Chapter 4
A Hypertext Markup Language Primer
Learning Objectives

• Know the meaning of and use hypertext terms
• Use HTML tags to structure a document
• Use HTML tag attributes
• Use HTML tags to link to other files
• Explain the differences between absolute and relative pathnames
• Use Cascading Style Sheets to style a Web page
• Use HTML to encode lists and tables
Web Pages

• Web pages are created, stored, and sent in encoded form
• A browser converts them to what we see on the screen
• Hypertext Markup Language (HTML) is the main language used to define how a Web page should look
• Features like background color, font, and layout are specified in HTML
Marking Up with HTML

• The words on a Web page are embellished by hidden formatting <tags>.
• We use the XHTML or the Extensible Hypertext Markup Language.
• XHTML tags are also HTML tags, but not vice versa.
• There are some parts of the original HTML that are not part of XHTML.
Formatting with Tags

• Tags are words or abbreviations enclosed in angle brackets, < and >
• Many tags come in pairs
• The second of the pair comes with a slash: <title> Fluency </title>
• In XHTML, the tags must be lowercase <TITLE>, <Title>, and <tITle> are illegal
• The tag pair surrounds the text to be formatted like parentheses
Formatting with Tags

<title>Serena Williams</title>

- These tags can be read as “this is where the title starts” and “this is where the title ends”
- <title> is referred to as the start or open tag
- </title> is the end or close tag
- The title appears on the title bar of the browser
• HTML has tags:
  – for **bold** text, `<b>` and `</b>`
  – for *italic* text, `<i>` and `</i>`
  – for paragraphs, `<p>` and `</p>`
• More than one kind of formatting can be used at a time:
  `<p><b><i>Veni, Vidi, Vici!</i></b></p>`
  produces
  *Veni, Vidi, Vici!*
Tags for Bold and Italic

• It doesn’t matter in which order you start the tags: italic follows bold, or bold follows italic

• You get the same result

• The rule is to make sure the tags “nest” correctly…they should mirror each other

• All the tags between a starting tag and its ending tag should be matched
Singleton Tags

- A few tags are not paired
- They do not have a matching ending tag
- For those tags, the closing angle bracket > of the *singleton tag* is replaced by />

- Examples:
  - `<hr />` produces a horizontal line
  - `<br />` continues the text to the next
More Formatting Tags

• Documents can be formatted in many ways
• Each formatting feature requires its own tag
• Programmers and Web designers need to remember a few common tags
• Uncommon tags can be looked up: for example, at: www.w3schools.com/tags/default.asp
<html>
<head>  
  <title> Formatting Examples </title>  
</head>
<body>  
<p>  
  This is <b>bold</b> text.  
  This is <big>big</big> text.  
  This is <em>emphasized</em> text.  
  This is <i>italic</i> text.  
  This is <small>small</small> text.  
  This is <strong>strong</strong> text.  
  This is <sub>subscripted</sub> text.  
  This is <sup>superscripted</sup> text.  
  This is <tt>typewriter</tt> text.  
  This is <q>A short quote</q> text.  
  This is <blockquote>  
    Blockquote text, for quotes longer than
    a line of text text text text text text text text text text text text text
    text text text text text text text text text text text text text
    text text text text text text text text text text text text text
  </blockquote>  
</p>  
</body>
</html>

Figure 4.1  HTML source code for formatting tags and the result (inset).
Required Tags

• Every Web page is composed of a **head** and a **body**

• There are three HTML tags required for every Web page:
  – `<head>` and `</head>` enclose the head
  – `<body>` and `</body>` enclose the body
  – `<html>` and `</html>` to enclose those two parts
Figure 4.2  Standard form for an HTML Web page; every page must have these tags nested this way: (a) HTML code as seen in Notepad++ and (b) HTML code as seen in Text Wrangler.
Required Tags

<html xmlns="http://www.w3.org/1999/xhtml">

- The text following the letters html:
  - the dialect is XHTML
  - the part inside of the quotes must be written exactly as given
Required Tags

\[\text{<head>}
\text{<title>Starter</title>other stuff goes here...that will come later}
\text{</head>}\]

- The head section contains the beginning material like the title and other information that applies to the whole page.
Required Tags

- The body section contains the content of the page.
- This <html> <head> <body> form must always be followed.
- All of these tags are required.

```html
<body>
  the main content of the page goes here
</body>
```
Configure Your Computer for Writing HTML

• Check that two programs are installed:
  – A browser (check for Firefox)
  – A text editor (Notepad++ for Windows or Text Wrangler for Macs)

• Both programs are free
• These programs are preferred for technical reasons
Firefox

• Firefox is a free open source browser
• Open source means that the program code is publicly available, and any programmer can contribute improvements to it
• Firefox is the browser referenced throughout this book
• It is available at www.mozilla.com/en-US/firefox/all.html
Text Editor

• A text editor is a basic way to process text
• Our word processors are called “what-you-see-is-what-you-get” or (WYSIWYG)
• Word processors include many application-specific information in their files
• This information confuses browsers
Text Editor

• You must use a text editor to write HTML
• Text editors do not include this extra information, browsers like their files!
• Browsers want Web pages written in ASCII characters only
• Think of ASCII as the normal keyboard characters with “nothing strange”
Text Editor

• Text editors figure out what language you are writing in and color code your HTML to make it easier to read

• Operating systems come with text editors installed.
  – TextEdit can be found on the Mac
  – Notepad comes with Windows

• TextWrangler and Notepad++ are better choices
Hello, World!

To produce your first HTML page, follow these instructions:

1. In your text editor, open a *New document instance*.
2. Carefully type in your text (see next slide)
   - Remove the *preliminary material goes here* nothing will replace it, *yet*
   - Replace *the main content of the page goes here* with:
     `<p>Hello, World!</p>`
3. Save the file as `starterPage.html`
4. Open the file with the Firefox browser
<html xmlns="http://www.w3.org/1999/xhtml">
  <head>
    <title>Starter Page</title>
  </head>
  <body>
    <p>Hello, World!</p>
  </body>
</html>

Hello, World!
Open with Double-Click

• As HTML is written, files must be opened in two applications:
  – the text editor, to make changes
  – the browser, to see the changes made
• Double-click on the file to open it with the default application (your browser)
Save This Page

- All HTML files have the same structure as the starterPage.html file just created
- Use it as a template for future HTML coding
- Set up a new folder to keep your HTML files in
- Using your new page as a template ensure that all pages will have the correct form
Headings in HTML

- Documents tend to have headings, subheadings
- HTML provides several levels of heading tags:
  - `<h1>` and `</h1>` level one
  - `<h2>` and `</h2>` level two
  - ...
  - `<h6>` and `</h6>` level six
- Headings display content on a new line
HTML Format Versus Display Format

• HTML source code tells the browser how to produce the formatted page based on the meanings of the tags

• The source’s form is unimportant

• HTML is written in a structured format to make it easier for people to understand

• Indenting is frequently used to emphasize the tags’ meanings
White Space

• Spaces that have been inserted for readability are called *white space*
• White space is created with spaces, tabs, and new lines (return or enter)
• HTML ignores white space
• The browser turns a *sequence* of white space characters into a *single* space
White Space

• The only white space exception is *preformatted* information contained within `<pre>` and `</pre>`

• This information is displayed as it appears

• The width of a line of text is determined by the width of the browser window
  – A narrower or wider browser window makes the lines break in different places
Xeno’s Paradox: Achilles and a turtle were to run a race. Achilles could run twice as fast as the turtle. The turtle, being a slower runner, got a 10 meter head start, whereupon Achilles started and ran the 10 meter distance. At that moment the turtle was 5 meters farther. When Achilles had run that distance the turtle had gone another 2.5 meters, and so forth. Paradoxically, the turtle always remained ahead.
The Escape Symbol

• What if the Web page had to show a math relationship: $0 < p > r$
• The browser might misinterpret $<p>$ as a paragraph tag
• Using angle brackets as text is prohibited
• To show angle brackets, use an escape symbol (&), followed by an abbreviation, followed by a semicolon

&lt; displays as <
&gt; displays as >
&amp; displays as &
<table>
<thead>
<tr>
<th>Start Tag</th>
<th>End Tag</th>
<th>Meaning</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;!--html--&gt;</td>
<td>&lt;!--/&gt;</td>
<td>XHTML document; first and last tags of XHTML; fn = <a href="http://www.w3.org/1999/xhtml">http://www.w3.org/1999/xhtml</a></td>
<td>✓</td>
</tr>
<tr>
<td>&lt;!--title--&gt;</td>
<td>&lt;!--/&gt;</td>
<td>Title bar text; describes page</td>
<td>✓</td>
</tr>
<tr>
<td>&lt;!--head--&gt;</td>
<td>&lt;!--/&gt;</td>
<td>Preliminary material; e.g., title at start of page</td>
<td>✓</td>
</tr>
<tr>
<td>&lt;!--body--&gt;</td>
<td>&lt;!--/&gt;</td>
<td>The main part of the page</td>
<td>✓</td>
</tr>
<tr>
<td>&lt;!--p--&gt;</td>
<td>&lt;!--/&gt;</td>
<td>Paragraph</td>
<td></td>
</tr>
<tr>
<td>&lt;!--hr--&gt;</td>
<td></td>
<td>Line (horizontal rule)</td>
<td></td>
</tr>
<tr>
<td>&lt;!--h1&gt;...&lt;h6--&gt;</td>
<td>&lt;!--/&gt;</td>
<td>Headings, six levels</td>
<td></td>
</tr>
<tr>
<td>&lt;!--b--&gt;</td>
<td>&lt;!--/&gt;</td>
<td>Bold</td>
<td></td>
</tr>
<tr>
<td>&lt;!--i--&gt;</td>
<td>&lt;!--/&gt;</td>
<td>Italic</td>
<td></td>
</tr>
<tr>
<td>&lt;!--a href=&quot;fn&quot;&gt;</td>
<td>&lt;!--/&gt;</td>
<td>Anchor reference, fn must be a pathname to an HTML file</td>
<td></td>
</tr>
<tr>
<td>&lt;!--img src=&quot;fn&quot;/&gt;</td>
<td></td>
<td>Image source reference, fn must be a pathname to .jpg or .gif file</td>
<td></td>
</tr>
<tr>
<td>&lt;!--br--&gt;</td>
<td></td>
<td>Break, continue text on a new line</td>
<td></td>
</tr>
</tbody>
</table>
Accent Marks in HTML

- Letters with accent marks also use the escape symbol
- General form is:
  - ampersand, followed by the letter, followed by the name of the accent mark, followed by a semicolon
- The case of the letter is important!
  - &eacute; displays as é
  - &Egrave; displays as È
<table>
<thead>
<tr>
<th>Symbol</th>
<th>Text</th>
<th>Number</th>
<th>Symbol</th>
<th>Text</th>
<th>Number</th>
<th>Symbol</th>
<th>Text</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>à</td>
<td>à</td>
<td>à</td>
<td>é</td>
<td>ê</td>
<td>ê</td>
<td>ô</td>
<td>ô</td>
<td>ô</td>
</tr>
<tr>
<td>ä</td>
<td>ä</td>
<td>ä</td>
<td>ì</td>
<td>î</td>
<td>î</td>
<td>ù</td>
<td>ù</td>
<td>ù</td>
</tr>
<tr>
<td>é</td>
<td>é</td>
<td>é</td>
<td>ó</td>
<td>ó</td>
<td>ó</td>
<td>á</td>
<td>ã</td>
<td>ã</td>
</tr>
<tr>
<td>í</td>
<td>í</td>
<td>í</td>
<td>ø</td>
<td>ø</td>
<td>ø</td>
<td>è</td>
<td>è</td>
<td>è</td>
</tr>
<tr>
<td>ö</td>
<td>ò</td>
<td>ò</td>
<td>ü</td>
<td>ü</td>
<td>ü</td>
<td>ì</td>
<td>ì</td>
<td>ì</td>
</tr>
<tr>
<td>ò</td>
<td>ö</td>
<td>ö</td>
<td>á</td>
<td>â</td>
<td>â</td>
<td>ñ</td>
<td>ñ</td>
<td>ñ</td>
</tr>
<tr>
<td>õ</td>
<td>û</td>
<td>û</td>
<td>ç</td>
<td>ç</td>
<td>ç</td>
<td>ò</td>
<td>õ</td>
<td>õ</td>
</tr>
<tr>
<td>ã</td>
<td>á</td>
<td>á</td>
<td>ê</td>
<td>ë</td>
<td>ë</td>
<td>ú</td>
<td>ú</td>
<td>ú</td>
</tr>
<tr>
<td>å</td>
<td>å</td>
<td>å</td>
<td>ï</td>
<td>ï</td>
<td>ï</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: For an accent mark on an uppercase letter, make the letter following the & uppercase or find the number for the uppercase letter at www.w3schools.com/tags/ref_entities.asp.
HTML

• Notice the following:
  – The title is shown on the title bar of the browser window
  – The statement of Russell’s Paradox is in bold
  – The HTML source paragraphs are indented more than the `<h2>` heading lines to make them more readable
• Notice the following:
  – The line between the two paragraphs crosses the width of the browser window
  – An acute accent is used in Magritte’s first name
  – The French phrase from the painting is in italics
  – The word *picture* is in italics for emphasis
Paradoxes

Russell's Paradox

The Twentieth Century logician Bertrand Russell introduced a curious paradox: This statement is false. The statement can't be true, because it claims the converse. However, if it is not true, then it's false, just as it says. That makes it true. Paradoxically, it seems to be neither true nor false, or perhaps both true and false.

Magritte's Paradox

The famous Belgian artist René Magritte rendered the idea of Russell's Paradox visually in his famous painting Ceci n'est pas une pipe. The title translates from French, This is Not A Pipe. The painting shows a pipe with the text Ceci n'est pas une pipe below it. Superficially, the painting looks like a true statement, since it is a picture of the pipe, not an actual pipe. However, the assertion is also part of the picture, which seems to make it false, because it is clearly a painting of a pipe. Paradoxically, the truth seems to depend on whether the statement is an assertion about the painting or a part of it. But, it's both.

Figure 4.3 The HTML for a simple page and the result (inset).
Compose and Check

• Most often Web pages are created all at once—both content and form

• It is smart to check your typing and your tagging often
  – Assume a page is okay
  – Add a few more tags, then the page is wrong
  – It must be the last tags added that have the error
Compose and Check

• A productive way to work is to keep two windows open:
  – your text editor
  – your browser
• After writing a few HTML formatting tags, save the file
• Check the result in the browser by a Reload or Refresh of the source
• Repeat
Another way to limit the mistakes you make is to have it automatically validated.

This service checks to make sure your XHTML is correct.

If it is wrong, the service tells you where the mistakes are and what’s not proper.
Figure 4.4 Diagram of the compose and check process; with both the browser and text editor open alternate between composing HTML and saving (^S), and refreshing the Firefox display of the HTML and checking.
Add Extra Information

• To benefit from the automatic checking service, you need to add three more lines to the starterPage.html

• These lines are not required for the file to be a proper XHTML page, but they are needed by the checking service

• Before the <html . . . > tag, add the lines:

```
<!DOCTYPE html PUBLIC "-/W3C//DTD XHTML 1.0 Strict//EN" "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
```
Add Extra Information

• The other line that we need to add is
  `<meta http-equiv="Content-Type" content="text/html; charset=utf-8"/>
  `between `<head>` and `<title>`

• This code specifies that the character encoding for the Web page will be UTF-8, or Unicode Translation Format for bytes

• This Unicode representation will be explained in Chapter 7
Check My Work

- With the three lines added, the validation service is ready to be used.
- Normally, validation doesn’t happen until the HTML page is finished and stable.
- During “compose and check,” the validation occurs at a “stopping place.”
- To validate go to the W3C Markup Validation Service at: validator.w3.org/#validate_by_upload
Figure 4.5  The W3C Markup Validation Service page; browse for your HTML file and then click Check.
Check My Work

• If a green banner comes back: the NHTML checks out

• If a red banner comes back, it will have a list of errors with it and an explanation of what’s wrong.

• It’s common to have a lot of errors at the start
Marking Links with Anchor Tags

- Two Sides of a Link, making hyperlinks
- When a user clicks a hyperlink, the browser loads a new Web page
- There are two parts to a hyperlink:
  - the highlighted text in the current document, which is called the anchor text
  - the address of the other Web page, called the hyperlink reference
Marking Links with Anchor Tags

• Both parts of the hyperlink are specified in the anchor tag:
  – Begin with `<a` and make sure there’s a space after the `a` but not before it. `a` is for anchor.
  – Give the hyperlink reference using the `href` attribute `href="filename"`, making sure to include the double quotes.
  – Close the anchor tag with the `>` symbol.
  – Give the anchor text, which will be highlighted when it is displayed by the browser.
  – End the hyperlink with the `</a>` tag.
Bertrand <a href="http://www.bioz.com/bios/sci/russell.html">Russell</a>

Bertrand Russell
Absolute Pathnames (URLs)

- In these anchor tags, the hyperlink reference is an *entire* URL
  - The Web browser needs to know how/where to find the page

- A URL is made from:
  - a protocol specification, *http://*
  - a domain or IP address, *www.bioz.com*
  - a path to the file, */bios/sci/russell.html*
Relative Pathnames

• Often links refer to other Web pages on the same site
• These pages are all be stored in the same or nearby folders
• These anchor tags use relative pathnames
• A relative pathname describes how to find the referenced file relative to the file in which the anchor tag appears
Going “Deeper” in a Folder

• When the file containing the anchor and the referenced file are in the same folder—we just give the file name

  <a href="russellbio.html">Russell</a>

• When the referenced file is “deeper” in the directory, we simply give the path from the current folder down to the file

  <a href="biographies/russellbio.html">Russell</a>
Going “Higher” in a Hierarchy

• But, what about moving higher up in the hierarchy
• This is a UNIX operating system technique
• Navigating up to another folder: add ../ to the beginning of the href attribute
  <a href="/biographies/russellbio.htm">Russell</a>
• Each ../ moves up one level higher in the hierarchy
Structure of the Image Tag

• An image tag specifies a file that contains an image:
  `<img src="filename" alt="description"/>`

• `src` is the abbreviation for “source”

• `filename` uses the same rules for absolute and relative pathnames as anchor tags

• `alt` value specifies an alternative form for the image, usually a textual description
Structure of the Image Tag

- The `alt` tag was introduced to assist persons who are visually impaired.
- Screen readers don’t know what the image is, but they can read the description of the `alt` tag.
- HTML requires `alt` tags.
- When an image is not available or loads slow, browsers display the `alt` information.
GIF and JPG Images

• Images can come in several formats
• Web pages tend to use two of them:
  – **GIF** (pronounced is *jif*)
    (Graphics Interchange Format)
    best suited for cartoons and simple drawings
  – **JPEG** (pronounced *JAY·peg*)
    Joint Photographic Experts Group
    appropriate for high-resolution photographs
    and complex artwork
GIF and JPG Images

- **PNG** are newer forms of GIF and can also be used on Web pages
- PNG stands for Portable Network Graphics format

- To tell the browser which format the image is in, the file name should include one of these extensions: .gif, .png, .jpg, or .jpeg
Making an Image Link

• We do not have to use text as the anchor
• Images can be used as well
• Combine an anchor tag with an image tag:
  `<a href="history_red_square.html">`<img src="red.gif" alt="Red Box">`</a>`
• When the page displays, the usual highlighting that links receive will be used to mark the .gif as a link
Attributes

- **Attributes**
  - An additional specification included inside a tag
  - The abbreviations `href`, `src`, and `alt` are attributes
  - Attributes have the form `name="value"
    - the name, such as `href`, is the attribute
    - the text in quotes, such as, `biographies/russellbio.html`, is the value

- Values are *always* enclosed in quotes
The Style Attribute

• The style attribute is the most useful attribute

• Used to control a huge list of properties for every feature of a Web page
  – Properties are characteristics of page components, such as color, size, or position.

• The value of the style has a standard form: "style = "property_name : specification""
The Style Attribute

\textit{style} = "property\_name : specification"

- The colon (:) separates the property name from its specification
- The spaces on each side of the colon are optional
- Notice that when more than one property is set with style, the name/specification pairs are separated by a semicolon (;)
<table>
<thead>
<tr>
<th>Color</th>
<th>Original HTML Colors</th>
</tr>
</thead>
<tbody>
<tr>
<td>black</td>
<td>silver</td>
</tr>
<tr>
<td>red</td>
<td>fuchsia</td>
</tr>
<tr>
<td>blue</td>
<td>navy</td>
</tr>
<tr>
<td>lime</td>
<td>green</td>
</tr>
<tr>
<td></td>
<td>white</td>
</tr>
<tr>
<td></td>
<td>maroon</td>
</tr>
<tr>
<td></td>
<td>aqua</td>
</tr>
<tr>
<td></td>
<td>yellow</td>
</tr>
<tr>
<td></td>
<td>gray</td>
</tr>
<tr>
<td></td>
<td>purple</td>
</tr>
<tr>
<td></td>
<td>teal</td>
</tr>
<tr>
<td></td>
<td>olive</td>
</tr>
</tbody>
</table>
Attributes for Image Tags

• The attributes width and height of the image tag can be used to specify the size of an image

  <img src="puffer.jpg" width="200" height="200" alt="origami puffer fish"/>

• The photo puffer.jpg will appear as 200 × 200 pixels, even if the actual size of the photo is 2000 × 2000

• Specify only the width or the height of an image
Attributes for Image Tags

• The browser will shrink that length or width dimension of the image by some factor \( f \)
• The browser will automatically reduce the other dimension by the same factor \( f \), producing a smaller picture
• Take care in specifying both width and height
• Images can become distorted if \( f \) is not consistent for both width and height
Figure 4.6  The effect of changing width and height attributes on a square image: (a) 200 × 200, (b) 200 × 100, (c) 100 × 200.
Styling Position for Images

• Images are inserted in the page at the point in the text where the tag is specified in the HTML, and the text lines up with the bottom of the image.

• Messy? Hard to read?

• A better way to place images in text is to flow the text around them.
Styling Position for Images

• You can either by positioning the image on the left with the text to its right, or vice versa

• To make the text flow around the image, use the style attribute in the image tag with the value "float:left" or "float:right"

• To display an image without any text around it, enclose it in paragraph tags
Span

• What if there is no tag to add a style attribute?
• Use the `<span>` tag
• `<span>`’s only job is to surround text, and provide a place for style and other attribute information

My favorite fonts are
  `<span style="font-family : helvetica">Helvetica</span>`
  `<span style="font-family : century gothic">Century Gothic</span>`, and
  `<span style="font-family : bodoni">Bodoni</span>`.
Cascading Style Sheets (CSS)

- *Cascading Style Sheets (CSS)* are responsible for much of the design of Web pages.
- It is a general styling system for documents that simplifies the task of creating complex page designs.
Setting Global Style

• Repeating style information wherever it is needed can be time-consuming and tedious
• It can be placed in one global location inside the `<head>`
• It then applies to the whole page
• Place the style information inside a pair of `<style>` and `</style>` tags
Setting Global Style

• The `<style>` tag contains a type attribute specifying the form of the style
• Within the `<style>` and `</style>` are specifications for each tag that should have its properties adjusted
• The general syntax is

```html
<elem_name>
  prop_name1 : value1 ;
  prop_nameN : valueN
</elem_name>
```
Setting Global Style

• The text between the tag’s angle brackets, known as the tag element, is given by the element name

• When styling a particular tag, use the name only, we are not allowed to use the brackets here

• After the element name and inside curly braces ({}), is the list of property—value pairs separated by semicolons
Setting Global Style

• For each value pair, the property is separated from its value by a colon
• Now, all occurrences of the tag will be styled with these properties
• A document can be now given a consistent look without having to repeat the styling information every time a style tag is used
<html>
<head><title>Stylin' Commands</title></head>
<style type="text/css">
  h1 { background-color: lightgray;
       color: white;
  }
</style>
<body>
  <h1>Comments on the Universe</h1>
</body>
</html>
In Styling, Closest Wins

- What if you want an exception to the rule?
- What if you want the `<h2>` to look different for one heading?

- Just style that specific tags with the style attribute
- The basic style is given globally, a specific style is given locally or at that point in the Web page
Adding Class to Style

• If a tag should be styled in several different ways, then there are several different *classes of styling*

• A *class is a family of styling* specifications with a common name

• The class is given in two places:
  - In the style definition inside the style tags in the `<head>`
  - At the site in the HTML code when the code is used
Adding Class to Style

\[<h2 \text{class="scientist"}> \ldots </h2>\]

- For the style definition, we append the class name (scientist) to the tag with a dot: \text{h2.scientist}
- Plain \text{<h2>} tags are styled with those features that apply to all \text{<h2>} tags
- Each separate class gives additional styling specifications
Figure 4.8  Global style information specified in the head section of the page.
<html>
<head><title>Stylin' Commands</title></head>
<body>

<h1 style="background-color: lightgray; color: white;">

Comments on the Universe

<h2>Albert Einstein</h2>
<em>Only two things are infinite, the universe and human stupidity, and I'm not sure about the former.</em>

<h2>Bill Waterson</h2>
<em>The surest sign that intelligent life exists elsewhere in the universe is that it has never tried to contact us.</em>

<h2>Charles Schultz</h2>
<em>Don't worry about the world coming to an end today. It is already tomorrow in Australia.</em>

</body>
</html>

Figure 4.9 Overriding the global style information by styling an <h2> tag.
<html>
<head>
<title>Stylin' Commands</title>
</head>
<style type="text/css">
  h1 { background-color : lightgray;
       color : white;
  }
  h2 { background-color : lightgray;
       font-size : x-large;
       text-align : right;
  }
  h2.scientist {
    color : red;
  }
  h2.cartoonist {
    color : blue;
    font-family : comic sans MS;
  }
  p { font-style : italic;
  }
</style>
<body>
  Comments on the Universe
  <h1 class="scientist">Albert Einstein</h1>
  Only two things are infinite, the universe and human stupidity, and I'm not sure about the former.
  <p>
  </p>
  <h2 class="cartoonist">Bill Waterson</h2>
  The surest sign that intelligent life exists elsewhere in the universe is that it has never tried to contact us.
  <p>
  </p>
  <h2 class="cartoonist">Charles Schultz</h2>
  Don't worry about the world coming to an end today. It is already tomorrow in Australia.
  <p>
  </p>
</body>
</html>

Figure 4.10  Using class naming to style <h2> tags in different ways.
Style from Files

• To reuse the style information for multiple works, all of the style information is placed inside a separate file.

• The browser is told where the style information is by using a `<link>` tag in the `<head>`:

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

• This ensures that a whole site is styled consistently.
Figure 4.11 The American Writers’ Anecdotes page for Henry David Thoreau: the source and the result (inset).
Moving Style to a File

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

- Place the global style specification into a file as a sequence of elements and their property/specification pairs
- Don’t include the `<style>` tags!
- The style file should be plain ASCII text
- The file extension should be .css
- Moving the style out shortens the `<head>` section of the HTML
Figure 4.12  The AWA page for Hemingway showing the <link> in the source code to the external style file AWAstyle.css and the result (inset).
Cascading the Style Sheets

• CSS uses the rule “closest style wins”
• There are 5 levels of styling information:
  1. Default, given by browser settings
  2. External, given in a file
  3. Global, given in the `<head>` section
  4. Range, given in an enclosing tag
  5. Site, given by the style attribute
Cascading the Style Sheets

• Each level is broader and more general than the level below it
• However, there’s a rule: the closest style wins!
• This idea of progressively becoming more site specific is the “cascading” behind Cascading Style Sheet
• It allows general styles to be adopted at various and overridden later
Lists Tags

- The easiest type of list is the unordered list.
- Unordered list tags `<ul>` and `</ul>` surround the items of the list.
- The items are enclosed in list item tags, `<li>` and `</li>`.
Lists Tags

• Another list is the ordered list
• It uses the tags `<ol>` and `</ol>`
• Bullets are replaced with numbers
• The ordered list behaves just like the unnumbered list
Lists Tags

• You can also have a list within a list
• Make a sublist within the main list
• Notice that sublists use a different bullet symbol
Lists Tags

• The definitional list
• Indicated by the `<dl>` and `</dl>` tags
• Definitional lists are made of:
  – Definitional *terms* surrounded by `<dt>` and `</dt>`
  – Definitional *data* surrounded by `<dd>` and `</dd>`
Handling Tables

- A table is a good way to present information.
- It’s like defining a list of lists
  - The main list items, called *rows*, has one or more items, called *cells*
- The browser aligns cells to form columns
Handling Tables

• The table is enclosed in `<table>` and `</table>`
• The table can have a border, if you use the border attribute
• Each row is enclosed in `<tr>` and `</tr>`
• Cells are surrounded by table data tags, `<td>` and `</td>`
<table>
<thead>
<tr>
<th>Country</th>
<th>Capital</th>
<th>Language(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>Ottawa</td>
<td>English/French</td>
</tr>
<tr>
<td>Iceland</td>
<td>Reykjavik</td>
<td>Icelandic</td>
</tr>
<tr>
<td>Norway</td>
<td>Oslo</td>
<td>Norwegian</td>
</tr>
</tbody>
</table>
Handling Tables

• You can give tables captions and column headings:
  
  • Place caption tags within the table tags around the table’s caption
    – caption tags are `<caption>` and `</caption>`
  
• Captions are centered at the top of the table
Handling Tables

• Column headings are the first row of the table
• In the “heading” row, replace the table data tags with table heading tags `<th>` and `</th>`
• Column headings display in bold
Pseudo Classes

• There are properties to change the style of links
• The default is for links to be blue and underlined
• Style the anchor tag:

```
a:link {color: darkviolet; text-decoration: none}
a.me:link {color: gray; text-decoration: none}
a:hover {color: red}
```
Pseudo Classes

• These styles are slightly different from the other tags
• The anchor tag has several different **states** that can be styled separately
• These states are referred to as pseudo classes
• The three main states are link, hover, and visited
Pseudo Classes

• link: the style for an unvisited link
• hover: the style for when the cursor hovers over a link
• visited: the style for links that have been visited
Summary

• Recall the idea of using tags for formatting:
  – A working set of HTML tags, giving you the ability to create a Web page.
  – An explanation of how links are marked with anchor tags.
  – Absolute and relative pathnames. Relative pathnames refer to files deeper or higher in the directory hierarchy.
  – The two most popular image formatting schemes and how to place them in a page.
  – Cascading Style Sheets, a general system for styling Web documents.
  – Lists and tables.
## Summary

Table 4.4  Official W3C Web sites referenced in this chapter

<table>
<thead>
<tr>
<th>Tags</th>
<th><a href="http://www.w3schools.com/tags/default.asp">www.w3schools.com/tags/default.asp</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>Special characters like Ö</td>
<td><a href="http://www.w3schools.com/tags/ref_entities.asp">www.w3schools.com/tags/ref_entities.asp</a></td>
</tr>
<tr>
<td>XHTML validation</td>
<td>validator.w3.org/#validate_by_upload</td>
</tr>
<tr>
<td>Attributes</td>
<td><a href="http://www.w3.org/TR/html4/index/attributes.html">www.w3.org/TR/html4/index/attributes.html</a></td>
</tr>
<tr>
<td>Color names</td>
<td><a href="http://www.w3schools.com/css/css_colornames.asp">www.w3schools.com/css/css_colornames.asp</a></td>
</tr>
<tr>
<td>Properties</td>
<td><a href="http://www.w3.org/TR/CSS2/propidx.html">www.w3.org/TR/CSS2/propidx.html</a></td>
</tr>
</tbody>
</table>