CM0133 Internet Computing

2. Introduction to HTML

Objectives

Today we will look at

- Markup Languages and HTML
- Basic structure elements
- Block elements
- Inline descriptive elements
- Inline explicit style elements
- Lists
- Special characters

Markup languages

- Suppose we have a document containing only plain text

- We tag certain parts of the document to indicate what they are and how they should be formatted

  - This procedure is called marking-up the document
  - Tags are usually paired: e.g. **`<title>My Memoirs</title>`**
  - A pair of tags plus their content constitute an element
  - Un-paired tags are called empty tags

Markup languages

- Physical vs Semantic markup
  - physical refers to appearance (style) on the page
  - semantic refers to structure and meaning

- HTML is the HyperText Markup Language

Markup languages

- HTML is based on SGML (Standard Generalised Markup Language) which is more complex
- HTML places primary emphasis on structure
  - paragraphs, headings, lists, images, links, ….
- HTML places secondary emphasis on style
  - fonts, colours, ….
- HTML does not label the meaning of the text (XML)
- HTML has a fixed set of tags but is constantly evolving
  - newer versions are downward compatible

HTML - History

- 1991 - Tim Berners Lee publishes the first version of HTML and runs the first webserver
- 1993 - Mosaic: the first full-featured browser is made available
- 1996 to 2001 - The .com craze is in full swing. Anything can be bought online
- 2005 to present - The rise of rich internet applications
- 2008 - Run internet applications offline (Adobe AIR, Mozilla Prism, ...)

HTML - Versions

- A number of drafts published between 1991 and 1995
- Version 2.0 (1995) - Based on features developed in the Mosaic browser
- Version 3.2 (Jan 1997) - Extended based on the Netscape browser's visual markup elements
- Version 4.0 (Dec 1997) - Clean-up deprecating most of the visual markup elements
  - Comes in three flavours: Strict, Transitional, Frameset

XHTML

- XHTML is derived from HTML, but describes a valid XML document
  - All tags and attributes are in lower-case
  - All tags must be closed
  - All tags must be correctly nested
- XHTML 1.0 was derived from HTML 4.01
- XHTML 1.1 is a modularisation of XHTML 1.0

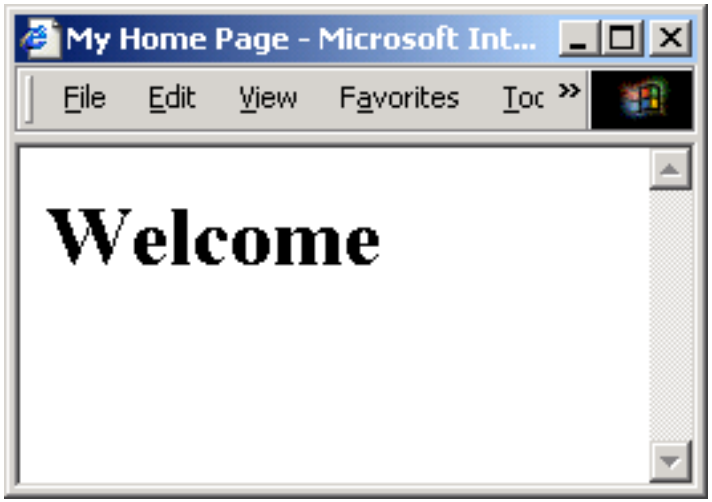
A basic document

- Every document should start with the following line

```
<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.0 Transitional//EN">
```

- There are three required elements, defined by the tags **<html>, <head> and <body>**

```
<html>
 <head>
  <title>My Home Page</title>
 </head>
 <body>
  <h1>Welcome</h1>
 </body>
</html>
```



Basic structure elements

- **`<html>`** and **`</html>`** must be the first and last tags
- The HEAD section
  - must come before the BODY section
  - contains generic information about the document
- Elements specified in the HEAD section include
  - **`title`**, **`base`**, **`link`**, **`meta`**, **`script`**, **`style`**
- The BODY section
  - contains the content of the document (text, images etc)
  - this content is structured by other tags

Block elements

- Block elements define sections of text, usually preceded by a blank line
- ** ** - paragraph
- **<h1></h1>...<h6></h6>** - headings
- **<pre></pre>** - preserve (original format)
- **<blockquote></blockquote>** - indented text
- ** ** - division
  - used to identify a section of the document that may be subject to special formatting (for example, using stylesheets).

Paragraphs

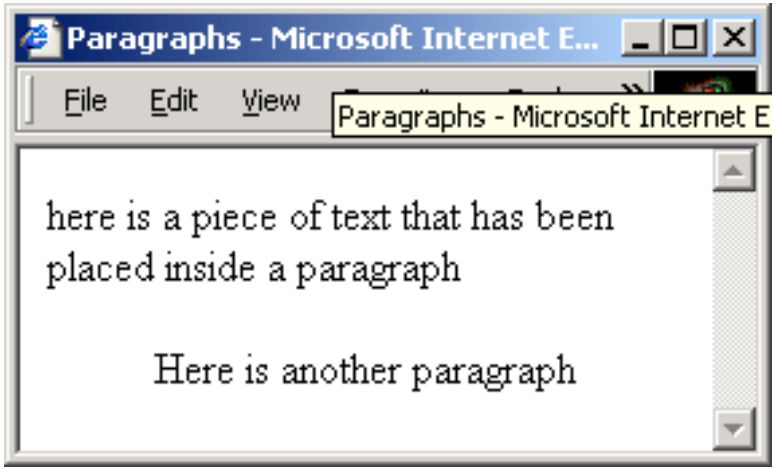
Paragraphs: ** ... **

- force a break between the enclosed text and the text surrounding it
- the tagged region of text may be subject to special formatting

```
<p align="center">Here is another paragraph</p>
```

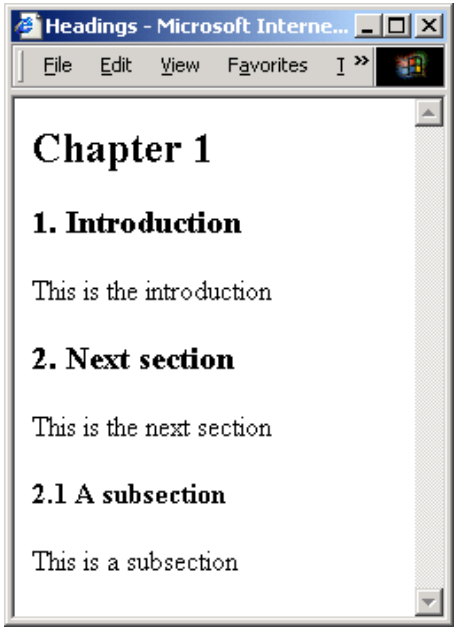
- **align** is an attribute of the paragraph tag
- **center** is the value of the align attribute

```
<p>here is a piece of text that has been placed inside a paragraph</p>
<p align="center">Here is another paragraph</p>
```



Headings

- Use headings to divide document into sections
- Six levels of importance **<h1>...<h6>**




```
<html>
 <head>
  <title>Headings</title>
 </head>
 <body>
  <h2>Chapter 1</h2>
  <h3>1. Introduction</h3>
   This is the introduction
  <h3>2. Next section</h3>
   This is the next section
  <h4>2.1 A subsection</h4>
   This is a subsection
 </body>
</html>
```

Element relationships

- The elements marked by tags form a hierarchy
- The root element is html (marked by **`<html>...</html>`**)
- It usually has two children: head and body
  - each of these are further subdivided
- There are rules for which elements can contain other elements
  - e.g. headers cannot contain headers
  - see **`http://www.w3.org/`** for a full list of rules
- Elements must not overlap each other
  - we cannot have: **`<h1>...<a..> ... </h1>...</a>`**
  - we can have: **`<h1>...<a..> ... </a>...</h1>`**

Links

- The link (anchor) element **<a>...** provides hypertext links between
  1. different documents (using a URL)
  2. different parts of an individual document
- User selection of the link (hot spot) results in
  1. retrieval and display of the designated document
  2. movement to relevant part of same document

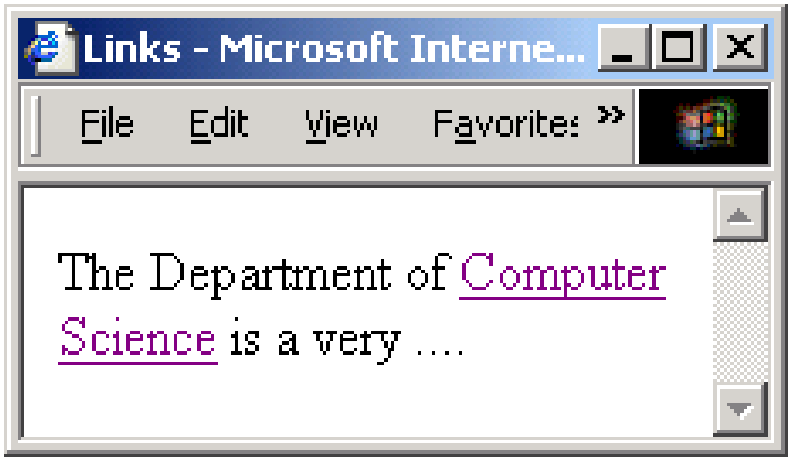
```
<body>
The Department of
<a href="http://www.cs.cf.ac.uk/index.html">
Computer Science</a> is a very ....
</body>
```

Link with URL

Example:

```
<body>
The Department of
<a href="http://www.cs.cf.ac.uk/index.html">
Computer Science</a> is a very ....
</body>
```

- The **`href`** attribute gives the URL of the target page
- The text between the tags is highlighted – selecting it activates the link



Relative addressing

- The previous example gave the full path name, known as the absolute address
- This is OK for URLs that are external to a website, but can be inflexible for web pages that are part of the website, because it ties all web pages (files) to a particular location (directory)
- A relative address specifies a URL relative to the directory of the page in which they are called (the parent page)
- This allows the location of a collection of web pages (that constitute a website) to be changed without having to edit all of the internal links

Relative addressing

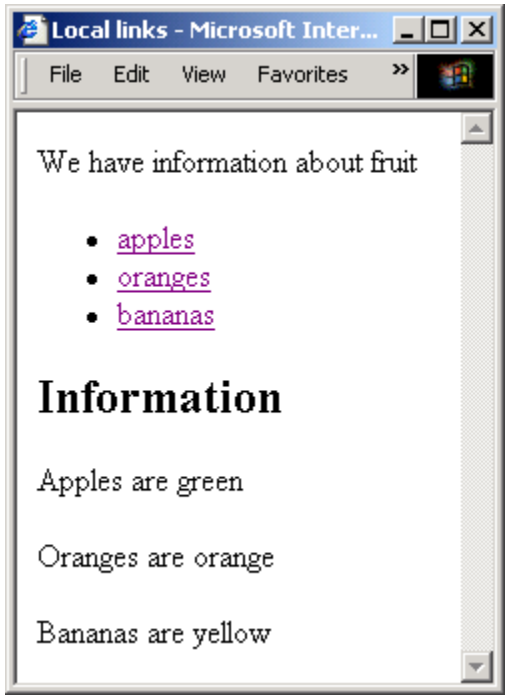
- The home page for my website is
  http://www.cs.cf.ac.uk/user/F.A.Twaroch/index.html
- This page has several links to other pages:

```
<a href="research.html">Research</a>
<a href="pub.html">Publications</a>
<a href="McGurk/index.html">Stuff..</a>
<a href="../../index.html">Computer Science home</a>
```

- The ‘root’ directory for the link is assumed to be the directory containing the parent page of the link
- Clicking on the ‘Research’ link results in accessing
  http://www.cs.cf.ac.uk/user/F.A.Twaroch/research.html

Local links

```
We have information about fruit
<ul>
 <li><a href="#apples">apples</a></li>
 <li><a href="#oranges">oranges</a></li>
 <li><a href="#bananas">bananas</a></li>
</ul>
<h2>Information</h2>
<p><a name="apples">
 Apples are green
</p>
<p><a name="oranges">
 Oranges are orange
</p>
<p><a name="bananas">
 Bananas are yellow
</p>
```



Images

- Images are included using the empty tag **<img>**
- Example:

```
<img src="mypicture.gif" alt="my picture">
```

- The **src** attribute specifies the file containing the image
  - absolute or relative path names can be used (see notes for links)
- The **alt** attribute specifies the text to be displayed if the image is not viewed
  - some users choose not to display images (for faster download)
  - also used for compatibility with older browsers

Image attributes

- The **`size`** attributes control the size of the image

```
<img src="cat.gif" height="60" width="90" alt="cat">
```

- The **`align`** attribute controls the vertical location of the image, relative to the line of text
  - **`align="top"`** top of image aligned with top of text
  - **`align="middle"`** centre of image aligned with centre of text
  - **`align="bottom"`** bottom of image aligned with baseline of text

Image attributes

- The **`align`** attribute also controls the horizontal location of the image, relative to the line of text
  - **`align="left"`** image aligned with left margin
  - **`align="right"`** image aligned with right margin
- The paragraph text flows around left or right aligned images - a feature of HTML 4
- To stop wrap around, use the clear attribute of the break element **`<br>`** (an empty tag)

```
<img src="cat.gif" align="left" alt="cat">
<br clear="left">
```

Image file formats

- GIF – Graphics Interchange Format (.gif)
  - 256 colours adapted to image
  - compressed (not good for photos)
  - options for transparency and animation (GIF89A)
- JPEG – Joint Photographic Experts Group (.jpg or .jpeg)
  - sophisticated compression
  - image quality can be chosen (good for photos)
- PNG – Portable Network Graphics (.png)
  - non-proprietary GIF (with better colour quality)
- X-Bitmap (.xbm)
  - black and white (transparent)
- X-Pixelmap (.xpm)
  - 8 bits per pixel (colour)

Links with images

- A link element can include an image instead of text
  - both images and text can be included if required

```
<body>
Enter my world of cats <a href="cats.html"><img
src="cat.gif" height="60" width="60" align="middle"
alt="cat"></a>
</body>
```

Large images via Thumbnails

- Large and high resolution images take a noticeable amount of time to load into the page.
- If you have an image that the user may or may not be interested in seeing, then provide a thumbnail version (which takes up very little disk space) as a link.
- When the user clicks on the thumbnail, the large image is loaded by the browser.
- This is an external file, as opposed to an inline file that is automatically loaded, e.g.:

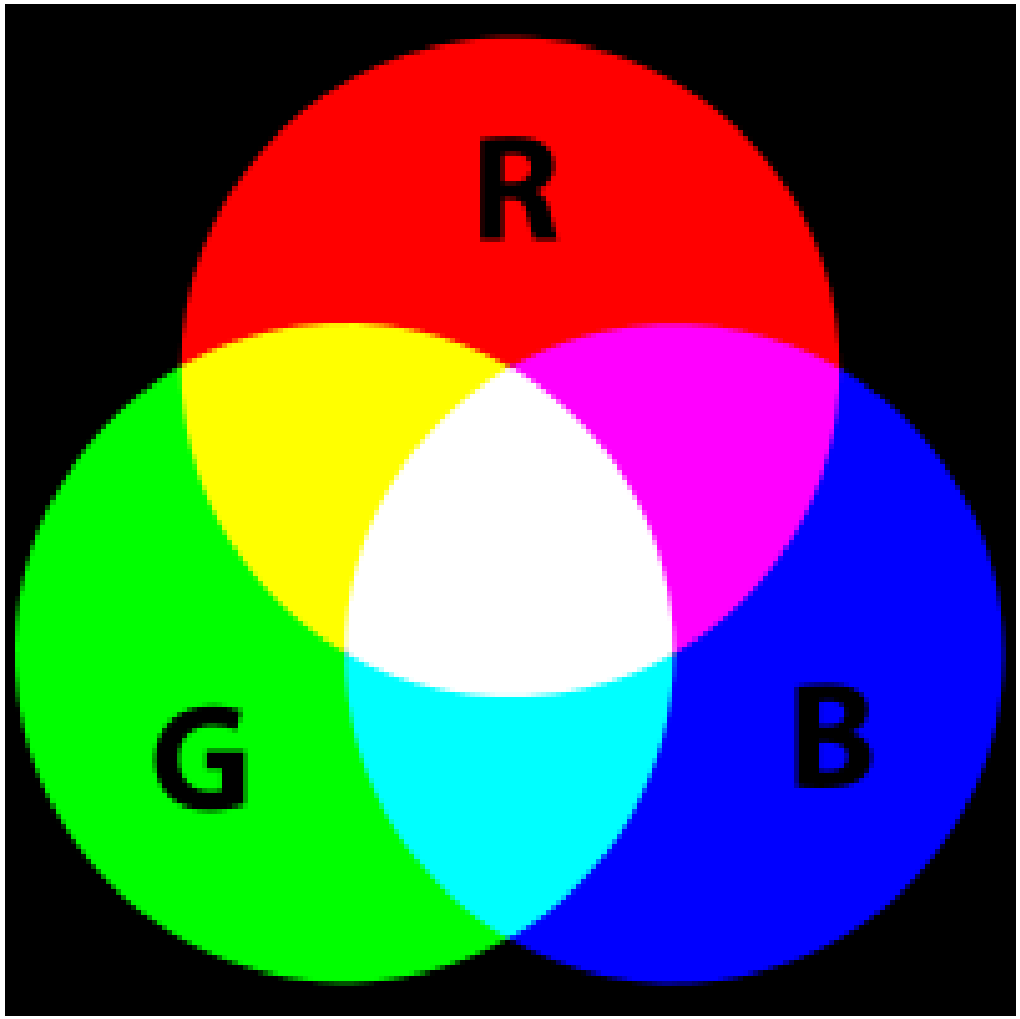
```
<a href="external.jpg" target="_blank">
<img src="inline.jpg" width="100" height="80" alt="Preview"
border="1"></a>
```

Colour

- We can specify the colour of text, the background of the whole page and the background of various parts of the page (e.g. the cells of a table – see later).
- Colours are specified with hexadecimal numbers for the red, green and blue primary colours, preceded by a "**#**".
- Each colour component has a value between **00** and **ff** (0 - 255 decimal)
- To set the background colour of a web page

```
<body bgcolor="#994422">
```

Colour – RGB Model



- **`#ff0000`** (red),
- **`#00ff00`** `(green)`
- **`#0000ff`** `(blue)`
- **`#ffff00`** `(yellow)`
- `...`
- **`#3395ab`** (a pastel blue)

Colour

- To set the colour of all text on a page

```
<body text="#994422">
```

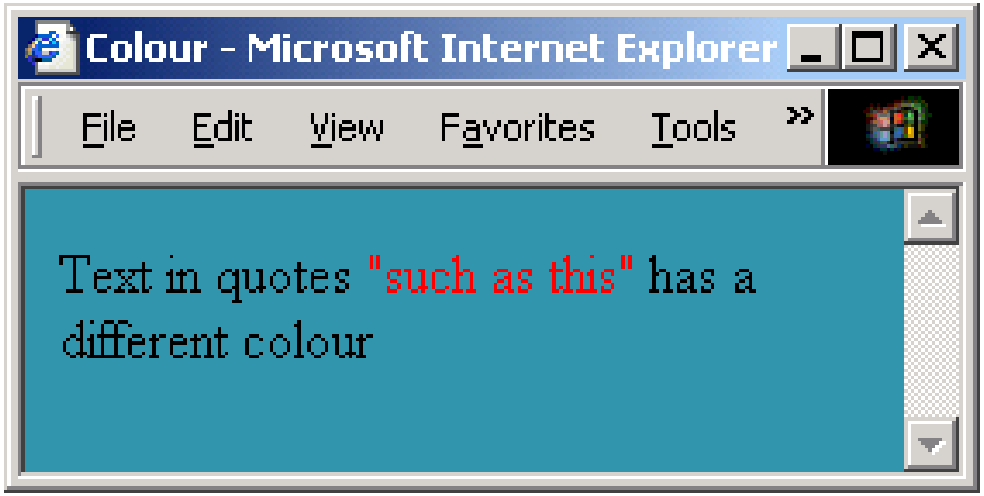
- In the body element, the colour of link text can be controlled with the following attributes:
  - **`link`** for an un-visited link
  - **`vlink`** for a visited link
  - **`alink`** for a link that is currently selected by the mouse
- Example

```
<body text="#000000" link="#0000ff">
```

Colour

- To set the colour of an individual piece of text use the **`font`** element (or preferably stylesheets – see later)

```
<body bgcolor="#3395ab">
Text in quotes <font color="#ff0000">"such as
this"</font> has a different colour
</body>
```



Colour names

- Netscape and Internet Explorer allow textual names for colours instead of hexadecimal
- This is OK provided the page is not looked at by a browser that does not support colour names
- Some HTML text books give the available colour names and their hexadecimal equivalents
- For example

```
<body bgcolor="gray" text="black" link="blue">
```

Background patterns

- To give the background of your web page a pattern (rather than a uniform colour), use the background attribute of the body element to provide the name of a file containing an image that can be tiled
- HOWEVER, be careful in your choice of background pattern – some are very disconcerting and can make reading the page an unpleasant experience

```
<body background="tileimage.gif">
```

Question

- **Warning:** Not all browsers support the latest features of HTML. Even when they do there are differences in the resulting appearance.

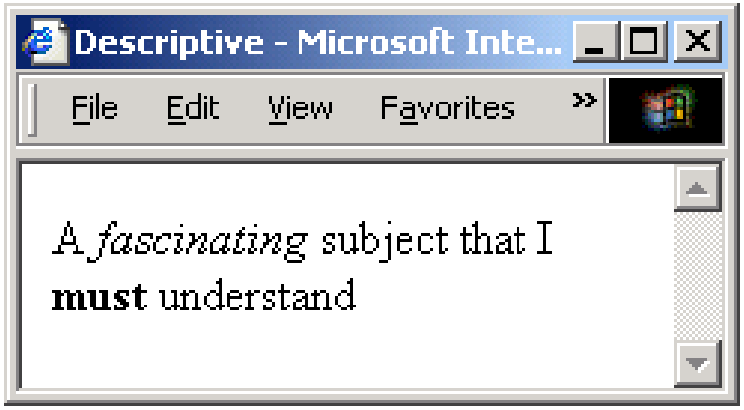
- What does this mean to you as a developer?

Inline descriptive elements

Descriptive elements affect the appearance of text depending on how the text is described

- **** emphasis, usually with italics
- **** strong, usually with bold
- **<cite></cite>** citation, usually in italics
- **<code></code>** usually results in monotype spacing

```
<body>
A <em>fascinating</em>
subject that I
<strong>must</strong>
understand
</body>
```



Inline explicit style elements

- **<boldface></boldface>**
- **<big></big>** bigger font than surrounding text
- **<small></small>** smaller font than surrounding text
- **** italics
- **<s></s>** strikethrough
- **** subscripts
- **** superscripts
- **** delimits text for stylesheet control
- ** ** delimits blocks of text for stylesheet control

Inline explicit style elements

`<font>` attributes

- **`face`** - name of font (must be installed)
  - `"arial", "times", "verdana", "helvetica"`
- **`size`** - absolute size (1-7), or relative to previous text
  - `"2", "5", "7", "+1", "-2"...`
- **`color`** - hexadecimal RGB, or a named color
  - `"3399dd", "blue", "red"`
- **`weight`** - boldness from 100, 200, ..., 900
  - `"100", "300", "900"`
- e.g.

```
<font face="arial" size="+1" color="pink" weight="300">
```

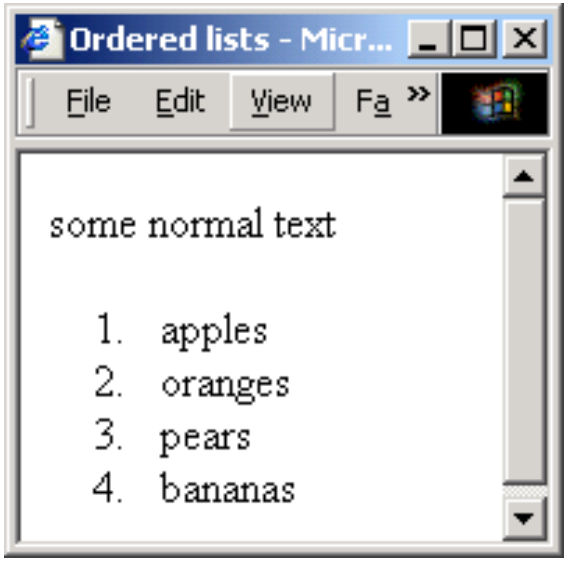
Unordered lists

- Unordered lists **
...
**
- **
...
** for the list elements
- each item has a bullet


```
some normal text
<ul>
<li>apples</li>
<li>oranges</li>
<li>pears</li>
<li>bananas</li>
</ul>
```

Ordered lists

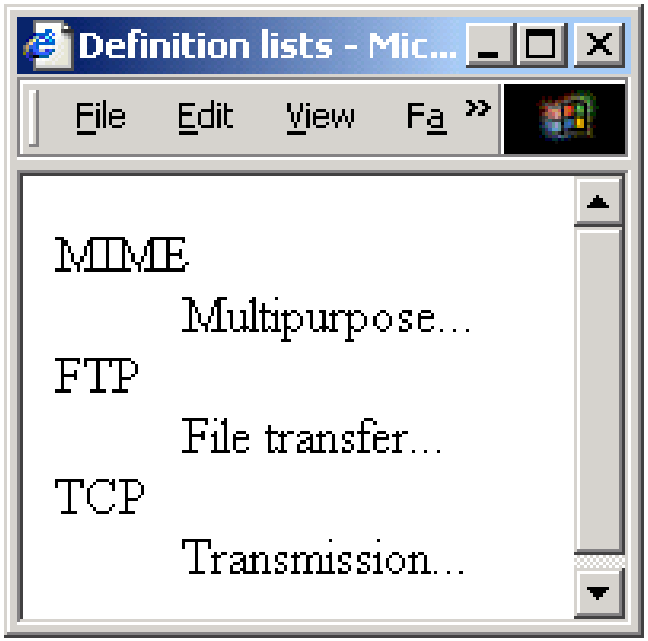
- Ordered lists **
...
**
- **
...
** for the list elements
- each item has a number




```
some normal text
<ol>
<li>apples</li>
<li>oranges</li>
<li>pears</li>
<li>bananas</li>
</ol>
```

Definition (glossary) lists

- **<dl></dl>** The enclosing tags
- **<dt></dt>** The definition term
- **<dd></dd>** The definition




```
<dl>
 <dt>MIME</dt>
  <dd>
   Multipurpose...
  </dd>
 <dt>FTP</dt>
  <dd>
   File transfer...
  </dd>
 <dt>TCP</dt>
  <dd>
   Transmission...
  </dd>
</dl>
```

Nested lists

- A list may contain another list
- The inner list is nested inside the outer list


```
<body>
<ol>
 <li>apples</li>
  <ul>
   <li>red</li>
   <li>green</li>
  </ul>
 <li>oranges</li>
 <li>pears</li>
 <li>bananas</li>
</ol>
</body>
```

Comments

- Comments are delimited by **<!--** and **-->**

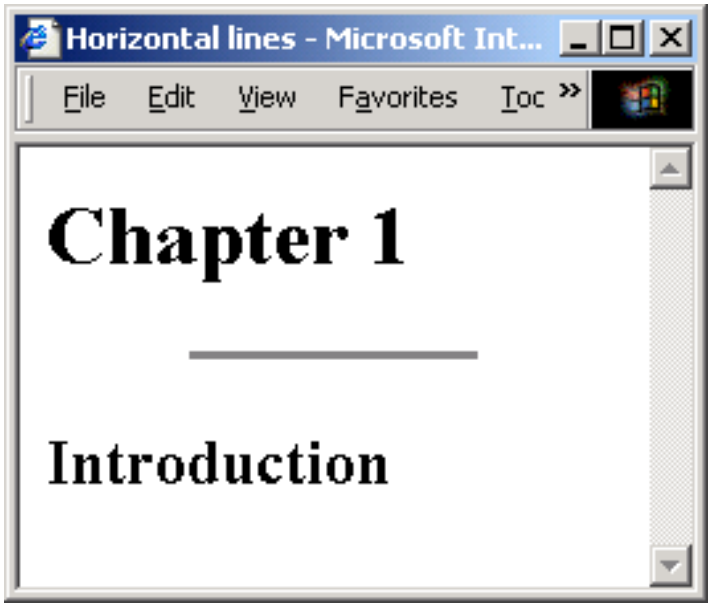
```
<!- this is a comment -->
```

- Comments may span multiple lines

```
<body>
 <!--
  this is
  a comment
 -->
</body>
```

Horizontal lines

- To insert a horizontal line to divide up parts of a document we use the empty tag **<hr>**
- Attributes: **align**, **size** (in pixels), **width** (in pixels or percentage), **noshade**

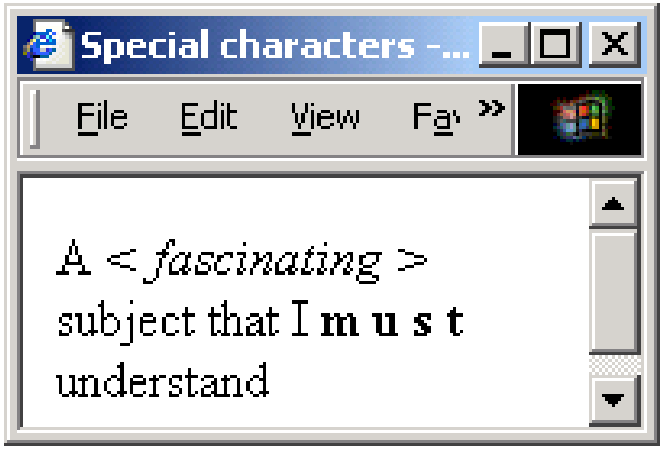



```
<body>
 <h1>Chapter 1</h1>
  <hr align="center" size="3" width="50%" noshade>
 <h2>Introduction</h2>
</body>
```

Special characters

- Some characters such as **<**, **>**, **"** and **&** have special meanings.
- To prevent them being interpreted as HTML code, they must be written as follows: **< > " &**
- Blank space is normally ignored in HTML. To include a space in your document use: ** **

```
<body>
A <em> &lt;
fascinating &gt; </em>
subject that I
<strong>m u 
s t</strong>
understand
</body>
```



Structure & Styling

- Separation of Structure & Styling
  - Easier to update documents
  - Easier to change the styling
    - Styles are attached to elements, not an integral part of the document
  - Allows for improved machine-readability
    - Better indexing & searching of documents
    - Faster parsing & smaller parser size

Summary

Today we looked at

- HTML a Markup Language
- Basic structure elements
- Block elements
- Inline descriptive elements
- Inline explicit style elements
- Lists
- Special characters

Outlook

Next time we will look at

- More HTML
- Images
- Links
- Tables, Frames
- Use of color
- Web page design