

CPET 499/ITC 250 Web Systems

Chapter 3

Introduction to Cascading Style Sheet (CSS)

Text Book:

* Fundamentals of Web Development, 2015, by Randy Connolly and Ricardo Hoar, published by Pearson

*E-Book on Building Web Applications with HTML, 2012, by Paul I. Lin,
http://www.etcs.ipfw.edu/~lin/CECourses/2_HTML/CE_02WebHhtmlindex.html

* Cascading Style Sheet: An Introduction,
http://www.etcs.ipfw.edu/~lin/CECourses/2_HTML/Lectures/8CCStyle.html

Paul I-Hai Lin, Professor
<http://www.etcs.ipfw.edu/~lin>

Topics

- What is CSS?
- CSS Syntax
- Location of Styles
- Selectors
- The Cascade: How Styles Interact
- The Box Model
- CSS Text Styling
- Summary

What is CSS?

- Cascading style sheets (CSS) specification, developed by World Wide Web Consortium (W3C), provides a simple approach for separating the style (font, size, background, layout and position, etc) of document from the content.
- Predefined style sheets can be used throughout a page or Web site.
 - Allowing multiple style sheets to affect one document
 - It is possible that conflicts can come up and the style referenced last generally takes precedence
- What is CSS, <http://www.w3.org/Style/CSS/Overview.en.html>

What is CSS?

HTML & CSS,

<http://www.w3.org/standards/webdesign/htmlcss:>

- HTML (the Hypertext Markup Language) and CSS (Cascading Style Sheets) are two of the core technologies for building Web pages. HTML provides the *structure* of the page, CSS the (visual and aural) *layout*, for a variety of devices. Along with graphics and scripting, HTML and CSS are the basis of building Web pages and Web Applications.

What is CSS?

HTML & CSS,

<http://www.w3.org/standards/webdesign/htmlcss:>

- CSS is the language for describing the presentation of Web pages, including colors, layout, and fonts. It allows one to adapt the presentation to different types of devices, such as large screens, small screens, or printers. CSS is independent of HTML and can be used with any XML-based markup language. The separation of HTML from CSS makes it easier to maintain sites, share style sheets across pages, and tailor pages to different environments. This is referred to as the *separation of structure (or: content) from presentation*.

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What is CSS?

The web standards model – HTML, CSS, and

JavaScript, [http://www.w3.org/wiki/The_web_standards_model -](http://www.w3.org/wiki/The_web_standards_model_-_HTML_CSS_and_JavaScript)

[_HTML_CSS_and_JavaScript](http://www.w3.org/wiki/The_web_standards_model_-_HTML_CSS_and_JavaScript) : Most compelling reasons for using CSS and HTML

- Efficient of code
- Ease of maintenance
- Accessibility
- Device compatibility
- Web crawlers/search engine

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What is CSS?

CSS Current Status,

http://www.w3.org/standards/techs/css#w3c_all

- Standards
 - CSS 2.1, June 2011, <http://www.w3.org/TR/CSS2/>
 - CSS Selectors
 - CSS Namespaces
 - CSS Media Queries
 - CSS Color
- Drafts: Candidate Recommendations
 - Intro to CSS 3, May 2001, <http://www.w3.org/TR/2001/WD-css3-roadmap-20010523/>
- Other Working Drafts
- CSS Validation Service, <http://www.css-validator.org/>

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Three Types of Style Sheets

- Author Created Style Sheet
- User-defined Sheet
- Default Browser Style Sheet

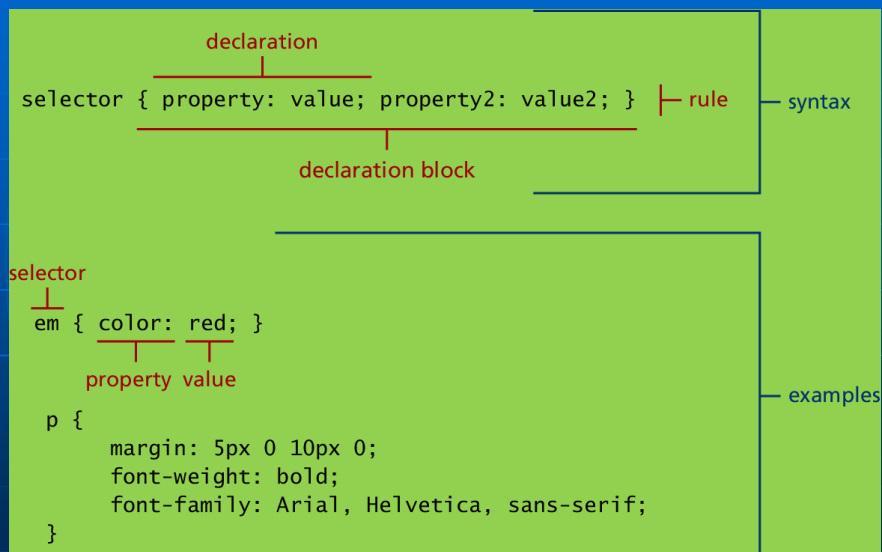
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CSS Syntax

- A CSS document consists of one or more **style rules**.
- A rule consists of a **selector** that identifies the HTML element or elements that will be affected, followed by a series of **property:value pairs** (each pair is also called a declaration).
- CSS Selectors, <http://www.w3.org/TR/CSS21/selector.html%23id-selectors>

Figure 2.2 CSS Syntax



Location of CSS Style Sheet

- Inline Styles (Listing3.1.html)
- Embedded Style Sheet (Listing3.2.html)
- External Style Sheet (Listing3.3.html)

In-Line Style Sheet

- A style applied to a particular tag on a Web page
- For formatting individual elements
- Inline Styles (Listing3.1.html)

```
<h1>Share Your Travels</h1>  
<h2 style="font-size:  
24pt">Description</h2>  
...  
<h2 style="font-size: 24pt; font-  
weight: bold;">Reviews</h2>
```

In-Line Style Sheet Example

- **Inliness.html,**

http://www.etcslipfw.edu/~lin/CECourses/2_HTML/08CCSEs/inliness.html

```
<html>
<!-- inliness.html -->
<head><title>Inline Styles Example</title></head>
<body>
<!-- Declare inline Styles -->
<span style="font-weight: bold">
Web Programming Language: HTML.
</span><br>
<p style = "font-size: 20pt">Web Programming Language: HTML.</p>
<p style = "font-size: 20pt; color: #FF0000">
Web Programming Language: JavaScript
</p>
<p>Web Programming Language: Perl.</p>
</body>
</html>
```

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Embedded Style Sheet

- Embedded as part of the HTML document
- Defined with <style> declaration block
- Can be kept in a file outside the document
- An Example

<style>

```
h1    {font-size: 24pt; font-weight: bold; color: red}
h2    {font-size: 16pt; font-style: italic; color: green}
span  {font-weight: bold; font-style: italic}
```

</style>

- After the declaration, we will be able to use <h1> </h1>, <h2> </h2>, and as new style definitions

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Embedded Style Sheet: Listing3.2.html

```
<head lang="en">
  <meta charset="utf-8">
  <title>Share Your Travels --
New York - Central Park</title>
  <style>
    h1 { font-size: 24pt; }
    h2 {
      font-size: 18 pt;
      font-weight: bold;
    }
  </style>
</head>
<body>
  <h1>Share Your Travels</h1>
  <h2>New York - Central
Park</h2>
  ...
```

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External CSS Style Sheet

- Used for control styles across several pages or across an entire Web site
- Require a style definition file that contains style definitions such as the three lines as shown below and save it as "style.css". Note that the <style> </style> tags are not included in the "**style.css**"

```
h1    {font-size: 24pt; font-weight: bold; color: red}
h2    {font-size: 16pt; font-style: italic; color: green}
span  {font-weight: bold; font-style: italic}
```

External CSS Style Sheet

- Then, we place the following line within <head> tags to refer to this file.
- Link element, href – hypertext reference, rel - relationship

```
<head>
```

```
<title> TEST LINKED STYLE SHEETS </title>
```

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

```
</head>
```

- An Example,
http://www.etcs.ipfw.edu/~lin/CECourses/2_HTML/08CCSExs/linkcss.html

An Example,

http://www.etcs.ipfw.edu/~lin/CECourses/2_HTML/08CCSExs/linkcss.html

```
<html>
```

```
<!-- linkcss.html -->
```

```
<head>
```

```
<title>Link Style Sheets</title>
```

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

```
</head>
```

```
<body>
```

```
<span>Web Programming Applications.</span>
```

```
<h1>Web Programming Applications.</h1>
```

```
<h2>Web Programming Applications.</h2>
```

```
<h2 STYLE="font-size: 36pt">Web Programming Applications.</h2>
```

```
</body>
```

```
</html>
```

External Style Sheet

- External Style Sheet (Listing3.3.html)

```
<head lang="en">
  <meta charset="utf-8">
  <title>Share Your Travels -- New York -
Central Park</title>
  <link rel="stylesheet" href="styles.css" />
</head>
```

CSS Selectors

- For select individual or multiple HTML documents
- Selector Types
 - Element Selectors
 - Class Selectors
 - ID Selectors
 - Attribute Selectors
 - Pseudo-Element and Pseudo-Class Selectors
 - Contextual Selectors

References

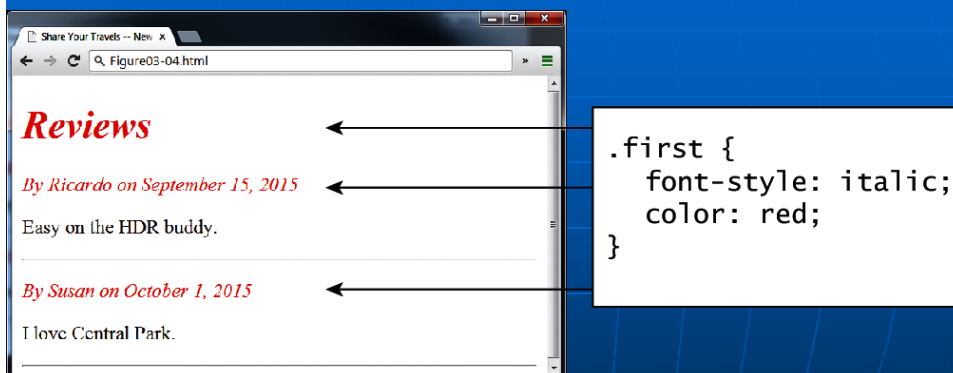
- Class Selectors, https://developer.mozilla.org/en-US/docs/Web/CSS/Class_selectors
- 5 Selectors, <http://www.w3.org/TR/CSS21/selector.html%23id-selectors>

Listing3.4.css – Sample grouped selector

```
/* commas allow you to group selectors */
p, div, aside {
    margin: 0;
    padding: 0;
}
/* the above single grouped selector is
equivalent to the following: */
p {
    margin: 0;
    padding: 0;
}

div {
    margin: 0;
    padding: 0;
}
aside {
    margin: 0;
    padding: 0;
}
```

Figure 3.4 Class selector example in browser (Listing3.5.html)



Listing3.5.html: Class selector example

```
<head>
  <title>Share Your Travels </title>
  <style>
    .first {
      font-style: italic;
      color: red;
    }
  </style>
</head>
<body>
  <h1 class="first">Reviews</h1>
  <div>
    <p class="first">By Ricardo on <time>September 15, 2012</time></p>
    <p>Easy on the HDR buddy.</p>
  </div>
  <hr/>
  <div>
    <p class="first">By Susan on <time>October 1, 2012</time></p>
    <p>I love Central Park.</p>
  </div>
  <hr/>
</body>
```

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Figure 3.5 Id selector example in browser



```
#latestComment {
  font-style: italic;
  color: red;
}
```

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```

Park</title>
<style>
    #latestComment {
        font-style: italic;
        color: red;
    }
</style>
</head>
<body>
    <h1>Reviews</h1>
    <div id="latestComment">
        <p>By Ricardo on <time>September 15, 2012</time></p>
        <p>Easy on the HDR buddy.</p>
    </div>
    <hr/>

    <div>
        <p>By Susan on <time>October 1, 2012</time></p>
        <p>I love Central Park.</p>
    </div>
    <hr/>
</body>

```

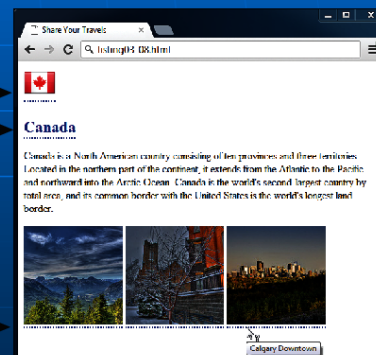
Listing3.6.html: ID selector example

Figure 3.6 Attribute selector example in browser

```

[title] {
    cursor: help;
    padding-bottom: 3px;
    border-bottom: 2px dotted blue;
    text-decoration: none;
}

```



Listing3.7.html: Attribute selector example

```
<head lang="en">
  <meta charset="utf-8">
  <title>Share Your Travels</title>
  <style>
    [title] {
      cursor: help;
      padding-bottom: 3px;
      border-bottom: 2px dotted blue;
      text-decoration: none;
    }
  </style>
</head>
```

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Listing3.7.html: Attribute selector example

```
<body>
  <div>
    
    <h2><a href="countries.php?id=CA" title="see posts
from Canada">
      Canada</a>
    </h2>
    <p>Canada is a North American country consisting of ... </p>
    <div>
      
      
      
    </div>
  </div>
</body>
```

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```

<head>
  <title>Share Your Travels</title>
  <style>
    a:link {
      text-decoration: underline;
      color: blue;
    }
    a:visited {
      text-decoration: underline;
      color: purple;
    }
    a:hover {
      text-decoration: none;
      font-weight: bold;
    }
    a:active {
      background-color: yellow;
    }
  </style> </head>

```

Listing3.8.html: Styling a link using pseudo-class selector

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Listing3.8.html: Styling a link using pseudo-class selector

```

<body>
  <p>Links are an important part of any web page. To learn more
  about links visit the <a href="#">W3C</a> website.</p>
  <nav>
    <ul>
      <li><a href="#">Canada</a></li>
      <li><a href="#">Germany</a></li>
      <li><a href="#">United States</a></li>
    </ul>
  </nav>
</body>

```

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Figure 3.7 Syntax of a descendent selection

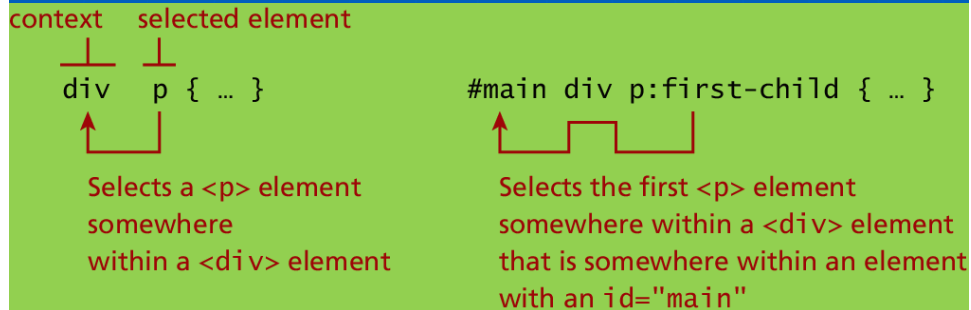
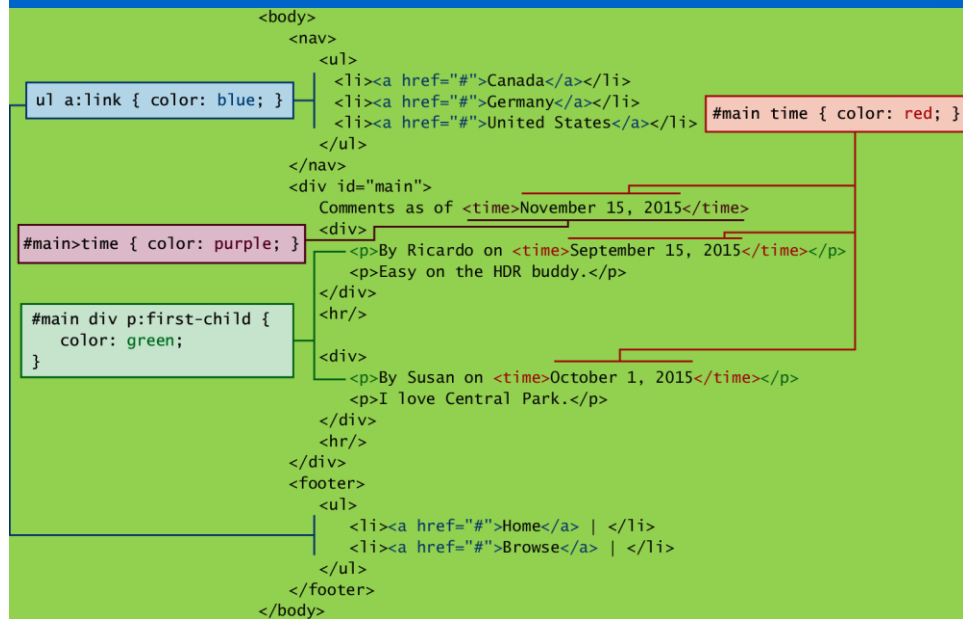


Figure 3.8 Contextual selectors in action



The Cascade: How Styles Interacts

■ Three Types of Style Sheets

- Author Created Style Sheet
- User-defined Sheet
- Default Browser Style Sheet

■ Cascade principles for conflict resolution

- Inheritance
- Specificity
- Location
 - Inline style override: embedded and external style sheets
 - Embedded style sheet override external style sheet

Figure 3.9 Inheritance

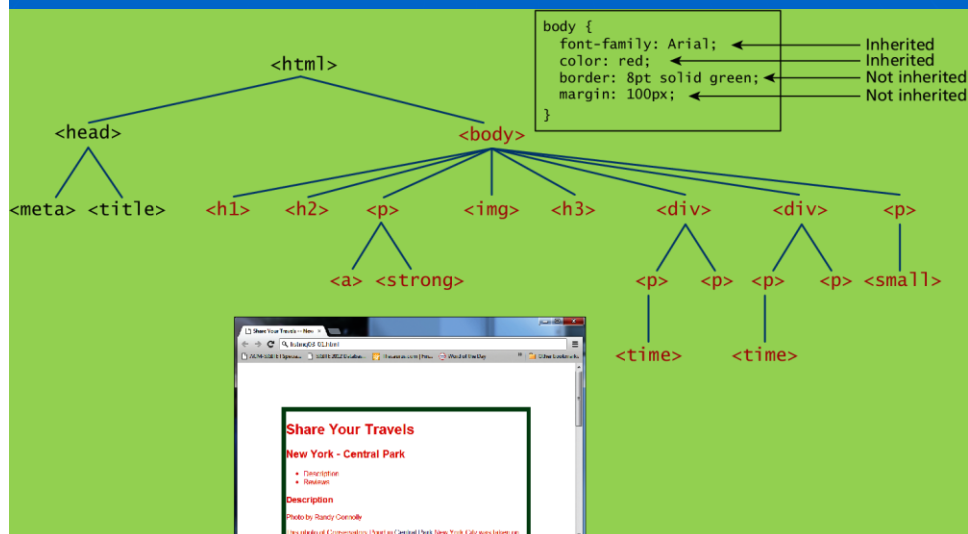
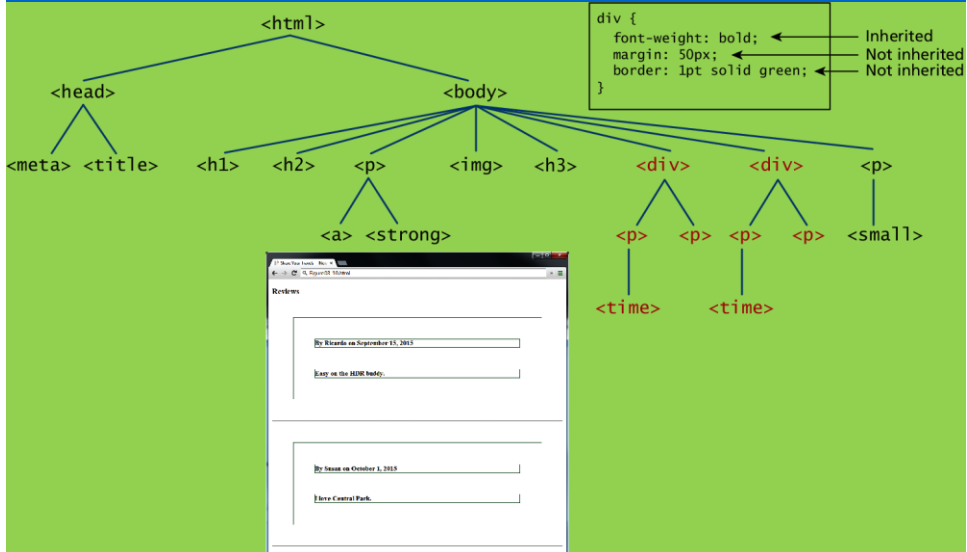


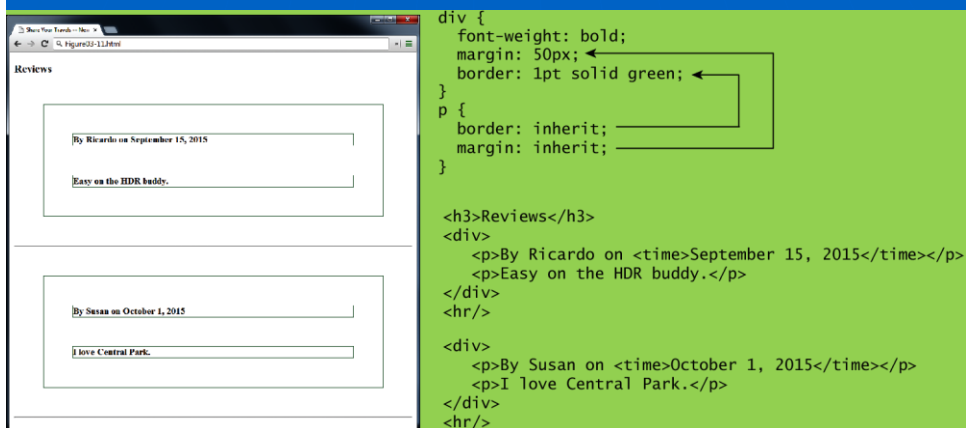
Figure 3.10 More Inheritance



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Figure 3.11 Using the inheritance value



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Fig 3.12

```

body {
  font-weight: bold;
  color: red;
}

div {
  font-weight: normal;
  color: magenta;
}

p {
  color: green;
}

.last {
  color: blue;
}

#verylast {
  color: orange;
  font-size: 16pt;
}

```

```

<body>
  This text is not within a p element.
  <p>Reviews</p>
  <div>
    <p>By Ricardo on <time>September 15, 2015</time></p>
    <p>Easy on the HDR buddy.</p>
  </div>
  <hr/>
  <div>
    <p>By Susan on <time>October 1, 2015</time></p>
    <p>I love Central Park.</p>
  </div>
  <hr/>
  <div>
    <p class="last">By Dave on <time>October 15, 2015</time></p>
    <p class="last" id="verylast">Thanks for posting.</p>
  </div>
</body>

```

Fig 3.13 Specify Algorithm

element selector	{ color: green; }	Specificity Value	0001
	1 overrides		
descendant selector (elements only)	<div color:="" div="" form="" orange;="" {="" }<=""></div>		0002
	2 overrides		
class and attribute selectors	{ color: blue; } a[href\$=".pdf"] { color: blue; }		0010
	3 overrides		
id selector	#firstExample { color: magenta; }		0100
	4 overrides		
id + additional selectors	#firstExample { color: grey; }		0101
	5 overrides		
inline style attribute			1000

A higher specificity value overrides lower specificity values.

Fig 3.14 Location

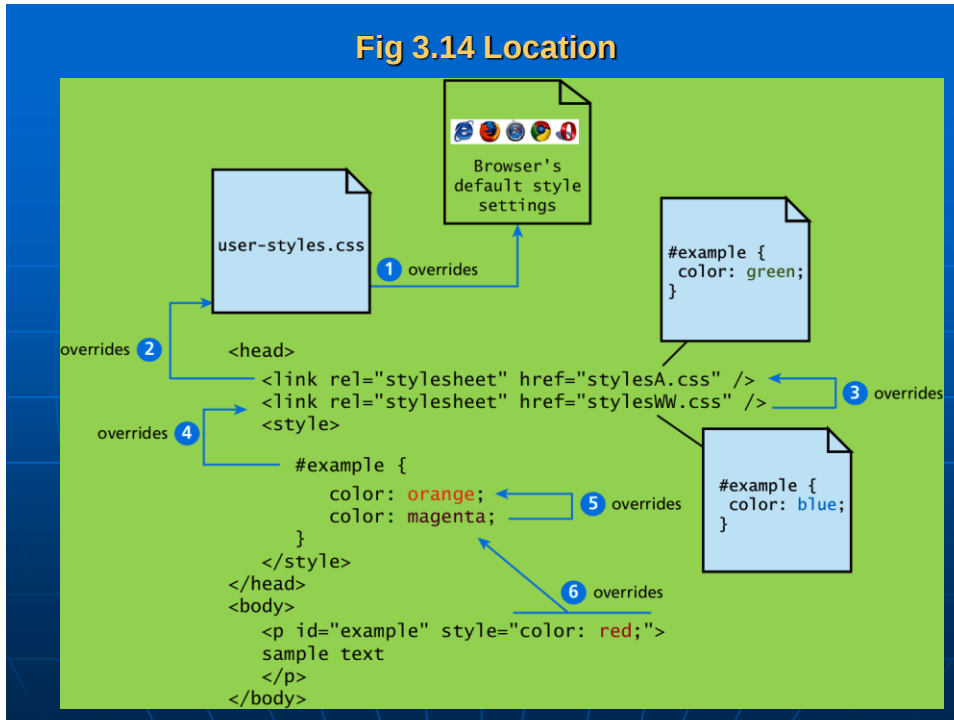


Fig 3.15 CSS Box Model

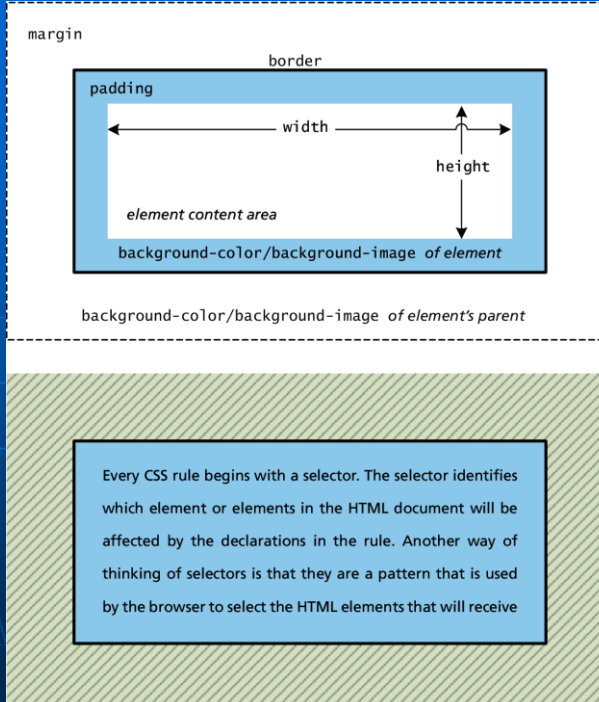
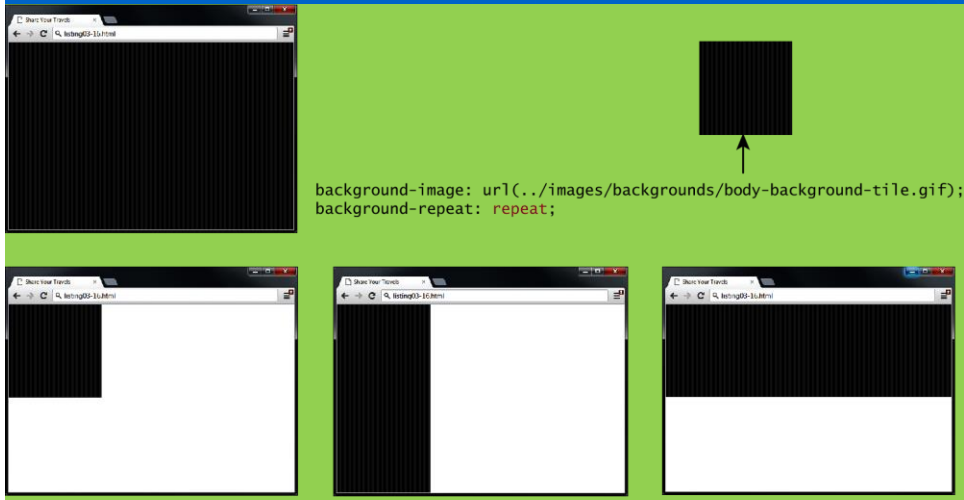


Fig 3.16 Background repeat



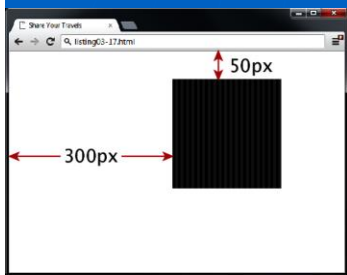
background-image: url(../images/backgrounds/body-background-tile.gif);
background-repeat: repeat;

background-repeat: no-repeat; background-repeat: repeat-y; background-repeat: repeat-x;

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Fig 3.17 Background position



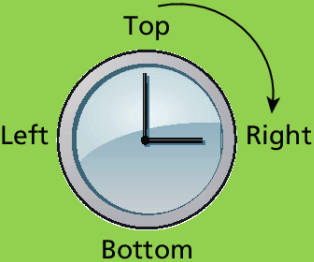
body {
 background: white url(../images/backgrounds/body-background-tile.gif) no-repeat;
 background-position: 300px 50px;
}

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Fig 3.18 CSS TRBL (Trouble) shortcut

TRBL (Trouble)



Top

Left

Right

Bottom

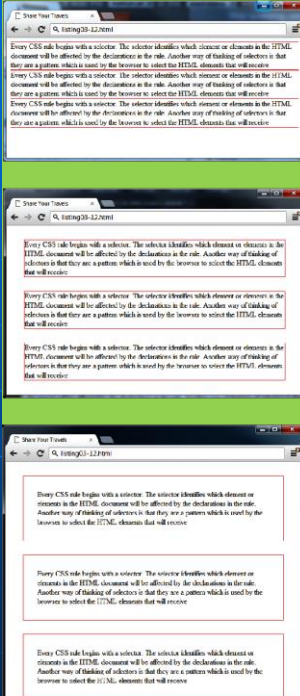
```
border-color: top right bottom left;
```

```
border-color: red green orange blue;
```

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Fig 3.19 Borders, margins, and padding provide element spacing and differentiation



```
p {
  border: solid 1pt red;
  margin: 0;
  padding: 0;
}
```

```
p {
  border: solid 1pt red;
  margin: 30px;
  padding: 0;
}
```

```
p {
  border: solid 1pt red;
  margin: 30px;
  padding: 30px;
}
```

4

Fig 3.20 Collapsing vertical margins

```

<div>
  <p>Every CSS rule ...</p>
  <p>Every CSS rule ...</p>
</div>
<div>
  <p>In CSS, the adjoining ... </p>
  <p>In CSS, the adjoining ... </p>
</div>

div {
  border: dotted 1pt green;
  padding: 0;
  margin: 90px 20px;
}

p {
  border: solid 1pt red;
  padding: 0;
  margin: 50px 20px;
}

```

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Fig 3.21
Calculating an
element true
size

```

div {
  box-sizing: content-box;
  width: 200px;
  height: 100px;
  padding: 5px;
  margin: 10px;
  border: solid 2pt black;
}

```

True element width = $10 + 2 + 5 + 200 + 5 + 2 + 10 = 234$ px

True element height = $10 + 2 + 5 + 100 + 5 + 2 + 10 = 134$ px

```

div {
  ...
  box-sizing: border-box;
}

```

True element width = $10 + 200 + 10 = 220$ px

True element height = $10 + 100 + 10 = 120$ px

Fig 3.22 Limitations of height property

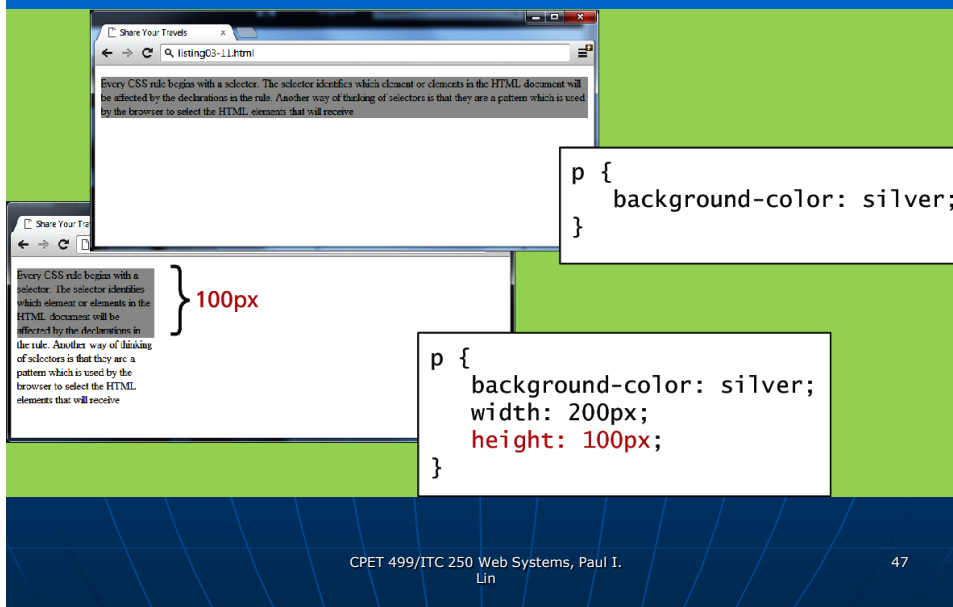


Fig 3.23 Overflow properties



Fig 3.24 Box sizing via percents

The diagram illustrates three methods of box sizing using percentages:

- pixels:** A box with a width of 200px and a height of 50px. The CSS rule is:


```

      .pixels {
        width:200px;
        height:50px;
        background: teal;
      }
      
```
- parentFixed:** A box with a width of 400px and a height of 150px. Inside it is a box with a width of 50% and a height of 50%. The CSS rule is:


```

      .parentFixed {
        width:400px;
        height:150px;
        background: beige;
      }
      .parentRelative {
        width:50%;
        height:50%;
        background: yellow;
      }
      
```
- parentRelative:** A box with a width of 400px and a height of 150px. Inside it is a box with a width of 50% and a height of 50%. The CSS rule is:


```

      .parentRelative {
        width:50%;
        height:50%;
        background: yellow;
      }
      
```

The diagram also shows the resulting visual representation of these boxes, with dimensions and percentages indicated.

Fig 3.25 Inspecting CSS using developer tools within modern browsers

The figure shows three screenshots of developer tools in different browsers:

- Chrome – Inspect Element:** A screenshot of the Chrome DevTools 'Inspect' panel. It shows the 'Elements' pane on the left, the 'Styles' pane in the middle, and the 'Computed' pane on the right. The 'Styles' pane shows the default styles for the selected element.
- Firefox – Inspect:** A screenshot of the Firefox DevTools 'Inspect' panel. It shows the 'Elements' pane on the left, the 'Styles' pane in the middle, and the 'Computed' pane on the right. The 'Styles' pane shows the default styles for the selected element.
- Internet Explorer – Developer Tools:** A screenshot of the Internet Explorer Developer Tools 'Inspect' panel. It shows the 'Elements' pane on the left, the 'Styles' pane in the middle, and the 'Computed' pane on the right. The 'Styles' pane shows the default styles for the selected element.

Fig 3.26 Specifying the font family

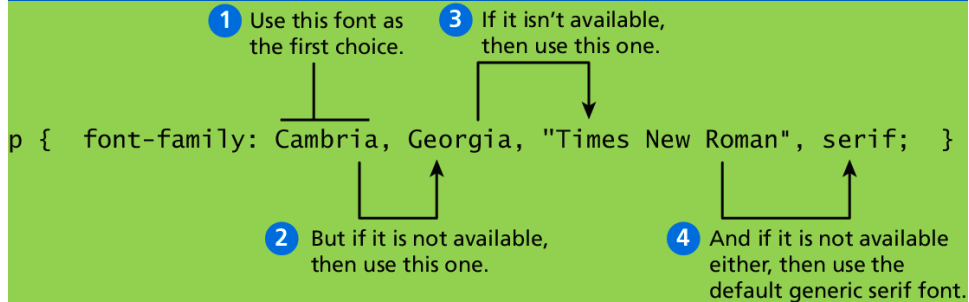


Fig 3.27 The different font families

<body>	Browser's default text size is usually 16 pixels
<p>	100% or 1em is 16 pixels
<h3>	125% or 1.125em is 18 pixels
<h2>	150% or 1.5em is 24 pixels
<h1>	200% or 2em is 32 pixels

/* using 16px scale */	
body { font-size: 100%; }	
p { font-size: 1em; }	/* 1.0 x 16 = 16 */
h3 { font-size: 1.125em; }	/* 1.25 x 16 = 18 */
h2 { font-size: 1.5em; }	/* 1.5 x 16 = 24 */
h1 { font-size: 2em; }	/* 2 x 16 = 32 */

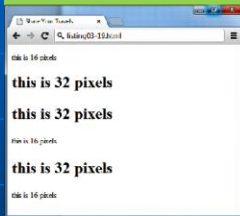
<body>	Browser's default text size is usually 16 pixels
<p>	100% or 1em is 16 pixels</p>
<h3>	125% or 1.125em is 18 pixels</h3>
<h2>	150% or 1.5em is 24 pixels</h2>
<h1>	200% or 2em is 32 pixels</h1>
</body>	

```

<body>
  <p>this is 16 pixels</p>
  <h1>this is 32 pixels</h1>
  <article>
    <h1>this is 32 pixels</h1>
    <p>this is 16 pixels</p>
    <div>
      <h1>this is 32 pixels</h1>
      <p>this is 16 pixels</p>
    </div>
  </article>
</body>

```

Fig 3.27 The different font families



/ using 16px scale */*

```

body { font-size: 100%; }
p { font-size: 1em; } /* 1 x 16 = 16px */
h1 { font-size: 2em; } /* 2 x 16 = 32px */

```



/ using 16px scale */*

```

body { font-size: 100%; }
p { font-size: 1em; }
h1 { font-size: 2em; }

article { font-size: 75%; } /* h1 = 2 * 16 * 0.75 = 24px
                             p = 1 * 16 * 0.75 = 12px */
div { font-size: 75%; } /* h1 = 2 * 16 * 0.75 * 0.75 = 18px

```

Figure 3.28 Using rem unit



/ using 16px scale */*

```

body { font-size: 100%; }
p {
  font-size: 16px; /* for older browsers: won't scale properly though */
  font-size: 1rem; /* for new browsers: scales and simple too */
}
h1 { font-size: 2em; }

article { font-size: 75%; } /* h1 = 2 * 16 * 0.75 = 24px
                             p = 1 * 16 = 16px */
div { font-size: 75%; } /* h1 = 2 * 16 * 0.75 * 0.75 = 18px

```

Summary and Conclusion

Q/A ?