

# Responsive Web Design

## From Soup to Nuts

R. Scott Granneman & Jans Carton

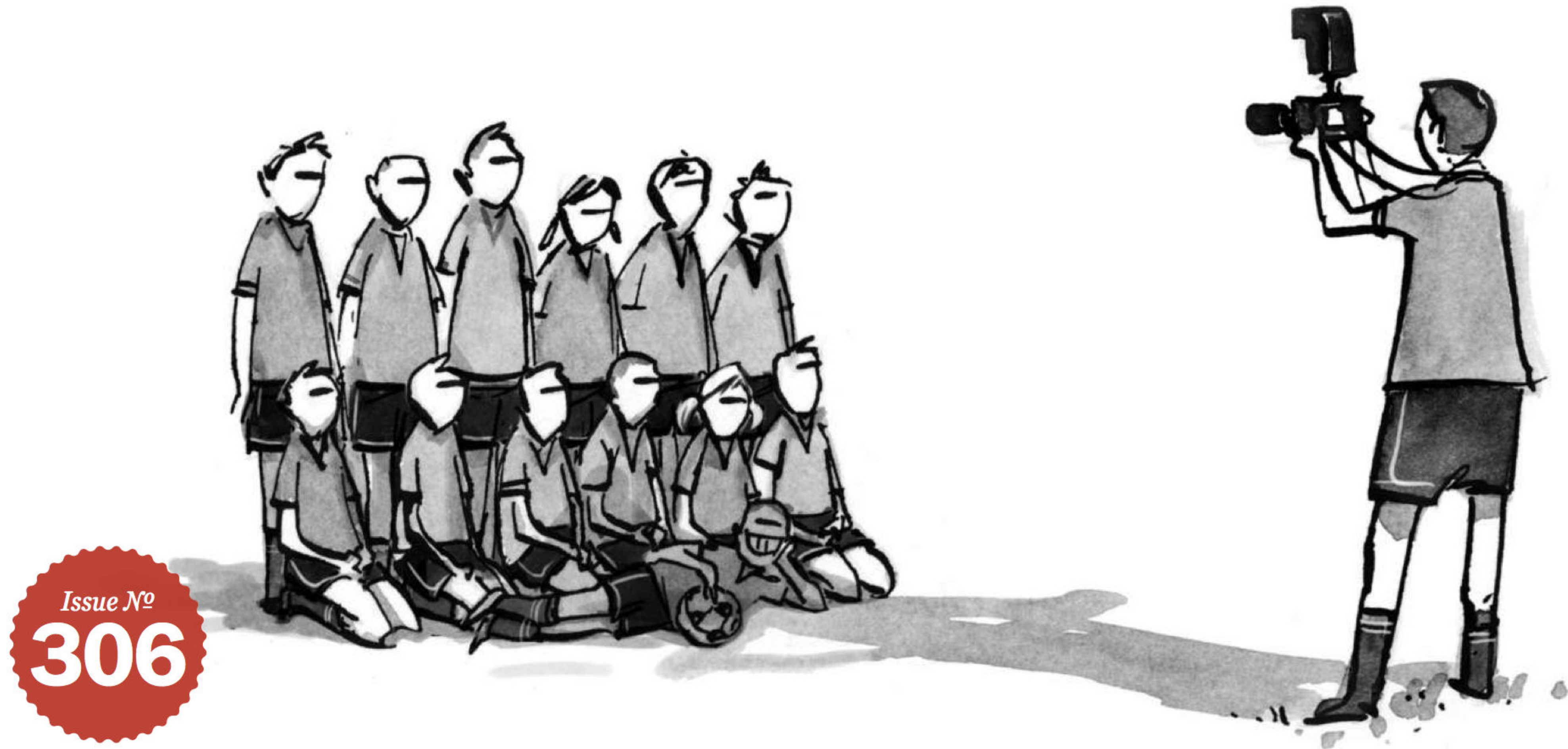
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What is  
Responsive  
Web Design?



# A LIST A PART



Issue No  
**306**

## 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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- 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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Hours, Prices, Directions  
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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Fun family activities all around the Zoo.

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# 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: 768px)`, 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



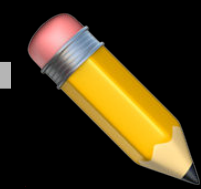
@media style rules

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 declaration is the same as the general declaration — & 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, `<a href="http://www.hplovecraft.com/writings/">Writings</a>` 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 `<img>` or `<tr>` to break across pages



## PRO TIP

To test print styles, use Print Preview 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: 769px)` is an *media feature*

If the media (in this case, the viewport) has a `min-width` of `769px`, 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 <b>The Tender Land</b> January 2007		Eric Satie <b>Gymnopedie 1, 2</b> February 2007
	01/12/07 <b>Middlebury College Center for the Arts</b> 8:00 pm		02/03/07 <b>Johnson State College Dibden Center for the Arts</b> 8:00 pm
	01/19/07 <b>Johnson State College Dibden Center for the Arts</b> 8:00 pm		02/10/07 <b>Castleton State College Fine Arts Center</b> 8:00 pm
	01/26/07 <b>Lyndon State College Alexander Twilight Theater</b> 8:00 pm		02/17/07 <b>Middlebury College Center for the Arts</b> 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 blues, and some green from trees and parks.

# 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](https://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

MSNBC

Constant Contact

NBA

PayPal

Dell

Target

GoDaddy

Reuters

Bloomberg Business

Wal-Mart

iStock

Codecademy

NASA

Home Depot

Newsweek

StumbleUpon

Digg

Healthcare.gov

PHP.net

SugarSync

BitBucket

Business Insider

Fender

Visual Studio Code

Bootstrap 1: 2011

Bootstrap 2: 2012

Bootstrap 3: 2013

Bootstrap 4: 2018

Bootstrap 5: 2021

Bootstrap 6: ?



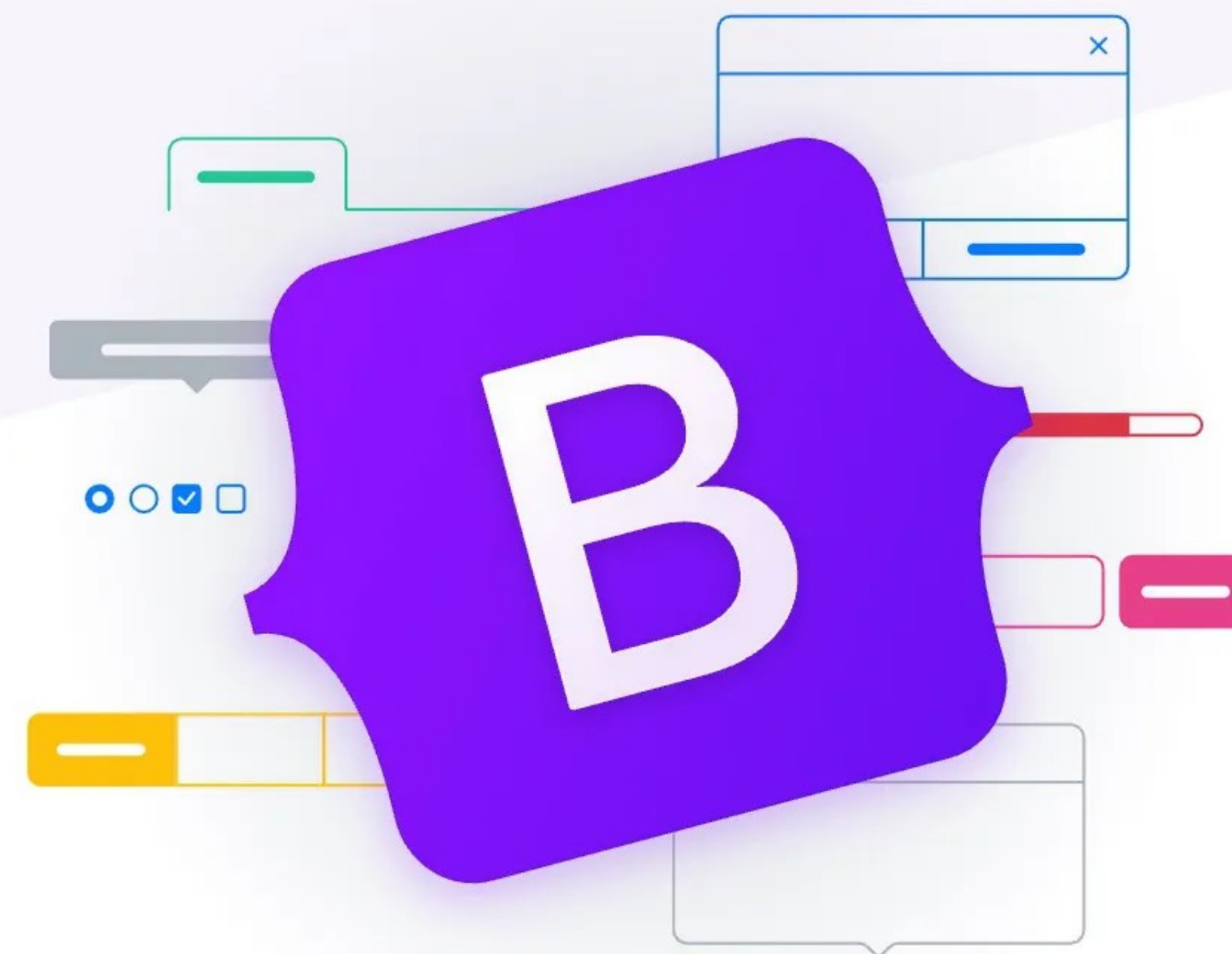
# Build fast, responsive sites with Bootstrap

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

Demographics

[edit]

2010 census

[edit]

As of the <sup>[2]</sup>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 <sup>[4]</sup>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** <sup>(2010)</sup><sup>[2]</sup>

• **Total**

13,065

• **Estimate** <sup>(2012)</sup><sup>[3]</sup>

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<sup>[4]</sup>

**GNIS feature ID**

0721900<sup>[5]</sup>

**Website**

[www.marshall-mo.com](http://www.marshall-mo.com) [↗](#)

Open "https://en.wikipedia.org/wiki/African\_American\_(U.S.\_Census)" in a new tab











```
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 Grannem

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**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
- » Takes control away from users (or is this an advantage?)

# Mobile Designs

Mobile Site



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

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

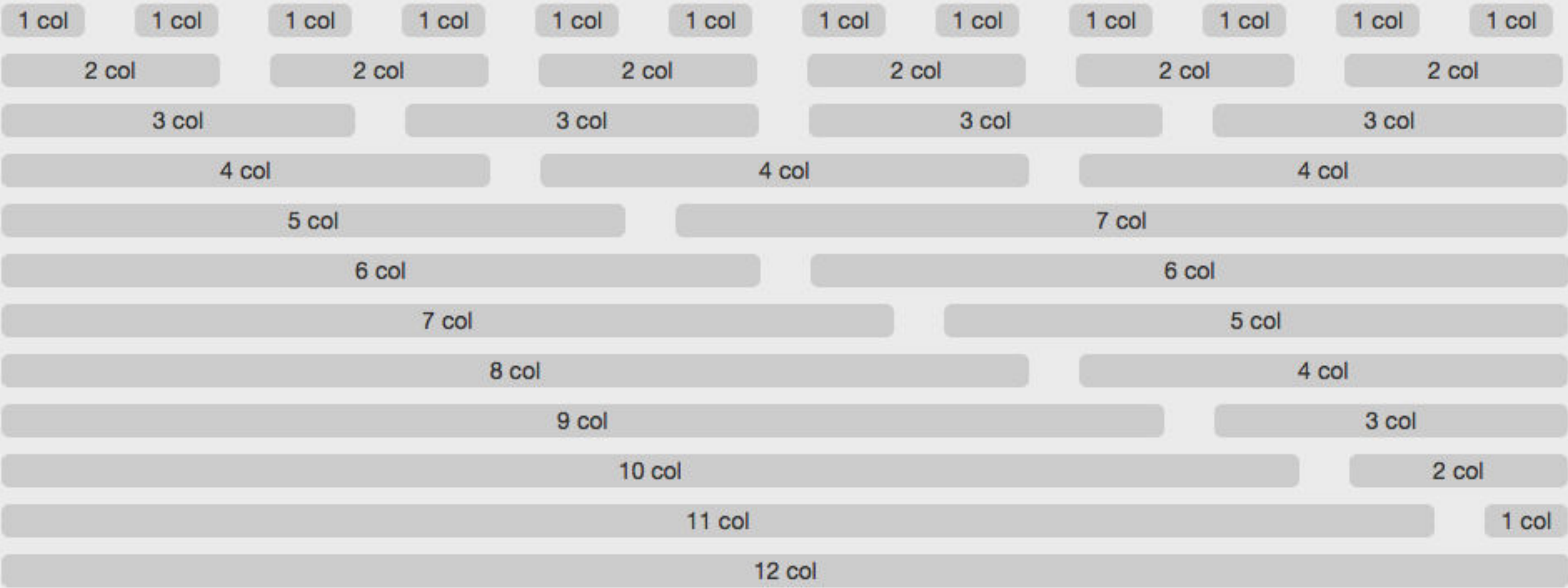
Create 1 site (at 1 URL) with the same content & HTML, but the CSS changes depending upon the width of the browser's or device's viewport, e.g.:

- » 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

# 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





ABOUT

VISIT

ANIMALS

CONSERVATION

EDUCATION

EVENTS

MEMBERSHIP

GIVE



# ZooMail

Join ZooMail to receive updates on events, animals, Zoo attractions and more!

## 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!

## FEATURES

Book a Behind the Scenes Tour

## VISIT

Hours, Prices, Directions  
Zoo Hours: 9 a.m.-5 p.m. daily  
Save with Adventure Passes  
Zoo Attractions  
Plan Your Visit

## CONTACT

Zoo Address & Phone  
Employment  
Contact Us  
Press Room

## SOCIALIZE

Blog

ZooMail



## FEATURES

- Kall's first Cardinals home opener
- St. Louis Children's Hospital Make Tracks for the Zoo
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## CONTACT

Zoo Address & Phone  
Employment  
Contact Us  
Press Room

## SOCIALIZE

Blog

ZooMail



## 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

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

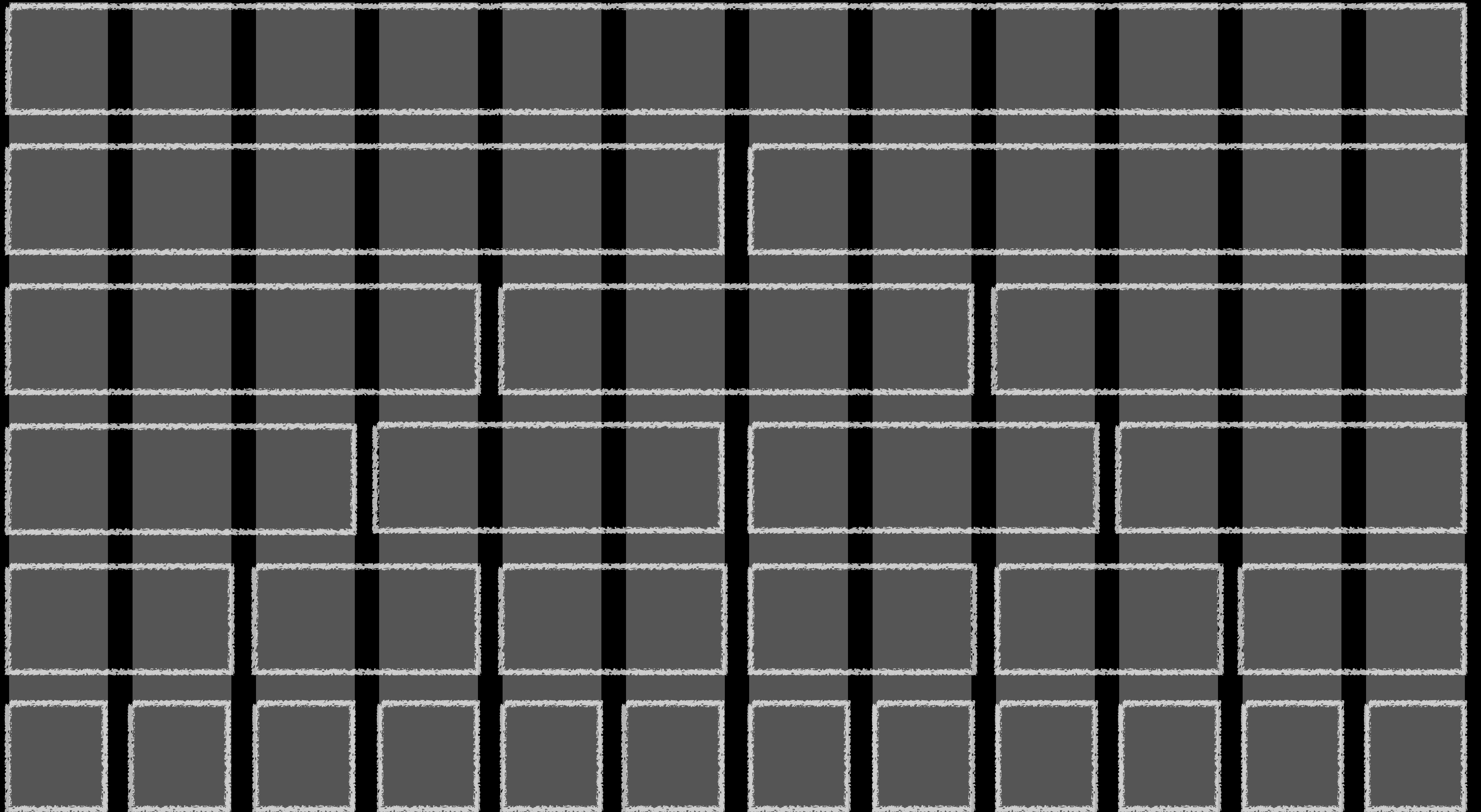
1-665-284-8548

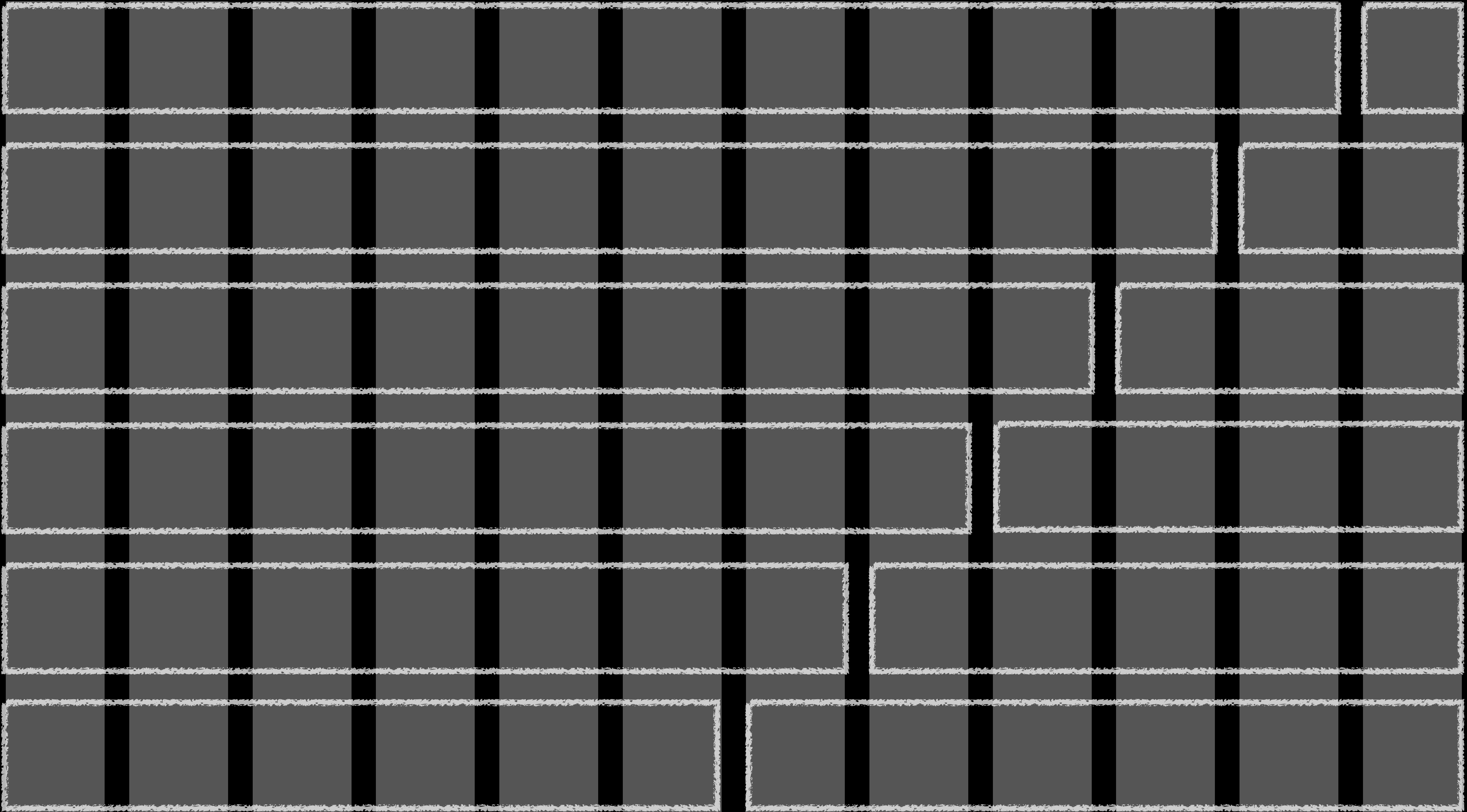
These cards are divided into fourths

© 2021 Herbert West Landscaping

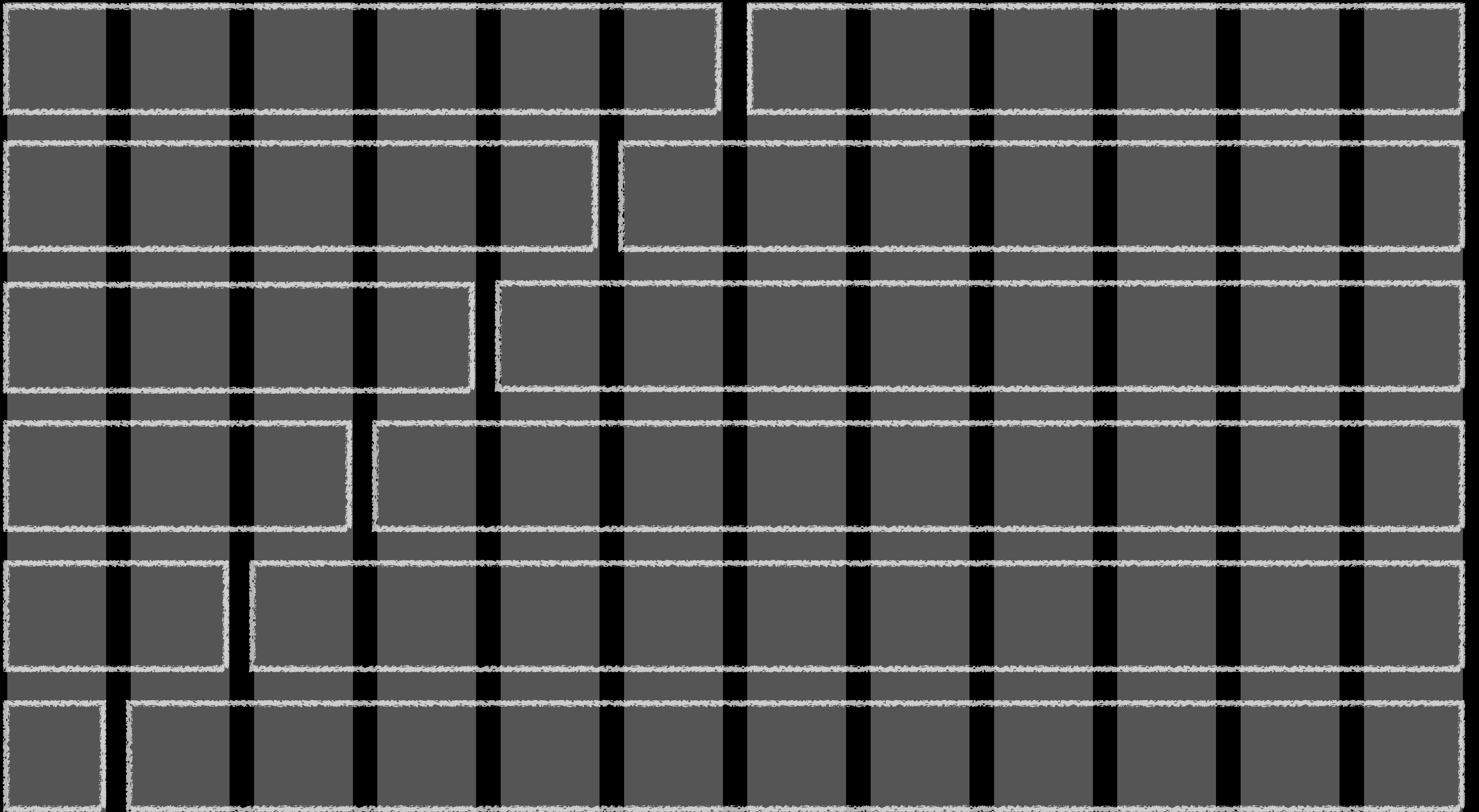












Layouts have to change at different viewport widths to look good & function well

*A breakpoint* is the width at which a layout change occurs

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

Frameworks have pre-defined breakpoints ready for you

## Bootstrap 3 (2013)

Desktops	lg	$\geq 1200$ px
Tablets (landscape)	md	$\geq 922$ px
Tablets (portrait)	sm	$\geq 768$ 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 &amp; Features

Brand Communication

Footer





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started.Transfer  
Open  
House  
Oct. 3

register

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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...

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Proudly sponsored by the [Sisters of St. Joseph of Carondelet](#)

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





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## STUDENT LIFE

<a href="#">Activities</a>	<a href="#">Intramurals</a>	<a href="#">Orientation</a>	<a href="#">Student Affairs</a>
<a href="#">Bookstore</a>	<a href="#">Leadership Development</a>	<a href="#">Parents</a>	<a href="#">Study Abroad</a>
<a href="#">Campus Ministry</a>	<a href="#">Multicultural Affairs</a>	<a href="#">Personal Counseling</a>	<a href="#">What's to Eat?</a>
<a href="#">Career Services</a>	<a href="#">Organizations</a>	<a href="#">Residential Living</a>	



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

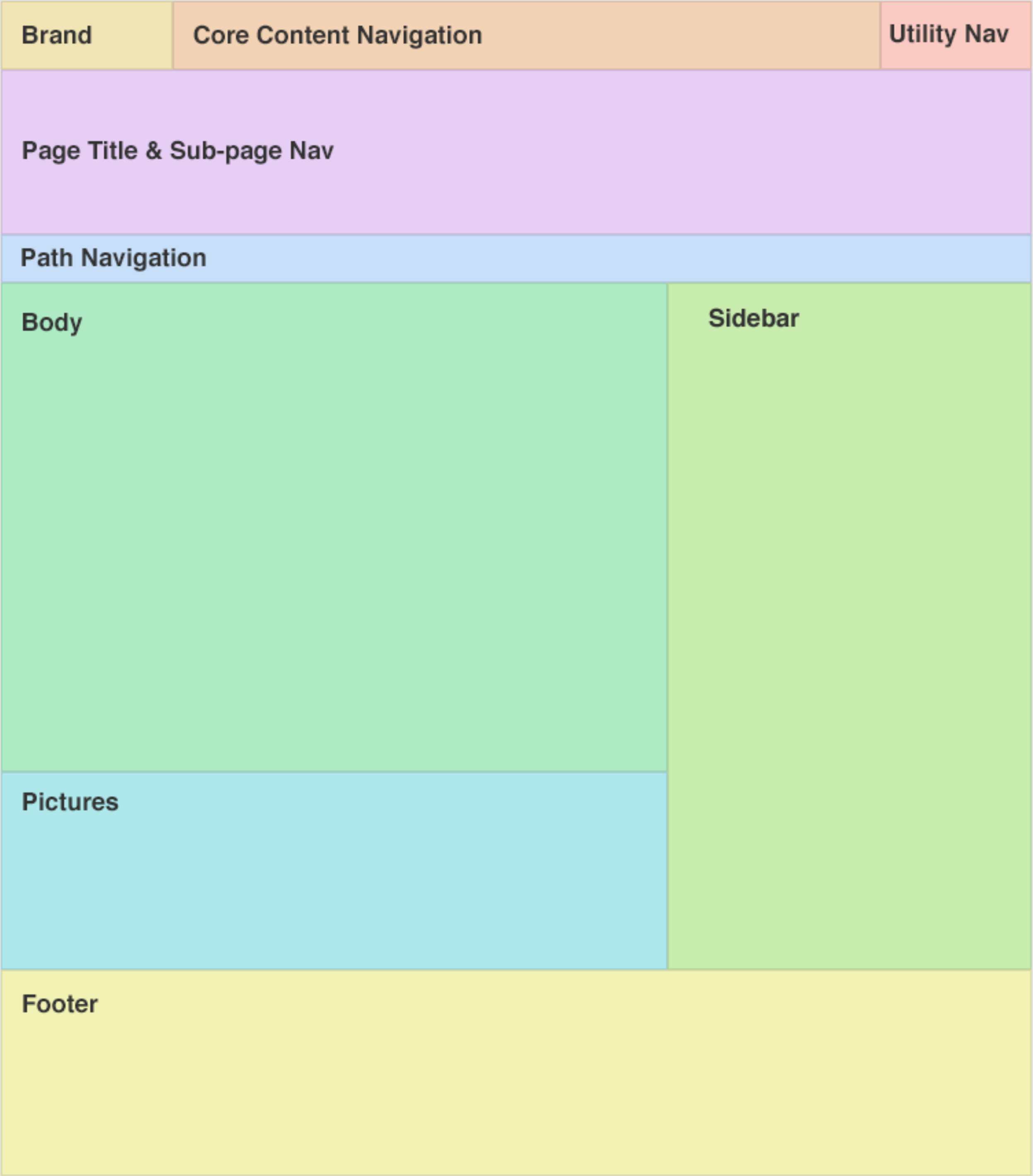


Responsive design

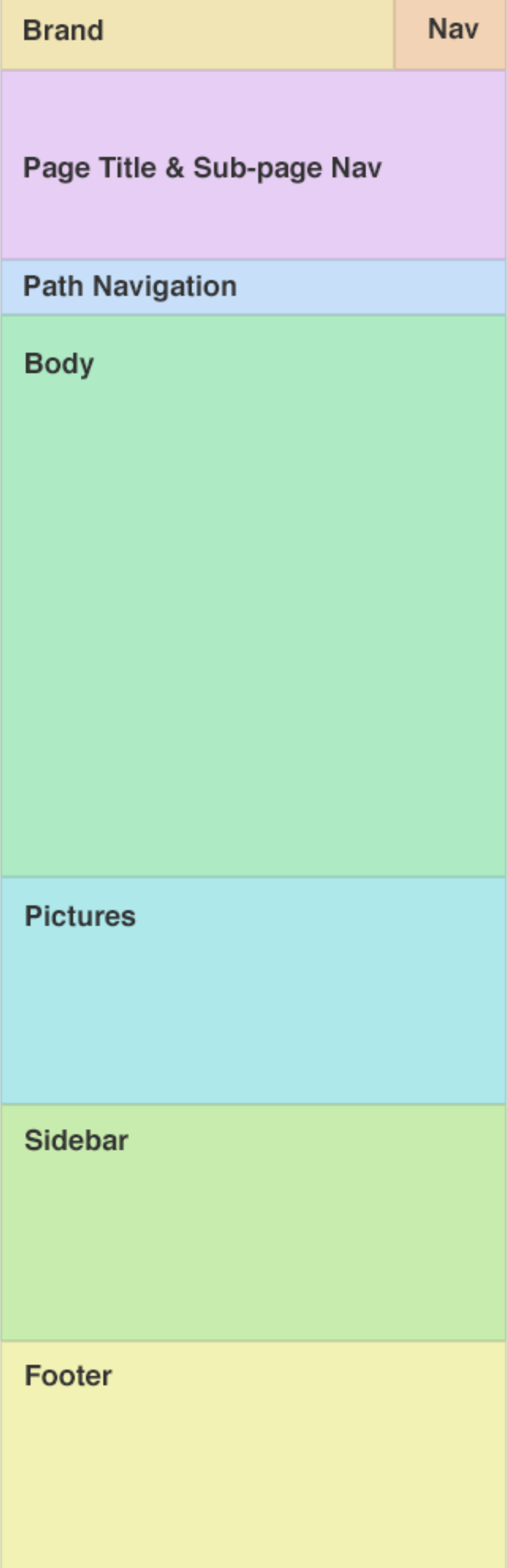








sm



xs

# 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.min.css" rel="stylesheet">

    <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.bundle.min.js" rel="script"></script>

    <!-- Option 2: Separate Popper and Bootstrap JS -->
    <!--
    <script src="https://cdn.jsdelivr.net/npm/@popperjs/core@2.10.2/dist/umd/popper.min.js" rel="script"></script>
    <script src="https://cdn.jsdelivr.net/npm/bootstrap@5.1.3/dist/js/bootstrap.min.js" rel="script"></script>
    -->
  </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 Caring for the Wild campaign.

Saint Louis Zoo

- SEARCH
- FEATURES
- Penguin & Puffin Coast
  - Specialty Adoption: Cuddle with a gorilla monkey!
  - Baby Gorilla Monday
  - Delta Dental [Polar Bear](#) and [Puffin](#) Give
  - Unleash Your Inner [Superhero](#) at the Zoo
  - [Polar Bear](#) Give: 3.4.6 for saving polar bears!

- 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  
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-



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# 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](#).*

Subscribe to News via:

- [RSS Reader](#)
- [Email](#)

### [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

[Introduction](#)[Download](#)[Contents](#)[Browsers & devices](#)[JavaScript](#)[Webpack](#)[Parcel](#)[Vite](#)[Accessibility](#)[RFS](#)[RTL](#)[Contribute](#)

## 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

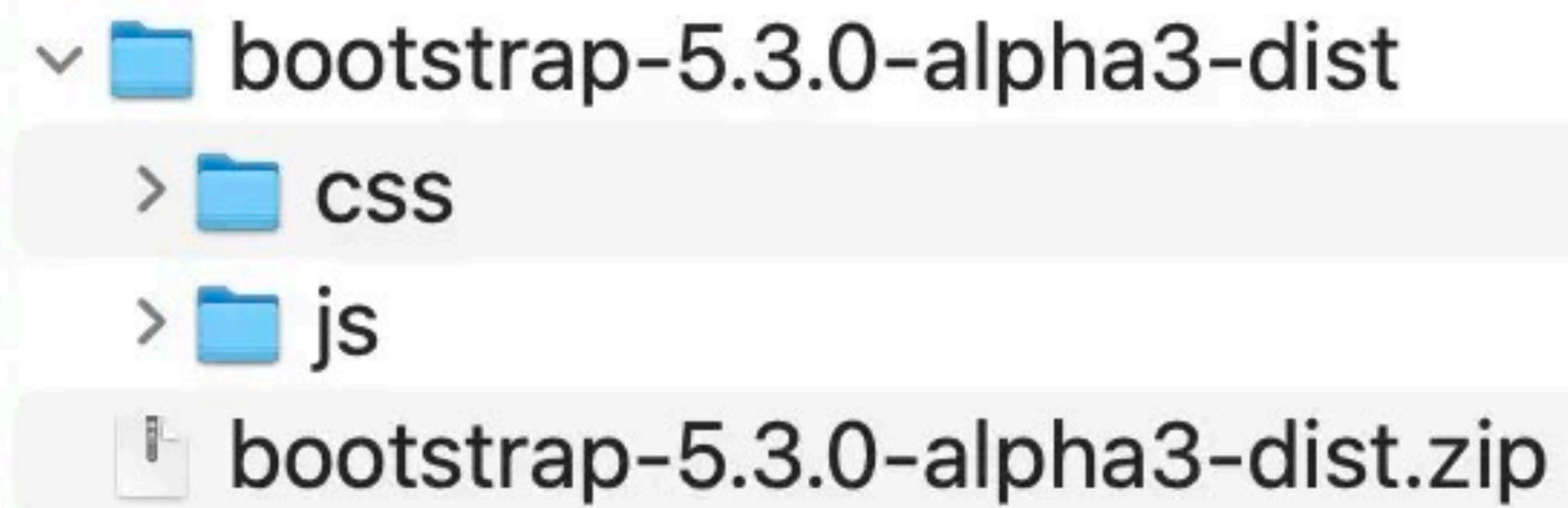


>  bootstrap-5.3.0-alpha3-dist  
 bootstrap-5.3.0-alpha3-dist.zip

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  
`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

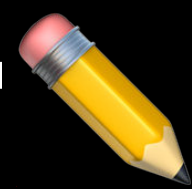
▼  js

 bootstrap.bundle.js

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>
```

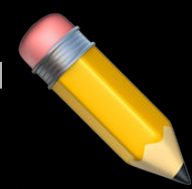
You *must* keep the JavaScript, or things will break (e.g.,  
dropdown menus)

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





## SIDE NOTE

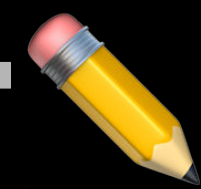
What is jQuery?

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

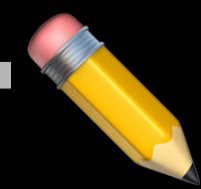


## SIDE NOTE

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





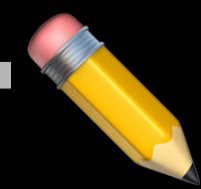
## SIDE NOTE

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

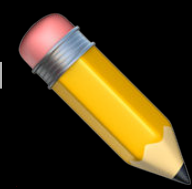
## Disadvantages

- » 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 &gt; ...

```
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
17 </head>
18
19 <body>
```

CDN



0 0

Live Share



GIST [github]



W3C validation



Assignments &gt; bootstrap-5-101



[off]





bootstrap-5-template.html



bootstrap-5-template.html &gt; ...

```
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
      +IlRH9sENB00LRn5q+8nbTov4+1p" crossorigin="anonymous"></script>
20 </body>
21 </html>
22
```

CDN



0 0

Live Share



GIST [github]

W3C validation

Assignments &gt; 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 ~9000 lines—do not read it!

Read the documentation at [getbootstrap.com](https://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







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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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- Build tools
- Webpack
- Accessibility
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# Introduction

Get started with Bootstrap, the world’s most popular framework for building responsive, mobile-first sites, with BootstrapCDN and a template starter page.

## 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
```

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- Important globals
  - HTML5 doctype
  - Responsive meta tag
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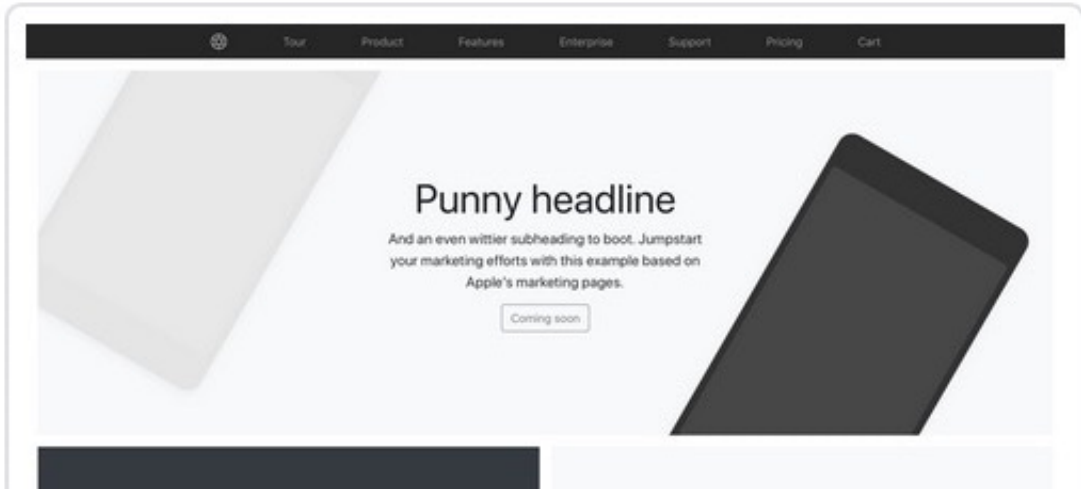
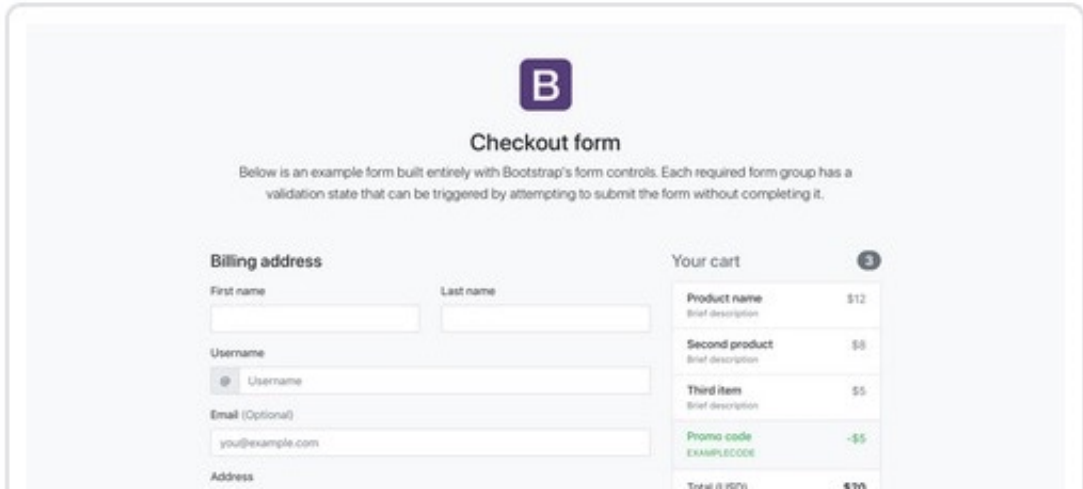
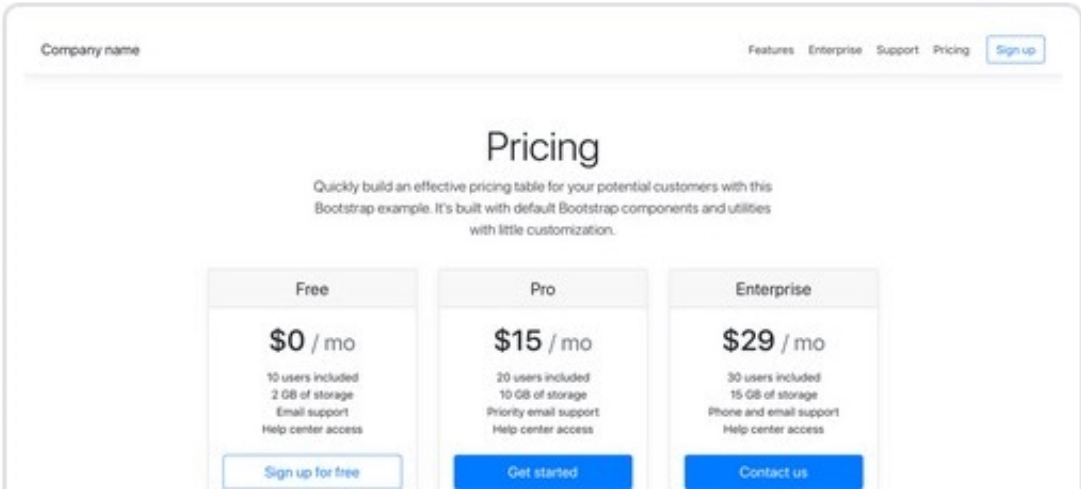
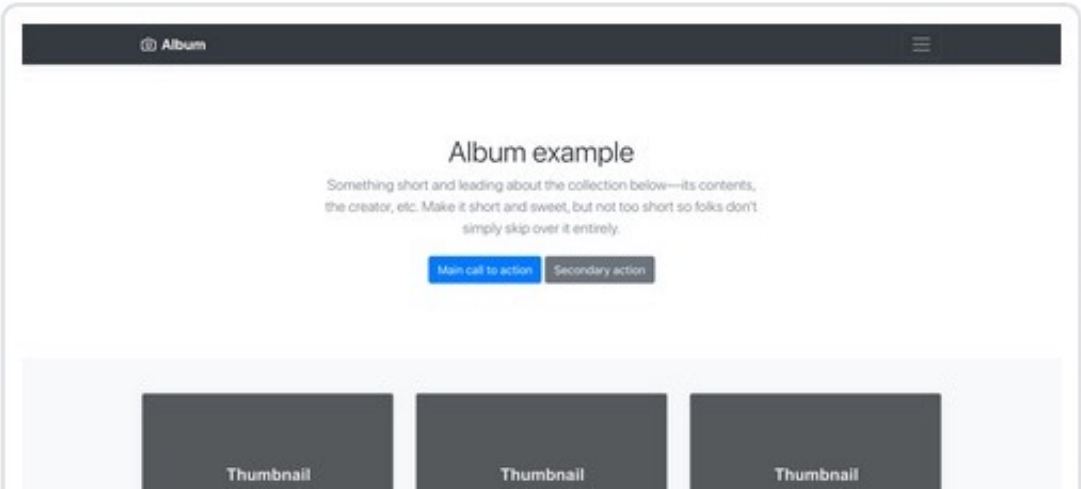
# Examples

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.





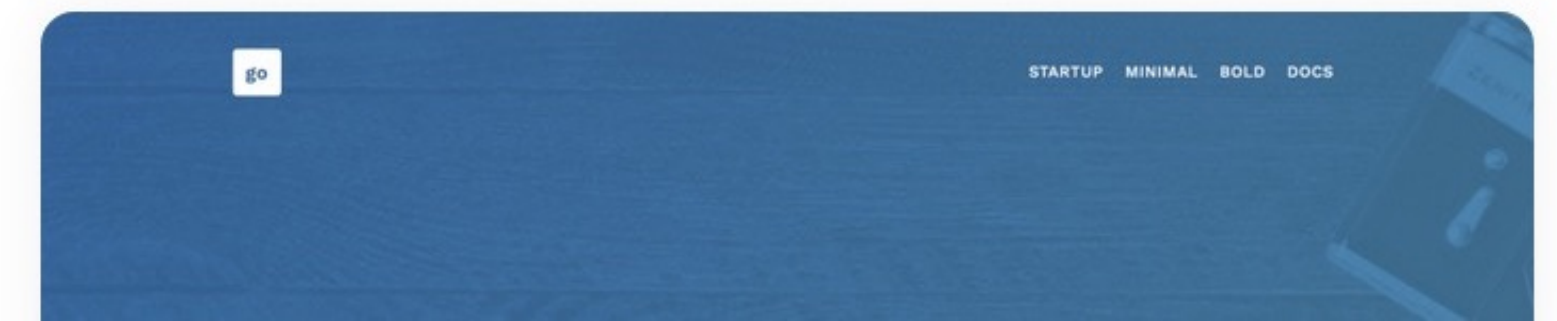
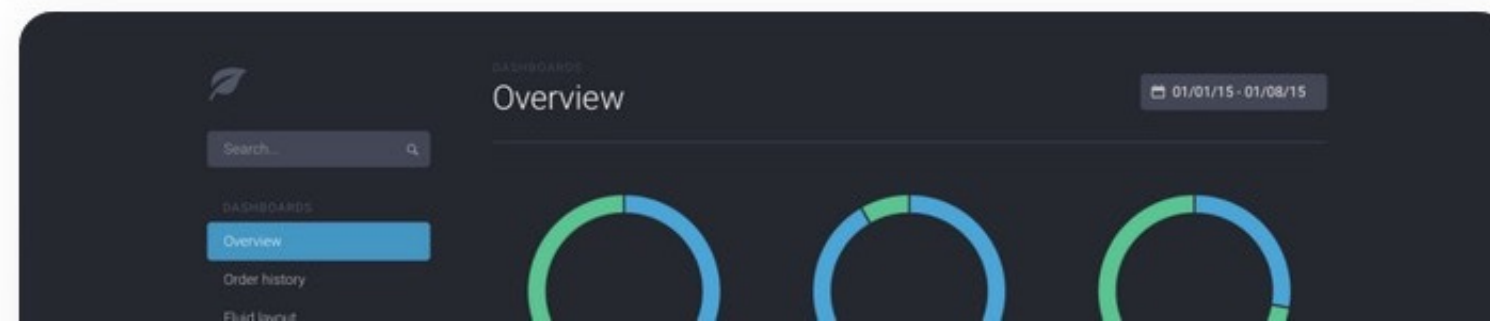
# Build anything

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.

- Home
- About
- Resources

Suggest a site  
RSS feed  
Twitter

## CREATIVE TIM

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## 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

AWWARDS®

## CREATIVE BLOQ

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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```

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Search...

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Grid

Media object

Utilities for layout

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Utilities

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# 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

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- Page defaults
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  - Summary
- HTML5 [hidden] attribute





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  - 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
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  - Colors
  - Display
  - Embed
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  - Float
  - Image replacement
  - Position
  - Screenreaders
  - Shadows

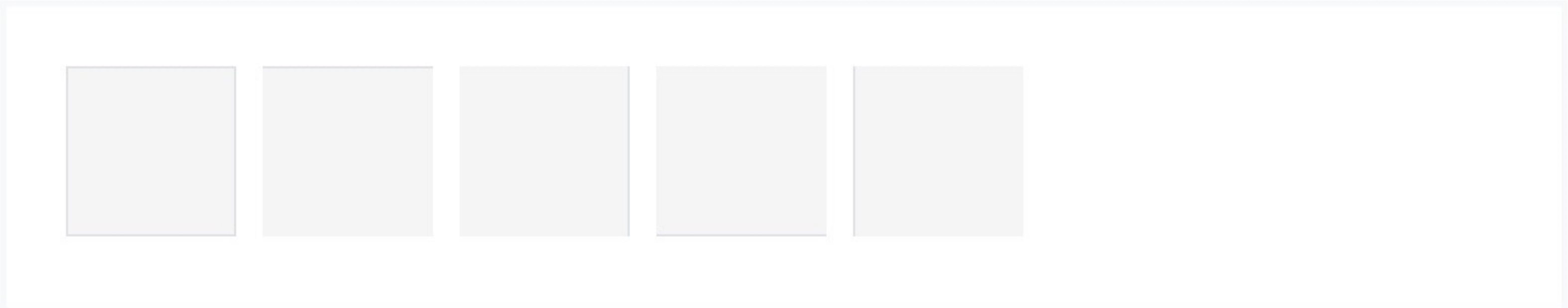
# Borders

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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# 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

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# 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

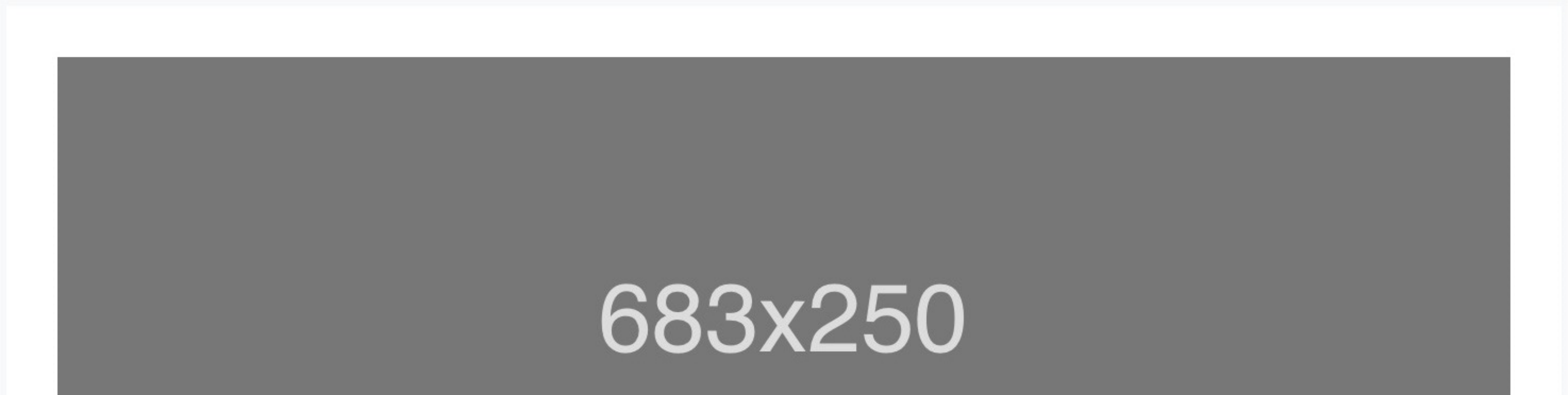


# Images

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.



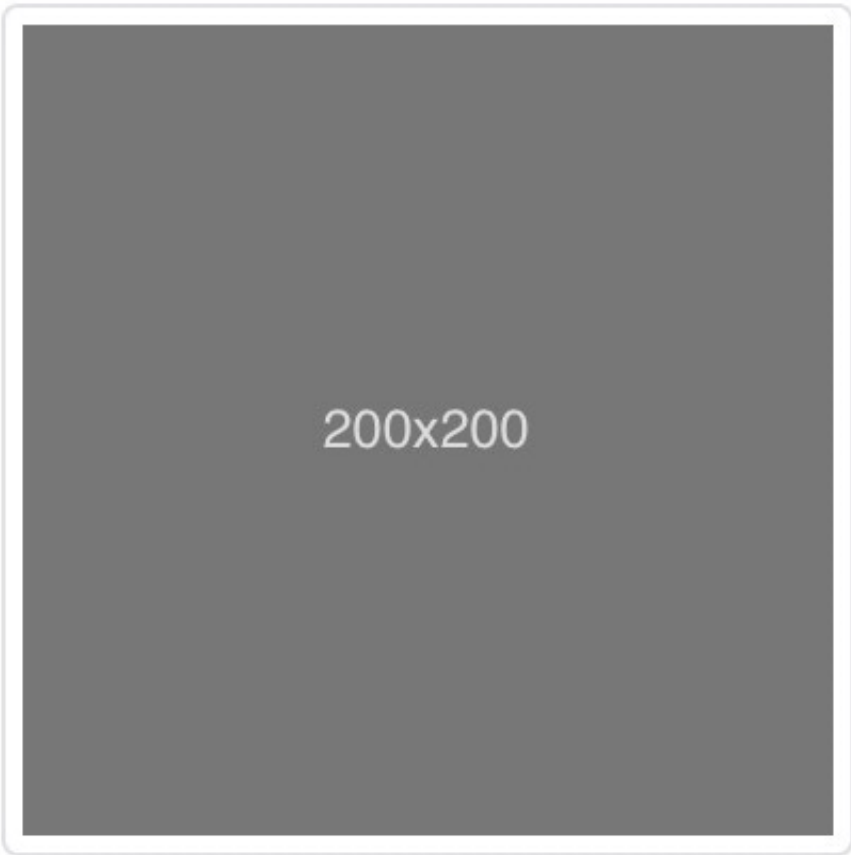
- Responsive images
- Image thumbnails
- Aligning images
- Picture



- Getting started
- Layout
- Content
  - Reboot
  - Typography
  - Code
- Images
- Tables
- Figures
- Components
- Utilities
- Extend
- Migration
- 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](#).



- Getting started
- Layout
- Content
  - Reboot
  - Typography
  - Code
- Images
- Tables
- Figures
- Components
- Utilities
- Extend
- Migration
- 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](#).



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

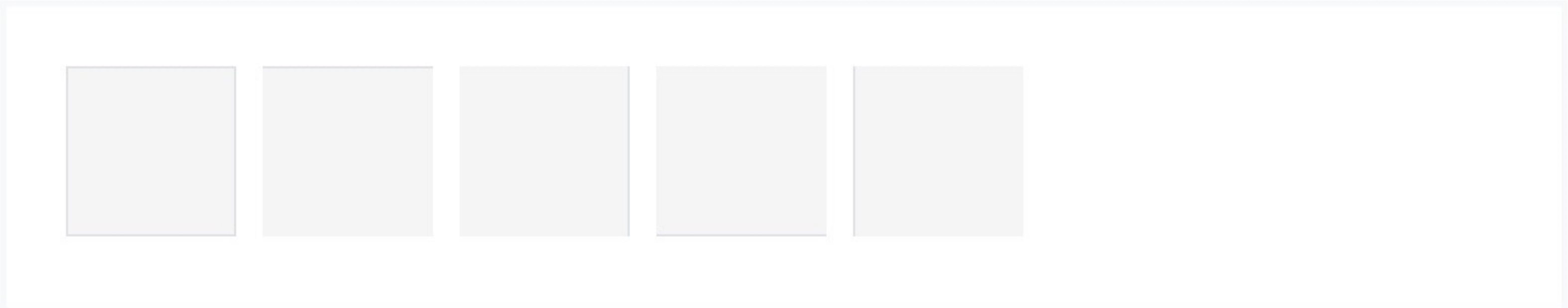
# Borders

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





Search...

Getting started

Layout

Content

Components

Utilities

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

Content

Components

Utilities

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](https://getbootstrap.com)







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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>

>



rounded"> == \$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

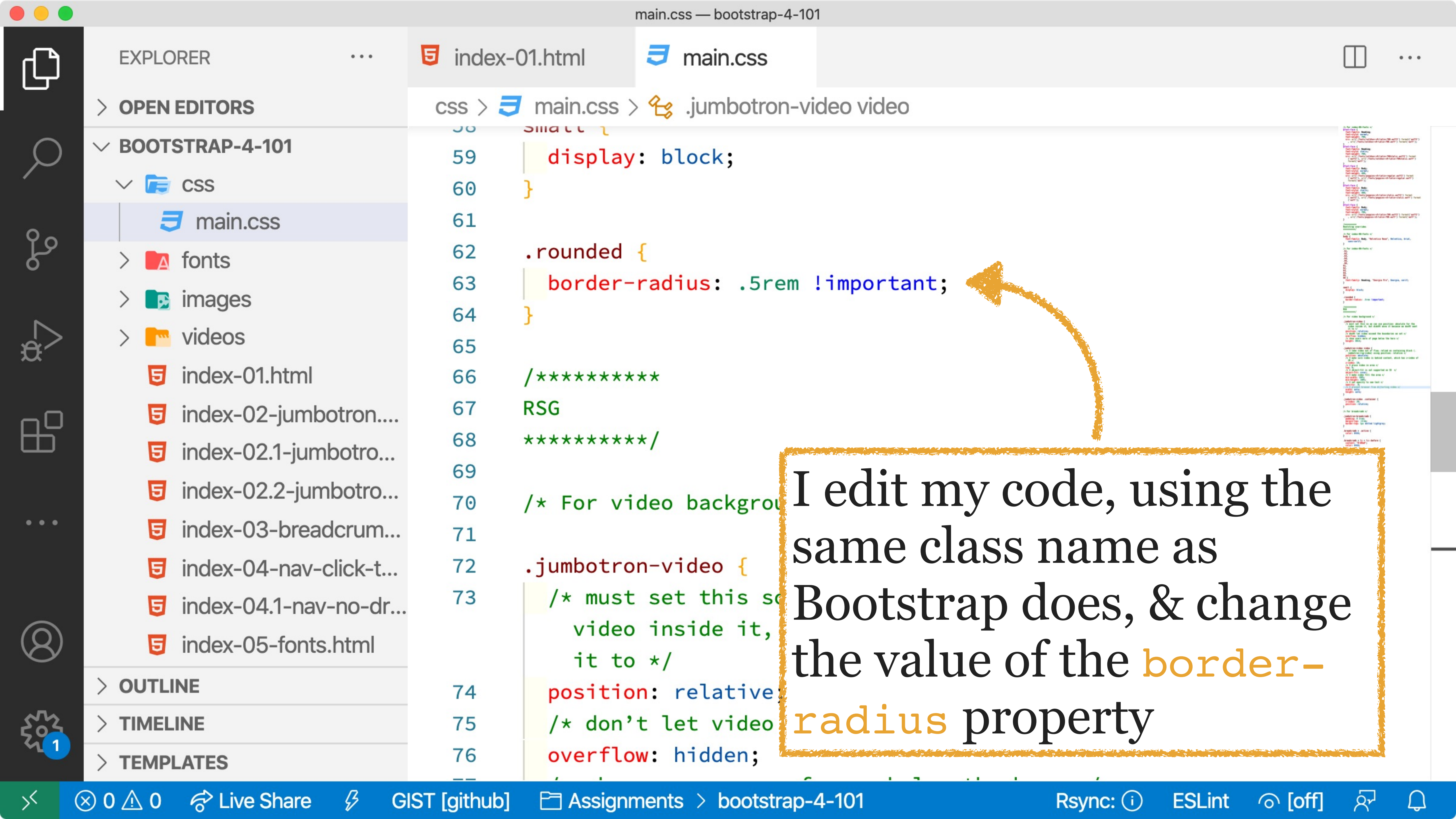
div.row

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

p

img.img-fluid.rounded





I edit my code, using the same class name as Bootstrap does, & change the value of the border-radius property



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...

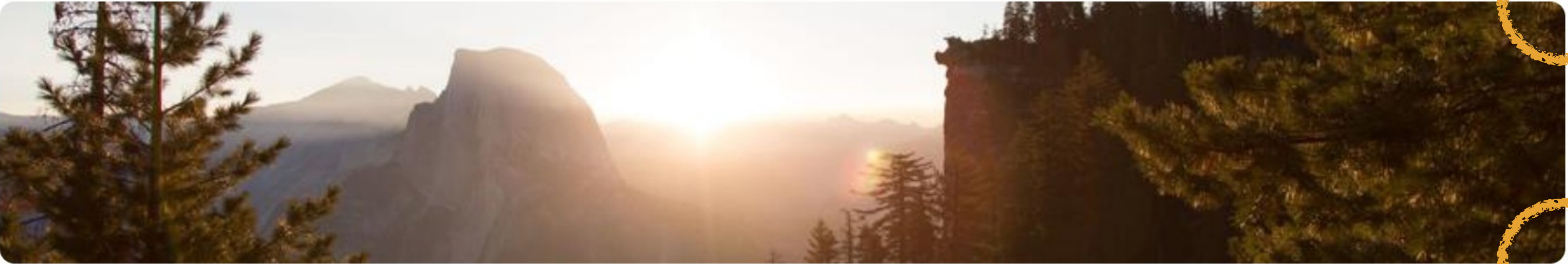
html[stopthemadness-user-select] \* {  
 user-select: text !important;  
}



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| 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

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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 &gt; html &gt; body &gt; div.jumbotron.jumbotron-fluid.jumbotron-breadcrumb &gt; div.container &gt;

```
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>
43
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
```

I add it to my code



0 0

Live Share



GIST [github]

Assignments &gt; bootstrap-4-101

Rsync: ⓘ

ESLint

[off]





## Article Title

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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...">
  </script>
  <script src="https://cdnjs.cloudflare.com/ajax/libs/popper.js/1.14.3/umd/popper.min.js"
    integrity="sha384-ZMP7rVo3mIykV+2+9J3UJ46jBk0WLaUAdn689aCwoqbBJiSnjAK/l8WvCWPIpM49"
    crossorigin="anonymous"></script>
```



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](http://www.fileformat.info/info/unicode/char/search.htm)

## Unicode Character Search

### Unicode Character Search

Query:

☐ include Han codepoints?

Preview:

☐ No

☒ HTML Entities

Search

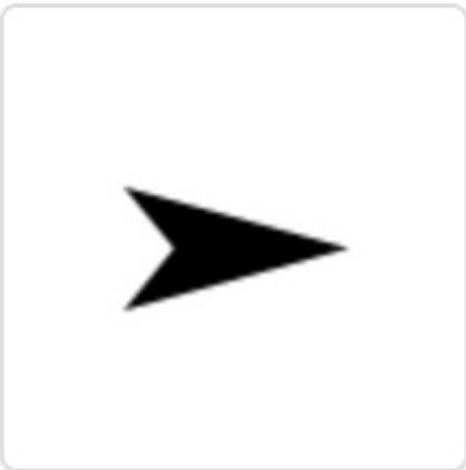
Cancel

[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        | <a href="#">Dingbats</a>           |
| Category     | <a href="#">Symbol, Other [So]</a> |
| Combine      | 0                                  |
| BIDI         | Other Neutrals [ON]                |
| Mirror       | N                                  |
| Old name     | BLACK RIGHT ARROWHEAD              |

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



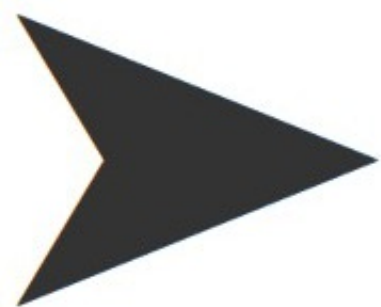
You need a font that supports this character to even have a hope of seeing it correctly in the browser.

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



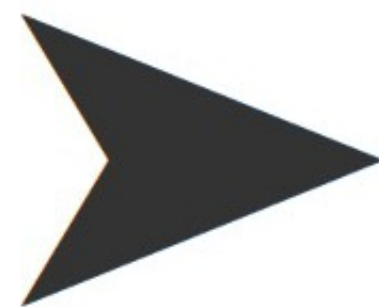
**Image**

*Server-generated*



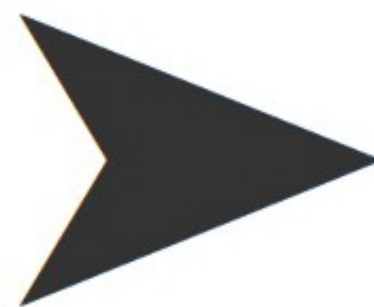
**Decimal Escape**

&#10148;



**Hex Escape**

&#x27a4;



**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

&#10148;



Hex Escape

&#x27a4;



UTF-8

Select & copy

As UTF-8 in an input field

Input test



index-01.html

index-03-breadcrumb.html

main.css



css &gt; main.css &gt; ...

```
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 `>`



0 0

Live Share



GIST [github]

Assignments &gt; bootstrap-4-101

Rsync: ⓘ

ESLint

[off]





## Article Title

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## Aside Title

Proident magna mollit id

Much better — but the gray for the active `<li>` 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.



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

Elements Console Sources Network Performance Memory Application Security Lighthouse CSS Overview

12 | ⚙️ ⋮

Filter :hov .cls +

element.style { }

.breadcrumb-item.active { breadcrumb.scss:39  
✓ color: #6c757d; }

.breadcrumb-item+.breadcrumb-item { breadcrumb.scss:14  
padding-left: .5rem; }

html[stopthemadness-user-select] \* { injected stylesheet  
user-select: text !important; }

\*, ::after, ::before { reboot.scss:24  
box-sizing: border-box; }

li { user agent stylesheet  
text-align: left; }

li { injected stylesheet  
font-weight: normal; }

.breadcrumb { breadcrumb.scss:2  
display: -ms-flexbox;  
display: flex;

```
<!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"> == $a
            ::before
            "Colostomo 1000"
          </li>
        </ol>
      </nav>
    </div>
  <div class="container">...</div>
  <footer>...</footer>
  <script src="https://code.jquery.com/jquery-3.5.1.slim.min.js" integrity="sha384-q81/
X+965Dz00rT7abK41JStQIAqVgRVzpbzo5smXKp4YfRvH+8abtTE1Pi6jizo" crossorigin="anonymous">
  </script>
```

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



css &gt; main.css &gt; ...

```
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**



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

Elements Console Sources Network Performance Memory Application Security Lighthouse CSS Overview

14

```
<!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"> == $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-box;
}
user agent stylesheet
list-item;
n: -webkit-match-parent;
ol.breadcrumb...
madness-user- injected stylesheet
ct: 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">
html body div div.container nav ol.breadcrumb li.breadcrumb-item.active
```



## Article Title

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## Aside Title

Much better — the darker gray for the active `<li>` 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!



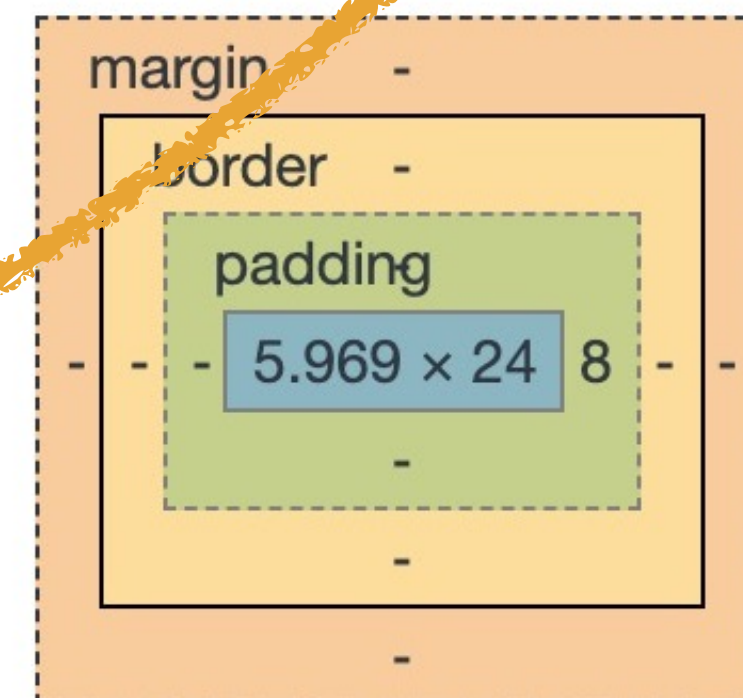
```
<!DOCTYPE html>
<html lang="en" stopthemadness-user-select="true">
  <head>...</head>
  <body>
    <!-- NEW: Breadcrumb -->
    <div class="jumbotron jumbotron-fluid jumbotron-video">...</div>
    <div class="jumbotron jumbotron-fluid jumbotron-breadcrumb">
      <div class="container">
        <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>
          </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+9J3UJ46jBk0WLaUAdn689aCwoqbBJiSnjAK/l8WvCWPIpM49"
    crossorigin="anonymous"></script>
```

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;  
}



Click on the link to  
the Sass file to load it



- ▼  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.woff2
  - ▶  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 `<ul>`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

```

Note that  
we could  
— now v  
\_varial

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)

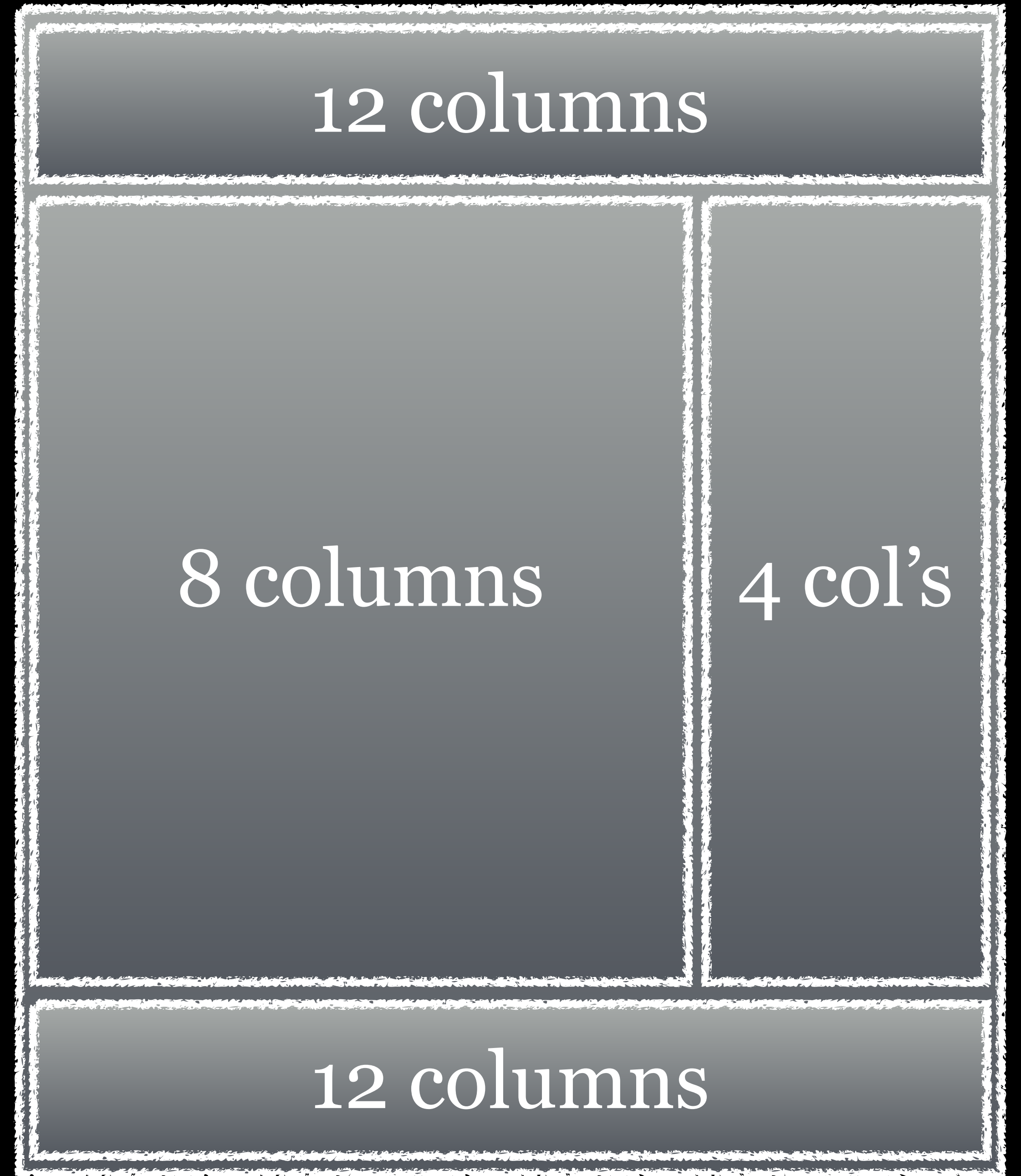
100%

75%

25%

100%





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



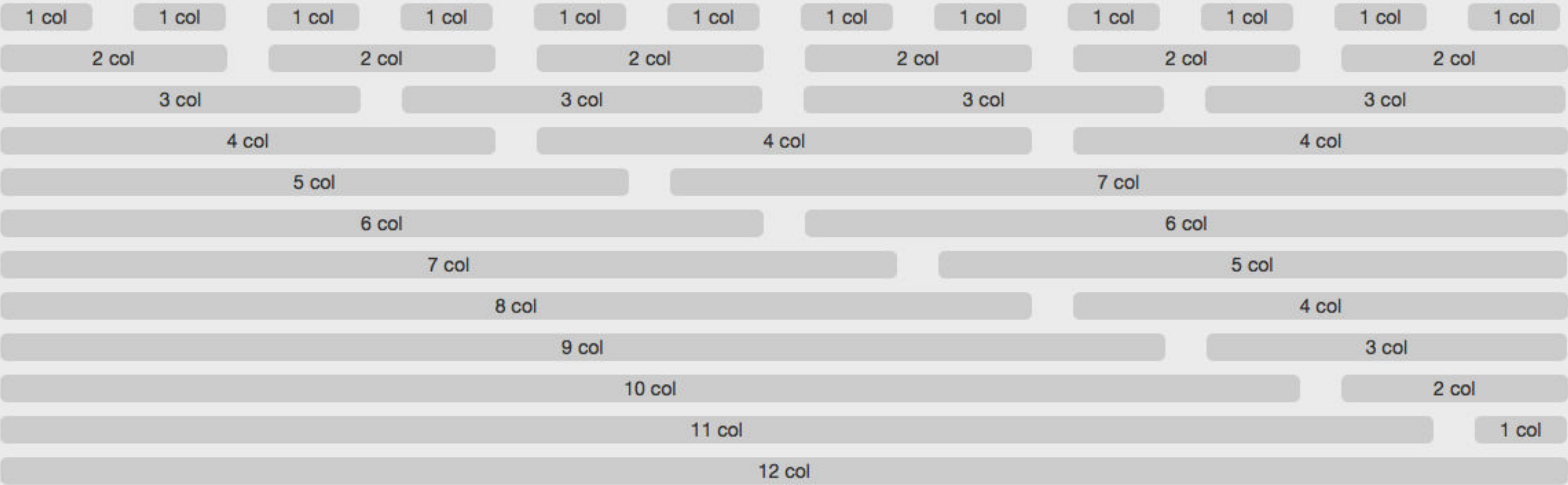
Bootstrap 3			Bootstrap 4		
Desktops	lg	≥1200 px	≥1200 px	xl	Large desktops
Tablets (landscape)	md	≥922 px	≥922 px	lg	Desktops
Tablets (portrait)	sm	≥768 px	≥768 px	md	Tablets
Phones	xs	<768 px	≥576 px	sm	Phones (landscape)
			<576 px	*	Phones (portrait)

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)



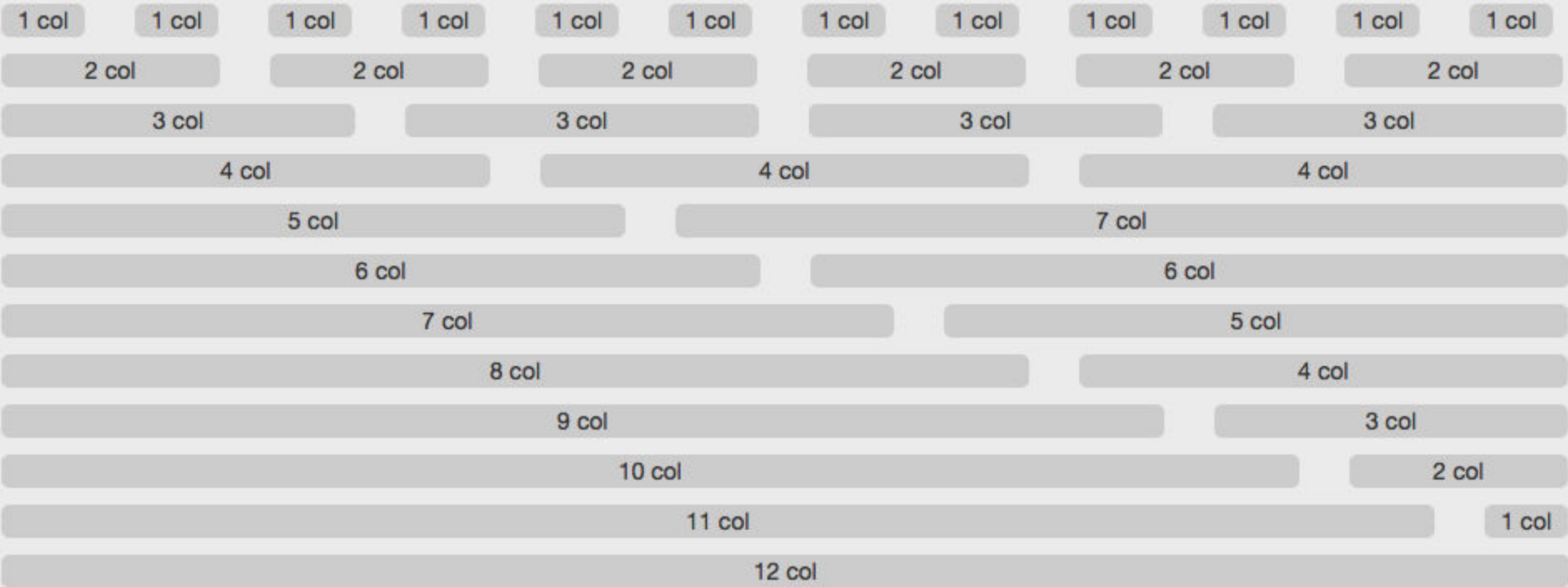
# Large Bootstrap Grid

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



# Medium Bootstrap Grid

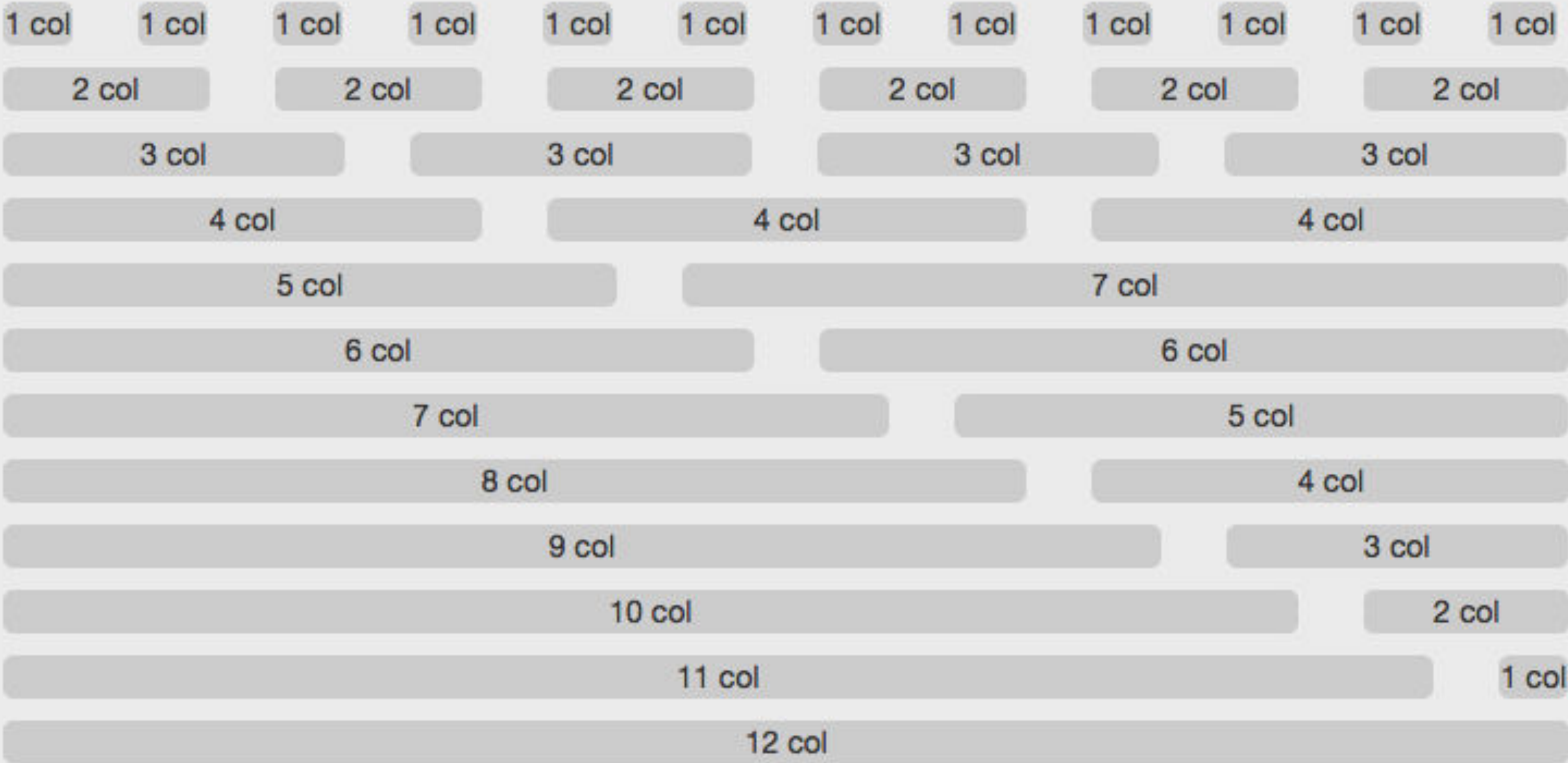
992px to 1199px viewport, fixed widths, 970px container, 30px gutters





# 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

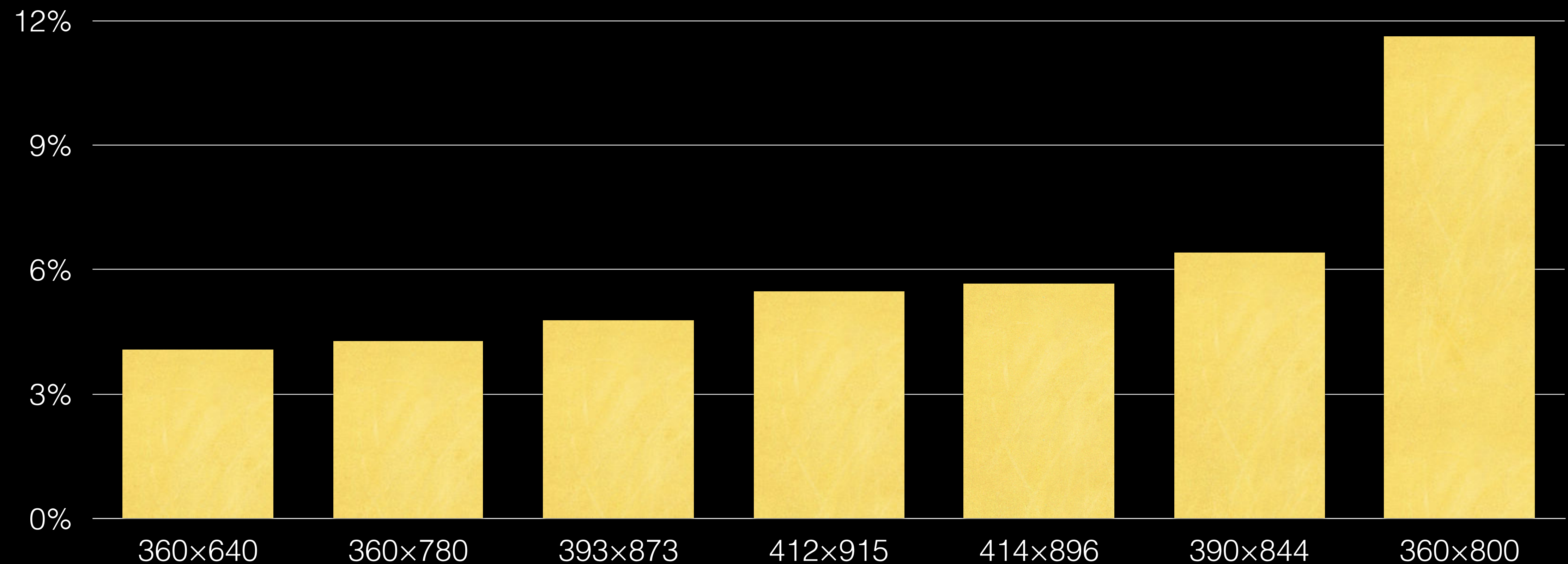


### Extra Small Bootstrap Grid

<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.

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



```
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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# Hello, world!

## Article Title

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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 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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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



```
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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The only immediate children allowed inside rows?

Columns



# Columns

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

# 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">  
    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>

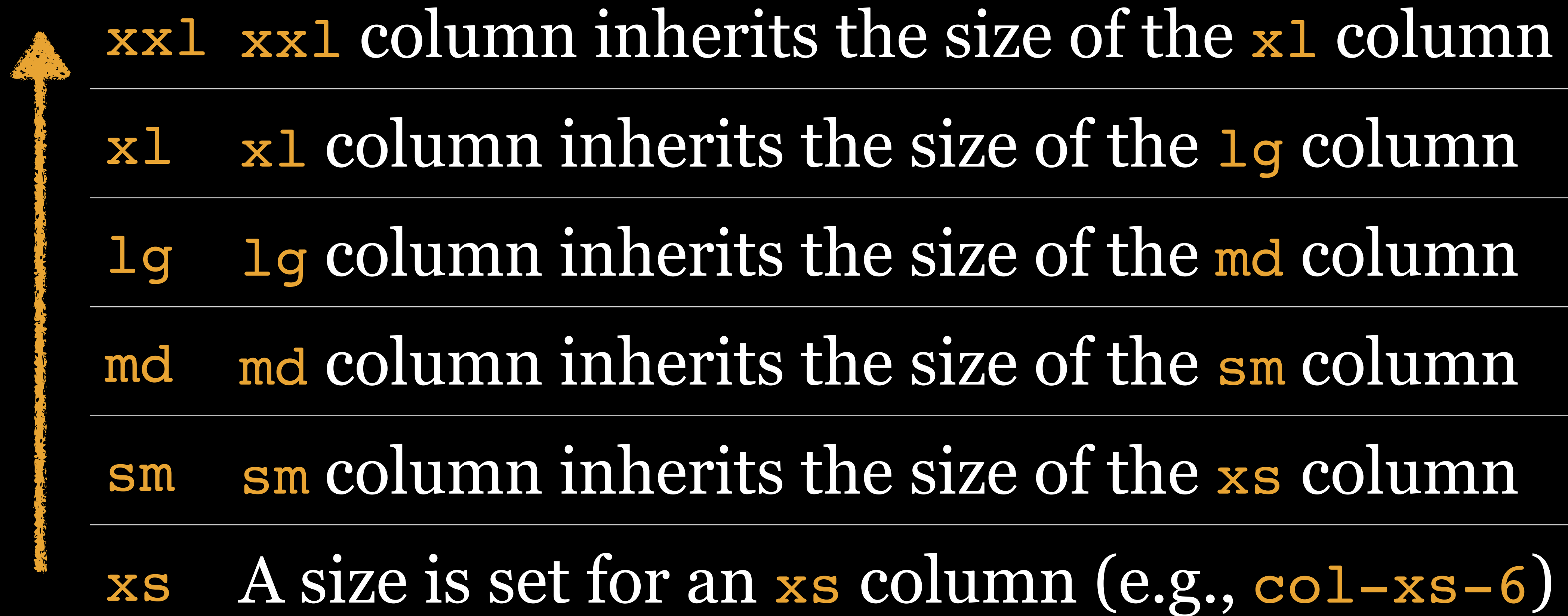




Bootstrap is *mobile-first*

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 ( <b>xs</b> )	Phones	Fluid
Small ( <b>sm</b> )	Tablets	60px
Medium ( <b>md</b> )	Tablets in portrait & desktops	78px
Large ( <b>lg</b> )	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



```
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

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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

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.



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>
6     </section>
7   <section class="col-sm-4">
8     <h2>Section 2</h2>
9     <p>↔</p>
10   </section>
11 <section class="col-sm-4">
12   <h2>Section 3</h2>
13   <p>↔</p>
14 </section>
15 </footer>
16 </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

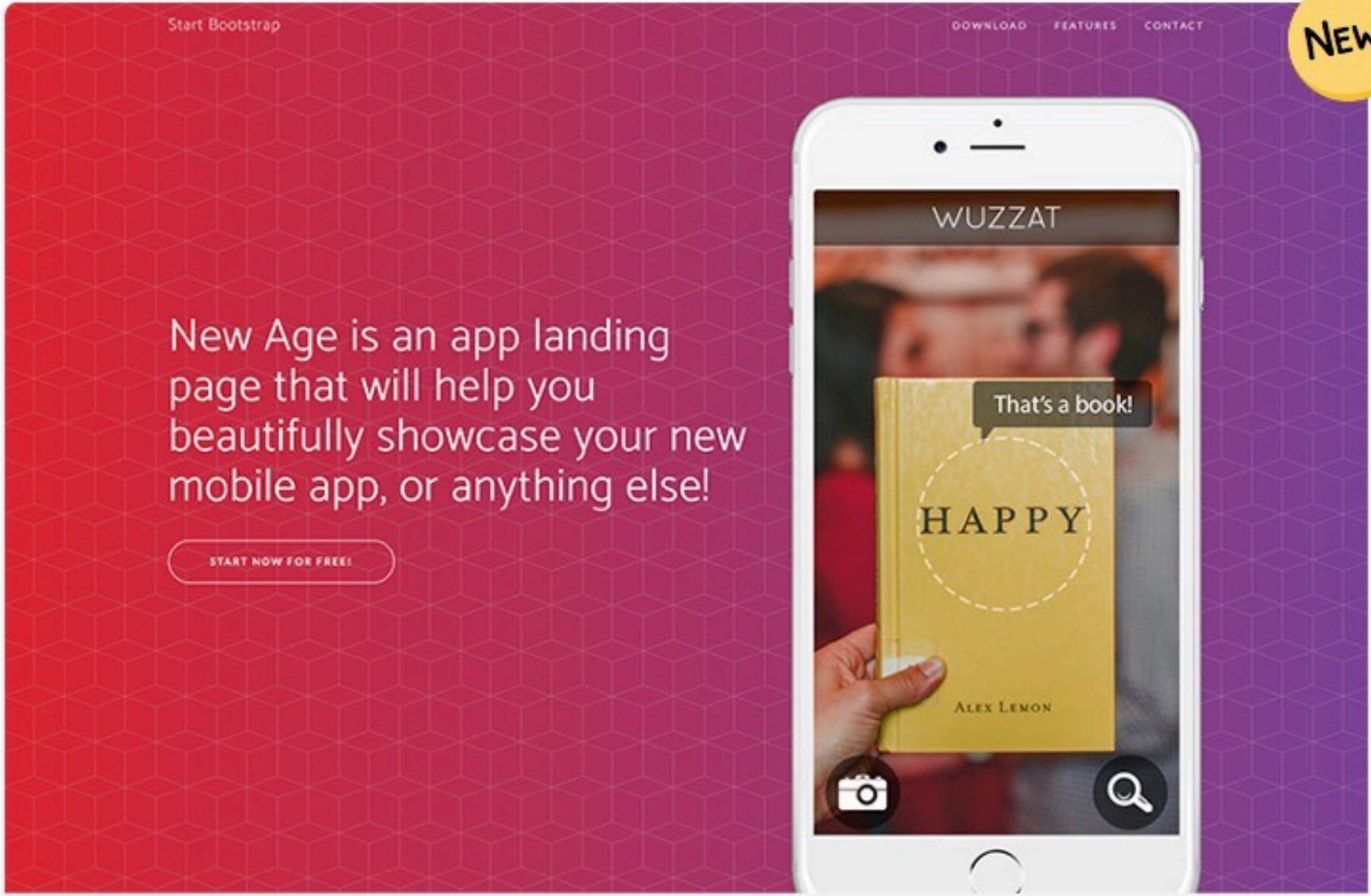
Created and Maintained by David Miller at Blackrock Digital

 Fork  Star 5,519

[➤ Browse Themes & Templates](#)



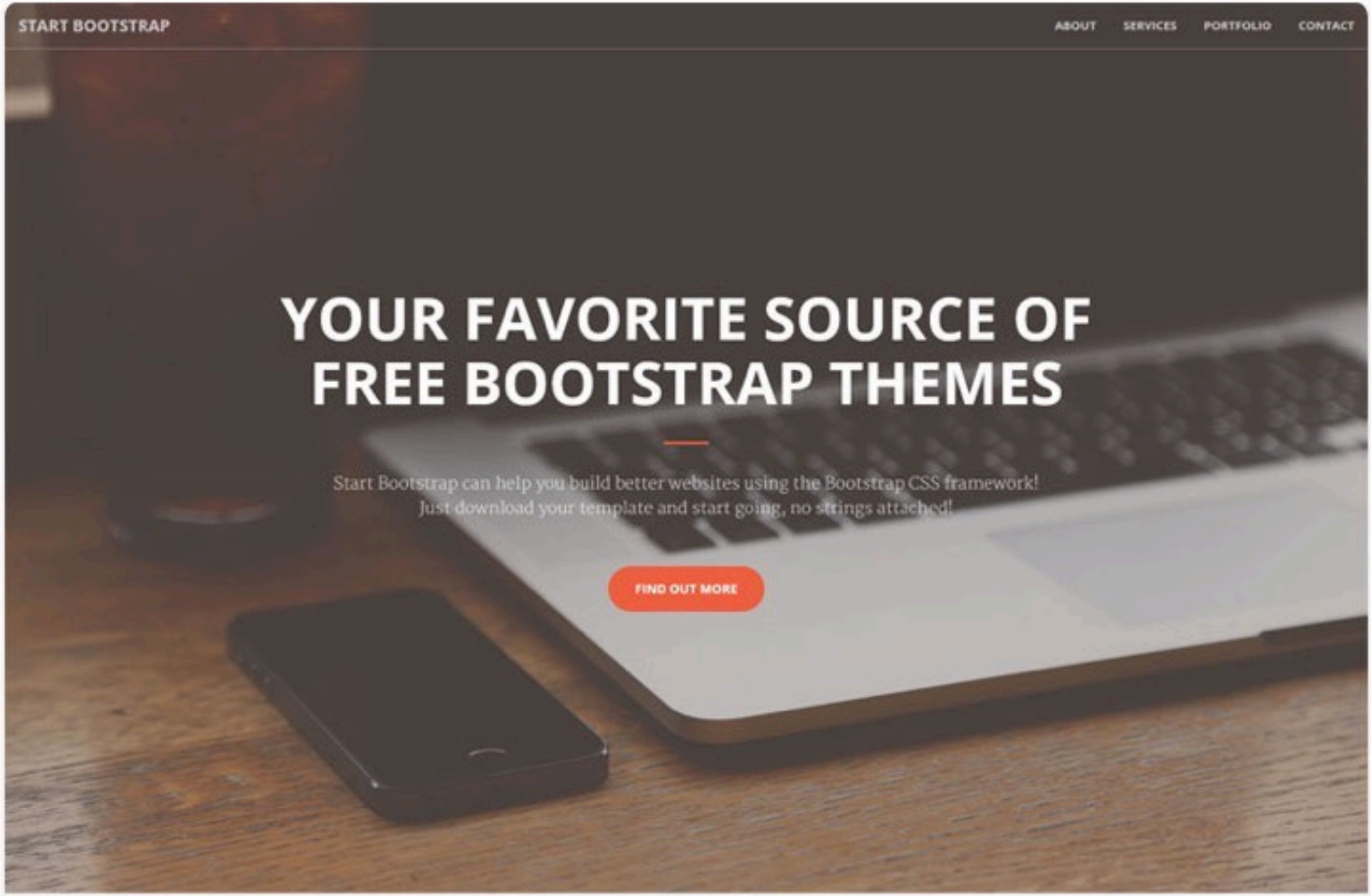




## New Age

An app landing page theme.

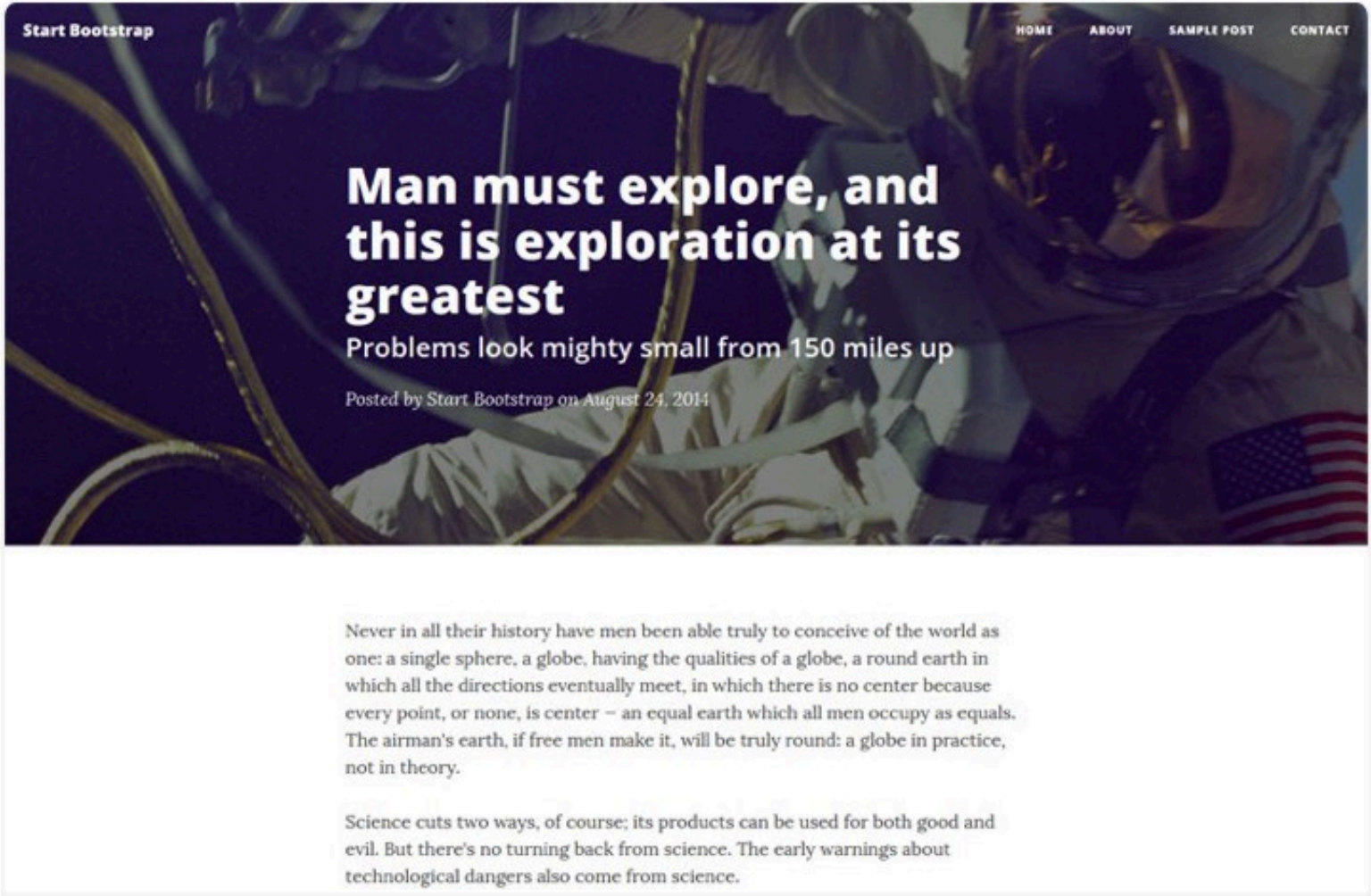
[PREVIEW & DOWNLOAD](#)



## Creative

A one page creative theme.

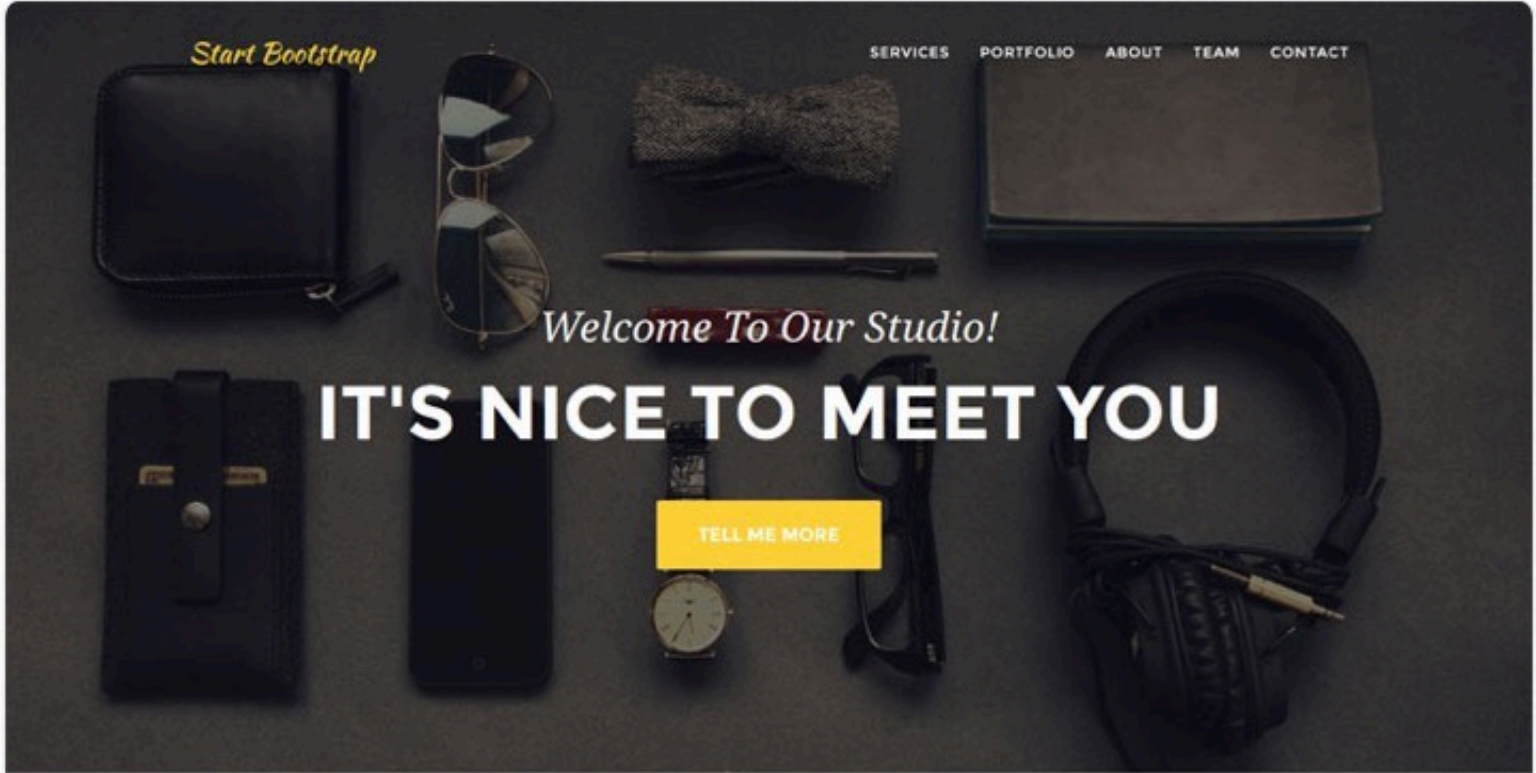
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## Clean Blog

A clean blog theme.

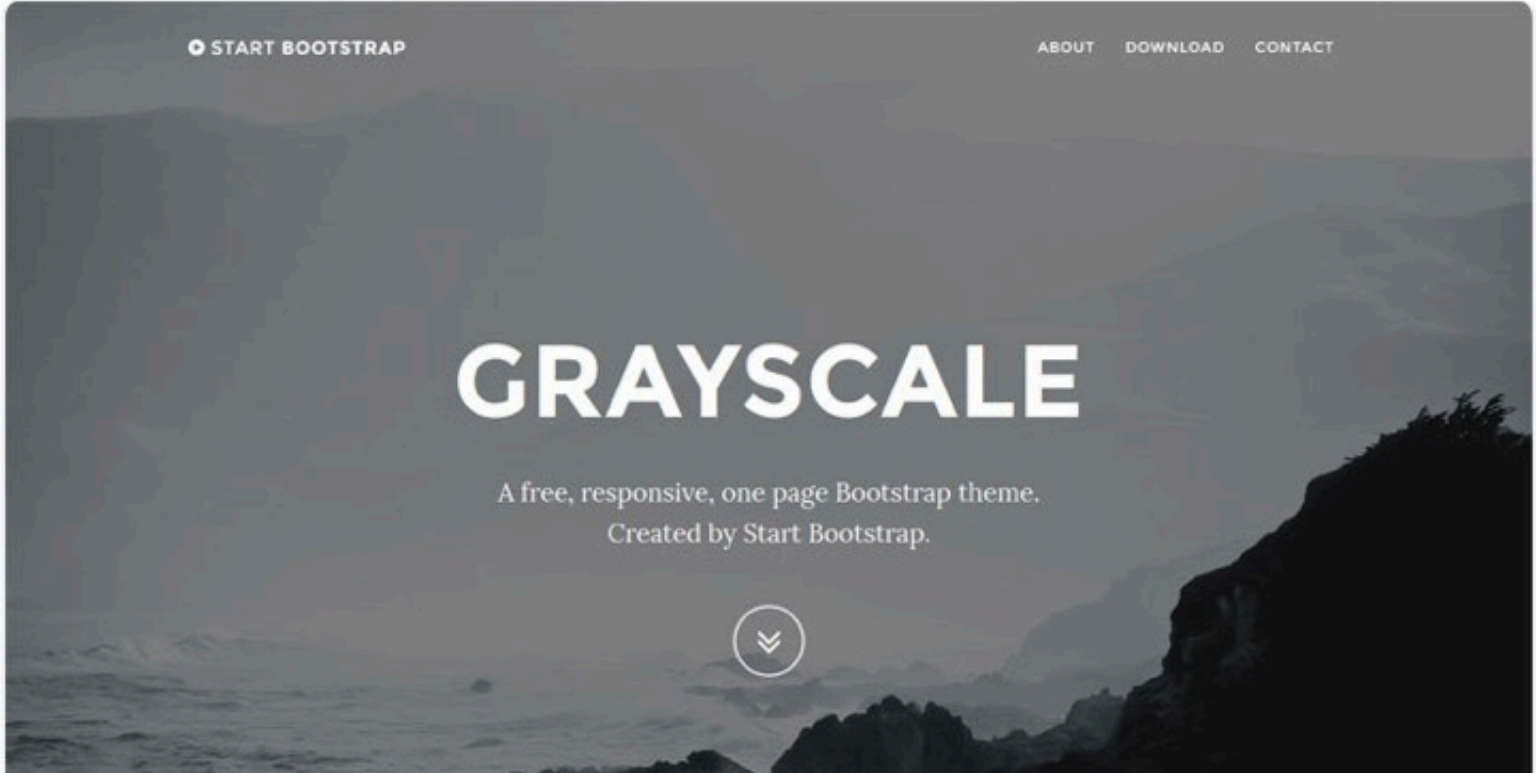
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## SERVICES



## PORTFOLIO





# Agency

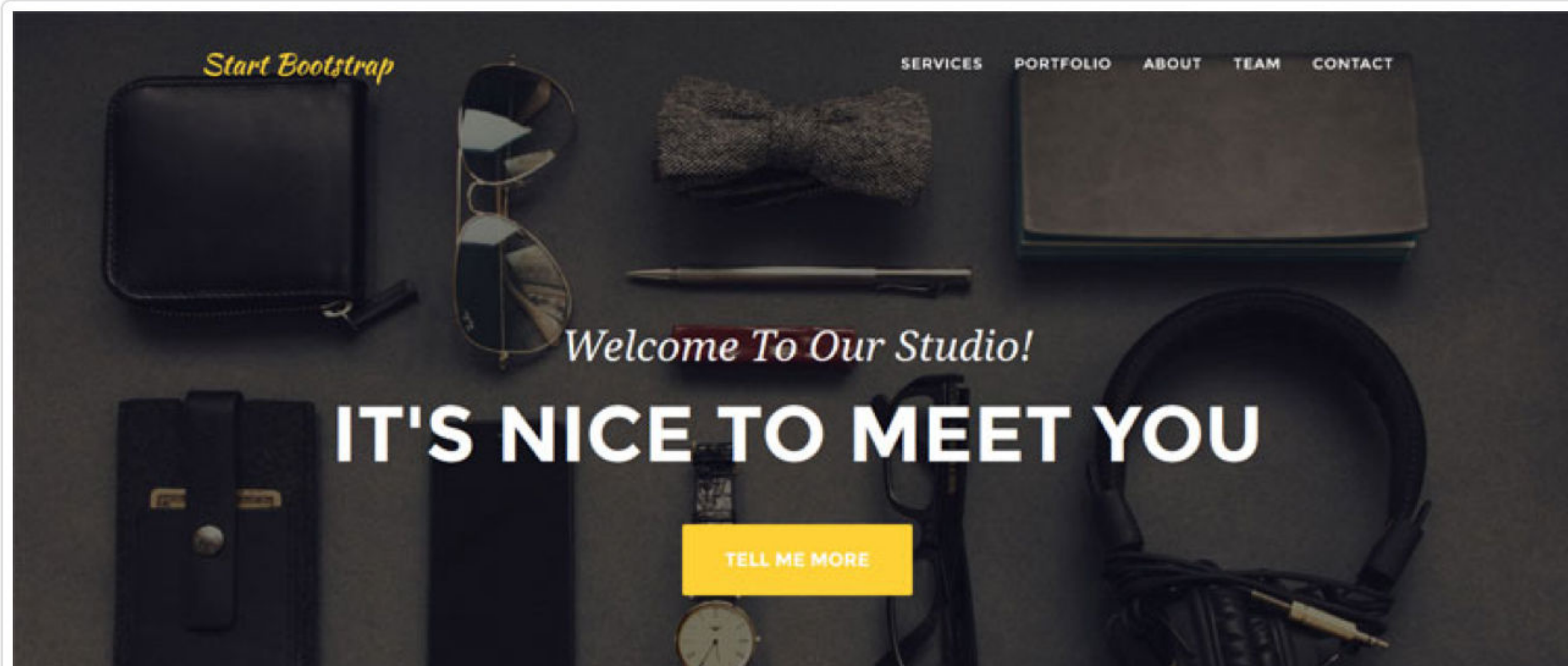
A clean, stylish, one page Bootstrap portfolio theme perfect for your agency or small business.

**Quip**  
Work Less Dumb

Get Quip. One place to write, share, and discuss work with your team.

ads via Carbon

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## Need a Custom Build?

If you like this theme, but need something a bit more custom, you can hire the Start Bootstrap design team to create a custom version of this template! Email us at [feedback@startbootstrap.com](mailto:feedback@startbootstrap.com) for more information!

## 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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Followers



**757**  
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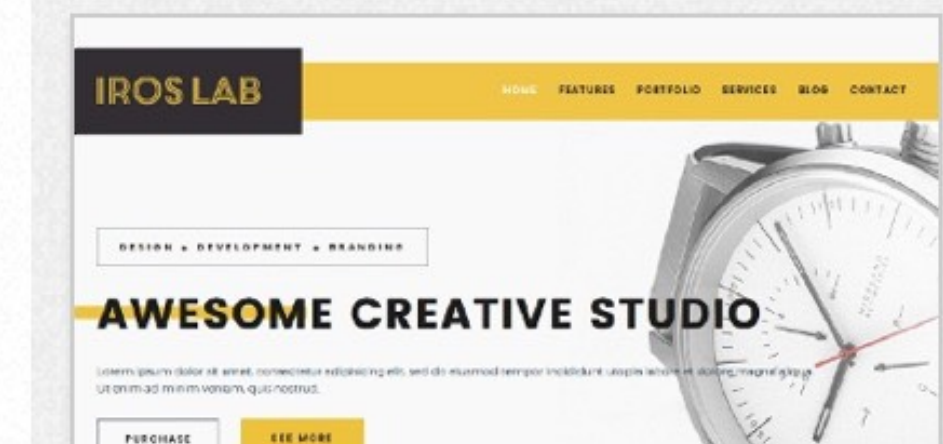
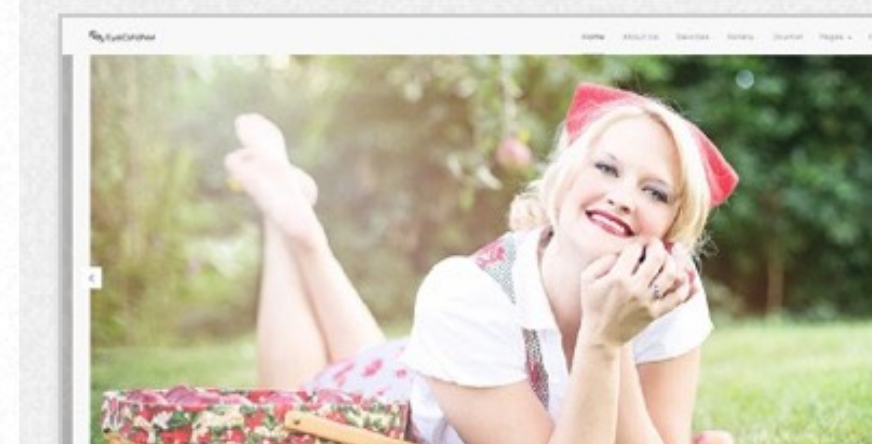
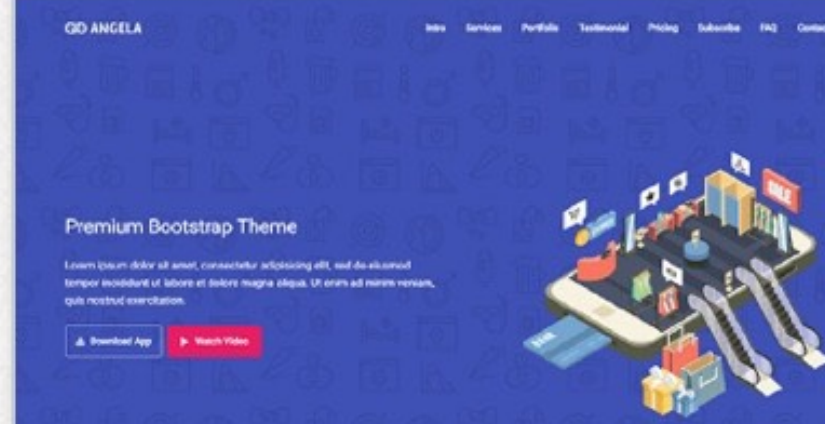


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Bootstrap is an open source toolkit for developing with HTML, CSS, and JS. Quickly prototype your ideas or build your entire app with our Sass variables and mixins, responsive grid system, extensive prebuilt components, and powerful plugins built on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

[Get started](#)

[Download](#)

Currently v4.0.0-beta.2



All the tools your team  
needs in one place



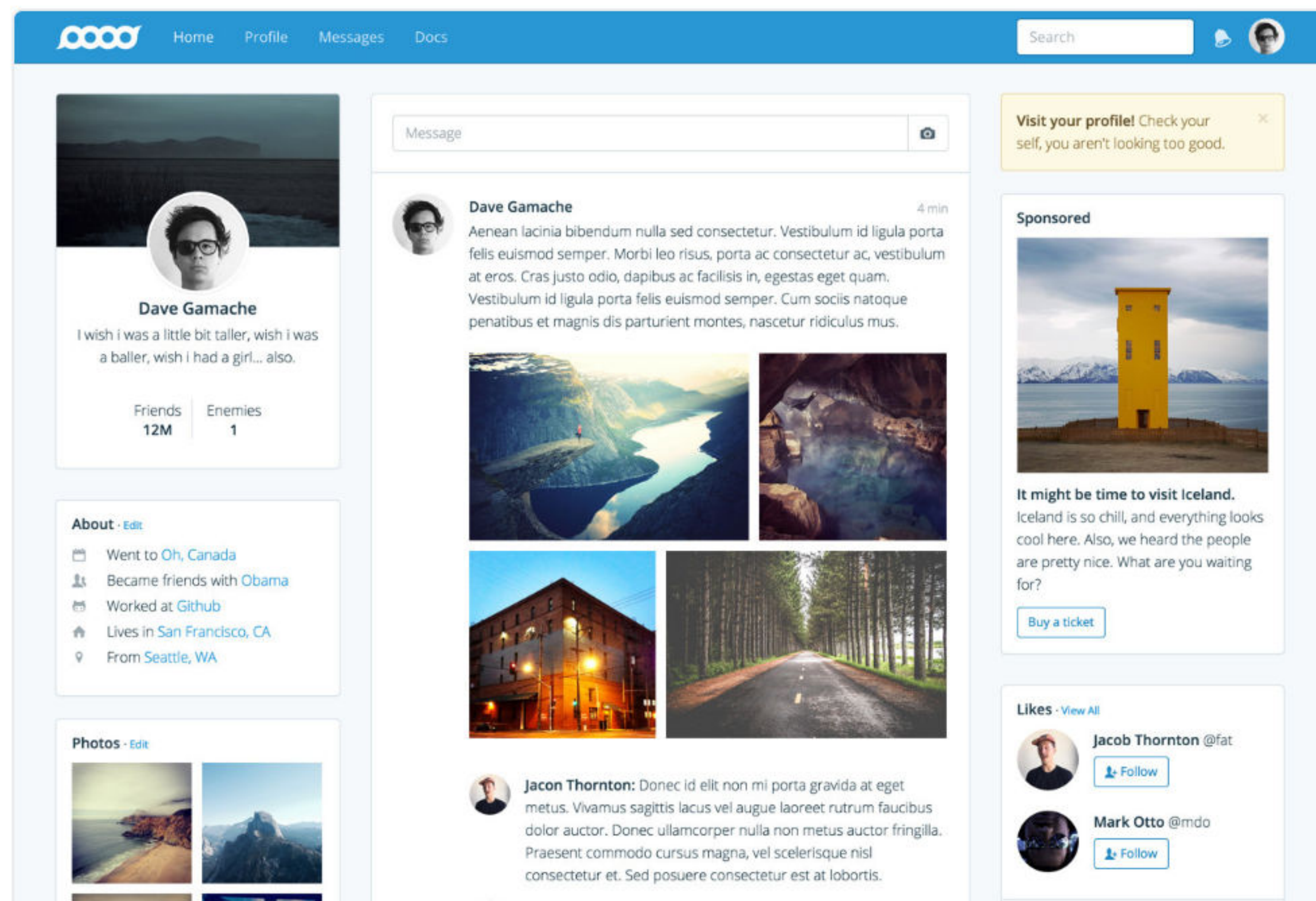
# Official Themes from Bootstrap's creators

Customize and extend the world's most popular front-end framework.

Explore themes







# Application

Building robust web apps is simple with timelines, profiles, notifications, messages, activity, and new utility classes.

Buy \$99

Preview

License: Multiple Use ▲





# Dashboard

Designed to be the perfect starting point for any dashboard or admin site. Charts, graphs, sortable tables, and more than a dozen other new components included.

Buy \$99

Preview

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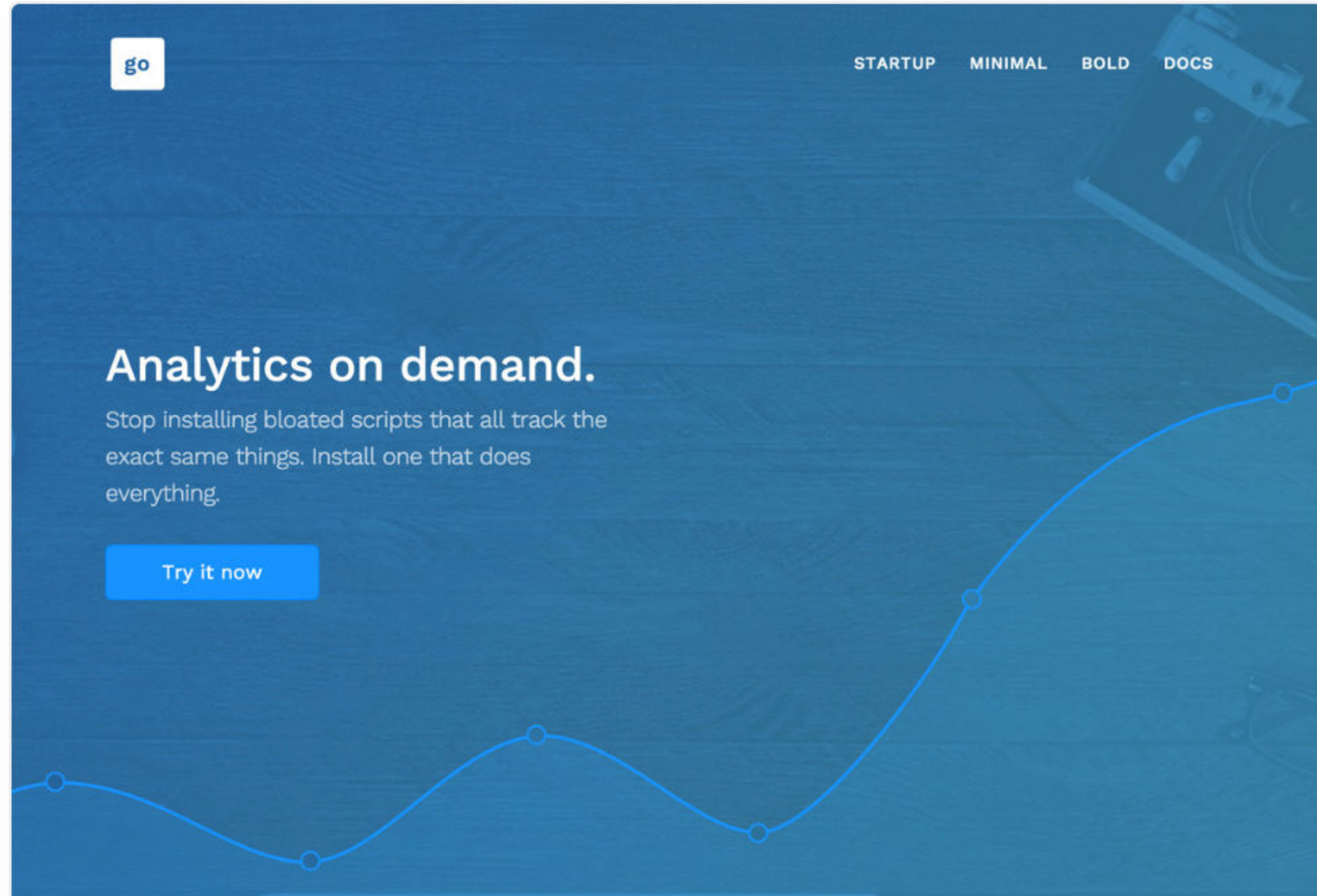
# Marketing

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

Buy \$99

Preview

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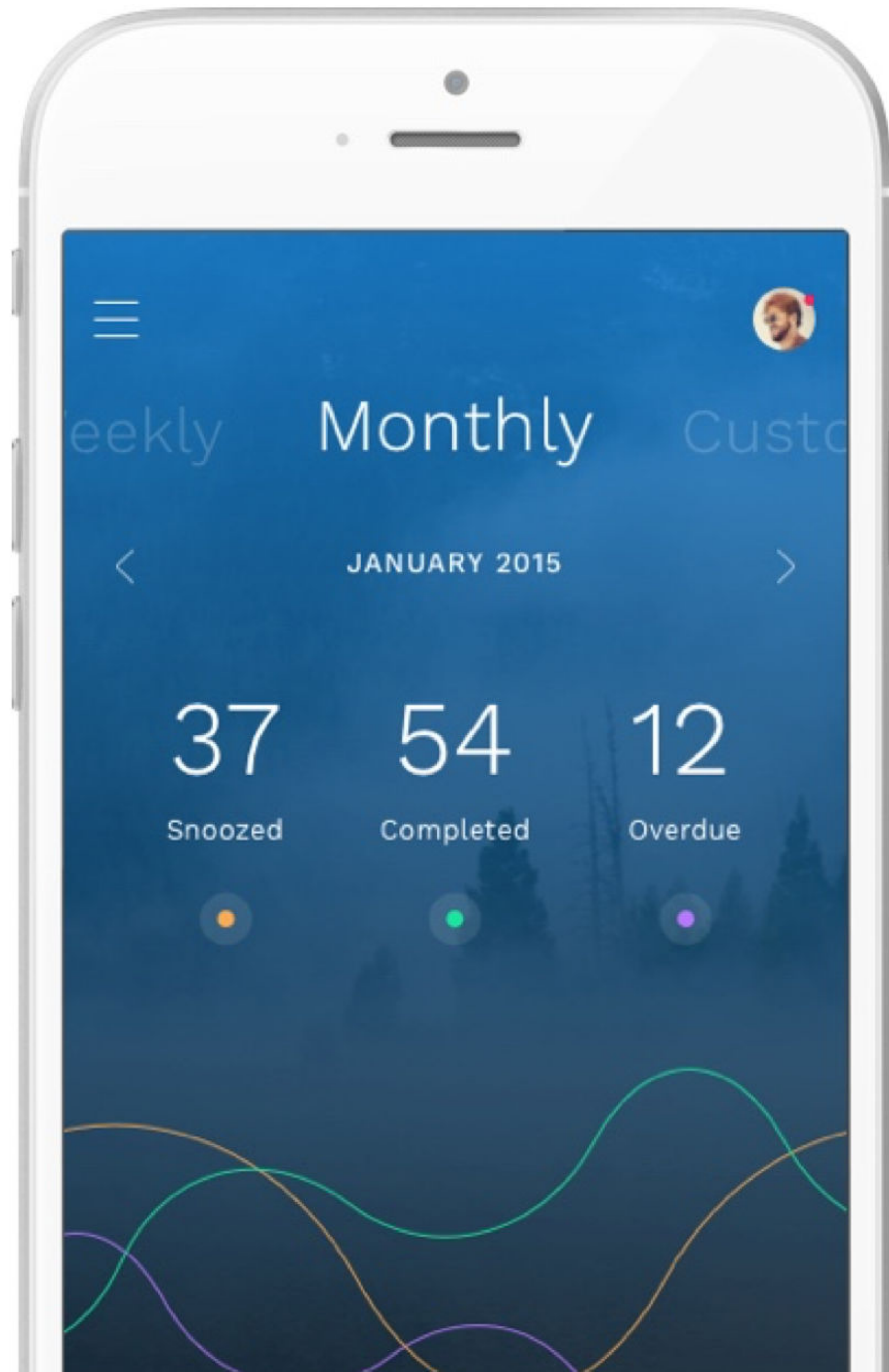


# Analytics on demand.

Stop installing bloated scripts that all track the exact same things. Install one that does everything.

Try it now





RICH INFORMATION

## Make informed decisions with historical & real time data.

We combine immediate real time events with rich historical data to help answer the toughest questions about retention, growth, and engagement.

### Data frequency

We poll for data on a millisecond basis. You can react to new information in seconds rather than days. [Learn more.](#)

### Reliability & uptime

We process our data across a massively distributed network of reliable servers to ensure 99.99% uptime, always. [Learn more.](#)



EASY DEVELOPMENT

## Natural language queries make mining data easy for anyone.

Rather than force everyone at your company to learn incredibly difficult terminal commands, we allow anyone to query the data with natural language to return data.

[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**

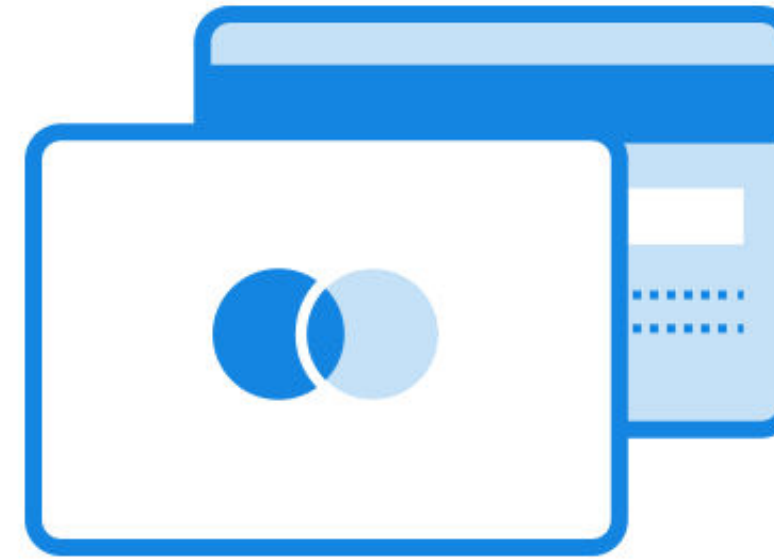
**⟨re/code⟩**



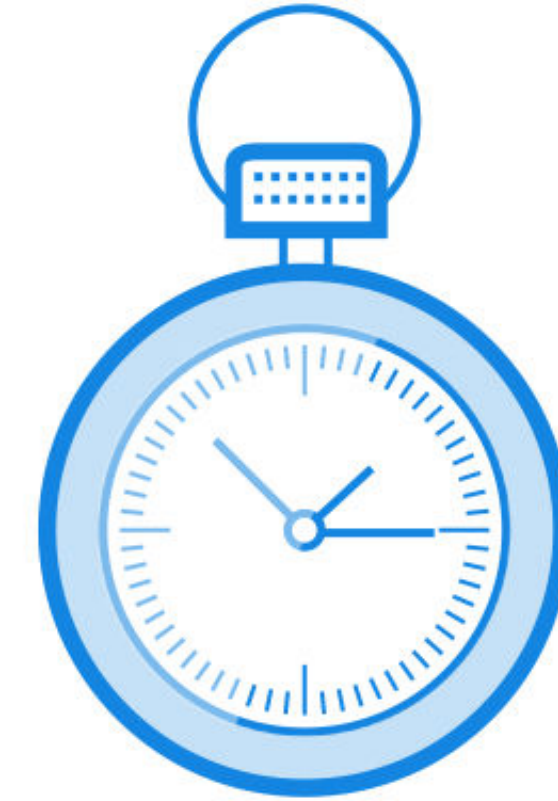
# It's not hard to see how we make your life easier every day.



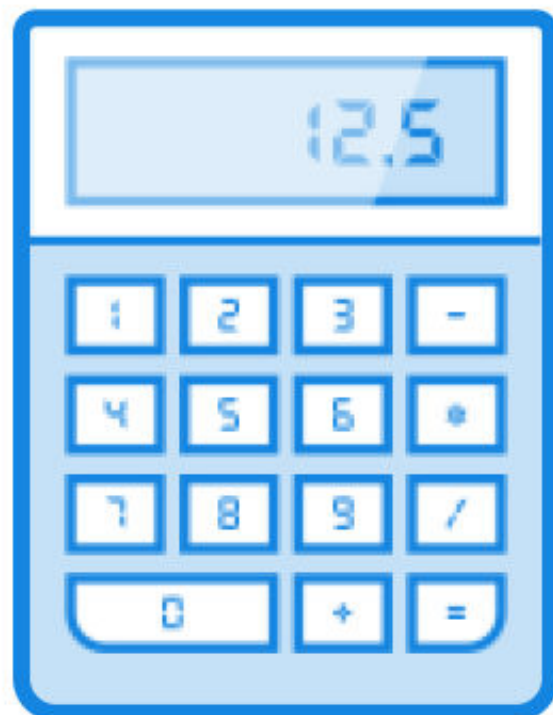
**24/7 support.** We're always here for you  
no matter what time of day.



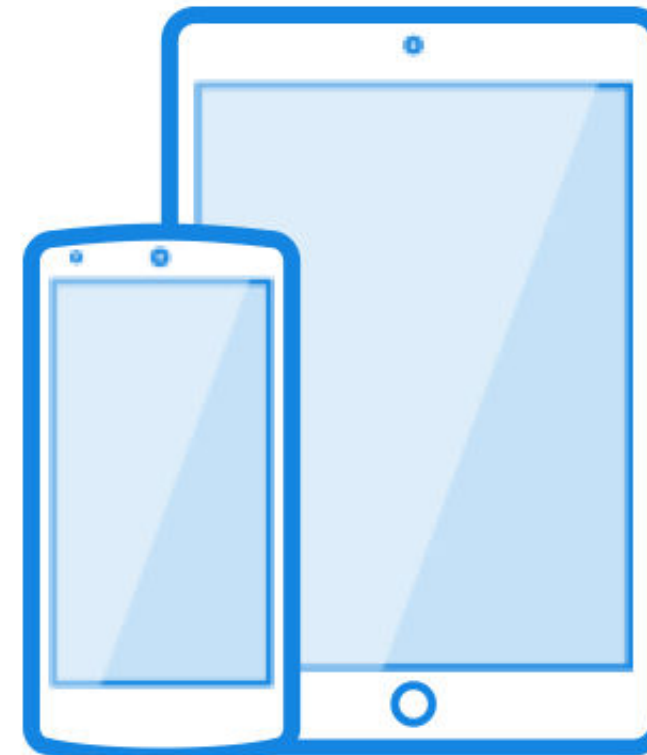
**E-commerce.** We automatically handle  
all sales analytics.



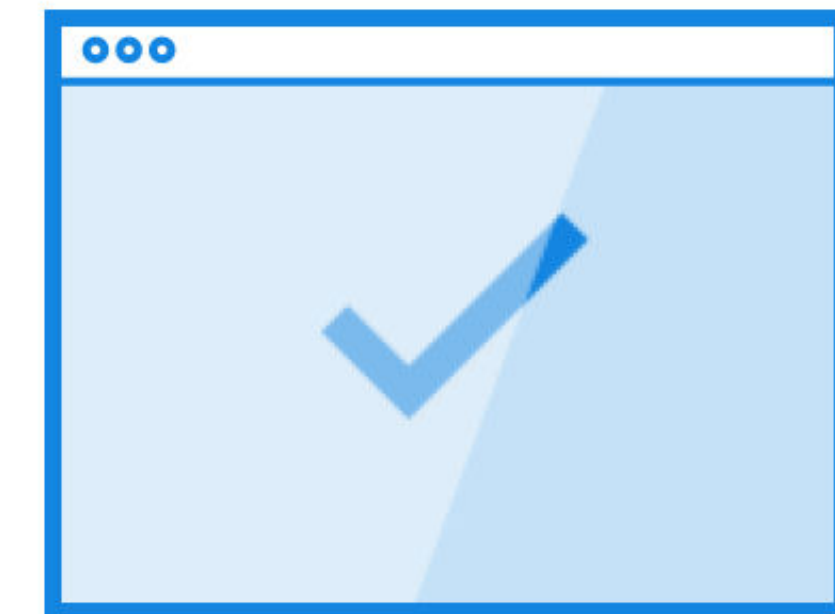
**Turnaround.** Our data analysis is  
distributed, so it processes in seconds.



**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.

## PERSONAL

\$9<sub>/MO</sub>

Plenty of processing power for any personal projects, big or small.

---

**10k** monthly requests

---

**9am-5pm** technical supprt

---

**Public** API access

---

Start a personal account

## BUSINESS

\$49<sub>/MO</sub>

The perfect sized plan for small businesses to get started.

---

**100k** monthly requests

---

**24/7** technical supprt

---

**Public** API access

---

Start a business account

## CORPORATE

\$119<sub>/MO</sub>

An unlimited plan that will scale infinitely to any size project.

---

**Unlimited** monthly requests

---

**24/7** technical supprt

---

**Public & Private** API access

---

Start a corporate account

**9am–5pm** technical supprt

---

**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](mailto:themes@getbootstrap.com).

## PRODUCT

Features  
Examples  
Tour  
Gallery

## APIS

Rich data  
Simple data  
Real time  
Social

## LEGAL

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Legal  
Privacy  
License



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---

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Redistribute and resell

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# Testing



*BrowserStack*

Cross-browser testing live via the Web

Excellent service

[www.browserstack.com](http://www.browserstack.com)



Live

Automate

Screenshots & Responsive

## 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+
<b>\$39</b> /mo billed monthly <i>or</i> \$35/mo billed annually	<b>\$99</b> /mo billed monthly <i>or</i> \$89/mo billed annually	<b>\$199</b> /mo billed monthly <i>or</i> \$179/mo billed annually	<b>\$399</b> /mo billed monthly <i>or</i> \$359/mo billed annually	<b>Large team?</b> 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

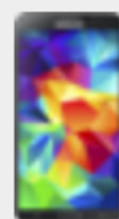


320x568



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

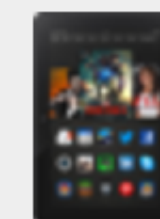


414x736



8.3

Kindle Fire HDX 7

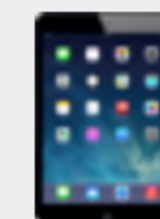


600x960



4.3

iPad Mini 2

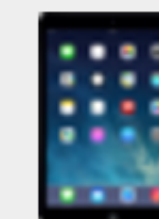


768x1024



8.3

iPad Air



768x1024



8.3

**iPhone 5S**

Viewport: 320x568

Screen size: 4"



Portrait



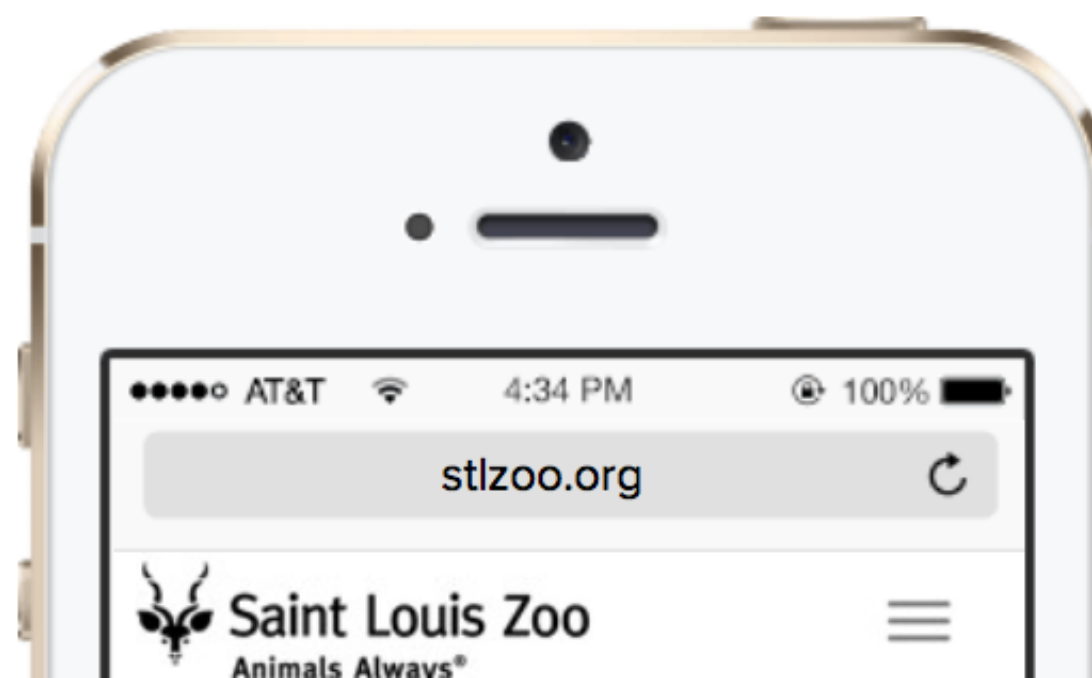
Landscape



Live Interactive Testing



▾

[← Previous](#)[Next →](#)





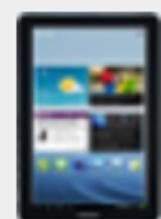
Note: [Set your monitor size](#) in the 'Monitor Size' settings (top right corner of the screen), to view devices at their actual size. ×

# 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



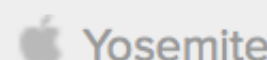
1280x1024



Mac OSX



1920x1080

**iPhone 5S**

Viewport: 320x568

Screen size: 4"



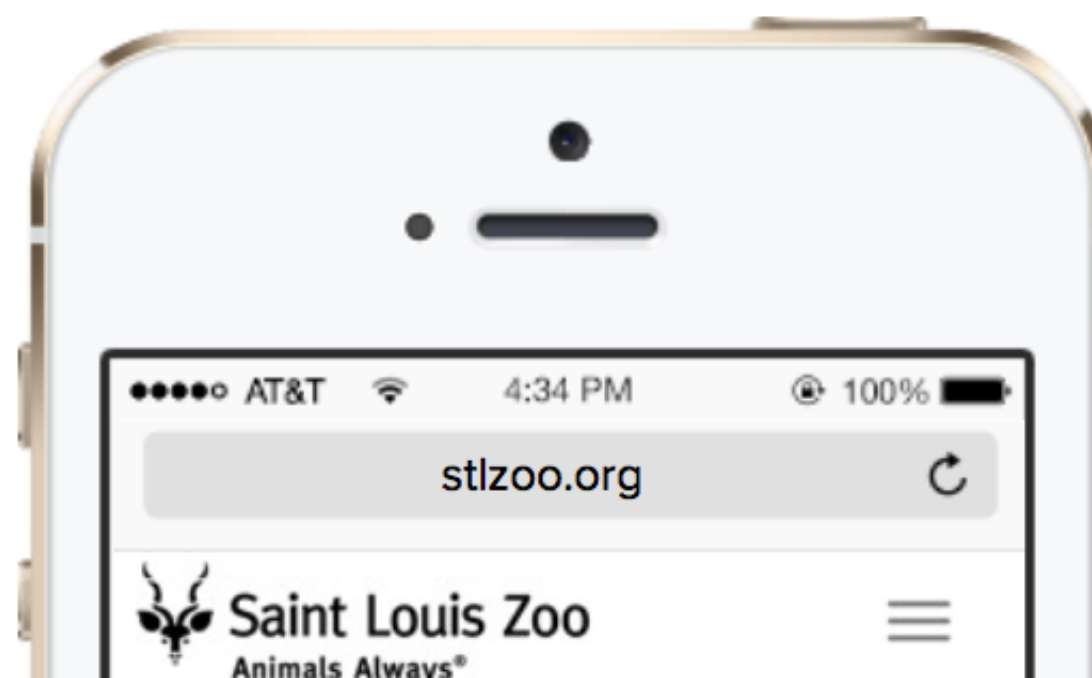
Portrait



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\*



















 Android	 Mobile						 Tablet		
 Windows Phone	<b>Samsung</b>			<b>Google</b>			<b>Amazon</b>		
 iOS	Galaxy S5 <a href="#">Latest</a>	1080x1920	4.4	Nexus 6 * <a href="#">Latest</a>	1440x2560	5	Kindle Fire HDX 7 *	1200x1920	4.3
 Windows 10	Galaxy S4	1080x1920	4.3	Nexus 5 *	1080x1920	5	Kindle Fire HD 8.9 *	1200x1920	4
 Windows 8.1	Galaxy S3	720x1280	4.1	Nexus 4	768x1280	4.2	Kindle Fire 2 *	600x1024	4
 Windows 8	Galaxy S2	480x800	2.3	Nexus	720x1280	4	<b>Google</b> Nexus 9 * 1536x2048 5 Nexus 7 1280x800 4.1		
 Windows 7	Galaxy S	480x800	2.2	<b>HTC</b> One M8 1080x1920 4.4 One X 720x1280 4 Wildfire 240x320 2.2 Hero 320x480 1.5					
 Windows XP	Galaxy Note 3 <a href="#">Latest</a>	1080x1920	4.3						
 OS X Yosemite	Galaxy Note 2	720x1280	4.1						
 OS X Mavericks	Galaxy Note	800x1280	2.3	<b>Sony</b> Xperia X10 480x854 1.6 Xperia Tipo 320x480 4			<b>Samsung</b> Galaxy Tab 4 10.1 1280x800 4.4 Galaxy Note 10.1 800x1280 4 Galaxy Tab 2 10.1 1280x800 4		
 OS X Mountain Lion	Galaxy S5 Mini	720x1280	4.4						
 OS X Lion	<b>Motorola</b> Droid Razr 540x960 2.3 Razr 540x960 4 Razr Maxx HD 720x1280 4.1								
 OS X Snow Leopard									






















	 Mobile		 Tablet	
 Android				
 Windows Phone				
 iOS	<b>Apple</b> iPhone 6 Plus <a href="#">Latest</a> 8.3 iPhone 6 <a href="#">Latest</a> 8.3 iPhone 5S 7 iPhone 5 6 iPhone 4S (6.0) 6 iPhone 4S 5.1 iPhone 4 4 iPhone 3GS 3		<b>Apple</b> iPad Air <a href="#">Latest</a> 8.3 iPad Mini 2 <a href="#">Latest</a> 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 <a href="#">Latest</a>	40 Aurora	23	7	44 Dev	28	30 Dev	12.15	14.12 <a href="#">Latest</a>
 iOS		38 <a href="#">Latest</a>	22	6	43 <a href="#">Latest</a>	27	29 <a href="#">Latest</a>	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 <a href="#">Latest</a>	40 Aurora	23	7	44 Dev	28	30 Dev	12.16	14.12 <a href="#">Latest</a>	5.1 <a href="#">Latest</a>
 iOS	10	38 <a href="#">Latest</a>	22	6	43 <a href="#">Latest</a>	27	29 <a href="#">Latest</a>	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			
		30	14		35	19	21			
 OS X Yosemite		29	13		34	18	20			
 OS X Mavericks		28	12		33	17	19			
 OS X Mountain Lion		27	11		32	16	18			
		26	10		31	15	17			
 OS X Lion		25	9		30	14	16			
 OS X Snow Leopard		24	8		29		15			





 Android	 IE	 Firefox	 Chrome	 Opera	 Yandex	 Safari
 Windows Phone	11 <a href="#">Latest</a>	40 Aurora	43 <a href="#">Latest</a>	30 Dev	14.12 <a href="#">Latest</a>	5.1 <a href="#">Latest</a>
 iOS		38 <a href="#">Latest</a>	42	29 <a href="#">Latest</a>		
 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

ChainsawOnATireSwing.com

@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

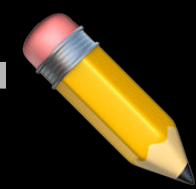
When printed, `<a href="#toc">Table of Contents</a>` looks like this:

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

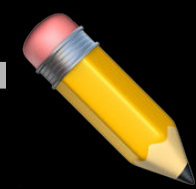
- » `(page-)break-after`
- » `(page-)break-before`
- » `(page-)break-inside`
- » `widows`
- » `orphans`



# Media Features

*Viewport- & Device-Centric*



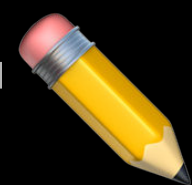


## SIDE NOTE

`<ratio>`

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

No units!



## SIDE NOTE

### Examples

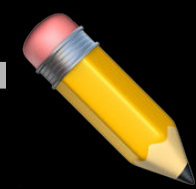
$4/3$ : traditional TV

$16/9$ : 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

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Last updated 2023-05-15

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# Changelog

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

2023-04-20 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*

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