

Responsive Design and Bootstrap

Web application with HTML and CSS



1. Responsive Design
2. Bootstrap Overview
3. Bootstrap Components

Section 1

RESPONSIVE DESIGN

- **Responsive** web design allows you to use CSS and HTML to resize, hide, shrink, enlarge, or move the content to make it look good on any screen.
- The **viewport** is the user's visible area of a web page.
- HTML5 introduced a method to let web designers take control over the viewport, through the `<meta>` tag.

```
<meta name="viewport" content="width=device-width, initial-scale=1.0">
```

Responsive Design Workflow



Start with the most narrow breakpoint



Make your window wider until the layout needs adjustments

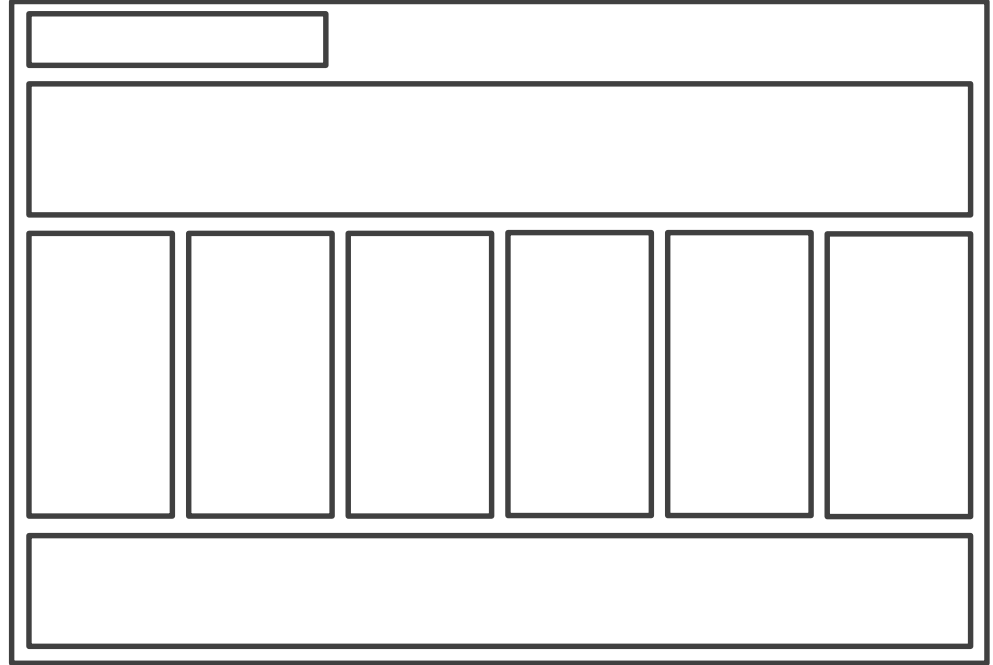
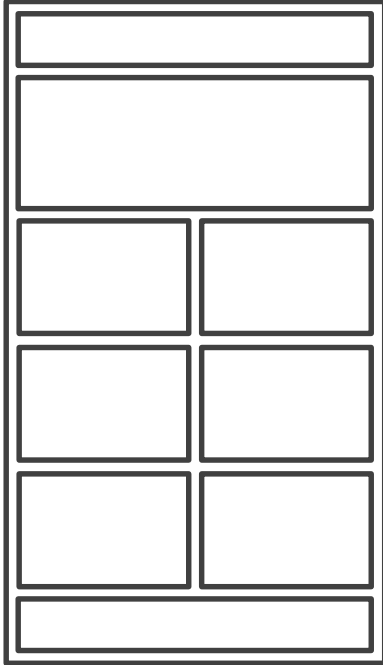


Add a new breakpoint and make the adjustment



Repeat steps 2-3

Responsive Design Workflow



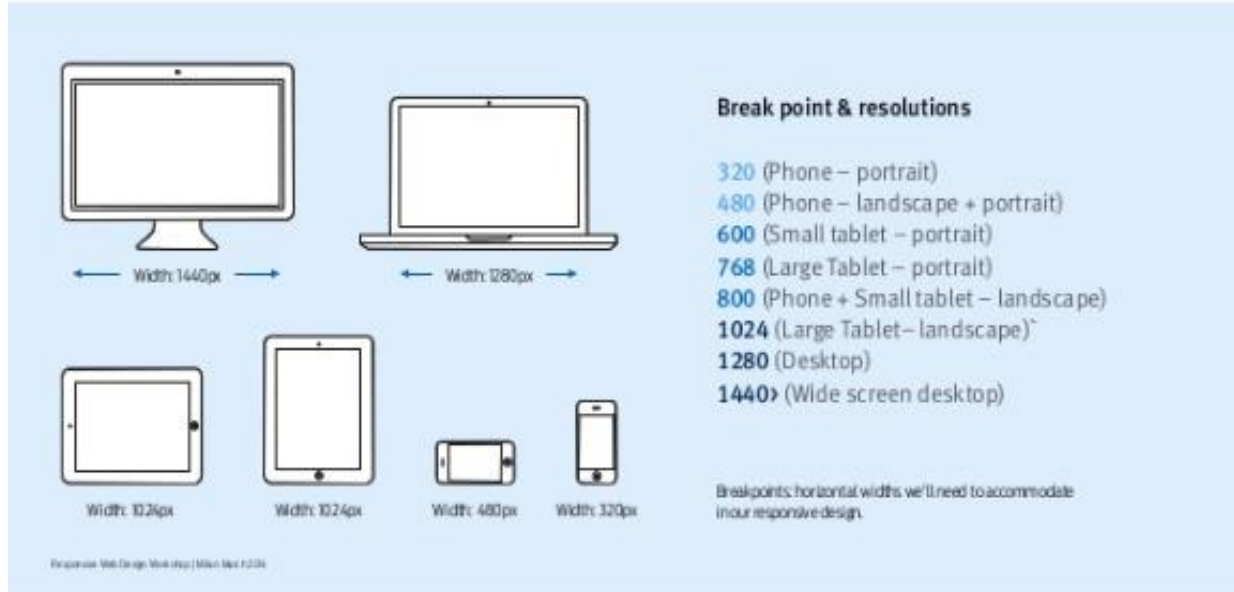
Media Queries

Media query is a CSS technique introduced in CSS3.
It uses the **@media** rule to include a block of CSS properties only if a certain condition is true.



- **Media Queries** is a CSS technique introduced in CSS3. It uses the **@media** rule to include a block of CSS properties only if a certain condition is true.
- The **@media** rule is used in media queries to apply different styles for different media types/devices.
- **Media queries** can be used to check many things, such as:
 - width and height of the viewport
 - width and height of the device
 - orientation (is the tablet/phone in landscape or portrait mode?)
 - resolution

- **Break point:** CSS breakpoints are points where the website content responds according to the device width, allowing you to show the best possible layout to the user.



Media Query

CSS use the **@media** rule to include a block of CSS properties only if a certain **condition** is **true**.

```
@media not|only mediatype and (mediafeature and|or|not mediafeature) {  
    CSS-Code;  
}
```

Media Types

Value	Description
all	Default. Used for all media type devices
print	Used for printers
screen	Used for computer screens, tablets, smart-phones etc.
speech	Used for screenreaders that "reads" the page out loud

Media Features

Value	Description
any-hover	Does any available input mechanism allow the user to hover over elements? (added in Media Queries Level 4)
any-pointer	Is any available input mechanism a pointing device, and if so, how accurate is it? (added in Media Queries Level 4)
aspect-ratio	The ratio between the width and the height of the viewport
color	The number of bits per color component for the output device
color-gamut	The approximate range of colors that are supported by the user agent and output device (added in Media Queries Level 4)
color-index	The number of colors the device can display
Grid	Whether the device is a grid or bitmap
height	The viewport height

Media Features

Value	Description
hover	Does the primary input mechanism allow the user to hover over elements? (added in Media Queries Level 4)
inverted-colors	Is the browser or underlying OS inverting colors? (added in Media Queries Level 4)
light-level	Current ambient light level (added in Media Queries Level 4)
max-aspect-ratio	The maximum ratio between the width and the height of the display area
max-color	The maximum number of bits per color component for the output device
max-color-index	The maximum number of colors the device can display
max-height	The maximum height of the display area, such as a browser window

Media Query

Media Features

Value	Description
max-monochrome	The maximum number of bits per "color" on a monochrome (greyscale) device
max-resolution	The maximum resolution of the device, using dpi or dpcm
max-width	The maximum width of the display area, such as a browser window
min-aspect-ratio	The minimum ratio between the width and the height of the display area
min-color	The minimum number of bits per color component for the output device
min-color-index	The minimum number of colors the device can display
min-height	The minimum height of the display area, such as a browser window

Media Features

Value	Description
min-monochrome	The minimum number of bits per "color" on a monochrome (greyscale) device
min-resolution	The minimum resolution of the device, using dpi or dpcm
min-width	The minimum width of the display area, such as a browser window
monochrome	The number of bits per "color" on a monochrome (greyscale) device
orientation	The orientation of the viewport (landscape or portrait mode)
overflow-block	How does the output device handle content that overflows the viewport along the block axis (added in Media Queries Level 4)
overflow-inline	Can content that overflows the viewport along the inline axis be scrolled (added in Media Queries Level 4)

Media Query

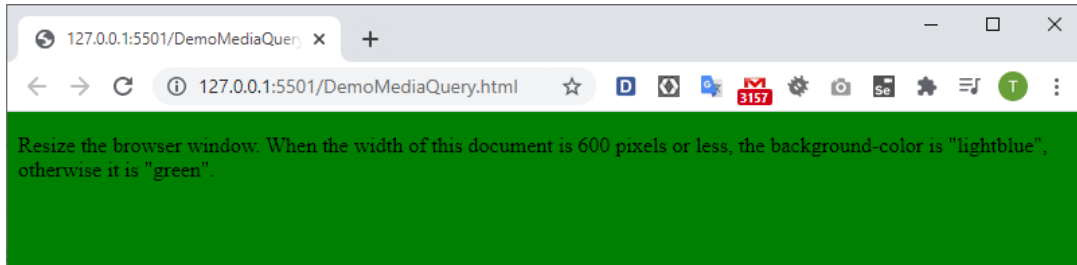
Media Features

Value	Description
pointer	Is the primary input mechanism a pointing device, and if so, how accurate is it? (added in Media Queries Level 4)
resolution	The resolution of the output device, using dpi or dpcm
scan	The scanning process of the output device
scripting	Is scripting (e.g. JavaScript) available? (added in Media Queries Level 4)
update	How quickly can the output device modify the appearance of the content (added in Media Queries Level 4)
width	The viewport width

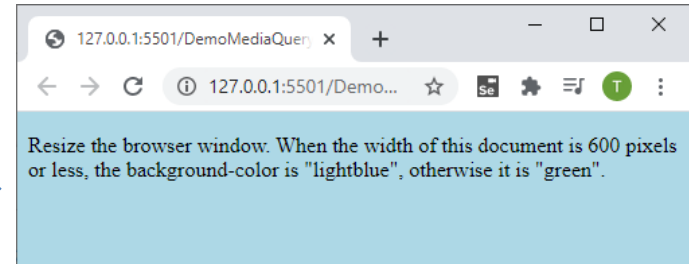
Media Query

```
body {  
  background-color: green;  
}
```

```
@media only screen and (max-width: 600px) {  
  body {  
    background-color: lightblue;  
  }  
}
```



Resize browser



Media Query

```
@media screen and (max-width: 900px) and (min-width: 600px), (min-width: 1100px) {  
  div.example {  
    font-size: 50px;  
    padding: 50px;  
    border: 8px solid black;  
    background: yellow;  
  }  
}
```



Change the appearance of DIV on different screen sizes

Example DIV.

When the browser's width is between 600 and 900px OR above 1100px, change the appearance of DIV. **Resize the browser window to see the effect.**

Demo

```
@media screen and (max-width: 900px) and (min-width: 600px), (min-width: 1100px) {  
  div.example {  
    font-size: 50px;  
    padding: 50px;  
    border: 8px solid black;  
    background: yellow;  
  }  
}
```

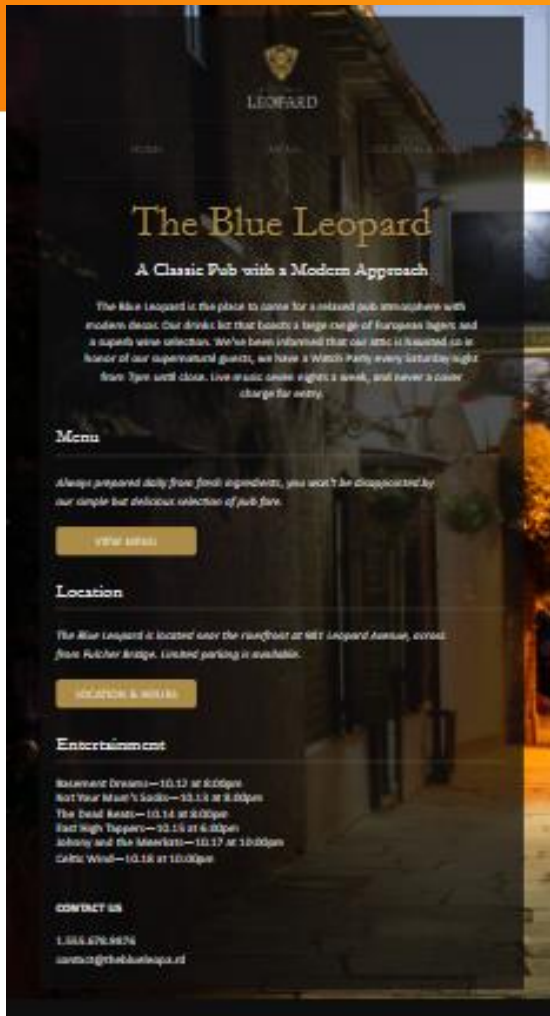


Change the appearance of DIV on different screen sizes

Example DIV.

When the browser's width is between 600 and 900px OR above 1100px, change the appearance of DIV. **Resize the browser window to see the effect.**

Mini Exercise



```

/* -----
| | | Navigation with resolution min-width 750px
| | | ----- */
@media screen and (min-width: 750px){
  .main-navigation {
    min-height: 100px;
    border-top: 1px solid #363636;
    border-bottom: 1px solid #363636;
  }

  .main-navigation ul {
    max-width: 950px;
    margin: 0 auto;
  }

  .main-navigation li {
    float: left;
    margin-left: 20px;
    width: 30%;
  }

  .main-navigation ul {
    padding-left: 0;
  }

  .main-navigation a {
    background: none;
  }

  .main-navigation a:hover {
    background: none;
  }
}

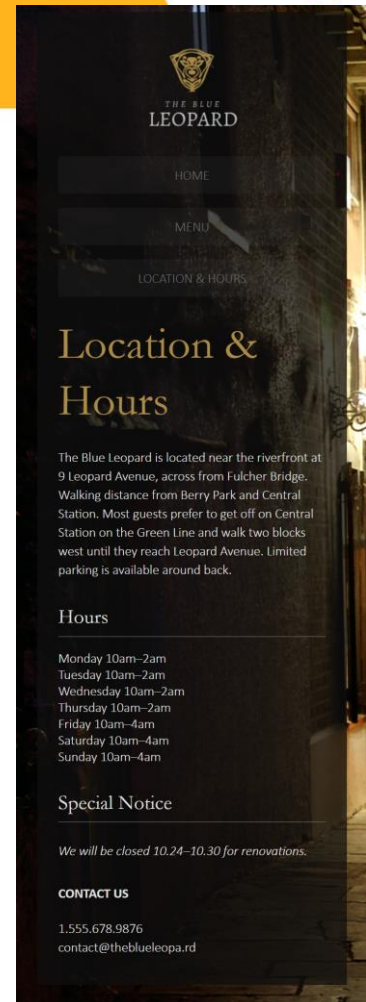
```

```

@media screen and (min-width: 750px){
  /* CSS */
  .featured-info {
    float: left;
    width: 30%;
    margin-left: 3%;
  }
}

```

Mini Exercise



Section 2

BOOTSTRAP

Introduce Bootstrap

- Bootstrap is a free front-end framework for faster and easier web development.
- Bootstrap includes HTML and 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

Advantages of Bootstrap

1. Easy to use
2. Responsive features
3. Mobile-first approach
4. Browser compatibility

Responsive Design

- Design a website such that it can support multiple devices
- Support means it has to display cleanly, easy to follow for **users**
- **Bootstrap** support Responsive under the hood: xs, md, lg...



Mobile First Web Design



- To start using Bootstrap 4 on your own web site:
 - Include Bootstrap 4 from a CDN
 - Download Bootstrap 4 from getbootstrap.com

- **Bootstrap 4 CDN:** MaxCDN provides CDN support for Bootstrap's CSS and JavaScript. You must also include jQuery

```
<!-- Latest compiled and minified CSS -->
<link rel="stylesheet" href="https://maxcdn.bootstrapcdn.com/bootstrap/4.5.0/css/bootstrap.min.css">

<!-- jQuery library -->
<script src="https://ajax.googleapis.com/ajax/libs/jquery/3.5.1/jquery.min.js"></script>

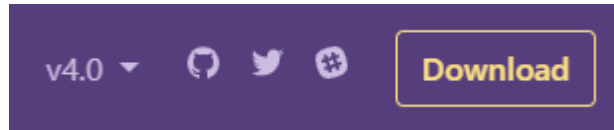
<!-- Popper JS -->
<script src="https://cdnjs.cloudflare.com/ajax/libs/popper.js/1.16.0/umd/popper.min.js"></script>

<!-- Latest compiled JavaScript -->
<script src="https://maxcdn.bootstrapcdn.com/bootstrap/4.5.0/js/bootstrap.min.js"></script>
```

➤ **Advantage of using the Bootstrap 4 CDN:**

- Easy to setup
- No need to download locally

- **Download Bootstrap 4:** Download ready-to-use compiled code for Bootstrap v4.5.0 to easily drop into your project, which includes:
- Compiled and minified CSS bundles
 - Compiled and minified JavaScript plugins



Section 3

BOOTSTRAP COMPONENTS

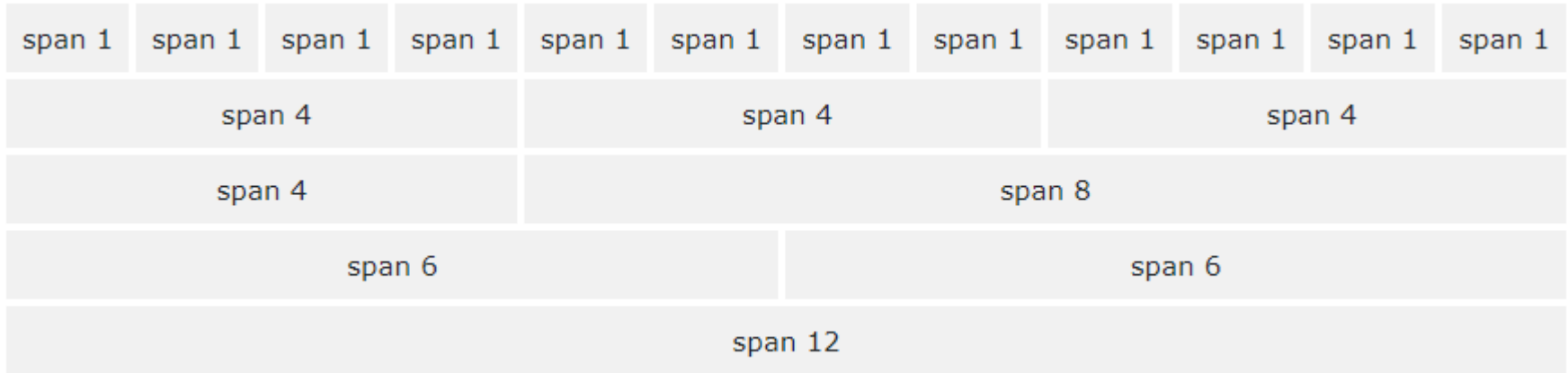
- Syntax:

```
<div class="container">  
  <!-- Content here -->  
</div>
```

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

- Use `.container-fluid` for a full width container, spanning the entire width of the viewport

- **Bootstrap 4 Grid System:** Bootstrap's grid system is built with flexbox and allows up to 12 columns across the page.



➤ How it works

- Bootstrap's grid system uses a series of containers, rows, and columns to layout and align content.
- It's built with flexbox and is fully responsive.

One of three columns

One of three columns

One of three columns

```
<div class="container">
  <div class="row">
    <div class="col-sm">
      One of three columns
    </div>
    <div class="col-sm">
      One of three columns
    </div>
    <div class="col-sm">
      One of three columns
    </div>
  </div>
</div>
```

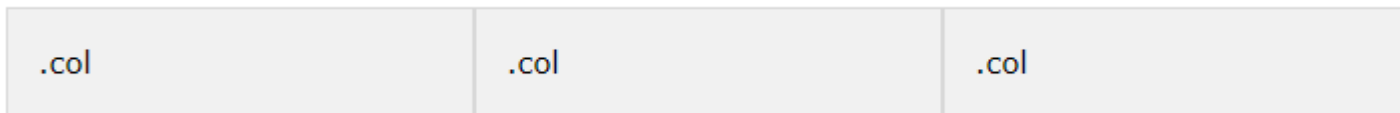
- **Grid Classes:** The Bootstrap 4 grid system has five classes
- .col- (extra small devices - screen width less than 576px)
 - .col-sm- (small devices - screen width equal to or greater than 576px)
 - .col-md- (medium devices - screen width equal to or greater than 768px)
 - .col-lg- (large devices - screen width equal to or greater than 992px)
 - .col-xl- (xlarge devices - screen width equal to or greater than 1200px)

➤ Basic Structure of a Bootstrap 4 Grid

```
<!-- 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>
```

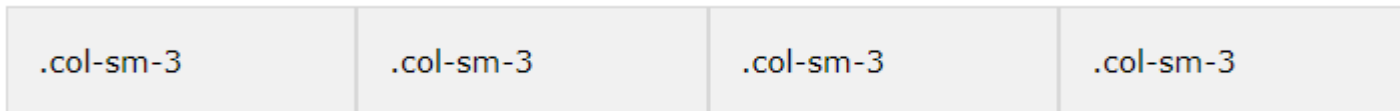
- **Three Equal Columns:** The following example shows how to create three equal-width columns, on all devices and screen widths



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

➤ Responsive Columns

- 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



```
<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>
```

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



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

- All HTML headings, `<h1>` through `<h6>`, are available

Heading	Example
<code><h1></h1></code>	h1. Bootstrap heading
<code><h2></h2></code>	h2. Bootstrap heading
<code><h3></h3></code>	h3. Bootstrap heading
<code><h4></h4></code>	h4. Bootstrap heading
<code><h5></h5></code>	h5. Bootstrap heading
<code><h6></h6></code>	h6. Bootstrap heading

- Classes **.h1** through **.h6** are also available

h1. Bootstrap heading

h2. Bootstrap heading

h3. Bootstrap heading

h4. Bootstrap heading

h5. Bootstrap heading

h6. Bootstrap heading

```
<p class="h1">h1. Bootstrap heading</p>
<p class="h2">h2. Bootstrap heading</p>
<p class="h3">h3. Bootstrap heading</p>
<p class="h4">h4. Bootstrap heading</p>
<p class="h5">h5. Bootstrap heading</p>
<p class="h6">h6. Bootstrap heading</p>
```

Copy

- Easily realign text to components with text alignment classes

Left aligned text on all viewport sizes.

Center aligned text on all viewport sizes.

Right aligned text on all viewport sizes.

Left aligned text on viewports sized SM (small) or wider.

Left aligned text on viewports sized MD (medium) or wider.

Left aligned text on viewports sized LG (large) or wider.

Left aligned text on viewports sized XL (extra-large) or wider.

```
<p class="text-left">Left aligned text on all viewport sizes.</p>
<p class="text-center">Center aligned text on all viewport sizes.</p>
<p class="text-right">Right aligned text on all viewport sizes.</p>

<p class="text-sm-left">Left aligned text on viewports sized SM (small) or wider.
<p class="text-md-left">Left aligned text on viewports sized MD (medium) or wider
<p class="text-lg-left">Left aligned text on viewports sized LG (large) or wider.
<p class="text-xl-left">Left aligned text on viewports sized XL (extra-large) or
```

Copy

- Transform text in components with text capitalization classes

lowercased text.

UPPERCASED TEXT.

CapiTaliZed Text.

```
<p class="text-lowercase">Lowercased text.</p>  
<p class="text-uppercase">Uppercased text.</p>  
<p class="text-capitalize">CapiTaliZed text.</p>
```

Copy

- **Unstyled:** Remove the default **list-style** and left margin on list items

```
<ul class="list-unstyled">
  <li>Lorem ipsum dolor sit amet</li>
  <li>Consectetur adipiscing elit</li>
  <li>Integer molestie lorem at massa</li>
  <li>Facilisis in pretium nisl aliquet</li>
  <li>Nulla volutpat aliquam velit
    <ul>
      <li>Phasellus iaculis neque</li>
      <li>Purus sodales ultricies</li>
      <li>Vestibulum laoreet porttitor sem</li>
      <li>Ac tristique libero volutpat at</li>
    </ul>
  </li>
  <li>Faucibus porta lacus fringilla vel</li>
  <li>Aenean sit amet erat nunc</li>
  <li>Eget porttitor lorem</li>
</ul>
```

Lorem ipsum dolor sit amet
Consectetur adipiscing elit
Integer molestie lorem at massa
Facilisis in pretium nisl aliquet
Nulla volutpat aliquam velit

- Phasellus iaculis neque
- Purus sodales ultricies
- Vestibulum laoreet porttitor sem
- Ac tristique libero volutpat at

Faucibus porta lacus fringilla vel
Aenean sit amet erat nunc
Eget porttitor lorem

- **Inline:** Remove a list's bullets and apply some light **margin** with a combination of two classes, **.list-inline** and **.list-inline-item**

Lorem ipsum Phasellus iaculis Nulla volutpat

```
<ul class="list-inline">  
  <li class="list-inline-item">Lorem ipsum</li>  
  <li class="list-inline-item">Phasellus iaculis</li>  
  <li class="list-inline-item">Nulla volutpat</li>  
</ul>
```

- **Navigation Bar** is a section of a graphical user interface intended to aid visitors in accessing information
- Require a wrapping `.navbar` with `.navbar-expand{-sm|-md|-lg|-xl}`

Navbar Home Link Dropdown ▼ Disabled

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

Home

[Home](#) / Library

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

- **Table** represents tabular data
- **Bootstrap 4** support for table by adding `.table` class to any `<table>` element

#	First	Last	Handle
1	Mark	Otto	@mdo
2	Jacob	Thornton	@fat
3	Larry the Bird		@twitter

- **Bootstrap** provides several form control styles, layout options, and custom components for creating a wide variety of forms.

Email address

We'll never share your email with anyone else.

Password

☐ Check me out

Submit

- **Form controls:** Textual form controls—like `<input>`s, `<select>`s, and `<textarea>`s—are styled with the `.form-control`
- Default checkboxes and radios are improved upon with the help of `.form-check`

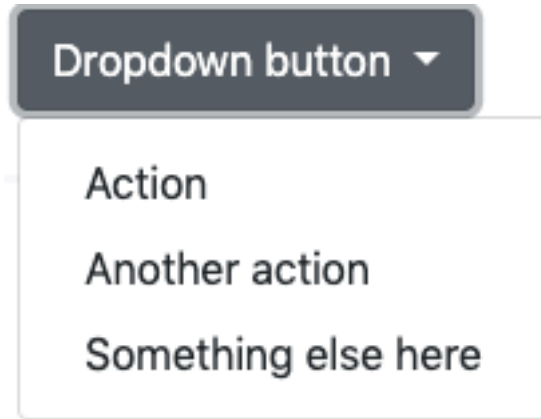
- **Bootstrap** includes several predefined button styles, each serving its own semantic purpose
- Add `.btn-lg` or `.btn-sm` for additional sizes
- Make buttons look inactive by adding the disabled `boolean` attribute to any `<button>` element



- Images in Bootstrap are made responsive with `.img-fluid` (`max-width: 100%;` and `height: auto;`)



- Dropdowns are toggleable, contextual overlays for displaying lists of links and more
- JavaScript is **required** for Dropdown

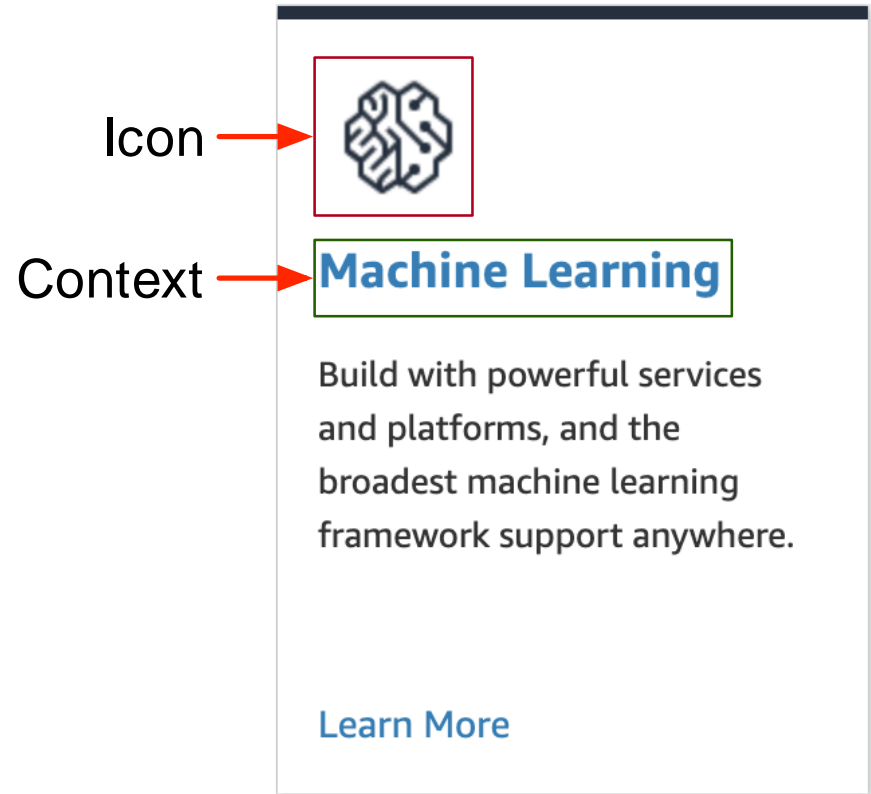


- Wrap the dropdown's toggle (your button or link) and the dropdown menu within **.dropdown**
- Add **.dropdown-item** to each item and **.dropdown-menu** to the menu

```
<div class="dropdown">
  <button class="btn btn-secondary dropdown-toggle" type="button" id="dropdownMenuButton">
    Dropdown button
  </button>
  <div class="dropdown-menu" aria-labelledby="dropdownMenuButton">
    <a class="dropdown-item" href="#">Action</a>
    <a class="dropdown-item" href="#">Another action</a>
    <a class="dropdown-item" href="#">Something else here</a>
  </div>
</div>
```

Copy

- Icons provide graphical information to user
- Help users to quickly understand the context



How to add Icons ?

- Two common ways to add Icons:
 1. Using Bootstrap Icons
 2. Using Font-Awesome

Using Font Awesome

- Download Font Awesome and add to web site
- Usage:

heartbeat

Solid Style (fas)



f21e

`<i class="fas fa-heartbeat"></i>`



Copy and paste to HTML

- Help developer to quickly create UI
- Provide many frequently used feature such as:
 - Create Spacing
 - Enable Flex
 - Create Borders
 - Create Shadows
 - Sizing items

- Assign responsive-friendly margin or padding values to an element or a subset of its sides with shorthand classes.
- Syntax:
 - `{property}{sides}-{size}` for xs
 - `{property}{sides}-{breakpoint}-{size}` for sm, md, lg, and xl
- Where *property* is one of:
 - m - for classes that set margin
 - p - for classes that set padding

- Side is one of:
 - **t** - for classes that set margin-top or padding-top
 - **b** - for classes that set margin-bottom or padding-bottom
 - **l** - for classes that set margin-left or padding-left
 - **r** - for classes that set margin-right or padding-right
 - **x** - for classes that set both *-left and *-right
 - **y** - for classes that set both *-top and *-bottom
 - **blank** - for classes that set a margin or padding on all 4 sides of the element

- Where *size* is one of:
 - 0 - for classes that eliminate the margin or padding by setting it to 0
 - 1 - (by default) for classes that set the margin or padding to $\$spacer * .25$
 - 2 - (by default) for classes that set the margin or padding to $\$spacer * .5$
 - 3 - (by default) for classes that set the margin or padding to $\$spacer$
 - 4 - (by default) for classes that set the margin or padding to $\$spacer * 1.5$
 - 5 - (by default) for classes that set the margin or padding to $\$spacer * 3$
 - auto - for classes that set the margin to auto

- Examples:

```
.mt-0 {  
  margin-top: 0 !important;  
}  
  
.ml-1 {  
  margin-left: ($spacer * .25) !important;  
}  
  
.px-2 {  
  padding-left: ($spacer * .5) !important;  
  padding-right: ($spacer * .5) !important;  
}  
  
.p-3 {  
  padding: $spacer !important;  
}
```

Thank you

