RESPONSIVE WEB

Bootstrap your website

RICARDO QUEIRÓS

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ME

RICARDO QUEIRÓS

- 42 years old
- Born in PORTO
- PhD in Computer Science (FCUP)
- Professor (ESMAD/P.PORTO)
- Researcher (CRACS/INESC-TEC)
- Web & Mobile Developer

ME

RICARDO QUEIRÓS

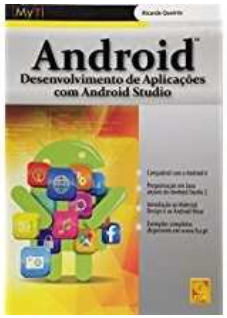
- Book writer

2008

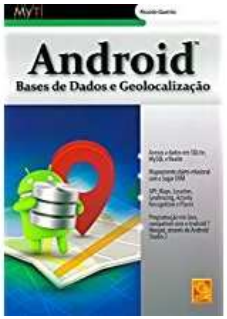
2013

2014

2015



2016

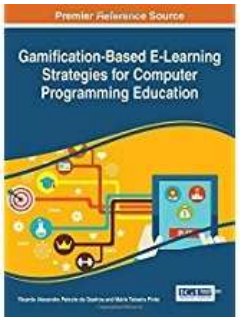


2016

2017

2012

2015



2016

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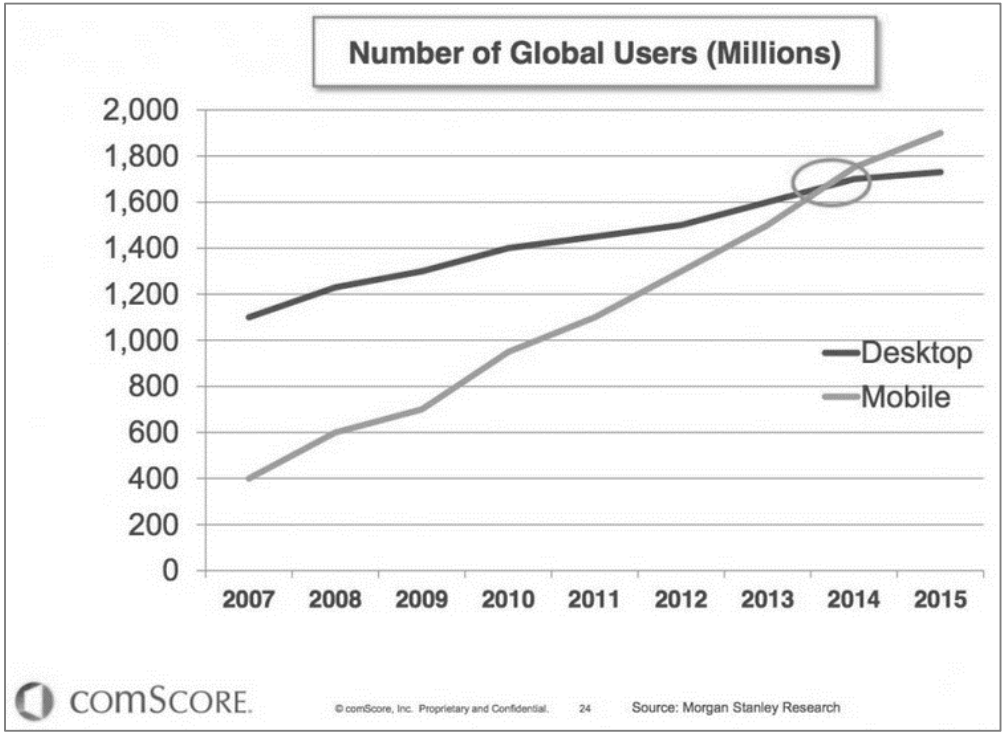
MOTIVATION

Why I'm doing this talk?

- I love Web
- Since 2001 teaching subjects related with Web & Mobile programming
- Changings in Internet access



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RESPONSIVE WEB

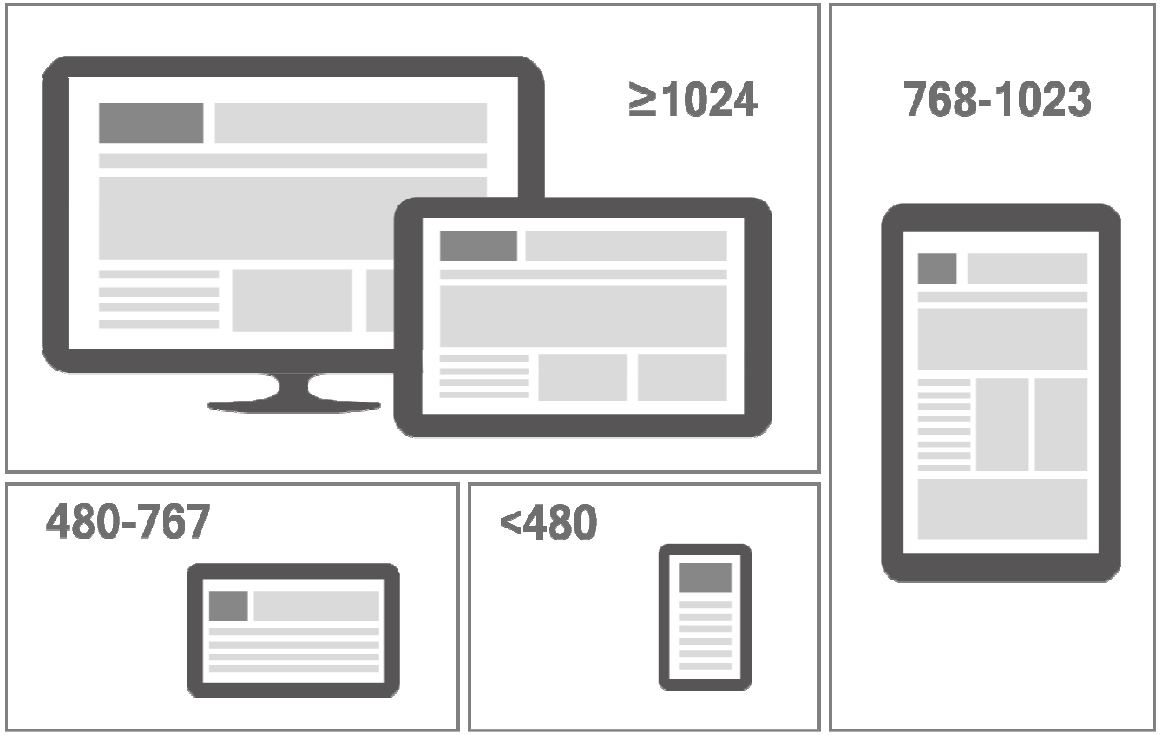
Let’s try a definition

- Solve the problem of
  - Creating web pages suitable for all the devices and resolutions
  - Non-mobile friendly websites

RESPONSIVE WEB

Let’s try a definition

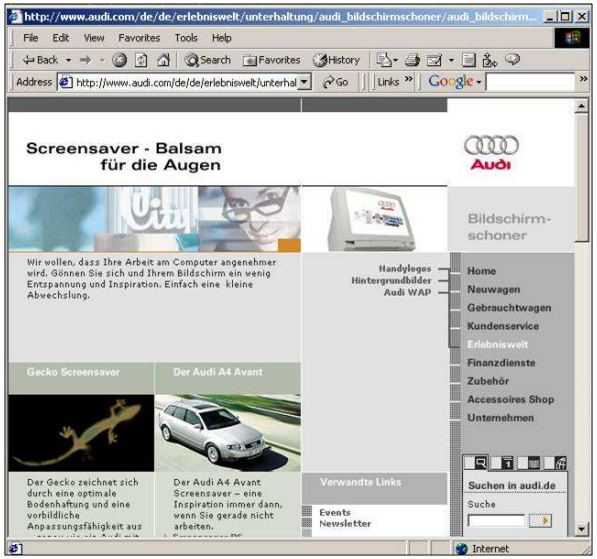
- A set of techniques to foster a richer user experience in Web browsing

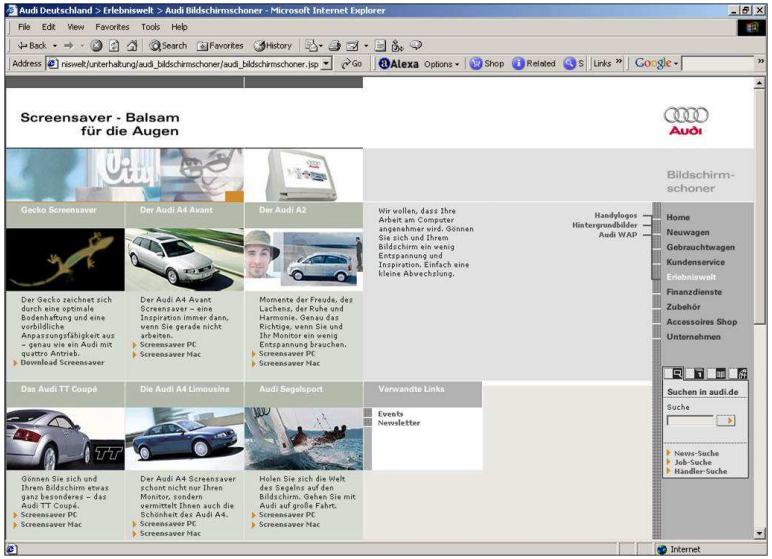


RESPONSIVE WEB

Some history…

- 2001
  Audi.com - first site to feature a layout that adapts to browser viewport width





- 2010
  Ethan Marcotte coined the term **responsive web design** (RWD) and defined it to as the combination of fluid grid/flexible images/media queries (in A List Apart)

- 2013
  Year of Responsive Web Design (*Mashable*)

RESPONSIVE WEB

Let’s try a definition

- A responsive design
  - Adapt the page layout according to the device’s resolution
  - Resize the images so they fit on the screen
  - Simplify screen elements for mobile devices
  - Hide unnecessary items on smaller devices
  - Adapt size of buttons and links to touch interfaces
  - Intelligent use of mobile resources (e.g. geolocation or change of device orientation)

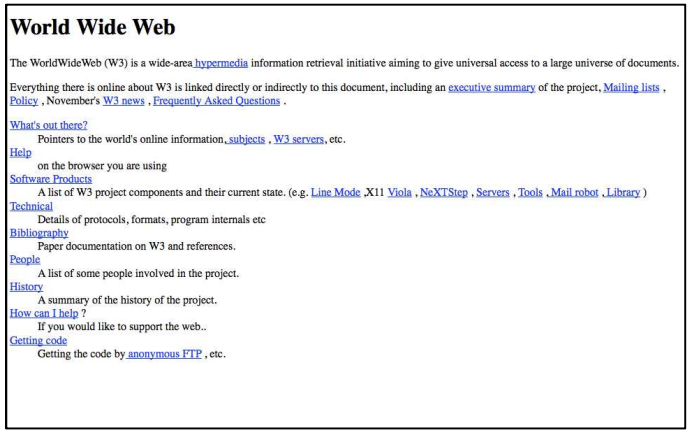
- What I need to know
  - HTML & CSS (basics)
  - Grid View
  - Media queries

RESPONSIVE WEB

HTML & CSS

- Hypertext Markup Language (HTML)
  - Standard **markup language** for creating web pages describing the structure of a web page semantically and (originally) included cues for the appearance of the document
  - Browsers get HTML documents from a webserver and render into multimedia pages
  - Created by Tim Berners-Lee in 1991
  - Extended from SGML
  - Maintained by W3C (currently: HTML 5.1, nov 2016)

```
<!DOCTYPE html>
<html>
  <head>
    <title>This is a title</title>
  </head>
  <body>
    <p>Hello world!</p>
  </body>
</html>
```



World Wide Web

The WorldWideWeb (W3) is a wide-area hypermedia information retrieval initiative aiming to give universal access to a large universe of documents.

Everything there is online about W3 is linked directly or indirectly to this document, including an executive summary of the project, Mailing lists , Policy , November's W3 news , Frequently Asked Questions .

What's out there?
Pointers to the world's online information, subjects , W3 servers, etc.
Help
on the browser you are using
Software Products
A list of W3 project components and their current state. (e.g. Line Mode ,X11 Viola , NeXTStep , Servers , Tools , Mail robot , Library)
Technical
Details of protocols, formats, program internals etc
Bibliography
Paper documentation on W3 and references.
People
A list of some people involved in the project.
History
A summary of the history of the project.
How can I help ?
If you would like to support the web..
Getting code
Getting the code by anonymous FTP , etc.

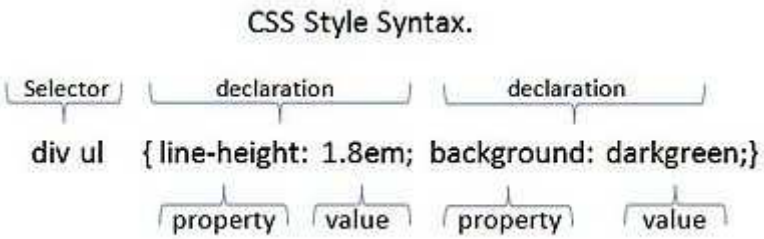
RESPONSIVE WEB

HTML & CSS

- Cascading Style Sheets (CSS)
  - Style sheet language to describe the presentation of a document in a markup language
  - Based on rules and properties that match HTML elements
  - Created by W3C in 1996
  - Example:

```
<!DOCTYPE html>
<html>
  <head>
    <title>This is a title</title>
  </head>
  <body>
    <p style="color: red">Hello World!</p>
  </body>
</html>
```

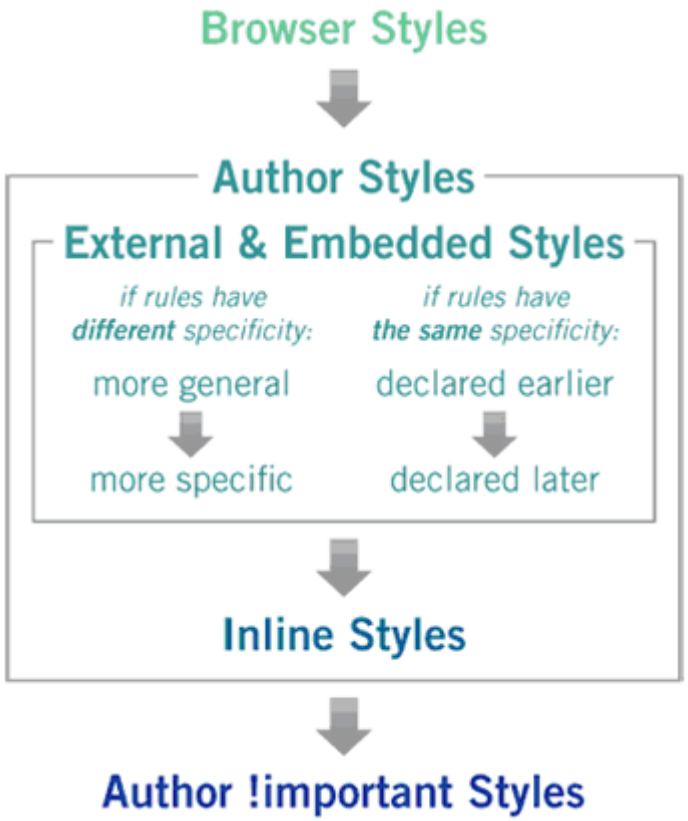
Hello World!



RESPONSIVE WEB

HTML & CSS

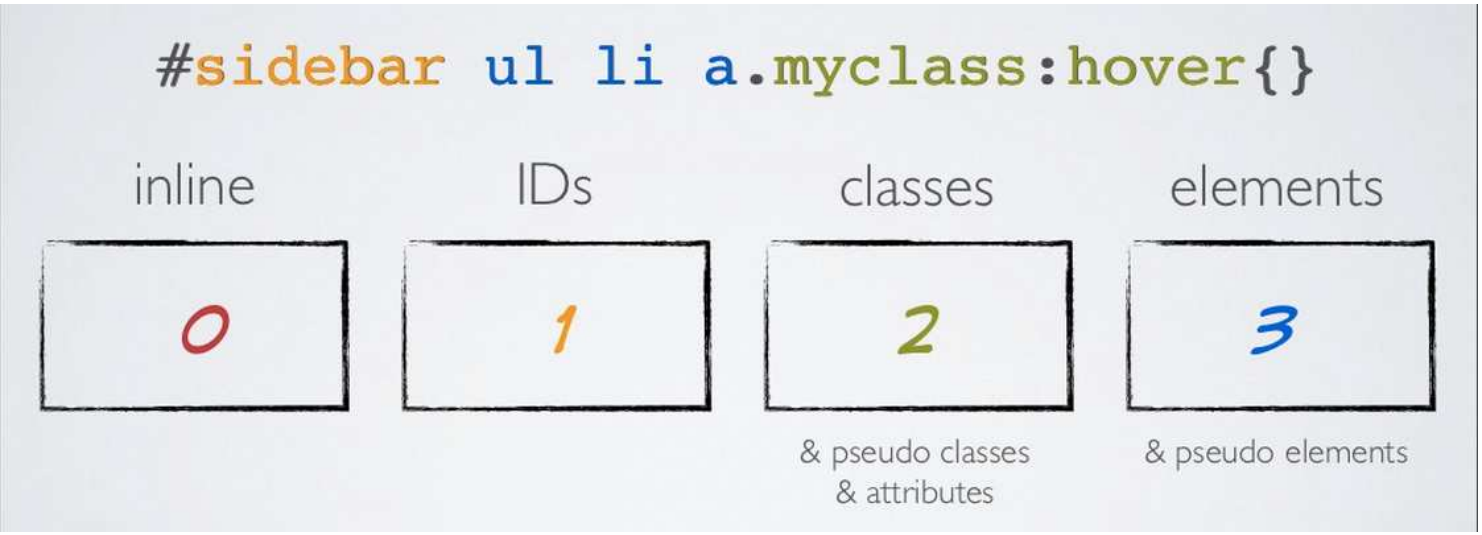
- Cascading Style Sheets (CSS)
  - Why cascading?



RESPONSIVE WEB

HTML & CSS

- Cascading Style Sheets (CSS)
  - Specificity



RESPONSIVE WEB

HTML & CSS

- Cascading Style Sheets (CSS)

```
<html>
  <head>
    <style>
      body p {color: blue}
      p {color: green}
    </style>
  </head>
  <body>
    <p>Hello World!</p>
  </body>
</html>
```

Hello World!

RESPONSIVE WEB

HTML & CSS

- Cascading Style Sheets (CSS)

```
<html>
  <head>
    <style>
      body p {color: blue}
      p {color: green}
    </style>
  </head>
  <body>
    <p>Hello World!</p>
  </body>
</html>
```

Hello World!

RESPONSIVE WEB

HTML & CSS

- Cascading Style Sheets (CSS)

```
<html>
  <head>
    <style>
      body p {color: blue}
      p {color: red !important}
    </style>
  </head>
  <body>
    <p style="color: green">Hello World!</p>
  </body>
</html>
```

Hello World!

RESPONSIVE WEB

HTML & CSS

- Cascading Style Sheets (CSS)

```
<html>
  <head>
    <style>
      body p {color: blue}
      p {color: red !important}
    </style>
  </head>
  <body>
    <p style="color: green">Hello World!</p>
  </body>
</html>
```

Hello World!

RESPONSIVE WEB

Media Queries

- Media query is a CSS3 technique
- Used to define different style rules for different media types/devices
- Uses the **@media** rule to include a block of CSS properties only if a condition is true
- Can be used to check many things, such as:
  - width and height of the device
  - orientation (is the tablet/phone in landscape or portrait mode?)
  - resolution

```
<style>
 body {
    background-color: lightgreen;
 }

 @media (max-width: 500px) {
    body {
        background-color: lightblue;
    }
 }
</style>
```

RESPONSIVE WEB

Media Queries

- Building a Responsive Grid-View

```
<style>
 /* For desktop: */
 .col-1 {width: 8.33%;}
 .col-2 {width: 16.66%;}
 .col-3 {width: 25%;}
 .col-4 {width: 33.33%;}
 .col-5 {width: 41.66%;}
 .col-6 {width: 50%;}
 .col-7 {width: 58.33%;}
 .col-8 {width: 66.66%;}
 .col-9 {width: 75%;}
 .col-10 {width: 83.33%;}
 .col-11 {width: 91.66%;}
 .col-12 {width: 100%;}

 @media (max-width: 768px) {
    /* For mobile phones: */
    [class*="col-"] {
        width: 100%;
    }
 }
</style>
```

Desktop

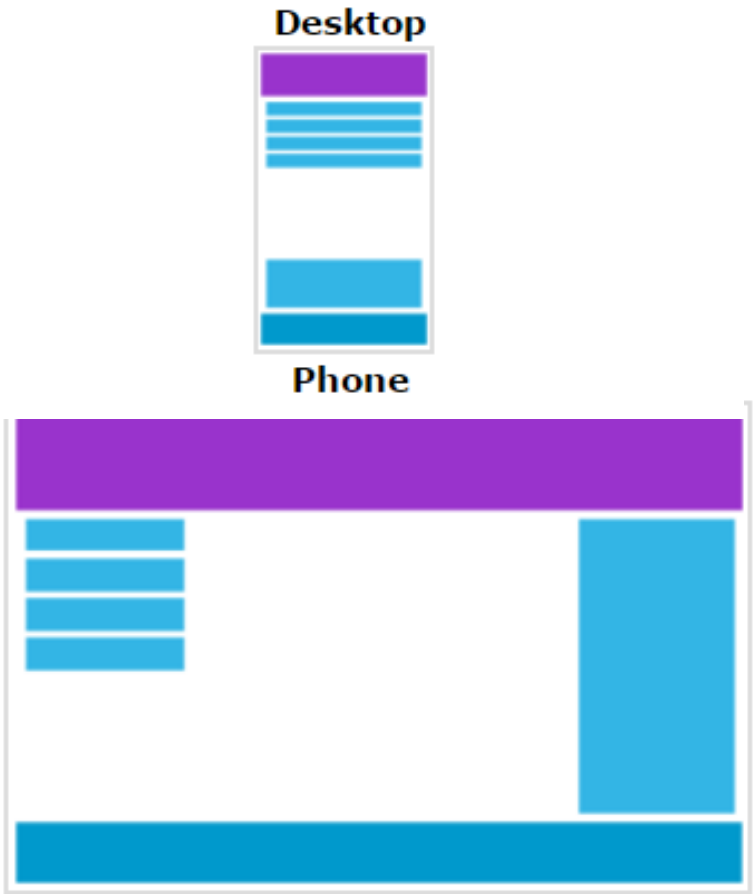
Phone

RESPONSIVE WEB

Media Queries

- Building a Responsive Grid-View (**Mobile first**)

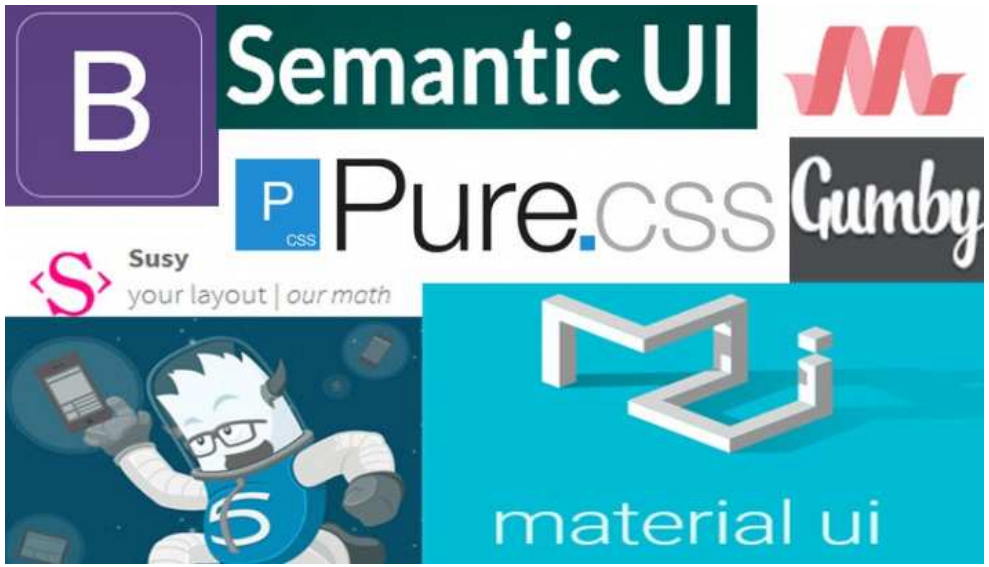
```
<style>
 /* For mobile phones: */
 [class*="col-"] {
    width: 100%;
 }
 @media (min-width: 768px) {
    /* For desktop: */
    .col-1 {width: 8.33%;}
    .col-2 {width: 16.66%;}
    .col-3 {width: 25%;}
    .col-4 {width: 33.33%;}
    .col-5 {width: 41.66%;}
    .col-6 {width: 50%;}
    .col-7 {width: 58.33%;}
    .col-8 {width: 66.66%;}
    .col-9 {width: 75%;}
    .col-10 {width: 83.33%;}
    .col-11 {width: 91.66%;}
    .col-12 {width: 100%;}
 }
</style>
```



RESPONSIVE WEB

RWD frameworks

- So new ways to easily create RWD appear!
- Coined as **Responsive Web Frameworks**
- Mostly free, and easy to use
- Some examples
  - Bootstrap
  - Foundation
  - Kube
  - Materialize
  - Pure
  - Semantic-UI
  - Skeleton
  - W3.css
- What should I use?



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  - FLEXBOX

BOOTSTRAP

What's that?

- A free front-end framework
- Created by Mark Otto & Jacob Thornton
- Allows to easily create responsive designs
- Includes
  - HTML and CSS based design templates for typography, forms, buttons, tables, navigation, modals, image carousels, etc.
  - JavaScript plugins (optional)
- In June 2014 Bootstrap was the nº1 project on GitHub
- Currently, is the second most-starred project on GitHub, with more than 107,000 stars and 48,000 forks

BOOTSTRAP

What's that?

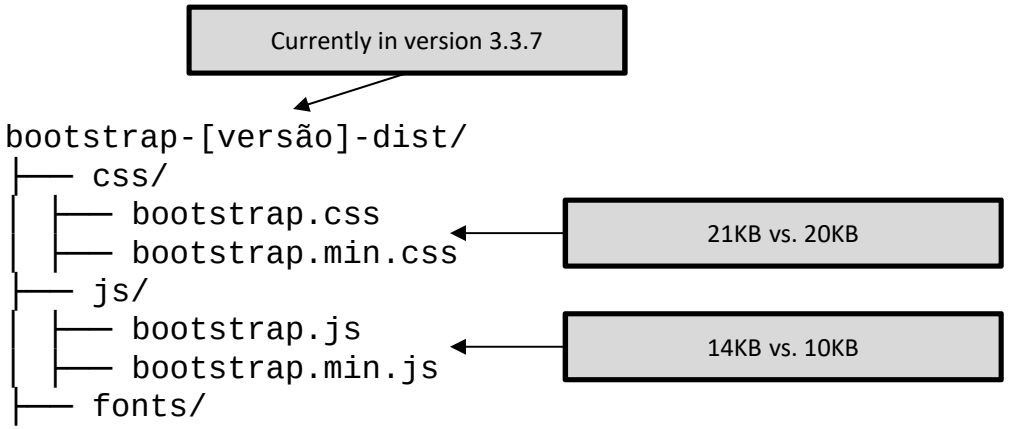
- Advantages of Bootstrap:
  - **Easy to use:** basic knowledge of HTML and CSS to start using Bootstrap
  - **Responsive features:** responsive CSS adjusts to phones, tablets, and desktops
  - **Mobile-first approach:** mobile-first styles are part of the core framework (v.3)
  - **Browser compatibility:** compatible with all modern browsers (Chrome, Firefox, Internet Explorer, Safari, and Opera)
- Where to get Bootstrap?
  - Download Bootstrap from getbootstrap.com

  - Include Bootstrap from a CDN

BOOTSTRAP

What's that?

- Structure:



BOOTSTRAP

What’s that?

- Hello World Bootstrap page:

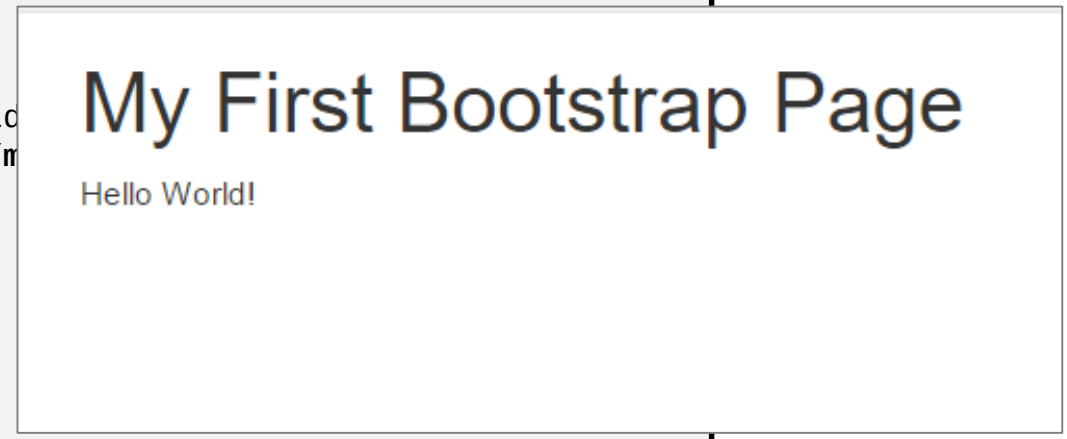
```
<!DOCTYPE html>
<html lang="en">
<head>
  <title>Bootstrap Example</title>
  <meta charset="utf-8">
  <meta name="viewport" content=“width=device-width, initial-scale=1”>
  <link rel="stylesheet" href=“css/bootstrap.min.css”>
</head>
<body>
 <div class="container">
  <h1>My First Bootstrap Page</h1>
  <p>Hello World!</p>
 </div>
</body>
</html>
```

BOOTSTRAP

What's that?

- Hello World Bootstrap page:

```
<!DOCTYPE html>
<html lang="en">
<head>
  <title>Bootstrap Example</title>
  <meta charset="utf-8">
  <meta name="viewport" content="wid
  <link rel="stylesheet" href="css/m
</head>
<body>
 <div class="container">
  <h1>My First Bootstrap Page</h1>
  <p>Hello World!</p>
 </div>
</body>
</html>
```



BOOTSTRAP

Architecture

- Framework architecture
  - Global CSS: HTML elements styled and enhanced with extensible classes, and an grid system
  - Components: reusable components built to provide iconography, dropdowns, input groups, navigation, alerts, etc.
  - JavaScript: custom jQuery plugins to bring Bootstrap's components to life

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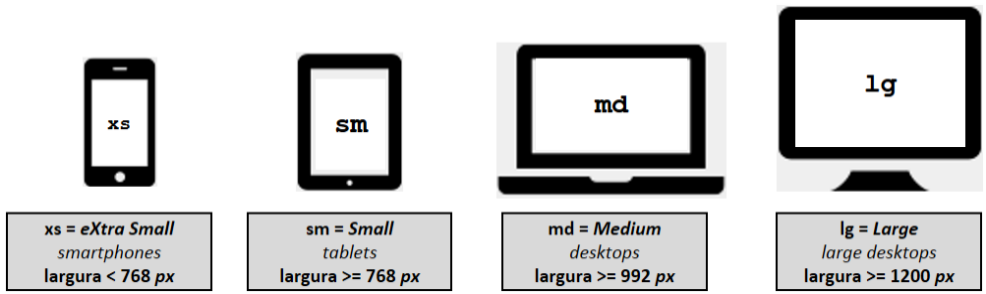
BOOTSTRAP

Architecture



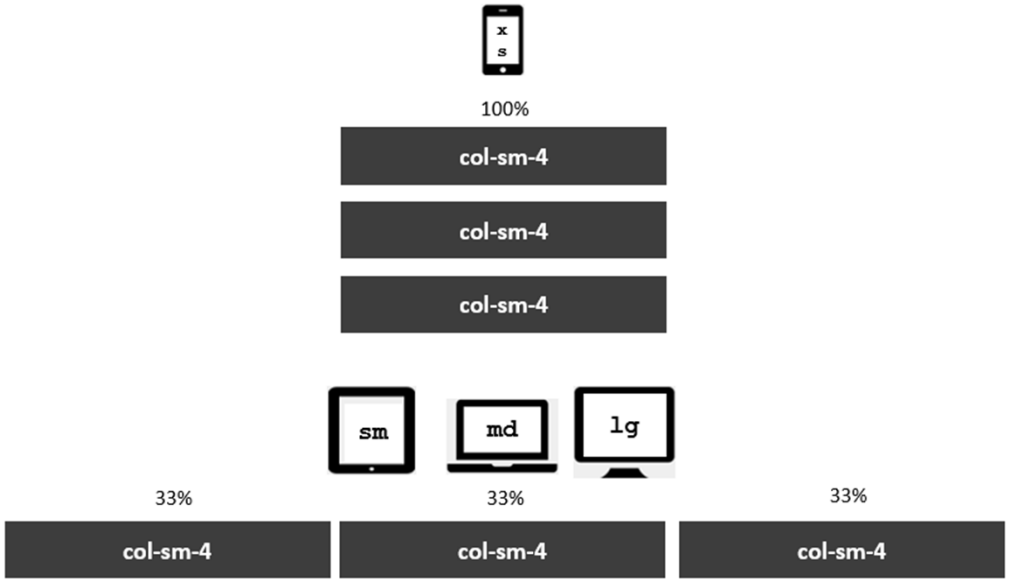
- Global CSS

  Grid System

  – allows up to 12 columns across the page

  – columns will re-arrange automatically depending on the screen size

```
<div class="row">
  <div class="col-sm-4">col-sm-4</div>
  <div class="col-sm-4">col-sm-4</div>
  <div class="col-sm-4">col-sm-4</div>
</div>
```



BOOTSTRAP

Architecture

- Global CSS

  Typography

h1 Bootstrap heading (36px)

h2 Bootstrap heading (30px)

h3 Bootstrap heading (24px)

h4 Bootstrap heading (18px)

h5 Bootstrap heading (14px)

h6 Bootstrap heading (12px)

BOOTSTRAP

Architecture

- Global CSS

  Tables

```
<table class="table">
 ...
</table>
```

Firstname	Lastname	Email
John	Doe	john@example.com
Mary	Moe	mary@example.com
July	Dooley	july@example.com

BOOTSTRAP

Architecture

- Global CSS

  Images

```
<img src="city.jpg" class="img-rounded" width="300" height="230">
```

BOOTSTRAP

Architecture

- Global CSS

  Buttons

```
<button type="button" class="btn btn-default">Default</button>
<button type="button" class="btn btn-primary">Primary</button>
<button type="button" class="btn btn-success">Success</button>
...
```

BOOTSTRAP

Architecture

- Global CSS

  Responsive utilities

  - toggling/printing content across viewport breakpoints

```
<span class="hidden-xs">Olá framework Web Bootstrap!</span>
<span class="visible-xs-inline">Olá Bootstrap!</span>
```

	Extra small devices Phones (<768px)	Small devices Tablets (≥768px)	Medium devices Desktops (≥992px)	Large devices Desktops (≥1200px)
`.visible-xs-*`	Visible	Hidden	Hidden	Hidden
`.visible-sm-*`	Hidden	Visible	Hidden	Hidden
`.visible-md-*`	Hidden	Hidden	Visible	Hidden
`.visible-lg-*`	Hidden	Hidden	Hidden	Visible
`.hidden-xs`	Hidden	Visible	Visible	Visible
`.hidden-sm`	Visible	Hidden	Visible	Visible
`.hidden-md`	Visible	Visible	Hidden	Visible
`.hidden-lg`	Visible	Visible	Visible	Hidden

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BOOTSTRAP

Architecture

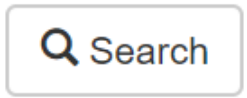
- Components
  - reusable components built to provide
    - Iconography
    - Dropdowns
    - Input groups
    - Navigation
    - Badges
    - etc.

BOOTSTRAP

Architecture

- Components
  - Glyphicons
    - Provides 260 glyphicons from the Glyphicons Halflings set.
    - Can be used in text, buttons, toolbars, navigation, forms, etc..

```
<button type="button" class="btn btn-default">
  <span class="glyphicon glyphicon-search"></span> Search
</button>
```

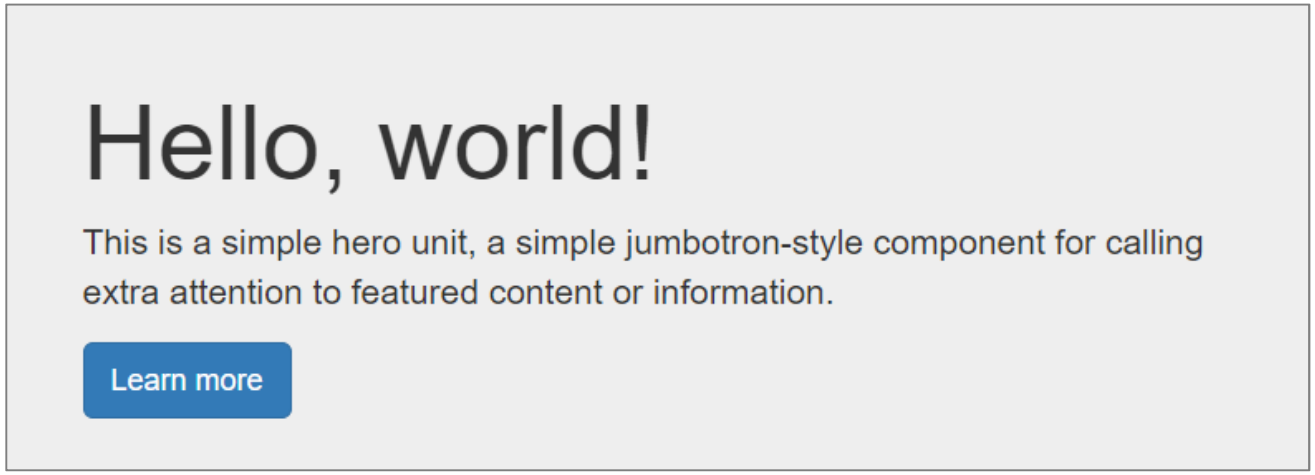


BOOTSTRAP

Architecture

- Components
  - Jumbotron

```
<div class="jumbotron">
  <h1>Hello, world!</h1>
  <p>...</p>
  <p><a class="btn btn-primary btn-lg" href="#" role="button">Learn more</a></p>
</div>
```



BOOTSTRAP

Architecture

- Components
  - NavBar

```
<nav class="navbar navbar-inverse">
  <div class="container-fluid">
    <div class="navbar-header">
      <a class="navbar-brand" href="#">WebSiteName</a>
    </div>
    <ul class="nav navbar-nav">
      <li class="active"><a href="#">Home</a></li>
      <li><a href="#">Page 1</a></li>
      <li><a href="#">Page 2</a></li>
    </ul>
    <ul class="nav navbar-nav navbar-right">
      <li><a href="#"><span class="glyphicon glyphicon-user"></span> Sign Up</a></li>
      <li><a href="#"><span class="glyphicon glyphicon-log-in"></span> Login</a></li>
    </ul>
  </div>
</nav>
```

BOOTSTRAP

Architecture

- Components
  - Input Groups

```
<div class="input-group">
  <span class="input-group-addon">$</span>
  <input type="text" class="form-control" aria-label="Amount (to the nearest dollar)">
  <span class="input-group-addon">.00</span>
</div>
```

BOOTSTRAP

Architecture

- Components
  - Badges

```
<a href="#">Inbox <span class="badge">42</span></a>

<button class="btn btn-primary" type="button">
  Messages <span class="badge">4</span>
</button>
```

Inbox 42

Messages 4

BOOTSTRAP

Architecture

- Components
  - Dropdown

```
<div class="dropdown">
  <button class="btn btn-default" type="button" data-toggle="dropdown">
    Dropdown
    <span class="caret"></span>
  </button>
  <ul class="dropdown-menu">
    <li><a href="#">Action</a></li>
    <li><a href="#">Another action</a></li>
    <li><a href="#">Something else here</a></li>
</ul>
</div>
```

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BOOTSTRAP

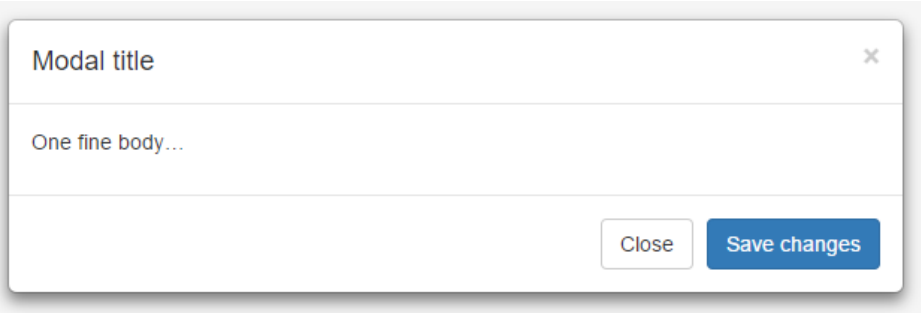
Architecture

- JavaScript
  - Custom jQuery plugins to bring Bootstrap's components to life:
    - Modal
    - ScrollSpy
    - Carousel
    - Affix
    - Etc.

BOOTSTRAP

Architecture

- JavaScript
  - Modal




```
<div class="modal fade" tabindex="-1" role="dialog">
  <div class="modal-dialog" role="document">
    <div class="modal-content">
      <div class="modal-header">
        <button type="button" class="close" data-dismiss="modal" aria-
label="Close"><span aria-hidden="true">&times;</span></button>
        <h4 class="modal-title">Modal title</h4>
      </div>
      <div class="modal-body">
        <p>One fine body&hellip;</p>
      </div>
      <div class="modal-footer">
        <button type="button" class="btn btn-default" data-
dismiss="modal">Close</button>
        <button type="button" class="btn btn-primary">Save changes</button>
      </div>
    </div><!-- /.modal-content -->
  </div><!-- /.modal-dialog -->
</div><!-- /.modal -->
```

BOOTSTRAP

Architecture

- JavaScript
  - Carousel

```
<div id="myCarousel" class="carousel slide" data-ride="carousel">
  <!-- Indicators -->
  <ol class="carousel-indicators">
    <li data-target="#myCarousel" data-slide-to="0" class="active"></li>
    ...
  </ol>
  <!-- Wrapper for slides -->
  <div class="carousel-inner">
    <div class="item active"><img src="la.jpg" alt="Los Angeles"></div>
    ...
  </div>
  <!-- Left and right controls -->
  <a class="left carousel-control" href="#myCarousel" data-slide="prev">
    <span class="glyphicon glyphicon-chevron-left"></span>
    <span class="sr-only">Previous</span>
  </a>
  ...
</div>
```

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BOOTSTRAP

v.4

- Currently: v4.0.0-alpha.6
- Link: https://v4-alpha.getbootstrap.com/
- Stable version launched in 2018 (?)
- Global changes:
  - Switched from px to rem as primary CSS unit, though pixels are still used for media queries and grid behavior
  - Global font-size increased from 14px to 16px
  - Added a new grid tier for smaller devices at 576px and below (our new xs tier)

BOOTSTRAP

v.4

- Global changes:
  - Dropped panels, thumbnails, and wells for a new component, **cards**.

```
<div class="card" style="width: 20rem;">
 <img class="card-img-top" src="arvore.jpg">
 <div class="card-block">
  <h4 class="card-title">Exemplo de um Card</h4>
  <p class="card-text">Este novo ...</p>
  <a href="#" class="btn btn-primary">Saber mais...</a>
 </div>
</div>
```

BOOTSTRAP

Sass

- But the **BIG CHANGES** are:
  - Switched from Less to **Sass** for Bootstrap source CSS files

  - **Flexbox** is enabled by default

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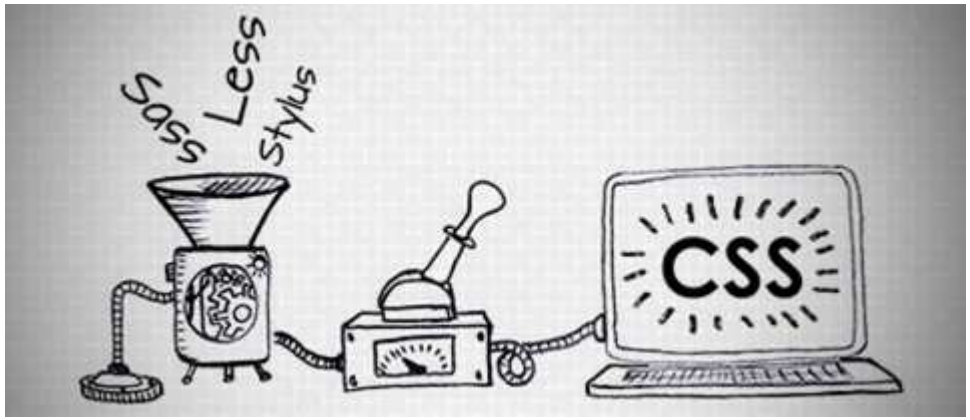
BOOTSTRAP

Sass

- CSS is primitive and incomplete
- Building a function, reusing a definition or inheritance are hard to achieve
- For bigger or complex projects, maintenance is a very big problem
- To address these issues several **CSS Preprocessors** appeared



- Benefits:
  - Make **writing** your CSS **quicker** not necessarily smaller!
  - More flexible and easy to maintain

BOOTSTRAP

Sass

- Sass (syntactically awesome stylesheets) :
  - Created in 2006 by Hampton Catlin, Natalie Weizenbaum and Chris Eppstein
  - Scripting language that is compiled into Cascading Style Sheets (CSS)

  - SassScript is the scripting language itself based in two flavors:
    - SASS - "the indented syntax", uses a syntax similar to Haml (.sass)
    - SCSS - the newer syntax, uses block formatting like that of CSS (.scss)
  - Extends CSS by providing several mechanisms available in programming languages

BOOTSTRAP

Sass

- How to use it?
  - Command line;
  - Desktop app (e.g. Koala);
  - Implementation in C called **libSass** (e.g. node-sass, sass.js);
  - Web playground (Sassmeister)

BOOTSTRAP

Sass

- Main features
  - Variables
  - Mixins
  - Extend
  - Nesting
  - Functions (built-in vs. user-defined)
  - Interpolation
  - Control

BOOTSTRAP

Sass

- Variables

SASS

```
$primary-color: #3bbfce;
$margin: 16px;

.content-navigation {
  border-color: $primary-color;
  color: darken($primary-color, 10%);
}

.border {
  padding: $margin / 2;
  margin: $margin / 2;
  border-color: $primary-color;
}
```

CSS

```
.content-navigation {
 border-color: #3bbfce;
 color: #2b9eab;
}

.border {
 padding: 8px;
 margin: 8px;
 border-color: #3bbfce;
}
```

BOOTSTRAP

Sass

- Mixins

SASS

```
@mixin square($size, $color) {
  width: $size;
  height: $size;
  background-color: $color;
}

.small-blue-square {
  @include square(20px, rgb(0,0,255));
}

.big-red-square {
  @include square(300px, rgb(255,0,0));
}
```

CSS

```
.small-blue-square {
 width: 20px;
 height: 20px;
 background-color: blue;
}

.big-red-square {
 width: 300px;
 height: 300px;
 background-color: red;
}
```

BOOTSTRAP

Sass

- Extend

SASS

```
.dialog-button {
  box-sizing: border-box;
  color: #ffffff;
  box-shadow: 0 1px 1px 0 rgba(0, 0, 0, 0.12);
  padding: 12px 40px;
  cursor: pointer;
}

.confirm {
  @extend .dialog-button;
  background-color: #87bae1;
  float: left;
}

.cancel {
  @extend .dialog-button;
  background-color: #e4749e;
  float: right;
}
```

CSS

```
.dialog-button, .confirm, .cancel {
 box-sizing: border-box;
 color: #ffffff;
 box-shadow: 0 1px 1px 0 rgba(0, 0, 0, 0.12);
 padding: 12px 40px;
 cursor: pointer;
}

.confirm {
 background-color: #87bae1;
 float: left;
}

.cancel {
 background-color: #e4749e;
 float: right;
}
```

BOOTSTRAP

Sass

- Nesting

SASS

```
ul {
  list-style: none;
  li {
    padding: 15px;
    display: inline-block;
    a {
      text-decoration: none;
      font-size: 16px;
      color: #444;
    }
  }
}
```

CSS

```
ul {
 list-style: none;
}

ul li {
 padding: 15px;
 display: inline-block;
}

ul li a {
 text-decoration: none;
 font-size: 16px;
 color: #444;
}
```

BOOTSTRAP

Sass

- Built-in functions

SASS

```
$my-blue: #2196F3;

a {
  padding: 10px 15px;
  background-color: $my-blue;
}

a:hover {
  background-color: darken($my-blue,10%);
}
```

CSS

```
a {
 padding: 10px 15px;
 background-color: #2196F3;
}

a:hover {
 background-color: #0c7cd5;
}
```

BOOTSTRAP

Sass

- User functions

SASS

```
$grid-width: 40px;
$gutter-width: 10px;

@function grid-width($n) {
  @return $n * $grid-width + ($n - 1) * $gutter-width;
}

#sidebar { width: grid-width(5); }
```

CSS

```
#sidebar {
 width: 240px;
}
```

BOOTSTRAP

Sass

- Interpolation

SASS

```
$name: foo;
$attr: border;

p.#{$name} {
  #{$attr}-color: blue;
}
```

CSS

```
p.foo {
  border-color: blue;
}
```

BOOTSTRAP

Sass

- Control

SASS

```
$boolean: true;

@mixin foo() {
  @if $boolean {
    @debug "$boolean is #{$boolean}";
    display: block;
  }
  @else {
    @debug "$boolean is #{$boolean}";
    display: none;
  }
}

.some-selector {
  @include foo();
}
```

CSS

```
.some-selector {
 display: block;
}
```

BOOTSTRAP

Sass

- Control

SASS

```
$squareCount: 3;

@for $i from 1 through $squareCount {
  #square-#{$i} {
    background-color: red;
    width: 50px * $i;
    height: 120px / $i;
  }
}
```

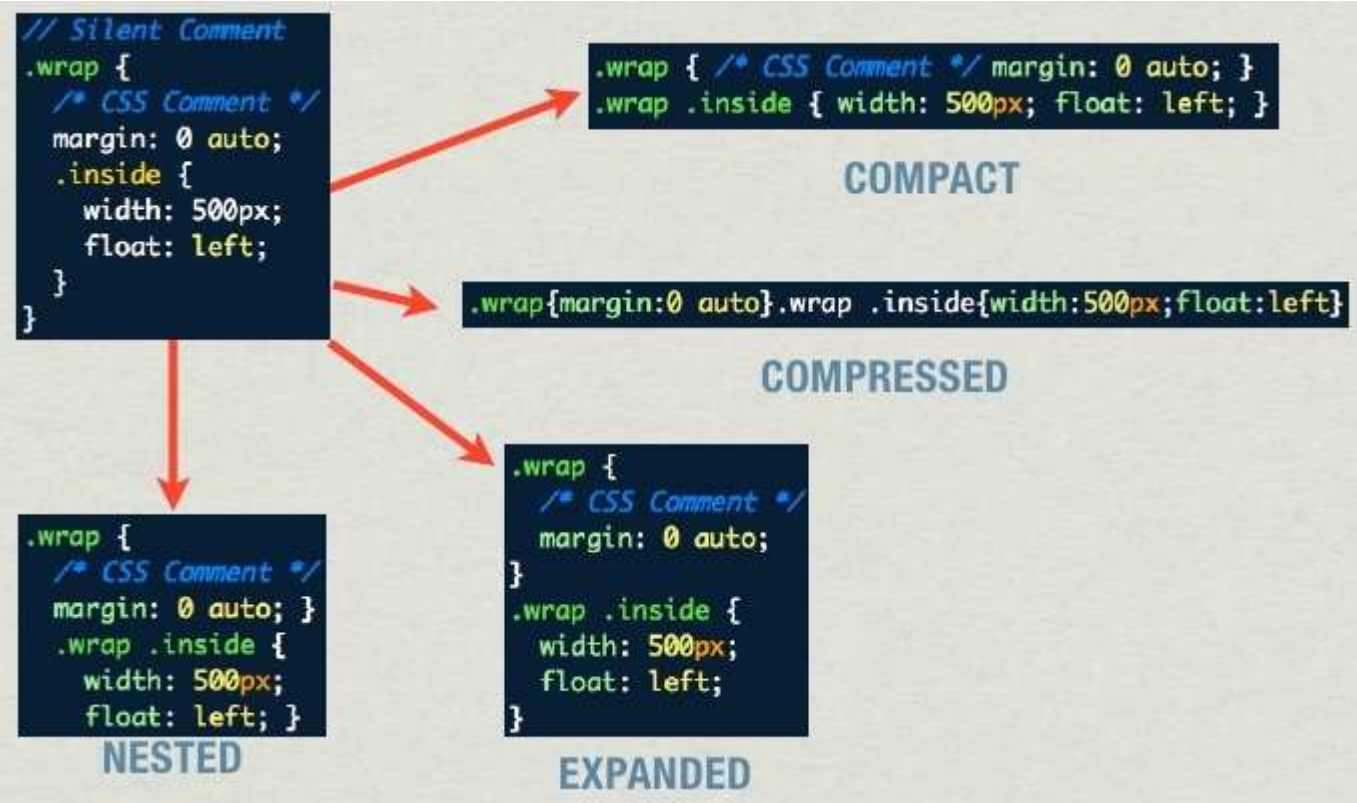
CSS

```
#square-1 {
  background-color: red;
  width: 50px;
  height: 120px;
}
#square-2 {
  background-color: red;
  width: 100px;
  height: 60px;
}
#square-3 {
  background-color: red;
  width: 150px;
  height: 40px;
}
```

BOOTSTRAP

Sass

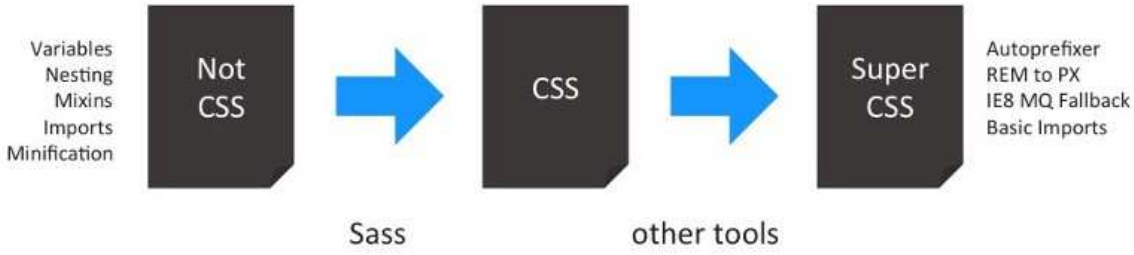
- Output formats



BOOTSTRAP

Sass

- Future?



- **PostCSS** is a tool for transforming styles with JS plugins
- These plugins can lint your CSS, support variables and mixins, transpile future CSS syntax, inline images, etc.
- PostCSS is used by industry leaders including Wikipedia, Twitter and JetBrains
- The **Autoprefixer** PostCSS plugin is one of the most popular CSS processors

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BOOTSTRAP

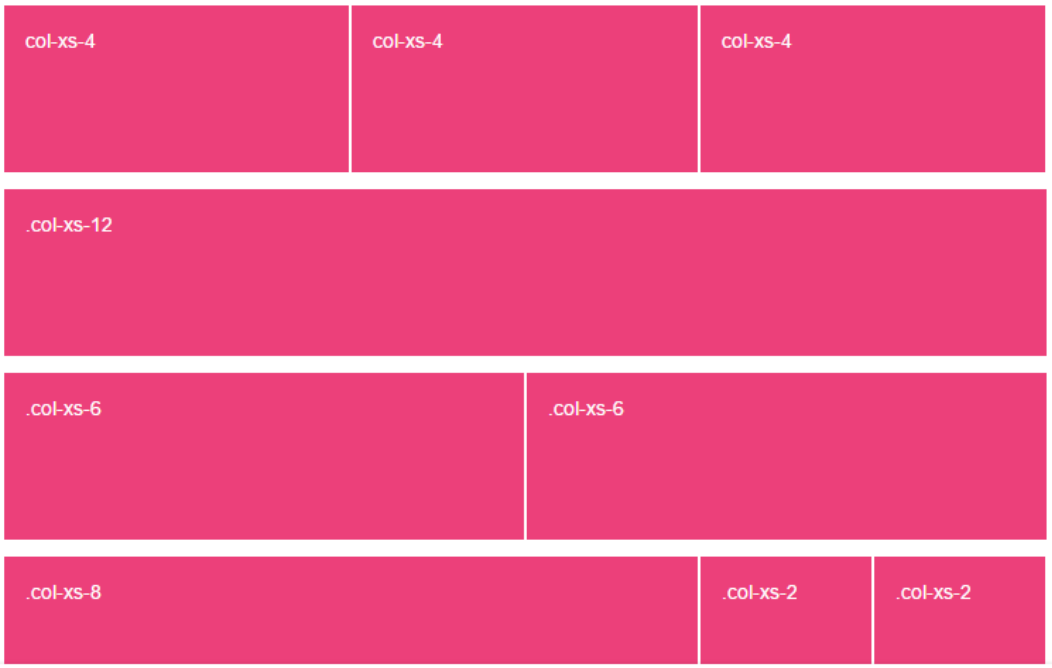
Flexbox

- Flexible boxes (**flexbox**), is a new layout mode in CSS3
- Provides an improvement over the block model:
  - does not use floats
  - nor do the flex container's margins collapse with the margins of its contents
- In Bootsrap 4, **Flexbox** is enabled by default

BOOTSTRAP

Flexbox

- Automatic layout (Bootstrap 3)



BOOTSTRAP

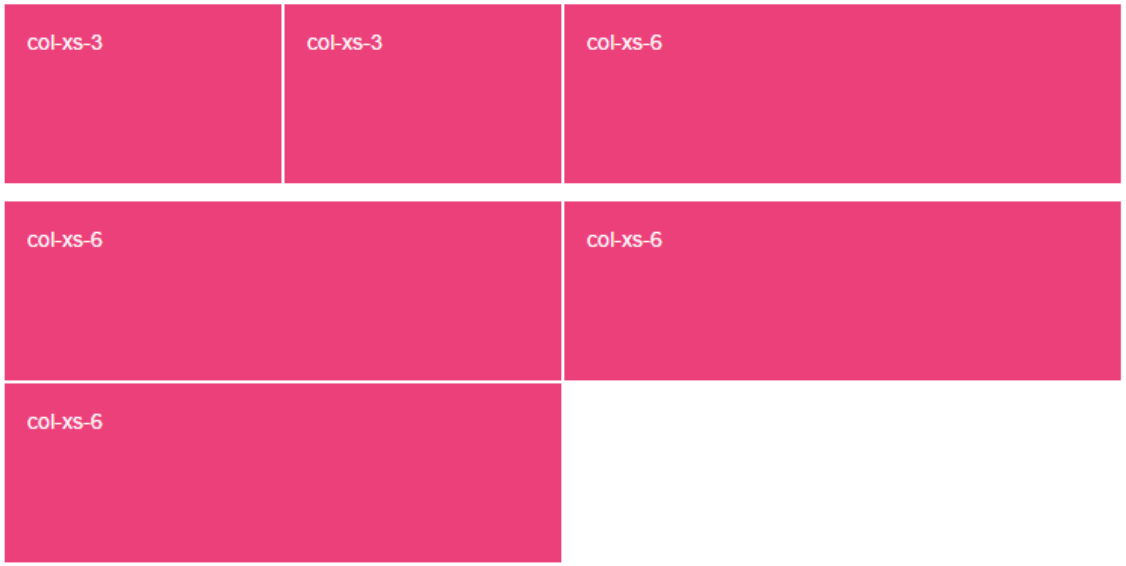
Flexbox

- Automatic layout (Bootstrap 4 with flexbox)

BOOTSTRAP

Flexbox

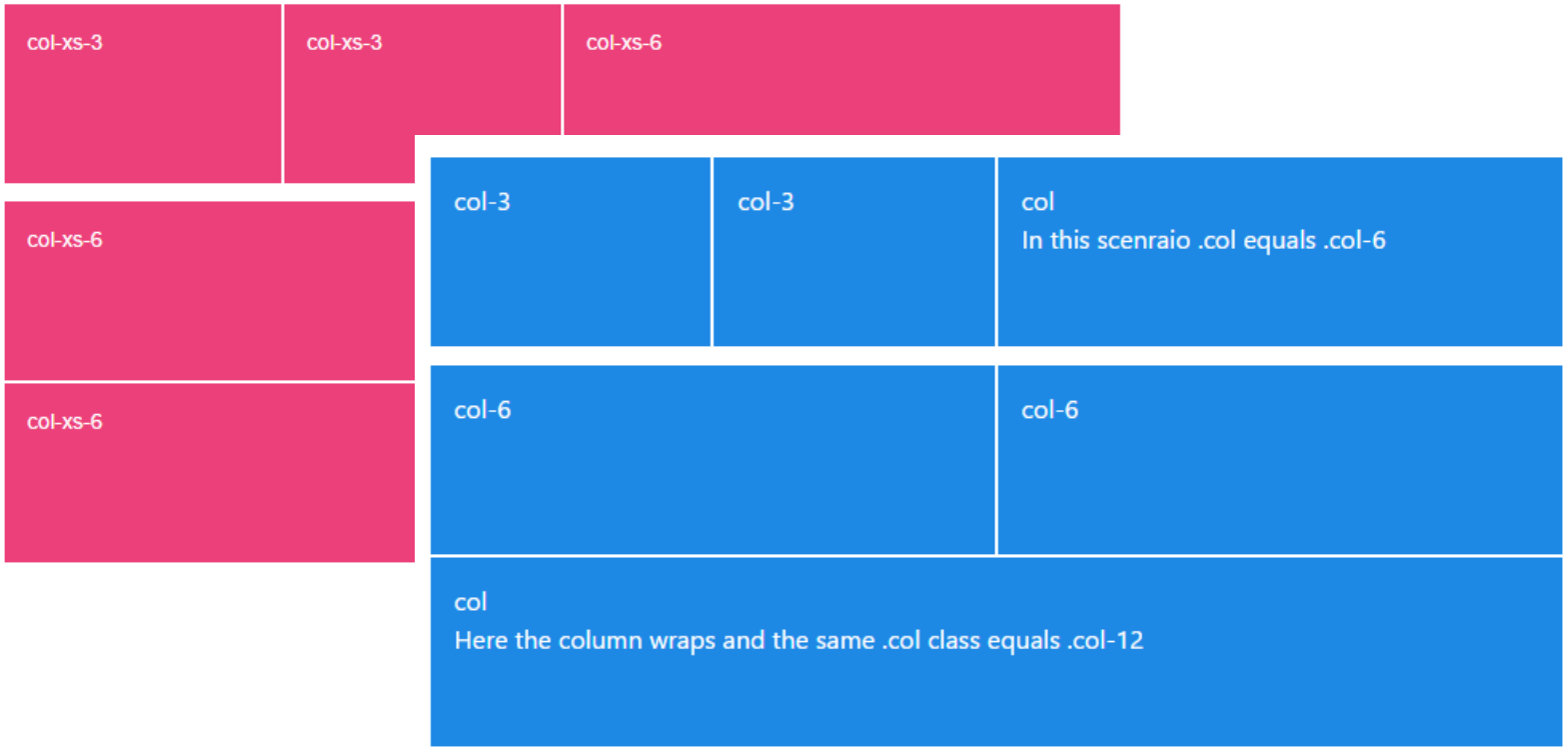
- Column wrapping (Bootstrap 3)



BOOTSTRAP

Flexbox

- Column wrapping (Bootstrap 4 with flexbox)



BOOTSTRAP

Flexbox

- Column height (Bootstrap 3)

col-xs-4
Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor incididunt

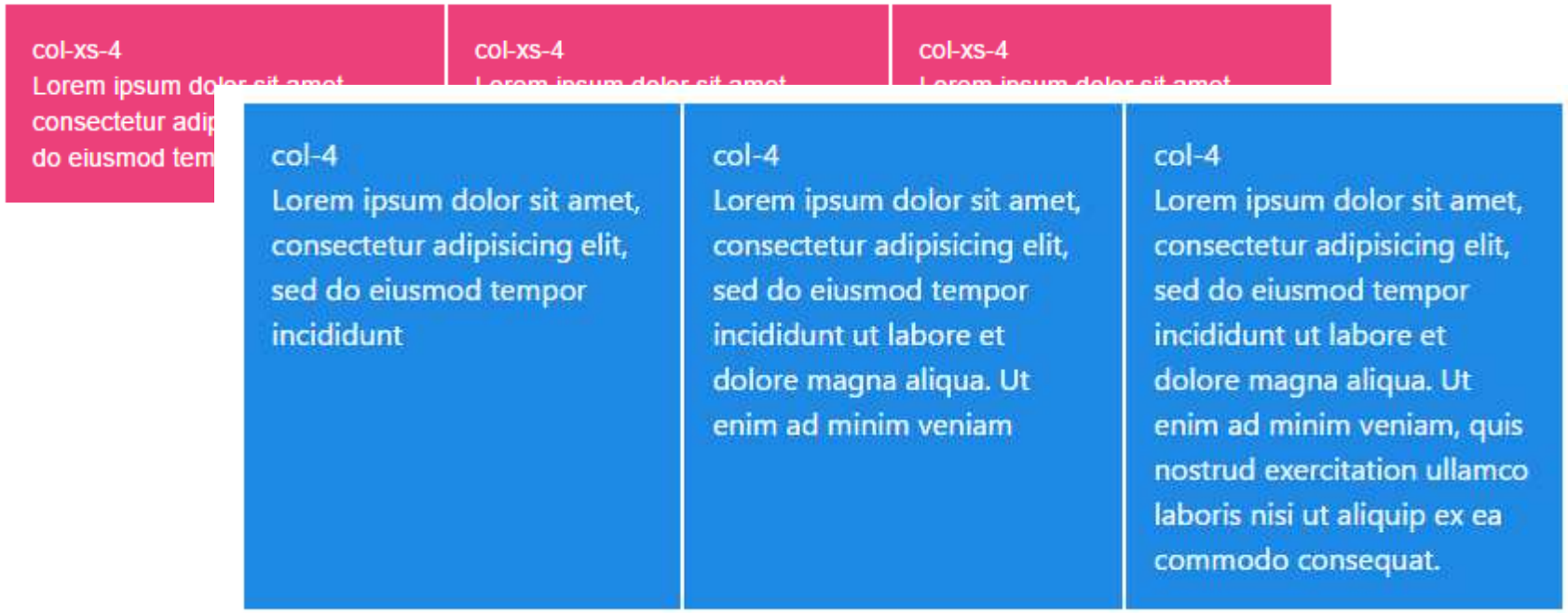
col-xs-4
Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam

col-xs-4
Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat.

BOOTSTRAP

Flexbox

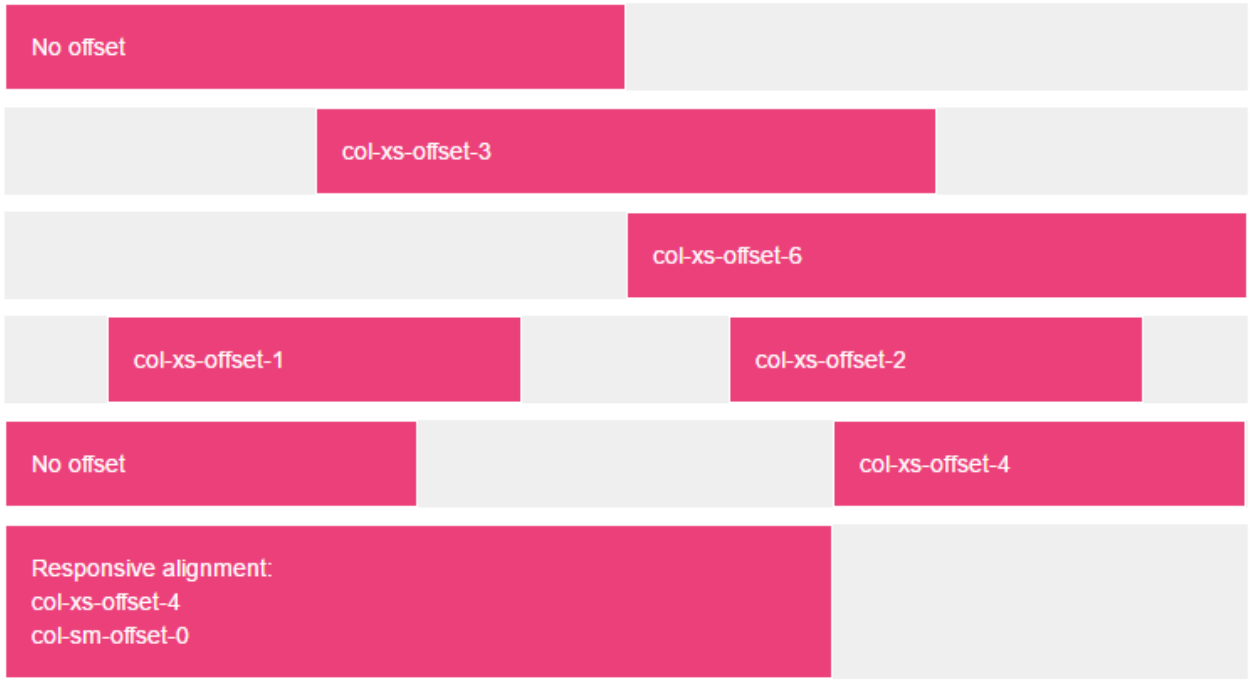
- Column height (Bootstrap 4 with flexbox)



BOOTSTRAP

Flexbox

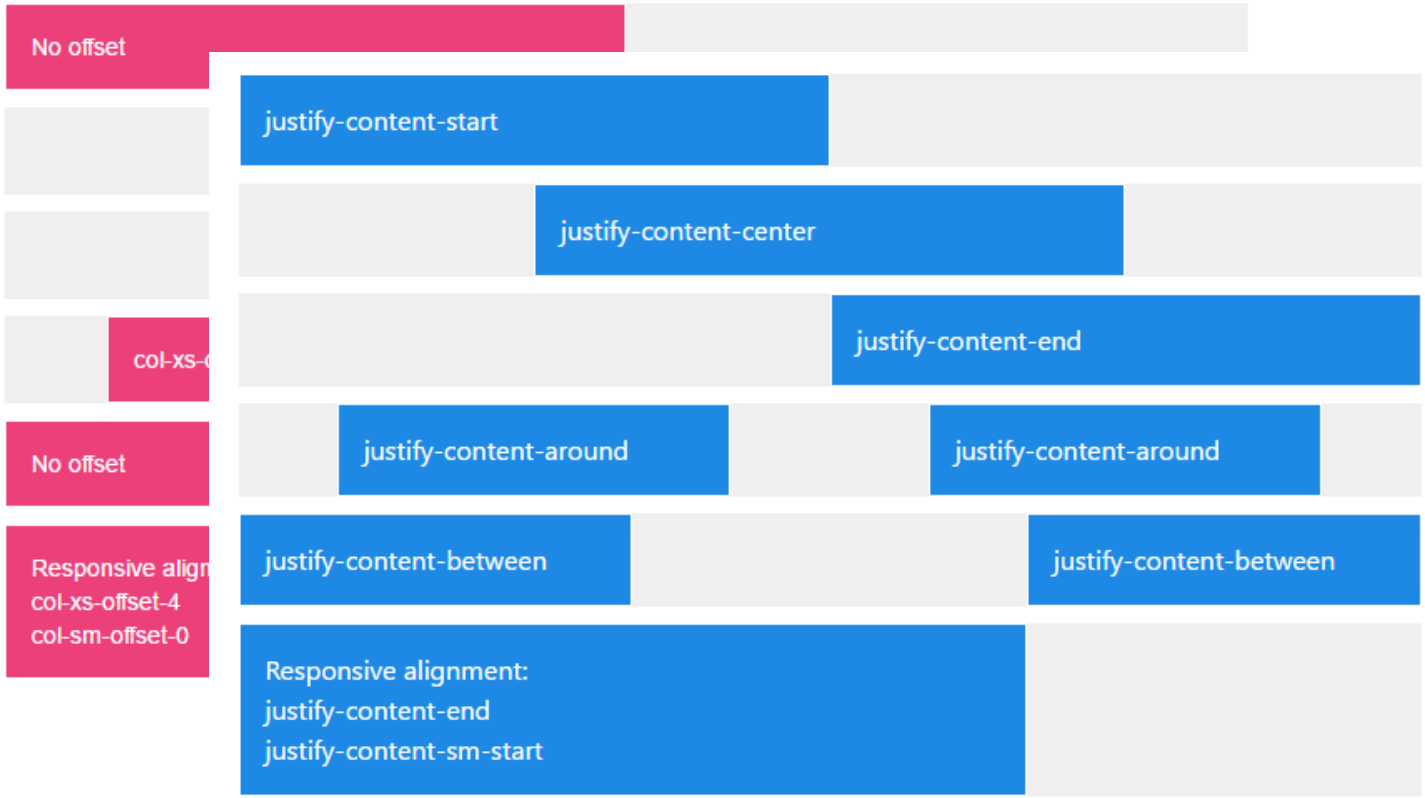
- Horizontal alignment (Bootstrap 3)



BOOTSTRAP

Flexbox

- Horizontal alignment (Bootstrap 4 with flexbox)



BOOTSTRAP

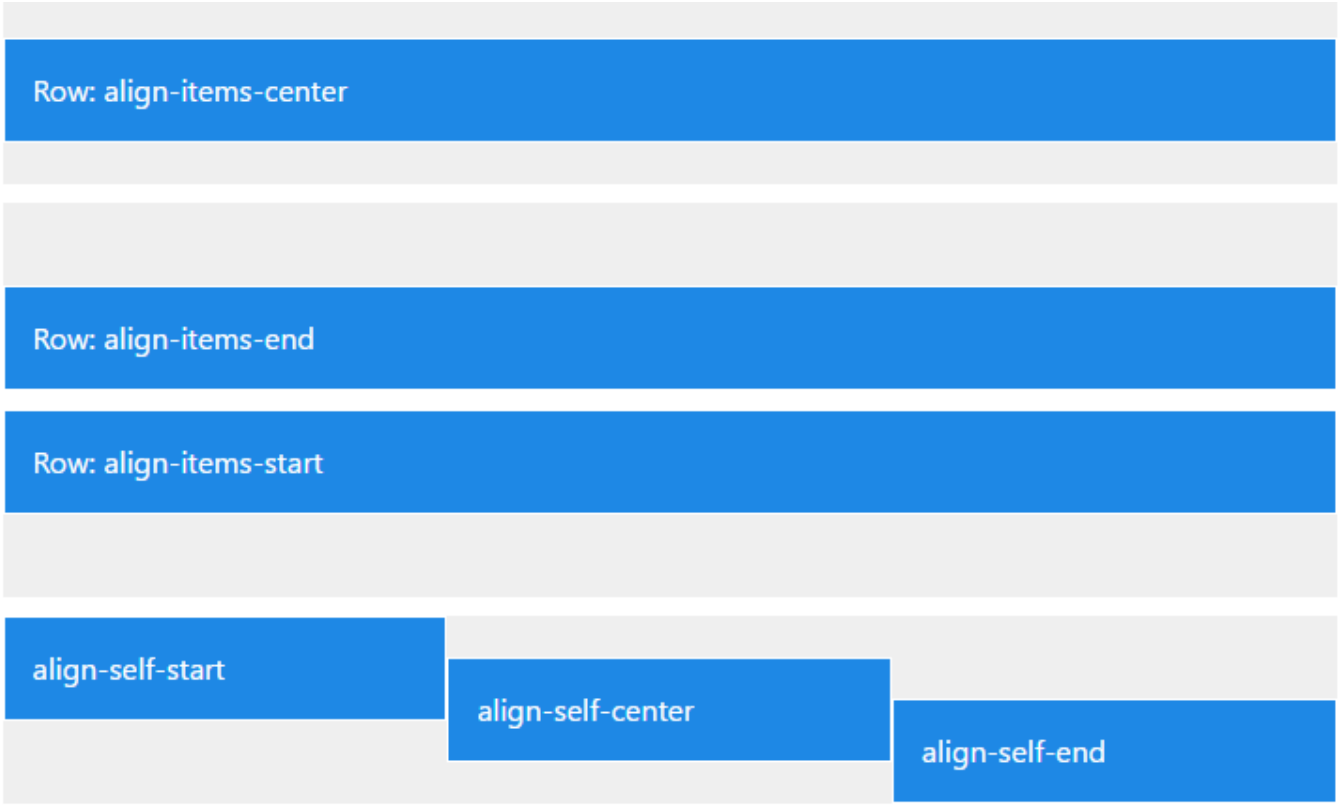
Flexbox

- Vertical alignment (Bootstrap 3)

BOOTSTRAP

Flexbox

- Vertical alignment (Bootstrap 4 with flexbox)



BOOTSTRAP

Flexbox

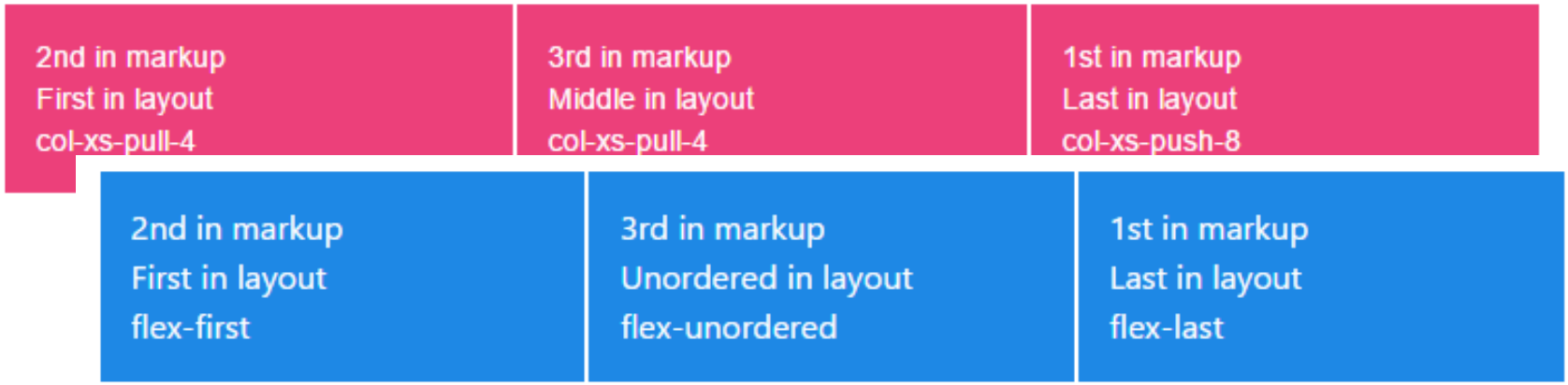
- Reordering columns (Bootstrap 3)

2nd in markup First in layout col-xs-pull-4	3rd in markup Middle in layout col-xs-pull-4	1st in markup Last in layout col-xs-push-8

BOOTSTRAP

Flexbox

- Reordering columns (Bootstrap 4 with flexbox)



Thanks

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