



LECTURE 3

# CASCADING STYLE SHEET (CSS)

# Welcome to My Homepage

Use the menu to select different Stylesheets

- [Stylesheet 1](#)
- [Stylesheet 2](#)
- [Stylesheet 3](#)
- [Stylesheet 4](#)
- [No Stylesheet](#)

## Same Page Different Stylesheets

This is a demonstration of how different stylesheets can change the layout of your HTML page. You can change the layout of this page by selecting different stylesheets in the menu, or by selecting one of the following links: [Stylesheet1](#), [Stylesheet2](#), [Stylesheet3](#), [Stylesheet4](#).

### No Styles

This page uses DIV elements to group different sections of the HTML page. Click here to see how the page looks like with no stylesheet: [No Stylesheet](#).

#### Side-Bar

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Stylesheet 1

Stylesheet 2

Stylesheet 3

Stylesheet 4

No Stylesheet

# INTRODUCTION

- HTML is primarily concerned with content, rather than style
  - However, tags have presentation properties, for which browsers have default values. (e.g:<i>)
- Cascading Style Sheets or **CSS** are a series of instructions that specify how markup elements should appear on a Web page.
- The CSS1 cascading style sheet specification was developed in 1996; followed by CSS2 in 1998. CSS3 is currently under development since 2005.
- CSS has become the W3C standard for controlling visual presentation of web pages

# WHAT DOES CSS DO?

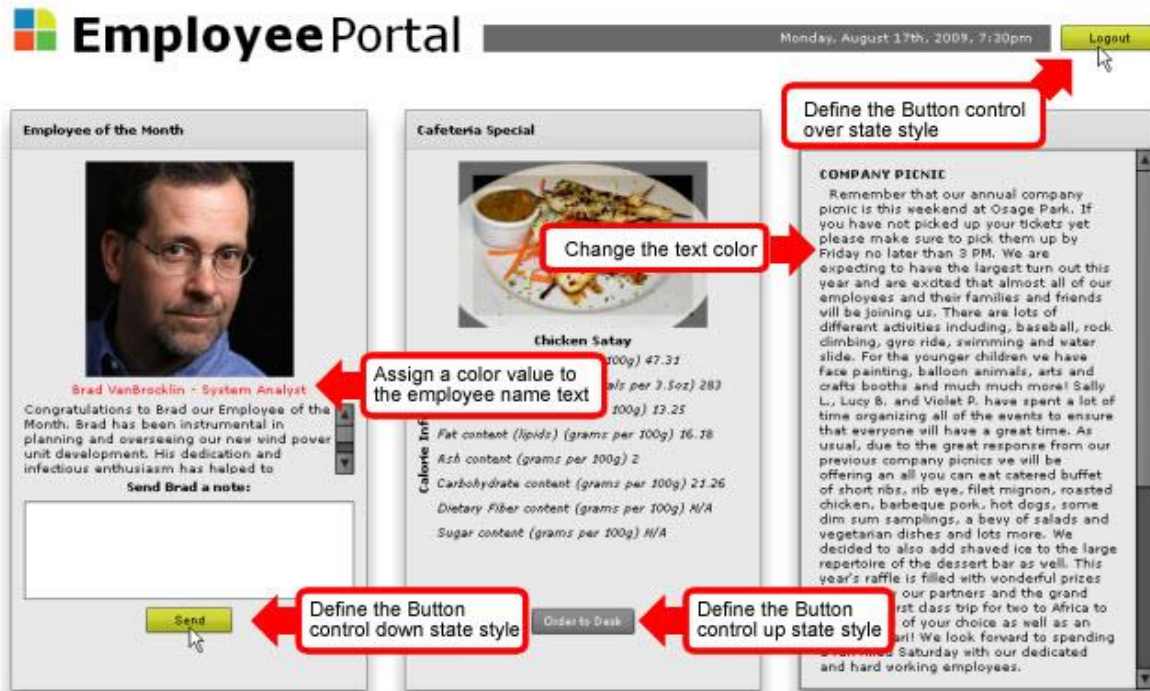
- Provide the means to control and change presentation of HTML documents
- Not technically HTML, but can be embedded in HTML documents
- One of the most important capabilities of style sheets is that they allow you to impose a standard style on a whole document or even a whole collection of documents
- Style is specified for a tag by the values of its properties
- External style sheets can be validated

<http://jigsaw.w3.org/css-validator/validator-upload.html>

# STYLING WITH CSS

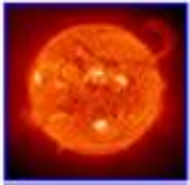
- Text formatting
- Element sizing
- Element positioning
- Change link attributes
- Cursor manipulation
- And more at

[csszengarden.com](http://csszengarden.com)





## Our Solar System



Sol



Mercury



Venus



Earth



- Original Page

- Styling with CSS

## Our Solar System



Sol



Mercury



Venus



Earth



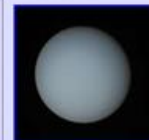
Mars



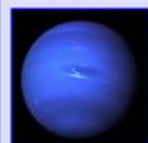
Jupiter



Saturn



Uranus



Neptune



Pluto and Charon

Images courtesy of:  
Sol: ESA/NASA/SOHO; Mercury: NASA/Johns Hopkins University Applied Physics Laboratory/Carnegie Institution of Washington; Venus: NASA/JPL; Earth: NASA, The Visible Earth; Mars: NASA/JPL/MSSS; Jupiter: NASA/JPL/Space Science Institute; Saturn: NASA/JPL/Space Science Institute; Uranus: NASA/JPL; Neptune: NASA/JPL; Pluto: Dr. R. Albrecht, ESA/ESO Space Telescope European Coordinating Facility, NASA;

## Harvard Summer School 2009

- [Login](#)
- [Calendar](#)
- [Forms](#)
- [Search](#)
- [About](#)
- [Courses](#)
- [Programs](#)
- [Registration](#)
- [Campus Life & Housing](#)
- [Exams, Grades, & Policies](#)
- [Help](#)

June 22–August 7 2009



### This summer, Harvard

Earn academic credit, satisfy your intellectual curiosity, and become a part

[Learn more »](#)

#### News & Noteworthy



#### Activities calendar

- Two Summer faculty members receive [Harvard honors](#)
- Harvard monitoring [H1N1 influenza](#) "swine flu" situation

[More news >](#)

#### Quick Links

- [Transcript request and forms](#)
- [Housing](#)
- [Map and directions](#)
- [Disability services](#)

Have a question? We have answers. Go ahead. 

#### Find information for

- [Harvard students](#)
- [Visiting students](#)
- [International students](#)
- [High school students](#)
- [English language students](#)

[Your Harvard Summer: picture yourself here >>](#)

- [Harvard University](#)
- [Trademarks](#)
- [Related Sites](#)
- [Privacy](#)
- [Contact Us](#)

## • Original Page

## • Styling with CSS

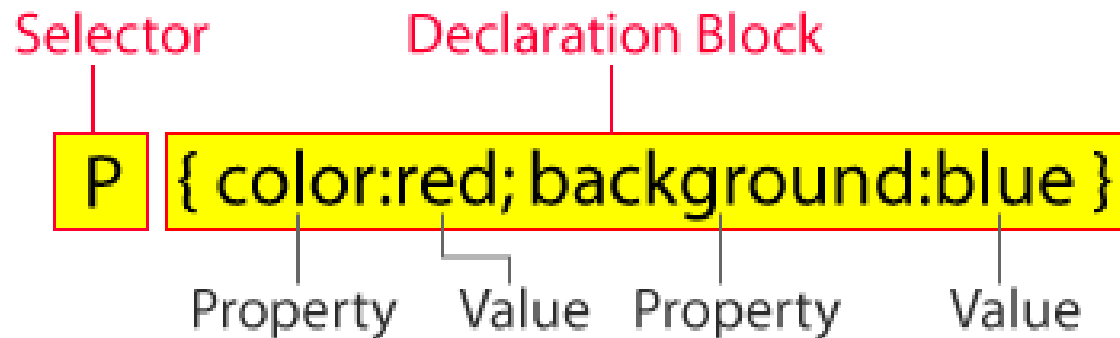
The screenshot shows the Harvard Summer School 2009 website. The header features the Harvard crest and the title "HARVARD SUMMER SCHOOL 2009". Navigation links include "login", "calendar", "forms", and "search". A main menu lists "ABOUT", "COURSES", "PROGRAMS", "REGISTRATION", "CAMPUS LIFE & HOUSING", "EXAMS, GRADES, & POLICIES", and "HELP". The date "June 22–August 7 2009" is prominently displayed. The main content area includes a large image of students in a classroom, the heading "This summer, Harvard", and the text "Earn academic credit, satisfy your intellectual curiosity, and become a part of Harvard's vibrant community." Below this is a "Learn more >" link. The "News & Noteworthy" section highlights two items: "Two Summer faculty members receive Harvard honors" and "Harvard monitoring H1N1 influenza 'swine flu' situation". The "Quick Links" section lists "Transcript request and forms", "Housing", "Map and directions", and "Disability services". A "Find information for" section lists links for "Harvard students", "Visiting students", "International students", "High school students", and "English language students". A "Your Harvard Summer: picture yourself here >>" link is also present. The footer includes "Copyright © 2009 President and Fellows of Harvard College" and a "Have a question? We have answers. Go ahead." link. Various elements are circled in green and purple to illustrate CSS styling, such as the navigation links, the main menu, the date, the main heading, the news items, the quick links, and the footer.





# ANATOMY OF CSS

- The style comes from rule/**rules** resides in a place separate from the actual element formatting.
- A CSS formatting rule consists of two parts—the **selector** and the **declaration**
- Rule example



# ANALOGY

- CSS consists of a location (like bedroom),
- a **property** in that location (like drapes, or carpet), and a **style** to apply to that property (like the color blue, or 1 inch tiles



# APPLYING STYLES

Ways to bind CSS rules to XHTML/HTML markup:

- Tag

h1{....}

affects

<h1>This heading</h1>

- Class

someclass{....}

affects

<p class="someclass">This paragraph</p>

ID

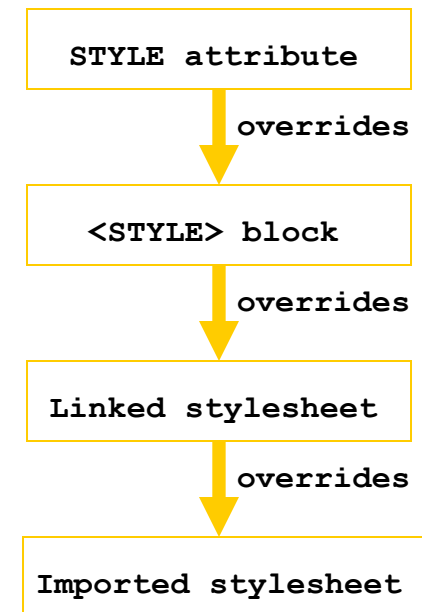
#someid{....}

affects

<div id="someid">This content block</div>

# LEVELS OF STYLE SHEETS

- CSS rules can reside in the following locations:
  - **Inline** - specified for a specific occurrence of a tag and apply only to that tag
  - **Document-level /Embedded style sheets** - apply to the whole document in which they appear
  - **External style sheets** - can be applied to any number of documents
- When more than one style sheet applies to a specific tag in a document, the lowest level style sheet has precedence
  - In a sense, the browser searches for a style property spec, starting with inline, until it finds one (or there isn't one)
- Browsers can ignore style sheets or use their own default values for properties





# INLINE STYLE SHEETS

- **Inline style sheets** appear in the tag itself
  - Style sheet appears as the value of the style attribute
  - General form:
 

```
<element style="style"> content <element>
style = "property_1: value_1;
        property_2: value_2;
        ...
        property_n: value_n"
```
  - Scope of an inline style sheet is the content of the tag
  - Examples
 

```
<body>
<h3 style="font-family: Arial;"></h3>
<p style="color: sienna; margin-left:20px">
This is a paragraph </p>
</body>
```

# EMBEDDED STYLE SHEETS

- Document-level/Embedded style sheets appear in the head of the document.
  - Style sheet appears as a list of rules that are the content of a <style> tag
  - The <style> tag must include the **type** attribute, set to **"text/css"**
  - The list of rules must be placed in an HTML comment, because it is not HTML
  - Comments in the rule list must have a different form - use C comments (**/\*...\*/**)
  - General form:
 

```
<style type = "text/css">  
<!--  
           rule list  
-->  
</style>
```
  - Form of the rules: **selector {list of property/values}**
  - The selector is a tag name or a list of tag names, separated by commas
  - Examples:  
h1, h3, p
  - Each property/value pair has the form: **property: value**
  - Pairs are separated by semicolons, just as in the value of a <style> tag

# EMBEDDED STYLE SHEETS

- Document-level/Embedded style sheets example

```
<html>
<head><style type="text/css">
    h1 {color: purple;}
    p {font-size: 10pt; color: gray;}
</style>
</head>

<body>
    <h1> Welcome </h1>
    <p> This is our site </p>
</body>
</html>
```

# EXTERNAL STYLE SHEETS

- External style sheets are in separate files, potentially on any server on the Internet
  - Written as text files with the MIME type text/css
  - A <link> tag is placed in the head and used to specify that the browser is to fetch and use an external style sheet file

```
<link rel = stylesheet type = "text/css" href = "style1.css"> </link>
<link rel = stylesheet type = "text/css" href =
"http://www.htmlfun/style2.css"> </link>
```
  - Or use Import rule

```
<style type="text/css">
@import url("style1.css");
@import url "style2.css";
</style>
```
- Collections of CSS rules stored in a separate, external CSS (.css) file (not an HTML file). This file is linked to one or more pages in a website using a link or an @import rule in the head section of a document.



# EXTERNAL STYLE SHEETS

## Example

### STYLEFILE.CSS

```
body {color: #000000;
      background: #F1F2EC;
      font-size: 8pt;
      font-family: Verdana,
      Helvetica, Sans Serif;}
h1 { color: #0D10E5;
     font-size: 12pt;}
h2 { color: #040677;
     font-size: 10pt;}
p   { margin-bottom: 16px;}
```

### DISPLAYFILE.HTML

```
<html >
  <head>
    <link href="stylefile.css"
    rel="stylesheet" />
  </head>
  <body>
    <h1>Heading 1 Text</h1>
    <p>A normal paragraph</p>
    <h2>Heading 2 Text</h2>
    <p>Another normal paragraph</p>
    <p>This paragraph will be a
    tip.</p>
  </body>
</html>
```

## Output

### Heading 1 Text

A normal paragraph

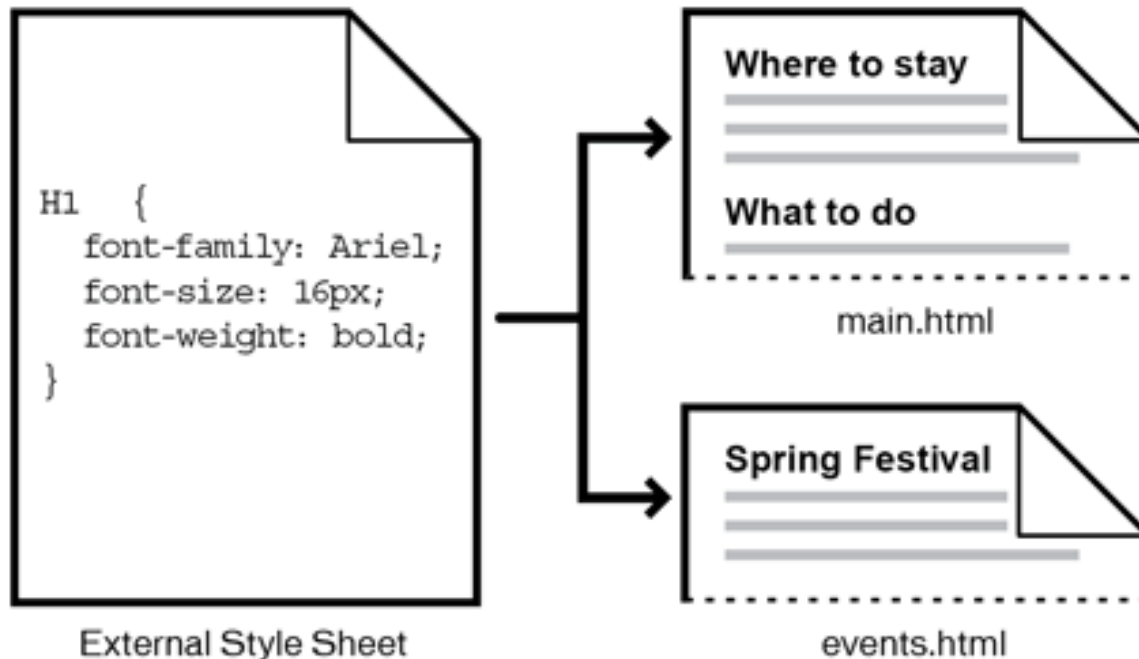
### Heading 2 Text

Another normal paragraph

This paragraph will be a tip.

# EXTERNAL STYLE SHEETS

- Using this method, any page that links to the .css file will use the defined styles. This method is preferred because it allows you to style multiple pages at once.



# CSS SELECTORS

- CSS selectors are used to "find" (or select) the HTML elements you want to style.
- We can divide CSS selectors into five categories:
  - Simple selectors (select elements based on name, id, class)
  - Combinator selectors (select elements based on a specific relationship between them)
  - Pseudo-class selectors (select elements based on a certain state)
  - Pseudo-elements selectors (select and style a part of an element)
  - Attribute selectors (select elements based on an attribute or attribute value)

# ID ATTRIBUTE

- Use an id to distinguish something, like a paragraph, from the others in a document.
- For example, to identify a paragraph as “header”, use the code:  
`<p id=“header”>... </p>`
- To create an ID for a specific tag, use the property:  
`<tag ID=id_name`
- To apply a style to a specific ID, use:  
`#id_name {style attributes and values}`
- HTML and XHTML require each id be unique— therefore an id value can only be used once in a document.
- You can mark a group of elements with a common identifier using the **Class** attribute.



# CLASS ATTRIBUTE

- Used to allow different occurrences of the same tag to use different style specifications.
- A style class has a name, which is attached to a tag name. For example,  
`p.narrow {property/value list}`  
`p.wide {property/value list}`
- The class you want on a particular occurrence of a tag is specified with the class attribute of the tag. For example,  
`<p class = "narrow">`  
`...`  
`</p>`  
`...`  
`<p class = "wide">`  
`...`  
`</p>`
- A generic class can be defined if you want a style to apply to more than one kind of tag
- A generic class must be named, and the name must begin with a period
- Example,  
`.really-big { ... }`
- Use it as if it were a normal style class  
`<h1 class = "really-big"> ... </h1>`  
`...`  
`<p class = "really-big"> ... </p>`

# PROPERTIES & PROPERTY VALUES

- There are 56 different properties in 6 categories:
  - Fonts, Colors and backgrounds, Text, Boxes and layouts, Lists, Tags
- Property Value Forms
  - Keywords - left, small, ...
    - Not case sensitive
  - Length - numbers, maybe with decimal points. Units:
    - px – pixels
    - in – inches
    - cm – centimeters
    - mm – millimeters
    - pt – points
    - pc - picas (12 points)
    - em - height of the letter 'm'
    - x-height - height of the letter 'x'
  - No space is allowed between the number and the unit specification. e.g., **1.5 in** is illegal!

# PROPERTIES & PROPERTY VALUES

- Property Value Forms (continued)
  - Percentage - just a number followed immediately by a percent sign
  - URL values  
`url(protocol://server/pathname)`
  - Colors
    - Color name
    - rgb (n1, n2, n3)
      - Numbers can be decimal or percentages
    - Hex form: #XXXXXX
  - Property values are inherited by all nested tags, unless overridden
- **FONT PROPERTIES**
  - **font-family** - Value is a list of font names - browser uses the first in the list it has  
`font-family: Arial, Helvetica, Courier`
  - Generic fonts: **serif**, **sans-serif**, **cursive**, **fantasy**, and **monospace** (defined in CSS).

# PROPERTIES & PROPERTY VALUES

- If a font name has more than one word, it should be single-quoted (e.g. **font-family: 'Times New Roman'**).
- **font-size**
  - Possible values: a length number or a name, such as **smaller**, **xx-large**, etc.
- **font-style**
  - **italic**, **oblique** (useless), **normal**
- **font-weight** - degrees of boldness
  - **bolder**, **lighter**, **bold**, **normal**
  - Could specify as a multiple of 100 (100 – 900)
- **font**
  - For specifying a list of font properties  
**font: bolder 14pt Arial Helvetica**
  - Order must be: style, weight, size, name(s)



# PROPERTIES & PROPERTY VALUES

(Example fonts.html)

```
<html>
<head>
  <title> Font Properties </TITLE>
  <style type = "text/css">
    <!-- /* Document-level style sheet*/
      p.big {
        font-size: 14pt;
        font-style: italic;
        font-family: 'Times New Roman';
      }
      p.small {font-size: 10pt;
        font-weight: bold;
        font-family: 'Courier New';
      }
    -->
  </style>
</head>
```

# PROPERTIES & PROPERTY VALUES

```
<body>
<p class = "big">
If a job is worth doing, it's worth doing right.
</p>
<p class = "small">
Two wrongs don't make a right, but they certainly
can get you in a lot of trouble.
</p>
<h2 style = "font-family: 'Times New Roman';
              font-size: 24pt; font-weight: bold">
    Chapter 1 Introduction
</h2>
<h3 style = "font-family: 'Courier New';font-size:
    18pt">
    1.1 The Basics of Computer Networks
</h3>
</body>
</html>
```

# PROPERTIES & PROPERTY VALUES

*If a job is worth doing, it's worth doing right.*

Two wrongs don't make a right, but they certainly can get you in a lot of trouble.

## Chapter 1 Introduction

### 1.1 The Basics of Computer Networks

# PROPERTIES & PROPERTY VALUES

- The **text-decoration** property
  - **line-through, overline, underline, none.** Example???
- **LIST PROPERTIES** - **list-style-type**
  - Unordered lists
    - Bullet can be a disc (default), a square, or a circle
    - Set it on either the <ul> or <li> tag
    - On <ul>, it applies to list items

```
<h3> Some Common Single-Engine Aircraft </h3>
<ul style = "list-style-type: square">
<li> Cessna Skyhawk </li>
<li> Beechcraft Bonanza </li>
<li> Piper Cherokee </li>
</ul>
```

# PROPERTIES & PROPERTY VALUES

- On `<li>`, `list-style-type` applies to just that item

```
<h3> Some Common Single-Engine Aircraft </h3>
```

```
<ul><li style = "list-style-type: disc">
```

```
    Cessna Skyhawk </li>
```

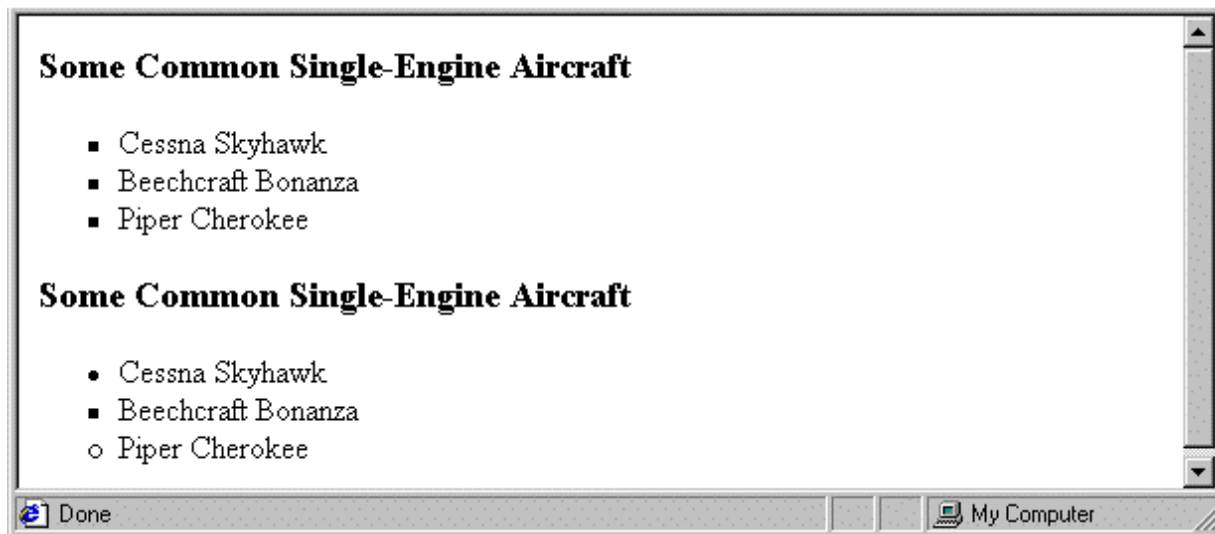
```
    <li style = "list-style-type: square">
```

```
        Beechcraft Bonanza </li>
```

```
    <li style = "list-style-type: circle">
```

```
        Piper Cherokee </li>
```

```
</ul>
```



# PROPERTIES & PROPERTY VALUES

- Could use an image for the bullets in an unordered list
- Example:  
`<li style = "list-style-image: url(bird.jpg)">`
- On ordered lists - `list-style-type` can be used to change the sequence values

Property value	Sequence type	First four
<code>decimal</code>	Arabic numerals	1, 2, 3, 4
<code>upper-alpha</code>	Uc letters	A, B, C, D
<code>lower-alpha</code>	Lc letters	a, b, c, d
<code>upper-roman</code>	Uc Roman	I, II, III, IV
<code>lower-roman</code>	Lc Roman	i, ii, iii, iv

# PROPERTIES & PROPERTY VALUES

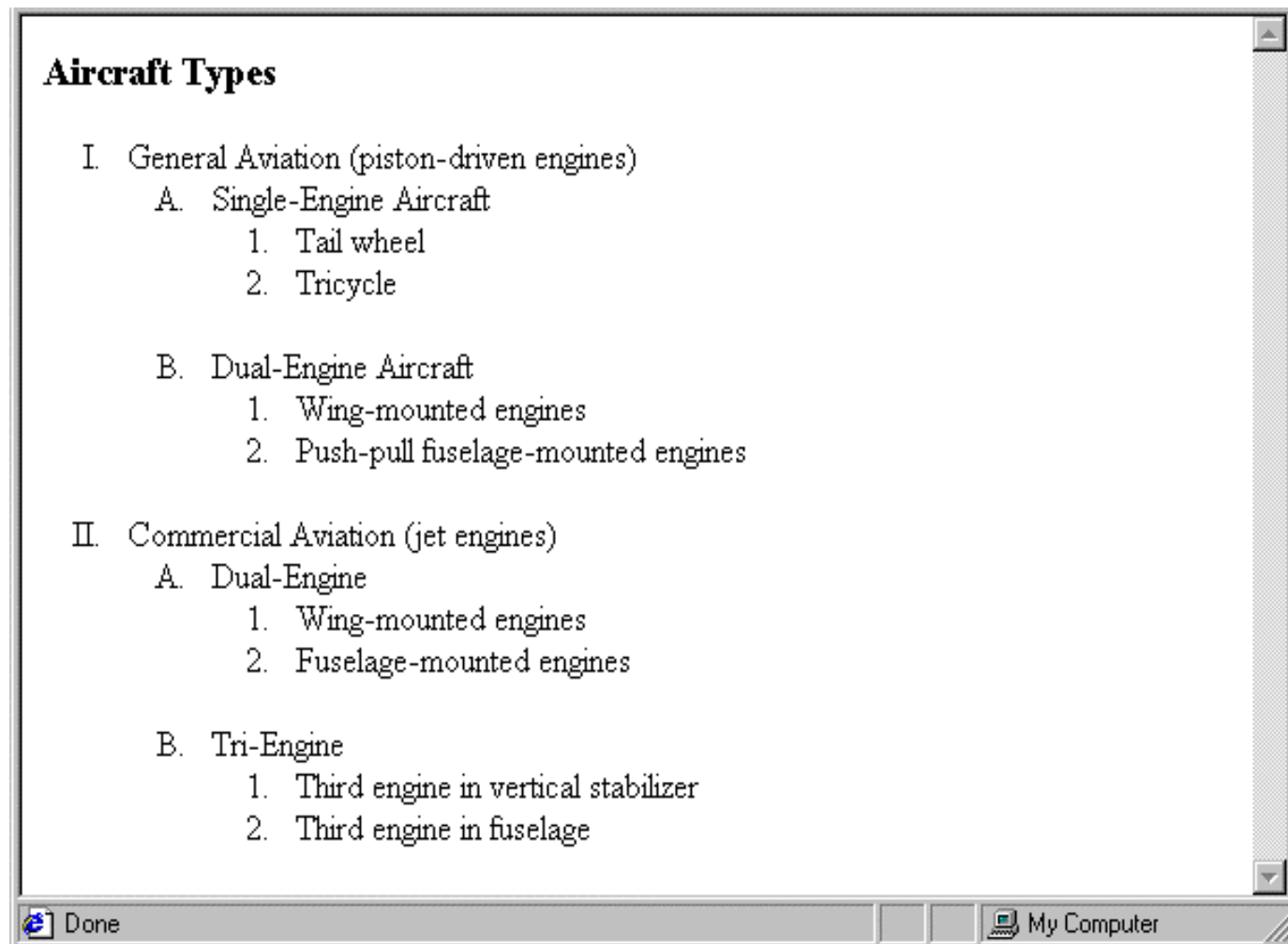
```

<h3> Aircraft Types </h3>
<ol style = "list-style-type: upper-roman">
  <li> General Aviation (piston-driven engines) </li>
  <ol style = "list-style-type: upper-alpha">
    <li> Single-Engine Aircraft </li>
    <ol style = "list-style-type: decimal">
      <li> Tail wheel </li>
      <li> Tricycle </li>
    </ol> <br />
    <li> Dual-Engine Aircraft </li>
    <ol style = "list-style-type: decimal">
      <li> Wing-mounted engines </li>
      <li> Push-pull fuselage-mounted engines </li>
    </ol>
  </ol> <br />
  <li> Commercial Aviation (jet engines) </li>
  <ol style = "list-style-type: upper-alpha">
    <li> Dual-Engine </li>
    <ol style = "list-style-type: decimal">
      <li> Wing-mounted engines </li>
      <li> Fuselage-mounted engines </li>
    </ol> <br />
    <li> Tri-Engine </li>
    <ol style = "list-style-type: decimal">
      <li> Third engine in vertical stabilizer
        </li>
      <li> Third engine in fuselage </li>
    </ol>
  </ol></ol>

```



# PROPERTIES & PROPERTY VALUES



# PROPERTIES & PROPERTY VALUES

- ALIGNMENT OF TEXT

- The **text-indent** property allows indentation
  - Takes either a length or a % value
  - `<p style = "text-indent : 0.5in">`
- The **text-align** property has the possible values, `left` (the default), `center`, `right`, or `justify`
- Sometimes we want text to flow around another element the `float` property
  - The **float** property has the possible values, `left`, `right`, and `none` (the default)
  - If we have an element we want on the right, with text flowing on its left, we use the default **text-align** value (`left`) for the text and the `right` value for **float** on the element we want on the right

# PROPERTIES & PROPERTY VALUES

```
<img src = "c210.jpg" style = "float: right" />
```

- Some text with the default alignment - left

This is a picture of a Cessna 210. The 210 is the flagship single-engine Cessna aircraft. Although the 210 began as a four-place aircraft, it soon acquired a third row of seats, stretching it to a six-place plane. The 210 is classified as a high performance airplane, which means its landing gear is retractable and its engine has more than 200 horsepower. In its first model year, which was 1960, the 210 was powered by a 260 horsepower fuel-injected six-cylinder engine that displaced 471 cubic inches. The 210 is the fastest single-engine airplane ever built by Cessna.



# PROPERTIES & PROPERTY VALUES

- **MARGINS**

- The margins around an HTML object can be set with margin-left, etc. - just assign them a length value

```
<img src = "c210.jpg " style = "float: right; margin-left: 0.5in; margin-bottom: 0.5in" />
```

This is a picture of a Cessna 210. The 210 is the flagship single-engine Cessna aircraft. Although the 210 began as a four-place aircraft, it soon acquired a third row of seats, stretching it to a six-place plane. The 210 is classified as a high performance airplane, which means its landing gear is retractable and its engine has more than 200

horsepower. In its first model year, which was 1960, the 210 was powered by a 260 horsepower fuel-injected six-cylinder engine that displaced 471 cubic inches. The 210 is the fastest single-engine airplane ever built by Cessna.



# COLOURS

- Colors are specified using predefined color names, or RGB, HEX, HSL, RGBA, HSLA values.
- In CSS, a color can be specified by using a predefined color name:



# RGB and RGBA VALUE

- **RGB** using this formula:

***rgb(red, green, blue)***

- Each parameter (red, green, and blue) defines the intensity of the color between 0 and 255.
- For example, `rgb(255, 0, 0)` is displayed as red, because red is set to its highest value (255) and the others are set to 0.
- To display black, set all color parameters to 0, like this: `rgb(0, 0, 0)`.
- To display white, set all color parameters to 255, like this: `rgb(255, 255, 255)`.

- **RGBA** color values are an extension of RGB color values with an alpha channel - which specifies the opacity for a color.
- An RGBA color value is specified with:

***rgba(red, green, blue, alpha)***

- The alpha parameter is a number between 0.0 (fully transparent) and 1.0 (not transparent at all).

# HSL and HSLA VALUE

- In CSS, a color can be specified using hue, saturation, and lightness (HSL) in the form:  
***hsl(hue, saturation, lightness)***
- Hue is a degree on the color wheel from 0 to 360. 0 is red, 120 is green, and 240 is blue.
- Saturation is a percentage value, 0% means a shade of gray, and 100% is the full color.
- Lightness is also a percentage, 0% is black, 50% is neither light or dark, 100% is white

- **HSLA** color values are an extension of HSL color values with an alpha channel - which specifies the opacity for a color.
- An HSLA color value is specified with:

***hsla(hue, saturation, lightness, alpha)***

- The alpha parameter is a number between 0.0 (fully transparent) and 1.0 (not transparent at all)



# HEX

- In CSS, a color can be specified using a hexadecimal value in the form:

*#rrggbb*

- Where rr (red), gg (green) and bb (blue) are hexadecimal values between 00 and ff (same as decimal 0-255).
- For example, #ff0000 is displayed as red, because red is set to its highest value (ff) and the others are set to the lowest value (00).



# COLOURS

- Any one of 16 million different colors
  - The `color` property specifies the foreground color of elements

```
<table border = "5px">  
  <tr>  
    <th style = "color: red"> Apple </th>  
    <th style = "color: orange"> Orange </th>  
    <th style = "color: orange"> Screwdriver  
    </th>  
  </tr>  
</table>
```

- The `background-color` property specifies the background color of elements

```
<p style = "font-size: 24; color: blue; background-  
color : red"> To really make it stand out, use a  
red background!
```

```
</p>
```

To really make it stand out, use a red background!

# LINKS

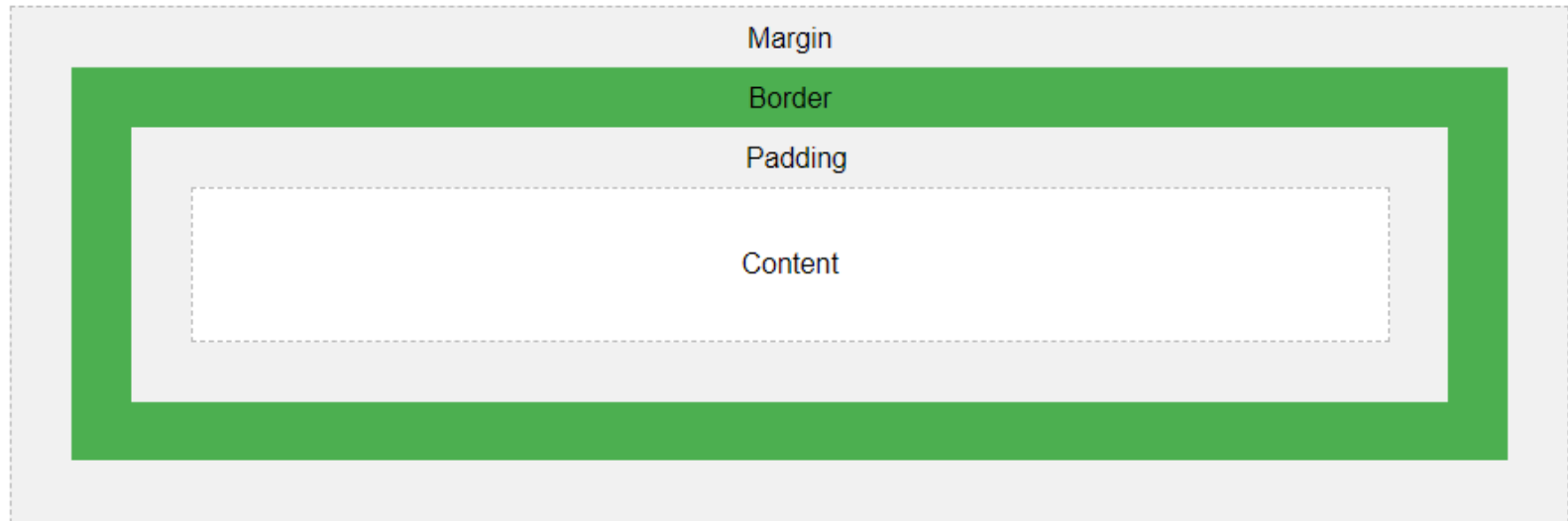
## Link Pseudo-class Selectors

- `a:link (...)` Affects any unclicked link.
- `a:visited (...)` Affects any link already visited.
- `a:hover (...)` Affects any link being hovered over by the cursor.
- `a:active (...)` Affects any link being activated (or clicked).

Example:

```
a {font-weight: bold;}  
a:link {color: black;}  
a:visited {color: gray;}  
a:hover {text-decoration: none;color:  
    white;background-color: navy;}  
a:active {color: aqua;background-color: navy;}
```

# CSS BLOCK MODEL



The box model allows us to add a border around elements, and to define space between elements.

**Content** - The content of the box, where text and images appear

**Padding** - Clears an area around the content. The padding is transparent

**Border** - A border that goes around the padding and content

**Margin** - Clears an area outside the border. The margin is transparent