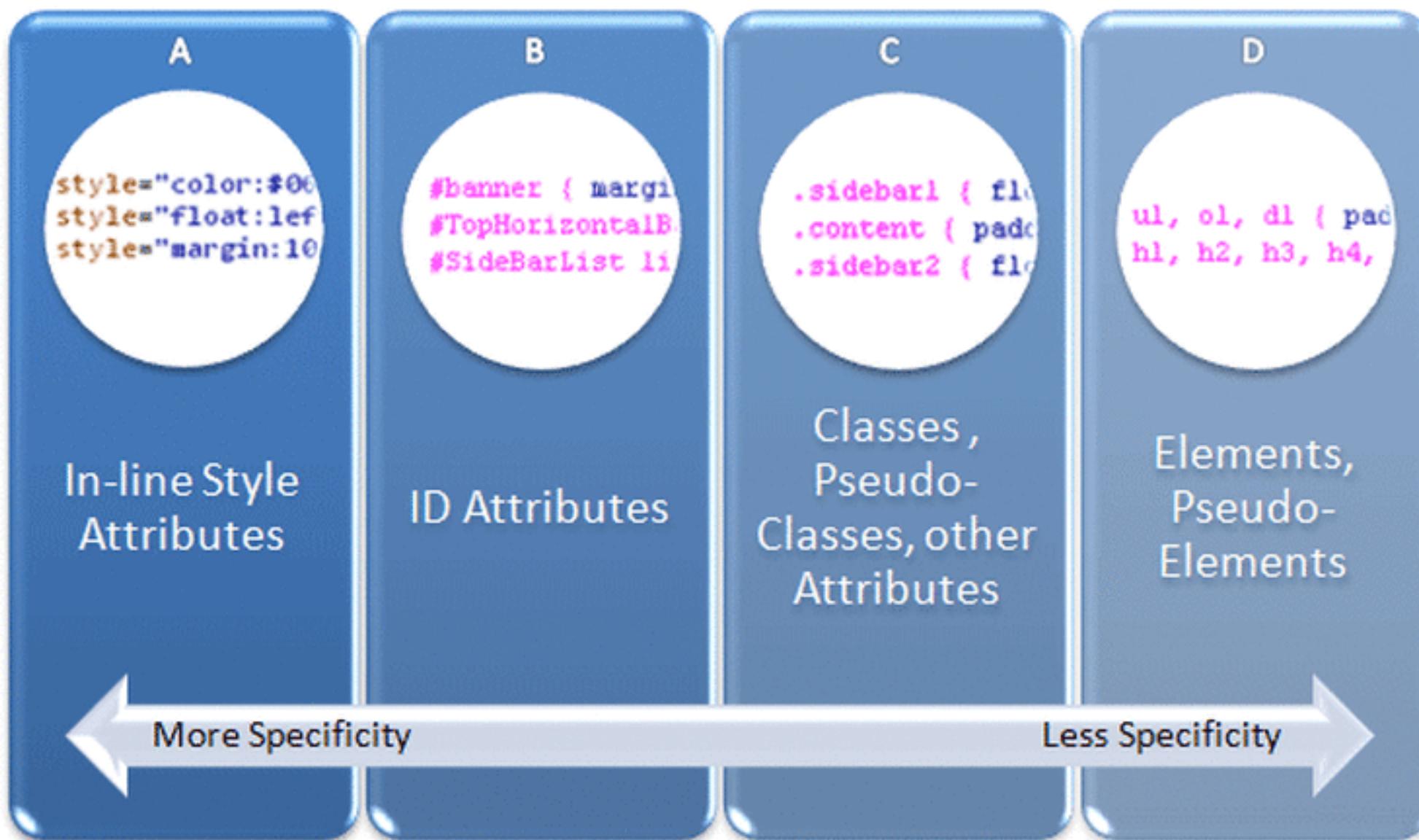


IN4MATX 133: User Interface Software

Semantic HTML, Grid Layout, and
Responsive Demo

Specifying styles

- CSS specificity is *calculated* based on which selector designates it
- General rule: rule that's “closer to the HTML element” applies
- This is difficult stuff, usually trial-and-error resolves most things



Positioning

- HTML tags are either*:
 - **Block** elements (line break after them)
 - **Inline** elements (no line break)

`<p>` ← Block

This is on a line.

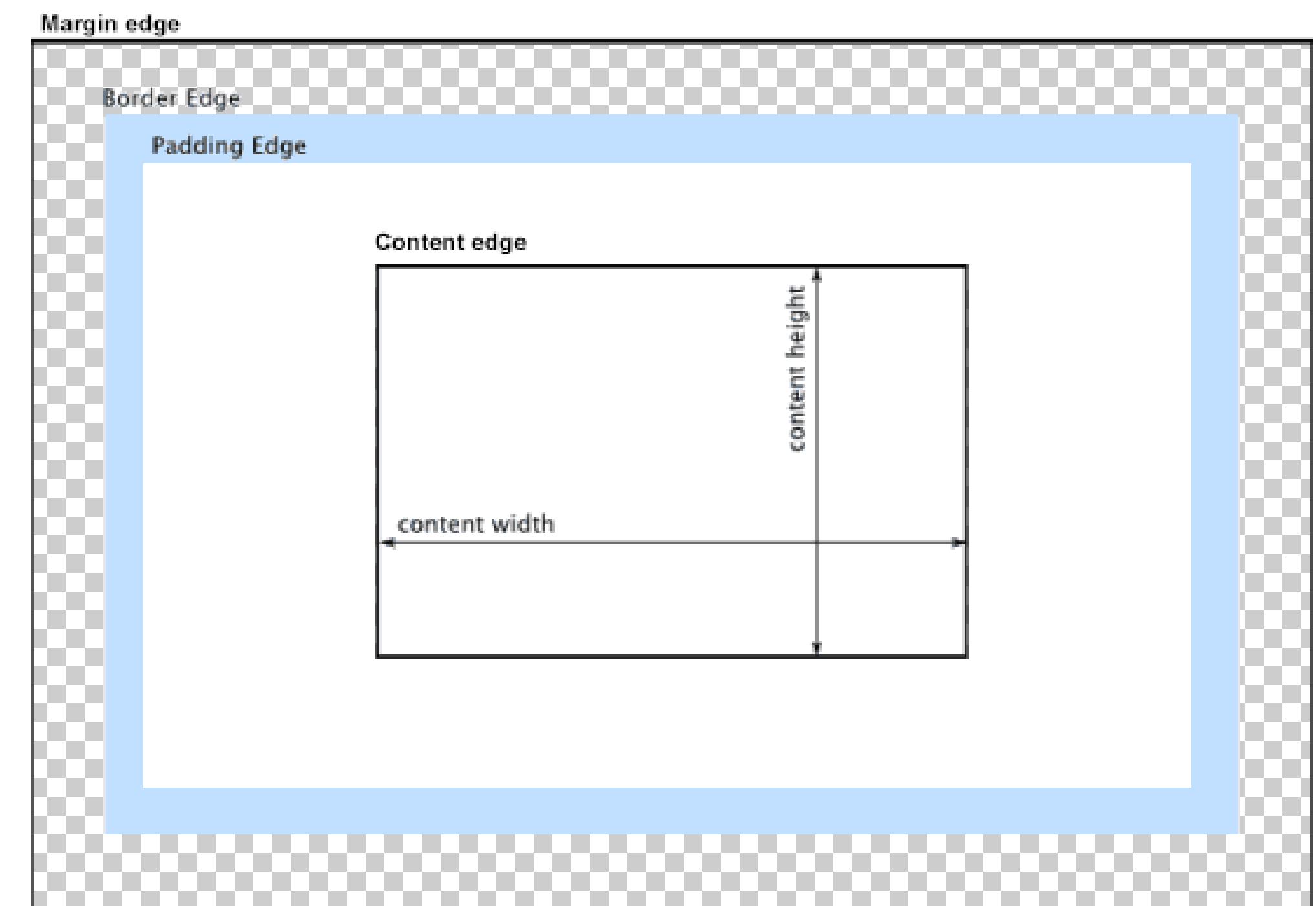
``This is on the same line.`` ← Inline
`</p>`

`<p>`This will be on a new line.`</p>`

- Don't put block elements inside inline elements!

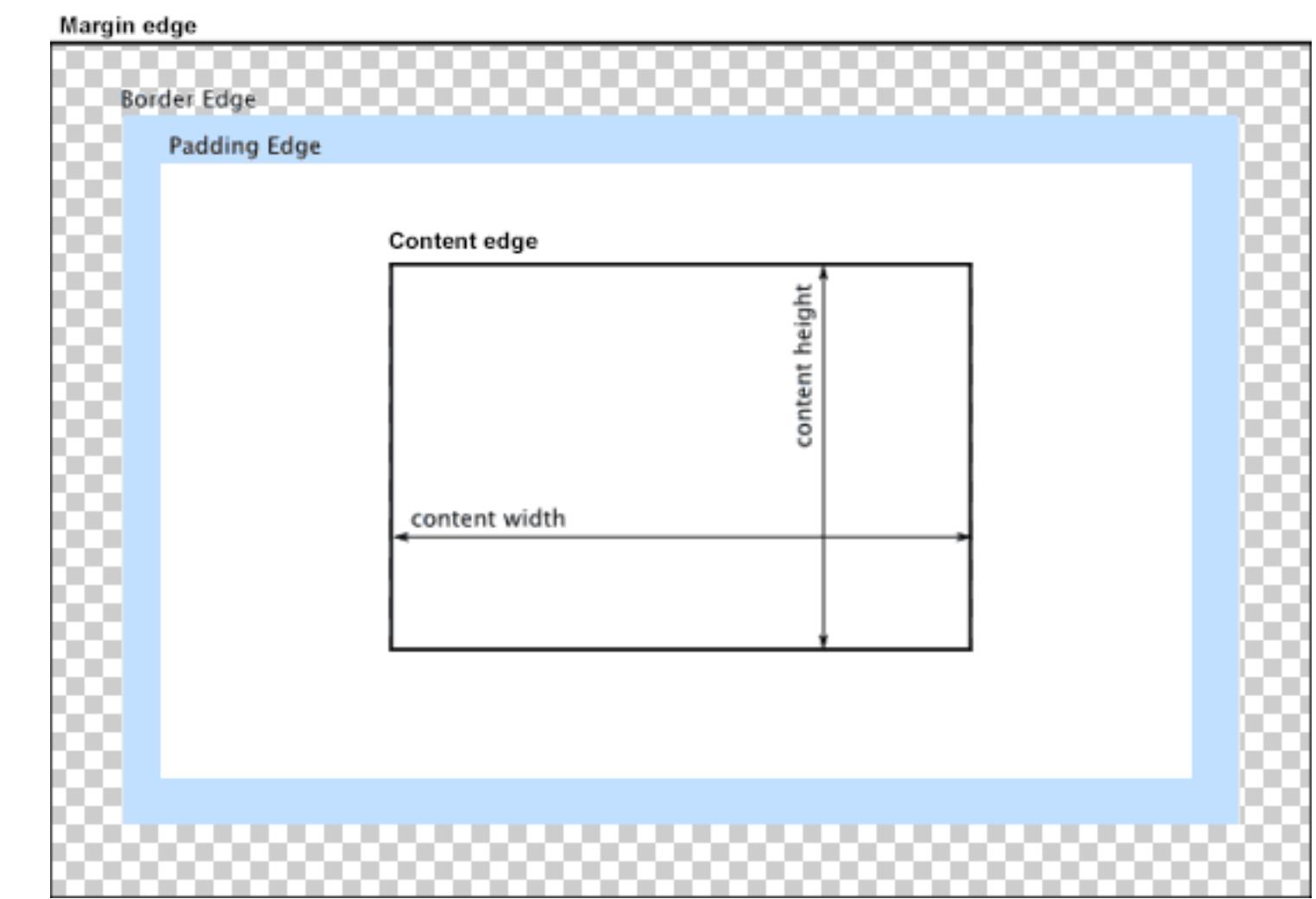
Positioning: box model

- **Content** contains “real” content
- **Padding** extends content area
- **Border** is similar
- **Margin** is intended to separate elements from neighbors



Positioning: box model

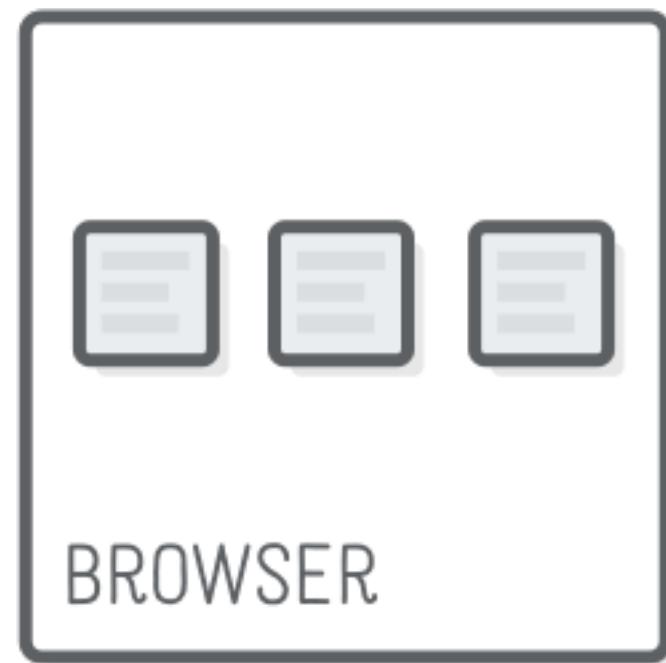
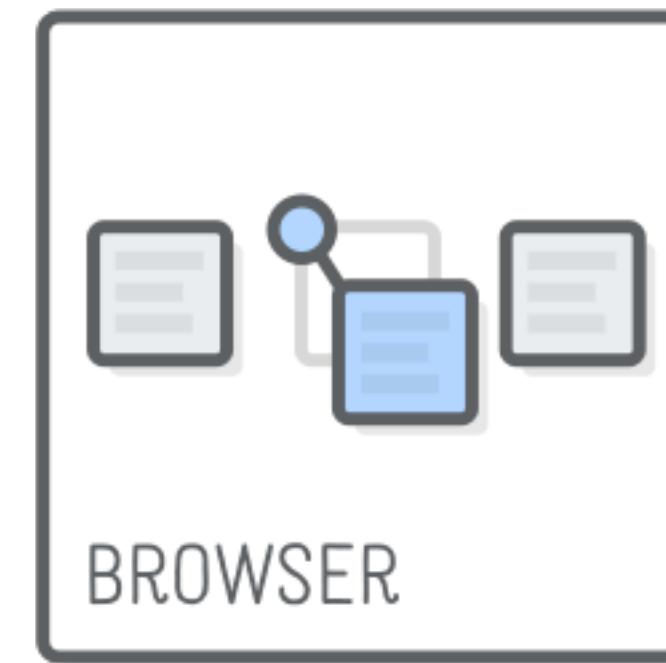
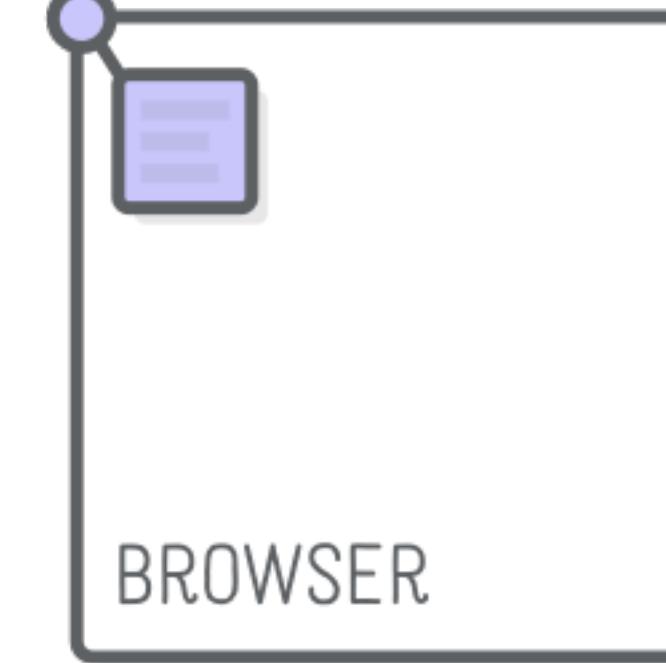
- Content dimensions are specified with width and height
- padding, border, and margin have direction properties (e.g., padding-top, margin-right, border-left)
- border can have border-color, border-width, and border-style
- Content color (e.g., background-color) extends into padding



Positioning

- All positioning is relative to the parent
 - If you nest tags, the child's margins, etc. are all dependent on parent's

Positioning: types

- | STATIC | RELATIVE | ABSOLUTE | FIXED |
|---|---|---|---|
| 
BROWSER | 
BROWSER | 
BROWSER | 
BROWSER |
- static (**default**)
 - relative (**offset from default**)
 - absolute (**from top-left**)
 - fixed (**absolute + floating, fixed to the viewport**)

Positioning: types

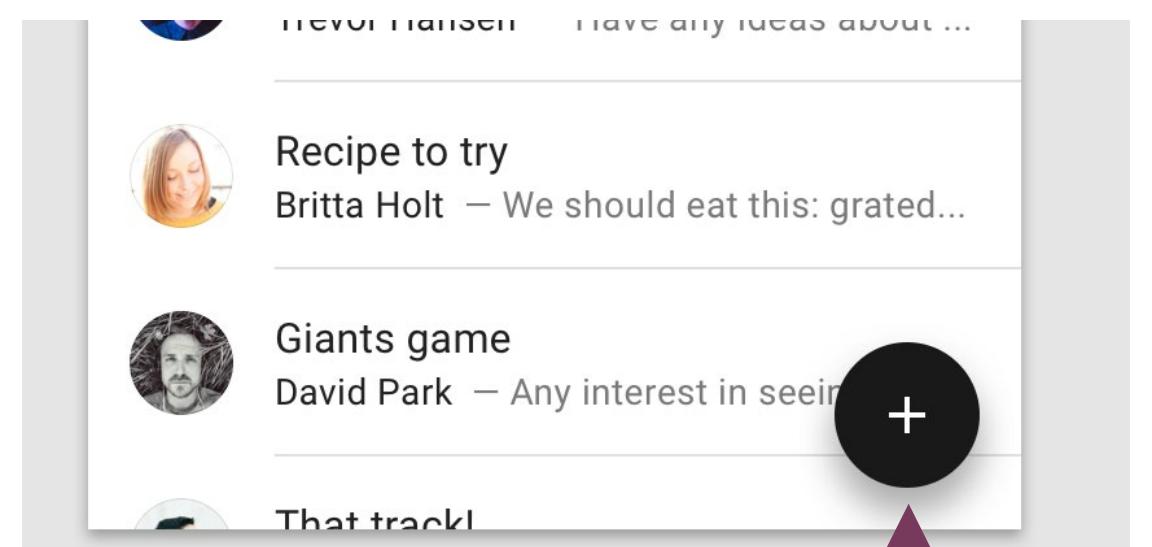
- static and relative follow the overall flow of a page
 - relative helps make adjustments to the flow
- absolute and fixed ignore it entirely
 - But they're helpful in some cases, like floating action buttons (FABs)

A screenshot of a sign-up form. It includes fields for Real Name, City, E-mail, Username, Password, and a 'Join!' button. To the right of the form is a vertical sidebar with a 'SIGN IN ABOVE' button and a 'member?' link. A red arrow points from the text 'Relative position' to the sidebar area.

Sign Up!

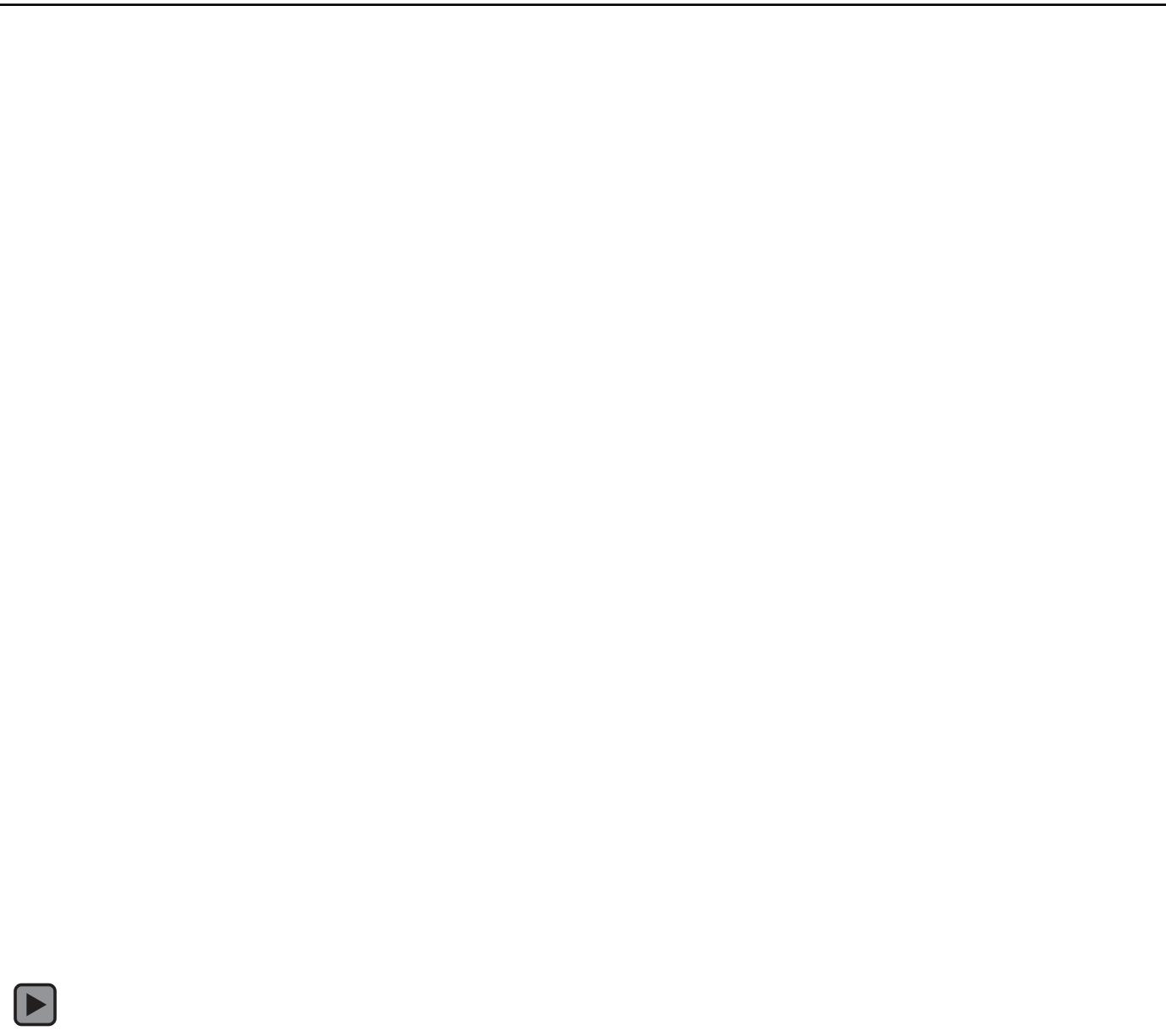
Real Name
City
E-mail
Username
Password
Join!

member?
SIGN IN ABOVE



Positioning: types

- sticky will stop when a user scrolls past it
 - Useful for menus



<https://css-tricks.com/examples/AbsoluteInsideRelative/>

Units

- Pixels (px), element units (em), percentages (%), real-world units (in, cm)
- Use relative units (em, %) whenever possible
- Helps accessibility, people with low vision change default size (usually 16px)
 - Em fonts scale from the default, a 30px heading stays 30px
 - Also useful to vary based on screen size

	Recommended	Occasional use	Not recommended
Screen	em, px, %	ex	pt, cm, mm, in, pc
Print	em, cm, mm, in, pt, pc, %	px, ex	

Advanced selectors

- Extremely useful for making clean stylesheets
- Add a top margin for all h2s that follow a paragraph

```
p + h2 {  
  margin-top: 10px;  
}
```

- Or only in a particular div

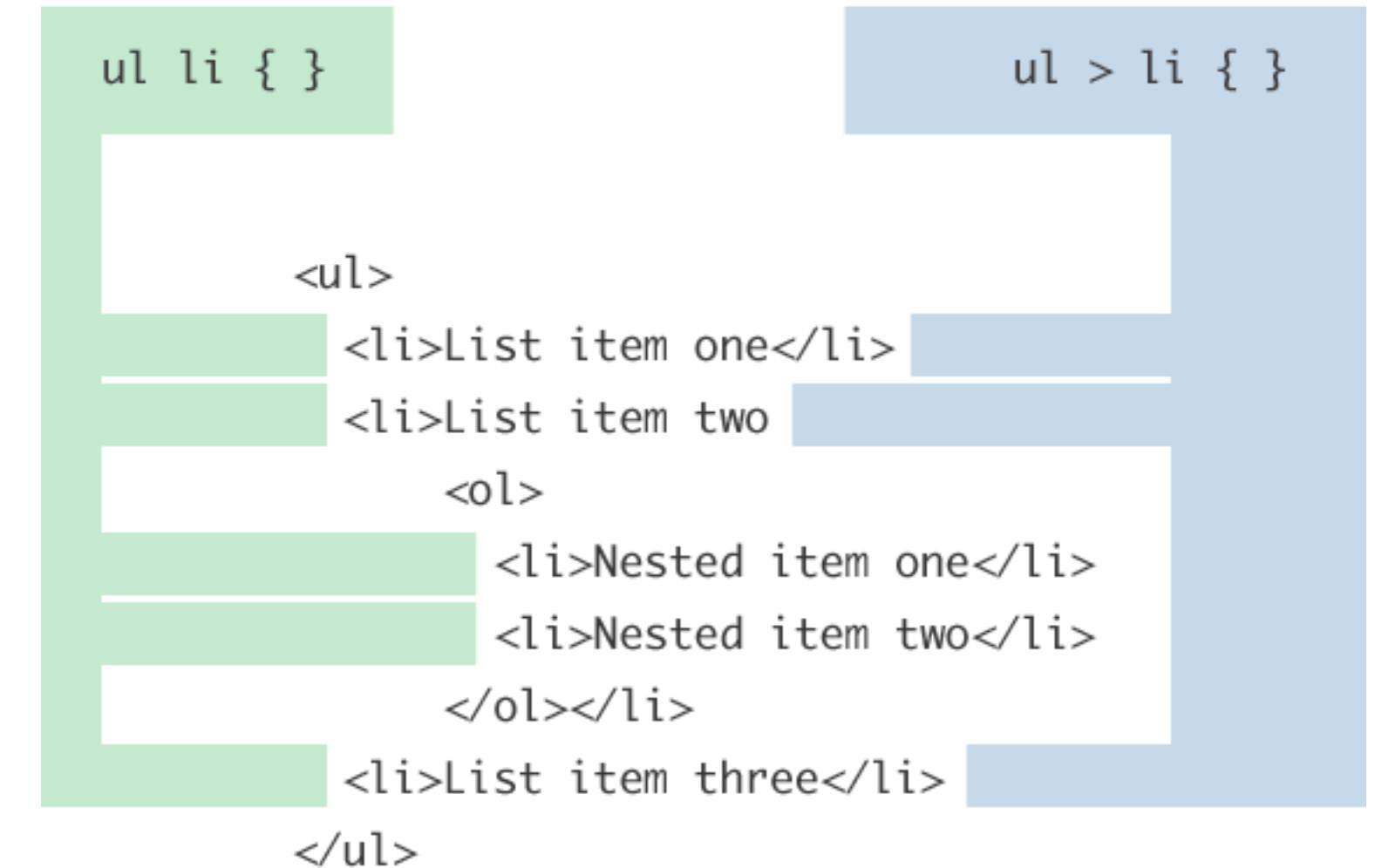
```
div.post p + h2 {  
  margin-top: 10px;  
}
```

<https://www.smashingmagazine.com/2009/08/taming-advanced-css-selectors/>

Advanced selectors

Child and Descendant Selectors

- `ul li`
 - Select *all* children and grandchildren
- `ul > li`
 - Select *direct* children (not grandchildren)



Fonts & fallbacks

- Browsers will try fonts in order

```
p {  
    font-family: "Times New Roman", Times, serif;  
}
```

- Google Fonts is a great resource

```
<!--HTML-->  
<link  
    href="https://fonts.googleapis.com/css?family=Roboto"  
    rel="stylesheet">  
/* CSS */  
font-family: 'Roboto', sans-serif;
```

<https://fonts.google.com/>

Fallbacks in HTML

- Work similarly to CSS

```
<video autoplay>
  <!--webm not supported in IE or Safari-->
  <source src="lecture3.webm" type="video/webm" />
  <!--mp4 supported in modern browsers, but lower
  quality-->
  <source src="lecture3.mp4" type="video/mp4" />
  <!--backup important for some old browsers-->
   tag">
</video>
```

Fallbacks: why?

- Format not supported (webm, ogg, flac)
- Font might not support certain characters
- Might take time to load (“flash of unstyled text”)
 - Pick a similar default font



<https://css-tricks.com/css-basics-fallback-font-stacks-robust-web-typography/>

Adaptive design

- Media queries in CSS

```
/* CSS */  
@media screen and (device-width: 375px) and (device-height: 667px)  
and (-webkit-device-pixel-ratio: 2) {  
    /* iPhone 8-specific CSS */  
}
```

- Load appropriate external stylesheet

```
<!--HTML-->  
<head>  
    <link rel="stylesheet" media="screen and (device-width: 375px)  
        and (device-height: 667px) and (-webkit-device-pixel-ratio: 2)" href="iPhone8.css">  
</head>
```

Media query syntax

- @media
- screen, print, speech, all
- min-width, max-width
- orientation, -webkit-min-device-pixel-ratio
- Many, many more

https://www.w3schools.com/cssref/css3_pr_mediaquery.asp

Transitioning to responsive design

Breakpoints

- The point at which your design “breaks” and is no longer visually appealing or usable
- Designs vary, but most have 3-5 breakpoints
 - extra small (old mobile), small (mobile), medium (tablet), large (laptop or desktop), extra large (wide desktop or wall display)
 - Again, somewhat similar to Weiser’s three types of computers

Breakpoints

```
@media screen and (max-width: 640px) {  
    /* small screens */  
}
```

```
@media screen and (min-width: 640px) and (max-width:  
1024px) {  
    /* medium screens */  
}
```

```
@media screen and (min-width: 1024px) {  
    /* large screens */  
}
```

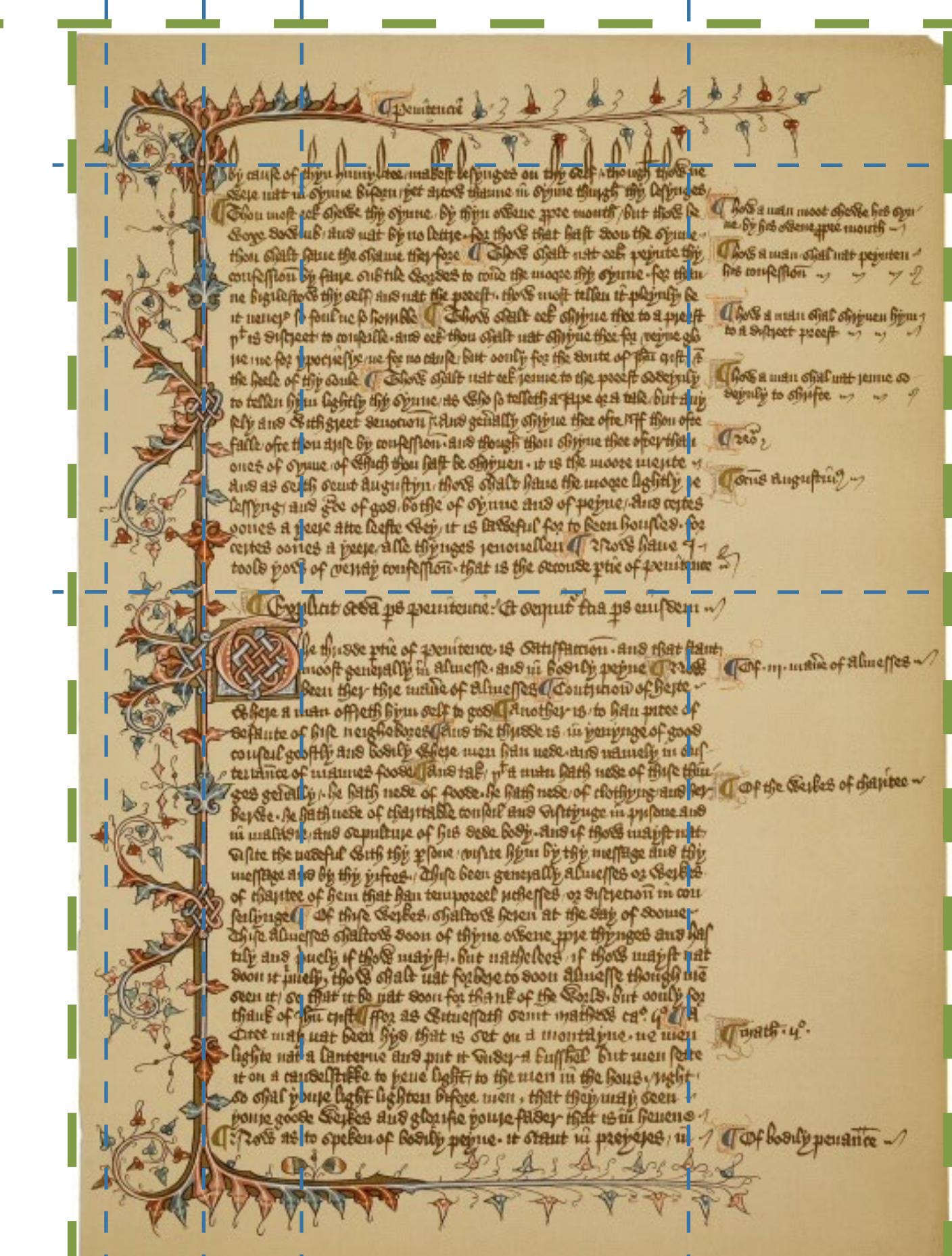
Responsive design

- Fluid grids
 - Lay out content in columns whose widths can vary
 - Bootstrap (and other CSS toolkits) helps with this; more on that in a bit
- Flexible images
 - Let image size change based on screen layout
 - Put images in containers which will scale appropriately
 - Set `width: 100%, max-width: 100%, height: auto`

Grid-based layouts

Grid-based layouts

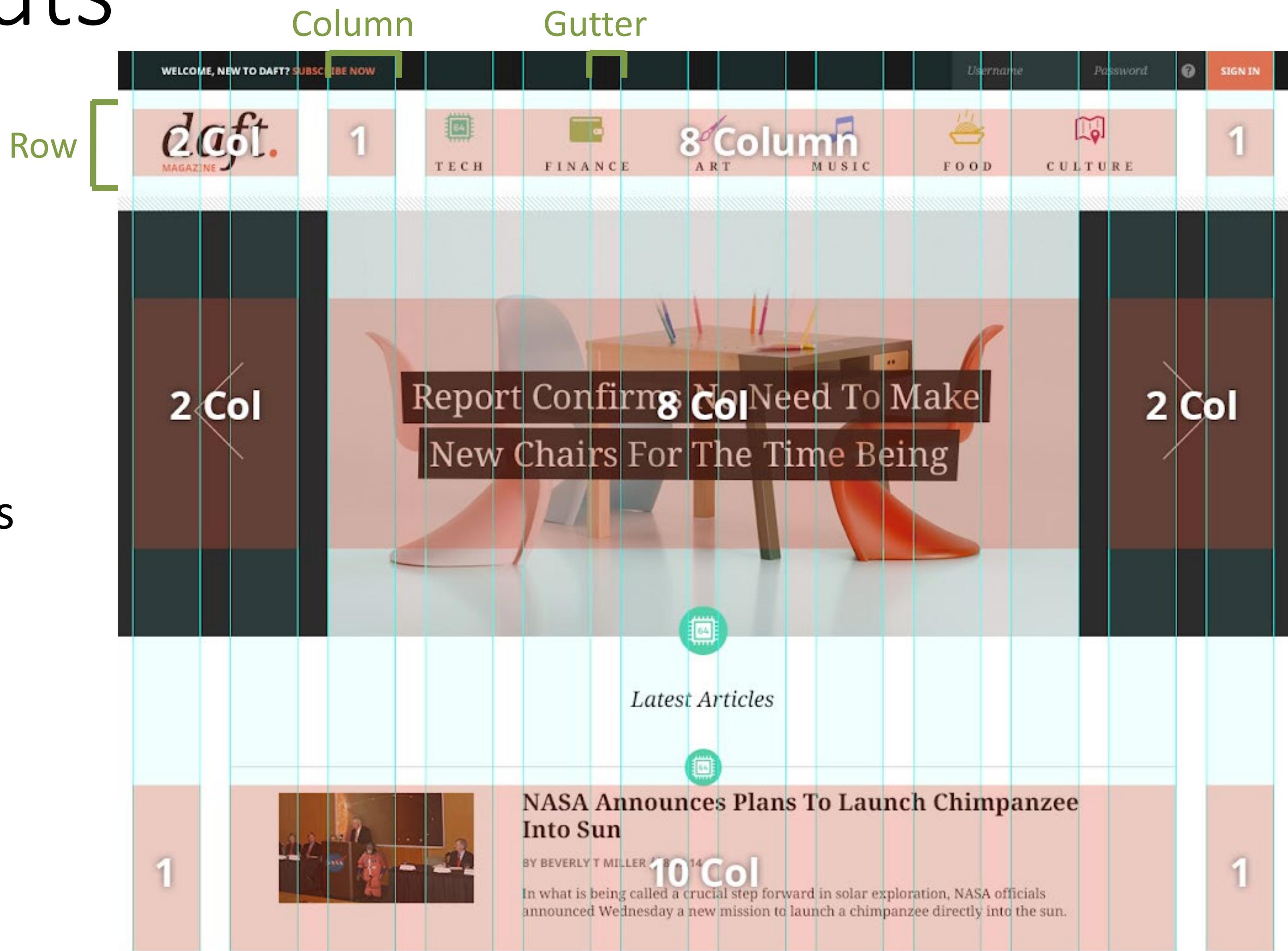
- Established tool for content arrangement
- Gridded content is familiar and easy to follow
- In general, it's good to target fewer lines
 - But breaking that rule is important for creativity and attention-grabbing



<http://printingcode.runemadsen.com/lecture-grid/>

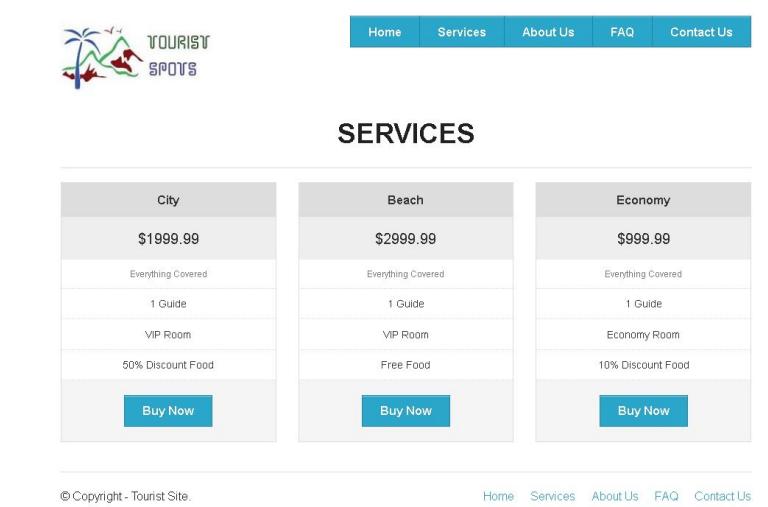
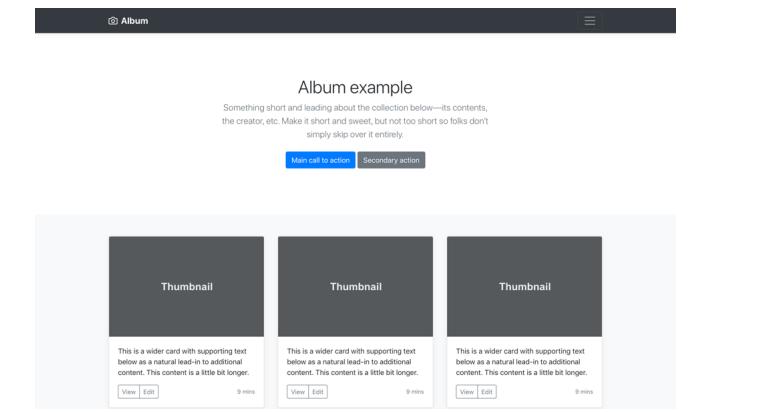
Grid-based layouts

- Rows
- Columns
- Gutters
- Padding/spacing
 - Defined by specific elements



Grid-based frameworks

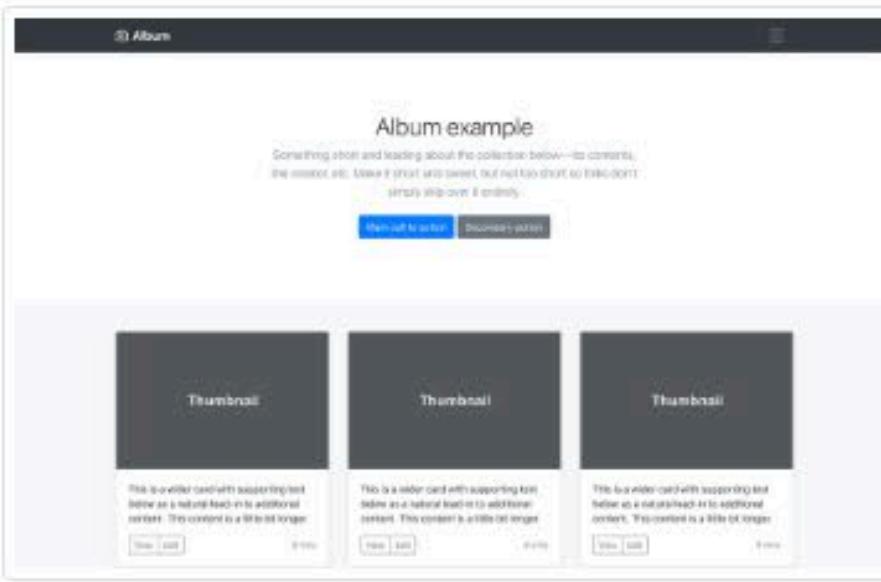
- Bootstrap (<https://getbootstrap.com/>)
 - Most popular, most extensions
- Foundation (<https://foundation.zurb.com/>)
 - Includes icons, drag&drop editor
- Pure.css (<https://purecss.io/>)
 - Small file size, 3.8KB
- Basscss (<https://basscss.com/>)
 - Even smaller, 3.39KB
 - Low-level (closer to raw CSS)



Grid frameworks
make development easier.
What are the downsides?

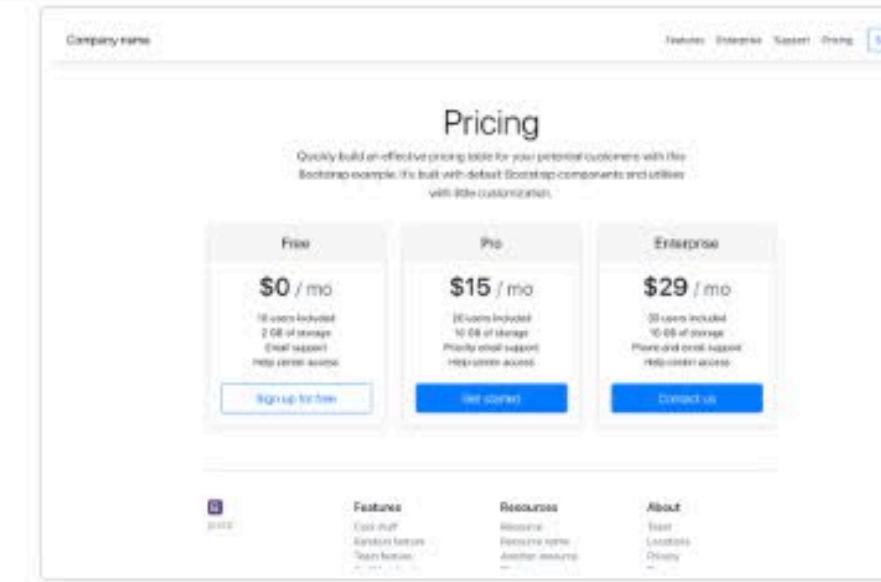
Opposition to Grid-based frameworks

Can lead to similar-looking webpages



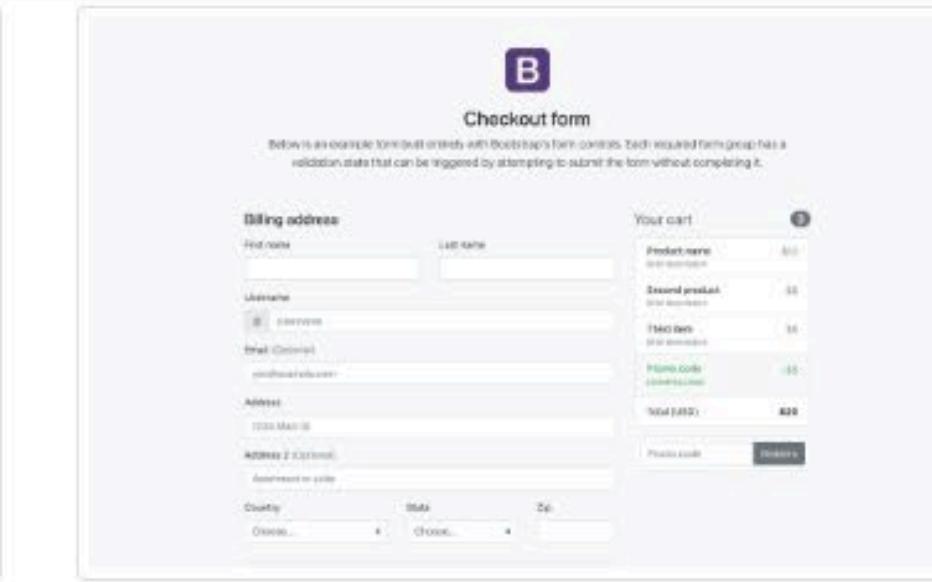
Album

Simple one-page template for photo galleries, portfolios, and more.



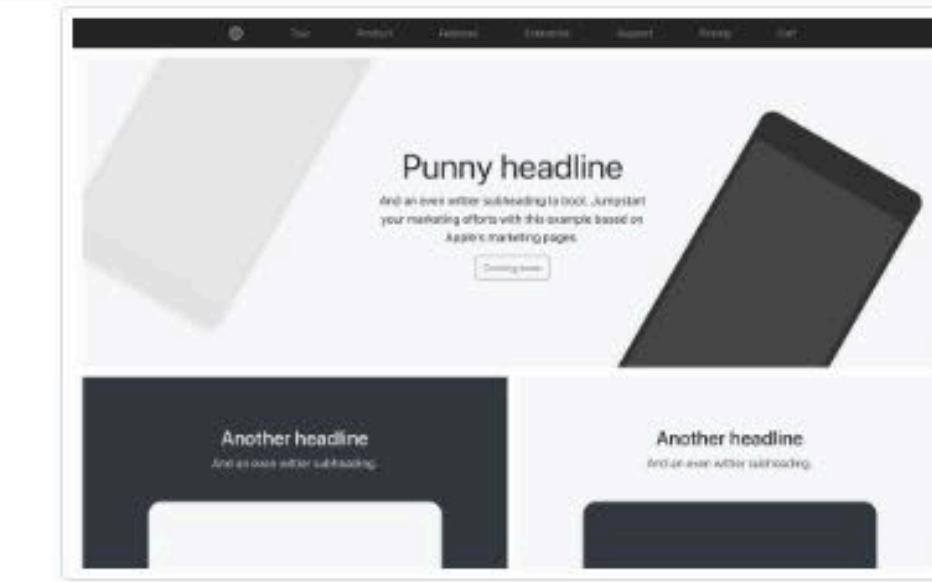
Pricing

Example pricing page built with Cards and featuring a custom header and footer.



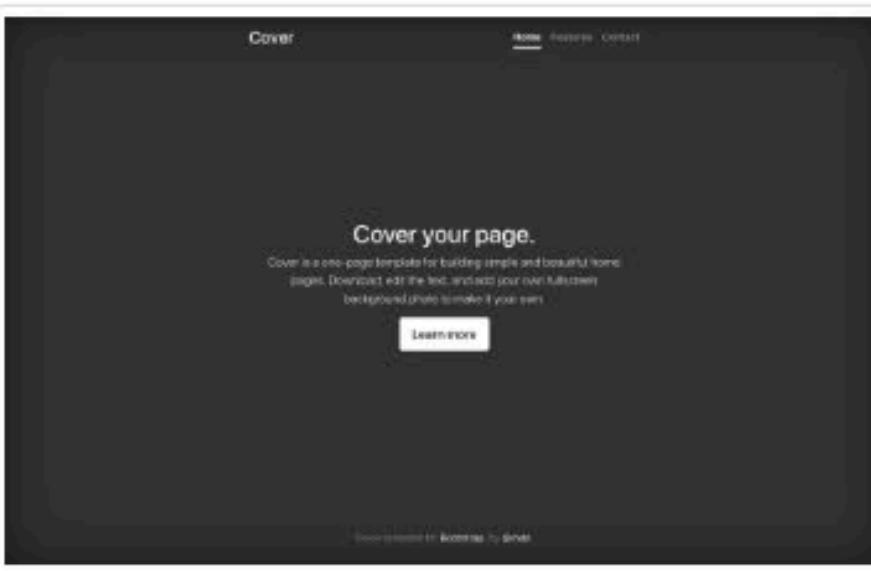
Checkout

Custom checkout form showing our form components and their validation features.



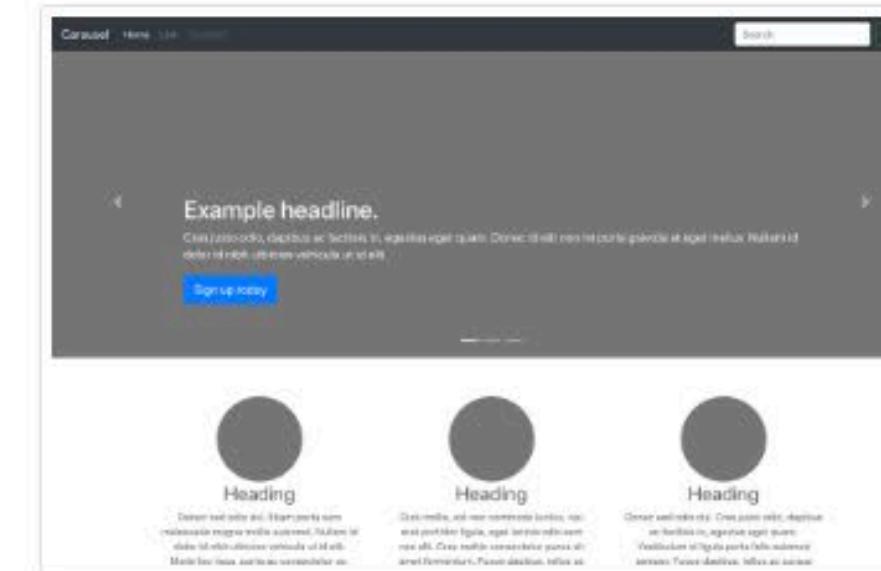
Product

Lean product-focused marketing page with extensive grid and image work.



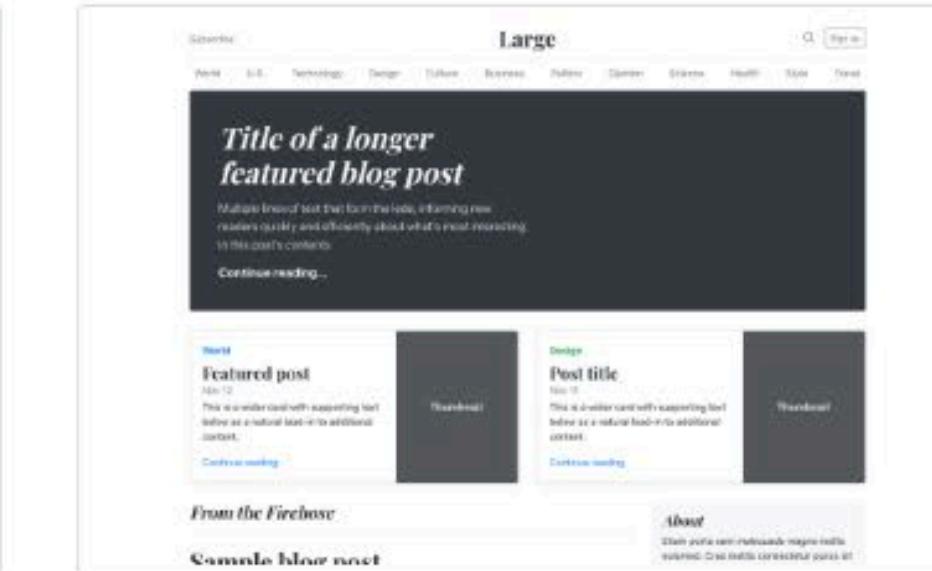
Cover

A one-page template for building simple and beautiful home pages.



Carousel

Customize the navbar and carousel, then add some new components.



Blog

Magazine like blog template with header, navigation, featured content.



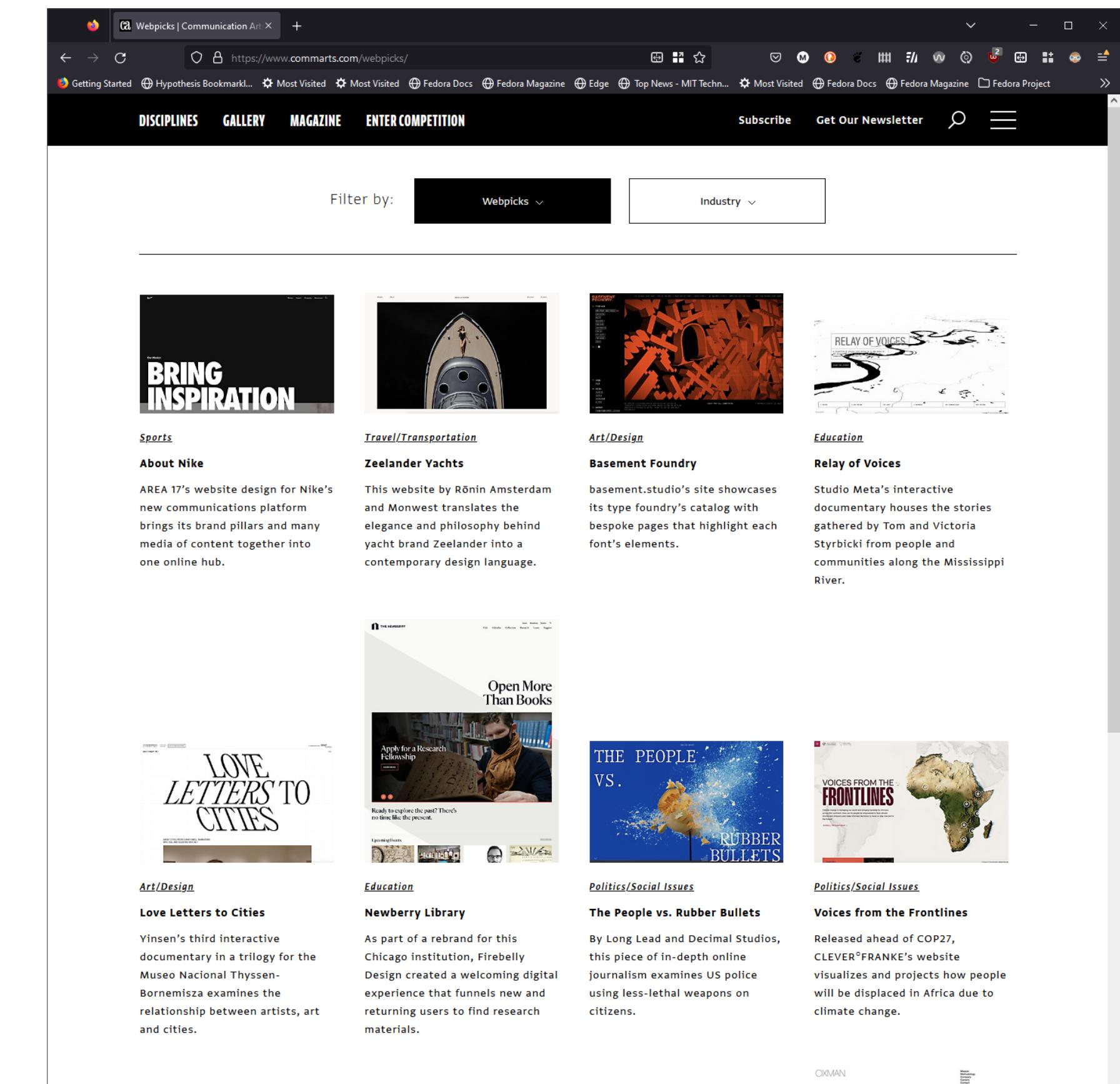
Dashboard

Basic admin dashboard shell with fixed sidebar and navbar.

Opposition to Grid-based frameworks

For inspiration take a look at **Communication Arts Webpicks**

<https://www.commarts.com/webpicks/>



Opposition to Grid-based frameworks

Can stifle creativity

Themes built by or reviewed by Bootstrap's creators.

Why our themes?

Built by Bootstrap Team

Component-based frameworks designed, built, and supported by the Bootstrap Team.

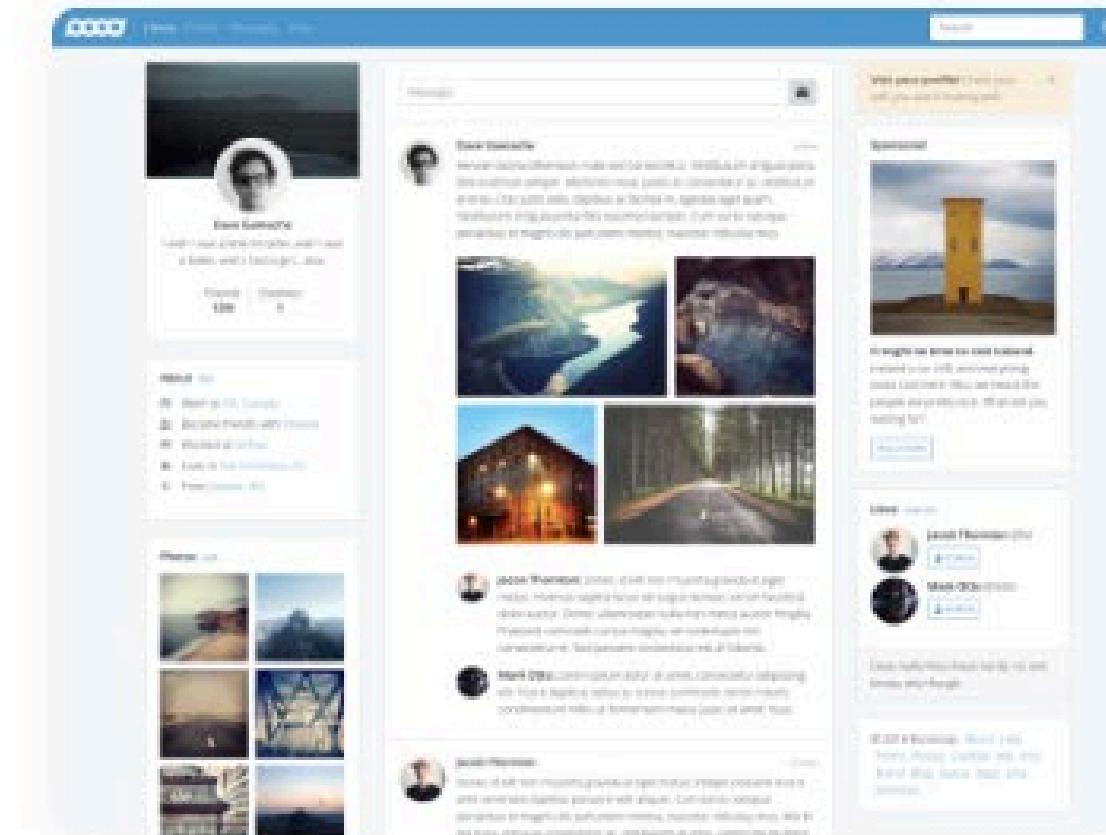


Dashboard

Admin & Dashboard

\$49.00

★★★★★

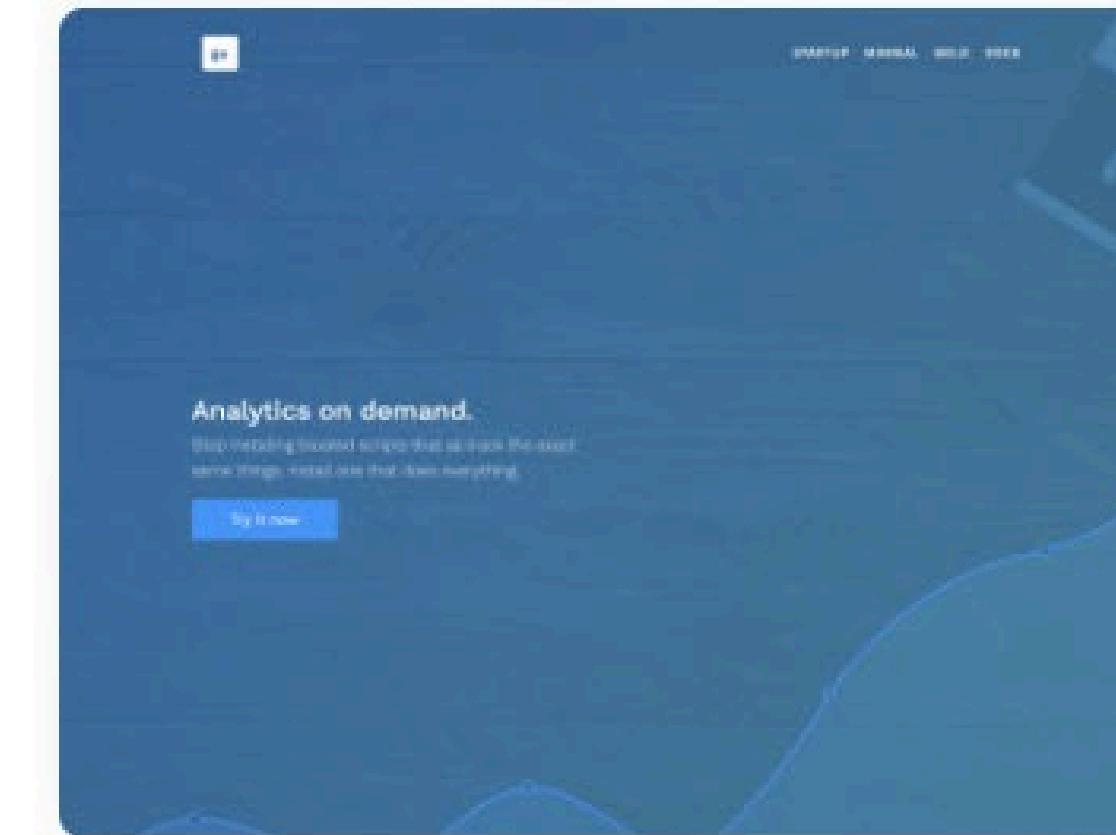


Application

Application

\$49.00

★★★★★



Marketing

Landing & Corporate

\$49.00

★★★★★

Bootstrap Grid Framework



Bootstrap

Bootstrap

- Direct download
 - <https://getbootstrap.com/docs/5.3/getting-started/introduction/>
- CSS and JavaScript files
- Minified files are compressed, will load faster
- .map files support editing preprocessed files
 - We won't really touch on those in this class
 - For more: <https://developer.chrome.com/blog/sourcemaps/>
- We'll use bootstrap.min.css for now

Name	Date Modified	Size	Kind
▼ css			
bootstrap-grid.css	Jul 23, 2018 at 5:49 PM	--	Folder
bootstrap-grid.css.map	Jul 23, 2018 at 6:37 PM	38 KB	CSS
bootstrap-grid.min.css	Jul 23, 2018 at 6:37 PM	99 KB	Document
bootstrap-grid.min.css.map	Jul 23, 2018 at 6:37 PM	29 KB	CSS
bootstrap-reboot.css	Jul 23, 2018 at 6:37 PM	68 KB	Document
bootstrap-reboot.css.map	Jul 23, 2018 at 6:37 PM	5 KB	CSS
bootstrap-reboot.min.css	Jul 23, 2018 at 6:37 PM	61 KB	Document
bootstrap-reboot.min.css.map	Jul 23, 2018 at 6:37 PM	4 KB	CSS
bootstrap-reboot.min.css.map	Jul 23, 2018 at 6:37 PM	26 KB	Document
bootstrap.css	Jul 23, 2018 at 6:37 PM	174 KB	CSS
bootstrap.css.map	Jul 23, 2018 at 6:37 PM	430 KB	Document
bootstrap.min.css	Jul 23, 2018 at 6:37 PM	141 KB	CSS
bootstrap.min.css.map	Jul 23, 2018 at 6:37 PM	562 KB	Document
▼ js			
bootstrap.bundle.js	Jul 23, 2018 at 5:49 PM	--	Folder
bootstrap.bundle.js.map	Jul 23, 2018 at 6:37 PM	212 KB	JavaScript
bootstrap.bundle.min.js	Jul 23, 2018 at 6:37 PM	359 KB	Document
bootstrap.bundle.min.js.map	Jul 23, 2018 at 6:37 PM	71 KB	JavaScript
bootstrap.js	Jul 23, 2018 at 6:37 PM	294 KB	Document
bootstrap.js.map	Jul 23, 2018 at 6:37 PM	124 KB	JavaScript
bootstrap.min.js	Jul 23, 2018 at 6:37 PM	212 KB	Document
bootstrap.min.js.map	Jul 23, 2018 at 6:37 PM	51 KB	JavaScript
bootstrap.min.js.map	Jul 23, 2018 at 6:37 PM	176 KB	Document

Bootstrap

- Load bootstrap

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

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

Bootstrap

- Content Delivery Networks (CDN)
- Browser-side caching reduces burdens of loading files
- Integrity: hashes to ensure the downloaded file matches what's expected
 - Protects against server being compromised
- Crossorigin: some imports require credentials, anonymous requires none

```
<link rel="stylesheet"
      href="https://stackpath.bootstrapcdn.com/bootstrap/4.1.3/css/bootstrap.min.css"
      integrity="sha384-MCw98/SFnGE8fJT3GXwEOngsV7Zt27NXFoaoApmYm81iuXoPkFOJwJ8ERdknLPMO"
      crossorigin="anonymous">
```

Bootstrap

Specifying a viewport

- In page's head
- Sets device width and scale level (for zooming)

`<head>`

```
  <meta name="viewport" content="width=device-
width, initial-scale=1">
```

`</head>`

Bootstrap

Designating a container

- All bootstrap content lives in a container

```
<div class="container">  
  <!--Bootstrap content-->  
</div>
```

- Just a class; anything can be a container

```
<main class="container">  
  <!--Bootstrap content-->  
</main>
```

Bootstrap

Grid System

- Grid system has 12 columns
 - 12 has a lot of factors (1, 2, 3, 4, 6)
- Content over 12 columns will wrap
 - (3+6+4=13, the 4 will wrap)
- 15px gutter for each
- Classes for `row` and `col-[size]-[number]`

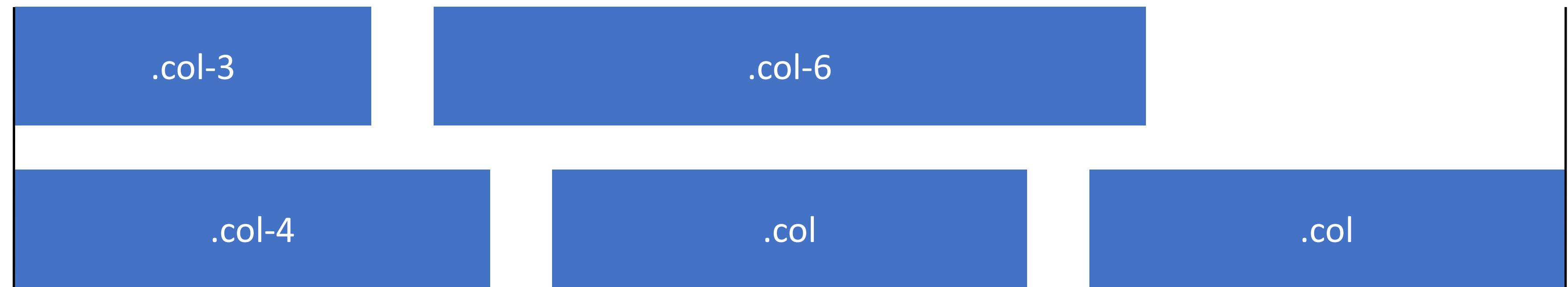
	Extra small devices Phones (<768px)	Small devices Tablets ($\geq 768px$)	Medium devices Desktops ($\geq 992px$)	Large devices Desktops ($\geq 1200px$)
Grid behavior	Horizontal at all times	Collapsed to start, horizontal above breakpoints		
Container width	None (auto)	750px	970px	1170px
Class prefix	<code>.col-xs-</code>	<code>.col-sm-</code>	<code>.col-md-</code>	<code>.col-lg-</code>
# of columns	12			
Column width	Auto	~62px	~81px	~97px
Gutter width	30px (15px on each side of a column)			
Nestable	Yes			
Offsets	Yes			
Column ordering	Yes			

Bootstrap

Grid System

- Within the same row, content will wrap once it goes over 12 columns
 - Size parameter is optional; will divide space proportionally

```
<main class="container">
  <div class="row">
    <div class="col-3">A</div>
    <div class="col-6">B</div>
    <div class="col-4">C</div>
    <div class="col">D</div>
    <div class="col">E</div>
  </div>
</main>
```

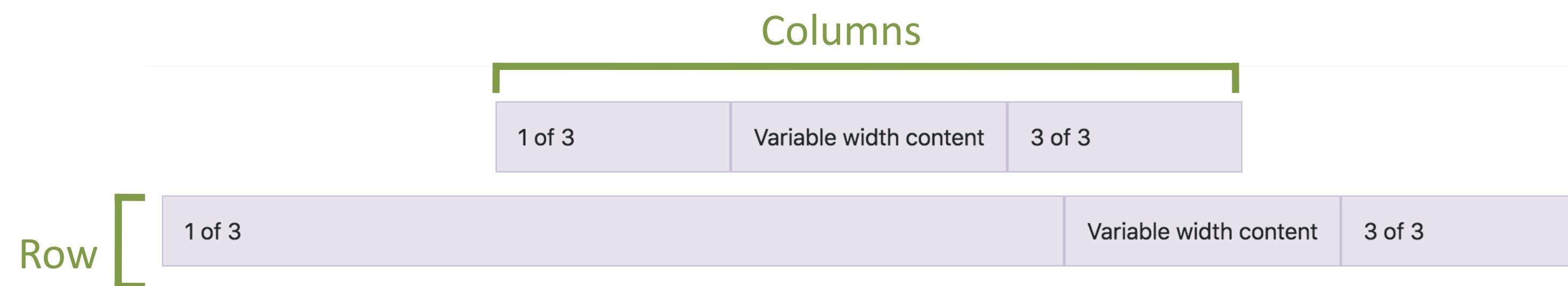


Bootstrap

Grid System

- Rows are block elements, while columns are inline

<https://getbootstrap.com/docs/4.1/layout/grid/>



Bootstrap

Grid System

- `.col` with no size defaults to the smallest (`xs`)
- The largest size listed will cover any larger sizes which are not-listed
- Will default to width 12 when no size is specified

100% on small screens, 67% on medium and up



Breakpoints

```
@media screen and (max-width: 640px) {  
    /* small screens */  
}
```

```
@media screen and (min-width: 640px) and (max-width:  
1024px) {  
    /* medium screens */  
}
```

```
@media screen and (min-width: 1024px) {  
    /* large screens */  
}
```

Bootstrap

Hiding and showing

- There are some helpful classes for showing and hiding content across breakpoints

Screen size	Class
Hidden on all	.d-none
Hidden only on xs	.d-none .d-sm-block
Hidden only on sm	.d-sm-none .d-md-block
Hidden only on md	.d-md-none .d-lg-block
Hidden only on lg	.d-lg-none .d-xl-block
Hidden only on xl	.d-xl-none .d-xxl-block
Hidden only on xxl	.d-xxl-none
Visible on all	.d-block
Visible only on xs	.d-block .d-sm-none
Visible only on sm	.d-none .d-sm-block .d-md-none
Visible only on md	.d-none .d-md-block .d-lg-none
Visible only on lg	.d-none .d-lg-block .d-xl-none
Visible only on xl	.d-none .d-xl-block .d-xxl-none
Visible only on xxl	.d-none .d-xxl-block

<http://getbootstrap.com/css>

Bootstrap

Default styling

- Bootstrap will change a lot of styles for you
- There are other custom styles involving various suffixes

h1. Bootstrap heading

Semibold 36px

h2. Bootstrap heading

Semibold 30px

h3. Bootstrap heading

Semibold 24px

Email address

Email

Password

Password

EXAMPLE

Default Primary Success Info Warning Danger Link

<!-- Standard button -->
<button type="button" class="btn btn-default">Default</button>

Copy

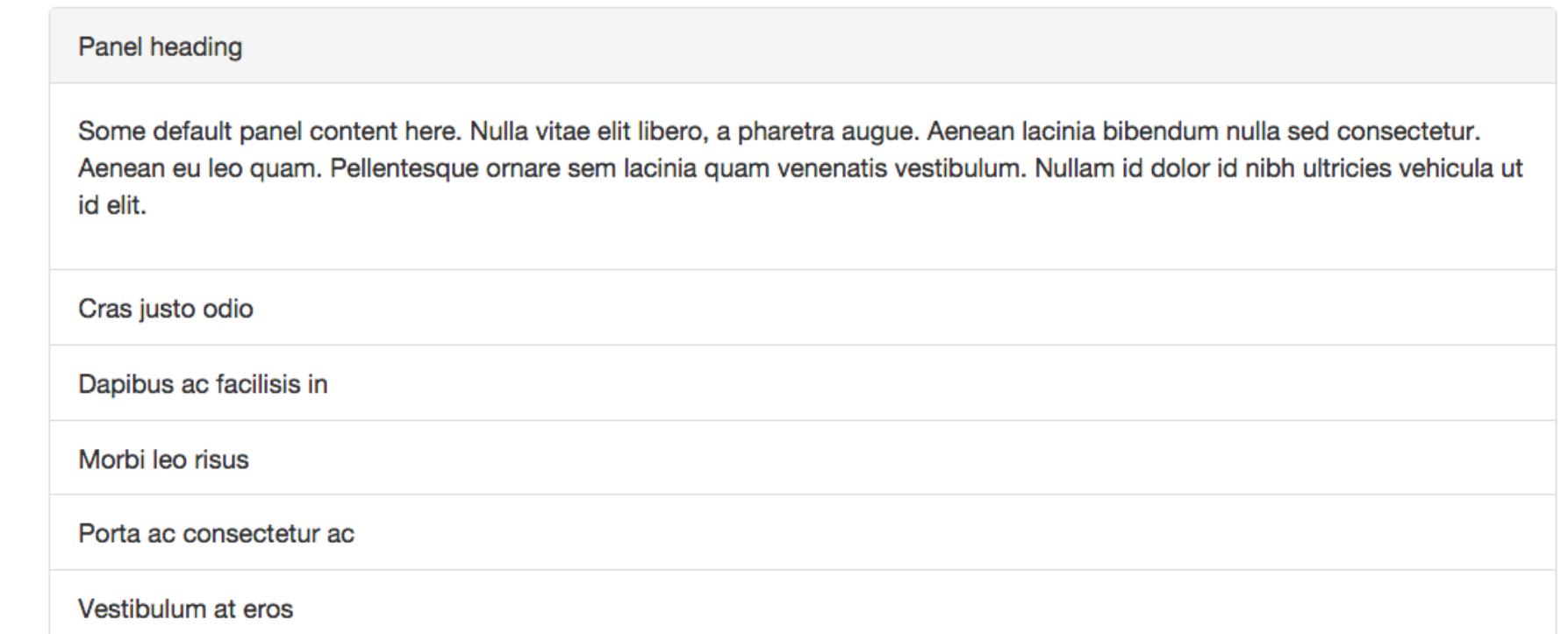
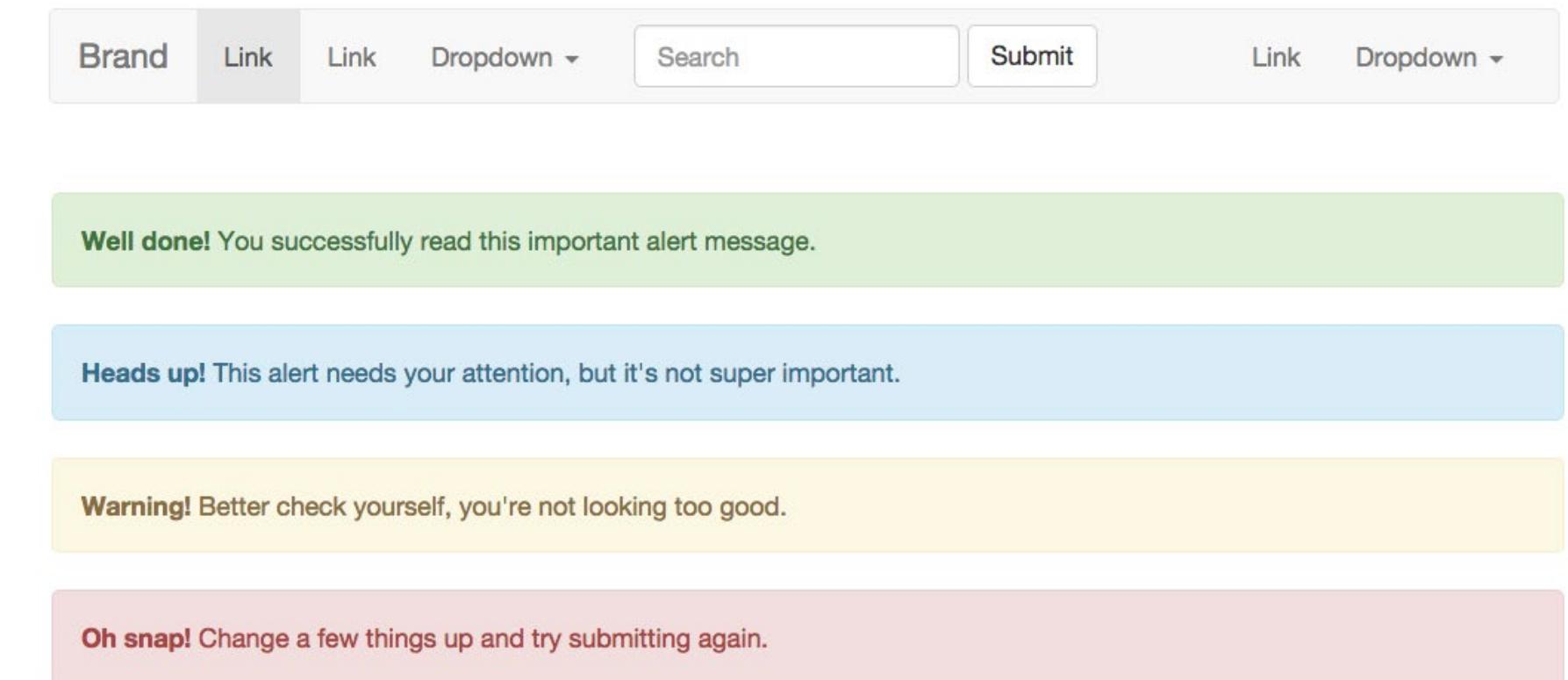
<!-- Provides extra visual weight and identifies the primary action in a set of buttons -->
<button type="button" class="btn btn-primary">Primary</button>

<!-- Indicates a successful or positive action -->
<button type="button" class="btn btn-success">Success</button>

Bootstrap

Components

- Components are elements pre-arranged into common patterns
- Makes making navigation bars, dropdowns, alerts, etc. simpler
- Some require JavaScript



<http://getbootstrap.com/css>