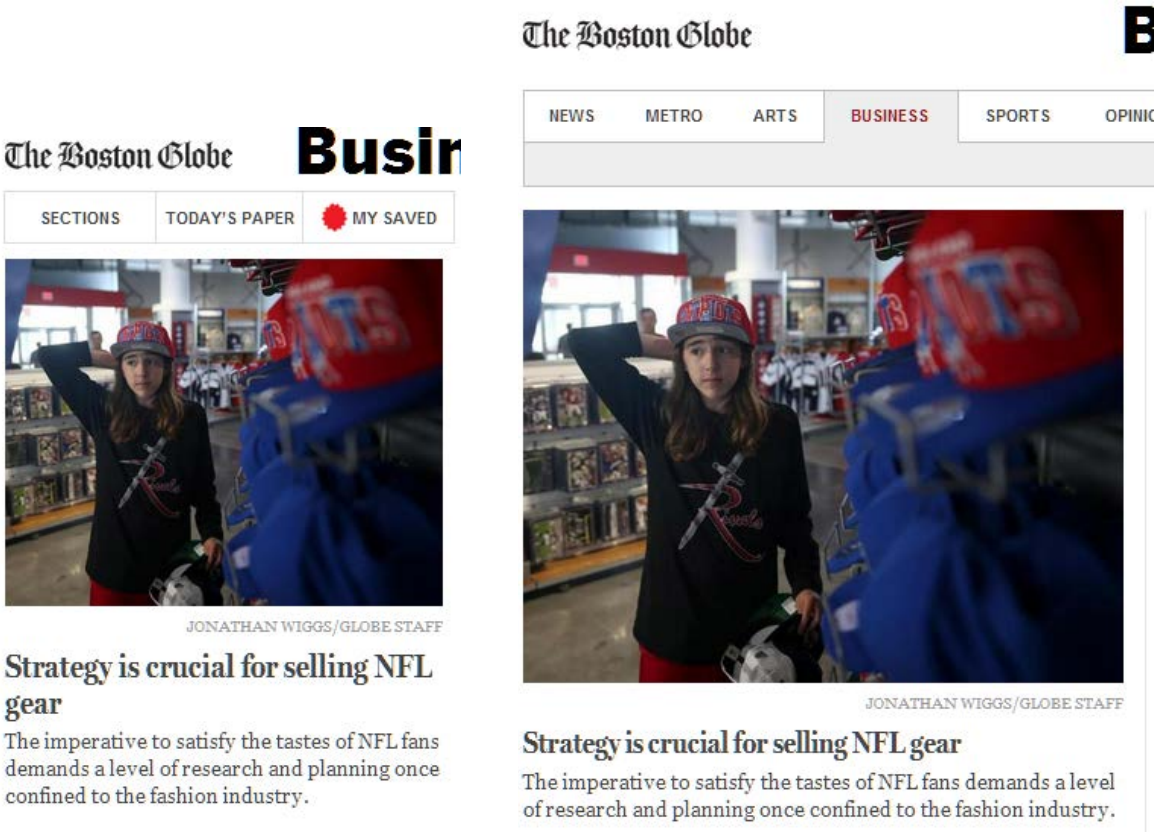
Web sites

- **Media Queries**
  - http://mediaqueri.es/
  - gallery of media query and responsive web design

`browser/relative-font-sizes.html`

Exercise

- Relative font size calculations



Responsive images

Optimize images before use

- Reduce file size
  - lower jpg quality, selective quality
  - flatten color areas in gifs
  - export for right display size
- Utilities
  - ImageOptim - http://imageoptim.com/ (Mac)
  - Trimage - http://trimage.org/ (PC)
  - TinyPNG - http://tinypng.org/ (service)

The resource downloading problem

- Bad: Setting an **image** to **display:none** won't stop the image from downloading
- Bad: Setting an **element** to **display:none** won't stop a background from downloading
- **OK:** Setting a **parent element** to **display:none** DOES stop a background from downloading
  - in most browsers
- **BEST:** Using a media query to (cascade) override or select between options DOES work
- http://timkadlec.com/2012/02/media-query-asset-downloading-tests/

Fluid images

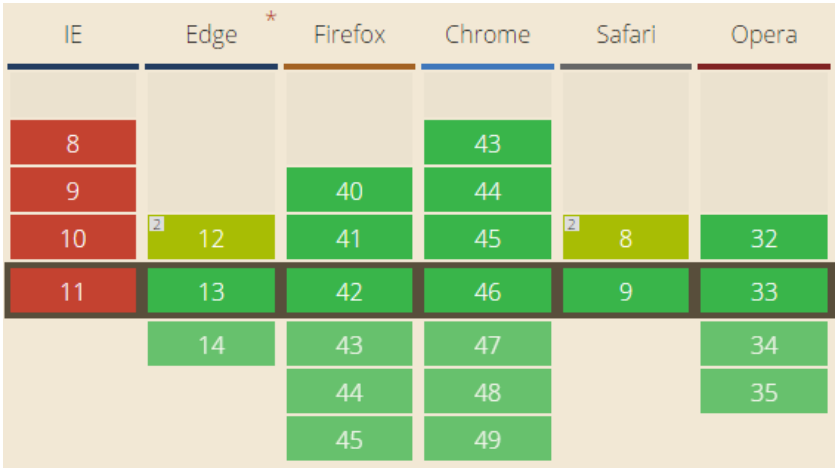
- max-width=100%
  - delete height and width img attributes
    - will override width, but not height
  - prevent this image from ever overflowing its parent
- send biggest possible image?
  - smallest device wastes its energy
  - smallest device usually has less bandwidth
  - best viewed on a Retina display?

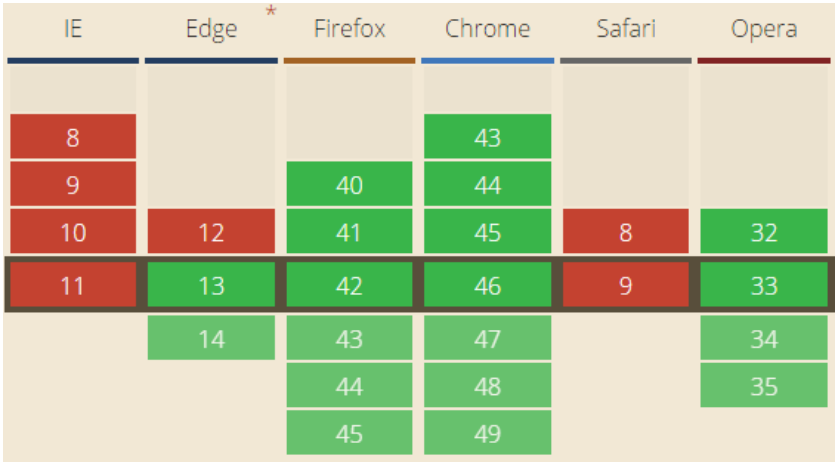
Fluid images

- Easy:
  - `img, object { max-width: 100% }`
- to fit within a parent container
  - problem when container is larger than image
  - problem when server has large number of requests

srcset vs. picture

- Standards track
  - <img **srcset**="a.jpg 2x, b.jpg 100w, c.jpg 100w 2x">
  - uses devicePixelRatio
- https://responsiveimages.org/
- **<picture>**





Resources - fluid images

- Scott Jehl's **picturefill** polyfill
  - https://scottjehl.github.io/picturefill/
- **Backstretch** jQuery plugin -
  - http://srobbin.com/jquery-plugins/jquery-backstretch/
  - to fit the background image to the viewport

2x images

- Always use the same PPI resolution, any will do!
  - 72 ppi is instilled into web culture even though those monitors were last seen in the 1980's
- Save at 2x pixel proportions
  - a normal image - 200 x 200 px
  - the 2x image - 400 x 400 px
- You'll be using vector and Smart Objects (Photoshop vector) images more.
  - Use Photoshop's Image Size / Nearest neighbor option to retain hard edges

2x image swapping - CSS

- backgrounds
  - @media only screen and (-webkit-min-device-pixel-ratio: 2), only screen and (min-device-pixel-ratio: 2) {
    - header h1 a {
      background-image: url(images/swappable@2x.png);
      background-size: 164px 148px; }
  - }
- inline (deal with it)
  -

2x image swapping - with JS

- var pixelRatio = window.devicePixelRatio || 1; if (pixelRatio >= 2) { document.querySelector(“#image1”).src = “picture_hi.png”; }
- Apple’s naming convention
  - Normal image - normal.jpg
  - 2x version - normal@2x.jpg
- Retina.js
  - checks for @2x images in your images directory and automatically swaps them out for you
    - http://retinajs.com/

Icon fonts

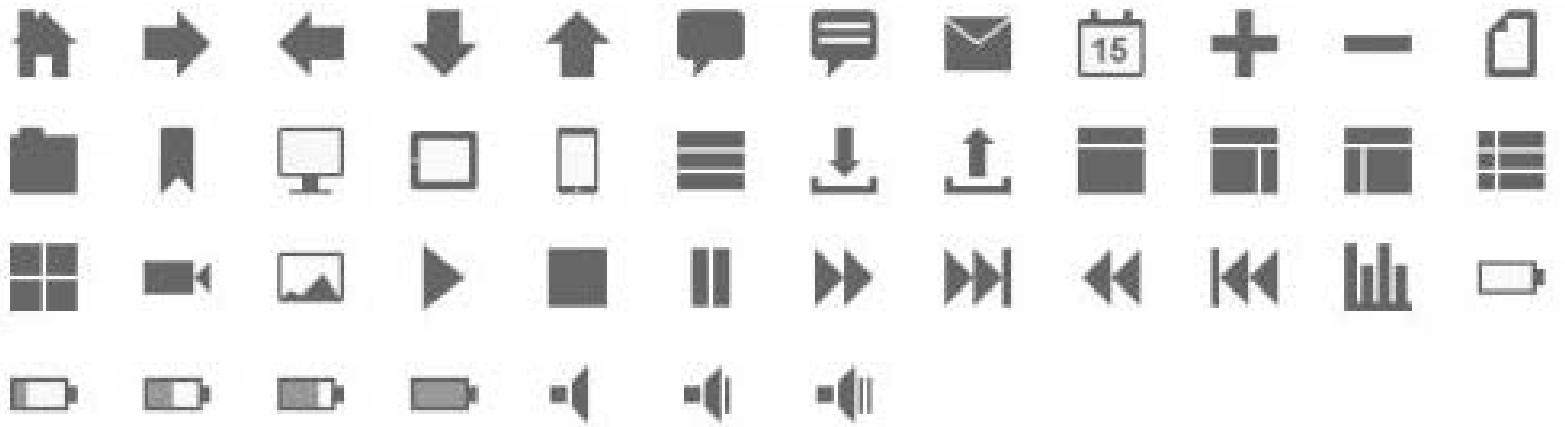
- Scalable, colorable, animatable
- Demo
  - http://css-tricks.com/examples/IconFont/
  - size, color, shadow, transparent knockouts with CS
- Create your own font
  - https://icomoon.io

Font Awesome

- SVG font
- http://fontawesome.io/
- Copy link from http://cdnjs.com
  - <link rel="stylesheet" href="https://cdnjs.cloudflare.com/ajax/libs/font-awesome/4.6.3/css/font-awesome.min.css">
- Use
  -

CSS for icons

- No, not sprites. Pure CSS.
- http://www.noupe.com/css/cikonss-1-0-responsive-icons-in-pure-css-ie-doesnt-fail-77325.html



SVG for icons

- inlined SVG (IE9+)

`responsive/fluid-image.html`

Resizing to layout 1

- Fluid image
  - No cropping
  - Adjusts with width set to relative size (%, ems, rems)
  - Can be used with min- or max-

`responsive/cropping.html`

Resizing to layout 2

- background-image
  - use a div instead of an img
  - use **`background-size:cover`** to size proportionately
  - flexible cropping from one side with background-position
  - IE8 uses polyfills
    - http://louisremi.github.io/background-size-polyfill/

`responsive/cropping-center.html`

Resizing to layout 3

- img with max-width %
  - wrapped in a hidden overflow div with height
  - proportional vertical scaling below a certain height
  - crop from top or bottom
    - uses transform:rotate()

`responsive/cropping-hybrid.html`

Resizing to layout 4

- Hybrid of 1 & 2
  - img is invisible to see the background
  - supports a hi-res image

Responsive video

- Creating Intrinsic Ratios for Videos by Thierry Koblentz
  - http://alistapart.com/article/creating-intrinsic-ratios-for-video
- The parent container
  - .video-wrapper { width: 600px; max-width: 100%; }
- With <iframe> or <object>
  - .video-container { position: relative;
    padding-bottom: 56.25%; padding-top: 30px;
    height: 0; overflow: hidden; }
  - .video-container iframe, .video-container object,
    .video-container embed {
    position: absolute; top: 0; left: 0;
    width: 100%; height: 100%; }

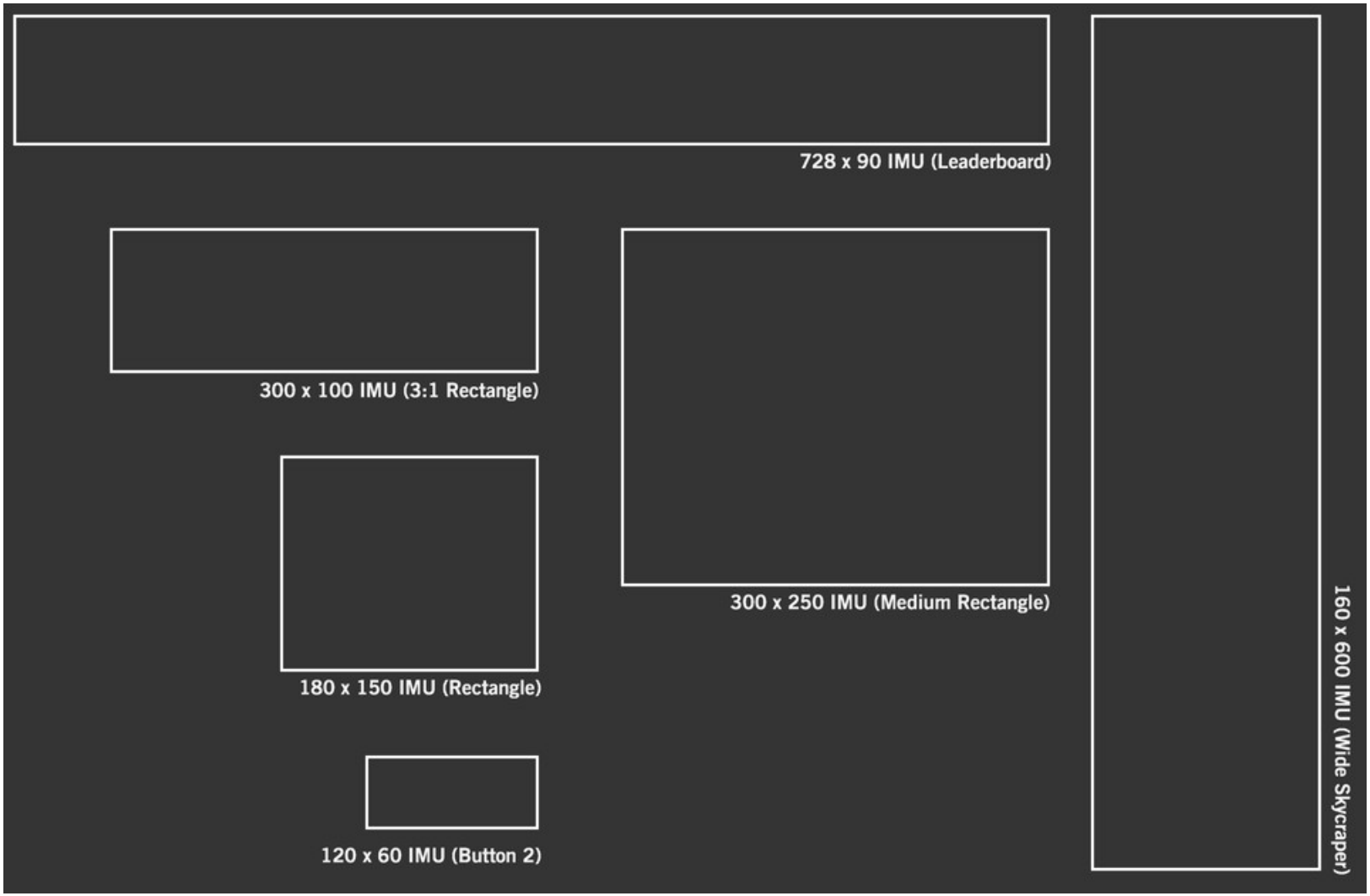
Responsive video

- HTML5 without an <iframe> or <object>
  - video { max-width: 100%; height: auto; }

Plugins - video

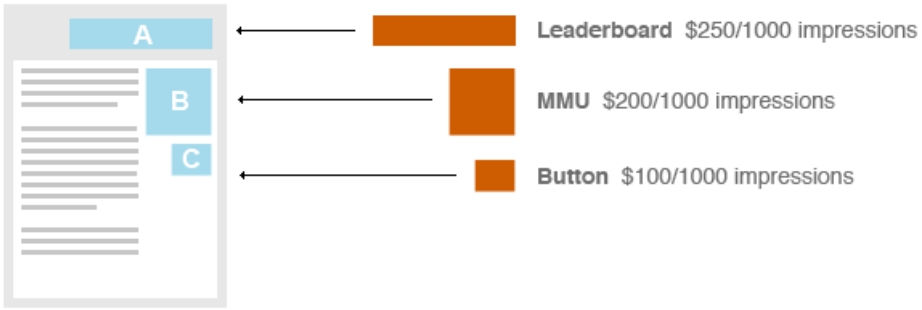
- FitVids.js - jQuery plug-in
  - http://fitvidsjs.com/

Fluid advertising



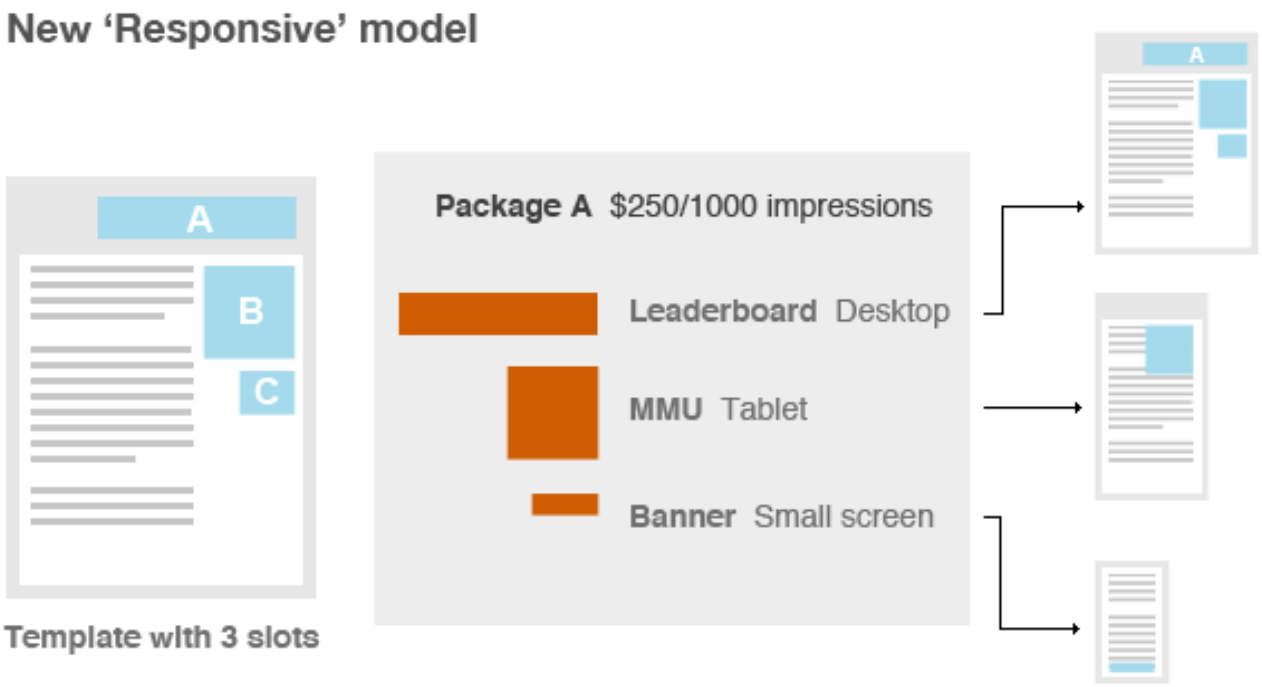
Fluid advertising

- Ads units are fixed, standardized sizes.
  - sales teams have page templates with ad slots
  - commissioned, sold and created on the basis of their size, position and views on the page
  - the advertiser supplies the ‘creative’
  - the scheduling app shows the ad impressions/views



Fluid advertising

- Proposed responsive ads are packages based on devices
- Flyouts and takeovers need creative thought



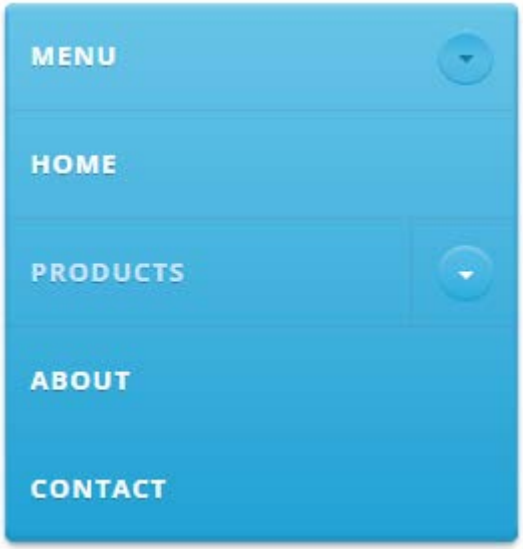
Blogs

- Dave Rupert
  - http://daverupert.com/
  - IE9 support blog post

`responsive/breakpoint-worksheet.html`

Exercise

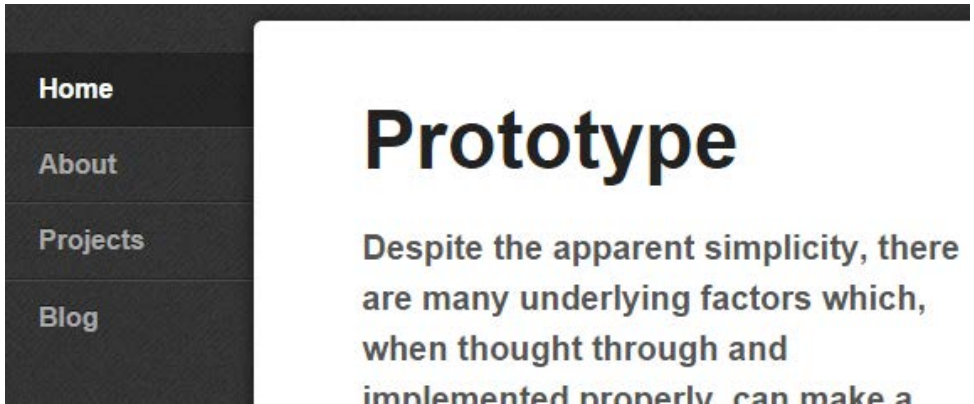
- Use the media-queries worksheet to
  - change font sizes, font families, line-heights
  - change text layout to use multi-columns in 2, 3, and 4 columns
  - adjust image sizes, margins, float…
  - remove/add color
- Leave at least three different sets of CSS in media queries

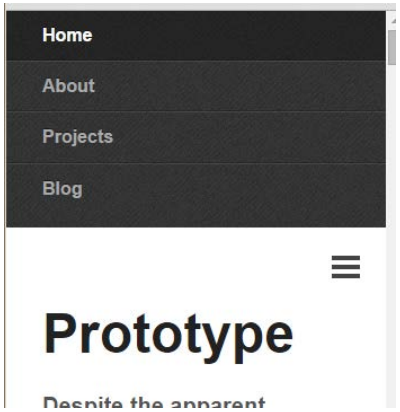


Responsive widgets

Menus

- Responsive Nav
  - http://responsive-nav.com/





Responsive layout - navigation

- Top - common tasks, bottom - exploring
- Use only essential links and don’t duplicate
  - hide secondary navigation
  - use lots of space
  - content first
- Transform links into:
  - menu button
  - grid of icons
  - accordion

Convert menu to dropdown 1

- Hide with media query
- <nav>
  - <**ul**> Home Books </**ul**>
  - <**select**><option value="" selected="selected“ > Select </option> <option value="/"> Home</option> <option value="/collections/all">Books</option> </**select**>
- </nav>
- nav select { display: none; }
  - @media (max-width: 460px) {
    nav ul { display: none; }
    nav select { display: inline-block; }
  - }

Convert menu to dropdown 2

- Use #1<nav> only or create on the fly and append <select> version dynamically
- `$("<select />").appendTo("nav");`
- `$("<option />", { "selected": "selected", "value" : "", "text" : "Go to..." }).appendTo("nav select");`
- `$("nav a").each(function() { var el = $(this); $("<option />", { "value" : el.attr("href"), "text" : el.text() }).appendTo("nav select"); });`
- `$("nav select").change(function() { window.location = $(this).find("option:selected").val(); });`

Convert menu to dropdown 3

- jQuery plug-ins
  - Responsive Menu Plugin
    - https://github.com/mattkersley/Responsive-Menu
  - Mean Menu
    - http://www.meanthemes.com/plugins/meanmenu/
  - FlexNav
    - http://jasonweaver.name/lab/flexiblenavigation/

Convert menu to static top table

- http://inspectelement.com/tutorials/pull-down-for-navigation-a-responsive-solution/

Home | Portfolio | Blog | About | Contact | Twitter | Dribbble | A Longer Navigation Item

Pull Down for Navigation Demo

See the tutorial here

Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Vestibulum tortor quam, feugiat vitae, ultricies eget, tempor sit amet, ante. Donec eu libero sit amet quam egestas semper. Aenean ultricies mi vitae est. Mauris placerat eleifend leo.

Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Vestibulum tortor

Pull Down for Navigation Demo

See the tutorial here

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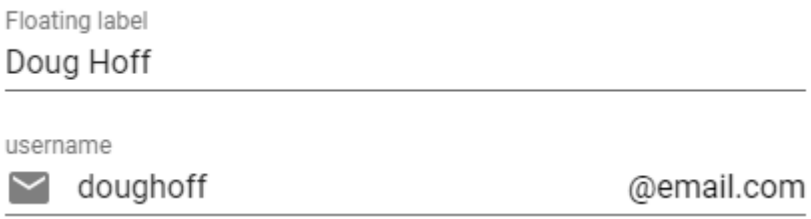
Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Vestibulum tortor quam, feugiat vitae, ultricies eget, tempor sit amet, ante. Donec eu libero sit amet quam

Responsive layout - UX

- Navigation patterns - Brad Frost
  - http://bradfrostweb.com/blog/web/responsive-nav-patterns/
  - Float label pattern
    - http://bradfrostweb.com/blog/post/float-label-pattern/



Tables - strategies

- hide non-essential columns
- convert a row to a two-col table
  - http://css-tricks.com/responsive-data-table-roundup/
- show a chart instead of tabular data
- invert the axes
- let the columns scroll under column 1
  - http://foundation.zurb.com/responsive-tables.html

Tables - Plug-ins

- Stackable - http://johnpolacek.github.io/stacktable.js/
- FooTable - http://css-tricks.com/footable-a-jquery-plugin-for-responsive-data-tables/

Stuff

Something

Rate	3.375%
Amount	$123.12
Points	1.125
Number	4,000
Type	Potato
Name	Paul

Something Else

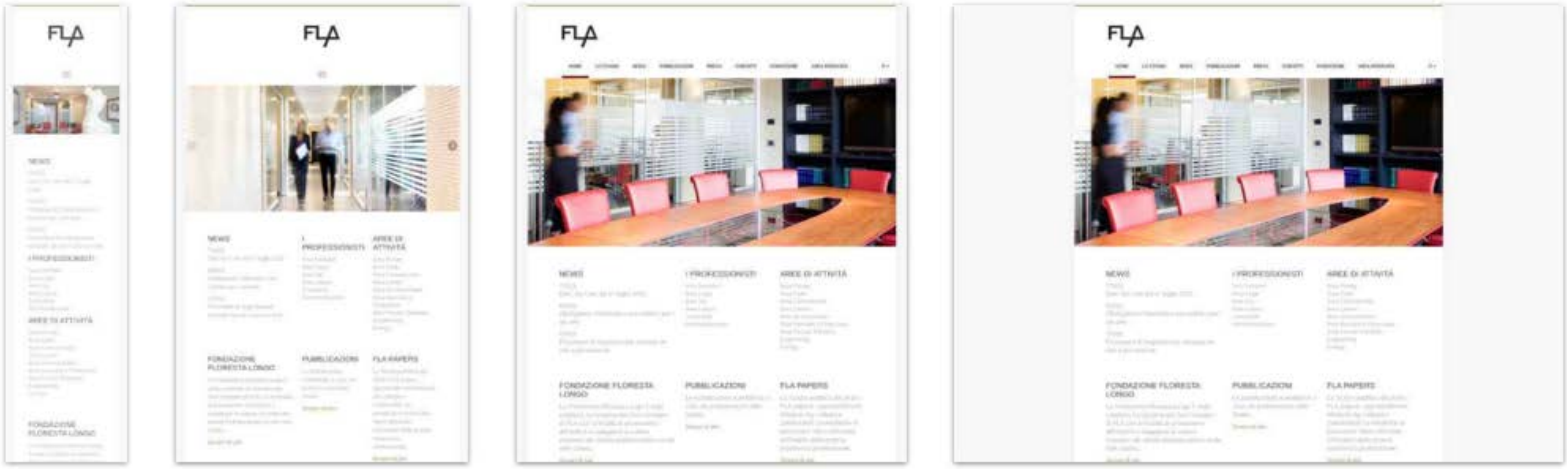
Rate	2.750%
Amount	$345.23
Points	5
Number	180
Type	Spaceship
Name	Skippy

Stuff	Rate	Amount	Points	Number	Type	Name
Something	3.375%	$123.12	1.125	4,000	Potato	Paul
Something Else	2.750%	$345.23	5	180	Spaceship	Skippy

`widgets/*.html`

Exercises

- Navigation
- Stacktable



Responsive layout

meta … viewport

- **<meta name="viewport" content="width=device-width, initial-scale=1”>**
- Must use meta tag to get browser to set layout viewport
  - Opera supports CSS version
  - but as device resolutions increase, sites will start to break
  - expressed in DIPS (px or name)
  - this is the only workable way - now width media query works
  - only use width, not pixels
- <meta name="viewport" content="width=device-width, minimum-scale=1.0, maximum-scale=1.0">
  - Worked a little better on pages that zoom too much

Transforming a layout

- Work from the top down
- The more narrow the screen, the more the layout became vertical, and use more centering to make things work.
- Hide things (via display: none) that were nice at bigger sizes but that weren’t needed at smaller sizes.

Fluid grids

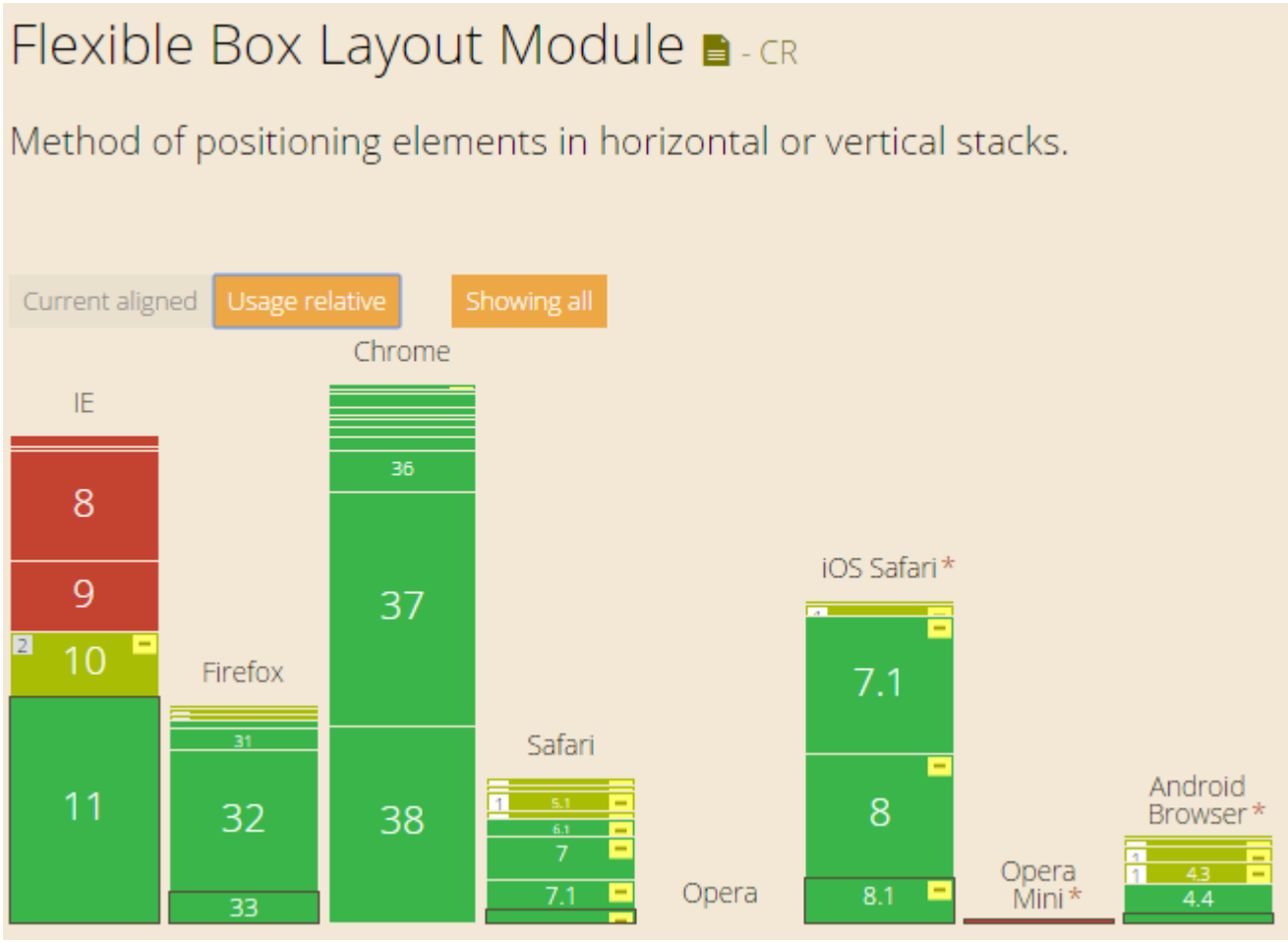
- Ethan Marcotte - Mar 2009
  - http://www.alistapart.com/articles/fluidgrids/
- Based around full grid systems.
  - Use a calculator to work out the numbers
  - http://csswizardry.com/2011/06/fluid-grid-calculator/

Fluid grids

- parent container (context)
  - max-width, padding, etc. based on text size in ems
- child container (target)
  - width, margin, etc. based on percentages
  - select non-fluid layout in px
  - **target** px **/ context** px **= result** in percentage
- IE always rounds up on fractional pixels
  - you may need to decrease by one pixel before calculating

Flexbox

- fluid by design
- semantic not tr, td, th…
- recently updated
- Waiting for IE9 to go



Flexbox

- RWD layout - http://codepen.io/team/css-tricks/pen/jqzNZq
- https://css-tricks.com/snippets/css/a-guide-to-flexbox/
- http://www.flexboxpatterns.com/home
- http://maxsteenbergen.com/fibonacci/ - interactive tool
- http://flexbox.io/#/ - 20 videos

Fluid CSS tips - Brad Frost

- display: inline-block
- box-sizing: border-box
  - fluid width items with fixed amounts of padding
    - .photogallery li { float: left; box-sizing: border-box; width: 50%; padding: 1em; }
  - Also for full-width form fields:
    - input[type=search] { box-sizing: border-box; width: 100%; padding: 1em; }
  - Handy for centering inline li's:
    - .nav { text-align: center; } .nav li { display: inline-block; margin: 0 0.5em; }

Responsive HTML email layouts

- Cerberus
  - http://tedgoas.github.io/Cerberus/
- Zurb
  - http://foundation.zurb.com/emails.html
- Patterns
  - http://responsiveemailpatterns.com/

Email layouts

- use a Gmail First strategy
  - http://julie.io/writing/gmail-first-strategy-for-responsive-emails/
- keep your max width to 600px

Fullscreen F11 on mobile

- To imitate the native app look
- Techniques
  - Fake it: auto-hide the address bar
  - Request the browser to go fullscreen in response to a user gesture.
  - Install the app to the home screen
- http://www.html5rocks.com/en/mobile/fullscreen/

`layouts/*.html`

Exercises

- Flexbox
- Grid

> It was actually the responsive side of things that were easier than I personally anticipated, and I would definitely never do anything else. It seems, in retrospect, completely ridiculous to do anything specific for each platform.

Responsive frameworks

Responsive frameworks

- Foundation 5 by ZURB
  - http://foundation.zurb.com/
  - boilerplate framework and components
  - SASS
- Twitter Bootstrap 3 & 4 alpha
  - http://getbootstrap.com/
  - boilerplate framework and components
  - look for free templates
  - visual compose - http://www.layoutit.com/

Bootstrap fix

- <script src="ie10-viewport-bug-workaround.js"></script>
- https://github.com/Haixing-Hu/bootstrap3-ie10-viewport-bug-workaround

Responsive Frameworks - simple

- Skeleton
  - http://www.getskeleton.com/
  - http://designshack.net/articles/css/build-a-responsive-mobile-friendly-web-page-with-skeleton/
  - CSS & JS grid template

Responsive frameworks - H5BP

- *HTML5 Boilerplate Mobile
  - http://html5boilerplate.com/mobile
  - **Paul Irish**, Alex Gibson, …
- Initializr
  - http://www.initializr.com
  - quick templates for H5BP including responsive

`frameworks/*.html`

Exercise

- Twitter Bootstrap 4
- Optional: Foundation, Skeleton, Semantic UI etc.

Responsive scripting

Trim 3rd party scripts

- Zurb - Facebook, Twitter and Google social media buttons = 19 requests = 246.7 KB bandwidth
  - replace with simple social media links
- Tracking scripts
  - load after body
  - use separate script tag to load external file

Question CMS usage

- Pro - client managed content
- Con - processing speed slow
- WordPress
  - Over 100 file requests and more on older
- Switch to static file based / lightweight

User agent detection

- Use Require.js
  - loads only if browser can support it
  - loads only if needed on that page
  - combines and minifies scripts (UglifyJS)
- Use Webpack
  - https://webpack.github.io/

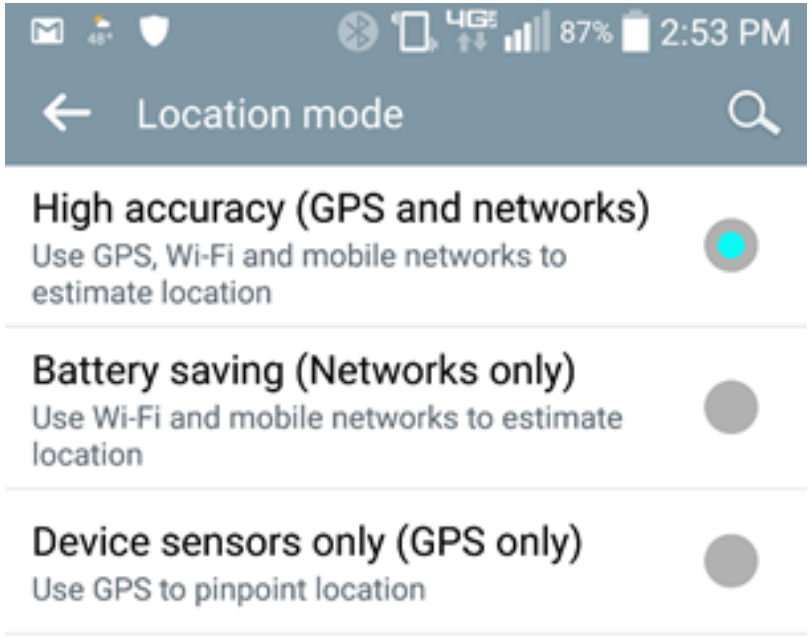
Conditional loading

- Responsive Comments - client side only
  - http://responsivecomments.com/
- Unison.js - breakpoint variables exposed
  - http://bjork24.github.io/Unison/

Geolocation

Intro

- Using a script to locate the user
- Methods used
  - combinations of data
- Privacy
  - permission is needed



getCurrentPosition( )

- // create a function to get lat/lon and send to Google as a query
- function success(geoposition){window.location.assign('http://google.com/search?q=' + geoposition.coords.latitude + ',' + geoposition.coords.longitude)}
- navigator.geolocation.getCurrentPosition(success,null)

Reverse geocoding

- latitude / longitude pair → street address
- Services
  - GeoNames.org's API
    - http://www.geonames.org/export/web-services.html
  - Nominatim
    - http://wiki.openstreetmap.org/wiki/Nominatim

Web app usage

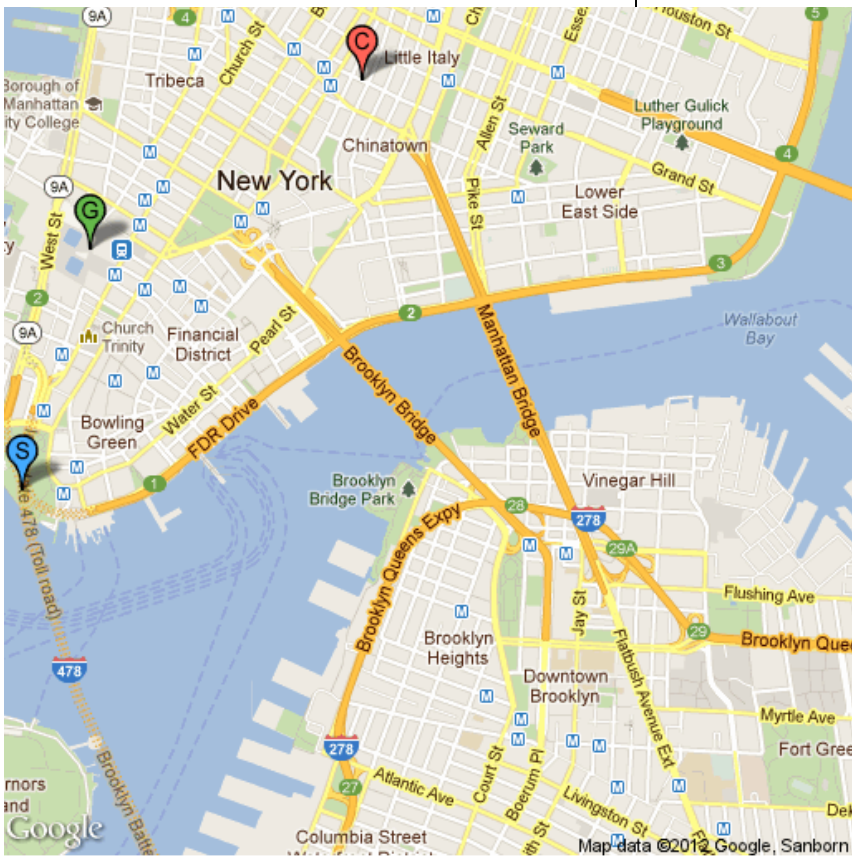
- Lat / Lon pair raw usage
  - Google Maps - https://developers.google.com/maps/
    - all Google maps requires keys
    - https://developers.google.com/maps/documentation/static-maps/intro
    - https://developers.google.com/maps/mobile-apps
    - https://developers.google.com/maps/documentation/javascript/
    - https://developers.google.com/maps/documentation/places/
    - https://developers.google.com/maps/documentation/imageapis/

Web app usage

- Flickr - http://www.flickr.com/services/api/
  - http://www.flickr.com/services/api/flickr.photos.geo.photosForLocation.html
- Meetup - http://www.meetup.com/meetup_api/docs/

Google Maps – Static Maps

- <img border="0" src="http://maps.googleapis.com/maps/api/staticmap?center=Brooklyn+Bridge,New+York,NY &zoom=14 &size=512x512 &maptype=roadmap &markers=color:blue%7Clabel:S%7C40.702147,-74.015794 &markers=color:green%7Clabel:G%7C40.711614,-74.012318 &markers=color:red%7Clabel:C%7C40.718217,-73.998284 &sensor=false" alt="Points of Interest in Lower Manhattan">

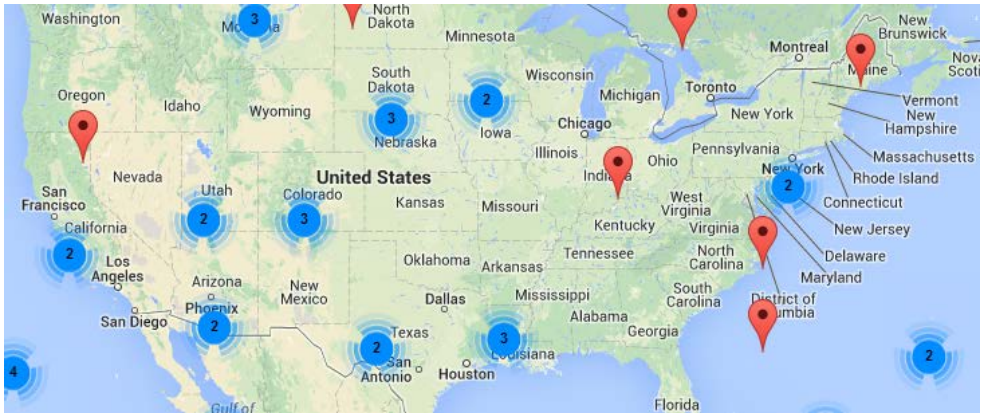


Create Google map

- var latlng = new google.maps.LatLng(mylat, mylong);
  var myOptions = { zoom: 15, center: latlng, mapTypeId: google.maps.MapTypeId.HYBRID };
  var map = new google.maps.Map(document.getElementById("map_canvas"), myOptions);
- //Add marker
  var marker = new **google**.maps.Marker({ position: latlng, map: map, title:"You are here" });
  }

jQuery plugins

- http://code.google.com/p/jquery-ui-map/



Alternative map services

- OpenLayers
  - http://openlayers.org/

APIs/maps.html

Exercise

- Maps / Geolocation

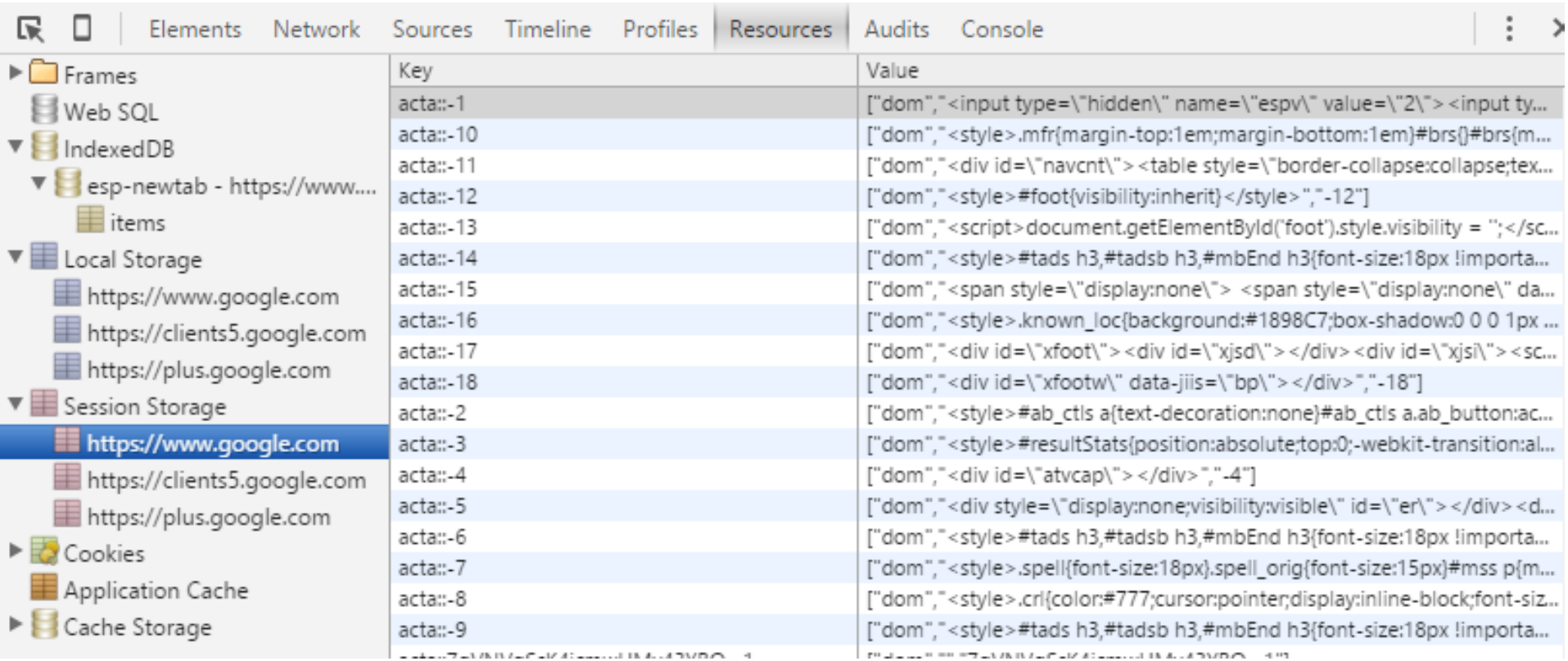
Offline applications require pages to be saved along with their data

Data storage

Intro

- Better than cookies
- Web storage
  - Local storage - application specific persistent data
  - Session storage - temporary data
  - http://www.w3.org/TR/webstorage/
- Structured storage
  - IndexedDB – key-value objects
    - http://www.w3.org/TR/IndexedDB/
  - WebSQL - **deprecated Nov 2010**

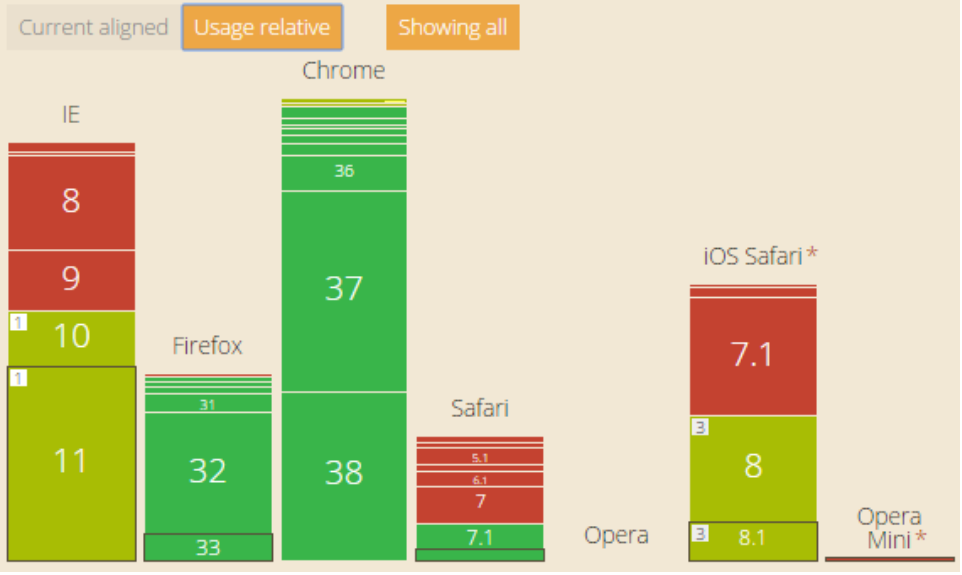
Chrome dev tools



Structured database models

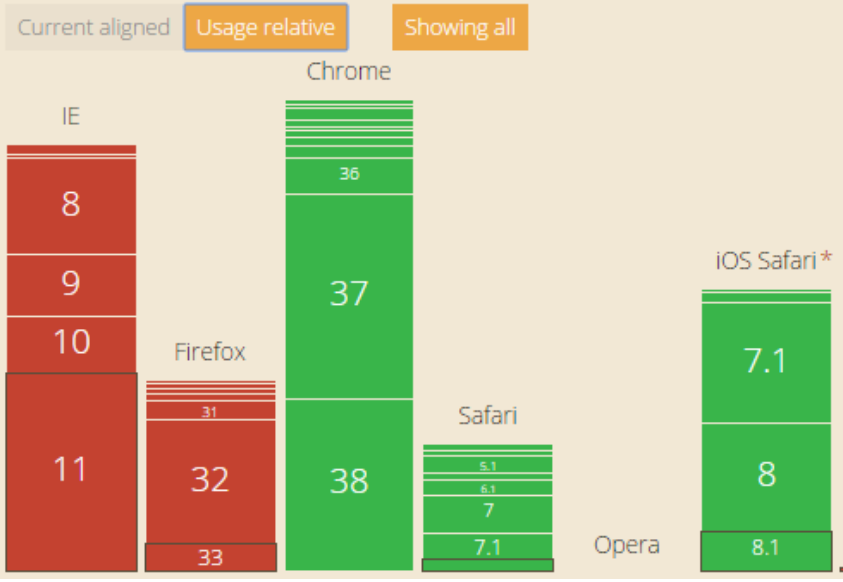
IndexedDB - CR

Method of storing data client-side, allows indexed database queries.



Web SQL Database - UNOFF

Method of storing data client-side, allows Sqlite database for access and manipulation



Web storage – pros & cons

- pros
  - simple string storage, good browser support
- cons
  - bad performance
  - no way to know when storage limit is reached
  - no way to get more space
  - issues with sessions and HTTPS
  - synchronous – can block rendering
  - persistent so data loads when browser loads on startup

Web storage – browser quirks

- **local**Storage and **session**Storage variable scope
  - quirky in Webkit
  - available on any same origin page (sharing the same scheme, domain and port)
- Chrome only displays local and session storage data on pages that reference them.
  - no reference to them, no visibility to them
- Safari creates multiple empty local stores for the same origin on each refresh and one with values. Bug?

Web storage - performance

- localStorage
  - tests show not much difference between localStorage and cookies for individual reads and writes
  - initial read into memory happens first
  - synchronous API - so it can block page load
    - cookies are read on page load
- Still better than indexedDB for small data stores
  - < 5Mb

Structured storage - IndexedDB

- pros
  - easy to store and retrieve objects
  - Transactional
    - most likely also using Asynchronous API
- cons
  - asks user for permission
  - Safari, Opera, iOS, Opera Mobile, Android Browser still favor WebSQL even though deprecated by W3C

Application cache

- Deprecated – use Service Workers in future, localStorage for now
  - http://alistapart.com/article/application-cache-is-a-douchebag
- used a manifest file (<anyname>.appcache)

```
# 2012-11-22
CACHE MANIFEST
CACHE:
/css/styles.css
/js/javascript.css
/img/logo.gif
FALLBACK:
/img/maybeYesMaybeNo.png /img/notavailable.png
NETWORK:
*
```

Service workers

- Provides rich offline experiences, periodic background syncs, push notifications
- a background browser script separate from web page for features not needing a web page or UI
- https://developer.mozilla.org/en-US/docs/Web/API/Service_Worker_API/Using_Service_Workers

IE	Edge *	Firefox	Chrome	Safari
			49	
8	13	47	51	
11	14	48	52	9.1
		49	53	10
		50	54	TP
		51	55	

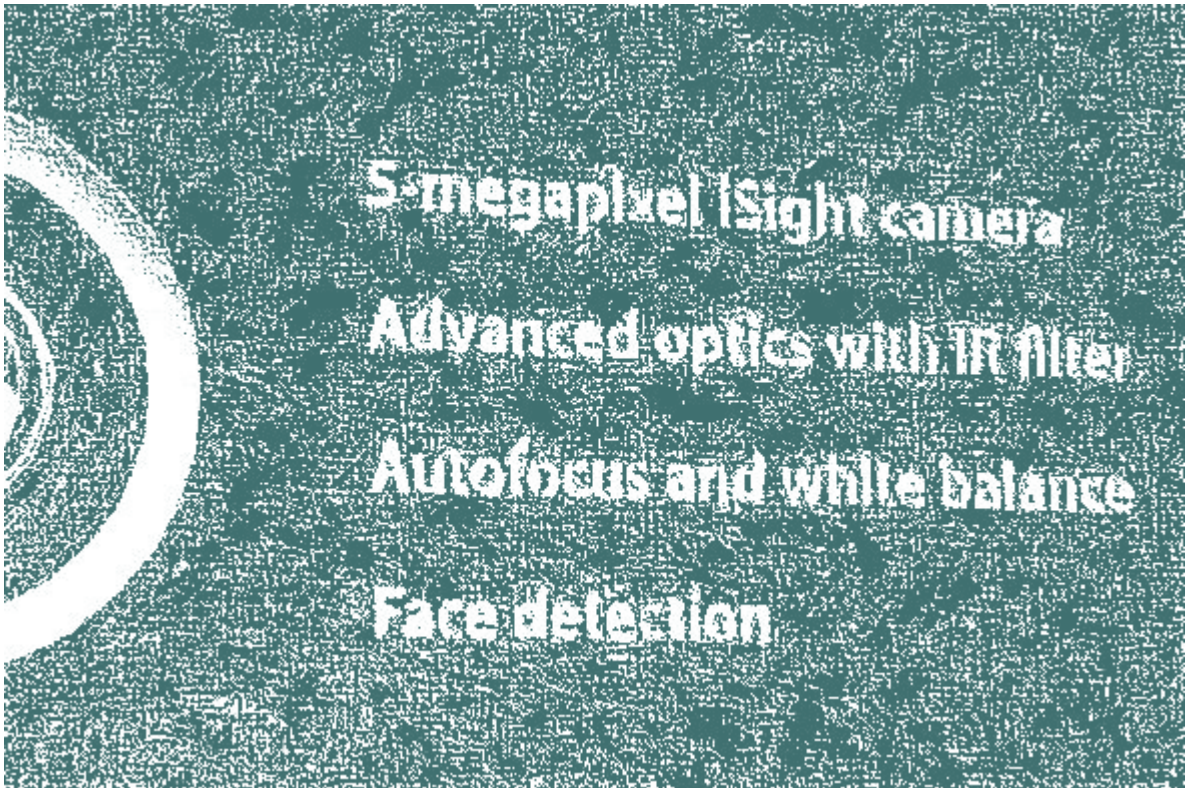
Web storage - plugins

- *Offline.js - http://github.hubspot.com/offline/
  - simple solution to loss of connection
  - resends AJAX requests that didn't make it
  - 3k
  - no dependencies
- Amplify.store - http://amplifyjs.com/api/store/
- http://www.sitepoint.com/9-javascript-libraries-working-with-local-storage/

APIs/local-storage.html

Exercise

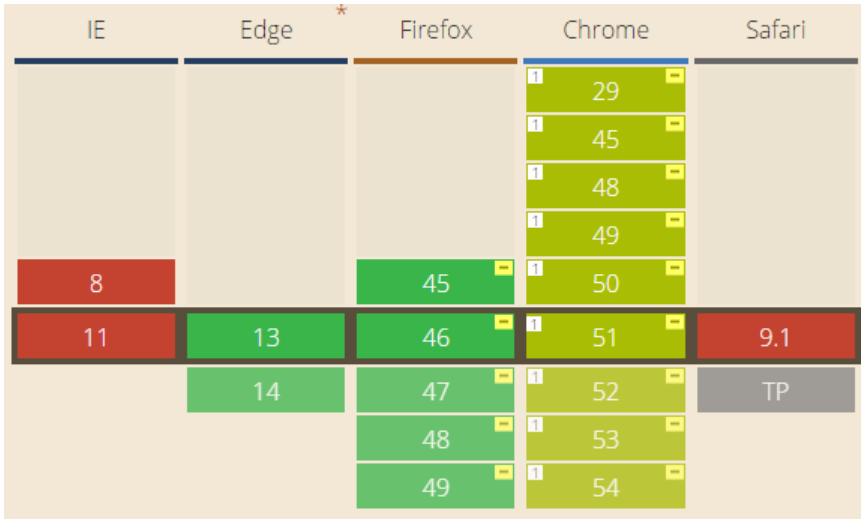
- Local storage

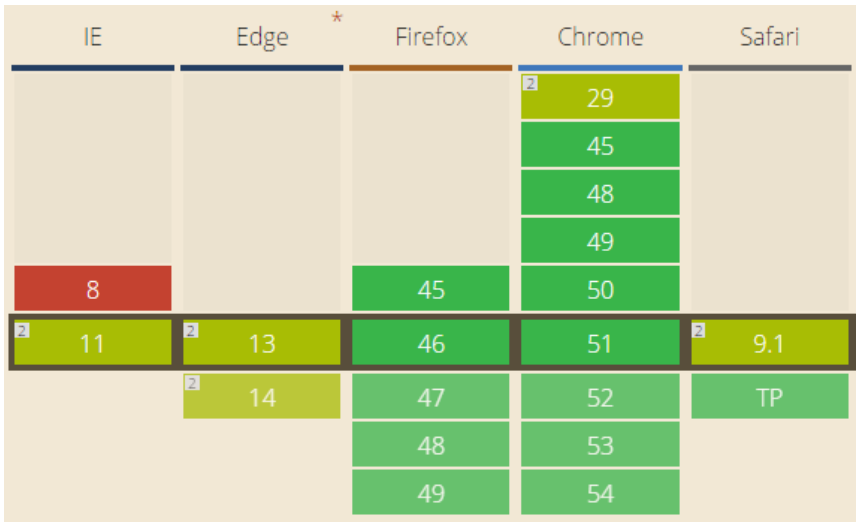


Device access

APIs

- getUserMedia/Stream API
  - WebRTC (peer to peer)
  - https://developer.mozilla.org/en-US/docs/Web/API/Media_Streams_API
- File API
  - https://developer.mozilla.org/en-US/docs/Using_files_from_web_applications





APIs

- Camera API
  - not W3C, Firefox OS
  - https://developer.mozilla.org/en-US/docs/Web/API/Camera_API/Introduction
- Example
  - media/capture.html

Camera iOS

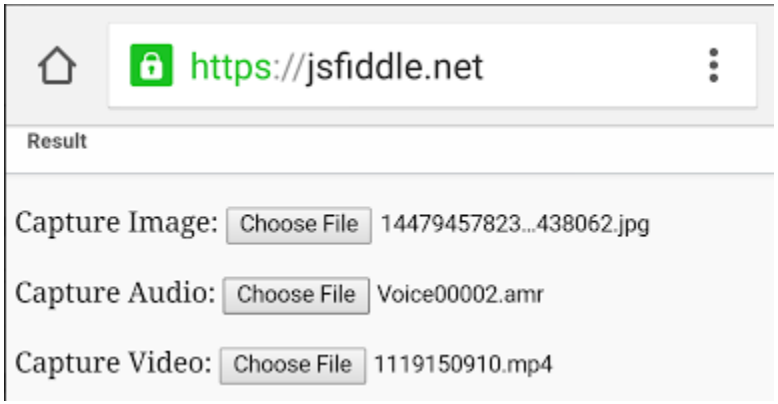
- <input type=‘file’ " /> support iOS6+
  - accept="image/*, audio/*, video/* to limit
- Pic up app
  - Native app to upload files to a web site
  - http://picupapp.com/
  - File-upload form fields don't work in Mobile Safari, a webapp can instruct Picup to choose and upload a photo. Once the upload is complete, Picup returns control to the webapp with information about the upload.

Camera Android

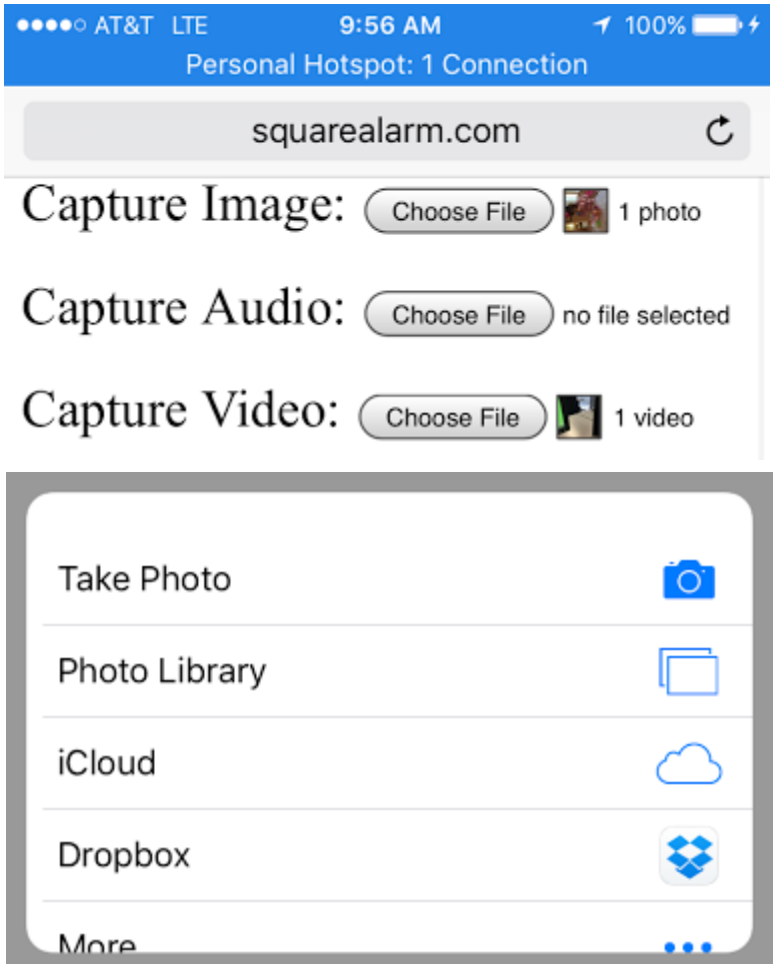
- 3.0 SDK supports image, audio, and video capture. Feb 2011 (capture optional)
  - <form enctype="multipart/form-data" method="post">
  - <h2>Regular file upload</h2>
  - <input type="file"></input>
  - <h2>capture=camera</h2>
  - <input type="file" accept="image/*;capture=camera"></input>
  - <h2>capture=camcorder</h2>
  - <input type="file" accept="video/*;capture=camcorder"></input>
  - <h2>capture=microphone</h2>
  - <input type="file" accept="audio/*;capture=microphone"></input>
  - </form>

Screen shots

- Android



- iOS



Camera resources

- Using WebRTC – permission based
  - https://developer.mozilla.org/en-US/docs/WebRTC
  - https://developer.mozilla.org/en-US/docs/WebRTC/navigator.getUserMedia
- Packages
  - WebcamJS - https://github.com/jhuckaby/webcamjs
  - Script Cam: http://www.scriptcam.com/ (jQuery)
  - jQuery Webcam: http://www.xarg.org/project/jquery-webcam-plugin/

File uploading

- File is named image.jpg
- Server tasks
  - Check min/max file size
  - Check file extension
  - Save file to temp area
  - Rename file
  - Move file to storage area

File upload resources

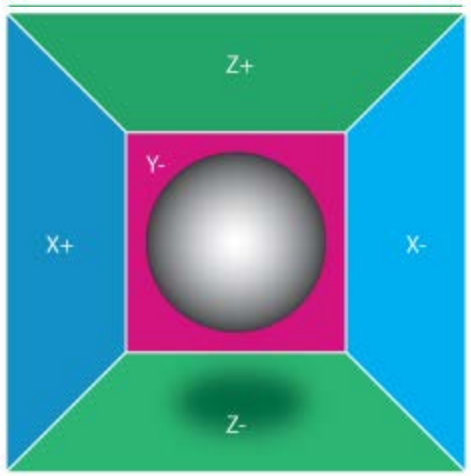
- JavaScript
  - FineUploader5 - http://fineuploader.com/
- Services
  - https://www.filestack.com/
  - https://transloadit.com/

Accelerometer / Gyroscope

- iOS 4+
  - Supported devices
    - Accelerometer – iPhone 4, **iPad**, iPad2, iPod Touch
    - Gyroscope – iPhone 4, iPad2, iPod Touch
  - Safari Developer Library
    - http://developer.apple.com/library/iOS/navigation/
- Android
  - Use ‘onorientationchange’ event.

Accelerometer / Gyroscope

- Accelerometer
  - measures orientation in the x, y, and z dimensions
    - Measures gravity or force from quick movement, low signal-to-noise
    - Rotate device left or right (think of steering a car), x and y values change. Let the top of the device fall towards or away from us, z dimension changes.

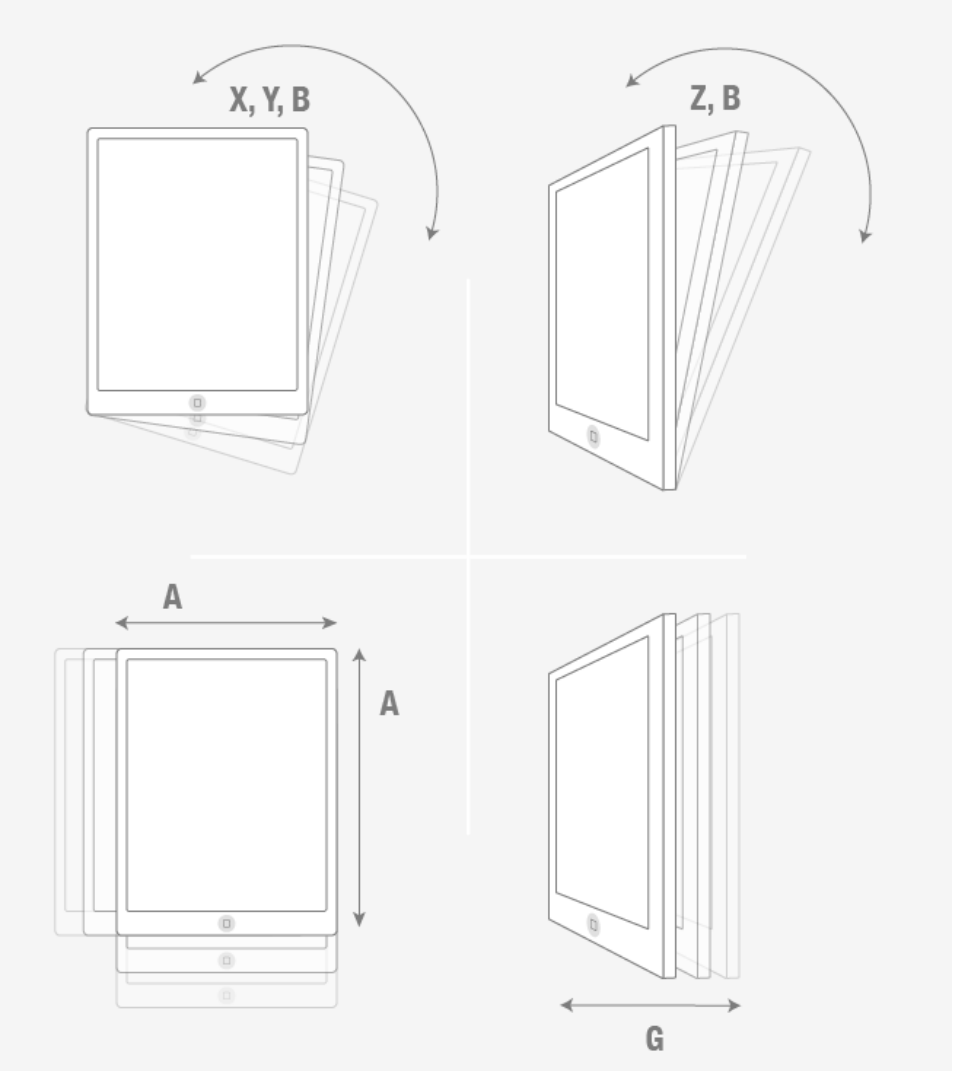


Accelerometer / Gyroscope

- Gyroscope
  - Measures forces *relative to the original position of the device*.
    - high signal-to-noise
  - Returns values based on the changed orientation
    - All values start at 0 on initialization.
    - Moving vertically (think of doing squats) changes alpha.
    - Twisting the device (wring out a rag) changes the beta.
    - Bringing the device towards or away from you (think of face punching) changes gamma.

Accelerometer / Gyroscope

- Accelerometer
  - X, Y, Z
- Gyroscope
  - beta
  - alpha
  - gamma



Magnetometer

- iPhone 3GS + Android now
  - acts as a digital compass
  - other magnetic fields can interfere
  - no web support
  - combine heading (yaw) with accelerometer info to get true orientation in real time

Battery

- var battery = navigator.mozBattery || navigator.webkitBattery; var level = battery.level * 100; var charging = battery.charging; var chargingTimeFully = battery.chargingTime; var dischargingTimeEmpty = battery.dischargingTime; // Events available battery.addEventListener(“levelchange”, handler, false); battery.addEventListener(“chargingchange”, handler, false); battery.addEventListener(“chargingtimechange”, handler, false); battery.addEventListener(“dischargingtimechange”, handler, false);

Vibration

- Vibration
  - One time vibration for 0.5 seconds
  - navigator.vibrate(500);
- Vibration pattern (vibration/pause)
  - navigator.vibrate([500, 500, 1000, 600,100]);

Accelerometer / Gyroscope

- window.addEventListener("devicemotion", function(event) { var acceleration = event.accelerationIncludingGravity; // acceleration.x, acceleration.y, acceleration.z }, false);

Phone <a href=?

- To call, tel:{phone-number}
- To SMS, sms:{destination}?body={message}.
  - The body might be ignored by some platforms.
  - iOS supports HTML on the body.
- To start mail, mailto:{to}?subject={subject}&body={message}
  - iOS supports HTML on the body.

Phone <a href=?

- Facetime on iOS, facetime:{number or user}
- To Skype call, skype:{user}?call
- To tweet with app, twitter://post?message={message}
  - Tweet

Phone <a href=?

- Maps on Android and iOS < 6, http://maps.google.com?q={query}
- <a href=”http://maps.google.com?q=golden+gate+bridge”> Open Map</ a>
- Navigation on Android and iOS < 6, http://maps.google.com?sa ddr={point1}&daddr={point2}
- Navigate to Pier 39

Phone <a href=?

- Maps on iOS >=6, http://maps.apple.com?q={query}
- Open Map
- Navigation on iOS >= 6, http://maps.apple.com?saddr={point1} &daddr={point2}
- Navigate to Pier 39

Remove automatic linking

- <meta name=”format-detection” content=”telephone=no”> <meta name=”x-rim-auto-match” content=”none” forua=”true”>

Web sites

- Bruce Lawson
  - http://html5doctor.com/getusermedia/
  - http://introducinghtml5.com/ - his book examples, links

Apps

- AndroSensor – detects all sensors and gives levels

`media/capture.html`

Exercise

- Media capture

{Programming && Testing}

Bandwidth detection

- a blind spot for front end and back end
- navigator.connection isn't widely implemented
  - not specific enough to be helpful
- watch the Device APIs Working Group
  - http://www.w3.org/2009/dap/
- Boomerang
  - http://yahoo.github.com/boomerang/doc/
  - measures the performance of your website from your end user's point of view and sends data back to you.

Game development - Lessons learned

- http://cubiq.org/hexagame-the-making-of-an-html5-game
  - Multiple versions needed, mobile had different rules.
  - CSS not good enough for games.
  - Browser renderers are slow and need a time-out.
  - localStorage best choice

Automated test tools

- Mobitest (Akamai)
  - http://mobitest.akamai.com
  - saved reports
  - multiple devices
  - ranks against other sites tested
  - load time, average page size
  - waterfall chart: same as Inspector
  - open sourced
    - http://www.blaze.io/technical/open-sourcing-mobitest/

Test tools - Microsoft

- Speed Reading
  - checks frames per second rate
  - http://ie.microsoft.com/testdrive/mobile/performance/speedreading/
- Internet Explorer Test Drive
  - http://ie.microsoft.com/testdrive/mobile/

Optimizing - Akamai

- **JavaScript Pre-Execution.** Expend CPU cycles offline. Execute JavaScript on the page offline and provide the browser with a mostly static page. Defer dynamic scripts after the page load.
- **Responsive Images.** Detect if the user has slow connection and send smaller, lower resolution images.
- **Invoke click on touch.** A mobile browser waits 300ms to see if the user is pinching, zooming or actually clicking a link. Convert hyperlink URLs to click events to eliminate this delay.
- **Cellular connection keep-alive**. A page request can have a 2-3 s. lag as the phone connects anew to the cell tower. Send a dummy request to keep the connection open between page requests.

Optimizing - Blaze

- **Adaptive consolidation.** Caching pages improves repeat view speed. But cache size on mobile browsers is very small, few files last in the cache until the user returns to the site. HTML5 can use offline storage instead of shared browser cache.
- **Asynchronous JavaScript.** Mobile networks are less reliable causing third party scripts to block the loading of other page objects. Decouple script execution from the rest of the page load.
- **Asynchronous CSS.**
- **Adaptive image sizing.** Use optimally sized images for the device.
- **Just in time (JIT) image loading.** Load images as they come into view.

Emulators / Validators

- http://developer.android.com/sdk/index.html
- http://validator.w3.org/mobile/

Web sites

- WebPageTest
  - http://www.webpagetest.org/
- Mobile tuts+
  - http://mobile.tutsplus.com/
  - web app and native development tutorials
- Mobile Performance Manifesto - David Calhoun
  - http://davidbcalhoun.com/2011/mobile-performance-manifesto

Exercise

- Follow instructions in Exercises handout for
  - 14. Test php
  - 15. Redirect to mobile page if known mobile device


Strong template framework and Shortcodes, Easy to Customize
Great!
PREMIUM WEB DESIGN COMPANY
RESPONSIVE JOOMLA! TEMPLATE
FOR JOOMLA! 2.5 AND JOOMLA! 3.X

Frameworks

Framework overview

- Problem: develop on multiple devices / OS / servers
  - Unix, Windows, iOS, Android, …
- Design constraints
  - Best tools: HTML, CSS, JavaScript
  - Execution environment: browser
- Solutions: Mobile capable on any platform
  - Server-side enhanced sites with **RWD**: (.NET/Java/PHP + Bootstrap, Foundation + Material Design, LESS/SASS, TypeScript, Web services)
  - Client-side web apps with little server side support (**Angular**, React)
- Solutions: other
  - Mobile only: code + **Cordova** → iOS, Android (Ionic)
  - Windows only: code + Electron

Frameworks – opinionated

- jQuery Mobile
  - https://jquerymobile.com/
- Mobile Angular UI (Bootstrap + FA)
  - http://mobileangularui.com
- App.js
  - http://code.kik.com/app/2/index.html
- Telerik Kendo UI Mobile (18 widgets, 7 frameworks)
  - http://www.kendoui.com/mobile.aspx

App packagers - Cordova

- Apache Cordova
  - https://cordova.apache.org/
  - Adobe PhoneGap - commercial product of same code
- Packages web pages into Android or iOS apps for the marketplaces.
  - Need accounts, Apple requires approval
  - Need Mac+IDE, need Eclipse + Android JDK
- Debugging is hard.
  - Test and debug it with developer tools on desktop browsers.
  - Use console log statements.
- http://stackoverflow.com/questions/8101933/how-to-wrap-a-website-in-a-phone-app
- https://developer.android.com/guide/webapps/index.html

Frameworks – hybrid

- HTML, CSS, JavaScript packaged with Cordova
- Majority of top Android apps
  - *Ionic – supports Angular2
    - http://ionicframework.com/
  - Appcelerator Titanium
    - http://www.appcelerator.com/product/
  - Sencha Touch
    - http://www.sencha.com/products/touch/

Frameworks – hybrid

- ManifoldJS - http://manifoldjs.com/
- open source Cordova based framework
  - create an app for Windows, iOS, Android, Chrome, and Firefox from web sites
  - debuted at the Microsoft Build 2015 conference in April 2015
  - http://www.noupe.com/development/manifold-js-with-crosswalk-a-simpler-dev-experience-for-android-93117.html

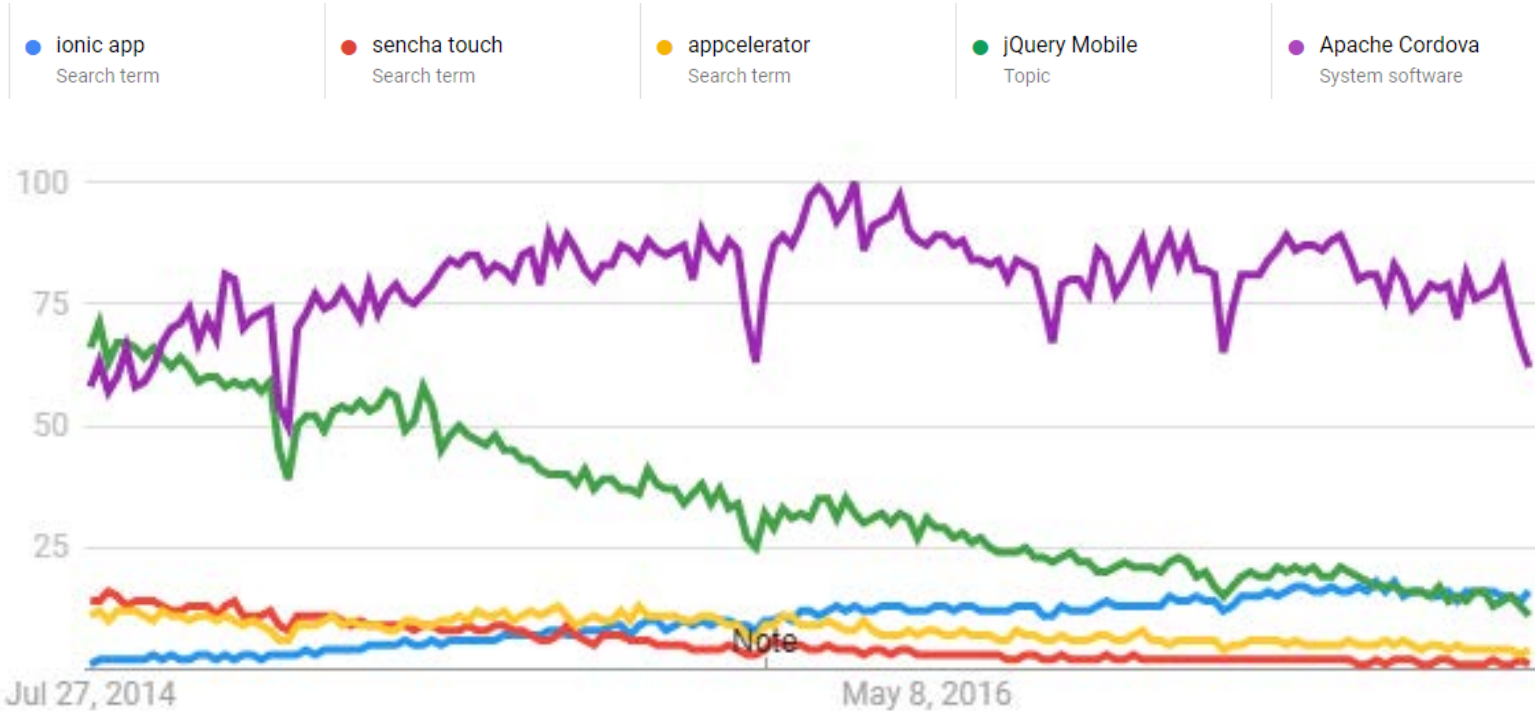
Native frameworks

- Xamarin
  - Purchased by Microsoft
  - http://xamarin.com/
  - C#.NET using MonoTouch for iOS and Mono for Android
  - $999 each
- Parse
  - https://www.parse.com/
  - managed back end for mobile for native code

Windows frameworks

- Use HTML, CSS, JavaScript for a Windows app
- Electron
  - http://electron.atom.io/
  - Microsoft VS Code
  - Github Atom Shell
  - Brackets
  - Photon – CSS library
    - http://photonkit.com/

Trends


ionic app
Search term
sencha touch
Search term
appcelerator
Search term
jQuery Mobile
Topic
Apache Cordova
System software
100
75
50
25
Note
Jul 27, 2014
May 8, 2016

Front end builders

- **Codiqa** –drag and drop interface to jQuery Mobile http://codiqa.com/ → Ionic Creator
- **Application Craft** - http://www.applicationcraft.com/
- **Rho Mobile** - http://www.rhomobile.com/

No-framework framework

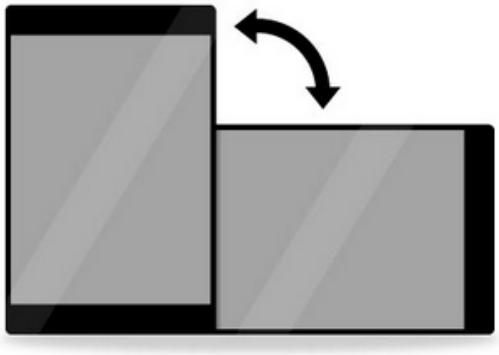
- Svelte – Dec 2016
  - transpile templates into JS
  - https://svelte.technology/
  - https://svelte.technology/blog/frameworks-without-the-framework/

svelte

Orientation

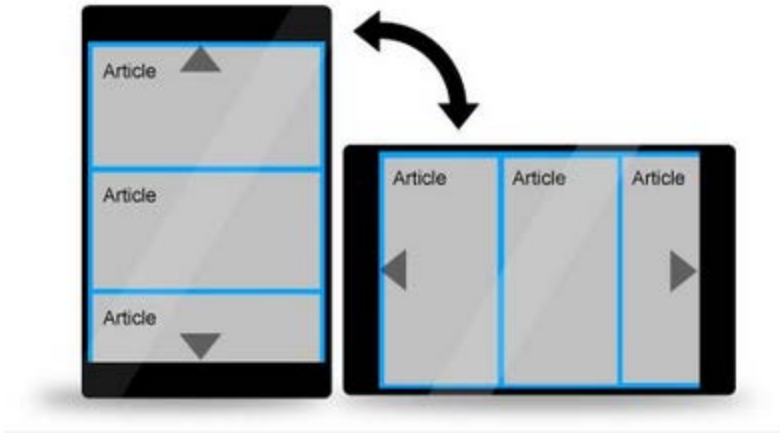
Orientation

- Orientation:
  - recognizes only two angles (landscape and portrait),
  - distinguishes the two “orientations” fairly easily,
  - detects “orientation” without requiring a lot of processing resources,
  - looks quite static, but is useful for traditional websites.



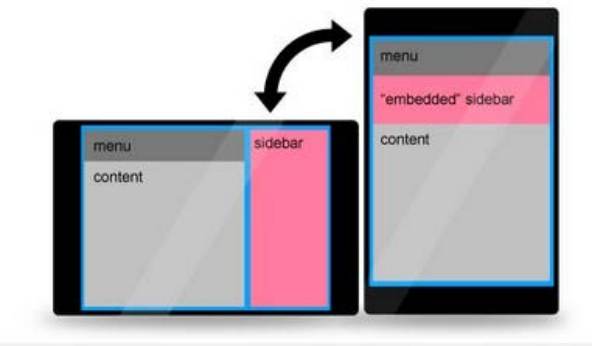
Navigation

- Vertical scrolling is natural to portrait mode.
- Horizontal swiping is more natural to landscape mode.
- Think about different styles.



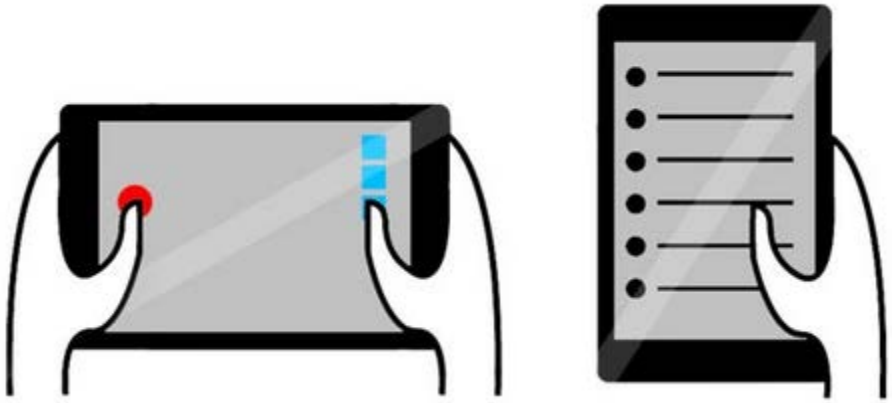
Tailor-Made Elements

- Media queries with screen-width only will cause shifting or hiding based on proportions
- Media queries with orientation, can adjust the size or appearance of a single element to fit
- Create alternatives to the sidebar, re-scale your ads or even recolor elements if they work better in different surroundings.



Menus

- Re-think your menu layout for orientation.
- Horizontal layouts work for landscape mode.
- Portrait view is better to place the menu items underneath each other. Even 2 columns.



Menus

- Thumbs
  - In portrait, people use one thumb to navigate.
  - Landscape is better for two hands and two thumbs.
  - Adding multi-touch navigation might work.

Responsive orientation

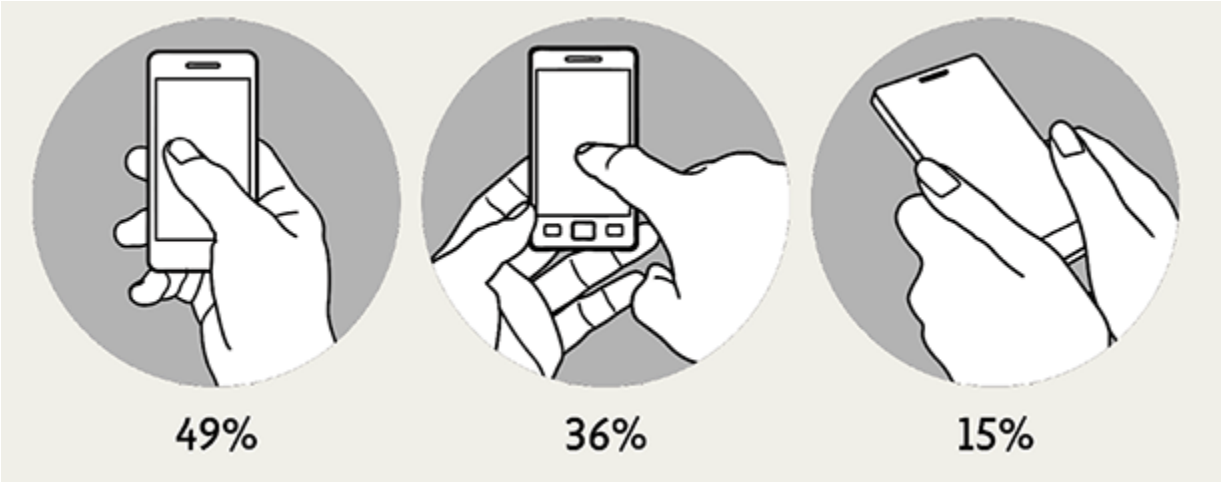
- @media screen and (orientation : landscape) {
  - section { }
- }
- @media screen and (orientation : portrait) {
  - section { }
- }

Orientation

- Orientation events are fired from anything that changes orientation.
- $(‘body').on("orientationchange", function (event) {
- $("#eventText").text(event.type + " changed me to " + event.orientation);
- });

Exercise

- jQuery
  - $('body').on('orientationchange’, function(e){console.log(e);})



Touch events

Touch

- Low level spec
  - touchstart, touchend
    - area for activate, area for deactivating
  - touchmove
  - touchcancel (Safari)
- Event payload (multi-touch)
  - touches
  - targetTouches
  - changedTouches

Touch detection

- var touchEvents = "ontouchstart" in document;
- Use Modernizr
  - .touch / .no-touch
  - if (Modernizr.touch) { … }
- Example
  - touch/modernizr.html

Touch targets

- Josh Clark - “The 44-pixel block is, in many ways, the basic unit of measurement for the iPhone interface, establishing the visual rhythm of many iPhone apps.”
  - Tab bars are 49px
  - Nav bars are 74px
  - Navigation bar, toolbars, table cells are 29 pixels tall with tap height of 44 pixels

Touch targets

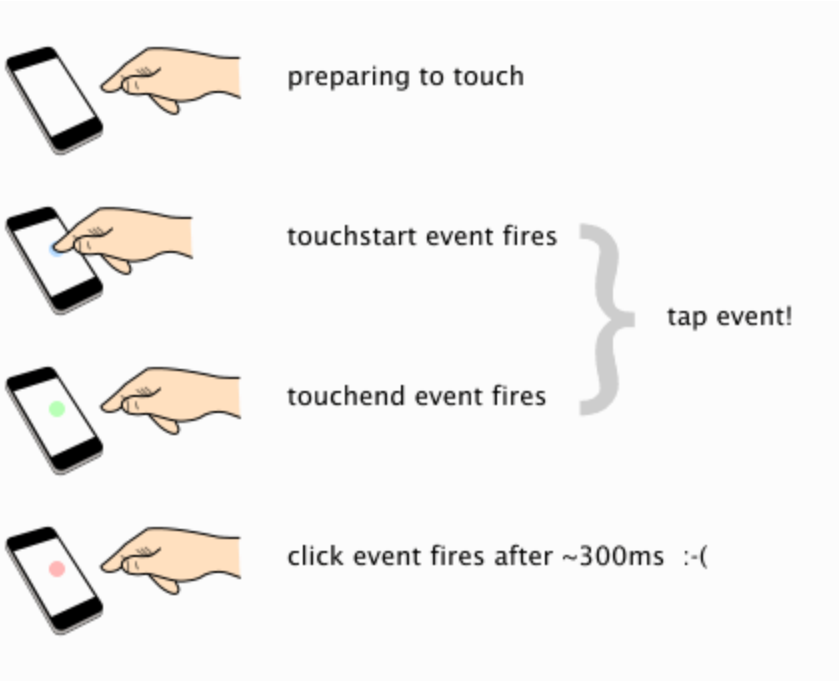
- Put the anchor tag around the block parent element
  - remove the a style
  - apply it to a strong and markup the original text with strong.

Gestures

- No standard gesture API yet
- Apple
  - proprietary API for gesture* events
  - http://developer.apple.com/library/ios/#DOCUMENTATION/AppleApplications/Reference/SafariWebContent/HandlingEvents/HandlingEvents.html
  - http://developer.apple.com/library/safari/#documentation/UserExperience/Reference/GestureEventClassReference/GestureEvent/GestureEvent.html#//apple_ref/doc/uid/TP40009353

Click delays

- Mouse click event delayed by 300ms
- Chrome Android removed it in v32
  - 5/2015 – v.42
- JS library to remove
  - https://github.com/ftlabs/fastclick



:active state

- Desktop only
  - mousedown on a link
- Workaround
  - document.addEventListener(‘touchstart’, function() { }, false);
  - works on iOS, Android, Chrome/Android

Disable zooming and scrolling

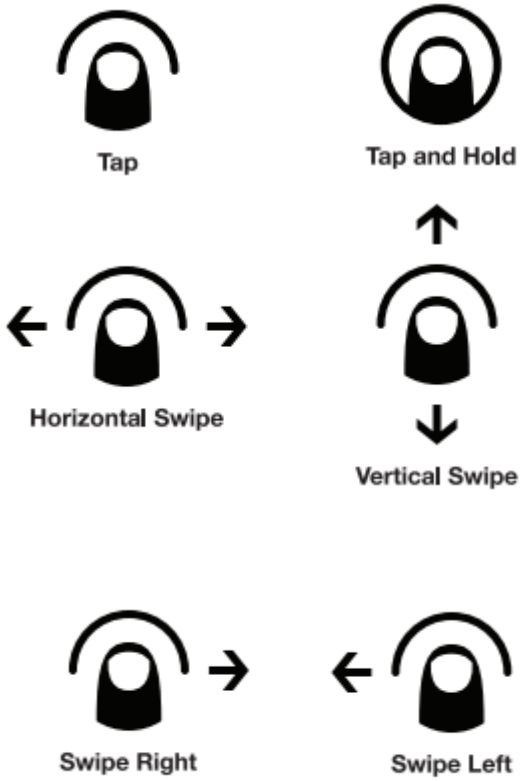
- When you need more control
- No zooming (viewport scaling)
  - <meta name="viewport" content="width=device-width,
    initial-scale=1.0, user-scalable=no">
- No scrolling
  - document.addEventListener('touchmove',
    function(e) {
      e.preventDefault( ) });

Scroll events

- scroll, scrollstart, scrollstop
- Remember that mobile scrolling is eased
  - slows to a stop before firing event
  - user usually is hunting and does not ever completely stop

Touch events

- tap, taphold
- swipe
  - scrollSupressionThreshold (default: 10px)
    Must be less than this.
  - durationThreshold (default: 1000ms)
    Must be less than this.
  - horizontalDistanceThreshold (default: 30px)
    Must be more than this.
  - verticalDistanceThreshold (default: 75px)
    Must be less than this.
- swiperight, swipeleft



Touch events

- Clicks interfere with zoom.
- A tap maps to a click. They can double trigger events.
  - A desktop click will trigger a tap second.
  - A tablet tap will trigger a click second.
  - When combining listeners with ...on("tap click “,… add return false at the end to get a single event
- A double tap does not map to click event.

Touch events

- A swiperight and a swipeleft are both swipes. They will double trigger events.
- A taphold will fire a tap/click event when you lift your finger/mouse.

`touch/detection.html`

Exercise

- Touch detection with Modernizr and event names
  - test in Chrome emulator, mobile devices

Pointer events

- Mouse, pen, touch, pressure sensitive, tilt.
- Not in Firefox yet.
  - `window.addEventListener('pointerdown', function onFirstPointer(e) {`
  - `  window.POINTER_SIZE = e.height;`
  - `  window.removeEventListener('pointerdown', onFirstPointer, false);`
  - `}, false);`
- https://developer.mozilla.org/en-US/docs/Web/API/Pointer_events

Zoom

- Changing the transform property of the content's container.
  - **But** this requires recalculating the content's size, which breaks CSS-based resizing technique and is not reliable when there are interactive elements such as iframes.
- Without a doubt, the library that implements such zooming and panning the best is iScroll by Matteo Spinelli.
  - http://cubiq.org/iscroll-5 - scrolling, zooming, panning, infinite scrolling, parallax scrolling, carousels

Touch libraries

- *Hammer.js
  - pan, pinch, press, rotate, swipe, tap
  - http://eightmedia.github.com/hammer.js/
  - Used by Microsoft templates, Zurb Foundation
- *jQuery UI Touch Punch – maps click to touch
  - http://touchpunch.furf.com/
    - will ignore text inputs when form is large on JellyBean

Touch library - jQM

- When using jQuery UI or any other package that needs touch support use
  - jQuery Mobile Download Builder (Custom Download)
  - http://jquerymobile.com/download-builder/
  - Select Events / Touch and download custom build

Fires a resize event with a slight delay to prevent excessive callback invocation

- ☑ Touch

  Touch events including: touchstart, touchmove, touchend, tap, taphold, swipe, swipeleft, swiperight, scrollstart, scrollstop

- ☐ Events

Touch enabled plugins

- *Swiper – image slider
  - http://www.idangero.us/sliders/swiper/
  - onTouchStart, onTouchMove, onTouchEnd, onSlideReset, onSlideChangeStart, onSlideChangeEnd, onSlideNext, onSlidePrev, onSlideClick, onSlideTouch

Multi-touch & mouse

- Drawing free-form 1,2,3 fingers example
  - http://blogs.msdn.com/b/ie/archive/2011/10/19/handling-multi-touch-and-mouse-input-in-all-browsers.aspx

touch/finger-painter.html

Exercises

- Finger Painter

Videos

- Stephen Woods of Flickr – Touch interactions in JavaScript
  - YouTube - http://youtube.com/watch?v=IcD9CF0bxyk
  - Slides - http://www.slideshare.net/ysaw/creating-responsive-html5-touch-interfaces

Pressure

- Apple
- Force Touch
  - Apple Watch
  - less sensitivity
- 3D Touch
  - peek (light = preview)
  - pop (heavy = tap)

- http://pressurejs.com/

Google advice

- https://developers.google.com/web/fundamentals/design-and-ui/input/touch/

Popular packages

- OwlCarousel2 - responsive carousel slider
  - https://owlcarousel2.github.io/OwlCarousel2/
- Slideout - touch slideout navigation menu
  - https://slideout.js.org/
- Swiper - touch slider (templates also)
  - http://idangero.us/swiper/#.WaAGcSiGOCg
- Sortable - reorderable drag-and-drop lists
  - http://rubaxa.github.io/Sortable/

`touch/drag-and-drop.html`

Exercise

- Hammer test
- Drag and drop with jQueryUI and TouchPunch
  - swap out TouchPunch with Hammer

End matter

Web sites

- Mobile Design patterns
  http://mobiledesignpatterngallery.com/mobile-patterns.php
  http://mobile-patterns.com/
- **HTML5 Rocks**
  http://www.html5rocks.com/en/mobile
  http://www.html5rocks.com/en/tutorials/
  http://www.html5rocks.com/en/mobile/mobifying.html

Web sites - links

- Yiibu Mobile Web Reference
  - Stephanie Rieger
  - http://yiibu.com/articles/mobile-web-reference/
- mobiForge
  - http://mobiforge.com/
- Programmable Web
  - http://www.programmableweb.com/

Conferences / videos

- *Breaking Development - Apr
  - http://bdconf.com
  - http://vimeo.com/bdconf
- Fluent (O'Reilly)
  - http://fluentconf.com/
  - http://www.youtube.com/playlist?list=PL75AC4484E6866741
- An Event Apart (A List Apart)
  - http://aneventapart.com/
  - http://aneventapart.com/news/tag/video

Videos - jQuery

- **jQuery Mobile conferences** (Todd Parker keynotes)
- **NewCircle** - open source tech (HTML5, jQuery, Android)
  - https://thenewcircle.com/s

Media

- Adobe Appliness -
  - http://www.appliness.com/
  - http://www.youtube.com/watch?v=ihbV09hi8cg

Conferences / meetings

- International - Lanyrd
  - http://lanyrd.com/topics/mobile-web/
  - http://lanyrd.com/topics/html5/
  - http://lanyrd.com/topics/javascript/
  - http://lanyrd.com/topics/web-development/
- Local - Meetup
  - http://www.meetup.com/Mobile-Media-Club/
  - http://www.meetup.com/KCWebCore/
  - http://www.meetup.com/Kansas-City-Mobile-App-Developers-Group/