

COEN 168/268

Mobile Web Application Development

Cascading Style Sheets

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ESS



What is CSS?

- Stands for **Cascading Style Sheets**
- Describes the look and feel of markup languages such as HTML
- Allows for web pages to be presented in different ways easily
 - For example, desktop or mobile

CSS History

- Style sheets have been around since SGML in some form
- CSS itself was initially specified in 1996 by Håkon Wium Lie
- First browser that supported some CSS1 was Internet Explorer 3
- CSS 3 was first specified in 1999
- However, it took years and years for browsers to support it

Three Ways to Add Styles

From **WORST** to **BEST**

WORST: Inline Style Attribute

```
<h2 style="color: red;">This is a RED heading!</h2>
```

- Quick and dirty
- As your app gets larger, this is near impossible to maintain
- Avoid this **almost** as much as the plague

BETTER: Inline <style> in the <head>

```
<head>  
  <style>  
    h2 {  
      color: red;  
    }  
  </style>  
</head>
```

- This is definitely better than inline styles
- However, it is still hard to maintain as your app gets larger

BEST: External Style Sheet

```
<head>
```

```
  <link rel="stylesheet" href="styles.css"/>
```

```
</head>
```

- This is best because it's isolated
- You can use tools as **LESS** for more power
- It's what the cool kids do
- In HTML5, `type="text/css"` is not needed

CSS Syntax

Selectors

- In CSS, **selectors** determine what elements a **style** applies to
- Three kinds:
 - **element** selector
 - **id** selector
 - **class** selector

Selector Syntax

```
selector {  
  property1: value1;  
  property2: value2;  
}
```

```
h1 {  
  color: red;  
  font-size: 24px;  
}
```

Selector Syntax

- The `property: value` pairs are called **declarations**
- Separate declarations are separated by semi-colons
- No spaces or newlines are required but are good for readability:

```
h1{color:red;font-size:24px;}
```

```
h1 {  
    color: red;  
    font-size: 24px;  
}
```

element selector

Applies to a HTML element tag **globally**

For example, **ALL** <h2> in the document will be green:

```
h2 {  
    color: green;  
}
```

id selector

Applies to a unique HTML element with the with the **specified id**

For example, the ONLY <h2> with the id="my-heading" in the document will be bold and have a 1 pixel black border:

```
<h2 id="my-heading">My Heading</h2>
```

```
#my-heading {  
    border: 1px solid red;  
    font-weight: bold;  
}
```

class selector

Applies to HTML all elements that have the specified `class` name.

For example, all elements that have `class="shadow"` will have a CSS 3 text shadow:

```
<span class="shadow">COEN 268</span>
```

```
<h2 class="shadow">My Heading</h2>
```

```
.shadow {  
    text-shadow: 2px 2px #ff0000;  
}
```

Some rules about `class` names

- No spaces allowed (use dashes instead)
- Lower case only
- Be descriptive but not overly verbose

```
.Left Navigation // INVALID  
.LeftNavigation // VALID but ugly  
.left-navigation // VALID but verbose  
.left-nav       // Perfect
```


Cascading Order

CSS specifies a priority scheme to determine which style rules apply if more than one rule matches against a particular element. In this so-called cascade, priorities or weights are calculated and assigned to rules, so that the results are predictable.

-- Wikipedia

Cascading Order (From least to most)

- External style sheet
- Inline `<style>` in `<head>`
- Inline style attribute
- Any rule with `!important`

Also, styles defined later override earlier declarations

```
h2 {  
    color: green;  
}  
...  
h2 {  
    color: red;  
}
```

The color will be **RED**

However, non-conflicting rules will be additive

```
h2 {  
  color: green;  
  font-weight: bold;  
}
```

...

```
h2 {  
  color: red;  
}
```

results in:

```
h2 {  
  color: red;  
  font-weight: bold;  
}
```

Global rules that apply to everything

```
* {  
  font-family: Helvetica;  
}
```

Can be very useful.

Demo

1 - CSS Basics

Code can be found at:

<http://coen268.peterbergstrom.com/resources/demos/csslecturedemos.zip>

Compounding class names on an element

- Elements can have more than one class name specified
- Separated by spaces

```
<ul class="left-nav shadow">  
  <li>Home</li>  
  <li>Lectures</li>  
</ul>
```

```
.left-nav.shadow {  
  text-shadow: 1px 1px gray;  
}
```

This means that only elements with both `class` names will have the styling specified in that block.

```
<!-- Will be red -->  
<ul class="left-nav shadow">  
  <li>Home</li>  
  <li>Lectures</li>  
</ul>
```

```
<!-- Will NOT be red -->  
<ul class="left-nav">  
  <li>Home</li>  
  <li>Lectures</li>  
</ul>
```


Also, you can specify `class` selectors to only work on a specific element type

```
p.shadow {  
    text-shadow: 2px 2px #ff0000;  
}
```

```
<!-- Will be have a shadow -->  
<p class="shadow">Hello.</p>
```

```
<!-- Will NOT have a shadow -->  
<span class="shadow">Hi!</span>
```

Demo

2 - CSS Selectors

Code can be found at:

<http://coen268.peterbergstrom.com/resources/demos/csslecturedemos.zip>

More advanced CSS selectors

Descendant Selector

```
div span {  
    text-decoration: line-through;  
}
```

Selects only `` elements that are contained within `<div>` elements.

Child Selector

```
div > span {  
    text-decoration: line-through;  
}
```

Selects only `` elements IMMEDIATE children of `<div>` elements.

Adjacent Sibling Selector

```
div + span {  
    text-decoration: line-through;  
}
```

Selects only `` elements that have placed right next to `<div>` element and have the same parent.

General Sibling Selector

```
div ~ span {  
    text-decoration: line-through;  
}
```

Selects only `` elements that are siblings of `<div>` elements.

Pseudo Classes

```
selector:pseudo-class {  
    text-decoration: underline;  
}
```

```
selector.class:pseudo-class {  
    text-decoration: underline;  
}
```


<a> anchor pseudo classes

```
a:link {  
    color: #666;  
    text-decoration: none;  
}  
a:visited {  
    color: #333;  
}  
a:active {  
    color: #aaa;  
}  
a:hover {  
    text-decoration: underline;  
}
```

Some other cool pseudo selectors

- `:first-child`, `:last-child`
 - First or last child inside a parent.
- `:nth-last-child(number)`
 - ex: `li:nth-last-child(2)`
 - Selects 2nd to last `` element inside a parent

Some other cool pseudo selectors

- `::first-letter`
 - ex. `p::first-letter`
 - - Selects the first letter of a paragraph element
- `::first-line`
 - ex: `p::first-line`
 - Selects the first line of a paragraph element

Demo

3 - Advanced CSS Selectors

Code can be found at:

<http://coen268.peterbergstrom.com/resources/demos/csslecturedemos.zip>

Okay, now that we can select all the
things...

CSS Positioning

- `static`
- `absolute`
- `relative`
- `inline`
- `fixed`

CSS Static Positioning

- This is the default
- Means that it is positioned along with the normal flow of the page

CSS Absolute Positioning

- Does not leave space for the element
- Position element at the exact place relative to its closest positioned parent
- Usually, this is just the `<html>` element
- This usually is used for fine grained control

CSS Relative Positioning

- Positioned relative to the parent
- Can overlap other sibling elements but reserves the space
- Usually, this is just the `<html>` element
- This usually is used for fine grained control

CSS Fixed Positioning

- Takes the element out of the flow of the document entirely
- Positions it relatively to the browser window
- Gives you great control for things such as headers or footer elements

CSS Floating

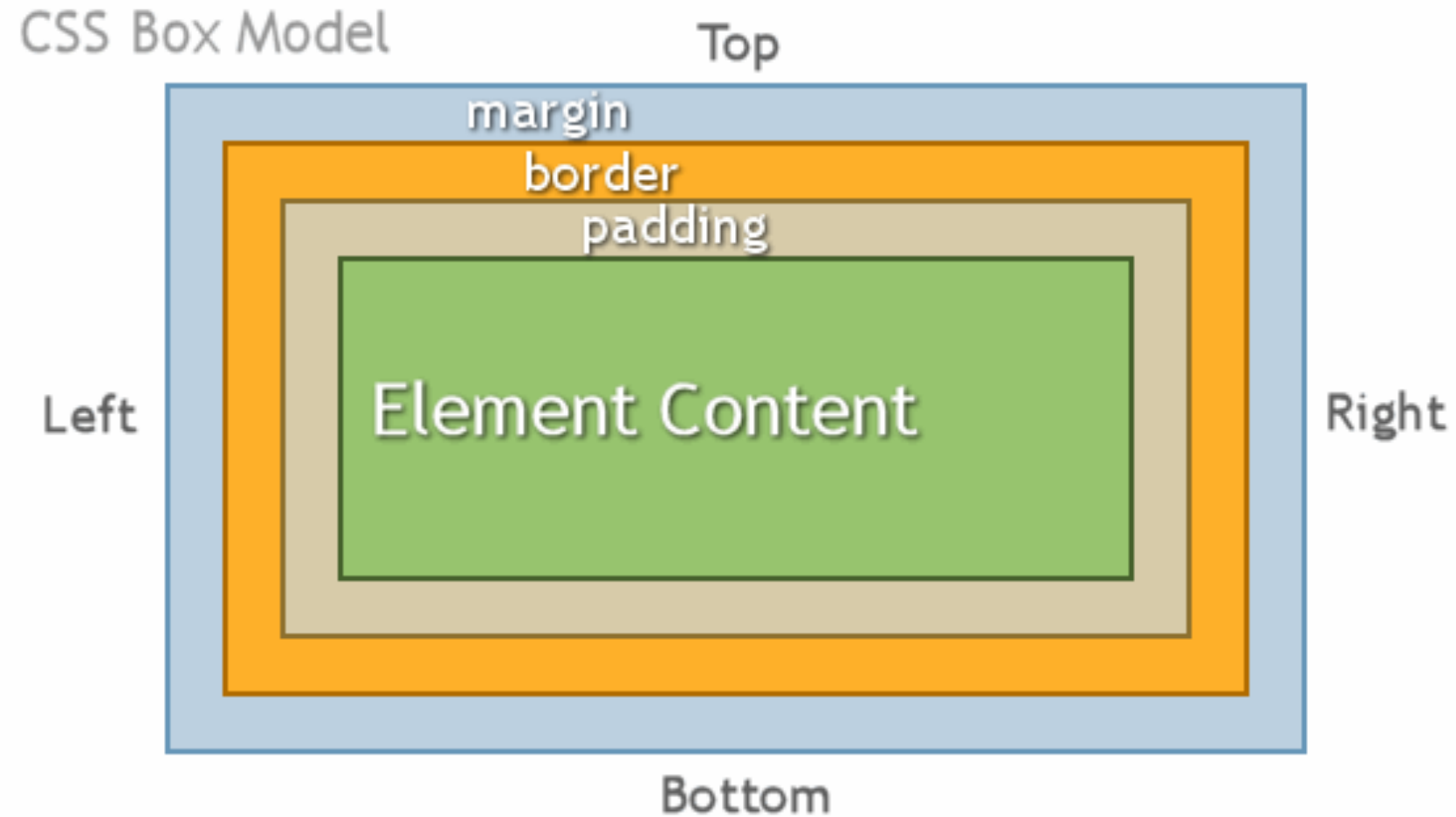
- Used for relative positioned elements to move to one side or the other
- Elements will take in account other floated elements with the same parent
 - `left`
 - `right`

CSS Box Model

Properties:

- margin
- padding
- border
- top, left, right, bottom, height, width, min-height, min-width

CSS Box Model



Source: <http://guistuff.com/css/images/boxmodel.png>

Zeroing Out margin and padding

Most browsers add some as a default to elements. In some cases you might want to zero that out if you are doing custom styling.

```
* {  
    margin: 0;  
    padding: 0;  
}
```

Demo

4 - CSS Positioning and Box Model

Code can be found at:

<http://coen268.peterbergstrom.com/resources/demos/csslecturedemos.zip>

CSS Colors

- Named values (limited set) -> `lightblue`
- Hex values -> `#a3f2e2`
- RGB values (0-255) -> `rgb(163, 242, 226)`
- RGBA values: (0-255) and alpha (0.0 - 1.0)
 - `rgba(163, 242, 226, 0.4)`

CSS Backgrounds

- `background-color`
- `background-image`
- `background-repeat`
- `background-attachment`
- `background-position`

CSS3 Backgrounds

- `background-size`
- `background-origin`

CSS3 Gradients

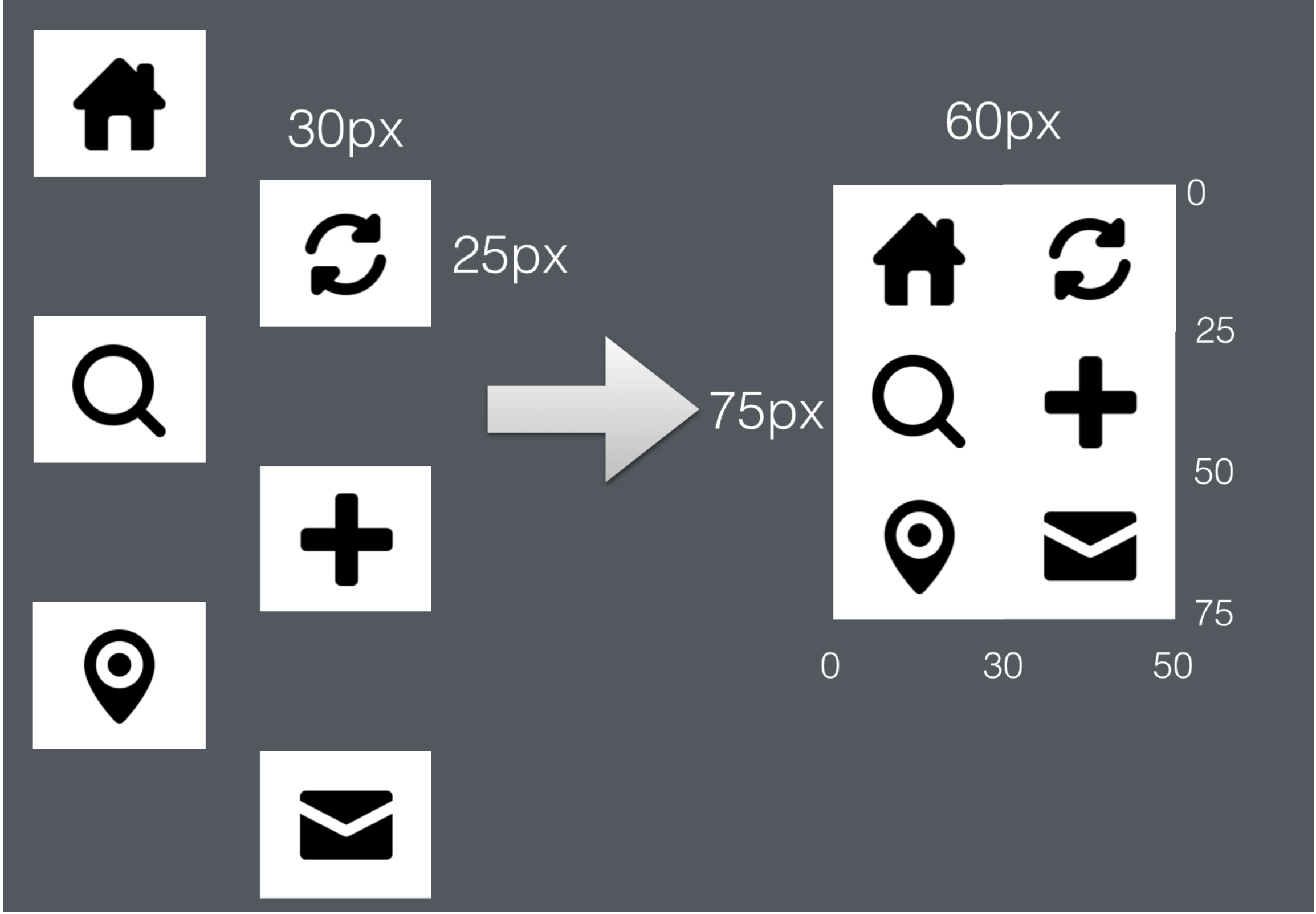
- `linear-gradient`
- `radial-gradient`
- `repeating-linear-gradient`
- `repeating-radial-gradient`

Image Spriting

- Instead of loading each image asset separately you combine them all into a larger image
- This means that the image is larger, but it isn't as large as all the images combined
- But you save on the number of calls to load assets
- As a result, you take much less of a latency hit when loading assets
- Image spriting is done via CSS background position

How Do You Make A Sprite?

- Let's say that you have 6 icons on your website that are 30px wide and 25 px tall
- Each are PNGs and about 4KB each.
- Combined in a sprite, they are all 5KB together
- Savings are made because PNGs compress solid colors, for example



Sprite CSS

```
.icon {  
  width: 30px;  
  height: 25px;  
  background: url(images/sprite.png);  
}  
.icon.home-icon {  
  background-position: 0px 0px;  
}  
.icon.search-icon {  
  background-position: 0px -25px;  
}  
.icon.search-icon {  
  background-position: 0px -50px;  
}  
.icon.reload-icon {  
  background-position: -30px 0px;  
}  
.icon.add-icon {  
  background-position: -30px -25px;  
}  
.icon.mail-icon {  
  background-position: -30px -50px;  
}
```

Demo

5 - CSS Backgrounds

Code can be found at:

<http://coen268.peterbergstrom.com/resources/demos/csslecturedemos.zip>

CSS Text Alignment

- Inside block level elements you can set the text positioning
 - left, center, right

```
h1 {  
    text-align: center;  
}
```

CSS Text Decoration

- You can decorate text
 - `overline`, `line-through`, `underline`

```
span.nixed {  
    text-decoration: line-through;  
}
```

CSS Text Color

- You can set color on text using the `color` property

```
.angry-text {  
    color: red;  
}
```

CSS Text Shadow

- You can add a text shadow to your text
 - `text-shadow: [h-distance]px [v-distance]px [color]`

```
p {  
  text-shadow: 1px 1px rgba(0,0,0,0.4);  
}
```

CSS Font Family

- You can specify the font face to use:
 - either generic: `Serif`, `Monospace`, `Sans-serif`
 - or by name `"HelveticaNeue-Light"` or `Arial`
- Can also have backup scheme if font isn't found, like `"HelveticaNeue-Light"` since it isn't found on Windows. `Arial` will work just fine.

```
p {  
  font-family: "HelveticaNeue-Light", Arial;  
}
```

CSS Font Size

- You can specify the font size with:
 - px
 - percent
 - em

```
h2 {  
    font-size: 20px;  
}
```

Demo

6 - CSS Fonts

Code can be found at:

<http://coen268.peterbergstrom.com/resources/demos/csslecturedemos.zip>

CSS Borders

- You can define borders with different styles and colors
- Can be defined per edge (left, right, top, bottom)
 - `ie: border-top-width: 3px;`

Border Style

- `border-style: [style]`
 - dotted, dashed, solid, double, groove, ridge, inset, outset
 - However, 99.999% of the time, you will ONLY use `solid`

```
div {  
    border-style: style;  
}
```

Border Color

- `border-color: [color]`
- Standard ways to define colors

```
div {  
    border-color: gray;  
}
```

Border Width

- `border-width: [value]px`

```
div {  
    border-width: 1px;  
}
```

Border Combined

- This is the most normal way to do it
- `border: [value]px [style] [color]`

```
div {  
    border: 1px solid gray;  
}
```

Border Radius

- Gives you rounded corners
- `border-radius: [value]px`
- HINT: If you want a circle, just make the radius 1/2 of the edge of the box.

```
div {  
    border-radius: 4px;  
}
```

Box Shadow

- Now your boxes can have shadows
- `box-shadow: [h offset]px [v offset]px [blur radius]px [spread radius]px [color]`
 - blur and spread are optional

```
div {  
  box-shadow: 4px 4px 3px 3px rgba(0,0,0,.5);  
}
```

Demo

7 - CSS Borders and Shadows

Code can be found at:

<http://coen268.peterbergstrom.com/resources/demos/csslecturedemos.zip>

CSS Display and Visibility

- You can toggle the visibility of elements two ways:
 - `display`
 - `visibility`

`display` is used most often

CSS Display

- When `display` is set to `none`, the element is hidden
 - Also is treated like it is out of the document so it takes up no space
- `block` will make it a block level element
- `inline` will make it an inline level element

CSS Visibility

- When `visibility` is set to `hidden`, the element is hidden
- But it still takes up space on the page
- `visible` will make the element show again

CSS Opacity

- Makes the element see through
- `opacity: [value]`
- Value is between 0.0 and 1.0

Demo

8 - CSS Display and Opacity

Code can be found at:

<http://coen268.peterbergstrom.com/resources/demos/csslecturedemos.zip>

CSS3 Transitions

- Allows you to add transition animations when CSS properties change
 - Specify the property to animate
 - Specify the duration in seconds
 - Can specify different timing functions

```
div {  
  transition: opacity 2s linear;  
}
```

Demo

9 - CSS Transitions

Code can be found at:

<http://coen268.peterbergstrom.com/resources/demos/csslecturedemos.zip>

CSS3 2D Transforms

- `-webkit-transform: [command]`
- Allows you to create cool effects with these commands:
 - `translate`
 - `rotate([n]deg)`
 - `skew`
 - `matrix`

Demo

10 - CSS 2D Transforms

Code can be found at:

<http://coen268.peterbergstrom.com/resources/demos/csslecturedemos.zip>

CSS3 3D Transforms

- Allows you to create cool effects with these commands:
 - `rotateX`
 - `rotateY`

Demo

11 - CSS 3D Transforms

Code can be found at:

<http://coen268.peterbergstrom.com/resources/demos/csslecturedemos.zip>

CSS3 Animations

- Can animate properties with keyframes
- Kind of similar to transitions, but with way more power

```
div {  
  animation: change-color 4s;  
}
```

```
@keyframes change-color {  
  0%    {color: red;}  
  50%   {color: blue;}  
  100%  {color: white;}  
}
```

Demo

12 - CSS Animations

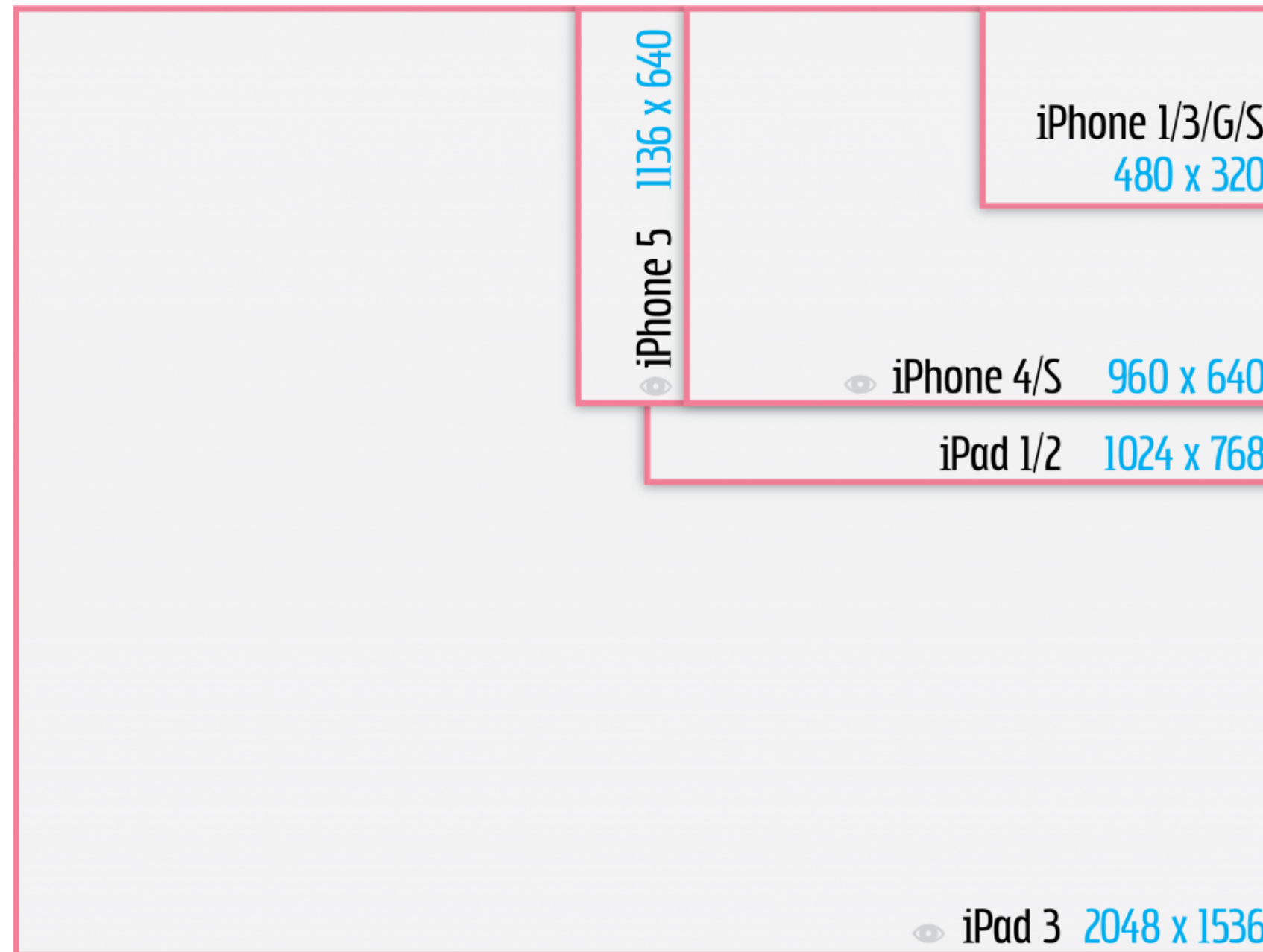
Code can be found at:

<http://coen268.peterbergstrom.com/resources/demos/csslecturedemos.zip>

Designing a Responsive Mobile Web Page

- For mobile, you have to consider different things
 - Screen sizes are smaller
 - Many different screen sizes
 - Need larger elements to tap on
 - Different resource constraints (image sizes, etc)
 - Not zoomable in the mobile browser (unless you want to)

Screen sizes on iOS (from phoneArena.com)



It gets worse when you also look at
Android

[http://thedigitaldisciple.net/2014/03/03/
tablet-resolution-and-screen-size-comparison-
chart-updates/](http://thedigitaldisciple.net/2014/03/03/tablet-resolution-and-screen-size-comparison-chart-updates/)

This means that you have decide how to display you content on these devices

- You can't make all devices perfect
- You can't easily make different experience for each device
- Compromise is the name of the game

CNN.com



July 1, 2014 — Updated 1329 GMT (2129 HKT)



When is Facebook NOT messing with your head?

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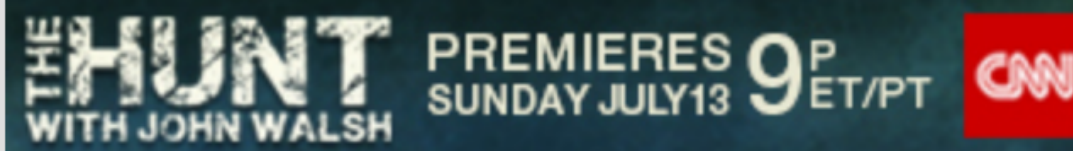
Weather

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Heavy Clashes After Ukraine's Leader Ends Cease-Fire

By DAVID M. HERSZENHORN
6:31 AM ET

Fighting resumed in eastern Ukraine early Tuesday, including artillery shelling around the rebel-controlled city of Sloviansk, shortly after President Petro O. Poroshenko ended a 10-day cease-fire.

NEWS ANALYSIS

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By JEREMY W. PETERS and
MICHAEL D. SHEAR

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Japan Moves to Permit Greater Use of Its Military



A river of protesters in the streets of Hong Kong.
Jerome Favre/European Pressphoto Agency

A Mass Protest in Hong Kong Defies Beijing

By KEITH BRADSHAW 8:45 AM ET

Hundreds of thousands of people held one of the largest marches in Hong Kong's history to demand democracy.

World Cup 2014

In Case of Shootout, Who Kicks for U.S.?

By SAM BORDEN

The New York Times polled several fans of the Americans, who also have various connections to U.S. Soccer, and asked the most important shootout question: Who are your five?

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At 11:46 AM ET

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1,973.86	16,958.17	4,460.11
+13.63	+131.57	+51.93
+0.70%	+0.78%	+1.18%

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Fighting Intensifies in Ukraine After Cease-Fire Is Ended

Fighting resumed in the east early Tuesday, including artillery shelling around the rebel-controlled city of Sloviansk, after President Petro O. Poroshenko ended a 10-day cease-fire.



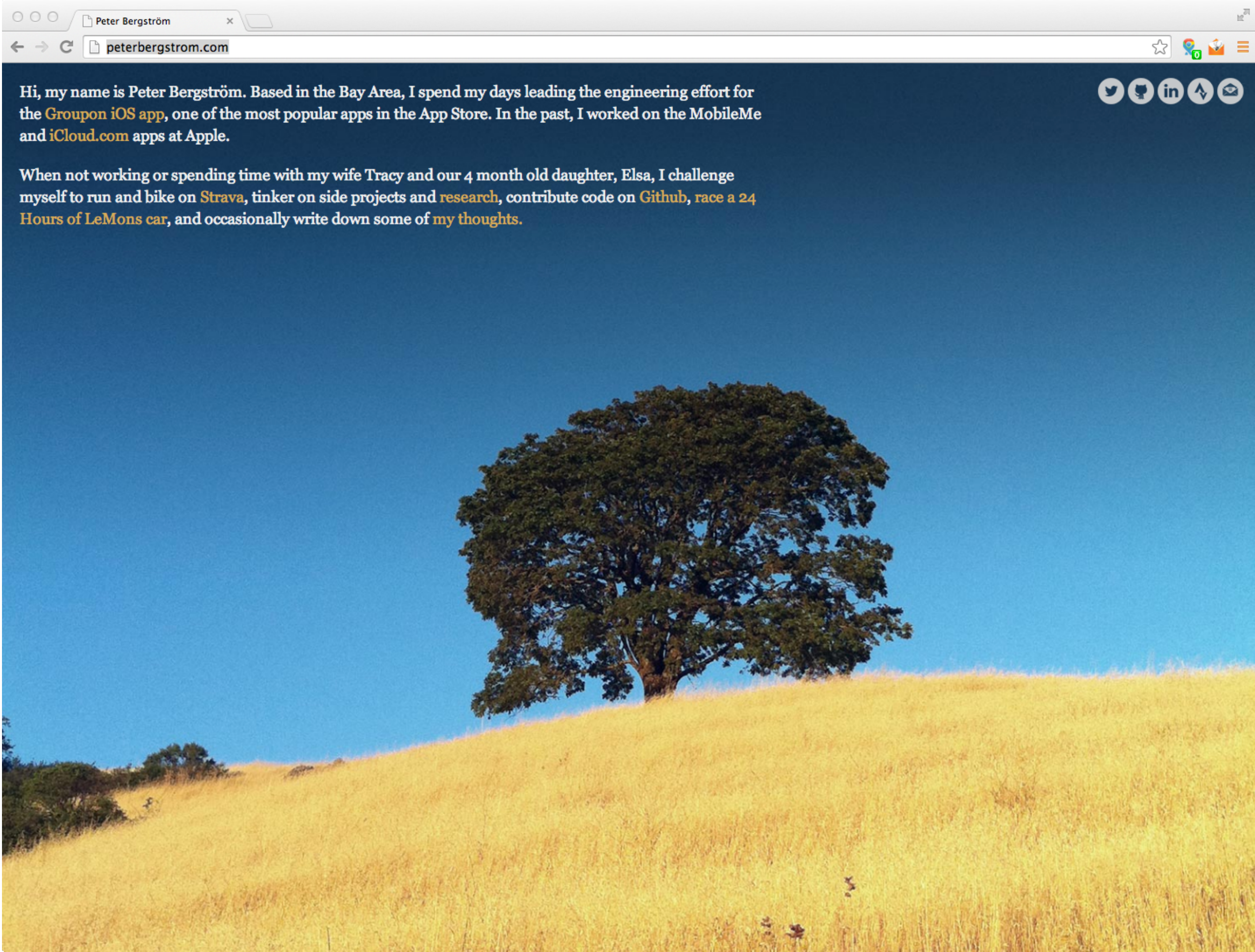
NEWS ANALYSIS

A Ruling That Both Sides Can Run With

Even as conservatives celebrated coming out on the winning side of a divisive social issue, their court



PeterBergstrom.com



Hi, my name is Peter Bergström. Based in the Bay Area, I spend my days leading the engineering effort for the [Groupon iOS app](#), one of the most popular apps in the App Store. In the past, I worked on the MobileMe and [iCloud.com](#) apps at Apple.

When not working or spending time with my wife Tracy and our 4 month old daughter, Elsa, I challenge myself to run and bike on [Strava](#), tinker on side projects and [research](#), contribute code on [Github](#), [race a 24 Hours of LeMons car](#), and occasionally write down some of [my thoughts](#).

peterbergstrom.com



Hi, my name is Peter Bergström. Based in the Bay Area, I spend my days leading the engineering effort for the [Groupon iOS app](#), one of the most popular apps in the App Store. In the past, I worked on the MobileMe and [iCloud.com](#) apps at Apple.

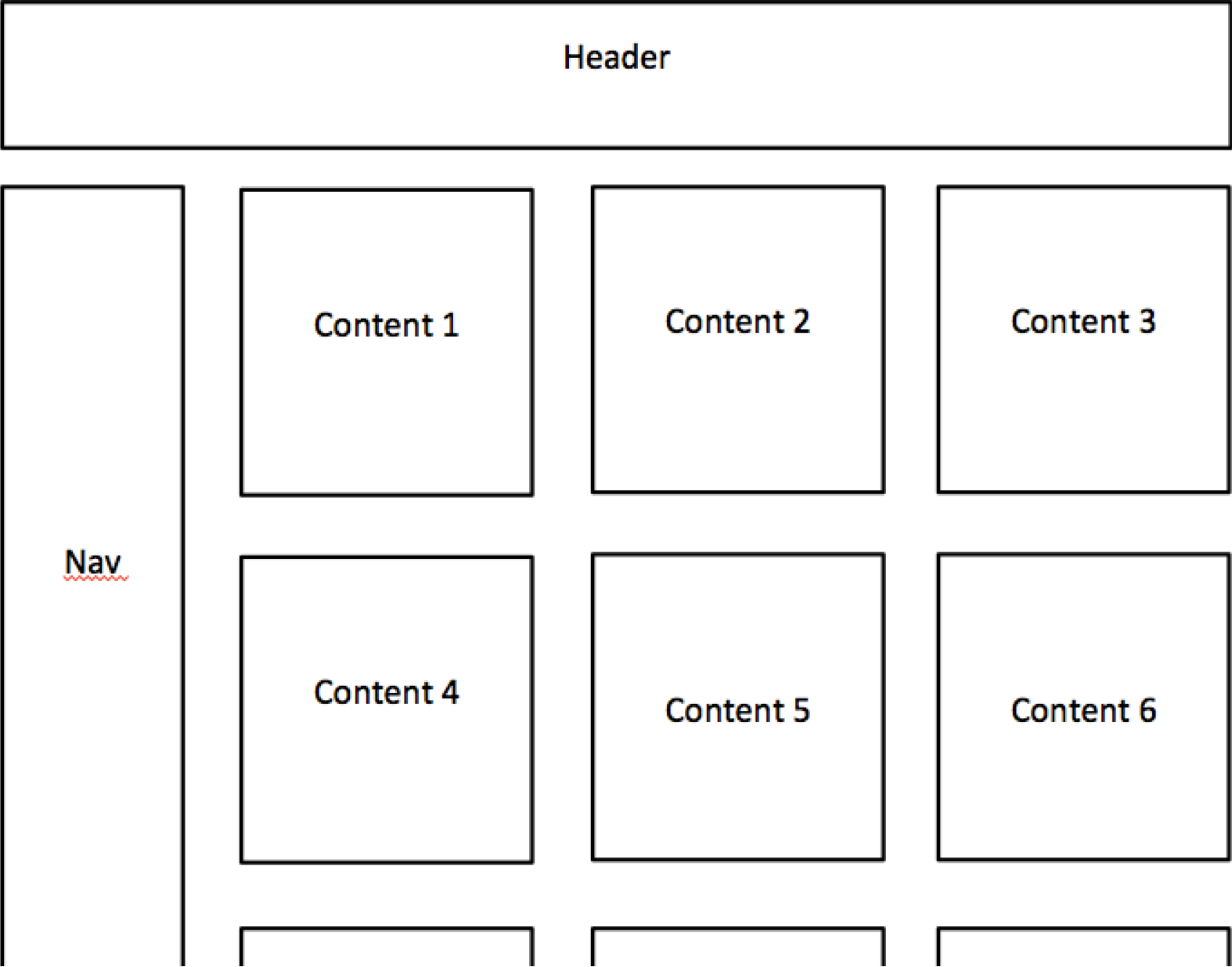
When not working or spending time with my wife Tracy and our 4 month old daughter, Elsa, I challenge myself to run and bike on [Strava](#), tinker on side projects and [research](#), contribute code on [Github](#), race a 24 Hours of LeMons car, and occasionally write down some of [my thoughts](#).



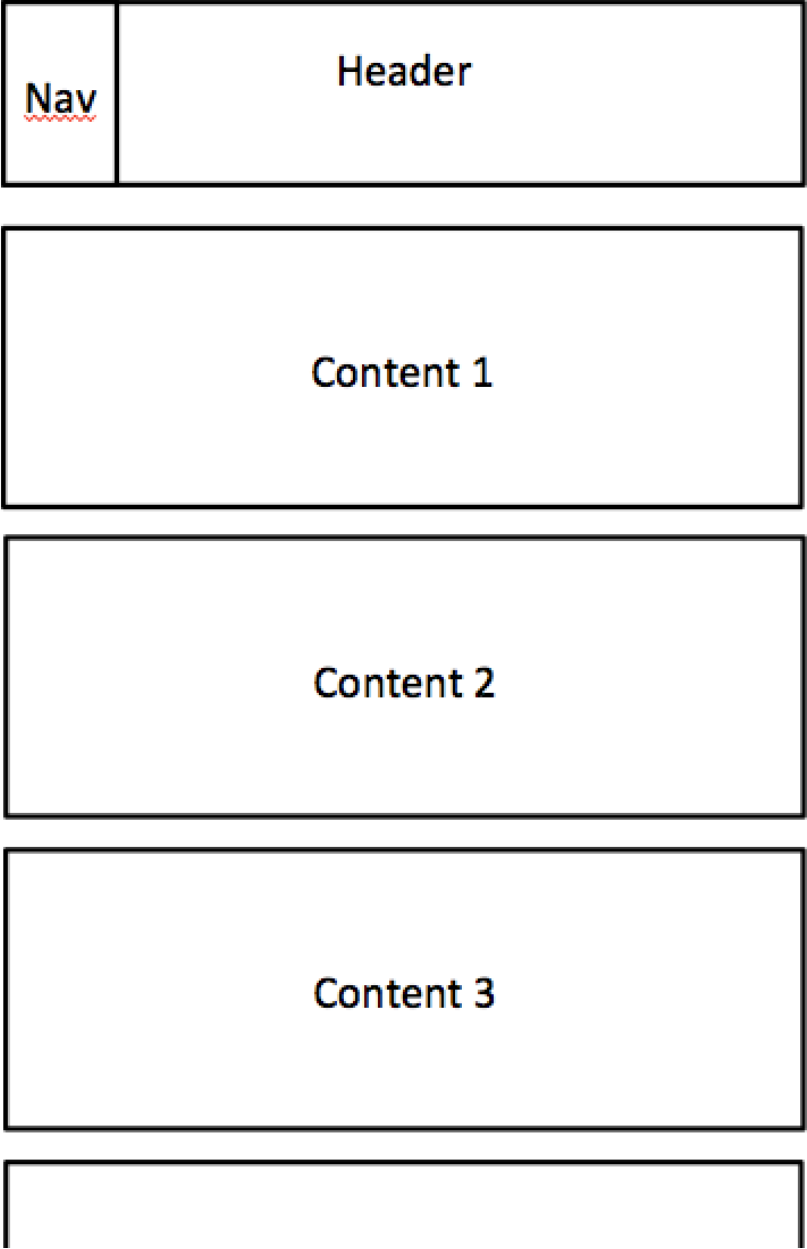
Some things that you might have noticed

- One column instead of many
- Larger tappable links and buttons
- However, displays the same content
- Since markup is markup, the HTML should be the same as well

Desktop Layout



Mobile Layout



So, how do you make your site responsive?

- @media CSS media selectors
- <meta> tag viewport display rules

CSS Media Selectors to the Rescue!

- Allows you to specify different subset of styles for different devices
 - `screen` for when it is displayed on a screen
 - `print` style rules for printing
 - `min-width` and `max-width` rules for various screen sizes
 - `orientation:landscape` or `orientation:portrait` for even more specifics
- Great for mobile development.

CSS Media Selectors in a single stylesheet

```
/* general screen rules */
@media screen {
  body {
    width: 75%;
  }
}

/* print rules */
@media print {
  body {
    width: 100%;
  }
}

/* only screen for devices between 480px-1024px wide */
@media screen (min-width:480px) and (max-width:1023px) {
  body {
    background: gray;
  }
}
```

CSS Media Selectors in different stylesheets

```
<!-- general screen rules -->
```

```
<link rel="stylesheet" href="screen.css" type="text/css"  
      media="screen" />
```

```
<!-- print rules -->
```

```
<link rel="stylesheet" href="print.css" type="text/css"  
      media="print" />
```

```
<!-- only screen for devices between 480px-1024px wide -->
```

```
<link rel="stylesheet" href="screen_max1024.css" type="text/css"  
      media="screen (min-width:480px) and (max-width:1023px)" />
```


Using @media selectors for retina images

```
a.link-twitter {  
    background-image: url(../images/icons/twitter.png);  
}
```

@media

```
only screen and (-webkit-min-device-pixel-ratio:2),  
only screen and (    min--moz-device-pixel-ratio:2),  
only screen and (        -o-min-device-pixel-ratio:2/1),  
only screen and (            min-device-pixel-ratio:2),  
only screen and (                min-resolution:192dpi),  
only screen and (                    min-resolution:2dppx){  
    a.link-twitter {  
        background-size:30px 30px;  
        background-image:url(../images/icons/twitter@2x.png);  
    }  
}
```



← Non-Retina & Retina →



Demo

13 - Media Selectors

Code can be found at:

<http://coen268.peterbergstrom.com/resources/demos/csslecturedemos.zip>

Content sizing using the viewport `<meta>` tag

- On a desktop computer, the browser window is resizable independently of the screen size
- On a mobile device, the browser and window size are fixed with relation to each other

This can cause a problems that sizing your page with the viewport `<meta>` tag can can help solve

How does it work?

```
<head>
```

```
...
```

```
<meta name="viewport" content="width=device-width, user-scalable=no">
```

```
...
```

```
</head>
```

The viewport meta tag properties

- device-width
 - Set this in **portrait** to lock the sizing down
- device-height
 - Set this in **landscape** to lock the sizing down
- initial-scale
 - Set this to 1.0 to use the device's size for the scale
- user-scalable

Demo

14 - Viewport <meta> tag

Code can be found at:

<http://coen268.peterbergstrom.com/resources/demos/csslecturedemos.zip>

LESS

Less is a CSS pre-processor, meaning that it extends the CSS language, adding features that allow variables, mixins, functions and many other techniques that allow you to make CSS that is more maintainable, themable and extendable.

Less runs inside Node, in the browser and inside Rhino. There are also many 3rd party tools that allow you to compile your files and watch for changes.

-- lesscss.org

LESS gives you:

- Mixins – Classes for classes
- Parametric mixins – Classes that take params, like functions
- Nested Rules – Classes within classes
- Operations – Math within CSS.
- Color functions – Edit your colors
- Namespaces – Groups of styles that can be called by references
- Scope – Make local changes to styles

The best thing... nesting with LESS

```
body {  
  header {  
    color: #555;  
    &:hover {  
      color: #777;  
    }  
  }  
}
```

- & allows you to add sub-rules to your class that you're defining
- like `header` then `header:hover`

There are so many features, so let's
go to LESSCSS.org

See more here: <http://lesscss.org/features/>

Demo

15 - LESS

Code can be found at:

<https://github.com/pbergstr/calculator-demo>

COEN 168/268

Mobile Web Application Development

Cascading Style Sheets

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