

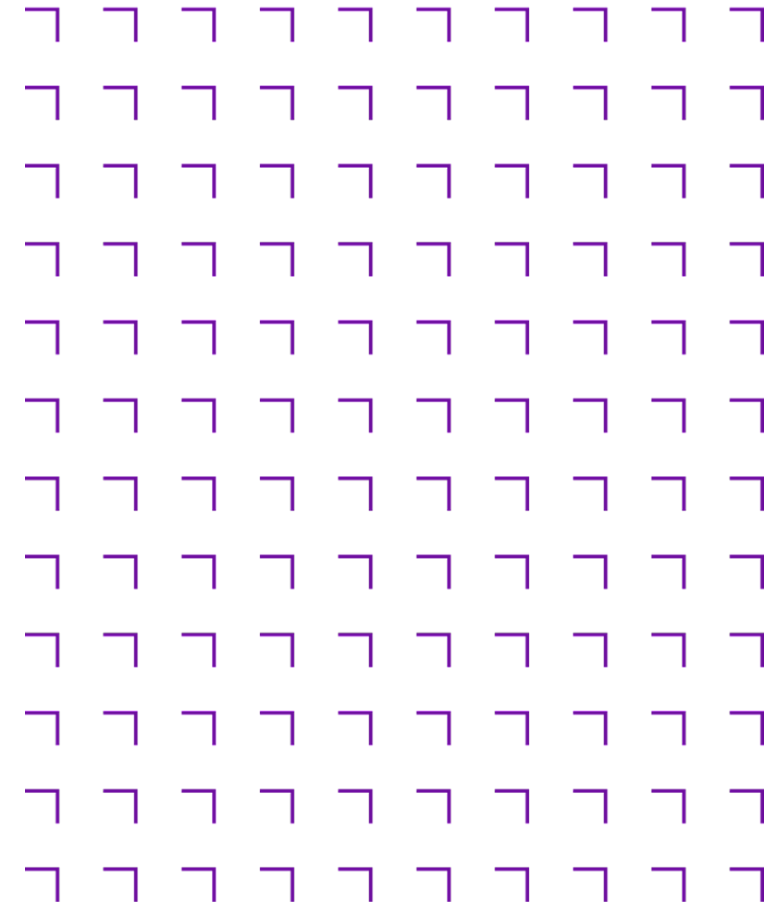
Front-End Web Development

Unit 14: Introduction to CSS Frameworks - Bootstrap

Course Outline



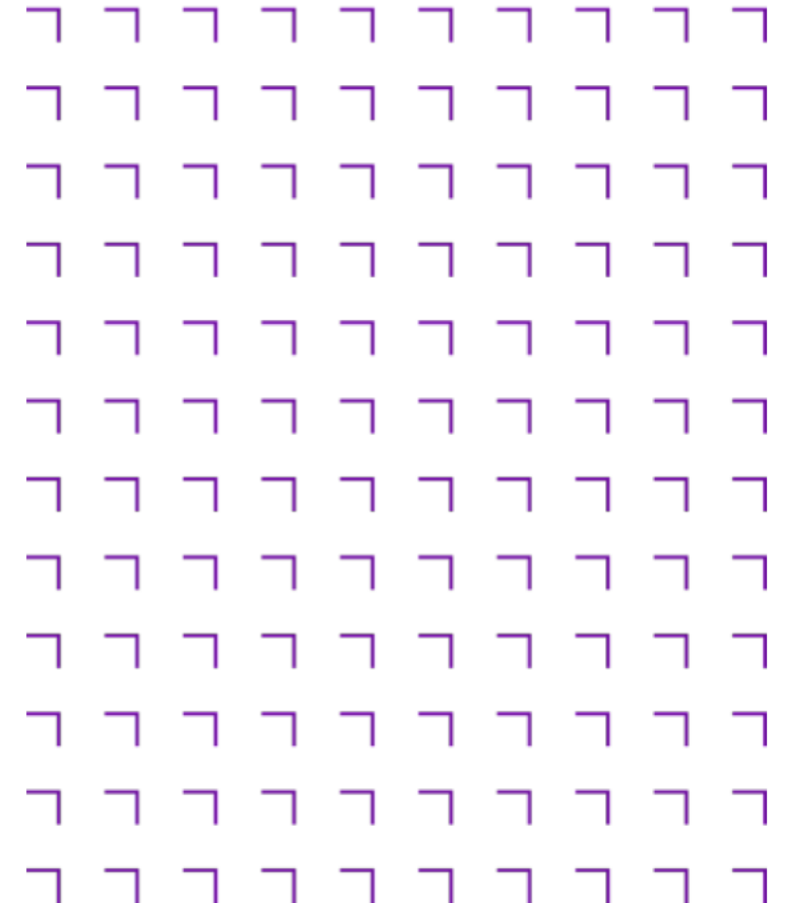
1. Getting Started
2. HTML - Structuring the Web
3. CSS - Styling the Web
4. JavaScript - Dynamic client-side scripting
5. CSS - Making Layouts
6. Introduction to Websites/Web Applications
7. CSS – Advanced
8. Reviewing Progress
9. JavaScript - Modifying the Document Object Model (DOM)
10. Dynamic HTML
11. Web Forms - Working with user data
12. JavaScript - Advanced
13. Building a Web Application with JavaScript
- 14. Introduction to CSS Frameworks – Bootstrap**
15. Other Frameworks, SEO, Web security, Performance
16. Walkthrough project



Course Learning Outcomes



- Competently write HTML and CSS code
- Create web page layouts according to requirements using styles
- Add interactivity to a web page with JavaScript
- Access and display third-party data on the web page
- Leverage Bootstrap and Static Site Generator



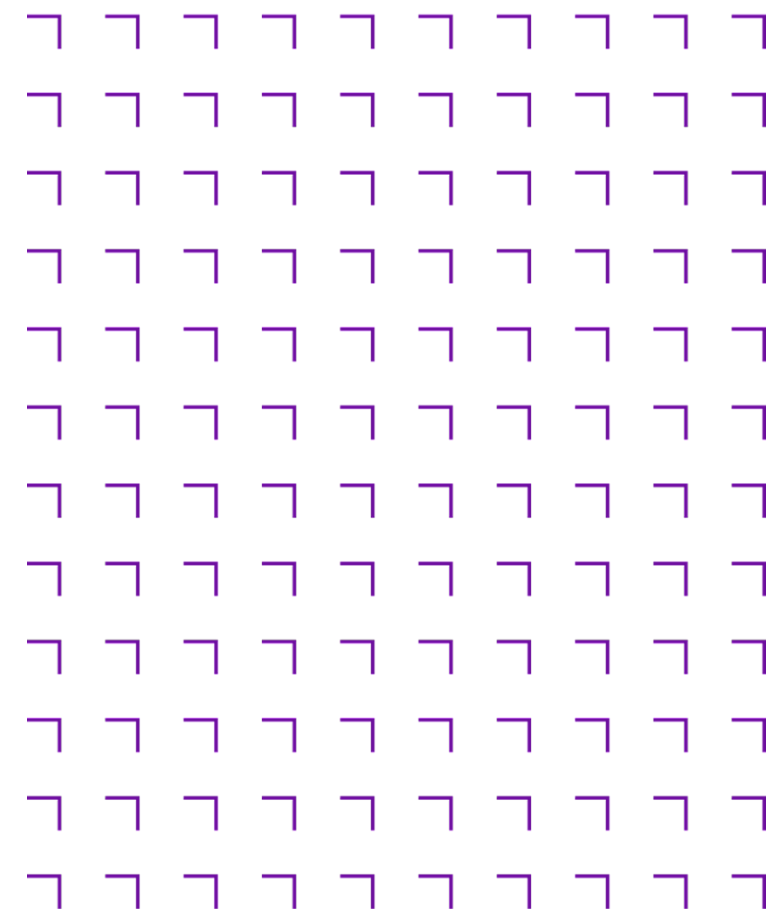
- Final Project - 100% of the grade

- Design and Build functioning Website using HTML5, CSS (including Bootstrap), JavaScript (browser only)

- ✓ Code will be managed in GitHub
 - ✓ Website will be deployed to GitHub Pages
 - ✓ All code to follow best practice and be documented

- Details and How-To-Guide are available on the course page under the section called Assessments

Assessment





In This Unit

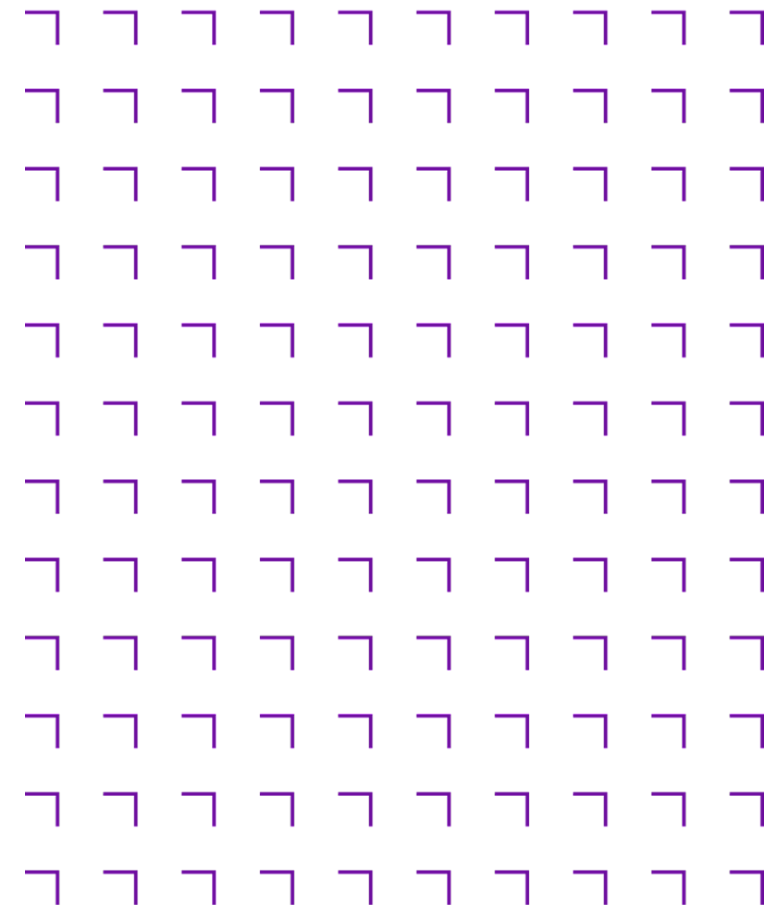
14. Bootstrap

Title

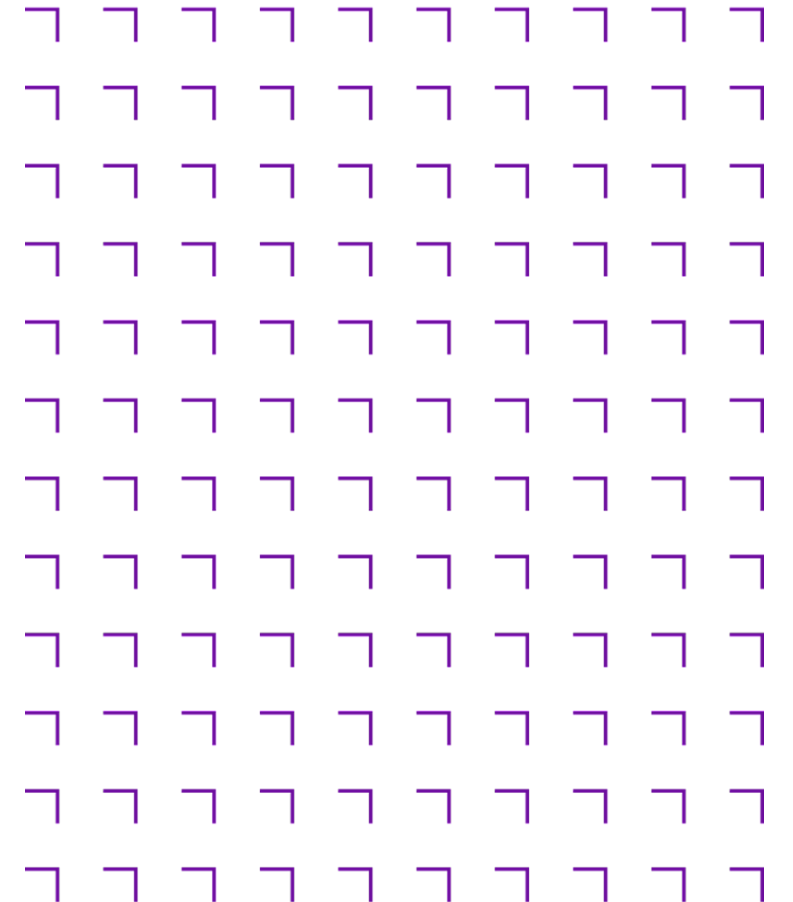
What is Bootstrap and getting started

Common Components

JavaScript and Events



What is Bootstrap and getting started



What are CSS Frameworks

- CSS frameworks are a set of pre-written and ready-to-use CSS styles and stylesheets that provide a set of styles and components for styling markup
- They streamline the development process by offering a foundation of reusable CSS styles for common design elements and layouts
- CSS frameworks are used to create familiar and consistent user interfaces, simplify responsive design, and enhance collaboration among development teams

Types

- **Component-Based**: offers a set of pre-built UI components that developers can plug into their applications to assemble interfaces quickly, e.g. `Bootstrap`
- **Utility-First**: utility-first frameworks offer CSS styles and classes that only do one thing (or a small set of things) as building blocks to extend and customize, e.g. `Tailwind CSS`
- **CSS-In_JS**: Allow developers to manipulate styles directly in JavaScript by including CSS in their JavaScript markup, e.g. `Material UI` with `React`

Top CSS Frameworks

- **Bootstrap**: Popular, easy for beginners, with many ready-to-use components
- **Tailwind CSS**: Highly customizable, focuses on performance, but has a steeper learning curve
- **Foundation**: Easy to start with, customizable through Sass, and lightweight
- **Bulma**: Fast, highly customizable, but lacks built-in JavaScript components
- **UIKit**: Offers animations and accessibility features, but customization might be challenging

Framework	Performance	Customizability	Community Support	Learning Curve	Feature Set
Bootstrap	Fast	Moderate	High	Easy	Rich
Tailwind CSS	Very Fast	High	Moderate	Moderate	Flexible
Foundation	Fast	High	Moderate	Easy	Comprehensive
Bulma	Very Fast	High	Low	Easy	Basic
UIKit	Fast	Moderate	Low	Easy	Specialized

What is Bootstrap 5?

- ♦ Bootstrap 5 is a powerful free framework that helps developers like you build modern webpages faster and easier
- ♦ First released in 2011 by Mark Otto and Jacob Thornton in Twitter. Current version is 5.3
- ♦ It provides pre-built components and styles for things like buttons, navigation bars, and forms
- ♦ By using Bootstrap, you can save time coding repetitive elements and focus on creating unique and interactive web experiences
- ♦ <https://getbootstrap.com/docs/5.3/getting-started/introduction/>

What We Can Do with Bootstrap

There are many things you can do with Bootstrap.

- You can easily create responsive websites, multi-column layouts with pre-defined classes, and different types of form layouts
- You can also create different variations of navigation bars, and components like accordions, modals, etc.
- Without writing any JS code, and dynamic tabs to manage large amounts of content
- Additionally, you can create tooltips and popovers to show hint text, a carousel or image slider to showcase your content, and different types of alert boxes

Features of the Bootstrap 5

Bootstrap 5 offers a variety of features that enhance the development experience and the resulting website

- **Components Library:** Bootstrap provides a rich set of pre-built components that simplify common website elements like navigation menus, forms, buttons, modals, and more
- **Improved JavaScript:** Bootstrap 5 has moved away from a heavy reliance on jQuery for interactivity. It now uses vanilla JavaScript for its core functionality, making it lighter weight and more modern
- **Enhanced CSS Features:** Bootstrap 5 leverages modern CSS features like custom properties and utilities, offering greater flexibility and control over styling
- **Responsive Design Focus:** As mentioned earlier, Bootstrap prioritizes responsive design by incorporating a mobile-first approach. This ensures websites adapt seamlessly to various screen sizes
- **Accessibility:** Bootstrap 5 prioritizes accessibility, making websites usable by people with disabilities. It follows WCAG guidelines to ensure a wider audience can interact with your website
- **Utility API:** Bootstrap 5 offers a robust utility API that provides pre-defined classes for common styling tasks like spacing, margins, colors, and typography. This allows for rapid styling without extensive custom CSS
- **Right-to-Left (RTL) Language Support:** Bootstrap 5 now supports right-to-left languages, making it more versatile for a wider global audience

Benefits of Using Bootstrap 5

- Bootstrap makes it simple to get started with coding
- Sliders, drop-down menus, tabs, and other interactive components are easy to create using Bootstrap
- One of the most significant benefits of utilizing Bootstrap is its cross-browser compatibility
- Saves time of coding repetitive elements
- Bootstrap 5 helps to build an optimized website for mobile dominant traffic
- Bootstrap has a large community and resources

Getting Started

- Simply add CSS & JavaScript links to any html file
- CDN links (shown below) are preferred but the files can also be hosted on your own site

```
<!doctype html>
<html lang="en">
  <head>
    <meta charset="utf-8">
    <meta name="viewport" content="width=device-width, initial-scale=1">
    <title>Bootstrap demo</title>
    <link href="https://cdn.jsdelivr.net/npm/bootstrap@5.2.3/dist/css/bootstrap.min.css" rel="stylesheet"
    integrity="sha384-rbsA2VBKQhggwzxH7pPCaAqO46MgnOM80zW1RWuH61DGLWZJEdK2Kadq2F9CUG65"
    crossorigin="anonymous">
  </head>
  <body>
    <h1>Hello, world!</h1>
    <script src="https://cdn.jsdelivr.net/npm/bootstrap@5.2.3/dist/js/bootstrap.bundle.min.js"
    integrity="sha384-kenU1KFdBIe4zVF0s0G1M5b4hcxpyD9F7jL+jjXkk+Q2h455rYXK/7HAuoJl+0I4"
    crossorigin="anonymous"></script>
  </body>
</html>
```

Containers

Containers are the most basic layout element in Bootstrap and are required when using the grid system

Containers are basically used to wrap content with some padding. They are also used to align the content horizontally center on the page in case of fixed width layout

Bootstrap provides three different types containers:

- ♦ `.container` , which has a max-width at each responsive breakpoint
- ♦ `.container-fluid` , which has 100% width at all breakpoints
- ♦ `.container-{breakpoint}` , which has 100% width until the specified breakpoint

Containers

The table below illustrates how each container's max-width changes across each breakpoint:

Classes Bootstrap Grid System	X-Small <576px	Small ≥576px	Medium ≥768px	Large ≥992px	X-Large ≥1200px	XX-Large ≥1400px
<code>.container</code>	100%	540px	720px	960px	1140px	1320px
<code>.container-sm</code>	100%	540px	720px	960px	1140px	1320px
<code>.container-md</code>	100%	100%	720px	960px	1140px	1320px
<code>.container-lg</code>	100%	100%	100%	960px	1140px	1320px
<code>.container-xl</code>	100%	100%	100%	100%	1140px	1320px
<code>.container-xxl</code>	100%	100%	100%	100%	100%	1320px
<code>.container-fluid</code>	100%	100%	100%	100%	100%	100%

Grid System

- Bootstrap grid system provides an easy and powerful way to create responsive layouts of all shapes and sizes
- Built with flexbox with mobile-first approach
- Fully responsive and uses twelve column system (12 columns available per row) and six default responsive tiers Read more:
- <https://webdesign.tutsplus.com/a-comprehensive-introduction-to-grids-in-web-design--cms-26521a>

Features	X-Small (xs)	Small (sm)	Medium (md)	Large (lg)	X-Large (xl)	XX-Large (xxl)
Bootstrap Grid System	<576px	≥576px	≥768px	≥992px	≥1200px	≥1400px
Container max-width	None (auto)	540px	720px	960px	1140px	1320px
Class prefix	.col-	.col-sm-	.col-md-	.col-lg-	.col-xl-	.col-xxl-
Number of columns	12					
Gutter width	1.5rem (.75rem on left and right)					
Custom gutters	Yes					
Nestable	Yes					
Column ordering	Yes					

Grid System

```
<div class="container">
  <!--Row with two equal columns-->
  <div class="row">
    <div class="col-md-6">Column left</div>
    <div class="col-md-6">Column right</div>
  </div>
  <!--Row with two columns divided in 1:2 ratio-->
  <div class="row">
    <div class="col-md-4">Column left</div>
    <div class="col-md-8">Column right</div>
  </div>
  <!--Row with two columns divided in 1:3 ratio-->
  <div class="row">
    <div class="col-md-3">Column left</div>
    <div class="col-md-9">Column right</div>
  </div>
</div>
```

Note: In a grid layout, content must be placed inside the columns (.col and .col-*) and only columns may be the immediate children of rows (.row). Also, rows should be placed inside a container (either fixed or fluid) for proper padding and alignment

Demo

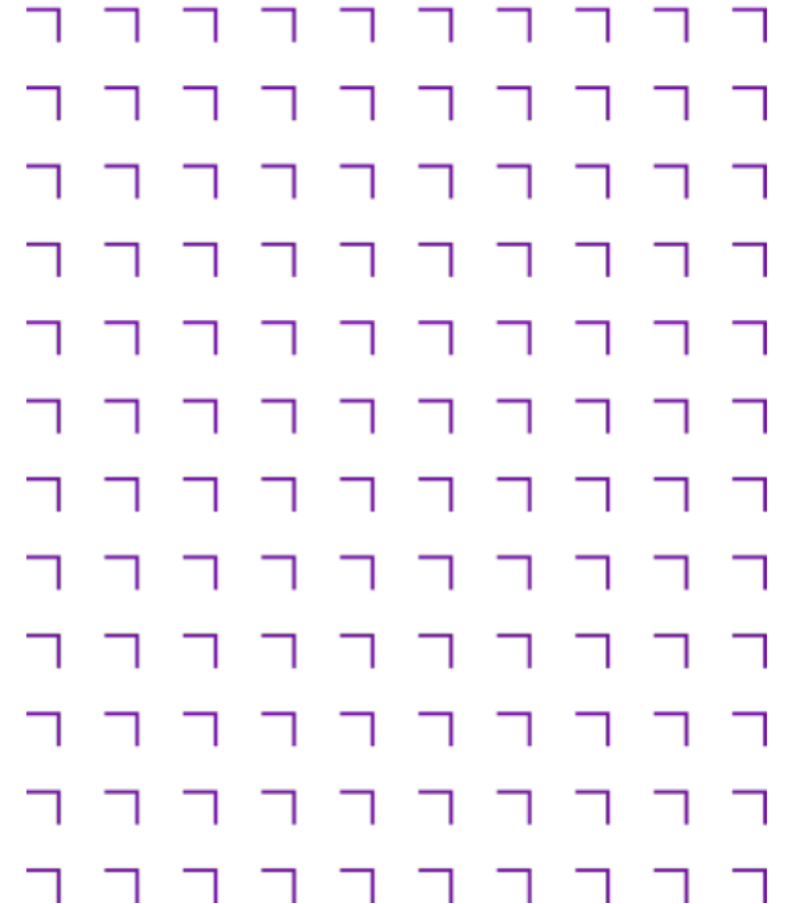
- bs-website-layout



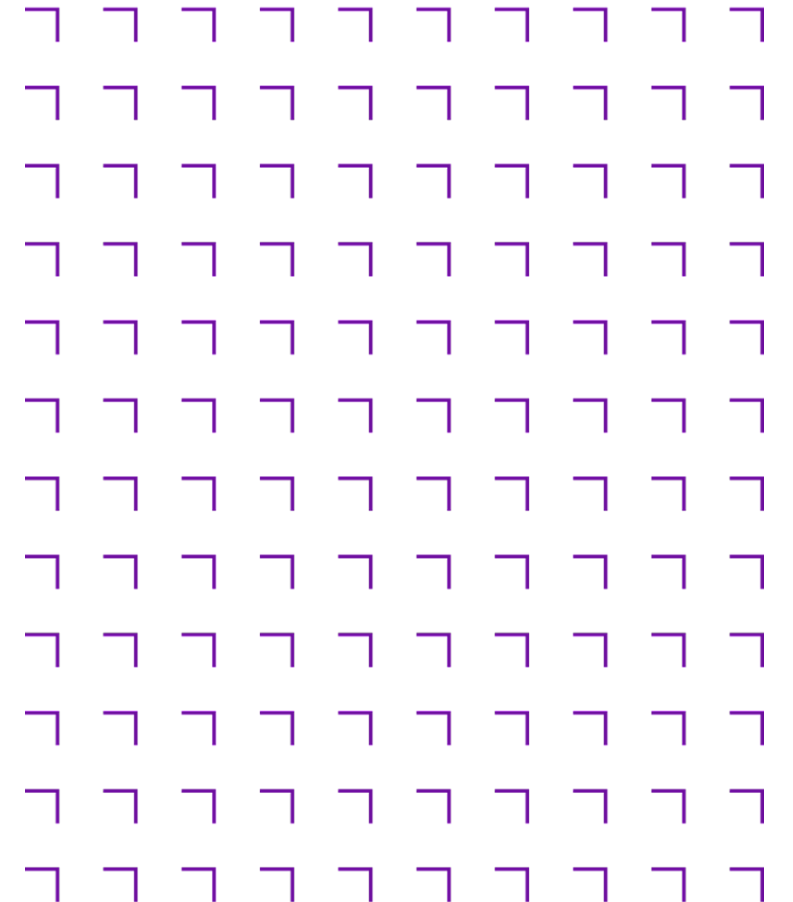
Activity

Breakout

- Join a breakout room
- Download the unit 14 exercises code from Moodle
- Follow the instructions and complete the exercises
- You have 35 minutes
- Lecturer will visit each room in turn, etc...
- Will start next topic on the hour



Common Components

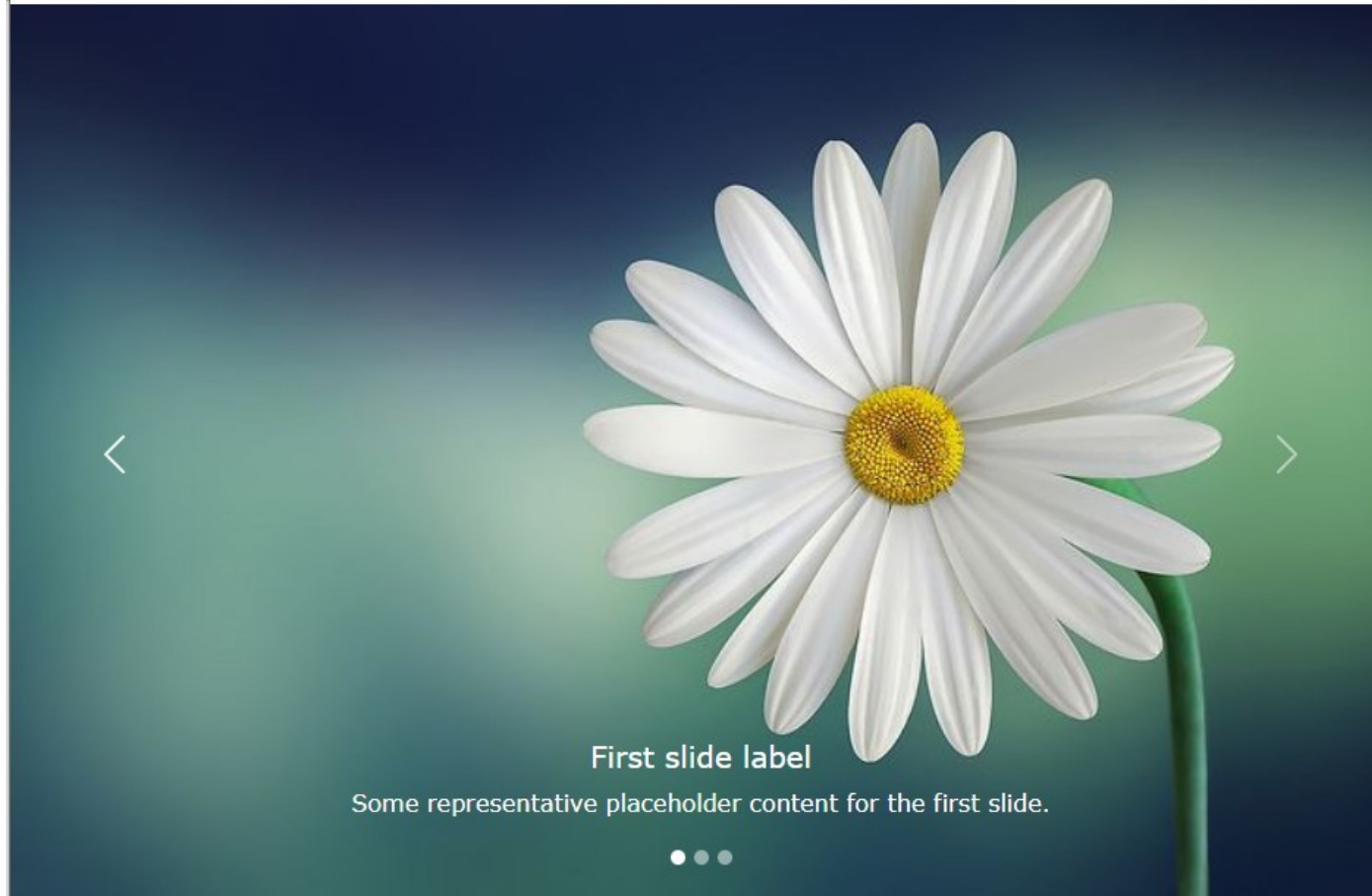


Bootstrap Components

- ◆ Bootstrap components are pre-styled UI elements like buttons, forms, navbars, and more, built with HTML, CSS, and JavaScript
- ◆ They provide a consistent and responsive design framework, facilitating rapid development of web applications with minimal customization required
- ◆ e.g. Alerts, Buttons, Button Group, Spinner, Card, Dropdown, Nav, Navbar, Forms, Breadcrumb, Carousel, Modal

Demo - Carousel (bs-carousel-slider)

Unit 14 Demo - Carousel Slider



Demo - Forms (bs-web-forms)

Responsive Form

Resize the browser window to see the effect. When the screen is less than 600px wide, make the two columns stack on top of each other instead of next to each other.

First Name

Last Name

Country



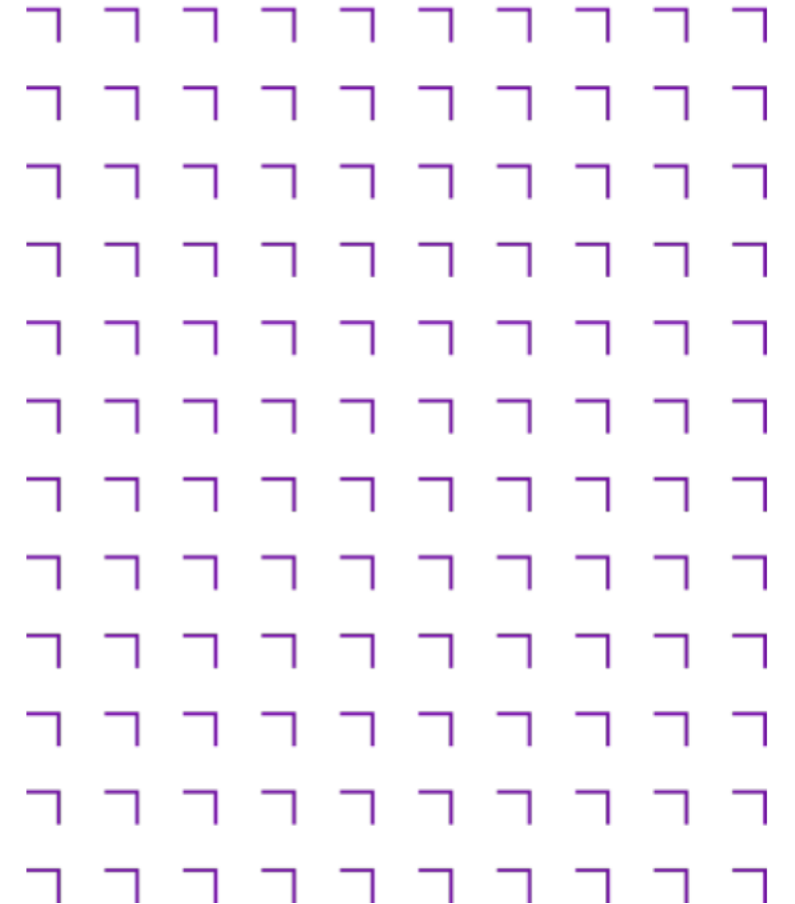
Subject



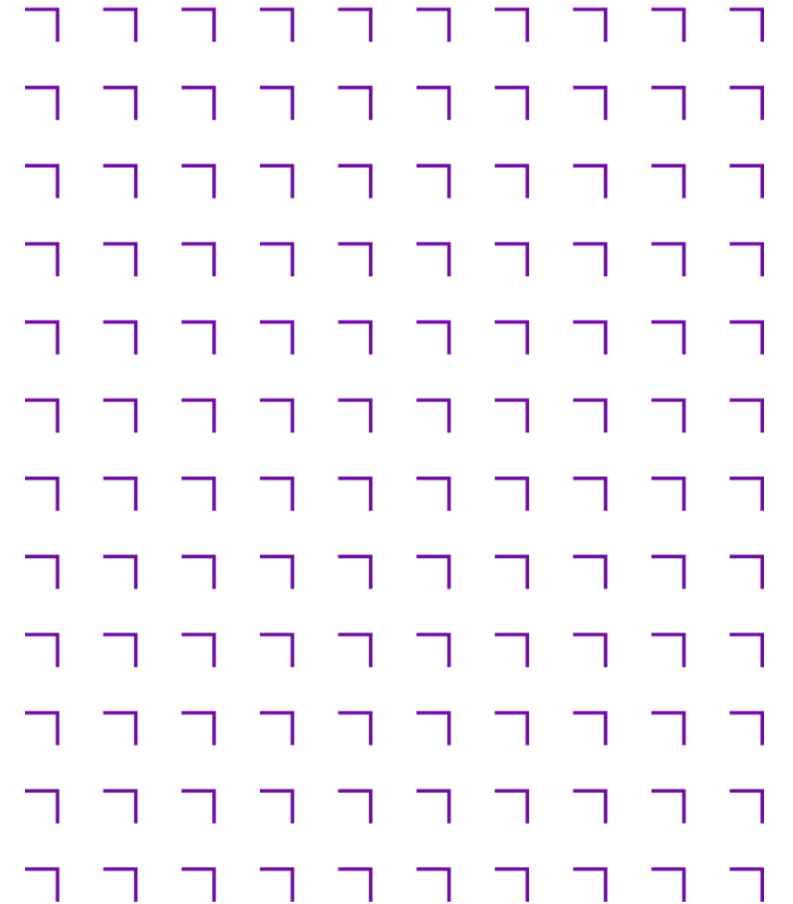
Activity

Breakout

- Join a breakout room
- Continue working on the unit 14 exercises
- You have 35 minutes
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JavaScripts and Events



Using Bootstrap as a Module

- Bootstrap provides a version built as JS Module (bootstrap.esm.js and bootstrap.esm.min.js) which allows you to use Bootstrap as a module in your browser, if [your targeted browsers](#) supports it
- Download Bootstrap -> <https://getbootstrap.com/docs/5.2/getting-started/download/>
- <https://getbootstrap.com/docs/5.2/getting-started/contents/#compiled-bootstrap>

```

├── bootstrap.rtl.min.css
├── bootstrap.rtl.min.css.map
└── js/
    ├── bootstrap.bundle.js
    ├── bootstrap.bundle.js.map
    ├── bootstrap.bundle.min.js
    ├── bootstrap.bundle.min.js.map
    ├── bootstrap.esm.js
    ├── bootstrap.esm.js.map
    ├── bootstrap.esm.min.js
    ├── bootstrap.esm.min.js.map
    ├── bootstrap.js
    ├── bootstrap.js.map
    ├── bootstrap.min.js
    └── bootstrap.min.js.map

```

Using Bootstrap as a Module

```
<script type="module">
  import { Toast } from 'bootstrap.esm.min.js'

  Array.from(document.querySelectorAll('.toast'))
    .forEach(toastNode => new Toast(toastNode))
</script>
```

Due to browser limitations, some plugins, such as `Dropdown`, `Tooltip` and `Popover` plugins, cannot be used in a `<script>` tag with module type because they depend on Popper -> <https://getbootstrap.com/docs/5.0/getting-started/javascript/>

Data attributes

- Nearly all Bootstrap plugins can be enabled and configured through HTML alone with data attributes (preferred way of using JavaScript functionality)
- Make sure to only use one set of data attributes on a single element (e.g., you cannot trigger a tooltip and modal from the same button.)

Custom Events

- Bootstrap provides custom events for most plugins' unique actions (https://developer.mozilla.org/en-US/docs/Web/Events/Creating_and_triggering_events)
- Generally, these come in an infinitive and past participle form - where the infinitive (ex. show) is triggered at the start of an event, and its past participle form (ex. shown) is triggered on the completion of an action
- All infinitive events provide preventDefault() functionality
- This provides the ability to stop the execution of an action before it starts
- Returning false from an event handler will also automatically call preventDefault()

```
const myModal = document.getElementById('myModal')

myModal.addEventListener('show.bs.modal', function (event) {
  if (!data) {
    return event.preventDefault() // stops modal from being shown
  }
})
```

Bootstrap Modal Events

Bootstrap’s modal class exposes a few events for hooking into modal functionality. All modal events are fired at the modal itself (i.e. at the `<div class="modal">`).

Event	Description
<code>hide.bs.modal</code>	Fired immediately when the hide instance method has been called
<code>hidden.bs.modal</code>	This event is fired when the modal has finished being hidden from the user (will wait for CSS transitions to complete)
<code>hidePrevented.bs.modal</code>	Fired when the modal is shown, its backdrop is static and a click outside of the modal is performed
<code>show.bs.modal</code>	Fires immediately when the show instance method is called. If caused by a click, the clicked element is available as the <code>relatedTarget</code> property of the event
<code>shown.bs.modal</code>	Fired when the modal has been made visible to the user (after CSS transitions have completed). If caused by a click, the clicked element is available as the <code>relatedTarget</code> property of the event

Demo - Modal (bs-modal-events)

Public Holidays

×

List of Public Holidays

Country

Ireland

▼

Year

2024

▼

Date	LocalName	Name	Types
2024-01-01	Lá Caille	New Year's Day	Public
2024-02-05	Lá Fhéile Bríde	Saint Brigid's Day	Public
2024-03-17	Lá Fhéile Pádraig	Saint Patrick's Day	Public
2024-03-29	Aoine an Chéasta	Good Friday	Bank,School
2024-04-01	Luan Cásca	Easter Monday	Public
2024-05-06	Lá Bealtaine	May Day	Public
2024-06-03	Lá Saoire i mí an Mheithimh	June Holiday	Public
2024-08-05	Lá Saoire i mí Lúnasa	August Holiday	Public
2024-10-	Lá Saoire i mí Dheireadh	October Holiday	Public

Public Holidays modal

26

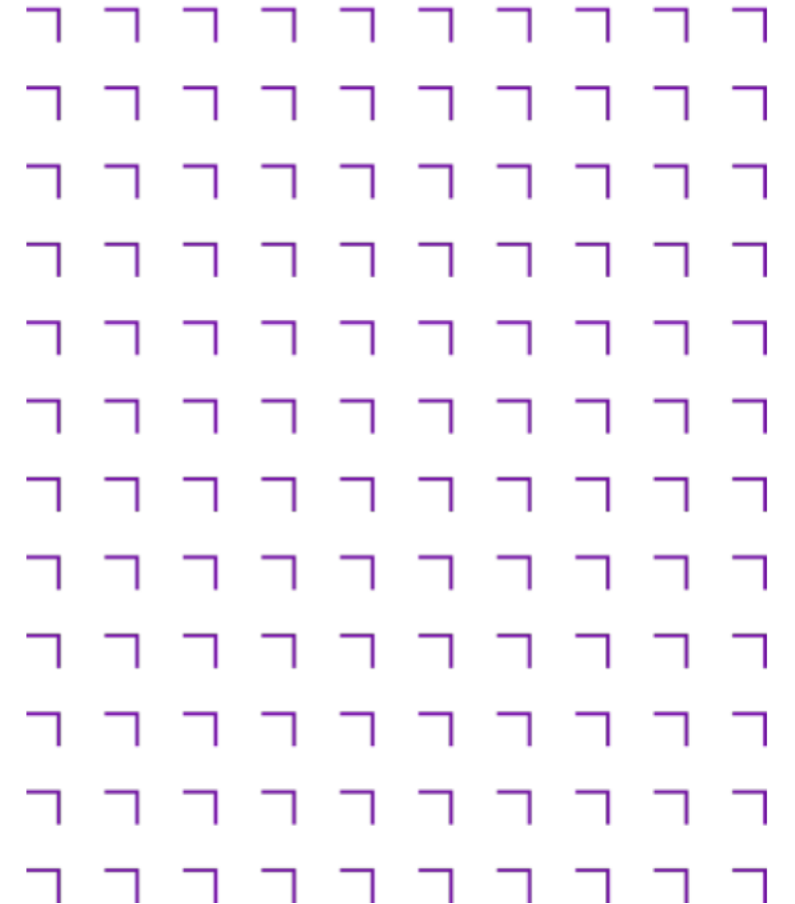
A.N. Other ©2024



Activity

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Summary



Completed this Week

- What is Bootstrap and getting started
- Common Components
- JavaScript and Events

For Next Week

- Complete the remaining exercises for unit 14 before next class
- Review the slides and examples for unit 15

