

Lecture five:

UI Frameworks

COURSE TITLE: WEB PROGRAMMING 1

TOPIC: UI FRAMEWORKS

SEMESTER: 1 2025/2026

DURATION: 10 WEEKS

UI Frameworks

UI (**User Interface**) framework is a set of **tools and libraries**.

Provide developers with **pre-designed and pre-built interface components and layouts**.

Examples of UI Frameworks:

Bootstrap: One of the most popular UI frameworks, known for a components like **buttons, forms, and navigation bars**.

Bootstrap

Bootstrap is the most famous free **CSS framework**.

Bootstrap Versions: Version **3**, **4**, and **5**



Bootstrap 5 is the newest version of Bootstrap. However, Internet Explorer 11 and higher is not supported

Bootstrap 5

Bootstrap 5 is the newest version of Bootstrap, which is the most popular **HTML, CSS, and JavaScript** framework for creating responsive, mobile-first websites.

Bootstrap 5 is completely free to download and use!



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Get Bootstrap

<https://getbootstrap.com>

[Bootstrap · The most popular HTML, CSS, and JS library in the ...](#)

Bootstrap utilizes Sass for a modular and customizable architecture. Import only the components you need, enable global options like gradients and shadows, and ...

V5.0.2



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Bootstrap is developed mobile first, a strategy in which we optimize ...

V5.1.3

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Bootstrap



Front-end framework

Bootstrap is a free and open-source CSS framework directed at responsive, mobile-first front-end web development. It contains HTML, CSS and JavaScript-

**New in v5.3**

Color mode support, expanded color palette, and more!



Build fast, responsive sites with Bootstrap

Powerful, extensible, and feature-packed frontend toolkit. Build and customize with Sass, utilize prebuilt grid system and components, and bring projects to life with powerful JavaScript plugins.

```
$ npm i bootstrap@5.3.2
```

[Read the docs](#)



Components

[Accordion](#)[Alerts](#)[Badge](#)[Breadcrumb](#)[Buttons](#)[Button group](#)[Card](#)[Carousel](#)[Close button](#)[Collapse](#)[Dropdowns](#)[List group](#)[Modal](#)[Navbar](#)[Navs & tabs](#)[Offcanvas](#)[Pagination](#)[Placeholders](#)[Popovers](#)[Progress](#)

Get started with Bootstrap

[View on GitHub](#)

Bootstrap is a powerful, feature-packed frontend toolkit. Build anything—from prototype to production—in minutes.

Quick start

Get started by including Bootstrap's production-ready CSS and JavaScript via CDN without the need for any build steps. See it in practice with this [Bootstrap CodePen demo](#).

1. **Create a new `index.html` file in your project root.** Include the `<meta name="viewport">` tag as well for [proper responsive behavior](#) in mobile devices.

```
<!doctype html>
<html lang="en">
  <head>
    <meta charset="utf-8">
    <meta name="viewport" content="width=device-width, initial-scale=1">
    <title>Bootstrap demo</title>
  </head>
  <body>
    <h1>Hello, world!</h1>
  </body>
</html>
```



On this page

Quick start

[CDN links](#)[Next steps](#)[JS components](#)[Important globals](#)[HTML5 doctype](#)[Viewport meta](#)[Box-sizing](#)[Reboot](#)[Community](#)

Installation

Default html CSS starter template

1. **Create a new `index.html` file in your project root.** Include the `<meta name="viewport">` tag as well for [proper responsive behavior](#) in mobile devices.

```
<!doctype html>
<html lang="en">
  <head>
    <meta charset="utf-8">
    <meta name="viewport" content="width=device-width, initial-scale=1">
    <title>Bootstrap demo</title>
  </head>
  <body>
    <h1>Hello, world!</h1>
  </body>
</html>
```



Installation

Include Bootstrap's CSS and JS.

2. **Include Bootstrap's CSS and JS.** Place the `<link>` tag in the `<head>` for our CSS, and the `<script>` tag for our JavaScript bundle (including Popper for positioning dropdowns, poppers, and tooltips) before the closing `</body>`. Learn more about our [CDN links](#).

```
<!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@5.3.2/dist/css/bootstrap.min.css" re
  </head>
  <body>
    <h1>Hello, world!</h1>
    <script src="https://cdn.jsdelivr.net/npm/bootstrap@5.3.2/dist/js/bootstrap.bundle.min.
  </body>
</html>
```



Bootstrap provide ...

1. pre-built html CSS JavaScript components
2. pre-designed CSS classes
3. Comprehensive CSS Grid System

1- pre-built html CSS JavaScript components

Components

Components

Accordion
Alerts
Badge
Breadcrumb
Buttons
Button group
Card
Carousel
Close button
Collapse
Dropdowns
List group
Modal
Navbar
Navs & tabs
Offcanvas
Pagination

1- pre-built html CSS JavaScript components

Example

PrimarySecondarySuccessDangerWarningInfoLightDarkLink

HTML⚡📋

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

<button type="button" class="btn btn-link">Link</button>
```

2- pre-designed CSS classes

- **m** - for classes that set **margin**
- **p** - for classes that set **padding**

Where *sides* is one of:

- **t** - for classes that set **margin-top** or **padding-top**
- **b** - for classes that set **margin-bottom** or **padding-bottom**
- **s** - (start) for classes that set **margin-left** or **padding-left** in LTR, **margin-right** or **padding-right** in RTL
- **e** - (end) for classes that set **margin-right** or **padding-right** in LTR, **margin-left** or **padding-left** in RTL
- **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

2- pre-designed CSS classes

Centered element

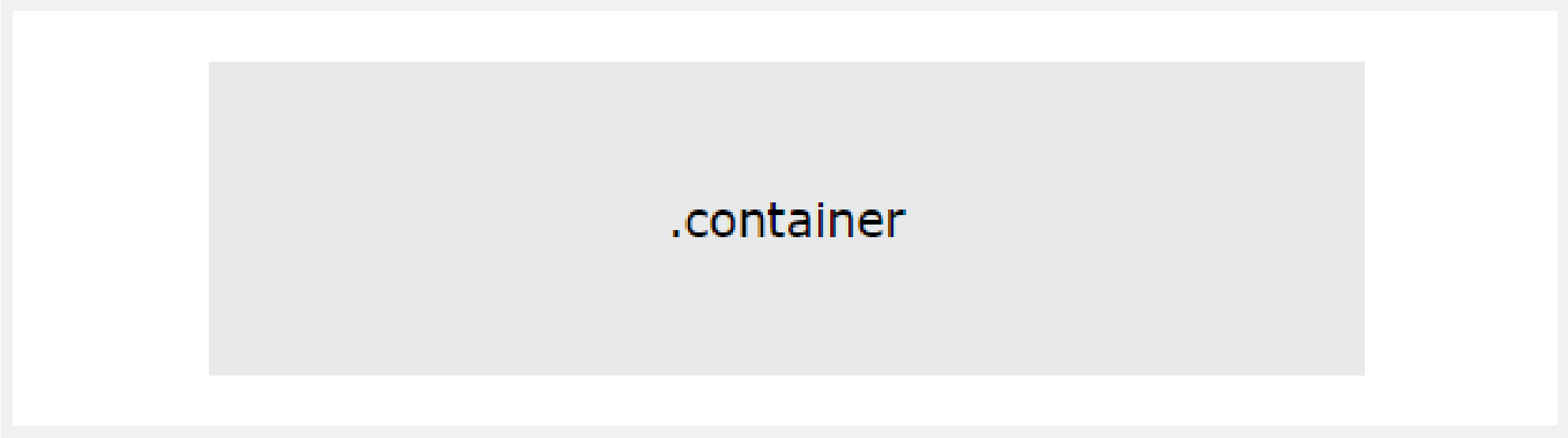
```
<div class="mx-auto p-2" style="width: 200px;">  
  Centered element  
</div>
```



Example

3- Bootstrap 5 Grid System

1- The `.container` Class

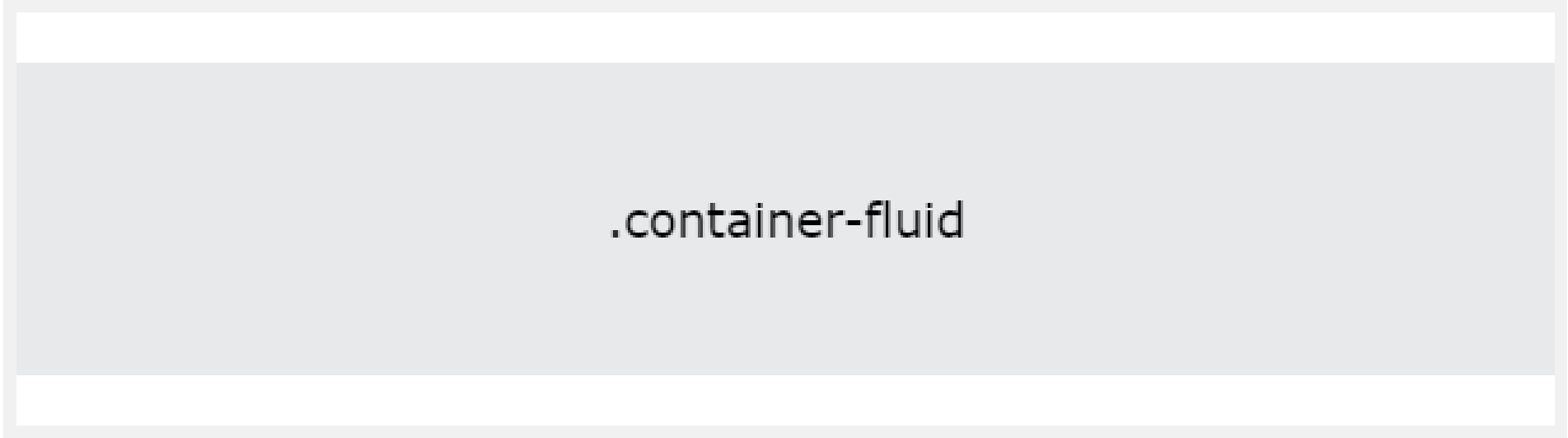


The diagram illustrates the Bootstrap 5 `.container` class. It consists of a large, light gray rectangular box representing the container. Inside this box, centered, is a smaller, darker gray rectangular box. The text `.container` is written in the center of the darker gray box, indicating the class name.

`.container`

3- Bootstrap 5 Grid System

1- The `.container-fluid` Class



`.container-fluid`

Bootstrap 5 Grid System

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

col	col	col	col	col	col	col	col	col	col	col	col	
span 1	span 1	span 1	span 1	span 1	span 1	span 1	span 1	span 1	span 1	span 1	span 1	row
span 4				span 4				span 4				row
span 4				span 8								row
span 6						span 6						row
span 12												row

responsive Grid Classes

The Bootstrap 5 grid system has six 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)
- **.col-xxl**- (xxlarge devices - screen width equal to or greater than 1400px)

Basic Structure of a Bootstrap 5 Grid

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

Example 1

Basic Structure of a Bootstrap 5 Grid

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

Example 2

Basic Structure of a Bootstrap 5 Grid

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

Example 3

Basic Structure of a Bootstrap 5 Grid

Three Equal Columns

.col	.col	.col
------	------	------

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

Example 4

Non responsive

Basic Structure of a Bootstrap 5 Grid

Responsive Columns

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

The following example shows how to create four equal-width columns starting at tablets and scaling to extra large desktops. **On mobile phones or screens that are less than 576px wide, the columns will automatically stack on top of each other:**

```
<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>
```

Example 5

Basic Structure of a Bootstrap 5 Grid

Two Unequal Responsive Columns

.col-sm-4

.col-sm-8

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

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

Example 7

References

- Mozilla Developer Network (MDN) - developer.mozilla.org
- W3Schools - www.w3schools.com

Thank you

