



Client-Side Web GIS

CSS Frameworks:
Bootstrap and w3.css

Image from NASA:
https://commons.wikimedia.org/wiki/File:Earth_Western_Hemisphere_transparent_background.png#filelinks



In this module, we will explore the Bootstrap and w3.css CSS frameworks, which make styling and designing responsive websites easier.

Module Topics



1. Responsive web design
2. Connecting to Bootstrap
3. Bootstrap grid
4. Bootstrap elements
5. Font Awesome
6. Connecting to w3.css
7. w3.css elements
8. w3.css colors
9. w3.css rows and columns

These are the topics covered in this module.

◀⋯▶ What is a framework?



- ❖ Provides generic functionality that can be selectively changed by user-written code, thus providing application-specific software
- ❖ In this course, I will introduce the **Bootstrap** framework for **CSS** that can be used to style a webpage

<https://www.w3schools.com/bootstrap4/default.asp>

- ❖ Another example is the jQuery framework that simplifies the use of JavaScript.

<https://www.w3schools.com/jquery/default.asp>

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A framework provides generic functionality that can be selectively changed and manipulated by user-written code to accomplish a specific task.

You can think of frameworks as code that has been written to perform common tasks and that can be customized for a specific use. Using frameworks can simplify the implementation of code, such as CSS and JavaScript.

For example, Bootstrap and w3.css provide frameworks for CSS to make website styling and responsive web design easier while jQuery simplifies the use of JavaScript.



❖ Web design that allows automatic **resizing**, **hiding**, **shrinking**, or **enlargement** of webpage content so that it looks good on all devices (devices with different screen sizes)

We tend to access web content on a variety of devices with different screen sizes. So, designing a webpage for a specific screen size can be limiting. It is preferable that the website is functional regardless of viewport sizes and can be used effectively on phones, tablets, and computers.

This is accomplished using responsive web design, which allows for page layout, content, and design to be altered or adapted based on the screen size.

It is generally recommended that all websites be set up with responsive design, especially if they will be used by the general public.

- ❖ Media Queries can be used to produce responsive content
- ❖ Uses @media rule to define a CSS property relative to a condition, generally a screen size
- ❖ We will not investigate media queries here
- ❖ We will introduce Bootstrap

Media queries are one means to make a website responsive. This requires that the browser determine the screen size and use CSS selectors appropriate for that screen size.

In the CSS document, you will need to set up media queries that define the CSS to use at defined screen size ranges.

We will not discuss media queries in this course, but I did want to mention them. Instead, we will focus on responsive design using the Bootstrap or w3.css framework.

Bootstrap



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

W3schools.com provides references and examples for Bootstrap versions 3, 4, and 5. The provided examples in this course use version 5.

What is Bootstrap?



- ❖ Provides **design templates** using HTML, CSS, and JavaScript
- ❖ **Free** and **open-source**
- ❖ **Front-end development**
- ❖ Originally developed for Twitter



<https://getbootstrap.com/>

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Bootstrap is a CSS framework for web design and responsive web design. It was originally developed for Twitter but is now freely available for use by web designers and developers.

Although there are other methods for responsive web design, Bootstrap is one of the most commonly used frameworks.



- ❖ Can download the scripts and add them to your project

- ❖ Can reference the **Content Delivery Network (CDN)**

- ❖ Should use **minimized** code for speed

```
<head>
  <!-- Latest compiled and minified CSS -->
  <link rel="stylesheet"
href="https://maxcdn.bootstrapcdn.com/bootstrap/4.4.1/css/b
ootstrap.min.css">
  <!-- jQuery library -->
  <script
src="https://ajax.googleapis.com/ajax/libs/jquery/3.4.1/jquery.
min.js"></script>
  <!-- Popper JS -->
  <script
src="https://cdnjs.cloudflare.com/ajax/libs/popper.js/1.16.0/u
md/popper.min.js"></script>
  <!-- Latest compiled JavaScript -->
  <script
src="https://maxcdn.bootstrapcdn.com/bootstrap/4.4.1/js/boo
tstrap.min.js"></script>
</head>
```

In order to use Bootstrap, you will need to download the Bootstrap CSS and Bootstrap JavaScript, jQuery, and Popper JavaScript libraries and store them in your website folder directory (generally in the “src” folder). Alternatively, you can link to the webpage that houses the code, known as the content delivery network (CDN). The second method is demonstrated on this slide.

Note that updates are made on a regular basis, so you will either need to update your styling or link to the older, original styling.

Either way, it is generally preferable to use the minimized version of the code to speed up loading. Minimized versions have spaces removed, so the file size is smaller, but the code is harder to interpret. However, that is not an issue when the code is accessed by the computer and does not need to be used or read by a human.

For more information, please visit the Bootstrap webpage.

- ❖ Break page into 12 columns or spans
- ❖ Can group columns or spans
- ❖ Grid system classes:
 - **xs** = screens less than 786px wide (phones)
 - **sm** = 786px to 992px (tablets)
 - **md** = 992px to 1200px (small laptops)
 - **lg** = greater than 1200px (laptops and desktops)
- ❖ Classes scale up

We will begin by discussing the grid system used by Bootstrap.

Each row or block is broken into 12 columns or spans. These spans can be grouped together to form larger subsets of the row.

How these columns or spans are used can vary based on the screen size, which is a key component of responsive web design with Bootstrap.

The screen size classes are listed on the slide and defined as ranges of pixel widths. These scale up, so if you want to use the same layout or design for small and medium screens, you only need to define the styling for small screens.

I will explain this grid system in the following slides using multiple examples. I have also provided a video demonstration.

Grid Example 1

```
<body>
<div class="container">
  <h1>A Header</h1>
  <div class="row">
    <div class="col-sm-6"
      style="background-
        color:gray;">
      <p>Some text</p>
    </div>
    <div class="col-sm-6"
      style="background-
        color:forestgreen;">
      <p>Some more text</p>
    </div>
  </div>
</div>
</body>
</html>
```



Small or Larger



Extra Small

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

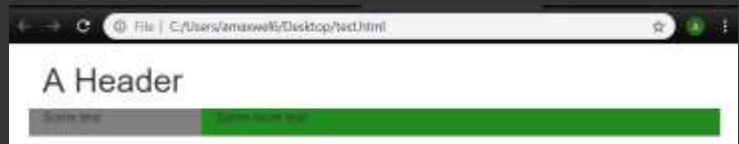
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In this first example, the two `<divs>` have been assigned to the “col-sm-6” class. So, from small to larger screen sizes, the two `<divs>` will fill all 12 spans of a single row. When screen size is reduced to extra small, then the two `<divs>` will stack.

Grid Example 2



```
<body>
  <div class="container">
    <h1>A Header</h1>
    <div class="row">
      <div class="col-sm-3" style="background-
color:gray;">
        <p>Some text</p>
      </div>
      <div class="col-sm-9" style="background-
color:forestgreen;">
        <p>Some more text</p>
      </div>
    </div>
  </div>
</body>
</html>
```



Small or Larger



Extra Small

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

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I have now changed the first <div> to the “col-sm-3” class and the second <div> to the “col-sm-9” class.

So, on screen sizes from small to larger, the first <div> will fill the first 3 spans while the second <div> will fill the last 9.

Once the screen size is reduced to extra small, the two <divs> will stack and fill all 12 spans in two separate rows.

Grid Example 3



```
<body>
<div class="container">
  <h1>A Header</h1>
  <div class="row">
    <div class="col-sm-3 col-md-6"
      style="background-
        color:gray;">
      <p>Some text</p>
    </div>
    <div class="col-sm-9 col-md-6"
      style="background-
        color:forestgreen;">
      <p>Some more text</p>
    </div>
  </div>
</div>
</body>
</html>
```



Medium or Larger



Small



Extra Small

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

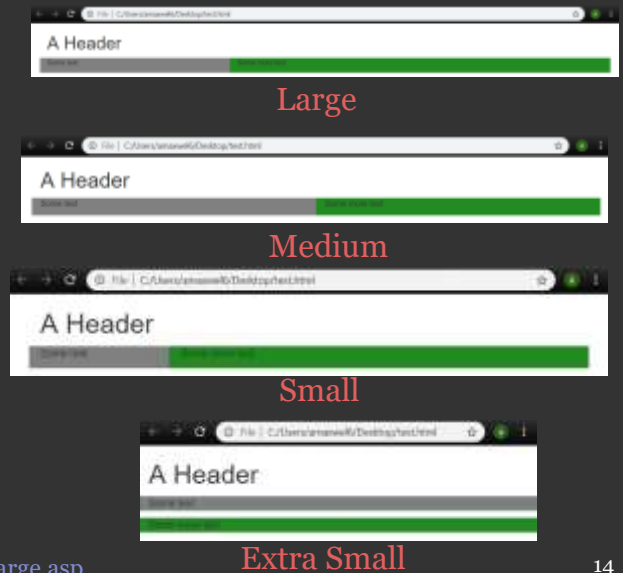
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It is possible to apply multiple CSS classes, and even multiple Bootstrap classes, to the same element. This can be very useful when you want to have more than two layouts to support multiple screen sizes.

In this example, the first <div> will fill 6 spans when the screen size is medium or larger, 3 spans when the screen size is small, and all 12 spans when the screen size is extra small. The second <div> will fill 6 spans when the screen size is medium or larger, 9 spans when the screen size is small, and all 12 spans when the screen size is extra small.

Grid Example 4

```
<body>
  <div class="container">
    <h1>A Header</h1>
    <div class="row">
      <div class="col-sm-3 col-md-6 col-lg-4"
        style="background-color:gray;">
        <p>Some text</p>
      </div>
      <div class="col-sm-9 col-md-6 col-lg-8"
        style="background-color:forestgreen;">
        <p>Some more text</p>
      </div>
    </div>
  </div>
</body>
</html>
```



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

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Now I am applying three Bootstrap classes to each <div>.

The first <div> will fill 4 spans when the screen size is large or larger, 6 spans when the screen size is medium, 3 spans when the screen size is small, and all 12 spans when the screen size is extra small. The second <div> will fill 8 spans when the screen size is large or larger, 6 spans when the screen size is medium, 9 spans when the screen size is small, and all 12 spans when the screen size is extra small.

Bootstrap Grid Examples

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Below we have collected some examples of basic Bootstrap grid layouts.

Three Equal Columns

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

The following example shows how to get a three equal-width columns starting at tablets and scaling to large desktops. On mobile phones, the columns will automatically stack:

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

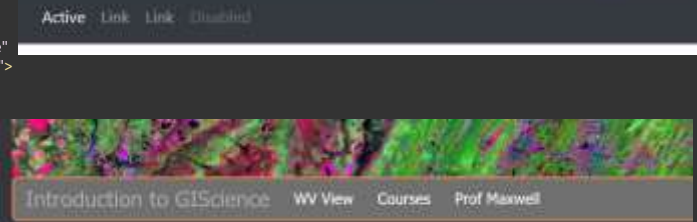
For more examples pertaining to the Bootstrap grid, please see [w3schools.com](https://www.w3schools.com/bootstrap/bootstrap_grid_examples.asp).

Creating a Nav Bar



```
<nav class="navbar navbar-default">
<div class="container-fluid">
<!-- Brand and toggle get grouped for better mobile display -->
<div class="navbar-header">
<button type="button" class="navbar-toggle collapsed" data-toggle="collapse"
data-target="#bs-example-navbar-collapse-1" aria-expanded="false">
<span class="sr-only">Toggle navigation</span>
<span class="icon-bar"></span>
<span class="icon-bar"></span>
<span class="icon-bar"></span>
</button>
<a class="navbar-brand" href="http://GISc.html" style="color: hover
#ffffff">Introduction to GIScience</a>
</div>
<!-- Collect the nav links, forms, and other content for toggling -->
<div class="collapse navbar-collapse" id="bs-example-navbar-collapse-1">
<ul class="nav navbar-nav">
<li><a href="http://www.wvview.org/" target="blank">WV View</a></li>
<li><a href="http://course_directory.html">Courses</a></li>
<li><a href="http://maxwellae.wixsite.com/maxwell-
geospatial" target="blank">Prof Maxwell</a></li>
</ul>
</div><!-- /.navbar-collapse -->
</div><!-- /.container-fluid -->
</nav>
```

Nav Bar Example from W3schools.com



https://www.w3schools.com/bootstrap4/bootstrap_navbar.asp

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There are a variety of Bootstrap classes and examples to generate nav bars as opposed to generating them from scratch. Check out the provided w3schools.com link to see a variety of samples and obtain code that can be used and manipulated.

In the example provided, I have used several Bootstrap classes to generate the provided nav bar.

Bootstrap Navigation Bar

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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">`.

The following example shows how to add a navigation bar to the top of the page:

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

This page provides additional nav bar examples.

Responsive Images



https://www.w3schools.com/bootstrap4/bootstrap_images.asp

```
</head>
<body>
  
</body>
</html>
```

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The Bootstrap “img-responsive” class can be used to make images and graphics responsive so that they resize with screen size. Again, this is generally much simpler than building your own CSS to make images responsive.

Button Styles

Basic Default Primary Success Info Warning Danger Link

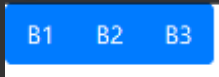
```
<body>
  <div class="container">
    <h2>Button Styles</h2>
    <button type="button" class="btn">Basic</button>
    <button type="button" class="btn btn-default">Default</button>
    <button type="button" class="btn btn-primary">Primary</button>
    <button type="button" class="btn btn-success">Success</button>
    <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-link">Link</button>
  </div>
</body>
```

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

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Bootstrap also provides a variety of button classes as demonstrated here. Note that these buttons can be further manipulated using your own custom CSS.

Button Groups



```
<div class="btn-group btn-group-lg">  
  <button type="button" class="btn btn-primary">B1</button>  
  <button type="button" class="btn btn-primary">B2</button>  
  <button type="button" class="btn btn-primary">B3</button>  
</div>
```

https://www.w3schools.com/bootstrap4/bootstrap_forms_input_group.asp

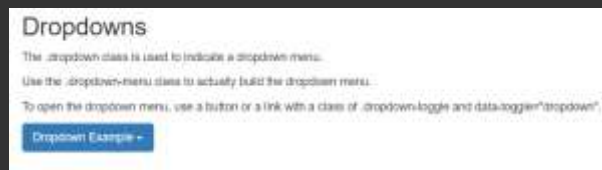
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There are also stylings available for button groups.

Bootstrap Dropdowns



```
<body>
  <div class="container">
    <h2>Dropdowns</h2>
    <p>The .dropdown class is used to indicate a dropdown menu.</p>
    <p>Use the .dropdown-menu class to actually build the dropdown
menu.</p>
    <p>To open the dropdown menu, use a button or a link with a class
of .dropdown-toggle and data-
toggle="dropdown".</p>
    <div class="dropdown">
      <button class="btn btn-primary dropdown-toggle" type="button"
data-toggle="dropdown">Dropdown Example
      <span class="caret"></span></button>
      <ul class="dropdown-menu">
        <li><a href="#">HTML</a></li>
        <li><a href="#">CSS</a></li>
        <li><a href="#">JavaScript</a></li>
      </ul>
    </div>
  </div>
</body>
```



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

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This example shows how a dropdown list can be generated.

Again, please see w3schools.com and the provided link to this example.



https://www.w3schools.com/bootstrap4/bootstrap_collapse.asp

A collapsible is used to show and hide blocks of content, such as multiple `<div>` with the press of a button. Go to the provided link to see an example collapsible.

Bootstrap Carousel



```
<div id="demo" class="carousel slide" data-ride="carousel">
  <!-- Indicators -->
  <ul class="carousel-indicators">
    <li data-target="#demo" data-slide-to="0" class="active"></li>
    <li data-target="#demo" data-slide-to="1"></li>
    <li data-target="#demo" data-slide-to="2"></li>
  </ul>
  <!-- The slideshow -->
  <div class="carousel-inner">
    <div class="carousel-item active">
      
    </div>
    <div class="carousel-item">
      
    </div>
    <div class="carousel-item">
      
    </div>
  </div>
  <!-- Left and right controls -->
  <a class="carousel-control-prev" href="#demo" data-slide="prev">
    <span class="carousel-control-prev-icon"></span>
  </a>
  <a class="carousel-control-next" href="#demo" data-slide="next">
    <span class="carousel-control-next-icon"></span>
  </a>
</div>
```

Carousel Example Modified from [W3schools.com](https://www.w3schools.com)



https://www.w3schools.com/bootstrap4/bootstrap_carousel.asp

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Carousels are used to rotate through graphics and pictures.

w3schools.com provides example Bootstrap carousels at the provided link.

See more table examples at [W3school.com](https://www.w3schools.com/w3css/tables.asp).

A	B	C
1A	1B	1C
2A	2B	2C
3A	3B	3C
4A	4B	4C

https://www.w3schools.com/bootstrap4/bootstrap_tables.asp

This link provides examples for formatting tables.

Bootstrap 4 Tooltip

⬅ Previous

Bootstrap 4 Tooltip

The Tooltip component is small pop-up box that appears when the user moves the mouse pointer over an element:

Hover over me

Hover over me

How To Create a Tooltip

To create a tooltip, add the `data-toggle="tooltip"` attribute to an element.

Use the `title` attribute to specify the text that should be displayed inside the tooltip:

https://www.w3schools.com/bootstrap4/bootstrap_tooltip.asp

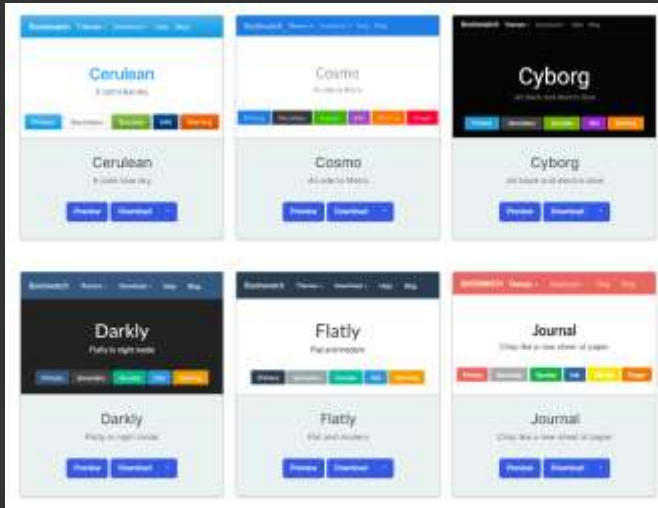
https://www.w3schools.com/bootstrap4/bootstrap_popover.asp

Tooltips are used to provide messages when you hover over an HTML element, like a button.

Check out the link on this slide for example tooltips.

Popovers can be used if you need to provide more content in the window.

Themes using Bootstrap



<https://bootswatch.com/>

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Many website themes have been created for or using Bootstrap. Bootswatch is an example set of free themes.



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

<https://getbootstrap.com/>

For more information and examples relating to using Bootstrap, please consult [w3schools.com](https://www.w3schools.com).

Note that some free Bootstrap templates are available to begin designing your website.

Font Awesome

- ❖ Bootstrap 3 provides an **icon** or **glyphicon** library
- ❖ Bootstrap 4/5 does not
- ❖ However, there are many free icon libraries available
- ❖ You can also pay for access to libraries or create your own icons
- ❖ You can link to icons or store them in your website directory
- ❖ Icons are commonly provided in compressed raster (**PNG**) or vector graphic (**SVG**) format

<https://www.flaticon.com/>

<https://fontawesome.com/>

<https://material.io/resources/icons/?style=baseline>

<https://thenounproject.com/>



Example from Font Awesome

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Bootstrap 3 included a library of icons or Glyphicons. However, Bootstrap 4/5 does not. Luckily, there are many free icon libraries. You can also pay for access to libraries or create your own icons. Make sure not to use copyright protected icons without appropriate permission.

To use an icon, you can link to its web address or store it in your website directory. Not all icons will be available for download and may require being accessed via a link. Most icons are either provided in a compressed raster graphic format (like PNG) or a vector graphic format (like SVG).

- ❖ Large set available for free
- ❖ Vector graphics
- ❖ Need to register and get an access token
- ❖ Can pay to have access to more tokens
- ❖ Can download and use locally
- ❖ Free icons are made available under a CC by 4.0 license



```
<script
src="https://kit.fontawesome.com/[REDACTED].js"
crossorigin="anonymous"></script>

<a href="courses.html" target="_blank"><i
class="fas fa-graduation-cap" style="font-size: 8em;
color: #828bc3; margin-top:10px; margin-
bottom:10px;"></i></a>
```

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This slide shows example icons provided by Font Awesome. Although there are paid options that provide additional icons, Font Awesome provides a set of free icons. However, you must register and obtain a token to use them on your page. I have redacted my token in the example code.

In the <head> tag of your HTML file, you will need to add a <script> tag that includes your access token.

When you want to use an icon on your page, you can reference it using a unique class assigned to it. In my example, the “fas fa-graduation-cap” references a graduation cap icon. You can resize and style the icon using CSS. Note that a vector graphic file is being referenced, so the colors can be changed using CSS.

There are different versions of some of the icons. “fas” generally means a filled icon, “far” means an outlined icon, “fal” mean a thin icon, and “fab” means brand logos. The free service may not include all versions.

w3.css

- ❖ Alternative to Bootstrap
- ❖ Free, open-source
- ❖ Based on CSS (no JavaScript)



<https://www.w3schools.com/w3css/defaultT.asp>

```
<link rel="stylesheet" href="https://www.w3schools.com/w3css/5/w3.css" />
```

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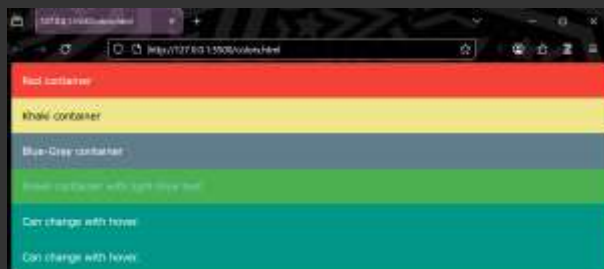
w3.css is an alternative to Bootstrap. It was produced by the folks at w3schools.com, is free and open-source, and is based completely on CSS, as opposed to CSS and JavaScript. It is well documented on the w3schools.com website. I generally prefer w3.css to Bootstrap, but this is just an opinion.

You can link to w3.css using a CDN, as demonstrated on this slide.

❖ Colors	❖ Buttons	❖ Icons	❖ Sidebar
❖ Containers	❖ Notes	❖ Grid	❖ Tabs
❖ Panels	❖ Quotes	❖ Flexbox	❖ Pagination
❖ Borders	❖ Alerts	❖ Rows	❖ Progress Bars
❖ Bards	❖ Tables	❖ Cells	❖ Slideshow
❖ Fonts	❖ Lists	❖ Bars	❖ Tooltips
❖ Round	❖ Images	❖ Dropdowns	❖ Code
❖ Padding	❖ Badges	❖ Accordions	
❖ Margins	❖ Tags	❖ Navigation	

The framework increases the ease of generating and styling a variety of HTML elements, as noted on this page. In the following slides, I provide examples of some of the functionality provided. You can access the documentation and examples on [w3schools.com](https://www.w3schools.com) for more information.

```
<div class="w3-container w3-red">
  <p>Red container</p>
</div>
<div class="w3-container w3-khaki">
  <p>Khaki container</p>
</div>
<div class="w3-container w3-blue-gray">
  <p>Blue-Gray container</p>
</div>
<div class="w3-container w3-green w3-text-light-blue">
  <p>Green container with light-blue text</p>
</div>
<div class="w3-container w3-teal w3-hover-deep-purple">
  <p>Can change with hover.</p>
</div>
<div class="w3-container w3-teal w3-hover-text-khaki">
  <p>Can change with hover.</p>
</div>
```



https://www.w3schools.com/w3css/w3css_colors.asp

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A variety of named colors are provided that can be applied as background colors, text colors, or border colors. The colors are accessed using classes.

For background colors, the class names are w3-COLOR. For text colors, the names are w3-text-COLOR. You can also specify colors to use when hovering over an element using w3-hover-COLOR or w3-hover-text-COLOR.

On this slide, I use several example colors including red, khaki, gray, green, light-blue, teal, and deep-purple. There are a variety of other named colors available at the link provided on the page.

```
<div class="w3-container">
  <h2>Border Colors</h2>

  <div class="w3-panel w3-border w3-border-red">
    <p>I have red borders.</p>
  </div>

  <div class="w3-panel w3-border-left w3-border-blue">
    <p>I have a blue left border.</p>
  </div>

  <div class="w3-panel w3-border-top w3-border-bottom w3-border-green">
    <p>I have a green top and bottom border.</p>
  </div>

  <div class="w3-panel w3-border-left w3-pale-red w3-border-red">
    <p>I have a red left border and a pale-red background color.</p>
  </div>
</div>
```

Border Colors

I have red borders.

I have a blue left border.

I have a green top and bottom border.

I have a red left border and a pale-red background color.

https://www.w3schools.com/w3css/w3css_borders.asp

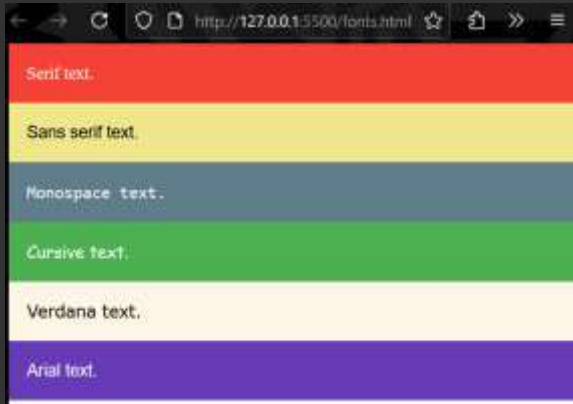
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This slide demonstrates how to add, style, and color borders using w3.css. There are classes available to add borders on all sides, to the left, to the right, at the top, or at the bottom.

You can also change the border color using w3-border-COLOR. You can change the border color when the element is hovered over with w3-hover-border-COLOR.

You can add thick borders with w3-topbar, w3-bottombar, w3-leftbar, or w3-rightbar.

You can also round borders using w3-round-SIZE.

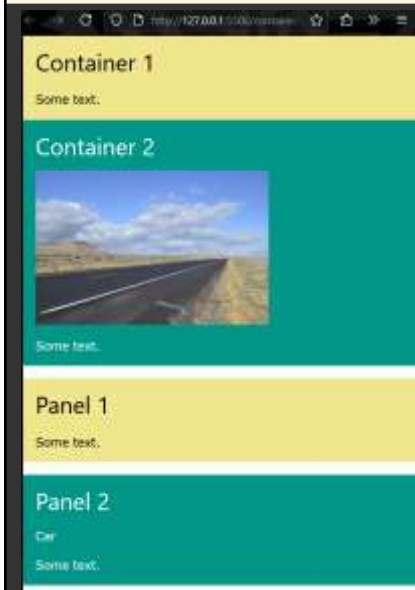


https://www.w3schools.com/w3css/w3css_fonts.asp

```
<head>
<link rel="stylesheet" href="https://www.w3schools.com/w3css/5/w3.css" />
<style>
.ver {
  font-family: Verdana, Geneva, sans-serif;
}
.ar {
  font-family: Arial, Helvetica, sans-serif;
}
</style>
</head>
<body>
<div class="w3-container w3-red">
  <p class="w3-serif">Serif text.</p>
</div>
<div class="w3-container w3-khaki">
  <p class="w3-sans-serif">Sans serif text.</p>
</div>
<div class="w3-container w3-blue-gray">
  <p class="w3-monospace">Monospace text.</p>
</div>
<div class="w3-container w3-green">
  <p class="w3-cursive">Cursive text.</p>
</div>
<div class="w3-container w3-sand">
  <p class="ver">Verdana text.</p>
</div>
<div class="w3-container w3-deep-purple">
  <p class="ar">Arial text.</p>
</div>
</body>
```

w3.css allows for specifying fonts using w3-serif, w3-sans-serif, w3-monospace, and w3-cursive.

Containers and Panels



```
<div class="w3-container w3-khaki">
  <h2>Container 1</h2>
  <p>Some text.</p>
</div>
<div class="w3-container w3-teal">
  <h2>Container 2</h2>
  
  <p>Some text.</p>
</div>
<div class="w3-panel w3-khaki">
  <h2>Panel 1</h2>
  <p>Some text.</p>
</div>
<div class="w3-panel w3-teal">
  <h2>Panel 2</h2>
  
  <p>Some text.</p>
</div>
```

https://www.w3schools.com/w3css/w3css_containers.asp

https://www.w3schools.com/w3css/w3css_panels.asp

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The w3-container class adds 16 pts of padding to the left and right of content within the element to which it is applied. In the example, this class is used for the first two divisions.

In contrast, w3-panel adds 16 pts of margin around the top and bottom of the element along with 16 pts of padding to the left and right within the element. This is demonstrated for the second two divisions in the example.

Margin and Padding



```
<div class="w3-container w3-khaki w3-padding-48">
  <h2>Container 1</h2>
  <p>Padding added.</p>
</div>
<div class="w3-container w3-teal w3-margin">
  <h2>Container 2</h2>
  
  <p>Margins added.</p>
</div>
<div class="w3-container w3-red w3-margin-left">
  <h2>Container 3</h2>
  
  <p>Margin left.</p>
</div>
```

https://www.w3schools.com/w3css/w3css_margins.asp

https://www.w3schools.com/w3css/w3css_padding.asp

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w3-padding-NUMBER, where number is defined using pixels (px), adds padding to the top and bottom of an element. w3-padding uses 8px while w3-padding-small uses 4px and w3-padding-large uses 12px.

16-pixel margins can be added using w3-margin (all sides), w3-margin-top, w3-margin-right, w3-margin-bottom, and w3-margin-left. w3-section adds a 16px margin to both the top and the bottom.

```

<div class="w3-container">
  <div class="w3-card-4 w3-center" style="width: 100%; max-width: 400px">
    <h2>Photo Card</h2>
    
    <div class="w3-container w3-center">
      <p>Glenn Canyon Dam</p>
      <p>Page, Utah</p>
    </div>
  </div>
</div>

```



https://www.w3schools.com/w3css/w3css_cards.asp

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Cards are meant to mimic paper-like cards. The example card on this slide includes a header, image, and text.

w3.css provides classes for creating cards including w3-card, ws-card-2 (adds a 2px bordered shadow), and w3-card-4 (adds a 4px bordered shadow).

In my example, the card is defined using a <div>.

```
<div class="w3-panel" style="width: 50%">
  <ul class="w3-ul w3-card-4">
    <li class="w3-red"><h2>Multiple Choice</h2></li>
    <li>A: Yes</li>
    <li>B: No</li>
    <li>C: Maybe</li>
    <li>D: Not Sure</li>
  </ul>
</div>
```



https://www.w3schools.com/w3css/w3css_lists.asp

This slide demonstrates classes available for styling lists.

Tables

```
<table  
  class="w3-table w3-striped w3-border w3-bordered w3-border-dark-gray w3-hoverable w3-centered"  
>  
  <tr class="w3-teal">  
    <th>Col 1</th>  
    <th>Col 2</th>  
    <th>Col 3</th>  
  </tr>  
  <tr class="w3-hover-red">  
    <td>1</td>  
    <td>A</td>  
    <td>1A</td>  
  </tr>  
</table>
```



Col 1	Col 2	Col 3
1	A	1A
2	B	2B
3	C	3C
4	D	4D
5	E	5E

https://www.w3schools.com/w3css/w3css_tables.asp

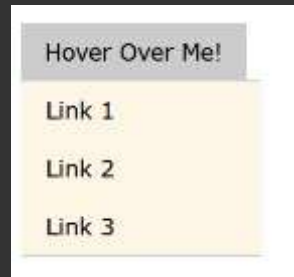
41

This slide demonstrates classes available for styling tables.

Dropdowns



```
<div class="w3-container">
  <h2>Dropdown Button</h2>
  <div class="w3-dropdown-hover">
    <button class="w3-button w3-red">Hover Over Me!</button>
    <div class="w3-dropdown-content w3-bar-block w3-border">
      <a href="#" class="w3-bar-item w3-button w3-sand">Link 1</a>
      <a href="#" class="w3-bar-item w3-button w3-sand">Link 2</a>
      <a href="#" class="w3-bar-item w3-button w3-sand">Link 3</a>
    </div>
  </div>
</div>
```



https://www.w3schools.com/w3css/w3css_dropdowns.asp

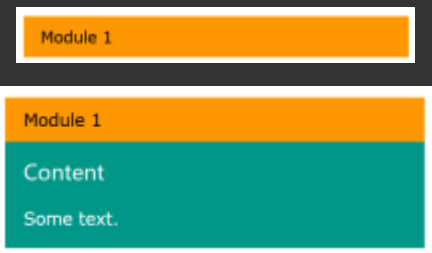
42

This slide provides an example of a dropdown. Check out the link included on the slide for additional dropdown examples.

Accordion



```
<div class="w3-panel">
  <button onclick="myFunction('Demo1')" class="w3-btn w3-block w3-left-align w3-orange">Module 1</button>
  <div id="Demo1" class="w3-container w3-hide w3-teal">
    <h4>Content</h4>
    <p>Some text.</p>
  </div>
</div>
<script>
function myFunction(id) {
  var x = document.getElementById(id);
  if (x.className.indexOf("w3-show") == -1) {
    x.className += " w3-show";
  } else {
    x.className = x.className.replace(" w3-show", "");
  }
}
</script>
```



https://www.w3schools.com/w3css/w3css_accordions.asp

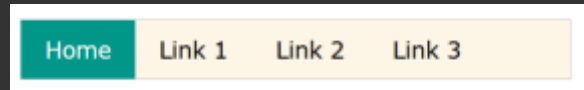
43

Accordions are used to include collapsible content.

Navigation Bar



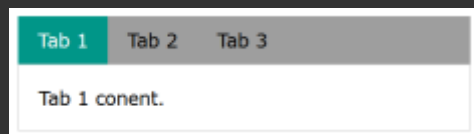
```
<div class="w3-panel">
  <div class="w3-bar w3-border w3-sand">
    <a href="#" class="w3-bar-item w3-button w3-teal">Home</a>
    <a href="#" class="w3-bar-item w3-button w3-sand">Link 1</a>
    <a href="#" class="w3-bar-item w3-button w3-sand">Link 2</a>
    <a href="#" class="w3-bar-item w3-button w3-sand">Link 3</a>
  </div>
</div>
```



https://www.w3schools.com/w3css/w3css_navigation.asp

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This slide demonstrates a navigation bar styled with w3.css. Visit the link on this page for additional nav bar examples.



```

<div class="w3-panel">
  <div class="w3-bar w3-gray">
    <button class="w3-bar-item w3-button tablink w3-teal"
      onclick="openCity(event,'t1')">Tab 1</button>
    <button class="w3-bar-item w3-button tablink"
      onclick="openCity(event,'t2')">Tab 2</button>
    <button class="w3-bar-item w3-button tablink"
      onclick="openCity(event,'t3')">Tab 3</button>
    </div>
    <div id="t1" class="w3-container w3-border city">
      <p>Tab 1 content.</p>
    </div>
    <div id="t2" class="w3-container w3-border city" style="display:none">
      <p>Tab 2 content.</p>
    </div>
    <div id="t3" class="w3-container w3-border city" style="display:none">
      <p>Tab 3 content.</p>
    </div>
  </div>
</div>

<script>
function openCity(evt, cityName) {
  var i, x, tablinks;
  x = document.getElementsByClassName("city");
  for (i = 0; i < x.length; i++) {
    x[i].style.display = "none";
  }
  tablinks = document.getElementsByClassName("tablink");
  for (i = 0; i < x.length; i++) {
    tablinks[i].className = tablinks[i].className.replace("
w3-red", "");
  }
  document.getElementById(cityName).style.display = "block";
  evt.currentTarget.className += " w3-red";
}
</script>

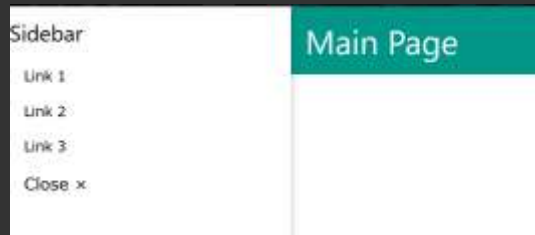
```

https://www.w3schools.com/w3css/w3css_tabulators.asp

45

The tab classes can be used to build navigation between pages using tabs.

```
<div class="w3-sidebar w3-bar-block w3-card w3-animate-left"
style="display:none" id="mySidebar">
  <h3>Sidebar</h3>
  <a href="#" class="w3-bar-item w3-button">Link 1</a>
  <a href="#" class="w3-bar-item w3-button">Link 2</a>
  <a href="#" class="w3-bar-item w3-button">Link 3</a>
  <button class="w3-bar-item w3-button w3-large"
    onclick="w3_close()">Close &times;</button>
</div>
<div id="main">
<div class="w3-teal">
  <button id="openNav" class="w3-button w3-teal w3-xlarge"
    onclick="w3_open()">&#9776;</button>
  <div class="w3-container">
    <h1>Main Page</h1>
  </div>
</div>
</div>
```



```
<script>
function w3_open() {
  document.getElementById("main").style.marginLeft = "25%";
  document.getElementById("mySidebar").style.width = "25%";
  document.getElementById("mySidebar").style.display =
"block";
  document.getElementById("openNav").style.display = 'none';
}
function w3_close() {
  document.getElementById("main").style.marginLeft = "0%";
  document.getElementById("mySidebar").style.display =
"none";
  document.getElementById("openNav").style.display =
"inline-block";
}
</script>
```

https://www.w3schools.com/w3css/w3css_sidebar.asp

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w3.css can ease the creation of sidebars at different positions on the page. Sidebars can also be defined to be collapsible.



```
<div class="w3-panel">
  <div class="w3-card" style="width:200px">
    
    <div class="w3-container">
      <h4><b>Rock</b></h4>
      <p>A rock.</p>
    </div>
  </div>
</div>
```

https://www.w3schools.com/w3css/w3css_images.asp

47

A variety of classes are available for images that allow for rounding corners (w3-round), cropping an image within a circle (w3-circle), adding a border (w3-border), or adding text to an image (w3-display-container and w3-display-POSITION). w3-image is used to add responsiveness to images.

Image opacity can be added using w3-opacity-min, w3-opacity, and w3-opacity-max. Images can be desaturated using w3-grayscale-min, w3-grayscale, and w3-grayscale-max. A sepia effect can be added using w3-sepia-min, w3-sepia, and w3-sepia-max.

Several of the above-mentioned classes can also be used for hover effects (w3-hover-opacity, w3-hover-grayscale, and w3-hover-sepia).

```
<script>
var slideIndex = 1;
showDivs(slideIndex);

function plusDivs(n) {
  showDivs((slideIndex += n));
}

function showDivs(n) {
  var i;
  var x = document.getElementsByClassName("mySlides");
  if (n > x.length) {
    slideIndex = 1;
  }
  if (n < 1) {
    slideIndex = x.length;
  }
  for (i = 0; i < x.length; i++) {
    x[i].style.display = "none";
  }
  x[slideIndex - 1].style.display = "block";
}
</script>

<h2 class="w3-center">Slideshow</h2>
<div class="w3-content w3-display-container">
  
  
  
  
  
  <button class="w3-button w3-black w3-display-left" onclick="plusDivs(-1)">
    &#10094;
  </button>
  <button class="w3-button w3-black w3-display-right" onclick="plusDivs(1)">
    &#10095;
  </button>
</div>
```



https://www.w3schools.com/w3css/w3css_slideshow.asp

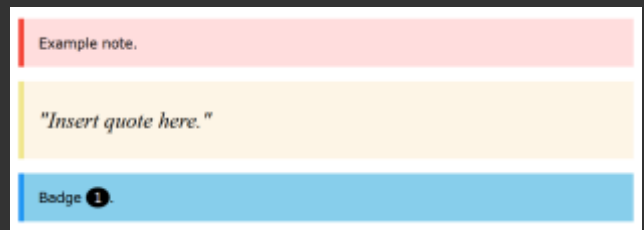
48

Slideshows allow you to scroll through images with clicks; alternatively, the slideshow can be configured to play automatically. Visit the link on this page to see additional slideshow examples. Note that this also requires the use of JavaScript.

◀⋯▶ Notes, Quotes, and Badges



```
<div class="w3-panel">
  <div class="w3-panel w3-pale-red w3-leftbar w3-border-red">
    <p>Example note.</p>
  </div>
  <div class="w3-panel w3-leftbar w3-sand w3-border-khaki">
    <p class="w3-xlarge w3-serif">
      <i>"Insert quote here."</i>
    </p>
  </div>
  <div class="w3-panel w3-light-blue w3-leftbar w3-border-blue">
    <p>Badge <span class="w3-badge">1</span>.</p>
  </div>
</div>
```



https://www.w3schools.com/w3css/w3css_notes.asp

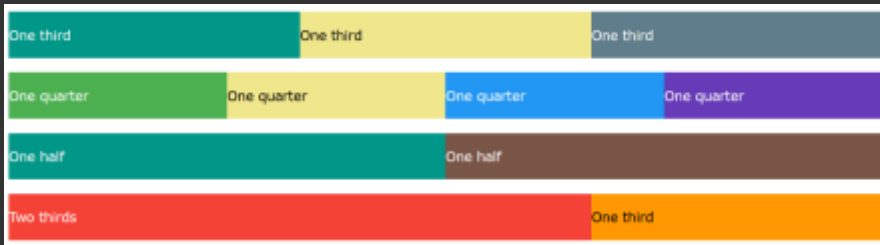
https://www.w3schools.com/w3css/w3css_quotes.asp

https://www.w3schools.com/w3css/w3css_badges.asp

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w3.css simplifies the creation of notes, quotes, and badges.

W3.css Responsive Components



```
<div class="w3-panel w3-row">
  <div class="w3-quarter w3-green">
    <p>One quarter</p>
  </div>
  <div class="w3-quarter w3-khaki">
    <p>One quarter</p>
  </div>
  <div class="w3-quarter w3-blue">
    <p>One quarter</p>
  </div>
  <div class="w3-quarter w3-deep-purple">
    <p>One quarter</p>
  </div>
</div>
```

https://www.w3schools.com/w3css/w3css_rows.asp

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Rows function similarly to the Bootstrap grid system and allow you to specify how the 12 spans that constitute a row are split between divisions of the row. This can be used for responsive web design. Classes include w3-half, w3-third, w3-twothird, w3-quarter, w3-threequarter, w3-rest, and w3-col. w3-rest is used to specify the remaining available columns in a row.

The number of specified spans will be used for screen sizes of medium (tablet) or larger (laptop or desktop monitor). For small screen sizes (phones), the elements will stack.



Combining Rows and Cells for Responsiveness



Class	Description
s1	Defines 1 of 12 columns (width:08.33%) for small screens
s2	Defines 2 of 12 columns (width:16.66%) for small screens
s3	Defines 3 of 12 columns (width:25.00%) for small screens
s4	Defines 4 of 12 columns (width:33.33%) for small screens
s5 - s11	
s12	Defines 12 of 12 columns (width:100%). Default for small screens
m1	Defines 1 of 12 columns (width:08.33%) for medium screens
m2	Defines 2 of 12 columns (width:16.66%) for medium screens
m3	Defines 3 of 12 columns (width:25.00%) for medium screens
m4	Defines 4 of 12 columns (width:33.33%) for medium screens
m5 - m11	
m12	Defines 12 of 12 columns (width:100%). Default for medium screens
l1	Defines 1 of 12 columns (width:08.33%) for large screens
l2	Defines 2 of 12 columns (width:16.66%) for large screens
l3	Defines 3 of 12 columns (width:25.00%) for large screens
l4	Defines 4 of 12 columns (width:33.33%) for large screens
l5 - l11	
l12	Defines 12 of 12 columns (width:100%). Default for large screens

❖ **s** = small screen (phone)

❖ **m** = medium screen (tablet)

❖ **l** = large screen
(laptop/computer)

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For more functionality, you can combine the w3-row and w3-col classes. This allows for functionality even more similar to the Bootstrap grid. The table on this slide demonstrates the available options. For example, w3-col m4 will cause the element to take up 4 of the 12 spans of the row that it is within on screen sizes of medium (tablet) or larger. For small screen sizes (phone), the element will stack with the other elements in the row.

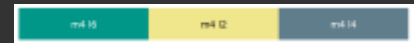
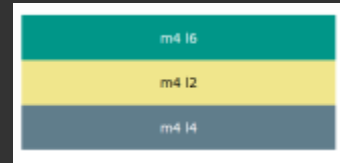
You can also combine classes for different functionality on different screen sizes. For example, w3-col s6 m4 l3 would cause the element to take up 6 spans on a small screen, 4 spans on a medium screen, and 3 spans on a large screen.

Combining Rows and Columns for Responsiveness



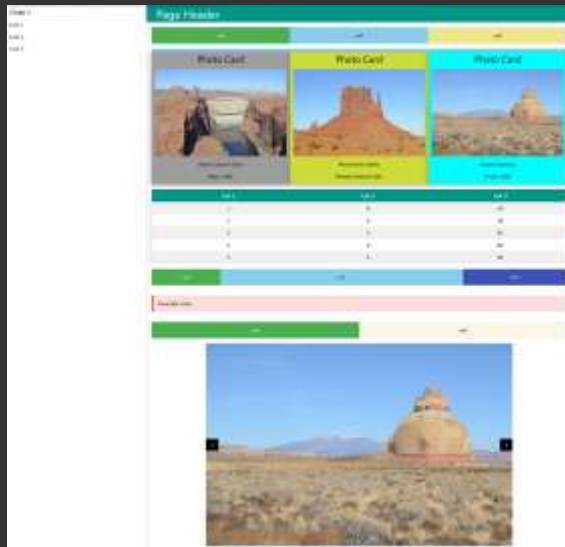
```
<!doctype html>
<html>
  <head>
    <link rel="stylesheet"
href="https://www.w3schools.com/w3css/5/w3.css" />
  </head>

  <body>
    <div class="w3-panel w3-row">
      <div class="w3-col m4 16 w3-teal w3-center">
        <p>m4 16</p>
      </div>
      <div class="w3-col m4 12 w3-khaki w3-center">
        <p>m4 12</p>
      </div>
      <div class="w3-col m4 14 w3-blue-gray w3-center">
        <p>m4 14</p>
      </div>
    </div>
  </body>
</html>
```



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This slide further demonstrates responsive design using w3.css. A division is defined as a row using w3-panel. The three divisions within the row make use of the w3-col class. At a medium screen size, each of the three divisions take up 4 spans. At a large screen size, the first division takes up 6 spans, the second takes up 2 spans, and the third takes up 4 spans. The three divisions within the row stack at small screen sizes.



```
<div class="w3-panel">
  <div class="w3-row">
    <div class="w3-col m4 w3-green w3-center">
      <p>m4</p>
    </div>
    <div class="w3-col m4 w3-light-blue w3-center">
      <p>m4</p>
    </div>
    <div class="w3-col m4 w3-khaki w3-center">
      <p>m4</p>
    </div>
  </div>
</div>

<div class="w3-panel">
  <div class="w3-row">
    <div class="w3-col m6 w3-green w3-center">
      <p>m6</p>
    </div>
    <div class="w3-col m6 w3-sand w3-center">
      <p>m6</p>
    </div>
  </div>
</div>
```

This slide provides further examples of creating a responsive layout using w3.css. The code has been provided as part of the course materials.

Additional responsiveness and flexibility is provided using the w3.css grid, flexbox, flex item, and cell classes. We will not discuss these components of w3.css in this class. However, they are discussed on the [w3schools.com w3.css](https://www.w3schools.com/w3css/) webpage.



This is the end of this lecture module.

Please return to the West Virginia View
Webpage for additional content.



Thanks! Hope you found this useful.