

Responsive Web Design

From Soup to Nuts

R. Scott Granneman & Jans Carton

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Notes & URLs for this presentation can be found...

- » underneath the link to this slide show on granneman.com
- » at granneman.com/downloads/web-dev/Responsive-Web-Design.txt

What is
Responsive Web
Design?

A LIST A PART

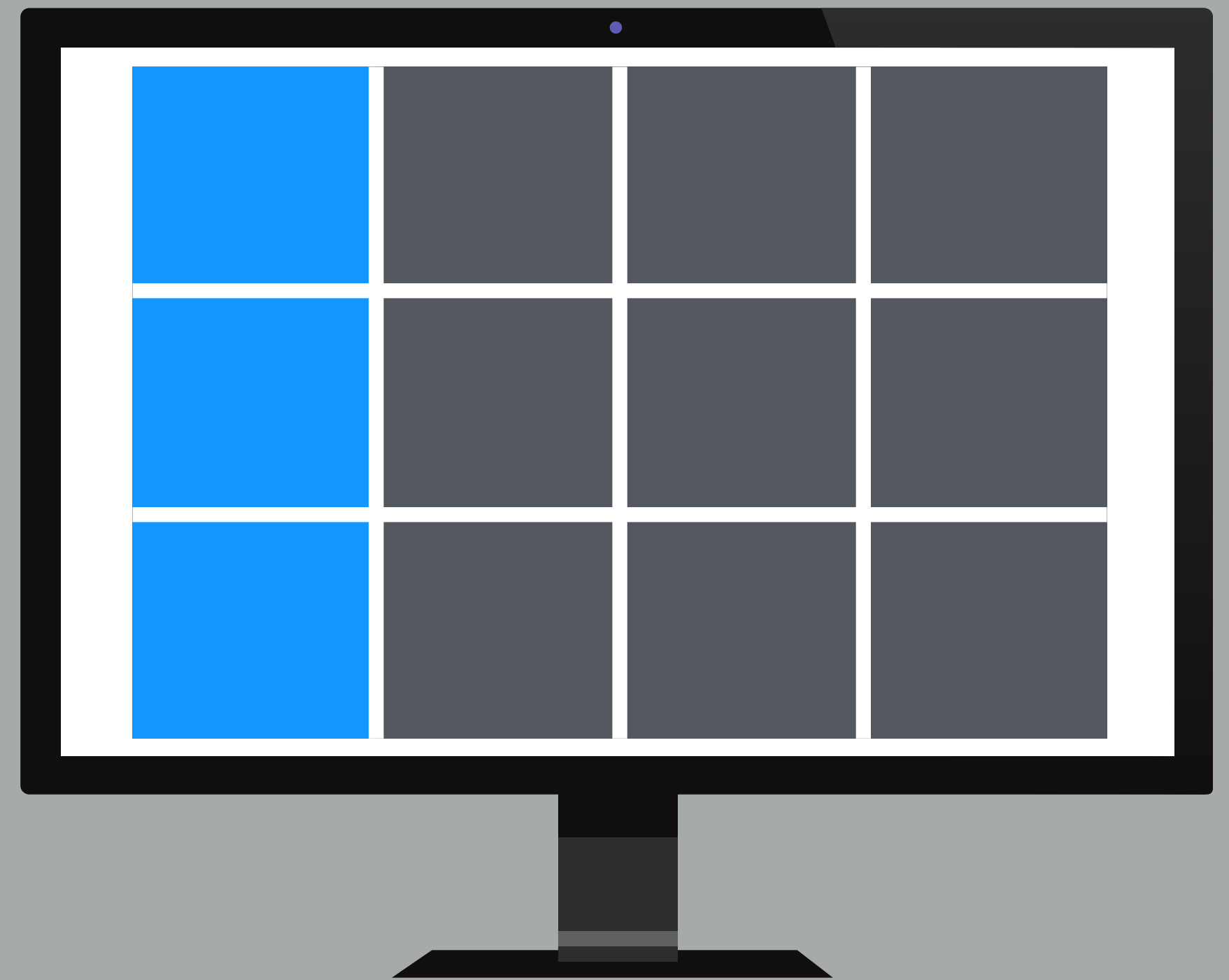
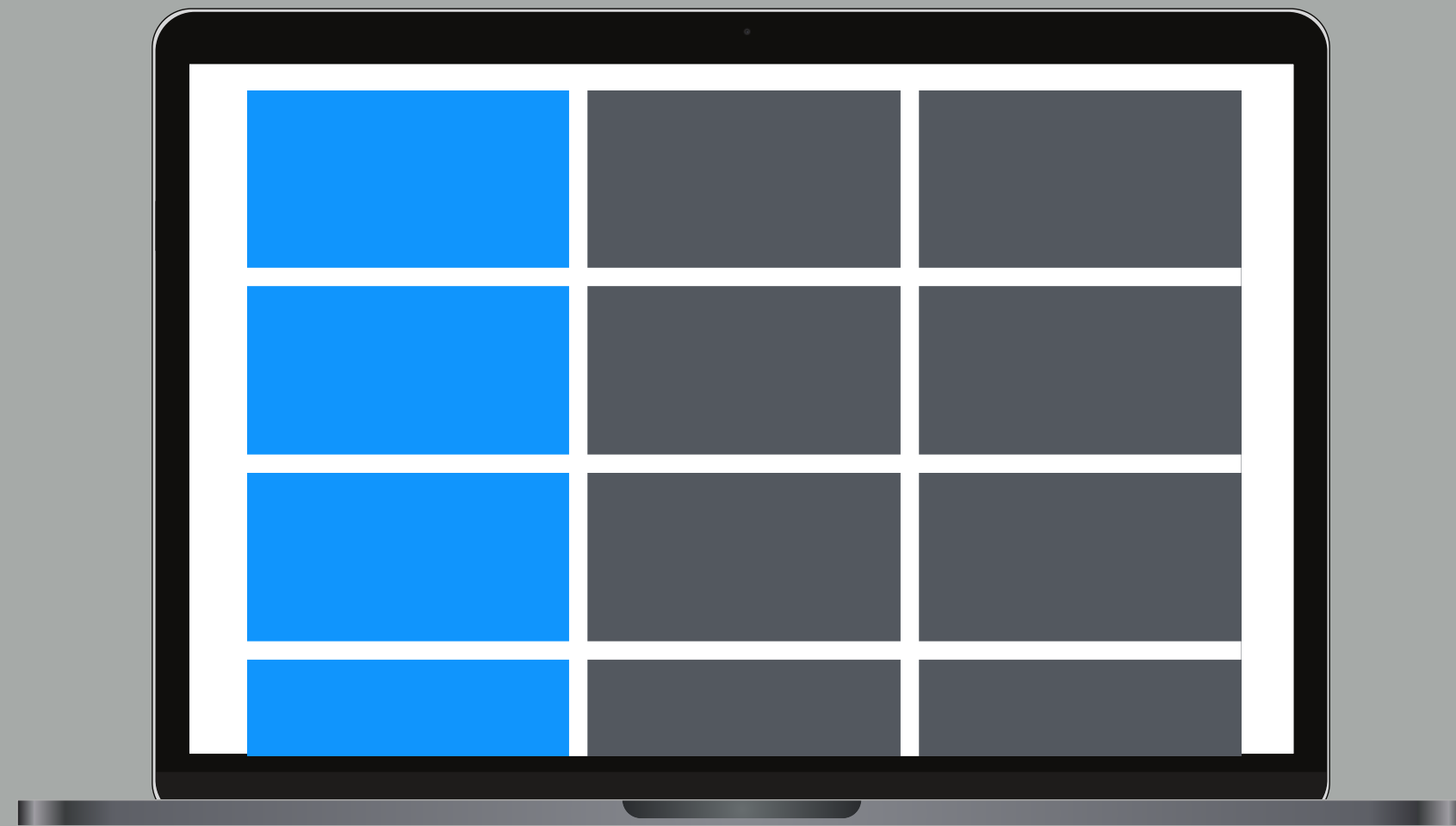
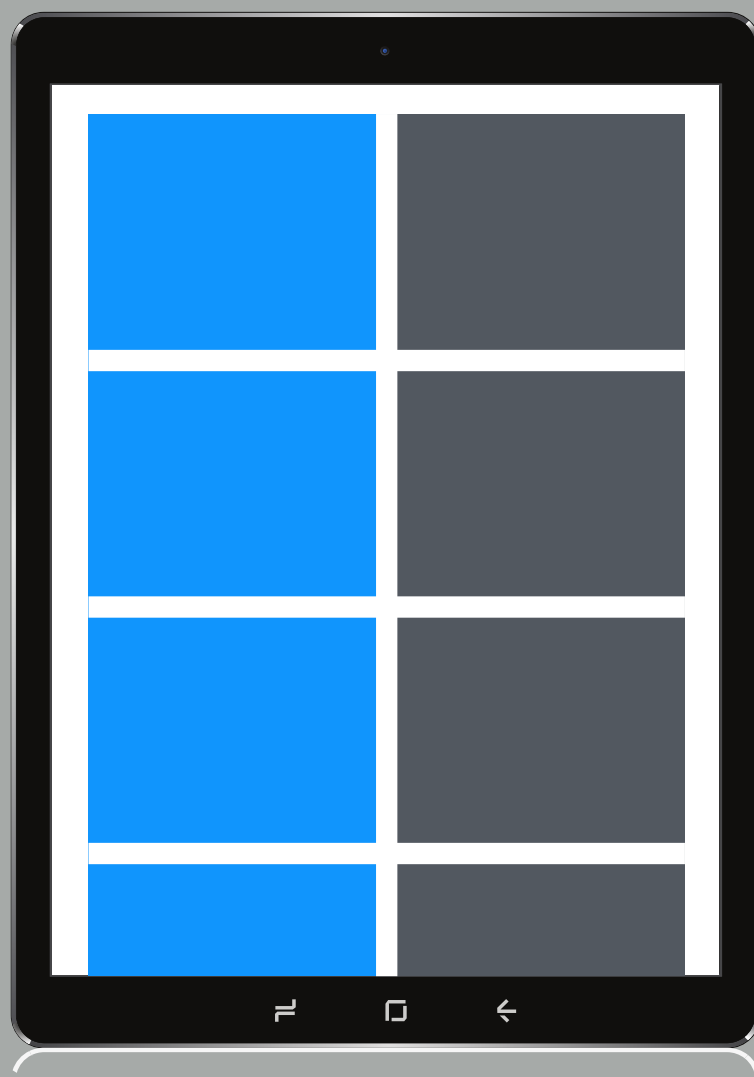
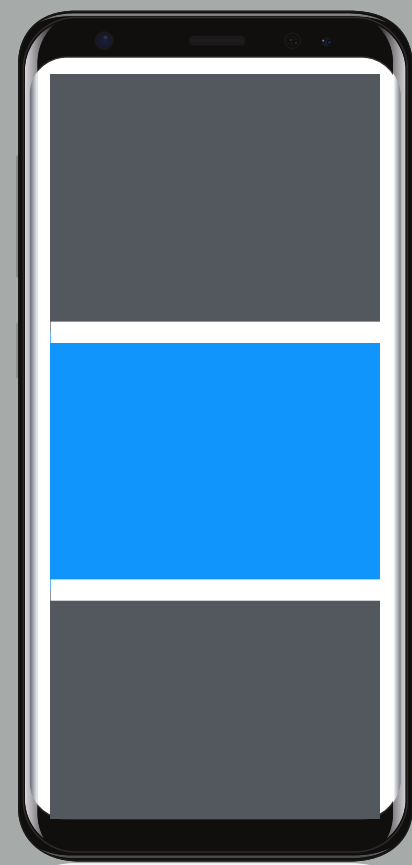


Responsive Web Design

by **ETHAN MARCOTTE** · May 25, 2010

Published in [CSS](#), [Layout & Grids](#), [Mobile/Multidevice](#), [Responsive Design](#), [Interaction Design](#) · 103 Comments

“... a web design approach aimed at crafting sites to *provide an optimal [user] experience*—easy reading and navigation with a minimum of resizing, panning, and scrolling—*across a wide range of devices* (from mobile phones to desktop computer monitors)”
—Wikipedia





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FEATURES

- Kall's first Cardinals home opener
- St. Louis Children's Hospital Make Tracks for the Zoo
- Stingrays at Caribbean Cove presented by Mercy Kids opens April 15
- First Bank Sea Lion Show
- Blog: Fighting Mosquitoes Takes On Whole New Urgency As Warm Weather Arrives!

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Zoo Hours: 9 a.m.-5 p.m. daily
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FEATURES

- Blog: Where do the kids who get off to help with Research?
- Using Technology & Summer Education Programs
- St. Louis Children's Hospital Make Tracks for the Zoo
- First Bank Sea Lion Show



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Cuddle with a colobus monkey!
- [Baby colobus monkey](#)
- Delta Dental [Winter Zoo](#)



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Delta Dental Winter Zoo

Fun family activities all around the Zoo.

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- [Untamed Hearts: Valentine's Day Dinner](#)

Media Types & Media Features

@media Queries

You've been creating CSS like this:

```
body {  
  background-color: #111;  
  color: #eee;  
}
```

A dark background with light text looks cool on a digital screen — but what if you want to print that page on paper?

You've been creating CSS like this:

```
.container {  
  display: flex;  
}
```

```
aside {  
  font-size: .9rem;  
}
```

This will look the same on a desktop, a tablet, & a phone — but what if you want it to look different on each?

You can specify that different CSS should be used when a webpage is printed, or if the webpage is being looked at via a desktop, tablet, or phone Web browser

How?

By using the `@media` *at-rule* with a *media query*

Default for screens:

```
body {  
    background-color:  
        #111;  
    color: #eee;  
}
```

When printing:

```
@media print {  
    body {  
        background-color:  
            white;  
        color: black;  
    }  
}
```

Applies to all devices:

```
.container {  
  display: flex;  
}  
  
aside {  
  font-size: .9rem;  
}
```

Applies only to phones:

```
@media (max-width:  
767px) {  
  .container {  
    flex-direction:  
      column;  
  }  
  aside {  
    font-size: 1rem;  
  }  
}
```




A media query allows you to change how content is presented on different devices without having to change the content itself

One example used `@media print`, a *media type*

The other used `@media (max-width: 767px)`, a *media feature*

A media query consists of...

- » an optional *media type* (a device; e.g., `print` or `screen`)
- » zero or more *media features* (a test for a single, specific feature of the device or browser; e.g., `max-width` or `orientation`)

| |  |  |  | ios |  |  |
|----------------|--|---|---|-----|---|---|
| @media | 9 | 1 | 1.3 | 3.1 | 1 | 1 |
| Media Features | 9 | 3.5 | 4 | 3.2 | 21 | 2.1 |

Using @media Queries

2 ways to specify media queries

- » Link to multiple style sheets using `<link>`
- » Within a stylesheet

Method 1: Link to multiple style sheets

```
<head>  
  <link rel="stylesheet" href="main.css">  
  
  <link rel="stylesheet" href="print.css"  
media="print">  
</head>
```

```
<head>
```

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

```
  <link rel="stylesheet" media="(max-width:  
800px)" href="small-screen.css">
```

```
</head>
```


You probably do *not* want to link to multiple style sheets

Why? Each one is an extra server call — even if the style sheet will not be used!

Method 2: Put the media-specific rule sets at the end of your main stylesheet

Step 1: create a single style sheet & link to it in `<head>`

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

(This should be pretty normal!)

Step 2: Put style rules for everything at the top, with specific `@media` style rules at the end

```
[styles for all media]
```

```
@media print {  
    [styles for print]  
}
```

```
html {  
  font-size: 16px;  
  background-color: black;  
}
```

```
aside {  
  width: 12rem;  
}
```

```
@media print {  
  html {  
    font-size: 12pt;  
    background-color: white;  
  }
```

```
  aside {  
    display: none;  
  }  
}
```



General style rules



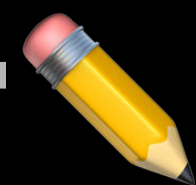
@media style rules

A media query is either true (apply it!) or false (ignore it!)

Media queries are applied first (to filter out unneeded style rules), & *then* the rendering engine applies the CSS Cascade

Therefore, you want to put the media queries *after* the main style rules

🔥 This is important! 🔥



SIDE NOTE

Why should the media-specific style rules come *after* the general style rules?

Using the Cascade...

1. *Importance* is tied (it's all by an *author*)
2. *Specificity* is tied (as long as the media-specific selector is the same as the general selector — & remember, `@media` itself doesn't change specificity)
3. *Order* therefore means that the media-specific declaration wins

Media Types

“A *media type* is a broad category of user-agent devices on which a document may be displayed. ” —Media Queries Level 4, W3C

Media Queries Level 4* defines these media types

- » **print**: printers & Print Preview
- » ~~**speech**: screen readers for visually disabled users, not browsers (was **aural**)~~
- » **screen**: “all devices that aren’t matched by print or speech”
- » **all**: all media type devices (default)

* Editor’s Draft as of March 13, 2023

Deprecated media types that now do nothing:

- » **braille**: Braille tactile feedback devices
- » **embossed**: paged Braille printers
- » **handheld**: small or handheld devices
- » **projection**: projected presentations
- » **speech**: screen readers
- » **tty**: fixed-pitch character grid (teletypes & terminals)
- » **tv**: television-type devices

DEPRECATED

“It is expected that all of the media types will also be deprecated in time, as appropriate media features are defined which capture their important differences.”
—Media Queries Level 4, W3C

Common Print Styles

The following styles are *common* — a lot of print style sheets use these — but are not required

They are here to give you ideas about what you can use

```
@media print {  
  aside,  
  nav,  
  .ad-banner {  
    display: none;  
  }  
}
```

Most of your print styles will probably be *removing* things

```
@media print {  
  html {  
    font-size: 12pt;  
    background-color: white;  
    color: black;  
  }  
}
```



```
@media print {  
  a[href] {  
    color: black;  
    text-decoration: underline;  
  }  
}
```

Make all links black & underlined

```
@media print {  
  a[href]::after {  
    color: black;  
    text-decoration: underline;  
    content: " (" attr(href) ") ";  
  }  
}
```

When printed, `Writings` looks like this:

Writings (http://www.hplovecraft.com/writings/)



PRO TIP

Only use that technique for specific areas of a webpage, if you use it at all!

It can be very ugly & overwhelming & make the text much harder to read

Long links do not wrap

```
@media print {  
  h1, h2, h3, h4, h5, h6 {  
    color: black;  
    padding-bottom: 1px;  
    border-bottom: 1px solid black;  
    page-break-after: avoid;  
    break-after: avoid;  
  }  
}
```

When printing, put a nice border under headings, & do not allow pages to break immediately after them

```
@media print {  
  h2,  
  h3,  
  p {  
    orphans: 3;  
    widows: 3;  
  }  
}
```

Avoid widows & orphans (see *CSS Layout Condensed* for more info)!

```
@media print {  
  img,  
  tr {  
    page-break-inside: avoid;  
    break-inside: avoid;  
  }  
}
```

When printing, don't allow `` or `<tr>` to break across pages



PRO TIP

To test print styles, use Print Preview or Print to PDF instead of actually printing

Media Features

You can limit the style sheet's *scope* based on *feature names*, such as **width**, **height**, & **color**

Almost all feature names can be prefixed with...

- » **min-**: equal to or greater than
- » **max-**: equal to or less than

Terms

```
@media (min-width: 768px) {  
  .hamburger-nav {  
    display: none;  
  }  
}
```

`min-width` is a *feature name*

`(min-width: 768px)` is an *media feature*

If the media (in this case, the viewport) has a `min-width` of `768px`, then the style rules are applied to it

```
@media (orientation: portrait) {  
  .sidebar {  
    float: none;  
  }  
}
```

`orientation` is a *feature name*

`(orientation: portrait)` is an *media feature*

If the media (in this case, the viewport) has an `orientation` of `portrait`, then the style rules are applied to it

```
@media (min-width: 700px) and (orientation:
landscape) {
    ...
}
```

You can create a *media condition* that combines 2 or more media features with a *logical operator* (**and**, **not**, **only**, & **or**)

```
@media (min-width: 700px) and (orientation:  
landscape) {  
    ...  
}
```

`min-width` & `orientation` are *feature names*

`(min-width: 700px) & (orientation: landscape)` are
media features

If the media has a `min-width` of `700px` AND an `orientation` of `landscape`, then the style rules are applied to it

Viewport- & Device-Centric

Media features are either:

- » *viewport-centric* (which we care about for responsive web design), or
- » *device-centric* (for special cases)

`min-width` & `max-width` are
essential to responsive design!

Viewport-centric

- » `width`: width of viewport
- » `height`: height of viewport
- » `aspect-ratio`: `<ratio>` of horizontal pixels to vertical pixels of viewport ← See *Bonus*
- » `orientation`: `landscape` or `portrait`

Device-centric media features include:

- » Display quality, e.g., **resolution** or **scan** (for TV; e.g., **interlace** or **progressive**)
- » Color, e.g., **monochrome**
- » Interaction, e.g., **any-pointer** or **hover**

For a longer list, see *Bonus*

Grids in Design

Josef Müller-Brockmann

Grid systems

in graphic design

A visual communication manual
for graphic designers,
typographers and
three dimensional designers

Raster systeme

für die
visuelle Gestaltung

Ein Handbuch für
Grafiker, Typografen und
Ausstellungsgestalter

Niggli

1961

Grids are composed of *columns & rows*, & (commonly)
gutters

The title
spans 3 rows
& 4 columns,
but note how
it is all
symmetrical

| | | | |
|----------------------------------|--|--|--|
| Vermont Symphony Orchestra | | | |
| Winter 2007 Season | Aaron Copland The Tender Land January 2007 | | Eric Satie Gymnopedie 1, 2 February 2007 |
| | 01/12/07 Middlebury College Center for the Arts 8:00 pm | | 02/03/07 Johnson State College Dibden Center for the Arts 8:00 pm |
| | 01/19/07 Johnson State College Dibden Center for the Arts 8:00 pm | | 02/10/07 Castleton State College Fine Arts Center 8:00 pm |
| | 01/26/07 Lyndon State College Alexander Twilight Theater 8:00 pm | | 02/17/07 Middlebury College Center for the Arts 8:00 pm |

“Orchestra”
spans 4
columns

Vermont Symphony Orchestra

Winter
2007
Season

Aaron Copland
The Tender Land
January 2007

Eric Satie
Gymnopedie 1, 2
February 2007

01/12/07
**Middlebury College
Center for the Arts**
8:00 pm

02/03/07
**Johnson State College
Dibden Center for the Arts**
8:00 pm

01/19/07
**Johnson State College
Dibden Center for the Arts**
8:00 pm

02/10/07
**Castleton State College
Fine Arts Center**
8:00 pm

01/26/07
**Lyndon State College
Alexander Twilight Theater**
8:00 pm

02/17/07
**Middlebury College
Center for the Arts**
8:00 pm

An aerial photograph of a city grid, showing a dense pattern of streets and buildings. The image is tilted at an angle, creating a sense of depth and perspective. The colors are muted, with a lot of greys and browns, and some greenery visible in the lower left.

Ordering Disorder

Grid Principles
for Web Design

Khoi Vinh

2010

Why use a grid system?

Elements line up

Proportion

Makes things easier for designers (& editors)

Particularly suited for how web rendering engines work

Rule of Thirds

Rule of thumb or guideline for images, designs, & websites

First named by John Thomas Smith in *Remarks on Rural Scenery* (1797)

“... an image should be imagined as divided into nine equal parts by two equally-spaced horizontal lines & two equally-spaced vertical lines ... important compositional elements should be placed along these lines or their intersections” —Wikipedia



















Settings > Camera >
☒ Grid



Open Camera app > ⋮ >
Grid/Grid Lines/Assistive
Grid

Grid-Based Frameworks

Some grid-based frameworks

- » Bootstrap
- » Foundation
- » Tailwind
- » Materialize
- » Bulma
- » UIKit (minimalist)

Good list at en.wikipedia.org/wiki/CSS_frameworks

What's a framework?

“A CSS framework is ... meant to allow for easier, more standards-compliant web design using ... Cascading Style Sheets... Most of these frameworks contain at least a grid. More functional frameworks also come with more features and additional JavaScript based functions, but are mostly design oriented and unobtrusive.” —Wikipedia

Advantages

- » Quicker development process
- » Should include many well thought out design patterns
- » Usually tested across multiple browsers

Disadvantages

- » Often lots of unused code in the framework, so can be bloated

Bootstrap

“Bootstrap is a free and open-source CSS framework directed at responsive, mobile-first front-end web development. It contains HTML, CSS and (optionally) JavaScript-based design templates for typography, forms, buttons, navigation, and other interface components.

As of December 2022, Bootstrap is the 14th most starred project ... on GitHub, with over 161,000 stars.
... Bootstrap is used by 19.2% of all websites.”
—Wikipedia

Who uses Bootstrap?

Lots of organizations!

Alibaba

GrubHub

ROBLOX

Apple

Instacart

Snap

BBC

Intel

Spotify

Bloomberg

LinkedIn

Visual Studio Code

CDC

Lyft

Vogue

CNN

MasterCard

Walmart

Coursera

Reuters

Wikimedia

Duolingo

Riot Games

Zoom

Bootstrap 1: 2011

Bootstrap 2: 2012

Bootstrap 3: 2013

Bootstrap 4: 2018

Bootstrap 5: 2021

Bootstrap 6: ?

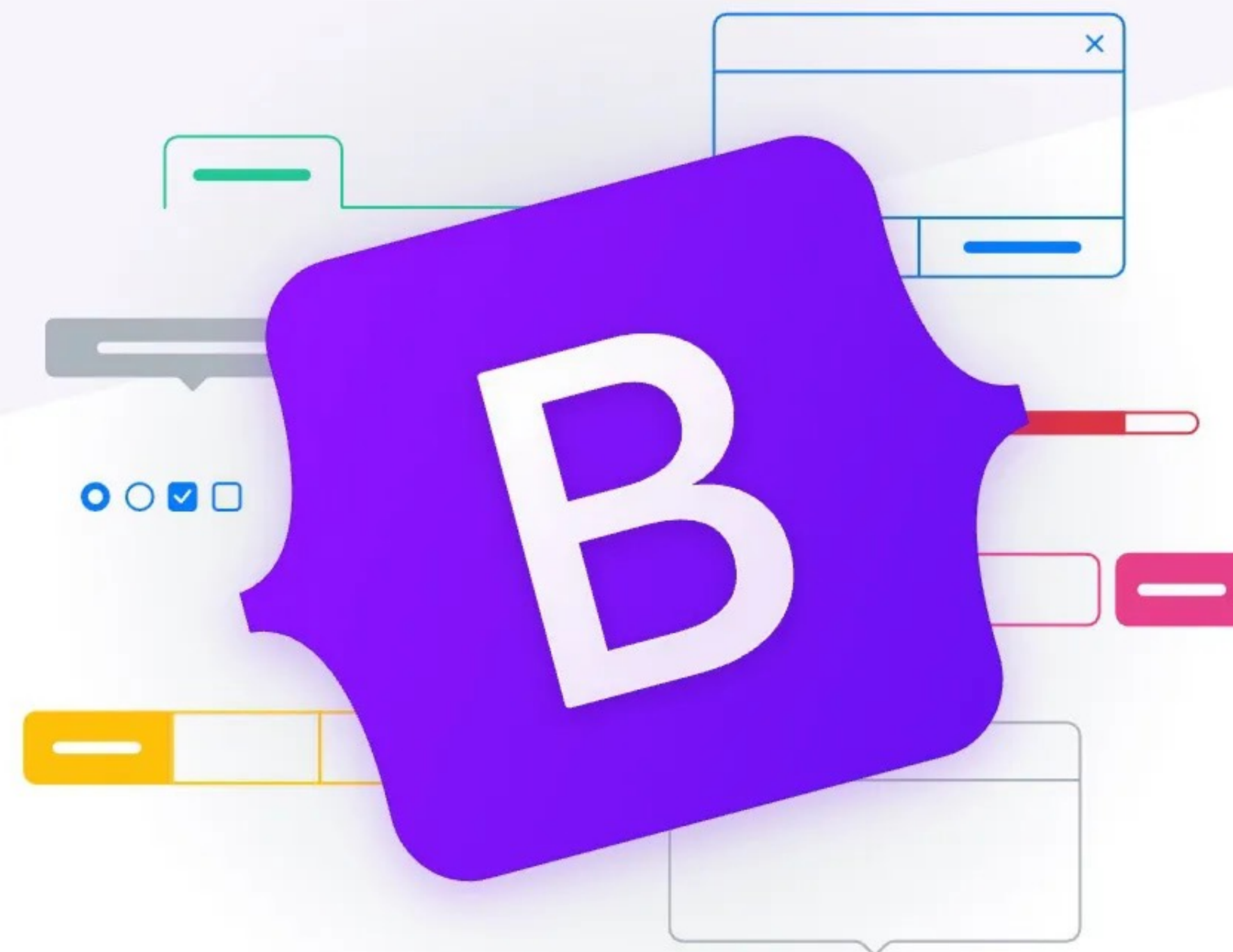


Build fast, responsive sites with Bootstrap

Quickly design and customize responsive mobile-first sites with Bootstrap, the world's most popular front-end open source toolkit, featuring Sass variables and mixins, responsive grid system, extensive prebuilt components, and powerful JavaScript plugins.

[Get started](#)[Download](#)

Currently **v5.1.3** · [v4.6.x docs](#) · [All releases](#)



SIDE NOTE

Bootstrap used to be called *Twitter Bootstrap*

2 developers at Twitter created Bootstrap, & Twitter sponsored it for a while

Twitter never actually used Bootstrap on its website!

Fluid Designs

Layout resizes to fit the display

Print/export

Create a book

Download as PDF

Printable version

Languages

Català

Español

فارسی

Français

Ido

Қазақша

Kreyòl ayisyen

Nederlands

O‘zbekcha

Português

Српски / srpski

Srpskohrvatski / српскохрватски

Volapük

Edit links

Marshall, Missouri – Wikipedia, the free encyclopedia

https en.wikipedia.org/wiki/Marshall,_Missouri

Reader

Demographics

[edit]

2010 census

[edit]

As of the ^[2]census of 2010, there were 13,065 people, 4,741 households, and 2,946 families residing in the city. The **population density** was 1,278.4 inhabitants per square mile (493.6 /km²). There were 5,276 housing units at an average density of 516.2 per square mile (199.3 /km²). The racial makeup of the city was 79.2% **White**, 7.8% **African American**, 0.4% **Native American**, 0.7% **Asian**, 1.2% **Pacific Islander**, 7.7% from **other races**, and 3.0% from two or more races. **Hispanic** or **Latino** of any race were 13.2% of the population.

There were 4,741 households of which 33.6% had children under the age of 18 living with them, 42.4% were **married couples** living together, 14.1% had a female householder with no husband present, 5.6% had a male householder with no wife present, and 37.9% were non-families. 30.5% of all households were made up of individuals and 14.1% had someone living alone who was 65 years of age or older. The average household size was 2.49 and the average family size was 3.07.

The median age in the city was 32.9 years. 23.8% of residents were under the age of 18; 15.8% were between the ages of 18 and 24; 23.5% were from 25 to 44; 22.8% were from 45 to 64; and 14.2% were 65 years of age or older. The gender makeup of the city was 49.2% male and 50.8% female.

2000 census

[edit]

As of the 2000 ^[4]census, with a population of 12,433, showed 4,732 households, and 2,985 families residing in the city. The **population density** was 1,225.4 people per square mile (472.9/km²). There were 5,127 housing units at an average density of 505.3 per square mile (195.0/km²). The racial makeup of the city was 86.05% **White**, 7.40% **African American**, 0.43% **Native American**, 0.39% **Asian**, 0.34% **Pacific Islander**, 3.46% from **other races**, and 1.94% from two or more races. **Hispanic** or **Latino** of any race were 7.17% of the population.

There were 4,732 households out of which 30.7% had children under the age of 18 living with them, 45.8% were **married couples** living together, 12.9% had a female householder with no husband present, and 36.9% were non-families. 31.1% of all households were made up of individuals and 15.4% had someone living alone who was 65 years of age or older. The average household size was 2.42 and the average family size was 3.00.

In the city the population was spread out with 24.7% under the age of 18, 13.0% from 18 to 24, 25.3% from 25 to 44, 21.8% from 45 to 64, and 15.3% who were 65 years of age or older. The median age was 36 years. For every 100 females there were 95.3 males. For every 100 females age 18 and over, there were 93.5 males.

The median income for a household in the city was \$31,649, and the median income for a family was \$36,686. Males had a median income of \$26,556 versus \$19,688 for females. The **per capita income** for the city was \$16,646. About 12.5% of families and 15.0% of the population were below the **poverty line**, including 23.6% of those under age 18 and 5.1% of those age 65 or over.

Censorship debate

[edit]

• **Water**

0.06 sq mi (0.16 km²)

Elevation

764 ft (233 m)

Population ⁽²⁰¹⁰⁾^[2]

• **Total**

13,065

• **Estimate** ⁽²⁰¹²⁾^[3]

13,033

• **Density**

1,278.4/sq mi (493.6/km²)

Time zone

Central (CST) (UTC-6)

• **Summer (DST)**

CDT (UTC-5)

ZIP code

65340

Area code(s)

660

FIPS code

29-46316^[4]

GNIS feature ID

0721900^[5]

Website

www.marshall-mo.com [↗](#)

Open "https://en.wikipedia.org/wiki/African_American_(U.S._Census)" in a new tab

Print/export

- Create a book
- Download as PDF
- Printable version

Languages 

- Català
- Español
- فارسی
- Français
- Ido
- Қазақша
- Kreyòl ayisyen
- Nederlands
- O‘zbekcha
- Português
- Српски / srpski
- Srpskohrvatski / српскохрватски
- и
- Volapük

 Edit links

- **Bob James**, jazz musician
- **Twila Tanner**, contestant on **Survivor: Vanuatu**
- **Noble Johnson**, actor
- **Mike Henderson**, blues musician, artist, teacher

A photograph of the Saline County Courthouse in Marshall, Missouri. The building is a large, two-story structure made of red brick with a prominent central tower featuring a clock face and a white dome. The entrance is grand with a portico supported by columns. The courthouse is surrounded by green lawns and trees, with a paved area in the foreground. The sky is blue with scattered white clouds. In the bottom right corner of the image, there is a small icon of a document with a checkmark.


```
body {  
  width: 100%;  
  margin: 0 30px;  
}
```

```
.column1, .column2, .column3 {  
  width: 31.3%;  
  float: left;  
  margin: 1%;  
}
```

$$31.3 \times 3 = 93.9$$

$$1 \times 6 = 6$$

$$93.9 + 6 = 99.9$$

Advantages

- » Adapts to most screen resolutions & devices
- » Reduces user scrolling
- » Allows for users on smaller displays while being optimized for larger displays

Disadvantages

- » Challenging to read when text spans a wide distance
- » Harder to execute successfully
- » Limits imposed on whitespace
- » Horrible on mobile & high resolution (retina) devices

Fixed Designs

Layout has same width on every display

```
body {  
    width: 960px;  
    margin: 0 auto;  
}
```

```
.column1, .column2, .column3 {  
    width: 300px;  
    float: left;  
    margin: 10px;  
}
```

$$300 \times 3 = 900$$

$$10 \times 6 = 60$$

$$900 + 60 = 960$$



search

Scott Granneman

[Writing](#)[Presentations](#)[Teaching](#)[Web Development](#)[Tech Info](#)[Personal](#)

Scott Granneman is an [author](#), [educator](#), & partner in a Web development company in St. Louis, Missouri. Scott has written six books, contributed to two, and penned monthly columns for SecurityFocus and *Linux Magazine*. He is an Adjunct Professor at Washington University in St. Louis & Webster University, [teaching courses](#) on technology, security, web development, & the Internet. As a Principal of [WebSanity](#), he plans, develops, and hosts websites for clients in 12 states using an open source, UNIX-based [content management system](#). He has given [presentations](#) all over the United States, and loves speaking to people.

News & Updates

Note: The following news items are personal in nature & are automatically selected from [GranneBlog](#).

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[Talk about Markdown to SLUUG this Wednesday](#)

November 7, 2011

Key Site Links

Pages you're probably looking for

- [Publications](#)
- [Summer Vacation 2007: The](#)
- [Web Development Key Links](#)
- Wash U: [Website Design & Development Syllabus](#)
- Webster U: [Programming for Communications Syllabus](#)
- Webster U: [Intro to Web Programming Syllabus](#)
- Webster U: [Senior Overview](#)

Advantages

- » Gives designer more control over how an image floated within the content will look
- » Allows for planned whitespace
- » Improves readability with narrower text blocks

Disadvantages

- » Can appear dwarfed in large browser windows or on wide displays
- » Takes control away from users (or is this an advantage?)

Mobile Design History

Mobile Site

Create 2 different sites with different HTML, CSS, & content:

- » 1 for desktops (www.cthulhu.com)
- » 1 for mobile (m.cthulhu.com)

Browser sniffing on the server determines which site is served

Adaptive Design

AKA reactive design & progressive enhancement

Create 3 sites (at 1 URL) with the same content, but different HTML & CSS:

- » A basic site without CSS or JavaScript for older, low-end devices
- » A site with CSS & JavaScript appropriate for mobile
- » A site with CSS & JavaScript appropriate for desktops

Browser sniffing on the server determines which site is served

Zooming



2007



2007

Responsive Design

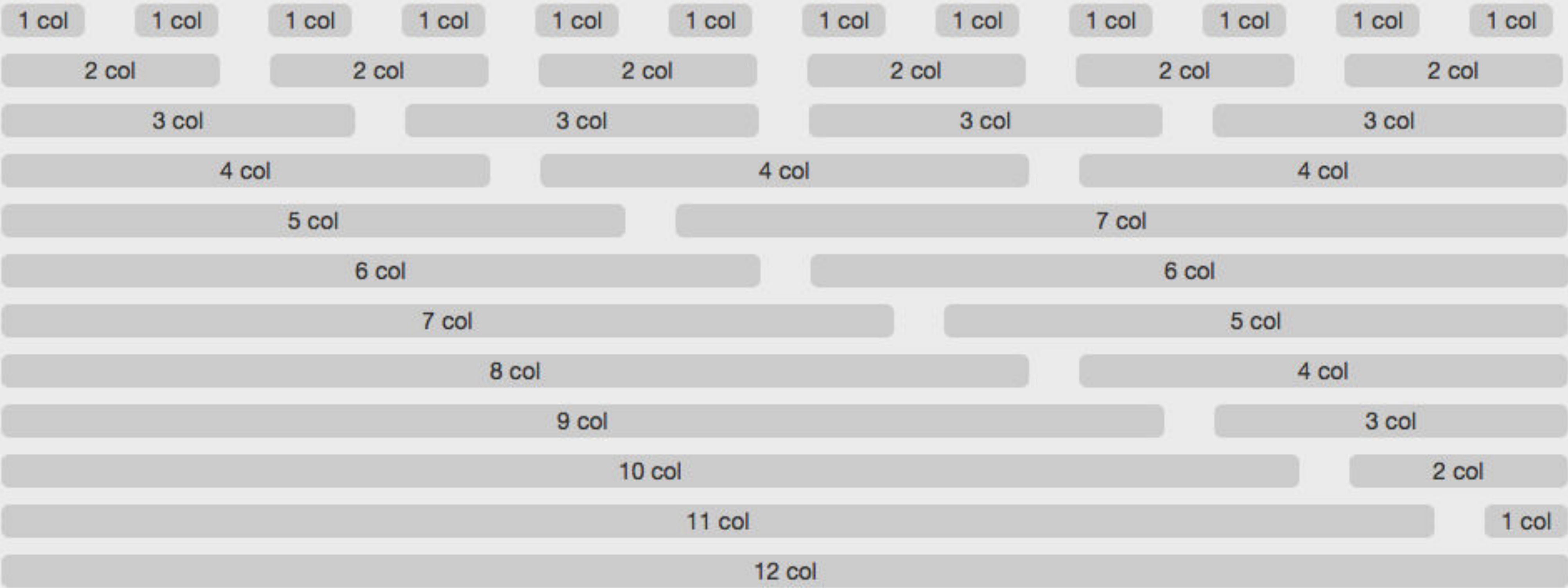
Create 1 site (at 1 URL) with the same content & HTML, but the CSS changes depending upon the width of the browser's or device's viewport, e.g.:

- » Phones
- » Phones in landscape
- » Tablets in portrait
- » Tablets in landscape
- » Small desktops & laptops
- » Desktops & laptops

Width detection is done on the client, not the server

Medium Bootstrap Grid

992px to 1199px viewport, fixed widths, 970px container, 30px gutters



All layout is based on *columns*, & elements may *span* multiple columns

Responsive Layouts

Bootstrap uses 12 columns to lay out the webpage

Why 12 & not 10? or 20? or 5?

Bootstrap uses 12 columns to lay out the webpage

Why 12 & not 10? or 20? or 5?

Because with 12 you can divide by thirds (4, 4, 4) & fourths (3, 3, 3, 3), which are very common layout patterns, as well as any other combination



The Lambert Family

"It looks even better than we imagined. You did everything that you stated you would do, when you stated you would do it, and went further and further to ensure the job was perfect. I am very grateful for your honesty, integrity, and skills. And that the wild Shoggoths only ate one of our dogs."



The Torrance Family

"We couldn't be any more pleased with the appearance and workmanship of the job you completed for us. It's so shiny and professional that it reminds us of this hotel we once stayed at. In fact, we have this great idea for a maze that we'd like to build, but with tentacles..."



The Oswalt Family

"Amazing job!" Our yard was covered in Poison Ivy, Nightshade, and other poisonous and/or deadly plants, and now it's safe enough to hold our weekly baby fights out there! Everyone is much happier—we haven't lost a baby to a baby-eating plant for weeks now! We can even hang out in a tree, or have a BBQ, or have a pool party."

Both the cards above & the footer below are divided into thirds

Contact

1 Miskatonic Ln
Arkham, MA 00420

1-665-284-8548

Legal

© 2021 Herbert West Landscaping

Social



The finest employees

At a lot of companies, the people are in flux. But not at Herbert West Landscaping! Our employees are consistent and smooth. Besides the previously mentioned Mr. Egesta, take a quick look at who will be there helping you:



B.S. Ordure, a former percussionist who played with Green Day on their 3rd album Dookie and with the Rolling Stones on their song "Doo Doo Doo Doo Doo (Heartbreaker)"



Colonel "Bat" Guano, a former aide to Dr. Strangelove who unfortunately had to leave the military after an unfortunate Coke machine shooting



B.M. Dunghill, a former mall cop who runs like a bull toward any manure he can provide to our customers until he is completely pooped and has to stop



Kaka Whoopsy, a former big game hunter who was famous for always staying on the spoor

Contact

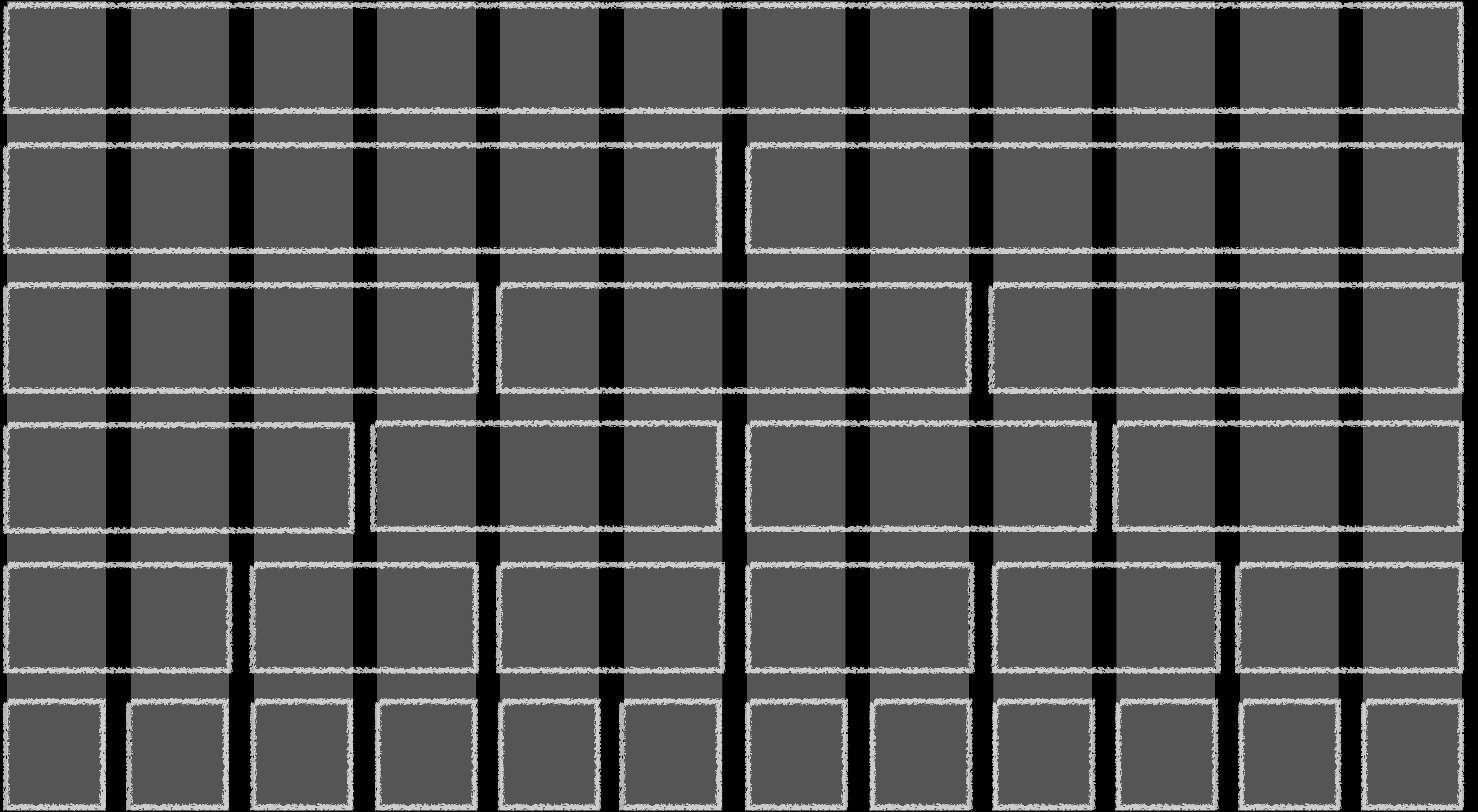
10 Barnes St.
Providence, RI 02906

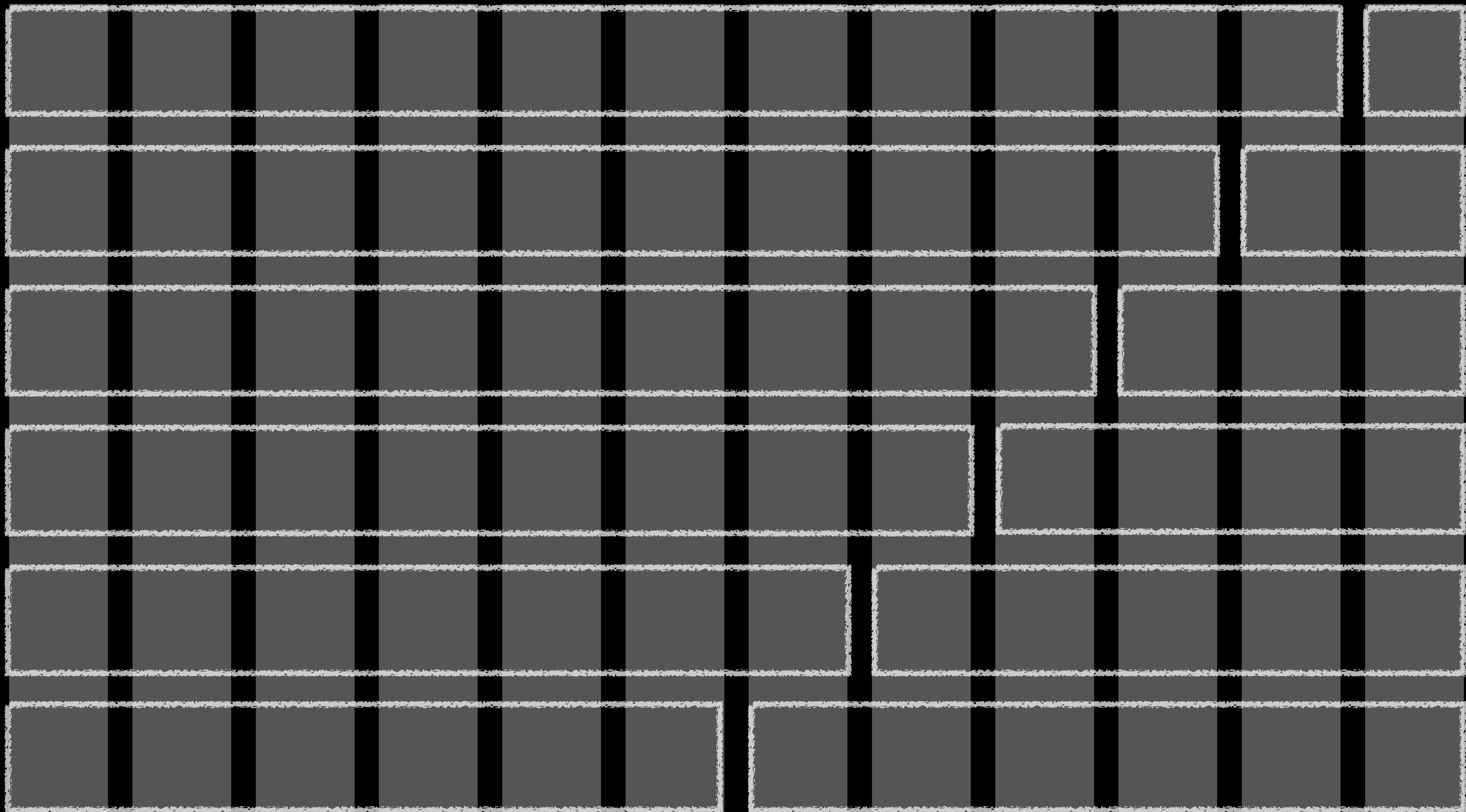
1-665-284-8548

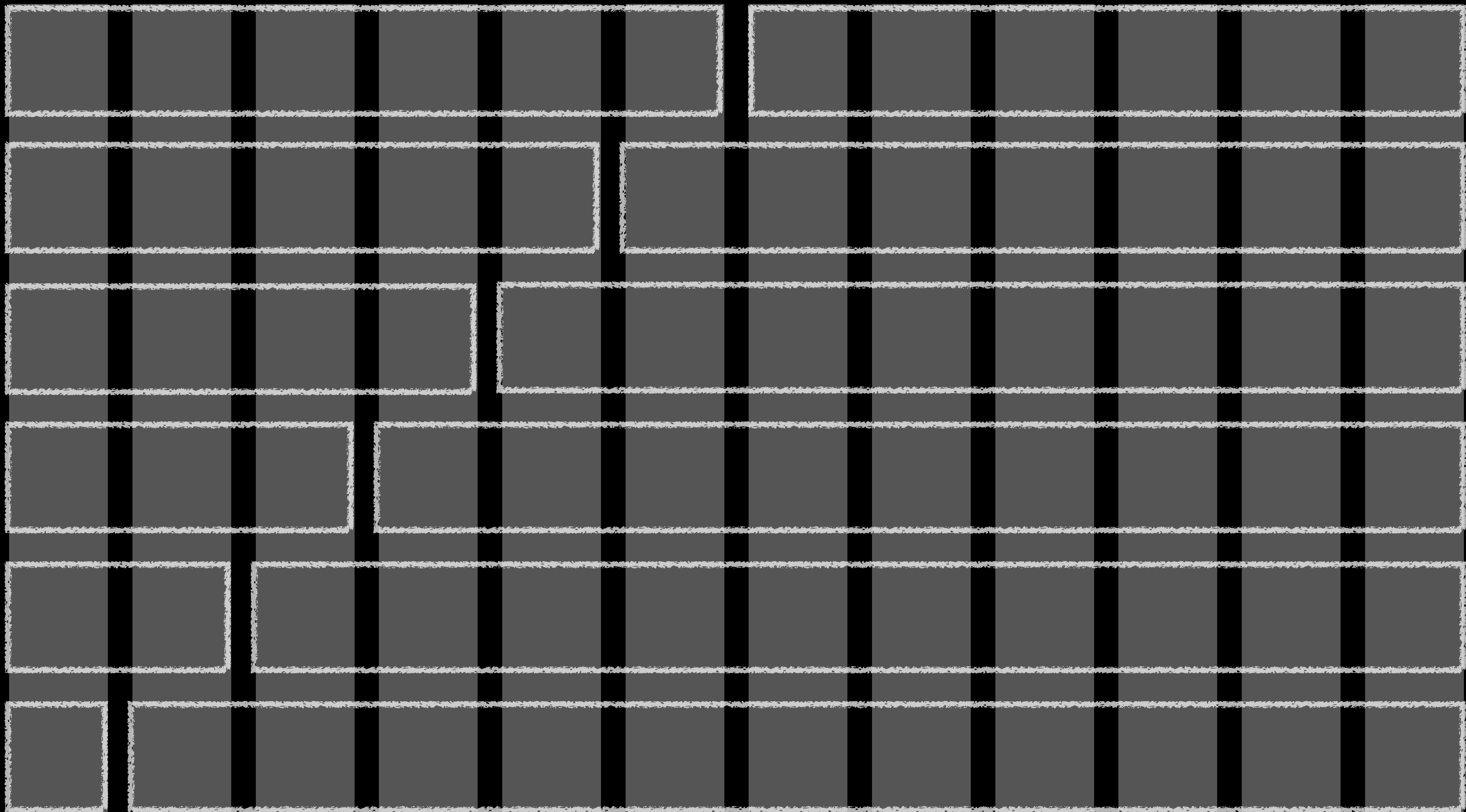
These cards are divided into fourths

© 2021 Herbert West Landscaping









Layouts have to change at different viewport widths to look good & function well

A breakpoint is the width at which a layout change occurs

You can create your own breakpoints (using media queries, of course)

Frameworks like Bootstrap have pre-defined breakpoints ready for you

Bootstrap 3 (2013)

| | | |
|------------------------|----|----------------|
| Desktops | lg | ≥ 1200 px |
| Tablets (landscape) | md | ≥ 922 px |
| Tablets (portrait) | sm | ≥ 768 px |
| Phones | xs | < 768 px |

These are common
breakpoint sizes at
which layout
changes occur

Issues with responsive design

- » Conceptual & coding complexity
- » Integration with 3rd party services can be problematic if they're not built to be responsive (thanks, Google Calendar ò_ó)
- » More designs for each breakpoint (so more money & time)

Before responsive design, websites normally needed designs for 2 templates*: the home page & every other page

Now we need at least 8: 4 for the home page & 4 for every other page, 1 for each breakpoint

*Sometimes a site required more; the Saint Louis Zoo, for instance, needed a template for *animal detail* pages

Before responsive design

Site Labeling

Alternative
NavigationAlternative
Navigation

Utility Navigation

Core Content Navigation

Directory

Banners

Featured Banner

News & Features

Brand Communication

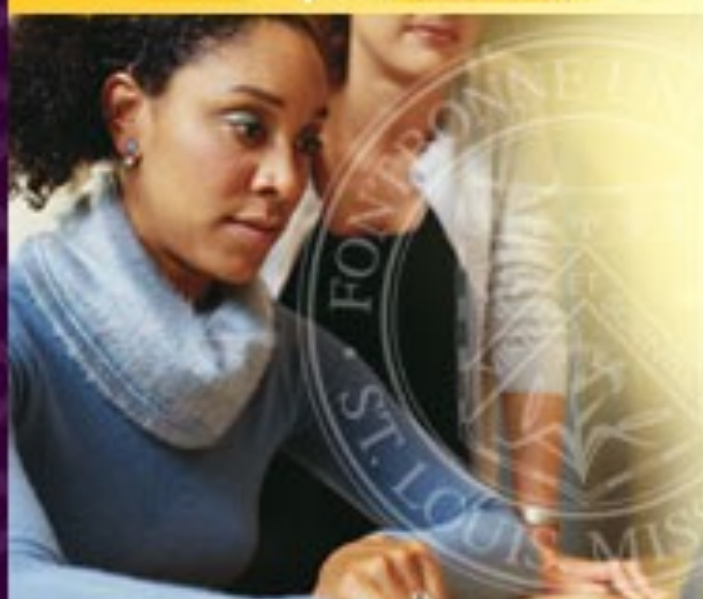
Footer



Fontbonne
UNIVERSITYFontbonne
UNIVERSITY
OPTIONSREADY TO
APPLY?

Site Map | Search

Shortcuts for ...

[ABOUT](#) [ACADEMICS](#) [ADMISSIONS](#) [STUDENT LIFE](#) [ATHLETICS](#) [ALUMNI](#) [CALENDAR](#) [LEARN ONLINE](#) [directory](#)**Finish**
what you
started.Transfer
Open
House
Oct. 3[register](#)**OPTIONS**
Adult Degree Programs
Enroll now. Lock in tuition!**LEARN MORE. BE MORE.®****Treasure
in the
Tropics**Alumni Reunion
Weekend

Sept. 28 - 30

[learn more](#)**NEWS & FEATURES**

- Rabblis to Lecture as Part of Dedicated Semester
- October Book Club Features Famed Hemingway Author
- Our Deaf Education Major Could be for You!
- Fontbonne and St. Louis Community College Team Up on Transfer Program
- I-64/40 Traffic Updates
- More News...



Start



WebSanity - Microsoft...

Internet



3:20 PM

Site Labeling

Alternative
NavigationAlternative
Navigation

Utility Navigation

Core Content Navigation

Brand Communication

Path Navigation

Page Labeling

Sub-page Navigaion (when needed)

Featured Images
(optional)

Page Content

Sidebar
(optional)

Footer



Fontbonne
UNIVERSITYFontbonne
UNIVERSITY
OPTIONSREADY TO
APPLY?

Site Map | Search

Shortcuts for ...

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LEARN MORE. BE MORE.

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STUDENT LIFE

| | | | |
|---------------------------------|--|-------------------------------------|---------------------------------|
| Activities | Intramurals | Orientation | Student Affairs |
| Bookstore | Leadership Development | Parents | Study Abroad |
| Campus Ministry | Multicultural Affairs | Personal Counseling | What's to Eat? |
| Career Services | Organizations | Residential Living | |



You can't put a price on quality of life at college, but a rich learning environment is another reason that Fontbonne is a great value. Here you will find a close-knit community and plenty to do.

We offer a neighborhood environment where you can grow in self-discipline, organizational skills, effective study habits and independent living. The neighborhood atmosphere also provides the opportunity to develop study partners, support systems and lasting friendships with a diverse group of neighbors.

You go to your professors or academic advisors for questions about classes, grades and registration, but where do you go for everything else that goes along with the college experience?

As the [Student Affairs Office](#), we're the people who help you with life outside of the classroom. Whether it's getting situated in [Residential Living](#), learning about [Student Activities](#) or [Student Organizations](#), participating in the [Study Abroad](#) program, or learning about diversity through [Multicultural Affairs](#), we will help you find your niche.



Alex

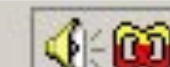


Start



WebSanity - Microsoft...

Internet

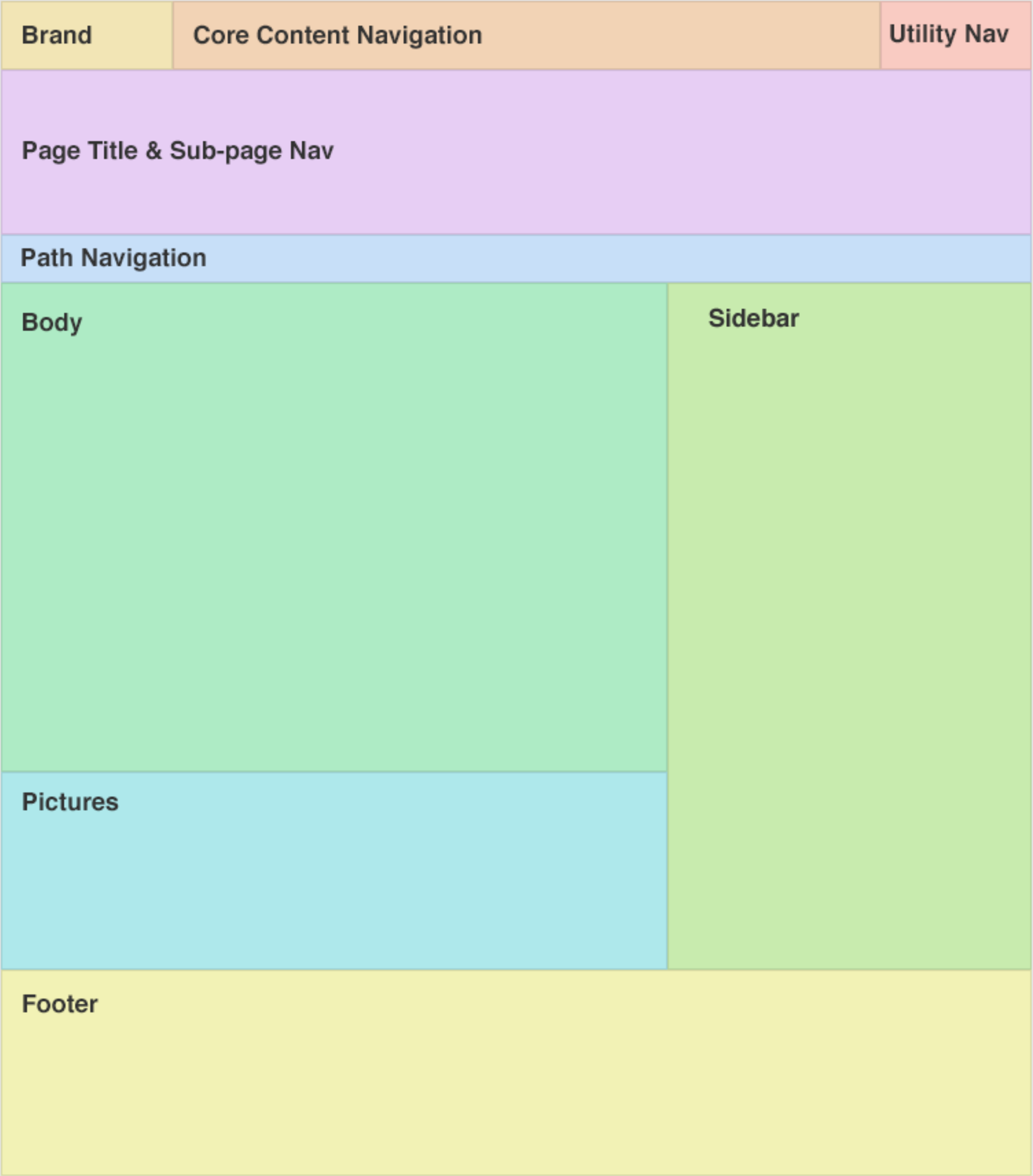


3:20 PM

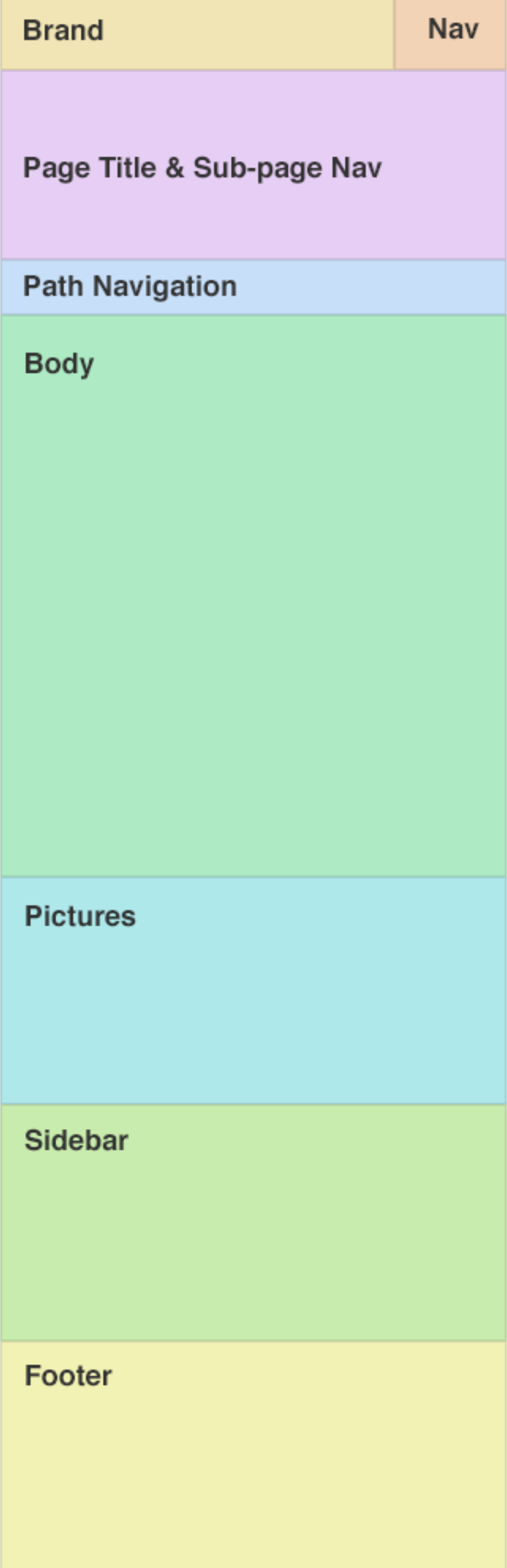
Responsive design



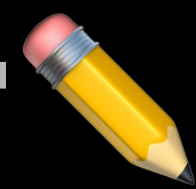




sm



xs

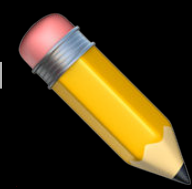


SIDE NOTE

Responsive covers a lot more conditions than it first did

Originally responsive design was focused on layout & screen size because those were the biggest problems that needed solving

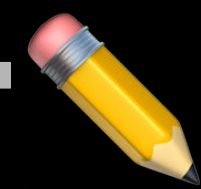
The solution is `@media (min-width|max-width|width)`



SIDE NOTE

Print is responsive too — after all, print CSS is about creating an optimal user experience when a webpage is printed

We've long had `@media print` for that



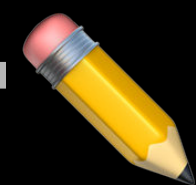
SIDE NOTE

New responsive concerns have developed over time

Touch device vs pointer device: the solution is `@media pointer` (or `any-pointer`) & `@media hover` (or `any-hover`)

Delivering hi-res images or not based on screen resolution: the solution is `<picture>` & `srcset`

Bit-depth, for displays that show differing numbers of colors: there is no solution yet



SIDE NOTE

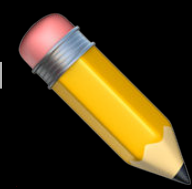
Responsive design toolkit

CSS functions: `max()`, `min()`, `minmax()`, `calc()`, & `clamp()`

Viewport-relative lengths: `vw` & `vh`, `vmin` & `vmax`

CSS properties:

- » `column-count`, `column-width`, `columns`
- » `max-width` & `min-width`



SIDE NOTE

Flexbox & Grid are also part of responsive design!

The Magic Tag

If you want to build a responsive website — whether you use Bootstrap or not — your webpage *must* have *the magic tag* in it

The magic tag makes all responsive design possible

Copy

```
<!doctype html>
<html lang="en">
  <head>
    <!-- Required meta tags -->
    <meta charset="utf-8">
    <meta name="viewport" content="width=device-width, initial-scale=1">

    <!-- Bootstrap CSS -->
    <link href="https://cdn.jsdelivr.net/npm/bootstrap@5.1.3/dist/css/bootstrap"

    <title>Hello, world!</title>
  </head>
  <body>
    <h1>Hello, world!</h1>

    <!-- Optional JavaScript; choose one of the two! -->

    <!-- Option 1: Bootstrap Bundle with Popper -->
    <script src="https://cdn.jsdelivr.net/npm/bootstrap@5.1.3/dist/js/bootstrap"

    <!-- Option 2: Separate Popper and Bootstrap JS -->
    <!--
    <script src="https://cdn.jsdelivr.net/npm/@popperjs/core@2.10.2/dist/umd/po
    <script src="https://cdn.jsdelivr.net/npm/bootstrap@5.1.3/dist/js/bootstrap"
    -->
  </body>
</html>
```



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

By default, mobile browsers zoom websites so that they fill the device screen



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al
o

Help make us
the best zoo in the
whole wild world.

Click here to learn more and donate
to the Adopt a Polar Bear campaign.

A close-up photograph of a polar bear's head and front paws as it swims in clear blue water.

- SEARCH
- FEATURES
- Penguin & Puffin Coast
 - Specialty Adoption: Cuddle with a gorilla monkey!
 - Baby Gorilla Monday
 - Delta Dental [Polar Bear](#) and [Puffin Coast](#)
 - Unleash Your [Superhero](#) at the Zoo
 - [Polar Bear](#) is now open! Plan your visit today!

- FEATURES
- Penguin & Puffin Coast is closed for construction of Polar Bear Pond
- VISIT
- Hours, Prices, Directions
Save with Safari Passes
Zoo Attractions
Plan Your Visit
- CONTACT
- Zoo Address & Phone
Employment
Contact Us
Press Room
- SOCIALIZE
- E-Newsletter
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Scott Granneman

- Writing
- Presentations
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- Web Development
- Tech Info
- Personal

Scott Granneman is an [author](#), [educator](#), & partner in a Web development company in St. Louis, Missouri. Scott has written six books, contributed to two, and penned monthly columns for SecurityFocus and *Linux Magazine*. He is an Adjunct Professor at Washington University in St. Louis & Webster University, [teaching courses](#) on technology, security, web development, & the Internet. As a Principal of [WebSanity](#), he plans, develops, and hosts websites for clients in 12 states using an open source, UNIX-based [content management system](#). He has given [presentations](#) all over the United States, and loves speaking to people.

News & Updates

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[Talk about Markdown to SLUUG this Wednesday](#)

November 7, 2011

I'll be giving a talk to the St. Louis UNIX Users Group next Wednesday night about Markdown, a tool I absolutely love. You're invited to come. Please do – I think you'll definitely learn a lot. Date: Wednesday, Nov. 9, 2011 Time: 6...

[Speaking at SLUUG: Amazing, Stupendous, Mind-Blowing Apps for iPad2](#)

June 5, 2011

Dans Carton & I are delivering a talk at the St. Louis UNIX Users Group at 6:30 pm this Wednesday, 8 June 2011, titled "Amazing, Stupendous, Mind-Blowing Apps for iPad2". We'll be demoing iPad apps live for everyone. If you want to f...

[A solution to two-way task list syncing on a Mac & iPhone](#)

December 11, 2009

I just published a page on my website about a solution I've found to an important issue: how to keep task lists on my Mac & my iPhone that are synced. I used to use The Hit List, but the developer's failure to come up with an iPhone soluti...

[Linux Phrasebook in Russian](#)

November 29, 2009

My book, Linux Phrasebook, which is still selling well & still just as useful today as when it came out in 2006 (& will be for another decade or two, given how consistent the Linux command line is), has been translated into Russian. You can find i...

[Outline for an Unpublished Linux Textbook](#)

June 18, 2009

Key Site Links

Pages you're probably looking for:

- [Publications](#)
- [Summer Vacation 2007: The Plains](#)
- [Web Development Key Links](#)
- Wash U: [Website Design & Development Syllabus](#)
- Webster U: [Programming for Web Communications Syllabus](#)
- Webster U: [Intro to Web Programming Syllabus](#)
- Webster U: [Senior Overview Syllabus](#)

However, when you responsively design a website, you do *not* want it to zoom—you want it to display responsively!


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

Essentially, putting this in your `<head>` tells the browser that it should *not* zoom, & that you will handle how it looks in the browser yourself (by using responsive design)

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

`width=device-width`

Tells browser that the website adapts to the browser's width, so the width of the viewport should be equal to the width of the device

`initial-scale=1`

Sets the initial zoom level: 1 CSS pixel is equal to 1 viewport pixel, ergo, do not zoom

Installation & Setup

3 ways to connect to Bootstrap in your projects

1. *Manually download* Bootstrap & copy the files into your project
2. *Link via CDN* to Bootstrap's files online ← What we're doing!
3. Install via *package manager* like `npm`, `yarn`, `gem`, `composer`, or `NuGet`

Manually Download

Advantages of downloading

- » Available offline
- » Can open & read Bootstrap CSS & JS files
- » Can install using package manager (e.g., Bower or NPM)

Disadvantages

- » You have to manage Bootstrap files
- » You have to make sure your templates match your files & folders
- » I have to take extra time with students 🙄

Download & Install

Remember, we are *not* doing this, so this is here for informational purposes

New in v5.3

Color mode support, expanded color palette, and more!



Build fast, responsive sites with Bootstrap

Powerful, extensible, and feature-packed frontend toolkit. Build and customize with Sass, utilize prebuilt grid system and components, and bring projects to life with powerful JavaScript plugins.

```
$ npm i bootstrap@5.3.0-alpha3
```



 [Read the docs](#)

As of 20 April 2023

Currently **v5.3.0-alpha3**

[Download](#)

[v4.6.x docs](#) · [All releases](#)



Getting started

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Customize

[Overview](#)[Sass](#)[Options](#)[Color](#)[Color modes](#)

Download

[View on GitHub](#)

Download Bootstrap to get the compiled CSS and JavaScript, source code, or include it with your favorite package managers like npm, RubyGems, and more.

Compiled CSS and JS

Download ready-to-use compiled code for **Bootstrap v5.3.0-alpha3** to easily drop into your project, which includes:

- Compiled and minified CSS bundles (see [CSS files comparison](#))
- Compiled and minified JavaScript plugins (see [JS files comparison](#))

This doesn't include documentation, source files, or any optional JavaScript dependencies like Popper.

[Download](#)

Source files


On this page

Compiled CSS and JS



[Source files](#)[Examples](#)[CDN via jsDelivr](#)[Package managers](#)[npm](#)[yarn](#)[RubyGems](#)[Composer](#)[NuGet](#)

You will download a file named something like
`bootstrap-5.3.0-alpha3-dist` into your Downloads
folder

Unzip that file & extract the contents to its own folder

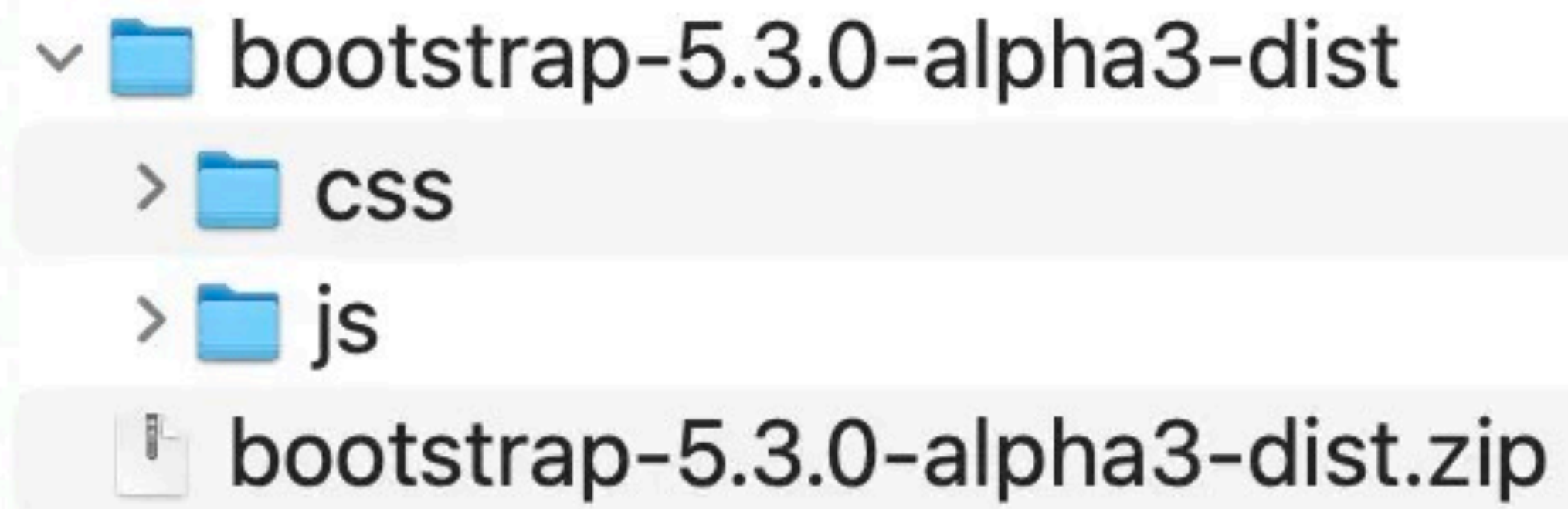
 bootstrap-5.3.0-alpha3-dist.zip



>  bootstrap-5.3.0-alpha3-dist
 bootstrap-5.3.0-alpha3-dist.zip

Mac users, just double-click on the zip file & you will have a folder named something like **bootstrap-5.3.0-alpha3-dist**

Windows users, right-click on `bootstrap-5.3.0-alpha3-dist` & select Extract Here



After unzipping

▼ bootstrap-5.3.0-alpha3-dist

▼ css

- # bootstrap-grid.css
- bootstrap-grid.css.map
- # bootstrap-grid.min.css
- bootstrap-grid.min.css.map
- # bootstrap-grid.rtl.css
- bootstrap-grid.rtl.css.map
- # bootstrap-grid.rtl.min.css
- bootstrap-grid.rtl.min.css.map
- # bootstrap-reboot.css
- bootstrap-reboot.css.map
- # bootstrap-reboot.min.css
- bootstrap-reboot.min.css.map
- # bootstrap-reboot.rtl.css
- bootstrap-reboot.rtl.css.map
- # bootstrap-reboot.rtl.min.css
- bootstrap-reboot.rtl.min.css.map
- # bootstrap-utilities.css
- bootstrap-utilities.css.map
- # bootstrap-utilities.min.css
- bootstrap-utilities.min.css.map
- # bootstrap-utilities.rtl.css
- bootstrap-utilities.rtl.css.map
- # bootstrap-utilities.rtl.min.css
- bootstrap-utilities.rtl.min.css.map
- # bootstrap.css
- bootstrap.css.map
- # bootstrap.min.css
- bootstrap.min.css.map
- # bootstrap.rtl.css
- bootstrap.rtl.css.map
- # bootstrap.rtl.min.css
- bootstrap.rtl.min.css.map


▼ js


- bootstrap.bundle.js
- bootstrap.bundle.js.map
- bootstrap.bundle.min.js
- bootstrap.bundle.min.js.map
- bootstrap.esm.js
- bootstrap.esm.js.map
- bootstrap.esm.min.js
- bootstrap.esm.min.js.map
- bootstrap.js
- bootstrap.js.map
- bootstrap.min.js
- bootstrap.min.js.map

Lots of extraneous files
we don't need!

Get rid of any file...


- » with **.min.**
- » with **.map**
- » with **.esm.**
- » with **.rtl.** (unless you
are working with right-
to-left languages)


▼  bootstrap-5.3.0-alpha3-dist

▼  CSS

 bootstrap-grid.css

 bootstrap-reboot.css

 bootstrap-utilities.css


 bootstrap.css

▼  js

 bootstrap.bundle.js

 bootstrap.js


You want
`bootstrap.bundle.js`
instead of `bootstrap.js`
because it includes
JavaScript used by several
useful features in
Bootstrap


▼  bootstrap-5.3.0-alpha3-dist

▼  CSS

 bootstrap-grid.css

 bootstrap-reboot.css

 bootstrap-utilities.css


 bootstrap.css

▼  js

 bootstrap.bundle.js

 ~~bootstrap.js~~


You want
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Bootstrap


▼  bootstrap-5.3.0-alpha3-dist

▼  CSS


 bootstrap-grid.css

 bootstrap-reboot.css

 bootstrap-utilities.css

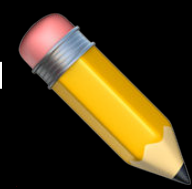
 bootstrap.css

▼  js

 bootstrap.bundle.js

The final contents

Now move the CSS & JavaScript files into your project's `/css` & `/js` folders



SIDE NOTE

`bootstrap.min.css`

`bootstrap.min.js`

The `.min` stands for *minified*

What's minification?


```
1 @charset "UTF-8";
2 /*!
3  * Bootstrap v5.3.0-alpha3 (https://getbootstrap.com/)
4  * Copyright 2011–2023 The Bootstrap Authors
5  * Licensed under MIT (https://github.com/twbs/bootstrap/blob/main/LICENSE)
6  */
7 :root,
8 [data-bs-theme=light] {
9   --bs-blue: #0d6efd;
10  --bs-indigo: #6610f2;
11  --bs-purple: #6f42c1;
12  --bs-pink: #d63384;
13  --bs-red: #dc3545;
14  --bs-orange: #fd7e14;
15  --bs-yellow: #ffc107;
16  --bs-green: #198754;
17  --bs-teal: #20c997;
18  --bs-cyan: #0dcaf0;
19  --bs-black: #000;
20  --bs-white: #fff;
21  --bs-gray: #6c757d;
22  --bs-gray-dark: #343a40;
23  --bs-gray-100: #f8f9fa;
24  --bs-gray-200: #e9ecef;
25  --bs-gray-300: #dee2e6;
26  --bs-gray-400: #ced4da;
27  --bs-gray-500: #adb5bd;
28  --bs-gray-600: #6c757d;
```

bootstrap.css


```
12086 }
12087 .d-print-grid {
12088     display: grid !important;
12089 }
12090 .d-print-inline-grid {
12091     display: inline-grid !important;
12092 }
12093 .d-print-table {
12094     display: table !important;
12095 }
12096 .d-print-table-row {
12097     display: table-row !important;
12098 }
12099 .d-print-table-cell {
12100     display: table-cell !important;
12101 }
12102 .d-print-flex {
12103     display: flex !important;
12104 }
12105 .d-print-inline-flex {
12106     display: inline-flex !important;
12107 }
12108 .d-print-none {
12109     display: none !important;
12110 }
12111 }
12112
12113 /*# sourceMappingURL=bootstrap.css.map */
```

12,113 lines (!) — *not* minified

bootstrap.min.css

```
1 @charset "UTF-8";/*!
```

```
2 * Bootstrap v5.3.0-alpha3 (https://getbootstrap.com/)
```

```
3 * Copyright 2011-2023 The Bootstrap Authors
```

```
4 * Licensed under MIT (https://github.com/twbs/bootstrap/blob/main/LICENSE)
```

```
5
... */:root, [data-bs-theme=light]{--bs-blue:#0d6efd;--bs-indigo:#6610f2;--bs-purple:#6f42c1;--bs-pink:#d63384;--bs-red
... :#dc3545;--bs-orange:#fd7e14;--bs-yellow:#ffc107;--bs-green:#198754;--bs-teal:#20c997;--bs-cyan:#0dcaf0;--bs-black
... :#000;--bs-white:#fff;--bs-gray:#6c757d;--bs-gray-dark:#343a40;--bs-gray-100:#f8f9fa;--bs-gray-200:#e9ecef;--bs-
... gray-300:#dee2e6;--bs-gray-400:#ced4da;--bs-gray-500:#adb5bd;--bs-gray-600:#6c757d;--bs-gray-700:#495057;--bs-gray
... -800:#343a40;--bs-gray-900:#212529;--bs-primary:#0d6efd;--bs-secondary:#6c757d;--bs-success:#198754;--bs-info:#
... 0dcaf0;--bs-warning:#ffc107;--bs-danger:#dc3545;--bs-light:#f8f9fa;--bs-dark:#212529;--bs-primary-rgb:13,110,253;-
... -bs-secondary-rgb:108,117,125;--bs-success-rgb:25,135,84;--bs-info-rgb:13,202,240;--bs-warning-rgb:255,193,7;--bs-
... danger-rgb:220,53,69;--bs-light-rgb:248,249,250;--bs-dark-rgb:33,37,41;--bs-primary-text-emphasis:#052c65;--bs-
... secondary-text-emphasis:#2b2f32;--bs-success-text-emphasis:#0a3622;--bs-info-text-emphasis:#055160;--bs-warning-
... text-emphasis:#664d03;--bs-danger-text-emphasis:#58151c;--bs-light-text-emphasis:#495057;--bs-dark-text-emphasis:#
... 495057;--bs-primary-bg-subtle:#cfe2ff;--bs-secondary-bg-subtle:#e2e3e5;--bs-success-bg-subtle:#d1e7dd;--bs-info-bg
... -subtle:#cfff4fc;--bs-warning-bg-subtle:#fff3cd;--bs-danger-bg-subtle:#f8d7da;--bs-light-bg-subtle:#fcfcfd;--bs-
... dark-bg-subtle:#ced4da;--bs-primary-border-subtle:#9ec5fe;--bs-secondary-border-subtle:#c4c8cb;--bs-success-border
... -subtle:#a3cfbb;--bs-info-border-subtle:#9eeaf9;--bs-warning-border-subtle:#ffe69c;--bs-danger-border-subtle:#
... f1aeb5;--bs-light-border-subtle:#e9ecef;--bs-dark-border-subtle:#adb5bd;--bs-white-rgb:255,255,255;--bs-black-rgb:
... 0,0,0;--bs-font-sans-serif:system-ui,-apple-system,"Segoe UI",Roboto,"Helvetica Neue","Noto Sans","Liberation
... Sans",Arial,sans-serif,"Apple Color Emoji","Segoe UI Emoji","Segoe UI Symbol","Noto Color
... Emoji";--bs-font-monospace:SFMono-Regular,Menlo,Monaco,Consolas,"Liberation Mono","Courier
... New",monospace;--bs-gradient:linear-gradient(180deg, rgba(255, 255, 255, 0.15), rgba(255, 255, 255,
... 0));--bs-body-font-family:var(--bs-font-sans-serif);--bs-body-font-size:1rem;--bs-body-font-weight:400;--bs-body-
... line-height:1.5;--bs-body-color:#212529;--bs-body-color-rgb:33,37,41;--bs-body-bg:#fff;--bs-body-bg-rgb:255,255,
... 255;--bs-emphasis-color:#000;--bs-emphasis-color-rgb:0,0,0;--bs-secondary-color:rgba(33, 37, 41,
... 0.75);--bs-secondary-color-rgb:33,37,41;--bs-secondary-bg:#e9ecef;--bs-secondary-bg-rgb:233,236,239;--bs-tertiary-
```



```
5... !important}.py-xxl-2{padding-top:.5rem!important;padding-bottom:.5rem!important}.py-xxl-3{padding-top:1rem!
... important;padding-bottom:1rem!important}.py-xxl-4{padding-top:1.5rem!important;padding-bottom:1.5rem!important}.py
... -xxl-5{padding-top:3rem!important;padding-bottom:3rem!important}.pt-xxl-0{padding-top:0!important}.pt-xxl-1{
... padding-top:.25rem!important}.pt-xxl-2{padding-top:.5rem!important}.pt-xxl-3{padding-top:1rem!important}.pt-xxl-4{
... padding-top:1.5rem!important}.pt-xxl-5{padding-top:3rem!important}.pe-xxl-0{padding-right:0!important}.pe-xxl-1{
... padding-right:.25rem!important}.pe-xxl-2{padding-right:.5rem!important}.pe-xxl-3{padding-right:1rem!important}.pe-
... xxl-4{padding-right:1.5rem!important}.pe-xxl-5{padding-right:3rem!important}.pb-xxl-0{padding-bottom:0!important}.
... pb-xxl-1{padding-bottom:.25rem!important}.pb-xxl-2{padding-bottom:.5rem!important}.pb-xxl-3{padding-bottom:1rem!
... important}.pb-xxl-4{padding-bottom:1.5rem!important}.pb-xxl-5{padding-bottom:3rem!important}.ps-xxl-0{padding-left
... :0!important}.ps-xxl-1{padding-left:.25rem!important}.ps-xxl-2{padding-left:.5rem!important}.ps-xxl-3{padding-left
... :1rem!important}.ps-xxl-4{padding-left:1.5rem!important}.ps-xxl-5{padding-left:3rem!important}.gap-xxl-0{gap:0!
... important}.gap-xxl-1{gap:.25rem!important}.gap-xxl-2{gap:.5rem!important}.gap-xxl-3{gap:1rem!important}.gap-xxl-4{
... gap:1.5rem!important}.gap-xxl-5{gap:3rem!important}.row-gap-xxl-0{row-gap:0!important}.row-gap-xxl-1{row-gap:.
... 25rem!important}.row-gap-xxl-2{row-gap:.5rem!important}.row-gap-xxl-3{row-gap:1rem!important}.row-gap-xxl-4{row-
... gap:1.5rem!important}.row-gap-xxl-5{row-gap:3rem!important}.column-gap-xxl-0{-moz-column-gap:0!important;column-
... gap:0!important}.column-gap-xxl-1{-moz-column-gap:0.25rem!important;column-gap:.25rem!important}.column-gap-xxl-2{
... -moz-column-gap:0.5rem!important;column-gap:.5rem!important}.column-gap-xxl-3{-moz-column-gap:1rem!important;
... column-gap:1rem!important}.column-gap-xxl-4{-moz-column-gap:1.5rem!important;column-gap:1.5rem!important}.column-
... gap-xxl-5{-moz-column-gap:3rem!important;column-gap:3rem!important}.text-xxl-start{text-align:left!important}.text
... -xxl-end{text-align:right!important}.text-xxl-center{text-align:center!important}}@media
... (min-width:1200px){.fs-1{font-size:2.5rem!important}.fs-2{font-size:2rem!important}.fs-3{font-size:1.75rem!
... important}.fs-4{font-size:1.5rem!important}}@media
... print{.d-print-inline{display:inline!important}.d-print-inline-block{display:inline-block!important}.d-print-block
... {display:block!important}.d-print-grid{display:grid!important}.d-print-inline-grid{display:inline-grid!important}.
... d-print-table{display:table!important}.d-print-table-row{display:table-row!important}.d-print-table-cell{display:
... table-cell!important}.d-print-flex
... print-none{display:none!important}
6 /*# sourceMappingURL=bootstrap.min
```

6 lines instead of 12,113 — that's minified!

Template

Your `<head>` should look like this...


```
<head>
  <meta charset="utf-8">
  <meta http-equiv="X-UA-Compatible"
content="IE=edge">
  <meta name="viewport" content="width=device-
width, initial-scale=1">
  <title>Untitled</title>

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

And your `<body>` like this...

```
<body>
  <h1>Hello, world!</h1>

  <script src="https://ajax.googleapis.com/
ajax/libs/jquery/1.11.2/jquery.min.js"></
script>
  <script src="/js/bootstrap.js"></script>
</body>
```

The dependency upon jQuery is removed in Bootstrap 5

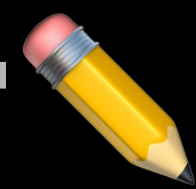
You *must* keep the JavaScript, or things will break (e.g.,
dropdown menus)

Make sure jQuery comes *before* any other JavaScripts that depend on it (like `bootstrap.js`)

```
<script src="https://ajax.googleapis.com/ajax/
libs/jquery/1.11.2/jquery.min.js"></script>
<script src="js/bootstrap.js"></script>
```

Otherwise, leave the jQuery `<script>` alone

The dependency upon jQuery is removed in Bootstrap 5



SIDE NOTE

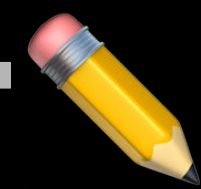
What is jQuery?

Most popular (73% of top 10 million websites!)
JavaScript library, designed to simplify client-side scripting

Lots of other JavaScripts depend upon jQuery (like Bootstrap)

The dependency upon jQuery is removed in Bootstrap 5

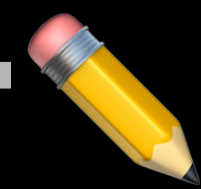
Link via CDN



SIDE NOTE

What's a *CDN* anyway?

“A *content delivery network* is a highly-distributed platform of servers that responds directly to end user requests for web content. It acts as an intermediary between a content server, also known as the origin, and its end users or clients. ... Content Delivery Networks, also known as CDNs, carry nearly half of the world's Internet traffic.” —Akamai's CDN Learning Center

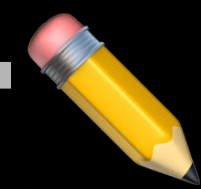


SIDE NOTE

Akamai is one of the largest CDNs in the world

Akamai serves 15–30% of all Web traffic

“The company operates a network of servers around the world and rents capacity on these servers to customers who want their websites to work faster by distributing content from locations close to the user. When a user navigates to the URL of an Akamai customer, their browser is redirected to one of Akamai’s copies of the website.” —Wikipedia



SIDE NOTE



Akamai's global reach

Advantages of linking

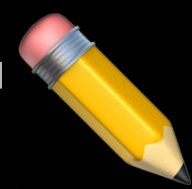
- » Create or use a template with the right links & you're finished 😎
- » Users already have it cached so it loads real quick like
- » You do not have to manage extra files
- » I do not have to take extra time with students

Disadvantages

- » No Internet, no files 🙅
- » Cannot easily open & read Bootstrap CSS & JS files

Using Visual Studio Code?

Go to the *Extensions View* & install File Templates
Manager by Ivan Zakharchanka

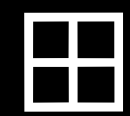


SIDE NOTE

FYI where templates are stored (in case you want to back them up)



```
~/Library/Application Support/Code/User/  
CodeTemplates/
```



```
%HOME%
```

```
\AppData\Roaming\Code\User\CodeTemplates\
```

Edit the current HTML template & copy over it with mine:

HTML5 template: <http://chnsa.ws/1b1>

Create a new templates & use the following:

Bootstrap 5 CDN template: <https://chnsa.ws/1wx>

bootstrap-5-template.html

bootstrap-5-template.html > ...

```
1  <!DOCTYPE html>
2  <html lang="en">
3
4  <head>
5    <meta charset="utf-8">
6    <meta name="viewport" content="width=device-width, initial-scale=1,
7      shrink-to-fit=no">
8
9    <title>Untitled Document</title>
10
11    <link href="https://cdn.jsdelivr.net/npm/bootstrap@5.1.3/dist/css/bootstrap.
12      min.css" rel="stylesheet"
13      integrity="sha384-1BmE4kWBq78iYhFdvKuhfTAU6auU8tT94WrHftjDbrCEXSU1oBoqyl2Qv
14      Z6jIW3" crossorigin="anonymous">
15    <link rel="stylesheet" href="/css/main.css">
16  </head>
17
18  <body>
```

CDN

bootstrap-5-template.html

bootstrap-5-template.html > ...

```
8      <title>Untitled Document</title>
9
10     <link href="https://cdn.jsdelivr.net/npm/bootstrap@5.1.3/dist/css/bootstrap.
      min.css" rel="stylesheet"
      integrity="sha384-1BmE4kWBq78iYhF1dvKuhfTAU6auU8tT94WrHftjDbrCEXSU1oBoqyl2Qv
      Z6jIW3" crossorigin="anonymous">
11     <link rel="stylesheet" href="/css/main.css">
12 </head>
13
14 <body>
15
16
17
18     <!-- Do NOT delete this script! -->
19     <script src="https://cdn.jsdelivr.net/npm/bootstrap@5.1.3/dist/js/bootstrap.
      bundle.min.js" integrity="sha384-ka7Sk0Gln4gmtz2MlQnikT1wXgYs0g+OMhuP
      +IlRH9sENBO0LRn5q+8nbTov4+1p" crossorigin="anonymous"></script>
20 </body>
21 </html>
22
```

CDN



0 0

Live Share



GIST [github]

W3C validation

Assignments > bootstrap-5-101



[off]



Using Bootstrap

Bootstrap is really just a collection of pre-made CSS & JavaScript for you to use with your site

Link to the default CSS in your `<head>` & the JavaScript in `<body>`, & use the CSS classes that Bootstrap provides in your HTML

Want to change Bootstrap's default styles or scripting behaviors?

Do *not* edit the default CSS & JavaScript!

Next time you upgrade, all your changes go poof

Instead, create your own CSS & link to it *after* you link to `bootstrap.css`

```
<link rel="stylesheet" href="https://  
stackpath.bootstrapcdn.com/.../  
bootstrap.min.css" ...>
```

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

Override Bootstrap's CSS as needed in your CSS

💡 PRO TIP

You would do the same thing with `bootstrap.js`

How do you know which Bootstrap classes to use, & which classes do what?

`bootstrap.css` is ~12,000 lines—do not read it!

Read the documentation at getbootstrap.com



Bootstrap

Build responsive, mobile-first projects on the web with the world's most popular front-end component library.

Bootstrap is an open source toolkit for developing with HTML, CSS, and JS. Quickly prototype your ideas or build your entire app with our Sass variables and mixins, responsive grid system, extensive prebuilt components, and powerful plugins built on jQuery.

[Get started](#)[Download](#)

Currently v4.1.3





Bootstrap

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[Get started](#)

[Download](#)

Currently v4.1.3

- ✓ Latest (4.1.x)
- v4.0.0
- v4 Alpha 6
- v3.3.7
- v2.3.2





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- Theming
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Introduction

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Quick start

Looking to quickly add Bootstrap to your project? Use BootstrapCDN, provided for free by the folks at StackPath. Using a package manager or need to download the source files? [Head to the downloads page](#).

CSS

Copy-paste the stylesheet `<link>` into your `<head>` before all other stylesheets to load our CSS.

```
<link rel="stylesheet" href="https://stackpath.bootstrapcdn.com/bootstrap/4.1.3/cs
```

- Quick start
 - CSS
 - JS
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- Important globals
 - HTML5 doctype
 - Responsive meta tag
 - Box-sizing
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- Community



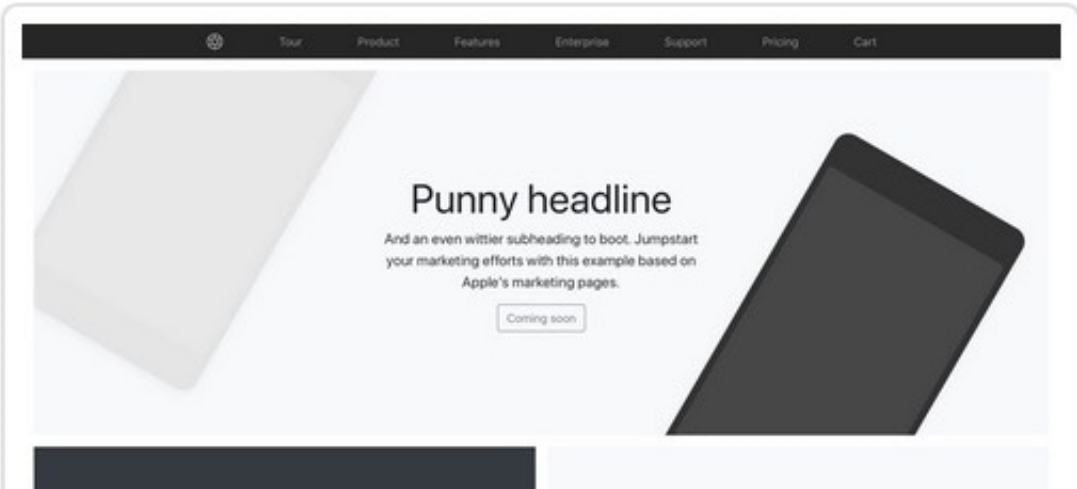
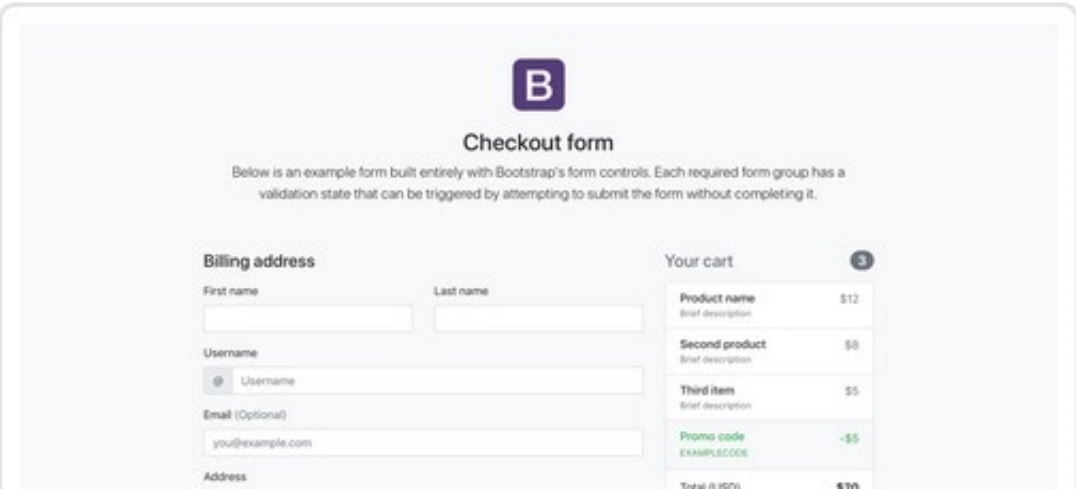
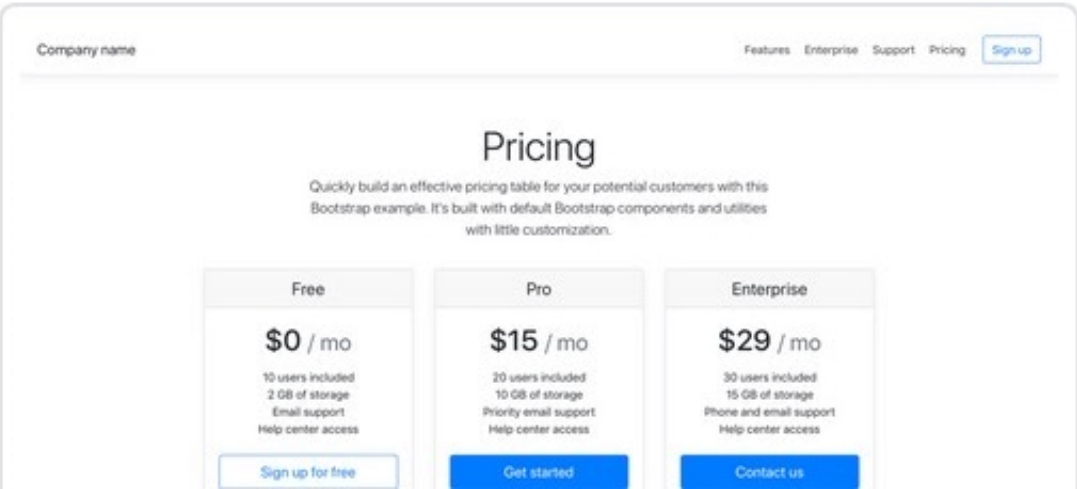
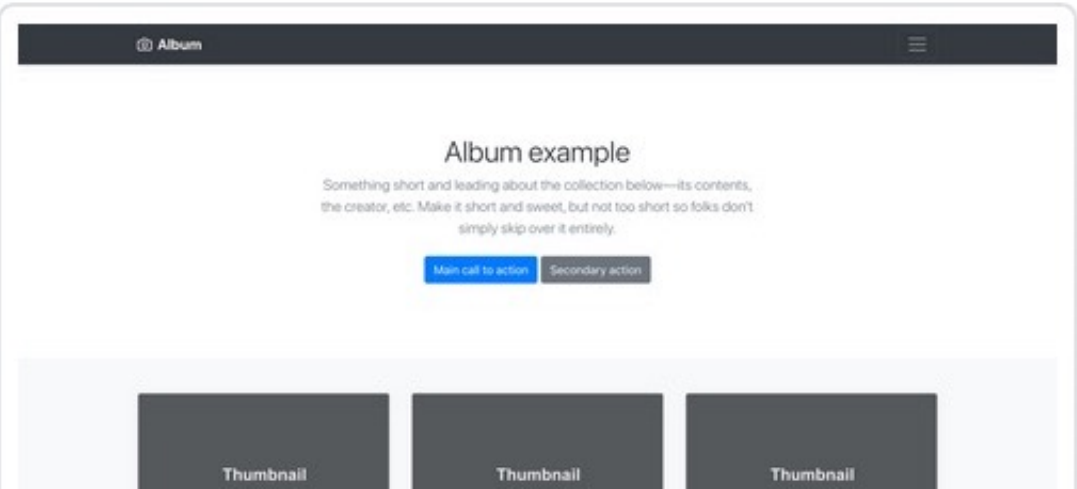
Examples

Quickly get a project started with any of our examples ranging from using parts of the framework to custom components and layouts.

Download source code

Custom components

Brand new components and templates to help folks quickly get started with Bootstrap and demonstrate best practices for adding onto the framework.





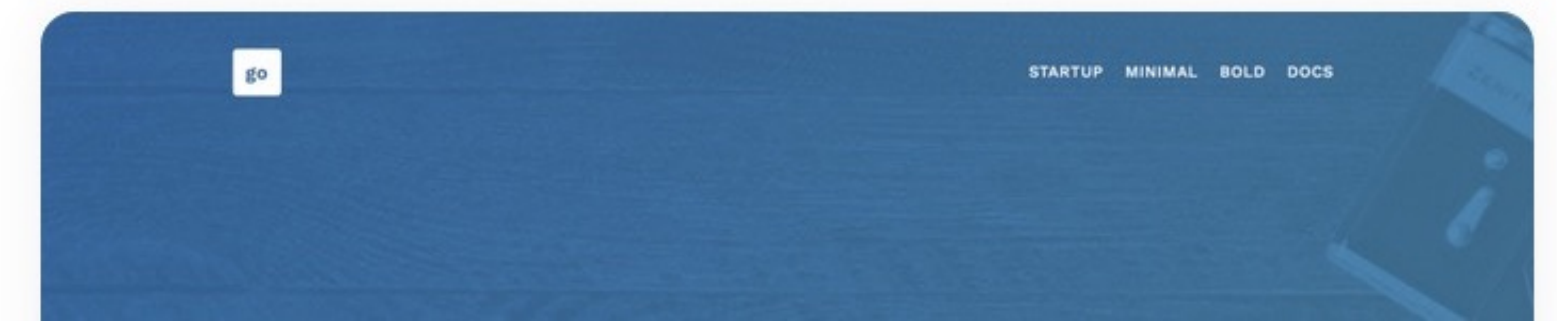
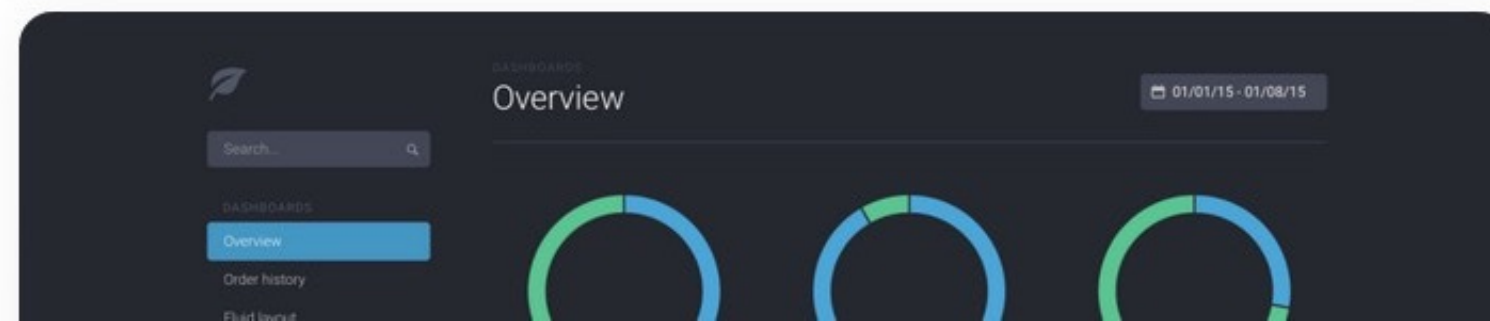
Build anything

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.



Bootstrap Expo

Beautiful and inspiring uses of **Bootstrap**, curated by @mdo.

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About
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Our products ▾



Fully coded UI Tools to create web apps

UI Kits and Dashboards built on top of
Bootstrap, Vue.js, React and Angular.



Forbes

Entrepreneur

Product Hunt

AWWWARDS

CREATIVE BLOG

speckyboy



The Bootstrap Blog

News and announcements for all things Bootstrap,
including new releases and Bootstrap Themes.

Bootstrap 4.1.3

24 Jul 2018

Cheap Trick - Surrender - Midnight Special



Watch later





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Copy-paste the stylesheet `<link>` into your `<head>` before all other stylesheets to load our CSS.

```
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```

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 - JS
- Starter template
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 - Responsive meta tag
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- Community



Getting started

Layout

Overview

Grid

Media object

Utilities for layout

Content

Components

Utilities

Extend

Migration

About

Overview

Components and options for laying out your Bootstrap project, including wrapping containers, a powerful grid system, a flexible media object, and responsive utility classes.

Containers

Containers are the most basic layout element in Bootstrap and are **required when using our default grid system**. Choose from a responsive, fixed-width container (meaning its **max-width** changes at each breakpoint) or fluid-width (meaning it's **100%** wide all the time).

While containers *can* be nested, most layouts do not require a nested container.



Containers

Responsive
breakpoints

Z-index



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Reboot

Reboot, a collection of element-specific CSS changes in a single file, kickstart Bootstrap to provide an elegant, consistent, and simple baseline to build upon.

Approach

Reboot builds upon Normalize, providing many HTML elements with somewhat opinionated styles using only element selectors. Additional styling is done only with classes. For example, we reboot some `<table>` styles for a simpler baseline and later provide `.table`, `.table-bordered`, and more.

Here are our guidelines and reasons for choosing what to override in Reboot:

- Update some browser default values to use `rem`s instead of `em`s for scalable component spacing.
- Avoid `margin-top`. Vertical margins can collapse, yielding unexpected results. More importantly though, a single direction of `margin` is a simpler mental model.
- For easier scaling across device sizes, block elements should use `rem`s for

- Approach
- Page defaults
- Native font stack
- Headings and paragraphs
- Lists
- Preformatted text
- Tables
- Forms
- Misc elements
 - Address
 - Blockquote
 - Inline elements
 - Summary
- HTML5 [hidden] attribute



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 - Alerts
 - Badge
 - Breadcrumb
 - Buttons
 - Button group
 - Card
 - Carousel
 - Collapse
 - Dropdowns
 - Forms
 - Input group
 - Jumbotron
 - List group

Alerts

Provide contextual feedback messages for typical user actions with the handful of available and flexible alert messages.

Examples

Alerts are available for any length of text, as well as an optional dismiss button. For proper styling, use one of the eight **required** contextual classes (e.g., `.alert-success`). For inline dismissal, use the [alerts jQuery plugin](#).

A simple primary alert—check it out!

A simple secondary alert—check it out!

A simple success alert—check it out!

- Examples
- Link color
 - Additional content
 - Dismissing
 - JavaScript behavior
 - Triggers
 - Methods
 - Events



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- Utilities
- Borders**
- Clearfix
- Close icon
- Colors
- Display
- Embed
- Flex
- Float
- Image replacement
- Position
- Screenreaders
- Shadows

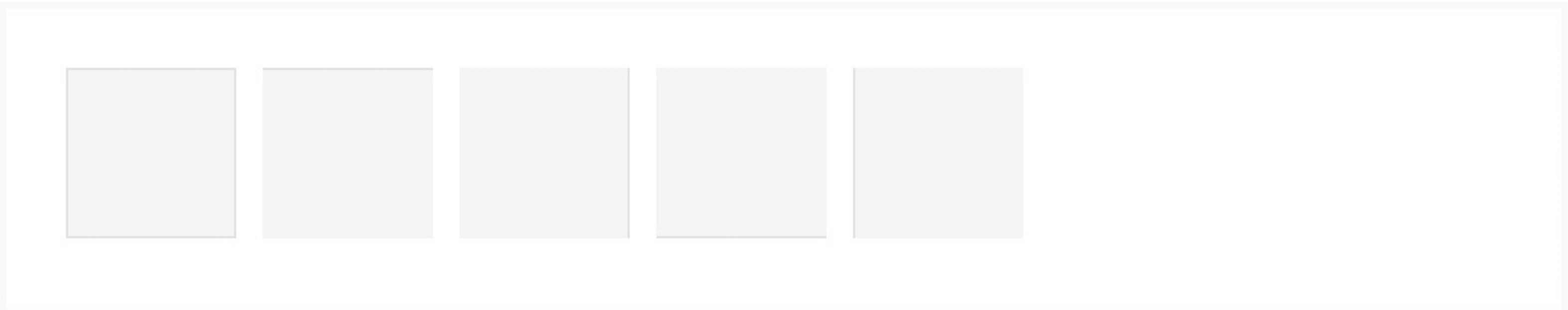
Borders

Use border utilities to quickly style the border and border-radius of an element. Great for images, buttons, or any other element.

Border

Use border utilities to add or remove an element’s borders. Choose from all borders or one at a time.

Additive



```
<span class="border"></span>
```

Copy

- Border
 - Additive
 - Subtractive
- Border color
- Border-radius



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- Utilities
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- Approach**
- Icons
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Approach

Learn about the guiding principles, strategies, and techniques used to build and maintain Bootstrap so you can more easily customize and extend it yourself.

While the getting started pages provide an introductory tour of the project and what it offers, this document focuses on *why* we do the things we do in Bootstrap. It explains our philosophy to building on the web so that others can learn from us, contribute with us, and help us improve.

See something that doesn't sound right, or perhaps could be done better? [Open an issue](#)—we'd love to discuss it with you.

Summary

We'll dive into each of these more throughout, but at a high level, here's what guides our approach.

- Components should be responsive and mobile-first
- Components should be built with a base class and extended via modifier classes



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Migrating to v4

Bootstrap 4 is a major rewrite of the entire project. The most notable changes are summarized below, followed by more specific changes to relevant components.

Stable changes

Moving from Beta 3 to our stable v4.0 release, there are no breaking changes, but there are some notable changes.

Printing

- Fixed broken print utilities. Previously, using a `.d-print-*` class would unexpectedly overrule any other `.d-*` class. Now, they match our other display utilities and only apply to that media (`@media print`).
- Expanded available print display utilities to match other utilities. Beta 3 and older only had `block`, `inline-block`, `inline`, and `none`. Stable v4 added `flex`, `inline-flex`, `table`, `table-row`, and `table-cell`.
- Fixed print preview rendering across browsers with new print styles that

- Stable changes
 - Printing
- Beta 3 changes
 - Miscellaneous
 - Forms
 - Input groups
- Beta 2 changes
 - Breaking
 - Highlights
- Summary
 - Browser support
 - Global changes
 - Grid system
 - Components
- By component
 - Reboot
 - Typography
 - Images
 - Tables
 - Forms
 - Buttons
 - Button group
 - Dropdowns

[Getting started](#)[Layout](#)[Content](#)[Components](#)[Utilities](#)[Extend](#)[Migration](#)[About](#)[Overview](#)[Brand](#)[License](#)[Translations](#)

About

Learn more about the team maintaining Bootstrap, how and why the project started, and how to get involved.

Team

Bootstrap is maintained by a [small team of developers](#) on GitHub. We're actively looking to grow this team and would love to hear from you if you're excited about CSS at scale, writing and maintaining vanilla JavaScript plugins, and improving build tooling processes for frontend code.

History

Originally created by a designer and a developer at Twitter, Bootstrap has become one of the most popular front-end frameworks and open source projects in the world.

Bootstrap was created at Twitter in mid-2010 by [@mdo](#) and [@fat](#). Prior to being an open-sourced framework, Bootstrap was known as *Twitter Blueprint*. A few months into development, Twitter held its [first Hack Week](#) and the project

So let's say I want to make some images responsive & interesting looking



Getting started

Layout

Content

Reboot

Typography

Code

Images

Tables

Figures

Components

Utilities

Extend

Migration

About

1

2

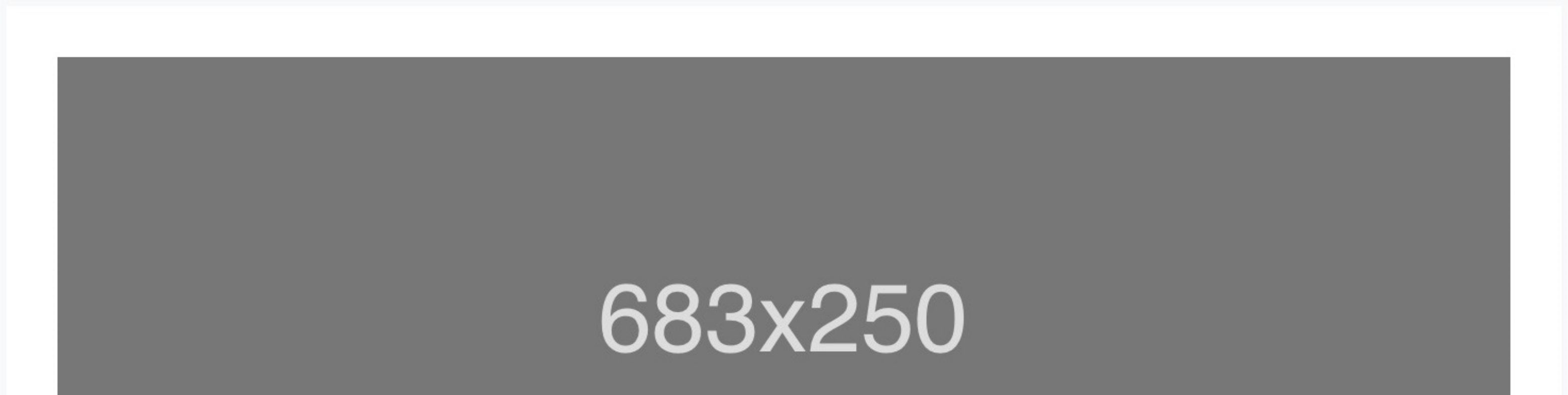
3

Images

Documentation and examples for opting images into responsive behavior (so they never become larger than their parent elements) and add lightweight styles to them—all via classes.

Responsive images

Images in Bootstrap are made responsive with `.img-fluid`. `max-width: 100%;` and `height: auto;` are applied to the image so that it scales with the parent element.



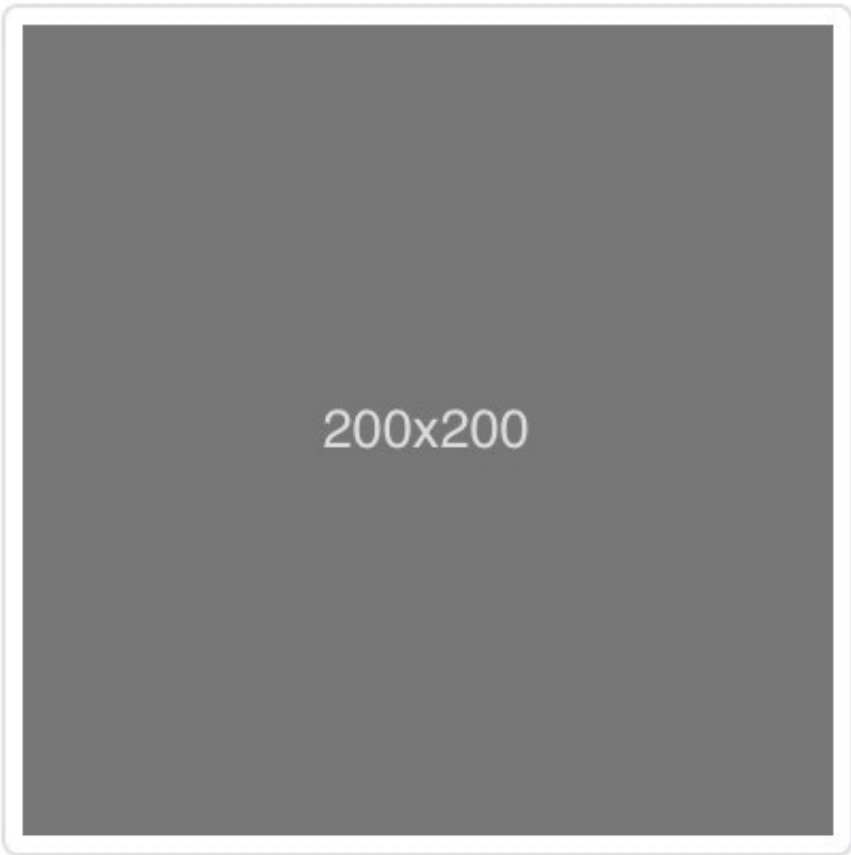
- Responsive images
- Image thumbnails
- Aligning images
- Picture



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- Images
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- Figures
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Image thumbnails

In addition to our [border-radius utilities](#), you can use `.img-thumbnail` to give an image a rounded 1px border appearance.



```

```

Copy

- Responsive images
- Image thumbnails
- Aligning images
- Picture

Aligning images

Align images with the [helper float classes](#) or [text alignment classes](#). `block`-level images can be centered using [the .mx-auto margin utility class](#).

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- Extend
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- About

Image thumbnails

In addition to our [border-radius utilities](#), you can use `.img-thumbnail` to give an image a rounded 1px border appearance.



```

```

Copy

- Responsive images
- Image thumbnails
- Aligning images
- Picture

Aligning images

Align images with the [helper float classes](#) or [text alignment classes](#). `block`-level images can be centered using [the .mx-auto margin utility class](#).



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- Layout
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- Components
- Utilities
- Borders**
- Clearfix
- Close icon
- Colors
- Display
- Embed
- Flex
- Float
- Image replacement
- Position
- Screenreaders
- Shadows

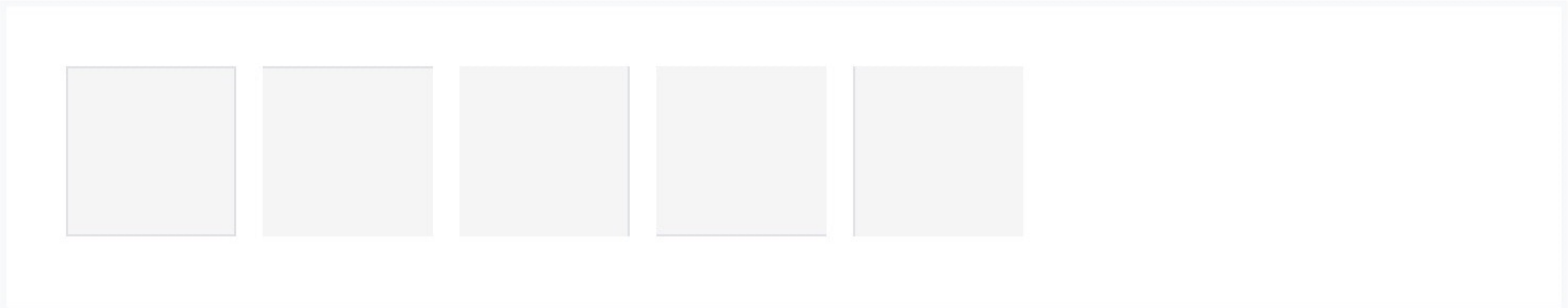
Borders

Use border utilities to quickly style the border and border-radius of an element. Great for images, buttons, or any other element.

Border

Use border utilities to add or remove an element’s borders. Choose from all borders or one at a time.

Additive



```
<span class="border"></span>
```

Copy

- Border
 - Additive
 - Subtractive
- Border color
- Border-radius**

Getting started

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Components

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Borders

Clearfix

Close icon

Colors

Display

Embed

Flex

Float

Image replacement

Position

Screenreaders







Shadows

```
<span class="border border-warning"></span>
<span class="border border-info"></span>
<span class="border border-light"></span>
<span class="border border-dark"></span>
<span class="border border-white"></span>
```

- Border
- Additive
- Subtractive
- Border color
- Border-radius

Border-radius

Add classes to an element to easily round its corners.



```







```

Copy

Once you start using Bootstrap, you will sometimes want to override its CSS

1. Use your browser's Inspector to find the exact selector & declaration that Bootstrap uses in `bootstrap.css`
2. Copy that selector & declaration & then paste them into your `main.css`
3. Enter a new value in the declaration

An easy example, with an easy selector

Search...

Getting started

Layout

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Components

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Borders

Clearfix

Close icon

Colors

Display

Embed

Flex

Float

Image replacement

Interactions

Overflow

Position

Border-radius

Add classes to an element to easily round its corners.



```
  
  
  
  
  
  

```

Copy

Border

Additive

Subtractive

Border color

Border-radius

Sizes

Sizes

Use `.rounded-lg` or `.rounded-sm` for larger or smaller border-radius.



I decide to add rounded corners to an image, so I check out what class to use at getbootstrap.com

index-01.html

main.css

index-01.html

html

body

div.container

div.row

article.col-md-8.col-lg-9

EXPLOLERER

OPEN EDITORS

BOOTSTRAP-4-101

- CSS
 - main.css
- fonts
- videos
- index-01.html
- index-02-jumbotron....
- index-02.1-jumbotro...
- index-02.2-jumbotro...
- index-03-breadcrum...
- index-04-nav-click-t...
- index-04.1-nav-no-dr...
- index-05-fonts.html
- navbar.html

OUTLINE

TIMELINE

TEMPLATES

33

34

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40

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44

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48

adipisicing labore. Laboris laborum cillum
excepteur laboris ea do in. In irure commodo
voluptate tempor nisi mollit eu deserunt laborum
dolore velit consectetur amet.

</p>

<p>

</p>

<!-- Table data at http://chnsa.ws/uo -->

<table class="table table-striped table-hover">

<thead>

<tr>

<th>Movie</th>

<th>Genre</th>

<th>Hero</th>

<th>Year</th>

<th>Star</th>

<th>Director</th>

</tr>

</thead>

I add it to my code

0 0

Live Share

GIST [github]

Assignments > bootstrap-4-101

Go Live

Rsync: [i]

ESLint

[off]

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ad occaecat.

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| Movie | Genre | Hero | Year | Star | Director |
|-----------|--------|----------------|------|--------------|----------------|
| Die Hard | Action | John McClane | 1988 | Bruce Willis | John McTiernan |
| Star Wars | Sci-Fi | Luke Skywalker | 1977 | Mark Hamill | George |
| John Wick | Action | John Wick | 2014 | Keanu Reeves | Chad St |



It looks OK, but I'd like the corners to be more rounded than Bootstrap's default

DevTools - 127.0.0.1:61506/index-01.html

Elements

Console

Sources

Network

Performance

Memory

Application

Security

Lighthouse

CSS Overview

4

<!DOCTYPE html>

<html lang="en" stopthem

> <head>...</head>

> <body>

> <!-- 2 column layout, movie embeds -->

> <!-- div.container>div

> <div class="container"

> > <h1>...</h1>

> > <div class="row">

> > <article class="co

> > <h2>Article Title

> > <!-- p.lead+p*3 -

> > > <p class="lead">...</p>

> > > <p>...</p>

> > > <p>...</p>

> > > <p>

> > > == \$0

> > > </p>

> > > <!-- Table data at http://chnsa.ws/uo -->

> > > <table class="table table-striped table-hover">...</table>

> > > <!-- Finny post-milk drop: https://www.youtube.com/watch?v=nsBH_wqn-Bo -->

> > > <div class="embed-responsive embed-responsive-16by9">...</div>

> > </article>

> > <aside class="col-md-4 col-lg-3">...</aside>

> </div>

> </div>

> <footer>...</footer>

> <script src="https://code.jquery.com/jquery-3.3.1.slim.min.js" integrity="sha384-q8i/

I open the browser's Inspector, select the image, & see the rule that Bootstrap has defined

>, responsive

Styles

Computed

Event Listeners

DOM Breakpoints

>>

Filter

:hov .cls +

element.style {

}

html[stopthemadness-user-select] * {

user-select: text !important;

}

.rounded {

border-radius: .25rem !important;

}

.img-fluid {

max-width: 100%;

height: auto;

}

img {

vertical-align: middle;

border-style: none;

}

*, ::after, ::before {

box-sizing: border-box;

}

Inherited from p

html[stopthemadness-user-select] * {

user-select: text !important;

}

Inherited from article.c...

html[stopthemadness-user-select] * {

user-select: text !important;

}

html

body

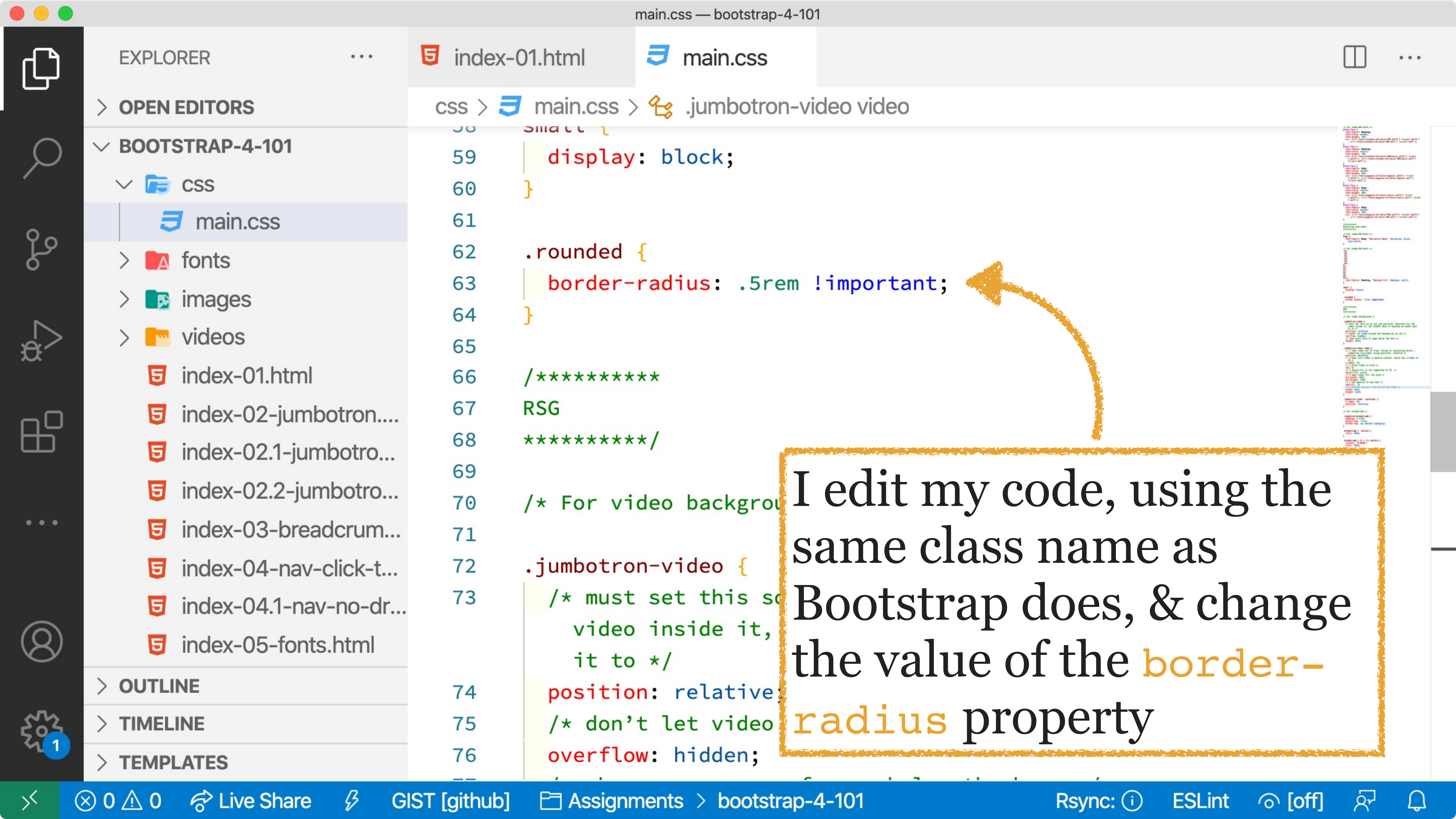
div.container

div.row

article.col-md-8.col-lg-9

p

img.img-fluid.rounded



DevTools - 127.0.0.1:61506/index-01.html

Elements | Console | Sources | Network | Performance | Memory | Application | Security | Lighthouse | CSS Overview

<!DOCTYPE html>
<html lang="en" stopthemadness-user-select="true">
 <head>...</head>
 <body>
 <!-- 2 column layout, .lead, <small> in <h1>, responsive images, <table>, responsive movie embeds -->
 <!-- div.contain...>
 <div class="con...>
 <h1>...</h1>
 <div class="ro...>
 <article cla...>
 <h2>Article</h2>
 <!-- p.lead...>
 <p class="lead">...</p>
 <p>...</p>
 <p>...</p>
 <p>...</p>
 == \$0
 </p>
 <!-- Table data at http://chnsa.ws/uo -->
 <table class="table table-striped table-hover">...</table>
 <!-- Finny post-milk drop: https://www.youtube.com/watch?v=nsBH_wqn-Bo -->
 <div class="embed-responsive embed-responsive-16by9">...</div>
 </article>
 <aside class="col-md-4 col-lg-3">...</aside>
 </div>
 </body>
 <script src="https://code.jquery.com/jquery-3.3.1.slim.min.js" integrity="sha384-q8i/...>
</html>
html body div.container div.row article.col-md-8.col-lg-9 p img.img-fluid.rounded

Thanks to the Cascade,
my changes have more
weight, so they win

Styles | Computed | Event Listeners | DOM Breakpoints

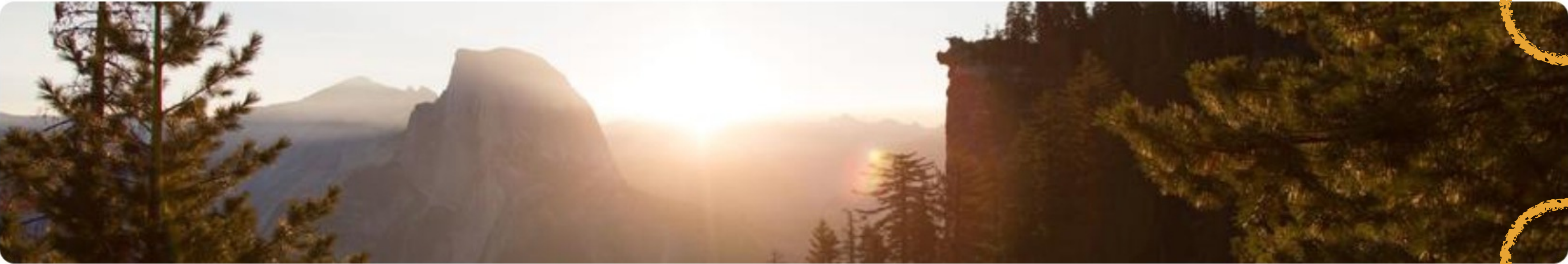
Filter :hov .cls +

element.style {
}
html[stopthemadness-user-select] * {
 user-select: text !important;
}
.rounded {
 border-radius: .5rem !important;
}
.rounded {
 border-radius: .25rem !important;
}
.img-fluid {
 max-width: 100%;
 height: auto;
}
img {
 vertical-align: middle;
 border-style: none;
}
*, ::after, ::before {
 box-sizing: border-box;
}
Inherited from p
html[stopthemadness-user-select] * {
 user-select: text !important;
}
Inherited from article.c...
html[stopthemadness-user-select] * {
 user-select: text !important;
}

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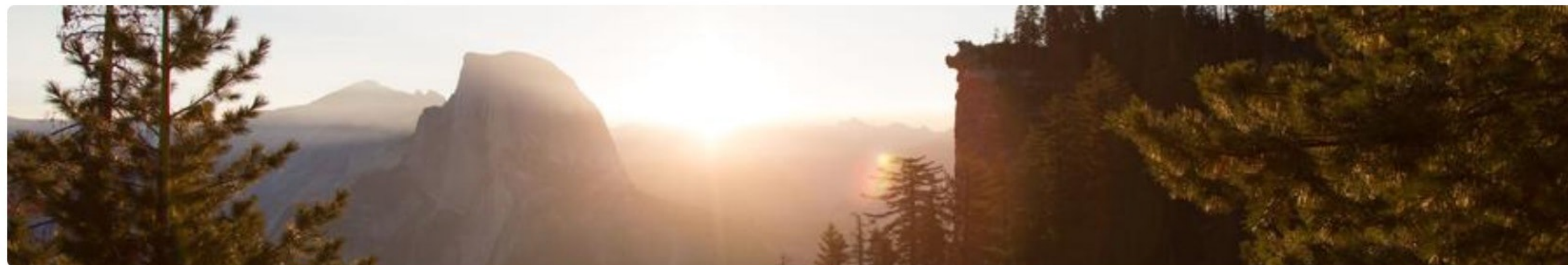
Ad eiusmod qui quis adipisicing ipsum sint. Aute fugiat occaecat ea laborum ea nisi do. Culpa sit Lorem do laborum. Pariatur exercitation dolore eu labore. Incidunt ex ea pariatur ea reprehenderit minim adipisicing cupidatat adipisicing labore. Laboris laborum cillum excepteur laboris ea do in. In irure commodo voluptate tempor nisi mollit eu deserunt laborum dolore velit consectetur amet.



| Movie | Genre | Hero | Year | Star | Director |
|-----------|--------|----------------|------|--------------|----------------|
| Die Hard | Action | John McClane | 1988 | Bruce Willis | John McTiernan |
| Star Wars | Sci-Fi | Luke Skywalker | 1977 | Mark Hamill | George Lucas |
| John Wick | Action | John Wick | 2014 | Keanu Reeves | Chad Stahelski |



Now the corners are
more rounded than
Bootstrap's default!



.25rem



.5rem

Don't be afraid to override Bootstrap — just do it in the correct way

A more complex example

Article Title

Velit labore ut incididunt irure nisi occaecat adipisicing est magna veniam aute nostrud in consequat. Minim ipsum ut occaecat laborum fugiat et eu consequat non laboris laborum dolor laborum. Labore mollit sint enim pariatur pariatur ullamco nulla ut adipisicing ad. Cupidatat incididunt sint cillum culpa labore. Laboris incididunt non incididunt commodo ea nulla consequat amet exercitation irure anim officia amet. Incidunt exercitation do non irure aliquip veniam excepteur dolor. Excepteur amet culpa quis deserunt ut ea cillum pariatur excepteur laborum.

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Aside Title

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This page needs a breadcrumb trail to indicate hierarchy & wayfinding

Breadcrumb

Indicate the current page's location within a navigational hierarchy that automatically adds separators via CSS.

[Home](#) / [Library](#) / Data

Copy

```
<nav aria-label="breadcrumb">
  <ol class="breadcrumb">
    <li class="breadcrumb-item active" aria-current="page">Data</li>
  </ol>
</nav>
```

```
<nav aria-label="breadcrumb">
  <ol class="breadcrumb">
    <li class="breadcrumb-item"><a href="#">Home</a></li>
    <li class="breadcrumb-item active" aria-current="page">Data</li>
  </ol>
</nav>
```

```
<nav aria-label="breadcrumb">
  <ol class="breadcrumb">
    <li class="breadcrumb-item"><a href="#">Home</a></li>
    <li class="breadcrumb-item"><a href="#">Library</a></li>
    <li class="breadcrumb-item active" aria-current="page">Data</li>
  </ol>
</nav>
```

Bootstrap says to use this HTML structure & these CSS classes to create a breadcrumb

Getting started

Layout

Content

Components

Alerts

Badge

Breadcrumb

Buttons

Button group

Card

Carousel

Collapse

Dropdowns

Forms

Input group

Jumbotron

List group

index-01.html

index-03-breadcrumb.html

main.css

index-03-breadcrumb.html > html > body > div.jumbotron.jumbotron-fluid.jumbotron-breadcrumb > div.container >

```
31 <div class="jumbotron jumbotron-fluid jumbotron-breadcrumb">
32   <div class="container">
33     <nav aria-label="breadcrumb">
34       <ol class="breadcrumb">
35         <li class="breadcrumb-item"><a href="/index.html">Home</a></li>
36         <li class="breadcrumb-item"><a href="/products/">Products</a></li>
37         <li class="breadcrumb-item"><a href="/products/colostomo/">Colostomo</a></li>
38         <li class="breadcrumb-item active" aria-current="page">Colostomo 1000</li>
39       </ol>
40     </nav>
41   </div>
42 </div>
```

I add it to my code

```
44 <div class="container">
45   <div class="row">
46     <article class="col-md-8 col-lg-9">
47       <h2>Article Title</h2>
48       <p class="lead">
49         Velit labore ut incididunt irure nisi occaecat adipisicing est magna veniam aute
          nostrud in consequat. Minim ipsum ut occaecat laborum fugiat et eu consequat non
          laboris laborum dolor laborum labore mollit sint enim pariatur pariatur ullamco
```



0 0

Live Share



GIST [github]

Assignments > bootstrap-4-101

Rsync: ⓘ

ESLint

[off]



Article Title

Velit labore ut incididunt irure nisi occaecat adipisicing est magna veniam aute nostrud in consequat. Minim ipsum ut occaecat laborum fugiat et eu consequat non laboris laborum dolor laborum. Labore mollit sint enim pariatur pariatur ullamco nulla ut adipisicing ad. Cupidatat incididunt sint cillum culpa labore Laboris incididunt non incididunt commodo ea nulla consequat amet irure anim officia amet. Incidunt exercitation do non irure aliquip vel excepteur dolor. Excepteur amet culpa quis deserunt ut ea cillum pariatur excepteur laborum.

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Aside Title

Proident magna velit id exercitation reprehenderit ea. Esse in deserunt id exercitation aliquip. Cupidatat excepteur esse ullamco ullamco et

I really don't like the / that Bootstrap uses as a default separator, since it's confusing & ugly

DevTools - 127.0.0.1:61506/index-03-breadcrumb.html

Elements Console Sources Network Performance Memory Application Security Lighthouse CSS Overview

Styles Computed Event Listeners DOM Breakpoints

Filter :hov .cls +

.breadcrumb-item+.breadcrumb-item::before {
display: inline-block;
padding-right: .5rem;
color: #6c757d;
content: "/";
}

*, ::after, ::before {
box-sizing: border-box;
}

margin -
border -
padding 5.969 x 24 8 -

I open the browser's Inspector, select the breadcrumb, & see the declaration Bootstrap uses

```
<!DOCTYPE html>
<html lang="en" stopthemadness-user-select="true">
<head>...</head>
<body>
  <!-- NEW: Breadcrumb -->
  <div class="jumbotron jumbotron-fluid jumbotron-video">...</div>
  <div class="jumbotron jumbotron-fluid jumbotron-breadcrumb">
    <div class="container">
      <nav aria-label="breadcrumb">
        <ol class="breadcrumb">
          <li class="breadcrumb-item">...</li>
          <li class="breadcrumb-item">...</li>
          <li class="breadcrumb-item">
            ...
            ::before == $0
            <a href="/products/colostomo/">Colostomo</a>
          </li>
          <li class="breadcrumb-item active" aria-current="page">...</li>
        </ol>
      </nav>
    </div>
  </div>
  <div class="container">...</div>
  <footer>...</footer>
  <script src="https://code.jquery.com/jquery-3.5.1.min.js" integrity="sha384-ZMP7rVo3mIykV+2+9J3UJ46jBk0WLaUAdn689aCwoqbBJiSnjAK/l8WvCWPiPm49" crossorigin="anonymous"></script>
  <script src="https://cdn.jsdelivr.net/npm/popper.js@1.16.0/dist/umd/popper.min.js" integrity="sha384-Joa7hp54d654bZ40wX47tK2+AFLV6BKhtJ1Qq8RuP60wqDcyPgkFJ1q7ZX-P" crossorigin="anonymous"></script>
  <script src="https://cdn.jsdelivr.net/npm/bootstrap@4.5.0/dist/js/bootstrap.min.js" integrity="sha384-OgRVmunjQQjOzB9WoDj/Vj1WruSfZ1WQx6H3WmQ2XkVGAJQcmh97tK2MrJPf6vQ" crossorigin="anonymous"></script>
</body>
</html>
```


I want to change the / to an arrowhead, & I want to use Unicode

To find a Unicode arrowhead, I head to
www.fileformat.info/info/unicode/char/search.htm

Unicode Character Search

Unicode Character Search

Query:

☐ include Han codepoints?

Preview:

☐ No

☒ HTML Entities

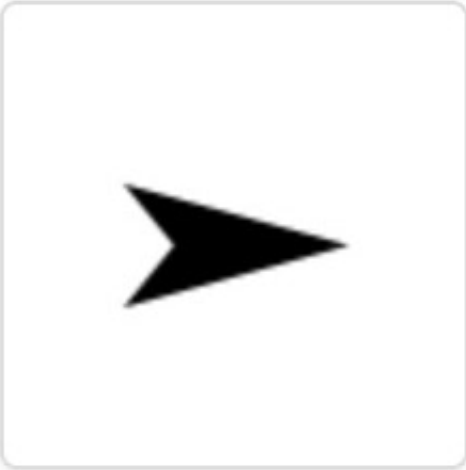
Search

Cancel

[A-Z index](#) | [Search options](#)

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Unicode Character 'BLACK RIGHTWARDS ARROWHEAD' (U+27A4)



[Browser Test Page](#)
[Outline \(as SVG file\)](#)
[Fonts that support U+27A4](#)

| Unicode Data | |
|--------------|------------------------------------|
| Name | BLACK RIGHTWARDS ARROWHEAD |
| Block | Dingbats |
| Category | Symbol, Other [So] |
| Combine | 0 |
| BIDI | Other Neutrals [ON] |
| Mirror | N |
| Old name | BLACK RIGHT ARROWHEAD |

Browser Test Page for Unicode Character 'BLACK RIGHTWARDS ARROWHEAD' (U+27A4)



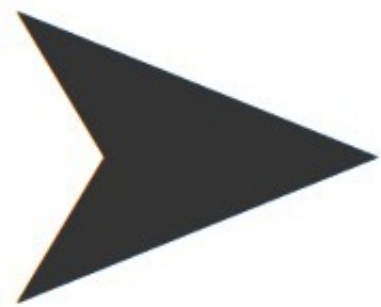
You need a font that supports this character to even have a hope of seeing it correctly in the browser.

See the [local font list](#) tool and [font support page](#) to see if you have a font that supports it!



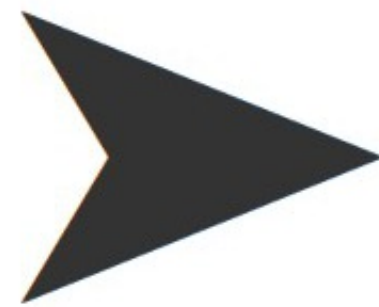
Image

Server-generated



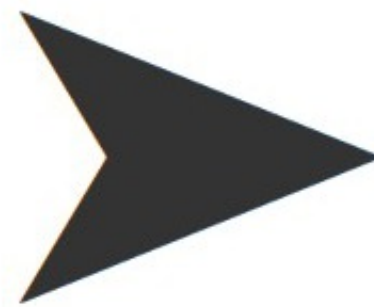
Decimal Escape

➤



Hex Escape

➤



UTF-8

As UTF-8 in an input field

Input test



Browser Test Page for Unicode Character 'BLACK RIGHTWARDS ARROWHEAD' (U+27A4)



You need a font that supports this character to even have a hope of seeing it correctly in the browser.

See the [local font list](#) tool and [font support page](#) to see if you have a font that supports it!



Image

Server-generated



Decimal Escape

➤



Hex Escape

➤



UTF-8

Select & copy

As UTF-8 in an input field

Input test

css > main.css > ...

```
108 padding: 0 2rem;
109 margin-top: -2rem;
110 border-top: 1px dotted lightgrey;
111 }
112
113 .breadcrumb-item + .breadcrumb-item::before {
114   content: ">";
115 }
116
117 /* Footer */
118
119 footer {
120   text-align: center;
121   border-top: 1px dotted darkgrey;
122   margin-top: 1em;
123   padding: 1em 0;
124   background-color: #e9ecef;
125   /* color: #007bff; */
126 }
127
```

I edit my CSS, using the same selector Bootstrap does, & change only the value of the `content` property with the Unicode ➤

Article Title

Velit labore ut incididunt irure nisi occaecat adipisicing est magna nostrud in consequat. Minim ipsum ut occaecat laborum fugiat non laboris laborum dolor laborum. Labore mollit sint enim pariatur ullamco nulla ut adipisicing ad. Cupidatat incididunt sint cillum laboris incididunt non incididunt commodo ea nulla consequat irure anim officia amet. Incidunt exercitation do non irure aliquam excepteur dolor. Excepteur amet culpa quis deserunt ut ea cillum excepteur laborum.

Mollit irure occaecat voluptate do non quis. Elit pariatur dolor ullamco qui non magna ullamco laborum. Excepteur incididunt mollit voluptate ipsum labore labore nulla pariatur Lorem. Exercitation reprehenderit esse exercitation ex ea Lorem reprehenderit eu culpa cupidatat. Aliquip consequat magna dolore aute. Qui incididunt non fugiat non mollit nulla occaecat eu labore. Exercitation aliquip elit nulla aliquip laboris veniam quis.

Ad eiusmod qui quis adipisicing ipsum sint. Aute fugiat occaecat ea laborum ea nisi do. Culpa sit Lorem do laborum. Pariatur exercitation dolore eu labore. Incidunt ex ea pariatur ea reprehenderit minim adipisicing cupidatat adipisicing labore. Laboris laborum cillum excepteur laboris ea do in. In irure commodo voluptate tempor nisi mollit eu deserunt laborum dolore velit consectetur amet.

Aside Title

Proident magna mollit id

Much better — but the gray for the active `` at the end is too light, so let's darken it

labore dolore laboris est pariatur. Lorem aute velit exercitation reprehenderit exercitation ipsum consectetur ad occaecat.


```
<!DOCTYPE html>
<html lang="en" stopthemadness-user-select="true">
  <head>...</head>
  <body>
    <!-- NEW: Breadcrumb -->
    <div class="jumbotron jumbotron-fluid jumbotron-video">...</div>
    <div class="jumbotron jumbotron-fluid jumbotron-breadcrumb">
      <div class="container">
        <nav aria-label="breadcrumb">
          <ol class="breadcrumb">
            <li class="breadcrumb-item">...</li>
            <li class="breadcrumb-item">...</li>
            <li class="breadcrumb-item">
              ::before
              <a href="/products/colostomo/">Colostomo</a>
            </li>
            <li class="breadcrumb-item active" aria-current="page"> =
              ::before
              "Colostomo 1000"
            </li>
          </ol>
        </nav>
      </div>
    </div>
    <div class="container">...</div>
    <footer>...</footer>
    <script src="https://code.jquery.com/jquery-3.3.1.slim.min.js
X+965Dz00rT7abK41JStQIAqVgRVzpbzo5smXKp4YfRvH+8abtTE1Pi6jizo" c
  </script>
```

The image shows the Chrome DevTools Styles panel. At the top, there are tabs for 'Styles', 'Computed', 'Event Listeners', and 'DOM Breakpoints'. The 'Styles' tab is active. Below the tabs is a 'Filter' input field. The main area displays a list of CSS rules. The first rule is 'element.style { }'. The second rule is '.breadcrumb-item.active { color: #6c757d; }' with a source of 'breadcrumb.scss:39'. The third rule is '.breadcrumb-item+.breadcrumb-item { padding-left: .5rem; }' with a source of 'breadcrumb.scss:14'. The fourth rule is 'html[stopthemadness-user-select] * { user-select: text !important; }' with a source of 'injected stylesheet'. The fifth rule is '*, ::after, ::before { box-sizing: border-box; }' with a source of 'reboot.scss:24'. The sixth rule is 'li { }' with a source of 'user agent stylesheet'. A yellow box is drawn around the text 'Inspector, & see the up uses' which is overlaid on the styles panel.

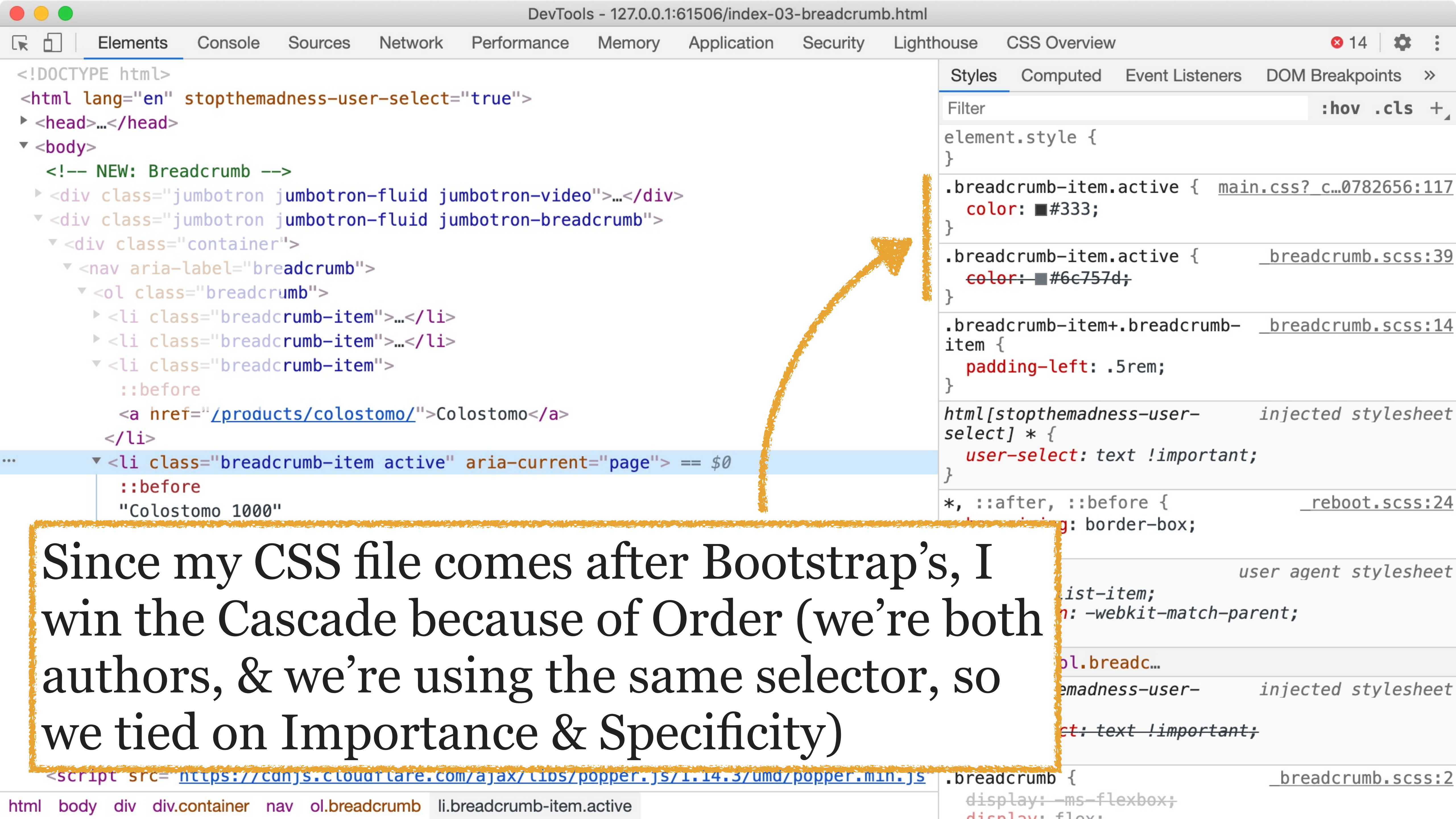
Inspector, & see the up uses

I open the browser's Inspector, select the final ``, & see the declaration Bootstrap uses

css > main.css > ...

```
108 padding: 0 2rem;
109 margin-top: -2rem;
110 border-top: 1px dotted lightgrey;
111 }
112
113 .breadcrumb-item + .breadcrumb-item::before {
114   content: ">";
115 }
116
117 .breadcrumb-item.active {
118   color: #333;
119 }
120
121 /* Footer */
122
123 footer {
124   text-align: center;
125   border-top: 1px dotted darkgrey;
126   margin-top: 1em;
127   padding: 1em 0;
128   background-color: #e9ecef;
```

I edit my CSS, using the same selector Bootstrap does, & change only the value of the **color** property from **#6c757d** to **#333**



<!DOCTYPE html>

<html lang="en" stopthemadness-user-select="true">

▶ <head>...</head>

▼ <body>

<!-- NEW: Breadcrumb -->

▶ <div class="jumbotron jumbotron-fluid jumbotron-video">...</div>

▼ <div class="jumbotron jumbotron-fluid jumbotron-breadcrumb">

▼ <div class="container">

▼ <nav aria-label="breadcrumb">

▼ <ol class="breadcrumb">

▶ <li class="breadcrumb-item">...

▶ <li class="breadcrumb-item">...

▼ <li class="breadcrumb-item">

::before

Colostomo

▼ <li class="breadcrumb-item active" aria-current="page"> == \$0

::before

"Colostomo 1000"

Styles

Computed

Event Listeners

DOM Breakpoints

»

Filter

:hov .cls +

element.style {
}.breadcrumb-item.active { main.css? c...0782656:117
color: #333;
}.breadcrumb-item.active { _breadcrumb.scss:39
color: #6c757d;
}.breadcrumb-item+.breadcrumb- _breadcrumb.scss:14
item {
padding-left: .5rem;
}html[stopthemadness-user- injected stylesheet
select] * {
user-select: text !important;
}*, ::after, ::before { _reboot.scss:24
border: 1px solid #deeaf3;
border-box;user agent stylesheet
list-item;
-webkit-match-parent;ol.breadcrumb...
stopthemadness-user- injected stylesheet

text !important;

.breadcrumb { _breadcrumb.scss:2

display: -ms-flexbox;
display: flex;

Since my CSS file comes after Bootstrap's, I win the Cascade because of Order (we're both authors, & we're using the same selector, so we tied on Importance & Specificity)

<script src="https://cdnjs.cloudflare.com/ajax/libs/popper.js/1.14.3/umd/popper.min.js">

Article Title

Velit labore ut incididunt irure nisi occaecat adipisicing est magna nostrud in consequat. Minim ipsum ut occaecat laborum fugiat non laboris laborum dolor laborum. Labore mollit sint enim pariatur ullamco nulla ut adipisicing ad. Cupidatat incididunt sint cillum laboris incididunt non incididunt commodo ea nulla consequat amet exercitation irure anim officia amet. Incidunt exercitation do non irure aliquip veniam excepteur dolor. Excepteur amet culpa quis deserunt ut ea cillum pariatur aliquip excepteur laborum.

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Ad eiusmod qui quis adipisicing ipsum sint. Aute fugiat occaecat ea laborum ea nisi do. Culpa sit Lorem do laborum. Pariatur exercitation dolore eu labore. Incidunt ex ea pariatur ea reprehenderit minim adipisicing cupidatat adipisicing labore. Laboris laborum cillum excepteur laboris ea do in. In irure commodo voluptate tempor nisi mollit eu deserunt laborum dolore velit consectetur amet.

Aside Title

Much better — the darker gray for the active `` stands out more

aliquip amet deserunt duis tempor laborum. Sit laborum sunt ea non. Magna officia labore dolore laboris est pariatur. Lorem aute velit exercitation reprehenderit exercitation ipsum consectetur ad occaecat.

Search...

Getting started

Layout

Content

Components

Alerts

Badge

Breadcrumb

Buttons

Button group

Card

Carousel

Collapse

Dropdowns

Forms

Input group

Jumbotron

List group

Changing the separator

Separators are automatically added in CSS through `::before` and `content`. They can be changed by changing `$breadcrumb-divider`. The `quote` function is needed to generate the quotes around a string, so if you want `>` as separator, you can use this:

```
$breadcrumb-divider: quote(">");
```

Copy

It's also possible to use a **base64 embedded SVG icon**:

```
$breadcrumb-divider: url(data:image/svg+xml;base64,PHN2ZyB4bWxucz0iaHR0cDovL3d3c
```

Copy

The separator can be removed by setting `$breadcrumb-divider` to `none`:

```
$breadcrumb-divider: none;
```

Copy

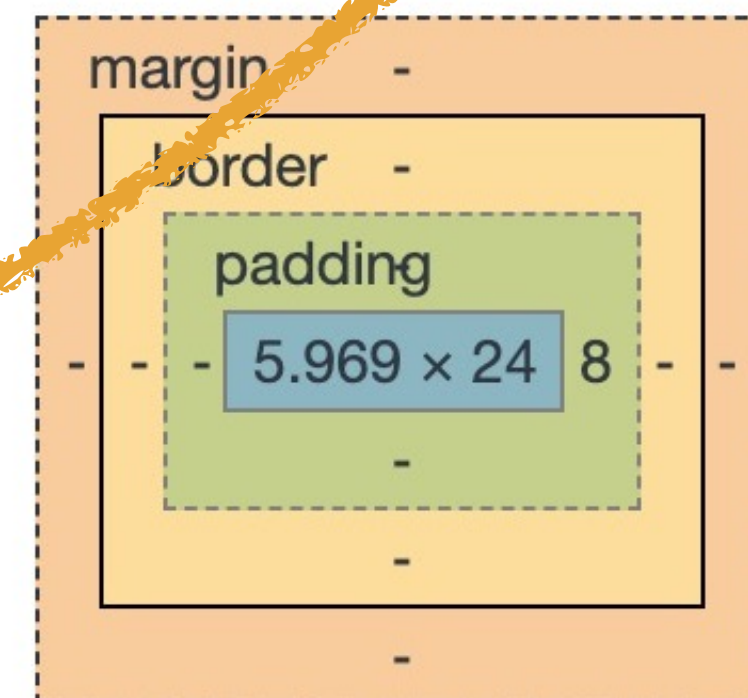
However, if you download the Sass for Bootstrap, you can edit the `$breadcrumb-divider` variable & change the `/` to a `➤` — much easier!


```
<!DOCTYPE html>
<html lang="en" stopthemadness-user-select="true">
<head>...</head>
<body>
  <!-- NEW: Breadcrumb -->
  <div class="jumbotron jumbotron-fluid jumbotron-video">...</div>
  <div class="jumbotron jumbotron-fluid jumbotron-breadcrumb">
    <div class="container">
      <nav aria-label="breadcrumb">
        <ol class="breadcrumb">
          <li class="breadcrumb-item">...</li>
          <li class="breadcrumb-item">...</li>
          <li class="breadcrumb-item">
            ...
            ::before == $0
            <a href="/products/colostomo/">Colostomo</a>
          </li>
          <li class="breadcrumb-item active">...</li>
        </ol>
      </nav>
    </div>
  </div>
  <div class="container">...</div>
  <footer>...</footer>
  <script src="https://code.jquery.com/jquery-3.3.1.slim.min.js" integrity="sha384-q8i/
X+965Dz00rT7abK41JStQIAqVgRVzpbzo5smXKp4YfRvH+8abtTE1Pi6jizo" crossorigin="anonymous">
  </script>
  <script src="https://cdnjs.cloudflare.com/ajax/libs/popper.js/1.14.3/umd/popper.min.js"
  integrity="sha384-ZMP7rVo3mIykV+2+9J3UJ46jBk0WLaUAdn689aCwoqBJiSnjAK/l8WvCWPIpM49"
  crossorigin="anonymous"></script>
```

```
.breadcrumb-item+.breadcrumb-
item::before {
  display: inline-block;
  padding-right: .5rem;
  color: #6c757d;
  content: "/";
}
```

```
*, ::after, ::before {
  box-sizing: border-box;
}
```

Click on the link to
the Sass file to load it



DevTools - 127.0.0.1:61506/index-03-breadcrumb.html

Elements | Console | Sources | Network | Performance | Memory | Application | Security | Lighthouse | CSS Overview

Page | Filesystem | >> | << | _breadcrumb.scss x

top

ajax/libs/popper.js/src

bootstrap

index-03-breadcrumb.html

bootstrap.min.js

jquery-3.3.1.slim.min.js

popper.min.js

bootstrap.min.css?_cacheO

index-03-breadcrumb.html

main.css?_cacheOverride=1

900x150

poppins-v5-latin-700.woff2

poppins-v5-latin-italic.woff2

poppins-v5-latin-regular.wof

nsBH_wqn-Bo

1

.breadcrumb {

2

display: flex;

3

flex-wrap: wrap;

4

padding: \$breadcrumb-padding-y \$breadcrumb-padding-x;

5

margin-bottom: \$breadcrumb-margin-bottom;

6

list-style: none;

7

background-color: \$breadcrumb-bg;

8

@include border-radius(\$breadcrumb-border-radius);

9

}

10

11

.breadcrumb-item {

12

// The separator between breadcrumbs (by default, a forward-slash: "/")

13

+ .breadcrumb-item {

14

padding-left: \$breadcrumb-item-padding;

15

16

&::before {

17

display: inline-block; // Suppress underlining of the separator in modern brow

18

padding-right: \$breadcrumb-item-padding;

19

color: \$breadcrumb-divider-color;

20

content: \$breadcrumb-divider;

21

}

22

}

23

24

// IE9-11 hack to properly handle hyperlink underlines for breadc

25

// without 's. The &::before pseudo-element generates an el

26

// *within* the .breadcrumb-item and thereby inherits the text-d

27

//

28

// To trick IE into suppressing the underline, we give the pseudo

29

// underline and then immediately remove it.

30

+ .breadcrumb-item:hover::before {

31

text-decoration: underline;

32

}

33

// stylelint-disable-next-line no-duplicate-selectors

34

+ .breadcrumb-item:hover::before {

35

text-decoration: none;

36

}

37

38

&.active {

39

color: \$breadcrumb-active-color;

40

}

41

}

42

Threads

Main

nsBH_wqn-Bo

Watch

Call Stack

Not paused

Scope

Not paused

Breakpoints

No breakpoints

XHR/fetch Breakpoints

{}

Line 39, Column 5

Coverage: n/a

Note the variables we could've used — now we need _variables.scss

Users > rsgranne > Downloads > bootstrap-4.5.0 > scss > _variables.scss > ...

```
1055
1056
1057 // Breadcrumbs
1058
1059 $breadcrumb-font-size: null !default;
1060
1061 $breadcrumb-padding-y: .75rem !default;
1062 $breadcrumb-padding-x: 1rem !default;
1063 $breadcrumb-item-padding: .5rem !default;
1064
1065 $breadcrumb-margin-bottom: 1rem !default;
1066
1067 $breadcrumb-bg: $gray-200 !default;
1068 $breadcrumb-divider-color: $gray-600 !default;
1069 $breadcrumb-active-color: $gray-600 !default;
1070 $breadcrumb-divider: quote("/") !default;
1071
1072 $breadcrumb-border-radius: $border-radius !default;
1073
1074
1075 // Carousel
```

And here you go

Grid System

When you lay things out using Bootstrap, you do *not* use **px** or **em** or **%**

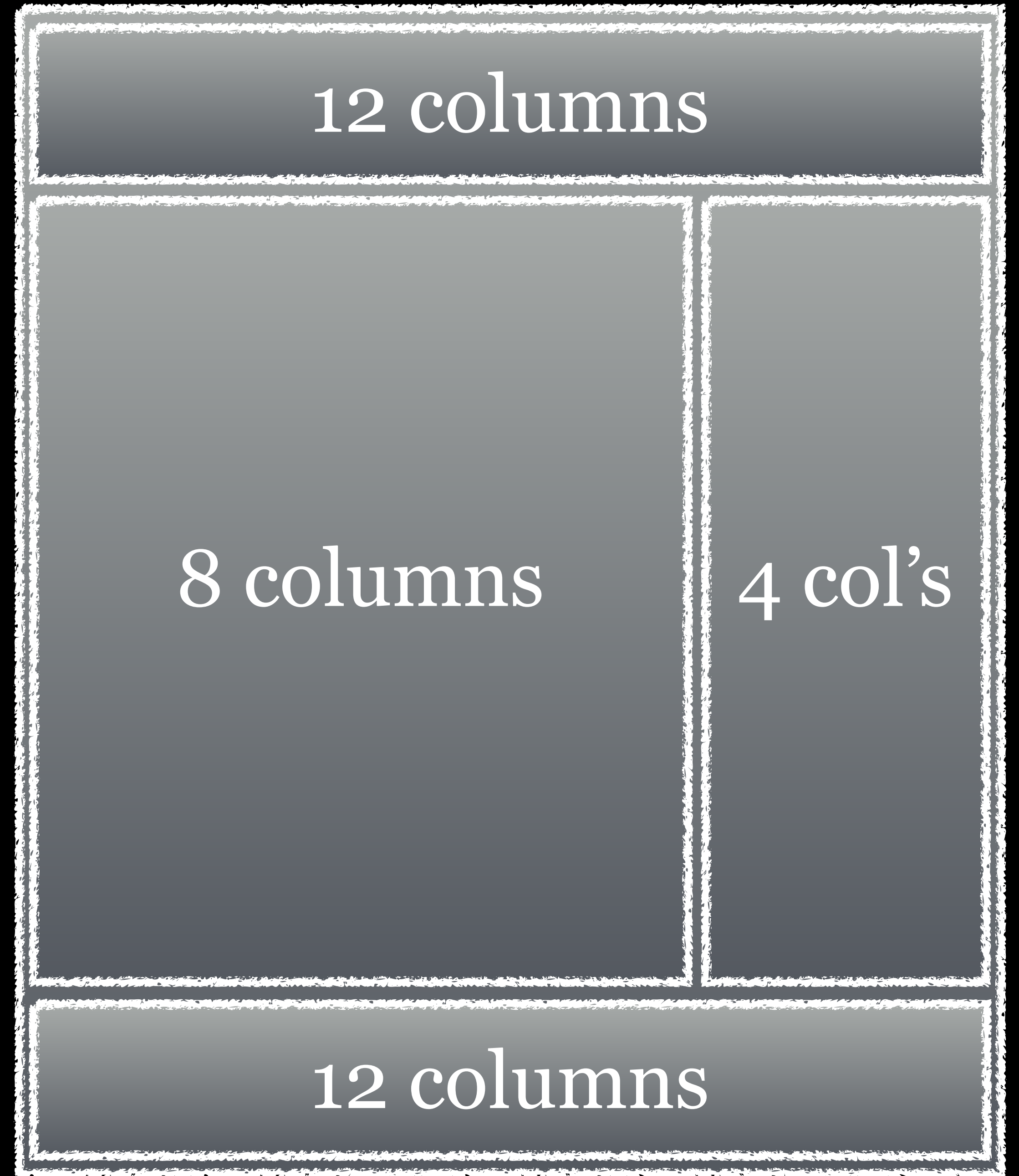
Instead, you use *columns* (that must add up to 12 in Bootstrap 3 & may or may not in Bootstrap 4 & 5)

100%

75%

25%

100%



| Bootstrap 3 | | |
|------------------------|----|----------|
| Desktops | lg | ≥1200 px |
| Tablets (landscape) | md | ≥922 px |
| Tablets (portrait) | sm | ≥768 px |
| Phones | xs | <768 px |

| Bootstrap 3 | | | Bootstrap 4 | | |
|------------------------|----|----------|-------------|----|-----------------------|
| Desktops | lg | ≥1200 px | ≥1200 px | xl | Large desktops |
| Tablets (landscape) | md | ≥922 px | ≥922 px | lg | Desktops |
| Tablets (portrait) | sm | ≥768 px | ≥768 px | md | Tablets |
| Phones | xs | <768 px | ≥576 px | sm | Phones (landscape) |
| | | | <576 px | * | Phones (portrait) |

| Bootstrap 4 | | | Bootstrap 5 | | |
|--------------------|----|----------------------|----------------------|-----|-----------------------|
| | | | $\geq 1400\text{px}$ | xxl | Really large desktops |
| Large desktops | xl | $\geq 1200\text{px}$ | $\geq 1200\text{px}$ | xl | Large desktops |
| Desktops | lg | $\geq 992\text{px}$ | $\geq 992\text{px}$ | lg | Desktops |
| Tablets | md | $\geq 768\text{px}$ | $\geq 768\text{px}$ | md | Tablets |
| Phones (landscape) | sm | $\geq 576\text{px}$ | $\geq 576\text{px}$ | sm | Phones (landscape) |
| Phones (portrait) | * | $< 576\text{px}$ | $< 576\text{px}$ | xs | Phones (portrait) |

Large Bootstrap Grid

≥1200px viewport, fixed widths, 1170px container, 30px gutters

1 col

1 col

1 col

1 col

1 col

1 col

1 col

1 col

1 col

1 col

1 col

1 col

2 col

2 col

2 col

2 col

2 col

2 col

3 col

3 col

3 col

3 col

4 col

4 col

4 col

5 col

7 col

6 col

6 col

7 col

5 col

8 col

4 col

9 col

3 col

10 col

2 col

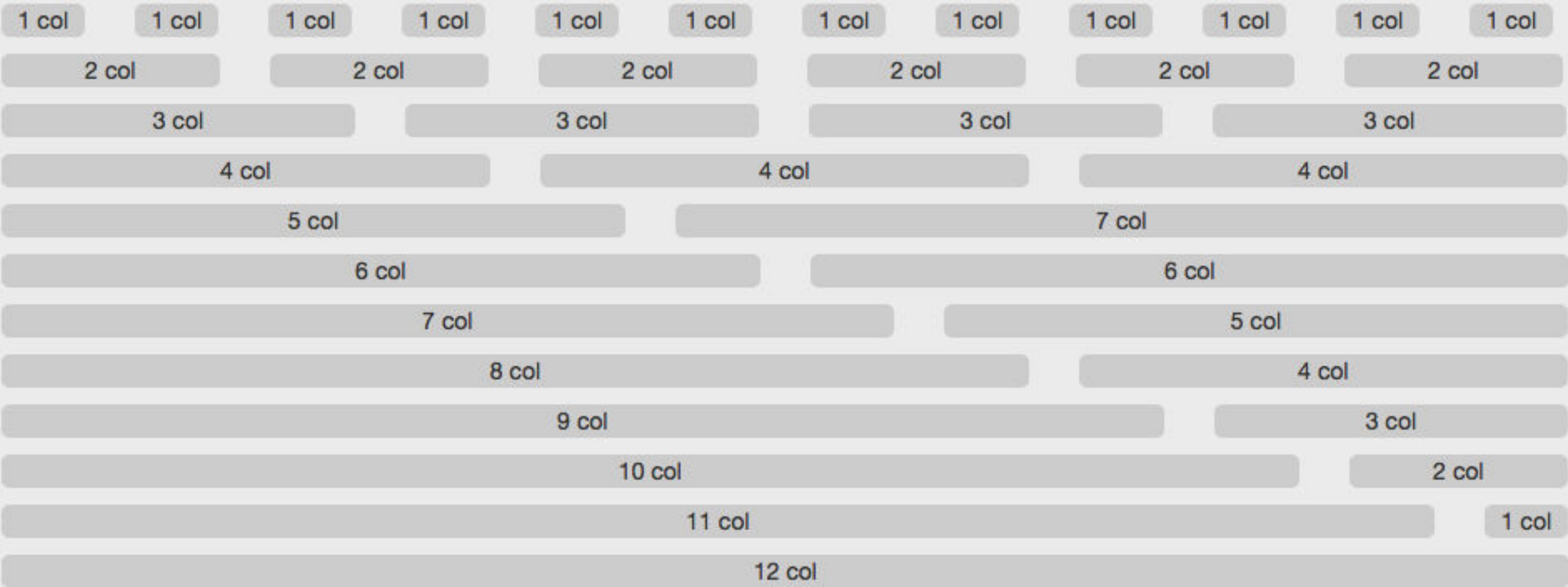
11 col

1 col

12 col

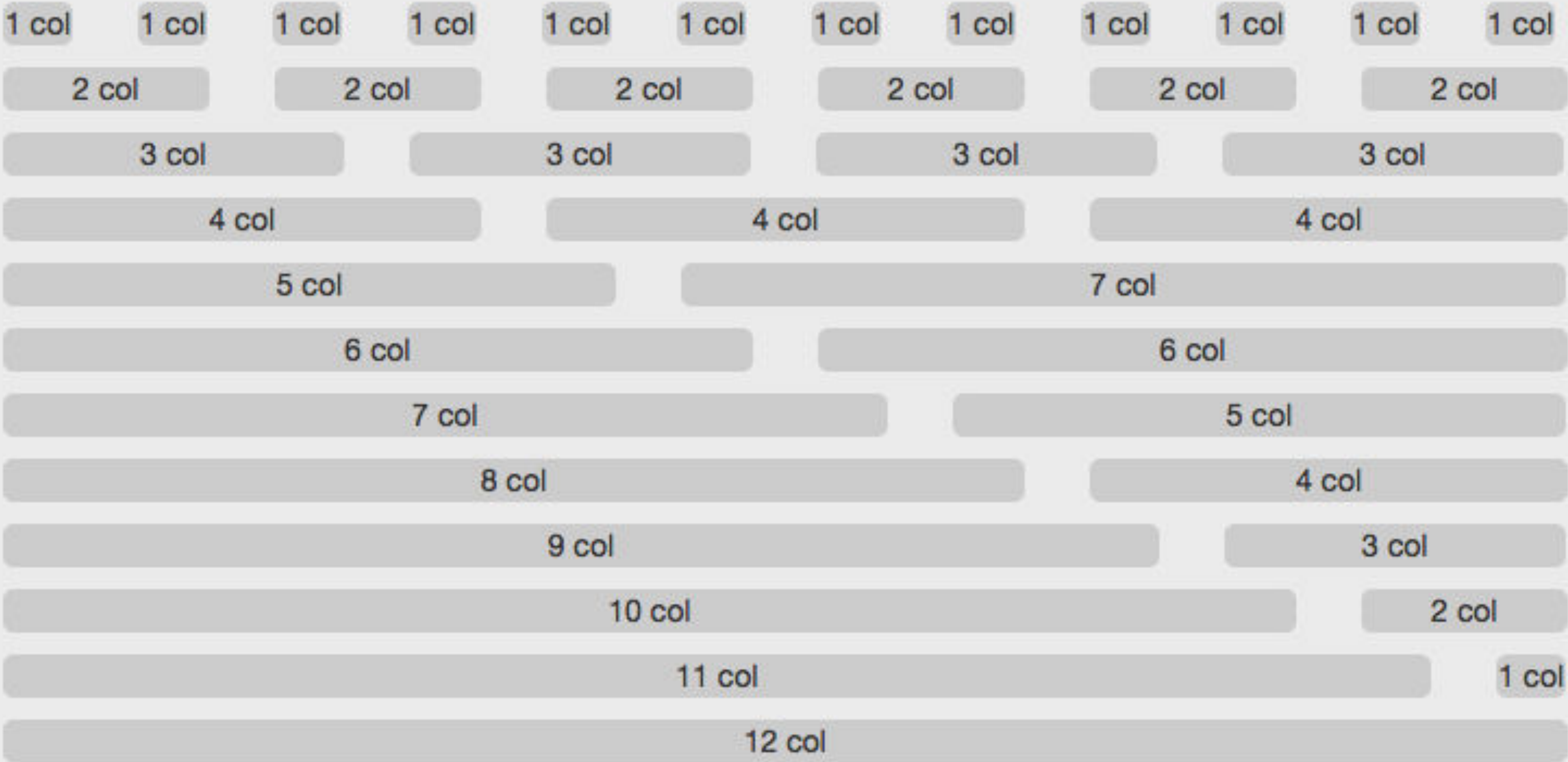
Medium Bootstrap Grid

992px to 1199px viewport, fixed widths, 970px container, 30px gutters



Small Bootstrap Grid

768px to 991px viewport, fixed widths, 750px container, 30px gutters



Extra Small Bootstrap Grid

<768px viewport, fluid widths, 30px gutters

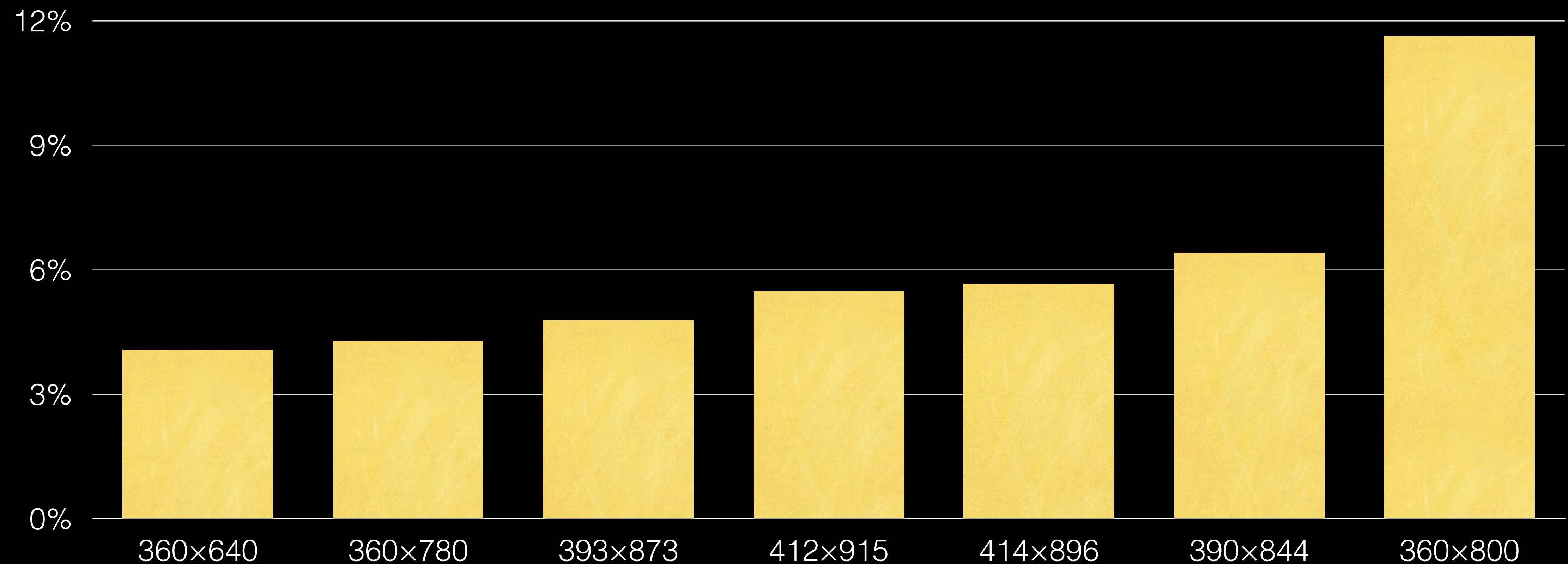
| | | | | | | | | | |
|-------|--|--|-------|-------|-------|-------|-------|-------|-------|
| 3 col | | | 9 col | | | | | | |
| 4 col | | | | 8 col | | | | | |
| 5 col | | | | | 7 col | | | | |
| 6 col | | | | | | 6 col | | | |
| 7 col | | | | | | | 5 col | | |
| 8 col | | | | | | | | 4 col | |
| 9 col | | | | | | | | | 3 col |
| 3 col | | | 3 col | | | 6 col | | | |
| 3 col | | | 4 col | | | 5 col | | | |
| 3 col | | | 5 col | | | | 4 col | | |
| 3 col | | | 6 col | | | | | 3 col | |
| 4 col | | | | 5 col | | | | 3 col | |
| 5 col | | | | | 4 col | | | 3 col | |
| 6 col | | | | | | 3 col | | 3 col | |
| 3 col | | | 3 col | | | 3 col | | 3 col | |

Extra Small Bootstrap Grid

<768px viewport, fluid widths, 30px gutters

| | | | |
|-------|-------|-------|-------|
| 3 col | 9 col | | |
| 4 col | 8 col | | |
| 5 col | 7 col | | |
| 6 col | 6 col | | |
| 7 col | 5 col | | |
| 8 col | 4 col | | |
| 9 col | 3 col | | |
| 3 col | 3 col | 6 col | |
| 3 col | 4 col | 5 col | |
| 3 col | 5 col | 4 col | |
| 3 col | 6 col | 3 col | |
| 4 col | 5 col | 3 col | |
| 5 col | 4 col | 3 col | |
| 6 col | 3 col | 3 col | |
| 3 col | 3 col | 3 col | 3 col |

-XS



Most common mobile screen resolution sizes
worldwide, February 2023

| Mobile | | | Tablets | | | Desktops | | |
|---------|--------|----|----------|--------|----|-----------|--------|-----|
| 360×800 | 11.62% | xs | 768×1024 | 27.95% | md | 1920×1080 | 23.22% | xxl |
| 390×844 | 6.41% | xs | 810×1080 | 8.26% | md | 1366×768 | 16.28% | xl |
| 414×896 | 5.65% | xs | 800×1280 | 7.62% | md | 1536×864 | 10.76% | xxl |
| 412×915 | 5.47% | xs | 1280×800 | 6.77% | xl | 1280×720 | 6.07% | xl |
| 393×873 | 4.77% | xs | 601×962 | 4.66% | sm | 1440×900 | 5.93% | xl |
| 360×780 | 4.26% | xs | 820×1180 | 3.42% | md | 1600×900 | 3.22% | xxl |

Most common mobile screen resolution sizes worldwide,
February 2023

Columns go inside rows, & rows go inside containers

```
<main class="container">
```

```
<div class="row">
```

```
<article class="col-sm-8">
```

...

```
</article>
```

Column

```
<aside class="col-sm-4">
```

...

```
</aside>
```

Column

```
</div>
```

Row

```
</main>
```

Container

Content (e.g., text & images) goes inside elements with CSS classes (e.g., `col-md-8`) that turn those elements into columns & define...

- » the size of the *breakpoint* at which changes to column widths happen (e.g., `-md`)
- » how many column *widths* they span, between 1–12 (e.g., `-8`)

Columns go inside elements with a CSS class of `row`

Rows go inside elements with a CSS class of `container`

```
<main class="container">
  <div class="row">
    <article class="col-sm-8">
      ...
    </article>
    <aside class="col-sm-4">
      ...
    </aside>
  </div>
</main>
```



```
<main class="container">
  <div class="row">
    <article class="col-sm-8">
      ...
      </article>      Column
    <aside class="col-sm-4">
      ...
      </aside>      Column
  </div>
</main>
```

```
<main class="container">
```

```
<div class="row">
```

```
<article class="col-sm-8">
```

...

```
</article>
```

Column

```
<aside class="col-sm-4">
```

...

```
</aside>
```

Column

```
</div>
```

Row

```
</main>
```



```
<main class="container">
```

```
<div class="row">
```

```
<article class="col-sm-8">
```

...

```
</article>
```

Column

```
<aside class="col-sm-4">
```

...

```
</aside>
```

Column

```
</div>
```

Row

```
</main>
```

Container

```
<body>
  <main>
    <div>
      <article class="col-sm-8"> ... </article>
      <aside class="col-sm-4"> ... </aside>
    </div>
  </main>
</body>
```

This does *not* work—no container & no row


```
<body>
  <main class="container">
    <div>
      <article class="col-sm-8"> ... </article>
      <aside class="col-sm-4"> ... </aside>
    </div>
  </main>
</body>
```

This does *not* work—no row

```
<body>
  <main>
    <div class="row">
      <article class="col-sm-8"> ... </article>
      <aside class="col-sm-4"> ... </aside>
    </div>
  </main>
</body>
```

This does *not* work—no container


```
<body>
  <main class="container">
    <div class="row">
      <article> ... </article>
      <aside> ... </aside>
    </div>
  </main>
</body>
```

This does *not* work—no columns

```
<body>
  <main class="container">
    <div class="row">
      <article class="col-sm-8"> ... </article>
      <aside> ... </aside>
    </div>
  </main>
</body>
```

This does *not* work—columns don't add up to 12


```
<body>
  <main class="container">
    <div class="row">
      <article class="col-sm-8"> ... </article>
      <aside class="col-sm-4"> ... </aside>
    </div>
  </main>
</body>
```

This works!

Containers

The grid system requires an element with a class of `container` on it to create a responsive container for rows

```
<div class="container">  
  ...  
</div>
```

Containers are *not* nestable


```
1 <main>
2 <!-- <main
   class="container"> -->
3 <h1>Hello, world!</h1>
4 <article>
5 <h2>Article Title</h2>
6 <p></p>
11 <p></p>
15 <p></p>
19 </article>
20 <aside>
21 <h2>Aside Title</h2>
22 <p></p>
26 </aside>
27 </main>
```

Hello, world!

Article Title

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Donec a diam lectus. Sed sit amet ipsum mauris. Maecenas congue ligula ac quam viverra nec consectetur ante hendrerit. Donec et mollis dolor. Praesent et diam eget libero egestas mattis sit amet vitae augue. Nam tincidunt congue enim, ut porta lorem lacinia consectetur. Donec ut libero sed arcu vehicula ultricies a non tortor. Lorem ipsum dolor sit amet, consectetur adipiscing elit. Aenean ut gravida lorem. Ut turpis felis, pulvinar a semper sed, adipiscing id dolor.

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Vivamus fermentum semper porta. Nunc diam velit, adipiscing ut tristique vitae, sagittis vel odio. Maecenas convallis ullamcorper ultricies. Curabitur ornare, ligula semper consectetur sagittis, nisi diam iaculis velit, id fringilla


```
1 <!-- <main> -->
2 <main class="container">
3   <h1>Hello, world!</h1>
4   <article>
5     <h2>Article Title</h2>
6     <p></p>
11    <p></p>
15    <p></p>
19  </article>
20  <aside>
21    <h2>Aside Title</h2>
22    <p></p>
26  </aside>
27 </main>
```

Hello, world!

Article Title

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Hello, world!

Article Title

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Pellentesque auctor nisi id magna consequat sagittis. Curabitur dapibus enim sit amet elit pharetra tincidunt feugiat nisl imperdiet. Ut convallis libero in urna ultrices accumsan. Donec sed odio eros. Donec viverra mi quis quam pulvinar at malesuada arcu rhoncus. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. In rutrum accumsan ultricies. Mauris vitae nisi at sem facilisis semper ac in est.

Vivamus fermentum semper porta. Nunc diam velit, adipiscing ut tristique vitae, sagittis vel odio. Maecenas convallis ullamcorper ultricies. Curabitur ornare, ligula semper consectetur sagittis, nisi diam iaculis velit, id fringilla sem nunc vel mi. Nam dictum, odio nec pretium volutpat, arcu ante placerat erat, non tristique elit urna et turpis. Quisque mi metus, ornare sit amet fermentum et, tincidunt et orci. Fusce eget orci a orci congue vestibulum.

| Size | Devices | Container Widths |
|------|------------------|------------------|
| xl | Large desktops | 1140px |
| lg | Desktops | 960px |
| md | Tablets | 720px |
| sm | Landscape phones | 540px |
| * | Portrait phones | 100% |

Bootstrap 4 breakpoints & container widths

| Size | Devices | Container Widths |
|------|-----------------------|------------------|
| xxl | Really large desktops | 1320px |
| xl | Large desktops | 1140px |
| lg | Desktops | 960px |
| md | Tablets | 720px |
| sm | Landscape phones | 540px |
| * | Portrait phones | 100% |

Bootstrap 5 breakpoints & container widths

Rows

Any element that is going to have horizontal groups of columns in it must...

- » be a child of the `container` element
- » have a class of `row` on it

```
<div
class="container">
  <div class="row">
    <article>
      ...
    </article>
    <aside>
      ...
    </aside>
  </div>
</div>
```



HTML

Tidy

```
1 <main class="container">
2   <h1>Hello, world!</h1>
3   <div class="row">
4     <article>
5       <h2>Article Title</h2>
6       <p></p>
11      <p></p>
15      <p></p>
19    </article>
20    <aside>
21      <h2>Aside Title</h2>
22      <p></p>
26    </aside>
27  </div>
28 </main>
```

Hello, world!

Article Title

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Donec a diam lectus. Sed sit amet ipsum mauris. Maecenas congue ligula ac quam viverra nec consectetur ante hendrerit. Donec et mollis dolor. Praesent et diam eget libero egestas mattis sit amet vitae augue. Nam tincidunt congue enim, ut porta lorem lacinia consectetur. Donec ut libero sed arcu vehicula ultricies a non tortor. Lorem ipsum dolor sit amet, consectetur adipiscing elit. Aenean ut gravida lorem. Ut turpis felis, pulvinar a semper sed, adipiscing id dolor.

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Vivamus convallis. Nam malesuada condimentum nibh, ut blandit mollis urna. Maecenas tristique, est et tempus accumsan magna vel interdum sem. Donec sed felis eget odio adipiscing mattis a diam neque. Pellentesque auctor nisi id magna consequat sagittis. Curabitur dapibus enim sit amet elit pharetra tincidunt feugiat nisl imperdiet. Ut convallis libero in urna ultrices accumsan. Donec sed odio eros. Donec viverra mi quis quam pulvinar at malesuada arcu rhoncus. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. In rutrum accumsan ultricies. Mauris vitae nisi at sem facilisis semper ac in est.

The `container` element can have other children besides `row` elements

Anything that you always want to span the full width of the `container` element does not need to be inside the `row` element(s)

- » Headings (e.g., `<h1>`)
- » `<header>`
- » `<footer>`
- » Horizontal navigation bar


```
1 <main class="container">
2   <h1>Hello, world!</h1>
3   <div class="row">
4     <article>
5       <h2>Article Title</h2>
6       <p></p>
11      <p></p>
15      <p></p>
19    </article>
20    <aside>
21      <h2>Aside Title</h2>
22      <p></p>
26    </aside>
27  </div>
28 </main>
```

Hello, world!

Article Title

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The only immediate children allowed inside rows?

Columns

Columns

| | xs <576px | sm ≥576px | md ≥768px | lg ≥992px | xl ≥1200px | xxl ≥1400px |
|-----------------------------------|-----------------------------------|----------------------|----------------------|----------------------|----------------------|-----------------------|
| Container <i>max-width</i> | None (auto) | 540px | 720px | 960px | 1140px | 1320px |
| Class prefix | <i>.col-</i> | <i>.col- sm-</i> | <i>.col- md-</i> | <i>.col- lg-</i> | <i>.col- xl-</i> | <i>.col- xxl-</i> |
| # of columns | 12 | | | | | |
| Gutter width | 1.5rem (.75rem on left and right) | | | | | |
| Custom gutters | Yes | | | | | |
| Nestable | Yes | | | | | |
| Column ordering | Yes | | | | | |

Bootstrap 5.3 grid system

Remember those 12 columns that Bootstrap uses?

Content that is responsive (e.g., text & images) goes inside elements with CSS classes (e.g., `col-md-8`) that turn those elements into columns & define...

- » the size of the breakpoint at which changes to column widths happen (e.g., `-md`)
- » how many column widths they span, between 1–12 (e.g., `-8`)

If all the columns will be same width with every viewport, you can just use `col`

```
<div class="row">
  <div class="col-xs-4">
    1 of 3
  </div>
  <div class="col-xs-4">
    2 of 3
  </div>
  <div class="col-xs-4">
    3 of 3
  </div>
</div>
```


If all the columns will be same width with every viewport, you can just use `col`

```
<div class="row">
  <div class="col">
    1 of 3
  </div>
  <div class="col">
    2 of 3
  </div>
  <div class="col">
    3 of 3
  </div>
</div>
```

If one column has a set width & the others can automatically resize, you can easily accommodate that

```
<div class="row">  
  <div class="col">  
    1 of 3  
  </div>  
  <div class="col-5">  
    2 of 3  
  </div>  
  <div class="col">  
    3 of 3  
  </div>  
</div>
```

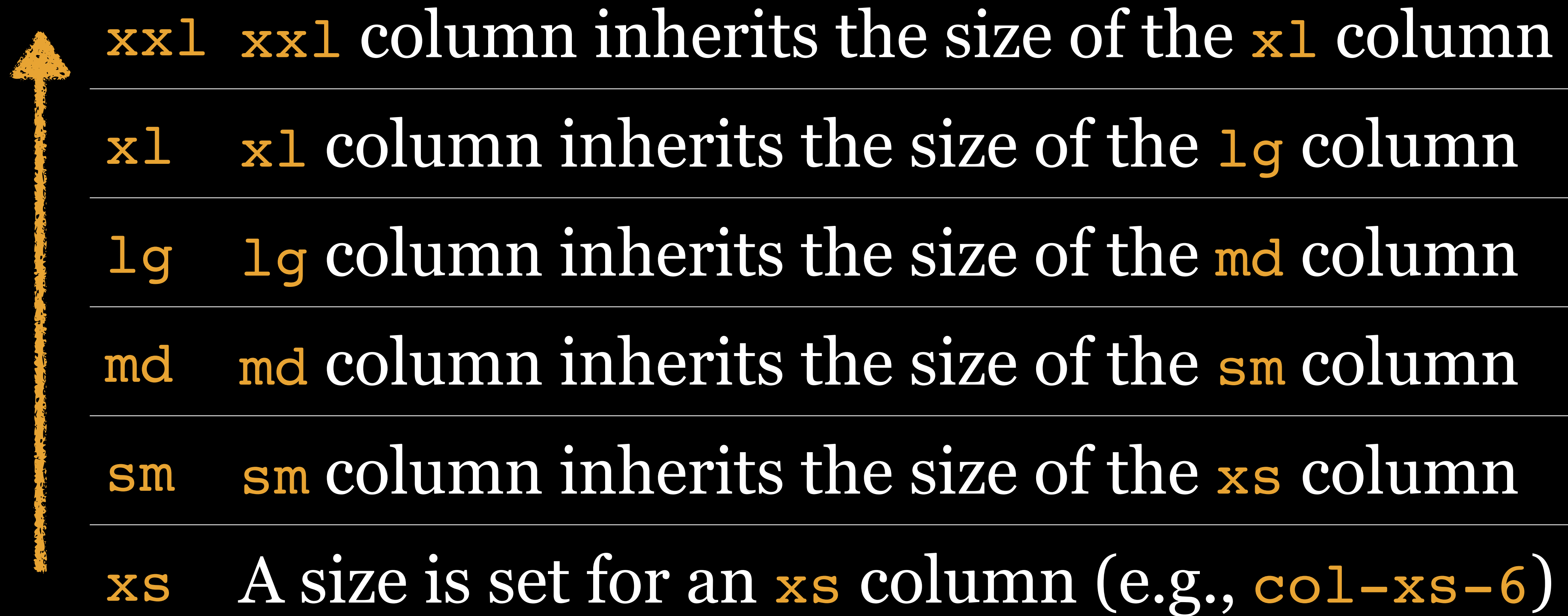

| HTML | CSS |
|-------------------------------|-------------------------------|
| Written by you | In <code>bootstrap.css</code> |
| <code>class="col-lg-6"</code> | <code>.col-lg-6 {}</code> |
| <code>class="col-md-6"</code> | <code>.col-md-6 {}</code> |
| <code>class="col-sm-6"</code> | <code>.col-sm-6 {}</code> |
| <code>class="col-xs-6"</code> | <code>.col-xs-6 {}</code> |



Bootstrap is *mobile-first*

Therefore, the default width is always...

- » 12 columns
which is the same as...
- » 100% width
which is the same as...
- » full width



Bootstrap is mobile-first

Because the default width of a column is 12 (unless overridden) & because column sizes are inherited from `xs` up to `lg`, this would be unnecessary:

```
<div class="col-xs-12 col-sm-12 col-md-8  
col-lg-8">
```

What should it be?

Because the default width of a column is 12 (unless overridden) & because column sizes are inherited from **xs** up to **lg**, this would be unnecessary:

```
<div class="col-xs-12 col-sm-12 col-md-8  
col-lg-8">
```

What should it be?

```
<div class="col-md-8">
```



PRO TIP

If you want an element to be 12 columns, you *cannot* do this:

```
<div>
```

Bootstrap's CSS isn't invoked, so there are *not* any columns

You must instead do this:

```
<div class="col-xs-12">
```

```
<div class="col">
```


| Size Name | Device | Column Width |
|---------------------------|-----------------------------------|--------------|
| Extra Small (xs) | Phones | Fluid |
| Small (sm) | Tablets | 60px |
| Medium (md) | Tablets in portrait & desktops | 78px |
| Large (lg) | Desktops | 95px |

15px gutter around each column

HTML

Tidy

```
1 <main class="container">
2   <h1>Hello, world!</h1>
3   <div class="row">
4     <article class="col-sm-8">
5       <h2>Article Title</h2>
6       <p></p>
11      <p></p>
15      <p></p>
19    </article>
20    <aside class="col-sm-4">
21      <h2>Aside Title</h2>
22      <p></p>
26    </aside>
27  </div>
28 </main>
```

Hello, world!

Article Title

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Donec a diam lectus. Sed sit amet ipsum mauris. Maecenas congue ligula ac quam viverra nec consectetur ante hendrerit. Donec et mollis dolor. Praesent et diam eget libero egestas mattis sit amet vitae augue. Nam tincidunt congue enim, ut porta lorem lacinia consectetur. Donec ut libero sed arcu vehicula ultricies a non tortor. Lorem ipsum dolor sit amet, consectetur adipiscing elit. Aenean ut gravida lorem. Ut turpis felis, pulvinar a semper sed, adipiscing id dolor.

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Aside Title

Vivamus fermentum semper porta. Nunc diam velit, adipiscing ut tristique vitae, sagittis vel odio. Maecenas convallis ullamcorper ultricies. Curabitur ornare, ligula semper consectetur sagittis, nisi diam iaculis velit, id fringilla sem nunc vel mi. Nam dictum, odio nec pretium

HTML

Tidy

```
1 <main class="container">
2   <h1>Hello, world!</h1>
3   <div class="row">
4     <article class="col-sm-8">
5       <h2>Article Title</h2>
6       <p></p>
11      <p></p>
15      <p></p>
19    </article>
20    <aside class="col-sm-4">
21      <h2>Aside Title</h2>
22      <p></p>
26    </aside>
27  </div>
28 </main>
```

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Article Title

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HTML

Tidy

```
1 <main class="container">
2   <h1>Hello, world!</h1>
3   <div class="row">
4     <article class="col-sm-8">
5       <h2>Article Title</h2>
6       <p></p>
11      <p></p>
15      <p></p>
19    </article>
20    <aside class="col-sm-4">
21      <h2>Aside Title</h2>
22      <p></p>
26    </aside>
27  </div>
28 </main>
```

odio eros. Donec viverra mi quis quam pulvinar at malesuada arcu rhoncus. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. In rutrum accumsan ultricies. Mauris vitae nisi at sem facilisis semper ac in est.

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Aside Title

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HTML

1

<main class="container">

2

<footer class="row">

3

<section class="col-sm-4">

4

<h2>Section 1</h2>

5

<p></p>

8

</section>

9

<section class="col-sm-4">

10

<h2>Section 2</h2>

11

<p></p>

14

</section>

15

<section class="col-sm-4">

16

<h2>Section 3</h2>

17

<p></p>

20

</section>

21

</footer>

22

</main>

CSS

JS

Section 1

Lorem ipsum dolor
sit amet,
consectetur
adipiscing elit.
Donec a diam
lectus. Sed sit amet
ipsum mauris.
Maecenas congue
ligula ac quam
viverra nec
consectetur ante
hendrerit. Donec et
mollis dolor.

Section 2

Lorem ipsum dolor
sit amet,
consectetur
adipiscing elit.
Donec a diam
lectus. Sed sit amet
ipsum mauris.
Maecenas congue
ligula ac quam
viverra nec
consectetur ante
hendrerit. Donec et
mollis dolor.

Section 3

Lorem ipsum dolor
sit amet,
consectetur
adipiscing elit.
Donec a diam
lectus. Sed sit amet
ipsum mauris.
Maecenas congue
ligula ac quam
viverra nec
consectetur ante
hendrerit. Donec et
mollis dolor.

⚙ HTML ▾

1 ▾

<main class="container">

2 ▾

<footer class="row">

3 ▾

<section class="col-sm-4">

4 ▾

<h2>Section 1</h2>

5 ▹

<p>↔</p>

8

</section>

9 ▾

<section class="col-sm-4">

10 ▾

<h2>Section 2</h2>

11 ▹

<p>↔</p>

14

</section>

15 ▾

<section class="col-sm-4">

16 ▾

<h2>Section 3</h2>

17 ▹

<p>↔</p>

20

</section>

21

</footer>

22

</main>

⚙ CSS ▾

⚙ JS ▾

Section 1

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Donec a diam lectus. Sed sit amet ipsum mauris. Maecenas congue ligula ac quam viverra nec consectetur ante hendrerit. Donec et mollis dolor.

Section 2

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Donec a diam lectus. Sed sit amet ipsum mauris. Maecenas congue ligula ac quam viverra nec consectetur ante hendrerit. Donec et mollis dolor.

Section 3

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Donec a diam lectus. Sed sit amet ipsum mauris. Maecenas congue ligula ac quam viverra nec consectetur ante hendrerit. Donec et mollis dolor.

Columns *must* go inside rows, & columns are the *only* allowed children of rows

Rows go inside containers, but other children are allowed inside containers

Containers *cannot* go *anywhere* inside other containers

Tools

Themes

Free

Start Bootstrap

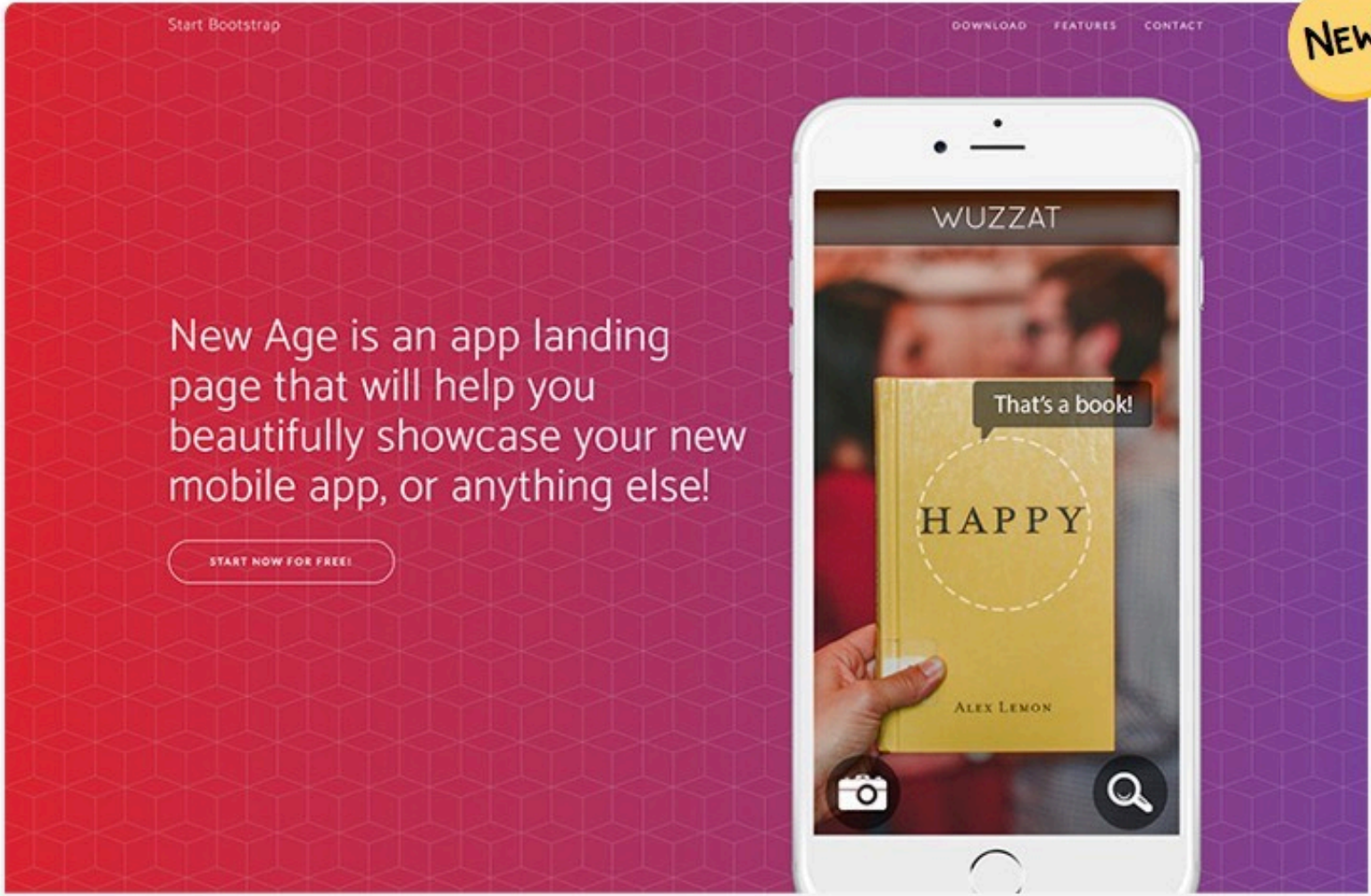
Free Bootstrap Themes & Templates

Created and Maintained by David Miller at Blackrock Digital

[🔗 Fork](#) [🌟 Star](#) **5,519**

➞ [Browse Themes & Templates](#)

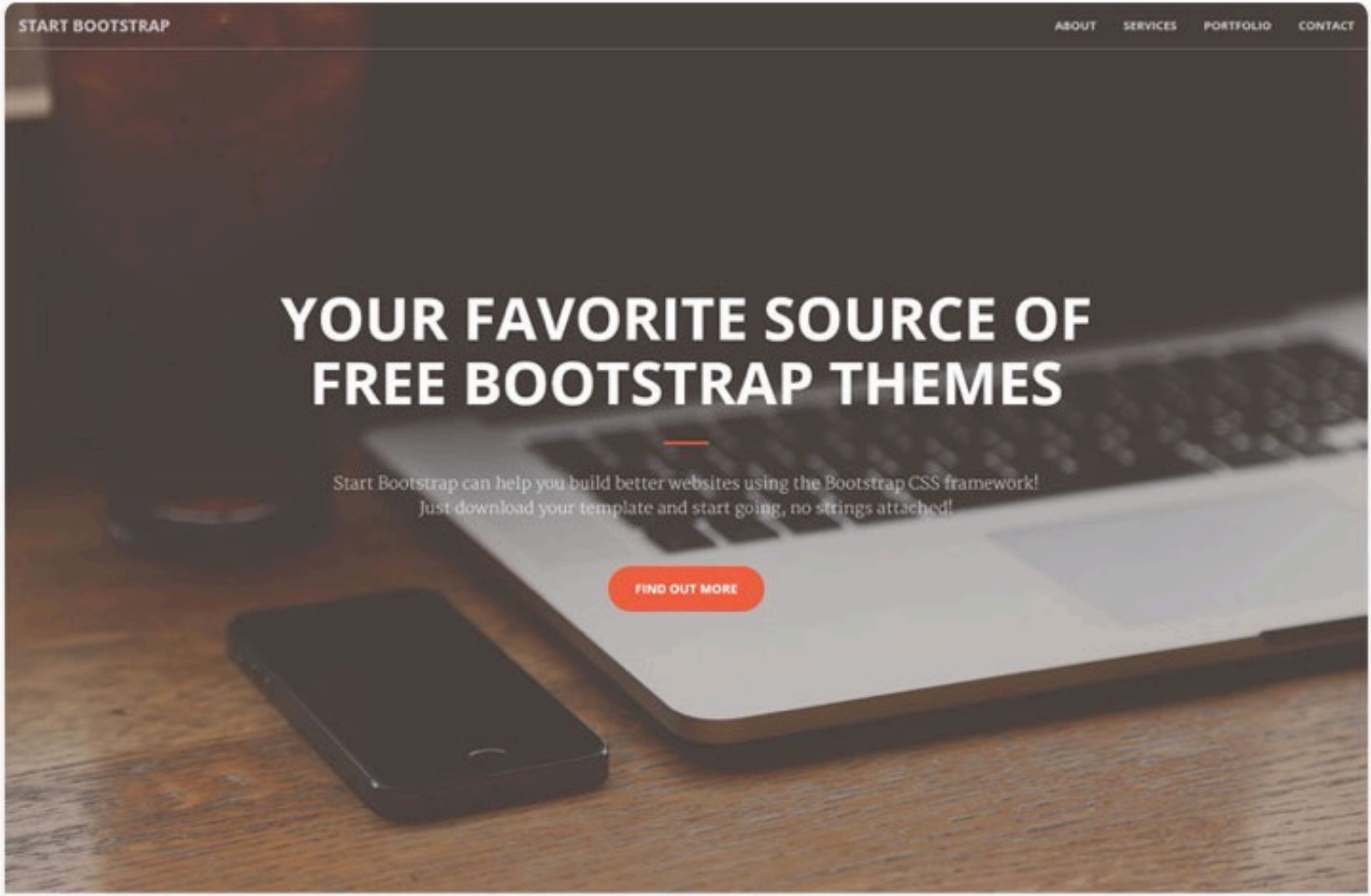




New Age

An app landing page theme.

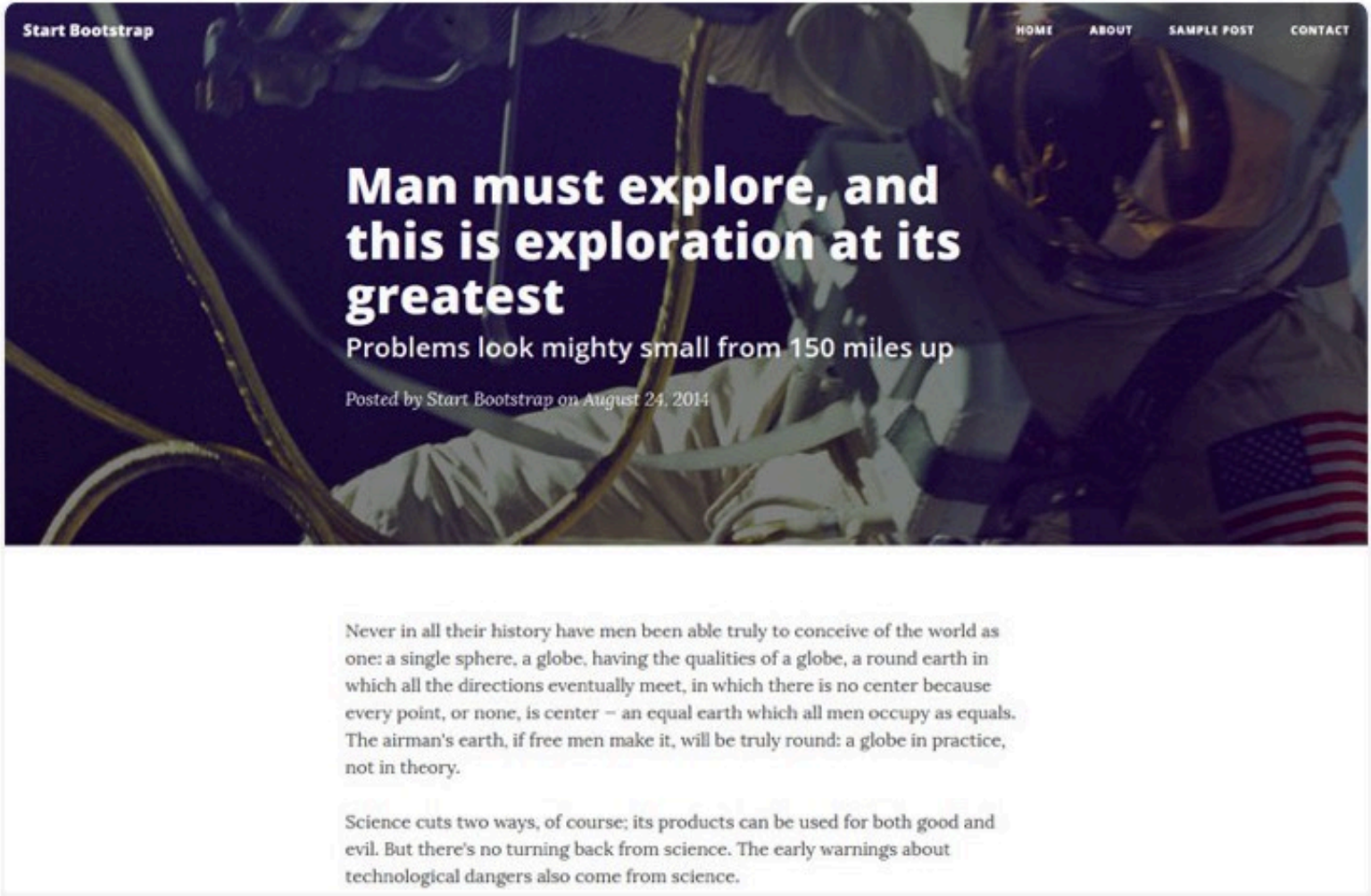
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Creative

A one page creative theme.

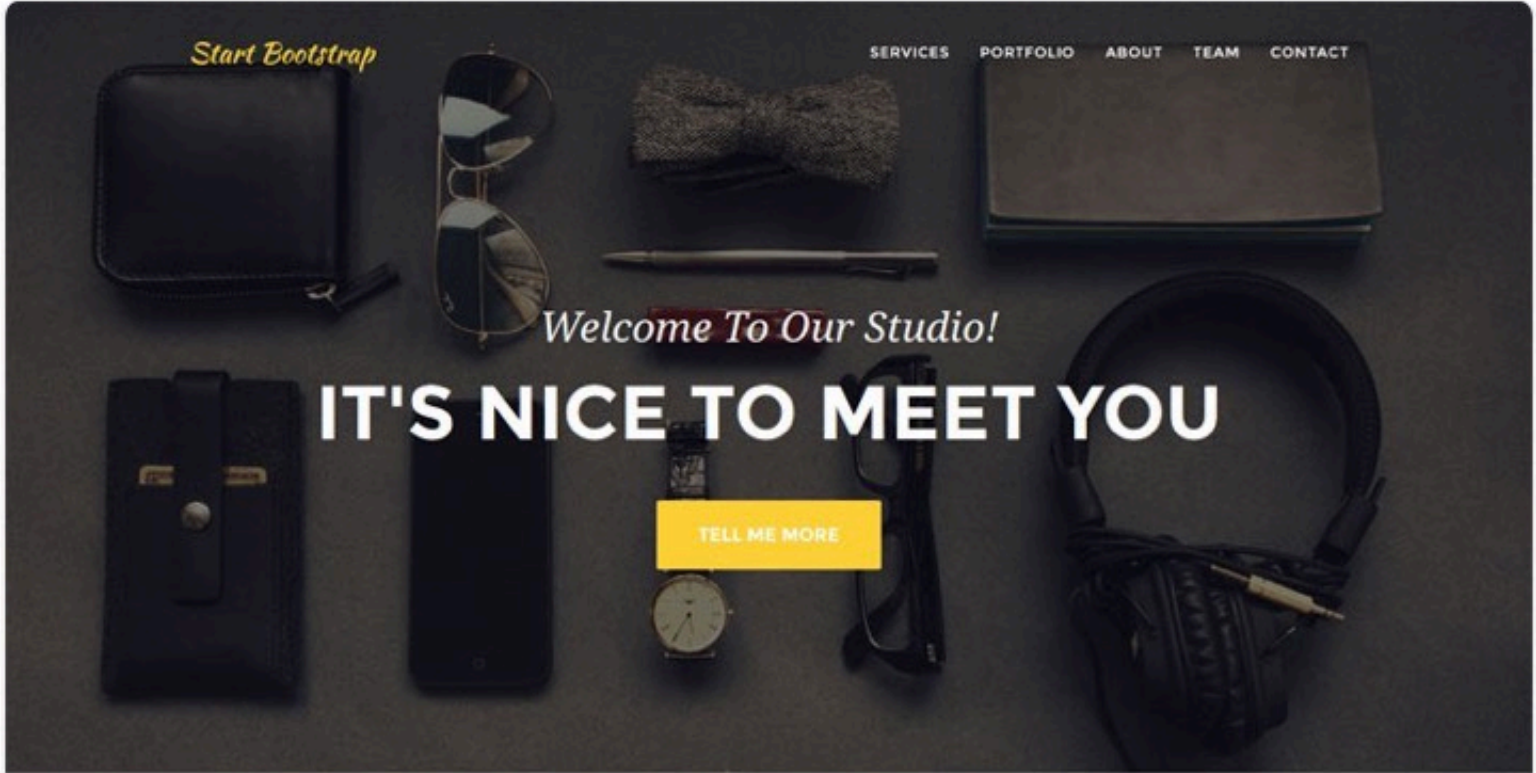
[PREVIEW & DOWNLOAD](#)



Clean Blog

A clean blog theme.

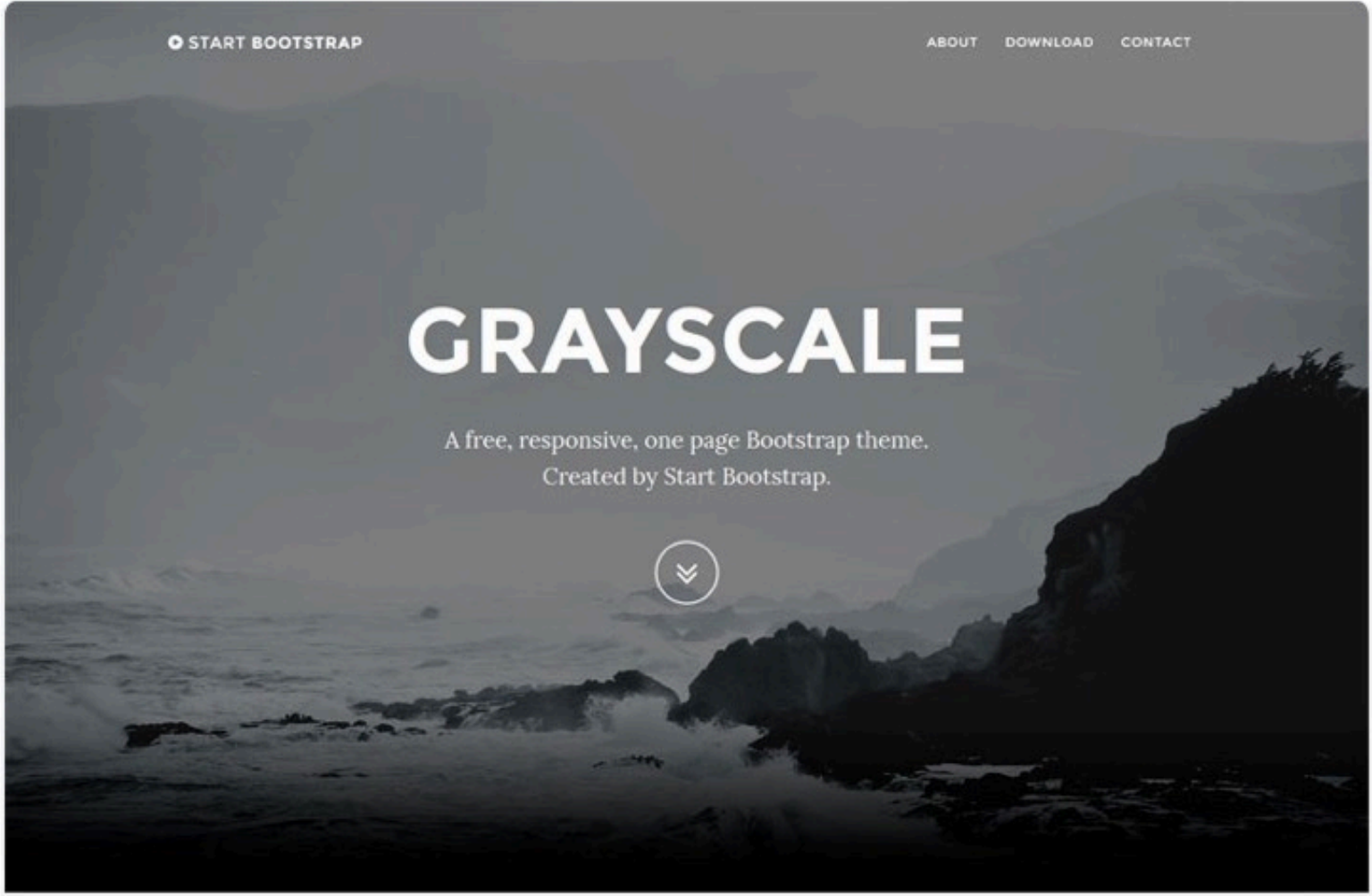
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[PORTFOLIO](#)



Agency

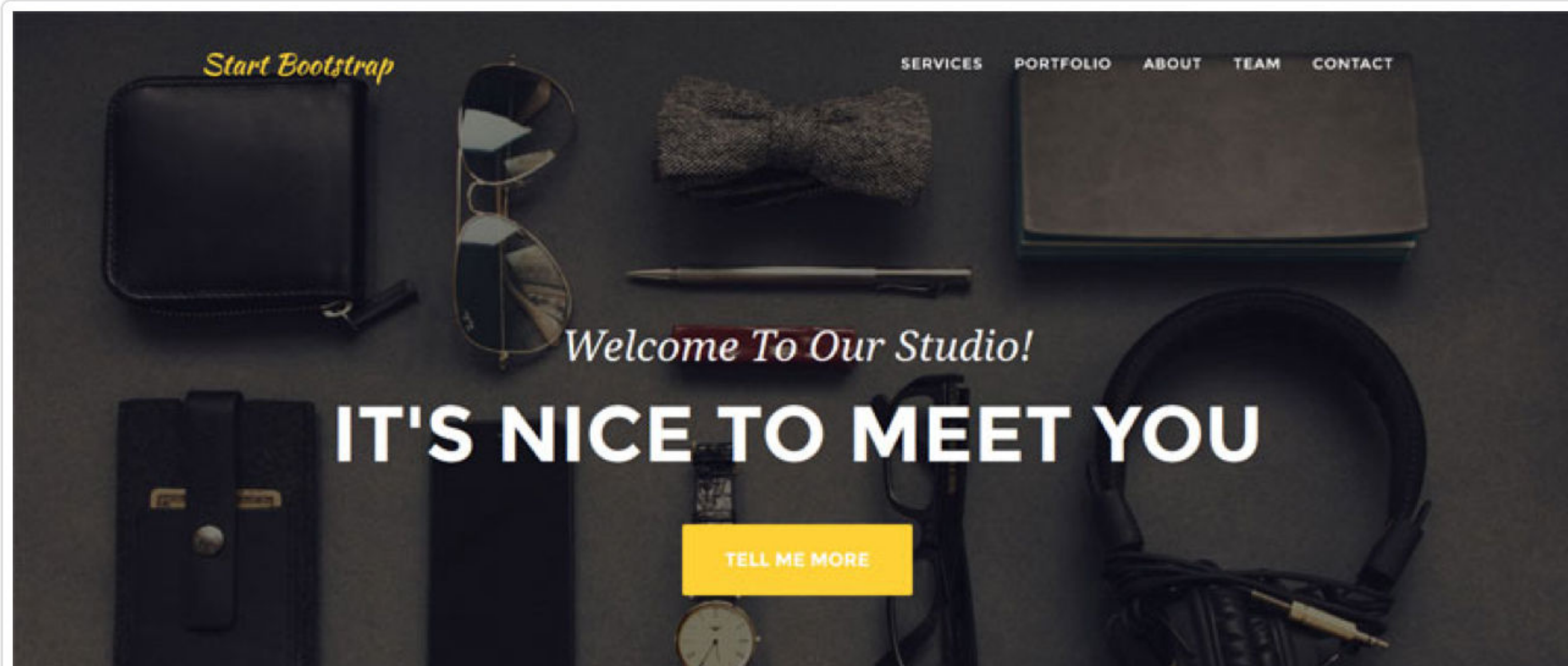
A clean, stylish, one page Bootstrap portfolio theme perfect for your agency or small business.

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ads via Carbon

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Description:

Agency is a stylish, one page Bootstrap theme for agencies and small businesses. The design of Agency is based off of the Golden PSD Theme by [Mathavan Jaya](#). You can download the PSD version of this theme at [FreebiesXpress.com](#).

Commercial

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Bootstrap Themes & Templates

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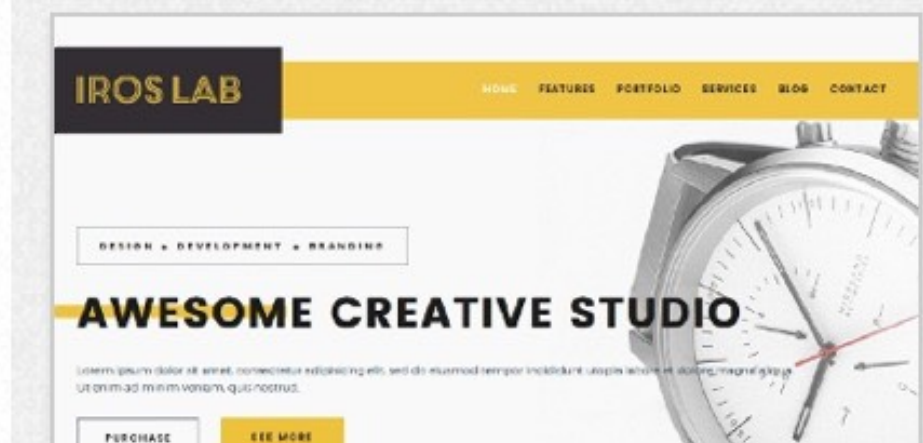
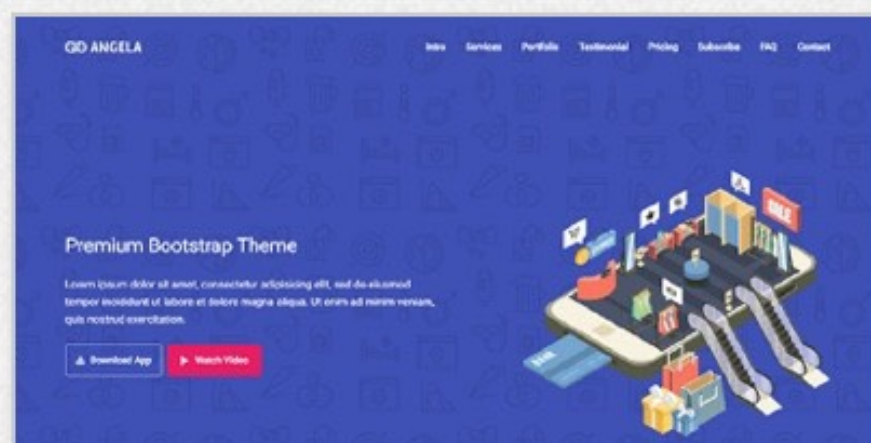


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Official

Bootstrap

Build responsive, mobile-first projects on the web with the world's most popular front-end component library.

Bootstrap is an open source toolkit for developing with HTML, CSS, and JS. Quickly prototype your ideas or build your entire app with our Sass variables and mixins, responsive grid system, extensive prebuilt components, and powerful plugins built on jQuery.

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Currently v4.0.0-beta.2



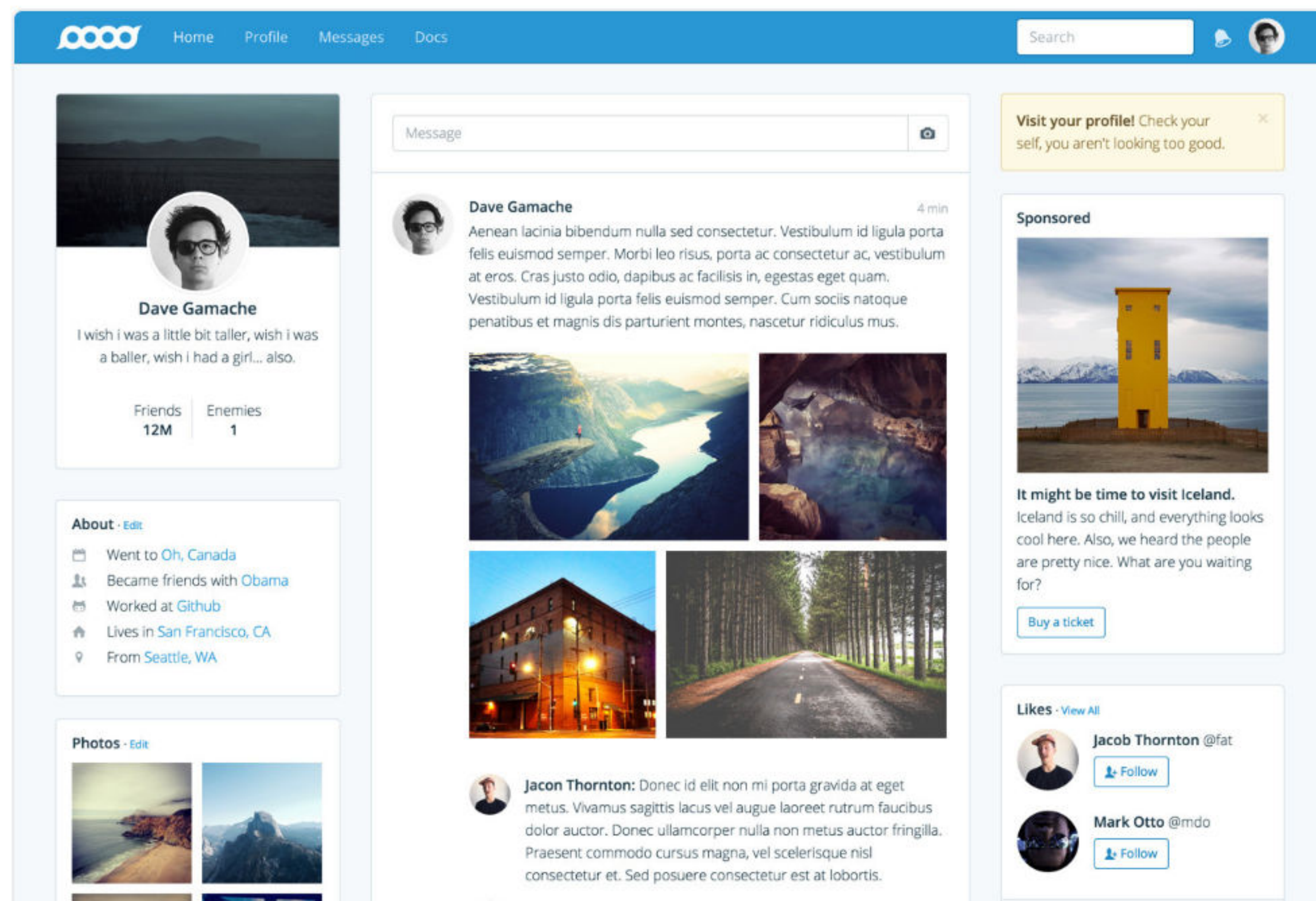
All the tools your team
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Customize and extend the world's most popular front-end framework.

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Preview

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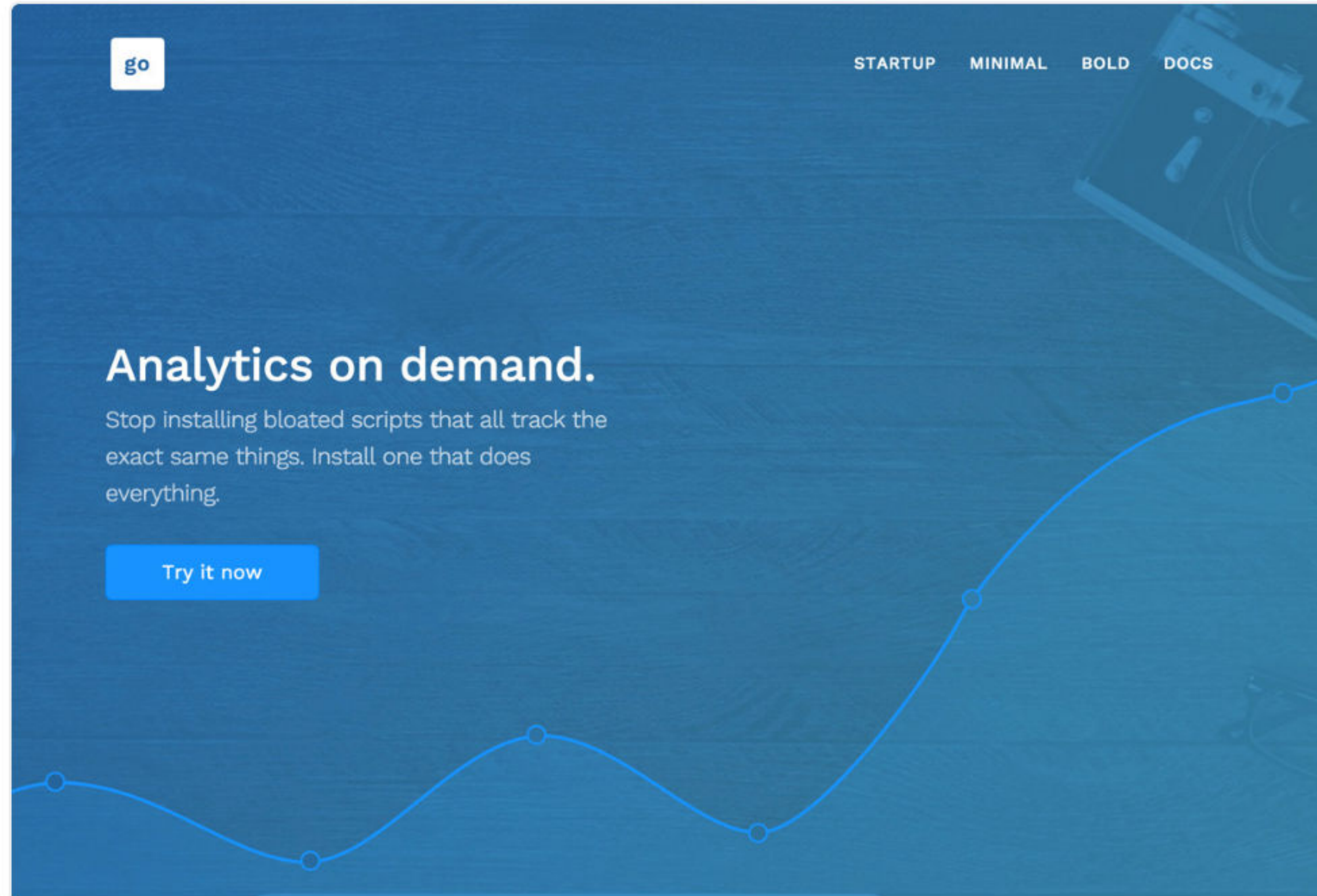
Marketing

Building beautiful marketing sites is easier than ever. Over 15 new CSS and JS components adapt to any brand or style.

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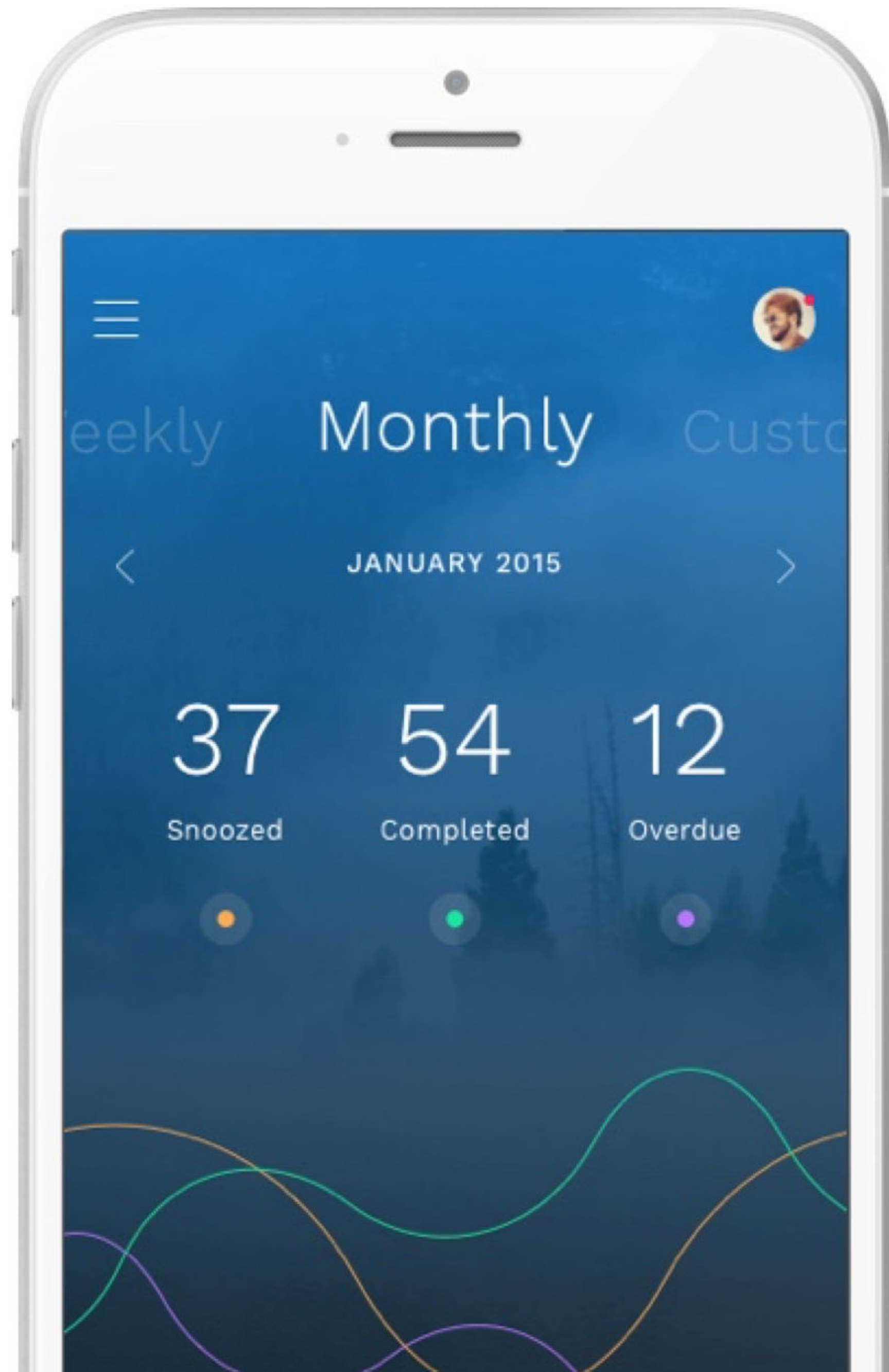
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[Read our docs](#)

```
1 goAnalytics "who are the latest 3 users?"
2
3 {
4   "Dave": {
5     "fullName": "Dave Gamache",
6     "twitterHandle": "@dhg",
7   }
8   "Mark": {
9     "fullName": "Mark Otto",
10    "twitterHandle": "@mdo",
11  }
12  "Jacob": {
13    "fullName": "Jacob Thornton",
14    "twitterHandle": "@fat",
15  }
16 }
```




HIGH PRAISE

“Go Analytics is amazing. Decisions that used to take weeks, now only takes minutes and is available to everyone on my team.”

Cindy Smith, founder of Cool Startup



HIGH PRAISE

“Go Analytics is amazing. Decisions that used to take weeks, now only takes minutes and is available to everyone on my team.”

Cindy Smith, founder of Cool Startup

TC TechCrunch

TNW
THE NEXT WEB

FASTCOMPANY

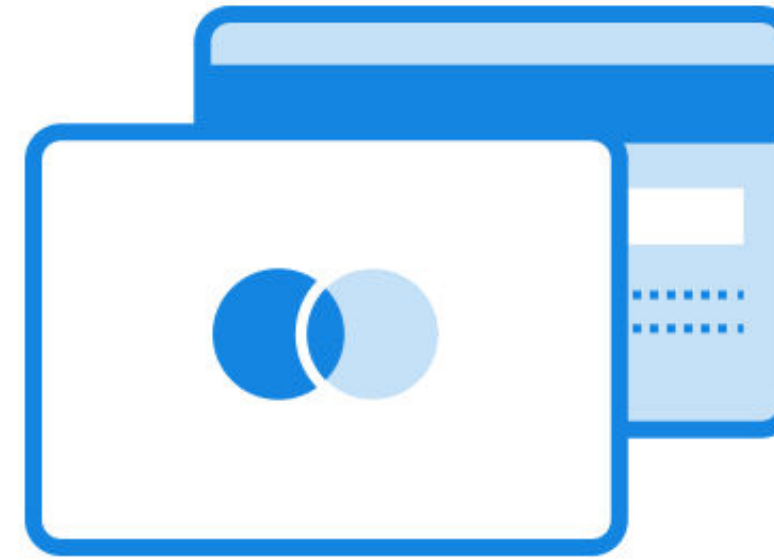
Mashable

⟨re/code⟩

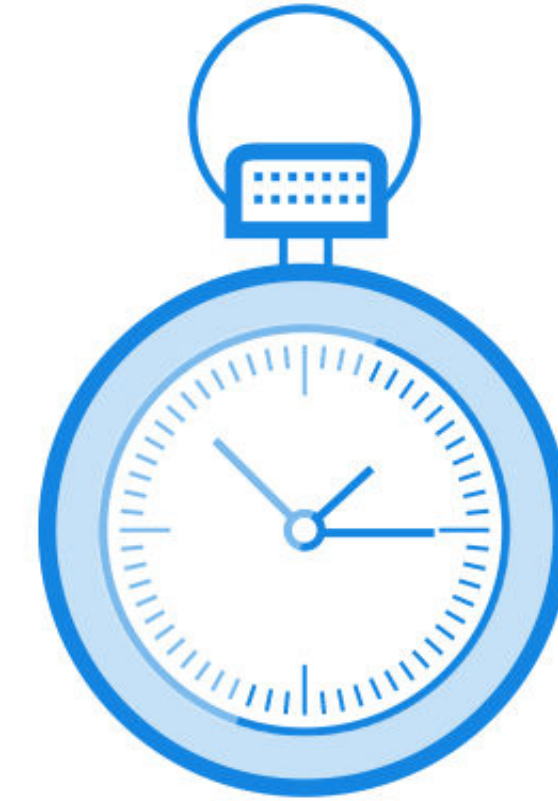
It's not hard to see how we make your life easier every day.



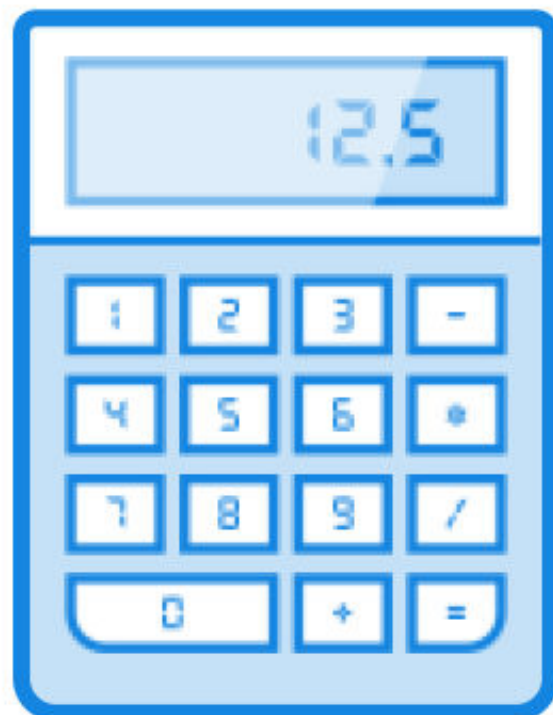
24/7 support. We're always here for you no matter what time of day.



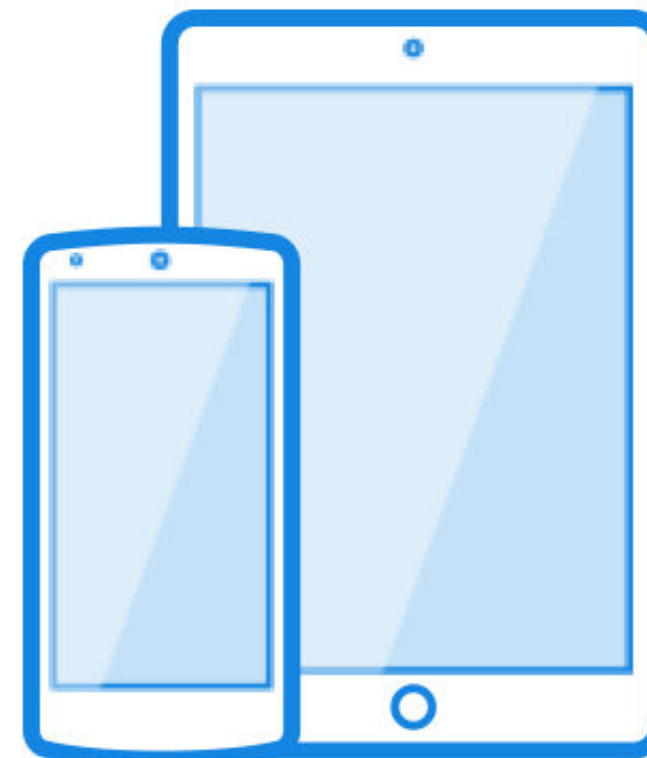
E-commerce. We automatically handle all sales analytics.



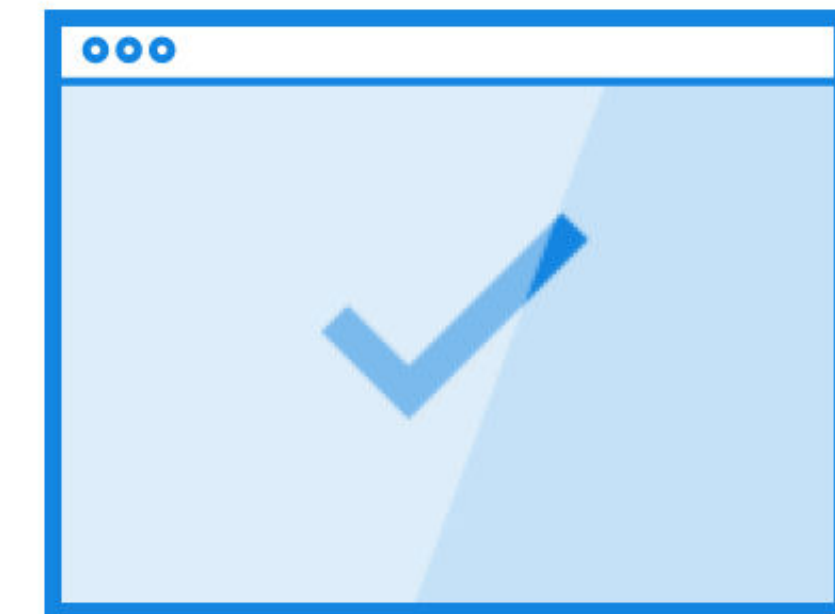
Turnaround. Our data analysis is distributed, so it processes in seconds.



Rich calculations. Limitless ways to



Mobile apps. iOS and Android apps



Secure connections. Every single

No plans. We just bump your plan whenever you need it.

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Public API access

Start a personal account

24/7 technical supprt

Public API access

Start a business account

24/7 technical supprt

Public & Private API access

Start a corporate account

ABOUT

We've been working on Go Analytics for the better part of a decade and are super proud of what we've created. If you'd like to learn more, or are interested in a job, contact us anytime at themes@getbootstrap.com.

PRODUCT

Features
Examples
Tour
Gallery

APIS

Rich data
Simple data
Real time
Social

LEGAL

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Interactive testing and debugging of websites in real browsers & mobile devices.

Live plans come with: Unlimited testing, Local testing, Developer tools, Issue Tracker,
700+ browsers, 40+ mobile devices, 9 Desktop OSes

| Solo Ideal for a team of 1-2 | Team Ideal for a team of 2-6 | Team Plus Ideal for a team of 4-12 | Enterprise Ideal for a team of 10-25 | Enterprise Plus Ideal for a team of 25+ |
|--|--|--|--|---|
| \$39 /mo billed monthly <i>or</i> \$35/mo billed annually | \$99 /mo billed monthly <i>or</i> \$89/mo billed annually | \$199 /mo billed monthly <i>or</i> \$179/mo billed annually | \$399 /mo billed monthly <i>or</i> \$359/mo billed annually | Large team? Contact sales for private setups, custom ToS & more |
| 1 session | 2 parallel users | 4 parallel users | 10 parallel users | 10+ parallel users |
| Up to 2 users | Up to 6 users | Up to 12 users | Up to 25 users | 25+ users |



Buy a single user Lite plan to test on desktop browsers only.

Billed \$19/mo monthly or \$17/mo annually.



Note: [Set your monitor size](#) in the 'Monitor Size' settings (top right corner of the screen), to view devices at their actual size. ×

Responsive Design Testing across Devices

Generate screenshots at actual device sizes on iOS, Android, OS X & Windows

[View](#)[Enable Local Testing ▾](#)[Learn more about local testing](#)

iPhone 5S

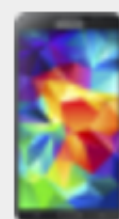


320x568



7.0

Galaxy S5 Mini



360x640



4.4

Galaxy S5



360x640



4.4

Galaxy Note 3



360x640



4.3

iPhone 6



375x667



8.3

Google Nexus 4



384x640



4.2

iPhone 6 Plus

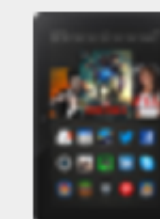


414x736



8.3

Kindle Fire HDX 7

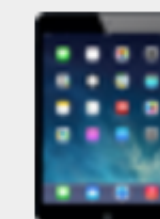


600x960



4.3

iPad Mini 2

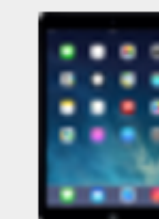


768x1024



8.3

iPad Air



768x1024



8.3

**iPhone 5S**

Viewport: 320x568

Screen size: 4"



Portrait



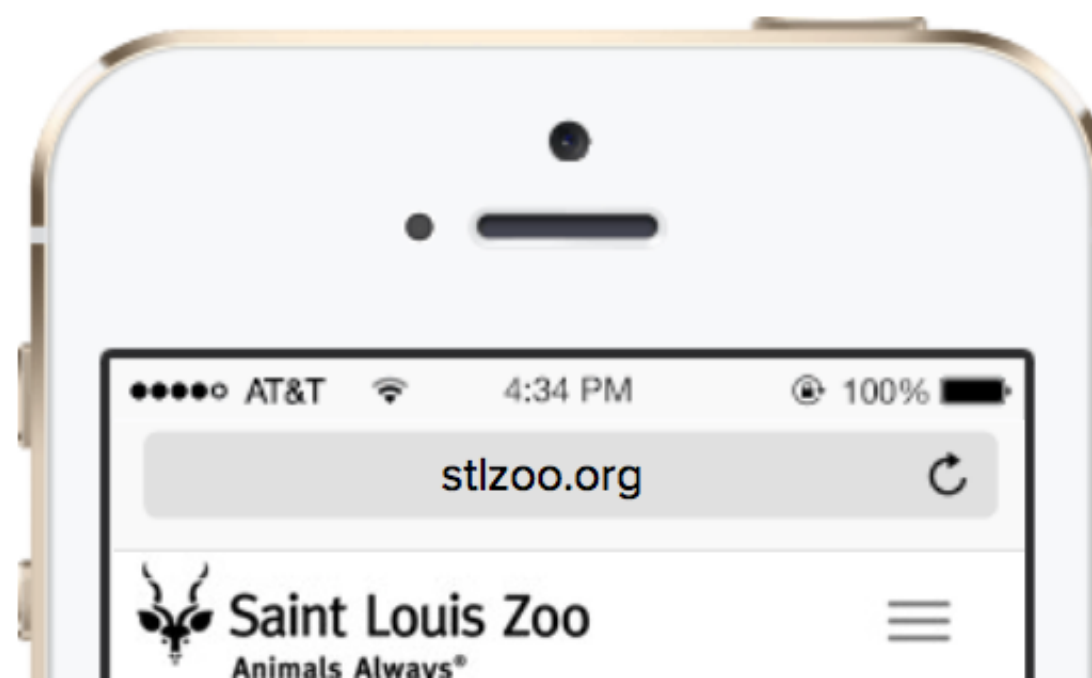
Landscape



Live Interactive Testing



▾

[← Previous](#)[Next →](#)



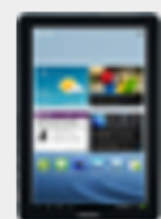
Note: [Set your monitor size](#) in the 'Monitor Size' settings (top right corner of the screen), to view devices at their actual size. ×

Responsive Design Testing across Devices

Generate screenshots at actual device sizes on iOS, Android, OS X & Windows

[View](#)[Enable Local Testing ▾](#)[Learn more about local testing](#)

Galaxy Tab 4



800x1280



Windows



1280x1024



Mac OSX



1920x1080

**iPhone 5S**

Viewport: 320x568

Screen size: 4"



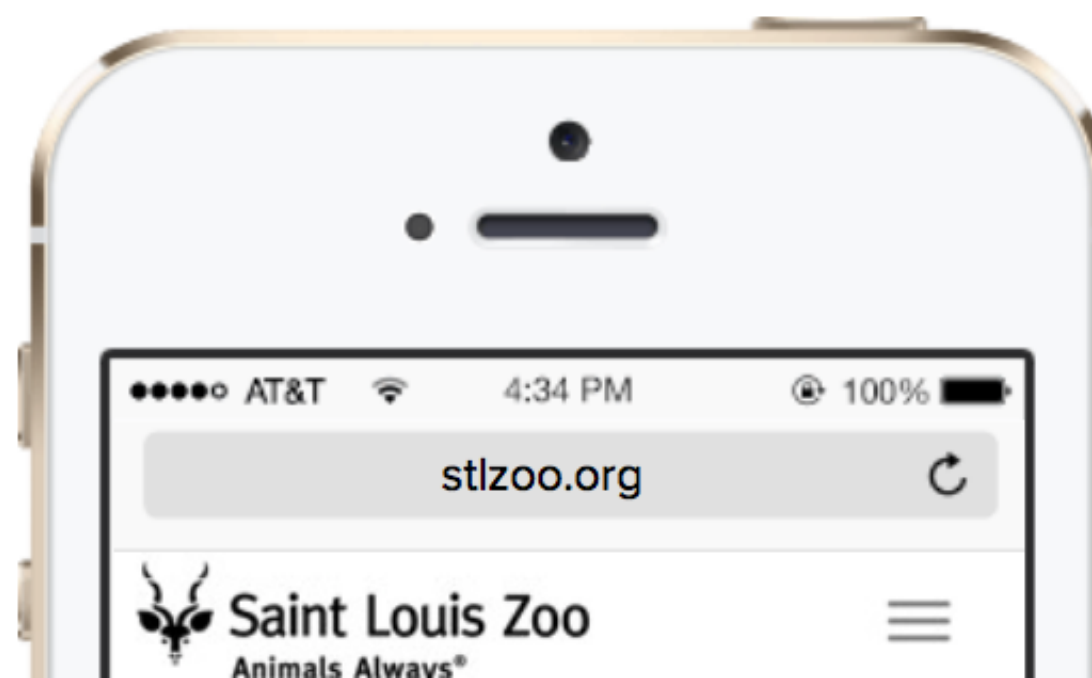
Portrait



Landscape



Live Interactive Testing

[← Previous](#)[Next →](#)



Rapidly test your website for cross browser compatibility across 700+ browsers.

History ▾

[Enable Local Testing ▾](#)[Learn more about local testing](#)

15 browsers pre-selected ×



iOS

v8.3

iPad Mini 2
iPad Air

iPhone 6

iPhone 6 Plus

v7

iPhone 5S

iPad 4th

iPad Mini

v6

iPhone 4S

iPhone 5

iPad 3

v5.1

iPhone 4S

iPad 3

v5

iPad 2



Android

Samsung

Galaxy S5

Galaxy S4

Galaxy S3

Galaxy S2

Galaxy Tab 2

Galaxy S5 Mini

Galaxy Tab 4

Galaxy Note 3

Galaxy Note 2

Galaxy Note 10.1

Galaxy Note

Amazon

Kindle Fire 2

Kindle Fire HD 8.9

Kindle Fire HDX

Motorola

Razr

Droid Razr

Razr Maxx HD

Google

Nexus 9

Nexus 7

Nexus 6

Nexus 5

Nexus 4

Nexus

HTC

One M8

One X

Wildfire

Sony

Xperia Tipo



Windows 8.1



11

37 36 35 34 33 32 31 30
29 28 27 26 25 24 23
22 21 20 19 18 17 1642 41 40 39 38 37 36
35 34 33 32 31 30 29
28 27 26 25 24 23
22* 12.16 12.15 12.14
12.10 12

5.1*



Windows 8



10

37 36 35 34 33 32 31 30
29 28 27 26 25 24 23
22 21 20 19 18 17 1642 41 40 39 38 37 36
35 34 33 32 31 30 29
28 27 26 25 24 23
22* 12.16 12.15 12.14
12.10 12

5.1*



Windows 7



11

10

9

8



37 36 35 34 33 32 31 30



42 41 40 39 38 37 36




































* 12.16 12.15 12.14






















5.1*




















* Local testing not available

| |  Mobile | |  Tablet | |
|--|--|--|--|--|
|  Android | | | | |
|  Windows Phone | | | | |
|  iOS | Apple iPhone 6 Plus Latest 8.3 iPhone 6 Latest 8.3 iPhone 5S 7 iPhone 5 6 iPhone 4S (6.0) 6 iPhone 4S 5.1 iPhone 4 4 iPhone 3GS 3 | | Apple iPad Air Latest 8.3 iPad Mini 2 Latest 8.3 iPad 4th 7 iPad Mini 7 iPad 3rd (6.0) 6 iPad 3rd 5.1 iPad 2 (5.0) 5 iPad 2 4.3.2 iPad 3.2 | |
|  Windows 10 | | | | |
|  Windows 8.1 | | | | |
|  Windows 8 | | | | |
|  Windows 7 | | | | |
|  Windows XP | | | | |
|  OS X Yosemite | | | | |
|  OS X Mavericks | | | | |
|  OS X Mountain Lion | | | | |
|  OS X Lion | | | | |
|  OS X Snow Leopard | | | | |

| |  Safari |  Firefox | | |  Chrome | |  Opera | |  Yandex |
|--|--|---|----|-----|--|----|---|-------|--|
|  Android | | | | | | | | | |
|  Windows Phone | 8 Latest | 40 Aurora | 23 | 7 | 44 Dev | 28 | 30 Dev | 12.15 | 14.12 Latest |
|  iOS | | 38 Latest | 22 | 6 | 43 Latest | 27 | 29 Latest | 12.14 | |
|  Windows 10 | | 37 | 21 | 5 | 42 | 26 | 28 | 12.12 | |
|  Windows 8.1 | | 36 | 20 | 4 | 41 | 25 | 27 | | |
|  Windows 8 | | 35 | 19 | 3.6 | 40 | 24 | 26 | | |
|  Windows 7 | | 34 | 18 | | 39 | 23 | 25 | | |
|  Windows XP | | 33 | 17 | | 38 | 22 | 24 | | |
|  OS X Yosemite | | 32 | 16 | | 37 | 21 | 23 | | |
|  OS X Mavericks | | 31 | 15 | | 36 | 20 | 22 | | |
|  OS X Mountain Lion | | 30 | 14 | | 35 | 19 | 21 | | |
|  OS X Lion | | 29 | 13 | | 34 | 18 | 20 | | |
|  OS X Snow Leopard | | 28 | 12 | | 33 | 17 | 19 | | |
| | | 27 | 11 | | 32 | 16 | 18 | | |
| | | 26 | 10 | | 31 | 14 | 17 | | |
| | | 25 | 9 | | 30 | | 16 | | |
| | | 24 | 8 | | 29 | | 15 | | |

|  Android |  IE |  Firefox | | | |  Chrome | |  Opera | |  Yandex |  Safari |
|--|--|---|----|-----|---------------------------|--|---------------------------|---|------------------------------|--|--|
|  Windows Phone | 11 Latest | 40 Aurora | 23 | 7 | 44 Dev | 28 | 30 Dev | 12.16 | 14.12 Latest | 5.1 Latest | |
|  iOS | 10 | 38 Latest | 22 | 6 | 43 Latest | 27 | 29 Latest | 12.15 | | 5 | |
|  Windows 10 | 9 | 37 | 21 | 5 | 42 | 26 | 28 | 12.14 | | 4 | |
|  Windows 8.1 | 8 | 36 | 20 | 4 | 41 | 25 | 27 | 12.10 | | | |
|  Windows 8 | | 35 | 19 | 3.6 | 40 | 24 | 26 | 11.6 | | | |
| | | 34 | 18 | 3 | 39 | 23 | 25 | 11.5 | | | |
| | | 33 | 17 | | 38 | 22 | 24 | 11.1 | | | |
|  Windows 7 | | 32 | 16 | | 37 | 21 | 23 | 10.6 | | | |
|  Windows XP | | 31 | 15 | | 36 | 20 | 22 | | | | |
|  OS X Yosemite | | 30 | 14 | | 35 | 19 | 21 | | | | |
|  OS X Mavericks | | 29 | 13 | | 34 | 18 | 20 | | | | |
|  OS X Mountain Lion | | 28 | 12 | | 33 | 17 | 19 | | | | |
|  OS X Lion | | 27 | 11 | | 32 | 16 | 18 | | | | |
|  OS X Snow Leopard | | 26 | 10 | | 31 | 15 | 17 | | | | |
| | | 25 | 9 | | 30 | 14 | 16 | | | | |
| | | 24 | 8 | | 29 | | 15 | | | | |



|  Android |  IE |  Firefox |  Chrome |  Opera |  Yandex |  Safari |
|--|---|---|--|---|--|--|
|  Windows Phone | 11 Latest | 40 Aurora | 43 Latest | 30 Dev | 14.12 Latest | 5.1 Latest |
|  iOS | | 38 Latest | 42 | 29 Latest | | |
|  Windows 10 | | 37 | 41 | 28 | | |
|  Windows 8.1 | | 36 | 40 | 27 | | |
|  Windows 8 | | 35 | 39 | 26 | | |
|  Windows 7 | | 34 | 38 | 25 | | |
|  Windows XP | | 33 | 37 | 24 | | |
|  OS X Yosemite | | 32 | | 23 | | |
|  OS X Mavericks | | | | | | |
|  OS X Mountain Lion | | | | | | |
|  OS X Lion | | | | | | |
|  OS X Snow Leopard | | | | | | |

Thank you!

scott@granneman.com

www.granneman.com

[@scottgranneman@mastodon.social](https://mastodon.social/@scottgranneman)

jans@websanity.com

websanity.com

Bonus

Media Types

Common Print Styles


```
a[href^="#"]::after,  
a[href^="javascript:"]::after {  
    content: "";  
}
```

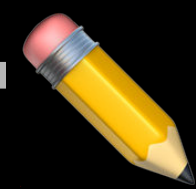
Don't print links that are fragment identifiers or use the `javascript:` pseudo protocol

When printed, `Table of Contents` looks like this:

Table of Contents

```
pre {  
    white-space: pre-wrap !important;  
}
```

When printed, allow `<pre>` to wrap



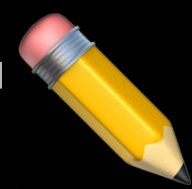
SIDE NOTE

Certain CSS properties can be used with printing, but are also available for layout, so look for the *Multi-Column Layout* section in the *CSS Layout* presentation for more info

- » `(page-)break-after`
- » `(page-)break-before`
- » `(page-)break-inside`
- » `widows`
- » `orphans`

Media Features

Viewport- & Device-Centric

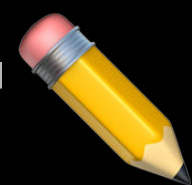


SIDE NOTE

`<ratio>`

Represents *aspect ratios* (proportions) in media queries: a positive `<integer>`, followed by `/`, followed by a positive `<integer>`

No units!



SIDE NOTE

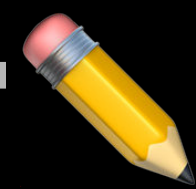
Examples

$4/3$: traditional TV






$16/9$: widescreen TV

$185/100$: traditional movies

$239/100$: widescreen movies



SIDE NOTE

| | | | | | | |
|---------|--|---|---|-----|---|---|
| |  |  |  | iOS |  |  |
| <ratio> | 9 | 3.5 | 5 | 4.2 | 4 | Y |

Device-centric: display quality

- » **resolution**: pixel density of the output device (**infinite** or **<resolution>**)
- » **scan**: scanning process of television (**interlace** or **progressive**)
- » **grid**: grid device or a bitmap device (**0** or **1**)

<resolution>

Represents the *resolution* of a device: its density of pixels, expressed as a <number> immediately followed by a unit of resolution

Units

- » **dpi**: dots per inch
- » **dpcm**: dots per centimeter
- » **dppx**: dots per px unit; **1dppx** is equivalent to **96dpi**



| |  |  |  |  | ios |  |  |
|--------------|--|---|---|---|-----|---|---|
| <resolution> | 9 | 12 | 8 | — | — | 29 | 4.4 |
| dppx | — | 12 | 16 | — | — | 29 | 4.4 |
| dpi | 9 | 12 | 8 | — | — | 29 | 4.4 |
| dpcm | 9 | 12 | 8 | — | — | 29 | 4.4 |

Device-centric: display quality

- » **update**: frequency that layout can be updated (**none**, **slow**, or **fast**)*
- » **overflow-block**: treatment of potential overflow on *block* axis (**none**, **paged**, **optional-paged**, or **scroll**)*
- » **overflow-inline**: treatment of potential overflow on *inline* axis (**none**, **paged**, **optional-paged**, or **scroll**)*

* New additions from Media Queries Level 4

Device-centric: color media

- » **color**: bit depth of a standard display (**<integer>**)
- » **color-index**: number of colors in an indexed color display (**<integer>**)
- » **monochrome**: bit depth of monochrome display (**<integer>**)
- » **color-gamut**: range of available colors (**srgb**, **p3**, or **rec2020**)*

* New additions from Media Queries Level 4

Device-centric: interaction

- » **pointer**: primary pointing device? (**none**, **coarse**, or **fine**)*
- » **any-pointer**: any pointing device available? (**none**, **coarse**, or **fine**)*
- » **hover**: can primary pointing device hover over elements? (**none** or **hover**)*
- » **any-hover**: can any available pointing device hover over elements? (**none** or **hover**)*

* New additions from Media Queries Level 4

DEPRECATED

Device-centric

- » `device-width`: width of screen in pixels
- » `device-height`: height of screen in pixels
- » `device-aspect-ratio`: `<ratio>` of horizontal pixels to vertical pixels of screen

Responsive Web Design

From Soup to Nuts

R. Scott Granneman & Jans Carton

© 2017 R. Scott Granneman
Last updated 2023-11-08

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Changelog

2023-11-08 1.16: Added diagram showing responsive design on 4 different devices; minor fixes & corrections; changed Twitter link to Mastodon

Changelog

2023-08-02 1.15: Added Side Note slides in *Responsive Layouts* that responsive is now about a lot more than just layout; changed *Mobile Designs* to *Mobile Design History*; added changelogs from 3 previous presentations; in *Media Types & Media Features* I said *declarations* are tied with specificity but I meant *selectors*; minor fixes & corrections

2023-05-15 1.14: Added `@media print` around print examples; added how to enable rule of thirds on iPhone & Android; added charts showing most common screen resolution sizes worldwide

Changelog

2023-09-04 1.16: Updated list of organizations using Bootstrap;

Changelog

2023-04-20 1.13: Moved content from *Fixed to Fluid to Responsive* here; moved content from *Bootstrap* here; fixes & additions

2023-04-18 1.12: Moved content from *CSS - Media-Specific Styles* here; crossed out **speech**, as it's no longer relevant; added lots of citations; moved stuff into *Bonus*

Previous Changelogs

Media Types & Media Features

Changelog

2020-07-24 1.11: Moved **a11** to the end of Media Types; minor wording fixes; fixed wording about relationship of **@media** & the Cascade

Changelog

2020-07-20 1.10: Updated icons in compatibility tables; added sample `@media` query at beginning; moved `@media` compatibility table to end of *Overview*; added note in *Common Print Styles* about print-specific properties that were moved to *CSS Layout*; added note re: importance of `min-width` & `max-width` to responsive design

2020-07-17 1.9: Moved print styling from *Print CSS* to *CSS Typography*; minor fixes

Changelog

2018-11-20 1.8: Changed `body` to `html` in Common Print Styles; fixed all compatibility tables; added illustrations of `widows` & `orphans`; added lots more examples to Common Print Styles; re-ordered & rewrote how to apply media queries; added note re: common print styles

2018-10-17 1.7: Updated theme to Granneman 1.5;

Changelog

2018-08-21 1.6: Added that some device-centric media queries are deprecated; added Deprecated label to appropriate media types; updated theme to Granneman 1.4; minor formatting fixes; added Important to slide on media queries before cascade; speech media type doesn't support browsers; all media types will be deprecated; updated **widows** & **orphans** compatibility chart; added & re-ordered media features

Changelog

2017-06-13 1.5: Minor wording changes

2015-01-16 1.4: Updated compatibility chart in Media Features

2015-01-11 1.3: Renamed Media Queries to Media Features; moved much of Overview to Media Types; added new content to Overview; made it clearer which method of specifying media queries is best; minor fixes

Changelog

2014-12-01 1.2: Improved recommendation at end of Overview

2014-08-01 1.1.2: Added more details on media features; corrected list of media types; more details on `:right` & `:left`

2014-05-15 1.1.1: Fixed minor errors

Fixed to Fluid to Responsive

Changelog

2021-04-28 1.9: Updated definition of responsive web design, with new concerns & how they're solved; moved as much Bootstrap-specific stuff to Bootstrap presentation; re-ordered some things; fixed a few small errors; changed “Layouts” to “Designs” on title slides to be clearer

2020-07-17 1.8: Updated breakpoints to Bootstrap 3, 4, & 5; removed URLs from slides since they're in Presenter Notes; added more Presenter Notes in a few places to help me 😊

Changelog

2018-12-03 1.8: Updated number of lines of CSS for Bootstrap for Skeleton; removed “Phablets”; added `spectre.css` under Skeleton; added code examples for fixed & fluid layouts; added slide defining frameworks

2018-05-07 1.7: Changed theme to Granneman 1.4; fixed minor formatting; added new breakpoints slide

2016-10-20 1.6: Improved slides re: number of designs needed for responsive design

Changelog

2016-10-20 1.5: Added explanation for 12 columns; fixed formatting errors that crept in; updated theme; removed Nathan Smith's grid frameworks; re-ordered Foundation to come before Bootstrap

2016-04-27 1.4: Added Zooming to Mobile Solutions, with video of Jobs introducing iPhone; fixed Adaptive Design; updated Foundation & moved it after Bootstrap; responsive based on columns; more detail re: additional designs needed for responsive

Changelog

2015-06-11 1.3: Switched theme to use Georgia Pro; added more examples of sites using Bootstrap; updated Wikipedia description of Bootstrap; added section on Mobile Solutions between Fluid & Responsive; removed Saint Louis Zoo slides & improved slides with Jans' Bootstrap grid images; made restrictions a list

Changelog

2015-01-16 1.2: Removed “Twitter” & added side note about Twitter; added Skeleton to frameworks

2014-05-20 1.1.2: Reorganized Zoo images & added Bootstrap grids

2014-05-19 1.1.1: Added animated GIFs showing the Saint Louis Zoo before & after responsive

Bootstrap

Changelog

2022-08-24 2.10: Corrections to a few citations

Changelog

2020-07-28 2.9: Minor fixes; screenshots for finding & copying arrowhead at fileformat.info; completely re-did both examples of how to override Bootstrap; adds Bootstrap 5 alpha

2020-07-16 2.8: Defined jQuery; small fixes; another way to install is via npm; added details about Bootstrap 4 & 5's breakpoints; added details about `col` classes for columns; integrated Bootstrap 4 better in places

Changelog

2018-10-29 2.7: VSCode screenshots of Bootstrap 4 CDN; better explanation of adding your CSS after Bootstrap's; screenshots of Bootstrap 4 website & examples; replaced 3 section screenshots in *Columns*; re-ordered tables so largest is on top

2018-05-05 2.6: Added slide re: necessity for `<div class="col-xs-12">`; added slide contrasting breakpoints for 3 & 4

Changelog

2017-12-19 2.5: Updated theme; fixed formatting errors; made *Template* section clearer; made *Installation* section clearer; made *Minification* into a Side Note; updated *Installation* screenshots; made *Using* section clearer & moved it after Template; made *Grid System* clearer, with more examples; better screenshots of free themes; added WrapBootstrap to themes; added slides showing new home page & dropdown for versions 2, 3, & 4; *Installation* now covers manual install vs CDN

Changelog

2016-04-27 2.4: Changed instructions to move `<script>` to `<head>`; added minification explanation; Bootstrap-specific bookmarklet; more info re: Bootstrap themes; cleaned up small errors

2016-02-16 2.3: Added *Bootstrap 4* section

Changelog

2015-06-11 2.2: Fixed a bunch of errors in layout in *Grid System*; small fixes

2015-05-24 2.1: Completely re-ordered *Grid System* & added lots more detail, examples, & clarification; added *Tools* section with Viewport Resizer & BrowserStack

Changelog

2015-05-20 2.0: Updated image showing Bootstrap contents; showed contents after culling; added examples of Bootstrap documentation for classes; added recommendation to use browser Inspector; simplified explanation of `<meta>` for disabling zooming; explained why you should move JS into `<head>`; added better clarification of Grid System; showed how to override Bootstrap's CSS with your own; added more about `<head>`

Changelog

2015-01-14 1.1: Removed “inherit” & clarified relationship between Bootstrap’s CSS & yours

2014-05-18 1.0.1: Replaced image showing default Bootstrap files

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