Web Applications

CSE183

Fall 2020

Cascading Style Sheets

Baskin Engineering UC SANTA CRUZ

Notices

- **Administration 1 & 2** due 23:59 **Thursday October 15**

- **Assignment 1** due 23:59 **Thursday October 8**

- **Assignment 2** available 08:00 **Friday October 9**

- **Quiz 1** during lecture **Friday October 16** (Wrong on Zoom Recording)

- All assignments now listed on Canvas
  - Locked until availability date
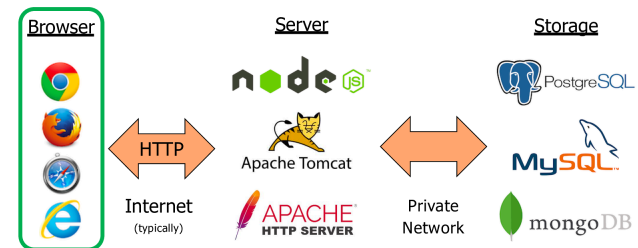
3

Today's Lecture

- HTML Weaknesses
- Separation of style from content
- Cascading Style Sheets

- Assignment 1 Secret Sauce
- Questions

4

Full Stack Web Applications

5

An HTML Weakness

Say we have an HTML table:

```
<font face = "arial,sanserif" size = "6">
  <table>
    <tr>
      <th>Reasons for taking CSE183</th>          <th align = "left">Reasons for taking CSE183</th>
    </tr>
    <tr>
      <td>You need it to graduate.</td>
    </tr>
    <tr>
      <td>You'll learn some cool stuff.</td>
    </tr>
    <tr>
      <td>It'll give you interesting things to talk about in job interviews.</td>
    </tr>
  </table>
</font>
```

Override defaults with an attribute

Center alignment ☹

Left alignment ☺

Reasons for taking CSE183
You need it to graduate.
You'll learn some cool stuff.
It'll give you interesting things to talk about in job interviews.

Reasons for taking CSE183
You need it to graduate.
You'll learn some cool stuff.
It'll give you interesting things to talk about in job interviews.

6

An HTML Weakness

- In our HTML example we had: `<h2>The Hard Sell</h2>`
  - Q: What font should the browser use for the level 2 heading?
  - A: Some default from the browser
- Basic Principle:
  - HTML says "what" browser says "how"
- But what if we'd like to say what font to use?
- Early HTML approach: The `<font>` tag

```
<font face = "arial,sanserif" size = "10">
    The Hard Sell
</font>
```

7

Pros and Cons of HTML Approach

- Can override the browser defaults ☺
- Becomes problematic if you have many elements you want to change the same attribute on ☹
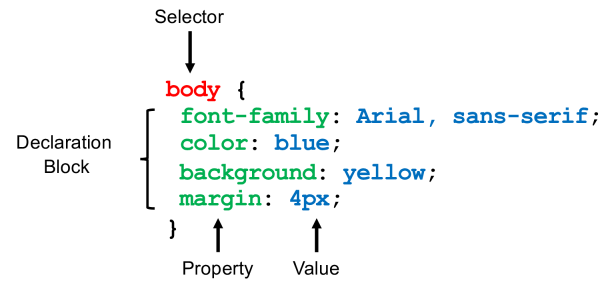
8

Solution: Style Sheets

- Principle 1 : Separate Style from Content
  - Content (the text to display) is in HTML files
  - Style (how to format that text) is in a separate file
- Principle 2 : Don't Repeat Yourself
  - Define style once, us it in many places
- Implementation:
  - Add the `class` attribute to all tags; links style and content
  - `<th class = "table-header">`

9

Style Sheet Rules

Selector

↓

```
body {
    font-family: Arial, sans-serif;
    color: blue;
    background: yellow;
    margin: 4px;
}
```

Declaration Block

Property   Value

10

Selectors

Selector	Style Sheet	HTML

Tag Name	`h2 {`
	`    color: blue;`
	`}`
		`<h2>The Hard Sell</h2>`

Class Attribute	`.large {`
	`    font-size: 16pt;`
	`}`
		`<div class = "large"/>`

Tag & Class	`p.large {`
	`    font-size: 20pt;`
	`}`
		`<p class = "large"/>`

Element ID	`#tr24 {`
	`    font-weight: bold;`
	`}`
		`<tr id = "tr24"/>`

11

Pseudo Selectors

- Add special effects to some selectors without needing JavaScript to generate the effect

- E.g. apply rule when:
  - `hover` : mouse pointer over element
  - `link` & `visited` : link has not been visited or has

```
p:hover {
  background-color: yellow;
}
a:visited {
  color: green;
}
a:link {
  color: blue;
}
```

https://www.tutorialspoint.com/css/css_pseudo_classes.htm
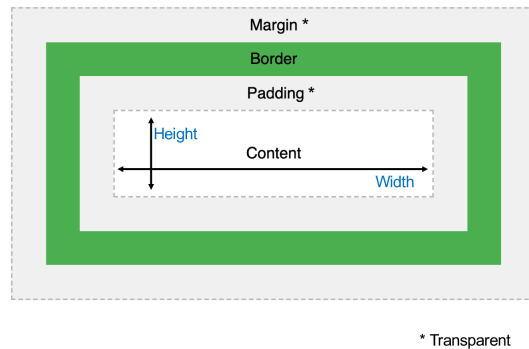
12

CSS Properties

- Text
  - e.g. `p { text-decoration: line-through; }`

- Colour
  - Predefined literals: `red`, `white`, etc.
  - 3 x 8-bit hexadecimal intensities for red, green, blue: `#ff0000`
  - Decimal intensities via function: `rgb(255,255,0)`
  - % intensities via function: `rgb(0%,100%,100%)`
  - e.g. `p:hover { background-color: rgb(255,128,255); }`

- Visibility, Size & Position
  - See later slides

- Plus many more
  - Self-study

13

3

The CSS Box Model

Margin *

Border

Padding *

Height

Content

Width

* Transparent

https://www.w3schools.com/css/css_boxmodel.asp 14

CSS Distance Units

- Absolute

px	pixel ($1/96$ of an inch)
mm	millimeter
cm	centimeter
in	inch
pt	printer point ($1/72$ of an inch)

- Relative

em	2 x element's current font size
rem	3 x root element's current font size

```
div {
    width: 300px;
    border: 15px solid green;
    padding: 50px;
    margin: 20px;
}
```

15

Size Properties

- Element

  `width`, `height`

- Box

```
padding,         margin,          border,
padding-top,     margin-top,      border-top
padding-right,   margin-right,    border-right
padding-bottom,  margin-bottom,   border-bottom
padding-left,    margin-left,     border-left
```

- Border

```
border-color,        border-style
border-top-color,    border-top-style
```
  etc. etc.

- Border shorthand

```
div { border: 5px solid red; }
```
             size   style   color

https://www.w3schools.com/css/css_border_shorthand.asp 16

Position Property

- Default position in document

  `position: static`

- Via `top`, `right`, `bottom`, and left properties:
  - Relative to default position

    `position: relative`
  - Relative to fixed position in the document

    `position: fixed`
  - Relative to nearest positioned ancestor element

    `position: absolute`
  - Relative to position of cursor

    `position: sticky`

- Fixed position (0,0) is top left of document

https://www.w3schools.com/css/css_positioning.asp 17

Visibility Properties

`display: none;`   Element not displayed and takes no space

`visibility: hidden;`   Element hidden but space allocated

`visibility: visible;`   Element is normally displayed

Plus others (self study)

18

Other Common Properties

- Set image for element's background
  `background-image`
- Font settings
  `font, font-family, font-size, font-weight, font-style`
- Text and sub element alignment
  `text-align, vertical-align`
  Values `center, left, right`
- Set the cursor when over element
  `cursor`
- And many, many more
  - Self study

19

Flexbox and Grid Layout

- Items "flex" (stretch) to fill additional space and shrink if space is limited
  - Useful for page layout ☺ but can be a little tricky to get the hang of ☹
- Flexbox - Layout in one dimension (row or column)
- Grid - Layout in two dimensions (rows and columns)

```
.grid-container {
  display: grid;
  grid-template-columns: auto auto auto;
  background-color: #2196F3;
  padding: 10px;
}
.grid-item {
  background-color: rgb(255, 255, 0);
  border: 1px solid rgb(0, 0, 0);
  padding: 20px;
  font-size: 30px;
  text-align: center;
}
```

```
<div class="grid-container">
  <div class="grid-item">1</div>
  <div class="grid-item">2</div>
  <div class="grid-item">3</div>
  <div class="grid-item">4</div>
  <div class="grid-item">5</div>
  <div class="grid-item">6</div>
</div>
```

| 1 | 2 | 3 |
| 4 | 5 | 6 |

https://www.w3schools.com/css/css_grid.asp

20

CSS Peculiarities

- Inheritance
  - Some properties (e.g. font-size) are inherited from parent elements
  - Others (border, background) are not inherited
- Multiple rule matches
  - Most specific rule wins
  - If we have this CSS:
    ```
    .mult { color: red }
    div.mult { color: green }
    div { color: blue }
    ```
  - And this HTML:
    ```
    <div class="mult">Hello World</div>
    ```
  - What gets rendered in the browser?
    Hello World

21

Adding Styles

- Link to separate file (recommended approach)

```
<head>
  <link rel="stylesheet" type="text/css" href="myStyles.css" />
</head>
```

- Page specific styles

```
<head>
<style type="text/css">
  body {
      font-family: Arial, sans-serif;
  }
 </style>
</head>
```

- Element specific styles

```
<div style="padding:2px; ... ">
```

22

CSS Example

```
<h1>Heading One</h1>
<p>
   Paragraph one.
</p>
<div class="shaded">
   <h2>Heading Two</h2>
   <p>
      Paragraph two.
   </p>
</div>


body {
   font-family: Arial, sans-serif;
   font-size: 20px;
}
h1 {
   font-size: 42px;
   border-bottom: 2px solid black
}
.shaded {
   background: rgb(0%,50%,100%);
}
```

Heading One

Paragraph one.

Heading Two

Paragraph two.

Heading One
_____

Paragraph one.

Heading Two

Paragraph two.

23

CSS In Practice

- In realistic projects Style Sheets proliferate and start to exhibit the similar problems to the ones HTML had with style
  - Same style written in many places, even within a single Style Sheet
- One solution is to use a CSS pre-processor
  - Adds variables, macros and functions
  - Allows for scoping with naming conventions
  - Examples: Sass, less, Stylus
    - Self Study: https://raygun.com/blog/css-preprocessors-examples/
- Problems when multiple Style Sheets are included
  - It's often hard to work out where a style is coming from ☹

24

Assignment 1 - Secret Sauce

- 1993 The Internet Underground Music Archive (IUMA)
  - "The birthplace of on-line music" founded by three guys from UCSC

IUMA Home Page

25

6

Assignment 1 - Secret Sauce

- 1994 Pizza Hut takes first on-line pizza order in Santa Cruz
  - The Santa Cruz Operation provided the technology

Next Lecture

- Friday: Resource Locators, Links, Assignment 2
- Monday: Introduction to JavaScript

Tasks

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