CM0133 Internet Computing

4. CSS , Stylesheets

Objectives

- Learn the motivation of stylesheets
- Appreciate the advantages of using stylesheets vs representational html elements
- Learn by examples to style a simple web page

Content and Presentation

- Cascading Stylesheets (CSS) have been designed to better separate the content and presentation of a web document (coded in HTML).
- CSS uses a model of selectors and declarations to achieve that.
- Selectors specify to which elements of a document a set of declarations apply.
- Additionally there is a model of how property values are inherited and cascaded.
- The biggest limitation of CSS is that it cannot change the structure of the displayed document.

adapted from http://dret.net/lectures/web-spring09/2009-02-04-css.pdf

Representational Aspects

- Aspects of the document presentation include
  - positioning on the page
  - choice of fonts
  - colours and backgrounds
  - Borders
- These have been controlled by HTML attributes (align, color, bgcolor)
- As a consequence HTML became “polluted” by layout information.

adapted from http://dret.net/lectures/web-spring09/2009-02-04-css.pdf

CSS

- CSS was introduced as a format for layout information
  - HTML can be kept simple, containing only the structures
  - Layout information can be reused by using separate CSS files
- CSS has been designed for HTML
  - It has been generalized to cover XML
  - HTML heritage is visible in CSS

adapted from http://dret.net/lectures/web-spring09/2009-02-04-css.pdf

Styles

- A style is a set of formatting instructions that can be applied to a piece of text.
- Styles can be defined
  1. Within a single HTML tag – Inline styles (redundant inside documents)
  2. In the **<head>** section, and applied to the whole document – Global styles (redundant across documents)
  3. In external files, and can be applied to any document by including the URI of the file – Stylesheets (best reuse)
  4. Any combination is possible

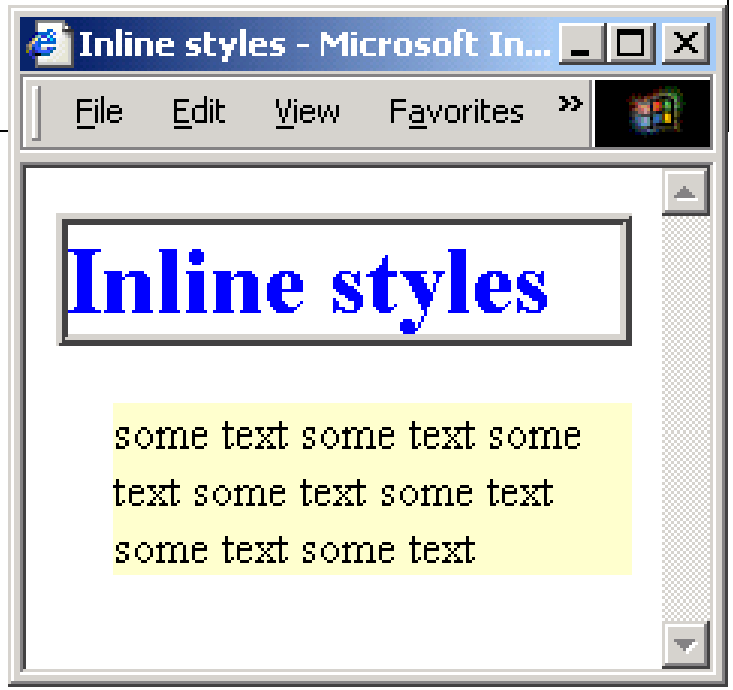
Inline styles

- Every tag has a style attribute
- This can be assigned a style definition
- A style definition is a list of property-value pairs
  - a property is separated from its value by a colon
  - property-value pairs are separated by semi-colons
  - the list is delimited by quotation marks
- Inline styles only affect the text contained in the tag

```
<h1 style="color:#2255ff; border:ridge">Inline styles</h1>
```

Inline styles

```
<body>
  <h1 style="color:blue; border:ridge">
    Inline styles</h1>
  <p style="margin-left:10%; background:#ffffcc">
    some text . . . some text
  </p>
<body>
```



- The heading is boxed with the text displayed in blue
- The paragraph is indented by 10% (from the left) and has a cream background

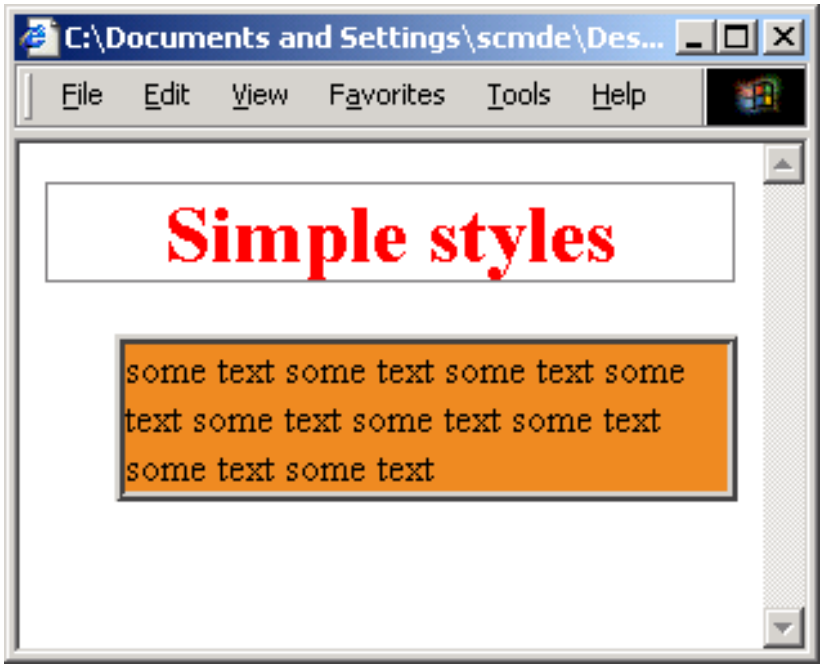
Global styles

- A style can be defined in the head of the document using the **<style>** tag
- The style declaration is placed inside a comment so that it can be ignored by older browsers
- Each style rule consists of the name of an element (selector) followed by a list of property-value pairs enclosed in curly brackets

```
<head>
 <title>Styles</title>
 <style>
  <!--
  h1 {
   color: red;
   border: thin groove;
   text-align:center;
  }
  -->
 </style>
</head>
<body>
<h1>Simple styles</h1>
</body>
```

```
<head>
 <style>
  <!--
  h1 {
   color: red;
   border: thin groove;
   text-align:center;
  }
  p {
   margin-left: 10%;
   border: ridge;
   background: #ee8822;
  }
  -->
</style>
</head>
<body>
<h1>Simple styles</h1>
<p>some text . . . </p>
</body>
```

Example



- A global style applies to every instance of the corresponding element in the document

Stylesheets

- Styles can be declared in separate files called stylesheets.
- A stylesheet is linked to a web document by including the following line in the head section

```
<link rel="StyleSheet" type="text/css" href="URL">
```

  - **`rel`** specifies the type of link being used
  - **`href`** specifies a hyperlink to the stylesheet file
  - **`type`** specifies the MIME type of the data
  - **`text/css`** describes the "cascading style sheets" type

Multiple stylesheets

- The first stylesheet is included using the **<link>** tag
- Any further stylesheets have to be imported
- The **@import** command is placed inside a comment

```
<head>
 <title>Stylesheets</title>
 <link rel="StyleSheet" type="text/css"
  href="http://www.abc.com/mainstyles.css">
 <!-
  @import
   url(http://www.abc.com/deptstyles.css)
   url(mystyles.css)
 -->
</head>
```

Cascading stylesheets

- Multiple stylesheets can be included in a document
- Styles defined in the first stylesheet are overridden by corresponding styles defined in the second stylesheet
  - the stylesheets are said to cascade
- Example
  - `mainstyles.css` – the company's stylesheet
  - `deptstyles.css` – the department's stylesheet
  - `mystyles.css` – the user's stylesheet
- If the stylesheets are included in this order, the user's style definitions will override the department styles, which in turn will override the company styles

Style rules

- A style rule has two parts
  - a selector (element name) and a set of declarations
- The selector associates the style rule with a HTML tag of the same name
- Each declaration has two parts:
  - a property and a value
- For readability, each declaration should be placed on a separate line

```
selector {
  property: value;
  property: value;
  property: value;
  property: value;
}
```

Style rules

- Some properties can be given multiple values
  - The browser first looks for the "**Book Antiqua**" font
  - If this is not on the system, it looks for the **Times** font
  - Last resort: the browser uses the generic **serif** font


```
body {
 background-color: lightgreen;
}
h1 {
 color: lightgreen;
 background-color: blue;
 font-family: "Book Antiqua", Times, serif;
 border: thick groove #9baab2;
}
```

Properties

- Properties define how elements are formatted
  - They define a specific facet of formatting
  - They may have interdependencies with other properties
  - The can be assigned explicitly
  - They may be defined through **cascading** or **inheritance**
- A property has a name and is used in a name/value-pair
  - The name identifies the property that is being set
  - The value space depends on the property
  - Some properties accept complex values
  - Sets of values:

    p { font-family: “Segoe UI”, Verdana, Helvetica, Arial, Sans-Serif }
- Property specifications can be grouped
  - .thinboxed {border-width: 1px ; padding: 10 px ; margin : 5px }

adapted from http://dret.net/lectures/web-spring09/2009-02-04-css.pdf

Properties and values

Fonts

- `font-family: <family name> [<generic family>]`
- `font-style: normal|italic|oblique`
- `font-weight: normal|bold|bolder|lighter`
- `font-size: small|medium|large|smaller|larger`

Backgrounds and colours

- `color: <value>`
- `background-color: <value>|transparent`
- `background-image: URL|none`

Properties and values

Text

- `text-decoration: none|underline|overline|line-through`
- `text-transformation: none|capitalize|uppercase|lowercase`
- `text-align: left|right|center|justify`
- `text-indentation: length|percentage`

Properties and values

Boxes

- **margin-top, margin-right, margin-left, margin-bottom: value (e.g. 5px)**
- **border-width: thin|thick|medium|length**
- **padding: length|percentage (e.g. .5em)**
- **border-color: red|blue|etc..**
- **border-style: none|dotted|dashed|solid|double|groove|ridge**
- **border-width: thick|medium|thin**

Properties and values

Position

- **`location`**: **`absolute|relative|fixed`**
  - **`absolute`**: relative to upper left corner of window
  - **`relative`**: relative to the last item
  - **`fixed`**: does not move when the page is scrolled
- **`left`**: distance from left border of window (pixels, %)
- **`top`**: distance from top border of window (pixels, %)

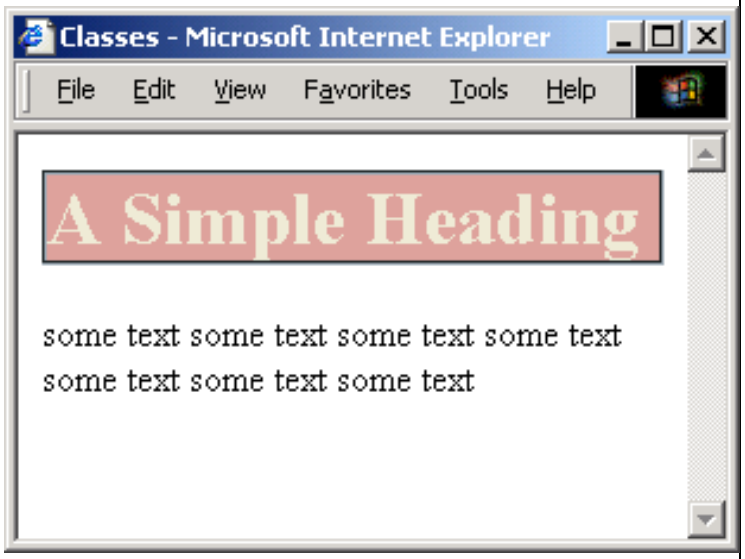
- These properties are very useful with the *div tag* (see later)

Classes

- Simple style rules change the appearance of all instances of the associated element
- A class is a style definition that may be applied as and when we choose
  - if we don't want the styles, we don't have to use them
- Simple classes are applied to a single type of element
- Anonymous classes can be applied to any type of element

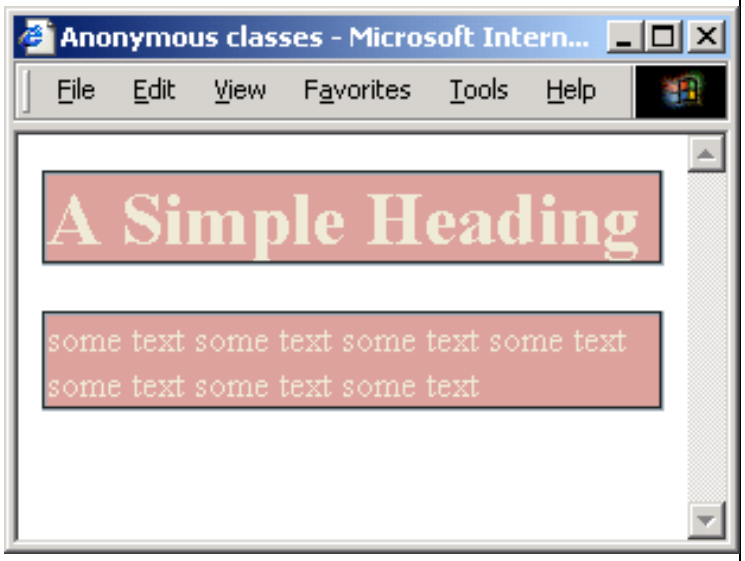
Simple classes

```
</head>
 <style>
 <!--
  h1.fred {
   color: #eeebd2;
   background-color: #d8a29b;
   border: thin groove #9baab2;
  }
 -->
 </style>
</head>
<body>
 <h1 class="fred">A Simple Heading</h1>
 <p>some text . . . some text</p>
</body>
```



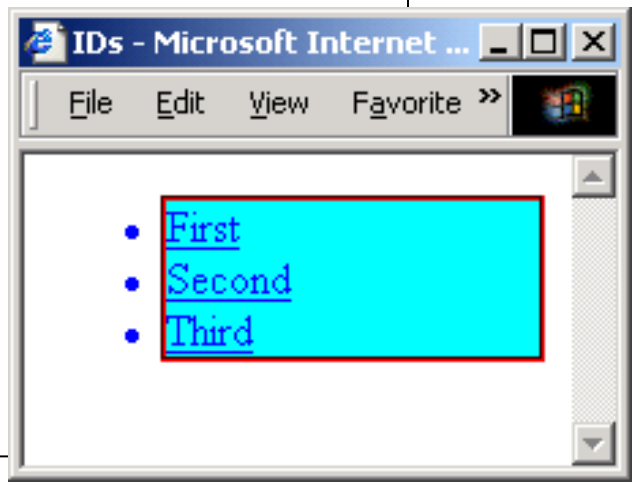
Anonymous classes

```
</head>
 <style>
 <!--
   .fred {
    color: #eeebd2;
    background-color: #d8a29b;
    border: thin groove #9baab2;
   }
 -->
 </style>
</head>
<body>
 <h1 class="fred">A Simple Heading</h1>
 <p class="fred">some text . . . some text</p>
</body>
```



IDs

```
<head>
 <style>
 <!--
  #list1 {
   color: blue;
   background: cyan;
   text-decoration: underline;
   border: thin groove red;
  }
 -->
 </style>
</head>
<body>
 <ul id="list1">
  <li>First</li>
  <li>Second</li>
  <li>Third</li>
 </ul>
</body>
```



- Classes specify styles for particular instances of an element
- IDs specify the style of a single element
  - IDs allow the element to be identified by other elements on the page

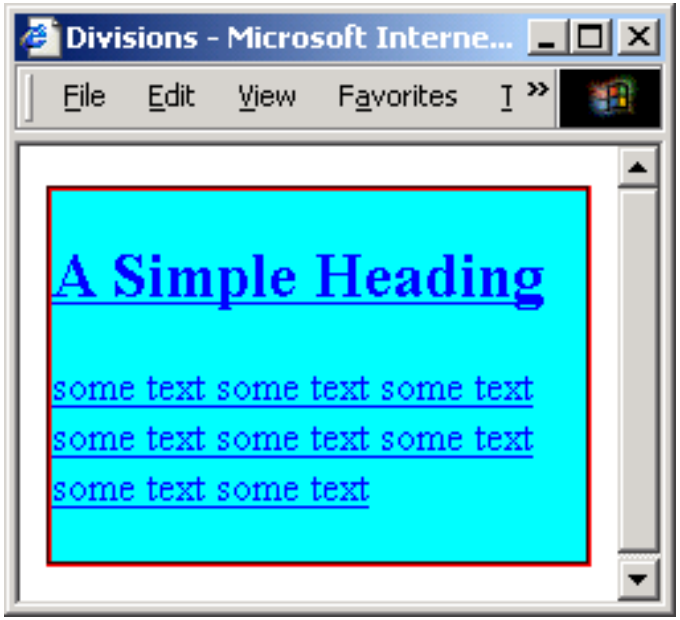
Divisions and spans

- Rather than applying styles to an element itself, we wrap the element in
  - a division element (usually for block elements), or
  - a span element (usually for inline elements)
- Any required formatting can then be applied to the **`<div>`** or **`<span>`** element.
- Division and span elements become part of the document
  - In particular, each can have **`class`** and **`id`** attributes

Divisions

```
<head>
 <style>
 <!--
  .myclass {
   color: blue;
   background: cyan;
   text-decoration: underline;
   border: thin groove red;
  }
 -->
 </style>
</head>
<body>
 <div class="myclass">
  <h2>A Simple Heading</h2>
  <p>some text . . . </p>
 </div>
</body>
```

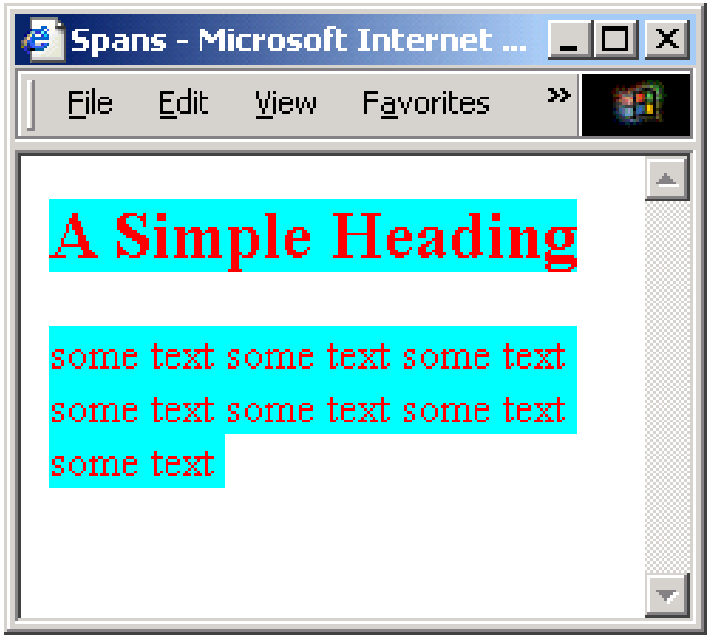
- Styles can be applied to blocks of HTML code using divisions



Spans

```
<head>
 <style>
 <!--
   .myclass {
    color: red;
    background: cyan;
    text-decoration: none;
   }
 -->
 </style>
</head>
<body>
 <span class="myclass">
  <h2>A Simple Heading</h2>
  <p>some text . . . </p>
 </span>
</body>
```

- spans are similar to divisions



Layers

- The browser maintains a stack of layers, each containing text, images etc. The browser displays layers on top of each other (in order).

- The **`<div>`** tag has the following attributes
  - **`z-index`**: the number of the layer containing the division
  - **`left`** and **`top`** : the location (top-left corner) of the division in pixels
  - **`width`** and **`height`**: the size of the division in pixels
  - **`position`**: **`absolute`** or **`relative`**

Layers

- Layers can be manipulated using JavaScript to create Dynamic HTML pages
- Layers can also be used to organise page content


```
<body>
<div style="z-index:2; left:100px; top:50px; position:absolute;
background-color:red; font-size:30">
<p>THIS STUFF IS ON TOP</p>
</div>

<div style="z-index:1; left:10px; top:10px; position:absolute;
background-color:yellow; font-size:56">
<p>BACKGROUND STUFF</p></div>
</body>
```

Cascading - Mechanics

- Stylesheets may have three different origins
  1. Page authors associate CSS with their pages
  2. Users configure their browser to use some CSS
  3. User agents (browsers) have built-in CSS how to style content
- Conflicts must be resolved using the following algorithm
  1. Find all matching declarations (matching media type and selector)
  2. Sort according to importance (browser < user < author)
  3. Same importance must be sorted by specificity (more specific selectors)
  4. Finally, sort by order in which they were specified
- !important rules can influence the algorithm
  - They are interpreted in step2 (sorting by importance)
  - Browser < user < author < author (important) < user (important)

adapted from http://dret.net/lectures/web-spring09/2009-02-04-css.pdf

Inheritance

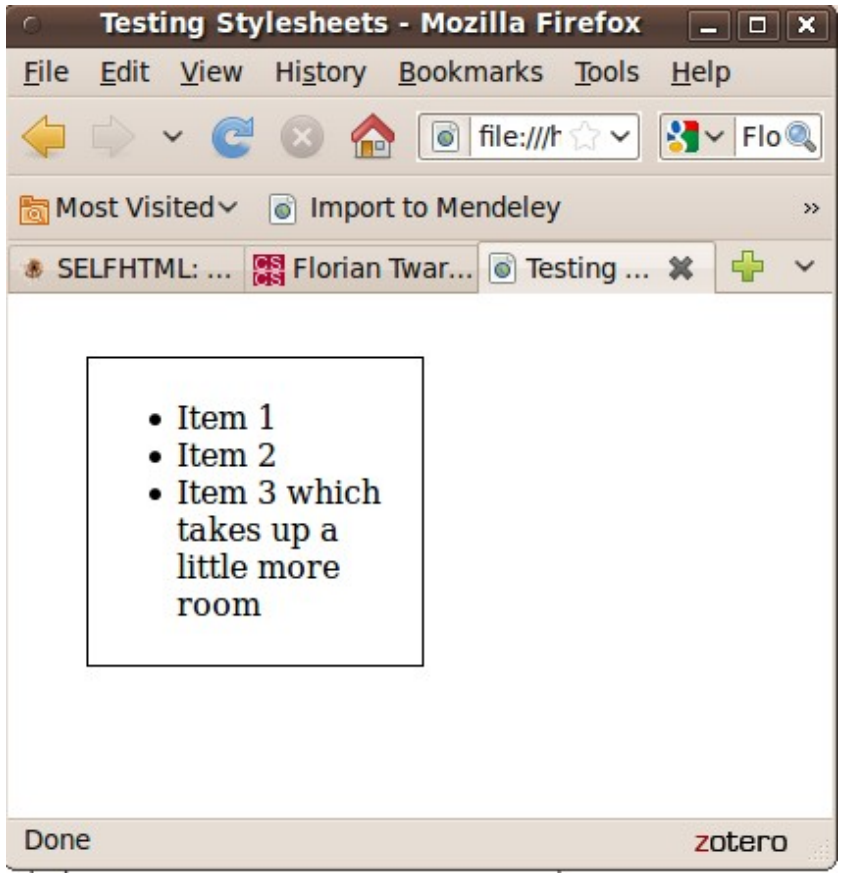
- Properties are often inherited by children
  - Setting a table's color sets the color for all contents
  - Without inheritance, CSS would have to be very large
- Inheritance is mostly intuitive but the reality is a bit more complex: A **specified value** comes from the content model/style sheet or is a default value, computed is an absolutized or inherited version of the specified value, used is the **computed value** in light of the actual layout of the document and the **actual value** deals with limitations of the output device or media.

Strategies

- CSS should never show up in your HTML
- Classes should reflect content or formatting
- Containers can restrict styles to a context
- Context can be nested
  - Orthogonal concepts should be represented in nested classes
  - e.g., pages for “staff” and “faculty” and “current” and “past” as classification
  - Different levels of formatting sophisitication can be implemented with CSS only
- Avoid redundant CSS code
  - Whenever appropriate, inherit properties
  - For invisible links use a {color : inherit ;}

Lists in CSS

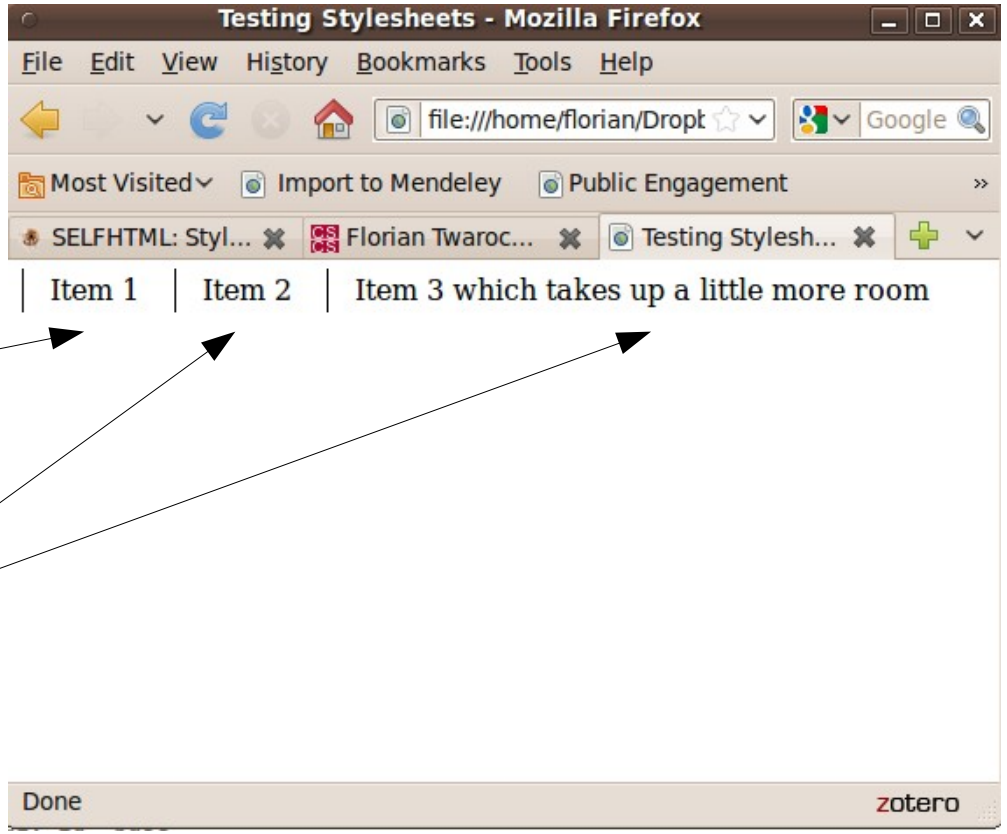
```
#base {
        border: 1px solid #000;
        margin: 2em;
        width: 10em;
        padding: 5px;}
}

...
<div id="base">
<ul>
        <li>Item 1</li>
        <li>Item 2</li>
        <li>Item 3 which takes up a
little more room</li>
</ul>
</div>
...
```



Inline lists

- Lists are normally vertically orientated
- In CSS you can make them horizontal “inline”

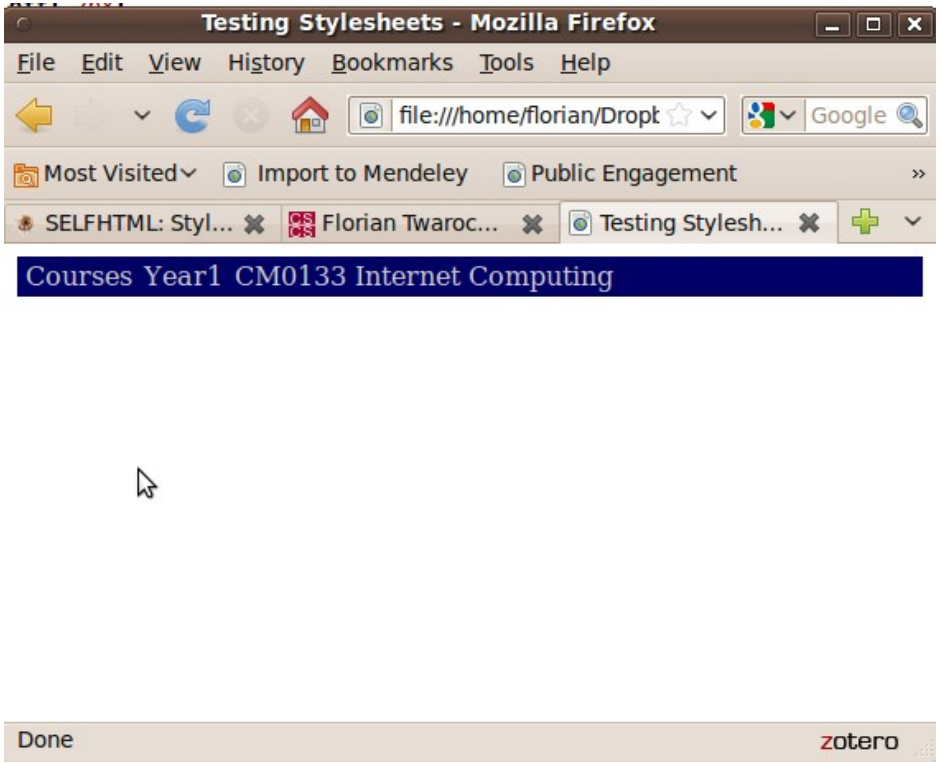
```
#pipe ul {
margin-left: 0;
padding-left: 0;
display: inline;
}
#pipe ul li.first {
margin-left: 0;
border-left: none;
list-style: none;
display: inline;
}
#pipe ul li {
margin-left: 0;
padding: 3px 15px;
border-left: 1px solid #000;
list-style: none;
display: inline;
}
```



Breadcrumb Trails

- Many sites now have an inline list showing the route you have navigated to end up at the current page
- It shows the hierachy of the web site you followed

```
#bread {
color: #ccc;
background-color: #006;
padding: 3px;
margin-bottom: 25px;
}
#bread ul {
margin-left: 0;
padding-left: 0;
display: inline;
border: none;
}
#bread ul li {
margin-left: 0;
padding-left: 2px;
border: none;
list-style: none;
display: inline;
}
```



Inline hyperlinked lists

- These lists are ok, but for navigation you can make them hyperlinked lists

```
<div id="button">
<ul>
<li><a href="#">Home</a></li>
<li><a href="http://www.bbc.co.uk">BBC</a></li>
<li><a href="#">About Us</a></li>
</ul>
</div>
```

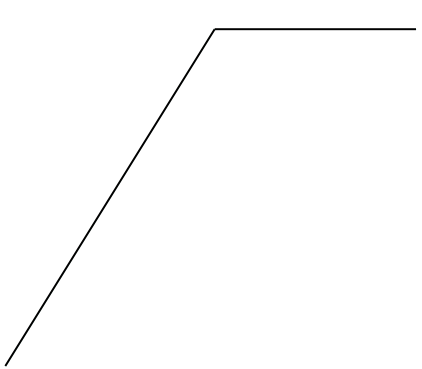
Set up the space for the menu

```
#button {
width: 12em;
border-right: 1px solid #000;
padding: 0 0 1em 0;
margin-bottom: 1em;
font-family: 'Trebuchet MS', 'Lucida Grande', Geneva, Helvetica, Arial, sans-serif;
background-color: #90bade;
color: #333;
}
```

Make it look more like a menu!

- Remove the bullets and any borders from the list

```
#button ul {
list-style: none;
margin: 0;
padding: 0;
border: none;
}
#button li {
border-bottom: 1px solid #90bade;
margin: 0;
}
```

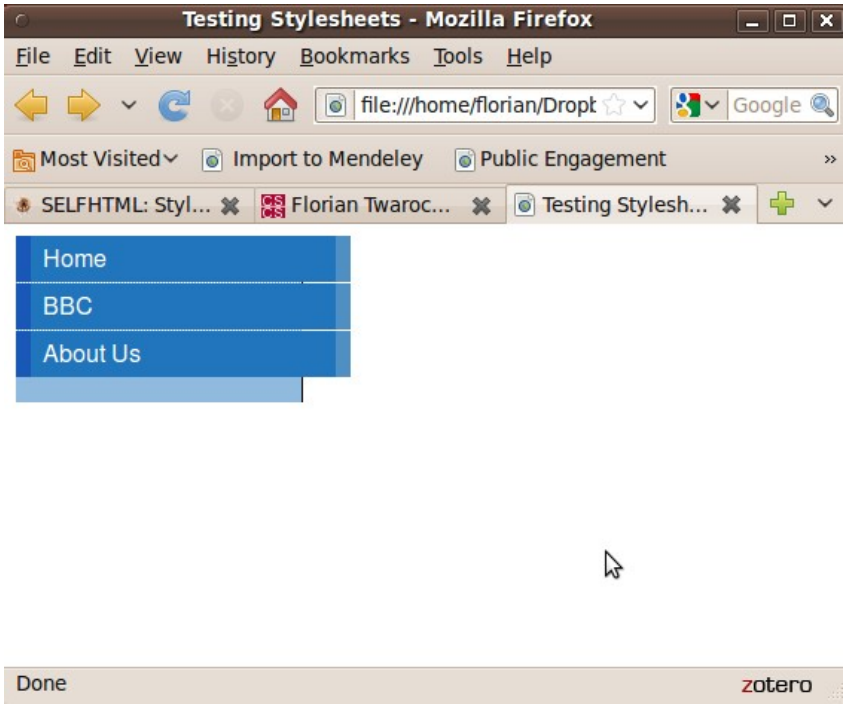


Make all hyperlinks pretty!

```
#button li a {
display: block;
padding: 5px 5px 5px 0.5em;
border-left: 10px solid #1958b7;
border-right: 10px solid #508fc4;
background-color: #2175bc;
color: #fff;
text-decoration: none;
width: 100%;
}
```

The Resulting Menu

```
#button {
width: 12em;
border-right: 1px solid #000;
padding: 0 0 1em 0;
margin-bottom: 1em;
font-family: 'Trebuchet MS', 'Lucida Grande', Geneva, Helvetica, Arial, sans-serif;
background-color: #90bade;
color: #333;
}

#button ul {
list-style: none;
margin: 0;
padding: 0;
border: none;
}

#button li {
border-bottom: 1px solid #90bade;
margin: 0;
}

#button li a {
display: block;
padding: 5px 5px 5px 0.5em;
border-left: 10px solid #1958b7;
border-right: 10px solid #508fc4;
background-color: #2175bc;
color: #fff;
text-decoration: none;
width: 100%;
}
```



CSS events

- We can use CSS code to catch events
- We can then assign CSS code to mouse events
  - CSS code allows you to access, images, layers, position, visibility etc
  - Use of these to create mouse over events for menus
- We can use CSS to make dynamic menus
- We can also use CSS to create all the buttons in our menus from just a text input
- This can save time when altering menus

Mouse Events

- We can catch the mouse over event from a hyperlink and use that to change our menu
- This will alter the colour of the block around the list item when the mouse is over it (the hyperlink)

```
#button li a:hover {
                border-left: 10px solid #1c64d1;
                border-right: 10px solid #5ba3e0;
                background-color: #2586d7;
                color: #fff;
                }
```

Why use CSS for this?

- CSS allows for neat and concise code to be written
- Any updates over multiple pages are easy to carry out
- Just alter the CSS code and all pages/tags calling that will alter
- Updating menus with new items, you just need to add a
- No need to go to photoshop and create a new set of images
- Overheads are less, so image sizes and code are kept low

CSS coding

- Web pages are becoming much more interactive and therefore complex
- The lack of intra browser similarity causes problems
- Many effects created for the latest browser X wont behave the same in browser Y
- How will these work in browser X version 2011
- How will they work when viewed with a PDA/Mobile/Tablet

- Code needs to be written so that it is
  - Neat
  - Easily maintained
  - Degrades well

Outlook

- CSS 2.0
- Layout with CSS