CSCI 1720
Intermediate Web Design

Bootstrap – Part 1

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Responsive Design

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Responsive Design: What's the Big Deal?

Some statistics (...as of 2016):

There are more mobile internet users than desktop internet users; 52.7% of global internet users access the internet via mobile, and 75.1% of U.S. internet users access the internet via mobile

Mobile media time in the U.S. has exceeded desktop, with mobile media time estimated to be 51% while desktop media time is estimated to be 42%. Mobile advertising spend is projected to account for 60.4% of all digital advertising spend by 2016 and 72.2% of all digital advertising spend by 2019

In 2015, mobile influenced retail sales to the tune of over $1 trillion

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Responsive Design: What's the Big Deal?

Some statistics (...as of 2016):

Search engines are the starting point for mobile research, with an estimated 48% of mobile internet users starting their search on search engines

Consequently, the #1 search engine, Google started to significantly use mobile compatibility as a factor when ranking websites. 4 out of 5 consumers use a Smartphone to shop

70% of mobile searches result in an online action within an hour of the search being conducted

50% of mobile users will abandon of web page if it takes more than 10 seconds to load, and 60% won't return to the site

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Responsive Design: What's the Big Deal?

The real eye-catcher:

75.1% OF U.S. INTERNET USERS ACCESS THE INTERNET VIA MOBILE

(!)

Responsive Design

Bootstrap (and other CSS frameworks) provide responsive design 'out of the box'

Still a few requirements:

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

This meta-element is included in the Bootstrap template file

"viewport" uses the device's display width

width=device-width sets the page's display width to the device's display width

initial-scale=1 instructs the browser to establish a 1:1 relationship between CSS pixels and device-independent pixels regardless of the device's orientation

Responsive Design

Other things to note:

    Do not use large fixed width elements

    Content should not rely on a particular viewport width to render well

    Use CSS media queries to apply different styling for small and large screens

Bootstrap takes care of these issues for you

What is 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 others, 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

Bootstrap History

Bootstrap was developed by Mark Otto and Jacob Thornton at Twitter, and released as an open source product in August 2011 on GitHub

In June 2014 Bootstrap was the No.1 project on GitHub

Bootstrap was created at Twitter in mid-2010

Prior to being an open-sourced framework, Bootstrap was known as *Twitter Blueprint*

Bootstrap History

A few months into development, Twitter held its first Hack Week and the project exploded as developers of all skill levels jumped in without any external guidance

It served as the style guide for internal tools development at the company for over a year before its public release, and continues to do so today

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Bootstrap History

Originally released on Friday, August 19, 2011, there have since been over twenty releases, including two major rewrites with v2 and v3 (and now, ~~v4.1.3~~ 5)

With Bootstrap 2, added responsive functionality to the entire framework as an optional stylesheet

Building on that with Bootstrap 3, rewrote the library once more to make it responsive by default with a mobile first approach

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Why Use Bootstrap?

Advantages of 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 3, mobile-first styles are part of the core framework

Browser compatibility: Bootstrap is compatible with all modern browsers (Chrome, Firefox, Internet Explorer, Safari, and Opera)

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Where to Get Bootstrap?

Download Bootstrap
from getbootstrap.com

Include Bootstrap from a CDN

CDN via jsDelivr

Skip the download with jsDelivr to deliver cached version of Bootstrap's compiled CSS and JS to your project.

```
<link href="https://cdn.jsdelivr.net/npm/bootstrap@5.1.1/dist/css/bootstrap.min.css" rel="stylesheet" in
<script src="https://cdn.jsdelivr.net/npm/bootstrap@5.1.1/dist/js/bootstrap.bundle.min.js" integrity="sh
```

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Why Use Bootstrap?

One advantage of using the Bootstrap CDN*:

Many users already have downloaded Bootstrap from MaxCDN when visiting another site. As a result, it will be loaded from cache when they visit your site, which leads to faster loading time

Also, most CDNs will make sure that once a user requests a file from it, it will be served from the server closest to them, which also leads to faster loading time

* CDN == 'Content Delivery Network'

Why Use Bootstrap?

jQuery

Bootstrap uses jQuery for JavaScript plugins (like modals, tooltips, etc)

However, if you just use the CSS part of Bootstrap, you don't need jQuery

Create First Web Page With Bootstrap

1. Add the HTML5 doctype

Bootstrap uses HTML elements and CSS properties that require the HTML5 doctype

Always include the HTML5 doctype at the beginning of the page, along with the lang attribute and the correct character set:

```html
<!DOCTYPE html>
<html lang="en">
  <head>
    <meta charset="utf-8">
  </head>
</html>
```

Create First Web Page With Bootstrap

2. Bootstrap 3+ is mobile-first

Bootstrap 3 is designed to be responsive to mobile devices. Mobile-first styles are part of the core framework

To ensure proper rendering and touch zooming, add the following <meta> tag inside the <head> element:

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

Create First Web Page With Bootstrap

2. The **width=device-width** part sets the width of the page to follow the screen-width of the device (which will vary depending on the device)

The **initial-scale=1** part sets the initial zoom level when the page is first loaded by the browser

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

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Create First Web Page With Bootstrap

3. Containers

Bootstrap also requires a containing element to wrap site contents

There are two container classes to choose from:

The **.container** class provides a responsive fixed width container

The **.container-fluid** class provides a full width container, spanning the entire width of the viewport

Note: Containers are not nestable (you cannot put a container inside another container)

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```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="utf-8">
    <meta name="author" content="Jack Ramsey">
    <meta name="description" content="Introduction to Bootstrap">
    <meta name="keywords" content="CSCI 1720, bootstrap">
    <meta name="date" content="9/16/2017">        jram7533, a year ago • Initial commit

    <title>Bootstrap I</title>

    <link rel="stylesheet" href="https://cdn.jsdelivr.net/npm/bootstrap@5.0.1/dist/css/
    bootstrap.min.css" integrity="undefined" crossorigin="anonymous">

    <link rel="stylesheet" href="css/style.css">
    <link href="https://fonts.googleapis.com/css?family=Philosopher" rel="stylesheet">
</head>
<body>
    <div class="container">
```

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```
<!DOCTYPE html>
<html lang="en">          Remember, you'll set up a template page so that you only
<head>                   have to type this part once, then each new page will start
    <meta charset="utf-8">   with your template
    <meta name="author" content="Jack Ramsey">
    <meta name="description" content="Introduction to Bootstrap">
    <meta name="keywords" content="CSCI 1720, bootstrap">
    <meta name="date" content="9/16/2017">

    <title>Bootstrap I</title>

    <link rel="stylesheet" href="https://cdn.jsdelivr.net/npm/bootstrap@5.0.1/dist/css/
    bootstrap.min.css" integrity="undefined" crossorigin="anonymous">

    <link rel="stylesheet" href="css/style.css">
    <link href="https://fonts.googleapis.com/css?family=Philosopher" rel="stylesheet">
</head>
<body>
    <div class="container-fluid">
```

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Bootstrap Grids

Bootstrap's grid system 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 4			span 4			span 4		
span 4			span 8						
span 6						span 6					
span 12											

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Bootstrap Grids

Bootstrap's grid system is responsive, and the columns will re-arrange automatically depending on the screen size

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											

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Bootstrap Grids - Grid Classes

The Bootstrap 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)

The classes above can be combined to create more dynamic and flexible layouts (more later)

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Basic Structure of a Bootstrap Grid

First; create a row
`<div class="row">`

Then, add the desired number of columns (tags with appropriate .col-*-* classes)

Note that numbers in .col-*-* should always add up to 12 for each row

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

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Example: Three Equal Columns

First; create a row
```
<div class="row">
```

Then, add the columns
```
class="col-sm-4"
```

```
<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>
```

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Example: Two Unequal Columns

First; create a row
```
<div class="row">
```

Then, add the columns
```
class="col-sm-4"
class="col-sm-8"
```

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

.col-sm-4	.col-sm-8

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Bootstrap Grid System Rules

Rows are 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

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Bootstrap Grid System Rules

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`**

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Responsive Design and Bootstrap's Grid

Earlier, we discussed the fact that there are five classes associated with Bootstrap's grid system:

col-

col-xs (for phones)   col-sm (for tablets)

col-md (for desktops)   col-lg (for larger desktops)

So, what's the difference / which one should we use?

xs / sm / md / lg – A Comparison

	Extra small <576px	**Small** ≥576px	**Medium** ≥768px	**Large** ≥992px	**Extra large** ≥1200px
Max container width	None (auto)	540px	720px	960px	1140px
Class prefix	.col-	.col-sm-	.col-md-	.col-lg-	.col-xl-
# of columns	12				
Gutter width	30px (15px on each side of a column)				
Nestable	Yes				
Column ordering	Yes				

Grid Example

```
<div class="container">
  <h1>Grid</h1>
  <p>
    This example demonstrates a 50%/50% split on small, medium and large devices.
    On extra small devices, it will stack (100% width).
  </p>
  <p>Resize the browser window to see the effect.</p>
  <div class="row">
    <div class="col-sm-6" style="background-color:yellow;">
      Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor incididunt.
    </div>
    <div class="col-sm-6" style="background-color:pink;">
      Sed ut perspiciatis unde omnis iste natus error sit voluptatem.
    </div>
  </div>
</div>
```

Grid Example

Grid

This example demonstrates a 50%/50% split on small, medium and large devices. On extra small devices, it will stack (100% width).

Resize the browser window to see the effect.

Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor incididunt.

Sed ut perspiciatis unde omnis iste natus error sit voluptatem.

vs.

Grid

This example demonstrates a 50%/50% split on small, medium and large devices. On extra small devices, it will stack (100% width).

Resize the browser window to see the effect.

Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor incididunt.

Sed ut perspiciatis unde omnis iste natus error sit voluptatem.

Responsive Design and Bootstrap's Grid

Multiple classes can be used to modify the grid layout based on device size

For example, we may decide that a 25%/75% split would look good on a small device, but 50%/50% would look better on medium (and large) devices

So we could do this:

Note   sm: 3+9=12
        md: 6+6=12

```html
<div class="row">
  <div class="col-sm-3 col-md-6" style="background-color:yellow;">
    Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor
    incididunt ut labore et dolore magna aliqua.<br>
  </div>
  <div class="col-sm-9 col-md-6" style="background-color:tan;">
    Sed ut perspiciatis unde omnis iste natus error sit voluptatem accusantium
    doloremque laudantium, totam rem aperiam.
  </div>
</div>
```

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Grid Example   vs.

Medium Grid

The following example will result in a 25%/75% split on small devices and a 50%/50% split on medium (and large) devices. On extra small devices, it will automatically stack (100%).

Resize the browser window to see the effect.

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.

Sed ut perspiciatis unde omnis iste natus error sit voluptatem accusantium doloremque laudantium, totam rem aperiam, eaque ipsa quae ab illo inventore veritatis et quasi architecto beatae vitae dicta sunt explicabo.

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.

Sed ut perspiciatis unde omnis iste natus error sit voluptatem accusantium doloremque laudantium, totam rem aperiam, eaque ipsa quae ab illo inventore veritatis et quasi architecto beatae vitae dicta sunt explicabo.

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Responsive Design and Bootstrap's Grid

Likewise, we could define different ratios for (xs &) sm, md, and lg displays:

```
<div class="col-sm-3 col-md-6 col-lg-4">....</div>
<div class="col-sm-9 col-md-6 col-lg-8">....</div>
```

Once again: sm: 3+9=12
               md: 6+6=12
               lg: 4+8=12

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Responsive Design and Bootstrap's Grid

Note:

Typically, the md class works fine across devices

Anything smaller than a laptop/desktop will simply stack the content

On smaller displays, however, navbars take up too much space

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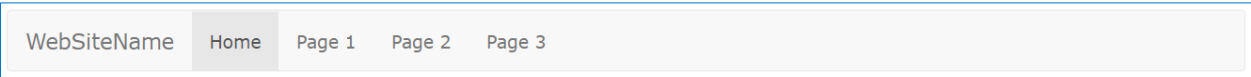
Bootstrap Navbars

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Bootstrap Navigation Bars

A navigation bar is a navigation header that is placed at the top of the page:

WebSiteName	Home	Page 1	Page 2	Page 3

With Bootstrap, a navigation bar can extend or collapse, depending on the screen size

A standard navigation bar is created with

```
<nav class="navbar navbar-default">
```

We can include the website's name (or logo) as part of the navbar:

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```
20
21    <nav class="navbar navbar-dark bg-dark">
22      <a class="navbar-brand" href="#">Never expand</a>
23      <button class="navbar-toggler" type="button" data-toggle="collapse" data-target="#navbarsExample01" aria-controls="navbarsExample01"
        aria-expanded="false" aria-label="Toggle navigation">
24        <span class="navbar-toggler-icon"></span>
25      </button>
26
27      <div class="collapse navbar-collapse" id="navbarsExample01">
28        <ul class="navbar-nav mr-auto">
29          <li class="nav-item active">
30            <a class="nav-link" href="#">Home <span class="sr-only">(current)</span></a>
31          </li>
32          <li class="nav-item">
33            <a class="nav-link" href="#">Link</a>
34          </li>
35          <li class="nav-item">
36            <a class="nav-link disabled" href="#">Disabled</a>
37          </li>
38          <li class="nav-item dropdown">
39            <a class="nav-link dropdown-toggle" href="https://example.com" id="dropdown01" data-toggle="dropdown" aria-haspopup="true" aria-
              expanded="false">Dropdown</a>
40            <div class="dropdown-menu" aria-labelledby="dropdown01">
41              <a class="dropdown-item" href="#">Action</a>
42              <a class="dropdown-item" href="#">Another action</a>
43              <a class="dropdown-item" href="#">Something else here</a>
44            </div>
45          </li>
46        </ul>
47        <form class="form-inline my-2 my-md-0">
48          <input class="form-control" type="text" placeholder="Search" aria-label="Search">
49        </form>
50      </div>
51    </nav>
```

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Bootstrap Navigation Bars

```
<body>
Navbar declaration  ←————————  <nav class="navbar navbar-default">
Makes navbar resize  ←————————   <div class="container-fluid">
                                   <div class="navbar-header">
Website name  ←——————————————       <a class="navbar-brand" href="#">WebSiteName</a>
                                   </div>
                                   <ul class="nav navbar-nav">
                                     <li class="active"><a href="#">Home</a></li>
List of links  ←—————————————        <li><a href="#">Page 1</a></li>
                                     <li><a href="#">Page 2</a></li>
                                     <li><a href="#">Page 3</a></li>
                                   </ul>
                                 </div>
                               </nav>
```
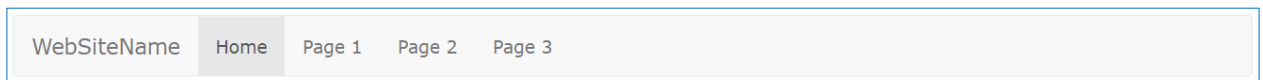
| WebSiteName | Home | Page 1 | Page 2 | Page 3 |

Bootstrap Navigation Bars

But, what if the display device is small (tablet) or extra-small (smart phone)?

It gets a little more complicated:

| WebSiteName | Home | Page 1 | Page 2 | Page 3 |

Bootstrap Navigation Bars

```
<nav class="navbar navbar-inverse">                                          ──→ Navbar declaration
  <div class="container-fluid">─────────────────────────────────────→ Makes navbar resize
    <div class="navbar-header">
      <button type="button" class="navbar-toggle" data-toggle="collapse" data-target="#myNavbar">
        <span class="icon-bar"></span>                                                        Creates the button
        <span class="icon-bar"></span>                                                        on small displays
        <span class="icon-bar"></span>
      </button>
      <a class="navbar-brand" href="#">WebSiteName</a>
    </div>
    <div class="collapse navbar-collapse" id="myNavbar">      ──→ Website name
      <ul class="nav navbar-nav">
        <li class="active"><a href="#">Home</a></li>
        <li><a href="#">Page 2</a></li>
        <li><a href="#">Page 3</a></li>                       ──→ List of links
      </ul>
    </div>
  </div>
</nav>                                   navbar-collapse instead of navbar-default
```

Bootstrap Navigation Bars
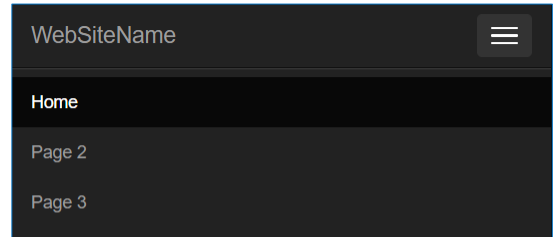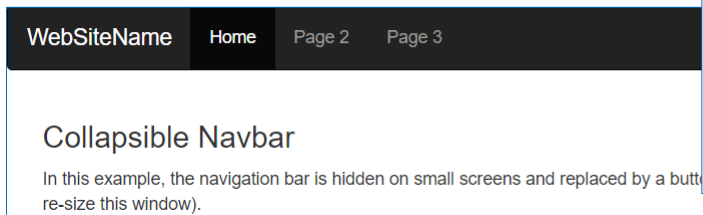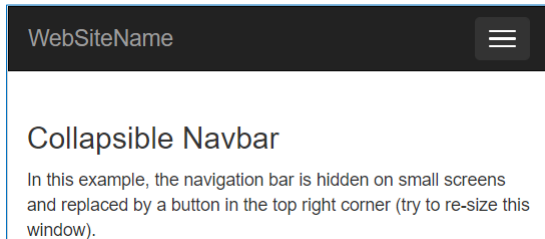
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Bootstrap Typography

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Bootstrap Typography

Default Settings

Bootstrap's global default font-size is 14px, with a line-height of 1.428

This is applied to the <body> element and all paragraphs (<p>)

In addition, all <p> elements have a bottom margin that equals half their computed line-height (10px by default)

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Bootstrap Typography - <h1> - <h6>

By default, Bootstrap will style the HTML headings (<h1> to <h6>) in the following way

h1 Bootstrap heading (36px)

h2 Bootstrap heading (30px)

h3 Bootstrap heading (24px)

h4 Bootstrap heading (18px)

h5 Bootstrap heading (14px)

h6 Bootstrap heading (12px)

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Bootstrap Typography - others

```
<p>Use the mark element to <mark>highlight</mark> text.</p>
```

Use the mark element to highlight text.

```
<p>The <abbr title="World Health Organization">WHO</abbr> was founded in 1948.</p>
```

The WHO was founded in 1948.

```
<p>
   The following HTML elements: <code>span</code>,
   <code>section</code>, and <code>div</code> defines a
   section in a document.
</p>
```

The following HTML elements: span , section , and div defines a section in a document.

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Bootstrap Typography - others

```
<p>Use <kbd>ctrl + p</kbd> to open the Print dialog box.</p>
```

Use ctrl + p to open the Print dialog box.

```
<pre>
Text in a pre element
is displayed in a fixed-width
font, and it preserves
both        spaces and
line breaks.
</pre>
```

```
Text in a pre element
is displayed in a fixed-width
font, and it preserves
both        spaces and
line breaks.
```

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Bootstrap Typography – Contextual Colors and Backgrounds

Bootstrap also has some contextual classes that can be used to provide "meaning through colors"

The classes for text colors are: .text-muted, .text-primary, .text-success, .text-info, .text-warning, and .text-danger:

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Bootstrap Typography – Contextual Colors and Backgrounds

```
<p class="text-muted">This text is muted.</p>
<p class="text-primary">This text is important.</p>
<p class="text-success">This text indicates success.</p>
<p class="text-info">This text represents some information.</p>
<p class="text-warning">This text represents a warning.</p>
<p class="text-danger">This text represents danger.</p>
```

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.

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Bootstrap Typography – Contextual Colors and Backgrounds

```html
<p class="bg-primary">This text is important.</p>
<p class="bg-success">This text indicates success.</p>
<p class="bg-info">This text represents some information.</p>
<p class="bg-warning">This text represents a warning.</p>
<p class="bg-danger">This text represents danger.</p>
```

This text is important.

This text indicates success.

This text represents some information.

This text represents a warning.

This text represents danger.

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Bootstrap Typography

These are some of the more common Bootstrap typography classes

For more information, visit

https://www.w3schools.com/bootstrap/bootstrap_ref_css_helpers.asp

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Sources

https://www.w3schools.com/bootstrap/bootstrap_get_started.asp

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