

# CSCI-4208: Developing Advanced Web Applications

Week 2: Lecture 4  
**Bootstrap v5 - Crash Course**

# Overview

Unit 1: Frontend development → Bootstrap Crash Course

1. What is Bootstrap
2. Importing Bootstrap into HTML document
3. Bootstrap Syntax
4. Containers
5. Spacing & Sizing
6. Colors
7. Text & Icons
8. Tables & Lists
9. Images
10. Buttons & Inputs
11. Gridview: Rows & Columns
12. Flexbox
13. Navbars
14. Cards
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# 1. What is Bootstrap?

- Bootstrap is a free front-end styling framework for faster and easier web development
- Bootstrap includes CSS based design templates for typography, forms, buttons, tables, navigation, modals, image carousels and many other, as well as optional JavaScript plugins
- Bootstrap also gives you the ability to easily create responsive designs

## **What is Responsive Web Design?**

Responsive web design is about creating web sites which automatically adjust themselves to look good on all devices, from small phones to large desktops.

# 1. Bootstrap solves a big problem for Responsive views

- Desktop/Laptop browsers use a **landscape** view (*i.e. width > height*)
  - All of which may have varying resolutions & screen dimensions
- Smartphone/Tablet browsers use a **portrait** view (*i.e. height > width*)
  - All of which may have varying resolutions & screen dimensions

**Problem: How to display web content that looks good for all devices (views)**



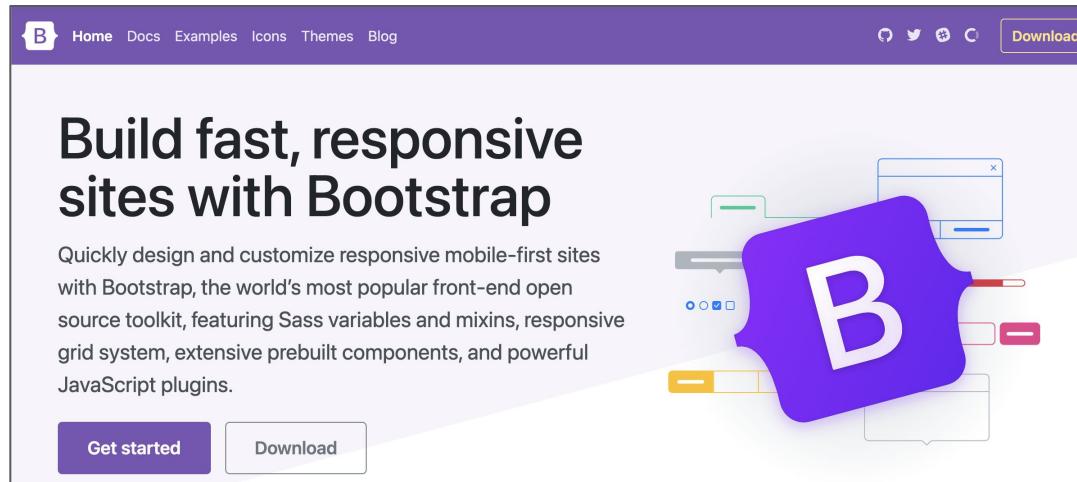
# 1. Why use Bootstrap?

- **Easy to use:** Anybody with just basic knowledge of HTML and CSS can start using Bootstrap
- **Responsive features:** Bootstrap's responsive CSS adjusts to phones, tablets, and desktops
- **Mobile-first approach:** In Bootstrap, mobile-first styles are part of the core framework
- **Browser compatibility:** Bootstrap 4 is compatible with all modern browsers (Chrome, Firefox, Internet Explorer 10+, Edge, Safari, and Opera)

## 2. Where to get Bootstrap?

You can:

- Include Bootstrap from a CDN (Content Delivery Network)
- Download Bootstrap from [www.getbootstrap.com](http://www.getbootstrap.com)



## 2. Importing Bootstrap into a HTML document

Link your **Bootstrap CSS files** in the `<head>` element of the HTML document.

Link your **Bootstrap JS files** at the end of the `<body>` element of the HTML document.

```
<html>
  <head>
    <link href='styles/bootstrap.min.css' rel="stylesheet">
  </head>
  <body>
    <script src="scripts/bootstrap.bundle.min.js"></script>
  </body>
</html>
```

## 2. Why is JavaScript needed for a Styling Framework?

### JavaScript and Popper?

Bootstrap uses JS and Popper.js for JavaScript components (like modals, tooltips, popovers etc). However, if you just use the CSS part of Bootstrap, you don't need them.

#### Components requiring JS

- Closable alerts
- Buttons and checkboxes/radio buttons for toggling states
- Carousel for slides, controls, and indicators
- Collapse for toggling content
- Dropdowns (also requires Popper.js for perfect positioning)
- Modals (open and close)
- Navbar (for collapsible menus)
- Tooltips and popovers (also requires Popper.js for perfect positioning)
- Scrollspy for scroll behavior and navigation updates

### 3. Bootstrap Syntax

- Bootstrap is a collection of predefined CSS class selectors.
- Using Bootstrap is just setting the defined class names in your HTML document

#### Example:

```
<div class='container'>  
    <button class='btn btn-lg btn-primary'> Click Me </button>  
</div>
```

Bootstrap's CSS selects based on those HTML classes & applies the specified styling.

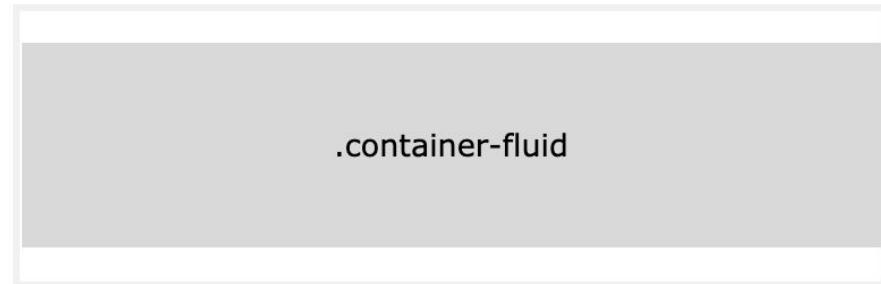
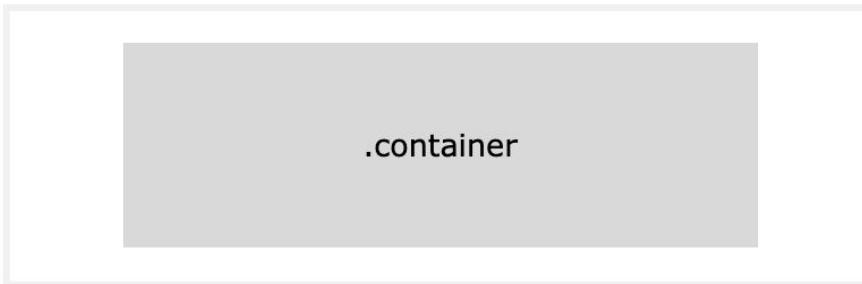
### 3. Bootstrap Syntax: Resources for Classnames

- <https://getbootstrap.com/docs/5.0/getting-started/introduction/>
- <https://bootstrapcreative.com/resources/bootstrap-5-cheat-sheet-classes-index/>

# 4. Bootstrap Containers

Containers are used to pad the content inside of them, and there are two container classes available:

1. The `.container` class provides a responsive **fixed width container**
2. The `.container-fluid` class provides a **full width container**, spanning the entire width of the viewport



# 5. Bootstrap Spacing & Sizing: Width (*by parent*)

## Class Selectors:

## Example

.w-25

Width 25%

.w-50

Width 50%

.w-75

Width 75%

.w-100

Width 100%

.w-auto

Width auto

.mw-100 Sets max-width property in CSS

## 5. Bootstrap Spacing & Sizing: Height (*by parent*)

### Example



### Class Selectors:

.mh-100 Sets max-height property in CSS

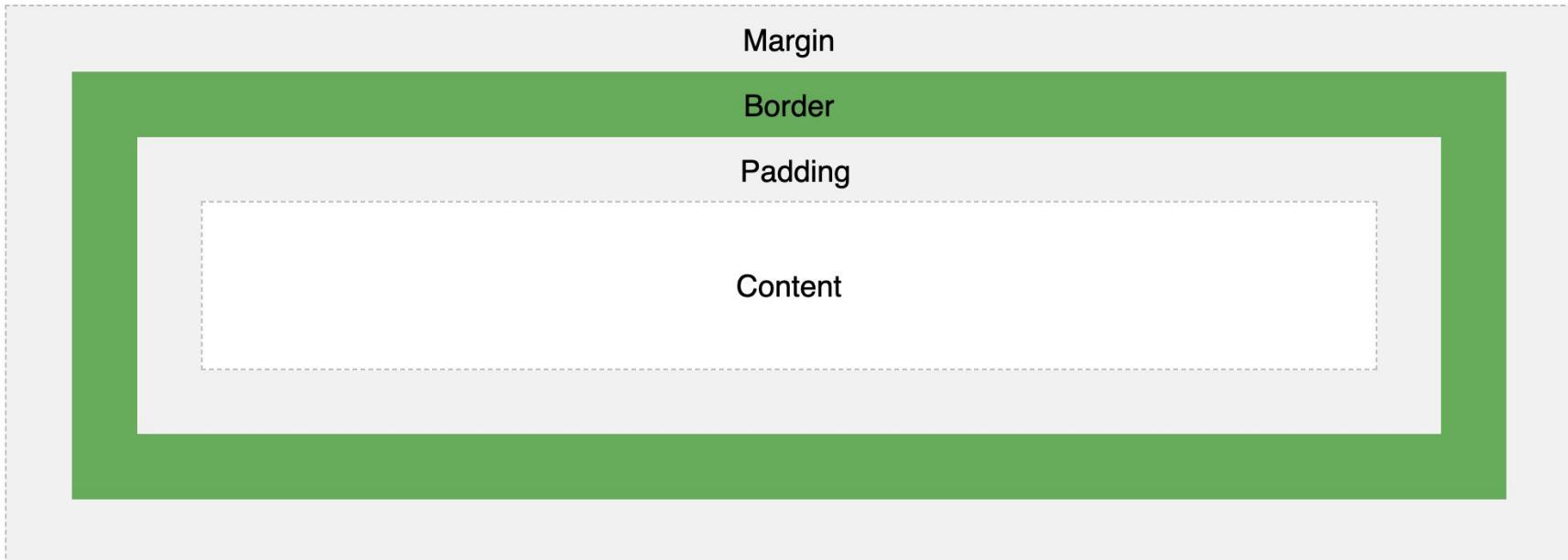
## 5. Bootstrap Spacing & Sizing: Width/Height (*by viewport*)

Class Selector	Description	Example
.min-vw-100	Min-width of element by viewport size	<div class="min-vw-100">
.min-vh-100	Min-height of element by viewport size	<div class="min-vh-100">
.vw-100	Width of element by viewport size	<div class="vw-100">
.vh-100	Height of element by viewport size	<div class="vh-100">

# 5. Bootstrap Spacing & Sizing: HTML Box Model

All HTML elements can be considered as boxes. In CSS, the term "box model" is used when talking about design and layout.

The CSS box model is essentially a box that wraps around every HTML element. It consists of: margins, borders, padding, and the actual content. The image below illustrates the box model:



# 5. Bootstrap Spacing & Sizing: Margins

Class selector	Description	Examples
.m-(1-5)	sets all margins by #	m-1, m-2, m-3, m-4, m-5
.mt-(1-5)	sets top margin by #	mt-1, mt-2, mt-3, mt-4, mt-5
.mb-(1-5)	sets bottom margin by #	mb-1, mb-2, mb-3, mb-4, mb-5
.mx-(1-5)	sets x-axis margins by #	mx-1, mx-2, mx-3, mx-4, mx-5
.my-(1-5)	sets y-axis margins by #	my-1, my-2, my-3, my-4, my-5

# 5. Bootstrap Spacing & Sizing: Padding

Class selector	Description	Examples
.p-#(1-5)	sets all paddings by #	p-1, p-2, p-3, p-4, p-5
.pt-#(1-5)	sets top padding by #	pt-1, pt-2, pt-3, pt-4, pt-5
.pb-#(1-5)	sets bottom padding by #	pb-1, pb-2, pb-3, pb-4, pb-5
.px-#(1-5)	sets x-axis padding by #	px-1, px-2, px-3, px-4, px-5
.py-#(1-5)	sets y-axis padding by #	py-1, py-2, py-3, py-4, py-5

## 5. Bootstrap Spacing & Sizing: Borders

Class selector	Description
.border	sets border around element
.border-bottom	sets bottom border
.border-top	sets top border
.border-start	sets left border
.border-end	sets right border

## 5. Bootstrap Spacing & Sizing: Border Colors

Class selector	Description
.border-muted	gray border
.border-primary	blue border
.border-success	green border
.border-info	light blue border
.border-warning	yellow border
.border-danger	red border
.border-secondary	gray border
.border-white	white border
.border-dark	black border

# 6. Bootstrap Colors: Text Colors

The classes for text colors are: `.text-muted`, `.text-primary`, `.text-success`, `.text-info`, `.text-warning`, `.text-danger`, `.text-secondary`, `.text-white`, `.text-dark`, `.text-body` (default body color/often black) and `.text-light`:

## Example

This text is muted.

This text is important.

This text indicates success.

This text represents some information.

This text represents a warning.

This text represents danger.

Secondary text.

Dark grey text.

Body text.

Light grey text.

# 6. Bootstrap Colors: Background Colors

The classes for background colors are: `.bg-primary`, `.bg-success`, `.bg-info`, `.bg-warning`, `.bg-danger`, `.bg-secondary`, `.bg-dark` and `.bg-light`.

Note that background colors do not set the text color, so in some cases you'll want to use them together with a `.text-*` class.

## Example

This text is important.

This text indicates success.

This text represents some information.

This text represents a warning.

This text represents danger.

Secondary background color.

Dark grey background color.

Light grey background color.

# 7. Bootstrap Text & Icons: Heading Fonts

**font: Default**

**h1** Bootstrap heading (2.5rem = 40px)

**h2** Bootstrap heading (2rem = 32px)

**h3** Bootstrap heading (1.75rem = 28px)

**h4** Bootstrap heading (1.5rem = 24px)

**h5** Bootstrap heading (1.25rem = 20px)

**h6** Bootstrap heading (1rem = 16px)

**font: Display**

**Display 1**

**Display 2**

**Display 3**

**Display 4**

**class selector**

.display-1

.display-2

.display-3

.display-4

## Display Headings

Display headings are used to stand out more than normal headings (larger font-size and lighter font-weight), and there are four classes to choose from: `.display-1`, `.display-2`, `.display-3`, `.display-4`

## 7. Bootstrap Text & Icons: Weights & Styles

Class Selector	Description
.fw-bold	( <i>font weight</i> ) Bold text
.fw-bolder	( <i>font weight</i> ) Bolder text
.fst-italic	( <i>font style</i> ) Italic text
.fw-light	( <i>font weight</i> ) Light weight text
.fw-lighter	( <i>font weight</i> ) Lighter weight text
.fw-normal	( <i>font weight</i> ) Normal text
.lead	Makes a paragraph stand out
.small	Indicates smaller text (set to 80% size of the parent)

## 7. Bootstrap Text & Icons: Text Alignment

Class Selector	Description
.text-left	Left aligned text
.text-center	Center aligned text
.text-right	Right aligned text
.text-justify	Justify aligned text

## 7. Bootstrap Text & Icons: Text Transforms

Class Selector	Description
.text-decoration-none	Removes underline from a link
.text-lowercase	Lowercase text
.text-uppercase	Uppercased text
.text-capitalize	Capitalized text
.font-monospace	Monospaced text

# 7. Bootstrap Text & Icons: Icons

## Bootstrap Icons

Free, high quality, open source icon library with nearly 1,200 icons. Include them anyway you like—SVGs, SVG sprite, or web fonts. Use them with or without Bootstrap in any project.

### Example: House icon



```
<i class="bi bi-house"></i> ← inline element
```

### Class Selectors:

.bi (bootstrap icon)

*Note:*

Each icon has its own unique bi label

### Resources:

Bootstrap 5 Icons (*full list*): <https://icons.getbootstrap.com/>

# 8. Bootstrap Tables & Lists: Table Styles

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

The `.table` class adds basic styling to a table:

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

The `.table-striped` class adds zebra-stripes to a table:

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

The `.table-borderless` class removes borders from the table:

# 8. Bootstrap Tables & Lists: Table Colors

Firstname	Lastname	Email
Default	Defaultson	def@somemail.com
Primary	Joe	joe@example.com
Success	Doe	john@example.com
Danger	Moe	mary@example.com
Info	Dooley	july@example.com
Warning	Refs	bo@example.com
Active	Activeson	act@example.com
Secondary	Secondson	sec@example.com
Light	Angie	angie@example.com
Dark	Bo	bo@example.com

Class	Description
.table-primary	Blue: Indicates an important action
.table-success	Green: Indicates a successful or positive action
.table-danger	Red: Indicates a dangerous or potentially negative action
.table-info	Light blue: Indicates a neutral informative change or action
.table-warning	Orange: Indicates a warning that might need attention
.table-active	Grey: Applies the hover color to the table row or table cell
.table-secondary	Grey: Indicates a slightly less important action
.table-light	Light grey table or table row background
.table-dark	Dark grey table or table row background

# 8. Bootstrap Tables & Lists: Table Headers

The `.thead-dark` class adds a black background to table headers,

The `.thead-light` class adds a grey background to table headers:

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

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

## 8. Bootstrap Tables & Lists: Table Sizes

<b>Class</b>	<b>Screen width</b>
.table-responsive-sm	< 576px
.table-responsive-md	< 768px
.table-responsive-lg	< 992px
.table-responsive-xl	< 1200px

# 8. Bootstrap Tables & Lists: Basic Lists

The most basic list group is an unordered list with list items:

First item

Second item

Third item

To create a basic list group, use an `<ul>` element with class `.list-group`, and `<li>` elements with class `.list-group-item`:

## Example

```
<ul class="list-group">
  <li class="list-group-item">First item</li>
  <li class="list-group-item">Second item</li>
  <li class="list-group-item">Third item</li>
</ul>
```

## 8. Bootstrap Tables & Lists: Horizontal Lists

If you want the list items to display horizontally instead of vertically (side by side instead of on top of each other), add the `.list-group-horizontal` class to `.list-group`:

First item	Second item	Third item	Fourth item
------------	-------------	------------	-------------

### Example

```
<ul class="list-group list-group-horizontal">
  <li class="list-group-item">First item</li>
  <li class="list-group-item">Second item</li>
  <li class="list-group-item">Third item</li>
  <li class="list-group-item">Fourth item</li>
</ul>
```

# 8. Bootstrap Tables & Lists: Lists Colors

Success item

Secondary item

Info item

Warning item

Danger item

Primary item

Dark item

Light item

```
<ul class="list-group">
  <li class="list-group-item list-group-item-success">Success item</li>
  <li class="list-group-item list-group-item-secondary">Secondary item</li>
  <li class="list-group-item list-group-item-info">Info item</li>
  <li class="list-group-item list-group-item-warning">Warning item</li>
  <li class="list-group-item list-group-item-danger">Danger item</li>
  <li class="list-group-item list-group-item-primary">Primary item</li>
  <li class="list-group-item list-group-item-dark">Dark item</li>
  <li class="list-group-item list-group-item-light">Light item</li>
</ul>
```

# 9. Bootstrap Images - Responsive

## Responsive Images

Images come in all sizes. So do screens. Responsive images automatically adjust to fit the size of the screen.

Create responsive images by adding an `.img-fluid` class to the `<img>` tag. The image will then scale nicely to the parent element.

The `.img-fluid` class applies `max-width: 100%;` and `height: auto;` to the image:

### Example

```

```

# 9. Bootstrap Images: Shapes

Rounded Corners:



*class selector:*

.rounded

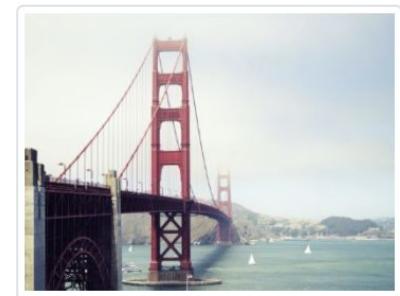
Circle:



*class selector:*

.rounded-circle

Thumbnail:



*class selector:*

.img-thumbnail

# 10. Bootstrap Buttons & Inputs: Button Colors

Basic

Primary

Secondary

Success

Info

Warning

Danger

Dark

Light

## Example

```
<button type="button" class="btn">Basic</button>
<button type="button" class="btn btn-primary">Primary</button>
<button type="button" class="btn btn-secondary">Secondary</button>
<button type="button" class="btn btn-success">Success</button>
<button type="button" class="btn btn-info">Info</button>
<button type="button" class="btn btn-warning">Warning</button>
<button type="button" class="btn btn-danger">Danger</button>
<button type="button" class="btn btn-dark">Dark</button>
<button type="button" class="btn btn-light">Light</button>
<button type="button" class="btn btn-link">Link</button>
```

# 10. Bootstrap Buttons & Inputs: Button Outlines

Primary

Secondary

Success

Info

Warning

Danger

Dark

Light

## Example

```
<button type="button" class="btn btn-outline-primary">Primary</button>
<button type="button" class="btn btn-outline-secondary">Secondary</button>
<button type="button" class="btn btn-outline-success">Success</button>
<button type="button" class="btn btn-outline-info">Info</button>
<button type="button" class="btn btn-outline-warning">Warning</button>
<button type="button" class="btn btn-outline-danger">Danger</button>
<button type="button" class="btn btn-outline-dark">Dark</button>
<button type="button" class="btn btn-outline-light text-dark">Light</button>
```

# 10. Bootstrap Buttons & Inputs: Button Sizes

Large

Default

Small

## Example

```
<button type="button" class="btn btn-primary btn-lg">Large</button>
<button type="button" class="btn btn-primary">Default</button>
<button type="button" class="btn btn-primary btn-sm">Small</button>
```

# 10. Bootstrap Buttons & Inputs: Button Group

```
Apple Samsung Sony
```

Use a `<div>` element with class `.btn-group` to create a button group:

## Example

```
<div class="btn-group">
  <button type="button" class="btn btn-primary">Apple</button>
  <button type="button" class="btn btn-primary">Samsung</button>
  <button type="button" class="btn btn-primary">Sony</button>
</div>
```

# 10. Bootstrap Buttons & Inputs: Text Inputs

Bootstrap supports all the HTML5 input types:

**text, password, datetime, datetime-local, date, month, time, week, number, email, url, search, tel, and color.**

Name:

Password:

The following example contains two input elements; one of `type="text"` and one of `type="password"`. Use the `.form-control` class to style inputs with full-width and proper padding, etc:

## Example

```
<div class="form-group">
  <label for="usr">Name:</label>
  <input type="text" class="form-control" id="usr">
</div>
<div class="form-group">
  <label for="pwd">Password:</label>
  <input type="password" class="form-control" id="pwd">
</div>
```

# 10. Bootstrap Buttons & Inputs: Checkbox/Radio Inputs

- Option 1
- Option 2
- Option 3

## Checkbox Input

### Example

```
<div class="form-check">
  <label class="form-check-label">
    <input type="checkbox" class="form-check-input" value="">Option 1
  </label>
</div>
<div class="form-check">
  <label class="form-check-label">
    <input type="checkbox" class="form-check-input" value="">Option 2
  </label>
</div>
<div class="form-check">
  <label class="form-check-label">
    <input type="checkbox" class="form-check-input" value="" disabled>Option 3
  </label>
</div>
```

## Radio Input

- Option 1
- Option 2
- Option 3

### Example

```
<div class="form-check">
  <label class="form-check-label">
    <input type="radio" class="form-check-input" name="optradio">Option 1
  </label>
</div>
<div class="form-check">
  <label class="form-check-label">
    <input type="radio" class="form-check-input" name="optradio">Option 2
  </label>
</div>
<div class="form-check disabled">
  <label class="form-check-label">
    <input type="radio" class="form-check-input" name="optradio" disabled>Option 3
  </label>
</div>
```

# 10. Bootstrap Buttons & Inputs: Inline Checkbox/Radio

## Checkbox Input

Option 1  Option 2  Option 3

### Example

```
<div class="form-check-inline">
  <label class="form-check-label">
    <input type="checkbox" class="form-check-input" value="">Option 1
  </label>
</div>
<div class="form-check-inline">
  <label class="form-check-label">
    <input type="checkbox" class="form-check-input" value="">Option 2
  </label>
</div>
<div class="form-check-inline">
  <label class="form-check-label">
    <input type="checkbox" class="form-check-input" value="" disabled>Option 3
  </label>
</div>
```

## Radio Input

Option 1  Option 2  Option 3

### Example

```
<div class="form-check-inline">
  <label class="form-check-label">
    <input type="radio" class="form-check-input" name="optradio">Option 1
  </label>
</div>
<div class="form-check-inline">
  <label class="form-check-label">
    <input type="radio" class="form-check-input" name="optradio">Option 2
  </label>
</div>
<div class="form-check-inline disabled">
  <label class="form-check-label">
    <input type="radio" class="form-check-input" name="optradio" disabled>Option 3
  </label>
</div>
```

# 10. Bootstrap Buttons & Inputs: Select Inputs

Select list (select one):

1



Multiple select list (hold ctrl or shift (or drag with the mouse) to select more than one):

2

3

4

5

## Example

```
<div class="form-group">
  <label for="sell">Select list:</label>
  <select class="form-control" id="sell">
    <option>1</option>
    <option>2</option>
    <option>3</option>
    <option>4</option>
  </select>
</div>
```

# 10. Bootstrap Buttons & Inputs: Input Sizing

Change the size of the form control with `.form-control-sm` or `.form-control-lg`:

Small form control

Default form control

Large form control

## Example

```
<input type="text" class="form-control form-control-sm">
<input type="text" class="form-control form-control">
<input type="text" class="form-control form-control-lg">
```

# 10. Bootstrap Buttons & Inputs: Input Groups

The `.input-group` class is a container to enhance an input by adding an icon, text or a button in front or behind the input field as a "help text".

Use `.input-group-prepend` to add the help text in front of the input, and `.input-group-append` to add it behind the input.

At last, add the `.input-group-text` class to style the specified help text.

The image shows two horizontal input fields. The first input field has a placeholder '@' followed by the word 'Username'. The second input field has a placeholder 'Your Email' followed by '@example.com'.

## Example

```
<form>
  <div class="input-group mb-3">
    <div class="input-group-prepend">
      <span class="input-group-text">@</span>
    </div>
    <input type="text" class="form-control" placeholder="Username">
  </div>

  <div class="input-group mb-3">
    <input type="text" class="form-control" placeholder="Your Email">
    <div class="input-group-append">
      <span class="input-group-text">@example.com</span>
    </div>
  </div>
</form>
```

# 10. Bootstrap Buttons & Inputs: Input Group Sizing

Use the `.input-group-sm` class for small input groups and `.input-group-lg` for large inputs groups:

Small

Default

Large

## Example

```
<form>
  <div class="input-group mb-3 input-group-sm">
    <div class="input-group-prepend">
      <span class="input-group-text">Small</span>
    </div>
    <input type="text" class="form-control">
  </div>
</form>
<form>
  <div class="input-group mb-3">
    <div class="input-group-prepend">
      <span class="input-group-text">Default</span>
    </div>
    <input type="text" class="form-control">
  </div>
</form>
<form>
  <div class="input-group mb-3 input-group-lg">
    <div class="input-group-prepend">
      <span class="input-group-text">Large</span>
    </div>
    <input type="text" class="form-control">
  </div>
</form>
```

# 11. Bootstrap Grid - Rows & Columns: Layout

Bootstrap's grid system is built with flexbox and allows up to 12 columns across the page.

If you do not want to use all 12 columns individually, you can group the columns together to create wider columns:

span 1	span 1	span 1	span 1	span 1	span 1	span 1	span 1	span 1	span 1	span 1	span 1	span 1			
span 4				span 4				span 4							
span 4				span 8											
span 6						span 6									
span 12															

The grid system is responsive, and the columns will re-arrange automatically depending on the screen size.

Make sure that the sum adds up to 12 or fewer (it is not required that you use all 12 available columns).

# 11. Bootstrap Grid - Rows & Columns: Classes

- `.col-` (extra small devices - screen width less than 576px)
- `.col-sm-` (small devices - screen width equal to or greater than 576px)
- `.col-md-` (medium devices - screen width equal to or greater than 768px)
- `.col-lg-` (large devices - screen width equal to or greater than 992px)
- `.col-xl-` (xlarge devices - screen width equal to or greater than 1200px)

The classes above can be combined to create more dynamic and flexible layouts.

**Tip:** Each class scales up, so if you wish to set the same widths for `sm` and `md`, you only need to specify `sm`.

# 11. Bootstrap Grid - Rows & Columns: Classes

	<b>Extra small (&lt;576px)</b>	<b>Small (&gt;=576px)</b>	<b>Medium (&gt;=768px)</b>	<b>Large (&gt;=992px)</b>	<b>Extra Large (&gt;=1200px)</b>
<b>Class prefix</b>	.col-	.col-sm-	.col-md-	.col-lg-	.col-xl-
<b>Grid behaviour</b>	Horizontal at all times	Collapsed to start, horizontal above breakpoints			
<b>Container width</b>	None (auto)	540px	720px	960px	1140px
<b>Suitable for</b>	Portrait phones	Landscape phones	Tablets	Laptops	Laptops and Desktops
<b># of columns</b>	12	12	12	12	12

# 11. Bootstrap Grid - Rows & Columns: Basic Structure

```
<!-- Control the column width, and how they should appear on different devices -->
<div class="row">
  <div class="col-*-*"></div>
  <div class="col-*-*"></div>
</div>
<div class="row">
  <div class="col-*-*"></div>
  <div class="col-*-*"></div>
  <div class="col-*-*"></div>
</div>

<!-- Or let Bootstrap automatically handle the layout -->
<div class="row">
  <div class="col"></div>
  <div class="col"></div>
  <div class="col"></div>
</div>
```

# 11. Bootstrap Grid - Rows & Columns: Basic Structure

```
<!-- Two columns: 50% width on all screens, except for extra small (100% width) -->
<div class="row">
  <div class="col-sm">1 of 2</div>
  <div class="col-sm">2 of 2</div>
</div>

<!-- Four columns: 25% width on all screens, except for extra small (100% width)-->
<div class="row">
  <div class="col-sm">1 of 4</div>
  <div class="col-sm">2 of 4</div>
  <div class="col-sm">3 of 4</div>
  <div class="col-sm">4 of 4</div>
</div>
```

1 of 2

2 of 2

1 of 4

2 of 4

3 of 4

4 of 4

# 11. Bootstrap Grid - Rows & Columns: Properties

## Equal Height

If one of the column is taller than the other (due to text or CSS height), the rest will follow:

Lorem ipsum dolor sit amet, cibo sensibus interesseret no sit. Et dolor possim volutpat qui. No malis tollit iriure eam, et vel tale zril blandit, rebum vidissem nostrum qui eu. No nostrud dolorem legendos mea, ea eum mucius oporteat platonem. Eam an case scribentur, ei clita causae cum, alia debet eu vel.	col	col
---	-----	-----

# 11. Bootstrap Grid - Rows & Columns: Examples

## Three Equal Columns

.col

.col

.col

The following example shows how to create three equal-width columns, on all devices and screen widths:

### Example

```
<div class="row">
  <div class="col">.col</div>
  <div class="col">.col</div>
  <div class="col">.col</div>
</div>
```

# 11. Bootstrap Grid - Rows & Columns: Examples

## Responsive Columns

```
.col-sm-3 .col-sm-3 .col-sm-3 .col-sm-3
```

The following example shows how to create four equal-width columns starting at tablets and scaling to extra large desktops.

**On mobile phones or screens that are less than 576px wide, the columns will automatically stack on top of each other:**

### Example

```
<div class="row">
  <div class="col-sm-3">.col-sm-3</div>
  <div class="col-sm-3">.col-sm-3</div>
  <div class="col-sm-3">.col-sm-3</div>
  <div class="col-sm-3">.col-sm-3</div>
</div>
```

```
.col-sm-3
```

```
.col-sm-3
```

```
.col-sm-3
```

```
.col-sm-3
```

# 11. Bootstrap Grid - Rows & Columns: Examples

## Two Unequal Responsive Columns

```
.col-sm-4
```

```
.col-sm-8
```

The following example shows how to get two various-width columns starting at tablets and scaling to large extra desktops:

### Example

```
<div class="row">
  <div class="col-sm-4">.col-sm-4</div>
  <div class="col-sm-8">.col-sm-8</div>
</div>
```

# 11. Bootstrap Grid - Rows & Columns: Examples

## Colored Columns

col-sm-6

col-sm-6

### Example: Stacked-to-horizontal

```
<div class="container">
  <div class="row">
    <div class="col-sm-6 bg-success">
      <p>Lorem ipsum...</p>
    </div>
    <div class="col-sm-6 bg-warning">
      <p>Sed ut perspiciatis...</p>
    </div>
  </div>
</div>
```

# 11. Bootstrap Grid - Rows & Columns: Nesting Columns

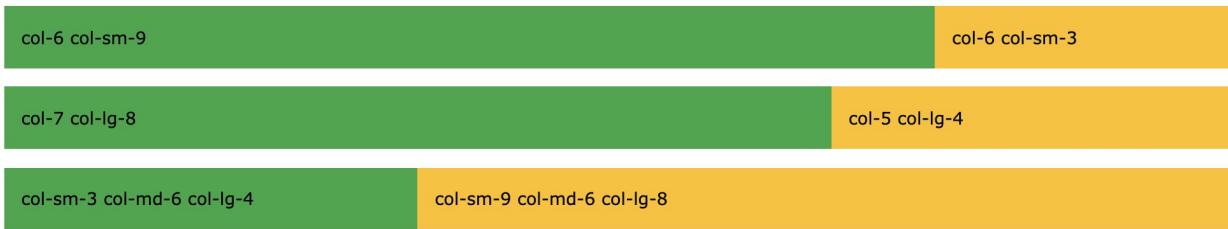


The following example shows how to create a two column layout, with another two columns inside one of the columns:

## Example

```
<div class="row">
  <div class="col-8">
    .col-8
    <div class="row">
      <div class="col-6">.col-6</div>
      <div class="col-6">.col-6</div>
    </div>
  </div>
  <div class="col-4">.col-4</div>
</div>
```

# 11. Bootstrap Grid - Rows & Columns: Mix Breakpoints



## Example

```
<!-- 50%/50% split on extra small devices and 75%/25% split on larger devices -->
<div class="row">
  <div class="col-6 col-sm-9">col-6 col-sm-9</div>
  <div class="col-6 col-sm-3">col-6 col-sm-3</div>
</div>

<!-- 58%/42% split on extra small, small and medium devices and 66.3%/33.3% split on large and xlarge devices -->
<div class="row">
  <div class="col-7 col-lg-8">col-7 col-lg-8</div>
  <div class="col-5 col-lg-4">col-5 col-lg-4</div>
</div>

<!-- 25%/75% split on small devices, a 50%/50% split on medium devices, and a 33%/66% split on large and xlarge devices. On extra small devices, it will automatically stack (100%) -->
<div class="row">
  <div class="col-sm-3 col-md-6 col-lg-4">col-sm-3 col-md-6 col-lg-4</div>
  <div class="col-sm-9 col-md-6 col-lg-8">col-sm-9 col-md-6 col-lg-8</div>
</div>
```

## Note:

.col-0  
.col-sm-0  
.col-md-0  
.col-lg-0  
.col-xl-0

Column will not appear at that breakpoint

# 11. Bootstrap Grid - Rows & Columns: Rules

- Rows must be placed within a `.container` (fixed-width) or `.container-fluid` (full-width) for proper alignment and padding
- Use rows to create horizontal groups of columns
- Content should be placed within columns, and only columns may be immediate children of rows
- Predefined classes like `.row` and `.col-sm-4` are available for quickly making grid layouts
- Columns create gutters (gaps between column content) via padding. That padding is offset in rows for the first and last column via negative margin on `.rows`
- Grid columns are created by specifying the number of 12 available columns you wish to span. For example, three equal columns would use three `.col-sm-4`
- Column widths are in percentage, so they are always fluid and sized relative to their parent element

# 12. Bootstrap Flexbox: Flexbox Container

To create a flexbox container and to transform direct children into flex items, use the `d-flex` class:

## Example



Flex item 1 Flex item 2 Flex item 3

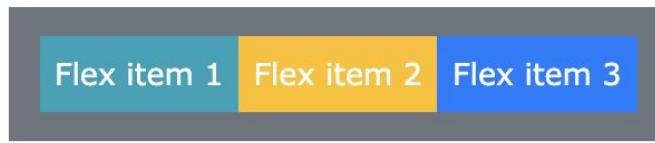
## Example

```
<div class="d-flex p-3 bg-secondary text-white">
  <div class="p-2 bg-info">Flex item 1</div>
  <div class="p-2 bg-warning">Flex item 2</div>
  <div class="p-2 bg-primary">Flex item 3</div>
</div>
```

# 12. Bootstrap Flexbox: Inline Flexbox Container

To create an inline flexbox container, use the `d-inline-flex` class:

## Example



The main div holder is inline with the next one, similar to `display: inline;`



`display: flex-inline;`

The main div holder is going to next line, similar to `display: block;`



`display: flex;`

## Example

```
<div class="d-inline-flex p-3 bg-secondary text-white">
  <div class="p-2 bg-info">Flex item 1</div>
  <div class="p-2 bg-warning">Flex item 2</div>
  <div class="p-2 bg-primary">Flex item 3</div>
</div>
```

# 12. Bootstrap Flexbox: Horizontal Direction

Use `.flex-row` to display the flex items horizontally (side by side). This is default.

**Tip:** Use `.flex-row-reverse` to right-align the horizontal direction:

## Example



## Example

```
<div class="d-flex flex-row bg-secondary">
  <div class="p-2 bg-info">Flex item 1</div>
  <div class="p-2 bg-warning">Flex item 2</div>
  <div class="p-2 bg-primary">Flex item 3</div>
</div>

<div class="d-flex flex-row-reverse bg-secondary">
  <div class="p-2 bg-info">Flex item 1</div>
  <div class="p-2 bg-warning">Flex item 2</div>
  <div class="p-2 bg-primary">Flex item 3</div>
</div>
```

# 12. Bootstrap Flexbox: Vertical Direction

Use `.flex-column` to display the flex items vertically (on top of each other), or `.flex-column-reverse` to reverse the vertical direction:

## Example

Flex item 1

Flex item 2

Flex item 3

Flex item 3

Flex item 2

Flex item 1

## Example

```
<div class="d-flex flex-column">
  <div class="p-2 bg-info">Flex item 1</div>
  <div class="p-2 bg-warning">Flex item 2</div>
  <div class="p-2 bg-primary">Flex item 3</div>
</div>

<div class="d-flex flex-column-reverse">
  <div class="p-2 bg-info">Flex item 1</div>
  <div class="p-2 bg-warning">Flex item 2</div>
  <div class="p-2 bg-primary">Flex item 3</div>
</div>
```

# 12. Bootstrap Flexbox: Justify Content

Use the `.justify-content-*` classes to change the alignment of flex items. Valid classes are `start` (default), `end`, `center`, `between` or `around`:

## Example



## Example

```
<div class="d-flex justify-content-start">...</div>
<div class="d-flex justify-content-end">...</div>
<div class="d-flex justify-content-center">...</div>
<div class="d-flex justify-content-between">...</div>
<div class="d-flex justify-content-around">...</div>
```

# 12. Bootstrap Flexbox: Fill / Equal Widths

Use `.flex-fill` on flex items to force them into equal widths:

## Example



Flex item 1      Flex item 2      Flex item 3

## Example

```
<div class="d-flex">
  <div class="p-2 bg-info flex-fill">Flex item 1</div>
  <div class="p-2 bg-warning flex-fill">Flex item 2</div>
  <div class="p-2 bg-primary flex-fill">Flex item 3</div>
</div>
```

# 12. Bootstrap Flexbox: Grow

Use `.flex-grow-1` on a flex item to take up the rest of the space. In the example below, the first two flex items take up their necessary space, while the last item takes up the rest of the available space:

## Example



Flex item 1 Flex item 2 Flex item 3

## Example

```
<div class="d-flex">
  <div class="p-2 bg-info">Flex item 1</div>
  <div class="p-2 bg-warning">Flex item 2</div>
  <div class="p-2 bg-primary flex-grow-1">Flex item 3</div>
</div>
```

# 12. Bootstrap Flexbox: Order

Change the visual order of a specific flex item(s) with the `.order` classes. Valid classes are from 0 to 12, where the lowest number has highest priority (order-1 is shown before order-2, etc..):

## Example

```
Flex item 3 Flex item 2 Flex item 1
```

## Example

```
<div class="d-flex bg-secondary">
  <div class="p-2 bg-info order-3">Flex item 1</div>
  <div class="p-2 bg-warning order-2">Flex item 2</div>
  <div class="p-2 bg-primary order-1">Flex item 3</div>
</div>
```

# 12. Bootstrap Flexbox: Automargins

Easily add auto margins to flex items with `.mr-auto` (push items to the right), or by using `.ml-auto` (push items to the left):

## Example



## Example

```
<div class="d-flex bg-secondary">
  <div class="p-2 mr-auto bg-info">Flex item 1</div>
  <div class="p-2 bg-warning">Flex item 2</div>
  <div class="p-2 bg-primary">Flex item 3</div>
</div>

<div class="d-flex bg-secondary">
  <div class="p-2 bg-info">Flex item 1</div>
  <div class="p-2 bg-warning">Flex item 2</div>
  <div class="p-2 ml-auto bg-primary">Flex item 3</div>
</div>
```

# 12. Bootstrap Flexbox: Wrap

Control how flex items wrap in a flex container with `.flexnowrap` (default), `.flex-wrap` or `.flex-wrap-reverse`.

`.flex-wrap`

Flex item 1	Flex item 2	Flex item 3	Flex item 4	Flex item 5	Flex item 6	Flex item 7
Flex item 8	Flex item 9	Flex item 10	Flex item 11	Flex item 12	Flex item 13	
Flex item 14	Flex item 15	Flex item 16	Flex item 17	Flex item 18	Flex item 19	
Flex item 20	Flex item 21	Flex item 22	Flex item 23	Flex item 24	Flex item 25	

`.flex-wrap-reverse`

Flex item 20	Flex item 21	Flex item 22	Flex item 23	Flex item 24	Flex item 25
Flex item 14	Flex item 15	Flex item 16	Flex item 17	Flex item 18	Flex item 19
Flex item 8	Flex item 9	Flex item 10	Flex item 11	Flex item 12	Flex item 13
Flex item 1	Flex item 2	Flex item 3	Flex item 4	Flex item 5	Flex item 6

`.flexnowrap`

Flex item 1	Flex item 2	Flex item 3	Flex item 4	Flex item 5	Flex item 6	Flex item 7	Flex item 8	Flex item 9	Flex item 10	Flex item 11	Flex item 12	Flex item 13	Flex item 14	Flex item 15	Flex item 16	Flex item 17	Flex item 18	Flex item 19	Flex item 20	Flex item 21	Flex item 22	Flex item 23	Flex item 24	Flex item 25
-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	--------------	--------------	--------------	--------------	--------------	--------------	--------------	--------------	--------------	--------------	--------------	--------------	--------------	--------------	--------------	--------------

# 12. Bootstrap Flexbox: Align Content

Control the vertical alignment of gathered flex items with the `.align-content-*` classes.

Valid classes are:

`.align-content-start` (default),

`.align-content-end`,

`.align-content-center`,

`.align-content-between`,

`.align-content-around`

`.align-content-stretch`.

Note: These classes have no effect on single rows of flex items.

# 12. Bootstrap Flexbox: Align Content - Example

Example **align-content-start**

Flex item 1	Flex item 2	Flex item 3	Flex item 4	Flex item 5	Flex item 6	Flex item 7	Flex item 8	Flex item 9	Flex item 10
Flex item 11	Flex item 12	Flex item 13	Flex item 14	Flex item 15	Flex item 16	Flex item 17	Flex item 18	Flex item 19	
Flex item 20	Flex item 21	Flex item 22	Flex item 23	Flex item 24	Flex item 25				

# 12. Bootstrap Flexbox: Align Content - Example

Example **align-content-end**

Flex item 1	Flex item 2	Flex item 3	Flex item 4	Flex item 5	Flex item 6	Flex item 7	Flex item 8	Flex item 9	Flex item 10
Flex item 11	Flex item 12	Flex item 13	Flex item 14	Flex item 15	Flex item 16	Flex item 17	Flex item 18	Flex item 19	
Flex item 20	Flex item 21	Flex item 22	Flex item 23	Flex item 24	Flex item 25				

# 12. Bootstrap Flexbox: Align Content - Example

Example **align-content-center**

Flex item 1	Flex item 2	Flex item 3	Flex item 4	Flex item 5	Flex item 6	Flex item 7	Flex item 8	Flex item 9	Flex item 10
Flex item 11	Flex item 12	Flex item 13	Flex item 14	Flex item 15	Flex item 16	Flex item 17	Flex item 18	Flex item 19	
Flex item 20	Flex item 21	Flex item 22	Flex item 23	Flex item 24	Flex item 25				

# 12. Bootstrap Flexbox: Align Content - Example

Example **align-content-around**

Flex item 1	Flex item 2	Flex item 3	Flex item 4	Flex item 5	Flex item 6	Flex item 7	Flex item 8	Flex item 9	Flex item 10
-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	--------------

Flex item 11	Flex item 12	Flex item 13	Flex item 14	Flex item 15	Flex item 16	Flex item 17	Flex item 18	Flex item 19
--------------	--------------	--------------	--------------	--------------	--------------	--------------	--------------	--------------

Flex item 20	Flex item 21	Flex item 22	Flex item 23	Flex item 24	Flex item 25
--------------	--------------	--------------	--------------	--------------	--------------

# 12. Bootstrap Flexbox: Align Content - Example

Example **align-content-stretch**

Flex item 1	Flex item 2	Flex item 3	Flex item 4	Flex item 5	Flex item 6	Flex item 7	Flex item 8	Flex item 9	Flex item 10
Flex item 11	Flex item 12	Flex item 13	Flex item 14	Flex item 15	Flex item 16	Flex item 17	Flex item 18	Flex item 19	
Flex item 20	Flex item 21	Flex item 22	Flex item 23	Flex item 24	Flex item 25				

# 12. Bootstrap Flexbox: Align Items

Control the vertical alignment of single rows of flex items with the `.align-items-*` classes.

Valid classes are:

`.align-items-start,`

`.align-items-end,`

`.align-items-center,`

`.align-items-baseline,`

`.align-items-stretch` (default).

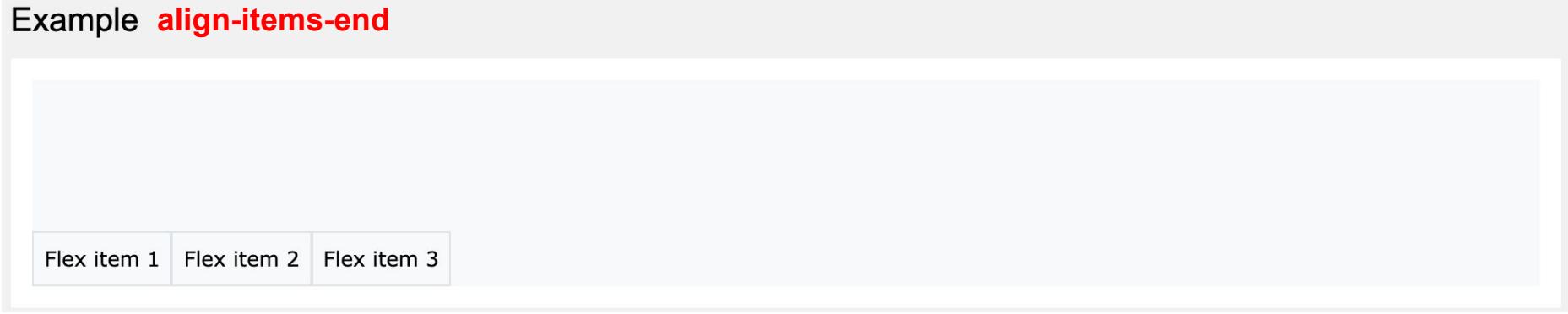
# 12. Bootstrap Flexbox: Align Items - Examples

Example **align-items-start**

Flex item 1	Flex item 2	Flex item 3
-------------	-------------	-------------

# 12. Bootstrap Flexbox: Align Items - Examples

Example **align-items-end**



Flex item 1 Flex item 2 Flex item 3

# 12. Bootstrap Flexbox: Align Items - Examples

Example **align-items-center**

Flex item 1	Flex item 2	Flex item 3
-------------	-------------	-------------

# 12. Bootstrap Flexbox: Align Items - Examples

Example **align-items-baseline**

Flex item 1 Flex item 2 Flex item 3

# 12. Bootstrap Flexbox: Align Items - Examples

Example **align-items-stretch**

Flex item 1	Flex item 2	Flex item 3
-------------	-------------	-------------

# 12. Bootstrap Flexbox: Align Self

Control the vertical alignment of a specified flex item with the `.align-self-*` classes.

Valid classes are:

`.align-self-start`,

`.align-self-end`,

`.align-self-center`,

`.align-self-baseline`,

`.align-self-stretch` (default).

## 12. Bootstrap Flexbox: Align Self - Examples

Example **align-self-start**

Flex item 1	Flex item 2	Flex item 3
-------------	-------------	-------------

## 12. Bootstrap Flexbox: Align Self - Examples

Example **align-self-end**

Flex item 1

Flex item 3

Flex item 2

## 12. Bootstrap Flexbox: Align Self - Examples

Example **align-self-center**

Flex item 1

Flex item 3

Flex item 2

## 12. Bootstrap Flexbox: Align Self - Examples

Example **align-self-baseline**

Flex item 1   Flex item 2   Flex item 3



## 12. Bootstrap Flexbox: Align Self - Examples

Example **align-self-stretch**

Flex item 1	Flex item 2	Flex item 3
-------------	-------------	-------------

# 13. Bootstrap Navbar: Basic - Example

Logo Link 1 Link 2 Link 3

Purpose: predefined styles to display a list of items as a navigation bar

```
<!-- A grey horizontal navbar that becomes vertical on small screens -->
<nav class="navbar navbar-expand-sm bg-light">

    <!-- Links -->
    <ul class="navbar-nav">
        <li class="nav-item">
            <a class="nav-link" href="#">Link 1</a>
        </li>
        <li class="nav-item">
            <a class="nav-link" href="#">Link 2</a>
        </li>
        <li class="nav-item">
            <a class="nav-link" href="#">Link 3</a>
        </li>
    </ul>

</nav>
```

# 13. Navbar: Collapsible - Example

Navbar



Collapsible Navbar expands with options when icon is clicked. Used for responsive menus

Navbar

Link

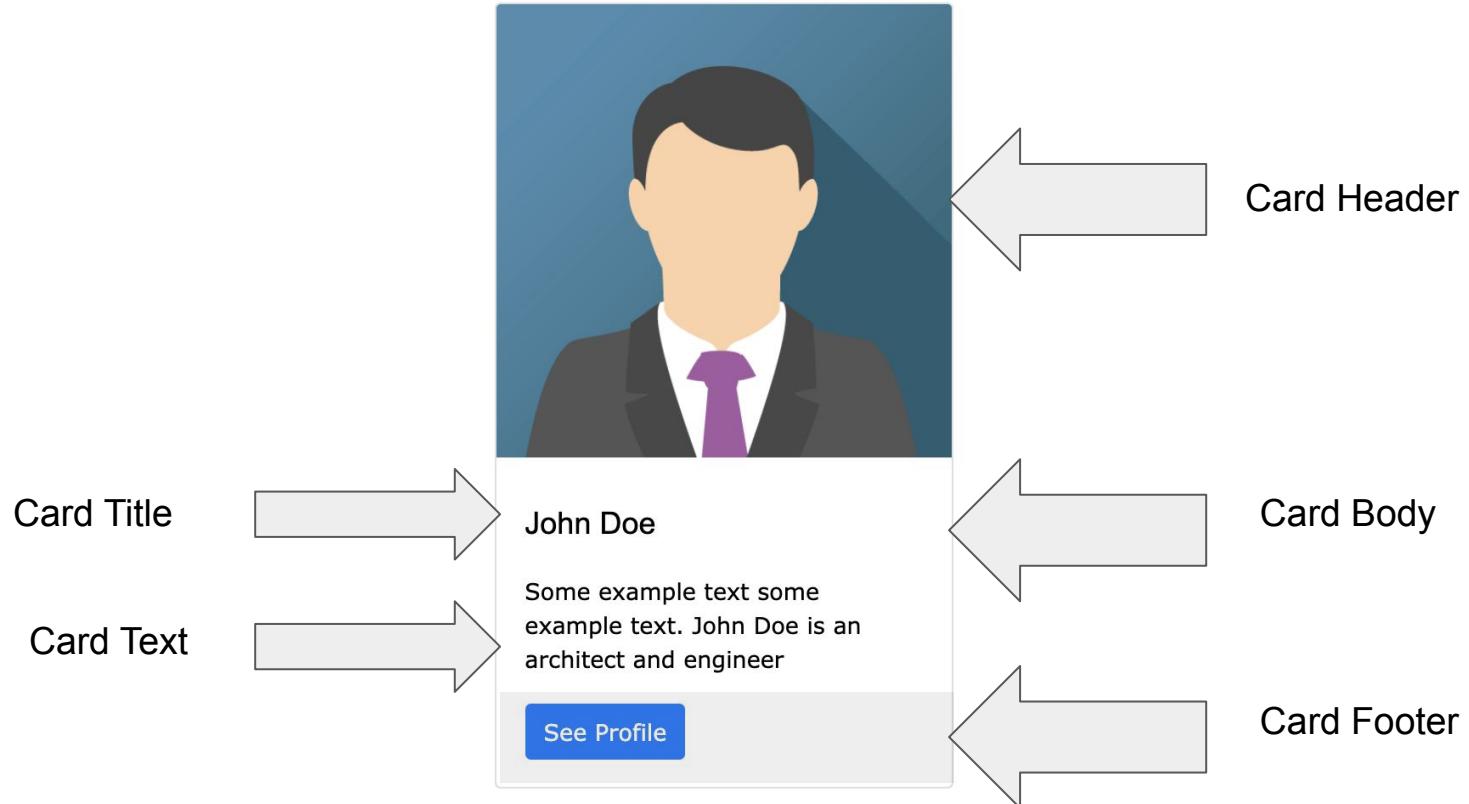
Link

Link



*Note: See Lab 3: Bootstrap for implementation details!*

## 14. Bootstrap Cards: Structure of a Card



# 14. Bootstrap Cards: Example code

```
<div class="card">

    <div class="card-header">
        
    </div>

    <div class="card-body">
        <h3 class="card-title"> Title </h3>
        <p class="card-text"> This is some text </p>
    </div>

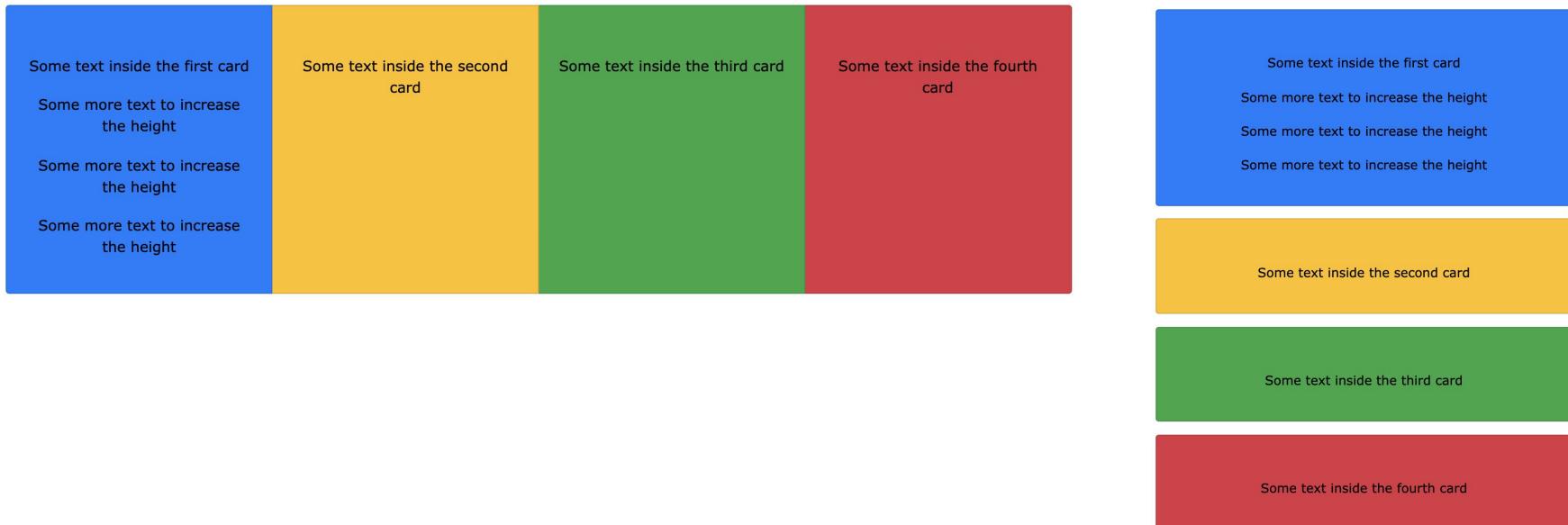
    <div class="card-footer">
        <p class="card-text"> footer text </p>
    </div>

</div>
```

# 14. Bootstrap Cards: Card Group

The `.card-group` class creates a grid of cards that are of equal height and width. The layout will automatically adjust as you insert more cards.

Note: The cards are displayed vertically on small screens (less than 576px)



# 14. Bootstrap Cards: Card Group - Code

```
<div class="card-group">
  <div class="card bg-primary">
    <div class="card-body text-center">
      <p class="card-text">Some text inside the first card</p>
    </div>
  </div>
  <div class="card bg-warning">
    <div class="card-body text-center">
      <p class="card-text">Some text inside the second card</p>
    </div>
  </div>
  <div class="card bg-success">
    <div class="card-body text-center">
      <p class="card-text">Some text inside the third card</p>
    </div>
  </div>
  <div class="card bg-danger">
    <div class="card-body text-center">
      <p class="card-text">Some text inside the fourth card</p>
    </div>
  </div>
</div>
```

# 15. Bootstrap Carousels

The Carousel is a slideshow for cycling through elements.



*Note: See Lab 3: Bootstrap for implementation details!*

The End.

Questions?

**COMING SOON... TO A MOODLE NEAR YOU!**

**Lab 3**

Portfolio Profile - Bootstrap Lab

**Homework 3**

Design your own Portfolio page