



香港中文大學  
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# CSCI2720 - Building Web Applications

Lecture 3: bootstrap for CSS

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# Outline

- Why Bootstrap?
- Adding Bootstrap to HTML
- Using classes
- Breakpoints
- Containers and grid system
- Components
- Bootstrap utilities
- Other useful features of Bootstrap
- Customizing Bootstrap
- Bootstrap Icons
- Alternatives to Bootstrap

# Why Bootstrap?

- Bootstrap: a front-end framework
  - Originally developed by Twitter engineers in 2011
  - Provides a collection of pre-designed CSS styles and JavaScript Components.
- Get started easily:
  - Base styling given with good browser compatibility
  - Consistent and nice-looking components
  - Responsive grid system for layout
- Current version: v5.3.0
- <https://getbootstrap.com/>



# Adding Bootstrap to HTML

- Quick Start: one line to add to the HTML head
- `<link rel="stylesheet" href="https://cdn.jsdelivr.net/npm/bootstrap@5.3.0/dist/css/bootstrap.min.css">`
  - We use the latest version of Bootstrap from a CDN by including the CSS file using the `<link>` tag in the `<head>` section.
  - CSS styles are applied to the HTML elements.
- A `<meta>` tag is often used to ensure responsive viewport:
  - `<meta name="viewport" content="width=device-width, initial-scale=1">`
  - Latest browser usually have it by default.
- <https://getbootstrap.com/docs/5.3/getting-started/introduction/>

# A simple example

```
1  <!DOCTYPE html>
2  <html lang="en">
3  <head>
4    <meta name="viewport" content="width=device-width, initial-scale=1">
5    <title>Bootstrap Example</title>
6    <!-- Include Bootstrap CSS -->
7    <link rel="stylesheet" href="https://cdn.jsdelivr.net/npm/bootstrap@5.3.0/dist/css/bootstrap.min.css">
8  </head>
9  <body>
10
11    <div class="container">
12      <h1>Bootstrap Example</h1>
13      <button class="btn btn-primary">Click me</button>
14    </div>
15
16
17 </body>
18 </html>
```

# A simple example

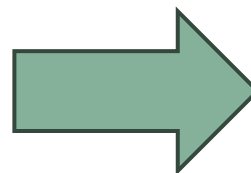
- Inside the `<body>` section:
  - We have a `<div>` tag with the class “container” to create a container for our content.
  - Within the container, we have a button with the class “*btn btn-primary*”
- Different classes are provided by Bootstrap and give the button a predefined style.
- You can explore various other classes and components offered by Bootstrap.
- <https://getbootstrap.com/docs/4.0/components/buttons/>

# CSS and Bootstrap

- CSS = Cascading Style Sheets
  - Allows you to style HTML contents.
  - Control the visual appearance of web page.
- Every element in HTML that are presentable has a set of style properties that can be modified via CSS.
- Using Bootstrap, you can set simple *class* attributes to HTML elements to style them.
  - The relevant CSS styles are applied automatically, without you coding in CSS.
  - Easy for beginners.
  - Less flexibility for fine control of styles.

# Coding in CSS without Bootstrap

```
1 <!DOCTYPE html>
2 <html>
3 <head>
4   <title>CSS Example</title>
5   <style>
6     /* CSS styles */
7     h1 {
8       color: blue;
9       font-size: 24px;
10    }
11    p {
12      color: red;
13      font-size: 16px;
14    }
15    .highlight {
16      background-color: yellow;
17    }
18  </style>
19 </head>
20 <body>
21   <h1>This is a heading</h1>
22
23   <p>This is a paragraph.</p>
24
25   <p class="highlight">This paragraph has a highlight class applied to it.</p>
26
27 </body>
28 </html>
```



**This is a heading**

This is a paragraph.

This paragraph has a highlight class applied to it.



# Using Classes

- Almost everything in Bootstrap is applied using the *class* attribute for HTML elements
  - Multiple classes can be applied separated by space
    - i.e., never use space in class names.
- Classes are often notated as *.classname* in Bootstrap documentations.

# Breakpoints

- Responsive layout could show contents differently based on device or screen size.
- Bootstrap defines 6 breakpoints with a class infix to be added to class names.
- `<nav class="navbar navbar-expand-lg"></nav>`
  - a navbar which expands only when screen width reaches the “large” breakpoint
- Font sizes are by default responsive after enabling Bootstrap.
- <https://getbootstrap.com/docs/5.1/layout/breakpoints/>

Breakpoint	Class infix	Dimensions
X-Small	<i>None</i>	<576px
Small	sm	≥576px
Medium	md	≥768px
Large	lg	≥992px
Extra large	xl	≥1200px
Extra extra large	xxl	≥1400px

# Containers

- A good idea for layout is to put contents into containers for nice padding.
  - Containers are responsive on Bootstrap.
- <https://getbootstrap.com/docs/5.0/layout/containers/>

```
<div class="container-sm">100% wide until  
small breakpoint</div>  
<div class="container-md">100% wide until  
medium breakpoint</div>  
<div class="container-lg">100% wide until  
large breakpoint</div>  
<div class="container-xl">100% wide until  
extra large breakpoint</div>  
<div class="container-xxl">100% wide until  
extra extra large breakpoint</div>
```

	Extra small <576px	Small ≥576px	Medium ≥768px	Large ≥992px	X-Large ≥1200px	XX-Large ≥1400px
.container	100%	540px	720px	960px	1140px	1320px
.container-sm	100%	540px	720px	960px	1140px	1320px
.container-md	100%	100%	720px	960px	1140px	1320px
.container-lg	100%	100%	100%	960px	1140px	1320px
.container-xl	100%	100%	100%	100%	1140px	1320px
.container-xxl	100%	100%	100%	100%	100%	1320px
.container-fluid	100%	100%	100%	100%	100%	100%

# Bootstrap Grid System



- In Bootstrap, a container is always divided into *12 columns*.
- This can be done by introducing a *row* div, and apply *col-\** class to the contents.
  - Phone in portrait: stacked up (no columns)
  - Phone in landscape: 4+4+4
  - Tablet: 3+6+3
  - Very large screen: 2+8+2
  - <https://getbootstrap.com/docs/5.0/layout/grid/>
- Responsive to breakpoints

```
<div class="container bg-warning">
  <div class="row">
    <div class="col-sm-1 col-xl-4 bg-primary"> Col 1</div>
    <div class="col-sm-2 col-xl-3 bg-secondary"> Col 2</div>
    <div class="col-sm-3 col-xl-2 bg-danger"> Col 3</div>
    <div class="col-sm-4 col-xl-1 bg-info"> Col 4</div>
  </div>
</div>
```

breakpoint

column / size

# Components

- A large bundle of easy components for adding spice to the page contents
  - Accordion, alerts, badge, breadcrumb, buttons, button group, card, carousel, close button, collapse, dropdowns, list group, modal, navs & tabs, navbar, offcanvas, pagination, placeholders, popovers, progress, scrollspy, spinner, toasts, tooltips
- Most are pure CSS, while some requires JavaScript or the Popper library.
- <https://getbootstrap.com/docs/5.1/components>

# Bootstrap utilities

- Some utilities are available for setting borders, colors, spacing, shadows, etc.
  - *.border-start* shows a border on left
  - *.text-warning* change text color to yellow
  - *.bg-success* changes background color to green
  - *.d-block changes* an element to block-level display
- A lot of mix-and-match with the help with breakpoints.

# Forms in Bootstrap

- The Bootstrap library allows easy customization on the appearance of form controls
  - Classes for *.form-text*, *.form-group*, etc. with responsive breakpoint settings
  - Fancy floating label with *.form-floating*
- Some custom components are also available
  - *.form-range*
- <https://getbootstrap.com/docs/5.0/forms/overview/>

# Other useful features of Bootstrap

- CSS reboot: fixing compatibility issues among browser
- Table styling: easily set up tables of stripped colors or hovering effects
- Form controls and styles: improving usability with customization and validation options
- Ratios: pseudo-elements to maintain aspect ratio of HTML elements, e.g., 4x3, 16x9,
- More to be discovered from the detailed documentations!
- <https://www.w3schools.com/bootstrap5/index.php>



# Bootstrap Icons

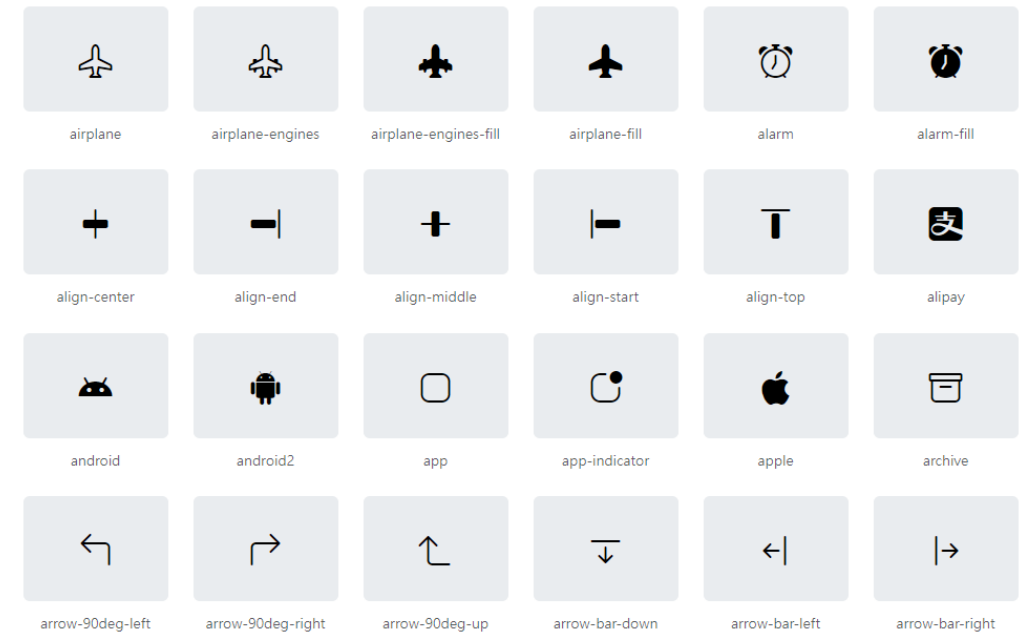
- Another line to include for the icon fonts stylesheet
- `<link rel="stylesheet" href="https://cdn.jsdelivr.net/npm/bootstrap-icons@1.9.1/font/bootstrap-icons.css">`

- Icons can be loaded as svg, img, or font,

- `<i class="bi bi-airplane"></i>`



- <https://icons.getbootstrap.com/>
- <https://www.w3schools.com/icons/>



# Alternatives to Bootstrap

- There are other CSS frameworks which are similar to Bootstrap:
  - See: <https://2021.stateofcss.com/en-US/technologies/css-frameworks/>
- Tailwind CSS: <http://tailwindcss.com>
- Pure CSS: <http://purecss.io>
- Bulma: <http://bulma.io>
- Many of them are also *class-based*.
- It's a personal choice, or it depends on your team.

# Further readings

- Bootstrap Docs:
- <https://getbootstrap.com/docs/5.3/getting-started/introduction/>
- W3schools tutorial for Bootstrap:
- <https://www.w3schools.com/bootstrap5/>