HTML Bootstrap JavaScript

CS421: Systems Programming

Alexandros Kleanthous 1005872
Andreas Komis 912451
Panayiotis Kyriakou 907921

The Technologies

HTML - HyperText Markup Language
Structure
Written by Tim Berners-Lee in 1993.

Bootstrap/CSS - Cascading Style Sheets
Appearance
Bootstrap is an open-source front-end (mostly CSS) framework.
Developed by Mark Otto and Jacob Thornton at Twitter in 2011.

Javascript
Functionality
Developed by Brandan Eich in 1995.

HTML

Tags

- Keywords which define how the rendering engine will format and display content.
- Elements are (usually) defined by three parts: opening tag, content and closing tag

  e.g. `<tag>text content..</tag>`

  - Block-level Elements (`<div>`, `<main>`, `<h1>` etc) :
    - Always starts on a new line
    - Always takes up the full width available
    - Have top and a bottom margin
  - Inline-level Elements (`<span>`, `<a>`, `<b>` etc):
    - Don't start on new line
    - Takes up as much width as necessary

Attributes

- All elements can have different valid attributes (`src, disabled, style`)
- Provide additional information about elements
- Are always specified in the opening tag
- Usually come in name/value pairs like: `name="value"`
- All elements can have the id and class attributes

```
<h1 id="heading" class="title">Hello World</h1>
```

demo.html

```html
<!DOCTYPE html>
<html>
  <head>
    <title>421 Presentation Demo</title>
  </head>
  <body>
    <h1>Hello World</h1>
    <p>This is a presentation about HTML, Bootstrap and JS!</p>
    <button type="submit">Click Here</button>
  </body>
</html>
```

Hello World

This is a presentation about HTML, Bootstrap and JS!
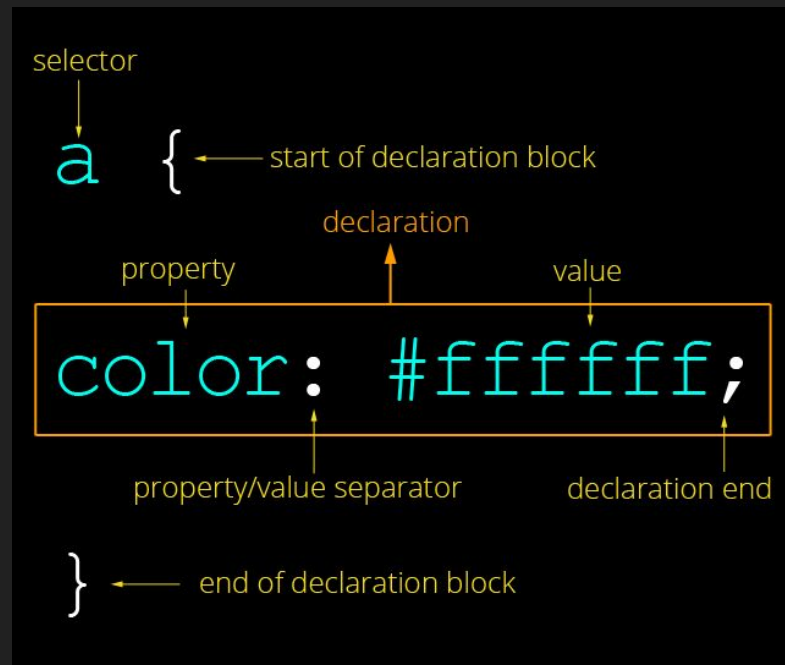
Click Here

CSS

Abilities:
- Change styles easily
- Have an external CSS file which styles different websites

Selector:
- Chooses particular element or even different elements and selects them with their tag, id or a class
- Provide a single or series of tags, id's, and/or classes to select and apply different style/color values to them

Declaration Block:
- Contains one or more declarations separated by semicolons. Each declaration includes a CSS property name and a value, separated by a colon. Multiple CSS declarations are separated with semicolons, and declaration blocks are surrounded by curly braces

selector

a { ← start of declaration block

declaration

property   value

color: #ffffff;

property/value separator   declaration end

} ← end of declaration block

style.css

```css
* {
    text-align: center;
}

body {
    height: 1000px;
    background: linear-gradient(0deg, rgba(34,193,195,1) 0%, rgba(253,187,45,1) 100%);
    background-repeat: no-repeat;
}

h1 {
    font-family: 'Lobster', cursive;
    font-size: 64px;
    color: white;
    text-shadow: 2px 2px black;
    margin-bottom: 0;
}

p {
    font-family: 'Roboto', sans-serif;
    font-size: 32px;
}
```

```css
button {
    font-family: 'Rubik', sans-serif;
    font-size: 28px;
    font-weight: bold;
    background-color: white;
    color: black;
    width: 250px;
    padding: 10px;
    border: 3px solid black;
    border-radius: 25px;
}

button:hover {
    transition: 0.75s;
    background-color: orange;
    color: white;
    cursor: pointer;
}
```

Hello World

This is a presentation about HTML, Bootstrap and JS!

Click Here

Bootstrap

- Is a free open source front-end development framework for creating websites and mobile apps.
- Bootstrap has a first approach on mobile devices and tablets to be able to resize to the users screen with an easier approach (using a grid system).
- Bootstrap includes user interface components, layouts and JavaScript tools along with the implementation framework.

demo.html (with Bootstrap)

```html
<!DOCTYPE html>
<html>
  <head>
    <title>421 Presentation Demo</title>
    <link rel="preconnect" href="https://fonts.gstatic.com">
    <link
href="https://fonts.googleapis.com/css2?family=Lobster&family=Roboto:wght@300&family=Rubik&
display=swap" rel="stylesheet">
    <link rel="stylesheet"
href="https://maxcdn.bootstrapcdn.com/bootstrap/4.0.0/css/bootstrap.min.css">
    <link rel="stylesheet" href="style.css">
  </head>
  <body>
    <div class="container">
      <h1 class="text-center text-light font-weight-bold mt-5">Hello World</h1>
      <p id="content" class="text-center">This is a presentation about HTML, Bootstrap and
JS!</p>
      <button class="btn btn-lg btn-light font-weight-bold border border-dark rounded"
type="submit">Click Here</button>
    </div>
  </body>
</html>
```

Hello World

This is a presentation about HTML, Bootstrap and JS!

Click Here

JavaScript

- It has curly-bracket syntax, dynamic typing, prototype-based object-orientation, and first-class functions
- It runs on a JavaScript Engine such as the V8 engine, Google's open source JavaScript and WebAssembly engine, written in C++
- JavaScript is an interpreted language

script.js

```javascript
window.onload = function () {
  var clickBtn = document.getElementById("btn")
  clickBtn.addEventListener("click", function () {
    let content = document.getElementById("content")
    content.textContent = "JS is awesome!"
  })
}
```

Hello World

This is a presentation about HTML, Bootstrap and JS!

Click Here
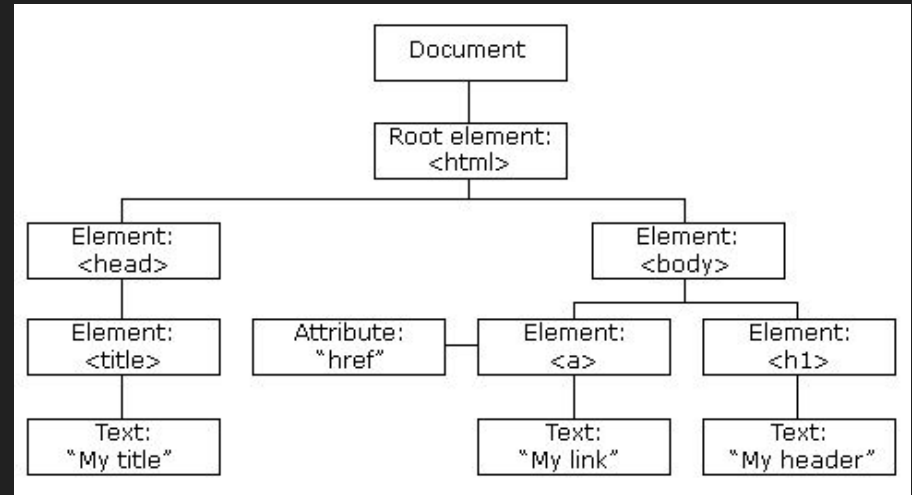
Hello World

JS is awesome!

Click Here

Rendering Engine

A rendering engine, also referred to as "browser engine", is used to transform HTML documents and other resources into an interactive visual representation on a user's device. In addition to layout and rendering, a browser engine enforces the security policy between documents, handles navigation through hyperlinks and data submitted through forms, and implements the Document Object Model (DOM) data structure exposed to page scripts.

Examples are Gecko, Blink, WebKit.

DOM - Document Object Model

The DOM is a cross-platform and language-independent interface that treats an XML or HTML document as a tree structure wherein each node is an object representing a part of the document. The DOM represents a document with a logical tree.

HTML Script Loading

- default: Blocks html parsing, loads and executes script

```
<script src="script.js"></script>
```

- async: Loads and executes script in parallel of html parsing

```
<script src="script.js" async></script>
```

- defer: Loads script in parallel of html parsing and runs it when DOM is ready

```
<script src="script.js" defer></script>
```

Bootstrap Grid System

- Bootstrap's grid system uses a series of containers, rows, and columns to layout and align content
- Built with flexbox and is fully responsive
- Each grid contains 12 columns
- A layout can consist of multiple grids (containers)
- Ensuring responsiveness through the following classes

	Extra small <576px	Small ≥576px	Medium ≥768px	Large ≥992px	Extra large ≥1200px
Max container width	None (auto)	540px	720px	960px	1140px
Class prefix	.col-	.col-sm-	.col-md-	.col-lg-	.col-xl-

Javascript AJAX

- AJAX stands for **A**synchronous **J**avaScript **A**nd **X**ML
- Uses browser built-in XMLHttpRequest object

```javascript
var xhr = new XMLHttpRequest();
xhr.onload = function() {
    if (xhr.status === 200) {
        var response = JSON.parse(xhr.responseText);
        console.log(response);
    } else {
        alert("Unexpected error");
    }
}


xhr.open('GET', "https://random-data-api.com/api/beer/random_beer");
xhr.send();
```

Conclusion

- HTML: Describes the structure of a page and is being parsed by a rendering engine (often used within a browser). No linting, thus prone to typos and mistakes.

- Bootstrap: Grid system enables responsive design. Framework implements commonly used components for rapid development that results in a modern design.

- Javascript: Can manipulate DOM and implement any functionality. Some operators (such as ==) behave differently in JS and can confuse beginners.

Resources

- https://developer.mozilla.org/en-US/docs/Web/HTML
- https://developer.mozilla.org/en-US/docs/Web/CSS
- https://developer.mozilla.org/en-US/docs/Learn/JavaScript/First_steps/What_is_JavaScript
- https://getbootstrap.com/
- https://www.javascript.com/