Web Development Frameworks

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Overview

- Web development frameworks are software frameworks for web development that simplify common tasks
- **jQuery** is a JavaScript library for JavaScript programming
- **Bootstrap** is a HTML/CSS/JavaScript framework for developing responsive, mobile first applications
  - Developed by Twitter and released to the public in 2011
- **Angular** is a TypeScript-based web application framework
  - Developed by Google
  - Angular (beginning with Angular 2+) is a rewrite of AngularJS which was a JavaScript framework

jQuery

- Can be included by loading the JavaScript library in the header of a page
- The basic jQuery framework involves applying an action to a set of elements as follows:
  - $(*selector*).*action*()
    - $ - specifies we are using jQuery (you can also use *jQuery*)
    - selector – a CSS style selector to apply the action to (e.g., *p*, *div.class*)
    - action() – a function to apply to each selector
- Examples
  - $("p").hide() - hides all <p> elements.
  - $(".test").hide() - hides all elements with class="test".
  - $("#test").hide() - hides the element with id="test".

- Tutorial: https://www.w3schools.com/jquery/default.asp

jQuery document.ready()

- In JavaScript, a *function* can be passed as an argument into another function (see JS_function example)
- The following statement uses jQuery to call a *function* after a page is loaded
  - $(document).ready(*function*)
- However anonymous functions are often used:

```
$(document).ready(function(){
  // jQuery methods go here...
});
```

- The following is shortcut for the above notation:

```
$(function(){
  // jQuery methods go here...
});
```

Common jQuery actions

Action	Description	Example
hide(), show(), or toggle()	Hides, shows, or toggles the element(s)	$("p").hide()
html() or text()	Gets the innerHTML or innerText of an element	$("p#id").html()
html("value") or text("value")	Sets the innerHTML or innerText of an element to the specified value	$("p#id").text("hello")
addClass("class"), removeClass("class"), toggleClass("class")	Adds, removes, or toggles the class of an element	$("p").addClass("fancy")
css("*propertyname*","*value*")	Sets the CSS property of an element	$("p").css("background-color", "yellow")

Handling events using jQuery

- Common events include *click()*, *doubleclick()*, *mouseenter()*, *mouseleave()*, and *hover()*
- For examples see
  - https://www.w3schools.com/jquery/jquery_events.asp
- When we handle events, we specify a function that should be called when the event is triggered, e.g.
  - $("p").click(*functionToCall*)
- The function to call is usually passed as an anonymous function

```
// set onclick event of all paragraphs
$("p").click(function(){
   // action goes here!!
   $(this).hide();   // hides the current element
});
```

$(this) accesses the current element

Bootstrap

- Can be included by loading the JavaScript and CSS libraries in the header of a page
- Basic design concepts
  - Responsive to changes in screen size (e.g., desktop vs. mobile)
    - Uses a grid system consisting of 12 columns
    - Includes collapsible navbars and other elements
- Bootstrap is used by specifying existing *classes*, e.g.
  - col-sm-4 – element is 4 columns wide
  - btn and btn-primary for buttons

- Full tutorial: https://www.w3schools.com/bootstrap4/default.asp

Selected Bootstrap examples

- Bootstrap's grid system allows up to 12 (responsive) columns across the page:
  - https://www.w3schools.com/bootstrap4/bootstrap_grid_basic.asp
- Bootstrap provides a variety of button styles:
  - https://www.w3schools.com/bootstrap4/bootstrap_buttons.asp
- Bootstrap provides a variety of navigation bar styles:
  - https://www.w3schools.com/bootstrap/bootstrap_navbar.asp

Angular

- Angular applications consist of *components* that have their own HTML, CSS, and typescript (ts) files. The typescript file defines the component/element as well as JavaScript objects.
- Angular compiles this code to HTML/CSS/JavaScript for display in a browser, which requires Node.js.
- For a tutorial see: https://angular.io/tutorial
- We will create a project using StackBlitz:
  - https://angular.io/generated/live-examples/getting-started-v0/stackblitz.html
- The main page is *index.html*, which has the following logic:
  - <*app-root*> is defined by the app-component
  - the app-component contains
    - *app-top-bar* which is defined in the top-bar component
    - *router-outlet* is a placeholder for routing content based on the current page (in this app, the *ProductListComponent* is routed here)

Angular

- Angular allows for *data binding* and *event binding*, where templates expressions are incorporated directly into the HTML
- In the code below, the value of the JavaScript variable *name* will be displayed
  - <h1> Welcome to {{name}} </h1>
- Angular has *directives* for iteration and conditionals. The following code creates list items that displays the *name* for each element of *products*
  - <li *ngFor = "let item of products">{{item.name}}